NEWBORO 1 SOLAR

SunE Newboro 1 Solar Farm

Project Description Report

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GENIVAR

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1. General Information

1.1 Proponent

The SunE Newboro 1 Solar Farm project is being developed by SunEdison Canada, LLC (SunEdison). The project will be owned and operated by SunE Ray LP, which is majority owned by SunEdison. SunEdison is North America's largest solar energy services provider. The company finances, installs and operates distributed power plants using photovoltaic technologies, delivering fully managed solar energy services for its commercial, government and utility customers. SunEdison is a global leader in solar energy generation with a current operating portfolio of more than 350 facilities generating over 100 Megawatts (MW) of solar power across the globe. Active Ontario solar farms currently owned and operated by SunEdison include First Light 1 (9.1 MW) located in Stone Mills north of Napanee, Norfolk I and II located in Norfolk County (18 MW combined) and Erie Ridge (9.3 MW) in Ridgetown, Chatham-Kent.

1.1.1 Project Contact

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1.2 Project Overview

SunEdison is proposing to construct a single Class 3 Solar Facility with a nameplate capacity of 10 MW (AC) near the villages of Newboro and Crosby in the Township of Rideau Lakes, Ontario. If approved, this facility will convert solar energy into electricity to be fed into the Hydro One distribution grid. The defined study area, presented as Figure 1 in Appendix A, covers approximately 142 hectares (ha).

Subject to receiving all approvals, the preliminary schedule anticipates that full commercial operation will be achieved by the end of 2013. The project has received a 20-year Feed-in-Tariff contract from the Ontario Power Authority to sell the generated electricity to the Ontario electricity grid. As such, the project is anticipated to operate until at least 2033, at which time in may continue to generate electricity or the site may be decommissioned and the land returned to its former vacant use.

1.3 Project Location and Land Ownership

The project is located on McCann Road, north of Crosby, within the Township of Rideau Lakes, Ontario. Figure 1 in Appendix A shows the study area. The area is generally bounded by:

- → McCann Road along the north
- → Narrows Lock Road (County Rd 14) along the west

The following coordinates (in UTM NAD 83, Zone 18N coordinate system) define the extremities of the Study Area for the project:

North-west: Easting 398594 Northing 4947801

North-east: Easting 399669 Northing 4948434

South-east: Easting 400208 Northing 4947752

South-west: Easting 399142 Northing 4946932

The solar farm will be located on privately owned land. The project's electrical substation will also be located on site. One overhead electrical connection line would run south within the Narrows Lock Road

right of way and then north-west within the County Road 42 right of way to connect to the existing Hydro One distribution line running east-west along County Road 42.

1.3.1 Renewable Energy Generation Facility Class

Under O.Reg. 359/09, this project is classified as a Class 3 Solar Facility.

1.3.2 Land Ownership and Parcel Description

The table below lists the legal description of the parcels which will be used for the proposed SunE Newboro 1 Solar Farm.

The land hosting the project is privately owned. The land rights have been acquired by SunEdison through an option to purchase agreement. Figure 1 in Appendix A shows the project study area and land within 300 metres of the project location.

Ownership (Public or Private)	Parcel Description
Private	Part of Lots 25, 26 and 27, Concession 1, Township of Rideau Lakes, Ontario

1.4 Authorizations Required

It is anticipated that in addition to the Renewable Energy Approval (REA), the SunE Newboro 1 Solar Farm project will need a Notice to Proceed (NTP) from the Ontario Power Authority, building permits from the Township of Rideau Lakes, permits from the Electrical Safety Authority (ESA) and the Ontario Energy Board (OEB), possible entrance and road use permits from the Township of Rideau Lakes and United Counties of Leeds and Grenville, and possibly permits from the Rideau Valley Conservation Authority and the Cataraqui Region Conservation Authority.

1.5 Federal Involvement

There is no expectation for the requirement of a federal environmental assessment under the Canadian Environmental Assessment Act. Nor is there any expectation for the requirement of federal permits or approvals under the Fisheries Act, Species at Risk Act or any other Act.

