



# PROJECT DESCRIPTION REPORT

## *Windsor Solar Project*

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February 2015

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## **1. INTRODUCTION**

Windsor Solar LP proposes to develop a solar facility with a maximum name plate capacity of 50 megawatts alternating current (MWac), located on the Windsor International Airport property in the City of Windsor, Ontario (**Figure 1**). The Windsor International Airport is owned by the City of Windsor and operated by Your Quick Gateway (Windsor) Inc. (YQG). The renewable energy facility will be known as the Windsor Solar Project (the “Project”).

Windsor Solar LP has initiated the Project with the Independent Electricity System Operator (IESO)<sup>1</sup>. The Project will require approval under Ontario Regulation 359/09 – Renewable Energy Approval (REA) under Part V.0.1 of the *Ontario Environmental Protection Act*.

This Project Description Report (PDR) provides an overview of the proposed Project including location, components, activities, potential negative environmental effects and applicable mitigation measures as detailed in **Table 1**. It is being submitted to the Ontario Ministry of Environment and Climate Change (MOECC) as required under the REA process as outlined in Ontario Regulation 359/09, and was made available for public review and comment prior to the final submission to the MOECC. Other reports that were made available for public review prior to this submission, which also form part of the REA submission to the MOECC, include:

- *Construction Plan Report*
- *Design and Operations Report*
- *Decommissioning Plan Report*
- *Noise Study Report*
- *Natural Heritage Assessment (Records Review Report, Site Investigation Report, Evaluation of Significance Report and Environmental Impact Study)*
- *Water Reports (Water Assessment and Water Body Report)*
- *Stage 1 and 2 Archaeological Assessment*
- *Heritage Assessment Report*

These documents are also posted on the Project website:

<http://www.samsungrenewableenergy.ca/windsor>.

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<sup>1</sup> The IESO and Ontario Power Authority were merged as of January 1, 2015.

Table 1: Checklist for Requirements under O. Reg. 359/09 – Project Description Report

Required Documentation	Location in Report
Any energy sources to be used to generate electricity at the renewable energy generation facility.	Section 5.3, <i>Energy Sources</i>
The facilities, equipment or technology that will be used to convert the renewable energy source or any other energy source to electricity.	Section 5.4, <i>Project Components</i>
If applicable, the class of the renewable energy generation facility.	Section 5.1, <i>Nameplate Capacity and Classification</i>
The activities that will be engaged in as part of the renewable energy project.	Section 5.5, <i>Project Activities</i>
The name plate capacity of the renewable energy generation facility.	Section 5.1, <i>Nameplate Capacity and Classification</i>
The ownership of the land on which the Project Location is to be situated.	Section 5.2, <i>Land Ownership</i>
If the person proposing to engage in the Project does not own the land on which the Project Location is to be situated, a description of the permissions that are required to access the land and whether they have been obtained.	Section 5.2, <i>Land Ownership</i>
Negative environmental effects that may result from engaging in the Project.	Section 6, <i>Description of Environmental Effects</i>
An unbound, well-marked, legible and reproducible map that is an appropriate size to fit on a 215 millimetre by 280 millimetre page, showing the Project Location and the land within 300 metres of the Project Location.	<i>Figures 2, 3</i>

**2. THE PROPONENT**

Windsor Solar LP is coordinating and managing the approvals process for the Project. Windsor Solar LP is located at 2050 Derry Road West 2<sup>nd</sup> Floor, Mississauga, ON, L5N 0B9 (1-866-236-5040). Dillon Consulting Limited (Dillon) has been retained by Windsor Solar LP to prepare the REA application for the Project. The contact at Dillon is:

<b>Full Name of Company:</b>	<i>Dillon Consulting Limited</i>
<b>Prime Contact:</b>	<i>Michael Enright, Project Manager</i>
<b>Address:</b>	<i>1155 North Service Road West, Unit 14, Oakville, Ontario, L6M 3E3</i>
<b>Telephone:</b>	<i>(905) 901-2912 ext. 3401</i>
<b>Fax:</b>	<i>(905) 901-2918</i>
<b>Email:</b>	<a href="mailto:menright@dillon.ca"><i>menright@dillon.ca</i></a>

### **3. PROJECT LOCATION**

The proposed Class 3 Solar Facility is to be located within the YQG, Windsor International Airport property, in the City of Windsor. The overall optioned lands available for development consist of approximately 175 hectares (432 acres) and the proposed Project Location is generally bounded by Rhodes Drive to the north, Division Road to the south, Lauzon Parkway to the east, and Walker Road to the west. Of the optioned lands, approximately 128.3 hectares (317 acres) will be occupied by components to make up the Project. The geographic coordinates of the centroid of the proposed Project Location are as follows:

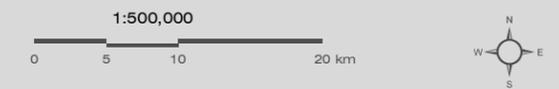
- Latitude: 42° 16' 43.07" N
- Longitude: 82° 56' 9.56" W

**Figure 1** shows the general location of the Project in Southwestern Ontario. The Project Location is defined in Ontario Regulation 359/09 to be “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”. The Project Location as shown on **Figure 2** identifies the maximum buildable area for the Project. Additional site plans are provided in the *Design and Operations Report*. **Figure 3** identifies natural features based on the *Natural Heritage Assessment (NHA) Records Review* that are within 300 m of the Project Location, and also identifies setbacks around these features for the purpose of assessing potential environmental effects.



