



February 1, 2018

Reference No. 086822

Mr. David Parks
Director of Planning, Development & Tourism
County of Simcoe
1110 Highway 26
Midhurst, ON L0L 1X0

Mr. Brent Spagnol, MCIP, RPP
Director of Planning Services and By-Law Enforcement
Township of Springwater
2231 Nursery Road
Minesing, ON L9X 1A8

Mr. Chris Hibberd
Director, Planning Services
Nottawasaga Valley Conservation Authority
8195 8th Line
Utopia, ON L0M 1T0

Dear Sirs:

**Re: County of Simcoe Environmental Resource Recovery Centre
Updated Hydrogeological Assessment
Ministry of Municipal Affairs File #: 43-OP-169096**

The County of Simcoe (County) continues to pursue the development of the proposed Environmental Resource Recovery Centre (ERRC) located at 2976 Horseshoe Valley Road West (Site) in the Township of Springwater (Township). In support of the ERRC, applications for Amendments to the Official Plan and Zoning By-Law were submitted to Township Planning staff on November 18, 2016. In addition to these Amendments, a number of supporting studies were also submitted, including a DRAFT Updated Hydrogeological Assessment Report (December 6, 2017).

As part of the One Window Provincial Planning Service, a copy of the draft Hydrogeological Assessment Report was circulated to the Ministry of Municipal Affairs and partner ministries including: Ministry of Natural Resources and Forestry, Ministry of the Environment and Climate Change (MOECC), Ministry of Tourism, Culture and Sport, Ministry of Transportation and Ministry of Agriculture, Food and Rural Affairs. The draft FCR was also circulated to Ainley & Associates Limited for review on behalf of the Township.

GHD are pleased to provide the enclosed final Updated Hydrogeological Assessment Report, which contains supplementary groundwater and surface water monitoring data, and addresses regulatory agency review comments. The review comments and responses have also been summarized in the attached table, providing an overview of the revisions made in the Updated Hydrogeological Assessment Report. In addition, the County has met with the Risk Management Official for the City of Barrie who confirmed that the proposed ERRC adequately addresses Source Protection.



Should you require any additional information or clarification please do not hesitate to contact the undersigned.

Sincerely,

GHD

A handwritten signature in black ink, appearing to read 'Brian Dermody', with a long horizontal flourish extending to the right.

Brian Dermody, P. Eng.

BD/jlm/2

Encl.

A handwritten signature in blue ink, appearing to read 'Philip Smart', with a long horizontal flourish extending to the right.

Philip Smart M.Sc., P.Geo.

Comment No.	Submitted By	Date Submitted	Document	Comment	Response	Action
20	Terraprobe Inc. (Ainley Group)	January 24, 2017	Hydrogeological Assessment	In general the Hydrogeological Assessment conducted by GHD has used generally accepted professional practices during their assessment, review and interpretation of the hydrogeological conditions at the site.	Acknowledged.	No further action required.
21	Terraprobe Inc. (Ainley Group)	January 24, 2017	Hydrogeological Assessment	Terraprobe agrees with the GHD conclusion that a PTTW or an EASR posting from the MOECC will not be required for water takings relating to construction activities at the site.	Acknowledged.	No further action required.
22	Terraprobe Inc. (Ainley Group)	January 24, 2017	Hydrogeological Assessment Facility Characteristics Report	Terraprobe agrees with the GHD conclusion that the deep water table and sandy soils have the potential to facilitate the infiltration of all collected storm water post development. Implementation of infiltration measures for the post development condition will be required.	Details of the proposed stormwater management system, including potential infiltration measures will be developed as part of the detailed design for the MMF in support of the Site Plan Approval and Environmental Compliance Approval. This will also include consideration for using stormwater to support the proposed fire protection systems. Further consideration will be given to using this water to supplement process water requirements during the development of the detailed design for the OPF. Amendments to the Site Plan and Environmental Compliance Approval will be submitted as required following completion of the detailed design for the OPF.	Complete the detailed design for the of MMF, including the stormwater management system. Complete the detailed design for the OPF, including potential modifications to the stormwater management system to allow for the use of water for processing operations or fire protection.
23	Terraprobe Inc. (Ainley Group)	January 24, 2017	Hydrogeological Assessment Facility Characteristics Report	The water demand of ERRC facility, and therefore the water taking of the proposed supply well, should be further evaluated to demine an estimated daily flow volume. If the water requirement does exceed 50,000 L/day, then a Category 3 PTTW for long term water takings will be required for the facility.	Details of the required water demand of the ERRC will be developed as part of the detailed design for the MMF and the OPF in support of the Site Plan Approval and Environmental Compliance Approval. If it is determined that more than 50,000 litres of water will be required per day, then a Permit to Take Water (PTTW) application will be submitted to the Ministry of the Environment and Climate Change.	Complete the detailed design for the Administrative Facility, MMF, and OPF, including the potable water requirements. Apply for a PTTW if required.
24	Terraprobe Inc. (Ainley Group)	January 24, 2017	Hydrogeological Assessment	Seasonal groundwater level monitoring has not been undertaken to confirm the seasonal ground water levels and flow direction. If the new ground water levels and flow direction are substantially different then what has been found to date (i.e. the water table is much shallower than has been observed to date), the conclusions and recommendations of the report may have to be reevaluated. GHD has indicated that this will be undertaken, but was not included as part of the report reviewed.	Additional groundwater level monitoring was undertaken in 2017 to confirm the seasonal groundwater levels and flow direction. The Amended Hydrogeological Assessment Report has been revised to reflect the additional monitoring.	No further action required.
25	Terraprobe Inc. (Ainley Group)	January 24, 2017	Hydrogeological Assessment Facility Characteristics Report	The unevaluated wetland near the northeast portion of the Site will constrain storm water management options in that vicinity. Additional evaluation of the wetland area should be undertaken to ensure that drainage patterns are maintained to provide similar hydrologic contributions to this feature.	Additional evaluation of the wetland will be undertaken during the stormwater management design to ensure drainage patterns are maintained to provide similar hydrologic contributions to this feature.	Complete the detailed design for the of MMF, including the stormwater management system. Complete the detailed design for the OPF, including potential modifications to the stormwater management system.
26	Nottawasaga Valley Conservation Authority	March 2, 2017	Hydrogeological Assessment	The site is located within a significant groundwater recharge area. Please include this classification within the report. Further advise on how the proposed development may impact groundwater quality and the associated risk management measures required to manage and/or prevent potential groundwater contamination from the ERRC.	The classification of the Site as a low to medium vulnerability significant groundwater recharge area (SGRA) will be added to the Hydrogeological Assessment Report. The MOECC has indicated that they are satisfied that the activities associated with the proposed land use are not subject to threat policies in the South Georgian Bay Lake Simcoe Source Protection Plan. In addition, the County met with the Risk Management Official for the City of Barrie who confirmed that the proposed ERRC adequately addressed Source Protection. The risk management measures required to manage and/or prevent potential groundwater contamination from the ERRC will be developed as part of the detailed design for the MMF in support of the Site Plan Approval and ECA.	Complete the detailed design for the of MMF, including risk management measures for the protection of groundwater. Complete the detailed design for the OPF, including risk management measures for the protection of groundwater.
27	Nottawasaga Valley Conservation Authority	March 2, 2017	Hydrogeological Assessment	The report indicates in Section 4.4 that chromium and lead were present in the water sample from monitoring well MW2-16. Please advise on the source of chromium and lead.	The concentration of chromium and lead from Monitoring Well MW-16 are only slightly above the ODWS maximum acceptable concentration and the sample collected was slightly turbid. Based on a confirmatory sample taken at Monitoring Well MW-16 on June 9, 2017, the chromium (total) concentration was not detected above the reportable detection limit of 0.005 mg/L, and the lead (total) concentration was not detected above the reportable detection limit of 0.0005 mg/L. The sample had a total suspended solid (TSS) concentration of 170 mg/L indicating a relatively low amount of sediment was contained in the sample. Based on the results, the elevated concentrations of chromium and lead obtained from the sample collected on August 22, 2016 are considered to be anomalous, due to sediment contained within the sample.	No further action required.
28	Nottawasaga Valley Conservation Authority	March 2, 2017	Hydrogeological Assessment	Although outside of the scope of the report, nitrate loading calculations will be required for the septic system(s) to service the site. This comment can be addressed to the satisfaction of the appropriate approval authority at the site plan stage of the planning process.	GHD confirms that the nitrate loading calculations are outside the scope of the current study, but will be completed as part of the detailed design and site servicing. The nitrate loading will be addressed to the satisfaction of the appropriate approval authority at the site plan stage of the planning process.	Complete the detailed design for the of MMF, including the wastewater system, and submit the Site Plan application for approval. Complete the detailed design for the OPF and submit an amended Site Plan for approval.
29	Nottawasaga Valley Conservation Authority	March 2, 2017	Hydrogeological Assessment	Ongoing groundwater level monitoring is strongly encouraged to capture high water table elevations. Upon receipt of data, confirm the sites flow direction as being in a westerly direction. This comment can be addressed at the site plan stage of the planning process.	Additional groundwater level monitoring was undertaken in 2017 to confirm the seasonal groundwater levels and flow direction. The Amended Hydrogeological Assessment Report has been revised to reflect the additional monitoring.	No further action required.
30	Ministry of Municipal Affairs and Partner Ministries (MNR, MOECC, MTCS, MTO, OMAFRA)	April 7, 2017	Hydrogeological Assessment	Source Protection Plan - MOECC staff are satisfied that the activities associated with the proposed land use are not subject to threat policies in the South Georgian Bay Lake Simcoe Source Protection Plan. In addition, it appears that the amendment to permit the ERRC is consistent with the adopted Simcoe County OPA No. 1 - Source Protection Conformity. Surface Water/Groundwater Protection - MOECC staff are satisfied that neither wetland nor downstream surface water tributaries will be impaired, provided that erosion and sediment control measures identified in the mitigation plan are implemented during the construction stage and for long-term site management. The "Hydrological Assessment" prepared by GHD (dated November 2016) notes that construction activities will be limited to slab on grade construction with trenching for utilities installation. Considering the depth of the water table and the length of the utilities trenches, a registration via the Environmental Activity and Sector Registry (EASR) for construction dewatering or Permit to Take Water (PTTW) may be required.	The depths of the building slabs and utility trenches relative to the water table, as well as the potential need for registration via the Environmental Activity and Sector Registry (EASR) for construction dewatering or Permit to Take Water (PTTW), will be determined during the detailed design.	Complete the detailed design for the of MMF, including the potential need for registration via the EASR or a PTTW application. Complete the detailed design for the OPF, including updates to the EASR or PTTW.
56	Ministry of Municipal Affairs and Partner Ministries (MNR, MOECC, MTCS, MTO, OMAFRA)	April 7, 2017	Hydrogeological Assessment	Source Protection Plan - MOECC staff are satisfied that the activities associated with the proposed land use are not subject to threat policies in the South Georgian Bay Lake Simcoe Source Protection Plan. In addition, it appears that the amendment to permit the ERRC is consistent with the adopted Simcoe County OPA No. 1 - Source Protection Conformity.	Acknowledged.	No further action required.



Updated Hydrogeological Assessment

Environmental Resource Recovery Centre (ERRC)
2976 Horseshoe Valley Road West
Springwater, Ontario

County of Simcoe

GHD | 111 Brunel Road Suite 200 Mississauga Ontario L4Z 1X3 Canada
086822|Report No 16 | February 1 2018



Executive Summary

This Updated Hydrogeological Assessment Report supersedes the previous Hydrogeological Assessment Report (November 15, 2016) submitted for the proposed Environmental Resource Recovery Centre development. This Report provides the updated groundwater monitoring for the Site, which was completed in November 2017, and contains all previous hydrogeological investigation and monitoring data. The hydrogeological interpretations and conclusions presented in this Updated Report supersede and override the understanding of the Site stated in previous reports. It is noted, however, that the updated groundwater level monitoring data presented herein does not significantly alter the previous interpretation of the Site.

A Hydrogeological Assessment was undertaken for County of Simcoe in support of a proposed Environmental Resource Recovery Centre (ERRC) development at 2976 Horseshoe Valley Road West, in Springwater, Ontario (Site). The proposed development includes an organics processing facility, materials management facility, truck servicing facility, administrative building with public education space, and associated roads and paved surfaces. The objective of this assessment was to:

- Assess current groundwater conditions, including quantification of potential impacts to the local groundwater regime (quality and quantity), and groundwater supply for the development.
- Identify hydrologically-sensitive features for recharge/discharge function protection (i.e., wetlands and/or watercourses).
- A water balance analysis to estimate the groundwater recharge potential at the Site, under pre-development and proposed post development conditions.
- Determine the requirement and options for groundwater control during construction and required approvals.

The Site is located in rural area and is designated as a County Forest. There are several small rural residential communities in the vicinity of the Site, and the surrounding area consists of agricultural lands, with farmhouses, barns and ancillary buildings. Adjacent properties are serviced with individual water supply wells and septic systems.

A wetland (not evaluated) is situated within the northeast corner of the Site. A watercourse originates in this area and flows to Matheson Creek, which is situated approximately 700 metres (m) to the east of the Site.

The Site is underlain by a glaciofluvial sand deposit. The hydraulic conductivity (K_h) of the sand is 2.4×10^{-3} cm/s, which is medium to high and indicates the fine to medium textured glaciofluvial deposit behaves as an aquifer.

The water table was encountered at depths of more than 10 mBGS across the ERCC footprint area. Groundwater levels fluctuate in the range of 0.5 to 0.8 metres seasonally, generally decreasing through the late summer fall and winter months, and recovering during the spring freshet and early summer months. Based on the seasonal groundwater level measurements, groundwater flow direction is to the northwest.



Construction activities are not anticipated to require groundwater takings based on the deep water table. It is anticipated that the excavations would be relatively small, such that, a construction EASR for groundwater seepage and stormwater management would not be required.

The ERRC facility will require a water supply well for maintenance and washroom facilities, and it is expected that the water usage would be much less than the amount that would require a Ministry of the Environment and Climate Change (MOECC) Permit To Take Water (PTTW) of 50,000 Litres per day (L/day). The water supply well is not anticipated to interfere with private wells in the area, based on the low takings and because the area of influence would be small and close to the supply well.

The amount of impervious surfaces (roofs, roads) is anticipated to increase from the existing pre-development condition to the post development condition. Based on the water balance, it is anticipated that there will be a net increase of the Site runoff with an annual water surplus of approximately 14,700 m³. The deep water table, and the presence of sandy soils, which have moderate to high infiltration potential will facilitate the infiltration of collected water post development.

The potential wetland near the northeast portion of the Site provides recharge to the underlying sand aquifer during the spring freshet, based on the observed mini-piezometer and surface water levels within the wetland area. Drainage patterns will need to be maintained to provide similar hydrologic contributions to this surface water feature.

Development of the Site is not anticipated to have an adverse impact on groundwater or surface water, given appropriate stormwater and natural environment mitigation construction methods are implemented.



Table of Contents

1.	Introduction.....	1
2.	Background	2
2.1	Site Description	2
2.2	Regional Setting.....	3
3.	Methodology.....	4
3.1	Borehole Advancement/Monitoring Well Installations	4
3.2	Guelph Permeameter Testing.....	5
3.3	Single Well Response Tests.....	6
3.4	Groundwater Level Monitoring.....	6
3.4.1	Mini-piezometer Installation.....	7
3.5	Groundwater Quality	7
3.6	Surface Water Flow	7
4.	Geology and Hydrogeology.....	8
4.1	Site Geology	8
4.2	Site Hydrogeology.....	9
4.2.1	Hydrostratigraphic Units	9
4.2.2	Unsaturated Properties.....	9
4.2.3	Flow Direction and Gradients	9
4.2.4	Saturated Hydraulic Properties.....	10
4.2.5	Groundwater-Surface Water Interaction.....	10
4.2.6	Surface Water Monitoring.....	11
4.3	Water Taking Evaluation.....	11
4.4	Groundwater Quality	13
4.5	Water Balance	13
4.5.1	Water Balance Calculations	14
4.5.2	Stormwater Management Options.....	14
5.	Development Constraints.....	16
5.1	Mitigation.....	17
6.	Summary and Conclusions	17
7.	References	19



List of Figures

- Figure 1.1 Site Location
- Figure 1.2 Site Plan
- Figure 2.1 Land Use (Aerial Image)
- Figure 2.2 Surface Water Features
- Figure 2.3 Wetlands
- Figure 2.4 Physiography
- Figure 2.5 Surficial Geology
- Figure 2.6 MOECC Water Well Records
- Figure 3.1 Investigative Locations
- Figure 4.1 Cross Section A-A'
- Figure 4.2 Cross Section B-B'
- Figure 4.3a Groundwater Elevation Contours (September 30, 2016)
- Figure 4.3b Groundwater Elevation Contours (July 30, 2017)
- Figure 4.3c Groundwater Elevation Contours (November 21, 2017)
- Figure 4.4 Depth to Water Table
- Figure 4.5 Estimated Water Taking – Analytical Model
- Figure 4.6 Estimated Area of Influence – Analytical Model

List of Tables

- Table 3.1 Borehole and Monitoring Well Completion Details
- Table 3.2 Summary of Grain Size Analyses
- Table 3.3a Summary of Groundwater Elevations - mAMSL
- Table 3.3b Summary of Groundwater Levels - mBGS
- Table 3.4 Sample Key
- Table 4.1 Summary of Hydraulic Conductivity
- Table 4.2 Summary of Groundwater Analytical Results – Ontario Drinking Water Standards
- Table 4.3 Land Type Annual Averages
- Table 4.4 Existing Conditions Water Balance
- Table 4.5 Proposed Uncontrolled Conditions Water Balance
- Table 4.6 Proposed Conditions Water Balance
- Table 4.7 Summary of Calculations



List of Appendices

Appendix A	Field Investigation Methodology and Protocols
Appendix B	B.1 Selected Stratigraphic and Instrumentation Logs B.2 Grain Size Distribution Test Results
Appendix C	Infiltration Analyses
Appendix D	Single Well Response Test Analyses
Appendix E	Groundwater Level Hydrographs
Appendix F	MOECC Well Records F.1 Well Record Formation Report F.2 Individual Records
Appendix G	Surface Water Monitoring Data
Appendix H	Laboratory Analytical Reports



1. Introduction

GHD Limited (GHD) was retained by the County of Simcoe to undertake a Hydrogeological Assessment for a proposed Environmental Resource Recovery Centre (ERRC) development located at 2976 Horseshoe Valley Road West, in Springwater, Ontario (herein referred to as the Property or Site) (**Figure 1.1**).

This Updated Hydrogeological Assessment Report supersedes the previous Hydrogeological Assessment Report (November 15, 2016) submitted for the proposed Environmental Resource Recovery Centre development. This Report provides the updated groundwater monitoring for the Site, which was completed in November 2017, and contains all previous hydrogeological investigation and monitoring data. The hydrogeological interpretations and conclusions presented in this Updated Report supersede and override the understanding of the Site stated in previous reports. It is noted, however, that the updated groundwater level monitoring data presented herein does not significantly alter the previous interpretation of the Site.

The Site is situated on the north side of Horseshoe Valley Road West, approximately 3 kilometers west of Highway 400. The Site is rectangular in shape and is described as Lot 2, Concession 1 in the Township of Springwater, County of Simcoe. The Site is approximately 84 hectares (ha) in size and the land use designation is Greenlands in the County of Simcoe Official Plan (County of Simcoe Official Plan, Schedule 5.1). The Site is identified as the Freele County Forest Tract in the Township of Springwater and is covered by a forest area with the exception of a small access road/trail.

The Site is proposed to be redeveloped as a co-located Organics Processing Facility (OPF) and Materials Management Facility (MMF) and is anticipated to consist of these facilities and a truck servicing facility, administrative building with public education space, and associated roads and paved surfaces. Additional details are provided in the Facility Characteristics Report (GHD, November 2016). The development footprint is centrally located and is anticipated to occupy approximately 4.5 ha within the 84 hectares of the Site (**Figure 1.2**).

The proposed OPF and MMF buildings will be serviced by a groundwater supply well and individual septic system. The buildings will be surrounded by paved parking and driveway areas. The access to the facility will be the existing unpaved road/trail that will be upgraded to include heavy-duty asphalt pavement to accommodate waste collection vehicles.

The objective of this hydrogeological assessment is to characterize the current geological and hydrogeological conditions and includes:

1. Assessment of current groundwater conditions, including quantification of potential impacts to the local groundwater regime (quality and quantity), and groundwater supply for the development.
2. Hydrologically-sensitive features for recharge/discharge function protection (i.e., wetlands and/or watercourses).



3. Completion of a water balance analysis to estimate the groundwater recharge potential at the Site, under pre-development and proposed post development conditions.
4. The requirement and options for groundwater control during construction and required approvals.

2. Background

2.1 Site Description

The Site is located in rural area and is designated as a County Forest (**Figure 2.1**). There are several small residential communities in the area, which include Apto, located approximately 2 kilometres (km) to the west of the Site, Anten Mills approximately 4 km to the west, and Craighurst located approximately 4 km to the east of the Site. Small residential subdivisions are present on Fox Farm Road and Ohara Lane south of the Site, and there are several farmhouses, barns and ancillary buildings in proximity to Site. The Site is not serviced with any utilities (water, waste water and power), and residential properties in the vicinity of the Site are serviced with individual water supply wells and septic systems.

The Site is bounded to the north by Rainbow Valley Road East and to the south by Horseshoe Valley Road West. The Site can be accessed from either road, and has a connecting trail that runs roughly north-south through the middle of the Site, which bends to the west at the north end. The surrounding area to the west of the Site consists of agricultural lands, with farmhouses, barns and ancillary buildings. Lands to the north, east and south of the Site are largely forested, and a Hydro transmission line corridor crosses the southeast corner of the Site. A small cemetery (Apto Cemetery) is located adjacent to the southwest corner of the Site.

The closest farmhouses relative to the ERRC footprint area are situated more than 300 metres to the northwest on Rainbow Valley Road, and 500 metres to the southwest on Horseshoe Valley Road. A residential property is also located in the forested area approximately 300 metres to the east of the ERRC footprint.

The topography slopes from west to east across the Site toward Matheson Creek. The topography ranges from an elevation of 265 metres above mean sea level (mAMSL) near the west side of the Site to 245 mAMSL on the east boundary. At the north end of the Site, the topography is relatively flat at an elevation of approximately 240 (mAMSL), which is coincident with a wetland area.

The Site is located in the Matheson Creek watershed (**Figure 2.2**). Matheson Creek is situated approximately 700 metres (m) to the east of the Site. The watershed divide between the Matheson Creek and the Nottawasaga River is situated approximately 2 km to the west of the Site.

The Site is situated within the Nottawasaga Valley Conservation Authority (NVCA) watershed, and portions of the Site are within the NVCA regulated area. The property is currently designated as Greenlands, and a wetland feature (not evaluated) is located on the northeast corner of the Site (**Figure 2.3**).



Two tributaries of Matheson Creek are mapped on the Site, as identified by the Natural Heritage Information Center (NHIC) and NVCA mapping resources. One watercourse originates at the wetland area near the northeast corner of the Site, and the second watercourse crosses the south portion of the Site. This south watercourse could not be located during site visits and investigations completed at the Site.

2.2 Regional Setting

The Site is not located within any Wellhead Protection Areas or Highly Vulnerable Aquifer Areas, but is located within a Significant Groundwater Recharge Area (SGRA) within the Nottawasaga Valley Source Protection region (SGBLS, 2015).

The Site is located in the Simcoe Uplands physiographic region (Chapman and Putnam 1984), which is characterized by a drumlinized till plain and sand plain (**Figure 2.4**). The topography on the till plain is generally undulating within an elevation range of approximately 240 to 260 metres above mean sea level (mAMSL). Matheson Creek is steeply incised into the sand plain at an elevation of 220 mAMSL.

Overburden underlying the Site is approximately 120 metres (m) thick, and is generally described as a thick sequence of Pleistocene glacial deposits overlying limestone and shale bedrock of the Middle Ordovician, Simcoe Group Formations (OGS, 1991).

Regional surficial geology mapping of the area indicates that the Site and surrounding lands are underlain by sandy deposits and foreshore basinal deposits (sand and silt) (**Figure 2.5**). The surficial geology and general stratigraphic framework for the Site and surrounding area consists of the following deposits:

- **Surficial Soil** – Topsoil
- **Glaciofluvial** - Sand
- **Glaciolacustrine Foreshore Deposits** – Sand and Silt
- **Bedrock** – Limestone, Shale

The location of recorded Ministry of Environment and Climate Change (MOECC) water wells within 500 m of the Site is presented on **Figure 2.6**, and a summary of the records is presented in **Appendix F** (MOECC Water Well Record Formation Report, Individual Well Records). The compilation of well records was obtained from the MOECC Water Well Information System, without revision or omission, as such, some records are not necessarily for wells within the study area.

Based on review of the well records, the majority of wells reported in the immediate vicinity of the Site consist of domestic water supply wells. The wells are typically 6 to 5-inch diameter drilled wells completed to depths of 30 to 43 metres below ground surface (mBGS) and screened within sand. The records indicate sand was often encountered throughout the well depth, with some intervening layers of clay and sand. The water table was typically found at depths of about 27 mBGS, based on static water levels reported in the wells records. Pumping rates recommended by the driller ranged from 27 to 45 Litres per minute (L/min), with one well (#7214502) that had a recommended rate of 350 L/min.



Review of the water well record information indicates that the overburden is primarily comprised of fine to medium textured sand deposits which extend to depths of more than 50 mBGS. The hydrostratigraphy consists of the following units:

- **Aquifer (Unconfined)** – fine to medium textured sand
- **Aquitard** - limestone, shale bedrock

In general, the sandy overburden forms a thick unconfined aquifer overlying bedrock.

3. Methodology

Cognizant of the objectives of the project, the following activities were undertaken:

- Borehole advancement and installation of monitoring wells in selected boreholes to facilitate the collection of groundwater levels to determine groundwater flow conditions.
- Installation of three (3) mini-piezometers within the wetland area to the northeast of the Site to assess the form and function of the wetland, and groundwater surface water interactions.
- Groundwater level monitoring to determine groundwater flow direction and seasonal fluctuations of the groundwater table.
- Guelph Permeameter testing to determine the hydraulic conductivity of the unsaturated surficial soils. This preliminary infiltration testing provides soil parameters for storm water management recommendations. Additional testing will be required to support any proposed LID storm water management options during detailed design.
- Aquifer testing (single well response tests) to determine hydraulic conductivity and groundwater flux of the water bearing deposits.
- Groundwater level monitoring to determine seasonal fluctuations of the groundwater table.
- Collection of groundwater samples to assess the groundwater quality with respect to Ontario Drinking Water Standards.
- Surface water monitoring of a tributary of Matheson Creek at Rainbow Valley Road East, and of Matheson Creek at Horseshoe Valley Road West.

The investigative activities listed above were completed concurrently with a geotechnical investigation (GHD 2016b). The investigative locations are shown on **Figure 3.1**. The details of these investigations are summarized in the following sections, and the field investigation methodology and protocols are provided in **Appendix A**.

3.1 Borehole Advancement/Monitoring Well Installations

Drilling activities were initially completed in August 2016, eight boreholes were advanced by Profile Drilling Inc., utilizing a track-mounted rotary drill rig equipped with hollow stem augers, and under the full time supervision of a GHD field technician. In addition, an ecologist was present and directed drill crews with respect to access (paths) and drill sites to avoid sensitive features, and the NVCA was notified of drilling activities and locations.



GHD undertook an additional geotechnical drilling program from December 19, 2016 to January 6, 2017 (GHD, 2017). The investigation consisted of the advancement of an additional fifteen (15) boreholes and the instrumentation of one (1) of these boreholes as a monitoring well, MW15-16.

Boreholes were advanced to depths up to 30.2 metres below ground surface (mBGS). Soil samples were collected using a 50 mm outside diameter split spoon sampler. Representative samples were collected at 0.75 metre intervals to 3.6 mBGS, and at 1.5 m intervals thereafter to the termination depth of drilling.

Monitoring wells were installed in five of the boreholes to depths ranging from 14.9 to 30.2 mBGS. The borehole and monitoring well locations are shown on **Figure 3.1**, and the completion details for the monitoring wells and boreholes are provided on **Table 3.1**. Stratigraphic and Instrumentation logs for the monitoring wells and selected boreholes are provided in **Appendix B.1**.

All monitoring wells were instrumented with a 3 m (10-foot) long, 50 mm (2-inch) inside diameter, No. 10 slot, Schedule 40 PVC screen, and a riser pipe of required length. A silica sand pack was placed in the annular space between the PVC screen/riser pipe and the borehole, from the bottom of the well screen to at least 0.60 m above the top of the well screen. Bentonite seal was placed above the sand pack to within 0.30 m of the ground surface. A protective monument casing with a concrete collar was placed around each of the monitoring wells upon completion. The drilling and monitoring well installation methods and procedures are discussed in **Appendix A**

Groundwater levels measured subsequent to the completion of the monitoring well installations are presented on the Stratigraphic and Instrumentation logs in **Appendix B.1**. Groundwater levels were allowed to stabilize for at least 24 hours following well installation before a groundwater level was recorded.

Grain size analyses, consisting of sieve and hydrometer testing, were carried out on selected samples collected from the drilled boreholes. The results of these tests are summarized in **Table 3.2**, and the grain size distribution test results are presented in **Appendix B.2**.

3.2 Guelph Permeameter Testing

In-situ permeability testing was undertaken using a Guelph Permeameter (GP) in accordance with ASTM D5126 to provide infiltration parameters and assist in the development of stormwater management options. The Guelph Permeameter determines the field saturated hydraulic conductivity in the vadose zone above the water table. The testing was completed at three (3) locations within the proposed development area (GP1-16), downgradient of the footprint (GP2-16) and within the wetland area (GP3-16) (**Figure 3.1**).

The boreholes for the infiltration tests were hand augered to depths of 0.5 to 0.7 mBGS. The Guelph permeameter tests were completed in the native sand soils.

The field permeameter test consisted of the following activities:

- Excavation of a cylindrical borehole to the interval to be tested.
- Placement of the permeameter in the borehole and filling of the borehole with water.



- Initiation of the permeameter and setting of the desired head and monitoring the rate of decline of the water level in the reservoir until steady state conditions.

The hydraulic conductivity measured in the unsaturated (vadose) zone is referred to as the “field-saturated” hydraulic conductivity (K_{fs}) (Reynolds, 1986). The Guelph Permeameter method measures the steady-state flow rate (Q) necessary to maintain a constant depth of water (H) in an uncased borehole. K_{fs} is then calculated from Q and H using the analytical solutions presented in **Appendix C** (after Reynolds et al., 1985).

The test results are discussed in Section 4.0.

3.3 Single Well Response Tests

In-situ hydraulic response testing, referred to as single well response tests (SWRT), were completed on selected monitoring wells to estimate the horizontal hydraulic conductivity of the water bearing deposits underlying the Site.

Single well response tests involve the injection or removal of a known volume of water into/from the well and measuring the water level response in the well until it returns to static conditions (i.e., falling/rising head test). The results of the hydraulic testing were analyzed using the Bouwer and Rice (1976) and Hvorslev (1951) solutions for unconfined conditions using the software package AQTESOLV™. These solutions were used to determine the horizontal hydraulic conductivity of the geologic deposits within the immediate vicinity of the screened interval of each monitoring well. The SWRT methodology is presented in **Appendix A**. The results of the testing are presented in **Appendix D** and discussed in Section 4.0.

3.4 Groundwater Level Monitoring

Groundwater level monitoring was undertaken from August 2016 to November 2017 to assess seasonal groundwater level fluctuations. Manual groundwater level measurements were collected bi-monthly using a water level meter at all wells (from August 2016 to February 2017), and electronic water level dataloggers were installed selected monitoring wells as well as in each of the minipiezometers for continuous water level measurements (from August 2016 to November 2017). The dataloggers provide a detailed record of the response of groundwater to climatic conditions throughout the year.

Manual measurements were collected using a Solinst water level meter, and electronic data loggers (Solinst Model 3001 – Levellogger Edge) were installed in monitoring wells MW1-16 to MW4-16 to continuously record water levels. A Solinst baralogger was used (suspended in air in one of the monitoring wells) to correct the water level data for atmospheric pressure.

Groundwater level measurements obtained from the monitoring wells are summarized in **Table 3.3a** and **Table 3.3b**. Measurements with respect to metres above mean sea level (mAMSL) are presented in **Table 3.3a**, and groundwater levels measured in metre below ground surface (mBGS) are presented in **Table 3.3b**. The groundwater elevation hydrographs are presented in **Appendix E**.



3.4.1 Mini-piezometer Installation

Three (3) mini-piezometers, MP1-16 to MP3-16 were installed within the wetland area on the northeast portion of the Site (**Figure 3.1**). The piezometers were installed using a manual slide hammer until refusal, which is generally about 1 to 2 mBGS. The piezometers consist of a 20 mm diameter (3/4-inch) pipe and stainless steel well point. The installation details for the mini-piezometers are provided in **Table 3.1**.

The mini-piezometers are used to determine the vertical gradient between groundwater and surface water. Data loggers (Solinst Leveloggers) are installed in the mini-piezometers to continuously record shallow groundwater levels inside the mini-piezometer and surface water levels outside the piezometer at adjacent staff gauge locations to provide a detailed record of groundwater-surface interactions, and the response of groundwater to climatic conditions throughout the seasons.

3.5 Groundwater Quality

Groundwater samples were collected in August 2016 from monitoring wells MW1-16 to MW4-16 and analyzed for general chemistry and metal parameters (Ontario Drinking Water Standards, MOE, 2003; revised June 2006) to determine baseline conditions and characterize the groundwater quality (**Table 3.4**). A follow-up water quality sample was collected from monitoring well MW2-16 on June 9, 2017 to assess elevated concentrations of chromium and lead detected in the initial August 2016 sampling event.

A water quality sample was also collected from monitoring well MW15-16 on November 21, 2017 to provide a baseline water quality sample from this well, which was installed subsequent to the initial sampling event.

Prior to sampling, the wells were developed to ensure that the sample collected was representative of groundwater quality. Purging of the well was considered to be complete when three consistent field measurement readings of pH, conductivity, and temperature had been obtained after each well volume removed.

The groundwater samples were submitted under chain of custody procedures to Maxxam Analytics Laboratories (Maxxam) of Mississauga, Ontario a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited analytical laboratory. The groundwater quality analytical results are discussed in **Section 4.0**.

3.6 Surface Water Flow

A surface water monitoring program was undertaken to characterize the baseflow in a tributary of Matheson Creek (SW1-16) at Rainbow Valley Road and of Matheson Creek at Horseshoe Valley Road (SW2-16). The monitoring locations were determined based on accessibility, stream sensitivity (potential aquatic habitat), stream transect characteristics, and the potential for groundwater discharge.

Stream flow measurements are collected manually using a Valeport Electromagnetic Flow Meter, and continuously using a Solinst Levelogger Edge (Edge). Measurements are collected on a



monthly basis, during a non-storm event and immediately following a major storm event (minimum of three days following rainfall event) (**Appendix G**).

Flows at each location have been measured in compliance with the Ontario Stream Assessment Protocol (MNR, 2010), and is calculated by the two methods identified by Ministry of Natural Resources, the Mean Method (mean velocities taken at the panel sides) and the Mid Method (panel width is the sum of half the distance to either adjacent velocity measurement). The average result from the two methods was used.

4. Geology and Hydrogeology

The following sections provide a detailed description of the geology and hydrogeology of the Site, based on the results of the investigations completed and on the available background information. Hydrostratigraphic cross sections referenced as A-A', and B-B' across the Site are shown on **Figures 4.1** and **4.2**. The cross-section locations are shown on **Figure 3.1**.

4.1 Site Geology

Based on observations during the installation of the monitoring wells and advancement of boreholes, the following surficial materials and geologic deposits underlie the Site (see **Figures 4.1** and **4.2**):

- **Topsoil (0 to 0.3 mBGS)** – topsoil with organics
- **Fill (0 to 1.5 mBGS)** – re-worked native soil, sand some silt to silty sand
- **Sand (0.3 to 30 mBGS)** – *glaciofluvial deposits consisting of sand, sandy silt to silty sand.*

All boreholes encountered a thin surficial layer of topsoil at the ground surface, which varied in thickness between 25 mm and 35 mm. In some areas fill was encountered comprised of re-worked native soils, mainly consisting of sand some silt to silty sand trace gravel. Fill was locally encountered underlying the topsoil, and extended generally to 0.5 to 1.5 mBGS. The fill has moist to very moist conditions, and the Standard Penetration Test (SPT) 'N' values ranged between 10 to 20 blows per 0.3 m of penetration, indicating a compact state.

The topsoil and fill is underlain by a fine to medium textured glaciofluvial deposit, comprised of sand, sandy silt to silty sand with some thin and discontinuous layers of silt and silty clay. In general the sand deposit is very moist and loose near surface and becomes moist and very dense with increasing depth. The sand deposit is brown to greyish brown, and moist. SPT 'N' values varied between 8 to in excess of 100 blows per 300 mm of penetration, indicating a compact to very dense condition.

The sand deposit was encountered in all of the boreholes and monitoring wells advanced extending to depths ranging between 0.3 mBGS and 30.2 mBGS (termination depth of borehole). Based on the grain size analyses, the sand deposit typically contains 84 to 96 percent sand and 4 to 16 percent silt (**Table 3.2**).



Discontinuous layers of silt and clayey silt are present within the sand. A silt layer was encountered in BH1-16 from approximately 6 to 8 mBGS, and in MW1-16 from approximately 21 to 30 mBGS. A fine textured compact native clayey silty layer was also encountered in BH8-16 at a depth of approximately 3 to 4.5 mBGS.

No boreholes advanced during the drilling activities encountered bedrock.

4.2 Site Hydrogeology

4.2.1 Hydrostratigraphic Units

Hydrostratigraphic profiles are presented on **Figures 4.1 and 4.2** and the primary aquifer/aquitard units underlying the Site include the following:

Fill – Based on the borehole investigations the fill and shallow native sand and silty sand soils are unsaturated over the Site. During ‘wet’ seasonal conditions the shallow soils form ‘perched’ conditions, and support infiltration and recharge to the deeper unconfined aquifer.

Sand Aquifer (Unconfined) – The sand, silty sand to sandy silt forms an unconfined aquifer

Although not encountered during the drilling activities, the bedrock forms an underlying aquitard.

4.2.2 Unsaturated Properties

Guelph Permeameter Tests were completed on the unsaturated sand deposits. The field saturated hydraulic conductivity (K_{fs}) is 7.1×10^{-4} cm/s (geomean) (**Figures C.1 to C.3**). The corresponding infiltration rate is 78 mm/hr, which converts to a percolation time of 8 min/cm. The field saturated hydraulic conductivity indicates the sand provides medium to high infiltration and recharge conditions.

4.2.3 Flow Direction and Gradients

The groundwater elevation contours for monitoring wells screened within the sand aquifer are presented on **Figure 4.3a** using the September 30, 2016 water elevation data. The water table ranges in elevation from approximately 236.1 to 233.3 mAMSL within the ERRC footprint area of the Site (**Table 3.3a**). Based on the groundwater level measurements, groundwater flow is in a northwesterly direction.

The average horizontal groundwater gradient across the footprint area is approximately 0.01 metres per metre (m/m), based on the difference in groundwater level elevations perpendicular to groundwater flow between MW1-16 and MW2-16 ($236.1 - 233.33$ mAMSL / 300 m = 0.01).

The depth to watertable is presented on **Figure 4.4**. The water table within the ERRC footprint area is present within the sand deposit at depths ranging from 9.3 to 25.8 mBGS (**Table 3.3a**).

Review of the groundwater level hydrographs in **Appendix E** indicates that groundwater levels declined steadily from August 2016 to March 2017. Groundwater levels in MW2-16 and MW3-16 decreased approximately 0.8 metres over this period, and the groundwater levels observed in MW1-16 and MW4-16 decreased approximately 0.5 metres. Subsequent to the decline,



groundwater levels recovered to about the same level from March to May 2017 during the spring freshet. Groundwater levels continued to increase slightly through the spring, and then flattened during the summer period (July/August), then began to decrease during the fall period November (see **Appendix E - Figure E1**).

The groundwater elevation contours for monitoring wells screened within the sand aquifer are presented on **Figure 4.3b**, using the May 31, 2017 water elevation data. The water table ranges in elevation from approximately 237.7 to 233.1 mAMSL across the Site (**Table 3.3a**).

The groundwater elevation contours for monitoring wells screened within the sand aquifer are also presented on **Figure 4.3c**, using the November 21, 2017 water elevation data. The water table ranges in elevation from approximately 236.27 to 233.34 mAMSL across the Site (**Table 3.3a**).

Based on the seasonal groundwater level measurements, groundwater flow direction is to the northwest. Groundwater flow is also anticipated to be to the southeast toward Matheson Creek, based on the deeply incised stream valley (220 mAMSL).

4.2.4 Saturated Hydraulic Properties

The fine to medium textured glaciofluvial deposit forms an unconfined aquifer underlying the Site. A summary of the hydraulic properties is presented in **Table 4.1**. Based on the results from the SWRTs, the geometric mean hydraulic conductivity (K_h) is 2.4×10^{-3} cm/s, which is representative of the sand deposit. The groundwater flux (per square metre) in the deposit can be estimated using the following relationship:

$$q = Ki$$

where:

q = groundwater flux (per square metre)

K = hydraulic conductivity (2.4×10^{-5} m/s)

i = hydraulic gradient (0.01 m/m)

Therefore the estimated groundwater flux in the glaciofluvial deposit is estimated to be 2.8×10^{-7} m/s, per square metre (2.4×10^{-5} m/s \times 0.01 m/m = 2.4×10^{-7} m/s). The flow rate per square metre of aquifer is approximately 0.14 L/min (2.4×10^{-7} m/s \times 60 sec/minute \times 1,000 L/m³ = 0.014 L/min). Based on this, the hydraulic conductivity and flow rate is relatively high.

4.2.5 Groundwater-Surface Water Interaction

The water table is at a depth of about 8 to 10 metres below the wetland feature on the north portion of the Site (**Figure 4.4**). Based on the monitoring during the spring freshet the wetland is recharged by snowmelt, surface water runoff and/or precipitation events, and gradually lose water throughout the year and recharges the aquifer. The wetland is dry in the summer and throughout the majority of the year.

Based on review of the mini-piezometer and surface water hydrographs (**Appendix E**), the mini-piezometers were dry at depths ranging from 0.1 to 0.8 mBGS, and the wetlands were also dry at



the mini-piezometer locations from August 2016 through to March 2017. Subsequently during the spring freshet in March 2017, the mini-piezometer water levels increased to approximately 0.1 to 0.3 m above ground surface, corresponding to the recharge and increase in the surface water levels at the piezometers of approximately 0.3 m.

The surface water levels within the wetland area typically range from approximately 241.5 to 242.5 mAMSL at MP1-16 to MP3-16 (**Appendix E**). These surface water levels observed within the wetland area are well above the groundwater table at the Site, which is generally below an elevation of 236 mAMSL, based on the monitoring well data.

The wetland provides recharge to the underlying sand aquifer during the spring freshet, based on the observed mini-piezometer and surface water levels within the wetland area.

4.2.6 Surface Water Monitoring

The surface water monitoring indicated that the surface water feature at SW1 was dry from July 2016 to December 2017. Subsequently there was flow during the winter period and spring freshet from January to May 2017, ranging from 0.5 to 13.7 litres per second (lps).

The flow at SW2 from July 2016 to May 2017 ranged from 172.9 to 1,459.2 lps. The lowest flow was observed in July 2016 and the highest in May 2017.

4.3 Water Taking Evaluation

Construction Water Takings

Conceptually, the ERRC buildings will be constructed with slab on grade foundations, with no below ground structures (basement). Below grade excavations would be required for services (water, septic). Given the water table beneath the Site is more than 9 mBGS, dewatering for the construction of the building and installation of services is not anticipated to be required.

Any water accumulations into excavations from precipitation or surface runoff is anticipated to be very minor, and well below the amount that would require an MOECC Environmental Activity and Sector Registry (EASR) (O. Reg. 63/16) of 50,000 L/day.

Operational Water Takings

The ERRC facility will require a groundwater supply well to service the buildings for maintenance and washroom facilities. The water supply well would likely be screened in the sand aquifer at a depth of approximately 30 mBGS, similar to other domestic water supply wells in the vicinity of the Site.

The results from the single well response tests were utilized to determine the hydraulic properties (hydraulic conductivity, transmissivity) and conditions to provide the basis for estimating the area of influence for the water supply well, based on a water taking of 10,000 L/day. The area of influence was determined using analytical methods for an unconfined aquifer, using the Neuman (1972, 1973b, 1975a) analytical method. The equation can be used to predict the drawdown and area of influence, using the following equations:



EQUATION AND PARAMETERS

$$h_o - h = \frac{Q}{4\pi T} W(u_b, \eta) \quad (1) \quad u_b = \frac{r^2 S_y}{4Tt} \quad (2) \quad \eta = \frac{r^2}{b^2} \quad (3)$$

where:

$h_o - h$ = drawdown

Q = constant pumping rate

$W(u_b, n)$ = well function for an unconfined aquifer with delayed yield response

T = transmissivity

r = distance from pumping well

S_y = specific yield

u_b = dimensionless

t = time after the start of pumping

b = aquifer thickness

For these estimations, the following was assumed:

- The aquifer is horizontal, confined top and bottom, infinite in horizontal extent, of constant thickness, and homogeneous and isotropic.
- That there is only one pumping well.
- The pumping rate is constant with time.
- Well diameter is infinitely small.
- The well penetrates the entire aquifer.
- Hydraulic head in the aquifer is uniform throughout prior to pumping.
- Flow is radial to wells.

The analytical model input parameters and estimated water taking rate are presented on **Figure 4.5**. The apparent transmissivity of the sand is estimated to be 16.5 m²/day, based on the hydraulic conductivity of 2.4 x10⁻⁵ m/s (geomean) for the sand, and saturated thickness of 8 m (2.4 x10⁻⁵ m/s x 86,400 s/day x 8 m = 16.5 m²/day). An assumed specific yield of 0.3 (dimensionless) was used based on the unconfined nature of the sand deposit.

Using the analytical model, the groundwater taking is predicted to result in an area of influence of less than 20 m from the water supply well, based on a maximum water taking of up to 10 cubic metres per day (m³/day), which is 10,000 L/day or a pumping rate of approximately 7 litres per minute (L/min). The predicted Area of Influence is presented on **Figure 4.6** and represents the radial distance to where there would be little if any effect on the water table.

Using the above methodology and assuming a maximum water taking of up to 50,000 L/day, the area of influence would be less than 30 metres from the water supply well. The water supply well area of influence is anticipated to be small and close to the well.



4.4 Groundwater Quality

Groundwater quality samples (unfiltered) were collected from each of the monitoring wells (MW1-16 to MW4-16) for laboratory analysis of general chemistry and metal parameters listed in the Ministry of the Environment and Climate Change (MOECC) Ontario Drinking Water Standards (ODWS) to determine baseline groundwater quality. Results from the laboratory analyses are presented in **Table 4.5** and the laboratory analytical report is provided in **Appendix H**.

The majority of parameters had concentrations below the MOECC ODWS for health-related parameters, with the exception of chromium (total) and lead (total) for the sample collected at MW2-16. The concentration of chromium (total) was 0.058 mg/L, which was marginally above the ODWS criteria of 0.05 mg/L, and the concentration of lead (total) was 0.011 mg/L, which was also marginally above the ODWS criteria of 0.01 mg/L. The sample also had a total suspended solid (TSS) concentration of 3,000 mg/L indicating a relatively high amount of sediment was present in the sample.

