



October 23, 2025

**PH5103-LET.01-REV.01**

**Nautical Lands Group**

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Attention: Angela Mariani

Subject: **Hydrogeological Assessment and Terrain Analysis  
Re-zoning Application  
2966-2978 Carp Road  
Ottawa (Carp), Ontario**

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## **INTRODUCTION**

Paterson Group Inc. (Paterson) was retained by Nautical Lands Group to conduct a Hydrogeological Assessment and Terrain Analysis in support of a Re-zoning Application for a proposed cheer academy located at 2966-2978 Carp Road in Ottawa (Carp), Ontario. It is our understanding that the current property consists of a 1.28 hectares (ha) parcel with an existing dwelling in the southern portion of the site. The proposed re-zoning application aims to change the zoning of the existing warehouse footprint that is designated as Rural Commercial (RC7) to include instructional facility and athletic & recreational facility use. For specific planning details, please refer to the consultant report application package and to the attached Key Plan for the approximate site location.

The purpose of this work has been to determine the suitability of the water supply aquifer underlying the site and to carry out a sewage system impact assessment (terrain analysis) to determine the site's suitability for private on-site sewage systems. Specifically, the intent of the report is to determine the quality and quantity of water underlying the subject site, as well as to provide the maximum sewage flow volume which the subject site can support from a nitrate attenuation standpoint.



## **BACKGROUND**

### **Subject Site**

The subject property consists of a warehouse with associated landscaped areas and parking lots, and a residential dwelling with associated landscaped areas and driveways located at 2966 and 2978 Carp Road in the City of Ottawa (Carp), Ontario. The ground surface across the site is relatively flat, with a general downslope direction to the east. The general overburden groundwater flow direction is assumed to be north to northeast towards the Carp River.

The Carp Road corridor and buildings onsite are serviced by private services. The site is bordered to the northeast and northwest by undeveloped lands, to the southwest by Carp Road, followed by residential properties, and to the southeast by a commercial property.

The subject site is largely rectangular in shape with a total area of 1.28 ha. The site is currently zoned as RC7 (Rural Commercial). The land parcels to the north and east are zoned RC9 (Rural Commercial), and the residential properties to the west are zoned RR5 (Rural Residential Zone).

### **Regional Geology**

Published surficial geology mapping (OGS MRD128) for the area in the vicinity of the subject site indicates that the subject site is underlain predominantly by stone-poor silty sand to sandy silt-textured till on Paleozoic Terrain.

Published bedrock geology mapping (OGS MRD219) indicates that the subject lands are underlain by limestone and shale of the Simcoe Group and Verulam Formation. The available bedrock mapping coincides with the well driller's description on the Ministry of the Environment, Conservation and Parks (MECP) Water Well Records (WWR) for the surrounding well supplies installed within the subject area, which generally indicate a grey limestone.

### **Karst Mapping**

Published karst mapping (OGS GRS005) for the area indicated that the subject site is not within a potential or inferred karst area.



## **MISSISSIPPI-RIDEAU SOURCE PROTECTION PLAN**

The Mississippi-Rideau Source Protection Plan (MRSP) provides guidance as to which policies apply to a given property, municipality or specific activity and if there are specific designations that apply to the area. The subject site has been designated as a Highly Vulnerable Aquifer (HVA within the MRSP) and a Significant Groundwater Recharge Area (SGRA) and is identified as two of the four groundwater related vulnerable areas identified within the Clean Water Act (2006). The four vulnerable areas consists of HVA, SGRA, Intake Protection Zones (IPZ), and Wellhead Protection Areas (WHPA).

Based upon the designation, there are no restrictions of land uses on the subject site based upon its proposed usage. Therefore, there are no related requirements for an HVA or SGRA at this location.

### **Hydrogeological Pre-Consultation**

A City of Ottawa pre-consultation was completed on August 27, 2025 to discuss the requirements for the hydrogeological assessment and terrain analysis of the subject site. Initial discussions were completed by email prior to the meeting.

## **FIELDWORK PROGRAM**

### **Well Testing**

As a means to demonstrate the adequacy of the aquifer underlying the subject lands, with respect to water quality and quantity, the existing drilled well (TW1) servicing the existing warehouse was tested. TW1 has a Water Well Record (WWR) Well ID of A212621. TW1 has a 150 mm diameter steel casing that extends to 6.82 m bgs with a 0.45 m stick up. The well itself extends to a depth of 58.9 m bgs. According to the water well record, limestone bedrock was recorded at a depth of approximately 4.34 m bgs. Based on available geological mapping, the drift thickness at TW1 varies from 2 to 3 m.

As a means to evaluate the water supply aquifer intercepted by the well, the well was subjected to a 8-hour constant rate pumping test. The pumping test was conducted on March 22, 2022 under the full-time supervision of Paterson personnel. Prior to the pumping test a data-logger was installed to monitor the background groundwater levels.

The existing submersible pump was used for the 8-hour pumping test. A licensed water well technician (Air Rock) completed the necessary plumbing related activities. The discharge line was placed at a sufficient distance to ensure that the discharge water was being directed away from the well and the septic system onsite. Upon completion of the test, the system was returned to its normal configuration.

The pumping test was carried out at a pumping rate of 45 L/min for a duration of 8 hours. During the pumping test, the pumping rate was periodically measured using the timed volume correlation method. The pumping rate was maintained within 5% of the selected



pumping rate. The static water level was recorded manually and an electric datalogger (VanEssen TD-Diver) was installed in the test well prior to the start of the pumping test.

The data logger recorded water levels at 30 second intervals. In addition, manual water level readings were taken at periodic intervals during the test.

Recovery data was collected from the well following the completion of the pumping. The well was noted to have achieved 100% recovery approximately 1 minute after the completion of pumping.

Groundwater samples were collected at 4 hours and 8 hours after the start of pumping. Prior to collection of the groundwater samples, the free chlorine residual was verified as non-detectable. The water samples were submitted for comprehensive testing of bacteriological, chemical, and physical water quality parameters consistent with the standard "Subdivision Supply" suite of parameters plus trace metals along with Volatile Organic Compounds (VOCs).

All samples were collected unfiltered and unchlorinated and were placed directly into clean bottles supplied by the analytical laboratory. Samples were placed immediately into a cooler with ice and were transported directly to Environmental Testing Canada Inc.(Eurofins) laboratory in Ottawa. All samples were received by the laboratory within 24 hours of collection.

A series of field tests of the pumped water were carried out at the well head during the 8-hour pumping test. The parameters tested at the well head included: pH, total dissolved solids, conductivity, turbidity, apparent colour, and temperature. Calibration / confirmation of calibration of all field-testing equipment was performed in Paterson's laboratory the day prior to the pumping test. Values are then confirmed again onsite prior to the start of the pumping test.

Total coliforms were detected in the analytical testing of TW1 during the pumping test at 19 ct/100 mL (TW1-GW1) in the sample taken 4 hours into the pumping test and at 23 ct/100 mL (Tw1-GW2) at 8 hours into the pumping test.

Paterson personnel went to site on April 1, 2022 to disinfect TW1 as per the Ministry of the Environment, Conservation and Parks (MECP) disinfection instruction sheet, attached. The existing submersible pump was used to circulate the water column in order to ensure proper mixing of the disinfectant. Paterson personnel confirmed the presence and adequate mixing of the disinfectant.

On April 4, 2022, Paterson personnel confirmed the presence of free chlorine within the well water. The well was purged using the existing submersible pump to remove residual free chlorine prior to obtaining a bacteriological sample. The discharge locations were placed at a sufficient distance to ensure that the discharge water was being directed away from the wellhead.





TW1 was pumped for 8 hours at a rate of approximately 15 L/min. Paterson personnel confirmed that the free chlorine residual was 0 mg/L prior to the collection of the bacteriological sample (GW1) at the end of 8 hours of purging the well.

All samples were collected unfiltered and unchlorinated and were placed directly into clean bottles supplied by the analytical laboratory. Samples were placed immediately into a cooler with ice and were transported directly to the Eurofins Environmental Testing Canada Inc. (Eurofins) laboratory in Ottawa. All samples were received by the laboratory within 24 hours of collection.

Total Coliforms were reported as 4 ct/100 mL in the analytical testing of TW1 after the disinfection process. E. Coli was found to be non-detect as per the original results.

Additional sampling was completed on October 8, 2025 for the parameters of E.Coli, Total Coliforms and Nitrates/Nitrites. The sampling was completed by Nelson Water Inc. Total Coliforms and E.Coli were noted to be non-detect. Nitrate was found to be 0.25 mg/L and Nitrite was found to be non-detect.



## Aquifer Analysis

### Water Quantity

Pumping test data was analyzed using AQTESOLV Pro Version 4 aquifer analysis software package by HydroSOLVE Inc. Drawdown data was measured using an electronic water level tape and an electronic datalogger unit.

<b>Table 1: SUMMARY OF WATER SUPPLY AQUIFER CHARACTERISTICS OF TW1</b>	
<b>AQUIFER PARAMETER</b>	<b>RESULT OF ANALYSIS</b>
Transmissivity (m <sup>2</sup> /day)	1,224
Pumping Rate (L/min)	45
Pre-test Static Water Level (m BTOC)	3.20
Post-test Static Water Level (m BTOC)	3.26
Maximum Drawdown (m BTOC)	3.34
Available Drawdown (m)	55.7
% Drawdown During Pumping Test (%)	0.3
Specific Capacity (L/min/m drawdown)	321

The drawdown data was analyzed using the Theis and Cooper Jacob methods of analysis. Aquifer transmissivity is estimated to be 1,224 m<sup>2</sup>/day. Refer to the Theis and Cooper Jacob methods of analysis data sheets attached to this report.

The pumping test results show that TW1 has a high yield to support the water demands that may be required. Overall maximum drawdown at a constant pumping rate for a period of 8 hours was approximately 0.14 m (0.3% of the available drawdown), but only 0.06 m at the end of the test period. 95% recovery was achieved approximately one minute after the end of pumping. It should be noted that the water level was measured to be increasing throughout the 8-hour constant rate pumping test.

The total volume of water pumped during the 8-hour pumping event was approximately 21,600 L. This is approximately 3.2 times the maximum total daily design volume of effluent (6,418 L/d) using 57% nitrate reduction required to support the Re-zoning Application. Further discussion in the Terrain Analysis notes an additional technology that can support greater than 10,000 L/day, however the 6,418 L/day is above the required flows as calculated under Part 8 – OBC for a subsequent application.

The suitability of the aquifer to support the proposed Re-zoning application was assessed using the methodology provided in the City of Ottawa Hydrogeological and Terrain Analysis Guidelines (HTAG).



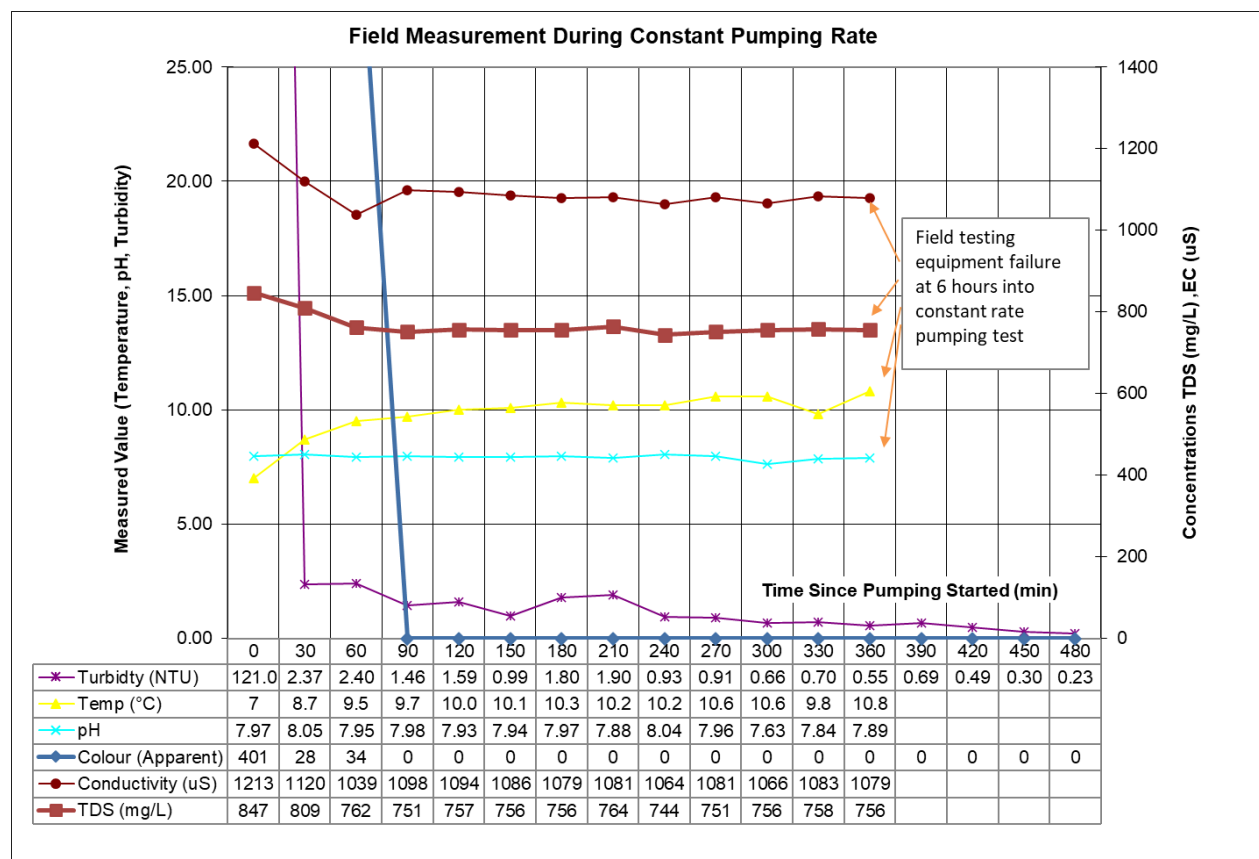
Based on the information summarized in Table 1, it is readily apparent that the water supply well has intercepted an adequately strong water supply aquifer which has sufficient quantity to service the proposed zoning usages.

Given the analyses presented and summarized above, it is our opinion that there is an adequate supply of water to support the proposed Application.

## Water Quality

### Field Data

Turbidity, electrical conductivity, total dissolved solids (TDS), pH, true color and temperature were measured at the wellhead during the pumping test. The measurements and time intervals for each of these parameters are summarized on the graphical representation below. In addition, a HACH Pocket Colorimeter II chlorine reader was used to measure the free chlorine residual level. No chlorine residual was detected in the discharged water prior to the collection of the water samples. During the constant rate pumping test, the field-testing equipment which tests for pH, TDS, EC, and temperature malfunctioned at the 6-hour point. These parameters were noted to have stabilized prior to the malfunction of the equipment.





## Laboratory Data

The Subdivision Package suite of parameters and trace metals laboratory water quality obtained from the pumping test of TW1 is provided in Table 2a, 2b, and 2c below and the laboratory analyses reports can be found attached. All laboratory test results can be found attached to this report.

TABLE 2a: GROUNDWATER MICROBIOLOGY & GENERAL GEOCHEMISTRY						
PARAMETER	UNITS	ODWS		TW1		
		LIMIT	TYPE	GW1 (4 hr) 2022-03-22	GW2 (8 hr) 2022-03-22	GW1 2022-04-04
MICROBIOLOGICAL						
Escherichia Coli (E.Coli)	ct/100mL	0	MAC	0	0	0
Total Coliforms	ct/100mL	0	MAC	19	23	4
GENERAL CHEMICAL - HEALTH RELATED						
Fluoride (F)	mg/L	1.5	MAC	<0.10	<0.10	-
Ammonia (N-NH <sub>3</sub> )	mg/L	-	-	<0.010	<0.010	-
Nitrite (N-NO <sub>2</sub> )	mg/L	1	MAC	<0.10	<0.10	-
Nitrate (N-NO <sub>3</sub> )	mg/L	10	MAC	3.15	3.02	-
Total Kjeldahl Nitrogen	mg/L	-	-	0.25	0.48	-
Turbidity (Field)	NTU	1.0 (5.0)	MAC/AO	0.93	0.23	-
Turbidity (Laboratory)	NTU	1.0 (5.0)	MAC/AO	0.50	0.50	-
GENERAL CHEMICAL - AESTHETIC RELATED						
Alkalinity (as CaCO3)	mg/L	30-500	OG	251	243	-
Chloride (Cl)	mg/L	250	AO	135	142	-
Colour	TCU	5	AO	<2	<2	-
Colour (Field - Apparent)	TCU	5	AO	0	0	-
Conductivity	uS/cm	-	-	1,180	1,180	-
Dissolved Organic Carbon	mg/L	5	AO	2.40	2.40	-
Hardness (as CaCO3)	mg/L	100	OG	454	451	-
Ion Balance	unitless	-	-	0.97	0.97	-
pH	unitless	6.5-8.5	AO	7.95	7.93	-
Phenols	mg/L	-	-	<0.001	<0.001	-
Sulphate (SO <sub>4</sub> )	mg/L	500	AO	182	175	-
Sulphide (S <sub>2</sub> <sup>-</sup> )	mg/L	0.05	AO	<0.01	<0.01	-
Tannin & Lignin	mg/L	-	-	1.00	1.00	-
Total Dissolved Solids	mg/L	500	AO	767	767	-

- ODWS identifies the following types of parameters:  
MAC = Maximum Allowable Concentration  
AO = Aesthetic Objective  
OG = Operational Guideline
- Shaded Concentration Indicates an Exceedance of the ODWS Objective

**TABLE 2b: GROUNDWATER GEOCHEMISTRY - METALS**

PARAMETER	UNITS	ODWS		TW1	
		LIMIT	TYPE	GW1 (4 hr)	GW2 (8 hr)
				2022-03-22	2022-03-22
Volatiles					
Aluminum (Al)	mg/L	0.1	OG	<0.01	<0.01
Antimony (Sb)	mg/L	0.006	IMAC	<0.0005	<0.0005
Arsenic (As)	mg/L	0.01	IMAC	<0.001	<0.001
Barium (Ba)	mg/L	1.0	MAC	0.12	0.12
Beryllium (Be)	mg/L	-	-	<0.0005	<0.0005
Boron (B)	mg/L	5.0	IMAC	0.04	0.04
Cadmium (Cd)	mg/L	0.005	MAC	<0.0001	<0.0001
Calcium (Ca)	mg/L	-	-	162	161
Chromium (Cr)	mg/L	0.05	MAC	<0.001	<0.001
Cobalt (Co)	mg/L	-	-	<0.0002	<0.0002
Copper (Cu)	mg/L	1.0	AO	<0.001	<0.001
Iron (Fe)	mg/L	0.3	AO	<0.03	<0.03
Lead (Pb)	mg/L	0.01	MAC	<0.001	<0.001
Magnesium (Mg)	mg/L	-	-	12	12
Manganese (Mn)	mg/L	0.05	AO	<0.01	<0.01
Mercury (Hg)	mg/L	0.001	MAC	<0.0001	<0.0001
Molybdenum (Mo)	mg/L	-	-	<0.005	<0.005
Nickle (Ni)	mg/L	-	-	<0.005	<0.005
Potassium (K)	mg/L	-	-	2	2
Selenium (Se)	mg/L	0.05	MAC	<0.001	<0.001
Silver (Ag)	mg/L	-	-	<0.0001	<0.0001
Sodium (Na)	mg/L	200	AO	77	75
Strontium (Sr)	mg/L	-	-	0.879	0.876
Thallium (Tl)	mg/L	-	-	<0.0001	<0.0001
Uranium (U)	mg/L	0.02	MAC	<0.001	<0.001
Vanadium (V)	mg/L	-	-	<0.001	<0.001
Zinc (Zn)	mg/L	5.0	AO	<0.01	<0.01

1. ODWS identifies the following types of parameters:

MAC = Maximum Acceptable Concentration

IMAC = Interim Maximum Acceptable Concentration

AO = Aesthetic Objective

OG = Operational Guideline

2. Shaded Concentration Indicates an Exceedance of the ODWS Objective



**TABLE 2c: GROUNDWATER GEOCHEMISTRY - VOLATILES**

PARAMETER	UNITS	ODWS		TW1	
		LIMIT	TYPE	GW1 (4 hr)	GW2 (8 hr)
				2022-03-22	2022-03-22
VOCs Surrogates					
1,2-dichloroethane-d4	%	-	-	100	119
4-bromofluorobenzene	%	-	-	71	76
Toluene-d8	%	-	-	91	98
Volatiles					
1,1,1,2-tetrachloroethane	µg/L	-	-	<0.5	<0.5
1,1,1-trichloroethane	µg/L	-	-	<0.4	<0.4
1,1,2,2-tetrachloroethane	µg/L	-	-	<0.5	<0.5
1,1,2-trichloroethane	µg/L	-	-	<0.4	<0.4
1,1-dichloroethane	µg/L	-	-	<0.4	<0.4
1,1-dichloroethylene	µg/L	14.0	MAC	<0.5	<0.5
1,2-dichlorobenzene	µg/L	200.0	MAC	<0.4	<0.4
1,2-dichloroethane	µg/L	5.0	IMAC	<0.2	<0.2
1,2-dichloropropane	µg/L	-	-	<0.5	<0.5
1,3,5-trimethylbenzene	µg/L	-	-	<0.3	<0.3
1,3-dichlorobenzene	µg/L	-	-	<0.4	<0.4
1,3-Dichloropropylene (cis+trans)	µg/L	-	-	<0.3	<0.3
1,4-dichlorobenzene	µg/L	5.0	MAC	<0.4	<0.4
Acetone	µg/L	-	-	<30	<30
Benzene	µg/L	1.0	MAC	<0.5	<0.5
Bromodichloromethane	µg/L	-	-	<0.3	<0.3
Bromoform	µg/L	-	-	<0.4	<0.4
Bromomethane	µg/L	-	-	<0.5	<0.5
c-1,2-Dichloroethylene	µg/L	-	-	<0.4	<0.4
c-1,3-Dichloropropylene	µg/L	-	-	<0.2	<0.2
Carbon Tetrachloride	µg/L	2.0	MAC	<0.2	<0.2
Chloroethane	µg/L	-	-	<0.2	<0.2
Chloroform	µg/L	-	-	<0.5	<0.5
Dibromochloromethane	µg/L	-	-	<0.3	<0.3
Dichlorodifluoromethane	µg/L	-	-	<0.5	<0.5
Dichloromethane	µg/L	50	MAC	<4.0	<4.0
Ethylbenzene	µg/L	140	MAC	<0.5	<0.5
Ethylene Dibromide	µg/L	-	-	<0.2	<0.2
Hexane	µg/L	-	-	<5	<5
m/p-xylene	µg/L	-	-	<0.4	<0.4
Methyl Ethyl Ketone (MEK)	µg/L	-	-	<10	<10
Methyl Isobutyl Ketone (MIBK)	µg/L	-	-	<10	<10
Methyl Tert Butyl Ether (MTBE)	µg/L	15	AO	<2	<2
Monochlorobenzene	µg/L	80	MAC	<0.5	<0.5
o-xylene	µg/L	-	-	<0.4	<0.4
Styrene	µg/L	-	-	<0.5	<0.5
t-1,2-Dichloroethylene	µg/L	-	-	<0.4	<0.4
t-1,3-Dichloropropylene	µg/L	-	-	<0.2	<0.2
Tetrachloroethylene	µg/L	10	MAC	<0.3	<0.3
Toluene	µg/L	60	MAC	<0.4	<0.4
Trichloroethylene	µg/L	5	MAC	<0.3	<0.3
Trichlorofluoromethane	µg/L	-	-	<0.5	<0.5
Vinyl Chloride	µg/L	1	MAC	<0.2	<0.2
Xylene; total	µg/L	90	MAC	<0.5	<0.5

- ODWS identifies the following types of parameters:  
MAC = Maximum Acceptable Concentration  
IMAC = Interim Maximum Acceptable Concentration  
AO = Aesthetic Objective  
OG = Operational Guideline
- Shaded Concentration Indicates an Exceedance of the ODWS Objective



The bacteriological test results (Certificate of Analysis – Report No. 1973843) indicated that the test samples at the 4- and 8-hour interval were non-detect (0 ct/100 mL) for E.Coli, however, Total Coliforms were detected at concentrations of 19 ct/100 mL and 23 ct/100 mL, respectively.

