Ministry of Natural Resources

Confirmation Letter

January 18, 2013

Ministry of
Natural Resources
Renewable Energy Operations Team
300 Water Street
4th Floor, South Tower
Peterborough, Ontario K9J 8M5

Ministère des
Richesses naturelles

Ontario

January 18, 2013

Dave Patterson
Saturn Power Inc
100 Mill Street, Unit F
New Hamburg, ON, N3A 2K6

RE: NHA Confirmation for David Brown Solar Park

Dear Dave:

In accordance with the Ministry of the Environment's (MOE's) Renewable Energy Approvals (REA) Regulation (O.Reg.359/09), the Ministry of Natural Resources (MNR) has reviewed the natural heritage assessment and environmental impact study for the David Brown Solar Park in the Township of Township of South Stormont submitted by Saturn Power Inc on January 17, 2013.

In accordance with Section 28(2) and 38(2)(b) of the REA regulation, MNR provides the following confirmations following review of the natural heritage assessment:

1. The MNR confirms that the determination of the existence of natural features and the boundaries of natural features was made using applicable evaluation criteria or procedures established or accepted by MNR.
2. The MNR confirms that the site investigation and records review were conducted using applicable evaluation criteria or procedures established or accepted by MNR, if no natural features were identified.
3. The MNR confirms that the evaluation of the significance or provincial significance of the natural features was conducted using applicable evaluation criteria or procedures established or accepted by MNR.
4. The MNR confirms that the project location is not in a provincial park or conservation reserve.
5. The MNR confirms that the environmental impact study report has been prepared in accordance with procedures established by the MNR.

In accordance with Section 28(3)(c) and 38(2)(c), MNR also offers the following comments in respect of the project.

<u>Post-Construction Monitoring</u>

A commitment has been made in the Environmental Effects Monitoring Plan, part of the Design and Operations Report, to conduct post-construction monitoring and if

determined necessary, implement mitigation measures. For David Brown Solar Park this includes;

i. Amphibian Woodland Breeding Habitat (we2 and wo2)

This confirmation letter is valid for the project as proposed in the natural heritage assessment and environmental impact study, including those sections describing the Environmental Effects Monitoring Plan and Construction Plan Report. Should any changes be made to the proposed project that would alter the NHA, MNR may need to undertake additional review of the NHA.

Where specific commitments have been made by the applicant in the NHA/EIS with respect to project design, construction, rehabilitation, operation, mitigation, or monitoring, MNR expects that these commitments will be considered in MOE's Renewable Energy Approval decision and, if approved, be implemented by the applicant.

In accordance with S.12 (1) of the Renewable Energy Approvals Regulation, this letter must be included as part of your application submitted to the MOE for a Renewable Energy Approval.

Please be aware that your project may be subject to additional legislative approvals as outlined in the Ministry of Natural Resources' *Approvals and Permitting Requirements Document*. These approvals are required prior to the construction of your renewable energy facility.

If you wish to discuss, please contact please contact Jim Beal at jim.beal@ontario.ca or 705-755-3203.

Sincerely,

Sharon Rew
A/Southern Region Planning Manager
Southern Region MNR

cc Jim Beal, Renewable Energy Operations Team, Coordinator, MNR
Ken Durst, District Manager, Kemptville District, MNR
Narren Santos, Environmental Approvals Access & Service Integration Branch, MOE
Zeljko Romic, Environmental Approvals Access & Service Integration Branch, MOE
Shari Muscat, Project Manager, Stantec

Natural Heritage Assessment and Environmental Impact Study

DAVID BROWN SOLAR PROJECT
NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Prepared for:

Saturn Power Inc.
100 Mill Street Unit F
New Hamburg, ON, N3A 2K6

Prepared by:

Stantec Consulting Ltd.
49 Frederick St
Kitchener, ON, N2H 6M7

File No. 161011028
January 2013

Executive Summary

Saturn Power Inc. is proposing to develop, construct and operate the 10 Megawatt (MW) David Brown Solar Park within the Township of South Stormont, United Counties of Stormont, Dundas and Glengarry, Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province.

The property on which the Project is proposed includes approximately 83 acres (33ha) generally bounded by (i) Highway 401 to the north, (ii) a Canadian National Railway corridor to the south, (ii) Dickinson Drive to the east, and (iv) the extension of Farrans Point Road to the west. The proposed Project Location is shown in Figure 1, Appendix A.

The Project consists of a proposed 10 MW Solar Photo Voltaic ("PV") Grid connected system. The basic components of the Project are up to 55,000 solar panels, a racking system, direct current cabling and combiner boxes, ten 1 MW inverter stations, a collector system, access roads, a distribution pole line, temporary construction laydown areas and a transformer substation that facilitates connection to an existing Hydro One Networks Inc. (HONI) distribution line.

This Natural Heritage Assessment and Environmental Impact Study is intended to satisfy the requirements outlined within O.Reg. 359/09 (s. 24 through 28, 37 and 38) and is to be submitted as a component of the Renewable Energy Approval (REA) application. The records review report, site investigation report, evaluation of significance report and Environmental Impact Study (for significant features located in and within 120 m of the Project Location) as required by O.Reg. 359/09 are found within this document.

Background data were collected and reviewed to identify natural features located in and within 120 m of the Project Location. The results of the records review were used to determine whether the Project Location is in a natural feature, within 50 m of an Earth Science Area of Natural and Scientific Interest and within 120 m of other natural features.

Natural features present in and within 120 m of the Project Location, confirmed during the site investigation, and requiring an evaluation of significance (O.Reg. 359/09, s. 27) included: wetlands, woodlands and candidate significant wildlife habitat for amphibian woodland breeding.

Natural heritage information collected from the records review, the site investigation and consultations were analyzed to determine the significance and sensitivity of existing ecological features and functions. The following significant features are located in and within 120 m of the Project Location, requiring an Environmental Impact Study (EIS): significant wetlands, significant woodlands and significant wildlife habitat (amphibian woodland breeding and area-sensitive woodland breeding bird).An EIS is provided for each of these significant natural features. The EIS identifies and assesses any negative environmental effects and proposes

mitigation measures to minimize and mitigate the potential negative impacts associated with the planning, design, construction, and operation of the proposed Project.

Once the identified protective, mitigation and compensation measures are applied to the environmental features discussed above, the construction and operation of the Project is expected to have acceptable net negative effects on the significant features and functions identified through the Natural Heritage Assessment process. An environmental effects monitoring plan that includes a post-construction monitoring program will be developed to confirm the accuracy of predicted effects as well as to monitor the effects to other natural elements.

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1.0 Introduction

1.1 BACKGROUND

Saturn Power Inc. (Saturn) is proposing to develop, construct and operate the 10 Megawatt (MW) David Brown Solar Park within the Township of South Stormont, United Counties of Stormont, Dundas and Glengarry, Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province.

The proposed Project Location includes approximately 33ha generally bounded by (i) Highway 401 to the north, (ii) a Canadian National Railway corridor to the south, (ii) Dickinson Drive to the east, and (iv) the extension of Farrans Point Road to the west.

The Project Location and the area within 120 m of the Project Location represent the study area for the physical field investigations required to complete a Natural Heritage Assessment and Environmental Impact Study (NHA/EIS). The proposed Project Location and the area within 120 m of the proposed Project Location are shown in **Figure 1, Appendix A.**

The Project consists of a proposed 10 MW Solar Photo Voltaic ("PV") Grid connected system. The basic components of the Project are up to 55,000 solar panels, a racking system, direct current cabling and combiner boxes, ten 1 MW inverter stations, a collector system, access roads, a distribution pole line, temporary construction laydown areas and a transformer substation that facilitates connection to an existing Hydro One Networks Inc. (HONI) distribution line.

Saturn retained Stantec Consulting Ltd. (Stantec) to prepare a Renewable Energy Approval (REA) Application, as required 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). According to subsection 4.(3) of O.Reg. 359/09, the Project is classified as a Class 3 Solar Facility and will follow the requirements identified in O.Reg. 359/09 for such a facility.

1.2 REPORT REQUIREMENTS

This Natural Heritage Assessment and Environmental Impact Study is intended to satisfy the requirements outlined within O.Reg. 359/09 (s. 24 through 28, 37 and 38) and is to be submitted as a component of the REA application. The Project Location is not situated within the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan.

A Natural Heritage Assessment is required to determine whether any of the following features exist in and within 120 m of the Project Location:

- Wetlands;

- Coastal wetlands;
- Life Science Areas of Natural and Scientific Interest (ANSIs);
- Earth Science ANSIs (within 50m);
- Valleylands;
- Woodlands;
- Wildlife habitat; and/or
- Provincial parks and conservation reserves.

This report identifies the existence and boundaries of all natural features in and within 120 m of the Project Location based on a review of background records and on-site field investigations. As the Project Location is within 120 m of natural features, this report provides an evaluation of significance for each identified feature based on either an existing Ontario Ministry of Natural Resources (MNR) designation of the feature, or by using evaluation criteria or procedures established or accepted by the MNR.

If the Project Location extends into any of the identified significant features (50 m of a provincially significant Earth Science ANSI, 120 m for all other specified natural features) an Environmental Impact Study is required that identifies and assesses any negative environmental effects and identifies mitigation measures (O.Reg. 359/09, s.38).

The results of the NHA/EIS must be consolidated into a report and submitted to MNR for confirmation. Written confirmation from the MNR, as well as any written comments received from the MNR, must be submitted along with the NHA and EIS to the MOE as part of the REA application.

1.2.1 Guidance Documents

During the preparation of this report, several guidance documents were referenced to ensure compliance with current standards and agency requirements. These documents include:

- Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011c)
- Natural Heritage Reference Manual (MNR, 2010a)
- Ontario Wetland Evaluation System, Southern Manual (MNR, 2002)
- Significant Wildlife Habitat Technical Guide (SWHTG) and Appendices (MNR, 2000); including Significant Wildlife Habitat Decision Support System (MNR, 2000)
- Draft Significant Wildlife Habitat Ecoregion 6E Criterion Schedule (MNR, 2012)[1]
- Bats and Bat Habitats Guidelines for Windpower Projects (MNR, 2011a)
- Birds and Bird Habitats Guidelines for Windpower Projects (MNR, 2011b)

[1] As per direction received from MNR, the Draft Significant Wildlife Habitat Ecoregion 6E Criterion Schedule will be the current standard used in the review of this NHA.

2.0 Records Review

2.1 METHODS

This records review report was prepared in accordance with Section 25 of O.Reg. 359/09.A variety of background documents and sources of information were reviewed during the preparation of this report, including consultation with the public, various agencies and organizations. Sources of background information included, but were not limited to, the following:

Provincial

- Ministry of Natural Resources. Background information request submitted October 25th, 2011. MNR provided background information on natural heritage features for the Project Location in writing on August 19, 2011 and November 21, 2011. Stantec had been in correspondence with MNR ongoing from August 2011 to Present;
- Natural Heritage Information Centre (NHIC) database. 2011. Natural Areas and Species records search. Biodiversity explorer, http:/nhic.mnr.gov.on.ca. OMNR, Peterborough. Accessed 28 September 2011;
- Ontario Ministry of Natural Resources (MNR). 2009. Land Information Ontario (LIO) digital mapping of natural heritage features;
- Ingleside Swamp Wetland Evaluation Record (2005);
- Renewable Energy Atlas (MNR, 2010b) Bat hibernacula mapping; and
- Ontario Parks Planning and Management Information (http://www.ontarioparks.com/english/plan-res.html).

Conservation Authority

- Raisin River Conservation Authority (RRCA). Preliminary Site Assessment and Butternut Health Assessment provided by Brendan Jacobs, Fish and Wildlife Biologist. 24, August 2011; and
- Raisin River Conservation Authority mapping (2011).

Local Municipal Government

- United Counties of Stormont, Dundas and Glengarry Official Plan (UCSDG OP) (2006) and associated schedules.

Other data sources

- Atlas of the Mammals of Ontario (Dobbyn, 1994)
- Ontario Herpetofaunal Atlas internet database (Oldham and Weller, 2000)

- Breeding Bird Atlas (Cadman et al., 2007)
- Important Bird Areas database (Bird Studies Canada and BirdLife International, undated); and
- Ontbirds Archives (various years).

A summary of agencies contacted, information requested and responses received is provided in **Table 2.1, Appendix B.**

The information received from each source and the manner in which it was used to identify natural features, provincial parks or conservation reserves that exist in and within 120 m of the Project Location (50m for Earth Science ANSIs) is detailed below (**Section 2.2**).

2.2 RESULTS

2.2.1 Wetlands

Any wetlands in and within 120 m of the Project Location have been identified through LIO mapping, NHIC database, and wetland evaluation records from MNR. Each wetland as identified by these sources, and its location relation to the Project Location, is shown on **Figure 2, Appendix A**.

2.2.1.1 Provincially Significant Wetlands

No Provincially Significant Wetlands are located in or within 120 m of the Project Location. The Ingleside Swamp Provincially Significant Wetland (PSW) is located to the west, beyond120 m of the Project Location.

2.2.1.2 Unevaluated Wetlands

Three unevaluated wetlands have been identified from LIO mapping as occurring in and within 120 m of the Project Location. These wetlands include a small unevaluated wetland (we1) found in the center of the Project Location associated with a small woodland; a larger, unevaluated wetland (we2) occurring in the western portion of the Project Location associated with larger, contiguous woodlands; a third unevaluated wetland (we3) associated with the large woodland extending south of the Project Location.

2.2.1.3 Coastal Wetlands

Coastal Wetlands are defined as wetlands that are located:

a) on Lake Ontario, Lake Erie, lake Huron, Lake Superior or Lake St. Clair,

b) on the St. Mary's, St. Clair, Detroit, Niagara or St. Lawrence River, or

c) on a tributary to any water body mentioned in clause a) or b) and, either in whole or in part, downstream of a line located 2 km upstream of the 1:100 year floodline (wave run-up included) of the water body. (O. Reg. 359/09).

Based on this definition and the PSW wetland evaluation, the Ingleside Swamp PSW is considered a coastal wetland. This coastal wetland is not located in or within 120 m of the Project Location.

2.2.2 Valleylands

Valleylands are linear natural areas that occur in a valley or other landform depression that have water flowing through or standing for some period of the year (MNR, 2010a; MNR, 2011c).

The identification and evaluation of significant valleylands based on the recommended criteria from MNR (i.e. surface and groundwater functions, landform prominence, ecological features and functions) is typically the responsibility of planning authorities (municipalities) (MNR, 2010b). Under O.Reg. 359/09 proponents engaging in a renewable energy project must identify the presence and boundaries of valleylands that occur within 120 m of the Project Location.

Significant valleylands have not been mapped in the United Counties of Stormont, Dundas and Glengarry Official Plan (UCSDG OP) (2006). Site investigations will determine whether valleylands are found in and within 120 m of the Project Location.

2.2.3 Woodlands

The Project Location is situated in the St. Lawrence Platform geographic province, and the Great Lakes-St. Lawrence (Upper St. Lawrence) Forest Region. In general, forest cover is broadleaved occurring on calcareous soils; shallow, acidic or eroding materials are characterized by coniferous cover (Rowe, 1972). Dominant cover type is composed of sugar maple and American beech, with red maple, yellow birch, American basswood, white ash, largetooth aspen and red and bur oaks; local occurrences include white oak, red ash, grey birch, rock elm, blue-beech and bitternut hickory (*ibid*). Settled landscapes have occurrences of white elm, while river valleys have sporadic occurrences of butternut, eastern cottonwood and slippery elm; poorly-drained depressed areas are characteristically hardwood swamps with black ash dominating (*ibid*).

The Natural Heritage Reference Manual (MNR, 2010b) and the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011c) defines significant woodlands based on a combination of size, shape, proximity to other features (e.g., water), linkages, diversity of vegetation types, and any unique attributes, as well as their economic and social values.

MNR LIO mapping (2010) and aerial photography indicate that the western and southern portion of the Project Location is wooded. Four (4) woodland areas were recorded in and within 120 m of the Project Location. The woodlands included; a small woodland (wo1) in the centre of the

Project Location; a western woodland (wo2) that is contiguous to the larger woodland extending west of the Project Location; a large woodland (wo3) located south of the Project Location,within120 m of the Project Location; a small woodland (wo4) straddling the 120 m area west of Industrial Drive. Communications with MNR (June 2011) indicate that these woodlands are Potential Significant Woodlands.

A preliminary site assessment undertaken by RRCA (2011) noted that woodland feature wo2 (**Figure 2, Appendix A**) located in the western portion of the Project Location is a mixed hardwood forest with a diverse tree community and a number of species of which are considered valuable habitat components for a number of wildlife species (i.e. mast producers). The stand is considered mature, ranging in age between 60 and 90 years, with some trees therein beginning to show old growth characteristics. Vernal pools, though dry during the RRCA survey, were found throughout this woodland, as indicated by perched growth of the trees as well as damp soil. RRCA noted that one of the dominant tree species within this woodland is Black ash, a number of which were measured at 22cm or larger in diameter at breast height (DBH). No specific records review information was available for the woodland to the south or small woodland centrally located in the Project Location.

In summary, 4 woodlands were identified in and within 120 m of the Project Location (**Figure 2, Appendix A**). Site investigations are required to confirm the presence and boundaries of all woodlands in or within 120 m of the Project Location.

2.2.4 Wildlife Habitat

Wildlife habitat is defined as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle and that are important to migratory and non-migratory species. The Draft Significant Wildlife Habitat Ecoregion 6E Criterion Schedule (SWHCS) groups wildlife habitat into four categories:

- Habitats of seasonal concentrations of animals;
- Rare vegetation communities or specialized habitat for wildlife;
- Habitat of species of conservation concern; and,
- Animal movement corridors.

A compilation of background information on known wildlife use in and within 120 m of the Project Location was undertaken. Using this information, a preliminary assessment was conducted to identify wildlife habitat features that may be present in and within 120 m of the Project Location to determine whether the area contains confirmed significant wildlife habitat (SWH) or involves a trigger for candidate SWH.

Aerial photograph interpretation indicates that the Project Location is comprised of woodland, which in some cases is associated with known wetlands, as well as some actively managed agricultural lands and cultural meadow communities. Natural wildlife habitat found in and within

120 m of the Project Location is primarily provided by the woodland/wetland features contiguous with larger such habitats extending west as well as south of the Project Location.

The nearest Important Bird Area (IBA) is the Lac Saint-Francois National Wildlife Area and Bordering Waters, located approximately 55 km from the Project. According to Bird Studies Canada IBA website (online, 2011), this site has recorded over 232 species and 119 breeding species, as well as very large concentrations of breeding and moulting waterfowl, especially in spring when numbers can exceed 10,000. Several nationally-threatened species also breed, albeit in low numbers, at this site. Approximately two-thirds of this IBA is covered by marshlands with scattered ponds and channels.

The Project Location is approximately 2 km north of the Upper Canada Bird Sanctuary. It is established on lands acquired by the St. Lawrence Parks Commission since 1961, and includes wildlife habitats such as mature upland forest, early successional woods, old fields, wetlands and open water. Over 200 species of birds have been recorded there, including many waterfowl and raptors.

Secondary source data were used to determine potential wildlife use in and within 120 m of the Project Location. Inventories of wildlife that have been recorded as occurring within the range of the David Brown Solar Project were compiled from available literature and resources including the Atlas of the Mammals of Ontario (Dobbyn, 1994), the Ontario Herpetofaunal Summary (Oldham and Weller, 2000) and the Ontario Breeding Bird Atlas (Cadman et al., 2007). Based on a review of background information, 191 species of birds (198 when including Upper Canada Migratory Bird Sanctuary bird list), 41 species of mammals, 16 species of amphibians and 9 species of reptiles and one butterfly species are known to occur in and within 120 m of the Project Location (**Appendix F**). It is important to note that the exact location of species occurrences are not available from these atlases and, instead, are recorded within 10 x 10 km squares. The potential for species to be present in and within 120 m of the Project Location will be limited by the habitat suitability and availability supported by the Project Location. Therefore, the identified species recorded from these databases may not occur within the Project Location.

2.2.4.1 Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. The Draft SWH Ecoregion 6E Criterion Schedule (MNR 2012) identifies 16 potential types of seasonal concentration areas:

- Waterfowl stopover and staging areas (terrestrial);
- Waterfowl stopover and staging areas (aquatic);
- Shorebird migratory stopover areas;
- Raptor wintering areas;

- Bat hibernacula;
- Bat maternity colonies;
- Bat migratory stopover areas;
- Turtle wintering areas;
- Snake hibernaculum;
- Colonial bird nesting sites (bank and cliff);
- Colonial bird nesting sites (tree/shrub);
- Colonial bird nesting sites (ground);
- Migratory butterfly stopover areas;
- Landbird Migratory Stopover areas;
- Deer Yarding Areas; and
- Deer winter congregation areas;

The Project is situated in southern Ontario along the St. Lawrence River. A review of background information to assess the potential for seasonal concentration areas associated with this region of Ontario to be supported in and within 120 m of the Project Location is provided in the following sections:

Waterfowl Stopover and Staging Areas (terrestrial and aquatic)

Areas generally considered candidate significant wildlife habitat for waterfowl staging areas are very large wetlands, associated with lakes that generally have a diversity of vegetation communities interspersed with open water (MNR, 2000). Marshes along Great Lakes shorelines are considered particularly valuable.

Though the Project does not lie within 5 km of the any Great Lakes shorelines, it is within 5 km of the St. Lawrence River and approximately 2 km north of the Upper Canada Migratory Bird Sanctuary. Waterfowl and other birds are known to migrate through the area and use preferred habitats for stopovers or breeding.

No known waterfowl stopover and staging areas occur in and within 120 m of the Project Location. Site investigations will determine whether colonial bird nesting sites are found in and within 120 m of the Project Location.

Shorebird Migratory Stopover Areas

Relatively undisturbed shorelines along lakes, rivers, and wetlands that produce abundant food (clams, insects, snails and worms) are used by shorebirds during migration (MNR, 2000). No known shorebird migratory stopover areas are confirmed in and within 120 m of the Project Location.

As the Upper Canada Bird Sanctuary is located within 2km of the Project Location and is known for receiving migratory shorebirds, the Project Location could provide candidate significant wildlife habitat for shorebird migratory birds .

Raptor Wintering Area

Hay fields, pastures and open meadows that support large and productive small mammal populations can provide critical winter feeding areas (MNR, 2000). The best roosting sites are typically found in relatively mature mixed or coniferous woodlands that abut windswept fields, with scattered trees and fence posts providing perches for hunting (MNR, 2000).

Site investigations will determine if this type of seasonal concentration area is supported in and within 120 m of the Project Location.

Bat Hibernacula, Maternity Roosts and Migratory Stopover Areas

Hibernacula

Bats require specific environmental conditions for hibernating. These conditions are provided by features such as caves or abandoned mines (MNR, 2000). Karst topography and areas of exposed bedrock can be indicators of potentially suitable hibernacula habitat for bats. Mapping of known and potential karst within Ontario indicates there is no observed evidence of karst in and within 120 m of the Project Location (Brunton, 2008).No known bat hibernacula have been identified in and within 120 m of the Project Location(Renewable Energy Atlas, 2010b).

Site investigations will determine whether this type of seasonal concentration area is supported in and within 120 m of the Project Location.

Maternity Roosts

Depending on the species, maternity roosts for bats can include tree foliage, tree cavities and crevices under loose bark, or buildings. Within southern Ontario, most bat roosts occur within anthropogenic structures and natural roosts are rare (L. Hale, pers. comm., June 29, 2011).

Candidate significant wildlife habitat for bat maternity roosts may be found in mixed wood or deciduous forests that contain a high density (ten per hectare or more) of large diameter (25 cm diameter at breast height (dbh) or more) snags or cavity trees (MNR 2011c). The best candidate trees or snags for bat maternity roosts within these habitats are considered according to the following criteria (in order of importance): those that are the tallest; have cavities or crevices; have a large dbh; are within the highest density of snags/cavity trees; have a large amount of loose, peeling bark; have a cavity or crevice more than 10 m high; are tree species that provide good cavity habitat (i.e. aspen, maple, ash, oak or white pine), are within an open canopy; and exhibit early stages of decay.

No known maternity roosts occur in and within 120 m of the Project Location. Site investigations will be conducted to determine whether candidate significant wildlife habitat for bat maternity roosts in and within 120 m of the Project Location.

Migratory Stopover Areas

Stopover areas for long distance migrant bats, including Hoary Bat, Eastern Red Bat and Silver-haired Bat, are important during fall migration. Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migrations concentrate these species of bats at stopover areas. The location and characteristics of stopover habitats are generally unknown, although Long Point has been identified as a significant stopover habitat for Silver-haired Bats (MNR, 2012).

Criteria for confirming bat migration corridors and bat movement corridors are not currently defined in the Draft SWH Ecoregion 6E Criterion Schedule meaning that the evaluation and confirmation of significant wildlife habitat is not possible for this category (MNR, 2012). As a result, it is not possible to identify candidate significant wildlife habitat for this group of species during migration.

Turtle Wintering Areas

No known turtle wintering areas occur in and within 120 m of the Project Location. Site investigations will be conducted to determine whether candidate significant wildlife habitat for turtle wintering areas exist in and within 120 m of the Project Location.

Snake Hibernacula

Potential hibernacula are overwintering areas that include features such as animal burrows, rock crevices, fractured rocks at the base of cliffs or karst areas that provide an access for snakes to hibernate below the frost line (MNR, 2000). These areas are often associated with water to prevent desiccation of the species.

The Project is located within the ranges of various common species of snakes (Oldham and Weller, 2000). There are no known reptile hibernacula in and within 120 m of the Project Location. Site investigations will determine whether this type of seasonal concentration area is supported in or within 120 m of the Project Location.

Colonial Bird Nesting Sites (bank, cliff, tree/shrub, and ground)

Colonial bird nesting sites can be located in swamps and along large bodies of water for herons, islands for gulls and cliffs, banks and artificial structures for swallows (MNR, 2000).

Based on background information obtained through LIO mapping NHIC database searches, Ontario Breeding Bird Atlas and Important Bird Area (IBA) reports, the Project Location is approximately 2 km north of the Upper Canada Migratory Bird Sanctuary. Colonial bird species

are listed as known to occur within this sanctuary. Habitat in and within 120 m of the Project Location may be able to support some of these species, though consideration must be given to the fact that the Project lies between a major four-lane highway and is transected by an active railway. Colonial nesting birds, such as herons, likely would prefer the habitat afforded by the Ingleside Swamp adjacent to the Project Location. No banks or similar artificial structures are known to occur in and within 120 m of the Project Location.

Site investigations will determine whether colonial bird nesting sites are found in or within 120 m of the Project Location.

Migratory Butterfly Stopover Areas

During fall migration, monarchs tend to move along the north shore of the Great Lakes (Calvert, 2001). Fields and other open areas with varied habitat types that are found within 5 km of the Lake Erie or Lake Ontario shoreline are considered candidate significant wildlife habitat for migratory butterfly stopover areas (MNR, 2000).

Monarchs can be observed throughout southern Ontario during migration; however these areas do not host the significant thousands that regularly occur at main staging areas. The Project Location is not located along a Great Lakes shoreline and is not considered to be in an area that would serve as a significant butterfly stopover.

Landbird Migratory Stopover Areas

Migratory passerines are known to use forested landscapes along Great Lakes shorelines as stopover sites during spring and fall migration (Ewert et al., 2006; MNR, 2000). Landbirds tend to concentrate at tips of peninsulas, congregating in significant numbers at known significant stopover sites including Point Pelee and Long Point, while raptors and shorebirds concentrate along the Great Lakes during migration.

Areas that provide a diversity of habitat types ranging from open grasslands to large woodlands within 5 km of the Lake Erie or Lake Ontario shorelines are considered potential candidate significant wildlife habitat for migrating landbird stopover areas (MNR, 2000).

The Project Location is not located adjacent to a Great Lakes shoreline and is not situated in or adjacent to other landform features that concentrate birds (ridges or peninsulas). The Project Location is not located in an area that would constitute candidate significant wildlife habitat for a migratory landbird stopover area.

Deer Yarding Areas

Deeryards are areas of key winter habitat for white-tailed deer. They usually consist of a core area of coniferous forest, which provides shelter from snow and wind, adjacent to an area of deciduous forest or other foraging habitat such as agricultural fields. White-tailed deer are known to occur in and within 120 m of the Project Location (Dobbyn, 1994). Based on MNR

(2011) and LIO mapping (2011), data indicates that the boundary of a winter deer yard exists approximately 600 m north of the Project Location.

Deer Winter Congregation Areas

Deer congregation areas have been identified by MNR in winters that are not constrained by snow depths 20cm or greater(Draft SWH Ecoregion 6E Criterion Schedule, MNR 2012). Suitable woodlands for Deer Winter Congregation Areas are usually greater than 100 ha in size, however smaller woodlands may be considered based on MNR assessments (Draft SWH Ecoregion 6E Criterion Schedule, MNR 2012).No features have been identified by MNR as Deer Winter Congregation Areas in or within 120 m of the Project Location.

2.2.4.2 Rare Vegetation Communities or Specialized Habitats

Rare Vegetation Communities

The Draft SWH Ecoregion 6E Criterion Schedule identifies the following features as rare vegetation communities:

- Cliffs and talus slopes;
- Sand barren;
- Alvar;
- Old growth forests;
- Savannah;
- Tallgrass prairie; and
- Other rare vegetation communities listed in Appendix M of the SWHTG

A search of the NHIC database did not identify any records of known rare vegetation communities in or within 120 m of the Project Location. Aerial photo interpretation and a review of available background information also indicate that there are no known rare vegetation communities in or within 120 m of the Project Location (LIO, 2009; NHIC, 2010; Official Plan, 2006). However, communications from RRCA and MNR indicate that some rare plant species may occur within 120 m of the Project Location. These may constitute rare vegetation communities.

Site investigations will determine whether rare vegetation communities occur in or within 120 m of the Project Location.

Specialized Habitats

Specialized habitats are microhabitats that are critical to some wildlife species. The Draft SWH Ecoregion 6E Criterion Schedule identifies the following potential specialized habitats:

- Waterfowl nesting area;

- Bald Eagle and Osprey nesting, foraging, and perching habitat;
- Woodland raptor nesting habitat;
- Turtle nesting habitat;
- Seeps and springs.
- Amphibian breeding habitat (woodland); and
- Amphibian breeding habitat (wetland).

A review of background information to assess the potential for specialized habitats that are associated with southern Ontario and may be supported in and within 120 m of the Project Locationis provided in the following sections.

Waterfowl Nesting Areas

Waterfowl nesting habitat typically includes upland habitat that is located near marshes, ponds or lakes. Sites considered candidate significant wildlife habitat for waterfowl nesting typically contain a high density of small and medium sized ponds, or are single wetlands that are large and diverse (MNR, 2000).

No known waterfowl nesting sites occur in and within 120 m of the Project Location.Site investigations will determine whether this type of seasonal concentration area is supported in and within 120 m of the Project Location.

Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat and Woodland Raptor Nesting Habitat

The SWHTG (MNR, 2000) indicates that some raptors require somewhat specialized habitats. Under the criteria and guidelines outlined in Appendix Q, critical habitat features that would support specialized Bald Eagle and Osprey nesting habitat are identified as waterbodies with fish populations and trees with good visibility and flight lines.

There are no known Osprey or Bald Eagle nests in and within 120 m of the Project Location (LIO, 2009; Cadman et al., 2007). Bald Eagle nests are found primarily along the Great Lakes shorelines in Ontario. Raptor species requiring specialized nesting sites have been recorded through the OBBA and by the Upper Canada Migratory Bird Sanctuary. No such breeding occurrences, however, have been identified through the records review.

Site investigations will determine the presence of candidate significant wildlife habitat for specialized raptor nesting in and within 120 m of the Project Location.

Turtle Nesting Habitat

Sandy or fine gravel soils are a requirement for turtle nesting (MNR, 2000). Areas that would be considered candidate significant wildlife habitat for turtle nesting include areas containing sandy

or fine gravel soils (i.e. shoreline beaches) adjacent to turtle habitat (weedy wetlands, lake or river shorelines).

No known turtle nesting habitat was identified through the records review. The MNR (MNR, 2011) indicated that habitat may be associated with the watercourse transecting the Project Location. Site investigations will determine the presence of candidate turtle nesting habitat in and within 120 m of the Project Location.

Seeps and Springs

Seepage areas and springs provide habitat for numerous uncommon species and may support a high diversity of plant species (MNR, 2000). In winter, these areas provide foraging opportunities for Wild Turkey and White-tailed Deer. Those that occur within forested areas where the canopy maintains cool, shaded conditions are most important. No known seeps or springs are known to occur in and within 120 m of the Project Location. The presence of seeps and springs in and within 120 m of the Project Location will be identified during site investigations.

Amphibian Breeding Habitat (woodland)

Woodland ponds may provide important habitat for local amphibian populations. Ponds that contain a variety of vegetation structures in and around the edge of the pond, are undisturbed and are found adjacent to closed canopy woodlands with dense undergrowth that maintain a damp environment typically provide the best ponds for breeding (MNR, 2000).

The Ontario Herpetofaunal Summary (Oldham and Weller, 2000) indicates the Project Location falls within the range of a number of common amphibian species. Woodlands are present in and within 120 m of the Project Location and may provide amphibian habitat. Site investigations will determine the presence of candidate significant wildlife habitat for amphibian woodland breeding to be present in or within 120 m of the Project Location.

Amphibian Breeding Habitat (wetland)

Wetlands supporting breeding for these amphibian species are extremely important and are fairly rare in southern Ontario landscapes.

Site investigations will determine whether this type of seasonal concentration area is supported in or within 120 m of the Project Location.

2.2.4.3 Habitat for Species of Conservation Concern

Habitat for species of conservation concern includes wildlife species that are listed as Special Concern or rare, that are declining, or are featured species. Habitats of Species Conservation Concern do not include habitats of Endangered or Threatened Species as identified by the Endangered Species Act 2007. Habitats of Species Conservation Concern include:

- Marsh Bird Breeding Habitat;
- Bird Breeding Habitat (woodland area-sensitive, open country, and shrub/early successional);
- Terrestrial Crayfish; and,
- Special Concern and Rare Wildlife Species.

A review of background information to assess the potential for habitat for species of conservation concern that are associated with southern Ontario and may be supported in and within 120 mof the Project Location is provided in the following sections.

Marsh Bird Breeding Habitat

Site investigations will determine whether this type of habitat is supported in or within 120 m of the Project Location.

Bird Breeding Habitat (woodland area-sensitive, open country, and shrub/early successional)

Woodlands of at least 30 ha are considered to have the potential to host populations of woodland area sensitive bird species (MNR 2000). Forest interior habitat for woodland area-sensitive bird species is considered to be habitat that is at least 200m from the forest edge (Draft SWH Ecoregion 6E Criterion Schedule, MNR 2012). Ontario Breeding Bird Atlas information indicates that the 10x10 km atlas squares that encompass the area in and within 120 m of the Project Location contain records of woodland area sensitive breeding birds.

One (1) woodlot (wo2) within 120 m of the Project Location is greater than 30 ha in size, and may support area sensitive forest birds. Site investigations will be conducted in this location to determine whether candidate habitat for area-sensitive woodland species is present in or within 120 m of the Project Location.

Large, contiguous undisturbed grasslands of at least 30 ha are considered likely to support and sustain a diversity of grassland species (MNR, 2000). Open country breeding bird habitat includes natural and cultural fields and meadows not actively farmed in 5 years (Draft SWH Ecoregion 6E Criterion Schedule, MNR 2012). Ontario Breeding Bird Atlas information indicates that the 10x10 km atlas squares that encompass the area in and within 120 m of the Project Location contain records of open country breeding birds.

Natural and cultural grassland areas that support significant habitat for open country breeding bird species may be present in and within 120 m of the Project Location. Site investigations will be conducted to determine whether potential habitat for area-sensitive open country bird species is present in or within 120 m of the Project Location. Actively managed agricultural fields within the Project Location are not considered candidate significant wildlife habitat for grassland breeding bird species. Site investigations will be conducted in this location to

determine whether candidate habitat for open country breeding birds present in or within 120 m of the Project Location.

Shrub thicket habitats greater than 10 ha are most likely to support and sustain a diversity of shrub /early successional bird breeding species (Draft SWH Ecoregion 6E Criterion Schedule, MNR 2012). Site investigations will determine whether shrub/early successional bird breeding habitat is present in or within 120 m of the Project Location.

Terrestrial Crayfish

The range of terrestrial crayfish is limited to southwestern Ontario based on the Draft SWH Ecoregion 6E Criterion Schedule (MNR 2012). The Project Location is out of the population range of terrestrial crayfish.

Special Concern and Rare Wildlife Species

Special Concern and rare wildlife species are those that are listed as special concern and provincially rare (S1-S3, SH) plant and animal species **(Table 2.2, Appendix B)**.NHIC and wildlife atlases were used to identify historic records of special concern and rare wildlife species that occur in and within 120 m of the Project Location. Site investigations will include habitat suitability assessments for each these species, and will be used to determine the potential for candidate significant wildlife habitat for rare species.

2.2.4.4 Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from breeding habitat to summer habitat. Movement corridors must be considered when breeding habitat is confirmed as significant wildlife habitat. Corridors consist of native vegetation, roadless area, no gaps such as fields, waterways or bodies, and undeveloped areas are most significant. Corridors should be at least 200 m wide with gaps less than 20 m and if following riparian area with at least 15m of vegetation on both sides of the waterway.

No known animal movement corridors were identified in and within 120 m of the Project Location. Site investigations will be conducted to assess the suitability of features as potential animal movement corridors.

2.2.4.5 Areas of Natural and Scientific Interest (ANSIs)

MNR identifies two types of ANSIs; Life Science and Earth Science (MNR, 2010b). Life Science ANSIs are significant representative areas of Ontario's biodiversity and natural landscapes, while Earth Science ANSIs are geological in nature and consist of significant representative examples of bedrock, fossils and landforms in Ontario.

Consultation with Kemptville District MNR indicates that no ANSIs fall in and within 120 m of the Project Location; the nearest ANSIs are located over 2 km from the site.

2.2.4.6 Specified Provincial Plan Areas

There were no provincial parks or conservation reserves identified in or within 120 m of the Project Location through the records review (NHIC, 2011; Ontario Parks 2010). The project does not occur in the Oak Ridges Moraine Planning Area or the Greenbelt Planning Area.

2.2.5 Summary

Table 2.1 provides a summary of the natural features that will be carried forward to site investigation.

Table 2.1 Natural Features Carried Forward to Site Investigation

Feature	Carried Forward to Site Investigation (Y/N)	Known Recorded Information
Wetlands	Y	3 unevaluated wetlands (we1, we2, and we3) identified in or within 120 m of the Project
Woodlands	Y	4woodlands (wo1, wo2, wo3, wo4)identified in or within 120 m of the Project Location
Valleylands	Y	No known records
WILDLIFE HABITAT		
Seasonal Concentration Area		
• Waterfowl Stopover and Staging Areas (Terrestrial) • Waterfowl Stopover and Staging Areas (Aquatic)	Y Y	No known records
• Shorebird Migratory Stopover Area	Y	The Upper Canada Bird Sanctuary is located within 2km of the Project Location and is known for receiving migratory shorebirds.
• Raptor Wintering Area	Y	No known records
• Bat Hibernacula	Y	No known records
• Bat Maternity Colonies	Y	No known records
• Bat Migratory Stopover Areas	N	No known records
• Turtle Wintering Area	Y	No known records
• Snake Hibernaculum	Y	No known records
• Colonial bird nesting sites (bank and cliff) • Colonial bird nesting sites (tree/shrub) • Colonial bird nesting sites (ground)	Y	Project Location is approximately 2km north of the Upper Canada Migration Bird Sanctuary.

Table 2.1 Natural Features Carried Forward to Site Investigation

Feature	Carried Forward to Site Investigation (Y/N)	Known Recorded Information
		No known banks or cliffs present in or within 120 mof Project Location.
• Migratory Butterfly Stopover Areas	N	Project Location is not situated along Great Lakes shoreline. No habitat in or within 120 mof Project Location.
• Landbird Migratory Stopover Areas	N	Project Location is not situated along Great Lakes shoreline. No habitat in or within 120 mof Project Location.
• Deer Yarding Areas	N	Deer yarding area located 600m north of Project Location (MNR, 2011 & LIO, 2011).
• Deer Winter Congregation Areas	N	No known records.
Rare Vegetation Communities or Specialized Habitat for Wildlife		
Rare Vegetation Communities		
• Cliffs and talus slopes • Sand barren • Alvar • Old growth forests • Savannah • Tallgrass prairie • Other rare vegetation communities listed in Appendix M of the SWHTG	Y	No known records
Specialized Habitat for Wildlife		
• Waterfowl nesting area	Y	No known records
• Bald Eagle and Osprey nesting, foraging, and perching habitat; • Woodland raptor nesting habitat;	Y	No known records
• Turtle nesting habitat;	Y	No known records
• Seeps and springs.	Y	No known records
• Amphibian breeding habitat (woodland) • Amphibian breeding habitat (wetland)	Y	Woodlands and wetlands present within Project Location
Habitat for Species of Conservation Concern		
• Marsh Bird Breeding Habitat	Y	No known records
• Bird Breeding Habitat (woodland area-sensitive) • Bird Breeding Habitat (open country) • Bird Breeding Habitat (shrub/early successional)	Y	Woodlands >30ha are present within 120 mof the Project Location.

Table 2.1 Natural Features Carried Forward to Site Investigation

Feature	Carried Forward to Site Investigation (Y/N)	Known Recorded Information
• Terrestrial Crayfish	N	The Project Location is out of the population range of terrestrial crayfish.
• Special Concern and Rare Wildlife Species	Y	NHIC, wildlife atlases and PIF indicate rare and special concern species may be present in or within 120 mof Project Location.
Animal Movement Corridors		
• Amphibian Movement	Y	No known records
• Deer Movement Corridors	N	No known records
AREAS OF NATURAL AND SCIENTIFIC INTEREST (ANSI) • Life Science ANSI • Earth Science ANSI	N	None present in and within 50mof the Project Location
SPECIFIED PROVINCIAL PLAN AREAS	N	None present in and within 120 m of the Project Location
PROVINCIAL PARKS AND CONSERVATION RESERVES	N	None present in and within 120 m of the Project Location

3.0 Site Investigation

The site investigations were conducted in accordance with O.Reg. 359/09, s. 26 (1), Natural Heritage Site Investigation. This report is prepared in accordance with s. 26 (3) with guidance provided from the *Natural Heritage Assessment Guide for Renewable Energy Projects* (MNR 2011c).

The site investigations in support of this report were completed with the purpose of confirming the status and boundaries of natural features identified through the records review (see Section 2.3) and identifying any additional features. Data collected during the records review concerning natural features and species occurrences were used to guide the scope of the site investigation. The extent of the site investigation program and type of field surveys included in the program is directly reflective of the extent of natural features and candidate significant wildlife habitat that was identified in and within 120 m of the Project Location through the records review. The Project is sited within a lot primarily used for industrial and agricultural purposes however, a portion of the project is sited within an unevaluated wetland feature and woodland area.

The boundaries of all natural features located within 120 m of the Project Location and the location and type of each natural feature relative to the Project Location is provided in **Figure 2, Appendix A.**A summary of the natural features that will be carried forward to the Site Investigation are detailed in **Table 2.1**.

3.1 METHODS

The site investigations detail the current conditions in and within 120 m of the Project Location, and were based on the information about the Project Location and siting that was current at the time of the respective survey. Survey dates, times, duration, field personnel and weather conditions are presented in **Table 3.1, Appendix B**. All surveys conducted in and within 120 m of the Project Location were completed by qualified personnel. *Curricula vitae* for personnel involved in conducting the site investigations are provided in **Appendix G**.

Land access was available for the entire property where Project components are proposed. Areas within the Project Location were traversed on foot during site investigations. Alternative site investigations, comprised of visual scans from roadsides and/or property boundaries in combination with review and interpretation of aerial photographs, were undertaken in locations within 120 m of the Project Location where access was not available and are discussed further in **Section 3.1.4.**

All site investigations were carried out in accordance with O.Reg. 359/09 and the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011c), using guidance provided in the Significant Wildlife Habitat Technical Guide (MNR, 2000) and the Draft SWH Ecoregion 6E Criterion Schedule (MNR 2012).

3.1.1 Vegetation Community and Vascular Plants Assessment

A botanical inventory and Ecological Land Classification (ELC) of the vegetation communities within the Project Location was conducted on October 12, 2011 and June 5, 2012. Survey times, weather conditions and field personnel are summarized in **Table 3.1, Appendix B**.

Vegetation communities were delineated on aerial photographs and checked in the field. Vascular plant species lists were recorded separately for each community. Community characterizations were then based on the ELC system (Lee et al., 1998). English colloquial names and scientific binominals of plant species generally follow Newmaster et al. (1998). Specific emphasis was placed on searching for plant species of conservation concern and species at risk identified through the records review with historical occurrences in or within 120 m of the Project Location.

Plant species were considered rare if designated provincially as S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable). Species having a high coefficient of conservatism (9 or 10) as designated by Oldham et al.(1995) were also considered species of note.

3.1.2 Woodland Assessment

The limits of all woodlands that occur, or partially occur, within 120 m of the Project Location were delineated through aerial photo interpretation. Information regarding woodland size, ecological function and uncommon characteristics was collected during ELC surveys on October 12, 2011 and June 5, 2012 and through GIS analysis. Treed areas identified during vegetation surveys were compared to the definition of woodlands provided in O.Reg 359/09 (as amended) to delineate the limits of “woodlands”.

In addition to assessing vegetation communities and surveying plant species during the woodland assessment, information relating to the attributes and functions of each woodland occurring within 120 m of the Project Location was collected during field investigations on October 12, 2011. Tree height, estimated stand age, presence of large and mature trees, snags, cavities, stick nests, disturbance and specialized habitat features such as seeps, springs and vernal pools were recorded and detailed if present. Data was recorded using a woodland assessment field form to ensure consistency and completeness of data collection.

3.1.3 Wetland Confirmation and Delineation

Site investigations were undertaken on October 28, 2011 to confirm presence and extent of wetland communities that occurred within 120 m of the Project Location. Wetland communities were identified and delineated using methods outlined by Ontario Wetland Evaluation System (OWES) Southern Manual protocol (MNR, 2002), by an OWES certified surveyor, where property access was available.

A method for Wetland Characteristics and Ecological Functions Assessment (WCEFA) was developed by the Ministry of Natural Resources (MNR) to provide a set of evaluation criteria focused on wetland attributes relevant to the completion of an Environmental Impact Statement (EIS) for renewable energy projects for unevaluated wetlands outside of the Project Location but within 120 m of this defined area. The criteria to be evaluated are presented in Appendix C of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011c). Wetlands identified that occur within the Project Location were subject to evaluation using the OWES (MNR, 2002). The results of these evaluations are presented in in the Evaluation of Significance section of this report.

Survey dates, weather conditions and field personnel are summarized in **Table 3.1, Appendix B**.

3.1.4 Valleylands

Areas in and within 120 m of the Project Location were searched for the presence of characteristics of valleylands as defined within O.Reg. 359/09.

3.1.5 Wildlife and Wildlife Habitat

Site investigations to determine the presence of candidate significant wildlife habitat were conducted on October 12, 2011.

Site investigations focused on determining whether candidate significant wildlife habitats, as identified during the records review, have the potential to occur in or within 120 m of the Project Location. Criteria used to identify candidate significant wildlife habitat were derived from the Significant Wildlife Habitat Technical Guide (MNR, 2000) and the Draft Significant Wildlife Habitat Ecoregion 6E Criteria Schedule (MNR 2012). Specific emphasis was placed on determining whether the critical habitat features required to support significant wildlife habitat were present in natural features in or within 120 m of the Project Location. As noted in Section 2.2.4, the Significant Wildlife Technical Guide groups wildlife habitat into 4 categories as outlined in the following sections.

3.1.5.1 Seasonal Concentration Areas

Seasonal Concentration Areas are areas where wildlife species occur in aggregations at certain times of the year, on an annual basis. Such areas are sometimes highly concentrated with members of a given species, or several species, within relatively small areas. In spring and autumn, migratory wildlife species will concentrate where they can rest and feed. Other wildlife species require habitats where they can survive winter. Seasonal concentration area habitats have been identified by using the habitat criteria found in the Significant Wildlife Habitat Technical Guide (MNR 2000) and the Draft Significant Wildlife Habitat Ecoregion 6E Criteria Schedule (MNR 2012). The habitat criteria for each potential seasonal concentration area, and

methods employed to identify them in and within 120 m of the Project Location, have been summarized in **Table 3.1**.

Table 3.1 Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
Waterfowl Stopover and Staging Area (Terrestrial)	• Fields with sheet water during spring (mid-March to May) or annual spring melt water flooding found in any of the following Community Types: Cultural Meadow (CUM), Cultural Thicket (CUT). • A 100-300m radius buffer around habitat has been considered the candidate SWH. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless used by Tundra Swans in the Long Point, Rondeau, Lk. St. Clair, Grand Bend and Pt. Pelee areas.	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • ELC surveys and GIS analysis of the landscape were used to identify large wetlands or marshes with a diversity of vegetation communities interspersed with cultural meadows that flood each spring (terrestrial staging areas)
Waterfowl Stopover and Staging Area (Aquatic)	• The following Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD). • Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) • The combined area of the ELC ecosites and a 100m radius area is the SWH. • Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify.	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • ELC surveys and GIS analysis of the landscape were used to identify large wetlands or marshes with a diversity of vegetation communities interspersed with open water (aquatic staging areas).
Shorebird Migratory Stopover Area	• Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of amour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. • Sewage treatment ponds and storm water ponds do not qualify as a significant wildlife habitat.	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • The presence of shorebird migratory stopover areas within suitable ELC communities was assessed.

Table 3.1 Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
Raptor Wintering Area	• Presence of fields and woodlands. i.e. at least one of the following Community Types: Deciduous Forest (FOD), Mixed Forest (FOM) or Coniferous Forest (FOC), in addition to one of the following Upland Community Types: Cultural Meadow (CUM), Cultural Thicket (CUT), Savannah (CUS), Woodland (CUW) (<60% cover) that are >20ha and provide roosting, foraging and resting habitats for wintering raptors. • The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering sites need to be > 20 ha with a combination of forest and upland, • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15 ha) with adjacent woodlands. • Upland habitat (CUM, CUT, CUS, CUW), must represent at least 15ha of the 20ha minimum size.	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats.
Bat Hibernacula	• Hibernacula may be found in caves, mine shafts, underground foundations and karsts. • May be found in these Community Types: Crevice (CCR), Cave (CCA).	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • Specialized site investigations were conducted to identify potential bat hibernacula.
Bat Maternity Colonies	• Maternity colonies considered significant wildlife habitat are found in forested ecosites. • Any of the following Community Types: Deciduous Forest (FOD), Mixed Forest (FOM), that have>10/ha wildlife trees >25cm diameter at breast height (dbh). • Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • Specialized site investigations were conducted to identify potential bat maternity colonies • Wooded areas were traversed and the presence and frequency of features that may support maternity colonies of bats were recorded. • Criteria from the OMNR Bat and Bat Habitats- Guidelines for Wind Power Projects were used to identify potential

Table 3.1 Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
	1 or 2. • Northern Myotis prefer contiguous tracts of older forest cover for foraging and roosting in snags and trees • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.	bat maternity roosts in the field.
Turtle Wintering Areas	• Snapping and Midland Painted turtles utilize ELC community classes: Swamp (SW), Marsh (MA) and Open Water (OA). Shallow water (SA), Open Fen (FEO) and Open Bog (BOO). • Northern Map turtle- open water areas such as deeper rivers or streams and lakes can also be used as over-wintering habitat. • For most turtles, wintering areas area in the same general area as their core habitat. • Water has to be deep enough not to freeze and have soft mud substrate. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen.	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • Specialized site investigations were conducted to identify potential turtle wintering areas.
Snake Hibernacula	• Hibernation occurs in sites located below frost lines in burrows, rock crevices, broken and fissured rock and other natural features. • Wetlands such as conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover can be important over-wintering habitat. • Any ecosite in southern Ontario other than very wet ones may provide habitat. The following Community Types may be directly related to snake hibernacula: Talus (TA), Rock Barren (RB), Crevice (CCR), Cave (CCA), and Alvar (RBOA1, RBSA1, RBTA1).	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • Specialized site investigations were conducted to identify potential snake hibernacula. Surveys for snakes and associated hibernacula features were conducted along edges of natural feature communities and hedgerows. • Habitat features that would provide an underground route, act as a potential hibernacula including exposed rock crevices or inactive animal borrows were recorded.

Table 3.1 Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	• Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, or barns found in any of the following Community Types: Cultural Meadow (CUM), Cultural Thicket (CUT), Savannah (SV), Bluff (BL), Cliff (CL). • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • Open habitats near bodies of water were scanned for large cavity trees (>25 cm DBH) and man-made structures (e.g. concrete bridges, buildings, nesting boxes) suitable for and with evidence of previous use by nesting swallows. Hills with exposed substrate, including river banks, were also scanned for holes indicative of a Bank Swallow nesting colony.
Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs)	• Any of the following Community Types: Mixed Swamp (SWM), Deciduous Swamp (SWD), Coniferous Treed Fen (FETC1). • The edge of the colony and a minimum 300m area of habitat or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH. • Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree.	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • Large areas of marsh or swamp habitat with live or an abundance of dead trees in and within 120 m of the Project Location were searched for the presence of large stick nests to assess the presence of colonially-nesting bird species within suitable ELC communities.
Colonial-Nesting Bird Breeding Habitat (Ground)	• Any rocky island or peninsula within a lake or large river, close proximity to watercourses in open fields or pastures with scattered trees or shrubs found in any of the following Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Meadow (ME), Thicket (TH), Savannah (SV). • Nesting colonies of gulls and terns on islands or peninsulas associated with open water or in marshy areas • Brewers Blackbird colonies are found loosely on the ground or in low bushes in close proximity to streams and irrigation	• Vegetation community classifications were utilized to assess features in and within 120 m of the Project Location that would support seasonal concentration habitats. • The presence of colonially-nesting bird species within suitable ELC communities was assessed.

Table 3.1 Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
	ditches within farmlands. • The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH.	

3.1.5.2 Rare Vegetation Communities or Specialized Habitats

Rare vegetation communities often contain rare species, particularly plants and small invertebrates, which depend on such habitats for their survival and cannot readily move to or find alternative habitats. Some wildlife species require large areas of suitable habitat for their long-term survival. Many wildlife species require substantial areas of suitable habitat for successful breeding. Their populations decline when habitat becomes fragmented and reduced in size. Specialized habitat for wildlife is a community or diversity-based category, therefore, the more wildlife species a habitat contains, the more significant the habitat becomes to the planning area. The largest and least fragmented habitats within a planning area will support the most significant populations of wildlife.

