

Barlow Solar Energy Centre Project Summary Report

A Summary of Renewable Energy
Approval Reports



Prepared for:
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Sign-off Sheet

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Abbreviations

AC	Alternating current
ANSI(s)	Area(s) of Natural and Scientific Interest
CEEMP	Construction Environmental Effects Monitoring Plan
CEMP	Construction Environmental Management Plan
CIA	Connection Impact Assessment
cm	Centimetre(s)
CN	Canadian National Railway
COD	Commercial Operation Date
dBA	A-weighted decibels
DC	Direct Current
DFO	Fisheries and Oceans Canada
EIS	Environmental Impact Study
Hydro One	Hydro One Networks Inc.
km	Kilometre(s)
kV	Kilovolt(s)
M	Metre(s)
MBCA	<i>Migratory Bird Convention Act</i>
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of the Environment and Climate Change
MTCS	Ministry of Tourism, Culture and Sport
MWac	Megawatt alternating current

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NHA	Natural Heritage Assessment
NHAG	Natural Heritage Assessment Guide
OEB	Ontario Energy Board
PCC	Point of Common Coupling
POR(s)	Point(s) of Reception
PV	Photovoltaic
REA	Renewable Energy Approval
SARA	<i>Species at Risk Act</i>
SCADA	Supervisory control and data acquisition
the Project	Barlow Solar Energy Centre
the Proponent	Barlow Energy Centre Limited Partnership

BARLOW SOLAR ENERGY CENTRE PROJECT SUMMARY REPORT

Introduction
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1.0 INTRODUCTION

1.1 OVERVIEW

Barlow Energy Centre Limited Partnership (the Proponent), is proposing the development of a 10 megawatt alternating current (MWac) solar energy generating facility, known as the Barlow Solar Energy Centre (the Project) approximately 10 kilometres (km) west of the city of Cornwall. The Project Location is primarily in the Township of South Stormont, United Counties of Stormont, Dundas and Glengarry, Ontario, however the Point of Common Coupling (PCC) will be located within the road allowance of Cornwall Centre Road, in the City of Cornwall, Ontario (**Figure 1 & 2, Appendix A**). A Trans Northern Pipeline Inc. pipeline and Hydro One Networks Inc. (Hydro One) transmission line bisect the Project. The Project will require a Renewable Energy Approval (REA) as per Ontario Regulation (O. Reg.) 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act, under the *Environmental Protection Act* (MOECC 2009, amended 2016).

The Proponent is proposing to develop, construct and operate the Project on 94 acres (38 ha) of land (i.e., size of Project Location) in response to the Government of Ontario's Large Renewable Procurement initiative to promote the development of renewable electricity in the province.

The term "Project Location" is defined by O. Reg. 359/09 as:

"a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project" (MOECC, 2009, amended 2016).

The Proponent has retained Stantec Consulting Ltd. (Stantec) to prepare a REA application, as required under O. Reg. 359/09. The proposed solar PV distribution grid connected system would be considered a Class 3 Solar Facility under O. Reg. 359/09, s. 4.

1.2 REPORT REQUIREMENTS

O. Reg. 359/09 requires the preparation of a series of reports which are submitted as part of the REA application to the Ministry of the Environment and Climate Change (MOECC), and are provided in draft format for review and comment to Aboriginal communities, municipalities, and the public.

This Project Summary Report provides a summary of each draft report (with the exception of the Consultation Report) that will be included as part of the REA application. Comments and feedback received from Aboriginal communities, municipalities, and the public will be considered and incorporated by the Project team prior to the final public meeting for the Project and submission of the REA application to the MOECC.

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This Project Summary Report includes a summary of the following draft reports:

- Project Description Report
- Construction Plan Report
- Design & Operations Report
- Decommissioning Plan Report
- Natural Heritage Assessment and Environmental Impact Study
- Water Assessment and Water Body Report
- Acoustic Assessment Report
- Stage 1-2 Archaeological Assessment Report
- REA Checklist: Consideration of Potential for Heritage Resources

BARLOW SOLAR ENERGY CENTRE PROJECT SUMMARY REPORT

Project Information
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2.0 PROJECT INFORMATION

This section of the report provides an overview of the Project, Project components, activities and schedule.

2.1 KEY PROJECT FACTS

Key facts of the Project are provided in **Table 2.1**.

Table 2.1: Key Project Facts

Name of the Project	Barlow Solar Energy Centre		
Proponent	Barlow Energy Centre Limited Partnership		
Project Location	The Project Location includes 94 acres (38 ha) of land in the Township of South Stormont, United Counties of Stormont, Dundas and Glengarry, Ontario. The PCC will be located within the road allowance of Cornwall Centre Road, in the City of Cornwall.		
Land Ownership	Privately-owned land leased by the Proponent for a period of 20 or more years, and the road allowance of Cornwall Centre Road owned by the City of Cornwall (for the PCC). The lease agreement provides the Proponent with permission to access and use the land for the purpose of the Project.		
Legal Description of Land Parcel	Parts of lots 20 and 21, Concession 4, Township of South Stormont, United Counties of Stormont, Dundas and Glengarry, Ontario.		
Energy Source	Solar facility that would utilize sunlight as a source of energy. No other supplementary sources of fuel will be used to generate electricity.		
Nameplate Capacity	10 MW		
Class of Facility	Class 3 Solar Facility under O. Reg.359/09, Section 4. This classification consists of solar facilities with nameplate capacities exceeding 10 kW that are in any location other than mounted on the roof or wall of a building.		
Contact Information	Contact information for the Proponent and consultant is as follows: <table><tr><td>Kevin Campbell Senior Developer Barlow Energy Centre Limited Partnership 53 Jarvis Street, Ste. 300 Toronto, ON M5C 2H2 Phone: (416) 216-5053 Email: Kevin.Campbell@edf-en.ca Project Website: http://www.edf-en.ca/project/barlow-solar-energy-centre</td><td>Tanya Turk Project Manager Stantec Consulting Ltd. 300-675 Cochrane Drive Markham, ON L3R 0B8 Phone: (905) 415-6416 Email: Tanya.Turk@stantec.com</td></tr></table>	Kevin Campbell Senior Developer Barlow Energy Centre Limited Partnership 53 Jarvis Street, Ste. 300 Toronto, ON M5C 2H2 Phone: (416) 216-5053 Email: Kevin.Campbell@edf-en.ca Project Website: http://www.edf-en.ca/project/barlow-solar-energy-centre	Tanya Turk Project Manager Stantec Consulting Ltd. 300-675 Cochrane Drive Markham, ON L3R 0B8 Phone: (905) 415-6416 Email: Tanya.Turk@stantec.com
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2.2 PROJECT ACTIVITIES

A summary of the key activities that will occur during construction, operation, and decommissioning of the Project are provided in **Table 2.2**.

Table 2.2: Key Project Activities

Project Phase	Activities
Construction	Site grading
	Access road preparation
	Installation of foundations and racking
	Panel installation
	Installation of inverter step-up transformers, inverters, main power transformer (if applicable) and substation equipment
	Installation of collector cables and connection line
	Reclamation of temporary work areas
	Site landscaping
Operation	Preventative maintenance
	Unplanned maintenance
	Meter calibrations
	Site/ground maintenance
Decommissioning	Disconnect the connection line from the distribution grid
	Removal of solar panel infrastructure
	Removal of inverter step-up transformers, inverters, main power transformer (if applicable) and substation equipment
	Removal of fencing, roads and site grading (dependent upon new proposed use)
	Excavation and removal of collector cables and foundations (up to 1 m depth below original grade) depending upon agreement with property landowner
	Re-establishment of tile drainage system for agricultural purposes provided that land is intended to return to agricultural production

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2.3 PROJECT SCHEDULE

An overview of the project schedule is provided in **Table 2.3**.

Table 2.3: Project Schedule Overview

Milestone	Approximate Date
Initiate Public REA Process	Spring 2016
REA technical studies	Ongoing through to fall 2016
Public Meeting #1	October 2016
Draft REA Reports to Public	January 2017
Final Public Meeting	April 2017
Submission of REA application to the MOECC	June 2017
REA Approval	December 2017
Start of Construction	February 2018
Commercial Operation Date (COD)	December 2018
Repowering/Decommissioning	2038 (20 or more years after the COD)

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Summary of Draft REA Documents
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3.0 SUMMARY OF DRAFT REA DOCUMENTS

The following sections provide a summary of each draft document that will be provided as part of the Project's REA application once comments and feedback from Aboriginal communities, municipalities, and the public have been incorporated. Each document summarized below was prepared in accordance with O. Reg. 359/09, and in consideration of the Ministry of Natural Resources and Forestry (MNRF)'s *Approval and Permitting Requirements Document for Renewable Energy Projects* (2009), and the MOECC's *Technical Guide to Renewable Energy Approvals* (2017).

