Hydrogeological Assessment Report

Proposed Residential Development
343622 Church Side Road East
Owen Sound, ON

MJD Investments Inc.

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Executive Summary

This report presents the results of a hydrogeological assessment that was conducted for a proposed 18.26 hectare residential development to be located in Owen Sound, Ontario. The lands have the municipal addresses of 343622 Church Side Road East and are herein referred to as "the Site". The proposed development is to be 33 lots and serviced municipally for water and privately for septic. GHD Limited (GHD) was retained by MJD Investments Inc. (the Client) to complete this hydrogeological assessment in accordance with our proposal PG-3741, dated November 22, 2016. The site was observed to have a single residential home on a portion of the Site with remainder of the Site being undeveloped, naturalized vegetation with a wooded area.

This hydrogeological assessment included a site inspection, advancement of test pits, soil analysis, water level monitoring, in-situ hydraulic conductivity testing, a review of available Ministry of the Environment and Climate Change (MOECC) well records, a detailed water balance evaluation and a nitrate impact assessment. A door-to-door well survey was conducted which indicated that the area is municipally serviced with some existing wells still in use. The existing wells are generally upgradient of the proposed development. Two wells are considered to be cross-gradient on Church Side Road East. Impacts to the existing wells from the proposed development are not expected as the development will be municipally serviced.

The proposed development area is generally comprised of topsoil underlain by silty clay. Bedrock was not encountered during the hydrogeological assessment. Karst topography was not observed or encountered on the Site or during excavation of the test holes. Water seepage was observed within the silty clay at depths 2.4 to 3.0 m during the test pit program. The water seepage was observed to be minimal. Based upon our observations, the flow direction is toward Georgian Bay.

It is our opinion that there will not be any constraints for development from a groundwater perspective as the existing seepage and water from within the silty clay is minimal and can be handled with appropriate engineering techniques. It is expected that groundwater will generally be below the depth of the future development, although it may be encountered for deeper excavations or foundations that may be required. If groundwater volumes of greater than 50,000 L/day are to be pumped during construction activities then a permit applied for through the Environmental Sector and Activity Registry (EASR) would be required from the MOECC. If the volumes are to exceed 400,000 L/day, a Permit To Take Water (PTTW) would be required. Based upon the groundwater observed, these permits are not anticipated.

With the use of low impact development (LID) strategies, the Site's post-development infiltration values are the same as the pre-development values. The clayey nature of the subsurface soils indicates that nitrate impact will not impact local groundwater sources by the installation of Class IV sewage disposal systems (or connection to a municipal sewer system in the future). Raised tile beds are recommended for the development. Tertiary septic system could be considered for the improvement of sewage effluent for these lots.

In summary, provided that the waste disposal system is properly constructed, no significant impact is anticipated on downgradient receptors from this development. It is GHD's opinion that the results of this hydrogeological assessment support the approval of the proposed 33-lot residential development at this Site.

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1. Introduction

1.1 Property Information

This report presents the results of a hydrogeological assessment that was conducted for a proposed 18.257 hectare residential development to be located in Owen Sound, Ontario. The lands have the municipal address of 343622 Church Side Road East and is herein referred to as "the Site". The proposed development is to be 33 lots and serviced municipally for water and privately for septic. GHD Limited (GHD) was retained by MJD Investments Inc. to complete this hydrogeological assessment in accordance with our proposal PG-3741, dated November 22, 2016. Downgradient about 110 metres of the Site is Georgian Bay.

The general location is presented on the National Topographic System Mapping from Centre for Topographic Information, Natural Resources Canada Map 41 A/10 Vicinity Plan, Figure 1. The location with respect to adjacent roadways and surrounding land uses is presented on the Ministry of Natural Resources and Forestry mapping and is shown on the Site Plan, Figure 2. The Plot Plan, Figure 3 is based on an aerial photograph from 2014 and illustrates the location and uses of surrounding lands. A preliminary plan of the proposed development is provided on the Concept Plan, Figure 4. The test hole locations are illustrated on the Test Hole Plan, Figure 5. Other figures are provided in the Enclosures section of this report.

2. Purpose and Scope of Work

The purpose of the hydrogeological assessment was to identify the local hydrogeology of the site, including a generic water balance that establishes target values for infiltration to address recharge / discharge characteristics (to the lands and any adjacent creek subwatersheds) and base flow; determine possible impacts and provide mitigation measures. The following scope of work was performed to accomplish the foregoing purposes:

1. Reviewed available background information relevant to the Site such as geologic, physiographic and water resources reports and maps.
2. Carried out an inventory of available well record data on file with the Ministry of the Environment and Climate Change (MOECC) for the immediate area to evaluate the physical characteristics of the aquifer complexes that underlie the region. A well survey of any existing wells in the immediate area was carried out to assist in the evaluation of the local aquifer(s) and supplement MOECC well records. A representative water sample was collected during the well survey for analysis of general chemistry parameters
3. A walkover inspection was conducted to review surficial ground characteristics.
4. The subsurface conditions were explored by advancing, sampling and logging a total of eight (8) test pits on May 9, 2017. The subsurface conditions were recorded and are summarized in detail on the logs attached in Appendix A. The test pits were advanced to depths ranging from 0.6 to 3.4 metres. Piezometers were installed in test pits TP-01 through to TP-07 to facilitate water level measurements and flow direction.

5. Carried out laboratory analyses of materials encountered including grain size and moisture content.
6. Conducted in-situ hydraulic conductivity testing in representative piezometers and infiltration testing at select locations.
7. Completed a generic water balance that considers pre- and post-development conditions and evaluates groundwater baseflow conditions.
8. Prepared a detailed report using engineering analyses of the acquired data outlining our conclusions and recommendations herein.

3. Project Details

A conceptual plan is provided as Figure 4 (based upon a drawing entitled "Concept Plan", drawing no. 3969-CP1 dated October 2006) and indicates the overall area of the development as 18.26 hectares (ha). The concept plan provided shows 33 lots, roads and a storm water management facility. Building footprints are not provided on the concept plan. GHD has assumed that future building footprints will cover about 30% of each lot (this value is used in the water balance section of this report). The asphalt roads and driveways are estimated to cover 18,125 m^2; the building footprints to have an area of 47,195 m^2; the lawn / landscaped areas will include 110,123 m^2; and the storm water management facility will encompass 7,125 m^2.

The details shown on the conceptual plan were used to calculate the water balance and discussed in Section 6 of this report.

4. Site Conditions

4.1 General

The field program consisted of a site inspection, a soils exploration investigation, measurement of water levels, in-situ hydraulic conductivity testing, infiltration testing and a door-to-door well survey. The soils exploration investigation was conducted on May 9, 2017. The test pit locations are provided on Figure 5. Test pit logs and hydrometer results are provided in Appendix A. A site visit was conducted on May 9, 2017 by GHD to observe the general surficial characteristics. Photographs are provided in Appendix B.

Based upon the site visit, the lands slope towards Georgian Bay. The topography is illustrated on Figure 6. Upgradient of the Site is an unevaluated wetland area as shown on Figure 7. The unevaluated wetland feature is about 1000 m away of the Site and will not be impacted by this development.

The residential properties adjacent to the Site along Grey Road 1 are upgradient. Two residential properties exist on Church Side Road East, which are cross gradient of the Site. The Site was observed to have a residential home on an area of the Site, with remainder of the lands undeveloped with a wooded area.

The Site contained depressions and drainage swales directing surface water towards Georgian Bay. A central area of the Site contained ponded water. Two dug wells were observed on the Site during the site visit.

It is GHD's understanding that this is an area of potential karst topography. No evidence of karst topography was observed during our site reconnaissance (i.e. disappearing streams, caves, subsided soil etc.).

4.2 Subsurface

4.2.1 Regional Physiography and Geology

This section of the report details the subsurface conditions based upon reports, mapping and available information. The Site is situated in the physiographic region known at the Bruce Peninsula (Chapman and Putnam, 1984) and the surrounding terrain is dominated by shale plains. The physiographic region is shown on the figure entitled Physiography, Figure 8 indicating this area is within shale plains. The Ontario Geological Survey information indicates that the surficial geology for the area is predominately Paleozoic bedrock and carbonate-derived silty to sandy till closer to Georgian Bay. The surficial geology is presented on Figure 9 and Quaternary geology is presented on Figure 10. Bedrock in the area is expected to be comprised of dolostone and limestone.

There were two (2) MOECC well records available for the Site. Both were for dug / bored wells that were observed during the site visit and extended to 4.6 m through topsoil, clay and shale. There were an additional 14 well records within 500 m indicating a mix of clay, shale and bedrock. The well records showed no indication of karst topography. Two (2) of those well records were for abandonments. The well records considered are provided in Appendix C. Physical and hydraulic data are presented on MOECC well records. The MOECC well records considered were drilled bedrock wells and dug / bored wells. Additional discussion of the well records is provided in Section 5 of this report.

4.2.2 Local Geology

This section of the report discusses the subsurface soil conditions observed during the test hole program. The subsurface stratigraphy was investigated by excavating seven (7) test pits with an excavator and one (1) shallow test hole using a hand shovel in the wooded area on May 9, 2017. Monitoring wells were installed in each of the seven (7) excavated test pits to facilitate water level measurements. The locations of the test holes are illustrated on the Test Hole Plan, Figure 5. Details of the subsurface conditions encountered are presented graphically in Appendix A.

It should be noted that the boundaries between the strata have been inferred from the test hole observations. They generally represent a transition from one soil type to another, and should not be inferred to represent an exact plane of geological change. Further, conditions may vary between and beyond the test holes.

The soils encountered generally consisted of topsoil then silty clay. The topsoil had depths ranging from 100 to 200 mm. The topsoil layer contained an appreciable amount of organic matter and thus is considered to be devoid of any structural engineering value. The native silty clay material encountered beneath the topsoil was generally reddish brown and in a hard in-situ state of relative density. Test pits were excavated to a maximum depth of 3.4 m. Bedrock was not observed. No karst formations or indicators of karst were observed within any of the test holes. Representative samples of the material encountered were submitted to the soils laboratory for analysis and characterization. Grain size distribution analyses were carried out on four (4) representative soil samples and are summarized in Table 4.1. The gradation curves are presented in Appendix A.

Table 4.1 Grain Size Distribution Summary

Location	Depth (m)	Grain Size Distribution			Observed Soil Unit
		%Gravel	%Sand	%Fines (silt/clay)	
TP-01	0.9 – 1.1	0	1	99	Silty Clay
TP-01	1.8 – 2.0	0	3	97	Silty Clay
TP-05	2.0 – 2.1	0	4	96	Silty Clay
TP-05	2.6 – 2.7	0	1	99	Silty Clay

Notes: %Fines indicates silt and clay particles.

Based on the grain size distribution summary, the groundwater recharge rates are estimated to be about 100 mm per year in this area. For purposes of septic percolation rates (T-times), the T-times are greater than 50 min/cm.

4.3 Groundwater

Water seepage was present within the silty clay within all the test pits but was observed to be minimal. From the test pits, the seepage depths ranged from 0.5 m in the hand excavated test hole at TP-08; and from 2.4 to 3.0 m in the excavated test pits TP-01 to TP-07. Monitoring wells were installed in test pits TP-01 to TP-07 in order to facilitate monitoring of water levels. The wells were screened to intersect water where seepage was occurring. A summary of the monitoring well details including water seepage depth is provided in Table 4.2:

Table 4.2 Summary of Monitoring Well Information

Location	Depth of Well (m)	Pipe Stick Up (m)	Well Screen Interval[1] (m)	Water Seepage Depth[2] (m)
TP-01	2.6	0.5	1.1 - 2.6	~2.6
TP-02	2.7	0.4	1.2 – 2.7	~2.4
TP-03	3.4	1.1	1.8 – 3.4	~3.0
TP-04	2.7	0.3	1.2 – 2.7	~2.7
TP-05	2.6	1.2	1.2 – 2.7	~2.6
TP-06	2.7	0.7	1.2 – 2.7	~2.7
TP-07	2.7	1.1	1.2 – 2.7	~2.6

Notes: m = metres; [1]Effective well screen includes 10-slot screen.
[2]Water seepage depth is the estimated depth where water was encountered during the test pit activities

Groundwater potentiometric water levels were measured at TP-01 to TP-07 on May 9 and 10, 2017 and the data is summarized in Table 4.3.

Table 4.3 Potentiometric Water Level Summary

Location	Ground Elevation* (masl)	Water Level (m)		GW Elevation (masl) (May 10, 2017 only)
		May 9, 2017	May 10, 2017	
TP-01	216.9	1.8	0.9	216.0
TP-02	217.6	0.5	0.2	217.4
TP-03	217.7	0.8	0.3	217.4
TP-04	218.1	1.9	1.0	217.1
TP-05	216.1	0.5	0.2	215.9
TP-06	216.1	1.8	1.1	215.0
TP-07	215.8	2.7	2.3	213.5

Notes: m = metres; masl = metres above sea level; GW = groundwater; *Elevations interpolated from MNRF's Ontario base mapping contours. The elevations provided are for the purposes of evaluating groundwater elevation and flow direction and should not be relied upon as a legal survey or topographic elevation survey.

Based upon the water level data collected and the topography of the Site, the shallow groundwater flow direction toward Georgian Bay. It should be noted that the water levels presented in this report represent potentiometric surface elevations and do not indicate that there is a water table as shallow as the water levels indicated in Table 4.3. Seepage zones were deeper than the measured water levels and water will not be encountered unless the water zones are excavated into.

It is GHD's opinion that there is not a permanently saturated, shallow aquifer at the Site and any water encountered is in relatively limited quantities. It is expected that groundwater seepage will be encountered at depths ranging from 2.4 to 3.0 m. It should be noted that groundwater levels are transient and tend to fluctuate with the seasons, periods of precipitation and temperature. Groundwater aquifers for drinking water sources are expected to be much deeper as indicated by the MOECC well records for drilled wells in this area that indicated well depths of about 28 m.

It is our opinion that there should not be any significant constraints for this development from a groundwater perspective as any water can be handled with appropriate engineering techniques. It is expected that groundwater will generally be below the depth of the future development, although it may be encountered for deeper excavations or foundations that may be required. Engineered foundation drains will be utilized to direct any groundwater encountered within building footprints with details provided at the detailed design stage. If groundwater volumes of greater than 50,000 L/day are to be pumped during construction activities then a permit applied for through the Environmental Sector and Activity Registry (EASR) would be required from the MOECC. If the volumes are to exceed 400,000 L/day, a Permit To Take Water (PTTW) would be required. Based upon the groundwater observed, these permits are not anticipated.

4.4 Single Response Well Testing

Hydraulic conductivity (K) testing was completed at TP-02 and TP-05 on May 10, 2017. The testing consisted of rising and falling head testing and was completed using a one-metre long slug. The water levels were measured using data loggers programmed at three (3) second intervals. The data was analyzed using AQTESOLV and the Bouwer-Rice solution for each rising and falling head test (Appendix D).

The K values for the hydraulic conductivity testing are on the order of 10^{-5} m/sec at TP-02 screened within the silty clay and 10^{-5} to 10^{-6} m/sec at TP-05 screened within the silty clay. These K values are consistent documented K values (e.g. Freeze and Cherry, 1979) and with the silt and clay materials observed during our subsurface investigation.

Infiltration testing was attempted at TP-02 and TP-05 locations. Infiltration testing is typically conducted of the unsaturated zone (vadose zone). Conditions at the Site were too wet at the time of the testing. Based upon the soils observed throughout the test pits, the K-values obtained from the single response well tests discussed above would be considered appropriate and minimal infiltration is expected.

5. Hydrogeology

5.1 General

The hydrogeology of the area is characterized by gently rolling and shale plains consisting of undifferentiated carbonate and clastic sedimentary rock exposed at surface or covered by a discontinuous, thin layer of drift. Groundwater and surface water drainage flow in an easterly direction across the Site. Infiltration through the shallow confining layers recharging the deeper aquifers below is expected to be minimal.

Information regarding groundwater characteristics of the immediate area was obtained from an inventory of MOECC well records. A total of 16 well records were identified within 500 m of the central part of the Site for statistical breakdown. The MOECC well records and their locations are provided in Appendix C.

A door-to-door survey of neighboring properties confirmed that the surrounding area in proximity of the Site is generally on municipal water services with some private wells for those who have not connected to the municipal water service.

5.2 Existing Local Water Supplies

Currently, this area is predominately supplied by municipal services for water. The water well records reviewed represent wells that were established prior to the implementation of municipal services in this area. Physical and hydraulic data are presented on MOECC well records and the information indicates the presence of two (2) aquifer systems:

1. A shallow overburden aquifer tapped by dug / bored wells; and,
2. A deeper bedrock aquifer tapped by drilled wells.

The groundwater was generally described as “fresh” in the well records reviewed. The information from the MOECC data indicates that 64% of the well records were drilled bedrock wells and 36% were dug / bored wells. The bedrock wells averaged a depth of about 28 m and encountered water at an average depth of 13.9 m.

The dug / bored wells averaged a depth of about 4.5 m and encountered water at a depth of 2.4 m. The pumping rates yielded an average of 12.1 L/min and 13.6 L/min for the bedrock and dug / bored wells, respectively. Shallow dug / bored wells are susceptible to large seasonal fluctuations in the groundwater. The result is that shallow wells are also more prone to becoming dry in the winter and summer months. From a quality perspective, shallow dug/bored wells are generally difficult to seal at the surface and therefore considered to be susceptible to shallow sources of contamination. The MOECC well record data has been summarized in Table 5.1.

Table 5.1 Summary of Water Well Information

Total Number of Wells Inventoried:	14
Dug/Bored Wells:	5 (36%)
Drilled Wells (Overburden):	0 (0%)
Drilled Wells (Bedrock):	9 (64%)
Abandoned Wells*:	2

Parameters	Statistical Summary Dug / Bored Wells		Statistical Summary Drilled – Overburden		Statistical Summary Drilled – Bedrock	
WELL YIELDS						
Range	13.6 L/min	3 Igpm	-- L/min	-- Igpm	4.5 - 22.7 L/min	1 - 5 Igpm
Average	13.6 L/min	3 Igpm	-- L/min	-- Igpm	12.1 L/min	2.7 Igpm
REPORTED YIELDS	Frequency		Frequency		Frequency	
Not Reported	0	0%	0	0%	0	0%
Dry	0	0%	0	0%	0	0%
0 to 1 Igpm	0	0%	0	0%	3	33%
2 to 4 Igpm	5	100%	0	0%	4	45%
5 to 9 Igpm	0	0%	0	0%	2	22%
≥10 Igpm	0	0%	0	0%	0	0%
STATIC WATER LEVELS						
Range	1.2 – 2.7 m	4 - 9 ft	-- m	-- ft	3.7 – 9.1 m	12 - 30 ft
Average	2.6 m	8.5 ft	-- m	-- ft	6.0 m	19.7 ft
WATER ENCOUNTERED						
Range	2.1 – 2.7 m	7 - 9 ft	-- m	-- ft	4.6 – 30.5 m	15 - 100 ft
Average	2.4 m	8 ft	-- m	-- ft	13.9 m	45.6 ft
WELL DEPTH						
Range	3.5 – 4.9 m	11.5 -16 ft	-- m	-- ft	12.2 – 38.1 m	40 - 125 ft
Average	4.4 m	14.4 ft	-- m	-- ft	27.6 m	90.6 ft

Notes: Data based on MOECC well record information (see Appendix C). L/m represents litres per minute, Igpm indicates Imperial gallons per minute and m is metres *Abandoned wells not considered in the statistical evaluation.

The well records are also generally consistent with the information gathered during GHD's field investigation and that the overburden soils are comprised of silt and clay. Water quality documented in the well records was indicated to be fresh and of good quality.

A door-to-door well survey was completed on May 9, 2017 by GHD. The well survey was conducted by going door-to-door to the residential homes neighbouring the proposed development along Church Side Road East, Grey Road 1 and Balmy Beach Road to gather information regarding the resident's well. The well survey information was used to supplement the MOECC well record data and is summarized in Table 5.2. Residents within about 500 m of the proposed development were surveyed.

Of the ten (10) residents surveyed, information was collected from six (6) locations. Three (3) locations indicated they were connected to municipal water service. Access to wells was not provided at the time of the well survey. The resident at 343650 Church Side Road East indicated issues with water quantity. They are on a shallow dug well with two (2) holding tanks for increased storage. The resident at 319183 Grey Road 1 had a drilled well within a pit and indicated no issues with water quality or quantity. The resident at 319197 Grey Road 1 had a drilled well and indicated no issues with water quality or quantity. The well survey map showing the homes that were surveyed is shown on the Well Survey Plan in Appendix C.

Table 5.2 Well Survey Summary

Address	Water Source	Well Depth	Water Level	Well Survey Plan
343612 Church Side Rd E	Drilled Well & Municipal	--	--	WS-1
343598 Church Side Rd E	Municipal	--	--	WS-2
343650 Church Side Rd E	Dug Well	3.0 to 3.6 m*	--	WS-3
319217 Grey Rd 1	Could not be confirmed	--	--	WS-4
319203 Grey Rd 1	Could not be confirmed	--	--	WS-5
319197 Grey Rd 1	Drilled Well	--	--	WS-6
319189 Grey Rd 1	Could not be confirmed	--	--	WS-7
319183 Grey Rd 1	Drilled Well	--	--	WS-8
319173 Grey Rd 1	Could not be confirmed	--	--	WS-9
581 Balmy Beach	Municipal	--	--	WS-10

Note: * indicates information was provided by home owner.

The potential for well impacts to neighboring wells is anticipated to be minimal. The proposed residential development will be municipally serviced for water.

5.3 Background Water Quality

The well records reviewed for this assessment reported fresh water supplies. The information from residents collected during the well survey indicated that the water of this area is generally of good quality. Based upon our well survey, the existing wells (not connected to municipal water services) are generally upgradient of the proposed development. Two wells are considered to be cross-gradient on Church Side Road East. Impacts to the existing wells from the proposed development are not expected.

Groundwater samples were taken from a dug well on Site and a drilled well at 319197 Grey Road 1 to evaluate background water quality. The location of the sampled wells are depicted on the Well Survey Plan, Appendix C. The sample from the dug well was collected directly from the well. The sample from 319197 Grey Road 1 was collected from a raw water tap at the house. The water samples were delivered to SGS Environmental Laboratories for chemical analyses.

A summary of the water quality data is provided in Table 5.3. The analytical results are compared with the Ontario Drinking Water Standards (ODWS). The Certificates of Analyses are presented in Appendix E.

Table 5.3 Water Quality Summary

Parameter	Dug Well 1	319197 Grey Rd 1	ODWS
	Dug Well on Site	Drilled Well	
Calcium	65.1	109	---
Sodium	1.11	93.7	200
Manganese	0.0275	0.00355	0.05
Magnesium	13.4	32	---
Potassium	1.78	6.24	---
Iron	0.023	0.009	0.30
Sulphate	1.1	34	500
Chloride	1.3	190	250
Nitrite – N	< 0.003	< 0.003	1.0
Nitrate – N	0.026	0.353	10
Organic Nitrogen	**0.27**	< 0.05	0.15
Total Organic Carbon	5	3	5
Fluoride	0.10	0.21	1.5
Alkalinity	231	332	30 to 500
Ammonia+Ammonium – N	< 0.04	0.05	---
pH (units)	8.23	8.14	6.5 to 8.5
Hardness	**218**	**404**	80 to 100
Turbidity (N.T.U.)	**5.85**	0.18	5
Conductivity (µmhos/cm)	389	1010	---
Colour (T.C.U.)	14	< 3	5
Total Dissolved Solids	222	**664**	500

Note: Units are mg/L unless otherwise stated; "<" indicates concentrations are less than laboratory reporting limits.
Bold indicates the concentration exceeds the ODWS.

In general, the analyses indicate the majority of parameters meet the ODWS. There were no health related parameter exceedances of the ODWS within these water samples. The chemical results indicate that the following parameters exceeded the ODWS aesthetic and operational objectives for the following:

- Organic Nitrogen (Dug Well);
- Hardness (both locations);
- Turbidity (Dug Well); and
- Total Dissolved Solids (319197 Grey Rd 1).

Nitrate concentrations were low in both wells. Elevated hardness is related to the overburden materials containing calcium and to a lesser extent, magnesium. Elevated hardness is a common trait of groundwater supplies in Southern Ontario and, if desired, can be treated using commercially available treatment equipment such as a water softener. Organic nitrogen is an operational guideline with the primary concern being that organic nitrogen compounds frequently contain amine groups, which can react with chlorine and severely reduce its disinfectant power. Treatment of well water by chlorine is not expected and is not considered to be a significant issue.

6. Conclusions and Recommendations

Supporting data upon which our recommendations are based have been presented in the foregoing sections of this report. The following recommendations are governed by the physical properties of the subsurface materials that were encountered at the site and assume that they are representative of the overall site conditions. It should be noted that these conclusions and recommendations are intended for use by the designers only. Contractors bidding on or undertaking any work at the Site should examine the factual results of the assessment, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of this factual data as it affects their proposed construction techniques, equipment capabilities, costs, sequencing, and the like. Comments, techniques, or recommendations pertaining to construction should not be construed as instructions to the contractor.

Based on the results of our hydrogeologic review, it is our professional opinion that the Site is suitable for the proposed residential development. It is our professional opinion that there is low potential for groundwater and surface water impact as a result of developing the Site. It is recommended that good construction and mitigation techniques must be used to minimize the potential for impact. Detailed conclusions and recommendations are presented in the following sections regarding the water balance and impacts to groundwater and surface water resources.

