March 01, 2018 (Revised August 24, 2018)

Our File Ref.: 170254

Mr. Bob Cousins
2930 French Hill Road
Ottawa, Ontario K4C 1K7

Attention: Bob Cousins

Subject: Hydrogeological Assessment & Terrain Analysis – Proposed Land Development
8015 Russell Road, Ottawa (Vars), Ontario

Dear Mr. Cousins,

1 INTRODUCTION

LRL Associates Ltd. (LRL) was retained by Mr. Bob Cousins to complete a hydrogeological assessment & terrain analysis at 8015 Russell Road in Ottawa (Vars), Ontario in support of a proposed commercial/industrial development. The assessment was carried out to determine if the proposed production well present on the lot can adequately and safely be supplied with potable water in accordance with the Ontario Drinking Water Standards (ODWS) and that the property has soil conditions that are suitable for on-site sewage disposal without impairing the use of groundwater resources on the site and adjacent lands.

The assessment was conducted per the MOECC *"Hydrogeological Technical Information Requirements for Land Development Applications"* (April 1995), which include the following guidelines and procedures:

- Guideline D-5 Planning for Sewage and Water Services (August 1996); and
- Procedure D-5-4 Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment (August 1996)

The assessment involved a desktop review of available information on the geology and hydrogeology of the site and adjacent lands, as well as fieldwork consisting of digging test pits for soil sampling and installation of piezometers (with groundwater sampling), as well as installation of a test well for conducting a 24 h pump test with further groundwater sampling of the quality of the aquifer in the area.

2 SITE AND AREA DESCRIPTION

The site is located at 8015 Russell Road in a Rural Heavy Industrial (RH) zoned area of Ottawa (Vars), Ontario. The location of the subject site is presented in **Figure 1**. The site is irregular in shape, being approximately 640 m wide (east-west) by between 110 and 153 m deep (north-south) with a total site area of approximately 89,954 m². The property is currently undeveloped with fields/cleared land and mature treed areas, see **Figure 2**. It is understood that the property

will be developed with a commercial office building with an approximate 1,859 m² footprint, supplied with a private well and septic, see **Figure 3** for proposed locations. Historical photos of the site indicated earth-moving activities in the central portion of the property since 2005[1], although it is LRL's understanding that no development took place. Land development in the surrounding area consists of mostly agricultural, low density residential and industrial land use, such as:

- Residential and vacant land to the north;
- Russell Road, followed by residential and agricultural land use to the south;
- Industrial (Tomlinson Ready Mix Concrete Supplier) to the east; and
- Frank Kenny Road, followed by residential and agricultural land use to the west.

The topography of the land is generally flat with an approximate elevation around 72 m above mean sea level. The nearest bodies of water are Shaws Creek located 72 m west from the south-west corner of the property line, and a tributary of Shaws Creek located 177 m north from the north-east corner of the property.

3 PROPOSED WATER SUPPLY

A newly constructed test well/proposed production well (TW1) (Well Tag No. A236235) was installed on the site by Bourgeois Well Drilling in January 2018 in order to assess the potential quality and quantity of the bedrock aquifer. It is proposed that TW1 be used as the production well for the proposed development. The approximate location of TW1 is presented in **Figure 2**.

A copy of the Water Well Record (WWR) is included in **Appendix A**. It was described on the WWR for TW1 that the underlying subsurface material encountered was brown clay with silt from grade to 3.1 m bgs, transitioning to grey clay with silt from 3.1 to 4.8 m bgs, over grey shale to a depth of 36.6 m bgs where the well was terminated. The recommended pumping rate was indicated as 100 L/min.

4 GEOLOGY & HYDROGEOLOGY

4.1 Geological Mapping

Surficial soil deposit maps[2] indicate that overburden material consists of a till, plain/ hummocky to rolling with local relief less than 5 m (to the north and southern portions of site) and/or between 5 – 25 m in the central portion of the site. The bedrock maps[3] indicate similar bedrock that is described as limestone, dolostone, shale, arkose and sandstone.

4.2 Water Well Record Review

A search of the Ontario Ministry of the Environment and Climate Change (MOECC) WWR database was conducted to locate available WWRs within 500 m of the site based on reported UTM coordinates thirteen (13) WWRs were available. Copies of available WWRs are included in **Appendix A** and their approximate locations are presented in **Figure 4**.

[1] City of Ottawa; geoOttawa Interactive Mapping Software; Retrieved from https://ottawa.ca/en/city-hall/get-know-your-city/maps-ottawa#geoottawa; 2018.
[2] St-Onge, D.A., Surficial Geology, Lower Ottawa Valley, Ontario, Map 2140A, Geological Survey of Canada, 2009.
[3] Ontario Geological Survey 1991. Bedrock geology of Ontario, southern sheet; Ontario Geological Survey, Map 2544, scale 1:1 000 000.

4.2.1 Subsurface Stratigraphy

The general subsurface conditions described in the thirteen (13) well records from within 500 m radius of the site are as follows:

MOE Well Number	Distance and Direction from Site (m)	Depth (m)	Subsurface Stratigraphy				Groundwater Encountered (m)	Static Water Level (m)	Type of water
			Clay (m)	Sand (m)	Gravel/ hard-pan (m)	Weathered Bedrock/ Bedrock (m)			
7179701	47 SW	18.4	3.1 - 6	0 – 3.1	6 – 7.1	7.1 – 18.4 (Limestone)	15	1.62	Untested
7229010	68 SW	18.1	0 – 7.27	--	7.27 – 9.09	9.09 – 18.1 (Limestone)	9.09	2.82	Fresh
7229011	53 SW	18.8	0 – 9.09	--	9.09 – 10.9	10.9 – 18.8 (Limestone)	10.9	2.77	Fresh
7229012	51 SW	12.7	0 – 7.27	--	7.27 – 9.09	9.09 – 12.7 (Limestone)	9.09	2.8	Fresh
1535359	46 SW	18.2	0.6 – 3.0	0 – 0.6	3.0 – 6.0	6.0 – 18.2	15.8; 13.7	2.65	Fresh
7207127	25 W	18.5	0 – 4.5	--	--	4.5 – 18.5 (Limestone)	17	3.21	Untested
5606153	32 SW	23.8	0 – 6.09	--	--	6.09 – 23.8 (Shale)	22	4.15	Fresh
1511791	38 SW	33.8	0 – 7.3	--	--	7.3 – 33.8 (Shale/Limestone)	21.3; 33.5	1.5	Fresh
1519681	55 NE	12.8	--	--	0 – 4.8	4.8 – 12.8 (Shale)	8.8	5.4	Fresh
1521089	55 NE	10.1	--	--	0 – 4.8	4.8 – 10.1 (Shale)	9.4	1.8	Fresh
1522272	42 SE	36.5	--	--	0 – 2.7	2.7 – 36.5 (Limestone)	21.3; 35.1	10.6	Fresh
1533155	55 NE	36.6	0 – 3.96	--	--	3.96 – 36.5 (Shale)	7.6; 30.4	3.0	Fresh
1533156	56 NE	57.9	0 – 4.5	--	--	4.5 – 57.9 (Limestone/Shale)	7.6	3.0	Fresh

*Distances are based on NAD83 UTM coordinates provided on the WWRs.

The well records show that that the geological conditions within 500 m are generally similar and described to consist of till material including sand, clay, hardpan and/or gravel material (from surface to 10.9 m below ground surface (bgs)), over limestone and/or shale bedrock (from 2.7 to 10.9 m bgs. Of the thirteen (13) well records found, all were drilled wells into bedrock. The well depths ranged from 10.1 to 57.9 m bgs.

5 FIELDWORK

5.1 Test Pits and Piezometer Installation

On January 18, 2018, four (4) test pits were completed across the proposed retained lot to determine the general upper soil and groundwater conditions, as well as to establish the depth of overburden in the area. The test pits were advanced using a hydraulic shovel operated by the client. LRL was present to supervise and document the advancement of the test pits. The locations of the test pits are presented in **Figure 2** with the test pit logs included in **Appendix D**.

The general subsurface stratigraphy encountered in the test pits consisted of a layer of sand and gravel fill with concrete and brick debris (up to approximately 1.9 m bgs), over silty grey clay (with the exception of sand in TP2), up to at least 2.8 m deep. Bedrock was not encountered in the test pits. Water was found at approximately 1.2 to 2.1 m bgs.

A 25 mm open tube PVC piezometer was installed in test pits TP1, TP2, TP3 and TP4 to allow for groundwater elevation measurement and sampling of the perched water found in the overburden, herein referred to as groundwater. Groundwater samples were collected from piezometers TP1, TP2, TP3 and TP4 on January 18, 2018 and were submitted for laboratory analyses for select nitrate species parameters. The laboratory Certificate of Analysis is included in **Appendix C.** Select soil samples from TP1, TP2 and TP3 were submitted to LRL's Materials Testing Laboratories for grain size/sieve and hydrometer analysis. Laboratory results reported that the subsurface native soil in the submitted soil samples consist of silty clay with trace to some fine to medium sand, with the exception of TP2 that indicated native fine to medium grained sand with some silt and clay and trace fine gravel. The laboratory certificates of analysis are included in **Appendix E**.

5.1.1 Pumping tests

5.1.1.1 Initial Pumping Test

LRL conducted a pumping test on the TW1 on January 24 and 25, 2018 in order to assess the quality and quantity of the aquifer. TW1 was pumped for a total of 1860 min (approximately 31 h) at 44 L/min for the first 8 h, and then at 26 L/min for the duration of the test.

The drawdown was measured during the pumping and recovery periods using an electronic water level tape. Following the pump's cessation, the pumping well's recovery was monitored until a minimum of 95% recovery was achieved.

5.1.1.2 Additional Pumping

The results of the initial pumping test indicated that TW1 was not fully developed at the end of the pumping test. Therefore, further development of the well was conducted to ensure representative groundwater quality. The well development activities of the well included additional pumping of the well until field observations and readings, primarily turbidity, were acceptable. The additional pumping was conducted on July 10 and 11, 2018. The well was pumped for 30 h (1,800 min) at an average pumping rate of 34 L/min for the duration of the test.

5.2 Groundwater Quality

5.2.1 Field measurements

Throughout the pumping test the following field parameters were measured and recorded:

- Turbidity, chlorine and colour using a Lamotte TC-3000 Trimeter; and
- Conductivity, total dissolved solids (TDS) and pH using a portable meter (Hanna Instruments HI 98129).

A summary of the field measurements is provided in the table included in **Appendix B.**

5.2.2 Groundwater Samples

Groundwater samples were collected for laboratory analysis during the pumping test to assess the quality of the proposed supply aquifer. During the initial pumping test, water samples were collected after three (3), eight (8), and thirty-one (31) hours of pumping. The water samples were collected directly into laboratory prepared bottles and were submitted to the laboratory for analysis of a "subdivision" package. The Certificates of Analysis from Paracel Laboratories Ltd. (Ottawa, Ontario) are included in **Appendix C**. The groundwater analytical results are discussed in Section 6.1.2.

During the additional pumping, groundwater samples were collected after twenty-four (24) and thirty hours (30) of pumping. The water samples were collected directly into laboratory prepared

bottles and were submitted to the laboratory for analysis of a “subdivision” package. The laboratory Certificate of Analysis from Paracel Laboratories Ltd. (Ottawa, Ontario) is included in **Appendix C**. The groundwater analytical results are discussed in the Section 6.1.3.

5.3 Groundwater Quantity

5.3.1 Pumping Test

On January 24 and 25, 2018, TW1 was pumped at approximately 44 L/min for 8 hours, then at 26 L/min for the duration of the test. The field data of the pumping tests, which include flow rates, water levels and measurement intervals, are presented in **Appendix B.** The maximum drawdown throughout the test was approximately 3.37 m or 10% of the available water column in the well.

5.3.2 Additional Pumping

On July 10 and 11, 2018 the well was pumped for 30 h (1,800 min) at an average pumping rate of 34 L/min for the duration of the test. Monitoring for drawdown and recovery was not included in the scope.

6 RESULTS

6.1 Water Quality

6.1.1 Groundwater Results

The analytical results for the samples collected during the January 24 and 25, 2018 pumping test and additional pumping on July 10 and 11, 2018 are summarized in **Table 1** along with the relative ODWS for the parameters tested.

The final sample (after 31 h of pumping) collected during the initial pumping test exceeded the ODWS aesthetic objectives (AO), operating guidelines (OG) or maximum acceptable concentrations for fecal coliforms, turbidity, colour, pH, sulphide, iron, sodium and hardness. Following additional well development on November 7, 2018, the analytical results for the final sample (after 30 h of pumping) meet the ODWS for the parameters tested except for the following:

- Turbidity was reported at a level of 1.8 NTU, above the MAC of 1 NTU if a treatment system is required to provide filtration and above the AO of 5 NTU. The level is below the D-5-5 level considered reasonably treatable of 5 NTU. However, given that the water sample had acceptable microbial results and filtration is not required for disinfection the turbidity level is considered acceptable.
- Sulphide was reported to be 1.07 mg/L, above the AO of 0.05 mg/L. Sulphide can cause an unpleasant taste and odour. Sulphide can be reduced by an aeration system.
- Sodium was reported to be 126 mg/L, below the ODWS AO and the level considered reasonably treatable in Procedure D-5-5 of 200 mg/L. However, the concentrations are above the 20 mg/L warning level notification limit for those on a sodium restricted diet. The local Medical Officer of Health should be notified of these levels so that this information may be communicated to local physicians with regards to homeowners who follow a sodium-restricted diet. Sodium can be reduced through the use of a point-of-use reverse osmosis system, if required.
- Hardness was reported to be 11.1 mg/L after thirty (30) hours of pumping, which is below the Operational Guideline (OG) of 80 mg/L.
    - The Langelier Saturation Index (LSI) is used to determine the calcium carbonate stability of water and the pH at which water is saturated with calcium carbonate (pHs). The Ryznar Stability Index (RI) is used to determine the

aggressiveness of water which can indicate the scale and corrosion potential. The calculations for RI and LSI for the thirty (30) h sample are shown in **Table 2**. Using a water temperature of 10°C, the LSI was calculated to be -0.3 which indicates the water is slightly corrosive but not scale forming. The RI was calculated to be 9.1 which indicate intolerable corrosion. Corrosion resistant plumbing is recommended.

6.2 Water Quantity

6.2.1 Water Quantity of wells within 500 m radius

A summary of the quantity of water reported for the thirteen (13) wells within a 500 m radius of the site are in the following table. The well records are included in **Appendix A** and their approximate locations are presented in **Figure 4**.

MOE Well Number	Distance and Direction from Site	Depth (m)	Pump Test Details					
			Pump Rate (L/min)	Duration (min)	Drawdown (m)	Specific Capacity (L/s/m)	Recovery (%)	Recommended Pump Rate (L/min)
7179701	47 SW	18.4	6.45	60	4.8	0.022	100	6.45
7229010	68 SW	18.1	63	60	0.7	1.50	100	90
7229011	53 SW	18.8	63	60	0.53	1.98	100	63
7229012	51 SW	12.7	58.5	60	6.25	0.156	100	67.5
1535359	46 SW	18.2	60	60	1.8	0.556	98	22.7
7207127	25 W	18.5	20	60	2.16	0.154	99	20
5606153	32 SW	23.8	20	60	2.67	0.125	86	30
1511791	38 SW	33.8	--	60	9.1	--	--	45.4
1519681	55 NE	12.8	26.5	60	2.5	0.177	--	18.9
1521089	55 NE	10.1	94.7	60	1.5	1.05	--	37.9
1522272	42 SE	36.5	30.3	90	25.9	0.019	--	22.7
1533155	55 NE	36.5	94.7	60	9.0	0.175	--	56.8
1533156	56 NE	57.9	11.3	120	54.9	0.003	72	11.3

As shown, the wells identified in the WWRs tap into the bedrock aquifer. Based on the details provided in the well records obtained, the recommended pumping rates were reported to be between 18.9 L/min and 94.7 L/min, with two (2) records being lower at 6.45 L/min and 11.3 L/min.

6.2.2 Quantity of TW1 (A236235)

The pumping test was conducted on January 24 and 25, 2018. The initial static water level was measured as 1.48 m below top of casing (BTOC). The drawdown at eight (8) hours of pumping at 44 L/min was 3.37 m bgs. This represents approximately 10% of the available drawdown in the well. At eight (8) hours the pumping rate was adjusted to 26 L/min, with a drawdown of 2.52 m bgs, representing 7% of the available drawdown. The specific capacity of the well after eight (8) hours of pumping is calculated to be 0.218 L/s/m.

The well achieved approximately 97.9% recovery within 76 minutes of the end of pumping. Based on the observed drawdown and recovery, it is concluded that the long-term yield of TW1 is in excess of the tested pumping rate of 44 L/min.

6.2.2.1 Quantity for Proposed Development Use

The proposed development involves construction of a multiuse 1,895 m^2 building on the center portion of the property; therefore, the required aquifer yield has been derived from the City of Ottawa's Water Distribution Guidelines, July 2010 and the MOECC's Design Guidelines for Drinking-Water Systems, 2008.

The anticipated average daily flow demands have been evaluated based on the septic design prepared by Dimensional Analysis. See **Appendix F** for attached septic design and sewage system details.

Based on the septic design, the anticipated daily flow demand is 2,850 L/day. The average daily flow demand was estimated based on the anticipated daily flow demand of 2,850 L/day over an 8 hour period as 5.9 L/min. The maximum daily flow is estimated as 4,275 L/day or 8.9 L/min (1.5 times the average daily flow) and the peak hourly flow is estimated as 16.0 L/min (1.8 times the maximum daily flow).

7 TERRAIN ANALYSIS

7.1 General

The terrain analysis was conducted to demonstrate that the unconsolidated material on the site is appropriate for the construction of an on-site subsurface sewage disposal system.

The subsurface conditions indicated for the site are considered suitable for a Class IV septic sewage disposal system with a fully raised leaching bed depending on the lot specific soil and groundwater conditions at the actual location of the proposed septic system leaching bed. The leaching bed should be constructed to conform to the specifications set out in the Ontario Building Code (OBC).

As part of this assessment, an analysis was carried out to ensure that sufficient space exists on the property for the construction of a septic system in accordance with the OBC. Based off septic designs and sewage system details an area of approximately 882 m^2 is required for the septic bed assuming 8 pipes each having a length of 18.2 m and a spacing of 1.6 m between the pipes, with mantle of 15 m in length along the down gradient portion of the bed. See **Appendix F** for details.

It is proposed that a lot size of 89,954 m^2, with 85,137 m^2 of area available for infiltration is considered sufficient area for the installation of a septic system in accordance with the OBC to service a commercial/industrial property with a design sewage flow of up to 2,850 L/day, see **Table 4** for nitrate attenuation calculations.

