RE ORILLIA 3 SOLAR PROJECT

Construction Plan Report

August 3, 2011

RECURRENT ENERGY

RECURRENT ENERGY

RE ORILLIA 3 ULC

Construction Plan Report

DEVELOPED WITH TECHNICAL SUPPORT PROVIDED BY WARDROP ENGINEERING

RE Orillia 3 Solar Project

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August 3, 2011

RECURRENT ENERGY

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RECURRENT ENERGY

1.0 INTRODUCTION

RE Orillia 3 (the "Project") is made by RE Orillia 3 ULC. The RE Orillia 3 property consists of a parcel of agricultural land totalling approximately 15 hectares located about 7 km southwest of Orillia in the Township of Oro-Medonte, County of Simcoe, Province of Ontario (as shown on Figure 1.1).

The Project will consist of solar photovoltaic panels that generate direct current (DC) electricity when exposed to sunlight. This project will use 230W – 280W crystalline photovoltaic modules to form the solar panel arrays. The panels will be stationary, arranged in rows mounted off the ground with a fixed tilt angle to the south to catch the sun's rays. Electricity generated by the rows of panels is collected through underground cabling by inverter/transformer pairs which convert the DC electricity to alternating current (AC) at a specified voltage. The AC current then continues from the inverters through underground cabling to a single main facility substation. At this substation, the main power transformer increases the voltage to the level of voltage of the electricity distribution grid. The power passes through protective relays (SEL‐351) and fault‐breaking switches before being delivered to Hydro One's electrical network. The total installed capacity of the Project is 6.5 MW AC.

The construction of the facility will be conducted in three phases:

- Phase 1: Site preparation
- Phase 2: Construction and Installation
- Phase 3: Post-installation

Construction of the facility is scheduled to begin in July 2011 and completed at the earliest by the end of February 2012. The commercial operation date and associated construction schedules proposed herein are currently estimates based on a number of variables and is an example of a very aggressive schedule. The actual construction time can vary between 6 to 10 months. In addition, the start of construction and operations dates for the project may be significantly changed, either accelerated or delayed, due to changes in expected timeframes for regulatory approval, equipment procurement, and/or project scheduling optimization.

<u>Phase 1 – Site Preparation</u>

Site preparation activities includes: connecting a temporary power supply, site survey and staking, road and parking area construction; preparation of site including, removal of vegetation and topsoil and compaction of sub-grade; shaping of ditches and swales and; installation of a perimeter security fence.

Schedule: July 30, 2011 to November 29, 2011

Phase 2 – Construction and Installation

Construction and installation activities includes: excavation of substation area for footings, foundations and oil containment area; construction of substation and control house; installation of culverts across ditches to the public roadways and; installation of panels, transformers, inverters, cable and other equipment.

Schedule: October 4, 2011 to February 13, 2012

Phase 3 – Post-installation

Post-installation activities include re-seeding/re-vegetating the site including ditches and swales and testing of systems prior to commencement of operations known as commissioning, commissioning of the interconnection.

Schedule: January 24, 2012 to February 13, 2012

The site will be re-seeded in the spring of 2012 weather permitting.

This Construction Plan Report has been prepared in accordance with the March 1, 2010 draft of *Technical bulletin three: Guidance for preparing the Construction Plan Report as part of an application under O.Reg.359/09 PIBS 7438e.*

Figure 1.1 Site Location Map

2.0 SUMMARY

Figure 2.1 shows the site plan of the RE Orillia 3 solar photovoltaic installation including the location of internal roadways, access to the public road, location of substation equipment and inverters. The layout as shown in the figure is subject to change and will depend on the final design of the facility. The facility will be contained within the total constructible area as shown in the figure.

Table 2.1 summarizes the heavy construction equipment that will be used in the construction of the project.

Table 2.1: Heavy Equipment

Quantity	Description	Site Use
2	D8 Dozer	Earthmoving
2	Cat 627 Scraper	Site preparation
1	Cat 140 Motor Grader	Site grading
2	Cat 563 Soil Compactors	Soil compaction for roadways, parking areas
5	Cat 730 End Dump Truck	Material handling
5	20 Cubic Meter End Dump Trailer	Material transport/handling
3	Cat 330 Excavators	Excavations
2	Cat 950 Wheel Loader	Material loading
2	JLG G9 Telehandler	Electrical installations
1	60 ton Rough Terrain Crane	Electrical installations

NOTES:

1. AERIAL IMAGERY OBTAINED FROM GOOGLE EARTH PRO, IMAGERY DATE 2006
2. ROAD CONSTRUCTION PROCEDURES

–CLEAR & GRUB ALL AREAS PROPOSED FOR ROAD AND PARKING LOT CONSTRUCTION.
–STRIP & REMOVE ALL TOPSOIL.
–SHAPE & PROOF–ROLL SUBGRADE.
–SHAPE & GRADE DITCHES & SWALES.
–PLACE, SHAPE AND COMPACT GRANULAR SUBBASE AND BASE MATERIALS AS FOLLOW:

TYPE 1 – 300mm GRANULAR "B" SUBBASE, 150mm GRANULAR "A" BASE.
TYPE 2 – 200mm GRANULAR "B" SUBBASE, 150mm GRANULAR "A" BASE.
TYPE 3 – 150mm TO 200mm GRANULAR "A".

–RE–VEGETATE DITCHES AND SWALES.

CULVERTS:

1. CULVERT SHALL BE CORRUGATED STEEL PIPE OR RIBBED PVC PIPE INSTALLED IN ACCORDANCE WITH OPSD.
2. MINIMUM CULVERT DIAMETER:
   300mm Min. Dia. FOR MINOR CULVERTS
   600mm Min. Dia. FOR MAIN CULVERTS
   REFER TO PLANS FOR CULVERT LOCATIONS.

APP. SCALE:

1:2000 — 20 0 25 50 75 100m

LEGEND:

- INVERTER / XFMR EQUIPMENT PAD
- SOLAR ARRAY
- LEASE BOUNDARY
- ACCESS ROAD
- PROPOSED FENCE
- ADDITIONAL CONSTRUCTIBLE AREA THAT MAY BE USED FOR THE FACILITY
- POTENTIAL LAYDOWN AREA AND TEMPORARY PARKING

REFERENCE NO. 1088760100–DWG–E0016–05

REV.	DATE	DESCRIPTION	APPROVED BY
05	11.01.12	ISSUED FOR REVIEW	
04	10.12.23	ISSUED FOR REVIEW	ENERGY
03	10.08.05	ISSUED FOR REVIEW	ENVIRO.
02	10.07.27	ISSUED FOR REVIEW	INFRAS.
01	10.05.21	ISSUED FOR REVIEW	STRUCT.

RECURRENT ENERGY – ORILLIA 3 6.5MW AC

SOLAR GENERATION FACILITY – SITE LAYOUT

WARDROP | A TETRA TECH COMPANY

RECURRENT ENERGY

3.0 PHASE 1 SITE PREPARATION AND CONSTRUCTION

3.1 PHASE 1 TIMELINE AND ACTIVITY DURATION

The timeline for the site preparation and construction phase of the Project are summarized in Table 3.1.

Activity Description	Activity Duration	
	From	To
Planned Commercial Operation Date		February 13, 2012
Temporary Power Installation		
Material Transport Timeline	July 30, 2011	August 13, 2011
Construction Equipment	July 30, 2011	August 13, 2011
Temporary Use of Land	July 30, 2011	August 13, 2011
Survey Facility and Stake		
Material Transport Timeline	August 16, 2011	August 30, 2011
Construction Equipment	N/A	N/A
Temporary Use of Land	N/A	N/A
Laydown Area Prepared and Set-up		
Material Transport Timeline	August 20, 2011	August 27, 2011
Construction Equipment	August 20, 2011	August 27, 2011
Temporary Use of Land	August 20, 2011	August 27, 2011
Access Road Construction		
Material Transport Timeline	August 20, 2011	August 27, 2011
Construction Equipment	August 30, 2011	September 20, 2011
Temporary Use of Land	August 30, 2011	September 20, 2011
Water Well Installation		
Material Transport Timeline	August 20, 2011	August 27, 2011
Construction Equipment	August 27, 2011	August 28, 2011
Temporary Use of Land	August 27, 2011	August 28, 2011
PV Field Preparation		
Material Transport Timeline	N/A	N/A
Construction Equipment	August 30, 2011	September 26, 2011
Temporary Use of Land	N/A	N/A
Substation Preparation		
Material Transport Timeline	August 30, 2011	September 20, 2011
Construction Equipment	August 30, 2011	September 20, 2011
Temporary Use of Land	August 30, 2011	September 20, 2011
Access From Public Roads		
Material Transport Timeline	September 20, 2011	November 29, 2011

Construction Equipment	September 6, 2011	September 20, 2011
Temporary Use of Land	N/A	N/A
Array Foundation Installation		
Material Transport Timeline	September 28, 2011	November 29, 2011
Construction Equipment	September 28, 2011	November 29, 2011
Temporary Use of Land	September 28, 2011	November 29, 2011
Foundations (Substation, Transformer, Inverters)		
Material Transport Timeline	September 28, 2011	October 18, 2011
Construction Equipment	September 28, 2011	October 18, 2011
Temporary Use of Land	September 28, 2011	October 18, 2011
Cable, Trench and Conduit Installation		
Material Transport Timeline	November 1, 2011	November 29, 2011
Construction Equipment	November 1, 2011	November 29, 2011
Temporary Use of Land	November 1, 2011	November 29, 2011
Dead End Structures		
Material Transport Timeline	October 19, 2011	November 2, 2011
Construction Equipment	October 19, 2011	November 2, 2011
Temporary Use of Land	October 19, 2011	November 2, 2011
Control House Installation		
Material Transport Timeline	October 25, 2011	November 2, 2011
Construction Equipment	October 25, 2011	November 2, 2011
Temporary Use of Land	N/A	N/A
Fence Installation		
Material Transport Timeline	November 2, 2011	November 17, 2011
Construction Equipment	November 2, 2011	November 17, 2011
Temporary Use of Land	November 2, 2011	November 17, 2011

3.2 CONSTRUCTION TRAFFIC

Flatbed trailers and trucks will be used to transport construction equipment and construction materials to the site. It is anticipated that during the 4 month construction period, approximately 15 flatbed trailers will arrive on the site each day.

3.3 TEMPORARY POWER INSTALLATION

A temporary connection to the existing hydro system will be constructed in order to supply power for construction activities.

