Barlow Solar Energy Centre
Construction Plan Report

FINAL DRAFT REPORT

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Sign-off Sheet

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Abbreviations

AC	Alternating current
cm	Centimetre(s)
CEEMP	Construction Environmental Effects Monitoring Plan
CEMP	Construction Environmental Management Plan
CPR	Construction Plan Report
DC	Direct Current
EASR	Environmental Activity and Sector Registry
FP	Flood Plain (Township of South Stormont) Zoning By-law, 2015)
Hydro One	Hydro One Networks Inc.
km	Kilometre(s)
kV	Kilovolt(s)
LIO	Land Information Ontario
MWac	Megawatt alternating current
m	Metre(s)
mbg	Metre(s) below ground
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of Environment and Climate Change
NHIC	Natural Heritage Information Centre
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
O. Reg.	Ontario Regulation
the Proponent	Barlow Energy Centre Limited Partnership
the Project	Barlow Solar Energy Centre

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PV	Photovoltaic
PCC	Point of Common Coupling
REA	Renewable Energy Approval
RRCA	Raisin Region Conservation Authority
RoW	Right-of-way
RU	Rural (Township of Alfred and Plantagenet Zoning By-law, 2009)
SWH	Significant Wildlife Habitat
Stantec	Stantec Consulting Ltd.
SCADA	Supervisory control and data acquisition
TNPI	Trans Northern Pipeline Inc.
W	Watt(s)
ZOI	Zone of Influence

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1.0 INTRODUCTION

1.1 OVERVIEW

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

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

The 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. Maps showing the location of the Project are provided in **Appendix A**.

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 of South Stormont and Raisin Region Conservation Authority (RRCA) to determine the necessary permitting requirements and guidelines required for the Project. 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 Project will include the installation of approximately 30,000 to 50,000 solar photovoltaic (PV) panels. The exact make and model of the solar panels will be determined later, but they are anticipated to be monocrystalline/polycrystalline silicon technology with a rated power of 300-420 watts (W) per panel and measure approximately 2 metres (m) long by 1 m wide. Each solar panel will be mounted on a galvanized steel and/or aluminum rack system in rows, either in a fixed position (not-tracking) at a particular degree of declination facing the south on the racking system, or will be tracking east/west on a north/south axis.

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

Section 2.0 provides details of construction or installation activities, as well as the location and timing of any construction or installation activities for the duration of the construction or installation. Section 3.0 describes negative environmental effects that may result from construction or installation activities and their respective mitigation measures.

To avoid significant environmental effects, a Construction Environmental Management Plan (CEMP) and Construction Environmental Effects Monitoring Plan (CEEMP) will be implemented in compliance with applicable municipal, provincial, and federal standards and guidelines. The CEMP will be comprised of a series of plans and procedures covering all critical construction and environmental management tasks including the mitigation measures identified within this Construction Plan Report (CPR). In addition, a CEEMP has been prepared that covers monitoring processes, effects monitoring and mitigation measures based on the potential effects and mitigation measures identified in Section 3. Section 4.0 outlines details of the CEMP, and Section 5.0 outlines the CEEMP.

1.2 PROJECT REQUIREMENTS

This CPR describes the Project activities planned during the construction phase 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 construction or installation activities.

This CPR 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)'s *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* (2013). **Table 1.1** summarizes the requirements of this report as specified under O. Reg. 359/09:

Table 1.1: Construction Plan Report Requirements (as per O. Reg. 359/09 – Table 1)

Requirements	Section Reference
Set out a description of the following in respect of the renewable energy project:	
1. Details of any construction or installation activities.	2.0
2. The location and timing of any construction or installation activities for the duration of the construction or installation.	2.1
3. Any potential environmental effects that may result from construction or installation activities within a 300 m radius of these activities.	3.0

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Table 1.1: Construction Plan Report Requirements (as per O. Reg. 359/09 – Table 1)

Requirements	Section Reference
4. Mitigation measures in respect of any potential environmental effects described in point 3.	3.0

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2.0 PROJECT CONSTRUCTION AND INSTALLATION ACTIVITIES

The anticipated timelines for Project construction and installation activities as well as the construction materials brought to the Project Location for various Project components are detailed in this section.

2.1 TIMING AND CONSTRUCTION PLANS

A description of the main construction activities is provided in **Table 2.1**. Construction activities leading up to Project operations are anticipated to take approximately 8-10 months. The exact calendar dates of construction activities are yet to be determined and will be based on the timing of the REA approval. Upon award of the construction contract, the selected general contractor will be required to provide an updated schedule.

The main construction activities will be timed to avoid early spring so that vehicles do not negatively impact the ground through soil rutting if the ground is too wet/soft.

Entrance culverts will be installed between July 16th and March 14th in accordance with the appropriate MNRF in-water timing windows (work is not permitted from March 15th to July 15th). Permitting will be discussed with the RRCA. The removal of trees during construction is not anticipated. In early 2019, trees will be planted within the designated Tree Planting Areas (see **Figure 2, Appendix A**). Additional seasonal timing requirements with respect to natural heritage features such as wildlife and wildlife habitat are provided in the Natural Heritage Assessment Report (provided under separate cover).

There is no noise by-law for the Township of South Stormont. On-site construction activities would be limited to the hours between 7:00 AM and 7:00 PM on Sundays and Statutory Holidays in accordance with City of Cornwall Noise By-law 079-1996, unless otherwise permitted by the City of Cornwall. There are no Municipal or County construction noise limitations from Monday to Saturday (excluding Statutory Holidays). Through consultation with the Township, the Proponent will determine if timing restrictions should be applied during the construction phase of the Project.

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Table 2.1 Construction Activities – Projection and Schedule

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

The Project is expected to achieve commercial operation by December 2018. It is anticipated that the main construction and installation activities required to fully operate the facility would be completed before this date (see Section 2.2 for construction and installation activities). Tree planting activities will occur in 2019 once the main construction activities are complete and the facility is in operation. Locations of the Tree Planting Areas are shown on **Figure 2**, **Appendix A**.

2.2 SITE PREPARATION

The following section outlines proposed site preparation activities for the Project.

2.2.1 Land Surveying and Geotechnical Surveys

A geotechnical study was completed for the Project to confirm site-specific geological conditions. This information was used to determine the suitability of the area. It was found that the soil conditions are suitable for the design and construction of the Project. Additional detailed geotechnical work may be required prior to Project construction.

A registered Ontario Land Surveyor completed a legal land survey of the site property boundaries, the Trans-Northern Pipeline easement and the Hydro One transmission line corridor in the summer of 2016. In addition, LIDAR data was obtained in the fall of 2016 to provide detailed topographical information of the Project Location.

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2.2.2 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 primary access to the facility for the duration of the operational life of the Project. The entire length of the existing access road into the facility will be upgraded from dirt to gravel, as described below. A second gravel access road from Cornwall Centre Road, west of the existing primary access road, is being proposed during construction. At the end of construction, the secondary access road will be removed and included in the tree planting area. Additional access roads may be considered as the Project design evolves.

During upgrading of the primary access road and construction of the secondary access road, topsoil will be stripped along the road right-of-way, stockpiled and reused to the extent possible for site landscaping. The roadbed will be constructed from gravel and graded to facilitate drainage. The road will be approximately 4 m wide with an additional 1 m of compacted shoulders on each side for a total width of 6 m. Road construction will require excavators, dump trucks and compaction equipment.

An upgraded entrance culvert may be required within the road allowance of Cornwall Centre Road for the primary access road. Additionally, installation of a temporary entrance culvert within the road allowance of Cornwall Centre Road will be required to facilitate construction of the secondary access road. New or upgraded entrance culverts will be installed by the Proponent and/or general contractor. Entrance culverts will be installed between July 16th and March 14th in accordance with the appropriate MNRF in-water timing windows (work is not permitted from March 15th to July 15th). Permits for each temporary entrance culvert will be required from the Township of South Stormont, the City of Cornwall, and the RRCA under O. Reg. 175/06. Culvert installation activities will conform to Ontario Provincial Standard Specification (OPSS) 421– Construction Specification for Pipe Culvert Installation in Open Cut.

The proposed grassed laneways between each row of solar panels (within each solar unit) will not require any upgrades or construction preparation other than general site grading or seeding, as required.

Since the solar panels are mounted above the ground, infiltration of water through vegetation and the underlying subsurface material will be maintained. Surface drainage will continue to be directed to existing receiving systems (drainage paths, roadside ditches, etc.). Since the existing drainage conditions will not change a general area-wide stormwater system is not required. The small increase in runoff from the gravel access roads will be attenuated and filtered through local ditches and no constructed catch basins or other management techniques are required.

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2.2.3 Construction Staging and Temporary Storage Areas

There will be two construction staging areas; a 1.1 ha (2.8 acre) area east of the Hydro One corridor, and a 1.6 ha (4 acre) area west of the Hydro One corridor. The construction staging areas will be laid with compacted gravel and will support the following construction operations:

- portable construction trailer(s) for Project management offices
- parking areas for the general contractor and subcontractors and other Project personnel;
- portable generators
- equipment storage and maintenance area
- truck unloading and loading area
- approved temporary fuel tanks, in properly contained spill containment structures
- disposal facilities for various solid wastes
- temporary toilet facilities – self-contained with no on-site disposal (additional facilities will be located throughout the Project Location)
- water and rinsing facilities
- laydown area for panels, inverters, inverter step-up transformers, electrical cabling and other Project components
- laydown areas for small scale solar materials, and equipment
- laydown areas for electrical power collection materials

During construction of the temporary staging areas, topsoil within both areas will be stripped, stockpiled and reused to the extent possible for site landscaping. Gravel will be laid and compacted. The depth of gravel will vary dependent upon site conditions/requirements at the time of construction. Construction of the temporary staging areas would utilize excavators, dump trucks and compaction equipment. Once construction is complete, the temporary staging area will be removed and restored as per Section 2.2.5.

2.2.4 Perimeter Fence

A 1.8 m high steel chain link fence topped with barbed wire will be constructed around the entire perimeter of the facility to prevent trespassing and vandalism and provide safety to the public. The fence will be constructed per Ontario Provincial Standards Drawings (OPSD) 972.130 (2012a) and OPSD 972.101(2012b). Manual locking gates will be installed at the facility entrances located at the proposed permanent access road (see Section 2.2.2).

Installation of the fence will require the use of a skid steer and auger to excavate holes for the fence posts. The fence posts will be secured into the ground using cement. The perimeter fencing will be installed near the end of construction after the solar equipment is installed.

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Signs will be placed on entrance gates and on the fence to notify the public that the facility is a solar energy centre and to provide warning of the dangers associated with unauthorized entry to the facility. The fence may affect animal movement patterns, however small mammals, amphibians and reptiles can pass through the fence and cross the Project Location.

The perimeter fence will be installed at or within the boundary of the Project Location shown in **Figures 1-4, 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).

2.2.5 Site Clean-up and Restoration

After all major construction activities are complete, the work areas will be remediated and returned to their pre-construction condition. All debris and surplus material will be removed from the Project Location. Trucks will be used to remove all non-permanent equipment from the Project Location. The truck(s) will access the site via the permanent access road. Most site clean-up activities will occur prior to site landscaping.

The temporary staging area (see Sections 2.2.3 and 2.4) will be restored to a condition acceptable to the landowner. Any topsoil that is removed and/or stockpiled during construction will be redistributed, as appropriate, during site clean-up and restoration, and site landscaping. This will enable the Project Location to be returned to agricultural use following the decommissioning of the facility.

2.2.6 Site Landscaping

Areas beneath and surrounding the solar panels that are not occupied by gravel road or project infrastructure will be vegetated with native species. The species selected should have slow growth to avoid shading the solar panels. Some areas within the Project Location may need to be re-seeded at the completion of construction activities. The RRCA will be consulted to determine an appropriate time to plant and the seed mix to be used. It is not anticipated that heavy machinery will be required for planting. Ongoing landscape maintenance is addressed in the Design & Operations Report (under separate cover).

In addition, tree planting within areas disturbed by construction is planned to occur at the end of construction. The location of the proposed Tree Planting Area is provided in **Figure 2, Appendix A**.

2.3 MATERIALS AND CONSTRUCTION EQUIPMENT

The solar panels would be delivered to the Project Location either by the Proponent or by the solar panel manufacturer. The solar panels and racking materials would be arriving on standard enclosed and open tractor trailers. Delivery details will be provided to the Township of South

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Stormont and the City of Cornwall prior to component transportation to the Project Location. Municipal road upgrades are not currently anticipated, however, the Proponent would be responsible for acquiring permits, where required, for any road upgrades or other uses required for component transportation.

Based on the information outlined in this section, it is anticipated that the following quantities of materials would be required for the construction of the Project:

- Cement for inverter and substation foundations (provided by ready mix trucks) – 200 m^3
- Compacted Surface Material – 1000 m^3
- Crush Stone – 1000 m^3
- Granular A – 500 m^3
- Granular B – 2000 m^3
- Sand – 2000 m^3

Construction equipment would include excavators, dozers, dump trucks and compaction equipment.

2.4 TEMPORARY USES OF LAND

See Section 2.2.3 regarding use of an on-site temporary staging area during construction.

The control building located within the substation area may be used as a temporary office space during the operation phase of the project. (see Section 3.8). Temporary construction trailers may be required on-site during the construction (see Section 2.2.3) and decommissioning phases of the Project.