2. Project Information

2.1 Project Facility and Equipment

The major components of the proposed project are as follows:

- → Approximately 40,000 x MEMC solar modules (280-watt generation capacity)
- → 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.
- → 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 25-m tall communications tower (if required by Hydro One)

2.1.1 Solar Photovoltaic Modules

The solar PV technology to be used on this project will be MEMC modules, manufactured in Newmarket, Ontario. There will be a total of approximately 40,000 modules, each approximately 2 m long x 1 m wide. The modules will be held by a single-axis tracking or fixed rack system which is supported off the ground by vertical posts. Racks will be arranged north-south (tracking) in rows each approximately 110 m long and 3 m wide.

All components are certified for application in a solar farm generation configuration.

2.1.2 Electrical System

The solar farm will connect to the existing Hydro One distribution line on County Road 42. DC power collected from modules will be directed to ten inverter/step-up transformer units placed on concrete pads. The AC power from the step-up transformers will be collected via 12.47-kV buried lines and connected to the main substation. This substation will include a transformer (12.47 kV to 44 kV) and associated switchgear and will be on a concrete pad. An overhead line will transfer the 44-kV power to the point of interconnection with the distribution line on County Road 42. The project will be designed in full conformance with all applicable electrical, building and other codes.

2.1.3 Access Driveways

Gravel driveways within the project site will be constructed to provide access to the equipment during the construction phase and later for maintenance access over the project's 20-year minimum life.

2.1.4 Communications and SCADA

It is proposed to provide Supervisory Control and Data Acquisition (SCADA) functions for remote supervisory monitoring and control. This system allows data on performance of the arrays, inverters, substations and weather conditions to be recorded and displayed at a control station, and also provides warnings if there are abnormal conditions. If required by Hydro One, a single 25-m tall communications tower will be installed to facilitate communications with the electricity grid.

2.2 Project Activities

The project will be composed of the following general activities:

1. Land Acquisition
2. Planning
3. Permitting
4. Detailed Design
5. Construction
6. Operations
7. Decommissioning

2.3 Construction Activities

2.3.1 Surveying and Geotechnical Study Activities

Surveys will be required to accurately locate the racking, inverters, access driveways, electrical lines and the substation. Crews will drive light trucks to reach sites primarily using existing roads. They will then walk the site for the surveying and mark the locations using stakes.

Existing buried infrastructure located on public property or easements will be located using the Ontario One Call service and buried infrastructure located on private property will be located by private contractors prior to construction or geotechnical sampling and updated throughout construction, as required.

Geotechnical sampling will also be required. Typically a truck-mounted drill rig visits the sampling locations, drills the survey hole and collects geotechnical information.

2.3.2 Site Preparation and Land Clearing

Prior to construction, the construction area will need to be cleared and grubbed. The topsoil is typically removed and some material may need to be added depending upon site specific geotechnical conditions. During clearing or excavation, if any significant archaeological resources are found to be in conflict with the proposed facilities, then consideration will be given to modifying the location of the construction. This will be determined in consultation with the Ministry of Tourism, Culture and Sport and registered archaeologists.

The project location will be surrounded by a chain-link fence approximately 2.5 m tall and topped with barbed wire for site security. The 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.

Equipment will include—at minimum— trucks, graders, light cranes, tractor trailers and bulldozers.

2.3.3 Road and Inverter Pad Construction

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

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

The construction of the internal 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 but will not be stockpiled onsite. The topsoil will be kept and re-used on site. New culverts may be required to maintain drainage in ditches and these will be constructed sufficient to support the construction equipment and delivery trucks. The exact culvert details (if any are required), installation details and erosion-control measures will be determined in conjunction with the Rideau Valley Conservation Authority (RVCA) and/or the Cataraqui Region Conservation Authority (CRCA) as a part of their permitting process. The area concerning CRCA is small and does not contain any natural heritage features or areas and thus it is unlikely that CRCA would issue permits related to the Newboro 1 solar farm project.

Inverter pads will be constructed at the same time as the internal driveways and will typically be 8 m x 4 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.

Vegetation will be cleared within the project location. Trees will be cleared in accordance with the Township of Rideau Lakes by-laws. Only woodlands within the Project Location will be cleared.

Equipment will include—at minimum— trucks, graders, light cranes, tractor trailers and bulldozers.

