

Barlow Solar Energy Centre Design & Operations Report

FINAL REPORT



Prepared for:
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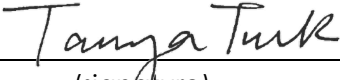
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File No. 160950879
June 12, 2017

Sign-off Sheet

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Abbreviations

AC	Alternating current
CN	Canadian National Railway
dB	Decibel(s)
dba	A-weighted decibel(s)
DC	Direct current
Hydro One	Hydro One Networks Inc.
Km	Kilometre(s)
kV	Kilovolt(s)
L	Litre(s)
LRP	Large Renewable Procurement
m	Metre(s)
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of the Environment and Climate Change
MTCS	Ministry of Tourism, Culture and Sport
MVA	Megavolt Amps
MWac	Megawatt alternating current
O. Reg.	Ontario Regulation
PV	Solar photovoltaic
REA	Renewable Energy Approval
SCADA	Supervisory control and data acquisition
Stantec	Stantec Consulting Ltd.

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SWH	Significant Wildlife Habitat
The Project	Barlow Solar Energy Centre
The Proponent	Barlow Energy Centre Limited Partnership
TNPI	Trans Northern Pipelines Inc.
V	Volt(s)
W	Watt(s)
ZOI	Zone of Investigation

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 centre of Cornwall in the Township of South Stormont, United Counties of Stormont, Dundas and Glengarry, Ontario. The Point of Common Coupling will be located adjacent to the Project Location, on the road allowance of Cornwall Centre Road, in the City of Cornwall, Ontario. 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 approximately 38 hectares (ha; 94 acres) of land in response to the Government of Ontario's Large Renewable Procurement (LRP) initiative to promote the development of renewable electricity in the province.

The Project will be located on parts of lots 20 and 21, Concession 4 on privately-owned land, leased for a period of 20 or more years. The Project Location is bounded to the south by Cornwall Centre Road, and to the west, north and east by undeveloped woodlands and scrubland. A Trans Northern Pipeline Inc. (TNPI) pipeline and Hydro One Networks Inc. (Hydro One) transmission line bisect the Project. A map showing the location of the Project is provided in **Figure 1, Appendix A**.

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 grid connected system would be considered a Class 3 Solar Facility under O. Reg. 359/09, s. 4.

Section 2.0 outlines the individual facility components illustrated on **Figure 2, in Appendix A** (also known as the Site Plan). Section 3.0 discusses the facility design and siting considerations. Section 4.0 describes the facility's operation plan, including a discussion on training, remote monitoring, and scheduled and unplanned maintenance. Negative environmental effects that may result from operations activities and their mitigation measures are discussed in Section 5.0. The

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Environmental Effects Monitoring Plan is outlined in Section 6.0 and the Emergency Response Plan and Communications Plan is outlined in Section 7.0.

1.2 REPORT REQUIREMENTS

This Design & Operations Report describes the operational details of a renewable energy project so that potential negative environmental effects may be identified. In addition, this report describes mitigation measures in respect of negative environmental effects that could result from activities that occur during the operations phase of the Project.

This Design & Operations Report is one component of the REA application for the Project, and has been prepared in accordance with O. Reg. 359/09, the Ministry of Natural Resources and Forestry (MNRF) *Approval and Permitting Requirements Document for Renewable Energy Projects* (2009), and the Ministry of the Environment and Climate Change (MOECC)'s *Technical Guide to Renewable Energy Approvals* (2017). **Table 1.1** summarizes the requirements of this report for a Class 3 solar facility as specified under O. Reg. 359/09, and provides a cross-reference of where the information can be found in this report.

Table 1.1: Design & Operations Report Requirements (as per O. Reg. 359/09 – Table 1)

Requirements	Section Reference
<p>1. Set out a site plan of the project location at which the renewable energy project will be engaged in, including,</p> <ul style="list-style-type: none">i. one or more maps or diagrams of,<ul style="list-style-type: none">A. all buildings, structures, roads, utility corridors, rights of way and easements required in respect of the renewable energy generation facility and situated within 300 metres of the facility,B. any ground water and surface water supplies used at the facility,C. any things from which contaminants are discharged into the air,D. any works for the collection, transmission, treatment and disposal of sewage,E. any areas where waste, biomass, source separated organics and farm material are stored, handled, processed or disposed of,F. the project location in relation to any of the following within 125 metres: the portion of the Oak Ridges Moraine Conservation Plan Area that is subject to the Oak Ridges Moraine Conservation Plan, the area of the Niagara Escarpment Plan, the Protected Countryside, the Lake Simcoe watershed, andG. any noise receptors or odour receptors that may be negatively affected by the use or operation of the facility,ii. a description of each item diagrammed under subparagraph i,iii. one or more maps or diagrams of land contours, surface water drainage and any of the following, if they have been identified in complying with this Regulation: properties described in Column 1 of the Table to section 19, heritage resources, archaeological resources, water bodies, significant or provincially significant natural features and any other natural features identified in the Protected Countryside or in the portion of the Oak Ridges Moraine Conservation Plan Area that is subject to the Oak Ridges Moraine Plan.	<p>Section 2.0 and Figure 1, 2, 3 and 4 Appendix A</p>

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Table 1.1: Design & Operations Report Requirements (as per O. Reg. 359/09 – Table 1)

Requirements	Section Reference
<p>2. Set out conceptual plans, specifications and descriptions related to the design of the renewable energy generation facility, including a description of,</p> <ul style="list-style-type: none"> i. any works for the collection, transmission, treatment and disposal of sewage, including details of any sediment control features and storm water management facilities, ii. any things from which contaminants are discharged into the air, iii. any systems, facilities and equipment for receiving, handling, storing and processing any waste, biomass, source separated organics, farm material and biogas, and iv. if the facility includes a transformer substation, the works, facilities and equipment for secondary spill containment. 	<p>Table 2.1</p>
<p>3. Set out conceptual plans, specifications and descriptions related to the operation of the renewable energy generation facility, including,</p> <ul style="list-style-type: none"> i. in respect of any water takings, <ul style="list-style-type: none"> A. a description of the time period and duration of water takings expected to be associated with the operation of the facility, B. a description of the expected water takings, including rates, amounts and an assessment of the availability of water to meet the expected demand, and C. an assessment of and documentation showing the potential for the facility to interfere with existing uses of the water expected to be taken, ii. a description of the expected quantity of sewage produced and the expected quality of that sewage at the project location and the manner in which it will be disposed of, including details of any sediment control features and storm water management facilities, iii. a description of any expected concentration of air contaminants discharged from the facility, iv. in respect of any biomass, source separated organics and farm material at the facility, <ul style="list-style-type: none"> A. the maximum daily quantity that will be accepted, B. the estimated annual average quantity that will be accepted, C. the estimated average time that it will remain at the facility, and D. the estimated average rate at which it will be used, v. in respect of any waste generated as a result of processes at the project location, the management and disposal of such waste, including, <ul style="list-style-type: none"> A. the expected types of waste to be generated, B. the estimated annual average quantity that will be accepted, C. the estimated average time that it will remain at the facility, and D. the estimated average rate at which it will be used, vi. if the facility includes a transformer substation, <ul style="list-style-type: none"> A. a description of the processes in place to prevent spills, B. a description of the processes to prevent, eliminate or ameliorate any adverse effects in the event of a spill, and C. a description of the processes to restore the natural environment in the event of a spill. 	<p>Section 3.0-5.0</p>

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Table 1.1: Design & Operations Report Requirements (as per O. Reg. 359/09 – Table 1)

Requirements	Section Reference
<p>4. Include an environmental effects monitoring plan in respect of any negative environmental effects that may result from engaging in the renewable energy project, setting out,</p> <ul style="list-style-type: none"> i. performance objectives in respect of the negative environmental effects, ii. mitigation measures to assist in achieving the performance objectives mentioned in subparagraph i, and iii. a program for monitoring negative environmental effects for the duration of the time that the project is engaged in, including a contingency plan to be implemented if any mitigation measures fail. 	Section 6.0
<p>5. Include a response plan setting out a description of the actions to be taken while engaging in the renewable energy project to inform the public, aboriginal communities and municipalities, local roads boards and Local Services Boards with respect to the project, including,</p> <ul style="list-style-type: none"> i. measures to provide information regarding the activities occurring at the project location, including emergencies, ii. means by which persons responsible for engaging in the project may be contacted, and iii. means by which correspondence directed to the persons responsible for engaging in the project will be recorded and addressed. 	Section 7.0
<p>6. If the project location is in the Lake Simcoe watershed, a description of whether the project requires alteration of the shore of Lake Simcoe, the shore of a fresh water estuary of a stream connected to Lake Simcoe or other lakes or any permanent or intermittent stream and,</p> <ul style="list-style-type: none"> i. how the project may impact any shoreline, including the ecological functions of the shoreline, and ii. how the project will be engaged in to, <ul style="list-style-type: none"> A. maintain the natural contour of the shoreline through the implementation of natural shoreline treatments, such as planting of natural vegetation and bioengineering, and B. use a vegetative riparian area, unless the project location is used for agricultural purposes and will continue to be used for such purposes. 	Not Applicable
<p>7. If it is determined that the project location is not on a property described in Column 1 of the Table to section 19, provide a summary of the matters addressed in making the determination.</p>	Not Applicable
<p>8. If section 20 applies in respect of the project and it is determined that the project location does not meet one of the descriptions set out in subsection 20 (2) or that the project location is not in an area described in subsection 20 (3), provide a summary of the matters addressed in making the determination.</p>	Not Applicable
<p>9. If subsection 21 (3) or 23 (2) applies, provide a summary of the matters addressed in making the determination,</p> <ul style="list-style-type: none"> i. under subsection 21 (3) or clause 23 (2) (a), as the case may be, including a copy of the document completed under the applicable provision, and ii. under clause 23 (3) (b), if applicable. 	Not Applicable

2.0 SITE PLAN

A detailed site plan is provided in **Appendix A (Figures 2)**. Additional information about site plan components is provided in **Table 2.1**.

Table 2.1: Site Plan Components

Site Plan Component	Additional Information and Site Plan Reference
FACILITY COMPONENTS	
Buildings or structures	The following buildings or structures are shown in Figure 2 (Appendix A) : <ul style="list-style-type: none"> • Solar panel area • Inverters and inverter step-up transformers • Substation (including circuit breakers, disconnect switch, surge arresters, station service transformer for auxiliary services, main power transformer (if applicable) and revenue metering equipment) • Operations and maintenance storage area
Access Roads, fencing and treed areas	The following is shown in Figure 2 (Appendix A) : <ul style="list-style-type: none"> • Permanent and temporary access roads • Tree Planting Area The perimeter fence will be installed at or within the boundary of the Project Location shown on the site plan map.
Electrical equipment	An overhead 44 kilovolt (kV) connector line is shown in Figure 2 (Appendix A) . Underground and overhead direct current (DC) and alternating current (AC) cabling are not shown in the Figures.
Utility corridors, rights of way or easements	No utility corridors or rights of way are required for the Project.
Temporary Staging Area	The temporary staging area used during construction is shown in Figure 2 (Appendix A) . The temporary staging area will be restored near the end of construction (see Section 2.2 of the <u>Construction Plan Report</u>).
OTHER FACILITY COMPONENTS: KEY PROCESS FEATURES	
Water taking: ground water	Groundwater takings are not anticipated during operation of the Project.
Water taking: surface water	Surface water takings are not anticipated during operation of the Project.
Sewage Works	No sewage works are required for the Project.
Stormwater Management	Based on the anticipated lack of changes to hydrology, no detention or treatment of stormwater is proposed as part of the Project.