Paterson personnel returned to site to disinfect the well. After the disinfection of the well and subsequent pumping, a bacteriological test was performed on the well water (Certificate of Analysis – Report No. 1974461) which indicated that E. Coli was not present (0 ct/100 mL) and that only 4 ct/100 mL Total Coliforms were present in the well water. Paterson personnel confirmed that the free chlorine residual was 0 mg/L prior to the collection of the bacteriological sample.

A water sample was taken by others on October 8, 2025. A bacteriological test was performed on the well water (Certificate of Analysis – Report No. 4491110) which indicated E.Coli and Total Coliforms were both non-detect (0 ct/100 mL). Additionally, Nitrate and Nitrite were analyzed (Certificate of Analysis – Report No. 4492546) with Nitrates at 0.25 mg/L and Nitrites at <0.1 mg/L.

The water quality of the subject water supply well meets all the Ontario Drinking Water Standards maximum acceptable concentrations (MAC). Furthermore, the water meets all of the Aesthetic Objectives (AO) and Operational Guidelines (OG) with the exception of the following.

- ☐ Hardness (as  $\text{CaCO}_3$ )
- ☐ Total Dissolved Solids (TDS)

Exceedances of the above parameters are not uncommon of the water supply in the subject aquifer. Each of these groundwater parameters are discussed in detail below.

Should any water treatment be desired by the owner, it is recommended that a water treatment specialist be retained to ensure that water treatment occurs in a safe manner.

### **Hardness as $\text{CaCO}_3$**

Hardness, expressed as calcium carbonate, is an operation guideline and does not appear in the ODWS. Rather, it appears in the Technical Support Documents for Ontario Drinking Water Standards, Objectives and Guidelines as a parameter with an operational guideline at 100 mg/L. At the measured concentrations of 454 and 451 mg/L, the water is considered to be very hard, however, it is below the reasonable treatable limit of 500 mg/L specified in Table 3 of the MOECC guidance document Procedure D-5-5 (1996), thus, hardness can be treated with readily available technologies.

It is recommended that water hardness be treated using conventional technologies such as water softening or reverse osmosis, if desired by the owner. Without treating hardness, scaling can occur which can result in discolouration and residue buildup on water fixtures, or reduction in boiler efficiency due to scale build-up. According to Health Canada's *Guidelines for Canadian Drinking Water Quality - Summary Tables* "Although hardness





may have significant aesthetic effects, a guideline has not been established because public acceptance of hardness may vary considerably according to the local conditions; major contributors to hardness (calcium and magnesium) are not of direct public health concern”.

### **Total Dissolved Solids (TDS)**

TDS refers to the concentration of inorganic substances dissolved in water. The main constituents are typically chloride, sulphates, calcium, magnesium, and bicarbonates. The TDS concentration of 767 mg/L exceeds the Aesthetic Objective of 500 mg/L. At concentrations above 500 mg/L, some consumers may find the taste objectionable, however, as the objective is an aesthetic objective, no treatment is required. It is, however, recommended that a point-of-use reverse osmosis unit be installed or to provide bulk bottled water on an as-needed basis for drinking water purposes. As such, no taste problems will occur when the system is used, or bottled water is consumed.

The Langelier calculation provided an LSI of 0.7. Based on the evaluation of the result, the water is super saturated and tends to precipitate a scale layer of calcium carbonate (scale forming but non-corrosive). Based on the range of stability in the positive direction, it is recommended that water softening be used to prevent scaling. See Langelier Saturation Index Calculation attached for calculation details.

### **Total Coliforms**

Total Coliforms are a type of bacteria which naturally occur in soil and decaying vegetation. Total Coliforms may also be associated with animal and/or human waste.

The maximum acceptable concentration (MAC) for Total Coliforms for potable drinking water in support of a Re-zoning application, as established by the City of Ottawa Hydrogeological and Terrain Analysis Guidelines (HTAG, 2021), is less than 6 ct/100 mL. According to the City of Ottawa HTAG, Total Coliforms counts of less than 6 per 100 mL sample shall be considered indicative of acceptable water quality.

Total Coliforms were detected at 19 and 23 count per 100 mL at the 4- and 8- hour mark of the pumping test, respectively. After disinfecting the well and purging the chlorinated water, Total Coliforms were detected at 4 ct/100 mL. 4 ct/100 mL Total Coliforms is below the City of Ottawa HTAG standard of less than 6 ct/100 mL.

As the site is not hydrogeologically sensitive (competent bedrock was encountered during the field investigations at depths of 2.4 to 5.9 m bgs), and is not located in an area which is mapped as potentially karstic, the Total Coliform level of 4 ct/100 mL. The subsequent analytical results in October 2025 indicate that Total Coliforms is non-detect (0 ct/100 mL) and is considered acceptable.

Consideration should be given to utilizing a Ultraviolet (UV) disinfection system on the water supply entering the existing warehouse and proposed development. Additionally,



the turbidity was less than 1 NTU, indicating that there should be no turbidity based interference in disinfection.

### **Sodium**

Sodium (Na), an aesthetic parameter, was detected in the laboratory test sample at a concentration of 77 and 75 mg/L, which does not exceed the ODWS aesthetic objective of 200 mg/L. Although sodium is not toxic and no MAC has been set, concentrations above 20 mg/L require that the Medical Officer of Health be notified of the water quality results, so that this information may be passed on to local physicians for use in treatment of those requiring a sodium-restricted diet.



## **TERRAIN ANALYSIS**

The fieldwork which was completed as part of a Geotechnical Investigation for the site (PH3834-1R, dated January 5, 2017; and PG3834-2, dated March 1, 2022) is used in support of this assessment. Additional information pertaining to this investigation was gathered from available geological mapping and surrounding WWRs.

### **Surficial Geology**

A series of test pits were excavated on the subject parcel to delineate the subsurface soil conditions as part of a Geotechnical Field Investigation. On February 8, 2022, seven (7) test pits were completed on the property. A previous investigation (PG3834-1R, dated January 5, 2017) was completed at the subject site in June and November 2016, during which fourteen (14) test pits were excavated and eleven (11) boreholes were completed onsite. The location of the test pits are delineated on the drawing PH5103-1-Test Hole Location Plan, attached. Note that the site plan on the drawing is not reflective of the proposed usage.

The test hole locations were recorded and the subsurface conditions, including the soil morphology and depth to the groundwater table (if encountered), were carefully observed and recorded. The soils encountered were classified texturally in the field and later reviewed in the laboratory.

The boreholes and test pits were advanced to a maximum depth of 5.9 and 3.4 m below ground surface (bgs), respectively. Bedrock was recorded in the WWR for TW1 at 4.34 m bgs. Refusal to excavation was recorded at depths ranging from 0.7 m to 5.9 m bgs on fractured bedrock. Competent bedrock was encountered at depths of 2.4 to 5.9 m bgs.

The subsurface profile generally consisted of topsoil extending to a maximum depth of 0.6 m bgs, underlain by silty sand to sandy silt with gravel, cobbles, boulders and trace clay which extend to a maximum depth of 1.9 m bgs. Frost heave/ frost shattered bedrock infilled with silty sand, gravel, cobbles, and boulders (unconsolidated soils) was observed under the silty sand to sandy silt with gravel, cobbles, boulders and trace clay. The testhole logs note split spoon sampling within this layer with significant sample recovery. TP1-22, TP2-22, TP6-22, and TP7-22 noted a fill of varying composition underlying the topsoil extending to depths of 1.75 m bgs. Groundwater was observed at depths between 3.6 to 4.3 m bgs in the boreholes and test pits.

Reference should be made to the borehole logs appended to this report for the details of the soil profiles encountered at each test hole location. The client should be aware that any information pertaining to soils are furnished as a matter of general information only and borehole descriptions are not to be interpreted as descriptive of conditions at locations other than those described by the boreholes themselves.



Materials encountered during Paterson's Geotechnical Investigation were generally consistent with the available surficial and bedrock geology mapping.

### **Hydrogeological Sensitivity of the Site**

The subject site currently consists of a warehouse and residential dwelling. The dwelling is currently unoccupied. The topography of the site is generally sloping downwards to the east. The local flow direction of the surficial aquifer is expected to be in the northeasterly direction towards the Carp River. The regional groundwater flow is considered to be in the northeast direction towards the Ottawa River.

The onsite overburden generally consists of topsoil overlying a brown silty sand with gravel, cobbles, boulders and trace clay which is underlain by a fractured bedrock (frost heave/frost shatter) infilled with unconsolidated soils. The unconsolidated soils are noted to have 50 to 80% recovery during split spoon sampling within this stratum. Competent bedrock was encountered during the field investigations at depths of 2.4 to 5.9 m bgs. The frost heave bedrock noted during the borehole field investigation contained high amounts of interspersed silty sand to sandy silt (unconsolidated soils), and some clay with fragmented bedrock. For the purposes of hydrogeological sensitivity, the "fractured bedrock" unit is considered an unconsolidated soil which would provide separation from the ground surface and the underlying competent bedrock. Furthermore, based on hydraulic conductivity testing, the fastest onsite T-time was 13.8 min/cm, which is an order of magnitude slower than the T-time of less than 1 min/cm required for highly permeable soils. There were five additional test locations completed that have estimated T-times in the range of 20 to 40 mins/cm and are all considered to be not hydrogeologically sensitive. Based on this, the soils and underlying interbedded materials are not considered as highly permeable when reviewing against Ontario Building Code (OBC) Section 8.7.2.1 (1) (b)(i) and the MMAH Supplementary Standards SB-6.

Refusal to excavation was recorded on competent bedrock ranging from 2.4 to 5.9 m bgs. According to the geotechnical investigation, the overburden thickness (which includes the fractured bedrock unit with interspersed unconsolidated soils) was observed to be greater than 2 m at all borehole locations. The subject site does not have any mapped karst topography on site. Furthermore, from the TW1 WWR, bedrock was observed at a depth of 4.34 m bgs. As the proposed site does not have bedrock within 2 m of the ground surface, the site is not considered hydrogeologically sensitive. Although mitigative measures, such as increased separation distances, are not required, there is sufficient space onsite to keep the onsite well greater than 30 m away from any onsite septic components.



## Conceptual Lot Development

As this Terrain Analysis is completed to support a Re-zoning Application, a Site Plan is not available.

## Sewage System Design and Total Daily Design Sewage Flow

As this Terrain Analysis is completed to support a Re-zoning Application, a Site Plan is not available at this time. As such a sewage system design and flows have not yet been completed. A maximum predicted nitrate concentration will be determined for the site as a whole, and the current assessment will be completed based on existing conditions.

The proposed property will be analyzed as part of the Re-zoning Application to ensure the theoretical impacts are below the Ontario Drinking Water Objective maximum allowable concentration of 10 mg/L of nitrate in the groundwater prior to the property line.

## PREDICTIVE NITRATE IMPACT ASSESSMENT

Nitrate is considered to be a critical parameter of concern when assessing impacts to groundwater quality downgradient of an onsite sewage system. The City of Ottawa annotated MECP Procedure D-5-4 in the Hydrogeological and Terrain Analysis Guidelines (HTAG) applies for the proposed development. For the purpose of this guideline, the Ontario Drinking Water Objective of 10 mg/L of nitrate is the maximum allowable concentration detectable in the groundwater prior to the property line.

A detailed impact assessment is required due to the proposed zoning of the site. In order to demonstrate that private services would adequately support the proposed Re-zoning Application, a predictive nitrate impact assessment for the subject site was completed. This calculation was completed to determine the maximum sewage flow volume which could be applied to the subject site with the current site conditions. As the site is within the Carp Road Corridor, the use of tertiary treatment systems (nitrate reducing systems) are allowed to be considered in support of re-zoning. The values shown in the Predictive Nitrate Impact Assessment calculation attached to this report are summarized below:

<input type="checkbox"/>	Site area	1.28 ha
<input type="checkbox"/>	Impervious area %	45 %
<input type="checkbox"/>	Concentration of nitrate in effluent (Value based on conventional effluent concentration)	40 mg/L
<input type="checkbox"/>	Concentration of nitrate in effluent (Value based on using NSF 245/BNQ certified 57% nitrate reduction technology)	17.2 mg/L



- ❑ Surplus Water 378 mm/year  
*(The surplus water value was estimated based on Environment Canada Climate Office values with a soil type comprised of clay loam (urban lawn) and anthropogenic sources, which can be found attached.)*
  
- ❑ Combined infiltration factor based on: 0.67
  - Topography infiltration factor 0.25
  - Soil texture infiltration factor 0.30
  - Cover infiltration factor 0.12

The topography infiltration factor of 0.25 is based upon a slope between “flat land” (<0.6 m/km) and “rolling land” (average slope of 2.8 to 3.8 m/km) based on available mapping.

The soil texture infiltration factor was based upon a soil that is between “open sandy loam” with a value of 0.4 and “medium combinations of clay and loam” with a value of 0.2 which is a reasonable generalization based upon the field investigation by Paterson, available geological mapping and surrounding WWRs.

The “vegetative cover infiltration factor” was calculated as 0.12 based upon the site being used as cultivated land with some trees throughout the site.

As part of the rezoning process, the City of Ottawa does not typically allow the use of tertiary treatment systems to support the re-zoning application, however, as the site is within the Carp Road Corridor, tertiary treatment systems can be used to support the re-zoning application. As a tertiary treatment system requires annual monitoring by the Ottawa Septic System Office (OSSO), and allows for advanced treatment of sewage effluent, a tertiary treatment system is being reviewed for the Subject Site. The mandatory monitoring required on tertiary treatment systems by the OSSO ensures that the system is properly maintained and replaced when required, whereas there is no mandatory monitoring on a conventional sewage system. In order to demonstrate the viability and sustainability aspects of private servicing on the subject site, a Nitrate Impact Assessment was completed using the above noted parameters.

The predicted nitrate concentration calculation for a conventional sewage system (system without nitrate reduction) results in a maximum of **1.58 m<sup>3</sup>/day** of effluent using a nitrate concentration of 40 mg/L. The inclusion of nitrate reduction technology (57 % nitrogen reduction in the of the effluent nitrate) would result in a maximum of **6.42 m<sup>3</sup>/day** of effluent using a nitrate concentration of 17.2 mg/L. The Waterloo-Biofilter technology (WaterNOx) is capable of up to 90% nitrate reduction, which would allow greater than **10 m<sup>3</sup>/day**. Both maximum sewage flow volumes with their respective reduced nitrate concentrations meet the nitrate concentration threshold of below 10 mg/L at the property boundary. Additional re-infiltration from stormwater (up to 10%) could be used to increase the dilution of septic effluent, if needed.



A sewage system installation application for a new sewage system on any site in the City of Ottawa with a sewage flow volume of less than 10 m<sup>3</sup>/day will require an OSSO application.

## CONCLUSIONS

Based on the information contained within the body of this report the following conclusions can be drawn:

1. The water supply aquifer underlying the subject site is considered to be adequate to support the water quantity demands for the proposed zoning uses.
2. The preferred water supply intercepted by TW1 contains a water supply that is potable and contains only elevated concentrations of hardness and TDS. The noted parameters can be treated with current readily available water conditioning equipment.
3. Total Coliforms were detected at 0 ct/100 mL, however, it is recommended that a UV system is installed to assist in the removal of any potential Total Coliforms found in the groundwater, as a precautionary measure.
4. If desired by the property owner, a commercial grade water softener can be used to facilitate the reduction of the hardness concentration and reduce scaling. If a water softener is used for the proposed development, the owner should be made aware that additional sodium will be added to the water to reduce hardness. If desired, a point-of-use reverse osmosis system can be used to provide a drinking tap source without increasing sodium levels.
5. It is recommended that either a point-of-use reverse osmosis system be used to reduce the TDS concentration, or bulk bottled water is provided as a drinking water source.
6. The subject site is sufficient in size to accommodate two new sewage systems and meet all of the regulatory separation criteria. As a precautionary measure, a 30 m setback should be maintained between the drinking water well and any septic system components.
7. A maximum sewage flow volume of **1.58 m<sup>3</sup>/day** at a nitrate concentration of 40 mg/L or **6.42 m<sup>3</sup>/day** at a nitrate concentration of 17.2 mg/L can be accommodated on the subject site based on the current layout and still be below the predictive nitrate concentration threshold of 10 mg/L at the property boundary.





8. Onsite sewage disposal needs can be accommodated with a Class 4 Sewage System utilizing tertiary treatment technologies.
9. A Sewage System Permit and Building Permit need to be issued prior to the commencement of construction on the proposed structures or amenities/services.
10. The results of the Hydrogeological Assessment and Terrain Analysis have provided satisfactory evidence that the subject site can support the proposed zoning usage with respect to water quality, quantity and sewage system placement.

We trust that the current submission satisfies your immediate requirements.

Best Regards,

**Paterson Group Inc.**

Alexander Schopf, PhD, EIT



Michael Killam, P.Eng

**Attachments:**

- ☐ Key Plan
- ☐ MECP Water Well Records – 1973843 & 1974461
- ☐ Eurofins Certificate of Analysis
- ☐ Paterson PG3834 - Test Pit and Borehole Logs
- ☐ AQTESOLV - Pumping Test Analysis Reports
- ☐ Langelier Calculation
- ☐ Nitrate Impact Assessment Calculations
- ☐ Paterson Drawing PH5103-1 - Test Hole Location Plan
- ☐ Well Disinfection Instruction Sheet





**Figure 1 – Key Plan**





Ontario

Ministry of the Environment  
and Climate Change

Well Tag No. (Place Sticker and/or Print Below)

Tag #: A 212621

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☒ Metric ☐ Imperial

Page \_\_\_\_\_ of \_\_\_\_\_

## Well Owner's Information

First Name	Last Name / Organization	E-mail Address	<input type="checkbox"/> Well Constructed by Well Owner
Nautical Lands Group			
Mailing Address (Street Number/Name)	Municipality	Province	Postal Code
2962 Carp Rd	Carp	ON	K0A1K0

## Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2978 Carp Rd.	West Carleton	10	2
County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa		Ontario	
UTM Coordinates	Zone	Easting	Northing
NAD 83	18	421689	5017621
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)
brown	sand + gravel			From To
gray	limestone			0 4.34
				4.34 58.90

Annular Space			
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)	
From To			
0 6.20	Cement Grout	.14	

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 type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify	<input type="checkbox"/> Public <input checked="" 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 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	
15.55	Steel	.48	0 6.82	<input checked="" 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 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

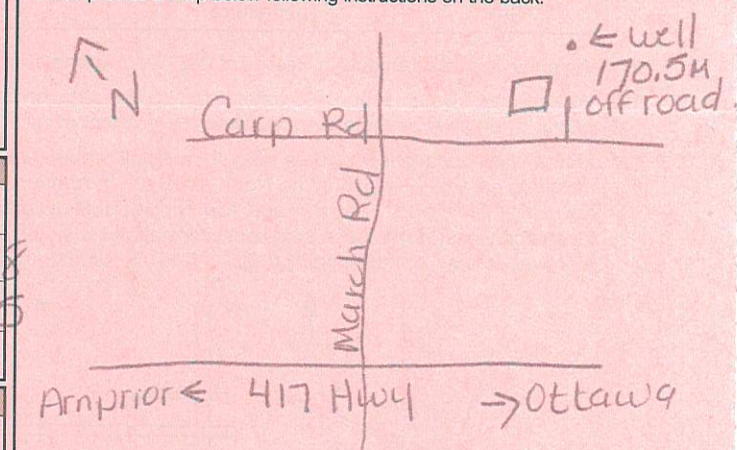
Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	Diameter (cm/in)
23.25		From To	
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	0 6.20	27.28
58.90		6.20 58.90	15.55
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify		

Well Contractor and Well Technician Information			
Business Name of Well Contractor	Well Contractor's Licence No.		
George H. Law + Son Ltd	313 213		
Business Address (Street Number/Name)	Municipality		
4848A Calabogie Rd, Box 155 Calabogie			
Province	Postal Code	Business E-mail Address	
ON	K0J1H0		
Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)		
613 752 2080	Fougere Allan		
Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted	
041312	Allan Fougere	20170515	

Results of Well Yield Testing					
After test of well yield, water was:		Draw Down		Recovery	
<input checked="" type="checkbox"/> Clear and sand free		Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
<input type="checkbox"/> Other, specify _____		Static Level			
If pumping discontinued, give reason: _____		1	2.16		
Pump intake set at (m/ft)		2	2.23	1	2.16
Pumping rate (l/min / GPM)		3	2.24	2	2.16
Duration of pumping		4	2.25	3	
____ hrs + ____ min		5	2.26	4	
Final water level end of pumping (m/ft)		10	2.27	5	
If flowing give rate (l/min / GPM)		15	2.28	10	
Recommended pump depth (m/ft)		20		15	
Recommended pump rate (l/min / GPM)		25		20	
Well production (l/min / GPM)		30		25	
Disinfected?		40		30	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		50		40	
		60		50	
				60	

## 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 20170512	Date Work Completed 20170510
Ministry Use Only		Audit No. 2242431	
Received			



Basin 25 | | | |

## The Ontario Water Resources Commission Act, 1957

GROUND WATER BRANCH  
15 N.  
APR 6 1960  
ONTARIO WATER  
RESOURCES COMMISSION

# WATER WELL RECORD

County or District..... Carleton ..... Township, ~~Village, Town or City~~..... Huntley .....

