

Natural Heritage Assessment

Site Investigation Report

Kingston Gardiner TS Unity Road

Solar Energy Project

prepared for

Axio Power Canada Inc.

DRAFT



ECOLOGICAL SERVICES

Report Author Signature

Dale Kuster

Date

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1.0 INTRODUCTION

Axio Power Canada Inc. (Axio Power) is proposing to develop a 10 megawatt (MW) solar photovoltaic project titled Kingston Gardiner TS Unity Road Solar Energy Project. The Project Location¹ is a 34 hectare (ha) parcel situated on Pt Lot 12 Concession 6, within the City of Kingston (single tier municipality) County of Frontenac and within Madoc Ecodistrict 6E-9 (Figure 1.1). The longitude and latitude are 44° 19' 33.88" and 76° 33' 54.87".

1.1 Renewable Energy Approval Legislative Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the REA Regulation) identifies the Renewable Energy Approval (REA) requirements for renewable energy projects in Ontario. As per the REA Regulation (Part II, Section 4), ground mounted solar facilities with a name plate capacity greater than (>) 10 kilowatts (kW) are classified as Class 3 solar facilities and require an REA.

Part IV, subsection 26 (1) of the REA Regulation requires proponents of Class 3 solar projects to conduct a site investigation (*SI*) of the air, land and water within 120 meters (m) of the Project Location for the purpose of determining:

- a) whether the results of the analysis summarized in the *Natural Heritage Assessment Records Review Report (NHARR - Hatch Ltd., 2011)* are correct and identifying any required corrections;
- b) whether any additional natural features exist, other than those that were identified in the *NHARR* (Hatch Ltd., 2011);
- c) the boundaries, located within 120 m of the Project Location, of any natural feature that was identified in the *NHARR* (Hatch Ltd., 2011) or the site investigation; and
- d) the distance from the Project Location to the boundaries determined under clause (c).

Part IV, subsection 26 (3) of the REA Regulation requires the proponent to prepare a report setting out the following:

1. A summary of any corrections to the *NHARR* (Hatch Ltd., 2011) and the determinations made as a result of conducting the site investigation under subsection 26 (1).
2. Information relating to each natural feature identified in the *NHARR* (Hatch Ltd., 2011) and in the site investigation, including the type, attributes, composition and function of the feature.

¹ "Project Location means, when used in relation to a renewable energy project, a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposed to engage in the project" (O. Reg. 359/09, s. 1 (1)).

3. A map showing, the boundaries of any natural feature that was identified in the **NHARR** (Hatch Ltd., 2011) and site investigation that is located within 120 m of the Project Location; the location and type of each natural feature identified in relation to the Project Location; the distance from the Project Location to the boundaries of any natural feature identified within 120 m of the Project Location.
4. The dates and times of the beginning and completion of the site investigations.
5. The duration of the site investigations.
6. The weather conditions during the site investigations.
7. A summary of methods used to make observations for the purposes of the site investigations.
8. The name and qualifications of any person conducting the site investigations.
9. Field notes kept by the person conducting the site investigations.

This **SI** report has been prepared to meet these requirements.

Natural features are defined in Part I, subsection 1 (1) of the REA Regulation to be all or part of the following:

- **Area of natural and scientific interest (ANSI) (earth science)** – An area that has earth science values related to protection, scientific study or education.
- **ANSI (life science)** – An area that has life science values related to protection, scientific study or education.
- **Coastal wetland** – A wetland that is located on Lake Ontario, Lake Erie, Lake Huron, Lake Superior, Lake St. Clair, St. Mary’s River, St. Clair River, Detroit River, Niagara River or St. Lawrence River; or on a tributary to any of these waterbodies and, wither in whole or in part, downstream of a line located 2 km upstream of the 1:100 year floodline (includes wave run-up) of the water body.
- **Northern wetland** – A wetland located north of the northern limit of Ecoregions 5E, 6E and 7E as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the *Planning Act* and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005.
- **Southern wetland** – A wetland located south of the northern limit of Ecoregions 5E, 6E and 7E as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the *Planning Act* and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005.
- **Valleyland** – A natural area that is south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the *Planning Act* and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005; and that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year.
- **Wildlife habitat** – An area where plants, animals and other organisms live or have the potential to live and find adequate amounts of food, water, shelter and space to sustain their population,

including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species.

- **Woodland** – Land that is south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the *Planning Act* and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005; and that has per hectare (ha) at least 1, 000 trees of any size or 750 trees that are > 5 centimetres (cm) in diameter, 500 trees that are > 12 cm in diameter, 250 trees that are > 20 cm in diameter that have been measured from 1.37 m from the ground.

Part I, subsection 1 (1) of the REA Regulation also provides a general definition for wetland which includes land: such as swamp, marsh, bog or fen, other than land that is being used for agricultural purposes and no longer exhibits wetland characteristics; that is seasonally or permanently covered by shallow water or has the water table close to or at the surface; and that has hydric soils and vegetation dominated by hydrophytic or water-tolerant plants.

2.0 REPORT PREPARATION AND QUALIFICATIONS

Axio Power has retained Ecological Services to assist in meeting the REA requirements by conducting the investigations in support of the preparation of the Natural Heritage Site Investigation Report as identified under O.Reg. 359/09. Contact information for this report is as follows:

Dale Kristensen: Consultant, Ecological Services

3803 Sydenham Rd. Elginburg, Ontario K0H 1M0

Tel: (613) 376-6916; Fax: (613) 544-0072 E-mail: ecoserv@kos.net

Web Site: <http://ecologicalservices.webs.com/>

Ecological Services is a locally owned firm, specializing in the provision of services relating to ecological management and research. We have been in operation in eastern Ontario since 1985. Our core personnel combine education and experience to give us a strong focus on land use planning and management as they relate to natural resources. Our experience includes environmental impact assessments, management plans, wetland evaluations, and municipal land use planning. We have research experience in aquatic ecology and chemistry, forest fragmentation, avian ecology, and fisheries ecology.

We have worked with government at the federal, provincial, local and international levels. Other clients have included Crown corporations, planning and engineering firms, developers, and local groups. Our association with Queen's University provides us immediate access to current and broad-based research, and also provides us with a pool of expert associates. A work prospectus is available at our website at <http://ecologicalservices.webs.com>.

Natural feature surveys of lands within 120 m of the Project location, and the subsequent preparation of the *SI* was done by Dale Kristensen, while Chris Grooms conducted the breeding bird surveys. CV information for each is provided below:

CURRICULUM VITAE OF DALE KRISTENSEN

Environmental Consultant
Bedford Rd.
Sydenham, Ontario
KOH 2T0
(613) 376-6561 (613) 533-6151

Phytotron Manager/Adjunct Academic 5607
Department of Biology
Queen's University
Kingston, Ontario K7L 3N6
drk1@queensu.ca

Employment

1988 - present: Environmental Consultant with Ecological Services

- Specializing in floral and faunal resource inventories, wetland evaluations, environmental impact assessments, habitat analyses, and habitat restoration.

1996 - present. Phytotron Manager (Plant Research Facility). Dept. of Biology, Queen's University.

- Manager of a controlled environment facility for plant and other research

2008 – present: Curator Queen's University Fowler Herbarium

1987- 2009: Adjunct Academic. Department of Biology at Queen's University.

Development and instruction of various courses at Queen's University, including:

- | | |
|--|---|
| - Wildlife Issues in a Changing World (ENSC 320) | - Restoration Ecology (BIOL 522) |
| - Biology of Sex (BIOL 210) | - Field Botany (BIOL 320) |
| - Field ecology module at Lake Opinicon (BIOL 344) | - International graduate-level course on biodiversity |

Education

M.Sc., 1996 (Ecology) Queen's University. Kingston, Ontario.

B.Sc., 1981 (Wildlife Biology), University of Guelph. Guelph, Ontario.

Affiliations

Ecological Restoration Society, North American Wildflower Society, Land Conservancy for Kingston, Frontenac, Lennox & Addington, Kingston Field Naturalists, COSEWIC Species Recovery Team – Deerberry (*Vaccinium stamineum*) and Cerulean Warbler (*Dendroica caerulea*) habitat modelling.
Certified Butternut Health Assessor

CURRICULUM VITAE OF CHRIS GROOMS

Environmental Consultant
4388 Florida Rd.
Harrowsmith, Ontario K0H 1V0
(613) 386-7969
cgrooms@kingston.net

Department of Biology
Queen's University
Kingston, Ontario K7L 3N6
(613) 533-6151
groomsc@queensu.ca

Employment

2006 - present: Research Assistant. Paleoeological Environmental Assessment and Research Laboratory, Queen's University.

- high arctic fieldwork, maintenance and supply, data management, figure design for publication, website design, computer and analytical machine operation and maintenance.

2003- 2005: Coordinator, Eastern Region. Ontario Nature – Federation of Ontario Naturalists.

- liaison with member groups and other conservation organizations to promote conservation, land stewardship and nature education

1992- 2003. Habitat Stewardship and Ornithological Experience. Contracts with the Canadian Wildlife Service, Ontario Ministry of Natural Resources (MNR), Wildlife Preservation Trust Canada, and Bird Studies Canada.

- endangered loggerhead shrike recovery - population surveys, landowner contact; monitored nests, oversaw colour banding, mapped habitat, selected future reintroduction sites; supervised first experimental reintroduction of captive-bred shrikes to the wild.

Ontario Power Generation: inventory of the fauna of the Lennox Generation Station property.

Nature Conservancy Canada: inventory of breeding birds and amphibians at Burnley Carmel Nature Reserve near Rice Lake, Ontario.

Acres & Associated Environmental Limited: bird usage inventory of proposed wind farm sites on Wolfe Island, Ontario, and a bird inventory for a proposed wind site on Amherst Island, Ontario.

Lower Trent Region Conservation Authority: documented nesting sites of Red-Shouldered Hawks in five townships in eastern Ontario for the MNR over three years.

Education

B.Sc., 1998 (Biology), Queen's University. Kingston, Ontario.

Affiliations

Former President, Kingston Field Naturalists

3.0 STUDY APPROACH

3.1 Summary of Natural Features from the *NHARR*

Natural features were identified following the definitions provided in subsection 1 (1) of the REA Regulation and described in Section 1.2 of this report. The Ontario Ministry of Natural Resources (MNR) Ontario Base Maps and Land Information Ontario (LIO) mapping (MNR, 2010a) were used to locate natural features and other features on and within 120 m of the Project Location. A desktop exercise using satellite imagery to delineate habitat polygons was completed and ground-truthed during the *SI*.

The presence and/or absence of natural features on and within 120 m of the Project Location that were identified in the *NHARR* (Hatch Ltd., 2011) is provided in Table 3.1.

Table 3.1. Summary of Records Review Determinations for Kingston Gardiner TS Unity Road Solar Energy Project (Hatch Ltd., 2011a).

Determination to be Made	Yes/No	Description
Is the Project Location in or within 120 m of a provincial park or conservation reserve?	No	There are no provincial parks or conservation reserves within 120 m of the Project Location.
Is the Project Location in a natural feature?	Yes	There are significant woodlands according to the CRCA located on and within 120 m of the Project Location. There are potential candidate significant wildlife habitats on the Project Location.
Is the Project Location within 50 m of an ANSI (earth science)?	No	The nearest earth science ANSI is located more than 10 km northwest of the Project Location.
Is the Project Location within 120 m of a natural feature that is not an ANSI (earth science)?	Yes	There are significant woodlands according to the CRCA located on and within 120 m of the Project Location. There are potential candidate significant wildlife habitats on the Project Location.

The *NHARR* (Hatch Ltd., 2011) identified 30 species of conservation concern (excluding species that are designated as Endangered or Threatened on the SARO list) that based on their habitat preferences have the potential to occur on and/or within 120 m of the Project Location (Table 3.2).

Species of conservation concern include:

- **globally rare species** – These species are assessed by NatureServe and assigned a global conservation status rank (G-rank) of G1 to G3.
- **nationally rare species** – These species are designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered or Threatened and not protected in regulation under the *Ontario Endangered Species at Risk Act* (ESA).
- **provincially rare species** – These species are designated by the MNR and assessed under two categories: species listed as Special Concern on the Species at Risk in Ontario (SARO) list; and species that are assigned a provincial (i.e. sub-national) conservation status rank of S1 to S3 and are not on the SARO list. There are species that can be found in both categories.

- **regionally rare species** – These species are not assigned a formal designation, however, have been recognized as declining within a planning jurisdiction by government and/or nongovernment authorities.
- **conservation priority species** – These include priority species that are recognized in government and/or non-government conservation plans and assigned a conservation objective.

As discussed in the *NHARR* (Hatch Ltd., 2011), species that are designated as Endangered and Threatened under the ESA on the SARO list will be discussed in further detail in the *Approval and Permitting Requirements Document for Renewable Energy Projects* and will not be discussed herein.

Table 3.2 Species of Conservation Concern Identified in the *NHARR* and Their Preferred Habitat Type.

<i>Species Of Conservation Concern</i>	<i>Habitat Guild</i>				
	<i>Woodland</i>	<i>Grassland</i>	<i>Shrub/Early Successional</i>	<i>Wetland</i>	<i>Other</i>
<i>Plants</i>					✓
Moss (<i>Grimmia obneyi</i>)					✓
Moss (<i>Bryum gemmiparum</i>)					✓
Smooth Woodsia (<i>Woodsia glabella</i>)	✓				
Drooping Bluegrass (<i>Poa languida</i>)			✓		
Brainerd's Hawthorn (<i>Crataegus brainerdii</i>)	✓				
Stiff Gentian (<i>Gentianella quinquefolia</i>)	✓				
Bowman's-root (<i>Porteranthus trifoliatius</i>)				✓	
Smith's Bulrush (<i>Schoenoplectus smithii</i>)				✓	
Branching Burreed (<i>Sparganium androcladum</i>)					
<i>Insects</i>					
Juniper Hairstreak (<i>Callophrys gryneus</i>)			✓		
<i>Amphibians</i>					
Jefferson Blue Spotted Salamander (<i>Ambystoma jeffersonianum</i> – laterale “complex”) –	✓			✓	
Western chorus frog (<i>Pseudacris triseriata</i>) – Great Lakes / St. Lawrence Canadian Shield Population				✓	
Five-lined skink (<i>Plestiodon fasciatus</i>) – Great Lakes Population	✓				
Map turtle (<i>Graptemys geographica</i>)				✓	
Snapping turtle (<i>Chelydra serpentina</i>)				✓	
Eastern Ribbonsnake (<i>Thamnophis sauritus</i>) Great Lakes Population			✓	✓	
Milksnake (<i>Lampropeltis triangulum</i>)	✓	✓	✓		
<i>Birds</i>					
Bald Eagle (<i>Haliaeetus leucocephalus</i>)				✓	✓
Black Tern (<i>Chlidonias niger</i>)				✓	
Yellow Rail (<i>Coturnicops noveboracensis</i>)				✓	
Short-eared Owl (<i>Asio flammeus</i>)		✓			
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	✓				
Common Nighthawk (<i>Chordeiles minor</i>)	✓		✓		
Olive-sided Flycatcher (<i>Contopus cooperi</i>)	✓				
Louisiana Waterthrush (<i>Seiurus motacilla</i>)	✓				
Canada Warbler (<i>Wilsonia canadensis</i>)	✓				
Golden-winged Warbler (<i>Vermivora chrysoptera</i>)			✓		
Yellow-breasted Chat (<i>Icteria virens</i>)			✓		
<i>Mammals</i>					
Eastern Pipistrelle (<i>Pipistrellus subflavus</i>)	✓				
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	✓				

3.2 Site Investigation Details and Methodology

The natural features and species of conservation concern identified in Table 3.1 and Table 3.2 respectively were considered during the site investigation as well as all other plant and wildlife species encountered. A complete list of plant and wildlife species (Ecological Services, 2011) that were observed during the *SI* is provided in Appendices 6 and 7.