6.1 Water Balance Evaluation

An evaluation of the water balance was completed to compute the potential impacts that may occur in the recharge / discharge characteristics related to the proposed development. The objective of the water balance is to ensure that post-development infiltration with the developable area meets the pre-development values. The computations have used detailed parameters such as precipitation (Owen Sound MOE from 1981 to 2010 was used), regional evapotranspiration, infiltration and runoff. Weather data from Owen Sound MOE was selected as it was the closest weather station to the Site (about 9 km to the south). The detailed calculations can be reviewed in Appendix F.

The area to be developed is 18.26 ha based on information provided by the Client. Below is a summary of the expected pre-development water balance values for the proposed development based on the current information.

6.1.1 Predevelopment Water Balance

The pre-development water balance incorporated the existing soils, slope and agricultural areas. The infiltration factor for the area was calculated from the table of values presented in the “Land Development Guidelines” (MOEE, 1995). It is based on three sub-factors which are:

- Topography sub-factor;
- Soil sub-factor; and
- Cover sub-factor.

Groundwater and surface flow direction is towards Georgian Bay. The slope is considered as "rolling" (slope of 2.8 to 3.8 m per km). The soils are generally comprised of silt and clay. The existing vegetation is currently a mixture of forest; tall grasses; and manicured lawn. The pre-development calculations also included one (1) existing house and a garage.

Table 6.1 summarizes the expected pre-development water balance values for the Site.

Table 6.1 Pre-Development Summary

Total Precipitation (Owen Sound MOE):	- 1114.5 mm/year
Regional Evapotranspiration:	- 588 mm/year
Recharge Available:	- 526.5 mm/year
Area of Recharge Available (Site):	- 18.26 ha
Total Water Surplus:	- 96,189 m^3/year
Total Estimated Infiltration:	- 21,045 m^3/year
Total Estimated Runoff:	- 75,144 m^3/year

Based upon these calculations, the overall Site infiltrates on the order of 21,045 m^3 per year or about 115 mm/year. Based upon the soil encountered during our test hole program (silty clay), infiltration is expected to be minimal.

6.1.2 Post Development Water Balance (No Enhancements)

The computation of the water budget was repeated for the proposed development assuming no mitigation techniques, that is, runoff from impervious surfaces is unrecoverable (stormwater from rooftops and asphalt is modelled to be discharged directly to storm sewers) and not infiltrated into the ground. The anticipated impact of the development is related to increased runoff from imperious surfaces such as the residential development roof tops and asphalt areas. These are assumed to be impervious surfaces with zero infiltration capacity in this model. A summary of the computations is provided in Table 6.2.

Table 6.2 Post-Development Summary (No Enhancements)

Area of Site:	- 18.26 ha
Total Water Surplus:	- 122,569 m^3/year
Total Estimated Infiltration:	- 11,595 m^3/year
Infiltration % Difference (pre- vs. post-):	- (-45%) (decrease)
Total Estimated Runoff:	- 110,974 m^3/year
Runoff % Difference (pre- vs. post-):	- 48% (increase)

Assumptions that were made in order to compute the post-development water budget in Table 6.2 included the impermeable (i.e. 0% infiltration) surface area of asphalt and development roof tops.

Under this scenario, the total infiltration volume decreased by 45% and runoff volume increased by nearly 50%.

Based upon this scenario, mitigative strategies are required to minimize infiltration losses and reduce storm water runoff. The following section discusses the water balance after considering enhanced infiltration options.

6.1.3 Post Development Water Balance (Enhanced Infiltration)

The post-construction water budget computations were repeated considering enhanced infiltration options which are also known as Low Impact Development (LID) technologies. These technologies include and are not restricted to rainwater harvesting, downspout disconnection, infiltration trenches, vegetated filter strips, bioretention, permeable pavement, enhanced grass swales, dry swales and perforated pipe systems in order to balance the water budget and maintain the downgradient wetland features. The shallow subsurface soils are topsoil underlain by silty clay. It is noted that LIDs can work in any soil type.

The primary enhancement for this Site is to direct water from the roof tops to areas where infiltration can occur. The post-development water balance was modelled to include the disconnection of downspouts from storm sewers and directing water from roof tops to lawn / landscaped areas. It is also assumed that grading and levelling will occur for the development increasing the infiltration potential. A summary of the post-construction water budget with enhancements for infiltration is presented in Table 6.3.

Table 6.3 Post-Development Summary (With Enhanced Infiltration)

Area of Site:	- 18.26 ha
Total Water Surplus:	- 122,569 m^3/year
Total Estimated Infiltration:	- 21,045 m^3/year
Infiltration % Difference (pre- vs. post-):	- (0%) (no change from pre-dev)
Total Estimated Runoff:	- 101,524 m^3/year
Runoff % Difference (pre- vs. post-):	- 35% (increase)

In this scenario, the infiltration values have been modelled to show no change compared with pre-development values. Based upon the water balance calculations, it is our professional opinion that there would be minimal impact to the local groundwater regime and minimal impact to the surface water regime from a quantity perspective due to the proposed development.

6.2 Impact on Groundwater Baseflow

The importance of the groundwater baseflow is that, depending upon the hydraulic functionality with the Site, it provides discharge to water bodies, wetlands and downgradient wells. Water infiltrating into the silty clay is minimal and water balance calculations suggest that the infiltration to the subsurface can be kept at pre-development values. It is GHD's professional opinion that there is no expected impact to the shallow groundwater baseflow that may be supplying baseflow to the downgradient features.

6.3 Impact on Surface Water Bodies

The impacts to surface water bodies are related to the reduction of the groundwater baseflow and water quality concerns related to human activities such as road salting, minor fuel and oil leaks, fertilizer application etc. It is expected that there will be no impacts to groundwater and neighbouring surface water bodies. Runoff from the development will conform to the stormwater management report for the Site.

6.4 Mitigation Measures

Several mitigative techniques have been recommended in order to address concerns relating to the potential for impact to the base flow. The impact and mitigation measures can be arranged into two (2) distinct categories: construction phase and operational phase. Prior to construction, storm water management techniques should be incorporated to control additional surface water runoff and permit enhanced infiltration into the surrounding ground. Storm water management techniques will minimize the potential for groundwater impact and also minimize the amount of silt or other fine-grained soil particles becoming mobile and entering into downgradient areas. The installation of strategically placed silt fences will reduce flow velocities of storm water enabling particulate to settle out prior to entering downgradient areas.

During the operational phase of the development, it is expected that storm water excess will be controlled as per the Stormwater Management report. As indicated above, LIDs will be required to maintain pre-development infiltration values and reduce storm water runoff and will be incorporated into the site plan at the detailed design stage.

6.5 Servicing

6.5.1 Water Supply

Private services for water are not considered as the Site will be connected to municipal water services. However, any wells at the Site are recommended to be decommissioned in accordance with Ontario Regulation 903 prior to development of the Site.

6.5.2 Septic Waste Disposal

A detailed assessment of the septic system suitability is required to determine the potential impact of individual sewage systems at the Site on groundwater resources since the proposed lot sizes are less than one (1) hectare in area on average. The Site is not considered to be hydrogeologically sensitive (Procedure D-5-4, MOE, 1996). No karst formations were observed. The MOE dilution model was used to confirm that the projected post-development nitrate concentration meets the drinking water standard of 10 mg/L for nitrate. It is our professional opinion that the Site is suitable for the construction of septic waste disposal systems.

The overburden materials were investigated during the advancement of 8 test pits. The soils encountered generally consisted of topsoil then silty clay. Test pits were excavated to a maximum depth of 3.4 m. Bedrock was not observed. No karst formations or indicators of karst were observed within any of the test holes.

The T-time of the underlying soil is estimated to be greater than 50 min/cm. Based upon the subsurface soils in the area of the proposed leaching beds, it is recommended that the waste disposal systems be designed as fully raised bed systems. A detailed review of the expected waste disposal impacts and recommendations are presented in the following sections.

6.5.2.1 Development Impact

For the purposes of calculating the potential impact of the planned residential development, 1,000 L/day/household is considered to be an acceptable septic effluent loading rate. Therefore, a proposed development of 33 lots is expected to generate about 33,000 L/day (33 m^3/day) of septic effluent. While most constituents in septic effluent are usually removed within a short distance of movement within soil, mobile constituents such as chlorides and nitrates will require sustained dilution to meet the drinking water standards of 10 mg/L N for nitrate.

The MOECC normally considers sewage from a Class 4 waste disposal system will contain 40 mg/L of nitrate. For the purpose of assessing the impact of projected nitrate loading, the dilution requirement of 4:1 was utilized in the impact computations.

A summary of the applicable parameters that were considered in the waste disposal evaluation and the computation of the projected nitrate concentration are presented below in Table 6.4. The detailed calculations can be reviewed in Appendix G. The calculations used a recharge rate of 115 mm/year for silty clay based on exploratory test pits. A shallow water sample was collected from the dug well at the Site to define the existing shallow groundwater background nitrate concentration. The analytical result for nitrate was 0.026 mg/L (refer to Appendix E for the certificate of analysis).

Using dilution only, the nitrate concentration generated from sewage at the Site is calculated to be 14.6 mg/L and exceeds 10 mg/L (ODWS for nitrate in drinking water). The clayey nature of the subsurface soils indicates that nitrate impact will not impact local groundwater sources by the installation of Class IV sewage disposal systems (or connection to a municipal sewer system in the future). Raised tile beds are recommended for the development. Tertiary septic system could be considered for the improvement of sewage effluent for these lots.

Table 6.4 provides a summary of the septic impact parameters for the proposed development

Table 6.4 Nitrate Impact Assessment Summary

Recharge Available Based on Soils:	- 115 mm/yr
Dilution Area:	- 18.26 ha
Background Nitrate:	- 0.026 mg/L
Residential Nitrate Loading (40 mg/L x 33,000 L/day):	- 1,320,000 mg/day
Projected Nitrate Concentration (33 lots at 115 mm/year):	- 14.6 mg/L

6.5.2.2 Waste Disposal Requirements

Based on the results of this assessment, it is our professional opinion that the Site is suitable for a private septic waste disposal system. Fill will be required and drainage patterns and storm drainage will be re-directed and controlled as part of the grading plan.

It is recommended that the septic systems use fully raised absorption trench leaching beds. The waste disposal systems should meet Ontario Regulation 350/06 made under the Building Code Act, 1992 and incorporate the following design features:

1. Organics should be stripped from the area of the leaching beds and downgradient mantle.

2. The exposed subgrade below the tile beds should be trimmed and scarified, and provided with a gentle slope of 0.5% in the direction of the mantle.
3. The tile beds should be constructed as fully raised leaching type beds to the full height of at least 1 m above existing grade. The raised beds should consist of clean, granular fill capable of providing an in-place percolation rate (T-time) of 4 to 8 min/cm.
4. The mantle should be constructed along the downgradient margin of the raised beds. Each mantle should extend along the full width of the bed and for a minimum of 15 m downgradient from the bed. The mantle should consist of similar granular fill raised to a minimum of 250 mm above the surrounding grade. Surface runoff should be diverted away from the leaching beds by means of proper site drainage.
5. The waste disposal systems should be kept clear of surface drainage swales, roof leader drains, and other sources of surface water.
6. The tile beds should be kept away from shade trees and a healthy cover of vegetation should be developed and maintained over the beds to promote evapotranspiration.
7. When sighting tile beds on sloping ground, it is recommended that procedures outlined in the Building Code be followed closely.
8. Minimum set back distances from septic tank (plus 2 times height raised):
    a) Building – 1.5 m
    b) Property line – 3 m
    c) Drilled Well – 15 m
    d) Open water course – 15 m
9. Minimum set back distances from septic tile bed (plus 2 times height raised):
    a) Building – 5 m
    b) Property line – 3 m
    c) Drilled well, properly sealed – 15 m
    d) Shallow well – 30 m
    e) Open water course – 15 m
10. The layout, design and construction of the waste disposal bed should be subject to inspection by experienced hydrogeologic personnel.

The tile beds should be sized according and will likely be about 400 square metres for a conventional system based upon a T-time of 8 min/cm and a 15 m mantle in the direction of flow. It is our opinion that there is sufficient area within the proposed lots to support the tile bed and house. New technologies are available that can reduce the size of the footprint of the conventional septic system. As outlined above, tertiary treatment systems will be needed if 33 lots are to be developed. If other new technology septic systems are incorporated into the design, it is recommended that the systems be installed as per the Ontario Building Code

6.6 Summary Conclusions

In summary, the proposed development area is generally comprised of topsoil underlain by silty clay. Bedrock or karst topography was not encountered during the hydrogeological assessment. Minimal water seepage was observed within the till at depths 2.4 to 3.0 m during the test pit program. Based upon the water level measurements, the flow direction is toward Georgian Bay.

It is our opinion that there will not be any constraints for development from a groundwater perspective as the existing seepage and water from within the silty clay is minimal and can be handled with appropriate engineering techniques. It is expected that groundwater will generally be below the depth of the future development. If groundwater volumes of greater than 50,000 L/day are to be pumped during construction activities then a permit applied for through the EASR would be required from the MOECC. If the volumes are to exceed 400,000 L/day, a PTTW would be required. Based upon the groundwater observed, these permits are not anticipated.

The MOECC well records indicate that wells in the area are either shallow dug / bored or drilled bedrock wells. The shallow dug / bored wells have an average depth of about 4.4 m and groundwater encountered at about 2.4 m. The drilled bedrock wells have an average depth of about 27.6 m and groundwater encountered at about 13.9 m. A door-to-door well survey was conducted which indicated that the area is municipally serviced with some existing wells still in use. The existing wells are generally upgradient of the proposed development. Two wells are considered to be cross-gradient on Church Side Road East. Impacts to the existing wells from the proposed development are not expected as the development will be municipally serviced.

There are minimal impacts expected to groundwater and surface water as a result of the future development provided that appropriate planning (i.e. incorporation of LIDs as supported by the water balance calculations), mitigation measures and proper construction techniques are considered. Based upon water directed from the rooftops to lawn / landscaped areas, the infiltration is expected to remain the same compared to pre-development values.

The clayey nature of the subsurface soils indicates that nitrate impact will not impact local groundwater sources by the installation of Class IV sewage disposal systems (or connection to a municipal sewer system in the future). Raised tile beds are recommended for the development. Tertiary septic system could be considered for the improvement of sewage effluent for these lots.

In summary, provided that the waste disposal system is properly constructed, no significant impact is anticipated on downgradient receptors from this development. It is GHD's opinion that the results of this hydrogeological assessment support the approval of the proposed 33-lot residential development at this Site.

The following Statement of Limitations should be read carefully and is an integral part of this report. We trust this report meets your immediate needs. Should any questions arise regarding any aspect of our report, please contact our office.

Sincerely,

GHD

Jason Geraldi, M.Sc.

Robert Neck, M.Eng., P.Geo. (Limited)

Nyle McIlveen, P.Eng.

7. References

Chapman and Putnam, 1966. The Physiography of Southern Ontario, 2nd Edition. University of Toronto Press.

Chapman and Putnam, 1984. The Physiography of Southern Ontario, 3rd Edition. Ministry of Natural Resources.

City of Toronto, November 2006. Wet Weather Flow Management Guidelines.

Conservation Authority Guidelines for Development Applications, June 2013. Hydrogeological Assessment Submissions.

Credit Valley Conservation and Toronto and Region Conservation Authority. Low Impact Development Stormwater Management Planning and Design Guide. Version 1.0. 2010.

Freeze, R. Allan and Cherry, John A. 1979. Groundwater.

8. Statement of Limitations

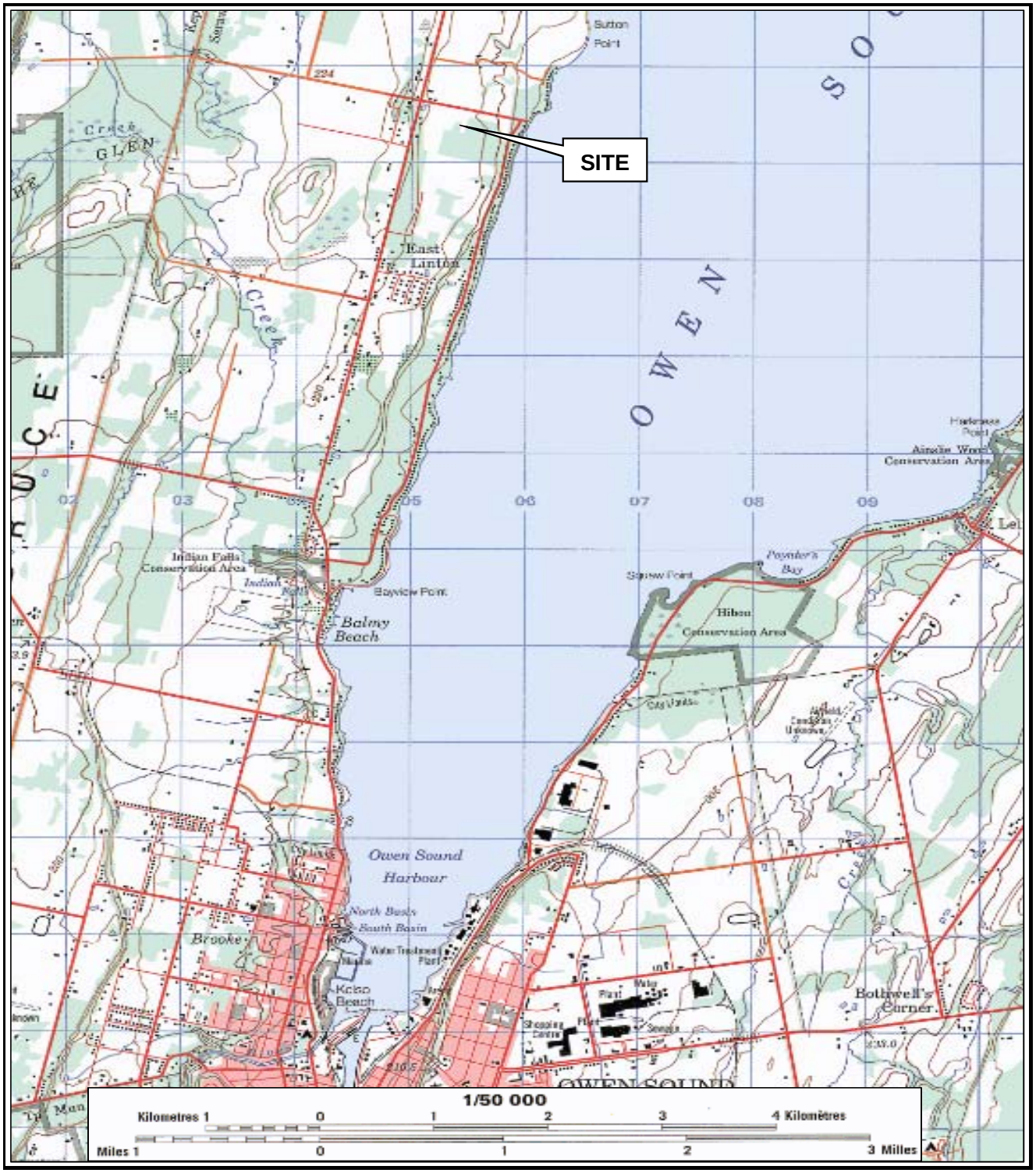
This report is intended solely for MJD Investments Inc. in assessing the hydrogeological aspects of the property (343622 Church Side Road East, Owen Sound, Ontario) and is prohibited for use by others without GHD's prior written consent. This report is considered GHD's professional work product and shall remain the sole property of GHD. Any unauthorized reuse, redistribution of or reliance on the report shall be at the Client and recipient's sole risk, without liability to GHD. Client shall defend, indemnify and hold GHD harmless from any liability arising from or related to Client's unauthorized distribution of the report. No portion of this report may be used as a separate entity; it is to be read in its entirety and shall include all supporting drawings and appendices.

The recommendations made in this report are in accordance with our present understanding of the project, the current site use, ground surface elevations and conditions, and are based on the work scope approved by the Client and described in the report. The services were performed in a manner consistent with that level of care and skill ordinarily exercised by members of hydrogeological engineering professions currently practicing under similar conditions in the same locality. No other representations, and no warranties or representations of any kind, either expressed or implied, are made. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

All details of design and construction are rarely known at the time of completion of a hydrogeological study. The recommendations and comments made in the study report are based on our subsurface investigation and resulting understanding of the project, as defined at the time of the study. We should be retained to review our recommendations when the drawings and specifications are complete. Without this review, GHD will not be liable for any misunderstanding of our recommendations or their application and adaptation into the final design.

It is important to emphasize that a soil investigation is, in fact, a random sampling of a site and the comments included in this report are based on the results obtained at the test hole locations only. The subsurface conditions confirmed at the test hole locations may vary at other locations. The subsurface conditions can also be significantly modified by the construction activities on site (ex. excavation, dewatering and drainage, blasting, pile driving, etc.). These conditions can also be modified by exposure of soils or bedrock to humidity, dry periods or frost. Soil and groundwater conditions between and beyond the test locations may differ both horizontally and vertically from those encountered at the test locations and conditions may become apparent during construction which could not be detected or anticipated at the time of our assessment. Should any conditions at the site be encountered which differ from those found at the test locations, we request that we be notified immediately in order to permit a reassessment of our recommendations. If changed conditions are identified during construction, no matter how minor, the recommendations in this report shall be considered invalid until sufficient review and written assessment of said conditions by GHD is completed.

Enclosures



Base map complied from Energy, Mines and Resources Canada Map 41A/10 published 1999.

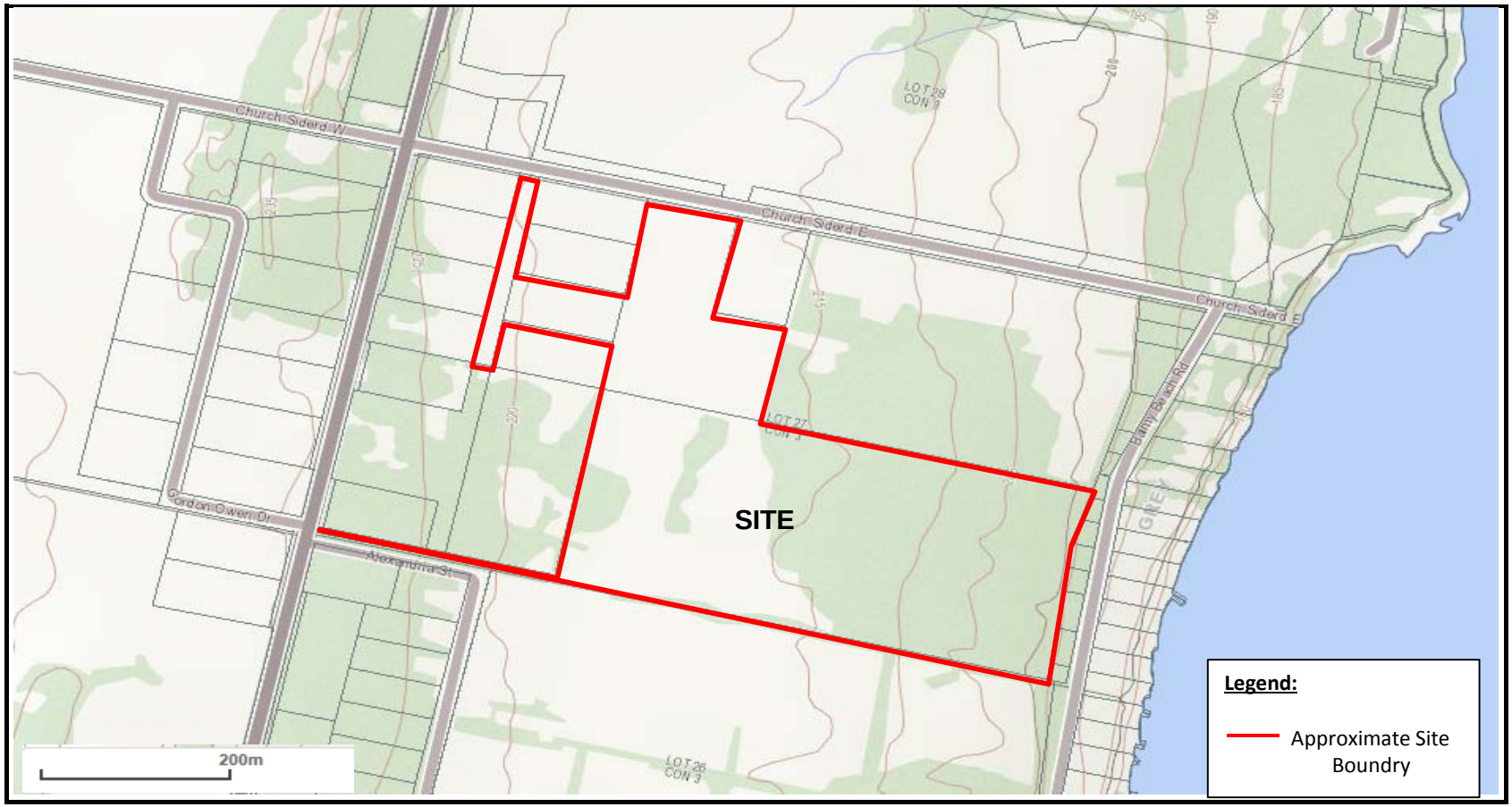
Scale:
1:50000
Coordinate System
NAD 1983 UTM

MJD Investments Inc.
343622 Church Side Rd E, Owen Sound
Hydrogeological Assessment

11139368-01
June 2017

Vicinity Plan

FIGURE 1



Source: Ministry of Natural Resources and Forestry. © Queen's Printer for Ontario, 2014.