2.5 SOLAR UNIT TRENCHING REQUIREMENTS

Trenching is required to conceal the direct current (DC) and alternating current (AC) power cables used to connect power throughout the Project Location beneath ground. Trenches will be required for DC cables from each row of solar panels to the solar unit inverters and inverter step-up transformers. Trenches will also be used for the buried AC cables connecting the inverter step-up transformers to the substation medium voltage electrical equipment.

Typically, trenches will be excavated to a depth of 1.2 m below finished grade using backhoes or tracked excavators. The excavated material will be stored on-site. The cables will be bedded in sand and the trench will be backfilled with the excavated material using dump trucks and compaction equipment.

Alternatively, cables will be plowed into the soil directly to their burial depth using a cable plow.

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While it is preferred to install AC cables and DC cables underground, in some cases, these cables may need to be installed above grade, in which case they will be installed a minimum of 30 cm above the floodplain level.

2.6 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 later, but are anticipated to be monocrystalline/polycrystalline silicon technology with 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.

To minimize the amount of excavation and concrete footings required, the racks and solar panels would 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 and installed using a specialized R2D-Post hydraulic machine, drilled into the ground, thereby eliminating the need for concrete footings (preferred)
- 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 ground below the frost line. Alternatively, the pre-cast pads would be positioned on-grade.

The racks and solar panels will be delivered to the solar unit worksite by truck. They will be delivered by hand or motorized cart to the location where they will be mounted onto the racks, or a small crane may be used at the Project Location for the lifting of the racks into position. Similarly, the solar panels will be delivered by truck to the location of the rack where they will be positioned and secured. It is not anticipated that any permits or approvals will be required for the transportation and delivery of the solar panel or rack.

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2.7 INVERTERS AND INVERTER STEP-UP TRANSFORMERS

The stations (each with one or more inverters and inverter step-up transformers) will convert the DC electricity generated from the solar panels into AC electricity before delivering it to the substation, which will provide the voltage required for interconnection to the local distribution line. 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 inverter step-up transformers will raise the voltage to either 27.6 kV or 34.5 kV.

The four stations will be located within the Project Location. The specifications of the inverters will be determined by the Proponent during the detailed design phase. In accordance with the specifications, the manufacturer of the inverters and inverter step-up transformers will be selected by Proponent or the general contractor during the detailed design phase. The inverters, inverter step-up transformers, and ancillary equipment such as switches, fuses and surge arresters will be delivered to the Project Location by truck and will be either fully assembled upon delivery, or will be assembled at the Project Location.

The stations will likely rest on an elevated platform at least 30 cm above the floodplain and supported by helical piles or concrete piers.

Construction of the stations would utilize one or more auger(s), excavator(s), dump truck(s), compaction equipment, and concrete equipment.

2.8 SUBSTATION

A main power transformer is being considered for this Project. The project will require a 44 kV substation comprised of circuit breakers, disconnect switches, surge arresters, station service transformer for auxiliary services, and, revenue metering equipment. In the event that a main power transformer is included in the final design, the voltage will be raised from 27.6kV / 34.5 kV to 44 kV at the substation. A separate chain link fence will be installed around the perimeter of the substation site (see Section 2.2.4). The control building may be located inside the fenced area of the substation, or may be located outside of the fenced area of the substation (but within the perimeter fence) to provide office space for maintenance personnel. All equipment will be preassembled before it is transported to the Project Location.

The substation access will be accessible from the permanent site access road, not a separate access. A small permanent parking area will be constructed adjacent to the substation. To prepare for construction of the substation and parking area, topsoil will be stripped, stockpiled and reused to the extent possible during site landscaping. Excavations of approximately 1-2 m depth will be required for the equipment and building foundations and for underground utilities. The entire substation area will be raised approximately 1 m with fill material to elevate the ground level a minimum of 30 cm above the floodplain. The fill material will either be sourced on

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site or from a nearby quarry. Equipment used will be dump trucks, excavators, bull dozers, and compactors.

Concrete construction would include the installation of the footings for the control building, equipment pad and supports. Excavations will be backfilled using granular fill and excavated materials.

The equipment will be supported by either cast-in place slab-on-grade concrete pads or structural steel piers and the entire fenced area will be graded and overlaid with a clear stone granular material. The specific make of the electrical equipment will be selected by the Proponent or general contractor during the detailed design phase and based on specifications provided by the Proponent. 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.

This construction task would utilize one or more excavator(s), dump truck(s) and compaction equipment.

2.9 OPERATIONS AND MAINTENANCE STORAGE AREA

The operations and maintenance storage area may be comprised of one or two 40 foot storage containers installed within the raised substation area to elevate the containers 30 cm above the floodplain and upon an area of compacted gravel or set upon a concrete pad and will include a locking door. The storage containers will be used to store equipment and spare parts used for maintenance activities. Spill response and containment materials will also be stored.

During construction of the operations and maintenance storage area, topsoil will be stripped, stockpiled and reused to the extent possible during site landscaping. Gravel, if required, will be laid and compacted. The depth of gravel will vary dependent upon site conditions/requirements at the time of construction. Construction of the operations and maintenance storage area would utilize excavators, dump trucks and compaction equipment.

The operations and maintenance storage containers will be located within the site perimeter fencing.

2.10 COLLECTION CABLES AND GRID INTERCONNECTION

DC power cables are required to interconnect the solar panels to the solar unit inverters. DC power cables directly buried, or if routed above grade, at least 30 cm above the floodplain level, will be used to collect and transport electricity generated from the solar panels at 1,500 V (or below) to a termination box mounted at the end of each solar panel row. Termination boxes installed at least 30 cm above the floodplain level for each parallel solar panel row will then be connected by DC power cables (buried or if above grade, at least 30 cm above the floodplain level) to one combiner box mounted above grade at least 30 cm above the floodplain level on

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the support structure of one of the rows, and then from the combiner boxes to the inverter for each solar unit. All wiring will be in accordance with the Ontario Electrical Safety Code developed by the Electrical Safety Authority.

The DC electricity generated by the solar panels will be collected at combiner boxes and transported via underground cables, of if above grade at least 30 cm above the floodplain level to the stations (which contain one or more inverters and inverter step-up transformers) where it will be converted to AC electricity. After the inverter step-up transformers co-located at the stations raise the voltage level, the AC electricity will be collected at junction boxes located 30 cm above the floodplain level and transported via directly buried AC cables or if above grade, at least 30 cm above the floodplain level, to the Project substation.

An AC overhead line, up to 140 m long, may be required from the substation to the Point of Common Coupling (PCC). The overhead line would include 3 aluminum conductors on wood poles

Alternatively, the connection between the substation and the PCC could be done using an AC underground cable, in which case open cutting or trenchless crossing of the watercourse along the north side of Cornwall Centre Road would be required.

Prior to start-up, all systems will be commissioned to verify that they are operating correctly. Acceptance testing will be completed on the equipment, both at the factory and on-site, to verify that it meets the engineering specifications. Operating staff will be trained on equipment control and operation. The testing and commissioning will be conducted in the presence of the design engineers and technical specialists representing the Proponent, general contractor and major equipment suppliers.

Construction of the interconnection components would utilize excavators, dozers, dump trucks and compaction equipment for the civil part of the work.

2.11 DELIVERY OF COMPONENTS

Inverters, inverter step-up transformers, substation components and precast concrete products will be delivered by flatbed truck and trailer. Containers would arrive on a standard roll-off truck. A small truck mounted crane will be used to lift other products and skids from trucks and place them directly onto the prepared surfaces. Surfaces will be prepared by excavating soil and placing granular base material.

2.12 MATERIALS GENERATED AT, OR TRANSPORTED FROM, THE PROJECT LOCATION

There are no demolition activities proposed as part of the Project. Excavated soils will be reused on-site, as feasible. Minor quantities of waste materials will be generated from the construction activities. Materials brought to the site that will require waste management include equipment

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packaging, fuel and other lubricants and will need to be recycled, and/or disposed of at an appropriate MOECC-approved off-site facility.

Sanitary waste generated during the construction phase will be collected via portable toilets and wash stations supplied by a licensed third party who will be retained by the general contractor prior to the start of major construction activities. Waste materials that require removal from the site will be disposed of at an approved off-site facility using large dump trucks that can transport heavy loads. Excess soils generated during the course of construction excavation will be handled in accordance with the MOECC's *Management of Excess Soil - A Guide for Best Management Practices* (MOECC 2016a). Additional information related to waste materials generated during construction including disposal techniques and mitigation measures are detailed in Section 3.10.

There will be no long-term on-site storage of waste during the construction of the Project and final disposal of waste will be conducted by a third-party contractor at a MOECC-approved facility.

Typical waste materials that can be recycled or reused are presented in **Table 2.2**:

Table 2.2 Typical Reusable and Recyclable Materials

Component	Mode of Disposal
Solar Panels	Reuse or recycle
Cabling	Recycle
Granular materials (roads, panel sites, temporary storage areas etc.)	Reuse or dispose in landfill
Oils/lubricants	Recycle

Although several components would be disposed of during decommissioning (see the Decommissioning Plan Report for further details), there may be a small quantity of the above noted materials (**Table 2.2**) that may break or otherwise require disposal during the construction stage. Electrical equipment will either be salvaged for reuse or recycled. Components such as cabling would have a high resale value due to copper and aluminum content.

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3.0 POTENTIAL EFFECTS AND MITIGATION MEASURES

O. Reg. 359/09 requires that any adverse environmental effects that may result from construction or installation activities be described. The following section identifies and assesses potential environmental effects, environmental mitigation measures and net effects for construction activities. The assessment generally considers potential effects within 300 m of the Project Location.

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 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 Assessment. Noise is assessed in the Acoustic Assessment Report.

The following is a high level summary of the methodology that was applied to identify potential environmental effects that may result from construction of the Project:

- 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 recommended mitigation measure to address potential environmental effects from construction 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 check that mitigation measures are functioning as intended. Additional monitoring and contingency measures are provided in **Table 5.1** (Section 5.0).

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.

Positive residual effects resulting from construction of the Project, such as employment or the purchase of local goods and services, were not assessed.

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3.1 CULTURAL HERITAGE AND ARCHAEOLOGICAL 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 MTCS 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.

Based on a review of aerial imagery, existing archaeological potential maps, information regarding registered archaeological sites in the vicinity, local physiography and topography, census returns, 19th century maps of the Project area and soil integrity, there are no registered archaeological sites within the proposed work area. Based on a review of existing information on archaeological resources in the area, a Stage 2 archaeological assessment was conducted. No areas of concern were identified. It has been determined that no further archaeological investigations are required.

Through completion of the MTCS REA Checklist, no built resources were identified within the Project Location and no cultural heritage landscapes or protected properties were identified in, or adjacent to, the Project Location. It has been determined that no further cultural heritage investigations are required.

Potential Effects

Potential effects are limited to the unplanned discovery of potential artifacts or human remains.

Mitigation Measures

General mitigation measures would be implemented to facilitate no detrimental disturbance to archaeological resources that may be found during Project construction. Although the Stage 1-2 Archaeological Assessment cleared the Project Location for development, in the event of an archaeological find during construction activities, artifacts and other archaeological deposits would be identified, documented and preserved.

If any artifacts, soil features, or other cultural features of note are discovered during groundwork for the Project the following procedures shall be adhered to:

- work in the area of the site or artifacts shall halt immediately and the general contractor notified of the discovery
- the area of the site, along with a buffer zone of 5 m (as available) shall be cordoned off using a barrier or stakes and flagging tape
- the regional archaeologist from the MTCS shall be contacted to determine the appropriate course of action. As well, Stantec archaeological staff are also available to offer advice in the event of a discovery

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- If human remains are discovered during Project activities the following procedures shall be adhered to:
  - all work shall cease in the immediate area of the discovery and the environmental inspector notified immediately
  - remains shall be covered as soon as possible
  - if human remains are discovered in the bucket of heavy equipment, the bucket shall not be emptied and any remains in the bucket covered over as soon as possible
  - local police and/or coroner shall be contacted immediately. If any human remains are identified as being of strictly archaeological interest, and not a crime scene, the MTCS (as identified above) and/or Stantec archaeological staff, should be contacted to determine the appropriate course of action. Until such time as appropriate authorities give the go-ahead, no further work shall take place near any discovery of human remains.

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

Based on a review of existing information on archaeological resources in the area, and based on the completion of the MTCS REA Checklist and Stage 1 - 2 Archaeological Assessment, no known areas of heritage or archaeological resources exist within the Project area. Potential effects are limited to the finding of previously undiscovered artifacts or human remains; therefore net effects are not anticipated.

3.2 NATURAL HERITAGE FEATURES

The following Sections provide a summary of the findings discussed in the Natural Heritage Assessment. As required by O. Reg. 359/09, the Natural Heritage Assessment included an assessment of the Project Location, as well as a Zone of Investigation (ZOI) of 50 m around the outer limits of the Project Location (**Figure 4, Appendix A**). A records review of available resources was conducted, followed by a site investigation, to determine the significance of existing natural heritage features. For all natural features existing in or within the ZOI and/or the Project Location, a determination was made of whether the natural feature is provincially significant, significant, not provincially significant or not significant. More information regarding natural heritage features is provided in the Natural Heritage Assessment.

3.2.1 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 Township of Cornwall Official Plan (2004), and the United Counties of Stormont, Dundas and Glengarry Official Plan (2009). The records review and site investigation

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identified five wetlands within the ZOI. No wetlands were identified in the Project Location. No Provincially Significant Wetlands (PSW) or Locally Significant Wetlands were identified within the Project Location or ZOI.

