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**PROPOSED GROUNDWATER MONITORING
FOR A PROPOSED SOLAR FARM
2176047 Solar Energy Project
Elizabethtown-Kitley Twp, Ontario
City of Brockville, Ontario**

***FINAL*
SCOPING REPORT**

Prepared for:

Canadian Solar Solutions Inc.
and
UC Solar Ltd.

Prepared by:

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Project No. OCP-11-211
August 5, 2011

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1.0 INTRODUCTION

McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) was retained by Canadian Solar Solutions Inc. (Canadian Solar) to prepare a groundwater monitoring plan related to a proposed solar farm project (2176047 Solar Energy Project) located in the Township of Elizabethtown-Kitley and in the City of Brockville (Figure 1). The legal description of the property is Part of Lot 7 & 8, Concession 3, Township of Elizabethtown-Kitley, United Counties of Leeds and Grenville. It has a civic address of 12 Centennial Road, Brockville, Ontario.

Assuming that Centennial Road runs east-west along the south boundary of the site (Figure 1), the site is bounded as follows:

- To the west by adjacent farm fields and open land
- To the north by forest and wetlands
- To the east by County Road 6 and residential properties
- To the south by vacant land and a manufacturing plant.

This scoping report provides background information and a proposed plan for monitoring groundwater around the proposed solar farm. It forms part of the Renewable Energy Approval (REA) submission for this project.

1.1 Rationale

As part of the REA application process, it is understood that applicants should consider the potential impact of the development on groundwater, in particular drinking water. In order to be pro-active, Canadian Solar has prepared this document and will execute the proposed plan in order to assess and mitigate any *potential* groundwater impacts from this development.

1.2 MOE Consultation

The Ontario Ministry of the Environment (MOE) has been consulted concerning groundwater monitoring and proposed solar farms in Eastern Ontario. The MOE Regional Hydrogeologist (Frank Crossley) was consulted and provided some general guidance on groundwater monitoring for solar farms in eastern Ontario (Appendix A). Mark Priddle, P.Geo., of McIntosh Perry has also verbally consulted with Mr. Crossley concerning groundwater monitoring at proposed solar farms in eastern Ontario.

2.0 BACKGROUND INFORMATION

2.1 Site Setting

The subject property (site) is located at 12 Centennial Road, just north of Brockville, Ontario (Figure 1). For the purpose of discussions in this report, it is considered that Centennial Road is oriented east-west and represents the southern boundary of the subject property.

2.2 Site Water Services

There are no municipal potable water services or sewer services supplying the subject property or neighbouring properties. There are residential properties with private wells to the east and southeast of the subject properties. All neighbouring properties likely have drilled bedrock wells and individual septic systems.

2.3 Topography and Drainage

The highest elevation on-site ranges between 105 and 110 m asl. The lowest point on-site is located along the north-western portion of the site. There are some ditches on the property, which drain northward. Locally, the shallow groundwater flow direction is expected to be northward, however the regional bedrock groundwater flow direction is likely to be to the southeast in the direction of the St. Lawrence River.

2.4 Surficial and Bedrock Geology

General geological maps of the area indicate that overburden consists of ground moraine (till) and is relatively thin (OGS, 2009 and Geological Survey of Canada, 1970). The bedrock in the area is of the March and Oxford formation and is described predominantly as sandstone and dolomite (OGS, 2009 and Geological Survey of Canada, 1963).

2.5 Water Wells

The Well Search Request was placed with the Ontario Ministry of the Environment (MOE) in an attempt to locate well records within approximately 500 m of the subject property. The search did not turn up any well records (Appendix B).

3.0 PROPOSED MONITORING AND CONTINGENCY PLANS

While no negative effects on surrounding well water are expected from this project, Canadian Solar is pro-actively proposing a monitoring plan to ensure that the construction of the solar farm will not affect local wells. This plan is to address potential issues related to construction and/or public concern which have been raised. A proposed work plan has been developed after the following were conducted:

- A site visit
- A review of conditions and the presence and type of neighbouring wells, and
- Pre-consultation with the MOE

All of this information was compiled to help address potential issues related to construction and/or public concern that may be raised. An initial response from F. Crossley, P.Geo., Hydrogeologist with the Technical Support Section of the MOE Eastern Region was received as part of the MOE pre-consultation and is included as Appendix B. The Eastern Region Groundwater Unit recommended that the following groundwater monitoring program be followed:

- Interview selected residents regarding well construction, groundwater quality, groundwater quantity and well locations to establish a history of the water well.
- Collect a water well sample from the well after allowing the distribution system to flow for approximately 5 minutes. The sample should be collected prior to any treatment systems (“raw”).
- Submit the water sample for analysis to a qualified laboratory. The analysis should be the “subdivision suite” (alkalinity, ammonia, bacteria, calcium, chloride, colour, conductivity, DOC, hardness, iron, magnesium, manganese, nitrite, nitrate, pH, potassium, sodium, sulphate, TDS and turbidity).
- Establish a contingency plan by a qualified person.

Subsequent discussion with Mr. Crossley indicated that only vulnerable wells need to be addressed and only a sub-sample of representative wells need to be sampled. Also, it was noted that on-site monitoring wells are not required. Vulnerable wells are those that are in close proximity to the solar project and which are drilled bedrock wells at sites where holes will have to be drilled into rock as part of the project construction.

All well owners with property abutting the proposed solar farm will be considered as priority wells for sampling prior to the commencement of construction activities. Other factors influencing the selection of wells include groundwater flow directions, well construction, subsurface conditions and professional judgment. At this site, the abutting properties are the only ones likely to be affected by construction of the solar farm as there are few other wells around the property.

Following the delineation of an assessment area, the MOE recommendation is then to seek permission from selected well owners within the assessment area to undertake a

groundwater survey. If permission is granted then the above-noted actions would be undertaken.

3.1 Groundwater Monitoring Plan

Well water monitoring will be performed to ensure that there are no impacts on local wells during construction. The neighbouring properties are all serviced by private wells for potable water supply, most of which are drilled bedrock wells. There may also be some dug wells in the area, however the bedrock is relatively shallow. Therefore it is prudent to monitor groundwater around this proposed solar farm.

Based on our review of the Project location and surrounding area, we have prepared a plan for groundwater monitoring that will effectively assess potential impacts to neighbouring properties. This Plan has been prepared by a Professional Geoscientist. At this location, it appears that the most important properties to be assessed are those with drilled wells or shallow dug wells (if present) on properties abutting the proposed solar farm.

Prior to any actual monitoring of residential wells, selected well owners with properties and water supply wells abutting the site boundaries will be contacted by McIntosh Perry to seek permission to undertake a groundwater survey. This work will be undertaken prior to the commencement of any on-site construction activities. Where permission is granted then residents will be interviewed regarding their well construction, groundwater quality, groundwater quantity and well locations to establish a history of the water well. At this stage these closest wells will be chosen for monitoring (again, with owner's permission).

Based on the available information, McIntosh Perry and Canadian Solar have determined that up to 14 wells to the east and southeast of the site are appropriate for sampling. The final number of wells that are sampled depends on whether or not permission is granted by well owners. The following is therefore the proposed plan for groundwater monitoring at this site:

Site	Private Wells	Monitoring Wells (proposed)
2176047 Solar Energy Project Centennial Rd., Brockville	2 on Centennial Road 5 on North Augusta Road 7 on County Road 6	none

The key test parameters at each site will be alkalinity, ammonia, bacteria (TC, EC), calcium, chloride, colour, conductivity, DOC, hardness, iron, magnesium, manganese, nitrite, nitrate, pH, potassium, sodium, sulphate, TDS and turbidity.

Samples from the selected domestic wells will be collected from flushed, untreated (raw water) taps in residences by trained personnel. Strict QA/QC procedures will be followed, including the collection of blind duplicate samples. At these location, samples will be collected prior to construction and also post-construction.

If a complaint arises during construction, the subject well will be re-sampled and the results will be compared to the pre-construction results to determine whether or not the well has been impacted by construction activities. If evidence shows that the well has been impacted by Project construction, then a contingency plan will be implemented, as noted below. Post-construction samples will be collected following substantial completion of the solar farm. No other sampling or chemical analysis of samples will be undertaken unless agreed upon with the proponent or suggested during the REA process. All work to be undertaken as part of this Plan will be overseen by a Professional Geoscientist.

