



Hydrogeological Study

2511 County Road 15,
Prince Edward County, ON

Prepared for:

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Prepared by:

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1.0 INTRODUCTION

1.1 Initiation and Objective

ASC Environmental Inc. (ASC) was retained by Sheila and Manuel Silva (*Client*) to conduct a hydrogeological assessment in advance of a proposed land severance located along County Road 15, Prince Edward County, Ontario. The proposed severed lot is located on the north side of County Road 15, encompassing approximately 4.81 hectares in area. The Bay of Quinte bounds the property to the north. The retained portion consists of approximately 5.3 hectares in area with an existing single detached dwelling.

A site location plan is shown on Drawing No. 1 and the proposed land severance with test well is shown on Drawing No. 2 in Appendix A.

The purpose of the hydrogeological study was to assess whether groundwater quality and quantity is sufficient to support the proposed severance for residential land use purposes and assess the potential impact that the potential single-family residential development may have on existing neighbouring wells.

ASC understands one (1) dug well (TW1) exists on the subject property, supplying the existing farmhouse. No well record was identified by ASC personnel and the Client was not aware of a record existing for the well. The work was initiated following authorization from the Client.

1.1 Scope of Work

The agreed scope of work included the following efforts:

- Review available Ministry of Environment, Conservation and Parks (MECP) well water records and historical data for the local area.
- Chlorinate the recently developed well and circulate water until zero residual chlorine is measured in the well water.
- Undertake one (1) six-hour pumping test (with recovery) on the dug well on the retained property.
- Monitor water levels in participating neighbouring adjacent wells during pumping.
- Collect well water sample near the end of the pumping test (approximate 5-hour mark) following zero chlorine residual.
- Submit well water sample to a certified laboratory for the required suite of parameters, as indicated in the MECP D-5-5 Procedure.
- Prepare a hydrogeological assessment report, in accordance with the MECP D-5-5 Procedure, including well construction protocols, water quality, water quantity, and potential well interference.

Note that the planned six-hour pumping test was extended to approximately seven and a half hours to purge remaining chlorine and ensure zero chlorine residual prior to sampling.



2.0 BACKGROUND

2.1 Site Information

The proposed severance is approximately 4.8 hectares in area and has approximately 73 meters (m) of road frontage along County Road 15. The proposed severance is currently vacant and has no constructed entry point. The retained portion of the property is approximately 5.0-hectares in area and is accessible from County Road 15. A site layout plan, Drawing No. 2, is attached in Appendix A.

The groundcover surrounding TW1 consists of predominantly vacant open grass and treed fields. Telegraph Narrows (Bay of Quite) is located north adjacent to the severance. A review of the MECP Areas of Natural and Scientific Interest Map identified no ANSIs within 500 metres of the subject property. The surrounding land use within a 500 m radius consists primarily of rural residential and agricultural properties.

2.2 Surficial Soil Conditions

The physiographic area can be described as Limestone Plains. Surficial geology in the area can be described as a mix of fine-textured glaciolacustrine deposits comprised of silt and clay, minor sand and gravel and Palaeozoic bedrock outcroppings.

The MECP online database of well records within a 500 metre radius identified mixed soil cover (topsoil, silts, and clays) (approximately 0.3 m – 1.2 m), overlying limestone bedrock (see MECP Water Well Summary Records in Appendix B).

2.3 Background Geology

Bedrock geology in the study area consists of limestone, dolostone, shale, arkose, and sandstone bedrock of the Ottawa and Simcoe group and Shadow Lake Formations

2.4 Local Hydrogeology

Six (6) water well summary records of local wells and three (3) monitoring wells (within a 500-metre radius) were available for review from the MECP online database (see Appendix B). Review of the well records indicated that bedrock was encountered at depths ranging from 0.3 m to 1.2 m below ground surface (bgs). Reported well depths ranged from approximately 9.2 m to 16.8 m. Fresh water was encountered predominantly in limestone bedrock at depths ranging from approximately 2.7 m to 14.1 m below ground surface. Three (3) well records were identified as monitoring wells, while one (1) record was identified as a dry well which was subsequently abandoned due to inadequate production. Water is typically encountered in fractures and joints in the limestone bedrock formation.



3.0 WELL CONSTRUCTION

ASC understands through correspondence with the Client that one (1) dug well (TW1) was historically advanced for the purposes of water supply to the existing farmhouse. No well record was identified from the MECP well records database by ASC personnel and the Client was not aware of an existing record for the well. The date and method of construction for the well is presently unknown.

Field observations indicate that the well is no longer capable of preventing surface water and foreign materials from entering the well due to openings in the concrete casing (likely attributed to weathering). Field observations further indicated that the well casing appeared to be constructed with interlocking stone and did not appear to be adequately sealed to achieve a watertight bond as per the requirements of Section 13 of O. Reg 903. The height of the casing above grade meets Ontario's Revised Regulation (RRO) 903, Wells, amended to Ontario Regulation (O Reg) 372/07, under the *Ontario Water Resources Act*. The test well (TW1) location is shown on Drawing No. 2 in Appendix A.

No sources of potential contamination were evident during the site work on the subject property. We understand that water is presently supplied using a submersible pump.

Based on field observation by ASC personnel, ASC recommends TW1 be upgraded to meet the present requirements of O. Reg 903 in order to ensure continued good quality groundwater for consumption purposes or abandoned if no longer required.



4.0 WATER QUANTITY

4.1 Background

The quantity of groundwater available for the test well was investigated through a scheduled 6-hour pumping test (with additional recovery) in accordance with MECP Procedure D-5-5 and Conditions of Provisional Consent. The pumping test for TW1 was conducted on June 22, 2022 for a duration of approximately 7.5 hours.

Referencing MECP D-5-5 guidelines, the minimum pumping rate per person based on peak demand is 3.75 L/min. Therefore, considering a 3-bedroom home (3 + 1), the pumping rate required would be 15 L/min (3.75 L/min * 4). On this basis, the test well could be pumped at a rate of 15 L/min for purposes of assessing peak demand and long term well yield. The pumping test was conducted at a rate of approximately 20 L/min to demonstrate long term well supply yield. Drawdown and recovery measurements obtained during the pumping tests are presented in Appendix C.

Bedrock hydrogeological values of transmissivity were calculated from the pumping data by the Jacob method, which assumes the heterogeneous limestone bedrock aquifer is analogous to a homogeneous, confined, porous media aquifer of infinite horizontal extent. Recognizing that the limestone bedrock water bearing unit is not likely fully confined, the Jacob method sufficiently estimates the aquifer parameters to assess well hydrogeological conditions.

4.2 Test Well TW1

Test well TW1 is approximately 2.91 metres into presumed limestone bedrock. Prior to the initiation of pumping, the static water level was measured to be approximately 1.54 metres from the top of the casing. The water in the well was pumped at a rate of 20 litres/minute for a total of 456 minutes, yielding approximately 9,120 litres of water. Total drawdown was measured at approximately 0.27 metres over the duration of the test, with approximately 0.09 m of drawdown measured from the 100 minute to 456 minute pumping time.

At the completion of pumping, approximately 80% of the total available well supply was remaining. Specific capacity calculated over the final 346 minutes of the pumping test (pumping at 20 litres/minute) was found to be approximately 222 litres/minute/metre. A plot of drawdown versus time is shown in Appendix C (see Figure 1 in Appendix C).

Section 4.3.1 of the Ministry of Environment, Conservation and Parks (MECP) (*previously known as the Ministry of Environment*) D-5-5 Procedure, Technical Guideline for Private Wells: Water Supply Assessment requires that water level recovery must be monitored in the test wells for the lesser of 95% recovery or 24 hours. Ninety-three percent (93%) recovery was reached approximately 19 hours following pump shutdown. Based on the minimal drawdown and observed recovery, the well is able to recover following peak usage periods.

The transmissivity (T) after approximately 100 minutes of pumping was calculated to be



approximately 4.04×10^{-4} m²/s. Hydraulic Conductivity ($K = T/b$), where $b = 1.37$ m (represents approximate aquifer thickness at time of pumping), was determined to be approximately $K = 2.95 \times 10^{-4}$ m/s. The test well recovery and transmissivity data may be found in Appendix C.

Referencing MECP D-5-5 guidelines, “peak demand” occurs for a period of 120 minutes each day. As indicated above and based on the considered number of bedrooms expected (3 + 1), a minimum pumping rate of 15 L/min is required with a resulting water requirement of 1800 litres/day during peak demand. Peak demand was reached approximately 90 minutes into the pumping test, with a measured a drawdown of approximately 0.18 m.

Drawdown and recovery measurements obtained during the pumping test are presented in Appendix C.

Based on the observations from the drawdown versus time relationship and recovery time, it is concluded that the long-term yield of TW1 is sufficient to meet normal domestic requirements in accordance with the MECP Procedure D-5-5 and the Conditions of Provisional Consent.



5.0 INTERFERENCE

5.1 Test Well TW1

Three (3) observation wells, located at 2494 County Road 15, 2491 County Road 15, and 2590 County Road 15 were utilized to assess potential interference during the TW1 pumping test. The observation wells are located approximately 100 to 500 metres horizontal distance from the subject test well. See Table 1 below, for observation well information.

Table 1. Test Well – TW1 Neighbouring wells involved in hydrogeological assessment at the subject property.

Observation Well ID	Well type	Observation Well Address	Distance from Test Well (m)
OW1	Drilled	2494 County Road 15	100
OW2	Drilled	2491 County Road 15	510
OW3	Drilled	2590 County Road 15	390

No significant positive response to pumping was measured in OW1, OW2, or OW3 during the 7.5-hour pumping test. Observation well OW2 measured a drawdown of approximately 1.0 m after approximately 250 minutes of pumping reducing to 0.1 m at completion of pumping, the measured drawdown in well OW2 was likely due to neighbour use and not interference given that the well is over 500 m from the pumping well and closer wells did not show a positive response to pumping.

Based on minimal drawdown and the quick recovery time of TW1, potential water quantity problems resulting from mutual well interference are not expected for TW1.

The measured interference during pumping is an appropriate estimation of the influence for the observation wells (with the exception of OW2 – in use), indicating potential well interference will not create adverse conditions to the existing neighbouring well supply.

Based on the observation well measurements during the pumping tests, the adjacent domestic water supply wells will not be significantly influenced by the proposed land severance. Results of the neighbouring residential water level measurements recorded during the pumping tests are presented in Appendix C.

6.0 WATER QUALITY

Well water sample was collected from the test well and stored in a cooler with ice and transported to a Canadian Association of Laboratory Accreditation (CALA) certified laboratory in Kingston, Ontario. Chemical and bacteriological parameter analyses were undertaken in accordance with the MECP Procedure D-5-5 and compared to the Ontario Drinking Water Quality Objectives (ODWO).

Results of analyses are presented in the following sections.

6.1 TW1

One (1) water sample was collected from the test well during the pumping test on June 22, 2022. The sample was collected during the final hour of the pumping test.

The sample was stored in a cooler with ice and transported to a Canadian Association of Laboratory Accreditation (CALA) certified laboratory in Kingston, Ontario. Chemical and bacteriological parameter analyses were undertaken in accordance with the MECP Procedure D-5-5 and compared to the Ontario Drinking Water Quality Objectives (ODWO).

Bacteriological parameter analyses showed no detection for Total Coliform, E. coli, or fecal coliform, which meets the referenced MECP D-5-5 standards indicating acceptable bacteriological water quality.

The health-related limit for sodium is 20 mg/L and sample results show a sodium concentration of 81.7 mg/L in TW1. The measured sodium concentration in the test well does not exceed the aesthetic objective of 200 mg/L. The health-related limit for sodium is a “warning level” and where this level is exceeded, the local Medical Health Officer shall be notified in order to alert individuals with relevant medical conditions. A warning regarding elevated levels of sodium should be registered on title. Sodium is readily treated with reverse osmosis. The slightly elevated sodium concentration identified in the dug well is likely due to seasonal surface infiltration from road salting activities. Reverse osmosis readily treats sodium.