There will be no clearing of trees in any of the wetland features that could result in wetland desiccation or drying. The risk of accidental intrusion and vegetation removal will be minimized through demarcation of work areas, as described below. The type of construction proposed involves works having little or minimal impact to pervious areas and precludes the potential for effects associated with changes in water balance (i.e., surface and ground water changes).

Potential Effects

No components of the Project Location are located within the significant wetland boundaries as identified and confirmed through site investigations. As the Project Location and all construction activities are sited outside all significant wetland boundaries, there will be no direct loss of significant wetland habitat or function as a result of the Project.

Construction activities during the installation of the project are anticipated to be low impact and short term in duration.

Mitigation Measures

Avoidance is the main strategy used to minimize impacts to wetland habitat within 50 m of the Project Location. All components of the Project are sited outside the wetland feature boundaries. Standard best management practices will be applied to all construction activities:

- No development will be permitted within the significant wetland boundaries.
- The edge of the work zone (i.e., Project Location) will be flagged or staked in the field prior to construction to assist with the demarcation of the construction area, so that construction activities avoid these sensitive areas and erosion and sediment controls can be accurately installed.
- Silt barriers (e.g., fencing) will be erected along the edge of the Project Location where it is located within 30 m of a wetland boundary. These barriers will be monitored weekly during construction and after periods of high precipitation and bi-weekly following construction and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation.
- Environmental inspectors will monitor construction vehicles and personnel so they remain within the construction envelope, thereby limiting the disturbance of natural vegetation.
-
- Maintenance activities, vehicle refueling or washing, as well as the storage of chemical and construction equipment will be located more than 30 m from significant wetlands.
- Fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas greater than 30 m from a wetland.

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- In the event of an accidental spill, the MOECC Spills Action Centre will be contacted and emergency spill procedures implemented immediately.

Mitigation measures for waste material disposal and accidental spills are listed in Section 3.7.

Net Effects

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

3.2.2 Significant Woodlands

A total of 5 woodland features were identified within the ZOI during the site investigation. No additional woodlands not previously identified in the Records Review were located during the site investigation. The woodland features were adjacent (0 m) or further from the Project Location. No woodlands were located in the Project Location.

No significant woodlands occur within the Project Location. Four significant woodlands occur within the ZOI.

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

Potential Effects

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

Mitigation Measures

Avoidance is the main strategy used to minimize impacts to significant woodlands within the ZOI. The following mitigation measures will be implemented for significant woodlands:

- No development will occur within the significant woodland boundary.
- The edge of the work zone (i.e., Project Location) will be flagged or staked in the field prior to construction to assist with the demarcation of the construction area, so that construction activities avoid these sensitive areas and erosion and sediment controls can be accurately installed.
- Silt barriers (e.g., fencing) will be erected along the edge of all woodland boundaries where they are located within 30 m of construction areas. These barriers will be monitored weekly during construction and after periods of high precipitation and bi-weekly following construction and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation.

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- Environmental inspectors will monitor construction vehicles and personnel so they remain within the construction envelope, thereby limiting the disturbance of natural vegetation.
- Maintenance activities, vehicle refueling or washing, as well as the storage of chemical and construction equipment will be located more than 30 m from significant woodlands.
- Fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas outside the woodland boundaries.
- In the event of an accidental spill, the MOECC Spills Action Centre will be contacted and emergency spill procedures implemented immediately.
- Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, MNRF will be consulted on the appropriate action(s) to be taken.

Mitigation measures for waste material disposal and accidental spills are listed in Section 3.7.

Net Effects

Potential net effects on significant woodlands would be spatially limited. With the implementation of the above mitigation measures, no significant adverse residual effects on significant woodlands are anticipated.

3.2.3 Wildlife and Wildlife Habitat

Candidate Significant Wildlife Habitat (SWH) features that were to be individually identified, delineated, and could not be classified as Generalized Candidate SWH were not identified at the Project Location or ZOI. No candidate SWH features were identified at the Project Location.

Generalized Candidate SWH is located outside the Project Location but within 7 m in proximity to solar panel area and adjacent (0 m) to the Project Location.

Potential Effects

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

Potential negative effects from construction activities could include habitat avoidance/disturbance caused by noise. However, given the rural and agricultural land uses adjacent to these features, and their location adjacent to existing roads, they are not considered highly sensitive to temporary disturbances. Indirect impacts resulting from construction activities, such as noise, dust generation, sedimentation and erosion are expected to be short term, temporary in duration and mitigated through the use of standard site control measures.

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Mitigation Measures

The following mitigation measures will be applied for Generalized Candidate SWH:

- Mitigation measures for the significant wetland and woodland features will be applied as outlined above, as Generalized Candidate SWH is contained within these features.
- To the extent possible, construction activities within 30 m of Generalized Candidate SWH will occur during daylight hours to avoid excessive noise and/or light disturbances.

  Mitigation measures for noise are listed in Section 3.4.2.

Net Effects

Potential net effects on Generalized Candidate SWH would be spatially limited. Sensory disturbances to wildlife would be temporary and intermittent. With the implementation of the above mitigation measures, no significant adverse residual effects on Generalized Candidate SWH are anticipated.

3.2.4 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.

The records review did not identify any Life Science or Earth Science ANSIs within the Project Location or ZOI (LIO 2016; NHIC 2015; MNRF 2016) and were therefore not reviewed during site investigations.

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.

3.2.5 Provincial Parks and Conservation Reserves

The records review did not identify provincial parks or conservation reserves within the Project Location or ZOI (LIO 2016; NHIC 2015; Ontario Parks 2016).

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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.

3.3 WATER BODIES & AQUATIC RESOURCES

The following sections describe the potential effects, recommended mitigation measures, and net effects for water bodies and aquatic resources.

3.3.1 Groundwater

According to the MOECC Water Well Records database, there are 11 water wells located within 300 m of the Project Location with three located directly within the Project Location (MOECC, 2016b) (**Figure 3, Appendix A**). All 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 is approximately 30-60 centimeters (cm) of topsoil underlain by clay and hard pan. The nearest water well is located near the southern boundary of the Project Location.

According to the Preliminary Geotechnical Investigation completed for the Project by Houle Chevrier Engineering Ltd. (Houle Chevrier), groundwater was noted at depths ranging from about 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 less than 4 km south of the Project Location and is

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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.

Potential Effects

There are no municipal wells within 20 km of the Project Location, and therefore under the *Clean Water Act* (2006) the construction activities and the operation of the facility do not pose a threat to the groundwater drinking supply.

Negative environmental effects to water wells are not anticipated during construction, as the rack and solar panel supports used will be screwed, or augered and poured, and put into the ground below the frost line. Alternatively, cast-in-place or pre-cast pads would be positioned below the frost line.

Since dewatering activities are not anticipated during construction of the Project, environmental effects associated with dewatering activities on potential groundwater quality or quantity are not anticipated.

Some materials, such as fuel, lubricating oils and other fluids associated with the construction phase of the Project have the potential for discharge to the natural environment through accidental spills and thus potentially infiltrate groundwater supplies.

Mitigation Measures

The REA may include a condition that requires the development and implementation of a pre- and post-construction groundwater monitoring program focused on assessing the potential for impacts to the quantity and quality of water in offsite water wells. Groundwater investigations and/or monitoring requirements will be confirmed during the REA process. Should a private water well be affected by project construction, a potable water supply should be provided and the water well should be repaired or restored as required.

If dewatering activities of more than 50,000 litres per day but less than 400,000 litres per day are required, the Proponent will register the water taking activities on the MOECC Environmental Activity and Sector Registry (EASR).

Mitigation measures for accidental spills are listed in Section 3.7.

Net Effects

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

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3.3.2 Surface Water, Fish & 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 (**Figure 4, Appendix A**). More information regarding surface water, fish and fish habitat is provided in the Water Assessment and Water Body Report.

The Project is located within the South Raisin River subwatershed which drains an area of approximately 103 km^2 (Crysler and Latham Ltd.1979). Land use within the subwatershed is a mix of rural, urban, commercial/ industrial, and natural heritage features (MNRF 2014).

The records review identified a mapped watercourse across the southern portion of the Project Location (MNRF 2014, MNRF 2016a). The watercourse is an Unnamed Tributary to Abrams Drain (MNRF 2016a) and is a Type E municipal drain (MNRF 2016b). Type E drains have permanent flow, support sensitive fish species that spawn in the spring, and have not been cleaned out within the last 10 years (Mandrak and Bouvier 2014). The watercourse was located in an active agricultural field. As a result of the site investigation, it was determined that there is no water body across the Project Location in the southern portion of the Project Location as indicated in the records review. In May 2016, this mapped watercourse was dry and exhibited no indicators of water flow, and is therefore not a water body under O. Reg. 359/09. However, the portion of this mapped watercourse located on the south side of Cornwall Centre Road is a flowing water body under O. Reg. 359/09. During the spring site investigation, small-bodied fish species were observed in this water body.

A review of aerial imagery indicated the potential of a water body in the northern portion of the Project Location. However, during the May 2016 site investigations, water flowed east toward the Project Location and then south along the western boundary of the Project Location. This observed watercourse is an intermittent stream and is classified as a water body under O. Reg. 359/09. During the spring site investigation, small-bodied fish species were observed in this water body. There was no visible flow path to the east across the Project Location, therefore the portion located within the Project Location is not a water body under O. Reg. 359/09.

The records review also identified two small ponds north of the Project Location but within the ZOI (MNRF 2016c; MNRF 2014). Based on the characteristics observed during the site investigation and information documented in the Natural Heritage Assessment Report, both ponds are permanent, natural features (wetland ponds) and are classified as water bodies under O. Reg. 359/09.

A review of available maps and aerial imagery did not identify any additional potential water bodies, however, during the site investigation, additional water bodies were identified around the perimeter of the site. Along the eastern boundary of the Project Location there is an intermittent stream that is a shallow, straight, trapezoidal channel. At the time of the site investigation it contained water and was flowing south toward Cornwall Centre Road. At the

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southeast corner of the Project Location it continued flowing west. During the spring site investigation, small-bodied fish species were observed in this water body.

An intermittent stream observed during the site investigation that originates along the northern boundary of the Project Location flowing west, flows south along the western boundary of the Project Location, and then flows east along Cornwall Centre Road. The water body then crosses Cornwall Centre Road through a corrugated steel pipe culvert. The water body is a trapezoidal channel. Near the entrance of the Project Location, in-water vegetation (algae, cattails, and *Phragmites* sp.) was present. Small-bodied fish species were observed in this water body.

In summary, five (5) water bodies under O. Reg. 359/09 were identified within the ZOI and are provided in **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 warmwater habitat (MNRF 2016d). During the spring site investigation, small-bodied fish species were observed at the four flowing bodies that provide fish habitat on a seasonal basis and contribute flow and nutrients to habitats located farther downstream.

Potential Effects

Project construction activities include land clearing, soil stripping, grubbing, and grading. Potential impacts to water bodies located within 120 m of the Project Location may include:

- short-term increase in turbidity from runoff and soil erosion during construction
- loss of shade
- reduced bank stability
- reduction in inputs of organic matter, nutrients and other material originating from the terrestrial environment water quality and habitat disturbance effects to aquatic habitat
- water quality and habitat effects due to entry of deleterious substances into surface water

Potential impacts related to the installation and maintenance of culvert crossings in addition to the general impacts listed above may include:

- disturbance to aquatic biota and habitat during installation
- permanent enclosure of portions of a water body
- loss of bed material within the length of the culvert
- changes to riparian vegetation within road allowance
- changes to fish passage

Short-term construction related impacts of overhead electrical lines on water bodies may include loss of riparian vegetation which can result in increased turbidity during construction.

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Loss of vegetation can also affect fish habitat by removing sources of shade, cover and food production.

Potential impacts to water bodies and fish and fish habitat related to the installation of underground electrical lines are as follows:

- erosion and sedimentation from site disturbance and dewatering
- collapse of the punch or bore hole under the stream
- disturbing riparian vegetation can reduce shoreline cover, shade and food production areas
- machinery fording the stream can disturb bottom and bank substrates, disrupt sensitive fish life stages and introduce deleterious substances i.e. equipment is not properly maintained.

Some materials, such as fuel, lubricating oils and other fluids associated with the construction phase of the Project have the potential for discharge to the natural environment through accidental spills and thus potentially enter surface water features.

Mitigation Measures

Standard mitigation measures used for works in and around water are summarized below. Details of the mitigation measures should be determined through consultations with the local municipality, RRCA, and DFO (if required) and are also dependent on project details such as technical requirements, construction methods and schedule. Permits may be required from the RRCA under O. Reg. 175/06.

General mitigation measures for construction activities near water bodies in the ZOI include:

- Complete in-water work within MNRF timing windows to protect local fish populations during their spawning and egg incubation periods. As part of background data collection for the Project, the Kemptville District MNRF indicated that no in-water work can occur between the warm water timing window of March 15th and July 15th (work is permitted from July 16th to March 14th). (MNRF 2016d).
- Operate and store materials and equipment used for the purpose of site preparation and Project construction in a manner that reduces the risk of the entry of deleterious substances (e.g., petroleum products, silt, etc.) into surface waters:
  - store and stabilize stockpiled materials away from the water
  - refuel and maintain construction equipment at least 30 m from water bodies
  - report spills to the MOECC Spills Action Centre
  - any part of equipment entering the water shall be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water
  - only clean material, free of fine particulate matter shall be placed in the water.
  - For the duration of the work, keep on-site and readily accessible, all material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances.