The wildlife and plant species discussed in the following sections are identified by common name only. The common names of species are written according to the standard rule of lower-case letters for all species excluding birds and proper nouns, in which case it is capitalized (e.g. woodland vole, Blanding's turtle, Black Tern and Red-headed Woodpecker). The binomial nomenclature system is a standard method used to formulate the scientific name of an organism (e.g. *genus* name + *species* name). The scientific and common names used in this report follow those used by the MNR.

As per subsection 26 (1) of the REA Regulation, the report must include: dates, times (beginning and completion of the site inventory), duration and weather conditions; qualifications, name and field notes kept by the person conducting the site investigation; and methodology used to make observations during the site investigation. The following information is intended to meet these requirements.

3.2.1 Site Investigation Details (Table 3.3)

- i. Location, potential environmental constraints and identified natural features relevant to the field survey were obtained from the Project Description Report (Hatch Ltd., 2011b) and a working copy of the *NHARR* in early June, 2010.
- ii. A breeding bird survey was conducted by Ecological Services staff on June 11, 2010.
- iii. A physical survey of areas within 120 m of the Project Location was done by Ecological Services staff on June 18, 2010 during which time vegetation and habitat characterization and mapping was conducted (Table 2).
- iv. A draft *SI* report was developed from the vegetation community maps and wildlife habitat features derived from the field surveys and satellite imagery. Information pertinent to revisions of the *NHARR* was submitted to Hatch Ltd. in June 2010.
- v. Comments by MNR Peterborough on a draft version of the *SI* (Ecological Services, December 2010) were obtained in early March of 2011 and reviewed prior to the preparation of this draft.
- vi. A physical survey of candidate winter raptor habitat was done by Ecological Services staff on March 4, 2011.
- vii. A physical survey of candidate amphibian and raptor nesting habitat was done by Ecological Services staff on April 9, 2011.

Table 3.3 Site visit summary table for the Unity Road Solar Energy Project.

Date of Survey	Time	Weather Conditions	Surveyor	Purpose of Visit
June 11, 2010	06:04 06:50	Sunny, light wind, 18°C	Chris Grooms	Breeding bird point count assessment
June 18, 2010	12:30 -16:30	Overcast, 20°C	Dale Kristensen	Vegetation and habitat surveys
March 4, 2011	08:00 approx	Clear, 0°C	Dale Kristensen	Winter raptor habitat survey
April 9, 2011	11:00-12:40	Clear, 11°C	Dale Kristensen	Amphibian and raptor nesting habitat survey

3.2.2 Site Investigation Methodology

The *SI* was completed in part to: verify the presence and/or absence of natural features and species of conservation concern identified in Table 3.1 and Table 3.2, respectively; identify any corrections required in the *NHARR* (Hatch Ltd., 2011) and determinations made as a result of conducting the site investigation; and document existing conditions including information on the type, attributes, composition and function for each natural feature identified on and within 120 m of the Project Location.

The methodology used during the *SI* involved walking the entire site by foot and documenting the natural features (including wildlife habitat), plant and wildlife species. A search for species of conservation concern that were identified in the *NHARR* (Hatch Ltd., 2011) was also completed. Habitat communities are generally described following the methodology outlined in the ELC for Southern Ontario (Lee *et al.*, 1998) and if applicable, the *Ontario Wetland Evaluation System Southern Manual* (MNR, 2002). Photographs of the site were also taken to document the existing environment and natural features observed during the site investigation. A copy of the field notes kept by the observer is provided in Appendix 3.

Candidate significant natural features were identified following the criteria outlined in the *Natural Heritage Reference Manual (NHRM - MNR, 2010b)*, *Draft Significant Wildlife Habitat Ecoregion Criteria Schedules* (MNR, 2009b) and *Significant Wildlife Habitat Technical Guide (SWHTG - MNR, 2000)* and are discussed further in Section 4.

A breeding bird point count survey of the Project Location was conducted using standardized survey methods as described in the Ontario Breeding Bird Atlas Guide for Participants (Cadman and Kopysh, 2001) for field and open land habitats and the Canadian Wildlife Service Forest Bird Monitoring Program for woodlands. Survey details on timing and conditions are given in Table 3.3. Surveying began after dawn under appropriate weather conditions and stations were established across the Project Location (Appendix 4) in accordance with minimum spacing requirements to reduce incidences of observational overlap. Surveys were conducted within the peak breeding season for most bird species (May-June) expected to be using the habitats found within 120 m of the Project location.

The presence of herpetofauna (reptiles and amphibians) was assessed at the Project Location by examining areas of appropriate habitat (if present) as indicated in the *SWHTG* (MNR, 2000). For reptiles, these include such features as rock piles and exposed limestone escarpment (potential hibernacula), creek basins and riparian edges, and potential basking sites (logs, exposed bedrock). For amphibians, supportive habitat includes water bodies, riparian areas, wetlands and vernal pools as well as beneath

fallen logs and other woody debris. Incidental signs of herpetofauna were also recorded and GPS referenced as encountered during vegetation community mapping and breeding bird surveys. Incidental signs included shed skins, depredated nests and eggshells. Amphibian breeding calls were recorded if heard at any time during the various survey periods.

Other wildlife species of interest (e.g., butterflies, mammals) were recorded as encountered from direct observation, or from other signs of their presence (tracks, scat, den sites, etc.).

All vascular plant species encountered were recorded and used to characterizing ELC community types. A plant checklist is provided in Appendix 7 of this report. Species of conservation concern were GPS referenced and the habitat was surveyed in order to determine the extent of the population. Specimens that could not be readily identified in the field were collected and assessed later using appropriate references (e.g., Gleason and Cronquist 1991; Queen`s University Fowler Herbarium records).

4.0 CONFIRMATION AND ASSESSMENT OF NATURAL FEATURES

The presence / absence of natural features identified in the *NHARR* (Hatch Ltd., 2011) were verified during the site investigation and are discussed in the following sections. The natural features identified on and within 120 m of the Project Location are shown on Figure 4.1.

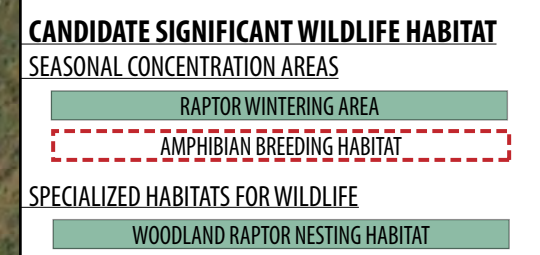
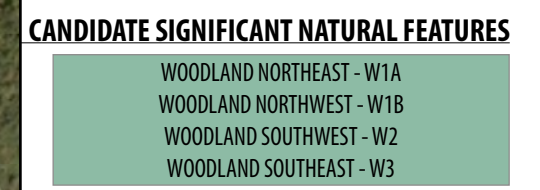
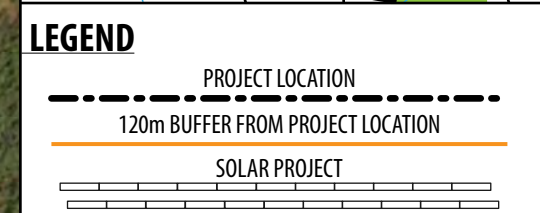
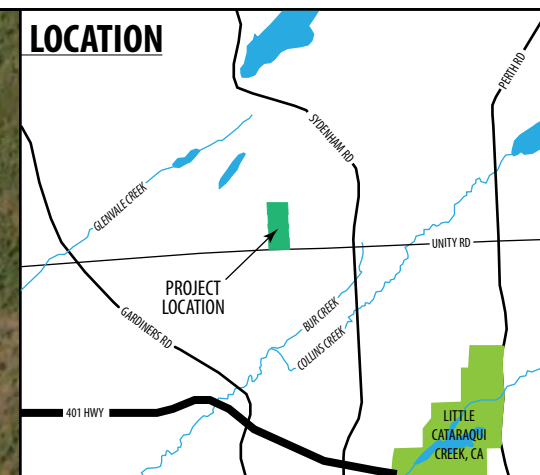
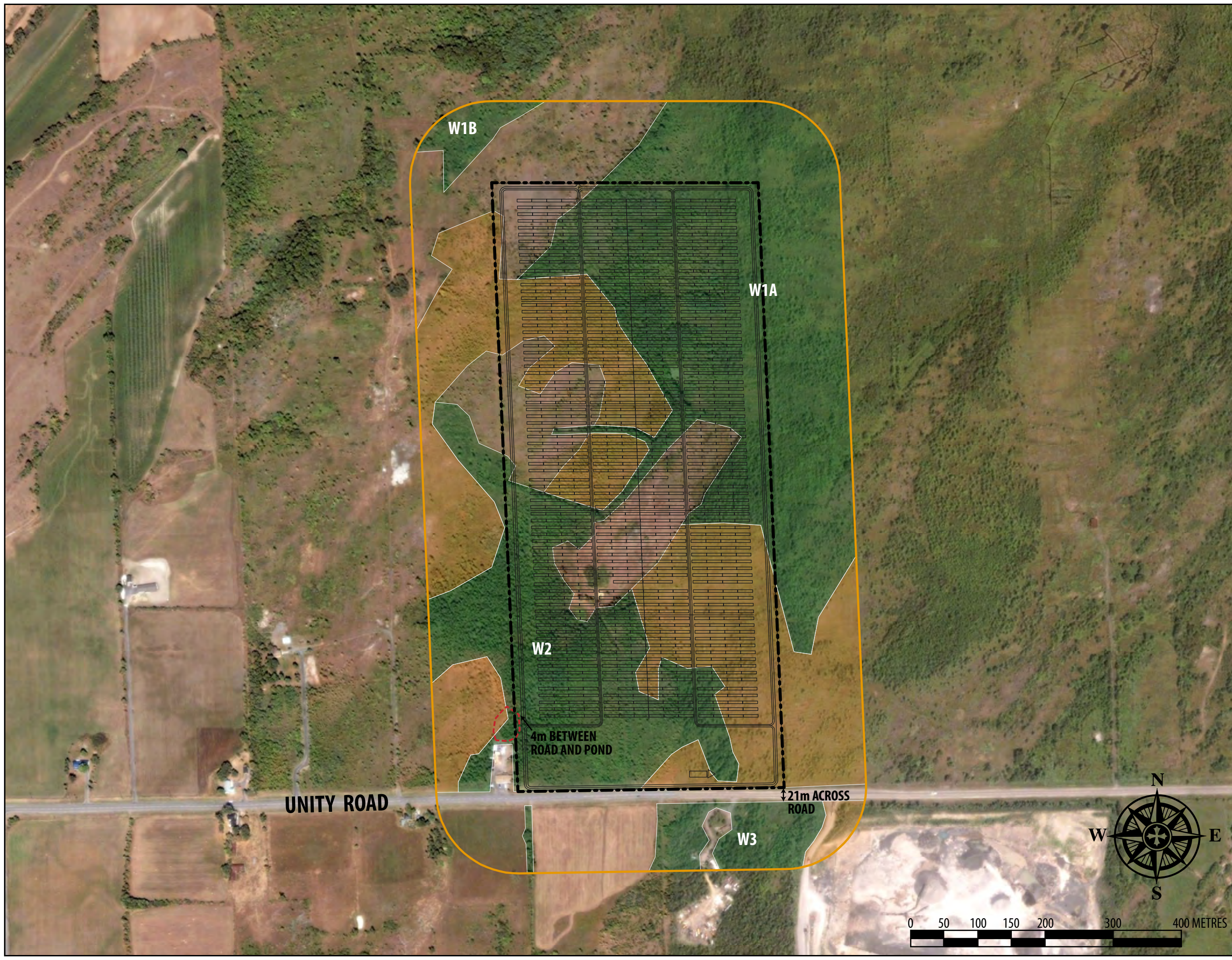


FIGURE 4.1



TITLE	KINGSTON GARDINER TS UNITY ROAD CANDIDATE NATURAL HERITAGE FEATURES		
DATE	JULY 5, 2011	PROJECT No. KP-11-626	FIGURE

4.1 Area of Natural and Scientific Interest

The information sources reviewed in the *NHARR* (Hatch Ltd., 2011) did not identify any provincially or regionally significant earth science or life science Areas of Natural and Scientific Interest (ANSI) on or within 120 m of the Project Location.

According to the *Natural Heritage Assessment Guide for Renewable Energy Projects* (MNR, 2010c), identifying additional ANSIs is not required during the site investigation.

Conclusion: There are no provincially significant earth science or life science ANSIs on or within 120 m of the Project Location and therefore they will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.2 Valleylands

The information sources reviewed in the *NHARR* (Hatch Ltd., 2011) did not identify significant valleylands on or within 120 m of the Project Location. The Project Location and surrounding lands are mainly natural areas that include mainly woodlands and shrub thicket on abandoned agricultural lands. A gravel quarry occurs south of the Project Location. Local topography is flat with a slight decrease in elevation to the south (130 ms/l). Vegetation communities typical of the Project Location are shown in Figures 4.2 and 4.3.



Figure 4.2 Shrub thicket community within Unity Road Project Location.



Figure 4.3 Red cedar woodland within Unity Road Project Location.

Conclusion: The site investigation determined that there are no valleylands on or within 120 m of the Project Location and this natural feature will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.3 Woodlands

The presence of woodlands on and within 120 m of the Project Location was confirmed using the definition in the ELC system for Southern Ontario (Lee *et al.*, 1998) and the REA Regulation. The ELC system describes woodlands as forested areas with greater than or equal to (\geq) 35 % tree cover. The REA Regulation defines “woodland” as land that is south and east of the Canadian Shield and has per hectare at least:

- 1000 trees of any size; or
- 750 trees measuring over 5 cm in diameter; or
- 500 trees measuring over 12 cm in diameter; or
- 250 trees measuring over 20 cm in diameter.

A cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees is not considered woodland according to the REA Regulation.

Woodlands were confirmed as occurring on and within 120 m of the Project Location from information obtained during the site investigation based on considerations of stocking density and canopy cover as per REA requirements. A description of the form and function of this woodland is provided in the following sections.

The *NHARR* (Hatch Ltd., 2011) provided the following information with respect to woodlands on and within 120 m of the Project Location:

- The MNR Land Information Ontario (LIO) wooded area layer shows woodlands on and within 120 m of the Project Location.
- The Cataraqui Region Conservation Authority (CRCA) prepared a natural heritage assessment of the local region (CRCA 2006) that identifies significant woodland on and within 120 m of the Project Location and extending for several hundred ha across the local area. This designation is based on area, interior habitat, and “corridor/linkage” criteria.

For the *SI*, woodland boundaries including plantations were verified from satellite imagery and from observations made during the *SI* (Figure 4.1). As per subsection 26 (3) of the REA Regulation, any corrections made to the woodland information from observations made during the *SI* are summarized in Table 5.1, Section 5.1 - Corrections Required in the *Natural Heritage Assessment Records Review Report*.

Three individual woodlands totalling 35 ha occur on and within 120 m of the Project Location (Figure 4.1). *Woodland 1a and 1b* (18 ha) are both part of a 270 ha local woodland that extends to the north. *Woodland 2* (10 ha) is within 120 m of the Project Location, except for a 0.5 ha portion that extends onto adjacent lands. *Woodland 3* (2 ha) is within 120 m adjacent lands south of Unity Road and is part of a 17 ha woodland that extends southward. Woodland areas were determined through ArcGIS 9.3 analysis of Google Earth images and LIO mapping of contiguous woodland cover (Appendix 1). ELC evaluations determined that *Woodland 1* consists of *Red Cedar Cultural Woodland (CUW1-1)* and *Conifer Plantation (CUP3)*; *Woodland 2* consists of *Red Cedar Cultural Woodland (CUW1-1)*; and *Woodland 3* consists of *Dry –Fresh White Pine-Maple-Oak Mixed Forest (FOM2)*. A 200 m long remnant treed hedgerow (not an ELC community type) connects *Woodland 1* and *Woodland 2*.