3.3.1 MATERIALS

Materials Brought On Site:	Temporary junction box, conductor
Transport Method:	Stake truck/bucket truck
Location Materials Used:	Temporary power point of interconnection
Temporary Storage:	N/A

3.3.2 CONSTRUCTION EQUIPMENT

Equipment:	JLG G9 Telehandler
Noise/Dust Potential:	Noise
Chemicals:	Gasoline, Lubricants
Access Method:	Flatbed to site. access site from public roads

3.3.3 TEMPORARY USE OF LAND

Affected area:	Laydown/Parking area, 30x50m as shown on Figure 2.1
Prior Land Use:	Agricultural
Construction Land Use:	Laydown/storage/parking

3.3.4 MATERIALS GENERATED

Type/Quantity:	N/A
Onsite Disposal:	N/A
Offsite Disposal:	N/A
Transport Method:	N/A

3.4 SURVEY FACILITY AND STAKE

The site will be surveyed and staked on order to delineate the outline of excavations, roads, and foundation locations.

3.4.1 MATERIALS

Materials Brought On Site:	Survey stakes
Timeline for Transport:	To be determined
Transport Method:	Pickup truck
Location Materials Used:	Site, PV field and substation
Temporary Storage:	N/A

3.4.2 CONSTRUCTION EQUIPMENT

Equipment:	N/A
Noise/Dust Potential:	N/A
Chemicals:	N/A
Access Method:	N/A

3.4.3 TEMPORARY USE OF LAND

Affected area:	N/A
Prior Land Use:	N/A
Construction Land Use:	N/A
Timing:	N/A

3.4.4 MATERIALS GENERATED

Type/Quantity:	N/A

Onsite Disposal:	N/A
Offsite Disposal:	N/A
Transport Method:	N/A

3.5 LAYDOWN AREA PREPARED AND SETUP

Laydown area construction procedure:

- Install temporary erosion and sediment control measures. These facilities will be inspected regularly during the construction period in order ensure their function;
- Clear and grub all areas for lot construction;
- Strip and salvage topsoil to allow for re-use and re-spreading. Topsoil will be stockpiled to drain surface water. Topsoil will be covered in order to minimize erosion from wind and precipitation;
- Shape and proof-roll subgrade;
- Shape ditches and swales;
- Place, shape and compact granular subbase and base materials;
- Re-vegetate ditches and swales.

3.5.1 MATERIALS

Materials Brought On Site:	Granular 'A' 1300m^3
Transport Method:	End dump truck, as required
Location Materials Used:	Laydown area/parking
Temporary Storage:	N/A

3.5.2 CONSTRUCTION EQUIPMENT

Equipment:	D8 dozer, Cat 627 scraper, Cat 140 motor grader, Cat 563 soil compactor, Cat 730 end dump truck, Cat 950 wheel loader
Noise/Dust Potential:	Noise and dust
Chemicals:	Gasoline, diesel fuel, lubricants
Access Method:	Flatbed to site as required or driven to site. Access site from public roads.

3.5.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior Land Use:	Agricultural
Construction Land Use:	Laydown area/parking

3.5.4 MATERIALS GENERATED

Type/Quantity:	Removed topsoil/TBD
Onsite Disposal:	Stockpile, re -spread topsoil

Offsite Disposal:	None anticipated, all stripped topsoil will be re-spread on the site
Transport Method:	N/A

3.6 ACCESS ROAD CONSTRUCTION

Internal access road construction procedure:

- Install temporary erosion and sediment control measures. These facilities will be inspected regularly during the construction period in order ensure their function;
- Clear and grub all areas for road construction;
- Strip and salvage topsoil to allow for re-use and re-spreading. Topsoil will be stockpiled to drain surface water. Topsoil will be covered in order to minimize erosion from wind and precipitation;
- Shape and proof-roll subgrade;
- Shape ditches and swales;
- Place, shape and compact granular subbase and base materials;
- Re-vegetate ditches and swales.

3.6.1 MATERIALS

Materials Brought On Site:	Granular 'A' 1220m^3 Granular 'B' 1225m^3
Transport Method:	End dump truck, as required
Location Materials Used:	Access roadways
Temporary Storage:	N/A

3.6.2 CONSTRUCTION EQUIPMENT

Equipment:	D8 dozer, Cat 627 scraper, Cat 140 motor grader, Cat 563 soil compactor, Cat 730 end dump truck, Cat 950 wheel loader
Noise/Dust Potential:	Noise and dust
Chemicals:	Gasoline, diesel fuel, lubricants
Access Method:	Flatbed to site as required or driven to site. Access site from public roads.

3.6.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior Land Use:	Agricultural
Construction Land Use:	Store removed topsoil

3.6.4 MATERIALS GENERATED

Type/Quantity:	Removed topsoil

Onsite Disposal:	Stockpile, re-spread topsoil
Offsite Disposal:	None anticipated, all stripped topsoil will be re-spread on the site
Transport Method:	N/A

3.7 WATER WELL INSTALLATION

A water well will be installed for construction purposes including dust control measures in a suitable area as determined from geotechnical and hydrogeological conditions. REA applicants are not required to obtain a Permit to Take Water (PTTW) under the *Ontario Water Resources Act*. Applicants are directed to use the guidance for a PTTW application in the Ministry of Environment publication "Permit to Take Water (PTTW) Manual" (2005 publication 4932e). Requirements for PTTW applications and methods used to evaluate and determine effects on the water source are identified only for water takings that are equal to or greater than 50,000 litres per day. During the construction period, it is estimated that approximately 10,000 litres of water per day will be drawn from the well and used for dust control measures and other construction purposes. In the event that more water is required, it will not exceed 45,000 litres per day,

3.7.1 MATERIALS

Materials Brought On Site:	Well drilling supplies
Transport Method:	Flatbed trailer
Location Materials Used:	Access roadways
Temporary Storage:	N/A

3.7.2 CONSTRUCTION EQUIPMENT

Equipment:	Well drilling truck or equivalent
Noise/Dust Potential:	Noise and dust
Chemicals:	Gasoline, diesel fuel, lubricants
Access Method:	Flatbed to site as required or driven to site. Access site from public roads.

3.7.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior Land Use:	Agricultural
Construction Land Use:	Store removed soil cuttings

3.7.4 MATERIALS GENERATED

Type/Quantity:	Drill cuttings
Onsite Disposal:	Stockpile, re-spread topsoil. Where possible, drill cuttings will be re-purposed and re-used on site.
Offsite Disposal:	For excess soil cuttings, licensed landfill per regulations
Transport Method:	End dump truck, as required

3.8 PV Field Preparation

Hedgerows on the site as indicated on the site plan will be cleared. Larger trees will be felled using chainsaws and limbed and cut into smaller lengths for transport off-site. Brush will be removed with a bulldozer fitted with a brush rake. Trees could be chipped and processed on site for use as temporary erosion control. Excess material will be collected on site and transported off-site to a licensed landfill operation. Minor grading may be required.

3.8.1 Materials

Materials Brought On Site:	None
Transport Method:	N/A
Timeline for Transport:	N/A
Location Materials Used:	N/A
Temporary Storage:	N/A

3.8.2 Construction Equipment

Equipment:	D8 Dozer, Cat 627 Scraper, Cat 140 Motor Grader, 5 Cat 730 End Dump Trucks,
Noise/Dust Potential:	Noise and dust
Chemicals:	Gasoline, diesel fuel, lubricants
Access Method:	Flatbed to site as required or driven to site. Access site from public roads.

3.8.3 Temporary Use of Land

Affected area:	N/A
Land Use:	N/A
Construction Land Use:	N/A
Timing:	N/A

3.8.4 Materials Generated

Type/Quantity:	Removed topsoil/TBD Removed Vegetation/TBD
Onsite Disposal:	Stockpile, re-spread topsoil
Offsite Disposal:	For excess vegetation, licensed landfill per regulations
Transport Method:	End dump truck, as required

3.9 Substation Preparation

The substation area will be excavated for the transformer foundations and oil containment area. The substation site will be prepared and excavated for the footings required for the termination equipment and control house foundation pad.

3.9.1 MATERIALS

Materials Brought On Site:	None
Transport Method:	N/A
Timeline for Transport:	N/A
Location Materials Used:	N/A
Temporary Storage:	N/A

3.9.2 CONSTRUCTION EQUIPMENT

Equipment:	D8 Dozer, Cat 627 Scraper, Cat 140 Motor Grader, 5 Cat 730 End Dump Trucks
Noise/Dust Potential:	Noise and dust
Chemicals:	Gasoline, diesel fuel, lubricants
Access Method:	Flatbed to site as required or driven to site. Access site from public roads.

3.9.3 TEMPORARY USE OF LAND

Affected area:	N/A
Prior Land Use:	N/A
Construction Land Use:	N/A
Timing:	N/A

3.9.4 MATERIALS GENERATED

Type/Quantity:	Removed topsoil/TBD
Onsite Disposal:	Stockpile, re-spread topsoil
Offsite Disposal:	None anticipated, all stripped topsoil will be re-spread on the site
Transport Method:	N/A

3.10 ACCESS FROM PUBLIC ROADS

Culverts will be installed across ditch to public roadway. The internal road system of the generation site will be connected to the public roadways as indicated on the Site Plan.

3.10.1 MATERIALS

Materials Brought On Site:	600mm diameter culverts (2)
Transport Method:	Flatbed trailer
Location Materials Used:	Access to public roads
Temporary Storage:	N/A

3.10.2 CONSTRUCTION EQUIPMENT

Equipment:	D8 Dozer, Cat 627 Scraper, Cat 140 Motor Grader, 5 Cat 730 End Dump Truck
Noise/Dust Potential:	Noise and dust

Chemicals:	Gasoline, diesel fuel, lubricants
Access Method:	Flatbed to site as required or driven to site. Access site from public roads.

3.10.3 *Temporary Use of Land*

Affected area:	N/A
Prior Land Use:	N/A
Construction Land Use:	N/A
Timing:	N/A

3.10.4 *Materials Generated*

Type/Quantity:	Removed topsoil/TBD
Onsite Disposal:	Stockpile, re-spread topsoil
Offsite Disposal:	None anticipated, all stripped topsoil will be re-spread on the site
Transport Method:	N/A

3.11 Array Foundation Installation

Array foundations will consist of structural footings of the appropriate design, placed into the soil to an appropriate depth depending on the geotechnical conditions. Typical footings may include steel piles, screw piles, concrete piers or a foundation on bedrock.