7.2 Groundwater Results from Test Pits

Table 3 summarizes the water quality analysis from the test pit piezometers for nitrates, nitrites, ammonia and total kjeldahl nitrogen (TKN). The Laboratory Certificate of Analysis are included in **Appendix C**.

Levels of nitrate and nitrite were non-detect (<0.1 and <0.05 mg/L, respectively) with the exception of nitrate in TP2 which was 0.3 mg/L; and nitrite in TP2 which was 0.97 mg/L and <0.25 mg/L in TP3. All results remained below the MAC of 10 mg/L for nitrate and 1 mg/L for nitrite.

7.3 Groundwater Impact Assessment

The groundwater impact assessment addresses the ability of the land to attenuate the sewage effluent created by the development. Three methods for conducting the assessment are outlined in MOE's *Procedure D-5-4 Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment* (1996):

- *Lot Size Consideration* for lot greater than 10,000 m^2;
- *System Isolation Consideration* for areas where the septic system is hydrogeologically isolated from the potable water source; and
- *Contaminate Attenuation Consideration* for sites that do not meet the above two points.

Based on the review of the available information and site visit, the site is not hydrogeologically sensitive (i.e. areas of karst formations, bedrock outcrops, or thin soil over highly permeable soils).

In this hydrogeological assessment the "***Contaminant Attenuation***" case was considered.

7.3.1 Contaminant Attenuation Method (Predictive Assessment)

The Contaminant Attenuation Method (Predictive Assessment) was used to determine the impact of the individual on-site septic systems at the boundary of the proposed developed lot. This procedure assesses the risk that the individual on-site systems will cause the concentration of the nitrate-nitrogen at the boundary to exceed 10 mg/L at the property boundaries. Dilution is the attenuation mechanism considered for nitrates, with precipitation being the only source of infiltration. The following parameters and assumptions were used in the nitrate attenuation calculations:

- Infiltration factors for the proposed development lot was;
    a. Flat topography;
    b. An assumption of clay loam;
    c. Cultivated Land/ woodland;
    d. Background nitrate concentration was not detected in submitted water samples thus for this calculation the background concentration is set to 0 mg/l;
    e. Impervious areas of 1,895 m^2 for the building and 2,922 m^2 of impervious area; and
    f. Moisture surplus values from the Ottawa weather station (Environment Canada, 2011). This value is considered representative of Vars, Ontario.

The detailed calculations for the proposed development is presented in the attached Nitrate Attenuation Calculations table, see **Table 4**. Based on the proposed lot size and soil conditions, the calculated levels of nitrates at the property limits will be 2.05 mg/L respectively. This meets the procedure's guideline of 10.0 mg/L at the properties boundaries. Based on the "***Contaminant Attenuation Method***" the currently proposed severed lot size and soil conditions are suitable to attenuate the nitrate impacts generated by the septic systems on the development.

8 CONCLUSIONS

Based on the results of this investigation the following conclusions are made:

- A test well/proposed production well (TW1) was installed on the site and was tested for quality and quantity in accordance with MOECC Procedures D-5 & D-5-4. TW1 was completed into the inferred shale bedrock to a depth of approximately 36.6 m bgs.
- Based on the results of the investigation the long-term yield of TW1 appears to be in excess of the tested rate of 44 L/min.
- Based on LRL's desktop review of the hydrogeology and geology of the site and surrounding area, site visits and calculations for the "Contaminant Attenuation Method"; a total lot size of 89,954 m^2 (with 27,647 m^2 of the total lot size consisting of cultivated land), produces a calculated nitrate level at the limits of the proposed severed lot as 2.9 mg/L, below the procedure's guideline of 10 mg/L. Therefore, the soil conditions are suitable to attenuate the nitrates.
- The results of the final sample submitted from TW1 on July 11, 2018 generally met the Procedure D-5-5 and ODWS limits for the tested parameters with the following exceptions:
    - Turbidity was reported at a level of 1.8 NTU, above the MAC of 1 NTU if a treatment system is required to provide filtration and above the AO of 5 NTU. The level is below the D-5-5 level considered reasonably treatable of 5 NTU. However, given that microbial parameters (E. coli, total coliforms and fecal coliforms) were not reported in the final sample, filtration is not required for disinfection. Therefore, the turbidity level is considered acceptable and no treatment is required.
    - Sulphide was reported to be 1.07 mg/L, above the AO of 0.05 mg/L.
    - Sodium was reported to be 126 mg/L, below the ODWS AO and the level considered reasonably treatable in Procedure D-5-5 of 200 mg/L. However, the concentrations are above the 20 mg/L warning level notification limit for those on a sodium restricted diet.
    - Hardness was reported to be 11.1 mg/L after thirty (30) hours of pumping, which is below the Operational Guideline (OG) of 80 mg/L.
        i. The Langelier Saturation Index (LSI) is used to determine the calcium carbonate stability of water and the pH at which water is saturated with calcium carbonate (pHs). The Ryznar Stability Index (RI) is used to determine the aggressiveness of water which can indicate the scale and corrosion potential. The calculations for RI and LSI for the thirty (30) h sample are shown in **Table 2**. Using a water temperature of 10°C, the LSI was calculated to be -0.3 which indicates the water is slightly corrosive but not scale forming. The RI was calculated to be 9.1 which indicate intolerable corrosion.

9 RECOMMENDATIONS

Based on the results of this investigation the following recommendations are made:

1. Conventional treatment options exist for the aesthetic parameters exceeding the ODWS and D-5-5 guidelines in the samples collected on November 7, 2018, which include the following:
    - Sulphide can cause an unpleasant taste and odour which at this level can be reduced by aeration. This would be housed immediately after the pressure tank.
    - Sodium is above the 20 mg/L warning level for persons on a sodium restricted diet. The local Medical Officer of Health should be notified of these levels so that this information may be communicated to local physicians with regards to homeowners who follow a sodium-restricted diet. Sodium can be reduced through the use of a point-of-use reverse osmosis system, if required. This would be installed at any cold-water tap designated for drinking purposes.
    - Hardness is below the operating guideline. No feasible options exist to increase the hardness.
2. A water treatment specialist should be consulted prior to the final design and installation of any water treatment system.
3. The owner is advised to have their water regularly analysed for bacteria and septic indicator parameters, such as chloride, ammonia, nitrates, nitrites, Total Kjeldahl Nitrogen, E. coli and total coliforms.
4. Corrosion resistant plumbing is recommended due to intolerable corrosion potential indicated in the calculated Ryznar Stability Index.
5. All future wells shall be drilled by a licensed well contractor in accordance with Ontario Regulation 903/90, as amended and the MOECCs Water Supply Wells - Requirements and Best Management Practices (December 2009). The construction, casing and sealing must comply with the applicable regulation and practices. The well casing should be installed into sound bedrock to a minimum depth of 6.1 m below the final surface grade. The owner should maintain their well as outlined in the Ontario Ministry of Agricultural and Rural Affairs Best Management Series – Water Wells and O. Reg. 903/90: Wells.
6. Future wells should not be installed deeper than TW1 (i.e. 36.6 m) due to the uncertainty of the water quality in the deeper aquifer. The water in any new well should be tested for similar parameters as in this assessment. If a deeper well is required, similar testing is recommended. Prior to testing the well should be developed to ensure that representative samples are collected.
7. Should the test well not be used or required to supply future intended use it must be decommissioned in accordance with Ontario Regulation 903/90.

10 LIMITATIONS

The findings contained in this report are based on data and information collected during the Hydrogeological Assessment & Terrain Analysis of the subject property conducted by LRL Associates Ltd. The conclusions and recommendations are based solely on the site conditions encountered at the time of our fieldwork on January 10 and 11, 2018; July 24 & 25, 2018, supplemented by desktop information and data obtained as described in this report. The information presented in this report represents the soil and groundwater conditions at the locations sampled. Due to natural variations in geological conditions, no inference is made to the

soil or groundwater conditions between sampling points. No assurance is made regarding changes in conditions subsequent to the time of this investigation. If additional information is discovered or obtained, LRL Associates Ltd. should be requested to re-evaluate the conclusions presented in this report and to provide amendments as required.

In evaluating the subject property, LRL Associates Ltd. has relied in good faith on information provided by individuals as noted in this report. We assume that the information provided is factual and accurate. We accept no responsibility for any deficiencies, misstatements or inaccuracies contained in this report as a result of omissions, misinterpretation or fraudulent acts of the persons contacted.

Yours truly,
LRL Associates Ltd.

Matthew Whitney, P. Eng.

Encl:

Figures:

- Figure 1: Site Location
- Figure 2: Site Plan with Test Well & Test Pits Locations
- Figure 3: Proposed Building & Septic Location Schematic
- Figure 4: MOECC Wells Within 500 m Radius of The Site

Tables:

- Table 1: Summary of Analysis of Water Sample Collected from Supply Well
- Table 2: Langelier and Ryznar Calculations- 8015 Russell Road 30 h – July 25, 2018
- Table 3: Summary of Analysis of Water Samples Collected from the Test Pits
- Table 4: Nitrate Attenuation Calculations

Appendices:

- Appendix A: Well Records of Wells Within 500 m of Site
- Appendix B: Pump Test Data
- Appendix C: Laboratory Analysis
- Appendix D: Test Pit Logs
- Appendix E: Sieve/Hydrometer Analysis Results
- Appendix F: Septic Design

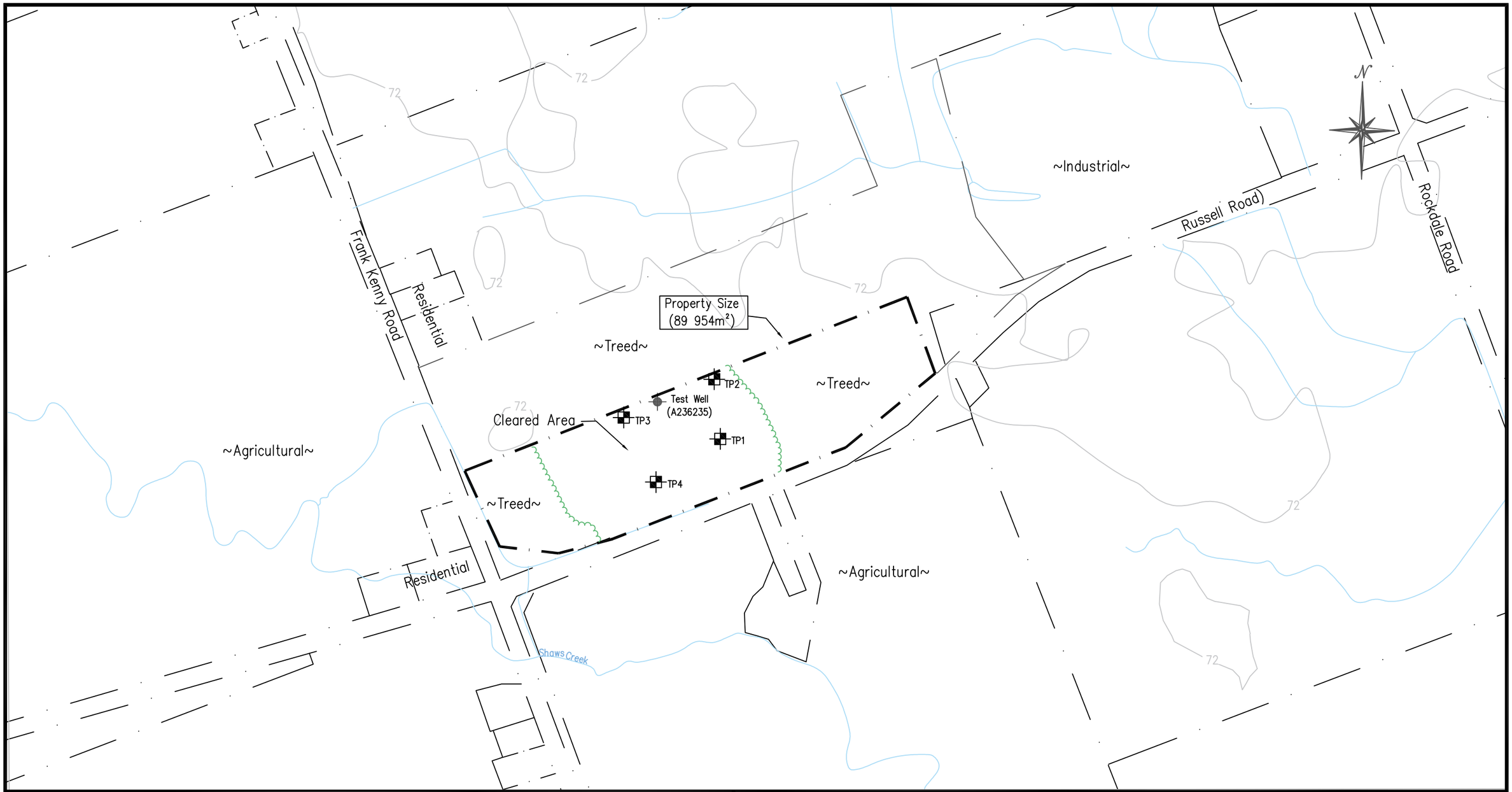
FIGURES

ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

PROJECT
HYDROGEOLOGICAL ASSESSMENT & TERRAIN ANALYSIS FOR PROPOSED COMMERCIAL DEVELOPMENT
8015 RUSSELL ROAD
OTTAWA (VARS), ONTARIO

DRAWING TITLE
SITE LOCATION
(NOT TO SCALE)
SOURCE: geoOttawa

CLIENT	DATE	PROJECT	
BOB COUSINS	AUGUST 2018	170254	FIGURE1



Legend

- Property Line
- Surface Water (according to City of Ottawa, Interactive geoOttawa Mapping)
- 99 — Groundsurface Contour Line
- Division of Surface Materials
- Existing Treeline
- TP99 — Test Pit
- Test Well

100m 50 0 100 200m

SCALE: 1:5000

No.	REVISIONS	BY	DATE
01	ISSUED FOR REVIEW	A.S.	09/02/2018

LRJ
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
BOB COUSINS

DESIGNED BY:	DRAWN BY:	APPROVED BY:
A.S.	A.S	M.W.

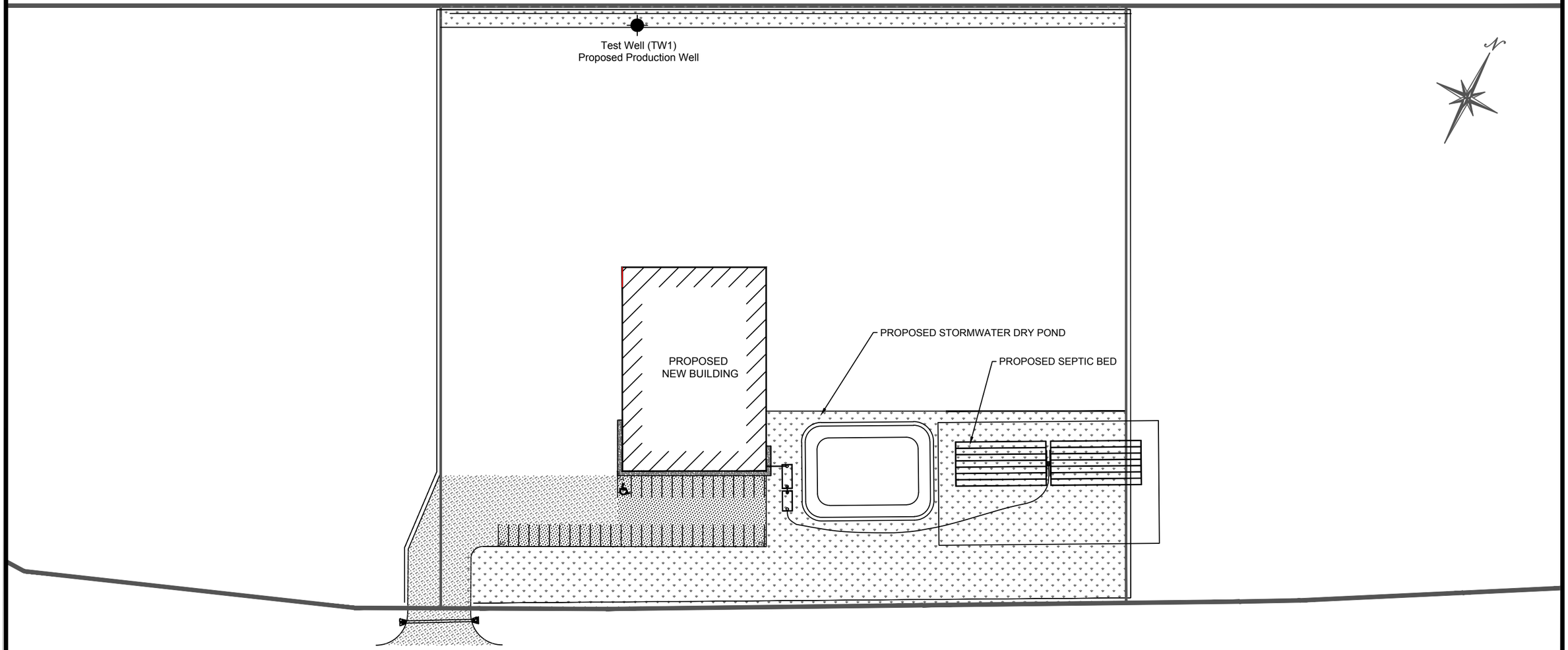
PROJECT
HYDROGEOLOGICAL ASSESSMENT & TERRAIN ANALYSIS FOR COMMERCIAL DEVELOPMENT
8015 RUSSELL ROAD
OTTAWA (VARS), ONTARIO

DRAWING TITLE
SITE PLAN WITH TEST WELL & TEST PIT LOCATIONS

PROJECT NO.
170254

DATE
FEBRUARY 2018

FIGURE2



Legend

- Property Line
- Test Well
- Proposed Building
- Proposed Granular Base Material
- Proposed Grassed Area

20m 10 0 20 40m

SCALE: 1:1000

No.	REVISIONS	BY	DATE
01	ISSUED FOR REVIEW	A.S.	09/02/2018

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
BOB COUSINS

DESIGNED BY:	DRAWN BY:	APPROVED BY:
A.S.	A.S	M.W.