Rare Vegetation Communities and Candidate Specialized Wildlife Habitat have been identified by using the habitat criteria found in the Significant Wildlife Habitat Technical Guide (MNR, 2000) and the Draft SWH Ecoregion 6E Criterion Schedule (MNR 2012). The habitat criteria for each potential rare vegetation community and candidate specialized wildlife habitat, and methods employed to identify them in and within 120 m of the Project Location, have been summarized in **Table 3.2**.

Table 3.2 Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Specialized Wildlife Habitat	Criteria	Methods
Cliffs and Talus Slopes	• A Cliff is vertical to near vertical bedrock >3m in height. • A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris • Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT • Most cliff and talus slopes occur along the Niagara Escarpment	• Vegetation community classifications and botanical inventories were used to assess the presence of rare vegetation communities in and within 120 m of the Project Location.

Table 3.2 Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Specialized Wildlife Habitat	Criteria	Methods
Sand Barrens	• Sand barrens typically are exposed sand, generally sparsely vegetated and cause by lack of moisture, periodic fires and erosion. • They have little or no soil and the underlying rock protrudes through the surface. • Usually located within other types of natural habitat such as forest or savannah. • Vegetation can vary from patchy and barren to tree covered but less than 60%. • Any of the following Community Types: SBO1 (Open Sand Barren Ecosite), SBS1 (Shrub Sand Barren Ecosite), SBT1 (Treed Sand Barren Ecosite). • Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always < 60%. • No minimum size for sand barren area. • Sand Barrens support rare species such as provincially Endangered Forked Three-awned Grass and American Badger. By extension, sand barren sites that could support these rare species (close proximity to other populations), historically or currently should be considered for higher priority conservation.	• Vegetation community classifications and botanical inventories were used to assess the presence of rare vegetation communities in and within 120 m of the Project Location.
Alvars	• An 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. • The hydrology of alvars is complex, with alternating periods of inundation and drought. • Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. • Undisturbed alvars can be phyto- and	• Vegetation community classifications and botanical inventories were used to assess the presence of rare vegetation communities in and within 120 m of the Project Location.

Table 3.2 Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Specialized Wildlife Habitat	Criteria	Methods
	zoogeographically diverse, supporting many uncommon or are relict plant and animals species. • Vegetation cover varies from patchy to barren with a less than 60% tree cover. • Any of the following Community Types: ALO1(Open Alvar Rock Barren Ecosite), ALS1 (Alvar Shrub Rock Barren Ecosite), ALT1 (Treed Alvar Rock Barren Ecosite), FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2. • An Alvar site > 0.5 ha in size • Alvar is particularly rare in ecoregion 7E where the only known sites are found in the western islands of Lake Erie	
Old-growth Forest	• Old-growth forests tend to be relatively undisturbed, structurally complex, and contain a wide variety of trees and shrubs in various age classes. These habitats usually support a high diversity of wildlife species. • No minimum size criteria t in any of the following Community Types: FOD (Deciduous Forest), FOM (Mixed Forest), FOC (Coniferous Forest)	• Vegetation community classifications and botanical inventories were used to assess the presence of rare vegetation communities in and within 120 m of the Project Location. • Forests greater than 120 years old and with no historical forestry management was the main criteria when surveying for old-growth forests.
Savannahs	• A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. • Tallgrass Prairie (TGP) and savannah were historically common in the near-shore areas of the Great Lakes. • Any of the following Community Types: TPS1 (Dry-Fresh Tallgrass Mixed Savanna Ecosite), TPS2 (Fresh-Moist Tallgrass Deciduous Savanna Ecosite), TPW1 (Dry-Fresh Black Oak Tallgrass Deciduous Woodland Ecosite), TPW2 (Fresh-Moist Tallgrass Deciduous Woodland Ecosite), CUS2 (Bedrock Cultural Savannah Ecosite). • 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 SWH	• Vegetation community classifications and botanical inventories were used to assess the presence of rare vegetation communities in and within 120 m of the Project Location.

Table 3.2 Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Specialized Wildlife Habitat	Criteria	Methods
Tall-grass Prairies	• A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. • Tallgrass Prairie (TGP) and savannah were historically common in the near-shore areas of the Great Lakes • Any of the following Community Types: TPO1 (Dry Tallgrass Prairie Ecosite), TPO2 (Fresh-Moist Tallgrass Prairie Ecosite). • 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 SWH	• Vegetation community classifications and botanical inventories were used to assess the presence of rare vegetation communities in and within 120 m of the Project Location.
Other Rare Vegetation Communities	• Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps. • Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG • Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH. • ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix Mof the SWHTG. • The OMNR/NHIC will have up to date listing for rare vegetation communities.	• Vegetation community classifications and botanical inventories were used to assess the presence of rare vegetation communities in and within 120 m of the Project Location.
Waterfowl Nesting Area	• All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: • MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4 • Note: includes adjacency to Provincially Significant Wetlands	• The results of vegetation community classifications and GIS analysis of the landscape were used to identify large upland areas of open habitat that occurred adjacent to a large marsh, pond, swamp or swamp thicket communities or clusters of these vegetation communities in and within 120 m of the Project Location.

Table 3.2 Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Specialized Wildlife Habitat	Criteria	Methods
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). • ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	• Searches for stick nests (active or not) as well as a general habitat assessment were conducted during vegetation wildlife habitat assessment surveys in the fall of 2011 and spring 2012.
Woodland Raptor Nesting Habitat	• All natural or conifer plantation woodland/forest stands combined >30ha or with >10 ha of interior habitat. Interior habitat determined with a 200m buffer. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. • May be found in all forested ELC Ecosites. • May also be found in SWC, SWM, SWD and CUP3	• Searches for stick nests (active or not) as well as a general habitat assessment were conducted during vegetation wildlife habitat assessment surveys in the fall of 2011 and spring 2012.
Turtle Nesting Areas	• Exposed mineral soil (sand or gravel) areas adjacent (<100m) cxlviii or within the following ELC Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, BOO1, FEO1 • Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals.	• The results of vegetation community classification and wildlife habitat assessment surveys were used to identify watercourses and any marshy wetlands with open water that occurred in and within 120 m of the Project Location.

Table 3.2 Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Specialized Wildlife Habitat	Criteria	Methods
	• For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	
Seeps and Springs	• Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs. • Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species	• The presence of seeps and springs was recorded during wildlife habitat assessments
Amphibian Breeding Habitat (Woodland)	• All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD • Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians • Presence of a wetland, lake, or pond within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat	• Natural vegetation communities with the potential to support amphibian breeding habitat (woodland) were assessed during vegetation assessment surveys. Each feature was visited, and areas of standing water or areas which showed evidence of holding water through the spring (based on topography and vegetation) were identified. Size of pools, presence and depth of standing water, surrounding vegetation community, emergent and submergent vegetation and canopy cover were recorded.

Table 3.2 Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Specialized Wildlife Habitat	Criteria	Methods
Amphibian Breeding Habitat (Wetland)	• ELC Community Classes SW, MA, FE, BO, OA and SA. • Wetland areas >120 m from woodland habitats. • Wetlands and pools (including vernal pools) >500m^2 (about 25m diameter) supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation.	• Vegetation community classification surveys were used to identify habitat features in and within 120 m of the Project Location including those that may support bullfrogs (i.e., natural open aquatic and marsh habitats greater than 1 ha in size).

3.1.5.3 Species of Conservation Concern

Habitats in and within 120 m of the Project Location were assessed for their suitability to support historic species of conservation concern that are known to occur or have the potential to occur in and within 120 m of the Project Location(**Table 2.2, Appendix B**). Assessments were carried out for the following categories of species of conservation concern:

- Marsh breeding bird habitat;
- Breeding bird habitat (area-sensitive, open country, and shrub/early successional); and
- Special Concern and rare wildlife species.

Site investigations were carried out through a combination of vegetation surveys for plant species of conservation concern, and ELC-based habitat assessments for both plant and wildlife species of conservation concern as described in the Draft SWH Ecoregion 6E Criterion Schedule (MNR 2012). Additional survey information for specific categories is discussed in **Table 3.3**.

Table 3.3 Characteristics Used to Identify Candidate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
Marsh Bird Breeding Habitat	• Nesting occurs in wetlands. 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 at a considerable distance from water. • All wetland habitats with shallow water and emergent aquatic vegetation. • May include any of the following Community Types: Meadow Marsh (MAM), Shallow Aquatic (SA), Open Bog (BOO), Open Fen (FEO), or for Green Heron: SW (Swamp), MA (Marsh) and Meadow (ME) Community Types. • Condition of existing habitat at site.	• Site investigations were conducted to assess the potential for this habitat using ELC to delineate previously unidentified wetland communities within 120 mof the Project Location.
Woodland Area-sensitive Bird Breeding Habitat	• Habitats where interior (>4ha) forest (at least 200m from the forest edge) breeding birds are breeding. • These include any of the following Community Types: Forest (FO), Treed Swamp (SW) that are mature (>60 years old) and >30ha. • Condition of existing habitat at site • Size and location of habitat • Potential for long-term protection of the habitat • Representation of species/habitat within the municipality.	• Vegetation community classification surveys and GIS analysis were used to identify woodlands larger than 30 ha that provided interior habitat (i.e. at least 200 m from the woodland edge) • One woodlot(wo2) within 120 m of the Project Location was>30 ha in size, and is considered to have the potential to host populations of area-sensitive species. Site investigations were conducted to assess the potential for these woodlots to support area-sensitive bird species, through the delineation and verification of forest communities by ELC.

Table 3.3 Characteristics Used to Identify Candidate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
Open Country Bird Breeding Habitat	• Grassland areas > 30ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Type: Meadow (ME). • Condition of existing habitat at site (level of disturbance) is an important consideration. For example, fields with intensive agriculture are not considered candidate habitat. Fields with light grazing are considered candidate habitat) • Size and location of habitat • Potential for long-term protection of the habitat • Representation of species/habitat within the municipality.	• Vegetation community classification surveys and GIS analysis were conducted to assess the potential for contiguous undisturbed grasslands of at least 30 ha in and within 120 m of the Project Location to support area-sensitive bird species.
Shrub/Early Successional Bird Breeding Habitat	• Oldfield areas succeeding to shrub and thicket habitats >10ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Types: Thickets (TH), Savannahs (SV). • Condition of existing habitat at site. • Size and location of habitat. • Potential for long-term protection of the habitat. • Representation of species/habitat within the municipality.	• Site investigations were conducted to identify the presence of shrub/early successional habitat communities greater than 10 ha in size.

Table 3.3 Characteristics Used to Identify Candidate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
S1-S3, Special Concern and SH Species and Communities	• All Species Concern or provincial rare plant and animal species element occurrences within a 1 or 10km grid.	• Site investigations were carried out through a combination of vegetation surveys for plant species of conservation concern, and ELC-based habitat assessments for both plant and wildlife species of conservation concern (including PIF conservation priority bird species) as described in the Draft SWH Ecoregion 6E Criterion Schedule.

3.1.5.4 Animal Movement Corridors

Vegetation communities within 120 m of the Project Location were assessed for their suitability to support animal movement corridors that have the potential to in and within 120 m of the Project Location. Assessments were carried out for the following categories of animal movement corridors:

- Amphibian movement corridors; and
- Deer movement corridors

Site investigations were carried out through a combination of vegetation surveys for ELC-based habitat assessments for animal movement corridors as described in the Draft SWH Ecoregion 6E Criterion Schedule (MNR 2012). Additional survey information for specific categories is discussed in **Table 3.4.**

Table 3.4 Characteristics Used to Identify Animal Movement Corridors

Candidate Specialized Wildlife Habitat	Criteria	Methods
Amphibian Movement Corridors	• Movement corridors between breeding habitat and summer habitat • Movement corridors must be determined when Amphibian breeding habitat is confirmed as significant wildlife habitat	• Review of aerial photography to identify the presence of small linear hedgerows within 120 m of the Project Location that may serve as corridors for amphibian movement. ELC mapping and aerial photography were used to determine is any hedgerows contained sufficient vegetation cover and connectivity to accommodate amphibian and other animal movement.

3.1.6 Alternative Site Investigation Methods

As discussed in Section 3.1, land access was available for the entire land parcel which hosts Project components. Areas within 120 m of the Project Location were traversed on foot during site investigations where land access was available. Alternative site investigations consisted of assessments conducted from roadsides and property boundaries in locations within 120 m of the Project Location where access was not available. These locations consisted primarily of properties where no Project components were proposed, but were within 120 m of the Project Location. Assessments were conducted in combination with the review and analysis of aerial photographs to confirm and delineate the extent of habitat communities in these locations.

3.2 RESULTS

The Site Investigations updated and corrected natural heritage features and potentially occurring features identified through the records review. A summary of these updates and corrections is provided in **Table 3.2, Appendix B**. **Figure 4, Appendix A** shows the boundaries located within 120 m of the Project Location of natural features (location and type).

The Project Location has been sited primarily in vegetation communities that have recently or historically been subject to human disturbance, including agriculture, cultural savannah and cultural meadow. A natural feature consisting of an unevaluated wetland(we1) and a woodland (wo2), occurs within the Project Location. Natural habitat features within 120 m of the Project Location include deciduous forest, deciduous swamp, cultural woodland and shallow marsh communities.

3.2.1 Vegetation Communities and Vascular Plants Assessment

Vegetation communities identified using the Ecological Land Classification System (Lee et. Al. 1998), occurring in, and within 120 m of the Project Location, as identified by field investigations are described in **Table 3.3, Appendix B**and are shown on **Figure 3, Appendix A**.

Field notes for the site investigation are provided in **Appendix D**.

In and within 120 m of the Project Location, 91 species of vascular plants were recorded. Of that number, 58 species (68%) were native and 33 species (32%) were exotic. Of the native species observed, 98% are ranked S5 (common and secure in Ontario), and 2% are ranked S4 (apparently secure in Ontario).

A complete list of vascular plant species recorded in and within 120 m of the Project Location is provided in **Appendix E**.

3.2.2 Wetlands

3.2.2.1 Provincially Significant Wetlands

No provincially significant wetlands were identified during field investigations. No corrections are required to the records review (**Table 3.2, Appendix B**). No evaluation of significance is required.

3.2.2.2 Unevaluated Wetlands

Three (3) unevaluated wetlands (in Features we1, we2 and we3) were identified during the records review within 120 m of the Project Location. These features were confirmed to occur in the noted area and refinements to their boundaries was completed using OWES Methodology (MNR, 2002). A Cattail Mineral Shallow Marsh unit that was contiguous to we2 was added to this wetland area and therefore the boundaries of the wetland refined and delineated. A small upland portion of vegetation community FOD6-1 was not included within the we2 boundary based on the criteria outlined in the OWES protocol. Vegetation within this portion of FOD6-1 was characteristic of an upland community dominated by sugar maple with a weakly developed organic soil layer that did not exhibit signs of mottling or gleying. Wetland we1 boundaries were corrected and refined using OWES wetland delineation procedures. Wetland we3 boundaries were also corrected and refined where the wetland occurred within 120 m of the Project Location. Beyond 120 m of the Project Location, the boundary was corrected based on land use changes (i.e. clearing and grading activities) observed from the Property Location. As such, corrections/additions to the records review are required(**Table 3.2, Appendix B**). An evaluation of significance for wetland we1, we2 and we3 is also required (**Section 4.1.1**).Details of the wetland features are provided in **Table 3.4, Appendix B and Figure 4, Appendix A.**

3.2.3 Woodlands

Results from the records review identified a total of four(4) woodlands (wo1 to wo4, **Figure 2, Appendix A**) within 120 m of the Project Location and sections of these woodlands within the Project Location (LIO, 2011). Site investigations confirmed the presence of three of the four woodlands within 120 m of the Project Location and confirmed that one woodland(wo1) is in the Project Location. No woodlot was observed at the site of woodland wo4 identified during the records review. One additional woodland was found to the east of the Project Location during field investigations and referred to as woodland wo5. Details for this feature are provided on **Table 3.4, Appendix B**.

Corrections/additions are required to the records review as a result of the site investigation (**Table 3.2, Appendix B**). An evaluation of significance is required for woodlands wo1, wo2, wo3, and wo5. (**Section 4.2.2**).

3.2.4 Valleylands

A valleyland is defined as a natural area that is south and east of the Canadian Shield and occurs in a valley or other landform depression that has water flowing through or standing for some period of the year (MNR 2010a). Section 8.3 of the Natural Heritage Reference Manual (MNR 2010a) was used to guide the identification of valleylands in and within 120 m of the Project Location. Site investigations confirmed that the topography of the Project Location is generally flat and that no valley features were present.

No corrections were required to the results of the record review as a result of the site investigation (**Table 3.2, Appendix B**). No evaluation of significance is required.

3.2.5 Wildlife and Wildlife Habitat

Over the course of the site investigations (ELC surveys, amphibian and breeding bird surveys), observations were made of 5 amphibians and35 species of birds in and within 120 m of the Project Location. A list of these wildlife species is provided in **Appendix F**.

Results of the site investigations for wildlife habitat are summarized in the following sections. The results are considered within the context of criteria for significant wildlife habitat as outlined within the Significant Wildlife Habitat Technical Guide (MNR, 2000) in order to determine whether natural communities within 120 m of the Project Location support candidate or confirmed significant wildlife habitat. Features associated with candidate significant wildlife are identified in the following sections, and illustrated in **Figure 4, Appendix A**.

3.2.5.1 Seasonal Concentration Areas of Animals

Site investigations involved a thorough assessment of natural areas for seasonal concentration areas for wildlife habitat. Potential habitat for seasonal concentration areas was examined during the site investigation phase, and is discussed in **Table 3.5**.

Table 3.5 Summary of Site Investigation Results for Seasonal Concentration Areas

Candidate Seasonal Concentration Areas	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
Waterfowl Stopover and Staging Areas (Terrestrial)	No	Cultural thickets and meadows with significant spring melt water flooding was absent within 120 m of the project location.	No
Waterfowl Stopover and Staging Areas (Aquatic)	No	Areas generally considered candidate significant wildlife habitat for waterfowl staging areas are very large wetlands, associated with lakes that generally have a diversity of vegetation communities interspersed with open water (SWHTG, 2000). Marshes along Great Lakes shorelines are considered particularly valuable (SWHTG, 2000). No open aquatic areas were identified in or within 120 m of the Project Location during site investigations. The habitat components required to support candidate significant wildlife habitat for waterfowl stopover and staging areas did not occur in or within 120 m of the Project Location	No
Shorebird Migratory Stopover Area	No	Relatively undisturbed shorelines along lakes, rivers, and wetlands that produce abundant food (clams, insects, snails and worms) are used by shorebirds during migration (MNR, 2000). No known shorebird migratory stopover areas are confirmed in or within 120 m of the Project Location. Site investigations determined that shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats were absent in and within 120 m of the Project Location. .	No
Raptor Wintering Area	No	The best roosting sites are typically found in relatively mature mixed or coniferous woodlands that abut windswept fields, with scattered trees and fence posts providing perches for hunting (MNR, 2000). Although the woodland may provide roosting habitat, the area of suitable grassland habitat to	No

Table 3.5 Summary of Site Investigation Results for Seasonal Concentration Areas

Candidate Seasonal Concentration Areas	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
		provide critical feeding areas (CUM, CUS or CUT communities) totals 9.73 ha which is less than >15 ha. Similarly, the area with 120 m of the Project Location supports minimal preferred hunting habitat.	
Bat Hibernacula	No	There are no caves, abandoned mine shafts, underground foundations, and Karsts or crevice/cave communities within 120 m of the project location.	No
Bat Maternity Colonies	No	No snags or trees capable of supporting bat maternity roosts were found in FOD7-2 or FOD6-1 in numbers greater than 10 per hectare in or within 120 m of the Project location. During site investigations, no potential bat maternity sites were identified. Additional supporting characteristics (e.g. the tallest, open canopy, appropriate tree species, clusters of snags) were lacking within these features and thus not considered candidate bat maternity roosts.	No
Turtle Wintering Area	No	For most turtles, wintering areas are the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrate. Overwintering sites are permanent waterbodies, large wetlands, and bogs or fens with adequate dissolved oxygen. A cattail mineral shallow marsh (MAS2-1) and two green ash mineral deciduous swamps were located in and within 120 m of the project location but did not contain water deep enough not to freeze. No turtles were observed during site investigations.	No
Snake Hibernaculum	No	Snake hibernacula features such as buried concrete or rock (e.g. building foundations, culverts, rock crevices or abandoned animal burrows were absent in and within 120 m of the Project Location.	No

Table 3.5 Summary of Site Investigation Results for Seasonal Concentration Areas

Candidate Seasonal Concentration Areas	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
Colonial bird nesting sites (bank and cliff)	No	Results of the vegetation community surveys determined that there no eroding banks, sandy hills, borrow pits, steep slopes and sand piles present in and within 120 m of the Project Location.	No
Colonial bird nesting sites (tree/shrub)	No	The results of the site investigation did not find any heronries, swallow, or other colonial birds nesting within 120 m of the Project Location. Woodlands containing deciduous treed swamp inclusions are present within 120 m of the project location; however, none of these sites had nests to demonstrate this habitat is used by colonial-nesting birds.	No
Colonial bird nesting sites (ground)	No	There are no lakes or large rivers providing shoreline habitat or containing rocky island or peninsula features within 120 m of the project location.	No

3.2.5.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Site investigation results pertaining to rare vegetation communities and specialized habitats in and within 120 m of the Project Location are summarized in Table 3.6. Rare vegetation community types or specialized habitats for wildlife that did not have any candidate significant wildlife habitat will not be carried forward to the evaluation of significance phase.

Table 3.6 Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community/Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
Cliffs and Talus Slopes	No	Rare vegetation communities (cliffs and talus slopes) were not observed during vegetation surveys and woodland assessment of all woodlands within 120 m of the Project Location.	No
Sand Barrens	No	Rare vegetation communities (sand barrens) were not observed during vegetation surveys and woodland assessment of all woodlands within 120 m of the Project Location.	No

Table 3.6 Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community/Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
Alvars	No	Rare vegetation communities (alvars) were not observed during vegetation surveys and woodland assessment of all woodlands within 120 m of the Project Location.	No
Old-growth Forest	No	Rare vegetation communities (old growth forest) were not observed during vegetation surveys and woodland assessment of all woodlands within 120 m of the Project Location. ELC surveys and woodland assessments of all woodlands within 120 m of the Project Location did not contain suitable habitat to old-growth forests. No candidate significant wildlife habitat was present in or within 120 m of the Project Location for old-growth forests.	No
Savannahs	No	Rare vegetation communities (savannahs) were not observed during vegetation surveys and woodland assessment of all woodlands within 120 m of the Project Location.	No
Tall-grass Prairies	No	Rare vegetation communities (tall-grass prairie) were not observed during vegetation surveys and woodland assessment of all woodlands within 120 m of the Project Location.	No
Other Rare Vegetation Communities	No	No other rare vegetation communities were observed during vegetation surveys within 120 m of the Project Location.	No
Waterfowl Nesting Area	No	Site investigations indicated that wetlands within 120 m of the Project Location were comprised primarily of deciduous swamps, lacking large cavity trees suitable for cavity nesting waterfowl (e.g., Wood Duck), and a mineral marsh community. A MAS2-1 community is contiguous to the FOD and SWD that could provide nesting area,	No

Table 3.6 Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community/Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
		however, this community lacks open water to be suitable habitat.	
Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat	No	ELC and habitat assessments of all woodlands and vegetated watercourses within 120 m of the Project Location did not detect any specialized nesting habitat for Osprey and Bald Eagle. No candidate significant wildlife habitat was present within 120 m of the Project Location for bald eagle and osprey nesting, foraging and perching habitat.	No
Woodland Raptor Nesting Habitat	No	ELC and habitat assessments of all woodlands and vegetated watercourses within 120 m of the Project Location did not detect any specialized nesting habitat for woodland raptors (e.g. no natural or conifer plantation woodland/forest stands >30ha). No candidate significant wildlife habitat was present within 120 m of the Project Location for woodland raptor nesting habitat.	No
Turtle Nesting Areas	Yes	ELC and habitat assessment surveys undertaken in all woodlands, wetland and watercourses in and within 120 m of the Project Location did not locate any exposed mineral soil (sand or gravel) or contain suitable habitat to support turtle nesting habitat. Site investigations identified potential turtle nesting habitat in the intermittent watercourse on the property. However, this watercourse was removed and realigned in 2012 and its current riparian zone no longer provides appropriate nesting substrate.	No
Seeps and Springs	No	• ELC and woodland habitat assessment surveys of all woodlands within 120 m of the Project Location did not contain seeps or springs.	No

Table 3.6 Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community/Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
		No candidate significant wildlife habitat was present in or within 120 m of the Project Location for seeps or springs.	
Amphibian Breeding Habitat (Woodland)	Yes	During site investigations to identify potential amphibian woodland breeding ponds in the fall of 2011, areas of standing water or areas which showed evidence of holding water through the spring (based on topography and vegetation) were assessed. Size of pools, presence and depth of standing water, surrounding vegetation community, emergent and submergent vegetation and canopy cover were recorded. Descriptions of these features are found on Table 3.6, Appendix B.	Yes
Amphibian Breeding Habitat (Wetland)	No	No wetland habitat >120 m from woodlands was identified during Site Investigations.	No

3.2.5.3 Species of Conservation Concern

Site investigation results pertaining to habitats for species of conservation concern within 120 m of the Project Location are summarized in **Table 3.7**. Species of wildlife concern that did not have any candidate significant wildlife habitat will not be carried forward to the evaluation of significance phase.

Table 3.7 Summary of Site Investigation Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120 m of Project Location	Rationale	Carried Forward to EOS (Y/N)
Marsh Bird Breeding Habitat	Yes	Site investigations confirmed that a meadow marsh community was located in we2. As such, candidate significant wildlife habitat for marsh bird breeding is present within 120 m of the Project Location.	Yes
Woodland Area-sensitive Bird Breeding Habitat	Yes	Site investigations confirmed that woodland Habitats with interior forest (at least 200m from the forest edge >4ha) were present within the Project Location (wo3). As such,	Yes

Table 3.7 Summary of Site Investigation Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120 m of Project Location	Rationale	Carried Forward to EOS (Y/N)
		candidate significant wildlife habitat for area-sensitive woodland species was present in or within 120 m of the Project Location.	
Open Country Bird Breeding Habitat	No	Site investigations confirmed that grassland habitat exceeding 30 ha was absent within 120 m of the Project Location. As such, no candidate significant wildlife habitat for area-sensitive grassland species was present in or within 120 m of the Project Location.	No
Shrub/Early Successional Bird Breeding Habitat	No	Site investigations confirmed that shrub/early successional habitat exceeding 10 ha was absent within 120 m of the Project Location. As such, no candidate significant wildlife habitat for area-sensitive shrub/successional bird species was present in or within 120 m of the Project Location.	No
Special Concern and Rare Wildlife Species	No	NHIC, wildlife atlases and PIF indicate rare and special concern species may be present in or within 120 m of Project Location.	Yes

3.2.5.4 Animal Movement Corridors

As indicated in the SWHTG (MNR, 2000), it is seldom possible to observe wildlife species using corridors. ELC site investigations, mapping and aerial photography were used to identify the presence of hedgerows that may contain sufficient vegetation cover and connectivity to accommodate animal movement. No hedgerow communities, such as riparian hedgerows (e.g. HR or RIP/HR) were mapped as part of the ELC vegetation surveys (**Figure 3, Appendix A**), no deer wintering habitat are identified by MNR within 120 m of the Project Location that would constitute deer movement corridors and no candidate amphibian breeding habitat (wetlands) were identified.

No corrections were required to the results of the records review as a result of the site investigations (**Table 3.2, Appendix B**). No evaluation of significance for animal movement corridors (amphibian and deer) is required.

3.3 SITE INVESTIGATION RESULTS SUMMARY

Table 3.8 provides a summary of the natural features that will be carried forward to the evaluation of significance.

Table 3.8 Natural Features Carried Forward to Evaluation of Significance

Feature	Carried Forward to Site Investigation (Y/N)	Carried Forward to Evaluation of Significance (Y/N)	Features to be Evaluated
WETLANDS	Y	Y	3 unevaluated wetlands(we1-we3) identified in or within 120 m of the Project
WOODLANDS	Y	Y	4woodlands(wo1, wo2, wo3,wo5) identified in or within 120 m of the Project Location
VALLEYLANDS	Y	N	None present in and within120 m of the Project Location.
WILDLIFE HABITAT			
Seasonal Concentration Area			
• Waterfowl Stopover and Staging Areas (Terrestrial) • Waterfowl Stopover and Staging Areas (Aquatic)	Y	N	None present in and within 120 m of the Project Location.
• Shorebird Migratory Stopover Area	Y	N	None present in and within 120 m of the Project Location.
• Raptor Wintering Area	Y	N	None present in and within 120 m of the Project Location.
• Bat Hibernacula	Y	N	None present in and within 120 m of the Project Location.
• Bat Maternity Colonies	Y	N	None present in and within 120 m of the Project Location.
• Bat Migratory Stopover Areas	N	N	None present in and within 120 m of the Project Location.
• Turtle Wintering Area	Y	N	None present in and within 120 m of the Project Location.

Table 3.8 Natural Features Carried Forward to Evaluation of Significance

Feature	Carried Forward to Site Investigation (Y/N)	Carried Forward to Evaluation of Significance (Y/N)	Features to be Evaluated
• Snake Hibernaculum	Y	N	None present in and within 120 m of the Project Location.
• Colonial bird nesting sites (bank and cliff) • Colonial bird nesting sites (tree/shrub) • Colonial bird nesting sites (ground)	Y	N	None present in and within 120 m of the Project Location.
• Migratory Butterfly Stopover Areas	N	N	Project Location is not situated along Great Lakes shoreline. No habitat in or within 120 mof Project Location.
• Landbird Migratory Stopover Areas	N	N	Project Location is not situated along Great Lakes shoreline. No habitat in or within 120 m of Project Location.
• Deer Yarding Areas	N	N	Deer yarding area located 600m north of Project Location (MNR, 2011 & LIO, 2011).
• Deer Winter Congregation Areas	N	N	None present in and within 120 m of the Project Location.
Rare Vegetation Communities or Specialized Habitat for Wildlife			
Rare Vegetation Communities			
• Cliffs and talus slopes • Sand barren • Alvar • Old growth forests • Savannah • Tallgrass prairie • Other rare vegetation communities listed in Appendix M of the SWHTG	Y	N	Rare vegetation communities were not observed during vegetation surveys and woodland assessment in or within 120 mof the Project Location.
Specialized Habitat for Wildlife			
• Waterfowl nesting area	Y	N	None present in and within 120 m of the Project

Table 3.8 Natural Features Carried Forward to Evaluation of Significance

Feature	Carried Forward to Site Investigation (Y/N)	Carried Forward to Evaluation of Significance (Y/N)	Features to be Evaluated
			Location.
• Bald Eagle and Osprey nesting, foraging, and perching habitat; • Woodland raptor nesting habitat;	Y	N	None present in and within 120 m of the Project Location.
• Turtle nesting habitat;	Y	N	None present in and within 120 m of the Project Location.
• Seeps and springs.	Y	N	None present in and within 120 m of the Project Location.
• Amphibian breeding habitat (woodland)	Y	Y	wo1, wo2, wo3
• Amphibian breeding habitat (wetland)	Y	N	None present in and within 120 m of the Project Location.
Habitat for Species of Conservation Concern			
• Marsh Bird Breeding Habitat	Y	Y	we2
• Bird Breeding Habitat (woodland area-sensitive) • Bird Breeding Habitat (open country) • Bird Breeding Habitat (shrub/early successional)	Y Y Y	Y N N	wo3
• Terrestrial Crayfish	N	N	None present in and within 120 m of the Project Location.
• Special Concern and Rare Wildlife Species	Y	Y	NHIC and wildlife atlases indicate rare and special concern species may be present in or within 120 m of the Project Location.
Animal Movement Corridors			
• Amphibian Movement	Y	N	None present in and within 120 m of the Project Location.
• Deer Movement Corridors	N	N	None present in and within 120 m of the Project Location.

Table 3.8 Natural Features Carried Forward to Evaluation of Significance

Feature	Carried Forward to Site Investigation (Y/N)	Carried Forward to Evaluation of Significance (Y/N)	Features to be Evaluated
AREAS OF NATURAL AND SCIENTIFIC INTEREST (ANSI) • Life Science ANSI • Earth Science ANSI	N	N	None present in and within 120 m of the Project Location
SPECIFIED PROVINCIAL PLAN AREAS	N	N	None present in and within 120 m of the Project Location
PROVINCIAL PARKS AND CONSERVATION RESERVES	N	N	None present in and within 120 m of the Project Location

3.4 QUALIFICATIONS

Personnel responsible for conducting the site investigation are listed in **Appendix G**. Where available, curricula vitae are provided in **Appendix G**.

4.0 Evaluation of Significance

Natural heritage information collected from the records review, the site investigation and consultations were analyzed to determine the significance and sensitivity of existing natural heritage features and their ecological functions. For all natural features existing in and within 120 m of the Project Location, a determination was made of whether the natural feature is provincially significant, significant, not provincially significant or not significant.

Natural features present in and within 120 m of the Project Location requiring an Evaluation of Significance are identified in **Table 3.8**.

4.1 METHODOLOGY

Wetlands, Life Science ANSIs and Earth Science ANSIs were determined to be provincially significant if they had been identified as such by MNR. This information was obtained from NHIC and through correspondence with the local MNR District. Locally significant wetlands are those that have been evaluated but did not receive sufficient points to be considered provincially significant. Wetlands that have yet to be examined are termed unevaluated and were assessed during the site investigations using evaluation criteria or procedures established or accepted by MNR.

Valleylands, wildlife habitat and woodlands were considered to be significant if MNR has identified them as such or when evaluated as significant using procedures established by MNR.

Sources used in the evaluation of significance for the natural features in and within 120 m of the Project Location included:

- Ontario Wetland Evaluation System (MNR, 2002);
- Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011); and
- Significant Wildlife Habitat Technical Guide (MNR, 2000).

Provincial designations for Special Concern species were obtained from the most recent Committee on the Status of Species at Risk in Ontario (COSSARO) assessments. Federally, designations for endangered, threatened and special concern species were obtained from the most recent Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessments and the schedules of the *Species at Risk Act* (SARA) were used to determine species protection.

Within the context of O.Reg. 359/09, endangered and threatened species are addressed as part of MNR's *Approval and Permitting Requirements Document for Renewable Energy Projects* (APRD) requirements and are therefore not included as part of this NHA. Information required with regards to endangered and threatened species is being submitted to MNR under separate

cover. Where this information indicates that approvals or permits are required, these will be addressed separately through the applicable statute and its permitting process.

atural Features are shown on **Figures 4 and 5,Appendix A**. Specific methods used in the evaluation of significance for each type of natural feature are detailed in the following sections.

4.1.1 Wetlands

A method for Wetland Characteristics and Ecological Functions Assessment (WCEFA) was developed by the Ministry of Natural Resources (MNR) to provide a set of evaluation criteria focused on wetland attributes relevant to the completion of an Environmental Impact Statement (EIS) for renewable energy projects. The criteria to be evaluated are presented in Appendix C of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011c).

Wetlands that occur within 120 m of the Project Location, but not in the Project Location, will be assessed using on-site field investigations and the WCEFA to determine the potential impacts created by construction of solar farms, their access roads and associated infrastructure (project components). Where the aforementioned wetland communities extend beyond 120 m of the Project Location, they will be included in the assessment to ensure accurate documentation of the features and functions. Only wetland communities contiguous with those in and within 120 m of the Project Location will be assessed. Wetlands occurring in the Project Location will be assessed using the Ontario Wetland Evaluation System (OWES) (MNR, 2002).

Data were collected through desktop procedures (e.g. aerial photograph interpretation) and on-site field investigations conducted from the Property Location. The criteria and procedures found within Appendix C of the Draft *Natural heritage Assessment Guide for Renewable Energy Projects* (MNR, 2011c) are based on sections of the OWES – Southern Edition (MNR, 2002). Although this procedure does not evaluate the significance of these wetlands, it provides a procedure by which the significance of these wetlands can be assumed and their functions assessed based on the criteria established within the OWES manual. Specifically, these criteria were addressed in the following manner:

Biological Component

Wetland Size*:* This determination is based on the overall size of the contiguous wetland, including areas that are within but extend beyond 120 m of the Project Location. Data is based on field surveys and/or aerial photo interpretation. (OWES Section 1.3)

Wetland Type*:* The dominant wetland type in the contiguous unit is listed. Data is based on field surveys and/or aerial photo interpretation. (OWES Section 1.1.2)

Site Type*:* The wetland site type is stated. Data is based on field surveys and/or aerial photo interpretation. (OWES Section 1.1.3)

Vegetation Communities*:* Each vegetation community in the contiguous unit is listed, based on the requirements of OWES. Data is based on field surveys where possible. (OWES Section 1.2.2)

Proximity to Other Wetlands*:* The approximate distance to the next closest wetland is provided. Data is based on field surveys and/or aerial photo interpretation. (OWES Section 1.2.4)

Interspersion*:* An estimate of the total number of interspersion points is provided, with consideration given to the scale of the map and complexity of the wetland type delineations. The interspersion number is provided in the Table. Data is based on field surveys and/or aerial photo interpretation. (OWES Section 1.2.5)

Open Water Types*:* The open water type number (page 52 of the OWES manual) is listed in the Table; data is based on field surveys and/or aerial photo interpretation. (OWES Section 1.2.6)

Hydrological Component

Flood Attenuation*:* The general proximity of the wetland within the local watershed is stated, indicating if it is headwater, mid-reach, or river-mouth. An estimate of the catchment area is also provided, either based on Digital Elevation Mapping, or topographic map interpretation.

Water Quality Improvement (Short Term):

- *Watershed Improvement Factor* (WIF) – this is based on presence/absence of specific site types (i.e. riverine, lacustrine wetlands at lake inflow or outflow; or palustrine wetlands with inflow isolated wetlands, or palustrine wetlands with no inflow or lacustrine wetlands on lake shoreline. The data was derived from field surveys where possible [OWES Section 3.2.1.1].

- *Adjacent and Watershed Land Use* (LUF) – estimated percent of land use and land use type (i.e. agricultural, urban or forested) is included for the catchment. The data was derived from field surveys where possible [OWES Section 3.2.1.2].

- *Pollutant Uptake Factor* (PUT) – this is based on the single *most* dominant vegetation form observed within the wetland community (data derived from field surveys where possible [OWES Section 3.2.1.3]), described as:

    - high proportion of emergent, submergent, and/or floating vegetation.
    - a high proportion of live trees, shrubs, herbs, or mosses.
    - a high proportion of wetland with little or no vegetation.

Water Quality Improvement (Long Term Nutrient Trap): Wetlands with a retentive capacity for nutrients (e.g., those with organic soils) provide protection for recharging groundwater. A

characterization of wetland type and soil conditions is provided. Data is based on field surveys where possible, or soil series mapping (OWES Section 3.2.2):

- *Water Quality Improvement (Groundwater Discharge):* OWES establishes eight wetland features that provide evidence of discharge, where the evaluator must make observations on as many of the features as possible (OWES Section 3.2.3). Where available, data indicative of groundwater discharge was provided.

- *Shoreline Erosion Control:* Shoreline wetlands provide a measure of protection from shoreline erosion caused by flowing water or waves. A description of the dominant shoreline vegetation was provided based on field surveys and/or aerial photo interpretation (OWES Section 3.4):

- *Groundwater Recharge (Site Type):* Site type was included based on field surveys where possible (OWES Section 3.5.1):

- *Groundwater Recharge (Soils):* Soil type was indicated for each wetland unit, based on county soil mapping. (OWES Section 3.5.2)

The information for the above noted evaluation criteria is provided in **Table 4.1, Appendix B**.

Wetlands that occur within the Project Location (we1) will not be assessed using the WCEFA but rather assessed to determine their potential for complexing with other wetlands and subject to an OWES evaluation if necessary.

4.1.2 Woodlands

Guidance provided in Section 6.2.2 of the *Natural Heritage Assessment Guide for Renewable Energy Projects* (MNR, 2011c) was used to evaluate woodlands. As described in **Section 3.2.3**,4 woodlands(wo1, wo2, wo3, wo5) were located in and within 120 m of the Project Location, and required an evaluation of significance.

4.1.3 Wildlife and Wildlife Habitat

4.1.3.1 Seasonal Concentration Areas

There are no features supporting candidate SWH for seasonal concentration areas in and within 120 m of the Project Location.

4.1.3.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

There are no rare vegetation communities in and within 120 m of the Project Location. The criteria and methods used to evaluate the significance of candidate significant wildlife habitat for specialized habitat for wildlife in and within 120 m of the Project Location are presented in **Table 4.1 and Table 4.3 (Appendix B).**

Table 4.1 Criteria and Methods Used to Evaluate Rare Vegetation Communities or Specialized Habitat for Wildlife		
Candidate Seasonal Concentration Area	**Criteria**	**Methods**
Amphibian breeding habitat (woodland)	• Presence of breeding population of 1 or more of the listed salamander species (i.e., Eastern Newt, Blue-spotted Salamander or Spotted Salamander) or 2 or more of the listed frog species (i.e., Gray Treefrog, Spring Peeper, Western Chorus Frog or Wood Frog) with at least 20 individuals (adults, juveniles, eggs/larval masses). • The habitat is the woodland (ELC polygons) and wetland (ELC polygons) combined. A travel corridor connecting the woodland and wetland polygons is to be included in the habitat.	• Conducted egg mass surveys to determine breeding/larval stages onApril 5, 2012 when amphibians are concentrated around suitable breeding habitat within or near the woodland. • Surveys were undertaken to confirm breeding during spring (Apr to June) when amphibians are migrating, calling and breeding within the wetland habitats. • Evaluation Methods followed the Marsh Monitoring protocol (BSC, 2003). • Counts were conducted between one half hour after sunset and midnight under appropriate weather conditions. This protocol involved the surveyor standing at each station and listening for 3 minutes, recording amphibians if they were heard calling within 100 m. Any species heard calling outside of the station (>100 m) were also recorded accordingly.

4.1.3.3 Habitat for Species of Conservation Concern

The criteria and methods used to evaluate the significance of candidate significant wildlife habitat for species of conservation concern for wildlife in and within 120 m of the Project Location are presented in **Table 4.2 and Table 4.4 and 4.5 (Appendix B)**.

Table 4.2 Criteria and Methods Used to Evaluate Habitat for Species of Conservation Concern		
Candidate Habitat for Species of Conservation Concern	**Criteria**	**Methods**
Marsh Breeding Bird Habitat	• 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 (American Bittern, Virginia Rail, Sora, Common Moorhen, American Coot, Pied-billed Grebe, Marsh Wren, Sedge Wren, Common Loon, Green Heron, Trumpeter Swan) • Any wetland with breeding of 1 or more Trumpeter Swans, Black Terns or Yellow Rail is SWH	• The results of the site investigation indicated one (1) candidate significant wildlife habitat occurred in or within the Project Location (we2) • Two rounds of surveys for breeding birds were conducted. The first was conducted on June 5 and the second round June 18. • Surveys were comprised of point counts and were augmented by area searches. Surveys began at, or within, half an hour of sunrise and were completed by 10:00

Table 4.2 Criteria and Methods Used to Evaluate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
		a.m. Area searches were conducted to identify as many breeding bird species as possible that were utilizing the habitat. • All species observed were recorded along with which habitat type(s) the species was observed in as well as the level of breeding evidence detected. • Evaluation methods followed "Bird and Bird Habitats: Guidelines for Wind Power Projects"
Bird Breeding Habitat (woodland area-sensitive)	• Presence of nesting or breeding pairs of 3 or more of the listed wildlife species (i.e., 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). • Any site with breeding Cerulean Warblers or Canada Warbler is to be considered SWH.	• Two rounds of surveys for breeding birds were conducted. The first was conducted on June 5 and the second round June 18. • Surveys were comprised of point counts and were augmented by area searches. Surveys began at, or within, half an hour of sunrise and were completed by 10:00 a.m. Area searches were conducted to identify as many breeding bird species as possible that were utilizing the habitat. • All species observed were recorded along with which habitat type(s) the species was observed in as well as the level of breeding evidence detected. • Evaluation methods followed "Bird and Bird Habitats: Guidelines for Wind Power Projects"
Special Concern and Rare Wildlife Species	• Presence of any of the potential rare plant species.	• Conducted botanical inventories in candidate SWH

4.1.3.4 Animal Movement Corridors

There are no features supporting candidate significant wildlife habitat for animal movement corridors in and within 120 m of the Project Location.

4.2 RESULTS

Results of the evaluation of significance for wetlands and woodlands are shown in **Figure 5, Appendix A** and outlined in **Tables 4.1** and **4.2, Appendix B**. The locations of individual features relative to area in and within 120 m of the Project Location are shown in **Figures 5,**

Appendix A. The following sections summarize the results of the evaluation of significance for natural in and within 120 m of the Project Location.

4.2.1 Wetlands

No wetlands assessed by MNR as provincially significant or locally significant occurred in or within 120 m of the Project Location. Three unevaluated wetlands (we1-we3) were identified in and within 120 m of the Project Location.

Unevaluated wetlands (we2 and we3) are within 120 m of the Project Location (but not within the Project Location).These communities were evaluated using the *Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects* described in **Section 4.1.1**. The results of the evaluation are on **Table 4.1, Appendix B**. Under the WCEFA procedure, these wetlands are considered to be of provincial significance for the purposes of the NHA and project siting.

As Project components are proposed inwe1, this unevaluated wetland is subject to a full OWES evaluation as described in **Section 4.1.1**. The proponent is required to determine if the natural heritage feature is significant. Wetlands can be evaluated by the MNR or by other qualified professionals provided that they use OWES and have received the MNR OWES training and that the evaluation is reviewed and approved by the MNR.

One unevaluated wetland was identified in the Project Location and referred to as wetland we1. The significance of this wetland feature not previously evaluated by MNR was assessed using the Southern Ontario Wetland Evaluation System (OWES) by a OWES qualified biologist. OWES evaluations consider Biological, Social, Hydrological and Special Features of the wetlands. A total score of 600 or more, or 200 or more in the Biological or Special Features component are required for a wetland to be considered provincially significant.

The wetland feature we1was considered for complexing within the existing Ingleside PSW Wetland Complex or other wetlands. Complexing with the existing Ingleside PSW or other wetland units was considered because the wetland unit within the Project Location is in near proximity to other wetland features; however, the Ingleside PSW wetland is greater than 750 m from the on-site wetland unit, andis 900m from the on-site wetland.

There are generally three rules for delineating a wetland complex as noted in OWES (MNR, 2002). They include the following:

1. Wetlands must not be complexed across watersheds, except in rare circumstances;

2. The maximum distance between units of a complex must not exceed 750 m; and

3. Lacustrine wetland at the mouth of streams, occurring within 750 m distance, may be combined as units within the same watershed.

The wetland unit occurring at the Project Location is within the same watershed and although not within 750 m of a PSW, is near wetlands and as such warrants further assessment concerning the potential for complexing. OWES guidance under Wetland Size, states that in general, individual wetlands <2ha will not be evaluated. However, as stated in the OWES, wetlands with an area <2 ha in size may be included as part of a wetland complex when the small wetland parcel(s) provides important ecological benefits and documentation exists which provides the reason for inclusion. This documentation is to be included in the Evaluation in a brief statement of rationale. In addition, rationale is required for any wetland community <0.5 ha within a contiguous wetland or a single community that is part of a complex.

The small wetland unit (we1) on site is a single unit of 1.23 ha (<2 ha) in size. The boundary of the unit delineated using the OWES system by a qualified assessor is shown on **Figure 3 and 4, Appendix A**. Generally, this unit will not be considered for complexing based on size however the following offers an assessment of the potential for complexing.

A statement of rationale would be required in order to include the on-site unit in an OWES evaluation or the unit within an existing PSW or complex. In order to assess the potential for complexing (adding) this wetland community to the other wetland parcels, the OWES guidance has been adopted that indicates that smaller wetland units considered for complexing should "provide important ecological benefits" (pg. 18, OWES, MNR 2002). Such benefits may include, but are not limited to, "a grassy area used by spawning pike; an area containing a community or specimen of a rare or unusual plant species; a seep area in which a regionally or provincially significant plant species is found; or wetland which strengthens a corridor link between larger wetlands of natural areas". In addition to this guidance, this evaluation goes beyond these criteria and considers a broader range of criteria often used by MNR Districts in the assessment of complexing The criteria for this complexing assessment included: wetland rarity, significant species and communities, provision of wildlife functions (i.e. the capacity of the wetland to support important wildlife breeding), hydrological functions and linkage to other natural features.

The small wetland (we1)(i.e.<2.0 ha) occurring within the Project Location, in this site-specific case, was tested against the above noted criteria to assess the potential applicability of complexing this unit with the nearby wetland features, as detailed in the following commentary.

Rarity, Significant Species and Communities

The wetlands found on site are a treed swamp, green ash community that is not rare in the site district. The swamp wetlands are also well represented in the area. The floristic inventory completed in the wetland units indicate that the wetland does not sustain significant species/communities (i.e. rare or uncommon species/communities at the regional or provincial/national level based on species lists provided in the Wetland Evaluation Manual). In addition, the wetland parcel is a not kettle wetland that may be considered uncommon. In summary, there are no rare or significant species or communities on site that would warrant complexing.

Provision of Wildlife Function

All wetlands are understood at some level to provide a wildlife function resulting from their fundamental characteristic associated with permanent or seasonal water regimes that offer a media for rapid flora and fauna growth and trophic interaction. In the context of this understanding, the wetland unit on site does not exhibit characteristics or habitats that offer a unique or important wildlife function on the landscape. As noted in the Site Investigations portion of the NHA, the wetland unit does not provide sufficient habitat for (avian fauna) waterfowl, shorebirds or (amphibian) woodland breeding habitat. Potential amphibian breeding pools were observed within vegetation community SWD2-2. However, breeding evidence was not indicated in any of these ponds through call count surveys and salamander egg mass count surveys. Call count surveys occurred from April, May and June and the salamander egg mass count survey occurred in April. The size, depth of the pool and limited period of wetness precludes this area from offering an important and productive amphibian breeding environment.

The wetlands on site are also noted not to have habitat characteristics conducive to waterfowl stopovers/staging, or summer feeding areas restricted by the lack of surface and open water. In summary, the wetland units on site do not exhibit important wildlife benefits that would warrant their consideration in a complexing exercise.

Hydrological Function

The wetland appears seasonally wet/moist and moves toward dryer conditions in a relatively short time as observed during field visits. The wetland is observed to be isolated and is not contributing to base flow of a watercourse system. A details site investigation confirmed that there are no surface connections or other hydrological connection to other wetlands in the local area. In summary, the hydrological function of the wetland unit is not linked to attributes that provide rationale for consideration in complexing.

Linkage to Other Natural Features

The location of the wetland unit on the landscape suggests that it is not directly tied to the Ingleside Wetland feature. The natural heritage linkages and corridor evident from a review of aerial photography, topographic mapping, and in-field observations of the local area, indicate that the wetland unit on site would not be considered part of a corridor system. In addition, given its location on the landscape, it does not provide linkage as an ‘intervening’ wetland between larger wetlands or other wetlands in the local or greater area. In summary, the wetland does not occur as a corridor system and does not provide linkage to other features.

Based on a review of the above noted criteria, the small wetland unit we1does not exhibit “important ecological benefits” as stated in OWES (MNR, 2002) and does not meet the additional criteria offered for consideration in the above assessment needed to rationalize and warrant complexing.

In summary, the wetland unit does not warrant complexing with other wetlands and is generally not of a sufficient size (<2 ha) to be considered for individual evaluation under the Ontario Wetland Evaluation System.

Nonetheless, in the absence of complexing with other wetland features in the area, and in compliance with the REA process, the wetland unit was evaluated using OWES (MNR, 2002) to assess and confirm its score and status. A Southern Ontario Wetland Evaluation data and scoring record (including the interspersion map) for the wetland is included in **Appendix D**. The scoring record indicates that the Biological component scores 61.5; Social component (21); Hydrological component (206.5); and Special Features component (3), for a total of 292. The small size, location relative to other features, lack of important ecological function and extensive disturbance on this property limited the overall score of the wetland evaluation. Based on the evaluation, we1 was not considered to be Provincially Significant.

4.2.2 Woodlands

Criteria for woodland significance were applied to each of the woodland features located in and within 120 m of the Project Location. Results of the evaluation are provided in **Table 4.2, Appendix B**. Woodlands wo2 and wo3 met the criteria for significance based on criteria standards within the *Natural Heritage Assessment Guide for Renewable Energy Projects* (MNR 2011c).

The Project Location is located within a portion of wo2. The 2 significant woodlands located within 120 m of the Project Location are shown on **Figure 5, Appendix A**. Significant woodlands in and within 120 m of the Project Location will be included in the EIS.

4.2.3 Wildlife and Wildlife Habitat

4.2.3.1 Seasonal Concentration Areas of Animals

There are no features supporting candidate SWH for seasonal concentration areas in and within 120 m of the Project Location.

4.2.3.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Evaluations of significance for candidate SWH for rare vegetation communities or specialized habitat for wildlife in and within 120 m of the Project Location are presented in **Table 4.3 and Table 4.3 (Appendix B)**.

Table 4.3 Summary of Evaluation of Significance Results for Rare Vegetation Communities or Specialized Habitat for Wildlife

Candidate Rare Vegetation Communities or Specialized Habitat for Wildlife	Present in and within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
Amphibian breeding habitat	Yes	wo2, we2 and wo3 are considered	Yes

Table 4.3 Summary of Evaluation of Significance Results for Rare Vegetation Communities or Specialized Habitat for Wildlife

Candidate Rare Vegetation Communities or Specialized Habitat for Wildlife	Present in and within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
(woodland)		significant wildlife habitat for amphibian woodland breeding.	

4.2.3.3 Habitat for Species of Conservation Concern

Evaluations of significance for candidate SWH for rare vegetation communities or specialized habitat for wildlife in and within 120 m of the Project Location are presented in **Table 4.4**.