The operational guideline for hardness is 80-100 mg/L and the ODWO level is 500 mg/L. Sample analyses identified hardness of 350 mg/L in the test well. Total Dissolved Solids (TDS) were measured at 520 mg/L and Conductivity of 976 $\mu\text{mho/cm}$. Hardness and TDS in water and elevated Conductivity usually occur when elevated concentrations of calcium and magnesium are present in water and elevated chlorides. Hardness, TDS are not considered a health concern. Elevated concentration of hardness and TDS may result in scale build-up and mineral deposits on hot water heaters and plumbing fixtures. Hard water can be readily treated through ion exchange water softening. Elevated Conductivity is likely due to road salting activities from County Road 15, infiltrating into the poorly maintained existing dug well.



Colour was measured at 10 TCU versus D-5-5 standard of 5 TCU. Based on site conditions, the elevated TCU is likely due to seasonal surficial environmental impacts due to the poor condition of the well cap. TCU is readily treated through manganese greensand filtration.

We recommend that disinfection (i.e., UV light) of the water source be implemented to ensure good quality groundwater for consumption purposes. To ensure safe drinking water is provided to the residents, we recommend contracting a professional water quality specialist to confirm treatment options of aesthetic parameters.

Results of laboratory sample analyses are presented in Appendix D.



7.0 LAND AND WATER USE CONFLICTS

Section 4.6 of the MECP D-5-5 Procedure requires an evaluation into the land and water use conflicts which may exist, within 500 metres of the site. A review of the public records for wells considered to be within 500 metres of the subject property may be found in Section 5.0 above. No land-use conflicts were identified. The area surrounding the subject property is largely rural residential, seasonal cottage, and agricultural land use activity.



8.0 GROUNDWATER UNDER DIRECT INFLUENCE OF SURFACE WATER (GUDI)

When drinking water wells are constructed in close proximity to permanent surface water bodies (i.e. ponds, lakes, rivers, creeks etc.), the bedrock aquifer(s) may be vulnerable to surface water influence due to shallow overburden and fracturing of the bedrock providing connectivity between the surface water and the groundwater source.

To determine whether the test well may be under direct influence from the adjacent Bay of Quinte, we reviewed the following data:

1. On-site water well record
2. The pumping test drawdown data,
3. The water quality parameters measured in the field during pumping and;
4. The laboratory bacteriological results.

Referencing the well records, shallow overburden is present (approximately 1.2 metres) which may not provide adequate protection to prevent potential infiltration of surface water influences to groundwater. Static water level prior to the pumping test was measured at approximately 1.5 m (below top of pipe)

Field indicator parameters: temperature, turbidity, conductivity, and total dissolved solids, measured with a Hanna HI 98130 Meter, while initially elevated, with development were observed to be consistent during the pumping test for test well TW1 (following approximately four hours of pumping), and field indicator parameters varied less than 10% between hourly readings.

E. Coli, Fecal Coliform, and TC were not detected in the groundwater sample collected from TW1 during the pumping test.

The drawdown data from the pumping test, TW1 (located approximately 500 metres south of the Bay of Quinte) showed a total drawdown of approximately 0.27 metres with approximately 0.09 m drawdown measured over the final 364 minutes of the pumping test.

Referencing a topographic map available thru the MNRF; test well TW1 is located at an elevation of approximately ELEV. 83 m and the surface of the Bay of Quinte is shown at approximately ELEV. 75 m.

Furthermore a drawdown radius calculation was undertaken for test well TW1. The equivalent radius of influence (R_o) is approximated using the Sichart and Kryeileis method, where:

Given:

$$H = 1.37 \text{ m}$$

$$h_w = 1.10 \text{ m}$$



$$K = 2.95 \times 10^{-4} \frac{m}{s}$$

$$R_o = 3000 * (H - h_w) * \sqrt{K}$$

$$R_o = 3000 * (1.37 - 1.10) * \sqrt{2.94 \times 10^{-4}}$$

$$R_o = 13.89 \text{ m}$$

Results indicate that the radius of horizontal drawdown influence is approximately 14 m and therefore on this basis would not extend to the Bay of Quinte and therefore, while it may be susceptible to seasonal surface water infiltration, it is not under direct influence from the Bay of Quinte water source.



9.0 CONCLUSIONS AND RECOMMENDATIONS

- Based on the field work, pumping test conducted, and favourable pumping test recovery, results indicate that sufficient quantities of groundwater are available to meet peak demand for normal domestic use from the limestone bedrock aquifer for the proposed severance for a dug well. This opinion is based on the results from the pumping test at the time of the investigation, shallow dug wells are susceptible to seasonal changes which may impact upon hydrogeological conditions.
- Bacteriological parameter analyses met drinking water criteria indicating adequate groundwater quality for domestic consumption purposes. We recommend the use of
- The health-related limit for sodium is 20 mg/L and sample result show sodium concentration of 81.7 mg/L in test well TW1.

The measured sodium concentration in TW1 does not exceed the aesthetic objective of 200 mg/L. The health-related limit for sodium is a “warning level” and where this level is exceeded the local Medical Health Officer shall be notified in order to alert individuals with relevant medical conditions. A warning regarding elevated levels of sodium should be registered on title. Sodium is readily treated with reverse osmosis.

- The operational guideline for hardness is 80 - 100 mg/L and the ODWS level is 500 mg/L. Sample analyses identified elevated hardness in the test well sample. Hardness is not considered a health concern. Elevated hardness usually occurs when elevated concentrations of calcium and magnesium are present in water and may result in scale build-up and mineral deposits on hot water heaters and plumbing fixtures. Hard water can be readily treated through ion exchange water softening.
- Test well TW1 was observed to not be in accordance with the current standards of RRO 903 (as amended). Based on field observation by ASC personnel, ASC recommends TW1 (if it is to be used in the future) be upgraded to meet the present requirements of O. Reg 903 in order to ensure continued good quality groundwater for consumption purposes. Otherwise, we recommend abandoning the well in accordance with MECP requirements.
- The surrounding land use within a 500 m radius consists primarily of rural residential, seasonal cottage and agricultural properties.
- The nearest surface water course is Telegraph Narrows of the Bay of Quinte, located north adjacent the proposed severance.



Referencing site topography; test well TW1 is located at an elevation of +7m above the river, and approximately 500 m horizontal distance. Based on this information, and bacteriological results of analyses, it is unlikely that the test well is GUDI.

Furthermore a drawdown radius calculation was undertaken for test well TW1. Results indicate that the radius of horizontal drawdown influence is approximated at 14 m, and therefore on this basis, and considering the horizontal well distance from the Bay of Quinte, potential surface water influence to test well TW1 from the Bay of Quinte is a low concern.

- Based on results of the pumping tests and monitoring results of neighbouring residential well water supplies, water quantity problems resulting from mutual well interference are not expected. The measured interference during pumping is an appropriate estimation of the influence.
- To ensure safe drinking water is provided to future residents, we recommend contracting a professional water quality specialist to confirm treatment options for colour, and disinfection. At a minimum, we recommend disinfection (i.e., UV light) of the water source to ensure bacteriological free groundwater for consumption purposes. We also recommend seasonal bacteriological sampling and analyses to confirm water quality.



10.0 LIMITATIONS

ASC Environmental (ASC) was retained by Sheila and Manuel Silva (*Client*) to undertake a Hydrogeological Assessment for one well at the subject property for purposes of land severance.

The scope of work for this assessment included:

- Undertaking a six-hour pumping test with recovery on the test well.
- Monitoring adjacent residential wells during pumping to assess potential interference.
- Collection of well water sample, following confirmation of zero residual chlorine.
- Submission of sample to a certified laboratory for the required suite of parameters.
- Preparation of a hydrogeological assessment report, addressing well construction, water quality and quantity, and potential interference.

The findings reported in this document are based on the tasks completed by ASC under the mutually agreed upon scope of work. Professional judgement, experience with similar investigations, and available data collected within the scope of work form the basis for this report. ASC has prepared this report using information understood to be factual and correct and shall not be responsible for conditions arising from information or facts that were inaccurate, concealed, or not fully disclosed at the time of investigation.

ASC Environmental Inc. makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

The nature of the investigation makes it possible that contrary conditions may be identified due to seasonal or meteorological changes that are beyond the control of ASC. Groundwater sampling results are current at the time of sampling only, seasonal conditions and future changes to the property may influence groundwater quality. The passage of time affects the information provided in the report. Environmental conditions of a Site can change. Opinions relating to the Site conditions are based upon information that existed at the time that the conclusions were formulated. ASC does not certify or warrant the future environmental/hydrogeological status of the property.

This document has been prepared by ASC Environmental Inc., for the sole use of Sheila and Manuel Silva and *assignees* to assess hydrogeological conditions related to the subject property. Unauthorized reuse of this document for other purposes, or by any other party, or any reliance on or decisions to be made based on it, are the responsibility of the third parties. If additional parties require reliance on this report, written authorization from ASC Environmental Inc. will be required. Such reliance will only be provided by ASC Environmental Inc. following written authorization from the Client. ASC Environmental Inc.

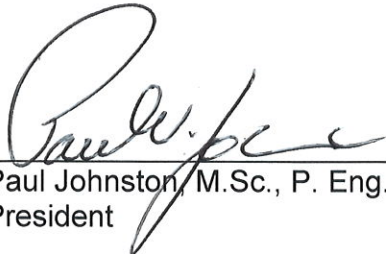


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ASC Environmental Inc. will not be responsible for any consequential or indirect damages. ASC Environmental Inc. will only be liable for damages resulting from negligence of ASC Environmental Inc. ASC Environmental Inc. will not be liable for any losses or damage if the Client has failed, within a period of two years following the date upon which the claim is discovered (Claim Period), to commence legal proceedings against ASC Environmental Inc. to recover such losses or damage unless the laws of the jurisdiction which govern the Claim Period which is applicable to such claim provides that the application Claim Period is greater than two years and cannot be abridged by the contract between the Client and ASC Environmental Inc., in which case the Claim Period shall be deemed to be extended by the shortest additional period which results in this provision being legally enforceable.

Yours truly,
ASC Environmental Inc.



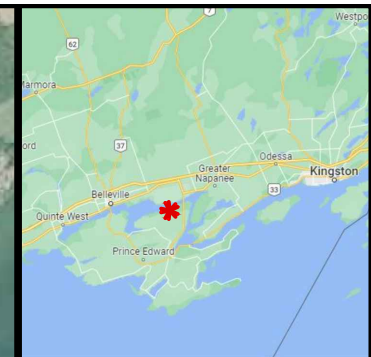
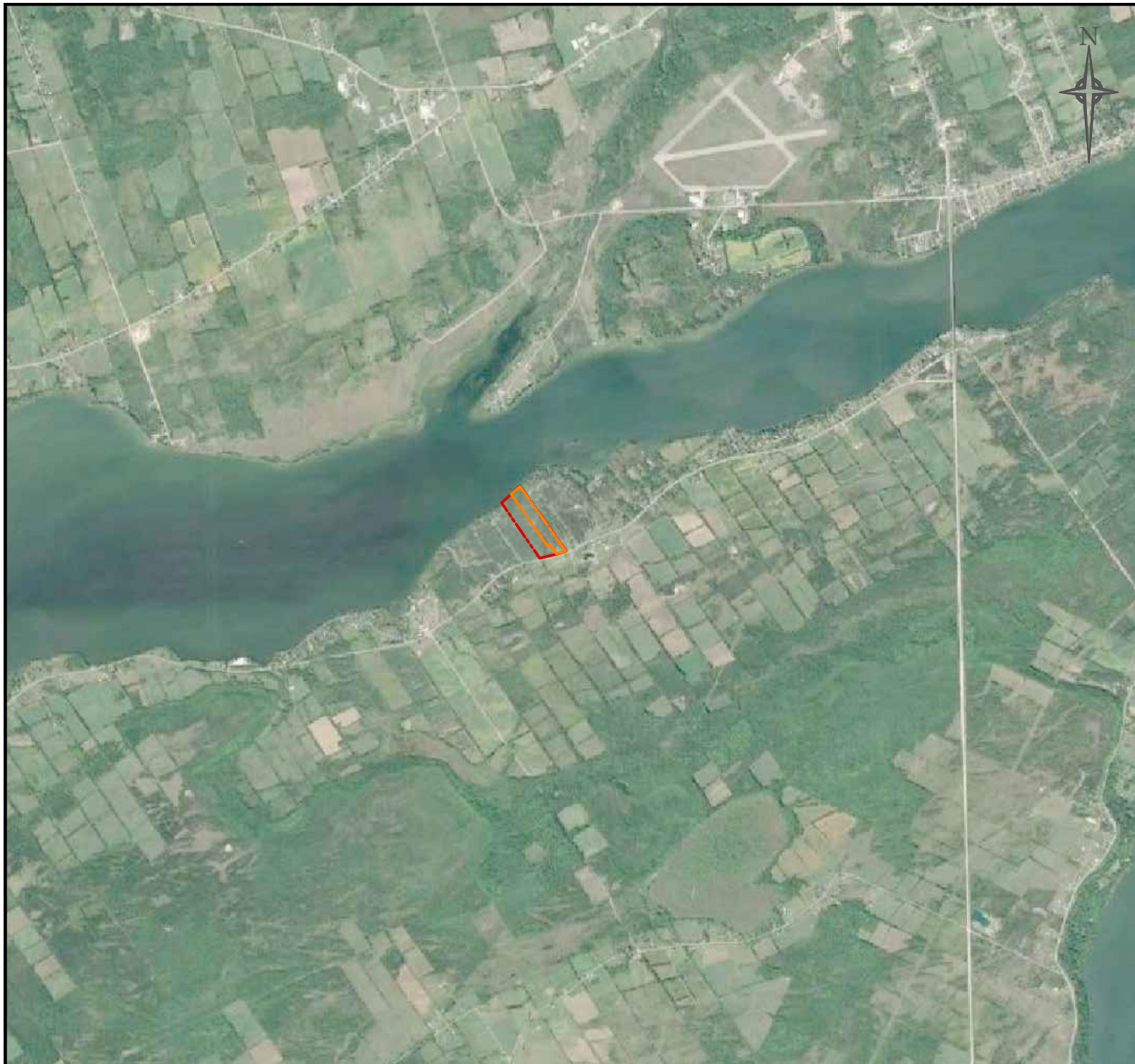
Paul Johnston, M.Sc., P. Eng., QPESA
President