3.1 PROJECT DESCRIPTION REPORT

The Project Description Report is the central summary document for the REA application and provides an overall view of the Project and a description of Project components, along with details regarding Project contacts, location of the Project, type of energy and technology to be used, nameplate capacity, and facility class. The report also identifies the key activities to be engaged in, a preliminary Project schedule, and other permits and approvals that may apply to the Project outside of the REA process, and summarizes the potential environmental effects of the Project by providing the key results of the more detailed assessments conducted in other REA reports.

3.1.1 Authorizations Potentially Required

The potential federal, provincial and municipal permits, approvals, and agreements (collectively referred to as the Authorizations) which may be required for this Project in addition to the REA are listed in **Table 3.1**. As the Project studies progress, this information will be updated as required.

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Table 3.1: Key Permits and Authorizations

Administering Agency	Key Permit / Authorization	Rationale
FEDERAL AUTHORIZATIONS		
Environment Canada	Clearing of vegetation under the <i>Migratory Bird Convention Act</i> (MBCA) (1994)	No permit is necessary; however, precautions need to be made so that no breeding birds or their nests are harmed or destroyed during the bird nesting season. Nest sweeps will be required at a maximum of 7 days prior to vegetation removal during the bird nesting season (April 1 to August 31), as per the MBCA.
Fisheries and Oceans Canada (DFO)	Review and authorization under Section 35 of the <i>Fisheries Act</i> (1985)	Works associated with the Project will require assessment to determine if a <i>Fisheries Act</i> review is required. A Self-Assessment should be completed for all work near water, to document potential impacts and mitigation measures with respect to water bodies within 120 m of the Project Location. The impact assessment should be submitted to DFO for review, as the installation of culverts (temporary or permanent) is an activity that does not meet the exclusion criteria on DFO's website. It is anticipated that potential impacts associated with other Project activities presented in the <u>Water Assessment and Water Body Report</u> can be mitigated.
	Permitting under Section 32 of the <i>Species at Risk Act</i> (SARA) (2002)	As there are no federally listed aquatic species at risk in the Project Location, a SARA permit for aquatic species at risk is not required.
PROVINCIAL AUTHORIZATIONS		
Ministry of Transportation	Change of Access and Heavy/Oversize Load Transportation Permit	To maintain compliance with provincial highway traffic and road safety regulations for transport of project components to the site.
MNRF	Approvals under the <i>Endangered Species Act</i> , 2007 (ESA)	Based on work completed during the REA process, and consultation with the MNRF, application for a permit is not required.

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Table 3.1: Key Permits and Authorizations

Administering Agency	Key Permit / Authorization	Rationale
	Approval under the <i>Fish and Wildlife Conservation Act, 1997</i>	In-water work to install the temporary and permanent culverts along Cornwall Centre Road will require work area isolation and a fish removal. Therefore, it will be necessary to apply for a License to Collect Fish for Scientific Purposes (post-REA), which is issued under the <i>Fish and Wildlife Conservation Act</i> .
Raisin Region Conservation Authority (RRCA)	Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses Permit	Consultation by the Proponent with the RRCA will continue to determine if the watercourses historically mapped within the Project Location will require permitting for work within a floodplain.
Electrical Safety Authority	Electrical Safety Code Certification	Electrical systems and connections will require inspection/Authorization.
Ministry of Labour	Notice of Project	Notify the Ministry of Labour before construction begins.
Ontario Energy Board (OEB)	Generator license	A license will be needed from the OEB in order to generate electricity.
Hydro One Networks Inc. (Hydro One)	Connection Impact Assessment (CIA)	Technical documentation submitted for review and comment by Hydro One to maintain technical compliance with the Distributed Generation Technical Interconnection Requirements. Upgrades and changes to the utility system will be identified by Hydro One as part of this submission.
	Connection Cost Agreement	Recovery of costs to Hydro One of changes to allow connection based on findings from the Connection Impact Assessment.
	Confirmation of Verification Evidence Report	Document to ensure that Project is designed with the required protections as identified in the CIA, and verified to function as designed.
	Distribution Connection Agreement	Legal agreement that outlines the project characteristics and operating procedures that are to be maintained and adhered to while Project is connected to Hydro One distribution system.

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Table 3.1: Key Permits and Authorizations

Administering Agency	Key Permit / Authorization	Rationale
MUNICIPAL AUTHORIZATIONS		
Township of South Stormont	Building Permit	May be required for compliance with building codes.
City of Cornwall	Entrance Permit	Required if an entrance from a municipal road is to be constructed.
City of Cornwall	Road Use Agreement	May be required for use of roads to construct/operate the facility and for works in municipal road allowances.

3.1.2 General Design and Siting Considerations

The key mitigation strategy used to address potential environmental effects from construction and operation of the facility was avoidance of significant natural and socio-economic features during siting of the Project. The original Project Location encompassed the entirety of the lands leased by the Proponent and was assessed during technical studies and modified, where necessary. Site investigations identified water bodies adjacent to the Project Location boundary. As a result, solar panels, inverters and transformers have been set back a minimum of 30 m from water bodies.

The Project Location is predominantly zoned as Flood Plain, but a portion in the north is zoned as Rural. The Proponent is currently in consultation with the Township and the RRCA to determine the necessary permitting requirements and guidelines.

Trees will be planted in early 2019 along Cornwall Centre Road on the outside of the Project Location boundary and perimeter fencing. The vegetation barrier is proposed to eventually partially mitigate the visual impact of the facility. Upon construction completion, the secondary access road will be naturalized and planted with trees along the Project Location boundary.

3.1.3 Key Net Environmental Effects of the Project

3.1.3.1 Construction

No known cultural heritage or archaeological resources exist within the Project area. Potential effects are limited to the finding of previously undiscovered artifacts or human remains.

Potential net effects on significant wetlands, significant woodlands and Generalized Candidate Significant Wildlife Habitat (SWH) would be spatially limited.

Potential effects from odour and dust will be intermittent. Air emissions from construction vehicles and equipment are short-term and intermittent, and will have negligible adverse residual effects on ambient air quality. Noise effects during construction would be frequent, but would be short-

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term, intermittent and reversible. Any net effects are expected to be limited to short-term, intermittent noise increases at the work areas and/or along the haul routes.

Although trees will provide a partial visual screen once they grow to a mature size, surrounding residents may experience a general visual or sensory nuisance from Project construction activities.

The Project will take the current Project Location lands out of agricultural production, but will return those lands to a state similar to the current state at the time of decommissioning. Construction and decommissioning activities have the potential to alter the agricultural capacity of the land through improper stripping, storage and replacement of topsoil resulting in topsoil and subsoil mixing, compaction, rutting, and erosion. Consequently, crop yields can potentially decrease.

If accidental spills occur, they are anticipated to occur infrequently and be spatially limited.

The general contractor will develop and implement a Traffic Management Plan and the Proponent may negotiate a Road Use Agreement with the municipalities to reduce the risk of accidents. The effect of constructing the various Project components is anticipated to have a limited, short term effect on traffic and roads during construction.

With the implementation of the mitigation measures outlined in the Construction Plan Report and adherence to safety policies and regulations, a minimal increase or new risk to public health and safety and no significant adverse residual effects to socio-economic or environmental features or conditions are anticipated during construction of the Project.

3.1.3.2 Operation

No significant adverse net effects on archaeological or cultural heritage resources are anticipated during operation of the Project. During operation there may be occasional maintenance activities required, but this will occur outside of all wetland, woodland and Generalized Candidate SWH boundaries. Potential for impacts such as dust and spills are considered low from maintenance activities. Maintenance activities are expected to occur occasionally and will be short term in duration and spatially limited.

Negative environmental effects to water wells are not anticipated during operation of the Project. Water taking activities are not anticipated during operation of the Project.

Spills are unlikely to occur and if they do, they are anticipated to occur infrequently and be spatially limited.

During the operational phase of the Project, no substantive emissions of air contaminants are expected. Minor localized air emissions would occur from the periodic use of equipment for general repairs, maintenance of Project components and vehicles. The Project has no facilities

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or equipment that will discharge contaminants or pollutants to the air during operation of the Project. Sources of localized emissions during operation are considered negligible. The application of the recommended mitigation measures during operations should limit air emissions to the work areas and limit the magnitude of combustion emissions (e.g., operations and maintenance vehicles).

Noise levels during the Project's predictable worst case scenario is expected to meet the MOECC criteria at applicable Points of Reception (PORs).

Trees will be planted along Cornwall Centre Road to partially mitigate visual impacts from the facility. However, visual nuisance to the community may occur due to the presence of the facility during the operational phase of the Project. Project infrastructure is removable and, as a result, the visual impact is considered temporary and reversible.