3.11.1 *Materials*

Materials Brought On Site:	Structural Footings, 1300 Ton
Transport Method:	Flatbed trailer
Location Materials Used:	PV Field
Temporary Storage:	Laydown area

3.11.2 *Construction Equipment*

Equipment:	Cat 730 End Dump Truck, pile driving rig
Noise/Dust Potential:	Noise and dust
Chemicals:	Gasoline, diesel fuel, lubricants
Access Method:	Flatbed to site as required or driven to site. Access site from public roads.

3.11.3 *Temporary Use of Land*

Affected area:	Laydown area/parking 30x50 m
Prior Land Use:	Agricultural
Construction Land Use:	Storage of structural footings

3.11.4 *Materials Generated*

Type/Quantity:	N/A
Onsite Disposal:	N/A

Offsite Disposal:	N/A
Transport Method:	N/A

3.12 FOUNDATIONS (SUBSTATION, TRANSFORMER, INVERTERS)

Foundations for the substation, main transformer and inverter locations will be formed with plywood, reinforced with structural rebar. Concrete will be poured to create foundations.

3.12.1 MATERIALS

Materials Brought On Site:	Wood forms, reinforced concrete (113 cubic metres)
Transport Method:	Flatbed trailer, concrete trucks
Location Materials Used:	Substation, inverter locations
Temporary Storage:	Laydown area

3.12.2 CONSTRUCTION EQUIPMENT

Equipment:	Cat 730 End Dump Trucks, 20 m^3 End Dump Trailers, Cat 330 Excavator Cat 950 Wheel Loaders
Noise/Dust Potential:	Noise and dust
Chemicals:	Gasoline, diesel fuel, lubricants
Access Method:	Flatbed to site as required (forming materials) or driven to site (concrete truck). Access site from public roads.

3.12.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior land Use:	Agricultural
Construction Land Use:	Storage of forming materials

3.12.4 MATERIALS GENERATED

Type/Quantity:	Discarded wood forms, excess rebar. Reuse where possible.
Onsite Disposal:	Recycle wood forms where possible including chipping for on-site restoration
Offsite Disposal:	Licensed landfill per regulations.
Transport Method:	End dump truck, as required

3.13 CABLE TRENCH AND CONDUIT INSTALLATION

Where overburden conditions allow, buried cable trench and conduits or direct buried cable will be installed for the PV collection and aggregation system. Typical cable trench details are included in the Design and Operations Plan.

For the cable trench system, a trench will be excavated by machine to accommodate the components. A layer of sand will be installed and levelled on the bottom of the excavation and covering the conduits or cables. Warning marking shall be placed over the sand bed.

Once the conduits or cables have been installed, the excavated soil, which shall be free of rocks and debris, will be used to fill the remaining trench and lightly tamped.

If the overburden is too thin for burial of cable trench or conduits, a racking system shall be employed.

3.13.1 MATERIALS

Materials Brought On Site:	Cable Trench (5,850 m), Conduit (32,500 m)
Transport Method:	Flatbed trailer
Location Materials Used:	Various
Temporary Storage:	Laydown area

3.13.2 CONSTRUCTION EQUIPMENT

Equipment:	Pickup truck
Noise/Dust Potential:	Dust
Chemicals:	Gasoline, lubricants
Access Method:	Flatbed to site. Access site from public roads.

3.13.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior land Use:	Agricultural
Construction Land Use:	Storage of materials

3.13.4 MATERIALS GENERATED

Type/Quantity:	Packaging waste
Onsite Disposal:	N/A
Offsite Disposal:	Recycle where possible, licensed landfill per regulations
Transport Method:	End dump truck, as required

3.14 DEAD END STRUCTURES

Wood pole dead end structures consisting of wood poles and associated insulators and connectors will be installed to connect the substation to the Hydro One system for power transmission.

3.14.1 MATERIALS

Materials Brought On Site:	Wood pole structures
Transport Method:	Flatbed trailer

Location Materials Used:	Substation area
Temporary Storage:	N/A

3.14.2 CONSTRUCTION EQUIPMENT

Equipment:	JLG G9 Telehandler
Noise/Dust Potential:	Noise
Chemicals:	Gasoline, lubricants
Access Method:	Flatbed to site via public roads.

3.14.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior land Use:	Agricultural
Construction Land Use:	Storage of materials

3.14.4 MATERIALS GENERATED

Type/Quantity:	Packaging waste
Onsite Disposal:	N/A
Offsite Disposal:	Recycle where possible, licensed landfill per regulations
Transport Method:	End dump truck, as required

3.15 CONTROL HOUSE INSTALLATION

A prefabricated control house will be transported to the site on a flatbed trailer and assembled on the foundation pad in the substation area. The prefabricated building is approximately 6 m x 9 m.

3.15.1 MATERIALS

Materials Brought On Site:	Prefabricated control house
Transport Method:	Flatbed trailer
Location Materials Used:	Substation area
Temporary Storage:	N/A

3.15.2 CONSTRUCTION EQUIPMENT

Equipment:	JLG G9 Telehandler
Noise/Dust Potential:	Noise
Chemicals:	Gasoline, lubricants
Access Method:	Flatbed to site via public roads

3.15.3 TEMPORARY USE OF LAND

Affected area:	N/A
Prior land Use:	N/A
Construction Land Use:	N/A
Timing:	N/A

3.15.4 MATERIALS GENERATED

Type/Quantity:	Packaging waste
Onsite Disposal:	N/A
Offsite Disposal:	Recycle where possible, licensed landfill per regulations.
Transport Method:	End dump truck, as required

3.16 FENCE INSTALLATION

A 2.7 m (9') chain link security fence will be erected around the perimeter of the solar facility. The perimeter fence will be designed to accommodate a 3-strand barbed wire top, as required. A 2.7 m (9') chain link security fence topped with 3-strand barbed wire will be erected around the substation area and the inverter clusters.

3.16.1 MATERIALS

Materials Brought On Site:	Chain link fencing, posts
Transport Method:	Flatbed trailer
Location Materials Used:	Facility perimeter
Temporary Storage:	Laydown area

3.16.2 CONSTRUCTION EQUIPMENT

Equipment:	Power auger
Noise/Dust Potential:	Noise and dust
Chemicals:	Gasoline, lubricants
Access Method:	Access roadways

3.16.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior land Use:	Agricultural
Construction Land Use:	Storage of materials

3.16.4 MATERIALS GENERATED

Type/Quantity:	Packaging waste
Onsite Disposal:	N/A
Offsite Disposal:	Recycle where possible, licensed landfill per regulations
Transport Method:	End dump truck, as required

4.0 PHASE 2: PV AND ELECTRICAL INSTALLATION

4.1 PHASE 2 TIMELINE AND ACTIVITY DURATION

The timeline for the PV and electrical installation phase of the Project are summarized in Table 4.1.

Table 4.1 Phase 2 Timeline and Activity Duration

Activity Description	Activity Duration	
	From	To
Planned Commercial Operation Date		February 13, 2012
PV Array Installation		
Material Transport Timeline	October 4, 2011	January 24, 2012
Construction Equipment	October 4, 2011	January 24, 2012
Temporary Use of Land	October 4, 2011	January 24, 2012
Install Substation		
Material Transport Timeline	November 17, 2011	December 27, 2011
Construction Equipment	November 17, 2011	December 27, 2011
Temporary Use of Land	November 17, 2011	December 27, 2011
Install Cabling and Terminations		
Material Transport Timeline	November 17, 2011	February 13, 2012
Construction Equipment	November 17, 2011	February 13, 2012
Temporary Use of Land	November 17, 2011	February 13, 2012

4.2 PV ARRAY INSTALLATION

Intermediate outdoor transformers and outdoor inverter units will be installed on foundation pads. The PV support structures will be erected on the foundation supports, and the PV modules installed in the support structures. Combiner boxes will be installed on the rear of the finished PV arrays.

4.2.1 MATERIALS

Materials Brought On Site: See Table 4.2
Transport Method: Flatbed trailer
Location Materials Used: PV field
Temporary Storage: Laydown area

Table 4.2: PV Array Materials

Item #	Description	Unit	Approximate Quantity	Remarks
	Major Equipment			
1	Intermediate Outdoor 2MVA Padmount Transformer	No.	3	To be installed on transformer pad
2	Intermediate Outdoor 1MVA Padmount Transformer	No.	1	To be installed on transformer pad
3	DC/AC 1 MW power inverter, suitable for outdoor installation	No.	7	To be installed on inverter pad
4	AC Power Enclosure for 2MVA transformers	No.	3	
5	AC Power Enclosure for 1MVA transformers	No.	1	
6	Combiner Box	No.	171	To be installed at the back of solar array
7	Recombiner Box	No.	35	Various locations within site
8	PV structures (7x2 panels/structure)	No.	2043	

Item #	Description	Unit	Approximate Quantity	Remarks
9	PV modules	No.	28,600	

4.2.2 CONSTRUCTION EQUIPMENT

Equipment:	JLG G9 Telehandler, 60 ton Rough Terrain Crane
Noise/Dust Potential:	Noise, Dust
Chemicals:	Gasoline, lubricants
Access Method:	Flatbed to site via public roads

4.2.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior land Use:	Agricultural
Construction Land Use:	Storage of materials

4.2.4 MATERIALS GENERATED

Type/Quantity:	Packaging waste
Onsite Disposal:	N/A
Offsite Disposal:	Recycle where possible, licensed landfill per regulations
Transport Method:	End dump truck, as required

4.3 INSTALL SUBSTATION

Substation components including the main power transformer, switchgear cells, metering, and service transformer and disconnect switches will be installed in the substation area.