Con. 2 ~~#~~ Lot 10 ..... Date completed..... 18 mar 1960 .....

(day month year)

Address..... Carp Ont. .....

## Casing and Screen Record

Inside diameter of casing..... 4 "

Total length of casing..... 24'

Type of screen..... none

Length of screen.....

Depth to top of screen.....

Diameter of finished hole..... 4 "

## Pumping Test

Static level..... 20'

Test-pumping rate..... 5..... G.P.M.

Pumping level..... 21'

Duration of test pumping.....  $\frac{1}{2}$  hr

Water clear or cloudy at end of test..... clear

Recommended pumping rate..... 5..... G.P.M.

with pumping level of..... 21'

## Well Log

## Water Record

[illegible]

For what purpose(s) is the water to be used?

House

Is well on upland, in valley, or on hillside?.....

Upland

Drilling Firm. K L Sparks

Address South March

Ans

Licence Number 484

Name of Driller..... *K L Sparks*

Address South Marsh Oak

Date Mar 18/60

K L Sparks

(Signature of Licensed Drilling Contractor)

(Signature of Licensed Drilling Contractor)

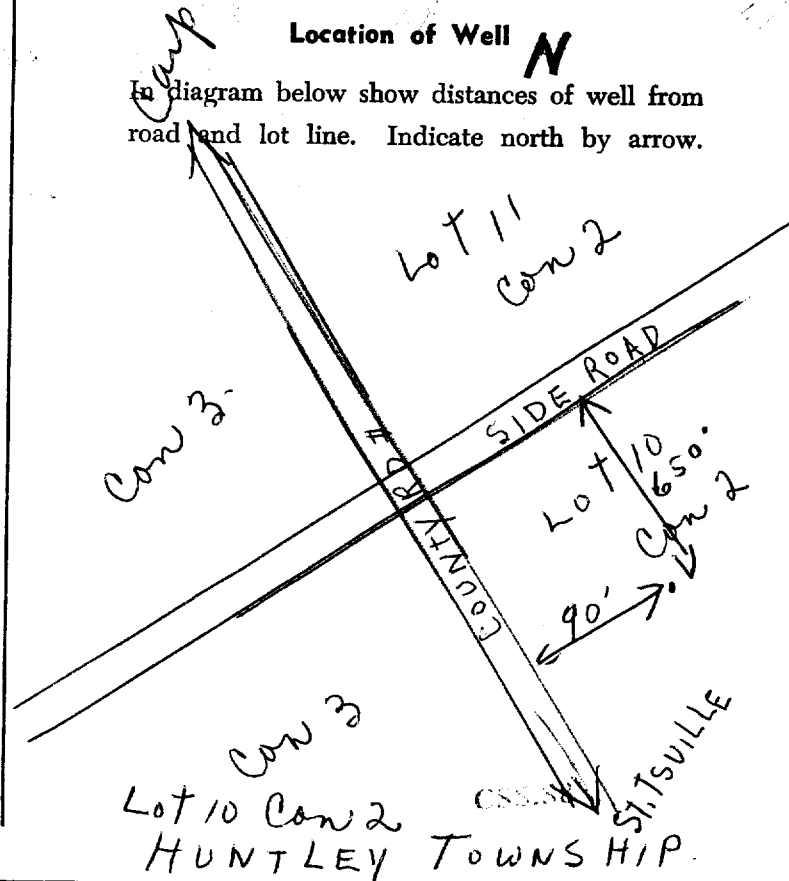
*Per Anna J. Sparks*

Form 5

Form 5  
15M-58-4149

**Location of Well**

In diagram below show distances of well from road and lot line. Indicate north by arrow.



UTM 18Z 422280E



15 No 3066

5R 5017910N

The Ontario Water Resources Commission Act

Elev. 4R 0388

# WATER WELL RECORD

Basin 25

Carl

Township, Village, Town or City

Huntley

Con. II

Lot 10

Date completed

4

Nov

1985

Address 3159 Carling Ave

## Casing and Screen Record

Inside diameter of casing 5"  
Total length of casing 30'  
Type of screen  
Length of screen  
Depth to top of screen  
Diameter of finished hole 5"

## Pumping Test

Static level 25'  
Test-pumping rate 3 G.P.M.  
Pumping level 75'  
Duration of test pumping 1 hr  
Water clear or cloudy at end of test cloudy  
Recommended pumping rate 3 G.P.M.  
with pump setting of 60 + 35' tailpipe feet below ground surface

## Well Log

## Water Record

### Overburden and Bedrock Record

gravel & boulders  
limestone

From ft.

To ft.

Depth(s) at which water(s) found

Kind of water (fresh, salty, sulphur)

0'  
5'

5'  
100'

70  
95

sulphur  
"

For what purpose(s) is the water to be used?

new house

Is well on upland, in valley or on hillside?

upland

Drilling or Boring Firm

Capital Water Supply

Address 1243 Heron Rd.  
Ottawa 733-0600

Licence Number 1687

Name of Driller or Borer G Colburne

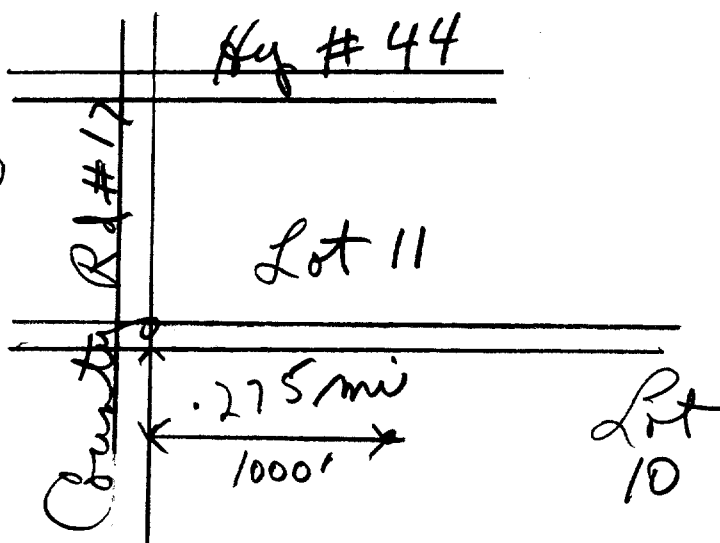
Address

Date 5 Nov 1965

Shalter Kavanagh  
(Signature of Licensed Drilling or Boring Contractor)

## Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



98



GROUND WATER BRANCH  
JUN 15 1962  
ONTARIO WATER  
RESOURCES COMMISSION

3069

UTM 18 Z 421735 E

5 R 5018140 N

The Ontario Water Resources Commission Act

Elev. 4 R 0380

# WATER WELL RECORD

Basin 25  
County or District *Carleton*

Township, Village, Town or City *Huntley*

Con. *2* Lot *11*

Date completed *28 May 62*  
(day month year)

Address *RR3 Corp*

## Casing and Screen Record

Inside diameter of casing *4 1/2"*  
Total length of casing *12*  
Type of screen  
Length of screen  
Depth to top of screen  
Diameter of finished hole *4"*

## Pumping Test

Static level *20'*  
Test-pumping rate *6* G.P.M.  
Pumping level *55'*  
Duration of test pumping *1 1/2*  
Water clear or cloudy at end of test *clear*  
Recommended pumping rate *5* G.P.M.  
with pump setting of *100* feet below ground surface

## Well Log

### Overburden and Bedrock Record

*previously drilled  
limestone*

From  
ft.

To  
ft.

Depth(s) at  
which water(s)  
found

Kind of water  
(fresh, salty,  
sulphur)

<i>70</i>	<i>130</i>	<i>125'</i>	<i>fresh</i>
-----------	------------	-------------	--------------

For what purpose(s) is the water to be used?

*house*

Is well on upland, in valley, or on hillside?

*upland*

Drilling or Boring Firm *Ben E. Sparks*

Address

Licence Number *700*

Name of Driller or Borer *Ben E. Sparks*

Address *413 Edgeworth*

Date *May 28/62*

(Signature of Licensed Drilling or Boring Contractor)

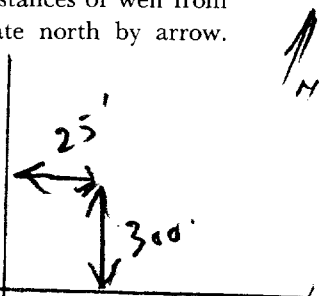
*Ben E. Sparks*

Form 7 15M Spts. 60-3930

OWRC COPY

## Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



*RD 17*

*CON 2  
LOT 10*

13

UTM 18 421710 E

Con 5 R 5018050 N

Elev 4 R 0375



The Ontario Water Resources Commission Act

GROUND WATER BRANCH

1520 No 324

ONTARIO WATER  
RESOURCES COMMISSION

## WATER WELL RECORD

Basin 25 | Carleton

County or District

Township, Village, Town or City

Con 3 Lot 11

Date completed 28 Sept 1961

Address Carp Ont

## Casing and Screen Record

Inside diameter of casing 4"

Total length of casing 7'

Type of screen none

Length of screen

Depth to top of screen

Diameter of finished hole 4"

## Pumping Test

Static level 20'

Test-pumping rate 5 G.P.M.

Pumping level 25'

Duration of test pumping 1/2 hr

Water clear or cloudy at end of test clear

Recommended pumping rate 5 G.P.M.

with pump setting of 90' feet below ground surface

## Well Log

## Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
clay loam	0'	7'		
grey limestone	7'	101'	100-101'	fresh

For what purpose(s) is the water to be used?

house &amp; farm

Is well on upland, in valley, or on hillside? upland

Drilling or Boring Firm W M E Sparks

413 Edgeworth Ave

Address Ottawa 3

Licence Number 485

Name of Driller or Borer W M E Sparks

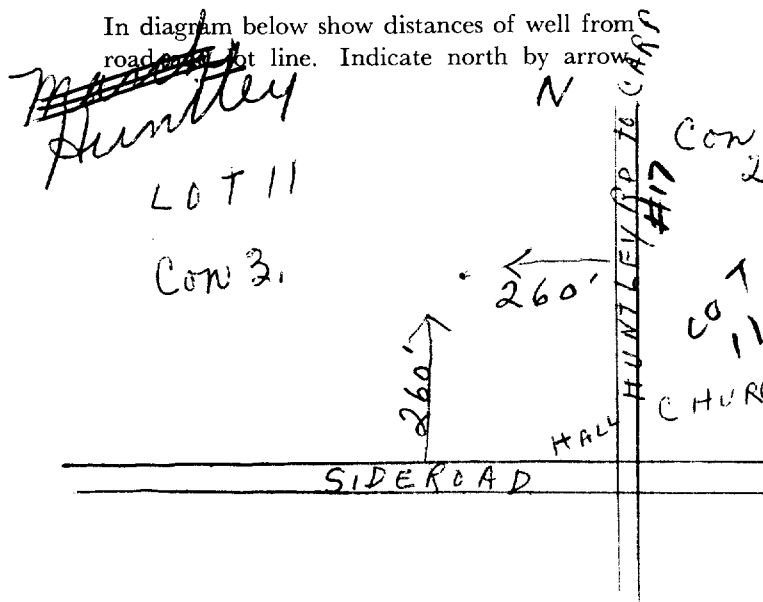
Address

Date Sept 28 / 61

(Signature of Licensed Drilling or Boring Contractor)

## Location of Well

In diagram below show distances of well from road, lot line. Indicate north by arrow.





UTM 18Z 421660E

ONTARIO WATER  
RESOURCES COMMISSION9961 15 No  
MAY 1 1966

3127

WATER RESOURCES  
DIVISION

5R 5018059N

The Ontario Water Resources Commission Act

Elev. 4R 0375

## WATER WELL RECORD

Basin 25 | | CANLETON

Township, Village, Town or City

Con. 3 Lot 11

Date completed

15 MAR 66  
(day month year)

Address

CARR PR

## Casing and Screen Record

Inside diameter of casing 4  
 Total length of casing 10  
 Type of screen  
 Length of screen  
 Depth to top of screen  
 Diameter of finished hole 4

## Pumping Test

Static level 15  
 Test-pumping rate 3 G.P.M.  
 Pumping level 50  
 Duration of test pumping 1 HR  
 Water clear or cloudy at end of test Clear  
 Recommended pumping rate 3 G.P.M.  
 with pump setting of 70 feet below ground surface

## Well Log

## Water Record

## Overburden and Bedrock Record

	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
GRAVEL	0	10		
Limestone	10	81	80	FRESH

For what purpose(s) is the water to be used?

House

Is well on upland, in valley, or on hillside?

Drilling or Boring Firm

F.P. SPARKS

Address

STITTSVILLE

Licence Number

Name of Driller or Borer

C. J. SPARKS

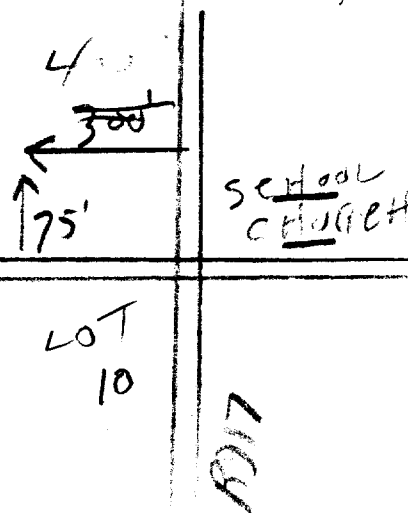
Address

Date

4. P. Sparks  
 (Signature of Licensed Drilling or Boring Contractor)

## Location of Well

In diagram below show distances of well from  
 road and lot line. Indicate north by arrow.









Ministry  
of the  
Environment  
Ontario

The Ontario Water Resources Act

# WATER WELL RECORD

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

11

1517377

MUNICIPALITY  
15.005

CON. CQN

02

COUNTY OR DISTRICT Carleton Place	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE West Carleton (Hanley)	CON. BLOCK, TRACT, SURVEY, ETC. Con 2.	DATE COMPLETED DAY 30 MO 10 YR 80
18.199		0280	26

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
grey	clay	stones		0	12
grey	shaly limestone			12	84

001720512	008421582
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<b>41 WATER RECORD</b> WATER FOUND AT - FEET 0080 KIND OF WATER 1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL	<b>51 CASING &amp; OPEN HOLE RECORD</b> INSIDE DIAM. INCHES 06.1 MATERIAL STEEL WALL THICKNESS INCHES 1.88 DEPTH - FEET 0020	<b>61 PLUGGING &amp; SEALING RECORD</b> DEPTH SET AT - FEET FROM TO 10-13 14-17 18-21 22-25 26-29 30-33
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<b>71 PUMPING TEST METHOD</b> 1 <input checked="" type="checkbox"/> PUMP 2 <input type="checkbox"/> BAILER	<b>PUMPING RATE</b> 0004 GPM	<b>DURATION OF PUMPING</b> 01 15-16 00 17-18 HOURS
<b>STATIC LEVEL</b> 025 FEET	<b>WATER LEVEL END OF PUMPING</b> 080 FEET	<b>WATER LEVELS DURING</b> 15 MINUTES 080 FEET 30 MINUTES 080 FEET 45 MINUTES 080 FEET 60 MINUTES 080 FEET
<b>IF FLOWING, GIVE RATE</b> 38-41 GPM	<b>PUMP INTAKE SET AT</b> 080 FEET	<b>WATER AT END OF TEST</b> 080 FEET
<b>RECOMMENDED PUMP TYPE</b> <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP	<b>RECOMMENDED PUMP SETTING</b> 080 FEET	<b>RECOMMENDED PUMPING RATE</b> 0004 GPM

<b>FINAL STATUS OF WELL</b> 1	1 <input checked="" type="checkbox"/> WATER SUPPLY 2 <input type="checkbox"/> OBSERVATION WELL 3 <input type="checkbox"/> TEST HOLE 4 <input type="checkbox"/> RECHARGE WELL	5 <input type="checkbox"/> ABANDONED - INSUFFICIENT SUPPLY 6 <input type="checkbox"/> ABANDONED - POOR QUALITY 7 <input type="checkbox"/> UNFINISHED
<b>WATER USE</b> 01	1 <input checked="" type="checkbox"/> DOMESTIC 2 <input type="checkbox"/> STOCK 3 <input type="checkbox"/> IRRIGATION 4 <input type="checkbox"/> INDUSTRIAL 5 <input type="checkbox"/> OTHER	5 <input type="checkbox"/> COMMERCIAL 6 <input type="checkbox"/> MUNICIPAL 7 <input type="checkbox"/> PUBLIC SUPPLY 8 <input type="checkbox"/> COOLING OR AIR CONDITIONING 9 <input type="checkbox"/> NOT USED
<b>METHOD OF DRILLING</b> 5	1 <input type="checkbox"/> CABLE TOOL 2 <input type="checkbox"/> ROTARY (CONVENTIONAL) 3 <input type="checkbox"/> ROTARY (REVERSE) 4 <input type="checkbox"/> ROTARY (AIR) 5 <input checked="" type="checkbox"/> AIR PERCUSSION	6 <input type="checkbox"/> BORING 7 <input type="checkbox"/> DIAMOND 8 <input type="checkbox"/> JETTING 9 <input type="checkbox"/> DRIVING

**LOCATION OF WELL**

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.