Table 4.4 Summary of Evaluation of Significance Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in and within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
Marsh Breeding Bird Habitat	No	None of the listed species was identified during field investigations. The presence of4 or more of the listed species are required to confirm SWH.	No
Bird Breeding Habitat (woodland area-sensitive)	Yes	wo3 is treated as significant for the purposes of this report and considered to be Generalized Habitat based on Appendix D of the SWHTG.	Yes (as Generalized Habitat)
Special Concern and Rare Wildlife Species	No	None of the rare or special concern plant species that had the potential to occur in habitats in and within 120 m of the Project Location were recorded during inventories. All of the native plant species recorded in and within 120 m of the Project Location are ranked S5 (secure in Ontario) or S4 (apparently secure in Ontario). A complete list of vascular plant species recorded in and within 120 m of the Project Location are included in Appendix E. As a result, natural vegetation communities in and within 120 m of the Project Location that were recorded during inventories should not be considered significant wildlife habitat for rare plant species.	No

4.3 SUMMARY

This Natural Heritage Assessment was undertaken to identify natural features found in and within 120 m of the Project Location and evaluate their significance. This report has been prepared in accordance with O.Reg. 359/09 and the MNR's Approval and Permitting Requirements Document for Renewable Energy Projects (September 2009).

Based on an evaluation of significance, significant natural features identified in and within 120 m of the Project Location are presented in **Table 4.5**.

Table 4.5 Natural Features Carried Forward to Environmental Impact Study

Feature	Carried Forward to Site Investigation (Y/N)	Carried Forward to Evaluation of Significance (Y/N)	Carried Forward to Environmental Impact Study (Y/N)	Significant Natural Features
WETLANDS	Y	Y	Y	we2 and we3
WOODLANDS	Y	Y	Y	wo2, wo3
VALLEYLANDS	N	N	N	
WILDLIFE HABITAT				
Seasonal Concentration Area				
• Waterfowl Stopover and Staging Areas (Terrestrial) • Waterfowl Stopover and Staging Areas (Aquatic)	Y	N	N	
• Shorebird Migratory Stopover Area	Y	N	N	
• Raptor Wintering Area	Y	N	N	
• Bat Hibernacula	Y	N	N	
• Bat Maternity Colonies	Y	N	N	
• Bat Migratory Stopover Areas	N	N	N	
• Turtle Wintering Area	Y	N	N	
• Snake Hibernaculum	Y	N	N	
• Colonial bird nesting sites (bank and cliff) • Colonial bird nesting sites (tree/shrub) • Colonial bird nesting sites (ground)	Y	N	N	
• Migratory Butterfly	N	N	N	

Table 4.5 Natural Features Carried Forward to Environmental Impact Study

Feature	Carried Forward to Site Investigation (Y/N)	Carried Forward to Evaluation of Significance (Y/N)	Carried Forward to Environmental Impact Study (Y/N)	Significant Natural Features
Stopover Areas				
• Landbird Migratory Stopover Areas	N	N	N	
• Deer Yarding Areas	N	N	N	
• Deer Winter Congregation Areas	N	N	N	
Rare Vegetation Communities or Specialized Habitat for Wildlife				
Rare Vegetation Communities				
• Cliffs and talus slopes • Sand barren • Alvar • Old growth forests • Savannah • Tallgrass prairie • Other rare vegetation communities listed in Appendix M of the SWHTG	Y	N	N	
Specialized Habitat for Wildlife				
• Waterfowl nesting area	Y	N	N	
• Bald Eagle and Osprey nesting, foraging, and perching habitat; • Woodland raptor nesting habitat;	Y	N	N	
• Turtle nesting habitat;	Y	N	N	
• Seeps and springs.	Y	N	N	
• Amphibian breeding habitat (woodland) • Amphibian breeding habitat (wetland)	Y	Y	Y	wo2 and wo3
Habitat for Species of Conservation Concern				
• Marsh Bird Breeding Habitat	Y	Y	N	
• Bird Breeding Habitat (woodland area-sensitive) • Bird Breeding Habitat	Y	Y	Y	wo3 (as Generalized Habitat)

Table 4.5 Natural Features Carried Forward to Environmental Impact Study

Feature	Carried Forward to Site Investigation (Y/N)	Carried Forward to Evaluation of Significance (Y/N)	Carried Forward to Environmental Impact Study (Y/N)	Significant Natural Features
(open country) • Bird Breeding Habitat (shrub/early successional)				
• Terrestrial Crayfish	Y	N	N	
• Special Concern and Rare Wildlife Species	Y	N	N	
Animal Movement Corridors				
• Amphibian Movement	Y	N	N	
• Deer Movement Corridors	N	N	N	
AREAS OF NATURAL AND SCIENTIFIC INTEREST (ANSI) • Life Science ANSI • Earth Science ANSI	N	N	N	
SPECIFIED PROVINCIAL PLAN AREAS	N	N	N	
PROVINCIAL PARKS AND CONSERVATION RESERVES	N	N	N	

The locations of these features are presented in Figure 6, Appendix A.

An Environmental Impact Study Report will be prepared to identify and assess any negative environmental effects and develop mitigation measures to avoid adverse effects on the following features:

- Wetlands (we2 and we3)
- Woodlands (wo2 and wo3)
- Amphibian Woodland Breeding Habitat (wo2, we2, we3)
- Generalized Significant Wildlife Habitat (wo3 – Woodland Area Sensitive Bird Breeding Habitat)

4.4 QUALIFICATIONS

The evaluation of significance was conducted from May 2012 to August 2012. The following Stantec personnel were responsible for the application of evaluation criteria and procedures:

- Shari Muscat, Environmental Planner and Natural Heritage Coordinator
- Josh Mansell, Terrestrial Ecologist (ELC, woodland and habitat assessments, wetland evaluation, breeding birds, wetland boundary delineation)

Curricula vitae are provided in **Appendix G**.

5.0 Environmental Impact Study

The construction, installation or expansion of a renewable energy generation facility is not permitted within a provincially significant southern wetland, provincially significant coastal wetland, or a provincial park or conservation reserve (unless otherwise permitted under the Provincial Parks and Conservation Reserves Act, 2006) (O. Reg. 359/08, s. 37).

Such facilities may be permitted within the following areas subject to the completion of an EIS (O. Reg. 359/09, s. (38(1)):

- provincially significant northern wetland;
- provincially significant life science ANSI;
- significant valleyland;
- significant woodland;
- significant wildlife habitat;
- within 120 m of the above natural features, provincially significant southern wetland, provincially significant coastal wetland, provincial park or conservation reserve;
- provincially significant earth science area of natural and scientific interest (ANSI); or
- within 50m of a provincially significant earth science ANSI (O.Reg. 359/09, s. (38(1)).

In accordance with O.Reg. 359/08, s. 37, no part of the David Brown Solar Project is sited within a provincially significant southern or coastal wetland. The David Brown Solar Project Location is sited:

- within 120 m of significant wetlands;
- in and within 120 m of significant woodlands;
- in and within 120 m of significant wildlife habitat components

As such, an EIS is required to assess potential negative environmental effects and identify mitigation measures designed to prevent or minimize potential negative effects.

5.1 DESCRIPTION OF THE PROJECT

The Project Location generally consists of the following:

Long-Term Land Use Components (For duration of operation, i.e. 20 years)

- Up to 55,000 solar panels and racking system
- Approximately 2585 m of access roads

- Transformer Substation: approximately 18.5m x 6.2m
- Ten 1 MW inverter stations: approximately 9.3m x 3.2m
- Approximately 299m of Distribution line
- Perimeter fence

Temporary Land Use Components (required only for construction of the Project, i.e. less than one year duration)

- Construction lay down area

5.2 LAND USE OF PROJECT LOCATION

The Project Location consists of a mix of naturalized habitat, recently abandoned agriculture and industrial-use lands. The naturalized communities are found on the western and southern portions of the Project Location and consist of deciduous swamp, meadow marsh and cultural woodland communities.

Some natural habitat removal is required for the current solar array arrangement and equipment layout (**Figure 6, Appendix A**). The total amount of significant woodland vegetation to be removed for the duration of project operation (i.e., long term removal areas) is 0.83 ha located at the western edge of the Project Location.

5.3 EIS OVERVIEW

Significant natural features found in and within 120 m of the Project Location are shown on **Figure 5, Appendix A**.

Based on the evaluation of significance, the following natural features have been identified as significant natural features in and within 120 m of the David Brown Solar Project Location, for which an environmental impact study is required:

- Wetlands (we2 and we3)
- Woodlands (wo2 and wo3)
- Amphibian Woodland Breeding Habitat (wo2, we2, we3)
- Generalized Significant Wildlife Habitat (wo3 - Woodland Area Sensitive Bird Breeding Habitat)

The following sections provide a detailed description of the potential negative environmental effects of the David Brown Solar Project, identify appropriate mitigation measures and describe how the environmental effects monitoring plan and construction plan will address any negative environmental effects (O. Reg. 359/09, s. 38(2)(a)). Distances for any project component within 120 m of a significant natural feature are provided.

The Natural Heritage Reference Manual (2010), the Significant Wildlife Habitat Technical Guide (MNR, 2000), the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011c) and the SWHTG Decision Support System (SWHTGDSS) in addition to relevant scientific literature and knowledge were used to assist in the evaluation of impacts and mitigation measures.

5.3.1 General Mitigation Measures

The following best management practices and other measures intended to minimize or mitigate potential adverse impacts on adjacent significant natural features will be implemented, where required and reasonable, during the construction and operation of the various turbines, access roads and collector lines.

5.3.1.1 Vegetation Removal

Natural features where habitat will be removed include woodlands habitat. Where vegetation removal is proposed the following mitigation measures will be employed:

- As appropriate and prior to construction the limits of vegetation clearing will be staked in the field. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed. Regular monitoring of the limits of clearing will be employed to ensure the objective of minimal disturbance. Should monitoring reveal that clearing occurred beyond defined limits, mitigation action will be taken that could include rehabilitation of the disturbed area to pre-disturbance conditions at the direction of a qualified ecologist (with enhancement of any disturbed areas).

- To the extent practical, tree and/or brush clearing will be completed prior to or after the core nesting season for migratory birds (May 1 to July 31). Should clearing be required during the breeding bird season, prior to construction, surveys will be undertaken to identify the presence/absence of nesting birds or breeding habitat. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer width will range from 5- 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.

- Prior to the start of construction activity, the topsoil/seedbank will be stripped and preserved; material will be reapplied in suitable rehabilitation areas post construction.

- All disturbed areas of the construction site will be re-vegetated as soon as conditions allow.

- Additional mitigation for the removal of natural habitat is provided in Section 5.5 with mitigation measures specific to the removal of the woodland feature found in Sections 5.5.2.

5.3.1.2 Sediment and Erosion Control Measures

In order to minimize erosion potential and the introduction of sediment into the natural features during grading and construction activities, erosion and sediment (E&S) control measures will be implemented prior to the initiation of any construction.

Erosion susceptibility in this area is relatively low. Due to the flat topography of the area there are no steep or elongated slopes that would accelerate runoff during a storm event. As such, the risk of erosion and resulting sedimentation within downstream natural features is limited, although not absent. Erosion and sediment controls will be installed during construction to minimize potential impacts.

The proximity and sensitivity of adjacent natural features increases the risk of sedimentation resulting from the detachment of soil materials within a construction area. As such, all natural features identified within 30 m of any proposed construction area are at higher risk of sediment transfer and erosion from grading and topsoil removal.

E&S control measures will be in installed to minimize erosion impacts adjacent to natural features, as appropriate. The following measures/guidelines will be implemented, as required, during the construction of the David Brown Solar Project components:

- Sediment control measures, which may include perimeter silt fencing, mud mats (access roads) and check dams (rock or strawbales);
- Silt barriers (e.g., fencing) will be erected along wetland and woodland community edges located within 30 m of construction areas (including staging areas and laydown areas) to minimize potential sediment transport to the natural features. These barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation; and
- Where the installation of an equalizing culvert is proposed appropriate erosion control measures (i.e. rip rap, strawbales, seeding) will be installed at the ends of each culvert to prevent erosion.

Specific E&S control measures will be selected, located and sized by an engineer during the detailed design stage to ensure proper functioning of these measures. All E&S controls will be installed prior to construction and will be maintained during and following construction to ensure their effectiveness at protecting the adjacent natural features.

5.3.1.3 Vegetation Management Plan

A vegetation management plan related to the ground cover beneath the solar panels will be developed. While the species of vegetation to be established under the panels has not yet been selected, the ground cover beneath the panels should require only minimal maintenance and would assist in preventing the invasion of non-native grassland species. Depending on the

species selected, the vegetation management plan may include mowing of the site for aesthetic purposes and to ensure vegetation does not grow tall enough to shade the solar panels. It is expected that mowing would occur infrequently, as a fast-growing, tall species is unlikely to be selected as a ground cover. The vegetation management plan will be confined to the perimeter fence within the Project Location for the duration of the Project (**Figure 6, Appendix A**).

5.4 WETLANDS

No significant wetlands occurred in the Project Location.

Three wetland features were identified as occurring in and within 120 m of the Project Location. Wetland features include unevaluated wetlands (we1, we2, we3).

Wetland features we2 and we3 were considered significant for the purposes of this report (refer to the Evaluation of Significance; Section 4.2.1) and require an EIS to identify and assess potential impacts and recommend appropriate mitigation measures and follow-up monitoring. These wetlands are shown in **Figures 4 and 5, Appendix A**.

Components of the Project located within 120 m of each significant wetland feature are detailed below.

There is no direct loss of significant wetland proposed associated with the proposed project.

Feature Number	Project Component(s) located in Natural Features	Total Amount of Habitat Removal Required	Project Component(s) located within 120 m (approximate closest point in parenthesis)
we2	None	None	Solar panel and racking system, fence, access road and inverter stations. (4m)
we3	None	None	Solar panel and racking system, fence (11m)

5.4.1 Potential Effects

All proposed Project components were located outside of significant wetland boundaries as identified and confirmed through the site investigation program.

As a result, there will be no direct loss of significant wetland habitat or function related to the Project.Indirect impacts resulting from construction activities, such as dust generation, sedimentation, and erosion are expected to be short term, temporary in duration and controllable through the use of standard site control measures.

Potential impacts specific to each feature are provided in **Table 5.1, Appendix B**.

5.4.2 Proposed Mitigation

Avoidance was the main strategy used to minimize impacts to significantwetland features within 120 m of the Project Location. As such, protection of wetlands will be accomplished by applying standard best management and mitigation strategies to construction and operational activities.

The following mitigation measures will be implemented:

- No development will be permitted within the significant wetland boundaries.
- The boundaries of all wetlands within 30 m of the proposed construction area will be flagged / staked in the field by a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid these sensitive areas and to assist with the proper field installation of E&S controls;
- Where possible, and as appropriate, access roads will be constructed at or near existing grade to maintain surface flow contributions to wetlands.
- No vegetation removal is to occur within 4m of we2. Additional mitigation measures for vegetation removal will be implemented as outlined in Section 5.4.1.1
- Silt fencing will be erected at the edge of we2 where it is located within 30 m of construction areas (including staging areas and laydown areas). At a minimum the silt fencing will be placed 4m from the edge of we2.These barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation. Additional mitigation measures for sediment and erosion control will be implemented as outlined in Section 5.4.1.2
- No activities (construction, operation, decommissioning) will occur within we3 as it is separated from the project location by an active railway corridor. No mitigation measures are required for we3.
- All refuelling activities will occur 30m from wetlands. In the event of an accidental spill, the MOE Spills Action Centre will be contacted and emergency spill procedures implemented immediately.
- Any fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas.

Mitigation measures to be applied to each feature are provided in **Table 5.1,Appendix B.**

5.4.3 Net Effects

A combination of feature avoidance and implementation of the mitigation measures described above ensure anticipated adverse effects to wetlands are minimized or avoided during

construction and operation of the Project. No adverse net effects to significant wetland features are anticipated as a result of the Project.

5.5 WOODLANDS

Two (2) of the featuresin and within 120 m of the Project Location met at least one of the evaluation of significance criteria and are considered significant woodland (woodland features) and require an EIS to identify and assess potential impacts and recommend appropriate mitigation measures and follow-up monitoring.

Significant woodlands in and within 120 m of the Project Location are shown on **Figure 5, Appendix A** and indicated in **Table 5.1, Appendix B**.

A total of 0.83 ha of significant woodland habitat will be removed or disturbed for the duration of the project and the western edge of the Project Location. Components of the Project located in and within 120 m of each woodland feature include:

Feature Number	Project Component(s) located in Natural Features	Feature Size (ha)	Total Amount of Habitat Removal Required Short Term (ha)	Total Amount of Habitat Removal Required Long Term (ha)	Project Component(s) located within 120 m (approximate closest point in parenthesis)
wo2	Solar Panels and racking system	20.58	0.83	0.83	Solar panel and racking system, fence, access road and inverter stations.
wo3	None	62.02	None	None	Solar panel and racking system, fence (11m)

5.5.1 Potential Impacts

5.5.1.1 Woodland wo2

Woodland wo2 was a 20.58ha feature comprised of swamp and deciduous woodland. It was considered significant based on three of the seven criteria; its size, provision of interior and woodland diversity) (**Table 4.2, Appendix B**).

Approximately 0.83 ha (0.04%) of this feature would be removed for the duration of the Project's operation. Habitat to be removed consists primarily of a sugar maple lowland ash deciduous forest community.

Clearing of trees would be required to facilitate the installation of solar panels. Clearing activities during construction would result in the removal of vascular plants and portions of plant communities. All plant species observed within woodland wo2 are considered common in

Ontario. The greater woodland also supports significant wildlife habitat in the form of amphibian breeding habitat. Potential impacts and mitigation measures related to this function is provided in Section 5.6.1.

Alteration or removal of vegetation for construction of Project components could have the potential to affect both flora and fauna through loss of species diversity, by reducing or fragmenting available habitat (especially for species with low mobility), from the introduction or spread of invasive species, and from the temporary disruption to movement of wildlife.

Indirect impacts resulting from construction activities, such as dust generation, sedimentation and erosion are expected to be short term, temporary in duration and mitigable through the use of standard site control measures. During operation there is the potential for spills and contamination to the woodland. Storage of fuel, and activities with the potential to cause contamination should occur in properly protected and sealed areas. Improper disposal of wastes (fluids, containers, cleaning materials) could also have a negative impact on the feature.

5.5.1.2 Woodland wo3

Woodland wo3 was a 62.02 ha deciduous swamp and cultural woodland located south of the railway tracks to the south of the Project Location. It was considered significant based on four of the seven criteria; its size, woodland interior, proximity to other significant woodlands and linkages (**Table 5.4, Appendix B**).

No Project components occurred in the woodland. All activities required for the Project would be located outside of the woodland boundaries. No direct impact to the function, form or habitat is expected during construction or operation of the Project.

Indirect impacts resulting from construction activities, such as dust generation, sedimentation and erosion are expected to be short term, temporary in duration and mitigable through the use of standard site control measures. During operation there is the potential for spills and contamination to the woodland. Storage of fuel, and activities with the potential to cause contamination should occur in properly protected and sealed areas. Improper disposal of wastes (fluids, containers, cleaning materials) could also have a negative impact on the feature.

5.5.2 Mitigation Measures

Mitigation measures by feature are provided in **Table 5.1, Appendix B**. The following mitigation measures will be implemented for significant woodland within the David Brown Solar Project Area:

- Prior to construction, the limits of vegetation clearing in wo2 will be staked in the field as detailed in **Figure 6**. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed. Daily monitoring of the limits of clearing will be employed to ensure the objective of minimal disturbance. Should monitoring reveal that

clearing occurred beyond defined limits, rehabilitation of the disturbed area to pre-disturbance conditions at the direction of a qualified ecologist (with enhancement of any disturbed areas) will be undertaken immediately.

- Tree and/or brush clearing in wo02 will be completed prior to or after the core nesting season for migratory birds (May 1 to July 31). Should clearing in wo2 be required during the breeding bird season, prior to construction, surveys will be undertaken to identify the presence/absence of nesting birds or breeding habitat. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer width will range from 5- 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.

- Additional mitigation measures for vegetation removal will be implemented as outlined in Section 5.3.1.1

- Silt fencing will be erected in wo2 at the staked edge of the limits of vegetation clearing. These barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation. Additional mitigation measures for sediment and erosion control will be implemented as outlined in Section 5.3.1.2

- No activities (construction, operation, decommissioning) will occur within wo3 as it is separated from the project location by an active railway corridor (11m). No mitigation measures are required for wo3.

- All refuelling activities will occur 30m from the woodlands. In the event of an accidental spill, the MOE Spills Action Centre will be contacted and emergency spill procedures implemented immediately.

- Any fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas.

5.5.3 Net Effects

Indirect effects can be controlled through the use of standard mitigation measures as discussed above and provided in Table 5.1. The total vegetation removal required would remove a small proportion of the woodland habitat evaluated as significant for the purposes of this Project that occurred within the landscape. Approximately 0.83 ha (0.04%) of significant woodland would be removed or disturbed for construction of the Project. More than 99% of the current significant woodland cover would be maintained within the landscape.

5.6 AMPHIBIAN BREEDING AREAS

As a result of the evaluation of significance, two features were considered significant wildlife habitat for amphibian breeding(we2/wo2 and we3/wo3);

Components of the Project located in and within 120 m of significant wildlife habitat (amphibian breeding areas) include:

Feature	Project Component(s) located in Natural Features	Amount of habitat to be removed	Project Component(s) located within 120 m (distance at closest point)
we2, wo2	Solar panel and racking system	0.83 ha	Solar panel and racking system, fence, access road and inverter stations.
we3, wo3	None	None	Solar panel and racking system, fence (11m)

5.6.1 Potential Impacts

5.6.1.1 Feature we2, wo2

Encroachment into Feature we2/wo2 is limited to the wo2 community. Approximately 0.83 ha (0.04%) of wo2 would be removed for the duration of the Project's operation. No loss of vernal pools is anticipated as part of the development as site investigations did not identify the presence of vernal pools in the area of removal but in the adjacent wetland communities within the feature. No direct loss of amphibian vernal pool habitat is anticipated.

A new woodland edge would be created as a result of tree clearing in Feature wo2that could result in desiccation or drying and changes to surface water drainage to the features could result.

The potential negative effects to amphibian breeding habitat during Project construction and decommissioning activities include short-term sensory disturbance to species using these areas, localized dust generation, soil erosion, sedimentation and chemical or fuel spills, and may occur indirectly from disturbance (affect use of adjacent habitats).

Development on adjacent land can have significant impacts on breeding pool functions if it alters ground or surface water flow. Woodland pools which dry up before larvae transform as a result of disruptions to hydrological function become unsuitable sites for reproduction. In addition, tree cutting in the vicinity of the pool or development in terrestrial habitats used as summer range can affect amphibian habitat by changing the moisture regime of the woodland. The release of contaminants (i.e. road salt, sediments, accidental spills) in surface runoff may affect breeding ponds due to the sensitivity that amphibians have to aquatic toxicants.

Indirect impacts resulting from construction activities, such as dust generation, sedimentation and erosion, are expected to be short term, temporary in duration and mitigable through the use of standard site control measures where land based disturbance is proposed within 120 m of the feature.

Roads can impact wildlife populations through direct mortality from vehicles, as well as through the increased isolation of populations resulting in decreased genetic diversity (LesBarreres, 2007). Traffic speed is one of the key factors which influences mortality (Farmer and Brooks, 2007), and traffic volume influences both mortality (Fahrig, 2007) and connectivity.

During construction of the solar panels the access roads will experience some traffic, which will vary in intensity as the construction phase progresses. Amphibians are at an increased risk from vehicle collisions in spring, particularly on cool rainy nights as they move towards warmer road surfaces (SWHTGDSS, Index #40). Given the temporary (i.e., one breeding season or less) nature of the increased traffic activity, the restriction of construction activities primarily to daytime hours and the design of access roads (unpaved gravel low speed traffic), the risk of increased mortality during construction is considered low. Some limited mortality is possible, however, the potential long-term effects to wildlife populations from this mortality is anticipated to be minimal.

During operation, direct mortality of amphibians is a potential risk due to vehicles using the access roads for maintenance activities. Given the short-term and temporary nature of the maintenance activity, access roads will experience very little traffic on a daily basis and mortality effects are expected to be negligible. Avoidance behaviour of amphibian breeding habitats due to operational use (e.g., maintenance) of the access roads is not expected.

During operation of the facility, some materials such as lubricating oils and other fluids associated with maintenance activities have the potential for discharge to the on-site environment through accidental spills resulting in a potential impact to amphibian habitat through ground or surface water contamination.

5.6.1.2 Feature we3, wo3

As all construction activities are sited outside the amphibian habitat boundaries there will be no direct loss of amphibian habitat or function as a result of the Project.No encroachment during construction or installation is proposed within these natural features. The potential negative effects to amphibian breeding habitat during Project construction and decommissioning activities include short-term sensory disturbance to species using these areas, localized dust generation, soil erosion, sedimentation and chemical or fuel spills, and may occur indirectly from disturbance (affect use of adjacent habitats).

At its closest point, construction activities would occur 11 m from Feature we3, wo3.

Development on adjacent land can have significant impacts on breeding pool functions if it alters ground or surface water flow. Woodland pools which dry up before larvae transform as a result of disruptions to hydrological function become unsuitable sites for reproduction. In addition, tree cutting in the vicinity of the pond or development in terrestrial habitats used as summer range can affect amphibian habitat by changing the moisture regime of the woodland. The release of contaminants (i.e. road salt, sediments, accidental spills) in surface runoff may affect breeding pools due to the sensitivity that amphibians have to aquatic toxicants.

No new edge would be created and there would be no clearing of trees in or near Feature we3, wo3that could result in desiccation or drying. No changes to surface water drainage to the features are anticipated.

Indirect impacts resulting from construction activities, such as dust generation, sedimentation and erosion, are expected to be short term, temporary in duration and mitigable through the use of standard site control measures where land based disturbance is proposed within 120 m of the feature.

5.6.2 Proposed Mitigation

The following mitigation measures will be implemented:

- Maintenance vehicle traffic will primarily be restricted to daytime hours. Vehicle speeds will be restricted to 30 km/h or less.
- Speed limit signage will be erected to communicate 30km/hr limit.
- Construction activities will be limited to daytime hours only.
- No vegetation removal is to occur within 4m of we2.
- Prior to construction, the limits of vegetation clearing in wo2 will be staked in the field as detailed in **Figure 6**. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed. Daily monitoring of the limits of clearing will be employed to ensure the objective of minimal disturbance. Should monitoring reveal that clearing occurred beyond defined limits, rehabilitation of the disturbed area to pre-disturbance conditions at the direction of a qualified ecologist (with enhancement of any disturbed areas) will be undertaken immediately.
- Tree and/or brush clearing in wo02 will be completed prior to or after the core nesting season for migratory birds (May 1 to July 31). Should clearing in wo2 be required during the breeding bird season, prior to construction, surveys will be undertaken to identify the presence/absence of nesting birds or breeding habitat. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the

nest is active. The radius of the buffer width will range from 5- 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.

- Additional mitigation measures for vegetation removal will be implemented as outlined in Section 5.3.1.1

- Silt fencing will be erected in wo2 at the staked edge of the limits of vegetation clearing. These barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation. Additional mitigation measures for sediment and erosion control will be implemented as outlined in Section 5.3.1.2

- All refuelling activities will occur 30m from Features 2 and 3. In the event of an accidental spill, the MOE Spills Action Centre will be contacted and emergency spill procedures implemented immediately.

- Maintenance activities such as infrequent mowing will occur during the day and will avoid the amphibian breeding season (April – June).

5.6.3 Net Effects

Considering the temporary nature of construction effects, the distance between the features and the Project components, and the periodic nature of maintenance activities, it is likely that resident herpetiles will adapt to the Project quickly. Consequently, no significant net negative effects are anticipated to amphibian breeding populations and their habitats.

5.6.4 Generalized Wildlife Habitat

Wildlife habitat types for area sensitive woodland breeding birds been have identified that may be present within the Project Boundary (wo3), but are located within 120 m of project components that are not expected to have an operational impact on these habitats. In accordance with the Natural Heritage Assessment Guide (OMNR, 2011), potential impacts to these habitats are typically associated with the temporary disturbance of construction activity and can be grouped together as generalized impacts and mitigation measures.

A comprehensive list of general construction mitigation measures that will be implemented during the construction and decommissioning phases is provided in **Table 5.2, Appendix B**.

5.7 MONITORING PROGRAM

5.7.1 Construction Phase Monitoring

A construction-phase monitoring program is required to address potential effects to wo2, we2, wo3 and we3. A summary of these potential negative effects to significant natural features,

mitigation strategies, performance objectives, monitoring plan principles (including general methods, location, frequency, rationale and reporting), and contingency measures are outlined in **Table 5.3, Appendix B**. This information will form the basis of the monitoring components of the Construction Plan Report and the Environmental Effects Monitoring Plan provided in the Design and Operations Report. As the project location is within amphibian woodland breeding habitat (we2 and wo2) post construction monitoring of this habitat is required for one year. Table 5.4 provides a summary of the post-construction monitoring plan for amphibian woodland breeding habitat.

5.7.2 Summary of Impacts and Mitigation

Table 5.1, Appendix B summarizes the general impacts, suggested mitigation measures and application to minimize and mitigate the potential negative impacts to significant natural heritage features associated with the planning, design and construction of the proposed Project.

6.0 Conclusions

This Natural Heritage Assessment for the David Brown Solar Park has been prepared in accordance with O.Reg 359/09, s. 24-28 and 37-38.

Once the identified protective, mitigation and compensation measures are applied to the environmental features discussed above, the construction and operation of the Project is expected to have no net negative effects on the significant features and functions identified through the Natural Heritage Assessment process. An environmental effects monitoring plan that includes a post-construction monitoring program will be developed to confirm the accuracy of predicted effects as well as to monitor the effects to other natural elements.

Stantec Consulting Ltd. prepared this Natural Heritage Assessment and Environmental Impact Study for Saturn Power Inc. for the David Brown Solar Park. Saturn Power Inc. is committed to implementing the appropriate protection and mitigation measures as they apply to the construction and operation of the proposed Project.

All of which is respectfully submitted,

STANTEC CONSULTING LTD.

Shari Muscat, B.A., B.E.S.
Environmental Planner

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Senior Environmental Planner

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Terrestrial Biologist

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APPENDIX A

FIGURES

499000
500000
4984000
4983000
Morgan Road
County Road 14
Highway 401 West
Dafoe Road
Railway Street
Dickinson Drive
Industrial Drive
45th Parallel Drive
Highway 401 East
Farran Drive
College Street
Spruce Street
Hickory Street
Farrans Point Road
Alf Drive
N
0
100
200
m
1:7,500

Legend

- Subject Property
- Project Location
- Project Boundary (120 m Zone of Investigation)
- Existing Transmission Line
- Road
- Railway Line
- Watercourse

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.

Stantec

January 2013
161011028

Client/Project
Saturn Power Inc.
David Brown Solar Park
Natural Heritage Assessment Report
Highway 401, Stormont Township, Ontario

Figure No.
1

Title
Project Location and Study Area Overview

\\cd1220-f02\01609\active_Other_PCs_Active\610 - Kitchener\61011028\drawing\MXD\NHA\ELCs\161011028_ELC_Fig01_ProjectLocation.mxd
Revised: 2013-01-24 By: mkirkpatrick

499000

500000

4984000

4983000

Deer Yard (Stratum 1)

Ingleside

Morgan Road

County Road 14

Highway 401 West

Railway Street

Dickinson Drive

WO1

WE1

WO4

Industrial Drive

WO2

WE2

WO3

WE3

45th Parallel Drive

Dafoe Road

Highway 401 East

Farrans Point Road

Farran Drive

College Street

Spruce Street

Ault Drive

Hickory Street

N

0 100 200 m

1:7,500

Legend

- Subject Property
- Project Location
- Project Boundary (120 m Zone of Investigation)
- Unevaluated Wetland
- Provincially Significant Wetland
- Other/Locally Significant Wetland
- Wintering Area
- Woodlands (> 0.5 ha)
- Road
- Railway Line
- Topographic Contour (mAMSL)
- Watercourse

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.

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Client/Project
Saturn Power Inc.
David Brown Solar Park
Natural Heritage Assessment Report
Highway 401, Stormont Township, Ontario

Figure No.
2

Title
Natural Areas (Records Review)

\\cd1220-f02\01609\active_Other_PCs_Active\610 - Kitchener\61011028\drawing\MXD\NHA\ELCs\161011028_ELC_Fig02_NaturalAreas_RecordsReview.mxd
Revised: 2013-01-24 By: mkirkpatrick

499000

500000

4984000

4983000

N

Morgan Road

County Road 14

Highway 401 West

Dafoe Road

Highway 401 East

Faurans Point Road

Railway Street

Dickinson Drive

Industrial Drive

45th Parallel Drive

Faran Drive

College Street

Spruce Street

Hickory Street

Arlt Drive

DIST

CUW1

CUM1

AG - Switchgrass / Tilled

CUS1-2

FOD7-2

CUT1

MAS2-1

SWD2-2

FOD6-1

RES

A

B

G

0 100 200 m

1:7,500

\\cd1220-f02\01609\active_Other_PCs_Active\610 - Kitchener\61011028\drawing\MXD\NHA\ELCs\161011028_ELC_Fig03_ELCs.mxd
Revised: 2013-01-24 By: mkirkpatrick

Legend

- Subject Property
- Project Location
- Project Boundary (120 m Zone of Investigation)
- Amphibian Call Survey Location
- Ecological Land Classification
- Surveyed Wetland (Stantec)
- Road
- Railway Line

Ecological Land Classification:

Vegetation Community
AG - Switchgrass - Agriculture - Switchgrass
DIST - Disturbed
SWD2-2 - Green Ash Mineral Deciduous Swamp
MAS2-1 - Cattail Mineral Shallow Marsh
FOD6-1 - Fresh-Moist Sugar Maple Low Land Ash Deciduous Forest
FOD7-2 - Fresh-Moist Ash Lowland Deciduous Forest
CUS1-2 - White Cedar-Green Ash Mineral Cutlural Savannah
CUM1 - Mineral Cultural Meadow
CUT1 - Cultural Mineral Thicket

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.

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January 2013
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Client/Project
Saturn Power Inc.
David Brown Solar Park
Natural Heritage Assessment Report
Highway 401, Stormont Township, Ontario

Figure No.
3

Title
Ecological Land Classification and Survey Locations

499000

500000

4984000

4983000

N

Morgan Road

County Road 14

Highway 401 West

Dafoe Road

Highway 401 East

Farrans Point Road

Railway Street

Dickinson Drive

Industrial Drive

45th Parallel Drive

Farran Drive

College Street

Spruce Street

Hickory Street

Ault Drive

WO1 (SWD)

WE1

WO2 (SWD & FOD)

WE2

WO3

WE3

WO4

0 100 200 m

1:7,500

Legend

- Subject Property
- Project Location
- Project Boundary (120 m Zone of Investigation)
- Wetland Feature
- Woodland Feature
- Road

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.

Stantec

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Client/Project
Saturn Power Inc.
David Brown Solar Park
Natural Heritage Assessment Report
Highway 401, Stormont Township, Ontario

Figure No.
4

Title
Natural Features (Site Investigation)

\\cd1220-f02\01609\active_Other_PCs_Active\610 - Kitchener\61011028\drawing\MXD\NHA\ELCs\161011028_ELC_Fig04_NaturalFeatures.mxd
Revised: 2013-01-24 By: mkirkpatrick

499000
500000
4984000
4983000
N
Morgan Road
County Road 14
Highway 401 West
Railway Street
Dickinson Drive
Defoe Road
Industrial Drive
45th Parallel Drive
Highway 401 East
WE2
WO2 (SWD & FOD)
WO3
WE3
Farrans Point Road
Farran Drive
College Street
Spruce Street
Hickory Street
Ault Drive
0
100
200
m
1:7,500

Legend

- Subject Property
- Project Location
- Project Boundary (120 m Zone of Investigation)
- Significant Wetland
- Significant Woodland
- Road

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.

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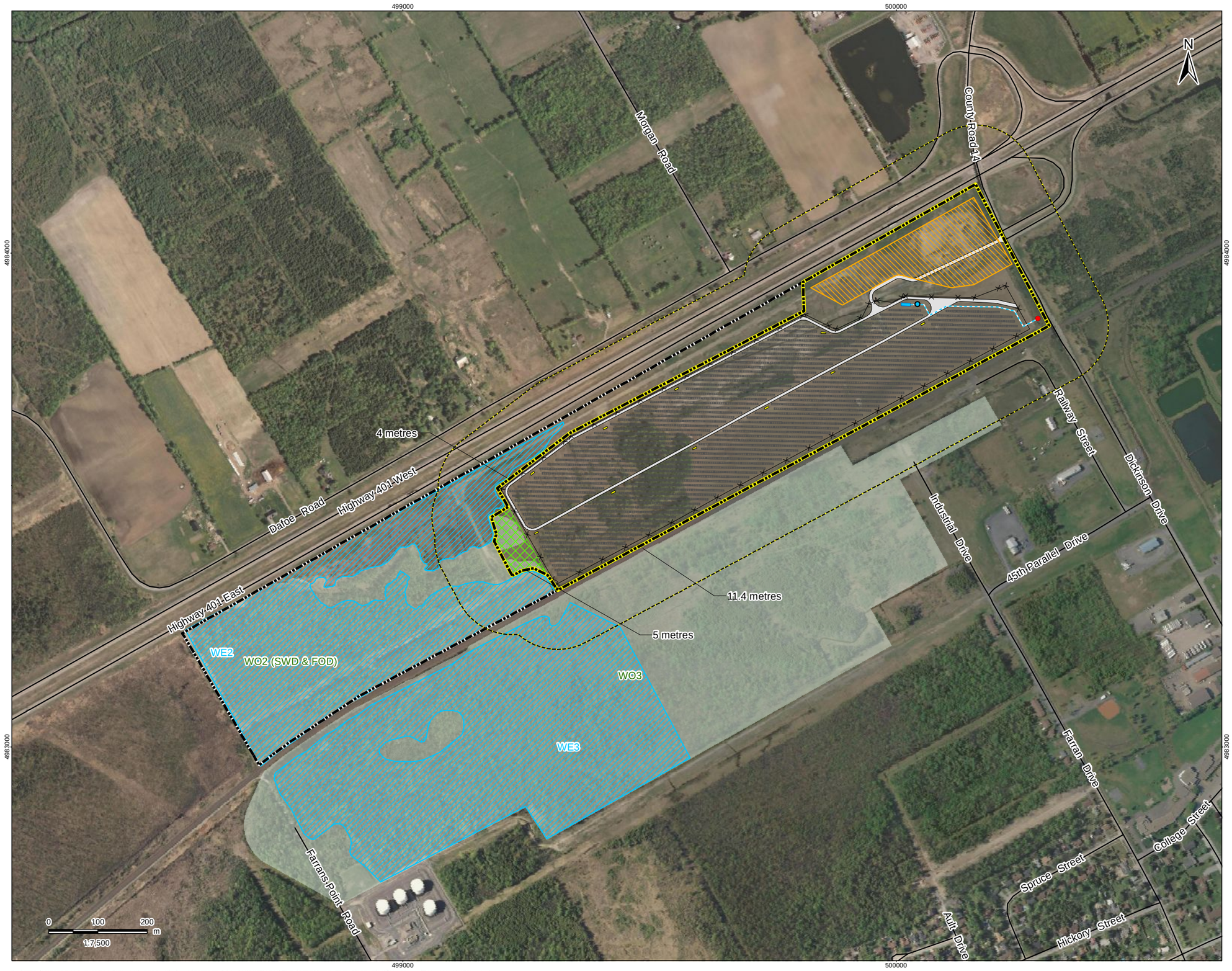
January 2013
161011028

Client/Project
Saturn Power Inc.
David Brown Solar Park
Natural Heritage Assessment Report
Highway 401, Stormont Township, Ontario

Figure No.
5

Title
Significant Natural Features

\\cd1220-f02\01609\active_Other_PCs_Active\610 - Kitchener\61011028\drawing\MXD\NHA\ELCs\161011028_ELC_Fig05_SignificantNaturalFeatures.mxd
Revised: 2013-01-24 By: mkirkpatrick



Legend

- Subject Property
- Project Location
- Project Boundary (120 m Zone of Investigation)
- Significant Woodland
- Significant Wetland
- Construction Laydown Area
- Potential Constructible Area
- Inverter Station
- Fence
- Access Road
- Communication Tower
- Proposed Distribution Line
- Transformer Substation
- Solar Panel
- Point of Common Coupling
- Road

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.

Stantec

January 2013
161011028

Client/Project
Saturn Power Inc.
David Brown Solar Park
Natural Heritage Assessment Report
Highway 401, Stormont Township, Ontario

Figure No.
6

Title
Significant Natural Features with Site Plan

\\cd1220-f02\01609\active_Other_PCs_Active\610 - Kitchener\61011028\drawing\MXD\NHA\ELCs\161011028_ELC_Fig06_SignificantNaturalFeatures_SitePlan.mxd
Revised: 2013-01-24 By: mkirkpatrick

APPENDIX B

TABLES

Table 2.1: Agency Contact Record

Information Source and Contact Information	Records Requested	Records Received
Heather Zurbrigg, Renewable Energy Planning Ecologist, Ministry of Natural Resources heather.zurbrigg@ontario.ca, (613)258-8366	Preliminary data request for information within study area	August 19, 2011 – Background and preliminary information provided (email)
Heather Zurbrigg, Renewable Energy Planning Ecologist, Ministry of Natural Resources heather.zurbrigg@ontario.ca, (613)258-8366	Request for confirmation of Species at Risk within Study Area	August 23, 2011 – Species list provided (email)
Brendan Jacobs, Wildlife Monitoring Supervisor, Raisin River Conservation Authority (RRCA) Brendan@rrca.on.ca, (613)938-3611	Preliminary site assessment and Butternut Health assessment	August 24, 2011 – Preliminary site assessment and Butternut Health assessment (email)
Shaun Thompson, District Ecologist, Ministry of Natural Resources shaun.thompson@mnr.gov.on.ca, (613)258-8235)	Wetland evaluation information	November 9, 2011- Discussion regarding wetland evaluation (phone)
Heather Zurbrigg, Renewable Energy Planning Ecologist, Ministry of Natural Resources heather.zurbrigg@ontario.ca, (613)258-8366	MNR Natural Areas and Features Information Request Form sent October 25, 2011	November 21, 2011 – Data received (email)
Heather Zurbrigg, Renewable Energy Planning Ecologist, Ministry of Natural Resources heather.zurbrigg@ontario.ca, (613)258-8366	Update on survey information	November 29, 2011 – Discussion regarding surveys being undertaking (phone)
Erin Thompson, Species at Risk Biologist, Ministry of Natural Resources erin.thompson@ontario.ca	Species at Risk information	November 29, 2011 – Discussion regarding Species at Risk and surveys being undertaken (phone)

Table 2.2: Records Review – Species of Special Concern Assessment

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	National Status (COSEWIC)	Source	Species Requirements/ Limiting Factors	Results of Site Investigation
PLANTS							
Slender Bulrush	*Schoenoplectus heterochaetus*	S3	---	---	NHIC	Fruiting during the summer, found in fresh, often calcareous marshes and lakes. This bulrush is often emergent in water.	Not Identified
Eggert's Thorn (Hawthorn)	*Crataegus dilatata*	S2	---	---	NHIC	Difficult to tell from other hawthorns, this species often forms thickets of several different hawthorn species, and can also typically occur on abandoned farmland, along streams and in forest openings, especially on soils high in calcium. Moderately shade-tolerant.	Not Identified
A Moss	*Astomum muhlenbergia*	S2	---	---	NHIC	Occurs along roadsides and in soil, fields, lawns and grassy areas	Not Identified
INSECTS							
Monarch Butterfly	Danaus plexippus	S2N,S4B	SC	SC	NHIC	In southern Ontario the Monarch are considered common. Monarchs are typically found in habitats including farmland, roadsides, and other open spaces where milkweed and wildflowers are present.	Not Identified
FISH							
Greater Redhorse	*Moxostoma valenciennesi*	S3	---	---	NHIC	Preference of cool bottom waters of large streams with substantial flows.	Not Identified
REPTILES							
Northern Map Turtle	Graptemys geographica	S3	SC	SC	NHIC	Map turtles inhabit slow moving, large rivers and lakes with high water quality and soft bottoms, often congregating at favoured basking (e.g., rocks and logs at water edges) and overwintering (e.g., bottom of lakes and rivers) sites.	Not Identified
Snapping Turtle	Chelydra serpentina	S3	SC	SC	NHIC	Snapping Turtles inhabit ponds, sloughs, streams, rivers, and shallow bays that are	Not Identified

Table 2.2: Records Review – Species of Special Concern Assessment

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	National Status (COSEWIC)	Source	Species Requirements/ Limiting Factors	Results of Site Investigation
						characterized by slow moving water, aquatic vegetation, and soft bottoms. Females nest in sand or gravel banks at waterway edges in late May or early June.	
BIRDS							
Canada Warbler	*Wilsonia canadensis*	S4B	SC	THR	OBBA	The Canada Warbler is usually found in moist mixed deciduous-coniferous forests with a well-developed understorey. It may also occur in shrub marshes, red maple stands, coniferous riparian woodlands, ravines and steep brushy slopes, and regenerating forests. It is estimated that about one third of the Canada Warbler population breeds in Ontario.	Not Identified
Hooded Warbler	*Wilsonia citrina*	S3B	SC	THR	NHIC	The Hooded Warbler can be found in mature, upland deciduous or mixed forest, with an area of more than 15 hectares, where clearings have been created naturally or by logging). It prefers clearings with low, dense, shrubby vegetation less than two meters in height.	Not Identified
Golden-winged Warbler	*Vermivora chrysoptera*	S4B	SC	THR	OBBA	The Golden-winged Warbler is a provincial species of special concern and a federally threatened species. It is confined to southern Ontario with local concentrations along the southern edge of the Canadian Shield, primarily around southeastern Georgian Bay and north of Kingston. Breeding occurs in successional scrub habitats bordered by forests and nests are constructed on the ground.	Not Identified
Olive-sided Flycatcher	*Contopus cooperi*	S4B	SC	THR	OBBA	Breeding habitat located in the boreal forest, where it primarily uses coniferous trees to support its cup-shaped nest. Only a handful of Olive-sided flycatchers have	Not Identified

Table 2.2: Records Review – Species of Special Concern Assessment

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	National Status (COSEWIC)	Source	Species Requirements/ Limiting Factors	Results of Site Investigation
						been found to breed below the Canadian Shield in Ontario.	
Red-headed woodpecker	*Melanerpes erythrocephalus*	S4	SC	THR	OBBA	The Red-headed Woodpecker Occupies a wide range of habitats, but most are characterized by open areas for feeding; snags for roosting, and a secure food supply. This species requires multiple snags for nesting, roosting, and foraging. Some of the habitats used are: open deciduous and riparian woodlands, orchards, parks, agricultural lands, savanna-like grasslands, beaver ponds with snags, forest edges, burned forests, and flooded bottomland forests.	Not Identified
Common Nighthawk	*Chordeiles minor*	S4B	SC	THR	NHIC	The Common Nighthawk is an aerial insectivore and forages at dawn and dusk. Common Nighthawks nest on the ground in open habitats preferably with rocky or graveled substrate. Nighthawks will even nest on gravel roofs in the city. The regeneration or succession of forest clearings and the destruction of grassland habitats appear to play a major role in this species' decline along with the non-selective spraying for mosquitoes.	Not Identified
Yellow Rail	*Coturnicops noveboracensis*	S4B	SC	SC	OBBA	The Yellow Rail inhabits sedge-dominated wetlands which retain standing water through their breeding season. In Ontario, few Yellow Rail nesting sites have been confirmed yet possible sites were scattered across the Canadian Shield and the Hudson's Bay lowlands. A local abundance occurs near Rainy River. No recent breeding or possible breeding sites have been found south of Prince Edward County.	Not Identified

Table 2.2: Records Review – Species of Special Concern Assessment

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	National Status (COSEWIC)	Source	Species Requirements/ Limiting Factors	Results of Site Investigation
Bald Eagle	*Haliaeetus leucocephalus*	S2N,S4B	SC	NAR	NHIC	The Bald Eagle almost always nests near water, usually on large lakes. Large stick nests are placed in trees located within mature woodlots. They usually require 250 ha of mature forest for breeding, however, along Lake Erie, where the lake provides a valuable food source, the eagles will nest in smaller woodlots or even single trees.	Not Identified
Short-eared Owl	*Asio flammeus*	S2N,S4B	SC	SC	NHIC	These owls inhabit open habitats such as agricultural lands, wetlands, and grasslands. This area sensitive species nests on the ground usually in tall vegetation and typically requires 75 hectares of suitable habitat in order for nesting to occur. Breeding area on any given year is strongly correlated to small rodent abundances.	Not Identified

Acronyms
HA – Ontario Herpetofaunal Atlas; Oldham and Weller, 2000
MA – Atlas of the Mammals of Ontario; Dobbyn, 1994
MNR – Ministry of Natural Resources; Kemptville District
NHIC – Natural Heritage Information Centre; NHIC, 2011
OBBA – Ontario Breeding Bird Atlas; Cadman et al., 2007
Statuses
S2 – Imperiled
S3 – Vulnerable
S4 – Apparently secure
S#B – Breeding Status
S#N – Non-breeding Status
? – Rank uncertain

Table 2.3: Natural Features Identified in and within 120m of the Project Boundary through Records Review

Natural Feature	In Project Location	Within 120m of Project Location
Wetlands- Provincially Significant	No	No
Wetlands- Non-provincially Significant	No	No
Wetlands- Unevaluated	Yes – we1	Yes – we2 and we3
ANSIs	No	No
Valleylands	No	No
Woodlands	Yes – wo1	Yes – wo2, wo3 and wo4

Table 3.1: Site Investigation Summary

Survey Date	Survey Type	Completed By	Time	Weather Conditions*
October 12, 2011	Ecological Lands Classification	J. Mansell & S. Rogers	Not recorded	14°C, 90% cloud cover
October 28, 2011	Wetland Delineation	J. Mansell	Not recorded	Not recorded
November 1, 2011	Site Investigation with Raisin River Conservation Authority	S. Muscat	14:00 – 15:30	Not recorded
April 5, 2012	Salamander Egg Mass Surveys	J. Leslie J. Mansell & S. Rogers	10:00 - 13:00	4°C, partial cloud cover, 2 wind, no rain during investigation, trace rain within last 24 hours.
April 9, 2012	Amphibian Call Counts	J. Mansell & S. Rogers	19:50 – 21:30	6°C, 100% cloud cover, 2 wind, and light rain. Approx. 3mm of light rain within the last 24 hrs.
May 3, 2012	Amphibian Call Counts	J. Mansell & S. Rogers	19:40 – 21:58	16°C, 80% cloud cover, 2 wind, no rain during investigation. Approx. 5mm of rain within last 24 hours.
June 5, 2012	Breeding Bird Surveys Ecological Land Classification and Vegetation Survey	J. Mansell	06:00	12°C, 10% cloud cover, 2 wind, no rain during investigation, trace rain within last 24 hours.
June 17, 2012	Amphibian Call Counts	S. Rogers N. Weil	21:20-22:35	24°C, 10% cloud cover, 1 wind, no rain during investigation, no rain within last 24 hours.
June 18, 2012	Breeding Bird Surveys	J. Mansell	Not recorded	18°C, 0% cloud cover, 1-2 wind, no rain during investigation and no rain within last 24 hours

* Wind conditions expressed using Beaufort Scale:

0 – calm, <2km/hr
1 – light, 2-6 km/hr
2 – light, 7-12 km/hr
3 – moderate, 13-19 km/hr
4 – moderate, 20-30 km/hr
5 – fresh, 31-40 km/hr
6 – strong, 41-51 km/hr

Table 3.2: Summary of Corrections to Records Review

Feature	Records Review	Correction made as a result of site investigation	Report Section Providing Criteria Used in Determination of Correction
Wetlands	No provincially significant wetlands (PSW) occur within 120m of the Project Location. No evaluated wetlands occur in or within 120m of the Project Location. One unevaluated wetland (we1) was identified within the Project Location, and two other unevaluated wetlands (we2 and we3) were identified within 120m of the Project Location.	The boundaries of the following wetlands were corrected: we1 – Refined boundary using OWES. we2 – Extension of wetland to include cattail shallow marsh unit and refinement of wetland boundary limit using OWES. we3 – Refined boundary using OWES.	Section 3.2.2.2
Valleylands	No valleylands occur in or within 120m of the Project Location.	None	
ANSIs	No Earth Science or Life Science ANSIs occur in or within 120m o f the Project Location.	None	
Woodlands	Three woodlands were identified within 120m of Project Location (wo2, wo3 and wo4). One woodland (wo1) was identified in the Project Location.	Woodland wo4 was found to no longer exist on the landscape. An additional woodland (wo5) was added as occurring within 120 m of the project location.	Section 3.2.3
Wildlife Habitat: Seasonal Concentration Areas	None identified	None – Project Location does not support this function	
Wildlife Habitat: Animal Movement Corridors	None identified	None- Project Location does not support this function	
Wildlife Habitat: Rare Vegetation Communities	None identified	None- Project Location does not support this function	
Wildlife Habitat: Specialized Habitats	Potential for amphibian breeding habitat	Field investigations determined that wo2 and wo3 contained candidate significant wildlife habitat for amphibians	Section 3.2.5.2

Table 3.2: Summary of Corrections to Records Review

Feature	Records Review	Correction made as a result of site investigation	Report Section Providing Criteria Used in Determination of Correction
Wildlife Habitat: Species of Conservation Concern	Potential for habitat of species of conservation concern (rare or low S-ranks) as outlined in Table 2.2, Appendix B	None- Project Location does not support this function	
	Potential for marsh breeding bird habitat in we2	Field investigations determined that we2 contained candidate significant wildlife habitat for marsh breeding bird habitat	Section 3.2.5.3
	Potential for Woodland Area-sensitive bird breeding habitat identified in wo3	None	

Table 3.3: Ecological Land Classification (ELC) Vegetation Types

ELC TYPE	Community Description
Forest (FO)	
Deciduous Forest (FOD)	
FOD6-1 Fresh-Moist Sugar Maple Lowland Ash Deciduous Forest	This forest community occupied a small portion of the southwestern end of the project area. The canopy consisted of sugar maple, green ash and some silver maple. The subcanopy contained younger stands of the same species. The understorey was mostly unpopulated with some goldenrod species. The groundlayer consisted mainly of various species of asters, grass and common strawberry.
Marsh (MA)	
Shallow Marsh (MAS)	
MAS2-1 Cattail Mineral Shallow Marsh	Cattail mineral shallow marsh was widespread over areas of the project area most prone to disturbance from the 400 series highway. This community was dominated by cattails and goldenrod species. There was no vegetation in the canopy layer. The subcanopy had the occasional willow species tree and tamarack. The nature of shallow marshes indicates that less than 2 m of water is present year-round.
Swamp (SW)	
Deciduous Swamp (SWD)	
SWD2-2 Green Ash Mineral Deciduous Swamp	This community occupies two separate areas in the project area. The forest composition is similar to the FOD6-2, yet wet-loving species increase in presence such as Black Ash, Elm species, Prickly Ash and Silver Maple. Sedge species also appear and the ground is much softer indicating a swamp environment. The sub-canopy consists of younger species found in the canopy. The understorey consists of prickly ash, buckthorn species and Burr Oak. Sensitive fern, aster species, sedge species, grass species and moss species are occasionally found throughout the ground layer.
Cultural (CU)	
Cultural Meadow (CUM)	
CUM1 Mineral Cultural Meadow	This community was present at the northeast end of the project area, adjacent to the 400 series highway. No species dominated this vegetation community in any layer. The most common species included: cattails, wild parsnip, grass species, aster species and immature balsam poplar and eastern white cedar trees. The composition of this community is a direct result of cultural disturbances. This community was further disturbed in 2012.