**WINDSOR SOLAR PROJECT**

**FIGURE 1  
GENERAL PROJECT LOCATION**



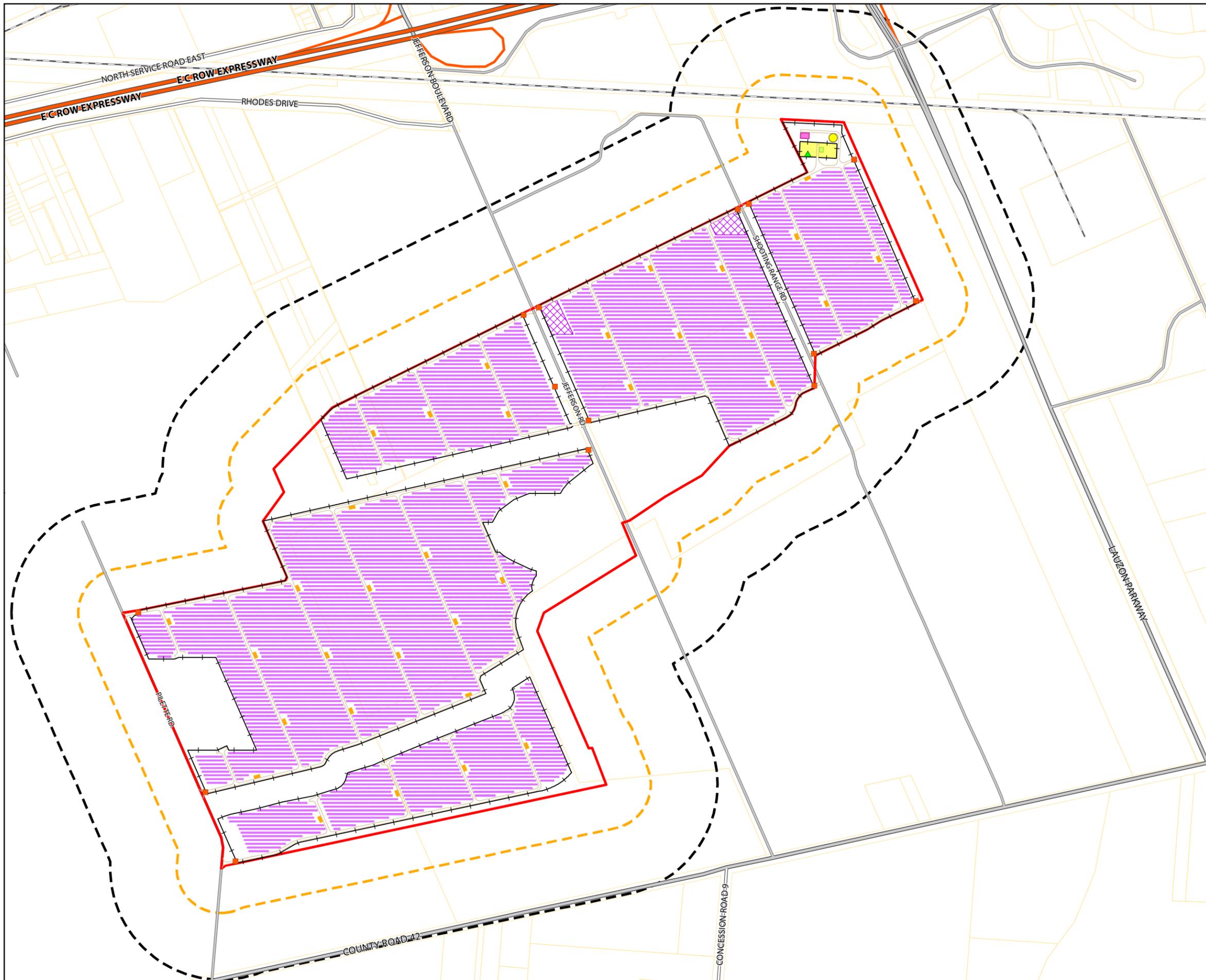
MAP DRAWING INFORMATION:  
DATA PROVIDED BY MNR

MAP CREATED BY: GM  
MAP CHECKED BY: MB  
MAP PROJECTION: NAD 1983 UTM Zone 17N

FILE LOCATION: I:\GIS\149152 - Samsung Windsor\mxd\PDR



PROJECT: 149152  
STATUS: DRAFT  
DATE: 9/22/2014



## WINDSOR SOLAR PROJECT

**FIGURE 2  
SITE PLAN -  
CONCEPTUAL COMPONENT LAYOUT**

- Gate
- ▲ Communication Tower
- Point of Common Coupling
- +— Fence
- Solar Panel Row
- Access Road
- Operations & Maintenance Building
- MV Station
- Substation Transformer
- Substation Yard
- Temporary Laydown Area
- Project Location Boundary
- Project Location 120 m Setback
- Project Location 300 m Setback
- Railway
- Parcel Boundary

1:10,000  
0 50 100 200 300 m



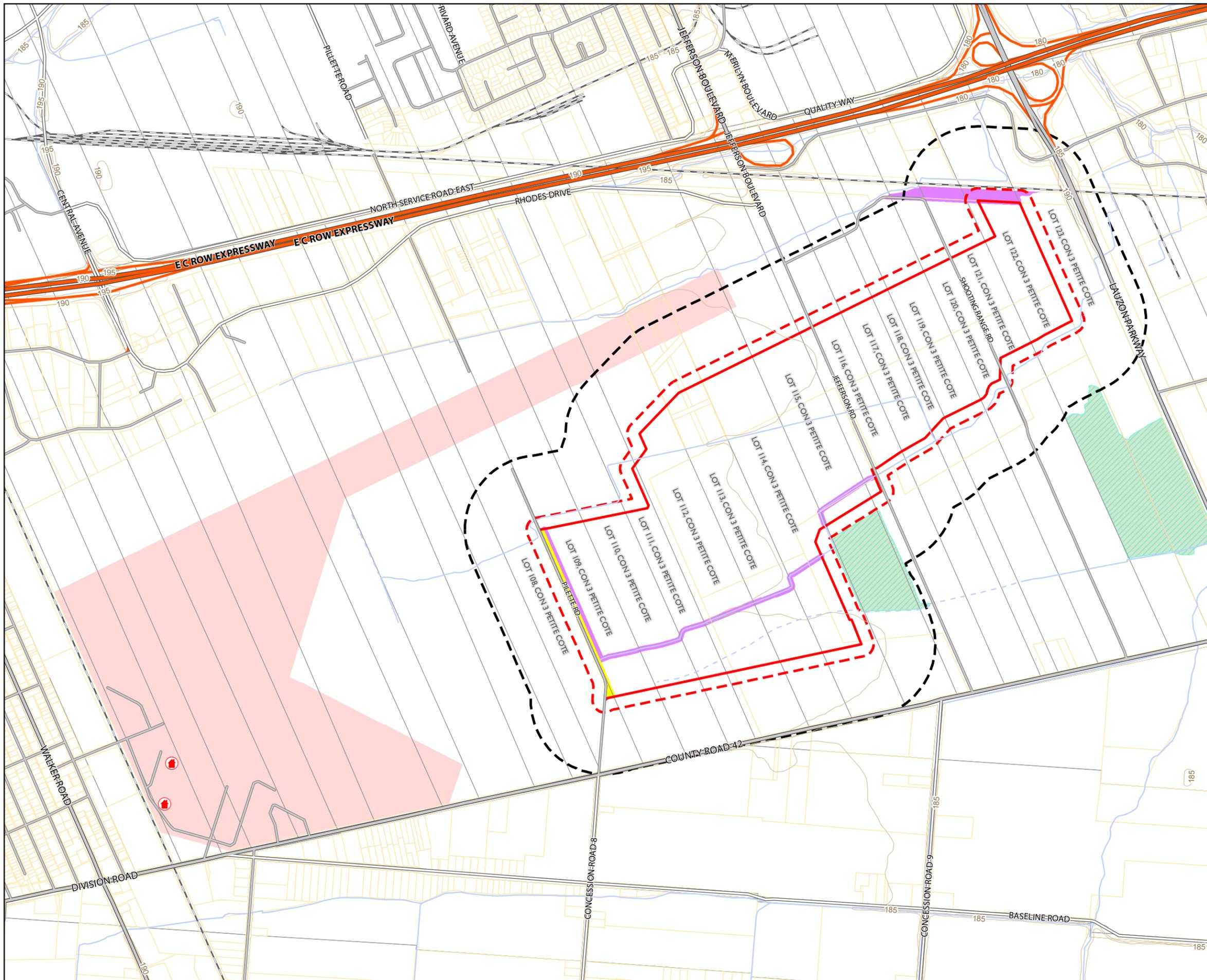
MAP DRAWING INFORMATION:  
DATA PROVIDED BY MNR