Acres Side Rd. 1/20'

7/10 km

Drillers Remarks

<b>CONTRACTOR</b> NAME OF WELL CONTRACTOR Herry Mains Well Drilling ADDRESS Box 326, Richmond Ont. NAME OF DRILLER OR BORER Herry Mains SIGNATURE OF CONTRACTOR SUBMISSION DATE DAY 1 MO 11 YR 80	LICENCE NUMBER 3644
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<b>OFFICE USE ONLY</b> DATA SOURCE DATE OF INSPECTION REMARKS	58 CONTRACTOR 3644 59-62 DATE RECEIVED 011280 63-68
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Well Owner's Information

First Name <b>Camcor Industries</b>	Last Name	E-mail Address	<input type="checkbox"/> Well Constructed by Well Owner
Mailing Address (Street Number/Name, RR) <b>2171 McGee Side Road</b>	Municipality <b>Carleton Place</b>	Province <b>Ont</b>	Postal Code <b>K0A 1L0</b>
Telephone No. (inc. area code)			

Part A Construction and/or Major Alteration of a Well

Address of Well Location (Street Number/Name, RR) <b># 2171 McGee Side Road</b>		Township <b>Huntley</b>	Lot <b>11</b>	Concession <b>2</b>
County/District/Municipality <b>Ottawa - Carleton</b>		City/Town/Village <b>Carleton Place</b>	Province <b>Ontario</b>	Postal Code
UTM Coordinates NAD 83 <b>184219215018437</b>	Zone <b>18</b>	Easting <b>15018437</b>	Northings <b>18437</b>	GPS Unit Make <b>Magellan</b>
Model <b>200</b>		Mode of Operation: <input type="checkbox"/> Undifferentiated <input checked="" type="checkbox"/> Averaged		
<input type="checkbox"/> Differentiated, specify				

Overburden and Bedrock Materials (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To
	<b>Sand Gravel</b>			<b>0</b>	<b>4.27</b>
	<b>Gray Limestone</b>			<b>4.27</b>	<b>152.3</b>
<b>* Plan RPSR 12610 *</b>					

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
<b>6.10</b>	<b>0</b>	<b>Neat Cement Slurry</b>	<b>2724</b>

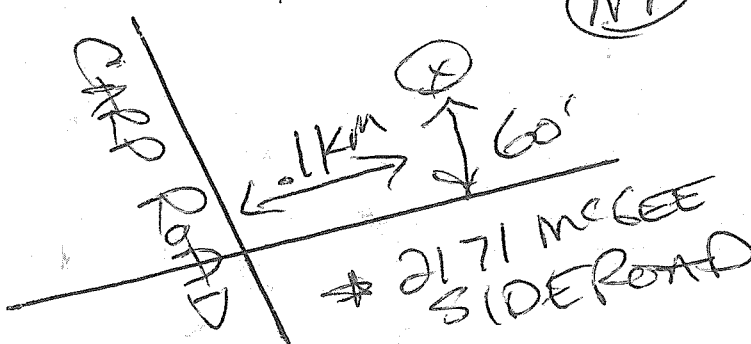
Method of Construction		Water Use	
<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input checked="" type="checkbox"/> Commercial
<input type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input type="checkbox"/> Domestic	<input type="checkbox"/> Municipal
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole
<input type="checkbox"/> Rotary (Air)	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning
<input checked="" type="checkbox"/> Air percussion	<input type="checkbox"/> Boring	<input type="checkbox"/> Industrial	
<input type="checkbox"/> Other, specify		<input type="checkbox"/> Other, specify	

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

Location of Well

Please provide a map below showing:

- all property boundaries, and measurements sufficient to locate the well in relation to fixed points,
- an arrow indicating the North direction
- detailed drawings can be provided as attachments no larger than legal size (8.5" by 14")
- digital pictures of inside of well can also be provided



Results of Well Yield Testing

Check box if after test of well yield, water was:		Draw Down		Recovery	
<input type="checkbox"/> Clear and sand free	<input type="checkbox"/> Cannot develop to sand-free state	Time (Min)	Water Level (Metres)	Time (Min)	Water Level (Metres)
<input checked="" type="checkbox"/> NOT TESTED		Static Level	<b>5.75</b>	Static Level	<b>34.90</b>
If pumping discontinued, give reason:		1	<b>7.08</b>	1	<b>32.36</b>
Pumping test method <b>Sub Pump</b>		2	<b>8.20</b>	2	<b>31.30</b>
Pump intake set at (Metres) <b>91.44</b>		3	<b>9.30</b>	3	<b>30.22</b>
Pumping rate (Litres/min) <b>26.5</b>		4	<b>10.30</b>	4	<b>29.18</b>
Duration of pumping <b>1</b> hrs + <b>0</b> min		5	<b>11.20</b>	5	<b>28.20</b>
Final water level end of pumping (Metres) <b>34.90</b>		10	<b>15.26</b>	10	<b>23.70</b>
Recommended pump type <input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep		15	<b>18.60</b>	15	<b>20.</b>
Recommended pump depth <b>91.44</b> Metres		20	<b>21.40</b>	20	<b>16.60</b>
Recommended pump rate (Litres/min) <b>26.5</b>		25	<b>23.37</b>	25	<b>13.90</b>
If flowing give rate (Litres/min)		30	<b>26.</b>	30	<b>11.58</b>
		40	<b>29.66</b>	40	<b>9.90</b>
		50	<b>32.60</b>	50	<b>7.80</b>
		60	<b>34.90</b>	60	<b>6.30</b>

Water Details

Water found at Depth	Kind of Water
<b>105.63</b> Metres	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals
<b>117.82</b> Metres	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals
<b>147.82</b> Metres	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals

Casing Used	Screen Used	Casing and Well Details
<input type="checkbox"/> Galvanized	<input type="checkbox"/> Galvanized	Diameter of the Hole (Centimetres) <b>14.28</b>
<input checked="" type="checkbox"/> Steel	<input checked="" type="checkbox"/> Steel	Depth of the Hole (Metres) <b>152.37</b>
<input type="checkbox"/> Fibreglass	<input type="checkbox"/> Fibreglass	Wall Thickness (Metres) <b>1.48 cm</b>
<input type="checkbox"/> Plastic	<input type="checkbox"/> Plastic	Inside Diameter of the Casing (Metres) <b>1.588</b>
<input type="checkbox"/> Concrete	<input type="checkbox"/> Concrete	Depth of the Casing (Metres) <b>6.11</b>
No Casing and Screen Used		
<input checked="" type="checkbox"/> Open Hole		
Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Ministry Use Only

Audit No. <b>z 60149</b>	Well Contractor No.
Date Received (yyyy/mm/dd) <b>OCT 15 2007</b>	Date of Inspection (yyyy/mm/dd)
Remarks	

Date Well Completed (yyyy/mm/dd) <b>2007-08-31</b>	Was the well owner's information package delivered? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd) <b>2007-08-31</b>
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Well Contractor and Well Technician Information		
Business Name of Well Contractor <b>AIR ROCK DRILLING CO LTD</b>	Well Contractor's Licence No. <b>10119</b>	
Business Address (Street No./Name, number, RR) <b>RR #1</b>	Municipality <b>RICHMOND</b>	
Province <b>ONT</b>	Postal Code <b>K0A 2R0</b>	Business E-mail Address
Bus. Telephone No. (inc. area code) <b>613 838 2170</b>	Name of Well Technician (Last Name, First Name) <b>Desautels Ken</b>	
Well Technician's Licence No. <b>TA</b>	Signature of Technician <i>[Signature]</i>	Date Submitted (yyyy/mm/dd) <b>2007-10-10</b>



Well Owner's Information

First Name	Last Name / Organization Shell Star Holdings	E-mail Address	<input type="checkbox"/> Well Constructed by Well Owner
Mailing Address (Street Number/Name) P.O. Box 569	Municipality Stittsville	Province Ontario	Postal Code K2S 1A6
		Telephone No. (inc. area code) 613 831 9041	

Well Location

Address of Well Location (Street Number/Name) 245 West Lake Circle	Township West Carleton	Lot 10	Concession 3
County/District/Municipality Ottawa Carleton	City/Town/Village Carp	Province Ontario	Postal Code
UTM Coordinates Zone Easting Northing NAD 83 18 421755 5018048	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	Hardpan	Boulders		0	2.43
Gray	Limestone		Layered & Soft	2.43	6.09
Gray	Limestone		Medium	6.09	49.37

Annular Space			
Depth Set at (m/ft) From To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)	
7.31 0	Grouted Cement & Bentonite	.31m³	

Method of Construction	Well Use
<input type="checkbox"/> Cable Tool <input type="checkbox"/> Rotary (Conventional) <input checked="" type="checkbox"/> Rotary (Reverse) Air <input type="checkbox"/> Boring <input checked="" type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify	<input type="checkbox"/> Diamond <input type="checkbox"/> Jetting <input type="checkbox"/> Driving <input type="checkbox"/> Digging <input type="checkbox"/> Public <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> Other, specify
	<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 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	<input checked="" 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 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	
15.86	Steel	.48	+ .45 7.31		

Construction Record - Screen				Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From To	<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 33.52m/ft	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft) From To	Diameter (cm/in)
Water found at Depth 49.07m/ft	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	0 7.31	15.86
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested	7.31 49.37	15.23

Well Contractor and Well Technician Information			
Business Name of Well Contractor Capital Water Supply Ltd.	Well Contractor's Licence No. 1 5 5 8		
Business Address (Street Number/Name) Box 490	Municipality Stittsville		
Province Ontario	Postal Code K2S 1A6	Business E-mail Address office@capitalwater.ca	

Bus. Telephone No. (inc. area code) 613 836 1766	Name of Well Technician (Last Name, First Name) Miller, Stephen		
Well Technician's Licence No. 0 0 9 7	Date Submitted 2 0 0 9 1 0 0 9		

Results of Well Yield Testing				
After test of well yield, water was: <input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify	Draw Down			
If pumping discontinued, give reason:	Time (min)	Water Level (m/ft)	Recovery	
	Static Level		Time (min)	Water Level (m/ft)
Pump intake set at (m/ft) 22.85	1	5.55	1	5.27
Pumping rate (l/min / GPM) 54.6	2	5.79	2	5.06
Duration of pumping 2 hrs + min	3	5.89	3	4.98
Final water level end of pumping (m/ft) 6.23	4	5.96	4	4.93
If flowing give rate (l/min / GPM)	5	5.97	5	4.90
Recommended pump depth (m/ft) 22.85	10	6.07	10	
Recommended pump rate (l/min / GPM) 45.5	15	6.10	15	
Well production (l/min / GPM)	20	6.12	20	
Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	25	6.13	25	
	30	6.14	30	
	40	6.17	40	
	50	6.22	50	
	60	6.23	60	

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 2 0 0 9 1 0 0 9 Date Work Completed 2 0 0 9 1 0 0 2	Ministry Use Only Audit No. 2101735 FEB 16 2010 Received
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Address of Well Location (Street Number/Name)		Township		Lot		Concession	
#305 West Lake Circle		West Carleton		10		3	
County/District/Municipality		City/Town/Village		Province		Postal Code	
Ottawa - Carleton		Carleton Place		Ontario			
UTM Coordinates		Zone		Easting		Northing	
NAD 83		18		421900		2017952	
Municipal Plan and Sublot Number		Other					
PLAN 4M-1316		S/L 28					

### 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)
	Sand, Gravel + Boulders			0' 17'
	Grey limestone			17' 135'
	Grey limestone + Sandstone mix			135' 160'
	Grey limestone			160' 200'

Annular Space		
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
28' 18'	Neat Cement Slurry	7.8
18' 0'	Neat Bentonite Slurry	16.8

Method of Construction	Well Use
<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Public
<input type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Commercial
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Municipal
<input type="checkbox"/> Boring	<input type="checkbox"/> Test Hole
<input type="checkbox"/> Air percussion	<input type="checkbox"/> Cooling & Air Conditioning
<input type="checkbox"/> Other, specify	<input type="checkbox"/> Not used
	<input type="checkbox"/> Dewatering
	<input type="checkbox"/> Monitoring
	<input type="checkbox"/> Industrial
	<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)	
6" Steel		1.88"	12' 28'	<input checked="" type="checkbox"/> Water Supply
6" Open hole			28' 200'	<input type="checkbox"/> Replacement Well
				<input type="checkbox"/> Test Hole
				<input type="checkbox"/> Recharge Well
				<input type="checkbox"/> Dewatering Well
				<input 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)	
			From	To

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)	Diameter (cm/in)
152'	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	From	To
186'	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	0' 200' 6"	

Business Name of Well Contractor		Well Contractor's Licence No.	
AIR ROCK DRILLING CO LTD 1119			
Business Address (Street Number/Name)		Municipality	
RR#1		Richmond	
Province	Postal Code	Business E-mail Address	
ONT	K0A2T0		
Bus. Telephone No. (inc. area code)		Name of Well Technician (Last Name, First Name)	
613 838 2170		Graham Ryan	
Well Technician's Licence No.		Signature of Technician and/or Contractor	
T3058		20100315	

Results of Well Yield Testing			
After test of well yield, water was:		Draw Down	
<input type="checkbox"/> Clear and sand free		Time (min)	Water Level (m/ft)
<input checked="" type="checkbox"/> Other, specify		Static Level	11' 7"
If pumping discontinued, give reason:		1	25' 9"
Pump intake set at (m/ft)		2	31' 2"
Pumping rate (l/min / GPM)		3	33' 9"
Duration of pumping		4	37' 7"
1 hrs + 0 min		5	40' 7"
Final water level end of pumping (m/ft)		10	49' 2"
If flowing give rate (l/min / GPM)		15	52' 1"
Recommended pump depth (m/ft)		20	53' 4"
Recommended pump rate (l/min / GPM)		25	54' 6"
Well production (l/min / GPM)		30	55'
Disinfected?		40	55' 6"
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		50	55' 8"
		60	56'

Map of Well Location	
Please provide a map below following instructions on the back.	
Comments:	
Well owner's information package delivered	Date Package Delivered
<input checked="" type="checkbox"/> Yes	20100209
<input type="checkbox"/> No	Date Work Completed
	20100204
Ministry Use Only	
Audit No.	z108236
Received	MAR 22 2010



Address of Well Location (Street Number/Name) **# 350 WEST LAKE CIRCLE** Township **West Carleton** Lot **10** Concession **3**  
 County/District/Municipality **Ottawa-Carleton** City/Town/Village **Carleton Place** Province **Ontario** Postal Code   
 UTM Coordinates Zone Easting Northing **18 46 52 32 15 02 94 54** Municipal Plan and Sublot Number **PLAN # 4M-1316 S/L # 11**

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
	Sand, Clay & Gravel			0' 15'
	Grey Limestone			15' 12'

Annular Space			
Depth Set at (m/ft) From To	Type of Sealant Used (Material and Type)	Volume Placed (m <sup>3</sup> /ft <sup>3</sup> )	
28' 18'	Neat Cement Slurry	7.8	
18' 0'	Neat Portland Cement Slurry	12.6	

Method of Construction	Well Use
<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Public
<input type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Commercial
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Municipal
<input type="checkbox"/> Boring	<input type="checkbox"/> Test Hole
<input checked="" type="checkbox"/> Air percussion	<input type="checkbox"/> Cooling & Air Conditioning
<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) From To	<input checked="" type="checkbox"/> Water Supply	
6"	Steel	1.88"	12' 28'	<input type="checkbox"/> Replacement Well	
5 5/16"	Open hole		28' 120'	<input type="checkbox"/> Test Hole	
				<input type="checkbox"/> Recharge Well	
				<input type="checkbox"/> Dewatering Well	
				<input 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

Water Details		Hole Diameter	
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 _____	Depth (m/ft) From To	Diameter (cm/in)
112'		0' 28'	6"
		28' 120'	5 5/16"

**Well Contractor and Well Technician Information**  
 Business Name of Well Contractor **AIR ROCK DRILLING CO LTD** Well Contractor's Licence No. **1119**  
 Business Address (Street Number/Name) **RR #1 RICHMOND** Municipality **RICHMOND**  
 Province **ONT** Postal Code **K0A 2Z0** Business E-mail Address   
 Bus. Telephone No. (inc. area code) **613 838 2170** Name of Well Technician (Last Name, First Name) **BOGAN, DAN**  
 Well Technician's Licence No. **13058** Signature of Technician and/or Contractor **[Signature]** Date Submitted **20100903**

Results of Well Yield Testing			
After test of well yield, water was:		Draw Down	
<input checked="" type="checkbox"/> Clear and sand free		Time (min)	Water Level (m/ft)
<input type="checkbox"/> Other, specify _____		Static Level	16' 2"
If pumping discontinued, give reason: <b>TESTED</b>		1	26' 5"
Pump intake set at (m/ft) <b>115</b>		2	33' 4"
Pumping rate (l/min / GPM) <b>20</b>		3	39' 3"
Duration of pumping <b>1</b> hrs + <b>0</b> min		4	44'
Final water level end of pumping (m/ft) <b>111.8</b>		5	48'
If flowing give rate (l/min / GPM) <b>20</b>		10	61' 5"
Recommended pump depth (m/ft) <b>344P-157P 100'</b>		15	69' 4"
Recommended pump rate (l/min / GPM) <b>20</b>		20	78'
Well production (l/min / GPM) <b>20</b>		25	86' 2"
Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		30	91' 5"
		40	101' 3"
		50	107' 3"
		60	111' 8"

**Map of Well Location**  
 Please provide a map below following instructions on the back.  
  
 Comments:  
 Well owner's information package delivered ☒ Yes ☐ No  
 Date Package Delivered **20100901**  
 Date Work Completed **20100826**  
**Ministry Use Only**  
 Audit No. **z110663**  
 Received **SEP 17 2010**



Address of Well Location (Street Number/Name) <b>Lot 5 West Lake Estates</b>		Township <b>West Carleton-Huntley</b>	Lot <b>10</b>	Concession <b>3</b>
County/District/Municipality <b>Ottawa Carleton</b>		City/Town/Village <b>Carp</b>	Province <b>Ontario</b>	Postal Code 
UTM Coordinates NAD   8   3   1   8	Easting <b>421718</b>	Northing <b>5018158</b>	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	Soil			0	.60
Brown	Shale		Soft	.60	5.48
Grey	Limestone	Brown Layers	Medium Soft	5.48	70.40

Annular Space			
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m <sup>3</sup> /ft <sup>3</sup> )	
From	To		
8.83	0	Grouted Cement Slurry	.21m <sup>3</sup>

<b>Method of Construction</b> <input type="checkbox"/> Cable Tool <input type="checkbox"/> Rotary (Conventional) <input checked="" type="checkbox"/> Rotary (Reverse Air) <input type="checkbox"/> Boring <input checked="" type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify _____		<b>Well Use</b> <input type="checkbox"/> Public <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> Other, specify _____		<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 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	
15.86	Steel	.48	+ .45	8.83	<input checked="" 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 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	

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)	Diameter (cm/in)	
		From	To	
70.10-70.40	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	0	8.83	15.86
		8.83	70.40	15.55

<b>Well Contractor and Well Technician Information</b>			
Business Name of Well Contractor <b>Capital Water Supply Ltd.</b>		Well Contractor's Licence No. <b>1 5 5 8</b>	
Business Address (Street Number/Name) <b>Box 490</b>		Municipality <b>Stittsville</b>	
Province <b>Ontario</b>	Postal Code <b>K2S 1A6</b>	Business E-mail Address <b>office@capitalwater.ca</b>	
Bus. Telephone No. (inc. area code) <b>613 836 1766</b>		Name of Well Technician (Last Name, First Name) <b>Miller, Stephen</b>	
Well Technician's Licence No. <b>0 0 9 7</b>	Signature of Technician and/or Contractor 	Date Submitted <b>2 0 1 0 0 7 2 7</b>	

Results of Well Yield Testing			
After test of well yield, water was:		Draw Down	
		Time (min)	Water Level (m/ft)
<input checked="" type="checkbox"/> Clear and sand free			
<input type="checkbox"/> Other, specify _____			
If pumping discontinued, give reason:		Static Level	
Pump intake set at (m/ft)		1	7.03
Pumping rate (l/min / GPM)		2	7.14
Duration of pumping		3	7.18
Final water level end of pumping (m/ft)		4	7.19
If flowing give rate (l/min / GPM)		5	7.20
Recommended pump depth (m/ft)		10	7.22
Recommended pump rate (l/min / GPM)		15	7.26
Well production (l/min / GPM)		20	7.32
Disinfected?		25	7.40
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		30	7.45
		40	
		50	7.48
		60	7.47

Map of Well Location
Please provide a map below following instructions on the back.
Comments:

Well owner's information package delivered	Date Package Delivered <b>2 0 1 0 0 7 2 6</b>	<b>Ministry Use Only</b> Audit No. <b>z115581</b> Received
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date Work Completed <b>2 0 1 0 0 7 2 6</b>	



Measurements recorded in: ☒ Metric ☐ Imperial

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## Well Owner's Information

First Name	Last Name / Organization Shell Star Holdings	E-mail Address	<input type="checkbox"/> Well Constructed by Well Owner
Mailing Address (Street Number/Name) P.O. Box 569	Municipality Stittsville	Province Ontario	Postal Code K2S 1A6
Telephone No. (inc. area code) 613 831 9041			

## Well Location

Address of Well Location (Street Number/Name) Lot 30 West Lake Estates	Township West Carleton - Huntley	Lot 10	Concession 3
County/District/Municipality Ottawa Carleton	City/Town/Village Carp	Province Ontario	Postal Code
UTM Coordinates NAD 83 18 421995 5017833	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	Soil	Large Boulders		0	7.31
Grey	Limestone	Dark Layers	Medium	7.31	83.20

Annular Space		
Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)
10.36	0	Grouted Bentonite Slurry

Method of Construction		Well Use	
<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial
<input checked="" type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Municipal
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole
<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) From To	<input checked="" 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 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	
15.86	Steel	.48	+4.5 10.36		

Construction Record - Screen				Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From To	<input checked="" 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 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	

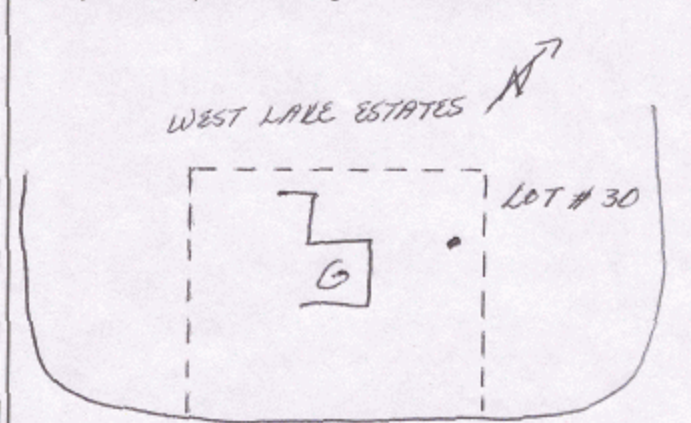
Water Details		Hole Diameter	
Water found at Depth 33.52(m/ft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft) From To	Diameter (cm/in)
Water found at Depth 79.24(m/ft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	0 10.36	15.86
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	10.36 83.20	15.39

Well Contractor and Well Technician Information			
Business Name of Well Contractor Capital Water Supply Ltd.	Well Contractor's Licence No. 1 5 5 8		
Business Address (Street Number/Name) Box 490	Municipality Stittsville		
Province Ontario	Postal Code K2S 1A6	Business E-mail Address office@capitalwater.ca	
Bus. Telephone No. (inc. area code) 613 836 1766	Name of Well Technician (Last Name, First Name) Miller, Stephen		
Well Technician's Licence No. 0 0 9 7	Signature of Technician and/or Contractor	Date Submitted 2 0 1 0 1 1 1 5	

Results of Well Yield Testing			
After test of well yield, water was: <input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify		Draw Down	
If pumping discontinued, give reason:		Time (min)	Water Level (m/ft)
Pump intake set at (m/ft) 45.71		Static Level	4.14
Pumping rate (l/min / GPM) 36.40		1	6.40
Duration of pumping 1 hrs + min		2	8.53
Final water level end of pumping (m/ft) 41.0		3	
If flowing give rate (l/min / GPM)		4	10.42
Recommended pump depth (m/ft) 45.71		5	12.40
Recommended pump rate (l/min / GPM) 36.40		10	16.50
Well production (l/min / GPM)		15	20.08
Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		20	22.20
		25	25.13
		30	28.85
		40	32.95
		50	36.77
		60	41.