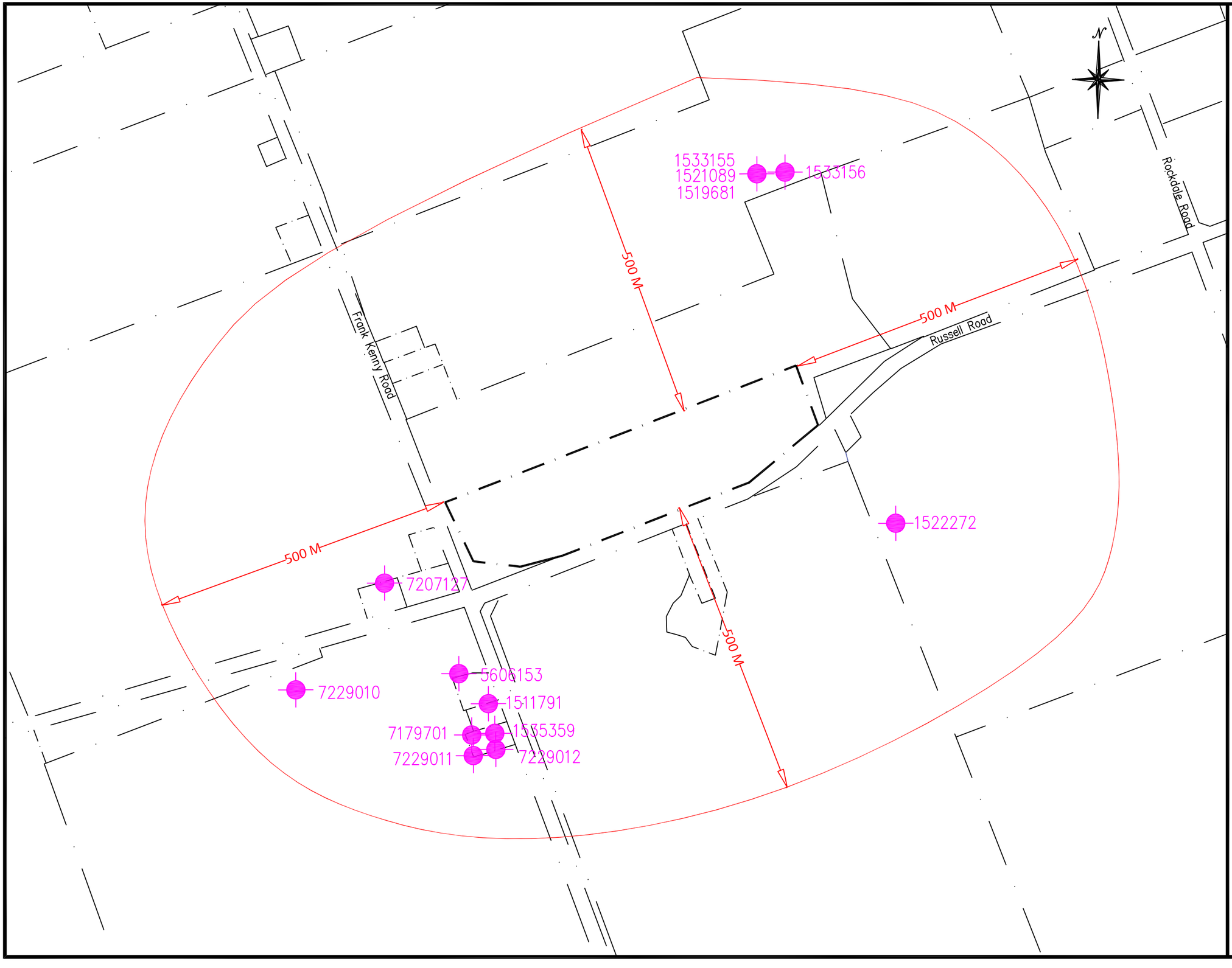
PROJECT
HYDROGEOLOGICAL ASSESSMENT & TERRAIN ANALYSIS FOR COMMERCIAL DEVELOPMENT
8015 RUSSELL ROAD
OTTAWA (VARS), ONTARIO

DRAWING TITLE
PROPOSED BUILDING AND SEPTIC LOCATION SCHEMATIC

PROJECT NO.
170254

DATE
AUGUST 2018

FIGURE3



Legend

- XXXX — Well With MOECC Tag Number
- Property Line
- XXX — Wells Within 500 m Radius from Property Line

No.	REVISIONS	BY	DATE
01	ISSUED FOR REVIEW	A.S.	17/01/2018

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT

BOB COUSINS

DESIGNED BY:	DRAWN BY:	APPROVED BY:
A.S.	A.S.	M.W.

PROJECT

HYDROGEOLOGICAL ASSESSMENT & TERRAIN ANALYSIS FOR PROPOSED COMMERCIAL DEVELOPMENT
8015 RUSSELL ROAD
OTTAWA (VARS), ONTARIO

DRAWING TITLE

MOECC WELLS WITHIN 500 M RADIUS OF THE SITE

PROJECT NO.
170254

DATE
FEBRUARY 2018

FIGURE4

TABLES

Table 1
Summary of Analysis of Water Sample Collected from the Supply Well
Hydrogeological Assessment and Terrain Analysis For Proposed Commercial Development
8015 Russell Road, Ottawa, Ontario
LRL File: 170254

			Ontario Drinking Water Standards			Sample		Additional Well Development		
Parameter	**Units**	**MRL**	**Standard**	**Type**	**MOECC D-5-5[5]**	**8015 Russell Road-3hr**	**8015 Russell Road-8hr**	**8015 Russell Road-31hr**	**8015 Russell Road-24hr**	**8015 Russell Road-30hr**
Sample Date (d/m/y)						**24/01/2018**	**24/01/2018**	**25/01/2018**	**11/7/2018**	**11/7/2018**
Microbiological Parameters										
E. Coli	CFU/100 mL	1	0	MAC		<1	<1	<1	<1	<1
Fecal Coliforms	CFU/100 mL	1	0[1]	MAC		<1	<1	**1**	<1	<1
Heterotrophic Plate Count	CFU/ml	10				<1	<10	10	10	<10
Total Coliforms	CFU/100 mL	1	0/5[1]	MAC		<1	<1	<1	<1	<1
General Inorganics										
Alkalinity, total	mg/L	5	30 - 500	OG		229	230	235	230	231
Ammonia as N	mg/L	0.01				0.81	0.78	0.83	0.88	0.89
Dissolved Organic Carbon	mg/L	0.5	5	AO	10	1.6	0.8	2.4	1.1	0.9
Colour	TCU	2	5	AO	7	***18***	***9***	3	2	3
Conductivity	uS/cm	5				521	519	531	540	545
Hardness	mg/L	1	80 - 100	OG		**6.3**	**7.9**	**8.6**	**10.1**	**11.1**
pH	pH Units	0.05	6.5 - 8.5	OG		**8.7**	**8.7**	**8.6**	8.5	8.5
Phenolics	mg/L	0.001				<0.001	<0.001	<0.001	<0.001	<0.001
Total Dissolved Solids	mg/L	10	500	AO		332	324	320	314	310
Sulphide	mg/L	0.02	0.05	AO		**1.42**	**1.56**	**1.38**	**1.18**	**1.07**
Tannin & Lignin	mg/L	0.1				1.1	1.1	1.4	0.4	0.4
Total Kjeldahl Nitrogen	mg/L	0.1				0.9	0.8	0.7	0.9	0.9
Organic Nitrogen (Calculated)	mg/L		0.15	OG		0.09	0.02	-0.13	0.02	0.01
Turbidity	NTU	0.1	1/5[2]	MAC/AO	5	***55.4***	***40.5***	***8.3***	**1.8**	***1.8***
Anions										
Chloride	mg/L	1	250	AO	250	23	22	23	25	25
Fluoride	mg/L	0.1	1.5[3]/2.4	MAC		0.5	0.4	0.4	0.5	0.4
Nitrate as N	mg/L	0.1	10	MAC		<0.1	<0.1	<0.1	<0.1	<0.1
Nitrite as N	mg/L	0.05	1	MAC		<0.05	<0.05	<0.25[1]	<0.05	<0.05
Sulphate	mg/L	1	500	AO	500	25	25	26	24	24
Metals										
Calcium	ug/L	100				1600	1700	2300	2800	3000
Iron	ug/L	100	300	AO	10000	**400**	**800**	<100	<100	<100
Magnesium	ug/L	200				600	900	700	800	900
Manganese	ug/L	50	50	AO	1000	20	20	17	13	14
Potassium	ug/L	100				3000	4100	3500	4000	4100
Sodium	mg/L	0.2	20[4]/200	AO	200	*100*	*101*	*97.4*	*117*	*126*

NOTES

MRL Minimum Reportable Limit
MAC Maximum Acceptable Concentration
AO Aesthetic Objective
OG Operational Guideline

ODWS Ontario Drinking Water Standards (2006)
NA Not Analysed
UNDERLINE Parameter level above ODWS
Italics Notify Medical Officer of Health
BOLD Parameter level above D-5-5 maximum treatability limits

[1] Elevated reporting limit due to matrix interference.

[1] As per Table 1 of MOECC's technical guideline *"D-5-5 Private Wells: Water Supply Assessment"*

[2] 1.0 NTU OG if treatment system required to provide filtration for disinfection. 5.0 NTU AO for all points of consumption.

[3] Where supplies of naturally occuring flouride at levels above 1.5 mg/L but below 2.4 mg/L the Ministry of Health recommends notification of local board of health of levels to avoid excesses exposure from other

[4] Health related warning level at which Local Medical Officer of Health should be notified of levels.

[5] MOECC D-5-5 guideline, maximum concentration considered reasonably treatable.

Table 2
Langelier and Ryznar Calculations- 8015 Russell Road 30 h - July 25, 2018
Hydrogeological Assessment & Terrain Analysis For Proposed Commercial Development
8015 Russell Road, Ottawa (Vars), Ontario
LRL File: 170254

Analyzed Parameters

TDS (mg/L)	310
Hardness(mg/L)	11.1
alkalinity(mg/L)	231
pH (pH units)	8.5
Temperature °C	10

Langelier

LSI = pH - pHs

pHs = (9.3 +A+B) - (C+D) Where

A= (Log10(TDS)-1)/10	=	0.1491362
B= (-13.12*Log10(T°C+273)+34.55	=	2.382562
C= Log10(Hardness)-0.4	=	0.645323
D= Log10(Alkalinity)	=	2.363612

Ryznar

RI=2pHs-pH

pHs=	8.82276
LSI=	-0.3
RI=	9.14553

Langelier

-2.0 < -0.5	Serious Corrosion
-0.5 < 0	Slightly corrosive but non-scale forming
LSI = 0.0	Balanced but pitting corrosion possible
0.0 < 0.5	Slightly scale forming and corrosive
0.5 < 2	Scale forming but non corrosive

http://www.lenntech.com/calculators/langelier/index/langelier.htm

Ryznar

4.0-5.0	Heavy Scale
5.0-6.0	Light Scale
6.0-7.0	Light Scale or Corrosion
7.0-7.5	Corrosion Significant
7.5-9.0	Heavy Corrosion
9.0 +	Corrosion is Intolerable

http://www.lenntech.com/calculators/ryznar/index/ryznar.htm

Table 3
Summary of Analysis of Water Samples Collected from the Test Pits.
Hydrogeological Assessment and Terrain Analysis For Proposed Commercial development
8015 Russell Road, Ottawa (Vars), Ontario
LRL File: 170254

Parameter	Units	MRL	Ontario Drinking Water Standards		Sample			
			Standard	Type	TP1	TP2	TP3	TP4
Sample Date (d/m/y)					18/01/2018	18/01/2018	18/01/2018	18/01/2018
Anions								
Ammonia	mg/L	0.01			1.03	10.7	1.48	0.33
Total Kjeldahl Nitrogen	mg/L	0.1			13.8	20.7	15.3	5.7
Nitrate as N	mg/L	0.1	10	MAC	<0.1	0.3	<0.1	<0.1
Nitrite as N	mg/L	0.05	1	MAC	<0.05	0.97	<0.25[1]	<0.05

NOTES

[1] Elevated reporting limit due to matrix interference

MRL Minimum Reportable Limit

MAC Maximum Acceptable Concentration

ODWS Ontario Drinking Water Standards (2006)

Table 4
Nitrate Attenuation Calculations
Hydrogeological Assessment & Terrain Analysis For Proposed Commercial Development
8015 Russell Road, Ottawa (Vars), Ontario
LRL File: 170254

1. Potential Infiltration

Weather Station Ottawa

No.	Section Area (m^2)	Infiltration Factor (IF)[1]						Total	Moisture Surplus (MS)				Potential Infiltration (PI) (IF*MS) (mm)	
		Topography	Value	Soil	Value	Cover	Value		Ground Cover	Soil Type	Moisture Retention[2] (mm)	Moisture Surplus[3] (mm)	Section	Weighted
1	62,307	Flat	0.3	Clay Loam	0.2	Woodland	0.2	0.7	Moderately Rooted Crops	3 Clay Loam	150	336	235.2	162.9
2	27,647	Flat	0.3	Clay Loam	0.2	Cultivated Land	0.1	0.6	Shallow Rooted Crops	4 Clay Loam	100	363	217.8	66.9
Total	89,954												**Total**	229.9

2. Area Available for Infiltration

Number of Lots		n	1	
Approximate footprint of house/garage		H	1895	m^2
Approximate paved area		d[4]	2085	m^2
Approximate Area of Stormwater Management Pond			837	m^2
Approximate Length of Road		L	0	m
Approximate Width of Road		w	0	m
Total Area of Property			89954	m^2
Impervious Area			4817.0	m^2
	Roads	l x w	0 m^2	
	Retention Pond	l x w	837 m^2	
	Driveway	n x d	2085 m^2	
	Houses	n x H	1895 m^2	
Area available Infiltration		A	85,137	m^2

3. Nitrate Diluation Calculations

Nitrate Concentration of Infiltration	C_i	0	mg/L[6]
Site Infiltration	$Q_i = A*PI$	19569	m^3
Daily Sewage Volume per Lot [5]	Q_d	2.9	m^3
Maximum Yearly Sewage Volume (water)	$Q_e=365*n*Q_d$	1059	m^3
Nitrate Concentration in Sewage[5]	C_e	40	mg/L
Maximum Allowable Nitrate Concentration at Boundary	C_m	10.0	mg/L
Increase in Nitrate Concentration at Boundaries	$C = (Q_eC_e+Q_iC_i)/(Q_e+Q_i)$	2.05	mg/L

NOTES

1 Table 2: Infiltration Factors, *Hydrogical Technical Information Requirements for Land Development Applications* , Ministry of the Energy and Environment, April 1995.

2 Thornthwaite and Mather's (1957) Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance.

3 Moisture surplus for data for Mason Anger (Environment Canada Meteorological Service of Canada, 2010).

4 Area based on proposed civil design drawings

5 As per *Technical Guideline for Individual On-Site Sewage Systems: Water Quality and Impact Risk Assessment* , Ministry of the Energy and Environment, August 1996.

6 Average of nitrate concentrations from test pits water sample collected on January 18, 2018

APPENDIX A

Well Records of Wells Within 500 m of the Site

The Ontario Water Resources Commission Act

WATER WELL RECORD

31G/6 d

Water management in Ontario

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

11 | 1511791 | MUNICIP. 15011 | CON. Cpm | 08

COUNTY OR DISTRICT: Carleton | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Cumberland | CON., BLOCK, TRACT, SURVEY, ETC.: 8 VIII | LOT: 021

[redacted] | DATE COMPLETED: DAY 20 MO. 05 YR. 72

[redacted] | RC. | ELEVATION: 0230 | RC. | BASIN CODE: 25

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
Red	Clay			0	24
	~~Shale~~			~~24~~	
Black	Shale	Rock		24	72
Gray	Limestone	Rock		72	111

31 | 0024705 | 0072817 | 01112/15

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0070	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
0110	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			16
~~06~~	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			23
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			30

SCREEN

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

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER | PUMPING RATE GPM | DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
005 FEET	035 FEET	020 FEET	025 FEET	030 FEET	035 FEET

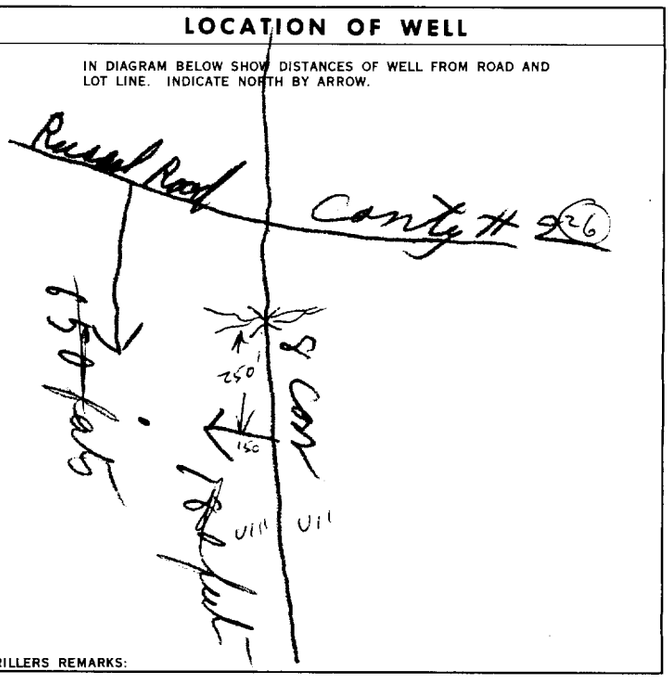
IF FLOWING, GIVE RATE GPM. | PUMP INTAKE SET AT 30 FEET | WATER AT END OF TEST: ☒ 1 CLEAR ☐ 2 CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING 050 FEET | RECOMMENDED PUMPING RATE 0012 GPM.