Scale:
Refer to Scale Bar
Coordinate System:
NAD 1983 UTM Zone 17

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Site Plan

FIGURE 2

Source: Google Earth. © 2017 Google. Image retrieved 6/1/2017.

Scale:
Refer to Scale Bar
Coordinate System:
NAD 1983 UTM Zone 17

MJD Investments Inc.
343622 Church Side Rd E, Owen Sound
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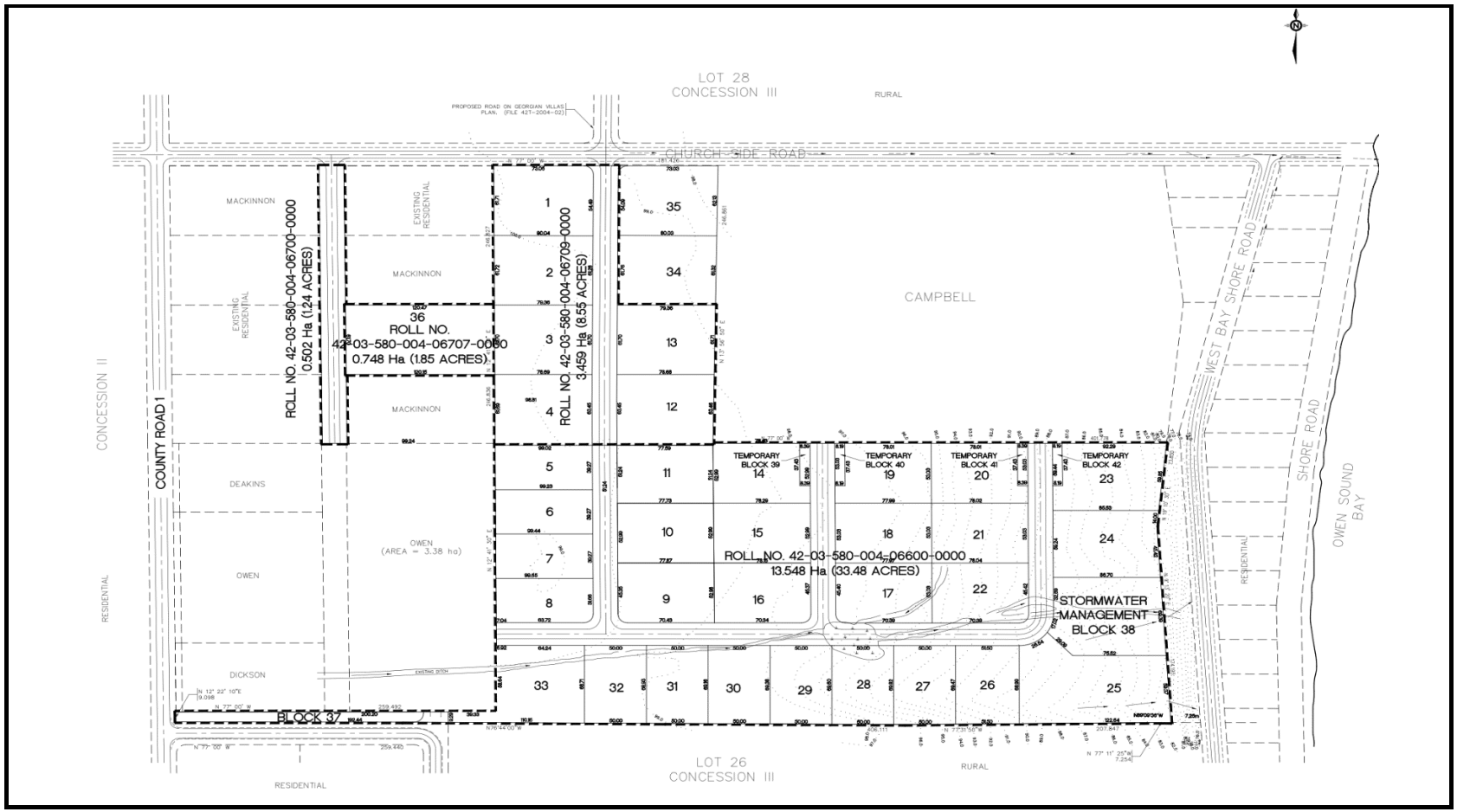
June 2017

Plot Plan

FIGURE 3



Source: MJ Davenport and Associates Limited. Dated October 2006. Drawing No. 3969-CP1.

Scale:
Refer to Scale Bar
Coordinate System:
NAD 1983 UTM Zone 17

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Hydrogeological Assessment

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June 2017

Concept Plan

FIGURE 4

Source: MNRF NRVIS, 2014. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry. © Queen's Printer 2017.

Scale:
Refer to Scale Bar
Coordinate System:
NAD 1983 UTM Zone 17

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Hydrogeological Assessment

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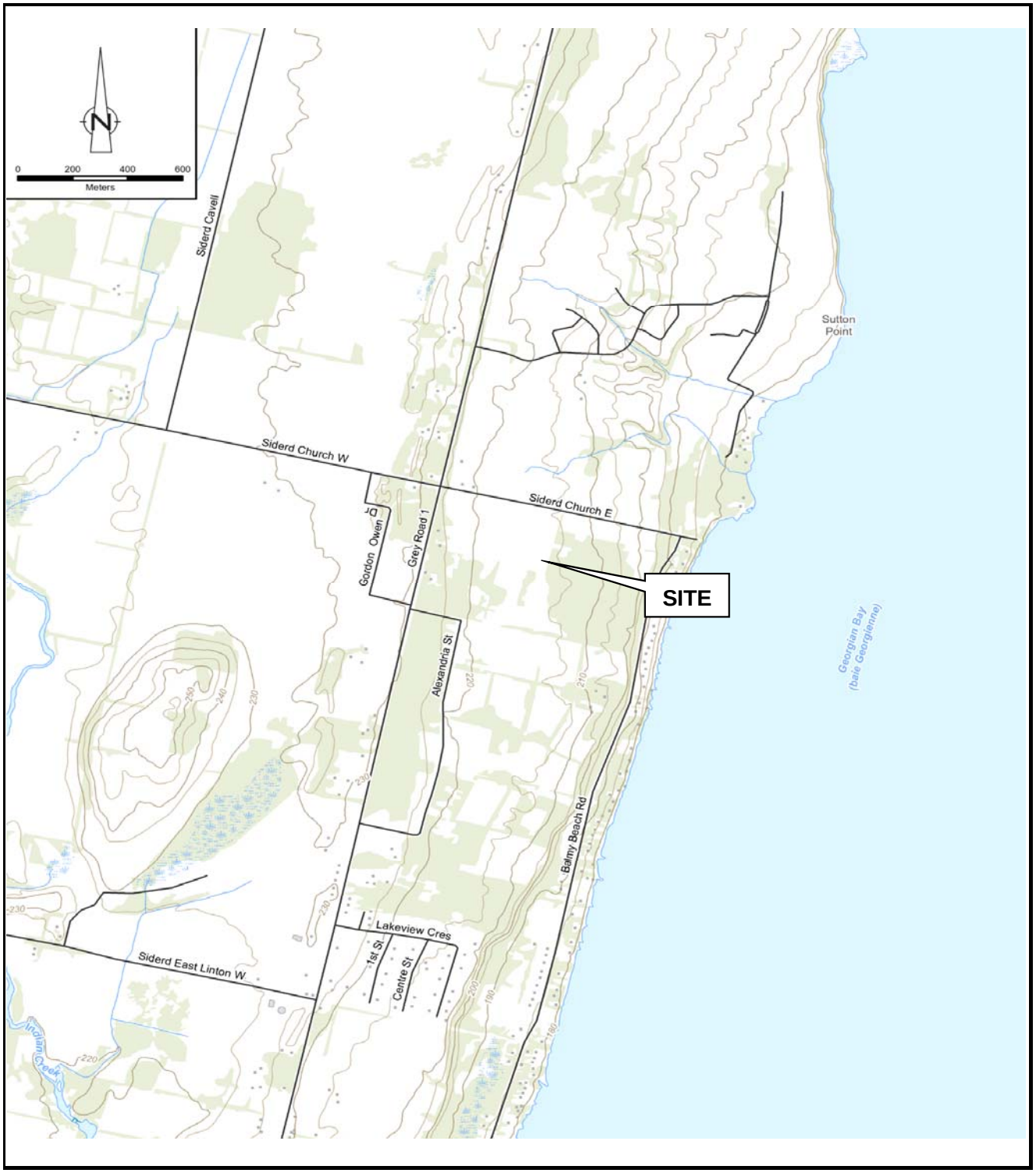
June 2017

Test Hole Plan

FIGURE 5



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Scale:
Refer to Scale Bar
Coordinate System:
NAD 1983 UTM Zone 17

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Hydrogeological Assessment

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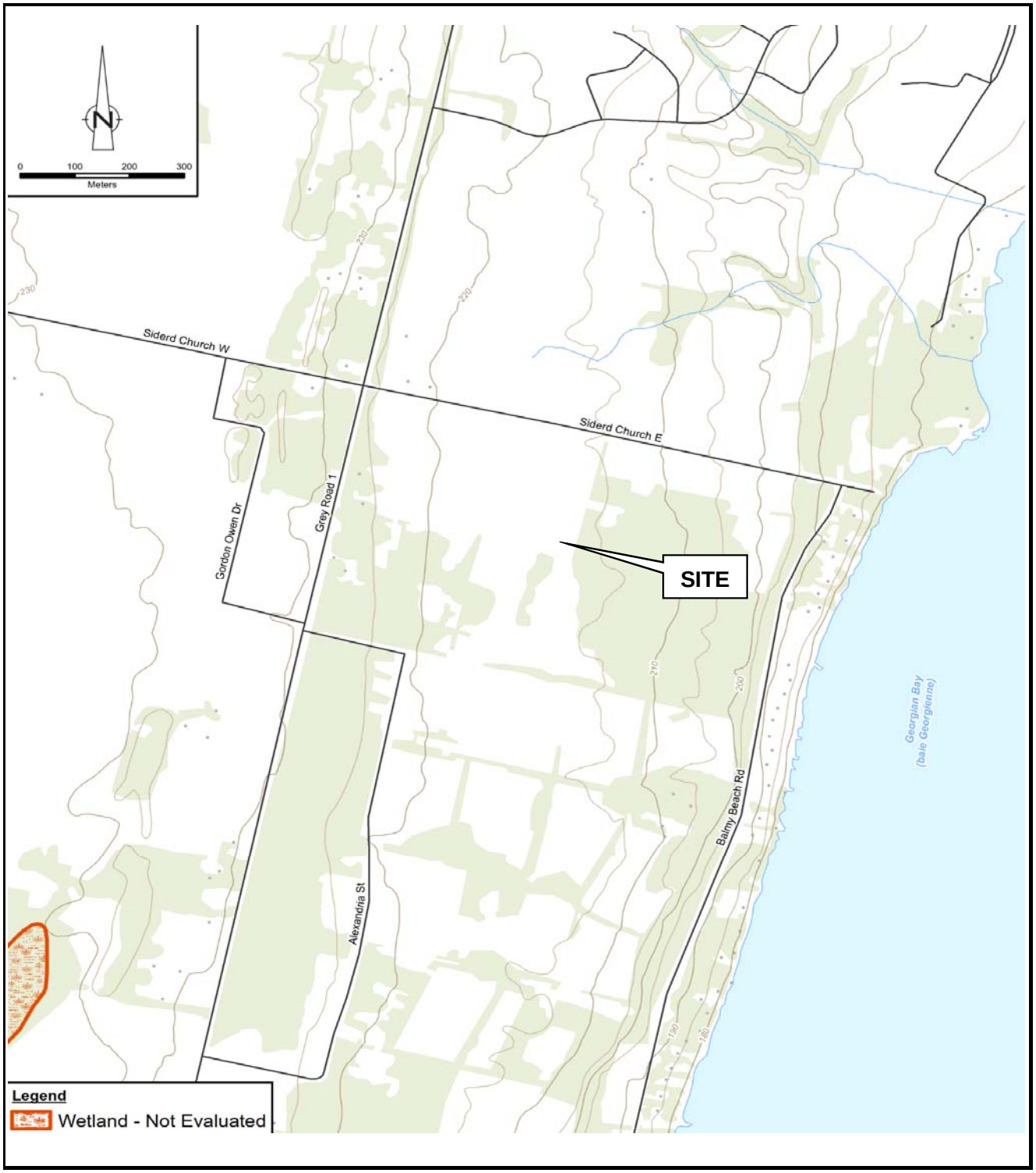
Topography

FIGURE 6



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Scale:
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Coordinate System:
NAD 1983 UTM Zone 17

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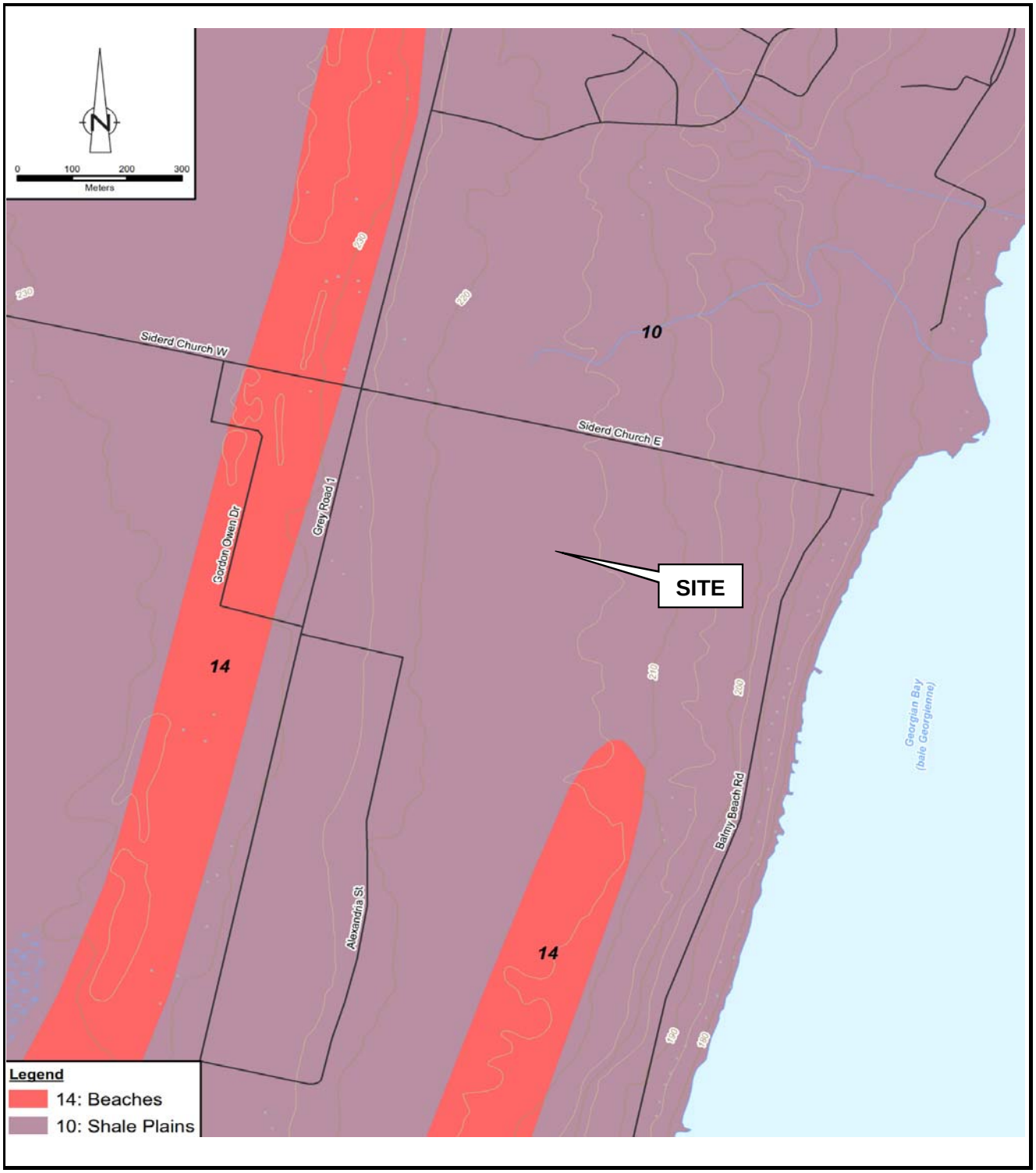
Wetland Areas

FIGURE 7



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Scale:
Refer to Scale Bar
Coordinate System:
NAD 1983 UTM Zone 17

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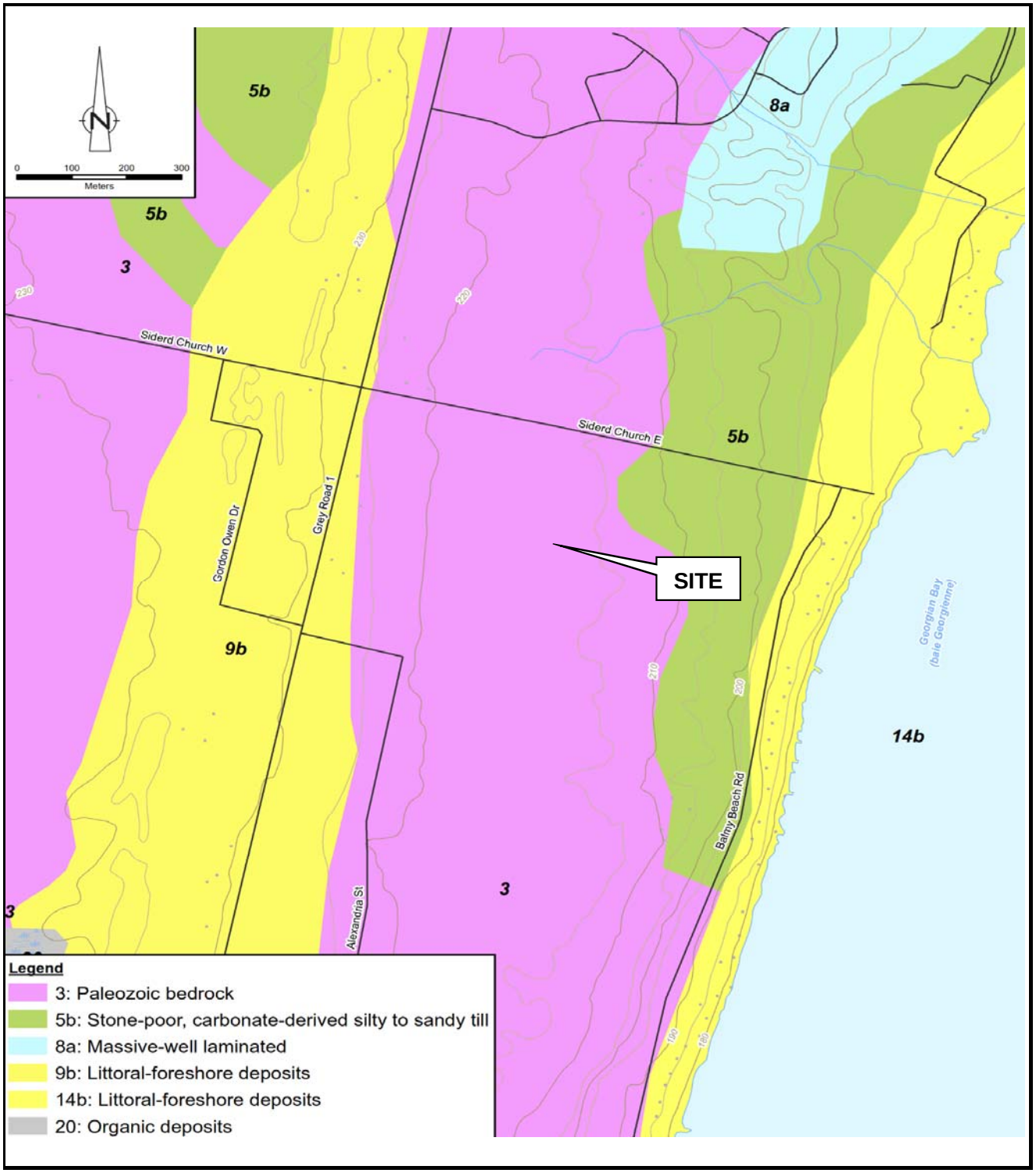
June 2017

Physiography

FIGURE 8



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Coordinate System:
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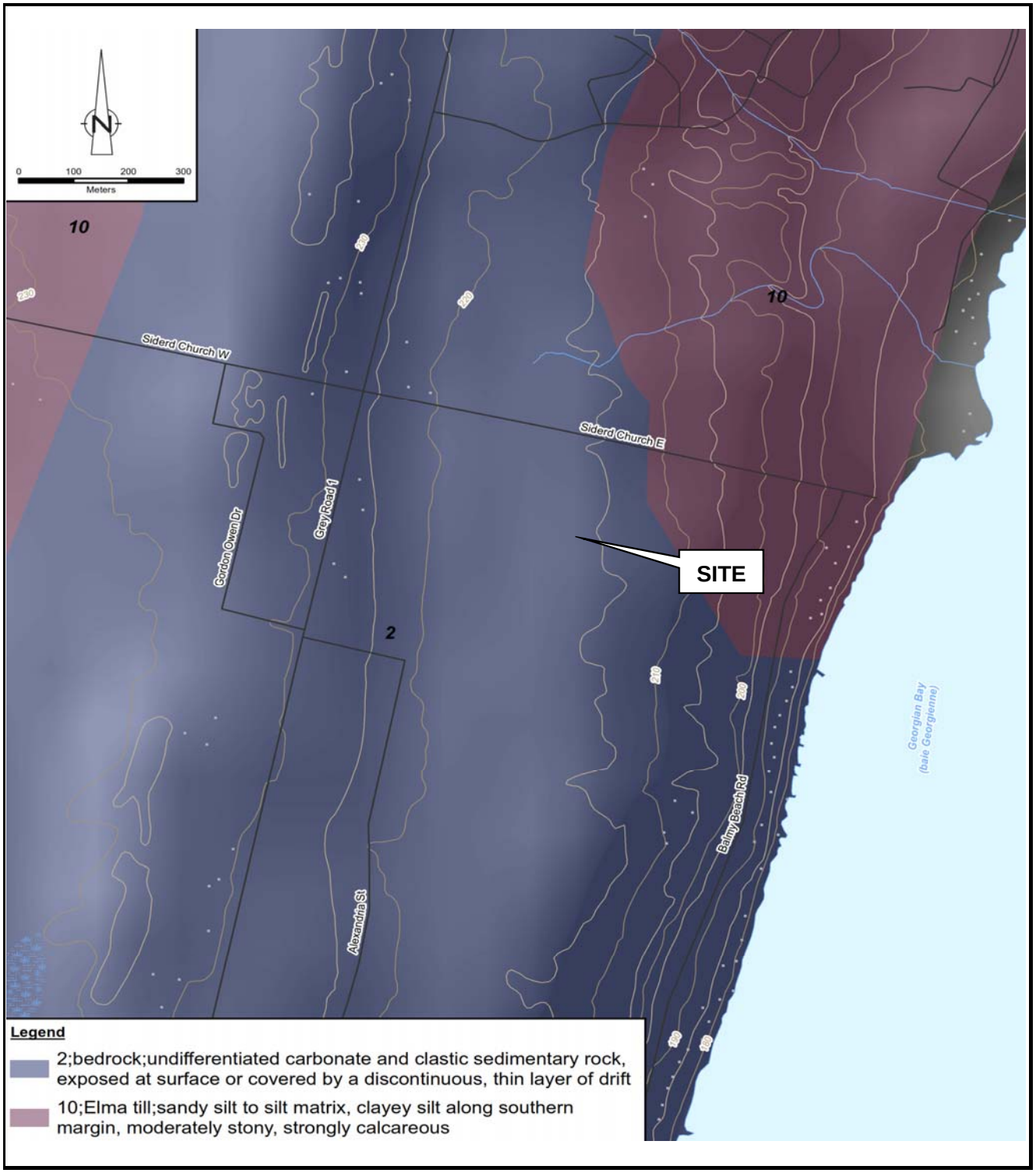
Surficial Geology FIGURE 9



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June 2017

Quaternary Geology

FIGURE 10

Appendix A
Soils Exploration Data

REFERENCE No.: 11139368-01 ENCLOSURE No.: A-1

TEST PIT No.: TP-01
ELEVATION: 216.9 m

TEST PIT REPORT

Page: 1 of 1

CLIENT: MJD Investments Inc.
PROJECT: Hydrogeological Assessment, 343622 Church Side Road East, Owen Sound
LOGGED BY: JG DATE: 9 May 2017
EXCAVATION COMPANY: Harold Sutherland METHOD: Excavator
NOTES:

LEGEND
GS - GRAB SAMPLE
▼ - WATER LEVEL

Depth (ft / m)	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Moisture Content (%)	Shear test (Cu) / Sensitivity (S) / Water content (%) / Atterberg limits (w_p, w_l) — △ Field, □ Lab	COMMENTS
ft / m	0.0		GROUND SURFACE		%	10 20 30 40 50 60 70 80 90	
	0.1		**TOPSOIL**				
1 / 0.5			**SILTY CLAY** - Reddish Brown Silty Clay, trace Sand, occasional Rootlets, compact, moist	GS-1	17	○	
3 / 1.0				GS-2	16	○	GS-2: 1% Sand 99% Silt and Clay 34% between 5 and 75 um
5 / 1.5	1.5		Greyish, hard				
6 / 2.0				GS-3	10	○	WL - 1.8 m May 9, 2017 GS-3: 3% Sand 97% Silt and Clay 39% between 5 and 75 um
8 / 2.5			Water seepage encountered at 2.6 m.				
	2.6		END OF TEST PIT				
10 / 3.0							
11 / 3.5							

TEST PIT LOG GEOTECH 11139368-01, 17-05-11, TEST PIT LOGS, WM JG.GPJ GEOLOGIC.GDT 23/6/17

REFERENCE No.: 11139368-01 ENCLOSURE No.: A-2

TEST PIT No.: TP-02
ELEVATION: 217.6 m

TEST PIT REPORT

Page: 1 of 1

CLIENT: MJD Investments Inc.
PROJECT: Hydrogeological Assessment, 343622 Church Side Road East, Owen Sound
LOGGED BY: JG DATE: 9 May 2017
EXCAVATION COMPANY: Harold Sutherland METHOD: Excavator
NOTES:

LEGEND
GS - GRAB SAMPLE
▼ - WATER LEVEL

Depth ft	Depth m	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Moisture Content %	Shear test (Cu) / Sensitivity (S) / Water content (%) / Atterberg limits (w_p w_l) 10 20 30 40 50 60 70 80 90	COMMENTS
		0.0		GROUND SURFACE				
		0.1		**TOPSOIL**	GS-1	38		
1	0.5			**SILTY CLAY** - Reddish Brown Silty Clay, trace Sand, hard, moist				WL - 0.5 m May 9, 2017
3	1.0							
4					GS-2	11		
5	1.5							
8	2.5			Water seepage encountered at 2.4 m.				
9		2.7		END OF TEST PIT				
10	3.0							
11	3.5							

TEST PIT LOG GEOTECH 11139368-01, 17-05-11, TEST PIT LOGS, WM JG.GPJ GEOLOGIC.GDT 23/6/17

REFERENCE No.: 11139368-01 ENCLOSURE No.: A-3

TEST PIT No.: TP-03
ELEVATION: 217.7 m

TEST PIT REPORT

Page: 1 of 1

CLIENT: MJD Investments Inc.
PROJECT: Hydrogeological Assessment, 343622 Church Side Road East, Owen Sound
LOGGED BY: JG DATE: 9 May 2017
EXCAVATION COMPANY: Harold Sutherland METHOD: Excavator
NOTES:

LEGEND
GS - GRAB SAMPLE
▼ - WATER LEVEL

Depth (ft / m)	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Moisture Content (%)	Shear test (Cu) / Sensitivity (S) / Water content (%) / Atterberg limits (%) (△ Field, □ Lab)	COMMENTS
ft / m	0.0		GROUND SURFACE		%	10 20 30 40 50 60 70 80 90	
			TOPSOIL	GS-1	37		
	0.2		**SILTY CLAY** - Reddish Brown Silty Clay, trace Sand, hard, moist				
1 / 0.5							
2							
3 / 1.0				GS-2	16		WL - 0.8 m May 9, 2017
4							
5 / 1.5							
6							
7 / 2.0							
8							
9 / 2.5							
10 / 3.0			Water seepage encountered at 3.0 m.				
11	3.4		END OF TEST PIT				
3.5							

TEST PIT LOG GEOTECH 11139368-01, 17-05-11, TEST PIT LOGS, WM JG.GPJ GEOLOGIC.GDT 23/6/17

REFERENCE No.: 11139368-01 ENCLOSURE No.: A-4

TEST PIT No.: TP-04
ELEVATION: 218.2 m

TEST PIT REPORT

Page: 1 of 1

CLIENT: MJD Investments Inc.
PROJECT: Hydrogeological Assessment, 343622 Church Side Road East, Owen Sound
LOGGED BY: JG DATE: 9 May 2017
EXCAVATION COMPANY: Harold Sutherland METHOD: Excavator
NOTES:

LEGEND
GS - GRAB SAMPLE
▼ - WATER LEVEL

Depth (ft / m)	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Moisture Content (%)	Shear test (Cu) / Sensitivity (S) / Water content (%) / Atterberg limits (w_p, w_l) — △ Field, □ Lab	COMMENTS
ft / m	0.0		GROUND SURFACE		%	10 20 30 40 50 60 70 80 90	
			TOPSOIL				
	0.2		**SILTY CLAY** - Reddish Brown Silty Clay, trace Sand, occasional Cobbles, Boulders and Rootlets, hard, moist				
1 / 0.5	0.6		Reddish Brown to Grey Silty Clay, trace Sand, hard, moist				
3 / 1.0				GS-1	14	○	
5 / 1.5							
6 / 2.0							WL - 1.9 m May 9, 2017
8 / 2.5							
9	2.7		Water seepage encountered at 2.7 m. END OF TEST PIT				
10 / 3.0							
11 / 3.5							

REFERENCE No.: 11139368-01 ENCLOSURE No.: A-5

TEST PIT No.: TP-05
ELEVATION: 216.1 m

TEST PIT REPORT

Page: 1 of 1

CLIENT: MJD Investments Inc.
PROJECT: Hydrogeological Assessment, 343622 Church Side Road East, Owen Sound
LOGGED BY: JG DATE: 9 May 2017
EXCAVATION COMPANY: Harold Sutherland METHOD: Excavator
NOTES:

LEGEND
GS - GRAB SAMPLE
▼ - WATER LEVEL

Depth (ft / m)	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Moisture Content (%)	Shear test (Cu) / Sensitivity (S) / Water content (%) / Atterberg limits (w_p, w_l) — △ Field, □ Lab	COMMENTS
ft / m	0.0		GROUND SURFACE		%	10 20 30 40 50 60 70 80 90	
			TOPSOIL				
	0.2		**SILTY CLAY** - Grey to Reddish Brown Silty Clay, trace Sand, hard, moist	GS-1	17	○	WL - 0.5 m May 9, 2017
1 / 0.5							
2 / 1.0							
3 / 1.5							
4 / 2.0				GS-2	9	○	GS-2: 4% Sand 96% Silt and Clay 38% between 5 and 75 um
5 / 2.5	2.1		Reddish Brown				
6 / 3.0			Water seepage encountered at 2.6 m.	GS-3	10	○	GS-3: 1% Sand 99% Silt and Clay 46% between 5 and 75 um
7 / 3.5	2.7		END OF TEST PIT				

TEST PIT LOG GEOTECH 11139368-01, 17-05-11, TEST PIT LOGS, WM JG.GPJ GEOLOGIC.GDT 23/6/17

REFERENCE No.: 11139368-01 ENCLOSURE No.: A-6

TEST PIT No.: TP-06
ELEVATION: 216.1 m

TEST PIT REPORT

Page: 1 of 1

CLIENT: MJD Investments Inc.
PROJECT: Hydrogeological Assessment, 343622 Church Side Road East, Owen Sound
LOGGED BY: JG DATE: 9 May 2017
EXCAVATION COMPANY: Harold Sutherland METHOD: Excavator
NOTES:

LEGEND
GS - GRAB SAMPLE
▼ - WATER LEVEL

Depth ft	Depth m	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Moisture Content %	Shear test (Cu) / Sensitivity (S) / Water content (%) / Atterberg limits (w_p w_l) — △ Field □ Lab	COMMENTS
		0.0		GROUND SURFACE			10 20 30 40 50 60 70 80 90	
				TOPSOIL				
		0.2		**SILTY CLAY** - Reddish Brown Silty Clay, trace Sand, occasional Rootlets, hard, moist	GS-1	18	○	
1	0.5							
2								
3	1.0	0.9		Reddish Brown Silty Clay, trace Sand, hard, moist				
4								
5	1.5							
6								WL - 1.8 m May 9, 2017
7	2.0				GS-2	8	○	
8								
9	2.5	2.7		Water seepage encountered at 2.7 m. END OF TEST PIT				
10	3.0							
11								
	3.5							

REFERENCE No.: 11139368-01 ENCLOSURE No.: A-7

TEST PIT No.: TP-07
ELEVATION: 215.8 m

TEST PIT REPORT

Page: 1 of 1

CLIENT: MJD Investments Inc.
PROJECT: Hydrogeological Assessment, 343622 Church Side Road East, Owen Sound
LOGGED BY: JG DATE: 9 May 2017
EXCAVATION COMPANY: Harold Sutherland METHOD: Excavator
NOTES:

LEGEND
GS - GRAB SAMPLE
▼ - WATER LEVEL

Depth (ft / m)	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Moisture Content (%)	Shear test (Cu) / Sensitivity (S) / Water content (%) / Atterberg limits (w_p, w_l) — △ Field, □ Lab	COMMENTS
0.0	0.0		GROUND SURFACE		%	10 20 30 40 50 60 70 80 90	
			TOPSOIL				
	0.2		**SILTY CLAY** - Reddish Brown Silty Clay, trace Sand, occasional Rootlets, hard, moist	GS-1	28	○	
0.9	0.9		Reddish Brown Silty Clay, trace Sand, hard, moist				
				GS-2	9	○	
			Water seepage encountered at 2.6 m.				WL - 2.7 m May 9, 2017
	2.7		END OF TEST PIT				

TEST PIT LOG GEOTECH 11139368-01, 17-05-11, TEST PIT LOGS, WM JG.GPJ GEOLOGIC.GDT 23/6/17

REFERENCE No.: 11139368-01 ENCLOSURE No.: A-8

TEST PIT No.: TP-08
ELEVATION: 201.6 m

TEST PIT REPORT

Page: 1 of 1

CLIENT: MJD Investments Inc.
PROJECT: Hydrogeological Assessment, 343622 Church Side Road East, Owen Sound
LOGGED BY: JG DATE: 9 May 2017
EXCAVATION COMPANY: GHD Limited METHOD: Shovel
NOTES:

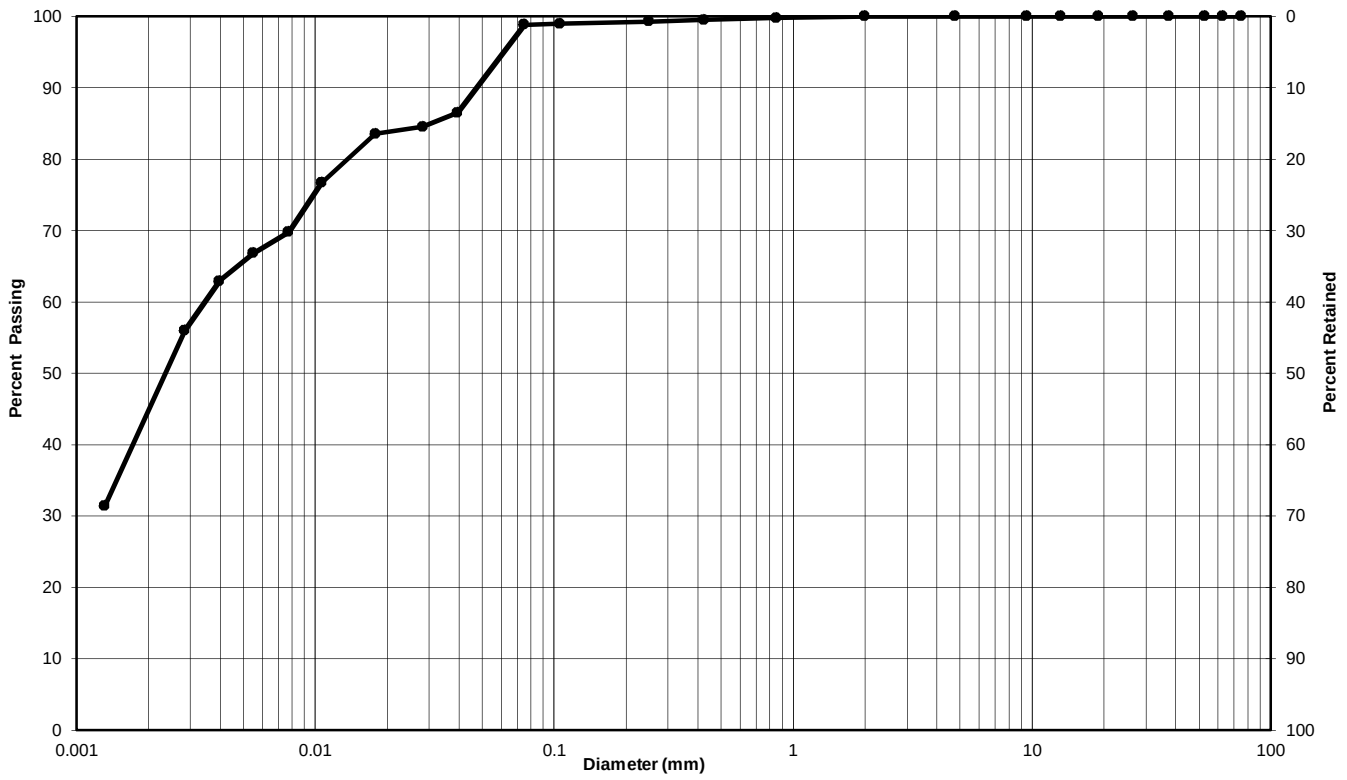
LEGEND
GS - GRAB SAMPLE
▼ - WATER LEVEL

Depth (ft / m)	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Moisture Content (%)	Shear test (Cu) △ Field / Sensitivity (S) □ Lab; ○ Water content (%); W_p W_l Atterberg limits (%)	COMMENTS
ft / m	0.0		GROUND SURFACE		%	10 20 30 40 50 60 70 80 90	
			TOPSOIL				
	0.2		**SILTY SAND** - Brownish Silty Sand, occasional Cobble and Rootlet, compact, moist to wet	GS-1	22	○	
1 / 0.5				GS-2	31	○	
	0.6		END OF TEST PIT				
2							
3 / 1.0							
4							
5 / 1.5							
6							
7 / 2.0							
8							
9 / 2.5							
10 / 3.0							
11 / 3.5							

Particle-Size Analysis of Soils (Geotechnical) (USCS) (ASTM D422)

Client:	MJD Investments	**Lab no.:**	SS-17-33
Project/Site:	343622 Church Side Road, Owen Sound	**Project no.:**	11139368-01

Borehole no.:	TP-1	Sample no.:	GS-2
Depth:	0.9 m	Enclosure:	A-9



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Unified Soil Classification System					

Soil Description	Gravel	Sand	Clay & Silt
TP-1 GS-2	0	1	99

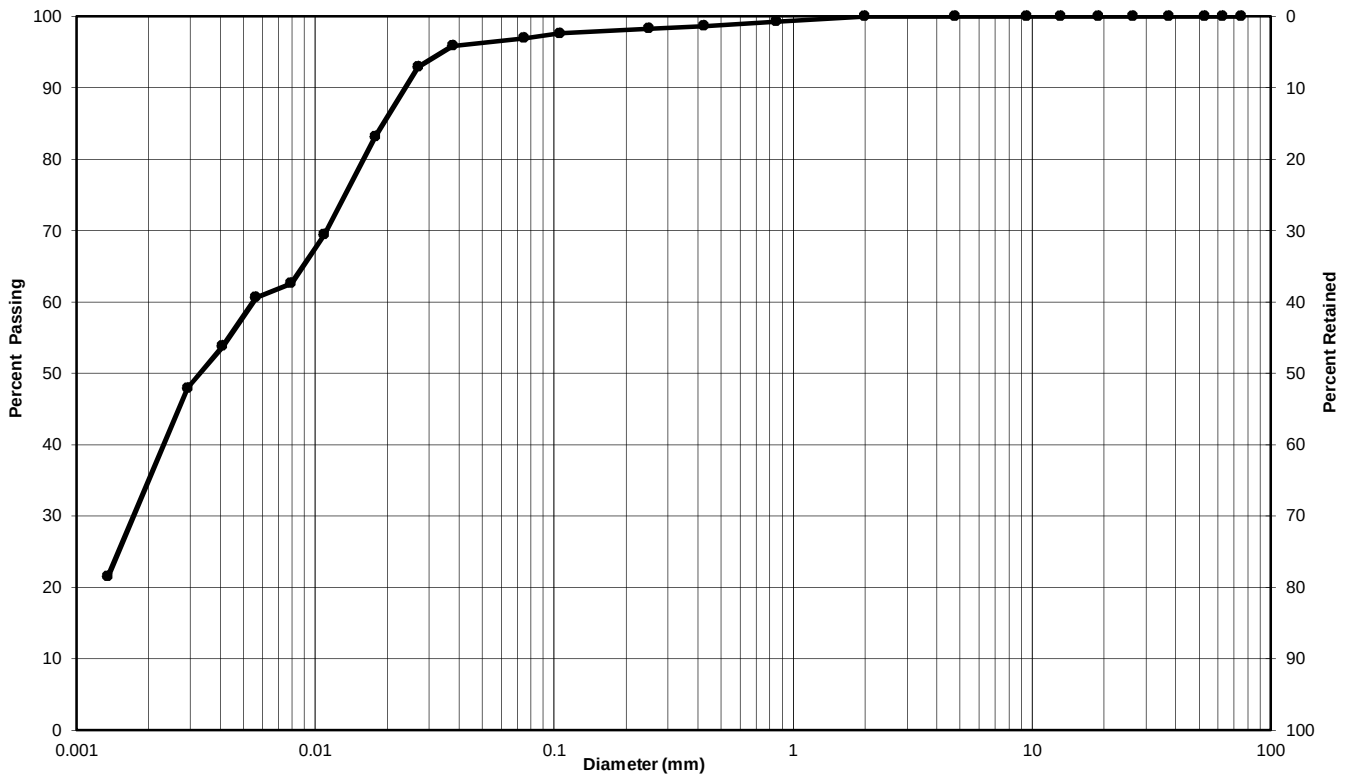
Remarks:

Performed by:	J. Sullivan	**Date:**	June 19, 2017
Verified by:		**Date:**	June 19, 2017

Particle-Size Analysis of Soils (Geotechnical) (USCS) (ASTM D422)

Client:	MJD Investments	**Lab no.:**	SS-17-33
Project/Site:	343622 Church Side Road, Owen Sound	**Project no.:**	11139368-01

Borehole no.:	TP-1	Sample no.:	GS-3
Depth:	1.8 m	Enclosure:	A-10



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Unified Soil Classification System					

Soil Description	Gravel	Sand	Clay & Silt
TP-1 GS-3	0	3	97

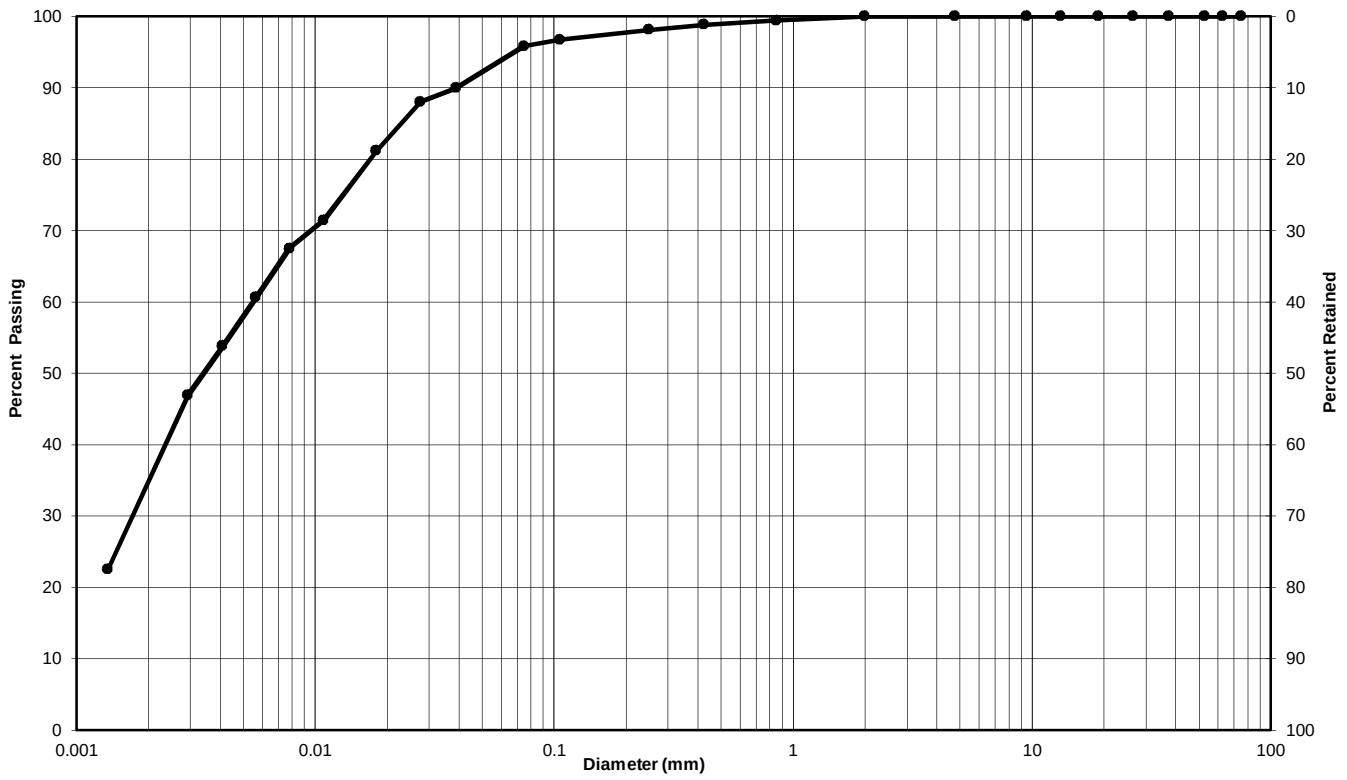
Remarks:

Performed by:	J. Sullivan	**Date:**	June 19, 2017
Verified by:		**Date:**	June 19, 2017

Particle-Size Analysis of Soils (Geotechnical) (USCS) (ASTM D422)

Client:	MJD Investments	**Lab no.:**	SS-17-33
Project/Site:	343622 Church Side Road, Owen Sound	**Project no.:**	11139368-01

Borehole no.:	TP-5	Sample no.:	GS-2
Depth:	2.0 m	Enclosure:	A-11



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Unified Soil Classification System					

Soil Description	Gravel	Sand	Clay & Silt
TP-5 GS-2	0	4	96

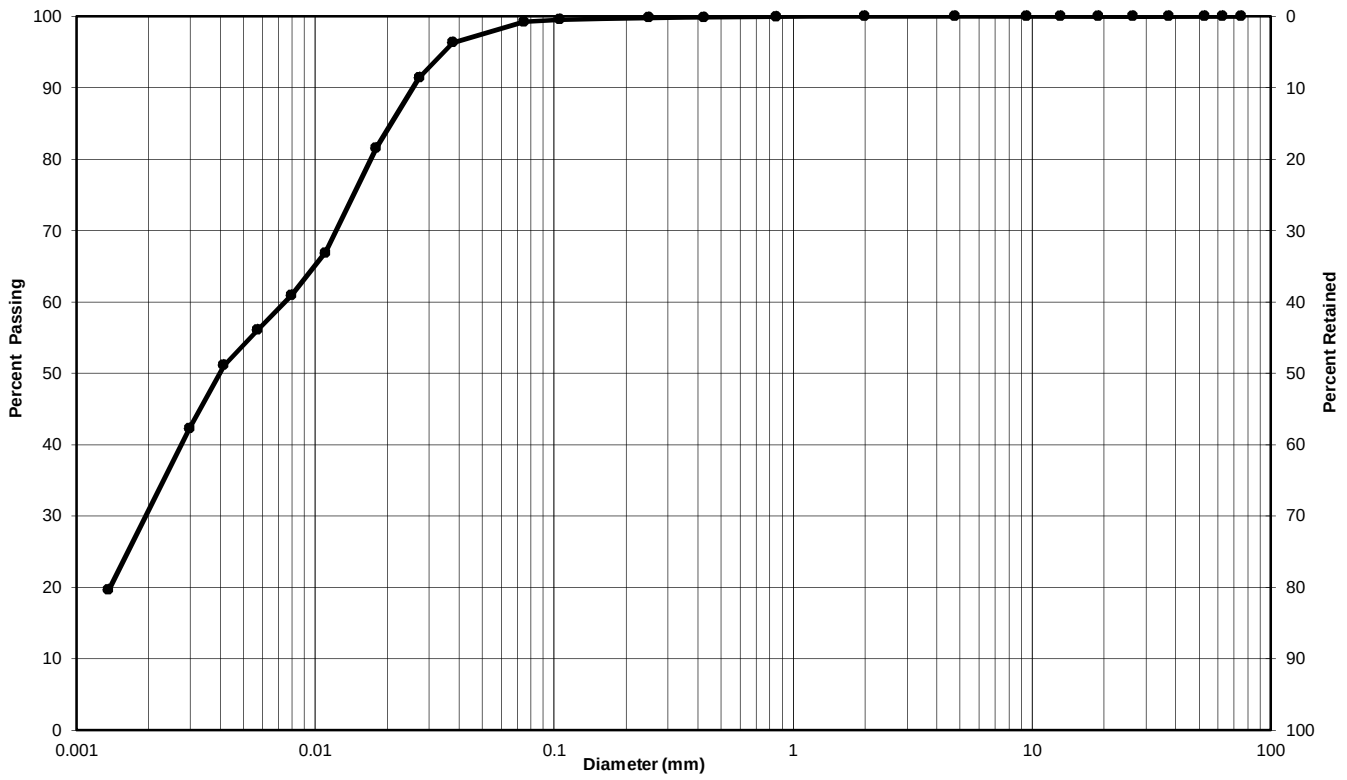
Remarks:

Performed by:	J. Sullivan	**Date:**	June 19, 2017
Verified by:		**Date:**	June 19, 2017

Particle-Size Analysis of Soils (Geotechnical) (USCS) (ASTM D422)

Client:	MJD Investments	**Lab no.:**	SS-17-33
Project/Site:	343622 Church Side Road, Owen Sound	**Project no.:**	11139368-01

Borehole no.:	TP-5	Sample no.:	GS-3
Depth:	2.6 m	Enclosure:	A-12



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Unified Soil Classification System					

Soil Description	Gravel	Sand	Clay & Silt
TP-5 GS-3	0	1	99

Remarks:

Performed by:	J. Sullivan	**Date:**	June 19, 2017
Verified by:		**Date:**	June 19, 2017

Appendix B
Photographs

Photo 1 – Looking south across Site from TP-01.

