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Terrain Analysis and Hydrogeological Study
Proposed Residential Subdivision
1730 Wilhaven Drive
Ottawa (Cumberland), Ontario

Prepared For:

2183144 Ontario Ltd.

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Report: PH1236-REP.02

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APPENDICES

1.0 INTRODUCTION

1.1 Terms of Reference

Paterson Group (Paterson) was retained by 2183144 Ontario Ltd. to conduct a terrain analysis and hydrogeological study for a proposed rural residential subdivision situated on the North Parts of Lots D & E, Concession 7, RP50R844 Part 2, former Township of Cumberland, now the City of Ottawa, Ontario, having the municipal address of 1730 Wilhaven Drive, hereafter referred to as the subject property. (Refer to Figure 1-Site Location Plan, which can be found in Appendix 5)

The purpose of this study has been to ascertain and assess the specific terrain and hydrogeological conditions which currently exist beneath the subject property as they relate to the suitability of the site for residential development on private services with minimal impact on groundwater resources.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and recommendations pertaining to the private services for the subject development as it is understood at the time of writing this report.

1.2 Background

The subject property is located south of the Village of Cumberland, Ontario, along the south side of Wilhaven Drive, east of Frank Kenney Road and immediately west of O'Toole Road. An old farmstead, consisting of a small bungalow, shed and medium sized wood clad barn, is presently situated on the central quadrant of the site with pasture lands to the west and east. A heavily treed area is present immediately south of the building area and extends as a narrow treeline along the southern property limits from east to west. The individual pasture lands are separated by narrow groupings of trees, also.

The subject property encompasses a total area of approximately 21.85 hectares (49.3 acres), based on available property information provided by the City of Ottawa, and is proposed to be developed into 21 individual lots. The average minimum lot size for each of the proposed lots has been assigned at 0.8 hectares (1.98 acres). It is proposed that the subdivision will be serviced by individual onsite wells and septic systems.

Paterson has conducted extensive hydrogeological investigations in the Ottawa area and is quite familiar with the geology and hydrogeology of the subject area. In addition to local experience, Paterson has reviewed numerous available hydrogeological studies in the area, including available studies in support of neighbouring residential subdivisions.

2.0 METHOD OF STUDY

2.1 Terrain Analysis

As part of this study, a series of test pits were put down on the subject property to delineate the subsurface soil conditions beneath the site. The field investigation was conducted on December 3, 2009. During this investigation a total of 12 test pits were put down across the subject property, using a small track mounted excavator. The test pit locations were selected by Paterson personnel to maximize the lot coverage within the open areas to minimize the inevitable gaps in the subsurface profile resulting from a heavily treed area situated along the south-central quadrant of the site.

All of the test holes were advanced to depths ranging between 2 and 3 m, measured below ground surface (bgs). The test pit locations are denoted with the appropriate symbol on Drawing No. PH1236-1- Test Hole Location Plan, located in Appendix 5.

Each test hole location was recorded and the subsurface conditions, including the soil morphology and depth to the groundwater table (where encountered), were carefully recorded as the test holes were advanced. Representative samples of the soils were recovered from the test holes. All samples were classified texturally in the field and sealed in proper containers for further perusal and analysis in our laboratory.

The depths at which the soil samples were recovered from the test holes are shown as "G" on the Soil Profile and Test Data sheets provided in Appendix 1. The locations of the test pits put down on the subject property are referenced on Drawing No. PH1236-1, entitled "Test Hole Location Plan", and is located in Appendix 5 of this report.

Sample Storage

All samples will be stored in the laboratory for a period of one (1) month after issuance of this report. They will then be discarded unless we are otherwise directed.

2.2 Test Well Installation

In order to evaluate the water supply aquifer(s) underlying the site, a total of three (3) test wells, hereafter denoted as TW1 to TW3, inclusive, were constructed across the site. These wells were constructed to compliment an existing drilled well which services the small bungalow in the property. The locations of the wells were selected by Paterson and located in the field by Annis, O'Sullivan, Vollebekk Ltd. Ontario Land Surveyors. Reference should be made to Paterson Drawing No. PH1236-1- Test Hole Location Plan, located in Appendix 5.

A rigorous review of available Water Well Records for the immediate area, published by the Ontario Ministry of the Environment (MOE) was undertaken prior to the placement of the test wells. Overburden thickness, depth of casing, aquifer interception points and reported well yields were reviewed in detail in order to establish a conceptual hydrogeological model for the site.

The Water Well Record for the existing well was obtained directly from Bourgeois Well Drilling who drilled the well in 2003. This well, hereafter denoted as HW, was a significant factor in the development of the conceptual hydrogeological model. A comprehensive well construction protocol was subsequently established based on the conceptual model.

The general well locations were chosen in order to ensure adequate areal coverage across the site, while, at the same time, endeavoring to maintain sufficient proximity such that response could be measured in observation wells during the pumping tests. The test well installation program was carried out by Air Rock Drilling Company Ltd. between November 5, 2009 and November 10, 2009. A engineer from Paterson was present during the creation of the casing hole, installation of the casing and grouting of the annular space for each test well. The Ministry of the Environment (MOE) Water Well Records for each test well appear in Appendix 2.

Construction of TW1

With respect to the construction of TW1, a 228 mm diameter casing hole was advanced using a rotary tri-cone bit through the shallow overburden, to the underlying limestone bedrock. The casing hole was advanced into the bedrock an additional 2.3 m to ensure that each casing was seated into competent (i.e. unfractured) bedrock and that a total casing length of 6.2 m bgs was realized.

A new, 150 mm diameter steel casing, having an approximate length of 6.7 m, was installed in the casing hole, thereby providing for a casing stickup of approximately 0.5m. The annular space was grouted utilizing a neat cement slurry introduced into the

bottom of the annular space and pumped, using pressure grouting equipment, to the surface of the ground. The return of the cement slurry to the surface of the ground, was visually observed by Paterson staff. As such, the casing installation and grouting of the annular space is considered to be in general compliance with Ontario Regulation 903, the current regulation governing water well construction in the Province of Ontario.

After sufficient set-up time, the open borehole was advanced using a 150 mm diameter air percussion button bit. Several potential aquifer intercepts were encountered during drilling of the open borehole. At each potential intercept, the well contractor repeatedly surged the formation with air and attempted to establish preliminary yield estimates, if water was found. Once the water supply aquifer was encountered, the formation was repeatedly surged with air and allowed to clear. Preliminary well yield was estimated and the well was purged until the water was observed to be in a sand free state.

Following completion of the drilling and purging process, the static water level was allowed to stabilize. Air Rock, in accordance with Ontario Regulation 903, proceeded to chlorinate the well and a one hour constant rate pumping test was carried out within approximately 7 to 10 days following completion of each test well. The rate chosen for the one hour pumping test was based on the preliminary findings of the well contractor at the time of installation and are those which are reflected on the published MOE Water Well Records.

Construction of TW2 and TW3

After TW1 was constructed successfully, thereby validating the well construction protocol and supporting the conceptual hydrogeological model, the remaining test wells were constructed.

Each of the remaining test wells were constructed utilizing the same construction protocol as had been demonstrated in TW1. In each case, the casing was advanced into the limestone bedrock a sufficient depth in order to ensure that the minimum casing length extended 6.2 m below ground surface.

Open borehole construction, surging and well development activities were carried out in general conformity to the well construction program, as detailed in the construction of TW1. Each well was sufficiently chlorinated and subjected to a one hour constant rate pumping test by Air Rock, prior to Paterson carrying out any detailed testing.

Construction of HW

Based on the MOE Water Well Record, which can be found in Appendix 2, the existing drilled well (HW) was completed with approximately 7.9 m of 150 mm diameter steel casing (7.3 m bgs and a 0.6 m stickup) set into grey limestone bedrock. Cement grout was utilized to seal the annular space.

The open borehole was constructed with a rotary air drilling rig, the same drilling equipment as was utilized by Air Rock for TW1, TW2 and TW3. The well contractor reported drilling through grey limestone bedrock with shale interbeds. An aquifer intercept was encountered at a depth of 18.3 m bgs and the total well depth was reported to be 26 m below ground surface. The overall well depth was confirmed by Paterson personnel during the course of the pumping test program.

2.3 Aquifer Analysis

Each of the four (4) test wells were subjected to a constant rate pumping test set at the pumping rate as recommended by Air Rock during their one hour constant rate pumping test, as noted in Section 2.2. The duration for each test was specified to be the greater of the time in which steady state was achieved, or after six (6) hours of continuous pumping.

TW1, TW2 and TW3 were pumped using a 1.5 HP electric submersible pump and portable generator package supplied by Air Rock. HW was pumped utilizing the existing submersible pump installed in the well. A garden hose was connected to the hose bib on the pressure tank and a constant discharge rate was established. In all cases, the pump discharge line was placed downgradient of the subject well at a sufficient distance in order to minimize the potential for short-circuiting and recharge of the pumped well. Observation wells were closely monitored during each pumping test, in order to attempt to utilize the drawdown data in the observation wells to accurately estimate the aquifer storativity.

During the pumping test, the pumping rate was constantly monitored in order to ensure that the rate did not vary by more than 5%. Furthermore, a series of chemical analyses of the pumped water were carried out at the well head during each pumping test. The parameters tested at the well head included: turbidity, free chlorine residual, total dissolved solids, pH, temperature and electrical conductivity.

Recovery data was collected for each of the test wells following the completion of pumping. Recovery times varied from well to well and were considered to be generally slow. All wells were noted to have at least 95% recovery within 24 hours after the completion of each pumping test.

Pumping test data was analyzed using Aquifer Test v. 2.5 aquifer analysis software package, by Waterloo Hydrogeologic. The following analytical methods were applied (where relevant data was available):

- Transmissivity Parameters: (Theis & Jacob Recovery); and
- Storativity Parameters: Cooper Jacob's Time Drawdown and Theis (Curve Matching).

The results of the aquifer analysis are presented and discussed in Section 7 of this report.

2.4 Topographical Survey

A detailed topographical survey had not been carried out on the subject property at the time of preparation of this report. Rather, the ground surface elevations for the three (3) new test wells were augmented with the detailed topographical information furnished by the City of Ottawa, through their interactive mapping website. The electronic contour mapping was carefully overlain onto the site plan provided by AOV in order to achieve the base mapping illustrated on Drawing No. PH1236-1. The test pit elevations were interpolated from the available topographic information.

2.5 Laboratory Testing

Gradation of Soils

The soil samples recovered from the test holes were returned to our laboratory and visually examined to review the results of the field logging. Four (4) representative samples were selected for grain size analyses in our laboratory. The results of the soil testing are provided on the Grain Size Distribution curves in Appendix 3.

Overburden Groundwater Assessment

The depth at which groundwater infiltration was observed in each of the test pits (where encountered) was recorded as part of the terrain analysis program. In addition, three (3) monitoring wells were installed across the site at TP1, TP9 and TP11, respectively. Groundwater samples were recovered from each of the monitoring wells after providing sufficient time for the groundwater to equalize after being disturbed during the test

pitting program. These samples were submitted to Exova Accutest Laboratories, located in Ottawa, Ontario, for chemical analysis for relevant nitrogen species (i.e. nitrite and nitrate). The results of this analysis were not available at the time of preparation of this study.

Bedrock Aquifer Groundwater Assessment

Raw water samples were collected from each of the four (4) test wells during the pumping tests. Specifically, one (1) sample was collected after three (3) hours of pumping and one (1) sample was collected at the completion of pumping.

Prior to collection of the water samples, the free chlorine residual was verified to be non detectable. After collection, the water samples were properly stored in a cooler and transported to Exova Accutest Laboratories, located in Ottawa, Ontario. The samples were submitted for comprehensive testing of bacteriological, chemical and physical water quality parameters.

3.0 SITE DESCRIPTION

3.1 Surface Conditions

Further to the establishment of the general description of the subject property in Section1.1 of this report, the subject property is located in a rural area of the former township of Cumberland. The site topography slopes at a modest grade from west to east towards the central to south central quadrant of the site. Drainage is imperfect to fair in the western quadrant.

From the central quadrant, which is heavily treed, the site is flat and the drainage is imperfect to poor. The existing land surface is primarily grassed, with three of the smaller parcels along the eastern quadrant of the site being utilized for field crops (soybeans). The poor crop performance noted during the field investigation in these fields coorborates the poor surficial drainage in this area.

3.2 Surrounding Land Uses with 500 m

The subject property is located in an area of relatively low density development, bound by Wilhaven Drive to the north and O'Toole Road to the east. To the south, agricultural and wooded lands are present. To the west, and beyond Wilhaven Drive to the north, a series of residential developments are present. A series of individual lots developed as rural estates, are situated along the north and south sides of Wilhaven Drive extending from Frank Kenney Road to the subject property. Agricultural lands are present beyond O'Toole Road to the east.

Based on the available information, there are no obvious indicators of potential groundwater contamination present on the surrounding lands within 500 m of the subject property, which may negatively impact the proposed development.

4.0 GEOLOGY

4.1 Surficial Geology

The surficial soils in the vicinity of the subject area generally consist of series of marine deposits associated with the Champlain Sea. Typically, a shallow deposit of medium to fine grained clayey silty sand is present overlying a marine clay of variable thickness and intermittent presence within the subject area. Glacial till, of marine origins, is typically present beneath the shallower deposits and, which in turn, overlies on bedrock.

Based on the test pit excavation program, overburden thickness across the site averages approximately 3 m in depth. Using well recognized techniques for the field identification of soils, four (4) unique stratigraphic units were identified in the areas investigated. The soils were classified using the Unified Soil Classification System (USCS) and percolation rates were estimated based on published data correlating soil types to permeability while accounting for variability in the consistency of the soil as identified by the soil morphology. The stratigraphic units are summarized in Table 1, below, and the grain size distribution curves are provided in Appendix 1.

Test pit locations and corresponding stratigraphy of the main soil types are summarized on the Test Hole Locations Plan (Drawing No. PH1236-1 in Appendix 5). The test pit logs are provided in Appendix 1.

To assist in the understanding of the areal coverage of the unit stratigraphic units, a plan (refer to Figure 2 in Appendix 5) has been prepared for illustration purposes.

Table 1: Summary of Unique Stratigraphic Units Encountered on Subject Property Based on Test Pit Excavations[1] in Study Area

Stratigraphic Unit	General Description (USCS Classification)	General Thickness (m)	Estimated Percolation Rate (min/cm)
1	**SC**- Clayey silty sand	0.3 to 0.6	25 to 35
2	**CH-CL**- Silty Clay	0.4 to 1.0	30 to 40
3	**ML-CH**- Clayey silt to sandy silt	0.8 to 2.2	25 to 40
4	**GC**- Glacial Till	more than 3 m	30 to 40

1. Maximum depth of test pit excavation of 3.0 m.

4.2 Bedrock Geology

Published geological mapping (Refer to Figure 3 located in Appendix 5), provided by the Geologic Survey of Canada (2003), and courtesy of Natural Resources Canada, reveals that the site and immediate surroundings are underlain by limestone of the Bobcaygeon formation of the Paleozoic Period. Beyond the Bobcaygeon Formation, to the east and west lies bedrock of the Gull River Formation. Lindsay Formation limestone is present beyond the site to the south.

A cursory review of the MOE Water Well Records also confirms that the significant majority of the wells drilled in the immediate area have been constructed into the limestone of the Bobcaygeon Formation.

5.0 REGIONAL HYDROGEOLOGY

A search of available published MOE Water Well Records for the immediate area surrounding the subject property (upwards of 750 m radius) yielded 43 water well records. Careful analysis of these records excluded 4 records due to incorrect information regarding location and obvious surficial and/or bedrock geology deficiencies, and general lack of defining information, in addition to records noting well decommissioning. In all, a total of 39 Water Well Records were utilized to assess the regional hydrogeology of the area. Of these records, 11 Water Well Records were located on Wilhaven Drive to the immediate west and east of the subject property.

Based on an analysis of the available water well records, the adjacent wells are drilled wells typically intercepting a water supply aquifer within the limestone of the Bobcaygeon. Some of the wells beyond the immediate area were reported to encounter a grey and green limestone which would suggest the Rockliffe Formation was encountered.

Through comparative analysis, the majority of wells within the immediate vicinity of the subject property appear to intercept the water supply aquifer located within the limestone at three (3) different depth ranges. These ranges are:

- 25 m to 27 m;
- 53 m to 77 m; and
- 93 m to 100 m.

A few of the wells were reported to intercept a lower water supply aquifer below the lower depth range. Of these wells, the deepest point of aquifer intercept was reported to be 134 m.

Beyond the immediate subject area, approximately 46 % of the well intercepted a water supply aquifer within the 50 m to 80 m depth range and 32% intercepted a water supply aquifer in the 90 to 100 m range. 11% of the wells were reported to intercept a water supply aquifer at a depth of between 25 to 30 m. 7% of the wells intercepted a water supply aquifer at a depth greater than 100 m.

With respect to well yields, the adjacent wells in the immediate vicinity have reported well yields in the order of 1.5 IGPM to 10 IGPM. Beyond the immediate subject area, well yields are equally variable with appear to have well yields of between 5 and 30 IGPM.

6.0 SITE HYDROGEOLOGY

As previously stated in this report, a total of three (3) test wells were constructed at the subject site during the well construction program (refer to Drawing No. PH1236-1- Test Hole Location Plan in Appendix 5 for well locations) to augment the existing drilled well on the site. Hydrogeological details of the construction of each test well and the house well, based on the MOE Water Well Records, and engineering site notes, are graphically presented in the Generalized Hydrogeological Cross Section of the Subject Property- Drawing No. PH1236-4 in Appendix 5.

A review of Drawing No. PH1236-3 reveals that the hydrogeology of the test well construction is consistent with the other wells constructed in the immediate vicinity of the site. The water supply aquifer located within the Bobcaygeon Formation appears, based on the findings of the pumping test program, which are discussed in detail in Section 7.0 of this report, to consist of a series of individual aquifer intercepts. Based on the resuls of the pumping test program, the individual intercepts do not appear to be interconnected. As such, it is believed that there are at least three (3) distinct aquifers located beneath the subject property. The first is present at a depth of approximately 20 m below ground surface. The next two(2) aquifers are located in the depth ranges of 103m to 106 m bgs and 130 to 131 m bgs, respectively.

Based on the information contained within the water well record for TW3, the lower aquifer appears to be present within the Rockliffe or Lindsay Formations. Both of these formations, especially the Rockliffe formation are younger bedrock with significant shale present throughout the vertical depth. Also, the water quality of aquifers present in these formations are well documented by Paterson and others to have elevated concentrations of iron, and sodium. Hardness is often low in Rockliffe aquifers as a natural softening process occurs within the aquifer which is generally responsible for the elevated sodium levels.

Based on the available data, the potentiometric head pressure on the aquifer is more than 50 m (on average (excluding HW). Using the Bernoulli equation for incompressible flow, and assuming a stationary vertical column of water, the confining force on the water in the aquifer can be calculated as follows:

$$\frac{P_1}{\partial} + \frac{V_1^2}{2g} + z_1 = \frac{P_2}{\partial} + \frac{V_2^2}{2g} + z_2$$

where:
P= pressure (kNm^{-2})
V= velocity (ms^{-1})
z = height of water column above datum (m)
∂ = specific weight of water (kNm^{-3})
g = acceleration due to gravity (9.81 ms^{-2})

Assuming that the column of water is stationary, $V_1=V_2=0$. Furthermore, using the aquifer depth as the datum, $z_1 = 0$ m. Assuming P_2=atmospheric pressure (101.325 kPa) and assuming a water temperature of 10 °C, substituting the known values into the equation and solving for P_1 yields:

$$P_1 = 9.81\ kNm^{-3} \times \left[\frac{101.325\ kN/m^{-2}}{9.81\ kNm^{-3}} + 50m\right]$$
$$= 591\ kPa$$
$$= \sim 6\ atmospheres\ (std.)$$

The presence of these significant pressures suggests that the aquifer is being acted on by two aquitards, thus creating a confined aquifer. By definition, "**a confined aquifer is an aquifer that is confined between two aquitards.**" (Freeze & Cherry, 1979). As such, the Paleozoic bedrock overlying and underlying the water supply aquifer, is considered to be an aquitard. This, combined with the strong upward gradient as evidenced by static water levels significantly above the surface of the ground, provide sufficient evidence to support the opinion that the water supply aquifers located within the Bobcaygeon Formation at the depth ranges specified above, are present in a confined environment and are isolated from passive surficial impacts.

Direction of Groundwater Flow

Typically, the static water levels in at least three (3) wells intercepting the same water supply aquifer is utilized to provide an interpolated direction of groundwater flow. In this instance, the test wells appear to intercept different aquifers with different confining pressures. As such, the direction of groundwater flow cannot be interpolated in this traditional manner.

Instead, the information gathered from previous hydrogeological studies carried out by Paterson in the area suggest the direction of groundwater flow is north towards the Ottawa River.

7.0 AQUIFER ANALYSIS

The results of the pumping tests performed on the test wells are presented in the following sections.

7.1 Aquifer Characteristics

The aquifer characteristics determined from the compilations of the pumping tests for the four (4) test wells are summarized below:

Table 2: Summary of Aquifer Characteristics Resulting from Analysis of PumpingTest Data Obtained from Constant Rate Pumping Tests

Parameter	Test Well Number			
	TW1	TW2	TW3	HW
Transmissivity[1] (m^2/d)	0.5	10.2	1.5	3.3
Storativity[2]	N/A	N/A	3.8×10^{-4}	N/A
Pumping Rate (L/min)	15.2	19.1	15.2	30
Available Drawdown (m)	150	58	81	18.2
Maximum Drawdown (m)	77.8	5.1	8.9	5.2
% Drawdown	52%	9%	11%	29%
Specific Capacity (L/min/m drawdown)	0.2	3.7	1.7	5.8
20 Year Safe Yield(m^3/day)	5.1×10^1	4.0×10^2	8.4×10^1	1.3×10^2

1. Transmissivity values calculated from numerical averages of values derived from the Theis & Jacobs Recovery method of analysis. In the case of TW3, transmissivity was calculated as the numerical average of the three (3) analytical results through the use of observation well data.
2. Storativity values calculated based on the numerical averages of all storativity values obtained from both Theis and Cooper & Jacobs Time-Drawdown analytical methods.

7.2 Groundwater Geochemistry Assessment

Table 3, presented in this section, summarize the overall laboratory geochemistry of the water supply aquifers located beneath the subject property. Data obtained from well head monitoring during the pumping tests is summarized, graphically, in Figures 4 through 7, in Appendix 5.

Table 3: Summary of Health and Aesthetic/Operation Objective Parameters for Original Test Wells

Parameter	Units	TW No. 1		TW No.2		TW No.3		HW	
		3 Hour	6 Hour	3 Hour	6 Hour	3 Hour	6 Hour	3 Hour	6 Hour
Microbiological Parameters (Health)									
Escherichia Coli	ct/100 mL	0	0	0	0	0	0	N/A	N/a
nFaecal Coliforms	ct/100 mL	0	0	0	0	0	0	N/A	
Faecal Streptococcus	ct/100 mL	2	11	0	0	2	0	N/A	
Heterotrophic Plate Count	ct/1 mL	135	291	>500	>500	181	11	N/A	
Total Coliforms	ct/100 mL	0	60	0	0	11	0	N/A	N/A
Chemical Parameters (Health)									
Fluoride	mg/L	0.12	0.16	1.94	1.96	0.61	0.63	0.11	N/A
Nitrite	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	N/A
Nitrate	mg/L	0.41	0.42	<0.10	<0.10	<0.10	<0.10	<0.10	N/A
Chemical Parameters with Aesthetic Objectives/ Operational Guidelines									
Alkalinity	mg/L	408	403	212	213	244	244	257	258
Chloride	mg/L	718	666	153	153	304	305	24	25
Colour	TCU	<2	<2	<2	<2	10	5	7	<2
DOC	mg/L	1.7	1.5	0.9	0.9	1.7	1.6	1.6	1.3
Hydrogen Sulfide	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.01
pH		7.81	7.85	8.18	8.18	7.88	7.93	7.74	7.76
Sulphate	mg/L	121	117	295	287	768	784	19	20
Hardness	mg/L	808	662	166	157	687	691	274	277
Sodium	mg/L	382	418	272	266	345	340	4	4
Iron	mg/L	5.51	0.73	<0.03	<0.03	1.55	0.06	0.78	0.50
Manganese	mg/L	0.15	0.06	<0.01	<0.01	0.04	0.03	0.04	0.04
Total Dissolved Solids	mg/L	2080	1980	975	962	2180	2220	377	382
Turbidity (lab)	NTU	81.7	15.4	0.7	0.3	19.4	1.3	15.1	6.7

Note: Additional General Chemical Parameters have not been summarized in this section as they have not been deemed relevant to this analysis. The data can be found on the individual laboratory reports in Appendix 3.

7.3 Aquifer Analysis Summary

Water Quantity Assessment

Using the procedure summarized in the document entitled, "*Procedure D-5-5 Technical Guideline for Private Wells: Water Supply Assessment*", prepared by the Ontario Ministry of the Environment, last revised August 2006, an analysis of the suitability of the aquifer to supply the proposed development can be completed. Using the values contained with in Procedure D-5-5, the per-person water requirement is set at 450 L/day. The peak demand, which occurs over a 120 minute period each day, equates to a peak demand rate of 3.75 L/min per person. Procedure D-5-5 suggest the utilization of the number of bedrooms plus one, to determine the minimum number of people per house. As the proposed development will likely witness three bedroom single family homes, using the Procedure D-5-5 methodology, the number of persons would be four (4) and the total peak demand rate is calculated to be 15 L/min.

Analysis of Table 3 in Section 7.1, reveals that the pumping rates chosen for each of the pumping wells are at or above this minimum pumping rate. Furthermore, all of the test wells were reported to have utilized less than 50% of the available drawdown during the pumping tests. This information, combined with the calculated 20 year long term safe yield values, suggests, in our professional opinion, that the specified well yields are representative of the yields which residents of the development are likely to obtain from future wells put down on the site.

Water Quality

A review of the water quality analysis data, received to date, for the test wells reveals that the raw water meets all health related parameters of the Ontario Drinking Water Standards (ODWS), with the exception of TW1. Moreover, it appears to be consistent with the surrounding water quality, based on other works carried out by Paterson, and, as such, is considered to be indicative of future, long term water quality.

Total coliforms and faecal streptococcus counts were noted to increase during the pumping test period. The laboratory was approached to discuss this anomaly and it uncertain whether or not the sample results may have been mixed up. As such, retesting of TW1 will be necessary and could not be completed prior to the preparation of this report.

With respect to aesthetic objectives and operational guidelines, the water contains modestly elevated concentrations of chloride, colour, hardness, iron, sodium and TDS. The laboratory turbidity levels were slightly elevated in the test wells also.

Observed levels of **colour** were noted to be below the aesthetic objective of 5 True Colour Units (TCU) at the completion of the pump tests for all of the test wells. Given that the iron and manganese concentrations in these wells were elevated, the colour is anticipated to be primarily a function of these ions, especially considering the low concentrations of tannin & lignin, and can be adequately removed using the same treatment devices. In the case of TW3, the colour may be indicative of the Rockliffe aquifer itself.

Iron (Fe) concentrations were observed to be above the aesthetic objective of 0.3 mg/L in only TW1 after the completion of the pumping tests. Similarly, **manganese (Mn)** concentrations were observed to be above the aesthetic objective of 0.05 mg/L in TW1. At the measured concentrations for both iron and manganese, common point of use water treatment devices, designed specifically for residential flows, will be more than adequate to significantly reduce these concentrations to aesthetic objective levels.

Sodium (Na) concentrations in TW1, TW2 and TW3 were noted to be elevated. The sodium concentration did not show significant reductions during the pumping tests. Although sodium is not toxic and no maximum acceptable concentration has been set, concentrations above 20 mg/L require that the Medical Officer of Health be notified so that this information may be passed on to local physicians for use in treatment of those requiring a sodium-restricted diet.

Hardness, an operational guideline, does not appear in the ODWS. Rather it appears in the Technical Support Documents for Drinking Water Standards, Objectives and Guidelines (Technical Support Documents) as a parameter with an operational guideline of 100 mg/L. At the measured concentrations, the water is considered to be hard to very hard. TW2 and the HW reported hardness concentrations below the reasonable treatable limit of 500 mg/L specified in Table 3 of the guidance document, entitled, "Procedure D-5-5: Technical Guideline for Private Wells: Water Supply Assessment", published by the MOE in 1995.

With respect to turbidity, the field turbidity was measured at regular intervals through the pumping tests for each of the test wells. With the exception of

TW1, the turbidity fell below 5 NTU after the completion of the pumping test. The field measured turbidity for TW1 was reported to be significantly lower than the laboratory turbidity. This phenomenon has been experienced in many instances where iron and/or manganese are present in moderate concentrations. As the raw water is collected, air is allowed to enter the water stream and air is in the sample bottles prior to collection. As a result, a series of reduction-oxidation reactions take place with the iron and manganese resulting in the precipitation of iron oxide and/or manganese oxide. The higher the pumping rate and longer the sample is stored prior to the laboratory analysing the sample, the greater the precipitation of these oxides.

With respect to Total Dissolved Solids (TDS), the Technical Support Documents state an aesthetic objective of 500 mg/L. Based on the fundamentals of groundwater chemistry, it is typical that ions of calcium, chloride, magnesium, sodium and sulphate, and hardness account for more than 90% of the TDS concentration measured in groundwater. TDS is a gross measurement of dissolved material and the aesthetic objective set out in the Technical Support Documents reflects both the tendency to have balanced water and the minimization of ionic concentrations that could affect the palatability of the water.

In accordance with Procedure D-5-5, Table 3 does not reflect a maximum concentration considered reasonably treatable for TDS. Rather, Procedure D-5-5 requires written rationale that corrosion, encrustation, or taste problems will not occur. The Langelier Saturation Index (LSI) indicates the corrosivity of water. The LSI is explained in the Table 8 below:

Table 8
Summary of Explanation of Langelier Saturation Index Values

LSI Value	Explanation
less than -0.5	Water is corrosive
between -0.5 and +0.5	Water is in equilibrium
higher than +0.5	Water has high scale potential

The LSI value for the water in the aquifer intercepted by TW1 is **+0.93** based on the field measured pH and temperature, and the laboratory analyses for calcium, alkalinity and TDS. Based on the calculated LSI, the water is in equilibrium with a significant potential for creation of scale but is not corrosive.

7.4 Water Conditioning Considerations

As the water within the preferred zone of aquifer interception contains elevated hardness and, to a lesser extent, iron, the raw water can be suitably conditioned to remove these two aesthetic parameters. A standard residential grade water softener can be installed to remove both the hardness and iron concentrations in the raw water. Regeneration rates may be slightly higher given the concentration of iron in a few of the test wells, however the iron concentrations are not anticipated to substantially contribute to a reduction in resin capacity.

As the water is considered to be very hard, it is recommended that should a water softener be selected for installation, that consideration be made to installing a separate tap for drinking water which bypasses the softener.

With respect to the slightly increased turbidity in both the field and laboratory samples, as there is no need for water treatment to control bacteriological parameters, the turbidity values are considered to be within the acceptable range of values contained within Procedure D-5-5. It is anticipated that extended well development, at a rate of not more than 5 L/min for at least 24 hours, will be sufficient to remove any residual turbidity resulting from well construction for each newly constructed well at the site.

In summary, the water quality from the test wells indicates that there are, indeed, three distinctly different aquifers located beneath the site. The deepest aquifers, intercepted by TW3 and TW1, specifically, have the least desirable aesthetic water quality. HW, which intercepts the shallowest aquifer, has the most desirable aesthetic water quality. TW2, which, based on the water quality and aquifer response, appears to be influenced by another aquifer. The reported aquifer intercept point for TW2 was between 103 and 106 m bgs. This, based on the hydrogeological cross section (refer to PH1236-3 in Appendix 5), shows a similar intercept elevation as in the case of TW1. While TW1 and TW2 share some similar water geochemistry markers, they are significantly different. This suggests that there may be mixing of multiple aquifers taking place in TW2. This hypothesis is furthered by the fact that the drawdown curve for TW2 (refer to Appendix 4) shows gapping which would suggest the test well is influenced by another aquifer of lower yield.

7.5 Potential Well Interference

It is anticipated that a series of individual water supply wells, in addition to the existing test wells, will be constructed at the subject property in order to provide individual water supplies for each lot. As these wells are anticipated to intercept aquifers located in Bobcaygeon Formation, and considering the inherent intermittent nature of pumping, potential well interference with offsite uses is anticipated to be negligible. This is further corroborated by the 20 year safe yield estimates established earlier in this report.

As the pumping is anticipated to be intermittent with several wells in operation at any given time, with the expectation of 100% recovery within a few hours of termination of pumping, a potential well interference model was created to reflect a hypothetical worst case scenario for drawdown at the site. The model, assumes series of wells, located along concentric circular spacings extending outward from one central well, each pumping continuously at a rate of 2000 L/day (average peak water demand) over a period of 20 years. The analytical model is presented in Appendix 4.

In the long term model, the maximum anticipated drawdown, based on a total of 29 wells pumping continuously for 20 years at 2,000L/day, is 15.50m. As the average anticipated well depth is approximately 100 m, this drawdown represents a removal of 15% of the available drawdown. Given that a conservative, but reasonable Transmissivity value was utilized (3.2 m^2/day (HW)) and the overall conservative approach of the model, this drawdown is considered to be an acceptable worst case scenario.

In the second model, a single well having an average available drawdown of 24 m was modelled to be pumped at 50,000L for 24 hours. This is the maximum allowable volume of pumping before a Permit to Take Water is required by the MOE. In this model, again a transmissivity of 3.3 m^2/day and a storativity of 3.8×10^{-4} was chosen. At a radial distance of 50 m, a distance approximately one half of the closest distance between future adjacent wells, a drawdown of 3.31 m is anticipated. This corresponds to a reduction in available drawdown of only 3%.

Given the very conservative nature of the models presented above, it is opined that the potential well interference between wells, and beyond the property limits is acceptable in the worst case scenario models. Considering the intermittent pumping, rapid recovery values and significant 20 year safe yield estimates, actual drawdown in offsite wells is anticipated to be negligible.

8.0 DEVELOPMENT RECOMMENDATIONS

The following sections outline the recommendations for development which have been formulated from the data collected in this study.

8.1 Site Development

Based on the results of our study, this site is considered to be suitable for the development of the 21 lots as described in Section 1.0 of this report. The on-site sewage disposal needs can be accommodated with standard Class 4 sewage systems consisting of a septic tank and fully raised leaching bed, as per Part 8 of the Ontario Building Code. Furthermore, an adequate water supply aquifer of sufficient quality and quantity is located beneath the subject property and can be intercepted by private wells drilled in accordance with Ontario Regulation 903.

8.2 Lot Development Plan

One objective of the hydrogeological study is to enhance development and minimize the effects of sewage systems on the surrounding environment. This is achieved through prevention of the accumulation of surface water, by ensuring the proper construction of water supply wells and sewage systems, and by coordinating the overall positioning of the services to maximize separations. A minimum separation of 18 m for fully-raised systems is required between a well and a Class 4 sewage system. Clearance distances also apply to wells and septic systems located on neighbouring lots.