Information on individual stand characteristics is presented below, while Table 4.1 provides a summary of attributes for the woodlands as they relate to the requirements of the REA regulations. *A tree inventory of the Project Location was conducted by a registered forester to address the requirements of the City of Kingston’s tree by-law (Appendix 8).*

4.3.1 ELC Forest Stand Types on and within 120 m of the Project Location

- Red Cedar Cultural Woodland (CUW1-1)*: Approx. 29 ha of early-seral red cedar woodland occurs on and within 120 m of the Project Location to the southwest (11 ha) and northeast (18 ha) (Figure 4.3). Tree cover varies from 25- 60% and is dominated by red cedar, green ash, and white elm, with clumps of gray dogwood, honeysuckle, raspberry and dense herbaceous growth (Canada bluegrass, timothy, Canada goldenrod, and sedges). Stand age is estimated at 20-30 years. Soils are generally

shallow and mainly dry across upland portions, but seasonal inundation occurs within poorly drained, low-lying areas across the middle of the Project Location and in the southwest.

- ii. *Conifer Plantation (CUP3)*: A 1 ha white pine plantation occurs along an access lane in the middle of the Project Location. The age of this stand is estimated at 25-35 years. There is sparse understory development and the stand has not been recently managed. Some ash and maple regen is evident inside the stand.



Figure 4.4. Small white pine conifer plantation in central portions of Project Location.

- iii. *Dry-fresh White Pine-Maple-Oak Mixed Forest (FOM2)*: There are 2 stands of mid-seral mixed forest associated with the 120 m adjacent lands to the northwest (1 ha) and south (2 ha) of the Project Location. Tree cover is between 80 and 100% with dominant canopy species consisting of red oak, sugar maple, white pine and basswood, and a subordinate mix of white ash, white oak and hickory. Older (75+ years) remnant oak, pine and maple occur along a fence line (treed hedgerow). Soils are variable in depth and moisture, but generally shallow. The average age of this community type is approximately 30-50 years. Representative understory species include ash and maple saplings, choke cherry, Virginia creeper, and common woodland forbs and sedges (e.g., *Carex pennsylvanica*). The northwest stand is contiguous with a 270 ha larger mixed forest of similar makeup that extends to the north while the south stand is part of a smaller local woodlands of 17 hectares.



Figure 4.5. Mixed forest stand south of Unity Road within 120 m of Project Location.

Table 4.1 Summary of ecological characteristics for woodlands found on and within 120 m of the Project Location.

Ecological Characteristic	Description
Woodland 1(a and b)	
Type(s)	<i>Red Cedar Cultural Woodland (CUW1-1); Conifer Plantation (CUP3).</i>
Attributes	<p>Location: covers 1/3 of Project Location and 120 m adjacent lands interspersed by shrub thicket and meadow.</p> <p>Size: 18 ha (9.5 ha on Project Location). <i>Woodland 1</i> is contiguous with a 270 ha local woodland.</p> <p>Shape: irregular and with patches of meadow and shrub thicket interspersed within.</p> <p>Topography: very flat, some undulations, moderate to poorly drained</p> <p>Adjacent Land Use: mainly natural lands, gravel quarry operation to southeast of Project Location</p> <p>Soils: dry-fresh mesic loams of variable depth, no exposed limestone</p>
Composition	See stand descriptions (Section 4.3.1.1)
Ecological Function	<p>Woodland interior: approx. 3.7 ha within Project Location, while the larger local woodland contains approx. 90 ha of woodland interior (determined as 100 m setback from defined forest edge).</p> <p>Proximity to other significant natural features: woodlands on and within 120 m of the Project Location are contiguous with regional forest cover that has been identified as significant by CRCA. Criterion met.</p> <p>Linkages: woodlands on and within 120 m of the Project Location are contiguous with regional forest cover that has been identified as significant by CRCA. Woodland also encompasses candidate wildlife habitat. .</p> <p>Water Protection: <i>Woodland 1</i> is not within 50 m of a watercourse.</p> <p>Woodland diversity representation: <i>Woodland 1</i> does not include native forest stand types identified in the NHRM as experiencing major reductions in their natural distribution. Criterion not met.</p> <p>Uncommon characteristics: there is no old growth or other uncommon features within <i>Woodland 1</i>.</p> <p>Provision of significant wildlife habitat: <i>Woodland 1</i> provides candidate significant wildlife habitat as identified in Section 4.4.</p>
Woodland 2	
Type(s)	<i>Red Cedar Cultural Woodland (CUW1-1)</i>
Attributes	<p>Location: south west corner of Project Location and 120 m adjacent lands north of Unity Road</p> <p>Size: <i>Woodland 2</i> is 11 ha in size (8ha within Project Location).</p> <p>Shape: irregular</p> <p>Topography: very flat, few undulations, moderately to poorly drained</p> <p>Adjacent Land Use: residential and abandoned agricultural</p> <p>Soils: fresh-moist mesic loams of variable depth</p>

Composition	See stand descriptions (Section 4.3.1.1)
Ecological Function	<p>Woodland interior: none.</p> <p>Proximity to other significant natural features: <i>Woodland 2</i> is not within 30 m of significant woodland or other natural feature.</p> <p>Linkages: <i>Woodland 2</i> is within 120 m of significant regional forest cover, as identified by CRCA.</p> <p>Water Protection: <i>Woodland 2</i> is not within 50 m of a watercourse or wetland.</p> <p>Woodland diversity representation: <i>Woodland 2</i> does not include native forest stand types identified in the NHRM as experiencing major reductions in their natural distribution.</p> <p>Uncommon characteristics: No uncommon features present.</p> <p>Provision of significant wildlife habitat: <i>Woodland 2</i> provides candidate significant wildlife habitat as identified in Section 4.4.</p>
Woodland 3	
Type(s)	<i>Dry-fresh White Pine-Maple-Oak Mixed Forest (FOM2)</i>
Attributes	<p>Location: south of Unity Road within 120m adjacent lands of Project Location</p> <p>Size: <i>Woodland 3</i> is 2 ha in size and is contiguous with a 17 ha woodland to the south.</p> <p>Shape: irregular</p> <p>Topography: very flat, few undulations, generally well drained</p> <p>Adjacent Land Use: aggregate extraction</p> <p>Soils: dry-fresh mesic loams of variable depth, some exposed limestone</p>
Composition	See stand descriptions (Section 4.3.1.1)
Ecological Function (as per REA criteria)	<p>Woodland interior: none within 120 m of Project Location. Larger woodland of which it is part contains <1 ha of interior woodland.</p> <p>Proximity to other significant natural features: <i>Woodland 2</i> is within 30 m of significant woodland (<i>Woodland 1</i>).</p> <p>Linkages: <i>Woodland 3</i> is within 120 m of significant regional forest cover, as identified by CRCA.</p> <p>Water Protection: <i>Woodland 3</i> is not within 50 m of a watercourse or wetland.</p> <p>Woodland diversity representation: <i>Woodland 3</i> is composed of tree species that have had major reductions in their natural distribution and is part of a stand exceeding 10 ha.</p> <p>Uncommon characteristics: Some older trees present, but less than 10/ha. No other uncommon features present.</p> <p>Provision of significant wildlife habitat: <i>Woodland 3</i> provides candidate significant wildlife habitat as identified in Section 4.4.</p>

Conclusion: The site investigation identified 3 candidate significant woodlands extending across the Project Location and 120 m adjacent lands. These woodlands will be evaluated in the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4 Wildlife Habitat

The REA Regulation defines wildlife habitat as areas “*where plants, animals and other organisms live or have the potential to live and find adequate amounts of food, water, shelter and space to sustain their population, including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species.*” The natural features

identified on and within 120 m of the Project Location meet the definition of wildlife habitat and will be considered in further detail with respect to significance following the wildlife habitat assessment guidelines indicated in the *Draft Significant Wildlife Habitat Ecoregion Criteria Schedules* (MNR, 2009b) for Site Region 6E (Table 4.2). Additional sources of information and assessment guidance include the NHRM (MNR, 2010b), SWHTG (MNR, 2000), and the *Significant Wildlife Habitat Decision Support System* (MNR, 2009a).

Table 4.2. Wildlife habitat assessment criteria based on the Ecoregion Criteria Schedules (OMNR 2009c) for Site Region 6E.

Wildlife Habitat Category	Criteria
<i>Seasonal Concentration Areas</i>	<ul style="list-style-type: none"> i. <i>Waterfowl stopover and staging areas (terrestrial)</i> ii. <i>Waterfowl stopover and staging areas (aquatic)</i> iii. <i>Colonial-nesting bird breeding habitat</i> iv. <i>Shorebird migratory stopover area</i> v. <i>Songbird migratory stopover areas</i> vi. <i>Raptor wintering area</i> vii. <i>Bat hibernacula</i> viii. <i>Butterfly migratory route/stopover areas</i> ix. <i>Snake hibernaculum</i> x. <i>Deer wintering areas</i> xi. <i>Amphibian breeding habitat</i>
<i>Rare Vegetation Communities</i>	<ul style="list-style-type: none"> i. <i>Alvar</i> ii. <i>Cliff and talus slopes</i> iii. <i>Savannah</i> iv. <i>Tallgrass prairie</i> v. <i>Sand barren</i> vi. <i>Old growth forest</i>
<i>Specialized Habitat for Wildlife</i>	<ul style="list-style-type: none"> i. <i>Waterfowl nesting area</i> ii. <i>Osprey Nesting, Foraging and Perching Habitat</i> iii. <i>Woodland Raptor Nesting Habitat</i> iv. <i>Turtle Nesting and Over-wintering Areas</i> v. <i>Seeps and Springs</i>
<i>Habitat for Species of Conservation Concern</i>	<ul style="list-style-type: none"> i. <i>Marsh bird breeding habitat</i> ii. <i>Area-sensitive bird breeding habitat</i> iii. <i>Open country bird breeding habitat</i> iv. <i>Shrub/early successional bird breeding habitat</i> v. <i>Other Habitat Types</i> vi. <i>Special concern and S1-S3 species and communities</i>
<i>Animal Movement Corridors</i>	<ul style="list-style-type: none"> i. <i>Amphibian movement corridors;</i> ii. <i>Deer movement corridors</i> iii. <i>Bat movement corridors</i>

Each of these types of wildlife habitat was considered during the site investigation and is described in further detail below. The wildlife and plant species discussed in the following sections are identified by common name only with the scientific names and S-ranks provided in Appendices 4 and 5 (i.e. species observed during the *SI*).

4.4.1 Habitats of Seasonal Concentration Areas:

Habitats of seasonal concentrations of animals are areas where animals occur in relatively high densities for specific periods in their life cycles and/or in particular seasons (MNR, 2010b). These areas are generally localized and relatively small in relation to the area of habitat used at other times of the year (MNR, 2010b). Areas that support species at risk, or provide important habitat for a large proportion of a

population are also examples of seasonal concentration areas that are considered *significant wildlife habitat*.

The criteria used to determine habitat of seasonal concentrations areas are outlined in the *Ecoregion Criteria Schedules* (MNR, 2009). The site investigation considered these 11 types of habitats of seasonal concentrations of animals and their potential occurrence on the Project Location are discussed below.

- i. ***Waterfowl stopover and staging areas (terrestrial):*** Waterfowl traditionally congregate in larger wetlands and relatively undisturbed shorelines with vegetation during spring and fall migration. Habitat requirements for staging areas differ in the spring and fall depending on the nesting habits and wintering areas for some waterfowl species. In the fall, some waterfowl species may use staging areas as night-time roosts and disperse to other areas to feed during the day. During the spring migration, waterfowl may congregate on flooded agricultural fields.

The *Draft Significant Wildlife Habitat Ecoregion Criteria Schedules* (MNR, 2009) provide habitat characteristics that are important for migrating waterfowl (i.e., terrestrial habitat) and for local and migrant waterfowl populations during the spring and fall migrations (i.e., aquatic habitat). Suitable stopover and staging habitat for migrating waterfowl include cultural meadow and thicket communities that are seasonally flooded (i.e., annual spring flooding from meltwater or surface water runoff), especially during spring migration (i.e., mid-March to May). Suitable aquatic habitat includes wetland communities such as ponds, marshes, swamps, lakes, bays, coastal inlets and watercourses. These habitat types have an abundant food supply (i.e., aquatic invertebrates and vegetation in shallow water) (MNR, 2009). For a designation of significance, candidate habitat should support 100 or more waterfowl.

There are no permanent wetlands on or within 120 m of the Project Location. Most of the Project Location is comprised of red cedar woodlands that do not provide suitable waterfowl stopover and staging habitat. Waterfowl stopover and staging areas are generally known within the planning area. A review of existing planning documents and available information from the MNR determined that there are no confirmed significant *waterfowl stopover and staging areas* on or within 120 m of the Project Location (Hatch Ltd., 2011).

Conclusion: Candidate significant *waterfowl stopover and staging areas* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*

- ii. ***Waterfowl stopover and staging areas (aquatic):*** See information provided above.

Conclusion: Candidate significant *waterfowl stopover and staging area habitat (aquatic)* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iii. ***Colonial-nesting bird breeding habitat:*** Colonial birds are a diverse group of species including herons, gulls, terns and swallows. Nesting sites for these species includes eroding banks/cliffs, sandy hills, pits, steep slopes, rock faces or piles (e.g. swallows), trees/shrubs (e.g. herons) and ground (e.g. gulls and terns). The *Ecoregion Criteria Schedules* (MNR, 2009) identify habitat characteristics for the Bank Swallow and Cliff Swallow as any exposed soil banks that are undisturbed or naturally eroding for more than 10 years. However, areas that are not considered important habitat include man-made structures or recently (i.e. two years) disturbed soils, such as berms, embankments or aggregate stock piles.

There are no permanent wetland habitats or aquatic areas within 120 m of the Project Location. No colonial nesting birds were observed during the site investigations and *NHARR* (Hatch Ltd., 2011a) records did not identify any known colonies.

Conclusion: Candidate significant *colonial-nesting bird breeding habitat* is not present and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iv. **Shorebird migratory stopover area:** This habitat type includes shorelines of lakes, rivers, and wetlands, including beach areas, bars, and seasonally flooded shoreline, usually muddy and un-vegetated. Shorebird species considered during the site investigation include: Common Snipe, Killdeer, Spotted Sandpiper and Wilson's Phalarope. None of these species were observed during the *SI*. Suitable habitat for shorebird migratory stopover areas does not occur on or within 120 m of the Project Location.

A review of existing planning documents and available information from the MNR determined that there are no confirmed significant *shorebird migratory stopover areas* on or within 120 m of the Project Location (Hatch Ltd., 2011).

Conclusion: Candidate significant *shorebird migratory stopover area habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- v. **Songbird migratory stopover areas:** Songbird migratory stopover areas are found within 5 km of the Lake Ontario shoreline and include traditionally-used sites to feed, rest and wait in poor weather conditions. To accommodate the habitat requirements of the diversity of migratory species, stopover areas must include a variety of habitat types ranging from open fields to large woodlands of >10 ha that provide adequate food and shelter for a minimum of 35 migratory species. Although the Project Location includes habitat types potentially supportive of migratory birds (FOM, FOC), it is 12 km north of Lake Ontario and is represented by natural cover that extends broadly across the larger region. Accordingly, candidate *songbird migratory stopover area habitat* is not considered to be present on and within 120 m of the Project Location.

Conclusion: Candidate significant *songbird migratory stopover area habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- vi. **Raptor wintering area:** This habitat type includes a combination of fields (CUM, CUT) and woodlands (FOD, FOM, FOC) that provide roosting, foraging and resting habitat for wintering raptors. These areas should have productive small mammal populations such as open fields, agricultural lands (i.e., hayfields, pasture) and meadows. Roosting sites for most raptor species include mature mixed or coniferous woodlands, although some species prefer grassy fields (i.e. Northern Harrier, Short-eared Owl). To be considered significant, raptor wintering sites need to be >20 ha and include both woodlands and upland vegetation community types, and have confirmed use by one or more Short-eared Owls or two or more of the following species: American Kestrel, Northern Harrier, Red-tailed Hawk, Roughlegged Hawk, and Snowy Owl (MNR, 2009). Other raptor species considered during the site investigation include: Barred Owl, Cooper's Hawk, Eastern Screech-Owl, Great Horned Owl, Long-eared Owl, Northern Goshawk, Northern Hawk Owl, Northern Saw-whet Owl, and Sharp-shinned Hawk.