The Project will take the current Project Location lands out of agricultural production, but will return those lands to a state similar to the current state at the time of decommissioning. Operation activities have the potential to alter the agricultural capacity of the land following decommissioning of the Project. Compaction of topsoil and erosion of surface soil may occur during operation and can potentially decrease crop yields. The agricultural productivity of the Project Location will be lost during construction and operation of the Project, however, the effects to the agricultural soils are expected to be temporary and spatially limited.

With the implementation of the mitigation measures provided in the Design & Operations Report and adherence to safety policies and regulations, no significant risks to public health and safety or adverse residual effects to socio-economic or environmental features or conditions are anticipated during operation of the Project.

3.2 CONSTRUCTION PLAN REPORT

The Construction Plan Report details the Project activities related to the construction phase so that potential adverse environmental effects may be identified. This includes detailed descriptions of the construction and installation activities, the location, timing and duration of construction activities, the potential adverse effects as a result of constructing the Project, and the proposed mitigation and monitoring measures.

3.2.1 Construction and Installation Activities Overview

Site preparation will include surveying, installing sediment and erosion controls, stripping the topsoil as required to prevent mixing with subsoil, and site grading. These activities will be conducted prior to onset of installation activities.

The existing primary access road, proposed secondary temporary access road and temporary staging area will be constructed on site from gravel and graded to facilitate drainage. Entrance

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culverts will be installed or upgraded as necessary within the road allowance of Cornwall Centre Road to facilitate construction of the access roads. All solar photovoltaic (PV) modules will be mounted on racks in rows. The racking foundations will be installed using generic helical piers or machine augered holes with either poured concrete or compacted stone footings. The racking foundations will be installed below the frost line. Alternatively, pre-cast pads may be positioned on-grade.

Four stations (each with one or more inverters and inverter step-up transformers) will be located within the Project Location. The specifications of the inverters will be determined by the Proponent during the detailed design phase, at which time the manufacturer of the inverters and inverter step-up transformers will be selected by Proponent or the general contractor. The stations will likely rest on an elevated platform at least 30 cm above the floodplain and supported by helical piles or concrete piers. The inverters, inverter step-up transformers, and ancillary equipment will be either fully assembled upon delivery, or will be assembled at the Project Location.

The Project will require a substation. A main power transformer is being considered but may not be required. The specific make of the substation equipment will be selected by the Proponent or general contractor during the detailed design phase and based on specifications provided by the Proponent. All equipment will be preassembled before it is transported to the Project Location. A control building and small permanent parking area will be constructed adjacent to the substation. Excavations of approximately 1-2 m depth will be required for the equipment and building foundations and for underground utilities. The entire substation area will be raised approximately 1 m with fill material to elevate the ground level a minimum of 30 cm above the floodplain. Fill material will either be sourced on site or from a nearby quarry. The substation equipment will be supported by either cast-in place slab-on-grade concrete pads or structural steel piers and the substation area will be graded and overlaid with a clear stone granular material. The control building footings, equipment pad and supports will be constructed from concrete. Excavations will be backfilled using granular fill and excavated materials.

An operations and maintenance storage area will be constructed and comprise of one or two 40 foot storage containers installed within the raised substation area to elevate the containers 30 cm above the floodplain and upon an area of compacted gravel or set upon a concrete pad.

Direct current (DC) and alternating current (AC) collector cables may be buried, or if routed above grade, at least 30 cm above the floodplain level. An AC overhead connection line, approximately 57 m long, is required from the substation to PCC. Alternatively, the connection between the substation and the PCC could be installed underground, in which case open cutting or trenchless crossing of the watercourse along the north side of Cornwall Centre Road would be required.

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A steel chain link fence topped with barbed wire will be constructed around the entire perimeter of the facility. The fence posts will be secured into the ground using cement. A separate chain link fence will be installed around the perimeter of the substation site.

The solar panels would be delivered to the Project Location either by the Proponent or by the solar panel manufacturer on standard enclosed and open tractor trailers. Inverters, inverter step-up transformers, substation components and precast concrete products would be delivered by flatbed truck and trailer. Containers would arrive on a standard roll-off truck. A small truck mounted crane will be used to lift other products and skids from trucks and place them directly onto the prepared surfaces.

After all major construction activities are complete, the work areas will be remediated and returned to their pre-construction condition. All debris and surplus material will be removed from the Project Location. The temporary staging area will be restored to a condition acceptable to the landowner. Topsoil that was removed and/or stockpiled during construction will be redistributed, as appropriate, to enable the Project Location to return to agricultural use following decommissioning of the facility. Areas beneath and surrounding the solar panels will be vegetated with native species. Tree planting will occur along Cornwall Centre Road, outside of the perimeter fencing.

A description of the main construction activities is provided in **Table 3.2**. Construction activities leading up to Project operations are anticipated to take approximately 8-10 months.

Table 3.2: Construction Activities – Projection and Schedule

Phase Details Sequence	Estimated Schedule
1. Surveying	Summer 2016 to Spring 2017
2. Culverts (in-water works)	Q1 2018 (before March 15 th)
3. Delivery of construction materials, storage materials, site preparation	Q2 2018
4. Solar panel delivery and installation	Q2-Q3 2018
5. Installation of collector cables	Q2-Q3 2018
6. Installation of interconnect facility	Q2-Q3 2018
7. Reclamation of temporary work areas, final grading, topsoil replacement	Q4 2018
8. Project Performance Testing	Q4 2018
9. Commercial Operation	Q4 2018
10. Tree planting along Cornwall Centre Road	Q2 2019

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3.2.2 Summary of Key Potential Construction Effects, Mitigation, and Monitoring

As the Project Location and all construction activities are sited outside all significant wetland and woodland boundaries, there will be no direct loss of significant wetlands or woodlands habitat or function. Potential negative effects include habitat avoidance/disturbance caused by noise, but species are not considered highly sensitive to temporary disturbances. Indirect impacts such as noise, dust generation, sedimentation and erosion are expected to be short term, temporary and mitigated through standard site controls. Mitigation measures include avoiding development within significant natural features, delineating work areas, installing silt fence(s), having environmental inspector monitor construction, undertaking maintenance activities, vehicle refueling or washing, and storage of chemical and equipment in designated areas away from significant natural features, conducting spill response if necessary, and replanting damaged vegetation.

Potential impacts to water may include erosion or sedimentation of water bodies, reduced bank stability, reduced water quality, disturbance to aquatic biota and/or habitat, entry of deleterious substances into surface water, changes to habitat or riparian vegetation, and/or changes to fish passage. General mitigation measures for construction activities near water bodies include completing in-water work within MNRF timing windows, conducting construction activities in a manner that reduces the risk of accidental spills entering into surface waters, implementing and maintaining erosion and sediment controls, and implementing a spill response plan. The report also includes specific mitigation measures for new culvert crossings and collector cables installation. In addition, outside of the REA requirements, a Surface Water Runoff Study is being completed for the Project to evaluate the effects of the proposed Project on the quantity of surface water runoff. Upon completion of the study, it will be used to inform detailed design of the site drainage and stormwater management controls. The Surface Water Runoff Study will also be provided to the MOECC.

Operation of construction vehicles and equipment will result in a minor localized increase of air emissions. Mitigation measures include equipment maintaining in compliance with regulatory requirements, protecting stockpiles of friable material with a barrier, applying dust suppressants, avoiding idling of vehicles and equipment, and turning vehicles and equipment off when not in use.

Surrounding residents, businesses and wildlife may experience a noise nuisance associated with construction activity. Equipment will be compliant with MOECC sound levels. Engines will be equipped with mufflers and/or silencers. On-site construction activities will occur in accordance with the City of Cornwall Noise By-law (1996). Consultation with surrounding landowners has and will continue to occur to identify methods of minimizing disturbance to their property.

Due to increased traffic as a result of construction, a Traffic Management Plan will be implemented and a Road Use Agreement may be negotiated to reduce the risk of accidents.

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Waste and accidental spills have the potential to contaminate soil and/or water resources. Mitigation measures include appropriate storage of materials, proper disposal, refueling in designated areas, and implementing adequate spill response in a timely manner.

Interactions with residents, vehicles and construction activities may occur. The Proponent will consult with residents in advance of construction commencement and provide contact information for a designated representative. Safety fencing will be installed at the edge of the construction area and the Construction Environmental Management Plan (CEMP) will be implemented.

3.2.3 Construction Environmental Management Plan

The Proponent, in consultation with the general contractor, will prepare a CEMP prior to the initiation of any construction activities occurring within the Project Location. The CEMP will be the controlling plan for all construction activities, and will be designed to minimize potential adverse environmental effects based on the environmental effects and mitigation measures identified in the Construction Plan Report, and other reports submitted as part of the REA application.