Photo 2 – Looking east from ditch along Church Side Road East at Site entrance. Georgian Bay in the horizon.

Site Photographs

Photo 3 – Ponded water feature in the central part of the Site.

Photo 4 – Small streams traversing through the wooded eastern area of the Site.

Photo 5 – Looking north across the Site from around TP-05.

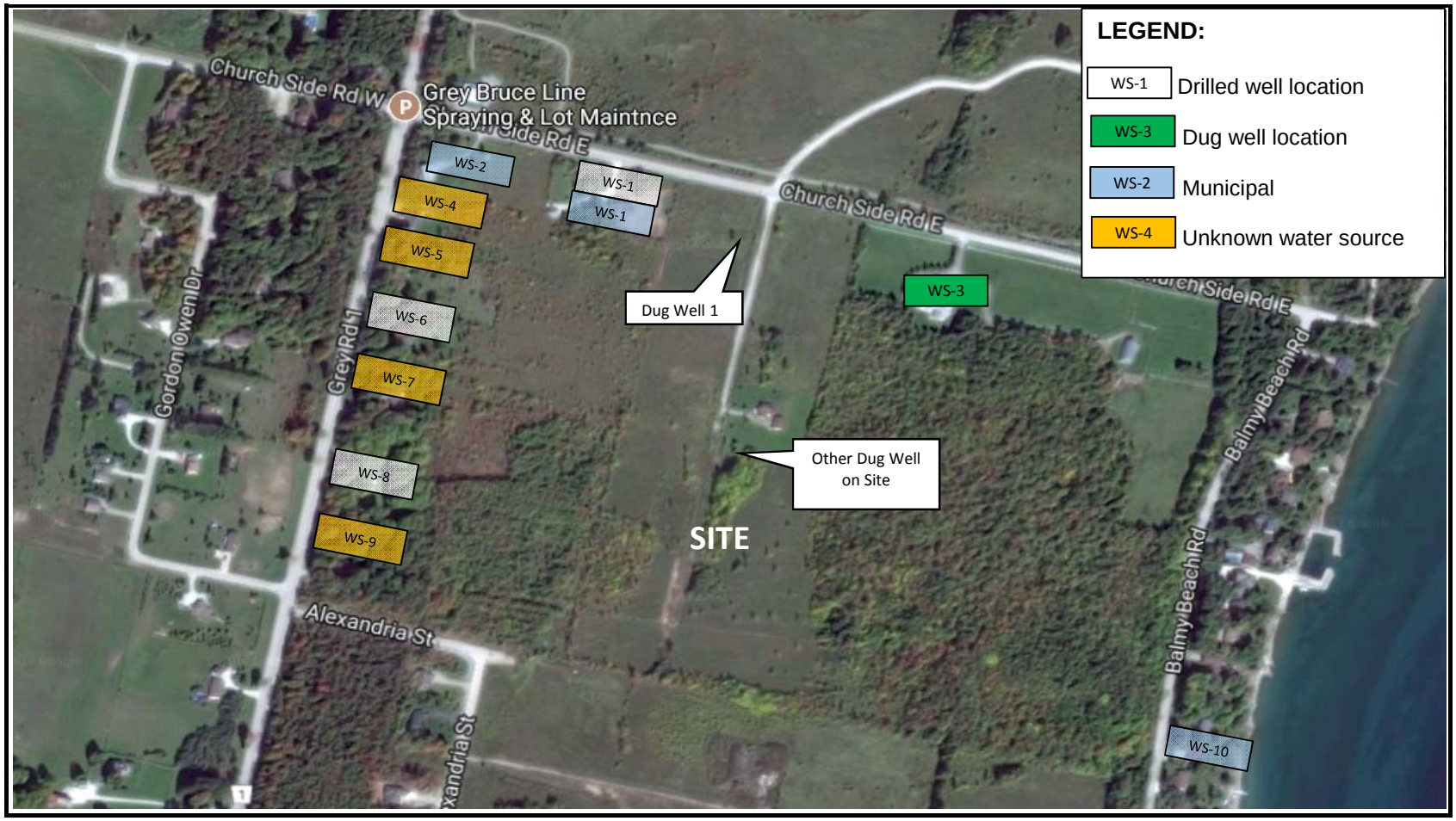
Photo 6 – Looking west across the Site from TP-05.

Photo 7 – Looking west across the Site from the edge of the wooded area showing the swale conveying surface water to the east.

Photo 8 – Looking north from the swale extending parts of the western area of the Site. The house at 343612 Church Side Road East can be seen.

Site Photographs

Appendix C
Well Survey and MOECC Well Records



Source: Image obtained from Google Earth Maps. © 2016 Google.

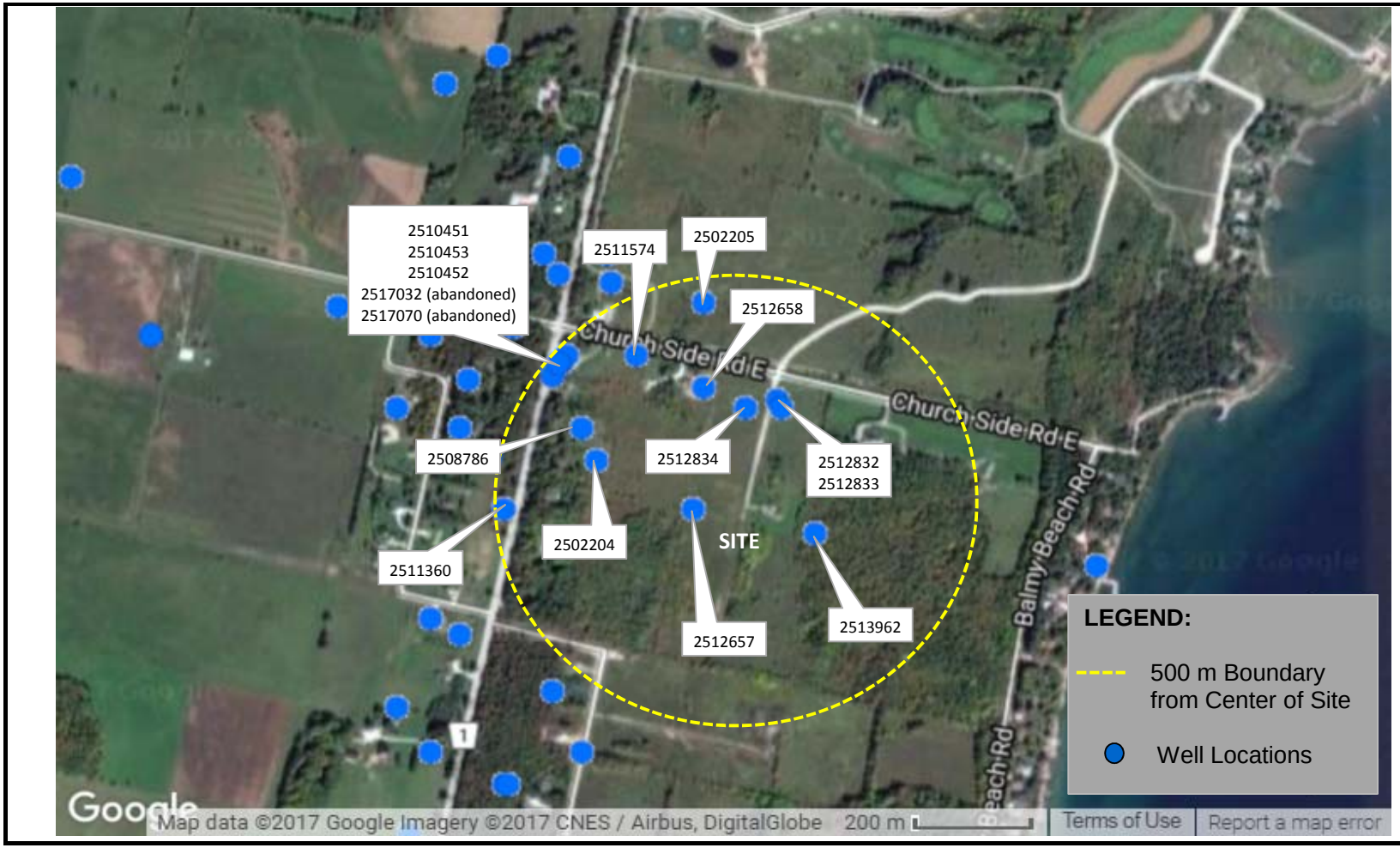
Scale:
Refer to Scale Bar
Coordinate System:
NAD 1983 UTM Zone 17

MJD Investments Inc.
343622 Church Side Rd E, Owen Sound, ON
Hydrogeological Assessment

11139368-01
June 2017

Well Survey Plan

Appendix C.1



Source: MOECC Well Records Map. Google Earth. © 2017 Google.

Scale:
Refer to Scale Bar
Coordinate System:
NAD 1983 UTM Zone 17

MJD Investments Inc.
343622 Church Side Rd E, Owen Sound, ON
Hydrogeological Assessment

11139368-01
June 2017

Well Location Plan

Appendix C.2

APPENDIX C.3: WELL SUMMARY - BORED / DUG WELLS

Well Record Summary
Project No.: 11139368-01
343622 Church Side Road East, Owen Sound, ON

MOECC Well No.	Well Use	Water Found Feet	Water Found Metres	Static Level Feet	Static Level Metres	Pump Rate Igpm	Pump Rate L/min	Well Depth Feet	Well Depth Metres	Comments
2512657	Domestic	8	2.4	-	-	3	13.6	15	4.6	Topsoil to 1', Clay to 6', Shale to 15'
2512658	Domestic	7	2.1	-	-	3	13.6	16	4.9	Topsoil to 1', Clay to 7', Shale to 16'
2512832	Domestic	9	2.7	9	2.7	3	13.6	15	4.6	Topsoil to 1', Clay to 6', Shale to 15'
2512833	Domestic	8	2.4	8	2.4	3	13.6	11.5	3.5	Topsoil to 1', Clay to 6', Shale to 11.5'
2512834	Domestic	8	2.4	4	1.2	3	13.6	15	4.6	Topsoil to 1', Clay to 8', Shale to 15'

Number of wells = 5

	Water Found Feet	Water Found Metres	Static Level Feet	Static Level Metres	Pump Rate Igpm	Pump Rate L/min	Well Depth Feet	Well Depth Metres
AVERAGE	8.0	2.4	8.5	2.6	3.0	13.6	14.4	4.4
MAXIMUM	9.0	2.7	9.0	2.7	3.0	13.6	16.0	4.9
MINIMUM	7.0	2.1	4.0	1.2	3.0	13.6	11.5	3.5

APPENDIX C.4: WELL SUMMARY - DRILLED BEDROCK

Well Record Summary
Project No.: 11139368-01
343622 Church Side Road East, Owen Sound, ON

MOECC Well No.	Well Use	Water Found Feet	Water Found Metres	Static Level Feet	Static Level Metres	Pump Rate Igpm	Pump Rate L/min	Well Depth Feet	Well Depth Metres	Depth to Bedrock Feet	Depth to Bedrock Metres	Comments
2502204	Domestic	30	9.1	30	9.1	5	22.7	90	27.4	10	3.0	Stone and dirt to 10', Limestone to 30', Shale to 90'
2502205	Domestic	15	4.6	25	7.6	2	9.1	40	12.2	-	-	Shale to 40'
2508786	Domestic	17	5.2	13	4.0	2	9.1	70	21.3	3	0.9	Topsoil to 3', Limestone to 23', Shale to 70'
2510451	Domestic	28	8.5	12	3.7	1	4.5	125	38.1	1	0.3	Clay to 1', Limestone to 2.5', Shale to 125'
2510452	Domestic	90	27.4	22	6.7	1	4.5	120	36.6	12	3.7	Fill to 4', Clay to 12', Limestone to 17', Shale to 120'
2510453	Domestic	60	18.3	20	6.1	1	4.5	80	24.4	8	2.4	Fill to 8', Limestone to 14', Shale to 80'
2511360	Domestic	50	15.2	18	5.5	3	13.6	80	24.4	3	0.9	Clay to 3', Limestone to 25', Shale to 80'
2511574	Domestic	20	6.1	12	3.7	4	18.2	90	27.4	-	-	Clay to 5', Shale to 90'
2513962	Domestic	100	30.5	25	7.6	5	22.7	120	36.6	65	19.8	Clay to 6', Shale to 65', Rock to 120'

Number of wells = 9

	Water Found Feet	Water Found Metres	Static Level Feet	Static Level Metres	Pump Rate Igpm	Pump Rate L/min	Well Depth Feet	Well Depth Metres	Depth to Bedrock Feet	Depth to Bedrock Metres
AVERAGE	45.6	13.9	19.7	6.0	2.7	12.1	90.6	27.6	14.6	4.4
MAXIMUM	100.0	30.5	30.0	9.1	5.0	22.7	125.0	38.1	65.0	19.8
MINIMUM	15.0	4.6	12.0	3.7	1.0	4.5	40.0	12.2	1.0	0.3

UTM [illegible] E
R [illegible] N
Elev. [illegible] R [illegible]
Basin [illegible]

ONTARIO

RECEIVED
DEC 18 1952
GEOLOGICAL BRANCH
DEPARTMENT of MINES

This form is No. 2204
Covering three wells.

The Well Drillers Act
Department of Mines, Province of Ontario

41A / 10W

Water Well Record

[redacted]

Village, Town or City: Sandwak
(Township or City) .....
..... P.R. No. 1 East Linton

Date Completed 28 Oct 1952 (day) (month) (year) ... Cost of Well (excluding pump) ... 7.9.2.00

Pipe and Casing Record

Casing diameter(s) 1 hole 4½, 2 holes (6")
Length(s) of casing(s) 13 ft, & 13 ft of 4½"
Type of screen
Length of screen
Distance from top of screen to ground level
Is well a gravel-wall type?

Pumping Test

Date 28 Oct 1952
Static level 30 feet
Pumping level
Pumping rate 300 gals per hr
Duration of test 1½ hrs
Distance from cylinder or bowls to ground level

Water Record

Kind (fresh or mineral) fresh
Quality (hard, soft, contains iron, sulphur, etc.) hard
Appearance (clear, cloudy, coloured) Cloudy at first
For what purpose(s) is the water to be used? Home use
How far is well from possible source of contamination? 200 ft
What is the source of contamination? septic tank
Enclose a copy of any mineral analysis that has been made of water

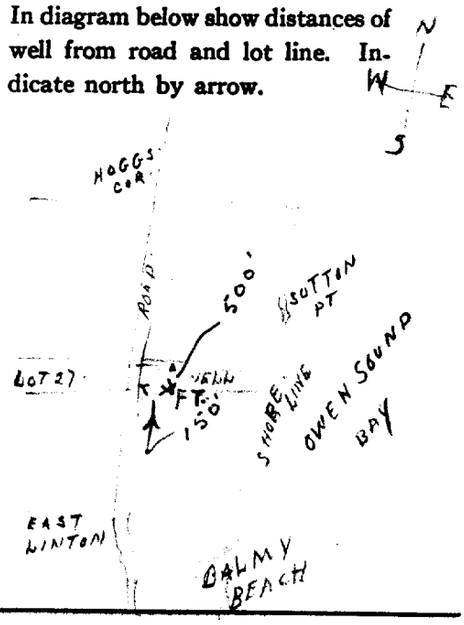
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
30	fresh	
all three same down	hole	stay at
	gravel 30	feet

Well Log

Overburden and Bedrock Record	From	To
Three wells - 1 - hole 4½, all 90 ft	0 ft.	....ft.
#1 old well was drilled to 51 feet to start with, we drilled it on down to 90 feet shale all the way - 4½ hole		
move over 18" and put down another well (6") to 90 ft, and the third well 18" from that down 90 also		
#2 #3		
Stone and dirt down to	0	10
hit limestone rock at	10	
limestone	10	30
then red & blue shale all the way down to	30	90
shale very hard		

Location of Well

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



Situation: Is well on upland, in valley, or on hillside? hillside
Drilling Firm Wright Bros.
Address Wiarton, Ont.
Name of Driller Roy & Stan Address Wiarton, Ont.
Date Dec 15 1952 Licence Number 3.2.8.33

R. Wright
Signature of Licensee

Form 5

UTM 17 5015298 E
17 R 4914514609 N
Elev. 5 R 017123
Basin 22

41A/10 NE

GROUND WATER BRANCH 25 No 2205
OCT 17 1961
ONTARIO WATER RESOURCES COMMISSION

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District Grey Township, Village, Town or City Elsinore

Con. III Lot 28 Date completed 23 (day) Sept. (month) 61 (year)

[redacted] Address East Linton

Casing and Screen Record

Inside diameter of casing 6"
Total length of casing 12'
Type of screen none used
Length of screen
Depth to top of screen
Diameter of finished hole 6"

Pumping Test

Static level 6'
Test-pumping rate 2 G.P.M.
Pumping level 25'
Duration of test pumping 1 hour
Water clear or cloudy at end of test clear
Recommended pumping rate 2 G.P.M.
with pump setting of 25' feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
streaks of red & blue shale	0	40	15'	fresh

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

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

Drilling or Boring Firm Dalton Wright & Sons

Address

Licence Number 336

Name of Driller or Borer Wm. Wright

Address Hepworth

Date Oct 13/61

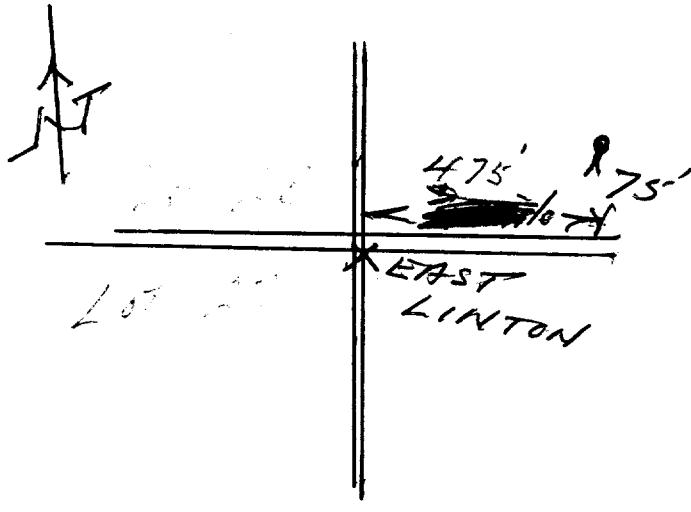
Wm Wright
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M Sets 60-5930

OWRC COPY

Location of Well

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



Ministry of the Environment
Ontario

The Ontario Water Resources Act

41 A/10 W

WATER WELL RECORD

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

11 | 2508786 | MUNICIP. 25013 | CON. CON | 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
GREY	SARAWAK	CON 3	27

[redacted]
R. # 2, KEMBLE, ONTARIO.

DATE COMPLETED: DAY 22 MO Aug. YR 86

UTM ... 245250 | RC | ELEVATION 750 | 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
Black	Top Soil	Shore Stones		0	3
Brown	Limestone			3	14
Grey	Limestone			14	23
Blue	Shale			23	32
Red	Shale	(traces Blue)		32	70

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
17-23	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5 1/8	☒ STEEL; ☐ GALVANIZED; ☐ CONCRETE; ☐ OPEN HOLE	.188	0	13
	☐ STEEL; ☐ GALVANIZED; ☐ CONCRETE; ☒ OPEN HOLE		13	70
	☐ 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	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

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

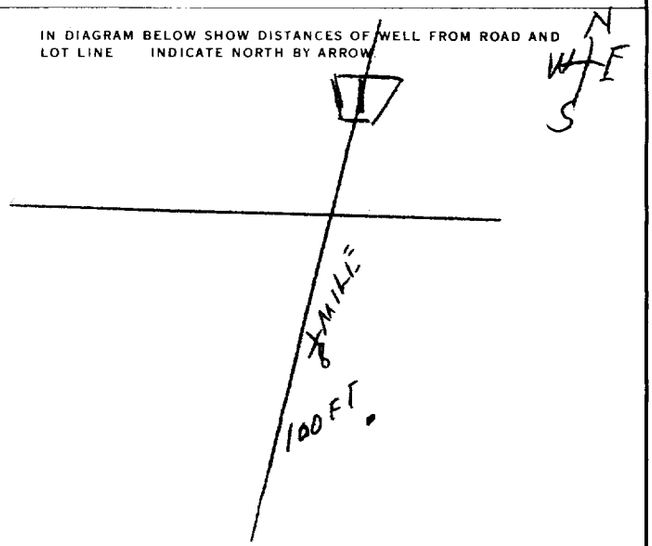
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
13 FEET	65 FEET	1 ☐ PUMPING 2 ☒ RECOVERY	33 FEET	15 FEET	13½ FEET	13 FEET

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

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	60 FEET	2 GPM

LOCATION OF WELL

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



DRILLERS REMARKS: 00355

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF DRILLING

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

CONTRACTOR

NAME OF WELL CONTRACTOR: STAN WRIGHT & CO WELL DRILLERS | LICENCE NUMBER: 5505

ADDRESS: 298 FRANK ST., WIARTON, ONT.