Table 3.3: Ecological Land Classification (ELC) Vegetation Types

ELC TYPE	Community Description
Cultural Woodland (CUW)	
CUW1 - Cultural Woodland	This community was adjacent to the Project Area; south of the railroad and east of Dickenson Road. There appeared to be a remnant buffer around Industrial Drive and the right-of-way west of 45th Parallel Drive with several vehicle pathways and slash piles throughout the property which suggests that it was historically logged. A majority of the species in this community were pioneer, colonizing or invasive. Poplar species and Green Ash were the most abundant tree species with many clumps of Willow species. Various species of cultural herbaceous vegetation made up the ground layer. The current age of the vegetation present suggests that the area has not been disturbed for approximately 10-15 years.
Cultural Savannah (CUS)	
CUS1-2 Eastern White Cedar – Green Ash Mineral Cultural Savannah	A savannah community indicates a primarily open landscape with between 25 – 35% tree cover. Trees found in the canopy of this community were primarily eastern white cedar, green ash and balsam poplar. The areas mapped as savannah in the project area typically had rolling topography and presented a transition between the forested, swampy areas and the meadows. Ground cover was mostly just grass species. The composition of this community is a direct result of cultural disturbances.
Agriculture (AG)	
AG – Switch grass (tilled)	Knowledge of this community indicates that it is presently being cultivated for switch grass production. This community occupies the southeastern portion of the project area and was tilled in the fall of 2012.

*ELC code not listed in the First Approximation of ELC for Southern Ontario (Lee et al., 1998)

Table 3.4: Description and Characterizations of Features found in and within 120m of the Project Location

Identification through Records Review	Feature Type As confirmed during Site Investigation	Feature Size (ha)	ELC Community Type	Description of Type
Woodland (wo1) Unevaluated Wetland (we1)	Woodland (wo1) Wetland (we1)	3.2	SWD2-2	Wet-loving species increase in presence such as Black Ash, Elm species, Prickly Ash and Silver Maple. Sedge species also appear and the ground is much softer indicating a swamp environment. The sub-canopy consists of younger species found in the canopy. The understorey consists of prickly ash, buckthorn species and Burr Oak. Sensitive fern, aster species, sedge species, grass species and moss species are occasionally found throughout the ground layer.
Woodland (wo2) Unevaluated Wetland (we2) Not identified	Woodland (wo2) Unevaluated Wetland (we2)	20.58	FOD6-2 SWD2-2 MAS2-1	The canopy consisted of sugar maple, green ash and some silver maple. The subcanopy contained younger stands of the same species. The understorey was mostly unpopulated with some goldenrod species. The groundlayer consisted mainly of various species of asters, grass and common strawberry Dominated by cattails and goldenrod species. There was no vegetation in the canopy layer. The subcanopy had the occasional willow species tree and tamarack. The nature of shallow marshes indicates that less than 2 m of water is present year-round. Wet-loving species increase in presence such as Black Ash, Elm species, Prickly Ash and Silver Maple. Sedge species also appear and the ground is much softer indicating a swamp environment. The sub-canopy consists of younger species found in the canopy. The understorey consists of prickly ash, buckthorn species and Burr Oak. Sensitive fern, aster species, sedge species, grass species and moss species are occasionally found throughout the ground layer.
Woodland (wo3) Unevaluated Wetland (we3)	Woodland (wo3) Wetland (we3)	62.02	SWD 2-2 CUW1	Wet-loving species increase in presence such as Black Ash, Elm species, Prickly Ash and Silver Maple. Sedge species also appear and the ground is much softer indicating a swamp environment. The sub-canopy consists of younger species found in the canopy. The understorey consists of prickly ash, buckthorn species and Burr Oak. Sensitive fern, aster species, sedge species, grass species and moss species are occasionally found throughout the ground layer. A majority of the species in this community were pioneer, colonizing or invasive. Poplar species and Green Ash were the most abundant tree species with many clumps of Willow species. Various species of cultural herbaceous vegetation made up the ground layer.
Not identified	Woodland (wo5)	2.0	CUW1	A majority of the species in this community were pioneer, colonizing or invasive. Poplar species and Green Ash were the most abundant tree species with many clumps of Willow species. Various species of cultural herbaceous vegetation made up the ground layer.

Table 3.5: Amphibian Call Count Results

STATION	DATE	SPECIES									NOTES
		NLFR	WOFR	SPPE	CHFR	AMTO	GRFR	PIFR	BULL	GRTR	
A	April 9, 2012			3*							
	May 3, 2012			3*							
	June 17, 2012									2-3*	
B	April 9, 2012			3*							
	May 3, 2012			1-2*							
	June 17, 2012										No Calls
C	April 9, 2012										No Calls
	May 3, 2012										No Calls
	June 17, 2012									2-2	

* Represents calls heard outside of the 100-meter station area

Call count codes: (1) calls not simultaneous – number of individuals can be accurately counted; number (2) some calls simultaneous – number of individuals can be reliably estimated; and (3) full chorus – calls continuous and overlapping, so number of individuals cannot be reliably estimated.

NLFR	Northern Leopard Frog (*Rana pipiens*)
WOFR	Wood Frog (*Rana sylvatica*)
SPPE	Spring Peeper (*Pseudacris crucifer*)
CHFR	Chorus Frog (*Pseudacris triseriata*)
AMTO	American Toad (*Bufo americanus*)

Table 3.6: Amphibian Woodland Breeding Habitat

Station No.	Woodland Feature No.	Feature Size (ha)	Vegetation Community Type	Description of Type	Attributes, Characteristics and Functions	Species Presences
C	wo1	3.4	SWD2-2	The forest composition is similar to the FOD6-2, yet wet-loving species increase in presence such as Black Ash, Elm species, Prickly Ash and Silver Maple. Sedge species also appear and the ground is much softer indicating a swamp environment. The sub-canopy consists of younger species found in the canopy. The understorey consists of prickly ash, buckthorn species and Burr Oak. Sensitive fern, aster species, sedge species, grass species and moss species are occasionally found throughout the ground layer.	SWD2-2 community surrounded by active agricultural land.	April & May 2012: No calls June 2012: Gray Treefrog calling simultaneously.
A & B	wo2	21.5	SWD2-2 / MAS2-1	**SWD2-2:** The forest composition is similar to the FOD6-2, yet wet-loving species increase in presence such as Black Ash, Elm species, Prickly Ash and Silver Maple. Sedge species also appear and the ground is much softer indicating a swamp environment. The understorey consists of prickly ash, buckthorn species and Burr Oak. Sensitive fern, aster species, sedge species, grass species and moss species are occasionally found throughout the ground layer. **MAS2-1:** Cattail mineral shallow marsh was widespread over areas of the project area most prone to disturbance from the 400 series highway. This community was dominated by cattails and goldenrod species. There was no vegetation in the canopy layer. The subcanopy had the occasional willow species tree and tamarack.	Within the MAS2-1 community, the nature of shallow marshes indicates that less than 2 m of water is present year-round. Located adjacent to FOD6-2.	April & May 2012: Spring Peeper observed in chorus. June 2012: Gray Treefrog observed in chorus. All calls were observed outside of the station, but within the feature.

Table 3.7: Breeding Bird Point Count Results

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)	ECO REGION (OWES)	Source	Local Status PIF Priority Species (BCR 13)
Ruffed Grouse	*Bonasa umbellus*	S5	G5			20			
Wild Turkey	*Meleagris gallopava*	S5	G5						
Great Blue Heron	*Ardea herodias*	S5	G5						
Broad-winged Hawk	*Buteo platypterus*	S5B	G5			100			
Spotted Sandpiper	*Actitis macularia*	S5	G5						
Ring-billed Gull	*Larus delawarensis*	S5B,S4N	G5						
Yellow-bellied Sapsucker	*Sphyrapicus varius*	S5B	G5			30-50			
Downy Woodpecker	*Picoides pubescens*	S5	G5						
Northern Flicker	*Colaptes auratus*	S4B	G5						X
Eastern Wood-Pewee	*Contopus virens*	S4B	G5						X
Alder Flycatcher	*Empidonax alnorum*	S5B	G5						
Eastern Phoebe	*Sayornis phoebe*	S5B	G5						
Red-eyed Vireo	*Vireo olivaceus*	S5B	G5						
Blue Jay	*Cyanocitta cristata*	S5	G5						
American Crow	*Corvus brachyrhynchos*	S5B	G5						
Tree Swallow	*Tachycineta bicolor*	S4B	G5						
Cliff Swallow	*Petrochelidon pyrrhonota*	S4B	G5						
Black-capped Chickadee	*Poecile atricapillus*	S5	G5						
Hermit Thrush	*Catharus guttatus*	S5B	G5			20-30	7		
American Robin	*Turdus migratorius*	S5B	G5						
Gray Catbird	*Dumetella carolinensis*	S4B	G5						
Brown Thrasher	*Toxostoma rufum*	S4B	G5						X
European Starling	*Sturnus vulgaris*	SNA	G5						

Table 3.7: Breeding Bird Point Count Results

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)	ECO REGION (OWES)	Source	Local Status PIF Priority Species (BCR 13)
Cedar Waxwing	*Bombycilla cedrorum*	S5B	G5						
Common Yellowthroat	*Geothlypis trichas*	S5B	G5						
Yellow Warbler	*Setophaga petechia*	S5B	G5						
Savannah Sparrow	*Passerculus sandwichensis*	S4B	G5						X
Song Sparrow	*Melospiza melodia*	S5B	G5						
Swamp Sparrow	*Melospiza georgiana*	S5B	G5						
White-throated Sparrow	*Zonotrichia albicollis*	S5B	G5			20			
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B	G5						X
Indigo Bunting	*Passerina cyanea*	S4B	G5						
Red-winged Blackbird	*Agelaius phoeniceus*	S5	G5						
American Goldfinch	*Carduelis tristis*	S5B	G5						

Table 4.1: Wetland Characteristics and Ecological Functions Assessment for Wetlands found within 120m of the Project Location

Characteristic	Size (ha)	Wetland Type	Site Type	Vegetation Communities	Proximity to other wetlands	Interspersion	Open Water Types	Flood Attenuation	Water Quality Improvement (short term)	Water Quality Improvement (long term nutrient trap)	Water Quality Improvement (groundwater discharge)	Shoreline Erosion	Groundwater Recharge	Rare Species	Significant Features	Fish Habitat
OWES Manual Section		**1.1.2**	**1.1.3**	**1.2.2**	**1.2.4**	**1.2.5**	**1.2.6**	**3.1**	**3.2**	**3.2**	**3.2**	**3.4**	**3.5**	4.1.2	**4.2**	**4.2.6**
Details	1.34	8	1	2	5	6	0	100	22.5	10	9	0	50	0	0	0
Wetland we2 Assessment	17.527	Swamp, Marsh	WE2 is considered palustrine. Flow is observed exiting feature within the watercourse bisecting the subject property	SWD2-2 has 4 forms (h, ls, gc, m) MAS2-1 has 2 forms (ls, ne) FOD6-1 has 3 forms (h, ls, gc)	WE2 is considered to be hydrologically connected by surface water to other wetlands (same dominant wetland type) within 0.5km	47 Intersections Scores 9	Within MAS2-1 it has been determined that there is a small open water section in the middle of the feature	Headwater 60.34 ha catchment area	Step1 = go to next step Step2 =FA of palustrine wetland with no inflow Step3 = 50% of upstream agriculture/urban Step4 = 60x0.7x1x0.75 = 31.5	A majority of WE2 is considered swamp with less than 50% being covered with organic soil. WE2 also has marsh features with more than 50% of the wetland covered with organic soil. Both score the same in OWES	1. Wetland Type =Swamp/Marsh 2. Topography =flat/rolling 3. WA:UCA =large(>50) 4. Lagg =none 5. Seeps =none 6. Marl =none 7. Iron =none 8. Aquifer =N/A *WA:UCA was estimated because UCA is unknown*	WE2 is considered palustrine	All features within WE2 are considered palustrine	No SAR species were identified through background data collection. No SAR/habitat was observed through multiple field investigations.	No significant features or habitat present for 1. Colonial water birds; 2. Winter cover for wildlife; 3. Waterfowl staging or moulting; 4. Waterfowl breeding; 5. Migratory passerine, shorebird or raptor stopover	Some minimal low marsh habitat is available (< 1% open water); majority of feature is high marsh (seasonally dry) and no connection to permanent water either upstream or downstream is available. Use as spawning/nursery habitat is unknown; however the feature is small and not considered locally significant.
Wetland we3 Assessment	45.547	Swamp	WE3 is considered palustrine. Flow is observed exiting feature within the watercourse south of the feature.	It is assumed that WE3 has a single vegetation community (SWD2-2). It is assumed that SWD2-2 has 4 forms (h, ls, gc, m) similar to the vegetation community that exists within the property boundary.	WE3 is considered to be hydrologically connected by surface water to other wetlands (same dominant wetland type) within 0.5km	44 Intersections Scores 9	There is no open water within WE3	Headwater 45.93 ha catchment area	Step1 = go to next step Step2 =FA of palustrine wetland with no inflow Step3 = 50% of upstream agriculture/urban Step4 = 60x0.7x1x0.75 = 31.5	It is assumed that SWD2-2 is covered with less than 50% organic soil. This is similar to feature SWD2-2 that is on the subject property.	1. Wetland Type =Swamp/Marsh 2. Topography =flat/rolling 3. WA:UCA =large(>50) 4. Lagg =none 5. Seeps =none 6. Marl =none 7. Iron =none 8. Aquifer =N/A *WA:UCA was estimated because UCA is unknown* *4 through 7 are unknown and assumed*	WE3 is considered palustrine	WE3 is considered palustrine	No SAR species were identified through background data collection.	No significant features or habitat present for 1. Colonial water birds; 2. Winter cover for wildlife; 3. Waterfowl staging or moulting; 4. Waterfowl breeding; 5. Migratory passerine, shorebird or raptor stopover	It is assumed that WE3 does not provide any habitat to fish species.

Table 4.2: Evaluation of Significance for Woodlands found in and within 120 m of the Project Location

				Ecological Functions Criteria						
Natural Feature Number	**Size (Ha)**	**ELC Type(s) within 120m of Project Location**	**Woodland Size Criteria**	**Woodland Interior**	**Proximity to other Significant Woodlands or Habitats[1]**	**Linkages[2]**	**Water Protection[3]**	**Woodland Diversity Representation[4]**	**Uncommon Characteristics Criteria[5]**	**Woodland is Considered Significant (meets at least 1 criteria)**
wo1	3.2	SWD2-2	4 ha	No	No	No	No	None	None	**No**
wo2	23.2	SWD2-2 and FOD6-2	4 ha	No	Yes	No	No	Yes	None	**Yes**
wo3	49.3	SWD2-2 and CUW	4 ha	Yes	Yes	No	No	Yes	None	**Yes**
wo5	2.0	CUW	4 ha	No	No	No	No	None	None	**No**

1- located within 30m of an identified significant feature or fish habitat *and* the woodland is 10 ha or larger

2- located between two other significant features each of which is within 120 m *and* the woodland is 10 ha or larger

3- located within 50m of a sensitive hydrological feature (i.e. fish habitat, groundwater discharge, headwater area) and the woodland is 4 ha or larger

4- has an area dominated by native natural occurring woodland species *and* the woodland is 10 ha or larger

5- has uncommon species composition, cover type, age or structure or are older than 100 years old *and* the woodland is 4 ha or larger

Table 4.3: Evaluation of Significance for Amphibian Woodland Breeding

Feature No.	Station No.	Vegetation Community Type(s)	Criteria		Significant (Yes/No)
			1 or more specified species*	20 or more total individuals*	
we1	C	SWD2-2	Yes	No	**No**
we2 and we3	A&B	SWD2-2	Yes	Yes	**Yes**
		MAS2-1			

*Both criteria must be present for a determination of significance

Table 4.4: Evaluation of Significance for Marsh Breeding Bird Habitat

Feature No.	Vegetation Community Type(s)	Criteria		Significant (Yes/No)
		Presence of 5 or more nesting pairs of the listed species	Any wetland with breeding of 1 or more Trumpeter Swans, Black Terns or Yellow Rail	
we2	MAM2-2	No	No	**No**

Table 4.5: Evaluation of Significant for Bird Breeding Habitat (woodland area sensitive)

Feature No.	Vegetation Community Type(s)	Criteria		Significant (Yes/No)
		Presence of nesting or breeding pairs of 3 or more of the listed wildlife species	Any site with breeding Cerulean Warblers or Canada Warbler	
wo2	SWD2-2 and FOD6-2	No	No	**No**
wo3	SWD 2-2	Assumed Significant	Assumed Significant	**Yes**

Table 5.1: Summary of Potential Impacts and Mitigation Measures for the Project components sited within 120 m of the Project Location

Feature # *(see Figure 5)*	**Significance**	**Project components sited within 120 m of the Project Location**	**Potential Impacts**	**Mitigation Measures**
wo2 and we2	Significant Woodland Wetland (assumed to be significant for the purposes of this report) Significant wildlife habitat (woodland amphibian breeding ponds)	Solar panels and racking system, fence, access road and inverter stations.	Loss of 0.83 ha of woodland vegetation and amphibian habitat. No loss of vernal pools. Alteration or removal of vegetation for construction of Project components could have the potential to affect both flora and fauna through loss of species diversity, by reducing or fragmenting available habitat (especially for species with low mobility). A new woodland edge would be created as a result of tree clearing that could result in desiccation or drying and changes to surface water drainage to the features could result. Some increased risk of amphibian mortality on construction roads; potential effects are considered minimal. Contamination through sedimentation and/or accidental spills during construction or operation. Some potential for change in surface water inputs to wetlands. Temporary disturbance to wildlife from construction noise are considered minimal.	No development in wetland boundary. Limits of vegetation clearing are to be staked in the field. To the extent practical, tree and/or brush clearing will be completed prior to or after the core nesting season for migratory birds (May 1 to July 31). Should clearing be required during the breeding bird season, prior to construction, surveys will be undertaken to identify the presence/absence of nesting birds or breeding habitat. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer width will range from 5- 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada The boundaries of all wetlands within 30 m of the proposed construction area will be flagged / staked in the field by a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid these sensitive areas and to assist with the proper field installation of E&S controls. Where possible, and as appropriate, access roads will be constructed at or near existing grade to maintain surface flow contributions to wetlands. Where new access roads cross existing drainage features, design will include culverts or other appropriate structures of sufficient size to accommodate flow. No vegetation removal is to occur within 4m of we2. Additional mitigation measures for vegetation removal will be implemented as outlined in

Table 5.1: Summary of Potential Impacts and Mitigation Measures for the Project components sited within 120 m of the Project Location

Feature # *(see Figure 5)*	Significance	Project components sited within 120 m of the Project Location	Potential Impacts	Mitigation Measures
				Section 5.4.1.1 Silt fencing will be erected at the edge of we2 where it is located within 30 m of construction areas (including staging areas and laydown areas). At a minimum the silt fencing will be placed 4m from the edge of we2.These barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation. Additional mitigation measures for sediment and erosion control will be implemented as outlined in Section 5.4.1.2 Prior to construction, the limits of vegetation clearing in wo2 will be staked in the field as detailed in **Figure 6**. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed. Daily monitoring of the limits of clearing will be employed to ensure the objective of minimal disturbance. Should monitoring reveal that clearing occurred beyond defined limits, rehabilitation of the disturbed area to pre-disturbance conditions at the direction of a qualified ecologist (with enhancement of any disturbed areas) will be undertaken immediately. Silt fencing will be erected in wo2 at the staked edge of the limits of vegetation clearing. These barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation. Additional mitigation measures for sediment and erosion control will be implemented as outlined in Section 5.3.1.2 All refuelling activities will occur 30m from the

Table 5.1: Summary of Potential Impacts and Mitigation Measures for the Project components sited within 120 m of the Project Location

Feature # *(see Figure 5)*	Significance	Project components sited within 120 m of the Project Location	Potential Impacts	Mitigation Measures
				woodlands and wetlands. In the event of an accidental spill, the MOE Spills Action Centre will be contacted and emergency spill procedures implemented immediately. Any fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas. Sediment and erosion control implemented and maintained in good repair, including maintenance of sediment fencing around the perimeter of the Project Location as a barrier to amphibians. Construction staff will be trained in amphibian identification and visually inspect work areas for amphibian presence prior to the initiation of construction activities and relocate identified amphibians from the work zone. Construction activities will be limited to daytime hours only. Vehicle speeds will be restricted to 30 km/h or less. Proper muffling of construction machinery to keep noise levels at a minimum
we3 and wo3	Significant Woodland Wetland (assumed to be significant for the purposes of this report)	Solar panels and racking system and fence	No direct negative impacts are expected. Some increased risk of amphibian mortality on construction roads; potential effects are considered minimal.	No activities (construction, operation, decommissioning) will occur within wo3 as it is separated from the project location by an active railway corridor (11m). No mitigation measures are required for wo3. No activities (construction, operation,

Table 5.1: Summary of Potential Impacts and Mitigation Measures for the Project components sited within 120 m of the Project Location

Feature # *(see Figure 5)*	Significance	Project components sited within 120 m of the Project Location	Potential Impacts	Mitigation Measures
	Significant wildlife habitat (woodland amphibian breeding ponds and woodland breeding birds)		Contamination through sedimentation and/or accidental spills during construction or operation. Some potential for change in surface water inputs to wetlands. Temporary disturbance to wildlife from construction noise are considered minimal.	decommissioning) will occur within we3 as it is separated from the project location by an active railway corridor. No mitigation measures are required for we3.

Table 5.2 Summary of Potential Effects and Mitigation Measures for Generalized Wildlife Habitat during the Construction and Decommissioning Phases

Project Component	Project Activity	Potential Negative Effects	Mitigation Measures	Objectives, Monitoring, and Contingency Plans
Solar Panel Installation	Clearing, grubbing, grading, and topsoil removal	• Increased erosion and sedimentation into woodlands, wetlands, and other natural features, • Soil compaction	• Develop and implement an erosion and sediment control plan, • Utilize erosion blankets, silt fencing, straw bales, etc for construction activities within 30m of a wetland, woodland, or water body, • Maintain erosion control measures for the duration of construction or decommissioning activities, • Suspend work if high runoff volume is noted or excessive sediment discharge occurs, • Any stockpiled material will be stored more than 30m from a wetland, woodland, or water body, • No vehicle traffic on exposed soils, and no heavy machinery traffic on sensitive slopes	• Minimize direct impacts on vegetation communities and protect rare/sensitive habitats, • Maintain vegetated buffers, particularly within riparian zones, • Minimize the impacts of sedimentation on nearby natural features • Monitor silt fencing daily when work is taking place at the location and before and after storm events
	Noise/human activity	• Disturbance and/or mortality to local wildlife	• Clearly post construction speed limits	• Limit potential wildlife road mortalities
	Accidental damage to vegetation	• Damage or removal of vegetation adjacent to the project location	• Where construction activity occurs within 30m of a naturally vegetated feature (ie a significant woodland or wetland), the construction area should be clearly delineated with protective fencing, such as silt fencing, • Damaged trees should be pruned through implementation of proper arboricultural techniques	• Minimize impacts to natural vegetation • Monitor silt fencing daily when work is taking place at the location and before and after storm events
	Chemical spills or accidental fluid release (ie oil, gasoline, grease, etc)	• Soil or water contamination	• Implement best management practices, • Develop a spill response plan and train staff on appropriate procedures, • Keep emergency spill kits on site, • Vehicle washing, refueling stations, and chemical storage will all be located more than 30m from natural features or water bodies, • Dispose of waste material by authorized and approved offsite vendors	• Minimize impacts to natural features and wildlife habitats, • Avoid contamination of water or wetland features
	Dewatering activities (if necessary)	• Reduced stream flow rate, • Increased water	• Control rate and timing of water pumping, • Pump from deep wells to infiltration galleries adjacent to water bodies or wetlands or use off-	• Maintain ground and surface water conditions with those near pre-

Table 5.2 Summary of Potential Effects and Mitigation Measures for Generalized Wildlife Habitat during the Construction and Decommissioning Phases

Project Component	Project Activity	Potential Negative Effects	Mitigation Measures	Objectives, Monitoring, and Contingency Plans
		temperature	site water, • Do not take water during periods of extreme low flow	construction conditions
	Installation of impervious surfaces	• Increase surface run-off, • Changes in surface water drainage	• Maintain vegetative buffers around water bodies, • Control quantity and quality of stormwater discharge using best management practices, • Minimize grading activities to maintain existing drainage patterns as much as possible	• Limit disturbances to surface water drainage patterns
Temporary Access Roads	Clearing, grubbing, grading, and topsoil removal	• Increased erosion and sedimentation into woodlands, wetlands, and other natural features, • Soil compaction	• Develop and implement an erosion and sediment control plan, • Utilize erosion blankets, silt fencing, straw bales, etc for construction activities within 30m of a significant wetland, woodland, or water body, • Maintain erosion control measures for the duration of construction or decommissioning activities, • Any stockpiled material will be stored more than 30m from a wetland, woodland, or water body, • No vehicle traffic on exposed soils, or heavy machinery traffic on sensitive slopes, • Re-vegetate temporary roads to pre-construction conditions as soon as possible after construction activities are complete	• Minimize direct impacts on vegetation communities and protect rare/sensitive habitats, • Maintain vegetated buffers, particularly within riparian zones, • Minimize the impacts of sedimentation on nearby natural features • Monitor silt fencing daily when work is taking place at the location and before and after storm events
	Noise/human activity	• Disturbance and/or mortality to local wildlife	• Avoid construction or decommissioning activities during sensitive time periods (ie breeding bird season), wherever possible, • Conduct nest searches if vegetation removal will occur during the breeding bird season (May 1-July 31) • Construction and decommissioning activities within 30m of woodlands or wetlands should occur during daylight hours, wherever possible, • Clearly post construction speed limits	• Limit potential wildlife road mortalities
	Accidental damage to	• Damage or removal of	• Where construction activity occurs within 30m of	• Minimize impacts to

Table 5.2 Summary of Potential Effects and Mitigation Measures for Generalized Wildlife Habitat during the Construction and Decommissioning Phases

Project Component	Project Activity	Potential Negative Effects	Mitigation Measures	Objectives, Monitoring, and Contingency Plans
	vegetation	vegetation adjacent to the project location	a naturally vegetated feature (ie significant woodland or wetland), the construction area should be clearly delineated with protective fencing, such as silt fencing, • Damaged trees should be pruned through implementation of proper arboricultural techniques	natural vegetation • Monitor silt fencing daily when work is taking place at the location and before and after storm events
	Chemical spills or accidental fluid release (ie oil, gasoline, diesel fuel, grease, etc)	• Soil or water contamination	• Implement best management practices, • Develop a spill response plan and train staff on appropriate procedures, • Keep emergency spill kits on site, • Vehicle washing, refueling stations, and chemical storage will all be located more than 30m from natural features or water bodies, • Dispose of waste material by authorized and approved offsite vendors	• Minimize impacts to natural features and wildlife habitats, • Avoid contamination of water or wetland features
	Installation of impervious surfaces	• Increase surface run-off, • Changes in surface water drainage	• Maintain vegetative buffers around water bodies, • Control quantity and quality of stormwater discharge using best management practices, • Minimize grading activities to maintain existing drainage patterns as much as possible	• Limit disturbances to surface water drainage patterns
Permanent Access Roads	Clearing, grubbing, grading, and topsoil removal	• Increased erosion and sedimentation into woodlands, wetlands, and other natural features, • Soil compaction	• Develop and implement an erosion and sediment control plan, • Utilize erosion blankets, silt fencing, straw bales, etc for construction activities within 30m of a wetland, woodland, or water body, • Maintain erosion control measures for the duration of construction or decommissioning activities, • Any stockpiled material will be stored more than 30m from a wetland, woodland, or water body, • No vehicle traffic on exposed soils, and no heavy machinery traffic on sensitive slopes	• Minimize direct impacts on vegetation communities and protect rare/sensitive habitats, • Maintain vegetated buffers, particularly within riparian zones, • Minimize the impacts of sedimentation on nearby natural features • Monitor silt fencing daily when work is taking place at the location and before and after storm events

Table 5.2 Summary of Potential Effects and Mitigation Measures for Generalized Wildlife Habitat during the Construction and Decommissioning Phases

Project Component	Project Activity	Potential Negative Effects	Mitigation Measures	Objectives, Monitoring, and Contingency Plans
	Noise/human activity	• Disturbance and/or mortality to local wildlife	• Avoid construction or decommissioning activities during sensitive time periods (ie breeding bird season), wherever possible, • Conduct nest searches if vegetation removal will occur during the breeding bird season (May 1-July 31) • Construction and decommissioning activities within 30m of woodlands or wetlands should occur during daylight hours, wherever possible, • Clearly post construction speed limits	• Limit potential wildlife road mortalities
	Accidental damage to vegetation	• Damage or removal of vegetation adjacent to the project location	• Where construction activity occurs within 30m of a naturally vegetated feature (ie significant woodland or wetland), the construction area should be clearly delineated with protective fencing, such as silt fencing, • Damaged trees should be pruned through implementation of proper arboricultural techniques	• Minimize impacts to natural vegetation • Monitor silt fencing daily when work is taking place at the location and before and after storm events
	Chemical spills or accidental fluid release (ie oil, gasoline, grease, etc)	• Soil or water contamination	• Implement best management practices, • Develop a spill response plan and train staff on appropriate procedures, • Keep emergency spill kits on site, • Vehicle washing, refueling stations, and chemical storage will all be located more than 30m from natural features or water bodies, • Dispose of waste material by authorized and approved offsite vendors	• Minimize impacts to natural features and wildlife habitats, • Avoid contamination of water or wetland features
	Installation of impervious surfaces	• Increase surface run-off, • Changes in surface water drainage	• Maintain vegetative buffers around water bodies, • Control quantity and quality of stormwater discharge using best management practices, • Minimize grading activities to maintain existing drainage patterns as much as possible	• Limit disturbances to surface water drainage patterns

Table 5.3: Post-Construction Monitoring Plan for the Project Location

Potential Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan					Contingency Measures
			Methods	Location	Freq.	Rationale	Reports	
Contamination of natural heritage features through sedimentation and/or accidental spill	Proper storage of materials off-site in storage containers Adherence to Emergency Response Plan Contact MOE Spills Action Centre Sediment and erosion control implemented and maintained in good repair.	Minimize likelihood of spill Contain spill material Contain sediments in run-off.	Visual inspections to ensure proper storage and maintenance of sediment control structures in good repair.	Storage areas Run-off point entering feature 2, as necessary.	Weekly	n/a	Monthly	Follow-up monitoring /inspections in the event of an accidental spill/leak Remedial actions may be required in the event monitoring indicates a negative effect to natural features
Disturbance, fragmentation and removal of woodland habitats	Limits of vegetation clearing to be staked in the field	No clearing beyond staked limits	Visual inspections to ensure stakes are present and works stay within demarcated areas	All clearing areas in woodland	Weekly	n/a	Monthly	Replace any missing stakes Immediately stop work in off-limit areas and replant or reseed as needed
Changes to woodland or wetland hydrology due to access roads	Access roads to be constructed at grade Use of permeable materials Installation of equalization culverts where	Minimal change to existing hydrologic conditions; no significant ponding or drying	Visual inspection	Access roads	Weekly through spring during construction	n/a	Monthly	To be developed based on site-specific conditions; may include installation of additional culverts,

Table 5.3: Post-Construction Monitoring Plan for the Project Location

Potential Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan					Contingency Measures
			Methods	Location	Freq.	Rationale	Reports	
	appropriate							
	Construction staff will be trained in amphibian identification and visually inspect work areas for amphibian presence; amphibian species will be relocated from work zone prior to the initiation of construction activities.	Minimize potential for amphibian mortality.	Visual inspections to identify amphibian presence; identified amphibian species will be relocated from work zone prior to the initiation of construction activities.	Work areas in Project Location	Immediately prior to commencement of work or activity	n/a	Monthly	Suspend work temporarily while amphibians are being relocated.

Table 5.4- Summary of Environmental Effects Monitoring Plan for operation of David Brown Solar Project

Feature	Potential Negative Environmental Effects	Mitigation Strategy	Performance Objective	Environmental Effects Monitoring Plan					Contingency Measure
				Methodology	Monitoring Locations	Frequency and Duration of Sample Collection	Technical and Statistical Value of Data	Reporting Requirements	
we2 and wo2	Improper storage or disposal of oils, gasoline, grease or other materials used in construction vehicles, or maintenance vehicles may result in spills or leaks, contaminating soils or water. Potential for erosion and/or sedimentation but these impacts will be short term and highly localized. Changes in soil moisture and structure (compaction) however should be highly localized. Indirect effects from construction (e.g., noise, vehicle movement) could temporarily disturb wildlife this habitat; however any disturbance is anticipated to be short-term. Dust generation will be short-term and highly localized.	Maintenance vehicle traffic will primarily be restricted to daytime hours. Vehicle speeds will be restricted to 30 km/h or less. Speed limit signage will be erected to communicate 30km/hr limit. Construction activities will be limited to daytime hours only. No vegetation removal is to occur within 4m of we2. Prior to construction, the limits of vegetation clearing in wo2 will be staked in the field as detailed in **Figure 6**. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed. Daily monitoring of the limits of clearing will be employed to ensure the objective of minimal disturbance. Should monitoring reveal that clearing occurred beyond defined limits, rehabilitation of the disturbed area to pre-disturbance conditions at the direction of a qualified ecologist (with enhancement of any disturbed areas) will be undertaken immediately. Construction is to take place outside of the sensitive April-June breeding period for this habitat. Should construction be unavoidable in April-June a trained biologist will accompany construction crews to monitor amphibian movements within vicinity of the amphibian breeding habitat and where possible prevent mortality. Specifically, the biologist will search the area for amphibians and usher them to areas outside of the construction zone according to MNR recommended best practices. Additional mitigation measures for vegetation removal will be implemented as outlined in	No impacts to amphibian use of habitat; no direct impacts to ABH01 anticipated. No disruption or significant alteration to current site hydrology including surficial flow patterns to feature given distance from feature to construction area and highly localized construction activity. No soil compaction, erosion, or other impacts to feature given distance from feature to construction area and highly localized construction activity. Monitoring one year post-construction to ensure no significant impacts to SWH.	Surveys will be conducted once per month in April, May and June after completion of the project. Surveys will begin 30 minutes after sunset on nights with suitable environmental conditions (temperatures above 8°C, no heavy rain, and the wind speed below a Beaufort Scale measurement of 3). Observations will be made in a listening radius of 100 m extending from each station and sweeping a semicircular area pointed toward the appropriate feature. Species occurrences, densities and locations will be noted, and results compared to Natural Heritage Assessment surveys.	Same stations used in EOS acoustic surveys,	One year of data will be collected post-construction following protocols for pre-construction surveys. Three surveys will be conducted between April and July 5th, with at least 15 days between each survey, on nights when the minimum nightly temperature is above 5°C, 10°C, and 17°C respectively.	All post-construction data will be compared with observations obtained during pre-construction habitat-use surveys of species richness and abundance.	Results of post-construction surveys to monitor changes in abundance and species richness will be compiled and submitted to the MNR for review.	If a change in species richness and/or abundance is noted during post-construction monitoring then MNR will be contacted to discuss further mitigation measures.

		Section 5.3.1.1 Silt fencing will be erected in wo2 at the staked edge of the limits of vegetation clearing. These barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation. As amphibians can be sensitive, no handling or collection will occur. There will be no collection or capturing of amphibians. Daily visual monitoring of work area to ensure compliance (construction only occurring outside significant feature).							

APPENDIX C

WILDLIFE SPECIES IN REGIONAL LANDSCAPE

Appendix C
Wildlife Species in a Regional Context

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)
BUTTERFLIES					
Monarch	*Danaus plexippus*	S4B, S2N	SC	SC	
AMPHIBIANS					
Mudpuppy	*Necturus maculosus*	S4	NAR	NAR	10
Red-spotted Newt	*Notophthalmus viridescens*	S5			
Spotted Salamander	*Ambystoma maculatum*	S4			
Northern Two-lined Salamander	*Eurycea bislineata*	S4			
Northern Redback Salamander	*Plethodon cinereus*	S5			
American Toad	*Anaxyrus americanus*	S5			
Tetraploid Gray Treefrog	*Hyla versicolor*	S5			
Western Chorus Frog (great lakes - shield)	*Pseudacris triseriata*	S3	NAR	THR	
Spring Peeper	*Pseudacris crucifer*	S5			
Bullfrog	*Lithobates catesbeiana*	S4			1
Northern Green Frog	*Lithobates clamitans*	S5			
Pickerel Frog	*Lithobates palustris*	S4	NAR	NAR	
Wood Frog	*Lithobates sylvatica*	S5			
Northern Leopard Frog	*Lithobates pipiens*	S5	NAR	NAR	
Mink Frog	*Lithobates septentrionalis*	S5			
REPTILES					
Snapping Turtle	*Chelydra serpentina*	S3	SC	SC	
Midland Painted Turtle	*Chrysemys picta marginata*	S5			
Northern Map Turtle	*Graptemys geographica*	S3	SC	SC	30-50
Blanding's Turtle	*Emydoidea blandingi*	S3	THR	THR	
Spotted Turtle	*Clemmys guttata*	S3	END	END	
Eastern Gartersnake	*Thamnophis sirtalis*	S5			
Northern Watersnake	*Nerodia sipedon sipedon*	S5	NAR	NAR	1
Redbelly Snake	*Storeria occipitomaculata*	S5			
Smooth Greensnake	*Opheodrys vernalis*	S4			
BIRDS					
Snow Goose	*Chen caerulescens*	S5B			
Ross' Goose	*Chen rossii*	S1B			
Canada Goose	*Branta canadensis*	S5			
Wood Duck	*Aix sponsa*	S5			
Gadwall	*Anas strepera*	S4			
American Wigeon	*Anas americana*	S4			
American Black Duck	*Anas rubripes*	S4			
Mallard	*Anas platyrhynchos*	S5			
Blue-winged Teal	*Anas discors*	S4			
Northern Shoveler	*Anas clypeata*	S4			
Northern Pintail	*Anas acuta*	S5			
Green-winged Teal	*Anas crecca*	S4			

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)
Long-tailed Duck	*Clangula hyemalis*	S3B			
Greater Scaup	*Aythya marila*	S4			
Lesser Scaup	*Aythya affinis*	S4			
Bufflehead	*Bucephala albeola*	S4			
Common Goldeneye	*Bucephala clangula*	S5			
Hooded Merganser	*Lophodytes cucullatus*	S5B,S5N			
Common Merganser	*Mergus merganser*	S5B,S5N			
Red-breasted Merganser	*Mergus serrator*	S4B,S5N			
Ruddy Duck	*Oxyura jamaicensis*	S4B,S4N			10
White-winged Scoter	*Melanitta fusca*	S4B,S4N			
Gray Partridge	*Perdix perdix*	SNA			
Ring-necked Pheasant	*Phasianus colchicus*	SNA			
Ruffed Grouse	*Bonasa umbellus*	S5			20
Wild Turkey	*Meleagris gallopava*	S5			
Common Loon	*Gavia immer*	S5B,S5N	NAR	NAR	70
Pied-billed Grebe	*Podilymbus podiceps*	S4B,S4N			
Double-crested Cormorant	*Phalacrocorax auritus*	S5B	NAR	NAR	20
American Bittern	*Botaurus lentiginosus*	S4B			10
Least Bittern	*Ixobrychus exilis*	S4B	THR	THR	
Great Blue Heron	*Ardea herodias*	S5			
Green Heron	*Butorides virescens*	S4B			
Black-crowned Night-Heron	*Nycticorax nycticorax*	S3B,S3N			
Turkey Vulture	*Cathartes aura*	S5B			
Osprey	*Pandion haliaetus*	S5B			
Bald Eagle	*Haliaeetus leucocephalus*	S2N,S4B	SC	NAR	
Northern Harrier	*Circus cyaneus*	S4B	NAR	NAR	55
Sharp-shinned Hawk	*Accipiter striatus*	S5	NAR	NAR	20-30
Cooper's Hawk	*Accipiter cooperii*	S4	NAR	NAR	4-50+
Northern Goshawk	*Accipiter gentilis*	S4	NAR	NAR	100
Red-shouldered Hawk	*Buteo lineatus*	S4B		NAR	50-70
Broad-winged Hawk	*Buteo platypterus*	S5B			100
Red-tailed Hawk	*Buteo jamaicensis*	S5	NAR	NAR	
Rough-legged Hawk	*Buteo lagopus*	S1B, S4N	NAR	NAR	
American Kestrel	*Falco sparverius*	S5B			
Yellow Rail	*Coturnicops noveboracensis*	S4B	SC	SC	
Virginia Rail	*Rallus limicola*	S5B			
Sora	*Porzana carolina*	S4B			
Common Gallinule	*Gallinula chloropus*	S4B			
American Coot	*Fulica americana*	S4B	NAR	NAR	50
Black-bellied Plover	*Pluvialis squatarola*	S4N			
Semipalmated Plover	*Charadrius semipalmatus*	S4B,S4N			

Appendix C
Wildlife Species in a Regional Context

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)
Lesser Golden Plover	*Pluvialis dominica*	S2B,S4N			
Killdeer	*Charadrius vociferus*	S5B, S5N			
Spotted Sandpiper	*Actitis macularia*	S5			
Solitary Sandpiper	*Tringa solitaria*	S4B			
Greater Yellowlegs	*Tringa melanoleuca*	S4B,S4N			
Lesser Yellowlegs	*Tringa flavipes*	S4B,S4N			
Upland Sandpiper	*Bartramia longicauda*	S4B			25
Sanderling	*Calidris alba*	S5N			
Willet	*Catoptrophorus semipalmatus*	SNA			
Ruddy Turnstone	*Arenaria interpres*	SNA			
Short-billed Dowitcher	*Limnodromus griseus*	S3B,S4N			
Dunlin	*Calidris alpina*	S4B, S5N			
Wilson's Snipe	*Gallinago delicata*	S5B			
American Woodcock	*Scolopax minor*	S4B			
Bonaparte's Gull	*Larus philadelphia*	S4B,S4N			
Ring-billed Gull	*Larus delawarensis*	S5B,S4N			
Herring Gull	*Larus argentatus*	S5B,S5N			
Great Black-backed Gull	*Larus marinus*	S2B			
Common Tern	*Sterna hirundo*	S4B	NAR	NAR	
Rock Pigeon	*Columba livia*	SNA			
Mourning Dove	*Zenaida macroura*	S5			
Yellow-billed Cuckoo	*Coccyzus americanus*	S4B			
Black-billed Cuckoo	*Coccyzus erythropthalmus*	S5B			
Eastern Screech-Owl	*Megascops asio*	S5	NAR	NAR	
Great Horned Owl	*Bubo virginianus*	S5			
Snowy Owl	*Bubo scandiaca*	SNA	NAR	NAR	
Barred Owl	*Strix varia*	S5			100
Long-eared Owl	*Asio otus*	S4			
Short-eared Owl	*Asio flammeus*	S2N, S4B	SC	SC-3	75
Northern Saw-whet Owl	*Aegolius acadicus*	S4			
Common Nighthawk	*Chordeiles minor*	S4B	SC	THR	
Eastern Whip-poor-will	*Caprimulgus vociferus*	S4B	THR	THR	100
Chimney Swift	*Chaetura pelagica*	S4B, S4N	THR	THR	
Ruby-throated Hummingbird	*Archilochus colubris*	S5B			
Belted Kingfisher	*Ceryle alcyon*	S4B			
Red-headed Woodpecker	*Melanerpes erythrocephalus*	S4B	SC	THR	
Yellow-bellied Sapsucker	*Sphyrapicus varius*	S5B			30-50
Downy Woodpecker	*Picoides pubescens*	S5			
Hairy Woodpecker	*Picoides villosus*	S5			10
Northern Flicker	*Colaptes auratus*	S4B			
Pileated Woodpecker	*Dryocopus pileatus*	S5			30-50*

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)
Olive-sided Flycatcher	*Contopus borealis*	S4B	SC	THR	
Eastern Wood-Pewee	*Contopus virens*	S4B			
Alder Flycatcher	*Empidonax alnorum*	S5B			
Willow Flycatcher	*Empidonax traillii*	S5B			
Least Flycatcher	*Empidonax minimus*	S4B			
Eastern Phoebe	*Sayornis phoebe*	S5B			
Great Crested Flycatcher	*Myiarchus crinitus*	S4B			
Eastern Kingbird	*Tyrannus tyrannus*	S4B			
Loggerhead Shrike	*Lanius ludovicianus*	S2B	END	END	25
Northern Shrike	*Lanius excubitor*	SNA			
Yellow-throated Vireo	*Vireo flavifrons*	S4B			30
Blue-headed Vireo	*Vireo solitarius*	S5B			100
Warbling Vireo	*Vireo gilvus*	S5B			
Philadelphia Vireo	*Vireo philadelphicus*	S5B			
Red-eyed Vireo	*Vireo olivaceus*	S5B			
Blue Jay	*Cyanocitta cristata*	S5			
American Crow	*Corvus brachyrhynchos*	S5B			
Common Raven	*Corvus corax*	S5			
Horned Lark	*Eremophila alpestris*	S5B			
Purple Martin	*Progne subis*	S4B			
Tree Swallow	*Tachycineta bicolor*	S4B			
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	S4B			
Bank Swallow	*Riparia riparia*	S4B			
Cliff Swallow	*Petrochelidon pyrrhonota*	S4B			
Barn Swallow	*Hirundo rustica*	S4B		THR-NS	
Black-capped Chickadee	*Poecile atricapillus*	S5			
Red-breasted Nuthatch	*Sitta canadensis*	S5			0
White-breasted Nuthatch	*Sitta carolinensis*	S5			10
Brown Creeper	*Certhia americana*	S5B			30
House Wren	*Troglodytes aedon*	S5B			
Winter Wren	*Troglodytes hiemalis*	S5B			30
Sedge Wren	*Cistothorus platensis*	S4B	NAR	NAR	
Marsh Wren	*Cistothorus palustris*	S4B			
Golden-crowned Kinglet	*Regulus satrapa*	S5B			0
Ruby-crowned Kinglet	*Regulus calendula*	S4B			
Blue-gray Gnatcatcher	*Polioptila caerulea*	S4B			30
Eastern Bluebird	*Sialia sialis*	S5B	NAR	NAR	
Veery	*Catharus fuscescens*	S4B			10-20
Swainson's Thrush	*Catharus ustulatus*	S4B			
Hermit Thrush	*Catharus guttatus*	S5B			20-30
Wood Thrush	*Hylocichla mustelina*	S4B			

Appendix C
Wildlife Species in a Regional Context

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)
American Robin	*Turdus migratorius*	S5B			
Gray Catbird	*Dumetella carolinensis*	S4B			
European Starling	*Sturnus vulgaris*	SNA			
Cedar Waxwing	*Bombycilla cedrorum*	S5B			
Bohemian Waxwing	*Bombycilla garrulus*	SNA			
Snow Bunting	*Plectrophenax nivalis*	SNA			
Ovenbird	*Seiurus aurocapilla*	S4B			20
Northern Waterthrush	*Parkesia noveboracensis*	S5B			20
Golden-winged Warbler	*Vermivora chrysoptera*	S4B	SC	THR	
Black-and-white Warbler	*Mniotilta varia*	S5B			100
Prothonotary Warbler	*Protonotaria citrea*	S1	END	END	
Nashville Warbler	*Oreothlypis ruficapilla*	S5B			
Mourning Warbler	*Geothlypis philadelphia*	S4B			30
Common Yellowthroat	*Geothlypis trichas*	S5B			
Hooded Warbler	*Setophaga citrina*	S3B	SC	THR	15-30
American Redstart	*Setophaga ruticilla*	S5B			20-30
Cerulean Warbler	*Setophaga cerulea*	S3B	THR	END	100
Magnolia Warbler	*Setophaga magnolia*	S5B			30
Bay-breasted Warbler	*Setophaga castanea*	S5B			
Blackburnian Warbler	*Setophaga fusca*	S5B			30-50
Yellow Warbler	*Setophaga petechia*	S5B			
Chestnut-sided Warbler	*Setophaga pensylvanica*	S5B			
Blackpoll Warbler	*Setophaga striata*	S4B			
Black-throated Blue Warbler	*Setophaga caerulescens*	S5B			30-50
Palm Warbler	*Setophaga palmarum*	S5B			
Yellow-rumped Warbler	*Setophaga coronata*	S5B			
Black-throated Green Warbler	*Setophaga virens*	S5B			30
Canada Warbler	*Cardellina canadensis*	S4B	SC	THR	30
Chipping Sparrow	*Spizella passerina*	S5B			
Clay-colored Sparrow	*Spizella pallida*	S4B			
Field Sparrow	*Spizella pusilla*	S4B			
Vesper Sparrow	*Pooecetes gramineus*	S4B			
Savannah Sparrow	*Passerculus sandwichensis*	S4B			
Fox Sparrow	*Passerella iliaca*	S4B			
Song Sparrow	*Melospiza melodia*	S5B			
Swamp Sparrow	*Melospiza georgiana*	S5B			
White-throated Sparrow	*Zonotrichia albicollis*	S5B			20
White-crowned Sparrow	*Zonotrichia leucophrys*	S4B			
Dark-eyed Junco	*Junco hyemalis*	S5B			
Scarlet Tanager	*Piranga olivacea*	S4B			20
Northern Cardinal	*Cardinalis cardinalis*	S5			

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B			
Indigo Bunting	*Passerina cyanea*	S4B			
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR-NS	10
Red-winged Blackbird	*Agelaius phoeniceus*	S5			
Eastern Meadowlark	*Sturnella magna*	S4B		THR-NS	
Common Grackle	*Quiscalus quiscula*	S5B			
Brown-headed Cowbird	*Molothrus ater*	S4B			
Baltimore Oriole	*Icterus galbula*	S4B			
Pine Grosbeak	*Pinicola enucleator*	S4B			
Purple Finch	*Carpodacus purpureus*	S4B			
Common Redpoll	*Carduelis flammea*	S4B			
Pine Siskin	*Carduelis pinus*	S4B			
American Goldfinch	*Carduelis tristis*	S5B			
Evening Grosbeak	*Coccothraustes vespertinus*	S4B			
House Sparrow	*Passer domesticus*	SNA			
MAMMALS					
Virginia Opossum	*Didelphis virginiana*	S4			
Masked Shrew	*Sorex cinereus*	S5			
Pygmy Shrew	*Sorex hoyi*	S4			
Northern Short-tailed Shrew	*Blarina brevicauda*	S5			
Star-nosed Mole	*Condylura cristata*	S5			
Little Brown Bat	*Myotis lucifugus*	S5			
Northern Long-eared Bat	*Myotis septentrionalis*	S3?			
Red Bat	*Lasiurus borealis*	S4			
Big Brown Bat	*Eptesicus fuscus*	S5			
Eastern Cottontail	*Sylvilagus floridanus*	S5			
Snowshoe Hare	*Lepus americanus*	S5			20
Eastern Chipmunk	*Tamias striatus*	S5			
Woodchuck	*Marmota monax*	S5			
Grey Squirrel	*Sciurus carolinensis*	S5			
Red Squirrel	*Tamiasciurus hudsonicus*	S5			
Northern Flying Squirrel	*Glaucomys sabrinus*	S5			
Beaver	*Castor canadensis*	S5			
White-footed Mouse	*Peromyscus leucopus*	S5			
Deer Mouse	*Peromyscus maniculatus*	S5			
Southern Red-backed Vole	*Clethrionomys gapperi*	S5			
Muskrat	*Ondatra zibethicus*	S5			
Norway Rat	*Rattus norvegicus*	SNA			
House Mouse	*Mus musculus*	SNA			
Meadow Jumping Mouse	*Zapus hudsonicus*	S5			
Woodland Jumping Mouse	*Napaeozapus insignis*	S5			

Appendix C
Wildlife Species in a Regional Context

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)
Porcupine	*Erethizon dorsatum*	S5			
Coyote	*Canis latrans*	S5			
Red Fox	*Vulpes vulpes*	S5			
Black Bear	*Ursus americanus*	S5	NAR	NAR	
Raccoon	*Procyon lotor*	S5			
Marten	*Martes americana*	S5			
Fisher	*Martes pennanti*	S5			
Ermine	*Mustela erminea*	S5			
Long-tailed Weasel	*Mustela frenata*	S4			
Mink	*Mustela vison*	S4			
Striped Skunk	*Mephitis mephitis*	S5			
River Otter	*Lutra canadensis*	S5			
Lynx	*Lynx canadensis*	S5		NAR	
Bobcat	*Lynx rufus*	S4			
White-tailed Deer	*Odocoileus virginianus*	S5			
Moose	*Alces alces*	S5			

SUMMARY

Total Butterflies:	*1*
Total Amphibians:	*15*
Total Reptiles:	*9*
Total Birds:	*191*
Total Breeding Birds:	
Total Mammals:	*41*

APPENDIX D

FIELD FORMS

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park	POLYGON: 6	
	SURVEYOR(S): SR + JM	DATE: Oct 12 - 2011	UTME:
	START:	END:	UTMZ: UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☒ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☒ VALLEY SLOPE		☐ FORB	☐ MARSH
		☐ TABLELAND		☐ LICHEN	☐ SWAMP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☒ DECIDUOUS	☐ BOG
		☐ TALUS		☐ CONIFEROUS	☐ BARREN
SITE		☐ CREVICE / CAVE	COVER	☐ MIXED	☐ MEADOW
☐ OPEN WATER	☐ CARB. BEDRK.	☐ ALVAR	☐ OPEN		☐ PRAIRIE
☐ SHALLOW WATER		☐ ROCKLAND	☐ SHRUB		☐ THICKET
☒ SURFICIAL DEP.		☐ BEACH / BAR	☒ TREED		☐ SAVANNAH
☐ BEDROCK		☐ SAND DUNE			☒ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY		3	FRAPENN > ACESACC > ACESASA
2	SUB-CANOPY		3	FRAPENN > ACESASA > ACESACC
3	UNDERSTOREY		1	SOL - SP
4	GRD. LAYER		1	AST-SP > GRA-SP > CAUTHAL > FRAVIVI

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION:	FRAPENN; ACESACC; ULM-SP	BA:	N/A

		<10		10 – 24		25 – 50		>50
SIZE CLASS ANALYSIS:		O		A		R		R
STANDING SNAGS:								N
DEADFALL/LOGS:		A		A		O		N

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH
			X		

SOIL ANALYSIS: Silty Sand

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: Forest	CODE:	FO
COMMUNITY SERIES: Deciduous forest	CODE:	FOD
ECOSITE: Fresh-Moist	CODE:	FOD6
VEGETATION TYPE: Fresh-Moist Sugar maple-lowland Ash decid. forest	CODE:	FOD6-2
INCLUSION		CODE:
COMPLEX		CODE:

Evidence of Disturbance / Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park
	POLYGON: 6
	DATE: Oct 12. 2011
	SURVEYOR(S): SR + JM

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
FRAPENN	D	A			
ACESACC	D	A			
ACESASA	A	A			

SPECIES CODE	LAYER 1	2	3	4	COLL.
SOL-SP			O		
AST-SP				D	
GRA-SP				A	
CAUTHAL				O	
FRAVIVI				O	

Page 1 of 1

Signature: (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE:			POLYGON:	
	SURVEYOR(S):		DATE:		UTME:
	START:	END:		UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	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	☐ NATURAL ☐ CULTURAL	☐ PLANKTON ☐ SUBMERGED ☐ FLOATING-LVD. ☐ GRAMINOID ☐ FORB ☐ LICHEN ☐ BRYOPHYTE ☐ DECIDUOUS ☐ CONIFEROUS ☐ MIXED	☐ LAKE ☐ POND ☐ RIVER ☐ STREAM ☐ MARSH ☐ SWMAP ☐ FEN ☐ BOG ☐ BARREN ☐ MEADOW ☐ PRAIRIE ☐ THICKET ☐ SAVANNAH ☐ WOODLAND ☐ FOREST ☐ PLANTATION
SITE			**COVER**		
☐ OPEN WATER ☐ SHALLOW WATER ☐ SURFICIAL DEP. ☐ BEDROCK			☐ OPEN ☐ SHRUB ☐ TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION:	BA:

SIZE CLASS ANALYSIS:		<10		10 – 24		25 – 50		>50
STANDING SNAGS:		<10		10 – 24		25 – 50		>50
DEADFALL/LOGS:		<10		10 – 24		25 – 50		>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:	(cm)	
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:	(cm)	

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	CODE:
COMMUNITY SERIES:	CODE:
ECOSITE:	CODE:
VEGETATION TYPE:	CODE:
INCLUSION	CODE:
COMPLEX	CODE:

Evidence of Disturbance / Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	
	SITE:
	POLYGON:
	DATE:
	SURVEYOR(S):

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	COLL.	SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	COLL.