GPM./FT. SPECIFIC CAPACITY

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

WATER USE

01

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

METHOD OF DRILLING

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

CONTRACTOR

NAME OF WELL CONTRACTOR: Maurice Cayen | LICENCE NUMBER: 1517

ADDRESS: R.R. Orman Ont

NAME OF DRILLER OR BORER | LICENCE NUMBER

SIGNATURE OF CONTRACTOR: Maurice Cayen | SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 1517 | DATE RECEIVED 060772

DATE OF INSPECTION | INSPECTOR

REMARKS: P K WI

OWRC COPY

Ontario

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

Cty · 56 · Russell · B 25 · Z-18

WATER WELL RECORD

31-G/6-W

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

11 | 1514684-1 | MUNICIP. 15011 | CON. CON 08

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carletpn	Cumberland	8	022

[redacted]
Box 4218 Station "E" Ottawa, Ont. K1S 5A7

DATE COMPLETED: DAY 26 MO. 05 YR. 75

SURFACE ELEVATION: 023533 RC 4 | ELEVATION: 0225 RC 5 | BASIN CODE: 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
red grey	clay	silt	packed	0	15
blue	clay		loose	15	18
grey	sand	stones	packed	18	22
black	shale		porous	22	103

OWRC C-9

31 | 0015705706 | 0018305 | 0022228 12 | 01038 17

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0062	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
0101	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE	188	0	0024
06	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE			0103
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

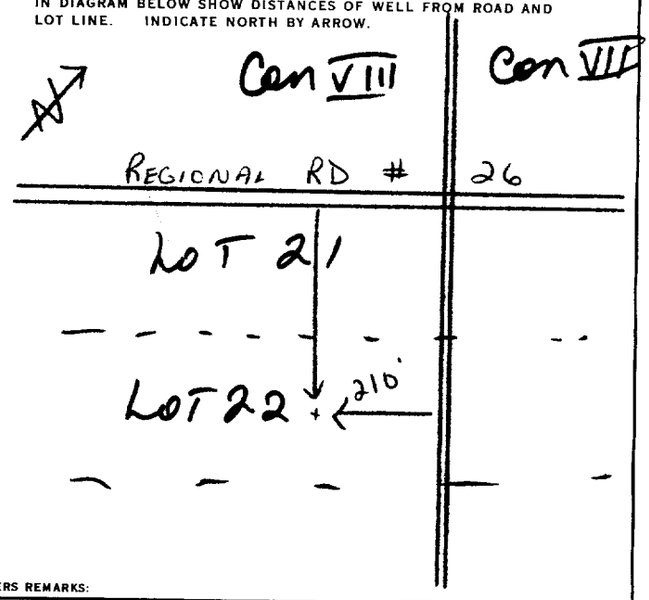
PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER
PUMPING RATE: 0006 GPM
DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
022 FEET	047 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	047 FEET	047 FEET	047 FEET	047 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 070 FEET
RECOMMENDED PUMPING RATE: 0005 GPM
GPM./FT. SPECIFIC CAPACITY: 000.2

LOCATION OF WELL 7023

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



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 55-56: 01 — 1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; ☐ OTHER; 9 ☐ NOT USED

METHOD OF DRILLING 57: 1 — 1 ☒ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. | LICENCE NUMBER: 1558
ADDRESS: Box 490 Stittsville, Ontario
NAME OF DRILLER OR BORER: E. Maurice & M. Kavanagh | LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: Mike Kavanagh | SUBMISSION DATE: DAY 26 MO. 5 YR. 75

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 1558 | DATE RECEIVED 06 06 75
DATE OF INSPECTION | INSPECTOR
REMARKS: | P ✓ | WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 — 11514684 — MUNICIP — CON.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carletpn	Cumberland	8	2

OWNER (SURNAME FIRST) [redacted] — ADDRESS . Box 4218 Station "E" Ottawa, Ont. K1S 5A7 — DATE COMPLETED DAY 26 MO. 5 YR. 7

NORTHING — RC — ELEVATION — RC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
red grey	clay	silt	packed	0	15
blue	clay		loose	15	18
grey	sand	stones	packed	18	22
black	shale		porous	22	103

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
62	1 ☒ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
101	1 ☒ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE	188	0	24
6	4 ☒ OPEN HOLE		24	103
	1 ☐ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☐ OPEN HOLE			
	1 ☐ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☐ OPEN HOLE			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	6 GPM	1 HOURS ____ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
22 FEET	47 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	47 FEET	47 FEET	47 FEET	47 FEET

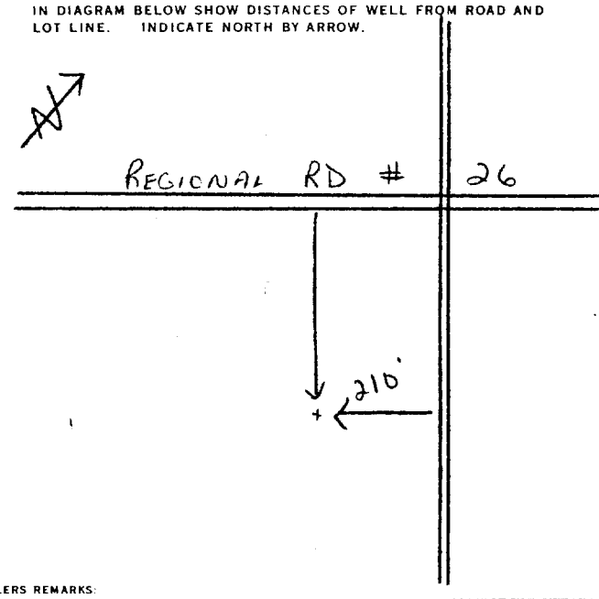
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	70 FEET	5 GPM

GPM./FT. SPECIFIC CAPACITY

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

WATER USE

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

METHOD OF DRILLING

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

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. — LICENCE NUMBER: 1558

ADDRESS: Box 490 Stittsville, Ontario

NAME OF DRILLER OR BORER: E. Maurice & M. Kavanagh — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Matt Kavanagh — SUBMISSION DATE: DAY 26 MO. 5 YR. 75

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR — DATE RECEIVED 06 06 75

DATE OF INSPECTION — INSPECTOR

REMARKS — P — WI

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FORM 7 MOE 07

Ministry of the Environment
Ontario

The Ontario Water Resources Act

316 GW

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
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(11) 1518521 MUNICIP 15011 CON. CON 08

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON.	BLOCK, TRACT, SURVEY, ETC.	LOT
OTTAWA-CARLETON	CUMBERLAND	8	PLAN M 46	020

[redacted] 85 McKNEELY RD

DATE COMPLETED DAY 18 MO 08 YR 83

UTM ZONE 18 | EASTING 0248999 | RC 5 | ELEVATION 0225 | RC 5 | BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	HARD PAN			0	6
BLACK	SHALE			6	60

MOE VF-18

(31) 0006614 0060817

(32)

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0058	1 ☒ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 4 06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	1.88		0020
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

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

(61) PLUGGING & SEALING RECORD

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

(71) PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	0002 GPM	01 HOURS 50 MINS

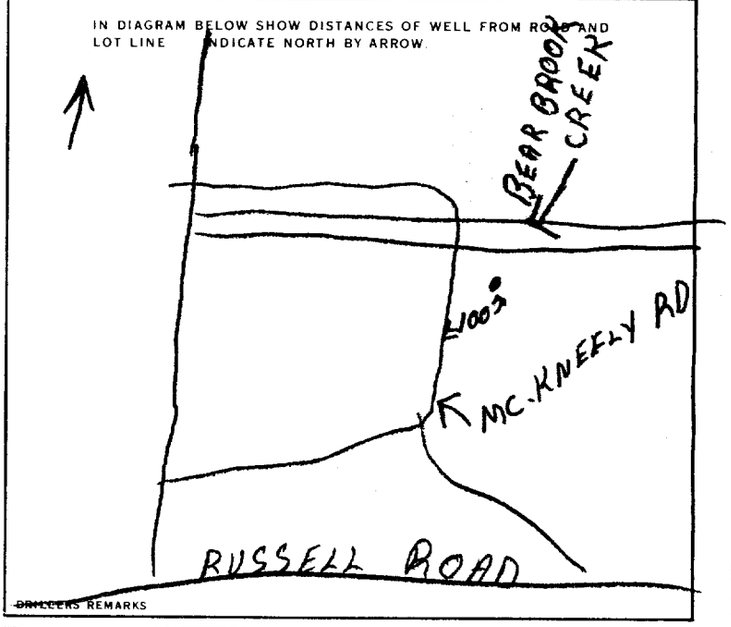
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
002 FEET	055 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	031 FEET	042 FEET	055 FEET	055 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	50 FEET	1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	050 FEET	0002 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 (54): 1

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

WATER USE (55-56): 01

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

METHOD OF DRILLING (57): 1

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

CONTRACTOR

NAME OF WELL CONTRACTOR: YVON GENIER WELL DRILLING — LICENCE NUMBER: 2351

ADDRESS: R.R.4 CASSELMAN ONT. K0A-1M0

NAME OF DRILLER OR BORER: YVON GENIER — LICENCE NUMBER: 2351

SIGNATURE OF CONTRACTOR: Yvon Genier — SUBMISSION DATE: DAY 18 MO. 8 YR. 83

OFFICE USE ONLY

DATA SOURCE (58): 1 — CONTRACTOR (59-62): 2351 — DATE RECEIVED (63-68): 17 10 83

DATE OF INSPECTION — INSPECTOR

REMARKS

CSS, ES

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WATER WELL RECORD

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11 1519681 MUNICIP CON.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON.	BLOCK, TRACT, SURVEY, ETC	LOT
OTTAWA-CARLETON	CUMBERLAND	7		20

OWNER (SURNAME FIRST) [redacted] ADDRESS 83 NAVAN DATE COMPLETED DAY 13 MO 5 YR 85

THING RC ELEVATION RC BASIN CODE I II III IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	HARD PAN			0	16
BLACK	SHALE			16	42

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
29	1 ☑ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☑ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	1.88	0	16
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☑ BAILER	7 GPM	1 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
18 FEET	26 FEET	1 ☑ PUMPING 2 ☐ RECOVERY	17 FEET	25 FEET	26 FEET	26 FEET

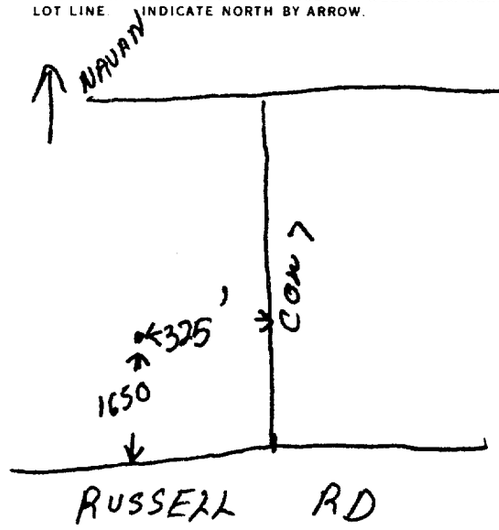
IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	28 FEET	1 ☐ CLEAR 2 ☑ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☑ DEEP	28 FEET	5 GPM

7125

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

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

METHOD OF DRILLING
1 ☑ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: YVON GENIER WELL DRILLING — LICENCE NUMBER: 2351
ADDRESS: BOX 160 CASSELMAN ONT K0A-1M0
NAME OF DRILLER OR BORER: YVON GENIER — LICENCE NUMBER: 2351
SIGNATURE OF CONTRACTOR: Yvon Genier — SUBMISSION DATE: DAY 13 MO 5 YR 85

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED 21 06 85
DATE OF INSPECTION | INSPECTOR
REMARKS: CCS/ES

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WATER WELL RECORD

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11 | 1519681 | MUNICIP 150 | CON. CON | 07

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	CUMBERLAND	7	20

[redacted] NAVAN

DATE COMPLETED: DAY 13 MO 5 YR 85

RC | ELEVATION | RC | BASIN CODE | I | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	HARD PAN			0	16
BLACK	SHALE			16	42

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
29	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	1.88	0	16
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	7 GPM	1 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
18 FEET	26 FEET	1 ☐ PUMPING 2 ☐ RECOVERY	17 FEET	25 FEET	26 FEET	26 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	28 FEET	1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	28 FEET	5 GPM

FINAL STATUS OF WELL

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

WATER USE

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

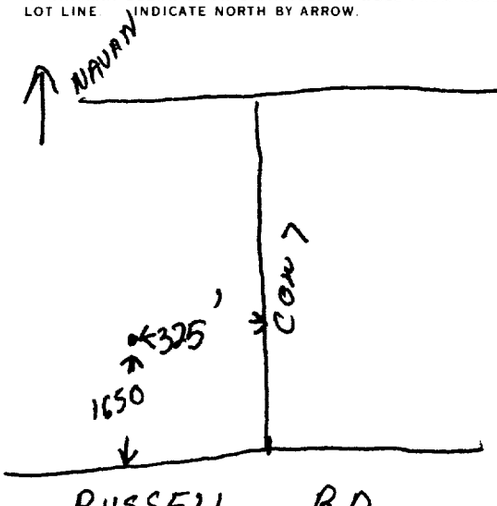
METHOD OF DRILLING

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

LOCATION OF WELL

7125

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



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
YVON GENIER WELL DRILLING	2351
ADDRESS: BOX 160 CASSELMAN ONT K0A-1M0	
NAME OF DRILLER OR BORER	LICENCE NUMBER
YVON GENIER	2351
SIGNATURE OF CONTRACTOR: Yvon Genier	SUBMISSION DATE: DAY 13 MO 5 YR 85

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED 21 06 85

DATE OF INSPECTION | INSPECTOR

REMARKS

WDE

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Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1521089

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COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	[illegible] LAND	7	20

DATE COMPLETED: DAY 15 MO 11 YR 86

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	HARD PAN			0	16
BLACK	SHALE			16	33

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
31	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL; 2 ☐ GALVANIZED; 1 ☐ CONCRETE; 4 ☐ OPEN HOLE	1.88	0	18
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

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

MATERIAL AND TYPE:

DEPTH TO TOP OF SCREEN FEET:

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	25 GPM	1 HOURS 00 MINS

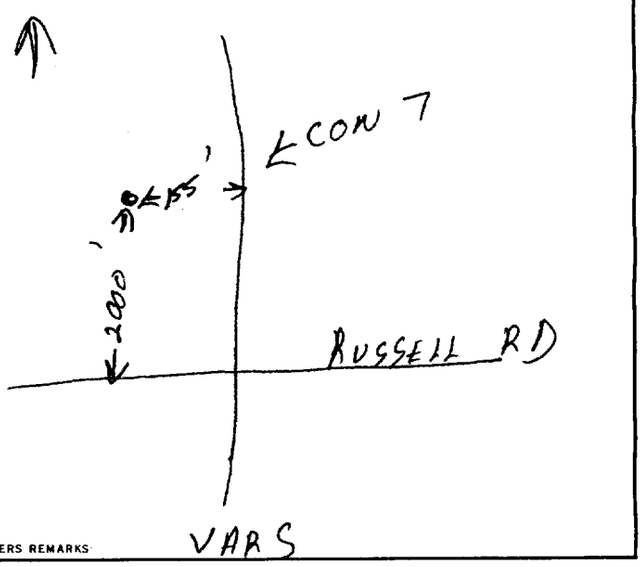
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
6 FEET	11 FEET		10 FEET	11 FEET	11 FEET	11 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	26 FEET	1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☒ SHALLOW ☐ DEEP	26 FEET	10 GPM

LOCATION OF WELL

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



DRILLERS REMARKS: VARS

FINAL STATUS OF WELL
1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

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

METHOD OF DRILLING
1 ☒ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: YVON GENIER WELL DRILLING — LICENCE NUMBER: 2351

ADDRESS: BOX A-7 CASSELMAN ONT K0A-1M0

NAME OF DRILLER OR BORER: YVON GENIER — LICENCE NUMBER: 7351

SIGNATURE OF CONTRACTOR: Yvon Genier — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED: 130187

DATE OF INSPECTION | INSPECTOR

REMARKS

CSSIFS

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Ministry of the Environment
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The Ontario Water Resources Act

WATER WELL RECORD

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11 1522272 MUNICIP CON.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC	LOT
Ottawa, Carleton	Cumberland	7 and 8	21

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Jean Gauthier, Const.	Cumberland, Ontario	DAY 12 MO 04 YR 88

21 UTM ZONE EASTING NORTHING RC ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Hardpen	Boulders	Hard	0	6
Grey	Gravel	Boulders	Loose	6	9
Grey	Limestone	Rock	Hard	9	120

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
70	2 ☒ SALTY
115	2 ☒ SALTY

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL	1.88	0	40
6	4 ☒ OPEN HOLE		40	120

SCREEN

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

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	40	Cement Grout

71 PUMPING TEST

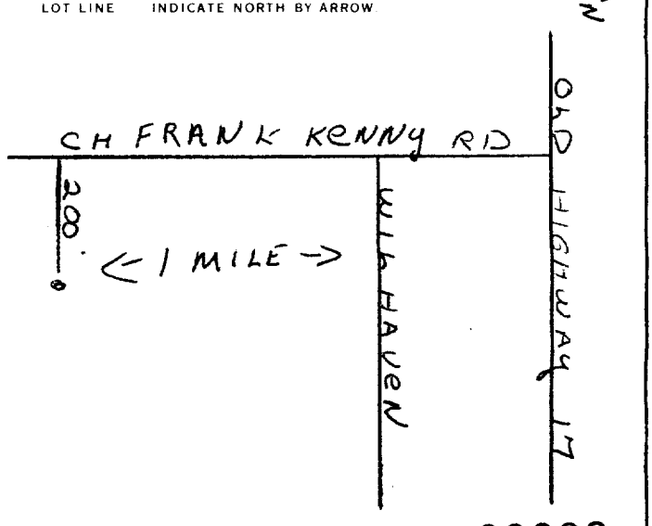
PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
2 ☒ BAILER	8 GPM	1 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
35 FEET	120 FEET	1 ☐ PUMPING 2 ☐ RECOVERY	70 FEET	85 FEET	90 FEET	120 FEET

IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
GPM	100 FEET	1 ☒ CLEAR 2 ☐ CLOUDY	☐ SHALLOW ☒ DEEP	100 FEET	6 GPM

LOCATION OF WELL

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



26030

DRILLERS REMARKS

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: Raymond Well-Drilling
WELL CONTRACTOR'S LICENCE NUMBER: 4646
ADDRESS: St-Albert Ontario
NAME OF WELL TECHNICIAN: Marcel Raymond
WELL TECHNICIAN'S LICENCE NUMBER: T-0522
SIGNATURE OF TECHNICIAN/CONTRACTOR: Marcel Raymond
SUBMISSION DATE: DAY 14 MO 04 YR 88

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 4646 | DATE RECEIVED MAY 24 1988
DATE OF INSPECTION | INSPECTOR
REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 — 1523588 — MUNICIP. 1501 — CON. CON 08

COUNTY OR DISTRICT: [redacted] Ott
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Cumberland
CON, BLOCK, TRACT, SURVEY, ETC: CONC 8
LOT: 20
[redacted] Cumberland ONT.
DATE COMPLETED: DAY 28 MO 07 YR 89

RC — ELEVATION — RC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
GRAY	Limestone		Soft.	120	175

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
140	1 ☑ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
170	1 ☑ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE 5 ☐ PLASTIC		120	175
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☑ BAILER	25 GPM	2 HOURS 0 MINS

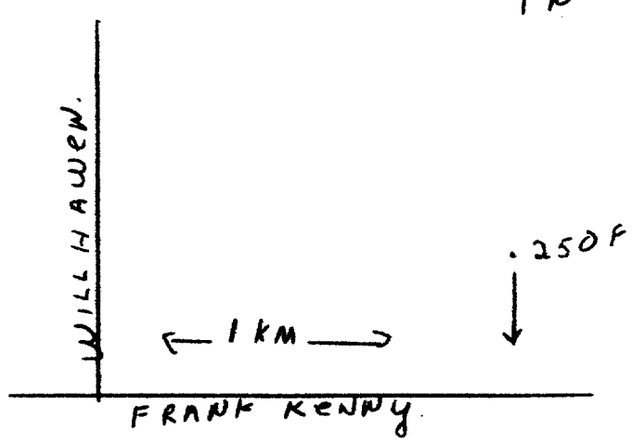
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
40 FEET	60 FEET		60 FEET	60 FEET	60 FEET	60 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	175 FEET	1 ☐ CLEAR 2 ☑ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☑ DEEP	160 FEET	20 GPM

LOCATION OF WELL

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



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DRILLERS REMARKS

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: D and R Well Drilling.
WELL CONTRACTOR'S LICENCE NUMBER:
ADDRESS: ST-ALBERT ONTARIO.
NAME OF WELL TECHNICIAN: Marcel Raymond.
WELL TECHNICIAN'S LICENCE NUMBER: T-0522.
SIGNATURE OF TECHNICIAN/CONTRACTOR:
SUBMISSION DATE: DAY 28 MO 07 YR 89

OFFICE USE ONLY

DATA SOURCE: CONTRACTOR 6006 — DATE RECEIVED: AUG 09 1989
DATE OF INSPECTION — INSPECTOR
REMARKS: CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

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

11 — 1532869 — Municipality 1501 1 — Con.

