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**PROPOSED GROUNDWATER MONITORING
FOR A PROPOSED SOLAR FARM
Mississippi Mills Solar Energy Project
Town of Mississippi Mills, Ontario**

***FINAL*
SCOPING REPORT**

Prepared for:

Canadian Solar Solutions Inc. and Saturn Power

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R. #3
Carp, ON
K0A 1L0

Phone (613) 836-2184

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Meghan Cameron, B.Sc.
Mark Priddle, P.Geo.

EXECUTIVE SUMMARY

While no negative effects on surrounding well water are expected from this project, Canadian Solar Solutions Inc. and Saturn Power (Canadian Solar) are pro-actively proposing a monitoring plan to ensure that the construction of the solar farm will not affect local water resources, including wells. This plan was developed with input from the Eastern Region Groundwater Unit, Technical Support Section of the MOE Eastern Region.

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; therefore it is prudent to monitor groundwater around this proposed solar farm.

Selected well owners around the site will be contacted prior to the commencement of construction activities to seek permission to undertake a groundwater survey. Where permission is granted, residents will be interviewed regarding their well construction, groundwater quality, groundwater quantity and well locations to establish a history of the water well. Several of the closest wells will be chosen for monitoring. The key test parameters will include ammonia, bacteria, calcium, chloride, iron, nitrite, nitrate, sodium, sulphate, and turbidity, among others.

Samples from the selected domestic wells will be collected from flushed, untreated (raw water) taps in residences by trained personnel. At these locations, 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.

Canadian Solar will immediately provide bottled water to the impacted party and implement their contingency plan. This plan may include possible modifications to the construction process which caused groundwater issues. The MOE will be notified of any complaints and Canadian Solar's actions to address the complaints.

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.

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1.0 INTRODUCTION

McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) was retained by Canadian Solar Solutions Inc. and Saturn Power (Canadian Solar) to prepare a groundwater monitoring plan related to a proposed solar farm project (Mississippi Mills Solar Energy Project) located in the Town of Mississippi Mills, southeast of Pakenham (Figure 1). The legal description of the property is Part of Lots 3 and 4, Concession 11, Geographic Township of Pakenham, Town of Mississippi Mills, County of Lanark. The Project is located on the west side of Concession Road 12 S, between Needham Sideroad and Panmure Sideroad in the Town of Mississippi Mills, Ontario.

The property is irregularly shaped as noted in Figure 1. The property consists predominantly of woodland and pasture land.

Assuming that Concession Road 12 S runs north-south along the eastern boundary of the site (Figure 1), the site is bounded as follows:

- To the north, east and south by vacant forest and pasture lands
- To the west by Concession Road 12 S, forests, and some residential properties

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 on Concession Road 12 S, between Needham Sideroad and Panmure Sideroad in the Town of Mississippi Mills, Ontario (Figure 1). For the purpose of discussions in this report, it is considered that Concession Road 12 S is oriented north-south and is the eastern boundary of the subject property. The western boundary of the property is approximately 700 m from Concession Road 12 S. The northern boundary of the property is located approximately 700m south from Needham Sideroad. The southern boundary of the site is located approximately 1.9km south from Needham Sideroad.

The legal description of the property is as follows; Part of Lots 3 and 4, Concession 11, Geographic Township of Pakenham, Town of Mississippi Mills, County of Lanark. The total area of the property is approximately 40.5 ha. The ground elevation on the site ranges from approximately 135 to 145 m above sea level (asl).

2.2 Site Water Services

There are no municipal potable water services or sewer services supplying the subject property or neighbouring properties. According to well records obtained from the MOE there are three water wells located to the east of the subject project location.

2.3 Site Characterization

The property is irregularly shaped as noted on Figure 1. The property is presently unoccupied woodland and pasture land. The land gently slopes to the east across the property with a moderate variation in topography.

The site is bounded to the north, east and south by vacant forest and pasture lands and to the west by Concession Road 12 S, forests, and some residential properties.

2.4 Topography and Drainage

The elevation on-site ranges between 130 and 143 m asl. The site is gently rolling with a general slope to the east. The site drains in a north-easterly direction. Locally, the shallow groundwater flow direction is expected to be toward the west (toward the Mississippi River). The regional bedrock groundwater flow direction is likely to be to the west or north in the direction of the Mississippi and Ottawa Rivers.

2.5 Surficial and Bedrock Geology

General geological maps of the area indicate that overburden in the area is described as stone-poor, carbonate-derived silty to sandy till, grey at depth but brown where oxidized; calcareous where derived from sedimentary rocks and not leached. In areas that lie below the marine limit (198 m asl) it is overlain by a discontinuous lag consisting of gravel, sand and boulders. The bedrock in the area also consists of undifferentiated carbonate and clastic sedimentary rock, exposed at the surface or covered by a discontinuous, thin layer of drift. The Paleozoic bedrock in the area is described as limestone, dolomite, sandstone, and locally shale; relatively flat lying; mainly occurring as bare, tabular outcrops; it also includes areas thinly veneered by unconsolidated Quaternary sediments up to 1 m (3 ft) thick (OGS, 2011).

