



PATERSON GROUP

October 1, 2024

PH4864-LET.01.REV.01

27783179 Ontario Inc.
6356 Fourth Line Road
North Gower, Ontario
K0A 2T0

Attention: Victoria La Valle

Subject: **Hydrogeological Assessment and Terrain Analysis
Re-zoning Application
6356 Fourth Line Road
Ottawa (North Gower), Ontario**

Consulting Engineers

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Geotechnical Engineering
Environmental Engineering
Hydrogeology
Materials Testing
Building Science
Rural Development Design
Retaining Wall Design
Noise and Vibration Studies

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INTRODUCTION

Paterson Group Inc. (Paterson) was retained by 27783179 Ontario Inc. to conduct a Hydrogeological Assessment and Terrain Analysis in support of a Re-zoning Application for the proposed Equestrian Establishment located at 6356 Fourth Line Road in Ottawa (North Gower), Ontario. It is our understanding that the current property, identified as 6356 Fourth Line Road, Ottawa (North Gower), consists of a 1.28 hectares (ha) parcel with an existing dwelling in the eastern portion of the site. The proposed Re-zoning application aims to modify acceptable uses of the 1.28 ha parcel that is designated as Agricultural (AG). Please refer to the Key Plan attached for more details.

The purpose of this work has been to determine the suitability of the water supply aquifer underlying the site and to carry out a septic 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 residential dwelling with associated landscaped areas and driveways, as well as a concrete block barn located at 6356 Fourth Line Road in the City of Ottawa (North Gower), Ontario. The existing dwelling is anticipated to be relocated off-site. The site is currently serviced by a private water supply and private septic system. The site is bordered by residential buildings to the north and south, by agricultural lands to the west and by Fourth Line Road to the east.

The subject site is largely rectangular in shape with a total area of 1.28 ha. The site is currently zoned as AG (agricultural). The intention of the aforementioned Re-zoning application is to amend the zoning of the subject site to allow for the zoning to include Equestrian Establishment as an allowable usage.

Regional Geology

Published surficial geology mapping (OGS MRD128) for the area in the vicinity of the subject site indicates that the majority of the site is underlain predominantly by fine-textured glaciomarine deposits largely consisting of silt and clay.

Published bedrock geology mapping (OGS MRD219) indicates that the subject lands are underlain by dolostone with minor shale and sandstone of the Beekmantown Group and Oxford 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.

Technically Representative Well

As a Water Well Record (WWR) was not available for the existing well located at 6356 Fourth Line Road. An existing well, located at 6340 Fourth Line Road, will be used as a technically representative well for the subject site. The technically representative well, hereby referred to as TW1, has a WWR with ID No. 1530684, is approximately 65 m from the property boundary of the subject site. Bedrock and aquifer mapping are consistent across the area.

TW1 has a well No of 1530684 with a 158.75 mm diameter steel casing. The well has a 0.42 m stick-up above ground surface with a total casing length of 14.75 m. The total well depth extends to 24.7 m below ground surface (bgs). The well is located such that water will drain away from the wellhead and was determined, by visual inspection, to be in good condition with an intact cap and no visual damage. The Water Well Record (WWR) can be found attached to this report. Available water well records (WWR) of the neighboring properties on the MECP Well Record mapping website indicated that the



wells were screened in limestone. Surrounding WWR's are attached to this report. TW1 meets the requirements as set by O.Reg.903 and is compliant.

MISSISSIPPI-RIDEAU SOURCE PROTECTION PLAN

The Mississippi-Rideau Source Protection Plan (MRSPP) 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 and surrounding areas have not been designated as a Highly Vulnerable Aquifer (HVA), an Intake Protection Zone (IPZ) or a Significant Groundwater Recharge Area (SGRA).

Therefore, there are no related requirements for an HVA, an IPZ with a score of less than 8 or SGRA at this location.

Hydrogeological Pre-Consultation

A City of Ottawa pre-consultation was completed on April 17, 2024 to discuss the requirements for the hydrogeological assessment and terrain analysis of the subject site.

FIELDWORK PROGRAM

Well Inspection

A visual inspection of TW1 was performed by Paterson personnel which confirmed that the well casing and cap are in good condition. The grading around the well was sufficiently graded to direct surface water away from the wellhead (as required by O.Reg 903) at the time of the new sewage system installation. The stickup was measured to be 0.42 m above ground surface. Based on a visual inspection by Paterson personnel, the well was deemed to be in good condition.

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) on the adjacent site was tested. TW1 has a Water Well Record (WWR) Well ID of 1530684. TW1 has a 158.75 mm diameter steel casing that extends to 14.33 m bgs with a 0.42 m stick up. The well itself extends to a depth of 24.7 m bgs. Based on available geological mapping, the drift thickness at TW1 varies from 5 to 10 m.

As a means to evaluate the water supply aquifer intercepted by the well, the well was subjected to a 6-hour constant rate pumping test. The pumping test was conducted on June 11, 2024 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 6-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 38 L/min (10 US gpm) for a duration of 6 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 selected rate of 38 L/min provides approximately 6.8 times the maximum total daily design volume of 2,000 L/day for the septic system during the 6-hour pumping test. The maximum total daily design sanitary sewage flows (TDDSSF) were calculated based on the maximum volume that can be attenuated by the subject site (see Predictive Nitrate Impact Assessment Calculation, attached). The rate was determined to be generally representative of a flow rate which would be in excess of what the proposed development would require.

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 90% recovery approximately 40 minutes after the completion of pumping and 95% recovery after the homeowner's pump was replaced, within 60 minutes of the completion of pumping.

Groundwater samples were collected at 3 hours and 6 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.

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 6-hour pumping test. The parameters tested at the well head included: pH, total dissolved solids, conductivity, turbidity, true 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.





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.

AQUIFER PARAMETER	RESULT OF ANALYSIS
Transmissivity (m ² /day)	78.83
Pumping Rate (L/min)	38
Pre-test Static Water Level (m BTOC)	1.32
Post-test Static Water Level (m BTOC)	1.91
Available Drawdown (m)	23.8
% Drawdown During Pumping Test (%)	2.5
Specific Capacity (L/min/m drawdown)	64.4

The drawdown data was analyzed using the Theis and Cooper Jacob methods of analysis. Aquifer transmissivity is estimated to be 78.83 m²/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 6 hours was approximately 0.59 m at approximately 6 hours into the pumping test (2.5% of the available drawdown). 95% recovery was achieved approximately 60 minutes after the end of pumping.

The total volume of water pumped during the 6-hour pumping event was approximately 13,680 L. This is approximately 6.84 times the maximum total daily design volume of water (2,000 L/d) required to support the Re-zoning Application.

The suitability of the aquifer to supply 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 usage.

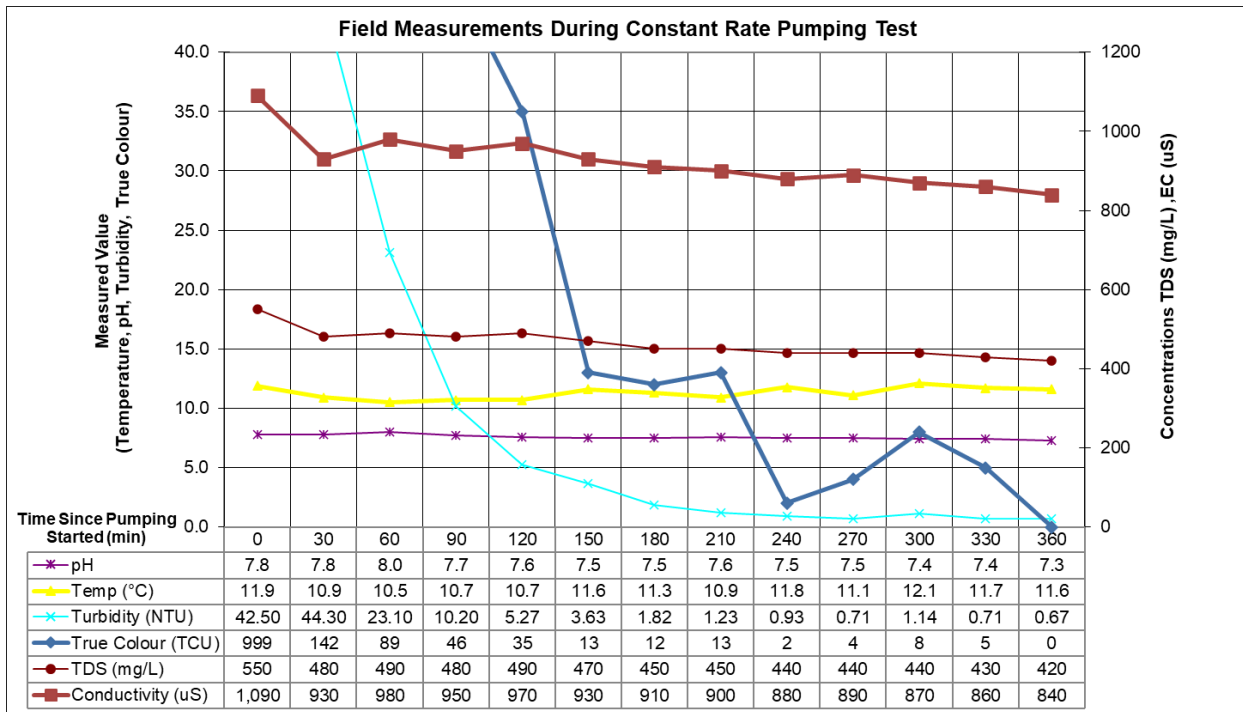
Given the analyses presented and summarized above, it is our opinion that there is an adequate supply of water to support the proposed Application



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 discharge water prior to the collection of the water samples.





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 and 2b 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	TW1 GW1 (3 hr)	TW1 GW2 (6 hr)
				5/30/2024	5/30/2024
MICROBIOLOGICAL					
Escherichia Coli (E.Coli)	ct/100mL	0	MAC	0	0
Total Coliforms	ct/100mL	0	MAC	0	0
GENERAL CHEMICAL - HEALTH RELATED					
Fluoride (F)	mg/L	1.5	MAC	0.10	0.10
Ammonia (N-NH ₃)	mg/L	-	-	<0.02	<0.02
Nitrite (N-NO ₂)	mg/L	1	MAC	<0.1	<0.1
Nitrate (N-NO ₃)	mg/L	10	MAC	1.28	1.61
Total Kjeldahl Nitrogen	mg/L	-	-	0.455	0.413
Turbidity (Field)	NTU	1.0 (5.0)	MAC/AO	1.81	0.67
Turbidity (Laboratory)	NTU	1.0 (5.0)	MAC/AO	1.4	0.6
GENERAL CHEMICAL - AESTHETIC RELATED					
Alkalinity (as CaCO ₃)	mg/L	30-500	OG	349	336
Chloride (Cl)	mg/L	250	AO	36	37
Colour (Apparent)	TCU	5	AO	8	4
Colour (Field - True)	TCU	5	AO	12	0
Conductivity	uS/cm	-	-	884	837
Dissolved Organic Carbon	mg/L	5	AO	3.3	2.8
Hardness (as CaCO ₃)	mg/L	100	OG	422	413
Ion Balance	unitless	-	-	1.08	1.06
pH	unitless	6.5-8.5	AO	8.04	8.06
Phenols	mg/L	-	-	<0.001	<0.001
Sulphate (SO ₄)	mg/L	500	AO	75	79
Sulphide (S ₂ ⁻)	mg/L	0.05	AO	<0.01	<0.01
Tannin & Lignin	mg/L	-	-	0.20	0.10
Total Dissolved Solids	mg/L	500	AO	575	544

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

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

PARAMETER	UNITS	ODWS		TW1	
		LIMIT	TYPE	TW1 GW1 (3 hr)	TW1 GW2 (6 hr)
				5/30/2024	5/30/2024
METALS					
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	0.06	0.05
Beryllium (Be)	mg/L	-	-	<0.0005	<0.0005
Boron (B)	mg/L	5.0	IMAC	0.02	0.02
Cadmium (Cd)	mg/L	0.005	MAC	<0.0001	<0.0001
Calcium (Ca)	mg/L	-	-	88	87
Chromium (Cr)	mg/L	0.05	MAC	<0.001	<0.001
Cobalt (Co)	mg/L	-	-	0.0010	0.0009
Copper (Cu)	mg/L	1.0	AO	0.004	0.003
Iron (Fe)	mg/L	0.3	AO	0.05	<0.03
Lead (Pb)	mg/L	0.01	MAC	<0.001	<0.001
Magnesium (Mg)	mg/L	-	-	49	47
Manganese (Mn)	mg/L	0.05	AO	0.05	0.05
Mercury (Hg)	mg/L	0.001	MAC	<0.0001	<0.0001
Molybdenum (Mo)	mg/L	-	-	<0.005	<0.005
Nickel (Ni)	mg/L	-	-	<0.005	<0.005
Potassium (K)	mg/L	-	-	52	47
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	16	15
Strontium (Sr)	mg/L	-	-	0.216	0.206
Thallium (Tl)	mg/L	-	-	<0.0001	<0.0001
Uranium (U)	mg/L	0.02	MAC	0.012	0.01
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

The bacteriological test results (Certificate of Analysis – Report No. 3952152) indicated that the test samples at the 3 and 6 hour interval were non-detect (0 ct/100 mL) for E.Coli and Total Coliforms.



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 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 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 422 and 415 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 575 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 recommended that a point of use reverse osmosis unit be installed, if the owner desires, for drinking purposes. As such, no taste problems will occur when the system is used, or, if the treatment system is not used, it is anticipated that the owner does not find the taste objectionable.



The Langelier calculation provided an LSI of 0.3. Based on the evaluation of the result, the water is super saturated and tends to precipitate a scale layer of calcium carbonate (slightly 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.





TERRAIN ANALYSIS

The fieldwork which was completed as part of a Geotechnical Investigation for the site (PG7022, dated April 17, 2024) is used in support of this assessment. Additional information pertaining to this investigation was gathered from available geological mapping and surrounding WWR's.

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 March 1, 2024, five (5) test pits were completed on the property. The location of the test pits are delineated on the drawing PG7022-1-Test Hole Location Plan, attached.

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 test pits were advanced to a maximum depth of 3.4 m below ground surface (bgs). Refusal to excavation was not recorded in any test pit. The subsurface profile generally consisted of silty clay with trace sand to the depth of the test pit. Topsoil was recorded to extend to a maximum depth of 0.3 m bgs.

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.

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

Hydrogeological Sensitivity of the Site

The subject site currently consists of a residential dwelling and a barn. It is anticipated that the dwelling will be relocated off-site. The topography of the site is generally level. The local flow direction of the shallow aquifer is expected to be towards local Drains to the north or south. The regional groundwater flow is considered to be in an east / southeast direction towards Stevens Creek and the Rideau River.

The onsite overburden generally consists of silty clay with trace sand. Refusal to excavation was not recorded in any test pit to a depth of 3.4 m bgs. The bedrock depths surrounding the proposed site vary from 3.7 to 4.5 m bgs based on surrounding Water Well Records (WWR). According to the field investigation, the overburden thickness was observed to be greater than 2 m at all borehole locations. As the proposed site does not



have bedrock within 2 m of the ground surface, the site is not considered hydrogeologically sensitive.

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 analysed 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 and without the use of tertiary treatment systems (nitrate reducing systems). 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 %	4 %
<input type="checkbox"/>	Concentration of nitrate in effluent <i>(Value based on conventional effluent concentration)</i>	40 mg/L



- ❑ Surplus Water 360 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: 0.52
 - Topography infiltration factor 0.20
 - Soil texture infiltration factor 0.20
 - Cover infiltration factor 0.12

The topography infiltration factor of 0.20 is based upon a 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 “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 WWR’s.