The CEMP will include the following plans:

- Traffic Management Plan
- Waste Management Plan
- Emergency Response and Communications Plan
- Complaint Response Protocol

The Proponent will provide overall direction and assume responsibility for the development and implementation of these plans. Additional information regarding the CEMP is available in the Construction Plan Report.

3.2.4 Construction Environmental Effects Monitoring Plan

The primary objective of the Construction Environmental Effects Monitoring Plan (CEEMP) is to assess the impacts of construction activities on environmental features and to verify that mitigation measures and contingency planning are effectively implemented.

The CEEMP includes performance objectives, monitoring activities and contingency plans based on the potential effects and mitigation measures identified in Section 5.0 of the Construction Plan Report. Additional environmental effects monitoring will take place during the operation of the Project and may consist of similar monitoring activities as described below.

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3.3 DESIGN & OPERATIONS REPORT

The Design & Operations Report details the activities planned to occur during the operational phase of the Project. It builds on the Project Description Report by providing a facility site plan and further details regarding the design of the facility and the equipment to be used. The report also identifies the potential environmental effects as result of operating the Project and the proposed mitigation and monitoring measures. The Emergency Response and Communications Plan is also outlined.

3.3.1 Site Plan

A Site Plan showing the proposed location and extent of Project components is included in Appendix A of the Design & Operations Report, along with other figures showing existing features that are subject to the siting requirements of O. Reg. 359/09. Collectively, Appendix A in the Design & Operations Report includes the following figures:

- Figure 1 – Project Location
- Figure 2 – Site Plan: Conceptual Project Component Layout
- Figure 3 – Socio-Economic Features
- Figure 4 – Natural Features and Water Bodies
- Figure 5 – Points of Reception

3.3.2 Facility Component Overview

The existing entrance from Cornwall Centre Road will be used for permanent access to the site. Gravel access roads within the site will provide access to the facility for the duration of the Project.

The Project will include the installation of approximately 30,000 to 50,000 solar panels. The exact make and model of the solar panels will be determined at a later date, but are anticipated to have a rated power of 300-420 watts per panel and measure approximately 2 m long by 1 m wide. Each solar panel will be mounted on a galvanized steel and/or aluminum rack system that is positioned approximately 0.5 to 1.5 m above finished grade either at an angle between 20 and 40 degrees (fixed tilt) or with a +/- 60-degree range of motion (single axis tracking).

Four stations including one or more inverter step-up transformer(s) and inverter(s) will be located within the Project Location. The inverters will convert the DC electricity to AC electricity while the inverter step-up transformers will step-up the AC voltage. In the event that no main power transformer is utilized at the substation, the inverter step-up transformers will raise the voltage to 44 kilovolt (kV). If the final design includes a main power transformer at the substation, the inverter step-up transformers will raise the voltage to either 27.6 kV or 34.5 kV. The electricity is then delivered to the local distribution grid level through the substation.

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The Project will require a 44kV substation comprised of circuit breakers, disconnect switches, surge arresters, station service transformer for auxiliary services, revenue metering equipment, and control building. A main power transformer is being considered and will be determined during the detailed design phase. In the event that a main power transformer is included in the final design, the voltage will be raised from 27.6kV or 34.5 kV to 44 kV at the substation. The equipment in the substation will also provide a supervisory control and data acquisition (SCADA) system for protection, control and monitoring of the substation and the facility.

The 1,500 volt (or below) DC electricity generated from the solar panels will be collected at combiner boxes and transported via underground cables to the inverters where it will be converted to AC electricity. The 27.6 kV / 34.5 kV / 44 kV AC electricity from all inverter step-up transformers will be collected via underground cables to the substation.

A 44 kV AC connection line, approximately 57 m long, is required from the substation to the PCC where Hydro One will connect the Project to the existing 44 kV distribution line about 700 m to the east near the intersection of Cornwall Centre Road and Power Dam Drive in the city of Cornwall.

An operations and maintenance building is not currently planned for the site. An operations and maintenance storage area will be comprised of one or two 40 foot storage containers with locking doors. The storage containers will be used to store equipment and spare parts used for maintenance activities.

The entire facility will be surrounded with a chain link fence topped with barbed wire to prevent unauthorized access. A gate will be installed at the main entrance from Cornwall Centre Road to provide access for maintenance personnel and emergency vehicles.

No waste management equipment or facilities are required during Project operation. A small waste bin(s) will be located near the main entrance to collect small quantities of domestic waste and debris resulting from maintenance activities (e.g., broken equipment parts and packaging). The Proponent will hire a licensed waste disposal company to periodically empty the bins. Small amounts of waste lubricants and oils may be generated during regular maintenance activities of the equipment throughout the operation phase. A licensed contractor will be responsible for disposing waste at an approved facility when the need arises. Any large waste generated during operation will be hauled off-site for disposal at an accredited waste disposal facility.

3.3.3 Facility Operations Plan

Operation activities include continuous remote monitoring of the facility, planned and unscheduled maintenance, and inspection activities.

An Operations Manager will be responsible for the day-to-day management of all Project facility operations and developing a schedule for regular inspections and routine maintenance of the

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facility components and equipment. Additional responsibilities will include staff training, health and safety training and compliance, spill and emergency response plans and reporting, predictive/preventive maintenance, unscheduled maintenance, and procurement of spare parts and equipment.

Remote monitoring of the performance of the facility would occur 24 hours a day, 7 days a week via a SCADA monitoring system. The SCADA system will identify potential damage or faults with the solar panels and electrical infrastructure so that proactive inspection and maintenance can be undertaken.

Routine maintenance of Project equipment will be key to mitigating equipment failure. Preventative maintenance activities will generally occur every one to six months, depending on the activity. Unscheduled maintenance and repairs will occur as needed based on inspections.

It is anticipated that water from precipitation will be sufficient for cleaning the solar panels; if not, they would be pressure-sprayed with water supplied in tanker trucks from off-site sources. No cleaning solutions are anticipated to be used. In the winter, the access road will be ploughed when necessary for the maintenance activities. In terms of snow accumulation on the panels, it is expected that snow will melt or slide off due to the tilt of the panels.

Spill response equipment will be provided on site or in the maintenance trucks should leaks be observed. A licensed contractor will be tasked with waste disposal.

The Proponent will implement a vegetation management plan to maintain the ground cover beneath the panels and the trees located immediately outside the perimeter fence. Routine visual inspections of the Project site for drainage, erosion or sedimentation issues will be conducted and remediation activities undertaken as required.

3.3.4 Summary of Key Potential Operational Effects, Mitigation, and Monitoring

No direct effects on wetlands, woodlands or Generalized Candidate SWH are anticipated, other than pruning around Project components, as part of the vegetation management plan, to maintain safe operation of the equipment. The key mitigation strategy used to address potential environmental effects from the facility was avoidance of significant features during siting of the Project. Noise disturbance of wildlife inhabiting Generalized Candidate SWH is a potential indirect effect that may occur during operation of the Project. A regular maintenance program would help in mitigating potential effects related to noise from damaged components.

The Project is predicted to comply with performance limits at PORs which are situated within 1 km of the Project without the need for noise control measures. Regular maintenance of Project components should limit noise emissions and mitigate potential effects related to noise from damaged components.

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Visual or sensory nuisance to the community may occur due to the presence of the facility and noise created during occasional maintenance activities. Trees will be planted and maintained along the north side of Cornwall Centre Road to act as a vegetation barrier to partially reduce the visual impact of the facility.

The Project will take the current Project Location lands out of agricultural production, but will return those lands to a state similar to the current state at the time of decommissioning. Compaction of topsoil and erosion of surface soil may occur during operation and can potentially decrease crop yields and will be addressed during the construction and decommissioning phase of the Project.

Accidental spills and improper disposal of waste may result in contamination to soil and/or water resources. Equipment maintenance and refueling will occur in designated areas. Standard containment facilities and emergency response materials would be maintained on-site as required.

Operation of the facility includes a potential risk of fire associated with an accident or component malfunction, failure of poles suspending overhead lines and on-site power outages. Equipment and components will be designed and operated in accordance with applicable codes, standards and regulatory guidelines and staff will receive proper training. The perimeter fence will restrict site access and reduce potential public health and safety risks, trespassing and vandalism. The Proponent will provide the municipality with an emergency response plan.

With the implementation of the mitigation measures provided in the Design & Operations Report and adherence to safety policies and regulations, no significant risks to public health and safety or adverse residual effects to socio-economic or environmental features or conditions are anticipated during operation of the Project.