MAP CREATED BY: GM  
MAP CHECKED BY: JP  
MAP PROJECTION: NAD 1983 UTM Zone 17N

FILE LOCATION: I:\GIS\149152 - Samsung Windsor\mxd\cpl



PROJECT: 149152  
STATUS: DRAFT  
DATE: 11/13/2014

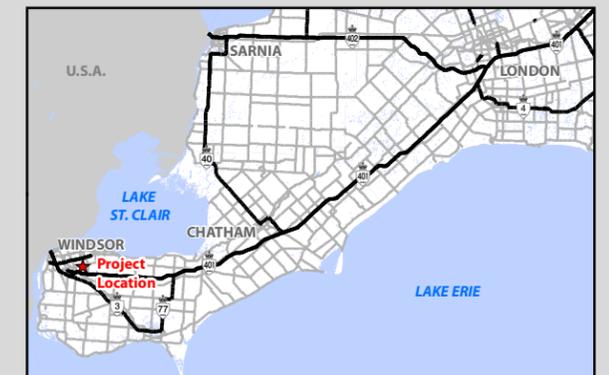


## WINDSOR SOLAR PROJECT

**FIGURE 3  
NATURAL AND CULTURAL  
HERITAGE FEATURES**

- Built Heritage Resource
- Cultural Heritage Landscape
- Railway
- Permanent / Intermittent Stream
- Ephemeral Drain
- 5 m Elevation Contour
- Project Location Boundary
- Project Location 50 m Setback
- Project Location 300 m Setback
- Lots/Concessions
- Parcel Boundary
- Significant Climbing Prairie Rose Habitat
- Significant Giant Ironweed Habitat
- Provincially Significant Wetland
- Woodland (Airport Woodlands- Environmentally Significant Area No. 39)

The Project Location is not on or adjacent to areas subject to Land Use Plans specifically the Niagara Escarpment, Lake Simcoe Watershed, Oak Ridges Moraine or the Greenbelt.



1:15,000

0 100 200 400 600 m



MAP DRAWING INFORMATION:  
DATA PROVIDED BY MNR, ERCA

MAP CREATED BY: GM  
MAP CHECKED BY: JP  
MAP PROJECTION: NAD 1983 UTM Zone 17N

FILE LOCATION: I:\GIS\149152 - Samsung Windsor\mxd\pdf



PROJECT: 149152  
STATUS: DRAFT  
DATE: 10/14/2014

#### 4. AUTHORIZATIONS

**Table 2** provides a list of authorizations (applicable permits, agreements, licenses, approvals and confirmation letters) that Windsor Solar LP expects may be required in addition to the REA. The necessary permits will be obtained prior to construction of the proposed solar facility.

Table 2: Possible Authorizations and Requirements for the Project

Authority, Agency or Governing Body	Requirement
Department of Fisheries and Oceans (DFO)	<ul style="list-style-type: none"> <li>• Fisheries Act self-assessment for new watercourse crossings, if works to update and/or replace any existing culverts is required.</li> </ul>
Transport Canada/YQG Screening	<ul style="list-style-type: none"> <li>• YQG Facility Alterations Permit (FAP)</li> <li>• Approvals related to Federal Aeronautical Zoning Regulations, Aerodromes and Air Navigation Ontario Region regulations</li> <li>• Compliance with Transport Canada’s Aerodrome Standards and Recommended Practices (TP312)</li> <li>• Approval under Canadian Aviation Regulation (CAR) Standard 621, Aeronautical Assessment Form</li> </ul>
NAV CANADA	<ul style="list-style-type: none"> <li>• Land Use Program/Approval</li> </ul>
Electrical Safety Authority (ESA)	<ul style="list-style-type: none"> <li>• Connection Authorization</li> <li>• Safety Inspection</li> </ul>
Hydro One (HONI)	<ul style="list-style-type: none"> <li>• Customer Impact Assessment - Integration of the Project within HONI and effects on customers</li> <li>• Connection Cost Recovery Agreement</li> </ul>
IESO	<ul style="list-style-type: none"> <li>• Authorization as market participant</li> <li>• Registration of facility</li> <li>• Registration of metering service</li> <li>• System Impact Assessment (SIA) - Integration of the Project with HONI’s transmission and distribution infrastructure</li> <li>• Connection Assessment Approval (CAA)</li> <li>• Power Purchase Agreement</li> <li>• Notice to Proceed</li> </ul>

Authority, Agency or Governing Body	Requirement
Ministry of Natural Resources and Forestry (MNRF)	<ul style="list-style-type: none"> <li>• MNRF Registry under Ontario Regulation 242/08 of the <i>Endangered Species Act</i>, if works to update and/or replace any existing culverts is required</li> </ul>
Ministry of Transportation (MTO)	<ul style="list-style-type: none"> <li>• Compliance with Road User Safety Policy and Corridor Management Permits, including Highway Traffic Act and Road Safety Regulations</li> <li>• Highway Entrance Permit(s), Transportation Permits (e.g. Oversize, Overweight Permit or Special Vehicle Configuration Permit)</li> </ul>
Essex Region Conservation Authority (ERCA)	<ul style="list-style-type: none"> <li>• Permit for development in natural hazard lands under Regulation 158/06 (Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses)</li> </ul>
Ontario Energy Board (OEB)	<ul style="list-style-type: none"> <li>• License to Generate under Section 57(C) of the <i>Ontario Energy Board Act</i></li> </ul>
City of Windsor (Landowner)	<ul style="list-style-type: none"> <li>• Lease Agreement</li> <li>• Building Permit(s)</li> <li>• Transportation and public safety permits (e.g. entrance permits, road occupancy permits, moving permits, encroachment permits)</li> <li>• Road Use Agreement</li> <li>• Entrance Permit(s)</li> </ul>
Industry Canada	<ul style="list-style-type: none"> <li>• Communication Frequency License</li> </ul>

## **5. PROJECT INFORMATION**

### **5.1 Nameplate Capacity and Classification**

The Project is designed to generate a maximum of 50 MWac of electricity. According to Part II, Section 4 of O. Reg. 359/09, the proposed Project is a Class 3 Solar Facility. The characteristics of a Class 3 Solar Facility, as described in the regulation, are as follows:

- The location of solar photovoltaic collector panels and devices are at any location other than mounted on the roof or wall of a building.
- The name plate capacity of the solar facility is greater than 10 kilowatts.

### **5.2 Land Ownership**

The proposed Project Location is entirely located on the YQG, Windsor International Airport property, which is wholly owned by the City of Windsor. The lands required to accommodate the solar facility will be leased by the City of Windsor to Windsor Solar LP for a period of 20 years.

### **5.3 Energy Sources**

The primary source of energy that will be used to generate electricity will be the kinetic solar energy of moving photons, which will be converted to electrons by the solar photovoltaic (PV) modules. This will create direct-current (DC) electricity, which is converted to AC electricity by inverters.

### **5.4 Project Components**

PV panels will be the technology used to convert solar energy into electricity. DC electricity generated from the panels will be collected and converted into AC electricity by inverters, which are contained in multiple Medium Voltage (MV) Stations. The AC voltage created by the inverters will be “stepped-up” to 34.5 kV through the multiple MV stations. The AC electrical energy output from the MV Stations will be collected via underground cables and connected to the main high voltage (HV) substation transformer where the voltage will be stepped up to 115 kV and connected to the IESO transmission grid.