A confirmatory groundwater sample was collected from monitoring well MW2-16 on June 9, 2017. Review of **Table 4.5** indicates the chromium (total) concentration was below the reportable detection limit of 0.005 mg/L, and the lead (total) concentration was below the reportable detection limit for lead of 0.0005 mg/L. The sample had a total suspended solid (TSS) concentration of 170 mg/L indicating a relatively low amount of sediment was contained in the sample. Based on the results, the elevated concentrations of chromium and lead obtained from the sample collected on August 22, 2016 are biased high due to the elevated sediment content in the sample.

The sodium concentration for the sample collected from MW1 -16 was 33 mg/L, which is above the ODWS criteria of 20 mg/L for persons on a sodium restricted diet.

The hardness of the water ranges from 140 to 260 mg/L (expressed as milligrams of calcium carbonate per litre), which is below the ideal range for water hardness of 80 to 100 mg/L. Hardness is an aesthetic, not health related, parameter. The sample turbidity ranged from 6.7 to 23 Nephelometric Turbidity Units (NTU) for three of the samples analyzed, which is above the aesthetic objective of 5 NTU. The concentration of organic nitrogen ranged from 0.16 to 0.36 mg/L, which exceeds the ODWS aesthetic criteria of 0.15 mg/L.

A few metal (total) parameters (aluminum, iron and manganese) had concentrations above the operational guideline and aesthetic criteria.

Water supply well treatment will be needed to address the elevated concentrations to ensure it is safe for use as a potable water supply.

4.5 Water Balance

A water balance was undertaken to determine the amount of surplus water potentially generated as a result of the development (increase in impermeable surfaces). This was then used to assist in the evaluation of options to manage the surplus.

The water balance was estimated using the most recent version of the water balance model developed by Meteorological Service of Canada (MSC, see Johnstone and Louie, 2008). The new



MSC's water balance method accounts for snow accumulation and melt (degree-day method of USACE, 1956), potential evapotranspiration (Thornthwaite and Mather, 1955), soil storage (Phillips, 1976), actual evapotranspiration, and moisture deficit and surplus. The MSC program calculated a 'water surplus' as the final product, which is the total water available in a given month to run off as surface overland flow and/or infiltrate to the ground and recharge the groundwater table. The MSC water balance model runs with continuous daily precipitation and air temperature data. The use of daily data allowed for more accurate modelling of snowmelt and snow storage, which are of particular importance in Canadian climate (Johnstone and Louie, 1983).

Daily air temperature and precipitation data from Environment Canada's Shanty Bay weather station (Climate ID: 6117684), for the period from January 2000 to February 2015, was inputted into the water balance model. Any missing data during this period (when the weather station has been out of service) was filled in with data observed at the Environment Canada's Coldwater Warminster (ID: 6111769), Barrie Landfill (ID: 6110556), and Barrie-Oro (ID: 6117700) weather stations.

The Site's latitude, longitude, and an estimate of the water holding capacity of the soil was also input to the model. The water holding capacity has been estimated based on soil and land use characteristics of the study area under Existing and Proposed conditions. Currently, the area of proposed development consists of 100% pervious (heavily forested area). Once the area has been developed, it is assumed that the proposed facility footprint will encompass approximately 4.5 ha, which is approximately 5% of the total Site. The assumption is due to the unknown configuration of the facility footprint. The soils underlying the Site are described as sand to sandy silty, with a low runoff potential and high infiltration. The water holding capacity was determined from tables provided in the Ontario's Stormwater Management Planning and Design Manual (MOE, 2003b), which relate water holding capacity to soil type and land use.

4.5.1 Water Balance Calculations

The water balance calculations for existing and proposed conditions are presented in **Table 4.3** to **4.10**. Water surplus is the total water available in a given month to run off as surface overland flow and/or infiltrate to the ground and recharge the groundwater table. Based on the water balance calculations, it is estimated that there will be an increase in the amount of water surplus from existing conditions to the proposed conditions of approximately 14,700 cubic metres (m³) annually.

The water surplus of 14,700 m³ is determined by subtracting the existing conditions precipitation surplus total of 4,900 m³ (**Table 4.4**) from the proposed conditions precipitation surplus total of 19,600 m³ (**Table 4.5**) (19,573 m³ – 4,865 m³ = 14,708 m³). The increase in the surplus is due to the increase in potential surface runoff, caused by the increase in impervious area and decrease in permeable surfaces for infiltration.

In addition to addressing the increase in peak flow and volume, storm water management controls should concentrate on enhancing infiltration within the developed area to maintain the hydrological conditions of the downstream surface water features (adjacent wetland areas)

4.5.2 Stormwater Management Options

Under the proposed development, the amount of runoff would increase as a result of the increase in impervious area and decrease in permeable surfaces. Additional measures would need to be



considered to promote evapotranspiration and infiltration on-Site and reduce runoff. Due to the soil conditions and existing Site conditions, it is encouraged that proposed stormwater management system infiltrate runoff for all storm event (up-to an including the 100-year storm event).

Stormwater management options that would address evapotranspiration and infiltration issues and reduce the amount of potential runoff to existing conditions are presented in **Table 4.6** and discussed in the following sections.

The stormwater management options would maintain existing drainage patterns and, most importantly, provide similar hydrologic contributions to maintain the downstream surface water features. It is important to allow additional runoff to replicate the slow contribution of groundwater and slowly compensate for the loss in infiltration that would have ultimately recharged the deep aquifer. By working at a treatment train approach, the below conceptual stormwater management options would also minimize the potential for slope erosion, and reduce water quality loadings.

The conceptual stormwater management options would be constructed as per Ministry of Environment and Climate Change (MOECC, 2003) and TRCA guidelines (CVC & TRCA, 2010) and additional construction measures could be required to meet guidelines. These options include:

- Reduction of grading to 0.5 - 1.0% slope in landscape areas to allow for additional evapotranspiration and infiltration.
- Scarification, or tilling of the soil to a depth of approximately 300 mm, would enhance evapotranspiration and infiltration within the landscaped areas to overcome soil compaction that occurs during construction.
- Directing excess surface runoff the facility footprint to vegetated filter strips located along the outer border of the facility footprint. The vegetated filter strip will be approximate 3 to 5 metres (m) in width, remain unmaintained and shallow sloped, to promote absorption of surface runoff and allow for infiltration and evapotranspiration. Overflow would be directed to an enhanced vegetated swale surrounding the facility footprint.
- The vegetated enhanced swales will be shallow (less than 1.0% slope), heavily vegetated and fitted with rock check dams allow for ponding within the swales, further enhancing infiltration storage and evapotranspiration.
- The vegetated enhanced swale will then discharge into a conceptual stormwater management pond (SWMP). The conceptual SWMP would be sized to capture all rainfall events, up-to and including the 100-year storm event. Since the underlying soil conditions consist of highly infiltrative soils (sand to sandy silt) and that existing land conditions consist of heavily forested area, pre-development peak flows are assumed to be minimal. Also due to the Facility's vicinity to a wetland area, it is encouraged to maintain the hydrological conditions of the downstream surface water features. Therefore, the SWMP is sized to capture the majority of rainfall events (excluding events greater than the 100-year storm event and large concurrent storm events) and infiltrate the captured runoff. The SWMP would also be sized to address quantity (maintain peak flows to existing conditions levels) and quality (Enhance Protection Levels) controls for the runoff from the facility footprint. The stormwater management pond would be designed as per Ministry of Environment and Climate Change (MOECC) guidelines, with a permanent pool that



would encourage evapotranspiration. Any overflow from the SWMP, which is possible during rainfall events greater than a 100-year storm event and large concurrent rainfall events, would discharge to a drainage ditch along the access road and discharge to the existing drainage ditch along Horseshoe Valley Road West and ultimately to Matheson Creek.

5. Development Constraints

The proposed development consists of the ERRC organic processing facility, associated roads and paved surfaces and stormwater management pond.

There are no surface water features on the Site, with the exception of a wetland area in the northeast portion of the Site.

Construction Water Takings

It is anticipated that there will be no groundwater seepage into construction excavations, and water accumulations into the excavations will be from precipitation and surface runoff. These accumulations are anticipated to be very small and will be below MOECC permit requirements.

Operational Water Takings

The ERRC facility water supply well is not anticipated to interfere with private wells in the area, as the water demand is low and the maximum area of influence is less than 30 metres from the well. Based on this, the area of influence will not extend beyond the property boundaries.

Stormwater Management

The amount of impervious surfaces (roofs, roads) is anticipated to increase from the existing pre-development condition to the post development condition. The volume of evapotranspiration and infiltration decreases and the runoff increases as a result of the increase in impervious area and impermeable surfaces (roads/driveways, roofs). Based on the water balance, there is a predicted net increase of the Site runoff with an annual water surplus of 14,700 m³.

Re-development of the Site is anticipated to increase the runoff from the Site, and as such mitigation methods will be required to address stormwater runoff and compensate for the loss of infiltration.

Surface water flow and shallow infiltration is anticipated to be directed toward stormwater management features located on the Site. Verification of appropriate infiltration measures that would control surface water runoff (quantity and quality) and maintain ground water recharge and function on the Site are addressed through the stormwater management plan.

Surface Water Features

The wetland on the northeast portion of the Site may constrain stormwater management options, as surface drainage patterns would need to be maintained to provide similar hydrologic contributions to this feature.



The form and function of the potential wetland area will be assessed based on seasonal monitoring, but it is anticipated that potential impacts on groundwater/surface water interactions is low, based on the deep water table (more than 8 m) below the wetland.

5.1 Mitigation

The stormwater management features and erosion and sediment controls should be designed to control surface water flow and promote infiltration and evapotranspiration. Given appropriate stormwater and natural environment mitigation construction methods are implemented re-development of the Site is not anticipated to have an adverse impact on the groundwater or local hydrologic features.

Recommended efforts to mitigate impacts to the potential wetland feature include:

- Installation of appropriate erosion and sediment controls and maintenance for the duration of all construction activities and minimum vegetation establishment periods.
- Minimization of any disturbance to vegetation adjacent to the potential wetland.

6. Summary and Conclusions

Based on the results of the hydrogeological investigation and monitoring undertaken to date, the following summary and conclusions are provided:

1. The development area is primarily underlain by a fine to medium glaciofluvial deposit, which comprises an unconfined sand aquifer. The site is located within a groundwater recharge area.
2. The groundwater table is encountered over the majority of the ERRC area at depths of more than 10 mBGS. The water table elevations range from approximately 233 to 237 mAMSL. Based on the seasonal groundwater level measurements, groundwater flow direction is to the northwest. Groundwater levels fluctuate in the range of 0.5 to 0.8 metres seasonally, generally decreasing through the late summer fall and winter months, and recover during the spring freshet and early summer months.
3. The hydraulic conductivity (K_h) of the sand is 2.4×10^{-3} cm/s (geomean), which is relatively high and indicates the medium textured glaciofluvial deposit behaves as an aquifer.
4. The infiltration rate within the shallow native sand soils (less than 0.7 mBGS) is 78 millimetres per hour (mm/hr), which converts to a percolation time of 8 minutes per centimeter (min/cm). The native sand provides medium to high infiltration and recharge conditions.
5. Construction activities will likely not require groundwater takings based on the deep water table beneath the Site. It is anticipated that there will be no groundwater seepage into construction excavations, and that the excavations would be relatively small, such that, a construction EASR for groundwater seepage and stormwater management would not be required.



6. A water supply well for the ERRC facility maintenance and washroom facilities is not anticipated to interfere with private wells in the area, because water usage would be minimal, and the area of influence would be small and close to the well.
7. Overall, the groundwater is of good quality however, some metals had concentrations above their respective criteria based on operational guideline and aesthetic considerations. Water supply well treatment will be needed to address the elevated concentrations to ensure it is safe for use as a potable water supply.
8. The amount of impervious surfaces (roofs, roads) is anticipated to increase from the existing pre-development condition to the post development condition. Based on the water balance, there is a predicted net increase of the Site runoff with an annual water surplus of approximately 14,700 m³.
9. It is anticipated that infiltration of collected water post development can be facilitated based on the deep water table, and the presence of sandy soils, which have high infiltration potential.
10. The potential wetland on the northeast portion of the Site provides recharge to the deeper underlying sand aquifer during the spring freshet, based on the observed mini-piezometer and surface water levels within the wetland area. Drainage patterns need to be maintained to provide similar hydrologic contributions to this feature.
11. Development of the Site is not anticipated to have an adverse impact on groundwater or surface water, given appropriate stormwater and natural environment mitigation construction methods are implemented.



7. References

Bouwer, H. and R.C. Rice, 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, *Water Resources Research*, vol 12, no. 3, pp. 423-428.

Chapman, L.J. and Putnam, D.F., 1984. *The Physiography of Southern Ontario*. Ontario Geological Survey, Special Volume 2.

GHD (November 2016) County of Simcoe Environmental Resource Recovery Centre Facility Characteristics Report, prepared for County of Simcoe Solid Waste Management Department.

GHD (August 2016). Preliminary Geotechnical Investigation Proposed Organics Processing & Material Management 2976 Horseshoe Valley Road West, Springwater, Ontario, County of Simcoe.

GHD Ltd. Supplementary Geotechnical Investigation, Environmental Resource Recovery Centre, 2976 Horseshoe Valley, Ontario. February 9, 2017

Ground Water Monitoring Review 6: 84-95. Elrick, D.E. and W.D. Reynolds. 1986. An analysis of the percolation test based on three-dimensional, saturated-unsaturated flow from a cylindrical test hole. *Soil Sci.* 142: 308-321.

Hvorslev, M. J. (1951): Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, Waterways Experiment Station, Corps of Engineers, Vicksburg, Mississippi.

Ministry of the Environment (MOE) 1995. MOEE Hydrogeological Technical Information Requirements For Land Development Applications. April 1995.

Ministry of the Environment (MOE) 1990 Wells. Regulation under the Ontario Water Resources Act. Regulation 903 of the Revised Regulations of Ontario, 1990.

Ministry of the Environment (MOE) 2003b. Stormwater Management Planning and Design Manual. March 2003.

MNR NRVIS, 2015. Produced by GHD under license from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2016; Site Location Map; Inset Map: ESRI Data & Maps 2008 Data Distribution Application (DDA)

MNR NRVIS, 2015. Produced by GHD under license from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2016; Aerial Image: ESRI Basemap Imagery, Capture Date: January 2013, Accessed 2015.

MNR NRVIS, 2015. Produced by GHD under license from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2016; Physiography, Chapman, L.J. and Putnam, D.F. 2007. *Physiography of southern Ontario*; Ontario Geological Survey, Miscellaneous Release - Data 228.

MNR NRVIS, 2015. Produced by GHD under license from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2016; Surficial Geology; Surficial geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release - Data 128.



MNR NRVIS, 2015. Produced by GHD under license from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2016; MOECC Water Well Records; WWIS, 2016. Ontario Ministry of the Environment and Climate Change (Accessed January 2016).

Ontario Ministry of the Environment (MOE). 2003. Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines. Revised June 2006.

Water Well Information System, Ontario Ministry of the Environment & Climate Change @ Queen's Printer for Ontario, 2015 (Accessed January 2015)

W.D. Reynolds and D.E. Elrick. 1986. A method for simultaneous in-situ measurement in the vadose zone of field saturated hydraulic conductivity, sorptivity and the conductivity-pressure head relationship.

Ontario Geological Survey 1991. Bedrock Geology of Ontario, southern sheet. Ontario Geological Survey Map 2544, Scale 1 000 000.

South Georgian Bay-Lake Simcoe Source Protection Committee. (SGBLS, 2015). Approved Assessment Report: Nottawasaga Valley Source Protection Area.



All of Which is Respectfully Submitted,
GHD

A handwritten signature in blue ink, appearing to read 'Philip J. Smart'.

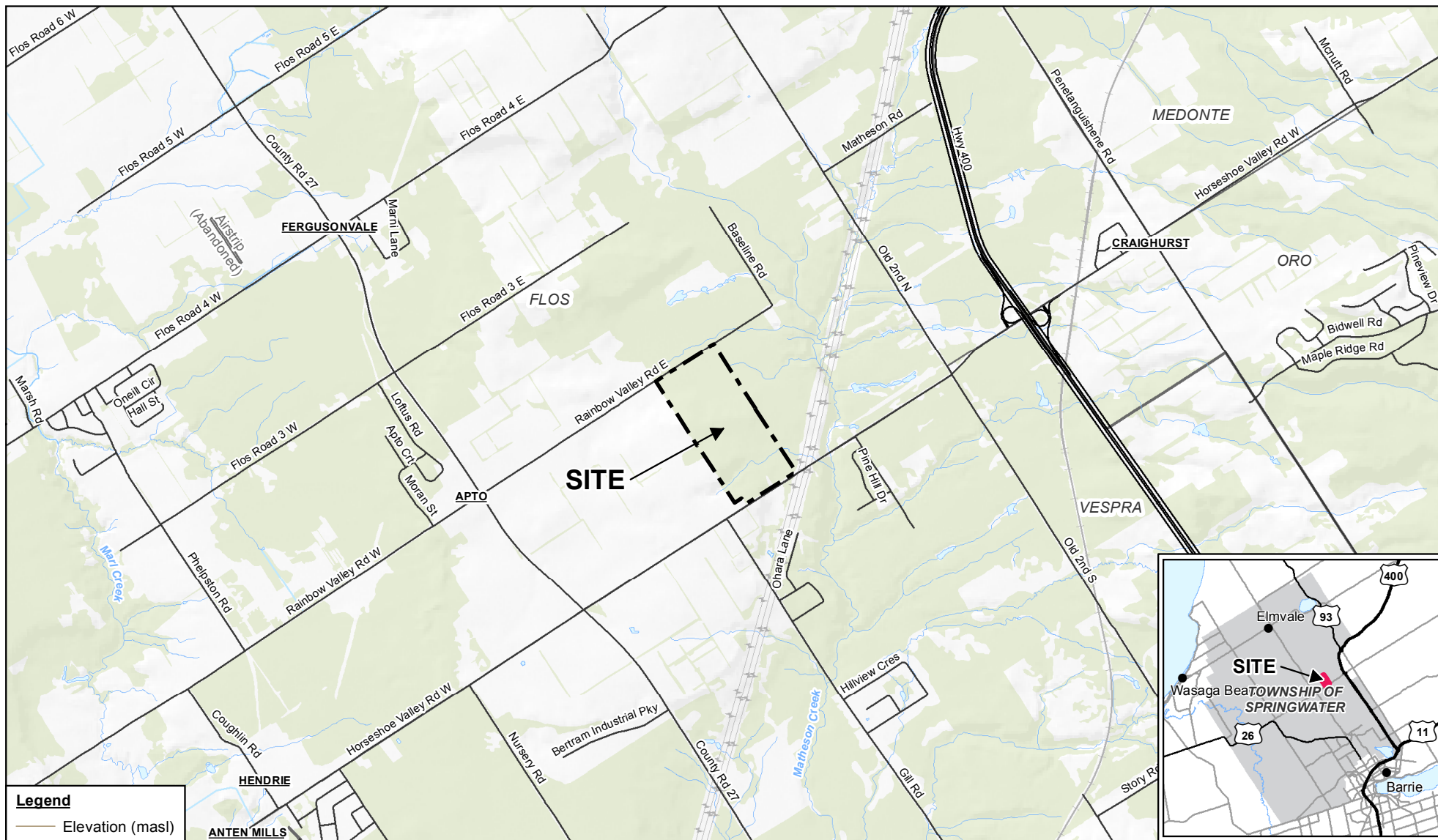


Philip J. Smart, M. Sc., P. Geo.

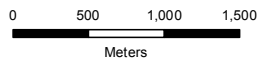
A handwritten signature in blue ink, appearing to read 'Thomas Guoth'.

Thomas Guoth, P. Eng.

Figures



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017;



Coordinate System:
NAD 1983 UTM Zone 17N

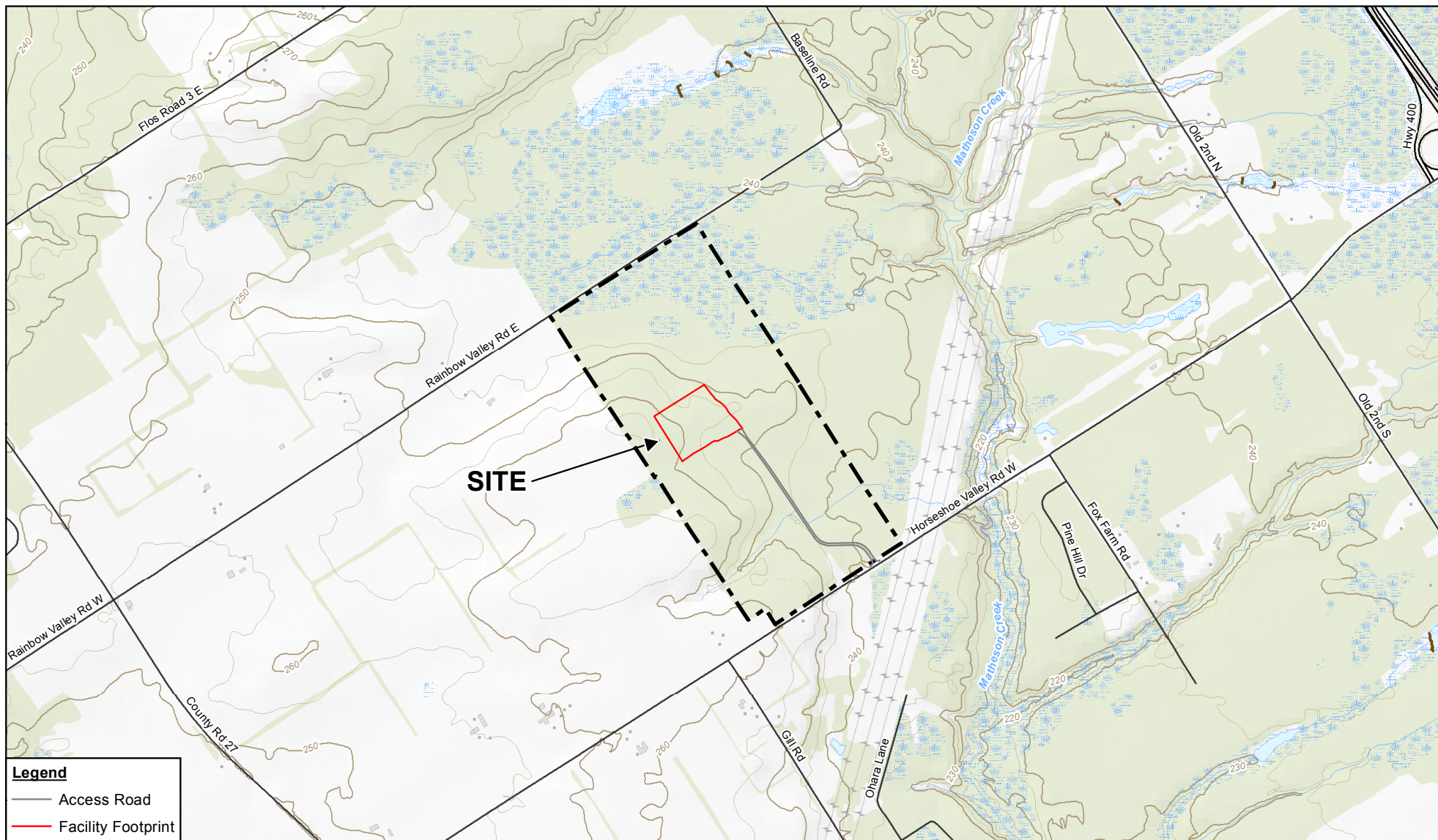


ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER
UPDATED HYDROGEOLOGICAL ASSESSMENT

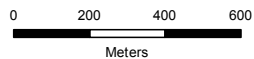
86822
Nov 30, 2017

SITE LOCATION

FIGURE 1.1



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017



Coordinate System:
NAD 1983 UTM Zone 17N

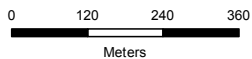
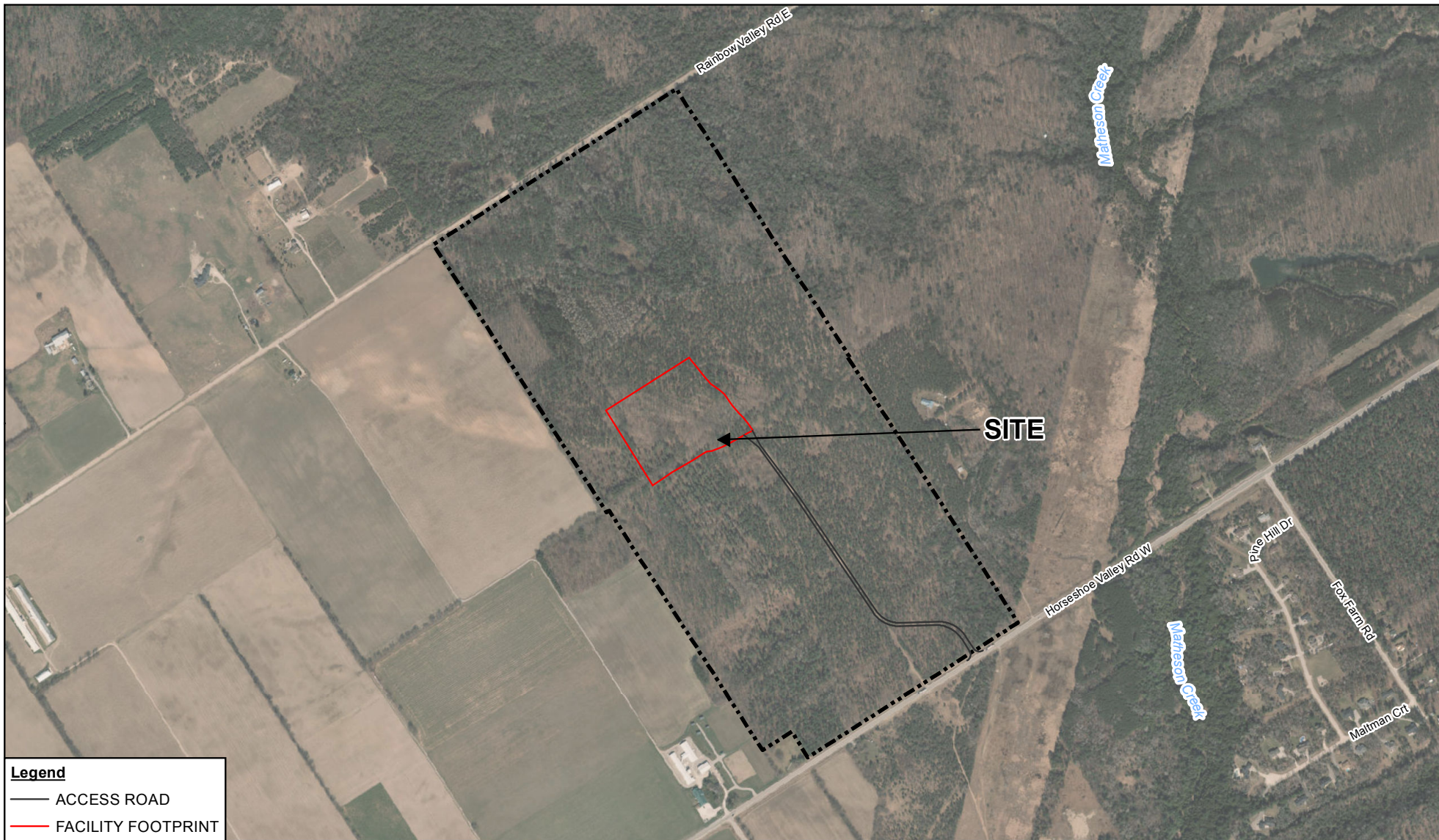


ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER
UPDATED HYDROGEOLOGICAL ASSESSMENT

SITE PLAN

86822
Nov 30, 2017

FIGURE 1.2



Coordinate System:
NAD 1983 UTM Zone 17N

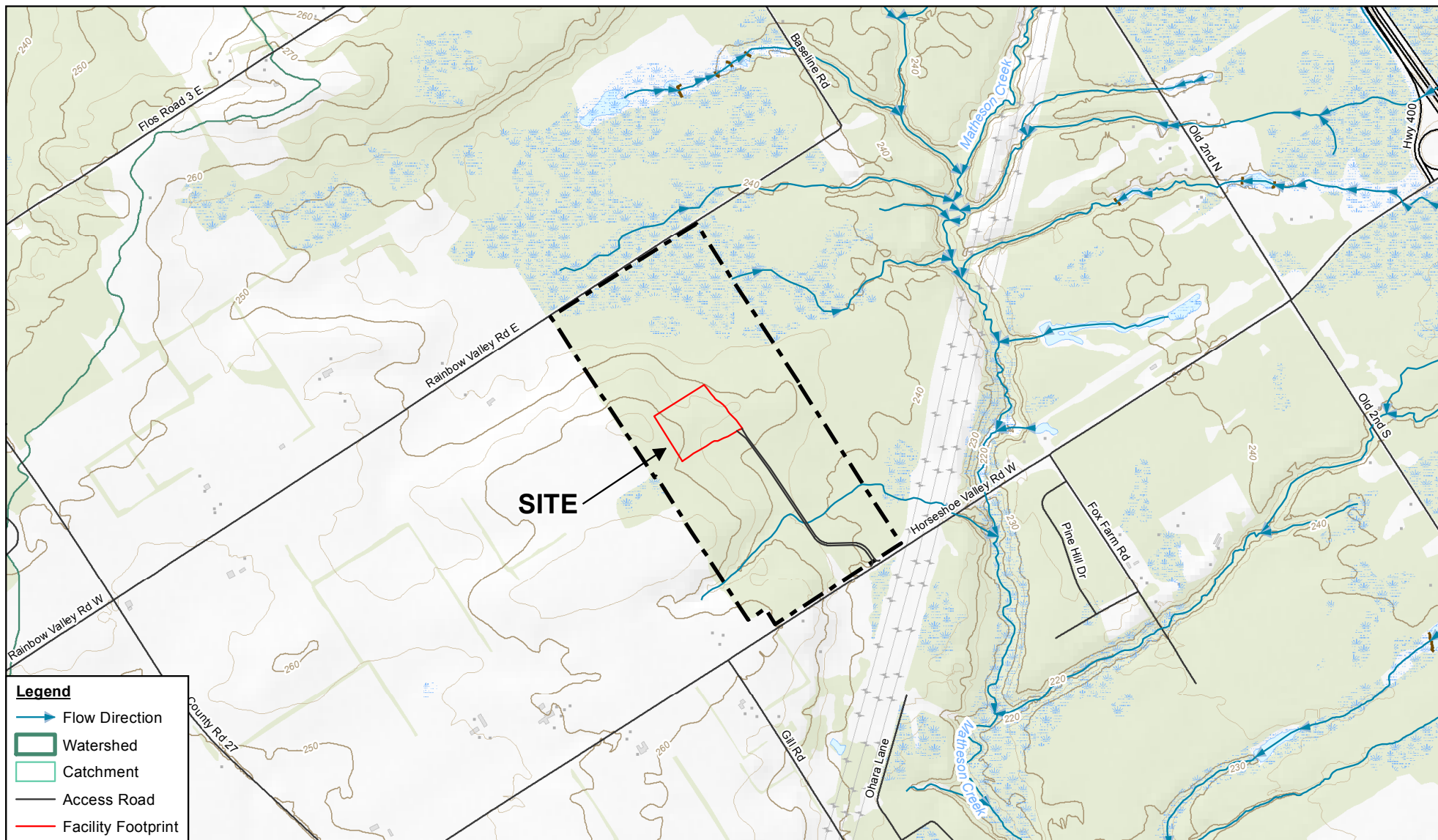


ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER
UPDATED HYDROGEOLOGICAL ASSESSMENT

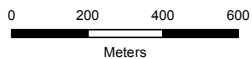
LAND USE (AERIAL IMAGE)

86822
Nov 30, 2017

FIGURE 2.1



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017;



Coordinate System:
NAD 1983 UTM Zone 17N



ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER
UPDATED HYDROGEOLOGICAL ASSESSMENT

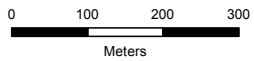
86822
Nov 30, 2017

SURFACE WATER FEATURES

FIGURE 2.2



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017



Coordinate System:
NAD 1983 UTM Zone 17N

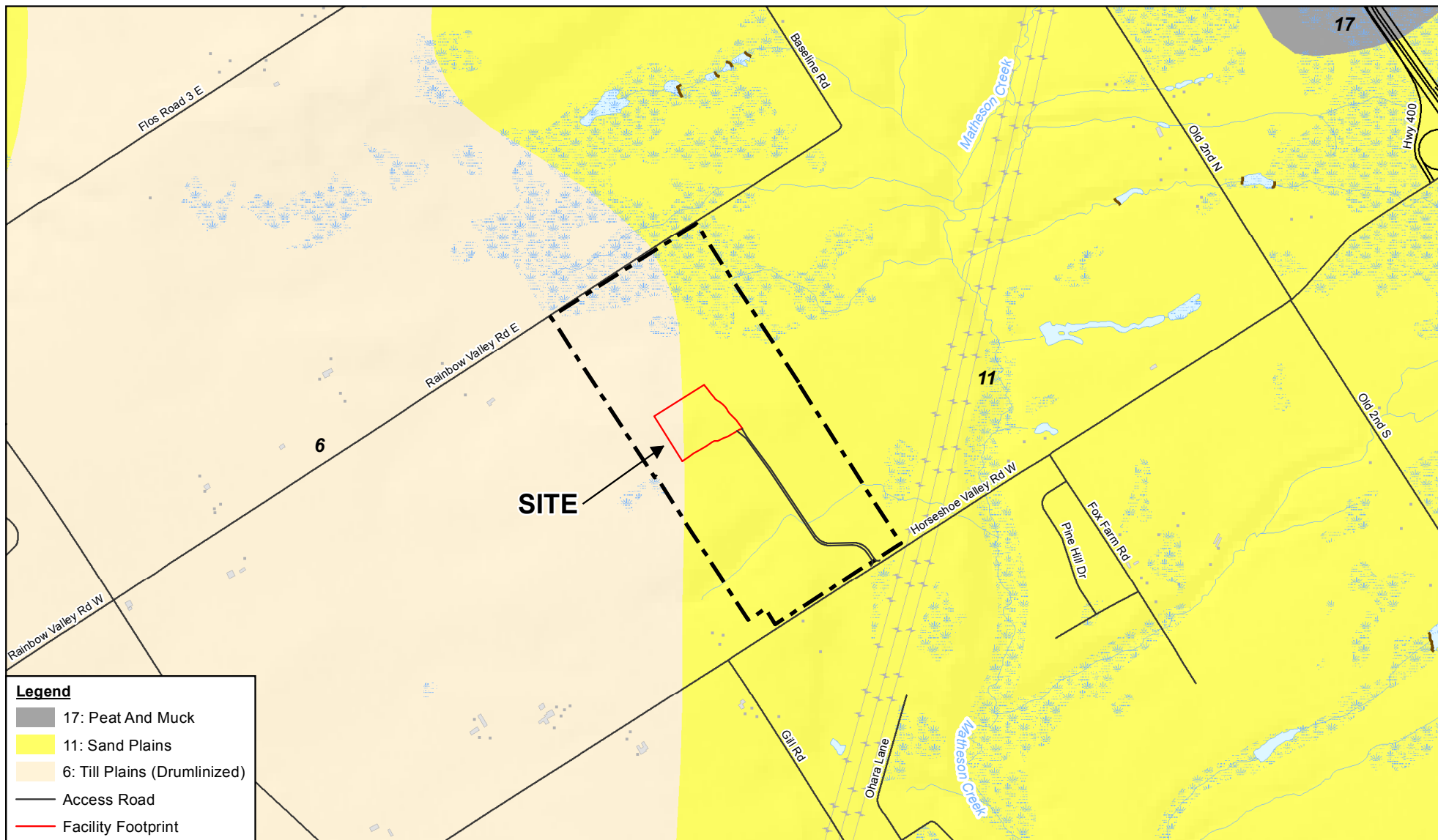


ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER
UPDATED HYDROGEOLOGICAL ASSESSMENT

WETLANDS

86822
Nov 30, 2017

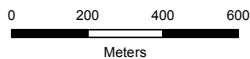
FIGURE 2.3



Legend

- 17: Peat And Muck
- 11: Sand Plains
- 6: Till Plains (Drumlinized)
- Access Road
- Facility Footprint

Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017
 Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.

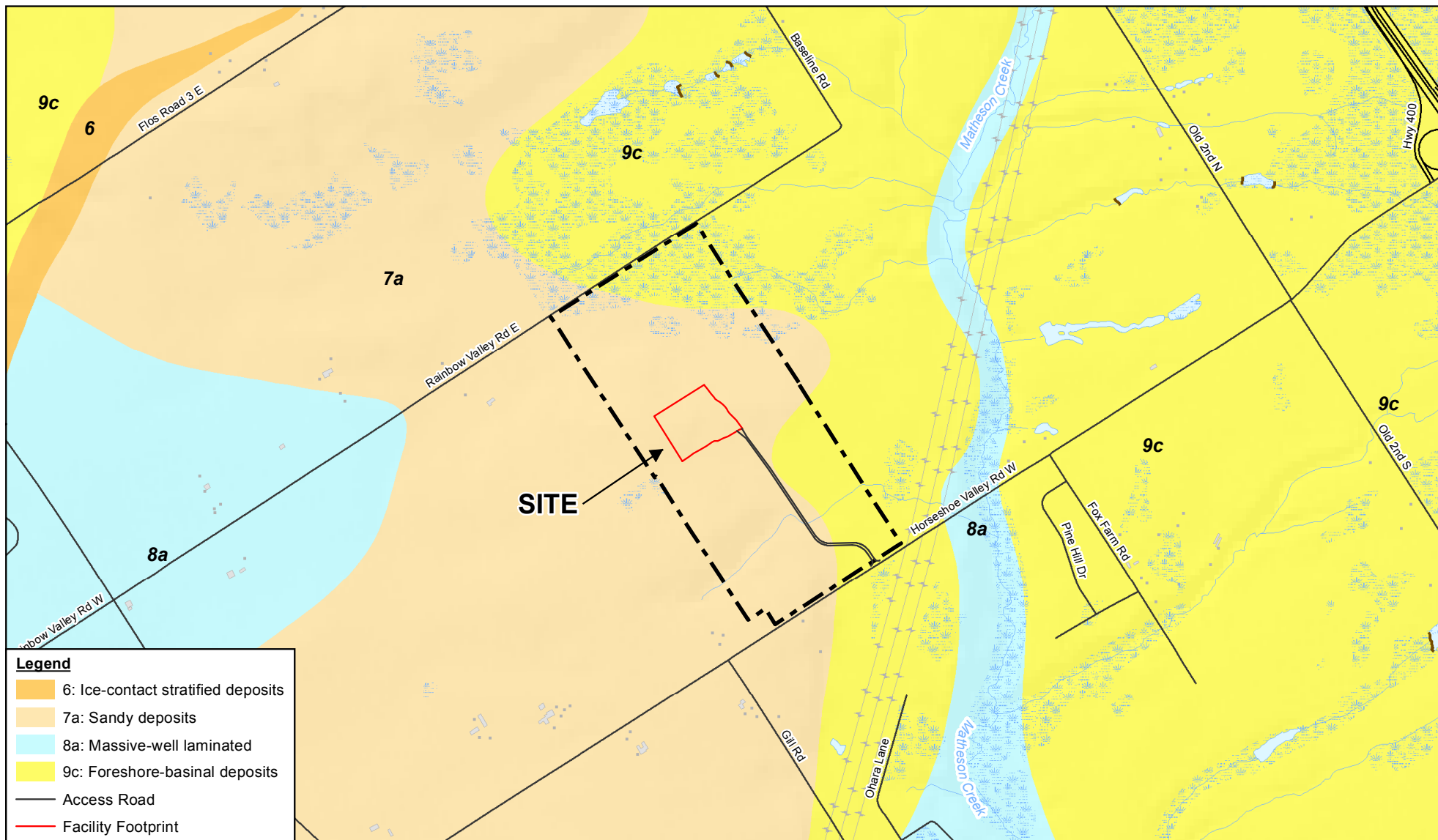


ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER
 UPDATED HYDROGEOLOGICAL ASSESSMENT

86822
 Nov 30, 2017

PHYSIOGRAPHY

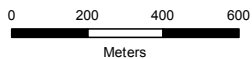
FIGURE 2.4



Legend

- 6: Ice-contact stratified deposits
- 7a: Sandy deposits
- 8a: Massive-well laminated
- 9c: Foreshore-basinal deposits
- Access Road
- Facility Footprint

Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017; Ontario Geological Survey 2003. Surficial geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128.



Coordinate System:
NAD 1983 UTM Zone 17N

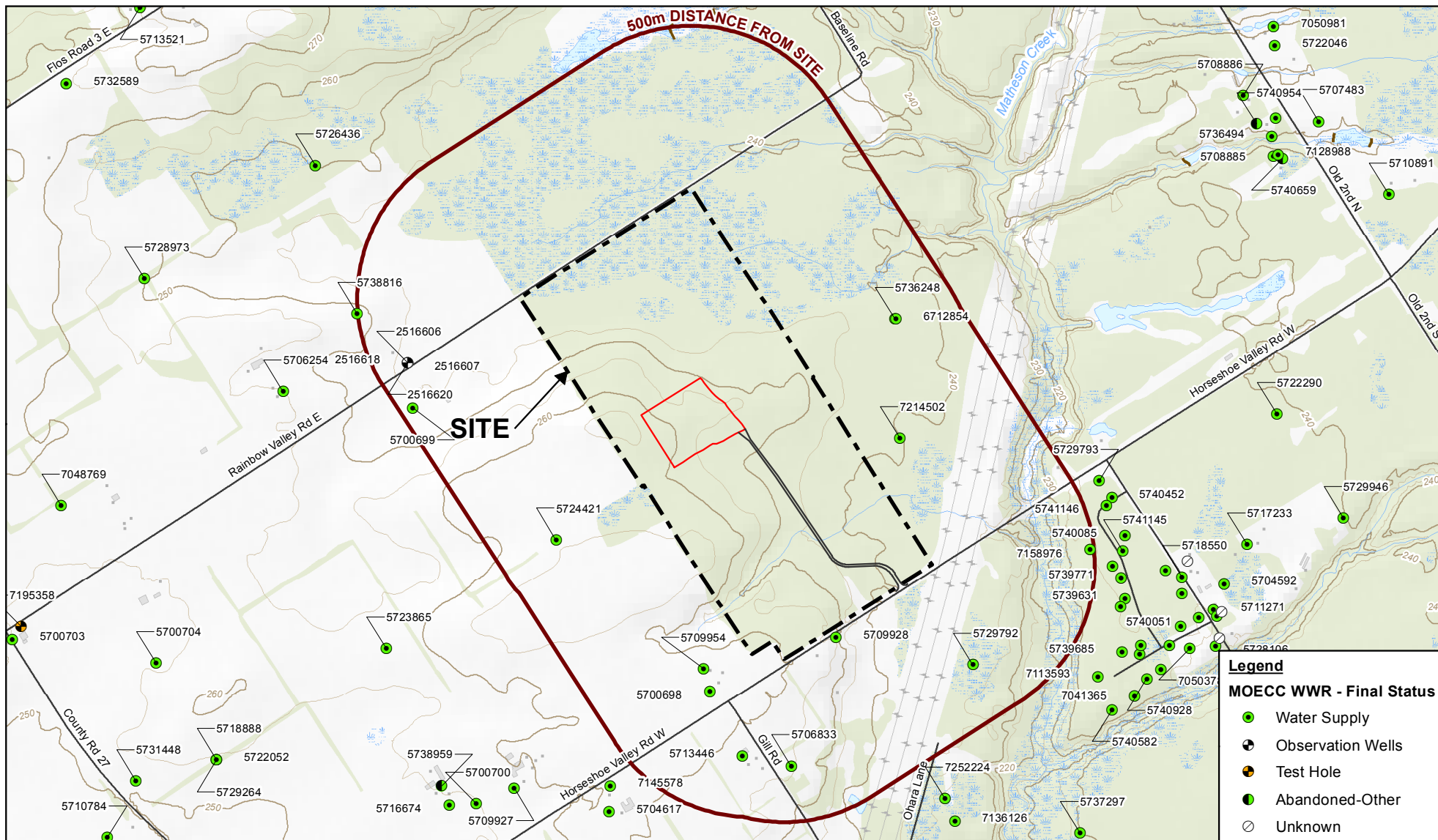


ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER
UPDATED HYDROGEOLOGICAL ASSESSMENT

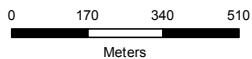
SURFICIAL GEOLOGY

86822
Nov 30, 2017

FIGURE 2.5



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017; WWIS, 2016. Ontario Ministry of the Environment and Climate Change (Accessed January 2016);



Coordinate System:
NAD 1983 UTM Zone 17N

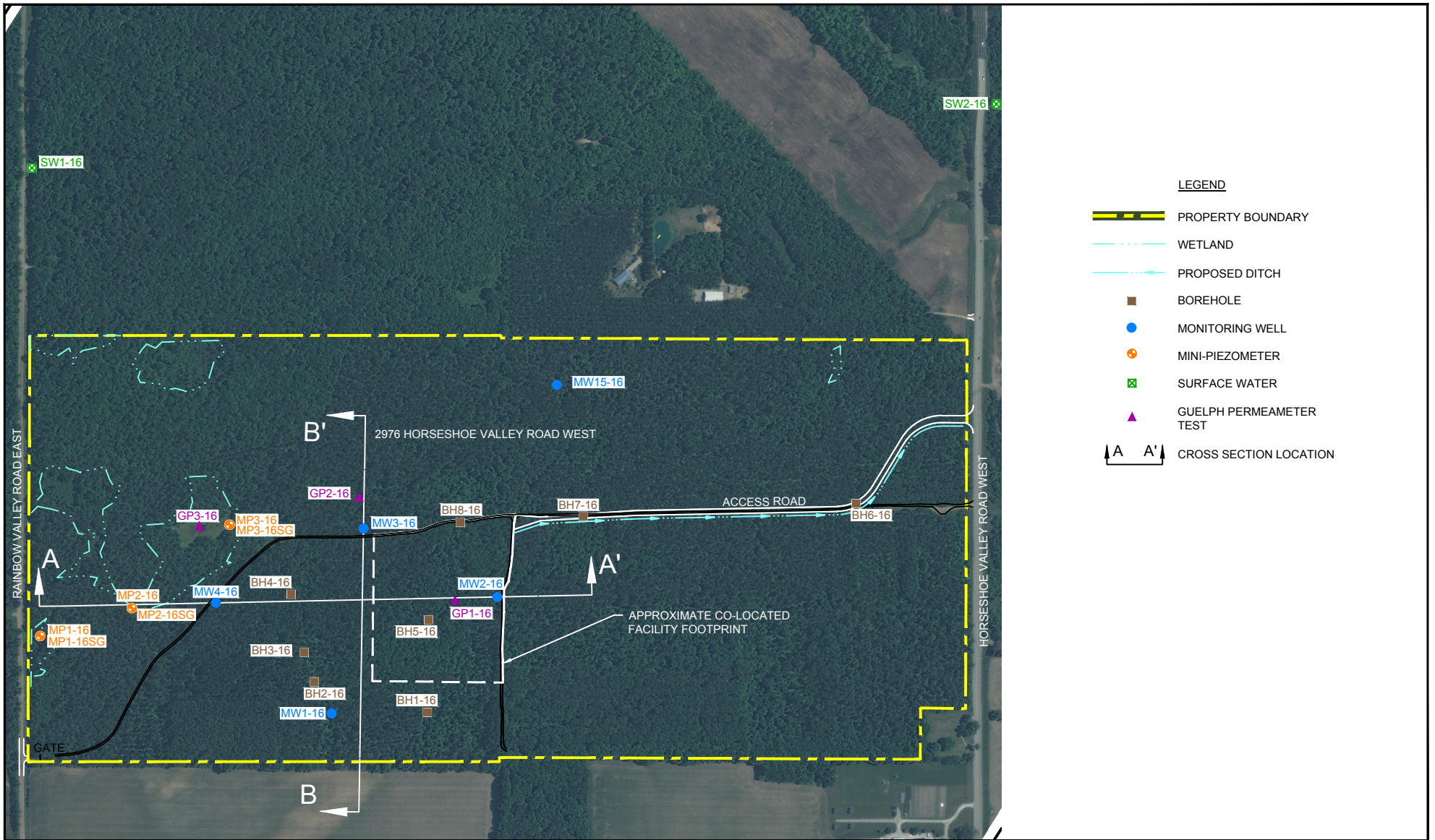


ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER
UPDATED HYDROGEOLOGICAL ASSESSMENT