## Map of Well Location

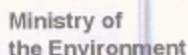
Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date Package Delivered 2 0 1 0 1 1 1 1 Date Work Completed 2 0 1 0 1 1 1 0	Ministry Use Only Audit No. 2115651 DEC 09 2010 Received
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Well Tag No. (Place Sticker and/or Print Below)

## Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☒ Metric ☐ Imperial

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## Well Owner's Information

First Name	Last Name / Organization		E-mail Address		<input type="checkbox"/> Well Constructed by Well Owner
	Shell Star Holding				
Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)	
P.O. Box 569	Stittsville	Ontario	K2S 1A6	613 831 9041	

## Well Location

Address of Well Location (Street Number/Name)				Township		Lot		Concession	
Lot 12 West Lake Estates				West Carleton - Huntley		10		3	
County/District/Municipality				City/Town/Village				Province	
Ottawa Carleton				Carp				Ontario	
UTM Coordinates				Zone		Easting		Northing	
NAD				8		3		1	
				8		3		422071	
								5017793	
Municipal Plan and Sublot Number								Other	

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

[illegible]

Annular Space			
Depth Set at (m/ft)		Type of Sealant Used	Volume Placed
From	To	(Material and Type)	(m³/ft³)
37.48	0	Grouted Bentonite Hole Plug	3/8 inch
		(33 bags)	

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 type="checkbox"/> Monitoring
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning	
<input type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial		
<input type="checkbox"/> Other, <i>specify</i> _____		<input type="checkbox"/> Other, <i>specify</i> _____		

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	
					<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 type="checkbox"/> Observation and/or Monitoring Hole
					<input type="checkbox"/> Alteration (Construction)
					<input checked="" type="checkbox"/> Abandoned, Inactive, or Sealed

Construction Record - Screen				
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To

☐ Insufficient Supply  
☐ Abandoned, Poor Water Quality  
☐ Abandoned, other, *specify* \_\_\_\_\_  
☐ Other, *specify* \_\_\_\_\_

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

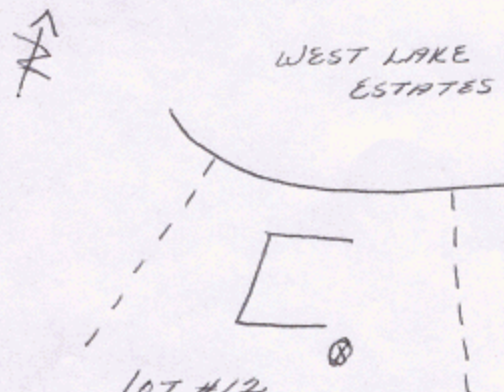
Well Contractor and Well Technician Information									
Business Name of Well Contractor						Well Contractor's Licence No.			
Capital Water Supply Ltd.						1   5   5   8			
Business Address (Street Number/Name)						Municipality			
Box 490						Stittsville			
Province		Postal Code		Business E-mail Address					
Ontario		K2S 1A6		office@capitalwater.ca					
Bus.Telephone No. (inc. area code)				Name of Well Technician (Last Name, First Name)					
613 836 1766				Miller, Stephen					
Well Technician's Licence No.		Signature of Technician and/or Contractor				Date Submitted			

### Results of Well Yield Testing

After test of well yield, water was: <input type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, <i>specify</i> _____	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	
	3		3	
Pumping rate (l/min / GPM)	4		4	
	5		5	
Duration of pumping ____ hrs + ____ min	10		10	
	15		15	
Final water level end of pumping (m/ft)	20		20	
	25		25	
If flowing give rate (l/min / GPM)	30		30	
	40		40	
Recommended pump depth (m/ft)	50		50	
	60		60	
Recommended pump rate (l/min / GPM)				
Well production (l/min / GPM)				
Disinfected? <input checked="" 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 type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Date Package Delivered Y Y Y Y M M D D	Ministry Use Only Audit No. <b>z115668</b> Received <b>AUG 05 2011</b>
	Date Work Completed 2 0 1 0 M M D D	



Measurements recorded in: ☒ Metric ☐ Imperial

## Well Owner's Information

First Name		Last Name / Organization		E-mail Address		<input type="checkbox"/> Well Constructed by Well Owner	
		T. Goddard Construction					
Mailing Address (Street Number/Name)		Municipality		Province	Postal Code	Telephone No. (inc. area code)	
335 West Lake Circle		Carp		Ontario	K0A 1L0	613 227 7870	

## Well Location

Address of Well Location (Street Number/Name)				Township		Lot		Concession		
Lot 29 West Lake Estates				West Carleton - Huntley						
County/District/Municipality				City/Town/Village				Province		
Ottawa Carleton				Carp				Ontario		
UTM Coordinates		Zone	Easting	Northing	Municipal Plan and Sublot Number				Other	
NAD 83		18	421948	5017894						

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

[illegible]

### Annular Space

Depth Set at (m/ft)		Type of Sealant Used (Material and Type)	Volume Placed (m <sup>3</sup> /ft <sup>3</sup> )
From	To		
8.53	0	Grouted Bentonite Slurry	.46m <sup>3</sup>

### Results of Well Yield Testing

After test of well yield, water was:		Draw Down		Recovery	
		Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
<input checked="" type="checkbox"/> Clear and sand free	If pumping discontinued, give reason:	Static Level	3.65		
<input type="checkbox"/> Other, specify		1	4.74	1	5.04
		2	5.13	2	4.29
		3	5.38	3	3.98
		4	5.56	4	3.87
		5	5.68	5	3.82
		10	5.96	10	3.76
		15	6.02	15	3.71
		20		20	3.68
		25	6.03	25	
		30	6.42	30	
		40	6.76	40	
	50	6.78	50		
	60	6.79	60		

### Map of Well Location

Please provide a map below following instructions on the back.

A hand-drawn map of West Lake Estates. At the top, a north arrow points towards the upper left. Below it, the text "LOT #29" is written. To the right, "WEST LAKE ESTATES" is written. A dashed rectangular line encloses a central area. Inside this dashed box, there is a stepped line that starts from the left, goes right, then up, then right again, and finally up to the top edge of the box. A small black dot is located in the lower right quadrant of the dashed box. To the right of the dashed box, a curved line represents the "WEST LAKE CIRCLE". On the far right, the text "MOORE SUB P1" is written vertically.

## Construction Record - Screen

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

☐ Abandoned, Poor Water Quality  
☐ Abandoned, other, specify \_\_\_\_\_  
☐ Other, specify \_\_\_\_\_

### Water Details

Water found at Depth 57.90 (m/ft) <input type="checkbox"/> Gas	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested <input type="checkbox"/> Other, specify _____
Water found at Depth 82.29 (m/ft) <input type="checkbox"/> Gas	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested <input type="checkbox"/> Other, specify _____
Water found at Depth (m/ft) <input type="checkbox"/> Gas	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested <input type="checkbox"/> Other, specify _____

## Hole Diameter

Depth (m/ft)		Diameter (cm/in)
From	To	
0	8.53	15.86
8.53	83.20	15.23

## Well Contractor and Well Technician Information

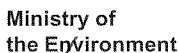
Business Name of Well Contractor										Well Contractor's Licence No.									
Capital Water Supply Ltd.										1   5   5   8									
Business Address (Street Number/Name)										Municipality									
Box 490										Stittsville									
Province				Postal Code				Business E-mail Address											
Ontario				K2S 1A6				office@capitalwater.ca											
Bus. Telephone No. (inc. area code)						Name of Well Technician (Last Name, First Name)													
613 836 1766						Miller, Stephen													
Well Technician's Licence No.				Signature of Technician and/or Contractor						Date Submitted									
0   0   9   7										20110617									

Well owner's information	Date Package Delivered
package delivered	2 0 1 1 0 6 1 7
<input checked="" type="checkbox"/> Yes	Date Work Completed
<input type="checkbox"/> No	2 0 1 1 0 6 1 7

Ministry Use Only  
Audit No. **z115728**  
**NOV 02 2011**  
Received







Well T-13 (10' 11" Sucker and/or Print Below)

A137237

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☒ Metric ☐ Imperial

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### Well Owner's Information

First Name	Last Name / Organization	E-mail Address	<input type="checkbox"/> Well Constructed by Well Owner	
Thomas	Cavanagh Construction	ccollins@thomascavanagh		
Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
9094 Cavanagh Road	Ashton	Ont	K0A1B0	6132572918

### Well Location

Address of Well Location (Street Number/Name) 305 West Lake Circle				Township West Carleton - March 28		Lot		Concession			
County/District/Municipality Ottawa Carleton				City/Town/Village Camp				Province Ontario		Postal Code 	
UTM Coordinates NAD 83		Zone 18		Easting 421941		Northing 5017942		Municipal Plan and Sublot Number 4M1316			
Other											

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

[illegible]

Annular Space			
Depth Set at (m/ft)		Type of Sealant Used	Volume Placed
From	To	(Material and Type)	(m³/ft³)
0	2-31	hole plug	2 bags
2.31	5.66	filter sand	2 bags

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 checked="" type="checkbox"/> Test Hole	<input type="checkbox"/> Monitoring
<input checked="" 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 <u>HS Auger</u>		<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)		<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, Inefficient
			From	To	
5.2	plastic	0.4	0	2.62	

Construction Record - Screen				
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To
6.0	plastic	10	2.62	5.66

☐ Insufficient Supply  
☐ Abandoned, Poor Water Quality  
☐ Abandoned, other, specify \_\_\_\_\_  
☐ Other, specify \_\_\_\_\_

Water Details		Hole Diameter		
Water found at Depth	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested	Depth (m/ft)		Diameter
0.02 (m/ft) <input type="checkbox"/> Gas	<input type="checkbox"/> Other, specify _____	From	To	(cm/in)
Water found at Depth	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested	0	1.37	22
(m/ft) <input type="checkbox"/> Gas	<input type="checkbox"/> Other, specify _____	1.37	5.66	9
Water found at Depth	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested			
(m/ft) <input type="checkbox"/> Gas	<input type="checkbox"/> Other, specify _____			

Well Contractor and Well Technician Information				
Business Name of Well Contractor			Well Contractor's Licence No.	
OGS INC			6 9 6 4	
Business Address (Street Number/Name)			Municipality	
5518 Appleton Side Road			Almonte	
Province	Postal Code	Business E-mail Address		
Ont	K0A 1A0	casing@bellnet.ca		
Telephone No. (inc. area code)		Name of Well Technician (Last Name, First Name)		
613/2567 666		Strude, Jason		
Well Technician's Licence No.		Signature of Technician and/or Contractor		Date Submitted
3 6 3 4		J. Strude		2013 07 17

### Results of Well Yield Testing

After test of well yield, water was:	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
<input type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, <i>specify</i> _____	Static Level			
If pumping discontinued, give reason:	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	
Recommended pump depth (m/ft)	15		15	
	20		20	
	25		25	
Recommended pump rate (l/min / GPM)	30		30	
Well production (l/min / GPM)	40		40	
Disinfected?	50		50	
<input type="checkbox"/> Yes <input type="checkbox"/> No	60		60	

### Map of Well Location

Please provide a map below following instructions on the back.

Site plan and area map are enclosed.

Comments:

Well owner's information package delivered	Date Package Delivered	<b>Ministry Use Only</b> Audit No. <b>Z 163946</b> Rec'd: <b>19 2012</b>
	Y Y Y Y M M D D Date Work Completed <b>20130108</b>	



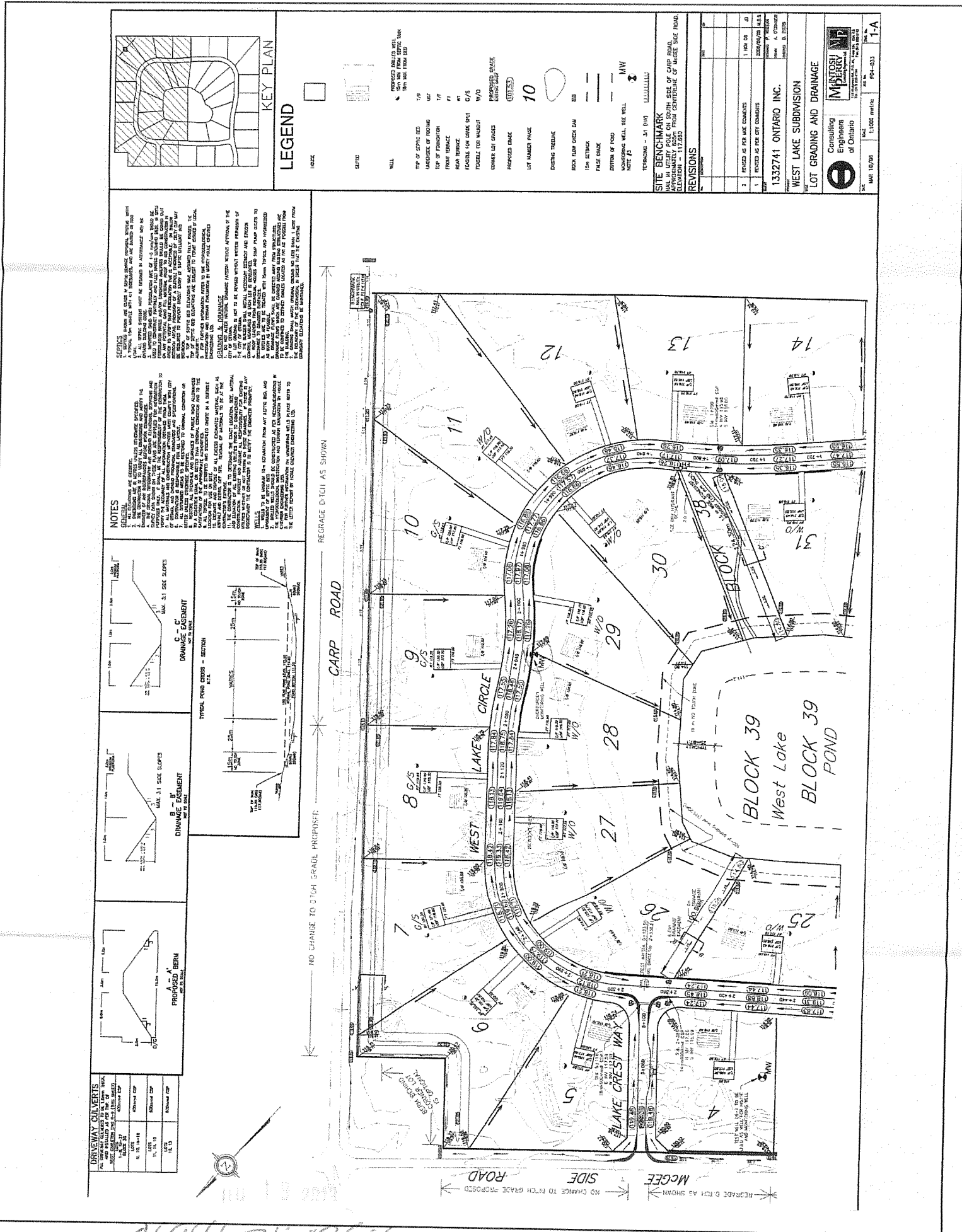
# Well Record for Well Cluster - Part 3 of 3 Detailed Drawing of All Well Locations

**Note:** This Well Record for Well Cluster Part 3 - Detailed Drawing of all Well Locations, must be attached to Parts 1 and 2. The drawing must include all property boundaries, an arrow indicating the North direction, all named roads and sufficient measurements to locate all wells in the cluster in relation to fixed points. The drawing must show the location of each well and each well must be numbered on the drawing to match number used for that well on the Well Record for Well Cluster Parts 1 and 2. The well with the well tag must be clearly identified on the Drawing.

UTM coordinates should appear beside each well, if space permits. Additional comments on wells can be included on the drawing

Well Tag Number: # A137237

"Well Record for Well Cluster" Form Audit Number: # 2163946



**Certificate of Analysis**

Client: Paterson Group  
154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:  
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

Page 1 of 14


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**Dear Oliver Blume:**

**Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).**

Report Comments:

APPROVAL:



Addrine Thomas  
2022.03.30 13:55:02 -04'00'

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Addrine Thomas, Inorganics Supervisor

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <http://www.cala.ca/scopes/2602.pdf>.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

# Certificate of Analysis

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154 Colonnade Rd. South  
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K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:   
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1615821 GW  2022-03-22 GW1	1615822 GW  2022-03-22 GW2
Group	Analyte	MRL	Units	Guideline			
Anions	Cl	1	mg/L	AO 250		135	142
	F	0.10	mg/L	MAC 1.5		<0.10	<0.10
	N-NO2	0.10	mg/L	MAC 1.0		<0.10	<0.10
	N-NO3	0.10	mg/L	MAC 10.0		3.15	3.02
	SO4	1	mg/L	AO 500		182	175
General Chemistry	Alkalinity as CaCO3	5	mg/L	OG 30-500		251	243
	Colour (Apparent)	2	TCU	AO 5		<2	<2
	Conductivity	5	uS/cm			1180	1180
	DOC	0.5	mg/L	AO 5		2.4	2.4
	pH	1.00		6.5-8.5		7.95	7.93
	Phenols	0.001	mg/L			<0.001	<0.001
	S2-	0.01	mg/L	AO 0.05		<0.01	<0.01
	TDS (COND - CALC)	1	mg/L	AO 500		767*	767*
	Turbidity	0.1	NTU	AO 5		0.5	0.5
Hardness	Hardness as CaCO3	1	mg/L	OG 80-100		454*	451*
Indices/Calc	Ion Balance	0.01				0.97	0.97
Mercury	Hg	0.0001	mg/L	MAC 0.001		<0.0001	<0.0001
Metals	Ag	0.0001	mg/L			<0.0001	<0.0001
	Al	0.01	mg/L	OG 0.1		<0.01	<0.01
	As	0.001	mg/L	IMAC 0.01		<0.001	<0.001
	B	0.01	mg/L	IMAC 5.0		0.04	0.04
	Ba	0.01	mg/L	MAC 1.0		0.12	0.12
	Be	0.0005	mg/L			<0.0005	<0.0005
	Ca	1	mg/L			162	161
	Cd	0.0001	mg/L	MAC 0.005		<0.0001	<0.0001

Guideline = ODWSOG

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# Certificate of Analysis

Client: Paterson Group  
154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:  
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1615821 GW 2022-03-22 GW1	1615822 GW 2022-03-22 GW2
Group	Analyte	MRL	Units	Guideline			
Metals	Co	0.0002	mg/L			<0.0002	<0.0002
	Cr	0.001	mg/L	MAC 0.05		<0.001	<0.001
	Cu	0.001	mg/L	AO 1		<0.001	<0.001
	Fe	0.03	mg/L	AO 0.3		<0.03	<0.03
	K	1	mg/L			2	2
	Mg	1	mg/L			12	12
	Mn	0.01	mg/L	AO 0.05		<0.01	<0.01
	Mo	0.005	mg/L			<0.005	<0.005
	Na	1	mg/L	AO 200		77	75
	Ni	0.005	mg/L			<0.005	<0.005
	Pb	0.001	mg/L	MAC 0.010		<0.001	<0.001
	Sb	0.0005	mg/L	IMAC 0.006		<0.0005	<0.0005
	Se	0.001	mg/L	MAC 0.05		<0.001	<0.001
	Sr	0.001	mg/L			0.879	0.876
	Tl	0.0001	mg/L			<0.0001	<0.0001
	U	0.001	mg/L	MAC 0.02		<0.001	<0.001
	V	0.001	mg/L			<0.001	<0.001
	Zn	0.01	mg/L	AO 5		<0.01	<0.01
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0		0	0
	Total Coliforms	0	ct/100mL	MAC 0		19*	23*
Nutrients	N-NH3	0.010	mg/L			<0.010	<0.010
	Total Kjeldahl Nitrogen	0.100	mg/L			0.252	0.477
Subcontract	Tannin & Lignin	1	mg/L				1
		1.0	mg/L			1.0	
VOCs Surrogates	1,2-dichloroethane-d4	0	%			100	119

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154 Colonnade Rd. South  
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K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:  
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1615821 GW 2022-03-22 GW1	1615822 GW 2022-03-22 GW2
Group	Analyte	MRL	Units	Guideline			
VOCs Surrogates	4-bromofluorobenzene	0	%			71	76
	Toluene-d8	0	%			91	98
Volatiles	1,1,1,2-tetrachloroethane	0.5	ug/L			<0.5	<0.5
	1,1,1-trichloroethane	0.4	ug/L			<0.4	<0.4
	1,1,2,2-tetrachloroethane	0.5	ug/L			<0.5	<0.5
	1,1,2-trichloroethane	0.4	ug/L			<0.4	<0.4
	1,1-dichloroethane	0.4	ug/L			<0.4	<0.4
	1,1-dichloroethylene	0.5	ug/L	MAC 14		<0.5	<0.5
	1,2-dichlorobenzene	0.4	ug/L	MAC 200		<0.4	<0.4
	1,2-dichloroethane	0.2	ug/L	IMAC 5		<0.2	<0.2
	1,2-dichloropropane	0.5	ug/L			<0.5	<0.5
	1,3,5-trimethylbenzene	0.3	ug/L			<0.3	<0.3
	1,3-dichlorobenzene	0.4	ug/L			<0.4	<0.4
	1,3-Dichloropropylene (cis+trans)	0.3	ug/L			<0.3	<0.3
	1,4-dichlorobenzene	0.4	ug/L	MAC 5		<0.4	<0.4
	Acetone	30	ug/L			<30	<30
	Benzene	0.5	ug/L	MAC 1		<0.5	<0.5
	Bromodichloromethane	0.3	ug/L			<0.3	<0.3
	Bromoform	0.4	ug/L			<0.4	<0.4
	Bromomethane	0.5	ug/L			<0.5	<0.5
	c-1,2-Dichloroethylene	0.4	ug/L			<0.4	<0.4
	c-1,3-Dichloropropylene	0.2	ug/L			<0.2	<0.2
	Carbon Tetrachloride	0.2	ug/L	MAC 2		<0.2	<0.2
	Chloroethane	0.2	ug/L			<0.2	<0.2
	Chloroform	0.5	ug/L			<0.5	<0.5