2.6 Water Wells

An MOE Well Records search was requested by McIntosh Perry. The well records that were obtained indicated that there are three wells located within 500 m of the subject property. A total of five wells appeared to be within 500m of the project location based on a windshield survey. The average depth to bedrock is 3.5m. The uses of the wells were for domestic purposes and livestock watering. According to the well records the average depth of the wells is 36.1 m. The well records are included as 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 A. 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; 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 bedrock wells with shallow overburden 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 three wells to the northeast of the site are appropriate for sampling (Figure 1). 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)
Mississippi Mills Solar Energy Project Concession Road 12 S, Ottawa	3 on Concession Road 12 S	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 Mississippi Mills 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 to assess well and determine if deepening or other options are available
5. Evaluate possible 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

Dillon Consulting (Dillon), November 2011 *“Canadian Solar Solutions Inc. and Saturn Power, Draft Project Description Report for Mississippi Mills Solar Park”*

Ontario Geological Survey (OGS), 2011 – Google Earth™ (website:
http://www.mndm.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 Saturn Power”. It is intended for the sole and exclusive use of Canadian Solar Solutions Inc. and Saturn Power, 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

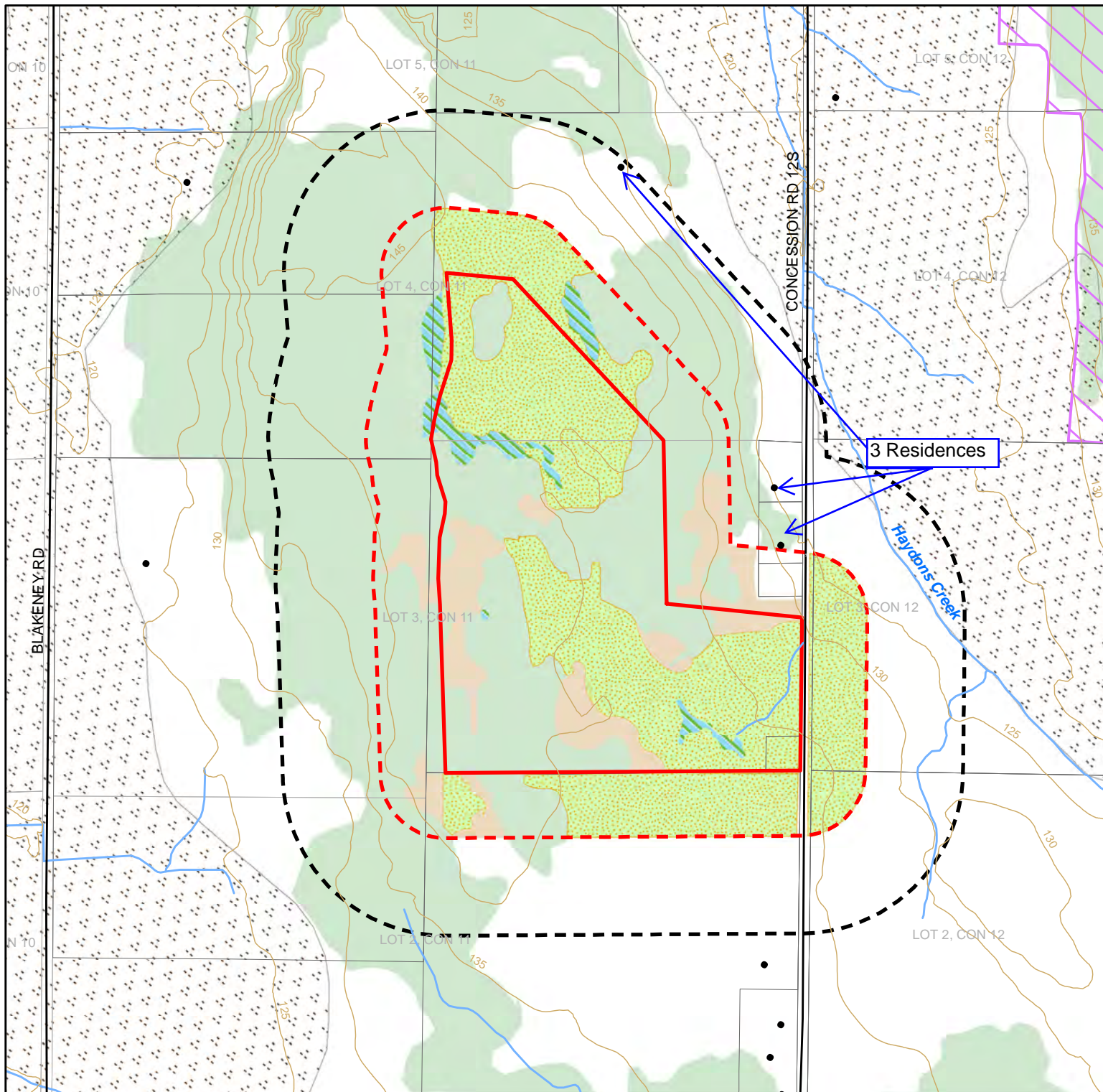


Mark Priddle, P.Geo.
Project Manager



Meghan Cameron, B.Sc.
Project Coordinator

FIGURE



Mississippi Mills Solar Park Figure 2: Project Location

Legend

- Existing Residential Dwelling
- Local Roads
- 5 m Contours
- Watercourse
- ▭ Project Location
- ▭ 120 m Project Location Setback
- ▭ 300 m Project Location Setback
- ▭ Parcels
- ▭ Lots/Concessions
- ▭ Panmure Alvar Life Sciences Area of Natural and Scientific Interest
- ▭ Thicket
- ▭ Unevaluated Wetlands
- ▭ Pasture
- ▭ Woodland
- ▭ Agriculture Designation
- ▭ Rural Designation

Notes: *Added by McIntosh Perry Consulting Engineers

Proposed Sampling Locations

FIGURE 1



1:10,000



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

TOWNSHIP CONCESSION (LOT)	UTM ¹	DATE ² CNTR ³	CASING DIA ⁴	WATER ^{5,6} DETAIL	STAT LVL/PUMP LVL ⁷ RATE ⁸ /TIME HR:MIN	WATER USE ⁹	SCREEN INFO ¹⁰	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND ^{5,11}