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. As a tertiary treatment system requires annual monitoring by the 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. As tertiary treatment technology is available to lower the potential risk to the groundwater supply, the use of nitrate reduction technology was included in the assessment for information purposes only and not to determine the maximum allowable volumes for the site.

The predicted nitrate concentration calculation for a conventional sewage system (system without nitrate reduction) results in a maximum of **2.1 m³/day** of effluent using a nitrate concentration of 40 mg/L. The inclusion of nitrate reduction technology (50 % nitrogen reduction in the of the effluent nitrate) would result in a maximum of **6.3 m³/day** of a effluent using a nitrate concentration of 20 mg/L. Note that the inclusion of tertiary treatment is for information purposes and does not dictate the maximum effluent volumes attenuable by the subject site. Both maximum sewage flows volumes with their respective nitrate concentrations meet the nitrate concentration threshold of below 10 mg/L at the property boundary. Additional re-infiltration from LID's or stormwater can be further used to increase the volume of septic effluent capable of being infiltrated on the subject site.



Furthermore, changing the parameters of the calculation (i.e. topography, cover factor, impermeable surfaces etc.) will further alter the maximum allowable effluent on the subject site.

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 m³/day will require an Ottawa Septic System Office (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.
2. The neighbouring well, located at 6340 Fourth Line Road, is considered technically representative of the aquifer underlying the subject site.
3. Based on a visual inspection performed by Paterson personnel, the well casing, stickup, well cap, and WWR details of the representative well are in compliance with O.Reg. 903.
4. 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.
5. If desired by the property owner, a residential 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.
6. A maximum sewage flow volume of **2.1 m³/day** at a nitrate concentration of 40 mg/L or **6.1 m³/day** at a nitrate concentration of 20 mg/L can be accommodated on the subject site and still be below the predictive nitrate concentration threshold of 10 mg/L at the property boundary. These values are subject to change due to numerous variable factors which will need to be considered at that time and are provided for informational purposes in support of the re-zoning application.
7. Onsite sewage disposal needs can be accommodated with a Class 4 Sewage System utilizing conventional or tertiary treatment technologies.



8. A Sewage System Permit and Building Permit need to be issued prior to the commencement of construction on the proposed structures or amenities/services.
9. 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
- Eurofins Certificate of Analysis
- Paterson PG7022 - Test Pit Logs
- AQTESOLV - Pumping Test Analysis Reports
- Langelier Calculation
- Nitrate Impact Assessment Calculations
- Paterson Drawing PG7022-1 - Test Hole Location Plan



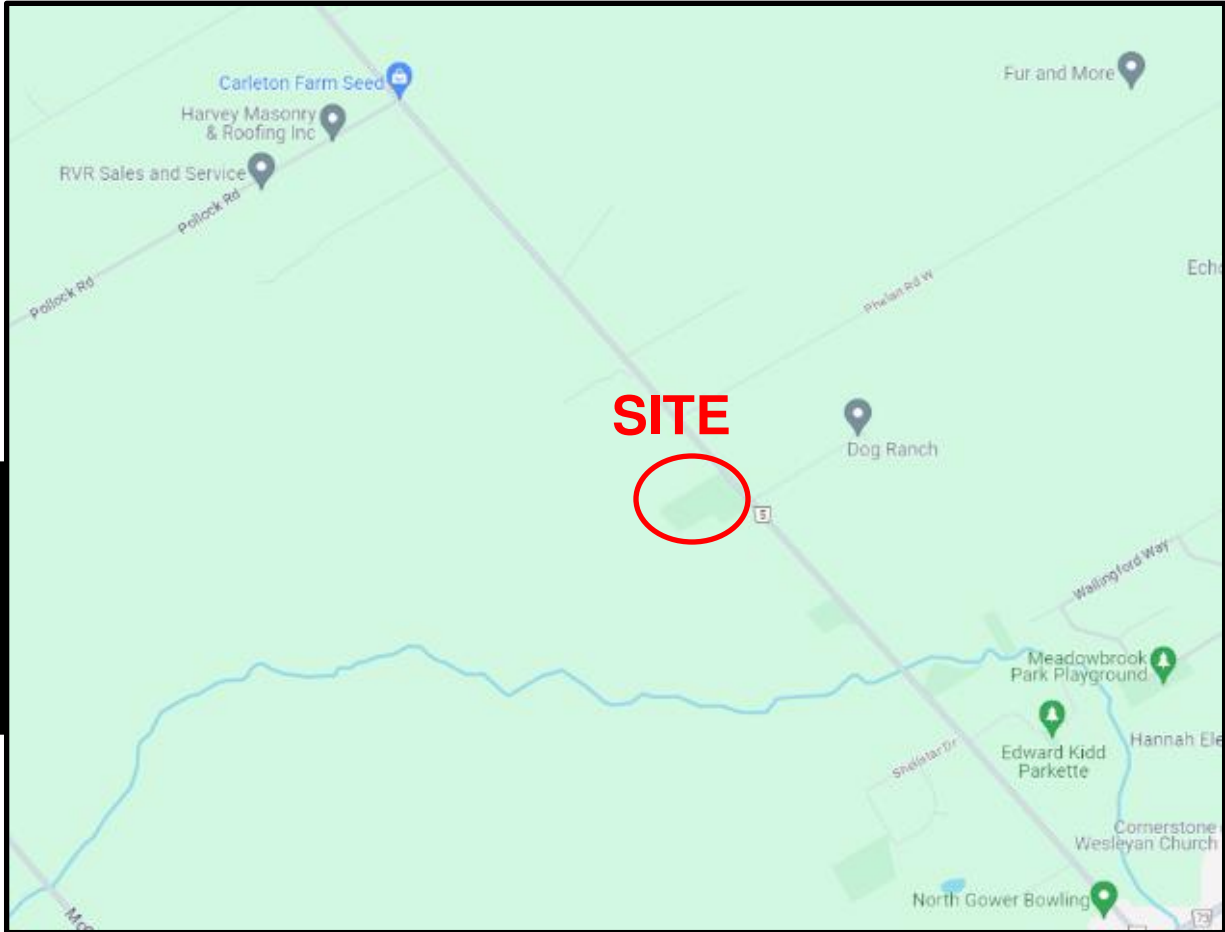


FIGURE 1

KEY PLAN



Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11

1530684

Municipality 15004 Con. CON 04

County or District: Ottawa-Carleton
 Township/Borough/City/Town/Village: Rideau
 Con block tract survey, etc.: Con #9 Lot: 16
 Address: Box 303 North Gower
 Date completed: 26 7 99
 Northing: K0A-270

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)					
General colour	Most common material	Other materials	General description	Depth - feet	
				From	To
Brown	Clay		Packed	0	8
Grey	Clay		Soft	8	40
Green	Clay	Stones	Packed	40	44
Grey	Limestone		Hard	44	81

31
32

41 WATER RECORD			
Water found at - feet	Kind of water		
72	<input checked="" type="checkbox"/> Fresh	<input type="checkbox"/> Sulphur	<input type="checkbox"/> Minerals
	<input type="checkbox"/> Salty	<input type="checkbox"/> Gas	

51 CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
9 7/8	Steel		0	47
6 1/4	Galvanized	.188	0	47
6	Steel		47	81

SCREEN	Sizes of opening (Slot No.)	Diameter inches	Length feet

61 PLUGGING & SEALING RECORD			
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)	
47	0	Cement Pressure Grouted	

71 PUMPING TEST

Pumping test method: Pumping rate: 30 GPM

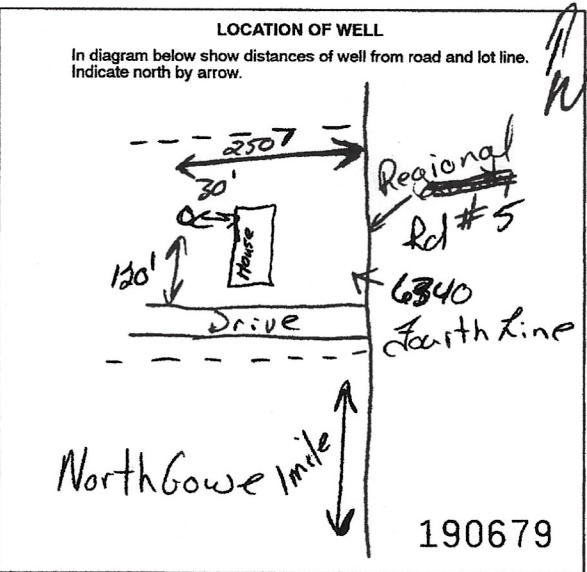
Static level: 8 feet

Water levels during pumping: 15 min: 8 feet, 30 min: 8 feet, 45 min: 8 feet, 60 min: 8 feet

Recommended pump type: Deep

Recommended pump setting: 60 feet

Recommended pump rate: 25 GPM



FINAL STATUS OF WELL

Water supply

WATER USE

Domestic

METHOD OF CONSTRUCTION

Cable tool

Name of Well Contractor: Splash Well Drilling Well Contractor's Licence No.: 4877

Address: Box 1083, Prescott

Name of Well Technician: Jodd Ferguson Well Technician's Licence No.: 7-0478

Signature of Technician/Contractor: Jodd Ferguson Submission date: 26 7 99

Data source: 4877 Date received: AUG 09 1999

Inspector: _____

Remarks: _____

CSS.ES0

UTM 18 4425105 E
5 R 491891610 N
 Elev. 4 R 0310
 Basin CON 111
 LOT 16



W.M.M.

15 No. 6849

GROUND WATER BRANCH
 NOV 17 1958
 ONTARIO WATER
 RESOURCES COMMISSION

The Water-well Drillers Act, 1954
 Department of Mines

Water-Well Record

County or Territorial District Carleton Township, Village, Town or City North Gower
 Village, Town or City
 Address North Gower
 Date completed
 (day) (month) (year)

Pipe and Casing Record

Pumping Test

Casing diameter(s) <u>2"</u>	Static level <u>13'</u>
Length(s) <u>50'</u>	Pumping rate <u>170 g.p.h.</u>
Type of screen	Pumping level <u>18'</u>
Length of screen	Duration of test <u>2 hours</u>

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
<u>Clay & Boulders</u>	<u>0'</u>	<u>45'</u>			
<u>Grey limestone</u>	<u>45'</u>	<u>134'</u>	<u>134'</u>	<u>121'</u>	<u>Fresh</u>

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

Is water clear or cloudy? Clear

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

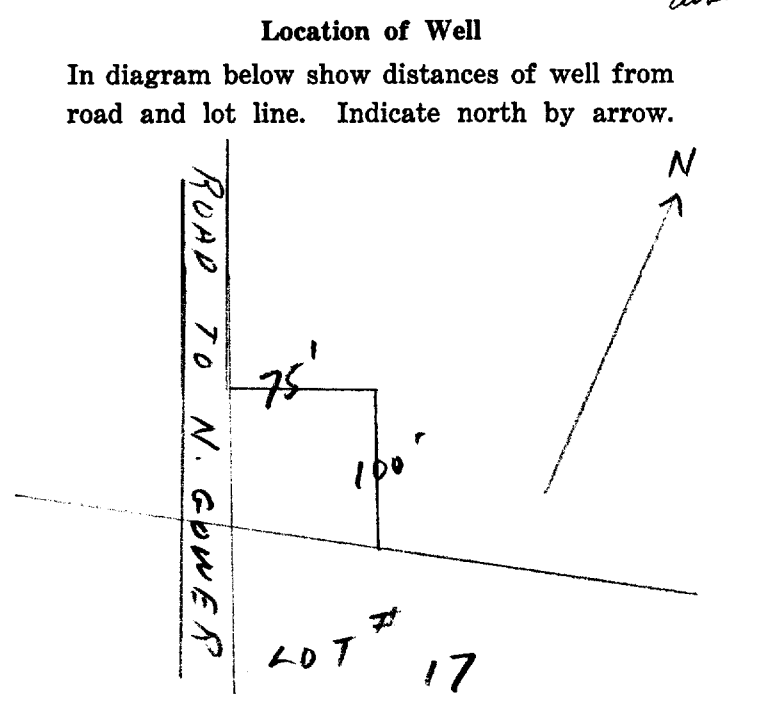
Drilling firm R.H. Miller
 Address 97 King St. E. Brackville

Name of Driller C. Robertson
 Address North Gower

Licence Number 1291

I certify that the foregoing statements of fact are true.

Date Nov 14/58 R.H. Miller
 Signature of Licensee



UTM 18 2 414119125 E

9 R 4191912810 N

Elev. 9 R 03110

Basin 25

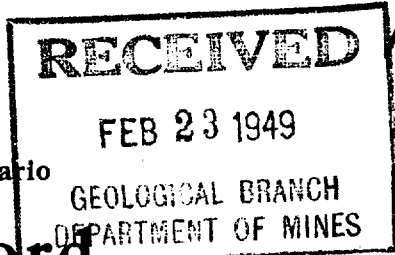


31C-4g

15 No 6925

The Well Drillers Act

Department of Mines, Province of Ontario



Water Well Record

Corleton To North Gower Con. 4 Lot 15 Pt. Lot ... Acres 100 ... (including pump) 124.00

Pipe and Casing Record

Pumping Test

Casing diameter(s) 4" Date Dec 27
Length(s) of casing(s) 26' Developed Capacity 1000 g.p.m.
Length of screen Duration of Test 1 hr
Type of screen Pumping Rate
Type of pump Drawdown 4"
Capacity of pump Static level of completed well 10'
Depth of pump setting Is well a gravel-wall type? 700.

Water Record

Table with 4 columns: Kind (fresh or mineral), Quality (hard, soft, contains iron, sulphur etc.), Appearance (clear, cloudy, coloured), For what purpose(s) is the water to be used?, How far is well from possible source of contamination?, What is source of contamination?, Enclose a copy of any mineral analysis that has been made of water. Includes handwritten entries like 'fresh', 'hard', 'clear', 'stock well', '20'', 'barn yard'.

Well Log

Drift and Bedrock Record

From To

0 ft.ft.

1' 5'

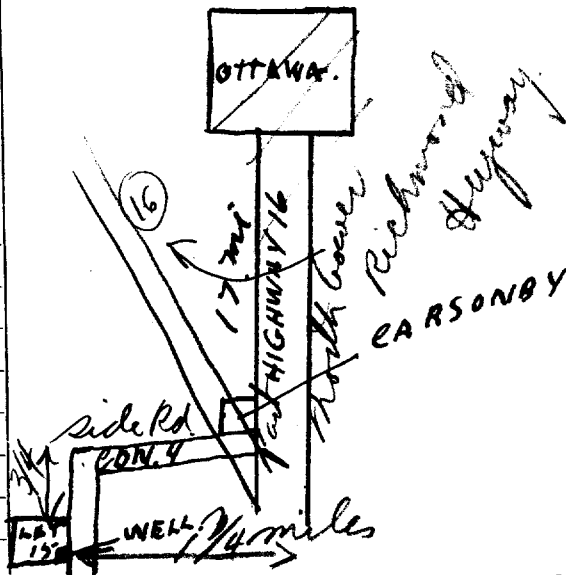
5' 26'

26' 42'

Top soil
Clay
Granite

Location of Well

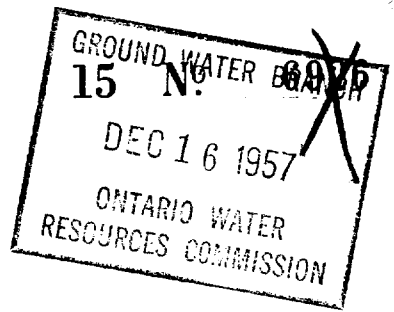
In diagram below show distances of well from road and lot line



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

Drilling Firm M M Meagher
Address 361 Bruce St Britannia Bay Ottawa
Recorded by M M Meagher Address 361 Bruce St Britannia Bay Ottawa
Date Dec 23/48 Licence Number

UTM 18Z 442020E
9R 4999235N
 Elev. 910
 Basin 25



The Water-well Drillers Act, 1954
 Department of Mines

Water-Well Record

Location: North Lower
 Village, Town or City
 Address

Date completed 26 11 1957
 (day) (month) (year)

Pipe and Casing Record

Pumping Test

Casing diameter(s) 2"
 Length(s) 72 FT
 Type of screen NONE
 Length of screen

Static level 30 F.T.
 Pumping rate 1.50 G.P.H.
 Pumping level 34 FT.
 Duration of test 1/2 H.