Potentially supportive woodland habitat of >20 ha intermixed with upland meadow and thicket communities occurs on and within 120 m of the Project Location. One raptor (Northern Harrier) was observed within 120 m of the Project Location on April 3, 2011, although an earlier site visit on March 4, 2011 did not encounter raptors.

Conclusion: Candidate significant raptor wintering area habitat is present and will be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

- vii. **Bat hibernacula:** *Bat hibernacula* are found in caves, abandoned mines and underground foundations. Winter roosts and maternal colonies are often found in trees with loose bark, tree cavities/hollow trees and buildings (buildings are not considered significant wildlife habitat). *Bat hibernacula, winter roosts and maternal colonies* are generally known within the planning area (OMNR wind resource mapping show a bat hibernaculum is present approximately 10-20 km north of the Project Location).

A review of existing planning documents and available information from the MNR determined that there are no confirmed *bat hibernacula, winter roosts and maternal colonies* on or within 120 m of the Project Location (Hatch Ltd., 2011; MNR, 2010d). The bat species whose ranges overlap the Project Location and that were considered during the site investigation include: big brown bat, little brown bat and northern long-eared bat (Hatch Ltd., 2011). All of these bat species are known to overwinter in Ontario.

Bat surveys were not completed and therefore, the presence / absence of these species on and within 120 m of the Project Location are unknown. However, an assessment of potential habitat for these species was considered during the site investigation. *Woodlands 1 and 2* are dominated by young red cedar, green ash and elm, trees that have not developed cavities or hollows that would provide suitable habitat for winter roosts or maternal colonies. More mature mixed forest within *Woodland 3* south of the Project Location has larger trees, but no hollow trees or tree cavities were encountered during the site investigations. There are no caves or karst topography on or within 120 m of the Project Location that would provide suitable bat hibernacula.

Conclusion: Bat hibernacula, winter roosts and maternal colonies will not be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

- viii. **Butterfly migratory route/stopover areas:** *Migratory butterfly stopover areas* are found within uplands (CUT, CUM) and woodlands (e.g., FOC, FOM, CUP) located within 5 km of Lake Ontario. The butterfly species that are considered important in determining the significance of this habitat type include: monarch butterfly, painted lady and white admiral. *Migratory butterfly stopover areas* are generally known within the planning area. A review of existing planning documents and available information from the MNR determined that there are no confirmed significant *migratory butterfly stopover areas* on or within 120 m of the Project Location (Hatch Ltd., 2011). The Project Location is 12 km from the Lake Ontario shoreline and no monarch butterflies were encountered during the field investigations.

Conclusion: Candidate significant *butterfly migratory route/stopover area habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- ix. **Snake hibernaculum:** Some species of snakes migrate to wooded areas in the fall where they find areas to hibernate such as animal burrows, log piles, and rock crevices. Woodlands ≥ 30 ha are favourable as they provide interior forest habitat with more moderate environmental conditions. Snake hibernacula are also found on man-made sites such as old stone fences, crumbling foundations and old wells. For identification of significance, 5 or more snakes or 2 or more species must be found in association with candidate hibernacula. Potential snake hibernacula, e.g., collapsed barn structure and rubble foundation was examined on April 3, and April 9, 2011, but no snakes or evidence of their presence were observed at these locations. It was noted that the foundation structure of the barn was on top of bedrock and did not extend below ground. No other features present within 120 m of the Project Location that possess qualities suitable for snake hibernacula (e.g., south-facing limestone ridges, crevices, etc.) were observed. A single eastern gartersnake was observed foraging within a small patch of open meadow within the Project Location on June 18, 2010.

Conclusion: *Snake hibernaculum* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- x. **Deer wintering areas:** To function as a *deer wintering area*, the *SWHTG* identifies the following requirements: history of use by deer; absence of barriers to migration to and from the yard itself; suitable areas of cover, food and adjacent natural lands. *Deer wintering area* have three basic habitat components: core areas; core feeding areas; and staging areas. Deer spend the majority of the winter in core areas and core feeding areas. These areas are associated with coniferous and mixed forests which provide shelter (i.e. $> 60\%$ canopy cover) and an adequate supply of food (i.e. woody browse, fruits and nuts). Staging areas are located adjacent to winter deer yards and provide temporary habitat as deer move in and out of winter yards. Suitable staging areas include agricultural land and mast-producing woodlands where food is abundant.

A review of existing planning documents and available information on deer wintering areas from the MNR determined that there are no confirmed significant *winter deer yards* on or within 120 m of the Project Location (Hatch Ltd., 2011). *Deer wintering area habitat* does not occur on or within 120 m of the Project Location.

Conclusion: Candidate significant *deer wintering areas* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- xi. **Amphibian breeding habitat:** Undisturbed woodlands with permanent ponds or those containing water in most years until at least mid July are most significant as are sites that contain shrubs, logs and woody debris. For designation as candidate significant *amphibian breeding habitat*, 2 or more species with at least 20 individuals must be observed (or any number of American bullfrogs). No amphibians were encountered on the Project Location within the small seasonally inundated wet meadow and dogwood thicket areas. However, on April 9th, 2011 approx. 30-40 chorus frogs (*Pseudacris spp*) were heard calling from a small (0.1 ha) vernal pool within a stand of young green ash within 120 m of the Project Location (Woodland 2) (Figure 4.6). *Similar numbers of chorus*

frogs were also encountered within a flooded area of quarry across Unity Road >120 m from Project Location.



Figure 4.6. Vernal woodland pond containing breeding chorus for population (photo taken April 9, 2011)

Conclusion: Candidate significant *amphibian breeding habitat* will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.1.1. Summary of Candidate Significant Habitats of Seasonal Concentration Areas

Two candidate significant habitats of seasonal concentration areas (*raptor wintering area, amphibian breeding habitat*) were identified on and within 120 m of the Project Location and will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.2 Rare Vegetation Communities

All vascular plant species encountered during the site investigation were recorded and used in characterizing individual vegetation community types. A plant checklist is provided in Appendix 7 of this report. Any plant identified as a species of conservation concern was GPS referenced and the habitat was surveyed in order to determine the extent of the population. Specimens that could not be readily identified in the field were collected and assessed later using appropriate references (e.g., Gleason and Cronquist 1991; Queen`s University Fowler Herbarium records).

Rare vegetation communities are those that are considered rare in Site Region 6E under the *Ecoregion Criteria Schedules* (see also NHIC S-Ranks designations). Rare community types are typically those with

S-ranks of S1 to S3 (i.e., extremely rare to rare – uncommon in Ontario). In addition to being rare themselves, it is also assumed that these communities support wildlife species that are also considered significant. There are 6 identified communities for Site Region 6E, including:

- i. Alvar,
- ii. Cliff and talus slopes,
- iii. Savannah,
- iv. Tallgrass prairie,
- v. Sand barren, and
- vi. Old growth forest.

Much of the natural vegetation communities within this local area are of secondary or tertiary growth on shallow soils over limestone bedrock. Local topography is generally flat with moderate to poor drainage. Early and mid-successional vegetation community types tend to be patchy with indistinct borders (i.e., broad ecotones); although remnant mature trees occur along fencerows. Small (i.e., <0.2 ha), seasonally inundated areas occur within low-lying areas of the Project Location; however, distinct wetland communities are absent or poorly developed as these patches typically dry up by late spring/summer. Owing to the timing of the survey seasons, not all plant species that potentially occur on the site were found; however, representative species were noted for each community.

Provincially Rare Vegetation Communities – The *Great Lakes Conservation Blueprint for Terrestrial Biodiversity, Volume 2: Ecodistrict Summaries* (Henson and Brodribb, 2005) identifies the following provincially rare vegetation community within the Madoc Ecodistrict 6E-9.

- Common Juniper – Fragrant Sumac – Hairy Beardtongue Alvar Shrubland – Globally and provincially rare based on conservation ranks of G2?, S2
- Dry – fresh White Pine Coniferous Forest Type – Globally rare based on a conservation rank of G3G4
- Dry Bur Oak – Shagbark Hickory Tallgrass Woodland Type – Globally and provincially rare based on conservation ranks of G?, S1
- Moist – Fresh Sugar Maple – Black Maple Deciduous Forest Type – Globally and provincially rare based on conservation ranks of G?, S3?
- Philadelphia Panic Grass – False Pennyroyal Alvar Pavement Type – Globally and provincially rare based on conservation ranks of G1Q, S1
- Red Cedar – Early Buttercup Treed Alvar Grassland Type – Globally and provincially rare based on conservation ranks of G2?, S2
- Tufted Hairgrass – Canada Bluegrass – Philadelphia Panic Grass Alvar Grassland Type – Globally and provincially rare based on conservation ranks of G2G3, S2S3
- White Cedar – Jack Pine – Shrubby Cinquefoil Treed Alvar Pavement – Globally and provincially rare based on conservation ranks of G1G2, S1
- White Cedar – White Spruce – Philadelphia Panic Grass Treed Alvar Grassland Type – Globally and provincially rare based on conservation ranks of G3?, S3
- Winterberry Organic Thicket Swamp Type – Globally and provincially rare based on conservation ranks of G3G4Q, S3S4

No rare vegetation communities were found on or within 120 m of the Project Location during the site investigations. All community types encountered have an S-rank of S5. A checklist of vascular plants identified on the Project Location is shown in Appendix 7. All of the plant species encountered are common native species with an S-rank of S5, S4, or are non-native (SNA).

4.4.2.1 Summary of Candidate Significant Rare Vegetation Community Habitat

Candidate significant rare vegetation communities are not present and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.3 Specialized Habitats for Wildlife

The *NHRM* (MNR, 2010b) describes specialized habitats for wildlife as:

- areas that support wildlife species that have highly specific habitat requirements
- areas with high species and community diversity
- areas that provide habitat that greatly enhances species' survival.

The *Ecoregion Criteria Schedules* (MNR 2009b) identifies 5 categories of specialized habitat for wildlife for Site Region 6E, the area in which the Project Location occurs. Each of these is discussed below in context with what was observed during the site investigations of the areas within 120 m of the Project Location:

- Waterfowl nesting area:*** Waterfowl nesting areas can extend 120 m from a wetland (> 0.5 ha) and can include clusters of 3 or more small (<0.5 ha) wetlands within 150 m of each other where waterfowl nesting is known to occur. For a designation of significance the presence of 3 or more nesting pairs for listed species except Mallard, or the presence of 10 or more nesting pairs for listed species including Mallard are required.

No waterfowl nesting area habitat was identified in the *NHARR* (Hatch Ltd., 2011a) as there are no permanent wetlands or waterbodies within 120 m of the Project Location. Four Mallards were observed during the breeding bird survey, one within a small patch of wet thicket in the northeast corner of the Project Location) and 3 within a shallow vernal pond to the southwest within 120 m adjacent lands (a site that also supports amphibians). These sightings consisted of 3 males and a single female. No nests or young were encountered.

Conclusion: Candidate significant *waterfowl nesting area habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- Osprey Nesting, Foraging and Perching Habitat:*** Osprey nests are associated with lakes, ponds, rivers, or wetlands. Osprey nests are along forested shorelines, on islands or on structures over water within dead trees; nests are usually at the top of the tree. No wetlands or waterbodies occur within 120 m of the Project Location. No ospreys or their nests were observed within 120 m of the Project Location during the site investigation and no references to their occurrence are indicated in the *NHARR* (Hatch Ltd., 2011).

Conclusion: Candidate significant *osprey nesting, foraging and perching habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iii. Woodland Raptor Nesting Habitat:** Several species of raptors, and those nesting and hunting in forests and grasslands require specialised nesting habitat for their long-term survival. The raptor species considered during the site investigation include: American Kestrel, Barred Owl, Broad-winged Hawk, Common Nighthawk, Cooper's Hawk, Eastern Screech-Owl, Great Horned Owl, Long-eared Owl, Northern Goshawk, Northern Harrier, Northern Hawk Owl, Northern Saw-whet Owl, Red-shouldered Hawk, Red-tailed Hawk, Sharp-shinned Hawk and Short-eared Owl. One raptor (Northern Harrier) was observed within 120 m of the Project Location on April 3, 2011.

Woodlands 1 and 2 consist of young red cedar woodlands and conifer plantation interspersed with patches of open thicket, which could potentially provide foraging and nesting habitat for woodland raptors. The 270 ha local woodland associated with *Woodland 1* contains 90 ha of interior habitat and *Woodland 3* is part of a more mature mixed forest stand that possesses features supportive of woodland raptor nesting including tall conifers and open understory.

Conclusion: Candidate significant *woodland raptor nesting habitat* will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iv. Turtle Nesting and Over-wintering Areas:** Turtle nesting areas include exposed sites typically with a southern exposure and with sand or gravel substrates that allow turtles to dig. Turtle over-wintering areas consist of permanent waterbodies, large wetlands, and bog or fens with adequate dissolve oxygen. There are no watercourses or wetlands present within 120 m of the Project Location and soils within the Project Location are not consistent with the requirements of most nesting species (i.e., sands and gravels).

Conclusion: Candidate significant *turtle nesting habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- v. Seeps and Springs:** No seeps or springs were identified within 120 m of the Project Location and none are reported in the *NHARR* (Hatch Ltd., 2011a).

Conclusion: *Seeps and springs* are not present and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.3.1 Summary of Candidate Specialized Habitats for Wildlife

One candidate specialized habitat for wildlife (woodland raptor nesting habitat) was identified on and within 120 m of the Project Location and will be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

4.4.4 Habitat for Species of Conservation Concern

The NHRM (MNR, 2010b) identifies species of conservation concern as:

- species that are designated at the national level as endangered or threatened by COSEWIC, which are not protected in regulation under Ontario's ESA
- species listed as special concern under the ESA on the SARO List (formerly referred to as "Vulnerable" in the SWHTG)
- species that are rare or substantially declining, or have a high percentage of their global population in Ontario.

The *SWHTG* (MNR, 2000) defines rare or significant species at six levels: globally significant; nationally significant; provincially significant; regionally significant; locally significant (within a Site District); within a planning authority's jurisdiction.

Five categories of habitat that support species of conservation concern are listed in the *Ecoregion Criteria Schedules* (MNR, 2009b) for Site Region 6E. Each of these is discussed below in context with species observed during the site investigations. A list of species of conservation concern identified in the *NHARR* (Hatch Ltd., 2011), including their preferred habitat type is provided in Table 3.2. Habitats supportive of identified species of conservation concern will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- i. ***Marsh bird breeding habitat:*** Marsh bird breeding habitat occurs in wetlands. All wetland habitats are to be considered as long as there is shallow water with emergent aquatic vegetation present. The presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 4 nesting pairs for any other listed species (i.e., American Bittern, Virginia Rail, Sora, Common Moorhen, American Coot, Pied-billed Grebe, Common Loon, Green Heron ; or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species. Any wetland with breeding Black Terns or Yellow Rail is to be considered as significant. Other wetland associated species considered during the *SI* include: American Woodcock, Killdeer, Spotted Sandpiper, Upland Sandpiper, Wilson's Snipe, Bald Eagle, Belted Kingfisher, Black-crowned Night Heron, Black Tern, Forster's Tern, and Wilson's Phalarope.

Small (<0.2 ha) seasonally inundated patches of shrub thicket and cultural meadow were observed within the Project Location in the spring of 2010 and 2011. Patches of emergent aquatic vegetation (sedges and rushes) were observed at some of these sites. A shallow vernal pool (0.1 ha) occurs within a young stand of green ash and elm to the southwest within 120 m of the Project Location. However, as no marsh-associated bird species were observed during the site investigations in 2010 and 2011, candidate significant marsh bird breeding habitat is not considered present.