The proposed Lot Development Plan (Drawing No. PH1236-2) in Appendix 5 shows the proposed lot development plan for the site. The purpose of this drawing is to show that a typical home and private services will fit onto the proposed lot, and can meet all pertinent regulations without causing environmental constraints. The houses shown in this drawing covers a plan area of 160 m^2, assuming a four (4) bedroom, two-storey 300 m^2 (3,500 ft^2) home, with a garage of 50 m^2, and is serviced by a sewage system with the capacity of 3,000 L/day. In actuality, the daily sewage flows will likely be significantly lower than this value.

In all instances, careful, site specific analysis of the soil morphology in the area of each proposed leaching bed is required during the design stages of the leaching bed in order to determine if sufficient soil exists to facilitate the use of native soil for subgrade preparation. Detailed soil morphology should only be determined by a qualified geotechnical specialist.

It is not the intent of the Lot Development Plan (Drawing No. PH1236-2) to restrict placement of a dwelling on each lot. While the actual configuration and position of the home may change, the relative position of the home, sewage system and well should be maintained. In all cases, the separation criteria for the immediate and neighbouring lots should be followed.

The required separation distance from a fully raised leaching bed to a surface water body or drilled well is 18 m. Furthermore, in accordance with Ontario Regulation 903, all drilled wells, in addition to the prescribed separation distances to the sewage system, must also be located a minimum of 15 m from a potential source of contamination. (i.e. fuel oil tanks, Regional Roads, etc.)

8.3 Predictive Impact Assessment

Hydrogeolocial Sensitivity

In accordance with Section 5.0 of the MOE publication, entitled, "Procedure D-5-4 Technical Guidelines for Individual On-site Sewage Systems: Water Quality Impact Risk Assessment", the groundwater impacts from on-site sewage systems must be addressed in a step-wise manner. In order to establish the initial step, it is essential to demonstrate whether or not the site is considered hydrogeologically sensitive.

Given the significant confining pressures exerted by the aquifer combined with the substantial thickness of competent bedrock present beneath the study area, **the subject property is not considered hydrogeologically sensitive**.

Isolation of Supply Aquifer

As established in Section 6.0 of this report, the supply aquifer is considered to be a confined aquifer with the overburden material and bedrock acting as an aquitard. By definition, "..**the term aquitard has been coined to describe the less-permeable beds in a stratigraphic sequence.**" (Freeze & Cherry, 1979). The upper layers of the limestone bedrock are considered to be an aquitard, which explains the confining pressure and Theis like response to pumping. Analysis of the available MOE Water Well Records within a 500 m radius of the site indicate significant thicknesses of limestone are present between the surface of the ground and the depth of the water supply aquifer on most, if not all of the drilled wells, combined with the absence of nitrates in the water supply aquifer our opinion, supports the belief that the hydrogeological isolation extends well beyond the property limits.

Nitrate Impact Assessment

In accordance with the interpretation of the City of Ottawa relating to MOE Procedure D-5-4 and D-5-5, the minimum proposed lot size is shall be at least 0.8 ha. As such, there is no requirement to carry out a nitrate impact assessment. Moreover, it has been sufficiently demonstrated that the water supply aquifer is hydrogeologically isolated from surface activities and that the isolation extends a significant distance beyond the property in all directions. As such, regardless of the minimum proposed lot size, there is no requirement, as specified in Procedure D-5-4, to continue the stepwise evaluation.

8.4 Sewage System Design

Sewage systems must be designed according to Part 8 of the Ontario Building Code (OBC). The OBC sets out minimum design and construction standards for all approved classes of sewage systems. It is proposed that this site be serviced with traditional Class 4 sewage systems consisting of a septic tank and separate leaching bed.

OBC requirements state that the there must be a minimum of 900 mm of suitable soil or leaching bed fill present between the base of the absorption trenches and the high groundwater table, bedrock or soil with a percolation rate greater than 50 min/cm. Given the moderately low permeability of the clayey sand and silty sand within the overburden soils, combined with the flat topography, most Class 4 absorption trench style leaching beds are expected to be fully raised above the existing ground surface. An imported sand mantle having a minimum thickness of 250 mm and extending a minimum of 15 m beyond the absorption trenches in the direction of effluent flow will also be required.

Based on OBC design sewage flow tables, a large 4 bedroom luxury residence with a finished floor area of 300 m^2 may produce in the order of 3,000 L/day of sewage effluent per day. Based on the quality of the sand deposits available in the local pits, imported sand is anticipated to have a percolation rate (a.k.a. T-time) of between 6 and 8 min/cm. Considering the design flows and percolation rate of the available imported sand, a tile length of 140 metres is required. The Lot Development Plan (PH1236-2) illustrates the size of such tile beds, complete with minor alternative configurations due to irregular lot shapes and other constraints. The sewage system should be placed down slope from any nearby wells, where possible.

The sewage system layouts detailed in Drawing No. PH1236-2 are shown to be fully raised leaching beds with a 15 m imported sand mantle. With due consideration to the low permeable terrain unit which dominates the subject property, the Lot Development Plan (Drawing No. PH1236-2) has been prepared to illustrate that the maximum foreseeable size of leaching bed utilized on any given lot, can be easily accommodated. Moreover, the purpose of the drawing is to illustrate that adequate space exists on each lot to accommodate such a sewage system. The end, or toe, of the mantles will be required to be unobstructed and free draining; the existing topsoil layer is likely to receive the polished effluent from the toe.

8.6 Well Design

Drilled wells, completed in the bedrock aquifer, should be used for the water supply in this development. The wells should be drilled by a licensed well contractor experienced in the study area, and should be completed in accordance with Ontario Regulation 903, as amended.

A minimum well yield of 3 IGPM is recommended for an average residence and is considered to be easily obtainable on this site. As it is desirable to drill the future wells to achieve the highest quality water, the wells should be drilled to a depth of not more than 30 m before first surging and flushing the well in order to maximize exposure to the upper aquifer. Moreover, it may be prudent to utilize a cable tool to construct the future wells as the inherent nature of the pounding of a cable tool is known to maximize the fracturing within limestone bedrock to open up a formation in a manner which a rotary drill cannot.

The casing hole should be constructed such that the hole extends into sound bedrock such that the casing penetration is at least 2 m into the bedrock and the casing length, measured below ground surface, should not be less than 6 m.

The casing should be fitted with an appropriate drive shoe prior to installation and the annular space should be grouted with cement grout delivered from the bottom of the annular space to the ground surface using a method permitted by Ontario Regulation 903, as amended. The creation of the casing hole, the installation of the casing and the grouting of the annular space should be inspected by a qualified Professional Engineer from Paterson Group Inc.

Creation of the open borehole should continue until the borehole reaches a depth of not more than 30 m below ground surface before first surging and purging the well as described above..

The well should be developed by surging or pumping until the water is developed to a sand free state at the time of construction in accordance with Ontario Regulation 903. If the water is observed to be cloudy at the completion of the prescribed well development, extended well development should be performed until all visible turbidity is removed.

Chlorine should be introduced at the completion of well development in sufficient quantity to produce a free chlorine residual of at least 50 mg/L (ppm). The chlorine should be mixed with the standing water in the casing using a procedure that will result in the thorough vertical mixing of the chlorine over the entire depth of the well.

The well should be completed with a submersible pump, pitless adaptor and vermin proof well cap. All such mechanical work connected to the well is to be completed by a qualified well contractor possessing a valid Class 4 pump installer's license. After completion of the mechanical work in the well, the well should be disinfected as described above.

The grading around the well casing should be slightly elevated to direct surface runoff away from the well. The casing should project approximately 400 mm above the mounded soil within 3 m in all directions from the casing.

9.0 CONCLUSIONS

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

1. The subject property is located in a relatively flat to slightly sloping setting with all areas exhibiting poor to imperfect drainage characteristics.
2. There is minimal potential impacts from surrounding land uses within 500 m of the site, based on available information. Moreover, offsite impacts from the proposed density of residential development are considered to be negligible
3. The surficial geology of the subject property generally consists of a mixture of silty sand to silty clay deposits overlying bedrock over the subject area. The soils types and areal delineation are consistent with available soils mapping.
4. The bedrock geology beneath the site consists of limestone of the Bobcaygeon Formation. The Bobcaygeon formation is bordered on the west and east by younger bedrock of the Rockliffe and Gull River Formations respectively. The direction of groundwater flow is interpreted to be north towards the Ottawa River.
5. The construction of the test wells on the subject property appear have intercepted at least three (3) individual water supply aquifers of suitable quantity. The quality of the shallowest aquifer is such that it is the preferred aquifer for future wells.
6. The most consistent zones of aquifer intercept of the test wells and neighbouring wells is between 25 m to 27 m, 53 m to 77 m and 93 m to 100 m below ground surface.
7. Significant confining pressures are present on the water supply aquifer at the interception points. An adequate quantity of water is present in all of the encountered aquifers, however the highest well yields were reported in TW2 and HW. Water quality of the upper aquifer, based on the analyses conducted in this report, is considered to be excellent for domestic use.
8. Potential well interference with neighbouring, offsite wells, is considered to be minimal and, based on the aquifer parameters determined by this study, the anticipated water demand from this subdivision will have minimal impact on the safe yield of the water supply aquifers.
9. Sewage systems, containing fully raised leaching beds, are easily accommodated on each of the proposed lots.
10. The subject property is suitable for development as a residential subdivision at the proposed density. Impacts to the neighbouring low density residential development area is expected to be minimal, at best.

10.0 RECOMMENDATIONS

Based on the information presented in the body of this report, the following recommendations can be made:

1. In accordance with the intent of Procedure D-5-5, the Medical Officer of Health must be notified where sodium concentrations in the new wells exceed 20 mg/L. This requirement is specified in order for the information to be disseminated to local physicians in order to treat persons with sodium reduced dietary needs.
2. If the use of water softeners are considered, it is recommended that a separate water supply tap be installed. This tap should bypass the water softener to prevent the increased sodium concentration which will result by softening the water with sodium chloride.
3. Wells should be constructed such that the casing hole extends into sound bedrock such that the casing penetration is at least 2 m into the bedrock and the casing length, measured below ground surface, should not be less than 6 m. The annular space should be grouted in a manner consistent with the construction of the test wells detailed in this study.
4. The preferred zone of aquifer interception for future wells should be set at approximately 25 m to 27 m measured below the ground surface. Wells should be constructed with cable tool drill to a depth of not more than 100 m before aggressive surging and purging has taken place.
5. The creation of the casing hole, installation of the casing, and grouting of the annular space, should be inspected by a qualified Professional Engineer of Ontario. Furthermore, it is recommended that a qualified Professional Engineer of Ontario oversee the construction of the open borehole in order to ensure well depths do not exceed those recommended in this study. All well construction must be carried out by a qualified, and experienced well technician.
6. TW1 should be chlorinated and resampled to ensure the well is free of microbiological parameters.
7. Wells should be developed to a sand free state in order to ensure that the residual turbidity created by the well drilling activities is completely purged from the well. Additional well development, prior to placing the well into use, is strongly recommended in order to provide adequate development of the formation and remove extraneous rock debris from the aquifer pathways.

In summary, it is our professional opinion that this site is suitable for development as a residential subdivision at the proposed lot density. The hydrogeological recommendations contained within this report, if followed, will ensure that the development takes place in an effective manner, with a minimal impact on the natural environment.

PATERSON GROUP INC.

Robert A. Passmore, P.Eng.
Hydrogeologist

Stephen J. Walker, P.Eng.
Senior Hydrogeologist

APPENDIX 1

- SOIL PROFILE & TEST DATA SHEETS
- SYMBOLS AND TERMS

patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Terrain Analysis & Hydrogeological Study
1730 Wilhaven Drive
Ottawa, Ontario

DATUM Elevations interpolated based on topographic information supplied by the City of Ottawa.

FILE NO. PH1236

REMARKS

HOLE NO. TP 1-09

BORINGS BY Hydraulic Shovel **DATE** 3 Dec 09

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	100.50
TOPSOIL 0.23							
Brown **SILTY SAND** with clay 0.81		G	1				
GLACIAL TILL: Brown silty sand with clay, gravel, cobbles and boulders		G	2			1	99.50
						2	98.50
3.02						3	97.50
End of Test Pit Refusal on inferred bedrock @ 3.02m depth (Water infiltration @ 2.6m depth)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %
20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Terrain Analysis & Hydrogeological Study
1730 Wilhaven Drive
Ottawa, Ontario

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REMARKS

FILE NO. **PH1236**

HOLE NO. **TP 2-09**

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	99.25
TOPSOIL 0.25							
Brown **SILTY CLAY**		G	1			1	98.25
1.22							
GLACIAL TILL: Brown silty clay with sand, gravel, cobbles and boulders 1.65		G	2			2	97.25
GLACIAL TILL: Coarse sand with gravel, clay, cobbles and boulders 2.44							
End of Test Pit							
(Water infiltration @ 0.9m depth)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

Piezometer Construction

▽

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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REMARKS

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

FILE NO. **PH1236**

HOLE NO. **TP 3-09**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	99.10
TOPSOIL 0.25							
Brown **SILTY CLAY,** some sand 0.60		G	1				
GLACIAL TILL: Grey-brown silty clay with sand, gravel and cobbles 0.86		G	2				
		G	3			1	98.10
GLACIAL TILL: Brown silty sand with clay, gravel, cobbles and boulders							
		G	4			2	97.10
2.72							
End of Test Pit							
(Water infiltration @ 1.6m depth)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

▽

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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REMARKS

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

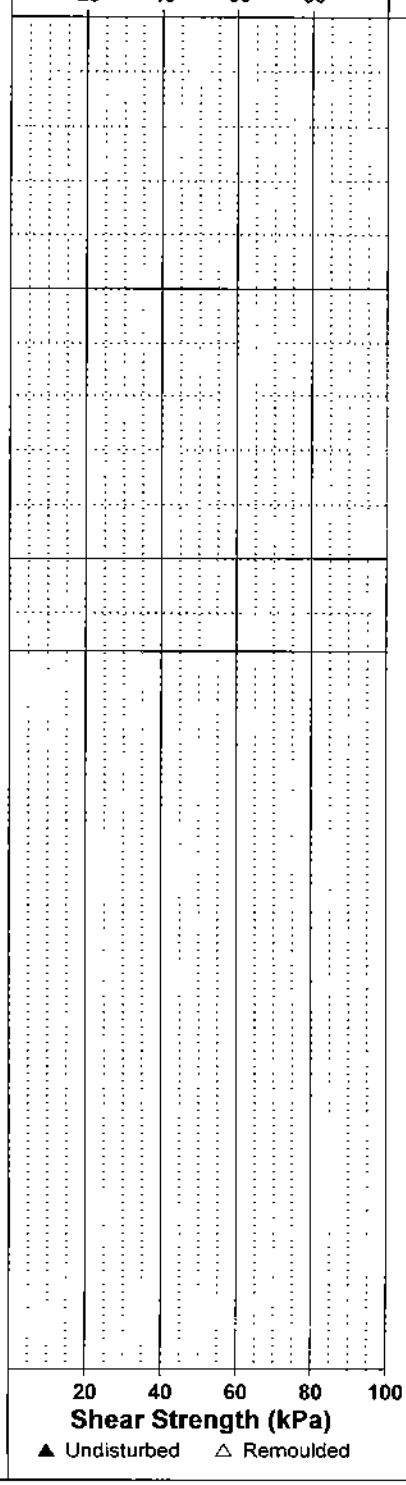
FILE NO. **PH1236**

HOLE NO. **TP 4-09**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	100.50
TOPSOIL 0.25							
Brown **SILTY CLAY,** some sand and gravel 0.71		G	1				
		G	2			1	99.50
GLACIAL TILL: Brown silty sand with gravel, cobbles and boulders 2.34						2	98.50
End of Test Pit Refusal on inferred bedrock surface @ 2.34m depth (Water infiltration @ 1.6m depth)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

Piezometer Construction



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28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

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1730 Wilhaven Drive
Ottawa, Ontario

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REMARKS

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

FILE NO. **PH1236**

HOLE NO. **TP 5-09**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	99.80
TOPSOIL 0.23							
Brown **SILTY SAND** with clay 0.60		G	1				
Red-brown **SILTY CLAY** 0.94		G	2			1	98.80
GLACIAL TILL: Brown silty sand with clay, gravel, cobbles and boulders						2	97.80
2.59							
End of Test Pit							
(Water infiltration @ 1.0m depth)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Terrain Analysis & Hydrogeological Study
1730 Wilhaven Drive
Ottawa, Ontario

DATUM Elevations interpolated based on topographic information supplied by the City of Ottawa.

REMARKS

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

FILE NO. **PH1236**

HOLE NO. **TP 6-09**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	99.60		
TOPSOIL 0.30		G	1						
Brown **SILTY CLAY,** some sand						1	98.60		
1.47 Interlayered **SAND** and **SILTY CLAY** 1.68		G	2						
Stiff, brown **SILTY CLAY** - grey by 2.3m depth						2	97.60		
2.59 **GLACIAL TILL:** Grey silty clay with sand, gravel, cobbles and boulders 2.74		G	3						
End of Test Pit (Water infiltration @ 1.5m depth)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Terrain Analysis & Hydrogeological Study
1730 Wilhaven Drive
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DATUM Elevations interpolated based on topographic information supplied by the City of Ottawa.

REMARKS

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

FILE NO. **PH1236**

HOLE NO. **TP 7-09**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	99.20		
TOPSOIL 0.23									
Brown **SANDY SILT,** trace clay 1.07						1	98.20		▽
GLACIAL TILL: Brown fine to coase sand with gravel, cobbles and boulders - grey by 2.1m depth		G	1			2	97.20		
End of Test Pit 2.90 (Water infiltration @ 1.1m depth)									

Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Terrain Analysis & Hydrogeological Study
1730 Wilhaven Drive
Ottawa, Ontario

DATUM Elevations interpolated based on topographic information supplied by the City of Ottawa.

REMARKS

FILE NO. **PH1236**

HOLE NO. **TP 8-09**

BORINGS BY Hydraulic Shovel

DATE 3 Dec 09

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.25						0	99.00		
Brown **SANDY SILT**, trace clay						1	98.00		▽
2.41						2	97.00		
Brown fine to medium sand with clay seams 2.84									
Firm, grey **SILTY CLAY** 3.05		G	1			3	96.00		
End of Test Pit									
(Water infiltration @ 1.5m depth)									

Water Content % scale: 20 40 60 80

Shear Strength (kPa) scale: 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Terrain Analysis & Hydrogeological Study
1730 Wilhaven Drive
Ottawa, Ontario

DATUM Elevations interpolated based on topographic information supplied by the City of Ottawa.

REMARKS

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

FILE NO. **PH1236**

HOLE NO. **TP 9-09**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	99.80		
TOPSOIL 0.28									
Brown **SANDY SILT**, trace clay						1	98.80		
1.58 Firm, brown **SILTY CLAY**		G	1						
1.83 **GLACIAL TILL:** Brown silty sand with clay, gravel, cobbles and boulders						2	97.80		
3.05 End of Test Pit (Water infiltration @ 0.8m depth)						3	96.80		

Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Terrain Analysis & Hydrogeological Study
1730 Wilhaven Drive
Ottawa, Ontario

DATUM Elevations interpolated based on topographic information supplied by the City of Ottawa.

REMARKS

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

FILE NO. **PH1236**

HOLE NO. **TP10-09**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	99.50		
TOPSOIL 0.25									
Brown **SANDY SILT,** trace clay						1	98.50		
1.98									
Firm, grey **SILTY CLAY** with sand						2	97.50		
3.56									
GLAICAL TILL: Grey silty clay with sand, gravel, cobbles and boulders 3.81						3	96.50		
End of Test Pit									
(Water infiltration @ 0.9m depth)									

Water Content % scale: 20 40 60 80

Shear Strength (kPa) scale: 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Terrain Analysis & Hydrogeological Study
1730 Wilhaven Drive
Ottawa, Ontario

DATUM Elevations interpolated based on topographic information supplied by the City of Ottawa.

FILE NO. **PH1236**

REMARKS

HOLE NO. **TP11-09**

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	99.30
TOPSOIL 0.30							
Brown **SANDY SILT,** trace clay						1	98.30
2.34						2	97.30
Grey **SILTY CLAY,** trace sand						3	96.30
3.50							
GLACIAL TILL: Grey silty sand with clay, gravel, cobbles and boulders 3.83							
End of Test Pit							
(Water infiltration @ 2.0m depth)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Terrain Analysis & Hydrogeological Study
1730 Wilhaven Drive
Ottawa, Ontario

DATUM Elevations interpolated based on topographic information supplied by the City of Ottawa.

REMARKS

BORINGS BY Hydraulic Shovel DATE 3 Dec 09

FILE NO. **PH1236**

HOLE NO. **TP12-09**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	100.50	20 40 60 80	
TOPSOIL 0.28									
GLACIAL TILL: Brown silty sand with clay, gravel, cobbles and boulders						1	99.50		
						2	98.50		▽
2.90									
End of Test Pit (Water infiltration @ 2.1m depth)									

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size at which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2$ / (D10 x D60)
Cu	-	Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$
Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$
Sand and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

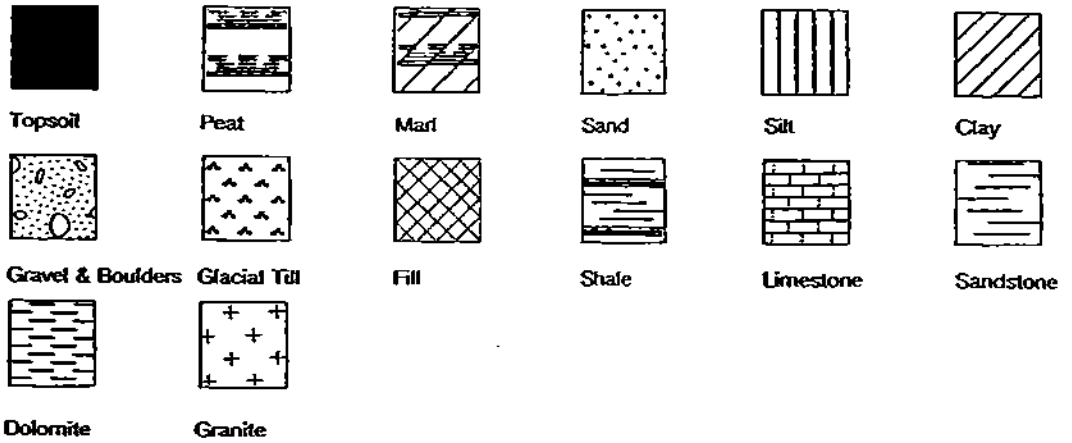
CONSOLIDATION TEST

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

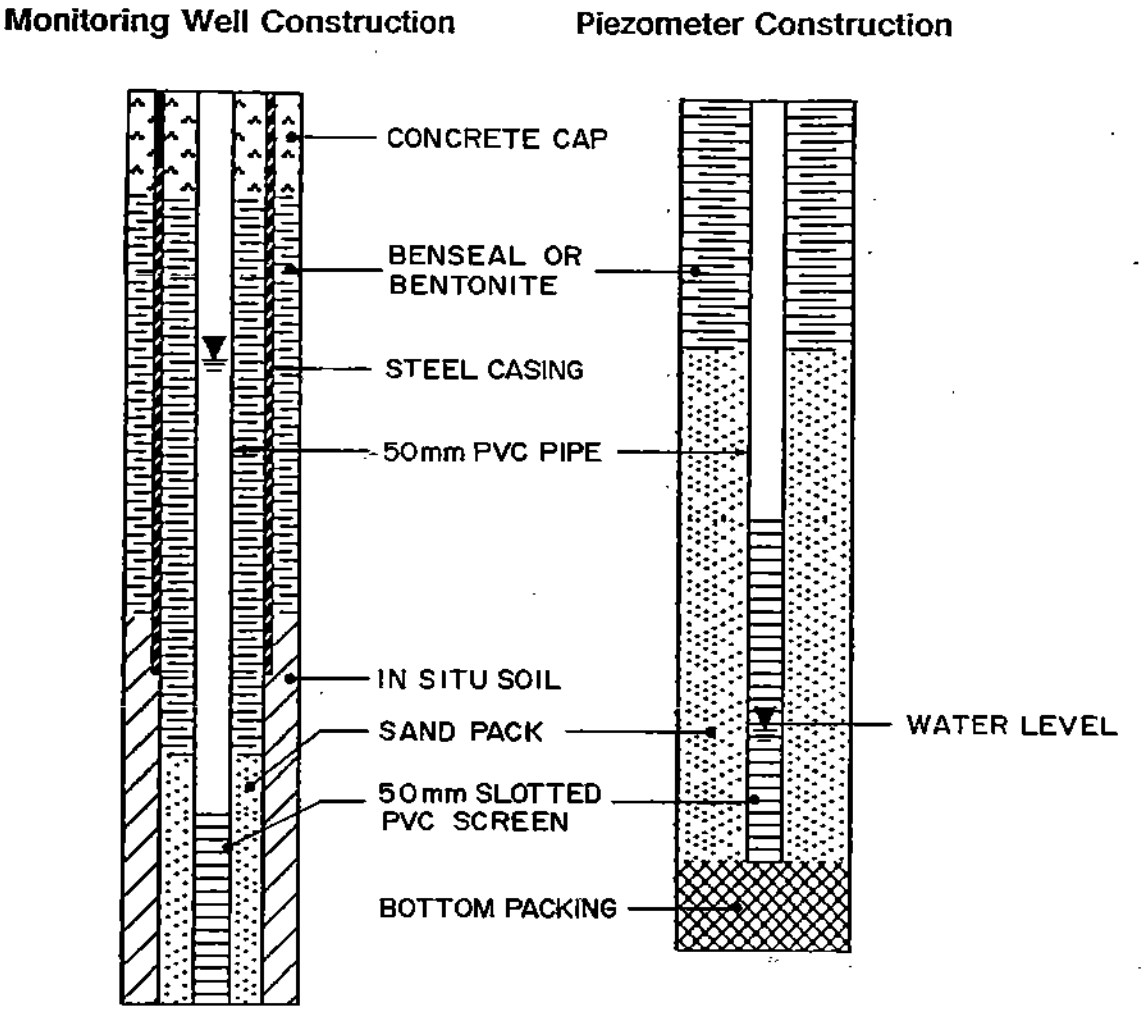
PERMEABILITY TEST

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

STRATA PLOT



MONITORING WELL AND PIEZOMETER CONSTRUCTION



APPENDIX 2

- PUBLISHED MOE WELL DATA

- WELL RECORDS FOR TEST WELLS
  - TW 1
  - TW2
  - TW3
  - HW4

A 089388

Ontario Ministry of the Environment

Well Record TW1

Regulation 903 Ontario Water Resources Act

Well Tag: A089388

Measurements recorded in: ☐ Metric ☒ Imperial

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	Well Constructed by Well Owner
FRED	FARSI	9218 3144 Ontario Inc	

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
1285 Byrnes Terrace	Cumberland	Ont.	K4C 1A9	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
#1730 Willhaven Drive	Cumberland	N P L	DHE 7

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa-Carleton	Cumberland	Ontario	

UTM Coordinates Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83 18	465558	5038265	PLAN RP50R844	PART 2

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 (ft) From	To
	Sandy Clay + Gravel			0'	12'6"
Grey + Black	Limestone			12'6"	500'

Test Well #1

Annular Space

Depth Set at (ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (ft³)
20'	10'	Neat Cement Slurry	4.68
10'	0'	Neat Bentonite Slurry	8.4

Results of Well Yield Testing

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

If pumping discontinued, give reason: X

Pump intake set at (ft): 300'

Pumping rate (GPM): 1

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (ft): 219'

If flowing give rate (GPM):

Recommended pump depth (ft): 490'

Recommended pump rate (GPM): 1

Well production (GPM): 1

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (ft)	Recovery Time (min)	Water Level (ft)
Static Level	46'7"		219'
1	51'8"	1	193'
2	54'6"	2	193'
3	58'	3	192'8"
4	61'6"	4	192'5"
5	64'8"	5	192'1"
10	84'9"	10	190'3"
15	96'7"	15	188'9"
20	114'	20	186'7"
25	128'5"	25	184'9"
30	142'8"	30	183'1"
40	169'8"	40	178'
50	194'6"	50	173'2"
60	219'	60	168'

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 (in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (in)	Depth (ft) From	To
6"	Steel	.188"	+2'	20'
5 7/8"	Open hole		20'	500'

Status of Well

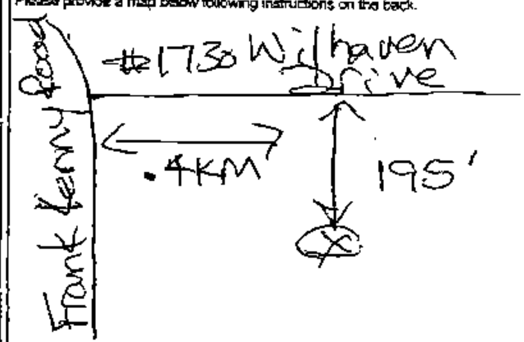
☒ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify: TW#1 ☐ Other, specify

Construction Record - Screen

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

Map of Well Location

Please provide a map below following instructions on the back.



Water Details

Water found at Depth: 360 (ft) Kind of Water: ☐ Fresh ☒ Untested ☐ Gas ☐ Other, specify

Water found at Depth: (ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Water found at Depth: (ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Hole Diameter

Depth (ft) From	To	Diameter (in)
0'	20'	6"
20'	500'	5 7/8"

Well Contractor and Well Technician Information

Business Name of Well Contractor: Air Rock Drilling Co Ltd — Well Contractor's Licence No.: 1119

Business Address (Street Number/Name): RR #1 — Municipality: Richmond

Province: ONT — Postal Code: K0A 2Z0 — Business E-mail Address:

Bus. Telephone No. (inc. area code): 6138382170 — Name of Well Technician (Last Name, First Name): Purcell Shannon

Well Technician's Licence No.: T2022 — Signature of Technician and/or Contractor — Date Submitted

Comments: Test Well #1

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

Date Package Delivered: 2009/11/13

Date Work Completed: 20091105

Ministry Use Only — Audit No. Z 102654

A 089412

TW2

Ontario Ministry of the Environment

Well Tag No. (Below): A089412

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

Page ___ of ___

Well Owner's Information

First Name: FRED
Last Name / Organization: PARSI 9218 3144 Ontario Ltd
E-mail Address:
☒ Well Constructed by Well Owner
Mailing Address (Street Number/Name): 1285 Byrnes Terrace
Municipality: Cumberland
Province: Ont
Postal Code: K4C 1A9
Telephone No. (inc. area code):

Well Location

Address of Well Location (Street Number/Name): #1730 Wilhaven Drive
Township: Cumberland
Lot: N P/L D of E T
Concession: 1
County/District/Municipality: Ottawa-Carleton
City/Town/Village: Cumberland
Province: Ontario
Postal Code:
UTM Coordinates: NAD 8 3, Zone 18, Easting 465796, Northing 5038121
Municipal Plan and Sublot Number / Other: PLAN #RESOR 844 Part 2

Overburden and Bedrock Materials/Abandonment Sealing Record

General Colour	Most Common Material	Other Materials	General Description	Depth (ft) From	To
	Sandy Clay + Gravel			0'	12'
Grey + Brown	Lime Stone			12'	360'

Test Well #2

Annular Space

Depth Set at (ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (ft³)
20'	10'	Neat Cement Slurry	4.68
10'	0	Neat Bentonite Slurry	8.4

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (in)	Depth (ft) From	To
6"	Steel	.188"	+2'	20'
5 7/8"	Open hole		20'	360'

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: TW#2

Construction Record - Screen

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

Water Details

Water found at Depth: 345 (ft) Kind of Water: ☐ Fresh ☒ Untested ☐ Gas ☐ Other, specify
Water found at Depth: 351 (ft) Kind of Water: ☐ Fresh ☒ Untested ☐ Gas ☐ Other, specify
Water found at Depth: ___ Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Hole Diameter

Depth (ft) From	To	Diameter (in)
0'	20'	6"
20'	360'	5 7/8

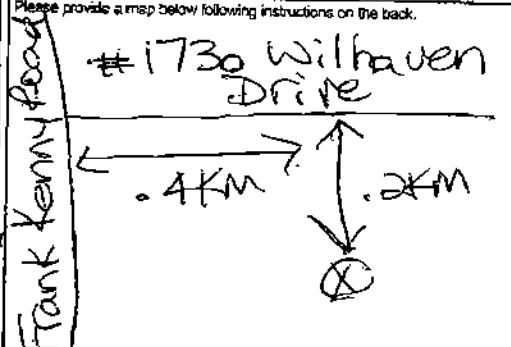
Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☒ Other, specify: Grey (TD)
If pumping discontinued, give reason:
Pump intake set at (ft): 300
Pumping rate (GPM): 12
Duration of pumping: 1 hrs + 0 min
Final water level end of pumping (ft): 205.7"
If flowing give rate (GPM):
Recommended pump depth (ft): 300'
Recommended pump rate (GPM): 12
Well production (GPM): 12
Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (ft)	Recovery Time (min)	Water Level (ft)
Static Level	169'5"		205'7"
1	177'	1	190'9"
2	180'4"	2	185'5"
3	183'2"	3	183'4"
4	185'4"	4	182'5"
5	187'6"	5	179'1"
10	193'2"	10	175'9"
15	197'1"	15	174'7"
20	199'	20	173'5"
25	200'	25	172'6"
30	200'9"	30	171'7"
40	202'	40	170'
50	203'8"	50	169'5"
60	205'7"	60	

Map of Well Location

Please provide a map below following instructions on the back.