MOECC WATER WELL RECORDS

86822
Nov 30, 2017

FIGURE 2.6



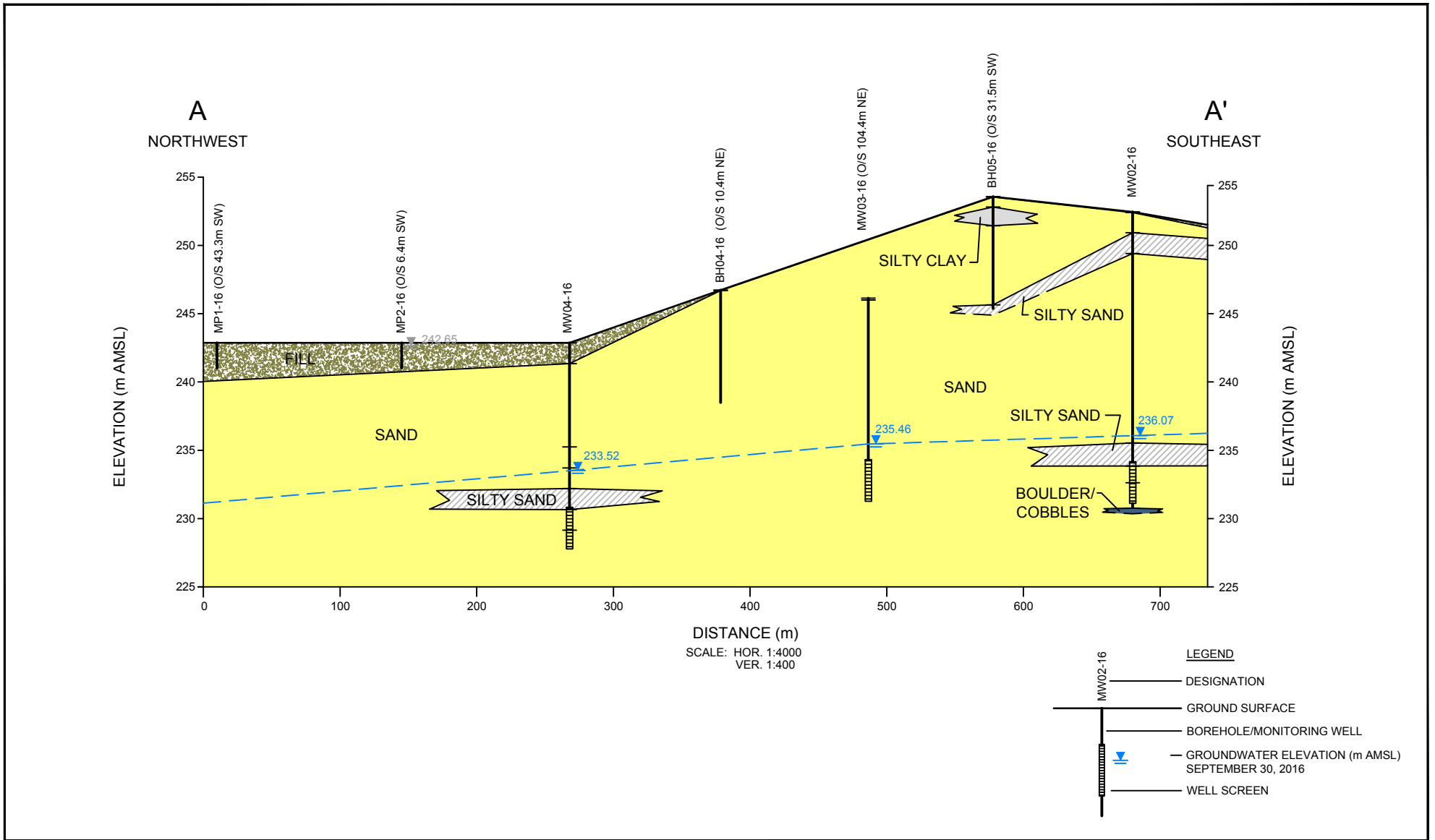
- LEGEND**
- PROPERTY BOUNDARY
 - WETLAND
 - PROPOSED DITCH
 - BOREHOLE
 - MONITORING WELL
 - MINI-PIEZOMETER
 - SURFACE WATER
 - GUELPH PERMEAMETER TEST
 - CROSS SECTION LOCATION



COUNTY OF SIMCOE
 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO
 UPDATED HYDROGEOLOGICAL ASSESSMENT
 ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
INVESTIGATIVE LOCATIONS

86822-03
 Nov 30, 2017

FIGURE 3.1

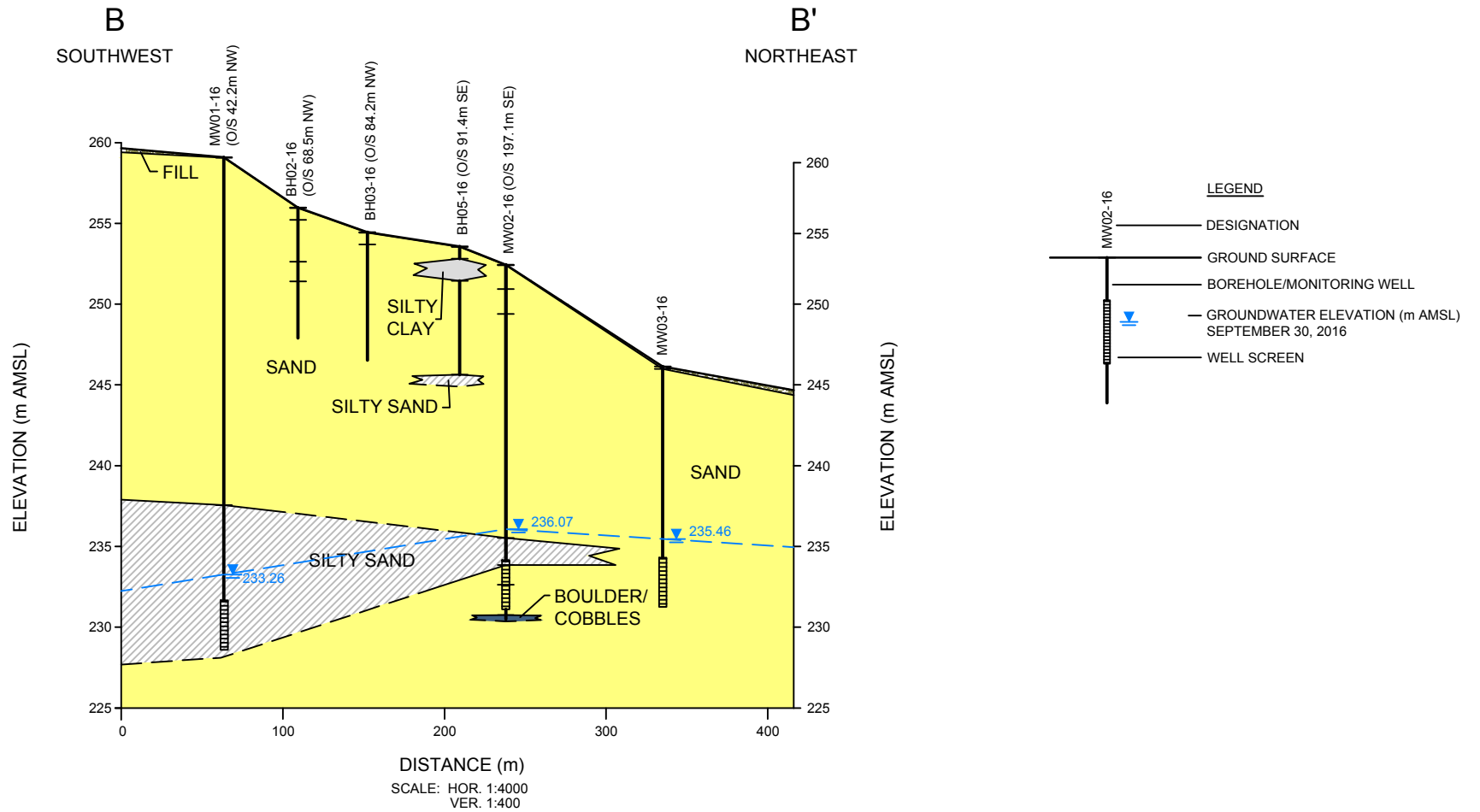


COUNTY OF SIMCOE
2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO
UPDATED HYDROGEOLOGICAL ASSESSMENT
ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)

CROSS SECTION A-A'

86822-03
Nov 30, 2017

FIGURE 4.1

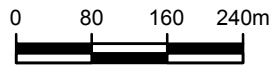


COUNTY OF SIMCOE
 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO
 UPDATED HYDROGEOLOGICAL ASSESSMENT
 ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)

CROSS SECTION B-B'

86822-03
 Nov 30, 2017

FIGURE 4.2

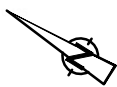
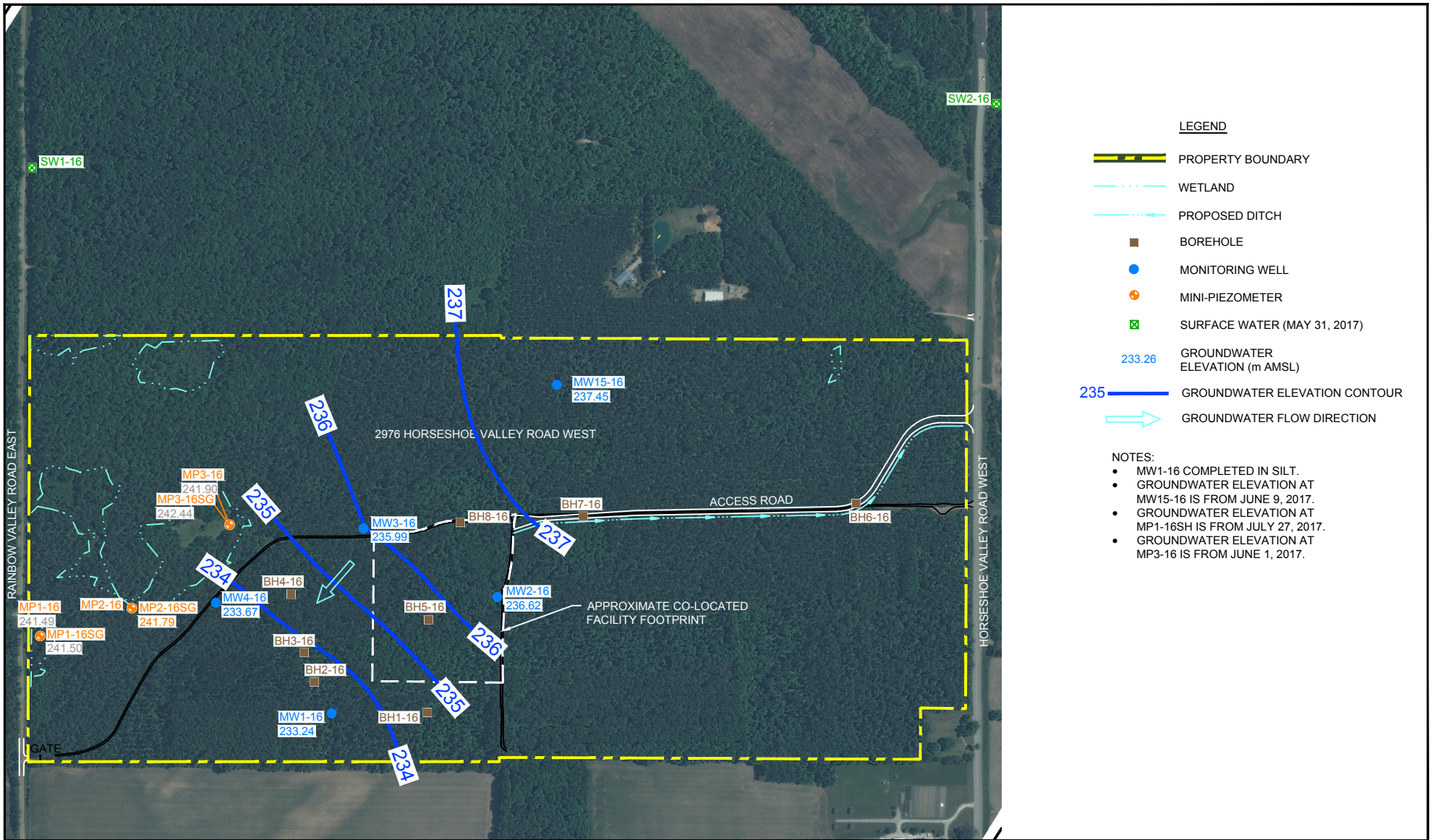


COUNTY OF SIMCOE
 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO
 UPDATED HYDROGEOLOGICAL ASSESSMENT
 ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)

86822-03
 Nov 28, 2017

GROUNDWATER ELEVATION CONTOURS (SEPT. 30, 2016)

FIGURE 4.3a

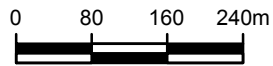
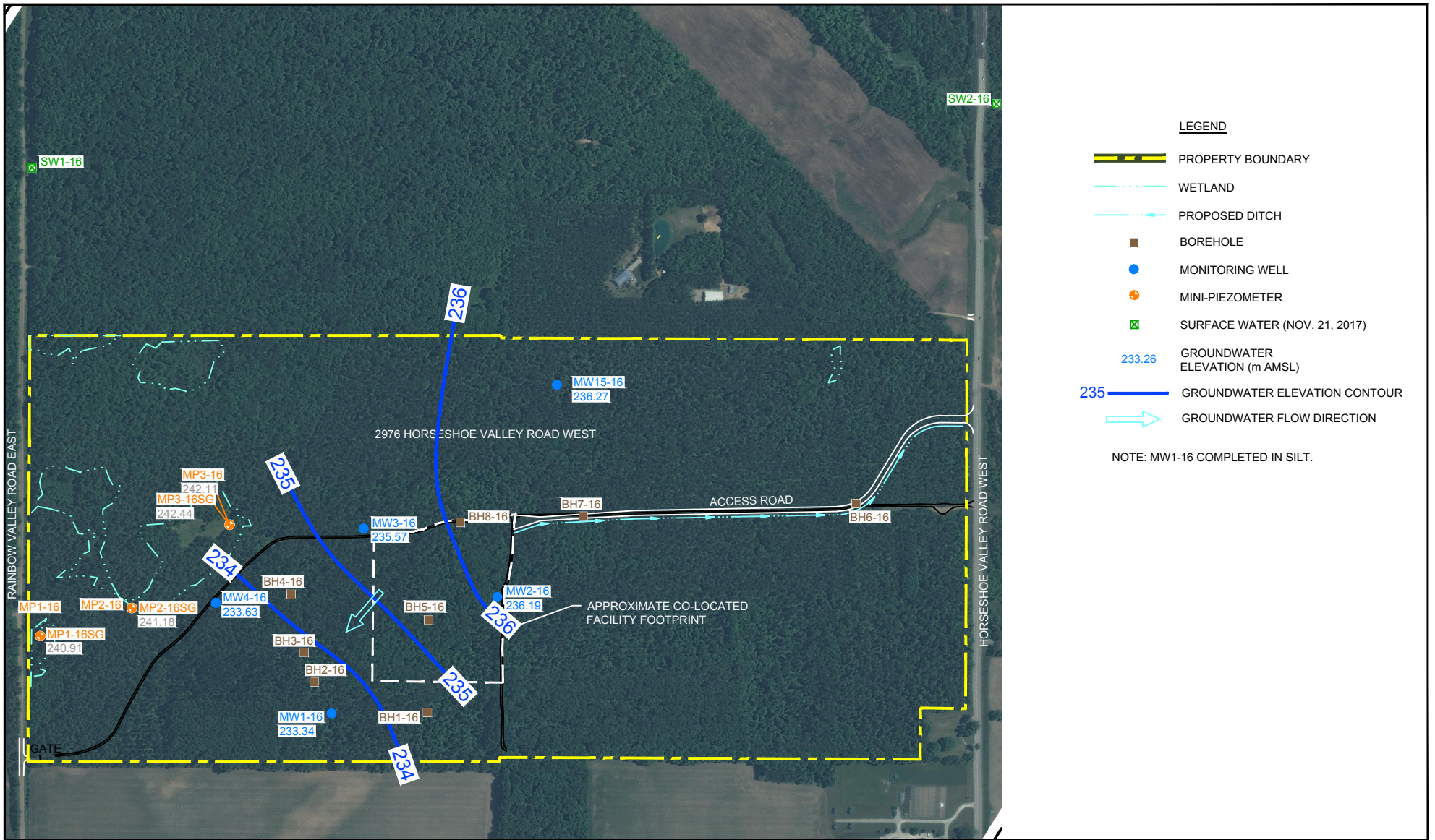


COUNTY OF SIMCOE
 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO
 UPDATED HYDROGEOLOGICAL ASSESSMENT
 ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)

86822-03
 Nov 30, 2017

GROUNDWATER ELEVATION CONTOURS (JULY 30, 2017)

FIGURE 4.3b

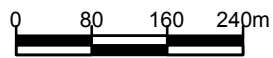
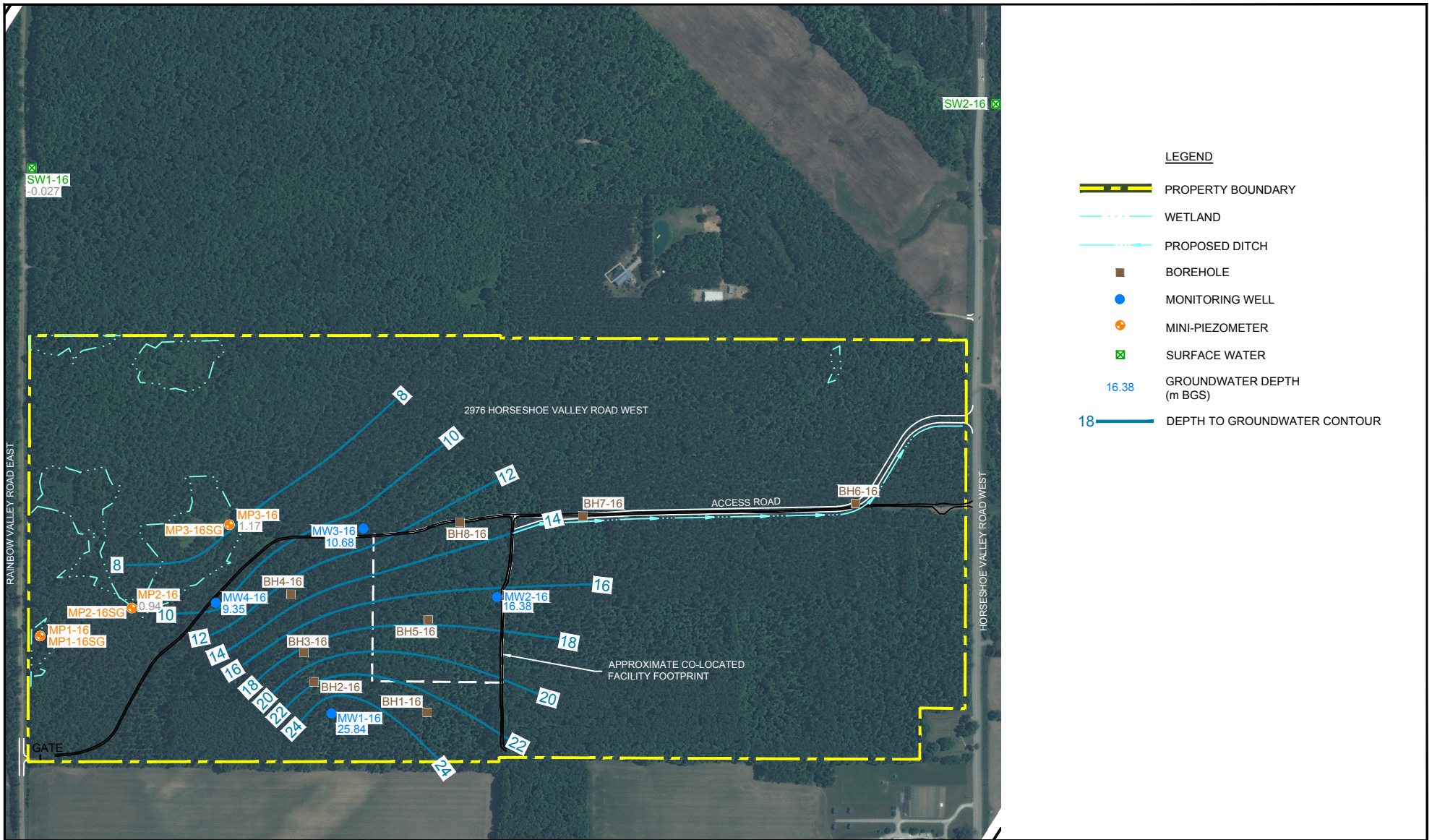


COUNTY OF SIMCOE
 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO
 UPDATED HYDROGEOLOGICAL ASSESSMENT
 ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)

86822-03
 Nov 30, 2017

GROUNDWATER ELEVATION CONTOURS (NOV. 21, 2017)

FIGURE 4.3c



COUNTY OF SIMCOE
 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO
 UPDATED HYDROGEOLOGICAL ASSESSMENT
 ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)

86822-03
 Nov 30, 2017

DEPTH TO GROUNDWATER CONTOURS (SEPT. 30, 2016)

FIGURE 4.4

FIGURE 4.5
ANALYTICAL MODEL INPUT PARAMETERS
HYDROGEOLOGICAL ASSESSMENT
ERRC
 County of Simcoe

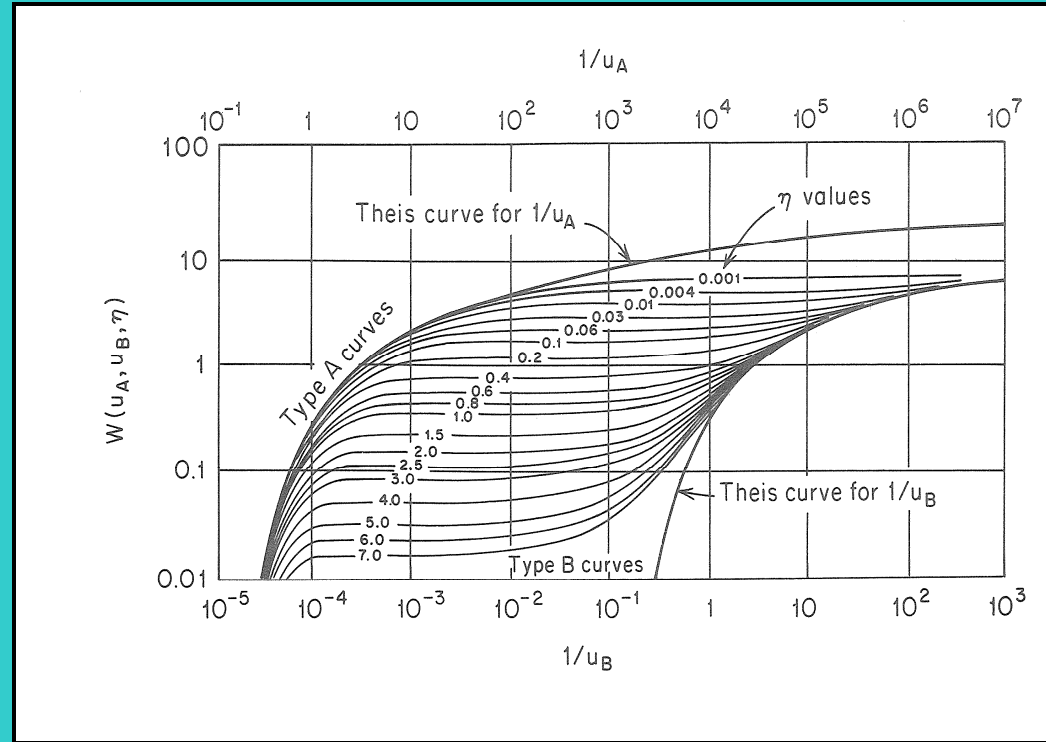
AQUIFER PARAMETERS		
S	Storativity	0.3
S_y	Specific Yield	0.3
b	Thickness of Aquifer	8.0 m
T	Transmissivity	16.5 m ² /day

PUMPING REGIME		
t	Time from Start of Pumping	1 days
r	Distance from Pumping Well	0.1 m

μ Parameter
Select Parameter
μB

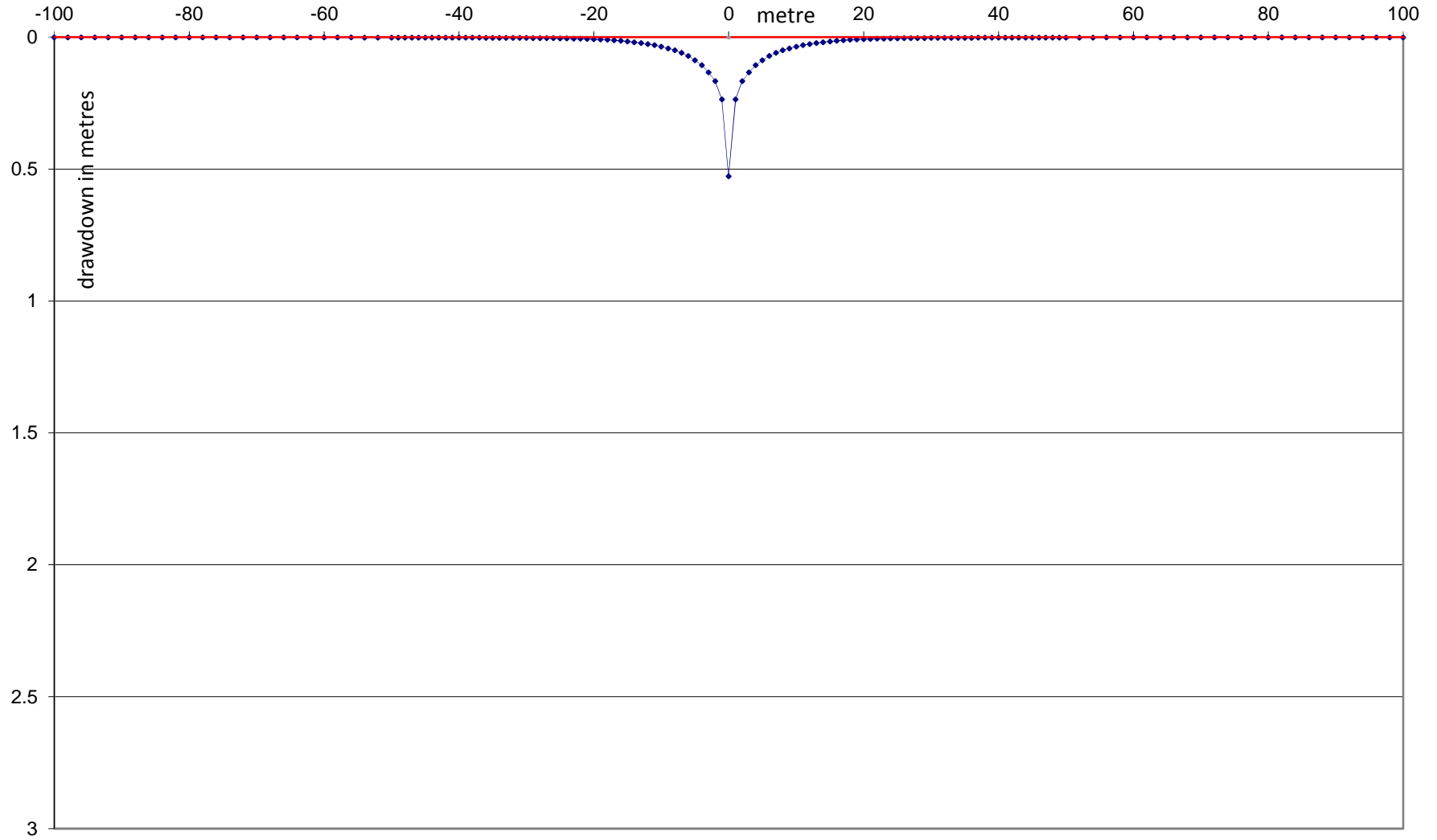
PUMP SETTINGS				
Pumping Well	Pumping Rate	Distance to Shaft Centre		α
PW-1	10 m ³ /day	0 m		0 °
PW-2	0 m ³ /day	0 m		0 °
PW-3	0 m ³ /day	0 m		0 °
PW-4	0 m ³ /day	0 m		0 °
PW-5	0 m ³ /day	0 m		0 °
PW-6	0 m ³ /day	0 m		0 °
PW-7	0 m ³ /day	0 m		0 °
PW-8	0 m ³ /day	0 m		0 °
PW-9	0 m ³ /day	0 m		0 °
PW-10	0 m ³ /day	0 m		0 °
Total	10 m ³ /day			

7 L/min



SHAFT MODEL SETTINGS	
Outer Radius of Shaft	0.01 m
Inner Radius of Shaft	0.01 m
Depth of shaft (below SWL)	0 m
Target Drawdown (optional)	0 m

**AREA OF INFLUENCE
HYDROGEOLOGICAL ASSESSMENT
ERRC**
County of Simcoe



Tables

Table 3.1

Monitoring Well Completion Details
Hydrogeological Investigation
Environmental Resource Recovery Centre (ERRC)
2976 Horseshoe Valley Road, Springwater
County of Simcoe

Well ID	Easting	Northing	Ground Elevation (m AMSL)	Top of Riser Elevation (m AMSL)	Total Depth Drilled (m BGS)	Screened Interval				Sandpack Interval				Screened Material
						(m BGS)		(m AMSL)		(m BGS)		(m AMSL)		
						Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	
<u>MONITORING WELLS</u>														
MW1-16	597082	4929846	259.10	260.00	30.18	27.50	30.49	231.60	228.61	24.39	30.49	234.71	228.61	Silt
MW2-16	597357	4929736	252.45	253.35	21.95	18.30	21.64	234.15	230.81	18.30	21.34	234.15	231.11	Silty Sand, Sand
MW3-16	597335	4929954	246.14	246.99	14.88	11.90	14.88	234.24	231.26	11.40	14.88	234.74	231.26	Sand
MW4-16	597126	4930077	242.86	243.67	15.09	12.00	15.09	230.86	227.77	11.59	15.09	231.27	227.77	Silty Sand, Sand
MW15-16	597665	4929831	247.33	248.11	18.90	15.24	18.29	232.09	229.04	14.32	18.29	233.01	229.04	Sand
<u>GEOTECHNICAL BOREHOLES</u>														
BH01-16	597160	4929730	260.66	-	7.90	-	-	-	-	-	-	-	-	-
BH02-16	597107	4929893	255.98	-	8.08	-	-	-	-	-	-	-	-	-
BH03-16	597135	4929929	254.46	-	7.93	-	-	-	-	-	-	-	-	-
BH04-16	597197	4929991	246.73	-	8.23	-	-	-	-	-	-	-	-	-
BH05-16	597274	4929801	253.57	-	8.23	-	-	-	-	-	-	-	-	-
BH06-16	597757	4929369	243.44	-	5.18	-	-	-	-	-	-	-	-	-
BH07-16	597525	4929694	247.11	-	5.18	-	-	-	-	-	-	-	-	-
BH08-16	597419	4929840	252.71	-	5.18	-	-	-	-	-	-	-	-	-
BH09-16	597200	4929758	261.83	-	5.18	-	-	-	-	-	-	-	-	-
BH10-16	597208	4929805	258.92	-	8.23	-	-	-	-	-	-	-	-	-
BH11-16	597238	4929777	258.26	-	8.23	-	-	-	-	-	-	-	-	-
BH12-16	597270	4929704	255.99	-	8.23	-	-	-	-	-	-	-	-	-
BH13-16	597264	4929863	252.15	-	8.23	-	-	-	-	-	-	-	-	-
BH14-16	597378	4929733	251.83	-	8.23	-	-	-	-	-	-	-	-	-
BH15-16	597321	4929732	253.47	-	8.23	-	-	-	-	-	-	-	-	-
BH16-16	597305	4929875	251.43	-	8.23	-	-	-	-	-	-	-	-	-
BH17-16	597338	4929816	252.81	-	8.20	-	-	-	-	-	-	-	-	-
BH18-16	597369	4929754	252.26	-	8.20	-	-	-	-	-	-	-	-	-
BH19-16	597332	4929888	249.99	-	5.18	-	-	-	-	-	-	-	-	-
BH20-16	597393	4929795	253.23	-	5.18	-	-	-	-	-	-	-	-	-
BH21-16	597467	4929779	249.75	-	5.18	-	-	-	-	-	-	-	-	-
BH22-16	597606	4929573	244.89	-	5.18	-	-	-	-	-	-	-	-	-
<u>MINIPIEZOMETERS</u>														
MP1-16	596946	4930266	241.80	243.24	1.45	-	-	-	-	-	-	-	-	-
MP1-16SG	596946	4930266	-	242.92	-	-	-	-	-	-	-	-	-	-
MP2-16	597053	4930176	241.71	242.72	1.31	-	-	-	-	-	-	-	-	-
MP2-16SG	597053	4930176	-	242.74	-	-	-	-	-	-	-	-	-	-
MP3-16	597233	4930122	241.71	243.60	0.56	-	-	-	-	-	-	-	-	-
MP3-16SG	597233	4930122	241.71	243.60	-	-	-	-	-	-	-	-	-	-
SW1-16	597515	4930648	239.01	239.24	-	-	-	-	-	-	-	-	-	-
SW2-16	598360	4929514	216.62	218.58	-	-	-	-	-	-	-	-	-	-

Notes:

BM Station: 00819798284 at 244.394 Surveying locations are based on a steel rod with brass cap bench mark on the east side of Hwy 27, 8.6km South of Junction of Hwy 27 and 92 in Elmvale, 9.6km North of the Junction of Hwy 26 and 27 at Midhurst, 0.4km South of Flos Township concession 3 and 18.1m East of Centerline of hwy 27

Table 3.2

Sample Key
Updated Hydrogeological Assessment
Environmental Resource Recovery Centre (ERRC)
2976 Horseshoe Valley Road, Springwater
County of Simcoe

Test Pit No.	Depth (m)	Percent				d ₁₀ (mm)	Description	Approximated Hydraulic Conductivity (cm/sec) ¹
		Gravel	Sand	Silt	Clay			
BH1-16	5.6 - 5.9 m	0	84	16		-	Sand, Some Silt	10 ⁻³ - 10 ⁻⁵
BH4-16	0.9 - 1.2 m	0	85	15		-	Sand, Some Silt	10 ⁻³ - 10 ⁻⁵
BH7-16	3.2 - 3.5 m	0	85	15		-	Sand, Some Silt	10 ⁻³ - 10 ⁻⁵
BH8-16	0.9 - 1.2 m	0	96	4		-	Sand, Trace Silt	10 ⁻³ - 10 ⁻⁵
BH22-16	1.7 - 2.0	0	88		12	-	Sand, some silt	10 ⁻¹ - 10 ⁻³
MW15-16	3.2 - 3.5	7	66	18	8	0.0035	Sand, Some Silt, Trace Clay and Gravel	1.23 x 10 ⁻⁵
							Geometric Mean³	1.9 x 10⁻⁴
BH10-16	2.4 - 2.7	0	25	47	28	-	Silt Clayey, Sandy	<10 ⁻⁶
BH20-16	2.4 - 2.7	0	10	47	43	-	Silty Clay, Trace to Some Sand	<10 ⁻⁶

Note: 1) Hydraulic conductivity estimated by Supplementary Guidelines to Ontario Building Code 1997, Table 2

2) Estimated D₁₀ based on projected clay fraction grain size curve

3) For Sand with some silt material

Table 3.3a

**Summary of Groundwater Levels (m AMSL)
Updated Hydrogeological Assessment
Environmental Resource Recovery Centre (ERRC)
2976 Horseshoe Valley Road, Springwater
County of Simcoe**

	MW1-16	MW2-15	MW3-16	MW4-16	MW15-16
Ground Elevation (mAMSL)	259.10	252.45	246.14	242.86	247.330
Reference Elevation (mAMSL) ⁽¹⁾	260.00	253.35	246.99	243.67	248.110
<i>20-Jul-2016</i>	-	-	-	-	-
<i>19-Aug-2016</i>	-	236.16	235.69	-	-
<i>22-Aug-2016</i>	-	235.65	-	233.60	-
<i>23-Aug-2016</i>	233.20	236.29	-	233.61	-
<i>23-Aug-2016</i>	-	-	-	-	-
<i>30-Sep-2016</i>	233.26	236.07	235.46	233.52	-
<i>30-Nov-2016</i>	233.15	235.82	235.22	233.38	-
<i>30-Jan-2017</i>	232.93	235.55	235.00	233.21	235.48
<i>27-Feb-2017</i>	232.86	235.51	234.96	233.15	235.85
<i>28-Mar-2017</i>	232.85	235.58	235.02	233.17	236.19
<i>3-May-2017</i>	232.90	235.92	235.48	233.38	237.41
<i>31-May-2017</i>	233.06	236.35	235.91	233.54	237.68
<i>9-Jun-2017</i>	-	236.44	-	-	237.45
<i>21-Nov-2017</i>	233.34	236.19	235.57	233.63	236.27

Notes:

⁽¹⁾ Reference elevation taken from top of riser pipe.

mAMSL metres Above Mean Sea Level

mBGS metres Below Ground Surface.

mBTOR metres Below Top of Riser.

Elevations referenced with respect to a geodetic benchmark - Steel rod with brass cap bench mark on east site of highway 27, 8.6 km south of the junction of highway 27 and 92 in Elmvale, 9.6 km North of the junctions of highway 26 and 27 at Midhurst, 0.4 km south of Flos Town

Table 3.3b

**Summary of Groundwater Levels (m BGS)
Updated Hydrogeological Assessment
Environmental Resource Recovery Centre (ERRC)
2976 Horseshoe Valley Road, Springwater
County of Simcoe**

	MW1-16	MW2-15	MW3-16	MW4-16	MW15-16
Ground Elevation (mAMSL)	259.10	252.45	246.14	242.86	247.330
Reference Elevation (mAMSL) ⁽¹⁾	260.00	253.35	246.99	243.67	248.110
<i>20-Jul-2016</i>	-	-	-	-	-
<i>19-Aug-2016</i>	-	16.29	10.45	-	-
<i>22-Aug-2016</i>	-	16.80	-	9.27	-
<i>23-Aug-2016</i>	25.90	16.16	-	9.26	-
<i>23-Aug-2016</i>	-	-	-	-	-
<i>30-Sep-2016</i>	25.84	16.38	10.68	9.35	-
<i>30-Nov-2016</i>	25.95	16.63	10.92	9.49	-
<i>30-Jan-2017</i>	26.17	16.90	11.15	9.65	11.86
<i>27-Feb-2017</i>	26.24	16.94	11.19	9.71	11.48
<i>28-Mar-2017</i>	26.25	16.87	11.13	9.69	11.15
<i>3-May-2017</i>	26.20	16.53	10.66	9.48	9.92
<i>31-May-2017</i>	26.04	16.10	10.23	9.32	9.66
<i>9-Jun-2017</i>	-	16.01	-	-	9.88
<i>21-Nov-2017</i>	25.76	16.26	10.58	9.23	11.07

Notes:

⁽¹⁾ Reference elevation taken from top of riser pipe.

mAMSL metres Above Mean Sea Level

mBGS metres Below Ground Surface.

mBTOR metres Below Top of Riser.

Elevations referenced with respect to a geodetic benchmark - Steel rod with brass cap bench mark on east site of highway 27, 8.6 km south of the junction of highway 27 and 92 in Elmvale, 9.6 km North of the junctions of highway 26 and 27 at Midhurst, 0.4 km south of Flos Town concession 3 rd and 18.1m east of centerline of highway 27. Benchmark

Table 3.4

Sample Key
Hydrogeological Assessment
Environmental Resource Recovery Centre (ERRC)
2976 Horseshoe Valley Road, Springwater
County of Simcoe

Sample	Sample Type	Sample ID ⁽¹⁾	Sample Date	Ontario Drinking Water Standards (Table 2)				
				Inorganics	Dissolved Metals	Metals	Semi-Volatiles	Volatiles
MW01	Groundwater	GW-86882-082316-SA-MW01	23-Aug-16	√	√	√	-	-
MW02	Groundwater	GW-86882-082216-SA-MW02	22-Aug-16	√	√	√	-	-
MW03	Groundwater	GW-86882-081916-SA-MW03	19-Aug-16	√	√	√	-	-
MW04	Groundwater	GW-86882-082216-SA-MW04	22-Aug-16	√	√	√	-	-
MW02	Groundwater	GW-86882-060917-SH-001	9-Jun-17	√	√	√	-	-
MW15	Groundwater	GW-86882-112417-SH-001	21-Nov-17	√	√	√	-	-

Notes:

⁽¹⁾ Complete Sample Identification for GW-076877-BF-200614. GW stands for groundwater; next 6 digits (076885) are GHD project number; next 6 digits represent the date (mm/dd/yy); next two characters are initials of field technician; next digits signify sample number.