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# Certificate of Analysis

Client: Paterson Group  
154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:   
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1615821 GW 2022-03-22 GW1	1615822 GW 2022-03-22 GW2
Group	Analyte	MRL	Units	Guideline			
Volatiles	Dibromochloromethane	0.3	ug/L			<0.3	<0.3
	Dichlorodifluoromethane	0.5	ug/L			<0.5	<0.5
	Dichloromethane	4.0	ug/L	MAC 50		<4.0	<4.0
	Ethylbenzene	0.5	ug/L	MAC 140		<0.5	<0.5
	Ethylene Dibromide	0.2	ug/L			<0.2	<0.2
	Hexane	5	ug/L			<5	<5
	m/p-xylene	0.4	ug/L			<0.4	<0.4
	Methyl Ethyl Ketone (MEK)	10	ug/L			<10	<10
	Methyl Isobutyl Ketone (MIBK)	10	ug/L			<10	<10
	Methyl Tert Butyl Ether (MTBE)	2	ug/L	AO 15		<2	<2
	Monochlorobenzene	0.5	ug/L	MAC 80		<0.5	<0.5
	o-xylene	0.4	ug/L			<0.4	<0.4
	Styrene	0.5	ug/L			<0.5	<0.5
	t-1,2-Dichloroethylene	0.4	ug/L			<0.4	<0.4
	t-1,3-Dichloropropylene	0.2	ug/L			<0.2	<0.2
	Tetrachloroethylene	0.3	ug/L	MAC 10		<0.3	<0.3
	Toluene	0.4	ug/L	MAC 60		<0.4	<0.4
	Trichloroethylene	0.3	ug/L	MAC 5		<0.3	<0.3
	Trichlorofluoromethane	0.5	ug/L			<0.5	<0.5
	Vinyl Chloride	0.2	ug/L	MAC 1		<0.2	<0.2
	Xylene; total	0.5	ug/L	MAC 90		<0.5	<0.5

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154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:  
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

### QC Summary

Analyte	Blank	QC % Rec	QC Limits
<b>Run No</b> 418950 <b>Analysis/Extraction Date</b> 2022-03-23 <b>Analyst</b> AaN <b>Method</b> C SM2130B			
Turbidity	<0.1 NTU	99	70-130
<b>Run No</b> 418958 <b>Analysis/Extraction Date</b> 2022-03-24 <b>Analyst</b> DRA <b>Method</b> AMBCOLM1			
Escherichia Coli			
Total Coliforms			
<b>Run No</b> 418995 <b>Analysis/Extraction Date</b> 2022-03-24 <b>Analyst</b> Z S <b>Method</b> M SM3120B-3500C			
Calcium	<1 mg/L	95	90-110
Potassium	<1 mg/L	96	87-113
Magnesium	<1 mg/L	95	76-124
Sodium	<1 mg/L	102	82-118
<b>Run No</b> 419016 <b>Analysis/Extraction Date</b> 2022-03-24 <b>Analyst</b> SKH <b>Method</b> EPA 350.1			
N-NH3	<0.010 mg/L	113	80-120
<b>Run No</b> 419027 <b>Analysis/Extraction Date</b> 2022-03-24 <b>Analyst</b> SKH <b>Method</b> EPA 351.2			
Total Kjeldahl Nitrogen	<0.100 mg/L	110	70-130

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Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

### QC Summary

Analyte	Blank	QC % Rec	QC Limits
<b>Run No</b> 419078 <b>Analysis/Extraction Date</b> 2022-03-24 <b>Analyst</b> YH <b>Method</b> EPA 8260			
Tetrachloroethane, 1,1,1,2-	<0.5 ug/L	92	60-130
Trichloroethane, 1,1,1-	<0.4 ug/L	88	60-130
Tetrachloroethane, 1,1,2,2-	<0.5 ug/L	114	60-130
Trichloroethane, 1,1,2-	<0.4 ug/L	104	60-130
Dichloroethane, 1,1-	<0.4 ug/L	94	60-130
Dichloroethylene, 1,1-	<0.5 ug/L	93	60-130
Dichlorobenzene, 1,2-	<0.4 ug/L	104	60-130
Dichloroethane, 1,2-	<0.2 ug/L	115	60-130
Dichloropropane, 1,2-	<0.5 ug/L	106	60-130
1,3,5-trimethylbenzene	<0.3 ug/L	97	60-130
Dichlorobenzene, 1,3-	<0.4 ug/L	96	60-130
Dichloropropene, 1,3-	<0.3 ug/L		
Dichlorobenzene, 1,4-	<0.4 ug/L	97	60-130
Acetone	<30 ug/L		60-130
Benzene	<0.5 ug/L	100	60-130
Bromodichloromethane	<0.3 ug/L	108	60-130

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### QC Summary

Analyte	Blank	QC % Rec	QC Limits
Bromoform	<0.4 ug/L	104	60-130
Bromomethane	<0.5 ug/L	93	60-130
Dichloroethylene, 1,2-cis-	<0.4 ug/L	98	60-130
Dichloropropene, 1,3-cis-	<0.2 ug/L	103	60-130
Carbon Tetrachloride	<0.2 ug/L	93	60-130
Chloroethane	<0.2 ug/L	91	60-130
Chloroform	<0.5 ug/L	100	60-130
Dibromochloromethane	<0.3 ug/L	96	60-130
Dichlorodifluoromethane	<0.5 ug/L	86	60-130
Methylene Chloride	<4.0 ug/L	113	60-130
Ethylbenzene	<0.5 ug/L	85	60-130
Ethylene dibromide	<0.2 ug/L	98	60-130
Hexane (n)	<5 ug/L	110	60-130
m/p-xylene	<0.4 ug/L	93	60-130
Methyl Ethyl Ketone	<10 ug/L	100	60-130
Methyl Isobutyl Ketone	<10 ug/L		60-130
Methyl tert-Butyl Ether (MTBE)	<2 ug/L	110	60-130
Chlorobenzene	<0.5 ug/L	93	60-130

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### QC Summary

Analyte	Blank	QC % Rec	QC Limits
o-xylene	<0.4 ug/L	84	60-130
Styrene	<0.5 ug/L	90	60-130
Dichloroethylene, 1,2-trans-	<0.4 ug/L	89	60-130
Dichloropropene, 1,3-trans-	<0.2 ug/L	112	60-130
Tetrachloroethylene	<0.3 ug/L	91	60-130
Toluene	<0.4 ug/L	96	60-130
Trichloroethylene	<0.3 ug/L	82	60-130
Trichlorofluoromethane	<0.5 ug/L	87	60-130
Vinyl Chloride	<0.2 ug/L	88	60-130
<b>Run No</b> 419082 <b>Analysis/Extraction Date</b> 2022-03-25 <b>Analyst</b> YH <b>Method</b> EPA 8260			
Xylene Mixture			
<b>Run No</b> 419088 <b>Analysis/Extraction Date</b> 2022-03-25 <b>Analyst</b> IP <b>Method</b> SM5530D/EPA420.2			
Phenols	<0.001 mg/L	50	50-120
<b>Run No</b> 419093 <b>Analysis/Extraction Date</b> 2022-03-25 <b>Analyst</b> AsA <b>Method</b> C SM4500-S2-D			
S2-	<0.01 mg/L	111	80-120

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COC #: 887701

## QC Summary

Analyte	Blank	QC % Rec	QC Limits
<b>Run No</b> 419123 <b>Analysis/Extraction Date</b> 2022-03-28 <b>Analyst</b> AsA <b>Method</b> C SM2120C			
Colour (Apparent)	<2 TCU	106	90-110
<b>Run No</b> 419127 <b>Analysis/Extraction Date</b> 2022-03-28 <b>Analyst</b> AaN <b>Method</b> SM 4110			
Chloride	<5 mg/L		90-110
N-NO2	<0.10 mg/L	103	90-110
N-NO3	<0.10 mg/L	104	90-110
SO4	<5 mg/L	105	90-110
<b>Run No</b> 419170 <b>Analysis/Extraction Date</b> 2022-03-25 <b>Analyst</b> AET <b>Method</b> SUBCONTRACT-A			
Tannin & Lignin	<1.0 mg/L	106	
<b>Run No</b> 419184 <b>Analysis/Extraction Date</b> 2022-03-28 <b>Analyst</b> AsA <b>Method</b> SM2320,2510,4500H/F			
Alkalinity (CaCO3)	<5 mg/L	98	90-110
Conductivity	<5 uS/cm	101	90-110
F	<0.10 mg/L	99	90-110
pH		100	90-110

Guideline = ODWSOG

\* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.  
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

## Certificate of Analysis

Client: Paterson Group  
154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:   
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

### QC Summary

Analyte	Blank	QC % Rec	QC Limits
<b>Run No</b> 419188 <b>Analysis/Extraction Date</b> 2022-03-28 <b>Analyst</b> AsA <b>Method</b> SM 5310B			
DOC	<0.5 mg/L	102	80-120
<b>Run No</b> 419190 <b>Analysis/Extraction Date</b> 2022-03-25 <b>Analyst</b> R K <b>Method</b> SUBCONTRACT-A			
Tannin & Lignin	<1.0 mg/L	106	
<b>Run No</b> 419203 <b>Analysis/Extraction Date</b> 2022-03-29 <b>Analyst</b> AET <b>Method</b> C SM2340B			
Hardness as CaCO <sub>3</sub>			
Ion Balance			
TDS (COND - CALC)			
<b>Run No</b> 419228 <b>Analysis/Extraction Date</b> 2022-03-29 <b>Analyst</b> SD <b>Method</b> EPA 200.8			
Silver	<0.0001 mg/L	82	80-120
Aluminum	<0.01 mg/L	111	80-120
Arsenic	<0.001 mg/L	97	80-120
Boron (total)	<0.01 mg/L	116	80-120
Barium	<0.01 mg/L	102	80-120
Beryllium	<0.0005 mg/L	105	80-120

Guideline = ODWSOG

\* = Guideline Exceedence

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MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

## Certificate of Analysis

Client: Paterson Group  
154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:  
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

### QC Summary

Analyte	Blank	QC % Rec	QC Limits
Cadmium	<0.0001 mg/L	101	80-120
Cobalt	<0.0002 mg/L	99	80-120
Chromium Total	<0.001 mg/L	94	80-120
Copper	<0.001 mg/L	106	80-120
Iron	<0.03 mg/L	99	80-120
Manganese	<0.01 mg/L	104	80-120
Molybdenum	<0.005 mg/L	99	80-120
Nickel	<0.005 mg/L	101	80-120
Lead	<0.001 mg/L	102	80-120
Antimony	<0.0005 mg/L	83	80-120
Selenium	<0.001 mg/L	108	80-120
Strontium	<0.001 mg/L	97	80-120
Thallium	<0.0001 mg/L	102	80-120
Uranium	<0.001 mg/L	99	80-120
Vanadium	<0.001 mg/L	98	80-120
Zinc	<0.01 mg/L	108	80-120
<b>Run No</b> 419288 <b>Analysis/Extraction Date</b> 2022-03-30 <b>Analyst</b> AaN <b>Method</b> M SM3112B-3500B			

Guideline = ODWSOG

\* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.  
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

## Certificate of Analysis

Client: Paterson Group  
154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:  
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

### **QC Summary**

Analyte	Blank	QC % Rec	QC Limits
Mercury	<0.0001 mg/L	96	76-123

**Guideline = ODWSOG**

**\* = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.  
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



## Certificate of Analysis

Client: Paterson Group  
154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#:  
Invoice to: Paterson Group

Report Number: 1973843  
Date Submitted: 2022-03-23  
Date Reported: 2022-03-30  
Project: PH4484  
COC #: 887701

### ***Sample Comment Summary***

Sample ID: 1615821	GW1	CI & SO4 MRL elevated due to matrix interference (dilution was done). Sediments not included for Hg analysis.
Sample ID: 1615822	GW2	CI & SO4 MRL elevated due to matrix interference (dilution was done). Sediments not included for Hg analysis.

**Guideline = ODWSOG**

**\* = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.  
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Paterson Group  
154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#: 32614  
Invoice to: Paterson Group

Report Number: 1974461  
Date Submitted: 2022-04-04  
Date Reported: 2022-04-05  
Project: PH4484  
COC #: 889009

Page 1 of 2

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**Dear Oliver Blume:**

**Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).**

Report Comments:

Dragana  
Dzeletovic  
*Dragana Dzeletovic*  
2022.04.05  
16:55:16  
-04'00'

APPROVAL: \_\_\_\_\_  
Dragana Dzeletovic-Andric, Microbiology Team Lead

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <http://www.cala.ca/scopes/2602.pdf>.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.



**Certificate of Analysis**

Client: Paterson Group  
154 Colonnade Rd. South  
Nepean, ON  
K2E 7T7  
Attention: Mr. Oliver Blume  
PO#: 32614  
Invoice to: Paterson Group

Report Number: 1974461  
Date Submitted: 2022-04-04  
Date Reported: 2022-04-05  
Project: PH4484  
COC #: 889009

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1617476 GW 2022-04-04 GW1
Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Total Coliforms	0	ct/100mL	MAC 0	4*

**Guideline = ODWSOG**

**\* = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

**Analytical Method: AMBCOLM1**

additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

**OFFICIAL CERTIFICATE OF ANALYSIS : 4491110****WORK REQUEST : 100392148****Report Date : 2025-10-09****Nelson Water**

248 Westbrook Rd.

Carp, Ontario

K0A 1L0

Attention : Customer Service

Reception Date : 2025-10-08

Project : NELSON WATER - Non-Regulated

Sampler : NA

PO Number : Not Applicable

Temperature : 14 °C

Analysis	Quantity	External Method
E.Coli and Total Coliforms (DC Plate)	1	Modified from MECP E3407

**Criteria :****A :** Ontario Regulation 169/03 (Non-Regulated Drinking Water)**Sample status upon receipt :**

9096463

**Compliant****Notes :**

- All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated.
- Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at <https://directory.cala.ca/>
- Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

**Legend :**

RL : Reporting limit

N/A : Not applicable

\* : Analysis conducted by external subcontracting

QC : Reference material (QC)

1 : Results in annex

^ : Analysis not accredited

## OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Nelson Water

Project : NELSON WATER - Non-Regulated

Reception Date: 2025-10-08

Eurofins Sample No :  Matrix :  Sampling Date :  Client Sample Identification :						9096463				
Microbiology		RL	Unit	Criteria						
				A	B	C				
E.Coli and Total Coliforms (DC Plate)										
Escherichia coli (DC)		0	CFU/100mL	0			0			
Total Coliforms (DC)		0	CFU/100mL	0			0			

Approved by :

  
Jason Kennedy,  
Project Manager

## OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Nelson Water  
Project : NELSON WATER - Non-Regulated

Reception Date: 2025-10-08

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
E.Coli and Total Coliforms (DC Plate)									
Method : Total Coliforms and E.Coli by MF (Water, DC plate). Internal method: OTT-M-BAC-WI45296.									
Escherichia coli (DC)	CFU/100mL	0	0					-	0-30
Total Coliforms (DC)	CFU/100mL	0	0					-	0-30
Associated Samples : 9096463								Prep Date: 2025-10-08 Analysis Date: 2025-10-09	

Where RPD % is reported as "-" the calculation is not available because one or both of the duplicates is within 5 times the RL.



## DRINKING WATER CHAIN-OF-CUSTODY

146 Colonnade Road, Unit #8, Ottawa, ON, K2E 7Y1 - Phone: 613-727-5692, Fax: 613-727-5222

[illegible]

**OFFICIAL CERTIFICATE OF ANALYSIS : 4492546****WORK REQUEST : 100392167****Report Date : 2025-10-14****Nelson Water**

248 Westbrook Rd.

Carp, Ontario

K0A 1L0

Attention : Customer Service

Reception Date : 2025-10-08

Project : NELSON WATER - Non-Regulated

Sampler : NA

PO Number : Not Applicable

Temperature : 14 °C

Analysis	Quantity	External Method
Nitrate and Nitrite (Water, Colorimetry)	1	Modified from SM 4500-NO3-F

**Criteria :****A :** Ontario Regulation 169/03 (Non-Regulated Drinking Water)**Sample status upon receipt :**

9096602

**Compliant****Notes :**

- All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated.
- Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at <https://directory.cala.ca/>
- Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

**Legend :**

RL : Reporting limit

N/A : Not applicable

\* : Analysis conducted by external subcontracting

QC : Reference material (QC)

1 : Results in annex

^ : Analysis not accredited

**OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS**

Client : Nelson Water

Project : NELSON WATER - Non-Regulated

Reception Date: 2025-10-08

Eurofins Sample No :						9096602				
Matrix :						Drinking water				
Sampling Date :						2025-10-07				
Client Sample Identification :						YORK - HOP				
Nutrients	RL	Unit	Criteria							
			A	B	C					
Nitrate and Nitrite (Water, Colorimetry)										
Nitrate (as Nitrogen)	0.1	mg/L	10.0			0.25				
Nitrate + Nitrite (as Nitrogen)	0.1	mg/L				0.25				
Nitrite (as Nitrogen)	0.1	mg/L	1.0			<0.10				

Approved by :

  
**Jason Kennedy,**  
**Project Manager**

## OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Nelson Water  
Project : NELSON WATER - Non-Regulated

Reception Date: 2025-10-08

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Nitrate and Nitrite (Water, Colorimetry)									
Method : Nitrates/Nitrates (Water, Colorimetry). Internal method: OTT-I-NUT-WI46199.									
Nitrate (as Nitrogen)	mg/L	0.1	<0.10	99	80-120			8	0-20
Nitrate + Nitrite (as Nitrogen)	mg/L	0.1	<0.10	99	80-120	104	80-120	5	0-20
Nitrite (as Nitrogen)	mg/L	0.1	<0.10	106	80-120	104	80-120	-	0-20
Associated Samples : 9096602								Prep Date: 2025-10-09	
								Analysis Date: 2025-10-09	

Where RPD % is reported as "-" the calculation is not available because one or both of the duplicates is within 5 times the RL.



# DRINKING WATER CHAIN-OF-CUSTODY

146 Colonnade Road, Unit #8, Ottawa, ON, K2E 7Y1 - Phone: 613-727-5692, Fax: 613-727-5222

CLIENT INFORMATION				DRINKING WATER SYSTEM (DWS) INFORMATION														
Company: NELSON WATER INC				DWS Name:														
Contact: Juan Ospina				DWS #:														
Address: 248 Westbrook Rd, Carp, ON, K0A 1L0				Contact:														
Telephone: 6138316491				Address:														
Email #1: customerservice@nelsonwater.com				Telephone:														
Project:				Cell Phone:														
PO #:				Email #1:														
Quote #:				#2:														
REGULATION/GUIDELINE REQUIRED				TURN-AROUND TIME (Business Days)														
<input type="checkbox"/> O. Reg. 170/03 <input type="checkbox"/> O. Reg. 170/03 Sch. 15.1 (Lead) <input type="checkbox"/> Non-Regulated (Ontario) <input checked="" type="checkbox"/> Other				<input type="checkbox"/> 1 Day* (100%) <input type="checkbox"/> 2 Day** (50%) <input type="checkbox"/> 3-5 Days (25%) <input type="checkbox"/> 5-7 Days (Standard)														
<input type="checkbox"/> O. Reg. 319/09 <input type="checkbox"/> O. Reg. 243/07 <input type="checkbox"/> Non-Regulated (Federal)				Please contact the laboratory in advance to determine rush availability. Surcharges may apply to rush service. Note that some tests (i.e. O. Reg. 170/03 Schedule 24 pesticides) may take up to 3 weeks to analyze. Please see notes (on reverse) about TAT policies.														
<input type="checkbox"/> Has an LSN form been submitted to MECP or MOHLIC (if applicable)?				Public Health Unit:														
<p>The optimal temperature conditions during transport are 4 - 10 °C. Sample(s) cannot be frozen. Note that for drinking water samples, adverse results will be reported where (and how) applicable legislation requires.</p> <p>The COC must be complete upon submission of the samples, there will be a \$25 surcharge if required information is missing (required fields are shaded in grey).</p>				Sample Details				Sample Analysis Required				Field Measurements						
				Sample Type Code (see below)	Resample?	MEC/MON Reportable (adverse notification required) Y/N	# of Containers	SPL Code/Watertrax	Sample Location (i.e. Kitchen, POE)	E. COLI	TOTAL COLIFORMS	NITRATE/NITRITES				pH	Total Chlorine	Free Chlorine
Sample ID#	Date/Time Collected																	
YORK - HOP	07/10/2025 3:24PM	DW	N	N	1			✓	✓									9096002
YORK - HOP	07/10/2025 3:24PM	TW	N	N	1					✓								
<p>Sample Type Codes for Drinking Water: RW = Raw Water, TW = Treated Water as per distribution, IW = In-stream Water as per distribution, DW = Distribution, RP = Residential Plumbing, NR = Non-Residential Plumbing, S = Station, F = Filling, P = Private Well.</p> <p>Notice of subcontracting: Occasionally, situations arise in which Eurofins Environment Testing Canada (Ottawa) is unable to process a sample after receipt. By using this chain-of-custody form, the client agrees that Eurofins Environment Testing Canada (Ottawa) may subcontract testing to a laboratory that is accredited and, where applicable, holds a drinking water license. Agreements made in advance to subcontract to a specific laboratory will be honored.</p>																		
PRINT		SIGN		LOCATION		DATE/TIME		TEMP (°C)										
Sampled By:	Les Orr					07/10/2025 3:24PM												
Relinquished By:	Alejandro Ospina					08/10/2025 1:50PM												
Received By:																		
Received By:	Makeya Ruston	[Signature]		OTT		Oct 8, 2025 16:36		14°C										
Comments:																		

100392167



Printed On : 2025-10-08 17:46:27

DATUM Geodetic

REMARKS

BORINGS BY Backhoe

DATE 2022 February 8

FILE NO.  
**PG3834**

HOLE NO.  
**TP 1-22**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL		G	1			0	120.05					
0.15												
FILL: Brown silty sand with gravel		G	2									
0.40												
Brown SILTY SAND with gravel, cobbles and boulders, trace clay		G	3									
		G	4			1	119.05					
1.25												
Highly fractured BEDROCK interbedded with silty sand to sandy silt, some clay with fragmented bedrock		G	4									
1.83												
End of Test Pit												
TP terminated on fractured bedrock surface at 1.83 m depth												
(TP dry upon completion)												
	</											