NAME OF DRILLER OR BORER: MIKE WRIGHT | LICENCE NUMBER: 5519

SIGNATURE OF CONTRACTOR: Stan Wright | SUBMISSION DATE: DAY 27 MO. 1 YR. 87

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED 020287

DATE OF INSPECTION 6/10/87 | INSPECTOR

REMARKS: CSS 88

FORM NO. 0506—4—77 FORM 7

MINISTRY OF THE ENVIRONMENT COPY

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 | 2510451 | MUNICIP 25013 | CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
[redacted]	[redacted]	III	27

[redacted] RR# 2 Kemble

DATE COMPLETED 48-53: DAY ___ MO 5 YR 89

[redacted] | RC | ELEVATION 718 | RC | BASIN CODE | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
			clay	0	1
			limestone	1	2½
			blue shale	2½	18
			red shale	18	68
			blue shale	68	71
			red shale	71	103
			shale rock	103	125

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
28	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERALS 6 ☐ GAS
100	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
6¼	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	21
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		21	125
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER — AIR	PUMPING RATE 1-1½ GPM	DURATION OF PUMPING 1 HOURS ___ MINS			
STATIC LEVEL 12 FEET	WATER LEVEL END OF PUMPING 125 FEET	WATER LEVELS DURING 1 ☐ PUMPING 2 ☒ RECOVERY			
		15 MINUTES 98 FEET	30 MINUTES 98 FEET	45 MINUTES 84 FEET	60 MINUTES 68 FEET
IF FLOWING, GIVE RATE ___ GPM	PUMP INTAKE SET AT 125 RODS FEET	WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY			
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP	RECOMMENDED PUMP SETTING 115 FEET	RECOMMENDED PUMPING RATE 1-1½ GPM			

FINAL STATUS OF WELL

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

WATER USE

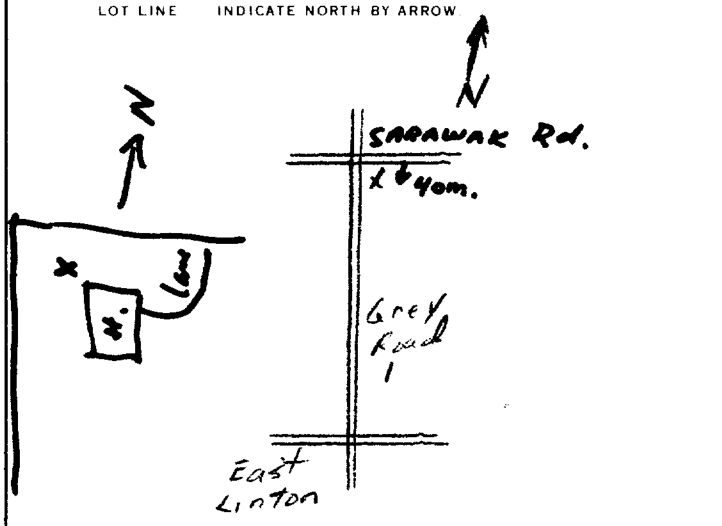
1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF CONSTRUCTION

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

LOCATION OF WELL

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



35557

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR: Wm Wright Well Drillers Ltd | WELL CONTRACTOR'S LICENCE NUMBER: 5507
ADDRESS: Box 162 Hepworth Ont
NAME OF WELL TECHNICIAN: Hank Wright | WELL TECHNICIAN'S LICENCE NUMBER: T-0140
SIGNATURE OF TECHNICIAN/CONTRACTOR: Wm Wright | SUBMISSION DATE: DAY ___ MO ___ YR ___

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 5507 | DATE RECEIVED FEB 21 1990
DATE OF INSPECTION | INSPECTOR
REMARKS

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FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
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11 — 2510452 — MUNICIP 25013 — CON. CON

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: [redacted]
CON. BLOCK, TRACT, SURVEY, ETC: III
LOT: 27
DATE COMPLETED: DAY ____ MO 5 YR 89
[redacted] # Kimble
UTM: 45357 — ELEVATION: 723 — 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
			fill	0	4
			clay & stones	4	12
			limestone	12	17
			blue shale	17	27
			red shale	27	120

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
90-100	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☑ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	20
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE 5 ☐ PLASTIC		20	120
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

MATERIAL AND TYPE: — DEPTH TO TOP OF SCREEN FEET:

61 PLUGGING & SEALING RECORD

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

PUMPING TEST

71

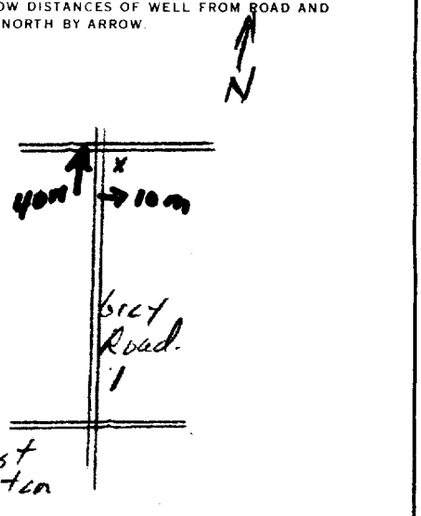
PUMPING TEST METHOD: 1 ☐ PUMP AIR 2 ☐ BAILER
PUMPING RATE: 1 GPM
DURATION OF PUMPING: 1 HOURS ____ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
22 FEET	120 FEET		FEET	95 FEET	78 FEET	59 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 120 RODS FEET
WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☐ DEEP
RECOMMENDED PUMP SETTING: FEET
RECOMMENDED PUMPING RATE: GPM

LOCATION OF WELL

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



35556

DRILLERS REMARKS

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: Wm Wright Well Drilling Ltd
WELL CONTRACTOR'S LICENCE NUMBER: 5507
ADDRESS: Box 167 Dyrwoth Ont
NAME OF WELL TECHNICIAN: Wm Wright
WELL TECHNICIAN'S LICENCE NUMBER: T-0440
SIGNATURE OF TECHNICIAN/CONTRACTOR: Wm Wright
SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 5507
DATE RECEIVED: FEB 21 1990
DATE OF INSPECTION
INSPECTOR
REMARKS

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WATER WELL RECORD

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11 | 2510453 | MUNICIP 25013 | CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
[redacted]	[redacted]	III	27

DATE COMPLETED 48-53: DAY ____ MO 4 YR 89

[redacted] RR#2 Kinmount

UTM ____ RC ____ ELEVATION 725 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
			Soil	0	8
			Limestone	8	14
			Blue shale	14	24
			red shale	24	80

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
60	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	20
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		20	80
	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 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 — AIR

PUMPING RATE: 1 GPM — DURATION OF PUMPING: 1 HOURS ____ MINS

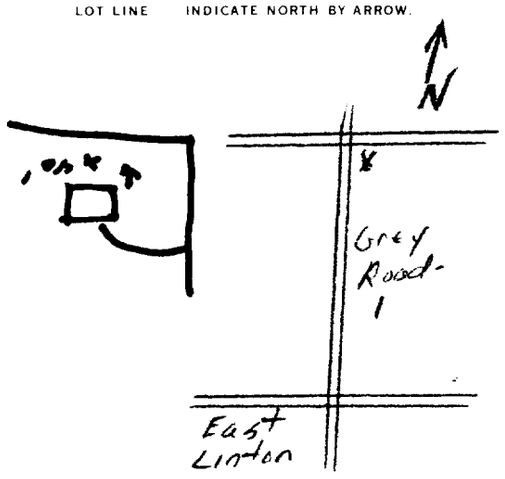
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
20 FEET	80 FEET	74 FEET	63 FEET	54 FEET	45 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	80 R.L.O.S. FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	75 FEET	1 GPM

LOCATION OF WELL

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



DRILLERS REMARKS

35558

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: [redacted] — WELL CONTRACTOR'S LICENCE NUMBER: 5507

ADDRESS: Box 167 Haliburton Ont

NAME OF WELL TECHNICIAN: Herb Wright — WELL TECHNICIAN'S LICENCE NUMBER: T-0140

SIGNATURE OF TECHNICIAN/CONTRACTOR: [redacted] — SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 5507 | DATE RECEIVED FEB 21 1990

DATE OF INSPECTION | INSPECTOR

REMARKS

CSS 88

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Ministry of the Environment
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

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11 | 2511360 | MUNICIP 25013 | CON. CON | 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
[redacted]	Sarawak	III	27

East Linton

DATE COMPLETED 48-53: DAY 07 MO 12 YR. 90

[redacted] N6 … ELEVATION 8724 … RC … BASIN CODE

17 504873 4945117

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
			soil clay stones	0	3
			limestone	3	25
			blue shale	25	32
			red shale	32	80

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
50	1 ☑ FRESH
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
6 1/4	1 STEEL 2 GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 PLASTIC	.188	0	20
	4 ☑ OPEN HOLE		20	80
	1 STEEL 2 GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 PLASTIC			

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD	AIR (1 ☐ PUMP 2 ☐ BAILER)
PUMPING RATE	3-4 GPM
DURATION OF PUMPING	1 HOURS
STATIC LEVEL	18 FEET
WATER LEVEL END OF PUMPING	80 FEET
WATER LEVELS DURING	2 ☑ RECOVERY
15 MINUTES	— FEET
30 MINUTES	29 FEET
45 MINUTES	18 FEET
60 MINUTES	— FEET
IF FLOWING, GIVE RATE	GPM
PUMP INTAKE SET AT	80 ROODS FEET
WATER AT END OF TEST	1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE	☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING	30 FEET
RECOMMENDED PUMPING RATE	3 GPM

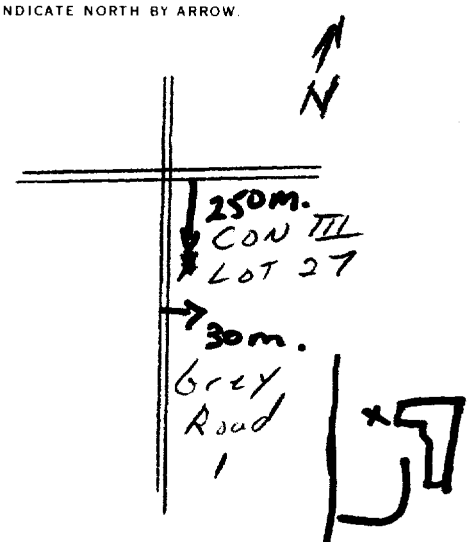
FINAL STATUS OF WELL
1 ☑ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED; ☐ DEWATERING

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

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

LOCATION OF WELL
Bkn.

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



DRILLERS REMARKS
099224

CONTRACTOR
NAME OF WELL CONTRACTOR: Wm Wright Well Drillers Ltd
WELL CONTRACTOR'S LICENCE NUMBER: 5507
ADDRESS: Box 167 Hepworth Ont
NAME OF WELL TECHNICIAN: Fred Wright
WELL TECHNICIAN'S LICENCE NUMBER: T-0140
SIGNATURE OF TECHNICIAN/CONTRACTOR: William Wright
SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY
DATA SOURCE | CONTRACTOR 5507 | DATE RECEIVED JUL 15 1991
DATE OF INSPECTION | INSPECTOR
REMARKS

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WATER WELL RECORD

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11 — 2511574 — MUNICIP 25013 — CON. CON 03

COUNTY OR DISTRICT: [redacted] — TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Sarawak — CON. BLOCK, TRACT, SURVEY, ETC: III — LOT: 27

Owen Sound — DATE COMPLETED: DAY 27 MO 05 YR 91

[redacted] — 45369 — RC — ELEVATION 710 — 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
			clay	0	5
			Limestone	5	90

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-13: 90	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
15-18	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
20-23	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
25-28	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
30-33	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
10-11: 6 1/4	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC (12)	-188	0	23 (13-16)
17-18	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE 5 ☐ PLASTIC (19)		23	90 (20-23)
24-25	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC (26)			(27-30)

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 31-33	DIAMETER INCHES 34-38	LENGTH FEET 39-40
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET 41-44	80

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 80	

71 PUMPING TEST

PUMPING TEST METHOD 10: 1 ☐ PUMP 2 ☐ BAILER — AIR

PUMPING RATE 11-14: 4-5 GPM — DURATION OF PUMPING 15-16 HOURS 1 — 17-18 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (25) 1 ☐ PUMPING 2 ☑ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
19-21: 12 FEET	22-24: 90 FEET		26-28 FEET	29-31: 21 FEET	32-34: 12 FEET	35-37 FEET

IF FLOWING, GIVE RATE 38-41 GPM

PUMP INTAKE SET AT: 90R305 FEET

WATER AT END OF TEST 42: 1 ☐ CLEAR 2 ☑ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP

RECOMMENDED PUMP SETTING 43-45: 80 FEET

RECOMMENDED PUMPING RATE 46-49: 4 GPM

50-53

FINAL STATUS OF WELL (54)

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

WATER USE (55-56)

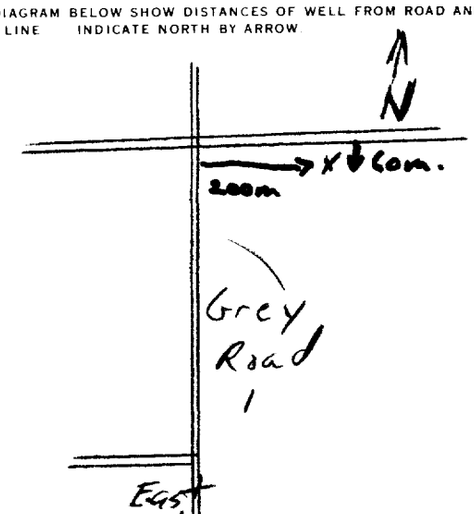
1 ☑ DOMESTIC — 2 ☐ STOCK — 3 ☐ IRRIGATION — 4 ☐ INDUSTRIAL — ☐ OTHER — 5 ☐ COMMERCIAL — 6 ☐ MUNICIPAL — 7 ☐ PUBLIC SUPPLY — 8 ☐ COOLING OR AIR CONDITIONING — 9 ☐ NOT USED

METHOD OF CONSTRUCTION (57)

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

LOCATION OF WELL

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



DRILLERS REMARKS: 099260

CONTRACTOR

NAME OF WELL CONTRACTOR: William Wright Well Drilling Ltd — WELL CONTRACTOR'S LICENCE NUMBER: 5507

ADDRESS: Box 167 Hanover Ont

NAME OF WELL TECHNICIAN: Herb Wright — WELL TECHNICIAN'S LICENCE NUMBER

SIGNATURE OF TECHNICIAN/CONTRACTOR: William Wright — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 58 — CONTRACTOR 5507 — DATE RECEIVED NOV 19 1991 63-66 — 80

DATE OF INSPECTION — INSPECTOR

REMARKS

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WATER WELL RECORD

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11 2512657 MUNICIP 25009 CON. CON. 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	KEPPEL	3	27

RR#1, KEMBLE

DATE COMPLETED: DAY 26 MO 8 YR 94

LAT | LONG | 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	TOP SOIL			0	1
RED	CLAY			1	6
RED	SHALE	GREEN & WHITE LAYERS		6	15

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
8	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
12	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
48	1 STEEL 2 GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 PLASTIC	5	0	12
36	1 STEEL 2 GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 PLASTIC	3	10	15
	1 STEEL 2 GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 PLASTIC			

SCREEN

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

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET
GRAVEL	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	6	BENSEAL &
		SAKRITE JOINTS

71 PUMPING TEST

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

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

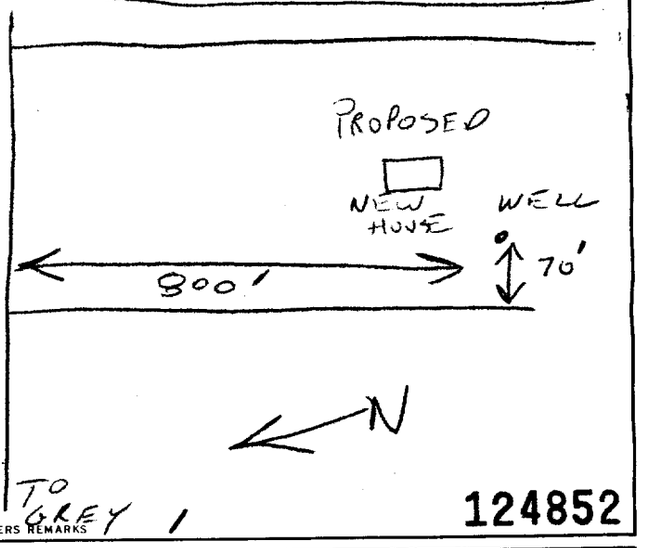
IF FLOWING, GIVE RATE GPM	PUMP INTAKE SET AT FEET	WATER AT END OF TEST 1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING FEET	RECOMMENDED PUMPING RATE GPM
☑ SHALLOW ☐ DEEP		3 INT

LOCATION OF WELL

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

GEORGIAN BAY



DRILLERS REMARKS

124852

FINAL STATUS OF WELL	1 ☑ WATER SUPPLY	5 ☐ ABANDONED, INSUFFICIENT SUPPLY	
	2 ☐ OBSERVATION WELL	6 ☐ ABANDONED, POOR QUALITY	
	3 ☐ TEST HOLE	7 ☐ UNFINISHED	
	4 ☐ RECHARGE WELL	☐ DEWATERING	
WATER USE	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 CONSTRUCTION	1 ☐ CABLE TOOL	6 ☑ BORING	
	2 ☐ ROTARY (CONVENTIONAL)	7 ☐ DIAMOND	
	3 ☐ ROTARY (REVERSE)	8 ☐ JETTING	
	4 ☐ ROTARY (AIR)	9 ☐ DRIVING	
	5 ☐ AIR PERCUSSION	☐ DIGGING ☐ OTHER	

CONTRACTOR

NAME OF WELL CONTRACTOR: JOHNSON & BAETZ
WELL CONTRACTOR'S LICENCE NUMBER: 3030
ADDRESS: RR#1, MT. PLEASANT
NAME OF WELL TECHNICIAN: JOHN BAETZ
WELL TECHNICIAN'S LICENCE NUMBER: T-0333
SIGNATURE OF TECHNICIAN/CONTRACTOR: J Baetz
SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE 58 | CONTRACTOR 59-62: 3030 | DATE RECEIVED 63-68: OCT 13 1994
DATE OF INSPECTION | INSPECTOR
REMARKS: CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 — 2512658 — MUNICIP 25009 — CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	KEPPEL	3	27

[redacted] RR#1 KEMBLE — DATE COMPLETED DAY 25 MO 8 YR 94

M — 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	TOP SOIL			0	1
RED	CLAY			1	7
RED	SHALE	GREEN & WHITE	LAYERS	7	16

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
7	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
12	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
15	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
48	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☒ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	4	0	12
36	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☒ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	3	11	16
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
0	6	BENSEAL &
		SAKRITE JOINTS

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER — PUMPING RATE: GPM — DURATION OF PUMPING: HOURS MINS

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

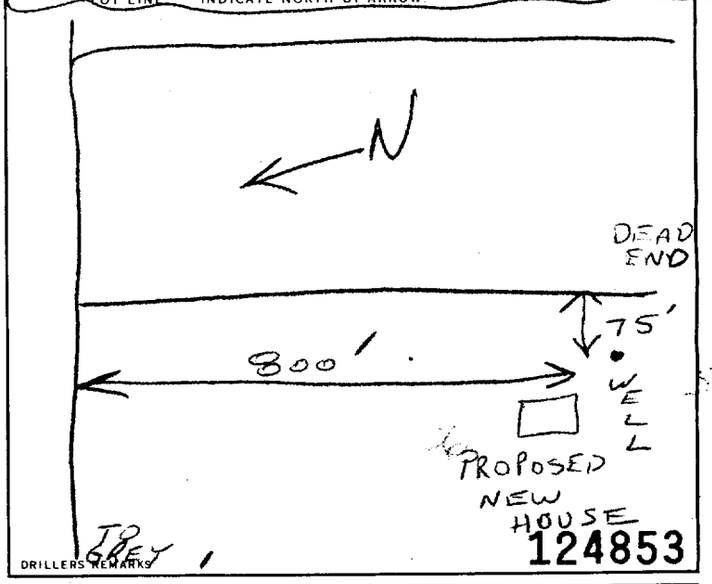
IF FLOWING, GIVE RATE: GPM — PUMP INTAKE SET AT: FEET — WATER AT END OF TEST: 1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☑ SHALLOW ☐ DEEP — RECOMMENDED PUMP SETTING: 15 FEET — RECOMMENDED PUMPING RATE: 3 INT GPM

LOCATION OF WELL

GEORGIAN BAY

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



DRILLERS REMARKS: 124853

FINAL STATUS OF WELL	1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING
WATER USE	1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF CONSTRUCTION	1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☑ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: JOHNSON & BAETZ — WELL CONTRACTOR'S LICENCE NUMBER: 3030

ADDRESS: RR# 1 MT. PLEASANT

NAME OF WELL TECHNICIAN: JOHN BAETZ — WELL TECHNICIAN'S LICENCE NUMBER: T-0333

SIGNATURE OF TECHNICIAN/CONTRACTOR: [signature] — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR: 3030 — DATE RECEIVED: OCT 13 1994

DATE OF INSPECTION — INSPECTOR

REMARKS

CSS.ES

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FORM NO. 0506 (11/86) FORM 9

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

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

11 (1 2) **2512832**

Municipality (10 14) 25013 Con. (15 22 23 24) CON 03

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot (25-27)
[redacted]	SARAWAK	3	27

Address: RR#1 KEMBLE

Date completed (48-53): 17 day 4 month 95 year

21 (1 2) T M (10) Northing (18 24) RC (25 26) Elevation (30) RC (31) Basin Code (47) ii iii iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
BROWN	TOP-SOIL			0	1
RED	CLAY			1	6
GREEN	SHALE		RED LAYERS	6	9
RED	SHALE		HARD	9	15
	SHALE IN BOTTOM				
	6 FT OF WATER OVER WEEKEN.				

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

41 WATER RECORD

Water found at – feet	Kind of water
9 (10-13)	1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (14)
12 (15-18)	1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (19)
(20-23)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (24)
(25-28)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (29)
(30-33)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (34) (60)

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
36 (10-11)	1 ☐ Steel (12) 2 ☐ Galvanized 3 ☑ Concrete 4 ☐ Open hole 5 ☐ Plastic	3	0	15 (13-16)
(17-18)	1 ☐ Steel (19) 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			(20-23)
(24-25)	1 ☐ Steel (26) 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			(27-30)

SCREEN

Sizes of opening (Slot No.) (31-33)	Diameter (34-38) inches	Length (39-40) feet

Material and type	Depth at top of screen (41-44) feet	(30)
GRAVEL		

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 (10-13)	8 (14-17)	CONCRETE
(18-21)	(22-25)	SAKRITE JOINTS
(26-29)	(30-33) (60)	

71 PUMPING TEST

Pumping test method (10): 1 ☐ Pump 2 ☐ Bailer
Pumping rate (11-14): GPM
Duration of pumping (15-16) Hours (17-18) Mins

Static level	Water level end of pumping	Water levels during (25): 1 ☐ Pumping 2 ☐ Recovery			
(19-21)	(22-24)	15 minutes (26-28)	30 minutes (29-31)	45 minutes (32-34)	60 minutes (35-37)
9 feet	feet	feet	feet	feet	feet

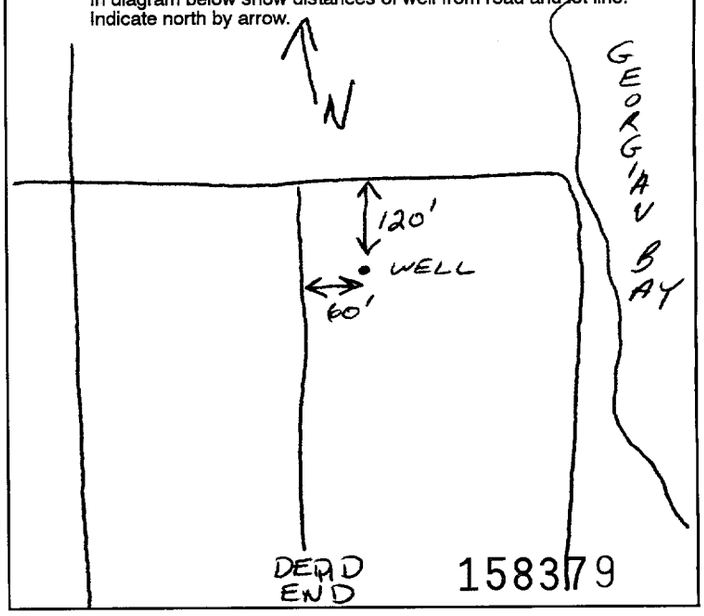
If flowing give rate (38-41)	Pump intake set at	Water at end of test (42)
GPM	feet	☐ Clear ☐ Cloudy

Recommended pump type	Recommended pump setting (43-45)	Recommended pump rate (46-49)
☑ Shallow ☐ Deep	14 feet	3 INT GPM

(50-53)

LOCATION OF WELL

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



FINAL STATUS OF WELL (54)

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

WATER USE (55-56)

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 (57)

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

Name of Well Contractor	Well Contractor's Licence No.
JOHNSON & BAETZ	3030
Address: RR#1 MT PLEASANT	
Name of Well Technician: JOHN BAETZ	Well Technician's Licence No.: T-0333
Signature of Technician/Contractor: J Baetz	Submission date: day mo yr

MINISTRY USE ONLY

Data source (58)	Contractor (59-62)	Date received (63-68) (80)
	3030	JUN 07 1995
Date of inspection	Inspector	
Remarks		CSS.ES

0506 (07/94) Front Form 9

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Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 2512833 | MUNICIP 25013 | CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	SARAWAK	3	27

[redacted] RR#1 KEMBLE

DATE COMPLETED: DAY 17 MO 4 YR 95

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	TOP-SOIL			0	1
RED	CLAY			1	6
RED	SHALE	GREEN	LAYERS	6	8
RED	SHALE		HARD	8	11½

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
8	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
11	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
48	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☑ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	3	0	8
36	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	3	8	11½
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

MATERIAL AND TYPE: GRAVEL

DEPTH TO TOP OF SCREEN (FEET):

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	8	CONCRETE &
		SAKRITE JOINTS

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER

PUMPING RATE: GPM

DURATION OF PUMPING: HOURS MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY			
8 FEET	FEET	15 MINUTES: FEET	30 MINUTES: FEET	45 MINUTES: FEET	60 MINUTES: FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☐ CLEAR 2 ☐ CLOUDY

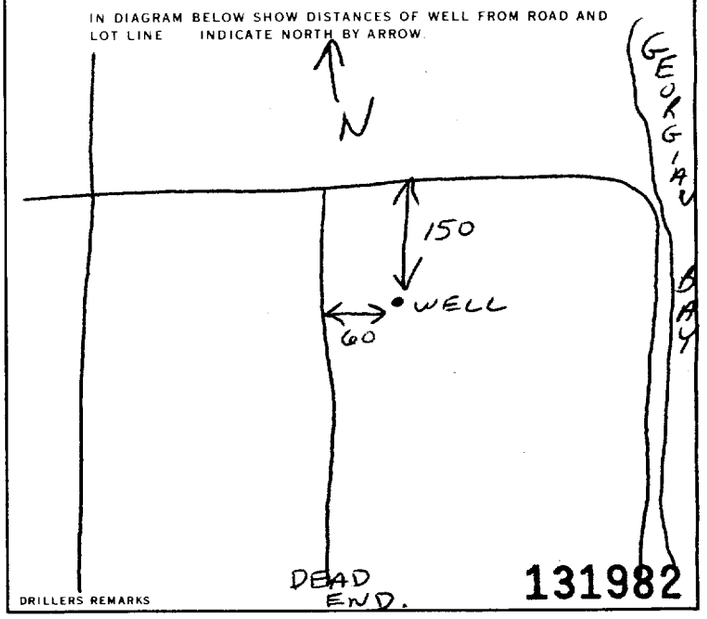
RECOMMENDED PUMP TYPE: ☑ SHALLOW ☐ DEEP

RECOMMENDED PUMP SETTING: 11 FEET

RECOMMENDED PUMPING RATE: 3 INT GPM

LOCATION OF WELL

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



DRILLERS REMARKS

131982

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: JOHNSON & BAETZ

WELL CONTRACTOR'S LICENCE NUMBER: 3030

ADDRESS: RR#1 MT PLEASANT

NAME OF WELL TECHNICIAN: JOHN BAETZ

WELL TECHNICIAN'S LICENCE NUMBER: T-0333

SIGNATURE OF TECHNICIAN/CONTRACTOR: J Baetz

SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE

CONTRACTOR: 3030

DATE RECEIVED: JUN 07 1995

DATE OF INSPECTION

INSPECTOR

REMARKS: CSS.ES

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FORM NO. 0506 (11/86) FORM 9