Well Contractor and Well Technician Information

Business Name of Well Contractor: AIR Rock DRILLING CO LTD
Well Contractor's Licence No.: 1119
Business Address (Street Number/Name): RR#1
Municipality: Richmond
Province: ONT
Postal Code: K0A 2Z0
Business E-mail Address:
Bus. Telephone No. (inc. area code): 613 838 2170
Name of Well Technician (Last Name, First Name): PURCELL SHANNON
Well Technician's Licence No.: 1 2 1 2 2
Signature of Technician and/or Contractor / Date Submitted:

Comments: Test Well #2

Well owner's information package delivered: ☒ Yes ☐ No
Date Package Delivered: 2009/11/13
Date Work Completed: 2009/11/09

Ministry Use Only
Audit No. Z102633
Received

0506E (12/2007) Ministry's Copy © Queen's Printer for Ontario 2007

TW3

Ontario Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

We A 089359 (nr Below)

A089359

Well Record

Regulation 903 Ontario Water Resources Act

Page ___ of ___

Well Owner's Information

First Name: FRED | Last Name / Organization: FARST | E-mail Address: 921 | ☐ Well Constructed ☒ Well Owner

Mailing Address (Street Number/Name): 1285 Byrnes Terrace | Municipality: Cumberland | Province: Ont | Postal Code: K4C 1A9 | Telephone No. (inc area code)

Well Location

Address of Well Location (Street Number/Name): #1730 Wilhaven Drive | Township: Cumberland | Lot: N P/L D | Concession: E 7

County/District/Municipality: Ottawa-Carleton | City/Town/Village: Cumberland | Province: Ontario | Postal Code

UTM Coordinates: Zone | Easting | Northing | Municipal Plan and Sublot Number | Other

NAD 83 18466005 5038447 PLAN# RP50R844 PART 2

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
	Clay & Gravel			0'	11'
	Grey Lime Stone			11'	337'
	Grey + Brown Limestone			337'	405'
	Green Limestone			405'	420'
	Black Shale			420'	440'

Test Well # 3

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/yd³)
20'	10'	Neat Cement Slurry	4.68
10'	0'	Neat Bentonite Slurry	12.6

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	To
6"	Steel	.188"	+2'	20'
5 7/8"	Open hole		20'	440'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	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 TW#3

Water Details

Water found at Depth (m/ft)	Kind of Water	Gas	Other, specify
430 (m/ft)	☐ Fresh ☒ Untested	☐	☐
(m/ft)	☐ Fresh ☐ Untested	☐	☐
(m/ft)	☐ Fresh ☐ Untested	☐	☐

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0'	20'	6"
20'	440'	5 7/8"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 300'

Pumping rate (l/min / GPM): 6

Duration of pumping: 1 hr + 0 min

Final water level end of pumping (m/ft): 211'9"

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

Recommended pump depth (m/ft): 350

Recommended pump rate (l/min / GPM): 6

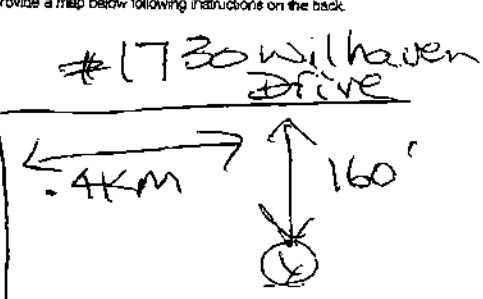
Well production (l/min / GPM): 6

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	178'4"		211'9"
1	185'4"	1	201'
2	187'9"	2	196'
3	190'	3	194'
4	192'1"	4	192'6"
5	193'7"	5	191'
10	199'5"	10	186'
15	202'9"	15	181'3"
20	204'9"	20	178'4"
25	206'2"	25	
30	206'9"	30	
40	208'4"	40	
60	210'	50	
60	211'9"	60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: Test well # 3

Well Contractor and Well Technician Information

Business Name of Well Contractor: AIRROCK DRILLING CO LTD | Well Contractor's Licence No.: 1119

Business Address (Street Number/Name): 228 | Municipality: RICHMOND

Province: ONT | Postal Code: K0A 2Z0 | Business E-mail Address

Bus. Telephone No. (inc area code): 6138382176 | Name of Well Technician (Last Name, First Name): PURCELL SHANNON

Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted: 2009/11/13

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

Date Package Delivered: 2009/11/13

Date Work Completed: 2009/11/10

Ministry Use Only

Audit No.: Z 102630

Received

(506E 11/2007)

Ministry's Copy

Ontario Ministry of Environment and Energy

The Ontario Water Resources Act

WATER WELL RECORD

House Well (HW)

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

County or District	Township/Borough/City/Town/Village	Con	block	tract	survey, etc.	Lot
Ottawa Carleton	Cumberland	7				D

Owner's surname: FitzpAtrick — First Name: Esplet
Address of Well Location: 1730 Wilhaven Drive Cumberland Ont. K4A1S0
Date completed: 30/09/03 (day / month / year)
Zone: — Easting: — Northing: —

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
Brown	Till	Boulders	Dense	0	10
Grey	Till	"	"	10	14
Grey	limestone Rock	Shale	Layered	14	83

WATER RECORD

Water found at - feet	Kind of water		
60	☑ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	

CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
8 3/4"	☐ Steel ☐ Galvanized ☐ Concrete ☑ Open hole ☐ Plastic		0	26
6 1/4"	☑ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic	188	+2	26
6"	☐ Steel ☐ Galvanized ☐ Concrete ☑ Open hole ☐ Plastic		26	83

SCREEN

Slot No.: — Diameter: — inches — Length: — feet
Material and type: — Depth at top of screen: — feet

PLUGGING & SEALING RECORD

☑ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	26	Cement grout

PUMPING TEST

Pumping test method: ☑ Pump ☐ Bailer — Pumping rate: 7 GPM — Duration of pumping: 1 Hours 0 Mins

Static level	Water level end of pumping	Water levels during ☐ Pumping ☑ Recovery: 15 minutes	30 minutes	45 minutes	60 minutes
60 feet	83 feet	22 feet	22 feet	22 feet	22 feet

If flowing give rate: — GPM — Pump intake set at: 83 feet — Water at end of test: ☐ Clear ☑ Cloudy

Recommended pump type: ☐ Shallow ☐ Deep — Recommended pump setting: 70 feet — Recommended pump rate: 6 GPM

FINAL STATUS OF WELL

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

WATER USE

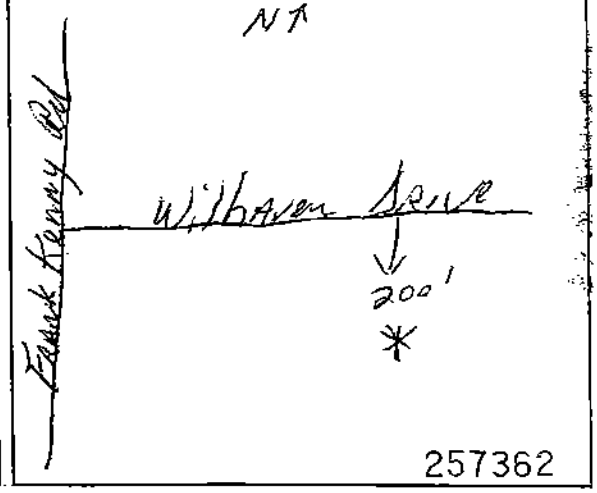
☑ Domestic ☐ Commercial ☐ Not use
☐ Stock ☐ Municipal ☐ Other
☐ Irrigation ☐ Public supply
☐ Industrial ☐ Cooling & air conditioning

METHOD OF CONSTRUCTION

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

LOCATION OF WELL

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



257362

Name of Well Contractor: Bourgeois well Drill — Well Contractor's Licence No: 1414
Address: Heat Out
Name of Well Technician (Driller): Raymond — Well Technician's Licence No: T-0264
Contractor: — Submission date: 30/09/03 (day / mo / yr)

MINISTRY USE ONLY

CONTRACTOR'S COPY

0506 (08/02) Front Form 7

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 **1531266** Municipality 1501 Con CON 07

County or District: OTTAWA - Carleton
Township/Borough/City/Town/Village: Cumberland
Con block tract survey, etc: Conc 7
Lot: D
Address: 1592 - Wilhaven Dr.
Date completed: 05/07/00 (day/month/year)

21 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	Clay	Boulder	Loose	0	7
Grey	Limestone		Hard	7	35
Brown	Shale		Porous	35	55
Grey	Limestone		Hard	55	203

31
32

41 WATER RECORD

Water found at - feet	Kind of water
100	1 ☑ Fresh 2 ☐ Salty; 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas
176	1 ☑ Fresh 2 ☐ Salty; 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty; 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty; 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty; 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6 1/8	1 ☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	1.88	0	20
6	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☑ Open hole 5 ☐ Plastic		20	203
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Size 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 #30

71 PUMPING TEST

Pumping test method: 1 ☑ Pump 2 ☐ Bailer
Pumping rate: 2 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	200 feet	160 feet	135 feet	120 feet	100 feet

If flowing give rate: GPM
Pump intake set at: 200 feet
Water at end of test: ☑ Clear ☐ Cloudy
Recommended pump type: ☐ Shallow ☑ Deep
Recommended pump setting: 195 feet
Recommended pump rate: 1 1/2 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 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

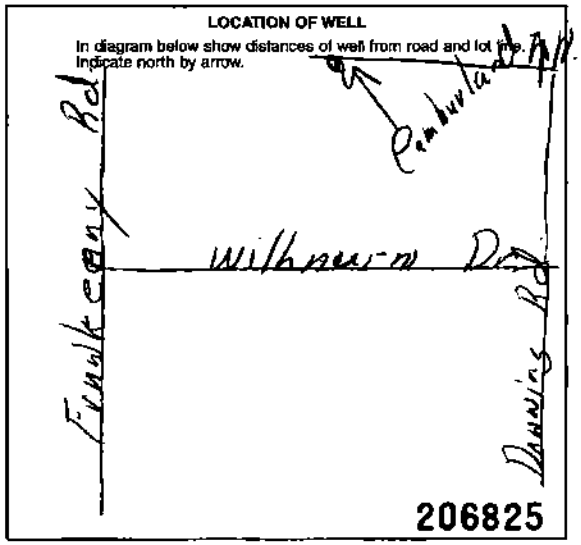
1 ☑ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not used 10 ☐ Other

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

LOCATION OF WELL

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



Name of Well Contractor: DxR-WATER well Drilling
Well Contractor's Licence No.: 6001
Address: St-Albert ont
Name of Well Technician: Louis Desnoyers
Well Technician's Licence No.: T-0625
Signature of Technician/Contractor:
Submission date: 08/08/00 (day/mo/yr)

MINISTRY USE ONLY
Data source
Contractor: 6006
Date received: AUG 08 2000
Date of inspection
Inspector
Remarks: CSS.ES0

0506 (11/98) Front Form 9

2 - MINISTRY OF THE ENVIRONMENT COPY

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below): A 000750 / A 000750

Well Record

Regulation 903 Ontario Water Resources Act

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 1501 CON CON 07 LOT D

Well Owner's Information and Location of Well Information

[redacted]

Address of Well Location (County/District/Municipality): 1550 Willhaven Dr.

RR#/Street Number/Name: Ottawa - Carleton

Township: Ottawa City/Town/Village: Cumberland

Lot: 07 E Concession: 7

Site/Compartment/Block/Tract etc: Pt Lt 5 Pl 4R17732

GPS Reading: NAD 83 Zone 18 Easting 465290 Northing 5038057 Unit Make/Model: Magellan Mode of Operation: UTM

Differentiated: 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	Clay		Soft	0	1.818
Grey	SHALE	Gravel	Loose	1.818	3.030
Grey	Limestone		Hard	3.030	30.30

Hole Diameter

Depth From	Depth To	Diameter Centimetres
0	3.63	22.23

Water Record

Water found at Metres	Kind of Water		
4.24 m	Fresh	Sulphur	Gas
Sally	Minerals	Other	
m	Fresh	Sulphur	Gas
Salty	Minerals	Other	
m	Fresh	Sulphur	Gas
Salty	Minerals	Other	

After test of well yield, water was: X Clear and sediment free; Other, specify

Chlorinated: X Yes No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To
15.55	X Steel Fibreglass / Plastic Concrete / Galvanized	1.88	0	3.63
	Steel Fibreglass / Plastic Concrete / Galvanized			
	Steel Fibreglass / Plastic Concrete / Galvanized			

Screen

Outside diam | Steel Fibreglass Slot No. | Plastic Concrete | Galvanized

No Casing or Screen

X Open hole 3.63 30.30

Test of Well Yield

Pumping test method: Submersible

Pump intake set at (metres): 28.78

Pumping rate (litres/min): 18

Duration of pumping: 1 hrs + 00 min

Final water level end of pumping: metres

Recommended pump type: Shallow X Deep

Recommended pump depth: 28.78 metres

Recommended pump rate: 22.5 (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		0.03		[illegible]
1	1	1.69	1	1.69
2	2.00		2	1.67
3	2.16		3	1.67
4	2.33		4	2.16
5	2.49		5	2.16
10	2.92		10	3.57
15	3.29		15	3.57
20	3.57		20	3.57
25	3.80		25	4.00
30	4.00		30	4.00
40	4.36		40	4.00
50	5.84		50	4.36
60	5.84		60	5.84

Plugging and Sealing Record

X Annular space Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc	Volume Placed (cubic metres)
0	3.63	Cement Grout	

Method of Construction

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

Water Use

X Domestic; Industrial; Public Supply; Other; Stock; Commercial; Not used; Irrigation; Municipal; Cooling & air conditioning

Final Status of Well

X 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: Dan-Water-Well-Drilling — Well Contractor's Licence No.: 6006

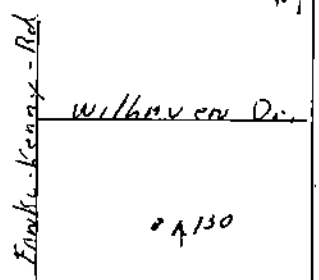
Business Address (street name, number, city etc.): St-Albert-ON

Name of Well Technician (last name, first name): Louis Desnoyers — Well Technician's Licence No.: T-625

Signature of Technician/Contractor: X [signature] — Date Submitted (YYYY MM DD): 2004 04 30

Location of Well

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



Audit No. Z 00840 — Date Well Completed (YYYY MM DD): 2004 03 17

Was the well owner's information package delivered? X Yes No — Date Delivered (YYYY MM DD): 2004 04 06

Ministry Use Only

Data Source — Contractor: 6006

Date Received: MAY 11 2004 — Date of Inspection (YYYY MM DD)

Remarks: CSS — Well Record Number: 1534621

Ontario | Ministry of the Environment

Well Tag Number: A004837

A 004837

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

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- **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 15011 CON CON 07 LOT D

Well Owner's Information and Location of Well Information

[redacted]

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
Ottawa Carleton	Cumberland	D+E	7

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
1600 Wilhaven	Cumberland	Part 2 Plan 4R17732

GPS Reading NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation
83	18	465378	5008139	Magellan	☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From (Metres)	To
	Clay fill			0	1.8
grey+green	limestone			1.8	67.4

Hole Diameter

Depth From (Metres)	To	Diameter Centimetres
0	67.4	14.91

Water Record

Water found at Metres	Kind of Water
26.5	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☒ Minerals ☐ Other: NOT
61.0	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: tested

After test of well yield, water was ☒ Clear and sediment free ☐ Other, specify: NOT tested

Chlorinated ☒ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From (Metres)	To
Casing				
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	0	6.7
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☒ Open hole		6.1	67.4

Test of Well Yield

Pumping test method: Sub pump

Pump intake set at (metres): 29.9

Pumping rate (litres/min): 18.2

Duration of pumping: 1 hrs + ___ min

Final water level end of pumping: 29.9 metres

Recommended pump type: ☐ Shallow ☒ Deep

Recommended pump depth: 61 metres

Recommended pump rate (litres/min): 18.2

If flowing give rate (litres/min):

If pumping discontinued, give reason: -

Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
Static Level	4.32		29.9
1	5.33	1	29.57
2	6.25	2	29.28
3	7.08	3	29.14
4	7.97	4	28.82
5	8.78	5	28.57
10	12.34	10	28.42
15	16.40	15	28.39
20	20.07	20	28.31
25	23.55	25	26.50
30	26.58	30	25.74
40	29.68	40	22.32
50	29.9	50	19.16
60	29.9	60	19.08

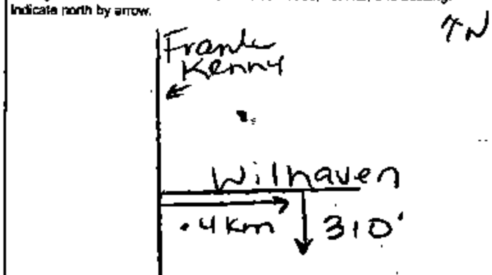
Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
6.1	0	Cement Slurry	0.1271

Location of Well

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



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

Audit No. Z 04945

Date Well Completed: 2004 05 17

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

Date Delivered: 2004 05 19

Well Contractor/Technician Information

Name of Well Contractor: Air Rock Dr. Ltd / Wire Ltd | Well Contractor's Licence No.: 1119

Business Address (street name, number, city etc.): RR#1 Richmond, Ont

Name of Well Technician (last name, first name): Purcell Shannon | Well Technician's Licence No.: 12122

Signature of Technician/Contractor: x [signature] | Date Submitted: 2004 06 02

Ministry Use Only

Data Source | Contractor 1119

Date Received: JUL 0 6 2004 | Date of Inspection

Remarks | Well Record Number: 1534787

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 Number (Place sticker and print number below): A014079 / A014099

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 3

Instructions for Completing Form

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- **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 1501 | CON CON | LOT 10

Well Owner's Information and Location of Well Information

[redacted]

Address of Well Location (County/District/Municipality): OTTAWA - Cumberland Twp | Township: Cumberland | Lot: D-E | Concession: Conc. 7

RR#/Street Number/Name: 1530 promenade Wilhaven | City/Town/Village: Cumberland - Ottawa 4R-17732 | Site/Compartment/Block/Tract etc.

GPS Reading | NAD: 83 | Zone: 18 | Easting: 465184 | Northing: 5038059 | Unit Make/Model: Magellan | 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)
Brown	Clay	Boulder	Loose	0	3.05
Grey	Limestone		Hard.	3.03	96.96
				96.96	97.07
				97.07	99.39

Hole Diameter

Depth From	Metres To	Diameter Centimetres
0	6.06	22.23

Water Record

Water found at Metres	Kind of Water
27.40	☑ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
96.96	☑ 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	7.27
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
15.55	☑ Open hole		7.27	99.89

Test of Well Yield

Pumping test method: Submersible

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at (metres) 60.60	Static Level	6.80		32.10
Pumping rate (litres/min) [redacted]	1	7.24	1	31.40
Duration of pumping 1 hrs + 00 min	2	7.43	2	31.06
Final water level end of pumping ___ metres	3	7.92	3	30.46
Recommended pump type: ☐ Shallow ☑ Deep	4	8.42	4	30.10
Recommended pump depth. 96 metres	5	8.84	5	29.81
Recommended pump rate [redacted] (litres/min)	10	10.90	10	28.29
If flowing give rate - (litres/min)	15	13.49	15	26.80
	20	16.33	20	25.47
	25	18.94	25	24.38
If pumping discontinued, give reason.	30	21.89	30	23.25
	40	25.44	40	21.30
	50	28.97	50	19.90
	60	32.10	60	19.25

Plugging and Sealing Record ☐ Annular space ☐ Abandonment

Depth set at - From	Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	6.06	Cement Grout	120 Kg

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: DXR-WATER-well-Drilling | Well Contractor's Licence No.: 6006

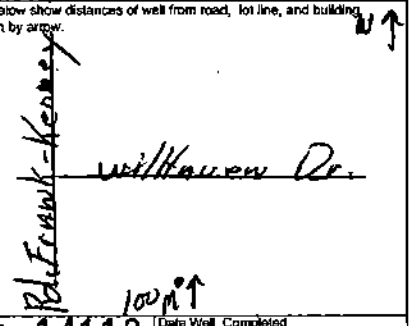
Business Address (street name, number, city etc.): St-Albert

Name of Well Technician (last name, first name): Desnoyers - Louis | Well Technician's Licence No.: T-625

Signature of Technician/Contractor: X Louis Desnoyers | Date Submitted: 2004/06/08

Location of Well

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



Audit No. Z 14112 | Date Well Completed: 2004/06/04

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

Ministry Use Only

Data Source | Contractor: 6006

Date Received: JUL 13 2004 | Date of Inspection

Remarks | Well Record Number: 1534819

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 Number (Place sticker and print number below) A 014115
A014115

Well Record
Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

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- All Sections must be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
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- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Well Owner's Information and Location of Well Information

Ministry Use Only: MUN 15011 | CON | LOT

[redacted]

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
OTTAWA City	Cumberland	18	

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
1260 - Gauthier ST. 19.00		50M-182

GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation
	83	18	466507?	5038985?	Magellan	UTM; ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Metres To
Yellow	Sand		Soft	0	4.81
Grey	Limestone		Hard	4.81	100.00

Hole Diameter

Depth From	Metres To	Diameter Centimetres
0	6.06	22.23

Water Record

Water found at Metres	Kind of Water
53.03	☑ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other
89.39	☑ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other
	☐ 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	Metres To
Casing				
15.55	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.48	0	6.66
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen (Outside diam)	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
15.55	☑ Open hole		6.66	100.00

Test of Well Yield

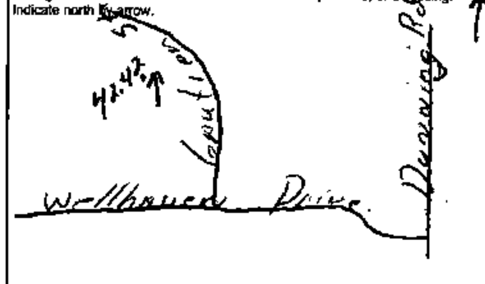
Pumping test method	Time min	Draw Down Water Level Metres	Time min	Recovery Water Level Metres
Submersible	Static Level	15.40		54.54
Pump intake set at (metres) 60.60	1	17.40	1	50.72
Pumping rate (litres/min) 6750	2	20.84	2	47.02
Duration of pumping 1 hrs + 00 min	3	22.27	3	45.01
Final water level end of pumping 54.54 metres	4	24.44	4	42.04
Recommended pump type ☐ Shallow ☑ Deep	5	26.83	5	40.04
Recommended pump depth 60.60 metres	10	37.70	10	38.82
Recommended pump rate 45.00 (litres/min)	15	48.55	15	37.44
If flowing give rate (litres/min)	20	54.54	20	35.81
If pumping discontinued, give reason.	25	54.54	25	33.88
	30	54.54	30	32.92
	40	54.54	40	29.12
	50	54.54	50	26.11
	60	54.54	60	24.86

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	6.06	Cement Grout	100 kg

Location of Well

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



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

Audit No. Z 14138

Date Well Completed (YYYY MM DD): 2004 08 04

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

Date Delivered (YYYY MM DD): 2004 08 17

Well Contractor/Technician Information

Name of Well Contractor: D.A.R. WATER well Drilling | Well Contractor's Licence No. 6006

Business Address (street name, number, city etc.): St. Albert ON

Name of Well Technician (last name, first name): Desnoyers, Rouis | Well Technician's Licence No. T-6?5

Signature of Technician/Contractor: X [signature] | Date Submitted YYYY MM DD

Ministry Use Only

Data Source | Contractor 6006

Date Received: OCT 07 2004 | Date of Inspection YYYY MM DD

Remarks | Well Record Number 1536079

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 Number (Place sticker and print number below): A 014129

A 014129

Well Record

Regulation 903 Ontario Water Resources Act

page 2 of 3

Instructions for Completing Form

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- Please print clearly in blue or black ink only.

Ministry Use Only

MUN 15011 | CON CON | LOT 07

Well Owner's Information and Location of Well Information

[redacted]

Address of Well Location (County/District/Municipality): OTTAWA City

Township: Cumberland. E-D Conc. 7

RR#/Street Number/Name: 1495 Frank-Kenny-Rd

City/Town/Village: Cumberland.

Site/Compartment/Block/Tract etc.: 46-11132

GPS Reading: NAD 83 | Zone 18 | Easting 465190 | Northing 5013781

Unit Make/Model: MAGELLAN | Mode of Operation: GPS ☐ Unditferentiated ☑ 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	Clay	Boulder	Soft	0	3.05
Grey	limestone		Hard	3.05	101.51

Hole Diameter

Depth From	Depth To	Diameter Centimetres
0	6.06	22.23

Water Record

Water found at Metres	Kind of Water		
22.86	☐ 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
	Casing			
15.55	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.48	0	6.66
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	Screen			
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
	No Casing or Screen			
15.23	☑ Open hole		6.66	101.51

Test of Well Yield

Pumping test method: Submersible

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres) 34.54	Static Level	2.09		14.10
Pumping rate - (litres/min) 45.50	1	3.83	1	11.52
Duration of pumping 1 hrs + 00 min	2	4.90	2	10.28
Final water level end of pumping 9.10 metres	3	5.73	3	8.06
Recommended pump type: ☐ Shallow ☑ Deep	4	6.44	4	9.33
Recommended pump depth. 75.75 metres	5	6.83	5	6.57
Recommended pump rate. 45.50 (litres/min)	10	8.73	10	8.17
If flowing give rate - (litres/min)	15	10.02	15	9.52
If pumping discontinued give reason.	20	10.73	20	9.98
	25	11.26	25	9.78
	30	12.18	30	9.69
	40	13.06	40	9.57
	50	13.62	50	9.32
	60	14.18	60	9.23

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	6.06	Cement Grout	120 kg

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: D&R-WATER-well-Drilling — Well Contractor's Licence No.: 6006

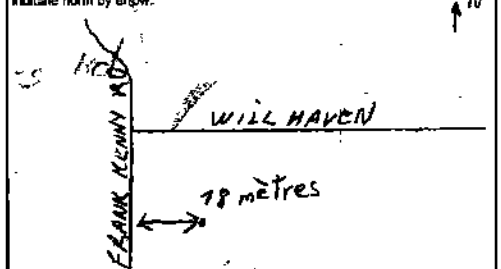
Business Address (street name, number, city etc.): St-Albert-ON

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

Signature of Technician/Contractor: X [signature] — Date Submitted YYYY MM DD: 2004 09 30

Location of Well

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



Audit No. Z 14152 — Date Well Completed YYYY MM DD: 2004 09 24

Was the well owner's information package delivered? ☑ Yes ☐ No — Date Delivered YYYY MM DD: 2004 09 30

Ministry Use Only

Data Source — Contractor: 6006

Date Received YYYY MM DD: OCT 07 2004 — Date of Inspection YYYY MM DD:

Remarks — Well Record Number: 1535083

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 Number (Place sticker and print number below): A 014069
A014069

Well Record

Regulation 903 Ontario Water Resources Act

Instructions for Completing Form

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- **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]

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
OTTAWA - City	Cumberland.	Sub-Park 1	7

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
1620 + Wilhaven Dr	Cumberland	4R-17732

GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation
	83	18	465567	5032212	Magellan	UTM; ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	Depth Metres To
Brown	Clay	SHALE-Boulders	Loose.	0	1.21
Grey	Limestone	Sandstone.	Hard.	1.21	84.84

Hole Diameter

Depth Metres From	Depth Metres To	Diameter Centimetres
0	6.06	25.40

Water Record

Water found at Metres	Kind of Water
72.72	☑ 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 Metres From	Depth Metres To
Casing				
15.55	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.48	0	6.66
	☐ 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		6.66	84.84

Test of Well Yield

Pumping test method: Submersible

Pump intake set at - (metres) 72.72

Pumping rate - (litres/min) 22.75

Duration of pumping 1 hrs + 00 min

Final water level end of pumping 64.74 metres

Recommended pump type. ☐ Shallow ☑ Deep

Recommended pump depth 83.33 metres

Recommended pump rate. 22.75 (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	18.24		64.74
1	19.06	1	63.06
2	20.36	2	61.10
3	21.16	3	59.96
4	22.24	4	58.56
5	23.26	5	57.15
10	27.92	10	55.20
15	32.01	15	53.04
20	35.65	20	51.16
25	39.78	25	49.32
30	43.84	30	48.20
40	50.79	40	46.56
50	57.06	50	45.02
60	64.74	60	43.10

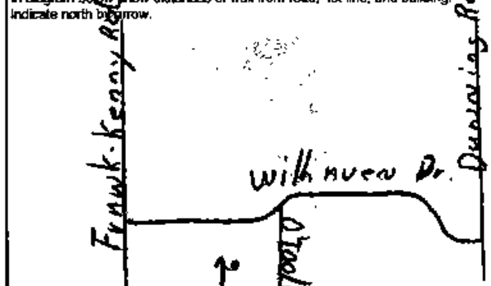
Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	6.06	Cement Grout	120 Kg.

Location of Well

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



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

Audit No. Z 14210

Date Well Completed (YYYY MM DD): 2005 07 22

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

Date Delivered (YYYY MM DD): 2005 07 22

Well Contractor/Technician Information

Name of Well Contractor: DAR+WATER-Well-Drilling

Well Contractor's Licence No.: 6006

Business Address (street name, number, city etc.): C.P. 98 St-Albert-Ont

Name of Well Technician (last name, first name): Desnoyers Louis

Well Technician's Licence No.: T-625

Signature of Technician/Contractor: X [signature]

Date Submitted (YYYY MM DD): 2005 07 28

Ministry Use Only

Data Source | Contractor: 6006

Date Received: AUG 1 0 2005 | Date of Inspection (YYYY MM DD)

Remarks | Well Record Number

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

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Ontario Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Well Tag A076053

A076053

Measurements recorded in: X Metric Imperial

Page of

Well Owner's Information

[redacted]

Address of Well Location (Street Number/Name): 1649 Wilhaven Rd.

Township: Cumberland

Lot: 7 (L7)

Concession: 2

County/District/Municipality: Ottawa - Carleton

City/Town/Village: Cumberland

Province: Ontario

UTM Coordinates: NAD 83, Zone 18, Easting 465915, Northing 5038323

Municipal Plan and Sublot Number: PLAN 4R-15934

Other: PART 1

Overburden and Bedrock Materials/Abandonment Sealing Record

General Colour	Most Common Material	Other Materials	General Description	Depth From (m)	Depth To (m)
	Sand / Earth			0	5.18
Grey	Limestone			5.18	134.11

Annular Space

Depth Set at (m) From	To	Type of Sealant Used (Material and Type)	Volume Placed
6.40	0	Neat Cement Slurry	.1816

Method of Construction

X Rotary (air)

X Other

Well Use

X Domestic

Construction Record - Casing

Inside Diameter	Open Hole or Material	Wall Thickness	Depth From	Depth To
15.88	Steel	.48	+.6	6.40
15.23	Open hole		6.40	134.11

Status of Well

X Water Supply

Construction Record - Screen

(crossed out)

Water Details

Water found at Depth: 93.57 — Fresh — Untested

Water found at Depth: 134.11 — Fresh — Untested

Hole Diameter

Depth From	To	Diameter
0	134.11	15.23

Results of Well Yield Testing

After test of well yield, water was: NOT TESTED

Pump intake set at: 41.44

Pumping rate: 34.07

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping: 7.96

Recommended pump depth: 34.07

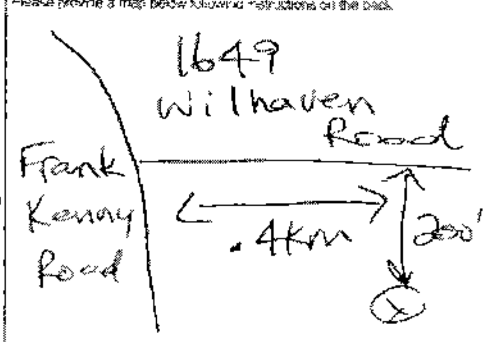
Recommended pump rate: 34.07

Well production: 6

Draw Down Time (min)	Water Level	Recovery Time (min)	Water Level
Static Level	6.80		7.96
1	7.20	1	7.60
2	7.26	2	7.50
3	7.30	3	7.30
4	7.34	4	7.20
5	7.40	5	7.18
10	7.50	10	7.16
15	7.56	15	7.16
20	7.57	20	7.16
25	7.76	25	
30	7.80	30	
40	7.84	40	
50	7.92	50	
60	7.96	60	

Map of Well Location

Please provide a map below following instructions on the back.



Well Contractor and Well Technician Information

Business Name of Well Contractor: AIR ROCK DRILLING CO LTD

Well Contractor's Licence No.: 1119

Business Address: RR 1

Municipality: Richmond

Province: Ont

Postal Code: K0A2Z0

Bus. Telephone No.: 6138382170

Name of Well Technician: Purcell, Shannon

Well Technician's Licence No.: T2122

Date Submitted: 20080930

Comments:

Well owner's information package delivered: X Yes

Date Package Delivered: 20080904

Date Work Completed: 20080820

Ministry Use Only

Audit No. Z 82447

Ministry's Copy

UTM |1|8|z |4|6|5|1|7|0|E
|9|R |5|0|3|8|8|2|0|N
Elev. |9|R |0|2|9|0|
Basin |2|5|| | | |
O.F. Con I Lot 22

ONTARIO

The Water-well Drillers Act, 1954

Department of Mines

RECEIVED 745
JUL 12 1956
GEOLOGICAL BRANCH
DEPARTMENT of MINES

Water-Well Record

1513095

316/1103

County or Territorial District ....Russell.... Township, Village, Town or City ....Cumberland....
Con. ....O.F. 1.... Lot ....22.... Street and Number (if in Village, Town or City) ....
Owner [redacted] Address ....Cumberland Ontario....
Date completed ....22.... (day) ....5.... (month) ....56.... (year)

Pipe and Casing Record	Pumping Test
Casing diameter(s) ....4 inches....	Static level ....9 feet....
Length(s) ....21 Feet....	Pumping rate ....8 gpm....
Type of screen	Pumping level ....16 Feet....
Length of screen	Duration of test ....1 hour....

Well Log / **Water Record**

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
~~Red Sand~~	0	6	69Feet	60 Feet	fresh
Lime stone rock	6	69			

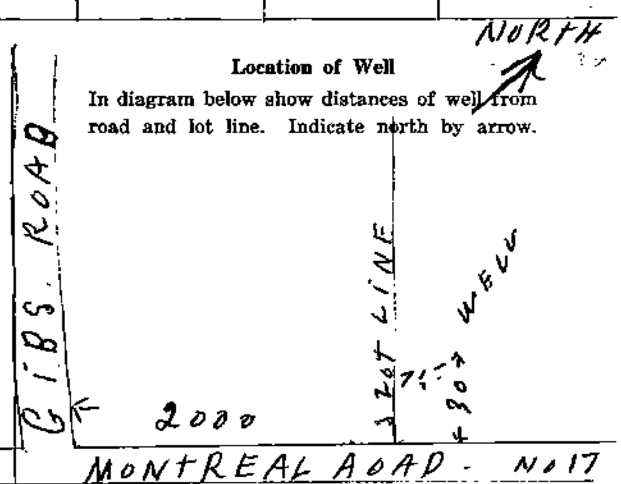
For what purpose(s) is the water to be used? ....Domestic....
Is water clear or cloudy? ....clear....
Is well on upland, in valley, or on hillside? ....hillside....
Drilling firm ....T. H. Adams....
Address ....Hurdman's Bridge....
....Ottawa, Ontario....
Name of Driller ....T. H. Adams....
Address ....Hurdman's Bridge....
....Ottawa, Ontario....
Licence Number ....42....

I certify that the foregoing statements of fact are true.

Date July 8 .... Thos H Adams
Signature of Licensee

Location of Well

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



Form 6

31G/11W

The Ontario Water Resources Commission Act

WATER WELL RECORD

Water management in Ontario

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

11 | 5601301 | MUNICIP 56003 | CON 0F | 01

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Russell	Cumberland	~~1st. from Ottawa R.~~ OF1	022

[redacted]

ADDRESS: Cumberland, Ont.

DATE COMPLETED: DAY 28 MO. 11 YR. 70

21 | ZONE 18 | EASTING 465350 | NORTHING 5038850 | RC 4 | ELEVATION 0300 | RC 6 | BASIN CODE 25T

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	TO
blue	clay & bolders			0	5
grey	limestone			5	150

1513100

31 | 000513015013 | 0150015T

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0150	☒ 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	TO
06	☒ 1 STEEL ☐ 2 GALVANIZED ☐ 3 CONCRETE ☐ 4 OPEN HOLE	188	0	~~20~~ 0020
	☐ 1 STEEL ☐ 2 GALVANIZED ☐ 3 CONCRETE ☒ 4 OPEN HOLE			0150
	☐ 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 0005 GPM | DURATION OF PUMPING 02 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
010 FEET	140 FEET	055 FEET	080 FEET	110 FEET	140 FEET

WATER LEVELS DURING: ☒ 1 PUMPING ☐ 2 RECOVERY

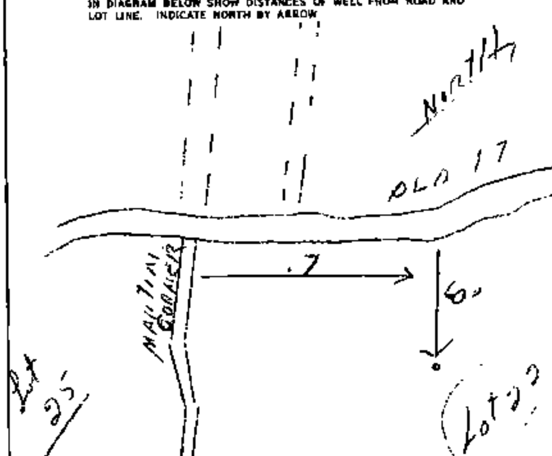
IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT 140 FEET | WATER AT END OF TEST: ☒ 1 CLEAR ☐ 2 CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING 140 FEET | RECOMMENDED PUMPING RATE 0004 GPM

000.0 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: G. Charbonneau, Diamond & Cable Drilling | LICENCE NUMBER 1504

ADDRESS: R. R. 2, Box 194, Orleans, Ont.

