

**KINGSTON SOLAR LP
SOL-LUCE KINGSTON
SOLAR PV ENERGY PROJECT
PROJECT DESCRIPTION REPORT**

Submitted to:

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IMPORTANT NOTICE

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REV.	DATE	DETAILS OR PURPOSE OF REVISION	PREPARED	CHECKED	APPROVED
0	25/07/2011	Issued for public information per REA regulation	<i>Matt Evans</i>	<i>PHD</i>	<i>PHD</i>
1	08/12/2011	Issued for client review	<i>Fmo</i>	<i>PHD</i>	<i>PHD</i>
2	07/05/2012	Issued for use.	<i>Fmo</i>	<i>PHD</i>	<i>PHD</i>
3	14/09/2012	Issued for use	<i>Fmo</i>	<i>PHD</i>	<i>PHD</i>

EXECUTIVE SUMMARY

The Sol-luce Kingston Solar PV Energy Project ("the Project") is being planned by Kingston Solar LP (the "Proponent"). The Proponent proposes to develop a solar facility with a maximum name plate capacity of approximately 100 MW AC (megawatts of alternating current). The Project sites are to be located to the north and south of Unity Road and south of Mud Lake Road in the City of Kingston and Loyalist Township in Eastern Ontario. The Project Description Report has been prepared under the requirements of the Renewable Energy Approvals (REA) process as outlined in *Ontario Regulation 359/09* and is being made available for agency, Aboriginal and public review and comment. The *Project Description Report* provides a summary of the content, key issues and findings of all the REA reports. It discusses project location, components, activities, potential negative environmental effects and proposed mitigation measures and/or monitoring activities. It covers the construction, operation and decommissioning phases of the project. All of these topics are covered further in their individual reports, as part of the REA submission. This package includes the following reports:

- **Construction Plan Report** – This report includes a description of the following:
 - Construction activities;
 - The location and timing of the construction;
 - Potential negative effects that might be incurred during construction;
 - Mitigation measures to be implemented to avoid/minimize the identified effects.

- **Decommissioning Plan Report** – A description of the activities that are to be undertaken should the facility be decommissioned including:
 - Procedures to dismantle the facility;
 - Land restoration activities;
 - Procedures for waste management.

- **Design and Operations Report** - This report includes a description of the following:
 - A Site plan of the project showing all project components and their location;
 - A description of how the project will be operated;
 - A description of how environmental effects will be mitigated and an environmental effects monitoring plan;
 - Emergency Response and Communications Plan.

- **Natural Heritage Assessment and Environmental Impact Study (NHA/EIS) Report**– A description of the natural heritage features in the Project Location (birds, vegetation and terrestrial wildlife) and demonstration that the required REA setbacks from natural heritage features have been met and any potential effects mitigated.

- **Water Assessment and Water Body Report** – A description of the water bodies (i.e., permanent watercourses, intermittent watercourses, seepage areas or lakes) in the project location and demonstration that the required REA setbacks from significant water features have been met and any potential effects mitigated.

- **Noise Study Report** – A Noise Study Report was prepared to demonstrate that the facility is in compliance with regulatory requirements pertaining to the types of operations that may occur at the facility. The report was prepared in accordance with the MOE requirements as set out in NPC-232, NPC-233, and NPC-205.
- **Stage 1 and 2 Archaeological Assessments (AAs) and Cultural Heritage Assessment Report** – Stage 1 and 2 Archaeological Assessments (AAs) and a *Cultural Heritage Assessment Report* were prepared to outline the archaeological and cultural potential of the project location and mitigate any potential negative effects of the proposed project. Stage 1 and 2 Archaeological Assessment Reports were submitted to the Ministry of Tourism, Culture and Sport (MTCS). MTCS has provided written acknowledgement that the field work and reports were carried out in accordance with the Standards and Guidelines for Consultant Archaeologists.

Following the second public information centre, the following report would be prepared:

- **Consultation Report** – Summary of communication and consultation activities conducted with the public, government agencies and Aboriginal communities as part of the REA approval process including responses to concerns that are received. Also to be included is a summary of the communication and consultation activities that are planned to be undertaken.

The proposed Project is a low-profile and non-obtrusive use. Once constructed, the Project will have no moving parts and produce no significant off-site noise, no harmful emissions or any other form of waste product. Inverters will be placed on concrete pad foundations. The arrays will be spaced in order to avoid shading on the panels and a resulting decrease in electrical output. Due to the spacing between rows, it is anticipated that small native vegetation will be grown beneath and between the rows.

The *Natural Heritage Assessment and Environmental Impact Study (NHA/EIS) Report* identified the boundaries and assessed the significance of natural features occurring partially or wholly within 120 m of the Project Location. This document, provided under a separate cover, fulfills the requirements outlined in Sections 24 through 28, 37, and 38 of O.Reg. 359/09.

By way of a Records Review, information was gathered about the Study Area to identify known or potential natural features occurring within 120 m of the Project Location. Natural features include woodlands, wetlands, protected lands (provincial and national parks, or ANSIs), and wildlife habitat. Site Investigation confirmed the presence and boundaries of natural features reported in the Records Review which occurred within 120 m of the Project Location.

An Evaluation of Significance was conducted for each natural feature confirmed through the Site Investigation. Significant features were identified based upon current designation by the MNR, or by comparing the results of habitat quality studies of the feature to evaluation criteria

provided or approved by the MNR. Significant natural features identified within 120 m of the Project Location included wetlands, woodlands, and wildlife habitat.

The EIS identified and assessed potential negative environmental effects of the Project on natural features. The EIS further identified mitigation measures described in the Environmental Effects Monitoring Plan and Construction Plans to address any negative environmental effects.

The overall conclusion of this *Project Description Report* is that this Project can be constructed, operated and decommissioned without significant adverse residual effects to the natural or social environment through careful facility layout planning, the application of appropriate mitigation measures, and adherence to all regulatory requirements.

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1.0 INTRODUCTION

Kingston Solar LP (hereinafter referred to as the “Proponent”) proposes to develop a solar facility with a maximum name plate capacity of approximately 100 MW AC (megawatts of alternating current) in Eastern Ontario located in the City of Kingston and Loyalist Township (Figure 1-1 and Figure 1-2). The renewable energy facility is to be known as the “Sol-luce Kingston Solar PV Energy Project” (hereinafter referred to as “the Project”) and will be rated as a Class 3 Solar Facility. The Project will require a Renewable Energy Approval (REA) as per Ontario Regulation *O.Reg. 359/09* under Part V.0.1 of the *Ontario Environmental Protection Act*.

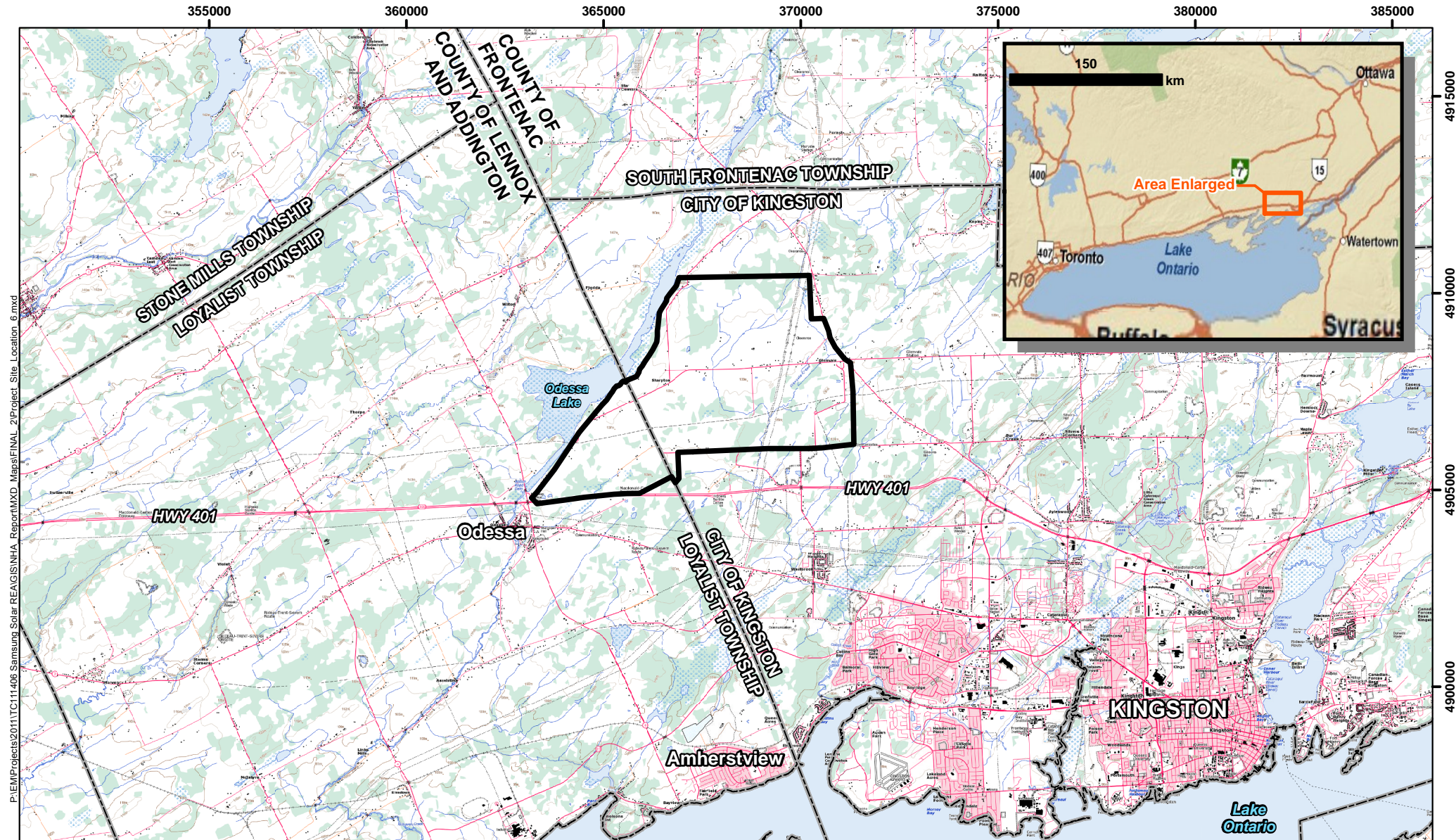
This *Project Description Report (PDR)* provides an overview of the proposed project including location, components, activities and potential negative environmental effects.

The development of the Project will help the Province of Ontario meet its goal of increasing the proportion of electricity generated from renewable sources. If approved, this facility would use photovoltaic (PV) technology to convert solar energy into electricity. Power generated by the Project will be fed into the provincial grid via a substation located adjacent to the Hydro One Networks Inc. (HONI) transmission line which crosses the study area.

The Project will consist of:

- Multiple sites consisting of arrays of Photovoltaic (PV) panels, with the cumulative capacity to generate up to 100 MW of power located as shown in Figure 1-2;
- Arrays mounted to aluminum or galvanized steel racking anchored to the ground or foundations;
- PV arrays grouped in blocks of approximately 1 MW and connected to an inverter station to convert the incoming power from direct current (DC) to alternating current (AC);
- A transformer at the inverter station that will transform the outgoing AC power to 34.5 kilovolts (kV);
- Underground and/or overhead collector lines to transmit power from the Project to the substation via the municipal road right-of-way. The collector line is estimated to be approximately 33 km in length;
- Transformers to transform the power to 230 kV for interconnection to the adjacent HONI transmission line;
- A maintenance and control building to be located at the substation site for operations and maintenance use; and
- Security fencing around Project site.