Details about the project components, both temporary and permanent, that will be used to construct, operate, maintain and decommission the solar facility are provided below.

#### ***5.4.1 Solar Modules and Mounting System***

Approximately 197,000 to 208,000 solar panels of between 290-305 watts (DC) each will be installed for the Project. The estimated number of panels uses a conservative 1.2 DC to AC conversion rate. This results in a high-level estimate for the number of modules (panels) to be installed.

The panels will be aligned in rows approximately 10 m apart and will be mounted on 28 – 36 degree fixed tilt ground mounting system. Based on a geotechnical assessment, it is recommended that helical screw pier type foundations be used to support the PV racking configurations. Further details on the racking system and supporting structures are provided in the *Design and Operations Report*.

#### **5.4.2 Medium Voltage Stations and Equipment**

An MV Station houses multiple components, including inverters, and an MV transformer. The AC voltage created by the inverters will be “stepped-up” to 34.5 kV through the multiple MV stations. A total of up to 34 MV Stations will be required for the Project and 31 of them will include two 800 kW inverters and one MV transformer with a capacity rating of 1600 kilovolt-amperes (KVA), while 3 of the MV Stations will only contain one 800 kW inverter. The MV transformer consists of a three-phase high-voltage winding and two separate low-voltage windings each rated for 360 volts. It is anticipated that the inverter used will be a 800 kW model, or similar, and the MV Transformer used will be a 1600 KVA 34.5kV-360/360 V delta HV connection with an ungrounded wye low voltage connection. Additional details are provided in the *Design and Operations Report*.

#### **5.4.3 Electrical Collector System**

The AC electrical energy output from the MV Stations will be collected via underground cables and connected to the main HV substation transformer. The location of the cables will be completely within the Project Location boundary as shown in **Figure 2** and will generally follow the internal access roads and will be directionally drilled under any existing drains, where necessary.

#### **5.4.4 Substation and Other Equipment**

The collector system voltage will be stepped up to the IESO’s 115 kV transmission grid voltage at one main HV substation transformer to be located at the very northeast corner of the Project Location immediately adjacent to the HONI corridor, which contains an existing 115 kV transmission line. Specifically, the Project will be transmission connected to the IESO controlled grid and the Point of Common Coupling (PCC) will be immediately north of the substation yard, just south of this HONI corridor within the Project Location. HONI will be responsible for the necessary equipment from the PCC to the Point of Connection within its corridor. The substation HV transformer will be sized appropriately for a 50 MWac solar facility. Equipment supplied must be CSA approved, meet ESA requirements and be acceptable to HONI/IESO with respect to protection, control and SCADA requirements. DSTATCOM (as well as capacitors and reactors) may be required for HV transformer VAR compensation, which will be used to regulate the IESO transmission grid voltage to an established set point. The size will ultimately be confirmed by the IESO.

The substation will require an auxiliary source in the event that its power supply is interrupted from the grid. The auxiliary power source is assumed to be a secondary power supply from the Local Distribution Company. The load is to be assumed to be approximately 200kW.

#### **5.4.5 Access Roads**

The main entrances to the facility will be located off Division Road via Pillette Road and Jefferson Boulevard. Pillette Road and Jefferson Boulevard are existing roads that were formerly open public municipal roads. However, since they became part of the YQG, Windsor International Airport lands, they have been closed to public access with controlled gated entries. Other existing internal access roads will also be utilized. In addition, temporary and/or permanent gravel access roads will be constructed to facilitate installation and delivery of equipment as well as maintenance requirements during operations. The roads will be granular and 6 m wide and will be constructed as appropriate for the Project and engineering design.

#### **5.4.6 Fence**

For the safety of the public and to prevent vandalism, chain link fencing of standard height will be installed around project components. The fencing will be installed after further consultation with YQG and in accordance with ESA specifications. Typically, the ESA requires a 1.8 m high fence with three strands of barbed wire on top. Gates will be installed where the fence intersects access roads.

#### **5.4.7 Temporary Storage and Construction Areas**

During construction it will be necessary to designate/construct temporary storage areas for equipment and components. Two such areas are shown on **Figure 2**; however, pending the final design, any part of the Project Location may be used as temporary storage, which will be dependent on how construction will be staged.

#### **5.4.8 Control Building/Communication Tower**

A control building and microwave (communication) tower will also be installed to provide transfer of facility operation data to HONI during operations. These components will be located within the substation yard at the northeast corner of the Project Location, as shown on **Figure 2**.

#### **5.4.9 Operations and Maintenance Building**

An operations and maintenance building will be constructed as part of the Project and would provide a reception area, office(s) for operation staff, washroom, lunch room, warehouse and parking area. The location for the Operations and Maintenance building will be in the northeast corner of the Project Location near the substation yard, as shown on **Figure 2**. It is likely that temporary office buildings (e.g., portable trailers) will also be required during construction.

#### ***5.4.10 Water Crossings***

It is not anticipated that the Project will require installation of a new water crossings. Appropriate buffers have been applied to water bodies found within 300 m of the Project Location. For more information, please refer to the *Water Assessment Report* and *Water Body Report*. Additional details on water bodies within the Project Location are provided within **Section 6.3**.

#### ***5.4.11 Drainage and Erosion Control***

Construction activities associated with the Project are not anticipated to increase the flow of drainage from the Project Location. The *Stormwater Management and Preliminary Erosion and Sediment Control Plan* is appended to the *Design and Operation Report*. It is proposed that stormwater quality control will be achieved by a treatment train approach of source and conveyance controls. The proposed source control treatment will be provided by the establishment of low maintenance, vegetative surface cover over the site; the specific species will be determined during detailed design. The proposed conveyance system treatment will be provided by enhanced ditching with rock check dams. These ditches are designed to reduce the velocity of water within the ditch, promoting the settling of pollutants.

Specific details regarding surface drainage and any construction requirements, further to those defined at this stage of design, will be established as part of a detailed stormwater management plan, which will be prepared prior to construction and during the detailed design phase of the Project. The stormwater management measures will remain installed throughout the construction period and will be routinely inspected by the contractor. It is anticipated that the stormwater management measures identified will be required during the construction phase of the Project; however, the need for any permanent structures will be determined during detailed design.

#### ***5.4.12 Water Supply***

If feasible, water for use in toilets and sinks would be supplied from the municipal system. If not feasible, water would either be taken from an on-site well or be trucked in from a municipal supply using a local water hauler and stored in an above ground water tank within the building. Bottled water would be provided for drinking purposes.

#### ***5.4.13 Sewage Disposal***

The operation and maintenance building would contain a washroom and kitchen facilities. If feasible, sewage from the washroom and kitchen facilities would be directed to the municipal system. If not feasible, sewage would be directed to a holding septic holding tank, designed in accordance with the Ontario Building Code and City building standards. A level gauge would be

provided to monitor the need for emptying the tank by a licensed septic tank hauler and high level alarms with audible and visual warning would be provided to prevent overflowing.