Page ___ of ___

Quality Control: This form is complete ☐ & legible ☐.

Signature: ______________________ (Field Personnel)

Signature: ______________________ (Project Manager)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park	POLYGON: 4	
	SURVEYOR(S): SR + JM	DATE: Oct 12, 2011	UTME:
	START:	END:	UTMZ: UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☐ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☒ NATURAL	☐ PLANKTON	☐ LAKE
☒ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☒ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☐ FORB	☐ MARSH
SITE	☐ CARB. BEDRK.	☐ TABLELAND	COVER	☐ LICHEN	☒ SWMAP
☐ OPEN WATER		☐ ROLL. UPLAND	☐ OPEN	☐ BRYOPHYTE	☐ FEN
☒ SHALLOW WATER		☐ CLIFF	☐ SHRUB	☒ DECIDUOUS	☐ BOG
☐ SURFICIAL DEP.		☐ TALUS	☒ TREED	☐ CONIFEROUS	☐ BARREN
☐ BEDROCK		☐ CREVICE / CAVE		☐ MIXED	☐ MEADOW
		☐ ALVAR			☐ PRAIRIE
		☐ ROCKLAND			☐ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	3	FRXPENN > ACESACC
2	SUB-CANOPY	3	3	FRXPENN > ACESACC > ULM-SP > THUOCC1
3	UNDERSTOREY	4	1	ZANAMER > RHA-SP > QUEMACR
4	GRD. LAYER	6	2	GRA-SP > AST-SP > SED-SP > ONDSENS

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: FRXPENN; ACESACC; ULM-SP	BA: N/A

		<10		10 – 24		25 – 50		>50
SIZE CLASS ANALYSIS:	A		A		O		N	
STANDING SNAGS:							N	
DEADFALL/LOGS:	A		A		A		N	

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	PIONEER	YOUNG	X MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS: Silty Sand

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	Swamp	CODE: SW
COMMUNITY SERIES:	Deciduous Swamp	CODE: SWD
ECOSITE:	Ash mineral	CODE: SWD2
VEGETATION TYPE:	GREEN ASH MINERAL DECIDUOUS SWAMP	CODE: SWD2-2
INCLUSION		CODE:
COMPLEX		CODE:

Evidence of Disturbance / Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park
	POLYGON: 4
	DATE: Oct 12. 2011
	SURVEYOR(S): SR + JM

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
ZANAMER			A		
FRAPENN	D	A			
ACESACC	D	O		O	
ULM-SP		O			
RHA-SP			O		
QUEMACR			O	O	
THUOCC1		O	O		
FRANIGR		O			

SPECIES CODE	LAYER 1	2	3	4	COLL.
ONDSENS				O	
LYC-SP				O	
AST-SP			O	O	
SED-SP				O	
GRA-SP				O	
MOS-SP				O	

Page 1 of 1

Signature: (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park	POLYGON: 5	
	SURVEYOR(S): SR + JM	DATE: Oct 12. 2011	UTME:
	START:	END:	UTMZ: UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☐ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☒ NATURAL	☐ PLANKTON	☐ LAKE
☒ WETLAND	☒ MINERAL SOIL	☒ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☒ FORB	☒ MARSH
SITE		☐ TABLELAND		☐ LICHEN	☐ SWAMP
☐ OPEN WATER	☐ CARB. BEDRK.	☐ ROLL. UPLAND	COVER	☐ BRYOPHYTE	☐ FEN
☒ SHALLOW WATER		☐ CLIFF	☐ OPEN	☐ DECIDUOUS	☐ BOG
☐ SURFICIAL DEP.		☐ TALUS	☒ SHRUB	☐ CONIFEROUS	☐ BARREN
☐ BEDROCK		☐ CREVICE / CAVE	☐ TREED	☐ MIXED	☐ MEADOW
		☐ ALVAR			☐ PRAIRIE
		☐ ROCKLAND			☐ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY	3	1	SAL-SP > LARLAR1
3	UNDERSTOREY	4	4	TYP-SP >> SOL-SP
4	GRD. LAYER	6	3	TYP-SP > SOL-SP > GRA-SP

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: SAL-SP ; LARLAR1 BA: N/A

SIZE CLASS ANALYSIS:	O	<10	O	10 – 24	N	25 – 50	N	>50
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

COMM. AGE:	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH
		X			

SOIL ANALYSIS: Silty Sand

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: Marsh	CODE:	MA
COMMUNITY SERIES: Shallow marsh	CODE:	MAS
ECOSITE: Mineral shallow marsh	CODE:	MAS2
VEGETATION TYPE: Cattail Mineral shallow Marsh	CODE:	MAS2-1
INCLUSION	CODE:	
COMPLEX	CODE:	

Evidence of Disturbance / Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park
	POLYGON: 5
	DATE: Oct 12. 2011
	SURVEYOR(S): SR + JM

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
SAL-SP		A			
LARLAR1		O			

SPECIES CODE	LAYER 1	2	3	4	COLL.
SOL-SP			D	O	
TYP-SP			D	O	
GRA-SP				A	

Page 1 of 1

Signature: (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: DAVE BROWN SOLAR Park	POLYGON: 1	
	SURVEYOR(S): SR + JM	DATE: OCT 12. 2011	UTME:
	START:	END:	UTMZ: UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
X TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☐ MINERAL SOIL	X RIVERINE	X CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	X PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		X GRAMINOID	☐ STREAM
		☐ VALLEY SLOPE		☐ FORB	☐ MARSH
	☐ BASIC BEDRK.	☐ TABLELAND		☐ LICHEN	☐ SWMAP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☐ DECIDUOUS	☐ BOG
		☐ TALUS		☐ CONIFEROUS	☐ BARREN
SITE		☐ CREVICE / CAVE	**COVER**	☐ MIXED	X MEADOW
☐ OPEN WATER	☐ CARB. BEDRK.	☐ ALVAR	X OPEN		☐ PRAIRIE
☐ SHALLOW WATER		☐ ROCKLAND	☐ SHRUB		☐ THICKET
X SURFICIAL DEP.		☐ BEACH / BAR	☐ TREED		☐ SAVANNAH
☐ BEDROCK		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY		0	
2	SUB-CANOPY	3	1	POPBABA > THUOCC1
3	UNDERSTOREY	1/5	2	TYP-SP > PASSAT1 > THUOCC1 > SOL-SP
4	GRD. LAYER	1/7	3	GRA-SP > AST-SP > MOS-SP > PASSAT1

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: FRX-SP; THUOCC1; POPBABA							BA: N/A	
SIZE CLASS ANALYSIS:	O	<10	N	10 – 24	N	25 – 50	N	>50
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

COMM. AGE:	X PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS: Silty Sand

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	CULTURAL	CODE:	CU
COMMUNITY SERIES:	meadow	CODE:	CUM
ECOSITE:	MINERAL	CODE:	CUM1
VEGETATION TYPE:		CODE:	
INCLUSION		CODE:	
COMPLEX		CODE:	

Evidence of Disturbance / Notes:

- Lots of rocks @ surface, in piles, gravel, cobble, boulders & erratics

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: DAVE BROWN SOLAR Park
	POLYGON: 1
	DATE: OCT 12. 2011
	SURVEYOR(S): SR & JM

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
FRX-SP			R		
POPBABA		R	R		
THUOCC1		R	O	O	
CORSTOL			R		

SPECIES CODE	LAYER 1	2	3	4	COLL.
SOL-SP			D		
TYP-SP			A		
ASCSYR1				O	
SPR-SP				O	
TANVULG				O	
PASSAT1			A	A	
ASTNOVA				O	
VICCRAC				O	
LYTJALI			O		
AHRAUST			O		
MOSS_SP				A	
SYL-SP			R		
GRA-SP				D	
AST-SP				A	

Signature: SRogers (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park		POLYGON: 2	
	SURVEYOR(S): SR + JM	DATE: Oct 12. 2011		UTME:
	START:	END:	UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☒ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☐ FORB	☐ MARSH
SITE	☐ CARB. BEDRK.	☐ TABLELAND		☐ LICHEN	☐ SWAMP
☐ OPEN WATER		☒ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
☐ SHALLOW WATER		☐ CLIFF		☐ DECIDUOUS	☐ BOG
☒ SURFICIAL DEP.		☐ TALUS		☐ CONIFEROUS	☐ BARREN
☐ BEDROCK		☐ CREVICE / CAVE	COVER	☒ MIXED	☐ MEADOW
		☐ ALVAR	☒ OPEN		☐ PRAIRIE
		☐ ROCKLAND	☐ SHRUB		☐ THICKET
		☐ BEACH / BAR	☐ TREED		☒ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	—	—	
2	SUB-CANOPY		2	POPBALBA > FRX-SP > THUOCCI > LARLAR1
3	UNDERSTOREY		1	CORSTOL > THUOCCI > POPBALBA
4	GRD. LAYER		3	GRA-SP

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: POPBALBA; THUOCCI; FRX-SP; LARLAR1	BA: N/A

SIZE CLASS ANALYSIS:	A	<10	b	10 – 24	C	25 – 50	N	>50
STANDING SNAGS:		<10		10 – 24		25 – 50	N	>50
DEADFALL/LOGS:	O	<10	O	10 – 24	N	25 – 50	N	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH
		X			

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	Cultural	CODE:	Cu
COMMUNITY SERIES:	Savannah	CODE:	CuS
ECOSITE:	Mineral	CODE:	CuS1
VEGETATION TYPE:	White Cedar - Green Ash Mineral Cultural Savannah	CODE:	CuS1-2
INCLUSION	—	CODE:	—
COMPLEX	—	CODE:	—

Evidence of Disturbance / Notes:

- Site is covered very prominently w/ lots of boulders!

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park
	POLYGON: 2
	DATE: Oct 12. 2011
	SURVEYOR(S): SR + JM

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.	SPECIES CODE	LAYER 1	2	3	4	COLL.
THUOCCI		O	O	A							
LARLAR1		R									
POPBALBA		A	O								
QUEMACR				O							
PINRES1			R								
FRX-SP		O									
CORSTOL			A			GRA-SP				A	

Page 1 of 1

Signature: (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park	POLYGON: 3	
	SURVEYOR(S): SR & JM	DATE: Oct 12 2011	UTME:
	START:	END:	UTMZ: UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☐ MINERAL SOIL	☐ RIVERINE	☑ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☒ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☒ GRAMINOID	☐ STREAM
		☐ VALLEY SLOPE		☐ FORB	☐ MARSH
	☐ BASIC BEDRK.	☒ TABLELAND		☐ LICHEN	☐ SWMAP
SITE		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
☐ OPEN WATER	☐ CARB. BEDRK.	☐ CLIFF		☐ DECIDUOUS	☐ BOG
☐ SHALLOW WATER		☐ TALUS		☐ CONIFEROUS	☐ BARREN
☒ SURFICIAL DEP.		☐ CREVICE / CAVE	COVER	☐ MIXED	☒ MEADOW
☐ BEDROCK		☐ ALVAR	☑ OPEN		☐ PRAIRIE
		☐ ROCKLAND	☐ SHRUB		☐ THICKET
		☐ BEACH / BAR	☐ TREED		☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	/	/	
2	SUB-CANOPY	/	/	
3	UNDERSTOREY	5	3	GRA-SP >> VICCRAC >
4	GRD. LAYER	6	4	GRA-SP >> AST-SP

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION:	NONE	BA:	N/A

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
DEADFALL/LOGS:	N	<10	N	10 – 24	N	25 – 50	N	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	X	PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS: Silty Sand

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	CULTURAL	CODE:	CU
COMMUNITY SERIES:	MEADOW	CODE:	CUM
ECOSITE:	MINERAL	CODE:	CUM1
VEGETATION TYPE:	MINERAL CULTURAL MEADOW	CODE:	CUM1
INCLUSION	/	CODE:	/
COMPLEX	/	CODE:	/

Evidence of Disturbance / Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Dave Brown Solar Park
	POLYGON: 3
	DATE: Oct 12, 2011
	SURVEYOR(S): SR & JM

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
VICCRAC			A		
SOL-SP			O		
DAUCARD			O		
CICINTY			O		
RUMCRIS			O		
AST-SP				O	
GRA-SP			D	D	

Page 1 of 1

Signature: (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

Stantec Consulting Ltd.
70-1 Southgate Drive
Guelph, Ontario, Canada
N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Amphibian Call Survey Observation Form

Project Number 160911028 Project Name: David Brown Solar.

Date April 9/2012. Field Personnel: S. Boggess + J. Maxwell.

Weather Conditions:	Temp:	Wind:	Cloud:	PPT:	PPT in last 24 hrs:
	0°C.	SW 8km/h (2-Beaufort).	100%	raining	~3mm.

Visit Number:	#1.		
Start Time:	19:50	End Time:	21:30.

- **Record Start Time at Each Station**

20:18 - 20:22

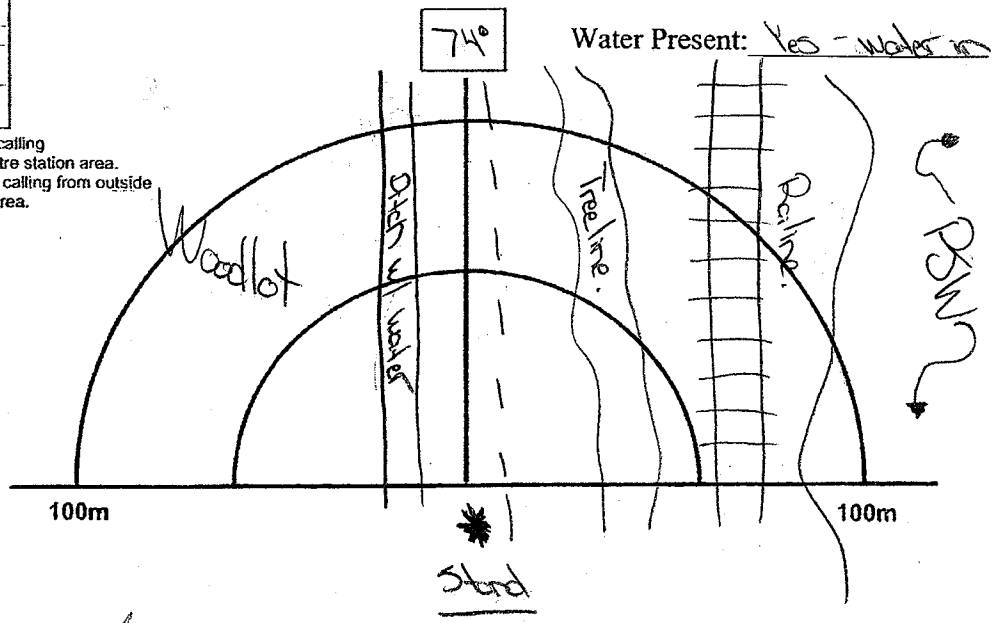
Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	X	
WOFR		

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

Station A UTM: 498926E 4983175N.

Habitat: Transmission line ROW w/ PSW to South and Woodlot to North.

Water Present: Yes - water in ditch.



*SPPE cc-3

Quality Control: This form is complete (✓) & legible (✓).

Signature: _____ (Field Personnel)

Signature: _____ (Project Manager)

REV: Mar, 09 Form 003

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

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

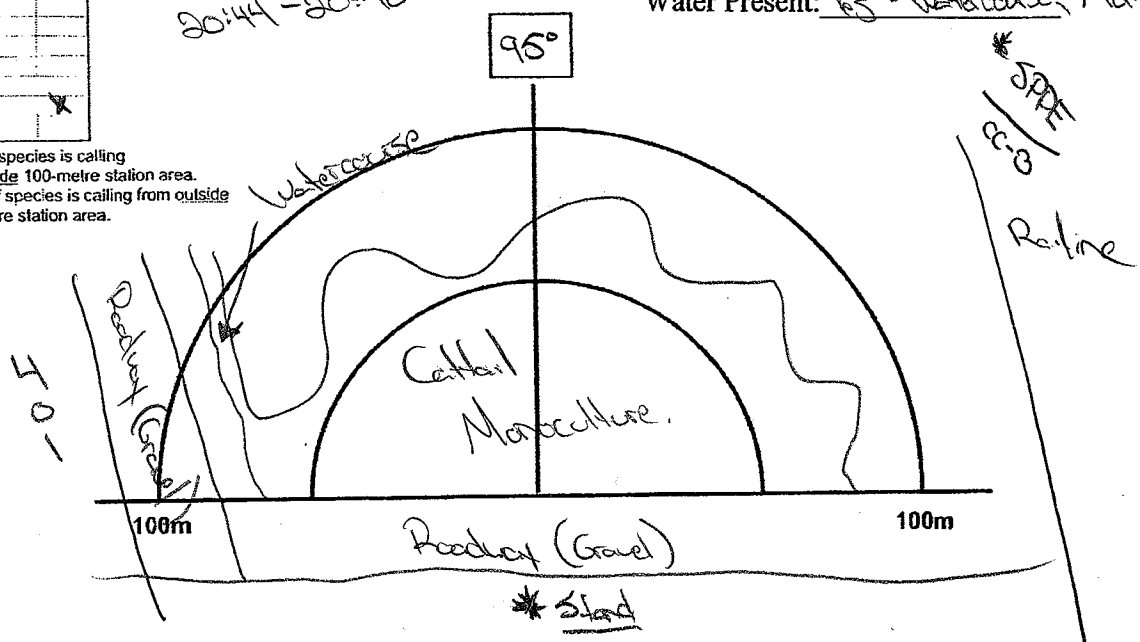
Station B

UTM: 499148E 4980448N.

Habitat: Marsh.

Water Present: Yes - Watercourse, Marsh

20:44 - 20:48.



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

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

Station C

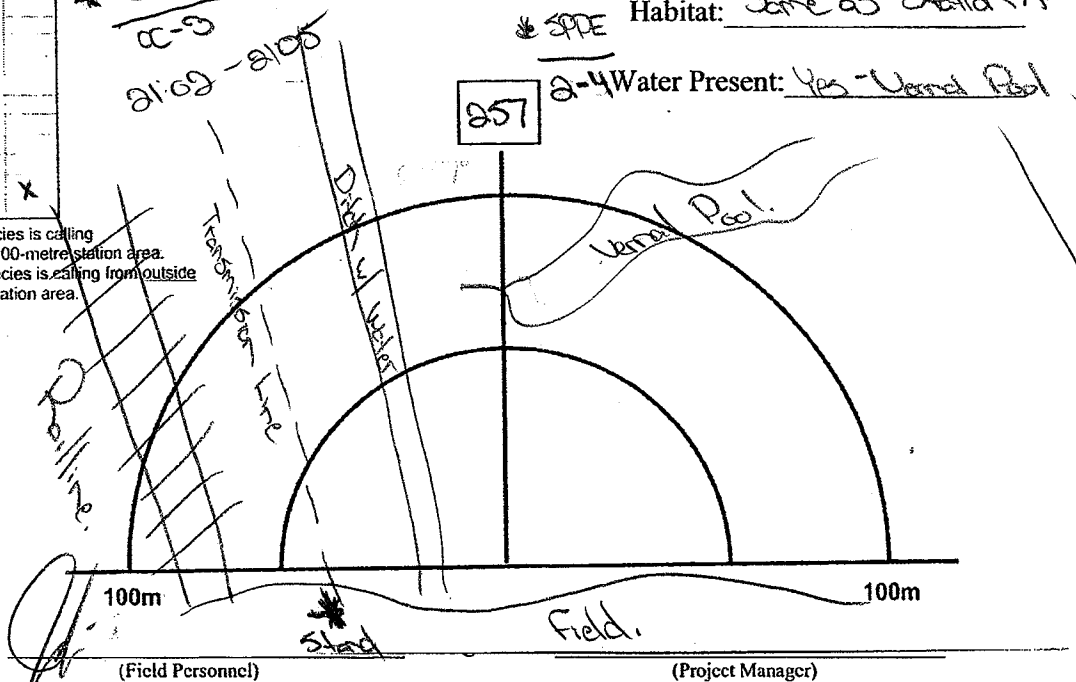
UTM: 499555E 4980529N.

Habitat: Same as Station A.

Water Present: Yes - Vernal Pool

SPPE
CC-3
SPPE
2-4

21:02 - 21:06



(Field Personnel)

(Project Manager)

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.

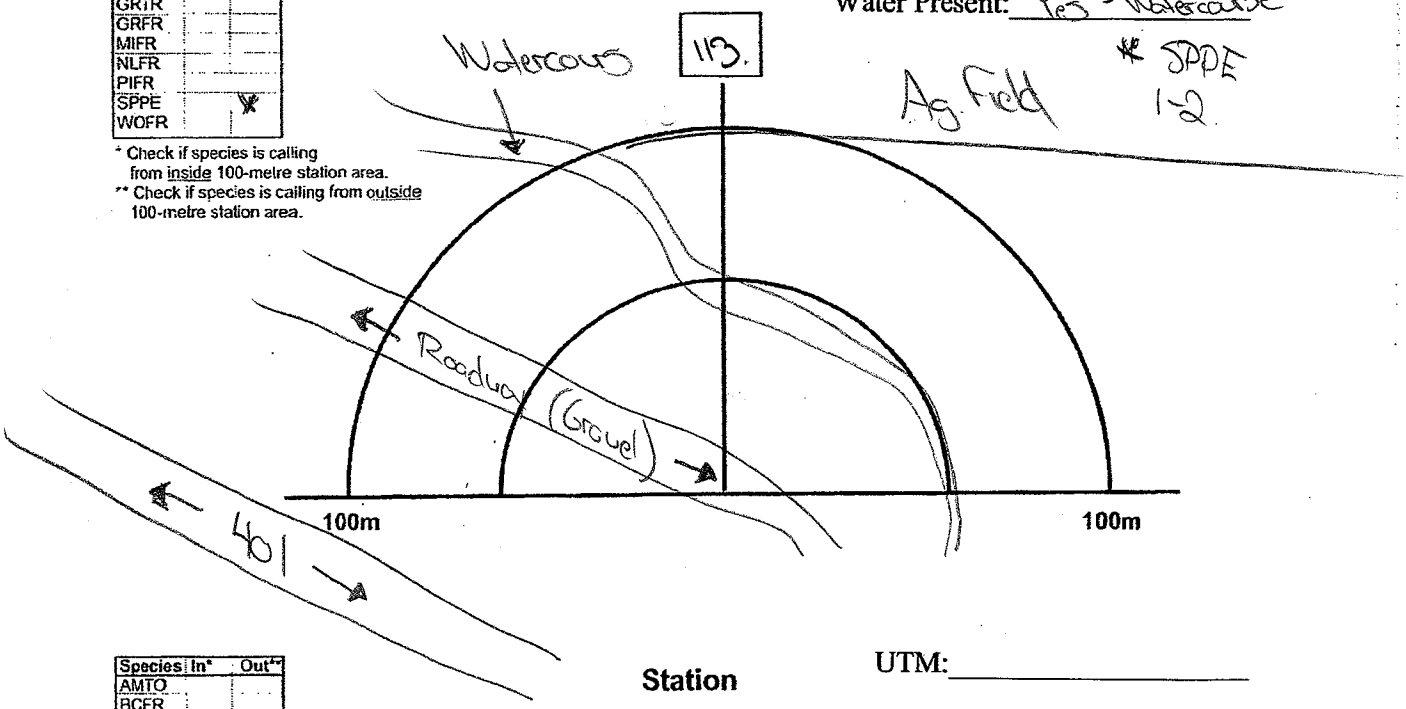
Station D

UTM: 499988E 4989919N

Habitat: Watercourse

Water Present: Yes - Watercourse

* SPPE 1-2



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

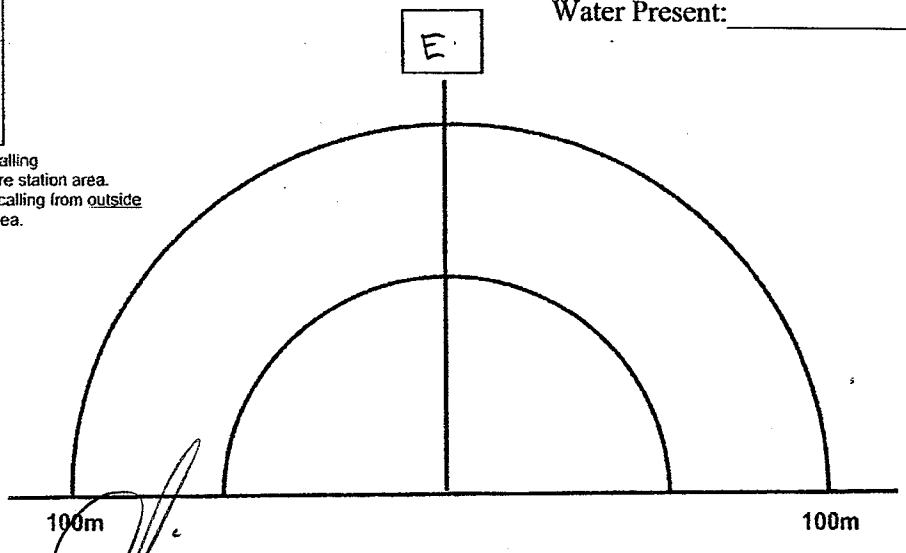
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station

UTM: _____

Habitat: _____

Water Present: _____



(Field Personnel) (Project Manager)

REV: Mar, 09 Form 003

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

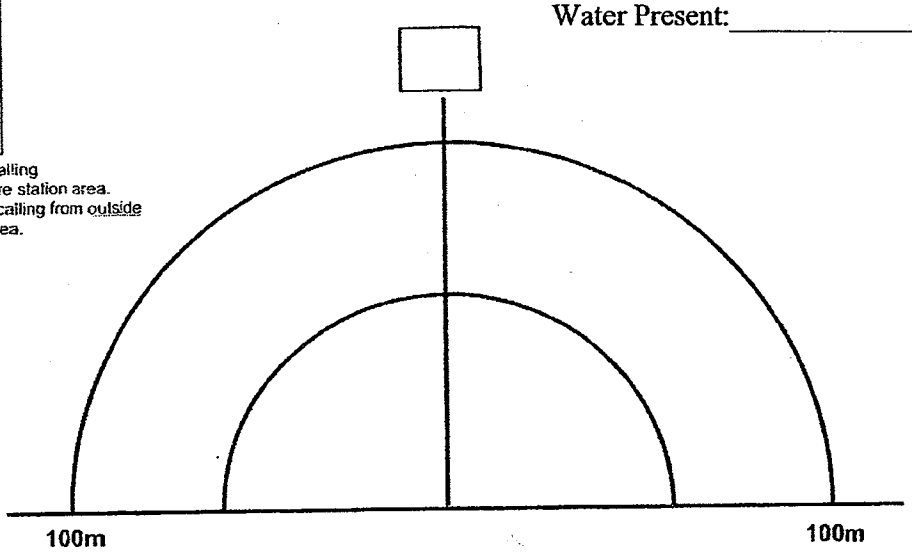
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station

UTM:_____

Habitat:_____

Water Present:_____



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

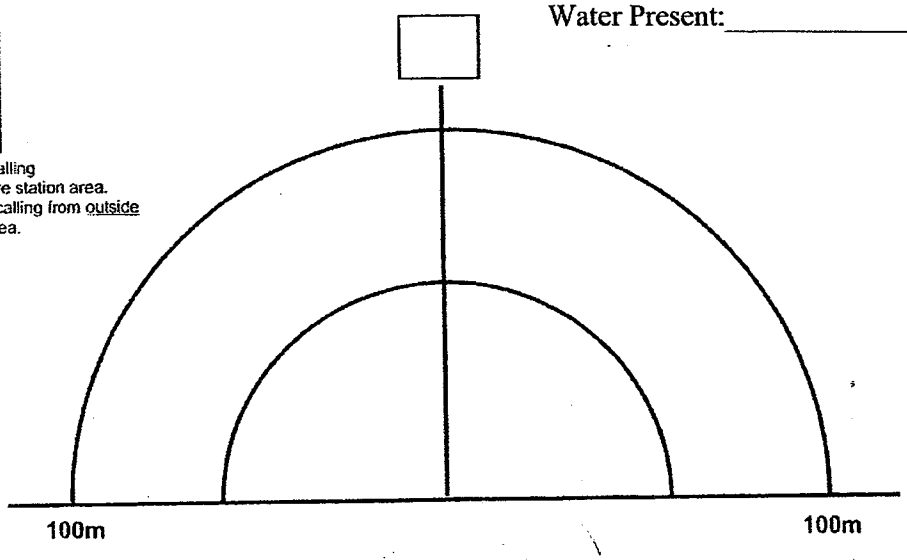
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station

UTM:_____

Habitat:_____

Water Present:_____



_____ _____

(Field Personnel) (Project Manager)

Stantec Consulting Ltd.
70-1 Southgate Drive
Guelph, Ontario, Canada
N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Stantec

Amphibian Call Survey Observation Form

Project Number ~~[illegible]~~ 161011028 Project Name: David Brown Solar

Date May 3/2012 Field Personnel: J. Morrell S. Rogers.

Weather Conditions:	Temp:	Wind:	Cloud:	PPT:	PPT in last 24 hrs:
	16c.	NE 7km/h.	80% cc.	0	~5mm.

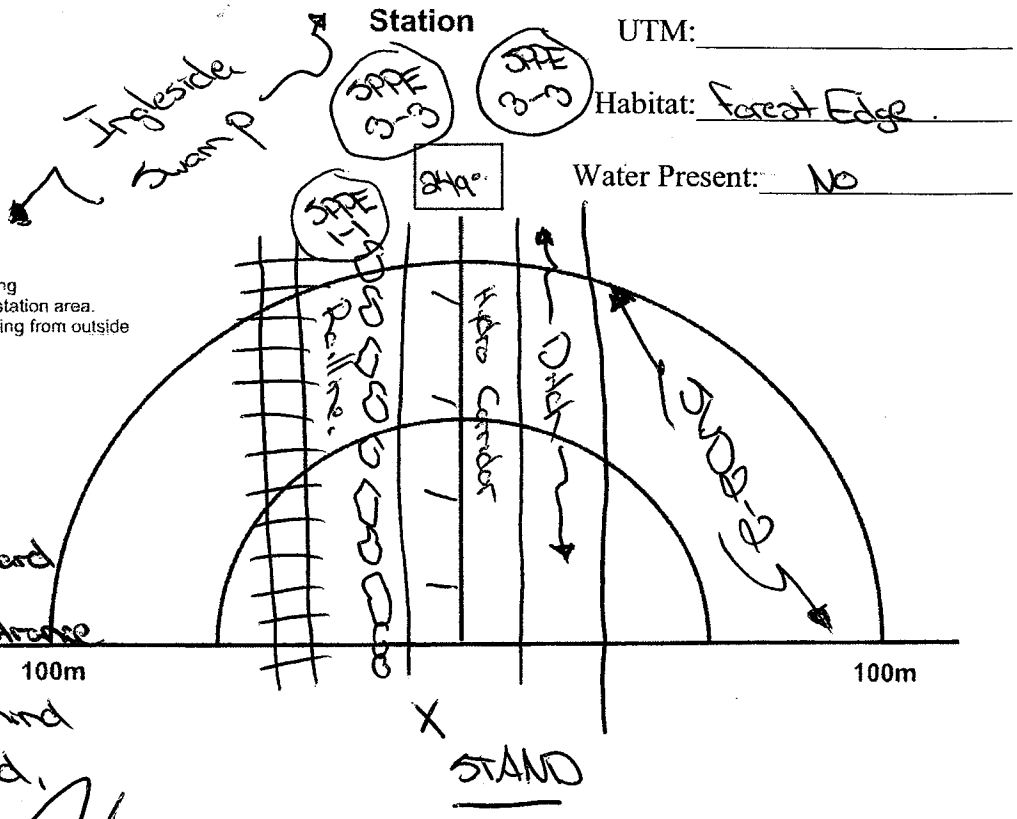
Visit Number:	#2.		
Start Time:	19:40	End Time:	21:58.

- **Record Start Time at Each Station**

S - 20:40 E - 20:43

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

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



* SPPE, AMTO and CHFR were all heard right at entrance to site behind utility shed.

Birds.
* HETH
AMRO
WTSP
SWSP
SOSP
* AMWO

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel) Signature: _____ (Project Manager)

Page _____ of _____

REV: Mar, 09 Form 003

S-20:55 E-20:59

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

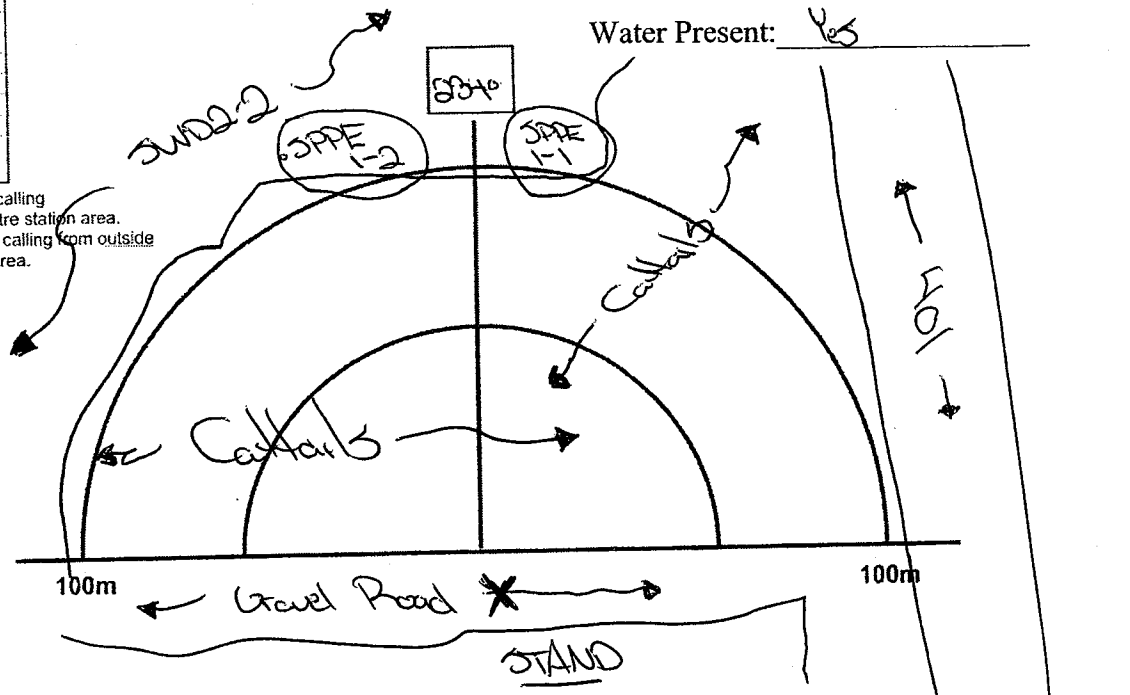
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

UTM: _____

Station

Habitat: Marsh / Wooded / Disturbed

Water Present: Yes



Birds

* AMWO

* Hot was very loud.

* Gray Treefrog was heard in bushlot while walking back to car.

S-21:20
E-21:24

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

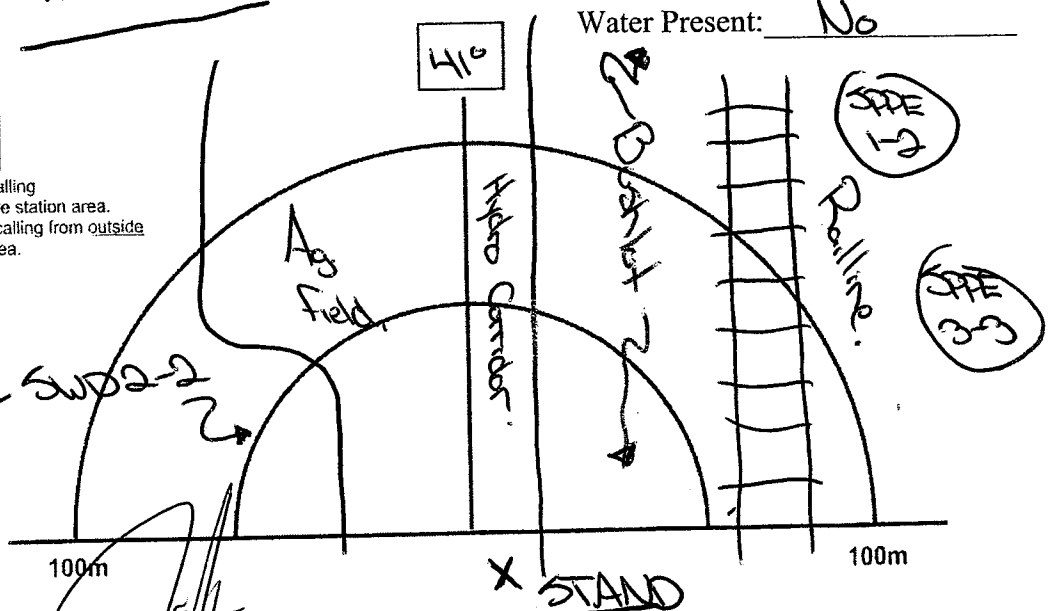
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

UTM: _____

Station

Habitat: Ag. / Forest / Bushlot

Water Present: No



Birds

* AMWO

* SPPE were heard around ephemeral pool on property while walking to site

(Field Personnel)

(Project Manager)

1-5

5-21:38

E-21:43

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

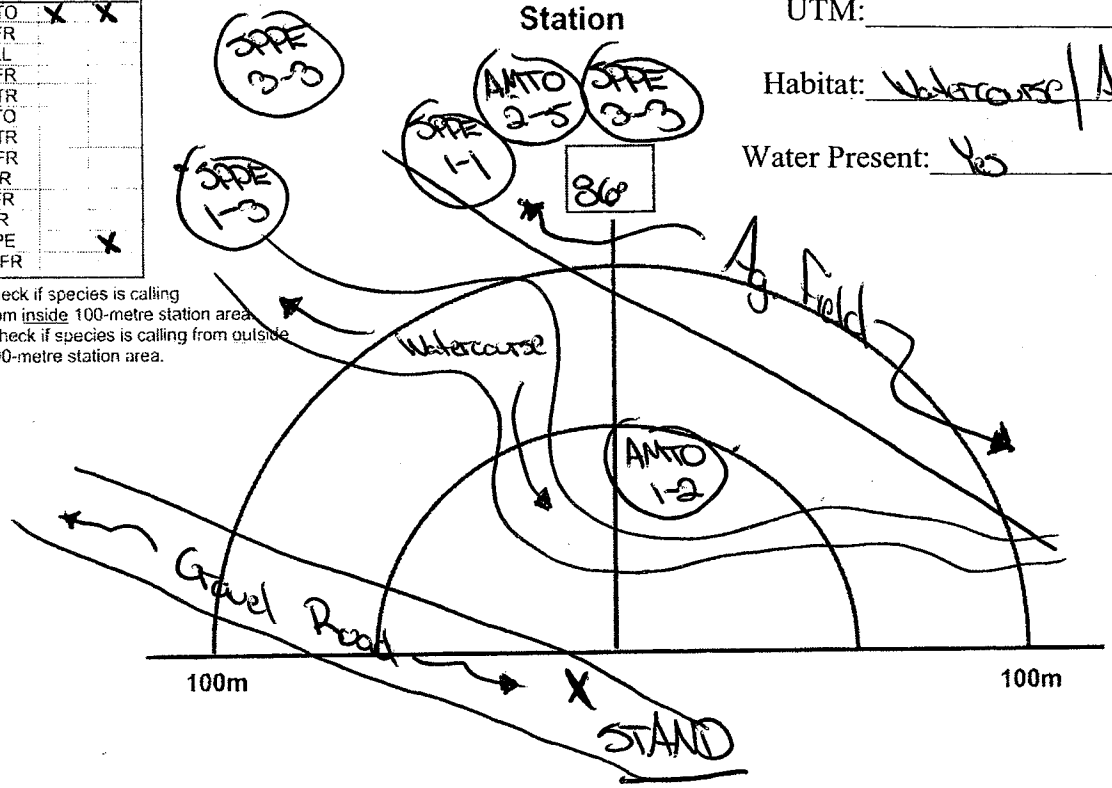
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station

UTM: _____

Habitat: Watercourse / Ag. / Disturbed

Water Present: Yes



* AMWO

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

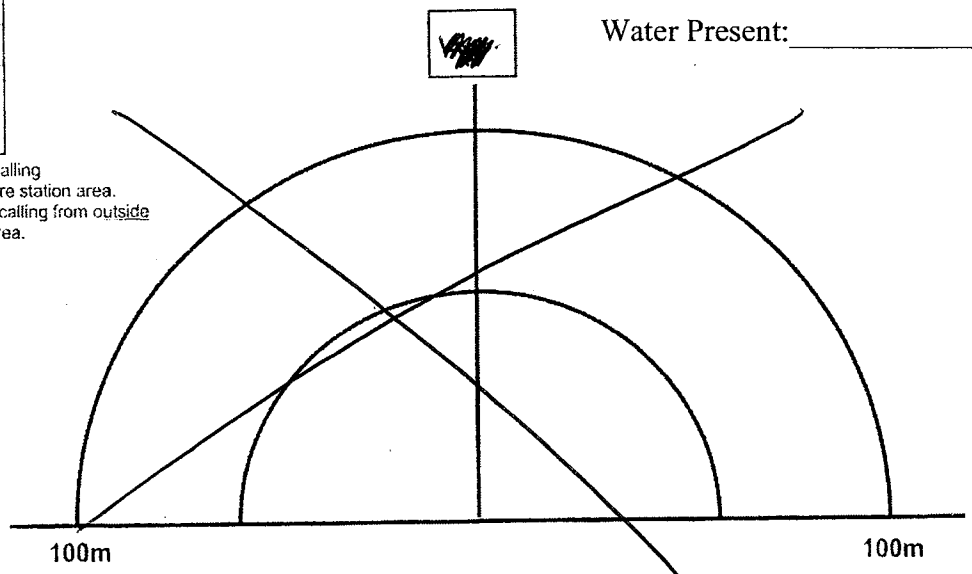
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station

UTM: _____

Habitat: _____

Water Present: _____



AMWO.

Signature: _____ Signature: _____

(Field Personnel) (Project Manager)

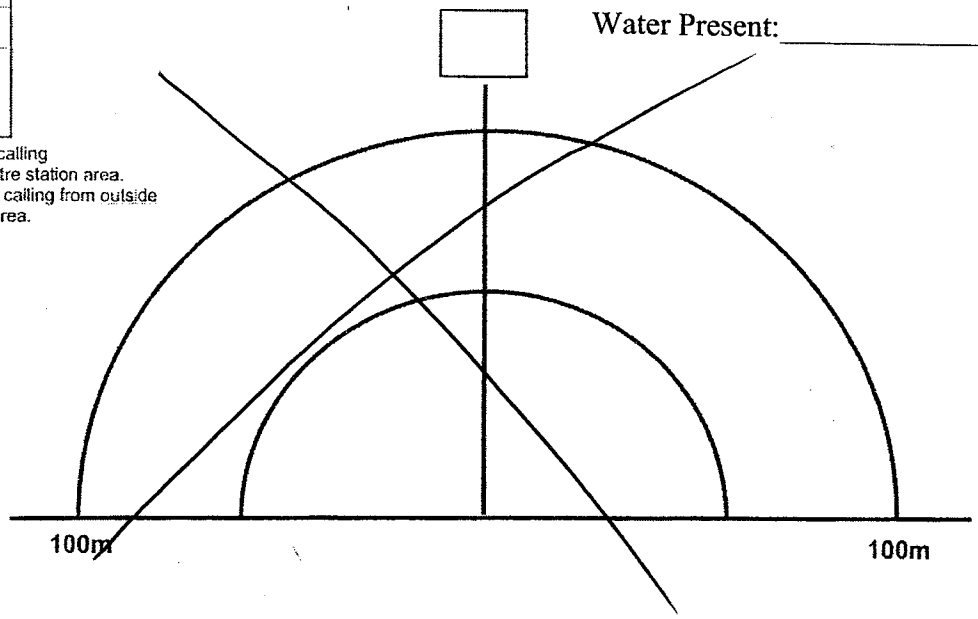
Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

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

Station UTM:_____

Habitat:_____

Water Present:_____



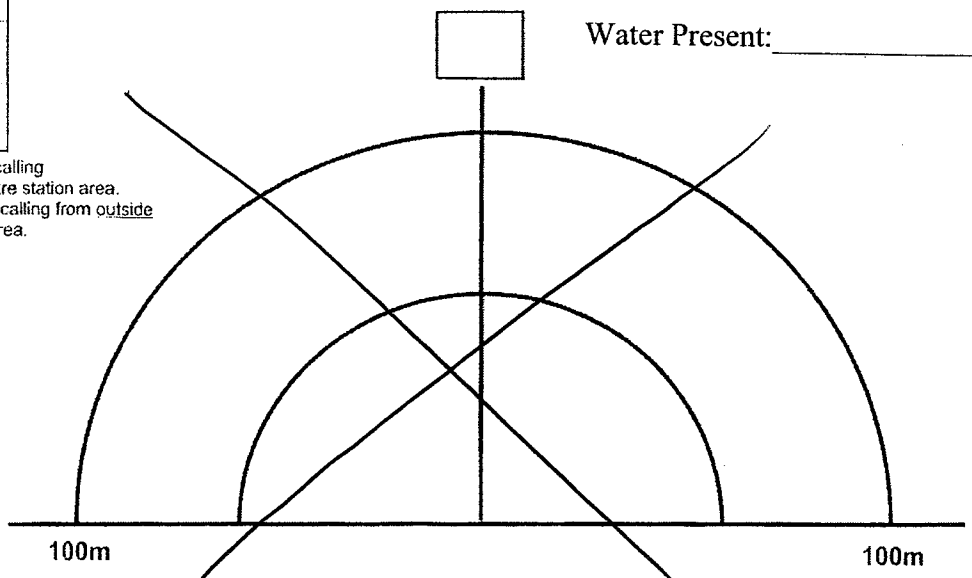
Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

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

Station UTM:_____

Habitat:_____

Water Present:_____



Signature: _____ Signature: _____

(Field Personnel) (Project Manager)

Stantec Consulting Ltd.
70-1 Southgate Drive
Guelph, Ontario, Canada
N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Amphibian Call Survey Observation Form

Project Number 161011028 Project Name: D.Brown Solar

Date June 17, 2012 Field Personnel: S.Rogers, N.Weil

Weather Conditions:	Temp:	Wind:	Cloud:	PPT:	PPT in last 24 hrs:
	24°C	Ø, gusting to 1	10%	Ø	Ø

Visit Number:	#3		
Start Time:	21:20	End Time:	22:35

- **Record Start Time at Each Station**

Station start/stop 21:24 - 21:27

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		X
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.

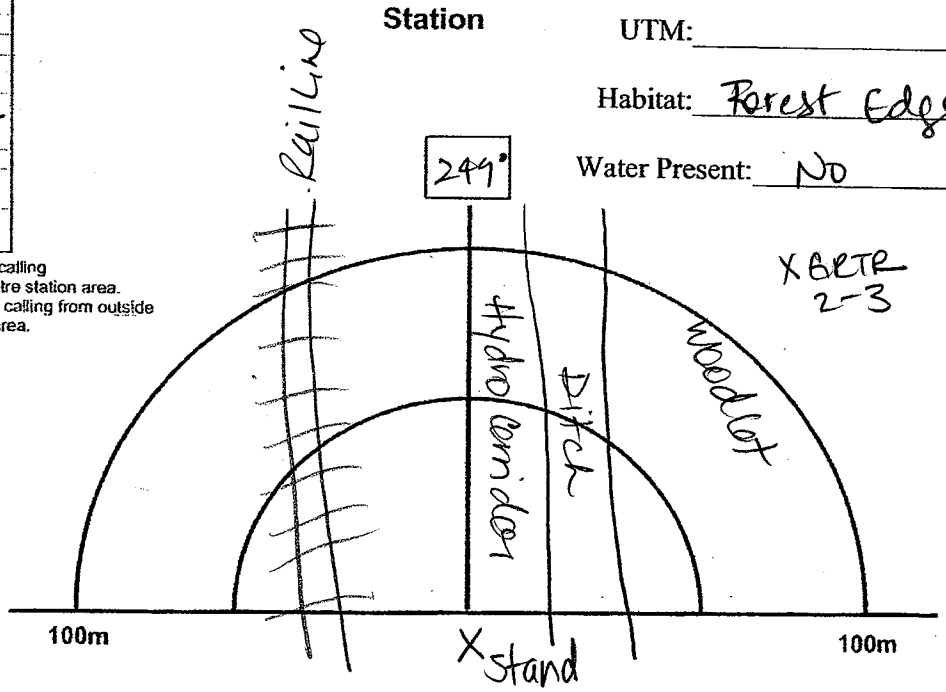
Heard 1 GRTR in project area woodlot on approach

Station

UTM:

Habitat: Forest Edge

Water Present: No



Quality Control: This form is complete (_) & legible (_).

Signature: _____ (Field Personnel) Signature: _____ (Project Manager)

REV: Mar, 09 Form 003

Station start/stop: 21:32 - 21:35

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.

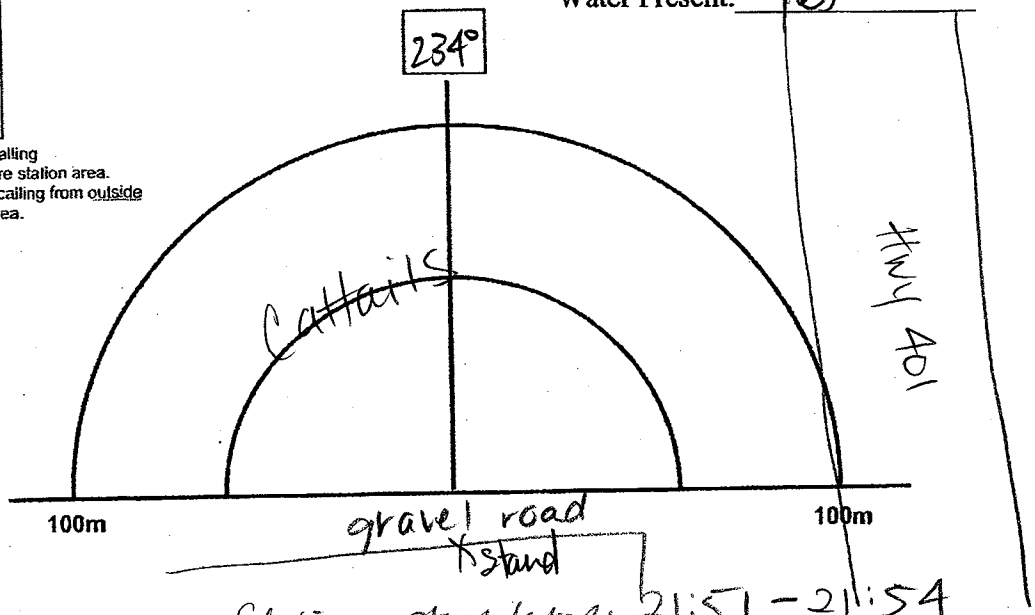
No calls heard.

Station

UTM: _____

Habitat: marsh, woodlot, disturbed

Water Present: Yes



Station start/stop: 21:51 - 21:54

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR	X	X
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.