NAME OF DRILLER OR BORER: G. Charbonneau | LICENCE NUMBER

SIGNATURE OF CONTRACTOR: Gerard Charbonneau | SUBMISSION DATE: DAY 28 MO. 11 YR. 70

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 1504 | DATE RECEIVED 230271

DATE OF INSPECTION | INSPECTOR P Km.

REMARKS

OWRC COPY

Ontario Ministry of the Environment

Well Tr: A 052474 (number below)

A052474

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 Help Desk (Toll Free) at 1-888-396-9355.
- **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]

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

Township: Cumberland

Lot: 23

Concession:

RR# / Street Number/Name: #100 King Arthur

City/Town/Village: Cumberland

Site/Compartment/Block/Tract etc: Plan 50R-10347 Lot 22

GPS Reading: NAD 83 Zone 18 Easting 465112 Northing 5038909

Unit Make/Model: Magellan

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

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
	Clay & Gravel			0	11.58
	Grey Limestone			11.58	73.15

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	73.15	14.91

Water Record

Water found at Metres	Kind of Water
53.34 m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☑ Minerals ☐ Other:
73.15 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: NOT TESTED

Chlorinated: ☑ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
15.88	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	0	18.29
	☐ 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		17.68	73.15

Test of Well Yield

Pumping test method: Submersible

Pump intake set at (metres): 60.96

Pumping rate (litres/minute): 56.78

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping: 58.00 metres

If pumping discontinued, give reason: ✓

Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump depth: 60.96 metres

Recommended pump rate: 56.78 (litres/min)

If flowing give rate - (litres/min):

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level		6.85		2.00
1	1	9.48	1	32.40
2	2	11.10	2	20.00
3	3	12.33	3	17.80
4	4	13.44	4	16.01
5	5	14.39	5	14.62
10	10	17.69	10	10.48
15	15	19.45	15	9.37
20	20	21.32	20	7.26
25	25	22.16	25	6.85
30	30	23.10	30	
40	40	24.12	40	
50	50	25.06	50	
60	60	26.00	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)
17.68	0	Neat Cement Slurry	.4086

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: D.R. Rock Drilling Co Ltd — Well Contractor's Licence No.: 1119

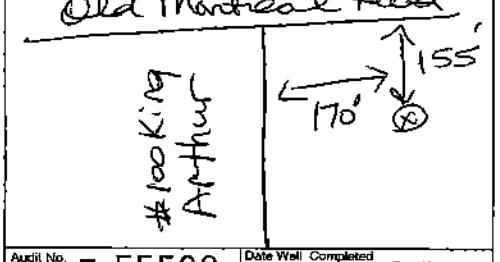
Business Address (street name, number, city etc.): RR#1 Richmond Ont K0A 2Z0

Name of Well Technician (last name, first name): Purcell, Shannon — Well Technician's Licence No.: T2122

Signature of Technician/Contractor: X [signature] — Date Submitted: 2006 09 22

Location of Well

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



Audit No.: Z 55562

Date Well Completed: 2006 12 11

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

Date Delivered: 2006 12 15

Ministry Use Only

Data Source: ___ — Contractor: 1119

Date Received: FEB 12 2007 — Date of Inspection: YYYY MM DD

Remarks: ___ — Well Record Number: ___

0506E (08/2006)

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Ontario Ministry of the Environment

Well Tag A 072326 (Below) A072326

Well Record

Regulation 903 Ontario Water Resources Act

Page ___ of ___

Well Owner's Information

[redacted]

Location of Well

Address of Well Location (Street Number/Name, RR)	Township	Lot	Concession
#201 King Arthur	Cumberland	23	

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa - Carleton	Cumberland	Ontario	

UTM Coordinates: NAD 83 | Zone 18 | Easting 445240 | Northing 5038423 | GPS Unit Make: Magellan | Model | Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Overburden and Bedrock Materials

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To
	Clay + Sand			0	3.96
	Black + Grey Limestone			3.96	52.39

Plan 50R-7034 Lot 10

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
10.66	0	Neat Cement Slurry	.4086

Method of Construction

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

Water Use

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

Status of Well

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

Results of Well Yield Testing

Check box if after test of well yield, water was: ☐ Clear and sand free ☐ Cannot develop to sand free state — NOT TESTED

If pumping discontinued, give reason:

Pumping test method: Sub Pump

Pump intake set at (Metres): 91.44

Pumping rate (Litres/min): 22.71

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (Metres): 54.70

Recommended pump type: ☐ Shallow ☒ Deep

Recommended pump depth (Metres): 91.44 (5 gpm)

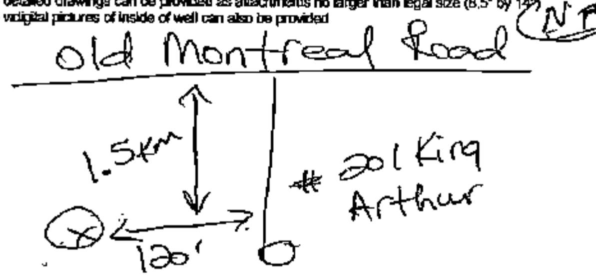
Recommended pump rate (Litres/min): 22.71

If flowing give rate (Litres/min): —

Draw Down Time (Min)	Water Level (Metres)	Recovery Time (Min)	Water Level (Metres)
Static Level	29.70	Static Level	54.70
1	30.72	1	53.70
2	31.73	2	52.48
3	32.56	3	52.7
4	33.26	4	51.50
5	34.27	5	50.98
10	37.33	10	47.3
15	40.70	15	45.92
20	42.65	20	45.4
25	45.10	25	43.82
30	46.90	30	42.76
40	50.47	40	40.27
50	52.7	50	39.32
60	54.70	60	37.91

Location of Well

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



Water Details

Water found at Depth: 91 Metres ☐ Gas | Kind of Water: ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

Water found at Depth: Metres ☐ Gas | Kind of Water: ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals — NOT TESTED

Water found at Depth: Metres ☐ Gas | Kind of Water: ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

Casing Used ☐ Galvanized ☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete

Screen Used ☐ Galvanized ☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete

Hole Casing and Well Details

Diameter of the Hole (Centimetres): 15.55

Depth of the Hole (Metres): 52.39

Wall Thickness (Metres): .48cm

Inside Diameter of the Casing (Metres): 17.1588

Depth of the Casing (Metres): 10.67

No Casing and Screen Used

☒ Open Hole 10.06-52.39

Disinfected? ☒ Yes ☐ No

Date Well Completed (yyyy/mm/dd): 2007-12-1

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

Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd): 2007-12-18

Well Contractor and Well Technician Information

Business Name of Well Contractor: AIR ROCK DRILLING Co LTD

Well Contractor's Licence No.: 1119

Business Address (Street No./Name, number, RR): RR#

Municipality: RICHMOND

Province: ONT | Postal Code: K0A2Z0 | Business E-mail Address:

Bus. Telephone No. (inc. area code): 6138382170 | Name of Well Technician (Last Name, First Name): Desaulniers Ken

Well Technician's Licence No.: T41 | Signature of Technician: [signature] | Date Submitted (yyyy/mm/dd): 2008-01-07

Ministry Use Only

Audit No.: Z60129 | Well Contractor No.:

Date Received (yyyy/mm/dd): JAN 15 2008 | Date of Inspection (yyyy/mm/dd):

Remarks:

0506E (11/2006) Ministry's Copy

Ontario Ministry of the Environment

Well Tag Number (place sticker and print number below): A 054029

A054029

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

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- **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]

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
Ottawa-Carleton	Cumberland	23	

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
# 221 King Arthur	Cumberland	Plan 50R-7034 S/L 12

GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation
	83	18	465346	5038477	Magellan	☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	To
	Rock Fill			0	0.91
	Sandy Clay			0.91	2.13
	Gray & Green Limestone			2.13	103.63

Hole Diameter

Depth Metres From	To	Diameter Centimetres
0	103.63	14.91

Water Record

Water found at Metres	Kind of Water
83.97 m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☒ Minerals ☐ Other: NOT TESTED
99.66 m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: NOT TESTED
m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was: Clear and sediment free; CLOUDY, NOT ☐ Other, specify: TESTED

Chlorinated ☒ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	To
Casing				
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	0	8.84
	☐ 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		8.84	103.63

Test of Well Yield

Pumping test method	Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
Sub Pump	Static Level	5.57		62.05
Pump intake set at (metres) 19.24	1	8.40	1	58.20
Pumping rate (litres/min) 40.95	2	10.30	2	57.40
Duration of pumping 1 hrs + 0 min	3	12.47	3	56.75
Final water level end of pumping 62.05 metres	4	14.61	4	56.00
Recommended pump type. ☐ Shallow ☒ Deep	5	16.70	5	55.15
Recommended pump depth. 19.24 metres	10	26.50	10	51.38
Recommended pump rate 40 LPM (litres/min)	15	34.86	15	48.01
If flowing give rate - (litres/min)	20	41.70	20	45.30
	25	47.80	25	43.60
If pumping discontinued, give reason.	30	51.58	30	42.60
	40	57.08	40	41.32
	50	60.38	50	40.19
	60	62.05	60	39.47

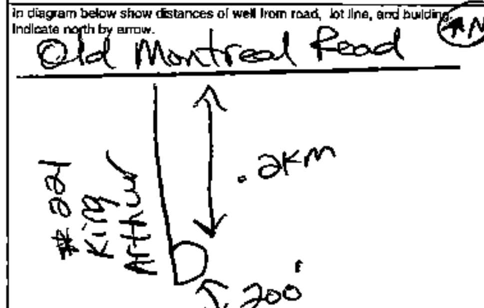
Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
8.00	0	Neat Cement Slurry	.1816

Location of Well

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



Method of Construction

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

Water Use

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

Final Status of Well

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

Audit No. Z 65055

Date Well Completed (YYYY MM DD): 2007 05 15

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

Date Delivered (YYYY MM DD): 2007 05 16

Well Contractor/Technician Information

Name of Well Contractor	Well Contractor's Licence No.
Air Rock Drilling Co Ltd	1119

Business Address (street name, number, city etc.): RR#1 Richmond Ont K0A 2Z0

Name of Well Technician (last name, first name)	Well Technician's Licence No.
Purcell Shannon	T2122

Signature of Technician/Contractor: x [signature] | Date Submitted (YYYY MM DD): 2007 06 18

Ministry Use Only

Data Source	Contractor: 1119
Date Received (YYYY MM DD): JUN 28 2007	Date of Inspection (YYYY MM DD)
Remarks	Well Record Number

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Ontario Ministry of the Environment

Well Tag No. (Place Sticker and/or Print Below)
A 052289

Well Record

Regulation 903 Ontario Water Resources Act

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Well Owner's Information

[redacted]

Part A: Construction and/or Major Alteration of a Well

Address of Well Location (Street Number/Name, RR) | Township | Lot 9 | Concession

County/District/Municipality | City/Town/Village | Province Ontario | Postal Code

UTM Coordinates Zone Easting Northing | GPS Unit Make Model | Mode of Operation: Undifferentiated / Averaged / Differentiated, specify

NAD 8 3

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

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)

Results of Well Yield Testing

Check box if other test of well yield, water was:
☒ Clear and sand free
☐ Cannot develop to sand-free state
If pumping discontinued, give reason.

Pumping test method

Pump intake set at (Metres)

Pumping rate (Litres/min)

Duration of pumping ___ hrs + ___ min

Final water level end of pumping (Metres)

Recommended pump type ☐ Shallow ☐ Deep

Recommended pump depth (Metres)

Recommended pump rate (Litres/min)

If flowing give rate (Litres/min)

Draw Down Time (Min)	Water Level (Metres)	Recovery Time (Min)	Water Level (Metres)
Static Level		Static Level	
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Method of Construction

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

Water Use

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

Status of Well

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

Location of Well

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

Date Well Completed (yyyy/mm/dd) | Was the well owner's information package delivered? ◯ Yes ◯ No | Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd)

Water Details

Water found at Depth ___ Metres Gas | Kind of Water: Fresh Salty Sulphur Minerals
Water found at Depth ___ Metres Gas | Kind of Water: Fresh Salty Sulphur Minerals
Water found at Depth ___ Metres Gas | Kind of Water: Fresh Salty Sulphur Minerals

Casing Used	Screen Used	Casing and Well Details
Galvanized	Galvanized	Diameter of Hole (Centimetres)
Steel	Steel	Depth of the Hole (Metres)
Fibreglass	Fibreglass	Wall Thickness (Metres)
Plastic	Plastic	Inside Diameter of the Casing (Centimetres)
Concrete	Concrete	Depth of the Casing (Metres)

No Casing and Screen Used

Open Hole

Disinfected? Yes No

Well Contractor and Well Technician Information

Business Name of Well Contractor | Well Contractor's Licence No.

Business Address (Street No./Name, Number, RR) | Municipality

Province | Postal Code | Business E-mail Address

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

Well Technician's Licence No. | Signature of Technician | Date Submitted (yyyy/mm/dd)

Ministry Use Only

Audit No. Z 69184 | Well Contractor No.

Date Received (yyyy/mm/dd) SEP 1 3 2003 | Date of Inspection (yyyy/mm/dd)

Remarks

Contractor's Copy

Ontario Ministry of the Environment

Measurements recorded in: X Metric Imperial

Well Tag No.: A 066502

A066508

Well Regulation 903 Ontario Water Re

Page

Well Owner's Information

[redacted]

Well Location

Address of Well Location (Street Number/Name): # 171 King Arthur

Township: Cumberland

Lot: 23

Concession:

County/District/Municipality: Ottawa Carleton

City/Town/Village: Cumberland

Province: Ontario

Postal Code:

UTM Coordinates Zone, Easting, Northing: NAD 83 18 465 ~~120~~ 5038 ~~506~~

Municipal Plan and Sublot Number: # 5OR-7034 5/L7

Other

Overburden and Bedrock Materials/Abandonment Sealing Record

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Grey	Clay			0	3.05
Bluish Grey & Brown	Limestone			3.05	152.39

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed
9.14	0	Neat Cement Slurry	.2724

Method of Construction

X Cable Tool / Rotary Air

Well Use

X Domestic

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material	Wall Thickness (cm/in)	Depth (m/ft) From	To
15.88	Steel	.48	+.6	9.14
15.23	Open hole		9.14	152.39

Status of Well

X Water Supply

Construction Record - Screen

(crossed out)

Water Details

Water found at Depth	Kind of Water
82.90	Untested

Hole Diameter

Depth From	To	Diameter
0	152.39	15.23

Results of Well Yield Testing

After test of well yield, water was: TESTED

Pump intake set at (m/ft): 91.44

Pumping rate: 15.14

Duration of pumping: 1 hrs 0 min

Final water level end of pumping (m/ft): 44.26

Recommended pump depth (m/ft): 143.98

Recommended pump rate: 15.14

Disinfected? X Yes

Time (min)	Draw Down Water Level	Time (min)	Recovery Water Level
Static Level	9.08		44.86
1	8.60	1	39.56
2	9.37	2	39.30
3	10.08	3	39.11
4	10.75	4	38.92
5	11.48	5	38.75
10	15.86	10	37.84
15	19.34	15	37.04
20	22.80	20	36.25
25	25.96	25	35.43
30	29.92	30	
40	35.28	40	
50	40.70	50	
60	44.86	60	

Map of Well Location

Please provide a map below following instructions on the back.

Old Montreal Rd

King Arthur

88'

#171 King Arthur

Well Contractor and Well Technician Information

Business Name of Well Contractor: Air Rock Drilling Co Ltd

Well Contractor's Licence No.: 1119

Business Address: RR1

Municipality: Richmond

Province: Ont

Postal Code: K0A 2Z0

Bus. Telephone No.: 613 838 2170

Name of Well Technician: Graham Ryan

Well Technician's Licence No.: 3484

Date Submitted: 20080801

Date Package Delivered: 2008 06 11

Date Work Completed: 2008 06 10

Ministry Use Only: Audit No. Z 80803

AUG 14 2008

Ministry's Copy

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Ontario Ministry of the Environment

Well A 086962 (Below)

086962

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☐ Imperial

Well Owner's Information

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
211 - King - Arthur St	Cumberland	11	3

County/District/Municipality	City/Town/Village	Province	Postal Code
OTTAWA City	Cumberland	Ontario	K4C0A2

UTM Coordinates Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83 18	465405	5034452	4M-1302	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Brown	Clay	Boulders	Loose	0	3.63
Grey	Limestone		Hard	3.63	151.51

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	12.12	Cement Grout	120 kg

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☒ Rotary (Reverse) AIR ☐ Driving ☐ Boring ☐ Digging ☐ Air percussion ☒ Other, specify WATER-percussion

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
15.86	Steel	0.48	+0.45	12.12

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	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 16.66 (m/ft) Kind of Water: ☒ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	12.12	15.86
12.12	151.5	15.54

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): 54.54

Pumping rate (l/min / GPM): 13.50

Duration of pumping: 1 hrs + 00 min

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

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

Recommended pump depth (m/ft): 148.48

Recommended pump rate (l/min / GPM): 22.50

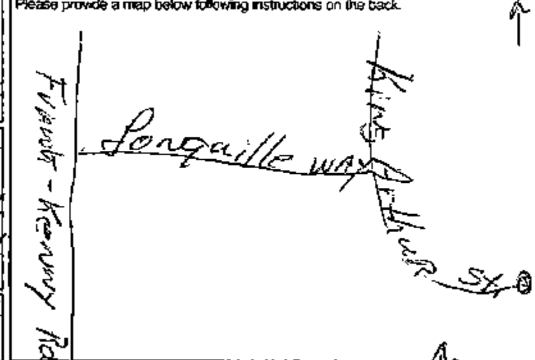
Well production (l/min / GPM): 9.00

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	6.01		42.08
1	5.77	1	40.85
2	6.25	2	40.73
3	6.90	3	40.60
4	7.44	4	40.50
5	8.08	5	40.41
10	11.29	10	39.88
15	14.30	15	39.57
20	17.79	20	39.16
25	21.12	25	38.78
30	24.23	30	38.38
40	30.35	40	37.60
50	36.22	50	36.86
60	42.08	60	36.15

Map of Well Location

Please provide a map below following instructions on the back.



Comments: 53 metre

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
DYR-WATER-well-Drilling	6006

Business Address (Street Number/Name)	Municipality
1763 - Route 900 west	NAtion

Province	Postal Code	Business E-mail Address
ON	K0A3C0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6139877-4598	Desnoyers Louis

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
T6215	[signature]	2009 07 14

Well owner's information package delivered ☒ Yes ☐ No

Date Package Delivered: 2009 07 14

Date Work Completed: 2009 07 10

Ministry Use Only

Audit No. Z099704

Received SEP 03 2009

0506E (12/2007) Ministry's Copy

M 18 465450
4 5038170
V 5 0325
in 215

1512686

316/6e
~~1510713~~

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District Carleton Township, Village, Town or City Cumberland

Con. 7 Lot D Date completed 21 April 1969 (day month year)

Owner [redacted] (print in block letters) Address Cumberland, Ont.

Casing and Screen Record		Pumping Test	
Inside diameter of casing	6"	Static level	10'
Total length of casing	20'	Test-pumping rate	8 G.P.M.
Type of screen		Pumping level	60'
Length of screen		Duration of test pumping	2 hrs.
Depth to top of screen		Water clear or cloudy at end of test	clear
Diameter of finished hole	6"	Recommended pumping rate	6 G.P.M.
		with pump setting of	60 feet below ground surface

Well Log / **Water Record**

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
loam	0	3	146	fresh
loose rock & clay	3	8		
grey limestone	8	146		

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

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

Drilling or Boring Firm G. Charbonneau, Diamond & Cable Drilling,

Address R. R. 1, Box 194, Orleans, Ont.

Licence Number 3395

Name of Driller or Borer G. Charbonneau,

Address R. R. 1, Orleans, Ont.

Date 21 April 1969.

Gérard Charbonneau

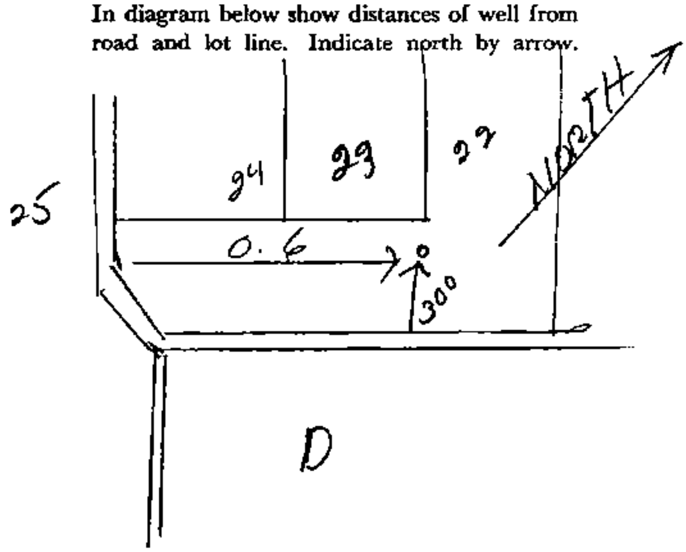
(Signature of Licensed Drilling or Boring Contractor)

Form 7

OWRC COPY

Location of Well

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



CSS.58

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

ONTARIO

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

11 | 1513924 | MUNICIP | CON | LOT

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	Cumberland	1st. Con. O.R.	1-OF

ADDRESS OF WELL: [redacted]
R. R. 1, Cumberland, Ont.

DATE COMPLETED: DAY 31 MO 05 YR 73

21 | ZONE | EASTING | NORTHING | ELEVATION | 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
grey	limestone			0	109

31 | 32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
109	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
6-00	1 STEEL	250	0	0022
06	4 OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	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.
10-13	14-17		
18-21	22-25		
26-29	30-33		

71 PUMPING TEST

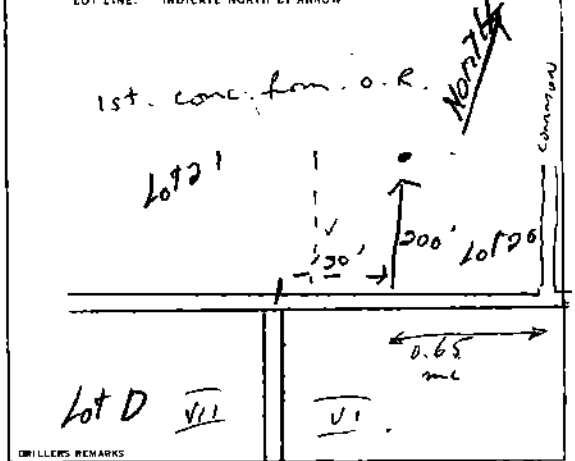
PUMPING TEST METHOD: 1 PUMP 2 ☒ BAILER
PUMPING RATE: 0004 GPM
DURATION OF PUMPING: 02 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 PUMPING 2 ☒ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
004 FEET	070 FEET	050 FEET	025 FEET	004 FEET	004 FEET

IF FLOWING GIVE RATE: GPM
PUMP INTAKE SET AT: 100 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 100 FEET
RECOMMENDED PUMPING RATE: 0004 GPM
0000.1 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 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED ☐ OTHER
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: C. Charbonneau, Diamond & Cable Drilling
LICENCE NUMBER: 1504
ADDRESS: R. R. 2, Box 194, Orleans, Ont.
NAME OF DRILLER OR BORER: Leo Bourgeois
LICENCE NUMBER:
SIGNATURE OF CONTRACTOR:
SUBMISSION DATE: DAY 31 NO. 5 YR 73

OFFICE USE ONLY

DATA SOURCE: 1
CONTRACTOR: 1504
DATE RECEIVED:
DATE OF INSPECTION:
INSPECTOR: K.
REMARKS:
P R
W1

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FORM 7 07-091

31G6C

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 | 1517909 | MUNICIP 15011 | CON. CON. 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Ottawa-Carleton	Cumberland	Conc. 6	C

OWNER (SURNAME FIRST): [redacted]
ADDRESS: Box E; Cumberland, Ontario
DATE COMPLETED: DAY 18 MO 06 YR 82

21 | ZONE 18 | EASTING 466499 | NORTHING 5037399 | RC 4 | ELEVATION 0340 | RC 4 | BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
Gray	Limestone		Large Loose Layers	0	17
Gray	Limestone			17	271

31 | 0017215774 | 0271215

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0190'	☒ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
0258'	☒ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
06 6¼	☒ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	188	0	0021
06	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☒ OPEN HOLE		21	0271
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

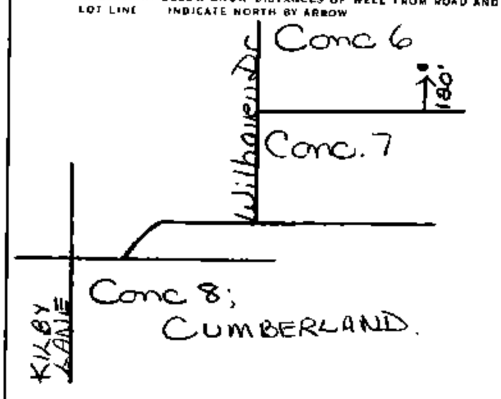
PUMPING TEST METHOD: ☐ PUMP ☒ BAILER | PUMPING RATE 0002 GPM | DURATION OF PUMPING 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
030 FEET	250 FEET	250 FEET	250 FEET	250 FEET	250 FEET

WATER LEVELS DURING: ☒ PUMPING ☐ RECOVERY
IF FLOWING GIVE RATE: GPM | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: ☒ CLEAR ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING 250 FEET | RECOMMENDED PUMPING RATE 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 1: ☒ WATER SUPPLY ☐ OBSERVATION WELL ☐ TEST HOLE ☐ RECHARGE WELL ☐ ABANDONED, INSUFFICIENT SUPPLY ☐ ABANDONED, POOR QUALITY ☐ UNFINISHED

WATER USE 01: ☒ DOMESTIC ☐ STOCK ☐ IRRIGATION ☐ INDUSTRIAL ☐ OTHER ☐ COMMERCIAL ☐ MUNICIPAL ☐ PUBLIC SUPPLY ☐ COOLING OR AIR CONDITIONING ☐ NOT USED

METHOD OF DRILLING 1: ☒ CABLE TOOL ☐ ROTARY (CONVENTIONAL) ☐ ROTARY (REVERSE) ☐ ROTARY (AIR) ☐ AIR PERCUSSION ☐ BORING ☐ DIAMOND ☐ JETTING ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. | LICENCE NUMBER: 1558
ADDRESS: Box 490; Stittsville, Ont. K0A 3G0
NAME OF DRILLER OR BORER: J. Moore | LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: [signature] | SUBMISSION DATE: DAY 21 MO 06 YR 82

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1558 | DATE RECEIVED: 05 10 82
DATE OF INSPECTION: | INSPECTOR: OP/LM
REMARKS: CSS.ES

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FORM NO. 0506-4-77 FORM 7

3166

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1 PRINT ONLY IN SPACES PROVIDED
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(11) 1517920 MUNICIP 1501 CON CON 06

COUNTY OR DISTRICT: OTTAWA-CARLETON
TOWNSHIP BOROUGH CITY, TOWN VILLAGE: CUMBERLAND
LOT: 6 BLOCK TRACT SURVEY ETC
LOT: C
ADDRESS: [redacted] CUMBERLAND
DATE COMPLETED: DAY 25 MO 09 YR 82

(21) ZONE 18 EASTING 466499 NORTHING 5037399 RC 14 ELEVATION 0340 RC 14 BASIN CODE 36

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
BROWN	HARD PAN	BOULDERS		0	12
GREY	LIMESTONE			12	189
BLACK	SHALE			189	200

(31) 0012614131 0189215 0200817

(32)

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0189	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	TO
6¼	1 ☑ STEEL 3 ☐ GALVANIZED 5 ☐ CONCRETE 4 ☐ OPEN HOLE	1.88	0	40
06	1 ☐ STEEL 3 ☐ GALVANIZED 5 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 3 ☐ GALVANIZED 5 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE 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 CLAY PACKER ETC.)
0	40	CEMENT

PUMPING TEST

(71) PUMPING TEST METHOD: 1 ☐ PUMP 2 ☑ BAILER
PUMPING RATE: 0004 GPM
DURATION OF PUMPING: 01 HOURS 20 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING
038 FEET	195 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
100 FEET	180 FEET	190 FEET	195 FEET

IF FLOWING GIVE RATE: GPM
PUMP INTAKE SET AT: 198 FEET
WATER AT END OF TEST: 1 ☐ CLEAR 2 ☑ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING: 198 FEET
RECOMMENDED PUMPING RATE: 0002 GPM

FINAL STATUS OF WELL (1)

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

WATER USE (01)

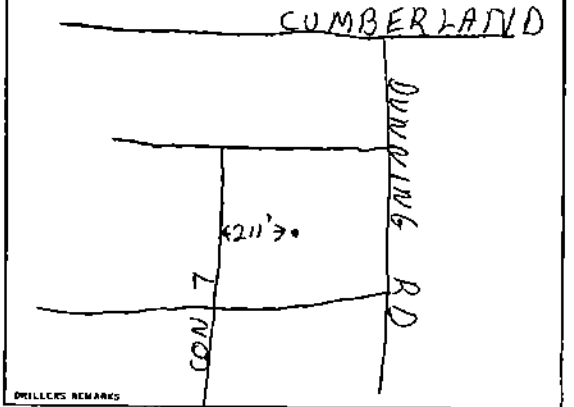
1 ☑ DOMESTIC 5 ☐ COMMERCIAL
2 ☐ STOCK 6 ☐ MUNICIPAL
3 ☐ IRRIGATION 7 ☐ PUBLIC SUPPLY
4 ☐ INDUSTRIAL 8 ☐ COOLING OR AIR CONDITIONING
☐ OTHER 9 ☐ NOT USED

METHOD OF DRILLING (1)

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

LOCATION OF WELL

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



DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR: YVON GENIER WELL DRILLING — LICENCE NUMBER: 2351
ADDRESS: RR4 CASSELMAN KOA-1MO
NAME OF DRILLER OR BORER: YVON GENIER — LICENCE NUMBER: 2351
SIGNATURE OF CONTRACTOR: Yvon Genier
SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 2351 DATE RECEIVED: 07 10 82
DATE OF INSPECTION: INSPECTOR: OP/lm
REMARKS

C55:65

MINISTRY OF THE ENVIRONMENT COPY

FORM NO 0506—4—77 FORM 7

Ontario Ministry of the Environment

Measurements recorded in: Metric / Imperial

Well Tag No. (Please Shown Below) A076803

Well Record

...tion 903 Ontario Water Resources Act

Page

A076803

Well Owner's Information

[redacted]

Well Location

Address of Well Location (Street Number/Name) | Township | Lot | Concession

Lot 15 Camelot | Cumberland | 23 | 10

County/District/Municipality | City/Town/Village | Province | Postal Code

Ottawa Carleton | Cumberland | Ontario

UTM Coordinates Zone | Easting | Northing | Municipal Plan and Sublot Number | Other

NAD 8 3 1 8 4 6 5 1 7 9 5 0 3 8 6 0 8

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Brown	Clay		Packed	0	3.65
Gray	Limestone	Light Colours	Medium	3.65	79.24
Gray	Limestone	Dark Layer	Medium	79.24	93.26

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
6.4	0	Grouted Cement	.21m³

Method of Construction

X Cable Tool | Diamond | Public | Domestic | Not used

Rotary (Conventional) | Jetting | Livestock | Dewatering

X Rotary (Reverse) | Driving | Irrigation | Test Hole | Monitoring

Boring | Digging | Industrial | Cooling & Air Conditioning

X Air percussion | Other, specify

Other, specify

Well Use

Commercial | Municipal | Not used | Dewatering | Monitoring

Test Hole | Cooling & Air Conditioning

Construction Record - Casing

Inside Diameter (mm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (mm/in)	Depth (m/ft) From	To	Status of Well
15.86	Steel	.48	+.45	6.4	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

Construction Record - Screen

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

Water Details

Water Found at Depth (m/ft)	Kind of Water	Fresh	Untested	Depth (m/ft) From	To	Diameter (cm/in)
88.38-89.91	Other, specify					
Water Found at Depth	Kind of Water	Fresh	Untested	0	6.4	15.86
gpm/l/s	Gas	Other, specify		6.4	83.81	15.23
Water Found at Depth	Kind of Water	Fresh	Untested	83.81	93.26	14.75
m/ft	Gas	Other, specify				

Hole Diameter

Well Contractor and Well Technician Information

Business Name of Well Contractor | Well Contractor's Licence No.

