Natural Heritage Assessment

Environmental Impact Study

Report

SunEdison Bruining

Solar Energy Project

FIT Contract Number: FIT-FH7CNFM

prepared for

Genivar & SunEdision

ECOLOGICAL SERVICES

Report Author Signature **Date**

June 13, 2012

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1.0 INTRODUCTION

SunEdison, LLC (SunEdison) is proposing to develop a 10 megawatt (MW) solar photovoltaic project titled SunEdison Bruining Solar Energy Project. This project has received a 20-year Feed-in Tariff contract from the Ontario Power Authority (FIT Reference Number: FIT-FH7CNFM). The Project Location[1] encompasses 53 hectares (ha) and is situated on Part of Lots 26, 27 and 28, Concession 2 located in Osnabruck (South Stormont) Township, Stormont County, Ontario. The Project Location is within Kemptville Ecodistrict 6E-12.

Additional information regarding the project, including the draft project description report, is available on the study website at www.sunedison.ca/Bruining.

As stated in sections 37 and 38 of Ontario Regulation (O. Reg.) 359/09 *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the "REA Regulation"), an environmental impact study is required for all significant natural heritage features determined to be within a specified distance of the Project Location. The Project Location refers to all areas that are associated with the operation of the solar project. The environmental impact study identifies the potential negative environmental effects of all project phases on identified significant natural features, proposes mitigation measures to prevent/minimize adverse effects, and describes the environmental effects monitoring plan.

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), came into force on September 24, 2009 and identifies the Renewable Energy Approval (REA) requirements for renewable energy generation facilities in Ontario. The REA Regulation has since been amended by O. Reg. 521/10, which came in effect as of January 1, 2011.

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.

The REA process requires the preparation of several reports with respect to natural heritage features on and adjacent to the Project Location, including the natural heritage records review report (*NHARR*), natural heritage site investigation report (*SI*), natural heritage evaluation of significance report (*EOS*), and if necessary, an environmental impact study (*EIS*). The legislative requirements for these reports are summarized in the following sections.

1.1.1 Natural Heritage Records Review

The REA Regulation require the proponent to provide a summary of records searched and to identify whether the Project Location is on or within certain natural heritage features such as a provincial park, conservation reserve, wetland, woodland, valleyland, wildlife habitat, life science or earth science ANSI, savannah, prairie, or alvar. The *NHARR (Genivar 2012)* was prepared to meet these requirements.

1.1.2 Natural Heritage Site Investigation Report

The REA Regulation requires proponents of Class 3 solar projects to undertake a natural heritage site

investigation for the purpose of determining:

a) whether the analysis summarized in the *NHARR (Genivar 2012)* are correct or require correction, and identifying any required corrections

b) whether natural features exist other than those identified in the *NHARR (Genivar 2012)*

c) the boundaries of any natural feature identified in the *NHARR* (Genivar 2011) or the *SI* (Ecological Services 2011) within 120 m of the Project Location, and

d) the distance from the Project Location to the boundaries.

The *SI* (Ecological Services, 2011) was prepared to meet these requirements.

1.1.3 Natural Heritage Evaluation of Significance Report

The REA Regulation require proponents of Class 3 solar projects to prepare an *EOS* for natural features identified during the *NHARR (Genivar 2012)* and *SI* (Ecological Services, 2012) that sets out:

a) a determination of whether the natural feature is provincially significant (wetlands and all other natural features).
b) a summary of the evaluation criteria used to make the determinations.
c) the name and qualifications of any person who applied the evaluation criteria.

The *EOS* (Ecological Services 2012b) was prepared to meet these requirements.

1.1.4 Environmental Impact Study Report

The REA Regulation prohibit the construction, installation or expansion of any component of a solar Project is:

a) within 120 m of a provincially significant southern wetland
b) on or within 50 m of a provincially significant earth science ANSI
c) on or within 120 m of a provincially significant life science ANSI
d) within a significant valleyland or within 120 m of a significant valleyland
e) within a significant woodland or within 120 m of a significant woodland
f) within a significant wildlife habitat or within 120 m of a significant wildlife habitat
g) within 120 m of a provincial park or conservation reserve

However, pursuant to subsection 38 (2) of the regulations, construction within the locations noted above may be permitted, subject to the completion of an *EIS* to assess negative effects and evaluate appropriate mitigation and monitoring measures. The *EIS* must:

a) identify and assess any negative environmental effects of the Project on a natural feature, provincial park or conservation reserve referred to in subsection 38 (1)
b) identify mitigation measures in respect of any negative environmental effects
c) describe how the environmental effects monitoring plan in the design and operations report (Genivar 2011c) addresses any negative environmental effects
d) describe how the Construction Plan Report (Genivar 2011b) addresses any negative environmental effects.

This ***EIS*** has been prepared to address these requirements for construction in and within 120 m of the significant natural features identified in Section 2.1.

2.1 Background Information on Natural Heritage Features

The following natural heritage features were identified on or within 120 m of the Project Location during the ***SI*** (Ecological Services 2011), and evaluated as significant in the ***EOS*** (Ecological Services 2011b).

Significant Wetlands – Portions of two provincially significant wetlands occur within 120 m of the Project Location (Figure 2.1).

- ***Ingleside Swamp PSW*** **-** 10.2 ha of shrub swamp occurs to the north of the Project Location (15 m at closest approach).
- ***UCMBS PSW*** **-** 0.7 ha of shrub swamp occurs to south of the Project Location (100 m at closest approach) and is separated from the site by Anderson Road and County Rd #2.

Significant Wildlife Habitat – the following features located on and within 120m of the Project Location are considered Significant Wildlife Habitat.

- ***Amphibian breeding habitat (woodland)*** occurs on the Project Location within a 2.6 ha area of open woodland identified as ELC polygon W2 (Figure 2.2).
- ***Shrub/early Successional Bird Breeding Habitat***: a contiguous 47 ha fresh-moist mixed thicket community (ELC polygon code T1) on and within 120 m of the Project Location was identified as a habitat area for shrub/early successional bird breeding and was treated as significant (Figure 2.3). *Note*: *two remaining pre-construction breeding bird surveys are planned for June 2012 to validate this designation.*

Section 1 of this report has identified the legislative requirements for an *EIS* under the REA Regulation and identified the reasons why an *EIS* is required for the Project. Section 2 provides the methodology of the *EIS*. Section 3 summarizes the activities associated with Project construction, operation and decommissioning, as described in the Project Description Report (Genivar 2010e). Section 4 identifies and assesses negative environmental effects on the identified significant natural features and the proposed mitigation measures to prevent/minimize the potential effects. Section 5 describes the environmental effects monitoring plan from the Design and Operations Report (Genivar 2010c). Section 6 describes how the Construction Plan Report (Genivar 2010b) addresses the potential negative environmental effects. Section 7 summarizes the results of the *EIS*. References are included in Section 8.