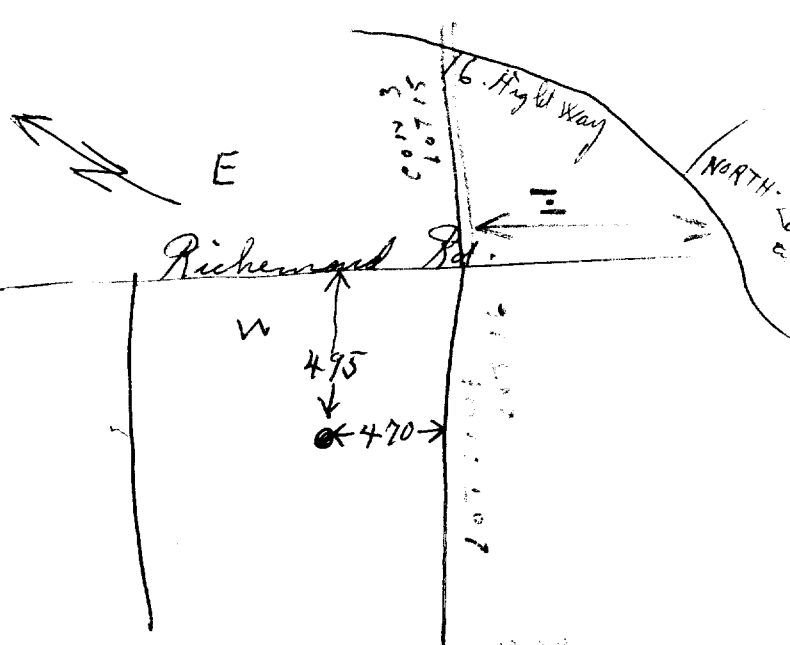
Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
SAND BOLDERS	0	72	150	120	FRESH
LIMESTONE GREY	72	150			

For what purpose(s) is the water to be used?
House + Stable
 Is water clear or cloudy? CLEAR
 Is well on upland, in valley, or on hillside?
Hillside
 Drilling firm MARCEL COSSETTE
 Address S.2. MARIER
EAST VIEW OTTA. ONT.
 Name of Driller F. COSSETTE
 Address 9 ALVARO HULL PRUE
 Licence Number 1193

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



I certify that the foregoing statements of fact are true.
M. Cossette
 Signature of Licensee

UTM 118Z 442120E 31644



WATER RESOURCES DIVISION
15 JAN 19 1965
 ONTARIO WATER RESOURCES COMMISSION

Col 5 R 14 T 9 S 9 3 1 1 9 N
 The Ontario Water Resources Commission Act

Elev 41 R 10 3 1 1 0

WATER WELL RECORD

Basin 25 County or District Carl Township, Village, Town or City North Gower

Con. 4 Lot 15 Date completed 8 October 1964
 (day month year)

Address R. No. 3 North Gower

Casing and Screen Record

Inside diameter of casing 5"
 Total length of casing 68'
 Type of screen
 Length of screen
 Depth to top of screen
 Diameter of finished hole 5"

Pumping Test

Static level 35'
 Test-pumping rate 10 G.P.M.
 Pumping level 65
 Duration of test pumping 1hr.
 Water clear or cloudy at end of test cloudy
 Recommended pumping rate 5 G.P.M.
 with pump setting of 80' & 35' take pipe 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)
<u>loam</u>	<u>0</u>	<u>5</u>	<u>100</u>	<u>fresh</u>
<u>hardpan & boulders</u>	<u>5</u>	<u>64</u>	<u>183</u>	<u>fresh</u>
<u>limestone</u>	<u>64</u>	<u>185</u>		

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 d.
Ottawa 736-0600

Licence Number 1223

Name of Driller or Borer M. Kavanagh

Address

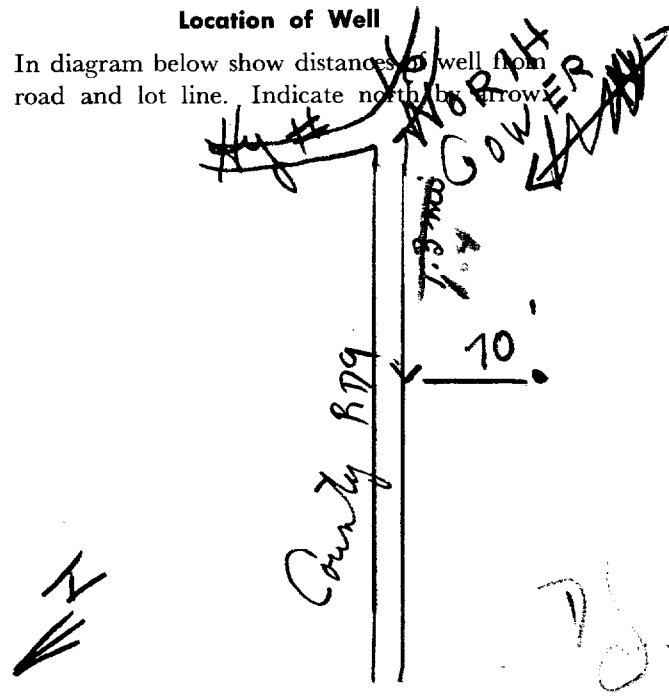
Date October 8, 1964

M. Kavanagh
 (Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

Location of Well

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



UTM 118 Z 441191810 E

31G49



15 No 6928

15 R 4999440 N

The Ontario Water Resources Commission Act

Elev. 4 R 10315

WATER WELL RECORD

Basin 25 L CAPELTON

Township, Village, Town or City

Con. L Lot 15

Date completed I NOV 66
(day month year)

Address N. Cowan RD 3

Casing and Screen Record

Inside diameter of casing 5
Total length of casing 44
Type of screen
Length of screen
Depth to top of screen
Diameter of finished hole 5

Pumping Test

Static level 17
Test-pumping rate 8 G.P.M.
Pumping level 23
Duration of test pumping 1 hr
Water clear or cloudy at end of test clear
Recommended pumping rate 5 G.P.M.
with pump setting of 40 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)
<u>Boulder loam</u>	<u>0</u>	<u>19</u>		
<u>GRAVEL</u>	<u>19</u>	<u>44</u>		
<u>Limestone</u>	<u>44</u>	<u>45</u>	<u>45</u>	<u>FRESH</u>

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

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

Drilling or Boring Firm M. McAGHER

Address OTIHO

Licence Number 2157

Name of Driller or Borer J. J. F.

Address

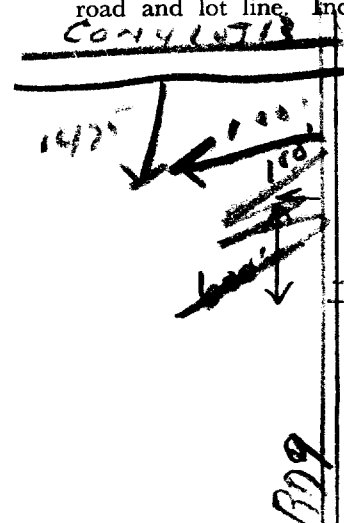
Date DEC 6

M. Mcagher
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

Location of Well

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



CONY
LOT 16

UTM 18 442480 E

3164g



ONTARIO

15 GROUND WATER BRANCH
N. 9929
DEC 16 1957
ONTARIO WATER RESOURCES COMMISSION

9R 4998785 N

Elev. 930.5

Basin 25

Lot 16

The Water-well Drillers Act, 1954
Department of Mines

Water-Well Record

County, Township, Village, Town or City... N GOWER

Address... North Lower

Date completed... 12... 1957
(day) (month) (year)

Pipe and Casing Record

Pumping Test

Casing diameter(s) 2"
Length(s) 72 FT
Type of screen NONE
Length of screen

Static level 15 FT
Pumping rate 250 g.p.m.
Pumping level 14 FT
Duration of test 1/2 H. Test

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
<u>Sand Bolden</u>	<u>0</u>	<u>72</u>	<u>89</u>	<u>74 FT</u>	<u>FRESH</u>
<u>Limestone 6027</u>	<u>72</u>	<u>88</u>			

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

Is water clear or cloudy? Clear

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

Drilling firm March Cassetto

Address 52 Main Rd

Name of Driller Flora Cassetto

Address Hill P. Ave

Licence Number 1193

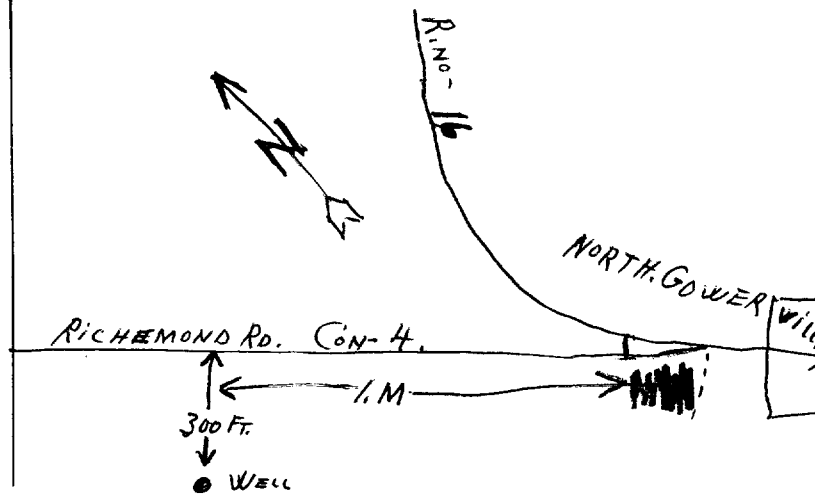
I certify that the foregoing statements of fact are true.

Date Dec 16 1957

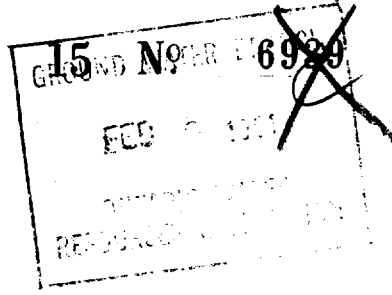
Signature of Licensee

Location of Well

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



UTM ¹²³⁰ 118 12 4443 3510 E 31249
 5 R 4997 8910 N
 Elev. 4 R 0300
 Basin 25 2101



The Ontario Water Resources Commission Act, 1957

WATER WELL RECORD

County or District Carleton Township, Village, Town or City N. Gower
 Con TV Lot 30 Date completed 27 Jan 61
(day month year)
 Address Yaro Ont. Box 108

Casing and Screen Record

Inside diameter of casing 5"
 Total length of casing 58'
 Type of screen none
 Length of screen
 Depth to top of screen
 Diameter of finished hole 5"

Pumping Test

Static level 30'
 Test-pumping rate 10 G.P.M.
 Pumping level 35'
 Duration of test pumping 1 hr
 Water clear or cloudy at end of test cloudy
 Recommended pumping rate 10 G.P.M.
 with pumping level of 35'

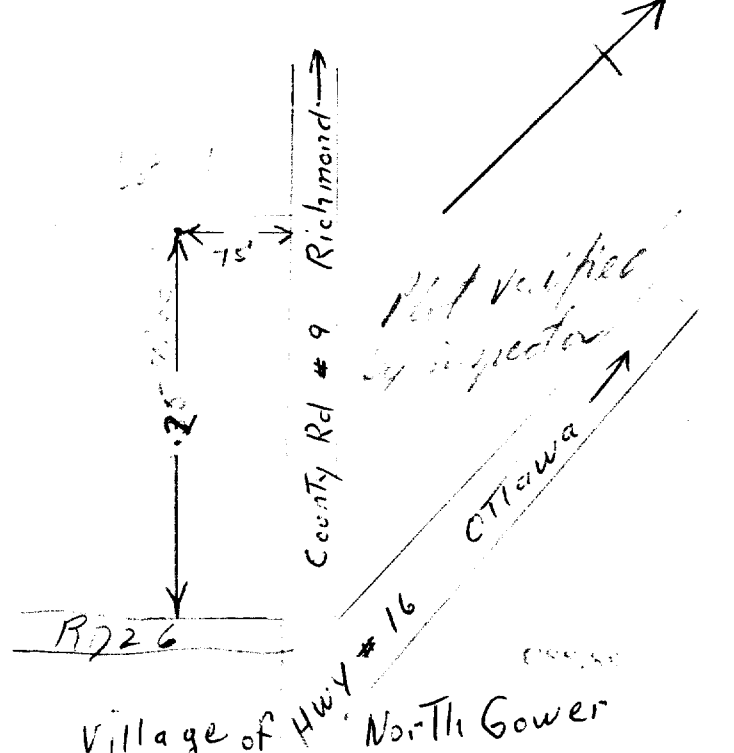
Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, sulphur)
<u>Fine grey sand and clay</u>	<u>0</u>	<u>41</u>			
<u>Grey limestone</u>	<u>41</u>	<u>91</u>	<u>91</u>	<u>61'</u>	<u>Fresh</u>

For what purpose(s) is the water to be used?
house
 Is well on upland, in valley, or on hillside?
hillside
 Drilling Firm McLEAN WATER SUPPLY LTD.
1532 RAVEN AVE.
 Address OTTAWA
 Licence Number 476
 Name of Driller W. Kavanagh
 Address
 Date Jan 27, 1961
[Signature]
 (Signature of Licensed Drilling Contractor)

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





The Ontario Water Resources Commission Act

WATER WELL RECORD

316/49

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED

2. CHECK CORRECT BOX WHERE APPLICABLE

11

1510590

MUNICIP.

151004

CON.

QPN

04

COUNTY OR DISTRICT: Cambridge TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: NORTH GOWER CON., BLOCK, TRACT, SURVEY, ETC.: 4 LOT: 017

DATE COMPLETED: DAY 09 MO. 04 YEAR 70

RC. 98840 ELEVATION 0308 RC. 4 BASIN CODE 25

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
	Hard Pan			0	20
	Bladey sand			20	52
	Hard Limestone			52	70

31 0020 14 0052 1309 0070 15

4 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
05	<input checked="" type="checkbox"/> STEEL	1/4	0	52
05	<input checked="" type="checkbox"/> STEEL		52	70

SCREEN

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

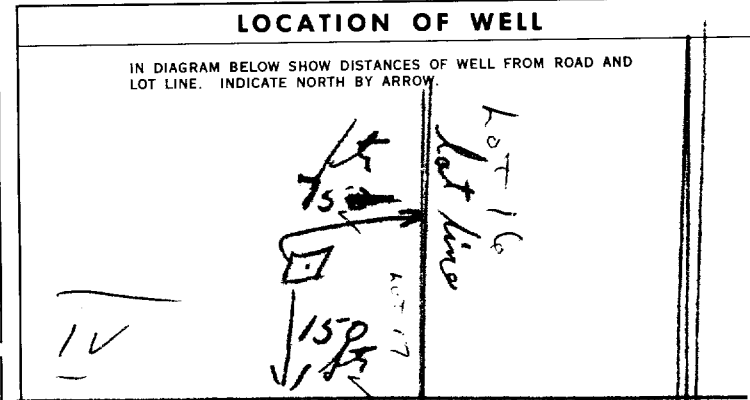
PUMPING TEST METHOD	PUMPING RATE GPM	DURATION OF PUMPING HOURS
<input checked="" type="checkbox"/> BAILER	0015	02

STATIC LEVEL FEET	WATER LEVEL END OF PUMPING FEET	WATER LEVELS DURING PUMPING
025	050	15 MINUTES: 050, 30 MINUTES: 050, 45 MINUTES: 050, 60 MINUTES: 050

RECOMMENDED PUMP TYPE: DEEP

RECOMMENDED PUMP SETTING: 060 FEET

RECOMMENDED PUMPING RATE: 0005 GPM



FINAL STATUS OF WELL

WATER SUPPLY

WATER USE

01 DOMESTIC

METHOD OF DRILLING

CABLE TOOL

DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: Armand Gauthier LICENCE NUMBER: 2308

ADDRESS: Cyber Cat

NAME OF DRILLER OR BORER: _____ LICENCE NUMBER: _____

SIGNATURE OF CONTRACTOR: Armand Gauthier SUBMISSION DATE: DAY 9 MO. 04 YEAR 70

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 2308 DATE RECEIVED: 020670

DATE OF INSPECTION: _____ INSPECTOR: P/Wm. M.