Capital Water Supply Ltd. | 1 5 5 8

Business Address (Street Number/Name) | Municipality

Box 490 | Stittsville

Province | Postal Code | Business E-mail Address

Ontario | K2S 1 A6 | office@capitalwater.ca

Business Telephone No. (inc. area code) | Name of Well Technician (Last, First, Middle Names)

6 1 3 8 3 6 1 7 6 6 | Miller, Stephen

Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted

0 0 9 7 | | 2 0 0 9 0 3 1 8

Results of Well Yield Testing

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

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static level	18.29		
1	18.39	1	48.57
2	18.80	2	47.96
3	19.21	3	47.37
4	19.60	4	46.74
5	19.98	5	46.19
10	23.49	10	43.45
15	27.03	15	40.57
20	29.68	20	38.64
25	32.15	25	36.84
30	34.79	30	35.03
40	38.12	40	32.26
50	41.19	50	30.07
60	43.59	60	28.89

Pumping rate (l/m / GPM): 18.2

Duration of pumping: 2 hrs + min

Final water level end of pumping (m/ft): 50.69

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

Recommended pump depth (m/ft): 68.57

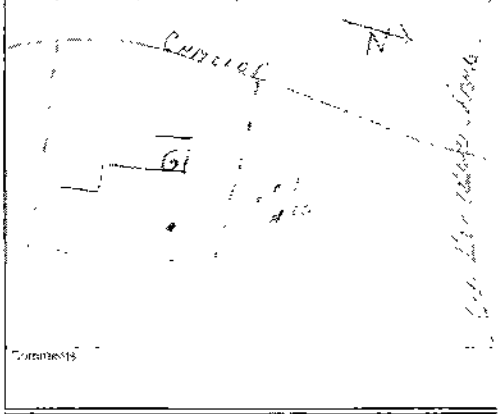
Recommended pump rate (l/min / GPM): 18.20

Well production (l/min / GPM):

Disinfected? X Yes / No

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered: X Yes / No — Date Package Delivered: 2 0 0 9 0 3 2 0

Date Work Completed: 2 0 0 9 0 3 1 4

Ministry Use Only

Audit No. Z095334

APR 0 6 2009

Ministry's Copy

Ontario — Ministry of the Environment

Measurements recorded in: Metric | Imperial

Well Tag No. (Place Sticker and/or Print Below): A076804 **A076804**

Well Record

Regulation 903 Ontario Water Resources Act

Page ___ of ___

Well Owner's Information

[redacted]

Well Location

Address of Well Location (Street Number/Name): Lot 14 Camelot Estates

Township: Cumberland

Lot: 23

Concession: 10

County/District/Municipality: Ottawa Carleton

City/Town/Village: Cumberland

Province: Ontario

Postal Code:

UTM Coordinates: Zone: 18 Easting: 465203 Northing: 5038556

NAD

Municipal Plan and Sub-lot 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 (mBGS) From	To
Brown	Clay	Stones	Packed	0	1.82
Gray	Limestone	Light Colours	Medium	1.82	77.72
Gray	Limestone	Dark Layers		77.72	91.43

Annular Space

Depth Set at (mBGS) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³)
6.4	0	Grouted Cement Slurry	.21m³

Method of Construction

[X] Cable Tool [ ] Diamond [ ] Public Supply Contractor [ ] Boring [X] Rotary (Conventional) Air [ ] Jetting [ ] Driving [X] Air Percussion [ ] Digging [ ] Other, specify

Well Use

[ ] Domestic [ ] Not used [X] Commercial [ ] Dewatering [ ] Municipal [ ] Monitoring [ ] Test Hole [ ] Cooling & Air Conditioning [ ] Other, specify

Construction Record - Casing

Outside Diameter (cm)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (mm)	Depth (mBGS) From	To
15.86	Steel	.48	+.45	6.4

Construction Record - Screen

Outside Diameter (cm)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (mBGS) From	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

Water Details

Water found at Depth	Kind of Water		Hole Diameter Depth From	To	Diameter (cm)
86.86-88.38m	Fresh [X] Untested	Other, specify			
Water found at Depth (mBGS)	Kind of Water: Fresh / Gas / Other, specify	Untested	0	6.4	15.86
Water found at Depth (mBGS)	Kind of Water: Fresh / Gas / Other, specify	Untested	6.4	83.81	15.23
			83.81	91.43	14.75

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 (mBGS): 83.81

Pumping rate (L/min / GPM): 31.85

Duration of pumping: 2 hrs + 30 mins

Final water level end of pumping (mBGS): 36.43

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

Recommended pump depth (mBGS): 60.95

Recommended pump rate (L/min / GPM): 31.85

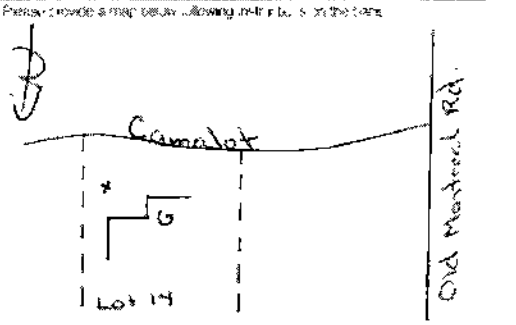
Well production (L/min / GPM):

Disinfected? [X] Yes [ ] No

Time (min)	Draw Down Water Level (mBGS)	Time (min)	Recovery Water Level (mBGS)
Static Level	22.10		
1	24.06	1	34.10
2	25.55	2	33.15
3	26.36	3	32.44
4	27.27	4	31.62
5	27.89	5	30.94
10	30	10	28.77
15	31.20	15	27.41
20	32.07	20	26.82
25	32.80	25	26.31
30	33.25	30	25.97
40	34.01	40	25.48
50	34.53	50	25.18
60	34.98	60	25.02

Map of Well Location

Please provide a map below showing main roads, major landmarks, and the direction of the nearest town.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: Capital Water Supply Ltd.

Well Contractor's License No.: 1558

Business Address (Street Number/Name): Box 400

Municipality: Stittsville

Province: Ontario

Postal Code: K2S 1A6

Business E-mail Address: office@capitalwater.ca

Well Technician's License No.: 6138361766

Name of Well Technician (Last Name, First Name): Miller, Stephen

Well Technician's Signature:

Date Package Delivered: 2009/03/20

Date Work Completed: 2009/03/14

Well owner's information package delivered: [X] Yes [ ] No

Date Submitted: 2009/03/18

Ministry Use Only

Audit No.: Z095333

APR 06 2009

Ministry's Copy

Ontario Ministry of the Environment

Measurements recorded in: X Metric ☐ Imperial

Well Tag No. (Place Sticker and/or Print Below) A068294 **A 068294**

Well Record

tion 903 Ontario Water Resources Act

Page __ of __

Well Owner's Information

[redacted]

Well Location

Address of Well Location (Street Number/Name)
1353 Jules Leger Dr.

Township
Cumberland

Lot
19

Concession
BF

County/District/Municipality
Ottawa Carleton

City/Town/Village
Cumberland

Province
Ontario

Postal Code

UTM Coordinates Zone | Easting | Northing
NAD 8 3 1 8 | 466597 | 5038700

Municipal Plan and Sub-plot 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
Gray	Limestone	Dark Layers	Medium Hard	0	76.19

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant used (Material and Type)	Volume Placed (m³/ft³)
6.40	0	Grouted Bentonite Slurry	.110m3

Method of Construction

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

Well Use

☐ Public ☐ Commercial ☐ Not used
X Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other (specify)

Construction Record - Casing

Outside Diameter (cm/in)	Casing Joint Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (mm/in)	Depth (m/ft) From	Depth (m/ft) To
15.86	Steel	.48 +2.74	6.40	

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

Water Details

Water found at Depth (m/ft)	Kind of Water	Fresh	X Untested
12.19m	Gas	Other, specify	
Water found at Depth (m/ft)	Kind of Water	Fresh	X Untested
72.84m	Gas	Other, specify	
Water found at Depth (m/ft)	Kind of Water	Fresh	Untested
	Gas	Other, specify	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	6.40	15.86
6.40	76.19	15.55

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)
60.95

Pumping rate (l/m / GPM)
54.6

Duration of pumping
1 hrs + min

Final water level end of pumping (m/ft)
5.22

If flowing give rate (l/m / GPM)

Recommended pump depth (m/ft)
22.85

Recommended pump rate (l/m / GPM)
45.5

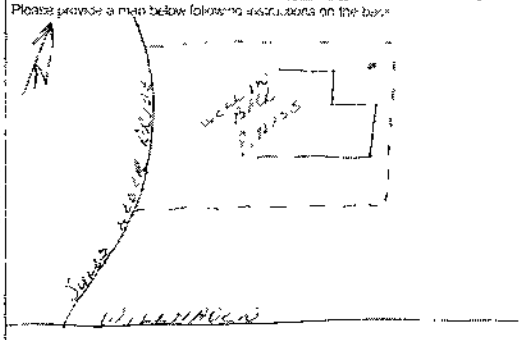
Well production (l/m / GPM)

Disinfected?
X Yes ☐ No

Time	Draw Down Water level (m/ft)	Recovery Water level (m/ft)
Static	2.32	
1	3.85	1 3.46
2	4.43	2 2.76
3	4.74	3 2.55
4	4.89	4 2.48
5	4.99	5 2.44
10	5.12	10 2.36
15	5.16	15 2.32
20	5.17	20
25	5.20	25
30	5.22	30
40	5.22	40
50	5.22	50
60	5.22	60

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
Capital Water Supply Ltd.

Well Contractor's Licence No
1558

Business Address (Street Number/Name)
Box 490

Municipality
Stittsville

Province
Ontario

Postal Code
K2S 1A6

Business E-mail Address
office capitalwater.ca

Business Telephone No. (inc. area code)
613 836 1766

Name of Well Technician (Last Name, First Name)
Miller, Stephen

Well Technician's Licence No.
0097

Signature of Technician and/or Contractor

Date Submitted
2009 04 30

Owner's Copy

Well owner's information package delivered
X Yes ☐ No
2009 04 30

Date Package Delivered

Date Work Completed
2009 04 28

Ministry Use Only

Audit No.
Z 095313
MAY 20 2009

Ontario Ministry of the Environment

Measurements recorded in: X Metric / Imperial

Well Tag No. (Place Sticker and/or Print Below): A068314 **A 068314**

Well Record

Regulation 903 Ontario Water Resources Act

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Well Owner's Information

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Lot 18 - Camelot	Cumberland	B.F.	24

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa Carleton	Cumberland	Ontario	

UTM Coordinates Zone, Easting, Northing: NAD 8 3 | 1 8 | 4 6 5 0 8 0 | 5 0 3 8 7 3 1

Municipal Plan and Sublot Number: Cumberland

Overburden and Bedrock Materials/Abandonment Sealing Record

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Brown	Soil	Broken Rock	Fill	0	1.82
Brown	Clay		Packed	1.82	3.65
Gray	Limestone	Green Layers	Soft	3.65	86.86

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
6.40	0	Grouted Bentonite Slurry	.110m³

Method of Construction

X Air percussion (Rotary Air)

Well Use

X Domestic

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material	Wall Thickness (cm/in)	Depth (m/ft) From	To
15.86	Steel	.48	+.45	6.40

Status of Well

X Water Supply

Construction Record - Screen

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

Water Details

Water found at Depth: 79.24 m/ft — Kind of Water: Fresh X Untested

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	6.40	15.86
6.40	86.86	15.23

Results of Well Yield Testing

After test of well yield, water was: X Clear and sand free

Pump intake set at (m/ft): 79.24

Pumping rate (l/min / GPM): 13.65

Duration of pumping: 1 hrs + 30 min

Final water level end of pumping (m/ft): 18.67

Recommended pump depth (m/ft): 60.95

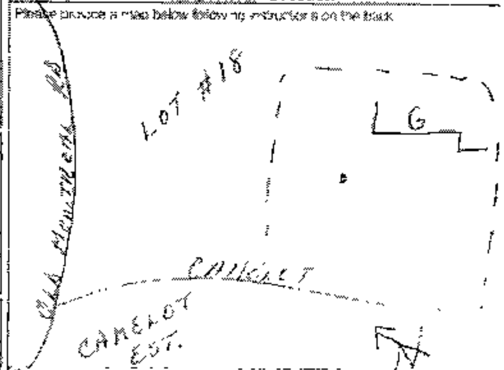
Recommended pump rate (l/min / GPM): 22.75

Disinfected? X Yes

Time (min)	Draw Down Water Level (m/ft)	Time (min)	Recovery Water Level (m/ft)
Static Level	9.33		
1	10.13	1	11.57
2	10.65	2	16.96
3	11.10	3	16.42
4	11.15	4	15.88
5	11.87	5	15.35
10	13.47	10	13.05
15	14.37	15	11.40
20	15.33	20	10.42
25	16.05	25	9.86
30	16.59	30	9.63
40	17.50	40	9.38
50	17.91	50	9.33
60	18.26	60	

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: Capital Water Supply Ltd.

Well Contractor's Licence No.: 1 5 5 8

Business Address (Street Number/Name): Box 490

Municipality: Stittsville

Province: Ontario | Postal Code: K 2 S 1 A 6 | Business E-mail Address: office@capitalwater.ca

Bus. Telephone No. (inc. area code): 6 1 3 8 3 6 1 7 6 6 | Name of Well Technician (Last Name, First Name): Miller, Stephen

Well Technician's Licence No.: 0 0 9 7 | Signature of Technician and/or Contractor | Date Submitted: 2 0 0 8 1 1 1 8

Well owner's information package delivered: X Yes

Date Package Delivered: 2 0 0 8 1 1 1 7

Date Work Completed: 2 0 0 8 1 1 1 4

Ministry Use Only

Audit No. Z 84446

Received: FEB 1 2 2009

0506E (12/2007)

Ministry's Copy

Ontario Ministry of the Environment

Well Tag No. A 038772

A038772

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

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- 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]

Address of Well Location (County/District/Municipality): City of Ottawa
Township: Cumberland
Lot: 5 A20
Concession: 1 (OS)

RR#/Street Number/Name: 1292 Jule Leger DR
City/Town/Village: Cumberland
Site/Compartment/Block/Tract/etc.: Plan 50M-182

GPS Reading: NAD 83 | Zone 18 | Easting 466843 E | Northing 5038828
Unit Make/Model: Magellan
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 (Metres) From	To
GRey	Sand		Soft	0	0.60
grey	limestone		layered	060	12800

Hole Diameter

Depth (Metres) From	To	Diameter Centimetres
0	12.80	21.23
12.80	128.00	1555

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth (Metres) From	To
Casing				
15.55	☑ Steel	0.48	+0.60	12.80
Screen				
Outside diam		Slot No.		
No Casing or Screen				
	☑ Open hole		12.80	128.00

Water Record

Water found at 120 m — ☑ Fresh

Chlorinated ☑ Yes ☐ No

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

Test of Well Yield

Pumping test method: 3 HP
Pump intake set at (metres): 120
Pumping rate (litres/min): 10
Duration of pumping: 1 hrs + 0 min
Final water level end of pumping: 25.09 metres
Recommended pump type: ☐ Shallow ☑ Deep
Recommended pump depth: 120 metres
Recommended pump rate (litres/min): 20
If flowing give rate (litres/min):
If pumping discontinued, give reason:

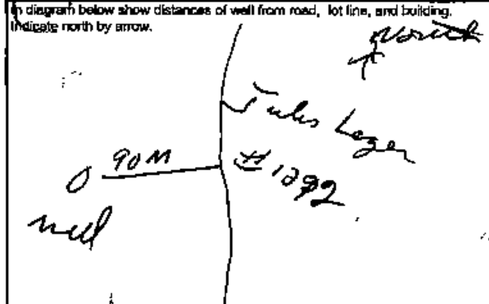
Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
Static Level	960		25.09
1		1	24.12
2		2	24.00
3		3	23.90
4		4	23.49
5	12.10	5	23.22
10	12.92	10	22.36
15	13.70	15	21.04
20	15.40	20	20.25
25	16.42	25	19.90
30	17.34	30	19.25
40	19.30	40	18.50
50	22.42	50	18.02
60	25.09	60	17.75

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	12.80	Cement Grout	6 bags

Location of Well

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



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: Gilles Bourgeois
Well Contractor's Licence No.: 1414
Business Address (street name, number, city etc.): 5+A Albert One
Name of Well Technician (last name, first name): St Pierre
Well Technician's Licence No.: 0-493
Signature of Technician/Contractor: [signature]
Date Submitted: 06 07 31

Audit No. Z 51952
Date Well Completed: 06 07 31
Was the well owner's information package delivered? ☑ Yes ☐ No
Date Delivered: 06 07 20

Ministry Use Only

Data Source | Contractor 1414
Date Received: AUG 2 3 2006 | Date of Inspection
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 A 043496 (number below)

A043496

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

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- **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]

Address of Well Location (County/District/Municipality): Ottawa-Carleton
Township: Cumberland
Lot: 23
Concession:
RR#/Street Number/Name: #181 King Arthur Street
City/Town/Village: Cumberland
Site/Compartment/Block/Tract etc.: Plan 50R-7034 S/L8
GPS Reading: NAD 83 Zone 18 Easting 465132 Northing 5038432
Unit Make/Model: Magellan
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 Metres From	To
	Clay			0	0.46
Grey + Black	limestone			0.46	103.63

Hole Diameter

Depth Metres From	To	Diameter Centimetres
0	103.63	15.07

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	To
Casing				
15.88	☒ Steel	.48	0	7.31
No Casing or Screen				
	☒ Open hole		6.71	103.63

Water Record

Water found at Metres: 100.4 — Kind of Water: ☒ Sulphur ☒ Minerals; NOT TESTED

After test of well yield, water was: Cloudy / Not Tested

Chlorinated ☒ Yes ☐ No

Test of Well Yield

Pumping test method: Sub Pump
Pump intake set at (metres): 30.49
Pumping rate (litres/min): 22.71
Duration of pumping: 1 hrs + 0 min
Final water level end of pumping: 80 metres
Recommended pump type: ☐ Shallow ☒ Deep
Recommended pump depth: 82.29 metres
Recommended pump rate (litres/min): 22.71

Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
Static Level	2.87		17.80
1	3.70	1	15.30
2	4.50	2	14.40
3	5.00	3	13.50
4	5.60	4	12.50
5	6.15	5	11.80
10	8.35	10	8.80
15	9.80	15	7.00
20	11.20	20	6.00
25	12.00	25	5.03
30	12.50	30	4.01
40	13.10	40	2.87
50	15.20	50	
60	17.80	60	

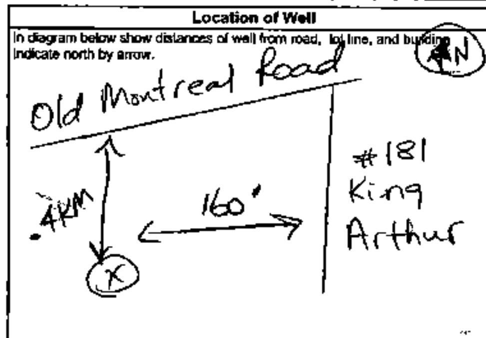
Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type	Volume Placed (cubic metres)
6.71	0	Neat Cement Slurry	.1362

Location of Well

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



Method of Construction

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

Water Use

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

Final Status of Well

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

Audit No. Z 48602
Date Well Completed: 2006 09 29
Was the well owner's information package delivered? ☒ Yes ☐ No
Date Delivered: 2006 08 08

Well Contractor/Technician Information

Name of Well Contractor: Air Rock Drilling Co LTD
Well Contractor's Licence No.: 1119
Business Address: RR#1 Richmond ONT K0A 2Z0
Name of Well Technician: PURCELL SHANNON
Well Technician's Licence No.: T0122
Signature of Technician/Contractor: [signature]
Date Submitted: 2006 09 29

Ministry Use Only

Data Source:
Contractor: 1119
Date Received: OCT 17 2006
Date of Inspection:
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 Number: A 012597 (Number below) A012597

Well Record

Regulation 903 Ontario Water Resources Act

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Instructions for Completing Form

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- 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]

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
Same (Ottawa)	Cumberland (Ottawa)	C.N.½	7

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
1553 Frank Kenny Cumberland	Ottawa	

GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation
	83	18	465647	5037502	Magellan	☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Metres To
Grey	hard pan	stone		0	4
Grey	rock			4	200

Hole Diameter

Depth From (Metres)	To	Diameter Centimetres
0	200	6 inch

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Metres To
Casing				
6¼	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	188	0	38
	☐ 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			

Water Record

Water found at Metres	Kind of Water
[illegible] 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 Cloudy

Chlorinated ☑ Yes ☐ No

Test of Well Yield

Pumping test method: Sub.

Pump intake set at - (metres): 125

Pumping rate - (litres/min): 22

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping: 37.90 metres

Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump depth: 180 metres

Recommended pump rate: 15 Galons/min (litres/min)

If flowing give rate - (litres/min):

If pumping discontinued, give reason:

Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
Static Level	17.6		37.90
1	17.10	1	37.40
2	17.11	2	36.87
3	17.12	3	36.67
4	17.17	4	36.00
5	17.21	5	35.61
10	17.58	10	34.83
15	34.00	15	34.28
20	36.00	20	33.60
25	38.01	25	33.78
30	38.10	30	31.90
40	36.94	40	30.80
50	37.00	50	29.71
60	37.90	60	28.17

from 18.06

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	37	grout	5 Bag.

Method of Construction

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

Water Use

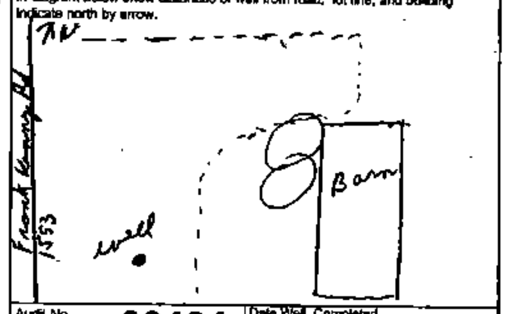
☑ Domestic ☑ Stock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Public Supply ☐ Not used ☐ Cooling & air conditioning ☐ Other

Final Status of Well

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

Location of Well

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



Audit No. Z 33424

Date Well Completed (YYYY MM DD): 2005 07 19

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

Date Delivered (YYYY MM DD): 2005

Well Contractor/Technician Information

Name of Well Contractor: Maurice Cayer Ltd

Well Contractor's Licence No.: 1517

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

Name of Well Technician (last name, first name):

Well Technician's Licence No.:

Signature of Technician/Contractor: X Maurice Cayer

Date Submitted (YYYY MM DD): 2005 07 19

Ministry Use Only

Data Source | Contractor 1517

Date Received (YYYY MM DD): AUG 29 2005 | Date of Inspection

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 Number (Place sticker and print number below): A614599

Well Record
Regulation 903 Ontario Water Resources Act

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- Please print clearly in blue or black ink only.

Ministry Use Only: MUN 1501 | CON CON | C1 | LOT 23

Well Owner's Information and Location of Well Information

[redacted]

Address of Well Location (County/District/Municipality): Ottawa Carleton
Township: Cumberland
Lot: 23
Concession: 1
RR#/Street Number/Name: old montreal Rd
City/Town/Village: Cumberland
Site/Compartment/Block/Tract etc.:
GPS Reading: NAD 83 | Zone 18 | Easting 466143 | Northing 5038619
Unit Make/Model: magellan
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
	Clay			0	0.61
black	shale	grey limestone		0.61	24.7
grey	limestone	dark brown shale		24.7	31.7
dark brown shale				31.7	35
grey	limestone	dark brown shale		35.0	91.7

Hole Diameter

Depth From	Depth To	Diameter Centimetres
0	91.7	15.24

Water Record

Water found at ___ Metres	Kind of Water	
54.6	☐ Fresh ☐ Salty ☑ Gas ☐ Other	☐ Sulphur ☐ Minerals
84.4	☐ Fresh ☐ Salty ☐ Gas ☐ Other: tested	☐ Sulphur ☐ Minerals
89.3	☐ Fresh ☐ Salty ☐ Gas ☐ Other:	☐ Sulphur ☐ Minerals

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			
15.88	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	0	6.7
	☐ 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		6.1	91.7

Test of Well Yield

Pumping test method: Draw Down / Recovery

Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level	39.37		
1	41.13	1	41.83
2	41.46	2	41.32
3	41.60	3	41.86
4	41.78	4	41.96
5	41.94	5	42.05
10	42.52	10	42.10
15	42.64	15	42.10
20	43.07	20	42.04
25	43.22	25	41.99
30	43.33	30	41.93
40	43.48	40	41.79
50	43.57	50	41.74
60	43.64	60	41.71

Pump intake set at (metres): 90
Pumping rate (litres/min): 12
Duration of pumping: 6 hrs 45 min
Final water level end of pumping: 43.34 metres
Recommended pump type: ☐ Shallow ☑ Deep
Recommended pump depth: 85 metres
Recommended pump rate: 12 (litres/min)
If flowing give rate (litres/min): —
If pumping discontinued, give reason: —

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)
61	0	Cement slurry	0.2043

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

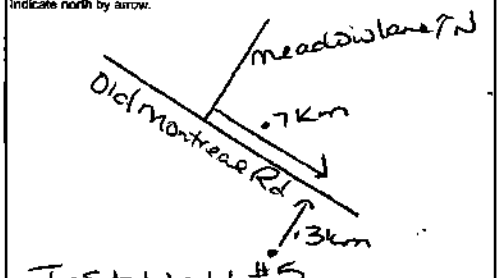
☐ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☑ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: Air Rock Drilling Ltd — Well Contractor's Licence No.: 1119
Business Address (street name, number, city etc.): RR1 Richmond, Ont
Name of Well Technician (last name, first name): Turcell Shannon — Well Technician's Licence No.: T2122
Signature of Technician/Contractor: X [signature] — Date Submitted: 2004/07/16

Location of Well

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



Audit No. Z 14561
Date Well Completed: 2004 06 29
Was the well owner's information package delivered? ☐ Yes ☑ No
Date Delivered: NIT

Ministry Use Only

Data Source
Contractor: 1119
Date Received: JUL 21 2004
Date of Inspection
Remarks
Well Record Number: 1534811

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 Number (Place sticker and print number below): A-014100 / A 014100

Well Record

Regulation 903 Ontario Water Resources Act

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Ministry Use Only

MUN 1501 | CON OF | LOT 20

Well Owner's Information and Location of Well Information

[redacted]

Address of Well Location (County/District/Municipality): OTTAWA - Carleton | Township: Cumberland | Lot: 3 | Concession:

RR#/Street Number/Name: 1290 Gauthier St. | City/Town/Village: Cumberland | Site/Compartment/Block/Tract etc.: SOM-183

GPS Reading | NAD: 83 | Zone: 18 | Easting: 466626 | Northing: 5039806 | Unit Make/Model: Magellan | Mode of Operation: UTM | ☐ 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	SHALE		loose	0	1.00
Grey	Limestone		Hard	1.00	98.48

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	7.82	22.23

Water Record

Water found at 70 Metres | Kind of Water

- ☐ 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	7.82
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
15.55	Open hole		7.82	98.48

Test of Well Yield

Pumping test method: Submersible

	Draw Down Time (min)	Draw Down Water Level (Metres)	Recovery Time (min)	Recovery Water Level (Metres)
Pump intake set at (metres) 60.60	Static Level	8.46		57.57
Pumping rate (litres/min) 45.00	1	10.81	1	65.10
Duration of pumping 1 hrs + 00 min	2	12.90	2	53.02
Final water level end of pumping 57.57 metres	3	15.10	3	56.01
Recommended pump type: ☐ Shallow ☑ Deep	4	17.15	4	49.26
Recommended pump depth 90.00 metres	5	19.59	5	47.02
Recommended pump rate 45.00 (litres/min)	10	32.10	10	36.36
If flowing give rate - (litres/min)	15	32.26	15	22.10
	20	42.56	20	24.66
	25	47.50	25	21.54
If pumping discontinued, give reason.	30	49.25	30	18.40
	40	52.30	40	12.60
	50	54.60	50	9.90
	60	57.57	60	8.46

Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - From	To (Metres)	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	6.66	Cement Grout	160 kg

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: D&R - WATER WELL Drilling | Well Contractor's Licence No.: 6006

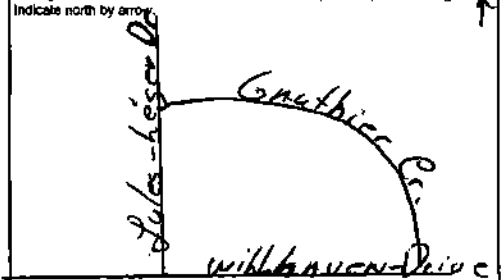
Business Address (street name, number/ city etc.): 54 - Albert - ON

Name of Well Technician (last name, first name): Desharnais, Louis | Well Technician's Licence No.: 1-625

Signature of Technician/Contractor: X [signature] | Date Submitted YYYY MM DD: 2004 06 02

Location of Well

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



Audit No. Z 14111 | Date Well Completed YYYY MM DD: 2004 06 01

Was the well owner's information package delivered? ☐ Yes ☑ No | Date Delivered YYYY MM DD

Ministry Use Only

Data Source | Contractor: 6006

Date Received JUL 13 2004 | Date of Inspection YYYY MM DD

Remarks | Well Record Number: 1534818

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Ontario Ministry of the Environment

Well Tag Number (A004706
A004706

Well Record
Regulation 903 Ontario Water Resources Act

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- Please print clearly in blue or black ink only.

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MUN 15011 CON CON LOT 23

Well Owner's Information and Location of Well Information

[redacted]

Address of Well Location (County/District/Municipality): Ottawa Carleton
Township: Cumberland
Lot: 23
Concession:
RR#/Street Number/Name: [redacted] Old Montreal Rd
City/Town/Village: Cumberland
Site/Compartment/Block/Tract etc.:
GPS Reading: NAD 83 Zone 18 Easting 465143 Northing 5028701
Unit Make/Model: Magellan
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)
	Clay	Gravel		0	1.8
green+grey	limestone			1.8	70.1

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	70.1	14.9

Water Record

Water found at Metres	Kind of Water	
66.1	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: Not tested	
___ 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: Not tested

Chlorinated ☑ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
15.88	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	0	6.7
	☐ 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		6.1	70.1

Test of Well Yield — Data Recorded

Pumping test method: Draw Down / Recovery

Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level	48.85		
1	47.31	1	51.40
2	47.35	2	51.18
3	47.40	3	51.0
4	47.45	4	50.85
5	47.50	5	50.72
10	47.65	10	50.38
15	47.81	15	50.23
20	47.87	20	50.14
25	47.90	25	50.07
30	48.92	30	45.99
40	50.07	40	45.87
50	50.61	50	49.35
60	50.87	60	49.65

Pump intake set at - (metres): 55
Pumping rate - (litres/min): 10
Duration of pumping: 6 hrs + ___ min
Final water level end of pumping: 53.5 metres
Recommended pump type: ☐ Shallow ☑ Deep
Recommended pump depth: 67 metres
Recommended pump rate: 10 litres/min
If flowing give rate - (litres/min):
If pumping discontinued, give reason:

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)
6.1	0	Cement Slurry	0.1362

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

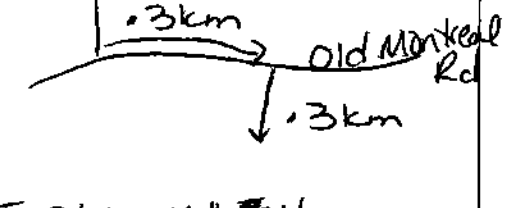
☐ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☑ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: A.R. Kohn Drilling Ltd. — Well Contractor's Licence No.: 1119
Business Address (street name, number, city etc.): RR#1 Richmond, Ont
Name of Well Technician (last name, first name): Shannon Purcell — Well Technician's Licence No.: T2122
Signature of Technician/Contractor: x [signature] — Date Submitted: 2004 07 16

Location of Well

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



Test Well #4

Audit No: Z 04920
Date Well Completed: 2004 04 21
Was the well owner's information package delivered? ☐ Yes ☑ No
Date Delivered: NA

Ministry Use Only

Data Source:
Contractor: 1119
Date Received: JUL 21 2004
Date of Inspection:
Remarks:
Well Record Number: 1534792

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Ontario — Ministry of the Environment

Well Tag Number A 004707
A004707

Well Record
Regulation 903 Ontario Water Resources Act

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- **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 15011 CON CON 21 LOT 23

Well Owner's Information and Location of Well Information

[redacted]

Address of Well Location (County/District/Municipality): Ottawa Carleton
Township: Cumberland.
Lot: 23
Concession: 1
RR#/Street Number/Name: Old Montreal Rd
City/Town/Village: Cumberland
Site/Compartment/Block/Tract etc:
GPS Reading: NAD 83 | Zone 18 | Easting 465143 | Northing 5023870
Unit Make/Model: magellan
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)
	Sandy clay			0	0.76
grey + green	limestone			0.76	75.3

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	75.3	14.91

Water Record

Water found at ___ Metres	Kind of Water
72 m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: NOT
164 m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other USED
___ m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was: ☑ Clear and sediment free ☐ Other, specify: NOT USED
Chlorinated? ☑ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
15.88	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	0	6.7
	☐ 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		6.1	75.3

Test of Well Yield Data Rec'd Jul 2

Pumping test method

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres) 51	Static Level	39.56		
Pumping rate - (litres/min) 42	1		1	44.52
Duration of pumping 6 hrs + 44 min	2	41.99	2	44.52
Final water level end of pumping 46.16 metres	3	42.23	3	44.44
Recommended pump type: ☐ Shallow ☑ Deep	4	42.51	4	44.38
Recommended pump depth. 70 metres	5	42.89	5	44.36
Recommended pump rate. N/A (litres/min)	10	43.82	10	43.96
	15	44.56	15	43.84
If flowing give rate - (litres/min)	20	45.14	20	43.A
	25	45.4	25	
If pumping discontinued, give reason.	30	45.69	30	43.17
	40	45.98	40	
	50		50	43.93
	60	46.18	60	42.N

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)
6.1	0	Cement Slurry	0.1362

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

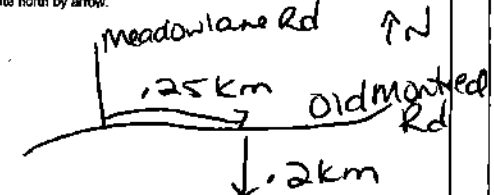
☐ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☑ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: Ar Rock Drilling Ltd — Well Contractor's Licence No. 1119
Business Address (street name, number, city etc.): RR#1 Richmond Ont
Name of Well Technician (last name, first name): Shannon Purcell — Well Technician's Licence No. T8122
Signature of Technician/Contractor: X — Date Submitted (YYYY MM DD) 2004 07 16

Location of Well

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



Test well # 2

Audit No. Z 04919 — Date Well Completed (YYYY MM DD) 2004 04 30
Was the well owner's information package delivered? ☐ Yes ☑ No — Date Delivered (YYYY MM DD) NA

Ministry Use Only

Data Source — Contractor 1119
Date Received (YYYY MM DD) JUL 21 2004 — Date of Inspection (YYYY MM DD)
Remarks — Well Record Number 1534791

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☑ Well Owner's Copy ☐ *Cette formule est disponible en français*

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 1533452 Municipality 15011 Con

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
City of Ottawa	Cumberland	Will Haven Plan 4M-840	12
[redacted]	Address: 1287 George Vanier Cumberland	Date completed: 16 day, Dec month, 02 year	

21 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	till		Hard	0	2
grey	limestone		layered	2	425

31
32

WATER RECORD

Water found at - feet	Kind of water
400	Fresh

CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
8 3/4	Open hole		0	42
6 1/4	Steel	.188	+2	42
6			42	425

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

PLUGGING & SEALING RECORD
☑ Annular space ☐ Abandonment

Depth set at - feet From	To	Material and type (Cement grout, bentonite, etc.)
0	40	cement grout

PUMPING TEST

Pumping test method: Bailer
Pumping rate: 1 GPM
Duration of pumping: 1 Hours 0 Mins

Static level	Water level end of pumping	15 minutes	30 minutes	45 minutes	60 minutes
70 feet	420 feet	420 feet	400 feet	375 feet	350 feet

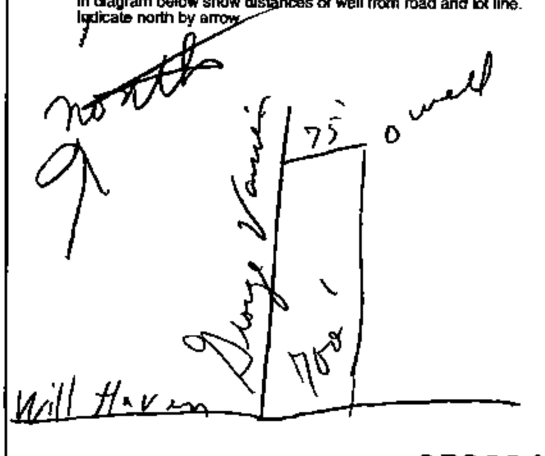
Water levels during: Recovery
If flowing give rate: GPM
Pump intake set at: feet
Water at end of test: ☐ Clear ☑ Cloudy
Recommended pump type: ☐ Shallow ☑ Deep
Recommended pump setting: feet
Recommended pump rate: 5 GPM

FINAL STATUS OF WELL
☑ Water supply ☐ Observation well ☐ Test hole ☐ Recharge well ☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Abandoned (Other) ☐ Dewatering ☐ Unfinished ☐ Replacement well

WATER USE
☑ Domestic ☐ Stock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Public supply ☐ Cooling & air conditioning ☐ Not use ☐ Other

METHOD OF CONSTRUCTION
☐ Cable tool ☐ Rotary (conventional) ☐ Rotary (reverse) ☑ Rotary (air) ☐ Air percussion ☐ Boring ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Other

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



252804

Name of Well Contractor: Gilles Bourgeois
Well Contractor's Licence No: 1414
Address: 57 A 16 ere
Name of Well Technician: Alain Bourgeois
Well Technician's Licence No.: T-2710
Signature of Technician/Contractor: [signature]
Submission date: 16 day Dec mo 02 yr

MINISTRY USE ONLY
Data source: Contractor 1414 Date received DEC 20 2002
Date of inspection: Inspector:
Remarks: CSS.ES2

2 - MINISTRY OF THE ENVIRONMENT COPY

0506 (07/00) Front Form 9

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 — 1533134 — Municipality ISO — Con

OTTAWA-CARLETON

County or District: City of Ottawa
Township/Borough/City/Town/Village: Cumberland
Con, block, tract, survey, etc.: Plan 50M-183
Lot: 2
Address: [redacted] 1312 Kanthier cumberland
Date completed: 23 08 02 (day month year)

21 — UTM — 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	Limestone		layered	0	230
White	Sandstone		Hard	230	395
Brown	Limestone		layered	395	422

31
32

41 WATER RECORD

Water found at - feet	Kind of water
350	1 Fresh 2 Salty 3 Sulphur 4 Minerals 5 Gas
	1 Fresh 2 Salty 3 Sulphur 4 Minerals 5 Gas
	1 Fresh 2 Salty 3 Sulphur 4 Minerals 5 Gas
	1 Fresh 2 Salty 3 Sulphur 4 Minerals 5 Gas
	1 Fresh 2 Salty 3 Sulphur 4 Minerals 5 Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
8 1/2	1 Steel 2 Galvanized 3 Concrete 4 Open hole 5 Plastic		0	42
6 1/4	1 Steel 2 Galvanized 3 Concrete 4 Open hole 5 Plastic	1.88	+2	42
6"	1 Steel 2 Galvanized 3 Concrete 4 Open hole 5 Plastic		42	422

SCREEN

Size 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	To	Material and type (Cement grout, bentonite, etc.)
0	42	Cement Grout

PUMPING TEST

71 — Pumping test method: 1 Pump 2 Bailer — Pumping rate: 1 GPM — Duration of pumping: 1 Hours 0 Mins

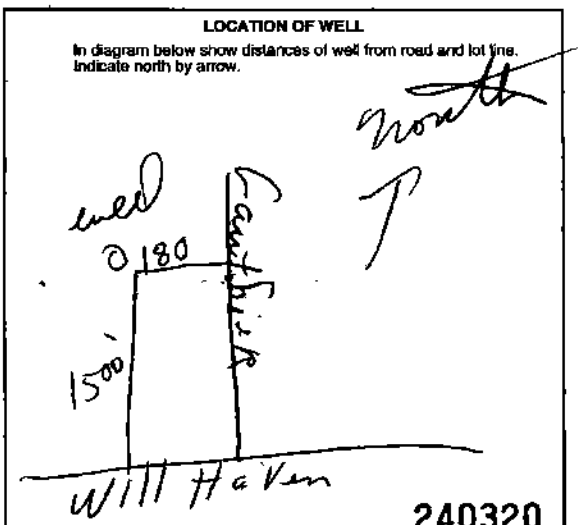
Static level	Water level end of pumping	Water levels during: 1 Pumping 2 Recovery			
120 feet	420 feet	15 minutes 375 feet	30 minutes 360 feet	45 minutes 340 feet	60 minutes 315 feet

If flowing give rate: GPM — Pump intake set at: feet — Water at end of test: ☐ Clear ☐ Cloudy

Recommended pump type: ☐ Shallow ☐ Deep — Recommended pump setting: 410 feet — Recommended pump rate: 1 GPM

LOCATION OF WELL

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



240320

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: Gilles Bourgeois — Well Contractor's Licence No.: 1414
Address: 5th Line of Cumberland
Name of Well Technician: Alain Bourgeois — Well Technician's Licence No.: 02710
Signature of Technician/Contractor: [signature] — Submission date: 23 08 02 (day month year)

MINISTRY USE ONLY — Data source — Contractor: 1414 — Date received: SEP 13 2002
Date of inspection — Inspector
Remarks: CSS.ES2

2 - MINISTRY OF THE ENVIRONMENT COPY

0506 (07/00) Front Form 9

The Ontario Water Resources Commission Act

WATER WELL RECORD

3166

Water management in Ontario

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

11 | 1512033 | MUNICIP. | CON.