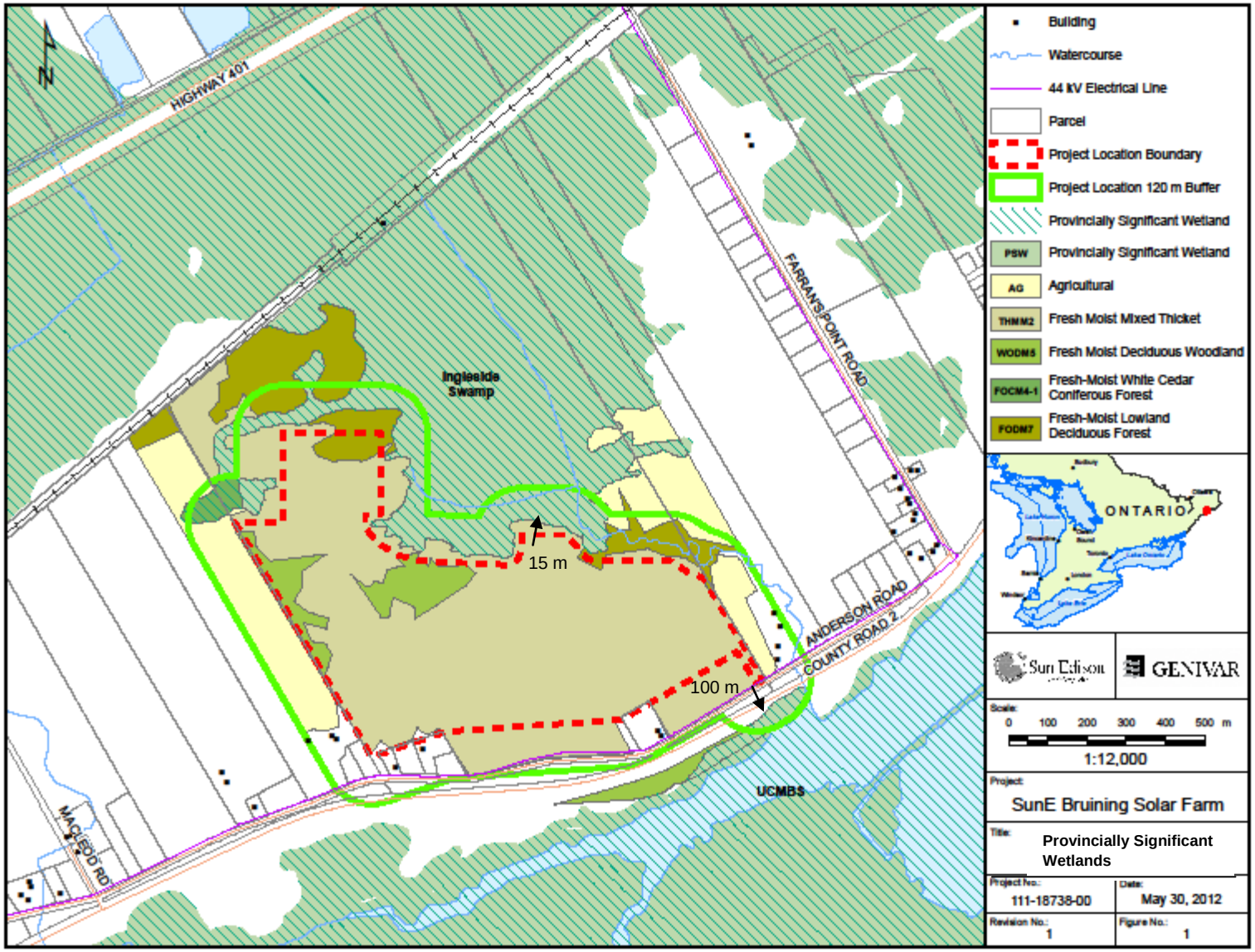

Figure 2.1 Ingleside Swamp PSW and UCMBS PSW within 120 m of Project Location

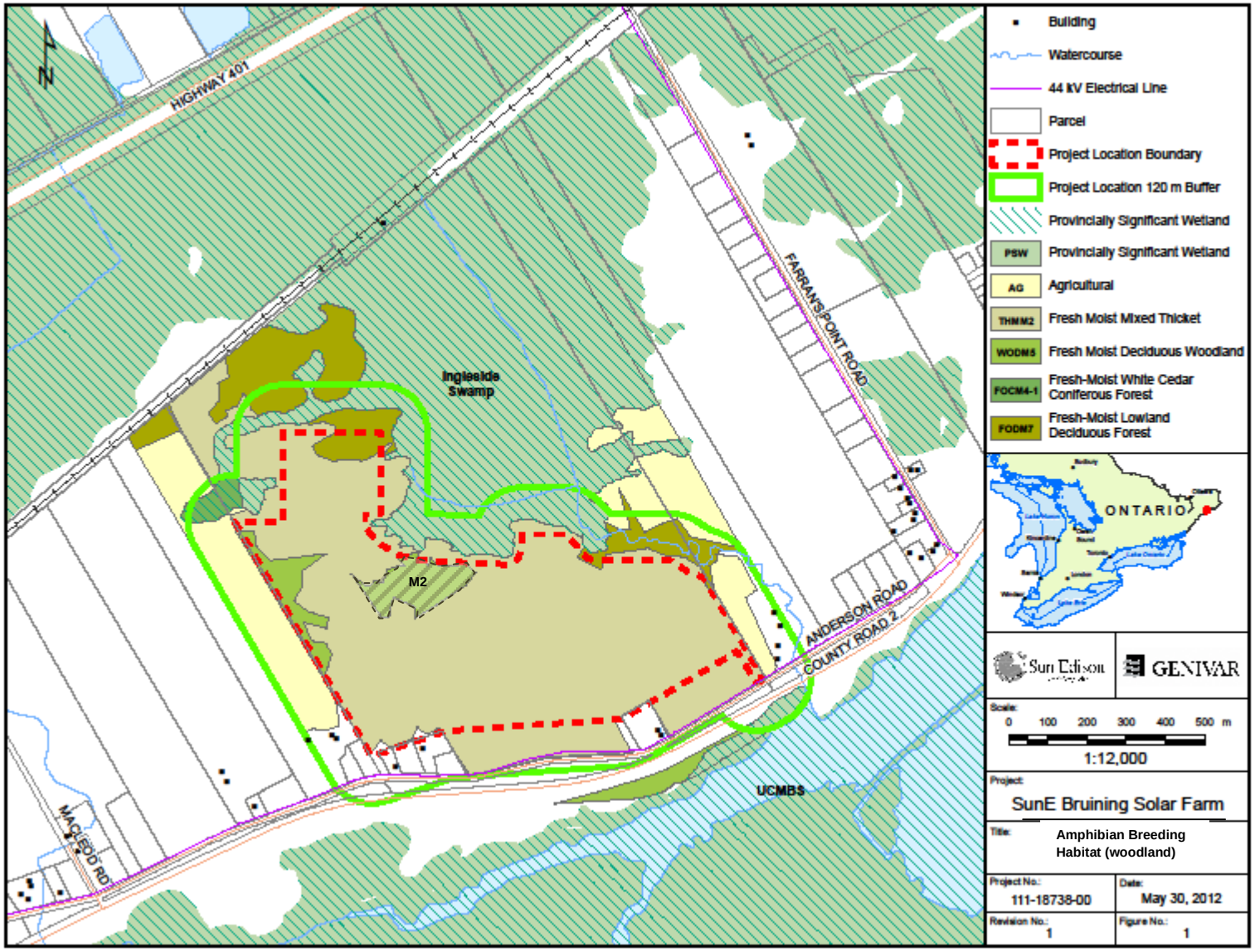

Figure 2.2. Amphibian breeding habitat (woodland) within ELC polygons M2 and SI, on and within 120 m of the Project Location.

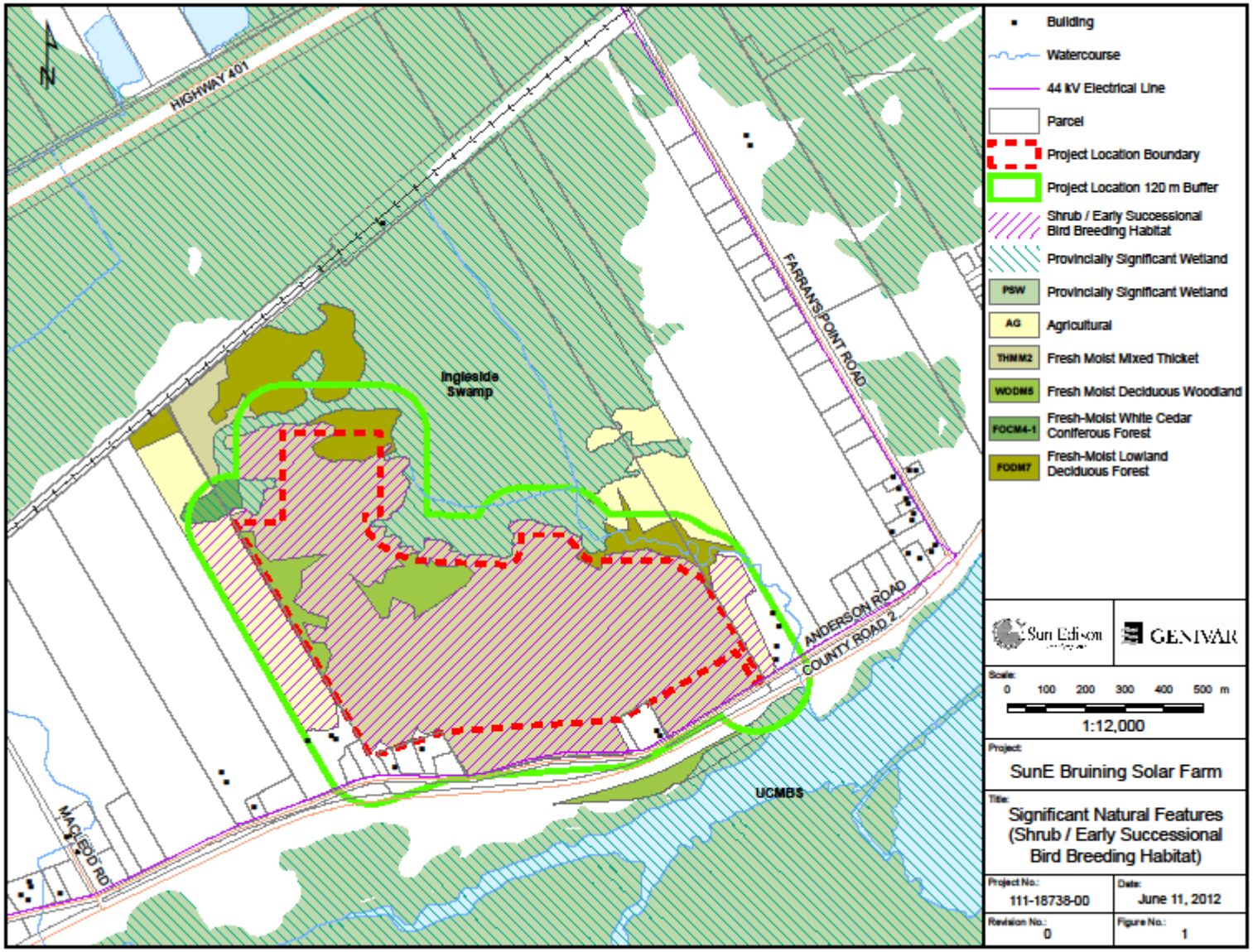

Figure 2.3 Shrub/early successional bird breeding habitat on and within 120 m of Project Location.