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Table 2.1: Site Plan Components

Site Plan Component	Additional Information and Site Plan Reference
Drainage	Site drainage will be developed as part of the detailed design by the general contractor to allow for proper water drainage. This would be determined closer to the construction phase of the project.
Discharge of Contaminants to Air	Sources of localized emissions during operation are considered negligible under O. Reg. 419/05. The Project has no facilities or equipment that will discharge contaminants or pollutants to the air (e.g., exhaust gases from emergency backup diesel generators) during operation of the Project. Minor emissions would occur from maintenance staff vehicles (e.g., service trucks).
Waste Management Equipment	No waste management equipment or facilities are required for the Project. Small waste bin(s) will be located near the main entrance. Larger waste will be transported off-site for proper disposal.
EXISTING FEATURES WITHIN 300 m OF THE PROJECT LOCATION	
Buildings or structures	Buildings are shown on the aerial imagery on Figures 1 and 2 (Appendix A) ; these are primarily commercial and industrial buildings located along Cornwall Centre Road.
Municipal Roads	Public roads are shown in Figures 1, 2, 3 and 4 (Appendix A) . Cornwall Centre Road is adjacent to the Project Location.
Utility corridors, rights of way, and easements	A hydrocarbon pipeline owned and operated by TNPI and 230 kV overhead electrical transmission lines owned and operated by Hydro One intersect the Project Location and are shown in Figures 1, 2 and 3 (Appendix A) . A 44 kV overhead or underground distribution line will be constructed by Hydro One within the road allowance of Cornwall Centre Road.
Groundwater wells	Wells included in the MOECC Water Well Records database (2016) are shown in Figure 3 (Appendix A) .
Topographical land contours	Land contours are shown in Figures 3 and 4 (Appendix A) .
Surface water drainage	Drainage features obtained from the MNRF's Land Inventory Ontario (LIO) mapping are shown in Figure 4 (Appendix A) outside of the Zone of Investigation (ZOI; 120 m surrounding the Project Location). Drainage features within the ZOI are mapped as identified through site investigation and assessment (as described in the Water Assessment and Water Body Report).
Natural Heritage Features	Significant wetlands, significant woodlands, and Candidate Generalized Significant Wildlife Habitat (SWH) are shown in Figure 4, Appendix A .
Land Use	Land use, including agricultural, residential, and natural heritage, is shown on the aerial imagery in Figures 1-3 (Appendix A) .
Provincial Policy Areas	The Project is not located within 300 m of the Oak Ridges Moraine Conservation Plan Area, Niagara Escarpment Plan Area, Greenbelt Plan Area (Protected Countryside), or Lake Simcoe Watershed.

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Site Plan
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Table 2.1: Site Plan Components

Site Plan Component	Additional Information and Site Plan Reference
NOISE CONSIDERATIONS	
Noise receptors	Noise receptors are shown in Figure 5 (Appendix A) .
Inverters, Inverter Step-Up Transformer and Main Power Transformer	<p>The dominant noise sources for the Project are:</p> <ul style="list-style-type: none"> • four (4) inverters each with 2.5 MW (Power Electronics HEC 1500V model) inverters • four (4) inverter step-up transformers rated at 3.0 MVA • one (1) main power transformer rated at 12 MVA located within the substation. <p>The conceptual layout for these components is shown in Figure 2 (Appendix A).</p>
DEMONSTRATION OF COMPLIANCE WITH SETBACKS	
Project Location Boundary	The outer limit of all Project components, including temporary work areas during construction, is shown in Figures 1-4 (Appendix A) .
Protected properties	No protected properties were identified within 300 m of the Project Location.
Heritage resources	No heritage resources were identified within 300 m of the Project Location.
Archaeological resources	No archaeological resources were identified within 300 m of the Project Location.
Water bodies	Water bodies (as per O. Reg. 359/09) identified within 300 m of the Project Location are shown in Figure 4 (Appendix A) , as verified through field investigations.
Significant or provincially significant natural features	Significant wetlands, significant woodlands, and Candidate Generalized SWH identified within 50 m of the Project Location are shown in Figure 4 (Appendix A) .

3.0 FACILITY DESIGN PLAN

This section provides a description of the design of the main facility components identified in **Appendix A**.

3.1 GENERAL DESIGN AND SITING CONSIDERATIONS

The key mitigation strategy used to address potential environmental effects from operation of the facility was avoidance of significant natural and socio-economic features to the extent possible 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 conducted for the Natural Heritage, Water, Acoustic and Archaeological Assessments. Where necessary, the Project Location boundary was modified based on the findings of the technical studies, as outlined below.

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

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 mitigate the visual impact of the facility. Upon construction completion, the secondary access road will be naturalized and planted with trees along the side of Cornwall Centre Road. (**Figure 2, Appendix A**).

There are water bodies located within 50 m of the Project Location. Two small ponds are located north of the Project Location and watercourses border the northwest, west, east and southern boundaries of the Project Location. Project components were sited a minimum of 30 m from water bodies.

Six significant wetlands (deciduous lowlands and swamps with swamp thickets) and four significant woodlands are located within 50 m of the Project Location. No significant wetlands or woodlands were observed within the Project Location. No Generalized Candidate SWH are located within the Project Location, however, the surrounding wetlands and woodlands are Generalized Candidate SWH. The Project Location boundary has been modified so that it does not cross the boundary of significant natural heritage features.

Potential effects and mitigation measures associated with Project operations are discussed in Section 5.0.

3.2 FACILITY COMPONENTS OVERVIEW

The Project is being designed and constructed to generate a maximum of 10 MWac of power. The basic Project components include access roads, perimeter fencing, approximately 30,000 to 50,000 solar panels, associated racking system, electrical inverters and transformers, electrical cabling, parking/storage areas, and a main facility substation including a main power transformer (if applicable) and control house. The Project will be interconnected to a 44 kV distribution grid line which will be built by Hydro One in 2018 within the road allowance of Cornwall Centre Road.

No equipment in the facility design relate to groundwater and surface water supplies, air discharges and/or water and biomass management.

3.2.1 Access Roads

Existing provincial and county roads will be used to transport project-related components, equipment and personnel to the Project Location. An existing entrance from Cornwall Centre Road is anticipated to be used for permanent access to the site and may be modified as required. Gravel access roads will be constructed within the site to provide access to the facility for the duration of the Project.

3.2.2 Perimeter Fence, Security, and Landscaping

The 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. Perimeter fencing would be located at or within the Project Location boundary as shown in **Figure 1, Appendix A**.

A second chain link fence, located within the perimeter fence, will be constructed around the substation. The fence will be constructed per OPSD 972.130 (2012a) and OPSD 972.101 (2012b).

To prevent soil erosion, provide dust control and maintain visual appeal during facility operation, the Proponent will implement a vegetation management plan related to the ground cover beneath the panels. While the species of vegetation to be established under the panels has not yet been selected, it is expected to be a native grassland species, such as clover.

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. The location of the Tree Planting Area is provided in **Figure 2, Appendix A**.

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Facility Design Plan
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3.2.3 Solar Panels

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 W 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). The bottom of the solar panels in a fixed tilt racking system would be elevated at a height at least 30 cm above the floodplain. Solar panels in the single axis tracking system would be elevated at a height of at least 30 cm above the floodplain while the panels are in a table position (i.e. flat horizontal position) as the panels would be manually placed in this position in the event of a flood event. Fixed tilt panels would be installed in rows facing south and the tracking system would be tracking east/west on a north/south axis.

If any solar panels are damaged during operation of the Project, it is possible that they may be replaced with a different panel make and/or model available at the time.

The racks will be supported using one, or a combination, of the following types of foundations:

- generic helical pier, consisting of a central shaft with a circular helical steel blade welded at the bottom
- machine augured holes and poured concrete footings for the galvanized-steel rack upright support posts
- machine augured holes and compacted stone screenings as footings for the galvanized-steel rack upright support posts.

The foundations (if screwed or augered and poured) will be installed into the undisturbed ground below the frost line. Alternatively, the pre-cast pads would be positioned on-grade.

3.2.4 Inverters and Inverter Step-Up Transformers

Four inverter step-up transformers and inverters will be located within the Project Location. The inverters will convert the direct current (DC) electricity to alternating current (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 kV. If the final design includes a main power transformer at the substation, the inverters 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.

The specifications of the inverters and inverter step-up transformers will be determined by the Proponent during the preliminary design phase. In accordance with the specifications, the manufacturer of the inverters, inverter step-up transformers, will be selected by the Proponent or the general contractor after the preliminary design phase.

The inverter step-up transformers and inverters will likely rest on an elevated platform at least 30 cm above the floodplain and supported by helical piles or concrete piers.

3.2.5 Substation

A main power transformer is being considered and will be determined during the detailed design phase. 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. 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. This equipment will be built in a separate fenced in area except the control building that may be located outside the fenced area of the substation (but within the perimeter fence) to provide office space for maintenance personnel. This equipment is likely to be prefabricated and transported to site. The equipment will be supported by either cast-in place slab-on-grade concrete pads or structural steel piers and the entire substation fenced area will be graded and overlaid with a clear stone granular material on a built-up pad approximately 1 m to 1.5 m to elevate the ground level a minimum of 30 cm above the floodplain. The control building will also be elevated to a minimum height of 30 cm above the floodplain. The specific make of the associated electrical equipment, including the main power transformer (if applicable) will be selected by the general contractor during the detailed design phase and based on the Proponent specifications. 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.

3.2.6 Buildings and Structures

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 installed on the built-up pad adjacent to the substation to elevate the containers 30 cm above the floodplain and will include a locking door. The storage containers will be used to store equipment and spare parts used for maintenance activities.

Details on a small control building to be installed as part of the substation component are outlined in Section 3.2.5.

3.2.7 Collector Lines and Grid Interconnection

The 1500 volt (or below) DC electricity generated from the solar panels will be collected at combiner boxes mounted at least 30 cm above the floodplain level and transported via underground cables to the inverters where it will be converted to AC electricity. Portions of the cables may be located above grade, in which case they will be at least 30 cm above the floodplain level.

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The 27.6 kV / 34.5 kV / 44 kVAC electricity from all inverter step-step up transformers and inverters will be collected via underground cables to a single substation. Portions of the cables may be located above grade, in which case they will be at least 30 cm above the floodplain level.

An overhead 44 kV AC connection line, approximately 57 m long, is required from the substation to the Point of Common Coupling where Hydro One will connect the Project to the 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. Alternatively, the AC connection line may be installed underground beneath the watercourse along the north side of Cornwall Centre Road.

3.2.8 Key Process Features

Water-taking

The taking of groundwater or surface water is not required for Project activities during operation. It is anticipated that water from precipitation will be sufficient for cleaning the solar panels; if not, the Proponent will hire a local supplier to provide water in tanker trucks from off-site sources for panel cleaning.

Sewage, Stormwater Management and Drainage

During operation, permanent on-site sanitation facilities are not required. If it is determined that sanitation facilities are required during temporary maintenance activities during operation, portable toilets and wash stations will be provided by a local sanitation company.

A stormwater management facility is not being proposed as part of the Project. As the solar panels are mounted above the ground, infiltration, filtration through vegetation, and other natural hydrologic processes will continue similar to existing conditions. Surface water from rainfall and snow will infiltrate through the permeable ground surface. Excess sheet flow from significant rainfall events will flow to a passive system of ditches/swales bordering the Project Location. The specific details of on-site surface drainage and specific construction requirements will be established as part of an overall drainage plan developed for the site by the general contractor during detailed design.

Discharge of Contaminants to Air

The Project has no facilities or equipment that will discharge contaminants or pollutants to the air (e.g., exhaust gases from emergency backup diesel generators) during operation of the Project. Minor, localized air emissions would occur during operation from the use of maintenance staff vehicles and equipment.

Sources of localized emissions from maintenance vehicles during operation are considered negligible under O. Reg. 419/05.

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Waste Management

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.

4.0 FACILITY OPERATIONS PLAN

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

4.1 SITE SUPERVISION AND STAFF TRAINING

The Proponent will have an Operations Manager, who will be responsible for the day-to-day management of all Project facility operations, including supervising site activities, site inspections, facility maintenance and repair.