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APPENDIX A Drawings





LEGEND

	APPROXIMATE PROJECT AREA LOCATION
	APPROXIMATE PROPERTY BOUNDARY
	PROPERTY SEVERANCE BOUNDARY


DRAWING TITLE
 Site Location Plan

FIGURE NO. 01	DRAWN BY M. Miller
-------------------------	------------------------------

PROJECT
 Hydrogeological Assessment

CLIENT
 S and M Silva

LOCATION
 2511 County Road 15, Prince Edward County, ON

PROJECT NO. ASC-733	SCALE: 
DATE 29-Aug-2022	



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LEGEND

- - - APPROXIMATE PROPERTY BOUNDARY
- - - PROPERTY SEVERANCE BOUNDARY
- ⊕ WELL LOCATIONS

DRAWING TITLE

Site Layout Plan

FIGURE NO.

02

DRAWN BY

M. Miller

PROJECT

Hydrogeological Assessment

CLIENT

S and M Silva

LOCATION

2511 County Road 15, Prince Edward County, ON

PROJECT NO.

ASC-733

SCALE:



DATE

29-Aug-2022

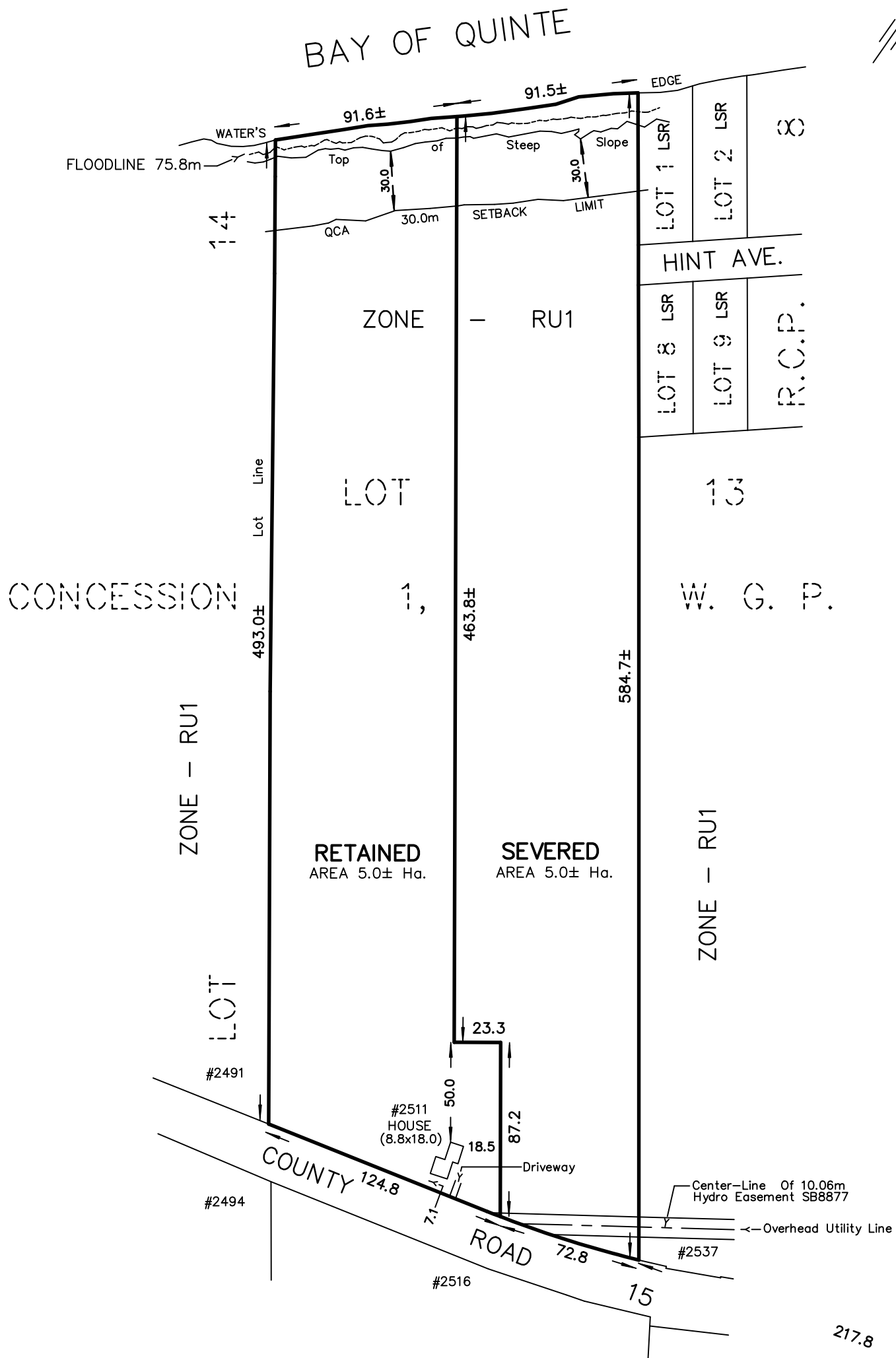
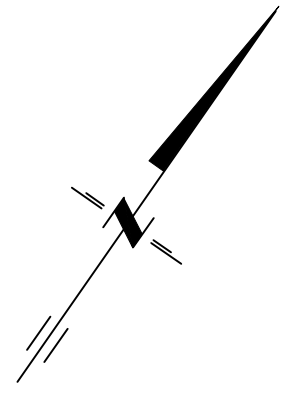


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SKETCH for SEVERANCE APPLICATION

METRIC SCALE 1 : 2500



NOTES :

2511 COUNTY ROAD 15

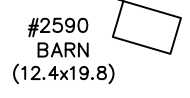
PART OF LOT 13
CONCESSION 1, WEST OF GREEN POINT
TOWNSHIP OF SOPHIASBURGH
NOW IN THE MUNICIPALITY OF THE
COUNTY OF PRINCE EDWARD

DIMENSIONS AND INFORMATION SHOWN ARE DERIVED FROM PLAN 254,
47R-7797, 47R-1013 AND COMPILED PLAN 8.

75.8m FLOODLINE, STEEP SLOPE LIMIT AND 30.0m SLOPE SETBACK PROVIDED
BY QUINTE CONSERVATION AUTHORITY - SITE VISIT REPORT-SV0182-2021

DISTANCES SHOWN ON THIS PLAN ARE IN METRES
AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

THIS SKETCH IS AN ORIGINAL IF EMBOSSED BY THE SURVEYOR'S SEAL.



APRIL 13, 2022

CAUTION

THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED
EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK

218 CHURCH STREET
BELLEVILLE, ONTARIO

WATSON
LAND SURVEYORS Ltd.

K8N - 3C3
(613) 962 - 9521

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PROJECT N^o 13693-S-22

APPENDIX B

MECP Water Well Summary Records



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Ministry of the Environment

Ontario

The Ontario Water Resources Act

31C3h

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

11

5304121

MUNICIPALITY 53007

CAN. GP.W.

01

COUNTY OR DISTRICT Prince Edward	TOWNSHIP, BOROUGH, CITY TOWN VILLAGE Sophiasburgh	CON. BLOCK TRACT SURVEY ETC I.G.P.W.	LOT 25-27 13
OWNER (SURNAME FIRST) [REDACTED]	ADDRESS R.R.#2 Picton	DATE COMPLETED DAY 23 MO 10 YR 81	
U T M	NORTHING	RC	ELEVATION
21	10 12 17 18 24 25	30	26 30 31

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
brown	topsoil		loose	0	1
grey	shale		loose	1	3
grey	limestone		hard	3	30

31	10 14 15 21 32 43 54 65 75 80
32	10 14 15 21 32 43 54 65 75 80

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-13	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
20	
15-18	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
26	
20-23	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
25-28	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
30-33	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
10-11	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE		0 18
6 1/2		188	
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input checked="" type="checkbox"/> OPEN HOLE		18 30
6 1/2			
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE		27-30

SCREEN

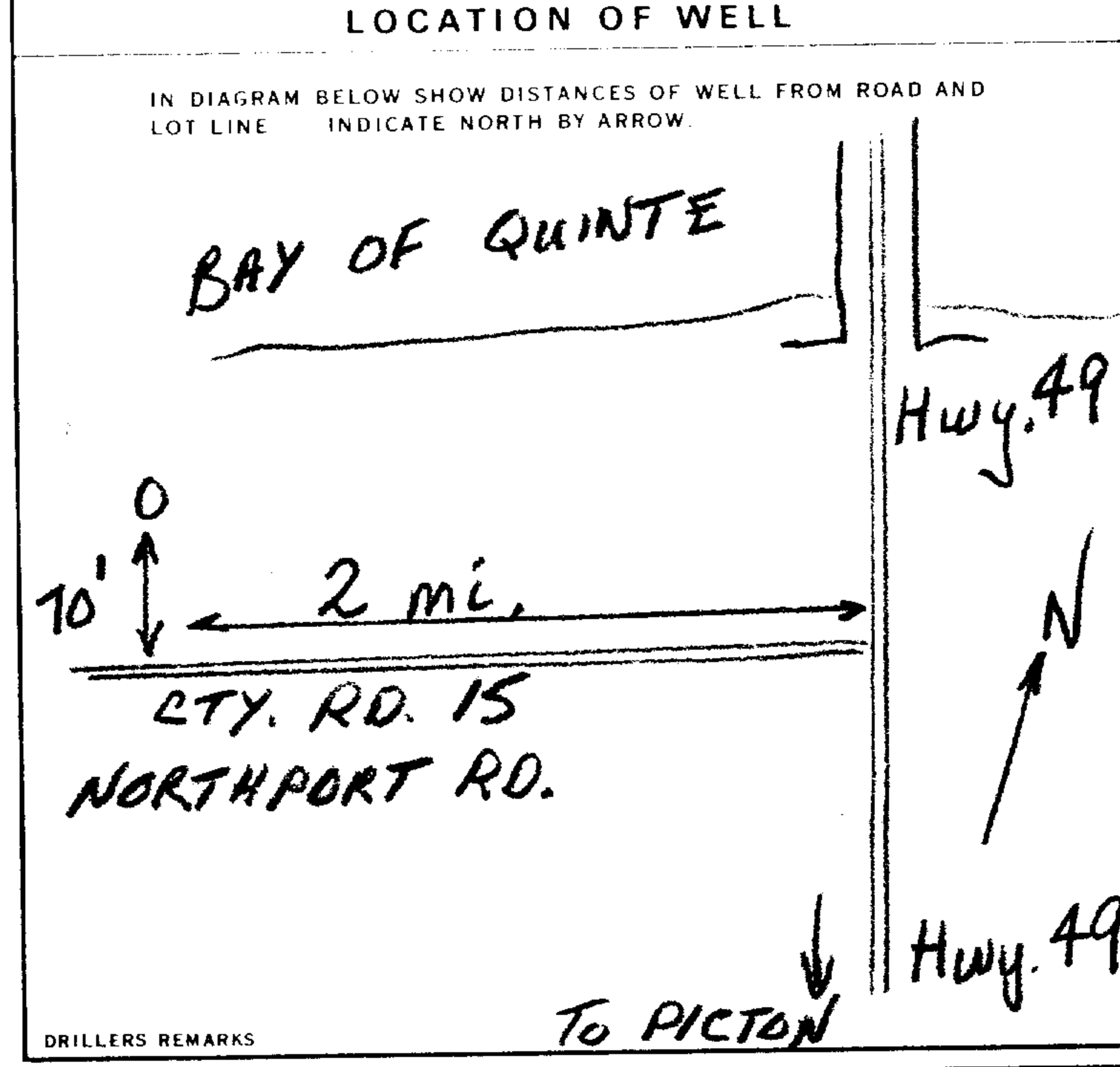
SIZE OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET
		41-44
		10