2.3.4 Construction Laydown Area

A portion of the site (southwest end of the Project Location close to Narrows Lock Road) will be used for the temporary storage of construction material. The topsoil at the Construction Laydown Area will be removed and approximately 600 mm of clean compacted crushed gravel will be imported on an as-needed basis. The excavated topsoil will be re-used on site as feasible.

Equipment will include—at a minimum—trucks, graders and bulldozers.

2.3.5 Delivery of Equipment

Equipment will be delivered by truck and trailer as needed throughout the construction phase and stored at the temporary lay-down site. These deliveries will typically occur during normal construction hours, typically 8 am to 5 pm and may include weekends. A traffic management plan has been developed using MTO standards. Prior to the start of construction, a road assessment of Narrows Lock and/or McCann Road will be undertaken. An agreement with the Township of Rideau Lakes for rehabilitation of Narrows Lock and/or McCann Road (if required) following the completion of construction will be put in place prior to the start of construction.

2.3.6 Installation of Racking System

The racking system will consist of either a single-axis tracker or fixed rack system with the solar modules affixed to a supportive metal rack. The rack/array is then connected to the ground via piles (posts), which are buried below ground to properly support the structure (racking and solar modules). 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 depending on geotechnical conditions as outlined above, but is essentially performed as follows:

1. piles are either driven or screwed into the ground, to a specified depth based on geotechnical and engineering requirements *
    a. in cases where special foundations, footing, and/or boreholes are required, *temporary* soil excavation and/or drilling will be required to expose sub-surface conditions and prepare them for pile insertion*;
2. soil directly beneath future rack/surrounding inserted pile is compacted and covered with crushed engineered fill (and further compacted/settled); and
3. racking hardware and module assembly are built over top of the piles.

*The preferred pile installation method is via 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. No blasting is required for either installation method. Once the piles are secured in the ground, the excavated soil will be re-filled and steps 2 and 3 above are completed.

2.3.7 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 44 modules, and a 10-MW solar farm can have as many as 900 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 may be 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.

2.3.8 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 will be used along public rights-of-way.

For the installation of electricity poles, the holes are typically augured into the ground using a truck-mounted auger device. The poles are then inserted using special 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 will install the poles and one crew will dress 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 installation work will be done by the proponent or by Hydro One.

2.3.9 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 chainlink fence with a locked gate and topped with barbed wire to meet Ontario Electrical Safety Authority requirements. The substation area will be gravelled with clean material imported to the site on an as-needed basis and sloped to facilitate drainage.

During the construction of the substation, the topsoil will be removed and approximately 600 mm of clean compacted crushed gravel will be imported on an as-needed basis. The pad will be constructed of poured concrete reinforced with rebar. The excavated topsoil will be re-used on site as feasible.

2.3.10 Clean-up and Reclamation

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

Stripped soil will be replaced and re-contoured in the construction areas and disturbed areas will be re-seeded, as appropriate. If possible, native plant species will be used for re-vegetation of disturbed areas. 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.

High-voltage warning signs will be installed at the transformer and elsewhere, as appropriate and as required by the ESA.

2.3.11 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.

2.4 Operation Activities

2.4.1 General

The solar farm will require technical and administrative staff to maintain and operate the facility. Most of the farm’s operation is run remotely, through a central monitoring hub. It is expected that a team of one or two 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). The solar farm is comprised of (10) 1 MW blocks, or group of modules and inverter and transformer combinations. Each 1-MW block (i.e., a series of array rows connected to a

single inverter) has a comprehensive control system that monitors the panel and electrical subsystems, as well as the local isolation conditions to determine whether operations should be carried out. If an event occurs which is considered to be outside the normal operating range of the array (such as electrical trips, panel weight overload (e.g., snow, extremely high winds), the SCADA system will immediately 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.

2.4.2 Routine Maintenance

Routine preventative maintenance activities are scheduled at six-month intervals with specific maintenance tasks scheduled for each interval. Maintenance is performed by removing individual MW blocks from service and inspecting the electrical, control and mechanical systems on the array. Consumables are used, such as the various greases used to keep the mechanical components operating at peak performance. Following all maintenance work on the 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 may include grass cutting, vegetation removal and fence repair. No pesticides or herbicides will be used during maintenance activities.