During pre-operational mobilization, the Operations Manager will confirm that the facility is in compliance with applicable municipal, provincial, and/or federal requirements. Responsibilities would include staff training, health and safety training and compliance, spill and emergency response plans and reporting, predictive/preventive maintenance, routine maintenance, unscheduled maintenance (including appropriate environmental mitigation measures), routine inspection of Project facilities, inspection of equipment and components, and procurement of spare parts and equipment. It would also include a schedule for regular inspections of the Project's facilities.

It is expected that approximately 2 part-time or full-time staff would be employed by the Project to conduct general monitoring and maintenance activities. Some maintenance activities may require temporary use of qualified professional contractors.

4.2 REMOTE MONITORING

The Project will be operated and monitored remotely and therefore no employees will regularly be on site other than to conduct maintenance and inspection activities. The remote monitoring would occur 24 hours a day, 7 days a week via a SCADA monitoring system connected to the data cabling installed in conjunction with the electrical collector system throughout the site. The operation staff would be able to monitor the performance of the PV panels and electrical systems in a real time basis from a remote location. The SCADA system will identify potential damage or faults with the PV panels and electrical infrastructure so that proactive inspection and maintenance can be undertaken.

4.3 PLANNED MAINTENANCE

Routine maintenance of Project equipment will be a key method of mitigating potential effects such as equipment failure. Preventative maintenance activities would generally occur at regular intervals, depending on the activity, usually every one to six months and would include inspection of the solar panels, interconnections, inverters, and transformers. Repairs to damaged or malfunctioning parts or equipment will occur as needed based on inspections.

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Cleaning the solar panels is not anticipated to be required; natural precipitation will keep the panels sufficiently clean. However, if an accumulation of dust reduces the efficiency of the panels, they would be pressure-sprayed with water. No cleaning solutions are anticipated to be used. The water used for cleaning the panels will be trucked in from an off-site source.

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 20° - 40° tilt of the panels.

Transformers will be routinely inspected, and spill response equipment will be provided on site or in the maintenance trucks should leaks be observed. Spill reporting will be completed by the maintenance personnel in accordance with provincial requirements. Copies of spill reports will be provided to the Proponent for record keeping.

A licensed contractor will be tasked with emptying the small waste bin(s) located at the main entrance and disposing the waste at an approved facility as required.

The Proponent will implement a vegetation management plan related to the ground cover beneath the panels and the trees located immediately outside the perimeter fence. While the species of vegetation to be established under the panels has not yet been selected, the ground cover beneath the panels should require only minimal maintenance and would assist in preventing the invasion of non-native grassland species. The vegetation management plan may recommend mowing of the site for aesthetic purposes and to avoid vegetation from growing tall enough to shade the solar panels. It is expected that mowing would not occur frequently, as clover is likely to be selected for ground cover. The vegetation barrier would be maintained so that no shading of the panels occurs. If planted trees do not survive, they will be replaced as necessary to maintain the function of the visual buffer.

Routine visual inspections of the Project site for drainage, erosion or sedimentation issues will be conducted and remediation activities undertaken as required. This includes identification of areas of bare soil and/or the formation of erosive gullies, presence of trash/debris or excess density of vegetation within the passive stormwater conveyance system that would affect flows, and areas of isolated ponding. Remediation measures would include applying sod or seeding, re-grading, removal of trash/debris, and vegetation management as required.

4.4 UNSCHEDULED MAINTENANCE

In addition to the regular scheduled maintenance, the Project will be inspected whenever the SCADA system indicates a potential concern requiring a visit by personnel. For example, a reduction in power output may be indicative of a mechanical problem, or dust or snow accumulation. Unscheduled maintenance will occur as required.

5.0 POTENTIAL ENVIRONMENTAL EFFECTS & MITIGATION MEASURES

O. Reg. 359/09 requires that any adverse environmental effects that may result from operation activities be described. The following section identifies and assesses potential environmental effects, environmental mitigation measures and net effects for operation activities.

A description of existing environmental features can be found within the technical reports completed as part of the REA application (i.e., Natural Heritage Assessment Report and Water Assessment and Water Body Report). A detailed analysis of the potential effects is provided in the associated technical reports, and has been summarized below.

A detailed description of existing archaeological and cultural heritage features can be found within the Ministry of Tourism, Culture and Sport (MTCS) REA Checklist and the Stage 1 - 2 Archaeological Assessments. Noise is assessed in the Acoustic Assessment Report.

To identify potential environmental effects that may result from operation of the Project, the following is a high level summary of the methodology that was applied:

- Collected information on the existing environment using available background information, consultation with stakeholders, and site investigations.
- Reviewed proposed Project activities to predict the potential interactions between the Project and environment.
- Identified potential interactions that could cause an adverse effect on the environment.
- Developed measures to avoid, mitigate, and monitor potential adverse effects.

The key mitigation strategy used to address potential environmental effects from operation of the Project was avoidance of natural and socio-economic features to the extent possible during siting design. Monitoring plans and contingency measures have also been outlined to assess if mitigation measures are functioning as intended. Monitoring plans and contingency measures are also outlined in Section 6.0.

Where net effects remain, they are assessed using the following descriptors, as applicable:

- Duration: the period of time until the element returns to baseline conditions
- Frequency: the number of times that an effect may occur
- Permanence: the degree to which an adverse residual effect will remain
- Spatial Extent: the area within which an effect may occur

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Positive residual effects resulting from operation of the Project, such as an increase in the supply of renewable energy, reduction in greenhouse gas emissions, employment or property tax revenue, have not been assessed.

5.1 ARCHAEOLOGICAL AND CULTURAL HERITAGE RESOURCES

The following sections describe the potential effects, recommended mitigation measures, and net effects for heritage and archaeological resources.

In accordance with O. Reg. 359/09, a Ministry of Tourism, Culture and Sport (MTC) REA Checklist: Consideration of Potential for Heritage Resources (REA Checklist) and Stage 1 - 2 Archaeological Assessment were completed for the Project, and are included under separate cover as part of the REA application.

Through completion of the MTC 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 has been determined that no further cultural heritage investigations are required.

A Stage 1 archaeological assessment of the study area determined that archaeological potential was still present. Based on the results of assessment, a Stage 2 archaeological assessment was recommended and undertaken. The Stage 2 archaeological assessment was conducted using pedestrian and test pit survey methods and no archaeological resources were identified and no further archaeological investigations were recommended. Upon completion of both assessments, a Stage 1-2 Archaeological Assessment Report was completed.

Potential Effects

There are no areas that would be excavated during the operation phase that would not have been previously assessed prior to construction, therefore, no effects are anticipated to archaeological or heritage resources during operation.

Mitigation Measures

There are no anticipated effects to known archaeological resources during operation of the Project. No mitigation measures or monitoring activities were recommended in the Stage 2 Archaeological Assessment.

Mitigation measures are not required for built resources, cultural heritage landscapes or protected properties as none exist within or adjacent to the Project Location.

Net Effects

No significant adverse net effects on archaeological or cultural heritage resources are anticipated during operation of the Project.

5.2 NATURAL HERITAGE RESOURCES

The following sections provide a summary of the findings discussed in the [Natural Heritage Assessment](#). As required by O. Reg. 359/09, a ZOI has been identified around the outer limits of the Project Location. The ZOI was measured 50 m from the Project Location.

More information regarding natural heritage features is provided in the [Natural Heritage Assessment](#).

5.2.1 Significant Wetlands

Key information sources reviewed to identify wetlands include consultation with the MNRF Kemptville District, Land Information Ontario (LIO) mapping and the Natural Heritage Information Centre (NHIC), the City of Cornwall Official Plan (2004), and the United Counties of Stormont, Dundas and Glengarry Official Plan (2009). This review identified four wetlands within the ZOI. No wetlands were identified within the Project Location.

The site investigation confirmed the presence of six significant wetlands within the ZOI. Wetlands within the ZOI are typically deciduous lowlands and swamps with swamp thickets. The Project has been designed to allow for additional buffer space between Project components and adjacent features. Solar panels have been set back approximately 30 m from wetland boundaries along the eastern, southern, western and north-western sides of the Project Location. At their closest point, solar panels will be located 15 m from a wetland. The perimeter fence will be placed within the Project Location to enclose the solar panels. It is expected to be placed approximately 5 m from the solar panels, so would generally be installed approximately 25 m from wetland boundaries, and approximately 10 m from the closest wetland. No wetlands were located within the Project Location.

According to the Wetland Characteristics and Ecological Functions Assessment, the six wetland features confirmed during site investigations are considered significant. The significant wetland features are shown on **Figure 4, Appendix A**.

Potential Effects

The Project Location is sited outside the significant wetland boundaries and, therefore, no direct effects on significant wetlands are anticipated during operation of the Project.

During operation there may be occasional maintenance activities required, but this will occur outside of all wetland boundaries. Maintenance activities are expected to be only required occasionally and will be short term in duration. Potential for impacts such as dust and spills are considered low from maintenance activities. 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

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negative effects to the hydrological functions provided by the wetlands are expected as a result of operation of the Project.

Mitigation Measures

Avoidance was the main strategy used to minimize effects to significant wetlands within 50 m of the Project Location. All components of the Project (i.e., the Project Location) are sited outside the wetland feature boundaries and, as such, no specific mitigation measures are recommended during operation. Standard management practices will be implemented during maintenance activities.

Mitigation measures for material waste disposal and accidental spills are listed in Section 5.7.

Net Effects

Maintenance activities are expected to occur occasionally and will be short term in duration and spatially limited. No direct effects to the wetland are anticipated.

5.2.2 Significant Woodlands

Woodlands are defined as treed areas, woodlots or forested areas other than cultivated fruit, nut orchards, or Christmas tree plantations that are located east and south of the Canadian Shield (MNR 2012).

A review of aerial imagery, the City of Cornwall Official Plan (2004) and the United Counties of Stormont, Dundas and Glengarry Official Plan (2009) indicate that the Project area is located in a rural area that is predominantly agricultural, with portions of wooded areas. The United Counties of Stormont, Dundas and Glengarry Draft Official Plan (2016) states a reported percent forest cover value of 28%.

Site investigations confirmed the presence of 5 woodland features within the ZOI. No woodlands were located in the Project Location.

Four of the five woodlands confirmed during site investigations met the criteria for significance based on criteria standards within the NHAG (MNR 2012). Significant woodland features are shown on **Figure 4, Appendix A**.

Potential Effects

The Project Location is sited outside the significant woodland boundaries and, therefore, no direct effects on significant woodlands are anticipated during operation of the Project.

Mitigation Measures

Avoidance was the main strategy used to minimize effects to significant woodlands within 50 m of the Project Location.

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Net Effects

Maintenance activities are expected to occur occasionally and will be short term in duration and spatially limited. With the implementation of the above mitigation measures, no significant adverse residual effects on significant woodlands are anticipated.

5.2.3 Wildlife and Wildlife Habitat

Wildlife habitat is defined in O. Reg. 359/09 as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle and that are important to migratory and non-migratory species.

Based on a review of background resources, 99 species of birds, 20 species of mammals, 10 species of amphibians, and six species of reptiles are known to occur within the vicinity of the Project. A complete list of species identified during the records review is provided in the [Natural Heritage Assessment](#).

During the site investigation, wildlife habitats within the ZOI were identified based on the presence of generalized landscape and geography (i.e., ELC assessment), in accordance with the NHAG (MNR 2012). These habitats have been 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 (at their closest point 5 m from the Project Location and 15 m from solar panel areas). A candidate amphibian movement corridor was identified in the ZOI, outside of the Project Location. Both the Generalized Candidate SWH and the candidate amphibian movement corridor are treated as significant for the purposes of the [Natural Heritage Assessment](#). The Generalized Candidate SWH and the candidate amphibian movement corridor are shown on **Figure 4, Appendix A**.

Potential Effects

The Project Location is sited outside the Generalized Candidate SWH boundaries and, therefore, no direct effects on Generalized Candidate SWH are anticipated during operation of the Project.

For the candidate amphibian movement corridor, avoidance or disturbance effects (i.e. reduced use of the amphibian movement corridor) due to operation of the facility is not predicted.