COUNTY OR DISTRICT: Carleton
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Cumberland
CON., BLOCK, TRACT, SURVEY, ETC: 7
LOT: 25
ADDRESS OF WELL LOCATION: [redacted] 889 Elliott Dr. Ottawa
DATE COMPLETED: DAY 29 MO 08 YR 72

21 | UTM ZONE 18 | EASTING 445420 | NORTHING 5038170 | RC | ELEVATION 0220 | RC | BASIN CODE 04

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
Grey	limestones		broken	0	7
Grey	limestones		sand & sand	7	90
Blue	limestones		" "	90	290

31 | 00902/1ST | 02903/1ST

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0090	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
0225	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
0286	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
5	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	0022
05	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		22	0290
	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: 1 ☐ PUMP 2 ☒ BAILER
PUMPING RATE: 0005 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	070 FEET	050 FEET	070 FEET	070 FEET	070 FEET

1 ☒ PUMPING 2 ☐ RECOVERY

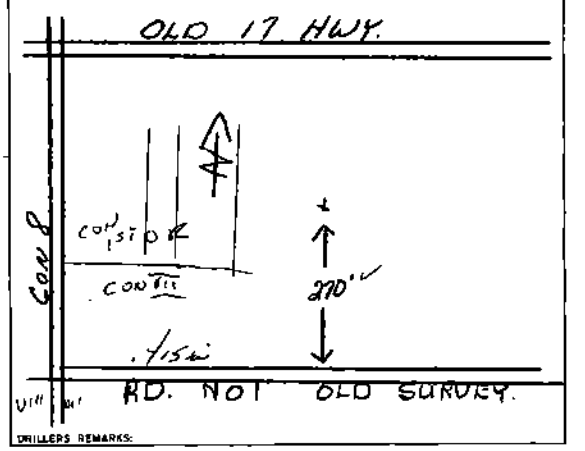
IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 100 FEET
RECOMMENDED PUMPING RATE: 0004 GPM

0200 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: CAPITAL WATER SUPPLY LTD | LICENCE NUMBER: 1558
ADDRESS: BOX 490 STITTSVILLE ONT.
NAME OF DRILLER OR BORER: E. MAURICE | LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: Walter Kavanagh | SUBMISSION DATE: DAY 30 MO 8 YR 72

OWRC COPY

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1558 | DATE RECEIVED: 041072
DATE OF INSPECTION | INSPECTOR
REMARKS:
PK
WI

The Ontario Water Resources Commission Act

WATER WELL RECORD

1467 3164W

Water management in Ontario 1. PRINT ONLY IN SPACES PROVIDED 2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 1512515 | MUNICIP. 15011 | CON. 06 | 01

COUNTY OR DISTRICT: RUSSELL CARLETON | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: CUMBERLAND | CON., BLOCK, TRACT, SURVEY, ETC.: I OF OR | LOT: 23 22

ADDRESS: [redacted]

DATE COMPLETED: DAY 02 MO 08 YR 72

21 | ZONE 18 | EASTING 465280 | NORTHING 5038760 | RC. 4 | ELEVATION 0325 | RC 6 | BASIN CODE 25

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
RED	SAND	FILL		0	5
GREY	LIMESTONE			5	240

31 | 0005128011 | 0240215T

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0190	☒ 1 FRESH ☐ 3 SULPHUR ☐ 2 SALTY ☐ 4 MINERAL
0210	☒ 1 FRESH ☐ 3 SULPHUR ☐ 2 SALTY ☐ 4 MINERAL
0240	☒ 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	TO
06 6¼	☒ 1 STEEL ☐ 2 GALVANIZED ☐ 3 CONCRETE ☐ 4 OPEN HOLE	188	0	0021
	☐ 1 STEEL ☐ 2 GALVANIZED ☐ 3 CONCRETE ☒ 4 OPEN HOLE			0240
	☐ 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 0010 GPM. | DURATION OF PUMPING 02 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
015 FEET	050 FEET	025 FEET	035 FEET	045 FEET	050 FEET

WATER LEVELS DURING ☒ 1 PUMPING ☐ 2 RECOVERY

IF FLOWING, GIVE RATE | PUMP INTAKE SET AT 75 FEET | WATER AT END OF TEST ☒ 1 CLEAR ☐ 2 CLOUDY

RECOMMENDED PUMP TYPE ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING 100 FEET | RECOMMENDED PUMPING RATE 0008 GPM.

0002 SPECIFIC CAPACITY

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 07

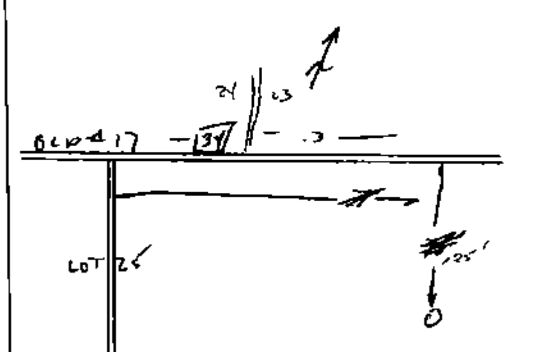
☐ 1 DOMESTIC ☐ 2 STOCK ☐ 3 IRRIGATION ☐ 4 INDUSTRIAL ☐ OTHER Trailer Camp ☐ 5 COMMERCIAL ☐ 6 MUNICIPAL ☒ 7 PUBLIC SUPPLY ☐ 8 COOLING OR AIR CONDITIONING ☐ 9 NOT USED

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

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



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: [signature] | LICENCE NUMBER

ADDRESS: 1110 FISHER AVE OTTAWA

NAME OF DRILLER OR BORER: F. FLEURY | LICENCE NUMBER

SIGNATURE OF CONTRACTOR: [signature] | SUBMISSION DATE DAY MO. YR.

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 3701 | DATE RECEIVED 101172

DATE OF INSPECTION | INSPECTOR K

REMARKS | P K | WI

OWRC COPY

3164W

1470

The Ontario Water Resources Commission Act

WATER WELL RECORD

Water management in Ontario 1. PRINT ONLY IN SPACES PROVIDED 2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 1512516 | 15011 | OF | 91

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
~~RUSSELL~~ CARLETON	CUMBERLAND	OF ~~1ST FROM OTT. R.~~	022

[redacted]

ADDRESS

DATE COMPLETED: DAY 08 MO 08 YR 72

21 | ZONE 18 | EASTING 465400 | NORTHING 5038820 | RC 4 | ELEVATION 0325t | RC 6 | BASIN CODE 25

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH — FEET FROM	TO
RED	SAND	FILL		0	4
GREY	LIMESTONE			4	100

31 | 0004728011 | 0100215

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0080	☒ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERAL
0095	☒ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERAL
	☐ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERAL
	☐ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERAL
	☐ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH — FEET FROM	TO
06	☒ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	188	0	0018
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ 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: ☐ PUMP ☒ BAILER

PUMPING RATE: 0010 GPM

DURATION OF PUMPING: 02 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
010 FEET	020 FEET	013 FEET	016 FEET	020 FEET	020 FEET

WATER LEVELS DURING: ☒ PUMPING ☐ RECOVERY

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: 30 FEET

WATER AT END OF TEST: ☒ CLEAR ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

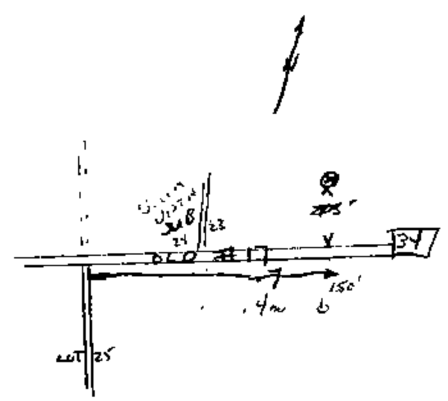
RECOMMENDED PUMP SETTING: 075 FEET

RECOMMENDED PUMPING RATE: 0006 GPM

001.0 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: ☒ WATER SUPPLY ☐ OBSERVATION WELL ☐ TEST HOLE ☐ RECHARGE WELL ☐ ABANDONED, INSUFFICIENT SUPPLY ☐ ABANDONED, POOR QUALITY ☐ UNFINISHED

WATER USE 01: ☒ DOMESTIC ☐ STOCK ☐ IRRIGATION ☐ INDUSTRIAL ☐ OTHER ☐ COMMERCIAL ☐ MUNICIPAL ☐ PUBLIC SUPPLY ☐ COOLING OR AIR CONDITIONING ☐ NOT USED

METHOD OF DRILLING: ☒ CABLE TOOL ☐ ROTARY (CONVENTIONAL) ☐ ROTARY (REVERSE) ☐ ROTARY (AIR) ☐ AIR PERCUSSION ☐ BORING ☐ DIAMOND ☐ JETTING ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: W. MOLOUGHNEY | LICENCE NUMBER

ADDRESS: 1110 FISHER AVE OTTAWA

NAME OF DRILLER OR BORER: F. FLEURY | LICENCE NUMBER

SIGNATURE OF CONTRACTOR: [signature] | SUBMISSION DATE: DAY 8 MO. 8 YR 72

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 3701 | DATE RECEIVED: 101172

DATE OF INSPECTION | INSPECTOR: K

REMARKS: | P | WI

OWRC COPY

CO 31 G/6e

UTM 1 8 z 4 6 5 7 8 2 E 1512685 56 № 462

5 R 5 0 3 7 6 9 2 N

The Ontario Water Resources Commission Act

Elev. 6 R 0 3 4 0

WATER WELL RECORD

Basin 25 County or District Russell Township, Village, Town or City Cumberland

Con. 7 Lot C Date completed 28 (day) July (month) 1966 (year)

Owner [redacted] Address R.R. 1 - Cumberland, Ont.

Casing and Screen Record		Pumping Test	
Inside diameter of casing	6 3/16	Static level	70
Total length of casing	13	Test-pumping rate	125 GPH
Type of screen	-	Pumping level	90
Length of screen	-	Duration of test pumping	1 hr.
Depth to top of screen	-	Water clear or cloudy at end of test	clear
Diameter of finished hole	6	Recommended pumping rate	125 GPH
		with pump setting of	120 feet below ground surface

Well Log: Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
Limestone	0	160	90	fresh

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

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

Drilling or Boring Firm J.B. DUFRESNE & CO. LIMITED

Address 1014 Maitland Ave., Ottawa 5, Ont.

Licence Number 2030

Name of Driller or Borer R. Laniel

Address 6 Bellevue - Lucerne, Que.

Date July 28th 1966

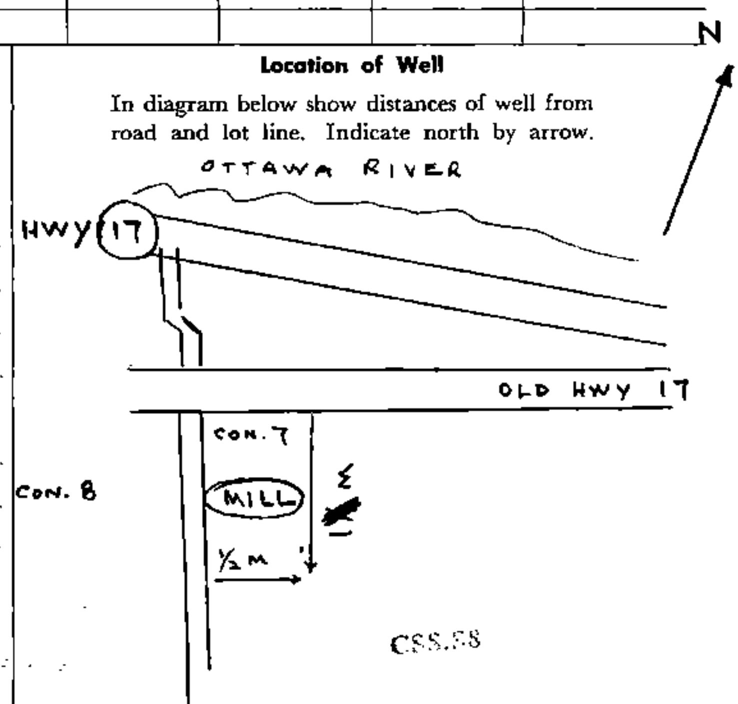
(Signature of Licensed Drilling or Boring Contractor)
for J.B. Dufresne & Co. Limited

Form 7 15M-60-4138

OWRC COPY

Location of Well

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



CSS.58

UTM 1 8 Z 4 6 6 2 4 1 0 E

5 R 5 0 1 8 7 6 0 N

Elev. 6 R 0 3 0 0

Basin 2 5

1513097 56 № 327

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District Russell (O.F. Con I Lot 22 34G/11W) Township, Village, Town or City Cumberland

Con. ~~1st. Con. from OrrawaRLot 23~~ Date completed 20 January 1966 (day) (month) (year)

Owner [redacted] (print in block letters) Address 4102 Lakewood, Detroit 1?, Michigan, U.S.A.

Casing and Screen Record		Pumping Test	
Inside diameter of casing	5"	Static level	35'
Total length of casing	25'	Test-pumping rate	6 G.P.M.
Type of screen		Pumping level	50'
Length of screen		Duration of test pumping	3 hrs.
Depth to top of screen		Water clear or cloudy at end of test	clear
Diameter of finished hole	5"	Recommended pumping rate	6 G.P.M.
		with pump setting of	75 feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
clay & loose rock	0	4		
loose rock ~~rock & limestone~~	4	10		
grey limestone	10	112	112	fresh

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

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

Drilling or Boring Firm G.Charbonneau, Cable & Diamond Drilling

Address R.R. # 1, Box 194, Orleans, Ont.

Licence Number 2156

Name of Driller or Borer G.Charbonneau

Address R.R. # 1, Orleans, Ont.

Date 20 January 1966.

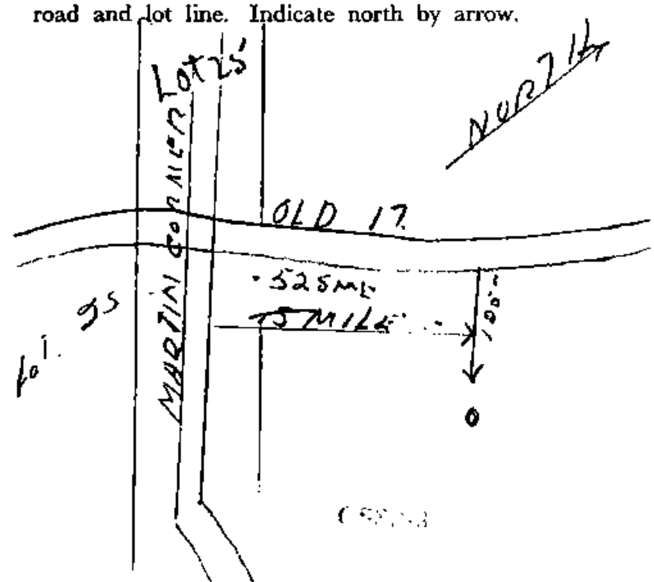
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

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



APPENDIX 3

- SOIL LABORATORY TEST RESULTS
- WATER LABORATORY TEST RESULTS
  - Water Samples from Test Wells

REPORT OF ANALYSIS

Exova Accutest

Client: Paterson Group
28 Concourse Gate, Unit 1
Nepean, ON
K2E 7T7
Attention: Mr. Robert Passmore

Report Number: 2929721
Date: 2009-12-07
Date Submitted: 2009-12-04

Project: PH1236

INVOICE: Paterson Group Inc.
Chain of Custody Number: 11723

P.O. Number:
Matrix: Water

			LAB ID:	764880	764881				GUIDELINE		
			Sample Date:	2009-12-03	2009-12-03						
			Sample ID:	TW1 WS1	TW1 WS2				ODWSOG		
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Total Coliforms	CFU/100mL			0	60				MAC	0	CFU/100mL
Escherichia Coli	CFU/100mL			0	0				MAC	0	CFU/100mL
Heterotrophic Plate Count	CFU/1mL			135	291						
Faecal Coliforms	CFU/100mL			0	0						
Faecal Streptococcus	CFU/100mL			2	11						

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration
Comment:

APPROVAL:
Dragana Dzelelovic
Microbiology Analyst

REPORT OF ANALYSIS

Exova Accutest

Client: Paterson Group
28 Concourse Gate, Unit 1
Nepean, ON
K2E 7T7
Attention: Mr. Robert Passmore

Report Number: 2929698
Date: 2009-12-08
Date Submitted: 2009-12-04

Project: PH1236

INVOICE: Paterson Group Inc.
Chain of Custody Number: 11723

P.O. Number: 7873
Matrix: Water

			LAB ID:	764828	764829				GUIDELINE		
			Sample Date:	2009-12-03	2009-12-03						
			Sample ID:	TW1 WS1	TW1 WS2				ODWSOG		
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Alkalinity as CaCO3	mg/L	5		408	403				OG	500	mg/L
Chloride	mg/L	1		718	666				AO	250	mg/L
Colour	TCU	2		<2	<2				AO	5	TCU
Conductivity	uS/cm	5		3200	3040						
Dissolved Organic Carbon	mg/L	0.5		1.7	1.5				AO	5	mg/L
Fluoride	mg/L	0.1		0.12	0.16				MAC	1.5	mg/L
Hydrogen Sulphide	mg/L	0.1		<0.1	<0.1				AO	0.05	mg/L
N-NH3 (Ammonia)	mg/L	0.02		0.13	0.14						
N-NO2 (Nitrite)	mg/L	0.1		<0.10	<0.10				MAC	1.0	mg/L
N-NO3 (Nitrate)	mg/L	0.1		0.41	0.42				MAC	10.0	mg/L
pH				7.81	7.85					6.5-8.5	
Phenols	mg/L	0.001		<0.001	<0.001						
Sulphate	mg/L	1		121	117				AO	500	mg/L
Tannin & Lignin	mg/L	0.1		0.1	0.3						
Total Dissolved Solids (COND - CALC)	mg/L	5		2080	1980				AO	500	mg/L
Total Kjeldahl Nitrogen	mg/L	0.1		0.39	0.23						
Turbidity	NTU	0.1		81.7	15.4				MAC	1.0	NTU
Hardness as CaCO3	mg/L	1		808	662				OG	100	mg/L
Ion Balance		0.01		1.06	1.08						
Calcium	mg/L	1		246	199						
Magnesium	mg/L	1		47	40						
Potassium	mg/L	1		5	5						
Sodium	mg/L	2		362	418				AO	200	mg/L
Iron	mg/L	0.03		5.51	0.73				AO	0.3	mg/L
Manganese	mg/L	0.01		0.15	0.06				AO	0.05	mg/L

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:
H2S MRL elevated due to sample turbidity.

APPROVAL:
Ewan McRobbie
Inorganic Lab Supervisor

REPORT OF ANALYSIS

Exova Accutest

Client: Paterson Group
28 Concourse Gate, Unit 1
Nepean, ON
K2E 7T7
Attention: Mr. Robert Passmore

Report Number: 2929469
Date: 2009-12-03
Date Submitted: 2009-12-01

Project: PH1236

P.O. Number: 7873
Matrix: Water

INVOICE: Paterson Group Inc.
Chain of Custody Number: 108473

			LAB ID:	764211	764212				GUIDELINE		
			Sample Date:	2009-12-01	2009-12-01				ODWSOG		
			Sample ID:	TW2 WS1	TW2 WS2						
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Total Coliforms	CFU/100mL			0	0				MAC	0	CFU/100mL
Escherichia Coli	CFU/100mL			0	0				MAC	0	CFU/100mL
Heterotrophic Plate Count	CFU/1mL			>500	>500						
Faecal Coliforms	CFU/100mL			0	0						
Faecal Streptococcus	CFU/100mL			0	0						

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:
Krista Quantrill
Drinking Water Coordinator

Exova Accutest

Client: Paterson Group
28 Concourse Gate, Unit 1
Nepean, ON
K2E 7T7
Attention: Mr. Robert Pasamore

Report Number: 2929470
Date: 2009-12-08
Date Submitted: 2009-12-01
Project: PH1236

INVOICE: Paterson Group Inc.
Chain of Custody Number: 108473

P.O. Number: 7873
Matrix: Water

			LAB ID:	764213	764214				GUIDELINE		
			Sample Date:	2009-12-01	2009-12-01				ODWSOG		
			Sample ID:	TWS WS1	TW2 WS2						
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Alkalinity as CaCO3	mg/L	5		212	213				OG	500	mg/L
Chloride	mg/L	1		153	153				AO	250	mg/L
Colour	TCU	2		<2	<2				AO	5	TCU
Conductivity	uS/cm	5		1500	1480						
Dissolved Organic Carbon	mg/L	0.5		0.9	0.9				AO	5	mg/L
Fluoride	mg/L	0.1		1.94	1.96				MAC	1.5	mg/L
Hydrogen Sulphide	mg/L	0.01		<0.01	<0.01				AO	0.05	mg/L
N-NH3 (Ammonia)	mg/L	0.02		0.20	0.19						
N-NO2 (Nitrite)	mg/L	0.1		<0.10	<0.10				MAC	1.0	mg/L
N-NO3 (Nitrate)	mg/L	0.1		<0.10	<0.10				MAC	10.0	mg/L
pH				8.18	8.18					6.5-8.5	
Phenols	mg/L	0.001		<0.001	<0.001						
Sulphate	mg/L	1		295	287				AO	500	mg/L
Tannin & Lignin	mg/L	0.1		0.1	<0.1						
Total Dissolved Solids (COND - CALC)	mg/L	5		975	962				AO	500	mg/L
Total Kjeldahl Nitrogen	mg/L	0.1		0.24	0.23						
Turbidity	NTU	0.1		0.7	0.3				MAC	1.0	NTU
Hardness as CaCO3	mg/L	1		166	157				OG	100	mg/L
Ion Balance		0.01		1.03	1.01						
Calcium	mg/L	1		35	33						
Magnesium	mg/L	1		19	18						
Potassium	mg/L	1		5	5						
Sodium	mg/L	2		272	266				AO	200	mg/L
Iron	mg/L	0.03		<0.03	<0.03				AO	0.3	mg/L
Manganese	mg/L	0.01		<0.01	<0.01				AO	0.05	mg/L

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration
Comment:

APPROVAL:
Ewan McRobbie
Inorganic Lab Supervisor

REPORT OF ANALYSIS

Exova Accutest

Client: Paterson Group
28 Concourse Gate, Unit 1
Nepean, ON
K2E 7T7
Attention: Mr. Robert Passmore

Report Number: 2929599
Date: 2009-12-07
Date Submitted: 2009-12-03

Project: PH1236

P.O. Number: 7873
Matrix: Water

INVOICE: Paterson Group Inc.
Chain of Custody Number: 108474

								GUIDELINE		
	LAB ID:	764594	764595							
	Sample Date:	2009-12-02	2009-12-02							
	Sample ID:	TW3 WS1	TW3 WS2					ODWSOG		
PARAMETER	UNITS	MRL						TYPE	LIMIT	UNITS
Total Coliforms	CFU/100mL		11	0				MAC	0	CFU/100mL
Escherichia Coli	CFU/100mL		0	0				MAC	0	CFU/100mL
Heterotrophic Plate Count	CFU/1mL		181	11						
Faecal Coliforms	CFU/100mL		0	0						
Faecal Streptococcus	CFU/100mL		2	0						

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:
Dragana Dzeletovic
Microbiology Analyst

Client: Paterson Group
28 Concourse Gate, Unit 1
Nepean, ON
K2E 7T7
Attention: Mr. Robert Passmore

Report Number: 2929600
Date: 2009-12-07
Date Submitted: 2009-12-03

Project: PH1236

P.O. Number:
Matrix: Water

INVOICE: Paterson Group Inc.
Chain of Custody Number: 108474

			LAB ID:	764596	764597				GUIDELINE		
			Sample Date:	2009-12-02	2009-12-02				ODWSOG		
			Sample ID:	TW3 WS1	TW3 WS2						
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Alkalinity as CaCO3	mg/L	5		244	244				OG	500	mg/L
Chloride	mg/L	1		304	305				AO	250	mg/L
Colour	TCU	2		10	5				AO	5	TCU
Conductivity	uS/cm	5		2730	2780						
Dissolved Organic Carbon	mg/L	0.5		1.7	1.6				AO	5	mg/L
Fluoride	mg/L	0.1		0.61	0.63				MAC	1.5	mg/L
Hydrogen Sulphide	mg/L	0.01		<0.1	<0.01				AO	0.05	mg/L
N-NH3 (Ammonia)	mg/L	0.02		0.46	0.46						
N-NO2 (Nitrite)	mg/L	0.1		<0.10	<0.10				MAC	1.0	mg/L
N-NO3 (Nitrate)	mg/L	0.1		<0.10	<0.10				MAC	10.0	mg/L
pH				7.88	7.93					6.5-8.5	
Phenols	mg/L	0.001		<0.001	<0.001						
Sulphate	mg/L	1		768	784				AO	500	mg/L
Tannin & Lignin	mg/L	0.1		0.2	0.4						
Total Dissolved Solids (COND - CALC)	mg/L	5		2180	2220				AO	500	mg/L
Total Kjeldahl Nitrogen	mg/L	0.1		0.58	0.64						
Turbidity	NTU	0.1		19.4	1.3				MAC	1.0	NTU
Hardness as CaCO3	mg/L	1		687	691				OG	100	mg/L
Ion Balance		0.01		0.98	0.97						
Calcium	mg/L	1		173	173						
Magnesium	mg/L	1		62	63						
Potassium	mg/L	1		8	8						
Sodium	mg/L	2		345	340				AO	200	mg/L
Iron	mg/L	0.03		1.55	0.06				AO	0.3	mg/L
Manganese	mg/L	0.01		0.04	0.03				AO	0.05	mg/L

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:
764596: H2S MRL elevated due to sample turbidity.

APPROVAL:
Ewan McRobbie
Inorganic Lab Supervisor

EXOVA ACCUTEST

REPORT OF ANALYSIS

Exova Accutest

Client: **Paterson Group**
28 Concourse Gate, Unit 1
Nepean, ON
K2E 7T7
Attention: **Mr. Robert Pasamore**

INVOICE: Paterson Group Inc.
Chain of Custody Number: 105473

Report Number: 2930081
Date: 2009-12-09
Date Submitted: 2009-12-08

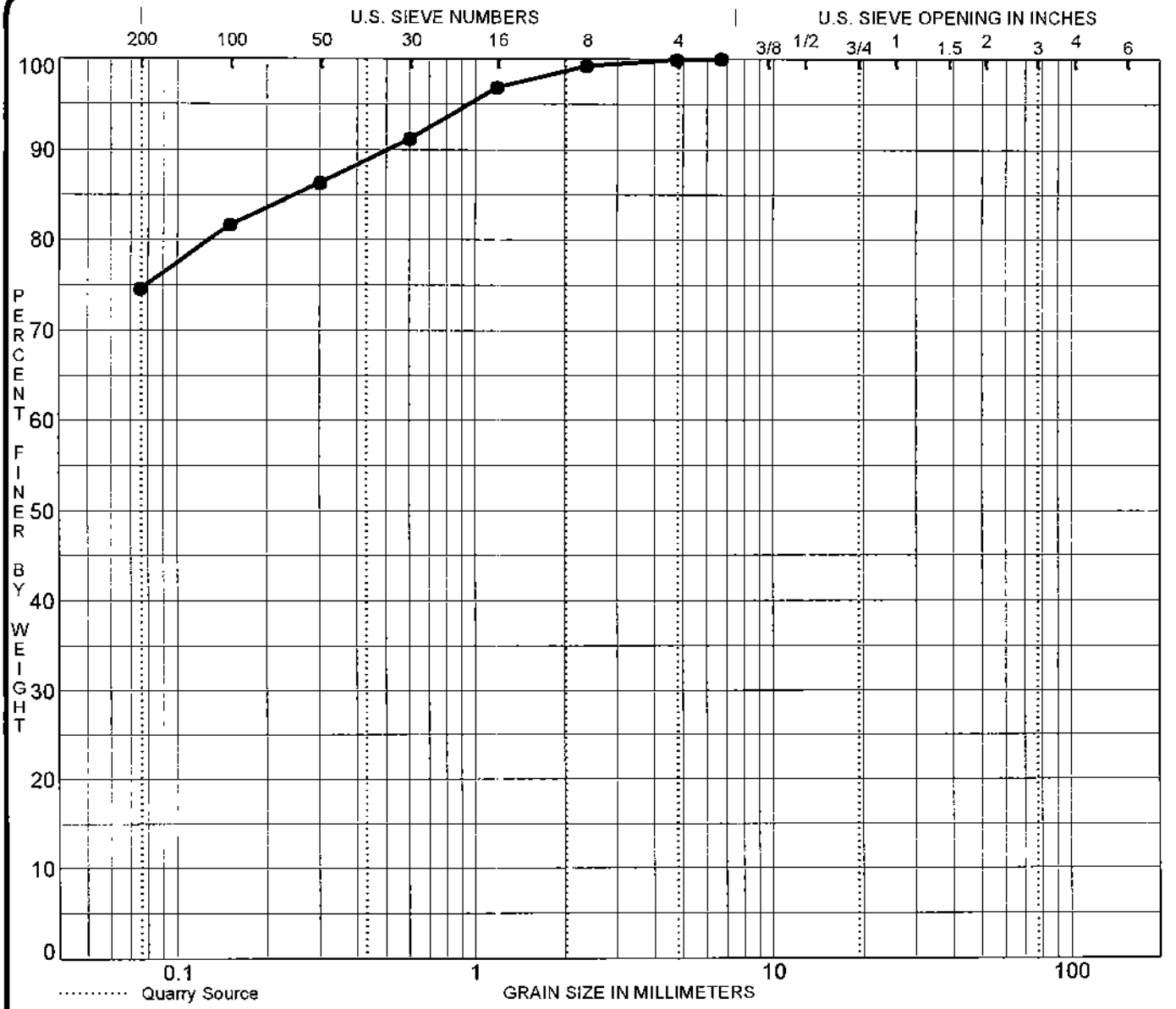
Project: PH1236

P.O. Number: 7875
Matrix: Water

			LAB ID:	765939	765940				GUIDELINE		
			Sample Date:	2009-12-08	2009-12-08						
			Sample ID:	HW WS1	HW WS2				ODWSOG		
PARAMETER	**UNITS**	**MRL**							**TYPE**	**LIMIT**	**UNITS**
Alkalinity as CaCO3	mg/L	5		257	258				OG	500	mg/L
Chloride	mg/L	1		24	25				AO	250	mg/L
Colour	TCU	2		7	<2				AO	5	TCU
Conductivity	uS/cm	5		580	587						
Dissolved Organic Carbon	mg/L	0.5		1.6	1.3				AO	5	mg/L
Fluoride	mg/L	0.1		0.11	0.11				MAC	1.5	mg/L
Hydrogen Sulphide	mg/L	0.01		0.06	0.01				AO	0.05	mg/L
N-NH3 (Ammonia)	mg/L	0.02		<0.02	0.06						
N-NO2 (Nitrite)	mg/L	0.1		<0.10	<0.10				MAC	1.0	mg/L
N-NO3 (Nitrate)	mg/L	0.1		<0.10	<0.10				MAC	10.0	mg/L
pH				7.74	7.76					6.5-8.5	
Phenols	mg/L	0.001		<0.001	<0.001						
Sulphate	mg/L	1		19	20				AO	500	mg/L
Tannin & Lignin	mg/L	0.1		<0.1	<0.1						
Total Dissolved Solids (COND - CALC)	mg/L	5		377	382				AO	500	mg/L
Total Kjeldahl Nitrogen	mg/L	0.1		<0.10	<0.10						
Turbidity	NTU	0.1		15.1	6.7				MAC	1.0	NTU
Hardness as CaCO3	mg/L	1		274	277				OG	100	mg/L
Ion Balance		0.01		0.92	0.92						
Calcium	mg/L	1		90	91						
Magnesium	mg/L	1		12	12						
Potassium	mg/L	1		2	2						
Sodium	mg/L	2		4	4				AO	200	mg/L
Iron	mg/L	0.03		0.76	0.50				AO	0.3	mg/L
Manganese	mg/L	0.01		0.04	0.04				AO	0.05	mg/L