Table 4.1
Summary of Hydraulic Conductivity
Hydrogeological Assessment
Environmental Resource Recovery Centre (ERRC)
2976 Horseshoe Valley Road, Springwater
County of Simcoe

Borehole ID	Geologic Unit (Screened):	Depth (mBGS)	Hydraulic Conductivity (m/s)		Hydraulic Conductivity (cm/s)		Method
			Falling	Rising	Falling	Rising	
MW1-16	Silt	30.5	4.7E-06	1.40E-06	4.7E-04	1.40E-04	Bouwer-Rice Hvorslev
			9.9E-06	1.94E-06	9.9E-04	1.94E-04	
MW2-16	Silty Sand, Sand	21.3	2.0E-05	1.56E-05	2.0E-03	1.56E-03	Bouwer-Rice Hvorslev
			1.4E-06	1.11E-06	1.4E-04	1.11E-04	
MW3-16	Sand	14.9	-	1.13E-04	-	1.13E-02	Bouwer-Rice
			-	1.44E-04	-	1.44E-02	Hvorslev
			-	3.11E-04	-	3.11E-02	Bouwer-Rice
			-	4.30E-04	-	4.30E-02	Hvorslev
			-	1.21E-04	-	1.21E-02	Bouwer-Rice
			-	1.62E-04	-	1.62E-02	Hvorslev
MW4-16	Silty Sand, Sand	15.1	3.8E-05	4.53E-05	3.8E-03	4.53E-03	Bouwer-Rice
			5.0E-05	5.92E-05	5.0E-03	5.92E-03	Hvorslev
			3.8E-05	4.20E-05	3.8E-03	4.20E-03	Bouwer-Rice
			4.9E-05	5.59E-05	4.9E-03	5.59E-03	Hvorslev
MW15-16	Sand	18.9	-	4.91E-06	-	4.91E-04	Bouwer-Rice
			-	6.07E-06	-	6.07E-04	Hvorslev
<i>Geometric Mean (m/s)</i>			2.43E-05		2.43E-03		

Table 4.2

**Summary of Groundwater Analytical Results (ODWS)
Hydrogeological Assessment
Environmental Resource Recovery Centre (ERRC)
2976 Horseshoe Valley Road, Springwater
County of Simcoe**

Sample Location:	MW01	MW02	MW03	MW04	MW02	MW15-16		
Sample ID:	GW-86882-082316-SA-	GW-86882-082216-SA-	GW-86882-081916-SA-	GW-86882-082216-SA-	GW-086822-060917-	GW-086822-112117-SH-001		
Sample Date:	MW01 8/22/2016	MW02 8/22/2016	MW03 8/22/2016	MW04 8/22/2016	SH-001 6/9/2017	11/21/2017		
Parameters	Units	Parameter Limits ODWS						
Inorganics								
Ammonia-N	mg/L	-	0.12	0.13	(ND < 0.050)	(ND < 0.050)	(ND < 0.050)	(ND < 0.050)
Color	TCU	5 (AO)	(ND < 2)	(ND < 2)	(ND < 2)	(ND < 2)	9	(ND < 2)
Total dissolved solids (TDS)	mg/L	500 (AO)	328	300	336	214	234	240
Fluoride	mg/L	1.5 (MAC)	(ND < 0.10)	(ND < 0.10)	(ND < 0.10)	(ND < 0.10)	0.11	(ND < 0.10)
Hardness	mg/L	80-100 (OG)	170	230	260	140	250	210
Total kjeldahl nitrogen (TKN)	mg/L	-	0.48	0.82	0.17	0.16	0.26	0.20
Dissolved organic carbon (DOC)	mg/L	-	0.74	1.0	2.9	2.3	11	-
Nitrogen, organic	mg/L	0.15 (AO)	0.36	0.69	0.17	0.16	0.26	0.20
pH, field	s.u.	6.5-8.5 (OG)	7.71	7.56	7.30	7.97	6.59	7.59
pH, lab	s.u.	6.5-8.5 (OG)	8.05	7.96	7.88	7.98	7.99	7.96
Phosphorus	mg/L	-	3.8	2.4	0.13	1.9	0.11	1.1
Sulfate (dissolved)	mg/L	500 (AO)	31	12	20	23	5.1	8.7
Sulfide	mg/L	0.05 (AO)	(ND < 0.020)	(ND < 0.020)	(ND < 0.020)	(ND < 0.020)	(ND < 0.020)	(ND < 0.020)
Turbidity	NTU	5.0 (AO)	15	23	6.7	4.2	120	-
Alkalinity, bicarbonate (calculated)	mg/L	-	200	240	270	130	200	240
Alkalinity, carbonate (calculated)	mg/L	-	2.1	2.0	1.9	1.2	1.9	2.0
Alkalinity, total (as CaCO3)	mg/L	30-500 (AO)	200	240	270	130	200	240
%difference/ion balance	%	-	3.30	1.44	2.13	1.34	13.1	7.43
Chloride (dissolved)	mg/L	250 (AO)	7.6	2.8	3.5	2.2	1.4	(ND < 1.0)
Hydroxide (as CaCO3)	mg/L	-	(ND < 1.0)	(ND < 1.0)	(ND < 1.0)	(ND < 1.0)	(ND < 1.0)	-
Nitrate (as N)	mg/L	10.0 (MAC)	0.80	1.54	(ND < 0.10)	0.12	0.42	0.68
Nitrite (as N)	mg/L	1.0 (MAC)	0.019	0.012	(ND < 0.010)	(ND < 0.010)	(ND < 0.010)	(ND < 0.010)
Nitrite/Nitrate	mg/L	10.0 (MAC)	0.81	1.56	(ND < 0.10)	0.12	0.42	0.68
Orthophosphate	mg/L	-	(ND < 0.010)	(ND < 0.010)	(ND < 0.010)	(ND < 0.010)	(ND < 0.010)	(ND < 0.010)
Temperature, field	Deg C	15 (AO)	10.48	9.70	10.93	9.83	9.10	6.08
Total suspended solids (TSS)	mg/L	-	2000	3000	300	610	170	1400
Un-ionized ammonia	mg/L	-	0.0014	0.0010	(ND < 0.0005)	(ND < 0.00084)	(ND < 0.0005)	(ND < 0.0005)
Total Metals								
Aluminum	mg/L	0.10 (OG)	16	22	4.4	5	(ND < 0.005)	21
Antimony	mg/L	0.006 (OG)	(ND < 0.0005)	(ND < 0.0005)	(ND < 0.0005)	(ND < 0.0005)	(ND < 0.0005)	(ND < 0.0005)
Arsenic	mg/L	0.025 (OG)	0.0035	0.003	(ND < 0.001)	(ND < 0.001)	(ND < 0.001)	0.0023
Barium	mg/L	1.0 (MAC)	0.22	0.31	0.1	0.26	0.029	0.29
Beryllium	mg/L	-	0.00059	0.00079	(ND < 0.0005)	(ND < 0.0005)	(ND < 0.0005)	0.00065
Boron	mg/L	5.0 (IMAC)	0.031	0.025	0.015	(ND < 0.01)	0.017	0.016
Cadmium	mg/L	0.005 (MAC)	(ND < 0.0001)	(ND < 0.0001)	(ND < 0.0001)	(ND < 0.0001)	(ND < 0.0001)	(ND < 0.0001)
Chromium	mg/L	0.05 (MAC)	0.022	0.058	0.0085	0.009	(ND < 0.005)	0.036
Cobalt	mg/L	-	0.011	0.022	0.0042	0.0043	(ND < 0.0005)	0.012
Copper	mg/L	1.0 (AO)	0.034	0.055	0.014	0.014	(ND < 0.001)	0.034
Iron	mg/L	0.30 (AO)	25	39	6.5	8.2	0.35	28
Lead	mg/L	0.01 (MAC)	0.0088	0.011	0.0023	0.0033	(ND < 0.0005)	0.0093
Manganese	mg/L	0.05 (AO)	1.3	1.7	0.26	0.36	0.17	0.93
Molybdenum	mg/L	-	0.011	0.034	0.0024	0.0015	0.021	0.0022
Nickel	mg/L	-	0.019	0.034	0.0084	0.0067	(ND < 0.001)	0.021
Phosphorus	mg/L	-	6.5	2.2	0.12	2	(ND < 0.1)	0.97
Selenium	mg/L	0.01 (MAC)	(ND < 0.002)	(ND < 0.002)	(ND < 0.002)	(ND < 0.002)	(ND < 0.002)	(ND < 0.002)
Silver	mg/L	-	(ND < 0.0001)	(ND < 0.0001)	(ND < 0.0001)	(ND < 0.0001)	(ND < 0.0001)	(ND < 0.0001)
Sodium	mg/L	20 (AO)	33	9.3	10	9.1	7.1	4.7
Thallium	mg/L	-	0.00021	0.00038	0.00088	0.000078	(ND < 0.00005)	0.00025
Tungsten	mg/L	-	(ND < 0.001)	0.031	(ND < 0.001)	(ND < 0.001)	(ND < 0.001)	(ND < 0.001)

Table 4.2

**Summary of Groundwater Analytical Results (ODWS)
Hydrogeological Assessment
Environmental Resource Recovery Centre (ERRC)
2976 Horseshoe Valley Road, Springwater
County of Simcoe**

Sample Location:		MW01	MW02	MW03	MW04	MW02	MW15-16
Sample ID:		GW-86882-082316-SA-	GW-86882-082216-SA-	GW-86882-081916-SA-	GW-86882-082216-SA-	GW-086822-060917-	GW-086822-112117-SH-001
Sample Date:		MW01 8/22/2016	MW02 8/22/2016	MW03 8/22/2016	MW04 8/22/2016	SH-001 6/9/2017	11/21/2017
Parameters	Units	Parameter Limits					
		ODWS					
Uranium	mg/L	0.0031	0.0014	0.0029	0.0025	0.00011	0.0011
Vanadium	mg/L	-	0.038	0.051	0.0093	0.011	(ND < 0.0005) 0.043
Zinc	mg/L	5.0 (AO)	0.051	0.079	0.02	0.017	(ND < 0.005) 0.074
Zirconium	mg/L	-	0.0082	0.0092	0.0015	0.0016	(ND < 0.001) 0.0041
Dissolved Metals							
Aluminum (dissolved)	mg/L	0.10	-	-	-	0.95	(ND < 0.005)
Antimony (dissolved)	mg/L	0.006	-	-	-	0.0011	(ND < 0.0005)
Arsenic (dissolved)	mg/L	0.025	-	-	-	(ND < 0.001)	(ND < 0.001)
Barium (dissolved)	mg/L	1.0	-	-	-	0.048	0.031
Beryllium (dissolved)	mg/L	-	-	-	-	(ND < 0.0005)	(ND < 0.0005)
Boron (dissolved)	mg/L	5.0	-	-	-	0.021	(ND < 0.01)
Cadmium (dissolved)	mg/L	0.005	-	-	-	(ND < 0.0001)	(ND < 0.0001)
Calcium (dissolved)	mg/L	-	50	72	82	42	77 60
Chromium (dissolved)	mg/L	0.05	-	-	-	(ND < 0.005)	(ND < 0.005)
Cobalt (dissolved)	mg/L	-	-	-	-	0.0015	(ND < 0.0005)
Copper (dissolved)	mg/L	1.0	-	-	-	0.0035	(ND < 0.001)
Iron (dissolved)	mg/L	0.30	-	-	-	2	(ND < 0.1)
Magnesium (dissolved)	mg/L	-	10	13	13	8	14 (ND < 0.0005)
Lead (dissolved)	mg/L	0.01	-	-	-	0.0011	14
Manganese (dissolved)	mg/L	0.05	-	-	-	0.26	0.0051
Molybdenum (dissolved)	mg/L	-	-	-	-	0.015	0.00061
Nickel (dissolved)	mg/L	-	-	-	-	0.0028	(ND < 0.001)
Phosphorus (dissolved)	mg/L	-	-	-	-	0.16	(ND < 0.1)
Potassium (dissolved)	mg/L	-	2.6	2.4	2.1	1.4	2.6 1.4
Selenium (dissolved)	mg/L	0.01	-	-	-	(ND < 0.002)	(ND < 0.002)
Silver (dissolved)	mg/L	-	-	-	-	(ND < 0.0001)	(ND < 0.0001)
Sodium (dissolved)	mg/L	20 (AO)	29	7	9.6	8.2	6.7 2.7
Thallium (dissolved)	mg/L	-	-	-	-	(ND < 0.00005)	(ND < 0.00005)
Tungsten (dissolved)	mg/L	-	-	-	-	(ND < 0.001)	(ND < 0.001)
Uranium (dissolved)	mg/L	0.02	-	-	-	0.00018	0.00039
Vanadium (dissolved)	mg/L	-	-	-	-	0.0023	0.00078
Zinc (dissolved)	mg/L	5.0	-	-	-	0.12	(ND < 0.005)
Zirconium (dissolved)	mg/L	-	-	-	-	(ND < 0.001)	(ND < 0.001)

Footnotes:

ND

Not detected at the associated reporting limit.

0.151

Parameter Exceeds Ontario Drinking Water Standards, Table 2 (ODWS, PIBS-4449e01)

**Land Type Annual Averages
Proposed ERRC
Simcoe County
Springwater, Ontario**

Topsoil

Month	Temperature (°C)	Precipitation (mm)	Rainfall (mm)	Snowmelt (mm)	Potential Evapotranspiration (mm)	Actual Evapotranspiration (mm)	Water Surplus (mm)
January	-7.5	85	19	28	1	1	44
February	-7.1	88	19	21	1	1	36
March	-1.4	61	31	98	8	8	121
April	6	76	68	69	32	32	107
May	12.9	81	81	0	78	78	19
June	17.8	92	92	0	112	112	8
July	20.4	83	83	0	131	130	0
August	19.7	77	77	0	117	109	0
September	16.1	83	83	0	81	77	0
October	9.3	89	89	0	41	41	0
November	3.2	89	73	11	14	14	19
December	-3.1	97	36	23	3	3	39
Total		1001	751	250	619	606	395

Sandy Silt

Month	Temperature (°C)	Precipitation (mm)	Rainfall (mm)	Snowmelt (mm)	Potential Evapotranspiration (mm)	Actual Evapotranspiration (mm)	Water Surplus (mm)
January	-7.5	85	19	28	1	1	45
February	-7.1	88	19	21	1	1	38
March	-1.4	61	31	98	8	8	121
April	6	76	68	69	32	32	106
May	12.9	81	81	0	78	78	19
June	17.8	92	92	0	112	111	8
July	20.4	83	83	0	131	119	0
August	19.7	77	77	0	117	91	0
September	16.1	83	83	0	81	69	0
October	9.3	89	89	0	41	41	5
November	3.2	89	73	11	14	14	37
December	-3.1	97	36	23	3	3	53
Total		1001	751	250	619	568	433

**Land Type Annual Averages
Proposed ERRC
Simcoe County
Springwater, Ontario**

Impervious Area (Hard-Packed Gravel)

Month	Temperature (°C)	Precipitation (mm)	Rainfall (mm)	Snowmelt (mm)	Potential Evapotranspiration (mm)	Actual Evapotranspiration (mm)	Water Surplus (mm)
January	-7.5	85	19	28	1	1	46
February	-7.1	88	19	21	1	1	39
March	-1.4	61	31	98	8	8	120
April	6	76	68	69	32	32	106
May	12.9	81	81	0	78	66	19
June	17.8	92	92	0	112	83	11
July	20.4	83	83	0	131	86	0
August	19.7	77	77	0	117	77	0
September	16.1	83	83	0	81	68	10
October	9.3	89	89	0	41	40	44
November	3.2	89	73	11	14	14	69
December	-3.1	97	36	23	3	3	56
Total		1001	751	250	619	479	520

Table 4.4

**Existing Conditions Water Balance
Proposed ERRC
Simcoe County
Springwater, Ontario**

Detail	Units	Impervious Area	Existing Pervious Cover	Total
<u>Input Information</u>				
Land Type ¹	%	0	100	100
Area ²	ha	0.00	4.49	4.49
Soil Type		Sandy Silt	Sandy Silt	
Hydrologic Soil Group		AB	AB	
<u>Pervious Infiltration Factor</u>				
Topography		-	0.2	
Soil		-	0.4	
Land Type		-	0.15	
TOTAL		0	0.75	
<u>Average Annual Depth</u> ¹				
Precipitation	(mm)	1001	1001	
Evapotranspiration	(mm)	479	568	
<u>Output Information</u>				
Annual Rainfall Volume	(m ³)	0	44,989	44,989
Annual Evapotranspiration Volume	(m ³)	0	25,528	25,528
Precipitation Surplus	(m ³)	0	19,461	19,461
Annual Groundwater Recharge Volume ²	(m ³)	0	14,596	14,596
Annual Runoff Volume	(m ³)	0	4,865	4,865

Notes:

1. This amount was proportionally modified to represent average annual conditions using the Shanty Bay weather station (Climate ID: 6117684) Climate Normals data.

Table 4.5

**Proposed Uncontrolled Conditions Water Balance
Proposed ERRC
Simcoe County
Springwater, Ontario**

Detail	Units	Impervious	Urban Lawn	Total
<u>Input Information</u>				
Land Type ¹	%	89	11	100
Total Area	ha	4.00	0.49	4.49
Underlying Soil Type		Sandy Silt	Topsoil	
Hydrologic Soil Group		AB	BC	
<u>Pervious Infiltration Factor</u>				
Topography		-	0.3	
Soil		-	0.3	
Land Type		-	-	
TOTAL		0	0.6	
<u>Average Annual Depth</u> ²				
Precipitation	(mm)	1001	1001	
Evapotranspiration	(mm)	479	606	493
<u>Output Information</u>				
Annual Rainfall Volume	(m ³)	40,040	4,949	44,989
Annual Evapotranspiration Volume	(m ³)	19,160	2,996	22,156
Surplus	(m ³)	20,880	1,953	22,833
Annual Groundwater Recharge Volume ³	(m ³)	2,088	1,172	3,260
Annual Runoff Volume	(m ³)	18,792	781	19,573

Notes:

- 1. Land Area Assumptions:
- a) Total ImperVIOUS Area:

Land Type	ERRC	Total Area (ha)	% Impervious	Total Imp. Area (ha)
		4.49	89	4.00
Total		4.49	89.00	4.00

Notes:

- 1. This amount was proportionally modified to represent average annual conditions using the Shanty Bay weather station (Climate ID: 6117684) Climate Normals data.

**Proposed Conditions Water Balance
Additional Infiltration and Evaporation Measures
Proposed ERRC
Simcoe County
Springwater, Ontario**

Additional Evaporative Losses**Stormwater Management Pond**

Surface area of permanent pool ¹	2,467 m ²
Excess evaporation from permanent pool ²	137 mm
Total evaporative losses per year	338 m ³

Enhanced Vegetated Swales

Approx. Length of Swale	525 m
Approx. Ponding within Swale Length	50 % of swale length
Average Surface area at permanent pool ³	394 m ²
Annual average total lake evaporation ¹	137 mm
Total evaporative losses per year	54 m ³

Total 392 m³

Additional Infiltration Losses**Stormwater Management Pond - Infiltration Chamber**

Area of Infiltration Gallery	380 m ²
Total Available Volume ⁴	380 m ³
Void Ratio ⁵	40%
Volume of water	152 m ³
Hydraulic Conductivity of native soil ⁶	1.07E-06 m/s
Infiltration Rate ⁷	18.8 mm/hr
Time to infiltrate water in trench	2.21 days
Total infiltration losses per year ⁸	22,885 m ³

Enhanced Swales

Total surface area of water	394 m ²
Volume of water in swale	66 m ³
Hydraulic Conductivity of Topsoil ⁶	1.00E-08 m/s
Infiltration Rate ⁷	5.4 mm/hr
Time to infiltrate water	3.86 days
Total infiltration losses per year ⁹	1,174 m ³

Total 24,060 m³

Notes:

1. As per MOE Standards, assumed water to remain at permanent pool elevation for majority of time.
2. Taken from long term lake evaporation monitoring conducted in southern ontario (630mm/year).
The lake evaporation total was reduced by the amount of evapotranspiration allowed for in the water balance calculations in order not to double count evaporative losses.
3. Assumptions on dimensions of Enhanced Swale
 Depth of Check Dam = 0.50 m
 Bottom Width = 0.50 m
 Side Slope = 2.00 H:1V
4. Assumptions on dimensions of clear stone bedding
 Depth of bedding = 1.00 m
5. TRCA, 2010
6. GHD, 2016
7. Using equation within Figure C1 in Appendix C of the TRCA Low impact Planning and Design Guide, with Safety Correction Factor of 2.5

**Proposed Conditions Water Balance
Additional Infiltration and Evaporation Measures
Proposed ERRC
Simcoe County
Springwater, Ontario**

8. Assumed that the stormwater management pond will infiltrate all runoff up to and including the 100-year storm event
Therefore all average rainfall amounts between May to October from Shanty Bay weather station
(Climate ID: 6117684) will infiltrate via the proposed stormwater management pond.
Amount of Rainfall = 509 mm
9. Average # of days per year w/ rainfall, during May to October and no snowfall, according to Climate Normals
for Shanty Bay weather station (Climate ID: 6117684)
Days with precip.= 69 days
Amount of Rainfall = 509 mm

Table 4.7

**Summary of Calculations
Proposed ERRC
Simcoe County
Springwater, Ontario**

Details	Precipitation	Evapotranspiration	Infiltration	Runoff
	(m ³)	(m ³)	(m ³)	(m ³)
Pre-development				
Existing Conditions	44,989	25,528	14,596	4,865
Percentage of Annual Precipitation		57%	32%	11%
Post-development				
Proposed Conditions (uncontrolled)	44,989	22,156	3,260	19,573
Percentage of Annual Precipitation		49%	7%	44%
Additional Infiltration and Evapotranspiration Measures				
Additional Measures				
Low-Impact Development (LID) Measures		392	24,060	
Proposed Conditions (controlled) ¹	44,989	22,548	22,441	0
Percentage of Annual Precipitation		50%	50%	0%
Pre- to Post-development Difference				
Proposed Conditions (uncontrolled)	0	-3,372	-11,336	14,708
Percentage Change		-7%	-25%	33%
Proposed Conditions (controlled)	0	-2,980	7,845	-4,865
Percentage Change		-7%	17%	-11%

Total volume of water losses per year = 44,989 m³
Percentage of Annual Precipitation lost via water losses = 100%

Proposed Conditions Runoff Coefficient ² = 0.75
Rainfall Amount = 5.00 mm
Runoff Volume (25 m Storm Event) = 169 m³
Total Volume of Infiltration Galleries = 218 m³

Notes:

1. The proposed stormwater management pond is sized to store, infiltrate all surface runoff from the proposed Facility, up to and including the 100-year storm. event
2. Runoff Coefficient for hard-packed gravel parking lot

Appendices

Appendix A

Field Investigation Methodology and Protocols

Appendix A Field Investigation Methodology and Protocols

1. Borehole Advancement/Monitoring Well Installation

1.1 Field Activities

Prior to initiating the subsurface investigation activities, all applicable utility companies (gas, telephone, network cables, pipelines and sewers) were contacted through Ontario One-Call.

1.2 Health and Safety

A Site-specific Health and Safety Plan (HASP) outlining specific job tasks and their related hazards was prepared and implemented by GHD prior to initiating field activities. The HASP presents the visually observed Site conditions and identifies potential physical hazards to field personnel. All GHD field and project staff working on and/or visiting the site were required to sign the HASP to document their knowledge of the potential hazards while on-site.

All drilling activities were conducted under Level D Personal Protective Equipment (PPE), which consisted of protective gloves, hard hats, safety glasses, safety boots and reflective vests at all times.

1.3 Borehole Drilling

The drilling work was carried out utilizing a track-mounted drill rig supplied and operated by Profile Drilling Inc., specialist drilling contractors (Ministry of the Environment and Climate Change Licensed Well Drillers), under the full-time supervision of GHD technical representatives.

Twenty seven (27) were advanced as part of the Hydrogeological Assessment, between 5.10 and 30 mBGS (metres below ground surface) between August 5, 2016 to January 6, 2017. The boreholes were advanced by Profile Drilling Inc. (Profile) using a drill rig equipped with hollow-stem augers. The boreholes were advanced to depths ranging from 5.18 and 30.2 mBGS.

Boreholes were advanced using hollow stem auger drilling methods and soil samples were collected every 0.75 metres to the final depth of investigation in all boreholes using a 50 mm outside diameter split spoon sampler. Prior to use and between each borehole location, the drilling and sampling equipment was thoroughly cleaned using Alconox® soap and potable water rinse.

The soil was logged using the Unified Soil Classification System (USGS), making special note of any visual or olfactory evidence of potential impacts.

1.4 Monitoring Well Installations

Monitoring wells were installed in five (5) selected boreholes by the licensed water well drillers consistent with Regulation 903 – Wells. GHD technical staff supervised the monitoring well construction and well development to ensure conformance with GHD's Standard Operating Procedures.

The monitoring wells were typically constructed with 2-inch (~50 mm) Schedule 40 PVC screen and casing. The screen length used for the monitoring wells was 3.0 metres on average and pre-slotted (No. 10 slot). The annular space between the monitoring well screen and surrounding geological formation were backfilled with No. 3 grade silica sand to an average height of 0.6 metres above the top of the

screen. The remaining annular space was backfilled with bentonite. Some monitoring wells were installed with minor alteration to the above installation details, due to the specific conditions encountered.

To complete the instrumentation, an expandable J-plug was installed on the riser style casing to cover the top of the riser pipe to protect against debris falling into the well and surface runoff infiltration. All wells were with an above-ground steel monument casing (4-inch x 4-inch). Each groundwater monitoring well was instrumented with dedicated sampling equipment consisting of polyethylene tubing and Waterra foot valves for monitoring well development and installation.

The wells will be decommissioned in accordance with Regulation 903, when it is determined that they are no longer required for monitoring.

1.5 Monitoring Well Development

Subsequent to the monitoring well installation, each well was developed to ensure hydraulic connection with the screened hydrostratigraphic unit. A hydraulic connection ensures that groundwater levels and samples are representative of the subsurface condition. Development also aids in achieving low-turbidity samples.

The wells were developed using dedicated 5/8" (~16 mm) diameter polyethylene tubing with a Waterra foot valve. Well development activities were undertaken until purged water was clear. In cases where a well was purged dry before sufficient development, the well water level was allowed to recover before continuing.

1.6 Surveying

Subsequent to installation, all wells and boreholes were surveyed for vertical and lateral control, and for water table elevation reference, using a geodetic benchmark¹ to tie in vertical elevations relative to metres above mean sea level (mAMSL) at the Site. The ground surface and top of riser pipe elevation of each of well were surveyed with respect to this benchmark.

2. Water Level Measurements

The measurement of groundwater levels in monitoring wells was required during the hydrogeological investigation in order to determine the presence and depth of groundwater. Water level measurements were used to determine: hydraulic head, hydraulic gradients and the direction of groundwater flow.

Since many decisions concerning the vertical and horizontal flow of groundwater through various types of geologic conditions depend on groundwater/fluid measurements, the accuracy of the measurements made at an appropriate level of precision is very important. Typically, the precision required is 1 mm, and the equipment employed had measurement resolution at this level.

Manual groundwater level measurements were measured using a Solinst water level meter. Measurements were obtained by lowering the electrode, attached to a graduated polyethylene tape,

¹ Benchmark station: 00819798284, Elevation 244.394 mAMSL (locations are based on a steel rod with brass cap bench mark on the east side of Hwy 27, 8.6km South of Junction of Hwy 27 and 92 in Elmvale, 9.6km North of the Junction of Hwy 26 and 27 at Midhurst, 0.4km South of Flos Township concession 3 and 18.1m East of Centerline of hwy 27) was used as a reference point for surveying purposes.

slowly into the well until the indicator sounded. To ensure accuracy, all fluid level readings were double-checked in the field when recorded.

In order to provide reliable data, each round of water level measurements was collected over as short a period of time as possible. Barometric pressure can affect groundwater levels and, therefore, observation of significant weather changes during the period of water level measurements was noted. Rainfall events and groundwater pumping can also affect groundwater level measurements. Personnel collecting water level data noted if any of these controls are in effect during the groundwater level collection period.

3. Groundwater Sampling

Prior to initiating groundwater sample collection, the wells were purged of the standing stagnant groundwater volume using a dedicated Waterra foot valve and polyethylene tubing. Purging was performed until the water in the well was representative of the actual conditions in the hydrostratigraphic unit. Stabilization was achieved by the removal of at least three times the volume of standing water in the well. Purging was considered complete once purged groundwater field parameters including conductivity, temperature and pH were stable. Stabilization was achieved when field measurements for conductivity and temperature were within a range of plus or minus 10 percent of the average for the last three readings and field measurements for pH were within a range of plus or minus 0.1 pH unit of the average for the last three readings.

The wells were purged using dedicated inertial pumps. In the event of a slowly recharging well, the well was pumped dry to ensure all standing water was removed from the sand pack and then allowed to recover prior to sample collection.

In the event of a well with groundwater that contains a high amount of silt or sediment after well development, a 0.75"x36" PVC water bailer was used to collect the water.

Water samples were collected directly from the dedicated tubing or bailer to laboratory supplied sample containers. Samples were relinquished to Maxxam Laboratories in Mississauga, Ontario under Chain of Custody protocols. The samples were analyzed for Ontario Drinking Water Standards (ODWS) and Provincial Water Quality Objectives (PWQO) criteria.

4. Single Well Response Tests

Single well response tests (SWRT) were completed at five (5) monitoring well installations to determine the hydraulic conductivity of the screened geologic formation. The SWRT consisted of falling head tests (slug tests), and rising head tests (recovery tests) as described in the sections below.

4.1 Falling Head Test (Slug Test)

The slug test involves causing a sudden change in water level in a well and measuring the water level response within that well. Water level change may be induced by suddenly injecting or emplacing a known quantity or "slug" into the well. The slug can water or solid (stainless steel, polyvinyl chloride). A detailed description of the procedure is provided, as follows:

- i) The static water level was determined prior to any testing of the well.
- ii) A datalogger, programmed to measure water pressure at an appropriate interval (e.g., 5 seconds), was installed in the well at a known depth.

- iii) A slug of known dimensions was set in place just above the static water level.
- iv) The slug was then released instantaneously until it was completely submerged in the water column.
- v) After the initial positive displacement of the water column, water levels were monitored manually.
- vi) When the water level reached approximately 90 percent of the original observed (static) water level, the slug was then rapidly removed from the water column to initiate a "rising-head" test.

4.2 Rising Head Test (Recovery Test)

The recovery test also involves causing a sudden change in water level in a well and measuring the water level response within that well. Water level change may be induced by suddenly removing a known quantity or "slug" out of the well. The slug is usually a stainless steel or polyvinyl chloride rod.

Recovery tests were carried out after the slug tests described above. Water level monitoring continued until the water level was within 10 percent of the original static level.

5. Guelph Permeameter Tests

The Guelph Permeameter (GP) is a well-known borehole permeameter technique. Guelph permeameter measurements are carried out in the vadose zone above the water table, where the soil is unsaturated. Steady flow produces a small inner saturated zone adjacent to the well, encased within a larger outer wetted, but unsaturated volume. As a consequence, combined saturated-unsaturated flow occurs.

The GP method measures the steady -state rate necessary to maintain a constant depth of water in an uncased cylindrical borehole above the water table. The field saturated hydraulic conductivity is calculated using an approximate analytical solution. A summary of field procedures is presented below:

- Excavate (hand dig) through fill material to expose native soil if necessary.
- Excavate a cylindrical borehole to the desired depth in the material to be tested.
- Fill the permeameter with water and place over the borehole.
- Start the permeameter by raising the air-inlet tube out of the outlet port.
- Set the desired H level by adjusting the height of the air-inlet tube.
- Monitor the rate of fall of the liquid surface in the reservoir until a steady rate, r , is attained.

The hydraulic conductivity measured in the unsaturated (vadose) zone is referred to as the "field-saturated" hydraulic conductivity (K_{fs}) (after Reynolds et al., 1986). The Guelph Permeameter method measures the steady-state flow rate (Q) necessary to maintain a constant depth of water (H) in an uncased borehole. K_{fs} is then calculated from Q and H using analytical solutions.

The analytical solution input parameters include the following:

- Reservoir cross sectional area
- Water height
- Borehole radius
- Soil texture
- Steady state rate of water level change

Appendix B

Stratigraphic Logs and Grain Size Analyses

Appendix B.1

Selected Stratigraphic and Instrumentation Logs



BOREHOLE No.: BH01-16

ELEVATION: 260.66 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 5 August 2016 DATE (FINISH): 5 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										Field	Lab	w _p	w _L	U _c	U _L	N	10	20
0	260.66		GROUND SURFACE			%			N									
0.03	260.63		TOPSOIL : 25 mm															
1			NATIVE : SAND, some silt, fine grained, well graded, trace gravel, rootlets, brown, moist, very loose		SS-1	50	3	1-0-1-1	1									
2																		
3	0.76																	
4	1.0		SANDY SILT, trace to some clay and gravel, grey, moist, compact to dense		SS-2	50	3	1-4-6-8	10									
5																		
6																		
7	2.0																	
8	2.29		SAND, fine grained, well graded, trace gravel, trace granitic cobbles, brown, moist, dense		SS-4	83	3	7-14-15-14	29									
9																		
10	3.0																	
11																		
12																		
13	4.0																	
14																		
15			becoming very dense															
16	5.0																	
17																		
18																		
19																		
20	6.0																	
21	6.10		SILT, some sand, trace gravel, brown, moist, very dense		SS-7	100	5	16-50	50									
22																		
23	7.0																	
24																		
25																		
26	7.90		granitic cobbles		SS-8	100	9	16-50/125mm	100									
27	8.0																	
28			END OF BOREHOLE:															
29			NOTE :															
30	9.0		End of Borehole at 7.90 m bgs															
31			Borehole was dry upon completion															
32			Borehole backfilled with enviroplug medium to the top															
33	10.0		bgs denotes 'below ground surface'															
34																		
35																		
36	11.0																	
37																		
38																		
39																		

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH02-16
ELEVATION: 255.98 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
 Geotechnical Investigation
PROJECT: Environmental Resource Recovery Centre (ERRC)
LOCATION: 2976 Horseshoe Valley Road West, Springwater
DESCRIBED BY: S. Andreou **CHECKED BY:** F. Gergis
DATE (START): 5 August 2016 **DATE (FINISH):** 5 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										Field	Lab	w _p	w _L	U _c	U _L	10	20	30
0	255.98		GROUND SURFACE			%			N									
0.03	255.95		TOPSOIL : 25 mm															
1			NATIVE : SAND and SILT, trace to some gravel, rootlets, grey, moist, compact		SS-1	75	3	1-6-6-8	12									
2			SILTY SAND, trace gravel, brown, moist, dense to compact		SS-2	83	10	3-14-21-23	35									
3	0.76																	
4	1.0																	
5																		
6	2.0				SS-3	42	10	9-12-13-19	25									
7			dense															
8																		
9																		
10	3.0																	
11	3.35																	
12			SAND, trace silt and gravel, layered, brown, moist, dense		SS-5	75	7	10-19-28-33	47									
13	4.0																	
14																		
15	4.57																	
16	5.0		SANDY SILT/SILTY SAND, brown, moist, very dense		SS-6	83	4	12-27-36-50	63									
17																		
18																		
19																		
20	6.0																	
21																		
22																		
23	7.0																	
24																		
25																		
26	8.0		silty sand layer															
27	8.08				SS-8	94	14	22-32-50	82									
28			END OF BOREHOLE:															
29			NOTE :															
30	9.0		End of Borehole at 8.08 m bgs															
31			Borehole was dry upon completion															
32			Borehole backfilled with enviroplug															
33	10.0		medium to the top															
34			bgs denotes 'below ground surface'															
35																		
36	11.0																	
37																		
38																		
39																		

SOIL LOG WITH GRAPH+WELL_068822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH03-16

ELEVATION: 254.46 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 8 August 2016 DATE (FINISH): 8 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										Field	Lab	w _p	w _L	U _c	U _L	10	20	30
0	254.46		GROUND SURFACE			%			N									
0.04	254.42		TOPSOIL with organics : 35 mm															
1			NATIVE : SAND and SILT, trace to some gravel, rootlets, grey, moist, loose		SS-1	62	9	1-2-3-7	5									
0.76	253.70		SAND, trace silt, occasional sand and silt layers, brown, moist, compact to dense		SS-2	50	10	5-6-6-8	12									
1.0					SS-3	58	8	4-5-10-15	15									
2.0					SS-4	71	3	6-18-21-25	39									
3.0					SS-5	100	9	8-19-25-30	44									
4.0																		
5.0					SS-6	87	13	10-20-28-32	48									
6.0			becoming very dense															
7.0					SS-7	75	12	11-25-27-33	52									
7.93	246.53		END OF BOREHOLE:		SS-8	50	9	17-50	50									
8.0			NOTE : End of Borehole at 7.93 m bgs Borehole was dry upon completion Borehole backfilled with enviroplug medium to the top bgs denotes 'below ground surface'															
9.0																		
10.0																		
11.0																		

SOIL LOG WITH GRAPH+WELL_068822-12.GPJ_INSPEC_SOL_GDT_8/11/17



BOREHOLE No.: BH04-16

ELEVATION: 246.73 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 8 August 2016 DATE (FINISH): 8 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▮ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		△ Field	□ Lab		
										w _p	w _L	U _c	U _L	10	20	30	40	50	60	70	80
0	246.73		GROUND SURFACE			%			N												
0.03	246.70		TOPSOIL with organics : 25 mm																		
1			NATIVE : SAND, some silt, trace to some gravel, brown, damp, loose		SS-1	50	5	2-3-4-4	7												
2			occasional sand and silt layers, moist		SS-2	50	1	1-3-2-3	5												
3						SS-3	71	3	2-4-5-6	9											
4	1.0					SS-4	83	3	5-12-19-21	31											
5			becoming dense		SS-5	92	3	8-18-19-22	37												
6						SS-6	92	7	10-18-22-31	40											
7	2.0					SS-7	71	19	11-26-32-38	58											
8			trace clay and gravel, occasional sand and silt layers, brown, moist, very dense		SS-8	100	2	12-25-36-50	61												
9																					
10	3.0																				
11			some silt, trace gravel, greyish brown																		
12																					
13	4.0																				
14			END OF BOREHOLE:																		
15																					
16	5.0																				
17			NOTE : End of Borehole at 8.23 m bgs Borehole was dry upon completion Borehole backfilled with enviroplug medium to the top bgs denotes 'below ground surface'																		
18																					
19	6.0																				
20																					
21																					
22	7.0																				
23																					
24																					
25	8.0																				
26																					
27	8.23	238.50																			
28																					
29																					
30																					
31	9.0																				
32																					
33																					
34	10.0																				
35																					
36																					
37	11.0																				
38																					
39																					

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH05-16

ELEVATION: 253.57 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 9 August 2016 DATE (FINISH): 9 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▮ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										Field	Lab	w _p	w _L	U _c	U _L	10	20	30
0	253.57		GROUND SURFACE			%			N									
0.03	253.54		TOPSOIL with organics : 25 mm		SS-1	58	7	1-2-3-7	5									
1			NATIVE : SAND, some silt, trace to some gravel, brown, damp to dry, loose		SS-2	87	2	3-13-8-7	21									
0.76	252.81		SILTY CLAY, trace gravel, grey, moist, stiff to very stiff		SS-3	50	22	5-7-9-10	16									
1.0					SS-4	75	5	6-15-18-14	33									
2.0	251.44		SAND, fine grained, some silt, brown, moist, dense		SS-5	67	5	11-16-10-11	26									
2.13					SS-6	83	8	10-18-27-37	45									
			auger grinding															
			occasional sandy silt layers, varved		SS-7	100	4	13-24-32-40	56									
			some silt, trace gravel, brown, moist, very dense															
					SS-8	92	18	10-30-43-50/125mm	73									
7.93	245.64		SILT, some clay, trace sand and gravel, grey, moist, very dense															
8.0																		
8.23	245.34																	
			END OF BOREHOLE:															
			NOTE : End of Borehole at 8.23 m bgs Borehole was dry upon completion Borehole backfilled with enviroplug medium to the top bgs denotes 'below ground surface'															

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH06-16

ELEVATION: 243.44 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 12 August 2016 DATE (FINISH): 12 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										△ Field	□ Lab	w _p	w _L	U _c	U _L	10	20	30
0	243.44		GROUND SURFACE			%			N									
1			REWORKED NATIVE : SILTY SAND, some gravel, trace topsoil and rootlets, brown, damp to moist, compact	SS-1	62	6	7-11-9-9	20										
2				SS-2	67	8	3-6-8-7	14										
3	1.0																	
4																		
5	1.52	241.92	NATIVE : SILTY SAND TILL, some gravel, brown, moist, compact	SS-3	62	5	7-13-14-12	27										
6			becoming dense	SS-4	75	6	10-19-20-24	39										
7	2.0																	
8																		
9			auger refusal, very dense	SS-5	100	6	50/75mm	100										
10	3.0																	
11																		
12																		
13	4.0																	
14																		
15																		
16	5.0																	
17	5.18	238.26	END OF BOREHOLE:															
18			NOTE :															
19			End of Borehole at 5.18 m bgs															
20	6.0		Borehole was dry upon completion															
21			Borehole backfilled with enviroplug															
22			medium to the top															
23	7.0		bgs denotes 'below ground surface'															
24																		
25																		
26	8.0																	
27																		
28																		
29	9.0																	
30																		
31																		
32																		
33	10.0																	
34																		
35																		
36	11.0																	
37																		
38																		
39																		

SOIL LOG WITH GRAPH+WELL_068822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH07-16

ELEVATION: 247.11 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 12 August 2016 DATE (FINISH): 12 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth		Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)	Water content (%)	Atterberg limits (%)	"N" Value (blows / 12 in.-30 cm)	Field	Lab	
Feet	Metres						%			N		w _p	w _L		△	□	
0		247.11		GROUND SURFACE													
1	0.46	246.65	☒	RE-WORKED NATIVE : SAND and SILT, trace gravel, trace to some topsoil, brown, damp to moist, compact	☒	SS-1	67	4	2-6-4-6	10	○	●					
2			▨	NATIVE : SAND, some silt, trace gravel, reddish brown to greyish brown, loose	▨	SS-2	71	8	1-3-4-5	7	●						
3	1.0		▨		▨	▨	SS-3	71	9	2-4-6-7	10	●					
4			▨	becoming brown, compact	▨	SS-4	67	6	2-4-4-6	8	●						
5	2.0		▨		▨	▨	SS-5	92	10	1-3-5-7	8	●					
6			▨		▨	▨	SS-6	79	3	1-4-11-14	15	○	●				
7			▨	END OF BOREHOLE:	▨	SS-7		8	7-12-15-18	27	○	●					
8	5.0	241.93															
9	5.18			NOTE : End of Borehole at 5.18 m bgs Borehole was dry upon completion Borehole backfilled with enviroplug medium to the top bgs denotes 'below ground surface'													
10																	
11																	
12																	
13	4.0																
14																	
15																	
16																	
17	5.0																
18	5.18																
19																	
20	6.0																
21																	
22																	
23	7.0																
24																	
25																	
26	8.0																
27																	
28																	
29	9.0																
30																	
31																	
32																	
33	10.0																
34																	
35																	
36	11.0																
37																	
38																	
39																	

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH08-16
ELEVATION: 252.71 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
 Geotechnical Investigation
PROJECT: Environmental Resource Recovery Centre (ERRC)
LOCATION: 2976 Horseshoe Valley Road West, Springwater
DESCRIBED BY: S. Andreou **CHECKED BY:** F. Gergis
DATE (START): 12 August 2016 **DATE (FINISH):** 12 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										Field	Lab	w _p	w _L	U _c	U _L	10	20	30
0	252.71		GROUND SURFACE			%			N									
1		☒	RE-WORKED NATIVE : SAND, some silt, trace gravel, some topsoil, light brown, moist, loose	SS-1	62	5	2-2-4-3	7	●									
2	0.76																	
3	1.0	☒	NATIVE : SAND, some silt, trace gravel, light brown, moist, loose	SS-2	42	5	2-2-2-2	4	●									
4																		
5																		
6	2.0			SS-3	58	5	1-1-2-2	3	●									
7																		
8				SS-4	67	4	2-2-1-2	3	●									
9																		
10	2.90	▨	CLAYEY SILT, some sand, trace gravel, grey, moist, stiff	SS-5	54	21	3-6-7-10	13	●	○								
11	3.0																	
12																		
13	4.0																	
14																		
15	4.57	☒	SANDY SILT TILL, some clay, trace gravel, grey, moist, compact	SS-6	96	8	8-9-11-13	20	○	●								
16	5.0																	
17	5.18																	
18			END OF BOREHOLE:															
19			NOTE :															
20	6.0		End of Borehole at 5.18 m bgs															
21			Borehole was dry upon completion															
22			Borehole backfilled with enviroplug															
23	7.0		medium to the top															
24			bgs denotes 'below ground surface'															
25																		
26	8.0																	
27																		
28																		
29	9.0																	
30																		
31																		
32																		
33	10.0																	
34																		
35																		
36	11.0																	
37																		
38																		
39																		

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH09-16
ELEVATION: 261.83 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
 Geotechnical Investigation
 PROJECT: Environmental Resource Recovery Centre (ERRC)
 LOCATION: 2976 Horseshoe Valley Road West, Springwater
 DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian
 DATE (START): 5 January 2017 DATE (FINISH): 5 January 2017

LEGEND

- SS - SPLIT SPOON
- ST - SHELBY TUBE
- GS - GRAB SAMPLE
- RC - ROCK CORE
- WATER LEVEL

Depth		Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)	Water content (%)	Atterberg limits (%)	"N" Value (blows / 12 in.-30 cm)	Field	Lab
Feet	Metres						%			N		w _p , w _L				
0		261.83		GROUND SURFACE						N				10 20 30 40 50 60 70 80 90		
1				NATIVE : SAND, some silt, rootlets, dark brown, moist, very loose		SS-1	33	12	1-1-2-3	3						
2	0.76	261.07		SAND, trace silt, brown, moist, loose		SS-2	50	7	1-4-4-5	8						
3	1.0															
4																
5				very loose		SS-3	58	3	1-3-4-5	7						
6																
7	2.0															
8																
9				sandy silt, loose		SS-4	63	3	1-1-2-3	3						
10	3.0															
11																
12																
13	3.96	257.87		SANDY SILT TILL, trace gravel, grey, moist, very dense		SS-5	58	8	2-4-5-4	9						
14	4.0															
15																
16	5.0	256.65				SS-6	75	6	6-14-36-50/76mm	50						
17	5.18															
18				END OF BOREHOLE:												
19																
20	6.0			NOTE :												
21				End of Borehole at 5.18 m bgs												
22				Borehole was dry upon completion												
23	7.0			Borehole backfilled with enviroplug medium to the top												
24				bgs denotes 'below ground surface'												
25																
26	8.0															
27																
28																
29	9.0															
30																
31																
32																
33	10.0															
34																
35																
36	11.0															
37																
38																
39	12.0															
40																
41																
42	13.0															
43																
44																
45	14.0															
46																
47																
48																

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH10-16

ELEVATION: 258.92 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian

DATE (START): 5 January 2017 DATE (FINISH): 5 January 2017

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth		Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)	Water content (%)	Atterberg limits (%)	"N" Value (blows / 12 in.-30 cm)	Field	Lab
Feet	Metres	258.92		GROUND SURFACE			%			N				10 20 30 40 50 60 70 80 90		
1				FILL: SAND, trace to some silt, topsoil with rootlets, dark brown to brown, loose	SS-1	33	11	2-3-3-2	6							
2	0.76	258.16		NATIVE: SILTY CLAY, sandy, brown, moist, firm to stiff	SS-2	50	8	1-2-3-4	5							
3	1.0				SS-3	63	9	3-3-5-4	8							
4					SS-4	75	11	3-8-8-6	16							
5	2.0	256.63		CLAYEY SILT, trace gravel, trace to some sand, rootlets, grey, moist, very stiff becoming firm	SS-5	67	13	3-3-3-4	6							
6	2.29															
7																
8																
9	3.0															
10																
11	4.0															
12																
13	4.57	254.35		SANDY SILT TILL, trace gravel, grey, moist, dense	SS-6	75	7	7-16-27-41	43							
14				damp to moist, very dense												
15	5.0															
16																
17	6.0															
18																
19	6.0															
20																
21	7.00	251.92		SAND, some silt to silty, grey, damp, dense	SS-7	83	11	10-27-31-34	58							
22																
23	8.0															
24																
25	8.0	250.69														
26	8.23															
27																
28																
29	9.0															
30																
31																
32																
33	10.0															
34																
35																
36	11.0															
37																
38																
39	12.0															
40																
41																
42	13.0															
43																
44																
45	14.0															
46																
47																
48																

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17

END OF BOREHOLE:

NOTE :
End of Borehole at 8.23 m bgs
Borehole was dry upon completion
Borehole backfilled with enviroplug medium to the top
bgs denotes 'below ground surface'



BOREHOLE No.: BH11-16

ELEVATION: 258.26 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian

DATE (START): 6 January 2017 DATE (FINISH): 6 January 2017

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth		Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)	Water content (%)	Atterberg limits (%)	"N" Value (blows / 12 in.-30 cm)	Field	Lab
Feet	Metres	258.26		GROUND SURFACE			%			N				10 20 30 40 50 60 70 80 90		
0						SS-1	33	9	1-3-2-2	5						
1			▨	FILL : SAND, trace silt and rootlets, dark brown, moist, loose		SS-2	67	6	2-3-4-3	7						
2	0.76	257.50				SS-3	83	9	1-1-2-1	3						
3	1.0			NATIVE: SAND, trace silt, brown, moist, loose very loose		SS-4	83	11	1-3-5-8	8						
4						SS-5	83	17	4-8-11-15	19						
5	2.0															
6				silty, loose												
7																
8				some clay and silt, trace gravel, grey, moist, very stiff												
9	3.0															
10																
11	4.0															
12																
13	4.57	253.69		SAND to SANDY SILT, trace silt, brown, damp, dense		SS-6	83	4	9-17-31-42	48						
14																
15	5.0															
16																
17	6.0			grey, moist, very dense		SS-7	75	10	9-22-36-50	58						
18																
19	7.0															
20																
21	8.0															
22	8.23	250.03				SS-8	75	4	10-39-50/76mm	89						
23																
24	9.0															
25																
26	10.0															
27																
28	11.0															
29																
30	12.0															
31																
32	13.0															
33																
34	14.0															
35																
36	14.0															
37																
38	14.0															
39																
40	14.0															
41																
42	14.0															
43																
44	14.0															
45																
46	14.0															
47																
48	14.0															

END OF BOREHOLE:

NOTE :
End of Borehole at 8.23 m bgs
Borehole was dry upon completion
Borehole backfilled with enviroplug medium to the top
bgs denotes 'below ground surface'

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH12-16
ELEVATION: 255.99 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
 Geotechnical Investigation
PROJECT: Environmental Resource Recovery Centre (ERRC)
LOCATION: 2976 Horseshoe Valley Road West, Springwater
DESCRIBED BY: O. Sabeeh **CHECKED BY:** S. Shahangian
DATE (START): 21 December 2016 **DATE (FINISH):** 21 December 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										Field	Lab	w _p	w _L	U _c	U _L	N	10	20
0	255.99		GROUND SURFACE			%			N									
1		▨	FILL : SAND, some silt, trace topsoil and rootlets, trace organics, dark brown to brown, very moist, very loose	SS-1	0	13	0-0-0-1	0	●	○								
2	0.76	▨		SS-2	50	24	1-3-5-8	8	●	○								
3	1.0	▨		SS-3	83	9	5-7-6-8	13	●	○								
4	1.52	▨	NATIVE : SANDY SILT, trace clay, dark brown, moist, loose	SS-4	83	--	10-24-33-50	57	●	○								
5	2.0	▨	SILTY SAND, trace gravel, grey, moist, compact	SS-5	78	5	8-26-40-50/125mm	66	○	○								
6	2.29	▨	SAND, trace silt, brown, damp, very dense	SS-6	92	3	13-25-22-19	47	○	○								
7			very dense	SS-7	92	1	14-30-36-50	66	○	○								
8				SS-8	92	2	9-22-35-42	57	○	○								
9	247.76		END OF BOREHOLE:															
10			NOTE : End of Borehole at 8.23 m bgs Borehole was dry upon completion bgs denotes 'below ground surface'															

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH13-16

ELEVATION: 252.15 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian

DATE (START): 3 January 2017 DATE (FINISH): 3 January 2017

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										Field	Lab	w _p	w _L	U _c	U _L	Field	Lab	
0	252.15		GROUND SURFACE						N	10	20	30	40	50	60	70	80	90
1	251.69	☒	FILL: SAND and SILT, topsoil, with rootlets, dark brown, moist, loose	☒	SS-1A	58	18	1-2-3-2	5	●	○							
2																		
3	1.0		NATIVE: SILTY SAND, trace to some clay, trace gravel, brown, moist, loose to very loose	☒	SS-2	58	6	1-3-2-1	5	●	○							
4																		
5																		
6	2.0		trace gravel, brown, moist, compact	☒	SS-3	75	8	1-2-1-1	3	●	○							
7																		
8																		
9																		
10	3.0		SAND, trace silt, trace gravel, clayey silt seam, brown, damp to moist, compact to dense	☒	SS-4	75	6	6-8-9-7	17	○	●							
11																		
12	4.0																	
13																		
14																		
15	5.0																	
16																		
17																		
18	6.0																	
19																		
20																		
21	8.0																	
22																		
23	7.0																	
24																		
25																		
26	8.0																	
27	8.23																	
28			END OF BOREHOLE:															
29			NOTE :															
30	9.0		End of Borehole at 8.23 m bgs															
31			Borehole was dry upon completion															
32			Borehole backfilled with enviroplug medium to the top															
33	10.0		bgs denotes 'below ground surface'															
34																		
35																		
36	11.0																	
37																		
38																		
39	12.0																	
40																		
41																		
42	13.0																	
43																		
44																		
45	14.0																	
46																		
47																		
48																		