3.2 Contingency Plan

In the event that a groundwater complaint arises during the construction activities, the proponent will repeat the sampling at the complainant's residence. The water samples will be submitted as "high priority" (rush analysis) to a qualified laboratory. If a problem is confirmed to be related to the construction activities at the proponent's 2176047 Solar Energy Project, then the proponent will immediately provide bottled water to the impacted party and implement a contingency plan.

1. Supply bottled water or water cooler for drinking (potable uses)
2. Supply portable water supply for household use (non-potable) – storage tank
3. Fill dug well (if present) with trucked potable water
4. Retain licensed driller (Splash Well Drilling (RR 3, Prescott, ON)) to assess well and determine if deepening or other options are available
5. Evaluate modifications to the solar farm construction process which potentially caused groundwater issues

The MOE will be notified of any complaints and the proponent's actions to address the complaints.

3.3 Reporting

Following each sampling event, a short letter report will be prepared. It is recommended that the results of the private well sampling be provided to the well owners. The data will be compiled in spreadsheets in order to assist in the evaluation of potential groundwater impacts.

4.0 REFERENCES

Geological Survey of Canada, 1963. Brockville-Mallorytown Area Bedrock Geology (Map 7-1963).

Geological Survey of Canada, 1970. Brockville-Mallorytown Area Surficial Geology (Map 6-1970)

OGS (Ontario Geological Survey), 2009 – Google Earth™ (website:
http://www.mndmf.gov.on.ca/mines/ogs_earth_e.asp).

5.0 LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by McIntosh Perry Consulting Engineers Ltd. for "Canadian Solar Solutions Inc. and UC Solar Ltd.". It is intended for the sole and exclusive use of Canadian Solar Solutions Inc. and UC Solar Ltd., any affiliated companies and partners and their respective financial institutions, insurers, agents, employees and advisors (collectively, "the proponent"). The report may not be relied upon by any other person or entity without the express written consent (*Reliance Letter*) of McIntosh Perry Consulting Engineers Ltd.

Any use which a third party makes of this report, or any reliance on decisions made based on it, without a *reliance letter* are the responsibility of such third parties. McIntosh Perry Consulting Engineers Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The conclusions presented represent the best professional judgment of the professional geoscientist based on current environmental standards and site conditions. Should additional information become available, McIntosh Perry Consulting Engineers Ltd. requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

We trust that this information is satisfactory for your present requirements. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Yours truly,