OTTAWA-CARLETON

County or District: [redacted] PHILIP
Township/Borough/City/Town/Village: CUMBERLAND
Con block tract survey, etc.:
Lot:
Address: 4918 FRANK KENNY ROAD CUMBERLAND
Date completed: 10 day 5 month 2001 year

21 — Northing — RC — Elevation — RC — Basin Code — ii — iii — iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
BROWN	TOPSOIL			0	1'
BROWN	FISSURED	BROWN CLAY		1'	7'

31
32

41 WATER RECORD

Water found at – feet	Kind of water
6	1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
11	1 ☐ Steel 2 ☐ Galvanized 3 ☑ Concrete 4 ☐ Open hole 5 ☐ Plastic	4"		36
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet
Material and type	Depth at top of screen feet	

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set at – feet From	Depth set at – feet To	Material and type (Cement grout, bentonite, etc.)
		NON TOXIC SEALER

71 PUMPING TEST

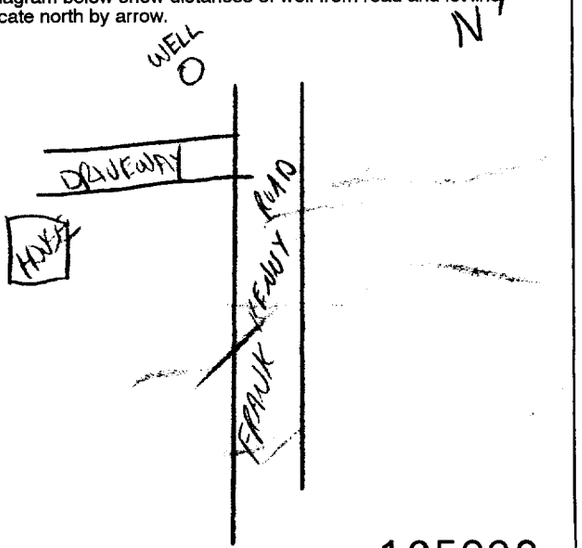
Pumping test method: 1 ☑ Pump 2 ☐ Bailer
Pumping rate: GPM
Duration of pumping: ..... Hours ..... Mins

Static level	Water level end of pumping	Water levels during: 1 ☐ Pumping 2 ☐ Recovery 15 minutes	30 minutes	45 minutes	60 minutes
6 feet	0 feet	6 feet	feet	feet	feet

If flowing give rate: 17.5 GPM
Pump intake set at: feet
Water at end of test: ☐ Clear ☐ Cloudy
Recommended pump type: ☑ Shallow ☐ Deep
Recommended pump setting: feet
Recommended pump rate: GPM

LOCATION OF WELL

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



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FINAL STATUS OF WELL

1 ☑ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☑ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not used 10 ☐ Other .....

METHOD OF CONSTRUCTION

1 ☐ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☐ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☑ Digging 11 ☐ Other .....

Name of Well Contractor: LEO SARAULT & FILS
Well Contractor's Licence No.: 6667
Address: 4882 CTY Rd 10 FOURNIER
Name of Well Technician: GILLES SARAULT
Well Technician's Licence No.: T-21-24
Signature of Technician/Contractor
Submission date: 11 day 02 month 2001 year

MINISTRY USE ONLY

Data source
Contractor: 6667
Date received: JUN 04 2002
Date of inspection
Inspector
Remarks: CSS.ES2

0506 (07/94) Front Form 9

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Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

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

11 1533155 Municipality ISOLI Con. CON 07 Conc. 7

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
OTTAWA - Carleton	Cumberland.	SOR-5427	20

Address: [redacted] 2125 - Russell Rd.

Date completed: 20 / 06 / 07 (day / month / year)

21 UTM Northing RC Elevation RC Basin Code ii iii iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
Brown	Clay	Gravel	Soft	0	13
Grey	SHALE		Hard	13	100
Brown	SHALE		Hard	100	120

31

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41 WATER RECORD

Water found at - feet	Kind of water
25	1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
100	1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6 1/2	1 ☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	1.188	0	20
6	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☑ Open hole 5 ☐ Plastic		20	120
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

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

Material and type | Depth at top of screen feet

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	20	Cement Grout.

71 PUMPING TEST

Pumping test method: 1 ☐ Pump 2 ☑ Bailer

Pumping rate: 25 GPM

Duration of pumping: Hours / Mins

Static level	Water level end of pumping	Water levels during: 1 ☑ Pumping 2 ☐ Recovery			
10 feet	40 feet	15 minutes: 40 feet	30 minutes: 40 feet	45 minutes: 40 feet	60 minutes: 40 feet

If flowing give rate: GPM

Pump intake set at: 60 feet

Water at end of test: ☐ Clear ☑ Cloudy

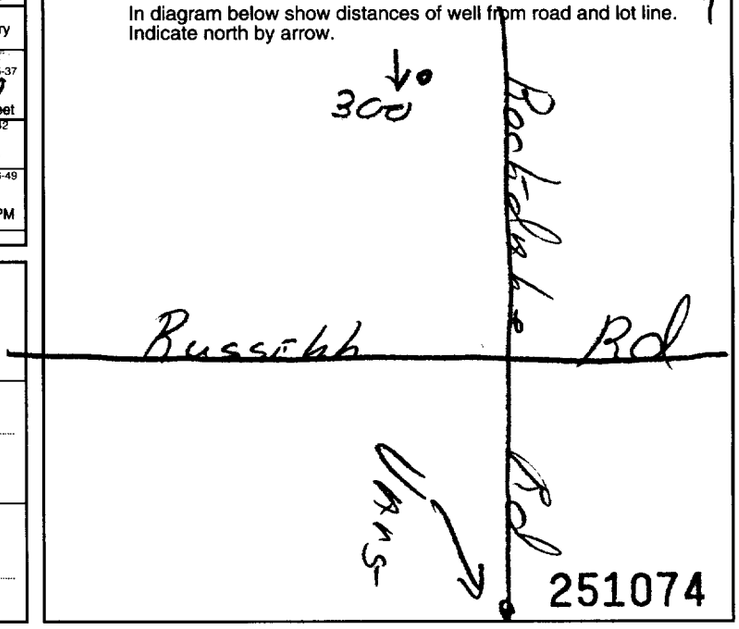
Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump setting: 115 feet

Recommended pump rate: 15 GPM

LOCATION OF WELL

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



FINAL STATUS OF WELL

1 ☑ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☐ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☑ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other

METHOD OF CONSTRUCTION

1 ☑ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☐ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
LAR-WATER-well-Drilling	6006
Address: 57 - Albert - on T	
Name of Well Technician: Lewis - Desnoyers	Well Technician's Licence No.: T-625
Signature of Technician/Contractor	Submission date: 27/06/02 (day / mo / yr)

MINISTRY USE ONLY

Data source	Contractor	Date received
	6006	SEP 09 2002
Date of inspection	Inspector	
Remarks	CSS.ES2	

0506 (07/00) Front Form 9

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Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

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

11 1533156 Municipality LSOU Con.

County or District: OTTAWA - Carleton
Township/Borough/City/Town/Village: Cumberland
Con block tract survey, etc.: SOR-5427
Lot: 20
Address: [redacted] 2125 - Russell Rd.
Date completed: 16/08/02 (day/month/year)

21 UTM Northing RC Elevation RC Basin Code ii iii iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
Brown	Clay	Gravel	Soft	0	15
Grey	limestone		Hard	15	155
Brown	SHALE		Hard	155	190

31
32

41 WATER RECORD

Water found at - feet	Kind of water
25	1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6 1/4	1 ☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	188	0	20
6	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☑ Open hole 5 ☐ Plastic		20	190
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

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

Material and type: | Depth at top of screen feet:

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	20	Cement Grout

PUMPING TEST

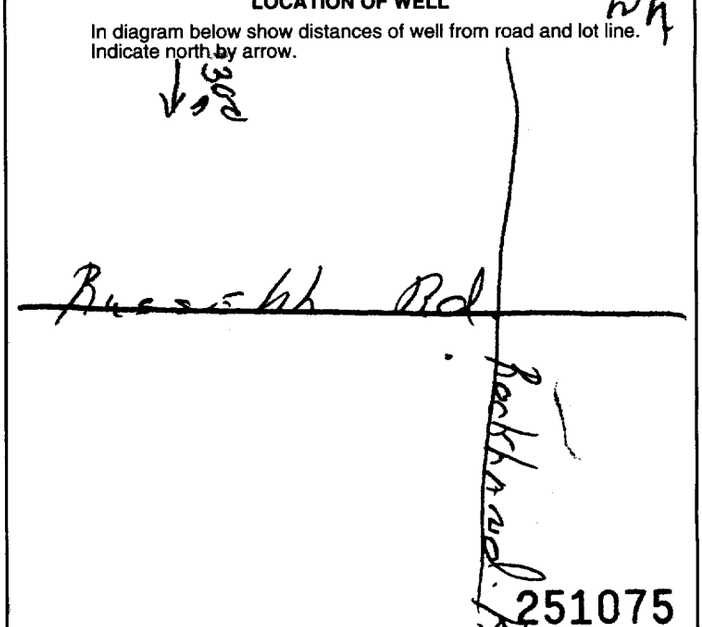
71 Pumping test method: 1 ☐ Pump 2 ☑ Bailer
Pumping rate: 3 GPM
Duration of pumping: 2 Hours 00 Mins

Static level	Water level end of pumping	Water levels during: 1 ☐ Pumping 2 ☑ Recovery			
		15 minutes	30 minutes	45 minutes	60 minutes
10 feet	190 feet	150 feet	125 feet	100 feet	60 feet

If flowing give rate: GPM
Pump intake set at: 190 feet
Water at end of test: ☑ Clear ☐ Cloudy
Recommended pump type: ☐ Shallow ☑ Deep
Recommended pump setting: 185 feet
Recommended pump rate: 3 GPM

LOCATION OF WELL

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



FINAL STATUS OF WELL

1 ☑ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☐ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☑ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other

METHOD OF CONSTRUCTION

1 ☑ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☑ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor: DAR-WATER-WELL-Drilling
Well Contractor's Licence No.: 6006
Address: St-Albert-ont
Name of Well Technician: Louis-Dennoyer
Well Technician's Licence No.: T-625
Signature of Technician/Contractor:
Submission date: 27/08/02 (day/mo/yr)

MINISTRY USE ONLY

Data source: 58
Contractor: 6006 59-62
Date received: SEP 09 2002 63-68 80
Date of inspection:
Inspector:
Remarks: CSS.EC2

2 - MINISTRY OF THE ENVIRONMENT COPY

0506 (07/00) Front Form 9

Ontario — Ministry of the Environment

Well Tag Number (Place sticker and print number below): A012454

A012454

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

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.

Ministry Use Only

MUN | CON | LOT

[redacted]

Address of Well Location (County/District/Municipality): Ottawa Carleton

Township: Cumberland / Orleans

Lot: 21 | Concession: 8

RR#/Street Number/Name: 5138 Frank Kenny Vars

City/Town/Village: Navan

Site/Compartment/Block/Tract etc.

GPS Reading: NAD 83 | Zone 18 | Easting 470236 | Northing 5023977

Unit Make/Model: Mazillon

Mode of Operation: ☑ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
Brown	Sandy	clay		0	2
Brown	clay			2	10
grey	hard pan			10	20
grey	rock			20	60

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	60'	6 inch

Water Record

Water found at ___ Metres	Kind of Water
52' m	☑ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
45' m	☑ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
___ m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was: ☒ Clear and sediment free ☐ Other, specify

Chlorinated ☒ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To
Casing				
6 1/4	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	188	0	23
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen	☐ Open hole			

Test of Well Yield

Pumping test method: Sub.

Pump intake set at (metres): 30'

Pumping rate (litres/min): 60

Duration of pumping: 1 hrs + ___ min

Final water level end of pumping: 30' metres

Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump depth: 40 metres

Recommended pump rate: 45 (litres/min)

If flowing give rate: ✓ (litres/min)

If pumping discontinued, give reason: ✓

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level		2.65		4.49
1	1	3.60	1	3.51
2	2	3.90	2	3.25
3	3	3.96	3	3.14
4	4	4.03	4	3.06
5	5	4.08	5	3.03
10	10	4.21	10	2.97
15	15	4.28	15	2.83
20	20	4.33	20	2.78
25	25	4.36	25	2.74
30	30	4.40	30	2.71
40	40	4.44	40	2.69
50	50	4.47	50	2.68
60	60	4.49	60	2.67

Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - From	Depth set at - To (Metres)	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	20	grout	4 Bag

Method of Construction

☒ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: Maurice Cayen Ltd — Well Contractor's Licence No.: 1517

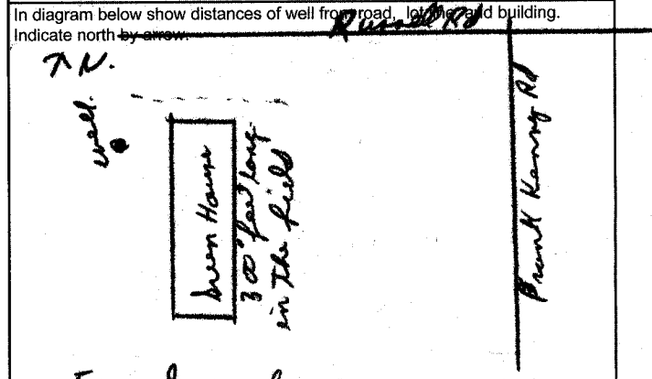
Business Address (street name, number, city etc.): Casselman RR1

Name of Well Technician (last name, first name) — Well Technician's Licence No.

Signature of Technician/Contractor: X Maurice Cayen — Date Submitted YYYY MM DD: 2004 11 22

Location of Well

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



Audit No.: Z 12615

Date Well Completed YYYY MM DD: 2004 11 24

Was the well owner's information package delivered? ☐ Yes ☐ No

Date Delivered YYYY MM DD: 2004 11 24

Ministry Use Only

Data Source — Contractor: 1517

Date Received YYYY MM DD: JAN 14 2005 — Date of Inspection YYYY MM DD

Remarks — Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☐

Cette formule est disponible en français

Ontario Ministry of the Environment

Well Tag I A021430 r below)

A021430

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

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.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

RR#/Street Number/Name: 5120 Frank Kenny Rd

City/Town/Village: ~~Corbett~~ Kars

Site/Compartment/Block/Tract etc.

GPS Reading: NAD 83 | Zone 18 | Easting 470253 E | Northing 5024186

Unit Make/Model: Magellan Utm

Mode of Operation: ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
Grey	Clay		Packed	0	5.18
blue	clay		Packed	5.18	6.09
blue	Shale		layered	6.09	23.77

Hole Diameter

Depth From	Metres To	Diameter Centimetres
0	6.09	21.23
6.09	23.77	15.55

Water Record

Water found at ___ Metres / Kind of Water

22 m	☑ Fresh	☐ Sulphur	
☐ Gas	☐ Salty	☐ Minerals	
☐ Other:			
___ m	☐ Fresh	☐ Sulphur	
☐ Gas	☐ Salty	☑ Minerals	
☐ Other:			
___ m	☐ Fresh	☐ Sulphur	
☐ Gas	☐ Salty	☐ Minerals	
☐ Other:			

After test of well yield, water was
☐ Clear and sediment free
☐ Other, specify

Chlorinated ☑ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
15.55	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.48	+0.60	6.09
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☑ Open hole		6.09	23.77

Test of Well Yield

Pumping test method: 3/4 H.P. Sub

Pump intake set at - (metres): 18

Pumping rate - (litres/min): 20

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping: 6.82 metres

Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump depth: 18 metres

Recommended pump rate: 30 (litres/min)

If flowing give rate - (litres/min)

If pumping discontinued, give reason.