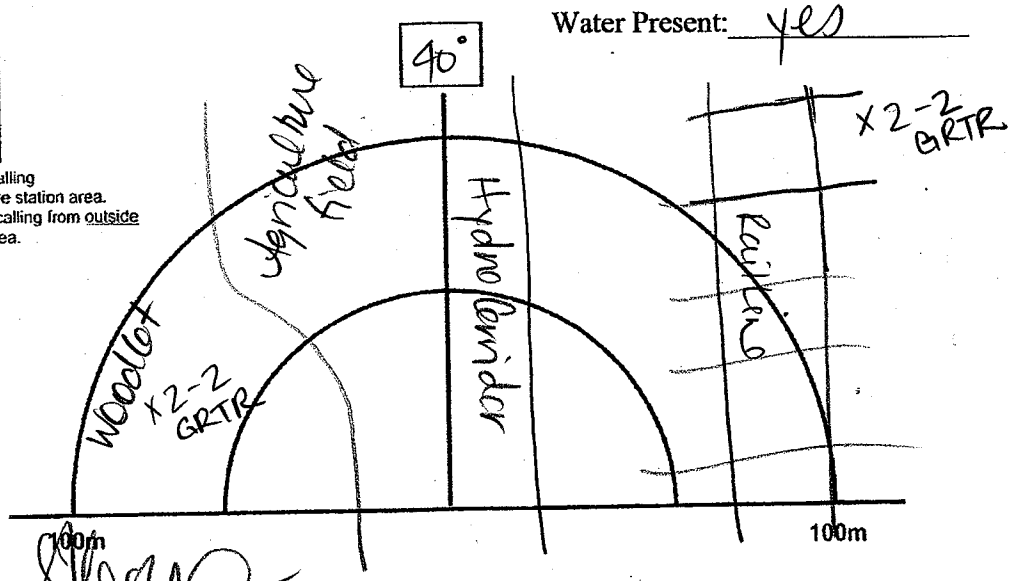
On approach, heard:
1 GRTR &
1 GRFR
in cattails off road.

Station

UTM: _____

Habitat: Ag, forest, woodlot

Water Present: yes



(Field Personnel) (Project Manager)

REV: Mar, 09 Form 003

Stantec Consulting Ltd.
70-1 Southgate Drive
Guelph, Ontario, Canada
N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Amphibian Call Survey Observation Form

Project Number 161011028 Project Name: D. Brown Solar

Date June 17, 2012 Field Personnel: S. Rogers, N. Weil

Weather Conditions:	Temp:	Wind:	Cloud:	PPT:	PPT in last 24 hrs:
	24°C	Ø gusting to 1	10%	Ø	Ø

Visit Number:	#3		
Start Time:	21:20	End Time:	22:35

- **Record Start Time at Each Station**

Station Start/Stop: 22:04 - 22:07

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

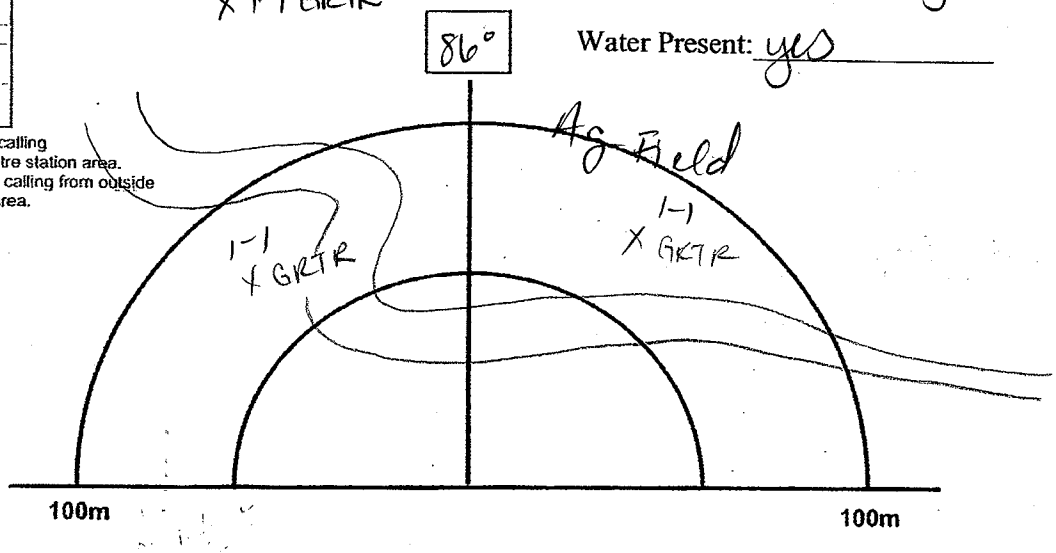
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station

UTM: _____

Habitat: watercourse, Ag, disturbed

Water Present: yes



Quality Control: This form is complete (_) & legible (_).

Signature: _____ (Field Personnel) Signature: _____ (Project Manager)

REV: Mar, 09 Form 003

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

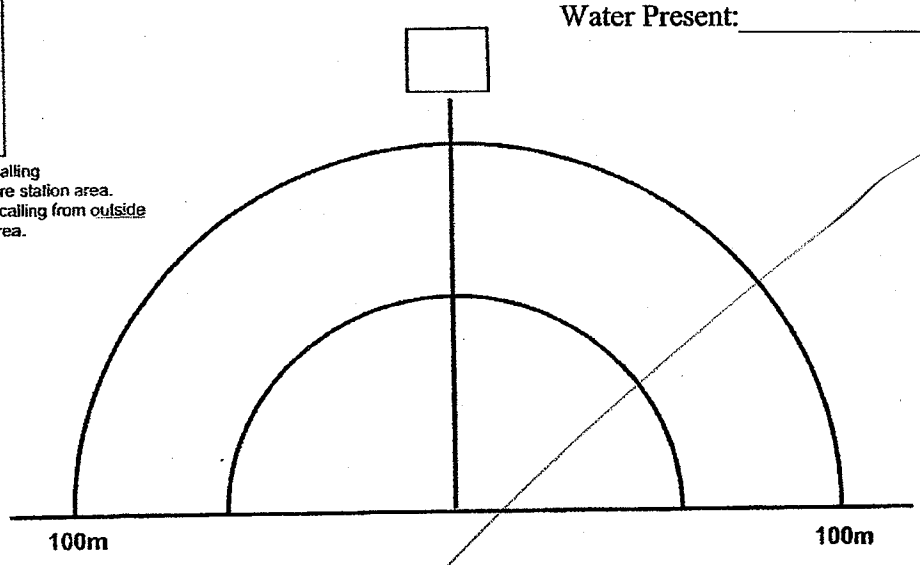
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station

UTM:_____

Habitat:_____

Water Present:_____



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

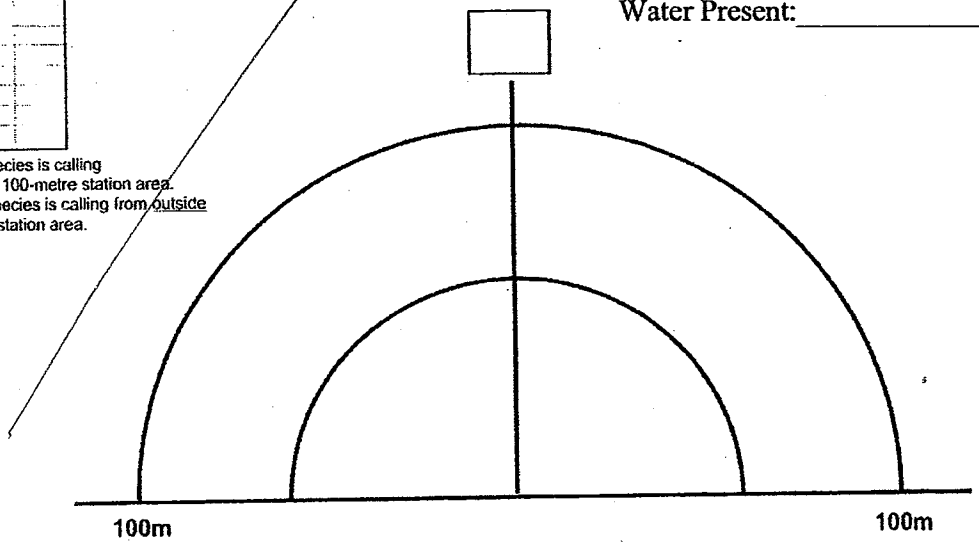
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station

UTM:_____

Habitat:_____

Water Present:_____



_____ _____
(Field Personnel) (Project Manager)

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Stantec

Breeding Bird Survey Observation Form

Project Number: 160110088

Project Name: David Braun Solar

Date: June 5/2012 @ 600

Field Personnel: Josh Mansell.

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	12	N 10km/h.	10%	0	trace.

Habitat #	ELC Code(s) or Habitat Descriptions	TIME	
		Start	End
1	Disturbed		
2	CUM1		
3	CUS1		
4	SWD2-2		
5	FOD6-2		
6	MAS2-1		
7	Ag - Switchgrass (tilled).		

Signature: (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

REV: 2011-05-02 / FORM 013
(see also Form 31)

Record location of all significant species on site map.

** Endangered, Threatened or Special Concern
† Partners In Flight
‡ Area Sensitive Species

Species	Habitats	BE*	Species	Habitats	BE*	Species	Habitats	BE*
Canada Goose			Red-headed Wo** †			Blue-wing. Wa. †		
Wood Duck			Red-bellied Wo.			Gold-wing. Wa** †		
Am. Black Duck			Yell-bellied Sap. ‡			Nashville Wa.		
Mallard			Downy Wo.			Yellow Wa.	36	S
Ring-neck. Pheasant			Hairy Wo.			Chestnut-sided Wa.		
Ruffed Grouse ‡	5	H	Northern Flicker †			Magnolia Wa. ‡		
Wild Turkey			Pileated Wo. ‡			Bl-thr Blue Wa. ‡		
Common Loon ‡			Ea. Wood-Pewee †	4	S	Yel-rumped Wa. ‡		
Pied-billed Grebe			Alder Fly.	37	S	Bl-thr Gr. Wa. ‡		
D. C. Cormorant ‡			Willow Fly. †			Blackburnian Wa. ‡		
American Bittern			Least Fly.			Pine Wa. ‡		
Least Bittern** ‡			Eastern Phoebe			Cerulean Wa** †‡		
Great Blue Heron	2	X	Great Crested Fly.			Bl-and-wh Wa. ‡		
Great Egret			Eastern Kingbird †			Am. Redstart ‡		
Green Heron			Yellow-thr. Vireo ‡			Ovenbird ‡		
Turkey Vulture			Blue-headed Vireo ‡			No. Waterthrush ‡		
Osprey			Warbling Vireo			Mourning Wa. ‡		
Northern Harrier †‡			Red-eyed Vireo	45	S	Co. Yellowthroat	134	S
Sharp-shin. Hawk ‡			Blue Jay			Hooded Wa** †‡		
Coopers Hawk ‡			American Crow	4	H	Canada Wa. †‡		
Red-shou. Hawk †‡			Common Raven			Scarlet Tanager ‡		
Red-tailed Hawk			Horned Lark			Eastern Towhee †		
Am. Kestrel †			Purple Mart.			Chipping Sp.		
Virginia Rail			Tree Swallow	7	H	Clay-colored Sp.		
Sora			No. R. W. Swallow			Field Sp. †		
Sandhill Crane			Bank Swallow †			Vesper Sp. †		
Killdeer			Cliff Swallow			Savannah Sp. †	23	AE
Spotted Sandpiper			Barn Swallow			Grasshopper Sp. †		
Upland Sandpiper ‡			Bl-capped Chickadee	4	S	Song Sp.	123567	AE
Wilson's Snipe			Tufted Titmouse			Swamp Sp.	637	S
American Woodcock			Red-br. Nuthatch			Wh-throated Sp. ‡		
Ring-billed Gull	\	X	Wh-br. Nuthatch			Northern Cardinal		
Herring Gull			Br. Creeper ‡			Rose-br. Grosbeak †		
Caspian Tern			Carolina Wren.			Indigo Bunting		
Black Tern** ‡			House Wren			Bobolink **†		
Common Tern			Winter Wren ‡			Red-winged Bl.	1236	CF
Rock Dove			Sedge Wren			Ea. Meadowlark †		
Mourning Dove			Marsh Wren			Common Grackle		
Yellow-bill. Cuckoo			Golded-cr. Kinglet ‡			Br-headed Cowbird		
Black-bill. Cuckoo †			B. G. Gnatcatcher ‡			Orchard Oriole		
Eastern Screech Owl			Eastern Bluebird			Baltimore Oriole †		
Great Horned Owl			Veery			Purple Finch		
Barred Owl ‡			Hermit Thrush ‡	4	S	House Finch		
Long-eared Owl			Wood Thrush †			Pine Siskin		
N. Saw-whet Owl			American Robin	23467	S	Am. Goldfinch	13	S
Co. Nighthawk**			Gray Catbird	3	S	House Sparrow		
Whip-poor-will †‡			No. Mockingbird			Other Species …		
Chimney Swift** †			Brown Thrasher †					
Ruby-thr. Humming.			European Starling	7	H	Broad-winged Hawk	5	H
Belted Kingfisher †			Cedar Waxwing	123567	H			

** Record highest Breeding Evidence (BE) observed over all habitat. Use codes as in Breeding Bird Atlas of Ontario.*

Signature: _____ (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: _____ (Project Manager)

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Canada N1G 4P5
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Breeding Bird Survey Observation Form

Project Number: 160011028
Project Name: David Brown Solar
Date: June 18/2012
Field Personnel: Josh Mansell

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	18	1-2 (W)	0% (Hazy)	ϕ	ϕ.

Habitat #	ELC Code(s) or Habitat Descriptions	TIME Start	TIME End
1	Disturbed		
2	CUM1		
3	CUS1		
4	SWD2-2		
5	FOD6-2		
6	MAS2-1		
7	Ag (Tilled).		

Signature: [signature] (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: ____________ (Project Manager)

Record location of all significant species on site map.

** Endangered, Threatened or Special Concern
† Partners In Flight
‡ Area Sensitive Species

Species	Habitats	BE*	Species	Habitats	BE*	Species	Habitats	BE*
Canada Goose			Red-headed Wo** †			Blue-wing. Wa. †		
Wood Duck			Red-bellied Wo.			Gold-wing. Wa** †		
Am. Black Duck			Yell-bellied Sap. ‡	4	S	Nashville Wa.		
Mallard			Downy Wo.	45	S	Yellow Wa.	36	T
Ring-neck. Pheasant			Hairy Wo.			Chestnut-sided Wa.		
Ruffed Grouse ‡			Northern Flicker †	5	CF	Magnolia Wa. ‡		
Wild Turkey	5	S	Pileated Wo. ‡			Bl-thr Blue Wa. ‡		
Common Loon ‡			Ea. Wood-Pewee †	5	S	Yel-rumped Wa. ‡		
Pied-billed Grebe			Alder Fly.	7	T	Bl-thr Gr. Wa. ‡		
D. C. Cormorant ‡			Willow Fly. †			Blackburnian Wa. ‡		
American Bittern			Least Fly.			Pine Wa. ‡		
Least Bittern** ‡			Eastern Phoebe	4	H	Cerulean Wa** †‡		
Great Blue Heron			Great Crested Fly.			Bl-and-wh Wa. ‡		
Great Egret			Eastern Kingbird †			Am. Redstart ‡		
Green Heron			Yellow-thr. Vireo ‡			Ovenbird ‡		
Turkey Vulture			Blue-headed Vireo ‡			No. Waterthrush ‡		
Osprey			Warbling Vireo			Mourning Wa. ‡		
Northern Harrier †‡			Red-eyed Vireo	45	T	Co. Yellowthroat	36	CF
Sharp-shin. Hawk ‡			Blue Jay	4	S	Hooded Wa** †‡		
Coopers Hawk ‡			American Crow	1	H	Canada Wa. †‡		
Red-shou. Hawk †‡			Common Raven			Scarlet Tanager ‡		
Red-tailed Hawk			Horned Lark			Eastern Towhee †		
Am. Kestrel †			Purple Mart.			Chipping Sp.		
Virginia Rail			Tree Swallow			Clay-colored Sp.		
Sora			No. R. W. Swallow			Field Sp. †		
Sandhill Crane			Bank Swallow †			Vesper Sp. †		
Killdeer			Cliff Swallow	1	H	Savannah Sp. †	857	A
Spotted Sandpiper	13	OO	Barn Swallow			Grasshopper Sp. †		
Upland Sandpiper ‡			Bl-capped Chickadee	5	S	Song Sp.	123567	AE
Wilson's Snipe			Tufted Titmouse			Swamp Sp.	36	T
American Woodcock			Red-br. Nuthatch			Wh-throated Sp. ‡	345	S
Ring-billed Gull			Wh-br. Nuthatch			Northern Cardinal		
Herring Gull			Br. Creeper ‡			Rose-br. Grosbeak †	4	H
Caspian Tern			Carolina Wren.			Indigo Bunting	45	FY
Black Tern** ‡			House Wren			Bobolink **†		
Common Tern			Winter Wren ‡			Red-winged Bl.	1236	AE
Rock Dove			Sedge Wren			Ea. Meadowlark †		
Mourning Dove			Marsh Wren			Common Grackle		
Yellow-bill. Cuckoo			Golded-cr. Kinglet ‡			Br-headed Cowbird		
Black-bill. Cuckoo †			B. G. Gnatcatcher ‡			Orchard Oriole		
Eastern Screech Owl			Eastern Bluebird			Baltimore Oriole †		
Great Horned Owl			Veery			Purple Finch		
Barred Owl ‡			Hermit Thrush ‡	5	S	House Finch		
Long-eared Owl			Wood Thrush †			Pine Siskin		
N. Saw-whet Owl			American Robin	2347	T	Am. Goldfinch	1367	H
Co. Nighthawk**			Gray Catbird	35	P	House Sparrow		
Whip-poor-will †‡			No. Mockingbird			Other Species …		
Chimney Swift** †			Brown Thrasher †	3	S			
Ruby-thr. Humming.			European Starling	1237	FY			
Belted Kingfisher †			Cedar Waxwing	3	H			

** Record highest Breeding Evidence (BE) observed over all habitat. Use codes as in Breeding Bird Atlas of Ontario.*

Signature: _____ (Field Personnel)

Quality Control: This form is complete ❑ & legible ❑.

Signature: _____ (Project Manager)

WETLAND DATA AND SCORING RECORD

i) **WETLAND NAME:** Unnamed (Dave Brown property)

ii) **MNR ADMINISTRATIVE REGION:** Southern **DISTRICT:** Kemptville

AREA OFFICE (if different from District): _____

iii) **CONSERVATION AUTHORITY JURISDICTION:** Raisin Region Conservation Authority (RRCA)

(If not within a designated CA, check here:_____

iv) **COUNTY OR REGIONAL MUNICIPALITY:** Stormont-Dundas-Glengarry (SD+G)

v) **TOWNSHIP:** South Stormont

vi) **LOTS & CONCESSIONS:** _____
(attach separate sheet if necessary)

vii) **MAP AND AIR PHOTO REFERENCES**

a) Latitude _____ Longitude: _____

b) UTM grid reference: Zone: 18T Block: WE
Grid: E 499611E N 4983649N

c) National Topographic Series:

map name(s) _____

map number(s) _____ edition _____

scale _____

d) Aerial photographs: Date photo taken: 2008 Scale: 1:7,500

Flight & plate numbers: Aerial images provided by First Base Solutions, SD6 (2008)

_____
(attach separate sheet if necessary)

e) Ontario Base Map numbers & scale _____

_____
(attach separate sheets if necessary)

viii) WETLAND SIZE AND BOUNDARIES

a) Single contiguous wetland area: 1.23 hectares

b) Wetland complex comprised of ____ individual wetlands:

Wetland Unit Number (for reference)	Size of each wetland unit
Wetland Unit No.1	_____ha
Wetland Unit No. 2	_____ha
Wetland Unit No. 3	_____ha
Wetland Unit No. 4	_____ha
Wetland Unit No. 5	_____ha
Wetland Unit No. 6	_____ha
Wetland Unit No. 7	_____ha
Wetland Unit No. 8	_____ha
Wetland Unit No. 9	_____ha
Wetland Unit No. 10	_____ha

(Attach additional sheets if necessary)

TOTAL WETLAND SIZE 1.23 ha

c) Brief documentation of reasons for including any areas less than 0.5 ha in size:

n/a.

(Attach separate sheets if necessary)

1.0 BIOLOGICAL COMPONENT

1.1 PRODUCTIVITY

1.1.1 GROWING DEGREE-DAYS/SOILS

GROWING DEGREE DAYS

(check one)

1) _____ <2800
2) _____ 2800 - 3200
3) X 3200 - 3600
4) _____ 3600 - 4000
5) _____ >4000

SOILS

Estimated Fractional Area

_____ clay/loam
_____ silt/marl
_____ limestone
_____ sand
100 humic/mesic
_____ fibric
_____ granite

SCORING:

Growing Degree-Days	Clay-Loam	Silt-Marl	Lime-stone	Sand	Humic-Mesic	Fibric	Granite
<2800	15	13	11	9	8	7	5
2800-3200	18	15	13	11	9	8	7
→ 3200-3600	22	18	15	13	11	9	7
3600-4000	26	21	18	15	13	10	8
>4000	30	25	20	18	15	12	8

(maximum score 30; if wetland contains more than one soil type, evaluate based on the fractional area)

Steps required for evaluation: (maximum score 30 points)

1. Select GDD line in evaluation table applicable to your wetland;
2. Determine fractional area of the wetland for each soil type;
3. Multiply fractional area of each soil type by score;
4. Sum individual soil type scores (round to nearest whole number).

In wetland complexes the evaluator should aim at determining the percentage of area occupied by the categories for the complex as a whole.

Final Score Growing Degree-Days/Soils (maximum 30 points) 11

1.1.2 WETLAND TYPE (Fractional Area = area of wetland type/total wetland area)

	Fractional Area		Score
Bog		x 3	
Fen		x 6	
→ Swamp	\	x 8	8
Marsh		x 15	

Wetland type score (maximum 15 points) 8

1.1.3 SITE TYPE (Fractional Area = area of site type/total wetland area)

	Fractional Area		Score
Isolated	\	x 1 =	\
Palustrine (permanent or intermittent flow)		x 2 =	
Riverine		x 4 =	
Riverine (at rivermouth)		x 5 =	
Lacustrine (at rivermouth		x 5 =	
Lacustrine (on enclosed bay, with barrier beach)		x 3 =	
Lacustrine (exposed to lake)		x 2 =	

Site Type Score (maximum 5 points) \

1.2 BIODIVERSITY

1.2.1 NUMBER OF WETLAND TYPES

(Check only one)		Score
1) X	one	9 points
2)	two	13
3)	three	20
4)	four	30

Number of Wetland Types Score (maximum 30 points) 9

Wetland Name: unnamed (David Braun Property)

Wetland Size (ha): 1.23

Vegetation Form	% area in which form is dominant
h	75 - Acer saccharinum, Fraxinus pennsylvanica.
c	___
dh	___
dc	___
ts	___
ls	___
ds	___
gc	10 Carex spp., Onoclea sensibilis
m	___
ne	___
be	___
re	___
ff	___
f	___
su	___
u (unvegetated)	15 - complete canopy cover inhibits ground cover growth.

Total = 100%

1.2.3 DIVERSITY OF SURROUNDING HABITAT
(Check all appropriate items)

X	row crop
	pasture
X	abandoned agricultural land
X	deciduous forest
	coniferous forest
	mixed forest (at least 25% conifer and 75% deciduous or vice versa)
	abandoned pits and quarries
	open lake or deep river
X	fence rows with cover, or shelterbelts
	terrain appreciably undulating, hilly, or with ravines
X	creek flood plain

Diversity of Surrounding Habitat Score (1 for each, maximum 7 points) 5

1.2.4 PROXIMITY TO OTHER WETLANDS
(Check first appropriate category only)

		Scoring
1)	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river within 1.5 km	8 points
2)	Hydrologically connected by surface water to other wetlands (same dominant wetland type) within 0.5 km	8
3)	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river from 1.5 to 4 km away	5
4)	Hydrologically connected by surface water to other wetlands (same dominant wetland type) from 0.5 to 1.5 km away	5
5) X	Within 0.75 km of other wetlands (different dominant wetland type) or open water body, but not hydrologically connected by surface water	(5)
6)	Within 1 km of other wetlands, but not hydrologically connected by surface water	2
7)	No wetland within 1 km	0

Proximity to other Wetlands Score (Choose one only, maximum 8 points) 5

1.2.5 INTERSPERSION

* 61 intersecting lines

Number of Intersections (Check one)		Score
1) 26 or less	____	3
2) 27 to 40	____	6
3) 41 to 60	____	9
4) 61 to 80	X	(12)
5) 81 to 100	____	15
6) 101 to 125	____	18
7) 126 to 150	____	21
8) 151 to 175	____	24
9) 176 to 200	____	27
10) >200	____	30

Interspersion Score (Choose one only, maximum 30 points) 12

1.2.6 OPEN WATER TYPES

Permanently flooded: (Check one)		Score
1) ____	type 1	8
2) ____	type 2	8
3) ____	type 3	14
4) ____	type 4	20
5) ____	type 5	30
6) ____	type 6	8
7) ____	type 7	14
8) ____	type 8	3
9) X	no open water	(0)

Open Water Type Score (Choose one only, maximum 30 points) 0

1.3 SIZE

1.25 hectares

Size Score (Biological Component) (maximum 50 points) 8

Evaluation Table Size Score (Biological Component)

Wetland size (ha)	Total Score for Biodiversity Subcomponent =33.5									
	<37	37-48	49-60	61-72	73-84	85-96	97-108	109-120	121-132	>132
<21 ha	1	5	7	8	9	17	25	34	43	50
21-40	5	7	8	9	10	19	28	37	46	50
41-60	6	8	9	10	11	21	31	40	49	50
61-80	7	9	10	11	13	23	34	43	50	50
81-100	8	10	11	13	15	25	37	46	50	50
101-120	9	11	13	15	18	28	40	49	50	50
121-140	10	13	15	17	21	31	43	50	50	50
141-160	11	15	17	19	23	34	46	50	50	50
161-180	13	17	19	21	25	37	49	50	50	50
181-200	15	19	21	23	28	40	50	50	50	50
201-400	17	21	23	25	31	43	50	50	50	50
401-600	19	23	25	28	34	46	50	50	50	50
601-800	21	25	28	31	37	49	50	50	50	50
801-1000	23	28	31	34	40	50	50	50	50	50
1001-1200	25	31	34	37	43	50	50	50	50	50
1201-1400	28	34	37	40	46	50	50	50	50	50
1401-1600	31	37	40	43	49	50	50	50	50	50
1601-1800	34	40	43	46	50	50	50	50	50	50
1801-2000	37	43	47	49	50	50	50	50	50	50
>2000	40	46	50	50	50	50	50	50	50	50

2.0 SOCIAL COMPONENT

2.1 ECONOMICALLY VALUABLE PRODUCTS

2.1.1 WOOD PRODUCTS

Area of wetland forested (ha), i.e. dominant form is h or c. Note that this is not wetland size. (Check one only)

		Score
1) X	<5 ha	(0)
2) _____	5 - 25 ha	3
3) _____	26 - 50 ha	6
4) _____	51 - 100 ha	9
5) _____	101 - 200 ha	12
6) _____	>200 ha	18

Source of information: site visit, aerial images

Wood Products Score (Score one only, maximum 18 points) (0)

2.1.2 WILD RICE

(Check one)		Score (Choose one)
Present (minimum size 0.5 ha)	1) _____	6 points
Absent	2) X	(0)

Source of information: site visit

Wild Rice Score (maximum 6 points) (0)

2.1.3 COMMERCIAL FISH (BAIT FISH AND/OR COARSE FISH)

(Check one)		Score (Choose one)
Present	1) _____	12 points
Habitat not suitable for fish	2) X	(0)

Source of information: site visit

Commercial Fish Score (maximum 12 points) (0)

2.1.4 BULLFROGS

(Check one)		Score (Choose one)
Present	1) _____	1 points
Absent	2) X	(0)

Source of information: site visit

Bullfrog Score (maximum 1 point) (0)

2.1.5 SNAPPING TURTLES

(Check one)		Score (Choose one)
Present	1) _____	1 point
Absent	2) X	(0)

Source of information: Site visit

Snapping Turtle Score (maximum 1 point) 0

2.1.6 FURBEARERS
(Consult Appendix 9)

Name of furbearer	Source of information
1) _____	_____
2) _____	_____
3) _____	_____
4) _____	_____
5) _____	_____

* No sign (scat, tracks, etc.) of fur bearing species observed within feature. Better habitat adjacent to site*

Scoring: 3 points for each species, maximum 12

Furbearer Score (maximum 12 points) 0

2.2 RECREATIONAL ACTIVITIES

Type of Wetland-Associated Use			
Intensity of Use	Hunting	Nature Enjoyment/ Ecosystem Study	Fishing
High	40 points	40 points	40 points
Moderate	20	20	20
Low	8	8	8
Not Possible/Not known	(0)	(0)	(0)

(score one level for each of the three wetland uses; scores are cumulative; maximum score 80 points)

Sources of information:

Hunting: Field Observation

Nature: " "

Fishing: " "

* Rural property, no public access *
- no recreational signs within feature

Recreational Activities Score (maximum 80 points) 0

2.3 LANDSCAPE AESTHETICS

2.3.1 DISTINCTNESS

(Check one)		Score (Choose one)
Clearly distinct	1)_____	3 points
Indistinct	2) X	(0)

Landscape Distinctness Score (maximum 3 points) (0)

2.3.2 ABSENCE OF HUMAN DISTURBANCE

(Check one)		Score (Choose one)
Human disturbances absent or nearly so	1)_____	7 points
One or several localized disturbances	2) X	4 - ditching near AG field
Moderate disturbance; localized water pollution	3)_____	2
Wetland intact but impairment of ecosystem quality intense in some areas	4)_____	1
Extreme ecological degradation, or water pollution severe and widespread	5)_____	0

Source of information: Field Observation.

Absence of Human Disturbance Score (maximum 7 points) 4

2.4 EDUCATION AND PUBLIC AWARENESS

2.4.1 EDUCATIONAL USES

(Check one)		Score (Choose one)
Frequent	1)_____	20 points
Infrequent	2)_____	12
No visits	3) X	(0)

Source of information: Field Observation

Educational Uses Score (maximum 20 points) (0)

2.4.2 FACILITIES AND PROGRAMS

(check one)		Score (Choose one)
Staffed interpretation centre	1)____	8 points
No interpretation centre or staff, but a system of self-guiding trails or brochures available	2)____	4
Facilities such as maintained paths (e.g., woodchips), boardwalks, boat launches or observation towers but no brochures or other interpretation	3)____	2
No facilities or programs	4) X	(0)

Source of information: Field Observation.

Facilities and Programs Score (maximum 8 points) (0)

2.4.3 RESEARCH AND STUDIES

(check appropriate spaces)		Score
Long term research has been done	_____	12 points
Research papers published in refereed scientific journal or as a thesis	_____	10
One or more (non-research) reports have been written on some aspect of the wetland's flora, fauna, hydrology, etc.	_____	5
No research or reports	X	0

Attach list of known reports by above categories

Research and Studies Score (Score is cumulative, maximum 12 points) 0

2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT

Circle the highest applicable score

Distance of wetland from settlement	1) population >10,000	2) population 2,500 - 10,000	3) population <2,500 or cottage community
1) Within or adjoining settlement	40 points	26	16
2) 0.5 to 10 km from settlement	26	16	10
3) 10 to 60 km from settlement	(12)	8	4
4) >60 km from settlement	5	2	0

Name of settlement: Cornwall (46,340) (2011)

Proximity to Human Settlement Score (maximum 40 points) 12

2.6 OWNERSHIP (FA = fractional area)

	Fractional Area		Score
FA of wetland in public or private ownership, held under contract or in trust for wetland protection	_____	x 10 =	_____
FA of wetland area in public ownership, not as above	_____	x 8 =	_____
FA of wetland area in private ownership, not as above	1	x 4 =	4

Source of information: Background Data Collection

Ownership Score (maximum 10 points) 4

2.1 - 0
2.2 - 0 > = (2)
2.5 - 12

2.7 SIZE

1.23 hectares

Evaluation Table for Size Score (Social Component)

Wetland size (ha)	Total for Size Dependent Score									
	<31	31-45	46-60	61-75	76-90	91-105	106-109	121-135	136-150	>150
<2 ha	1	2	4	8	10	12	14	14	14	15
2-4	1	2	4	8	12	13	14	14	15	16
5-8	2	2	5	9	13	14	15	15	16	16
9-12	3	3	6	10	14	15	15	16	17	17
13-17	3	4	7	10	14	15	16	16	17	17
18-28	4	5	8	11	15	16	16	17	17	18
29-37	5	7	10	13	16	17	18	18	19	19
38-49	5	7	10	13	16	17	18	18	19	20
50-62	5	8	11	14	17	17	18	19	20	20
63-81	5	8	11	15	17	18	19	20	20	20
82-105	6	9	11	15	18	18	19	20	20	20
106-137	6	9	12	16	18	19	20	20	20	20
138-178	6	9	13	16	18	19	20	20	20	20
179-233	6	9	13	16	18	20	20	20	20	20
234-302	7	9	13	16	18	20	20	20	20	20
303-393	7	9	14	17	18	20	20	20	20	20
394-511	7	10	14	17	18	20	20	20	20	20
512-665	7	10	14	17	18	20	20	20	20	20
666-863	7	10	14	17	19	20	20	20	20	20
864-1123	8	12	15	17	19	20	20	20	20	20
1124-1460	8	12	15	17	19	20	20	20	20	20
1461-1898	8	13	15	18	19	20	20	20	20	20
1899-2467	8	14	16	18	20	20	20	20	20	20
>2467	8	14	16	18	20	20	20	20	20	20

Total Size Score (Social Component) 1

2.8 ABORIGINAL AND CULTURAL HERITAGE VALUES

Either or both Aboriginal or Cultural Values may be scored. However, the maximum score permitted for 2.8 is 30 points. Attach documentation.

2.8.1 ABORIGINAL VALUES

Full documentation of sources must be attached to the data record.

1) _____	Significant	=	30 points
2) _____	Not Significant	=	0
3) X	Unknown	=	(0)

2.8.2 CULTURAL HERITAGE

1) _____	Significant	=	30 points
2) _____	Not Significant	=	0
3) X	Unknown	=	(0)

Aboriginal Values/Cultural Heritage Score (maximum 30 points) (0)

3.0 HYDROLOGICAL COMPONENT

3.1 FLOOD ATTENUATION

If the wetland is a complex including isolated wetlands, apportion the 100 points according to area. For example, if 10 ha of a 100 ha complex is isolated, the isolated portion receives the maximum proportional score of 10. The remainder of the wetland is then evaluated out of 90.

Step 1 Determination of Maximum Score

_____ Wetland is located on one of the defined 5 large lakes or 5 major rivers (Go to Step 4).
__X__ Wetland is entirely isolated (i.e. not part of a complex) (Go to Step 4)
_____ All other wetland types (Go through steps 2, 3, and 4B)

Step 2. Determination of Upstream Detention Factor (DF)

(a)	Wetland area (ha)	_____
(b)	Total area (ha) of upstream detention areas (include the wetland itself)	_____
(c)	Ratio of (a):(b)	_____
(d)	Upstream detention factor: (c) x 2 = (maximum allowable factor = 1)	_____

Step 3 Determination of Wetland Attenuation Factor (AF)

(a)	Wetland area (ha)	_____
(b)	Size of catchment basin (ha) upstream of wetland (include wetland itself in catchment area)	_____
(c)	Ratio of (a):(b)	_____
(d)	Wetland attenuation factor: (c) x 10 = (maximum allowable factor = 1)	_____

Step 4. Calculation of final score

(a)	Wetlands on large lakes or major rivers	0
(b)	Wetland entirely isolated	100
(b)	All other wetlands -- calculate as follows:	
	Initial score	100*
	Upstream detention factor (DF) (Step 2)	_____
	Wetland attenuation factor (AF) (Step 3)	_____
	Final score: ((DF + AF)/2) x Initial score =	_____

*Unless wetland is a complex with isolated portions (see above).

Flood Attenuation Score (maximum 100 points) 100

3.2 WATER QUALITY IMPROVEMENT

3.2.1 SHORT TERM WATER QUALITY IMPROVEMENT

Step 1: **Determination of maximum initial score**

____ Wetland on one of the 5 defined large lakes or 5 major rivers (Go to Step 5a)
_X_ All other wetlands (Go through Steps 2, 3, 4, and 5b)

Step 2: **Determination of watershed improvement factor (WIF)**

Calculation of WIF is based on the fractional area (FA) of each site type that makes up the total area of the wetland.

(FA = area of site type/total area of wetland)	Fractional Area
FA of isolated wetland	_1_ x 0.5 = 0.5
FA of riverine wetland	____ x 1.0 = ____
FA of palustrine wetland with no inflow	____ x 0.7 = ____
FA of palustrine wetland with inflows	____ x 1.0 = ____
FA of lacustrine on lake shoreline	____ x 0.2 = ____
FA of lacustrine at lake inflow or outflow	____ x 1.0 = ____

Sum (WIF cannot exceed 1.0) 0.5

Step 3: **Determination of catchment land use factor (LUF)**

(Choose the first category that fits upstream landuse in the catchment.)

1) _X_	Over 50% agricultural and/or urban	(1.0)
2) ____	Between 30 and 50% agricultural and/or urban	0.8
3) ____	Over 50% forested or other natural vegetation	0.6

LUF (maximum 1.0) 1.0

Step 4: **Determination of pollutant uptake factor (PUT)**

Calculation of PUT is based on the fractional area (FA) of each vegetation type that makes up the total area of the wetland. Base assessment on the dominant vegetation form for each community except where dead trees or shrubs dominate. In that case base assessment on the dominant live vegetation type. (FA = area of vegetation type/total area of wetland)

	Fractional Area
FA of wetland with live trees, shrubs, herbs or mosses (c,h,ts,ls,gc,m)	_1_ x 0.75 = 0.75
FA of wetland with emergent, submergent or floating vegetation (re,be,ne,su,f,ff)	____ x 1.0 = ____
FA of wetland with little or no vegetation (u)	____ x 0.5 = ____

Sum (PUT cannot exceed 1.0) 0.75

Step 5: **Calculation of final score**

(a)	Wetland on large lakes or major rivers	0
(b)	All other wetlands - calculate as follows	
	Initial score	60
	Water quality improvement factor (WQF)	0.5
	Land use factor (LUF)	1.0
	Pollutant uptake factor (PUT)	0.75

Final score: 60 x WQF x LUF x PUT = 22.5

Short Term Water Quality Improvement Score (maximum 60 points) 22.5

3.2.2 LONG TERM NUTRIENT TRAP

Step 1:

____	Wetland on large lakes or 5 major rivers	0 points
X	All other wetlands (Proceed to Step 2)	

Step 2: Choose only one of the following settings that best describes the wetland being evaluated

1) ____	Wetland located in a river mouth	10 points
2) X	Wetland is a bog, fen, or swamp with more than 50% of the wetland being covered with organic soil	10
3) ____	Wetland is a bog, fen, or swamp with less than 50% of the wetland being covered with organic soil	3
4) ____	Wetland is a marsh with more than 50% of the wetland covered with organic soil	3
5) ____	None of the above	0

Long Term Nutrient Trap Score (maximum 10 points) 10

3.2.3 GROUNDWATER DISCHARGE

(Circle the characteristics that best describe the wetland being evaluated and then sum the scores. If the sum exceeds 30 points assign the maximum score of 30.)

Wetland Characteristics	Potential for Discharge		
	None to Little	Some	High
Wetland type	1) Bog = 0	(2) Swamp/Marsh = 2	3) Fen = 5
Topography	(1) Flat/rolling = 0	2) Hilly = 2	3) Steep = 5
Wetland Area:Upslope Catchment Area	Large (>50%) = 0	Moderate (5-50%) = 2	(Small (<5%) = 5
Lagg Development	1) None found = 0	(2) Minor = 2	3) Extensive = 5
Seeps	(1) None = 0	2) = or < 3 seeps = 2	3) > 3 seeps = 5
Surface marl deposits	(1) None = 0	2) = or < 3 sites = 2	3) > 3 sites = 5
Iron precipitates	(1) None = 0	2) = or < 3 sites = 2	3) > 3 sites = 5
Located within 1 km of a major aquifer	(N/A = 0	N/A = 0	Yes = 10

(Scores are cumulative, maximum score 30 points)

Groundwater Discharge Score (maximum 30 points) 9

3.3 CARBON SINK

Choose only one of the following

1) X	Bog, fen or swamp with more than 50% coverage by organic soil	5 points
2) _____	Bog, fen or swamp with between 10 to 49% coverage by organic soil	2
3) _____	Marsh with more than 50% coverage by organic soil	3
4) _____	Wetlands not in one of the above categories	0

Carbon Sink Score (maximum 5 points) 5

3.4 SHORELINE EROSION CONTROL

Step 1:

		Score
X	Wetland entirely isolated or palustrine	0
_____	Any part of the wetland riverine, or lacustrine (proceed to Step 2)	

Step 2:

Choose the one characteristic that best describes the shoreline vegetation (see text for a definition of shoreline)

		Score
1) _____	Trees and shrubs	15
2) _____	Emergent vegetation	8
3) _____	Submergent vegetation	6
4) _____	Other shoreline vegetation	3
5) _____	No vegetation	0

Shoreline Erosion Control Score (maximum 15 points) 0

3.5 GROUND WATER RECHARGE

3.5.1 WETLAND SITE TYPE

		Score
(a)	Wetland > 50% lacustrine (by area) or located on one of the five major rivers	0
(b)	Wetland not as above. Calculate final score as follows: (FA = area of site type/total area of wetland)	

	Fractional Area	
FA of isolated or palustrine wetland	1 x 50 =	50
FA of riverine wetland	_____ x 20 =	_____
FA of lacustrine wetland (wetland <50% lacustrine)	_____ x 0 =	_____

Ground Water Recharge, Wetland Site Type Component Score (maximum 50 points) 50

3.5.2 WETLAND SOIL RECHARGE POTENTIAL

(Circle only one choice that best describes the hydrologic soil class of the area surrounding the wetland being evaluated.)

Dominant Wetland Type	1) Sand, loam, gravel, till	2) Clay or bedrock
1) Lacustrine or on a major river	0	0
2) Isolated	10	5
3) Palustrine	7	4
4) Riverine (not a major river)	5	2

Ground Water Recharge, Wetland Soil Recharge Potential Score (maximum 10 points) 10

4.0 SPECIAL FEATURES COMPONENT

4.1 RARITY

4.1.1 WETLANDS

Site District 6O

Presence of wetland type (check one or more)

_____ Bog
_____ Fen
__X__ Swamp
_____ Marsh

Score for rarity within the landscape and rarity of the wetland type. Score for rarity of wetland type is cumulative (maximum 80 points) based on presence or absence.

Site District	Score for Rarity within the Landscape	Score for Rarity of Wetland Type			
		Marsh	Swamp	Fen	Bog
6-1	60	40	0	80	80
6-2	60	40	0	80	80
6-3	40	10	0	40	80
6-4	60	40	0	80	80
6-5	20	40	0	80	80
6-6	40	20	0	80	80
6-7	60	10	0	80	80
6-8	20	20	0	80	80
6-9	0	20	0	80	80
6-10	20	0	20	80	80
6-11	0	30	0	80	80
6-12	0	30	0	60	80
6-13	60	10	0	80	80
6-14	40	20	0	40	80
6-15	40	0	0	80	80
7-1	60	0	60	80	80
7-2	60	0	0	80	80
7-3	60	0	0	80	80
7-4	80	0	0	80	80
7-6	80	30	0	80	80

SD+G

Rarity within the Landscape Score (maximum 80 points) 0

Rarity of Wetland Type Score (Maximum 80 points) 0

4.1.2 SPECIES

4.1.2.1 BREEDING HABITAT FOR AN ENDANGERED OR THREATENED SPECIES

Name of species	Source of information
1)_____	_____
2)_____	_____
3)_____	_____

* no habitat for SAR observed through multiple site visits *

Attach documentation.

Scoring:

For each species	250 points

(Score is cumulative, no maximum score)

Breeding Habitat for Endangered or Threatened Species Score (no maximum) 0

4.1.2.2 TRADITIONAL MIGRATION OR FEEDING HABITAT FOR AN ENDANGERED OR THREATENED SPECIES

Name of species	Source of information
1)_____	_____
2)_____	_____
3)_____	_____

* same as 4.1.2 *

Attach documentation.

Scoring:

For one species	150 points
For each additional species	75

(Score is cumulative, no maximum score)

Traditional Habitat for Endangered or Threatened Species Score (no maximum) 0

4.1.2.3 PROVINCIALLY SIGNIFICANT ANIMAL SPECIES

Name of species	Source of information
1)	
2)	
3)	
4)	
5)	

Attach separate list if necessary; Attach documentation

* no provincially significant species or habitat observed though multiple site visits *

Scoring:

Number of provincially significant animal species in the wetland:

One species	=	50 points	14 species	=	154
2 species	=	80	15 species	=	156
3 species	=	95	16 species	=	158
4 species	=	105	17 species	=	160
5 species	=	115	18 species	=	162
6 species	=	125	19 species	=	164
7 species	=	130	20 species	=	166
8 species	=	135	21 species	=	168
9 species	=	140	22 species	=	170
10 species	=	143	23 species	=	172
11 species	=	146	24 species	=	174
12 species	=	149	25 species	=	176
13 species	=	152			

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

(no maximum score)

Provincially Significant Animal Species Score (no maximum) 0

4.1.2.4 PROVINCIALLY SIGNIFICANT PLANT SPECIES

(Scientific names must be recorded)

	Common Name	Scientific Name	Source of information
1)			
2)			
3)			
4)			
5)			

Attach separate list if necessary. Attach documentation.

Scoring:

Number of provincially significant plant species in the wetland:

* no provincially sig. plant species identified*

One species	=	50 points	14 species	=	154
2 species	=	80	15 species	=	156
3 species	=	95	16 species	=	158
4 species	=	105	17 species	=	160
5 species	=	115	18 species	=	162
6 species	=	125	19 species	=	164
7 species	=	130	20 species	=	166
8 species	=	135	21 species	=	168
9 species	=	140	22 species	=	170
10 species	=	143	23 species	=	172
11 species	=	146	24 species	=	174
12 species	=	149	25 species	=	176
13 species	=	152			

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Plant Species Score (no maximum) 0

4.1.2.5 REGIONALLY SIGNIFICANT SPECIES (SITE REGION)

Scientific names must be recorded for plant species. **Lists of significant species must be approved by MNR.**

SIGNIFICANT IN SITE REGION:

	Common Name	Scientific Name	Source of information
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			

Attach separate list if necessary. Attach documentation

Scoring:

No. of species significant in Site Region

One species	=	20	6 species	=	55
2 species	=	30	7 species	=	58
3 species	=	40	8 species	=	61
4 species	=	45	9 species	=	64
5 species	=	50	10 species	=	67

Add one point for every species past 10. (No maximum score)

Regionally Significant Species Score (Site Region) (no maximum) 0

* There is currently no list of regionally significant plants species developed for SDG or the area of extreme eastern Ontario *

- Vascular plants of Eastern Ontario (1991). L Stannard

only resource available.

4.2.1.6 LOCALLY SIGNIFICANT SPECIES (SITE DISTRICT)

Scientific names must be recorded for plant species. **Lists of significant species must be approved by MNR.**

	Common Name	Scientific Name	Source of information
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			

Attach separate list if necessary. Attach documentation.

Scoring: * same as 4.1.2.5 *

No. of species significant in Site District

One species	=	10	6 species	=	41
2 species	=	17	7 species	=	43
3 species	=	24	8 species	=	45
4 species	=	31	9 species	=	47
5 species	=	38	10 species	=	49

For each significant species over 10 in the wetland, add 1 point.

Locally Significant Species Score(Site District) (no maximum)

0

4.2 SIGNIFICANT FEATURES AND/OR FISH & WILDLIFE HABITAT

4.2.1 NESTING OF COLONIAL WATERBIRDS

Status	Name of species	Source of Information	Score
1) Currently nesting			50 points
2) Known to have nested within past 5 years			25
3) Active feeding area (Do not include feeding by great blue herons)			15
4) None known			0

Attach documentation (nest locations, etc., if known)

Score highest applicable category only; maximum score 50 points.

Score for Nesting Colonial Waterbirds (maximum 50 points) 0

4.2.2. WINTER COVER FOR WILDLIFE

(Check only highest level of significance) (one only)		Score
1) _____	Provincially significant	100
2) _____	Significant in Site Region	50
3) _____	Significant in Site District	25
3) _____	Locally significant	10
4) X	Little or poor winter cover present	(0)

Source of information: Field Observation

Winter Cover for Wildlife Score (maximum 100 points) 0

4.2.3 WATERFOWL STAGING AND/OR MOULTING

(Check only highest level of significance for both staging and moulting; score is cumulative across columns, maximum score 150)

	Staging	Score (one only)	Moulting	Score (one only)
1) Nationally significant	_____	150	_____	150
2) Provincially significant	_____	100	_____	100
3) Regionally significant	_____	50	_____	50
4) Known to occur	_____	10	_____	10
5) Not possible	X	0	X	0
6) Unknown	_____	0	_____	0

Source of information: Field Observation

Waterfowl Moulting and Staging Score (maximum 150 points) 0

4.2.4 WATERFOWL BREEDING

(Check only highest level of significance)		Score
1) _____	Provincially significant	100
2) _____	Regionally significant	50
3) _____	Habitat suitable	10
4) X	Habitat not suitable	0

Source of information: Field Observation

Waterfowl Breeding Score (maximum 100 points) 0

4.2.5 MIGRATORY PASSERINE, SHOREBIRD OR RAPTOR STOPOVER AREA

(check highest applicable category)

		Score
1) _____	Provincially significant	100
2) _____	Significant in Site Region	50
3) _____	Significant in Site District	10
4) 0	Not significant	0

Source of information: Background Data

Passerine, Shorebird or Raptor Stopover Score (maximum 100 points) 0

4.2.7 FISH HABITAT

4.2.7.1 Spawning and Nursery Habitat

Table 5. Area Factors for Low Marsh, High Marsh and Swamp Communities.

No. of ha of Fish Habitat	Area Factor
< 0.5 ha	0.1
0.5 - 4.9	0.2
5.0 - 9.9	0.4
10.0 - 14.9	0.6
15.0 - 19.9	0.8
20.0+ ha	1.0

Step 1:

X Fish habitat is not present within the wetland (Score = 0)

___ Fish habitat is present within the wetland (Go to Step 2)

Step 2: Choose only one option

1) ___ Significance of the spawning and nursery habitat within the wetland is known (Go to Step3)

2) ___ Significance of the spawning and nursery habitat within the wetland is not known (Go through Steps 4, 5, 6, and 7)

Step 3: Select the highest appropriate category below, attach documentation:

1) ___	Significant in Site Region	100 points
2) ___	Significant in Site District	50
3) ___	Locally Significant Habitat (5.0+ ha)	25
4) ___	Locally Significant Habitat (<5.0 ha)	15

Score for Spawning and Nursery Habitat (maximum score 100 points) 0

Step 4: Proceed to Steps 4 to 7 only if Step 3 was not answered.

(**Low Marsh**: marsh area from the existing water line out to the outer boundary of the wetland)

__X__ Low marsh not present (Continue to Step 5)
_____ Low marsh present (Score as follows)

Scoring for Presence of Key Vegetation Groups

Scoring is based on the one most clearly dominant plant species of the dominant form in each Low Marsh vegetation community. Check the appropriate Vegetation Group (see Appendix 16, Table 16-2) for each Low Marsh community. Sum the areas of the communities assigned to each Vegetation Group and multiply by the appropriate size factor from Table 5.

Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (see Table 5)	Score	Final Score (area factor x score)
1	Tallgrass				6 pts	
2	Shortgrass-Sedge				11	
3	Cattail-Bulrush-Burreed				5	
4	Arrowhead-Pickerelweed				5	
5	Duckweed				2	
6	Smartweed-Waterwillow				6	
7	Waterlily-Lotus				11	
8	Waterweed-Watercress				9	
9	Ribbongrass				10	
10	Coontail-Naiad-Watermilfoil				13	
11	Narrowleaf Pondweed				5	
12	Broadleaf Pondweed				8	
Total Score (maximum 75 points)						

Step 5: (**High Marsh**: area from the water line to the inland boundary of marsh wetland type. This is essentially what is commonly referred to as a wet meadow, in that there is insufficient standing water to provide fisheries habitat except during flood or high water conditions.)

__X__ High marsh not present (Continue to Step 6)
_____ High marsh present (Score as follows)

Scoring for Presence of Key Vegetation Groups

Scoring is based on the one most clearly dominant plant species of the dominant form in each High 1Marsh vegetation community. Check the appropriate Vegetation Group (see Appendix 16, Table 16-2) for each High Marsh community. Sum the areas of the communities assigned to each Vegetation Group and multiply by the appropriate size factor from Table 5.

Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (see Table 5)	Score	Final Score (area factor x score)
1	Tallgrass				6 pts	
2	Shortgrass-Sedge				11	
3	Cattail-Bulrush-Burreed				5	
4	Arrowhead-Pickerelweed				5	
Total Score (maximum 25 points)						

Step 6: (**Swamp**: Swamp communities containing fish habitat, either seasonally or permanently. Determine the total area of seasonally flooded swamps and permanently flooded swamps containing fish habitat.)

X Swamp containing fish habitat not present (Continue to Step 7)
____ Swamp containing fish habitat present (Score as follows)

Swamp containing fish habitat	Present (check)	Total area (ha)	Area Factor (see Table 5)	Score	TOTAL SCORE (factor x score)
seasonally flooded				10	
permanently flooded				10	
SCORE (maximum 20 points)					

Step 7: Calculation of final score

Score for Spawning and Nursery Habitat (Low Marsh) (maximum 75) = 0

Score for Spawning and Nursery Habitat (High Marsh) (maximum 25) = 0

Score for Swamp Containing Fish Habitat (maximum 20) = 0

Sum (maximum score 100 points) = 0

4.2.6.2 Migration and Staging Habitat

Step 1:

1) X Staging or Migration Habitat is not present in the wetland (Score = 0)

2) ___ Staging or Migration Habitat is present in the wetland, significance of the habitat is known (Go to Step 2)

3) ___ Staging or Migration Habitat is present in the wetland, significance of the habitat is not known (Go to Step 3)

NOTE: Only one of Step 2 or Step 3 is to be scored.

Step 2: Select the highest appropriate category below, attach documentation:

			Score
1)	___	Significant in Site Region	25 points
2)	___	Significant in Site District	15
3)	___	Locally Significant	10
4)	___	Fish staging and/or migration habitat present, but not as above	5

Score for Fish Migration and Staging Habitat (maximum score 25 points) 0

Step 3: Select the highest appropriate category below based on **presence** of the designated site type (does not have to be dominant). See Section 1.1.3. Note name of river for 2) and 3).