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER ETC.
FROM TO		
10-13 14-17		
18-21 22-25		
26-29 30-33 80		

71 PUMPING TEST

PUMPING TEST METHOD 1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> BAILER	PUMPING RATE 30 GPM	DURATION OF PUMPING 1 15-16 HOURS 30 MINS
STATIC LEVEL 19-21 1 FEET	WATER LEVEL END OF PUMPING 22-24 14 FEET	WATER LEVELS DURING 1 <input type="checkbox"/> PUMPING 2 <input checked="" type="checkbox"/> RECOVERY
IF FLOWING GIVE RATE 38-41 GPM	PUMP INTAKE SET AT 43-45 FEET	WATER AT END OF TEST 46-49 1 <input checked="" type="checkbox"/> CLEAR 2 <input type="checkbox"/> CLOUDY
RECOMMENDED PUMP TYPE <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP	RECOMMENDED PUMP SETTING 27	RECOMMENDED PUMPING RATE 30 GPM



FINAL STATUS OF WELL

1 <input checked="" type="checkbox"/> WATER SUPPLY	5 <input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY
2 <input type="checkbox"/> OBSERVATION WELL	6 <input type="checkbox"/> ABANDONED POOR QUALITY
3 <input type="checkbox"/> TEST HOLE	7 <input type="checkbox"/> UNFINISHED
4 <input type="checkbox"/> RECHARGE WELL	

WATER USE

1 <input checked="" type="checkbox"/> DOMESTIC	5 <input type="checkbox"/> COMMERCIAL
2 <input type="checkbox"/> STOCK	6 <input type="checkbox"/> MUNICIPAL
3 <input type="checkbox"/> IRRIGATION	7 <input type="checkbox"/> PUBLIC SUPPLY
4 <input type="checkbox"/> INDUSTRIAL	8 <input type="checkbox"/> COOLING OR AIR CONDITIONING
<input type="checkbox"/> OTHER	9 <input type="checkbox"/> NOT USED

METHOD OF DRILLING

1 <input checked="" type="checkbox"/> CABLE TOOL	6 <input type="checkbox"/> BORING
2 <input type="checkbox"/> ROTARY (CONVENTIONAL)	7 <input type="checkbox"/> DIAMOND
3 <input type="checkbox"/> ROTARY (REVERSE)	8 <input type="checkbox"/> JETTING
4 <input type="checkbox"/> ROTARY (AIR)	9 <input type="checkbox"/> DRIVING
5 <input type="checkbox"/> AIR PERCUSSION	

CONTRACTOR

NAME OF WELL CONTRACTOR CHALK WELL DRILLING LTD.	LICENCE NUMBER 1507
ADDRESS R.R.#6 Napanee	
NAME OF DRILLER OR BOREN R. Ian Chalk	LICENCE NUMBER 1576
SIGNATURE OF CONTRACTOR	SUBMISSION DATE DAY 23 MO 10 YR 81
CHALK WELL DRILLING LTD.	

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR 1507	DATE RECEIVED 11 01 82
DATE OF INSPECTION	INSPECTOR	
REMARKS	WDE	



Well Location

Address of Well Location (Street Number/Name) **2590 NORTHPORT RD** Township **SOPHIASBURGH** Lot **14** Concession **WOGP**

County/District/Municipality **PRINCE EDWARD COUNTY** City/Town/Village _____ Province **Ontario** Postal Code _____

UTM Coordinates Zone Easting Northing **NAD 83 18 330323 4891366** Municipal Plan and Sublot Number _____ Other _____

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
BROWN	CLAY	SILT	LOOSE	0	1.10
GREY	LIMESTONE	BEDROCK	HARD	1.10	9.20

Annular Space		
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0 7.380	BENTONITE	0.0640
7.380 9.210	SAND	0.016

Results of Well Yield Testing				
After test of well yield, water was: <input type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify _____	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason: _____	Static Level			
			1	
Pump intake set at (m/ft)	2		2	
Pumping rate (l/min / GPM)	3		3	
Duration of pumping _____ hrs + _____ min	4		4	
Final water level end of pumping (m/ft)	5		5	
If flowing give rate (l/min / GPM)	10		10	
	15		15	
Recommended pump depth (m/ft)	20		20	
	25		25	
Recommended pump rate (l/min / GPM)	30		30	
	40		40	
Well production (l/min / GPM)	50		50	
	60		60	
Disinfected? <input type="checkbox"/> Yes <input type="checkbox"/> No				

Method of Construction		Well Use		
<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input type="checkbox"/> Domestic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input checked="" type="checkbox"/> Monitoring
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning	
<input checked="" type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial		
<input type="checkbox"/> Other, specify _____		<input type="checkbox"/> Other, specify _____		

Construction Record - Casing			Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	
5.0	PLASTIC		0	7.710

<input type="checkbox"/> Water Supply	<input type="checkbox"/> Replacement Well	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Recharge Well	<input type="checkbox"/> Dewatering Well
<input checked="" type="checkbox"/> Observation and/or Monitoring Hole	<input type="checkbox"/> Alteration (Construction)	<input type="checkbox"/> Abandoned, Insufficient Supply	<input type="checkbox"/> Abandoned, Poor Water Quality	<input type="checkbox"/> Abandoned, other, specify _____
<input type="checkbox"/> Other, specify _____				

Construction Record - Screen			Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
5.8	PLASTIC		7.710	9.210

<input type="checkbox"/> Abandoned, Insufficient Supply	<input type="checkbox"/> Abandoned, Poor Water Quality	<input type="checkbox"/> Abandoned, other, specify _____
<input type="checkbox"/> Other, specify _____		

Water Details		Hole Diameter	
Water found at Depth 8.2 (m/ft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft) From To	Diameter (cm/in)
Water found at Depth _____ (m/ft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested	0 9.210	12
Water found at Depth _____ (m/ft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested		

Well Contractor and Well Technician Information

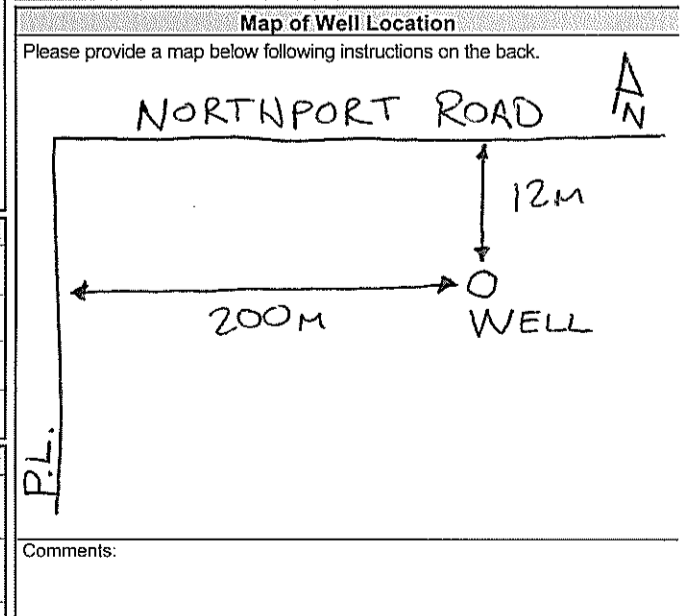
Business Name of Well Contractor **LISSOM EARTH SCIENCES** Well Contractor's Licence No. **6683**

Business Address (Street Number/Name) **67 KING STREET** Municipality **PICTON**

Province **ON** Postal Code **K0K2T0** Business E-mail Address **water@lissom.com**

Bus. Telephone No. (inc. area code) **6134768147** Name of Well Technician (Last Name, First Name) **PORRITT JOHN**

Well Technician's Licence No. **21165** Signature of Technician and/or Contractor _____ Date Submitted **20100205**



Comments: _____

Well owner's information package delivered <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Date Package Delivered	Ministry Use Only	
	Y Y Y Y M M D D	Date Work Completed	Audit No.
	20091118	Z 102529	MAR 04 2010

Well Location

Address of Well Location (Street Number/Name) 2590 NORTHPORT RD		Township SOPHIASBURGH	Lot 14	Concession WOSP
County/District/Municipality PRINCE EDWARD COUNTY		City/Town/Village	Province Ontario	Postal Code
UTM Coordinates NAD 8 3	Zone 18	Easting 330230489	Northing 11340	Municipal Plan and Sublot Number

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	CLAY	SILT	LOOSE	0	1.0
GREY	LIMESTONE	BEDROCK	HARD	1.0	9.285

Annular Space		
Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)
0	7.285	BENTONITE
7.285	9.285	SAND

Method of Construction	Well Use
<input type="checkbox"/> Cable Tool <input type="checkbox"/> Rotary (Conventional) <input type="checkbox"/> Rotary (Reverse) <input type="checkbox"/> Boring <input checked="" type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify _____	<input type="checkbox"/> Public <input type="checkbox"/> Domestic <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> Other, specify _____
<input type="checkbox"/> Diamond <input type="checkbox"/> Jetting <input type="checkbox"/> Driving <input type="checkbox"/> Digging	<input type="checkbox"/> Commercial <input type="checkbox"/> Municipal <input type="checkbox"/> Test Hole <input type="checkbox"/> Cooling & Air Conditioning
	<input type="checkbox"/> Not used <input type="checkbox"/> Dewatering <input checked="" type="checkbox"/> Monitoring

Construction Record - Casing			Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
5.0	PLASTIC		0	7.785

Construction Record - Screen			Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
5.8	PLASTIC		7.785	9.285

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft) From	Diameter (cm/in)
8.2	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	0	12
		9.285	

Well Contractor and Well Technician Information			
Business Name of Well Contractor LISSOM EARTH SCIENCES		Well Contractor's Licence No. 616183	
Business Address (Street Number/Name) 67 KING STREET		Municipality PICTON	
Province ON	Postal Code K0K2T0	Business E-mail Address water@lissom.com	
Bus. Telephone No. (inc. area code) 6134768147	Name of Well Technician (Last Name, First Name) PORRITT JOHN		
Well Technician's Licence No. 21165	Signature of Technician and/or Contractor <i>[Signature]</i>		Date Submitted 20100205

Results of Well Yield Testing				
After test of well yield, water was: <input type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify _____	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason:	Static Level			
	1		1	
Pump intake set at (m/ft)	2		2	
Pumping rate (l/min / GPM)	3		3	
Duration of pumping hrs + min	4		4	
Final water level end of pumping (m/ft)	5		5	
If flowing give rate (l/min / GPM)	10		10	
	15		15	
Recommended pump depth (m/ft)	20		20	
	25		25	
Recommended pump rate (l/min / GPM)	30		30	
	40		40	
Well production (l/min / GPM)	50		50	
	60		60	
Disinfected? <input type="checkbox"/> Yes <input type="checkbox"/> No				

Map of Well Location	
Please provide a map below following instructions on the back.	
Comments:	
Well owner's information package delivered <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date Package Delivered 20091118
Date Work Completed	
Ministry Use Only Audit No. Z102530 MAR 04 2010 Received	



Well Location

Address of Well Location (Street Number/Name) **2590 NORTHPORT RD.** Township **SOPHIASBURGH** Lot **14** Concession **WOGP**

County/District/Municipality **PRINCE EDWARD COUNTY** City/Town/Village _____ Province **Ontario** Postal Code _____