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration
Comment:

APPROVAL:
Ewan McRobbie
Inorganic Lab Supervisor



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	TP 2-09 G1	SILTY CLAY						
⊠								
▲								
★								

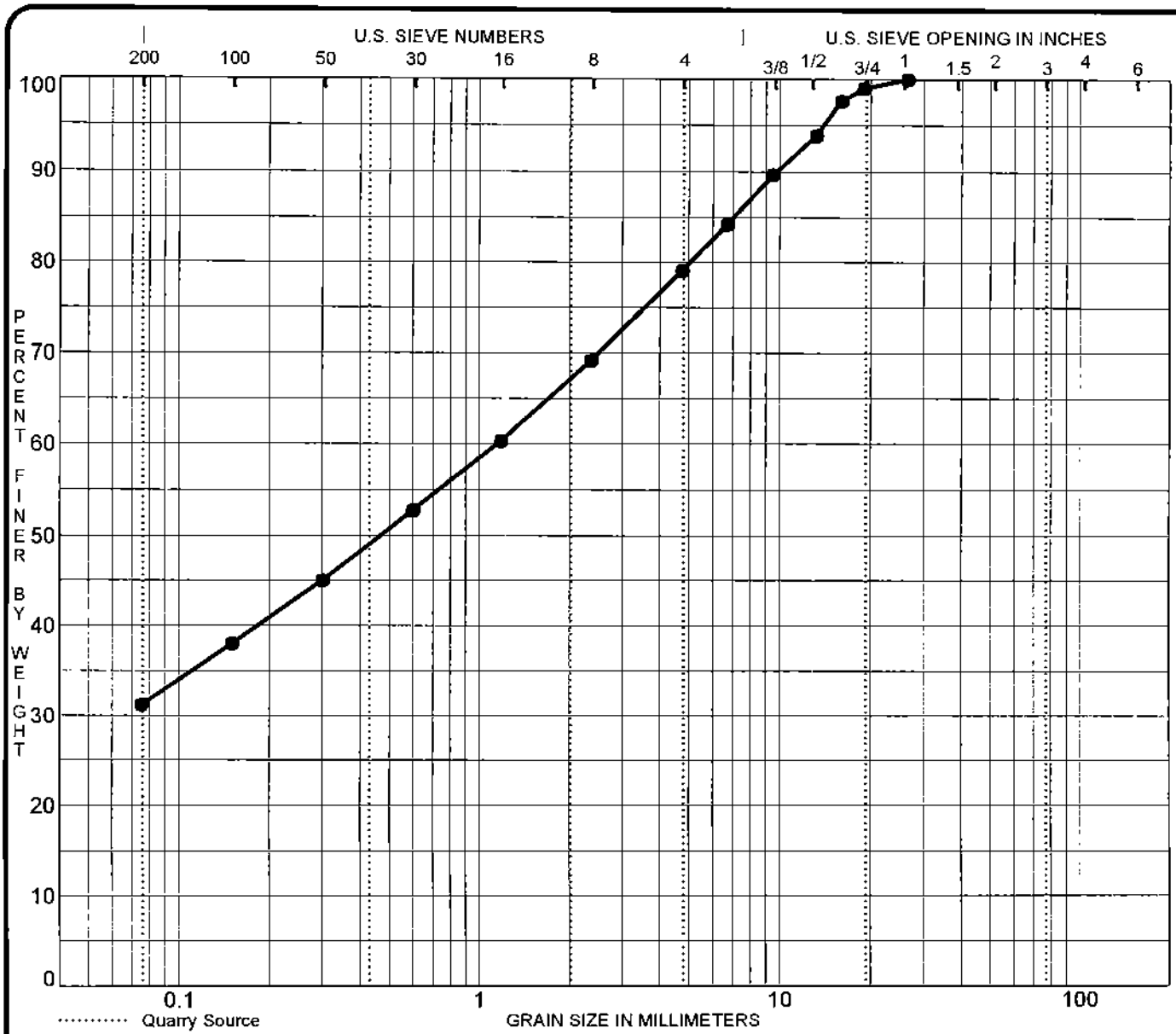
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP 2-09 G1	6.70				0.1	25.3	74.6	
⊠									
▲									
★									

CLIENT **2183144 Ontario Limited** FILE NO. **PH1236**

PROJECT **Terrain Analysis & Hydrogeological Study - 1730 Wilhaven Drive** DATE **3 Dec 09**

patersongroup Consulting Engineers
28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION



	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	TP 6-09	G3	GLACIAL TILL (MARINE)						
⊠									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP 6-09	G3	26.50	1.15			20.9	47.9	31.2	
⊠										
▲										
★										

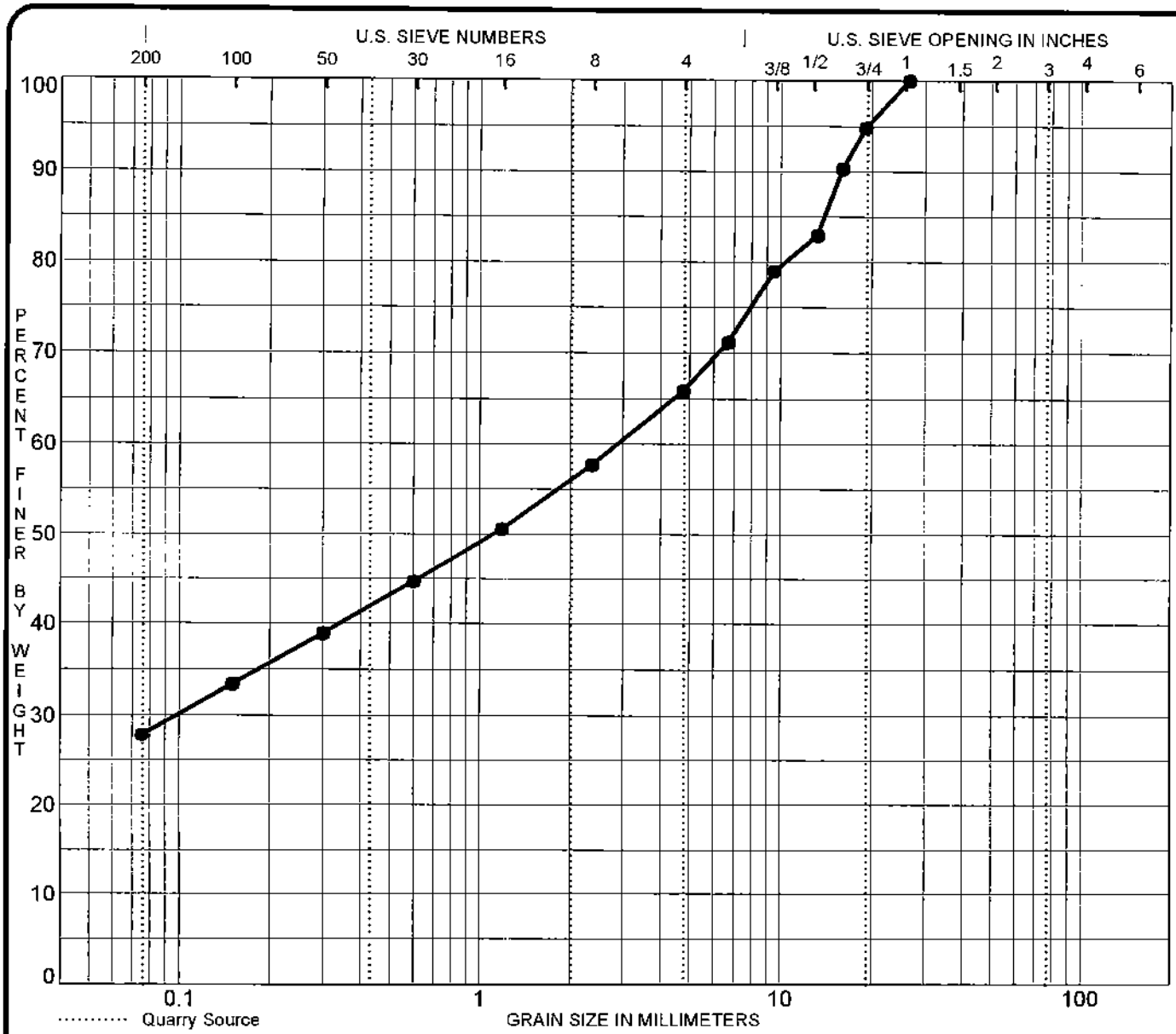
CLIENT **2183144 Ontario Inc.** FILE NO. **PH1236**

PROJECT **Terrain Analysis & Hydrogeological Study - 1730 Wilhaven Drive** DATE **3 Dec 09**

patersongroup Consulting Engineers

28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	TP 7-09 G1	GLACIAL TILL (MARINE)						
⊠								
▲								
★								

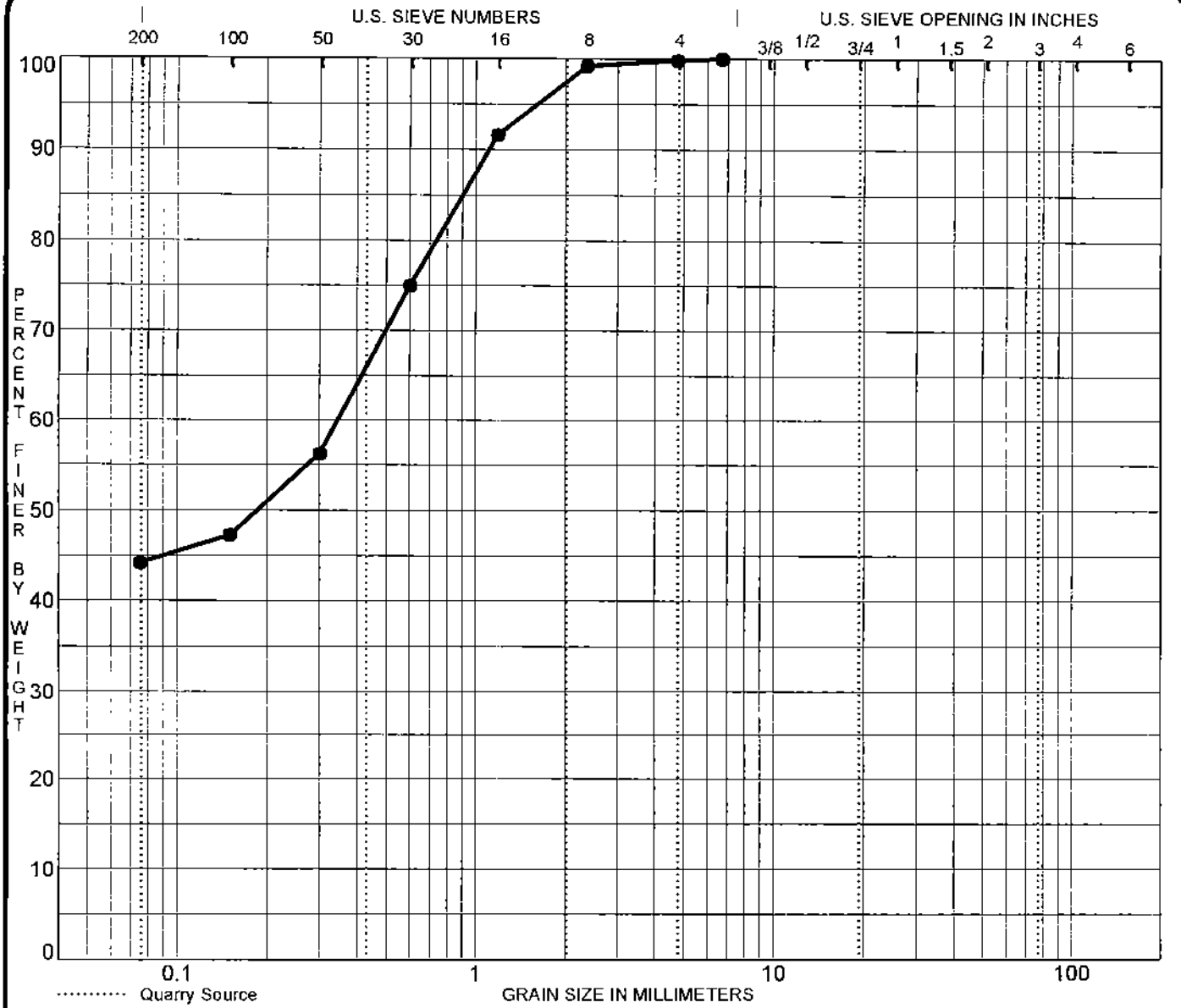
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP 7-09 G1	26.50	2.87	0.098		34.1	38.1	27.8	
⊠									
▲									
★									

CLIENT **2183144 Ontario Limited** FILE NO. **PH1236**

PROJECT **Terrain Analysis & Hydrogeological Study - 1730 Wilhaven Drive** DATE **3 Dec 09**

patersongroup Consulting Engineers
28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
● TP 9-09	G1	SANDY CLAYEY SILT						
■								
▲								
★								

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP 9-09	G1	6.70	0.35			0.2	55.6	44.2	
■									
▲									
★									

CLIENT **2183144 Ontario Limited** FILE NO. **PH1236**

PROJECT **Terrain Analysis & Hydrogeological Study - 1730 Wilhaven Drive** DATE **3 Dec 09**

patersongroup Consulting Engineers
28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

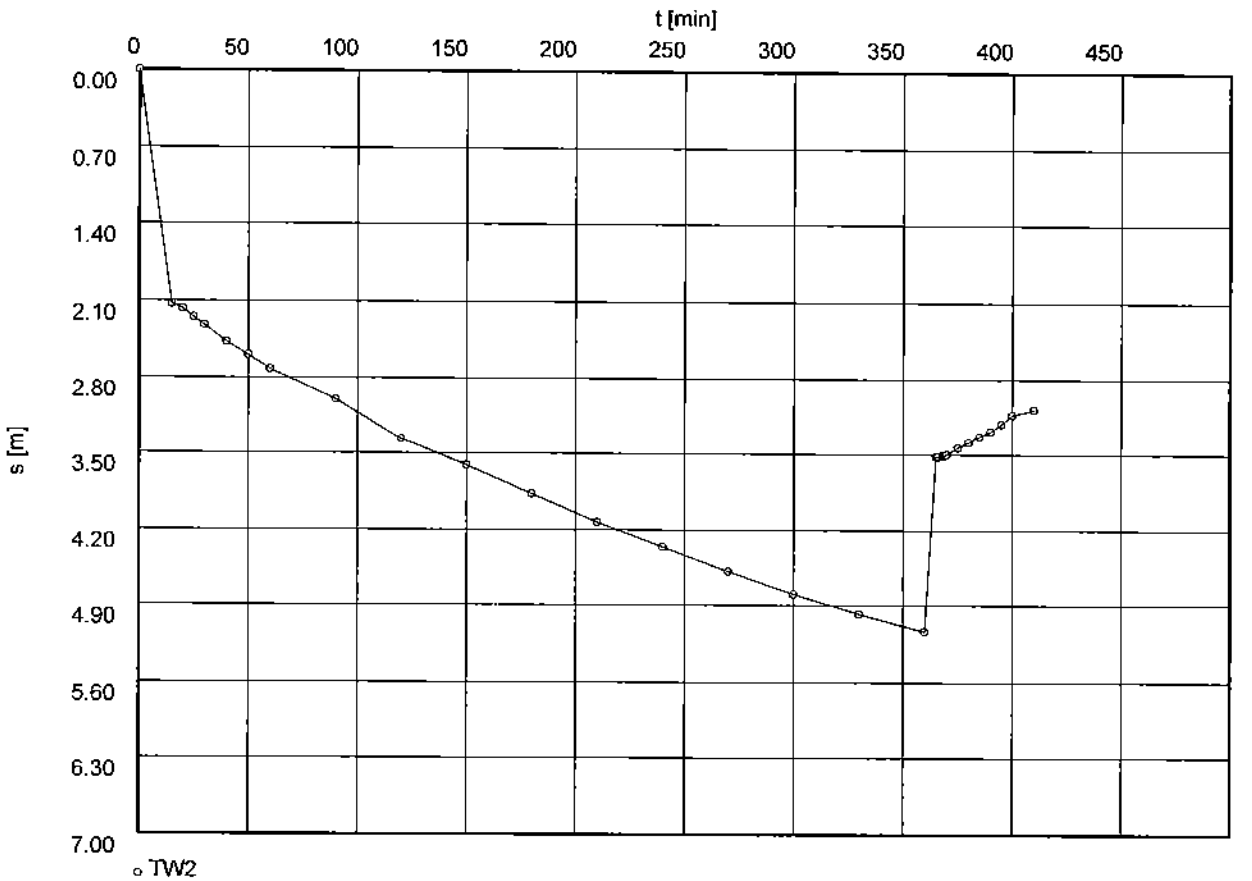
GRAIN SIZE DISTRIBUTION

APPENDIX 4

- AQUIFER ANALYSIS DATA FOR TEST WELLS

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo, Ontario, Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot	Date: 07.12.2009	None, Page 1
		Project: PH1236	
		Evaluated by: RAP	

Pumping Test No. 1	Test conducted on: Dec.3, 2009
TW2	
Discharge 0.32 l/s	



Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot	Date: 07.12.2009	None, Page 2
		Project: PH1236	
		Evaluated by: RAP	

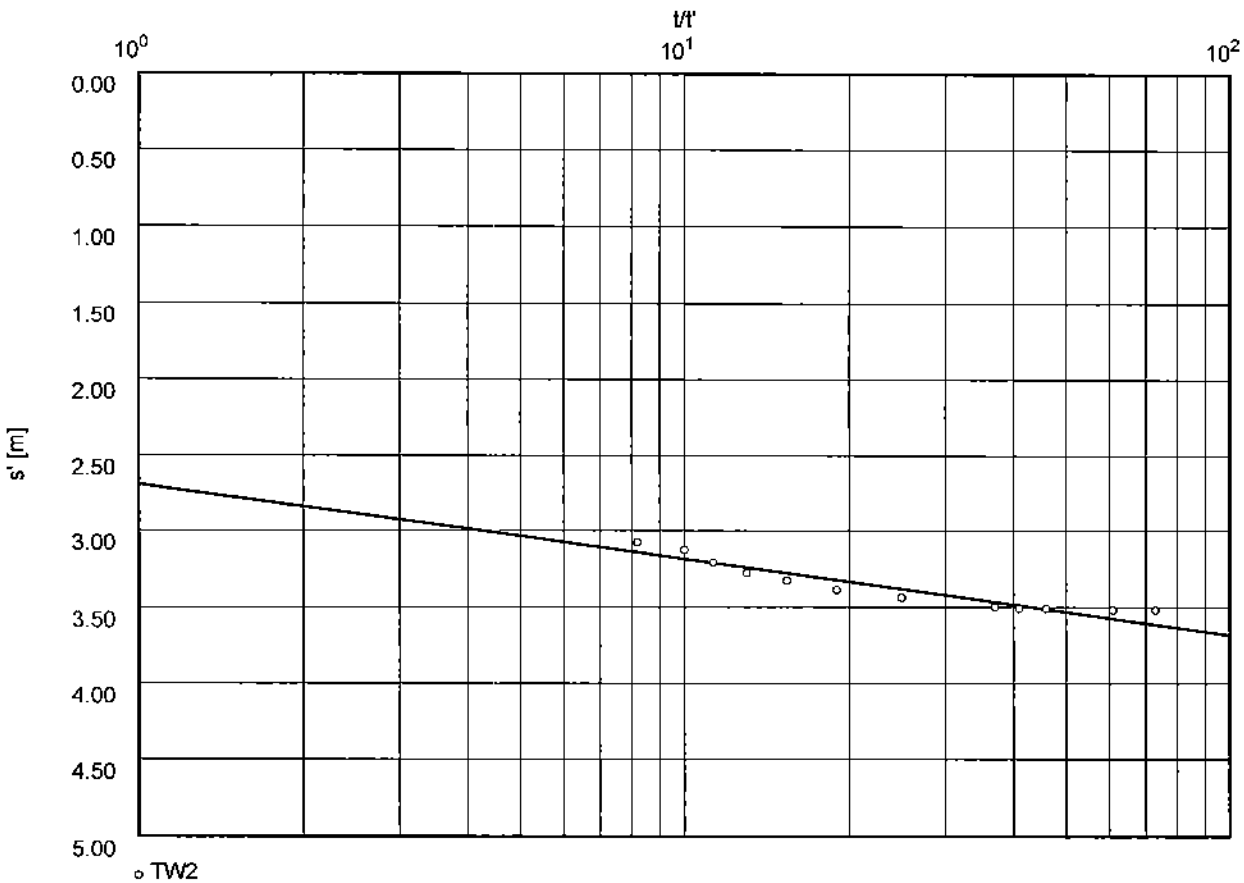
Pumping Test No. 1	Test conducted on: Dec.3, 2009
TW2	TW2
Discharge 0.32 l/s	

Static water level: 52.070 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
1	0.00	52.070	0.000	
2	15.00	54.200	2.130	
3	20.00	54.240	2.170	
4	25.00	54.320	2.250	
5	30.00	54.390	2.320	
6	40.00	54.540	2.470	
7	50.00	54.660	2.590	
8	60.00	54.790	2.720	
9	90.00	55.070	3.000	
10	120.00	55.440	3.370	
11	150.00	55.680	3.610	
12	180.00	55.940	3.870	
13	210.00	56.200	4.130	
14	240.00	56.430	4.360	
15	270.00	56.660	4.590	
16	300.00	56.870	4.800	
17	330.00	57.050	4.980	
18	360.00	57.210	5.140	
19	365.00	55.590	3.520	
20	366.00	55.590	3.520	
21	368.00	55.580	3.510	
22	369.00	55.580	3.510	
23	370.00	55.570	3.500	
24	375.00	55.510	3.440	
25	380.00	55.460	3.390	
26	385.00	55.400	3.330	
27	390.00	55.350	3.280	
28	395.00	55.280	3.210	
29	400.00	55.200	3.130	
30	410.00	55.150	3.080	

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Date: 07.12.2009	None, Page 1
		Project: PH1236	
		Evaluated by: RAP	

Pumping Test No. 1	Test conducted on: Dec.3, 2009
TW2	
Discharge 0.32 l/s	
	Pumping test duration: 360.00 min



Transmissivity [m²/min]: 7.09×10^{-3}

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Dale: 07.12.2009	None, Page 2
		Project: PH1236	
		Evaluated by: RAP	

Pumping Test No. 1	Test conducted on: Dec.3, 2009
TW2	TW2
Discharge 0.32 l/s	

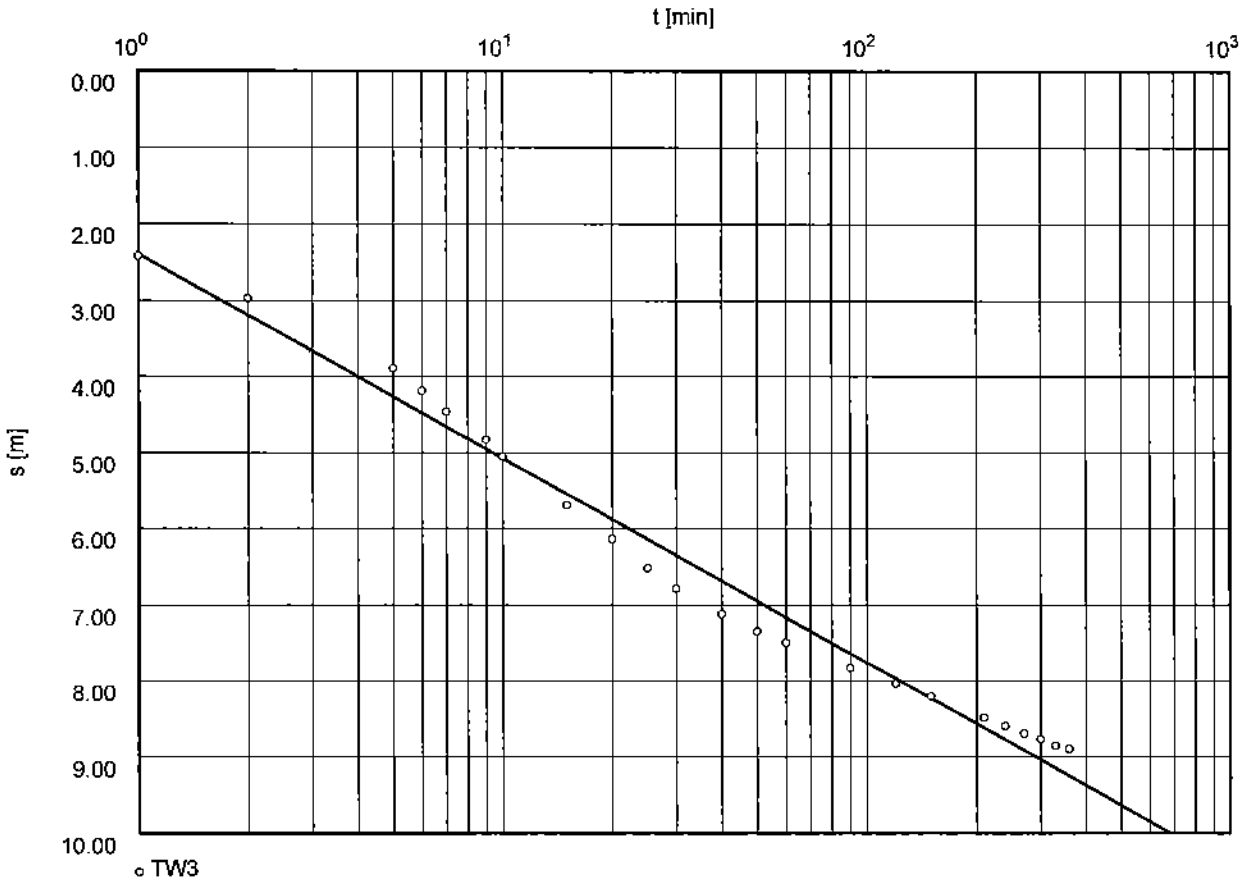
Static water level: 52.070 m below datum

Pumping test duration: 360.00 min

	Time from end of pumping [min]	Water level [m]	Residual drawdown [m]	
1	5.00	55.590	3.520	
2	6.00	55.590	3.520	
3	8.00	55.580	3.510	
4	9.00	55.580	3.510	
5	10.00	55.570	3.500	
6	15.00	55.510	3.440	
7	20.00	55.460	3.390	
8	25.00	55.400	3.330	
9	30.00	55.350	3.280	
10	35.00	55.280	3.210	
11	40.00	55.200	3.130	
12	50.00	55.150	3.080	

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 08.12.2009	none, Page 1
		Project: PH1236	
		Evaluated by: RAP	

Pumping Test No. 1	Test conducted on: Dec. 2, 2009
TW3	
Discharge 0.25 l/s	



Transmissivity [m²/min]: 1.02×10^{-3}

Storativity: 2.97×10^{-4}

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 08.12.2009	none, Page 2
		Project: PH1236	
		Evaluated by: RAP	

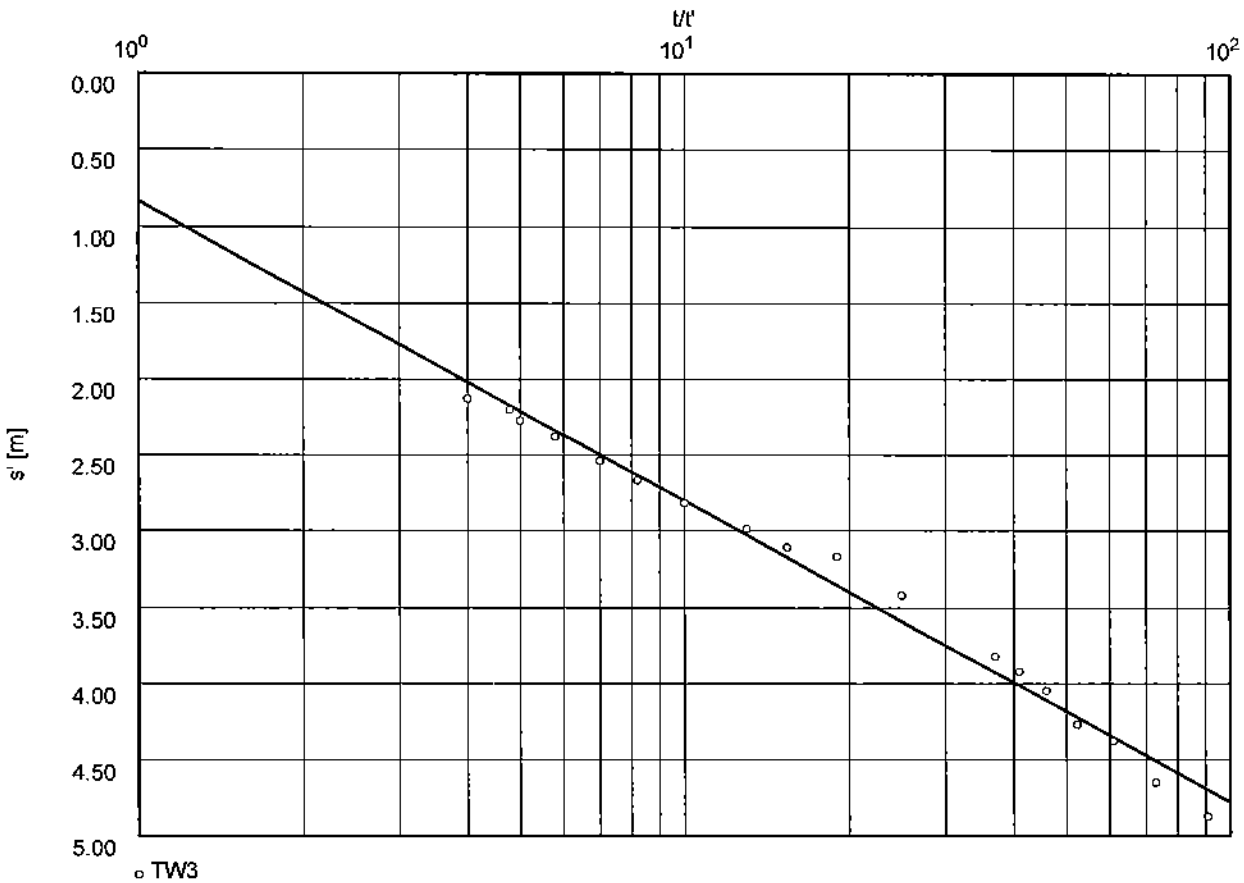
Pumping Test No. 1	Test conducted on: Dec. 2, 2009
TW3	TW3
Discharge 0.25 l/s	Distance from the pumping well 1.000 m

Static water level: 53.630 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
2	1.00	56.050	2.420	
3	2.00	56.600	2.970	
4	5.00	57.530	3.900	
5	6.00	57.820	4.190	
6	7.00	58.090	4.460	
7	9.00	58.460	4.830	
8	10.00	58.680	5.050	
9	15.00	59.330	5.700	
10	20.00	59.770	6.140	
11	25.00	60.150	6.520	
12	30.00	60.420	6.790	
13	40.00	60.750	7.120	
14	50.00	60.970	7.340	
15	60.00	61.120	7.490	
16	90.00	61.460	7.830	
17	120.00	61.670	8.040	
18	150.00	61.840	8.210	
19	210.00	62.120	8.490	
20	240.00	62.230	8.600	
21	270.00	62.330	8.700	
22	300.00	62.400	8.770	
23	330.00	62.490	8.860	
24	360.00	62.530	8.900	

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph (519)746-1798	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Date: 08.12.2009	none, Page 1
		Project: PH1236	
		Evaluated by: RAP	

Pumping Test No. 1	Test conducted on: Dec. 2, 2009
TW3	
Discharge 0.25 l/s	
	Pumping test duration: 360.00 min



Transmissivity [m²/min]: 1.39×10^{-3}

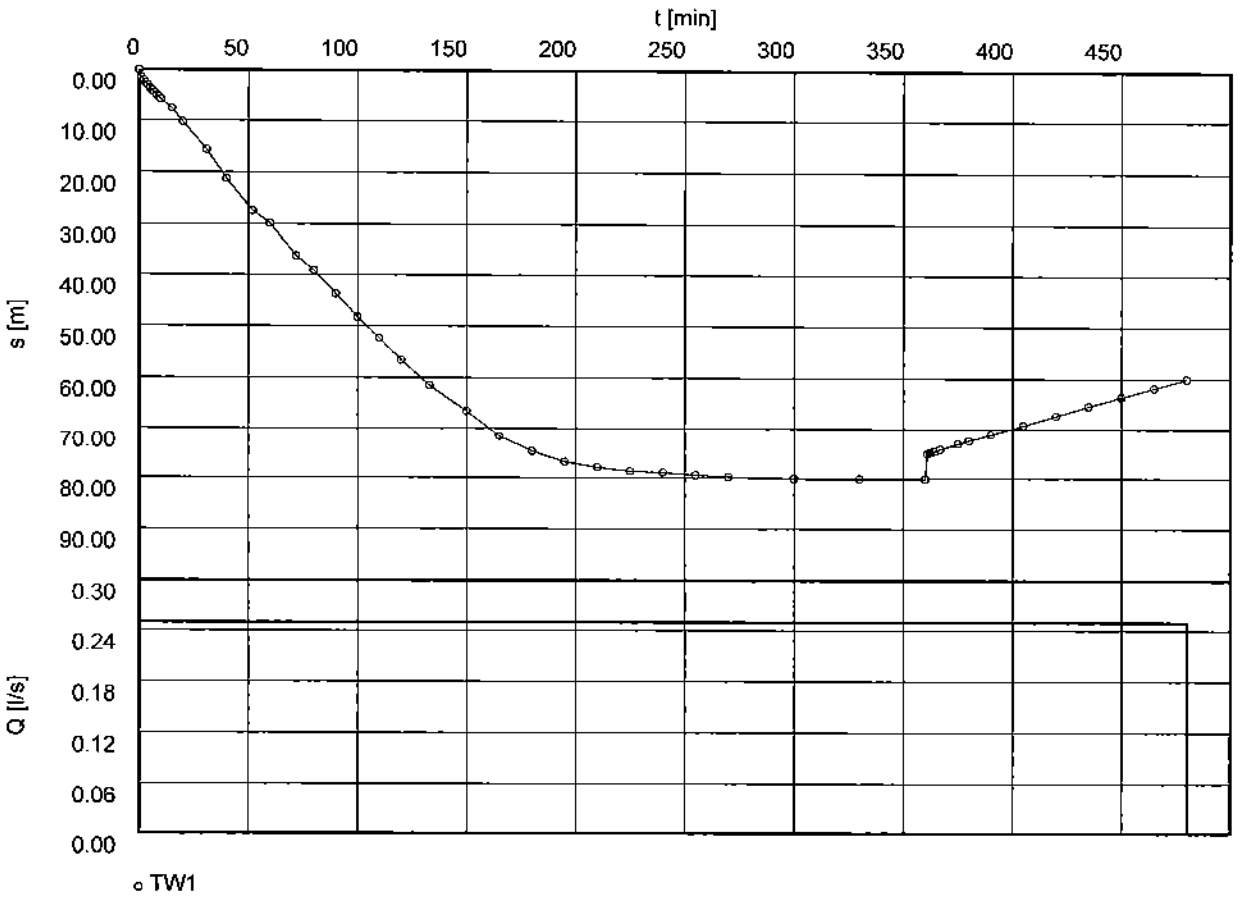
Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Date: 08.12.2009	none, Page 2
		Project: PH1236	
		Evaluated by: RAP	