Mitigation Measures

Mitigation measures for the significant wetland and woodland features will be applied as outlined above (in Section 5.2.1 and 5.2.2), as Generalized Candidate SWH is contained within these features.

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A perimeter fence will be installed around the facility which will ensure there is no infringement into adjacent habitats during operation of the facility.

Net Effects

With the implementation of the above mitigation measures, no significant adverse residual effects on significant wildlife or wildlife habitat are anticipated.

5.2.4 Areas of Natural and Scientific Interest (ANSIs)

MNRF identifies two types of ANSIs: Life Science and Earth Science. Life Science ANSIs are significant representative areas of Ontario's biodiversity and natural landscapes, while Earth Science ANSIs are geological in nature and consist of significant representative examples of bedrock, fossils and landforms in Ontario.

No Life Science or Earth Science ANSIs were identified within the Project Location or ZOI (LIO 2016; NHIC 2015; MNRF 2016a).

Potential Effects

Since no ANSIs were identified within 300 m of the Project Location, potential effects on ANISs are not anticipated.

Mitigation Measures

No mitigation measures are recommended because potential effects on ANISs are not anticipated.

Net Effects

No significant adverse residual effects on ANSIs are anticipated.

5.2.5 Provincial Parks and Conservation Reserves

No provincial parks or conservation reserves were identified within the Project Location or ZOI (LIO 2016; NHIC 2015; Ontario Parks 2016).

Potential Effects

Since no provincial parks or conservation reserves were identified within 300 m of the Project Location, potential effects on provincial parks or conservation reserves are not anticipated.

Mitigation Measures

No mitigation measures are recommended because potential effects on provincial parks or conservation reserves are not anticipated.

Net Effects

No significant adverse residual effects on provincial parks or conservation reserves are anticipated.

5.3 WATER BODIES AND AQUATIC RESOURCES

5.3.1 Groundwater

According to the MOECC Water Well Records database (2016), there are 11 water wells located within 300 m of the Project Location with three located within the Project Location (MOECC, 2016) (**Figure 3, Appendix A**). The wells are classified as observation or test wells that are not in use. The average static water level is reported at 4.65 metres below ground (mbg), and ranges between 0.61 mbg and 1.79 mbg. The well records indicate that there are approximately 30-60 centimeters (cm) of topsoil underlain by clay and hard pan. Neighbouring houses are serviced by water wells and septic systems.

According to the Preliminary Geotechnical Investigation completed for the Project by Houle Chevrier Engineering Ltd. (Houle Chevrier), groundwater was noted at depths ranging from approximately 0.6 to 3.7 mbg, averaging 1.8 mbg (2016). This assessment was based on a summary of seven (7) boreholes and eight (8) test pits excavated at the Project Location (2016). A surficial layer of topsoil was encountered at all borehole and test pit locations. The topsoil is generally composed of dark brown silty clay with trace to some organic material. The topsoil ranges in thickness from about 20 to 36 cm, averaging 27 cm (Houle Chevrier 2016). A deposit of silty clay was encountered below the topsoil at all borehole and test pit locations with the upper 2 m generally consisting of a very stiff grey brown silty clay which has been weathered (Houle Chevrier 2016).

The Project Location is found in the Raisin Region Source Protection Area. Municipal drinking water in the Township of South Stormont is sourced from surface water intakes along the St. Lawrence River in Long Sault located approximately 6 km west of the Project Location, and groundwater intakes in Newington located more than 17 km northwest of the Project Location. The Cornwall Drinking Water System is located approximately 4 km south of the Project Location and is sourced from a surface water intake along the St. Lawrence River. The Project is not anticipated to have any effects on municipal drinking water wellhead protection areas or intake protection zones. The Project Location is not found within a significant groundwater recharge area.

No dewatering activities are anticipated during operation of the Project.

Potential Effects

There are no municipal wells within 17 km of the Project Location, and therefore under the *Clean Water Act* (2006) operation of the facility does not pose a threat to the groundwater drinking supply.

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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. Water is not anticipated to be required for solar panel washing as rain water and snow should be sufficient for the cleaning of panels. If required, water for cleaning the panels will be trucked in from an off-site source.

Mitigation Measures

Groundwater investigations and/or monitoring requirements will be verified during the REA process.

Spill response and clean up should be conducted in a timely fashion to prevent contamination from reaching the groundwater table. If adverse effects have occurred due to operation activities, remedial actions should be implemented in consultation with the appropriate agencies. This may include actions such as temporary provision of potable water supply to relevant users.

Net Effects

With the implementation of the above mitigation measures, no significant adverse residual effects on groundwater or private wells are anticipated.

5.3.2 Surface Water, Fish and Fish Habitat

The following section provides a summary of the findings discussed in the Water Assessment and Water Body Report. As required by O. Reg. 359/09, the Water Assessment and Water Body Report assessed the Project Location, as well as a ZOI that included 120 m around the outer limits of the Project Location. More information regarding surface water, fish and fish habitat is provided in the Water Assessment and Water Body Report. 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.

The Project is located within the South Raisin River subwatershed which drains an area of approximately 103 km² (Crysler and Latham Ltd. 1979). Land use within the subwatershed is a mix of rural, urban, commercial/ industrial, and natural heritage features (MNRF 2014).

Five (5) water bodies (per O. Reg. 359/09) were identified within the ZOI. One water body crosses the south side of the Project Location boundary, parallel to Cornwall Centre Road. Water body features are shown on **Figure 4, Appendix A**.

The MNRF provided a fish species list for the South Raisin River. The list included Largemouth Bass, Northern Pike, Common Carp, Yellow Perch, and a diversity of baitfish species. There were no fisheries data provided specifically for Abrams Drain; however, the MNRF indicated it provides

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warmwater habitat (MNR 2016d). The four flowing water bodies provide fish habitat on a seasonal basis and contribute flow and nutrients to habitats located farther downstream.

Potential Effects

No direct effects to water bodies are anticipated during operation of the Project.

Mitigation Measures

General mitigation measures for operation activities near a water body within 50 m of the Project Location include:

- refuel and maintain equipment at least 100 m from water bodies
- report spills to the MOECC Spills Action Centre
- For the duration of the work, keep on-site and readily accessible, material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances.

Mitigation measures for accidental spills are provided in Section 5.7.

Net Effects

With the implementation of the above mitigation measures, no significant adverse residual effects on surface water, fish and fish habitat are anticipated.

5.4 AIR QUALITY AND ENVIRONMENTAL NOISE

The following sections describe the potential effects, recommended mitigation measures, and net effects for air, dust and noise.

5.4.1 Air Emissions

Potential Effects

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 panels and from personnel vehicles travelling to and from the property. The Project has no facilities or equipment that will discharge contaminants or pollutants to the air (e.g., exhaust gases from emergency backup diesel generators) during operation of the Project.

Sources of localized emissions during operation are considered negligible under O. Reg. 419/05.

Mitigation Measures

To reduce emissions from equipment and vehicles, several mitigation measures may be employed:

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- multi-passenger vehicles should be utilized to the extent practical
- company and maintenance personnel should avoid idling of vehicles when not necessary for operations activities
- equipment and vehicles should be maintained in good working order with functioning mufflers and emission control systems as available
- all operations equipment and vehicles should meet the emissions requirements of the MOECC and/or Ministry of Transportation.

Net Effects

The application of the recommended mitigation measures during operations should limit air emissions to the work areas and limit the magnitude of combustion emissions. As a result, adverse net effects to air quality from air emissions during operation of the Project are anticipated to be short-term in duration and highly localized.

5.4.2 Environmental Noise

The Project's dominant noise sources would consist of noise radiating from:

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

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 Points of Reception (PORs; Vacant, Commercial, and Existing PORs) were considered in all directions within approximately 1 km of the Project Location.

Additional information regarding equipment specifications and acoustic modelling is provided in the [Acoustic Assessment Report](#).

Potential Effects

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.

Mitigation Measures

The Project would be required to operate according to the terms and conditions of the REA. In the event the Project does not operate according to the terms and conditions of the REA, the non-compliant components may be shut down until the problem is resolved. A regular maintenance program would help in mitigating potential effects related to noise from malfunctioning components.

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Net Effects

Regular maintenance of Project components during operation should limit noise emissions and mitigate potential effects related to noise from malfunctioning components. The noise assessment has concluded that the environmental noise effects from the operation of the Project would be in compliance with the applicable MOECC environmental noise guidelines. No significant adverse residual effects from environmental noise are anticipated.

5.5 LAND USE AND SOCIO-ECONOMIC RESOURCES

The following sections describe the potential effects, recommended mitigation measures, and net effects for Land Use.

The Project Location and surrounding land uses north of Cornwall Centre Road are designated by the United Counties of Stormont, Dundas and Glengarry, the Township of South Stormont. Lands south of Cornwall Centre Road are designated by the City of Cornwall.

An assessment of land use at the Project Location and within 300 m was conducted through a review of the United Counties of Stormont, Dundas and Glengarry Official Plan (2009), Township of South Stormont Comprehensive Zoning By-law 2011-100 (2011), City of Cornwall Official Plan (2004), City of Cornwall Zoning By-law No. 751 (1969), and several provincial land use documents. Additionally, visits to the Project Location by the Project team and air photo interpretation were used to identify existing uses of land in the vicinity of the Project Location that could be affected by the Project.

The Project Location is currently used for agricultural operations. Lands within the Project Location are privately owned and have been leased by the Proponent for a 20 or more year term. Lands surrounding the Project Location are primarily forested and/or scrub. There are two closed landfills located north of the Project Location, and an active landfill and the Hydro One St. Lawrence Transmission Station located south of the Project Location. No recreational facilities or cultural features have been identified within the Project Location or on immediately adjacent lands. The Project Location does not include or border local hiking or cycling routes, or fishing or conservation areas or parks. It is possible that hunting activities occur within the Project Location or on adjacent lands.

Land use designations at the Project Location are as follows:

United Counties of Stormont, Dundas and Glengarry

The United Counties of Stormont, Dundas and Glengarry is an upper-tier municipality. The United Counties of Stormont, Dundas and Glengarry Official Plan was adopted by Council in July, 2009. The Project Location is within a designated Rural District. Schedule A4 (Land Use) of the Official Plan identifies the Project Location as being intersected by an oil pipeline owned and operated by TNPI and a Hydro One power transmission line, and as being within the Influence Area of two

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closed landfill sites and one active landfill. Schedule B4 (Constraints Plan) of the Official Plan identified the northern extent of the Project Location as being within the Regulatory Floodline. Cornwall Centre Road is identified as a municipal Road.

Township of South Stormont

The Township of South Stormont is a lower-tier municipality in the United Counties of Stormont, Dundas and Glengarry. The *Township of South Stormont Comprehensive Zoning By-law 2011-100* was adopted by Council in December, 2011. The Project Location is predominantly zoned as Flood Plain (FP), but a portion in the north is zoned as Rural (RU). The Proponent is currently in consultation with the Township and RRCA to determine the necessary permitting requirements and guidelines required for the Project.

City of Cornwall

The City of Cornwall is a single-tier municipality. The City of Cornwall Official Plan came into effect in May, 2004. The City of Cornwall Official Plan (2004) and Zoning By-law No. 751 (1969) were reviewed as part of the land use assessment, however, Cornwall Centre Road is the northern boundary of the City of Cornwall, therefore, there are no City of Cornwall land use or zoning designations at the Project Location.

Provincial Land Use

The Project Location is not within areas protected under Provincial Plans and Policies specified in O. Reg. 359/09, such as the *Greenbelt Plan (2005)*, *Niagara Escarpment Plan (2005)*, or the *Oak Ridges Moraine Conservation Plan (2002)*.

In accordance with the Large Renewable Procurement I program rules, the Project is located in whole within the boundaries of the Approved Official Plan of the Township of South Stormont. The Township of South Stormont completed the Prime Agricultural designation process for its Approved Official Plan and the Project does not have its site located within Prime Agricultural Areas as set out in the Official Plan.

Potential Effects

The Project was confirmed by the Proponent to be in compliance with the agricultural land use requirements of the IESO's LRP I program.