PAKENHAM TOWNSHIP CON 11(002)	18 403080 5017122 ^N	1975/11 4767	06	FR 0185	020 / 150 005 / 2:0	DO		3504140 () BRWN LOAM 0004 BRWN LMSN 0191
PAKENHAM TOWNSHIP CON 11(003)	18 402029 5016721 ^N	1984/12 4875	06 06	FR 0066	012 / 060 005 / 1:0	ST		3507095 () BLUE CLAY HARD 0015 BRWN CLAY SOFT 0030 GREY LMSN 0073
PAKENHAM TOWNSHIP CON 11(004)	18 402890 5017962 ^N	1970/03 4806	06	FR 0090 FR 0079	015 / 022 010 / 2:0	DO ST		3502563 () GREY SHLE 0010 GREY LMSN 0091

- Notes:
1. UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
 2. Date Work Completed
 3. Well Contractor Licence Number
 4. Casing diameter in inches
 5. Unit of Depth in Feet
 6. See Table 4 for Meaning of Code
 7. STAT LVL: Static Water Level in Feet ; PUMP LVL: Water Level After Pumping in Feet
 8. Pump Test Rate in GPM, Pump Test Duration in Hour : Minutes
 9. See Table 3 for Meaning of Code
 10. Screen Depth and Length in feet
 11. See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms										
Code	Description	...	Code	Description	...	Code	Description	...	Code	Description
BLDR	BOULDERS		FCRD	FRACTURED		IRFM	IRON FORMATION		PORS	POROUS
									SOFT	SOFT
BSLT	BASALT		FGRD	FINE-GRAINED		LIMY	LIMY		PRDG	PREVIOUSLY DUG
									SPST	SOAPSTONE
CGRD	COARSE-GRAINED		FGVL	FINE GRAVEL		LMSN	LIMESTONE		PRDR	PREV. DRILLED
									STKY	STICKY
CGVL	COARSE GRAVEL		FILL	FILL		LOAM	TOPSOIL		QRTZ	QUARTZITE
									STNS	STONES
CHRT	CHERT		FLDS	FELDSPAR		LOOS	LOOSE		QSND	QUICKSAND
									STNY	STONEY
CLAY	CLAY		FLNT	FLINT		LTCL	LIGHT-COLOURED		QTZ	QUARTZ
									THIK	THICK
CLN	CLEAN		FOSS	FOSILIFEROUS		LYRD	LAYERED		ROCK	ROCK
									THIN	THIN
CLYY	CLAYEY		FSND	FINE SAND		MARL	MARL		SAND	SAND
									TILL	TILL
CMTD	CEMENTED		GNIS	GNEISS		MGRD	MEDIUM-GRAINED		SHLE	SHALE
									UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE		GRNT	GRANITE		MGVL	MEDIUM GRAVEL		SHLY	SHALY
									VERY	VERY
CRYS	CRYSTALLINE		GRSN	GREENSTONE		MRBL	MARBLE		SHRP	SHARP
									WBRG	WATER-BEARING
CSND	COARSE SAND		GRVL	GRAVEL		MSND	MEDIUM SAND		SHST	SCHIST
									WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED		GRWK	GREYWACKE		MUCK	MUCK		SILT	SILT
									WTHD	WEATHERED
DLMT	DOLOMITE		GVLY	GRAVELLY		OBDN	OVERBURDEN		SLTE	SLATE
DNSE	DENSE		GYPS	GYP SUM		PCKD	PACKED		SLTY	SILTY
DRTY	DIRTY		HARD	HARD		PEAT	PEAT		SNDS	SANDSTONE
DRY	DRY		HPAN	HARDPAN		PGVL	PEA GRAVEL		SNDY	SANDY

2. Core Color	
Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Water Use			
Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial		
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail			
Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		