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

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

11 | 2512834 | Municipality 25013 | Con. CON 03

County or District [redacted]

Township/Borough/City/Town/Village: SARAWAK

Con block tract survey, etc.: 3

Lot: 27

Address: RR#1 KEMBLE

Date completed: 17 day 4 month 95 year

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

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
BROWN	TOPSOIL			0	1
RED	CLAY			1	8
RED	SHALE	GREEN SHALE LATERS		8	14
RED	SHALE			14	15
	11 FT OF WATER OVER A 24 HR PERIOD				

31

32

41 WATER RECORD

Water found at – feet	Kind of water
8-14	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
48	1 ☐ Steel 2 ☐ Galvanized 3 ☑ Concrete 4 ☐ Open hole 5 ☐ Plastic	3	0	12
36	1 ☐ Steel 2 ☐ Galvanized 3 ☑ Concrete 4 ☐ Open hole 5 ☐ Plastic	3	11	15
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

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

Material and type: GRAVEL

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	8	CONCRETE &
		SAKAITE JOINT

71 PUMPING TEST

Pumping test method: 1 ☐ Pump 2 ☐ Bailer

Pumping rate: GPM

Duration of pumping: Hours Mins

Static level: 4 feet

Water level end of pumping: feet

Water levels during: 1 ☐ Pumping 2 ☐ Recovery

15 minutes	30 minutes	45 minutes	60 minutes
feet	feet	feet	feet

If flowing give rate: GPM

Pump intake set at: feet

Water at end of test: ☐ Clear ☐ Cloudy

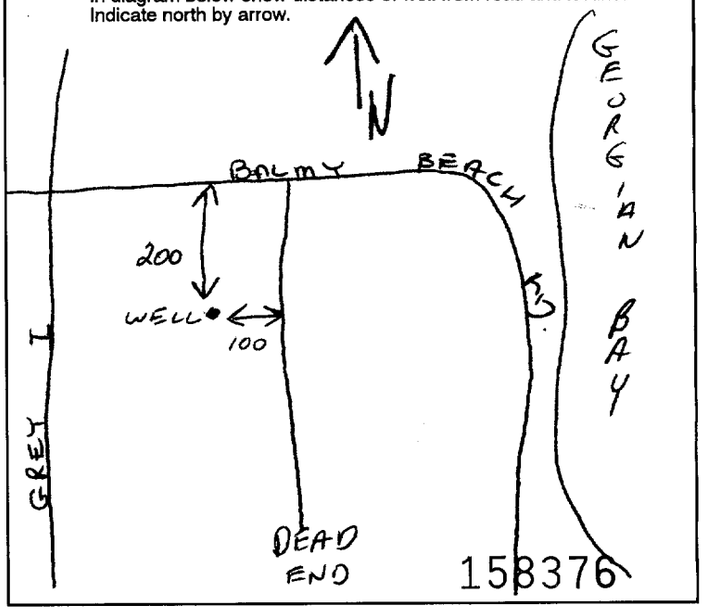
Recommended pump type: ☑ Shallow ☐ Deep

Recommended pump setting: 14 feet

Recommended pump rate: 3 INT GPM

LOCATION OF WELL

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



FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

Name of Well Contractor: JOHNSON & BAETZ

Well Contractor's Licence No.: 3030

Address: RR#1 MT. PLEASANT

Name of Well Technician: JOHN BAETZ

Well Technician's Licence No.: T-0333

Signature of Technician/Contractor

Submission date: day mo yr

MINISTRY USE ONLY

Data source | Contractor: 3030 | Date received: JUN 07 1995

Date of inspection | Inspector

Remarks: CSS.ES

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0506 (07/94) Front Form 9

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

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

11 (1 2) — 2513962 — Municipality 25013 (10 14) — Con. CON (15 22 23 24) 03

County or District: [redacted]
Township/Borough/City/Town/Village: Sarawak
Con block tract survey, etc.: III
Lot (25-27): 27
Address: RR#2 Owen Sound
Date completed (48-53): 10 day 05 month 99 year

21 (1 2) — T M (10) — Northing (12 17) — RC (18) — Elevation (24 25) — RC (26) — Basin Code (30) — ii (31) — iii — iv (47)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
			clay and stones	0	6
			red shale	6	65
			shale rock	65	120

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

41 WATER RECORD

Water found at – feet (10-13)	Kind of water (14)
100-120	1 ☒ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
(15-18)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur (19) 4 ☐ Minerals 6 ☐ Gas
(20-23)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur (24) 4 ☐ Minerals 6 ☐ Gas
(25-28)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur (29) 4 ☐ Minerals 6 ☐ Gas
(30-33)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur (34) 4 ☐ Minerals 6 ☐ Gas (60)

51 CASING & OPEN HOLE RECORD

Inside diam inches (10-11)	Material (12)	Wall thickness inches	Depth – feet From	Depth – feet To (13-16)
6¼	1 ☒ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	0	24
(17-18)	1 ☐ Steel (19) 2 ☐ Galvanized 3 ☐ Concrete 4 ☒ Open hole 5 ☐ Plastic		24	120 (20-23)
(24-25)	1 ☐ Steel (26) 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			(27-30)

SCREEN

Sizes of opening (Slot No.) (31-33)	Diameter (34-38) inches	Length (39-40) feet
Material and type	Depth at top of screen (41-44) feet	(30)

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set at – feet From (10-13)	Depth set at – feet To (14-17)	Material and type (Cement grout, bentonite, etc.)
(18-21)	(22-25)	
(26-29)	(30-33) (80)	

71 PUMPING TEST

Pumping test method (10): 1 ☐ Pump 2 ☒ Air 3 ☐ Bailer
Pumping rate (11-14): 5+ GPM
Duration of pumping (15-16) Hours (17-18) Mins: 1

Static level (19-21)	Water level end of pumping (22-24)	Water levels during (25): 1 ☐ Pumping 2 ☒ Recovery			
		15 minutes (26-28)	30 minutes (29-31)	45 minutes (32-34)	60 minutes (35-37)
25 feet	120 feet	feet	feet	25 feet	✓ feet

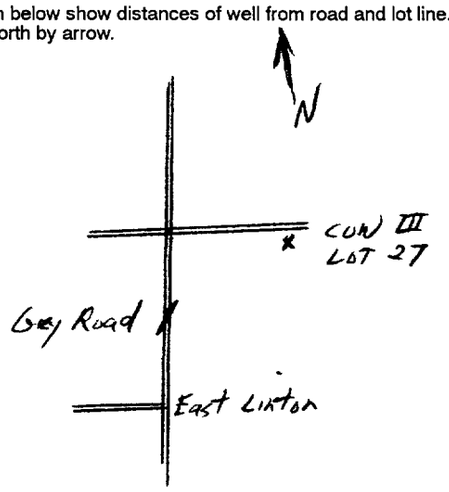
If flowing give rate (38-41)	Pump intake set at	Water at end of test (42)
GPM	120 FOOT feet	☐ Clear ☒ Cloudy

Recommended pump type	Recommended pump setting (43-45)	Recommended pump rate (46-49)
☐ Shallow ☒ Deep	100 feet	5 GPM

(50-53)

LOCATION OF WELL

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



202530

FINAL STATUS OF WELL (54)

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

WATER USE (55-56)

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 (57)

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

Name of Well Contractor	Well Contractor's Licence No.
Wm Wright Well Drilling Ltd	5507
Address: Box 167 Hepworth Ont	
Name of Well Technician	Well Technician's Licence No.
Hugh Wright	T-0140
Signature of Technician/Contractor: Florence Wright	Submission date: day mo yr

MINISTRY USE ONLY

Data source (58)	Contractor (59-62)	Date received (63-68) (80)
	5507	AUG 23 1999
Date of inspection	Inspector	
Remarks		

CSS.ES0

0506 (07/94) Front Form 9

2 - MINISTER OF ENVIRONMENT & ENERGY COPY

Ontario | Ministry of the Environment

Well Tag Number (Place sticker and print number below)

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

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

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

Dury | Sarawak | 27 | W

RR#/Street Number/Name | City/Town/Village | Site/Compartment/Block/Tract etc.

RR#2 Kemble

GPS Reading | NAD | Zone | Easting | Northing | Unit Make/Model | Mode of Operation: ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

	8 3	17	0505065	4945564	Canmore	Mark

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
			previously dulled	-6"	77.

Hole Diameter

Depth From	Depth To	Diameter Centimetres
0	77	6"

Water Record

Water found at ___ 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
Casing				
6"	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___hrs +___ min	2		2	
Final water level end of pumping ___metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☐ Annular space ☑ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	77	cement slurry.	

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: Wm C Wright & Sons Well Drilling Ltd | Well Contractor's Licence No.: 5507

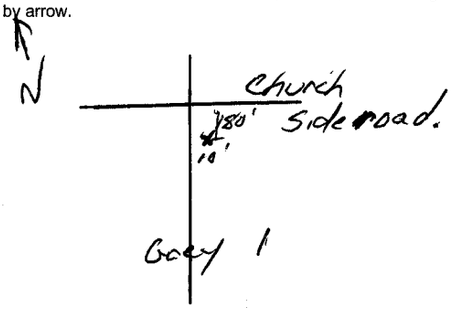
Business Address (street name, number, city etc.): Box 967 Haliburton Ont

Name of Well Technician (last name, first name): Wright Mark | Well Technician's Licence No.: 7-0140

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

Location of Well

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



Audit No. Z 48943 | Date Well Completed YYYY MM DD: 2006 08 21

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

Ministry Use Only

Data Source | Contractor: 5507

Date Received: NOV 17 2006 YYYY MM DD | Date of Inspection YYYY MM DD

Remarks | Well Record Number

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

Cette formule est disponible en français

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below)

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

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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.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

[redacted]

Address of Well Location (County/District/Municipality) Grey | Township Sarawak | Lot 27 | Concession III

RR#/Street Number/Name RR# 2 Kemble | City/Town/Village | Site/Compartment/Block/Tract etc.

GPS Reading | NAD 83 | Zone 17 | Easting 0505070 | Northing 4945579 | Unit Make/Model Lawson 12 | 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)
			previously drilled	0	115.

Hole Diameter

Depth From (Metres)	Depth To	Diameter Centimetres
0	115	6"

Water Record

Water found at ___ 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				
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ____hrs +____ min	2		2	
Final water level end of pumping ____metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ____metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

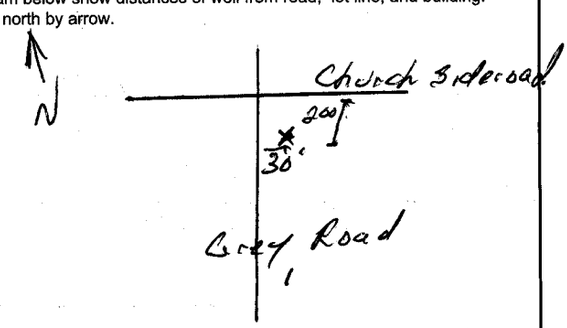
Plugging and Sealing Record

☐ Annular space ☑ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	3	cement	
3	115	hole plug.	

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 29229 | Date Well Completed YYYY 2006 MM 09 DD 01

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

Well Contractor/Technician Information

Name of Well Contractor: Wright Well Drilling Ltd | Well Contractor's Licence No.: 5507

Business Address (street name, number, city etc.): Box 167 Hepworth Ont

Name of Well Technician (last name, first name): Wright, Herb | Well Technician's Licence No.: 7-0140

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

Ministry Use Only

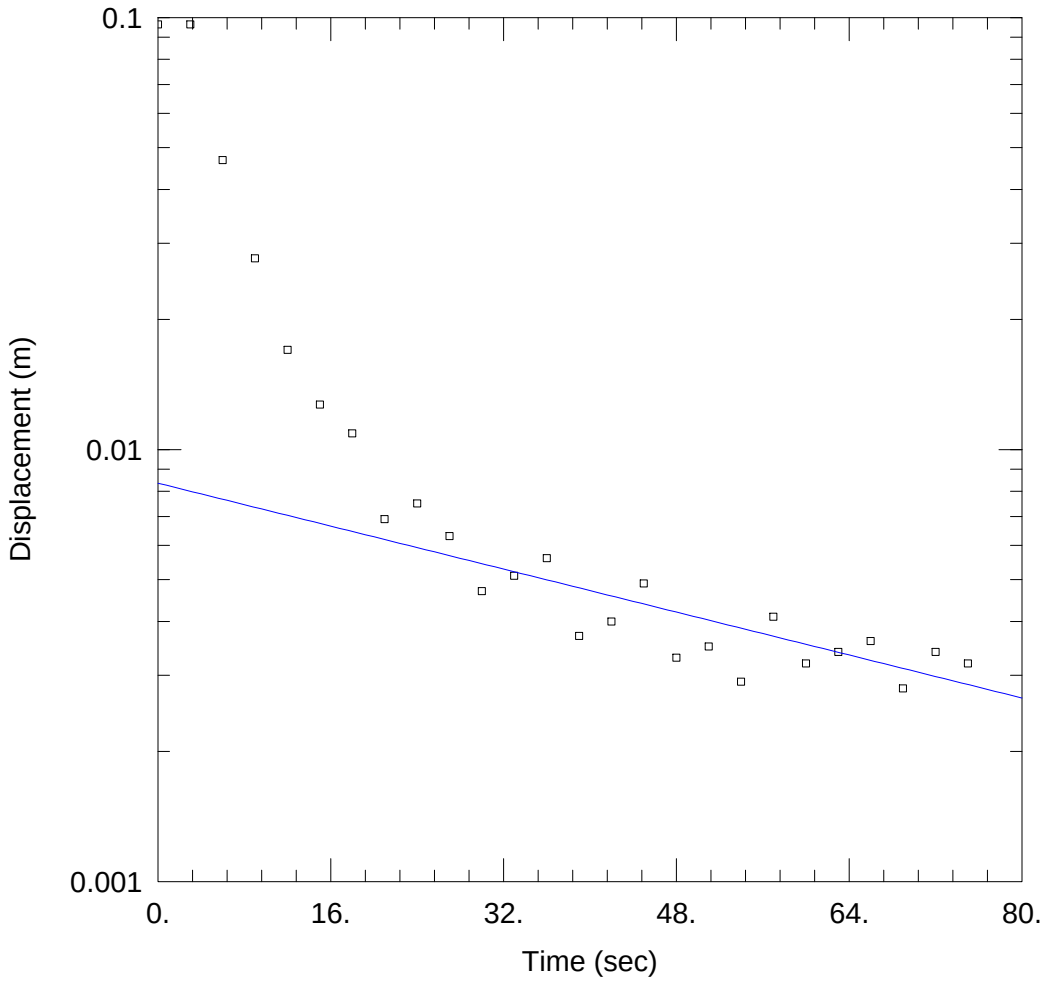
Data Source | Contractor 5507

Date Received NOV 17 2006 YYYY MM DD | Date of Inspection YYYY MM DD

Remarks | Well Record Number

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

Appendix D
Single Response Well Testing Data



TP-02 RISING HEAD

Data Set: I:\...\11139368-01, 17-06-26, TP-02 rising head.aqt
Date: 06/26/17 Time: 17:02:07

PROJECT INFORMATION

Company: GHD
Client: MJD Investments Inc.
Project: 11139368-01
Location: Owen Sound
Test Well: TP-02
Test Date: May 10, 2017

AQUIFER DATA

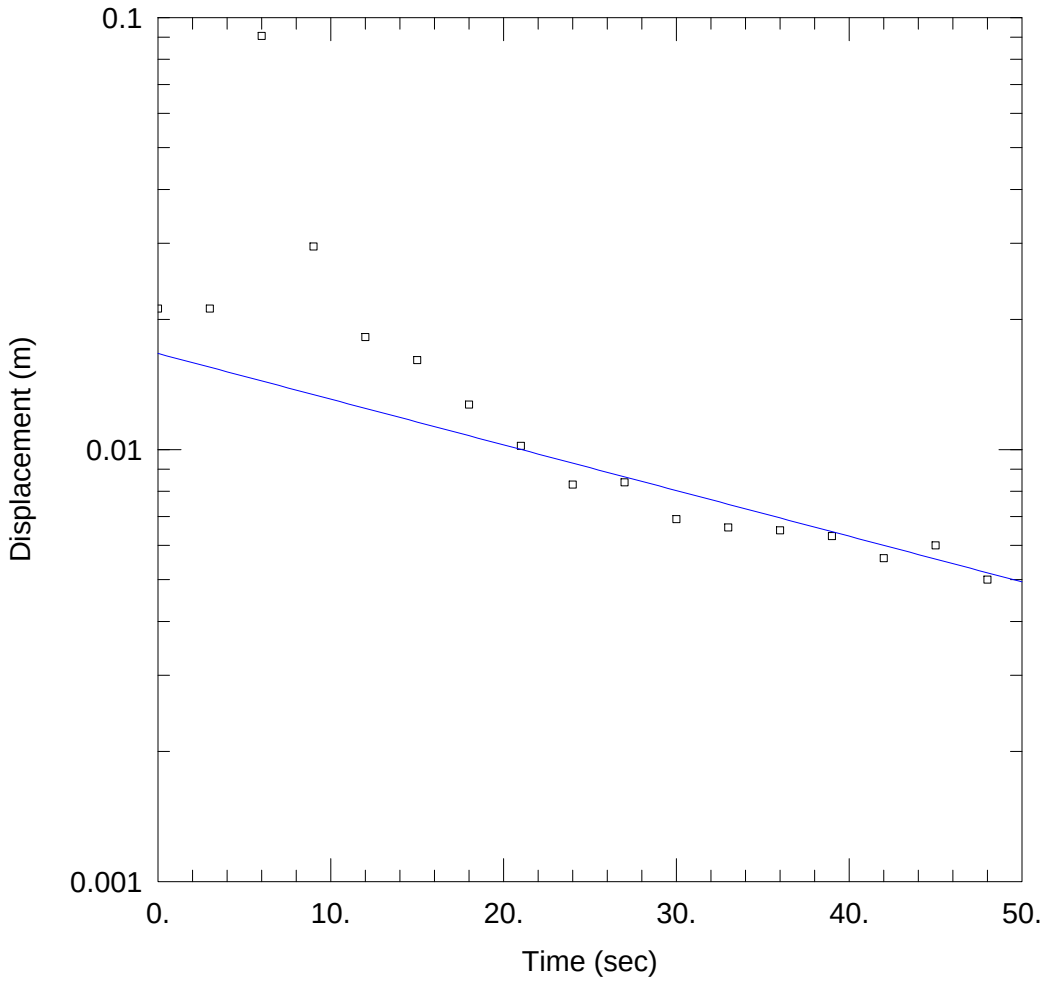
Saturated Thickness: 2.2 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (TP-02)

Initial Displacement: 0.0964 m
Total Well Penetration Depth: 2.7 m
Casing Radius: 0.025 m
Static Water Column Height: 2.2 m
Screen Length: 1.5 m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.047E-5 m/sec
y0 = 0.008357 m



TP-02 FALLING HEAD

Data Set: I:\...\11139368-01, 17-06-26, TP-02 falling head.aqt
Date: 06/26/17 Time: 16:47:11

PROJECT INFORMATION

Company: GHD
Client: MJD Investments Inc.
Project: 11139368-01
Location: Owen Sound
Test Well: TP-02
Test Date: May 10, 2017

AQUIFER DATA

Saturated Thickness: 2.2 m Anisotropy Ratio (Kz/Kr): 1.

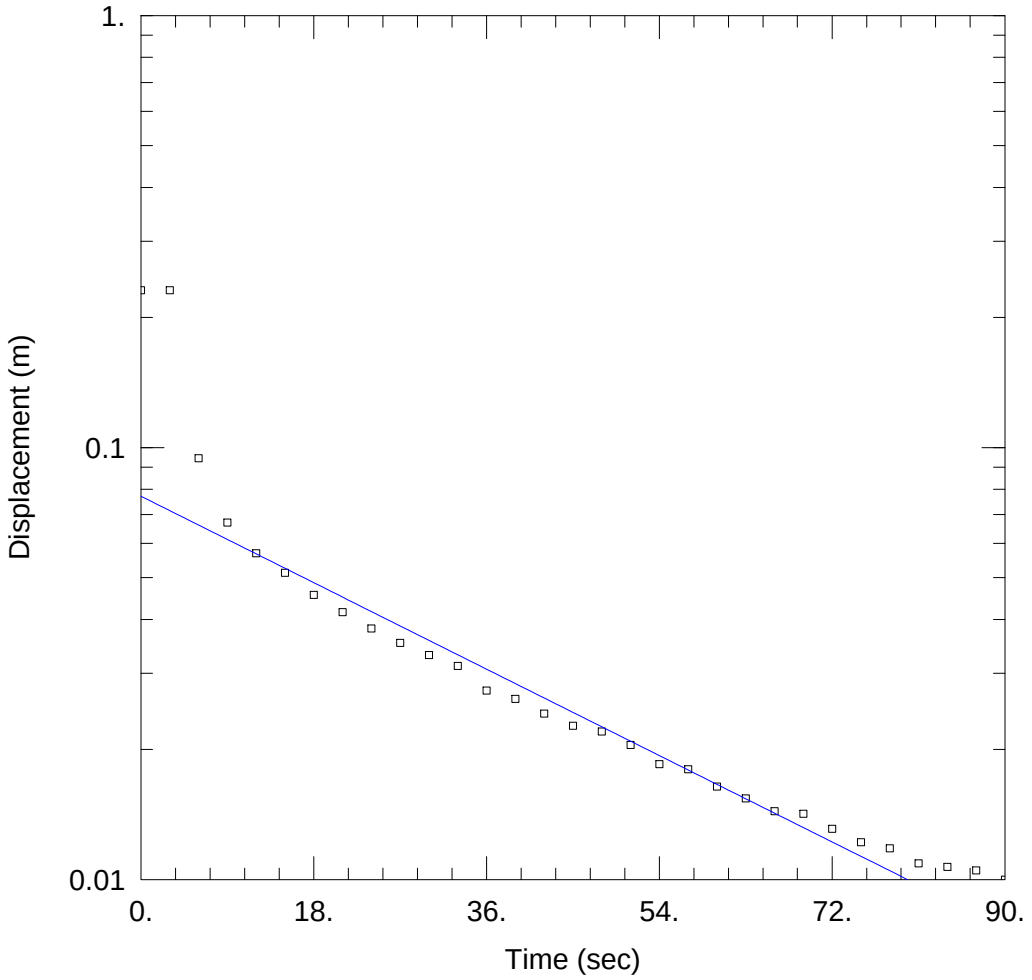
WELL DATA (TP-02)

Initial Displacement: 0.0212 m
Total Well Penetration Depth: 2.7 m
Casing Radius: 0.025 m
Static Water Column Height: 2.2 m
Screen Length: 1.5 m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.781E-5 m/sec
y0 = 0.01668 m



TP-05 FALLING HEAD

Data Set: I:\...\11139368-01, 17-06-26, TP-05 falling head.aqt
Date: 06/26/17 Time: 16:06:02

PROJECT INFORMATION

Company: GHD
Client: MJD Investments Inc.
Project: 11139368-01
Location: Owen Sound
Test Well: TP-05
Test Date: May 10, 2017

AQUIFER DATA

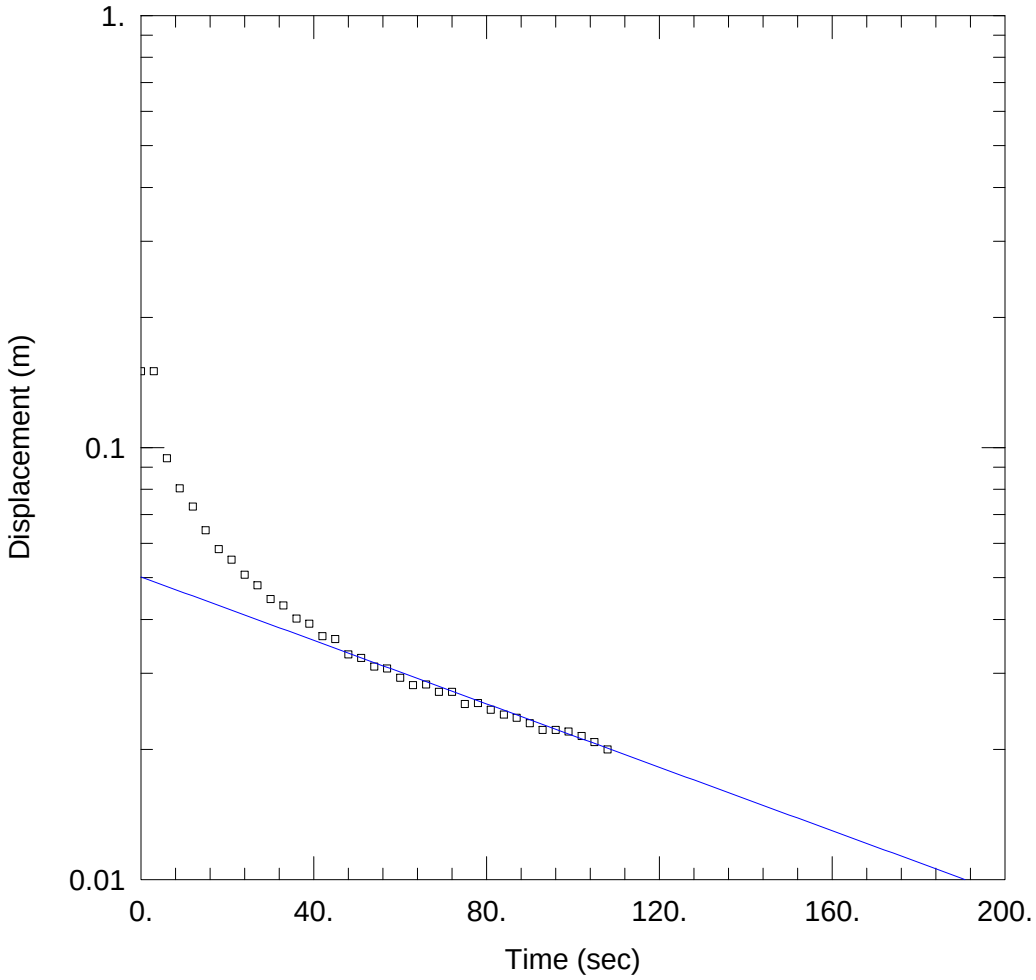
Saturated Thickness: 2.2 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (TP-05)