McIntosh Perry Consulting Engineers Ltd

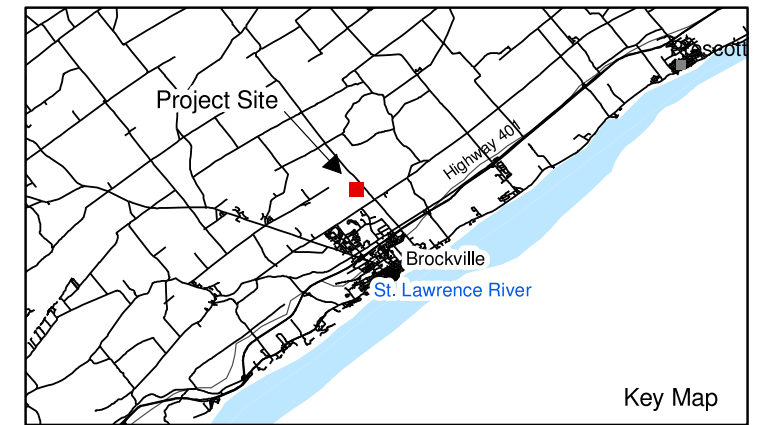
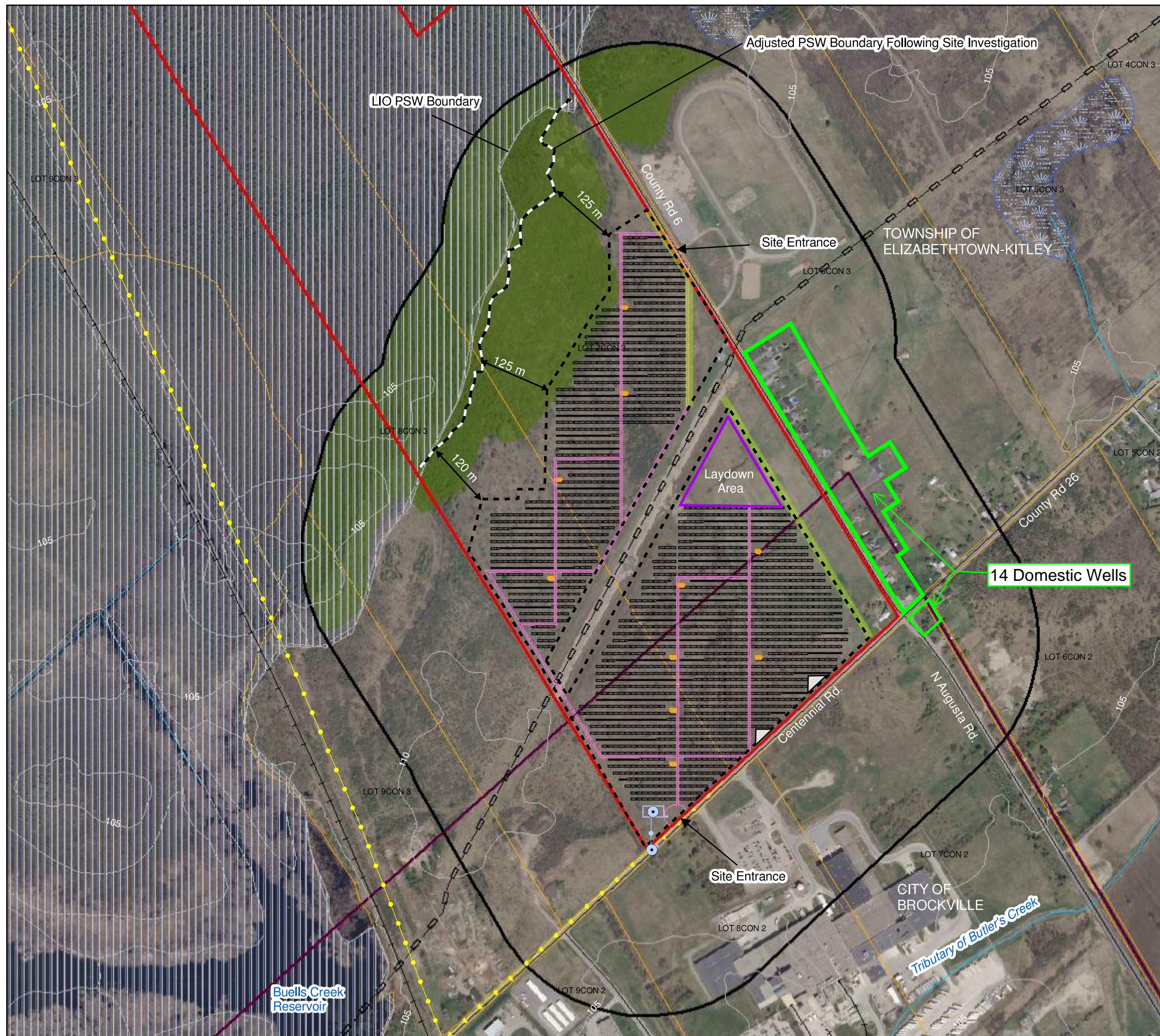
Mark Priddle, P.Geol.
Project Manager



Patrick Leblanc, EIT
Project Coordinator

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Cdn solar_Water_Monitoring_Final_REPORT Aug.5.2011.doc

FIGURE



LEGEND

Existing Features

- Railway
- Transmission Line
- Road
- Pipeline
- Topographic Contour (5 m Interval)
- Watercourse

Project Location

- Project Location
- 300 m from Project Location
- Municipal Boundary

Natural Features

- Wetland
- Significant Woodland
- Provincially Significant Bulls Creek Reservoir Wetland

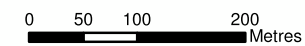
Proposed Project Components

- Tree Planting
- Panel Layout
- Transmission Line
- Access Roads
- Fence
- Inverter
- Laydown Area
- Substation
- Connection Point

Heritage and Archaeological Resources

- Historic Site (Stage 1/2 Archaeology)

Notes:
 1. OBM and NRVIS data downloaded from LIO, with permission.
 2. Spatial referencing UTM NAD 83, August 2010.
 3. Air Photos from CRCA, flown Spring 2008, scale 1:2000



Scale 1:7,000



APPENDIX A

MOE CONSULTATION RECORD

Edited E-mail response from MOE

From: Crossley, Frank (ENE) [mailto:Frank.Crossley@ontario.ca]