Pumping Test No. 1	Test conducted on: Dec. 2, 2009
TW3	TW3
Discharge 0.25 l/s	Distance from the pumping well 1.000 m
Static water level: 53.630 m below datum	Pumping test duration: 360.00 min

	Time from end of pumping [min]	Water level [m]	Residual drawdown [m]	
1	4.00	58.500	4.870	
2	5.00	58.280	4.650	
3	6.00	58.010	4.380	
4	7.00	57.900	4.270	
5	8.00	57.680	4.050	
6	9.00	57.550	3.920	
7	10.00	57.450	3.820	
8	15.00	57.050	3.420	
9	20.00	56.800	3.170	
10	25.00	56.740	3.110	
11	30.00	56.620	2.990	
12	40.00	56.450	2.820	
13	50.00	56.300	2.670	
14	60.00	56.170	2.540	
15	75.00	56.010	2.380	
16	90.00	55.900	2.270	
17	95.00	55.830	2.200	
18	120.00	55.760	2.130	

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 08.12.2009	none, Page 1
		Project: PH1236	
		Evaluated by: RAP	

Pumping Test No. 1	Test conducted on: 03.12.2009
TW1	
Discharge 0.25 l/s	



Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 08.12.2009	none, Page 2
		Project: PH1236	
		Evaluated by: RAP	

Pumping Test No. 1	Test conducted on: 03.12.2009
TW1	TW1
Discharge 0.25 l/s	Distance from the pumping well 1.000 m

Static water level: 1.320 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
1	0.00	1.320	0.000	
2	1.00	2.910	1.590	
3	2.00	3.410	2.090	
4	3.00	3.990	2.670	
5	4.00	4.380	3.060	
6	5.00	4.990	3.670	
7	6.00	5.480	4.160	
8	7.00	5.920	4.600	
9	8.00	6.440	5.120	
10	9.00	6.850	5.530	
11	10.00	7.280	5.960	
12	15.00	9.080	7.760	
13	20.00	11.640	10.320	
14	31.00	16.990	15.670	
15	40.00	22.600	21.280	
16	52.00	28.730	27.410	
17	60.00	31.220	29.900	
18	72.00	37.610	36.290	
19	80.00	40.430	39.110	
20	90.00	45.060	43.740	
21	100.00	49.640	48.320	
22	110.00	53.690	52.370	
23	120.00	57.960	56.640	
24	133.00	62.870	61.550	
25	150.00	67.900	66.580	
26	165.00	72.970	71.650	
27	180.00	76.030	74.710	
28	195.00	78.160	76.840	
29	210.00	79.270	77.950	
30	225.00	80.100	78.780	
31	240.00	80.330	79.010	
32	255.00	80.810	79.490	
33	270.00	81.110	79.790	
34	300.00	81.510	80.190	
35	330.00	81.510	80.190	
36	360.00	81.510	80.190	
37	361.00	76.440	75.120	
38	362.00	76.210	74.890	
39	363.00	76.050	74.730	
40	364.00	75.910	74.590	
41	365.00	75.800	74.480	
42	367.00	75.500	74.180	
43	375.00	74.400	73.080	
44	380.00	73.740	72.420	
45	390.00	72.470	71.150	
46	405.00	70.550	69.230	
47	420.00	68.620	67.300	
48	435.00	66.710	65.390	
49	450.00	64.910	63.590	
50	465.00	63.140	61.820	

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 08.12.2009	none, Page 3
		Project: PH1236	
		Evaluated by: RAP	

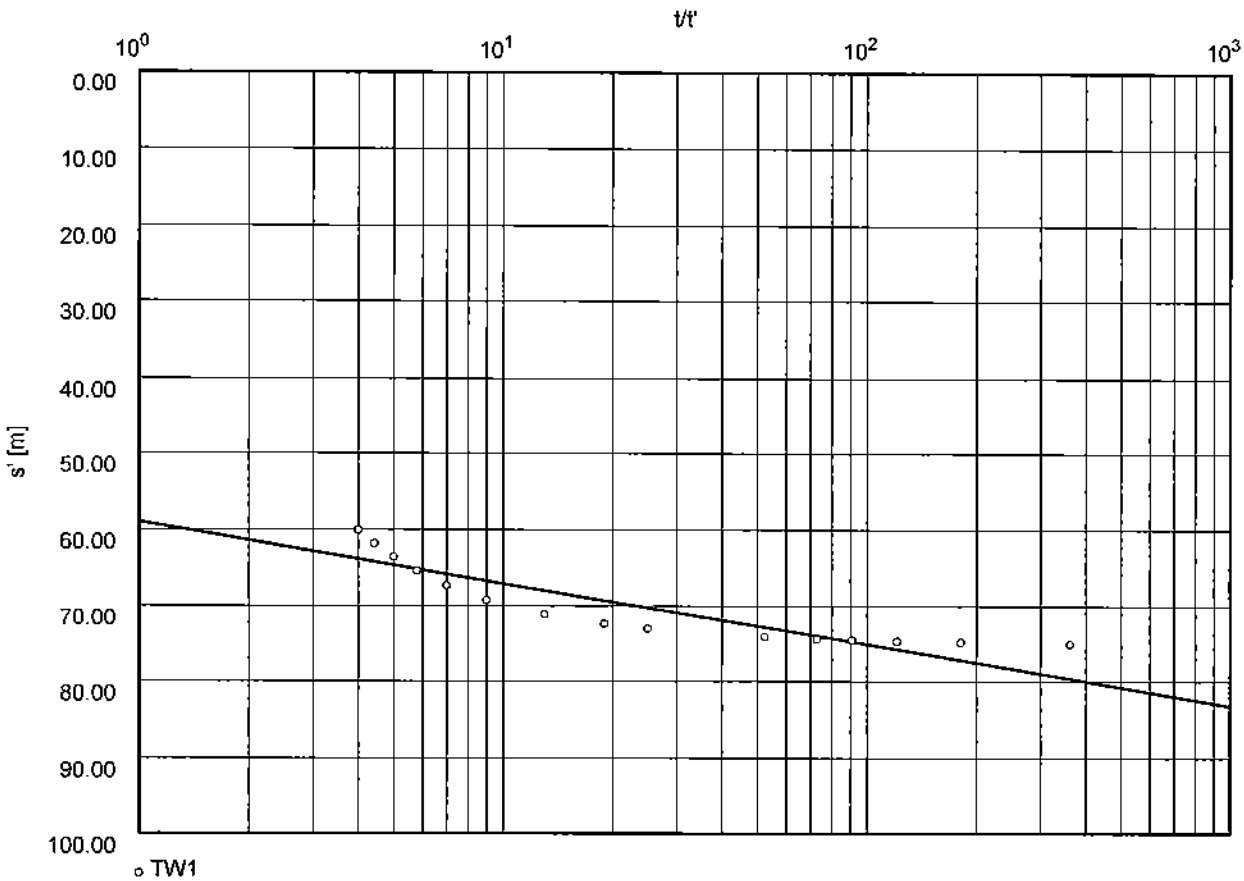
Pumping Test No. 1	Test conducted on: 03.12.2009
TW1	TW1
Discharge 0.25 l/s	Distance from the pumping well 1.000 m

Static water level: 1.320 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
51	480.00	61.400	60.080	

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph (519)746-1798	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Date: 08.12.2009	none, Page 1
		Project: PH1236	
		Evaluated by: RAP	

Pumping Test No. 1	Test conducted on: 03.12.2009
TW1	
Discharge 0.25 l/s	
	Pumping test duration: 360.00 min



Transmissivity [m²/min]: 3.39×10^{-4}

Waterloo Hydrogeologic
180 Columbia St. W.
Waterloo,Ontario,Canada
ph.(519)746-1798

Pumping test analysis
Recovery method after
THEIS & JACOB
Confined aquifer

Pumping Test No. 1 | Test conducted on: 03.12.2009

TW1 | TW1

Discharge 0.25 l/s | Distance from the pumping well 1.000 m

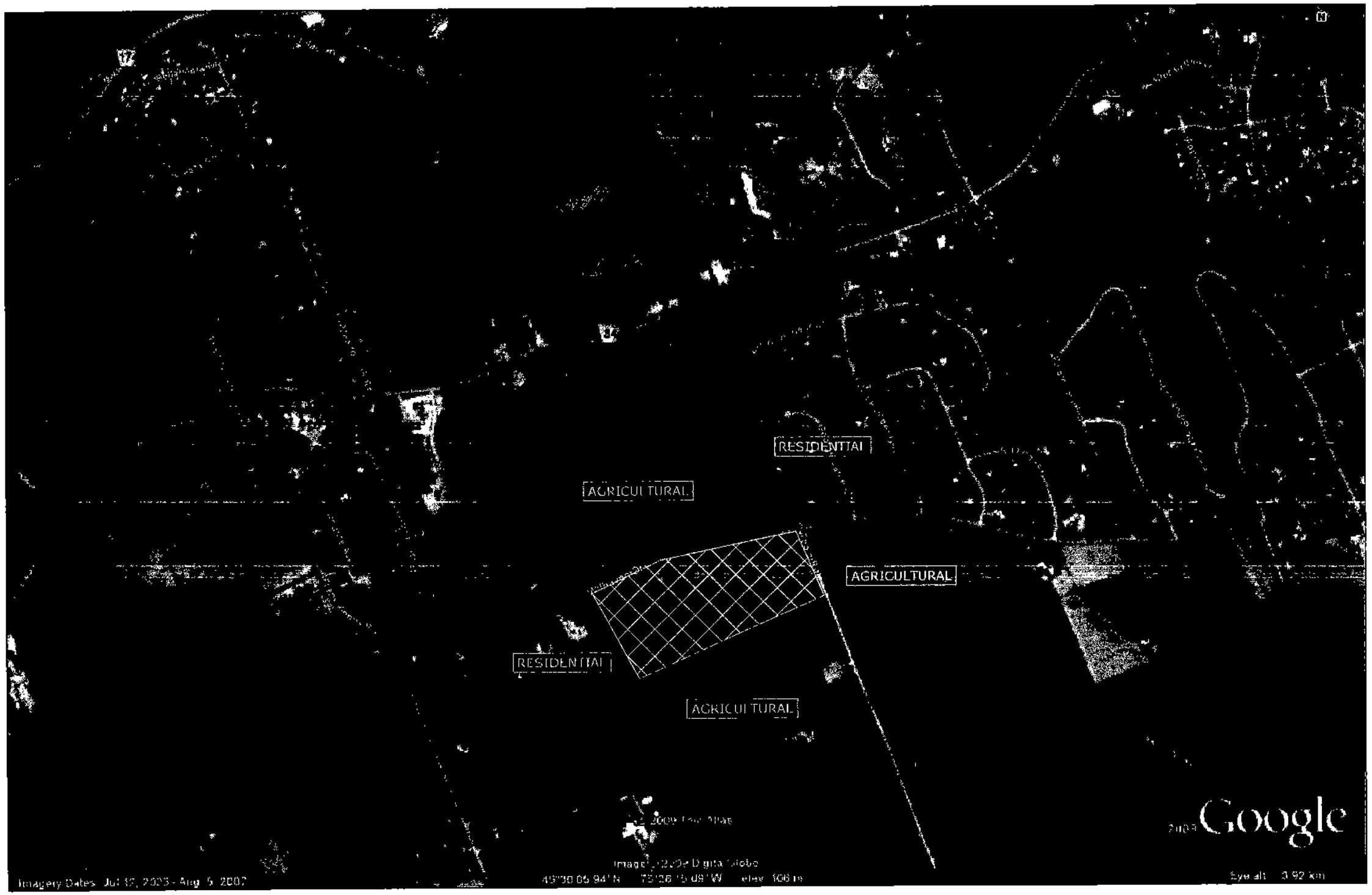
Static water level: 1.320 m below datum | Pumping test duration: 360.00 min

	Time from end of pumping [min]	Water level [m]	Residual drawdown [m]	
1	1.00	76.440	75.120	
2	2.00	76.210	74.890	
3	3.00	76.050	74.730	
4	4.00	75.910	74.590	
5	5.00	75.800	74.480	
6	7.00	75.500	74.180	
7	15.00	74.400	73.080	
8	20.00	73.740	72.420	
9	30.00	72.470	71.150	
10	45.00	70.550	69.230	
11	60.00	68.620	67.300	
12	75.00	66.710	65.390	
13	90.00	64.910	63.590	
14	105.00	63.140	61.820	
15	120.00	61.400	60.080	

APPENDIX 5

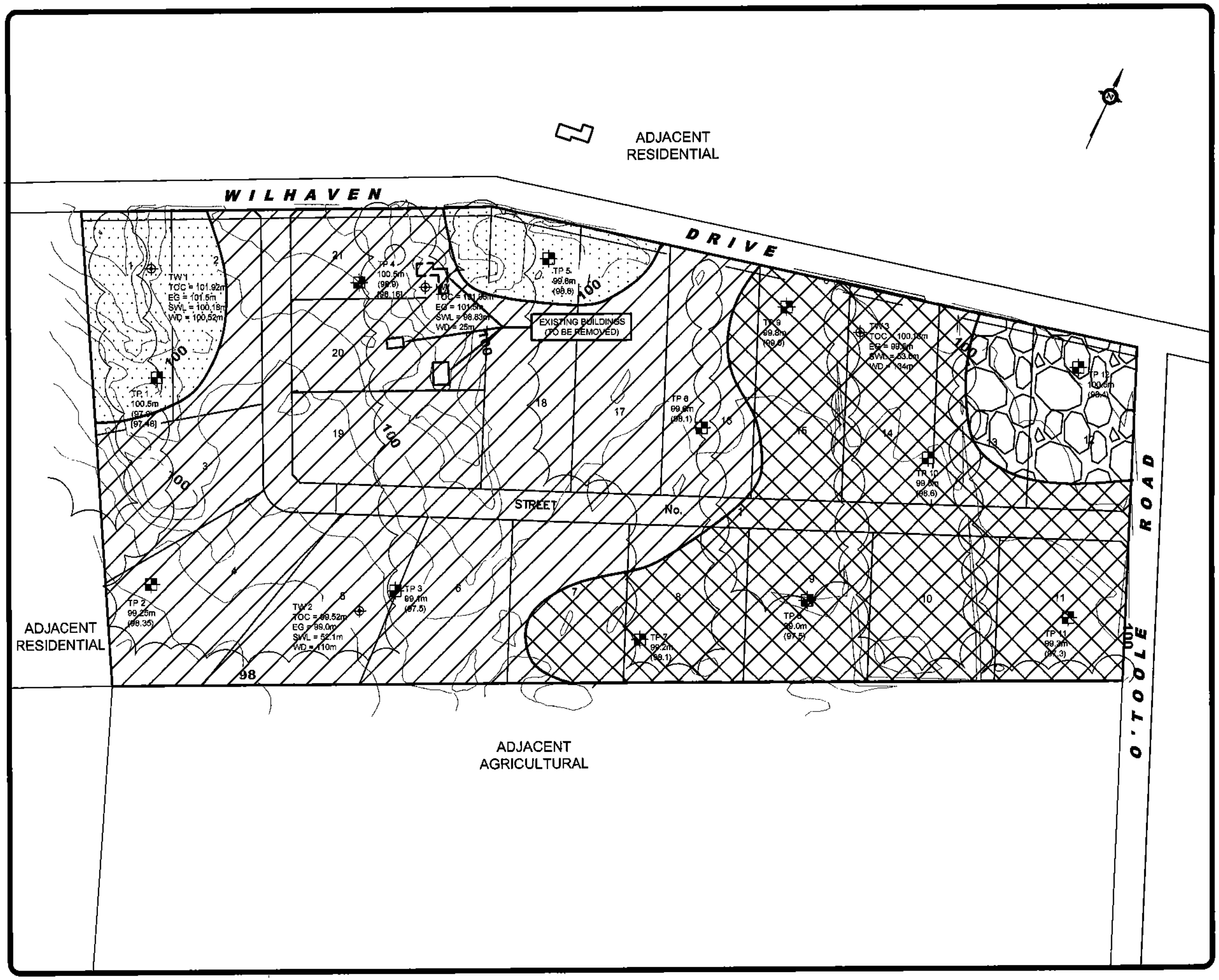
- ❑ FIGURE 1 - SITE LOCATION PLAN
- ❑ FIGURE 2- TERRAIN UNIT DELINEATION
- ❑ FIGURE 3- BEDROCK MAPPING
- ❑ FIGURE 4- TO 7 GRAPHICAL SUMMARY OF WELL HEAD WATER QUALITY ANALYSIS OF TEST WELLS DURING PUMPING TEST

- ❑ TEST HOLE LOCATION PLAN - Drawing No. PH1236-1
- ❑ LOT DEVELOPMENT PLAN - Drawing No. PH1236-2
- ❑ HYDROGEOLOGICAL CROSS SECTION - Drawing No. PH1236-3



paterson group **consulting engineers** **28 Concourse Gate, Unit 1, Ottawa, Ontario K2E 7T7**	**Scale:** 1:15,000 **Des.:** RAP **Dwn:** BA **Chkd:** RAP	2183144 ONTARIO LTD. TERRAIN ANALYSIS & HYDROGEOLOGICAL STUDY 1730 WILHAVEN DRIVE OTTAWA (CUMBERLAND), ONTARIO	SITE LOCATION PLAN	**Dwg. No.** PH1236-FIG1 **Report No.:** PH1236-REP.02 **Date:** 12/2009

PH12XX\PH1236-4.DWG



LEGEND:

- SILTY SAND
- SILTY CLAY
- CLAYEY SANDY GRAVEL
- GLACIAL TILL

Date	Description	Rev.

Client:

2183144 ONTARIO LTD.

Consultant:

patersongroup
consulting engineers

Project:

TERRAIN ANALYSIS & HYDROGEOLOGICAL STUDY
1730 WILLHAVEN DRIVE
OTTAWA (CUMBERLAND), ONTARIO

Drawing:

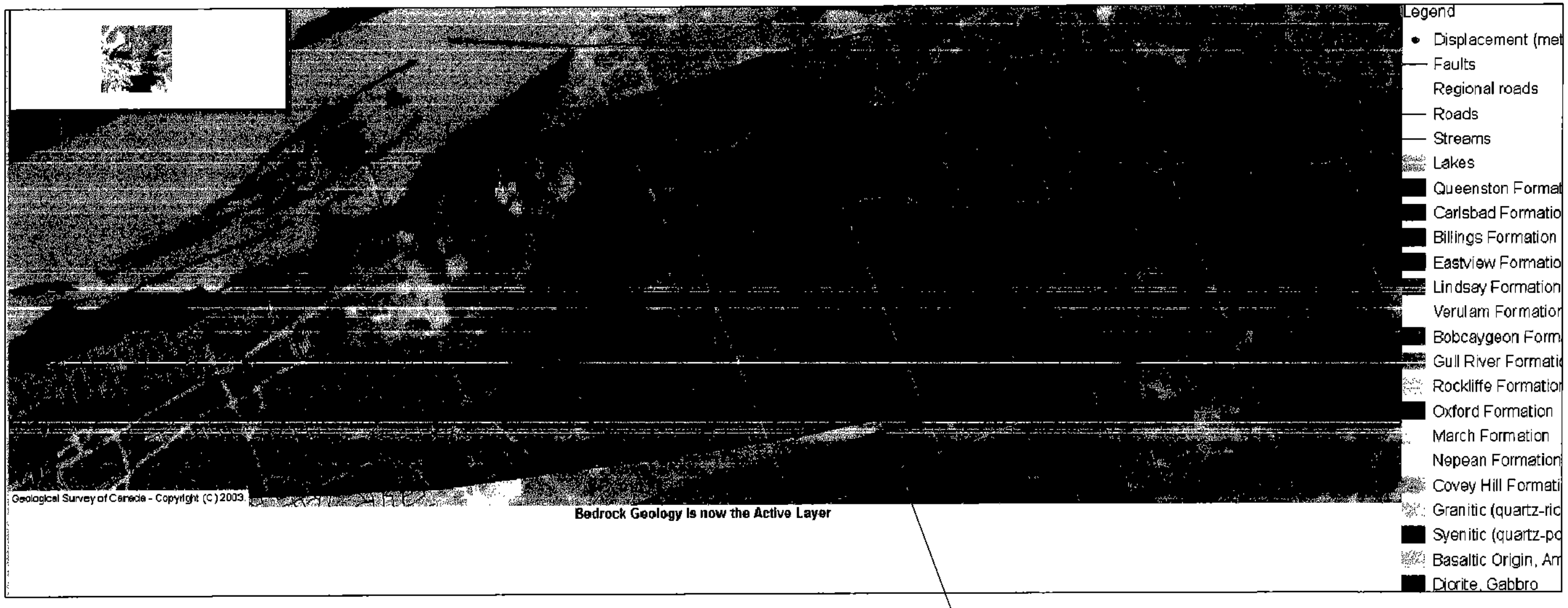
TERRAIN UNIT DELINEATION PLAN

Scale: 1:250	Seal:
Date: 12/2009	
Drawn by: MPG	
Checked by: RAP	
File: PH1236	

Drawing No.:

FIGURE 2

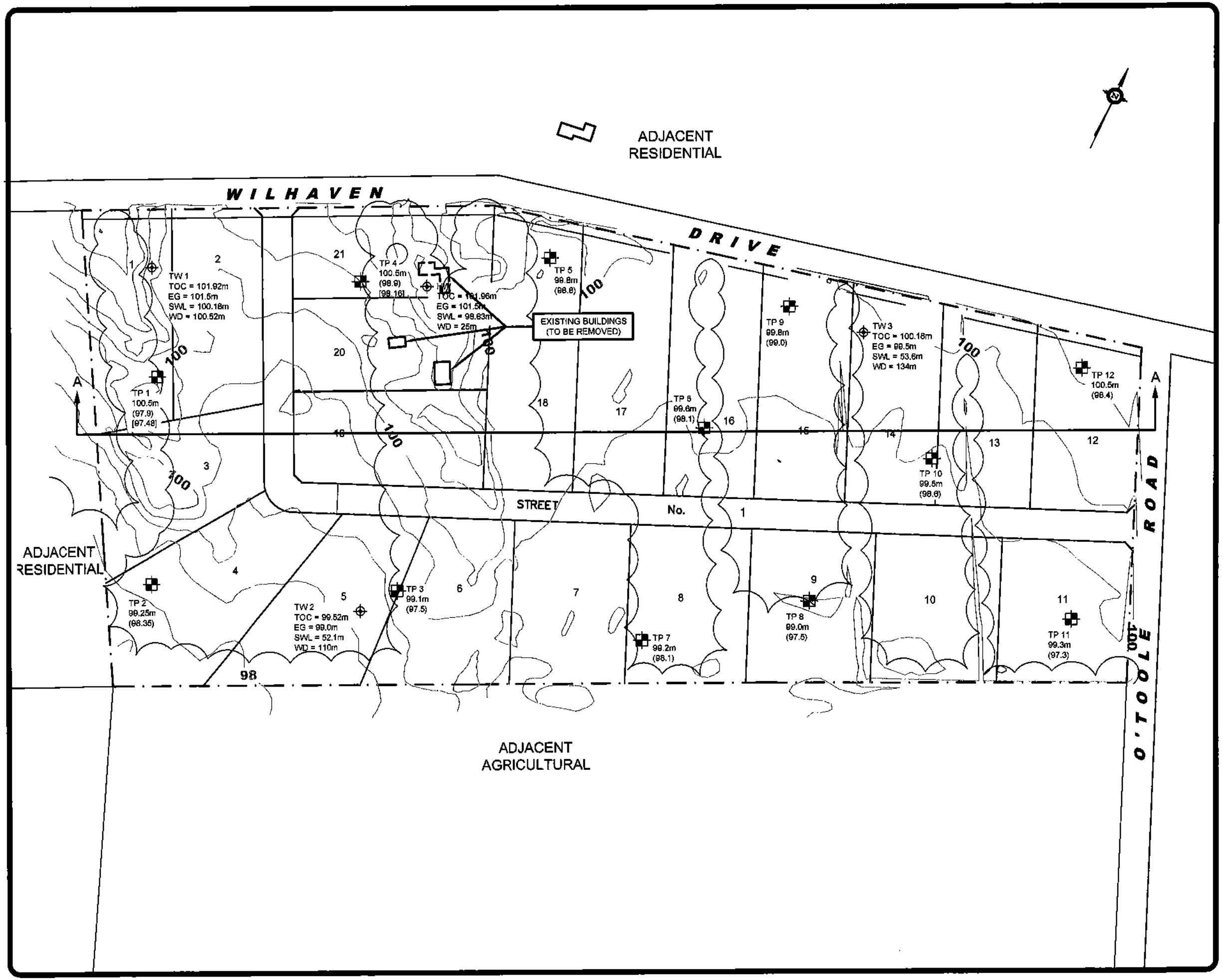
STORAGE NO.: PH12XX\PH1236-FIGURE 2.DWG



INFORMATION FURNISHED BY NATURAL RESOURCES CANADA (GEOLOGIC SURVEY OF CANADA 2003 INFORMATION)

paterson group **consulting engineers** **28 Concourse Gate, Unit 1, Ottawa, Ontario K2E 7T7**	**Scale:** 1:15,000 **Des.:** RAP **Dwn:** BA **Chkd:** RAP	2183144 ONTARIO LTD. TERRAIN ANALYSIS & HYDROGEOLOGICAL STUDY 1730 WILHAVEN DRIVE OTTAWA (CUMBERLAND), ONTARIO	BEDROCK MAPPING	**Dwg. No.** PH1236-FIG3 **Report No.:** PH1236-REP.02 **Date:** 12/2009

PH12XX\PH1236-FIGURE 3.DWG



LEGEND:

TP 1
100.5m GROUND SURFACE ELEVATION (m)
(97.9) GROUND WATER ELEVATION (m)
[97.48] BEDROCK ELEVATION (m)

98.00 GROUND SURFACE ELEVATION (m)

APPROXIMATE TEST WELL LOCATION

TOC = TOP OF CASING
EG = EXISTING GRADE
SWL = STATIC WATER LEVEL
WD = WELL DEPTH

Date	Description	Rev.

Client:

2183144 ONTARIO LTD.

Consultant:

patersongroup
consulting engineers

Project:

TERRAIN ANALYSIS & HYDROGEOLOGICAL STUDY
1730 WILLHAVEN DRIVE
OTTAWA (CUMBERLAND), ONTARIO

Drawing:

TEST HOLE LOCATION PLAN

Scale: 1:250	Seal:
Date: 12/2009	
Drawn by: MPG	
Checked by: RAP	
File: PH1236	

Drawing No.:

PH1236-1

STORAGE NO.: PH12XX\PH1236-1A.DWG

ADJACENT
RESIDENTIAL

WILHAVEN DRIVE

TW 1
TOC = 101.92m
EG = 101.5m
SWL = 100.16m
WD = 100.52m

TP 1
100.5m
(97.9)
[97.48]

TP 4
100.5m
(98.9)
[98.18]

HW
TOC = 101.96m
EG = 101.5m
SWL = 98.83m
WD = 25m

EXISTING BUILDINGS
(TO BE REMOVED)

TP 5
98.8m
(98.9)

TP 6
99.6m
(98.1)

TP 9
98.8m
(99.0)

TW 3
TOC = 100.18m
EG = 99.5m
SWL = 53.6m
WD = 134m

TP 10
99.5m
(98.8)

TP 12
100.5m
(98.4)

STREET No. 1

TP 2
99.25m
(98.35)

TW 2
TOC = 99.52m
EG = 99.0m
SWL = 52.1m
WD = 110m

TP 3
99.1m
(97.5)

TP 7
99.2m
(98.1)

TP 8
99.0m
(97.5)

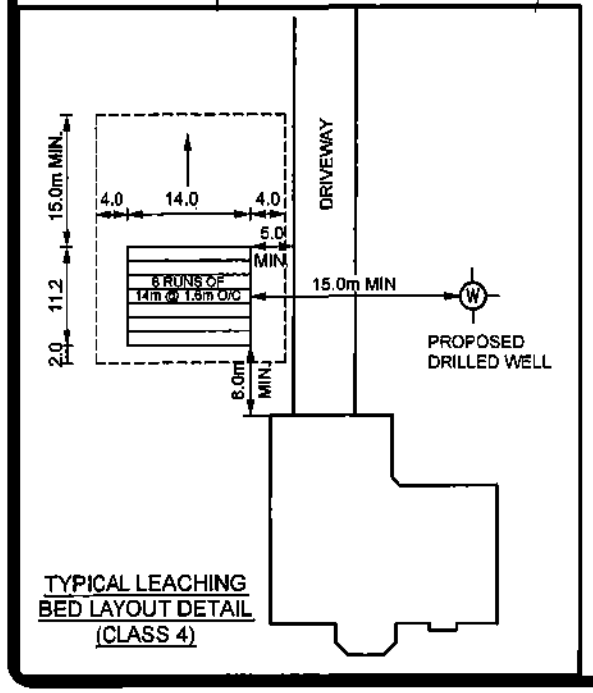
TP 11
99.3m
(97.3)

ADJACENT
RESIDENTIAL

98

ADJACENT
AGRICULTURAL

O'TOOLE ROAD



TYPICAL LEACHING
BED LAYOUT DETAIL
(CLASS 4)

LEGEND:

PROPOSED HOUSE

PROPOSED WELL

PROPOSED FULLY RAISED
CLASS 4 - SEWAGE SYSTEM

Date	Description	Rev.

Client:

2183144 ONTARIO LTD.

Consultant:

patersongroup
consulting engineers

Project:

**TERRAIN ANALYSIS &
HYDROGEOLOGICAL STUDY**
**1730 WILLHAVEN DRIVE
OTTAWA (CUMBERLAND), ONTARIO**

Drawing:

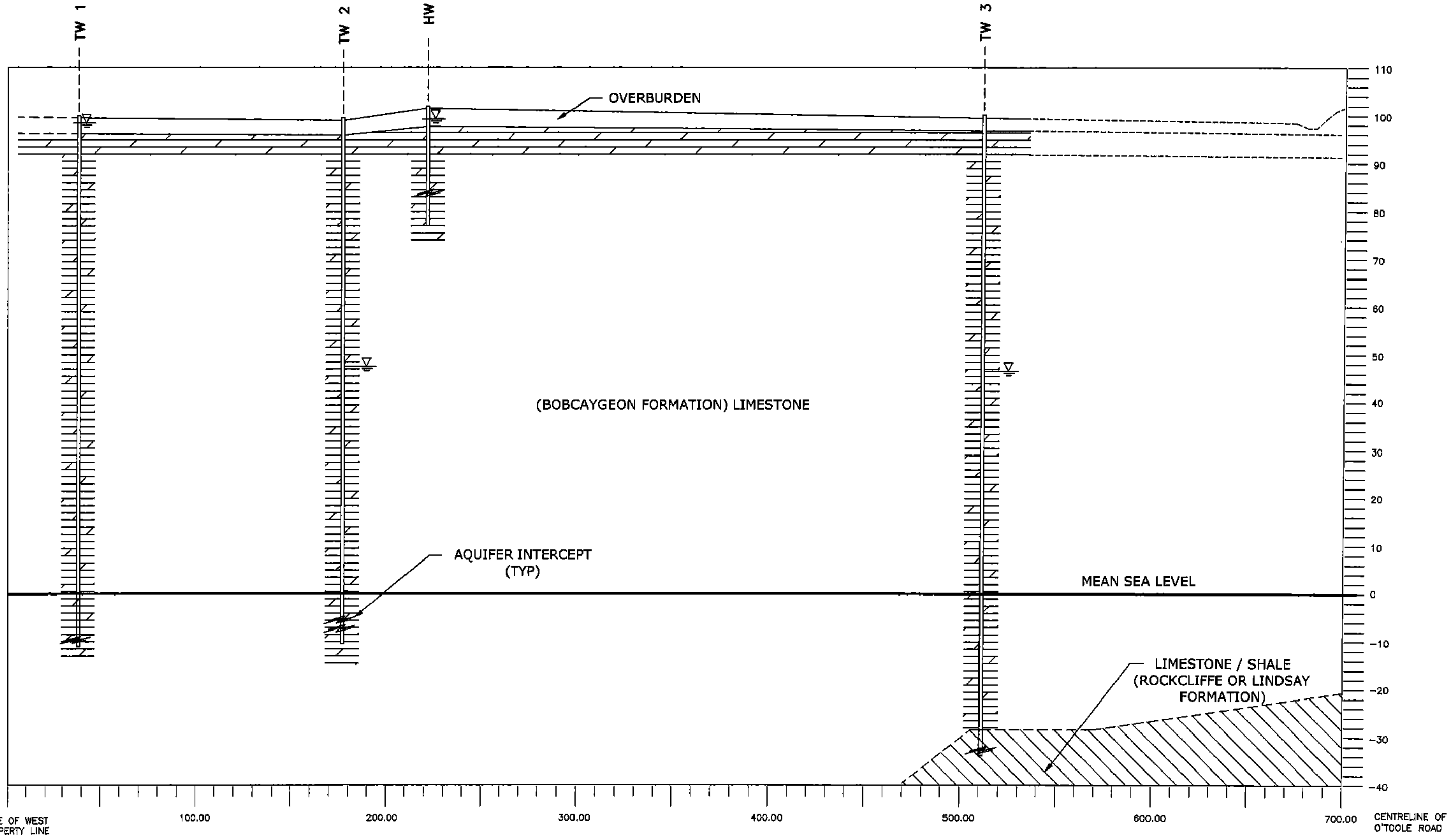
**LOT DEVELOPMENT
PLAN**

Scale: 1:250	Seal:
Date: 12/2009	
Drawn by: MPG	
Checked by: RAP	
File: PH1236	

Drawing No.:

PH1236-2

STORAGE NO.: PH12XX\PH1236-2.DWG



paterson group
consulting engineers
28 Concourse Gate, Unit 1, Ottawa, Ontario K2E 7T7

Scale:	H 1:2000 V: 1:400
Des.:	RAP
Dwn:	BA
Chkd:	RAP

2183144 ONTARIO LTD.
TERRAIN ANALYSIS & HYDROGEOLOGICAL STUDY
1730 WILHAVEN DRIVE
OTTAWA (CUMBERLAND), ONTARIO

TERRAIN UNIT DELINEATION

Dwg. No.	PH1236-3
Report No.:	PH1236-REP.02
Date:	12/2009