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH14-16
ELEVATION: 251.83 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
 Geotechnical Investigation
PROJECT: Environmental Resource Recovery Centre (ERRC)
LOCATION: 2976 Horseshoe Valley Road West, Springwater
DESCRIBED BY: O. Sabeeh **CHECKED BY:** S. Shahangian
DATE (START): 21 December 2016 **DATE (FINISH):** 22 December 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		Field	Lab	
										w _p	w _L	U _c	U _L	N	10	20	30	40	50	60
0	251.83		GROUND SURFACE			%			N											
1	251.07	☒	FILL : SAND, trace to some silt, trace topsoil and rootlets, trace organics, dark brown to reddish brown, very moist, very loose	☒	SS-1	75	12	1-1-1-2	2	●	○									
2				☒	SS-2	92	7	2-3-3-3	6	●										
3				☒	SS-3	92	8	1-2-1-2	3	●	○									
4				☒	SS-4	83	5	2-2-3-3	5	●										
5				☒	SS-5	100	3	1-2-4-3	6	●										
6				☒	SS-6	100	11	3-6-9-17	15	●										
7				☒	SS-7	75	4	11-22-28-29	50	○										
8				☒	SS-8	100	3	11-20-29-30	49	○										
9	243.60		END OF BOREHOLE: NOTE : End of Borehole at 8.23 m bgs Borehole was dry upon completion bgs denotes 'below ground surface'																	

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH15-16
ELEVATION: 253.47 m

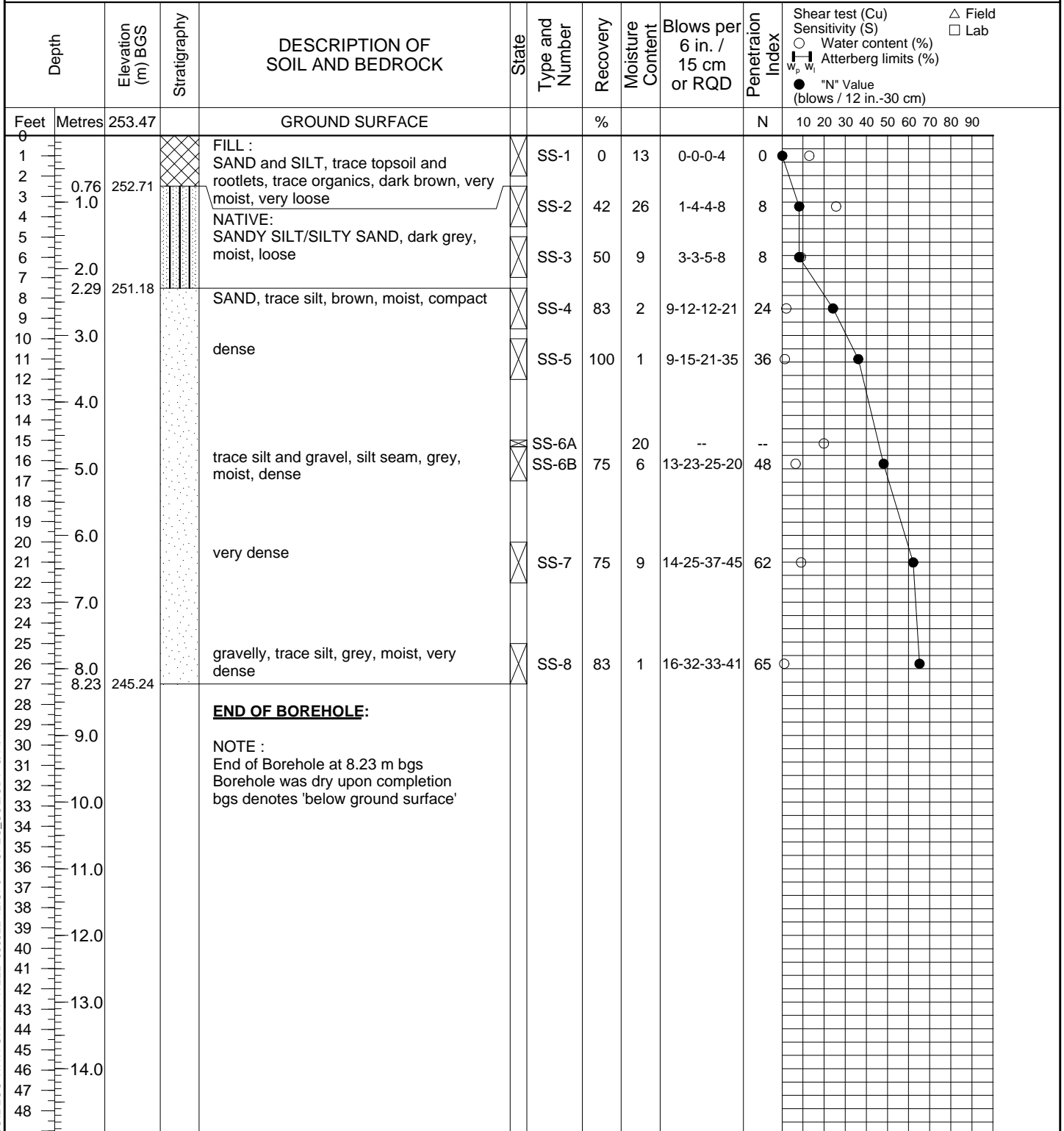
BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
 Geotechnical Investigation
PROJECT: Environmental Resource Recovery Centre (ERRC)
LOCATION: 2976 Horseshoe Valley Road West, Springwater
DESCRIBED BY: O. Sabeeh **CHECKED BY:** S. Shahangian
DATE (START): 19 December 2016 **DATE (FINISH):** 19 December 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL



SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH16-16

ELEVATION: 251.43 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian

DATE (START): 3 January 2017 DATE (FINISH): 3 January 2017

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										Field	Lab	w _p	w _L	U _c	U _L	N	Field	Lab
0	251.43		GROUND SURFACE						N									
1		▨	FILL: SAND and SILT, trace gravel, topsoil, with rootlets, dark brown to brown, moist, very loose	SS-1	33	21	1-1-1-1	2										
2	0.76			SS-2	58	12	2-2-2-4	4										
3	1.0			SS-3	42	11	1-9-9-5	18										
4			NATIVE: SAND and SILT to SANDY SILT, trace gravel, rootlets, brown, moist, very loose	SS-4	42	21	2-4-5-9	9										
5	2.0		silty clay seam, brown, moist, loose	SS-5	42	7	3-3-13-12	16										
6			compact															
7																		
8			dense	SS-6	67	14	10-17-20-36	37										
9	3.0																	
10																		
11																		
12	4.0																	
13																		
14																		
15																		
16	5.0																	
17																		
18	5.50		SAND, trace silt, silt pockets, brown, damp, dense	SS-7	83	13	7-17-27-36	44										
19	6.0																	
20																		
21																		
22	7.0																	
23																		
24																		
25																		
26	8.0		damp, very dense	SS-8	83	1	12-22-31-43	53										
27	8.23																	
28	243.20																	
29			END OF BOREHOLE:															
30	9.0		NOTE :															
31			End of Borehole at 8.23 m bgs															
32			Borehole was dry upon completion															
33	10.0		Borehole backfilled with enviroplug medium to the top															
34			bgs denotes 'below ground surface'															
35																		
36	11.0																	
37																		
38																		
39	12.0																	
40																		
41																		
42	13.0																	
43																		
44																		
45	14.0																	
46																		
47																		
48																		

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH17-16

ELEVATION: 252.81 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian

DATE (START): 4 January 2017 DATE (FINISH): 4 January 2017

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										Field	Lab	w _p	w _L	U _c	U _L	N	Penetration Index	
0	252.81		GROUND SURFACE						N									
1		▨	FILL: SAND, trace silt, topsoil, with rootlets, dark brown to brown, moist, very loose	SS-1	67	7	1-2-1-2	3										
2	0.76		NATIVE: SAND, trace silt, brown, damp, loose	SS-2	75	7	2-2-2-3	4										
3	1.0		sandy silt, with rootlets, grey	SS-3	75	13	2-2-4-4	6										
4				SS-4	67	17	2-6-6-9	12										
5	2.0		SANDY CLAYEY SILT, grey, moist, stiff	SS-5	79	26	5-7-9-13	16										
6	2.29			SS-6	25	5	6-50/203mm	50										
7	2.52		SILT CLAY, some sand, trace gravel, grey, very moist, very stiff	SS-7	67	18	5-22-45-50/127mm	58										
8	2.76			SS-8	83	2	8-21-19-33	40										
9	3.0		SANDY SILT, trace gravel, grey, moist, very dense															
10	3.05																	
11	3.96																	
12	4.0																	
13																		
14																		
15	5.0																	
16																		
17	6.0																	
18	6.25																	
19																		
20																		
21																		
22																		
23	7.0																	
24																		
25																		
26	8.0																	
27	8.23																	
28			END OF BOREHOLE:															
29			NOTE :															
30			End of Borehole at 8.23 m bgs															
31			Borehole was damp upon completion															
32			Borehole backfilled with enviroplug															
33			medium to the top															
34			bgs denotes 'below ground surface'															
35	10.0																	
36																		
37																		
38																		
39	12.0																	
40																		
41																		
42																		
43	13.0																	
44																		
45																		
46	14.0																	
47																		
48																		

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH18-16
ELEVATION: 252.26 m

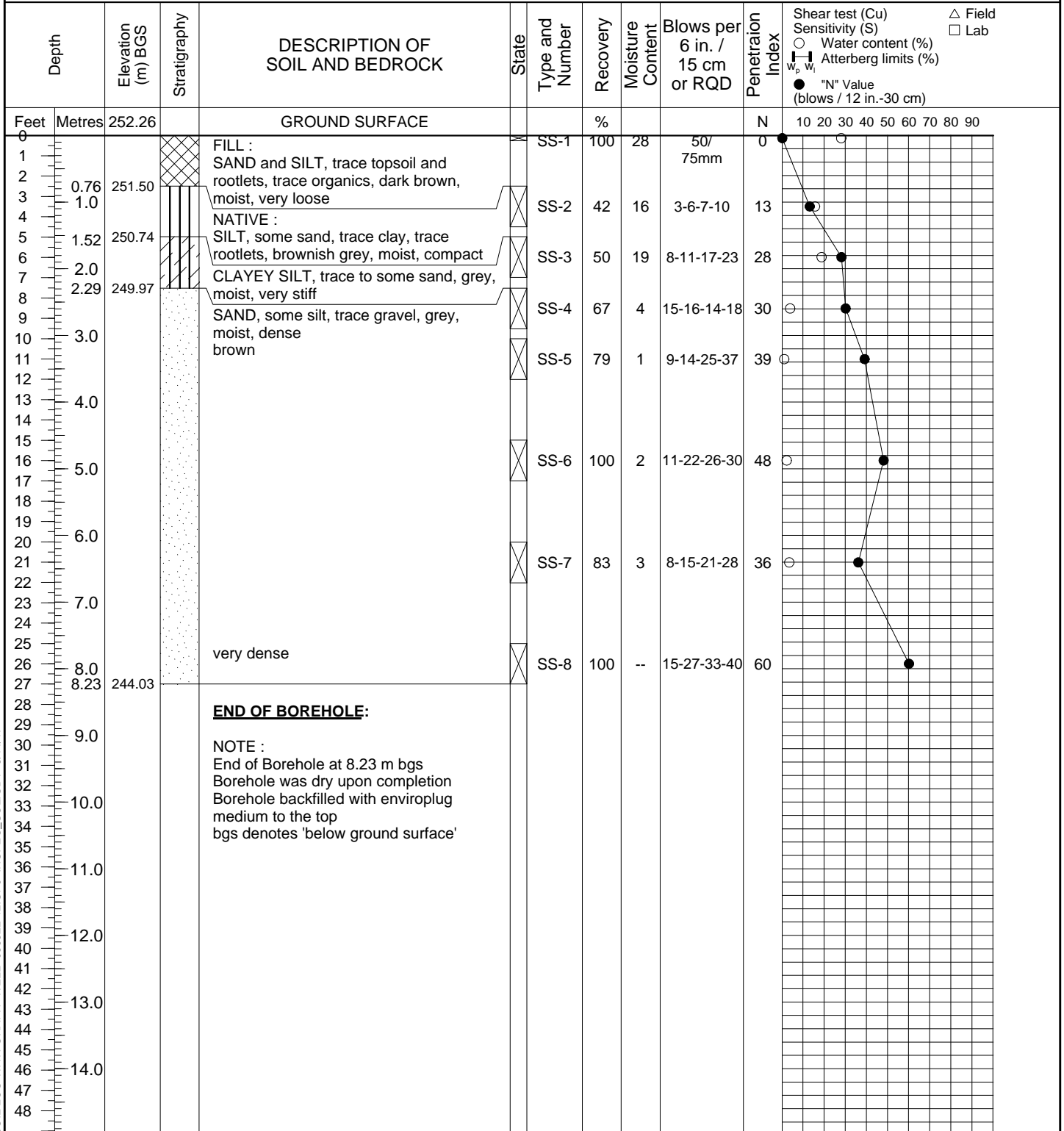
BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
 Geotechnical Investigation
PROJECT: Environmental Resource Recovery Centre (ERRC)
LOCATION: 2976 Horseshoe Valley Road West, Springwater
DESCRIBED BY: O. Sabeeh **CHECKED BY:** S. Shahangian
DATE (START): 19 December 2016 **DATE (FINISH):** 19 December 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL



SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17

NOTE :
 End of Borehole at 8.23 m bgs
 Borehole was dry upon completion
 Borehole backfilled with enviroplug medium to the top
 bgs denotes 'below ground surface'



BOREHOLE No.: BH19-16
ELEVATION: 249.99 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
 Geotechnical Investigation
PROJECT: Environmental Resource Recovery Centre (ERRC)
LOCATION: 2976 Horseshoe Valley Road West, Springwater
DESCRIBED BY: O. Sabeeh **CHECKED BY:** S. Shahangian
DATE (START): 3 January 2017 **DATE (FINISH):** 3 January 2017

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth		Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)	Water content (%)	Atterberg limits (%)	"N" Value (blows / 12 in.-30 cm)	Field	Lab	
Feet	Metres						%			N		w _p , w _L					
0		249.99		GROUND SURFACE						N				10 20 30 40 50 60 70 80 90			
1				FILL: SAND and SILT, topsoil, with rootlets, dark brown, moist, very loose	☒	SS-1	75	19	1-2-1-2	3							
2	0.76	249.23		NATIVE: SILTY CLAY to CLAYEY SILT, trace gravel, trace sand, grey, moist, very stiff	☒	SS-2	33	25	24-15-5-6	20							
3	1.0				☒	SS-3	33	7	9-8-8-6	16							
4	1.52	248.47			☒	SS-4	67	7	8-11-13-16	24							
5				SANDY SILT to SILTY SAND, trace gravel, brown, moist, compact	☒	SS-5	83	7	7-14-13-15	27							
6	2.0				☒	SS-6	96	1	22-27-41-40	68							
7				SAND, trace silt, brown, damp, very dense													
8		246.03															
9	3.0																
10																	
11	3.96																
12	4.0	246.03															
13																	
14																	
15	5.0																
16	5.18	244.81															
17				END OF BOREHOLE:													
18																	
19	6.0																
20				NOTE :													
21				End of Borehole at 5.18 m bgs													
22				Borehole was dry upon completion													
23				Borehole backfilled with enviroplug medium to the top													
24	7.0			bgs denotes 'below ground surface'													
25																	
26	8.0																
27																	
28																	
29	9.0																
30																	
31																	
32																	
33	10.0																
34																	
35																	
36	11.0																
37																	
38																	
39	12.0																
40																	
41																	
42	13.0																
43																	
44																	
45	14.0																
46																	
47																	
48																	

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH20-16

ELEVATION: 253.23 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian

DATE (START): 4 January 2017 DATE (FINISH): 4 January 2017

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)			
										Field	Lab	w _p	w _L	U _c	U _L	N	Field	Lab	
0	253.23		GROUND SURFACE						N										
1		▨	FILL: SAND, trace silt, trace topsoil with rootlets, dark brown to brown, moist, very loose		SS-1	83	5	1-1-1-1	2										
2	0.76		NATIVE: SAND, trace silt, dark brown to brown, damp to moist, very loose		SS-2	58	7	1-2-1-2	3										
3	1.0				SS-3	75	7	1-1-3-2	4										
4	2.0				SS-4	67	26	2-3-3-5	6										
5	2.29	▨	CLAYEY SILT to SILTY CLAY, trace sand, trace rootlets, grey, moist, firm		SS-5	75	33	3-3-5-6	8										
6	2.50		SANDY SILT, trace to some gravel, grey, moist, very dense		SS-6	67	7	11-25-28-30	53										
7	2.79																		
8	2.96																		
9	3.0																		
10	3.96																		
11	4.0																		
12	4.0																		
13	4.0																		
14	4.0																		
15	5.0																		
16	5.18																		
17	5.18																		
18			END OF BOREHOLE:																
19			NOTE :																
20	6.0		End of Borehole at 5.18 m bgs																
21			Borehole was dry upon completion																
22			Borehole backfilled with enviroplug medium to the top																
23	7.0		bgs denotes 'below ground surface'																
24																			
25																			
26	8.0																		
27																			
28																			
29	9.0																		
30																			
31																			
32																			
33	10.0																		
34																			
35																			
36	11.0																		
37																			
38																			
39	12.0																		
40																			
41																			
42																			
43	13.0																		
44																			
45																			
46	14.0																		
47																			
48																			

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH21-16
ELEVATION: 249.75 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe
 Geotechnical Investigation
PROJECT: Environmental Resource Recovery Centre (ERRC)
LOCATION: 2976 Horseshoe Valley Road West, Springwater
DESCRIBED BY: O. Sabeeh **CHECKED BY:** S. Shahangian
DATE (START): 22 December 2016 **DATE (FINISH):** 22 December 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
										△ Field	□ Lab	w _p	w _L	U _c	U _L	N	10	20
0	249.75		GROUND SURFACE			%			N									
1		▨	FILL : SAND, trace to some silt, trace topsoil and rootlets, trace organics, dark brown to brown, moist, very loose	▨	SS-1	83	7	1-2-1-1	3	●	○							
2		▨	trace rootlets, dark brown, very moist	▨	SS-2	75	9	1-1-1-1	2	●	○							
3	1.0																	
4	1.52	▨	POSSIBLE NATIVE: SANDY SILT/SILTY SAND, trace gravel, trace rootlets, dark brown, moist, loose	▨	SS-3	50	13	1-2-4-4	6	●	○							
5	2.0																	
6	2.29	▨	NATIVE : SAND, trace silt, brown, damp, compact dense	▨	SS-4	83	3	2-3-7-10	10	●	○							
7																		
8																		
9																		
10	3.0																	
11																		
12	4.0																	
13																		
14																		
15																		
16	5.0																	
17	5.18	▨	END OF BOREHOLE:		SS-6	100	7	8-13-17-19	30	●	○							
18																		
19	6.0																	
20			NOTE :															
21			End of Borehole at 5.18 m bgs															
22			Borehole was dry upon completion															
23	7.0		Borehole backfilled with enviroplug medium to the top															
24			bgs denotes 'below ground surface'															
25																		
26	8.0																	
27																		
28																		
29	9.0																	
30																		
31																		
32	10.0																	
33																		
34																		
35	11.0																	
36																		
37																		
38	12.0																	
39																		
40																		
41	13.0																	
42																		
43																		
44	14.0																	
45																		
46																		
47																		
48																		

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: BH22-16

ELEVATION: 244.89 m

BOREHOLE REPORT

Page: 1 of 1

CLIENT: County of Simcoe

Geotechnical Investigation

PROJECT: Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian

DATE (START): 4 January 2017 DATE (FINISH): 4 January 2017

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ☐ GS - GRAB SAMPLE
- ▬ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth		Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)	Water content (%)	Atterberg limits (%)	"N" Value (blows / 12 in.-30 cm)	Field	Lab
Feet	Metres	244.89		GROUND SURFACE			%			N				10 20 30 40 50 60 70 80 90		
0						SS-1	58	7	4-5-4-4	9						
1				FILL: SAND and GRAVEL, trace to some silt, dark brown to brown, moist, loose		SS-2	83	6	3-3-4-5	7						
2	0.76	244.13		NATIVE: SAND, trace silt, brown, moist, loose		SS-3	100	3	2-10-12-15	22						
3	1.0					SS-4	100	7	5-12-16-22	28						
4						SS-5	100	5	16-22-28-30	50						
5	2.0			some silt to silts, trace gravel, brown, moist, very dense		SS-6	100	7	11-22-35-36	57						
6																
7																
8																
9																
10	3.0															
11																
12	4.0															
13																
14																
15																
16	5.0															
17	5.18	239.71		END OF BOREHOLE:												
18																
19	6.0															
20																
21																
22																
23	7.0															
24																
25																
26	8.0															
27																
28																
29	9.0															
30																
31																
32																
33	10.0															
34																
35																
36	11.0															
37																
38																
39	12.0															
40																
41																
42																
43	13.0															
44																
45																
46	14.0															
47																
48																

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ INSPEC_SOL.GDT 8/11/17



BOREHOLE No.: MW01-16

ELEVATION: 259.10 m

BOREHOLE REPORT

Page: 1 of 3

CLIENT: County of Simcoe
 PROJECT: Preliminary Geotechnical Investigation - Environmental Resource Recovery Centre (ERRC)
 LOCATION: 2976 Horseshoe Valley Road West, Springwater
 DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis
 DATE (START): 2 August 2016 DATE (FINISH): 4 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ▭ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m)		Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery TCR	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index / SCR	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		Field
	Feet	Metres									W _p	W _L	U _c	U _L	10	20	30	40	50
		259.10		GROUND SURFACE			%			N									
1	0.03	259.07		TOPSOIL with organics : 25 mm	SS-1	62	6	1-2-2-3	4	●									0.31 m
2				NATIVE : SAND, some silt, trace gravel, rootlets, light reddish brown, dry to damp, loose	SS-2	21	10	1-2-4-5	6	●									
3	1.0			compact	SS-3	46	6	5-6-5-5	11	●									
4					SS-4	79	13	2-3-4-3	7	●									
5	2.0			fine grained, grey, loose	SS-5	100	4	9-12-16-18	28	○									
6				some silt, trace to some gravel, moist, compact	SS-6	92	5	3-16-22-23	38	○									
7	3.0			becoming dense	SS-7	96	4	14-21-35-43	56	○									
8				very dense	SS-8	100	3	19-34-39-44	73	○									
9	4.0			thin dark bands, layered	SS-9	92	2	14-28-44-50/75mm	72	○									
10					SS-10	87	3	18-35-50/125mm	100	○									
11	5.0				SS-11	83	6	14-33-50/125mm	100	○									
12					SS-12	75	7	15-40-50/125mm	100	○									
13	6.0																		
14																			
15	7.0																		
16																			
17	8.0																		
18																			
19	9.0																		
20																			
21	10.0																		
22																			
23	11.0																		
24																			
25	12.0																		
26																			
27	13.0																		
28																			
29	14.0																		
30																			
31	15.0																		
32																			
33	16.0																		
34																			
35	17.0																		
36																			
37	18.0																		
38																			
39	19.0																		
40																			
41	20.0																		
42																			
43	21.0																		
44																			
45	22.0																		
46																			
47	23.0																		
48																			

SOIL LOG WITH GRAPH+WELL_086822.GPJ INSPEC_SOL.GDT 14/9/16



BOREHOLE No.: MW01-16

ELEVATION: 259.10 m

BOREHOLE REPORT

Page: 2 of 3

CLIENT: County of Simcoe

PROJECT: Preliminary Geotechnical Investigation - Environmental Resource Recovery Centre (ERRC)

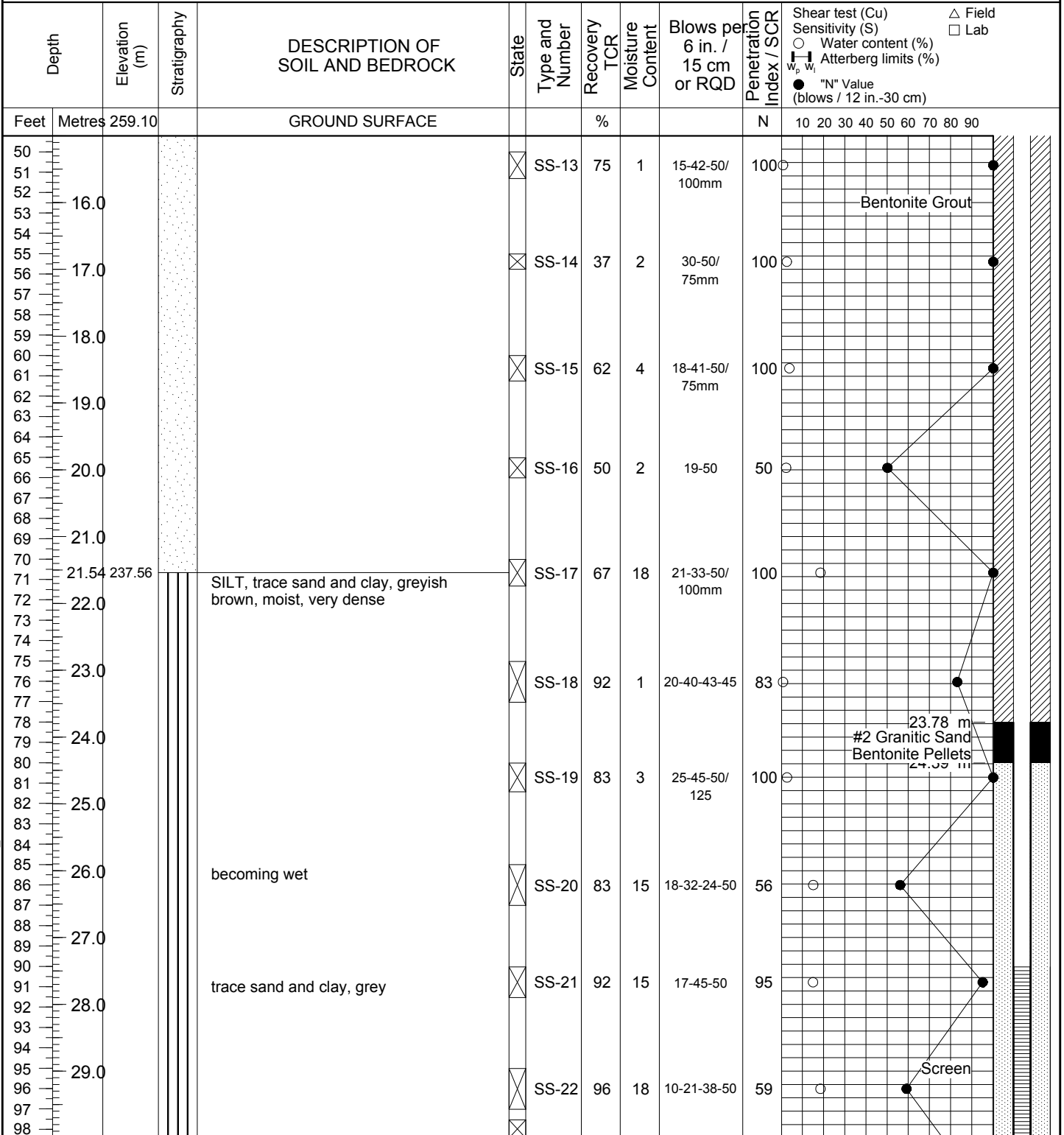
LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 2 August 2016 DATE (FINISH): 4 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ▮ RC - ROCK CORE
- ▼ - WATER LEVEL



SOIL LOG WITH GRAPH+WELL_086822.GPJ INSPEC_SOL.GDT 14/9/16

Bentonite Grout

23.78 m
#2 Granitic Sand
Bentonite Pellets

Screen



BOREHOLE No.: MW01-16

ELEVATION: 259.10 m

BOREHOLE REPORT

Page: 3 of 3

CLIENT: County of Simcoe
 PROJECT: Preliminary Geotechnical Investigation - Environmental Resource Recovery Centre (ERRC)
 LOCATION: 2976 Horseshoe Valley Road West, Springwater
 DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis
 DATE (START): 2 August 2016 DATE (FINISH): 4 August 2016

LEGEND

- SS - SPLIT SPOON
- ST - SHELBY TUBE
- RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m)		Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery TCR	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index / SCR	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		
	Feet	Metres									Field	Lab	w _p	w _L	U _c	U _L	U ₁₀	U ₂₀	
		259.10		GROUND SURFACE			%			N									
99						SS-23	100	15	13-27-50-0	77									
100	30.49	228.61																	
101				END OF BOREHOLE:															
102	31.0			NOTE :															
103				End of Borehole at 30.18 m bgs															
104				Borehole was dry upon completion															
105	32.0			50 mm diameter monitoring well installed															
106				at 30.49 m bgs															
107				bgs denotes 'below ground surface'															
108	33.0																		
109																			
110																			
111	34.0																		
112																			
113																			
114	35.0																		
115																			
116	36.0																		
117																			
118	37.0																		
119																			
120	38.0																		
121																			
122	39.0																		
123																			
124	40.0																		
125																			
126	41.0																		
127																			
128	42.0																		
129																			
130	43.0																		
131																			
132	44.0																		
133																			
134	45.0																		
135																			
136	46.0																		
137																			
138	47.0																		
139																			
140	48.0																		
141																			
142	49.0																		
143																			
144	50.0																		
145																			
146	51.0																		
147																			

SOIL LOG WITH GRAPH+WELL_086822.GPJ INSPEC_SOL.GDT 14/9/16



BOREHOLE No.: MW02-16

ELEVATION: 252.45 m

BOREHOLE REPORT

Page: 1 of 2

CLIENT: County of Simcoe

PROJECT: Preliminary Geotechnical Investigation - Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 9 August 2016 DATE (FINISH): 9 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ▭ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m)		Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery TCR	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index / SCR	Shear test (Cu) Sensitivity (S)		△
	Feet	Metres									W _p	W _L	Field
GROUND SURFACE													
1	0.04	252.41		TOPSOIL with organics : 35 mm		SS-1	50	5	1-3-3-4	6	●	○	0.31 m
2				NATIVE : SAND, some silt, trace clay and gravel, rootlets, brown, moist, loose compact		SS-2	50	7	3-5-7-9	12	○	○	
3	1.0												
4		250.93		SAND and SILT, trace clay and gravel, grey, moist, compact		SS-3	50	9	6-11-15-14	26	○	○	
5	1.52			becoming loose		SS-4	100	4	5-3-4-11	7	○	○	
6	2.0												
7		249.40		SAND, some silt to silty, brown, dry to damp, compact		SS-5	83	1	6-13-11-14	24	○	○	
8	3.0												
9	3.05												
10	4.0												
11		247.88		becoming dense		SS-6	100	6	10-17-24-32	41	○	○	
12	4.57												
13	5.0												
14													
15	6.0												
16		244.83		very dense		SS-8	100	2	16-35-40-50	75	○	○	Bentonite Grout
17	7.62												
18	8.0												
19													
20	9.0			coarse sand, very dense		SS-9	100	2	12-27-30-36	57	○	○	
21													
22	10.0												
23													
24	11.0			fine sand		SS-10	100	3	14-23-33-38	56	○	○	
25													
26	12.0			layered/varved		SS-11	92	3	19-36-42-45	78	○	○	
27													
28	13.0												
29													
30	14.0					SS-12	100	3	13-26-38-41	64	○	○	
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													

SOIL LOG WITH GRAPH+WELL_086822.GPJ INSPEC_SOL.GDT 14/9/16



BOREHOLE No.: MW02-16

ELEVATION: 252.45 m

BOREHOLE REPORT

Page: 2 of 2

CLIENT: County of Simcoe
 Preliminary Geotechnical Investigation - Environmental Resource
 PROJECT: Recovery Centre (ERRC)
 LOCATION: 2976 Horseshoe Valley Road West, Springwater
 DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis
 DATE (START): 9 August 2016 DATE (FINISH): 9 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ▮ RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m)		Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery TCR	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index / SCR	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)	△ Field	□ Lab	
	Feet	Metres									252.45	%	%	N	10	20		30	40	50
				GROUND SURFACE																
50																				
51																				
52		16.0																		
53																				
54																				
55		16.92																		
56		17.0		SILTY SAND TILL, gravelly, brown, moist, very dense		SS-13	79	9	15-39-50/75mm	100										
57		235.53																		
58																				
59		18.0																		
60																				
61		18.60		SILTY SAND, trace clay and gravel, brown, wet, very dense sand heaving observed		SS-14	92	8	25-36-50	86										
62		19.0																		
63																				
64																				
65		19.82		SAND, trace silt, brown, wet, very dense		SS-15	100	10	8-28-34-50	62										
66		20.0																		
67																				
68																				
69		21.0																		
70																				
71		21.65		BOULDER/COBBLES, very dense		SS-16	100	15	22-50/50mm	100										
72		21.95																		
73		230.80																		
74		230.50																		
75				END OF BOREHOLE:																
76		23.0		NOTE :																
77				End of Borehole at 21.95 m bgs																
78				Groundwater measured at 17.38 m bgs upon completion																
79		24.0		50 mm diameter monitoring well installed at 21.34 m bgs																
80				Sand heaving encountered at 18.60 m bgs																
81				bgs denotes 'below ground surface'																
82		25.0																		
83																				
84																				
85		26.0																		
86																				
87																				
88		27.0																		
89																				
90																				
91		28.0																		
92																				
93																				
94		29.0																		
95																				
96																				
97																				
98																				

SOIL LOG WITH GRAPH+WELL_086822.GPJ INSPEC_SOL.GDT 14/9/16



BOREHOLE No.: MW03-16

ELEVATION: 246.14 m

BOREHOLE REPORT

Page: 1 of 2

CLIENT: County of Simcoe

PROJECT: Preliminary Geotechnical Investigation - Environmental Resource Recovery Centre (ERRC)

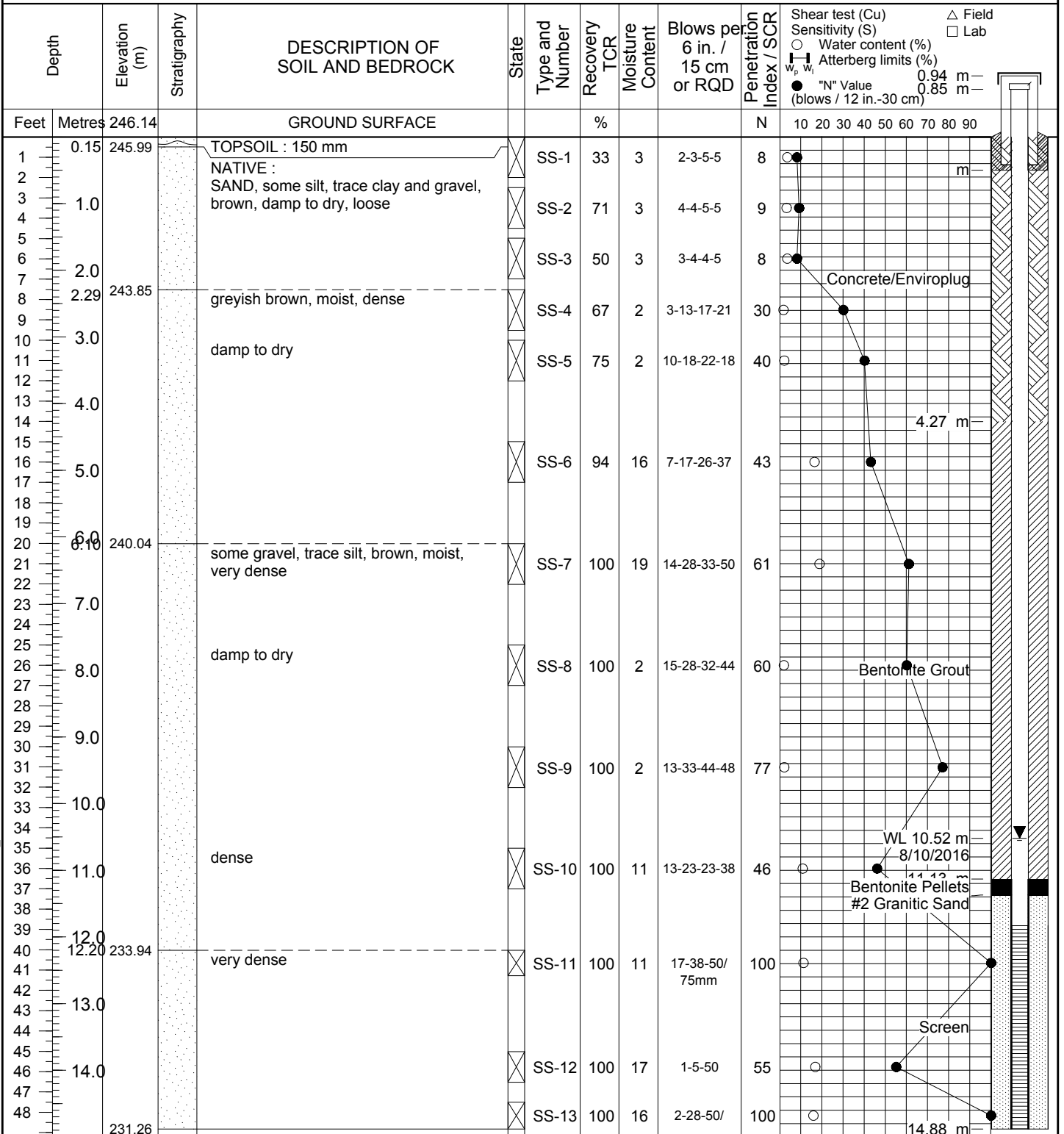
LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 10 August 2016 DATE (FINISH): 10 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ▭ RC - ROCK CORE
- ▼ - WATER LEVEL



SOIL LOG WITH GRAPH+WELL_086822.GPJ INSPEC_SOL.GDT 14/9/16



BOREHOLE No.: MW03-16

ELEVATION: 246.14 m

BOREHOLE REPORT

Page: 2 of 2

CLIENT: County of Simcoe

PROJECT: Preliminary Geotechnical Investigation - Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: S. Andreou CHECKED BY: F. Gergis

DATE (START): 10 August 2016 DATE (FINISH): 10 August 2016

LEGEND

- SS - SPLIT SPOON
- ST - SHELBY TUBE
- RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery TCR	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index / SCR	Shear test (Cu) Sensitivity (S)										
										○ Water content (%) ▭ Atterberg limits (%) ● "N" Value (blows / 12 in.-30 cm) △ Field □ Lab										
Feet	Metres 246.14		GROUND SURFACE			%			N	10	20	30	40	50	60	70	80	90		
50	14.88		END OF BOREHOLE:					100mm												
51			NOTE :																	
52			End of Borehole at 14.88 m bgs																	
53	16.0		Groundwater measured at 10.52 m bgs upon completion																	
54			50 mm diameter monitoring well installed at 14.88 m bgs																	
55			bgs denotes 'below ground surface'																	
56	17.0																			
57																				
58																				
59	18.0																			
60																				
61																				
62	19.0																			
63																				
64																				
65	20.0																			
66																				
67																				
68	21.0																			
69																				
70																				
71	22.0																			
72																				
73																				
74	23.0																			
75																				
76																				
77	24.0																			
78																				
79																				
80	25.0																			
81																				
82																				
83	26.0																			
84																				
85																				
86	27.0																			
87																				
88																				
89	28.0																			
90																				
91																				
92	29.0																			
93																				
94																				
95																				
96																				
97																				
98																				

SOIL LOG WITH GRAPH+WELL_086822.GPJ INSPEC_SOL.GDT 14/9/16



BOREHOLE No.: MW04-16

ELEVATION: 242.86 m

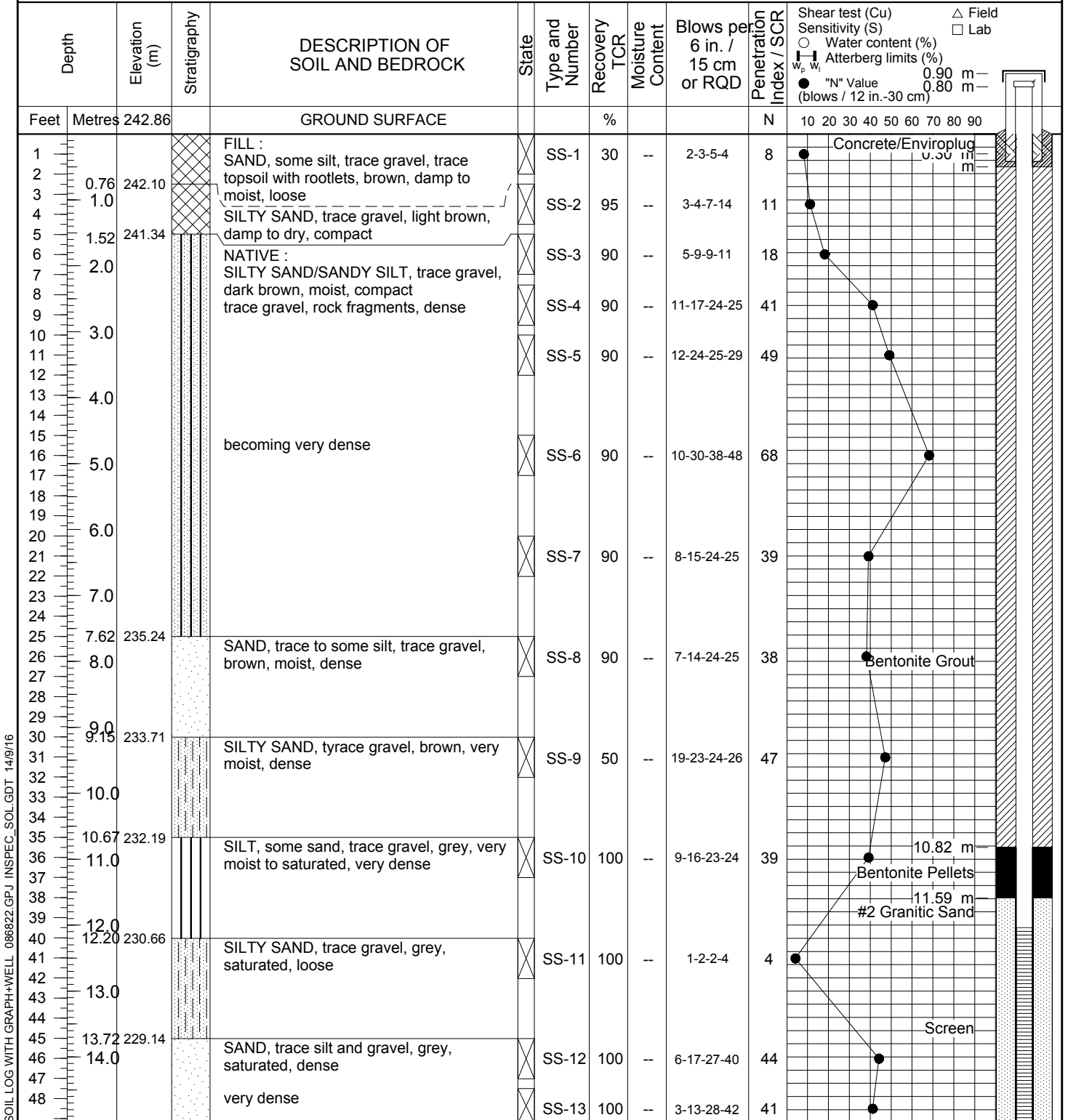
BOREHOLE REPORT

Page: 1 of 2

CLIENT: County of Simcoe
 Preliminary Geotechnical Investigation - Environmental Resource
 PROJECT: Recovery Centre (ERRC)
 LOCATION: 2976 Horseshoe Valley Road West, Springwater
 DESCRIBED BY: O. Sabeeh CHECKED BY: F. Gergis
 DATE (START): 11 August 2016 DATE (FINISH): 11 August 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ▭ RC - ROCK CORE
- ▼ - WATER LEVEL



SOIL LOG WITH GRAPH+WELL_086822.GPJ INSPEC_SOL.GDT 14/9/16



BOREHOLE No.: MW04-16

ELEVATION: 242.86 m

BOREHOLE REPORT

Page: 2 of 2

CLIENT: County of Simcoe

PROJECT: Preliminary Geotechnical Investigation - Environmental Resource Recovery Centre (ERRC)

LOCATION: 2976 Horseshoe Valley Road West, Springwater

DESCRIBED BY: O. Sabeeh CHECKED BY: F. Gergis

DATE (START): 11 August 2016 DATE (FINISH): 11 August 2016

LEGEND

- SS - SPLIT SPOON
- ST - SHELBY TUBE
- RC - ROCK CORE
- ▼ - WATER LEVEL

Depth	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery TCR	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index / SCR	Shear test (Cu) Sensitivity (S)		Water content (%)		Atterberg limits (%)		"N" Value (blows / 12 in.-30 cm)		Field	Lab		
										w _p	w _L	U _c	U _L	10	20	30	40	50	60	70	80
Feet	Metres	242.86	GROUND SURFACE			%			N												
50	15.09	227.77	<p>END OF BOREHOLE:</p> <p>NOTE :</p> <p>End of Borehole at 15.09 m bgs</p> <p>Borehole dry upon completion</p> <p>50 mm diameter monitoring well installed at 15.09 m bgs</p> <p>bgs denotes 'below ground surface'</p>																		
51																					
52																					
53	16.0																				
54																					
55																					
56	17.0																				
57																					
58																					
59	18.0																				
60																					
61																					
62	19.0																				
63																					
64																					
65	20.0																				
66																					
67																					
68	21.0																				
69																					
70																					
71	22.0																				
72																					
73																					
74	23.0																				
75																					
76																					
77	24.0																				
78																					
79																					
80	25.0																				
81																					
82																					
83	26.0																				
84																					
85																					
86	27.0																				
87																					
88																					
89	28.0																				
90																					
91																					
92	29.0																				
93																					
94																					
95																					
96																					
97																					
98																					

SOIL LOG WITH GRAPH+WELL_086822.GPJ INSPEC_SOL.GDT 14/9/16



BOREHOLE No.: MW15-16

ELEVATION: 247.33 m

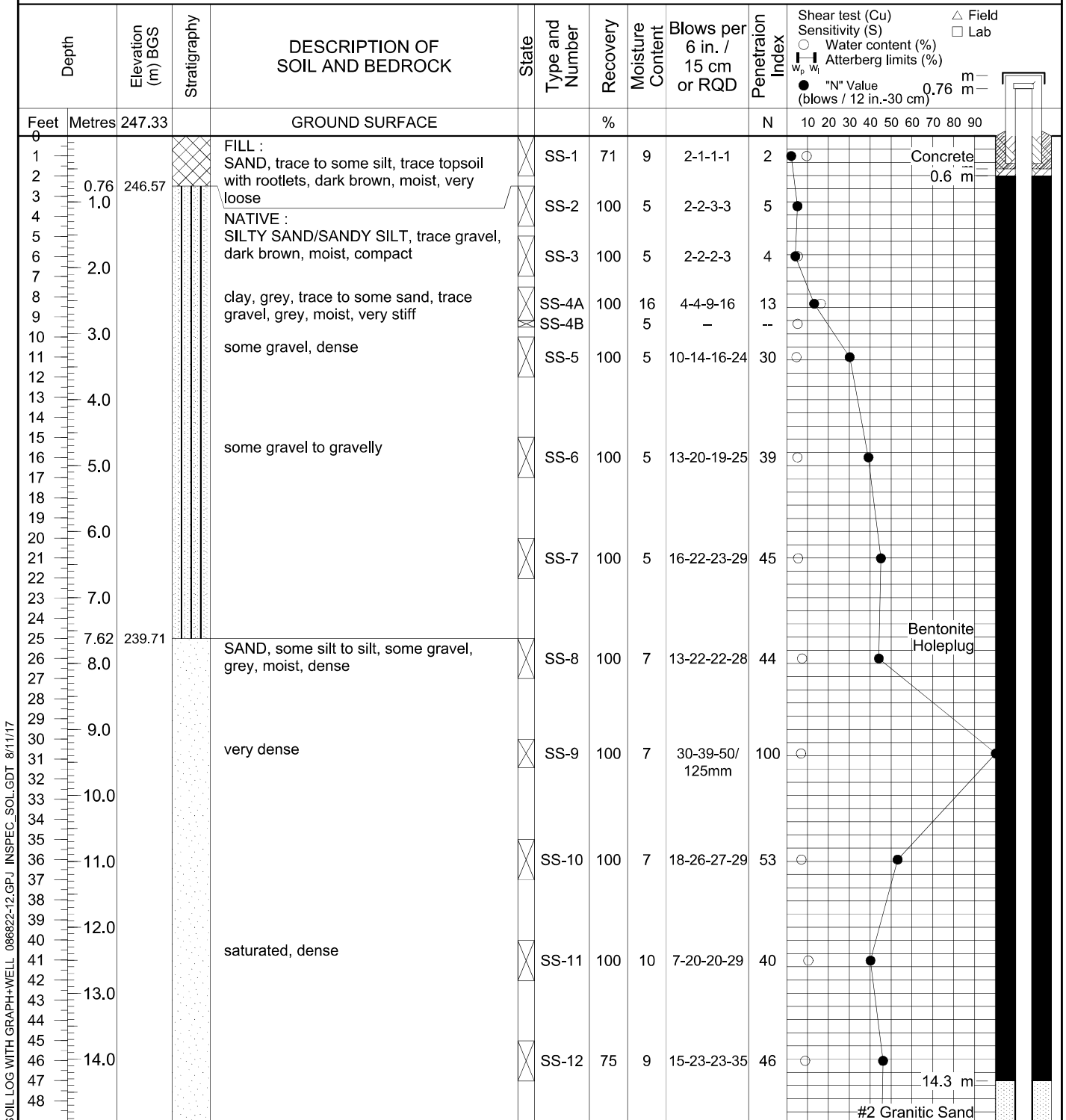
BOREHOLE REPORT

Page: 1 of 2

CLIENT: County of Simcoe
 Geotechnical Investigation
 PROJECT: Environmental Resource Recovery Centre (ERRC)
 LOCATION: 2976 Horseshoe Valley Road West, Springwater
 DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian
 DATE (START): 22 December 2016 DATE (FINISH): 23 December 2016