2.0 METHODOLOGY

The following steps outline the methodology that was used to prepare this *EIS*:

1. Documentation of Project components and activities during all Project phases, including construction, operations and decommissioning, including identification of temporal and spatial boundaries.

2. Background data collection on the natural features on and within 120 m of the Project location through the Records Review and Site Investigation processes.

3. Identification of the effects likely to occur to identified environmental components as result of implementing, operating and decommissioning of the project.

4. Development of mitigation measures to eliminate, alleviate or avoid the identified negative effects.

5. Design of an environmental effects monitoring program to confirm the predicted effects and the effectiveness of mitigation measures.

3.0 CONSTRUCTION PHASE

SunEdison is proposing a single Class 3 Solar Facility with a nameplate capacity of 10 MW (AC) near Ingleside, Ontario. If approved, this facility will convert solar energy into electricity to be fed into the Hydro One distribution grid. The defined project location is presented in Figure 3.0. The major components of the projects are as follows:

- Approximately 40,000 x MEMC solar modules (260 to 300-watt generation capacity)
- Approximately 320 disconnect combiners
- 44 kV Substation including pole-top motor-operated disconnect; 44kV switchgear; 10 MVA oil filled pad-mount transformer; interrupter switches, communication equipment, etc.
- Approximately 20 x 500-kW inverters and 10 corresponding 1000 kVA transformers
- Internal access driveways
- Temporary staging areas for the installation of the solar panels
- A 30-m tall communications tower (if required by Hydro One)
- The location of the equipment has not yet been confirmed but will be limited to the defined project area.

The CPR report will detail the construction activities, the duration of these activities, any potential environmental effects that could result from these activities and proposed mitigation measures to be applied to the potential environmental effects.

3.1 Construction Details

The work will meet or exceed all relevant regulations and standards (such as the Ontario Electrical Safety Code, Ontario Building Code, etc.).

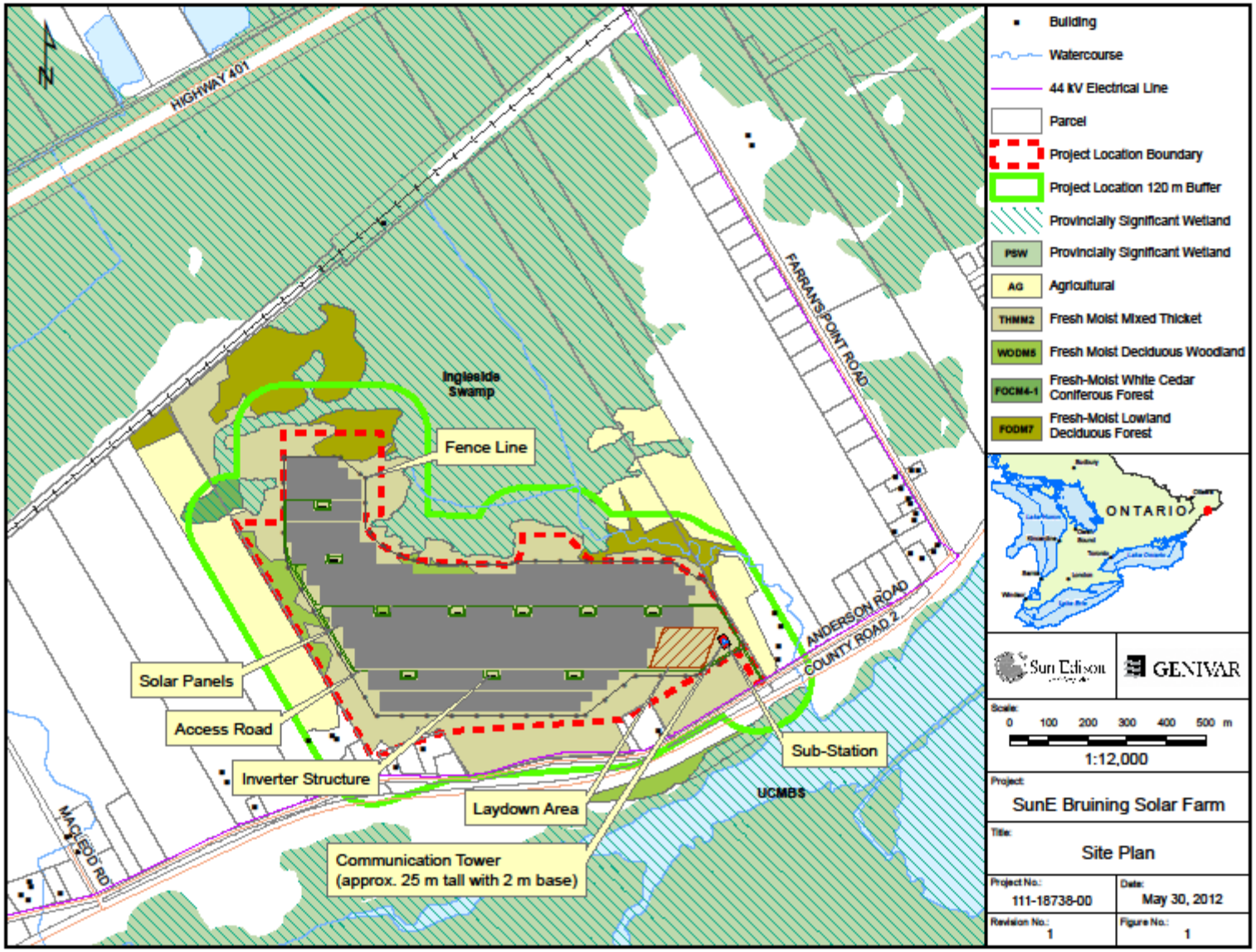

Figure 3.0 Bruining Project Location site plan

3.1.1. Roads and Land Clearing

Municipal and provincial roads will be used for transportation to the construction sites, and no permanent paved roads will be constructed for the solar farm. Minor modifications might be required to some existing roads (for example, widen the turning radius) for equipment transportation. Any road damage will be repaired in consultation with the applicable road authority.

On-site access to the array will require new driveways, and following completion of the construction phase, the driveways will be used for maintenance activities for the duration of the facility's operation.

The construction of the driveways typically requires excavation of the top soil layer and adding a layer of compacted material to a typical thickness of 300 mm (depending upon site specific geotechnical conditions). Clean granular material (typically "A" or "B" gravel) will be brought to the site on an as-needed basis and will not be stockpiled onsite. The topsoil will be kept and re-used on site. Culverts may be required to maintain site drainage in order to support the construction equipment and delivery trucks. If required, culvert installation details and erosion-control measures will be determined in conjunction with the Raisin River Conservation Authority as a part of their permitting process.

The construction equipment used will include trucks, graders, and bulldozers. The trucks and graders will be driven to the site and the bulldozers will be brought on trailers. All will be temporarily stored in the temporary laydown area. The construction will emit minimal noise and dust, and no chemicals other than fuel will be used. Road dust will be controlled with water, as necessary.

The work will preferentially be completed after mid-July to take advantage of typically drier weather.

3.1.2 Construction Laydown Areas

A 2.5 ha laydown area to the southeast will be used to store materials during construction. The topsoil at the laydown area will be removed and approximately 600 mm of clean compacted crushed gravel will be used as needed.

Construction equipment will include cars, trucks, graders, and bulldozers. Cars, trucks and graders will be driven to the site and the bulldozers will be brought on trailers. The construction will emit minor amounts of noise and dust, and no chemicals other than fuel will be used. This will preferentially be completed immediately following land clearing activities. Some top soil will be stripped; however this will be disposed of or re-used on site.

After the construction completion, the gravel will be removed, or re-used by the landowner, the topsoil will be replaced from the stockpile, and the site re-seeded. It is anticipated that the majority of the laydown area will be restored after approximately 8 months. A small portion might remain as a parking site for maintenance vehicles over the 20-year life of the solar farm.

3.1.3 Site Preparation and Inverter Pad Construction

The construction area will be cleared, grubbed and fenced. The topsoil is typically removed and some material may be added depending upon site specific geotechnical conditions. The site will be surrounded by a chain-link fence approximately 2 m tall for site security. Fence post holes will be augured and the fence posts placed into concrete and allowed to set. Once the posts have set, the metal chain link fence

will then be secured. The fencing used will allow the free passage of small animals but prevent access to large animals and humans.