The Proponent will provide design, construction, operation, and decommissioning plan of the Project. The proposed schedule is to commence construction in early 2013 with completion by 2014.



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LEGEND

- Project Area
- Municipal / County Boundary

NOTES:
 - Background topographic DRG map extracted from Geogratis.ca, 1:50k NTS

**KINGSTON
 SOLAR LP**



SOL-LUCE KINGSTON SOLAR PV ENERGY PROJECT

Regional Study Area

Datum: NAD83
 Projection: UTM Zone 18N



PROJECT N^o: TC121402

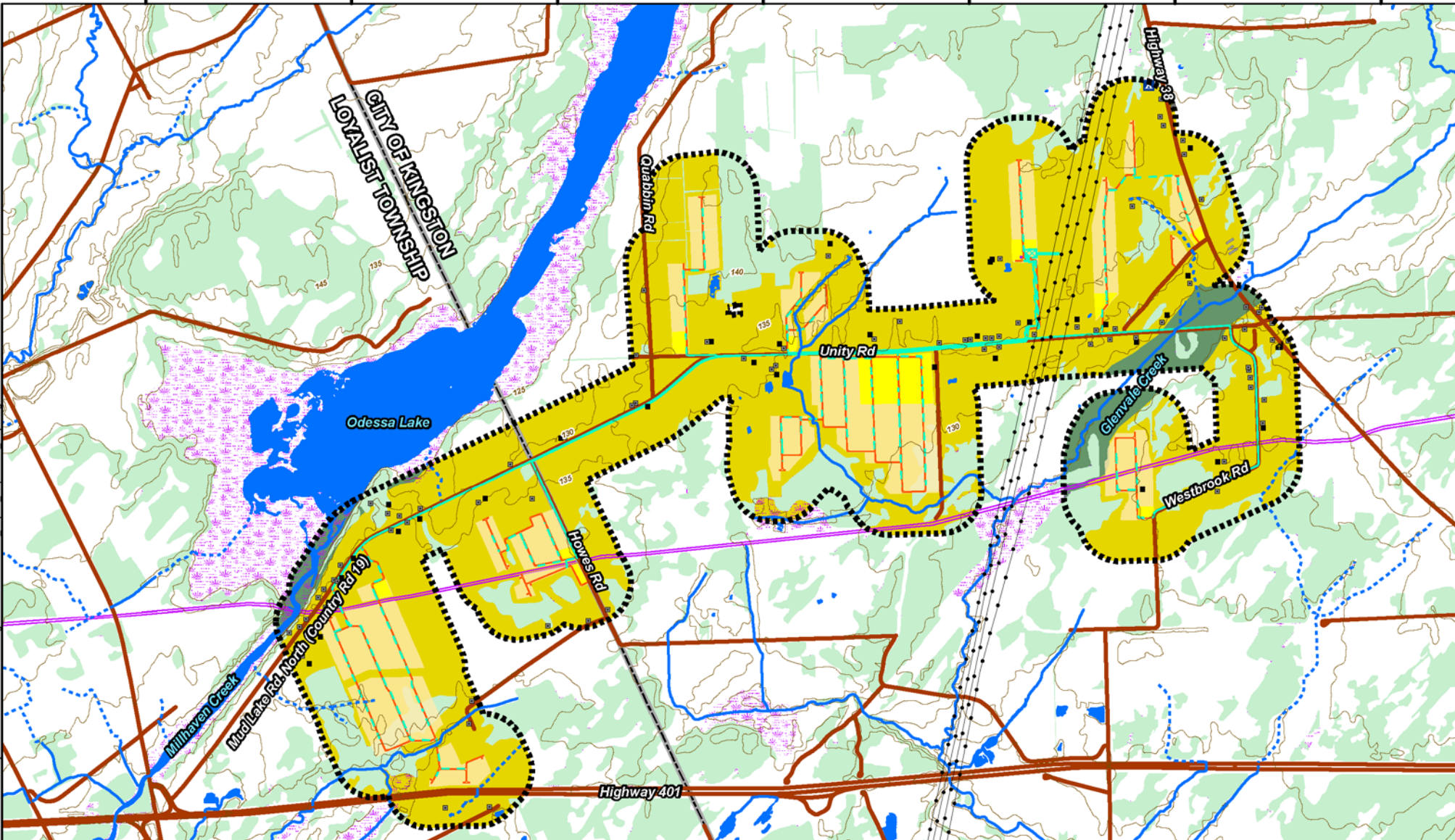
FIGURE: 1-1

SCALE: 1:135,000

DATE: September 2012



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4908000
4906500
4905000

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LEGEND

- Area within 300 m of Project
- Contours (5 m interval)
- Camp
- Building Point by Function**
 - Barn
 - Church
 - Other
 - Transmission Lines
- Watercourse/Waterbody**
 - Intermittent
 - Permanent
- Roads
- Municipal Boundary
- TransCanada Natural Gas Pipeline ROW (Approx.)
- Wooded Area
- Wetland Unit Area
- Land Use Category (Loyalist Township / City of Kingston)**
 - Rural / Country Area
 - Environmental Protection / Open Space-Environmental Area
- Layout Features**
 - Collector Line (Overhead)
 - Collector Line (Underground)
 - Access Road
 - Operations and Maintenance Building
 - Substation Location
 - Laydown Area
 - Development Area (Solar Panels)

NOTES:
 - Building type location extracted from National Topographic Database (geogratis.ca)
 - Transmission line, contours, watercourses wooded areas, wetlands, gas pipeline, roads and municipal boundary extracted from Land Information Ontario (MNR)
 - Land Use categories estimated from City of Kingston Official Plan, Schedule 2 and Loyalist Township Official Plan, Schedule A
 - Layout features are based on the April 20, 2012 layout.

KINGSTON SOLAR LP



SOL-LUCE KINGSTON SOLAR PV ENERGY PROJECT

Project Location

Datum: NAD83
 Projection: UTM Zone 18N



PROJECT N^o: TC121402

FIGURE: 1-2

SCALE: 1:40,000

DATE: September 2012



The Proponent retained AMEC Environment & Infrastructure, a Division of AMEC Americas Limited (AMEC) to assist in the preparation of studies and reports in support of a Renewable Energy Approval (REA) application for the Project. This *Project Description Report* has been prepared in accordance with Item 10, Table 1 of O.Reg. 359/09 and the Ministry of the Environment's (MOE's) "*Technical Guide to Renewable Energy Approvals – Chapter 4: Guidance for Preparing the Project Description Report*" (MOE 2011, 2012). Revisions to the Renewable Energy Approval (REA) regulation (O.Reg. 359/09) and the Technical Guide for Renewable Energy Approvals (Technical Guide, 2012) are currently under review and this *Project Description Report* has been prepared with consideration of the proposed regulations and revised Technical Guide.

This *Project Description Report* is one component of the REA application requirement for the Project.

1.1 Contact Information

Kingston Solar LP (the "Proponent"), is coordinating and managing the approvals process for the Project. The proponent would be pleased to receive any comments, concerns or questions about the project or this Project Description Report and is committed to public consultation throughout the REA process. Contact information for Kingston Solar LP is as follows:

Company Name: Kingston Solar LP
Company Address: 55 Standish Court, 9th Floor
Mississauga, ON
L5R 4B2
Company Website: <http://www.samsungrenewableenergy.ca/>
Prime Contact: A. José De Armas
Telephone: 905-501-5658 (1-855-359-2342)
Fax: 905-285-1852
Email: solucekingston@samsungrenewableenergy.ca

AMEC is the consultant responsible for the preparation of REA-related reports for the Project. The contact at AMEC is:

Full Name of Company: AMEC Environment & Infrastructure,
a Division of AMEC Americas Limited (AMEC)
Prime Contact: Rob Young
Address: 160 Traders Blvd. E., Unit 110
Mississauga, ON
L4Z 3K7
Telephone: 905-568-2929 ext. 4325
Fax: 905-568-1686
Email: rob.young@amec.com

1.2 Project Location and Maps

The Project will span a total area of approximately 261 hectares (ha). The proposed Project sites are to be located to the north and south of Unity Road and south of Mud Lake Road in the City of Kingston and Loyalist Township. Figure 1-1 shows the Project location in relation to Kingston, Odessa, and Highway 401. The Project Location Lots and Concessions are provided in **Appendix A**.

The “Project location” is identified 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 person is engaging in or proposes to engage in the project”. While facility components making up the Project location have been identified, their exact location within the marked property boundary has yet to be determined. Thus Figure 1-2 shows the Project location as the property boundary within which all project components will be located. Updated maps will be provided in subsequent versions of this PDR and more detailed site plan layouts will be provided in the *Design and Operations Report* at a future date. Figure 1-2 also identifies natural features and water bodies (based on the records review) within 300 m of the project location and identifies the setbacks around these features. A summary of Project location is provided in Table 1-1.

Table 1-1: Project Location Details

Description	The Project consists of approximately 261 hectares (ha) of land located as shown in Figure 1-1 and Figure 1-2
City and Township	City of Kingston, Loyalist Township
Longitude and Latitude (degrees)	Latitude: 44 18' N Longitude: 76 39' W
Site Control Status	The Proponent has entered into a Lease Agreement with the property owners on privately owned lands.
Land Use	Rural/agricultural
Land Classification	CLI Class 4 or higher
Agricultural Land Class	Much of the land in the Project location has a soil rating of 4 or higher where the agricultural potential is limited. Solar panels will be located on lands with low agricultural potential with a soils classification of 4 or higher.
Conservation Authority	Cataraqui Region Conservation Authority

All project components; including solar panels and electrical facilities such as inverters, transformers, substations and electrical lines, will be located on private land or municipal rights-of-way.

The Project lands are covered by two Official Plans (OPs): the Loyalist Township OP and the City of Kingston OP. Within the Loyalist Township portion, the dominant land use is rural and the community of Odessa is located to the southwest. The dominant land use within the City of

Kingston portion is rural. Other existing land uses within 120 m of the Project components include scattered residences, transmission line and pipeline infrastructure.

Most of the Project lands are either undeveloped or used for agriculture. The Project will be located on privately owned lands. Overhead power lines will connect the substation to the Hydro One Networks Inc. transmission line.

Figure 1-1 provides the geographical location of the proposed Project within the City of Kingston and Loyalist Township in Ontario and Figure 1-2 outlines the Project site. The Project boundary and details on natural features required REA setbacks, roads, facilities and other features within 300 m of the project boundary are provided on an aerial photograph in Figure 1-2.

1.2.1 Regulatory Framework

In addition to the REA the proposed Project will be subject to multiple permits, licences and authorizations at the provincial and municipal levels to facilitate the development of the Project. The ultimate applicability of all permits, licenses and authorizations will be determined based on the Project's detailed design.

1.2.2 Government of Canada

Under current legislation, a Federal Screening report is not expected to be required for the Project, as the Project is not anticipated to cause a 'trigger' under the *Canadian Environmental Assessment Act* (CEAA), such as a Harmful Alteration, Disruption or Destruction (HADD) of Fish Habitat under the *Fisheries Act*, application for project funding under a future program similar to *ecoEnergy for Renewable Power*, or require Authorization under the *Navigable Waters Protection Act*. On April 26, 2012, the federal government released the proposed *Canadian Environmental Assessment Act, 2012* which includes several revisions to the current *Canadian Environmental Assessment Act*. The impacts of these revisions and subsequent revisions to the Project are not known as corresponding regulations have not been released.

1.2.3 Government of Ontario

At the provincial level there are multiple permits and approvals that may be required to facilitate the development of the Project, in addition to the REA. Their ultimate applicability will be determined during the REA process and based upon the Project's detailed design. The following is a list of key permits and approvals that may be required; however additional permits may also be required.