3.3.5 Environmental Effects Monitoring Plan

The environmental effects monitoring plan for Project operation outlines the proposed mitigation, monitoring and contingency measures to be implemented during the operational phase of the Project. The environmental effects monitoring plan includes performance objectives, monitoring activities and contingency plans based on the potential effects and mitigation measures identified in Section 5.0 of the Design & Operations Report.

3.3.6 Emergency Response and Communications Plan

The Emergency Response and Communications Plan sets out a general description of the actions to be taken during all Project phases to inform stakeholders and Aboriginal communities regarding activities and emergencies. It also includes the Proponent's contact information and process for recording and addressing correspondence.

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3.3.6.1 Emergency Response

The purpose of the Emergency Response and Communications Plan is to establish and maintain emergency procedures required to effectively deal with an emergency situation and to minimize potential effects. The Emergency Response and Communications Plan will be implemented from construction to decommissioning of the Project and will be updated as required. The Emergency Response Plan will include key contact information for emergency service providers. Regular contact with municipal emergency response staff will occur so that they stay aware of how to deal with potential accidents and malfunctions.

All Project personnel will be trained in the emergency response and communication plan procedures, including appropriate actions to undertake in the event of a fire, personal injury, or accidental spill.

During operation of the Project, the site will be monitored 24 hours a day, 7 days a week. If an emergency is detected, the Proponent will send Project personnel to address the emergency and communicate with the appropriate authorities. Additionally, a sign will be posted during all phases of the Project at the gate of the facility which will include a telephone number, email and mailing address for contacting the Proponent.

3.3.6.2 Non-Emergency Communication

The Emergency Response and Communications Plan will also outline non-emergency communications, such as the process and method for maintaining contact with Stakeholders, Aboriginal communities and the Complaint Response Protocol. Ongoing stakeholder and Aboriginal community communication will allow the Proponent to receive and respond to general community issues on an ongoing basis.

Along with posting a sign with the Proponent's contact information on the entry gate of the facility, the telephone number, mailing address and email will also be posted on the Project website and provided directly to the Township, City, County and MOECC.

All complaints received by the Proponent will be recorded in a Complaint Response Document. Reasonable efforts would be made to take appropriate action as a result of concerns as soon as practicable to address the complaint and avoid similar complaints being filed in the future.

3.4 DECOMMISSIONING PLAN REPORT

The Decommissioning Plan Report discusses probable future uses of the Project Location following decommissioning of the Project and describes the Project activities planned for the removal of the Project components so that potential negative environmental effects may be identified. In addition, this report describes site rehabilitation and restoration plans and mitigation measures in respect of environmental effects that could result from decommissioning activities.

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3.4.1 Probable Future Use of the Facility

The Project is anticipated to have an operational lifespan of 20 or more years. At the end of the Project lifespan, the Project components are expected to be decommissioned as described in Section 3.0 of the Decommissioning Plan Report. If Project economics and need remain viable at that time, the facility could be "repowered" with new technology and continue operating for an extended period. This process may include the replacement and/or upgrading of Project components. The Proponent would engage the public, as appropriate and as required based on regulations and requirements in effect at the time of decommissioning, prior to incorporating substantial Project changes.

Although the future land use of the Project Location cannot be known, it is most probable that after decommissioning the Project Location will be returned to its former agricultural land use. However, there is potential for the planned post-Project land use to change prior to actual decommissioning.

3.4.2 Decommissioning During Construction (Abandonment of Project)

If construction cannot be completed and decommissioning of the Project is required during the construction phase, restoration of lands to pre-construction conditions will follow the same procedure as for the decommissioning at the end of Project life.

The Proponent would be responsible for environmental protection. The extent of environmental protection measures required would be dependent on the progress made at the time of Project abandonment, and would be determined through site inspections by qualified specialists.

3.4.3 Decommissioning Procedures

For this section of the report, it is assumed that the Project will be decommissioned after the 20-year power purchase agreement with the Independent Electricity System Operator (IESO), and prior to any substantial repowering efforts. At the end of the Project's useful life, it will first be de-energized and isolated from all external electrical lines. Project components will be dismantled and removed, and the Project Location will be restored to agricultural use.

Many activities during decommissioning would be comparable to the construction phase, therefore, general mitigation measures and management practices, including erosion and sediment control, air quality and noise mitigation, and contingency plans for unexpected finds and spills will be followed as provided in the Construction Plan Report.

Prior to any dismantling or removal of equipment, staging areas would be delineated at appropriate locations within the Project Location, including near the project substation and inverter locations.

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The solar panels and racks, electrical equipment (inverters, inverter step-up transformers and substation), storage infrastructure and perimeter fence will be disassembled and removed from the site. All surface components and subsurface components, including foundations and cables, to 1 m below original grade or to the depth of bedrock (whichever is nearest to ground surface), will be removed and transported off site. Where feasible, some Project components that are located below approximately 1 m depth, such as piles or concrete footings, may also be removed from the ground.

All work to decommission the overhead / underground connection line would be conducted within the boundaries of the Project and Cornwall Centre Road municipal road allowance. The Proponent is responsible for decommissioning up to the PCC, after which point the infrastructure is owned by Hydro One.

All granular and geotextile materials, including those used for the access roads, will be removed from the Project Location by a dump truck, or placed in a designated on-site area for use by the landowner.

3.4.3.1 Site Rehabilitation/Restoration

The operator of the Project at the time of decommissioning will develop a Rehabilitation Plan designed to restore agricultural lands and wildlife habitat in areas affected by the Project.

Where Project infrastructure has been removed, disturbed areas will be seeded with quick growing native species to prevent topsoil erosion. Agricultural land will be decompacted where necessary and damaged tile drains will be repaired or replaced. Erosion and sediment control measures will be installed and will be left in place until ground cover is fully established. Any proposed decommissioning works within or near watercourses will follow similar mitigation and monitoring measures implemented during construction, as described in the Construction Plan Report, and site specific requirements determined during the detailed design and permitting process. Should any of the municipal road allowances be disturbed during decommissioning activities, they will be returned to the condition they were in prior to the decommissioning activities.

Mitigation measures for spills are described in the Construction Plan Report.

3.4.3.2 Managing Excess Materials & Waste

Prior to decommissioning of the Project, the Proponent would complete a waste audit and prepare a waste reduction work plan. Waste materials would be managed in accordance with O. Reg. 347 or subsequent applicable legislation.

Typical waste materials and modes of disposal, recycling or reuse are presented in **Table 3.3**.

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Table 3.3: Typical Facility Decommissioning Waste Materials and Modes of Disposal

Component	Typical Mode of Disposal
Concrete foundations	Crush and recycle as granular material
Solar Panels	Reuse or recycle
Steel & aluminum racks and mounts	Salvage for reuse or recycle for scrap
Cabling	Recycle
Inverter step-up transformers, inverters and circuit breakers	Salvage for reuse or recycle for scrap
Granular material	Reuse or dispose in landfill
Oils/lubricants	Recycle
Hazardous materials	Dispose through licensed hauler
Geotextile material	Dispose in landfill
Miscellaneous non-recyclable materials	Dispose in landfill

3.4.4 Emergency Response and Communications Plan

The plans and procedures described within the Design & Operations Report for spills and releases, hazardous waste management, and non-hazardous waste management will be carried forward during the decommissioning of the Project.

The general contractor will be responsible for implementing training of Project personnel with respect to safety procedures and protocols, as appropriate and to maintain employee health and safety throughout decommissioning activities. The general contractor will also prepare a Health and Safety Plan considering both public and occupational health and safety issues.

The Emergency Response and Communications Plan detailed in the Design & Operations Report will be utilized during the decommissioning of the Project, along with the Complaint Response Protocol.

Advance notification of decommissioning will be provided to stakeholders prior to the commencement of decommissioning work.

3.4.5 Other Approvals

The Proponent will obtain all necessary approvals required at the time of decommissioning from the appropriate government and regulatory bodies. Permits and approvals, which may be required at the time of decommissioning are provided in **Table 3.4**.

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Table 3.4: Potential Permits and Approvals Required for Decommissioning

Administering Agency	Permit / Approval	Rationale
MUNICIPAL		
City of Cornwall and possibly Township of South Stormont	Municipal Consent, Work within the Right of Way	Required for works in municipal road allowances (e.g. Cornwall Centre Road).
	Occupancy Permit	Use of municipal roads (e.g., Cornwall Centre Road).
	Road Cut Permit	May be required for works to municipal roads (e.g. Cornwall Centre Road).
Township of South Stormont and/or City of Cornwall and/or United Counties of Stormont, Dundas and Glengarry	Traffic Management Plan	To adhere to road safety and suitability.
PROVINCIAL		
RRCA	Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses Permit	Work within floodplains, watercourse crossings, river or stream valleys, hazardous lands and within or adjacent to wetlands.
MOECC	Record of Site Condition	A change of property use and/or ownership.
Ministry of Labour	Notice of Project	Notify the Ministry of Labour before decommissioning begins.
Ministry of Transportation	Special vehicle configuration permit	Use of non-standard vehicles to transport large components.
	Transportation Plan	Adherence to road safety and suitability.
	Highway Entrance Permit	Interference or obstruction of the highway.
	Change of Access and Heavy/Oversize Load Transportation Permit	Compliance with provincial highway traffic and road safety regulations.
	Wide or excess load permit	Transportation of large or heavy items on provincial highways.