LEGEND

- ☒ SS - SPLIT SPOON
- ▨ ST - SHELBY TUBE
- ▨ GS - GRAB SAMPLE
- ▨ RC - ROCK CORE
- ▼ - WATER LEVEL



SOIL LOG WITH GRAPH+WELL_086822-12.GPJ_INSPEC_SOL_GDT_8/11/17

Concrete 0.6 m

Bentonite Holeplug

14.3 m

#2 Granitic Sand



BOREHOLE No.: MW15-16

ELEVATION: 247.33 m

BOREHOLE REPORT

Page: 2 of 2

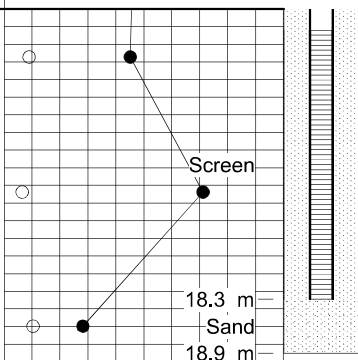
CLIENT: County of Simcoe
 Geotechnical Investigation
 PROJECT: Environmental Resource Recovery Centre (ERRC)
 LOCATION: 2976 Horseshoe Valley Road West, Springwater
 DESCRIBED BY: O. Sabeeh CHECKED BY: S. Shahangian
 DATE (START): 22 December 2016 DATE (FINISH): 23 December 2016

LEGEND

- SS - SPLIT SPOON
- ST - SHELBY TUBE
- GS - GRAB SAMPLE
- RC - ROCK CORE
- WATER LEVEL

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State Type and Number	Recovery	Moisture Content	Blows per 6 in. / 15 cm or RQD	Penetration Index	Shear test (Cu) Sensitivity (S)		△ Field							
									W _c	W _L	□ Lab							
Feet	Metres	247.33	GROUND SURFACE		%			N	10	20	30	40	50	60	70	80	90	
50			dense	SS-13	100	9	15-24-21-29	45										
51																		
52	16.0																	
53																		
54																		
55			very dense	SS-14	50	6	10-26-45-43	71										
56	17.0																	
57																		
58																		
59	18.0																	
60	18.29	229.04																
61			SILTY SAND, some gravel, grey, saturated, compact	SS-15	100	10	13-12-16-20	28										
62	18.90	228.43																
63	19.0																	
64			END OF BOREHOLE:															
65			NOTE :															
66	20.0		End of Borehole at 18.90 m bgs															
67			Waterlevel at 16.6 m bgs upon completion															
68			50 mm diameter monitoring well installed at 18.29 m bgs															
69	21.0		Water level at 11.8 m bgs after well installation															
70			bgs denotes 'below ground surface'															
71																		
72	22.0																	
73																		
74																		
75	23.0																	
76																		
77																		
78	24.0																	
79																		
80																		
81	25.0																	
82																		
83																		
84	26.0																	
85																		
86																		
87	27.0																	
88																		
89																		
90	28.0																	
91																		
92																		
93	29.0																	
94																		
95																		
96																		
97																		
98																		

SOIL LOG WITH GRAPH+WELL_086822-12.GPJ_INSPEC_SOL_GDT_8/11/17



Appendix B.2 Grain Size Distribution Test Results



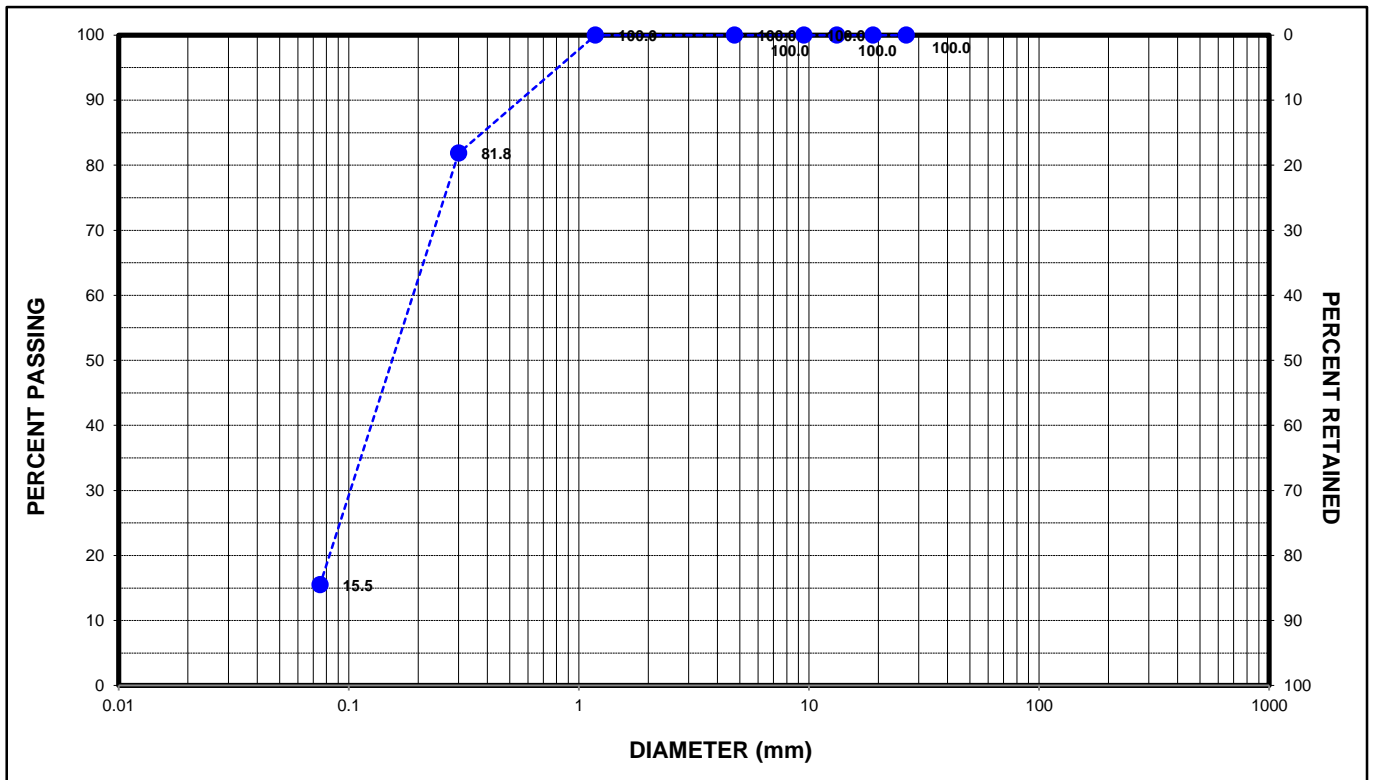
GRANULAR A - SIEVE ANALYSIS (PIT) (LS-602)

Client: _____	Lab no.: _____	G1310
Project/Site: <u>Proposed Organics Processing and Material Management</u>	Project no.: _____	086822

Source: BH1-16 SS2

Sampled by: _____ Date sampled: August 11, 2016

Sieve Size (mm)	Sample % Passing	OPSS 1010 Gradation Specification	
		Minimum %	Maximum %
26.5	100.0	100	-
19.0	100.0	85	100
13.2	100.0	65	90
9.50	100.0	50	73
4.75	100.0	35	55
1.180	100.0	15	40
0.300	81.8	5	22
0.075	15.5	2	8



Remarks: Gravel 0%, Sand 84% , Silt 16% (Sand, Some Silt)

Performed by: <u>Riddhee Panchal</u>	Date: <u>August 23, 2016</u>
Verified by: <u>Raj Kadia, C.E.T.</u>	Date: _____



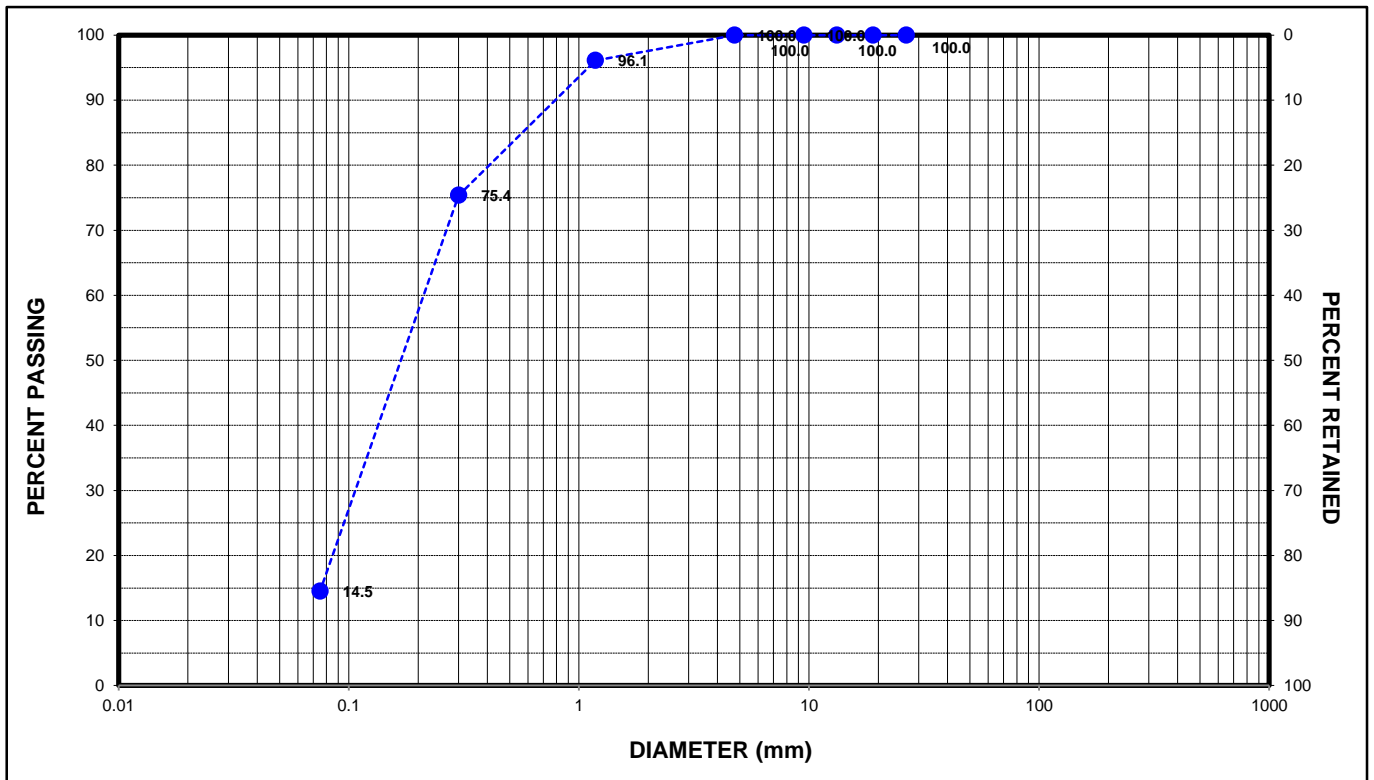
GRANULAR A - SIEVE ANALYSIS (PIT) (LS-602)

Client: _____	Lab no.: <u>G1310</u>
Project/Site: <u>Proposed Organics Processing and Material Management</u>	Project no.: <u>086822</u>

Source: BH4-16 SS2

Sampled by: _____ Date sampled: August 11, 2016

Sieve Size (mm)	Sample % Passing	OPSS 1010 Gradation Specification	
		Minimum %	Maximum %
26.5	100.0	100	-
19.0	100.0	85	100
13.2	100.0	65	90
9.50	100.0	50	73
4.75	100.0	35	55
1.180	96.1	15	40
0.300	75.4	5	22
0.075	14.5	2	8



Remarks: Gravel 0%, Sand 85% , Silt 15% (Sand, Some Silt)

Performed by: <u>Riddhee Panchal</u>	Date: <u>August 23, 2016</u>
Verified by: <u>Raj Kadia, C.E.T.</u>	Date: _____



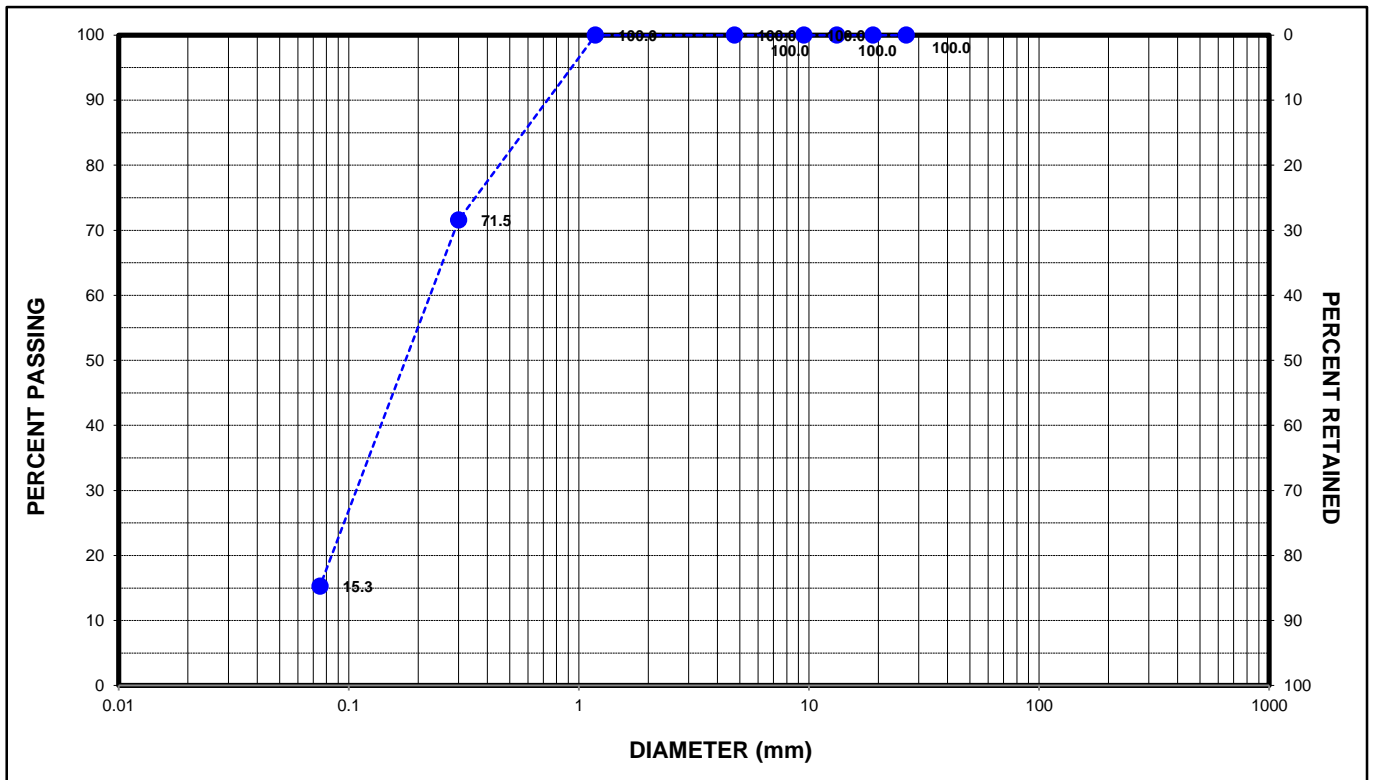
GRANULAR A - SIEVE ANALYSIS (PIT) (LS-602)

Client: _____	Lab no.: _____	G1310
Project/Site: <u>Proposed Organics Processing and Material Management</u>	Project no.: _____	086822

Source: BH7-16 SS2

Sampled by: _____ Date sampled: August 11, 2016

Sieve Size (mm)	Sample % Passing	OPSS 1010 Gradation Specification	
		Minimum %	Maximum %
26.5	100.0	100	-
19.0	100.0	85	100
13.2	100.0	65	90
9.50	100.0	50	73
4.75	100.0	35	55
1.180	100.0	15	40
0.300	71.5	5	22
0.075	15.3	2	8



Remarks: Gravel 0%, Sand 85% , Silt 15% (Sand, Some Silt)

Performed by: <u>Riddhee Panchal</u>	Date: <u>August 23, 2016</u>
Verified by: <u>Raj Kadia, C.E.T.</u>	Date: _____



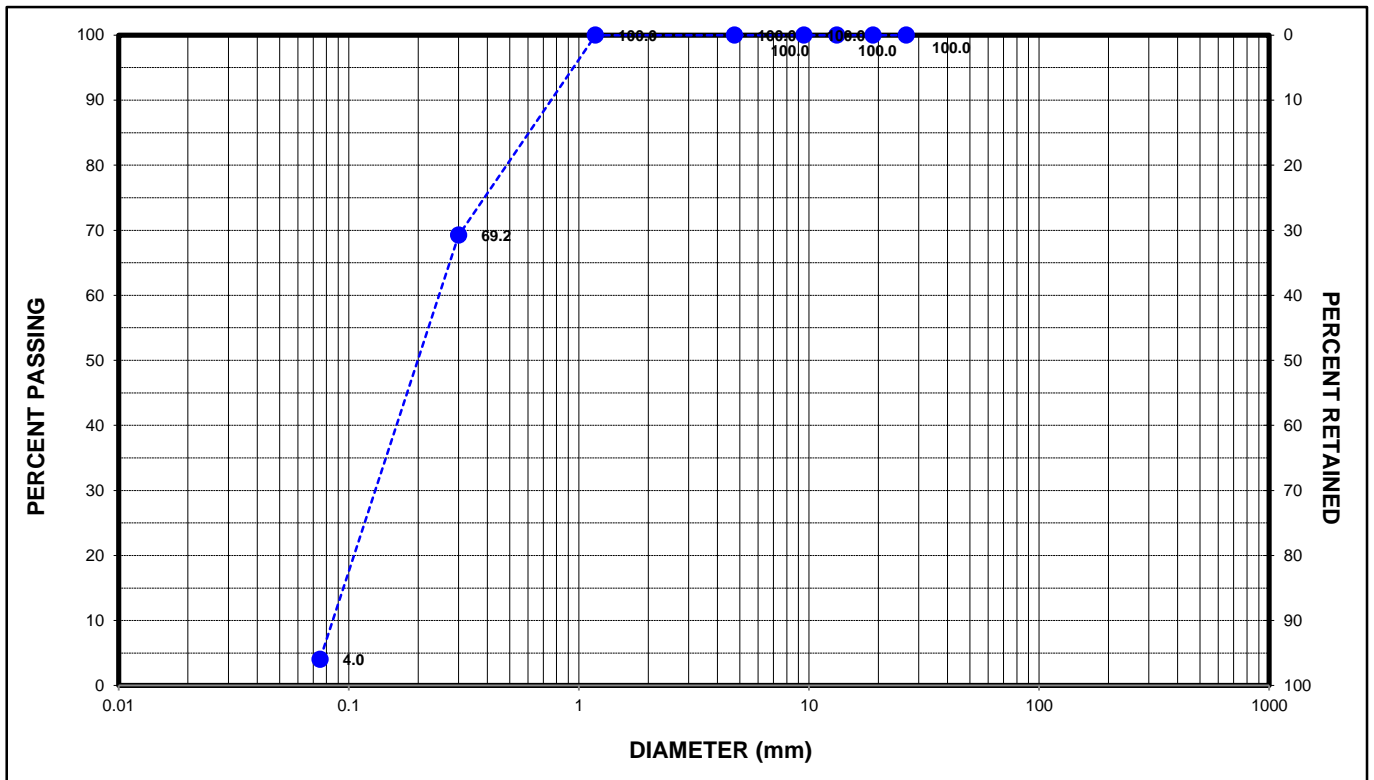
GRANULAR A - SIEVE ANALYSIS (PIT) (LS-602)

Client: _____	Lab no.: <u>G1310</u>
Project/Site: <u>Proposed Organics Processing and Material Management</u>	Project no.: <u>086822</u>

Source: BH8-16 SS2

Sampled by: _____ Date sampled: August 11, 2016

Sieve Size (mm)	Sample % Passing	OPSS 1010 Gradation Specification	
		Minimum %	Maximum %
26.5	100.0	100	-
19.0	100.0	85	100
13.2	100.0	65	90
9.50	100.0	50	73
4.75	100.0	35	55
1.180	100.0	15	40
0.300	69.2	5	22
0.075	4.0	2	8



Remarks: Gravel 0%, Sand 96% , Silt 4% (Sand, Trace Silt)

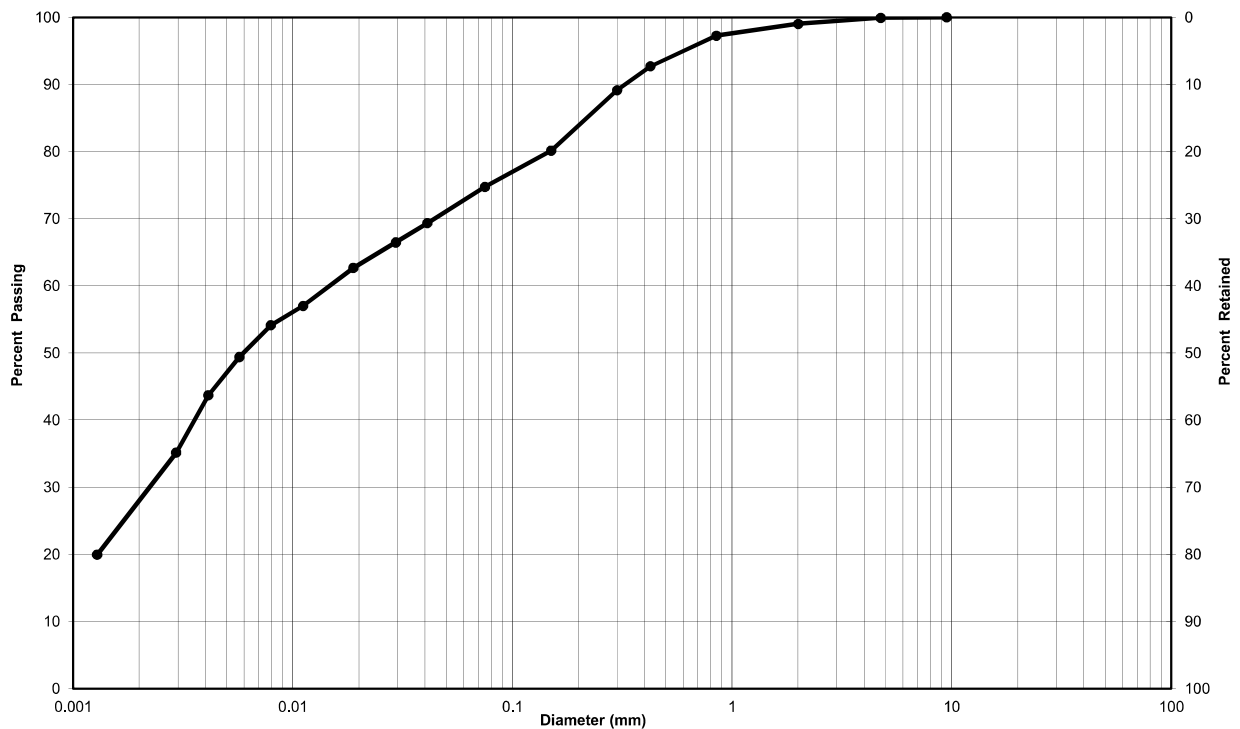
Performed by: <u>Riddhee Panchal</u>	Date: <u>August 23, 2016</u>
Verified by: <u>Raj Kadia, C.E.T.</u>	Date: _____



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

Client: County of Simcoe **Lab No.:** G1447
Project, Site: Supplementary Geotechnical Investigation- (ERRC) 2976 **Project No.:** 086822
Horseshoe Valley Road West, Springwater, ON

Borehole No.: BH10-16 **Sample No.:** SS4
Depth: 2.4m - 2.7m **Enclosure:** _____



Silty Clay	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Silty Clayey, Sandy	0	25	75

Remarks: Silt-size particles (0.074 to 0.002 mm): 47%, Clay-size particles (<0.002 mm): 28%
Gravel 0%, Sand 25%, Silt 47%, Clay 28%

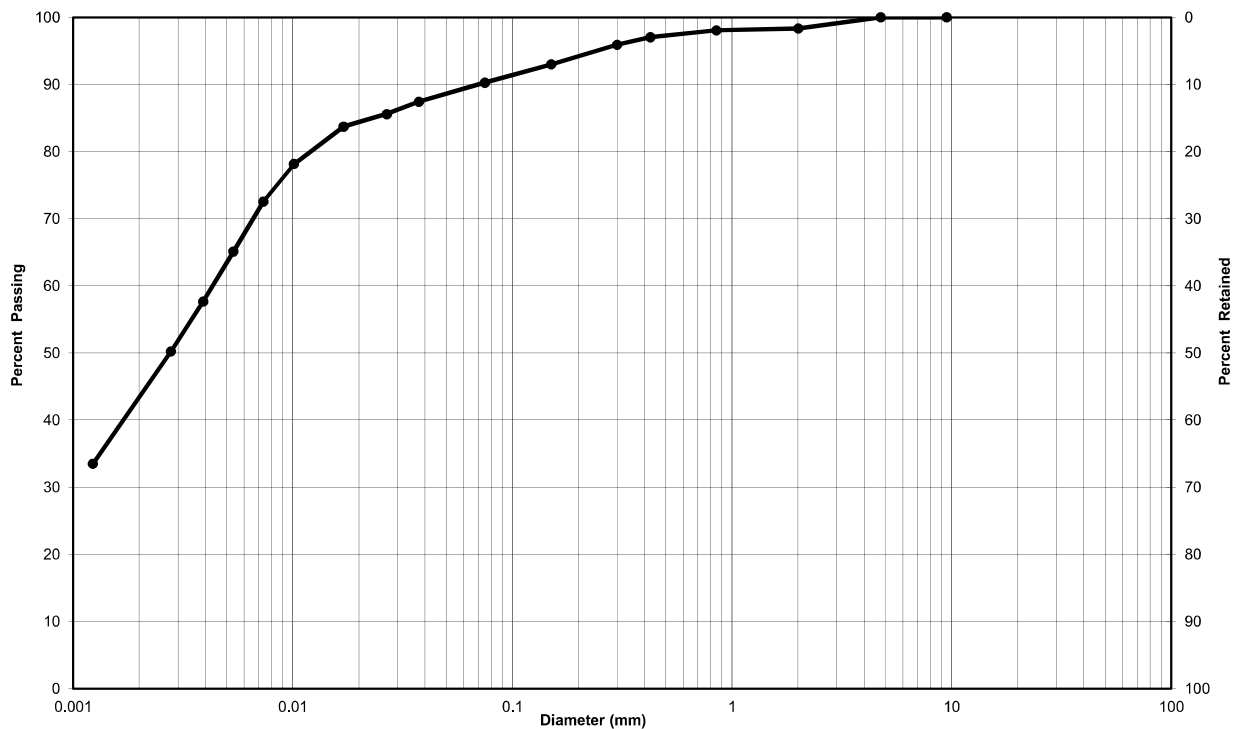
Performed by: Anwar Rehani **Date:** January 11, 2017
Verified by: Raj Kadia C.E.T **Date:** January 17, 2017



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

Client: County of Simcoe **Lab No.:** G1446
Project, Site: Supplementary Geotechnical Investigation- (ERRC) 2976 **Project No.:** 086822
Horseshoe Valley Road West, Springwater, ON

Borehole No.: BH20-16 **Sample No.:** SS4
Depth: 2.4m - 2.7m **Enclosure:** _____



Silty Clay	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse

Particle-Size Limits as per USCS (ASTM D-2487)

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Silty Clay, Trace to Some Sand	0	10	90

Remarks: Silt-size particles (0.074 to 0.002 mm): 47%, Clay-size particles (<0.002 mm): 43%
Gravel 0%, Sand 10%, Silt 47%, Clay 43%

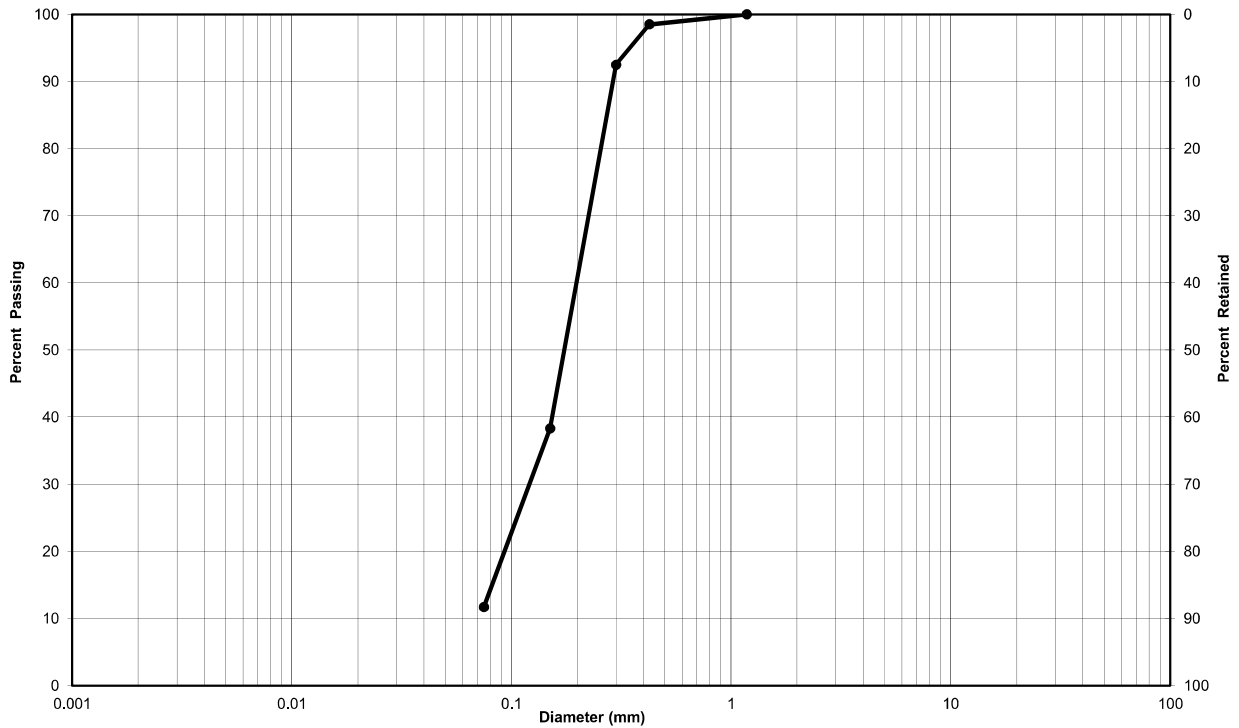
Performed by: Anwar Rehani **Date:** January 11, 2017
Verified by: Raj Kadia C.E.T **Date:** _____



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

Client: County of Simcoe **Lab No.:** G1446
Project, Site: Supplementary Geotechnical Investigation- (ERRC) 2976 **Project No.:** 086822
Horseshoe Valley Road West, Springwater, ON

Borehole No.: BH22-16 **Sample No.:** SS3
Depth: 1.7m - 2.0m **Enclosure:** _____



Silty Clay	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Sand, Some Silt	0	88	12

Remarks: _____
Gravel 0%, Sand 88%, Silt 12%

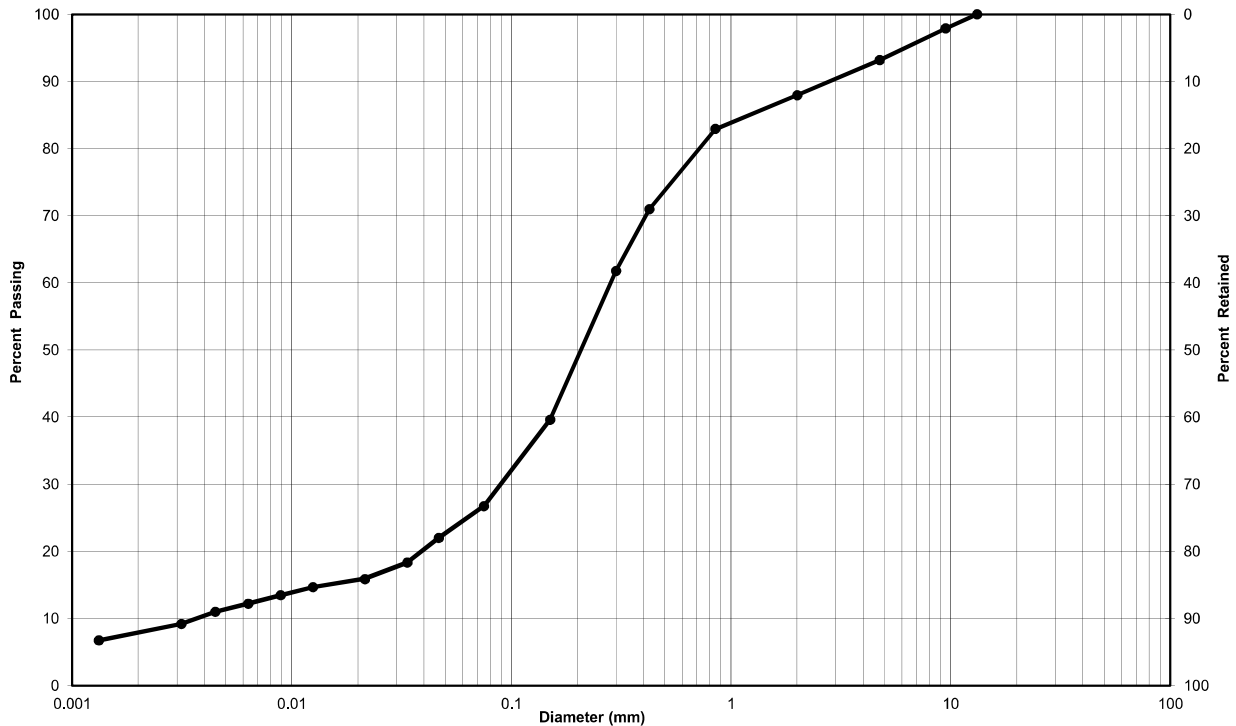
Performed by: Anwar Rehani **Date:** January 11, 2017
Verified by: Raj Kadia C.E.T **Date:** January 16, 2017



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

Client: County of Simcoe **Lab No.:** G1444
Project, Site: Supplementary Geotechnical Investigation- (ERRC) 2976 **Project No.:** 086822
Horseshoe Valley Road West, Springwater, ON

Borehole No.: MW15-16 **Sample No.:** SS5
Depth: 3.2m - 3.5m **Enclosure:** _____



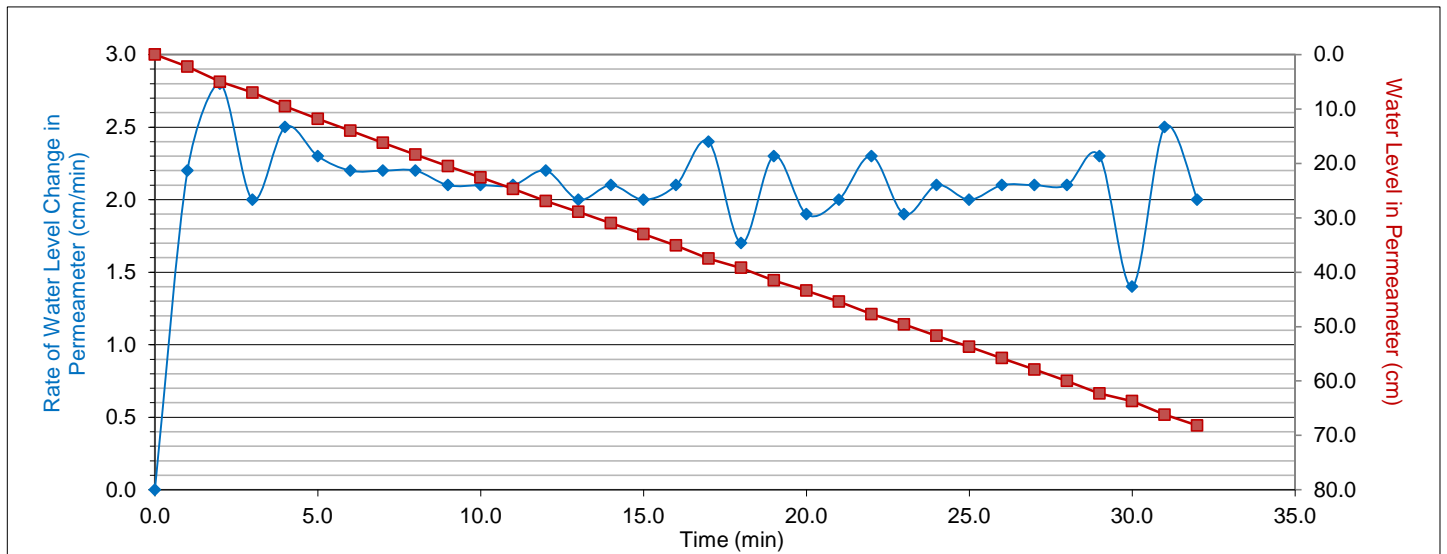
Silty Clay	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Sand, Some Silt, Trace Clay and Gravel	7	66	27

Remarks: Silt-size particles (0.074 to 0.002 mm): 19%, Clay-size particles (<0.002 mm): 8%
Gravel 7%, Sand 66%, Silt 19%, Clay 8%

Performed by: Anwar Rehani **Date:** January 11, 2017
Verified by: Raj Kadia C.E.T. **Date:** January 16, 2017

Appendix C Infiltration Analyses



depth of infiltration test = 0.71 m BGS

soil description: SAND with silt

grain size analysis results (%)		
gravel	sand	silt & clay
TBD	TBD	TBD

hydraulic conductivity, field saturated⁽¹⁾ (K_{fs}) = 1.07E-03 cm/s

$$\begin{aligned} \text{approximate infiltration rate}^{(2)} &= \left(\frac{K_{fs}}{6 \times 10^{-11}} \right)^{\frac{1}{3.7363}} \text{ mm/h} \\ &= 87 \text{ mm/h} \end{aligned}$$

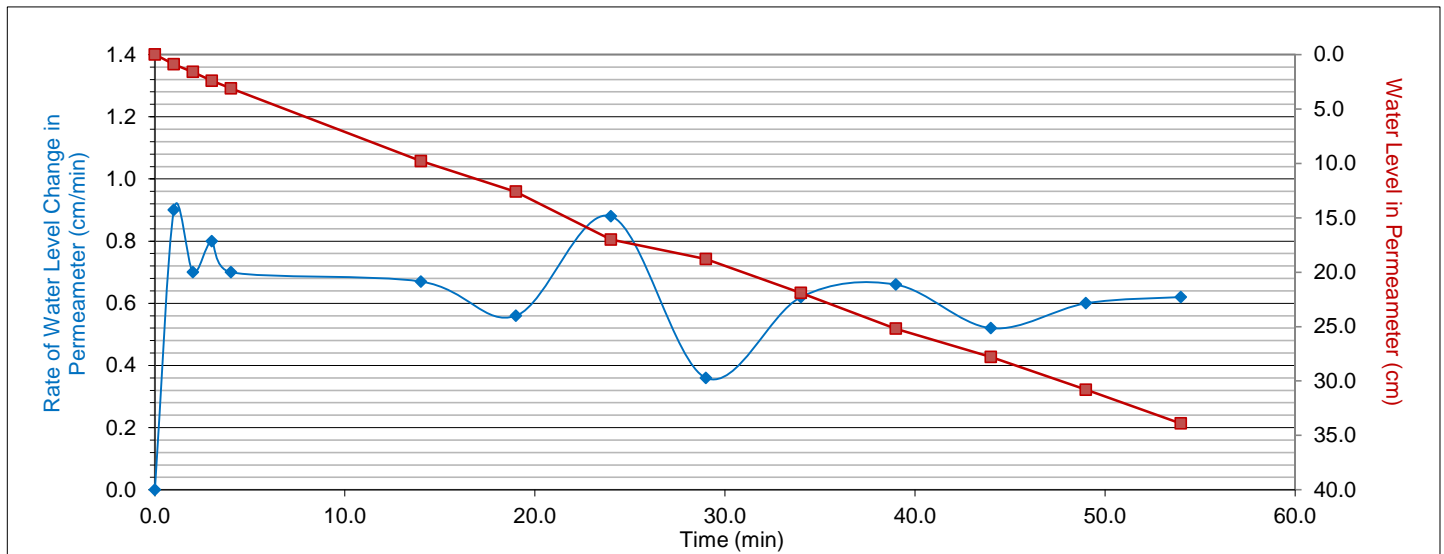
$$\begin{aligned} \text{percolation time} &= (\text{infiltration rate})^{-1} \times (60 \text{ min/h}) \times (10 \text{ mm/cm}) \text{ min/cm} \\ &= 7 \text{ min/cm} \end{aligned}$$

- Notes:
- (1) see Figure C2 for calculation of K_{fs}
 - (2) Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997. Supplementary Guidelines to Ontario Building Code 1997. SG-6 Percolations Times and Soil Descriptions. Toronto, Ontario.



COUNTY OF SIMCOE
 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO
 ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
GUELPH PERMEAMETER TEST RESULTS (GP01-16)

Figure C.1A



depth of infiltration test = 0.53 m BGS

soil description: SAND with silt

grain size analysis results (%)		
gravel	sand	silt & clay
TBD	TBD	TBD

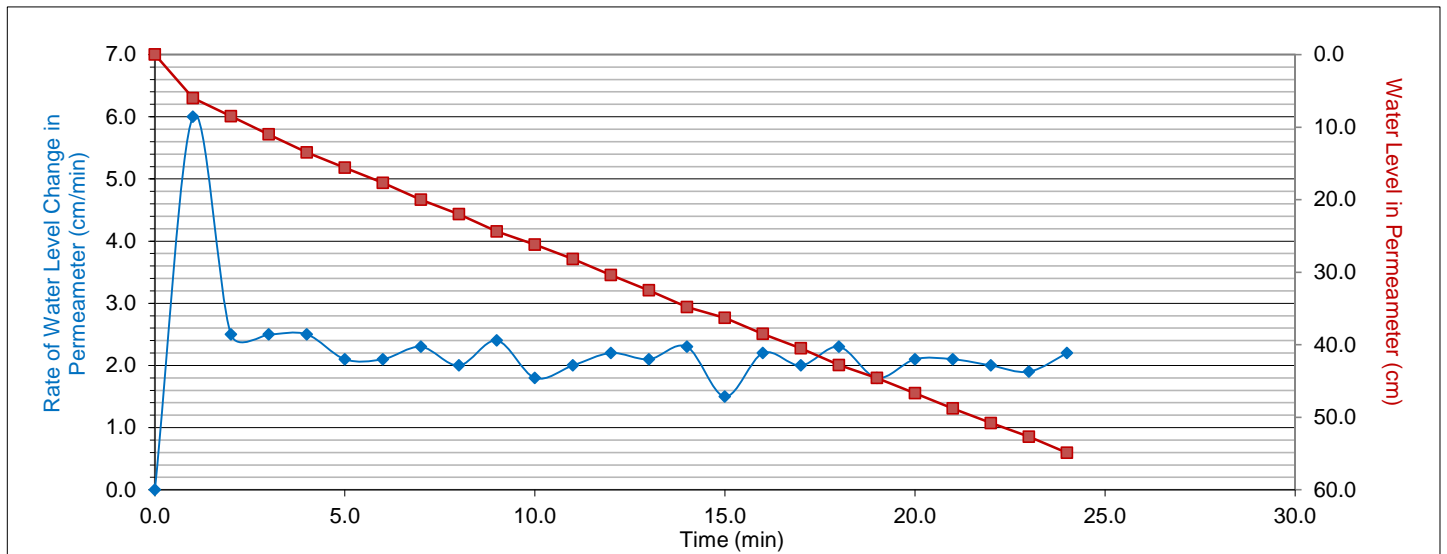
hydraulic conductivity, field saturated⁽¹⁾ (K_{fs}) = 3.07E-04 cm/s

$$\begin{aligned} \text{approximate infiltration rate}^{(2)} &= \left(\frac{K_{fs}}{6 \times 10^{-11}} \right)^{\frac{1}{3.7363}} \text{ mm/h} \\ &= 62 \text{ mm/h} \end{aligned}$$

$$\begin{aligned} \text{percolation time} &= (\text{infiltration rate})^{-1} \times (60 \text{ min/h}) \times (10 \text{ mm/cm}) \text{ min/cm} \\ &= 10 \text{ min/cm} \end{aligned}$$

- Notes:
- (1) see Figure C2 for calculation of K_{fs}
 - (2) Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997. Supplementary Guidelines to Ontario Building Code 1997. SG-6 Percolations Times and Soil Descriptions. Toronto, Ontario.





depth of infiltration test = 0.49 m BGS

soil description: SAND with silt

grain size analysis results (%)		
gravel	sand	silt & clay
TBD	TBD	TBD

hydraulic conductivity, field saturated⁽¹⁾ (K_{fs}) = 1.07E-03 cm/s

$$\begin{aligned} \text{approximate infiltration rate}^{(2)} &= \left(\frac{K_{fs}}{6 \times 10^{-11}} \right)^{\frac{1}{3.7363}} \text{ mm/h} \\ &= 87 \text{ mm/h} \end{aligned}$$

$$\begin{aligned} \text{percolation time} &= (\text{infiltration rate})^{-1} \times (60 \text{ min/h}) \times (10 \text{ mm/cm}) \text{ min/cm} \\ &= 7 \text{ min/cm} \end{aligned}$$

- Notes:
- (1) see Figure C2 for calculation of K_{fs}
 - (2) Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997. Supplementary Guidelines to Ontario Building Code 1997. SG-6 Percolations Times and Soil Descriptions. Toronto, Ontario.