Conclusion: Candidate significant *marsh breeding bird habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- ii. ***Area-sensitive bird breeding habitat:*** All mature (>60 years old) natural forest (non-plantation) stands 30 ha or greater in size and with at least 10 ha interior habitat assuming 100 m buffer at edge of forest are to be considered for this criterion. Studies will confirm the presence of 3 or more breeding or nesting area-sensitive species including 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 and Canada Warbler.

Woodland 1 and *2* are represented by young patchy red cedar dominated woodlands that are not of sufficient maturity to meet the criteria indicated. *Woodland 3* is part of a small local mixed forest that includes a portion of stand >60 years of age; however, *Woodland 3* does not meet the size or interior habitat criteria. No area-sensitive bird species were encountered during the breeding bird survey within 120 m of the Project Location.

Conclusion: Candidate significant *area-sensitive bird breeding habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iii. **Open country bird breeding habitat:** Grassland habitat 30 ha or larger in size, that is not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e., no row-cropping in the last 5 years). Studies will confirm the presence of nesting or breeding of 2 or more indicator (Bobolink, Grasshopper Sparrow, Vesper Sparrow, Upland Sandpiper) or special concern species (Short-eared Owl) and at least 1 of the common species (Eastern Kingbird, Eastern Meadowlark, Northern Harrier and American Kestrel). A field with breeding Short-eared Owl is to be considered a Significant Wildlife Habitat. Other open country bird species of regional conservation concern considered in the *SI* include Killdeer and Savannah Sparrow. Of these, one open country bird species (Northern Harrier) was observed foraging across the northern sections of the Project Location on April 3, 2011.

There are approx. 12 ha of cultural meadow (CUM1-1) on and within 120 m of the Project Location in the form of patches of former pasture interspersed by thickets and woodland (Appendix 2). As there is insufficient habitat present and only a single potential indicator species, open country bird breeding habitat is not considered present.

Conclusion: Candidate significant *open country bird breeding habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iv. **Shrub/early successional bird breeding habitat:** Shrubland or successional fields 30 ha or larger in size, not class 1 or 2 agricultural lands, and not being actively used for farming (i.e., no row-cropping in the last 5 years). Studies must confirm the presence of nesting or breeding of 2 or more indicator (Brown Thrasher, Clay-coloured Sparrow) or special concern species (Yellow-breasted Chat, Golden-winged Warbler) and at least 1 of the common species (Field Sparrow, Black-billed Cuckoo, Eastern Towhee, Willow Flycatcher, or Blue-winged Warbler). A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. Other shrub/early successional species of regional conservation concern considered for this local area in the *SI* include: Alder Flycatcher, American Woodcock, Black-billed Cuckoo, and Prairie Warbler. During the site investigations, 5 shrub/early successional habitat breeding bird species (Alder Flycatcher, Willow Flycatcher, Brown Thrasher, and Clay-coloured Sparrow) were encountered on and within 120 m of the Project Location.

Approximately 20 ha of cultural thicket (CUT1-1) occurs on and within 120 m of the Project Location; however, this community is part of an extensive area of succession shrublands that extend east and west across the local region for several hundred hectares, thus exceeding the minimum size criterion of 30 ha.

Conclusion: Candidate significant *shrub/early successional bird breeding habitat* will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- v. **Other Habitat Types:** No other species of conservation concern requiring other forms of habitat (e.g., lakes, lakeshore) were noted in Table 3.2 and no other forms of habitat not already noted above occur within 120 m of the Project Location.

Conclusion: Candidate significant other habitat types will not be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

- vi. **Special concern and S1-S3 species and communities:** Candidate habitat assessments for remaining species of conservation concern indicated in Table 3.2 that were not included in the habitat criteria evaluations are discussed in Table 4.3.

Table 4.3. Habitat requirements and occurrence for remaining species of conservation concern identified in the NHARR (Hatch Ltd., 2011)

<i>Species Of Conservation Concern</i>	<i>Preferred Habitat Description (Appendix G SWHTG; Conard and Redfern, 1979; Gleason and Cronquist, 1991; Cobb, 1956)</i>	<i>Notes and Habitat Assessment from SI</i>	<i>Observed during SI</i>	<i>Species Occurrence Potential</i>
Plants				
Moss (<i>Grimmia olneyi</i>)	Exposed wet calcareous or acidic rock faces	1868 record only; no exposed relief features	<i>no</i>	<i>nil</i>
Moss (<i>Bryum gemmiparum</i>)	Clefts in exposed calcareous bedrock, occurs in tufts	Underlying limestone bedrock not exposed, seasonally inundated, shallow to moderate soils present. No clefts.	<i>no</i>	<i>nil</i>
Smooth Woodsia (<i>Woodsia glabella</i>)	Shaded moist limestone crevices	No limestone relief features present such as escarpments or bluffs	<i>no</i>	<i>nil</i>
Drooping Bluegrass (<i>Poa languida</i>)	Dry rocky woodlands	<i>Woodland 1</i> is moist with deeper soils. <i>Woodland 2</i> is drier but no rocky	<i>no</i>	<i>nil</i>
Brainerd's Hawthorn (<i>Crataegus brainerdii</i>)	Dry calcareous uplands	Potential habitat present but species often confused with <i>C. succulenta</i> ; no herbarium records for this area	<i>no</i>	<i>nil</i>
Stiff Gentian (<i>Gentianella quinquefolia</i>)	Rich woods, wet, gravelly banks, damp fields	No rich woods present, some patches of damp field	<i>no</i>	<i>nil</i> (1883 record)
Bowman's-root (<i>Porteranthus trifoliatus</i>)	Rich mesophytic forests	No rich mesophytic forest within 120 m of	<i>no</i>	<i>nil</i> (1886 record)
Smith's Bulrush (<i>Schoenoplectus smithii</i>)	Shallow marsh, humic organic soils		<i>no</i>	<i>nil</i> (1932 record)
Branching Burreed (<i>Sparganium androcladum</i>)	Muddy shorelines, peaty swamps and marshes		<i>no</i>	<i>nil</i> (1897 record)
Insects				
Juniper Hairstreak (<i>Callophrys gryneus</i>)	Open red cedar woodlands and common juniper dominated field and alvars	Open red cedar woodlands occur within <i>Woodland 1</i>	<i>no</i>	<i>Moderate</i>
Amphibians				
Jefferson Blue Spotted Salamander (<i>Ambystoma jeffersonianum</i> – <i>laterale</i> “complex”)	damp shady deciduous forest, swamps, moist pasture, lakeshores; temporary woodland pools for breeding; hides under leaf litter, stones or in decomposing logs	Temporary woodland pool present within <i>Woodland 1</i> . No salamanders encountered during site investigations.	<i>no</i>	<i>low</i>
Reptiles				
Five-lined skink (<i>Plestiodon fasciatus</i>) – Great Lakes Population	moderately dense or open deciduous or mixed woodlands with logs and slash piles; damp spots under logs, leaf litter; open talus slopes, barren rock; breeds in forest floor litter; forages in open woodlands, in sandy areas; hibernates under rock piles, in rock crevices, under logs and in stumps	No exposed rock or bedrock. Woodlands present, but understory growth dense. Logs and large woody debris scarce due to young stand age. No records of occurrence in this area.	<i>no</i>	<i>nil</i>

Table 3. cont'd...

<i>Species Of Conservation Concern</i>	<i>Preferred Habitat Description</i>	<i>Wildlife Habitat Assessment</i>	<i>Observed during SI</i>	<i>Species Occurrence Potential</i>
Eastern Ribbonsnake (<i>Thamnophis sauritus</i>) Great Lakes Population	grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups	No wetlands or permanent water bodies within 200m of Project Location.	<i>no</i>	<i>nil</i>
Milksnake (<i>Lampropeltis triangulum</i>)	farmlands, meadows, hardwood or aspen stands; pine forest with brushy or woody cover; river bottoms; hides under logs, stones, or boards or in outbuildings; often uses communal nest sites	Regionally common foraging habitat present. Species reported in local area. Derelict barn on site	<i>no</i>	<i>Moderate to high</i>
Map turtle (<i>Graptemys geographica</i>)	large waterbodies with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges; uses soft soil or clean dry sand for nest sites; may nest at some distance from water; home range size is larger for females (about 70 ha) than males (about 30 ha) and includes hibernation, basking, nesting and feeding areas; aquatic corridors (e.g. stream) are required for movement	No large wetlands or suitable waterbodies present within 200m. Substrates on site are shallow loam over calcareous bedrock. No supportive nesting habitat present.	<i>no</i>	<i>nil</i>
Snapping turtle (<i>Chelydra serpentina</i>)	permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water	No suitable wetlands or waterbodies present within 200m. Substrates on site are shallow loams over calcareous bedrock. No supportive nesting habitat present	<i>no</i>	<i>nil</i>
<i>Mammals</i>				
Eastern Pipistrelle (<i>Pipistrellus subflavus</i>)	open woods near water; roosts in trees, cliff crevices, buildings or caves; hibernates in damp, draft-free, warm caves, mines or rock crevices	Open woods present but not near water; no caves or crevices present	<i>no</i>	<i>nil</i>
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	hibernates in mines or caves; roosts in houses, manmade structures but prefers hollow trees or under loose bark; hunts within forests, below canopy	No caves or crevices present; no open understory or mature forest within 120 m of Project Location with hollow trees	<i>no</i>	<i>nil</i>

Conclusion: Candidate habitat supportive of species of conservation concern (juniper hairstreak and milksnake) is found on or within 120 m of the Project Location and will be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

4.4.4.1 Summary of Habitats for Species of Conservation Concern

Candidate habitats for species of conservation concern found on and within 120 m of the Project Location include:

- *shrub/early successional bird breeding habitat*
- *Special concern and S1-S3 species and communities (juniper hairstreak, milksnake)*

These candidate significant specialized habitats for species of conservation concern will be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

4.4.5 Animal Movement Corridors

Animal movement corridors are defined in the *SWHTG* (MNR, 2000) as elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another. Under the *Ecoregion Criteria Schedules* (MNR, 2009b) for Site Region 6E, movement corridors that should be identified as candidate SWH include *amphibian movement corridors, deer movement corridors, and bat movement corridors*.

Amphibian movement corridors: Amphibian movement corridors provide a linkage between aquatic breeding habitat (includes both wetland and woodlands) (i.e., spring) and terrestrial habitat (i.e. summer and fall). There are no records of amphibian movement corridors reported in the *NHARR* (Hatch Ltd., 2011a) and no habitat or landscape features supportive of significant movements (e.g., valleylands, treed corridors) are found within 120 m of the Project Location. The vegetation community types present are regionally common and extend broadly across the local landscape.

Conclusion: Amphibian movement corridors are not considered to be present within 120 m of the Project Location and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

Deer movement corridors: Deer movement corridors are typically found in (but are not limited to) riparian areas, ravines, steep river valleys and woodlands (MNR, 2000; MNR, 2009), and provide a linkage between summer and winter range and deer yards. There are no confirmed winter deer yards or deer movement corridors reported in the *NHARR* (Hatch Ltd., 2011) based upon a review of MNR records. The woodland community types present within the Project Location extend broadly across the local landscape (i.e., there is no natural corridor occurring within an otherwise restrictive landscape matrix).

Conclusion: Deer movement corridors will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

Bat movement corridors: Suitable bat migration corridors include areas along shorelines of large lakes or areas of high elevation (i.e. escarpment). The Project Location is located >12 km from the Lake Ontario shoreline, there are no records of bat movement corridors reported in the *NHARR* (Hatch Ltd., 2011a) for this site and no habitat features supportive of significant movements (e.g., escarpments, treed corridors). The vegetation community types present are regionally common and extend broadly across the local landscape (i.e., there is no natural corridor occurring within an otherwise restrictive landscape matrix).

Conclusion: Bat movement corridors are not considered to be present and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.5.1 Summary of Animal Movement Corridors

The results of the site investigation determined that there are no candidate significant animal movement corridors within 120 m of the Project Location. This candidate significant wildlife habitat will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

5.0 SUMMARY OF SITE INVESTIGATION RESULTS

5.1 Corrections Required in the Natural Heritage Assessment Records Review Report

Subsection 26 (3) of the REA Regulation requires that the *Natural Heritage Assessment Site Investigation Report* include a summary of any corrections to the *NHARR* (Hatch Ltd., 2011) and the determinations made as a result of conducting the site investigation. Table 5.1 identifies the corrections required (if any) and determinations made for the natural features identified in the *NHARR* and documented during the site investigation.

5.2 Candidate Significant Natural Features

The findings from this report identified the following confirmed and candidate significant natural features. A map showing the locations of these natural features is provided on Figure 4.1.

Candidate Significant Woodlands – There are 3 woodlands on and within 120 m of the Project Location.

Candidate Significant Wildlife Habitat – The following candidate significant wildlife habitat types have been identified within 120 m of the Project Location.

- **Seasonal Concentration Areas** – *raptor wintering area; amphibian breeding habitat*
- **Specialized Habitats for Wildlife** – *woodland raptor nesting habitat*
- **Habitats of Species of Conservation Concern** – These include: *shrub/early successional bird breeding habitat, and special concern and S1-S3 species and communities (juniper hairstreak, milksnake).*

The candidate significant natural features identified above will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

Table 5.1. Summary of Corrections Required to NHARR (Hatch Ltd. 2011).

RECORDS REVIEW			SITE INVESTIGATION				
Natural Feature identified through Records Review	In Project Location?	In 120 metre buffer?	Type	Functions and Attributes	Composition	Distance from Project Location (PL)	Corrections to Records Review?
Woodlands	Yes	Yes	Candidate Significant Woodland	Woodland 1 - Size: 18 ha of 270 ha local woodland - Proximity to significant woodlands - Linkage - Interior woodland (9 ha) - Wildlife habitat	- Red Cedar Cultural Woodland; White Pine- Plantation	10 ha within PL	No
			Candidate Significant Woodland	Woodland 2 - Linkage - Wildlife habitat	- Red Cedar Cultural Woodland	8 ha within PL	No
			Candidate Significant Woodland	Woodland 3 - Size: 2 ha of 17 ha woodland - Linkage - Diversity representation - Wildlife habitat	- Dry-fresh White Pine-Maple- Oak Mixed Forest	Within 120 m adjacent lands	No
Wildlife Habitat	Yes	Yes	Seasonal Concentration Areas	<i>Raptor wintering area</i>	- woodland and shrub thicket communities - interior habitat - 1 indicator species (NOHA)	On and within 120 m of PL	No
				<i>Amphibian breeding habitat</i>	- Small vernal woodland pool - 30-40 chorus frogs present	Within 3 m of PL access road	No
				<i>Snake hibernaculum</i>	- small limestone ridge and rubble present	Within PL	No
			Specialized Habitats for Wildlife	<i>Raptor nesting habitat</i>	- extensive woodlands, meadows and shrub thickets across local region	On and within 120 m of PL	No
			Habitats of Species of Conservation Concern	<i>Shrub/early successional bird breeding habitat</i>	- extensive local shrub thicket communities present >30 ha - indicator species noted	On and within 120 m of PL	No
				<i>Special concern and S1-S3 species and communities (juniper hairstreak, milksnake)</i>	- extensive red cedar woodlands, meadows and shrub thickets across local region	On and within 120 m of PL	No