4.3.1 MATERIALS

Materials Brought On Site:	See Table 4.3
Transport Method:	Flatbed trailer
Location Materials Used:	Substation Area
Temporary Storage:	Laydown area

Table 4.3: Substation Materials

Item #	Description	Unit	Quantity	Remarks
1	Power Transformer 7 MVA	No.	1	To be installed on transformer foundation surrounded by oil containment
2	High voltage switchgear	No.	1	Installed within substation
3	Prefabricated building 5000mm x 3500mm with 125 VDC 100AH Battery and 120 VAC 30 A DC Battery Charger, AC/DC Auxiliaries and three free standing racks for installation of the protective devices SEL 387 A, NSD 570, HONI IESO modems, RTU, facility monitoring devices, communications, etc.	No.	1	
4	100 kVa three phase outdoor transformer – Station Service Connection	No.	1	To be installed within Station Fence
5	Connection pole	No.	As required for connection purposes	

4.3.2 CONSTRUCTION EQUIPMENT

Equipment:	JLG G9 Telehandler, 60 ton Rough Terrain Crane
Noise/Dust Potential:	Noise, Dust
Chemicals:	Gasoline, lubricants
Access Method:	Flatbed to site via public roads

4.3.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior land Use:	Agricultural
Construction Land Use:	Storage of materials

4.3.4 MATERIALS GENERATED

Type/Quantity:	Packaging waste
Onsite Disposal:	N/A
Offsite Disposal:	Recycle where possible, licensed landfill per regulations
Transport Method:	End dump truck, as required

4.4 INSTALL CABLING AND TERMINATIONS

4.4.1 MATERIALS

Materials Brought On Site:	Low voltage conductor, various (55,250 m), high voltage conductor, various (9,750 m)
Transport Method:	Flatbed trailer
Location Materials Used:	Entire Site
Temporary Storage:	Laydown area

4.4.2 CONSTRUCTION EQUIPMENT

Equipment:	JLG G9 Telehandler, 60 ton Rough Terrain Crane
Noise/Dust Potential:	Noise, Dust
Chemicals:	Gasoline, lubricants
Access Method:	Flatbed to site via public roads

4.4.3 TEMPORARY USE OF LAND

Affected area:	Laydown area/parking 30x50 m
Prior land Use:	Agricultural
Construction Land Use:	Storage of materials

4.4.4 MATERIALS GENERATED

Type/Quantity:	Packaging waste
Onsite Disposal:	N/A
Offsite Disposal:	Recycle where possible, licensed landfill per regulations
Transport Method:	End dump truck, as required

5.0 PHASE 3: POST INSTALLATION

5.1 PHASE 3 TIMELINE AND ACTIVITY DURATION

The timeline for the post installation phase of the Project are summarized in Table 5.1.

Activity Description	Activity Duration	
	From	To
Planned Commercial Operation Date		February 13, 2012
Commissioning		
Material Transport Timeline	N/A	N/A
Construction Equipment	January 24, 2012	February 13, 2012
Temporary Use of Land	January 24, 2012	February 13, 2012
Re-seed, Re-vegetate Site		
Material Transport Timeline	April 1, 2012	May 1, 2012
Construction Equipment	April 1, 2012	May 1, 2012
Temporary Use of Land	N/A	N/A

5.2 COMMISSIONING

The substation equipment, inverters, collector system and PV array systems will be tested and commercial operations will commence. Activities will include testing, calibration of equipment and troubleshooting.

5.2.1 MATERIALS

Materials Brought On Site: N/A
Transport Method: N/A
Timeline for Transport: N/A
Location Materials Used: N/A
Temporary Storage: N/A

5.2.2 CONSTRUCTION EQUIPMENT

Equipment: Service vehicles
Noise/Dust Potential: N/A
Chemicals: N/A
Access Method: N/A

5.2.3 TEMPORARY USE OF LAND

Affected area: Laydown area

Prior land Use:	Agricultural
Construction Land Use:	Service vehicle parking

5.2.4 *MATERIALS GENERATED*

Type/Quantity:	Packaging waste
Onsite Disposal:	N/A
Offsite Disposal:	Recycle where possible, licensed landfill per regulations
Transport Method:	End dump truck, as required

5.3 RE-SEED, RE-VEGETATE SITE

Once major construction has been completed, the site will be re-seeded/re-vegetated with a low growing, plant species in order to reduce soil erosion. The plants will be selected based on their growth habit (lower growing cover is preferred) and their suitability for the area. Temporary erosion and sediment control measures will be removed once the vegetation has stabilized the soil conditions on the site.

5.3.1 *MATERIALS*

Materials Brought On Site:	Vegetative species (determined in conjunction with the Nottawasaga Valley Conservation Authority and/or Ministry of Natural Resources, which is non-invasive and low maintenance), vegetative spreader.
Transport Method:	Trailer
Location Materials Used:	Areas to be re-seeded/re-vegetated, determined after major construction has been completed.
Temporary Storage:	Laydown area

5.3.2 *CONSTRUCTION EQUIPMENT*

Equipment:	N/A
Noise/Dust Potential:	Noise/dust possible during re-seeding/re-vegetating activities.
Chemicals:	N/A
Access Method:	N/A
Duration:	N/A

5.3.3 *TEMPORARY USE OF LAND*

Affected area:	Laydown area/parking 30x50 m
Prior land Use:	Agricultural
Construction Land Use:	Storage of Materials

5.3.4 *MATERIALS GENERATED*

Type/Quantity:	Packaging waste (if any)

Onsite Disposal:	N/A
Offsite Disposal:	Recycle where possible, licensed landfill per regulations
Transport Method:	End dump truck, as required

6.0 COMMUNICATION AND EMERGENCY RESPONSE PLAN

6.1 GENERAL

During construction, operation and decommission activities at the facility, a sign with emergency instructions will be posted at the site including contact information.

- Emergency Instructions
  - Dial 911 for all emergencies
  - Dial RE Orillia 3 ULC contact
- Medical Aid Facilities
  - Orillia Soldiers' Memorial Hospital, 170 Colborne Street West, Orillia, ON L3V 2Z3, Administrative telephone number (705) -
- Fire Services
  - 68 West Street South, Orillia, ON L3V 5G4, Administrative telephone number (705) 325-5201, 8:30 AM to 4:30 PM
- Police Services
  - Ontario Provincial Police, Orillia Detachment, 66 Peter Street South, Orillia ON L3V 5B1, Administrative telephone number (705) 326-3536

6.2 GENERAL INQUIRIES

The public and other organizations will be able to contact RE Orillia 3 ULC regarding general non-emergency issues. A contact number and website will be posted at the site. All inquires will be directed to a company official who can respond to the questions or comments. Inquiries may be addressed by discussion internally and where required, local authorities may be contacted. A written and/or verbal response will be communicated to the concerned individual or party. All correspondence will be recorded and saved electronically in a database and will include name, address and telephone number of individual; time and date of contact and proposed actions to be taken to resolve any issues and possibly prevent reoccurrence.

6.3 EMERGENCIES: GENERAL

A detailed Emergency Response Plan will be prepared in consultation with local municipal authorities and emergency response agencies prior to the start of any construction activity being performed at the site. The plan will be communicated and available to all site personnel. The plan will include:

- Communication procedures including the identification of a primary and secondary crisis manager to serve as the company spokesperson in the event of an emergency;
- Listing of site personnel trained in first aid/CPR;
- Emergency & evacuation procedures for each type of emergency (fire, personal injury, spill);
- Emergency phone numbers (as detailed below); and
- Name and directions to nearest hospital or medical aid facility.

All emergencies will be documented by the Primary Emergency Contact and saved in an electronic file.

6.4 EMERGENCY SCENARIO: FIRE

Prior to the commencement of construction, a fire response plan will be implemented. This will include the notification of appropriate emergency personnel, including the Orillia Fire Department, if a fire occurs at the site.

6.5 EMERGENCY SCENARIO: SPILLS

Spills of operating fluids (gasoline, diesel fuel, lubricants) are possible from construction equipment and maintenance equipment and vehicles.

Spills of transformer insulating oils are possible. The main tanks of the power transformers at the station facility will be filled with insulating oil. Oil levels in the transformers are remotely monitored. Monthly maintenance routines include a check of the level of transformer oil in each transformer, and an inspection of the transformer for leaks.

6.5.1 REPORTABLE SPILLS

Spills are defined as a discharge of a pollutant into the natural environment, from out of a structure, vehicle or other container, and which is abnormal in quantity or quality in light of all the circumstances of the discharge and which may cause an adverse effect resulting directly or indirectly from human activities (Environmental Protection Act, R.S.O. 1990 Part X).

Reportable spills include:

1. Discharge of a pollutant into the natural environment.
2. Discharge likely to cause adverse effects.
3. Discharge not contained by secondary containment.
4. Discharge >100 litres of vehicle operation fluids.
5. Discharge >100 litres of mineral oil from electrical equipment

6. Any discharge (including those exempted in d and e) that enter water or drainage structures (ditches, maintenance holes, etc.).
7. Any discharges that contain more than 1.0 gram of PCBs (>50ppm) or any discharge with unknown but potential PCB content.
8. Spills of airborne pollutants or emissions of smoke including gases, vapours, particulate, uncontained dust emissions from blasting, etc.

6.5.2 INTERNAL NOTIFICATIONS

The Primary Crisis Manager will record all the pertinent information regarding the spill in a Spill Incident Report. The Secondary Crisis manager will be informed of the spill, and be given a copy of the Spill Incident Report.

6.5.3 EXTERNAL NOTIFICATIONS

The Response Supervisor or designate must notify the following responders:

Agency	Contact Numbers
Ministry of the Environment	
Spills Action Centre (SAC)	1-800-268-6060 (24 hours)
Orillia Fire Department	911
Orillia OPP	911

Where readily ascertainable, also contact any third party of or person having control of the pollutant (if applicable). For spills that enter the storm and/or sanitary sewer system, or that occur within the boundaries of the municipal authority, contact the local municipality.

Agency	Contact Numbers
Township of Oro-Medonte	(705) 487-6499
County of Simcoe	(705) 726-9300
City of Orillia	(705) 329-7249

The nearest hospital or medical aid facility to the RE Orillia 3 site is the Orillia Soldiers' Memorial Hospital in Orillia, which is approximately 7 km to the east-northeast of the site.

6.5.4 SPILL INCIDENT REPORT

When reporting a spill to any government agency, the following information should be given:

- What was spilled?
- How much was spilled?
- Where is the spill?
- What was done to contain and clean up the spill?
- Who (i.e. what company) do you represent?
- Where are you?

The following Spill Incident Report will be used to record spills.

Spill Incident Report

Location: **Date:** ____ / ____ / ____
Year Month Day

Time: □ a.m. □ p.m

Reported by Whom: _____

Reported Interally to: _____ **Date:** ____ / ____ / ____
Year Month Day

Time: □ a.m. □ p.m

Incident description _____

Material Spilled/Released: _____ **Duration:** _____

Estimated Quantity _____

Immediate Cause _____

Additional Equipment or Agency Employed: _____

Immedate Actions: _____

Weather Conditions: _____

Time Normal Conditons Restored: _____ □ a.m. □ p.m **Date:** ____ / ____ / ____
Year Month Day

Reported to (MOE, etc.): Time _____ □ a.m. □ p.m **Date:** ____ / ____ / ____
Year Month Day

7.0 ENVIRONMENTAL FEATURES, EFFECTS AND MITIGATION

Anticipated environmental effects and the mitigation plan by Hatch are presented in Appendix A.