[illegible]



## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Office Building  
2966 Carp Road - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Backhoe

DATE 2022 February 8

FILE NO.  
**PG3834**

HOLE NO.  
**TP 3-22**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL	0.10		G	1			0	119.19					
Brown <b>SILTY SAND</b> with gravel, cobbles and boulders			G	2									
			G	3									
			G	3									
			G	3									
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DATUM	Geodetic
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FILE NO. PG3834

REMARKS

HOLE NO. TP 4-22

**BORINGS BY** Backhoe

**DATE** 2022 February 8

[illegible]

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Office Building  
2966 Carp Road - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Backhoe

DATE 2022 February 8

FILE NO.  
**PG3834**

HOLE NO.  
**TP 5-22**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	117.88						
TOPSOIL													
0.15		G	1										
Brown <b>SILTY SAND</b> with gravel, cobbles and boulders		G	2										
0.65													
Highly fractured <b>BEDROCK</b> interbedded with silty sand to sandy silt, some clay with fragmented bedrock		G	3			1	116.88						
1.75													
End of Test Pit													
TP terminated on fractured bedrock surface at 1.75 m depth													
(TP dry upon completion)													

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Office Building  
2966 Carp Road - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Backhoe

DATE 2022 February 8

FILE NO.  
**PG3834**

HOLE NO.  
**TP 6-22**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	118.91						
BEDROCK	0.10	G	1										
FILL: Brown silty sand with brick fragments, concrete and gravel		G	2										
		G	3										
		G	4										
		G											
End of Test Pit	1.75												
TP terminated on fractured bedrock surface at 1.75 m depth (TP dry upon completion)													
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed    △ Remoulded					

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Office Building  
2966 Carp Road - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Backhoe

DATE 2022 February 8

FILE NO.  
**PG3834**

HOLE NO.  
**TP 7-22**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL		G	1			0	118.67					
0.15		G	2									
FILL: Brown silty sand with gravel some clay		G	3									
1.05		G	4			1	117.67					
Highly fractured BEDROCK interbedded with silty sand to sandy silt, some clay with fragmented bedrock												
1.50												
End of Test Pit												
TP terminated on fractured bedrock surface at 1.50 m depth												
(TP dry upon completion)												
								</				

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

**REMARKS**

**BORINGS BY** CME 55 Power Auger

**DATE** June 1, 2016

**FILE NO.**  
**PG3834**

**HOLE NO.**  
**BH 1**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.08					0	118.24					
Brown <b>SILTY SAND</b> with gravel, cobbles and boulders, trace clay and organics	0.76	SS	1	75	50+	1	117.24					
		SS	2	80	50+	2	116.24					
Highly fractured <b>BEDROCK</b> interbedded with silty sand to sandy silt, some clay with fragmented bedrock		SS	3	80	50+	3	115.24					
		SS	4	75	71	4	114.24					
		SS	5	75	50+							
		SS	6		50+							
End of Borehole	4.95											
Practical split spoon refusal at 4.95m depth												
(GWL @ 4.2m depth based on field observations)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed    △ Remoulded				

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

**REMARKS**

**BORINGS BY** CME 55 Power Auger

**DATE** June 1, 2016

**FILE NO.** PG3834

**HOLE NO.** BH 2

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.10					0	118.42					
Brown <b>SILTY SAND</b> with gravel, cobbles and boulders, trace clay and organics		SS	1	92	51	1	117.42					
	1.45	SS	2	25	50+	2	116.42					
Highly fractured <b>BEDROCK</b> interbedded with silty sand to sandy silt, some clay with fragmented bedrock		SS	3	50	50+	3	115.42					
						4	114.42					
	4.80	SS	4	67	50+							
End of Borehole												
Practical split spoon refusal at 4.80m depth												
(BH dry - June 6, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed    △ Remoulded				



## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

FILE NO. PG3834

HOLE NO. **BH 3**

**DATE** June 1, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.15					0	118.29					
Brown <b>SILTY SAND</b> with gravel, cobbles and boulders, trace clay and organics	0.91											
Highly fractured <b>BEDROCK</b> interbedded with silty sand to sandy silt, some clay with fragmented bedrock	1.12	SS	1		50+	1	117.29					
End of Borehole												
Practical refusal to augering at 1.12m depth												
(BH dry upon completion)												

20 40 60 80 100

**Shear Strength (kPa)**

▲ Undisturbed    △ Remoulded

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

**REMARKS**

**FILE NO.**  
**PG3834**

**HOLE NO.**  
**BH 3A**

**BORINGS BY** CME 55 Power Auger

**DATE** June 1, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.15					0	118.29					
Brown <b>SILTY SAND</b> with gravel, cobbles and boulders, trace clay and organics						1	117.29					
	1.80	SS	1	58	54	2	116.29					
Highly fractured <b>BEDROCK</b> interbedded with silty sand to sandy silt, some clay with fragmented bedrock						3	115.29					
		SS	2	75	50+	4	114.29					
End of Borehole	4.65	SS	3	67	50+							
Practical split spoon refusal at 4.65m depth												
(GWL @ 4.3m depth based on field observations)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed    △ Remoulded				

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

FILE NO. PG3834

REMARKS

HOLE NO. **BH 4**

**BORINGS BY** CME 55 Power Auger

**DATE** June 1, 2016

[illegible]

## SOIL PROFILE AND TEST DATA

HOLE NO. **BH 5**

[illegible]

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

**REMARKS**

**BORINGS BY** CME 55 Power Auger

**DATE** June 1, 2016

**FILE NO.**  
**PG3834**

**HOLE NO.**  
**BH 6**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.10					0	117.71					
Brown <b>SILTY SAND</b> with gravel, cobbles and boulders, trace clay and organics	0.91											
		SS	1	83	55	1	116.71					
		SS	2	92	88	2	115.71					
Highly fractured <b>BEDROCK</b> interbedded with silty sand to sandy silt, some clay with fragmented bedrock		SS	3	58	77							
		SS	4	78	50+	3	114.71					
						4	113.71					
	4.70	SS	5	100	50+							
End of Borehole												
Practical split spoon refusal at 4.70m depth												
(GWL @ 3.93m-June 6, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed    △ Remoulded				

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

<b>DATUM</b>	TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.
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FILE NO. PG3834

REMARKS

HOLE NO. **BH 7**

**BORINGS BY CME 55 Power Auger**

**DATE** June 1, 2016

[illegible]

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

FILE NO. PG3834

HOLE NO. **BH 8**

**DATE** June 2, 2016

[illegible]



## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

FILE NO. PG3834

HOLE NO. **BH 9**

**DATE** June 2, 2016

[illegible]

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

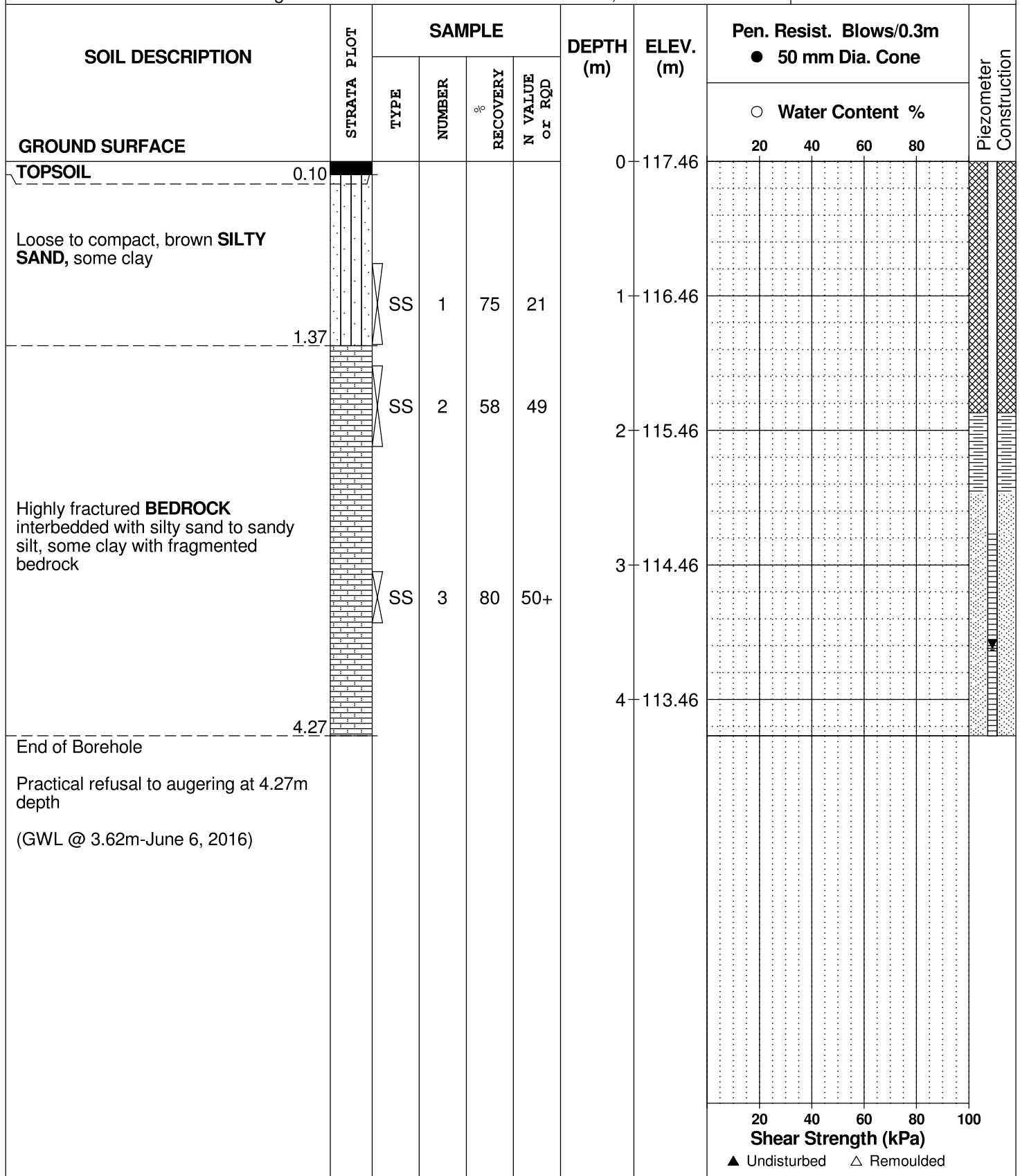
**REMARKS**

**BORINGS BY** CME 55 Power Auger

**DATE** June 2, 2016

**FILE NO.** PG3834

**HOLE NO.** BH10



## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

FILE NO. PG3834

HOLE NO. BH11

**DATE** June 2, 2016

[illegible]

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

**REMARKS**

**BORINGS BY** Backhoe

**DATE** November 3, 2016

**FILE NO.**  
**PG3834**

**HOLE NO.**  
**TP 1**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	117.72						
TOPSOIL	0.20	G	1										
Brown SILTY SAND to SANDY SILT, some tree roots		G	2			1	116.72						
Highly fractured BEDROCK with sandy silt, gravel, cobbles and boulders, some clay	1.20 1.30												
End of Test Pit													
TP terminated on fractured bedrock surface at 1.30m depth  (TP dry upon completion)													

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

FILE NO. PG3834

HOLE NO. **TP 2**

**DATE** November 3, 2016

[illegible]

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

FILE NO. PG3834

REMARKS

HOLE NO. **TP 3**

**BORINGS BY** Backhoe

**DATE** November 3, 2016

[illegible]



## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

**REMARKS**

**BORINGS BY** Backhoe

**DATE** November 3, 2016

**FILE NO.**  
**PG3834**

**HOLE NO.**  
**TP 5**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	118.06						
TOPSOIL	0.20												
Brown SANDY SILT with clay to SILTY SAND	0.50	G	1										
Highly fractured BEDROCK with sandy silt, gravel, cobbles and boulders, some clay	1.30					1	117.06						
End of Test Pit													
TP terminated on fractured bedrock surface at 1.30m depth  (TP dry upon completion)													



## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

FILE NO. PG3834

REMARKS

HOLE NO. TP 6

**BORINGS BY** Backhoe

**DATE** November 3, 2016

[illegible]

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

FILE NO. PG3834

REMARKS

HOLE NO. **TP 7**

**BORINGS BY** Backhoe

**DATE** November 3, 2016

[illegible]

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

FILE NO. PG3834

REMARKS

HOLE NO. **TP 8**

**BORINGS BY** Backhoe

**DATE** November 3, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	118.54					
Crushed stone	0.05											
TOPSOIL	0.20											
Brown <b>SILTY SAND</b> , trace gravel	0.80											
Highly fractured <b>BEDROCK</b> with brown silty sand, gravel and cobbles, trace boulders	1.50	G	1			1	117.54					
End of Test Pit												
TP terminated on fractured bedrock surface at 1.50m depth (TP dry upon completion)												

20406080100

Shear Strength (kPa)

▲ Undisturbed    △ Remoulded

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

REMARKS

## BORINGS BY Backhoe

**DATE** November 3, 2016

FILE NO. PG3834

HOLE NO. **TP 9**

[illegible]

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

FILE NO. **PG3834**

HOLE NO. **TP10**

**DATE** November 3, 2016

[illegible]

## SOIL PROFILE AND TEST DATA

HOLE NO. **TP11**

[illegible]

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

**REMARKS**

**BORINGS BY** Backhoe

**DATE** November 8, 2016

**FILE NO.**  
**PG3834**

**HOLE NO.**  
**TP12**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	117.46						
TOPSOIL													
0.25													
Brown <b>SILTY SAND</b> , trace cobbles, boulders and clay  - intermittent thin layers of silty clay from 1.25m depth	G	1				1	116.46						
1.50													
Highly fractured <b>BEDROCK</b> interbedded with sandy silt, some clay with fragmented bedrock throughout						2	115.46						
2.65													
End of Test Pit  TP terminated on fractured bedrock surface at 2.65m depth  (TP dry upon completion)													
								20	40	60	80	100	
								<b>Shear Strength (kPa)</b>					
								▲ Undisturbed    △ Remoulded					

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario

**DATUM** TBM - Top of magnetic nail in utility pole on Carp Road. Geodetic elevation = 119.73m.

**REMARKS**

**BORINGS BY** Backhoe

**DATE** November 8, 2016

**FILE NO.**  
**PG3834**

**HOLE NO.**  
**TP13**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	117.43						
TOPSOIL													
0.25													
Brown <b>SILTY SAND</b> , some clay and tree roots, trace gravel, cobbles and boulders													
1.00		G	1			1	116.43						
Highly fractured <b>BEDROCK</b> interbedded with sandy silt, some clay with fragmented bedrock throughout													
1.80													
End of Borehole													
TP terminated on fractured bedrock surface at 1.80m depth  (TP dry upon completion)													
								</					



## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation  
Proposed Storage Building - 2978 & 2966 Carp Road  
Ottawa, Ontario**

FILE NO. PG3834

HOLE NO. TP14

**DATE** November 8, 2016

[illegible]

# SYMBOLS AND TERMS

## SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

## **SYMBOLS AND TERMS (continued)**

### **SOIL DESCRIPTION (continued)**

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

### **ROCK DESCRIPTION**

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

<b>RQD %</b>	<b>ROCK QUALITY</b>
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

### **SAMPLE TYPES**

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

## SYMBOLS AND TERMS (continued)

### GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D_{30})^2 / (D_{10} \times D_{60})$
Cu	-	Uniformity coefficient = $D_{60} / D_{10}$

Cc and Cu are used to assess the grading of sands and gravels:

Well-graded gravels have:  $1 < Cc < 3$  and  $Cu > 4$

Well-graded sands have:  $1 < Cc < 3$  and  $Cu > 6$

Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.

Cc and Cu are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

### CONSOLIDATION TEST

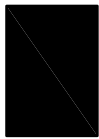
$p'_o$	-	Present effective overburden pressure at sample depth
$p'_c$	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below $p'_c$ )
Cc	-	Compression index (in effect at pressures above $p'_c$ )
OC Ratio		Overconsolidation ratio = $p'_c / p'_o$
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

### PERMEABILITY TEST

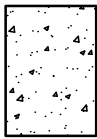
k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.
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## SYMBOLS AND TERMS (continued)