## 5.5 Project Activities

The following subsections outline project activities during the construction, operations and decommissioning phases of the Project. The Project will not require the collection, transmission, treatment, storage, handling, processing or disposal of sewage, biogas, biomass or source separated organics or surface water. The operation of the facility will not discharge contaminants to the air. Some management of stormwater may be required. Further detail on stormwater management is provided in the *Design and Operations Report*.

### 5.5.1 Construction

It is anticipated that construction would last approximately 10 to 12 months. Pending receipt of all necessary approvals and permits, construction is tentatively scheduled to begin in late 2015. The following activities associated with construction of the solar facility will occur in the relative order in which they are presented below in **Table 3**. Additional details can be found in the *Construction Plan Report*. Pre-construction activities at the Project Location include: natural heritage fieldwork, geotechnical studies and archaeological and cultural heritage assessments.

Table 3: Construction Activities

Activity	Description
Survey and Staking of Project Location	Prior to the construction phase, the Project Location will be surveyed and staked to delineate the boundaries for fencing, access roads, excavations and foundation locations. Areas to be avoided will be fenced and/or flagged for public safety.
Clearing, ground levelling and grading	The Project Location will be minimally graded to facilitate construction activities based on a grading plan, and a stormwater management plan (see the <i>Design and Operations Report</i> ) will be implemented to maintain the general off-site drainage patterns as much as possible. Selective vegetation clearing may be necessary.
Drainage and Erosion Control	It is not anticipated that the construction of the Project will have a significant impact on stormwater peak flows at the Project Location. A detailed stormwater management plan will be developed prior to construction to address any temporary and/or permanent systems to manage flow and protect natural features during construction and operation. Temporary erosion and sediment control measures will be installed prior to and during site construction to protect natural features and other considerations identified in the <i>Natural Heritage Assessment</i> .
Installation of the	Fencing will be installed for the duration of the project lifespan along the

<b>Activity</b>	<b>Description</b>
perimeter fence and Security Lighting	<p>perimeter of the Project Location. The fence will be as required by the ESA and YQG. This stipulates a chain-link fence with three strands of barbed wire on top. Gated entrances will be installed at the site entrances. Temporary entrances may be in place during the construction phases. For security and maintenance purposes, lights may be installed near the entrance of the facility and task-specific lights will be provided as necessary. To avoid any potential impacts with the airport’s operational requirements, further consultation with YQG will continue to ensure there are no conflicts.</p> <p>During construction, the site will be monitored by the supervising construction staff and 24-hour on-site security will also be utilized. Lights will be installed near the entrance to the facility and task-specific lights will be installed where they are deemed appropriate based on YQG safety requirements.</p>
Construction of Access Roads and Installation of Temporary Power	<p>The main entrances to the facility will be located off Division Road via Pillette Road and Jefferson Boulevard. Pillette Road and Jefferson Boulevard are existing roads that were formerly open public municipal roads. However, since they became part of the YQG, Windsor International Airport lands they have been closed to public access with controlled gated entries. Other existing internal access roads will be utilized. In addition, temporary and/or permanent gravel access roads will be constructed to facilitate installation and delivery of equipment as well as maintenance requirements during operations. These granular access roads will be 6 m wide and constructed as appropriate for the Project Location and final engineering design.</p> <p>During the construction period, it is anticipated that on-site electricity will be obtained from the local distribution utility from nearby suitable distribution lines to provide the Project Location with auxiliary power as required to power equipment and for temporary construction offices, lighting and other purposes. If no distribution supply is available nearby, the requirements for an auxiliary generator will be determined once the layout of the solar facility is reviewed in detail.</p>

Activity	Description
Delineation of Temporary Storage and Construction Areas and Installation of Temporary Facilities	Temporary laydown and construction staging areas, totalling approximately 1 ha (2.5 acres), have been delineated on the north side of the Project Location, as shown on <b>Figure 2</b> . However, pending the final design, any part of the Project Location may be used as temporary storage, which will be dependent on how construction will be staged. These areas will be used for the construction office trailers, portable washrooms, first aid stations, vehicle parking, construction equipment parking, storage sheds, truck unloading/loading, waste disposal pick-up areas, and equipment and material lay-down. After site grading (discussed above) a layer of granular material will be installed to provide an adequate base for construction vehicles, heavy equipment and material laydown. A small portion of the area may be retained to accommodate vehicle parking for maintenance personnel and equipment storage. Additional storage and/or staging areas may be in place in the area between the Project Location boundary and the final fenceline (i.e., area of operational flexibility).
Construction of Foundations	Engineered foundations for the MV Stations, high voltage substation components and the operations and maintenance building will be constructed. The types of foundations will be determined based on the final engineering design, but based on the preliminary geo-technical study it is anticipated that conventional spread footings will be used.
Installation of Supports, Racking and PV Modules	The Project will consist of approximately 197,000 to 208,000 solar panels of between 290-305 watts (DC) each. The panels will be aligned in rows approximately 10 m apart and will be mounted on 28 – 36 degree fixed tilt ground mounting system. The types of foundations will be determined based on the final engineering design, but based on the preliminary geo-technical study it is anticipated that helical screw foundations will most likely be used.
Installation of Wiring and Inverters/Transformers	<p>The electricity generated by the PV panels will be in the form of direct current (DC). Inverters will be required to convert the DC output of the PV cells into alternative current (AC) suitable for supplying the electrical grid. DC wiring mounted to the back side of the racks is connected to a combiner box.</p> <p>From the combiner box, the DC current will be transmitted below ground to one of 65 inverters configured to 793kW contained in multiple MV Stations, which house multiple components, including inverters, and a MV transformer. The AC voltage created by the inverters will be “stepped-up” to 34.5 kV through the multiple MV stations. A total of 34 MV Stations will be required for the Project and 31 of them will include two 800 kW inverters and one MV transformer with a capacity rating of 1600 KVA, while 3 of the MV Stations will only contain one 800 kW inverter. The MV transformer consists of a three-phase high-voltage winding and two separate low-voltage windings each rated for 360 volts. It is anticipated that the inverter used will be an 800 kW model, or similar, and the MV Transformer used will be a 1600 KVA 34.5kV-360/360 V delta HV connection with an ungrounded wye low</p>

Activity	Description
	<p>voltage connection.</p> <p>The AC electrical energy output from the MV Stations will be collected via underground cables and connected to the main HV substation transformer. At the substation, the voltage will be stepped up to 115 kV and connected to the IESO transmission grid.</p> <p>The underground cables will be installed in trenches by a cable trenching machine or dropped in trenches created by an excavator. A tape will be layered above the underground cabling system to serve as a marker, as per ESA standard.</p> <p>After all major construction activities are completed the components will be tested. If any problems or issues arise, remedial corrections and calibration of equipment will be made prior to start-up.</p>
Clean-up of Work Areas	<p>After all major construction activities are completed work areas will be returned to their pre-construction condition or similar. All construction-related waste and excess materials brought to the site will be removed and reused, recycled, or disposed of as applicable by a licensed contractor in accordance with provincial guidelines. Trucks will be used to remove all non-permanent equipment from the Project Location, along with any debris.</p>
Site Landscaping and Vegetation	<p>Site restoration and reclamation is planned for as much of the Project Location as possible, including along access roads. The restoration and reclamation strategy may include re-contouring of the land to natural drainage patterns (in accordance with a stormwater management plan), management and replacement of subsoil (if applicable) and topsoil and re-vegetation. Disturbed areas may be seeded with a low-growing species such as clover, or allowed to re-vegetate naturally as needed, to help stabilize soil conditions, enhance soil structure and increase soil fertility.</p>

Construction activities will be conducted by licensed contractors in accordance with required standards and codes and all activities will abide by local laws. All construction-related activities will be conducted within the Project Location outlined in **Figure 2**. After all major construction activities are complete the components will be tested. If any problems or issues arise, remedial corrections and calibration of equipment will be made prior to start-up. During construction, fuel, oils or grease may be stored on site. These materials will be stored in accordance with a Spills Response Plan to be developed prior to the start of construction. Decisions on waste disposal or recycling during, and immediately after, construction will be made by the on-site contractor who will refer to the *Environmental Protection Act*.