REMARKS: _____



WATER WELL RECORD

3/6/75

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

1515161 MUNICIPAL 15004 CON 04

COUNTY OR DISTRICT: North York TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: North York CON. BLOCK, TRACT, SURVEY, ETC: Con 4 LOT: 017

DATE COMPLETED: DAY 11 MONTH 08 YEAR 75

RC: 988.17 ELEVATION: 4 BASIN CODE: 0304

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
grey	clay	stone		0	37
grey	concrete			37	45

31 003720512 32 0015215

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
10-11	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	188	0-39
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE		20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE		27-30

SCREEN

SIZE (S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
	31-33	34-38

MATERIAL AND TYPE: _____ DEPTH TO TOP OF SCREEN: 41-44 FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 PUMP 2 BAILER

PUMPING RATE: 0020 GPM DURATION OF PUMPING: 01 HOURS 00 MINS

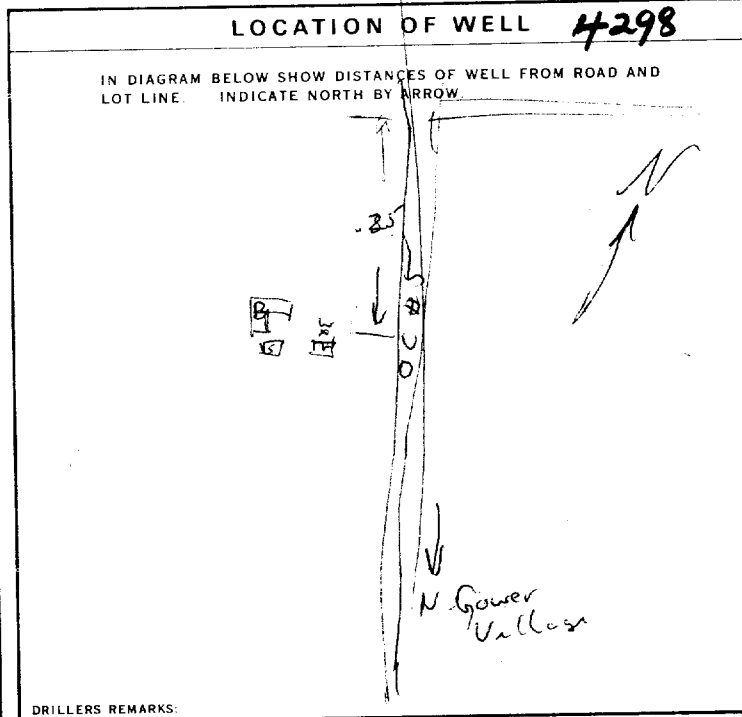
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING PUMPING
19-21	22-24	15 MINUTES: <u>0025</u> 30 MINUTES: <u>025</u> 45 MINUTES: <u>025</u> 60 MINUTES: <u>025</u>

IF FLOWING, GIVE RATE: _____ GPM

PUMP INTAKE SET AT: _____ FEET WATER AT END OF TEST: 1 CLEAR 2 CLOUDY

RECOMMENDED PUMP TYPE: 1 SHALLOW 2 DEEP

RECOMMENDED PUMP SETTING: _____ FEET RECOMMENDED PUMPING RATE: _____ GPM



FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF DRILLING

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

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mains Well Drilling LICENSE NUMBER: 3644

ADDRESS: Box 326, Richmond Ont

NAME OF DRILLER OR BORER: [Signature] LICENSE NUMBER: _____

SIGNATURE OF CONTRACTOR: [Signature] SUBMISSION DATE: DAY 11 MONTH 8 YEAR 75

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 3644 DATE RECEIVED: 15 01 76

DATE OF INSPECTION: 16 Jun 76 INSPECTOR: P/R Dyl

REMARKS: _____

P _____
WI _____

31G49

WATER WELL RECORD

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

11 1517856 15004 Con. C&N 04

COUNTY OR DISTRICT *Lot* TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE *Redeau North Gower* CON. BLOCK, TRACT, SURVEY, ETC. *Con 4, 015* LOT *015*

RR#3 North Gower DATE COMPLETED DAY *26* MO *05* YR *82*

RC *99399* RC *4* ELEVATION *0310* RC *4* BASIN CODE *26*

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
<i>grey</i>	<i>clay</i>			<i>0</i>	<i>31</i>
<i>grey</i>	<i>hardpan</i>	<i>stones</i>		<i>31</i>	<i>62</i>
<i>grey</i>	<i>limestone</i>			<i>62</i>	<i>195</i>
<i>white</i>	<i>sandstone</i>			<i>195</i>	<i>225</i>

31 *0031205* *006221412* *0195215* *0225118*

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
<i>0215</i>	<input checked="" type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FR. M	TO
<i>06 1/4</i>	<input checked="" type="checkbox"/> STEEL	<i>188</i>	<i>0</i>	<i>188</i>
	<input type="checkbox"/> GALVANIZED			
	<input type="checkbox"/> CONCRETE			
	<input type="checkbox"/> OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET
		DEPTH TO TOP OF SCREEN

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD PUMP BAILER

PUMPING RATE *0006* GPM

DURATION OF PUMPING *01* HOURS *00* MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
<i>015</i>	<i>030</i>	15 MINUTES <i>030</i>	30 MINUTES <i>030</i>	45 MINUTES <i>030</i>	60 MINUTES <i>030</i>

IF FLOWING GIVE RATE *030* GPM

PUMP INTAKE SET AT *030* FEET

WATER AT END OF TEST *030* FEET

RECOMMENDED PUMP TYPE SHALLOW DEEP

RECOMMENDED PUMP SETTING *030* FEET

RECOMMENDED PUMP RATE *0006* GPM

LOCATION OF WELL

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

Drillers Remarks

FINAL STATUS OF WELL *1*

WATER USE *12*

METHOD OF DRILLING *5*

CONTRACTOR

NAME OF WELL CONTRACTOR *Henry Mains Well Drilling* LICENCE NUMBER *3644*

ADDRESS *Box 326, Richmond Ont*

NAME OF DRILLER OR BORER *Henry Mains* LICENCE NUMBER

SIGNATURE OF CONTRACTOR *Henry Mains*

SUBMISSION DATE DAY *27* MO *5* YR *82*

OFFICE USE ONLY

DATA SOURCE *1* CONTRACTOR *3644* DATE RECEIVED *09 07 82*

DATE OF INSPECTION

INSPECTOR

REMARKS

A 013620

A013620

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Well Owner's Information and Location of Well Information

First Name		Last Name		Mailing Address (Street Number/Name, RR, Lot, Concession)			
Barasite Construction				2354 Summerside Drive			
County/District/Municipality		Township/City/Town/Village		Province	Postal Code	Telephone Number (include area code)	
Ottawa Carleton		Manotick		Ontario	K4M 1B4	613 692 5049	
Address of Well Location (County/District/Municipality)				Township	Lot	Concession	
Ottawa Carleton				Ridesau	25	4	
RR#/Street Number/Name				City/Town/Village	Site/Compartment/Block/Tract etc.		
6366 4th Line Road				North Gower			
GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation: <input type="checkbox"/> Undifferentiated <input checked="" type="checkbox"/> Averaged	
	8 3	18	44 24 62	49 99 12 6	Garmin	<input type="checkbox"/> Differentiated, specify	

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres	
				From	To
Brown	Clay	Boulders		0	3.65
Gray	Clay			3.65	6.09
Gray	Sandy Clay	Boulders		6.09	21.33

Hole Diameter		
Depth From	Metres To	Diameter Centimetres
0	13.10	22.75
13.10	21.33	15.23

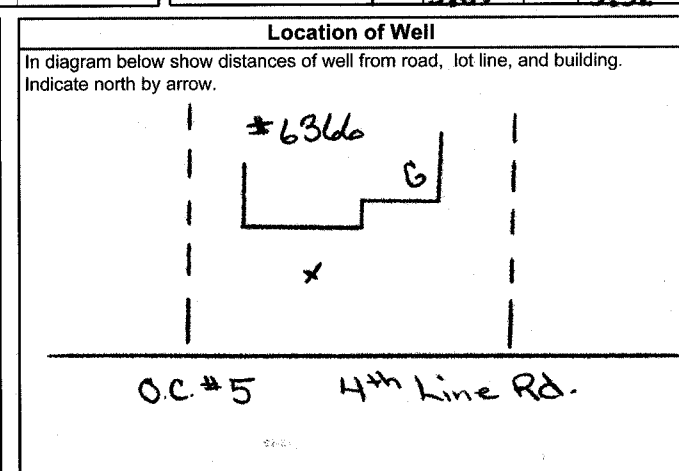
Construction Record				
Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres	
			From	To
Casing				
15.86	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	0.48	+ 0.45	13.10
Screen				
Outside diam	<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	Slot No.		
No Casing or Screen				
15.23	<input checked="" type="checkbox"/> Open hole		13.10	21.33

Test of Well Yield				
Pumping test method	Draw Down		Recovery	
	Time min	Water Level Metres	Time min	Water Level Metres
submersible				
Pump intake set at - (metres)	15.24	Static Level 3.46		
Pumping rate - (litres/min)	54.6	1 3.51	1	3.64
Duration of pumping	1 hrs + min	2 3.53	2	3.63
Final water level end of pumping	3.69 metres	3 3.54	3	3.62
Recommended pump type.	<input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep	4 3.55	4	3.62
Recommended pump depth.	15.24 metres	5 3.56	5	3.61
Recommended pump rate.	45.5 (litres/min)	10 3.59	10	3.59
		15 3.62	15	3.57
If flowing give rate - (litres/min)		20 3.63	20	3.56
		25 3.65	25	3.55
If pumping discontinued, give reason.		30 3.66	30	3.55
		40 3.68	40	3.55
		50 3.68	50	3.52
		60 3.69	60	3.52

Water Record	
Water found at Metres	Kind of Water
19.81	<input type="checkbox"/> Fresh <input type="checkbox"/> Sulphur <input type="checkbox"/> Gas <input type="checkbox"/> Salty <input type="checkbox"/> Minerals <input type="checkbox"/> Other: not tested
	<input type="checkbox"/> m <input type="checkbox"/> Fresh <input type="checkbox"/> Sulphur <input type="checkbox"/> Gas <input type="checkbox"/> Salty <input type="checkbox"/> Minerals <input type="checkbox"/> Other:
	<input type="checkbox"/> m <input type="checkbox"/> Fresh <input type="checkbox"/> Sulphur <input type="checkbox"/> Gas <input type="checkbox"/> Salty <input type="checkbox"/> Minerals <input type="checkbox"/> Other:
After test of well yield, water was	
<input checked="" type="checkbox"/> Clear and sediment free	
<input type="checkbox"/> Other, specify	
Chlorinated <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Plugging and Sealing Record			
Depth set at From	Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
13.10	0	Grouted - Bentonite Slurry	0.46m³

Method of Construction			
<input type="checkbox"/> Cable Tool	<input checked="" type="checkbox"/> Rotary (air)	<input type="checkbox"/> Diamond	<input type="checkbox"/> Digging
<input type="checkbox"/> Rotary (conventional)	<input checked="" type="checkbox"/> Air percussion	<input type="checkbox"/> Jetting	<input type="checkbox"/> Other
<input type="checkbox"/> Rotary (reverse)	<input type="checkbox"/> Boring	<input type="checkbox"/> Driving	
Water Use			
<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Industrial	<input type="checkbox"/> Public Supply	<input type="checkbox"/> Other
<input type="checkbox"/> Stock	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used	
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Municipal	<input type="checkbox"/> Cooling & air conditioning	
Final Status of Well			
<input checked="" type="checkbox"/> Water Supply	<input type="checkbox"/> Recharge well	<input type="checkbox"/> Unfinished	<input type="checkbox"/> Abandoned, (Other)
<input type="checkbox"/> Observation well	<input type="checkbox"/> Abandoned, insufficient supply	<input type="checkbox"/> Dewatering	
<input type="checkbox"/> Test Hole	<input type="checkbox"/> Abandoned, poor quality	<input type="checkbox"/> Replacement well	



Audit No. Z 13734	Date Well Completed	YYYY	MM	DD
		2004	8	12
Was the well owner's information package delivered? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date Delivered	YYYY	MM	DD
		2004	8	13

Well Contractor/Technician Information	
Name of Well Contractor	Well Contractor's Licence No.
Capital Water Supply Ltd.	1558
Business Address (street name, number, city etc.)	
P.O. Box 490 Stittsville, Ontario K2S 1A6	
Name of Well Technician (last name, first name)	Well Technician's Licence No.
Miller, Stephen	T0097
Signature of Technician/Contractor	Date Submitted
<i>[Signature]</i>	YYYY MM DD
	2004 8 18

Ministry Use Only	
Data Source	Contractor
	1558
Date Received	Date of Inspection
YYYY MM DD	YYYY MM DD
SEP 10 2004	
Remarks	Well Record Number
	1534966

Measurements recorded in: Metric Imperial

Address of Well Location (Street Number/Name) **6382 FOURTH LINE RD NORTH GOWER** Township **NORTH GOWER** Lot _____ Concession _____
 County/District/Municipality **OTTAWA-CARLETON** City/Town/Village **NORTH GOWER** Province **Ontario** Postal Code **K0A2T0**
 UTM Coordinates Zone Easting Northing 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

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
From 10 To 1.5M	BENTONITE	0.32 m³

Results of Well Yield Testing

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

Method of Construction

Cable Tool Diamond Public Commercial Not used
 Rotary (Conventional) Jetting Domestic Municipal Dewatering
 Rotary (Reverse) Driving Livestock Test Hole Monitoring
 Boring Digging Irrigation Cooling & Air Conditioning
 Air percussion Industrial
 Other, specify _____ Other, specify _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
7.586	Steel	1.48	1.45	1.45	<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 checked="" 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 _____
10.0	Steel	1.48	1.45	UNK	

Construction Record - Screen

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

Water Details

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

Hole Diameter

Depth (m/ft)	Diameter (cm/in)		
		From	To

Well Contractor and Well Technician Information

Business Name of Well Contractor **H.O. WRIGHT & SONS LTD** Well Contractor's Licence No. **6357**
 Business Address (Street Number/Name) **2323 CHURCH ST** Municipality **NORTH GOWER**
 Province **ON** Postal Code **K0A2T0** Business E-mail Address **g.patt@howright.ca**
 Bus. Telephone No. (inc. area code) **6134893302** Name of Well Technician (Last Name, First Name) **PRATT GEORGE**
 Well Technician's Licence No. **1445** Signature of Technician and/or Contractor **George Pratt** Date Submitted **2012/10/05**

Map of Well Location

Please provide a map below following instructions on the back.