3.5 NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

A Natural Heritage Assessment (NHA) is required to determine whether any of the following features exist within the Project Location or Zone of Investigation (ZOI) – i.e. within 50 m outside of the Project Location.:

- Wetlands

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- Coastal wetlands
- Life Science Areas of Natural and Scientific Interest (ANSIs)
- Earth Science ANSIs
- Woodlands
- Wildlife habitat
- Provincial Parks and Conservation Reserves

An EIS is required to identify and assess any negative environmental effects and identify mitigation measures for significant natural features within the Project Location or ZOI.

The NHA/EIS report identifies the existence and boundaries of natural features in and within the Project Location and ZOI based on a review of background records and field investigations. The NHA/EIS provides an evaluation of significance for each identified feature based on either an existing Ministry of Natural Resources and Forestry (MNRF) designation of the feature, or by using evaluation criteria or procedures established or accepted by the MNRF.

3.5.1 Records Review

Background data was collected and reviewed to identify natural features located within the Project Location or within the ZOI. Agencies contacted as part of the records review included but were not limited to Environment Canada, MNRF, RRCA, City of Cornwall, and United Counties of Stormont, Dundas and Glengarry.

The records review identified four wetland features and nine woodland features within the ZOI. There were no ANSIs, provincial parks or conservation reserves identified within the ZOI. No known features were identified within the Project Location.

3.5.2 Site Investigations

Site investigations were conducted to confirm the presence and boundaries of natural features identified during the records review and to identify any additional natural features within the Project Location and associated ZOI.

Site investigations conducted at the Project Location and ZOI included:

- vegetation community and vascular plants assessment
- wetland confirmation and boundary delineation
- woodland confirmation and boundary delineation
- wildlife habitat assessment

The site investigation confirmed the presence of six wetlands within the ZOI. No wetlands were located within the Project Location.

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Site investigations also confirmed the presence of five woodland features within the ZOI. No woodlands were located within the Project Location.

During the site investigation, wildlife habitat within the Project Location and ZOI were identified based on the presence of generalized landscape and geography (i.e., Ecological Land Classification). These habitats were grouped together and are collectively referred to as "Generalized Candidate SWH". No Generalized Candidate SWH is located within the Project Location, however, there is Generalized Candidate SWH abutting the Project Location.

Candidate SWH for an amphibian movement corridor (specific to bullfrog) was identified in the ZOI, outside of the Project Location. Amphibian movement corridors must be individually identified, delineated, and cannot be classified as Generalized Candidate SWH.

3.5.3 Evaluation of Significance

Natural heritage information collected from the Records Review and Site Investigation were analyzed to determine the significance of existing natural heritage features. For all natural features existing in or within the ZOI and/or the Project Location, a determination was made of whether the natural feature is provincially significant, significant, not provincially significant or not significant.

According to the Wetland Characteristics and Ecological Functions Assessment (MNRF 2012), the six wetland features confirmed during site investigations are considered significant. Four of the five woodlands confirmed during site investigations met the criteria for significance based on criteria standards within the Natural Heritage Assessment Guide (NHAG; MNR, 2012). In accordance with the NHAG, Generalized Candidate SWH and the candidate amphibian movement corridor are treated as significant.

3.5.4 Environmental Impact Study

An EIS is required to identify and assess any potential negative environmental impacts of the Project on the natural features throughout its lifecycle (e.g., construction, operation, and decommissioning). Mitigation measures are recommended to reduce the potential negative impacts associated with the Project.

3.5.4.1 Potential Impacts

Significant Wetlands

As the Project Location and all construction and operational activities are sited outside all significant wetland boundaries, there will be no direct loss of significant wetland habitat or function as a result of the Project.

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There will be no clearing of trees that could result in wetland desiccation or drying. The risk of accidental intrusion and vegetation removal will be minimized through demarcation of work areas. The Project should have little or minimal impact to pervious areas and precludes the potential for effects associated with changes in water balance (i.e., surface and ground water changes). Construction activities are anticipated to be low impact and short term in duration. Construction activities during the installation of the project are anticipated to have a low magnitude of effect as construction will be a single frequency event, short term in duration, there will be no direct loss of habitat and indirect effects will be mitigated.

During operation, occasional maintenance activities will occur and will be located outside of all wetland boundaries. Maintenance activities are expected occasionally and will be short term in duration. Potential for impacts such as dust and spills from maintenance activities are considered low. Since the solar panels are mounted above the ground and the underlying land is to be planted with native vegetation species, infiltration of water through vegetation and the underlying subsurface material will be maintained and no negative effects to the hydrological functions provided by the wetlands are expected as a result of operation of the Project.

Decommissioning of the Project is expected to experience similar impacts to those described above during construction.

Significant Woodlands

As the Project Location and all construction and operational activities are sited outside of significant woodland boundaries, there will be no direct loss of significant woodland habitat or function to these features as a result of the Project.

Indirect effects resulting from construction activities, such as dust generation, sedimentation and erosion will be short term, temporary in duration and mitigated through the use of standard site control measures specified.

During operation, there is the potential for spills and contamination to the woodland. Accidental spills are anticipated to occur infrequently and be spatially limited. With the implementation of specified mitigation measures outlined in the Construction Plan Report, no significant adverse residual effects from waste material disposal or accidental spills are anticipated.

Decommissioning of the facility is expected to impose similar impacts to those described above during construction.

Generalized Candidate SWH

As the Project components and all construction and operational activities are sited outside of the boundaries of these features, there will be no direct loss of Generalized Candidate SWH or function to these features as a result of the Project.

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Potential negative effects from construction activities could include habitat avoidance/disturbance caused by noise. Given the spatial separation between construction and the generalized candidate significant wildlife habitat features, species such as interior breeding birds will be spatially separated from the closest point of construction activities. Species that inhabit edges are generally considered less susceptible to disturbance and given the existing rural and agricultural land uses currently occurring adjacent to these features, and their location adjacent to existing roads, they are not considered highly sensitive to temporary disturbances.

Indirect impacts resulting from construction activities, such as noise, dust generation, sedimentation and erosion are expected to be short term (i.e. one breeding season or less), intermittent, temporary in duration and mitigated through the use of standard site control measures. Additional mitigation measures for noise during the construction phase of the project are outlined in Section 3.4.2 in the Construction Plan Report.

Disturbance impacts from operation of a solar facility on resident wildlife are considered negligible.

Impacts occurring during the decommissioning of the facility are similar to those described above during construction, comprised predominantly of short term disturbances associated with noise.

Candidate Amphibian Movement Corridor

As the Project components and all construction and operational activities are sited outside of the amphibian movement corridor, the associated breeding ponds and the natural habitat that surround the ponds and corridor, there will not be disruption to the linkages between ponds and summer habitat or winter range/habitat. There will be no direct loss of function to these features as a result of the Project.

The existing natural habitat and separation distance between the project and the movement corridor is considered to reduce the potential for negative effects to bullfrog movement.

During construction, there will be increased traffic and the potential for accidental spills within the Project Location. Indirect impacts resulting from construction activities, such as noise, dust generation, sedimentation and erosion are expected to be short term, temporary in duration and mitigated through the use of standard site control measures (i.e. installation of silt fencing).

Potential effects from construction would be limited for construction activities that occur outside of the period when bullfrogs may be using the movement corridor. For any construction activities that may occur during the period bullfrogs may be using the corridor (i.e. in July and August) potential effects are considered mitigable as a result of the separation distance between the corridor and closest potential point of activities (i.e. at least 30 m) as well as the implementation of mitigation measures.

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Impacts occurring during the decommissioning of the facility are similar to those described above during construction, comprised predominantly of short term disturbances.

During operation, solar panels are the closest project component to the corridor and are 43 m at their closest point from the amphibian movement corridor. Roads, which can have potential effects to amphibian movement corridors as a result of fragmentation or mortality risk, are also expected to be sited more than 43 m at their closest point from the amphibian movement corridor and as a result are not predicted to result in negative effects on the amphibian movement corridor habitat or its ecological function. Avoidance or disturbance effects (i.e. reduced use of the amphibian movement corridor) due to operation of the facility is not predicted. A perimeter fence will be installed around the facility which will ensure there is no infringement into adjacent habitats during operation of the facility.