Inverter pads will be constructed at the same time as the internal driveways and will typically be 14 m x 5 m in size. The topsoil at the inverter pad will be removed and approximately 600 mm of clean compacted crushed gravel will be imported on an as-needed basis. The pads will be constructed of poured concrete reinforced with rebar. The excavated topsoil will be re-used on site as feasible.

Granular material will be brought on site to maintain a stable base, as well as cement mix for the concrete, rebar steel, metal posts and fencing.

Construction equipment will include (at a minimum) cars, trucks, graders, and bulldozers. The cars, trucks and graders will be driven to the site and the bulldozers will be brought via trailers. The construction will emit minor amounts of noise and dust. No chemicals other than fuel will be used.

This will preferentially be completed immediately following land clearing activities. Some top soil will be stripped; however this will be disposed of or re-used on site.

After the construction of the project is completed, the gravel will be removed, or re-used by the landowner, and the topsoil will be replaced from the stockpile. It is anticipated that the majority of the construction laydown area will be restored after approximately 8 months.

3.1.4 Delivery of Equipment

Equipment will be delivered by truck and trailer as needed throughout the construction phase and stored at the temporary construction laydown area. Deliveries will typically occur during normal construction hours, typically 8 am to 5 pm and may include weekends.

3.1.5 Installation of Racking System

The Solar Array racking system will consist of a single-axis tracker rack system with the solar modules affixed to a supportive metal rack. The rack/array is then connected to the ground via piles, and the piles will be buried. Variations on the rack connections to the ground are dependent on the mount type (fixed/tracking) and the geotechnical conditions.

The general procedure for rack installation varies slightly depending on geotechnical conditions as outlined above, but essentially uses a vibratory system, with no pre-excavation requirements. However, if subsurface conditions are less favourable, subsurface pile work may include borehole pre-drilling, rock grouting and/or cement casting. Once the piles are secured in the ground, the excavated soil will be re-filled and steps 2 and 3 above are completed. Soil directly beneath the future racking/surrounding piles is compacted and covered with crushed engineered fill (and further compacted/settled); and racking, hardware and module assembly are built over top the piles.

Materials Brought On Site: Steel for rebar, piles, racking and potentially concrete, if necessary.

Construction Equipment Used:

- Excavator for removing material;
- Pile vibration or drill rig

- Flatbed trucks (4-6) for delivery;
- Concrete trucks for delivery of concrete (if necessary)
- Construction trucks (3-4 vehicles with multiple visits); and
- Dozer, loader and trucks to backfill and compact foundation and remove surplus excavated materials

Trucks will be driven to the site and the vibration/drill rig, bulldozers and excavator will be brought via trailers. The construction will emit minor amounts of noise and dust. No chemicals other than fuel will be used. Installation will preferentially be completed as soon as the land area has been graded and access roads are present. If necessary, this can be completed in early spring, depending on the amount of rainfall. Any excavated subsoil will be removed from the site and disposed of in an appropriate manner.

3.1.6 Solar Panel Assembly and Installation

This portion of the work is labour intensive and requires significant manual assembly. An array row typically holds up to 100 modules, and a 10-MW solar farm can have as many as 400 array rows. With the exception of light crane trucks and flatbed trailers (storage and module transfer), the assembly work is essentially manual and requires little more than hand tools; welding is required to join tubes that comprise the array skeleton (where appropriate – assembly via hardware connection remains the main form of rack assembly).

The installation and assembly procedure consists of mounting rack components to the support columns (piles), fastening the rack elements together, joining and welding tubes, mounting and assembling tracking motors and their associated hardware (where tracking systems are utilized), and finally, mounting and fastening the PV modules to the assembled rack.

Materials Brought On Site:	Solar panels, racking material and tracking motors.
Construction Equipment Used:	Flatbed trailers. No chemicals other than fuel will be used.
Timing:	Immediately after the racking installation.

3.1.7 Electrical Collector System

The electrical collector system will consist of wiring from the panel strings to the disconnect combiner boxes which are connected to the pad-mounted inverters/transformers. Cabling will run from the inverters/transformers to a 12.47-kV / 44-kV transformer which will upgrade the voltage to connect to the Hydro One distribution system. Underground cabling will be used on private property and aboveground collector lines are used along public rights-of-way.

For the installation of electricity poles, the holes are typically augured in the ground using a truck-mounted auger device. The poles are then inserted using cranes to a typical depth of 1 to 2 m below grade. The poles are then “dressed” (made ready to accept conductors) using a boom truck. Typically, one crew installs the poles and one crew dresses them. Once the poles are in place and dressed, cables are strung in place using boom trucks and special cable reel trucks. It is still to be determined, in conjunction with Hydro One, whether the pole installations work will be done by the proponent or by Hydro One.

Materials Brought On Site: Electrical cabling.

Construction Equipment Used: Flatbed trailers and trenching equipment. The construction will emit minor amounts of noise and dust. No chemicals other than fuel will be used.

Timing: Late summer is preferred, but if necessary, this can be completed in the spring, fall or winter.

Material Generated: Some packing material waste will be generated. Recyclable material will be separated from the non-recyclable material onsite, and removed by a licensed sub-contractor.

3.1.8. Substation

The electrical substation for the solar farm will be located on the site property. The substation equipment will include an isolation switch, a circuit breaker, a step-up power transformer (12.47 to 44 kV), switch gear, instrument transformers, grounding and metering equipment. It will be surrounded by a chain-link fence with a locked gate to meet Ontario Electrical Safety Authority requirements. The area around the substation area will be gravelled and sloped to facilitate drainage. The substation will sit on a poured concrete pad, reinforced with rebar.

Materials Brought On Site: Gravel, an isolation switch, a circuit breaker, a step-up power transformer (12.47 to 44 kV), switch gear, instrument transformers, grounding and metering equipment, insulators, transformer oil and electrical cabling.

Construction Equipment Used: A truck mounted crane, flatbed trailers and a bulldozer. The bulldozer will be delivered to the site by a flatbed trailer. Construction will emit minor amounts of noise and dust. No chemicals other than fuel and transformer oil will be used.

Timing: Late summer to take advantage of typically drier weather. If necessary, this can be completed in the spring, fall or winter.

Material Generated: Some packing material waste will be generated. The recyclable material will be separated from the non-recyclable material onsite. Both streams of waste will be removed by a licensed sub-contractor.

3.1.9. Clean-up and Reclamation

Waste and debris generated during the construction activities will be collected and disposed of at an approved waste or recycling facility. During construction, industry best practices for spill prevention will be utilized. In the unlikely event of a spill, it will be cleaned up immediately and any impacted soils will be removed from site and disposed of at an approved and appropriate facility. At the conclusion of construction, vehicles and construction equipment will be removed from the site.

Stripped soil will be replaced and re-contoured in the construction areas and disturbed areas will be re-seeded, as appropriate. Erosion control equipment will be removed once inspections have determined that the threat of erosion has diminished to the original land-use level or lower.

3.1.10. Facility Commissioning

The facility commissioning will occur once the Solar Panels and electrical system are fully installed and Hydro One is ready to accept grid interconnection. The commissioning activities will consist of testing and inspection of the electrical, mechanical and communications systems.

Materials Brought On Site: None.
Construction Equipment Used: None

Material Generated: None.
Timing: This will be completed after the construction activities are completed.

3.2 Location and Timing of Construction

The construction activities will generally be located in two areas.

i. Transportation of equipment to the site will utilize public roadways; and
ii. Construction on the leased property.

3.2.1 Schedule

Construction activities will commence once all necessary permits (REA, building permits, etc.) have been obtained and the weather conditions are conducive to construction. Table 3.1 outlines the normal duration of each activity. Following site grading, construction will move from one end of the site to the other and will follow an assembly line like process. Construction of the electrical collector system and the substation can be constructed while the foundations are being built and the panels are being installed.

Table 3.1: Duration of Construction Activities

Activity	Total Duration	Notes
Surveying	2 days	
Clearing, grubbing, grading and internal driveway construction	15 days	Will occur outside bird breeding season (May – mid July)
Tracker Foundation	1 month	Concurrent with driveway construction
Tracker Assembly and Panel Installation	2-3 months	Concurrent with foundation construction
Installation of electrical collector system	1-2 months	Concurrent with foundation construction and panel installation
Substation installation and connection to distribution grid	1 month	Concurrent with electrical collector system construction
Clean up and reclamation	Concurrent with construction activities	
Site commissioning	2 weeks	

4.0 OPERATIONS

4.1 General

Technical and administrative staff will maintain and operate the facility, although most operations will be controlled automatically or remotely, through a central monitoring hub. It is expected that a team of 1-2 full-time workers will be required to keep the facility operating properly and maintained regularly. Generally, a team of maintenance personnel covers a regional territory that houses multiple solar farms. The primary workers will be electricians, grounds keepers and mechanics, as well as software technicians who carry out maintenance on the equipment, along with a general supervisor.