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- Implement erosion and sediment control measures prior to construction and maintain measures during the construction phase to reduce the risk of the entry of sediment into the water:
  - silt fencing and/or barriers shall be used along all construction areas adjacent to water bodies
  - no equipment shall be permitted to enter any water bodies beyond the silt fencing during construction
  - all sediment and erosion control measures shall be inspected at least weekly and during and immediately following rainfall events to see that they are functioning properly and are maintained and/or upgraded as required
  - topsoil stockpiles shall be sufficiently distant from water bodies to preclude sediment inputs due to erosion of stored soil materials
  - all disturbed areas of the construction site shall be stabilized and re-vegetated as soon as conditions allow
  - sediment and erosion control measures should be left in place until the construction site has been stabilized with vegetation.
- Develop a response plan to be implemented in the event of a sediment release or spill of a deleterious substance.

<u>New Culvert Crossings</u>

Culverts should be sized according to hydrologic requirements that will be determined during the detailed design / permit application stage. Other technical requirements may influence culvert size and materials.

Where fish that are part of or support a commercial, recreational or aboriginal fishery are present, culverts must be installed such that fish passage is maintained. Where a water body indirectly contributes to reaches downstream that support fish that are part of, or support a commercial, recreational or aboriginal fishery, the culvert must continue to convey flow to downstream areas.

Culverts shall be designed and installed to reduce the risk of:

- restriction of flows through the culvert resulting in upstream pooling
- erosion at the culvert inlets and outlets
- barriers to fish passage to upstream environments

Under flowing water conditions, water must be pumped or flumed around the work area to install a culvert. In-water timing windows are applicable when water is present. The following measures are applicable to isolation of in-water work:

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- Coffer dams (e.g., aqua-dams, sand bags, concrete blocks, steel or wood wall, clean rip-rap, sheet pile or other appropriate designs) can be used to isolate the in-water work area from flowing water.
- If rip rap or pea gravel bags are used for coffer dams, clean, washed material should be used to build the berm. The berm face should consist of clean, washed granular material that is adequately sized (i.e., moderate sized rip rap - no sand or gravel) to hold the berm in place during construction.
- Coffer dams should be designed to accommodate expected high flows of the water body during the construction period.
- Before starting construction, fish should be rescued from behind the coffer dam and returned to an area outside of the isolated area.
- Accumulated sediment should be removed (ensuring that the original bed of the water body is not excavated) from behind the coffer dam before its removal.
- The original channel bottom gradient and substrate should be restored after coffer dam removal.
- Coffer dams should be removed in a downstream to upstream sequence to allow gradual re-introduction of water to the dewatered area and prevent excessive suspension of silt or other bed material.
- Pump intakes should be sized and adequately screened to prevent debris blockage and fish mortality (refer to the DFO *Freshwater Intake End-of-Pipe Fish Screen Guidelines 1995*).
- The pumping system should be sized to accommodate expected high flows of the water body during the construction period. Back-up pumps should be kept on site (within Project Location) in case of pump failure.
- The pump should be discharged to a grassed area to allow water to re-enter the water body only after it has been filtered through vegetation to prevent silt deposition. If no suitable areas exist, a filter bag should be placed on the outlet to filter the water prior to re-entry into the water body.
- Work should not be completed during flood stage flows or during times when heavy precipitation is occurring or is expected.

<u>Overhead Electrical Lines</u>

Although construction of overhead electrical lines (if required) would not require in-water works, it is the riparian habitat that is most sensitive to disturbance from overhead line construction. There is often riparian vegetation adjacent to water bodies, which contributes to fish habitat by providing shade, cover, and spawning and food production areas.

The following mitigation measures apply to installation of overhead electrical lines:

- Prior to constructing and/or placing any temporary or permanent structures (e.g., islands, poles, crib works, etc.) below the ordinary high water mark, consultation should occur with the DFO to confirm if additional mitigation measures or review may be required, in order to protect fish habitat.

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- Prior to constructing and/or placing any temporary or permanent structure (e.g., islands, poles, crib works, etc.) within a regulated area, the works should be reviewed by the RRCA. Additional mitigation measures for the protection of water quality may be included in RRCA permits or approvals (if required).
- Install overhead lines under frozen (or dry) conditions where possible.
- Implement standard erosion and sediment controls listed above.

Underground Electrical Lines

There are several options with respect to construction methods of a buried electrical line at a water body crossing, in order to protect fish and fish habitat: 1) punch or bore, 2) high pressure directional drilling, 3) dry open cut crossing and 4) isolated open cut crossing. Mitigation measures for these methods vary slightly and are provided below.

Punch and Bore

In addition to the general mitigation measures provided above, the following additional measures are recommended:

- A punch or bore crossing can be conducted at any time of the year provided there is not a high risk of failure and it does not require in-water activities such as machinery fording.
- Design the punch or bore path for an appropriate depth below the water body to reduce the risk of exposure due to natural scouring of the stream bed.
- The removal of select plants may be necessary to access the construction site and to excavate the bell holes. This removal shall be reduced to the extent possible and kept within the utility right-of-way.
- Excavate bell holes beyond the high water mark, far enough away from any water body to allow containment of sediment or deleterious substances above the high water mark:
  - When dewatering bell holes, remove suspended solids by diverting water into a vegetated area or settling basin, and reduce the risk of entry of sediment and other deleterious substances into the water body.
  - Stabilize waste materials removed from the work site (including bell holes) to prevent them from entering the water body. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.
  - After suitably backfilling and packing the bell holes, vegetate disturbed areas.
  - If the excavation bell holes cannot be located as indicated above, consultation should occur with the RRCA and DFO to confirm if additional mitigation measures may be required.
- Monitor the water body to observe signs of malfunction during all phases of work.

High Pressure Directional Drill

In addition to the general mitigation measures provided above, the following additional measures are recommended:

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- Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.
- Design the drill path to an appropriate depth below the water body to minimize the risk of inadvertent release and to a depth to prevent the line from becoming exposed due to natural scouring of the stream bed. The drill entry and exit points are far enough from the banks of the water body to have minimal impact on these areas.
- The removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the road or utility right-of-way.
- Construct a dugout/settling basin at the drilling exit site to contain drilling mud to reduce the risk of sediment and other deleterious substances from entering the water body. If this cannot be achieved, use silt fences or other effective sediment and erosion control measures to prevent drilling mud from entering the water body. Inspect these measures regularly during construction and make all necessary repairs if any damage occurs.
- Dispose of excess drilling mud, cuttings and other waste materials at an adequately sized disposal facility located away from the water to prevent it from entering the water body.
- Monitor the water body to observe signs of surface migration (inadvertent release) of drilling mud during all phases of construction.
- Prepare an Emergency inadvertent release Response and Contingency Plan

Dry Open Cut

In addition to the general mitigation measures provided above, the following additional measures to employ for dry open cut crossings (dry water body) include:

- crossings should be undertaken on days when precipitation is not expected
- the tracked excavator should be working in the dry when excavating a trench
- topsoil stockpiles should be reasonably distant from water bodies to preclude sediment inputs due to erosion of stored soil materials
- water bodies should be backfilled with substrate material that is consistent with the existing substrate size and texture and should remain in/under the crossing
- the water body bed and bank areas should be rehabilitated to pre-excavation condition
- materials such as sand bags, straw bales, geotextile filters, and/or pumps should be readily available on-site so that the crossing can be completed in the dry in case of unexpected stream flow

Isolated Open Cut (Dam and Pump Crossings)

Where a dry open cut crossing is not possible, in-water work should be completed via an isolated open cut crossing by de-watering the work area and diverting and/or pumping flows around cofferdams placed at the limits of the work area.

In addition to the general mitigation measures and the mitigation measures related to construction of a new culvert, the following measures are recommended during construction of an isolate open cut crossing of a water body:

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- crossings should be undertaken on days when precipitation is not expected
- topsoil stockpiles should be reasonably distant from water bodies to preclude sediment inputs due to erosion of stored soil materials
- water bodies should be backfilled with substrate material that is consistent with the existing substrate size and texture and should remain in/under the crossing
- the water body bed and bank areas should be rehabilitated to pre-excavation condition
- materials such as sand bags, straw bales, geotextile filters, and backup pumps should be readily available on-site in case of an unexpected increase stream flow.
- Mitigation measures for accidental spills are provided in Section 3.7.

In addition to the mitigation measures provided below, Sections 4.0 and 5.0 of this CPR provide monitoring commitments that are intended to reduce the risk of negative effects resulting from construction-related activities.

Net Effects

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

3.4 AIR QUALITY AND ENVIRONMENTAL NOISE

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

3.4.1 Air Emissions, Odour & Dust

The landscape surrounding the Project Location is comprised of open space, agricultural, natural heritage and moderate commercial and industrial operations. While there are no sources of air emissions identified within 300 m of the Project Location, closed landfills are located less than 500 m from the Project Location, and is a potential source of odour and greenhouse gas emissions (methane and carbon dioxide). Although the surrounding area has a low population density, surrounding businesses and automobiles are also minor sources of air emissions.

No existing sources of dust were identified.

Potential Effects

During construction, minor localized air emissions will occur from operating heavy equipment. Construction activities rely on the utilization of a wide range of mobile equipment, such as bulldozers and dump trucks. The engine exhaust from these vehicles, especially from those operating on diesel fuel, represent a source of particulate and other emissions (e.g., SO_2, NOX, VOCs , PAHs, and CO_2) from the construction site. Traffic delays also result in increased emissions from vehicles traveling slowly through construction zones. The delivery of materials to

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construction sites can also generate significant amounts of emissions, especially for sites that are relatively far from material manufacturers.

Additionally, construction related traffic and various construction activities (e.g., earth moving, grading, and exposed areas) have the potential to create short-term nuisance odour and dust effects in the general vicinity of the Project Location.

Mitigation Measures

The contractor should implement site practices during construction that are in line with the Environment Canada document 'Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities' (Cheminfo Services Inc. 2005), which may include:

- maintaining equipment in compliance with regulatory requirements;
- protecting stockpiles of friable material with a barrier or windscreen in the event of dry conditions and dust;
- dust suppression of source areas; and
- covering loads of friable materials during transport.
- the general contractor will avoid idling of vehicles and equipment when not necessary for construction activities
- equipment and vehicles will be turned off when not in use unless required for construction activities and/or effective operation

Watering for dust control must not result in the formation of puddles, rutting by equipment or vehicles, the tracking of mud onto roads or the siltation of watercourses.

In terms of emissions from combustion engines, all construction equipment will meet the emissions requirements of the MOECC and/or Ministry of Transportation (MTO). This will assist in minimizing the Project's short-term contributions of greenhouse gases, odour, and other airborne pollutants.

Net Effects

Effects from odour and dust will be intermittent. Air emission are permanent, but will have negligible adverse residual effects on ambient air quality. With the implementation of the above mitigation measures, no significant adverse residual effects on air emissions, odour and dust are anticipated.

3.4.2 Environmental Noise

The area's acoustical environment is best described as a Class 3 (Rural) area as per MOECC's guideline publication "Environmental Noise Guideline" (NPC-300). The acoustic environment is expected to be dominated by natural ambient noise with sporadic contributions from road and rail sources.

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No other major noise sources were identified within 300 m of the Project Location.

Potential Effects

During construction of the Project, noise will be generated by the operation of heavy equipment and vehicles on-site and from increased vehicular traffic on Cornwall Centre road. Construction equipment would remain at the Project Location until completion or until it is no longer necessary. Daily access to the site by the general contractor would be via Cornwall Centre Road.

Surrounding residents and businesses may experience a noise nuisance associated with construction activity. Construction noise may also disturb surrounding wildlife.

Mitigation Measures

To minimize nuisance brought on by noise during the construction phase of the Project, all engines associated with construction equipment will be equipped with mufflers and/or silencers in accordance with regulatory requirements of the *Occupational Health and Safety Act*. Noise levels arising from equipment will also be compliant with sound levels established by the MOECC.

There is no noise by-law for the Township of South Stormont. On-site construction activities would be limited to the hours between 7:00 AM and 7:00 PM on Sundays and Statutory Holidays in accordance with City of Cornwall Noise By-law 079-1996, unless otherwise permitted by the City of Cornwall. There are no Municipal or County construction noise limitations from Monday to Saturday (excluding Statutory Holidays). Through consultation with the Township, the Proponent will determine if timing restrictions should be applied during the construction phase of the Project.

A Complaint Response Protocol will be established as part of the CEMP. The Proponent should review Project complaints on a regular basis and respond accordingly in a timely manner, in accordance with the Complaint Response Protocol.

Net Effects

Noise effects would be frequent, but would be short-term, intermittent and reversible. Application of the recommended mitigation measures during construction should limit noise emissions to the general vicinity of the Project Location. With the implementation of the above mitigation measures, no significant adverse residual effects from noise are anticipated.

3.5 LAND USE AND SOCIO-ECONOMIC RESOURCES

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

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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), the *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 to the west, north and east of the Project Location are primarily forested and/or scrub. The Hydro One St. Lawrence Transmission Station is located south of the Project Location.