COUNTY OF SIMCOE
 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO
 ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)
GUELPH PERMEAMETER TEST RESULTS (GP03-16)

Figure C.3A

Appendix D

Single Well Response Test Analyses

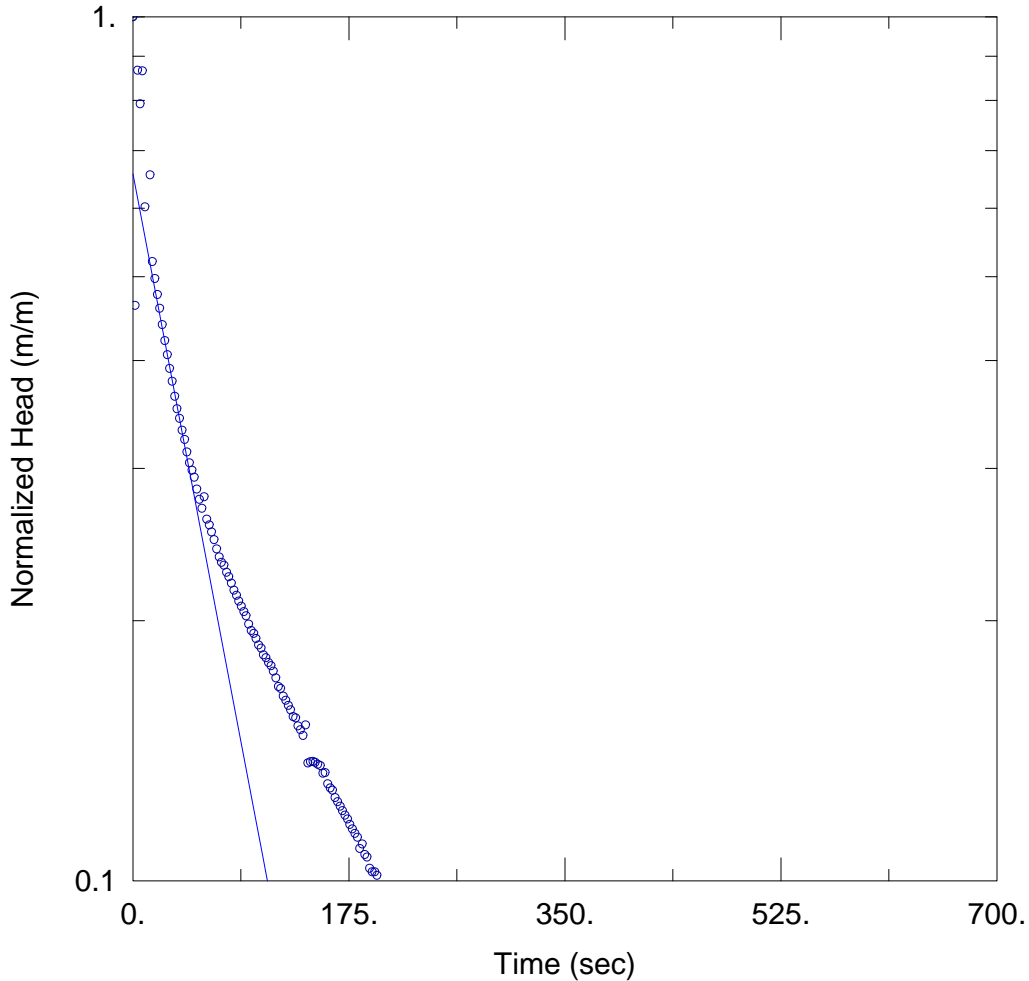
MW1-16 Falling Head

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW01-16 Falling Hvorslev.aqt
Date: 10/05/16 Time: 15:46:38

SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 0.0009922$ cm/sec $y_0 = 0.5404$ m

AQUIFER DATA

Saturated Thickness: 4.62 m Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW1-16)

Initial Displacement: 0.8216 m

Static Water Column Height: 4.62 m

Total Well Penetration Depth: 4.62 m

Screen Length: 3.09 m

Casing Radius: 0.0254 m

Well Radius: 0.0254 m



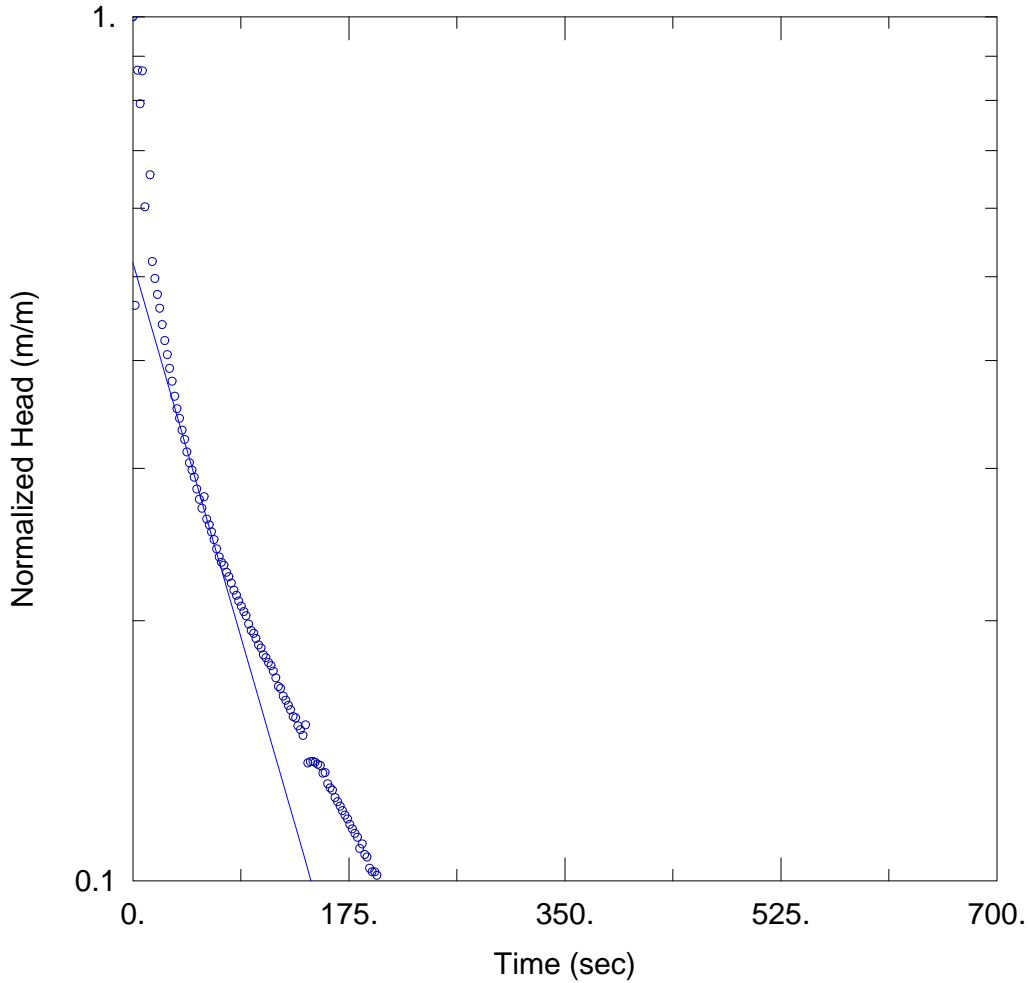
MW1-16 Falling Head

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Falling.aqt
Date: 10/05/16 Time: 15:46:22

Saturated Thickness: 4.62 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0004716 cm/sec y0 = 0.4261 m

WELL DATA (MW1-16)

Initial Displacement: 0.8216 m
Static Water Column Height: 4.62 m
Total Well Penetration Depth: 4.62 m
Screen Length: 3.09 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



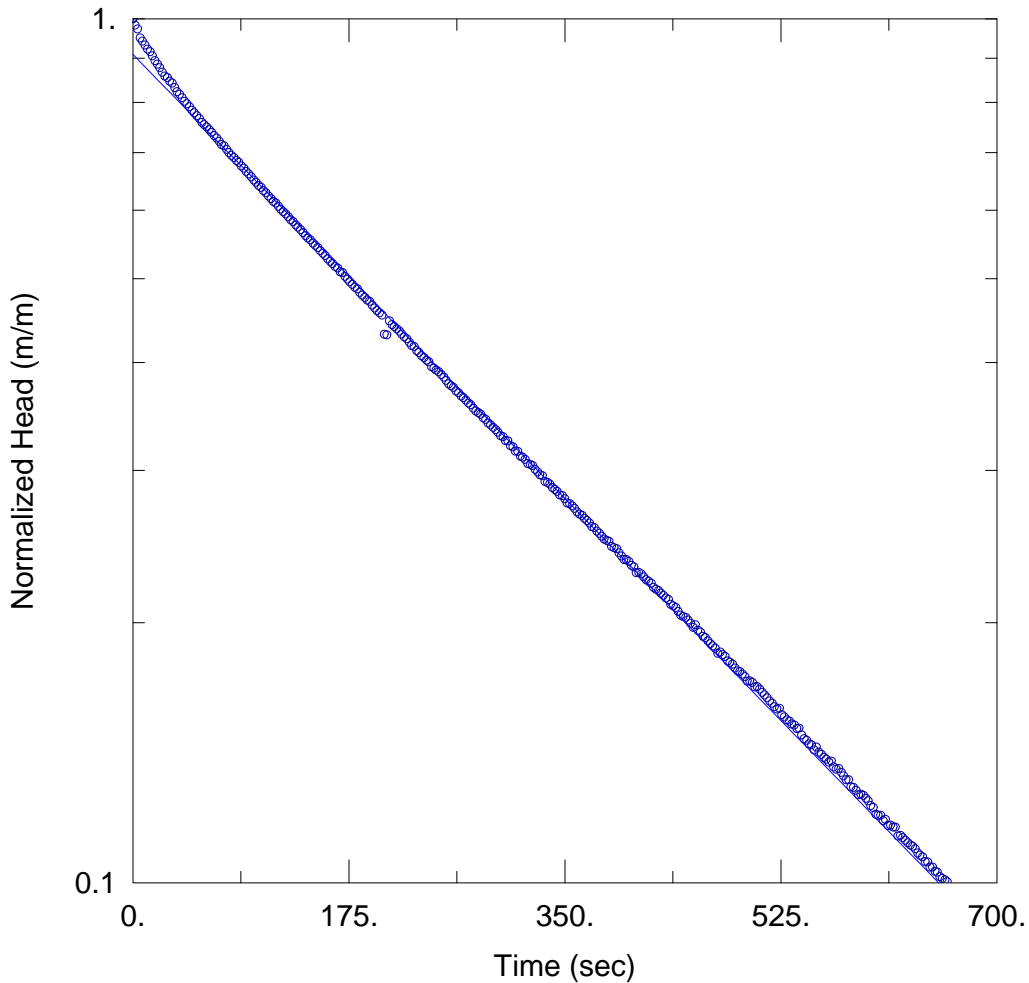
MW1-16 Rising Head

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW01-16 Rising Hvorslev.aqt
Date: 10/05/16 Time: 15:46:33

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

$K = 0.000194$ cm/sec $y_0 = 0.7168$ m

AQUIFER DATA

Saturated Thickness: 4.62 m Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW1-16)

Initial Displacement: 0.7886 m
Static Water Column Height: 4.62 m
Total Well Penetration Depth: 4.62 m
Screen Length: 3.09 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



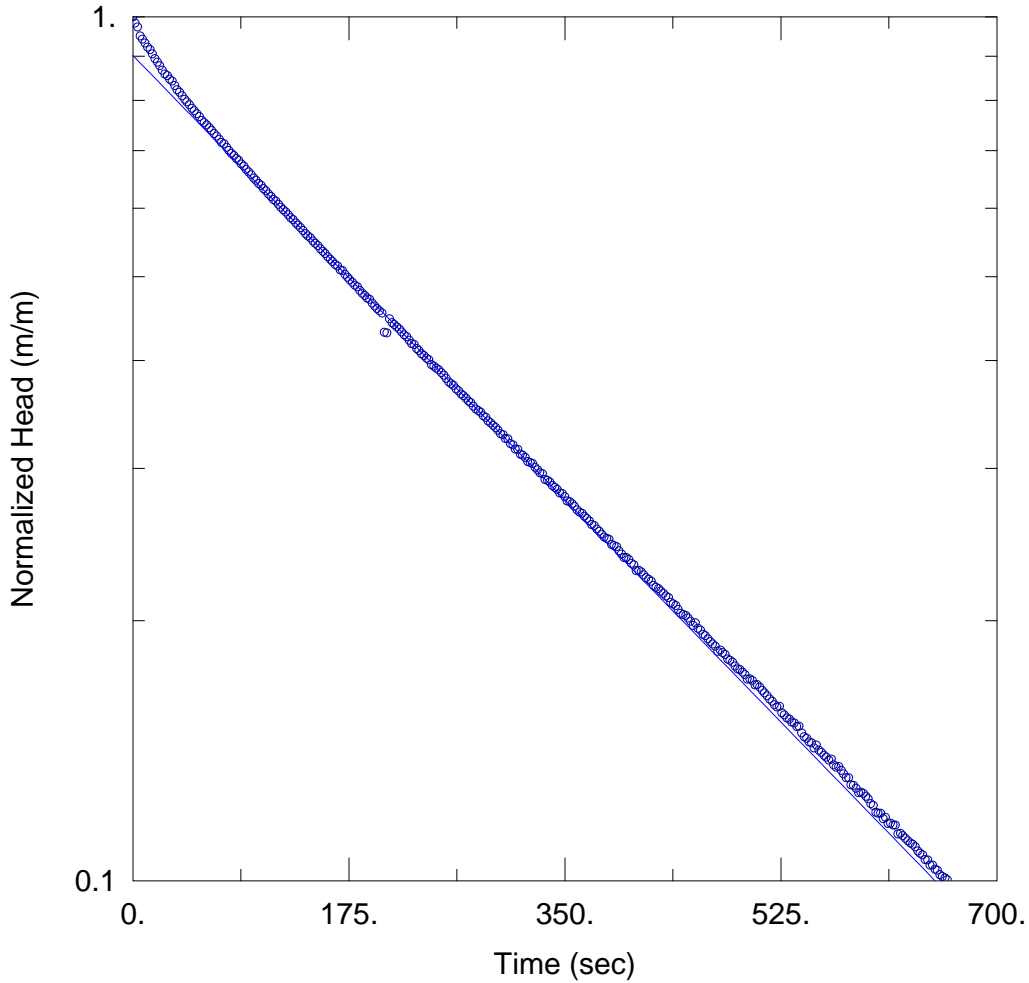
MW1-16 Rising Head

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Rising.aqt
Date: 10/05/16 Time: 15:46:27

Saturated Thickness: 4.62 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.00014 cm/sec y0 = 0.711 m

WELL DATA (MW1-16)

Initial Displacement: 0.7886 m
Static Water Column Height: 4.62 m
Total Well Penetration Depth: 4.62 m
Screen Length: 3.09 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



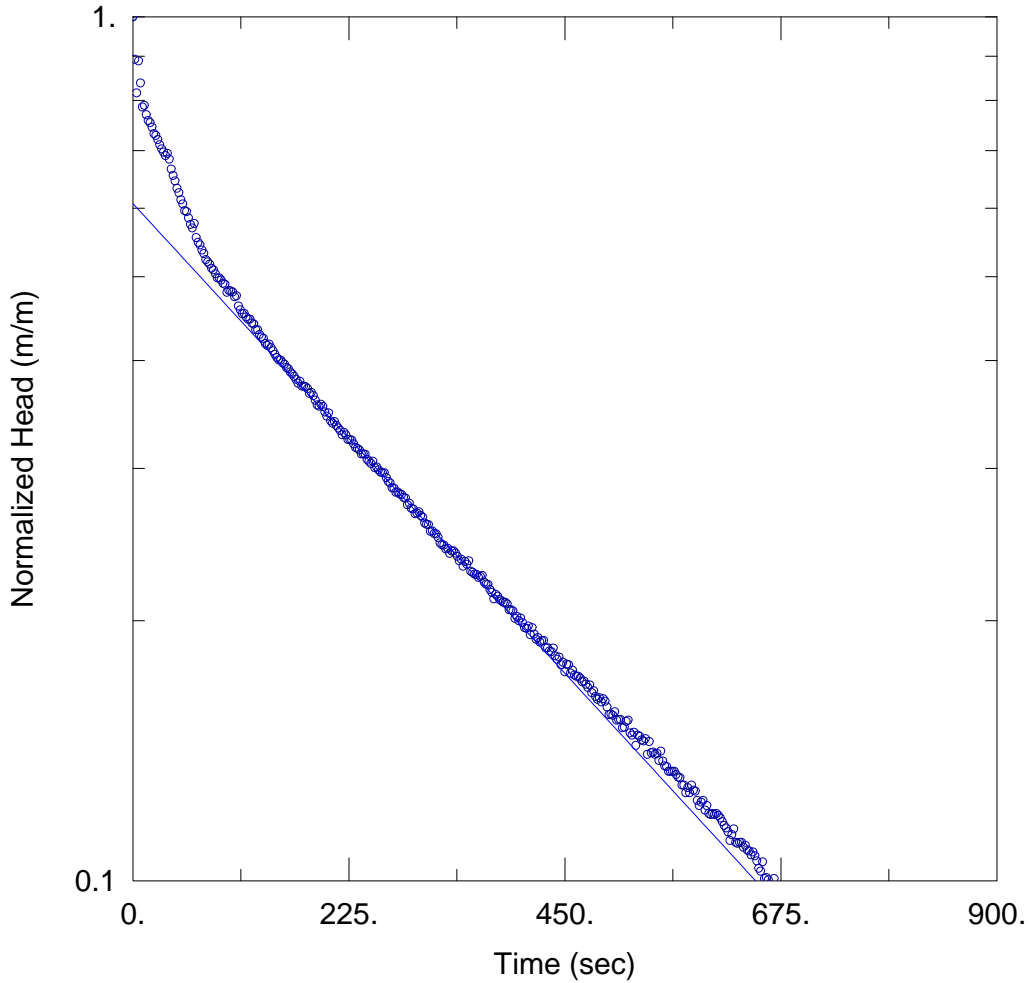
MW2-16 Falling Head

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW02-16 Falling Hvorslev.aqt
Date: 10/05/16 Time: 15:45:52

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

$K = 0.0001413$ cm/sec $y_0 = 0.214$ m

AQUIFER DATA

Saturated Thickness: 12.08 m Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW2-16)

Initial Displacement: 0.3521 m
Static Water Column Height: 12.08 m
Total Well Penetration Depth: 12.08 m
Screen Length: 3.04 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



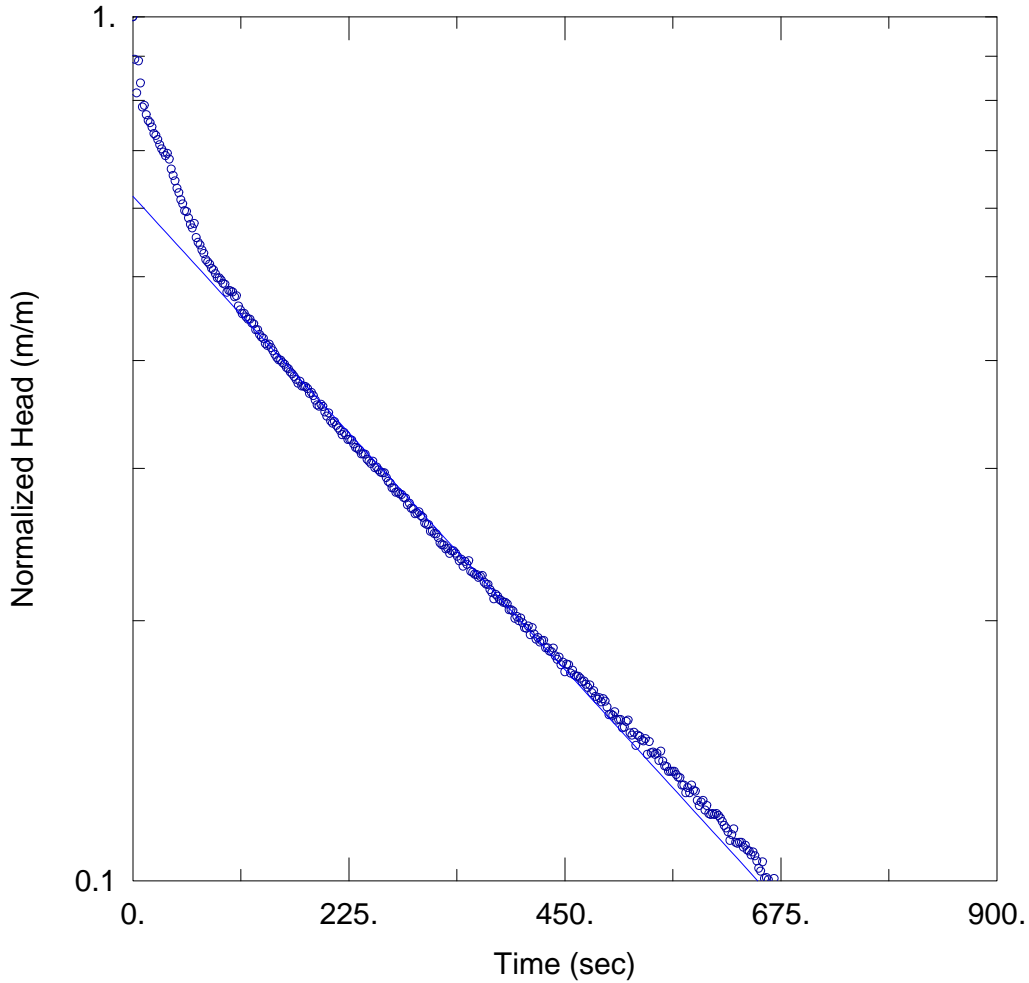
MW2-16 Falling Head

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Falling.aqt
 Date: 10/05/16 Time: 15:46:11

Saturated Thickness: 12.08 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 K = 0.00203 cm/sec y0 = 0.2182 m

WELL DATA (MW2-16)

Initial Displacement: 0.3521 m
 Static Water Column Height: 12.08 m
 Total Well Penetration Depth: 12.08 m
 Screen Length: 3.04 m
 Casing Radius: 0.0254 m
 Well Radius: 0.0254 m



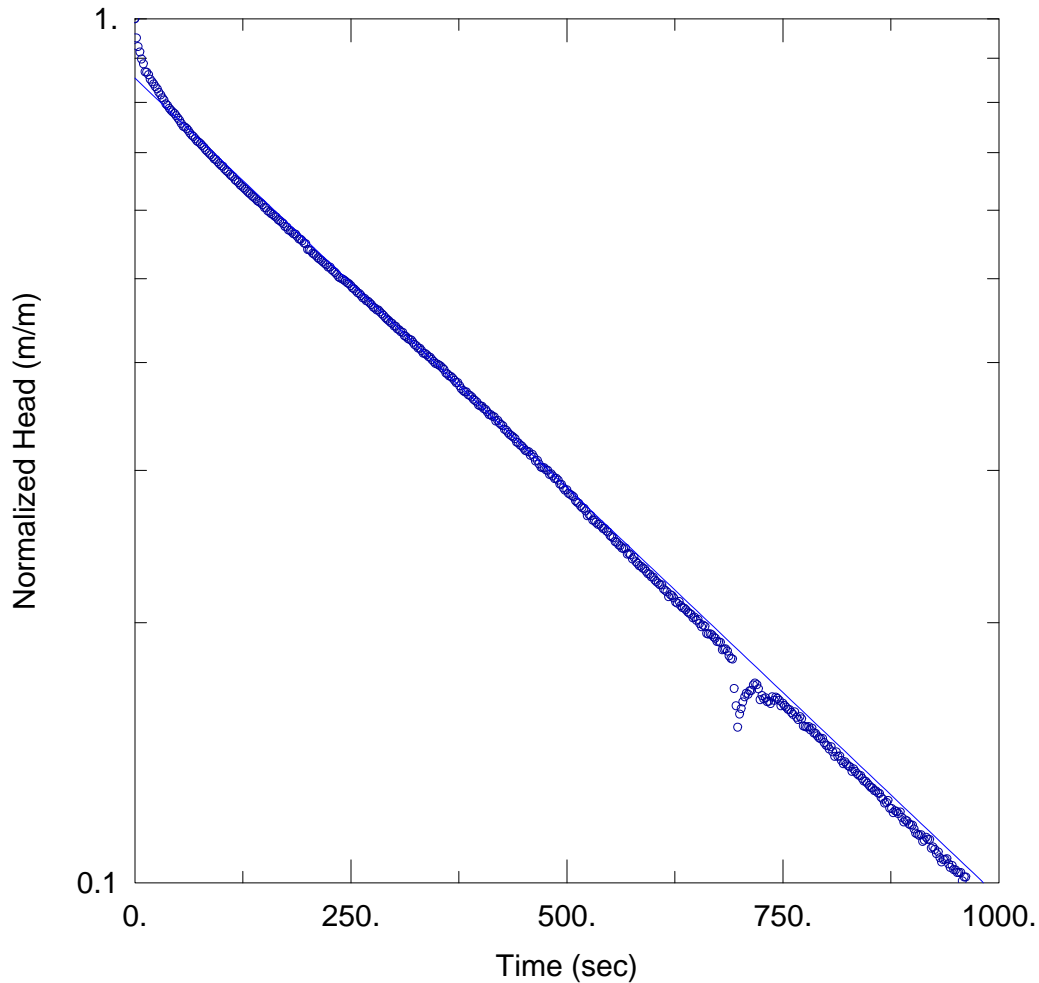
MW2-16 Rising Head

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW02-16 Rising Hvorslev.aqt
Date: 10/05/16 Time: 15:45:58

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

$K = 0.0001108$ cm/sec $y_0 = 0.6752$ m

AQUIFER DATA

Saturated Thickness: 12.08 m Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW2-16)

Initial Displacement: 0.7912 m
Static Water Column Height: 12.08 m
Total Well Penetration Depth: 12.08 m
Screen Length: 3.04 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



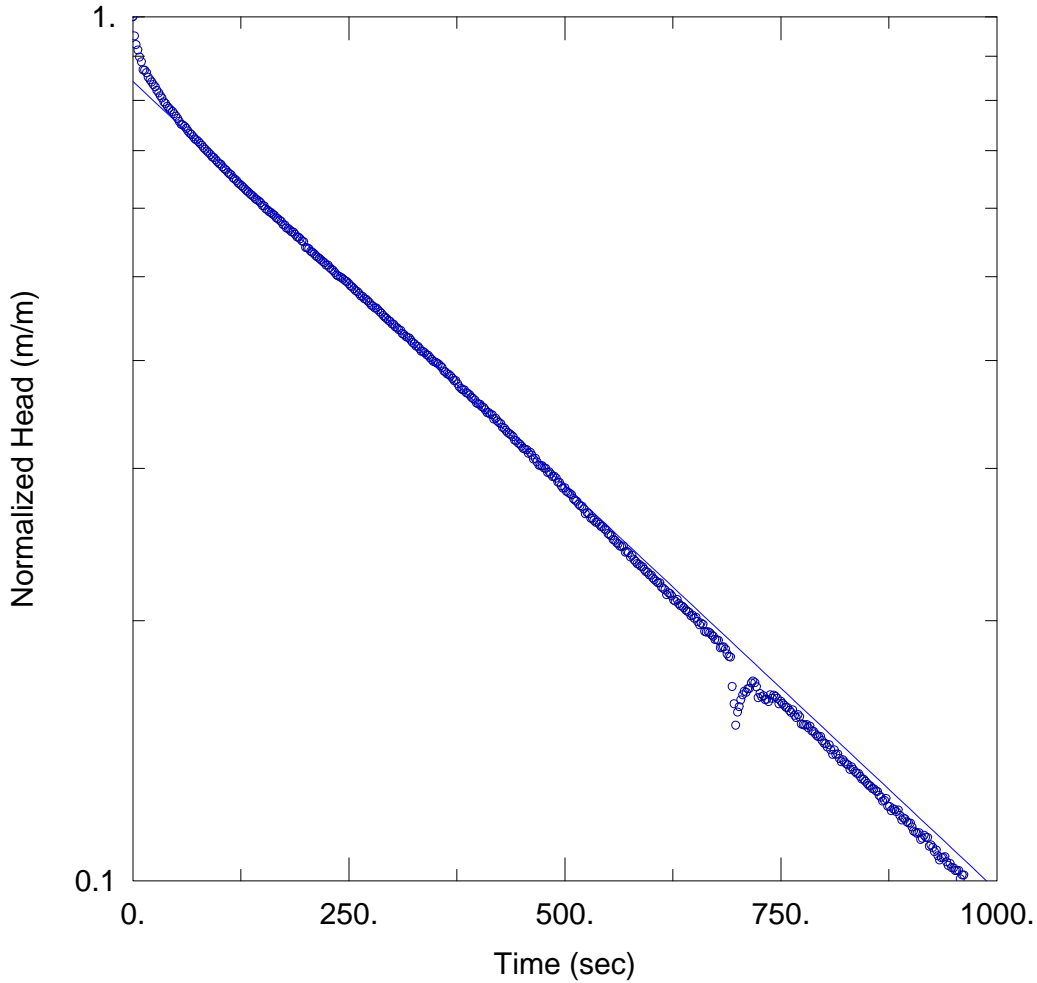
MW2-16 Rising Head

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Rising.aqt
Date: 10/05/16 Time: 15:46:05

Saturated Thickness: 12.08 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.001562 cm/sec y0 = 0.6657 m

WELL DATA (MW2-16)

Initial Displacement: 0.7912 m
Static Water Column Height: 12.08 m
Total Well Penetration Depth: 12.08 m
Screen Length: 3.04 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



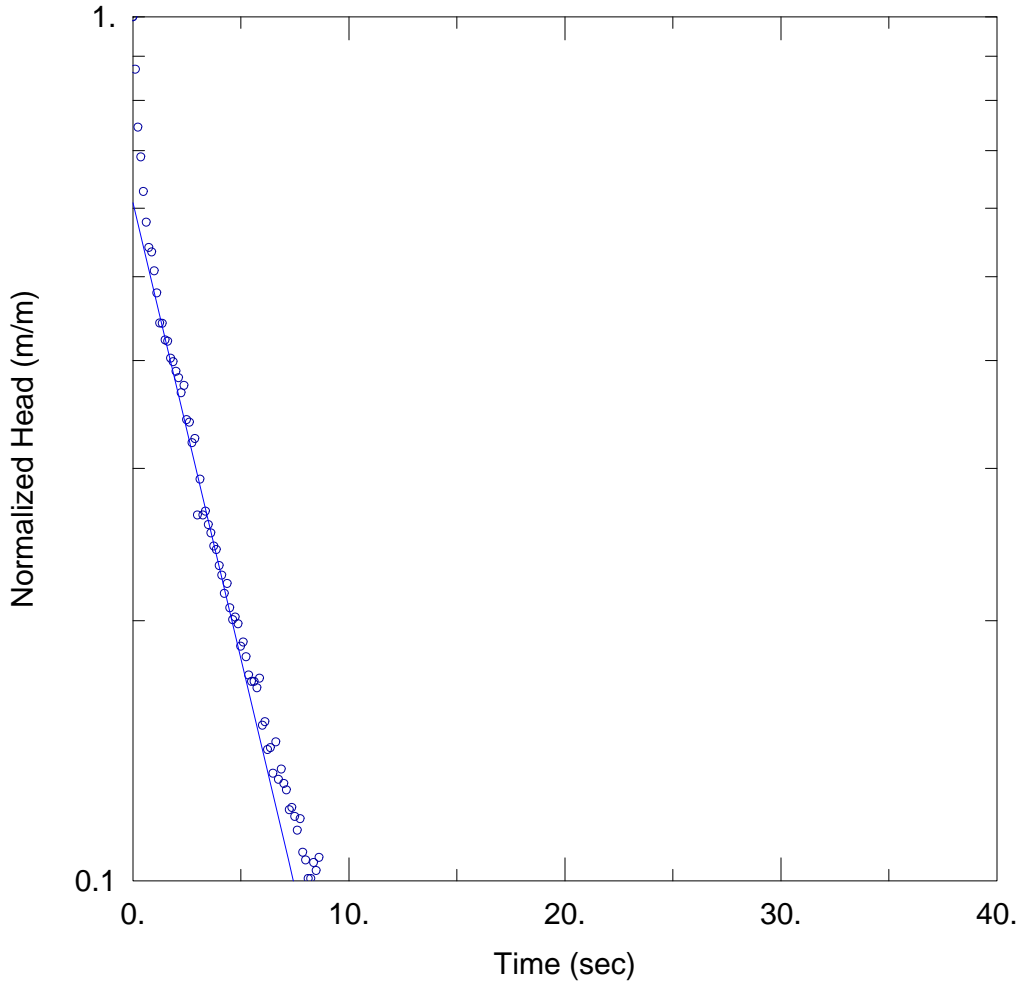
MW3-16 Rising Head 1

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW03-16 Rising 1 Hvorslev.aqt
Date: 10/05/16 Time: 15:45:38

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

$K = 0.01437$ cm/sec $y_0 = 0.08419$ m

AQUIFER DATA

Saturated Thickness: 3.58 m Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW3-16)

Initial Displacement: 0.1382 m
Static Water Column Height: 3.58 m
Total Well Penetration Depth: 4.43 m
Screen Length: 2.98 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



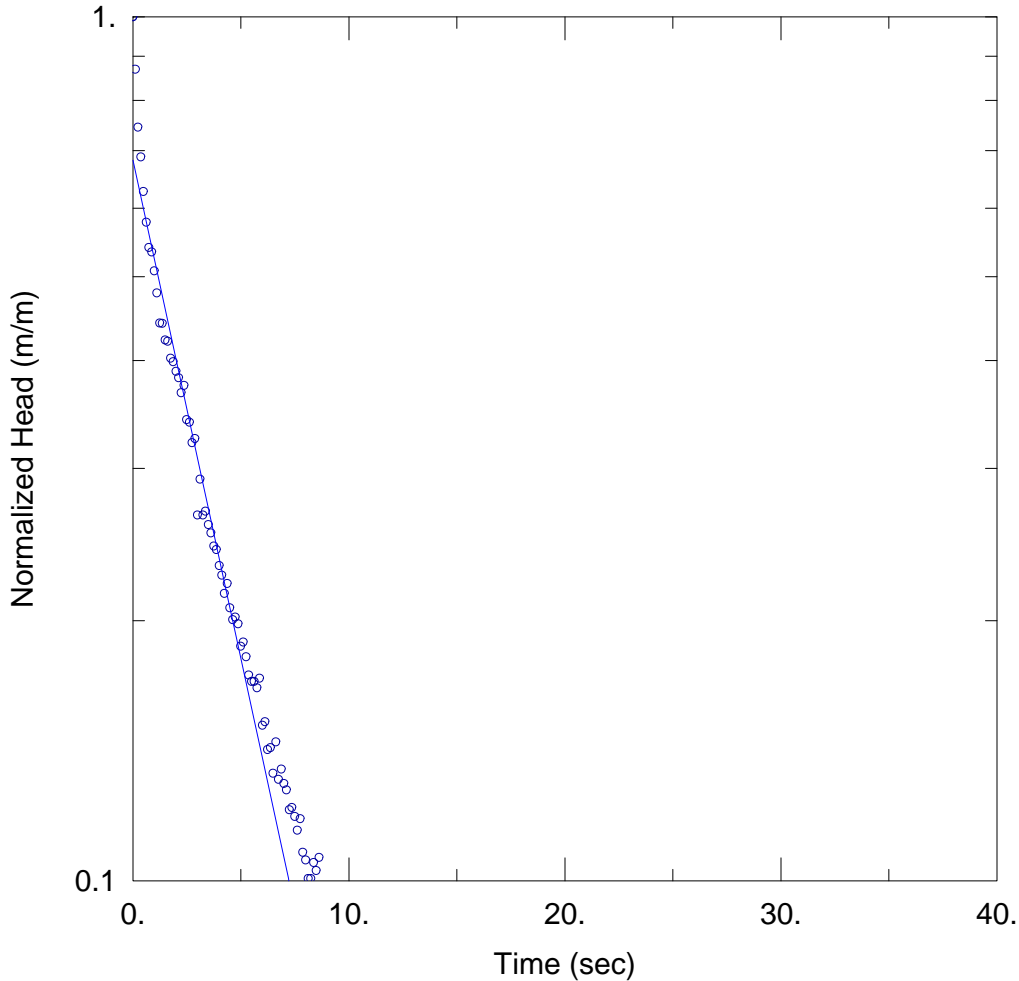
MW3-16 Rising Head 1

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Rising 1.aqt
Date: 10/05/16 Time: 15:45:33

Saturated Thickness: 3.58 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01131 cm/sec $y_0 =$ 0.09426 m

WELL DATA (MW3-16)

Initial Displacement: 0.1382 m
Static Water Column Height: 3.58 m
Total Well Penetration Depth: 4.43 m
Screen Length: 2.98 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



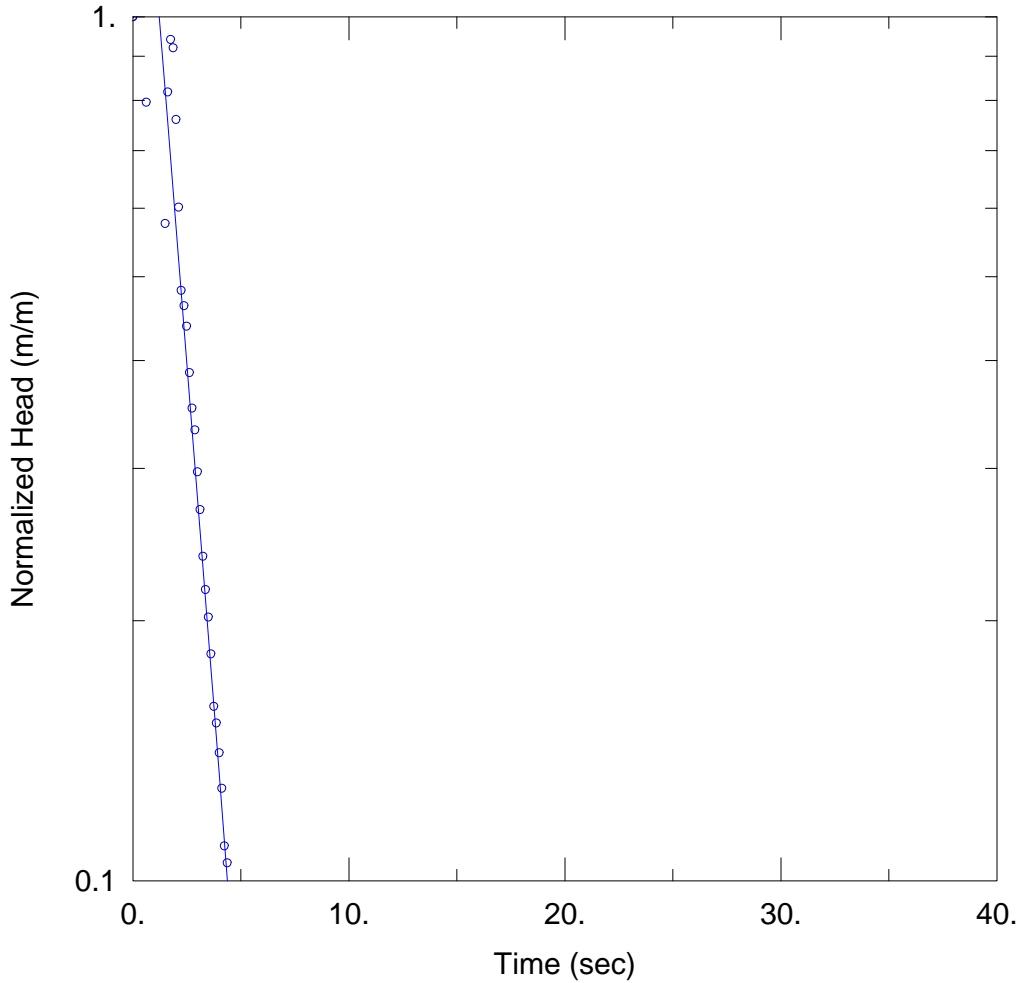
MW3-16 Rising Head 2

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW03-16 Rising 2 Hvorslev.aqt
Date: 10/05/16 Time: 15:45:26

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.04304 cm/sec y0 = 0.7513 m

AQUIFER DATA

Saturated Thickness: 3.58 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW3-16)

Initial Displacement: 0.3081 m
Static Water Column Height: 3.58 m
Total Well Penetration Depth: 4.43 m
Screen Length: 2.98 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



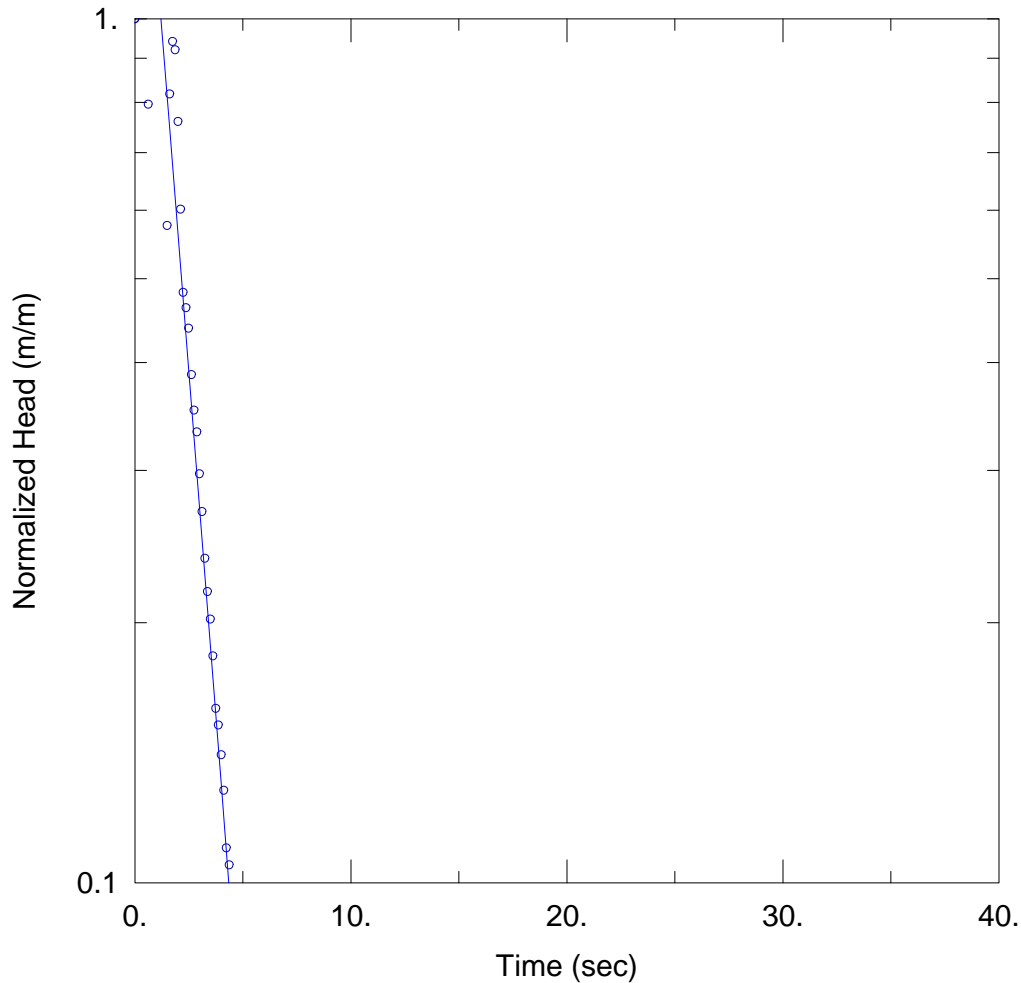
MW3-16 Rising Head 2

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Rising 2.aqt
Date: 10/05/16 Time: 15:45:13

Saturated Thickness: 3.58 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.03114 cm/sec $y_0 =$ 0.7461 m

WELL DATA (MW3-16)

Initial Displacement: 0.3081 m
Static Water Column Height: 3.58 m
Total Well Penetration Depth: 4.43 m
Screen Length: 2.98 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



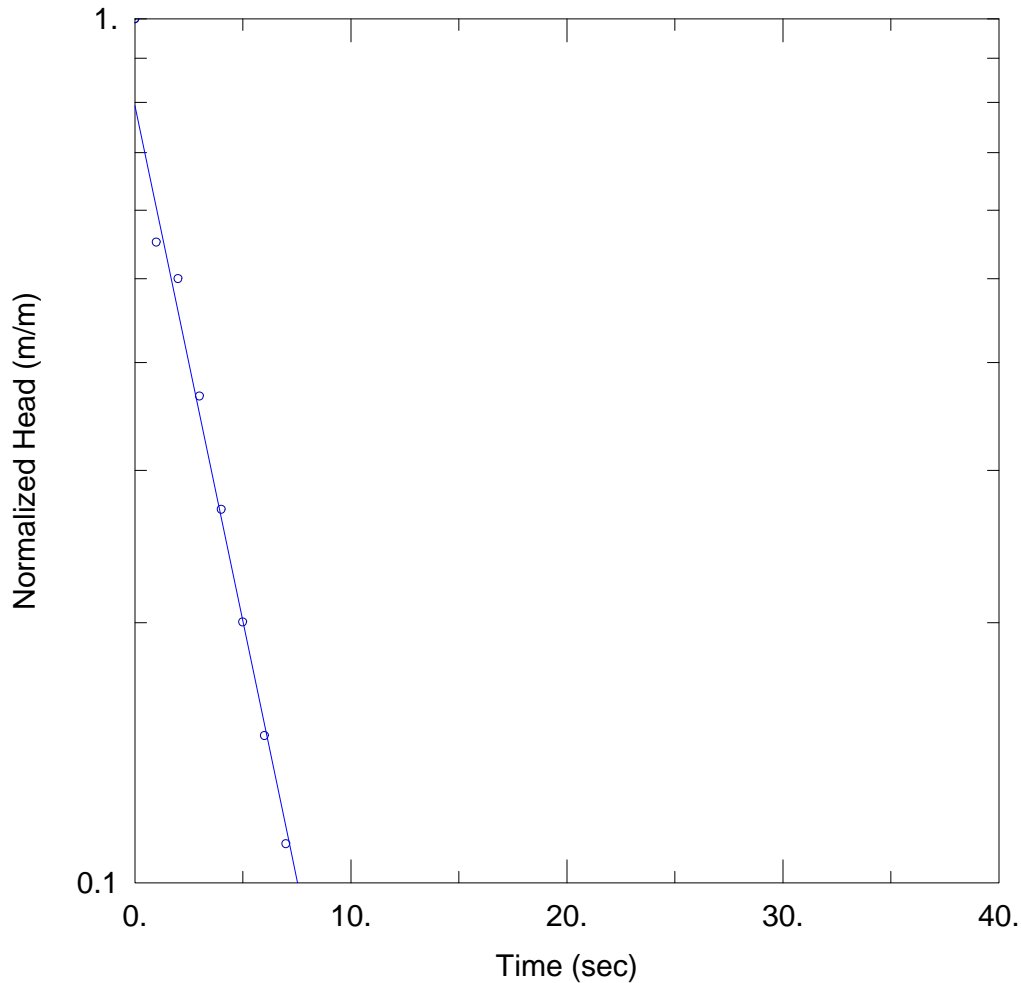
MW3-16 Rising Head 3

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW03-16 Rising 3 Hvorslev.aqt
Date: 10/05/16 Time: 15:45:06

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.01624 cm/sec y0 = 0.4619 m

AQUIFER DATA

Saturated Thickness: 3.58 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW3-16)

Initial Displacement: 0.5825 m
Static Water Column Height: 3.58 m
Total Well Penetration Depth: 4.43 m
Screen Length: 2.98 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