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level		4.15		6.82
1	1	4.87	1	6.00
2	2	4.90	2	5.50
3	3	4.75	3	4.90
4	4	4.73	4	4.72
5	5	4.60	5	4.52
10	10	5.20	10	
15	15	5.80	15	
20	20	6.22	20	
25	25	6.51	25	
30	30	6.66	30	
40	40	6.73	40	
50	50	6.82	50	
60	60	6.82	60	

Plugging and Sealing Record ☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	6.09	cement grout	3 bag

Method of Construction

☐ Cable Tool	☑ Rotary (air)	☐ Diamond	☐ Digging
☐ Rotary (conventional)	☐ Air percussion	☐ Jetting	☐ Other
☐ Rotary (reverse)	☐ Boring	☐ Driving	

Water Use

☑ Domestic	☐ Industrial	☐ Public Supply	☐ Other
☐ Stock	☐ Commercial	☐ Not used	
☐ Irrigation	☐ Municipal	☐ Cooling & air conditioning	

Final Status of Well

☑ Water Supply	☐ Recharge well	☐ Unfinished	☐ Abandoned, (Other)
☐ Observation well	☐ Abandoned, insufficient supply	☐ Dewatering	
☐ Test Hole	☐ Abandoned, poor quality	☐ Replacement well	

Well Contractor/Technician Information

Name of Well Contractor: Giles Borehole — Well Contractor's Licence No.: 1414

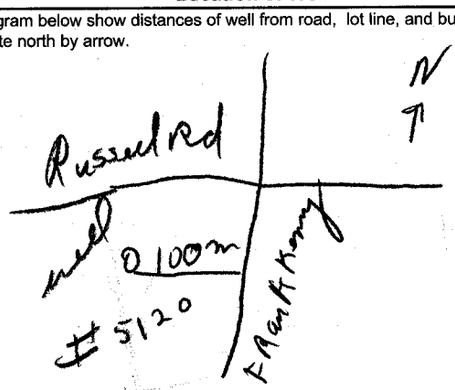
Business Address (street name, number, city etc.): 5 Tara Court

Name of Well Technician (last name, first name): Stone — Well Technician's Licence No.: 0-193

Signature of Technician/Contractor: x Giles Borehole — Date Submitted: YYYY 05 MM 08 DD 15

Location of Well

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



Audit No. Z 27956

Date Well Completed: YYYY 05 MM 08 DD 15

Was the well owner's information package delivered? ☐ Yes ☑ No

Date Delivered: YYYY MM DD

Ministry Use Only

Data Source

Contractor: 1414

Date Received: YYYY MM DD — SEP 01 2005

Date of Inspection: YYYY MM DD

Remarks

Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☐

Cette formule est disponible en français

Ontario — Ministry of the Environment

Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. (Sticker and/or Print Below): **A106049**

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

[redacted]

Address of Well Location (Street Number/Name): 7891 Russell Rd

Township: Cumberland

Lot: 20

Concession: 8

County/District/Municipality: Ottawa

City/Town/Village: Vars

Province: Ontario

Postal Code: K0A3H0

UTM Coordinates — Zone: 18 | Easting: 470116 | Northing: 5022475

Municipal Plan and Subdivision Number:

Other:

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	clay	silt	hard	0	4.5
grey	limestone		fractured	4.5	18.5

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	6	cement grout	.2m³

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
15.55	Steel	.48	+.6	6
15.55	Open Hole		6	18.5

Construction Record - Screen

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

Status of Well

☑ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
17 (m/ft)	☐ Fresh ☑ Untested ☐ Gas ☐ Other, specify	0	6	28.23
(m/ft)	☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify	6	18.5	15.55
(m/ft)	☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify			

Results of Well Yield Testing

After test of well yield, water was:
☑ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 16

Pumping rate (l/min / GPM): 20

Duration of pumping: 1 hrs 0 min

Final water level end of pumping (m/ft): 5.37

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 16

Recommended pump rate (l/min / GPM): 20

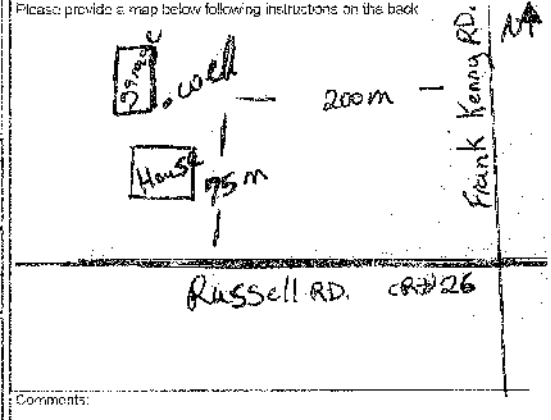
Well production (l/min / GPM):

Disinfected? ☑ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	3.21		5.37
1	3.57	1	4.81
2	3.81	2	4.69
3	4.10	3	4.42
4	4.10	4	4.24
5	4.07	5	4.14
10	4.49	10	3.81
15	4.71	15	3.57
20	4.73	20	3.37
25	4.87	25	3.22
30	4.97	30	3.22
40	5.11	40	3.22
50	5.25	50	3.22
60	5.37	60	3.22

Map of Well Location

Please provide a map below following instructions on the back



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: Bourgeois Well Drilling

Well Contractor's Licence No.: 1401

Business Address (Street Number/Name): 151 Montee D'Aoust

Municipality: Nation

Province: ON

Postal Code: K0A3B0C

Business E-mail Address: N/A

Bus. Telephone No. (inc. area code): 6139875091

Name of Well Technician (Last Name, First Name): Michael Gener

Well Technician's Licence No.: 31493

Signature of Technician and/or Contractor:

Date Submitted: 2013 08 05

Well owner's information package delivered: ☑ Yes ☐ No

Date Package Delivered: 2013 09 25

Date Work Completed: 2013 09 29

Ministry Use Only

Audit No.: Z120341

AUG 27 2013

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Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: [X] Metric [ ] Imperial

Well Tag No. Tag#: A 236235 — A 236235

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	Well Constructed by Well Owner
	2572768 Ontario Inc	N/A	[ ]

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
2930 French Hill Road	Cumberland	On	K4C1K7	6138331917

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
8015 Russell Road			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Navan	Ontario	K4B1J4

UTM Coordinates NAD 83	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
	18	470485	5024552		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	clay	Silt	Hard	0	3.1
Grey	clay	Silt	Hard	3.1	4.8
Grey	Shale		layered	4.8	36.6

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
6.2	0	cinent grout	.2m3

Method of Construction

[ ] Cable Tool [ ] Diamond
[ ] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[X] Air percussion
[ ] Other, specify ____

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
15.55	Steel	.48	+1.5	6.2
15.53	Open Hole		6.2	36.6

Construction Record - Screen

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

Status of Well

[X] Water Supply
[ ] Replacement Well
[ ] Test Hole
[ ] Recharge Well
[ ] Dewatering Well
[ ] Observation and/or Monitoring Hole
[ ] Alteration (Construction)
[ ] Abandoned, Insufficient Supply
[ ] Abandoned, Poor Water Quality
[ ] Abandoned, other, specify ____
[ ] Other, specify ____

Results of Well Yield Testing

After test of well yield, water was:
[X] Clear and sand free
[ ] Other, specify ____

If pumping discontinued, give reason:

Pump intake set at (m/ft): 29

Pumping rate (l/min / GPM): 60

Duration of pumping: 1 hrs + ____ min

Final water level end of pumping (m/ft): 3.50

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 28

Recommended pump rate (l/min / GPM): 100

Well production (l/min / GPM): 163

Disinfected? [X] Yes [ ] No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	1.48		3.50
1	2.29	1	3.04
2	2.51	2	2.69
3	2.64	3	2.23
4	2.72	4	2.09
5	2.78	5	1.98
10	2.97	10	1.70
15	3.11	15	1.52
20	3.21	20	1.51
25	3.27	25	1.49
30	3.32	30	1.49
40	3.41	40	1.49
50	3.47	50	1.49
60	3.50	60	1.49

Water Details

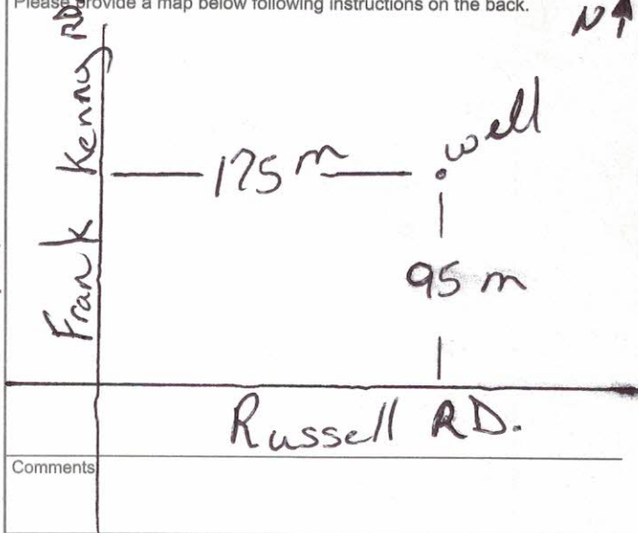
Water found at Depth (m/ft) [ ] Gas	Kind of Water: [ ] Fresh [X] Untested [ ] Other, specify ____
Water found at Depth (m/ft) [ ] Gas	Kind of Water: [ ] Fresh [ ] Untested [ ] Other, specify ____
Water found at Depth (m/ft) [ ] Gas	Kind of Water: [ ] Fresh [ ] Untested [ ] Other, specify ____

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	6.2	24.9
6.2	36.6	15.55

Map of Well Location

Please provide a map below following instructions on the back.



Comments

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Bourgeois Well Drilling Ltd	7417

Business Address (Street Number/Name)	Municipality
1425 Conc. 10-11	Cyrville

Province	Postal Code	Business E-mail Address
On.	K0A1R0	N/A

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6139875291	GENIER, MICHAEL

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3493		2018/01/29

Well owner's information package delivered	Date Package Delivered	Date Work Completed
[X] Yes [ ] No	2018/01/30	2018/01/23

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Audit No. Z276175

Received

0506E (2014/11)

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APPENDIX B

Pump Test Data

Pump Test Data
Hydrogeolgical Assessment and Terrain Analysis For Proposed Commercial Development
8015 Russell Road, Ottawa (Vars), Ontario
LRL File No. 170254

Date: **1/25/2018**
Well Number: **A236235**
Depth of Well (m bgs): 36.6
Ground Surface Elev. (m): --
Top of Casing Elev. (m): 0.16
Water Level (m) 1.48

Technician: A. Sare
Pump Depth (m): 29.5
Start Time: 8:09 AM 01.24.2018
End Time: 3:25:00 PM 01.25.2018
Average Pump Rate (L/min): 44 L/min & 26 L/min

				Field Parameters						
Time[1] (min)	Water Level (Pump In) (m BTC)	Drawdown (m)	Flow Rate (L/min)	Turbidity (NTU)	Residual Chlorine (mg/L)	Colour (TCU)	pH	Conductivity (µs)	Total Dissolved (mg/L)
0.0	1.48	0.00	44						
0.3	1.80	0.32							
1	1.94	0.46							
1.5	2.05	0.57							
2	2.14	0.66							
2.5	2.21	0.73							
3	2.27	0.79							
3.5	2.32	0.84							
4	2.36	0.88							
4.5	2.41	0.93							
5	2.43	0.95							
6	2.49	1.01							
7	2.53	1.05							
8	2.59	1.11							
9	2.64	1.16							
10	2.68	1.20							
15	2.82	1.34							
20	2.93	1.45							
25	2.98	1.50							
30	3.04	1.56							
40	3.12	1.64							
50	3.17	1.69							
60	3.21	1.73	44	38.4	0.01	519	8.50	1787	849
120	3.30	1.82	44	43.7	0.00	573	9.16	728	364
180	3.34	1.86	40	44.0	0.00	562	9.08	677	336
240	3.35	1.87	56	40.6	0.02	523	9.04	587	294
300	3.36	1.88	44	36.7	0.01	477	9.24	611	304
360	3.37	1.89	48	34.4	0.00	452	9.27	530	278
420	3.37	1.89	48	32.6	0.00	410	9.19	528	257
480	3.37	1.89	48	29.8	0.02	398	9.00	511	255
480.5	2.67	1.19	26						
756	2.52	1.04							
1316	2.52	1.04	28	9.4	0.02	79	9.20	533	267
1650	2.53	1.05	26	7.8	0.02	61	7.84	1392	695
1710				7.2		63			
1770	2.53	1.05	24	7.2		54	8.77	759	383
1880				7.0		44	8.75	510	255
1860	2.53	1.05	28	7.0	0.01	46	9.04	518	292
Recovery				**% Recovery**					
1876	2.53	1.05		44.4					
1935	1.54	0.06		96.8					
1946	1.53	0.05		97.4					
1965	1.52	0.04		97.9					

1 Time elapse from pump turning on.
BTC: Below Top of Casing
NM: Not Measured

APPENDIX C

Laboratory Analysis

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

LRL Associates Ltd.

5430 Canotek Road
Ottawa, ON K1J 9G2
Attn: Andrea Sare

Client PO:
Project: 170254
Custody: 7339

Report Date: 31-Jan-2018
Order Date: 25-Jan-2018

Order #: 1804341

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1804341-01	8015 Russell Rd-3hr
1804341-02	8015 Russell Rd-8hr
1804341-03	8015 Russell Rd-31hr

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 31-Jan-2018
Order Date: 25-Jan-2018
Project Description: 170254

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	25-Jan-18	25-Jan-18
Ammonia, as N	EPA 351.2 - Auto Colour	29-Jan-18	29-Jan-18
Anions	EPA 300.1 - IC	26-Jan-18	27-Jan-18
Colour	SM2120 - Spectrophotometric	25-Jan-18	25-Jan-18
Conductivity	EPA 9050A- probe @25 °C	25-Jan-18	25-Jan-18
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	30-Jan-18	31-Jan-18
E. coli	MOE E3407	25-Jan-18	25-Jan-18
Fecal Coliform	SM 9222D	25-Jan-18	25-Jan-18
Heterotrophic Plate Count	SM 9215C	25-Jan-18	25-Jan-18
Metals, ICP-MS	EPA 200.8 - ICP-MS	29-Jan-18	29-Jan-18
pH	EPA 150.1 - pH probe @25 °C	25-Jan-18	25-Jan-18
Phenolics	EPA 420.2 - Auto Colour, 4AAP	26-Jan-18	26-Jan-18
Subdivision Package	Hardness as CaCO3	29-Jan-18	29-Jan-18
Sulphide	SM 4500SE - Colourimetric	26-Jan-18	26-Jan-18
Tannin/Lignin	SM 5550B - Colourimetric	25-Jan-18	25-Jan-18
Total Coliform	MOE E3407	25-Jan-18	25-Jan-18
Total Dissolved Solids	SM 2540C - gravimetric, filtration	26-Jan-18	30-Jan-18
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	26-Jan-18	26-Jan-18
Turbidity	SM 2130B - Turbidity meter	26-Jan-18	25-Jan-18

PARACEL LABORATORIES LTD.

Order #: 1804341

Certificate of Analysis

Client: LRL Associates Ltd.

Client PO:

Report Date: 31-Jan-2018

Order Date: 25-Jan-2018

Project Description: 170254

	Client ID:	8015 Russell Rd-3hr	8015 Russell Rd-8hr	8015 Russell Rd-31hr	-
	Sample Date:	24-Jan-18	24-Jan-18	25-Jan-18	-
	Sample ID:	1804341-01	1804341-02	1804341-03	-
	MDL/Units	Drinking Water	Drinking Water	Drinking Water	-
Microbiological Parameters					
E. coli	1 CFU/100 mL	ND	ND	ND	-
Fecal Coliforms	1 CFU/100 mL	ND	ND	1	-
Total Coliforms	1 CFU/100 mL	ND	ND	ND	-
Heterotrophic Plate Count	10 CFU/mL	<10	<10	<10	-
General Inorganics					
Alkalinity, total	5 mg/L	229	230	235	-
Ammonia as N	0.01 mg/L	0.81	0.78	0.83	-
Dissolved Organic Carbon	0.5 mg/L	1.6	0.8	2.4	-
Colour	2 TCU	18	9	3	-
Conductivity	5 uS/cm	521	519	531	-
Hardness	mg/L	6.3	7.9	8.6	-
pH	0.1 pH Units	8.7	8.7	8.6	-
Phenolics	0.001 mg/L	<0.001	<0.001	<0.001	-
Total Dissolved Solids	10 mg/L	332	324	320	-
Sulphide	0.02 mg/L	1.42	1.56	1.38	-
Tannin & Lignin	0.1 mg/L	1.1	1.1	1.4	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.9	0.8	0.7	-
Turbidity	0.1 NTU	55.4	40.5	8.3	-
Anions					
Chloride	1 mg/L	23	22	23	-
Fluoride	0.1 mg/L	0.5	0.4	0.4	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	<0.1	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	<0.25 [1]	-
Sulphate	1 mg/L	25	25	26	-
Metals					
Calcium	0.1 mg/L	1.6	1.7	2.3	-
Iron	0.1 mg/L	0.4	0.8	<0.1	-
Magnesium	0.2 mg/L	0.6	0.9	0.7	-
Manganese	0.005 mg/L	0.020	0.020	0.017	-
Potassium	0.1 mg/L	3.0	4.1	3.5	-
Sodium	0.2 mg/L	100	101	97.4	-

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 31-Jan-2018
Order Date: 25-Jan-2018
Project Description: 170254

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	TCU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Metals									
Calcium	ND	0.1	mg/L						
Iron	ND	0.1	mg/L						
Magnesium	ND	0.2	mg/L						
Manganese	ND	0.005	mg/L						
Potassium	ND	0.1	mg/L						
Sodium	ND	0.2	mg/L						
Microbiological Parameters									
E. coli	ND	1	CFU/100 mL						
Fecal Coliforms	ND	1	CFU/100 mL						
Total Coliforms	ND	1	CFU/100 mL						
Heterotrophic Plate Count	ND	10	CFU/mL						

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 31-Jan-2018
Order Date: 25-Jan-2018
Project Description: 170254

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	22.8	1	mg/L	22.8			0.1	10	
Fluoride	0.46	0.1	mg/L	0.46			0.6	10	
Nitrate as N	ND	0.1	mg/L	ND				20	
Nitrite as N	ND	0.05	mg/L	ND				20	
Sulphate	25.0	1	mg/L	24.8			0.7	10	
General Inorganics									
Alkalinity, total	27.2	5	mg/L	27.5			1.0	14	
Ammonia as N	0.020	0.01	mg/L	0.032			47.9	17.7	QR-01
Dissolved Organic Carbon	11.5	0.5	mg/L	10.2			12.4	37	
Colour	ND	2	TCU	ND				12	
Conductivity	137	5	uS/cm	137			0.5	11	
pH	7.1	0.1	pH Units	7.2			0.1	10	
Phenolics	ND	0.001	mg/L	ND				10	
Total Dissolved Solids	52.0	10	mg/L	52.0			0.0	10	
Sulphide	ND	0.02	mg/L	ND				10	
Tannin & Lignin	0.2	0.1	mg/L	0.2			0.0	11	
Total Kjeldahl Nitrogen	0.98	0.1	mg/L	0.88			11.1	10	QR-01
Turbidity	0.5	0.1	NTU	0.5			1.9	10	
Metals									
Calcium	14.2	0.1	mg/L	14.4			1.5	20	
Iron	ND	0.1	mg/L	ND			0.0	20	
Magnesium	2.2	0.2	mg/L	2.3			5.9	20	
Manganese	ND	0.005	mg/L	ND			0.0	20	
Potassium	0.7	0.1	mg/L	0.7			4.1	20	
Sodium	3.8	0.2	mg/L	4.1			6.2	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100 mL	ND				30	
Fecal Coliforms	ND	1	CFU/100 mL	ND				30	
Total Coliforms	ND	1	CFU/100 mL	ND				30	
Heterotrophic Plate Count	ND	10	CFU/mL	30			0.0	30	

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 31-Jan-2018
Order Date: 25-Jan-2018
Project Description: 170254

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	32.2	1	mg/L	22.8	94.5	78-112			
Fluoride	1.36	0.1	mg/L	0.46	90.5	73-113			
Nitrate as N	0.99	0.1	mg/L	ND	98.8	81-112			
Nitrite as N	0.982	0.05	mg/L	ND	98.2	76-117			
Sulphate	34.0	1	mg/L	24.8	92.0	75-111			
General Inorganics									
Ammonia as N	0.273	0.01	mg/L	0.032	96.4	81-124			
Dissolved Organic Carbon	11.5	0.5	mg/L	0.8	106	60-133			
Phenolics	0.026	0.001	mg/L	ND	105	69-132			
Total Dissolved Solids	106	10	mg/L		106	75-125			
Sulphide	0.45	0.02	mg/L	ND	90.8	79-115			
Tannin & Lignin	1.0	0.1	mg/L	0.2	82.4	71-113			
Total Kjeldahl Nitrogen	3.01	0.1	mg/L	0.88	107	81-126			
Metals									
Calcium	883		ug/L		88.3	80-120			
Iron	851		ug/L	15	83.7	80-120			
Magnesium	2920		ug/L	2290	62.5	80-120			QM-07
Manganese	55.4		ug/L	2.90	105	80-120			
Potassium	1560		ug/L	729	83.5	80-120			
Sodium	962		ug/L		96.2	80-120			

Qualifier Notes:

Sample Qualifiers :

1 : Elevated Reporting Limit due to matrix interference.