2.4.3 Unplanned Maintenance

Modern solar panels have no moving parts and are very reliable and the major components are designed to operate for well over 25 years. However, with the large number 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 solar farm for several hours.

2.4.4 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.

2.5 Decommissioning Activities

2.5.1 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. In order to provide sufficient area for the lay-down of the disassembled panels and racking and loading onto trucks, an area must be cleared, levelled and made accessible. The topsoil will be removed and some material may need to be added;
- Equipment will include, at a minimum: The use of cranes to remove the panels, racking, inverters and transformers and the use of trucks for the removal of panels, racking, inverters and transformers;
- Roads and culverts (if installed) will be removed unless the landowner requests that they be left in place. Road bedding material will be removed and replaced with clean sub- and top-soil for reuse by the landowner for agricultural or other purposes. If requested by the landowner, and subject to approval by the Rideau Valley Conservation Authority and/or Cataraqui Region Conservation Authority and the Ministry of Natural Resources (MNR), the culverts (if installed) will be removed and the land will be contoured to maintain the current drainage patterns; and

- Decommissioning of electrical lines and foundations. Above ground lines and poles that are not shared with Hydro One will be removed and the hydro pole holes will be filled with clean fill.

2.5.2 Land Restoration Activities

Once the equipment has been removed the land will be restored to its previous agricultural use. This will be accomplished by removing the foundations (or part of foundation) and granular material from roadways and culverts (if installed), depending on the landowner's preference. Land use will be restored using stockpiled subsoils and topsoil. If there is insufficient material onsite, topsoil and/or subsoil will be imported form a source acceptable to the landowner.

Although strict spill prevention procedures will be in place, there is the potential through the decommissioning process for small spills of solvents or fuels. Site soil conditions will be surveyed to determine if any impacts have occurred. Should soil impacts be noted, the impacted soils will be delineated, excavated and removed, adhering to regulatory standards and requirements of the day, and disposed of 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.

2.5.3 Waste Disposal

As discussed above, any waste generated at the facility during operation and decommissioning of the solar farm is minimal and there are no toxic residues. Any wastes generated will be disposed of according to standards of the day with the emphasis of recycling materials whenever possible.

2.6 Activities Schedule

Though not confirmed, the tentative timing for the general activities are Summer 2013 for construction, Fall 2013 to Fall 2033 for operation and Fall 2033 for decommissioning. Specific timing of activities listed above will be provided in the Construction Plan Report, Design and Operations Report and Decommissioning Plan Report in the complete REA submission.

3. Potential Environmental Effects

The following sections describe the potential environmental effects of the construction, operation and decommissioning of the project. A summary of the effects as they relate to project activities is included in Table 1.

3.1 Cultural Heritage

Archaeology

Construction of the project will result in the disturbance to land. As such, there is potential to disturb archaeological and heritage resources, should they exist on the site. A preliminary desktop (Stage 1) Archaeological study was completed to assess the potential for archaeological resources.

In addition, a property assessment (Stage 2) archaeological survey was completed on all lands to be disturbed which have potential for archaeological resources prior to construction in accordance with the Ministry of Tourism, Culture and Sport Guidelines. The Stage 1 background study found that the property exhibited potential for recovery of archaeological resources of cultural heritage value and concluded that a Stage 2 assessment was required. The Stage 2 was completed on the property and the characteristics of the property dictated that the Stage 2 survey be conducted both by pedestrian survey and test pit survey. The Stage 2 was conducted to document all archaeological resources on the property, to determine whether the property contains archaeological resources requiring further assessment and to recommend next steps. The Stage 2 report provided recommendations regarding additional mitigation efforts if necessary.

The results of the Stage 1 & 2 surveys are reported in (Appendix D). The Stage 2 property assessment resulted in the identification of 3 Euro-Canadian homesteads dating to the early to mid nineteenth century. The artifacts collected during the Stage 2 assessment indicated that these sites (designated as H1, H2 and H3) may represent sites of significant cultural heritage value and it was recommended that a Stage 3 assessment be undertaken.

A Stage 3 site-specific assessment was conducted in August-September 2012. Site H1 is located close to the proposed solar infrastructure. Stage 3 findings were used to determine the extent of the affected area surrounding H1 and the modifications needed for the solar panel layout. Based on the findings it was determined that the layout should be modified with a shift of some of the solar panels north on the site to provide a greater buffer between the infrastructure and the archaeological site. The Project Layout remained the same between the previous and revised layouts.