UTM Coordinates Zone Easting Northing **NAD 83 1803301484891286** Municipal Plan and Sublot Number _____ Other _____

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	CLAY	SILT	LOOSE	0	0.9
GREY	LIMESTONE	BEDROCK	HARD	0.9	9.212

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	7.412	BENTONITE	0.064
7.412	9.212	SAND	0.015

Results of Well Yield Testing

After test of well yield, water was: <input type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify _____	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason: _____	Static Level			
	1		1	
Pump intake set at (m/ft)	2		2	
Pumping rate (l/min / GPM)	3		3	
Duration of pumping _____ hrs + _____ min	4		4	
Final water level end of pumping (m/ft)	5		5	
If flowing give rate (l/min / GPM)	10		10	
	15		15	
Recommended pump depth (m/ft)	20		20	
	25		25	
Recommended pump rate (l/min / GPM)	30		30	
	40		40	
Well production (l/min / GPM)	50		50	
	60		60	
Disinfected? <input type="checkbox"/> Yes <input type="checkbox"/> No				

Method of Construction

Cable Tool Diamond Rotary (Conventional) Jetting Rotary (Reverse) Driving Boring Air percussion Other, specify _____

Well Use

Public Commercial Not used Domestic Municipal Dewatering Livestock Test Hole Monitoring Irrigation Cooling & Air Conditioning Industrial Other, specify _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
5.0	PLASTIC	0.4	0	7.712	<input type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input checked="" type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____ <input type="checkbox"/> Other, specify _____

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To
5.8	PLASTIC		7.712	9.212

Water Details

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____
8.3	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	9.212	12

Well Contractor and Well Technician Information

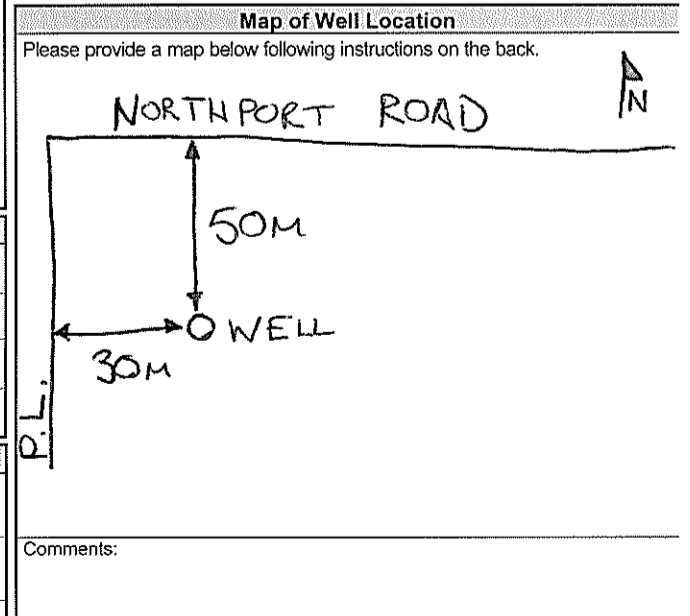
Business Name of Well Contractor **LISSOM EARTH SCIENCES** Well Contractor's Licence No. **6161813**

Business Address (Street Number/Name) **67 KING STREET** Municipality **PICTON**

Province **ON** Postal Code **K0K2T0** Business E-mail Address **water@lissom.com**

Bus. Telephone No. (inc. area code) **6134768147** Name of Well Technician (Last Name, First Name) **PORRITT JOHN**

Well Technician's Licence No. **211615** Signature of Technician and/or Contractor Date Submitted **20100205**



Comments: _____

Well owner's information package delivered Yes No

Date Package Delivered **20091118**

Date Work Completed _____

Ministry Use Only

Audit No **2102525**

MAR 04 2010

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2. CHECK CORRECT BOX WHERE APPLICABLE

11 5304900 53007 13

COUNTY OR DISTRICT: **P.E.C.** TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: **Sophiasburgh** CON. BLOCK, TRACT, SURVEY ETC: **I** LOT: **13**
 ADDRESS: **Peta** DATE COMPLETED: DAY **13** MO **10** YR **88**
 476 3564

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
	Soil			0	3
	Limestone			3	55

31 32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
9	<input checked="" type="checkbox"/> FRESH <input type="checkbox"/> SALTY <input type="checkbox"/> SULPHUR <input type="checkbox"/> MINERALS <input type="checkbox"/> GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
6	<input checked="" type="checkbox"/> STEEL <input type="checkbox"/> GALVANIZED <input type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE <input type="checkbox"/> PLASTIC	1.88	0 7
	<input type="checkbox"/> STEEL <input type="checkbox"/> GALVANIZED <input type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE <input type="checkbox"/> PLASTIC		7 55

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
		30

61 PLUGGING & SEALING RECORD

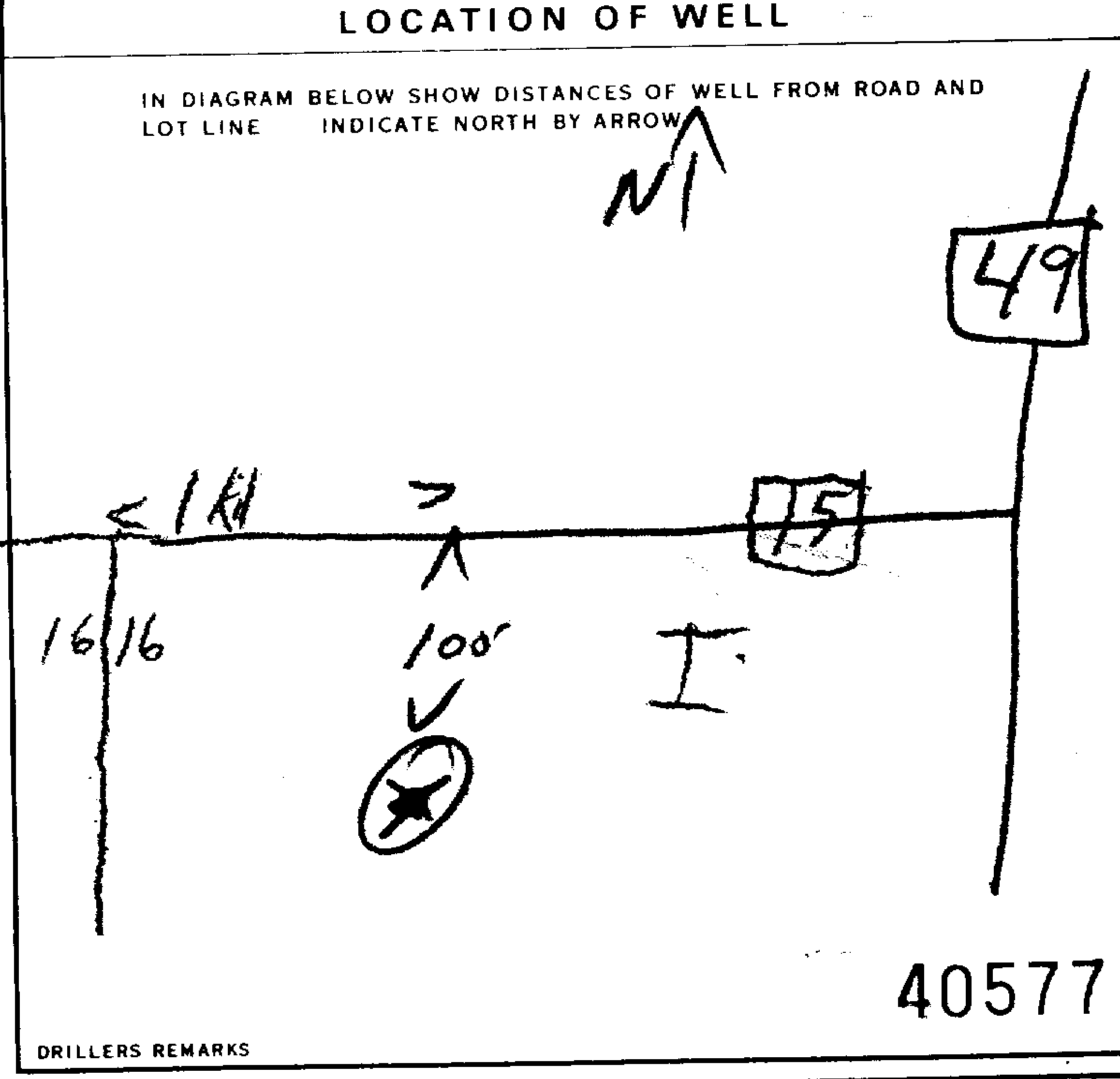
DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
10-13	14-17
18-21	22-25
26-29	30-33

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
<input type="checkbox"/> PUMP <input checked="" type="checkbox"/> BAILER	5 GPM	15 HOURS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING PUMPING
3 FEET	55 FEET	15 MINUTES: 55 FEET 30 MINUTES: FEET 45 MINUTES: FEET 60 MINUTES: FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	50 FEET	<input type="checkbox"/> CLEAR <input checked="" type="checkbox"/> CLOUDY



FINAL STATUS OF WELL

<input type="checkbox"/> WATER SUPPLY	<input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY
<input type="checkbox"/> OBSERVATION WELL	<input type="checkbox"/> ABANDONED POOR QUALITY
<input type="checkbox"/> TEST HOLE	<input type="checkbox"/> UNFINISHED
<input type="checkbox"/> RECHARGE WELL	<input type="checkbox"/> DEWATERING

WATER USE

<input checked="" type="checkbox"/> DOMESTIC	<input type="checkbox"/> COMMERCIAL
<input type="checkbox"/> STOCK	<input type="checkbox"/> MUNICIPAL
<input type="checkbox"/> IRRIGATION	<input type="checkbox"/> PUBLIC SUPPLY
<input type="checkbox"/> INDUSTRIAL	<input type="checkbox"/> COOLING OR AIR CONDITIONING
<input type="checkbox"/> OTHER	<input type="checkbox"/> NOT USED

METHOD OF CONSTRUCTION

<input checked="" type="checkbox"/> CABLE TOOL	<input type="checkbox"/> BORING
<input type="checkbox"/> ROTARY (CONVENTIONAL)	<input type="checkbox"/> DIAMOND
<input type="checkbox"/> ROTARY (REVERSE)	<input type="checkbox"/> JETTING
<input type="checkbox"/> ROTARY (AIR)	<input type="checkbox"/> DRIVING
<input type="checkbox"/> AIR PERCUSSION	<input type="checkbox"/> DIGGING <input type="checkbox"/> OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: **Ed Campbell** WELL CONTRACTOR'S LICENCE NUMBER: **1519**
 ADDRESS: **Newburgh**
 NAME OF WELL TECHNICIAN: **Ed Campbell** WELL TECHNICIAN'S LICENCE NUMBER: **70094**
 SIGNATURE OF TECHNICIAN/CONTRACTOR: *[Signature]* SUBMISSION DATE: DAY **12** MO **11** YR **88**

OFFICE USE ONLY

DATA SOURCE: **1519** CONTRACTOR: **1519** DATE RECEIVED: **NOV 23 1988**
 DATE OF INSPECTION: INSPECTOR:
 REMARKS: **C.S.S.E.S.**



Ministry of the Environment

The Ontario Water Resources Act

31 C3h

WATER WELL RECORD

5304157

MUNICIPALITY: 53007
 COUNTY: GPW
 LOT: 101

1. PRINT ONLY IN SPACES PROVIDED
 2. CHECK CORRECT BOX WHERE APPLICABLE

COUNTY OR DISTRICT: Prince Edward
 TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Southampton
 CON. BLOCK, TRACT, SURVEY, ETC: 1 G.P.W.
 LOT: 14
 ADDRESS: R.R. #2 Picton
 DATE COMPLETED: DAY 8 MO 7 YR 82

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
	previously drilled			0	20
	Brown limestone			20	44

41 WATER RECORD

WATER FOUND AT - FEET: 8
 KIND OF WATER: untreated

10-13	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL
15-18	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL
20-23	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL
24-29	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL
30-33	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
6 1/2	STEEL	1/8	0 - 3'6"
6 1/4	STEEL	1/8	3'6" - 44