Comments: **EXTEND CASING TO ABOVE GRADE**

Well owner's information package delivered <input type="checkbox"/> Yes <input type="checkbox"/> No	Date Package Delivered 2012/10/05	Ministry Use Only Audit No. 2159104 Received OCT 25 2012
Date Work Completed 2012/10/05		

Measurements recorded in: Metric Imperial

A178213

Page ___ of ___

Address of Well Location (Street Number/Name) **6381 Fourth Line Rd.** Township **Rideau** Lot **17** Concession **3**
 County/District/Municipality **North Gower** City/Town/Village **North Gower** Province **Ontario** Postal Code **K0A2T0**
 UTM Coordinates Zone **18** Easting **442545** Northing **4991361** Municipal Plan and Sublot Number Other

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
Brown	clay	Silt	Hard	0	4.5
Grey	clay	Silt	Hard	4.5	12.6
Grey	gravel	Stone, Sand	packed	12.6	14.1
Grey	limestone		layered	14.1	24.3

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0 to 15.2	cement grout	0.4 m³

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 <input type="checkbox"/> Other, specify				
If pumping discontinued, give reason:	Static Level	3.44		11.63
Pump intake set at (m/ft)	1	5.10	1	9.22
Pumping rate (l/min / GPM)	2	5.99	2	8.05
Duration of pumping	3	6.82	3	7.03
	4	6.98	4	6.30
	5	7.26	5	5.78
Final water level end of pumping (m/ft)	10	8.05	10	5.20
If flowing give rate (l/min / GPM)	15	8.47	15	4.10
	20	9.13	20	3.45
Recommended pump depth (m/ft)	25	9.54	25	3.44
Recommended pump rate (l/min / GPM)	30	9.82	30	3.44
Well production (l/min / GPM)	40	10.60	40	3.44
Disinfected?	50	11.13	50	3.44
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	60	11.63	60	3.44

Method of Construction

Cable Tool Diamond Public Commercial Not used
 Rotary (Conventional) Jetting Domestic Municipal Dewatering
 Rotary (Reverse) Driving Livestock Test Hole Monitoring
 Boring Digging Irrigation Cooling & Air Conditioning
 Airpercussion Industrial Other, specify
 Other, specify **Air Rotary**

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
15.55	Steel	0.48	4.6	15.2	<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
15.55	Open Hole		15.2	24.3	

Construction Record - Screen

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

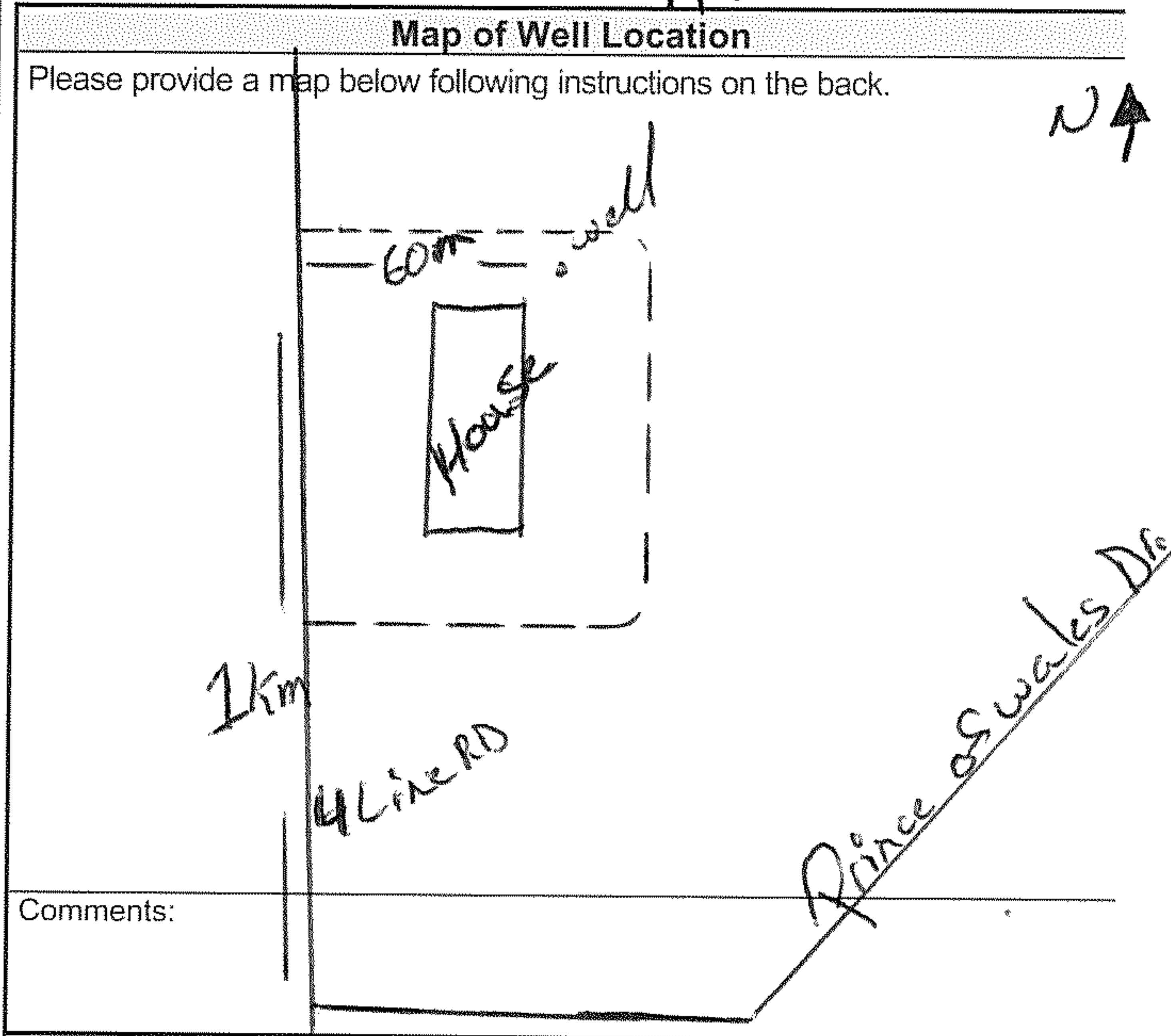
Water Details

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	Diameter (cm/in)
21 (m/ft)	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	0 to 15.2	24.9
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	15.2 to 24.3	15.55

Well Contractor and Well Technician Information

Business Name of Well Contractor: **Bourgeois Well Drilling** Well Contractor's Licence No.: **7417**
 Business Address (Street Number/Name): **14245 Conc. 10-11** Municipality: **Oyster**
 Province: **On.** Postal Code: **K0A1R0** Business E-mail Address: **N/A**

Business Telephone No. (inc. area code): **1848752911** Name of Well Technician (Last Name, First Name): **GENIER MICHAEL**
 Well Technician's Licence No.: **3493** Signature of Technician and/or Contractor: *[Signature]* Date Submitted: **20150824**



Well owner's information package delivered: Yes No

Date Package Delivered: **20150818** Date Work Completed: **20150818**

Ministry Use Only
 Audit No.: **202984**
 SEP 04 2015

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11

1530684

Municipality 15004 Con. 04

County or District: Ottawa-Carleton
 Township/Borough/City/Town/Village: Rideau
 Con block tract survey, etc.: Con #9 Lot: 16
 Address: Box 303 North Gower
 Date completed: 26 7 99
 Elevation: KOA-270

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)					
General colour	Most common material	Other materials	General description	Depth - feet	
				From	To
Brown	Clay		Packed	0	8
Grey	Clay		Soft	8	40
Green	Clay	Stones	Packed	40	44
Grey	Limestone		Hard	44	81

31
32

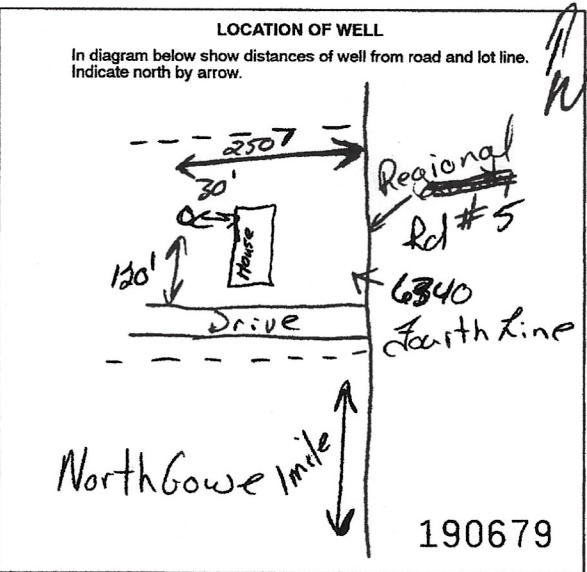
41 WATER RECORD			
Water found at - feet	Kind of water		
72	<input checked="" type="checkbox"/> Fresh	<input type="checkbox"/> Sulphur	<input type="checkbox"/> Minerals
	<input type="checkbox"/> Salty	<input type="checkbox"/> Gas	

51 CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
9 7/8	Steel		0	47
6 1/4	Galvanized	.188	0	47
6	Steel		47	81

60 SCREEN			
Sizes of opening (Slot No.)	Diameter inches	Length feet	Material and type

61 PLUGGING & SEALING RECORD			
Annular space		Abandonment	
47	0	Cement Pressure	Grouted

71 PUMPING TEST			
Pumping test method	Pumping rate	Duration of pumping	
2 <input type="checkbox"/> Bailer	30 GPM	0	Hours
Static level	Water level during	Recovery	
8 feet	8 feet	8 feet	8 feet



FINAL STATUS OF WELL
 Water supply
 Observation well
 Test hole
 Recharge well

WATER USE
 Domestic
 Stock
 Irrigation
 Industrial

METHOD OF CONSTRUCTION
 Cable tool
 Rotary (conventional)
 Rotary (reverse)
 Rotary (air)

Name of Well Contractor: Splash Well Drilling
 Well Contractor's Licence No.: 4877
 Address: Box 1083, Prescott
 Name of Well Technician: Todd Ferguson
 Well Technician's Licence No.: T-0478
 Signature of Technician/Contractor: Todd Ferguson
 Submission date: 26 7 99

MINISTRY USE ONLY
 Data source: 4877
 Date received: AUG 09 1999
 Date of inspection:
 Inspector:
 Remarks:
 CSS.ES0

OFFICIAL CERTIFICATE OF ANALYSIS : 3952152

WORK REQUEST : 100288909

Report Date : 2024-06-18

Paterson Group

9 Auriga Dr
Nepean, Ontario
K2E 7T9
Attention : Alex Schopf

Reception Date : 2024-06-11

Project : PH4864

Sampler : NA

PO Number : 60414

Temperature : 13 °C

Analysis	Quantity	External Method
Alkalinity (Water, Automated)	2	Modified from SM 2320 B
Ammonia, Total (Water, Colorimetry)	2	Modified from EPA 350.1
Chloride (Water, IC)	2	Modified from SM 4110 B and C
Colour, Apparent (Water, Spectrophotometry)	2	Modified from SM 2120 C
Conductivity (Water, Automated)	2	Modified from SM 2510 B
DOC (Water, IR)	2	Modified from SM 5310 B
Escherichia coli (DC Plate)	2	Modified from MECP E3407
Fluoride (Water, Auto/ISE)	2	Modified from SM 4500-F A and 4500-F C
Hardness (Water, Calculation Only)	2	SM 2340 B
Ion Balance (Water, Calculation)	2	Modified from SM1030 E
Metals Scan (Water, ICP/MS)	2	Modified from EPA 200.8
Metals Scan (Water, ICP/OES)	2	Modified from SM 3120 B
Nitrate (Water, IC)	2	Modified from SM 4110 B and C
Nitrite (Water, IC)	2	Modified from SM 4110 B and C
pH (25°C) (Water, Automated)	2	Modified from SM 4500-H+ B
Phenols (Water, Colorimetry)	2	Modified from EPA 420.2
Sulphate (Water, IC)	2	Modified from SM 4110 B and C
Sulphide (Water, Colorimetry)	2	Modified from SM 4500-S2 D
Tannin and Lignin (Water, Spec)	2	Modified from SM 5550 B
TDS (Estimated)	2	Modified from SM 2510 A
Total Coliforms (DC Plate)	2	Modified from MECP E3407
Total Kjeldahl Nitrogen (Water, Colorimetry)	2	Modified from EPA 351.2
Turbidity (Water, Turbidimeter)	2	Modified from SM 2130 B

Criteria :

A : Ontario Regulation 169/03 (Non-Regulated Drinking Water)

Sample status upon receipt :

7773595 7773596

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

QC : Reference material (QC)

N/A : Not applicable

1 : Results in annex

* : Analysis conducted by external subcontracting

^ : Analysis not accredited

OFFICIAL CERTIFICATE OF ANALYSIS - EXCEEDENCE SUMMARY

Client : Paterson Group
 Project : PH4864

Reception Date : 2024-06-11

Eurofins Sample No	Client Sample Identification	Analyte	Result	Units	Exceeded Criteria		
					A	B	C
Colour, Apparent (Water, Spectrophotometry)							
7773595	TW1-GW1	Colour (Apparent)	8	TCU	5		
Hardness (Water, Calculation Only)							
7773595	TW1-GW1	Hardness as CaCO3 (Calculation)	422	mg/L	80-100		
7773596	TW1-GW2	Hardness as CaCO3 (Calculation)	413	mg/L	80-100		
TDS (Estimated)							
7773595	TW1-GW1	TDS (Estimated)^	575	mg/L	500		
7773596	TW1-GW2	TDS (Estimated)^	544	mg/L	500		

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Paterson Group
Project : PH4864

Reception Date: 2024-06-11

Anions						Eurofins Sample No :		7773595	7773596
						Matrix :		Drinking water	Drinking water
RL						Unit		Sampling Date :	
						Criteria		Client Sample Identification :	
						A	B	C	
Chloride	0.5	mg/L	250			35.6	37.3		
Nitrate (as Nitrogen)	0.1	mg/L	10.0			1.28	1.61		
Nitrite (as Nitrogen)	0.1	mg/L	1.0			<0.1	<0.1		
Sulphate	1	mg/L	500			75	79		

Calculations						Eurofins Sample No :		7773595	7773596
						Matrix :		Drinking water	Drinking water
RL						Unit		Sampling Date :	
						Criteria		Client Sample Identification :	
						A	B	C	
Ion Balance (Calculation)^	0.1		1.08			1.06			

General Chemistry						Eurofins Sample No :		7773595	7773596
						Matrix :		Drinking water	Drinking water
RL						Unit		Sampling Date :	
						Criteria		Client Sample Identification :	
						A	B	C	
Alkalinity (as CaCO3)	5	mg/L	500			349	336		
Colour (Apparent)	2	TCU	5			8	4		
Conductivity @ 25°C	5	µS/cm				884	837		
Dissolved Organic Carbon	0.5	mg/L	5			3.3	2.8		
Fluoride	0.1	mg/L	1.5			0.10	0.10		
Hardness as CaCO3 (Calculation)	1	mg/L	80-100			422	413		
pH @ 25°C	1		6.5-8.5			8.04	8.06		
Phenols-4AAP	0.001	mg/L				<0.001	<0.001		
Sulphide (S2-)	0.01	mg/L	0.05			<0.01	<0.01		
Tannin and Lignin	0.1	mg/L				0.2	0.1		
TDS (Estimated)^	5	mg/L	500			575	544		
Turbidity	0.1	NTU	5			1.40	0.643		

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Paterson Group
Project : PH4864