Solar panels should operate during daytime hours, in both direct and diffuse light conditions (although at a lesser power output). Each 1-MW block (i.e., a series of array rows connected to two 500-kW inverters) has a comprehensive control system that monitors the panel and electrical subsystems, as well as the local insolation conditions to determine whether operations should be carried out. If an event occurs outside the normal operating range of the array, such as electrical trips, panel weight overload (e.g., snow, extremely high winds), the array will take itself out of service and report the condition to the SCADA system. A communication line connects each 1-MW block to the monitoring hub, which closely monitors and, as required, controls the operation of the array.

4.2 Routine Solar Farm Maintenance

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

Vegetation management in the setback areas between the solar arrays and the property fence line will consist of a once a year cut in late summer after the end of the amphibian and bird breeding seasons.

4.3 Unplanned Farm Maintenance

Modern Solar Panels are designed to operate for over 25 years. However, with large numbers of modules it is inevitable that component failures will occur despite the high reliability. Most commonly, the failure of small components such as switches, fans, or sensors will take a MW block, or even the entire farm out of service until the faulty component is replaced. These repairs can usually be carried out by a single technician visiting the farm for several hours.

4.4 Electrical System

The collector lines and substation will require periodic preventative maintenance activities. Routine maintenance will include condition assessment and protective relay maintenance of the substation as well as vegetation control.

5.0 DECOMMISSIONING

The anticipated life of the project is a minimum of 25 years. If the economics of solar power remain viable at that time, the facility could be "repowered" with new technology.

5.1 Decommissioning During Construction

It is unlikely that the project would be dismantled during construction. Should this occur the procedures used would be the same as those used after ceasing operation.

5.2 Decommissioning After Ceasing Operations

If the project is not repowered, then the equipment will be dismantled and the lands restored to a pre-construction state of open meadow.

5.2.1 Procedures for Dismantling

If the facility is to be decommissioned and the solar array is to be removed at the end of its Feed-in-Tariff contract, the impacts will be similar to the construction phase, but in reverse sequence. The procedures will include the creation of temporary work areas for the lay-down of the disassembled panels and racking and loading onto trucks with cranes. Driveways and culverts (if installed) will be removed unless the landowner requests that they be left in place. Driveway bedding material will be replaced with clean sub- and top-soil for reuse by the landowner, and the land will be contoured to maintain the current drainage patterns. Decommissioning (removal) of onsite electrical lines and foundations will also occur.

5.3. Restoration of Land

Once the equipment has been removed the land will be restored for pre-existing farm use using stockpiled subsoils and topsoil. If there is insufficient material onsite, topsoil and/or subsoil will be imported from a source acceptable to the landowner.

Although spill prevention procedures will be in place, there is the potential through the decommissioning process for small spills of solvents or fuels. The soil conditions of the site will be surveyed to the standards of the day to determine if any impacts have occurred. Should soil impacts be noted, the impacted soils will be delineated, excavated and removed, to the standards of the day, from the site for disposal at an approved and appropriate facility. The removed soils will be replaced with stockpiled sub- and topsoil, if available. If none are available, clean fill and topsoil will be imported. If possible, native plant species will be used for the re-vegetation of disturbed areas.

As previously discussed, waste generated by the installation, operation and decommissioning of the solar farm should be minimal, with no toxic residues. Any wastes generated will be disposed of according to standards of the day with the emphasis of recycling materials whenever possible.

6.0 POTENTIAL ENVIRONMENTAL EFFECTS ON NATURAL HERITAGE FEATURES AND MITIGATION

6.1. Vegetation Removal Impacts

Prior to construction, existing tree and shrub vegetation will be removed from the Project Location and the site will be graded. The implications of this action to the natural features identified in the EOS report (Ecological Services, 2011b) are discussed below along with mitigation measures intended to limit the extent of impact. A summary of impacts on identified natural features and mitigation measures by development phase is provided in Table 6.1

6.1.1 Significant Wetlands

Although the Project Location approaches to 15 m of the tall shrub wetland associated with the Ingleside PSW, there will be no encroachment and no requirement for vegetation removal (Figure 2.2). It was determined in the 2005 OWES wetland evaluation by Huizer and Lehman that the primary functions of the Ingleside Swamp PSW are flood attenuation and maintenance of water quality. In terms of potential impacts to water quality, stormwater sediment could potentially enter the wetland via stormwater runoff associated with soils exposed during the construction phase (about 5 months). However, as the 10.2 ha portion of tall shrub wetland within 120 m of the Project Location represents ≈1% of total wetland area, it plays a very minor role in support of these functions. The landowner has also recently increased drainage rates across this local wetland by cleaning and deepening a drainage channel located 200 m north of the Project Location and flowing east into a creek (Figure 6.2). Within the Project Location, the topography has a slight southward gradient, and surficial flow is naturally directed away from the wetland and will remain so following site grading. To further mitigate potential sediment movement during the construction period, the perimeter of the Project Location will be clearly demarcated and a filter fabric sediment fence installed in areas adjacent to any water or wetland features. The sediment will be secured along the base by digging in the fabric and backfilling with earth to grade. The intervening 15 m between the wetland and the Project Location will remain undisturbed and the existing buffer of shrub and herbaceous vegetation will help to mitigate stormwater sediments coming from exposed soils. Following site clearing, the Project Location will be revegetated with a mix of grasses and forbs appropriate to maintaining soil integrity.

For the 0.7 ha portion of thicket swamp associated with the UCMBS PSW, only the access road component of the Project Location is within 120 m of this feature (100 m). As both Anderson Road and County Road #2 are located between the project and the wetland, no significant impact to any of the wetland features or functions associated with the UCMBS are anticipated provided standard BMP measures for access road construction and use are in place as described above.

It is clear that measurable impacts to both the Ingleside Swamp PSW and the UCMBS PSW relate to current land use actions (i.e., channel cleaning and municipal road use) and not to any minor potential for sediment input from the development proposal. As a result, no *significant* impacts to identified wetland functions or features are anticipated for the Ingleside Swamp PSW as a result of project development.

Figure 6.1 Willow and alder dominated shrub swamp north of Project Location.

Figure 6.2 Channelization of the shrub swamp approx. 200 m north of Project Location.

6.1.3 Significant Wildlife Habitat – Amphibian Breeding Habitat (Woodland)

Amphibian breeding habitat (woodland) was identified within a 2.6 ha patch of woodland (Polygon code M2) on the Project Location and a portion of the Ingleside Swamp PSW within 120m (Figures 2.2, 6.3). This feature was characterized as open fresh-moist deciduous woodland comprised mainly of young green ash and white elm of approx. 25-30 years of age through which a shallow drainage swale flows southward from its origin north of the Project Location. During the amphibian surveys conducted in 2012, at least 20 spring peepers were heard calling from within this feature.

The Project will require the complete removal of vegetation, which will result in a loss of 2.6 ha of identified significant amphibian breeding habitat (woodland). In terms of mitigation, the only available measure is related to construction timing, whereby site devegetation will not take place during the spring breeding period of April-May when spring peepers are most likely to be using this feature (thus reducing potential for direct mortality). To compensate for loss, the creation of an equivalent area of woodland amphibian breeding habitat (i.e., 2.6 ha) is being proposed in consultation with MNR staff. This proposal will include a 5-year commitment to monitor/ manage the site, will be prepared with MNR prior to issuance of a REA and includes the following elements:

a. The chosen site is proximal to a source population of woodland amphibians and there are no impediments to immigration (e.g., roads), and;

b. Site characteristics (e.g., vegetation and hydrology) are appropriate for amphibian breeding.

Figure 6.3 Amphibian breeding habitat (woodland) associated with ELC polygon M2 (Fresh-moist Deciduous Woodland). Note drainage swale. (Photo taken April 27, 2012).

6.1.4 Significant Wildlife Habitat – Shrub/early Successional Bird Breeding Habitat

Significant shrub/early successional bird breeding habitat was identified both on and within 120 m of the Project Location. Specifically, the habitat is represented by 60 ha of fresh-moist mixed thicket (THMM2) and remnant patches of young fresh-moist deciduous woodland (WODM5) and includes the entire 47 ha Project Location (Figure 2.3). During the 2011 breeding bird survey, a common shrub/early successional bird (Willow Flycatcher) was observed within this habitat. As indicated in the *EOS*, it is likely that additional shrubland species are not supported by this feature as it has been recently converted from woodland and experiences continuing disturbance from ongoing logging activities. *Two additional breeding bird surveys will be conducted in June of 2012, the results of which will be used to validate this habitat designation. Refer to Appendix 1 for survey methodology.*

The Project will require the removal of 47 ha of vegetation (primarily thicket and young trees) from this habitat feature. The only mitigation measure available is related to construction timing, whereby site devegetation will not take place during the spring breeding period of May-July when shrub/early successional bird species are most likely to be using this feature (thus reducing the probability of mortality or nest abandonment). Appropriate BMP measures will be in place to ensure that construction activities, site management (e.g., mowing) and facility operations do not affect shrub/early successional bird breeding in the adjoining 13 ha of remaining habitat in the 120 m setback areas.