A letter of confirmation was received on April 13 from MTCS regarding the Newboro 4 solar farm project. The letter of confirmation agreed with the recommendations made in the Stage 1 and 2 Archaeological Assessments.

Should any archaeological resources be found during construction, work will suspended within the immediate area of the find site and the MTCS will be contacted immediately. A licensed archaeologist will be contracted to assess the find make recommendations on avoidance or removal should the find be determined to be significant.

Built Heritage

A cultural heritage resource assessment was conducted on the Newboro 1 solar farm. Based on project limitations and constraints mitigation options were refined for the project as follows:

1. Minimizing the visual impacts of the substation on four heritage features (CHL1, CH2, CHL3 and CHL 9) through the use of vegetative or wooden screening along the sides of the sub station visible from these resources.
2. Preparation of a landscape documentation report (prior to construction activities) to serve as final record of the resource and the project location in general.
3. Where feasible, existing fence rows and/or tree lines around the perimeter of the project location should be preserved.
4. Post-construction landscaping and rehabilitation should be undertake in a manner similar to the character of the existing cultural heritage landscapes.

A letter of confirmation from the MTCS was received on July 6, 2012 that agreed with the recommendations in the Built Cultural Heritage Assessment.

3.2 Natural Heritage and Water Features

A Natural Heritage Assessment (NHA) has been conducted and submitted as part of the REA package. This assessment included a desktop records review, site investigation, evaluation of significance and environmental impact study of all potentially significant natural features and watercourse within 120 m of the project location. Details of these studies can be found in Appendix C.

The Project Location is dominated by cultural meadow with cultural thickets and woodlots concentrated at the north end of the property. The property vegetation on and within 120 m of the Project Location is typically characterized by cultural thickets in the north and southeast portions of the property, and dry-fresh sugar maple deciduous forests along the north portion of the Project Location. The main woodland has been heavily logged which has influenced structure and composition, resulting in a patch species assemblage that is mostly dominated by young sugar maple. There is a watercourse (minor agricultural drain) located in the centre of the Project Location that extends southwest to County Rd 14.

Greater than 120 m from the Project Location is an unnamed watercourse with an associated wetland which lies to the northeast of the Project Location. There is an unnamed intermittent watercourse that lies in the western half of the project location and is located approximately 15 m from the western boundary of

the development footprint. The watercourse appears to be a man-made farm ditch dug to facilitate drainage on the adjacent fields. The watercourse does not provide fish habitat and is thought to have little ecological value. The watercourse is under the jurisdiction of the Cataraqui Region Conservation Authority and is regulated for its hydraulic function.

The MNR was consulted for further information of natural features in the area and any known significant features.

The natural features (on or within 120 m of the project location) were evaluated for their significance (*Natural Heritage Assessment Evaluation of Significance Report*, Appendix C) and the following significant natural features were identified:

- Significant woodland which includes woodland raptor wintering area; and
- Woodland Amphibian breeding habitat.

The project has been designed to avoid natural features and wildlife habitat as much as possible and to minimize impacts on natural features. Wildlife habitat may be affected during construction due to site grading or other earth-moving activities, accidental spills, removal of vegetation or direct loss of areas. In addition, bird, mammal, amphibian and reptile, fish and fish habitat may occur in the project area. There is potential for project activities to disturb these species through direct vehicle collisions or noise and visual disturbance. In order to prevent and/or minimize adverse effects on these features the mitigation measures proposed are shown in the table below and detailed in the *Natural Heritage Assessment Environmental Impact Study Report*, Appendix C.

3.3 Surface Water and Ground Water

No water taking is anticipated for any project activities.

The MOE has regulations related to water takings. Provided less than 50,000 litres per day is taken, no permit is required if there is greater than 50,000 litres per day taken, this requires a Permit to Take Water from the MOE. Regardless for the Newboro 1 project, there will not be any installing of a well, or taking of any surface water. If any water is required it will be trucked in by a licensed hauler.

No discharge of any kind in to a water body is anticipated for any project activities.