According to the *Township of South Stormont Comprehensive Zoning By-law 2011-100*, there are development restrictions in FP zones.

Visual nuisance to the community may occur due to the presence of the facility during the operational phase of the Project.

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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 (or another state, in accordance with the zoning by-law, as determined by the landowner at the time of decommissioning). Operational 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.

Impacts to mineral, aggregate or petroleum resources, local hiking or cycling routes, fishing or conservation areas, or parks are not anticipated.

Mitigation Measures

The proponent is currently in consultation with the Township and RRCA to determine land use impacts and permitting requirements regarding development in the FP zone.

Trees will be planted along the north side of Cornwall Centre Road to act as a vegetation barrier which will partially reduce the visual impact of the facility (**Appendix A**). The Proponent will implement a vegetation management plan to monitor and maintain the vegetation barrier.

Soil compaction and topsoil management will be addressed during the construction and decommissioning phase of the Project and is discussed in the Construction Plan Report and Decommissioning Plan Report, respectively.

Net Effects

Project infrastructure is removable and, as a result, the visual impact is considered temporary and reversible.

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 (i.e., during the life of the project only).

With the implementation of the above mitigation measures, no significant adverse residual effects on land use or socio-economic resources are anticipated.

5.6 EXISTING LOCAL INFRASTRUCTURE

5.6.1 Municipal Infrastructure

There is one municipal roadway located within 300 m of the Project Location maintained by the City of Cornwall. Cornwall Centre Road runs east-west along the southern boundary of the Project Location.

No water mains or sewer mains have been identified within 300 m of the Project Location.

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Potential Effects

Potential effects on municipal infrastructure are not anticipated during operation of the Project. A Road Use Agreement is anticipated to be in place following consultation with the United Counties of Stormont, Dundas and Glengarry and the City of Cornwall.

Mitigation Measures

As no potential effects are anticipated on municipal infrastructure during operation of the Project, no mitigation measures are recommended.

Net Effects

Significant adverse residual effects to municipal infrastructure are not anticipated to occur during operation of the Project.

5.6.2 Other Utilities and Infrastructure

A private gravel roadway runs adjacent to the northeast corner of the Project Location. The roadway can be accessed at the intersection of Cornwall Centre Road and Power Dam Drive.

The southwest corner of the Project Location is diagonally intersected by Hydro One 230 kV overhead electrical transmission lines. The Project will be interconnected to a 44 kV overhead or underground distribution line located in the road allowance of Cornwall Centre Road.

A transmission hydrocarbon pipeline owned and operated by TNPI intersects the Project Location diagonally from the southeast corner to the northwest corner.

A railway owned and operated by Canadian National Railway (CN) is located approximately 50 m southwest of the Project Location.

No phone lines, or other buried utilities have been identified within 300 m of the Project Location.

Potential Effects

If utilities are not properly located and marked prior to planned or unplanned maintenance activities, there is potential to strike or interfere with a buried or overhead utility which could result in damage to the infrastructure and injury to personnel.

Unsafe operation of vehicles and equipment near the railway during maintenance activities may result in damage to equipment or the rail facility, or injury or death.

Mitigation Measures

The contractor will be responsible for locating and marking existing pipelines and utilities on lands which may be affected by Project maintenance. Machine operators will be informed where electrical lines are present overhead. Lines that may interfere with the operation of equipment will be aptly identified by the general contractor.

CN should be notified of major maintenance activities that may impact the railway, and the use of traffic controls should be considered.

Net Effects

With the implementation of the above mitigation measures, no significant adverse residual effects on utilities or infrastructure are anticipated.

5.7 WASTE MATERIAL DISPOSAL AND ACCIDENTAL SPILLS

The following sections describe the potential effects, recommended mitigation measures, and net effects for waste material disposal and fuel spills.

Potential Effects

Wastes such as equipment packaging, wrappings and scraps (wood and metal) will be generated during operation activities and require reuse, recycling, and/or disposal at an appropriate MOECC-approved off-site facility. Improper disposal of waste material generated during operation may result in contamination to soil, and/or surface water resources on and off Project lands. Litter generated during operation may also become a nuisance to nearby residences if not appropriately contained and allowed to blow off-site.

Mitigation Measures

During operation, the Proponent and/or the operation and maintenance contractor will implement a site-specific waste collection and disposal management program, which may include:

- the Proponent and/or contractors will remove waste materials from the Project Location during maintenance activities
- labelling and proper storage of liquid wastes (e.g., used oil and solvents) in a secure area that would contain spill response materials
- as appropriate, spill kits (e.g., containing absorbent cloths and disposal containers) will be provided on-site during maintenance activities and at the control building
- dumping or burying wastes within the Project sites would be prohibited
- non-hazardous waste will be disposed at a registered waste disposal site(s)
- if waste is generated that is not solid non-hazardous waste, a Generator Registration Number is required from the MOECC and the generator would have obligations regarding manifesting of waste. Compliance with Schedule 4 of O. Reg. 347 is mandatory when determining waste category
- implementation of an on-going waste management program consisting of reduction, reuse, and recycling of materials.

Equipment maintenance and refueling, and other potentially contaminating activities, will occur in designated areas. Large quantities of fuel, lubricating oils, and other fluids associated with

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maintenance activities will not be stored at the site. The storage of minor quantities of fuels and lubricants on-site do not represent a significant potential adverse effect on the groundwater in the event of accidental spills. Standard containment facilities and emergency response materials would be maintained on-site as required.

In the unlikely event of an accidental spill, the response procedures noted in Section 3.7 of the Construction Plan Report will be implemented. Follow-up monitoring /inspections would be implemented in the event of an accidental spill/leak, as appropriate. Remedial actions may be required in the event that follow-up monitoring indicates adverse effects to natural features.

Net Effects

Accidental spills are anticipated to occur infrequently, if at all, and be spatially limited. With the implementation of the above mitigation measures, no significant adverse residual effects from waste material disposal or accidental spills are anticipated.

5.8 PUBLIC HEALTH AND SAFETY

Potential Effects

Given the installation of large scale electrical equipment, there is a potential risk of fire associated with an accident or malfunction. However, the solar panels and associated equipment will have appropriate protection and controls, and will be grounded, resulting in a negligible increase in fire potential.

During operation, failure of poles suspending overhead lines is a possibility. In the event of a pole failure during operation, an on-site power outage may occur. The duration of the outage would depend on the number of poles affected, the extent of the damages, weather conditions at the time of the incident and the availability of response personnel. All poles owned and operated by the Proponent are expected to be installed within the perimeter fence. The probability of pole failure occurring during operation is considered low.

Mitigation Measures

The primary method of minimizing potential public health and safety risks will be by installing perimeter fencing to restrict site access and prevent trespassing and vandalism (see Section 3.3.2).

The Proponent will reduce accidents and malfunctions by providing proper training and education of staff operating the control system and maintaining the panels. Solar panels and associated electrical equipment will be installed and maintained in accordance with applicable codes and standards.

The primary preventative measure taken to avoid pole failure during operation is at the design stage. Overhead lines will be designed and constructed in accordance with applicable regulatory guidelines.

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Should maintenance activities be required within a municipal road allowance, access to residential properties should be maintained. Safety fences should be installed at the edge of the maintenance areas where public safety considerations are required. Traffic controllers and appropriate signage should be used as necessary.

The Proponent will maintain communication with the municipality and provide them with an emergency response plan for the Project. Specialized equipment beyond what is typically required to respond to electrical fires is not required for fires involving solar panels. The Emergency Response and Communications Plan is provided in Section 7.0.

Net Effects

With the implementation of the above mitigation measures and adherence to safety policies and regulations, a minimal increased or new risk to public health and safety is anticipated during operation of the Project.

6.0 ENVIRONMENTAL EFFECTS MONITORING PLAN

The environmental effects monitoring plan for Project operation has been designed to monitor implementation of the proposed mitigation, monitoring and contingency measures provided in Section 5.0.

Environmental monitoring can provide data on key functions of natural environment and socio-economic features that may be affected during operation of the Project, and on the effectiveness of mitigation measures implemented as part of the Project. The monitoring procedures noted herein are linked to the potential effects and mitigation measures discussed throughout Section 5.0.

The environmental effects monitoring plan associated with construction activities, including a description of post-construction monitoring, is provided in the Construction Plan Report.

Table 6.1 summarizes the potential negative effects, performance objectives, mitigation strategies, monitoring plan and contingency measures for the operational stage of the Project.

Table 6.1: Summary of the potential negative effects, performance objectives, mitigation strategies, monitoring plan and contingency measures for the operational stage of the Project.

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 5.1 Cultural Heritage and Archaeological Resources	<ul style="list-style-type: none"> None. No cultural heritage landscapes, protected properties or archeological resources were identified. 	<ul style="list-style-type: none"> No impacts to cultural heritage landscapes, protected properties and archeological resources 	<ul style="list-style-type: none"> None Required. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None Required.
Section 5.2.1 Significant Wetlands	<ul style="list-style-type: none"> No direct effects on significant wetlands are anticipated during operation of the Project. Potential for dust and spills is considered low. 	<ul style="list-style-type: none"> No impacts to significant wetland features. 	<ul style="list-style-type: none"> Avoidance was the main strategy used to minimize effects to significant wetlands within 50 m of the Project Location. 	<ul style="list-style-type: none"> With the implementation of suggested mitigation measures, no significant adverse residual effects on significant wetlands are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.2.2 Significant Woodlands	<ul style="list-style-type: none"> No direct effects on significant woodlands are anticipated during operation of the Project. 	<ul style="list-style-type: none"> No impacts to significant woodland features. 	<ul style="list-style-type: none"> Avoidance was the main strategy used to minimize effects to significant woodlands within 50 m of the Project Location. 	<ul style="list-style-type: none"> Accidental spills are anticipated to occur infrequently and be spatially limited. With the implementation of suggested mitigation measures, no significant adverse residual effects on significant wetlands are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.2.3 Wildlife and Wildlife Habitat	<ul style="list-style-type: none"> No direct effects on Generalized Candidate SWH are anticipated during operation of the Project. For the candidate amphibian movement corridor, avoidance or disturbance effects (i.e. reduced use of the amphibian movement corridor) due to operation of the facility is not predicted. 	<ul style="list-style-type: none"> Minimize impacts to wildlife habitat. 	<ul style="list-style-type: none"> Mitigation measures for the significant wetland and woodland features will be applied as outlined above, as Generalized Candidate SWH is contained within these features. A perimeter fence will be installed around the facility which will ensure there is no infringement into adjacent habitats during operation of the facility. 	<ul style="list-style-type: none"> With the implementation of suggested mitigation measures, no significant adverse residual effects on significant wildlife or wildlife habitat are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.2.4 Areas of Natural and Scientific Interest (ANSIs)	<ul style="list-style-type: none"> None. No ANSIs were identified within 300 m of the Project Location. 	<ul style="list-style-type: none"> No impacts to ANSIs. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No significant adverse residual effects on ANSIs are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.2.5 Provincial Parks and Conservation Areas	<ul style="list-style-type: none"> None. No provincial parks or conservation reserves were identified within 300 m of the Project Location. 	<ul style="list-style-type: none"> No impacts to Provincial Parks and Conservation Reserves. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No significant adverse residual effects on provincial parks or conservation reserves are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.3.1 Groundwater	<ul style="list-style-type: none"> Under the Clean Water Act (2006) operation of the facility does not pose a threat to the groundwater drinking supply. Negative environmental effects to water wells are not anticipated during operation of the Project. 	<ul style="list-style-type: none"> No impacts to Groundwater. 	<ul style="list-style-type: none"> Groundwater investigations and/or monitoring requirements will be verified during the REA process. Spill response and clean up should be conducted in a timely fashion to prevent contamination from reaching the groundwater table. If adverse effects have occurred due to operation activities, remedial actions should be implemented in consultation with the appropriate agencies. This may include actions such as temporary provision of potable water supply to relevant users. 	<ul style="list-style-type: none"> With the implementation of suggested mitigation measures, no significant adverse residual effects on significant wetlands are anticipated. 	<ul style="list-style-type: none"> None required.