Sent: Wednesday, June 15, 2011 1:56 PM

To: Mark Priddle

Cc: Harrison, Courtney (ENE); Robert, Marc (ENE); Ryan, Jason (ENE); Taylor, Peter (ENE)

Subject:

Mark Priddle - McIntosh Perry Consulting Engineers

Hello Mark

Thank you for your e-mail dated June 09, 2011 requesting a groundwater monitoring program at upcoming solar farm construction sites by *PROPONENT*. You indicated that the proposed installations are in Eastern Ontario. As part of the Renewable Energy Approval (REA) process, a groundwater monitoring program is required.

To this end, the Eastern Region Groundwater Unit recommends the following groundwater monitoring program:

- Contact all well owners within 500 metres of the site boundaries prior to the commencement of construction activities and seek permission to undertake a groundwater survey. If permission is granted then:
 - interview the residents regarding well construction, groundwater quality, groundwater quantity and well locations to establish a history of the water well.
 - collect a water well sample from the well after allowing the distribution system to flow for approximately 5 minutes. The sample should be collected prior to any treatment systems ("raw").
 - submit the water sample for analysis to a qualified laboratory. The analysis should be the "subdivision suite" (alkalinity, ammonia, bacteria, calcium, chloride, colour, conductivity, DOC, hardness, iron, magnesium, manganese, nitrite, nitrate, pH, potassium, sodium, sulphate, TDS and turbidity).
 - establish a contingency plan by a qualified person.

The groundwater monitoring program should be conducted under the supervision of a qualified person (P.Eng. or P.Geo.). The survey information should be summarized in a report by a qualified person and a copy forwarded to this Ministry.

In the event that a complaint arises against the construction activities, *PROPONENT* should repeat the survey at the complainant's residence. The water samples should be submitted as "high priority" to a qualified laboratory. If a problem is confirmed related to the construction activities at *PROPONENT*, then *PROPONENT* should immediately provide bottled water to the impacted party and implement their contingency plan. This Ministry should be notified of any complaints and the company's actions to address the complaints.

F. Crossley, P.Geo.
Hydrogeologist
Technical Support
Eastern Region
1259 Gardiners Road, Unit 3
Kingston, Ontario K7P 3J6
(613)549-4000x2631

APPENDIX B

WELL RECORD SEARCH

Ministry of the Environment

Wells Help Desk
Environmental Monitoring and
Reporting Branch

125 Resources Road
Toronto ON M9P 3V6
(Toll Free) 1-888-396-9355 (follow
prompts 1, 3)
Fax: 416-235-5960
WellsHelpdesk@Ontario.ca

Ministère de l'Environnement

Service d'information sur les puits
Direction de la surveillance
environnementale

125 Resources Road
Toronto (Ontario) M9P 3V6
Téléphone : 1 888 396-9355 – Faites
ensuite le 2 et le 3 (sans frais en Ontario)
Télécopieur : 416 235-5960
WellsHelpdesk@Ontario.ca



Computer Print-Out Data Well Search Request – Form B
Reference Number 1112-0802Bm

August 4, 2011

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Rd.
Carp, ON, K0A 1L0
Attn: Meghan Cameron

Fax: : 613.836.3742
Email Address: m.cameron@mcintoshperry.com
File/Reference No. : CP-11-211

Search by UTM Coordinates (radius) Easting 443956-445115 Northing 4943245-4941753	<input checked="" type="checkbox"/>
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County:	
Township:	
Conc.:	
Lot:	

No Well Record found matching the search criteria provided	<input checked="" type="checkbox"/>
---	-------------------------------------

If you have any questions or concerns please contact the **Wells Help Desk**
 *** SEARCH REQUEST FORMS AVAILABLE AT www.forms.ssb.gov.on.ca ***
 Please note: The Ministry cannot and does not represent or guarantee that the Well
 Records information is current, accurate or complete. The Ministry assumes no
 responsibility for errors or omissions in the Well Records information and is not liable in
 any way for damages of any kind arising out of or related to the Well Records information
 or for delay or failure to provide the Well Records information. Any reliance upon the Well
 Records information provided is solely at the risk of the requester. Well Information
 provided is subject to the Freedom of Information and Protection of Privacy Act (FIPPA),
 Ontario.