There is a closed landfill located north of the Project Location, and two landfills (active and inactive) located south of the Project Location. The City of Cornwall owns the landfill properties south of the Project Location. The former City of Cornwall Landfill that is currently closed, is located approximately 120 m south of the Project Location boundary, and is separated by Cornwall Centre Road. An active waste management facility, also owned by the City of Cornwall, is located over 500 m from the Project Location. The Corporation of the Township of Osnabruck landfill (currently closed) is located north of the Project Location. Consultation is currently underway to confirm the boundaries of the landfill to determine the distance to the Project. The Proponent will further confirm if additional requirements are applicable to the Project, through consultation with the local municipalities and MOECC.

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:

<u>United Counties of Stormont, Dundas and Glengarry</u>

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 located 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 closed and one active waste management facilities. Schedule B4 (Constraints Plan) of the Official Plan identified the northern extent of Project Location as being within the Regulatory Floodline. Cornwall Centre Road is identified as a Township Road.

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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 FP, but a portion in the north is zoned as Rural (RU). The Proponent is currently in consultation with the Township of South Stormont 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 Planning Documents

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 is not located within Prime Agricultural Areas as set out in the Official Plan.

Potential Effects

There are development restrictions in FP zones. Proponent is currently in consultation with the Township and RRCA to determine land use impacts and permitting requirements.

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). Construction activity has the potential to alter the agricultural capacity of the land following decommissioning of the Project. Improperly stripping, storage and replacement of topsoil can result in topsoil and subsoil mixing, compaction, rutting, and erosion, which 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.

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Mitigation Measures

Consultation has been initiated, and will continue, with surrounding landowners to identify methods of minimizing disturbance to their property. Where work is to occur within RRCA regulated areas, consultation with RRCA will occur and the Proponent will apply for permits under O. Reg. 175/06 as required.

Erosion and sediment control structures should be installed on erosion susceptible surfaces and monitored to maintain their effectiveness during construction and site clean-up and restoration. Details about site clean-up and restoration are provided in Section 2.2.5 and landscaping in Section 2.2.6.

To the extent feasible, construction activities should occur during drier times of the year. Lands affected by heavy rainfall events should be monitored for wet soil conditions, to avoid the potential for topsoil and subsoil mixing. Construction activities should be temporarily halted on lands where excessively wet soil conditions are encountered.

Where stripping is undertaken, topsoil and subsoil should be stripped and stockpiled separately to avoid mixing. Topsoil depth should be confirmed prior to stripping so that the proper depth of topsoil is removed and replaced.

Net Effects

Although some disturbance to adjacent land uses is unavoidable during construction, effects are anticipated to be short-term in duration, temporary, and would be minimized through the implementation of good site practices, transportation planning, communication with surrounding landowners and the mitigation measures described above.

The agricultural productivity of the Project Location will be lost during construction, however, the effects to the agricultural soils removed during construction are expected to be temporary and spatially limited. The agricultural capability of the soil after proper decommissioning of the project is anticipated to be comparable to that prior to construction.

Construction noise effects on games species are anticipated to be temporary and intermittent.

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

3.6 EXISTING UTILITIES AND INFRASTRUCTURE

The following sections describe the potential effects, recommended mitigation measures, and net effects for existing utilities and infrastructure.

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3.6.1 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.

Potential Effects

There will be an increase in traffic on municipal roads during construction due to the commuting workforce, the transport of Project components, construction machinery, equipment and supplies, and to remove excess materials and waste from the Project Location.

The general contractor will develop and implement a Traffic Management Plan and the Proponent may negotiate a Road Use Agreement with the United Counties of Stormont, Dundas and Glengarry and the City of Cornwall to reduce the risk of accidents along the haul route.

Potential effects related to construction traffic noise and air emissions are addressed in Section 3.4.

Mitigation Measures

The general contractor will implement a Traffic Management Plan to identify and address specific traffic planning issues including the management of traffic and the delivery of materials. The Traffic Management Plan should include strategies governing movement of materials and personnel to, from, and within the Project Location; management of connection points between the Project Location and public roads; transport of solar panels and large loads; and dust and vehicle emission controls. Delivery routes and times may be negotiated in a Road Use Agreement with the United Counties of Stormont, Dundas and Glengarry and the City of Cornwall.

Mitigation measures for construction traffic noise and air emissions are addressed in Section 3.4.

Net Effects

The effect of constructing the various Project components is anticipated to have a limited, short term effect on traffic and roads during construction. A minor temporary increase in local traffic is anticipated, however, with the implementation of the above mitigation measures, no significant adverse residual effects on municipal infrastructure is anticipated.

3.6.2 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.

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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 distribution line located in the road allowance of Cornwall Centre Road (see Section 2.10).

A hydrocarbon pipeline owned and operated by TNPI intersects the Project Location diagonally from the southeast corner to the northwest corner. Consultation with TNPI is ongoing, and an access route will be maintained outside the Project fenced area to give TNPI access to the pipeline during the construction, operation and decommissioning phases of the Project.

A railway owned and operated by Canadian National Railway (CN) is located approximately 50 m southwest of the Project Location. No work will be conducted on or adjacent to the railway.

No existing 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 construction, 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 may result in damage to equipment or the rail facility, or injury or death. More frequent railway crossings inherently increase risk.

Mitigation Measures

Consultation has been initiated, and will continue, with Hydro One to discuss interconnection to the 44 kV overhead distribution line which is anticipated to be constructed in 2018 within the road allowance of Cornwall Centre Road. The general contractor will be responsible for locating and marking existing pipelines and utilities on lands which may be affected by the Project. Machine operators will be informed where electrical lines are present overhead or buried pipelines are present below the ground. Lines that may interfere with the operation of equipment will be aptly identified by the general contractor.

Consultation should occur with CN staff to advise them about the project and increased traffic and operation of large vehicles near the railway. Vehicle and equipment operators will obey all traffic controls. The general contractor will implement a Traffic Management Plan to identify and address railway crossing safety.

Net Effects

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

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3.7 WASTE MATERIAL DISPOSAL & ACCIDENTAL SPILLS

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

Potential Effects

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

Hazardous materials to be used during construction include fuels, lubricants and fluids that are required for use in construction equipment. Accidental spills of fuels or lubricants could result in contamination of soil and or groundwater if not properly contained.

Mitigation Measures

Waste materials will be stored on-site by the general contractor in appropriate containment facilities during the construction phase of the Project. Designated containment areas and the type of containment will be confirmed by the general contractor prior to construction. Small waste bins will be provided on-site during construction. Upon completion of construction activities, waste materials remaining on-site will be collected and properly disposed at an appropriate MOECC-approved off-site facility.

Fuelling of construction vehicles will take place within designated fuelling areas, including in the temporary staging area described in Section 2.2.3.

Materials kept on-site during construction that may result in an accidental spills or release to the environment are limited to fuel and lubricating oils. Fuel will be stored on site in a double wall tank surrounded with bollards and emergency response equipment at the stations (fire extinguishers, spill kits, etc.).

In the event of a fuel or lubricant spill on-site, the following procedures will be implemented:

- Primary action at the spill location
  - Notify the construction supervisor.
  - Contain the spill by building earth dikes.
    - As per Section13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or that exceed the prescribed regulatory quantities should be reported to the MOECC's Spills Action Centre.

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- Secondary action
  - For a small quantity spill, absorbent pads will be carried in the driven equipment and machinery used on-site and would be applied. All absorbent pads will be disposed of in plastic bags and placed into a container marked for proper disposal.
  - For a larger quantity spill, a hazardous waste removal contractor will be mobilized to the site to remove contaminated material with a vacuum truck.
  - If any hazardous material reaches a waterway or ditch containing water, absorbent booms will be deployed to contain and spill.
- Final cleanup
  - All contaminated soil or other contaminated materials would be removed and placed into plastic bags or other approved containers and disposed of off-site by an approved hazardous waste contractor.
  - Backfilling and grading will be performed to restore the spill area, as required.

Sanitary waste generated during the construction phase will be collected via portable toilets and wash stations supplied by a licensed third party who will be retained prior to the start of major construction activities.

Net Effects

Accidental spills area anticipated to occur infrequently 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.

3.8 PUBLIC HEALTH & SAFETY

The following sections describe the potential effects, recommended mitigation measures, and net effects for public health and safety.

Potential Effects

Potential safety concerns exist at locations where residents and vehicles may come in proximity to construction activities, particularly near Cornwall Centre Road. Traffic safety is a concern during installation of the overhead connection line from the substation to the PCC.

Mitigation Measures

Consultation with surrounding residents will occur in advance of construction commencement. Contact information for a designated Proponent representative will be available prior to and during construction to address questions and concerns.

A safety fence will be installed at the edge of the construction area to keep the public away from the work area. A safety fence should be installed at the edge of the construction area where public safety considerations are required. The CEMP will include a Health and Safety Plan,

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Emergency Response and Communications Plan, Training Plan, and Complaint Response Protocol (see Section 4.0).

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 construction of the Project.

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4.0 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

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

Information regarding the environmental effects monitoring plan are available in the Design & Operations Report. As part of the construction program, site practices and procedures will be implemented to further reduce the environmental effects identified in this report and supporting studies. These practices may include specifications regarding disposal of excavated material, sediment control, dust control, and soil compaction control. In addition, the Proponent and contractors will review and implement the environmental commitments contained in this report and supporting studies. Commitments will be summarized into a tracking table and monitored by the Proponent.

The CEMP will include procedures and plans based on regulatory requirements and accepted site practices and as appropriate would include the following plans:

- *Traffic Management Plan*: the general contractor and/or the major component manufacturers would assist in the development and implementation of this plan, which will contain strategies governing movement of materials and personnel to, from, and within the Project Location; management of connection points between access roads and public roads; transport of abnormal loads; road/lane closure strategies; control of any upgrading/modification roadworks; and/or dust suppression and vehicle emission controls.
- *Waste Management Plan:* to outline the procedures for proper identification, storage, handling, transport, and disposal of hazardous and non-hazardous waste.
- *Emergency Response and Communications Plan*: the general contractor and/or the Proponent will include a plan for the proper handling of material spills and associated procedures to be undertaken during a spill event. Specify containment and clean-up materials and their storage locations, and general procedures for personnel training will be outlined in the plan. As appropriate, response actions to fire preparedness, evacuation procedures, and medical emergencies will be detailed. Consultation will occur with local emergency services personnel to determine the extent of emergency response resources and response actions of those involved. Contact information will be provided for emergency service providers. The plan will also include address information for Project infrastructure locations, a description of the chain of communications and how information would be disseminated between the Proponent and/or the general contractor and the relevant responders.

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- *Complaint Response Protocol:* the Proponent will continue to consult with Project stakeholders during construction and through the initial period of operation. The Proponent and/or the general contractor will develop and implement a Complaint Response Protocol for the construction phase to address reasonable concerns from the public. As part of the protocol, a telephone number will be provided to Project stakeholders so they may contact the Proponent to ask questions or provide comments. The telephone number will be equipped with a voice message system. Reasonable concerns should be dealt with appropriately as soon as practicable. The Proponent will make the protocol available on the Project website (http://www.edf-en.ca/project/barlow-solar-energy-centre/) and provide it directly to the Township of South Stormont, City of Cornwall and the MOECC.

The Proponent will provide overall direction and assume responsibility for the development and implementation of these plans.

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5.0 CONSTRUCTION ENVIRONMENTAL EFFECTS MONITORING PLAN

The primary objective of the CEEMP is to assess the impacts of construction activities on environmental features and to check that mitigation measures and contingency planning are effectively implemented. The general contractor will be the primary party responsible for the implementation of the CEEMP and should be undertaken in compliance with applicable municipal, provincial, and federal standards and guidelines.

Trained personnel should be on-site to monitor construction and should be responsible for checking that the mitigation measures and monitoring requirements within the CEEMP are executed.

Contingency planning may prevent a delayed or ineffective response to unexpected events or conditions that may occur during construction of the Project. Contingency planning includes the preparation of plans and procedures that can be implemented if unexpected events occur. The absence of contingency plans may result in short or long term environmental or socio-economic impacts and public safety risks.

Based on the potential effects and mitigation measures identified in Section 3.0, performance objectives, monitoring activities and contingency plans are outlined in **Table 5.1**.

Additional environmental effects monitoring will take place during the operation of the Project and may consist of similar monitoring activities as described below. A CEEMP for the operation of the Project is provided in the Design & Operations Report and should be referenced for a complete description of the monitoring efforts and contingency measures that will be implemented during the operation phase of the Project.