If this feature is evaluated as significant habitat following the results of the two remaining breeding bird surveys in June 2012 (in conjunction with the 2011 survey already completed), then MNR will be consulted to develop a habitat compensation plan. The compensation plan must be completed prior to issuance of a REA and should consider and outline the following:

- Proximity of created/managed habitat relative to project location; creation of habitat within the subject municipality is preferable. Selection of property should be done in consultation with MNR
- Habitat creation should be for an equivalent area (i.e. 47 ha minimum replaced). If comprised of separate areas no single area should be below the minimum size threshold (10ha)
- Composition of vegetation, and planting/harvest plans if required
- Maintenance activities planned to ensure that the created habitat continues to function as shrub/early successional habitat for breeding birds
- Monitoring should include a baseline inventory of species abundance and composition followed by monitoring once habitat has been established
- Any partnerships and/or affiliations to assist/lead maintenance of the habitat
- Timeline for commencement of habitat compensation.

Site management (e.g., mowing) will be carried out within the project location only and is not anticipated to affect survivorship in adjoining areas as it will take place in late summer, outside of the peak breeding period.

6.2. Dust and Noise

Some minor noise and dust will be generated during the construction and decommissioning phases. Noise is typically limited to daylight hours and excessive dust will be controlled with watering, as necessary. The key functions of the significant natural features are not susceptible to the levels of noise and dust that will be produced.

6.4. Water Takings

No water takings are planned for this project.

6.5. Fuels Spills

All equipment operators will be trained to avoid spills and to respond to spills should they occur. No re-fuelling will be permitted within 120 m of a significant natural feature. Should a spill occur the following protocol will be implemented:

1. Spill response kits kept onsite will be used to contain the spill;
2. The SunEdison representative will be notified;
3. If the spill is of sufficient quantity, the MOE Spill Action Centre will be notified;
4. An environmental contractor will be brought in to remove any excess fuel and impacted soils; and
5. An environmental consultant will be retained to ensure that all impacted soil and groundwater has been properly removed and the site returned to pre-spill condition.

6.6. Potential Impacts and Mitigation Measures by Activity (Construction Phase)

Identification of potential impacts to the identified significant natural heritage features and mitigation measures related to specific activities during the construction phase of development are presented below.

6.6.1 Site Clearing

Potential Environmental Components Affected	Ingleside Swamp PSW, UCMBS PSW, Significant Wildlife Habitat
Potential Impacts	Vegetation clearing from Project location may result in stormwater sediment input into Ingleside Swamp PSW. Direct loss of significant amphibian breeding habitat and shrub/early successional breeding bird habitat. Potential for direct mortality of wildlife foraging or nesting within Project Location boundaries
Mitigation Measures	Silt screen mitigation measures as described in Section 6.1.1., and leaving the intervening 15 m vegetation buffer. Demarcation and monitoring of vegetation within adjoining setback areas to ensure clearing does not extend beyond prescribed area and to insure buffer vegetation survives. Devegetation and grading operations not to take place during peak breeding period of April-July inclusive.

6.6.2 Road Construction

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	None anticipated due to large setback distance (i.e., 100 m from UCMBS PSW) and intervening municipal roads.
Standard Mitigation Measures	Will be kept to a minimum by staking off the areas that define limits of the work to be done, and excavated soil will be re-used on-site where feasible, or disposed of in a proper facility off-site. No permanent paved roads will be constructed for the construction activities.
Residual Impacts	None anticipated.

6.6.3 Laydown Areas

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	Laydown area is within shrub/early successional breeding bird habitat but not within 120 m any other identified natural feature. The laydown area will only be used for about 5 months during construction of the panels, preferably in the dry time of the year (starting in July).
Mitigation Measures	After use, the laydown area will be tilled and re-seeded to open meadow. Sedimentation controls will be put in place at the edge of the laydown area.
Residual Impacts	None anticipated

6.6.4. Solar Array Construction

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	None anticipated due to setback distances, and vegetated buffers between project and wetland
Mitigation Measures	Site clearing and grubbing will be kept to a minimum by staking off the areas that define limits of the work to be done, excavated soil will be re-used on-site where feasible, or disposed of in a proper facility off-site.
Residual Impacts	None anticipated

6.6.5 Installation of Racking System

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	None anticipated due to setback distances, and vegetated buffers between project and wetland
Mitigation Measures	Any area of surface disturbance will be re-contoured, with stockpiled material removed during excavation, to match original landscape. Areas that define the limits of the work will be staked and marked. Equipment movement on-site will be limited to specified travel areas to minimize impacts on land use. Noise and dust control measures will be utilized where required for the construction period.
Residual Impacts	No residual impacts are anticipated.

6.6.6 Solar Panel Assembly and Installation

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	None anticipated due to setback distances, and vegetated buffers between project and wetland.
Mitigation Measures	None required.
Residual Impacts	Solar panel assembly and installation will result in no residual impacts.

6.6.7 Electrical Collector System

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	None anticipated due to setback distances, and vegetated buffers between project and wetland.
Mitigation Measures	Locating the electrical lines within access road allowances.
Residual Impacts	No residual impacts are anticipated.

6.6.8 Substation Construction

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	None anticipated due to setback distances

Mitigation Measures	None needed.
Residual Impacts	No impacts are anticipated.

6.9. Potential Impacts and Mitigation by Activity (Operating Phase)

6.9.1. Noise Impacts

Potential Environmental Component Affected	Ingleside Swamp PSW, UCMBS PSW
Potential Impacts	No noise above background levels is expected at any receptor.
Mitigation Measures	None required.
Residual Impacts	No residual impacts are anticipated.

6.9.2 Maintenance Activities

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	Routine maintenance visits will include cutting grass (or brush hogging) within the project location only. This will be less of a disturbance than the regularly occurring farming activities (i.e., ploughing). Maintenance activities will also include regular lubrication of the tracking units which generates some waste material.
Mitigation Measures	Grass cutting north and south of the panels will be done once a year after breeding bird season (late August), using either a brush hot or tractor hay scythe. If the latter, the cut grass will be offered for bailing to the local farmer. Any waste material from the maintenance activities will be properly disposed of by authorized and approved offsite vendors.
Residual Impacts	Infrequent visits by maintenance staff will have little residual impacts.

6.10. Potential Impacts and Mitigation by Activity (Decommissioning Phase)

6.10.1. Road Removal

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	None anticipated to significant natural features.
Mitigation Measures	Site clearing will be conducted by staking off the work areas and excavated

	soil will be re-used where feasible, or disposed of in a proper facility off-site.
Residual Impacts	None anticipated.

6.10.2. Solar Array Removal

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	None anticipated due to setback distances
Mitigation Measures	Site clearing will be kept within staked off work and excavated soil will be re-used where feasible, or disposed of in a proper facility off-site. Exposed soils will be reseeded to naturalized meadow.
Residual Impacts	None anticipated

6.10.3. Removal of Racking System

Potential Environmental Component Affected	None due to setback distances
Potential Impacts	None anticipated due to setback distances
Mitigation Measures	Surface disturbances will be re-contoured with stockpiled material removed during excavation. Work areas will be staked and marked, and equipment movement will be limited to specified travel areas to minimize impacts on land use. Noise and dust control measures will be utilized where required.
Residual Impacts	No residual impacts are anticipated.

6.10.4. Electrical Collector System Removal

Potential Environmental Component Affected	None due to setback distances and absence of significant features within Project Location
Potential Impacts	None anticipated due to setback distances
Mitigation Measures	Electrical lines are within access road allowances.
Residual Impacts	No residual impacts are anticipated.

6.10.5. Substation Deconstruction

Potential Environmental Component Affected	None due to setback distances

Potential Impacts	None anticipated due to setback distances
Mitigation Measures	None anticipated due to setback distances
Residual Impacts	No impacts are anticipated.

Table 6.1. Potential negative environmental effects and mitigation by Natural Feature and development phase.