			Score
1)	___	Wetland is riverine at rivermouth or lacustrine at rivermouth	25 points
2)	___	Wetland is riverine, within 0.75 km of rivermouth	15
3)	___	Wetland is lacustrine, within 0.75 km of rivermouth	10
4)	___	Fish staging and/or migration habitat present, but not as above	0

Score for Staging and Migration Habitat (maximum score 25 points)_____

4.3 ECOSYSTEM AGE

(Fractional Area = area of wetland/total area of wetland area)

	Fractional Area	Scoring	
Bog	_____	x 25	_____
Fen, treed to open on deep soils, floating mats or marl	_____	x 20	_____
Fen, on limestone rock	_____	x 5	_____
Swamp	1	x 3	3
Marsh	_____	x 0	_____

Ecosystem Age Score (maximum 25 points) 3

4.4 GREAT LAKES COASTAL WETLANDS

Score for coastal (see text for definition) wetlands only

Choose one only

____ wetland <10 ha	= 10 points
____ wetland 10-50 ha	= 25
____ wetland 51-100 ha	= 50
____ wetland >100 ha	= 75

* wetland is not a coastal feature *

Great Lakes Coastal Wetlands Score (maximum 75 points) 0

5.0 EXTRA INFORMATION

5.1 PURPLE LOOSESTRIFE

___ Absent/Not seen

___ Present

(a) One location in wetland ___
Two to many locations ___

Abundance code
(b) (1) < 20 stems ___
(2) 20-99 stems ___
(3) 100-999 stems ___
(4) >1000 stems ___

5.2 SEASONALLY FLOODED AREAS

Indicate length of seasonal flooding

Check one or more

duration is approximate

Ephemeral	(less than 2 weeks)	X
Temporal	(2 weeks to 1 month)	X
Seasonal	(1 to 3 months)	___
Semi-permanent	(>3 months)	___
No seasonal flooding		___

5.3 SPECIES OF SPECIAL SIGNIFICANCE

5.3.1 Osprey

Present and nesting	___
Known to have nested in last 5 yr.	___
Feeding area for Osprey	___
Not as above	X

5.3.2 Common Loon

Nesting in wetland	___
Feeding at edge of wetland	___
Observed or heard on lake or river adjoining the wetland	___
Not as above	X

INVESTIGATORS	AFFILIATION
Josh Mansell	Stantec Consulting Ltd.

DATES WETLAND VISITED

October 12 + 21 / 2011, June 5 / 2012

DATE THIS EVALUATION COMPLETED: October 1 / 2012.

ESTIMATED TIME DEVOTED TO COMPLETING THE FIELD SURVEY IN "PERSON HOURS"

~ 10 hours

WEATHER CONDITIONS

i) at time of field work - variable

(Continue in the space below if necessary)

ii) summer conditions in general - extremely dry / drought conditions across Eastern Ontario (2012).

OTHER POTENTIALLY USEFUL INFORMATION:

n/a.

CHECKLIST OF PLANT AND ANIMAL SPECIES RECORDED IN THE WETLAND:

Attach list of all flora and fauna observed in the wetland.

* Indicate if voucher specimens or photos have been obtained, where located, etc.

- included under separate cover.

Southern Ontario Wetland Evaluation, Score Summary March 1993

WETLAND EVALUATION SCORING RECORD

WETLAND NAME AND/OR NUMBER unnamed (David Brown Property)

1.0 BIOLOGICAL COMPONENT

1.1 PRODUCTIVITY

1.1.1 Growing Degree-Days/Soils	11
1.1.2 Wetland Type	8
1.1.3 Site Type	1
Total for Productivity	20

1.2 BIODIVERSITY

1.2.1 Number of Wetland Types	9
1.2.2 Vegetation Communities (maximum 45)	9.5
1.2.3 Diversity of Surrounding Habitat (maximum 7)	5
1.2.4 Proximity to Other Wetlands	5
1.2.5 Interspersion	12
1.2.6 Open Water Type	0
Total for Biodiversity	33.5

1.3 SIZE (Biological Component) 8

TOTAL FOR BIOLOGICAL COMPONENT (not to exceed 250) 61.5

2.0 SOCIAL COMPONENT

2.1 ECONOMICALLY VALUABLE PRODUCTS

2.1.1 Wood Products	0
2.1.2 Wild Rice	0
2.1.3 Commercial Fish	0
2.1.4 Bullfrogs	0
2.1.5 Snapping Turtles	0
2.1.6 Furbearers	0
Total for Economically Valuable Products	0

2.2 RECREATIONAL ACTIVITIES (maximum 80) 0

2.3 LANDSCAPE AESTHETICS

2.3.1 Distinctness	0
2.3.2 Absence of Human Disturbance	4
Total for Landscape Aesthetics	4

2.4 EDUCATION AND PUBLIC AWARENESS

2.4.1 Educational Uses	0
2.4.2 Facilities and Programs	0
2.4.3 Research and Studies	0
Total for Education and Public Awareness	0

2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT 12

2.6 OWNERSHIP 4

2.7 SIZE (Social Component) 1

2.8 ABORIGINAL AND CULTURAL VALUES 0

TOTAL FOR SOCIAL COMPONENT (not to exceed 250) 21

3.0 HYDROLOGICAL COMPONENT

3.1 FLOOD ATTENUATION 60

3.2 WATER QUALITY IMPROVEMENT

3.2.1 Short Term Improvement	22.5
3.2.2 Long Term Improvement	10
3.2.3 Groundwater Discharge (maximum 30)	9
Total for Water Quality Improvement	41.5

3.3 CARBON SINK 5

3.4 SHORELINE EROSION CONTROL 0

3.5 GROUNDWATER RECHARGE

3.5.1 Site Type	50
3.5.2 Soils	10
Total for Groundwater Recharge	60

TOTAL FOR HYDROLOGICAL COMPONENT (not to exceed 250) 206.5

4.0 SPECIAL FEATURES

4.1 RARITY

4.1.1 Wetlands

4.1.1.1 Rarity within the Landscape	0
4.1.1.2 Rarity of Wetland Type (maximum 80)	0
Total for Wetland Rarity	0

4.1.2 Species

4.1.2.1 Endangered Species Breed	0
4.1.2.2 Traditional Use by Endangered or Threatened Species	0
4.1.2.3 Provincially Significant Animals	0
4.1.2.4 Provincially Significant Plants	0
4.1.2.5 Regionally Significant Species	0
4.1.2.6 Locally Significant Species	0
Total for Species Rarity	0

4.2 SIGNIFICANT FEATURES OR HABITAT

4.2.1 Colonial Waterbirds	0
4.2.2 Winter Cover for Wildlife	0
4.2.3 Waterfowl Staging and Moulting	0
4.2.4 Waterfowl Breeding	0
4.2.5 Migratory Passerine, Shorebird or Raptor Stopover	0
4.2.6 Fish Habitat	0
Total for Significant Features and Habitat	0

4.3 ECOSYSTEM AGE 3

4.4 GREAT LAKES COASTAL WETLANDS 0

TOTAL FOR SPECIAL FEATURES (maximum 250) 3

SUMMARY OF EVALUATION RESULT

Wetland unnamed (David Braun Property).

TOTAL FOR 1.0 BIOLOGICAL COMPONENT	61.5
TOTAL FOR 2.0 SOCIAL COMPONENT	21
TOTAL FOR 3.0 HYDROLOGICAL COMPONENT	206.5
TOTAL FOR 4.0 SPECIAL FEATURES COMPONENT	3
WETLAND TOTAL	292

INVESTIGATORS

Josh Morsell

AFFILIATION

Stantec Consulting Ltd.

DATE October 1 / 2019

Legend

- Subject Property
- Project Location
- 120 m Zone of Investigation
- Amphibian Call Survey Location
- Ecological Land Classification
- Surveyed Wetland (Stantec)
- Road
- Railway Line
- Grid (19.5 m x 19.5 m)

Ecological Land Classification:

Vegetation Community
AG - Switchgrass - Agriculture - Switchgrass
DIST - Disturbed
SWD2-2 - Green Ash Mineral Deciduous Swamp
MAS2-1 - Cattail Mineral Shallow Marsh
FOD6-2 - Fresh-Moist Sugar Maple Low Land Ash Deciduous Forest
CUS1-2 - White Cedar-Green Ash Mineral Cutlural Savannah
CUM1 - Mineral Cultural Meadow

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Aerial imagery provided by First Base Solutions, Stormont Dundas and Glengarry, 2008.

Stantec

October 2012
161011028

Client/Project
Saturn Power Inc.
David Brown Solar Park
Natural Heritage Assessment Report
Highway 401, Stormont Township, Ontario

Figure No.
1

DRAFT

Title
Wetland Units & OWES Interspersion Map

\\Cd1220-f02\01609\active_Other_PCs_Active\610 - Kitchener\161011028\drawing\MXD\Interspersion\161011028_Interspersion_Fig01_Wetland_Interspersion_Map.mxd
Revised: 2012-10-01 By: sstroszkali

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Guelph, Ontario, Canada
N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Salamander Egg Survey Observation Form
2-page

Project Number _____ Project Name: DAVID BRAUN SOLAR

Date / Time: APR. 5 - 2012 Field Personnel: STL, JOSH, SARAH

Weather Conditions:	Temp:	Wind:	Cloud:	PPT:	PPT in last 24 hrs:
	3°C	2-3	50%	∅	∅

Site Information

Site ID: 1 *(name and locate on aerial photo)* (1)

Pond UTM: Easting: 499729 Northing: 4983740 GPS Accuracy = ±. N/A

Start time: 10:19 AM End time: 10:33 Duration of visit: 14 min.

Photos taken: 2-4

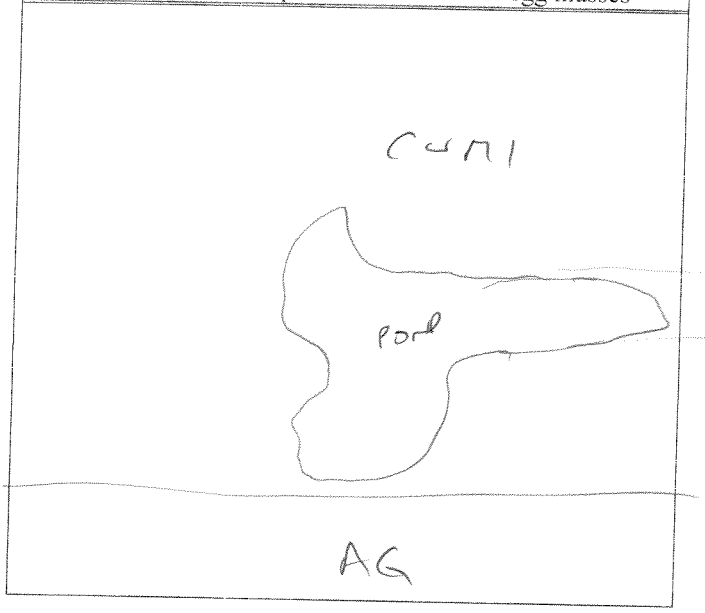
Waterbody Description	
Average depth (m)	15cm
Maximum depth (m)	20cm
Average length(m) width	15M x 4M
Water temperature	5.5°C
Water flow and speed	NO FLOW
Substrate / soils	MINERAL
Amount and type of litter / debris	LEAF, TWIGS
Number of egg attachment sites	THROUGHOUT
Fish likely present or observed?	NO, NONE OBSERVED
Emergent / wetland vegetation	PURPLE LOOSESTRIFE
Edge vegetation	SALIX SHRUBS, POPLAR SAPLINGS
Dominant surrounding vegetation / community	AG & OPEN CUM
Percent canopy closure over pond	50%
Percent in-pond shrub cover and species	40%, SALIX

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel) Signature: _____ (Project Manager)

REV: May, 07 Form 004

Sketch of Pond -Include dimension of pond and location of egg masses	***OTHER NOTES:***



Egg Mass Observations		
Number of masses observed:		
Total number of **live** masses by probable species	Species Code	# Egg masses
	NONE OBS.	
Total number of **dead** masses by probable species	Species Code	# Egg masses
	NONE OBS	
Direct salamander observations *(list species and number)*	NONE	
Other direct herp. Observations *(list species and number)*	NONE	

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel)

Signature: _____ (Project Manager)

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Salamander Egg Survey Observation Form
2-page

Project Number _____ Project Name: DAVID BROWN SOLAR

Date / Time: APR 5 - 12 Field Personnel: JTL; SARH, JOSH

Weather Conditions:	Temp:	Wind:	Cloud:	PPT:	PPT in last 24 hrs:

(2)

Site Information

Site ID: 2 *(name and locate on aerial photo)*

Pond UTM: Easting: 499495 Northing: 4983582 GPS Accuracy = ± N/A

Start time: 10:40 End time: 11:12 Duration of visit: 32 min

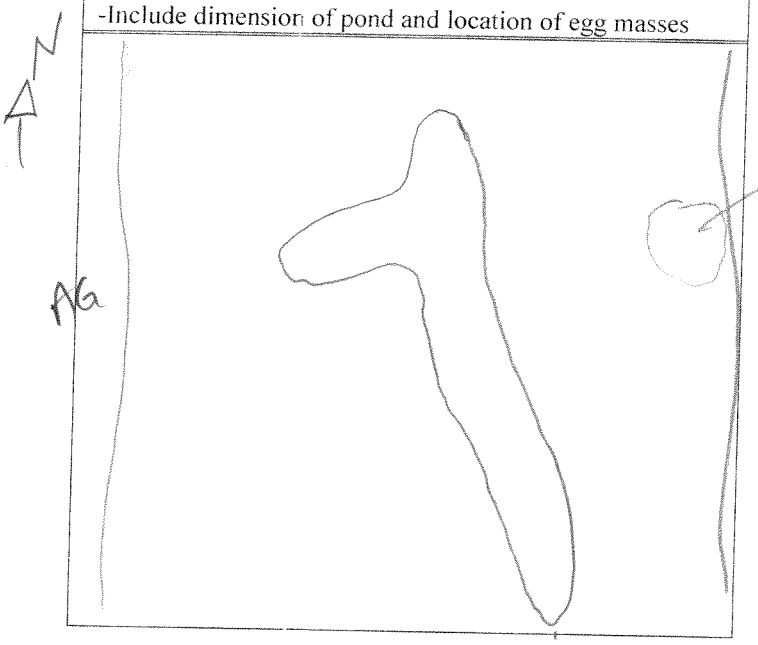
Photos taken: PIC 5 - 8

Waterbody Description	
Average depth (m)	15cm
Maximum depth (m)	35cm
Average length(m) width	45m x 2.5m
Water temperature	5°C
Water flow and speed	NO FLOW
Substrate / soils	MINERAL
Amount and type of litter / debris	LEAF, TWIG, LOGS,
Number of egg attachment sites	THROUGHOUT
Fish likely present or observed?	POSSIBLE; NONE OBS.
Emergent / wetland vegetation	FEW SAPLINGS
Edge vegetation	SAPLINGS
Dominant surrounding vegetation / community	FOD/SWD - MATURE
Percent canopy closure over pond	80%
Percent in-pond shrub cover and species	15%, FRAXINUS & ACERRUB SAPLINGS, RHACATH

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel) Signature: _____ (Project Manager)

Sketch of Pond
-Include dimension of pond and location of egg masses



OTHER NOTES:

(2)

SHALLOWER POOL
-APPEARS TO SHALLOW FOR MASSES.

CUM

- SOUTH OF THIS POOL IS ANOTHER SMALL POOL, ~ 6m x 2.5m, DEPTH ~ 10cm
- NO MASSES OBSERVED
- PIC #8
- SEASONAL HYDRO CONNECTION FROM THIS TO MAIN POOL

Egg Mass Observations

Number of masses observed:		
Total number of **live** masses by probable species	Species Code	# Egg masses
	NONE OBS	
Total number of **dead** masses by probable species	Species Code	# Egg masses
	NONE OBS	
Direct salamander observations *(list species and number)*	NONE	
Other direct herp. Observations *(list species and number)*	NONE	

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel)

Signature: _____ (Project Manager)

Stantec

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Salamander Egg Survey Observation Form
2-page

Project Number ______________________

Project Name: David Brown Solar.

Date / Time: April 5, 2012

Field Personnel: Rogers, Leslie, Mansell

Weather Conditions:	Temp:	Wind:	Cloud:	PPT:	PPT in last 24 hrs:
	4°c.	5-10 km/h.	100%	ϕ	ϕ.

Site Information

Site ID: 3 *(name and locate on aerial photo)*

Pond UTM: Easting: 498995 Northing: 4998365 (83) GPS Accuracy = ± ________

Start time: 11:44 End time: 11:57 Duration of visit: 13 min.

Photos taken: 9 - 10

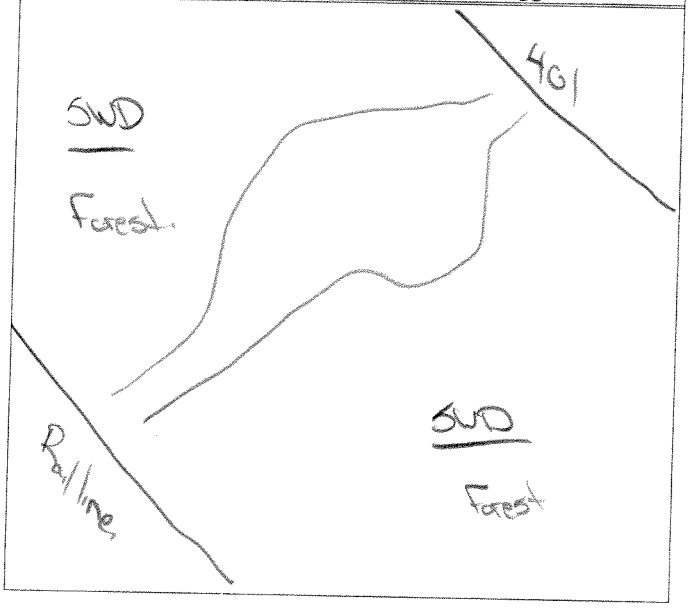
Waterbody Description	
Average depth ~~(m)~~ (cm)	20
Maximum depth ~~(m)~~ (cm)	45m
Average length(m) width	20 10
Water temperature	8°c.
Water flow and speed	0
Substrate / soils	mineral
Amount and type of litter / debris	leafs, twigs, logs.
Number of egg attachment sites	occasional
Fish likely present or observed?	no, none observed.
Emergent / wetland vegetation	Carex spp.
Edge vegetation	Silver Maple, Green Ash, W. Elm
Dominant surrounding vegetation / community	disturbed, marsh
Percent canopy closure over pond	50%.
Percent in-pond shrub cover and species	100%. - Carex spp - Silver Maple.

Quality Control: This form is complete (__) & legible (__).

Signature: ______________________ (Field Personnel)

Signature: ______________________ (Project Manager)

REV: May, 07 Form 004

Sketch of Pond -Include dimension of pond and location of egg masses	***OTHER NOTES:***
	- Several small pools in chain - looks connected to railline drain. - Gem Ash, Silver Maple, Coral Spp.

Egg Mass Observations		
Number of masses observed:		
Total number of **live** masses by probable species	Species Code	# Egg masses
	- none observed	0
Total number of **dead** masses by probable species	Species Code	# Egg masses
	- none observed	0
Direct salamander observations *(list species and number)*	- none observed	
Other direct herp. Observations *(list species and number)*	- none observed.	

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel)

Signature: _____ (Project Manager)

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Tel: (519) 836-6050
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Salamander Egg Survey Observation Form
2-page

Project Number _____ Project Name: DAVID BROWN SOLAR

Date / Time: APR. 5 - 12 Field Personnel: JTL ; JOSH, SARAH

Weather Conditions:	Temp:	Wind:	Cloud:	PPT:	PPT in last 24 hrs:
	4°C	2	90%	Ø	Ø

Site Information

Site ID: 4 *(name and locate on aerial photo)*

Pond UTM: Easting: 498939 Northing: 4993279 GPS Accuracy = ±. N/A

Start time: 11:55 End time: 12:10 Duration of visit: 15 MIN.

Photos taken: 11 - 12

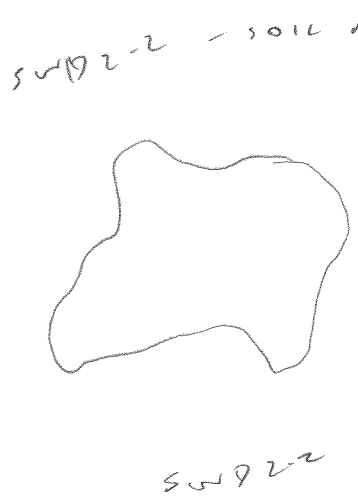
Waterbody Description	
Average depth (m)	15 CM
Maximum depth (m)	25 CM
Average length(m) width	25M x 6M
Water temperature	6°C
Water flow and speed	NO FLOW
Substrate / soils	MINERAL
Amount and type of litter / debris	LEAF, LOGS, TWIGS
Number of egg attachment sites	LEAVES THROUGHOUT, SPARSE TWIGS
Fish likely present or observed?	UNLIKELY, NONE OBS.
Emergent / wetland vegetation	FEW CAREX
Edge vegetation	CANOPY SAPLINGS
Dominant surrounding vegetation / community	SWD 2
Percent canopy closure over pond	75%
Percent in-pond shrub cover and species	20%, ACERRUF

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel) Signature: _____ (Project Manager)

Page _____ of _____

HW4

Sketch of Pond 401 -Include dimension of pond and location of egg masses	***OTHER NOTES:***
N ↑  	- LIMITED TWIG ATTACHMENT SITES

Egg Mass Observations		
Number of masses observed:		
Total number of **live** masses by probable species	Species Code	# Egg masses
	NONE OBS.	
Total number of **dead** masses by probable species	Species Code	# Egg masses
	NONE OBS.	
Direct salamander observations *(list species and number)*	NONE	
Other direct herp. Observations *(list species and number)*	NONE	

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel)

Signature: _____ (Project Manager)

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Salamander Egg Survey Observation Form
2-page

Project Number _____ Project Name: DAVID BROWN SOLAR

Date / Time: APR 5 - 12 Field Personnel: JTL, JOSH, SARAH

Weather Conditions:	Temp:	Wind:	Cloud:	PPT:	PPT in last 24 hrs:

Site Information

Site ID: 5 *(name and locate on aerial photo)*

Pond UTM: Easting: 498752 Northing: 4983286 GPS Accuracy = ±. N/A

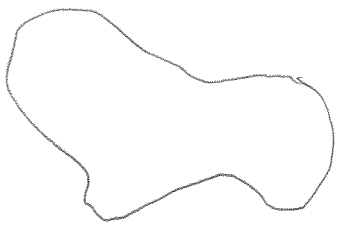
Start time: 12:20 End time: 12:30 Duration of visit: 10 MIN.

Photos taken: 13-14

Waterbody Description	
Average depth (m)	18cm
Maximum depth (m)	30cm
Average length(m) width	15m x 4m
Water temperature	6°C
Water flow and speed	NO FLOW
Substrate / soils	MINERAL
Amount and type of litter / debris	LEAF, TWIG, LOG
Number of egg attachment sites	THROUGHOUT
Fish likely present or observed?	UNLIKELY; NONE OBS.
Emergent / wetland vegetation	FEW CAREX (< 2% COVER)
Edge vegetation	FEW SAPLINGS
Dominant surrounding vegetation / community	SWD 2-2
Percent canopy closure over pond	60%
Percent in-pond shrub cover and species	- 15%, CANOPY SAPLINGS - NO SHRUBS

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel) Signature: _____ (Project Manager)

Sketch of Pond -Include dimension of pond and location of egg masses	***OTHER NOTES:***
Hwy 401 swpz-2 moist  swpz-2	

Egg Mass Observations		
Number of masses observed:		
Total number of **live** masses by probable species	Species Code	# Egg masses
	None obs.	
Total number of **dead** masses by probable species	Species Code	# Egg masses
	none obs.	
Direct salamander observations *(list species and number)*	None	
Other direct herp. Observations *(list species and number)*	None	

Quality Control: This form is complete (__) & legible (__).

Signature: _____ (Field Personnel)

Signature: _____ (Project Manager)

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Woodland & Wildlife Habitat Assessment Form

Project Number: 160911028 Project Name: David Brown Site

Date: October 12 \ 2011. Field Personnel: J. Mansell \ S. Rogers

Weather Conditions:	TEMP (°C):	WIND: (beaufort)	CLOUD:	PPT:	PPT (in last 24 hrs):
	14	2	90%	trace	n/a

ELC Polygon: # FOD6-2 Assessment Type: ❑-Visual; roadside, no access / ■-Physical; walk through feature

Extent of Physical Investigation of Feature: ■-Entire / ❑-Partial, walk through polygon *(indicate on map)*

Reptile / Bat Hibernacula Features: Contains potential reptile hibernacula features?
❑-Y* / ■-N / ❑-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]
Contains potential bat hibernacula features?
❑-Y* / ■-N / ❑-Unknown, no access *(*if yes, describe in table below)*
[i.e. karst topography, abandoned mines or caves]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED			
UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Roosting Features: Contains potential bat roosting features?
❑-Y* / ■-N / ❑-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surroundings, DBH >25cm, side-facing cavities ~10m high in tree]

POTENTIAL BAT ROOSTING FEATURE(S) IDENTIFIED							
UTM	Tree ID	Tree Spp.	DBH	Photo No.	Decay Class (1-5)	No. of Cavities	Height and Type of Cavities

Stick Nests: Contains large stick nests?
❑-Y* / ■-N / ❑-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED					
UTM	Tree ID	Tree Spp.	Nest Size	Photo No.	Spp. Observed Using Feature

Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
❑-Y* / ■-N / ❑-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED						
UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES & HABITAT OBSERVATIONS (list species and type of observation & indicate on map)

A fairly young woodlot that does not have a lot of trees that support the above habitat specifics.
does not

* No Rock Piles, bedrock fissures, etc.

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

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Fax: (519) 836-2493

Woodland & Wildlife Habitat Assessment Form

Project Number: 160911028 Project Name: David Brown Site

Date: October 12/2011 Field Personnel: Josh Mansell / S. Boggs

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	14	2	90%	trace	n/a.

ELC Polygon: # SWD2-2 Assessment Type: ☐-Visual; roadside, no access / ■-Physical; walk through feature

Extent of Physical Investigation of Feature: ■-Entire / ☐-Partial, walk through polygon *(indicate on map)*

Reptile / Bat Hibernacula Features: Contains potential reptile hibernacula features?
☐-Y* / ■-N / ☐-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]
Contains potential bat hibernacula features?
☐-Y* / ■-N / ☐-Unknown, no access *(*if yes, describe in table below)*
[i.e. karst topography, abandoned mines or caves]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED			
UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Roosting Features: Contains potential bat roosting features?
☐-Y* / ■-N / ☐-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surroundings, DBH >25cm, side-facing cavities ~10m high in tree]

POTENTIAL BAT ROOSTING FEATURE(S) IDENTIFIED							
UTM	Tree ID	Tree Spp.	DBH	Photo No.	Decay Class (1-5)	No. of Cavities	Height and Type of Cavities

Stick Nests: Contains large stick nests?
☐-Y* / ■-N / ☐-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED					
UTM	Tree ID	Tree Spp.	Nest Size	Photo No.	Spp. Observed Using Feature

Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
☐-Y* / ■-N / ☐-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED						
UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES & HABITAT OBSERVATIONS (list species and type of observation & indicate on map)

Vernal pools were not present at the time of investigations, but they are more than likely to occur based on the visible characteristics. Ie - low depression, mineral soil, aquatic vegetation.

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

APPENDIX E

VASCULAR PLANT LIST

Appendix E
Vascular Plant List

LATIN NAME		COMMON NAME	ENT OF CONSERV	WETNESS INDEX	WEEDINESS INDEX	AL STATUS	OMNR STATUS	COSEWIC STATUS
PTERIDOPHYTES		**FERNS & ALLIES**						
Dryopteridaceae		**Wood Fern Family**						
Dryopteridaceae	*species*	Wood fern species						
Matteuccia	*struthiopteris* var. *pensylvanica*	Ostrich Fern	5	-3		S5		
Onoclea	*sensibilis*	Sensitive Fern	4	-3		S5		
Polystichum	*acrostichoides*	Christmas Fern	5	5		S5		
Equisetaceae		**Horsetail Family**	8	-3		S5		
Equisetum	*pratense*	Meadow Horsetail						
GYMNOSPERMS		**CONIFERS**						
Cupressaceae		**Cedar Family**						
Juniperus	*virginiana* var. *virginiana*	Red Cedar	4	3		S5		
Thuja	*occidentalis*	Eastern White Cedar	4	-3		S5		
Pinaceae		**Pine Family**						
Larix	*laricina*	Tamarack	7	-3		S5		
Picea	*glauca*	White Spruce	6	3		S5		
Picea	*mariana*	Black Spruce	8	-3		S5		
Pinus	*resinosa*	Red Pine	8	3		S5		
Pinus	*sylvestris*	Scotch Pine		5	-3	SE5		
DICOTYLEDONS		**DICOTS**						
Aceraceae		**Maple Family**						
Acer	*negundo*	Manitoba Maple	0	-2		S5		
Acer	*rubrum*	Red Maple	4	0		S5		
Acer	*saccharinum*	Silver Maple	5	-3		S5		
Acer	*saccharum* ssp. *saccharum*	Sugar Maple	4	3		S5		
Anacardiaceae		**Sumac or Cashew Family**						
Rhus	*radicans* ssp. *negundo*	Poison-ivy	5	-1		S5		
Rhus	*typhina*	Staghorn Sumac	1	5		S5		
Apiaceae		**Carrot or Parsley Family**						
Daucus	*carota*	Wild Carrot		5	-2	SE5		
Pastinaca	*sativa*	Wild Parsnip		5	-3	SE5		
Araliaceae		**Ginseng Family**						
Aralia	*nudicaulis*	Wild Sarsaparilla	4	3		S5		

Appendix E
Vascular Plant List

LATIN NAME		COMMON NAME	ENT OF CONSERV	WETNESS INDEX	WEEDINESS INDEX	AL STATUS	OMNR STATUS	COSEWIC STATUS
Asclepiadaceae		**Milkweed Family**						
Asclepias	*incarnata* ssp. *incarnata*	Swamp Milkweed	6	-5		S5		
Asclepias	*syriaca*	Common Milkweed	0	5		S5		
Asteraceae		**Composite or Aster Family**						
Aster	*species*	Aster species						
Bidens	*cernua*	Nodding Beggar-ticks	2	-5		S5		
Cichorium	*intybus*	Chicory		5	-1	SE5		
Cirsium	*arvense*	Canada Thistle		3	-1	SE5		
Cirsium	*species*	Thistle species						
Erigeron	*pulchellus*	Robin's Plantain	7	3		S5		
Erigeron	*strigosus*	Daisy Fleabane	0	1		S5		
Eurybia	*macrophylla*	Large-leaved Aster	5	5		S5		
Hieracium	*caespitosum*	Field Hawkweed		5	-2	SE5		
Leucanthemum	*vulgare*	Ox-eye Daisy		5	-1	SE5		
Senecio	*obovatus*	Round-leaved Ragwort						
Solidago	*species*	Goldenrod Species						
Solidago	*canadensis*	Canada Goldenrod	1	3		S5		
Symphyotrichum	*cordifolium*	Heart-leaved Aster	5	5		S5		
Symphyotrichum	*novae-angliae*	New England Aster	2	-3		S5		
Tanacetum	*vulgare*	Common Tansy		5	-1	SE5		
Taraxacum	*officinale*	Common Dandelion		3	-2	SE5		
Tragopogon	*pratensis* ssp. *pratensis*	Meadow Goat's-beard		5	-1	SE5		
Tussilago	*farfara*	Coltsfoot		3	-2	SE5		
Balsaminaceae		**Touch-me-not Family**						
Impatiens	*capensis*	Spotted Touch-me-not	4	-3		S5		
Berberidaceae		**Barberry Family**						
Caulophyllum	*thalictroides*	Blue Cohosh	6	5		S5		
Betulaceae		**Birch Family**						
Betula	*papyrifera*	White Birch		2		S5		
Brassicaceae		**Mustard Family**						
Brassicaceae	*Species*	Mustard Species						
Erysimum	*cheiranthoides* ssp. *cheiranthoi*	Wormseed Mustard		3	-1	SE5		

Appendix E
Vascular Plant List

LATIN NAME		COMMON NAME	ENT OF CONSERV	WETNESS INDEX	WEEDINESS INDEX	AL STATUS	OMNR STATUS	COSEWIC STATUS
Thlaspi	*arvense*	Field Penny-cress		5	-1	SE5		
Boraginaceae		**Borage Family**						
Echium	*plantagineum*	Purple Viper's Bugloss				SE1		
Caprifoliaceae		**Honeysuckle Family**						
Viburnum	*lentago*	Nannyberry	4	-1		S5		
Viburnum	*trilobum*	High Bush Cranberry	5	-3		S5		
Caryophyllaceae		**Pink Family**						
Silene	*latifolia*	Bladder Campion				SE5		
Cornaceae		**Dogwood Family**						
Cornus	*alternifolia*	Alternate-leaved Dogwood	6	5		S5		
Cornus	*stolonifera*	Red-osier Dogwood	2	-3		S5		
Fabaceae		**Pea Family**						
Lotus	*corniculatus*	Bird's-foot Trefoil		1	-2	SE5		
Melilotus	*species*	Sweet-clover species						
Melilotus	*alba*	White Sweet-clover		3	-3	SE5		
Trifolium	*pratense*	Red Clover		2	-2	SE5		
Trifolium	*repens*	White Clover		2	-1	SE5		
Vicia	*cracca*	Tufted Vetch		5	-1	SE5		
Fagaceae		**Beech Family**						
Quercus	*macrocarpa*	Bur Oak	5	1		S5		
Grossulariaceae		**Currant Family**						
Ribes	*species*	Gooseberry species						
Juglandaceae		**Walnut Family**						
Carya	*cordiformis*	Bitternut hickory	6	0		S5		
Juncaceae		**Rush Family**						
Juncus	*effusus* ssp. *solutus*	Soft Rush	4	-5		S5		
Lamiaceae		**Mint Family**						
Lycopus	*americanus*	Cut-leaved Water-horehour	4	-5		S5		
Lythrum	*salicaria*	Purple Loosestrife		-5	-3	SE5		
Oleaceae		**Olive Family**						
Fraxinus	*pennsylvanica*	Red Ash	3	-3		S5		
Oxalidaceae		**Wood Sorrel Family**						

Appendix E
Vascular Plant List

LATIN NAME		COMMON NAME	ENT OF CONSERV	WETNESS INDEX	WEEDINESS INDEX	AL STATUS	OMNR STATUS	COSEWIC STATUS
Oxalis	*acetosella* ssp. *montana*	True Wood-sorrel	8	3		S5		
Plantago	*major*	Common Plantain		-1	-1	SE5		
Polygonaceae		**Smartweed Family**						
Ranunculaceae		**Buttercup Family**						
Ranunculus	*acris*	Tall Buttercup			-2	SE5		
Rhamnus	*cathartica*	Common Buckthorn		3	-3	SE5		
Rhamnus	*frangula*	Glossy Buckthorn		-1	-3	SE5		
Crataegus	*species*	Hawthorn species						
Fragaria	*virginiana* ssp. *virginiana*	Scarlet Strawberry	2	1		SU		
Potentilla	*anserina* ssp. *anserina*	Silverweed	5	-4		S5		
Potentilla	*norvegica* ssp. *monspeliensis*	Rough Cinquefoil	0	0		SU		
Prunus	*virginiana* ssp. *virginiana*	Choke Cherry	2	1		S5		
Spiraea	*alba*	Narrow-leaved Meadow-sw	3	-4		S5		
Spiraea	*Species*	Meadow-sweet Species						
Galium	*asprellum*	Rough Bedstraw	6	-5		S5		
Galium	*palustre*	Marsh Bedstraw	5	-5		S5		
Rutaceae		**Rue Family**						
Salicaceae		**Willow Family**						
Populus	*balsamifera* ssp. *balsamifera*	Balsam Poplar	4	-3		S5		
Populus	*grandidentata*	Large-tooth Aspen	5	3		S5		
Populus	*tremuloides*	Trembling Aspen		0		S5		
Salix	*amygdaloides*	Peach-leaved Willow	6	-3		S5		
Salix	*species*	Willow species						
Scrophulariaceae		**Figwort Family**						
Verbascum	*thapsus*	Common Mullein		5	-2	SE5		
Ulmaceae		**Elm Family**						
Ulmus	*americana*	White Elm	3	-2		S5		
Vitaceae		**Grape Family**						
Parthenocissus	*tricuspidata*	Virginia-creeper				SE1		
Vitis	*riparia*	Riverbank Grape	0	-2		S5		
MONOCOTYLEDONS		**MONOCOTS**						
Cyperaceae		**Sedge Family**						

Appendix E
Vascular Plant List

LATIN NAME		COMMON NAME	ENT OF CONSERV	WETNESS INDEX	WEEDINESS INDEX	AL STATUS	OMNR STATUS	COSEWIC STATUS
Carex	*species*	Sedge species						
Najadaceae		**Naiad Family**						
Najas	*flexilis*	Slender Najas	5	-5		S5		
Panicum	*virgatum*	Switch Grass	6	-1		S4		
Phragmites	*australis*	Common Reed	0	-4		S5		
Potamogetonaceae		**Pondweed Family**						
Potamogeton	*natans*	Common Floating Pondwee	5	-5		S5		
Typhaceae		**Cattail Family**						
Typha	*latifolia*	Broad-leaved Cattail	3	-5		S5		

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity			
Total Species:		84	
Native Species:		57	68%
Exotic Species		27	32%
S1-S3 Species		0	0%
S4 Species		1	2%
S5 Species		54	98%
Co-efficient of Conservatism and Floristic Quality Index			
Co-efficient of Conservatism (CC) (average)		4.13	
CC 0 to 3	lowest sensitivity	6	0
CC 4 to 6	moderate sensitivity	1	0
CC 7 to 8	high sensitivity	0	0
CC 9 to 10	highest sensitivity	0	0
Floristic Quality Index (FQI)		18.91	

APPENDIX F

WILDLIFE LIST

Appendix F
Wildlife List

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)	Local Status PIF Priority Species (BCR 13)
AMPHIBIANS						
American Toad	*Anaxyrus americanus*	S5				
Tetraploid Gray Treefrog	*Hyla versicolor*	S5				
Northern Green Frog	*Lithobates clamitans*	S5				
Spring Peeper	*Pseudacris crucifer*	S5				
Western Chorus Frog	*Pseudacris triseriata*	S4	NAR	Thr		
BIRDS						
Ruffed Grouse	*Bonasa umbellus*	S5				
Wild Turkey	*Meleagris gallopava*	S5			100	
Great Blue Heron	*Ardea herodias*	S5				
Broad-winged Hawk	*Buteo platypterus*	S5B				
Spotted Sandpiper	*Actitis macularia*	S5			30-50	
Ring-billed Gull	*Larus delawarensis*	S5B,S4N				
Yellow-bellied Sapsucker	*Sphyrapicus varius*	S5B				X
Downy Woodpecker	*Picoides pubescens*	S5				X
Northern Flicker	*Colaptes auratus*	S4B				
Eastern Wood-Pewee	*Contopus virens*	S4B				
Alder Flycatcher	*Empidonax alnorum*	S5B				
Eastern Phoebe	*Sayornis phoebe*	S5B				
Red-eyed Vireo	*Vireo olivaceus*	S5B				
Blue Jay	*Cyanocitta cristata*	S5				
American Crow	*Corvus brachyrhynchos*	S5B				
Tree Swallow	*Tachycineta bicolor*	S4B				
Cliff Swallow	*Petrochelidon pyrrhonota*	S4B			20-30	
Black-capped Chickadee	*Poecile atricapillus*	S5				
Hermit Thrush	*Catharus guttatus*	S5B				
American Robin	*Turdus migratorius*	S5B				X
Gray Catbird	*Dumetella carolinensis*	S4B				
Brown Thrasher	*Toxostoma rufum*	S4B				
European Starling	*Sturnus vulgaris*	SNA				
Cedar Waxwing	*Bombycilla cedrorum*	S5B				
Common Yellowthroat	*Geothlypis trichas*	S5B				X
Yellow Warbler	*Setophaga petechia*	S5B				
Savannah Sparrow	*Passerculus sandwichensis*	S4B				
Song Sparrow	*Melospiza melodia*	S5B			20	
Swamp Sparrow	*Melospiza georgiana*	S5B				X
White-throated Sparrow	*Zonotrichia albicollis*	S5B				
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B				
Indigo Bunting	*Passerina cyanea*	S4B				
Red-winged Blackbird	*Agelaius phoeniceus*	S5				
American Goldfinch	*Carduelis tristis*	S5B				
American Woodcock	*Scolopax minor*	S4B				

Appendix F
Wildlife List

SUMMARY

Total Butterflies:	*0*
Total Amphibians:	*5*
Total Reptiles:	*0*
Total Birds:	*35*
Total Breeding Birds:	*35*
Total Mammals:	*0*

SIGNIFICANT SPECIES

Global:	*0*
National:	*0*
Provincial:	*0*
Regional:	*0*
Local:	*5*

APPENDIX G

CURRICULA VITAE

Shari L. Muscat B.A., B.E.S.

Project Manager/Environmental Planner

Shari Muscat has over 10 years of experience in environmental resource planning and management. Shari is responsible for planning and coordinating environmental impact assessments, natural environment field programs and biological inventories in support of development, transportation, renewable energy and watershed restoration projects. Shari has been involved in the implementation of the natural heritage and natural hazards policies of the Provincial Policy Statement, Conservation Authorities Regulations, Municipal planning documents and the Renewable Energy Act. Shari has developed a thorough understanding of the complex and evolving policy framework in the Province and a comprehensive understanding of the interconnections between the physical and the natural environment, and maintains a good working relationship with the review and approval agencies.

Formerly with the Grand River Conservation Authority, she developed an extensive working knowledge of watershed management, environmental assessment and natural resources planning through input into the development of GRCA policies, public consultation and coordinating the review and approval of development applications, permits, aggregate applications and Environmental Assessments.

EDUCATION

Bachelor of Arts, Honours, Carleton University, Ottawa, Ontario, 1993

Bachelor of Environmental Studies, Urban and Regional Planning, University of Waterloo, Waterloo, Ontario, 1996

PROJECT EXPERIENCE

Approval Authority Review and Coordination

Waterloo West Side Lands*, Waterloo, Ontario (Resource Planner)

Resource Planner with the GRCA responsible for reviewing and commenting and approving a proposed residential draft plan of subdivision in the City of Waterloo. Duties included coordinating the internal review of draft submissions, consulting with municipal staff and their consultants, preparing position statements on the proposed subdivision and resolving outstanding conflicts.

Environmental Assessments

Activa Weiss Environmental Impact Study, City of Kitchener, Ontario (Task Manager)

Task Manager responsible for the completion of an Environmental Impact Study to recommend measures to protect the natural features and functions in the area to support a residential site plan and zone change application. An EIS was prepared that considered the proposed plan of development adjacent to a significant woodlot and wetland, consolidated field investigation results pertaining to vegetation and wildlife assessments, identified the potential environmental impacts and discussed mitigation measures for each potential impact. Preparation of this report required the coordination of technical staff and active involvement with other study team members and approval agencies.

King and Fountain Streets Class EA, Cambridge, Ontario (Task Manager)

Environmental Planner responsible for the completion of a Natural Environment Report in support of a Class Environmental Assessment for the selection of a roadway alignment for King and Fountain Streets to alleviate road congestion.. In addition to writing the report, my role included agency consultation, corresponding with engineering staff, consolidating field investigation results pertaining to vegetation, wildlife and aquatic assessments to identify opportunities and constraints to be considered during the evaluation of route alternatives

** denotes projects completed with other firms*

Shari L. Muscat B.A., B.E.S.

Project Manager/Environmental Planner

Laurel Creek and Sanitary Sewer EA, Waterloo, Ontario (Task Manager)
Environmental Planner responsible for the completion of a Natural Environment Report in support of a Class Environmental Assessment for the selection of a preferred route for the construction of a trunk sanitary sewer alignment . In addition to writing the report, my role includes agency and public consultation, corresponding with engineering staff, consolidating field investigation results pertaining to vegetation, wildlife and aquatic and fluvial geomorphology assessments to identify opportunities and constraints to be considered during the evaluation of route alternative and recommend opportunities for rehabilitation.

Columbia Lake Environmental Assessment*, Waterloo, Ontario (Resource Planner)
Resource Planner with the GRCA and member of the technical Steering Committee responsible for coordinating the technical review, consulting with DFO, and providing advice to the City of Waterloo for the rehabilitation of Columbia Lake. This involvement focused on providing input to identify environmental constraints and opportunities for improving water quality and enhancing the existing ecological conditions of the lake.

Tullis Estates Butler Pit Application for Aggregate Extraction*, Cambridge, Ontario (Resource Planner)
Resource Planner with the GRCA responsible for coordinating the review of a proposed below water table aggregate extraction application under the Aggregate Resources Act in the Township of North Dumfries. Duties included coordinating the internal review of submissions including operation and rehabilitation plans, consulting with Township and Regional staff, Ministry of Natural Resources and consultants, preparing positions statements on the proposed extraction and resolving outstanding conflicts.

Bridge Street and Bridgeport Bridge EA*, Kitchener, Ontario (Resource Planner)
Resource Planner with the GRCA responsible for coordinating the technical review, consulting with DFO and providing advice to the Region of Waterloo as input to the Environmental Assessment and GRCA permit process for the rehabilitation of the Bridgeport Bridge over the Grand River. This involvement focussed on ensuring the natural hazards associated with flooding and erosion were not aggravated and the natural heritage features and functions were protected from the impacts and design of the new bridge.

Clair Lake Environmental Assessment*, Waterloo, Ontario (Resource Planner)
Resource planner with the GRCA and member of the technical steering committee responsible for coordinating the technical review, consulting with DFO, providing input to the public participation process and providing advice to the City of Waterloo for the rehabilitation of Clair Lake. This involvement focused on providing input to identify environmental constraints and opportunities for improving water quality and enhancing existing ecological conditions of the lake and its upstream reaches.

Fairway Road Extension Class Environmental Assessment*, Kitchener, Ontario (Resource Planner)
Resource Planner with the GRCA responsible for coordinating the technical review, consulting with DFO and providing advice to the Region of Waterloo as input to the Environmental Assessment and GRCA permit process for the extension of Fairway Road over the Grand River. This involvement focussed on ensuring the natural hazards associated with flooding and erosion were not aggravated and the natural heritage features and functions were protected from the impacts and design of the new road and bridge.

Environmental Impact Assessments

Huron Woods Environmental Implementation Report, Kitchener, Ontario (Task Manager)
Task Manager responsible for the completion of an Environmental Implementation Report to recommend measures to protect the natural features and functions as a result of modifications to the approved draft plan. An EIR was prepared that considered the proposed SWM design, the potential environmental impacts and discussed mitigation measures for each potential impact. Preparation of this report required the coordination of technical staff and active involvement with other study team members

Tutela Heights Subdivision Environmental Impact Study, Brantford, Ontario (Task Manager)
Task Manager responsible for the completion of an Environmental Impact Study to recommend measures to protect the natural features and functions in the area. An EIS was prepared that considered the proposed plan of development, the potential environmental impacts and discussed mitigation measures for each potential impact. Preparation of this report required the coordination of technical staff, participation in public open houses and active involvement with other study team members.

** denotes projects completed with other firms*

Shari L. Muscat B.A., B.E.S.

Project Manager/Environmental Planner

20 Vic Developments Franklin and Main Environmental Impact Study, Cambridge, Ontario (Task Manager)
Task Manager responsible for the completion of an Environmental Impact Study to recommend measures to protect the natural features and functions in the area. An EIS was prepared that considered the proposed plan of development, the potential environmental impacts and discussed mitigation measures for each potential impact. Preparation of this report required extensive consultation with the review agencies and it one of the first applications reviewed against the Region of Waterloo's new Significant Woodland Policies. Preparation of this report required the coordination of technical staff and active involvement with other study team members.

Hearthwood Subdivision Environmental Impact Study, KItchener, Ontario (Task Manager)
Task Manager responsible for the completion of an Environmental Impact Study to recommend measures to protect the natural features and functions in the area to support a residential plan of subdivision. An EIS is currently being prepared that considers the proposed plan of development adjacent to a woodlot and Provincially Significant Wetland, consolidates field investigation results pertaining to vegetation and wildlife assessments, identifies the potential environmental impacts and discusses mitigation measures for each potential impact. Preparation of this report requires the coordination of technical staff and active involvement with other study team members and approval agencies.

Winzen Developments on Myers Rd. Environmental Impact Study, Cambridge, Ontario (Task Manager)
Task Manager responsible for the completion of an Environmental Impact Study to recommend measures to protect the natural features and functions in the area to support a residential plan of subdivision. An EIS is currently being prepared that considers the proposed plan of development adjacent to a significant woodlot and wetland, consolidates field investigation results pertaining to vegetation and wildlife assessments, identifies the potential environmental impacts and discusses mitigation measures for each potential impact. Preparation of this report requires the coordination of technical staff and active involvement with other study team members and approval agencies.

Clerview Stables Environmental Impact Study, Guelph, Ontario (Environmental Planner)
Environmental Planner responsible for the completion of an Environmental Impact Study to recommend measures to protect the natural features and functions in the area to support a residential site plan of subdivision. An EIS was prepared that considered the proposed plan of development adjacent to a Provincially Significant Wetland and aquatic habitat features, identified the potential environmental impacts and discussed mitigation measures for each potential impact. Preparation of this report required involvement with other study team members and approval agencies.

Sunningdale Meadows Scope Environmental Impact Study, London, Ontario (Environmental Planner)
Environmental Planner responsible for the completion of an Environmental Impact Study to recommend measures to protect the natural features and functions in the area to support a residential site plan of subdivision. An EIS was prepared that considered the proposed plan of development adjacent to a an Environmentally Sensitive Area, wetland and aquatic habitat features, identified the potential environmental impacts and discussed mitigation measures for each potential impact. Preparation of this report required the coordination of technical staff and active involvement with other study team members and approval agencies.

Campbellvale Estates Development Assessment Report, Municipality of Strathroy-Caradoc, Ontario (Task Manager)
Task Manager responsible for the completion of a Development Assessment Report to recommend measures to protect the natural features and functions in the area to support a residential severance and zone change application. A report was prepared that considered the proposed plan of development adjacent to a significant woodlot, identified the potential environmental impacts and discussed mitigation measures for each potential impact. Preparation of this report required the coordination of technical staff and active involvement with other study team members and approval agencies

** denotes projects completed with other firms*

Shari L. Muscat B.A., B.E.S.

Project Manager/Environmental Planner

Safety Kleen Site Expansion, Township of Woolwich, Ontario (Task Manager)
Task Manager responsible for the completion of an Environmental Impact Study recommending measures to protect the natural features and functions in the area to support the expansion of an industrial use adjacent to wetland and aquatic habitat features. An EIS was prepared that considered the proposed plan of development, the potential environmental impacts and discussed mitigation measures for each potential impact. Preparation of this report required the coordination of technical staff, field investigations and active involvement with other study team members and approval agencies.

Environmental Planning

London Psychiatric Hospital Lands Area Plan, City of London, Ontario (Environmental Planner)
Performed a preliminary environmental constraints analysis for the subject lands, using published resources and initial field investigations, including Chimney Swift surveys, to identify constraints to development. Information was presented to the client in report format

Bridgeport Industrial Subdivision Environmental Impact Study, Kitchener, Ontario (Task Manager)
Task Manager responsible for the completion of an Environmental Impact Study to recommend measures to protect the natural features and functions in the area. An EIS was prepared that considered the proposed plan of development, the potential environmental impacts and discussed mitigation measures for each potential impact. Preparation of this report required the coordination of technical staff and active involvement with other study team members.

Lackner Boulevard and Fairway Road – Environmental Constraint & Opportunities Report, Kitchener, Ontario (Environmental Planner)
Performed a preliminary environmental constraints analysis for the subject lands, using published resources and initial field investigations to identify constraints to development. Information was presented to the client in report format.

North Waterloo Subwatershed Study*, Waterloo, Ontario (Resource Planner)
Resource Planner and Steering Committee member representing the GRCA in support of completing a subwatershed study for the Northwest corner of Waterloo. Duties included providing input into the preparation of the terms of reference for the study. This study was initiated to support future urban expansion for residential development in the City of Waterloo.

Opportunity / Constraint Analysis

El – En Packaging Constraint Analysis, Markham, Ontario (Project Manager)
Performed a preliminary environmental constraints analysis for the subject lands, using published resources and initial field investigations to identify constraints to development. Information was presented to the client in mapping format.

Renewable Energy

Fairview Wind Project, Stayner, Ontario (Task Manager)
Task Manager responsible for the completion of a Natural Heritage Assessment and Environmental Impact Study for review by MNR in support of an application to MOE under the Renewable Energy Act. The assessment included evaluating the proposed impacts of wind turbine components adjacent to natural heritage features.

Grand Renewable Energy Project, Brant County, Ontario (Environmental Planner)
Environmental Planner responsible for assisting with the completion of a Natural Heritage Assessment and Environmental Impact Study for review by MNR in support of an application to MOE under the Renewable Energy Act. The assessment included evaluating the proposed impacts of wind turbine components adjacent to natural heritage features.

** denotes projects completed with other firms*

Josh Mansell

Terrestrial Biologist

Josh Mansell is a Terrestrial Biologist, in the Environmental Services Group for Stantec Consulting Ltd. His academic background encompasses many aspects of environmental sciences and natural resource management with a focus towards aquatic and terrestrial biology. Mr. Mansell is certified in Ontario's Southern Ontario Wetland Evaluation System and is experienced in its field and reporting applications. He also has field experience in avian and amphibian identification through sight and sound and their associated habitats, as well as conducting extensive terrestrial and aquatic flora identification. Josh's expertise encompasses a healthy knowledge of Ontario's freshwater fish species, familiarity with the Natural Heritage Information Centre, Natural Heritage Reference Manual, Significant Wildlife Habitat Technical Guide, the Species at Risk Act, Endangered Species Act and Migratory Birds Convention Act, which aids in the analysis of natural heritage features to identify significance through Natural Heritage Assessments. Josh was the lead on a fisheries compensation project component that involved the design and creation of a coastal wetland along the St. Lawrence River for the purpose of creating and enhancing fisheries habitat where he was able to display his strong knowledge of the Fisheries Act and freshwater fisheries ecology. Also, he has experience in reporting findings for biological surveys, conducting the associated statistical analysis, preparing budgets and proposals.