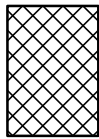
### STRATA PLOT



Topsoil



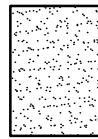
Asphalt



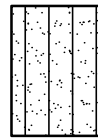
Fill



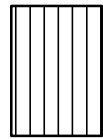
Peat



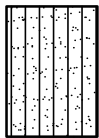
Sand



Silty Sand



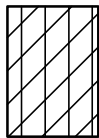
Silt



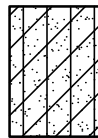
Sandy Silt



Clay



Silty Clay



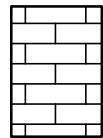
Clayey Silty Sand



Glacial Till



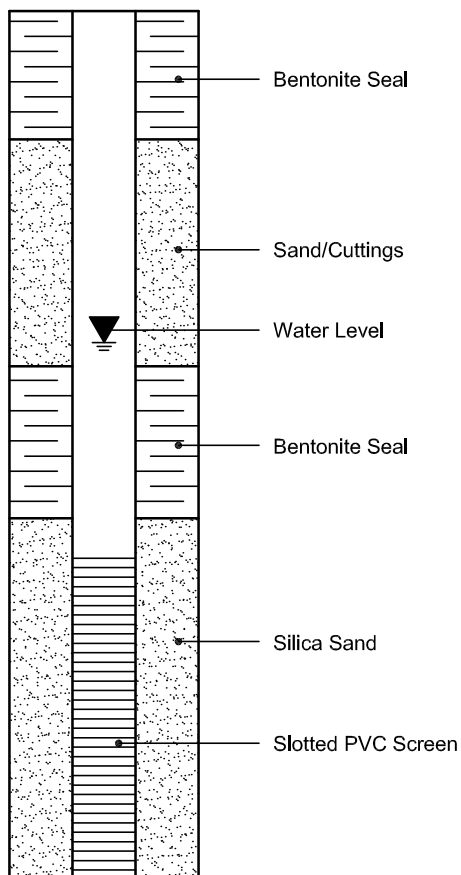
Shale



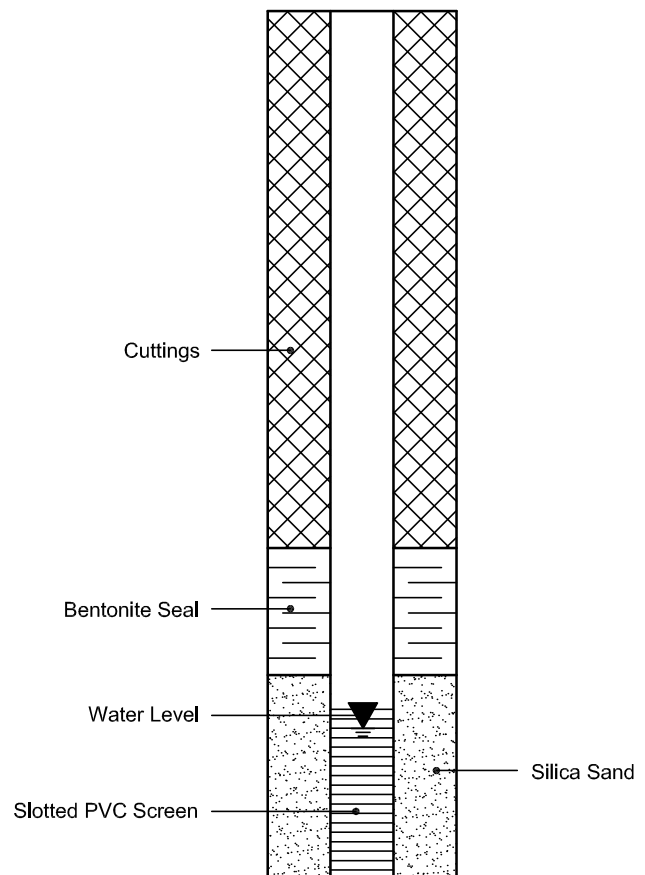
Bedrock

### MONITORING WELL AND PIEZOMETER CONSTRUCTION

#### MONITORING WELL CONSTRUCTION

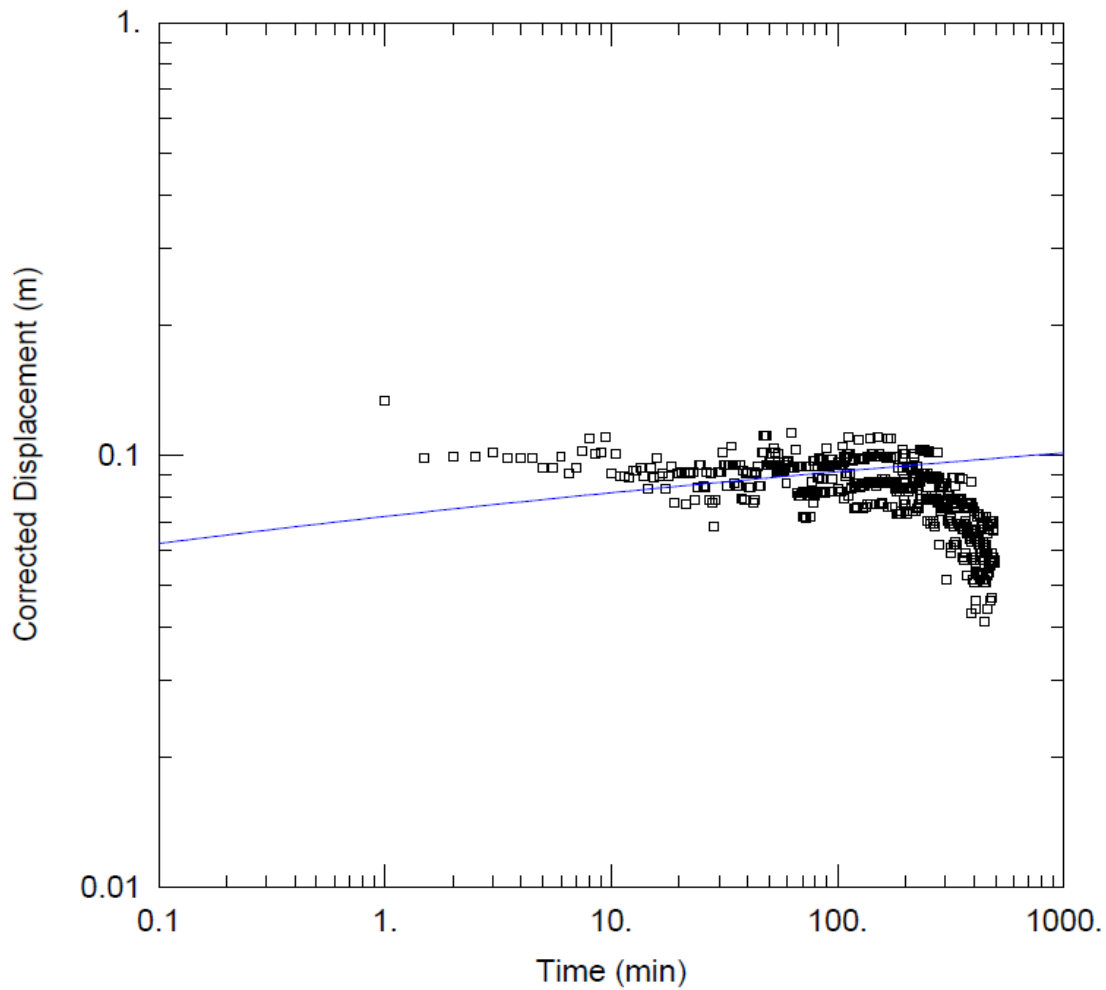


#### PIEZOMETER CONSTRUCTION



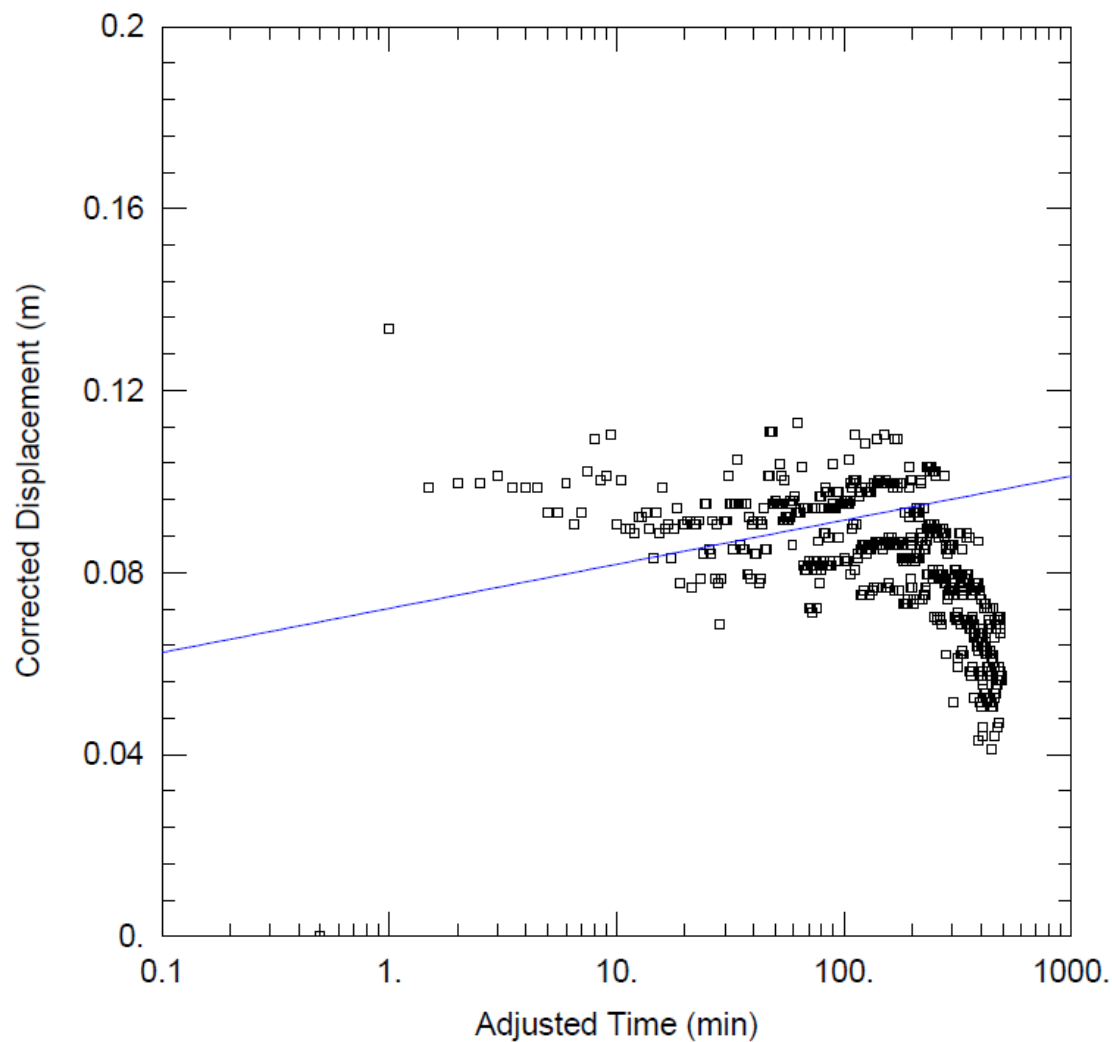
**Pumping Test Analysis Report**

File No.	PH4484	Well ID:	TW1
Date:	April 13, 2022	Solution Method:	<b>Theis</b>
Client:	Nautical Lands Group	Transmissivity (m <sup>2</sup> /day):	1224.1
Site Address:	2966 Carp Road, Ottawa	Discharge Rate (L/min)	45
Project:	Site Plan Application	Analysis performed by:	EA



**Pumping Test Analysis Report**

File No.	PH4484	Well ID:	TW1
Date:	April 13, 2022	Solution Method:	<b>Cooper-Jacob</b>
Client:	Nautical Lands Group	Transmissivity (m2/day):	1224.1
Site Address:	2966 Carp Road, Ottawa	Discharge Rate (L/min)	45
Project:	Site Plan Application	Analysis performed by:	EA



**Pumping Test Analysis Report**

File No. PH4484  
Date: April 13, 2022  
Client: Nautical Lands Group  
Site Address: 2966 Carp Road, Ottawa  
Project: Site Plan Application

Summary Table:		
Solution Method:	Well ID:	Transmissivity (m <sup>2</sup> /day):
Theis	TW1	1224.1
Cooper-Jacob	TW1	1224.1
Average:		<b>1224.10</b>

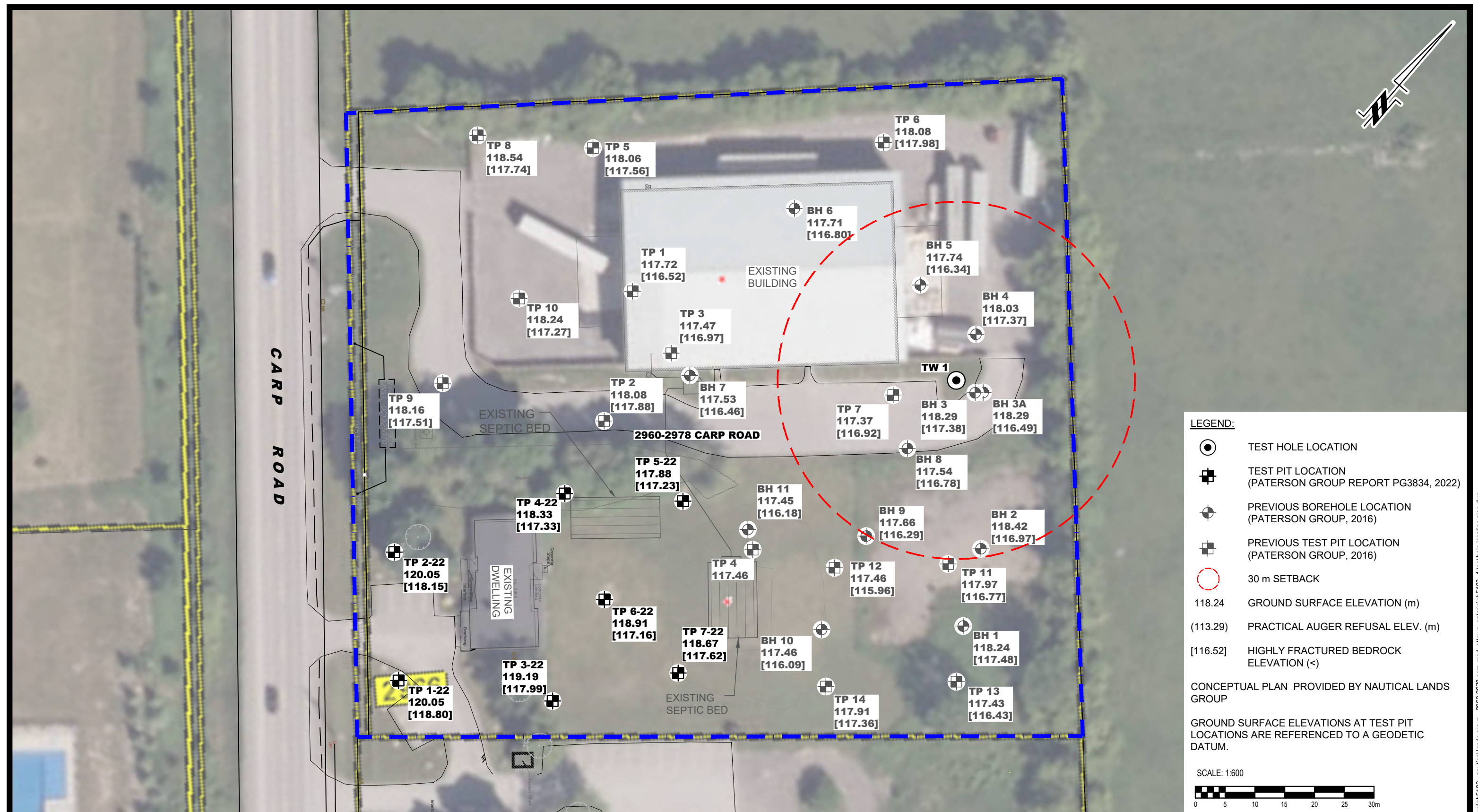


TW1 inputs		
pH	7.93	A
TDS	767	B
Hardness	451	C
Alkalinity	243	D
Temp.	10.8	
		pHs = 7.215174149

Langelier Saturation Index (LSI) Calculation		(Langelier, 1936)
$LSI = pH - pHs$ $pHs = (9.3 + A + B) - (C + D)$ <p>Where:</p> $A = (\text{Log}_{10} [\text{TDS}] - 1) / 10$ $B = -13.12 \times \text{Log}_{10} (\text{oC} + 273) + 34.55$ $C = \text{Log}_{10} [\text{Ca}^{2+} \text{ as CaCO}_3] - 0.4$ $D = \text{Log}_{10} [\text{alkalinity as CaCO}_3]$		
		LSI = 0.7
LSI	Effect	
0.5 to 2	Water is super saturated and tends to precipitate a scale layer of calcium carbonate (scale forming but non-corrosive)	
0 to 0.5	Water is super saturated and tends to precipitate a scale layer of calcium carbonate (slightly scale forming and corrosive).	
0	Water is saturated (in equilibrium) with calcium carbonate. A scale layer of calcium carbonate is neither precipitated nor dissolved.	
0 to -0.5	Water is under saturated and tends to dissolve solid calcium carbonate (slightly corrosivebut non-scale forming).	
-0.5 to -2	Water is under saturated and tends to dissolve solid calcium carbonate (seriously corrosive).	

PREDICTIVE NITRATE IMPACT ASSESSEMENT		
<b>Infiltration Factors</b>		
Topography	0.25	
Soil	0.30	
Cover	0.12	
<b>Total</b>	<b>0.67</b>	
<b>Site Characteristics</b>		
Area of Site :	12832	m <sup>2</sup>
Total of roof areas:	1713	m <sup>2</sup>
Total area of paved driveway areas:	4051	m <sup>2</sup>
Roof + paved driveway areas	5764	m <sup>2</sup>
Impervious Area	5764	m <sup>2</sup>
Percent Impervious Area =	45	%
Infiltration Area =	7068	m <sup>2</sup>
<b>Septic Effluent</b>		
Concentration of Effluent (Cs) =	17.2	mg/L
<b>Infiltration Calculation</b>		
Nitrate concentration in precipitation (C <sub>i</sub> ) =	0	mg/L
Surplus Water (Environment Canada)	378	mm/yr
Factored Water Surplus =	253	mm/yr
Infiltration % due to stormwater management measures	-	%
Infiltration rate from stormwater management measures =	0	mm/yr
Infiltration Flow Entering the System (Q <sub>i</sub> ) =	5	m <sup>3</sup> /day
<b>Mass Balance Model (MOEE, 1995)</b>		
$C_T = (Q_b C_b + Q_e C_e + Q_i C_i) / (Q_b + Q_e + Q_i) = \text{Cumulative Nitrate Concentration}$		
Q <sub>b</sub> = flow entering the system across the upgradient area	0	m <sup>3</sup> /day
C <sub>b</sub> = background nitrate concentration	0.25	mg/L
C <sub>s</sub> = concentration of nitrates in the septic effluent	17.2	mg/L
Q <sub>i</sub> = flow entering the system from infiltration	5	m <sup>3</sup> /day
C <sub>i</sub> = Concentration of nitrates in the infiltrate	0	mg/L
<b>C<sub>T</sub> =</b>	<b>9.75</b>	<b>mg/L</b>
<b>Maximum Allowable Sewage Flow Volume</b>		
Daily Sewage Flow (Q <sub>s</sub> )=	<b>6.418279445</b>	<b>m<sup>3</sup></b>
<i>Notes: Site characteristic values were measured as approximate values from the available site plans and GeoOttawa.</i>		

PREDICTIVE NITRATE IMPACT ASSESSEMENT		
<b>Infiltration Factors</b>		
Topography	0.25	
Soil	0.30	
Cover	0.12	
<b>Total</b>	<b>0.67</b>	
<b>Site Characteristics</b>		
Area of Site :	12832	m <sup>2</sup>
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Roof + paved driveway areas	5764	m <sup>2</sup>
Impervious Area	5764	m <sup>2</sup>
Percent Impervious Area =	45	%
Infiltration Area =	7068	m <sup>2</sup>
<b>Septic Effluent</b>		
Concentration of Effluent (Cs) =	40	mg/L
<b>Infiltration Calculation</b>		
Nitrate concentration in precipitation (C <sub>i</sub> ) =	0	mg/L
Surplus Water (Environment Canada)	378	mm/yr
Factored Water Surplus =	253	mm/yr
Infiltration % due to stormwater management measures	-	%
Infiltration rate from stormwater management measures =	0	mm/yr
Infiltration Flow Entering the System (Q <sub>i</sub> ) =	5	m <sup>3</sup> /day
<b>Mass Balance Model (MOEE, 1995)</b>		
$C_T = (Q_b C_b + Q_e C_e + Q_i C_i) / (Q_b + Q_e + Q_i) = \text{Cumulative Nitrate Concentration}$		
Q <sub>b</sub> = flow entering the system across the upgradient area	0	m <sup>3</sup> /day
C <sub>b</sub> = background nitrate concentration	0.25	mg/L
C <sub>s</sub> = concentration of nitrates in the septic effluent	40	mg/L
Q <sub>i</sub> = flow entering the system from infiltration	5	m <sup>3</sup> /day
C <sub>i</sub> = Concentration of nitrates in the infiltrate	0	mg/L
<b>C<sub>T</sub> =</b>	<b>9.75</b>	<b>mg/L</b>
<b>Maximum Allowable Sewage Flow Volume</b>		
Daily Sewage Flow (Q <sub>s</sub> )=	<b>1.580700227</b>	<b>m<sup>3</sup></b>
<i>Notes: Site characteristic values were measured as approximate values from the available site plans and GeoOttawa.</i>		



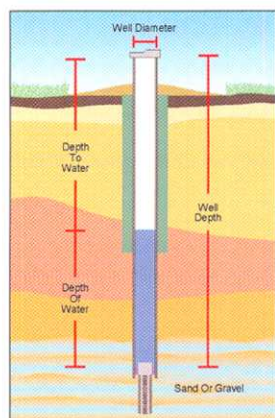
NO.	REVISIONS	DATE	INITIAL

<p>NAUTICAL LANDS GROUP</p> <p>PROPOSED RE-ZONING APPLICATION</p> <p>2960-2978 CARP ROAD</p>	
<p>OTTAWA,</p> <p>Title:</p>	<p>ONTARIO</p>
<p><b>TEST HOLE LOCATION PLAN</b></p>	

Scale:	1:600	Date:	08/2025
Drawn by:	GK	Report No.:	PH5103-1
Checked by:	AS	Dwg. No.:	PH5103-1
Approved by:	MK	Revision No.:	



# Disinfection Instruction Sheet



If your drinking water continues to test positive on repeated submissions, consult your local health unit, which can help you interpret the results of your tests and provide you with advice on what measures you can take to safeguard your drinking water.

The first step in identifying the reason for repeated adverse water quality is to conduct a visual inspection of your well. Start with a close look at your well. The area around it should be

clear of any potential contaminant sources, such as pets, lawn care products, and gardens. Once you're satisfied that the area around your well is okay, take a good, close look at the well itself. If you have an older well, make sure that the cap and the sealant around the well casing isn't cracked or damaged. If it is, you need to fix or replace it right away.

If the source of the problem can't be detected, consult a licensed well contractor right away to identify the source of the problem and eliminate it. You can save yourself a lot of money by doing this instead of rushing out to buy a home treatment device that may be expensive to install, operate, and maintain. And it may not eliminate the source of your trouble.

(If you have a cistern, please talk to your public health unit about disinfection requirements.)

1. Measure the diameter of the well.
2. Measure the well depth and the static or resting water level, then calculate the depth of water in the well.
3. Using the table on this sheet, measure out the amount of bleach needed. (The table gives the volume of bleach needed for different well sizes.) Then, pour the mixture into your well.
4. If possible, mix the water in the well. This can be accomplished by attaching a hose to a tap, running water from the well, through the hose and back into the well.
5. After adding chlorine to the well, remove or bypass any carbon filters that are in the system for water treatment. If you don't, these filters will remove the chlorine from the water, and any pipes beyond the filter will not get disinfected. Replace with new filters after chlorination to avoid reintroducing bacteria into the system.
6. Run water at every faucet in the house (and barn, if you have one) until a strong chlorine odour is detected. Be aware that your nose may lose its ability to detect chlorine.
7. If there is no chlorine smell or it is very weak, add more bleach to the well and repeat Step 6 above.
8. Drain the water heater and fill with chlorinated water.
9. Backflush the water softener and all water filters (except carbon filters).

Volume of Bleach to Add for Every 3 Metres (10 Feet) of Water in the Well*		
Casing Diameter		Volume of Unscented Bleach (5.25% solution)
Millimetres	Inches	Millilitres
50	2	6
100	4	30
150	6	60
200	8	100
250	10	200
300	12	250
400	16	400
500	20	650
600	24	900
900	36	2000 (2 litres)
1200	48	3600 (3.6 litres)

**For example:** If you have 6 metres (20 feet) of water in your well and it has a casing diameter of 100 mm or 4 inches, you would add 60 mm or 2 fluid ounces of bleach.

\* For questions or more information on how to disinfect your well, contact your local health unit.

## For more information

### Ontario Government Ministry Abbreviations

Ministry of Health and Long-Term Care  
MOHLTC (also MOH)

Ministry of the Environment  
MOE (also MOEE)

Ontario Ministry of Agriculture and Food  
OMAF (also OMAFRA)

### Ontario Government Information Lines

MOE Public Information Centre: 1-800-565-4923

MOE Water Well Records: 1-888-396-9355

MOHLTC INFOline: 1-800-268-1154

OMAF Agricultural Information Contact Centre: 1-877-424-1300

### Ontario Government Web Sites

MOE: [www.ene.gov.on.ca](http://www.ene.gov.on.ca)

MOHLTC: [www.health.gov.on.ca](http://www.health.gov.on.ca)

OMAF: [www.gov.on.ca/omaf](http://www.gov.on.ca/omaf)

### Publications available on-line

Health Canada: [www.hc-sc.gc.ca](http://www.hc-sc.gc.ca)

- *A Guide to Well Water Treatment and Maintenance*;
- *Water treatment devices for disinfection of drinking water*.

MOHLTC: [www.health.gov.on.ca](http://www.health.gov.on.ca)

- *How to use water safely during a "Boil Water Advisory"*;
- *E. coli Bacteria*;
- List of Public Health Units in Ontario.

OMAF: [www.gov.on.ca/omaf](http://www.gov.on.ca/omaf)

- *Assessing the Potential for Ground Water Contamination on Your Farm*, Publication 97-017;
- *Best Management Practices: Water Wells*, OMAFRA and Agriculture and Agri-Food Canada, 2003 (to order).

MOE: [www.ene.gov.on.ca](http://www.ene.gov.on.ca)

- *Important Facts About Water Well Construction*, Publication 3788;
- *Water Wells and Groundwater Supplies: The Protection of Water Quality in Bored and Dug Wells*, Information Sheet PIB 601b;
- *Water Wells and Groundwater Supplies: The Protection of Water Quality in Drilled Wells*, Information Sheet PIB 602b.