Table 6.1: Summary of the potential negative effects, performance objectives, mitigation strategies, monitoring plan and contingency measures for the operational stage of the Project.

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 5.3.2 Surface Water, Fish and Fish Habitat	<ul style="list-style-type: none"> No direct effects to water bodies are anticipated during operation of the Project. 	<ul style="list-style-type: none"> No impacts to surface water, fish and fish habitat. 	<ul style="list-style-type: none"> General mitigation measures for operation activities near a water body within 50 m of the Project Location include: <ul style="list-style-type: none"> refuel and maintain equipment at least 100 m from water bodies report spills to the MOECC Spills Action Centre For the duration of the work, keep on-site and readily accessible, material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances. 	<ul style="list-style-type: none"> With the implementation of the suggested mitigation measures, no significant adverse residual effects on surface water, fish and fish habitat are anticipated. 	<ul style="list-style-type: none"> Drainage ditches, culverts and general flow patterns will be monitoring during operation to maintain proper site drainage.
Section 5.4.1 Air Emissions	<ul style="list-style-type: none"> Minor localized air emissions from periodic use of equipment for general repairs, maintenance of panels and from personnel vehicles. 	<ul style="list-style-type: none"> Minimize duration and magnitude of emissions 	<ul style="list-style-type: none"> Use of multi-passenger vehicles where practical. Avoid idling. Maintain equipment and vehicles in good working order with functioning mufflers and emission control systems as available. Equipment and vehicles should meet emissions requirements of the MOECC and/or Ministry of Transportation. 	<ul style="list-style-type: none"> Any adverse net effects are anticipated to be short-term in duration and highly localized. 	<ul style="list-style-type: none"> Adherence to Complaint Response Protocol.
Section 5.4.2 Environmental Noise	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Predicted sound levels at non-participating receptors meet MOECC Guidelines. 	<ul style="list-style-type: none"> Comply with MOECC environmental noise guidelines. In the event the project does not operate in accordance with the terms and conditions of the REA, non-compliant components may be shut down until the problem is resolved. Regular maintenance program to fix damaged components. 	<ul style="list-style-type: none"> Regular maintenance of Project components during operation should limit noise emissions and mitigate potential effects related to noise from damaged components. The noise assessment has concluded that the environmental noise effects from the operation of the Project would be in compliance with the applicable MOECC environmental noise guidelines. No significant adverse residual effects from environmental noise are anticipated. 	<ul style="list-style-type: none"> Noise monitoring (if required), would be conducted in accordance with the REA for the Project. Routine maintenance and monitoring would also help minimize the likelihood of malfunctioning equipment resulting in excessive noise emissions.

Table 6.1: Summary of the potential negative effects, performance objectives, mitigation strategies, monitoring plan and contingency measures for the operational stage of the Project.

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 5.5 Land Use and Socio-Economic Resources	<ul style="list-style-type: none"> According to the <i>Township of South Stormont Comprehensive Zoning By-law 2011-100</i>, there are development restrictions in FP zones. Visual nuisance to the community may occur due to the presence of the facility during the operational phase of the Project. 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 (or another state, in accordance with the zoning by-law, as determined by the landowner at the time of decommissioning). Operational activities have the potential to alter the agricultural capacity of the land following decommissioning of the Project. Compaction of topsoil and erosion or surface soil may occur during operation and can potentially decrease crop yields. 	<ul style="list-style-type: none"> Minimize nuisance to surrounding landowners. Preserve quality of agricultural lands. 	<ul style="list-style-type: none"> The proponent is currently in consultation with the Township and RRCA to determine land use impacts and permitting requirements regarding development in the FP zone. Trees will be planted along Cornwall Centre Road to act as a vegetation barrier which will partially reduce the visual impact of the facility. Soil compaction and topsoil management will be addressed during the construction and decommissioning phase of the Project and is discussed in the <u>Construction Plan Report</u> and <u>Decommissioning Plan Report</u>, respectively. 	<ul style="list-style-type: none"> Project infrastructure is removable and, as a result, the visual impact is considered temporary and reversible. 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 (i.e., during the life of the project only). With the implementation of suggested mitigation measures, no significant adverse residual effects on land use or socio-economic resources are anticipated. 	<ul style="list-style-type: none"> The Proponent should review Project complaints on a regular basis and respond accordingly in a timely manner, in accordance with the Complaint Response Protocol. The Proponent should monitor compliance with the Emergency Response and Communications Plan.
Section 5.6.1 Municipal Infrastructure	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None required.
Section 5.6.2 Other Utilities and Infrastructure	<ul style="list-style-type: none"> If utilities are not properly located and marked prior to planned or unplanned maintenance activities, there is potential to strike or interfere with a buried or overhead utility which could result in damage to the infrastructure and injury to personnel. Unsafe operation of vehicles and equipment near the railway during maintenance activities may result in damage to equipment or the rail facility, or injury or death. 	<ul style="list-style-type: none"> No interference with utilities and other infrastructure. 	<ul style="list-style-type: none"> The contractor will be responsible for locating and marking existing pipelines and utilities on lands which may be affected by Project maintenance. Machine operators will be informed where electrical lines are present overhead. Lines that may interfere with the operation of equipment will be aptly identified by the general contractor. CN should be notified of major maintenance activities that may impact the railway, and the use of traffic controls should be considered. 	<ul style="list-style-type: none"> With the implementation of suggested mitigation measures, no significant adverse residual effects on utilities or other infrastructure are anticipated. 	<ul style="list-style-type: none"> None required.

Table 6.1: Summary of the potential negative effects, performance objectives, mitigation strategies, monitoring plan and contingency measures for the operational stage of the Project.

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
<p>Section 5.7 Waste Material Disposal and Accidental Spills</p>	<ul style="list-style-type: none"> • Wastes such as equipment packaging, wrappings and scraps (wood and metal) will be generated during operation activities and require reuse, recycling, and/or disposal at an appropriate MOECC-approved off-site facility. • Improper disposal of waste material generated during operation may result in contamination to soil, and/or surface water resources on and off Project lands. • Litter generated during operation may also become a nuisance to nearby residences, if not appropriately contained and allowed to blow off the construction site. 	<ul style="list-style-type: none"> • No contamination as a result of improper disposal of waste. • No spills. 	<ul style="list-style-type: none"> • During operation, the Proponent and/or the operation and maintenance contractor will implement a site-specific waste collection and disposal management program, which may include: <ul style="list-style-type: none"> ○ the Proponent and/or contractors will remove waste materials from Project Location during maintenance activities ○ labelling and proper storage of liquid wastes (e.g. used oil and solvents) in a secure area that would contain materials in the event of a spill ○ as appropriate, spill kits (e.g. containing absorbent cloths and disposal containers) will be provided on-site during maintenance activities and at the control building ○ dumping or burying wastes within the Project sites would be prohibited ○ non-hazardous waste will be disposed at a registered waste disposal site(s) ○ if waste is generated that is not solid non-hazardous waste, a Generator Registration Number is required from the MOECC and the generator would have obligations regarding manifesting of waste. Compliance with Schedule 4 of O. Reg. 347 is mandatory when determining waste category 	<ul style="list-style-type: none"> • Accidental spills area anticipated to occur infrequently, if at all, and be spatially limited. 	<ul style="list-style-type: none"> • Records of waste generation and hauling should be maintained, as appropriate. Where a third party's activities are identified as non-compliant or insufficient, the general contractor would seek out an alternative recycling or disposal solution. • The Proponents should inspect that the maintenance contractor is following the spill response protocols outlined in this CPR and the Emergency Response and Communications Plan. • In the event that previously unknown materials or contaminated soils are uncovered or suspected of being uncovered, construction in the find location should cease immediately. In such an instance, the Proponent should retain expert advice on assessing and developing a plan for soil sampling, handling, disposal and remediation.

Table 6.1: Summary of the potential negative effects, performance objectives, mitigation strategies, monitoring plan and contingency measures for the operational stage of the Project.

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 5.7 Waste Material Disposal and Accidental Spills (cont'd)			<ul style="list-style-type: none"> ○ implementation of an on-going waste management program consisting of reduction, reuse, and recycling of materials. • Equipment maintenance and refueling, and other potentially contaminating activities, will occur in designated areas. Large quantities of fuel, lubricating oils, and other fluids associated with maintenance activities will not be stored at the site. The storage of minor quantities of fuels and lubricants on-site do not represent a significant potential adverse effect on the groundwater in the event of accidental spills. Standard containment facilities and emergency response materials would be maintained on-site as required. • In the unlikely event of an accidental spill, the response procedures noted in Section 3.7 of the <u>Construction Plan Report</u> will be implemented. Follow-up monitoring /inspections would be implemented in the event of an accidental spill/leak, as appropriate. Remedial actions may be required in the event that follow-up monitoring indicates adverse effects to natural features. 		

Table 6.1: Summary of the potential negative effects, performance objectives, mitigation strategies, monitoring plan and contingency measures for the operational stage of the Project.

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
<p>Section 5.8 Public Health and Safety</p>	<ul style="list-style-type: none"> • Potential risk of fire associated with an accident or malfunction. • Possible failure of overhead line poles. 	<ul style="list-style-type: none"> • Zero project related injuries. 	<ul style="list-style-type: none"> • The primary method of minimizing potential public health and safety risks will be by installing perimeter fencing to restrict site access and prevent trespassing and vandalism (see Section 3.3.2). • The Proponent will reduce accidents and malfunctions by providing proper training and education of staff operating the control system and maintaining the panels. • Solar panels and associated electrical equipment will be installed and maintained in accordance with applicable safety standards. • The primary preventative measure taken to avoid pole failure during operation is at the design stage. Overhead lines will be designed and constructed in accordance with applicable regulatory guidelines. • Should maintenance activities be required within a municipal road allowance, access to residential properties should be maintained. • Safety fences should be installed at the edge of the maintenance areas where public safety considerations are required. Traffic controllers and appropriate signage should be utilized as necessary. • The Proponent will maintain communication with the municipality and provide them with an emergency response plan for the Project. • Specialized equipment beyond what is typically required to respond to electrical fires is not required for fires involving solar panels. The Emergency Response and Communications Plan is provided in Section 7.0. 	<ul style="list-style-type: none"> • None. 	<ul style="list-style-type: none"> • The Proponent should review Project complaints on a regular basis and respond accordingly in a timely manner, in accordance with the Complaint Response Protocol.

7.0 EMERGENCY RESPONSE AND COMMUNICATIONS PLAN

The following sets out a general description of the actions to be taken during all Project phases to inform the public, Aboriginal communities, the host municipalities, and relevant government ministries regarding activities occurring at the Project Location (including emergencies), and means by which stakeholders and Aboriginal communities can contact the Proponent and the Proponent will record and address correspondence.

The Proponent will create an Emergency Response and Communications Plan for use by employees, which will include up-to-date contact information and will be maintained at an accessible location during all Project phases. The Emergency Response and Communications Plan will be reviewed by the Proponent during each phase of the Project. Notification of changes to the Emergency Response and Communications Plan would be communicated to relevant stakeholders as outlined in Section 7.2.

7.1 EMERGENCY RESPONSE

The Emergency Response and Communications Plan will be implemented throughout the life of the Project (from construction to decommissioning) and will be updated as required. 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. Copies of the detailed Emergency Response and Communications Plan will be kept on-site (construction office trailer during construction and control building during operation) and will be accessible to on-site personnel. Regular contact with municipal emergency response staff will occur so that they stay aware of the status of construction on-site and understand how to deal with potential accidents and malfunctions resulting from the operation of the Project.

Emergency medical services (ambulance) are provided by the City of Cornwall. The Township of South Stormont is responsible for fire services. The Proponent will provide the Emergency Response Plan to the County, Township and City's emergency services departments for review and approval. Policing in the United Counties Stormont, Dundas and Glengarry is provided by the Ontario Provincial Police from the Stormont, Dundas and Glengarry detachment, with headquarters in Long Sault. The City of Cornwall also have a community police service. The Emergency Response Plan will include key contact information for emergency service providers, a description of the chain of communications and how information would be disseminated between the Proponent and the relevant responders. This information will be obtained during consultations with the County, Township and City's emergency services departments.