### 5.5.2 Operation and Maintenance

The following activities, outlined in **Table 4**, are associated with the operation and maintenance of the solar facility. These activities will take place over the operational lifetime of the facility. More information is provided in the *Design and Operations Report*.

Overall, few activities are associated with the operational phase of the Project. The proposed solar facility will be monitored and managed remotely and minimal on-site activity is required for its daily operation. An operations and maintenance manual will be prepared prior to the start of construction of the Project. Security and minor maintenance are the only regular activities anticipated on-site, although, there could be some permanent on-site employees working out of the operations and maintenance building.

Table 4: Operations and Maintenance Activities

Activity	Description
Monitoring and meter calibrations	The facility will be monitored remotely twenty-four hours a day off-site to ensure proper power output and to alert the operations staff to potential issues. Most issues can be remotely diagnosed so that the correct individual(s) can be dispatched to the facility to correct any problems or potentially corrected by permanent staff working out of the operations and maintenance building.
Routine periodic maintenance and inspection of project components	Site visits will occur as scheduled to visually inspect the solar facility and Project Location and ensure that the facility is in proper working order. Activities that will occur during these visits may include data collection, regular maintenance (as described below) and any necessary minor repairs such as replacement of weathered electrical components. Security visits may also occur periodically. Some of these activities may be undertaken by permanent staff working out of the operations and maintenance building.  Transformers, inverters, panels and arrays will be visually inspected during scheduled visits.
Lighting	For security and maintenance purposes, lighting may be installed near the entrance of the facility and task-specific lights will be provided as necessary. These will be appropriately shielded or directed to avoid impacts to neighbours and will be inspected for burned/broken bulbs. Regularly scheduled maintenance will occur.
Cleaning of panels	It is anticipated that the rain would generally be sufficient for cleaning the solar panels; however, depending on the quantity and frequency of rain at the Project Location, the modules may require periodic cleaning. If required, water trucks would bring water to the site. It is not anticipated that chemical detergents will be used to clean panels.

Activity	Description
Periodic landscape maintenance	Short native vegetation may be planted once construction activities are complete and through further discussion with YQG. It will be necessary to maintain the land in such a way that vegetation does not shade or in other ways impact the solar panels. Regular scheduled maintenance will also occur to manage weed growth. This will be done in consideration of any seasonal limitations outlined in the NHA. It is not anticipated that herbicides will be used to manage vegetation.
Major maintenance	Unforeseen, large repairs are not anticipated. Should major maintenance be required it will be performed using existing roads and site access points.
Third party inspections and testing	Activities will be carried out as required by the local utility and other governing bodies in addition to any regularly scheduled inspections and testing.
Traffic	No major deliveries are anticipated for maintenance. Minimal vehicle traffic is associated with regular maintenance.
Drainage and erosion control	Stormwater runoff at the Project Location will be managed as per a stormwater management plan to be developed by the appropriate contractor prior to detailed design. This will be done with consideration to maintaining pre-construction drainage patterns and any recommendations or limitations outlined in the <i>Natural Heritage Assessment</i> or <i>Water Reports</i> . Implemented measures will be inspected during routine maintenance reviews.
Waste	The operation of the system does not produce waste of any kind. All debris as a result of maintenance or cleaning will be removed from the site immediately by the contractor. The only exception is sewage disposal from the washrooms and kitchen facilities, which will either be directed to the municipal system or to a septic tank designed to building code requirements.

During the operations phase, no hazardous materials will be stored on-site with the exception of oil for transformers, which will be adequately contained and accompanied by a Spills Response Plan, which will be developed prior to the start of construction.

### **5.5.3 Decommissioning**

Most of the materials used in a solar facility are reusable or recyclable, and some equipment may have manufacturer take-back and recycling requirements. Through the decommissioning phase of the Project the site will be returned to a functional state. The future land use of the Project Location is subject to change at the time of decommissioning from its current agricultural use. Although presently used for agriculture, the current Official Plan designation does not limit the land to that use. Due to the variability in the future use of the land, its use will be confirmed through future consultation with the City of Windsor and YQG prior to

decommissioning to determine the most appropriate action for restoring the land. Materials such as steel/aluminum from the racking and copper from the electrical infrastructure will be removed and recycled. The PV panels will be removed and either returned through manufacturers' recycling protocols or refurbished and recycled where possible. Any remaining materials will be removed and disposed of off-site at an appropriate location.

The following activities are associated with the decommissioning of the solar facility. These activities are expected to take place approximately 20 years after commissioning. Decommissioning activities are expected to take between 6-9 months and will occur in the relative order in which they are presented below. More information is provided in the *Decommissioning Plan Report*:

- Disconnection and removal of above and below-ground wiring.
- Removal of PV modules, steel/aluminum structures and electrical equipment.
- Removal of foundations and any maintenance buildings or other structures.
- Removal of access roads.
- Topsoil replacement as necessary.
- Site grading and rehabilitation as necessary.
- Removal of waste from the Project Location.

The final decision on waste disposal or recycling will be the responsibility of the on-site contractor who will refer to the *Environmental Protection Act*, or the applicable standards of the day before submitting a Generator Registration Report, or other applicable report, for each type of waste produced at the facility.

## **6. DESCRIPTION OF ENVIRONMENTAL EFFECTS**

The following subsections provide a summary of potential effects that may result from the construction, installation, operation, use and retirement of the solar facility at the Project Location and up to 300 metres beyond the Project Location. Appropriate mitigation and monitoring requirements to minimize negative effects will be evaluated and implemented, where necessary. Details on mitigation measures and monitoring are provided in additional reports, including the *Natural Heritage Assessment*, *Construction Plan Report* and the Environmental Effects Mitigation and Monitoring Plan within the *Design and Operations Report*.

### **6.1 Cultural Heritage and Archaeological Resources**

Stantec Consulting Ltd. was contracted to conduct Stage 1 and Stage 2 Archaeological Assessments for the Project. The assessment was conducted in May and June of 2014 and in accordance with the Ministry of Tourism, Culture and Sport (MTCS) 2011 Standards and Guidelines for Consultant Archaeologists. The Stage 1 and 2 Archaeological Assessments identified 23 sites within the Project Location with archaeological finds that are of value or interest. Eighteen of the sites were recommended for Stage 3 assessment prior to any development of the property. Based on the findings of the Stages 1 and 2 Archaeological Assessments, the layout was modified to avoid some areas that were recommended for the Stage 3 assessment. Of the sites where the Stage 3 assessment was completed, a few were subject to a Stage 4 assessment. Specifically, a Stage 3 Assessment has already been completed for 11 sites and 3 of the 11 sites were subject to a Stage 4 Assessment. The comment (clearance) letters from MTCS on all of the sites for Stage 3 Assessments and Stage 4 Preliminary Assessments have been received.