QC Qualifiers :

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

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Certificate of Analysis

LRL Associates Ltd.

5430 Canotek Road
Ottawa, ON K1J 9G2
Attn: Andrea Sare

Client PO:
Project: 170254
Custody: 29955

Report Date: 23-Jan-2018
Order Date: 19-Jan-2018

Order #: 1803451

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1803451-01	TP1
1803451-02	TP2
1803451-03	TP3
1803451-04	TP4

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 23-Jan-2018
Order Date: 19-Jan-2018
Project Description: 170254

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Ammonia, as N	EPA 351.2 - Auto Colour	22-Jan-18	22-Jan-18
Anions	EPA 300.1 - IC	19-Jan-18	20-Jan-18
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	23-Jan-18	23-Jan-18

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 23-Jan-2018
Order Date: 19-Jan-2018
Project Description: 170254

	Client ID:	TP1	TP2	TP3	TP4
	Sample Date:	18-Jan-18	18-Jan-18	18-Jan-18	18-Jan-18
	Sample ID:	1803451-01	1803451-02	1803451-03	1803451-04
	MDL/Units	Water	Water	Water	Water
General Inorganics					
Ammonia as N	0.01 mg/L	1.03	10.7	1.48	0.33
Total Kjeldahl Nitrogen	0.1 mg/L	13.8	20.7	15.3	5.7
Anions					
Nitrate as N	0.1 mg/L	<0.1	0.3	<0.1	<0.1
Nitrite as N	0.05 mg/L	<0.05	0.97	<0.25 [1]	<0.05

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 23-Jan-2018
Order Date: 19-Jan-2018
Project Description: 170254

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
General Inorganics									
Ammonia as N	ND	0.01	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 23-Jan-2018
Order Date: 19-Jan-2018
Project Description: 170254

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N	0.24	0.1	mg/L	0.26			6.0	20	
Nitrite as N	0.057	0.05	mg/L	0.057			0.0	20	
General Inorganics									
Total Kjeldahl Nitrogen	34.6	2.0	mg/L	40.2			15.0	10	QR-05

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 23-Jan-2018
Order Date: 19-Jan-2018
Project Description: 170254

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N	1.23	0.1	mg/L	0.26	97.0	81-112			
Nitrite as N	1.09	0.05	mg/L	0.057	103	76-117			
General Inorganics									
Ammonia as N	0.245	0.01	mg/L		98.1	81-124			
Total Kjeldahl Nitrogen	1.97	0.1	mg/L		98.5	81-126			

Qualifier Notes:

Sample Qualifiers :

1 : Elevated Reporting Limit due to matrix interference.

QC Qualifiers :

QR-05 : Duplicate RPDs higher than normally accepted. Remaing batch QA\QC was acceptable. May be sample effect.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

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Certificate of Analysis

LRL Associates Ltd.

5430 Canotek Road
Ottawa, ON K1J 9G2
Attn: Andrea Sare

Client PO:
Project: 170254
Custody: 9680

Report Date: 19-Jul-2018
Order Date: 11-Jul-2018

Order #: 1828393

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1828393-01	C.N.8015 Russell Road-24hr (11.07.18)
1828393-02	C.N.8015 Russell Road-30hr (11.07.18)

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 19-Jul-2018
Order Date: 11-Jul-2018
Project Description: 170254

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	12-Jul-18	12-Jul-18
Ammonia, as N	EPA 351.2 - Auto Colour	16-Jul-18	16-Jul-18
Anions	EPA 300.1 - IC	12-Jul-18	12-Jul-18
Colour	SM2120 - Spectrophotometric	12-Jul-18	12-Jul-18
Conductivity	EPA 9050A- probe @25 °C	12-Jul-18	12-Jul-18
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	11-Jul-18	12-Jul-18
E. coli	MOE E3407	12-Jul-18	12-Jul-18
Fecal Coliform	SM 9222D	12-Jul-18	12-Jul-18
Heterotrophic Plate Count	SM 9215C	11-Jul-18	11-Jul-18
Metals, ICP-MS	EPA 200.8 - ICP-MS	17-Jul-18	19-Jul-18
pH	EPA 150.1 - pH probe @25 °C	12-Jul-18	12-Jul-18
Phenolics	EPA 420.2 - Auto Colour, 4AAP	12-Jul-18	13-Jul-18
Subdivision Package	Hardness as CaCO3	17-Jul-18	19-Jul-18
Sulphide	SM 4500SE - Colourimetric	16-Jul-18	16-Jul-18
Tannin/Lignin	SM 5550B - Colourimetric	12-Jul-18	12-Jul-18
Total Coliform	MOE E3407	12-Jul-18	12-Jul-18
Total Dissolved Solids	SM 2540C - gravimetric, filtration	13-Jul-18	16-Jul-18
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	13-Jul-18	13-Jul-18
Turbidity	SM 2130B - Turbidity meter	12-Jul-18	12-Jul-18

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 19-Jul-2018
Order Date: 11-Jul-2018
Project Description: 170254

	Client ID:	C.N.8015 Russell Road-24hr (11.07.18)	C.N.8015 Russell Road-30hr (11.07.18)	-	-
	Sample Date:	07/11/2018 09:00	07/11/2018 12:00	-	-
	Sample ID:	1828393-01	1828393-02	-	-
	MDL/Units	Drinking Water	Drinking Water	-	-
Microbiological Parameters					
E. coli	1 CFU/100 mL	ND	ND	-	-
Fecal Coliforms	1 CFU/100 mL	ND	ND	-	-
Total Coliforms	1 CFU/100 mL	ND	ND	-	-
Heterotrophic Plate Count	10 CFU/mL	10	<10	-	-
General Inorganics					
Alkalinity, total	5 mg/L	230	231	-	-
Ammonia as N	0.01 mg/L	0.88	0.89	-	-
Dissolved Organic Carbon	0.5 mg/L	1.1	0.9	-	-
Colour	2 TCU	2	3	-	-
Conductivity	5 uS/cm	540	545	-	-
Hardness	mg/L	10.1	11.1	-	-
pH	0.1 pH Units	8.5	8.5	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-
Total Dissolved Solids	10 mg/L	314	310	-	-
Sulphide	0.02 mg/L	1.18	1.07	-	-
Tannin & Lignin	0.1 mg/L	0.4	0.4	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.9	0.9	-	-
Turbidity	0.1 NTU	1.8	1.8	-	-
Anions					
Chloride	1 mg/L	25	25	-	-
Fluoride	0.1 mg/L	0.5	0.4	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-
Sulphate	1 mg/L	24	24	-	-
Metals					
Calcium	0.1 mg/L	2.8	3.0	-	-
Iron	0.1 mg/L	<0.1	<0.1	-	-
Magnesium	0.2 mg/L	0.8	0.9	-	-
Manganese	0.005 mg/L	0.013	0.014	-	-
Potassium	0.1 mg/L	4.0	4.1	-	-
Sodium	0.2 mg/L	117	126	-	-

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 19-Jul-2018
Order Date: 11-Jul-2018
Project Description: 170254

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	TCU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Metals									
Calcium	ND	0.1	mg/L						
Iron	ND	0.1	mg/L						
Magnesium	ND	0.2	mg/L						
Manganese	ND	0.005	mg/L						
Potassium	ND	0.1	mg/L						
Sodium	ND	0.2	mg/L						
Microbiological Parameters									
E. coli	ND	1	CFU/100 mL						
Fecal Coliforms	ND	1	CFU/100 mL						
Total Coliforms	ND	1	CFU/100 mL						
Heterotrophic Plate Count	ND	10	CFU/mL						

Certificate of Analysis
Client: LRL Associates Ltd.
Client PO:

Report Date: 19-Jul-2018
Order Date: 11-Jul-2018
Project Description: 170254

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	7.12	1	mg/L	7.16			0.6	10	
Fluoride	0.66	0.1	mg/L	0.69			4.1	10	
Nitrate as N	0.59	0.1	mg/L	0.60			0.8	20	
Nitrite as N	ND	0.05	mg/L	ND				20	
Sulphate	29.1	1	mg/L	29.0			0.3	10	
General Inorganics									
Alkalinity, total	26.8	5	mg/L	27.2			1.5	14	
Ammonia as N	0.103	0.01	mg/L	0.120			14.7	17.7	
Dissolved Organic Carbon	1.8	0.5	mg/L	1.9			3.6	37	
Colour	2	2	TCU	2			0.0	12	
Conductivity	114	5	uS/cm	116			1.6	11	
pH	8.9	0.1	pH Units	8.9			0.3	10	
Phenolics	ND	0.001	mg/L	ND				10	
Total Dissolved Solids	80.0	10	mg/L	80.0			0.0	10	
Sulphide	1.16	0.04	mg/L	1.18			1.5	10	
Tannin & Lignin	ND	0.1	mg/L	ND			0.0	11	
Total Kjeldahl Nitrogen	0.90	0.1	mg/L	0.92			2.5	10	
Turbidity	31.8	0.1	NTU	31.7			0.3	10	
Metals									
Calcium	54.3	0.1	mg/L	54.9			1.2	20	
Iron	2	0.1	mg/L	2			10.8	20	
Magnesium	ND	0.2	mg/L	1.6			0.0	20	
Manganese	1.02	0.005	mg/L	1.24			19.5	20	
Potassium	2.9	0.1	mg/L	3.5			18.2	20	
Sodium	5.7	0.2	mg/L	14.3			85.9	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100 mL	ND				30	
Fecal Coliforms	ND	1	CFU/100 mL	ND				30	
Total Coliforms	ND	1	CFU/100 mL	ND				30	
Heterotrophic Plate Count	10	10	CFU/mL	10			0.0	30	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	16.1	1	mg/L	7.16	89.7	78-112			
Fluoride	1.53	0.1	mg/L	0.69	83.4	73-113			
Nitrate as N	1.58	0.1	mg/L	0.60	98.3	81-112			
Nitrite as N	0.891	0.05	mg/L	ND	89.1	76-107			
Sulphate	37.4	1	mg/L	29.0	83.7	75-111			
General Inorganics									
Ammonia as N	0.370	0.01	mg/L	0.120	100	81-124			
Dissolved Organic Carbon	11.8	0.5	mg/L	1.9	98.8	60-133			
Phenolics	0.022	0.001	mg/L	ND	86.4	69-132			
Total Dissolved Solids	122	10	mg/L		122	75-125			
Sulphide	0.50	0.02	mg/L		99.6	79-115			
Tannin & Lignin	1.1	0.1	mg/L	ND	108	71-113			
Total Kjeldahl Nitrogen	2.94	0.1	mg/L	0.92	101	81-126			
Metals									
Calcium	481		ug/L		96.1	80-120			
Iron	2640		ug/L	1900	74.1	80-120			QM-07
Magnesium	2370		ug/L	1590	77.7	80-120			QM-07
Manganese	41.8		ug/L	0.768	82.1	80-120			
Potassium	4280		ug/L	3450	82.1	80-120			
Sodium	506		ug/L		101	80-120			

Qualifier Notes:

Sample Qualifiers :

QC Qualifiers :

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

APPENDIX D

Test Pit Logs

Test Pit Log: TP-1

Project No.: 170254
Project: Hydrogeological Assessment & Terrain Analysis
Client: Bob Cousins
Location: 8015 Russell Road, Ottawa (Vars), Ontario
Date: January 18, 2018
Field Personnel: AS
Excavation Method: Hydraulic Shovel
Excavation Contractor: Client

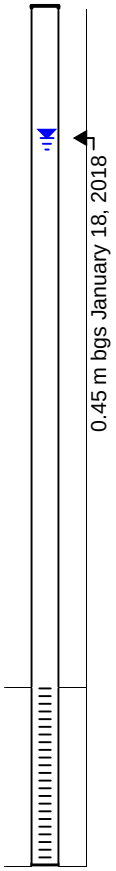
Depth (ft / m)	Soil Description	Elev./Depth (m)	Lithology	Sample Number
0 / 0	Ground Surface	100.81		
	TOPSOIL Sandy loam, dark brown, dry.	0.00		
1	**FILL** Sand and gravel, brown, some brick and concrete debris (ranging from 0.3 m to 0.9 m), moist.			TP1-1
2				
3				
1	Water found at 1.29 m bgs.			
4		99.52		
	SILTY CLAY Trace fine to medium grained sand, dark grey, wet, weathered in appearance.	1.29		
5				
6				TP1-2
2				
7				
8				
9				TP1-3
		97.92		
3	End of Test Pit	2.89		
10				
11				
12				
13				

Shear Strength (kPa): 50, 100, 150, 200

Water Content (%): 25, 50, 75

Liquid Limit (%): 25, 50, 75

Water Level (Standpipe or Open Excavation)



Easting: 470572
Northing: 5024510

Site Datum: Property pin by south-west entrance off Russell Road (100.00 m)

Groundsurface Elevation: 100.81
Top of Riser Elev.: 101.64

Excavation Width: 1.6 m
Excavation Length: 4.2 m

BGS: Below Ground Surface

Groundwater sample collected on January 18, 2018 and submitted for general chemistry and nutrients parameters (Nitrate, Nitrite, Total Kjeldahl Nitrogen and Ammonia).

Test Pit Log: TP-2

Project No.: 170254
Project: Hydrogeological Assessment & Terrain Analysis
Client: Bob Cousins
Location: 8015 Russell Road, Ottawa (Vars), Ontario
Date: January 18, 2018
Field Personnel: AS
Excavation Method: Hydraulic Shovel
Excavation Contractor: Client

Depth (ft / m)	Soil Description	Elev./Depth (m)	Lithology	Sample Number	Shear Strength (kPa) 50 100 150 200	Water Content (%) 25 50 75 / Liquid Limit (%) 25 50 75	Water Level (Standpipe or Open Excavation)
0 ft / 0 m	Ground Surface	101.48					
	TOPSOIL Sandy loam, dark brown, dry.	0.00					
1	**FILL** Sand and gravel, reddish-brown, some brick and concrete debris (ranging from 0.9 m to 1.2 m), dry to moist.			TP2-1			
2	Wood debris found at 1 m bgs. Water found at 1.2 m bgs.						
3 / 1							
4							
5							
6							
7 / 2	**SAND** Fine to medium grained sand with some silt and clay, trace fine gravel, dark grey, wet, increase in clay content with depth.	99.50 1.98		TP2-2			
		99.28 2.20		TP2-3			
8	End of Test Pit						
9							
10 / 3							
11							
12							
13							

0.70 m bgs January 18, 2018

Easting: 470531
Northing: 5024584
Site Datum: Property pin by south-west entrance off Russell Road (100.00 m)
Groundsurface Elevation: 101.476
Top of Riser Elev.: 102.236
Excavation Width: 1.7 m
Excavation Length: 3.9 m

BGS: Below Ground Surface

Approximately 0.9 m of standing water at end of test pit.

Groundwater sample collected on January 18, 2018 and submitted for general chemistry and nutrients parameters (Nitrate, Nitrite, Total Kjeldahl Nitrogen and Ammonia).

Test Pit Log: TP-3

Project No.: 170254
Project: Hydrogeological Assessment & Terrain Analysis
Client: Bob Cousins
Location: 8015 Russell Road, Ottawa (Vars), Ontario
Date: January 18, 2018
Field Personnel: AS
Excavation Method: Hydraulic shovel
Excavation Contractor: Client

Depth (ft / m)	Soil Description	Elev./Depth (m)	Lithology	Sample Number
0 / 0	Ground Surface	101.66		
	FILL Sand and gravel, brown, trace clay & brick debris, dry.	0.00		TP3-1
2		101.06		
	SILTY CLAY Some fine to medium grained sand, trace fine gravel, dark grey, wet at 2.1 m bgs, weathered appearance.	0.60		TP3-2
7				TP3-3
8	End of Test Pit	99.26		
		2.40		

Shear Strength (kPa): 50 100 150 200

Water Content (%): 25 50 75

Liquid Limit (%): 25 50 75

Water Level (Standpipe or Open Excavation): 1.48 m bgs January 18, 2018

Easting: 470441
Northing: 5024542

Site Datum: Property pin by south-west entrance off Russell Road (100.00 m)

Groundsurface Elevation: 101.656
Top of Riser Elev.: 102.286

Excavation Width: 1.6 m
Excavation Length: 4.2 m

BGS: Below Ground Surface

Groundwater sample collected on January 18, 2018 and submitted for general chemistry and nutrients parameters (Nitrate, Nitrite, Total Kjeldahl Nitrogen and Ammonia).

Test Pit Log: TP-4

Project No.: 170254
Project: Hydrogeological Assessment & Terrain Analysis
Client: Bob Cousins
Location: 8015 Russell Road, Ottawa (Vars), Ontario
Date: January 18, 2018
Field Personnel: AS
Excavation Method: Hydraulic shovel
Excavation Contractor: Client

Depth (ft / m)	Soil Description	Elev./Depth (m)	Lithology	Sample Number	Shear Strength (kPa) 50 100 150 200	Water Content (%) 25 50 75 / Liquid Limit (%) 25 50 75	Water Level (Standpipe or Open Excavation)
Ground Surface		101.46					
0 ft / 0 m	**FILL** Sand and gravel, dark brown, trace cobbles and boulders trace to some wood & brick debris, dry to moist.	0.00					
				TP4-1			
				TP4-2			
	SILTY CLAY Trace to some fine to medium grained sand, dark grey, moist to wet at 1.5 m bgs, weathered in appearance.	99.55 1.90					
				TP4-3			
	End of Test Pit	99.05 2.40					

1.55 m bgs January 18, 2018

Easting: 470490
Northing: 5024452

Site Datum: Property pin by south-west entrance off Russell Road (100.00 m)

Groundsurface Elevation: 101.455
Top of Riser Elev.: 102.005

Excavation Width: 1.6 m
Excavation Length: 4.2 m

BGS: Below Ground Surface

Groundwater sample collected on January 18, 2018 and submitted for general chemistry and nutrients parameters (Nitrate, Nitrite, Total Kjeldahl Nitrogen and Ammonia).