There is potential for water contamination due to accidental spills of contaminants, specifically oils and lubricants during construction or operation. Only small quantities of lubricants are present during operation. Any leaks or spills from trucks or machinery will be contained, properly cleaned and disposed of at a registered disposal facility. Refueling of all vehicles and equipment will be conducted away from watercourses during construction and off-site during operation.

3.4 Air, Odour, Dust

The project is a Class 3 solar project and will not emit any air or odour emissions beyond those described in section 2.0. Some dust is expected to be created during construction and decommissioning. Standard construction dust suppression and control may be used. Further discussion of the potential effects and mitigation measures is included in section 2.0.

3.5 Noise

A temporary increase in ambient environmental noise during construction will occur due to increased traffic and the operation of construction equipment.

The project proposes installing transformers, inverters and a substation. Each of these components will emit some sound. Noise modeling in accordance with MOE standards will be completed and all standards will be adhered to. The results will be summarized in a Noise Assessment Report. The regulatory requirement of noise emissions less than 40 dBa before 7:00 am to after 7:00 pm will be met during construction and operation of the site.

3.6 Local Interest, Land Use and Resources

According to the Ontario Oil, Gas & Salt Resources library there are no oil or gas wells in the study area.

A transmission line cross the south end of the property. The project is not expected to impact this line.

Potential short term impacts to local traffic may result from increased traffic due to construction and decommissioning. A traffic control plan will be developed.

The land is zoned Rural (RU) in the Township of Rideau Lakes zoning bylaw. The soil classification of the property is Class 4 or higher. The project will occupy approximately 90 ha of the 142 ha property and the land will not be accessible for the duration of the operation phase.

3.7 Public Health and Safety

The construction, operation and decommissioning of the proposed project is not expected to significantly affect public health and safety. The equipment and substation locations will adhere to all regulatory requirements including those to preserve public safety such as setbacks from roads, property lines and residences. All electrical equipment will be designed and installed in accordance with the ESA standards and will be equipped with proper safety signage. The transformer substation will be surrounded by a fence to prevent public and large animal access. Some individuals may find the sound from the equipment under certain operational conditions to be somewhat irritating.

The project will connect to the local distribution system, owned and operated by Hydro One Networks Inc. There is no potential for stray voltage to occur. Stray voltage occurs when there is a voltage potential difference between grounded equipment and the customer neutral from the electrical distribution supply at a customer connection. When this Neutral to Earth Voltage exists, there can be a voltage difference between ground at various locations on the customer's facilities due to the currents flowing from the distribution system neutral to the ground. At a voltage difference above about 10 volts people may detect a tingle. Livestock such as dairy cattle are sensitive to these small tingle voltages that are not a health hazard to humans. Hydro One has a standard for how they will deal with stray or tingle voltage complaints. The local distribution company is responsible for addressing stray voltage concerns. Moreover, all electrical equipment and design must meet the Ontario Electrical Safety Code and be certified by the ESA. A complaint tracking system will also be documented in the Environmental Effects Monitoring Plan.

3.8 Areas Protected under Provincial Plans and Policies

The project will not impact any lands under Provincial Plans and Policies. The site is not located in an area covered by: the *Greenbelt Act* or plan; The Oak Ridges Moraine Conservation Plan Area; The Niagara Escarpment Plan Area; or The Lake Simcoe Watershed Plan.

3.9 Provincial and Local Infrastructure

The construction, operation and decommissioning of the proposed project is not expected to negatively affect provincial or local infrastructure. Some increase in local traffic will occur during construction and decommissioning activities.

3.10 Summary of Potential Effects and Potential Mitigation Measures

A preliminary summary of these potential effects and potential mitigation measures are presented in the table on the following pages.