Table 1-2: Key Provincial Permits and Authorizations

Key Permit / Authorization	Administering Agency	Rationale
Approval of Connection	Independent Electricity System Operator (IESO)	Electrical interconnect with IESO regulated network
Connection Assessment	IESO	Integration of project with IESO-controlled transmission system
Customer Impact Assessment	Hydro One Networks Inc. (HONI)	Integration of project with Hydro One and effects to customers
Connection Cost Recovery Agreement (CCRA)	HONI	Recovery of costs to grid operator of changes to allow connection
System Impact Assessment	IESO	Integration of project with IESO-controlled transmission system
Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses Permit	Cataraqui Region Conservation Authority (CRCA)	Work within floodplains, water crossings, river or stream valleys, hazardous lands and within or adjacent to wetlands. Projects requiring review, Fisheries Act authorization and/or assessment under the Canadian Environmental Assessment Act are forwarded to the Department of Fisheries and Oceans (DFO)
Certificate of Inspection	Electrical Safety Authority (ESA)	A record that electrical work complies with the requirements of the Ontario Electrical Safety Code.
Generator's License	Ontario Energy Board (OEB)	Generation of electrical power for sale to grid
Notice of Project Construction	Ministry of Labour (MOL)	Notify the Ministry of Labour before construction begins.
Special vehicle configuration permit	Ministry of Transportation (MTO)	Use of non-standard vehicles to transport large components
Transportation Plan	MTO	Adherence to road safety and suitability
Highway Entrance Permit	MTO	Entrance permit for new or upgraded road entrances onto a provincial highway; and, Interference or obstruction of the highway
Change of Access and Heavy/Oversize Load Transportation Permit	MTO	Compliance with provincial highway traffic and road safety regulations
Wide or excess load permit	MTO	Transportation of large or heavy items on provincial highways

1.2.4 Municipal

Several permits and authorizations may also be required from City of Kingston and Loyalist Township (Table 1-3).

Table 1-3: Key Municipal Permits and Authorizations

Key Permit / Authorization	Rationale
Municipal Consent, Work with the R.O.W	Required for works in municipal road allowances
Consent/Severance Application	Required if easements over private lands required
Road Cut Permit	May be required for access roads off of county roads or works to county roads
Pre-Condition Survey	Assessment of pre-construction conditions for engineering staff
Building Permit	Compliance with building codes
Entrance Permit	Entrance from county roads
Transportation Plan	Adherence to road safety and suitability
Additional Plans related to general engineering (e.g., siltation control, lot grading, plan of services, etc.), water, wastewater, storm water, transportation, and geotechnical	Required supporting information/plans required by City of Kingston and Loyalist Township

2.0 GENERAL REQUIREMENTS

2.1 Project Description Report Requirements

Ontario Regulation 359/09 (“Regulation”) sets out specific content requirements for the *Project Description Report*. The supplementary MOE guidance document *Technical Guide to Renewable Energy Approvals – Chapter 4: Guidance for preparing the Project Description Report* (MOE 2011) further elaborates on the contents of this report.

The following table provides the requirements of the *Project Description Report* as prescribed in the Regulation and the relevant sections where it can be found within this document.

Table 2-1: Project Description Report Requirements per Ontario Regulation 359/09

ID	Requirements	Section Number
1	Set out a description of the following in respect of the renewable energy project:	
	1. Any energy sources to be used to generate electricity at the renewable energy generation facility.	3.1
	2. The facilities, equipment or technology that will be used to convert the renewable energy source or any other energy source to electricity.	3.2, 3.4.1
	3. If applicable, the class of the renewable energy generation facility.	1.0, 3.5
	4. The activities that will be engaged in as part of the renewable energy project.	3.6
	5. The nameplate capacity of the renewable energy generation facility.	1.1, 3.6
	6. The ownership of the land on which the project location is to be situated	3.3 and Appendix A
	7. If the Proponent does not own the land, a description of the permissions that are required to access the land and whether they have been obtained.	3.3 and Appendix A
	8. Any negative and positive environmental effects that may result from engaging in the Project.	4.0
	9. 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.	Attached Unbound (see back sleeve)

For additional details in support of this *Project Description Report*, reference should be made to the following reports issued by the Proponent in support of its REA application:

- *Construction Plan Report;*
- *Design and Operations Report;*
- *Decommissioning Plan Report;*
- *Noise Study Report;*

- *Natural Heritage Assessment and Environmental Impact Study Report;*
- *Stage 1 and 2 Archaeological Assessment Reports;*
- *Water Assessment and Water Body Report; and*
- *Cultural Heritage Assessment Report.*

3.0 TECHNICAL PROJECT INFORMATION

3.1 Energy Sources

The Project is a solar electric generating facility which will collect the energy from the sun using photovoltaic (PV) panels and convert it to electrical energy. Direct Current (DC) electricity generated from the PV panels is converted to Alternating Current (AC) electricity by an inverter. The voltage level of the AC electricity produced by the inverter is stepped-up to distribution level voltages by a series of transformers.

No supplementary fuel sources will be used to generate electricity for the Project.

3.2 Nameplate Capacity

The Project will have a total nameplate capacity of up to 100 MW AC and will consist of approximately 426,000 PV panels, covering approximately 261 ha. Each panel produces a total of approximately 270 watts of Direct Current (DC) electricity. The actual electrical output at any specific time would vary, depending on solar intensity.

3.3 Land Ownership

The Project is spread across an area of approximately 261 hectares (ha). All of the land on which the solar panels will be located is privately owned with the Proponent having agreements in place with the landowners for leasing the panel sites. Information on the land parcels that will be used for the facility is provided in Appendix A.

All solar sites have been granted access through the lease agreement for the duration of the Project.

The substation site, as well as the operations and maintenance building, will be leased by the Proponent. Project site is currently under option with the respective landowner. Part of the substation land leased by the Proponent will later be transferred to Hydro One Networks Inc. (HONI) for construction and operation of the switchyard portion of the site.

The power lines leaving each solar site follow access roads and existing road allowances. These lines will be overhead or underground depending on location. In cases where lines are overhead, some lines may share existing, or new poles with distribution lines.

3.4 Facility Components

The basic components of the Project include:

- Multiple solar sites comprising:
 - PV panels;
 - an inverter station consisting of two 500 kVA inverters and transformer;

- access roads;
- electrical collector system (underground and overhead lines); and
- security fencing and gates.

- Substation site comprising:
 - transformer and ancillary equipment such as switches and controls;
 - control building;
 - stormwater collection and discharge infrastructure; and
 - security fencing and gates.

- Operations and maintenance building comprising:
 - office;
 - washrooms and kitchen;
 - maintenance and storage area; and
 - security fencing and gates.

No equipment in the facility design relate to groundwater and surface water supplies, air discharges and/or water and biomass management for the production of power. Water for the operations and maintenance building will be supplied either by an on-site well or trucked in from a municipal supply. The building will also have a septic tank system for sanitary sewage. Bottled water will be supplied for drinking purposes.

Construction of the Project components, and types of equipment that will be used, are described in the *Construction Plan Report*.

3.4.1 Generation Equipment

The generation equipment will consist of fixed ground mounted photovoltaic panels to generate approximately 100 MWAC of power. The Project will utilize approximately 426,000 PV panels. Each row of PV panels will be connected together in series forming a string, and the DC power will be brought to an inverter station via underground or overhead cabling. At the inverter stations, the DC electricity generated from each block of PV panels will be converted to AC electricity and the voltage increased to 34.5 kV by a transformer.

The outgoing AC power would leave the site by underground collector lines or overhead on utility poles. The generated power will be transmitted to the substation via collector lines which follow the municipal road allowance. At the substation the voltage would be increased by a transformer for connection to HONI's 230 kV grid network.

A summary of the basic specifications of the panels is provided in Table 3-1.

Table 3-1: Basic Solar Panel Specifications

Manufacturer	TBD
Model	TBD
Individual PV panel nameplate capacity (kW)	0.27 kW
Mounting	Fixed tilted ground mount racks
Total number of PV panels	approximately 426,000

3.4.1.1 Stormwater Management System

The solar land stormwater management system will be a passive system comprised of local vegetated ditches/swales alongside the access roads constructed through the area. Because the solar panels are mounted above the ground, infiltration, filtration through vegetation and other natural hydrologic processes will continue similar to existing conditions. Drainage will generally be directed to existing receiving systems (drainage paths, roadside ditches, etc.) as under current conditions. Therefore, a general area-wide stormwater treatment and/or detention systems are not required. The small increase in runoff from the gravel access roads will be attenuated and filtered through local ditches and no formal basins or other management techniques are required.

3.4.2 Ancillary Components

Access Roads

Gravel access roads will be installed from the edge of the municipal road to the solar panel sites. These will be approximately 6 m wide and initially permit access by construction vehicles but will be required throughout the life of the project for maintenance purposes. Considerable effort has been made to avoid intrusions by access roads into natural areas and to minimize the number of water crossings required to access the solar panel sites.

Footings and Pads

Major equipment consisting of transformers and switchgear will be installed on concrete pads and footings. Concrete pads would also be poured for each of the Inverter Stations. In addition, concrete foundations will be poured for attachment of solar panel racking in locations of poor soil conditions.

Substation (transformers and switchyard)

Circuits from the solar sites will be connected into the substation. At the substation, transformers would step-up the voltage and transform the power to 230 kV (nominal) to match the operating voltage of the adjacent HONI transmission line. The transformers will be constructed in concrete containment pits to retain spills in the event of a transformer leak. Upon completion of the installation of the electrical equipment, the substation will be interconnected to the provincial grid via the switchyard.

Temporary Laydown Areas

A central site will be selected by the Contractor for overall Project management and laydown for solar farm development. The area will be used for construction offices, parking, equipment, and materials storage.

Contractor trailers will be brought to each solar site as they are developed for storage of materials required at that site.

A separate laydown area will be included on the substation site for Contractor offices, parking, equipment, and materials storage during construction of the substation and operations and maintenance building.

Water Crossings

There are seven watercourses within 300 m of the Project location. Some of the access roads would need to cross watercourses. During the Project planning and site layout, the crossing of streams and drainage swales was avoided where feasible. Stream crossings will be required as identified in the *Water Assessment and Water Body Report*. The *Water Assessment and Water Body Report* is provided under a separate cover. Permanent culvert installations will be required along access roads and associated underground electrical collector lines that cross watercourses. All water crossings would require permit approval from the Cataraqui Region Conservation Authority.

Operations and Maintenance Building

A maintenance and control building will be located near the substation site for operations and maintenance use. This facility would provide warehouse, storage space, workshop spaces, administrative office and washroom areas. Preliminary engineering drawings for the facility are provided in **Appendix A** in the *Design and Operations Report*.

Overhead and/or Underground Collector Lines

Power from solar sites will be transmitted by underground and/or overhead collector lines to the substation. The 34.5 kV power lines leaving each solar site would follow the municipal road allowance.

Underground cables will be installed in trenches between the property line and the travelled portion of the roadway within the road allowance. Overhead power lines will be placed on existing poles where possible. Existing poles that cannot accommodate the additional power lines will be replaced with new poles and the existing cables will be transferred. Where trimming of vegetation is required within the road allowance, it would be completed in accordance with Municipal and/or HONI requirements. Following installation of poles and hardware the new cabling will be strung to complete the connection to the substation.

Fencing

Security fencing will be erected around the site perimeter prior to start of the Project. This would consist of 1.8 m high chain link fencing. Manual lockable gates will be supplied at all entrance locations. Detail project design may also include consideration of landscaping such as berms or vegetation screens where practical and effective to mitigate potential visual effects.