Reception Date: 2024-06-11

			Eurofins Sample No :		7773595	7773596			
			Matrix :		Drinking water	Drinking water			
			Sampling Date :		2024-06-11	2024-06-11			
			Client Sample Identification :		TW1-GW1	TW1-GW2			
Metals	RL	Unit	Criteria						
			A	B	C				
Metals Scan (Water, ICP/MS)									
Aluminum	0.01	mg/L	0.1			<0.01	<0.01		
Antimony	0.0005	mg/L	0.006			<0.0005	<0.0005		
Arsenic	0.001	mg/L	0.01			<0.001	<0.001		
Barium	0.001	mg/L	1			0.057	0.052		
Beryllium	0.0005	mg/L				<0.0005	<0.0005		
Boron	0.01	mg/L	5			0.02	0.02		
Cadmium	0.0001	mg/L	0.005			<0.0001	<0.0001		
Chromium	0.001	mg/L	0.05			<0.001	<0.001		
Cobalt	0.0002	mg/L				0.0010	0.0009		
Copper	0.001	mg/L	1			0.004	0.003		
Iron	0.03	mg/L	0.3			0.05	<0.03		
Lead	0.001	mg/L	0.01			<0.001	<0.001		
Manganese	0.01	mg/L	0.05			0.05	0.05		
Mercury	0.0001	mg/L	0.001			<0.0001	<0.0001		
Molybdenum	0.005	mg/L				<0.005	<0.005		
Nickel	0.005	mg/L				<0.005	<0.005		
Selenium	0.001	mg/L	0.05			<0.001	<0.001		
Silver	0.0001	mg/L				<0.0001	<0.0001		
Strontium	0.001	mg/L				0.216	0.206		
Thallium	0.0001	mg/L				<0.0001	<0.0001		
Uranium	0.001	mg/L	0.02			0.012	0.010		
Vanadium	0.001	mg/L				<0.001	<0.001		
Zinc	0.01	mg/L	5			<0.01	<0.01		
Metals Scan (Water, ICP/OES)									
Calcium	1	mg/L				88	87		
Magnesium	1	mg/L				49	47		
Potassium	1	mg/L				52	47		
Sodium	1	mg/L	200			16	15		

			Eurofins Sample No :		7773595	7773596			
			Matrix :		Drinking water	Drinking water			
			Sampling Date :		2024-06-11	2024-06-11			
			Client Sample Identification :		TW1-GW1	TW1-GW2			
Microbiology	RL	Unit	Criteria						
			A	B	C				
Escherichia coli (DC)	0	CFU/100mL	0			0	0		
Total Coliforms (DC)	0	CFU/100mL	0			0	0		

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Paterson Group
Project : PH4864


Reception Date: 2024-06-11

Eurofins Sample No :			7773595	7773596				
Matrix :			Drinking water	Drinking water				
Sampling Date :			2024-06-11	2024-06-11				
Client Sample Identification :			TW1-GW1	TW1-GW2				
Nutrients	RL	Unit						
Ammonia (Total, as Nitrogen)	0.02	mg/L	<0.020	<0.020				
Total Kjeldahl Nitrogen	0.1	mg/L	0.455	0.413				

Approved by :


Emma-Dawn Ferguson, M.Sc.
Environmental Chemist

Approved by :


Jason Kennedy,
Project Manager

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Paterson Group
Project : PH4864

Reception Date: 2024-06-11

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Alkalinity (Water, Automated)									
<i>Method : Alkalinity (water, titration to pH 4.5, automated). Internal method: OTT-I-AT-WI45398.</i>									
Alkalinity (as CaCO ₃)	mg/L	5	<5	99	95-105			1	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	
Ammonia, Total (Water, Colorimetry)									
<i>Method : Ammonia (Water, Colorimetry). Internal method: OTT-I-NUT-WI46201.</i>									
Ammonia (Total, as Nitrogen)	mg/L	0.02	<0.020	103	80-120	105	80-120	-	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-13 Analysis Date: 2024-06-14	
Chloride (Water, IC)									
<i>Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.</i>									
Chloride	mg/L	0.5	<0.5	100	80-120	106	80-120	-	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	
Colour, Apparent (Water, Spectrophotometry)									
<i>Method : Colour (Water, Spectrophotometric). Internal method: OTT-I-SPEC-WI45980.</i>									
Colour (Apparent)	TCU	2	<2	101	39-159			-	0-40
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-17 Analysis Date: 2024-06-17	
Conductivity (Water, Automated)									
<i>Method : Conductivity (Water, Autotitrator). Internal Method: OTT-I-AT-WI45398.</i>									
Conductivity @ 25°C	uS/cm	5	<5	100	98-102			0	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	
DOC (Water, IR)									
<i>Method : Organic carbon (water, IR, combustion). Internal method: OTT-I-DEM-WI46148.</i>									
Dissolved Organic Carbon	mg/L	0.5	<0.5	97	84-116	87	80-120	13	0-15
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	
Escherichia coli (DC Plate)									
<i>Method : Total Coliforms and E.Coli by MF (Water, DC plate). Internal method: OTT-M-BAC-WI45296.</i>									
Escherichia coli (DC)	CFU/100mL	0	0					-	0-30
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-12 Analysis Date: 2024-06-13	
Fluoride (Water, Auto/ISE)									
<i>Method : Fluoride by autotitrator, ion selective electrode. Internal method: OTT-I-AT-WI45398.</i>									
Fluoride	mg/L	0.1	<0.10	98	90-110			-	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Paterson Group
Project : PH4864

Reception Date: 2024-06-11

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Metals Scan (Water, ICP/MS)									
<i>Method : Metals (Water, ICP/MS). Internal method: AMMTFQE1.</i>									
Aluminum	mg/L	0.01	<0.01	100	80-120	105	70-130	-	0-20
Antimony	mg/L	0.0005	<0.0005	103	80-120	92	70-130	1	0-20
Arsenic	mg/L	0.001	<0.001	93	80-120	103	70-130	-	0-20
Barium	mg/L	0.001	<0.001	100	80-120	94	70-130	1	0-20
Beryllium	mg/L	0.0005	<0.0005	100	80-120	107	70-130	-	0-20
Boron	mg/L	0.01	<0.01	100	80-120	98	70-130	3	0-20
Cadmium	mg/L	0.0001	<0.0001	98	80-120	99	70-130	-	0-20
Chromium	mg/L	0.001	<0.001	100	80-120	104	70-130	-	0-20
Cobalt	mg/L	0.0002	<0.0002	101	80-120	96	70-130	1	0-20
Copper	mg/L	0.001	<0.001	100	80-120	97	70-130	-	0-20
Iron	mg/L	0.03	<0.03	100	80-120	87	70-130	0	0-20
Lead	mg/L	0.001	<0.001	100	80-120	91	70-130	-	0-20
Manganese	mg/L	0.01	<0.01	100	80-120	96	70-130	1	0-20
Mercury	mg/L	0.0001	<0.0001	108	80-120	84	70-130	-	0-20
Molybdenum	mg/L	0.005	<0.005	90	80-120	99	70-130	-	0-20
Nickel	mg/L	0.005	<0.005	100	80-120	99	70-130	-	0-20
Selenium	mg/L	0.001	<0.001	95	80-120	99	70-130	-	0-20
Silver	mg/L	0.0001	<0.0001	104	80-120	94	70-130	-	0-20
Strontium	mg/L	0.001	<0.001	90	80-120	84	70-130	2	0-20
Thallium	mg/L	0.0001	<0.0001	100	80-120	92	70-130	-	0-20
Uranium	mg/L	0.001	<0.001	100	80-120	96	70-130	-	0-20
Vanadium	mg/L	0.001	<0.001	100	80-120	104	70-130	-	0-20
Zinc	mg/L	0.01	<0.01	110	80-120	92	70-130	-	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-17 Analysis Date: 2024-06-17	
Metals Scan (Water, ICP/OES)									
<i>Method : Metals (Water, ICP/OES). Internal method: OTT-I-MET-WI48491.</i>									
Calcium	mg/L	1	<1	106	86-115	108	70-130	0	0-20
Magnesium	mg/L	1	<1	102	91-109	107	70-130	0	0-20
Potassium	mg/L	1	<1	112	87-113	121	70-130	-	0-20
Sodium	mg/L	1	<1	110	85-115	115	70-130	-	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-18 Analysis Date: 2024-06-12	
Nitrate (Water, IC)									
<i>Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.</i>									
Nitrate (as Nitrogen)	mg/L	0.1	<0.1	101	80-120	107	80-120	-	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	
Nitrite (Water, IC)									
<i>Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.</i>									
Nitrite (as Nitrogen)	mg/L	0.1	<0.1	100	80-120				
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	
pH (25°C) (Water, Automated)									
<i>Method : pH (Water, Automated Meter). Internal method: OTT-I-AT-WI45398.</i>									
pH @ 25°C		1	6.14	100	97-103			0	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Paterson Group
Project : PH4864

Reception Date: 2024-06-11

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Phenols (Water, Colorimetry)									
<i>Method : Phenols (Water, Colorimetry). Internal method: OTT-I-4AAP-WI46150.</i>									
Phenols-4AAP	mg/L	0.001	<0.001	100	75-125	98	70-130	-	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-13 Analysis Date: 2024-06-13	
Sulphate (Water, IC)									
<i>Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.</i>									
Sulphate	mg/L	1	<1	95	90-110	100	80-120	0	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	
Sulphide (Water, Colorimetry)									
<i>Method : Sulphide, S2- (Water, Colorimetry). Internal method: OTT-I-SPEC-WI45931.</i>									
Sulphide (S2-)	mg/L	0.01	<0.01	115	80-120			-	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-17 Analysis Date: 2024-06-17	
Tannin and Lignin (Water, Spec)									
<i>Method : Tannin and Lignin (Water, Spec), Internal method: OTT-I-SPEC-WI57693.</i>									
Tannin and Lignin	mg/L	0.1	<0.1	94	80-120			-	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-14	
Total Coliforms (DC Plate)									
<i>Method : Total Coliforms and E.Coli by MF (Water, DC plate). Internal method: OTT-M-BAC-WI45296.</i>									
Total Coliforms (DC)	CFU/100mL	0	0					-	0-30
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-12 Analysis Date: 2024-06-13	
Total Kjeldahl Nitrogen (Water, Colorimetry)									
<i>Method : TKN (Water, colorimetry). Internal method: OTT-I-NUT-WI46201.</i>									
Total Kjeldahl Nitrogen	mg/L	0.1	<0.100	113	70-130	92	70-130	15	0-20
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-14 Analysis Date: 2024-06-17	
Turbidity (Water, Turbidimeter)									
<i>Method : Turbidity (Water, Turbidimeter). Internal method: OTT-I-TUR-WI46288.</i>									
Turbidity	NTU	0.1	<0.1	104	80-120			4	0-30
Associated Samples : 7773595, 7773596								Prep Date: 2024-06-13 Analysis Date: 2024-06-13	

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



STANDARD CHAIN-OF-CUSTODY

146 Colonnade Road, Unit #8, Ottawa, ON, K2E 7Y1 - Phone: 613-277-5692, Fax: 613-727-5222

CLIENT INFORMATION

INVOICE INFORMATION (SAME AS CLIENT)

100288909



Printed On: 2024-06-12 13:07:50

Company: Paterson Group

Contact: Alex Schopf

Address: 9 Auriga Drive

Telephone: 613-218-3444

Email: #1: jeardeley@patersongroup.ca, mlatflamme@patersongroup.ca, mkilliam@patersongroup.ca

Email: #2: aschopf@patersongroup.ca;

Project: PH4864

TURN-AROUND TIME (Business Days)

1 Day (100%) 2 Day (50%) 3-5 Days (25%) 5-7 Days (Standard)

Please contact Lab in advance to determine rush availability.

**For results reported after rush due date, surcharges will apply: before 12:00 - 400%, after 12:00 - 50%.

**For results reported after rush due date, surcharges will apply: before 12:00 - 50%, after 12:00 - 25%.

The optimal temperature conditions during transport should be less than 10°C. Sample(s) cannot be frozen, unless otherwise indicated or agreed upon with the Laboratory. Note that this COC is not to be used for drinking water samples. 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).

Sample Details: Field Filtered -> Sample Matrix, # of Containers, PHC F1 - F4, BTEX, VOCs, PAHs, PCBs, Metals + Inorganics, Metals only, See attached paper, Subdivision Supply Bacti 2 (Eo/TC only), TSS, pH, Total Metals, Hg

Sample Analysis Required: Sanitary Sewer, City: Ottawa, Storm Sewer, City: Ottawa, od/WSO6, PWCO, O. Reg 347/558, Other: None

REGULATION/GUIDELINE REQUIRED: O. Reg 153, Table #, Course / Fine, Surface / subsurface, Type: Com-nd / Res-Park / Agr / GW / All Other / Sediment, Excess Soil Table, Type: The sample results from this submission will form part of a formal Record of Site Condition (RSC) under O. Reg. 153/04

Table with columns: Sample ID, Date/Time Collected, Sample Matrix, # of Containers, PHC F1 - F4, BTEX, VOCs, PAHs, PCBs, Metals + Inorganics, Metals only, See attached paper, Subdivision Supply Bacti 2 (Eo/TC only), TSS, pH, Total Metals, Hg, COMMENTS: Total and Trace Metals

Sampled By: Alex Schopf, Date/Time: June 11, 2024, Received By: Alex Schopf, Date/Time: June 11, 2024, CUSTODY SEAL: YES NO per packs submitted: YES NO

EASTING: 365103.937 NORTHING: 5000698.79 ELEVATION: 92.54

DATUM: Geodetic

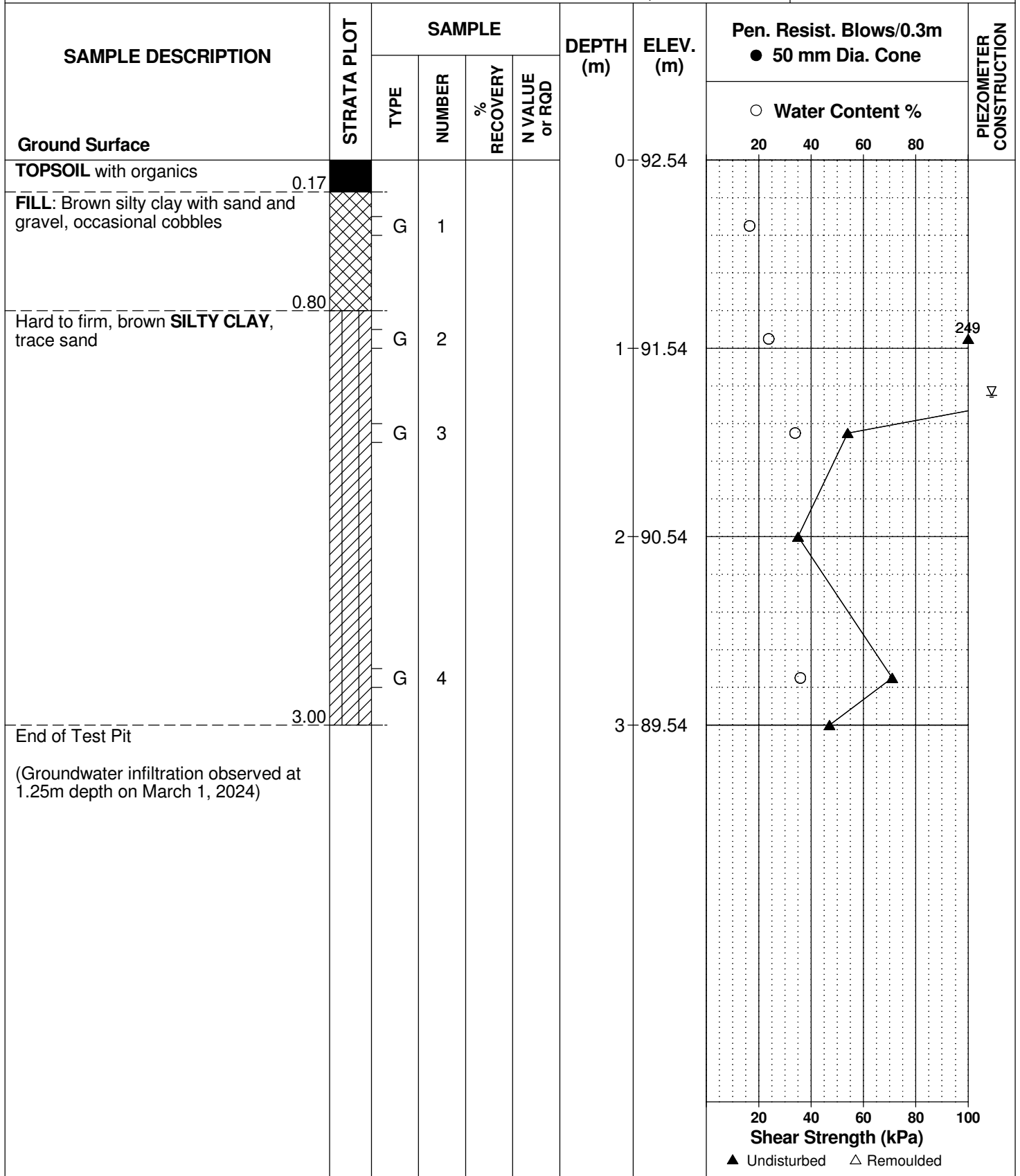
REMARKS:

BORINGS BY: Backhoe

DATE: March 1, 2024

FILE NO. **PG7022**

HOLE NO. **TP 1-24**



EASTING: 365082.851 NORTHING: 5000730.443 ELEVATION: 92.05

DATUM: Geodetic

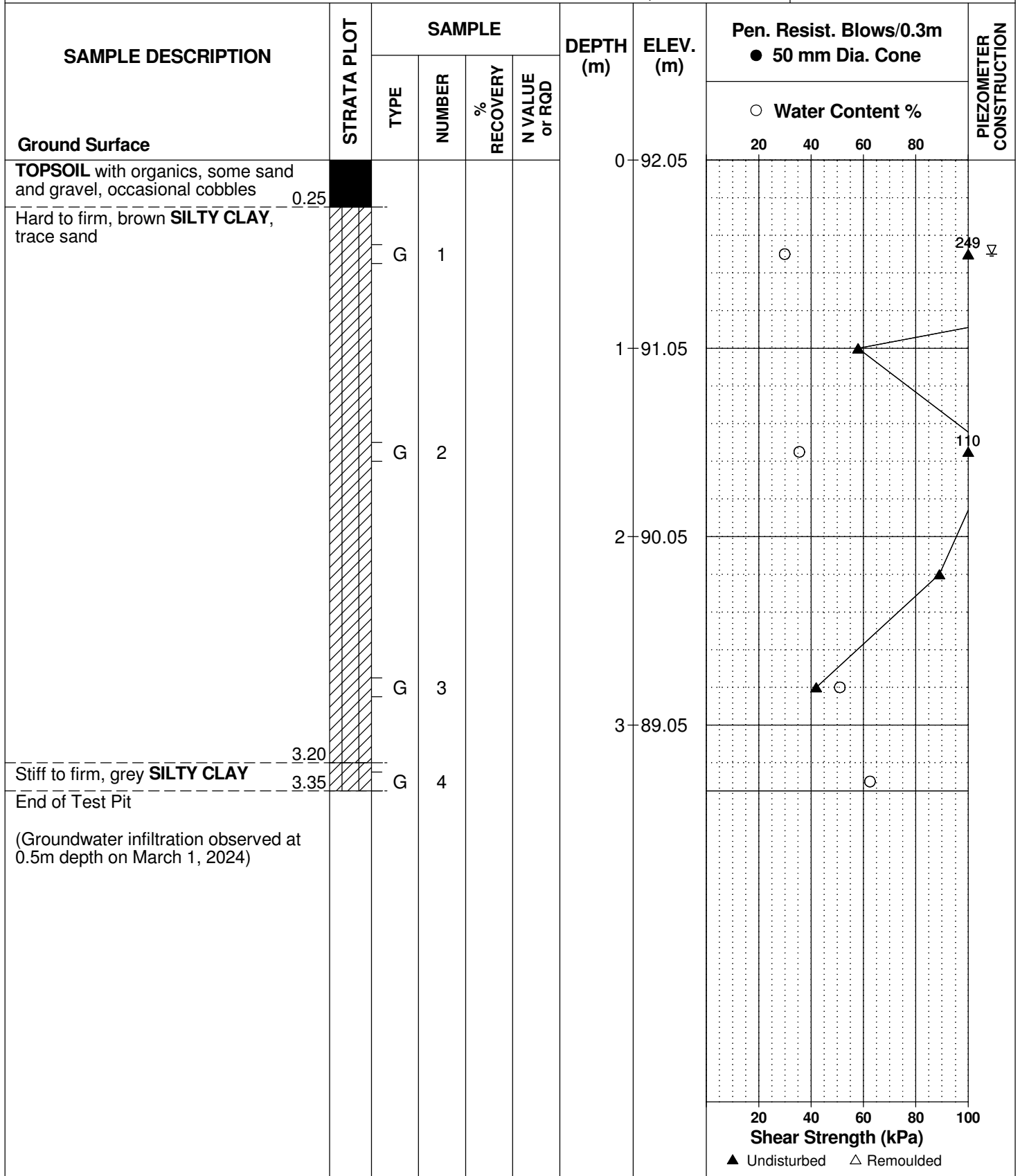
REMARKS:

BORINGS BY: Backhoe

DATE: March 1, 2024

FILE NO. **PG7022**

HOLE NO. **TP 2-24**



EASTING: 365138.314 NORTHING: 5000771.858 ELEVATION: 92.05

DATUM: Geodetic

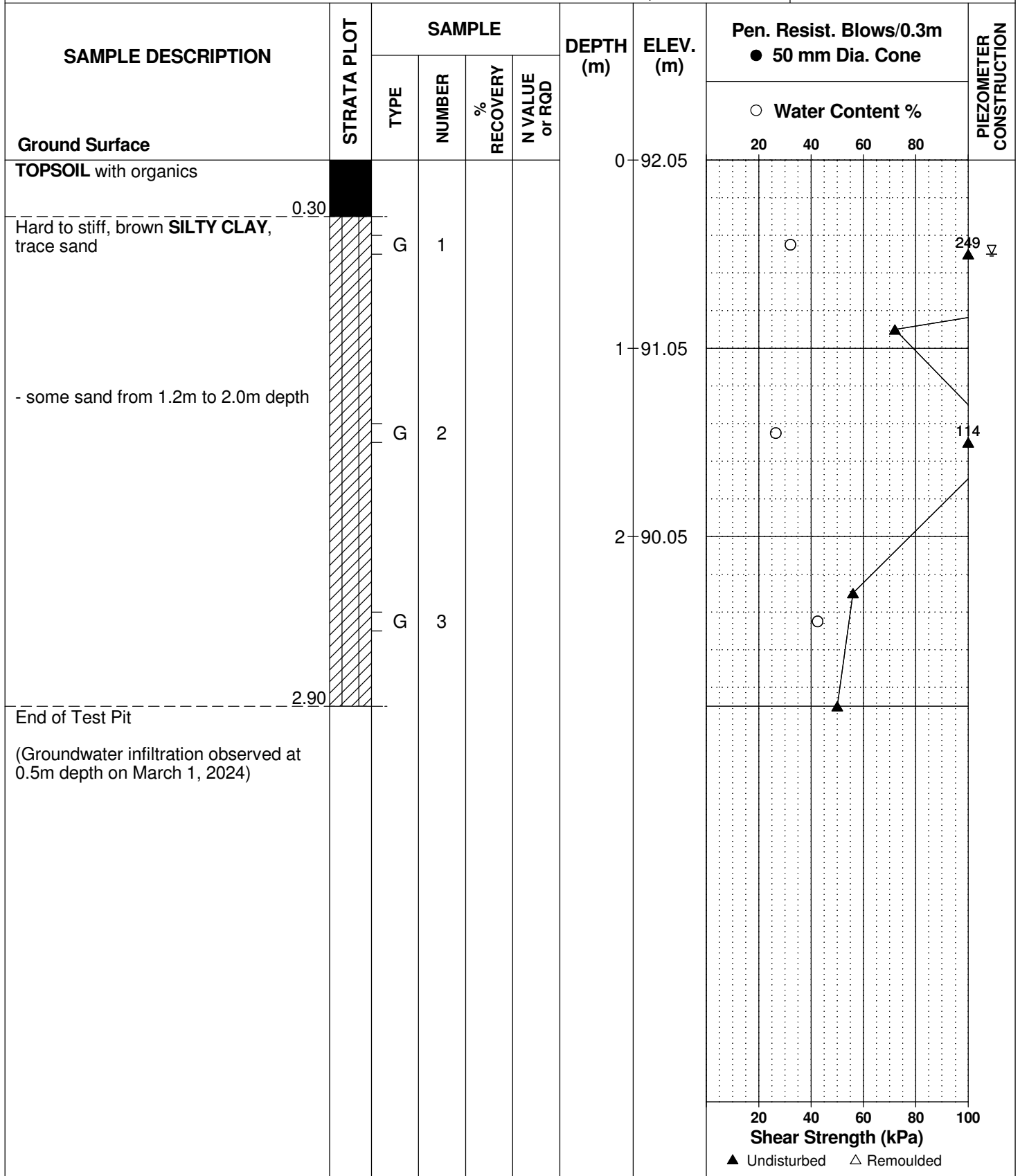
REMARKS:

BORINGS BY: Backhoe

DATE: March 1, 2024

FILE NO. **PG7022**

HOLE NO. **TP 3-24**



EASTING: 365155.177 NORTHING: 5000735.496 ELEVATION: 92.22

DATUM: Geodetic

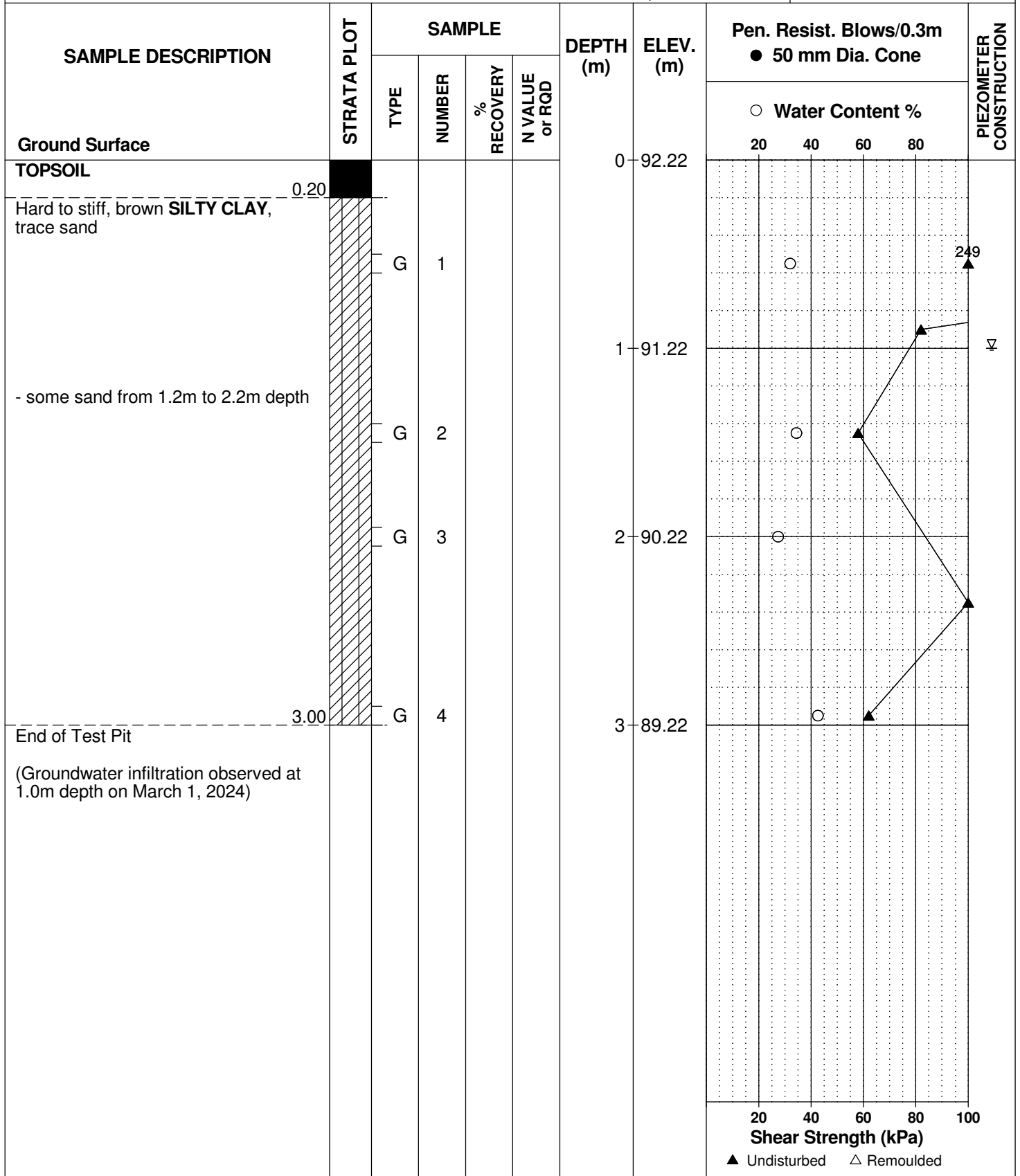
REMARKS:

BORINGS BY: Backhoe

DATE: March 1, 2024

FILE NO. **PG7022**

HOLE NO. **TP 4-24**



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Commercial Development - 6356 Fourth Line Road
 Ottawa, Ontario