In the event of an emergency, the Proponent will initiate the following Emergency Response Plan and will contact (via phone or in-person) Project stakeholders who may be directly impacted so that the appropriate actions can be taken to protect health and safety. Potential

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emergency scenarios that could occur on the Project site include fire, personal injury and accidental spills. The following sections provide procedures to follow in the event of these potential emergency scenarios.

All Project personnel will be trained in the emergency response and communication plan procedures outlined. Any non-Project personnel visiting the site will need to be accompanied by Project personnel when on the site, will be required to attend and participate in safety awareness training before entering the site, and must wear appropriate personal protective equipment when on the site.

During operation of the Project, the site will be monitored using the SCADA system on a real-time basis, 24 hours a day, 7 days a week. If an emergency detected on the site, the Proponent will respond by sending Project personnel to the site to address the emergency and communicate with the appropriate authorities.

7.1.1 Fire

Fire extinguishers will be located throughout the Project site at health and safety points (e.g., the entrance to the site, the substation, etc.); these points will be determined by the general contractor for the construction and decommissioning phases and by the Operations Manager during the operation phase. Fire extinguishers will also be located in personnel vehicles. If a fire occurs on the site, Project personnel will follow safety procedures and attempt to extinguish the fire only if it is safe to do so. Project personnel will not attempt to extinguish the fire if there is a potential risk to personal safety. If personal safety is a concern, the Project area will be evacuated immediately and Project personnel will call 911 to contact the local fire department (and ambulance if required) and the Operations Manager. If there is potential for the fire to spread off-site, the Project personnel will notify adjacent property owners immediately. Project personnel that will be on-site during the life of the Project will be trained in the proper procedures for dealing with a fire and on how to properly use a fire extinguisher.

For the duration of Project operation, a sign will be placed in a visible location on the entrance gate to the Project site providing important instructions in the case of an emergency situation. It will identify that the passerby should call 911 and the Proponent.

A record of incidents that occur at the site will be kept on file by the Proponent. The record will include the date of the incident, date of reporting, name of reporter, description of the incident, cause of the incident, actions taken, communications to internal and external groups, and follow-up required.

7.1.2 Personal Injury

First-aid supplies and maps providing the location and routes to the local hospital will be kept on-site for the life of the Project. A list of Project personnel certified in first-aid and CPR will be posted with the first-aid supplies on-site. In the event of a personal injury, the injured worker will

BARLOW SOLAR ENERGY CENTRE DESIGN & OPERATIONS REPORT

Emergency Response and Communications Plan
June 12, 2017

be treated on-site if it is a minor injury; otherwise, the person will be transported to the hospital directly or by ambulance. If an ambulance is required for an injury, Project personnel will call 911 and assist the injured worker as required until emergency personnel arrive on-site.

The general contractor (during construction and decommissioning) or the Operations Manager (during operations) will be immediately notified of personal injuries.

A record of incidents on the site will be kept on file by the Proponent. The record will include date of the incident, date of reporting, name of reporter, description of the incident, cause of the incident, actions taken, communications to internal and external groups, and follow-up, as required by Health and Safety Regulations.

7.1.3 Accidental Spills

The MOECC *Spills Reporting – A Guide to Reporting Spill and Discharge* (2007) provides the procedures to be used in the event of an accidental spill on the Project site. The *Environmental Protection Act* (1990) and O. Reg. 675/98 provide the definition of spills that are required to be reported.

The most likely sources of potential accidental spills on-site include transformer oil, vehicle or equipment fuel or oil, and liquid wastes stored on-site. Accidental spills may result from the improper handling of equipment or materials, or a leak from spill containment material.

Measures to prevent potential effects of accidental spills on the natural environment can be found in the Natural Heritage Assessment Report. Project personnel on-site during the life of the Project will be trained to properly respond to accidental spills. Spill kits (e.g., containing absorbent cloths and disposal containers) will be located at health and safety points for the life of the Project. The following procedures will be followed if an accidental spill occurs:

- potential health and safety issues will be identified before entering the scene of the spill
- the spill will be stopped, if safe to do so
- if the spill may cause harm to human health, 911 will be called immediately and Project personnel will notify any other on-site personnel who could be potentially impacted
- the appropriate Project personnel will be notified of the spill (general contractor during construction and decommissioning and the Operations Manager during operations)
- a spill kit, located on-site or in the vehicle of Project personnel, will be used to clean and contain the spill, if safe to do so
- an outside spill response contractor will be contacted to help clean up major spills beyond the spill kit's capabilities
- if required the spill will be reported to the MOECC's Spills Action Centre and any other relevant outside agencies, as required.

BARLOW SOLAR ENERGY CENTRE DESIGN & OPERATIONS REPORT

Emergency Response and Communications Plan
June 12, 2017

In accordance with O. Reg. 675/98, the MOECC Spills Action Centre will be notified if any of the following types of spills occur on-site:

- non-approved releases/discharges to the land, air or water
- vehicle fluid discharges greater than 100 litres (L)
- electrical transformer releases of mineral oil greater than 100 L
- any discharges to water bodies (e.g., sediment).

The MOECC Spills Action Centre can be contacted 24-hours a day through their toll-free number: 1-800-268-6060. This phone number will be posted on the Project entrance gate and at each health and safety point on the Project site.

All accidental spills will be documented by the Proponent and the reports will be provided to the MOECC, as required. Reporting will include the date of the incident, date of reporting, name of reporter, description of the accidental spill, cause of the accidental spill, type and amount of spill, actions taken, methods and actions taken to dispose of contaminated material, communications to internal and external groups, and follow-up as required.

7.2 NON-EMERGENCY COMMUNICATIONS

7.2.1 Project Updates and Activities

The Proponent will maintain contact with Project stakeholders (public, Aboriginal communities, and the municipalities) during the operation of the Project, as needed. Methods of communication could include providing Project updates on the Project website (<http://www.edf-en.ca/project/barlow-solar-energy-centre/>), letters, newsletters, newspaper notices, and/or direct contact via phone or email. As a long-term presence in the community, the Proponent will continue to build new contacts, local relationships and channels of communication.

Should federal, provincial or municipal agencies require notification, the information will be sent to them by email, mail or direct contact (via phone or in person). The Proponent will keep a record of communications on file.

7.2.2 Complaint Response Protocol

Prior to construction, a newsletter will be distributed to the Project distribution list to provide information to the public on the complaint response protocol. 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. The telephone number, along with the mailing and/or email address would also be posted on the Project website (<http://www.edf-en.ca/project/Barlow-solar-energy-centre/>) and provided directly to the Township, City, County and MOECC.

BARLOW SOLAR ENERGY CENTRE DESIGN & OPERATIONS REPORT

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The telephone number provided for the reporting of questions, concerns and/or complaints would be equipped with a voice message system used to record the complainant's name, address, telephone number, time and date of the complaint, and details of the complaint. Messages would 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. The actions taken to remediate the cause of the complaint and the proposed actions to be taken to prevent reoccurrences of the same complaint in the future would also be recorded within the Complaint Response Document. Correspondence would be shared with other stakeholders, such as the municipality or MOECC, as required and/or as deemed appropriate.

Ongoing stakeholder communication will allow the Proponent to receive and respond to general community issues on an ongoing basis.

BARLOW SOLAR ENERGY CENTRE DESIGN & OPERATIONS REPORT

References
June 12, 2017

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References

June 12, 2017

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

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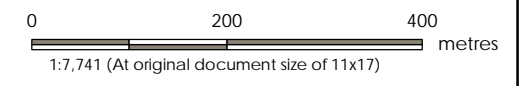
APPENDIX A: FIGURES



- 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

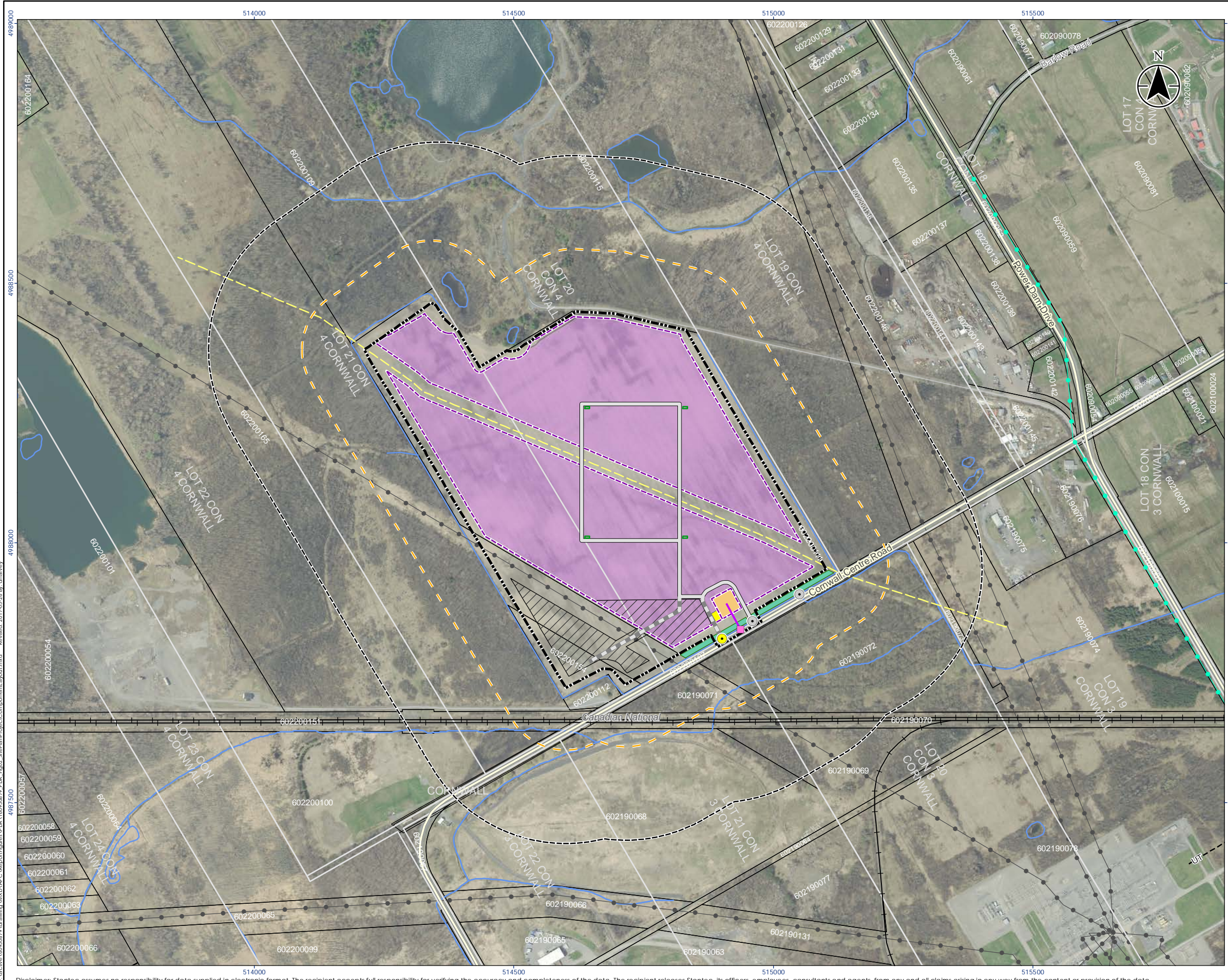


Project Location: 160950879 REVF
 United Counties of Stormont, Dundas and Glengarry: Prepared by AW on 2017-05-26
 Technical Review by RN on 2017-01-02
 Independent Review by RN on 2017-01-02

Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
 BARLOW SOLAR ENERGY CENTRE

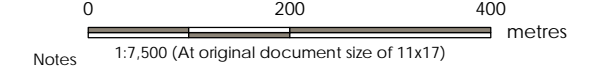
Figure No.: 1
 Title: Project Location

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 Revised: 2017-05-26 By: dhanvey



Legend

- | | |
|---|-------------------------------|
| Zone of Investigation (120 m from Project Location) | Solar Panel Area |
| Substation | Tree Planting Area |
| Proposed Project Components | Existing / Natural Features |
| 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 |



- 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.