Project Activity	Potential Effects	Mitigation Strategy	Residual Effects
Construction Activities			
1.1 Construction Activities	Disturbances to wildlife & birds due to construction activities	○ Ensure no loss of woodland beyond Project Location ○ Clearly marked construction limits ○ Site will be re-vegetated as an open meadow after construction ○ Minimal time required to complete activities	○ None Anticipated
	Impacts to vegetation and soil through site clearing, grubbing and soil excavation	○ Site clearing and grubbing will be kept to a minimum area on-site by staking and marking off the areas that define limits of the work to be done ○ Ensure no loss of woodland beyond Project Location ○ No vegetation clearing adjacent between early April and late June ○ Excavated soil will be re-used on-site where feasible, or disposed of in a proper facility off-site. ○ Sedimentation and erosion controls	○ None Anticipated
	Impacts to surface water features from construction	○ Adherence to setback, maintain a vegetated buffer from watercourse, and enhance vegetation within buffer zone where deficient ○ Complete permitting process with the RVCA and/or CRCA, if required ○ Proper sizing and installation of culverts (if required) ○ Stabilization of disturbed surfaces to prevent erosion ○ Installation of light duty sedimentation fencing installed around work area during construction	○ None Anticipated
	Potential short-term closures on local roads to provide room for trucks to deliver project components. A short-term increase in truck traffic during construction period.	○ Delivery of equipment will be coordinated with local traffic patterns ○ Traffic control plan will be developed	○ Minor traffic delays

Project Activity	Potential Effects	Mitigation Strategy	Residual Effects
	Archaeological resources	○ Stage 1 & 2 archaeological field surveys of all areas to be disturbed showed 3 sites (H1, H2 and H3) of which only H1 is close to the project infrastructure ○ Complete a Stage 3 site-specific assessment to determine extent of H1 and review/revise project layout to minimize potential impact on site H1 ○ If any unknown archaeological resources are found then follow MTCS protocols/guidelines (if practical, the resources will be removed and catalogued in accordance with MTCS guidelines)	○ None Anticipated
	Fuel or transformer oil spill	○ Any leak or spills from trucks or machinery would be contained and site would be properly cleaned up and disposed of at registered disposal facilities ○ Use of SorbWeb to deal with potential spills that may occur with the substation ○ Transformers used in the project are silicone based and do not contain hydrocarbons ○ Refuelling of all vehicles and equipment will be done away from watercourses during construction	○ None Anticipated
	May experience annoyance with dust and/or noise	○ Dust suppression measures will be employed, as necessary ○ On-site supervisor to address any noise complaints	○ Minor short-term annoyances
Operational Activities			
2.1 Solar Farm Operation	Reduction in aesthetic quality of landscape	○ Complaints tracking ○ Adherence to noise setbacks will site inverters away from residents	○ Change in view for nearest neighbours
	Noise impacts on receptors (residents located on non-lease properties)	○ Adherence to noise setbacks ○ Noise modelling to predict sound levels ○ Repair equipment in a timely manner ○ Complaints tracking	○ None Anticipated
	Disturbance to wildlife & birds	○ Adherence to setbacks ○ Delay grass cutting until mid-July	○ None Anticipated

Project Activity	Potential Effects	Mitigation Strategy	Residual Effects
	Spill of transformer oil	○ SorbWeb will be installed as a means of controlling impact from spills ○ Proper disposal of waste materials ○ No re-fuelling on-site during the operation phase	○ None Anticipated
Decommissioning Activities			
3.1 Removal of Equipment	Surficial disturbance	○ Re-grading of site & land use restored after equipment disturbances complete ○ Install erosion control measures	○ None Anticipated
	Sensory disturbance (sound and visual presence)	○ Complaints tracking ○ Impacts from equipment usage & personnel present will be short term	○ Minor short-term annoyance
	Dust	○ Watering of exposed soils ○ Maximum speeds	○ Minor short-term annoyance
3.2 Removal of Transformer	Spill of transformer oil	○ SorbWeb will be maintained during decommissioning to prevent soil contamination in the event of a leak ○ Proper disposal of waste materials	○ None Anticipated
Accidents and Malfunctions			
4.1 Accidents & Malfunctions	Land contamination from lubricant/transformer fluid leak or spill and lightning strikes	○ Any leak or spills from trucks or machinery would be contained and site would be properly cleaned up and disposed of at registered disposal facilities ○ Small quantities of lubricants present in the tracking system ○ Transformers used in the project are silicone based and do not contain hydrocarbons ○ Refuelling of all vehicles and equipment will be done away from watercourses during construction and no re-fuelling on-site during operation phase	○ None Anticipated
	Public safety	○ Proper signage warning of electrical danger ○ Siting on private property which restricts public access to the site ○ Fencing of the project area and substation for security based on standard utility practices	○ None Anticipated