Natural Feature(s)	Characteristics and Functions	Potential Negative Environmental Effect		Mitigation Measures	Residual Effects on Natural Feature
		Direct	***Indirect***		
Significant Wetlands ***Ingleside Swamp PSW***	*Characteristics* Size – 10.2 ha. (part of the larger Ingleside Swamp PSW of approx. 375 ha.) Community types: **(ELC)***:* SWT, willow/alder thicket swamp **(OWES)***:* tsS1, tall shrub thicket swamp Current Disturbances – recent improvements to local drainage channels. *Features:* No features of note for local wetland *Functions:* Flood attenuation and water quality for larger Ingleside Swamp PSW	*Vegetation Removal (Construction Phase)*			
		No encroachment into wetland (15 m from PL)	None anticipated	Staking of project location and daily visual monitoring of work area to ensure compliance that during construction, no vegetation removal will be undertaken between the fence and the wetland. Closest distance between the fence and wetland is 15 m; A sediment silt fence will be constructed along the base of the fenceline.	None anticipated.
		Site Grading (Construction Phase)			
		>15 m from wetland	None anticipated.	Soil grading will occur within demarcated areas within PL that are greater than 15 m from the wetland. Site will be re-vegetated to open meadow	None anticipated.
		Road Construction (Construction Phase)			
		No encroachment into wetland (nearest distance to wetland – 100 m)	None anticipated.	Standard BMP measures for road construction including drainage culverts, clean gravel, grading and tamping to prevent erosion (additional measures as directed through consultation with RRCA)	None anticipated.
		Dust Generation (Construction Phase)			
		15 m to PL	None anticipated..	Standard construction BMP measures taken for dust control measures including watering. No timing window needed.	None anticipated.
		Facility Operations (Operation Phase)			
		>15 m from wetland	None anticipated.	No mitigation, or timing needed for solar array due to separation distances, transformer will not be situated near wetland.	None anticipated.
		Vegetation Management (Operation Phase)			
		15 m from wetland (once annual grassland management)	None anticipated.	Grass will be cut in areas within the PL. Grass will be cut once a year in late summer after bird breeding season and before fall amphibian migration.	None anticipated.
		Component removal and site restoration (Decommissioning Phase)			
		>15 m	None anticipated.	Project Location area will be re-vegetated. Vegetation will be maintained throughout the project in the buffer areas between project location and wetland.	None anticipated.
Natural Feature(s)	**Characteristics and Functions**	**Potential Negative Environmental Effect**		**Mitigation Measures**	**Residual Effects on Natural Feature**
		Direct	***Indirect***		
Significant Wetlands ***UCMBS PSW***	*Characteristics* Size – 0.7 ha. (part of the extensive UCMBS PSW of >1000 ha.) Community types: **(ELC)***:* SWT, willow/alder thicket swamp **(OWES)***:* M (marsh); S (swamp) Current Disturbances – recent improvements to local drainage channels. *Features:* extensive coastal wetland *Functions:* provincially significant nesting and feeding area for waterfowl, and marsh birds	*Vegetation Removal (Construction Phase)*			
		No encroachment (100 m from PL)	None anticipated	Staking of project location and daily visual monitoring of work area to ensure compliance that during construction, no vegetation removal will be undertaken between the fence and the wetland. Closest distance between the access road and wetland is 100 m.	None anticipated.
		Site Grading (Construction Phase)			
		100 m from wetland	None anticipated.	Soil grading will occur within demarcated areas within PL that are 100 m from the wetland. Standard road construction BMP	None anticipated.
		Road Construction (Construction Phase)			
		No encroachment into wetland	None anticipated.	Standard BMP measures for road construction including drainage culverts, clean gravel, grading and tamping to prevent erosion (additional measures as directed through consultation with RRCA)	None anticipated.
		Dust Generation (Construction Phase)			
		100 m to PL	None anticipated..	Standard construction BMP measures taken for dust control measures including watering. No timing window needed.	None anticipated.
		Facility Operations (Operation Phase)			
		100 m from wetland	None anticipated.	No mitigation, or timing needed for solar array due to separation distances, transformer will not be situated near wetland.	None anticipated.
		Vegetation Management (Operation Phase)			
		100 m from wetland (	None anticipated.	Road use infrequent. Grass will be cut once a year in late summer after bird breeding season and before fall amphibian migration.	None anticipated.
		Component removal and site restoration (Decommissioning Phase)			
		100 m	None anticipated.	Project Location area will be re-vegetated. Access road deconstruction possible. Vegetation will be maintained throughout the project in the buffer areas between project location and wetland.	None anticipated.

Natural Feature(s)	Characteristics and Functions	Potential Negative Environmental Effect		Mitigation Measures	Residual Effects on Natural Feature
		Direct	***Indirect***		
Amphibian Breeding Habitat (Woodland)	*Characteristics* 2.6 ha fresh-moist open woodland with seasonal drainage swales and Ingleside Swamp PSW *Features* At least 20 breeding spring peepers encountered *Functions* Provides breeding habitat.	*Vegetation Removal (Construction Phase)*			
		Complete removal of vegetation from feature	None anticipated	Timing window required– no site disturbance during April-May inclusive Staking of project location to ensure that clearing does not take place beyond intended work area. Sediment silt fence will be constructed along base of fence line.	None anticipated as remaining feature will be outside of project location (PSW).
		Site Grading (Construction Phase)			
		None (remaining portion of feature outside project location)	None anticipated.	Soil grading will occur within demarcated areas within PL that are greater than 15 m from the wetland.	None anticipated.
		Road Construction (Construction Phase)			
		None(remaining portion of feature outside project location)	None anticipated.	Standard BMP measures for road construction including drainage culverts, clean gravel, grading and tamping to prevent erosion (additional measures as directed through consultation with RRCA)	None anticipated.
		Dust Generation (Construction Phase)			
		None (remaining portion of feature outside project location)	None anticipated..	Standard construction BMP measures taken for dust control measures including watering. No timing window needed.	None anticipated.
		Facility Operations (Operation Phase)			
		None (remaining portion of feature outside project location)	None anticipated.	No mitigation, or timing needed for solar array due to separation distances, transformer will not be situated near wetland.	None anticipated.
		Vegetation Management (Operation Phase)			
		None (remaining portion of feature outside project location)	None anticipated.	Road use infrequent. Grass will be cut once a year in late summer before fall amphibian migration.	None anticipated.
		Component removal and site restoration (Decommissioning Phase)			
		None (remaining portion of feature outside project location)	None anticipated.	Project Location area will be re-vegetated. Vegetation will be maintained throughout the project in the buffer areas between project location and wetland.	None anticipated.

Natural Feature(s)	Characteristics and Functions	Potential Negative Environmental Effect		Mitigation Measures	Residual Effects on Natural Feature
		Direct	***Indirect***		
Shrub/early Successional Bird Breeding Habitat*	*Characteristics* 60 ha of fresh-moist mixed thicket (THMM2) dominated by dogwood, buckthorn, forbs and grasses within 120 m of Project Location. 47 ha occurs on the Project Location *Features* Possible significant shrub/early successional bird breeding Willow Flycatchers observed *Functions* Provide breeding habitat.	*Vegetation Removal (Construction Phase)*			
		Loss of 47 ha of upland thicket habitat	Potential disturbance of breeding birds on adjacent lands	If breeding bird surveys confirm that shrub/early successional bird breeding habitat is significant, timing window required such that site devegetation and grading of the 47 ha portion of upland thicket will not take place during peak breeding in May-July. Daily visual monitoring of work area to ensure compliance during construction, no vegetation removal outside of project location. Clear demarcation of project location boundary.	None anticipated as remaining upland habitat in adjoining areas will remain undisturbed
		Site Grading (Construction Phase)			
		None (feature removed)	None anticipated.	None needed as soil grading will occur after habitat feature has been removed. Project Location will be re-vegetated to open grassland. Timing window not needed unless otherwise dictated (see above).	None anticipated.
		Road Construction (Construction Phase)			
		None (feature removed)	None anticipated.	Standard BMP measures for road construction. Timing window not needed.	None anticipated.
		Dust Generation (Construction Phase)			
		None (feature removed)	Minor disturbance to adjacent area	Standard construction BMP measures taken for dust control measures including watering. Timing window not needed.	None anticipated.
		Facility Operations (Operation Phase)			
		None (feature removed)	None anticipated.	No mitigation, or timing window needed, for solar array due to separation distances, transformer will not be situated near remaining habitat.	None anticipated.
		Vegetation Management (Operation Phase)			
		None (feature removed)	None anticipated.	Grass will be cut in areas within the PL only. Grass will be cut once a year in late summer after spring breeding season and before fall movements.	None anticipated.
		Component removal and site restoration (Decommissioning Phase)			
		None (feature removed)	None anticipated.	Project Location will be re-vegetated. Vegetation will be maintained throughout the project in the buffer areas between project location and wetlands.	Potential restoration depending on landowner plans

* Mitigation to be implemented based on determination of significance, pending June 2012 pre-construction surveys for breeding birds.

7.0 ENVIRONMENTAL EFFECTS MONITORING – DESIGN AND OPERATIONS

As discussed in the Design and Operations Report (Genivar 2010c) environmental effects monitoring is proposed for negative environmental effects that may result from engaging in the Project. As per the REA Regulation, the monitoring plan identifies

- performance objectives in respect of the negative environmental effects
- mitigation measures to assist in achieving the performance objectives
- a program for monitoring negative environmental effects for the duration of the time the Project is engaged in, including a contingency plan to be implemented if any mitigation measures fail.