APPENDIX E

Sieve/Hydrometer Analysis Results

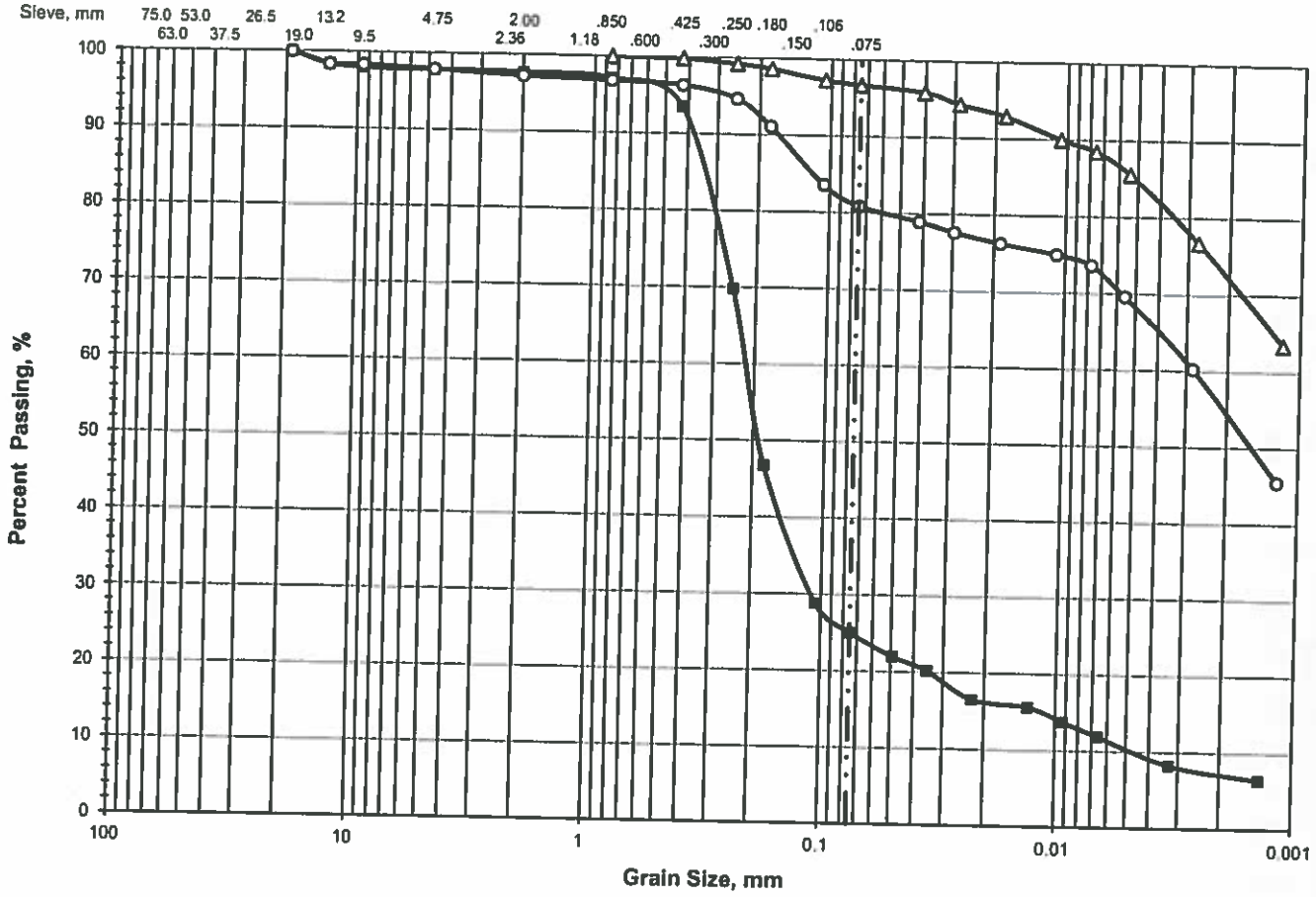
LRL Associates Ltd.

PARTICLE SIZE ANALYSIS

ASTM D 422 / LS-702

Client: Mr. B. Cousins
Project: Hydrogeological Assessment
Location: 8015 Russell Road, Ottawa, ON.

File No.: 170254
Report No.: 1
Date: January 18, 2018



Unified Soil Classification System

	> 75 mm	% GRAVEL		% SAND			% FINES	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
△	0.0	0.0	0.0	0.0	0.2	3.1	26.2	70.5
■	0.0	0.0	2.2	0.1	4.2	68.5	18.0	7.0
○	0.0	0.0	2.1	0.7	0.9	15.5	28.2	52.7

	Location	Sample	Depth, m	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
△	TP1	Sa 2	1.57							
■	TP2	Sa 2	1.98	0.2201	0.1898	0.1108	0.0118	0.0049	11.4	44.9
○	TP3	Sa 2	0.61	0.0028	0.0017					

APPENDIX F

Septic Design

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name	Unit no.	Lot/con.
8015 RUSSELL ROAD		

Municipality	Postal code	Plan number/ other description
OTTAWA		

B. Individual who reviews and takes responsibility for design activities

Name	Firm
P. SAVARD	DIMENSIONAL ANALYSIS

Street address	Unit no.	Lot/con.
17171 UNIT 3, CORNWALL CENTER ROAD		

Municipality	Postal code	Province	E-mail
LONG SAULT	K0C 1P0	ON	

Telephone number	Fax number	Cell number
(613) 362-8312	( )	( )

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1. of Division C]

House	HVAC – House	Building Structural
Small Buildings	Building Services	Plumbing – House
Large Buildings	Detection, Lighting and Power	Plumbing – All Buildings
Complex Buildings	Fire Protection	☒ On-site Sewage Systems

Description of designer's work
DESIGN SEPTIC SYSTEM

D. Declaration of Designer

I PIERRE SAVARD declare that (choose one as appropriate):
(print name)

I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: 13527

Firm BCIN: 43452

I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Division C, of the Building Code.

Individual BCIN:

Basis for exemption from registration:

The design work is exempt from the registration and qualification requirements of the Building Code.

Basis for exemption from registration and qualification:

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

Date Dec 28, 2017 Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) (c).of Division C, Article 3.2.5.1. of Division C and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of practice, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

Ottawa Septic System Office
Bureau des systèmes septiques d'Ottawa

Do Not Complete
Permit No _____
Revision No _____
Date _____

Schedule 4
Proposed Services
Complete Sections 1 thru 7

1. Engineered
- ☐ Yes
- ☑ No

2. Water supply
- ☑ Proposed
- ☐ Existing

3. Type of work proposed
- ☑ New Installation
- ☐ Replacement
- ☐ Alteration

4. Type of Well
- ☐ Dug/bored/Sandpoint well
- ☑ Drilled well
- ☐ Municipal
- ☐ Other

5. Residential Sewage Design Flow Info.
Bedrooms _____
House (floor area) _____ **m²**
People _____
Total Fixture Units _____ **(Schedule 8)**
Residential Flow _____ **L/day**

6. Sewage Design Flow Other Occupancies
Design Flow 2850 L/day
Detailed sewage flow calculations:
38 EMPLOYEES X 75 L/PERSON
= 2850 LITERS/DAY

7. Type of System
- ☐ Treatment Unit
- ☐ Class 2 – Leaching Pit
- ☐ Class 3 – Cesspool
- ☐ Class 4 – Shallow Buried Trench
- ☑ Class 4 – Trench **(Schedule 9)**
  - ☐ Fully raised
  - ☑ Partially raised
  - ☐ In-ground
- ☐ Class 4 – Filter Media **(Schedule 10)**
  - ☐ Fully raised
  - ☐ Partially raised
  - ☐ In-ground
- ☐ Class 4 – BMEC Area Bed **(Schedule 11)**
  - ☐ Fully raised
  - ☐ Partially raised
  - ☐ In-ground
- ☐ Class 4 – "Type A" Dispersal **(Schedule 13)**
  - ☐ Fully raised
  - ☐ Partially raised
  - ☐ In-ground
- ☐ Class 4 "Type B" Dispersal **(Schedule 14)**
  - ☐ Fully raised
  - ☐ Partially raised
  - ☐ In-ground
- ☐ Class 5 – Holding Tank (9000L min)
- ☐ Tank/TreatmentUnit/PumpChamber ONLY
- ☐ Effluent Filter/Risers ONLY

Ottawa Septic System Office | Bureau des systèmes septiques d'Ottawa

Do Not Complete
Permit No _____
Revision No _____
Date _____

Schedule 5
Sewage System Details

Type of System CLASS 4 TRENCH (Schedule 4)
Septic/Holding Tank Size: 18290 Litres Make: _____
Septic Tank Effluent Filter Make: POLYLOK Model: PL S2S

Treatment Unit – Make & Model _____
Number of Units: _____ Other: _____
Refer to Typical Drawing # A1 Pump(s) required YES.
Mantle Information: Pump Rate 859 L/15min*
Native or imported =15m in 1 direction(s) **Note:** Alarm required for all pumping systems

Slope subgrade 1 % slope
ENE direction(s)

Site to be Scarified (If clay) (YES) / NO
Clay Seal Required (If bedrock) YES / NO

☐ **Trench**
Distribution Pipe Length 145.6 m
Loading Area 882.3 m²
Type of Chamber PIPE & GRAVEL
Length of Chamber 18.2 m

☐ **Shallow Buried Trench**
Pipe Length _____ m

☐ **Filter Media Bed**
Stone _____ m²
Extended Base _____ m²
Pipe _____ m
Weight of Filter Media _____ Kg
Loading Area _____ m²

☐ **BMEC Area Bed**
☐ Type A
☐ Type B
Stone _____ m²
Sand _____ m²
Pipe _____ m
Linear Loading _____ L/m²

☐ **Tank/Treatment Unit/Pump Chamber Replacement** ONLY
☐ **Effluent Filter & Riser** ONLY

Construction Notes:

PROPOSED NEW BUILDING
(G.F.A. = ±1895m²)
F.F.=72.90

DAILY FLOW CALCULATIONS
38 EMPLOYEES AT 75 LITERS / PERSON
2850 LITERS PER DAY

R15.2000

PROPOSED WELL
SUGGESTED LOCATION < 15 METERS
TO WASTEWATER TREATMENT WORKS

PHASE 2
PROPOSED NEW
BUILDING

PROPOSED DISPOSAL
FIELD 8 RUNS AT 18.28 m
SPACED AT 1.6 m

PROPOSED TANK
10290 LITERS,
ON DEMAND PUMP STATION

2.0029

18.1062

16.1062

PROPOSED RIP-RAP
AS PER OPSD 810.010

BOTTOM OF BANK

HWL = 71.60

TOP OF BANK = 71.90

28.2880

7.6339

5.0m

5.0m

5.0m

31.2000

15.0m

71.57 GS

71.49 GS

71.28 GS

71.01 GS

(DESCRIPTION: HORIZONTAL GRIND MARK)
IN EASTERLY FACE OF I BEAM
ELEVATION = 72.72 m

1.5 " 38 mm FORCED MAIN (INSULATED)

15m SETBACK

NOTE:

1. ALL TREATMENT UNITS AND LEACHING BEDS ARE TO BE INSTALLED IN ACCORDANCE WITH MINIMUM ONTARIO BUILDING CODE CLEARANCE DISTANCES.

2. CARE IS TO BE EXERCISED DURING CONSTRUCTION ACTIVITIES NEAR OVERHEAD HYDRO WIRES.

3. EXISTING ELEVATIONS ARE APPROXIMATE, CONTRACTOR MUST VERIFY ALL ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.

4. SOIL CONDITIONS ARE ACCURATE FOR THE LOCATIONS SHOWN, CONTRACTOR MUST CONTACT THE DESIGN ENGINEER OR REGULATORY AUTHORITY SHOULD SOIL CONDITIONS DIFFER.

5. LOT TO BE SERVICED WITH A DRILLED WELL.

LEGEND

100.438	PROPOSED ELEVATION
100.438	EXISTING ELEVATION
———	EXISTING WORKS
———	PROPOSED SEWAGE WORKS
- - - -	PROPERTY LINE
TBM	TEMPORARY BENCH MARK (DESCRIPTION: HORIZONTAL GRIND MARK) IN EASTERLY FACE OF I BEAM ELEVATION = 72.72 m

CODES:

HS = HOUSE
CL = CENTER LINE
CD = CENTER LINE OF DITCH
SIB = STEEL IRON BAR
GS = GROUND SHOT
EP = EDGE OF PAVEMENT
OG = ORIGINAL GROUND
TW = TOP OF WELL
HK = HYDRO KIOSK
GD = GRAVEL DRIVEWAY
HP = HYDRO POLE
TS = TOP OF SLOPE

BM = BENCH MARK
FIB = FOUND IRON BAR
ST PI = STAND PIPE
PL = PROPERTY LINE
TP = TEST PIT
DRW = DRILLED WELL
bot sw = BOTTOM OF SWALE
BBR = BOTTOM-BRICK
ST = SEPTIC TANK
ga = GARAGE
CSL = CONCRETE SLAB
ED = EDGE OF DITCH
t of b = TOP OF BANK

Drawn by: prs | Designed by: prs | Checked by: prs

Description	Date	Approved

City of Ottawa	Plan#	Lot	Sublot	Con	
					No.: SD/227/2017

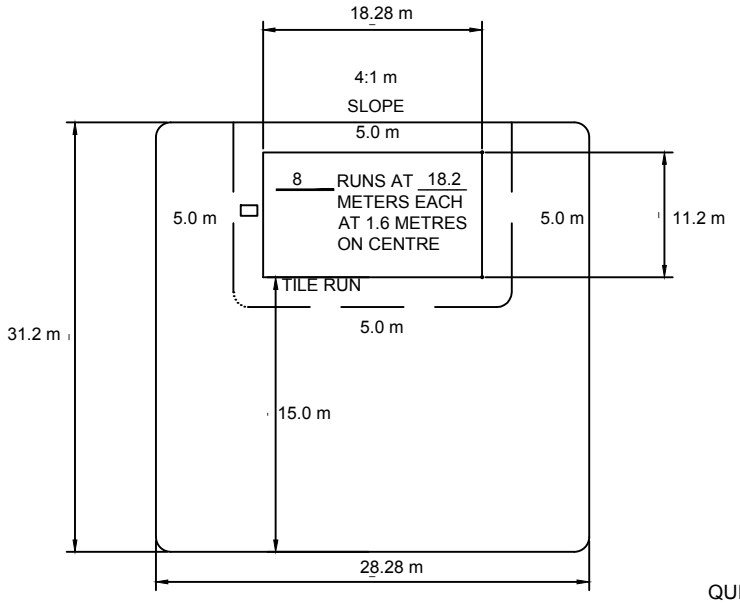
Civic Address
8015 RUSSELL ROAD

Date: Dec. 28, 2017

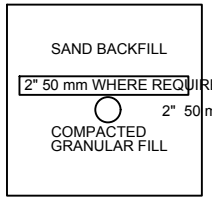
Scale: 1:400

DIMENSIONAL ANALYSIS BCIN 13527, 43452

ON-SITE SEWAGE TREATMENT PLAN FOR OF:
BOB COUSINS



FORCED MAIN DETAILS



PUMP CALCULATIONS
75% OF VOLUME OF DISTRIBUTION PIPES
V = 5.9 * 145.6 m = 859 LITERS
WHERE 5.9 = 75% OF 100 mm PIPES

TYPICAL DRAWING

FULLY RAISED
ABSORPTION TRENCH SYSTEM

As built

ELEVATIONS:

FINISHED GRADE 72.82 m

BOTTOM OF GRAVEL 72.22 m

BOTTOM OF PIPE
1. AT HEADER 71.44 m
2. AT ENDS 72.37 m

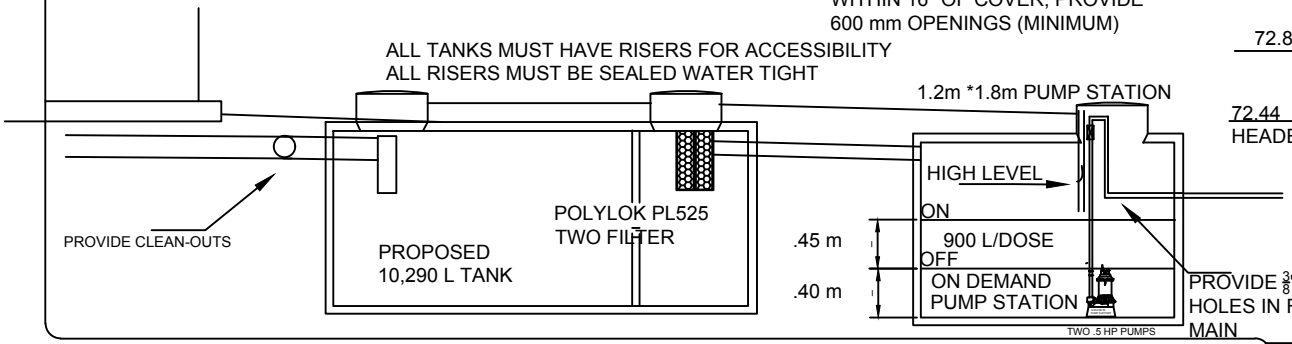
BOTTOM OF EXCAVATION 71.32 m

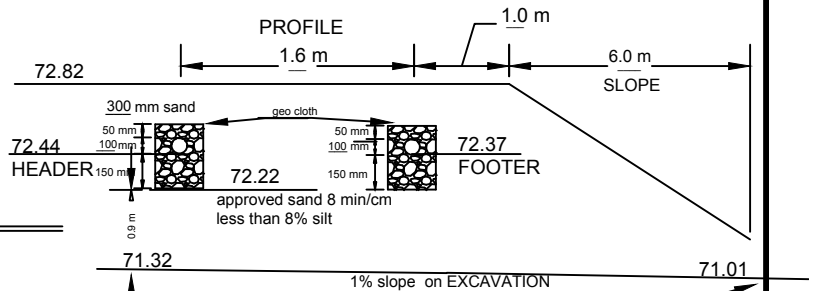
EXISTING GRADE 71.28 m AVG.

HGWT 1.2 m BELOW EXISTING GRADE est.
LIMITING DESIGN FACTOR IS FILL SOIL

QUICK DISC. TO BE ACCESSIBLE WITHIN 16" OF COVER, PROVIDE 600 mm OPENINGS (MINIMUM)

ALL TANKS MUST HAVE RISERS FOR ACCESSIBILITY
ALL RISERS MUST BE SEALED WATER TIGHT





DIMENSIONAL ANALYSIS

BCIN 13527, 43452

TITLE: PROPOSED SEPTIC SECTION FOR BOB COUSINS 8015 RUSSELL ROAD	TITLE: SECTION DATE: DEC 29, 2017 DRAWN BY: PRS CHECKED BY: SCALE: NTS	REVISED FILE: FILE DRAWING NO: A1

DAILY FLOW CALCULATIONS
Q = 2850 L/DAY
REQUIRED LENGHT OF PIPE
L = Q*T/200 where Q= daily flow; T = percolation rate
L = L/D * 8 MIN/CM / 200
L = 114 meters required
146.2 meters provided

Loading Rate Calculation
A = Q /4 liters / m ^{2}/d
A = 2850 l/d / 4 L / m^2 /d
A = 712.5 m^2
Provide

Loading rate of 4 liters per meter has been chosen due to the variety of fill materiel

DIMENSION OF EXCAVATION 28.28 m x 31.2 m

LOADING RATE 882.3 m sq^2

SCARIFICATION REQUIRED (Y) / N