61 PLUGGING & SEALING RECORD

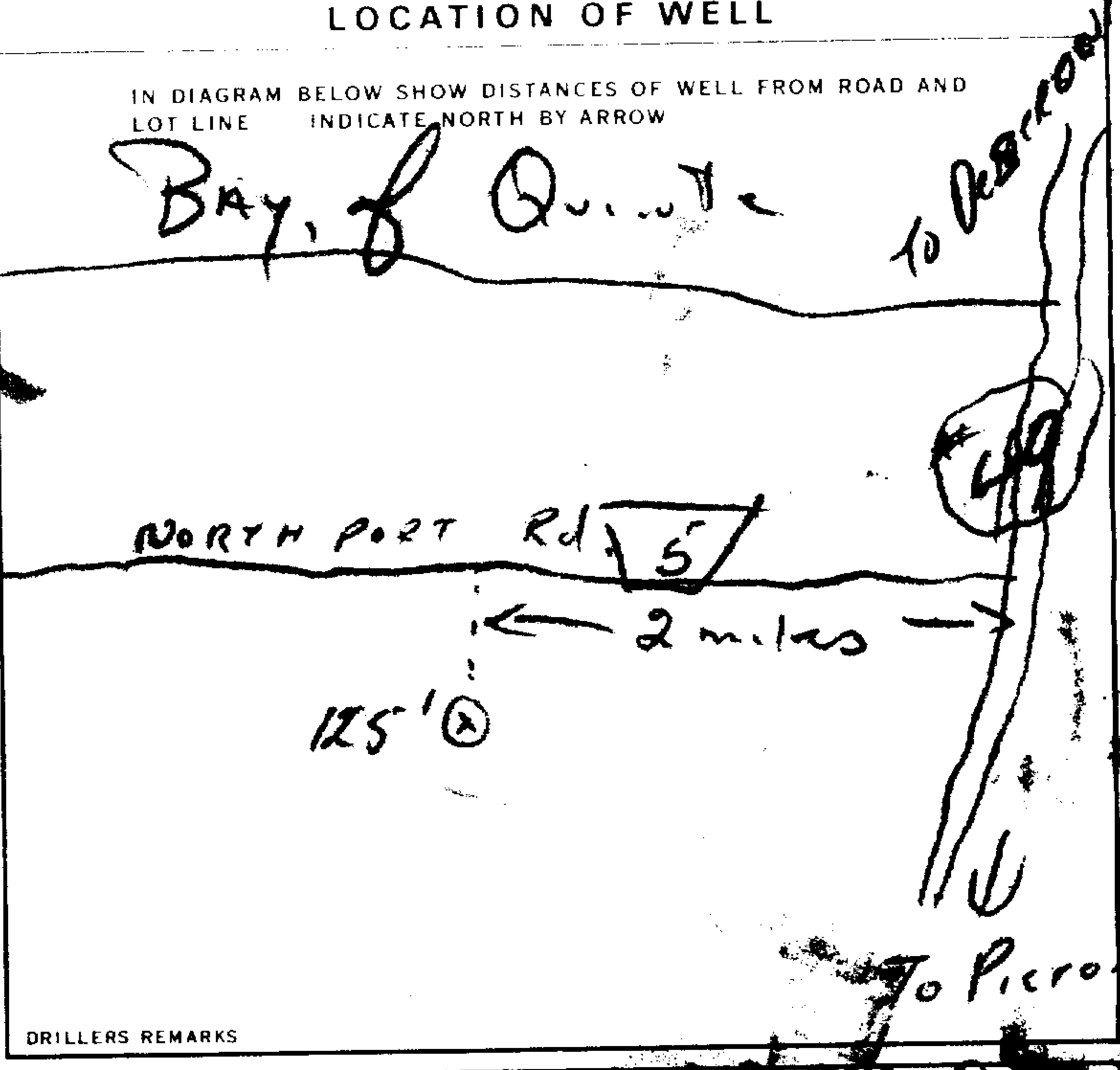
DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER ETC.
10-13		
14-17		
18-21		
22-25		
26-29		
30-33		

PUMPING TEST

PUMPING TEST METHOD: PUMP BAILER
 PUMPING RATE: 15 G.P.H. GPM
 DURATION OF PUMPING: 1/2 HOURS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
6 FEET	44 FEET	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
		26-28 FEET	29-31 FEET	32-34 FEET	35-37 FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP
 RECOMMENDED PUMP SETTING: FEET
 RECOMMENDED PUMPING RATE: GPM



FINAL STATUS OF WELL

1 WATER SUPPLY
 2 OBSERVATION WELL
 3 TEST HOLE
 4 RECHARGE WELL
 5 ABANDONED, INSUFFICIENT SUPPLY
 6 ABANDONED, POOR QUALITY
 7 UNFINISHED

WATER USE

1 DOMESTIC
 2 STOCK
 3 IRRIGATION
 4 INDUSTRIAL
 5 COMMERCIAL
 6 MUNICIPAL
 7 PUBLIC SUPPLY
 8 COOLING OR AIR CONDITIONING
 9 NOT USED

METHOD OF DRILLING

1 CABLE TOOL
 2 ROTARY (CONVENTIONAL)
 3 ROTARY (REVERSE)
 4 ROTARY (AIR)
 5 AIR PERCUSSION
 6 BORING
 7 DIAMOND
 8 JETTING
 9 DRIVING

NAME OF WELL CONTRACTOR: Quinte Well Drilling
 LICENCE NUMBER: 4409
 ADDRESS: 7th Street, Belleville
 NAME OF DRILLER OR BORER: Floyd A. Taylor
 LICENCE NUMBER: 4409
 SIGNATURE OF CONTRACTOR: Floyd A. Taylor
 SUBMISSION DATE: DAY 8 MO 7 YR 82

DATA SOURCE: 4409
 DATE OF INSPECTION: 03 08 82
 INSPECTOR: WDE
 REMARKS: WDE
 OFFICE USE ONLY



Ministry
of the
Environment

Ontario

The Ontario Water Resources Act

31C3h

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

11

5304121

MUNICIPALITY 53007

CORPORATION G.P.W.

LOT 101

COUNTY OR DISTRICT Prince Edward	TOWNSHIP, BOROUGH, CITY TOWN VILLAGE Sophiasburgh	CON. BLOCK TRACT SURVEY ETC.	LOT 25-27 13
OWNER (SURNAME FIRST) [REDACTED]	ADDRESS R.R.#2 Picton	DATE COMPLETED DAY 23 MO 10 YR 81	

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)					
GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
brown	topsoil		loose	0	1
grey	shale		loose	1	3
grey	limestone		hard	3	30

31

32

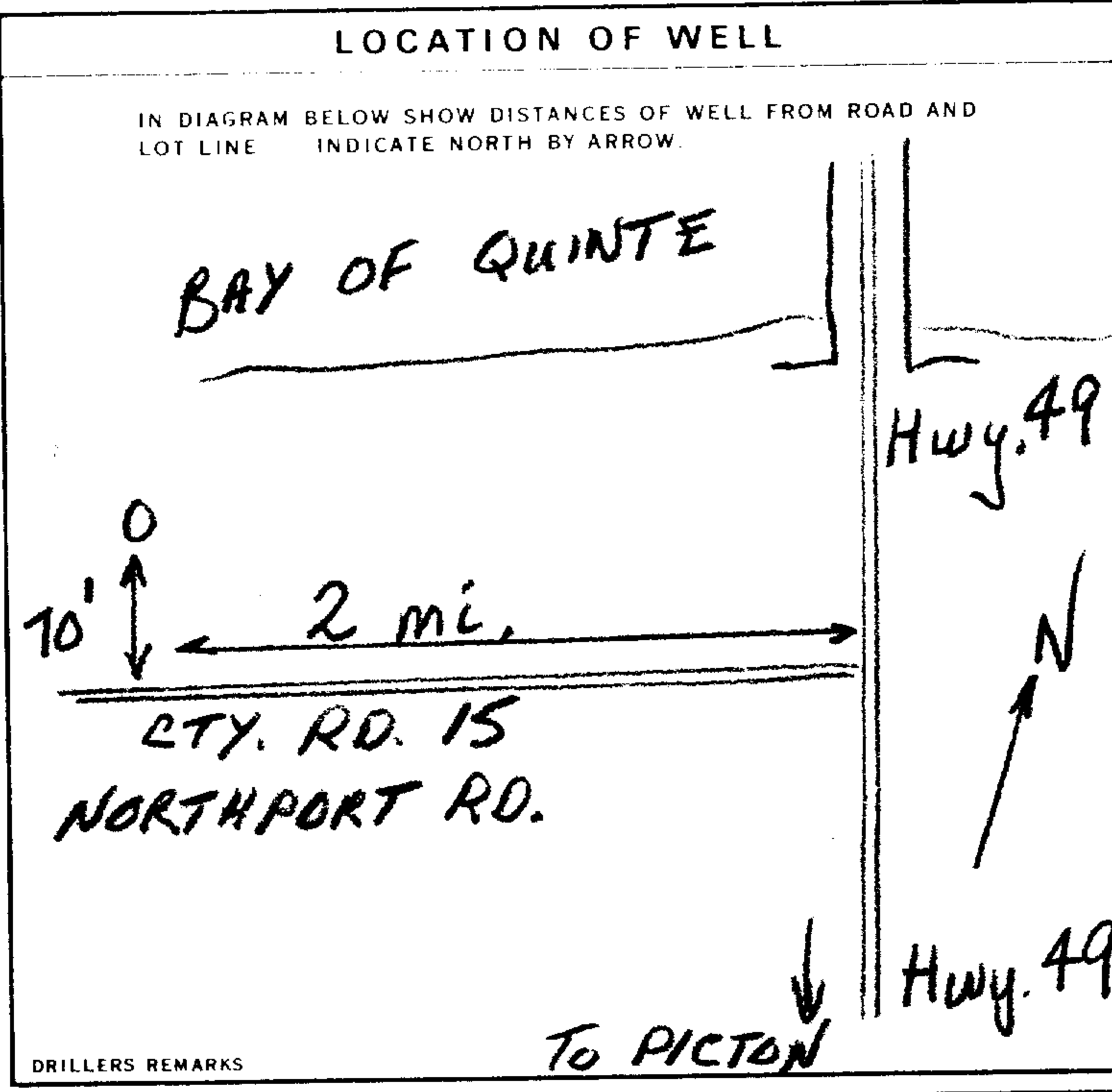
41 WATER RECORD			
WATER FOUND AT - FEET	KIND OF WATER		
20	1 <input checked="" type="checkbox"/> FRESH 2 <input checked="" type="checkbox"/> SALTY	3 <input type="checkbox"/> SULPHUR 4 <input type="checkbox"/> MINERAL	
26	1 <input checked="" type="checkbox"/> FRESH 2 <input type="checkbox"/> SALTY	3 <input type="checkbox"/> SULPHUR 4 <input type="checkbox"/> MINERAL	

51 CASING & OPEN HOLE RECORD				
INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
6 1/2	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	188	0	18
6 1/2	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input checked="" type="checkbox"/> CONCRETE 4 <input checked="" type="checkbox"/> OPEN HOLE		18	30

SCREEN	SIZE OF OPENING (SLOT NO.)	DIAMETER	LENGTH
		INCHES	FEET
			10

61 PLUGGING & SEALING RECORD			
DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)		
10-13	14-17		
18-21	22-25		
26-29	30-33		

71 PUMPING TEST	
PUMPING TEST METHOD 1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> BAILER	PUMPING RATE 30 GPM
DURATION OF PUMPING 1 HOURS 30 MINS	
STATIC LEVEL 1 FEET	WATER LEVEL END OF PUMPING 14 FEET
WATER LEVELS DURING	
15 MINUTES 1 FEET	30 MINUTES 1 FEET
45 MINUTES 1 FEET	60 MINUTES 1 FEET
IF FLOWING GIVE RATE GPM	PUMP INTAKE SET AT FEET
RECOMMENDED PUMP TYPE <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP	RECOMMENDED PUMP SETTING 27 FEET
RECOMMENDED PUMPING RATE GPM	RECOMMENDED PUMPING RATE 30 GPM



54 FINAL STATUS OF WELL	
1 <input checked="" type="checkbox"/> WATER SUPPLY	5 <input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY
2 <input type="checkbox"/> OBSERVATION WELL	6 <input type="checkbox"/> ABANDONED POOR QUALITY
3 <input type="checkbox"/> TEST HOLE	7 <input type="checkbox"/> UNFINISHED
4 <input type="checkbox"/> RECHARGE WELL	

55-56 WATER USE	
1 <input checked="" type="checkbox"/> DOMESTIC	5 <input type="checkbox"/> COMMERCIAL
2 <input type="checkbox"/> STOCK	6 <input type="checkbox"/> MUNICIPAL
3 <input type="checkbox"/> IRRIGATION	7 <input type="checkbox"/> PUBLIC SUPPLY
4 <input type="checkbox"/> INDUSTRIAL	8 <input type="checkbox"/> COOLING OR AIR CONDITIONING
<input type="checkbox"/> OTHER	9 <input type="checkbox"/> NOT USED

57 METHOD OF DRILLING	
1 <input checked="" type="checkbox"/> CABLE TOOL	6 <input type="checkbox"/> BORING
2 <input type="checkbox"/> ROTARY (CONVENTIONAL)	7 <input type="checkbox"/> DIAMOND
3 <input type="checkbox"/> ROTARY (REVERSE)	8 <input type="checkbox"/> JETTING
4 <input type="checkbox"/> ROTARY (AIR)	9 <input type="checkbox"/> DRIVING
5 <input type="checkbox"/> AIR PERCUSSION	

NAME OF WELL CONTRACTOR CHALK WELL DRILLING LTD.	LICENCE NUMBER 1507
ADDRESS R.R.#6 Napanee	
NAME OF DRILLER OR BURNER R. Ian Chalk	LICENCE NUMBER 1576
SIGNATURE OF CONTRACTOR	SUBMISSION DATE DAY 23 MO 10 YR 81
CHALK WELL DRILLING LTD.	