For the purposes of this ***EIS*** report, the effects monitoring measures with respect to negative effects on the significant natural features have been reproduced here, in Table 7.1. The monitoring proposed in Table 7.1 will serve to verify that mitigation measures are functioning as designed to meet performance objectives. If monitoring shows that performance objectives are not being met, the contingency measures documented in Table 7.1 will be used to ensure that remedial action is undertaken as necessary to meet the performance objectives.

Table 7.1 Summary of Environmental Effects Monitoring with Respect to Construction Activity

		Monitoring Plan				
Mitigation Measures by Stage	**Performance Objective**	**Methodology**	**Monitoring Locations**	**Frequency**	**Reporting Requirements**	**Contingency Measures**
Vegetation Removal (Construction Phase)						
Maintain vegetative buffer (minimum 15m) between project location and PSW edge. Staking project location perimeter and daily visual monitoring to ensure compliance (i.e., no encroachment onto adjacent natural features). Installation of sediment silt fence along project location fence line.	Maintain features and associated functions of adjacent natural areas including significant wetland	Standard marking to demarcate off-limit areas (project location boundary) Visual monitoring of work area to ensure compliance Wildlife relocation will follow established protocols with trained staff Monitor and ensure effectiveness of sediment control measures	Throughout construction site, focusing on project location adjacent to wetlands.	Ongoing during construction.	Reported in monthly environmental monitoring report during construction	Loss of significant features outside of demarcated highly unlikely, but if needed will require remediation to restore impacted area.
Site Grading (Construction Phase)						
Soil grading will occur only within demarcated areas within Project Location Site will be re-vegetated as open meadow immediately following erection of solar array panel	Maintain hydrology similar to pre-development state such that impacts to adjacent natural features and functions is minimal	Preparation of a RRCA approved Stormwater Management Plan to maintain existing hydrology and prevent erosion Areas requiring grading clearly demarcated Site will be re-seeded and monitored during growing season to ensure meadow vegetation established	Monitoring of water quality within adjacent drainage channels (constructed or otherwise) Site re-vegetation monitoring across Project Location	Periodically during all site grading activities and following storm events Twice during growing season (May-Sept) to ensure meadow establishment and once in following year	Reported in monthly environmental monitoring report during construction.	Evidence of offsite sediment transport will be dealt with through standard BMP measures including immediate erection of a fence followed by evaluation of source of problem and consultation with RRCA as to remedial actions required Failure to establish vegetation on or after the first year will be dealt with through reseeding and additional monitoring
Road Construction(Construction Phase)						
Standard BMP measures for road construction including drainage culverts, clean gravel, grading and tamping to prevent erosion (additional measures as directed through consultation with RRCA)	Construct road system such that site hydrology is not affected and adjacent natural areas are not impacted	Visual monitoring of work area to ensure compliance (i.e. no work to take place outside project location) Speeds limited on road network within PL	Throughout construction site.	Ongoing during construction.	Reported in monthly environmental monitoring report during construction	See contingency measures for soil grading and vegetation removal
Dust Generation (Construction Phase)						
Standard construction BMP measures taken for dust control measures	Limit dust related impacts	Visual monitoring of work area to ensure compliance	Throughout construction site.	Ongoing during construction.	Reported in monthly environmental monitoring report during construction	Dust control measures implemented as necessary to prevent/minimize dust generation. Site re-vegetation management as above
Facility Operations (Operation Phase)						
No mitigation possible for solar array	Ensure no ***project-related*** impacts to adjacent wetlands and watercourses such as increased sedimentation, decreased hydrological input (drying), upland vegetation succession, increase in invasive species. ***NOTE: these impacts are now occurring as a result of landowner drainage actions and site grading in wetland areas >120m from Project location***	Noise Report prepared	Across construction site at established point count stations	Ongoing during construction	Reported in monthly environmental monitoring report during construction	None required.
Vegetation Management (Operation Phase)						
Visual monitoring of work area to ensure compliance	Ensure no impact to adjacent wetlands and watercourses.	Visual monitoring of work area to ensure compliance	Throughout construction site.	Ongoing during vegetation control operations	Reported in monthly environmental monitoring report during construction	None required
Component removal and site restoration (Decommissioning Phase)						
Maintain existing hydrology and prevent erosion Site will be re-vegetated at discretion of regulatory authority	Maintain hydrology similar to pre-development state minimal	Preparation of approved Stormwater Management Plan if necessary	Throughout decommissioning stage	Ongoing during decommissioning.	Reported in monthly Environmental monitoring report during decommissioning.	See contingency measures for site grading

8.0 CONSTRUCTION PLAN REPORT

The REA Regulation requires proponents of Class 3 solar projects to prepare a Construction Plan Report (*CPR*) (Genivar 2010b). The CPR details the location and timing of construction and installation activities, any negative environmental effects that result from construction activities within 300 m of the Project Location and mitigation measures for the identified negative environmental effects. The *CPR* addresses all potential effects of construction on natural features as well as socio-economic considerations such as air quality, noise and traffic within 300 m of the Project Location in a general manner.

The mitigation proposed in the *CPR* with respect to preventing or minimizing negative effects on significant natural features is the same as discussed in this *EIS (Table 6.1)*. Additional mitigation is proposed in the *CPR* to address negative effects to socio-economic considerations and other non-significant natural features that are not discussed in this Report. Therefore, the *CPR* and this *EIS* should be read in conjunction with each other.

9.0 SUMMARY AND CONCLUSIONS

This *EIS* has been prepared to identify potential negative environmental effects that all phases of the Project may have on these significant natural features. Mitigation measures have been proposed to prevent these effects from occurring or minimize the magnitude, extent, duration and frequency in the event that they do occur to an acceptable level. Monitoring measures have been proposed to confirm that mitigation measures are having the intended effect and that performance objectives are being met.

A summary table is provided below documenting significant natural features identified in the ***EOS*** and the associated mitigation measures and monitoring requirements. (*Note: if, pending results of additional field surveys shrub/early successional bird breeding habitat found not to be significant, feature may be removed from this list).*

Table 8.1 Natural Features on and within 120 m of the Project Location

Feature	Attributes/Composition	Function	Significant?	Mitigation Strategy (C=Construction, O=Operation, D=Decommissioning)
Wetlands	a. Ingleside Swamp PSW ELC -SWT; willow/alder thicket swamp OWES – tsS1; tall shrub thicket swamp	Flood attenuation and water quality	Significant	See CPR (Genivar, 2010b) C – Demarcation of work areas; Dust control measures; Erosion and sedimentation prevention. O – None required. Timing of activities. D – see C
	b. UCMBS PSW ELC -SWT; willow/alder thicket swamp OWES – MS; marsh, treed swamp		Significant	See CPR (Genivar, 2010b) C – Demarcation of work areas; Dust control measures; Erosion and sedimentation prevention. O – None required. Timing of activities. D – see C
Significant Wildlife Habitat	Seasonal Concentration Habitat Specialized Habitat	Amphibian Breeding Habitat (Woodland) Shrub/early Successional Bird Breeding Habitat	Significant Significant	See CPR (Genivar, 2010b) C – Demarcation of work areas; Dust control measures; Erosion and sedimentation prevention. Timing of activities. O – None required. Timing of activities. D – see C

10.0 REFERENCES

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APPENDIX 1 – Pre-Construction Methodology

Shrub/Early Successional Breeding Bird Habitat

Evaluation Criteria

Shrub/early successional bird breeding habitat is found within large field areas succeeding to shrub and thicket habitats>10ha in size. Shrub land or early successional fields must not be class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years). Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of species.

Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Field studies should confirm:

- Presence of nesting or breeding of 1 of the indicator species (Brown Thrasher, Clay-coloured Sparrow), and at least 2 of the common species (Field Sparrow, Black-billed Cuckoo, Eastern Towhee, Willow Flycatcher)
- A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat.
- The area of the SWH is the contiguous ELC ecosite field/thicket area.

Survey Methods

Ten point count stations were established across the Project Location and adjacent subject property at a minimum of 200 m apart to reduce the incidence of duplicate observations (see Figure 2.4). Surveys followed standardized 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. Accordingly, for open habitat stations, surveys lasted 5 minutes, while for forest habitats surveys lasted 10 minutes. Birds were identified to species by song or call or by direct visual identification (binocular). The number of individuals occurring within 100 m of the survey station was distinguished from those occurring beyond 100 m. Surveying began under optimal weather conditions at or around dawn and continued until mid-morning. Surveys were conducted within the peak breeding season (May-June) for most bird species expected to be using the habitats found in and within 120 m of the Project location.

Survey Dates

Date	**Time**	**Weather Condition**	**Surveyor**
June 27, 2011	05:20 -10:12	Light fog, sun/cloud, 19°C,	Chris Grooms
June 13, 2012	pending		Chris Grooms
June 22, 2012	pending		Chris Grooms

Results of the above surveys will be communicated with MNR once completed.