3.5 Renewable Energy Generation Facility Class

The proposed Sol-luce Kingston Solar PV Energy Project is considered to be a “Class 3 Solar Facility” according to O.Reg 359/09 Section 4. This section states that any solar facility with a capacity of over 10 kW that is not mounted on the wall or roof of a building shall be considered ‘Class 3’. The proposed project will have a nameplate capacity of approximately 100 MW AC.

The Ontario Regulation 359/09 classifies various types of renewable energy facilities to determine the approval requirements. The Project is defined as a Class 3 (>10 kW) ground mounted solar facility under Section 4 of the regulation based on the following criteria:

Class of Project

Class of Solar Facility	Location of Solar Photovoltaic Collector Panels or Devices	Name Plate Capacity of Solar Facility (Expressed in kW)
Class 3	At any a location other than mounted on the roof or wall of a building.	>10

3.6 Project Activities

3.6.1 Description of Regulated Activities

A general overview of the activities that would be engaged in during construction, operation, and decommissioning phases of the Project are provided in Table 3-2. More specific details on the Project phases and related activities are outlined in *Construction Plan Report*, *Design and Operations Report*, and *Decommissioning Plan Report* which are provided under separate covers.

Table 3-2: Key Project Activities

CONSTRUCTION	
Solar Facility Sites	Staking of site work area and installation of erosion and runoff controls
	Construction of temporary access roads
	Delineation of temporary work areas and installation of temporary construction facilities
	Completion of necessary site grading
	Installation of racking for solar panels
	Installation of solar panels
	Connection of solar facility to electrical collector system
	Restoration of temporary work areas
	Completion of permanent access roads
	Landscaping (final grading, topsoil replacement, re-vegetation, fence installation, etc.)
Collector System	Installation of underground and/or overhead collector lines on lease lands
	Installation of collector lines either underground and/or overhead on transmission line poles along municipal road rights-of-way
	Tree trimming and right-of-way clearing as required and approved by Municipality and/or HONI
	Installation of hydro poles within existing municipal road right-of-ways
	Installation of hydro poles for stream crossings
	Stringing and installation of the collector line conductors
Substation	Staking of site work area and installation of erosion and runoff controls
	Construction of temporary access roads
	Delineation of temporary work areas and installation of temporary construction facilities
	Grading of substation site
	Construction of concrete footings and pads
	Installation of transformers and ancillary facilities
	Landscaping (final grading, topsoil replacement, re-vegetation, fence installation, etc.)
	Connection to HONI grid
	Commissioning of the Project
Operation & Maintenance Building	Staking of site work area and installation of erosion and runoff controls
	Construction of temporary access road
	Delineation of temporary work areas and installation of temporary construction facilities
	Grading of site
	Construction of foundation and building
	Landscaping (final grading, topsoil replacement, re-vegetation, fence installation, etc.)

OPERATION	
Solar Panels	Periodic truck access for routine operational checks and maintenance
	Routine maintenance and repairs
	Meter calibrations
	Grounds keeping
Collector System and Substation	Periodic maintenance on collector lines and substation
	Inspection and maintenance of collector lines and poles annually
	Tree trimming along collector lines as required and approved by Municipality
	Substation vegetation control
	Testing and maintenance
DECOMMISSIONING	
Solar Panels	Removal of above-ground structures: solar panels, supporting racks, and infrastructure
	Removal of below-ground structures such as foundations as agreed to or as necessary in accordance with the land lease agreement
	Site grading (dependent upon new proposed use)
	Site restoration (may include re-vegetation and seeding)
Collector Lines	Collector line excavation and removal as necessary in accordance with the land lease agreement
	Removal of interconnection lines and poles
	Site restoration
Substation	Removal of foundations, equipment and ancillaries as necessary
	Removal of grid interconnection
	Site restoration (may include re-vegetation and seeding)
Operation & Maintenance Building	Building demolition and foundation removal
	Site grading (dependent upon new proposed use)
	Site restoration

3.6.2 Facility Phases, Timing and Scheduling

There are three phases in a solar Project lifecycle: (1) construction, (2) operation and (3) decommissioning. These Project Phases are described below.

The projected starting dates for Project construction, operation and decommissioning activities are provided in Table 3-3 below.

Environmental studies of the Project area commenced in January, 2011 and have been completed. Construction activities are short-lived, extending over a period of approximately 15 months. The construction schedule is detailed in the *Construction Plan Report*. Operation and maintenance activities would occur as required throughout the life of the Project, and are detailed in the *Design and Operations Report*. While the specific schedule for decommissioning

will be determined at the time of the decommissioning phase, the general staging of decommissioning are outlined in the *Decommissioning Plan Report*.

The PV panels used for the Project can be expected to be in service for the term of the 20-year Ontario Power Authority contract. Following the term of the contract, a decision will be made regarding whether to extend the life of the facility or to decommission.

Table 3-3: Major Project Phases and Scheduling Milestones

Construction	Operation	Decommissioning/Repowering
Early 2013 to Late 2014	Late 2014 to Late 2034	Late 2034 to Early 2035

3.6.2.1 Construction

The following activities associated with construction phase of the solar facility will take approximately 15 months and are scheduled to begin in 2013. They will occur in relative order in which they are presented (Table 3-4). More information is provided in the *Construction Plan Report*.

Table 3-4: Construction Activities

Activity	Description
Site clearing, ground levelling and grading	Selective clearing of trees and vegetation based on the results of the Natural Heritage Assessment. Minimal ground levelling and grading to ensure proper drainage and to facilitate construction activities.
Installation of storm water management measures	Based on the results of the Natural Heritage Assessment and Stormwater Management Plan temporary and/or permanent equipment to manage flow and protect natural features during construction/operation will be installed.
Installation of perimeter fences	Installation of temporary fencing to delineate construction area and installation of a permanent chain-link perimeter fence.
Construction of access roads	Temporary and/or permanent gravel access road construction to facilitate installation and delivery of equipment as well as future maintenance requirements.
Delineation of temporary storage and construction areas and installation of temporary facilities	Equipment laydown and materials storage areas will be delineated with fencing or other materials and temporary office buildings (trailers) will be constructed. If a permanent operations and maintenance building exists it will be constructed at this time.
Construction of foundations	Foundations for the solar panels and support structures will be constructed. The type of foundation (concrete, steel piles) will depend on the results of geotechnical studies and thus the construction methods vary.
Installation of supports and PV panels	Racking and support structures will be mounted on the foundations and solar panels will be attached. Drilling or piling to anchor the racking system may occur.
Wiring and inverters/transformers	Where underground wiring is used trenching may occur. Inverters and transformers will be set up and wiring will be interconnected.
Construction of transmission line and connection to provincial grid	This work will be undertaken by Hydro One Networks Inc. and will consist of erecting transmission poles and stringing electrical cables.



Activity	Description
Remediation and clean-up of work areas	Removal of all construction-related waste from the project site (reuse/recycle where applicable).
Site landscaping	Planting of vegetation suitable to the area and type of solar panels/equipment.

All construction activities will be conducted by licensed contractors in accordance with required standards and codes and all activities will abide by local laws and requirements. All construction related activities will be conducted within the Project boundary outlined in Figure 1-2. Testing and commissioning of the facility will occur over the last few weeks of construction. During construction, no hazardous materials, including fuel, oils or grease will be stored on site, although equipment may require their use. Disposal of hazardous wastes will only be required in the case of accidental spills and will follow the procedures outlined in the Spills Response Plan. 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*.

3.6.2.2 Operation and Maintenance

The following activities are associated with the operation and maintenance of the solar facility. These activities will take place over the lifetime of the facility. Additional details are provided in the *Design and Operations Report*.

Overall, few activities are associated with the operational phase of the Project. Five to 10 permanent on-site operators will be required for the daily operation of the facility. An operations report will be prepared and made available prior to the start of construction of the project. Security and minor maintenance will be the only regular activities anticipated on site.

Table 3-5: Operations and Maintenance Activities

Activity	Description
Monitoring and meter calibrations	Ongoing remote monitoring. Meter calibrations as needed.
Periodic maintenance and inspection of project components	Regular inspections for all project components will occur on a semi-annual basis. Routine maintenance. Security visits and measures will be conducted as needed.
Cleaning of panels	No water is required for operation and maintenance of the solar panels, or the electrical transmission component of the Project. Water is not anticipated to be required for solar panel washing as rain water and snow should be sufficient for the cleaning of panels. If required, water trucks would bring water to the Project site to supply the water. No chemical cleaning would be used.
Major or additional maintenance	As needed if equipment fails or is damaged and needs to be repaired or replaced.
Periodic landscape maintenance	Ground maintenance will take place (frequency to be determined) to ensure that weeds are contained and that the panels are not shaded.
Inspections and testing	Activities will be carried out as required by local utility and other governing bodies.

During the operation 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.

3.6.2.3 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 sites will be returned to a state similar to its original for future use. Materials such as steel 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 off-site at an appropriate location.

The following activities are associated with the decommissioning of the solar facility. These activities will 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. Additional details are provided in the *Decommissioning Plan Report*.

- Disconnection and removal of all overhead and underground wiring;
- Removal of PV panels, steel 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; and
- Removal of all waste from the project location.

The final decision on waste disposal or recycling will be contracted to the on-site contractor that will refer to the *Environmental Protection Act* before submitting a Generator Registration Report for each waste produced at the facility.

3.6.2.4 General Activities

Waste Generation

Construction

During construction, waste material would be generated at, and transported from, the Project Location. Waste produced during construction is expected to consist of material (e.g., excess fill, soil, brush, scrap lumber and metal, banding, plastic wrap removed from palletized goods, equipment packaging, grease and oil, steel, etc.) and a minor amount of domestic waste (i.e., garbage, recycling and organics).

Operation

During operation, the operation and maintenance building will produce small quantities of waste materials typical of an office setting, including recyclables and domestic waste. Waste materials would be temporarily stored at the operation and maintenance building and would be reused, recycled and/or disposed at an appropriate off-site facility. Litter generated during operations is expected to be minimal.

Decommissioning

Waste material similar to the construction phase may be generated during decommissioning scrap components (metals, equipment) will also be removed from site for recycling or reuse.

Air Emissions and Dust Generation

Construction

Construction of the Project may temporarily affect air quality due to the use of construction equipment and exposure of soils through excavation and grading. To control dust emissions the Contractor would: apply dust suppressants; enforce low speed limits for trucks on site; re-vegetate exposed soils as soon as possible; protect stockpiles of friable material in the event of dry conditions and excessive dust; consult local road authorities prior to application of dust suppressants on public roads; ensure dust generation is monitored and controlled in areas of sensitive land use.

Construction activities would 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, represents a source of particulate and other emissions.

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

Traffic delays also 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.

The application of recommended mitigation measures during construction (contained within the *Construction Plan Report*) should limit fugitive dust emissions to the work areas and limit combustion emissions.

Operation

During operations, minor localized air emissions would occur from the periodic use of maintenance equipment to repair Project infrastructure over the life of the Project and from

personnel vehicles and waste management haulers travelling to and from the operations and maintenance building during regular business hours.

There will be no sources of odour emissions from the Project.

Decommissioning

The activities described for the construction of the Project described above will also apply to the decommissioning phase. The application of recommended mitigation measures during decommissioning (similar to those contained within the *Construction Plan Report*) should limit fugitive dust emissions to the work areas and limit combustion emissions.

Noise Emissions

Construction

During construction, noise will be generated by the operation of heavy construction equipment at each of the work areas and associated vehicular traffic on-site. The audible noise at receptors beyond the construction areas is expected to be a minor, short-term disruption consistent with noise generated by any construction project.