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Table 5.1: Summary of the Potential Environmental Effects, Performance Objectives, Mitigation Measures, and Contingency Measures for the Construction Stage of the Project

Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.1 Cultural Heritage and Archaeological Resources	• None. No cultural heritage landscapes, protected properties or archeological resources were identified.	• No impacts to cultural heritage landscapes, protected properties and archeological resources	• None Required.	• Significant adverse residual effects on heritage landscapes, protected properties and archeological resources are not anticipated.	• In the event of an archaeological find during construction activities, artifacts and other archaeological deposits would be identified, documented and preserved. • In the event that any artifacts, soil features, or other cultural features of note are discovered during groundwork for the Project the following procedures shall be adhered to: – Work in the area of the site or artifacts shall halt immediately and the general contractor notified of the discovery – The area of the site, along with a buffer zone of 5 m (as available) shall be cordoned off using a barrier or stakes and flagging tape – The regional archaeologist from the MTCS shall be contacted to determine the appropriate course of action – If human remains are discovered during Project activities: o All work shall cease in the immediate area of the discovery and the environmental inspector notified immediately o Remains shall be covered as soon as possible o If human remains are discovered in the bucket of heavy equipment, the bucket shall not be emptied and any remains in the bucket covered over as soon as possible o Local police and/or coroner shall be contacted immediately. – If any human remains are identified as being of strictly archaeological interest, and not a crime scene, the MTCS or Stantec archaeological staff should be contacted to determine the appropriate course of action. Until appropriate authorities give the go-ahead, no further work shall take place near any discovery of human remains.
Section 3.2.1 Significant Wetlands (cont'd)	• No components of the Project Location are located within the significant wetland boundaries as identified and confirmed through site investigations. As the Project Location and all construction activities are sited outside all significant wetland boundaries, there will be no direct loss of significant wetland habitat or function as a result of the Project. • Construction activities during the installation of the project are anticipated to be low impact and short term in duration.	• No impacts to wetland features. • No spills.	• Avoidance is the main strategy used to minimize impacts to wetland habitat within 50 m of the Project Location. • No development will be permitted within the significant wetland boundaries. • The edge of the work zone will be flagged or staked in the field prior to construction to assist with the demarcation of the construction area so that construction activities avoid these sensitive areas and erosion and sediment controls can be accurately installed.	• With the implementation of mitigation measures, no significant adverse residual effects on wetlands are anticipated.	• Erosion and sediment control measures will be monitored on a regular basis (weekly) and maintained throughout construction. Issues with erosion and sediment controls will be rectified immediately. • In the event of contamination due to an accident spill, monitoring of the spill area should occur as outlined in the Emergency Response and Communications Plan. • The post-construction monitoring program will be reassessed by the MNRF and the Proponent at the end of each monitoring year.

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Table 5.1: Summary of the Potential Environmental Effects, Performance Objectives, Mitigation Measures, and Contingency Measures for the Construction Stage of the Project

Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.2.1 Significant Wetlands (cont'd)			• Silt barriers will be erected along the edge of all wetland boundaries where they are located within 30 m of construction areas. • Environmental inspectors will monitor construction vehicles and personnel so they remain within the construction envelope, thereby limiting the disturbance of natural vegetation. • Maintenance activities, vehicle refueling or washing, as well as the storage of chemical and construction equipment will be located more than 30 m from significant wetlands. • Fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas greater than 30 m from a wetland. • In the event of an accidental spill, the MOECC Spills Action Centre will be contacted and emergency spill procedures implemented immediately.		• Contingency measures may include an adaptive management approach that allows mitigation measures to be implemented in the event that unanticipated potentially significant adverse environmental effects are observed, as assessed through a review of annual monitoring reports.
Section 3.2.2 Significant Woodlands	• No project components are located within significant woodlands. As the Project Location and all construction and operational activities are sited outside of significant woodland boundaries, there will be no direct loss of significant woodland habitat or function to these features as a result of the Project	• No impacts to woodland features.	• The edge of the work zone will be flagged or staked in the field prior to construction to assist with the demarcation of the construction area. • Silt barriers (e.g., fencing) will be erected along the edge of all woodland boundaries where they are located within 30 m of construction areas. • Environmental inspectors will monitor construction vehicles and personnel so they remain within the construction envelope. • Maintenance activities, vehicle refueling or washing, as well as the storage of chemical and construction equipment will be located more than 30 m from significant woodlands. • Fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas outside the woodland boundaries. • In the event of an accidental spill, the MOECC Spills Action Centre will be contacted and emergency spill procedures implemented immediately. • Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, MNRF will be consulted on the appropriate action(s) to be taken.	• With the implementation of mitigation measures, no significant adverse residual effects on significant woodlands are anticipated.	• Contingency measures may include an adaptive management approach that allows mitigation measures to be implemented in the event that unanticipated potentially significant adverse environmental effects are observed, as assessed through a review of annual monitoring reports.

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Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.2.3 Wildlife and Wildlife Habitat	• No candidate SWH features were identified at the Project Location. • Generalized Candidate SWH is located outside the Project Location but within the ZOI within 7 m in proximity to solar panel area and adjacent (0 m) to the Project Location.	• No impacts to wildlife habitat.	• The following mitigation measures will be applied for Generalized Candidate SWH: – Mitigation measures for the significant wetland and woodland features will be applied as outlined above, as Generalized Candidate SWH is contained within these features. – To the extent possible, construction activities within 30 m of Generalized Candidate SWH will occur during daylight hours to avoid excessive noise and/or light disturbances.	• Potential net effects on Generalized Candidate SWH would be spatially limited. With the implementation of mitigation measures, no significant adverse residual effects on Generalized Candidate SWH are anticipated.	• See monitoring and contingency measures provided for Significant Wetlands and Significant Woodlots. • Should SAR be identified during wildlife and wildlife habitat field surveys, permitting and construction monitoring may need to be undertaken. The exact nature of monitoring will be determined in consultation with the MNRF and will depend on the species present.
Section 3.2.4 Areas of Natural and Scientific Interest	• None. No ANSIs were identified within 300 m of the Project Location.	• No impacts to ANSIs.	• None required.	• No significant adverse residual effects on ANSIs are anticipated.	• None required.
Section 3.2.5 Provincial Parks and Conservation Reserves	• None. No provincial parks or conservation reserves were identified within 300 m of the Project Location.	• No impacts to Provincial Parks and Conservation Reserves.	• None required.	• No significant adverse residual effects on provincial parks or conservation reserves are anticipated.	• None required.
Section 3.3.1 Groundwater	• Negative environmental effects to water wells are not anticipated during construction. • Some materials, such as fuel, lubricating oils and other fluids associated with the construction phase of the Project have the potential for discharge to the natural environment through accidental spills and thus potentially infiltrate groundwater supplies.	• No spills. • No impacts to ground water.	• Groundwater investigations and/or monitoring requirements will be confirmed during the REA process. • If dewatering activities of more than 50,000 litres per day but less than 400,000 litres per day are required, the Proponent will register the water taking activities on the MOECC EASR.	• With the implementation of mitigation measures, no significant adverse residual effects on groundwater or private wells are anticipated.	• If dewatering is required, the discharge location(s) should be monitored to avoid erosion, sedimentation or flooding. If any issues are observed, dewatering should cease until proper controls are implemented.
Section 3.3.2 Surface Water, Fish and Fish Habitat	• Potential impacts to water bodies located within 120 m of the Project Location may include: – short-term increase in turbidity from runoff and soil erosion during construction – loss of shade – reduced bank stability – reduction in inputs of organic matter, nutrients and other material originating from the terrestrial environment water quality and habitat disturbance effects to aquatic habitat – water quality and habitat effects due to entry of deleterious substances into surface water	• No erosion, sedimentation of water bodies. • No impacts to fish or fish habitat (riparian or in-water vegetation, stream bed or bank) • No spills.	• Standard mitigation measures used for works in and around water are summarized below. Details of the mitigation measures should be determined through consultations with the local municipality, RRCA, and DFO (if required) and are also dependent on project details such as technical requirements, construction methods and schedule. Permits may be required from the RRCA under O. Reg. 175/06. – Operate and store materials and equipment used for the purpose of site preparation and Project construction in a manner that reduces the risk of the entry of deleterious substances (e.g., petroleum products, silt, etc.) into surface waters: o store and stabilize stockpiled materials away from the water	• With the implementation of mitigation measures, no significant adverse residual effects on surface water, fish and fish habitat are anticipated.	• Drainage ditches, culverts and general flow patterns will be monitored during construction to maintain proper site drainage. • Monitoring during the following spring run-off the year after construction (first year of operations), to review the effectiveness of the site stabilization and re-vegetation, to check bank and slope stability, and to check if surface drainage has been maintained. • Follow-up will occur in the event of an accidental spill. Remedial actions may be developed and implemented if adverse effects are observed. Contaminated soils would be removed and replaced as appropriate. • The entrance culverts should be monitored to check that they are functioning properly. Further restoration activities and subsequent monitoring should be conducted as necessary.

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Table 5.1: Summary of the Potential Environmental Effects, Performance Objectives, Mitigation Measures, and Contingency Measures for the Construction Stage of the Project

Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.3.2 Surface Water, Fish and Fish Habitat (cont'd)	• Potential impacts related to the installation and maintenance of culvert crossings in addition to the general impacts listed above may include: – disturbance to aquatic biota and habitat during installation – permanent enclosure of portions of a water body – loss of bed material within the length of the culvert – changes to riparian vegetation within road allowance – changes to fish passage • Short-term construction related impacts of overhead electrical lines on water bodies may include loss of riparian vegetation which can result in increased turbidity during construction. Loss of vegetation can also affect fish habitat by removing sources of shade, cover and food production. • Potential impacts to water bodies and fish and fish habitat related to the installation of underground electrical lines are as follows: – erosion and sedimentation from site disturbance and dewatering – collapse of the punch or bore hole under the stream – disturbing riparian vegetation can reduce shoreline cover, shade and food production areas – machinery fording the stream can disturb bottom and bank substrates, disrupt sensitive fish life stages and introduce deleterious substances i.e. equipment is not properly maintained. • Some materials, such as fuel, lubricating oils and other fluids associated with the construction phase of the Project have the potential for discharge to the natural environment through accidental spills and thus potentially enter surface water features.		o refuel and maintain construction equipment at least 100 m from water bodies o report spills to the MOECC Spills Action Centre o any part of equipment entering the water shall be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water o only clean material, free of fine particulate matter shall be placed in the water. o for the duration of the work, keep on-site and readily accessible, all material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances. – Implement erosion and sediment control measures prior to construction and maintain measures during the construction phase to reduce the risk of the entry of sediment into the water: o silt fencing and/or barriers shall be used along all construction areas adjacent to water bodies o no equipment shall be permitted to enter any water bodies beyond the silt fencing during construction o all sediment and erosion control measures shall be inspected at least weekly and during and immediately following rainfall events to see that they are functioning properly and are maintained and/or upgraded as required o topsoil stockpiles shall be sufficiently distant from water bodies to preclude sediment inputs due to erosion of stored soil materials o all disturbed areas of the construction site shall be stabilized and re-vegetated as soon as conditions allow o sediment and erosion control measures should be left in place until the construction site has been stabilized with vegetation. – Develop a response plan to be implemented in the event of a sediment release or spill of a deleterious substance.		• Even with properly installed erosion and sedimentation control measures, extreme runoff events could result in the collapse of silt fencing, overflow or bypass of barriers, and other problems which could lead to sedimentation of watercourses. If sedimentation of a watercourse occurs, immediate action should be taken under the direction of on-site inspection team to install temporary measures that will contain the erosion as quickly and effectively as practical. • Permanent erosion and sedimentation control be reinstalled on erosion susceptible surfaces when site conditions permit.

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Table 5.1: Summary of the Potential Environmental Effects, Performance Objectives, Mitigation Measures, and Contingency Measures for the Construction Stage of the Project

Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.3.2 Surface Water, Fish and Fish Habitat (cont'd)	•		**New Culvert Crossings** • Culverts should be sized according to hydrologic requirements that will be determined during the detailed design / permit application stage. Other technical requirements may influence culvert size and materials. • Where fish that are part of or support a commercial, recreational or aboriginal fishery are present, culverts must be installed such that fish passage is maintained. Where a water body indirectly contributes to reaches downstream that support fish that are part of, or support a commercial, recreational or aboriginal fishery, the culvert must continue to convey flow to downstream areas. • Culverts shall be designed and installed to reduce the risk of: – restriction of flows through the culvert resulting in upstream pooling – erosion at the culvert inlets and outlets – barriers to fish passage to upstream environments • Under flowing water conditions, water must be pumped or flumed around the work area to install a culvert. In-water timing windows are applicable when water is present. The following measures are applicable to isolation of in-water work: – Coffer dams (e.g., aqua-dams, sand bags, concrete blocks, steel or wood wall, clean rip-rap, sheet pile or other appropriate designs) can be used to isolate the in-water work area from flowing water. – If rip rap or pea gravel bags are used for coffer dams, clean, washed material should be used to build the berm. The berm face should consist of clean, washed granular material that is adequately sized (i.e., moderate sized rip rap - no sand or gravel) to hold the berm in place during construction. – Coffer dams should be designed to accommodate expected high flows of the water body during the construction period. – Before starting construction, fish should be rescued from behind the coffer dam and returned to an area outside of the isolated area.		•

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Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.3.2 Surface Water, Fish and Fish Habitat (cont'd)			– Accumulated sediment should be removed (ensuring that the original bed of the water body is not excavated) from behind the coffer dam before its removal. – The original channel bottom gradient and substrate should be restored after coffer dam removal. – Coffer dams should be removed in a downstream to upstream sequence to allow gradual re-introduction of water to the dewatered area and prevent excessive suspension of silt or other bed material. – Pump intakes should be sized and adequately screened to prevent debris blockage and fish mortality (refer to the DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines). – The pumping system should be sized to accommodate expected high flows of the water body during the construction period. Back-up pumps should be kept on site in case of pump failure. – The pump should be discharged to a grassed area to allow water to re-enter the water body only after it has been filtered through vegetation to prevent silt deposition. If no suitable areas exist, a filter bag should be placed on the outlet to filter the water prior to re-entry into the water body. – Work should not be completed during flood stage flows or during times when heavy precipitation is occurring or is expected. **Electrical Lines** • Although construction of overhead electrical lines (if required) would not require in-water works, it is the riparian habitat that is most sensitive to disturbance from overhead line construction. There is often riparian vegetation adjacent to water bodies, which contributes to fish habitat by providing shade, cover, and spawning and food production areas. • The following mitigation measures apply to installation of overhead electrical lines: – Prior to constructing and/or placing any temporary or permanent structures (e.g., islands, poles, crib works, etc.) below the ordinary high water mark, consultation should occur with the DFO to confirm if additional mitigation measures or review may be required, in order to protect fish habitat.		•

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Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.3.2 Surface Water, Fish and Fish Habitat (cont'd)			– Prior to constructing and/or placing any temporary or permanent structure (e.g., islands, poles, crib works, etc.) within a regulated area, the works should be reviewed by the RRCA. Additional mitigation measures for the protection of water quality may be included in RRCA permits or approvals (if required). – install overhead lines under frozen (or dry) conditions where possible. – implement standard erosion and sediment controls listed above. • There are several options with respect to construction methods of a buried electrical line at a water body crossing, in order to protect fish and fish habitat: 1) punch or bore, 2) high pressure directional drilling, 3) dry open cut crossing and 4) isolated open cut crossing. Mitigation measures for these methods vary slightly and are provided below. **Punch and Bore** • In addition to the general mitigation measures provided above, the following additional measures are recommended: – A punch or bore crossing can be conducted at any time of the year provided there is not a high risk of failure and it does not require in-water activities such as machinery fording. – Design the punch or bore path for an appropriate depth below the water body to reduce the risk of exposure due to natural scouring of the stream bed. – The removal of select plants may be necessary to access the construction site and to excavate the bell holes. This removal shall be reduced to the extent possible and kept within the utility right-of-way. – Excavate bell holes beyond the high water mark, far enough away from any water body to allow containment of sediment or deleterious substances above the high water mark: o When dewatering bell holes, remove suspended solids by diverting water into a vegetated area or settling basin, and reduce the risk of entry of sediment and other deleterious substances into the water body.		