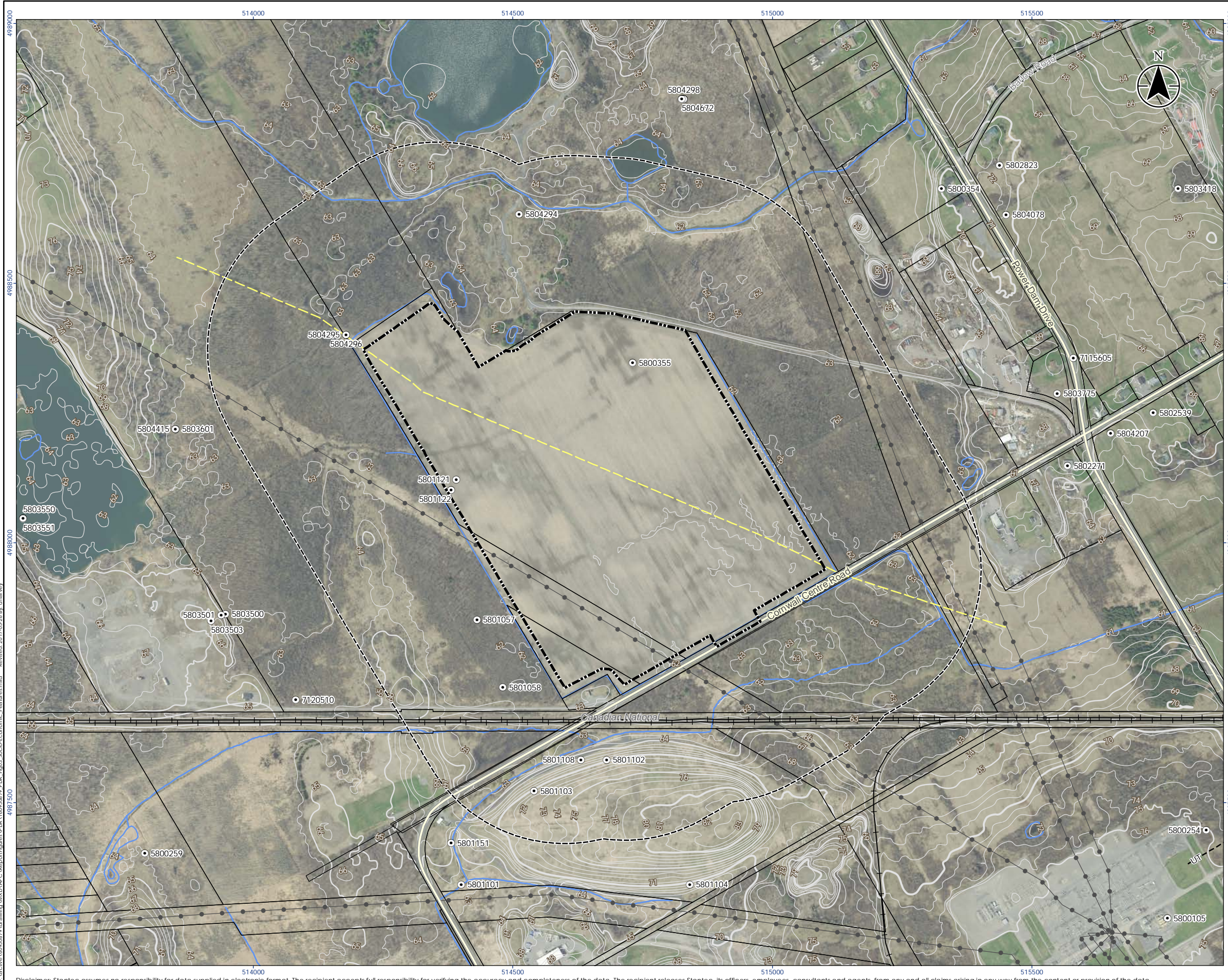


Project Location: 160950879 REV F
 United Counties of Stormont, Dundas and Glengarry
 Prepared by AW on 2017-05-26
 Technical Review by RN on 2017-01-02
 Independent Review by RN on 2017-01-02

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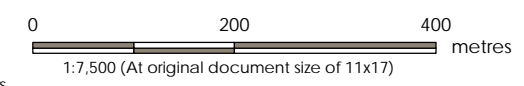
Figure No.: 2

Title: Site Plan: Conceptual Project Component Layout



- Legend**
- 300 m from Project Location
 - Project Location
 - Existing / Natural Features
 - Water Well Location
 - Contour (10 m Interval)
 - Contour (5 m Interval)
 - Contour (1 m Interval)
 - Major Road
 - Minor Road
 - Hydro One Transmission Line
 - Other Transmission Line
 - Pipeline
 - Railway
 - Watercourse
 - Property Boundary
 - Waterbody

The Project Location is currently used for agricultural operations. Surrounding lands are primarily forested and/or scrub. The Project Location is within lands designated Rural (as per the United Counties of Stormont, Dundas and Glengarry Official Plan).



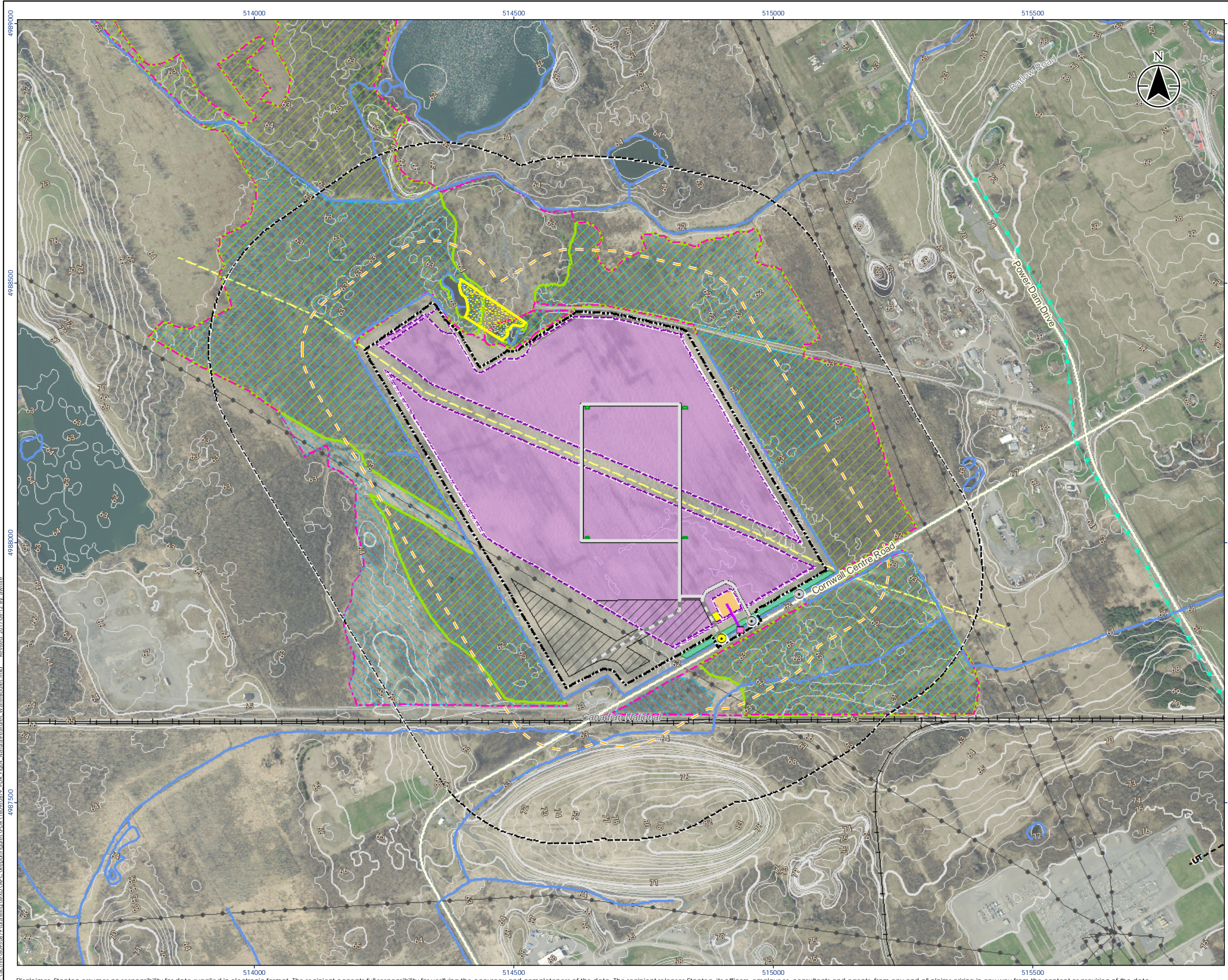
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016; Ontario Ministry of Environment and Climate Change © Queen's Printer for Ontario, 2016.
 3. Imagery Source: DRAPE 2014.
 4. MOECC Water well locations are approximate and have been positioned based on published UTM coordinates © Queen's Printer for Ontario, 2016.
 5. 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: United Counties of Stormont, Dundas and Glengarry
 Prepared by AW on 2017-05-26
 Technical Review by RN on 2017-01-02
 Independent Review by RN on 2017-01-02

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Figure No. **3**
 Title: **Socio-Economic Features**

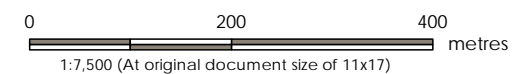


Legend

Generalized Candidate Significant Wildlife Habitat	Temporary Construction Laydown and Parking Area
Significant Wetland	Solar Panel Area
Significant Woodland	Substation
Zone of Investigation (120 m)	Tree Planting Area
Candidate Amphibian Movement Corridor	Existing / Natural Features
Proposed Project Components	Contour (10 m Interval)
Point of Common Coupling	Contour (5 m Interval)
Culvert	Contour (1 m Interval)
Connection Line	Culvert (existing)
Inverter Step-up Transformer and Inverter	Major Road
Permanent Access	Minor Road
Temporary Access During Construction	Distribution Line (Hydro One)
300 m Buffer of Project Location	Hydro One Transmission Line
Buildable Area	Other Transmission Line
Operations & Maintenance Storage Area	Pipeline
Project Location	Railway
	Watercourse
	Waterbody

Project Location is not located within 300 m of the Oak Ridges Moraine Conservation Plan Area, Niagara Escarpment Plan Area, Greenbelt Plan Area (Protected Countryside), or Lake Simcoe Watershed.

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.
 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 G
 United Counties of Stormont, Dundas and Glengarry: Prepared by AW on 2017-06-12
 Technical Review by RN on 2017-01-02
 Independent Review by RN on 2017-01-02

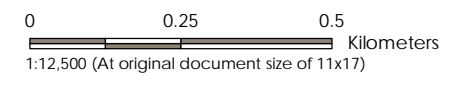
Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
 BARLOW SOLAR ENERGY CENTRE

Figure No.: 4
 Title: Natural Features and Water Bodies

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- Legend
- Receptor
- Non-Participating Residence
 - ▲ Non-Participating Vacant
 - Commercial
 - Project Location
 - Highway
 - Major Road
 - Minor Road
 - Railway
 - Hydro One Transmission Line
 - Unknown Transmission Line
 - Watercourse
 - Waterbody



- Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Orthoimagery © First Base Solutions, 2016. Imagery Date, 2008.
 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 REVC
 Municipality of United Counties Of Stormont, Dundas And Glengarry
 Prepared by AW on 2017-05-26
 Technical Review by RN on 2017-01-02
 Independent Review by RN on 2017-01-02

Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
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Figure No.: 5

Title: Points of Reception

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