Operation

A *Noise Study Report* has been completed for the Project in accordance with the MOE's document entitled "*Basic Comprehensive Certificates of Approval (Air) – User Guide*", requirements as set out in NPC-232, NPC-233, NPC-205, and O.Reg 359/09, and is provided as an appendix in the *Design and Operations Report*.

The solar panels themselves do not generate noise; however the two associated inverters will generate noise. During operations of the Project, sound will be generated by the periodic use of maintenance equipment in addition to personnel vehicles and waste management haulers that would travel to and from the operations and maintenance building during regular business hours.

Based on the analysis carried out in the *Noise Study Report*, there are no significant sources of vibration at the Project site and therefore, a vibration assessment is not required for this Project. Sound levels from the Project operations were modelled. The predicted sound levels from the Project noise sources are not expected to exceed the MOE NPC-232 guideline limits for Class 3 Areas. The project attributable noise at each point of reception is not expected to exceed the applicable guideline limits. Therefore, the Project will be in compliance with MOE NPC-232 guidelines with the proposed layout. No additional noise mitigation is required

Decommissioning

Noise sources and impacts during decommissioning and mitigation measures will be similar to those described above for construction.

Hazardous Materials

Construction

Hazardous materials are limited to fuels and lubricants that will be on-site for use in construction equipment. These materials will be stored in appropriate storage units during construction of the Project. Designated storage unit areas and the type of storage units will be confirmed by the Contractor prior to construction.

Operation

Hazardous materials to be used during the course of Project operation are limited to fuels, and other fluids associated with overall Project maintenance. No hazardous materials or wastes will be stored on-site during operation and maintenance of the Project. The Operation and Maintenance Contractor will be responsible for implementing environmental procedures during the operation phase of the Project for hazardous waste management. If there were any minor quantities of hazardous waste, such waste would be stored in a secure area until removal by a certified contractor with the appropriate manifests in place.

Decommissioning

Hazardous material use and storage during decommissioning will be consistent with that described for the construction phase above.

Sewage

Construction

During construction the site will be serviced by portable toilets and wash facilities.

Operation

Sewage from the washroom and kitchen facilities will be directed to a septic holding tank, designed to meet the Ontario Building Code and local building standards. A level gauge will be provided to monitor the need for emptying by a licensed septic tank hauler. High level alarms with audible and visual warning will be provided to prevent overfilling. A maintenance program will be designed based on the type of tank selected and would include regular monitoring and maintenance, as required. Septic tanks are typically constructed of fibreglass or concrete, and the tank selected for the Project would conform to local building code requirements and industry standards as required.

Decommissioning

During decommissioning the site will be serviced by portable toilets and wash facilities.

Stormwater Management

Construction

Construction activities would have the potential to impair surface water quality through the increased erosion from the site due to clearing vegetation and excavation of soils. The result can be increased levels of particulate in the stormwater runoff. While this potential adverse effect is common to most construction sites, best management practices have been developed to mitigate the effects. The mitigation measures to control stormwater runoff are detailed in the *Construction Plan Report*.

Operation

A *Stormwater Management (SWM) Plan* was developed for runoff control from the Project. The *SWM Plan* concluded that, based on the results of hydrologic modelling, the computed increases in peak flows from the Project (substation and solar sites) will be negligible and therefore 'quantity' control will be unnecessary. Therefore, the focus of the *SWM Plan* was stormwater 'quality' control. The *SWM Plan* is provided as an appendix in the *Design and Operations Report*.

The Project land area will be graded by earth moving equipment to the elevations determined by the storm water management and grading plans. The stormwater runoff from the access roads and the solar unit access roads will accumulate in the stormwater management ditches adjacent to the road surfaces and be sloped to berms constructed to control stormwater flows and limit the flow of stormwater into the nearby watercourses.

Because the solar panels are mounted above the ground, infiltration, and filtration through vegetation and other natural hydrologic process will continue similar to existing conditions. Drainage will generally be directed to existing receiving systems (drainage paths, roadside ditches, etc.) as under current conditions. Therefore, a general area-wide stormwater treatment and/or detention system is not required. The small increase in runoff from the gravel access roads will be attenuated and filtered through local ditches and no formal basins or other management techniques are required.

Decommissioning

Similar to the construction phase, decommissioning activities have the potential to impair surface water quality during the removal of equipment and site restoration. Mitigation measures to be employed during decommissioning will be similar to those detailed in the *Construction Plan Report*.

Water-taking Activities

Construction

There is potential for groundwater to be encountered during the installation of the underground collector lines, solar panel foundations, solar panel access roads, substation, and operations and maintenance building. As such, it is possible that some dewatering activities may be required when installing these project components. All water pumped during dewatering activities will be directed away from natural features and not directly into wetlands or watercourses. Mitigation measures to be employed during dewatering, if required, are detailed in the *Construction Plan Report*.

Operation

No water is required for operation and maintenance of the solar panels, or the electrical transmission component of the Project. Water is not anticipated to be required for solar panel washing as rain water and snow should be sufficient for the cleaning of panels.

The Project will not take water from ground or surface water sources for the generation of power. Water for toilets and kitchen facilities will be obtained from an on-site well or be trucked to site from a municipal supply using a local water hauler. This water will be stored in an above ground tank and replenished as necessary. Bottled water will be provided for drinking purposes.

The estimated usage of water will be minor and is expected to be less than 1,500 L/day and therefore no negative effects are predicted.

Decommissioning

No water taking will be required for the decommissioning phase.

4.0 DESCRIPTION OF POTENTIAL ENVIRONMENTAL EFFECTS

The effects of constructing, operating, and decommissioning a solar project and transmission systems is well understood and can be typically mitigated through well known and accepted techniques and practices.

Based upon agency guidance and AMEC's understanding of the potential effects of constructing, operating, and decommissioning a solar project and transmission systems, the following Project-specific issues and potential effects have been identified and are further analyzed as part of the Renewable Energy Approval (REA) application process. Please note that below is a summary of the potential effects during the construction, operation, and decommissioning phases of the Project. Detailed descriptions of all potential effects, mitigation measures, and monitoring plans are provided in the:

- *Construction Plan Report;*
- *Design and Operations Report;*
- *Decommissioning Plan Report;*
- *Natural Heritage Assessment/Environmental Impact Study (NHA/EIS) Report;*
- *Water Assessment and Water Body Report;*
- *Stage 1 and 2 Archaeological Assessment Report;* and
- *Cultural Heritage Assessment Report.*

The above reports are provided as separate documents for public review.

The following provides a brief description of the environmental effects that may result from engaging in the Project as outlined in the MOE's *Technical Guide to Renewable Energy Approvals: Chapter 4 - Guidance for Preparing the Project Description Report*, (MOE 2011 and 2012). A summary of the potential negative environmental effects as a result of the Project development, during all phases of construction, operations and decommissioning and the proposed mitigation measures to be employed is also provided in Table 4-1. Negative effects will be evaluated for mitigation and monitoring requirements to minimize impact. Details on mitigation measures and monitoring will be provided in subsequent reports.

4.1 Project Related Setbacks

A key component of the REA process is the establishment of common setbacks for all renewable energy facilities in the Province. In all cases the Project was designed to meet the mandatory setbacks within O.Reg. 359/09. Within the regulation there are some setbacks for which studies that identify potential adverse environmental effects and mitigation measures can be conducted in lieu of meeting the setback requirements. In some instances in the proposed design, the Project components are proposed within the defined setbacks for natural features, water bodies and property lines. In these instances, additional assessments have been conducted as per the requirements of O.Reg. 359/09 and results have established that impacts would be low or not expected. The results of the assessments are provided in the *NHA/EIS*

report which is provided under a separate cover and the *Water Assessment and Water Body Report*, which is provided as an appendix to the *Design and Operations Report*.

4.2 Natural Heritage Resources

A *Natural Heritage Assessment and Environmental Impact Study (NHA/EIS) Report* was completed for the Project. The *NHA/EIS Report* identified the boundaries and assessed the significance of natural features occurring partially or wholly within 120 m of the Project Location. It also assessed the effects of the Project components on the significant natural features within 120 m. The *NHA/EIS Report* is provided under a separate cover.

4.2.1 Wildlife and Wildlife Habitats

4.2.1.1 Construction

Disturbance to wildlife may occur during construction of the solar arrays, access roads, and electrical transmission components resulting from local vegetation removal, increased human activity, and increased traffic, noise and dust.

Clearing required for construction of Project components will remove 66.2 ha of vegetation consisting largely of regenerating agricultural lands with lesser amounts of woodland and hedgerow. Agricultural and unused open country account for 58 % of the Study Area and as a result, 240.5 ha of unused or fallow agricultural land will be utilized. Wetlands not provincially significant will account for approximately 0.34 ha of vegetation removed. The total area of vegetation cleared within natural features will represent a very small proportion of the natural features provided both within the Study Area, and the General Project Area.

Disturbance effects experienced during construction are expected to be short-term in duration and spatially limited to active construction zones and their immediate vicinity. Wildlife mortality is possible during construction, particularly with respect to the increase likelihood of road kill, due to increased traffic on local roadways. Limited wildlife mortality is expected to occur directly as a result of construction of solar arrays, access roads, fencing, transmission lines, or inverter stations.

Destruction of significant wildlife habitat is anticipated within the Study Area during construction activities. Due to the abundance of similar habitat features in surrounding areas and lands adjacent to the Study Area, it is anticipated that the Project will have no residual net effect on wildlife populations in the area. Efforts have been made to preserve habitat or greatest ecological significance to wildlife guilds residing in the Study Area and will result in the conservation of habitat of declining species.

Table 4-1 provides a summary of potential effects on wildlife and wildlife habitat during construction and installation activities.

4.2.1.2 Operation

There is little potential for disturbance to wildlife as a result of day-to-day operation of the solar facility and electrical transmission components of the Project. During the operating period of the Project, traffic and human activity will decrease significantly from the construction phase and overall risk and disturbance to local wildlife will decrease.

Solar panels and other project components are not expected to pose a risk of mortality to local wildlife and, as such, little to no wildlife mortality is expected to occur as a result of Project activities during operation.

Smaller wildlife such as small mammals, amphibians, reptiles, and insects will be able to pass through the fence and cross the solar arrays.

4.2.1.3 Decommissioning

Disturbance to wildlife may occur during removal of the solar arrays, access roads, and electrical transmission components resulting from local vegetation removal, increased human activity, and increased traffic, noise and dust.

Disturbance effects experienced during decommissioning are expected to be short-term in duration and spatially limited to active decommissioning areas and their immediate vicinity. Wildlife mortality is possible during decommissioning, particularly with respect to the increase likelihood of road kill, due to increased traffic on local roadways. Limited wildlife mortality is expected to occur directly as a result of the removal of solar arrays, access roads, fencing, transmission lines, or inverter stations.

4.2.2 Wetlands and Woodlands

4.2.2.1 Construction

Though the majority of project components will be located outside of woodland boundaries, a total of 8.1 ha of woodland habitat from woodlands WO03, WO04, WO09, WO21 and WO48 will be cleared of all vegetation to accommodate project components. Project components not requiring vegetation removal will also occur within 120 m of woodlands. Potential impacts and mitigation measures are detailed in the *NHA/EIS Report*.

Two of fourteen wetlands are occurring within 120 m of the Project Location are located within the boundary of the Project. Both wetlands are contained entirely within an agricultural field. Consequently, a total of 0.34 ha of wetlands will be cleared for construction of project components. Project components (e.g., solar panels, access roads and corresponding buried collector lines) not requiring vegetation removal will also occur within 120 m of wetlands. A setback of 30 m of Project infrastructure from wetlands was observed when possible to avoid disruption of wetland function and net loss of wetland area. Some disturbance to other wetland habitat occurring within 120 m of the Project Location may result due to increases to local traffic,

human activity, and dust. Potential impacts and mitigation measures are detailed in the *NHA/EIS Report*. These disturbances are expected to be short-term in duration and spatially limited to the construction zones and their immediate vicinity.