6.0 NEXT STEPS

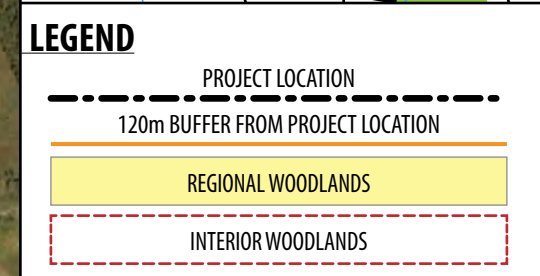
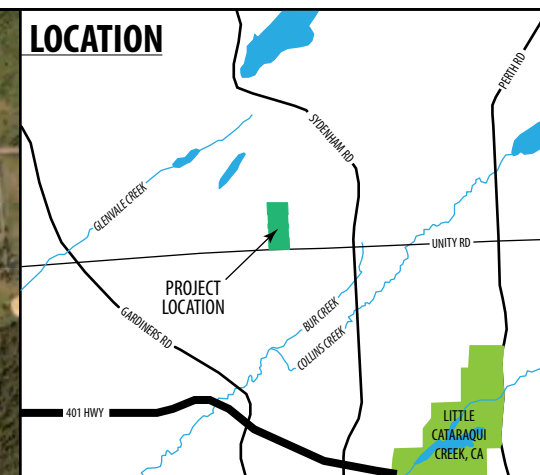
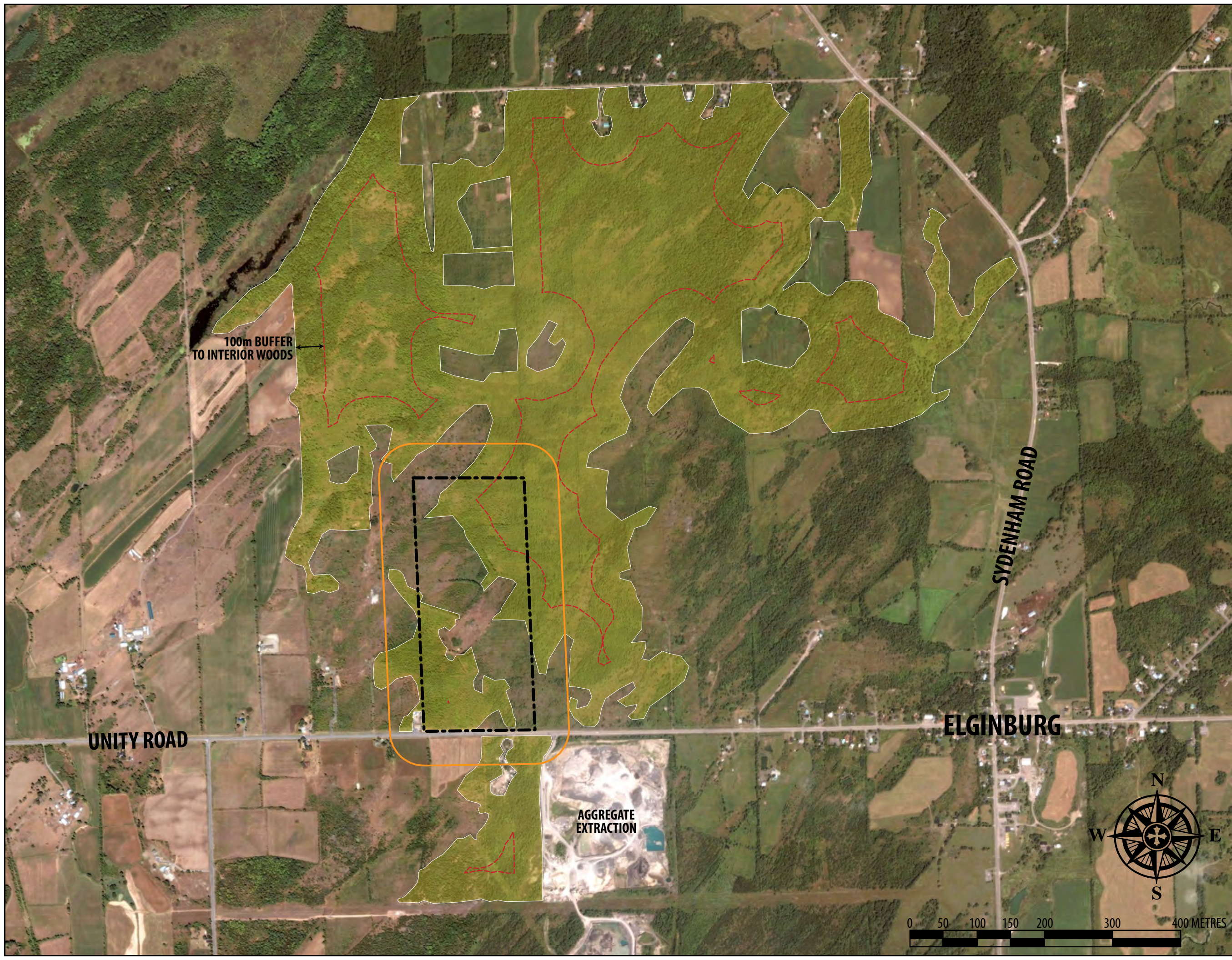
- A *Natural Heritage Assessment Evaluation of Significance Report* will be prepared for the confirmed and candidate significant natural features identified in this report.

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Appendix 1. Local woodland cover in association with Project Location



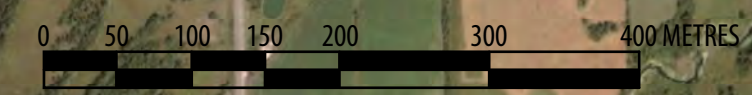
WOODLANDS NORTH OF UNITY ROAD

REGIONAL WOODLAND	= 269.4ha
INTERIOR WOODLAND	= 89.6ha

WOODLAND SOUTH OF UNITY ROAD

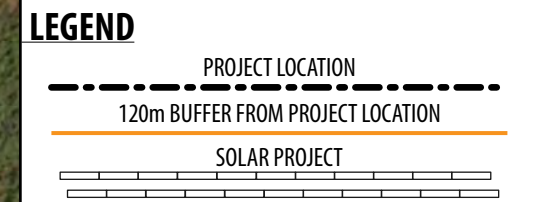
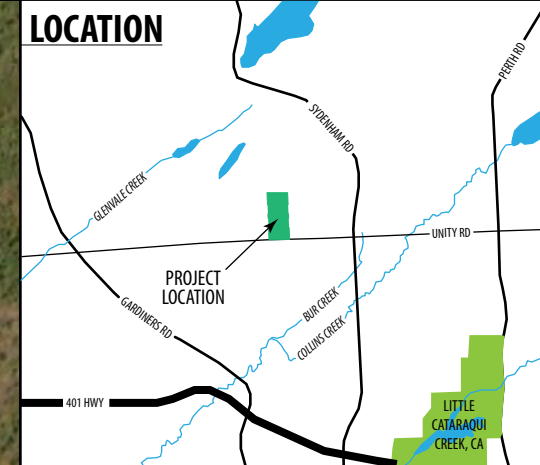
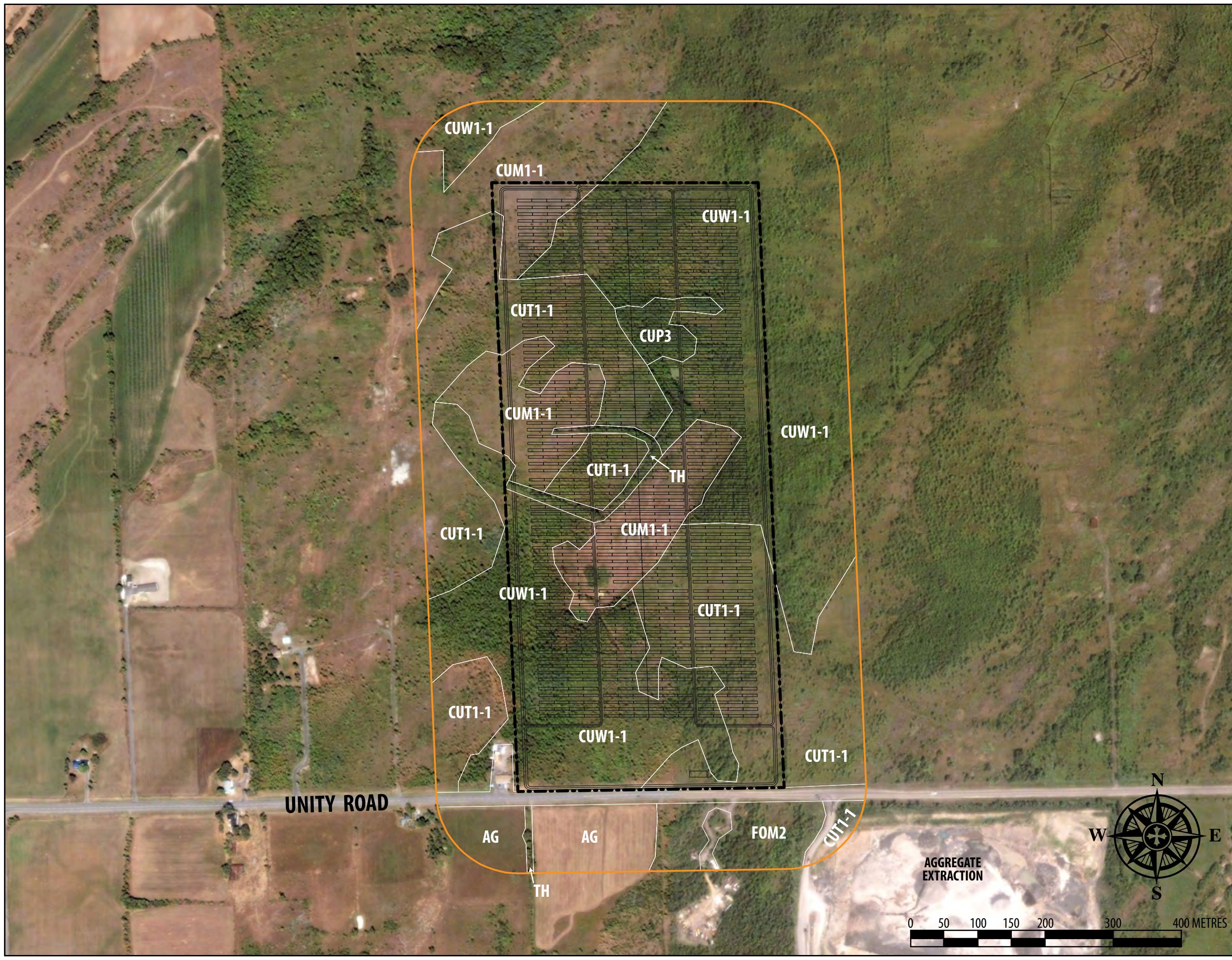
REGIONAL WOODLAND	= 16.8ha
INTERIOR WOODLAND	= 0.8 ha

axiopower



TITLE	KINGSTON GARDINER TS UNITY ROAD PROJECT LOCATION & REGIONAL WOODLAND	
DATE	JUNE 29, 2011	PROJECT No. KP-11-626
FIGURE		

Appendix 2. ELC vegetation communities in relation to Project Location



- ELC VEGETATION COMMUNITIES**
- CUM1-1**
DRY MOIST OLD FIELD MEADOW
 - CUT1-1**
CULTURAL THICKET
 - CUP3**
CONIFER PLANTATION
 - CUW1-1**
RED CEDAR CULTURAL WOODLAND
 - FOM2**
DRY-MOIST WHITE PINE/MAPLE/OAK MIXED FOREST
 - TH**
TREED HEDGEROW
 - AG**
AGRICULTURAL LAND

axiopower



TITLE	KINGSTON GARDINER TS UNITY ROAD ELC VEGETATION COMMUNITIES: PROJECT OVERLAY	
DATE	JUNE 29, 2011	PROJECT No. KP-11-626
FIGURE		

Appendix 3. Field notes from site investigations.

118

Location UNITY RD. Date JUNE 16/10

Project / Client Axiopower.
25C clear. 10:30

ENTER FROM UNITY RD [Photo 1]
 2nd Seab/Elm regem. mixed grass / scrub
 100m² grass ~ 20cm DBH.
 200 grass. Pm, Dusky, NE Ash, Small-leaved
 Sol. juncea, Sol can, Saction, carrot, top down
 21. Siam Goldenrod, Euthamia, Am, Bol. Regem
 - some shallow, dry, Vic. grasses, Fragm
 2 others, Milkweed, Sluggish Elm, Red Clover
 Poor comp. Hirc, Bar, Mt. Ash,
 Tort. Worms, P. Jay, Buckthorn,
 - some exposed littered, Co. Juniper.
 Fr. Ash, Cr. Pine, Timothy
 Fleabane, C. patens, C. boboli, Ar.
 Junco tenuis, Ash, late, stasis,
 Wood Nymph, 1 small Swallowtail,
 C. grandis, Pasture Pace, Agrostis
 - yellow pine, Fox Den, C. grac.
 Avon, Scatter Snake C. scaparia
 Dogflew Pink, C. normalis, C. wild
 [Photo 2] 375219/4908661 open meadow
 NONE LINE OF Young Ash to North
 WIFC SOIL, RED, Phylaxid
 C. flava, → soils hummocky &
 some water patches, Open meadow
 dom. small

119

Location _____ Date _____

Project / Client _____

OLD CASIN & BARN DERELICT.
 Rhus, Y. Rock, 1851
 Co. Rasp. - Full. Red Currant,
 Eltham, Burdock, Douglas,
 Liliac, CHA, Nera, AMGO,
 Man. Maple, Staphyrina, Greenbeard,
 Bromus, Intense, Blueweed, GRCA
 [Photo 3] More overgrown, general
 mixture (30cm DBH) 5/24/10000
 Spirea alba, C. Juniper, Gale off,
 Scirp. cyper. Sc. drav. 185A OVEN
 Note - large grassy slope
 N.S. access trail w/ low ground
 [Photo 4] 5234/1155 Pm plantation ~ 35 DBH
 P. scots. C. nicta
 [Photo 5] 5167/19321 → Back into
 SWAMP scrub → shallow scrub,
 gravel exposed (NOT PLANT)
 Sol. form. Wood saw, Grape
 Pterocarya redm (creeping)
 Coyote, Rhus glabra, Do. Arroun,
 Panicum dichotomum P. philad.
 7506/09463 → older forest Pm N.W.
 Am, O., Bass, ~~stasis~~ (Sawtooth)
 Cb. 60 DBH, Shags. (Photo 6)

Location: Unity Rd Date: Mar 7, 2011
Project / Client: AG10

TIME: APPROX 08:00
WEATHER: Clear, O.C.
→ ON SITE WITH GENIVRE ENGINEER → INVESTIGATE WOODLAND & WOODLAND PATCH WINDERING SURVEY.
→ ran transects of project lands. X2. NORTON - SOUTH
→ no raptors encountered.
→ no evidence of raptor presence.
→ site very open with trees not in leaf. not much cover present.

12 Location: Unity Rd Date: Apr 3, 2011
Project / Client: AG10 Phase 2

weather: clear O.C. no wind
→ WINDSE BLOWE HABITATS ALL SURROUND
→ TRANSECT SOUTH & NORTH UP CENTER.
→ No raptor nests or capture
→ trees escaped about 100m from edge to west
→ 1. Notta foraging over meadow area
→ some localized shading of low-lying areas (3-6 m tall)
→ centre of property near abandoned barn
→ thalassid-dominated roughfield.
→ ~ 0.3 ha in size.

18 Location: Unity Rd Date: Apr 9, 2011
Project / Client: AG10

→ Chorus Frog Survey,
→ No frog or toad location
→ no much standing water
→ few thalassid dominated patches
→ ~ 30-50 chorus frogs calling within frog pond behind house at SW corner on edge of project location (photo taken)

Note: old trees follow fence, rest is young regrowth
1007 - looking south along access
→ showing mature forest
→ 1. Hawthorn, Elm, Apple, Bass, Oak, Poplar, Sycamore, Chestnut, Sycamore
→ CANADA THREATS:
→ Grave of ~~Elm~~ Elm to 4895/9150
→ 1/2 old field, abandoned case, central access road (E)
→ young forest patch E of road.
→ NORTON CATCHMENT
→ two small ponds, Salix dicolor
photo 10 → central access rd. looking from UNITY RD → MIDDLE OF PROPERTY, ELM/ALN PEG
12-20cm DBH.