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Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.3.2 Surface Water, Fish and Fish Habitat (cont'd)			o Stabilize waste materials removed from the work site (including bell holes) to prevent them from entering the water body. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs. o After suitably backfilling and packing the bell holes, vegetate disturbed areas. o If the excavation bell holes cannot be located as indicated above, consultation should occur with the RRCA and DFO to confirm if additional mitigation measures may be required. – Monitor the water body to observe signs of malfunction during all phases of work. **High Pressure Directional Drill** • In addition to the general mitigation measures provided above, the following additional measures are recommended: – Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation. – Design the drill path to an appropriate depth below the water body to minimize the risk of inadvertent release and to a depth to prevent the line from becoming exposed due to natural scouring of the stream bed. The drill entry and exit points are far enough from the banks of the water body to have minimal impact on these areas. – The removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the road or utility right-of-way. – Construct a dugout/settling basin at the drilling exit site to contain drilling mud to reduce the risk of sediment and other deleterious substances from entering the water body. If this cannot be achieved, use silt fences or other effective sediment and erosion control measures to prevent drilling mud from entering the water body. Inspect these measures regularly during the course of construction and make all necessary repairs if any damage occurs. – Dispose of excess drilling mud, cuttings and other waste materials at an adequately sized disposal facility located away from the water to prevent it from entering the water body.		

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Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.3.2 Surface Water, Fish and Fish Habitat (cont'd)			– Monitor the water body to observe signs of surface migration (inadvertent release) of drilling mud during all phases of construction. – Prepare an Emergency Inadvertent Release Response and Contingency Plan. **Dry Open Cut** • In addition to the general mitigation measures provided above, the following additional measures to employ for dry open cut crossings (dry water body) include: – crossings should be undertaken on days when precipitation is not expected – the tracked excavator should be working in the dry when excavating a trench – topsoil stockpiles should be reasonably distant from water bodies to preclude sediment inputs due to erosion of stored soil materials – water bodies should be backfilled with substrate material that is consistent with the existing substrate size and texture and should remain in/under the crossing – the water body bed and bank areas should be rehabilitated to pre-excavation condition – materials such as sand bags, straw bales, geotextile filters, and/or pumps should be readily available on-site so that the crossing can be completed in the dry in case of unexpected stream flow **Isolated Open Cut (Dam and Pump Crossings)** • Where a dry open cut crossing is not possible, in-water work should be completed via an isolated open cut crossing by de-watering the work area and diverting and/or pumping flows around cofferdams placed at the limits of the work area. • In addition to the general mitigation measures and the mitigation measures related to construction of a new culvert, the following measures are recommended during construction of an isolate open cut crossing of a water body: – crossings should be undertaken on days when precipitation is not expected – topsoil stockpiles should be reasonably distant from water bodies to preclude sediment inputs due to erosion of stored soil materials		

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Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.3.2 Surface Water, Fish and Fish Habitat (cont'd)			– water bodies should be backfilled with substrate material that is consistent with the existing substrate size and texture and should remain in/under the crossing – the water body bed and bank areas should be rehabilitated to pre-excavation condition – materials such as sand bags, straw bales, geotextile filters, and backup pumps should be readily available on-site in case of an unexpected increase stream flow.		
Section 3.4.1 Air Emission, Odour & Dust	• During construction, minor localized air emissions will occur from operating heavy equipment. • The engine exhaust from these vehicles, especially from those operating on diesel fuel, represent a source of particulate and other emissions (e.g., SO2, NOX, VOCs , PAHs, and CO2) from the construction site. • Traffic delays result in increased emissions from vehicles traveling slowly through construction zones. • The delivery of materials to construction sites can also generate significant amounts of emissions, especially for sites that are relatively far from material manufacturers. • Construction related traffic and various construction activities (e.g., earth moving, grading, and exposed areas) have the potential to create short-term nuisance odour and dust effects in the general vicinity of the Project Location.	• Minimize duration and magnitude of air emissions odour, and dust.	• The contractor should implement site practices during construction that are in line with the Environment Canada document 'Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities' (Cheminfo Services Inc., 2005.), which may include: – maintaining equipment in compliance with regulatory requirements; – protecting stockpiles of friable material with a barrier or windscreen in the event of dry conditions and dust; – dust suppression of source areas; and – covering loads of friable materials during transport. – the general contractor will avoid idling of vehicles and equipment when not necessary for construction activities – equipment and vehicles will be turned off when not in use unless required for construction activities and/or effective operation • Watering for dust control must not result in the formation of puddles, rutting by equipment or vehicles, the tracking of mud onto roads or the siltation of watercourses. • In terms of emissions from combustion engines, all construction equipment will meet the emissions requirements of the MOECC and/or Ministry of Transportation (MTO). This will assist in minimizing the Project's short-term contributions of greenhouse gases, odour, and other airborne pollutants.	• Effects from odour and dust and will be intermittent. • Air emission are permanent, but will have negligible adverse residual effects on ambient air quality. • With the implementation of the above mitigation measures, no significant adverse residual effects on air emissions, odour and dust are anticipated.	• All vehicles identified through the monitoring program that fail to meet the minimum emission and noise standards will be repaired immediately or replaced as soon as practicable. • The Proponent should review Project complaints on a regular basis and respond accordingly in a timely manner, in accordance with the Complaint Response Protocol. • Maintenance records of Project vehicles will be retained and made available for periodic review by the general contractor.

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Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.4.2 Environmental Noise	• Noise will be generated by the operation of heavy equipment and vehicles on-site and from increased vehicular traffic on Cornwall Centre Road. • Surrounding residents and businesses may experience a noise nuisance associated with construction activity. Construction noise may also disturb surrounding wildlife.	• Sound level of construction equipment to meet MOECC guidelines	• All engines associated with construction equipment will be equipped with mufflers and/or silencers in accordance with regulatory requirements of the Occupational Health and Safety Act. • Noise levels arising from equipment will also be compliant with sound levels established by the MOECC. • On-site construction activities would be limited to the hours between 7:00 AM and 7:00 PM on Sundays and Statutory Holidays in accordance with City of Cornwall Noise By-law 079-1996, unless otherwise permitted by the City of Cornwall. Through consultation with the Township, the Proponent will determine if timing restrictions should be applied during the construction phase of the Project. •	• Noise effects would be frequent, but would be short-term, intermittent and reversible. • Application of the recommended mitigation measures during construction should limit noise emissions to the general vicinity of the Project Location. • With the implementation of the above mitigation measures, no significant adverse residual effects from noise are anticipated.	• The Proponent should review Project complaints on a regular basis and respond accordingly in a timely manner, in accordance with the Complaint Response Protocol.
Section 3.5 Land Use and Socio-Economic Resources	• High wind, heavy rainfall, absence of vegetation and/or ground disturbance may result in surface soil erosion. • Taking 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). • Construction activity has the potential to alter the agricultural capacity of the land following decommissioning of the Project. • Improperly stripping, storage and replacement of topsoil can result in topsoil and subsoil mixing, compaction, rutting, and erosion, which 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.	• Minimize nuisance to surrounding landowners. • Preserve quality of agricultural lands.	• Consultation has been initiated, and will continue, with surrounding landowners to identify methods of minimizing disturbance to their property. • Where work is to occur within the RRCA regulated areas, consultation with RRCA will occur and the Proponent will apply for permits under O. Reg. 175/06 as required. • Erosion and sediment control structures should be installed on erosion susceptible surfaces. • To the extent feasible, construction activities should occur during drier times of the year. • Where stripping is undertaken, topsoil and subsoil should be stripped and stockpiled separately to avoid mixing. Topsoil depth should be confirmed prior to stripping so that the proper depth of topsoil is removed and replaced.	• Although some disturbance to adjacent land uses is unavoidable during construction, effects are anticipated to be short-term in duration, temporary, and would be minimized through the implementation of good site practices, transportation planning, and communication with surrounding landowners. • 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. The agricultural capability of the soil after proper decommissioning of the project is anticipated to be comparable to that prior to construction.	• The Proponent's on-site monitoring team should monitor the general contractors' implementation of the Traffic Management Plan, to verify that property access to residences has been maintained and that traffic is not being unnecessarily interrupted. • 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. • Erosion and sediment control structures should be monitored to maintain their effectiveness during construction and site clean-up and restoration. • Topsoil stripping and replacement should be monitored by a Soil Inspector to avoid mixing of topsoil and subsoil. • Exposed soils should be monitored for surface soil erosion and sedimentation of watercourses. If evidence of erosion or sedimentation is observed, proper controls should be implemented. • During construction activities, weather should be monitored to identify the potential onset of high winds or heavy rain. • Lands affected by heavy rainfall events should be monitored for wet soil conditions, to avoid the potential for topsoil and subsoil mixing. Construction activities should be temporarily halted on lands where excessively wet soil conditions are encountered. The Proponent's on-site inspection team should determine when construction activities may be resumed.

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Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.5 Land Use and Socio-Economic Resources (cont'd)				• Construction noise effects on game species are anticipated to be temporary and intermittent. • With the implementation of the above mitigation measures, no significant adverse residual effects on land use or socio-economic resources are anticipated.	
Section 3.6.1 Municipal Infrastructure	• There will be an increase in traffic on municipal roads during construction due to the commuting workforce, the transport of Project components, construction machinery, equipment and supplies, and to remove excess materials and waste from the Project Location. • The general contractor will develop and implement a Traffic Management Plan and the Proponent may negotiate a Road Use Agreement with the United Counties of Stormont, Dundas and Glengarry and the City of Cornwall to reduce the risk of accidents along the haul route.	• Minimize disturbance to municipal infrastructure.	• The general contractor will implement a Traffic Management Plan to identify and address specific traffic planning issues including the management of traffic and the delivery of materials. The Traffic Management Plan should include strategies governing movement of materials and personnel to, from, and within the Project Location; management of connection points between the Project Location and public roads; transport of solar panels and large loads; and dust and vehicle emission controls.	• The effect of constructing the various Project components is anticipated to have a limited, short term effect on traffic and roads during construction. • A minor temporary increase in local traffic is anticipated, however, with the implementation of the above mitigation measures, no significant adverse residual effects on municipal infrastructure are anticipated.	• The Proponent's on-site monitoring team should monitor the general contractors' implementation of the Traffic Management Plan to see that property access to residences has been maintained and that traffic is not being unnecessarily interrupted.
Section 3.6.2 Other Utilities and Infrastructure	• If utilities are not properly located and marked prior to construction, 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 may result in damage to equipment or the rail facility, or injury or death. More frequent railway crossings inherently increase risk.	• No interference with utilities and other infrastructure.	• Consultation has been initiated, and will continue, with Hydro One to discuss interconnection to the 44 kV overhead distribution line which is anticipated to be constructed in 2018 within the road allowance of Cornwall Centre Road. • The general contractor will be responsible for locating and marking existing pipelines and utilities on lands which may be affected by the Project. • Machine operators will be informed where electrical lines are present overhead or buried pipelines are present below the ground. Lines that may interfere with the operation of equipment will be aptly identified by the general contractor. • Consultation should occur with Canadian National Railway staff to advise them about the project and increased traffic and operation of large vehicles near the railway.	• With the implementation of the above mitigation measures, no significant adverse residual effects on utilities or infrastructure are anticipated.	• None required.