RECURRENT ENERGY

APPENDIX A

ENVIRONMENTAL EFFECTS AND MITIGATION

RE ORILLIA 3 SOLAR PROJECT

Negative Environmental Effects, Mitigation Measures, and Environmental Effects Monitoring Plan

August 3, 2011

RECURRENT ENERGY

RE Orillia 3 ULC

Negative Environmental Effects, Mitigation Measures, and Environmental Effects Monitoring Plan

RE Orillia 3 Solar Project

H334680-0000-07-124-0093
Rev. 1
August 3, 2011

Project Report

August 3, 2011

RE Orillia 3 ULC
RE Orillia 3 Solar Project

Negative Environmental Effects, Mitigation Measures, and Environmental Effects Monitoring Plan

Completed in accordance with the requirements of the Construction Plan Report to be submitted as part of the application for a Renewable Energy Approval

Table of Contents

List of Figures

1. Introduction

RE Orillia 3 ULC is proposing to develop and operate a 6.5-megawatt (MW) solar photovoltaic (Solar PV) facility, on an approximately 15-hectare (ha) parcel of land, located about 7 km west-southwest of Orillia in the Township of Oro-Medonte in County of Simcoe (Figure 1.1); herein referred to as "RE Orillia 3" or the "Project".

This report identifies the potential negative environmental effects, documents the proposed mitigation measures, and describes the environmental effects monitoring plan for the Project. This information is being completed in accordance with the requirements of the Construction Plan Report to be submitted as part of the application for a Renewable Energy Approval (REA).

1.1 Renewable Energy Approval Legislative Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the REA Regulation) made under the *Environmental Protection Act* identifies the REA requirements for renewable energy projects in Ontario. As per Section 4 of the REA Regulation, ground-mounted solar facilities with a nameplate capacity greater than 10 kilowatts (kW) are classified as Class 3 solar facilities and do require an REA.

Section 13 of the REA Regulation requires proponents of Class 3 solar facilities to complete a Construction Plan Report to identify

i. details of any construction or installation activities

ii. location and timing of any construction or installation activities for the duration of the construction or installation

iii. any negative environmental effects that may result from construction or installation activities within a 300-m radius of the activities

iv. mitigation measures in respect of any negative environmental effects identified.

Information contained in this Report will be used to provide input into the Construction Plan Report to satisfy the requirements of points (iii) and (iv), identified above. The Construction Plan Report, which will be prepared separately, is to be submitted in association with RE Orillia 3 ULC's application for a REA.

1.1.1 Definition of "Environment"

In order to establish negative environmental effects, the definition of environment must be clearly identified. For the purposes of renewable energy projects, Section 47(1) of the *Environmental Protection Act* defines environment as having the same meaning as in Section 1(1) of the *Environmental Assessment Act*. Therefore, environment means

(a) air, land or water

(b) plant and animal life, including human life

(c) the social, economic and cultural conditions that influence the life of humans or a community

(d) any building, structure, machine or other device or thing made by humans

(e) any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or

(f) any part or combination of the foregoing and the interrelationships between any two or more of them

in or of Ontario.

1.2 Renewable Energy Approvals – Technical Bulletins

In addition to the content of the REA Regulation, the Government of Ontario released a series of draft Technical Bulletins for public comment on March 1, 2010. The purpose of these technical bulletins is to provide guidance to renewable energy developers on meeting the requirements of the REA process. Specifically, Technical Bulletin Three provides guidance for preparing the Construction Plan Report as part of an application under O. Reg. 359/09. Though these bulletins remain in draft form, this report has been prepared, taking into consideration the requirements outlined within Technical Bulletin Three.

2. Existing Conditions

Prior to completing an environmental effects assessment, an understanding of existing conditions on and within 300 m of the Project location (shown in Figure 1.1 and hereafter referred to as the "study area"), is necessary.

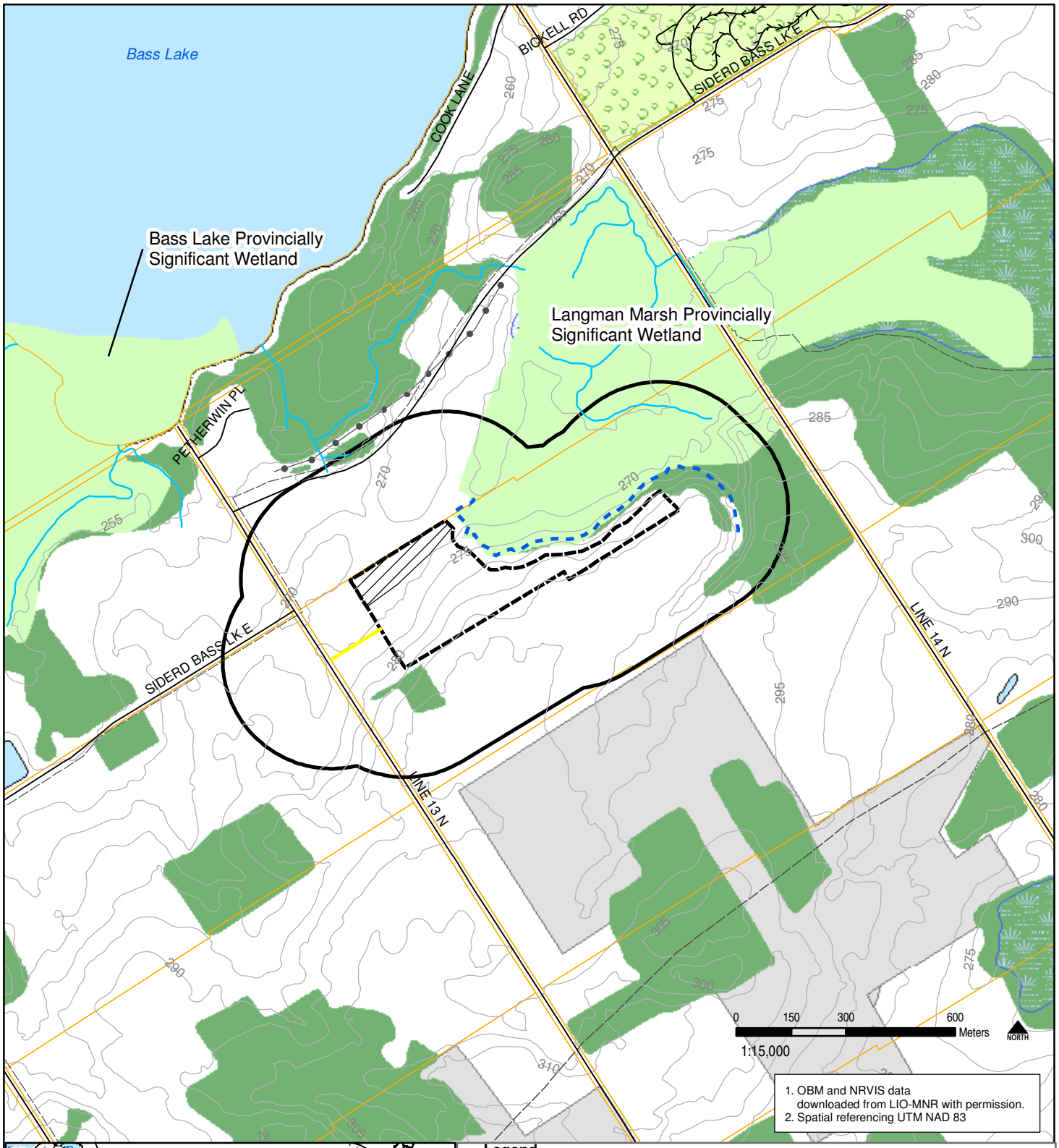
In order to accomplish this, Hatch Ltd. gathered existing information on the study area through the following sources:

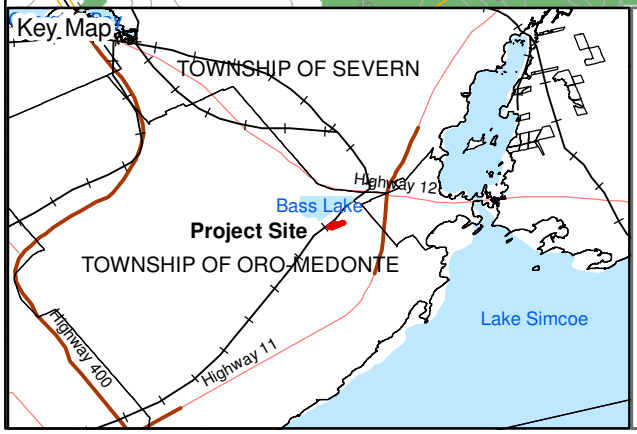
- local municipalities
- provincial government records, such as those maintained by the Ontario Ministry of Natural Resources (MNR) and the Ontario Ministry of Agriculture, Food, and Rural Affairs
- federal government records, such as those maintained by Natural Resources Canada, Fisheries and Oceans Canada, Environment Canada (EC), etc
- other records, such as the Atlas of the Mammals of Ontario, the Ontario Breeding Bird Atlas, etc.

Following the review of existing records, Hatch Ltd. completed a site investigation within the study area to confirm the presence of the features identified during the records review. Features identified within the study area are shown in Figure 1.1, and provide the basis for the assessment of environmental effects associated with the Project.

3. Potential Negative Environmental Effects

This section describes the potential negative environmental effects that could occur during the construction and installation activities associated with the Project. The details of the construction





Legend

- New Distribution Line From Project
- Wetland Boundary and Seepage Area
- Trail
- Project_Location
- Temporary Construction Laydown Area
- 300 m from Project Location
- Provincial Park
- Provincially Significant Wetland
- Wooded Area
- Pit/Quarry

Figure 1.1
Recurrent Energy
RE Orillia 3
Project Location

HATCH™

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BACK OF FIGURE

and installation activities are provided within the Construction Plan Report (Recurrent Energy LLC, 2010). All construction and installation activities are expected to occur at the Project location; however, potential environmental effects are considered within 300 m of the Project location.

Potential environmental effects are addressed by resource below.

3.1 Soils

A number of construction activities (e.g., soil stripping (where necessary), vegetation removal, site grading, addition of fill for temporary or permanent access roads, stockpiling of materials and heavy equipment use) could potentially result in negative effects on soil quality and loss of soils due to erosion. Accidental spills during construction could also impact the soil.

Stockpiling of excavated materials may result in the development of anaerobic conditions or mixing of topsoils and subsoils (if present), which could negatively affect the soil's productivity.

The use of gravel or granular materials as a base for access roads could result in the mixing of these materials with underlying soils, potentially impacting soil structure and/or texture, infiltration of surface water, and vegetation growth.