During construction, vehicles and construction equipment requiring fuel, lubricating oils, or other industrial fluids will be present on site. Accidental spills of harmful fluids associated with construction have the potential to filter into wetland features and may have a negative environmental impact. It is anticipated that with the implementation of best management practices, any potential effects from an accidental spill would be short term in nature and have negligible negative environmental effects.

When possible, setbacks from wetlands and mitigation measures for infrastructure within 30 m of wetlands will ensure that there is no disruption of wetland function and no net loss of wetland area.

4.2.2.2 Operation

Disturbance to woodland and wetland features resulting from Project operation is expected to lessen as vehicular traffic, human activity, and ground disturbance will be greatly reduced as compared to construction or decommissioning phases. The potential for accidental spills of harmful fluids is minimal during the operation of the Project as there will be no major equipment required during routine maintenance of the Project.

It is anticipated that with the implementation of best management practices, any potential effects from an accidental spill would be short term in nature and have negligible negative environmental effects. It is also anticipated that dust created from Project activities during operation will be minimal. Discussion with between MNR, the Proponent, and relevant agencies will occur with regards to post-construction monitoring and the requirement of an Environmental Effects Monitoring Plan.

Further details about potential negative environmental effects on natural heritage features and proposed mitigation measures are available in the *NHA/EIS Report*.

4.2.2.3 Decommissioning

During decommissioning, vehicles and equipment requiring fuel, lubricating oils, or other industrial fluids will be present on site. Accidental spills of harmful fluids associated with decommissioning have the potential to filter into wetland features and may have a negative environmental impact. It is anticipated that with the implementation of best management practices, any potential effects from an accidental spill would be short term in nature and have negligible negative environmental effects.

4.3 Cultural Heritage and Archaeological Resources

4.3.1 Cultural Heritage

A *Cultural Heritage Assessment Report* was completed for the Project. As a result of consultation with designating authorities under the Ontario Heritage Act, none of the Project properties constitute protected properties under Ontario Regulation 350/09. The *Cultural Heritage Assessment Report*, which is provided under a separate cover, concluded that while all the properties exhibit varying degrees of association with the historical theme of land settlement and related agricultural activity, (namely they are remnant agricultural fields in a larger contextual rural landscape) and possess some contextual value due to historical linkages with their surroundings, none are of sufficient cultural heritage value or interest that would warrant not-developing these lands for solar energy installations. The following properties were identified:

- Westbrook Road, Property 12 - Where remnants of log structure were identified, this should be noted for potential archaeological mitigation.
- 4017 Unity Road, Land located between Property 14B and 14C - The stone farmhouse and frame barn are located between two properties identified as Project sites and are not anticipated to be demolished or removed as part of this project. Edge treatments or buffer and screening devices around the periphery of these features are recommended to filter or break up views to any solar energy installations beyond.

4.3.1.1 Construction

Impacts to heritage resources may be short or long in duration and experienced during construction only or during the post construction phase. The *Cultural Heritage Assessment Report* provided general recommendations consisting of screening along roadways comprising traditional fencing and vegetative plantings in keeping with examples found in the general area.

4.3.1.2 Operation

The Project is not expected to have any potential for disturbance to cultural heritage resources during the operations phase.

4.3.1.3 Decommissioning

The Project is not expected to have any potential for disturbance to cultural heritage resources during decommissioning as activities during this phase will be limited to the footprint of the Project.

4.3.2 Archaeological Resources

As part of the Renewable Energy Approval Application, Stage 1 and 2 Archaeological Assessments (AAs) were completed on all lands directly affected by construction and/or

operations activities during 2011 and 2012. Reports have been submitted to the Ministry of Tourism, Culture and Sport (MTCS). The Proponent has received written acknowledgement that the field work completed in 2011 and associated reports were carried out in accordance with the Standards and Guidelines for Consultant Archaeologists. The Proponent is expecting written acknowledgement for 2012 fieldwork and reports in June 2012.

Due to sensitivity of the information, and to protect the resource, the location of any artefacts found during the archaeological investigations cannot be disclosed. Additional Stage 3 and 4 AAs will be completed as necessary prior to construction.

4.3.2.1 Construction

There is potential for disturbance to unknown archaeological resources during the Project installation.

Electrical collector line works are proposed to occur predominantly within existing, previously disturbed road rights-of-way, thus reducing the potential for encountering previously undisturbed archaeological materials during collector line construction.

The *Construction Plan Report* includes mitigation measures should unforeseen archaeological materials be discovered during construction.

4.3.2.2 Operation

The Project does not involve the removal or alteration of potential archaeological resources, protected properties, heritage buildings or structure during operations phase.

4.3.2.3 Decommissioning

The decommissioning of the Project will not involve disturbance outside of the Project footprint and therefore will not have an impact on archaeological resources.

4.4 Impacts on Surface Water and Groundwater

4.4.1 Construction

There will be no required use of water resources (groundwater or surface water) during construction. The project also does not require deep excavations for foundations that would involve extensive dewatering.

Construction activities would have the potential to impair surface water quality through the increased erosion from the site due to the activity of construction equipment and excavation of soils. The *Construction Plan Report* and *Decommissioning Plan Report* include detailed mitigation measures to prevent adverse effects to surface water and groundwater from erosion and run-off. All erosion control measures will be maintained for the duration of

construction/decommissioning and until adequate re-vegetation had occurred. The Operational Statements of Fisheries and Oceans Canada would be followed for constructing/decommissioning water crossings to protect fish and fish habitat. All watercourse crossings would require a permit from the Cataraqui Region Conservation Authority. The *Water Assessment and Water Body Report* provides details of the Project components within 120 m of a water body, and the mitigation methods to be used at each water crossing or encroachment during construction

4.4.2 Operation

Grassed filter strips will be installed on the down gradient end of all sites to promote sediment control in runoff. The Project site will be visually inspected during operations for any erosion or sedimentation issues and remediation will be implemented as necessary to mitigate any impacts.

It is unlikely that accidental spills that could affect surface and groundwater would occur. However, a detailed Emergency Response Plan will be developed in collaboration with Loyalist Township and the City of Kingston's Emergency Services Departments for procedures to be undertaken in the event of a spill. As a preventative measure the transformer at the substation will be built in a concrete pit to contain potential spills.

Rain and snow would generally be sufficient for cleaning the PV panels. If required, water trucks would bring water to the Project site to supply the water. No chemical cleaning will be used to protect surface and groundwater resources.

There will be no use of surface water or groundwater for the production of electricity. The Operations and Maintenance Building would require a water supply, which will be either trucked in or obtained from a well. The estimated water usage, based on 5-10 employees will be less than 1,500 L/day. A septic tank will be installed to handle sanitary wastes.

With implementation of the above mitigation measures, covering all phases of the Project lifecycle, no adverse effects on surface and groundwater are predicted. A summary of potential impacts on water bodies (surface water, ground water, aquifers) including mitigation measures is provided in Table 4-1.

4.4.3 Decommissioning

There will be no required use of water resources (groundwater or surface water) during decommissioning.

Decommissioning activities would have the potential to impair surface water quality through the increased erosion from the site due to the activity of equipment during excavation and restoration of Project areas. The *Construction Plan Report* and *Decommissioning Plan Report* include detailed mitigation measures to prevent adverse effects to surface water and groundwater from erosion and run-off. All erosion control measures will be maintained for the

duration of decommissioning and until adequate re-vegetation had occurred. The Operational Statements of Fisheries and Oceans Canada would be followed for decommissioning water crossings to protect fish and fish habitat.

4.5 Air, Odour, Dust

4.5.1 Construction

Construction related activities (e.g., excavation, grading) have the potential for releasing some minor dust emissions. Effects of dust emissions will be localized, short in duration and spatially limited. Mitigation measures related to dust emissions are summarized in Table 4-1.

4.5.2 Operation

The operations phase of the Project will involve the use of equipment and vehicles. The potential effects of these activities are similar to that of vehicles in Ontario for which standard emission controls are required. To minimize potential impacts from equipment and emissions the Proponent and Contractor will avoid excessive idling; maintain equipment and vehicles with functioning mufflers and emission control systems; vehicles will be fitted with catalytic converters as required.

4.5.3 Decommissioning

Decommissioning related activities (e.g., excavation, grading) have the potential for releasing some minor dust emissions. Effects of dust emissions will be localized, short in duration and spatially limited. Mitigation measures related to dust emissions are summarized in Table 4-1.

4.6 Environmental Noise

4.6.1 Construction

Noise will be generated by the operation of heavy equipment at each site and associated vehicular traffic onsite. The audible noise at receptors beyond the construction area is expected to be a minor short-term disruption consistent with noise generated by any construction project or the operation of agricultural equipment.

4.6.2 Operation

Two types of noise sources are associated with the Project operations: transformers and inverters. The inverters are located inside Medium Voltage Power Platform (MVPP) enclosures. There are ninety-seven (97) MVPPs proposed for this project, each houses two (2) SC-500HE-US 500 kW inverters, or equivalent inside an enclosure and one (1) 1 MVA step-up transformer located outdoor. A 110 MVA transformer is proposed for the substation. The solar panels produce electricity during daytime only. After sunset, the facility will not receive solar radiation to generate any electricity. Under these conditions, the inverters will not produce noise, the will be transformers energized, but not in operation. During operations, sound levels

from the Project are not expected to exceed the applicable noise guidelines (MOE NPC-232) limits.

Vehicular traffic associated with periodic maintenance visits would likely be the only source of noise during maintenance. To minimize noise during maintenance, all engines associated with maintenance equipment and trucks will be equipped with mufflers in accordance with MOE and/or MTO guidelines and regulations. Noise levels arising from maintenance equipment would also be compliant with sound levels established by the MOE. Other mitigation measures related to environmental noise are provided in Table 4-1.

Noise emissions will meet provincial requirements and are anticipated to be short-term in duration and intermittent.

4.6.3 Decommissioning

Noise will be generated by the operation of heavy equipment at each site and associated vehicular traffic onsite. The audible noise at receptors beyond the construction area is expected to be a minor short-term disruption consistent with noise generated by any construction project or the operation of agricultural equipment.

4.7 Land Use, Resources and Infrastructure

4.7.1 Construction

The solar facility will be constructed on lands with low agricultural potential. O.Reg. 359/09 and the Feed-in-Tariff (FIT) program clearly state that any solar project with a Contract Capacity greater than 100 kW cannot be located (built) in Canadian Land Inventory (CLI) Class 1 Lands, CLI Class 2 Lands or CLI Class 3 Lands that have not been designated as Class 3 Available Lands. Therefore the proponent is not allowed to build on agricultural lands of these classifications in neither City of Kingston nor Loyalist Township.

A small section of the Project is located within the City of Kingston's Prime Agricultural Land Use Zoning (City of Kingston Official Plan, 2012). Location of solar panels and access roads are completed with the approval of the participating landowners. Temporary loss of agricultural land will occur for the duration of the project. Mitigation measures will ensure no impact to surrounding land uses. Short native vegetation will be grown beneath and between the panel rows to control erosion.

Although not required by O.Reg. 359/09, the Proponent has taken the initiative to further minimize development on City of Kingston zoned Prime Agricultural Lands in response to community input and preservation of wildlife habitat while balancing its obligations to the province of Ontario which is to produce 100 MW AC of power.

The proposed facility is physically low-profile and will be non-obtrusive to the surrounding community.