A Cultural Heritage Assessment was undertaken to identify resources of interest or value and evaluate their cultural significance. The assessment included background research, consultation with agencies, review of historical and archival documents, and field surveys. The assessment identified three potential heritage resources within the defined Heritage Assessment Area, but outside of the Project Location. The three resources included two aircraft hangars, and the YQG, Windsor International Airport grounds as a transportation landscape. All three were evaluated and found to satisfy the criteria for cultural heritage value or interest. The resources were evaluated in consideration of project activities and location. It was found that the resources are at a sufficient distance from the Project Location. Therefore, impacts are not anticipated to any of the resources as a result of the Project, and as such, no mitigation measures will be required.

### **6.2 Natural Heritage Resources**

Windsor Solar LP has undertaken an NHA consisting of a *Records Review*, *Site Investigation*, *Evaluation of Significance* and *Environmental Impact Study* to identify all natural features within the Project Location and lands within 120 m. The NHA identified the following natural features within 120 m of the Project Location:

- Windsor Airport Swamps Provincially Significant Wetland.
- Airport Woodlands (Environmentally Significant Area #39).
- Significant Climbing Prairie Rose Habitat.
- Significant Giant Ironweed Habitat.

Features falling within 50 m of the Project Location were evaluated for significance using procedures and criteria approved by the MNRF. Both the Climbing Prairie Rose and Giant Ironweed habitats are located within 50 m of the Project Location and were evaluated to be significant, based on the presence of the species. **Figure 3** is a summary of natural heritage features within and adjacent to the Project Location and is based on the determination made in the *NHA Evaluation of Significance*.

Based on the natural environment information collected, the Project Location was refined to avoid impacts to significant and/or sensitive natural heritage features. The layout of the Project has been developed to minimize its footprint and prioritize the protection of natural features. The potential negative environmental effects to significant natural features and wildlife may include:

- Change in land topography associated with vegetation clearing, grubbing and subsequent grading.
- Soil mobilization resulting in sedimentation of adjacent habitat.
- Change in surface water run-off volumes/patterns.
- Potential changes in water quality.
- Dewatering during installation of underground project components may affect local hydrological regime (groundwater).
- Overland dispersal of water during dewatering may increase surface runoff.
- Increased vulnerability of cleared areas to invasion by non-native species.
- Reduction in habitat.
- Obstacle to wildlife movement after construction of perimeter security fence.
- Disturbance/incidental mortality to wildlife species from project activities.

In consideration of the above potential environmental effects, mitigation measures have been proposed to address these effects and maintain the ecological integrity and functionality of significant natural features. Proposed mitigation and/or monitoring measures include:

- Erosion and sediment control measures prior to site clearing and regularly maintained until the Project is operational and vegetative ground cover is re-established.

- Re-vegetate land with low-maintenance, native vegetative ground cover or monitor the Project Location post-construction to ensure natural re-vegetation occurs.
- Development and implementation of a grading and water flow management plan which maintains pre-construction surface water flows to adjacent lands (quantity, quality, infiltrations, conveyance patterns and seasonality of water flow).
- Visual monitoring for and avoidance of wildlife species encountered during activities.
- Limit vehicular speeds on internal access roads and monitor for wildlife that may be on access roads.

The Project has been developed to retain the value of all significant natural features identified and to mitigate any negative effects that will occur. For the natural features deemed significant, the layout of the Project will allow for the persistence of all these natural features after this Project is constructed and operational.

### **6.3 Water Bodies**

Windsor Solar LP has undertaken a *Water Assessment* and completed a *Water Body Report* to identify all water bodies within the Project Location and lands within 120 m. Specific details related to the identification and mitigation of environmental effects are available in the *Water Body Report*.

As outlined in Sections 30 and 31 in Ontario Regulation 359/09, a records review and site investigation were undertaken to fulfill the requirements of the *Water Assessment Report*. In the records review, four potential water bodies were mapped within the Project Location and the surrounding 120 m setback. Results of the site investigation found that three of these four meet the definition of a water body as defined by Ontario Regulation 359/09, while one does not.

Each of these four potential water bodies and the results of the site investigation are discussed below:

- The Lappan Drain was found to occur as mapped in the records review. It is a channelized permanent stream that originates approximately 610 m west of the Project Location, enters the Project Location, flows generally eastward, exits the Project Location at its eastern boundary, and empties into the McGill Drain within the 120 m setback area.
- The McGill Drain was found to occur as mapped in the records review. It is a channelized stream that originates within the Project Location near its southwest boundary, flows generally eastward, exits the Project Location at its southeast boundary, forms a confluence with the Lappan Drain, continues eastward and flows into the Little River approximately 655 m east of the Project Location. From its origin to its confluence with the Lappan Drain, the McGill Drain is an intermittent stream. Downstream of the confluence, the McGill Drain is a permanent stream.

- The Rusette Drain was found to occur as mapped in the records review. It is a channelized permanent stream that originates northwest of the Project Location, flows generally eastward, enters the 120 m setback area at its northeast boundary, turns northward, exits the 120 m setback area, continues northward and empties into the Little River.
- The Rivard Drain was found to be a temporary channel for surface drainage that can be tilled and driven through and therefore is not a water body as defined by Ontario Regulation 359/09.

Potential negative effects to water bodies at and within 120 metres of the Project Location have been identified. No solar panels or transformer substation will be constructed within 30 m of a water body. Therefore, all potential negative environmental effects of the Project are considered to be indirect effects associated with the drainage area for each water body. None of the project activities are expected to have any direct or indirect effect on a water body provided the appropriate mitigation measures are implemented. Mitigation measures are proposed to minimize and/or eliminate negative environmental effects to water bodies within 300 m of this Project, and will be implemented during all phases of the Project. Details regarding mitigation measures can be found in the *Water Bodies Report*, *Construction Plan Report* and *Design and Operations Report*.

#### **6.4 Air, Odour and Dust**

Once operational, the solar facility will not create dust, odour or emissions to the air. During construction, minimal increases in particulate matter (dust) will be experienced in the adjacent area, which is predominantly agricultural to the south and east, and predominantly employment uses (industrial/office/commercial) to the north and west. Residential developments are also located within the adjacent area.

Additionally, there will be emissions from the diesel engines of construction machinery and equipment which may cause temporary impacts to local air quality.

Given the current use of this area as an airport facility, the impacts will be localized and temporary in nature and are not anticipated to have a residual impact on regional air quality or climate change. Appropriate air quality mitigation measures will be implemented during construction. The anticipated impacts on air quality will be minimal from construction in comparison with daily emissions produced by airport operations.

Due to the proximity of the solar facility to the YQG, Windsor International Airport, consultation will continue to take place with YQG to determine if there are any potential concerns on airport operations as a result of potential construction dust.