Excessive soil compaction can result in inhibited vegetation growth by impeding root penetration within the soil, reducing aeration, and altering moisture intake (i.e., decreased infiltration due to decreased pore space within the soil structure) (DeJong-Hughes et al, 2001). Decreased water infiltration into the soil could also potentially result in an increase in surface runoff which could increase soil erosion.

Surficial soils will also be disturbed throughout the construction site due to topsoil and subsoil stripping, grading and use of heavy machinery. These activities have the potential to increase soil erosion due to exposure of bare soil (not protected by vegetation) to the effects of stormwater or wind. In addition, any changes in surface runoff from the Project location resulting in higher rates of runoff or more concentrated flow paths could potentially result in increased soil erosion on or off site.

The cumulative effect would be some minor impacts to soil quality and loss of soils from the Project location. This could potentially affect the quality of the remaining soil and, in particular, its ability to support vegetation growth. Mitigation measures to address these impacts are described in Section 4.1. Potential adverse effects on soils due to accidental spills are discussed in Section 3.16.

3.2 Groundwater

The Project location is located in close proximity to Langman Marsh Provincially Significant Wetland (PSW), which it is primarily fed from groundwater discharged from the Oro-Moraine physiographic feature, and there is an identified seepage area in the woodland to the northwest of the Project location. Therefore, groundwater resources are present at the Project location, although the depth of the groundwater table in the construction area where excavations may be necessary is not known at this time.

Excavations for transformers and potentially solar panel footings (depending on the type of footing and the installation method) could encroach upon the groundwater table. These activities have the

potential to cause seepage into the excavations and pumping may be necessary to keep the area dry during the construction period. If significant amounts of pumping were required, it could potentially result in lowering of the local groundwater table around the excavation. However, due to the small size of the excavations and the limited time they will be open (<2 weeks), significant impacts on the groundwater table are not anticipated.

A groundwater well will likely be installed on the Project location to provide water for construction purposes. Any water withdrawn from the well will be stored in a bladder tank on site, prior to use. Groundwater withdrawal from the well could potentially result in a minor, short-term decrease in the local groundwater table in the vicinity of the well.

Soil compaction could also impact groundwater recharge by reducing water infiltration.

These effects are minor and temporary in nature and will result in only short-term minor impacts to the groundwater table. Mitigations measures to address these impacts are described in Section 4.2.

Groundwater quality could also be impaired as a result of contamination from accidental spills (see Section 3.14).

3.3 Surface Water Quality

The closest surface water body to the Project location is an unnamed tributary of Bass Lake, located approximately 200 m northeast of the Project location within the Langman Marsh PSW. However, water in this watercourse may be supplied through surface water runoff from areas including the Project location, or by groundwater discharge from the seepage area adjacent to the Project location. Therefore, although unlikely given the distance from the Project location to the water body, surface water quality and flow in this water body could potentially be impaired during construction and installation by

- runoff from the Project location with increased turbidity from erosion/sedimentation of excavated or exposed soils
- increased rates and quantity of runoff from the Project location due to ditch collection and discharge network around access roads, impervious concrete slabs or less pervious access roads and parking areas, or
- increased turbidity from deposition of fugitive dust from the Project location.

Mitigation measures to address these potential adverse effects are described in Section 4.3.

Potential adverse effects to surface water quality as a result of accidental spills are discussed in Section 3.14.

3.4 Aquatic Habitat and Biota

Aquatic habitat and biota (e.g., fish and benthic invertebrates) residing in the watercourse in Langman Marsh PSW adjacent to the Project location will not be directly affected by any Project activity, since no activity will occur within ~200 m of the average annual high water mark.

However, negative effects to aquatic habitat and/or biota could potentially occur as a result of changes in surface water quality (see Section 3.3), groundwater (see Section 3.2) and/or erosion and sedimentation due to changes in topography and/or erosion of soils from the Project area. Mitigation measures to address impacts to groundwater and surface water quality are described in Sections 4.2 and 4.4, respectively.

Aquatic biota could also be negatively affected by accidental spills, if the contaminants are transported into the watercourse. These potential effects are discussed in Section 3.14.

3.5 Vegetation

There will be some minor removal of natural vegetation required for the Project associated with the hedgerows crossing the Project location. This represents a minor loss of natural vegetation from the vicinity of the Project location.

Vegetation communities in the vicinity of the Project location may also be impacted by dust deposition on leaf surfaces, resulting in minor impairment of growth. These effects are temporary in nature and will result in only short-term minor impacts to vegetation communities adjacent to the Project location. Mitigation measures to address these impacts are described in Section 4.5.

Vegetation could also be damaged as a result of accidental spills, which are addressed in Section 3.16.

3.6 Wildlife

Impacts on wildlife species could occur as a result of loss of habitat, disturbance from construction activities, or incidental mortality as a result of collision with construction vehicles.

There will be some minor loss of habitat on agricultural lands and within the hedgerows associated with the construction of the Project, but the majority of the site will remain suitable for use by wildlife species that would have been present on the agricultural fields prior to construction. Further, the hedgerows do not provide sufficient quality habitat for wildlife species and will represent a negligible loss of habitat from the area.

The presence of the construction workforce and operation of construction machinery on site will result in avoidance of the Project location by species intolerant of these types of disturbances. This effect will occur over a single year and will result in a short-term, temporary reduction in wildlife abundance in the immediate vicinity of the Project.

The movement of construction machinery across the site has the potential to result in the incidental take of wildlife species as a result of collisions with moving vehicles. Machinery operating on site will be travelling at low speeds, and therefore, the potential for incidental take is considered low, and likely restricted to species of small mammals and reptiles/amphibians that may be unable to rapidly move away from oncoming machinery.

These effects are temporary in nature and will result in only short-term minor impacts to wildlife communities on and in the vicinity of the Project location. Mitigation measures to address these impacts are described in Section 4.6.

3.6.1 Species at Risk

Several Species at Risk were identified as having potential habitat in the vicinity of the Project. Consultation with the Ministry of Natural Resources (MNR) is ongoing, as is required by the *Endangered Species Act, 2007,* in order to ensure that either

- there is no impact to these species, or
- if an impact is determined to be likely to occur, compensation occurs such that an overall benefit to the species is achieved.

Mitigation measures to address any impacts that may occur are discussed in Section 4.6.1.

3.6.2 Air Quality and Noise

Dust may become airborne from vehicular traffic and heavy machinery use on loose or granular surfaces, and soil moving activities. Airborne dust can have a range of effects including, but not limited to,

- impacts on human health as a result of irritation to lungs, eyes, etc, which could impact construction workers or nearby residents
- impacts on surface water quality and aquatic habitat if the dust is deposited into the watercourses
- impacts on vegetation if heavy dust loads build up on photosynthetic surfaces, thereby resulting in mortality of the plants.

In addition to impacts from dust, a variety of construction, haulage and personnel vehicles, as well as portable generators will be used on site during the construction period. The use of this equipment will result in exhaust emissions containing, among other emissions, carbon monoxide, nitrogen oxides and sulphur oxides. Operation of this equipment will result in some minor decrease in air quality in the immediate vicinity of operating equipment. However, this potential effect will be temporary in nature and emissions would be expected to dissipate following the equipment being shut down or it's moved out of the affected area.

Construction and installation activities have the potential to result in increased noise levels on and within the vicinity of the Project location. Noise emanating from the Project location could disturb both the sensitive receptors (e.g., neighbouring residents) and local wildlife populations.

Both the air quality and noise effects are temporary in nature and will result in only short-term minor impacts on local air quality and noise levels. Mitigation measures to address these impacts are described in Section 4.7.

3.7 Traffic

Increased traffic volumes and equipment delivery to the Project location and temporary disruption along routes utilized by construction vehicles may result in delays to local community traffic flow during the construction period. This potential negative effect is most likely to affect the nearby aggregate resource operation and the local road users in the vicinity of the Project location, as opposed to resulting in an inconvenience to a wider, regional area. Mitigation measures to address these impacts are described in Section 4.8.

3.8 Municipal Roadways

The use of municipal roadways by construction vehicle traffic may result in roadway damage during the construction of the Project. The magnitude of this potential negative effect will correspond directly with the proximity to the Project location, as construction vehicles will likely cause the most damage to roads which are highly travelled by construction traffic, especially in the vicinity of the construction vehicle entrance. Mitigation measures to address these impacts are described in Section 4.9.

3.9 Public and Construction Site Safety

Construction of the proposed development poses potential public and construction site safety concerns in the vicinity of the Project location. Potential impacts include injury from construction equipment or activities. Mitigation measures to address these impacts are described in Section 4.10.

3.10 Waste Management

Construction activities will likely result in the generation of recyclable material, as well as construction and sanitary waste. Generation of such material will occur within the Project location, and wastes and recyclables will be transported to the nearest, approved facility for disposal or recycling. Mitigation measures to address these impacts are described in Section 4.11.

3.11 Land Use

Lands within the Project location will be removed from agricultural production upon Project construction. However, the Project location can be returned to agricultural production upon site decommissioning. This potential negative effect is, therefore, considered to be negligible given its reversibility.

3.12 Protected Properties

No protected properties, as defined in Section 19 (1) of O. Reg. 359/09, exist in the vicinity of the Project location. Therefore, no adverse effects on protected properties will occur.

3.13 Built Heritage and Cultural Heritage Landscapes

Upon completion of the Ministry of Tourism and Culture (MTC) – *Check Sheet for Environmental Assessments: Screening for Impacts to Built Heritage and Cultural Heritage Landscapes,* it has been determined that no Heritage Impact Assessment for the Project would be required as no negative effect to built heritage and cultural heritage landscapes is anticipated.

3.14 Archaeological Resources

Stages 1 and 2 Archaeological Assessments were conducted to determine if archaeological resources were present within the Project location. The office of the MTC has reviewed the Archaeological Assessment Report in accordance with Part VI of the *Ontario Heritage Act*, R.S.O 1990, c 0.18, and accepted its findings. No archaeological resources were found during the assessment. However, following a standard archaeological assessment, there remains a potential to uncover deeply buried heritage or archaeological resources (including human burial sites) which would not have previously been identified. In this instance, the MTC has specified mitigation that must be undertaken in the

event of discovery of human remains or other archaeologically or culturally significant material. These mitigation measures are discussed in Section 4.12.