DATA SOURCE	CONTRACTOR 1507	DATE RECEIVED 11 01 82
DATE OF INSPECTION	INSPECTOR	
REMARKS		
WDE		

APPENDIX C

Test Well Drawdown and Recovery Data



ASC Environmental Inc.
1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 634-5596



Table 1. Water Quality Field Measurements.							
		Field Water Quality Analysis			Test Well:	TW1	
		Project No.:	ASC-733		Date:	22-Jun-22	
		Client:	Sheila and Manuel Silva		Recorded By:	T.A.	
		Location:	2511 County Road 15, Prince Edward County, Ontario				
Started pumping 20 L/min at 7:57 am							
Pumping Test Elapsed Time (min)	Odour	Temperature (°C)	pH	Conductivity (µS)	Total Dissolved Solids (ppm)	Turbidity NTU	Chlorine (Total) (mg/L)
6	None	14.8	7.78	2459	1130	7	200.00
30	None	15.2	7.20	2495	1240	0	150.00
60	None	15.8	7.08	2272	1139	0	75.00
90	None	16.2	6.86	1799	902	0	75.00
120	None	17.1	6.86	1469	728	0	25.00
150	None	17.8	6.71	1362	681	0	<25
180	None	17.5	6.74	1236	617	0	<25
210	None	17.3	6.09	1213	608	0	>2.2
240	None	17.0	6.76	1201	606	0	1.15
270	None	18.0	6.70	1147	574	0	2.17
300	None	17.2	6.60	1163	575	0	>2.2
330	None	17.4	6.51	1136	569	0	>2.2
360	None	N/A	N/A	N/A	N/A	N/A	1.39
387	None	N/A	N/A	N/A	N/A	N/A	0.70
416	None	N/A	N/A	N/A	N/A	N/A	0.35
431	None	N/A	N/A	N/A	N/A	N/A	0.10
449	None	N/A	N/A	N/A	N/A	N/A	0.00
Notes	water was clear throughout the test						
Field Analysis Equipment							
Chlorine :	N/A						
Temp./pH/Cond./TDS :	Hanna HI 98130 Meter						
Turbidity :	Hach DR 900 Colorimeter						

Table 2. Test Well drawdown during pumping test.

	Pumping Test - Drawdown			Test Well: TW1	
	Project No.:	ASC-733		Date:	22-Jun-2022
	Client:	Sheila and Manuel Silva		Recorded By: T.A.	
	Location:	2511 County Rd 15, PEC, ON			
Pumping Rate (Q) (L/min)	Elapsed Time (ET) (min)	Well Level (WL) (m)	Drawdown (DD) (m)		
20	0	1.54	0.00		
20	1	1.55	0.01		
20	2	1.55	0.01		
20	3	1.56	0.02		
20	4	1.56	0.02		
20	5	1.57	0.03		
20	6	1.57	0.03		
20	7	1.58	0.04		
20	8	1.58	0.04		
20	9	1.58	0.04		
20	10	1.59	0.05		
20	15	1.60	0.06		
20	20	1.61	0.07		
20	25	1.63	0.09		
20	30	1.64	0.10		
20	40	1.66	0.12		
20	50	1.67	0.13		
20	60	1.68	0.14		
20	70	1.69	0.15		
20	80	1.70	0.16		
20	90	1.71	0.17		
20	100	1.72	0.18		
20	110	1.72	0.18		
20	120	1.72	0.18		
20	130	1.73	0.19		
20	140	1.73	0.19		
20	150	1.73	0.19		
20	160	1.74	0.20		
20	170	1.75	0.21		
20	180	1.75	0.21		
20	190	1.75	0.21		
20	200	1.75	0.21		
20	225	1.76	0.22		
20	250	1.76	0.22		
20	300	1.78	0.24		
20	350	1.79	0.25		
20	400	1.80	0.26		
20	456	1.81	0.27		
TW1	(m)			m ³ /day	
ΔS_{0-1min}	0.01	Q_{0-1min}	20.00	28.8	
$\Delta S_{1-10min}$	0.03	$Q_{1-10min}$	20.00	28.8	
$\Delta S_{10-100min}$	0.13	$Q_{10-100min}$	20.00	28.8	
$\Delta S_{100-1000min}$	0.15	$Q_{100-1000min}$	20.00	28.8	
	m ² /day	m ² /s			
T_{0-1min}	1013.54	1.17E-02			
$T_{1-10min}$	193.98	2.25E-03			
$T_{10-100min}$	39.26	4.54E-04			
$T_{100-1000min}$	34.95	4.04E-04			
Notes					
1				Drawdown over one Log Cycle based on Trend Line	
Q	Volumetric Flow Rate			Litres per Minute	
T	Coefficient of Transmissivity			Gallon per Minute	

ASC Environmental Inc.
ASC-733, Sheila and Manuel Silva, 2511 County Rd 15, PEC, ON
Figure 1. TW1 Pumping Test Drawdown

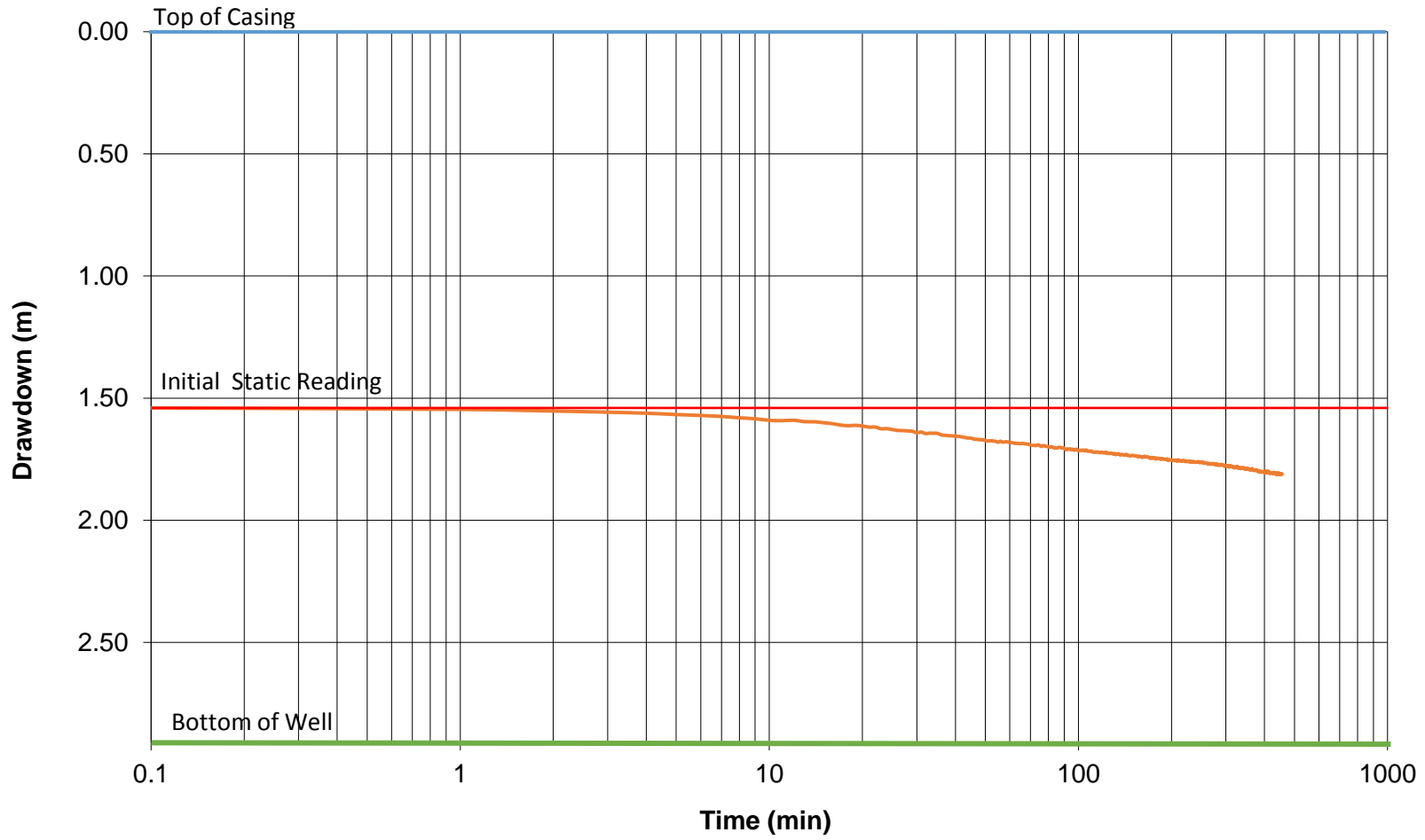



Table 3. Observation well drawdown during pumping test.

										
Pumping Test - Drawdown							Test Well:	TW01		
Project No.:		ASC-733					Date:	22-Jun-2022		
Client:		Sheila and Manuel Silva					Pumping start time			
Location:		2511 County Road 15, Prince Edward County,					7:57	AM		
2494 County Road 15 (OW1)					2491 County Road 15 (OW2)					
WL	WL	DD	Time	ET	WL	WL	DD	Time	ET	
(ft)	(m)	(m)	H:Min	(min)	(ft)	(m)	(m)	H:Min	(min)	
4.790	1.460	0.000	7:30	0	15.387	4.690	0.000	7:35	0	
4.724	1.440	-0.020	9:5	68	15.387	4.690	0.000	9:8	71	
4.823	1.470	0.010	10:4	127	16.699	5.090	0.400	10:7	130	
4.888	1.490	0.030	11:4	187	15.420	4.700	0.010	11:7	190	
4.921	1.500	0.040	12:5	248	18.701	5.700	1.010	12:8	251	
5.020	1.530	0.070	13:5	308	15.682	4.780	0.090	13:8	311	
4.888	1.490	0.030	15:53	476	15.420	4.700	0.010	15:56	479	
2590 County Road 15 (OW3)					Observation Well				Distance (m)	
WL	WL	DD	Time	ET	2494 County Road 15 (OW1) 2491 County Road 15 (OW2) 2590 County Road 15 (OW3)				100 510 390	
(ft)	(m)	(m)	H:Min	(min)						
6.299	1.920	0.000	7:40	0						
6.135	1.870	-0.050	9:3	66						
6.365	1.940	0.020	10:1	124						
6.365	1.940	0.020	11:1	184						
6.430	1.960	0.040	12:2	245						
0.000	1.980	0.000	13:2	305						
6.266	1.910	-0.010	15:50	473						

ASC Environmental Inc.
ASC-733, Sheila and Manuel Silva, 2511 County Rd 15, PEC, ON
Figure 2. Pumping Test Influence on Neighbouring Wells
TW1 Pumping Test Zone of Influence