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Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.6.2 Other Utilities and Infrastructure (cont'd)			• Vehicle and equipment operators will obey all traffic controls. • The general contractor will implement a Traffic Management Plan to identify and address specific railway crossing safety.		
Section 3.7 Waste Material Disposal & Spills	• Improper disposal of waste material generated during construction may result in contamination to soil, and/or surface water resources on and off Project lands. • Litter generated during construction may also become a nuisance to nearby residences, if not appropriately contained and allowed to blow off the construction site. • Accidental spills of fuels or lubricants could result in contamination of soil and or groundwater if not properly contained.	• No contamination as a result of improper disposal of waste. • No spills.	• Waste materials will be stored on-site by the general contractor in appropriate containment facilities during the construction phase of the Project. Designated containment areas and the type of containment will be confirmed by the general contractor prior to construction. Small waste bins will be provided on-site during construction. Upon completion of construction activities, waste materials remaining on-site will be collected and properly disposed at an appropriate MOECC-approved off-site facility. Materials kept on-site during construction that may result in an accidental spills or release to the environment are limited to fuel and lubricating oils. Fuel will be stored on site in a double wall tank surrounded with bollards and emergency response equipment at the stations (fire extinguishers, spill kits, etc.). • In the event of a fuel or lubricant spill on-site, the following procedures will be implemented: – Primary action at the spill location o Notify the construction supervisor. o Contain the spill by building earth dikes. o As per s.13 of the Environmental Protection Act, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of the prescribed regulatory levels should be reported to the MOECC's Spills Action Centre. – Secondary action o For a small quantity spill, absorbent pads will be carried in the driven equipment and machinery used on-site and would be applied. All absorbent pads will be disposed of in plastic bags and placed into a container marked for proper disposal.	• Accidental spills are anticipated to occur infrequently 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.	• 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 Proponent's on-site inspection team should inspect that the general 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.

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Table 5.1: Summary of the Potential Environmental Effects, Performance Objectives, Mitigation Measures, and Contingency Measures for the Construction Stage of the Project

Section	Potential Environmental Effects	Performance Objective	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 3.7 Waste Material Disposal & Spills (cont'd)		•	o For a larger quantity spill, a hazardous waste removal contractor will be mobilized to the site to remove contaminated material with a vacuum truck. o If any hazardous material reaches a waterway or ditch containing water, absorbent booms will be deployed to contain and spill. – Final cleanup o All contaminated soil or other contaminated materials would be removed and placed into plastic bags or other approved containers and disposed of off-site by an approved hazardous waste contractor. o Backfilling and grading will be performed to restore the spill area, as required. • Waste materials brought to the site that will be removed include equipment packaging, scraps, fuels and other lubricants and would require reuse, recycling, and/or disposal at an appropriate MOECC-approved off-site facility. • Sanitary waste generated during the construction phase would be collected via portable toilets and wash stations supplied by a licensed third party who would be retained prior to the start of major construction activities.		
Section 3.8 Public Health and Safety	• Potential safety concerns exist at locations where residents and vehicles may come in proximity to construction activities, particularly near Cornwall Centre Road. • Traffic safety is a concern during installation of the overhead connection line from the substation to the PCC.	• Zero project related injuries.	• Consultation with surrounding residents will occur in advance of construction commencement. • Contact information for a designated Proponent representative will be available prior to and during construction to address questions and concerns. • Access to residences and businesses should be maintained at all times. • Safety fence should be installed at the edge of the construction area where public safety considerations are required. • The CEMP will include a Health and Safety Plan, Emergency Response and Communications Plan, Training Plan, and Complaint Response Protocol.	• With the implementation of the above mitigation measures and adherence to safety policies and regulations, there is minimal increased or new risk to public health and safety from construction of the Project.	• The Proponent should review Project complaints on a regular basis and respond accordingly in a timely manner, in accordance with the Complaint Response Protocol.

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APPENDIX A: FIGURES

Stantec BARLOW solar energy centre

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.

0 200 400 metres

1:7,741 (At original document size of 11x17)

Notes

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

Project Location
United Counties of Stormont, Dundas and Glengarry

160950879 REVF
Prepared by AW on 2017-01-17
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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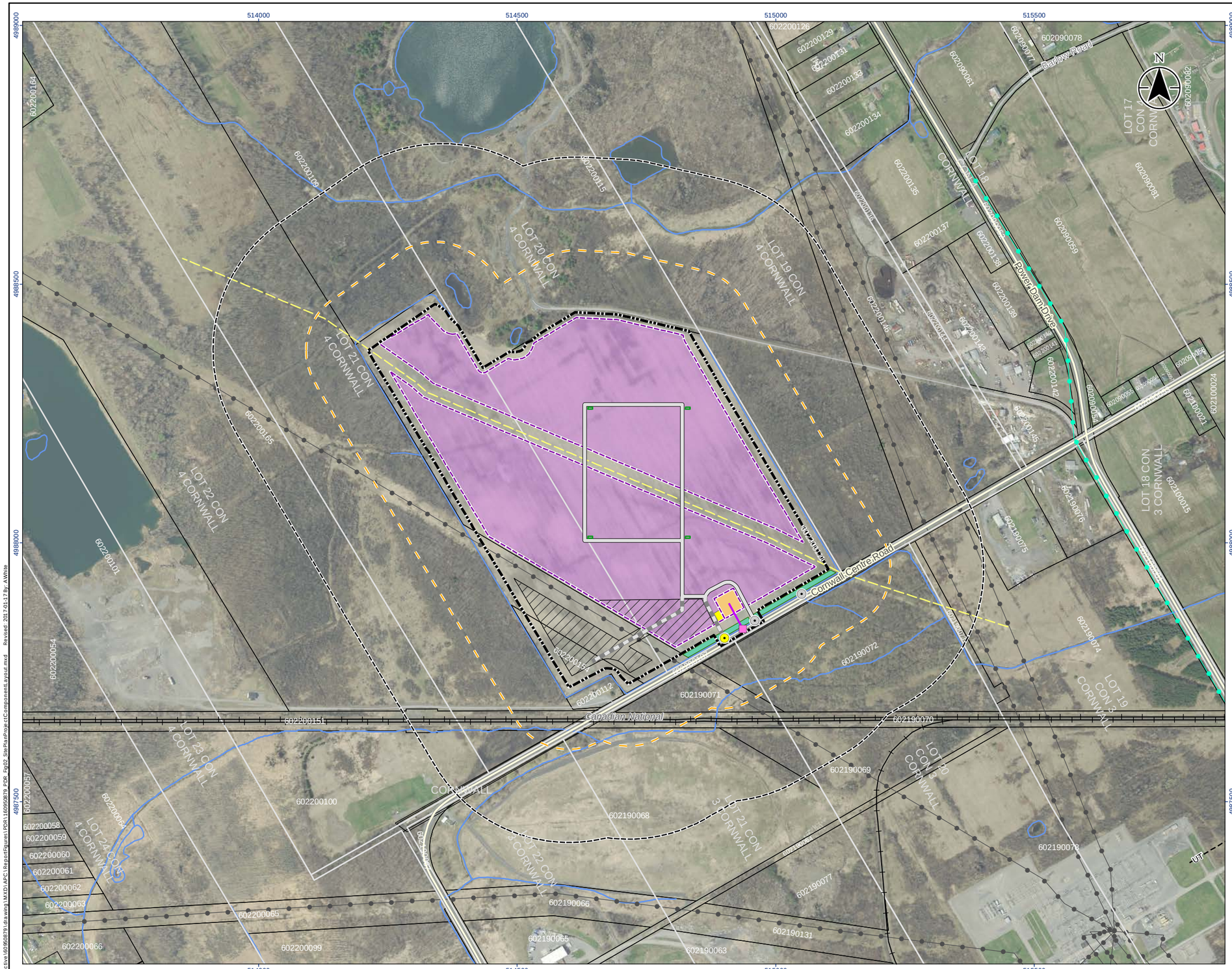

Stantec BARLOW solar energy centre

Legend

- Zone of Investigation (120 m from Project Location)

Proposed Project Components

- Point of Common Coupling
- Culvert (proposed)
- Connection Line
- Inverter Step-up Transformer and Inverter
- Permanent Access
- Temporary Access During Construction
- 300 m from Project Location
- Temporary Construction Laydown and Parking Area
- Buildable Area
- Operations & Maintenance Storage Area
- Project Location

- Solar Panel Area
- Substation
- Tree Planting Area

Existing / Natural Features

- Major Road
- Minor Road
- Culvert (existing)
- Distribution Line (Hydro One)
- Hydro One Transmission Line
- Other Transmission Line
- Pipeline
- Railway
- Watercourse
- Property Boundary and PIN
- Waterbody

0 200 400 metres

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

Notes

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

Project Location
United Counties of Stormont, Dundas and Glengarry

160950879 REVF
Prepared by AW on 2017-01-17
Technical Review by RN on 2017-01-02
Independent Review by RN on 2017-01-02

Client/Project
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BARLOW SOLAR ENERGY CENTRE

Figure No.
2

Title
Site Plan: Conceptual Project Component Layout

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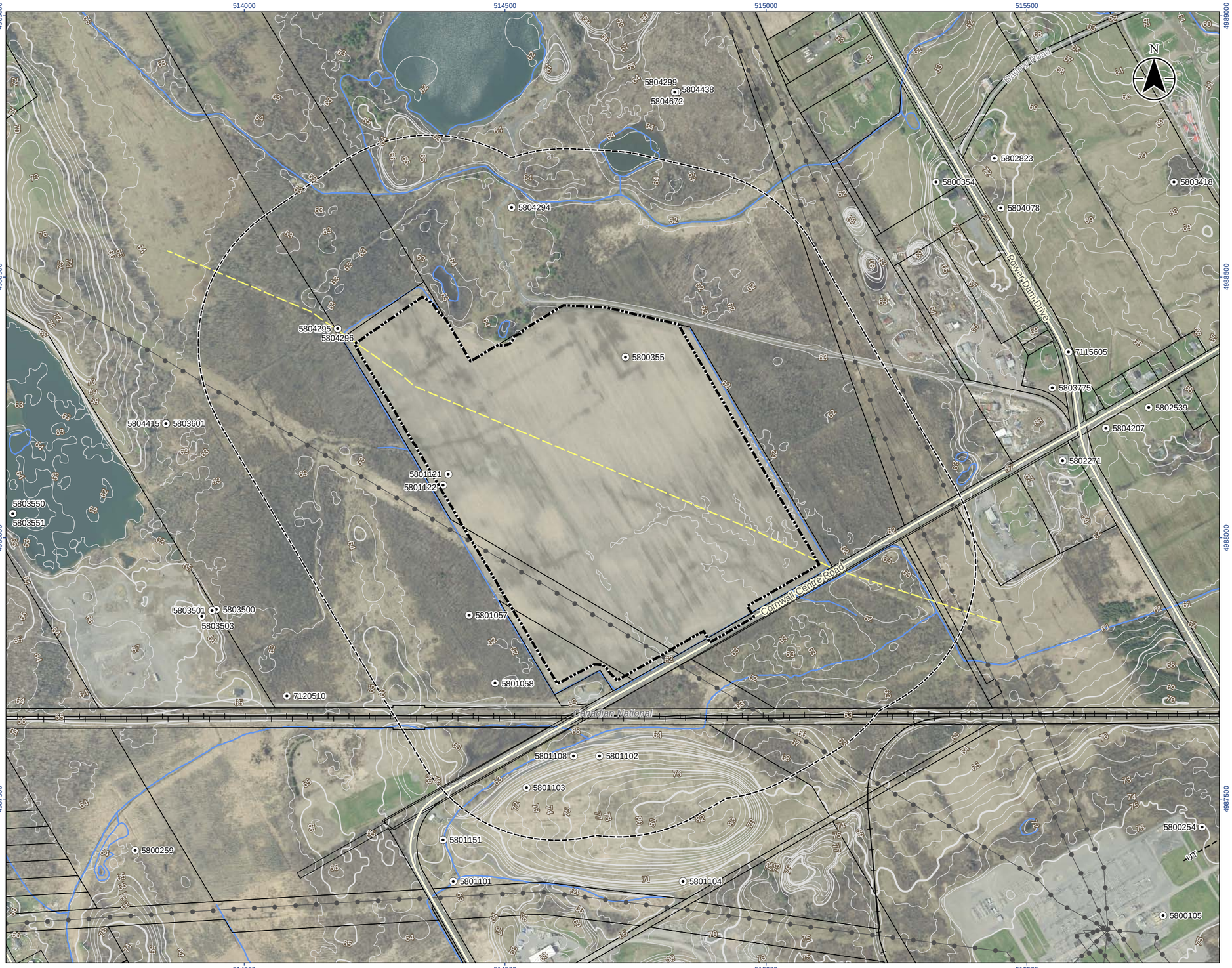

Stantec BARLOW solar energy centre

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).

0 200 400 metres

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

Notes

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

160950879 REVF
Prepared by AW on 2017-01-17
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.
3

Title
Socio-Economic Features

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Stantec BARLOW solar energy centre

Legend

- Generalized Candidate Significant Wildlife Habitat
- Significant Wetland
- Significant Woodland
- Zone of Investigation (120 m)
- Temporary Construction Laydown and Parking Area
- Solar Panel Area
- Substation
- Tree Planting Area

Proposed Project Components

- Point of Common Coupling
- Culvert
- Connection Line
- Inverter Step-up Transformer and Inverter
- Permanent Access
- Temporary Access During Construction
- 300 m Buffer of Project Location
- Buildable Area
- Operations & Maintenance Storage Area
- Project Location

Existing / Natural Features

- Contour (10 m Interval)
- Contour (5 m Interval)
- Contour (1 m Interval)
- Culvert (existing)
- Major Road
- Minor Road
- Distribution Line (Hydro One)
- Hydro One Transmission Line
- UT Other Transmission Line
- Pipeline
- 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.

0 200 400 metres

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

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

Project Location
United Counties of Stormont, Dundas and Glengarry

160950879 REVF
Prepared by AW on 2017-01-17
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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