A search was completed of the Ontario Oil, Gas and Salt Resources Library which maintains information on over 26,000 petroleum wells on its website (www.ogsrlibrary.com). No listings were found in the database for these resources within the Project location.

The Official Plans of the City of Kingston and Loyalist Township identify undeveloped aggregate reserve areas within the Project lands. Although the operation of the solar facility would affect the ability to develop these resources during its 20 year life-span, it would not affect the development of those resources after Project decommissioning.

4.7.2 Operation

There are no forestry operations or landfills on or near the Project sites.

As part of the Project development, detailed technical reports are provided to the Independent Electricity System Operator and HONI which consider the effects of the solar Project on the provincial power grid. Approval of the reports by these agencies requires that there be no adverse effect on the power infrastructure due to connection of the Project.

4.7.3 Decommissioning

The Project Location will be returned to its original condition after decommissioning and as such will not limit future land uses.

4.8 Traffic and Road Usage

4.8.1 Construction

There are potential effects on local road infrastructure from the increase in heavy truck traffic during construction; however, construction-related traffic will be localized and short in duration. Road condition surveys will be completed, in consultation with the appropriate municipality, before and after construction to monitor potential damage to roads. Where necessary, the Proponent would provide repairs.

A Traffic Management Plan will be developed in consultation with the municipalities covering haul routes, signage, detours etc.

4.8.2 Operation

Traffic during operations will be minimal. The only source of traffic during operations will be vehicular traffic associated with periodic maintenance of the facility based on a workforce of 5-10 persons.

4.8.3 Decommissioning

Similar to the construction phase, there are potential effects on local road infrastructure from the increase in heavy truck traffic during decommissioning. Decommissioning related traffic will be localized and short in duration. Road condition surveys will be completed, in consultation with the appropriate municipality, before and after decommissioning to monitor potential damage to roads. Where necessary, the Proponent would provide repairs.

As previously indicated a Traffic Management Plan will be developed in consultation with the municipalities covering haul routes, signage, detours etc.

4.9 Waste Material Disposal

4.9.1 Construction

During construction, minor quantities of waste materials will be generated at, and transported from, the Project Location. Waste material produced by the Project is expected to consist of recyclable materials such as packaging, pallets and scrap metal (electrical cabling) and a minor amount of domestic waste (e.g., garbage, recycling and organics). Soils from excavations will be reused elsewhere on the property with landowner permission or removed for use as fill material or landfill cover.

4.9.2 Operation

The Project operation would not result in significant quantities of waste for disposal. Waste materials from maintenance activities such as oil, batteries and a minor amount of domestic waste (i.e., garbage, recycling, and organics), will be generated during normal operations. Waste materials will be temporarily stored at the operation and maintenance building and will be reused, recycled and/or disposed at an appropriate off-site facility. There will be no on-site disposal of waste during the operation of the facility.

Minor quantities of hazardous waste will be stored in a secure area until removal by a certified contractor with the appropriate manifests in place.

4.9.3 Decommissioning

Waste material similar to the construction phase may be generated during decommissioning. In addition, scrap components (metals, equipment) will be generated for recycling or reuse. All Project related material will be removed from the Project Location.

4.10 Public Health and Safety:

4.10.1 Construction

Solar photovoltaic (PV) facility produces power without the combustion of any fossil fuels, therefore improving public health by reducing the need for burning fossil fuels. Potential

impacts to public health and safety from the Project are minimal but include those generally related to construction (noise, vibration and dust during construction). The level of noise, vibration, and dust emissions expected during construction will likely be small, localized and temporary in nature and mitigation measures will be implemented to address or eliminate the impacts.

Potential safety issues could arise due to increased traffic along rural roads during construction. A Traffic Management Plan will be developed in consultation with the municipalities covering haul routes, signage, detours etc. Construction-related traffic will be of short duration and localized.

An Emergency Response Plan and Emergency Communications Plan will be prepared in the event of an emergency on the site and will provide key contact information for relevant responders, regulators, landowners and other stakeholders.

4.10.2 Operation

There is a potential for unauthorized access of the public to the work sites during operation phase of the Project. To prevent safety issues due to unauthorized access to the Project, security fencing and gates will be installed at all sites. Regular inspections will be made of all sites to ensure perimeter fencing and gates are intact and adequately maintained. No adverse effects are predicted.

4.10.3 Decommissioning

Potential impacts to public health and safety from the decommissioning phase of the Project are minimal and are similar to those related to construction (noise, vibration and dust). As with the construction phase, the level of noise, vibration, and dust emissions expected during decommissioning will likely be small, localized and temporary in nature and mitigation measures will be implemented to address or eliminate the impacts.

Potential safety issues could arise due to increased traffic along rural roads during decommissioning. A Traffic Management Plan will be developed in consultation with the municipalities covering haul routes, signage, detours etc. Construction-related traffic will be of short duration and localized.

An Emergency Response Plan and Emergency Communications Plan will be prepared in the event of an emergency on the site and will provide key contact information for relevant responders, regulators, landowners and other stakeholders.

4.11 Areas Protected under Provincial Plan and Policies:

The Project lands are not within area of the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan Area, the Niagara Escarpment Plan Area or the Lake Simcoe Watershed

Plan Area Greenbelt Plan, therefore no impacts are expected to occur to areas protected under provincial plans and policies.

4.12 Accidents and Malfunctions

There is the potential for exposure to toxic vapours should a fire consume the solar panel. However, given the melting points of the potentially harmful substances within the photovoltaic cells (Fthenakis, 2003) and the lack of burnable materials in a solar panel, the risk of fires and the generation of hazardous fumes are extremely limited.

The probability of transmission structure failure occurring during operation is low. The transmission and collector lines will be designed and constructed in accordance with applicable regulatory guidelines (e.g., International Electrical Commission Standards) minimizing the risk of pole failure.

The Proponent and/or the relevant Contractor would finalize a detailed Emergency Response and Communications Plan for each Project phase in collaboration with the Loyalist Township and the City of Kingston's Emergency Services Departments to minimize accidents and malfunctions with proper training and education of staff operating the facility. Developing this plan with local emergency services personnel would allow the Proponent to determine the extent of emergency response resources and response actions of those involved.

The plan would include key contact information for emergency service providers, a description of the chain of communications and how information would be disseminated between the Proponent and/or the Contractor and the relevant responders. The plan would also indicate how the Proponent and/or the Contractor would contact (via phone or in-person) Project stakeholders who may be directly impacted by an emergency so that the appropriate actions can be taken to protect stakeholders health and safety.

The Emergency Response and Communications Plan would include a plan for the proper handling of material spills and associated procedures to be undertaken during a spill event. The plan would also specify containment and clean-up materials and their storage locations as well as general procedures for personnel training. As appropriate, the plan may cover fire preparedness, evacuation procedures, and medical emergencies. With the implementation of the Emergency Response and Communications Plan which would include protocols for the proper handling of material spills and procedures to be undertaken in the event of a spill no adverse effects are anticipated from spills during the Project.

Other potential adverse effects to public health and safety and proposed mitigation measures are summarized in Table 4-1.

4.13 Effects of the Environment on the Project

Solar panels are designed to withstand various types of weather. The solar panels are designed to withstand specific weather conditions (including hail, ice, rain, snow, etc.). The

solar panels will be installed on a tilt to maximize power generation; moreover this tilt naturally assists with ice, snow, or water removal.

4.14 Other Resources

Environmental effects from the Project on other resources such as aggregate resources, landfill sites, petroleum wells, or forest resources are not anticipated.

Table 4-1: Summary of the Potential Negative Environmental Effects as a Result of Project Development and Proposed Mitigation Measures

Environmental Component	Sources of Negative Effects	Potential Negative Effect	Mitigation Measures	Residual Negative Effect
Heritage & Archaeological Resources	Excavation required for installation of the facility.	<ul style="list-style-type: none"> Potential disturbance of archaeological resources during Project installation. The Project does not involve the removal or alteration of protected properties, heritage buildings or structures. 	<ul style="list-style-type: none"> Stage 1 & 2 Archaeological Assessments (AAs) have been completed on all Project lands. Additional Stage 3 and 4 AAs would be completed as necessary prior to construction. Electrical collector line works are proposed to occur predominantly within existing, previously disturbed road right-of-ways, thus reducing the potential for encountering previously undisturbed archaeological materials during collector line construction. The Construction Plan Report includes mitigation measures will unforeseen archaeological materials be discovered during construction. 	None predicted.
Natural Heritage Resources (vegetation communities & wildlife habitat)	<p>Changes in site topography, placement of Project components, ditches, etc.</p> <p>Installation activities</p> <p>Operations and maintenance activities.</p>	<p>Installation of the solar panels in existing agricultural fields would impact bird species and wildlife that use agricultural field for foraging and protection; however, the impact would be localized (restricted only to the fields in which the solar panels are constructed).</p> <p>Grassland breeding birds may avoid nesting in the vicinity of solar panels and may move to other nearby habitat.</p> <p>There was a lack of staging habitat for shorebirds and waterfowl within the study area; therefore, the potential for impacts to these Orders of birds is minimal.</p> <p>Due to the lack of topographic features at the study site that would concentrate raptors, and the small number of raptors observed onsite, there is limited potential for raptor mortality as a result of the Project. However, wintering and migrating Bald Eagles have been observed. The installation of new electrical generation and electrical transmission infrastructure may have the potential to affect Bald Eagles.</p> <p>Habitat loss due to the construction of access roads adjacent to woodland and thicket or in grassland habitats may result in some limited effects to wildlife; however, the post-construction periods and lack of noise disturbance would generally allow for the re-establishment of these habitat types.</p> <p>Traffic volumes, both during construction and during post-construction maintenance, are anticipated to be low and would not constitute a significant threat to mammals, reptiles and amphibians. Potential effects may result from construction and access road crossings of existing drainage features, which may represent amphibian habitat.</p>	<p>The primary mitigation measure employed to reduce impacts to significant specialized wildlife habitat and their functions was avoidance where possible.</p> <p>Modifications to the layout were made to avoid placing the Project in features identified as significant through the Site Investigation and Evaluation of Significance for this Project.</p> <p>Micro-siting decisions made during the final development of the Project layout considered minimizing impacts to significant specialized wildlife habitat.</p>	The net residual effects on raptor area and the birds that use them are expected to be low to minimal with the implementation of these mitigation plans and periodic monitoring and inspection of standard site control measures.