The following air quality mitigation measures will be implemented during construction where appropriate:

- vehicle idling will be minimized where possible in order to minimize particulate matter from vehicles and equipment.

- equipment will be maintained in good working order.
- vehicular traffic will be minimized on exposed soils and high traffic areas will be stabilized with fresh gravel.
- gravel roads will be watered down as required to reduce dust during construction.

## **6.5 Noise**

During the construction period, which is expected to be 10 to 12 months, construction activities may lead to elevated levels of noise in the area. Noise levels within the City of Windsor are governed by Bylaw 6716. Construction activities resulting in noise emissions will typically take place during normal business hours. Should work need to be conducted on weekends, this work will be done in accordance with local regulations and policies to minimize disturbance to the surrounding community. Additionally, mitigation measures will reduce the impact of construction noise on surrounding land uses (e.g. maintaining equipment in good working order, and limiting vehicle idling where possible). Minimal noise (vehicles, spray washing) could also be experienced by nearby receptors during times of periodic maintenance. Efforts will be made to minimize this noise and the Project will comply with applicable By-laws and restrictions

Once the solar facility has been constructed and is operational, the only noise generated will be from the MV Stations and main substation transformer. This equipment has been located so as to minimize noise impacts on receptors and noise levels have been modelled to confirm that regulated noise levels are met. Based on the results of the *Noise Study Report*, the Project complies with the MOECC environmental noise guidelines without needing additional mitigation measures. For more information, please refer to the *Noise Study Report*.

Minimal noise (e.g., vehicles, spray washing) may be experienced during the operations phase at nearby receptors during times of periodic maintenance. Given the proximity to the airport and the existing noise regime associated with the airport, noise from the Project's construction, operation and decommissioning should be minimal.

## **6.6 Land Use and Resources**

As noted, the proposed solar facility will be located within the boundary of the YQG, Windsor International Airport, which is located within the Sandwich South Planning District of the City of Windsor Official Plan. The Planning District covers 2,530 hectares and was annexed into the City of Windsor in 2003 and incorporated into the City Official Plan in 2007. The Project Location is designated "Airport" and "Future Employment Area" in the Official Plan and is adjacent to an "Open Space" designation in the southeast corner of the airport lands.

In 2010, the Windsor International Airport Master Plan was also completed, which is the overall planning document that guides the development of the Airport and assists the City of Windsor and the private sector in making land use decisions on surrounding lands. In the general vicinity of the Airport, land use is governed by Transport Canada TP1247E (Land Use in the Vicinity of

Airports) and recent modifications by NAV CANADA. Specifically, the registered zoning in place by Transport Canada is entitled *Windsor Airport Zoning Regulations*.

The majority of the Project Location is currently rented out and farmed with cash crops and/or consists of mowed fields. Low maintenance native vegetation will be grown beneath and between the panel rows to control erosion. The Project Location will be returned to its original or similar condition after decommissioning.

The proposed facility is physically low-profile and should be non-obtrusive to the surrounding community. Significant setbacks from the surrounding road network and adjacent property lines are being applied and the majority of the surrounding uses are employment and agricultural in nature with very few residential uses nearby.

The solar PV panels to be installed have the potential of creating glare and reflectivity issues for YQG activities. Solar PV panels are designed with anti-reflective coatings and surface texture, which reduces reflectivity and glare. There are currently no federally, provincially or municipally mandated requirements or guidelines regarding how to conduct the analysis of reflection/glare of sunlight from solar projects. In the absence of any Canadian guidelines, the United States Federal Aviation Agency (FAA) interim policy – *FAA Review of Solar Energy System Projects on Federally Obligated Airports* was referenced to undertake a *Glare Analysis* on potential impacts to airport operations.

The *Glare Analysis* concluded that based on the geometric configuration of the panels relative to the sunlight path and the inherently low reflectivity of the PV panels, the proposed Project will not result in *hazardous glare* conditions, in comparison to the FAA interim standard. Additional details can be found in the *Glare Analysis Report*, which is appended to the *Design and Operations Report*.

The proposed Project is also in the process of being reviewed by NAV CANADA under its Land Use Program process and the Project is also being screened by YQG under its Facility Alterations Permit (FAP) process. When the FAP process is complete, YQG will submit the FAP to Civil Aviation Services Ontario (CASO) through the Transport Canada website for final approval.

## **6.7 Provincial and Local Infrastructure**

Existing paved roads in the vicinity of the Project Location, including but not limited to Division Road, Jefferson Boulevard, Lauzon Parkway and Pillette Road may be required for use during the construction phase of the Project and may experience additional wear from heavy construction loads. Road damage will be repaired by Windsor Solar LP based on the Road Use Agreement between Windsor Solar LP and the City of Windsor. Periodic traffic disruptions are possible along the aforementioned roads, and some local roads, during the construction phase of the Project. Minimization of impacts will be addressed in detail through a traffic management study during detailed design.

Specific connection details to the IESO controlled grid are being considered by the IESO and HONI and no negative effects are predicted during the operational phase of the Project. Outside

of the Project Location, within the HONI corridor along the north side, there is an easement containing an existing natural gas pipeline owned by Union Gas Limited. All necessary on-site locates regarding existing underground infrastructure will be completed prior to construction.

Solar facility development activities will take place such that negative impacts to airport infrastructure will not occur. Ongoing communication between Windsor Solar LP and YQG will occur as needed.

## **6.8 Public Health and Safety**

Potential impacts to public health and safety are minimal but include those generally related to construction. Noise, vibration and dust during construction are the key potential causes of human health impacts. The level of noise, vibration, and dust emissions expected during construction are anticipated to be low, localized and temporary in nature and mitigation measures will be implemented to address or eliminate the impacts.

Temporary and permanent fencing will prevent unauthorized access and ensure public safety during the construction, operations and decommissioning phases. Appropriate signage, flagging and other safety measures will be undertaken to notify the public and ensure public safety. Applicable safety policies and procedures will be adhered to during the construction phase of the Project.

Consultation is ongoing with the YQG to determine any additional measures that may be required to ensure the safety of the adjacent operations.

An Emergency Response Plan and Emergency Communications Plan will also be prepared prior to construction and will outline the protocol to be followed in the event of an emergency at the Project. This plan will be developed in consultation with the local emergency services department from the City of Windsor and YQG. The Emergency Response Plan will provide key contact information for relevant responders, regulators, landowners and other stakeholders.

## **6.9 Areas Protected under Provincial Plans and Policies**

The Project is not located in areas subject to any Provincial Plans. Specifically, the Project does not lie within the Niagara Escarpment, Lake Simcoe Watershed, Oak Ridges Moraine or the Greenbelt. The Project supports the goals of the Province's *Green Energy and Green Economy Act, 2009* and *Long-Term Energy Plan (LTEP), 2013*.

## **7. BENEFITS OF THE PROJECT**

The generation of power from solar energy will displace approximately 50 MWac of electricity annually that otherwise may have been generated by fossil fuel-burning or non-renewable energy power plants. As a result, the energy generated will not contribute to climate change or emissions-related health impacts. There will be not only a direct benefit to the local economy in terms of the number of construction jobs that will be created, but also an economic spin-off to the local service sector (i.e. hotels, restaurants, etc.).