3.15 Potential Negative Effects Due to Spills

Spills of petroleum hydrocarbon materials from equipment operating on site, such as fuel or hydraulic oils or spills of concrete materials from concrete trucks, could occur during the construction process. Spills may occur as a result of leakage from vehicles/equipment due to malfunction, leakage from storage areas (if such materials are stored on site) as a result of weakness in the storage equipment, improper handling techniques, and/or improper refuelling techniques. Spills of these materials could result in the following negative effects:

- contamination of soils, surface water, and groundwater with materials inhospitable to the promotion of biological life
- uptake/ingestion by, or coating of, vegetation species or terrestrial and aquatic biota resulting in senescence or individual mortality.

The extent of these effects is highly dependent on the magnitude and location of the spills (i.e., larger spills or those in proximity to sensitive areas are anticipated to potentially have greater effects). The effectiveness of the spill response has a strong bearing on the scale of potential impact. Spill response measures are discussed in Section 4.13.

4. Proposed Mitigation Measures

The following sections detail the proposed mitigation measures to prevent or minimize the potential negative environmental effects discussed in Section 3. Three types of mitigation measures were included and documented where applicable:

- modifying the types of construction activities
- installing treatment technologies (e.g., erosion and sedimentation control measures)
- changing the Project construction schedule to prevent adverse effects during sensitive time periods.

4.1 Soils

As discussed in Section 3.1, soils on and in the vicinity of the Project location may be negatively affected as a result of construction and installation activities. Negative effects were documented with respect to soil displacement, soil quality and sedimentation/erosion processes. Mitigation measures are identified below in consideration of these areas.

In order to assess if soil compaction has occurred, at the completion of construction activities, disturbed areas will be visually monitored for evidence of rutting or flattened areas beneath stockpiles. Restoration efforts (e.g., discing or other soil loosening methods) will be undertaken as required to prevent significant long-term impacts due to excessive amounts of compaction.

In order to prevent mixing of topsoil and subsoils (if encountered), these materials will be stored separately. The depth of topsoil stockpiles is to be limited to the greatest extent possible, with depths preferably restricted to <1 m. Stockpiling to depths >1 m may result in adverse effects on the health of the soils at the base of the stockpile by promoting the generation of anaerobic conditions (Harris and Birch, 1989; cited in Strohmayer, 1999).

Following the stripping of the topsoil and prior to the deposition of the gravel base in access road, laydown and parking areas, a layer of geotextile fabric will be placed over the entire area to prevent mixing of gravel with the native subsoils.

Preventing erosion from occurring will be the primary goal of an erosion and sedimentation control plan, to be prepared by the construction contractor. The main mitigation measures that will form the basis for the sediment and erosion control plan will include the following:

- erosion and sediment control measures to be placed throughout the Project location to minimize the potential for erosion and off-site sedimentation. This will include, at minimum, silt fencing installed around the Project work areas and in the vicinity of drainage features on and adjacent to the Project location. All erosion and sediment control measures are to be installed and maintained in accordance with Ontario Provincial Standards Specification (OPSS) 577.
- all necessary erosion and sediment control measures must be in place prior to the start of any earthworks, and are to remain in place until all areas of the construction site have been stabilized
- an adequate supply of erosion (e.g., geotextiles, revegetation materials) and sedimentation (e.g., silt fences) control devices is to be provided on site to control erosion and sedimentation and respond to unexpected events
- the size of the disturbed areas at the construction site is to be minimized. The extent of the work area is to be demarcated on the site to ensure that the contractor does not work beyond these bounds.
- phase construction to minimize the time that soils are exposed
- revegetate/stabilize disturbed as soon as possible after exposure
- erosion and sedimentation control measures (e.g., silt fence barriers, flow dissipaters, rock flow check dams, etc) will be installed and maintained as required in accordance with the relevant OPSS
- sediment control measures will be used during any dewatering of open excavations, should they be required
- stockpiles will have appropriate barrier/covers to prevent wind erosion, as necessary.

With the implementation of the proposed mitigation measures as outlined above, it is anticipated that adverse effects on soils will be minor, short term in duration and localized in the Project area.

4.2 Groundwater

As discussed in Section 3.2, groundwater pumping from open excavations could potentially result in lowering of the local groundwater table in the vicinity. Should dewatering be required, all groundwater will be pumped out of the excavated area, treated, if required to meet the Ministry of Environment (MOE) water quality discharge criteria, and discharged to a vegetated buffer area. The duration of groundwater pumping will be limited to the extent possible to avoid significant changes in the groundwater table. If groundwater seepage into excavations is extensive, other mitigation measures may be installed to prevent seepage from entering the excavations in order to avoid pumping requirements. Therefore, if pumping is required, it may result in short-term localized lowering of the groundwater table, but no significant changes are anticipated.

Groundwater may also be pumped from a new on-site well installed for construction purposes. It is estimated that approximately 10,000 L of water per day will be drawn from the well and used for dust control and other construction purposes. In the event that more water is required, withdrawals from the well will not exceed 45,000 L/d to mitigate the potential impact on the surrounding groundwater supplies. Though there remains a potential for short-term localized lowering of the groundwater table, significant changes are not anticipated to occur.

Rehabilitation of significant areas of soil compaction following construction (as discussed in Section 4.1) will ensure that soil compaction around the site is limited with no significant adverse effects on water infiltration, and hence groundwater recharge, anticipated to occur.

Section 4.11 details the mitigation to prevent or minimize the potential adverse effects of accidental spills during construction.

4.3 Surface Water Quality

Mitigation measures identified with respect to other resources will be effective in preventing impacts to surface water quality:

- mitigation for contamination from accidental spills (see Section 4.13)
- mitigation for erosion/sedimentation (see Section 4.1)
- mitigation for fugitive dust deposition (see Section 4.7).

As a result of the use of effective mitigation measures, it is anticipated that there will be no resulting adverse effect on surface water quality. Mitigation measures are discussed in more detail in the Waterbodies Environmental Impact Study (Hatch Ltd., 2010). With the implementation of these mitigation measures, any adverse effects on surface water quality will be minor and temporary.

4.4 Aquatic Habitat/Biota

Adherence to the 30-m setback requirement is the primary mitigation measure that will prevent direct adverse effects on aquatic habitat and biota. Given the distance to the watercourse within the Langman Marsh PSW (~200 m from the Project boundary), it is expected that this will be effective.

Additional mitigation measures to address potential negative effects on aquatic habitat and biota are discussed in Sections 4.1, 4.2 and 4.3 (Soils, Groundwater and Surface Water Quality, respectively).

As a result of the mitigation measures identified in these sections, impacts to aquatic habitat/biota as a result of Project construction are anticipated to be prevented. With the implementation of these mitigation measures, any adverse effects on surface water quality will be minor and temporary.

4.5 Vegetation

As was identified in Section 3.5, vegetation communities may be impacted by clearing of hedgerows, accidental spills or movement of dust off site. Mitigation measures with respect to potential impacts of accidental spills on vegetation communities are addressed in Section 4.13. In addition, mitigation measures with respect to the movement of dust from the Project location are described in Section 4.7. As a result of the effective use of the mitigation measures identified in these sections, potential impacts to vegetation communities from these impacts are expected to be fully mitigated, and there is no resulting effect.

It is not possible to mitigate the impacts of clearing from the hedgerows. In order to minimize potential losses from surrounding vegetation communities, areas where clearing is required will be well marked, and workers will be instructed not to enter areas of natural vegetation. In addition, cleared and grubbed materials will be piled away from the surrounding woodlands, and trees will be felled into cleared areas.

4.6 Wildlife

As described in Section 3.6, wildlife populations could be impacted by loss of habitat, disturbance due to construction activities, and incidental take.

In order to minimize the potential for habitat loss, work areas will be demarcated in order to ensure that the contractor does not work beyond those bounds. Vegetation ground cover to be used on the Project location will be selected in consideration of promotion of wildlife features.

In order to minimize potential for disturbance or incidental take of wildlife, construction activities will be timed outside of the breeding bird period (generally May through July), wherever possible. If this is not possible, a trained avian biologist will inspect the proposed work area, plus an additional 100 m around the area, for nesting birds prior to any work being done to delineate workable areas (i.e., avoiding nests or other sensitive breeding habitat until area is abandoned for wildlife breeding). If an active nest of a species covered under the federal *Migratory Birds Convention Act* (MBCA) or the provincial *Fish and Wildlife Conservation Act* (FWCA) is located within a proposed work area, a mitigation plan (which may include the establishment of buffers around the active nests) will be developed to prevent impacts on birds or their active nests, and submitted to EC (for MBCA species) or MNR (for FWCA species) for review prior to implementation.

In spite of the mitigation measures identified above, it is anticipated that there will be some disturbance of wildlife population on and in the vicinity of the Project location during construction, but these effects will be minor, temporary, and reversible. In addition, it is possible that there may be an incidental take of a species of wildlife during the construction; however, species observed on the Project location are common to the regional area and loss of one or a few individuals will have a negligible effect on population size at the local and regional levels.

4.6.1 Species at Risk

The disturbances caused by construction activities may cause any Bobolink to leave the vicinity of the Project location thus preventing any mortality during the construction phase of the Project.

A contingency plan will be developed prior to construction in order to identify procedures to be followed if a provincial or federal species at risk are identified on the Project location during construction. This will generally consist of

- ceasing construction activities
- contacting the contractor's environmental representative to (i) confirm the presence of the species at risk, (ii) identify the nature of its presence on the Project location (i.e., breeding, stop-over on migration, incidental occurrence), and (iii) determine if critical habitat for the species is present
- the environmental representative will then contact the MNR (for species listed on the Ontario *Endangered Species Act*) or EC (for species listed on the federal *Species at Risk Act*) to identify whether a mitigation plan is required, and to develop such a plan, if needed.

4.7 Air Quality and Noise

The use of standard construction best management practices and mitigation measures, such as those identified in "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" (Cheminfo Services Inc., 2005), will be used. These mitigation measures are to include, as required

- use of dust suppression (i.e., water or other approved materials that will not have adverse effects on surface water quality or vegetation growth) on exposed areas including access roads, stockpiles and work/laydown areas as necessary
- hard surfacing (addition of coarse granular material) of access roads or other high-traffic work areas
- phased construction, where possible, to limit the duration of soil exposure
- avoid earth-moving works during excessively windy weather. Stockpiles to be worked (e.g., loaded/unloaded) from the downwind side to minimize wind erosion
- stockpiles and other disturbed areas to be stabilized as necessary (e.g., taped, mulched, graded, revegetated or watered to create a hard surface crust) to reduce/prevent erosion and escape of fugitive dust
- dust curtain to be used on loaded dump trucks, delivering materials from off site but will not be used on heavy equipment at site
- workers to utilize appropriate personal protective equipment (e.g., masks, safety goggles) as necessary.