Environmental Component	Sources of Negative Effects	Potential Negative Effect	Mitigation Measures	Residual Negative Effect
Water Bodies (surface water, ground water, aquifers)	<p>Accidental spills.</p> <p>In-stream work during construction for the installation of overhead and/or underground collector lines or culverts.</p> <p>Erosion of sites during all phases of the Project. Potential for water quality impacts due to bank erosion, or improperly sized culverts</p> <p>Cleaning of solar panels</p>	<p>Potential adverse effects on surface and groundwater quality due to spills.</p> <p>There is potential for effects upon fisheries and surface waters due to destruction of fish habitat, sedimentation of waterways, or water contamination.</p> <p>Adverse effects on water quality from particulate matter.</p> <p>Potential for adverse effects on groundwater or surface water. Aquifers can be susceptible to land use impacts depending on the type and thickness of the overburden and/or shallow depth to groundwater</p>	<p>Emergency Plans would be in place for all Project phases.</p> <p>Transformers at the substation will be built in concrete pits to contain spills.</p> <p>A detailed Emergency Response Plan will also be developed in collaboration with Loyalist Township and the City of Kingston's Emergency Services Departments for procedures to be undertaken in the event of a spill.</p> <p>The Operational Statements of Fisheries and Oceans Canada would be followed for constructing water crossings to protect fish and fish habitat. All watercourse crossings would require a permit from the Cataraqui Region Conservation Authority.</p> <p>The Construction Plan Report and Decommissioning Plan Report include detailed mitigation measures to prevent adverse effects to surface and groundwater from erosion. Grassed filter strips would be installed on the down gradient end of all sites to promote sediment control in runoff. The Project site would be visually inspected for any erosion or sedimentation issues and remediation would be implemented as necessary to mitigate any impacts.</p> <p>Rain and snow would generally be sufficient for cleaning the PV panels. If required, water trucks would bring water to the Project site to supply the water. No chemical cleaning would be used.</p>	<p>Accidental spills would be spatially limited, of short duration and protocols to minimize effect would be provided in the Emergency Response Plan.</p> <p>No residual effect is anticipated.</p> <p>No residual effect is anticipated.</p> <p>No residual effect is anticipated.</p>
Air Emissions (Odour, Dust)	<p>Construction related activities (e.g., excavation, grading).</p> <p>Use of heavy equipment and vehicles during construction and operations.</p>	<p>Minor localized air emissions (dust) due to excavation and exposure of soils.</p> <p>The potential effects of these activities are similar to that of vehicles in Ontario for which standard emission controls are required.</p>	<p>Contractor will: apply dust suppressants; enforce low speed limits for trucks on site; re-vegetate exposed soils as soon as possible; protect stockpiles of friable material in the event of dry conditions and excessive dust; consult local road authorities prior to application of dust suppressants on public roads; ensure dust generation is monitored and controlled in areas of sensitive land use.</p> <p>To minimize potential impacts from equipment and emissions the Proponent and Contractor will: avoid excessive idling; maintain equipment and vehicles with functioning mufflers and emission control systems; vehicles would be fitted with catalytic converters as required.</p>	<p>Effects of dust emissions would be short duration and spatially limited.</p> <p>No residual effect is anticipated from vehicle emissions.</p>
Noise	Construction activities.	Noise would be generated by the operation of heavy equipment at each site and associated vehicular traffic on-site. The audible noise at receptors beyond the construction area is expected to be a minor short-term disruption consistent with noise generated by any construction project or the operation of agricultural equipment.	To minimize inconvenience brought on by noise during the use of vehicles during the operations phase of the Project, all engines associated with maintenance equipment would be equipped with mufflers and/or silencers in accordance with MOE and/or MTO guidelines and regulations. Noise levels arising from maintenance equipment would also be compliant with sound levels established by the MOE.	Application of the recommended mitigation measures during construction phase and operations would limit noise emissions to the general vicinity of the Project site and substation property.

Environmental Component	Sources of Negative Effects	Potential Negative Effect	Mitigation Measures	Residual Negative Effect
	Operations activities and noise emissions from transformers and inverters.	During operations, no noise pollution would be emitted from the solar panels. Vehicular traffic associated with periodic maintenance visits would likely be the only source of noise.	Mitigation includes installation of noise barrier around transformer if required to meet performance objectives.	Noise emissions will meet provincial requirements and are anticipated to be short-term in duration and intermittent.
Land Use & Resources	Installation of facility.	Potential loss of agricultural lands. Use of land with aggregate resources potential	Solar panels will be located on lands with low agricultural potential with a soils classification of 4 or higher. Location of solar panels and access roads are completed with the approval of the participating landowner. Contract with OPA is 20 years after which Project will be decommissioned and lands restored for future uses.	None. No effect on the future use of the resources (>20 years).
Provincial, Municipal and Local Infrastructure	Construction activities. Operational activities.	Potential effects on local roads infrastructure from construction traffic. Effects of connection into provincial electrical grid.	The Proponent would complete road conditions surveys before and after construction in consultation with the appropriate local municipality to monitor potential to damage municipal roads and provide repairs. The Proponent will be providing technical reports to the Independent Electricity System Operator and Hydro-One Networks for approval of the effects of the solar operation on the provincial power grid.	No long term residual effect. The operation of the solar facilities would have no adverse residual effect on power infrastructure.
Public Health & Safety	Construction activities. Construction and Operations	There is potential for increased construction-related road traffic. Potential for unauthorized access of the public on the work site.	A Traffic Management Plan will be developed in consultation with the municipalities covering haul routes, signage, detours etc. Security fencing and gates will be present at all sites. Regular inspections will be made during the operations phase of all sites to ensure perimeter fencing and gates are intact and adequately maintained. All sites will be fenced and locked maintained	Construction-related traffic would be short duration and limited and localized. No residual effect.
Areas Protected under Provincial Plan & Policies	The Project altering the ecological functions of a specific land use plan.	The Project site is not within area of the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan Area, the Niagara Escarpment Plan Area or the Lake Simcoe Watershed Plan Area Greenbelt Plan. No impacts are expected to occur to areas protected under provincial plans and policies.	No mitigation measures needed as no negative impacts are expected.	None.

5.0 PROJECT BENEFITS

The Project will have a number of positive effects in the local community. Local benefits that may be realized as a result of this Project include:

- Direct economic benefits such as purchasing materials, equipment rental, accommodations, restaurants, and employment wages;
- Income to property owners where leases have been established;
- Spin-off or indirect economic benefits such as increased employment in local firms providing materials and equipment. The indirect benefits typically exceed the direct economic benefits;
- New property and sales tax revenues for the tax base in the City of Kingston and Loyalist Township; and
- Environmental benefits through the reduction of greenhouse gas emissions.

6.0 CLOSURE

AMEC has completed this report for the exclusive use of the Proponent for specific application to the Sol-luce Kingston Solar PV Energy Project. The work has been completed using generally accepted practices and with reference to *Technical Guide to Renewable Energy Approvals – Chapter 4: Guidance for Preparing the Project Description Report* (MOE 2011, 2012).

Sincerely,

AMEC Environment & Infrastructure
a Division of AMEC Americas Limited

A handwritten signature in blue ink, appearing to read "F. Amirjalari".

Faranak Amirjalari, B.Sc., MES
Environmental Planner

A handwritten signature in black ink, appearing to read "Peter Rostern".

Peter Rostern, P.Eng., MBA
Principal Environmental Engineer

7.0 REFERENCES

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- Ontario Ministry of Environment. 2012. Technical Guide to Renewable Energy Approvals – Chapter 4: Guidance for Preparing the Project Description Report as part of an application for a Renewable Energy Approvals (REA) under O.Reg. 359/09. for Public Comment.

APPENDIX A
LEGAL DESCRIPTION OF PROJECT LAND PARCELS

PT LT 1-2 CON 6 WESTERN ADDITION KINGSTON AS IN FR319482 LYING N OF FORCED RD AKA ROCK RD; S/T DEBTS IN FR319482; KINGSTON
PT LT 2-3 CON 6 WESTERN ADDITION KINGSTON PT 1, 13R11037 T/W FR750411; KINGSTON
PT LT 3 CON 6 WESTERN ADDITION KINGSTON AS IN FR334814 EXCEPT FR334813; KINGSTON
PT LT 5 CON 6 WESTERN ADDITION KINGSTON AS IN FR458081, S/T FR458081; KINGSTON
PT LT 7 CON 6 WESTERN ADDITION KINGSTON PT 2, 13R7020; S/T EXECUTION 98-0000303, IF ENFORCEABLE; KINGSTON
PT LT 9 CON 6 WESTERN ADDITION KINGSTON AS IN FR333258 DESCRIPTION MAY NOT BE ACCEPTABLE IN FUTURE AS IN FR333258; S/T DEBTS IN FR 333258; S/T LIFE INTEREST IN FR 333257; KINGSTON
PT LT 10-11 CON 5 WESTERN ADDITION KINGSTON AS IN FR333258 (PCLS 1, 2 & 5) LYING S OF PT 5, 6, 8 & 9 RP1561; S/T DEBTS IN FR333258; S/T LIFE INTEREST IN FR333257; KINGSTON
PT LT 10-11 CON 6 WESTERN ADDITION KINGSTON AS IN FR592600 & FR592602 EXCEPT PT 1-2, 13R4908; KINGSTON
PT LT 11 CON 6 WESTERN ADDITION KINGSTON PT 1, 13R10933; KINGSTON
PT LT 11 CON 6 WESTERN ADDITION KINGSTON PT 1 & 2, 13R6247 EXCEPT PT 1, 13R10933; KINGSTON
PT LT 11 CON 6 WESTERN ADDITION KINGSTON AS IN TKB414; KINGSTON
PT LT 12 CON 6 WESTERN ADDITION KINGSTON PT 1 & 4, 13R12503; KINGSTON
PT LT 2-3 CON 5 WESTERN ADDITION KINGSTON AS IN FR742098; S/T FR108782 AMENDED BY RP1060; S/T FR270560; KINGSTON
N 1/2 LT 4-5 CON 5 WESTERN ADDITION KINGSTON LYING E OF PT 9 13R352 EXCEPT PT 1 13R1250 & PT 10 RP1562; T/W FR222333; S/T FR102026 AMENDED BY RP1060; S/T FR252304, FR282159; KINGSTON
N 1/2 LT 7 CON 5 WESTERN ADDITION KINGSTON; NE 1/4 LT 8 CON 5 WESTERN ADDITION KINGSTON LYING W OF TRAVELLED RD EXCEPT PT 14 & 15 RP1562; S/T DEBTS IN FR319484; KINGSTON
NW 1/4 LT 8 CON 5 WESTERN ADDITION KINGSTON; N 1/2 LT 9 CON 5 WESTERN ADDITION KINGSTON EXCEPT PT 2 RP1561; KINGSTON
E 1/2 OF NE 1/4 LT 10 CON 5 WESTERN ADDITION KINGSTON EXCEPT PT 5 RP1561; KINGSTON
PT LT 10 CON 5 WESTERN ADDITION KINGSTON PT 1 13R3240 EXCEPT PT 3 13R4637; S/T FR512922; S/T FR108785 AS AMENDED BY RP1059; S/T FR100646 AS AMENDED BY RP1059; S/T FR272183; KINGSTON
SW 1/4 LT 10 CON 5 WESTERN ADDITION KINGSTON EXCEPT PT 4 13R4637; S/T FR100646 AMENDED BY RP1059; S/T FR271762; KINGSTON
S 1/2 LT 11 CON 5 WESTERN ADDITION KINGSTON EXCEPT PT 1 13R4400 & PT 1-3 13R6417; S/T FR105837 AMENDED BY RP1059; S/T FR271484; KINGSTON
PT LT 12 CON 5 WESTERN ADDITION KINGSTON PT 1 & 2 13R18722; KINGSTON

PT LT 42 CON 4 ERNESTOWN; PT GORE LT CON 4 ERNESTOWN PT 1 TO 4, 29R9191; S/T LA282147; S/T LA26307 AS AMENDED BY PL478; LOYALIST
PT LT 41-42 CON 4 ERNESTOWN AS IN LA210151 EXCEPT PT 1 AND 2 29R8520; S/T LA26059 AS AMENDED BY PL478; S/T LA86448; LOYALIST
PT LT 39 CON 4 ERNESTOWN PT 1, 2 AND 3 29R7698; S/T LA26055 AS AMENDED BY PL478; S/T LA86443; LOYALIST
PT LT 38 CON 4 ERNESTOWN AS IN LA101545 (PARCEL # 2) EXCEPT PT 2 29R5702; S/T LA26168 AS AMENDED BY PL478; S/T LA85936; LOYALIST
PT LT 38 CON 4 ERNESTOWN AS IN LA64275 EXCEPT PT 1 29R5702; S/T LA26053 AS AMENDED BY PL478; S/T LA86444; LOYALIST
PT LT 37-39 CON 4 ERNESTOWN PT 2, 29R3887; S/T LA47223; LOYALIST