Appendix 4. Breeding bird survey results.

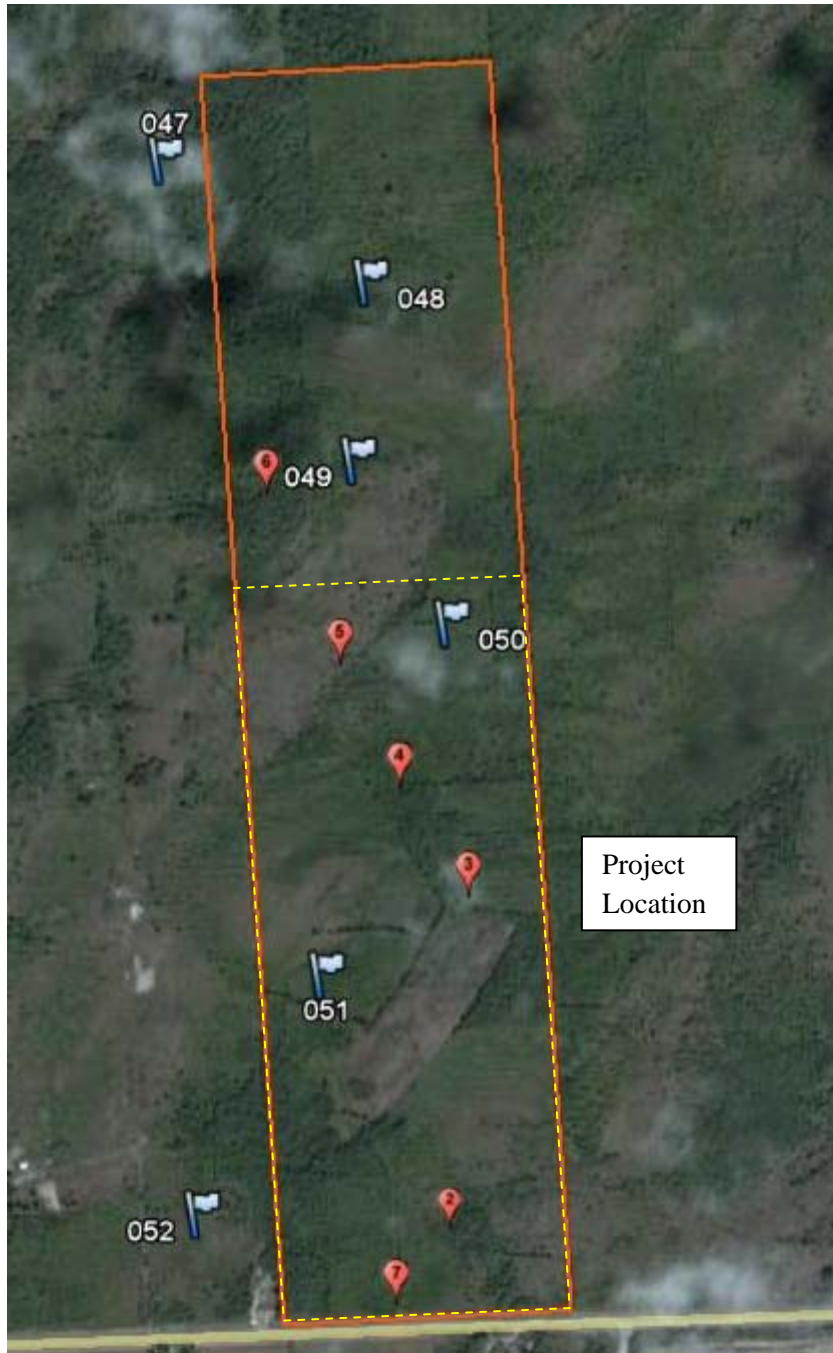
Date: June 11, 2011

Time: 06:04

Weather: sunny, 18C

Name	Station 50		Station 51		Station 52	
	<100	>100	<100	>100	<100	>100
Mallard		1				3
Alder Flycatcher	1					
Willow Flycatcher	1	1				
Great Crested Flycatcher			1			
Gray Catbird	1					
Brown Thrasher	1		1	1		
American Robin	3	1	1	1	1	
Black-capped Chickadee						
Blue Jay	1	1				
Yellow Warbler	2					
Chestnut-sided Warbler					1	
Black-and-white Warbler			1		1	1
Common Yellowthroat			1			
Eastern Towhee	1		3		1	
Chipping Sparrow	2		1		2	
Field Sparrow	1				1	
Song Sparrow	5		3	3	2	2
Brown-headed Cowbird			3		2	
American Goldfinch	2					

Appendix 5. Map of breeding bird point count plots. Image from Google Earth maps. Note: Yellow hatched line = approx. Project location.



Appendix 6. Checklist of wildlife species at the Project Location. (Note: mammals listed based on presumed occurrence only).

Scientific Name	Common Name	SRANK	FAMILY
<i>Anas platyrhynchos</i>	Mallard	S5B	ANATIDAE
<i>Bombycilla cedrorum</i>	Cedar Waxwing	S5B	BOMBYCILLIDAE
<i>Cardinalis cardinalis</i>	Northern Cardinal	S5	CARDINALIDAE
<i>Carduelis tristis</i>	American Goldfinch	S5B	FRINGILLIDAE
<i>Circus cyaneus</i>	Northern Harrier	S4B	ACCIPITRIDAE
<i>Cyanocitta cristata</i>	Blue Jay	S5	CORVIDAE
<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler	S5B	PARULIDAE
<i>Dendroica petechia</i>	Yellow Warbler	S5B	PARULIDAE
<i>Dumetella carolinensis</i>	Gray Catbird	S5B	MIMIDAE
<i>Empidonax alnorum</i>	Alder Flycatcher	S5B	TYRANNIDAE
<i>Empidonax traillii</i>	Willow Flycatcher	S5B	TYRANNIDAE
<i>Geothlypis trichas</i>	Common Yellowthroat	S5B	PARULIDAE
<i>Hylocichla mustelina</i>	Wood Thrush	S5B	TURDIDAE
<i>Melospiza melodia</i>	Song Sparrow	S5B	EMBERIZIDAE
<i>Mniotilta varia</i>	Black-and-white Warbler	S5B	PARULIDAE
<i>Molothrus ater</i>	Brown-headed Cowbird	S5B	ICTERIDAE
<i>Myiarchus crinitus</i>	Great Crested Flycatcher	S5B	TYRANNIDAE
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	S5B	CARDINALIDAE
<i>Pipilo erythrophthalmus</i>	Eastern Towhee	S4B	EMBERIZIDAE
<i>Poecile atricapillus</i>	Black-capped Chickadee	S5	PARIDAE
<i>Seiurus aurocapilla</i>	Ovenbird	S5B	PARULIDAE
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S5B	PICIDAE
<i>Spizella pallida</i>	Clay-colored Sparrow	S4B	EMBERIZIDAE
<i>Spizella passerina</i>	Chipping Sparrow	S5B	EMBERIZIDAE
<i>Spizella pusilla</i>	Field Sparrow	S5B	EMBERIZIDAE
<i>Sturnus vulgaris</i>	European Starling	SNA	STURNIDAE
<i>Toxostoma rufum</i>	Brown Thrasher	S5B	MIMIDAE
<i>Troglodytes aedon</i>	House Wren	S5B	TROGLODYTIDAE
<i>Turdus migratorius</i>	American Robin	S5B	TURDIDAE
<i>Vireo gilvus</i>	Warbling Vireo	S5B	VIREONIDAE
<i>Zenaidura macroura</i>	Mourning Dove	S5B	COLUMBIDAE
<i>Zonotrichia albicollis</i>	White-throated Sparrow	S5B	EMBERIZIDAE
<i>Pseudacris spp.</i>	Chorus Frog	S3?	HYLIDAE
<i>Thamnophis sirtalis sirtalis</i>	Eastern Gartersnake	S5	COLUBRIDAE
<i>Canis latrans</i>	Coyote	S5	CANIDAE
<i>Erethizon dorsatum</i>	Porcupine	S5	ERETHIZONTIDAE
<i>Mephitis mephitis</i>	Striped Skunk	S5	MEPHITIDAE
<i>Microtus pennsylvanicus</i>	Meadow Vole	S5	MURIDAE
<i>Odocoileus virginianus</i>	White-tailed Deer	S5	CERVIDAE
<i>Peromyscus maniculatus</i>	Deer Mouse	S5	MURIDAE
<i>Sciurus carolinensis</i>	Eastern Gray Squirrel	S5	SCIURIDAE
<i>Sylvilagus floridanus</i>	Eastern Cottontail	S5	LEPORIDAE
<i>Tamias striatus</i>	Eastern Chipmunk	S5	SCIURIDAE
<i>Tamiasciurus hudsonicus</i>	Red Squirrel	S5	SCIURIDAE
<i>Vulpes vulpes</i>	Red Fox	S5	CANIDAE

Appendix 7. Checklist of vascular plant species observed at the Project Location.

Scientific Name	Common Name	SRANK	FAMILY
<i>Acer negundo</i>	Box Elder	S5	ACERACEAE
<i>Acer saccharum</i> var. <i>saccharum</i>	Sugar Maple	S5	ACERACEAE
<i>Achillea millefolium</i> var. <i>millefolium</i>	Common Yarrow	SNA	ASTERACEAE
<i>Agrostis perennans</i>	Perennial Bentgrass	S5	POACEAE
<i>Apocynum androsaemifolium</i>	Spreading Dogbane	S5	APOCYNACEAE
<i>Arctium minus</i> ssp. <i>minus</i>	Common Burdock	SNA	ASTERACEAE
<i>Asclepias syriaca</i>	Kansas Milkweed	S5	ASCLEPIADACEAE
<i>Barbarea vulgaris</i>	Yellow Rocket	SNA	BRASSICACEAE
<i>Bromus inermis</i> ssp. <i>inermis</i>	Awnless Brome	SNA	POACEAE
<i>Carex bebbii</i>	Bebb's Sedge	S5	CYPERACEAE
<i>Carex flava</i>	Yellow Sedge	S5	CYPERACEAE
<i>Carex granularis</i>	Meadow Sedge	S5	CYPERACEAE
<i>Carex hirta</i>	A Sedge	SNA	CYPERACEAE
<i>Carex lupulina</i>	Hop Sedge	S5	CYPERACEAE
<i>Carex normalis</i>	A Sedge	S4	CYPERACEAE
<i>Carex pallescens</i>	Pale Sedge	S5	CYPERACEAE
<i>Carex scoparia</i>	Pointed Broom Sedge	S5	CYPERACEAE
<i>Carex vulpinoidea</i>	Fox Sedge	S5	CYPERACEAE
<i>Carya ovata</i>	Shag-bark Hickory	S5	JUGLANDACEAE
<i>Cichorium intybus</i>	Chicory	SNA	ASTERACEAE
<i>Cornus foemina</i>	Stiff Dogwood	S5	CORNACEAE
<i>Cornus sericea</i>	Red-osier Dogwood	S5	CORNACEAE
<i>Cynanchum rossicum</i>	European Swallow-wort	SNA	ASCLEPIADACEAE
<i>Daucus carota</i>	Wild Carrot	SNA	APIACEAE
<i>Dianthus armeria</i>	Deptford-pink	SNA	CARYOPHYLLACEAE
<i>Echium vulgare</i>	Common Viper's-bugloss	SNA	BORAGINACEAE
<i>Erigeron acris</i>		S5	ASTERACEAE
<i>Eurybia macrophylla</i>	Large-leaf Wood-aster	S5	ASTERACEAE
<i>Euthamia graminifolia</i>	Flat-top Fragrant-golden-rod	S5	ASTERACEAE
<i>Festuca rubra</i>	Red Fescue	S5	POACEAE
<i>Fragaria virginiana</i>	Virginia Strawberry	S5	ROSACEAE
<i>Fraxinus americana</i>	White Ash	S5	OLEACEAE
<i>Fraxinus pennsylvanica</i>	Green Ash	S5	OLEACEAE
<i>Galium triflorum</i>	Sweet-scent Bedstraw	S5	RUBIACEAE
<i>Geum laciniatum</i>	Rough Avens	S4	ROSACEAE
<i>Hemerocallis fulva</i>	Orange Daylily	SNA	LILIACEAE
<i>Hieracium aurantiacum</i>	Orange Hawkweed	SNA	ASTERACEAE
<i>Hieracium praealtum</i>	King Devil	SNA	ASTERACEAE
<i>Iris pseudacorus</i>	Yellow Iris	SNA	IRIDACEAE
<i>Juncus tenuis</i>	Path Rush	S5	JUNCACEAE
<i>Juniperus communis</i>	Ground Juniper	S5	CUPRESSACEAE
<i>Juniperus virginiana</i>	Eastern Red Cedar	S5	CUPRESSACEAE
<i>Leucanthemum vulgare</i>	Oxeye Daisy	SNA	ASTERACEAE
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	SNA	CAPRIFOLIACEAE
<i>Lycopus americanus</i>	American Bugleweed	S5	LAMIACEAE
<i>Malus pumila</i>	Common Apple	SNA	ROSACEAE
<i>Melilotus albus</i>	White Sweet Clover	SNA	FABACEAE
<i>Melilotus altissimus</i>	Tall Yellow Sweetclover	SNA	FABACEAE
<i>Minuartia michauxii</i>	Michaux's Stitchwort	S5	CARYOPHYLLACEAE
<i>Packera paupercula</i>	Balsam Ragweed	S5	ASTERACEAE
<i>Panicum dichotomiflorum</i>	Spreading Panicgrass	SNA	POACEAE