EDUCATION

Ecosystems Management Technician, Sir Sandford Fleming College, Lindsay, Ontario, 2006

Fish and Wildlife Management Technologist, Sir Sandford Fleming College, Lindsay, Ontario, 2007

Ontario Wetland Evaluation System Certificate (Southern Region), Lindsay, Ontario, 2007

Fish Hatchery Operations Certificate, Lindsay, Ontario, 2007

Ice Safety/Rescue WOI Certificate (OMNR), Lindsay, Ontario, 2006

Winter GPS Mammal Tracking, Lindsay, Ontario, 2006

Ontario Fur Harvesters Certificate, Lindsay, Ontario, 2005

Fish and Wildlife Management Technician, Sir Sandford Fleming College, Lindsay, Ontario, 2005

OSAP Training Course/Electrofishing Certificate (Class 2), Kemptville, Ontario, 2010

MNR NHIC Training for SAR Management, Smiths Falls, Ontario, 2011

DFO Ontario Freshwater Mussel Identification Workshop, Finch, Ontario, 2010

ROM Fish Identification Certificate of Completion, Toronto, Ontario, 2010

PAL and Ontario Hunter Safety Certificate, Lindsay, Ontario, 2006

Chainsaw Training, Aylmer, Ontario, 2003

Ontario Drivers License (D Class)/Defensive Driving/Traffic Control, Toronto, Ontario, 2007

Level II Certified, Ontario Freshwater Fish Identification Course, Kemptville, Ontario, 2011

AED and CPR (C) Certificate of Completion, Ottawa, Ontario, 2011

MEMBERSHIPS

Voluntary Member, Bird Studies Canada

Voluntary Member, Ducks Unlimited

** denotes projects completed with other firms*

Josh Mansell

Terrestrial Biologist

PROJECT EXPERIENCE

Aquatic Ecology

Stream Monitoring and Assessment Research Team Eastern Region (SMARTER)*

The purpose of the SMARTER group was to collaborate with Eastern Ontario stream researchers that talked about study designs, funding opportunities, evolving legislation and techniques. As a member of the Ontario Stream Assessment Protocol (OSAP) Steering Committee new information regarding the protocol was presented to the team biannually; who most of which implemented the protocol at their respective agencies.

Created Wetlands

Port of Prescott Fish Habitat Compensaton Plan*, Morrisburg, Ontario

Involved with the initiation, coordination and design of a coastal wetland along the St. Lawrence River for the purpose of creating fish habitat. Required to construct an extensive monitoring plan that involved aspects of terrestrial and aquatic biology for pre and post-construction monitoring. Led the process of actively searching and selecting an engineering firm to construct professional CAD drawings of the proposed wetland.

Fisheries Management

Ontario Graphite Ltd.,, Kearney, Ontario (Terrestrial Biologist)

A simple fisheries investigation in remote locations was conducted to determine the current fisheries community within various waterbodies and watercourses in the study area. Orienteering and backpacking were large components of this project.

City of Ottawa Slope Stabilization Project, Carp, Ontario (Terrestrial Biologist)

Josh provided a detailed description of the existing fisheries communities and habitat to the city for this project.

Windsor Park Village Environmental Inventory, Finch, Ontario (Terrestrial Biologist)

A simple fisheries investigation was conducted to determine the current fisheries community within the watercourse

Ottawa 300 Development, Lindsay, Ontario (Terrestrial Biologist)

Fisheries investigations were also employed by Josh for this project. Fisheries communities and habitat were identified and described.

Liffey Creek, arnprior, Ontario (Terrestrial Biologist)

Josh completed a fish rescue for the Township of Braeside-McNab in order for them to install a new culvert. Identification skills were a necessity because of identified SAR in the area.

Kemptville Commercial EIS, Kemptville, Ontario (Terrestrial Biologist)

Josh was involved with several fish and fish habitat components for this project. Identifying and describing the fisheries communities within several watercourses were a major component.

MTO Highway 7 & 35, Lindsay, Ontario (Terrestrial Biologist)

A detailed fisheries community and habitat assessment was conducted along several watercourse crossings for this project using specific MTO guidelines.

City of Ottawa Campeau Drive, Kanata, Ontario (Terrestrial Biologist)

Josh was involved with several fish and fish habitat components for this project. Identifying and describing the fisheries communities within the Carp River were a major component.

Lake Ontario Atlantic Salmon Reintroduction Program* (Hatchery Technician)

Volunteered my services to the Lake Ontario Atlantic Salmon Reintroduction Program at Fleming College's Frost Campus fish hatchery. Enough hours were accumulated to obtain a Fish Hatchery Operations Certificate. Experience with Muskellunge at the hatchery was also obtained in previous years.

South Nation Conservation* (Fisheries Technician)

As a technician I had the responsibility of initiating, coordinating and implementing a stream fisheries monitoring project watershed wide. The Ontario Stream Assessment Protocol (OSAP) was conducted on various streams in outlined subwatersheds to obtain baseline data that is used to perform multiple restoration projects, fulfill data requests and update the municipal drain database. Morphological, chemistry and biological data was gathered during each sampling event. The Near Shore Community Index Netting (NSCIN) protocol was also conducted on the larger rivers of the watershed where important fisheries data was collected that was used to create a fisheries management plan for the watershed. Various other projects that were conducted involved species at risk management; including a rare turtle study, butternut and ginseng surveys and cutlip minnow sampling.

** denotes projects completed with other firms*

Josh Mansell

Terrestrial Biologist

Forestry Services

Ontario Ministry of Natural Resources*, Aylmer, Ontario (Internship)

Collaborated with Elgin/Oxford/Middlesex Counties Stewardship Councils to assist with the Ministry of Resources' Forests for Life program, where it was required to secure native seed stocks for plantings on private land. An important role was to engage landowners and interact with them daily on the Stewardship Councils roles and projects.

Stream Rehabilitation

Catfish Creek Conservation Authority*, Aylmer, Ontario (Internship)

Involved with various stewardship projects in the watershed
Responsible for students of the Environmental Leadership Program
Aided with stream remediation projects to improve habitat

Tree Preservation & Assessment

Davey Tree Expert* (Arborist/Crew Leader)

Many aspects of this position involved the identification of tree species, tree health and tree maintenance at an advanced level to comply with clients requests. Understanding the ecology of various tree species was integral to the successful completion of many of the projects.

Wetland Restoration and Mitigation

Yarmouth Natural Heritage Area Wetland Restoration*, Aylmer, Ontario

The Yarmouth Natural Heritage Area was historically a wetland that was drained for agricultural purposes and was designated to be restored to its natural function after the it was retired. Duties included the initial consultation and field visits to the site. Surveying, species identification and basin delineation were involved with the initial visits. GIS services were also provided, creating a map of the area with different polygons that outlined the distinct vegetation communities, habitat features and project area.

Wildlife Biology

City of Ottawa East Pool SAR Study, Orleans, Ontario (Terrestrial Biologist)

A Bobolink habitat survey was completed in conjunction with a dedicated Bobolink transect survey.

Windsor Park Village Environmental Inventory, Ottawa, Ontario (Terrestrial Biologist)

A complete environmental inventory of a National Capital Commission (NCC) property was conducted using the BBS protocol, MMP's amphibian monitoring protocol, Butternut transect survey and also a complete vegetation inventory was collected. Knowledge of provincially significant natural features and federally significant species was essential.

Ottawa 300 Development, Lindsay, Ontario (Terrestrial Biologist)

Josh implemented three rounds of the MMP's amphibian survey and two rounds of the BBS.

MTO Highway 7 & 35, Lindsay, Ontario (Terrestrial Biologist)

The ELC protocol was implemented using MTO's specific terrestrial assessment guidelines outlined. An emphasis was also placed on the identification of bird nests within culverts and bridges of the watercourse crossings.

Kemptville Commercial EIS, Kemptville, Ontario (Terrestrial Biologist)

Familiarity with the local municipal official plan and provincial guidelines, with respect to significant natural features, was necessary for this project. Josh was involved with the ELC and habitat characterization components for this project.

Highway 7 Service Road EA Update, Stittsville, Ontario (Terrestrial Biologist)

Several SAR surveys and protocols were implemented in this project. They include active searching for Blanding's and Spotted Turtles, Environment Canada's Least Bittern survey protocol and Butternut and Ginseng transect surveys. Reporting on the findings and describing SAR habitat was important.

David Brown Solar Project, Ingleside, Ontario (Terrestrial Biologist)

Identifying and describing watercourses, waterbodies and wetlands with respect to the Renewable Energy Act (REA) were the main focus of this project. Wetlands were identified and delineated using the OWES protocol and vegetation communities were described using the ELC protocol.

Campeau Drive, Kanata, Ontario (Terrestrial Biologist)

Two rounds of the BBS were carried out within the project area, as well as, the ELC protocol.

** denotes projects completed with other firms*

Josh Mansell

Terrestrial Biologist

Ashcroft Homes East Urban Community, Orleans, Ontario (Terrestrial Biologist)
Prior to development a series of surveys were conducted to determine the presence or absence of Species at Risk (SAR). A thorough Butternut survey was conducted by walking transects through potential habitat within the project area. Recommendations were given to the client concerning Butternut and associated municipal and provincial regulations. A dedicated Bobolink transect and point count survey was also implemented using the MNR's draft Bobolink survey methodology.

Amherst Island Proposed Wind Farm, Stella, Ontario (Terrestrial Biologist)
Various avian surveys were conducted throughout the year, including: fall passerine transects, fall and winter raptor and waterfowl surveys and Short-eared Owl Surveys. ELC was also conducted in certain locations on the island.

Wolfe Island Wind Farm, Marysville, Ontario (Terrestrial Biologist)
Various avian surveys were conducted throughout the year, including: marsh monitoring protocol, winter raptor surveys, Short-eared Owl surveys and bi-weekly aerial waterfowl surveys.

Almonte Solar Project, Almonte, Ontario (Terrestrial Biologist)
Josh conducted several rounds of the Breeding Bird Survey (BBS) while implementing a protocol specifically targeting Bobolink, Eastern Meadowlark and Barn Swallow. Also, he was involved with wetland delineation and characterizing vegetation communities using the Ontario Wetland Evaluation System (OWES) and the Ecological Land Classification (ELC) protocol.

Bird Studies Canada/Toronto Region Conservation Authority* (Avian Specialist)
This project was conducted on behalf of Bird Studies Canada (BSC) and the Toronto Region Conservation Authority (TRCA) to perform BSC's Marsh Monitoring Protocol that targets specific sensitive marsh birds along Lake Ontario's large coastal wetlands. Though these sensitive species were the primary target it was equally as important to have knowledge of all avian marsh species to record incidental occurrences. Breeding bird surveys were also a component of this position.

Algonquin Park Eastern Wolf Study* (Researcher)
Provided assistance to the lead researcher and research team when conducting various duties to determine the prey preference of Algonquin Park's wolves. GPS telemetry was a major component of this study to determine where wolves captured their prey and the species of prey. Deer, Moose and Wolf ecology knowledge was important to understand in order to accomplish the scope of the study. Winter identification of forest trees and shrubs was also a necessity to complete the required vegetation survey plots to determine the amount of deer and moose browse around the specific sites.

Herptile Marsh Monitoring Tommy Thompson Park*, Toronto (Researcher)
Involved with the ongoing monitoring of Tommy Thompson Parks' Herptile population by performing the Marsh Monitoring Protocols' amphibian survey at various locations throughout the park. Extensive knowledge of Ontario's amphibian vocalizations were required to accurately complete the surveys throughout the summer.

Tommy Thompson Bird Research Station*, Toronto (Researcher)
Volunteered in a citizen science program that identified and banded migrating land birds at a provincial bird banding research station in Toronto. Avian identification and ecology knowledge was provided to perform various seasonal components including census point counts, handling of birds and banding of birds.

** denotes projects completed with other firms*

Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Mr. Eusebi has extensive environmental planning experience, from site assessment/route selection for linear facilities (roads, hydro corridors, sewers and petroleum pipelines) and aggregate site development, to remediation for brownfield and spill sites. He has coordinated the environmental planning components for environmental screenings, detailed natural science-based environmental assessment and design, rehabilitation, construction inspection and post-development monitoring. Dan has worked closely with public and private clients on industrial and development projects, and has managed extensive terrestrial and aquatic field studies. He provides a wealth of knowledge concerning permitting and approvals for a number of environmental disciplines. One of Dan's greatest strengths is his communication skills with various project stakeholders. His range of experience allows him to manage large projects with detailed policy and planning requirements, and he excels at coordinating projects involving multidisciplinary professionals.

EDUCATION

BES (Honours), Major in Environmental and Resource Studies, University of Waterloo, Waterloo, Ontario, 1988

Certificate, Ontario Ministry of Natural Resources / Ontario Wetland Evaluation Training Course, North Bay, Ontario, 2009

MEMBERSHIPS

Registered Professional Planner, Ontario Professional Planners Institute

Member, Environment Committe, Ontario Stone, Sand & Gravel Association

Member, Society of Wetland Scientists

PROJECT EXPERIENCE

Aggregate Services

Level 2 Natural Environment Technical Assessment Report for Aggregate Expansion, Hillsburgh Pit, CBM Aggregates, Erin, Ontario (Environmental Planner, Project Manager)

Adaptive Management Plan, Nelson Aggregate Co., Burlington, Ontario (Environmental Planner)

Landscape and Ecosystem Restoration Plan, Nelson Aggregate Co., Burlington, Ontario (Environmental Planner)

Level 2 Natural Environment Technical Report, Nelson Aggregate Co., Burlington, Ontario (Environmental Planner)

Duntroon Quarry Application Adaptive Management Plan (AMP), Walker Industries, Collingwood, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environmental Technical Assessment Report for Proposed Aggregate Application, Montrose Pit, Capital Paving, County of Wellington, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environment Technical Assessment Report for Proposed Aggregate Application, Godfrey Extension, CBM Aggregates, Peterborough County, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environment Technical Assessment Report for Proposed Aggregate Application, CBM Aggregates, Township of North Dumfries, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environment Assessment, Holman Pit, Guelph Eramosa Township, Ontario (Environmental Planner)

Level 2 Natural Environmental Assessment Technical Report, Capital Paving, Aikensville, Ontario (Environmental Manager)

Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Level 2 Natural Environmental Assessment Technical Report Aggregate Application, Region of Halton, City of Burlington, Ontario (Environmental Coordinator)

Levels 1 & 2 Natural Environmental Technical Assessment Report for Proposed Aggregate Application, CBM Aggregates, Brant County, Ontario (Environmental Planner)

Level 2 Natural Environmental and Aquatic Assessment - Aggregate Quarry Application, Federal White Cement, Oxford County, Ontario (Project Manager)

Environmental Impact Study Report Aggregate Application, Flamborough, Ontario (Project Coordinator)

Environmental Assessments

Prism Pipeline Project (Environmental Permit and Approval Manager and Acquisition Coordinator)

Fox Hollow Subdivision Phase 1 External Sanitary Sewer - Water crossing, permits and approval package (Project Manager)

Transportation Design, Construction Report and Aquatic Assessment. Highway 3 Road Improvement St. Thomas to Aylmer, Ontario Ministry of Transportation (Environmental Planner)

Fisheries Assessment and Letter of Intent - Highway 3 Improvements/Aquatic Crossings, Ministry of Transportation

Transportation Environmental Study Report, Highway 401 Bridge Rehabilitation at County Road 36 and Concession Road 7, Puslinch Township, Wellington County, Ministry of Transportation Ontario (MTO) (Environmental Planner)

Environmental Screening Document, Terrestrial and Fisheries Technical Report, Hopewell Creek Bridge Rehabilitation at Highway 7, Ministry of Transportation Ontario (MTO) (Natural Environment Planner)

Agricultural Economic Assessment, Agricultural Assessments of Tom Howe Landfill Site and Canborough Landfill Site (Project Manager)

Sithe Goreway Station, Sithe Energies Canadian Development Ltd. (Project Manager)
Represented client at public forums

Public Consultation Program for Remediation of Brownfield Site in Residential Neighbourhood, Pirelli Cable Inc (Project Manager)
Developed two phase public consultation program for remediation of brownfield site. Presented information and completed individual liaison with affected landowners

Orlean Pipeline Environmental Assessment Public Consultation Program, Consumers Gas (Project Manager)
Preparation of announcements and public forum presentations for pipeline project approvals

NEB Environmental Assessment, Great Lakes Power Ltd. (Project Manager)
Coordinated public consultation program for high voltage power cable line – NEB Environmental Assessment. Involved preparation of notifications, presentation materials and establishment of public input database

Link Pipeline Project, Environmental Assessment and Route Selection, Niagara Gas Transmission Limited (Environmental Planner)

International Power Line Project - Environmental Site Assessment and Linear Facility Route Selection, Great Lakes Power Ltd. (Environmental Planner)

Groundwater Assessment Investigations and Remediation Initiatives for southwestern Ontario Tank Farm and Pumping Station, Enbridge Pipeline Inc. (Project Manager)

Fisheries Habitat Assessment, Oshawa/Newcastle proposed Highway 407, Route Location and Environmental Assessment Study (Project Manager)

** denotes projects completed with other firms*

Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Environmental Property Assessments, Preliminary Phase I Assessment for Contamination Identification, 50 Sites, Canadian National Real Estate Division (Project Manager)

Environmental Management System Audit of Enbridge Pipeline Division, Enbridge Pipeline Inc. (Project Manager)

Detailed Phase II Investigations for Former Massey Ferguson Brownfield Site, City of Brantford, Ontario (Project Manager)

City of London: Fisheries Habitat Assessment - Medway Creek Trunk Sewer, City of London (Project Manager)

Brownfield Phase I Investigations for 16 Sites in the City of Brantford, City of Brantford (Project Manager)

Westover Station - Initial Screening Level Risk Assessment, Enbridge Pipeline Inc.* (Project Manager)

Meyer Pier Park - Risk Assessment Peer Review, City of Belleville, Ontario* (Senior Environmental Planner)

Sudbury Area Community Risk Assessment - Soil and Groundwater Project Component Assessments, Inco* (Planner)

New Orleans/Gatineau Pipeline Environmental Assessment and Route Selection, Consumer Gas* (Project Manager)

Site Remediation Program at Six Remote Fly-in Sites in Northern Ontario, Bell Canada* (Site Remediation Program Manager)
Conducted preliminary site assessments and coordinated site construction contractors

Peer Review of Environmental Screening Reports and Phase 1 Assessments in South Western Ontario for Property Transactions, Union Gas* (Project Manager)

Vector Pipeline Project: Phase I and II Property Investigation, Vector Pipeline Ltd.* (Project Manager)

Nanticoke Junction: Phase I and II Environmental Site Assessment, Enbridge Pipeline Inc.* (Project Manager)

Peer Review of Phase I and II ESA's for Legal Counsel, Smith Valeriote, Barristers and Solicitors* (Project Manager)

Phase I and II Environmental Property Site Assessments* (Manager)
More than 250 Phase I, and II Environmental Property Site Assessments in Ontario and Quebec for private industry, as well as federal and municipal governments

Natural Science Route Selection Environmental Assessment for Line 9C portion of the Line 9 Reversal Project, Enbridge Pipeline Inc.* (Project Manager)

Ontario Manitoba Interconnection Project. Data Collection and Regulatory Agency Issue Assessment, Ontario Hydro* (Resource Planner)

PRISM Pipeline Project Environmental Site Assessment and Route Selection, Imperial Oil Ltd* (Environmental Planner)

Environmental Site Management

PRISM Pipeline Project, Imperial Oil Ltd. (Project Manager)
Conducted on-going monitoring and compliance requirements for directional drilling operation at the Grand River

St. Clair River Directional Drilling Operations and Regulatory Approvals, Vector Pipelines Ltd. (Project Manager)
Development of environmental protection procedures for directional drilling operations of the St. Clair River and coordinated regulatory approval requirements

PRISM Pipeline Project, Imperial Oil Ltd. (Project Manager)
Managed approvals for the implementation of a drill slurry management program

** denotes projects completed with other firms*

Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Grand River Crossing at Cambridge, Union Gas (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

First Nations Consultation Program and Training Program at Remote Site in Northern Ontario, Bell Canada (Project Manager)
Programs involved presenting project remediation information to First Nations groups and providing training for community based employment opportunities

Crude Oil Leak Site, Enbridge Pipeline Inc. (Project Manager)
Conducted public liaison in emergency response scenario at crude oil leak site. Maintained ongoing public information liaison with affected landowners

Terrace Pipeline Project, Enbridge Pipeline Inc. (Project Manager/Inspector)
Environmental supervision of the directional drill, South Saskatchewan River (1100m drill)

St. Clair River Sediment Quality Sampling Investigations, Vector Pipelines Ltd. (Project Manager)
Coordinated sediment quality sampling investigations of the St. Clair River for proposed directional drilling operations

Westover Tank 222 Spill Response, Enbridge Pipeline Inc. (Project Manager)

Spill Response and Regulatory Agency Consultation, RCAN Environmental (Project Manager)

Line 8 Hydrostatic Testing, Interprovincial Pipe Line Inc. (Project Manager)
Coordinated environmental components and developed emergency response program and obtained regulatory approval for Line 8 hydrostatic testing

Emergency Response Management Services - Wolverton Leak Site, Enbridge Pipeline Inc. (Project Manager)

Emergency Response Management Services - Bronte Junction Historic Leak Site, Enbridge Pipeline Inc. (Project Manager)

Emergency Response Management Services - Binbrook Leak Site (Spill Response and Land Rehabilitation), Enbridge Pipeline Inc. (Project Manager)

Emergency and Spill Response Services, Alltech Canada Inc. (Project Manager)

Emergency and Spill Response Management, Sarnia Suncor Metering Facility (Project Manager)

Clarkson Station - Spill Response and Site Management, Enbridge Pipeline Inc. (Project Manager)

Decommissioning of Four Crude Oil Pumping Stations, Interprovincial Pipe Line Inc.* (Project Manager)
Managed decommissioning of Four Crude Oil Pumping Stations: Keyser, Smithville, Wolverton and Bryanston

Golf Course and Estate Residential Facility, Town of Aurora* (Project Manager)
Environmental site peer review of mitigation and construction of golf course and estate residential facility

Denso Manufacturing Inc., Guelph Industrial Site Phase I and II Environmental Site Assessment* (Project Manager)
Phase I and II Environmental Site Assessment and managed site remediation program

Plant Demolition, Building Decommissioning, Pirelli Cables and Systems Inc.* (Project Manager)
Identification and removal of PCB containing ballast

Decommissioning of Hydro Electric Transformer Stations, Guelph Hydro* (Project Manager)
Initiated soil studies and coordinated contracting of site remediation program

Pirelli Cables Corporation Site Decommissioning, Guelph, Ontario, Pirelli Cables and Systems Inc.* (Project Manager)
Site assessment and remediation of Pirelli Cables Corporation Site Decommissioning

** denotes projects completed with other firms*

Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Bronte Junction Compound Facility, Enbridge Pipelines Inc.* (Project Manager)
Remediation and Clean-up site management for the Bronte Junction compound facility

Binbrook Leak Site, Enbridge Pipelines Inc.* (Project Manager)
Remediation and Clean Up of Binbrook leak site, 600,000 L Crude Oil spill site

Housing Development On-going Site Monitoring, City of Guelph* (Project Manager)
On-going Site Monitoring of South Creek, Clairfields, Clarington Place and Whitetail Sites

Meadowlily ESA, City of London* (Project Manager)
Environmental Inspection, Meadowlily ESA, Subdivision development project. Inspection of topsoil stripping, vegetation clearing, erosion and silt control, construction activities, dewatering and rehabilitation monitoring

Line 8 Oil Products Transportation System, Interprovincial Pipe Line Inc.* (Project Manager)
Coordinated and Conducted Environmental Inspection of Line 8 Construction Program, Southern Ontario

Natural Sciences & Heritage Resources

Vector Pipeline Project, Vector Pipeline Ltd. (Project Manager)
Development of watercrossing technique design for environmental protection. Coordination of regulatory approval requirements

PRISM Pipeline Project, Imperial Oil Ltd. (Project Manager)
Environmental Construction permits and approvals for all natural environmental features

OCWA Water Pipeline at the Ausable River Watercrossing, Ontario Clean Water Agency (Project Manager)
Developed and implemented environmental protection methods on-site.

Medway Creek Trunk Sewer Crossings (5), City of London (Project Manager)
Preparation of watercrossing plans / bed-level crossing, permits and approval package.

Line Lowering at 403 Burlington - Rambo Creek Crossing, Interprovincial Pipe Line Inc. (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

Line 9C, Shell Take off to Sarnia Terminal, Interprovincial Pipe Line Inc. (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

Line 9C Sarnia Delivery Line, Enbridge Pipeline Inc. (Project Manager)
Development of watercrossing design for protection of water resource

Highway 9 Project, 5 Watercrossings, Consumers Gas (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

Consumers Gas Link Project, Baby Creek (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

Conceptual Restoration Plans, Smithville and Wolverton Pumping Station, Interprovincial Pipe Line Inc. (Project Manager)

Link Pipeline Project, Niagara Gas Transmission Limited* (Project Manager)
Conducted pre-construction woodlot appraisal for construction compensation

** denotes projects completed with other firms*

Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

PUBLICATIONS

Unique Features of Environmental Management System/ISO-14001 Application to Linear Facilities. *7th International Symposium on Environmental Concerns in Right-of-Way Management*, 2002.

James Leslie B.E.S.

Terrestrial Ecologist

James Leslie has over six years of experience as a Terrestrial Ecologist with Stantec and is the Technical Lead for vegetation field studies. While James has acquired a diverse skill set, he has become a specialist in vegetation ecology with expertise in plant identification, Ecological Land Classification (ELC), wetland delineation, and vegetation monitoring. Additionally, he has gained extensive experience conducting and leading herpetofauna field surveys.

James completed his Bachelor of Environmental Studies at the University of Waterloo with a focus on applied ecology and environmental policy. He has obtained certification for Ecological Land Classification (ELC), Ontario Wetland Evaluation System (OWES), Ecological Monitoring and Assessment Network (EMAN), and is a Ministry of Natural Resources (MNR) designated Butternut Health Assessor for the endangered Butternut tree. He is RAQS-certified by the Ontario Ministry of Transportation (MTO), and can lead natural heritage assessments for MTO projects. James is familiar with legislation that applies to natural heritage assessment, including the Provincial Policy Statement (PPS), the *Endangered Species Act, 2007* and the federal *Species at Risk Act* (SARA).

James provides expertise in a variety of sectors including aggregate extraction, infrastructure, energy, and urban land development. He has gained extensive experience conducting and leading vegetation related surveys for renewable energy and highway infrastructure projects. He has authored a variety of reports, including natural heritage components of Environmental Impact Studies, Environmental Assessments, and Natural Environment Technical Reports.

EDUCATION

B.E.S., University of Waterloo / Environmental Studies / Geography, Waterloo, Ontario, 2006

Certificate, Humboldt Field Research Institute / Applied Field Identification of Grasses and Sedges, Steuben, Maine, 2010

Certificate, Butternut Health Assessment, Burlington, Ontario, 2009

Certificate, Ontario Wetland Evaluation System, North Bay, Ontario, 2009

Certificate, Ecological Monitoring and Assessment Network, Turkey Point, Ontario, 2008

Certificate, Ecological Land Classification for Southern Ontario, Kingston, Ontario, 2007

MEMBERSHIPS

Member, Botanical Society of America

Member, Field Botanists of Ontario

PROJECT EXPERIENCE

Aggregate Services

Proposed Duntroon Quarry Expansion, Duntroon, Ontario (Terrestrial Ecologist)

Designed and conducted a multi-year research program to assess the habitat characteristics of American hart's-tongue fern – a federal and provincial Special Concern species. Research examined various features of soil, ambient air, tree canopy cover, associate species, and snow depth. The purpose of this research was to compare and contrast known habitat with potential transplant locations. A preliminary transplant of over 500 ferns was conducted where post-transplant monitoring studies are ongoing. Unrelated surveys conducted onsite include butternut health assessments and forest plot assessments using protocols outlined in the Ecological Monitoring and Assessment Network (EMAN).

Proposed Flamborough Quarry, Hamilton, Ontario (Ecologist)

Aquatic surveys included stream flow discharge and uploading of data loggers. Terrestrial surveys included winter wildlife surveys and health assessments of over 100 butternut trees using 2009 OMNR guidelines.

** denotes projects completed with other firms*

James Leslie B.E.S.

Terrestrial Ecologist

Acton Quarry Environmental Review, Acton, Ontario (Terrestrial Ecologist)
Assist with extensive amphibian surveys to identify significant wildlife habitat, species composition, and presence or absence of pure Jefferson salamander specimens. Surveys included call-counts, egg mass surveys, pit and aquatic trapping, and tail clippings of potential Jefferson species (in conjunction with the OMNR). Assisted with surveys in 2007 and thereafter, which remain ongoing.

Environmental Mitigation and Monitoring
Various Urban Lands Projects, Waterloo and Oakville, Ontario (Terrestrial Ecologist)
Monitor vegetation communities using Ecological Monitoring and Assessment Network (EMAN) and local Conservation Authority guidelines. Field surveys consisted of identifying vascular plants growing within pre-determined plots and determining their respective cover; photographic records were compiled each year for temporal comparison. Data analysis included calculation of frequency, dominance, and importance value.

Georgia Pacific PCB Remediation, Thorold, Ontario (Terrestrial Ecologist)
ELC; mapping and evaluation of species at risk (Butternut); develop vegetation monitoring plots to determine density, frequency, dominance, and importance value; data synthesis, and technical memorandum.

Oil & Gas
Union Gas Lobo Compressor Station Expansion, Strathroy, Ontario (Terrestrial Ecologist)
Assist with Project Management of a proposed compressor station expansion, including proposal and budget; conduct/delegate appropriate field surveys; compile background data through review of Official Plan, Significant Wildlife Habitat Technical Guide, Ontario Provincial Policy Statement, etc.; agency consultation. Deliverables consisted of an Environmental Impact Study report.

Power Transmission & Distribution
Bruce to Milton Transmission Project, Milton, Ontario (Terrestrial Ecologist)
180 km linear study area of proposed hydro transmission lines from Bruce Nuclear to Milton, Ontario. Assisted with ELC, butternut health assessments, flora inventories, and winter wildlife surveys.

Renewable Energy
Terrestrial Surveys for Wind and Solar Projects, Various Municipalities, Ontario (Terrestrial Ecologist)
Conducted numerous site assessments based on the Renewable Energy Approvals (REA) process for proposed layouts near Belwood, Port Dover, Sydenham, Whittington, St. Columban, and Prince Edward County. Field work included ELC, wetland delineations and evaluations using the Ontario Wetland Evaluation System (OWES), floral and faunal species inventories, and identification of significant wildlife habitat. Study areas included proposed turbine locations, access roads, and transmission corridors. Data analysis and summaries were provided in the respective Natural Heritage Assessment Reports.

Island Falls Energy Project, Smooth Rock Falls, Ontario (Terrestrial Ecologist)
Field work component of a proposed hydroelectric dam in Northern Ontario. Assist with ELC, botanical inventory, and soil surveys in remote areas.

Avian Surveys for Wind and Solar Projects, Various Municipalities, Ontario (Terrestrial Ecologist)
Avian monitoring was conducted at Kingsbridge, Melancthon, Ostrander, Parkhill, and Plateau wind energy locations. Field work consisted of installation, troubleshooting, and data retrieval of Anabat SD1 monitoring devices. Received training for data interpretation and isolation of bat calls based on digital graph patterns. Post-construction surveys of avian mortality under active wind turbines were completed for the Kingsbridge and Melancthon locations.

Terrestrial Assessments
Master Service Plan, Cayuga and Jarvis, Ontario (Terrestrial Ecologist)
Develop ELC mapping for the towns of Jarvis and Cayuga. The purpose was to update natural heritage data for the respective Master Service Plan revisions. Data analysis included ecological constraints mapping and authoring a technical memorandum.

Transportation Planning
Highway 3 Rehabilitation, Detail Design, Renton to Jarvis, Ontario (Terrestrial Ecologist)
This work was conducted to identify natural features where road widening and culvert replacement was proposed. Performed ELC and compiled records of local flora and fauna. The study area included Endangered butternut trees and a variety of forested, wetland, and cultural communities. A Terrestrial Ecosystems Report was submitted to characterize existing conditions, and to address predicted impacts and required mitigation to on-site vegetation communities, terrestrial wildlife and their habitat. Fieldwork and reporting conducted in accordance with MTO regulations and guidelines.

** denotes projects completed with other firms*

James Leslie B.E.S.

Terrestrial Ecologist

Highway 69, Preliminary Design, Patrol Yard Selection, Parry Sound to Sudbury, Various Sites, Ontario (Terrestrial Ecologist)
This study was undertaken in order to assess a number of alternative locations for patrol yards within the study area, and to identify preferred alternatives at three locations. Performed ELC, compiled records of local flora and fauna, and identified significant wildlife habitat. Natural heritage features consisted of numerous wetland communities, large, contiguous forests, significant wildlife habitat and observations of a Threatened species. Fieldwork and reporting were conducted in accordance with MTO regulations and guidelines.

Highway 17, Preliminary Design, Sudbury Southwest Bypass, Sudbury, Ontario (Terrestrial Ecologist)
The purpose of this study was to identify a four-lane highway plan for a section of Highway 17 through the Sudbury area, with access restricted to interchange locations only. Performed ELC, compiled records of local flora and fauna, and identified significant wildlife habitat. The study area included a variety of upland and wetland habitats, including Areas of Natural and Scientific Interest. Fieldwork and reporting were conducted in accordance with MTO regulations and guidelines.

Highway 11, Preliminary Design Study, Access Review from Powassan to Callander, Ontario (Terrestrial Ecologist)
This project was part of a study to upgrade the highway to 'full freeway standard', which included eliminating at-grade intersections and entrances and providing access to highway only at interchanges. Performed ELC, compiled records of local flora and fauna, and identified significant wildlife habitat. The study area included a variety of upland and wetland habitats. Fieldwork and reporting were conducted in accordance with MTO regulations and guidelines.

Highway 401 and Highway 8 Improvements, Preliminary Design, Kitchener, Ontario (Terrestrial Ecologist)
This study was undertaken to assess proposed interchange improvements in the cities of Kitchener and Cambridge along Highway 401 and Highway 8. Performed ELC, compiled records of local flora and fauna, and identified significant wildlife habitat. The study area included rare flora, Provincially and Locally Significant Wetland, and an Area of Natural and Scientific Interest (ANSI). A Terrestrial Ecosystems Report was submitted to characterize existing conditions, and to address predicted impacts and required mitigation to on-site vegetation communities, terrestrial wildlife and their habitats. The preliminary impact assessment included constraint ratings of each ELC unit and the calculation of the areas potentially affected by the Preferred Plan. Fieldwork and reporting conducted in accordance with MTO regulations and guidelines.

Highway 11, Preliminary Design Study, Improvements North of Highway 144, Huntsville, Ontario (Terrestrial Ecologist)
The purpose of this study was to undertake the Planning, Preliminary Design and Environmental Assessment for improvements to Highway 11 from 1 km north of Highway 141, northerly for 5.5 km. Performed ELC, compiled records of local flora and fauna, and identified significant wildlife habitat. The study area included a rare vegetation community not previously documented and a variety of upland and wetland habitat. A Terrestrial Ecosystems Report was submitted to characterize existing conditions, and to address predicted impacts and required mitigation to on-site vegetation communities, terrestrial wildlife and their habitats. Fieldwork and reporting were conducted in accordance with MTO regulations and guidelines.

Highway 11, Preliminary Design Study, South Entrance to Powassan, Powassan, Ontario (Terrestrial Ecologist)
This study was carried out to update a Preliminary Design Report that recommended interchange locations for this stretch of Highway 11. Performed ELC, compiled records of local flora and fauna, and identified significant wildlife habitat. The study area included significant features, a variety of habitats, and cultural communities. Fieldwork and reporting were conducted in accordance with MTO regulations and guidelines.

Municipal Road Improvement Projects, Various Sites, Ontario (Terrestrial Ecologist)
Conducted ELC and wetland delineations using OMNR protocols. Identified wildlife habitat and determined potential impacts and mitigation options.
- City of London, Southdale Road Widening
- City of London, Hamilton Road Improvements

** denotes projects completed with other firms*

James Leslie B.E.S.

Terrestrial Ecologist

Victoria Road North Class EA, Guelph, Ontario
(Terrestrial Ecologist)

Assist with Task Management for a proposed road widening, including background data review of applicable legislation and guidelines; conduct or delegate appropriate field surveys; agency consultation; prepare a draft Natural Environment Technical Report and constraints analysis for a proposed parking area.

** denotes projects completed with other firms*

Sarah Rogers B.Sc. HON., G. Dip. (Sci. Comm.)

Environmental Scientist

Sarah Rogers is an Environmental Scientist in the Environmental Services Group in Ottawa. Since joining Stantec Miss Rogers has worked on numerous screening level environmental assessments under CEAA and also, several provincial environmental assessments. Sarah has partnered on several field programs including ecological land classification, fisheries, terrestrial and species at risk (SAR) investigations and reporting. Prior to joining Stantec she worked on a major project completing a multi-disciplinary environmental baseline program for a comprehensive EA at a remote location in the Yukon. Sarah has a strong background in geomatics. She has developed numerous digital spatial databases and has taken a leadership role in the Ottawa office to create various geomatics-based products to fulfill various reporting requirements.

EDUCATION

G. Dip., Science Communication, Laurentian University, Sudbury, Ontario (2006)

B.Sc., Environmental Earth Science (Honours), Laurentian University, Sudbury, Ontario (2005)

Collège Universitaire de Saint-Boniface. French immersion program (2006)

Malaspina University College. Certificate: Environmental Monitoring for Construction Projects (2008)

Malaspina University College. Certificate Environmental Field Techniques for Construction Projects (2008)

PROFESSIONAL COURSES AND DESIGNATIONS

Canadian Environmental Assessment Act Training (2012)

Orientation to the Canadian Environmental Assessment Act (2012)

Ecological Land Classification for Southern Ontario (2011)

Petroleum Oriented Safety Training (POST) (2012)

CPR, First Aid and AED (2012)

Workplace Hazardous Materials Training (WHMIS) (2011)

Transportation endorsement (2008)

MEMBERSHIPS

Member, of Canadian Society of Environmental Biologists

Member, of Ontario Association of Impact Assessors

SECURITY CLEARANCE

Secret

PROJECT EXPERIENCE

Species at Risk Surveys

Shell, Bluewater Project, Sarnia, ON. *Conducted targeted surveys for Butler's Garter Snake and amphibian surveys.*

NOVA Chemicals, Plant Expansion 2020, Sarnia, ON. *Conducted targeted surveys for Butler's Garter Snake and amphibian surveys.*

NOVA Chemicals, Pipeline Construction, Sarnia, ON. *Conducted targeted surveys for Butler's Garter Snake and amphibian surveys.*

City of Ottawa, Manotick Snow Disposal Facility, Ottawa, ON. *Conducted targeted surveys for Butternut, Eastern meadowlark and Bobolink.*

City of Ottawa, Carp Snow Disposal Facility, Ottawa, ON. *Targeted surveys for Butternut, Least Bittern and Blanding's Turtle. Assisted with breeding bird surveys.*

City of Kawartha Lakes North West Trunk Sanitary Sewer Extension: Scugog River Crossing, Lindsay, ON. *Characterization of the environment, investigation of habitat or potential habitat for SAR.*

Sarah Rogers B.Sc. HON., G. Dip. (Sci. Comm.)

Environmental Scientist

Ottawa River Cable Crossing, Quigley Hill Park, Ottawa ON. *Targeted surveys for Butternut and SAR turtles.*

Highway 7 - Extension of South Service Road from Westleigh Boulevard to Jinkinson Road, Ottawa, ON. *Involved with the collection of species at risk data, wetland hydrology assessment and preparation of preliminary design to address outstanding requirements of a Municipal Class EA. Conducted habitat assessments and targeted surveys for Butternut, Ginseng, Blandings Turtle, and Spotted Turtle.*

City of Ottawa, Cumberland Transitway, Ottawa, ON. *Terrestrial investigations including targeted Butternut and SAR turtle surveys.*

MTO HWY 7 & 35 Improvements, Lindsay, ON. *Characterized the project area for 7 locations using ELC methodology and conducted targeted surveys for SAR avifauna, snakes and turtles. Assisted with breeding bird surveys.*

City of Ottawa, Ottawa River Outfalls Rehabilitation Environmental Assessment and Preliminary Design, Ottawa, ON. *Terrestrial investigations including targeted SAR surveys.*

City of Ottawa, Glen Cairn Flood Investigation, Ottawa, ON. *Characterization of the environment, investigation of habitat or potential habitat for SAR. Assisted with breeding bird surveys.*

Environmental Assessments

City of Ottawa, Combined Sewer Overflow EA and Functional Design, Ottawa, ON. *A part of the consultation team for a Municipal Class EA, Schedule C (Provincial).Co-authored the environmental study report and lead the consultation for the project through phase 3 and 4 of the EA process.*

City of Ottawa, Fitzroy Harbour EA. *Co-authored the EA report and conducted targeted SAR surveys. Provided task management on the pre-construction fieldwork for the channel stabilization project on the Carp River including liaison with regulatory agencies.*

Canada Post Corporation Facility Construction EA, Oshawa, ON. *Authored the Screening level EA report (CEAA).*

DFO Minor Remediation Projects Class Screening EA, Ontario. *Assisted with completing the Class EA report (CEAA).*

DFO Fixed Aids to Navigation Class Screening EA, Ontario. *Assisted with completing the Class EA report (CEAA).*

Transport Canada Oyster Aquaculture Activities Class Screening EA, New Brunswick. *Authored the Class Screening EA report (CEAA).*

Canada Post Corporation Mail Distribution Facility EA, Ottawa, ON. *Authored the Screening level EA report (CEAA).*

NCC Harrington Lake Dock Replacement EA, Gatineau, QC. *Authored the Screening level EA report (CEAA).*

RPIWG Baseline and Performance Measures Project, Canada. *Evaluation of regulatory performance of environmental assessments for major projects within Canada by conducting interviews and literature review.*

City of Ottawa, Ottawa River Outfalls Rehabilitation Environmental Assessment and Preliminary Design, Ottawa, ON. *A part of the consultation team and conducting natural environment investigations for a Municipal Class EA (Provincial).*

NCC Environmental Regulatory Review, Ottawa, ON. *Compiled a detailed database of all applicable legislation through research, interviews and practice.*

NCC Rideau Canal Skateway EA, Ottawa, ON. *Co-authored the Screening level EA reports (CEAA).*

Atria Networks Fibre Optic Cable Installation Environmental Assessment, Ottawa, ON. *Authored the Screening level EA report (CEAA).*

NCC Pine Grove Pathway Phase I & II Environmental Assessment, Ottawa, ON. *Co-authored the Screening level EA reports (CEAA).*

NCC Rideau Canal Corridor and Open Spaces Environmental Assessment, Ottawa, ON. *Authored the Screening level EA report (CEAA).*

Canada Border Services Agency, Prescott, ON. *Authored the Screening level EA report (CEAA).*

Chesterville Waterfront Development Project, Chesterville, ON. *Co-authored the Screening level EA report (CEAA), including identification of environmental effects and mitigation*

for fish habitat, wildlife, species at risk, and archaeology for construction of a waterfront recreational facility and docks on the South Nation River.

Canada Museum of Science and Technology. Agriculture Pavilion EA, Ottawa, ON. *Authored the Screening level EA report (CEAA).*

Nanisivik Naval Facility, Nunavut, NT *EA phase I (NIRB).*

VIA Rail Station Improvements, Belleville & Brockville, ON. *Co-authored the screening level EA for Belleville and Brockville station improvements (CEAA).*

Grain Storage Annex at the Port of Prescott EA, Prescott, ON. *Authored the screening level EA report (CEAA).*

River Road Fuel Storage Facility EA, Environment Canada, Ottawa, ON. *Authored the Screening level EA report (CEAA).*

*Selwyn Resources Ltd., Project Environmental Scientist, Yukon Territory. *Working directly for the exploration company provided an opportunity to gain solid expertise in field data collection, program design methods and analysis. Assisted senior scientists with project design of a variety of baseline data collection programs for a comprehensive Territorial/Federal EA at a remote fly-in site in the Yukon (approx. 321km2 in size). Conducted and scheduled fieldwork independently and trained junior staff in proper data collection methodology. Program areas of expertise: water quality, hydrology, snowpack surveys, hydrogeology, waste characterization, archaeology studies, ecosystem mapping, soils mapping, climate, wildlife surveys, fisheries and fish habitat, forest resource inventory (FRI) cruise plots, vegetation inventories, including species at risk, rare and endangered.*

Terrestrial Assessments

Shell Canada Products, Former Biodegradation Site, Montreal-East, QC. *Conducted amphibian surveys.*

Amherst Island Wind Energy Project. Frontenac County, ON. *Conducted amphibian surveys.*

David Brown Solar Project, Ingleside, ON. *Characterized the project area using ELC methodology. Conducted amphibian surveys and wetland delineation. The project was seeking approvals related to the Renewable Energy Act (REA) process.*

NCC. Chapel Hills Constraints Analysis, Ottawa, ON. *Conducted a desktop constraints analysis for future trail development.*

Kemptville Commercial Development EIS, Kemptville, ON. *Characterized the project area using ELC methodology.*

City of Ottawa Campeau Drive Extension, Ottawa, ON. *Characterized the project area using ELC methodology.*

NCC Windsor Park Village Drainage Assessment: Natural Environment Inventory Ottawa, ON. *Conducted amphibian surveys, wetland delineation and characterized the project area using ELC methodology.*

Highway 7 - Extension of South Service Road from Westleigh Boulevard to Jinkinson Road, Ottawa, ON. *Involved with the collection of species at risk data, wetland hydrology assessment and preparation of preliminary design to address outstanding requirements of a Municipal Class EA. Conducted habitat assessments and targeted surveys for Butternut, Ginseng, Blandings Turtle, and Spotted Turtle.*

Ottawa 300 Development, Ottawa, ON. *Conducted amphibian surveys.*

Petitcodiac River Causeway Modifications, Petitcodiac, NB. *Delineated coastal wetlands through air photo interpretation to assess the impact of the causeway removal on the Petitcodiac River in New Brunswick.*

CFB Rockcliffe soil pH investigation, Ottawa, ON. *Investigated and authored a report outlining the potential for vegetation stresses at two locations identified with elevated soil pH.*

Carp Airport Water Reservoir and Pump Enclosure. SAR and Habitat Study, Carp, ON. *Identified potential SAR located in the area and characterization of the terrestrial environment.*

Stanley Park Species at Risk and Habitat Study, Ottawa, ON. *Collected data on vegetation, species at risk and habitat in a park for an environmental assessment and remediation project.*

Trim Road Trade Building EIS, Ottawa, ON. *Assisted with identifying potential SAR and co-authoring the EIS.*

Terrestrial Inventory and SAR for the Pink Road Natural Gas Pipeline, Gatineau QC. *Assisted identifying potential*

species at risk located in the area, research for verification and characterizing the terrestrial environment.

*Selwyn Resources Ltd., Project Environmental Scientist, Yukon Territory. *Assisted local expert with rare and endangered plants mapping of the 321km2 remote project site in the Yukon. Assisted the terrestrial work-group in vegetation mapping of the project area for baseline EA. Used air photos to outline forest resource inventory cruise plots then went out to those sites and characterized the plot. Data collected: percent cover in all three stories, canopy, shrub and ground. Detailed species inventory and used prisms.*

*Natural Resources Canada, Canada Centre for Remote Sensing, Environmental Research Lead, Northern Ontario. *Lead a field project aimed to quantify Northern Ontario's reclamation efforts over the past 30+ years. Including, forest resource inventory cruise plots then went out to those sites and characterized the plot. Data collected: percent cover in all three stories, canopy, shrub and ground.*

Fish Habitat Services

City of Ottawa slope instability investigation, Ottawa, ON. *Assisted with fisheries investigations.*

NCC Rideau Canal Fisheries Investigation, Ottawa, ON. *Assisted with reporting.*

City of Ottawa, West Transitway, Ottawa, ON. *Assisted with fisheries fieldwork and reporting.*

Township of Rideau Lakes, Jones Falls Waste Weir Reconstruction, Smiths Falls, ON. *Assisted with fisheries fieldwork and reporting. The project involved replacement of a waste weir on the Rideau Waterway.*

CFB Farnham, Quebec. *Assisted with fisheries-related data entry and writing summary reports.*

Defence Construction Canada, Leitrim Road Realignment Study, Ottawa, ON. *Conducted the collection of species at risk, as well as preparation of a report providing recommendation of mitigation measures to protect species at risk. Habitat assessments and targeted surveys were conducted for Butternut, Monarch, Blandings Turtle, Spotted Turtle and Least Bittern.*

City of Ottawa, Cumberland Transitway, Ottawa, ON. *Assisted with fisheries-related fieldwork, (electro-fishing) data entry and writing summary reports.*

National Research Council, CSTT Uplands Fish Habitat Assessment, Ottawa, ON. *Assisted with fisheries-related fieldwork, (electro-fishing) data entry and writing summary reports.*

Trim Road Trade Building EIS, Ottawa, ON. *Assisted with fisheries-related fieldwork, (electro-fishing) data entry and writing summary reports.*

*Selwyn Resources Ltd., Project Environmental Scientist, Yukon Territory. *Conducted fisheries fieldwork and helped design of baseline program for EA. Fish presence/absence modelling. Gill/hoop net methods, electro-fishing and angling. Also trained in benthic, periphyton and sediment sampling for baseline research.*

Consultation

City of Ottawa, Combined Sewer Overflow EA and Functional Design, Ottawa, ON. *A part of the consultation team for a Municipal Class EA, Schedule C (Provincial).Co-authored the environmental study report and lead the consultation for the project through phase 3 and 4 of the EA process.*

*Selwyn Resources Ltd., Project Environmental Scientist, Yukon Territory. *Created communications materials for publication to stakeholders. Helped coordinate open houses for the four First Nations communities bordering the project. Published newsletters and designed presentations for communications about the project to government agencies, skateholders and internal use.*

Soils Testing

*Selwyn Resources Ltd., Project Environmental Scientist, Yukon Territory. *Assisted with the field collection and analysis of in-stream sediment sampling for baseline EA studies. Assisted the terrestrial work-group in soils mapping of the project area by digging soil test pits (200+ sites). Characterizing soils according to the Canadian System of Soils classification. Analysis of data to create detailed soils maps of the entire project area, approx. 321km2 in size.*

* O'Kane Consultants, Engineering Assistant, Sudbury ON. *In charge of the on-site field laboratory conducting geotechnical soils testing to maintain compliance with engineering designs. Including: grain-size analysis, hydrometer, specific gravity, proctor, Atterberg limits and sieve tests. Nuclear densometer testing for compaction, moisture and density. Permeability testing (AEP tests). QA/QC on the construction of*

the dry-cover concept for the back-filled open pit mine closure for Vale INCO.

Hydrogeologic Assessments

*Selwyn Resources Ltd., Project Environmental Scientist, Yukon Territory. *Assisted with project design, determining well locations. Supervised on-site drilling contractors. Soils characterization of wells. Conditioned, primed and regularly took water depth measurements at all well locations. Also was in charge of regularly collecting water quality sampling for each well location and analysis of data for baseline EA.*

Hydrology Studies

*Selwyn Resources Ltd., Project Environmental Scientist, Yukon Territory. *Assisted with project design for the project area, approx. 321km2 in size. Conducted regular collection (monthly) of velocity measurements and snowpack surveys to create a water balance model. Collection of water quality parameters and analysis of data. Installation and demobilization of automated water level data collectors to monitor hydrologic cycles, e.g. freshet, summer dry periods.*

Geologic Studies

*Selwyn Resources Ltd., Project Environmental Scientist, Yukon Territory. *Assisted with the collection of data to establish the waste characterization program for baseline EA. Characterized core samples from diamond drilling, chose samples to be sent to lab for metals analysis. Analysed chemical results from humidity cells testing to evaluate best engineering design of mine and tailings complex. Developed a strong understanding of geologic formation and processes. Set-up crib and run-off tests to evaluate acidity testing of native rock-types.*

GIS and Information Management

Zero Emissions People LLC, Built Heritage and Protected Properties Assessments, Ontario. *Developed digital spatial databases and produced GIS-related materials for ten projects across Ontario undergoing the Renewable Energy Act (REA) process.*

Ontario Infrastructure and Lands Corporation, Stage 1 Archaeological Assessment of Four Former Northern Ontario Jails, Ontario. *Developed digital spatial database and produced GIS-related materials for all archaeology reports.*

Niagra Region Wind Power, Niagra, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

Amherst Island Wind Energy Project. Frontenac County, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

Beckwith Solar Inc., Almonte Solar Project, Almonte, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

Samsung Grand Renewable Energy Project. Haldimand County, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

Sydenham Wind Energy Project, Lambton County and the Municipality of Chatham-Kent, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

White Pines Wind Energy Project, Prince Edward County, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

Fairview Wind Energy Project, Simcoe County, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

Whittington Wind Energy Project, Dufferin County, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

Springwood Wind Energy Project, Wellington County, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

Chelmsford By-Pass, Sudbury, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology and built heritage reports.*

St. Columban Wind Energy Project and Transmission Line, Huron County, ON. *Developed digital spatial database and produced GIS-related materials for all archaeology, built heritage and protected properties reports.*

Region of York Source Water Protection and Threats Analysis, York, ON. *Assisted with development of digital*

spatial database and processing. Authored 100+ maps required for final report.

VIA Rail Station Improvements, Belleville & Brockville, ON. *Developed digital spatial database and produced GIS-related materials for reports.*

Leitrim Road, Defence Construction Canada, Ottawa, ON. *Developed digital spatial database and produced GIS-related materials for reports.*

Issues Evaluation and Threats Inventory in Wellhead Protection Areas. The Regional Municipality of York, ON. *Developed digital spatial database and produced GIS-related materials for reports.*

*Selwyn Resources Ltd., Project Environmental Scientist, Yukon Territory. *Developed a comprehensive GIS database for the Environment and Community Affairs department along with various GIS-based analysis and maps required for reports, research and presentations. Interpreted air photos for ecosystem/soils mapping. Digitized LiDAR data.*

*Natural Resources Canada, Canada Centre for Remote Sensing, Geomatics Analyst, Northern Ontario. *Developed remote sensing and GIS materials based on field research.*

*Professor E. Ann Gallie, Sudbury, ON. *Developed a digital spatial database for on-going research initiatives.*