EASTING: 365182.962 NORTHING: 5000724.926 ELEVATION: 92.23

DATUM: Geodetic

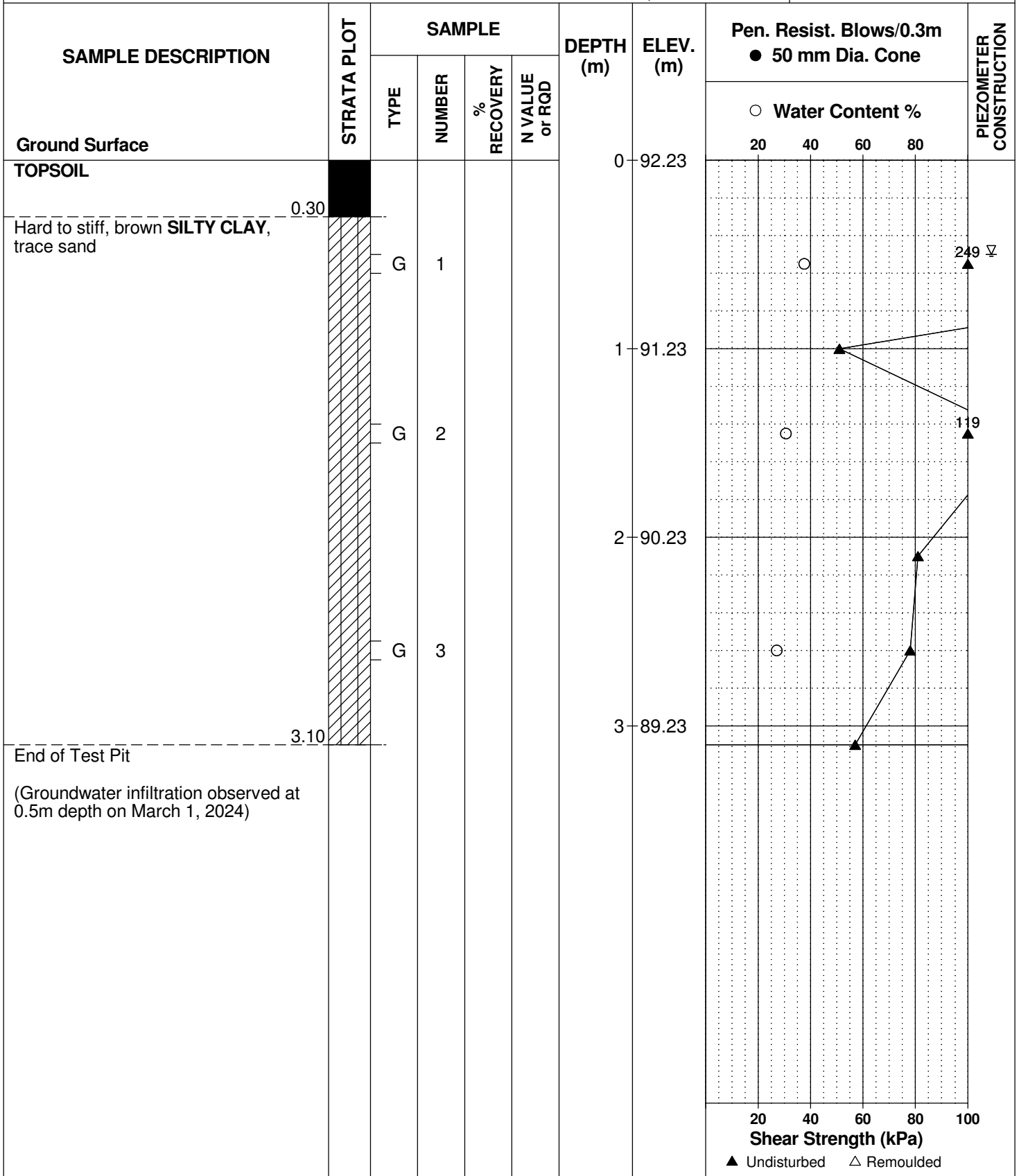
REMARKS:

BORINGS BY: Backhoe

DATE: March 1, 2024

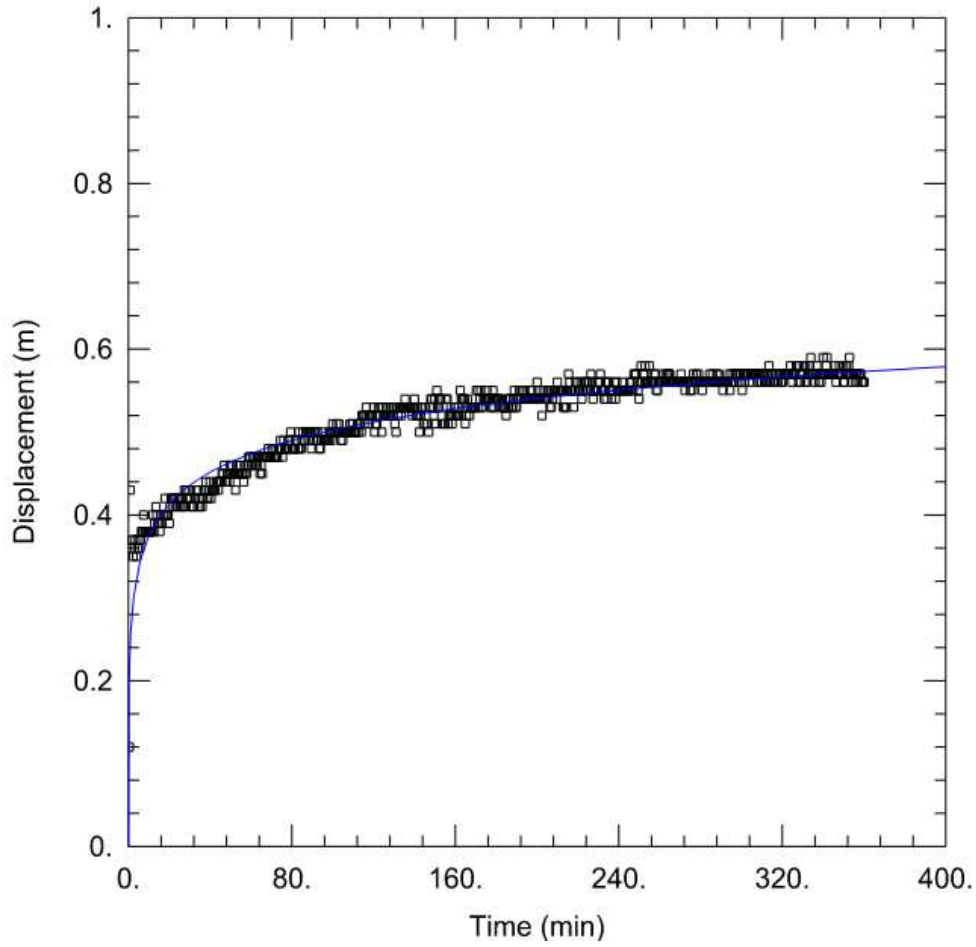
FILE NO. **PG7022**

HOLE NO. **TP 5-24**



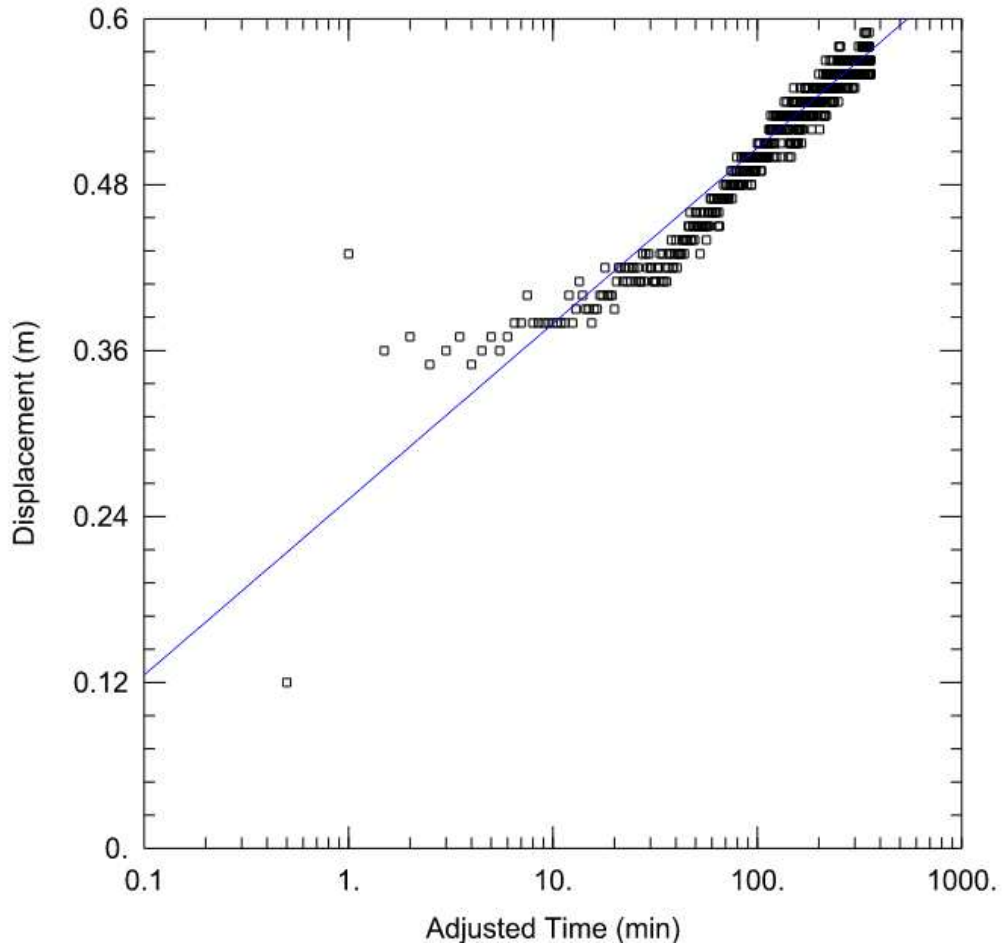
Pumping Test Analysis Report

File No.	PH4864	Well ID:	TW1
Date:	Tuesday, June 11, 2024	Solution Method:	Theis
Client:	Victoria La Valle	Transmissivity (m ² /day):	78.74
Site Address:	6356 Fourth Line Road	Discharge Rate (L/min)	38
Project:	Re-zoning Application	Analysis performed by:	AS



Pumping Test Analysis Report

File No.	PH4864	Well ID:	TW1
Date:	Tuesday, June 11, 2024	Solution Method:	Cooper-Jacob
Client:	Victoria La Valle	Transmissivity (m ² /day):	78.91
Site Address:	6356 Fourth Line Road	Discharge Rate (L/min)	38
Project:	Re-zoning Application	Analysis performed by:	AS



Pumping Test Analysis Report

File No. PH4864
Date: Tuesday, June 11, 2024
Client: Victoria La Valle
Site Address: 6356 Fourth Line Road
Project: Re-zoning Application

Summary Table:		
Solution Method:	Well ID:	Transmissivity (m ² /day):
Theis	TW1	78.74
Cooper-Jacob	TW1	78.91
Average:		78.83

patersongroup
 6356 Fourth Line Road
 PH4864

MW1 inputs			
pH	8.05	A	0.17
TDS	560	B	2.36
Calcium	88	C	1.54
Alkalinity	340	D	2.53
Temp.	11		
		pHs =	7.761320592

Langelier Saturation Index (LSI) Calculation		(Langelier, 1936)
$LSI = pH - pHs$ $pHs = (9.3 + A + B) - (C + D)$ Where: $A = (\text{Log}_{10} [\text{TDS}] - 1) / 10$ $B = -13.12 \times \text{Log}_{10} (oC + 273) + 34.55$ $C = \text{Log}_{10} [\text{Ca}^{2+} \text{ as CaCO}_3] - 0.4$ $D = \text{Log}_{10} [\text{alkalinity as CaCO}_3]$		
		LSI = 0.3
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

Infiltration Factors

Topography	0.20
Soil	0.20
Cover	0.12
Total	0.52

Site Characteristics

Area of Site :	12794	m ²
Total of roof areas:	623	m ²
Total area of paved driveway areas:	457	m ²
Roof + paved driveway areas	1080	m ²
Impervious Area	1080	m ²
Percent Impervious Area =	8	%
Infiltration Area =	11714	m ²

Septic Effluent

Concentration of Effluent (Cs) =	40	mg/L
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Infiltration Calculation

Nitrate concentration in precipitation (C _i) =	0	mg/L
Surplus Water (Environment Canada)	360	mm/yr
Factored Water Surplus =	187	mm/yr
Infiltration % due to stormwater management measures	-	%
Infiltration rate from stormwater management measures =	0	mm/yr
Infiltration Flow Entering the System (Q _i) =	6	m ³ /day

Mass Balance Model (MOEE, 1995)

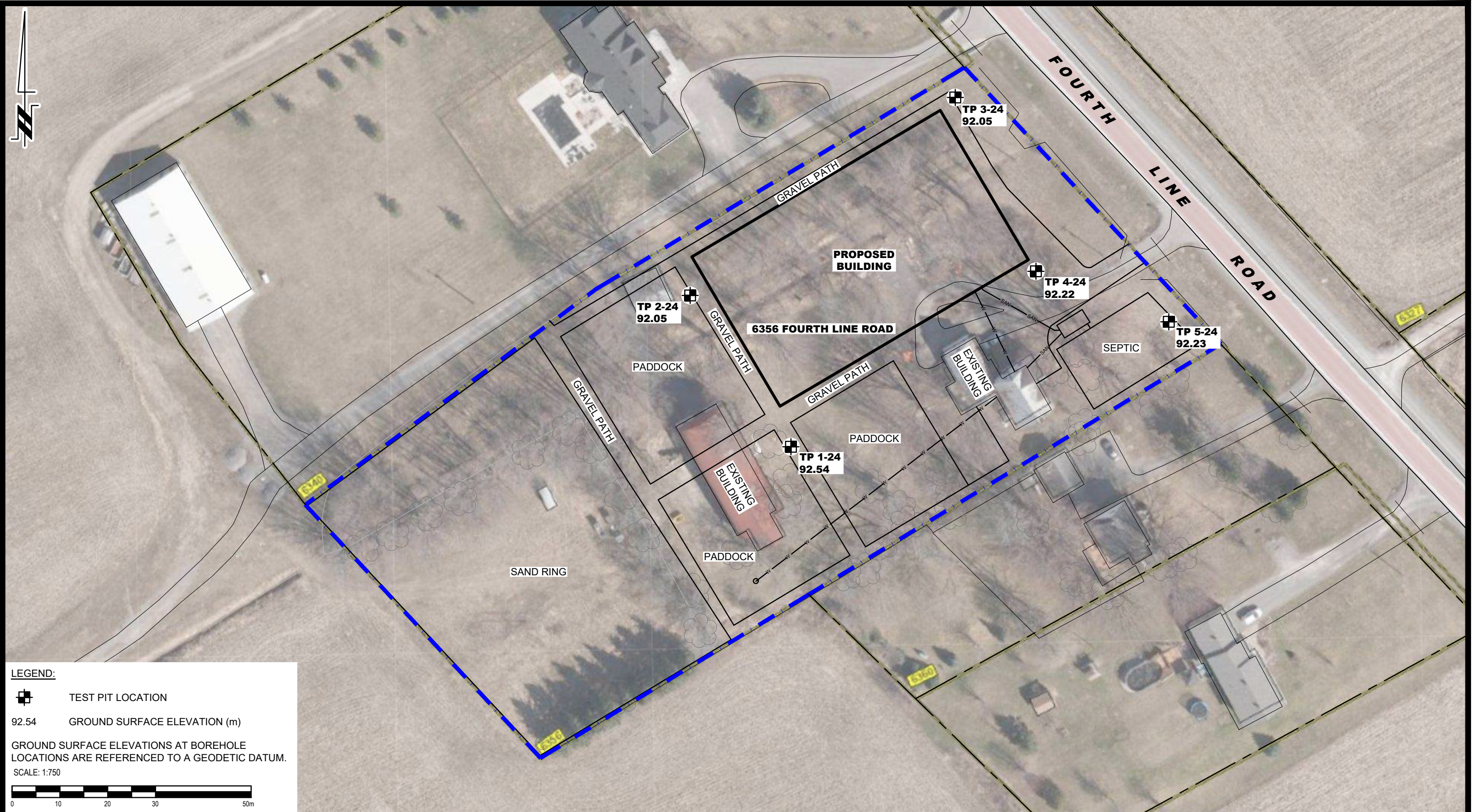
$$C_T = (Q_b C_b + Q_e C_e + Q_i C_i) / (Q_b + Q_e + Q_i) = \text{Cumulative Nitrate Concentration}$$

Q _b = flow entering the system across the upgradient area	0	m ³ /day
C _b = background nitrate concentration	0	mg/L
C _s = concentration of nitrates in the septic effluent	40	mg/L
Q _i = flow entering the system from infiltration	6	m ³ /day
C _i = Concentration of nitrates in the infiltrate	0	mg/L
C_T =	10.00	mg/L

Maximum Allowable Sewage Flow Volume

Daily Sewage Flow (Q _s)=	2.002612603	m³
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Notes: Site characteristic values were measured as approximate values from the available site plans and GeoOttawa.



9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2778317 ONTARIO INC.
GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
6356 FOURTH LINE ROAD

OTTAWA, ONTARIO

Title: **TEST HOLE LOCATION PLAN**

Scale:	1:750	Date:	03/2024
Drawn by:	GK	Report No.:	PG7022-1
Checked by:	MA	Dwg. No.:	PG7022-1
Approved by:	KP	Revision No.:	