The use of these mitigation measures would be expected to mitigate most effects of dust on local air quality, with any impacts expected to be temporary in nature and low in magnitude.

Noise emissions due to construction and installation activities will be limited to daylight hours. Vehicles will also be regularly checked for properly-working mufflers or other noise-reducing equipment, and all construction equipment will meet MOE emission standards (NPC 115). In spite of the mitigation measures identified above, it is anticipated that noise from the Project will have some effect on local wildlife populations (addressed in Section 4.6, above) and may be audible at nearby sensitive receptors. Adjacent residents will be made aware of a contact person for complaints relating to noise during the Project construction, such that, if noise complaints are received, RE Orillia 3 ULC can take appropriate actions to mitigate further impacts. As construction will occur over an approximately 6 to 10 month period, the resulting effect on nearby receptors is expected to be minor and temporary.

4.8 Traffic

Potential negative effects as a result of increased traffic volumes and equipment delivery to the Project location as well as temporary disruption along routes utilized by construction vehicles will be minimized with the implementation of the following proposed mitigation measures:

- designated transportation routes will be utilized
- overhead lines will be temporarily removed or relocated as required (the appropriate utility will be contacted)
- a police or security escort will be utilized to guide or accompany major equipment deliveries to the Project location
- flagmen will be utilized as required to facilitate traffic flow and control
- construction vehicles will be driven in a proper manner with respect for all traffic laws
- signage providing any detour directions will be prominently displayed
- vehicle imprints or erosion gullies will be repaired or regraded as necessary through consultation with the Township of Oro-Medonte.

As a result, impacts to traffic will be temporary, and reversible following Project construction.

4.9 Municipal Roadways

Damage to municipal roadways caused by construction vehicle traffic could potentially occur during the construction of the Project. The following mitigation measures are proposed to minimize this potential negative effect:

- designated transportation routes will be utilized
- construction vehicles will be driven in a proper manner with respect for all traffic laws
- damage to municipal roadways will be repaired as necessary during the construction period
- upon construction completion, municipal roadways will be repaired, as required through consultation with the Township of Oro-Medonte.

As a result, there will be no residual effect to municipal roadways following effective mitigation.

4.10 Public and Construction Site Safety in the Vicinity of the Project

Implementation of the following mitigation measures will serve to minimize potential risk to public and construction staff safety within the Project location:

- public access to the construction area will be prevented through the use of fences, gates, and security procedures
- signage will be posted to notify the public of construction in the area
- workers will be required to adhere to prescribed safety procedures
- proper procedures for construction traffic will be developed, where required.

As a result, the risk to public and construction site safety is effectively minimized following the use of these mitigation measures.

4.11 Waste Management

Solid wastes generated during construction will include construction waste such as material packaging and scrap material as well as domestic waste such as food and sanitary waste. Sanitary facilities on site will include portable self-contained toilets and washroom facilities. The following mitigation measures will serve to minimize any potential negative effects as a result of the generation of waste and recyclables:

- construction waste will be properly stored on site prior to disposal off site at local registered disposal facilities
- all sanitary waste is to be contained and hauled off site by a designated hauler throughout the construction period
- hazardous wastes will be properly stored in secure containers inside impervious berms or other containment areas until disposal off site at a registered facility
- reuse and recycling will be practiced wherever possible.

The use of these mitigation measures will minimize any environmental effects resulting from the generation of waste.

4.12 Disturbance to Archaeological Resources

Following a standard archaeological assessment (including Stages 1 and 2), there remains a potential to uncover deeply buried heritage or archaeological resources (including human burial sites) during construction of the Project, which would not have previously been identified. In this instance, the MTC has specified mitigation that must be undertaken in the event of discovery of human remains or other archaeologically or culturally significant material.

- Should human remains or artifacts be identified during construction, all work in the vicinity of the discovery is to be halted immediately, as required under the *Ontario Heritage Act*.
- If human remains are found, notification is to be made to the Ontario Provincial Police (OPP), or local police who will conduct a site investigation and contact the district coroner.

- Notification is to be made to the Development Plans Review Office of the Ontario Ministry of Tourism and Culture, Heritage Libraries Branch, Heritage Operations Unit, 400 University Avenue, 4th Floor, Toronto, Ontario, M7A 2R9, and Registrar of Cemeteries, Ontario Ministry of Consumer and Commercial Relations.
- Work is to be halted if any artifacts are found, until the site can be investigated and cleared by a licensed archaeologist.

The mitigation measures identified above will effectively minimize impacts on archaeological resources of the study area.

4.13 Spills

Accidental spills have the potential to occur during construction, and appropriate safeguards will be put in place to prevent contamination of the receiving environments. Contaminants that will be used during construction and have the potential to be spilled consist of petroleum hydrocarbons (from fuel storage and transport, vehicle maintenance and in transformers), concrete materials, sewage (from portable toilets), and silt (from clearing and earth-moving operations).

To mitigate the potential for spills during construction, the site engineer and environmental specialist will be responsible for ensuring that the Project is constructed using best environmental management practices. The following measures will be implemented.

- A designated Site Environmental Inspector will be appointed. This person will be responsible for ensuring that the contractor(s) have prepared a spill clean-up procedure/emergency response plan and appropriate equipment, with all staff trained in proper implementation in the event of a spill.
- Emergency contacts will be posted, including 911, Police, Fire Department, MOE Spills Action Centre, and contacted as required.
- An emergency spill kit will be kept on site in case of fluid leaks or spills from machinery.
- Establish designated refueling and maintenance areas at least 30 m from waterbodies, drainage ditches, channels or other wet areas.
- Locate designated hazardous material storage areas at least 30 m away from drainage routes for all hazardous materials to be stored outside. Storage areas should be above ground and enclosed by an impervious secondary containment structure (e.g., berm or container) capable of holding the entire volume of the stored material, as well as some additional volume of rainwater. The area should be equipped with a drain so that it can be cleared of any spilled material or accumulated rainwater, which would be disposed of in a suitable manner. Secondary containment areas should be monitored throughout the construction period to ensure their integrity.
- Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- All potentially hazardous materials, fuels and lubricants must be stored in the laydown area, in a protected/bermed area and at least 30 m from watercourses/drains.

- All refuelling and equipment maintenance activities will be conducted at specified locations.
- Equipment is to be monitored to ensure it is well maintained and free of leaks.
- Spill containment and cleanup supplies are to be maintained on site at all times.
- Spill will be cleaned up immediately and reported accordingly.
- In the event of a reportable spill, the MOE Spills Action Centre is to be contacted immediately, as required by provincial regulations.
- Portable toilets will be located not closer than 30 m from a watercourse/drain and will be pumped by an MOE-approved hauler to an approved facility.
- A sediment and erosion control plan will be developed and implemented.
- Erosion and sediment control systems must be installed in any location where erosion or sediment from stored soil/rock piles, access roads, clearings activities, etc, could discharge directly into a surface watercourse/drain. An adequate supply of erosion and sediment control devices (e.g., silt fences) will be maintained on site during construction.
- The size of cleared and disturbed area is to be minimized where possible.
- Excavated, erodible material is to be placed in suitable designated areas away from watercourses/drains and stabilized with erosion protection.

As a result, the effective use of mitigation measures will prevent impacts on soils, groundwater, surface water, vegetation, terrestrial or aquatic biota.

4.13.1 Spills of Concrete

Concrete will be used to construct the inverter and transformer pads, and depending on soil strength conditions, may also be used as ballast for the solar panel racking. Concrete will be brought on site by a ready-mix concrete supplier in concrete trucks and poured directly into the form for each transformer/inverter pad. If concrete ballast is required for the panel racking structures, it would likely consist of pre-fabricated structures brought to the site. No cement is anticipated to be stored or mixed on site.

Concrete, grout and associated materials (e.g., cement, mortars) typically have high pH values (i.e., highly basic or alkaline), which, if they enter a watercourse, could create adverse surface water quality conditions that are toxic to aquatic biota (Province of British Columbia, 2007).

Although the use of concrete during Project construction is relatively limited and will not occur within 30 m of any water body, mitigation measures are proposed to prevent negative effects. The Province of British Columbia (2007) has identified a number of construction best management practices to prevent adverse impacts on surface water quality and biota due to the use of concrete. Therefore, in order to mitigate potential adverse effects due to concrete and cement use, the following mitigation measures are to be implemented:

- No alkaline cement products will be deposited directly or indirectly into or adjacent to any watercourse.

- Concrete truck rinsing will occur at a designated area at least 120 m from any waterbodies or drainage routes in a manner to contain the rinse water and concrete residue to prevent off site transport. However, if all wastewater arising from truck rinsing will be contained and treated to meet pH requirements before discharge, then the truck rising may occur within the laydown area, however, this should be avoided if possible.
- No cement is anticipated to be stored on site. However, if some cement bag storage is required, bags are to be stored indoors, where possible. If outdoor storage is required, cement bags should be covered with waterproof sheeting and raised off the ground (e.g., on wooden palates) to ensure no contact with surface water runoff. Impervious material will be placed under the elevating mechanism to collect any spills (e.g., due to ripped bags). Empty cement bags are to be collected as soon as possible after use and spills of cement or concrete cleaned up as appropriate.

Given this mitigation, no negative effects on surface water quality due to use of concrete during construction is anticipated to occur.

5. Environmental Effects Monitoring Plan

The use of mitigation measures identified in Section 4 has either completely mitigated or reduced the scale of potential effects to a minor level such that detection of the effect through monitoring is not considered possible. Therefore, environmental effects monitoring during construction will be restricted to ensuring compliance with the mitigation measures identified herein. Monitoring will consist of weekly inspections of the Project location by a designated environmental inspector. The inspector will ensure that all mitigation measures described herein are in place and functioning according to design specifications. If required, remedial actions will be recommended and work ceased in the area of interest until the remedial actions are undertaken.

6. References

Cheminfo Services Inc. 2005. Best Practices for the Reduction of Air Emissions From Construction and Demolition Activities. Prepared in conjunction with the Construction and Demolition Multi-stakeholder Working Group for Environment Canada, Transboundary Issues Branch. 49 pp.

Harris, J. A., and P. Birch. 1989. Soil microbial activity in opencast coal mine restorations. Soil Use and Management 5(4): 155-160. Cited in Strohmayer, 1999.

Hatch Ltd. 2010. RE Orillia 3 Solar Project – Waterbodies Environmental Impact Study. Prepared for RE Orillia 3 ULC.

Recurrent Energy LLC. 2010. RE Orillia 3 - Construction Plan Report. Prepared for RE Orillia 3 ULC.