3.5.4.2 Mitigation Measures

All components of the Project are sited outside the wetland and woodland feature boundaries. Standard best management practices will be applied to all construction activities:

- No development will be permitted within the boundaries of significant wetlands or woodlands.
- The edge of the work zone (i.e., Project Location) will be flagged or staked prior to construction.
- Silt barriers (e.g., fencing) will be erected along the edge of the construction area where wetland or woodland boundaries are located within 30 m of construction areas. Silt barriers will be regularly monitored and properly maintained until soils are re-stabilized with vegetation.
- Environmental inspector(s) will ensure construction vehicles and personnel stay within the construction envelope, thereby limiting the disturbance of natural vegetation.
- Refueling activities will occur more than 30 m from the woodlands and wetlands. In the event of an accidental spill, the MOECC Spills Action Centre will be contacted and emergency spill procedures will be implemented immediately.
- Maintenance activities, vehicle refueling or washing, and storage of chemical and equipment will occur in properly protected and sealed areas located more than 30 m from significant wetlands and woodlands.
- Storage of fuel and activities with the potential to cause contamination will occur in properly protected and sealed areas outside the woodland boundaries and greater than 30 m from a wetland.
- To the extent possible, construction activities within 30 m of Generalized Candidate SWH will occur during daylight hours to avoid excessive noise and/or light disturbances.

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- If habitat use surveys confirm the significance of the candidate significant wildlife habitat for amphibian breeding (wetlands) for bullfrog, the associated amphibian movement corridor will conservatively be considered to be significant and the following mitigation measures will be applied:
 - For any construction activities that are required in July and August within 30 m of the communities that contain the amphibian movement corridor, silt barriers will be erected along the edge of the work zone to prevent bullfrog access. These barriers will be monitored daily in July and August and properly maintained.
 - For any construction activities that are required in July and August, no construction activities will be conducted from dusk to dawn within 30 m of the communities that contain the amphibian movement corridor.
 - All refuelling will occur more than 30 m away from the identified amphibian movement corridor.

Mitigation measures for noise, waste material disposal and accidental spills are listed in the Construction Plan Report and Design & Operations Report.

The NHA also includes a number of mitigation measures pertaining to dewatering, including installation and monitoring of sediment and erosion controls, flagging the work area, minimizing length of dewatering, discharging 30 m from a significant natural feature, using appropriate energy dissipation techniques, monitoring discharge rates, and restoration.

The application of these mitigation measures are expected to address any negative environmental effects of construction, operation and decommissioning of the Project on the natural heritage features located within the Project Location and ZOI and their associated ecological functions.

3.6 WATER ASSESSMENT AND WATER BODY REPORT

A Water Assessment and Water Body Report is required to determine the presence and boundaries of water bodies (as defined in O. Reg. 359/09) within the Project Location or the ZOI (area extending 120 m outside of the Project Location) (assuming that no Lake Trout lakes that are at or above development capacity are identified within 300 m). If water bodies are identified within the Project Location or ZOI, a Water Body Report must be prepared to assess impacts of the proposed work. The report also provides mitigation measures to reduce the impacts of the proposed work on water bodies identified within the Project Location or ZOI.

3.6.1 Records Review

The records review involved reviewing background sources, correspondence with agencies and interpretation of aerial photography. Agencies were contacted to acquire background data for the Project included the MNRF and RRCA.

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The records review identified one watercourse mapped across the south portion of the Project Location. In the northern portion of the Project, there is a potential water body visible in air photos. The records review also identified two small ponds within 120 m north of the Project Location.

Watercourses and water bodies as mapped by the MNRF might or might not meet the definition of a water body as per O. Reg. 359/09.

3.6.2 Site Investigations

As a result of the site investigation, it was determined that there is no water body across the Project Location in the southern central portion of the Project Location as indicated in the records review. This mapped watercourse was dry and exhibited no indicators of water flow. However, a waterbody under O. Reg. 359/09 is present within the Project Location along the north side of Cornwall Centre Road and flows into the mapped watercourse located on the south side of Cornwall Centre Road. During the site investigation, small-bodied fish species were observed in this water body.

During the site investigations, it was also confirmed that the potential waterbody seen on aerial photography in the northern portion of the Project Location is not a water body under O. Reg. 359/09. There was no visible flow path to the east across the Project Location; water flowed east toward the Project Location and then south along the western boundary of the Project Location. This observed watercourse (west of the Project Location) is an intermittent stream and is classified as a water body under O. Reg. 359/09. During the site investigation, small-bodied fish species were observed in this water body.

Both ponds north of the Project Location are permanent, natural features (wetland ponds) and are classified as water bodies.

During the site investigation, additional water bodies containing small-bodied fish species were observed around the perimeter of the Project Location.

In total, five water bodies were confirmed during site investigations.

3.6.3 Potential Impacts

Potential impacts to water bodies located within the Project Location and the 120 m ZOI include erosion or sedimentation of water bodies, reduced bank stability, reduced water quality, disturbance to aquatic biota and/or habitat, entry of deleterious substances into surface water, changes to habitat or riparian vegetation, and/or changes to fish passage.

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3.6.4 Mitigation Measures

General mitigation measures for construction activities near water bodies in the ZOI include completing in-water work within MNR timing windows (July 16 to March 14), operating and storing materials and equipment in a manner that reduces the risk of deleterious substances entering into surface waters, implementing and maintaining erosion and sediment control measures, and developing a response plan to be implemented in the event of a sediment release or spill of a deleterious substance. The report also includes specific mitigation measures for new culvert crossings, and overhead and underground electrical line installation.

Based on the current Project layout and proposed environmental mitigation measures, no net effects to water bodies are expected to occur as a result of the Project.

Once culvert size and construction methods are finalized, DFO review under the *Fisheries Act* may be required due to work associated with the access roads (i.e., culvert installation or upgrading); however, a *Fisheries Act* Authorization will not likely be required.

3.7 ACOUSTIC ASSESSMENT REPORT

All ground mounted solar facilities with a name plate capacity greater than 10 kW require a noise study report to support REA applications. The Acoustic Assessment Report was prepared based on the requirements described in the current MOECC noise forms and guidelines including the following documents:

- NPC-300, Environmental Noise Guideline
- Basic Comprehensive Certificates of Approval, User Guide v2.0, Appendix A, "Supporting Information to be Submitted for an Acoustic Assessment Report or Vibration Assessment Report Required by a Basic Comprehensive C of A", April 2004

3.7.1 Operating Scenario

The Project will operate 7 days a week throughout the year during the daylight hours. Due to extended daylight hours during summer months, the facility could operate outside the typical daytime period of 7:00 AM and 7:00 PM. It was conservatively assumed that all equipment units will operate at full rated capacity during the predictable worst case hour.

3.7.2 Noise Sources

The Project's dominant noise sources would consist of:

- four (4) inverters each with 2.5 MW (Power Electronics HEC 1500V model) inverters
- four (4) inverter step-up transformers rated at 3.0 Megavolt amps (MVA)
- one (1) main power transformer rated at 12 MVA at the substation location

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Sound levels for the inverters were based on equipment manufacturer submittals. The sound level for the transformers was estimated based on the provided rating, and dimensional data from typical transformers from other similar projects.

A total of 72 receptors identified (Vacant, Commercial, and Existing PORs) were considered in all directions within approximately 1 km of the Project Location.

3.7.3 Noise Assessment Criteria

Receptors within 1 km of the Project Location are considered to be located in a Class 3 (or rural) area. In a Class 3 area, the sounds of the ambient environment are expected to be dominated by natural sounds with little or no road traffic.

Publication NPC-300 requires that the one-hour equivalent sound level (L_{eq} (1 hour)) in A-weighted decibels (dBA) from the proposed stationary noise sources should not exceed the applicable sound level limit at a noise-sensitive receptor location. The sound level limit is considered to be the lower of the prescribed exclusionary limit for a Class 3 area, or the background sound level. The exclusionary limits for a Class 3 area are:

- 45 dBA for a facility operating between 0:700 and 19:00 hours (daytime)
- 40 dBA for a facility operating between 19:00 and 0:700 hours (night-time)

Ambient monitoring was not conducted in the vicinity of the proposed facility and therefore exclusionary limits were applied. The applicable criterion is considered to be the MOECC nighttime exclusionary limit of 40 dBA.

3.7.4 Conclusions

The impact assessment indicated that the Project noise effects comply with performance limits at all applicable PORs which are situated within 1 km of the Project without the need for noise control measures.