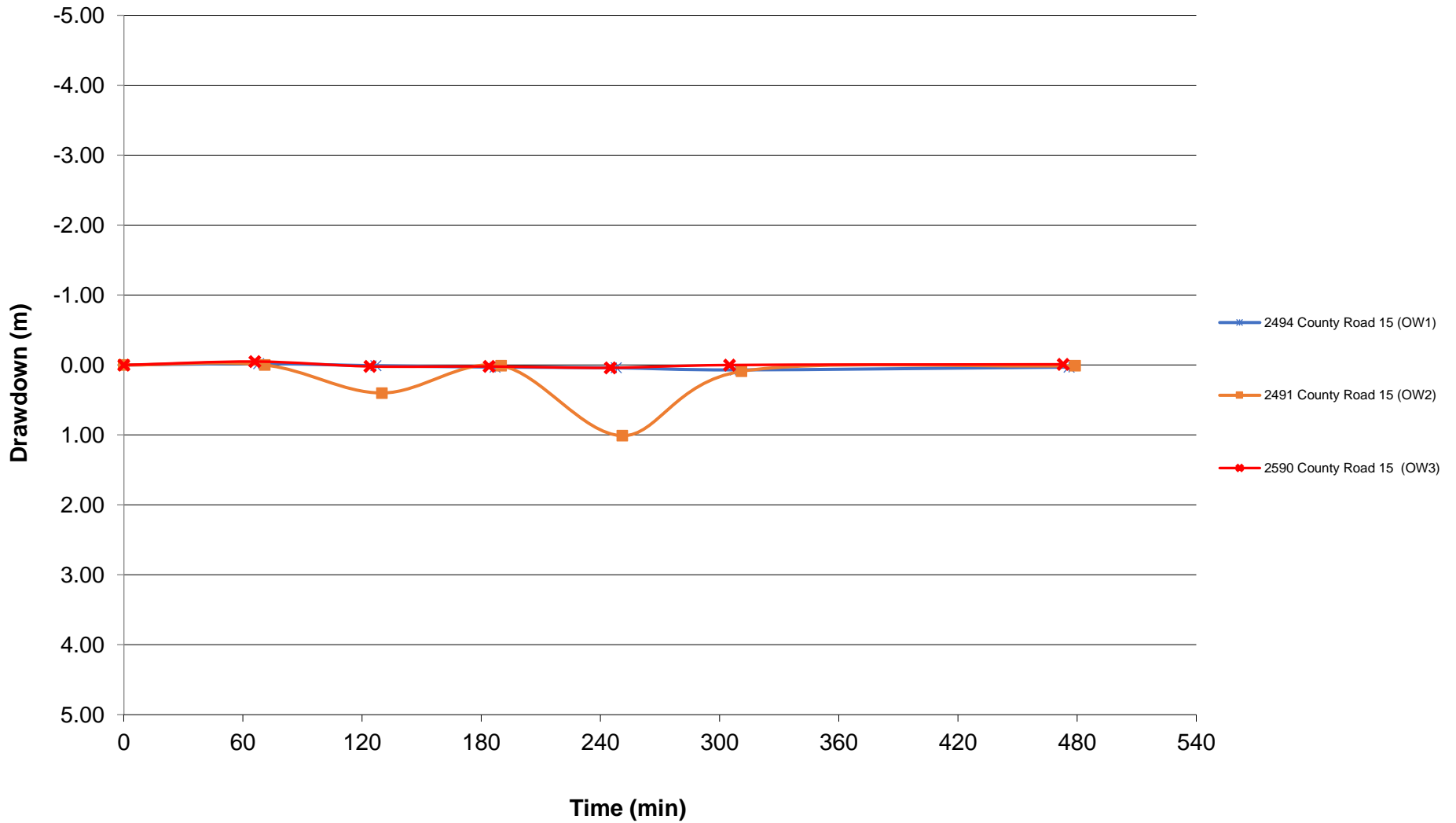

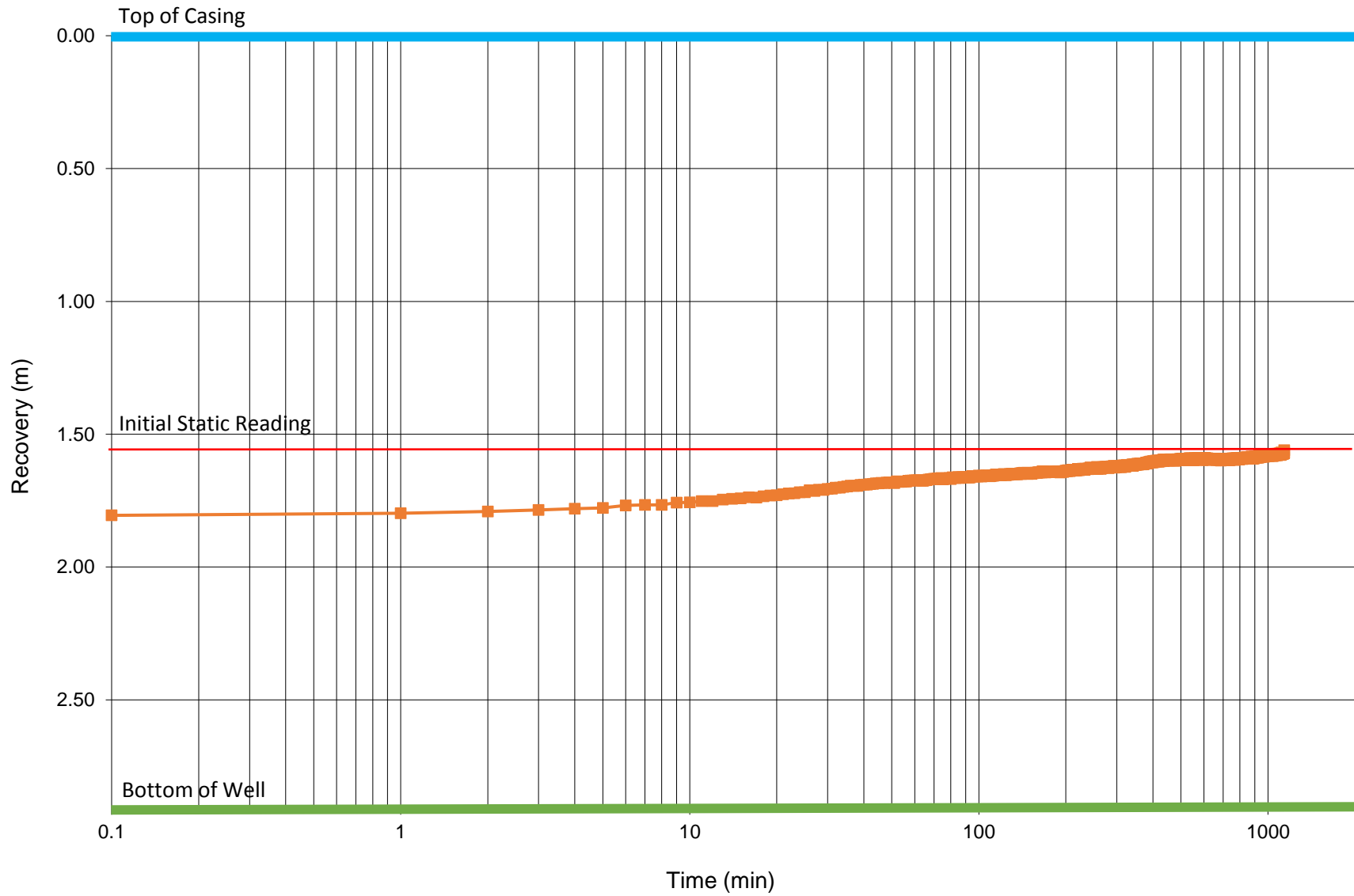


Table 4. Test well recovery after pumping test.

		Pumping Test - Recovery		Test Well:	TW1	
		Project No.:	ASC-733	Date:	22-Jun-22	
		Client:	Sheila and Manuel Silva		Recorded By: T.A.	
		Location:	2511 County Road 15, Prince Edward County, Ontario			
		Test Well				
Pumping	Elapsed Time (min)	Well Level (WL) (m)	Drawdown (m)			
0	0	1.81	0.27			
0	1	1.80	0.26			
0	2	1.79	0.25			
0	3	1.79	0.25			
0	4	1.78	0.24			
0	5	1.78	0.24			
0	6	1.77	0.23			
0	7	1.77	0.23			
0	8	1.77	0.23			
0	9	1.76	0.22			
0	10	1.76	0.22			
0	30	1.71	0.17			
0	60	1.67	0.13			
0	120	1.65	0.11			
0	180	1.64	0.10			
0	240	1.63	0.09			
0	300	1.62	0.08			
0	360	1.61	0.07			
0	420	1.60	0.06			
0	480	1.60	0.06			
0	540	1.59	0.05			
0	600	1.59	0.05			
0	660	1.60	0.06			
0	720	1.59	0.05			
0	780	1.59	0.05			
0	840	1.59	0.05			
0	900	1.59	0.05			
0	1000	1.58	0.04			
0	1100	1.57	0.03			
0	1139	1.56	0.02			
WL at 93% Recovery =		1.56				

ASC Environmental Inc.
ASC-733, Sheila and Manuel Silva, 2511 County Rd 15, PEC, ON
Figure 3. TW1 Recovery



APPENDIX D

Laboratory Analytical Certificates



ASC Environmental Inc.
1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 634-5596

C.O.C.: G109047

REPORT No. B22-19492

Report To:

ASC Environmental
 1305 Princess St.,
 Kingston ON K7M 3E3 Canada

Attention: Thomas Asma

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 23-Jun-22

JOB/PROJECT NO.: ASC-733

DATE REPORTED: 30-Jun-22

P.O. NUMBER:

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	TW1		
Sample I.D.	B22-19492-1		
Date Collected	22-Jun-22		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Total Coliform	cfu/100mL	1	MOE E3407	23-Jun-22/K	0		
E coli	cfu/100mL	1	MOE E3407	23-Jun-22/K	0		
Fecal Coliform	cfu/100mL	1	SM9222D	23-Jun-22/K	0		
Heterotrophic Plate Count	cfu/mL	10	SM9215D	23-Jun-22/K	20		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Jun-22/O	315		
pH @25°C	pH Units		SM 4500H	24-Jun-22/O	7.34		
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Jun-22/O	976		
Colour	TCU	2	SM 2120C	27-Jun-22/O	10		
Turbidity	NTU	0.1	SM 2130	27-Jun-22/O	0.9		
Fluoride	mg/L	0.1	SM4110C	27-Jun-22/O	< 0.1		
Chloride	mg/L	0.5	SM4110C	27-Jun-22/O	113		
Nitrite (N)	mg/L	0.1	SM4110C	27-Jun-22/O	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	27-Jun-22/O	< 0.1		
Sulphate	mg/L	1	SM4110C	27-Jun-22/O	9		
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	29-Jun-22/K	0.6		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	24-Jun-22/K	< 0.01		
o-Phosphate (P)	mg/L	0.002	PE4500-S	24-Jun-22/K	0.319		
TDS (Calc. from Cond.)	mg/L	1	Calc.	27-Jun-22	520		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	27-Jun-22/O	3.8		
Sulphide	mg/L	0.01	SM4500-S2	29-Jun-22/K	< 0.01		
Phenolics	mg/L	0.001	MOEE 3179	28-Jun-22/K	< 0.001		
Tannins and Lignins	mg/L	0.5	SM5500B	28-Jun-22/K	0.6		
Hardness (as CaCO3)	mg/L	1	SM 3120	27-Jun-22/O	350		
Calcium	mg/L	0.02	SM 3120	27-Jun-22/O	131		
Iron	mg/L	0.005	SM 3120	27-Jun-22/O	0.107		
Manganese	mg/L	0.001	SM 3120	27-Jun-22/O	0.090		
Potassium	mg/L	0.1	SM 3120	27-Jun-22/O	1.9		



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an *

Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Michelle Dubien
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

C.O.C.: G109047

REPORT No. B22-19492

Report To:

ASC Environmental
 1305 Princess St.,
 Kingston ON K7M 3E3 Canada

Attention: Thomas Asma

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 23-Jun-22

JOB/PROJECT NO.: ASC-733

DATE REPORTED: 30-Jun-22

P.O. NUMBER:

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	TW1			
Sample I.D.	B22-19492-1			
Date Collected	22-Jun-22			

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Sodium	mg/L	0.2	SM 3120	27-Jun-22/O	81.7		



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an *

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
 Lab Manager

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