<i>Phalaris arundinacea</i>	Reed Canary Grass	S5	POACEAE
<i>Phleum pratense</i>	Meadow Timothy	SNA	POACEAE
<i>Pinus strobus</i>	Eastern White Pine	S5	PINACEAE
<i>Pinus sylvestris</i>	Scotch Pine	SNA	PINACEAE
<i>Poa compressa</i>	Canada Bluegrass	SNA	POACEAE
<i>Poa palustris</i>	Fowl Bluegrass	S5	POACEAE
<i>Poa pratensis ssp. pratensis</i>		S5	POACEAE
<i>Potentilla recta</i>	Sulphur Cinquefoil	SNA	ROSACEAE
<i>Prunella vulgaris ssp. lanceolata</i>	Self-heal	S5	LAMIACEAE
<i>Prunus serotina</i>	Wild Black Cherry	S5	ROSACEAE
<i>Prunus virginiana</i>	Choke Cherry	S5	ROSACEAE
<i>Quercus alba</i>	White Oak	S5	FAGACEAE
<i>Quercus rubra</i>	Northern Red Oak	S5	FAGACEAE
<i>Ranunculus acris</i>	Tall Butter-cup	SNA	RANUNCULACEAE
<i>Rhamnus cathartica</i>	Buckthorn	SNA	RHAMNACEAE
<i>Rheum rhabarbarum</i>	Rubarb	SNA	POLYGONACEAE
<i>Rhus glabra</i>	Smooth Sumac	S5	ANACARDIACEAE
<i>Rhus typhina</i>	Staghorn Sumac	S5	ANACARDIACEAE
<i>Ribes rubrum</i>	Northern Red Currant	SNA	GROSSULARIACEAE
<i>Rosa blanda</i>	Smooth Rose	S5	ROSACEAE
<i>Rubus idaeus ssp. strigosus</i>		S5	ROSACEAE
<i>Sambucus racemosa</i>	European Red Elder	S5	CAPRIFOLIACEAE
<i>Scirpus atrovirens</i>	Dark-green Bulrush	S5	CYPERACEAE
<i>Scirpus cyperinus</i>	Cottongrass Bulrush	S5	CYPERACEAE
<i>Scrophularia lanceolata</i>	Hare Figwort	S4	SCROPHULARIACEAE
<i>Solidago caesia</i>	Bluestem Goldenrod	S5	ASTERACEAE
<i>Solidago canadensis var. canadensis</i>		S5	ASTERACEAE
<i>Solidago juncea</i>	Early Goldenrod	S5	ASTERACEAE
<i>Solidago ptarmicoides</i>	Prairie Goldenrod	S5	ASTERACEAE
<i>Spiraea alba</i>	Narrow-leaved Meadow-sweet	S5	ROSACEAE
<i>Symphotrichum cordifolium</i>	Heart-leaf Aster	S5	ASTERACEAE
<i>Symphotrichum lanceolatum ssp. lanceolatum</i>	Panicked Aster	S5	ASTERACEAE
<i>Symphotrichum lateriflorum var. lateriflorum</i>	Small White Aster	S5	ASTERACEAE
<i>Symphotrichum novae-angliae</i>	New England Aster	S5	ASTERACEAE
<i>Syringa vulgaris</i>	Common Lilac	SNA	OLEACEAE
<i>Taraxacum officinale</i>	Brown-seed Dandelion	SNA	ASTERACEAE
<i>Tilia americana</i>	American Basswood	S5	TILIACEAE
<i>Toxicodendron radicans ssp. negundo</i>	Poison Ivy	S5	ANACARDIACEAE
<i>Tragopogon dubius</i>	Meadow Goat's-beard	SNA	ASTERACEAE
<i>Trifolium campestre</i>	Low Hop Clover	SNA	FABACEAE
<i>Trifolium hybridum</i>	Alsike Clover	SNA	FABACEAE
<i>Trifolium pratense</i>	Red Clover	SNA	FABACEAE
<i>Trifolium repens</i>	White Clover	SNA	FABACEAE
<i>Ulmus americana</i>	American Elm	S5	ULMACEAE
<i>Ulmus rubra</i>	Slippery Elm	S5	ULMACEAE
<i>Verbascum thapsus</i>	Great Mullein	SNA	SCROPHULARIACEAE
<i>Veronica americana</i>	American Speedwell	S5	SCROPHULARIACEAE
<i>Viburnum lentago</i>	Nannyberry	S5	CAPRIFOLIACEAE
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	S5	CAPRIFOLIACEAE
<i>Vicia cracca</i>	Tufted Vetch	SNA	FABACEAE
<i>Vitis riparia</i>	Riverbank Grape	S5	VITACEAE
<i>Zanthoxylum americanum</i>	Northern Prickley Ash	S5	RUTACEAE

Appendix 8. Tree inventory of the Unity Road Project Location .

**Axio Power, Unity Road
Tree Assessment Report**

Tree Bylaw for the City of Kingston, 2007-140

Prepared for: Axio Power Canada Inc.

Prepared by: David Smallwood

March 18, 2011

Report prepared for

Robert Barkley
Manager Project Development, Axio Power Canada Inc.
945 Princess Street, Suite 252
Kingston, ON, K7L 3N6
Tel 613-545-0215



Report prepared by

David Smallwood
321 Deshane Rd. RR2
Marlbank ON K0K 2L0
Tel 613-478-2888
Ontario Professional Foresters Association # 1988
Provincial Tree Marker Certification # TM-00333-L1

This report has been prepared to satisfy the requirements of the Tree Bylaw for the City of Kingston, 2007-140.

Location of intended tree removal

Unity Rd Part Lot12, Concession 6, Kingston, Frontenac County
(maps attached)

Background and methodology

It is the intent of Axio Power to remove all of the trees on a 35-hectare portion of their 66-hectare property (see attached maps) in order to establish a 10-MW solar photovoltaic project.

Strip cruise lines were established on that portion of the property described as the project location with a 3% sampling intensity as the goal.

Information on tree species, diameter at breast height (Dbh), tree health/quality and stand history was collected.

Extrapolations of data collected were based on area determinations from the draft natural heritage assessment and measurements taken on the ground during the cruise.

It was determined that two distinct stands are present for a total of 20 hectares of "forested" land while the remainder of the project location consisted of abandoned pasture with scattered trees less than 10cm Dbh. Neither one of these stands contains merchantable material from a forestry point of view.

No "distinctive trees" as outlined in the bylaw were encountered.

Stand 1 White pine plantation, 2 hectares
1320 stems per hectare (all species)

Stand history

This is a mix of planted and naturally established white pine occurring on abandoned agricultural land.

Species	% Composition	Average Dbh cm (range cm)	Comments
Pw	83.3	12.1 (10-26)	Relatively good heath (80% AGS*), signs of past weeviling present, dominant height 13m
Ag	15.6	14 (10-22)	Larger stems (20cm+) showing signs of decline (20% AGS) relatively short lived (<100yr) tree
Ew	1.1	12 (10-16)	> 80% UGS**, Dutch elm disease present

*AGS-acceptable growing stock, trees that may be suitable for retention and not expected to decline in the next 20 years

**UGS-unacceptable growing stock, trees that have a high risk of dying or are expected to decline over the next 20 years

Stand 2 Red cedar, 18 hectares
632 stems per hectare (all species)

Stand history

This is abandoned agricultural land in an early stage of natural forest succession.

Species	% Composition	Average Dbh (cm) (range cm)	Comments
Cer	34.5	9.8 (<10-22)	No health concerns
Ce	25	8.7 (<10-18)	No health concerns
Ag	23.2	11.2 (10-22)	Larger stems (20cm+) showing signs of decline relatively short lived (<100yr) tree
Ew	10.2	13.5 (<10-20)	> 80% UGS, Dutch elm disease present
Pw	7.1	20 (16-20)	Relatively good heath, signs of past weeviling present

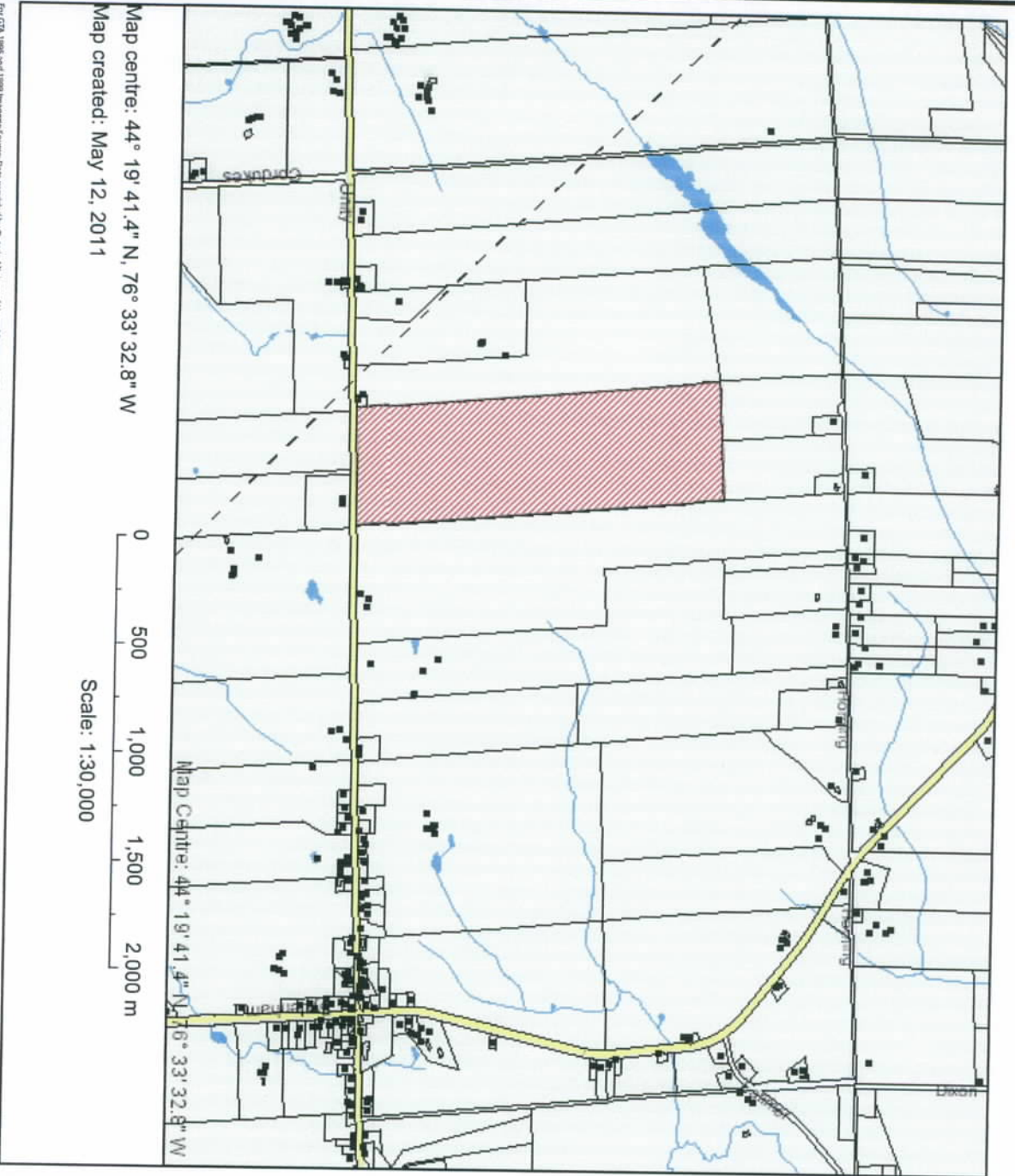
Species Code	Common name	Genus	Species
Ag	Green (Red) Ash	Fraxinus	pennsylvanica
Ce	White Cedar	Thuja	occidentalis
Cer	Eastern Red Cedar	Juniperus	virginiana
Ew	White Elm	Ulmus	americana
Pw	White Pine	Pinus	strobus

Recommendations

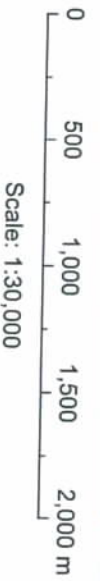
In order to achieve the stated long term goal of the Tree Bylaw for the City of Kingston, 2007-140 "to at least maintain, if not increase, the amount of tree coverage in the City", the following suggestions are made;

1. Assess those portions of the property (Part Lot12, Concession 6, Kingston, Frontenac County) that will not be affected by the project to determine suitability for tree planting. If a portion of the property can be planted with a reasonable expectation of seedling survival, it is suggested that planting commence in the spring of 2012. The tree planting prescription would be prepared after the frost is out of the ground in the spring of 2011 and submitted to the City of Kingston for approval. The long term (60-90 years) goal of establishing the plantation will be to return the site to a mixed forest similar to what is described as a pre-European settlement type forest.
2. If a suitable site cannot be located on the property then the local Planting Delivery Agencies for Trees Ontario (Cataragui Region Conservation or Frontenac Stewardship Council) shall be contacted and funding offered for tree planting projects within the municipality for an agreed upon number of seedlings.
3. A third option could be providing local schools with an agreed upon number of seedlings for students to plant at their own homes or for schoolyard naturalization projects.
4. In addition, a visual buffer of wildlife shrubs (species to be determined) will be established along the Unity Road boundary of the project.

Pt L 12C6 Kingston Key Map



Map centre: 44° 19' 41.4" N, 76° 33' 32.8" W
 Map created: May 12, 2011



Map Centre: 44° 19' 41.4" N, 76° 33' 32.8" W

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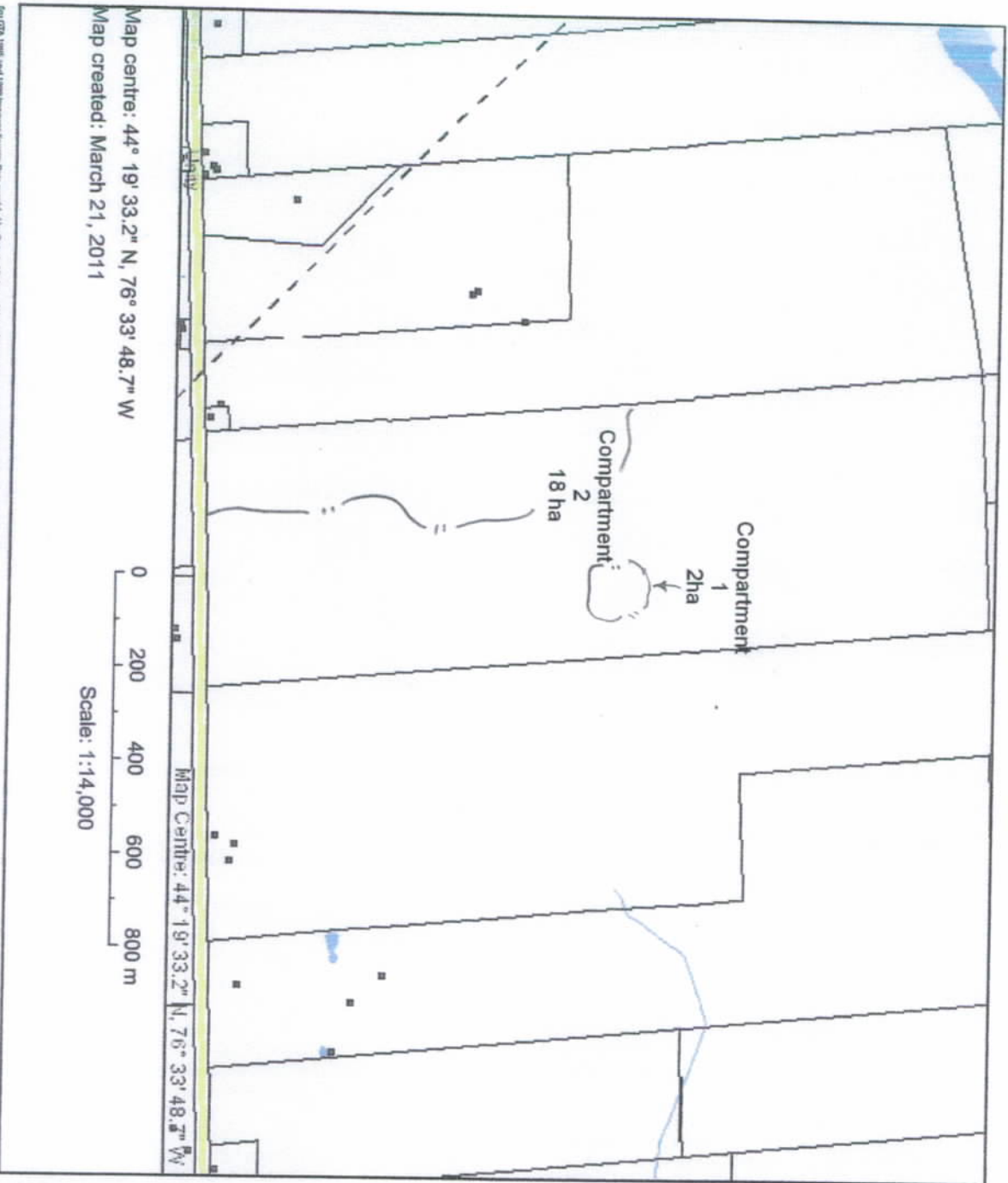
Legend

Buildings to Scale	
Buildings	
Transmission Lines and Pipelines	
Assessment Parcels	
Freeways	
Highways	
Arterial Roads	
Collector Roads	
Local Roads	
Rivers and Streams	
Lakes and Ponds	
Province	

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Axio Power PTL12 C6 Kingston



Map centre: 44° 19' 33.2" N, 76° 33' 48.7" W
 Map created: March 21, 2011

Scale: 1:14,000

Map Centre: 44° 19' 33.2" N, 76° 33' 48.7" W

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Legend

- Buildings to Scale
- Buildings
- Transmission Lines and Pipelines
- Assessment Parcels
- Freeways
- Highways
- Arterial Roads
- Collector Roads
- Local Roads
- Rivers and Streams 20K
- Lakes and Ponds 20K
- Province
- Compartment

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