3.8 STAGES 1-2 ARCHAEOLOGICAL ASSESSMENT

The objectives of the Stage 1- 2 Archaeological Assessment were to compile available information about the known and potential archaeological heritage resources within the Project Location and to provide specific direction for the protection, management and/or recovery of these resources. The archaeological assessment is also subject to the *Ontario Heritage Act* (1990) and the 2011 *Standards and Guidelines for Consultant Archaeologists* (2011).

Archaeological assessments must be submitted to the Ministry of Tourism, Culture and Sport (MTCS) for review and acceptance into the Ontario Public Register of Archaeological Reports in advance of public release of the REA reports. MTCS has reviewed and accepted the report.

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An examination of the Ontario Archaeological Sites Database has indicated that no archaeological sites have been registered within a 1 km radius of the Project Location and no assessments have taken place within 50 m of the Project Location (MTCS 2016a, 2016b).

3.8.1 Stage 1 Archaeological Assessment

Based on the criteria identified in the Stage 1 Archaeological Assessment, it was determined that the archaeological potential for Aboriginal and historic Euro-Canadian sites is deemed to be moderate to high. As such, a Stage 2 assessment was completed at the Project Location.

3.8.2 Stage 2 Archaeological Assessment

A Stage 2 Archaeological Assessment was conducted on May 3 and August 29, 2016. Approximately 90% of the Project Location consisted of recently ploughed and well-weathered fallow fields and were assessed using pedestrian surveys at 5 m intervals. Approximately 3% of the Project Location was assessed using the test pit survey method at 5 m intervals. Each test pit was approximately 30 cm in diameter and excavated 5 cm into sterile subsoil. Soil was screened through 6 millimetre mesh hardware cloth and then used to backfill the pit. Approximately 7% of the Project Location was documented as being previously disturbed due to recent road construction along either side of Cornwall Centre Road.

No archaeological resources were identified during the Stage 2 assessment of the Project Location, and therefore no further archaeological assessment is required for the Project.

3.9 REA CHECKLIST: CONSIDERATION OF POTENTIAL FOR HERITAGE RESOURCES

The MTCS REA Checklist: Consideration of Potential for Heritage Resources applies to applicants of a REA who choose to consider the potential for heritage resources under O. Reg. 359/09. Through completion of the MTCS REA Checklist, no built resources were identified within the Project Location and no cultural heritage landscapes or protected properties were identified in, or adjacent to, the Project Location. It was determined that no further cultural heritage investigations were required.

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References
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4.0 REFERENCES

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Ontario Heritage Act. 1990. (R.S.O. 1990, amendment: 2009, c. 33)

Species at Risk Act. 2002. (S.C. 2002, c. 29)

APPENDIX A: FIGURES

W:\Active\60950879\Drawings\MXD\APC\ReportFigures\PDFR\60950879_PDR_Fig01_SiteLocation.mxd
Revised: 2017-05-26 By: dhanvey

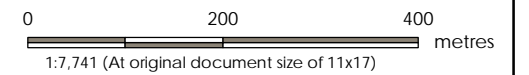


Legend

- Project Location
- 300 m from Project Location
- Existing / Natural Features
 - Major Road
 - Minor Road
 - Hydro One Transmission Line
 - Pipeline
 - Railway
 - Property Boundary and PIN

The Oak Ridges Moraine Conservation Plan Area, the Niagara Escarpment and the Lake Simcoe watershed are not within 300 m of the Project Location.

No protected properties, heritage resources or archaeological resources were identified within 300 m of the Project Location.



Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Imagery Source: DRAPE 2014



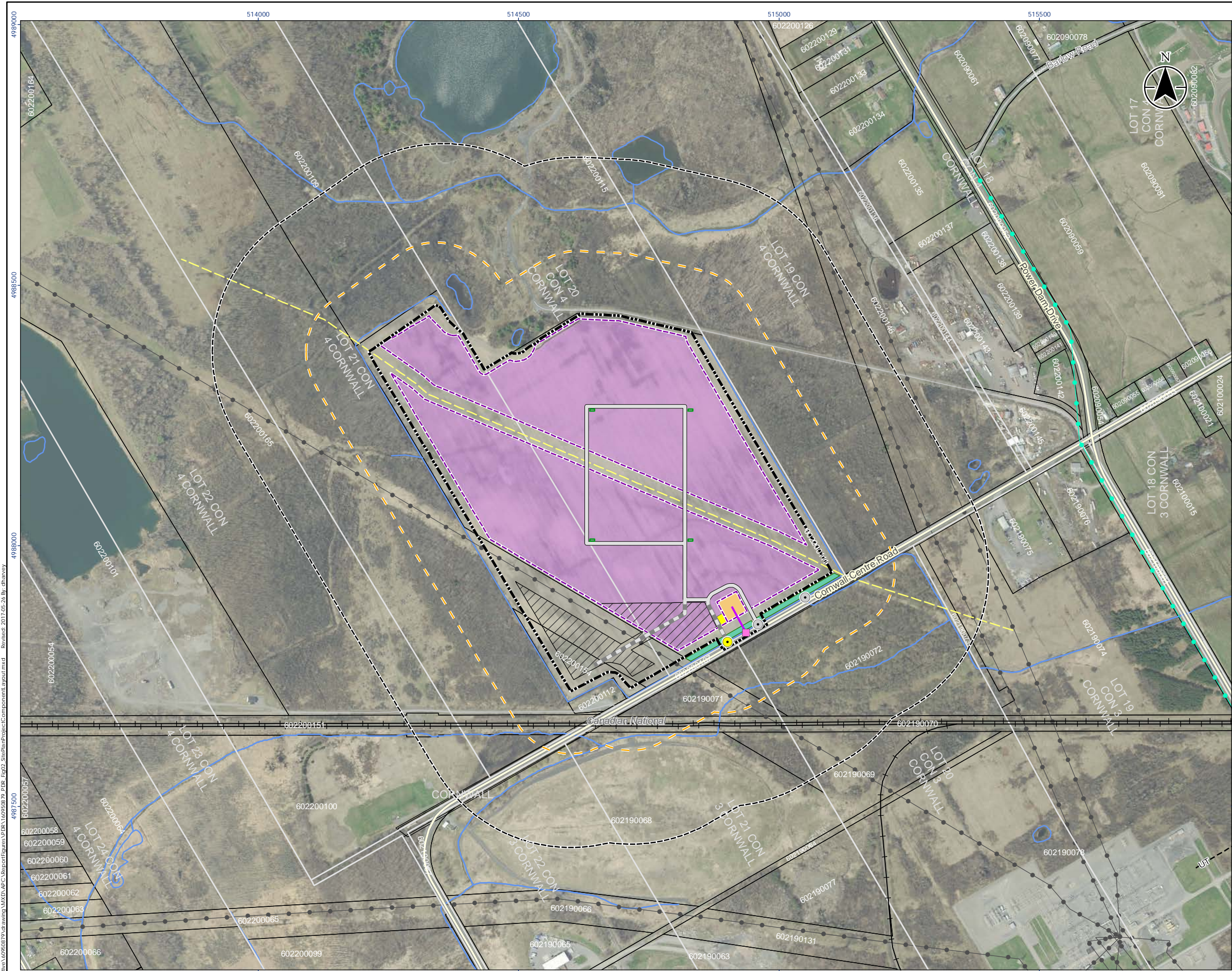
Project Location	160950879 REV F
United Counties of Stormont, Dundas and Glengarry	Prepared by AW on 2017-05-26
Client/Project	Technical Review by RN on 2017-01-02
BARLOW ENERGY CENTRE LIMITED PARTNERSHIP	Independent Review by RN on 2017-01-02
BARLOW SOLAR ENERGY CENTRE	

Figure No.

1

Title

Project Location



Legend

Zone of Investigation (120 m from Project Location)	Solar Panel Area
Substation	Tree Planting Area
Proposed Project Components	
Point of Common Coupling	Major Road
Culvert (proposed)	Minor Road
Connection Line	Culvert (existing)
Inverter Step-up Transformer and Inverter	Distribution Line (Hydro One)
Permanent Access	Hydro One Transmission Line
Temporary Access During Construction	Other Transmission Line
300 m from Project Location	Pipeline
Temporary Construction Laydown and Parking Area	Railway
Buildable Area	Watercourse
Operations & Maintenance Storage Area	Property Boundary and PIN
Project Location	Waterbody

0 200 400 metres

1:7,500 (At original document size of 11x17)

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Imagery Source: DRAPE 2014
 4. Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



Project Location: 160950879 REV F
United Counties of Stormont, Dundas and Glengarry
Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
BARLOW SOLAR ENERGY CENTRE
Prepared by AW on 2017-05-26
Technical Review by RN on 2017-01-02
Independent Review by RN on 2017-01-02

Figure No. 2
Title: Site Plan: Conceptual Project Component Layout