Initial Displacement: 0.2312 m
Total Well Penetration Depth: 2.7 m
Casing Radius: 0.025 m
Static Water Column Height: 2.2 m
Screen Length: 1.5 m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.872E-5 m/sec
y0 = 0.07715 m



TP-05 RISING HEAD

Data Set: I:\...\11139368-01, 17-06-26, TP-05 rising head.aqt
Date: 06/26/17 Time: 16:33:36

PROJECT INFORMATION

Company: GHD
Client: MJD Investments Inc.
Project: 11139368-01
Location: Owen Sound
Test Well: TP-05
Test Date: May 10, 2017

AQUIFER DATA

Saturated Thickness: 2.2 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (TP-05)

Initial Displacement: 0.1503 m
Total Well Penetration Depth: 2.7 m
Casing Radius: 0.025 m
Static Water Column Height: 2.2 m
Screen Length: 1.5 m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 6.186E-6 m/sec
y0 = 0.05017 m

Appendix E
Analytical Data

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

26-May-2017

GHD
Attn : Jason Geraldi

347 Pido Rd., Unit #29
Peterborough, ON
K9J 6Z8,

Phone: 705-749-3317
Fax:705-749-9248

Date Rec. : 11 May 2017
LR Report: **CA14339-MAY17**
Reference: 11139368-01 PO# 73507536

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Approval Date	4: Analysis Approval Time	5: MAC	6: AO/OG	7: NR 319917 Grey Rd. 1
Sample Date & Time							09-May-17 14:30
Temperature Upon Receipt [°C]	---	---	---	---	---	---	6.0
UV Transmittance [%]	12-May-17	12:51	12-May-17	16:31	---	---	97.7
Alkalinity [mg/L as CaCO3]	12-May-17	11:05	16-May-17	11:25	---	30-500	332
Colour [TCU]	12-May-17	11:53	15-May-17	09:30	---	5	< 3
Conductivity [µS/cm]	12-May-17	11:05	16-May-17	11:25	---	---	1010
pH [no unit]	12-May-17	11:05	16-May-17	11:25	---	6.5-8.5	8.14
Total Suspended Solids [mg/L]	15-May-17	08:05	17-May-17	14:41	---	---	< 2
Turbidity [NTU]	12-May-17	16:18	15-May-17	14:12	1	5	0.18
Organic Nitrogen [mg/L]	12-May-17	21:16	16-May-17	15:09	---	0.15	< 0.05
Total Kjeldahl Nitrogen [mg/L]	15-May-17	20:47	16-May-17	15:08	---	---	< 0.05
Ammonia+Ammonium (N) [mg/L]	12-May-17	21:16	15-May-17	13:47	---	---	0.05
Total Organic Carbon [mg/L]	15-May-17	22:25	16-May-17	13:54	---	5	3
Chloride [mg/L]	15-May-17	21:28	16-May-17	11:31	---	250	190
Fluoride [mg/L]	12-May-17	18:38	15-May-17	11:09	1.5	---	0.21
Nitrite (as N) [mg/L]	12-May-17	19:32	15-May-17	08:05	1	---	0.003 <MDL
Nitrate (as N) [mg/L]	12-May-17	19:32	15-May-17	08:05	10	---	0.353
Sulphate [mg/L]	15-May-17	21:28	16-May-17	11:31	---	500	34
Hardness [mg/L as CaCO3]	18-May-17	09:00	19-May-17	11:56	---	80-100	404
Aluminum (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	---	0.1	0.001
Arsenic (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	0.025	---	< 0.0002
Boron (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	5	---	0.469
Barium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	1	---	0.0294
Calcium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	---	---	109
Cadmium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	0.005	---	< 0.000003
Copper (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	---	1	0.00327
Chromium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	0.05	---	0.00015
Iron (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	---	0.3	0.009

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA14339-MAY17**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Approval Date	4: Analysis Approval Time	5: MAC	6: AO/OG	7: NR 319917 Grey Rd. 1
Potassium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	---	---	6.24
Magnesium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	---	---	32.0
Manganese (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	---	0.05	0.00355
Sodium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	20*	200	93.7
Phosphorus (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	---	---	< 0.003
Lead (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	0.01	---	0.00015
Antimony (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	0.006	---	0.0003
Selenium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	0.01	---	0.00010
Uranium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	0.02	---	0.000586
Zinc (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:56	---	5	0.007
Cation sum [meq/L]	---	---	---	---	---	---	12.3
Anion Sum [meq/L]	---	---	---	---	---	---	12.7
Anion-Cation Balance [% difference]	---	---	---	---	---	---	-1.58
Ion Ratio	---	---	---	---	---	---	0.97
Total Dissolved Solids (calculated) [mg/L]	---	---	---	---	---	---	664
Conductivity (calculated) [µS/cm]	---	---	---	---	---	---	1250
Langelier's Index [@4°C]	---	---	---	---	---	---	0.71
Saturation pH [pHs @ 4°C]	---	---	---	---	---	---	7.43

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.

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0001010767

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

26-May-2017

GHD
Attn : Jason Geraldi

347 Pido Rd., Unit #29
Peterborough, ON
K9J 6Z8,

Phone: 705-749-3317
Fax:705-749-9248

Date Rec. : 11 May 2017
LR Report: **CA14340-MAY17**
Reference: 11139368-01 PO# 73507536

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Approval Date	4: Analysis Approval Time	5: MAC	6: AO/OG	7: NR Dug Well 1
Sample Date & Time							09-May-17 08:00
Temperature Upon Receipt [°C]	---	---	---	---	---	---	6.0
UV Transmittance [%]	12-May-17	12:51	12-May-17	16:31	---	---	68.0
Alkalinity [mg/L as CaCO3]	12-May-17	11:05	16-May-17	11:25	---	30-500	231
Colour [TCU]	12-May-17	11:53	15-May-17	09:30	---	5	14
Conductivity [µS/cm]	12-May-17	11:05	16-May-17	11:25	---	---	389
pH [no unit]	12-May-17	11:05	16-May-17	11:25	---	6.5-8.5	8.23
Total Suspended Solids [mg/L]	15-May-17	08:05	17-May-17	14:42	---	---	5
Turbidity [NTU]	12-May-17	16:18	15-May-17	14:12	1	5	5.85
Organic Nitrogen [mg/L]	12-May-17	21:16	16-May-17	15:09	---	0.15	0.27
Total Kjeldahl Nitrogen [mg/L]	15-May-17	20:47	16-May-17	15:09	---	---	0.28
Ammonia+Ammonium (N) [mg/L]	12-May-17	21:16	15-May-17	13:47	---	---	< 0.04
Total Organic Carbon [mg/L]	15-May-17	22:25	16-May-17	13:54	---	5	5
Chloride [mg/L]	15-May-17	21:28	16-May-17	13:25	---	250	1.3
Fluoride [mg/L]	12-May-17	18:38	15-May-17	11:09	1.5	---	0.10
Nitrite (as N) [mg/L]	12-May-17	19:32	15-May-17	08:05	1	---	0.003 <MDL
Nitrate (as N) [mg/L]	12-May-17	19:32	15-May-17	08:05	10	---	0.026
Sulphate [mg/L]	15-May-17	21:28	16-May-17	13:25	---	500	1.1
Hardness [mg/L as CaCO3]	18-May-17	09:00	19-May-17	11:57	---	80-100	218
Aluminum (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	---	0.1	0.033
Arsenic (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	0.025	---	< 0.0002
Boron (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	5	---	0.037
Barium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	1	---	0.0125
Calcium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	---	---	65.1
Cadmium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	0.005	---	0.000010
Copper (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	---	1	0.00144
Chromium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	0.05	---	0.00006
Iron (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	---	0.3	0.023

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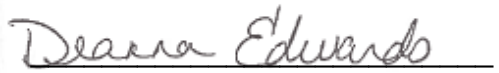
LR Report : **CA14340-MAY17**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Approval Date	4: Analysis Approval Time	5: MAC	6: AO/OG	7: NR Dug Well 1
Potassium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	---	---	1.78
Magnesium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	---	---	13.4
Manganese (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	---	0.05	0.0275
Sodium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	20*	200	1.11
Phosphorus (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	---	---	0.015
Lead (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	0.01	---	0.00006
Antimony (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	0.006	---	0.0003
Selenium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	0.01	---	0.00007
Uranium (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	0.02	---	0.00135
Zinc (dissolved) [mg/L]	18-May-17	09:00	19-May-17	11:57	---	5	0.002
Cation sum [meq/L]	---	---	---	---	---	---	4.44
Anion Sum [meq/L]	---	---	---	---	---	---	4.67
Anion-Cation Balance [% difference]	---	---	---	---	---	---	-2.49
Ion Ratio	---	---	---	---	---	---	0.95
Total Dissolved Solids (calculated) [mg/L]	---	---	---	---	---	---	222
Conductivity (calculated) [µS/cm]	---	---	---	---	---	---	456
Langelier's Index [@4°C]	---	---	---	---	---	---	0.47
Saturation pH [pHs @ 4°C]	---	---	---	---	---	---	7.76

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.



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Appendix F
Water Balance Calculations

Appendix F.1

Water Budget (Thornthwaite Method 1948) - Average Values*

Owen Sound MOE (1981 - 2010) **Elevation:** 178.9 masl **Distance Away:** 8.6 km south

Month	Mean Temperature (^{o}C)	Heat Index	Potential ET (mm)	Daylight Correction Factor	Adjusted ET (mm)	Total Precipitation (mm)	Surplus (mm)	Deficit (mm)
January	-5.4	0	0	0.82	0	128.8	128.80	
February	-4.8	0	0	0.82	0	86.3	86.30	
March	-1	0	0	1.03	0	77.8	77.80	
April	5.8	1.25	26.53	1.12	29.71	71	41.29	
May	11.5	3.53	55.09	1.27	69.96	84	14.04	
June	16.6	6.15	81.51	1.28	104.34	73.5	0.00	30.84
July	20.1	8.22	99.98	1.3	129.98	70.4	0.00	59.58
August	19.6	7.91	97.33	1.2	116.79	78.7	0.00	38.09
September	15.8	5.71	77.33	1.04	80.42	106.1	25.68	
October	9.6	2.68	45.43	0.95	43.16	98	54.84	
November	3.8	0.66	16.89	0.81	13.68	110	96.32	
December	-1.8	0	0	0.78	0	129.9	129.90	
TOTAL	7.5	36.1	500.1		588.0	1114.5	655.0	128.5
				TOTAL WATER SURPLUS:		526.5	mm	

Notes:

*Average values of precipitation were used. Average values of temperature were also used.

Appendix F.2
Water Budget Pre-Development

Catchment Designation	**SITE**			
	Mixed Grass	**Wooded**	**House**	
	Area	**Area**	Rooftop	Total
Area (m^2)	112370	70000	200	182570
Pervious Area (m^2)	112370	70000	0	182370
Impervious Area (m^2)	0	0	200	200
INFILTRATION FACTORS				
Topography Infiltration Factor	0.15	0.15	0.15	
Soil Infiltration Factor	0.1	0.1	0.1	
Land Cover Infiltration Factor	0.1	0.2	0.1	
MOE Infiltration Factor	0.35	0.45	0.35	
Actual Infiltration Factor	0.2	0.25	0	
Runoff Coefficient	0.8	0.75	1	
Runoff from Impervious Surfaces*	0	0	0.8	
INPUTS (PER UNIT AREA)				
Precipitation (mm/yr)	1115	1115	1115	1115
Run On (mm/yr)	0	0	0	0
Other Inputs (mm/yr)	0	0	0	0
Total Inputs (mm/yr)	1115	1115	1115	1115
OUTPUTS (PER UNIT AREA)				
Precipitation Surplus (mm/yr)	526	526	892	527
Net Surplus (mm/yr)	526	526	892	527
Evaportranspiration (mm/yr)	588	588	223	588
Infiltration (mm/yr)	105	132	0	115
Rooftop Infiltration (mm/yr)	0	0	0	0
Total Infiltration (mm/yr)	105	132	0	115
Runoff Pervious Areas	421	395	892	412
Runoff Impervious Areas	0	0	0	0
Total Runoff (mm/yr)	421	395	892	412
Total Outputs (mm/yr)	1115	1115	1115	1115
Difference (Inputs - Outputs)	0	0	0	0
INPUTS (VOLUMES)				
Precipitation (m^3/yr)	125236	78015	223	203474
Run On (m^3/yr)	0	0	0	0
Other Inputs (m^3/yr)	0	0	0	0
Total Inputs (m^3/yr)	125236	78015	223	203474
OUTPUTS (VOLUMES)				
Precipitation Surplus (m^3/yr)	59158	36852	178	96189
Net Surplus (m^3/yr)	59158	36852	178	96189
Evaportranspiration (m^3/yr)	66078	41163	45	107285
Infiltration (m^3/yr)	11832	9213	0	21045
Rooftop Infiltration (m^3/yr)	0	0	0	0
Total Infiltration (m^3/yr)	11832	9213	0	21045
Runoff Pervious Areas (m^3/yr)	47327	27639	178	75144
Runoff Impervious Areas (m^3/yr)	0	0	0	0
Total Runoff (m^3/yr)	47327	27639	178	75144
Total Outputs (m^3/yr)	125236	78015	223	203474
Difference (Inputs - Outputs)	0	0	0	0

Appendix F.3

Water Budget Post-Development - No Mitigation Strategies

Catchment Designation	SITE				
	Buildings	Storm Pond	Landscaping Trees, Grass	Asphalt Parking, Access	Total
Area (m^2)	47195	7125	110123	18127	182570
Pervious Area (m^2)	0	0	110123	0	110123
Impervious Area (m^2)	47195	7125	0	18127	72447
	INFILTRATION FACTORS				
Topography Infiltration Factor	0	0	0.15	0	
Soil Infiltration Factor	0	0	0.1	0	
Land Cover Infiltration Factor	0	0	0.15	0	
MOE Infiltration Factor	0	0	0.4	0	
Actual Infiltration Factor	0	0	0.2	0	
Runoff Coefficient	1	1	0.8	1	
Runoff from Impervious Surfaces*	0.8	0.8	0	0.8	
	INPUTS (PER UNIT AREA)				
Precipitation (mm/yr)	1115	1115	1115	1115	1115
Run On (mm/yr)	0	0	0	0	0
Other Inputs (mm/yr)	0	0	0	0	0
Total Inputs (mm/yr)	1115	1115	1115	1115	1115
	OUTPUTS (PER UNIT AREA)				
Precipitation Surplus (mm/yr)	892	892	526	892	671
Net Surplus (mm/yr)	892	892	526	892	671
Evaportranspiration (mm/yr)	223	223	588	223	443
Infiltration (mm/yr)	0	0	105	0	64
Rooftop Infiltration (mm/yr)	0	0	0	0	0
Total Infiltration (mm/yr)	0	0	105	0	64
Runoff Pervious Areas	0	0	421	0	254
Runoff Impervious Areas	892	892	0	892	354
Total Runoff (mm/yr)	892	892	421	892	608
Total Outputs (mm/yr)	1115	1115	1115	1115	1115
Difference (Inputs - Outputs)	0	0	0	0	0
	INPUTS (VOLUMES)				
Precipitation (m^3/yr)	52599	7941	122732	20203	203474
Run On (m^3/yr)	0	0	0	0	0
Other Inputs (m^3/yr)	0	0	0	0	0
Total Inputs (m^3/yr)	52599	7941	122732	20203	203474
	OUTPUTS (VOLUMES)				
Precipitation Surplus (m^3/yr)	42079	6353	57975	16162	122569
Net Surplus (m^3/yr)	42079	6353	57975	16162	122569
Evaportranspiration (m^3/yr)	10520	1588	64757	4041	80905
Infiltration (m^3/yr)	0	0	11595	0	11595
Rooftop Infiltration (m^3/yr)	0	0	0	0	0
Total Infiltration (m^3/yr)	0	0	11595	0	11595
Runoff Pervious Areas (m^3/yr)	0	0	46380	0	46380
Runoff Impervious Areas (m^3/yr)	42079	6353	0	16162	64594
Total Runoff (m^3/yr)	42079	6353	46380	16162	110974
Total Outputs (m^3/yr)	52599	7941	122732	20203	203474
Difference (Inputs - Outputs)	0	0	0	0	0

Appendix F.4

Water Budget Post-Development - With Mitigation Strategies

Catchment Designation	SITE				
	Buildings	Storm Pond	Landscaping Trees, Grass	Asphalt Parking, Access	Total
Area (m^2)	47195	7125	110123	18127	182570
Pervious Area (m^2)	0	0	110123	0	110123
Impervious Area (m^2)	47195	7125	0	18127	72447
	INFILTRATION FACTORS				
Topography Infiltration Factor	0	0	0.15	0	
Soil Infiltration Factor	0	0	0.1	0	
Land Cover Infiltration Factor	0	0	0.15	0	
MOE Infiltration Factor	0	0	0.4	0	
Actual Infiltration Factor	0	0	0.2	0	
Runoff Coefficient	1	1	0.8	1	
Runoff from Impervious Surfaces*	0.8	0.8	0	0.8	
	INPUTS (PER UNIT AREA)				
Precipitation (mm/yr)	1115	1115	1115	1115	1115
Run On (mm/yr)	0	0	0	0	0
Other Inputs (mm/yr)	0	0	0	0	0
Total Inputs (mm/yr)	1115	1115	1115	1115	1115
	OUTPUTS (PER UNIT AREA)				
Precipitation Surplus (mm/yr)	892	892	526	892	671
Net Surplus (mm/yr)	892	892	526	892	671
Evaportranspiration (mm/yr)	223	223	588	223	443
Infiltration (mm/yr)	0	0	105	0	64
% Rooftop to balance infiltration	22%				
Rooftop Infiltration (mm/yr)	200	0	0	0	52
Total Infiltration (mm/yr)	200	0	105	0	115
Runoff Pervious Areas	0	0	421	0	254
Runoff Impervious Areas	691	892	0	892	302
Total Runoff (mm/yr)	691	892	421	892	556
Total Outputs (mm/yr)	1115	1115	1115	1115	1115
Difference (Inputs - Outputs)	0	0	0	0	0
	INPUTS (VOLUMES)				
Precipitation (m^3/yr)	52599	7941	122732	20203	203474
Run On (m^3/yr)	0	0	0	0	0
Other Inputs (m^3/yr)	0	0	0	0	0
Total Inputs (m^3/yr)	52599	7941	122732	20203	203474
	OUTPUTS (VOLUMES)				
Precipitation Surplus (m^3/yr)	42079	6353	57975	16162	122569
Net Surplus (m^3/yr)	42079	6353	57975	16162	122569
Evaportranspiration (m^3/yr)	10520	1588	64757	4041	80905
Infiltration (m^3/yr)	0	0	11595	0	11595
Rooftop Infiltration (m^3/yr)	9450	0	0	0	9450
Total Infiltration (m^3/yr)	9450	0	11595	0	21045
Runoff Pervious Areas (m^3/yr)	0	0	46380	0	46380
Runoff Impervious Areas (m^3/yr)	32629	6353	0	16162	55144
Total Runoff (m^3/yr)	32629	6353	46380	16162	101524
Total Outputs (m^3/yr)	52599	7941	122732	20203	203474
Difference (Inputs - Outputs)	0	0	0	0	0

Appendix F.5
Water Budget Summary

PARAMETER	SITE				
	Pre-Development	***Post-Development No Mitigation***	***Difference Pre- vs. Post-***	***Post-Development Mitigation***	***Difference Pre- vs. Post-***
INPUTS (VOLUMES)					
Precipitation (m^3/yr)	203474	203474	0%	203474	0%
Run On (m^3/yr)	0	0	0%	0	0%
Other Inputs (m^3/yr)	0	0	0%	0	0%
Total Inputs (m^3/yr)	203474	203474	0%	203474	0%
OUTPUTS (VOLUMES)					
Precipitation Surplus (m^3/yr)	96189	122569	27%	122569	27%
Net Surplus (m^3/yr)	96189	122569	27%	122569	27%
Evapotranspiration (m^3/yr)	107285	80905	-25%	80905	-25%
Infiltration (m^3/yr)	21045	11595	-45%	11595	-45%
Rooftop Infiltration (m^3/yr)	0	0	0%	9450	--
Total Infiltration (m^3/yr)	21045	11595	-45%	21045	0%
Runoff Pervious Areas (m^3/yr)	75144	46380	-38%	46380	-38%
Runoff Impervious Areas (m^3/yr)	0	64594	-	55144	-
Total Runoff (m^3/yr)	75144	110974	48%	101524	35%
Total Outputs (m^3/yr)	203474	203474	0%	203474	0%

Appendix G
Nitrate Impact Assessment Calculations

APPENDIX G.1: Contaminant Attenuation Considerations

MASS BALANCE EQUATION

$Q_TC_T = Q_eC_e + Q_iC_i + Q_bC_b$

$C_T = (Q_eC_e + Q_iC_i + Q_bC_b)/Q_T$

Data to be Input

Lots =	33	lots
Average flow =	1000	L/day
Site area =	18.26	ha

SEWAGE EFFLUENT (Q_eC_e)

Q_e = Lots * Average Flow

Q_e = 33000 L/lot/day

C_e = Concentration of effluent

C_e = 40 mg/L

Q_eC_e = 1320000 mg/Lot/day

INFILTRATION (Q_iC_i)

Q_i = Infiltration volume

C_i = Concentration of infiltration

C_i = 0 mg/L

Therefore, $Q_iC_i = 0$ and drops from mass balance equation.

BACKGROUND GROUND WATER (Q_bC_b)

C_b = Concentration of aquifer

C_b = 0.026 mg/L From dug well on site

Note: The volume of insitu groundwater will ultimately be replaced by the infiltrating precipitation and therefore is not included in the mass balance equation (MOEE Hydrogeological Technical Info Requirements, page 5-6).

Therefore, $Q_bC_b = 0$ and drops from mass balance equation.

Therefore, $C_T = (Q_eC_e)/Q_T$

Where $Q_T = Q_e + Q_i$

Q_e = 33000 L/lot/day

Q_i = 115 mm/year (Infiltration rate based upon soil type observed at 8 test pits)

Q_i = 57531.51 L/day

Q_T = 90531.51 L/day

C_T = 14.58 mg/L (NO_3-N) for 33 lots

Therefore, 33 lots can be developed based upon the nitrate impact assessment.

APPENDIX G.2: Contaminant Attenuation Considerations

MASS BALANCE EQUATION

$Q_TC_T = Q_eC_e + Q_iC_i + Q_bC_b$

$C_T = (Q_eC_e + Q_iC_i + Q_bC_b)/Q_T$

Data to be Input

Lots =	33	lots
Average flow =	1000	L/day
Site area =	18.26	ha

SEWAGE EFFLUENT (Q_eC_e)

Q_e = Lots * Average Flow

Q_e = 33000 L/lot/day

C_e = Concentration of effluent

C_e = 27.4 mg/L

Q_eC_e = 904200 mg/Lot/day

INFILTRATION (Q_iC_i)

Q_i = Infiltration volume

C_i = Concentration of infiltration

C_i = 0 mg/L

Therefore, $Q_iC_i = 0$ and drops from mass balance equation.

BACKGROUND GROUND WATER (Q_bC_b)

C_b = Concentration of aquifer

C_b = 0.026 mg/L From dug well on site

Note: The volume of insitu groundwater will ultimately be replaced by the infiltrating precipitation and therefore is not included in the mass balance equation (MOEE Hydrogeological Technical Info Requirements, page 5-6).

Therefore, $Q_bC_b = 0$ and drops from mass balance equation.

Therefore, $C_T = (Q_eC_e)/Q_T$

Where $Q_T = Q_e + Q_i$

Q_e = 33000 L/lot/day

Q_i = 115 mm/year (Infiltration rate based upon soil type observed at 8 test pits)

Q_i = 57531.51 L/day

Q_T = 90531.51 L/day

C_T = 9.99 mg/L (NO_3-N) for 33 lots

Therefore, 33 lots can be developed based upon the nitrate impact assessment and provided that nitrate is reduced using tertiary treatment to: 27.4 mg/L.