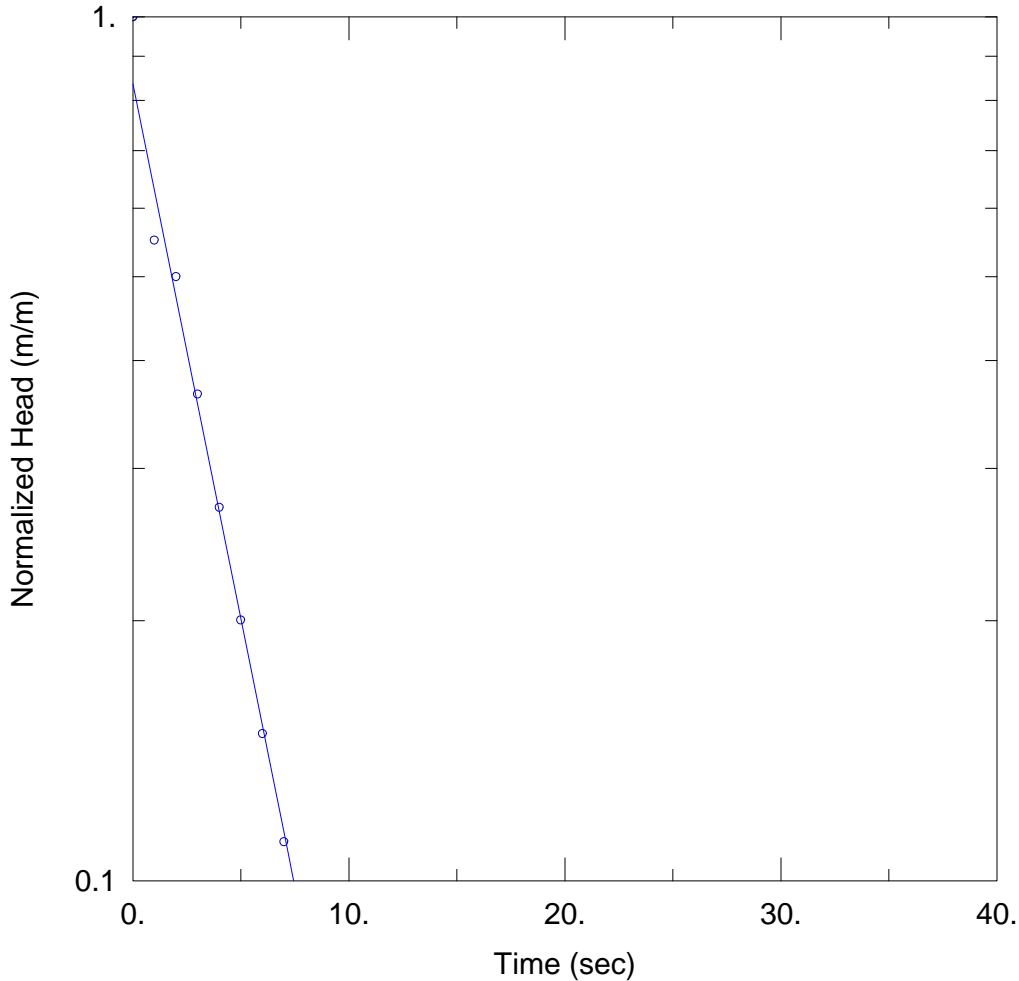
MW3-16 Rising Head 3

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Rising 3.aqt
Date: 10/05/16 Time: 15:45:19

Saturated Thickness: 3.58 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01213 cm/sec y0 = 0.4868 m

WELL DATA (MW3-16)

Initial Displacement: 0.5825 m
Static Water Column Height: 3.58 m
Total Well Penetration Depth: 4.43 m
Screen Length: 2.98 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



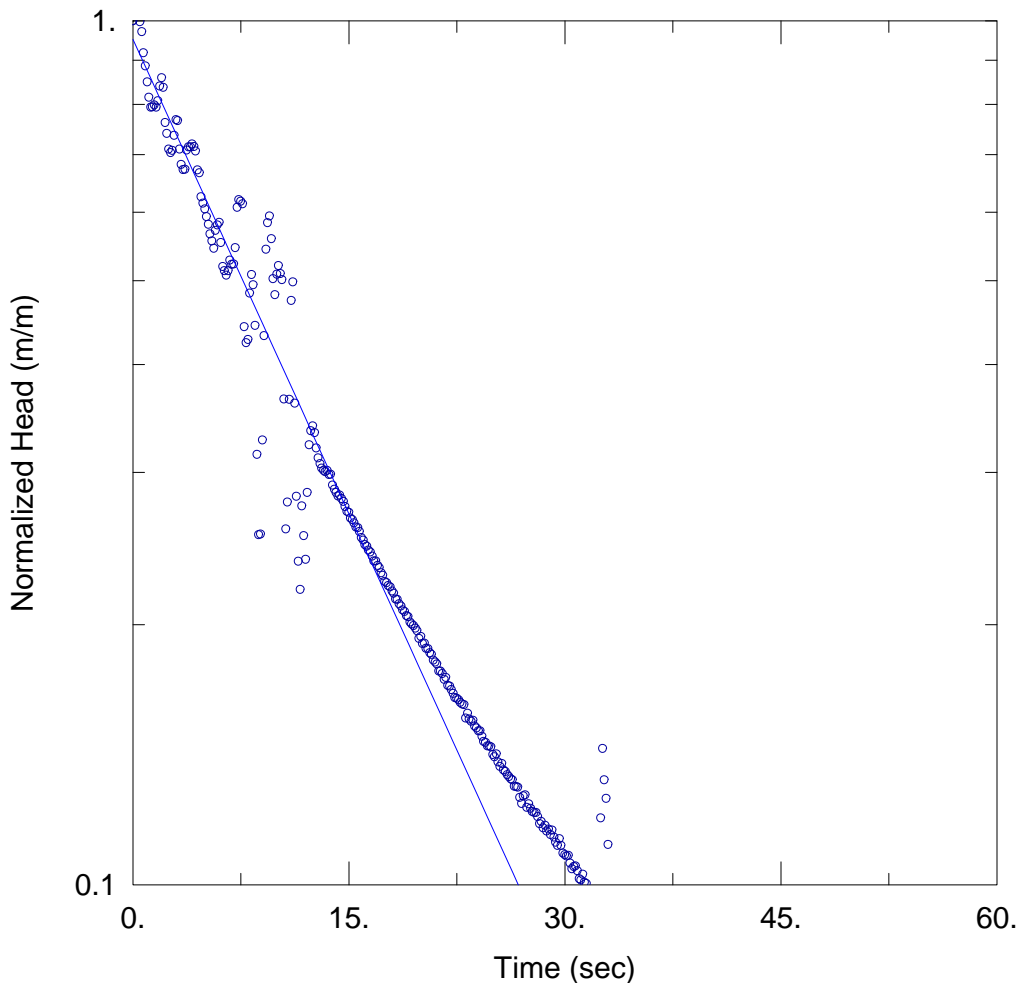
MW4-16 Falling Head 1

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...\MW04-16 Falling 1 Hvorslev.aqt
 Date: 10/05/16 Time: 15:44:26

SOLUTION

Aquifer Model: Unconfined
 Solution Method: Hvorslev

K = 0.004961 cm/sec y0 = 0.5692 m

AQUIFER DATA

Saturated Thickness: 5.83 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW4-16)

Initial Displacement: 0.5983 m
 Static Water Column Height: 5.83 m
 Total Well Penetration Depth: 5.83 m
 Screen Length: 2.99 m
 Casing Radius: 0.0254 m
 Well Radius: 0.0254 m



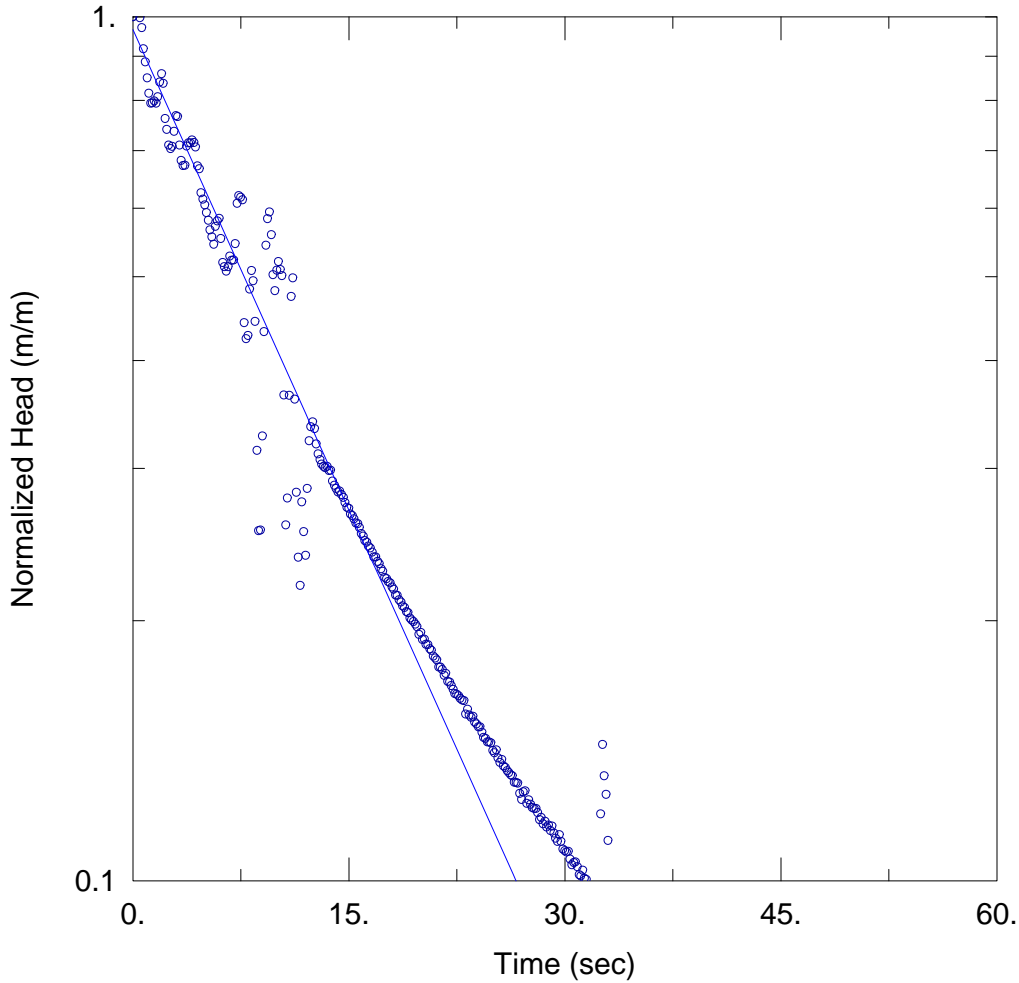
MW4-16 Falling Head 1

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Falling 1.aqt
Date: 10/05/16 Time: 15:44:33

Saturated Thickness: 5.83 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.003775 cm/sec y0 = 0.5781 m

WELL DATA (MW4-16)

Initial Displacement: 0.5983 m
Static Water Column Height: 5.83 m
Total Well Penetration Depth: 5.83 m
Screen Length: 2.99 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



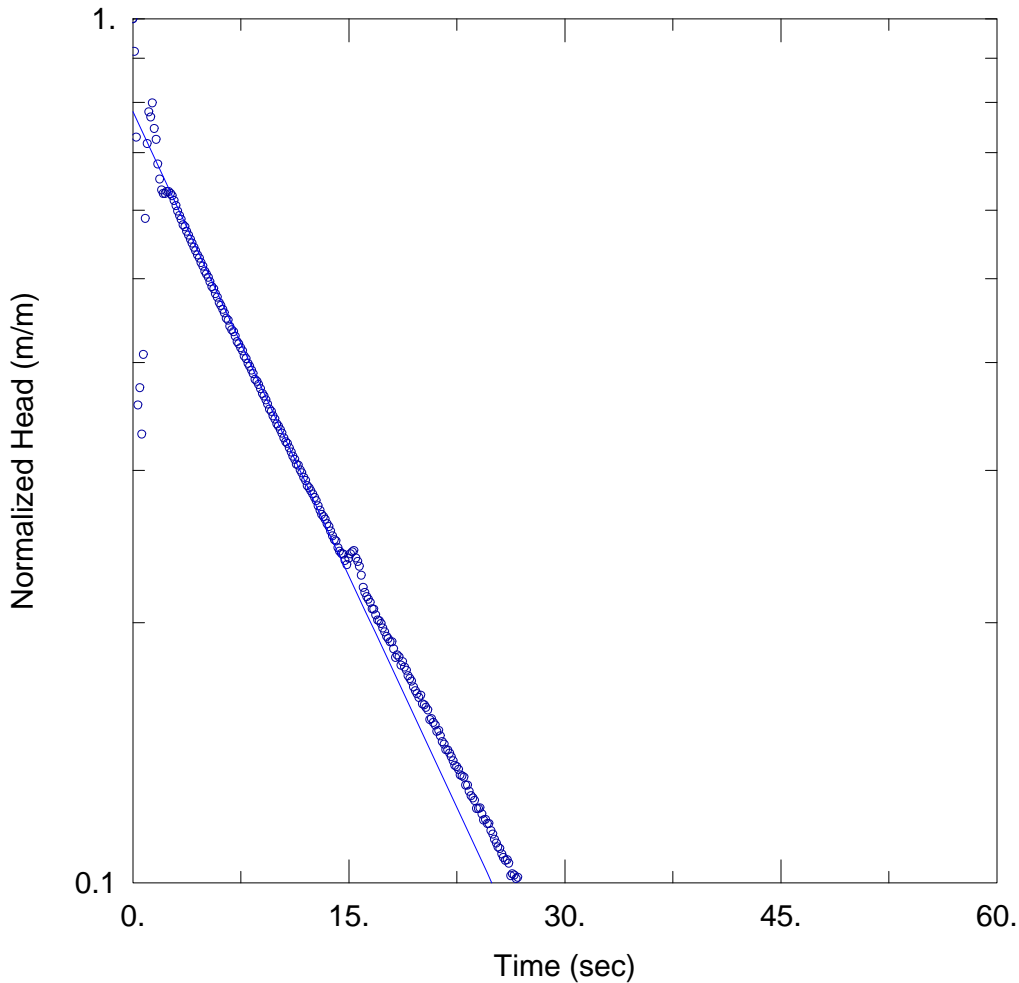
MW4-16 Falling Head 2

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW04-16 Falling 2 Hvorslev.aqt
Date: 10/05/16 Time: 15:43:57

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.004858 cm/sec y0 = 0.4805 m

AQUIFER DATA

Saturated Thickness: 5.83 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW4-16)

Initial Displacement: 0.6154 m
Static Water Column Height: 5.83 m
Total Well Penetration Depth: 5.83 m
Screen Length: 2.99 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



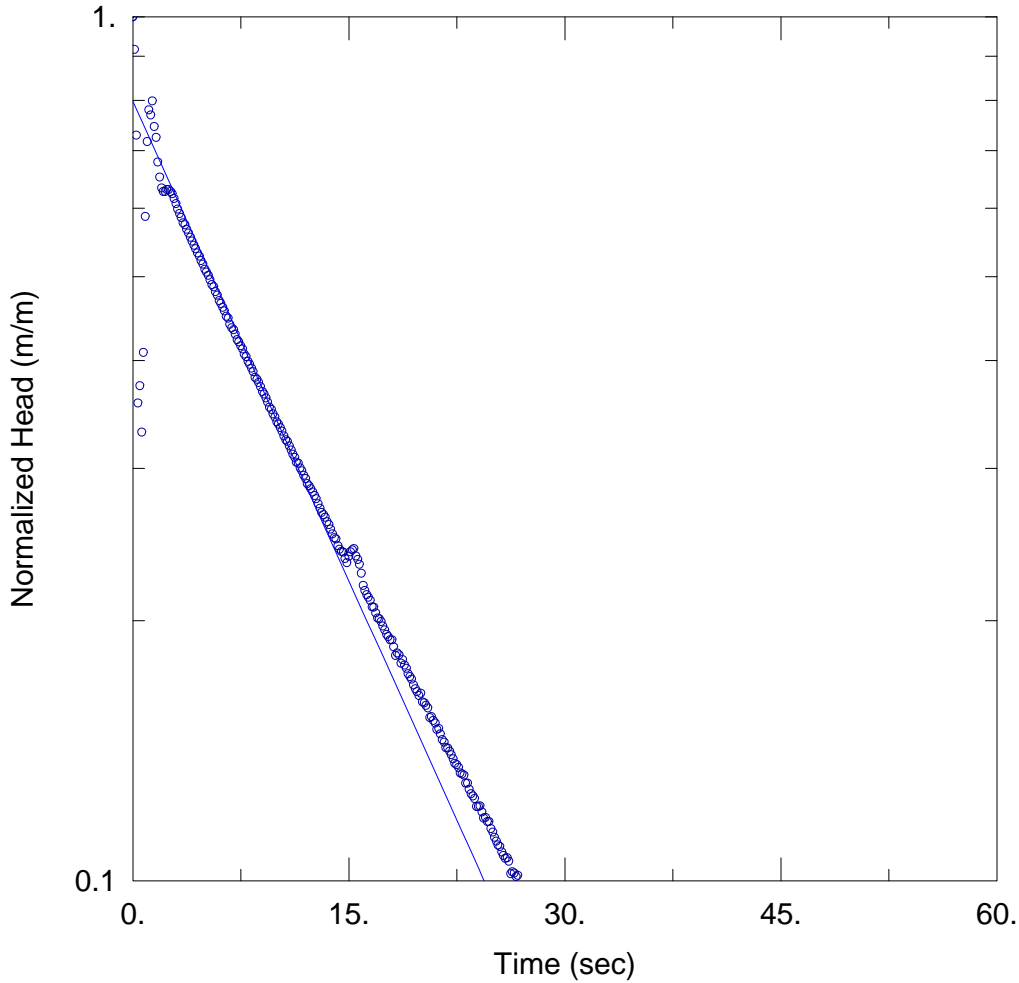
MW4-16 Falling Head 2

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Falling 2.aqt
Date: 10/05/16 Time: 15:44:39

Saturated Thickness: 5.83 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.003769 cm/sec y0 = 0.4909 m

WELL DATA (MW4-16)

Initial Displacement: 0.6154 m
Static Water Column Height: 5.83 m
Total Well Penetration Depth: 5.83 m
Screen Length: 2.99 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



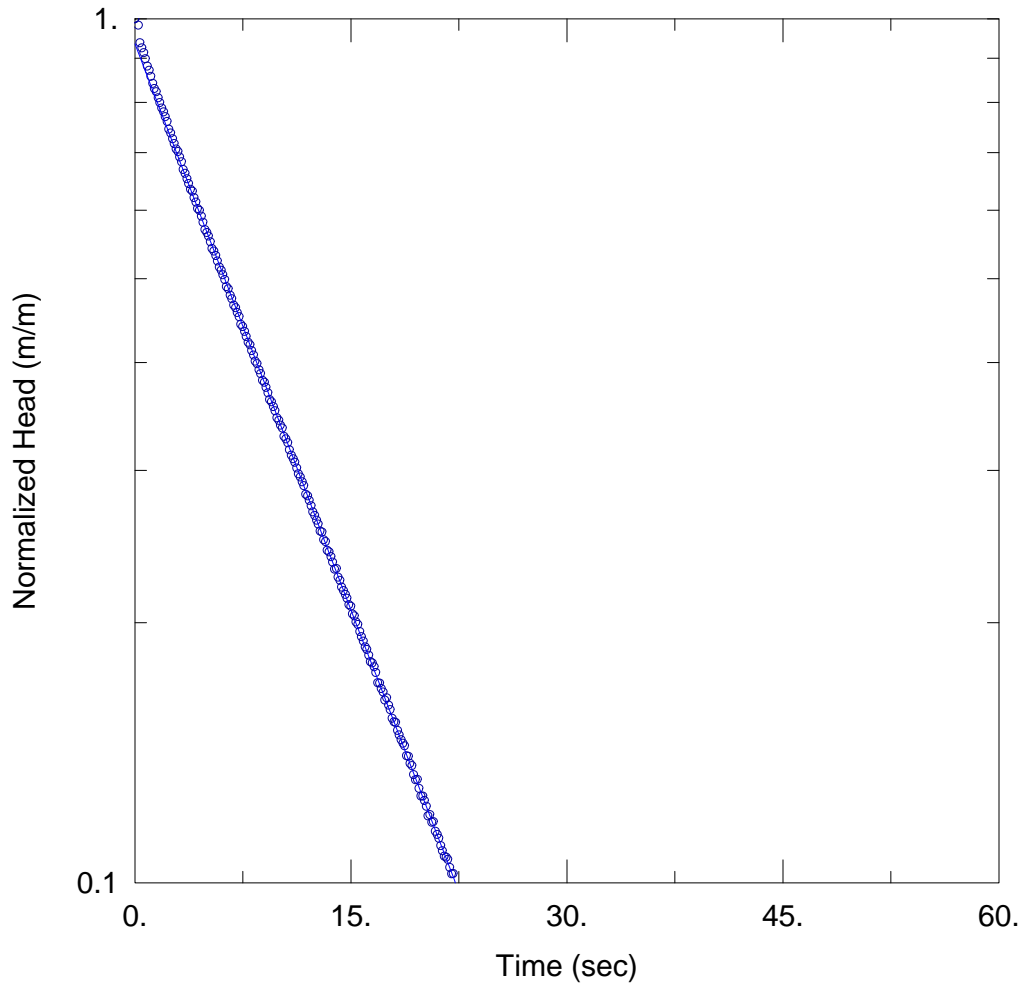
MW4-16 Rising Head 1

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW04-16 Rising 1 Hvorslev.aqt
Date: 10/05/16 Time: 15:43:47

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.005918 cm/sec y0 = 0.7136 m

AQUIFER DATA

Saturated Thickness: 5.83 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW4-16)

Initial Displacement: 0.7632 m
Static Water Column Height: 5.83 m
Total Well Penetration Depth: 5.83 m
Screen Length: 2.99 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



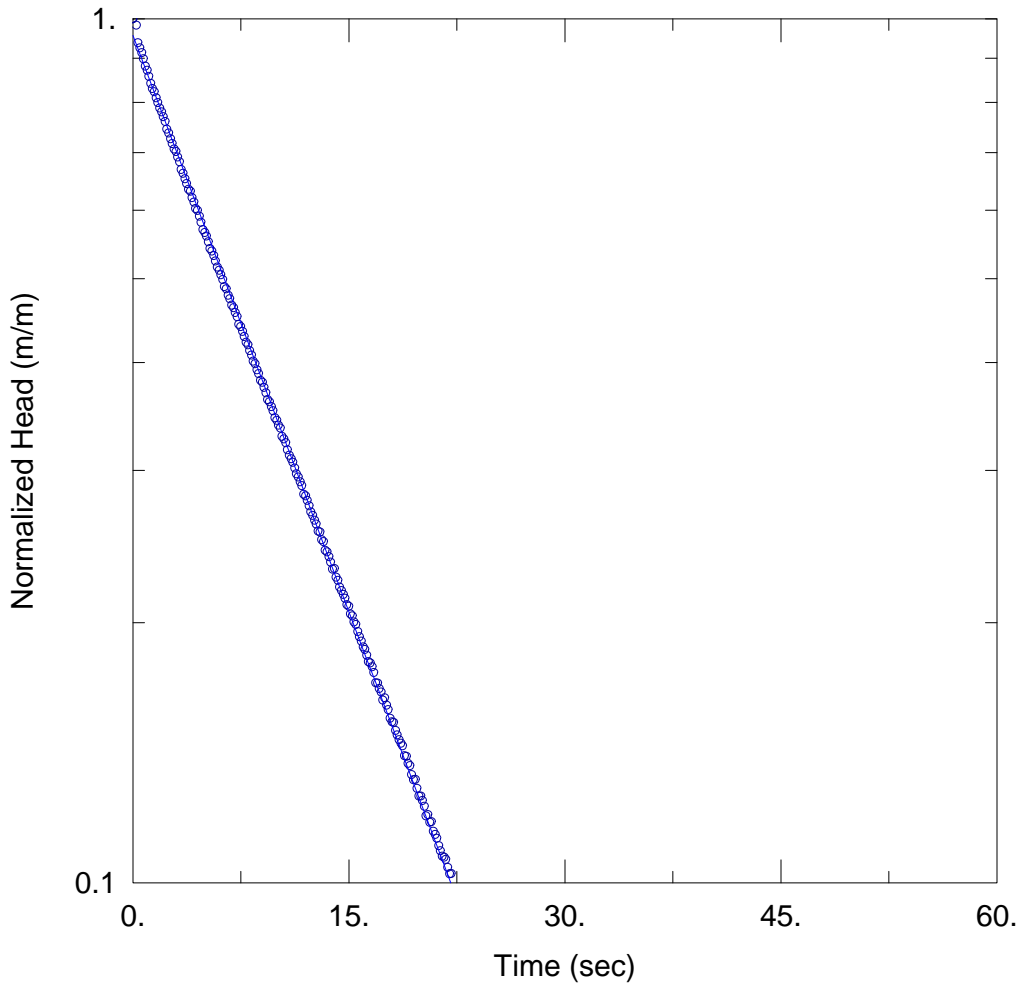
MW4-16 Rising Head 1

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Rising 1.aqt
 Date: 10/05/16 Time: 15:44:18

Saturated Thickness: 5.83 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 K = 0.004527 cm/sec y0 = 0.7296 m

WELL DATA (MW4-16)

Initial Displacement: 0.7632 m
 Static Water Column Height: 5.83 m
 Total Well Penetration Depth: 5.83 m
 Screen Length: 2.99 m
 Casing Radius: 0.0254 m
 Well Radius: 0.0254 m



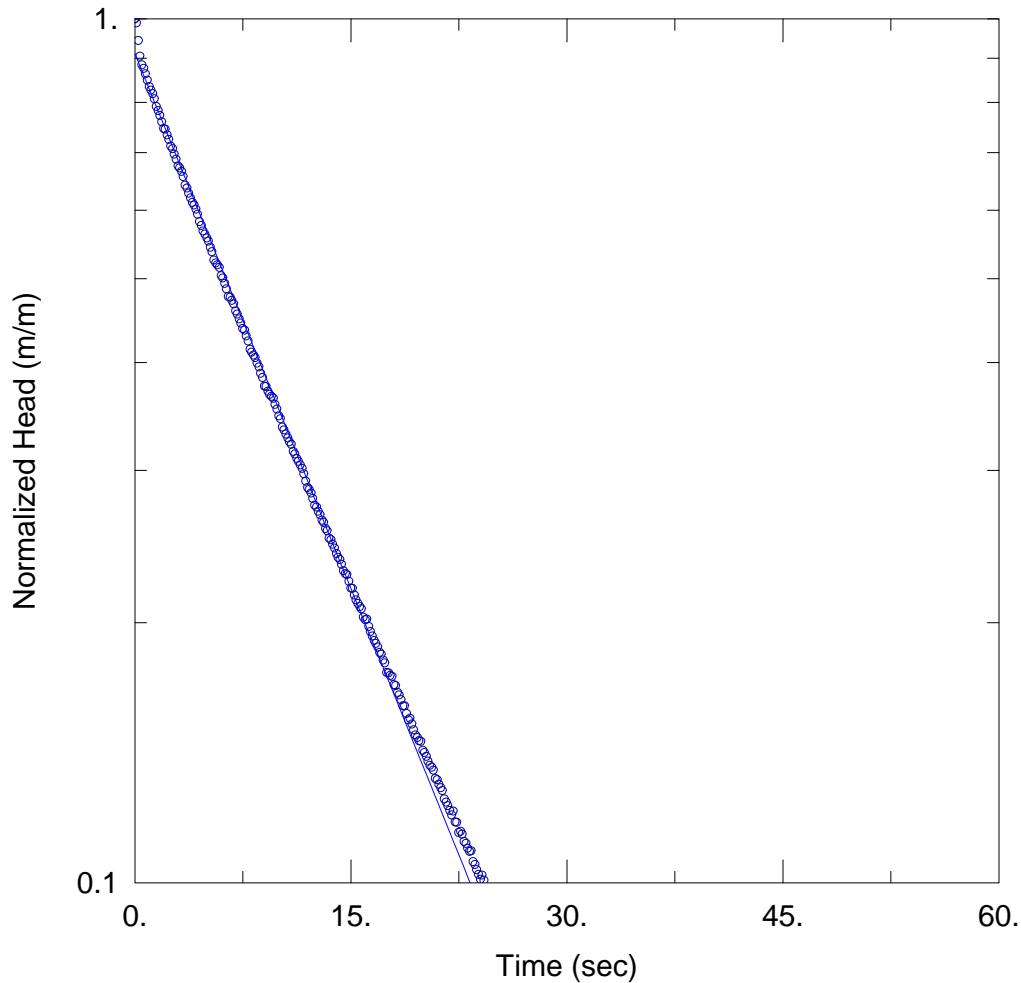
MW4-16 Rising Head 2

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\...MW04-16 Rising 2 Hvorslev.aqt
Date: 10/05/16 Time: 15:42:50

AQUIFER DATA

Saturated Thickness: 5.83 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 0.005592 cm/sec

y0 = 0.6988 m

WELL DATA (MW4-16)

Initial Displacement: 0.7672 m

Static Water Column Height: 5.83 m

Total Well Penetration Depth: 5.83 m

Screen Length: 2.99 m

Casing Radius: 0.0254 m

Well Radius: 0.0254 m



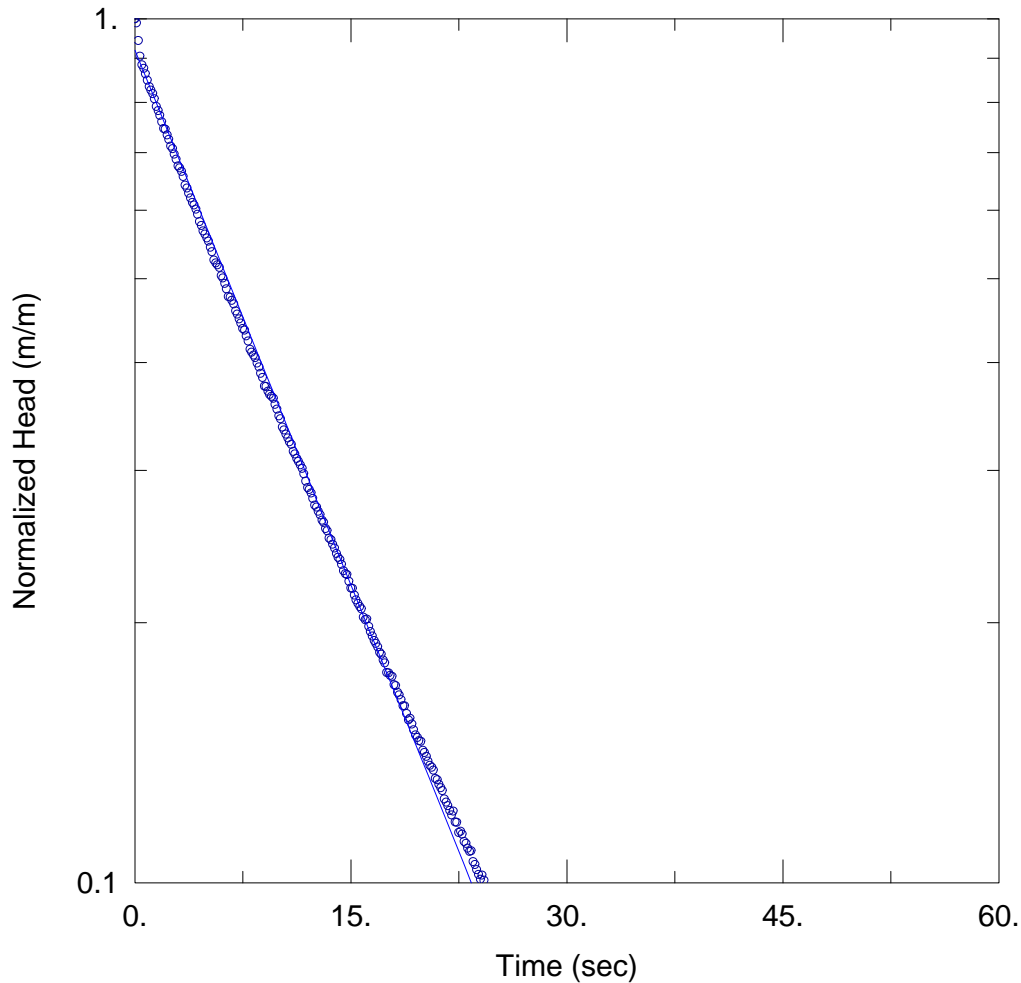
MW4-16 Rising Head 2

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: G:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydrAQUIFER DATA6 Rising 2.aqt
Date: 10/05/16 Time: 15:42:00

Saturated Thickness: 5.83 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.004202 cm/sec y0 = 0.7055 m

WELL DATA (MW4-16)

Initial Displacement: 0.7672 m
Static Water Column Height: 5.83 m
Total Well Penetration Depth: 5.83 m
Screen Length: 2.99 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



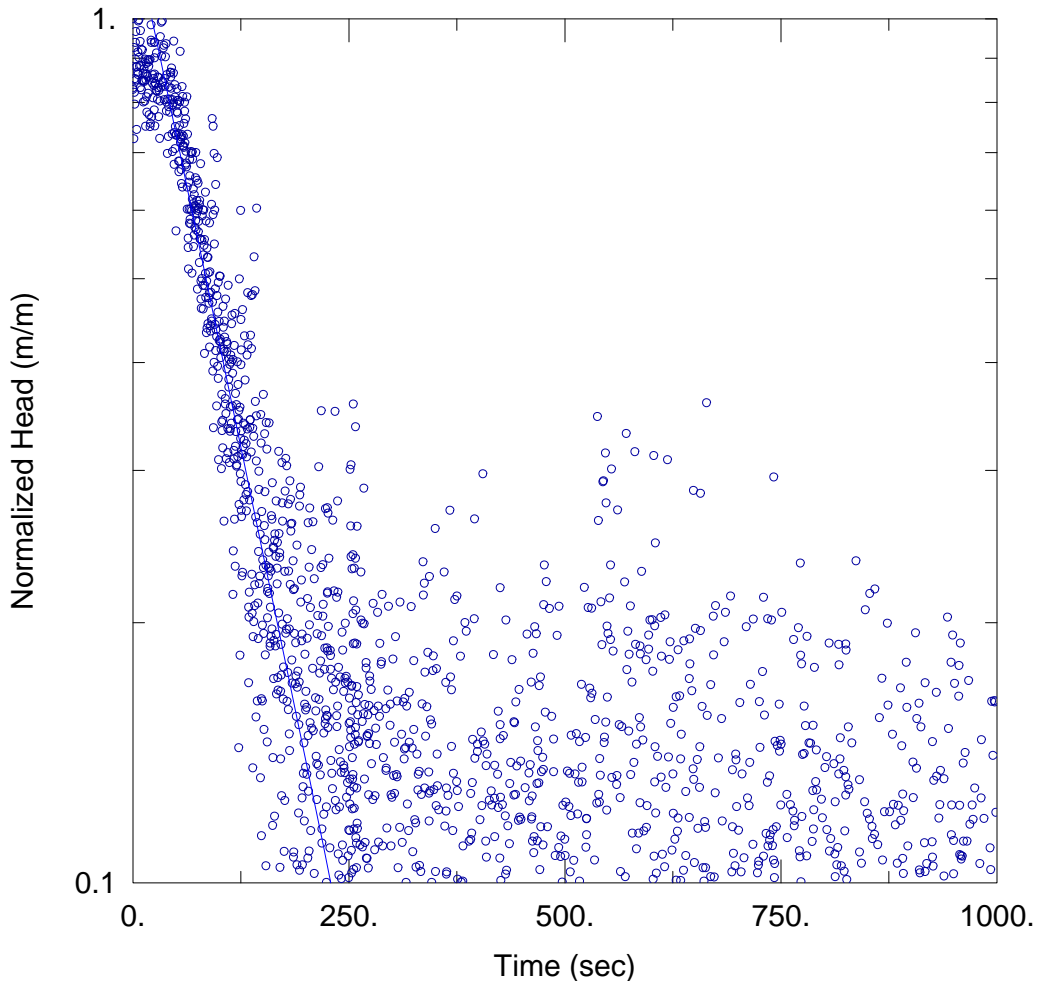
MW15-16 Rising Head Test

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: I:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydroAQUIFER DATA Rising Hvorslev.aqt
Date: 07/20/17 Time: 14:08:46

Saturated Thickness: 8.53 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 0.0006074 cm/sec y0 = 1.219 m

WELL DATA (MW15-16)

Initial Displacement: 0.9526 m

Static Water Column Height: 8.53 m

Total Well Penetration Depth: 8.53 m

Screen Length: 3.28 m

Casing Radius: 0.0254 m

Well Radius: 0.0254 m



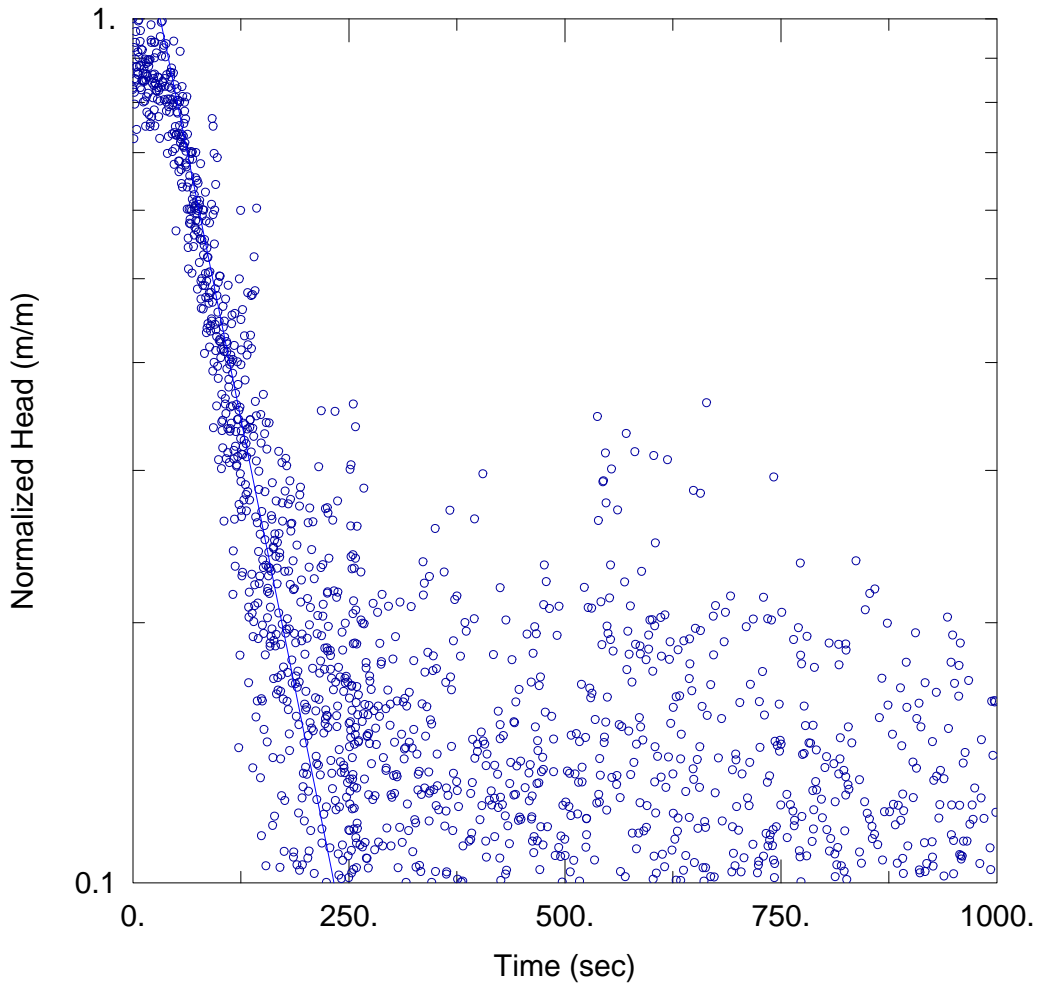
MW15-16 Rising Head Test

Prepared By:
GHD

Prepared For:
County of Simcoe

Project:
86822

Location:
2972 Horseshoe Valley Rd



Data Set: I:\Projects in Progress\6-chars\08----\0868--\086822\086822-MISC\HydroAQUIFER DATA Rising.aqt
Date: 07/20/17 Time: 14:09:07

Saturated Thickness: 8.53 m Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0004911 cm/sec $y_0 =$ 1.37 m

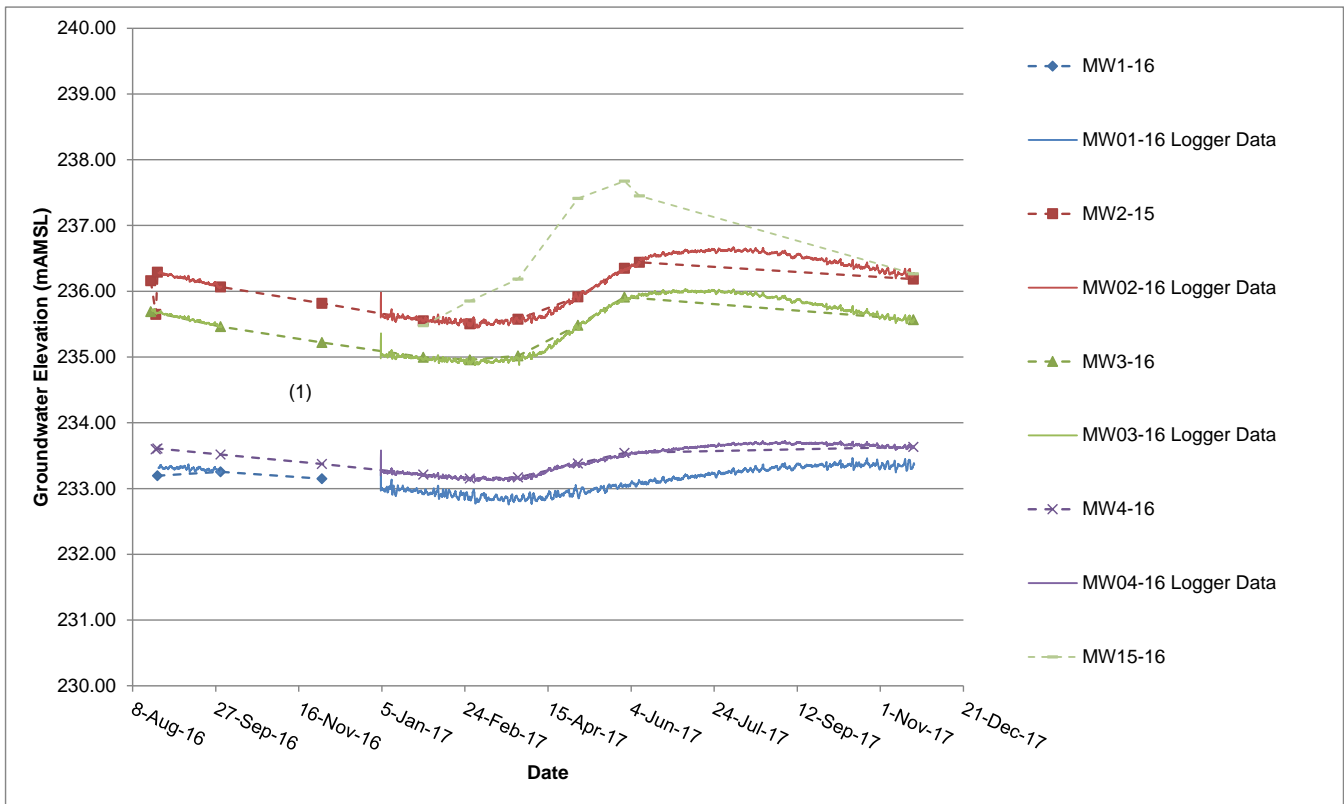
WELL DATA (MW15-16)

Initial Displacement: 0.9526 m
Static Water Column Height: 8.53 m
Total Well Penetration Depth: 8.53 m
Screen Length: 3.28 m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m



Appendix E

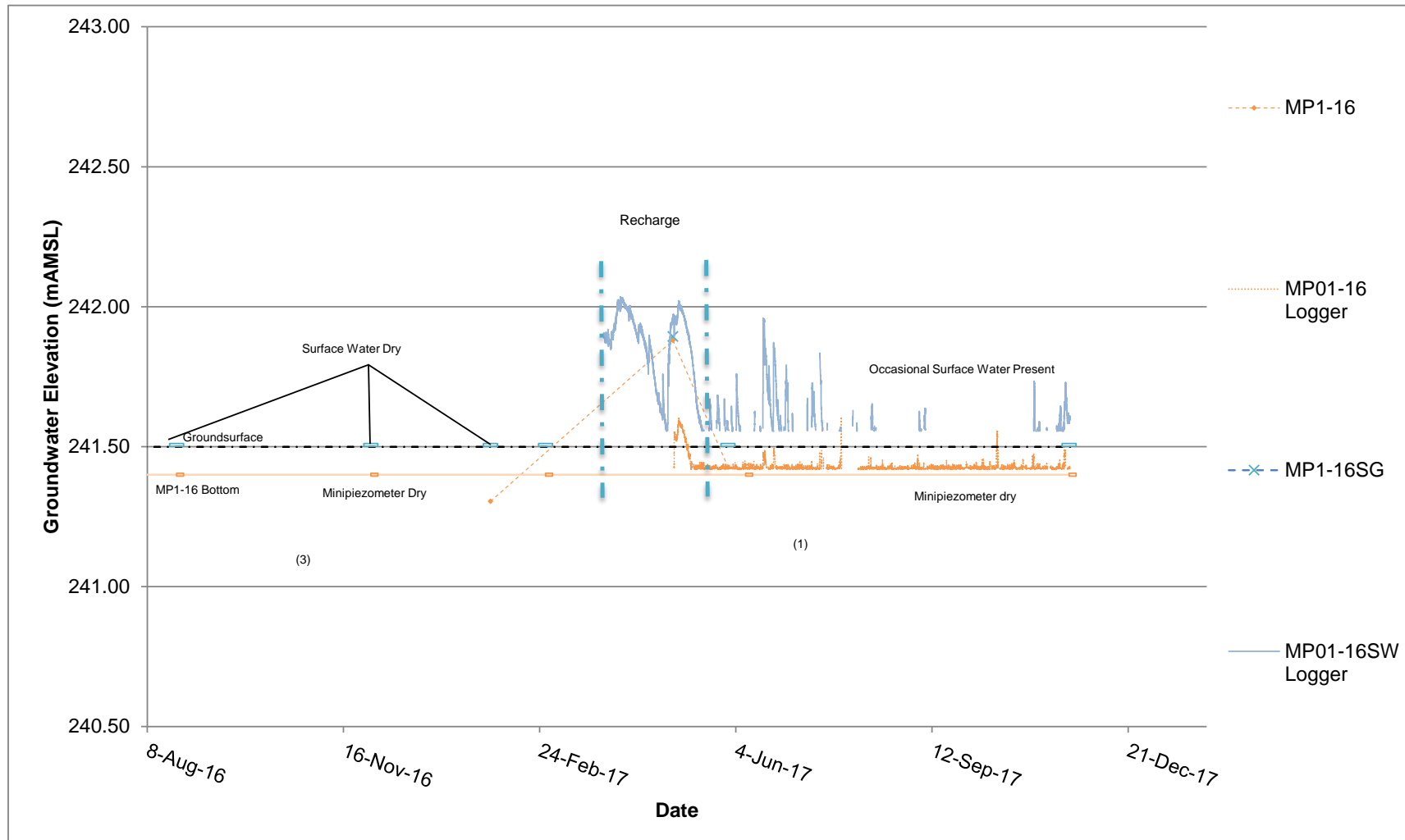
Groundwater Level Hydrographs



Note: Levellogger for MW4-16 malfunctioned during monitoring
 1) Level loggers are removed during the winters to avoid damage



County of Simcoe
 Environmental Resource Recovery Centre (ERRC)
 Updated Hydrogeological Assessment
 2976 Horseshoe Valley Road, Springwater
GROUNDWATER ELEVATION HYDROGRAPHS

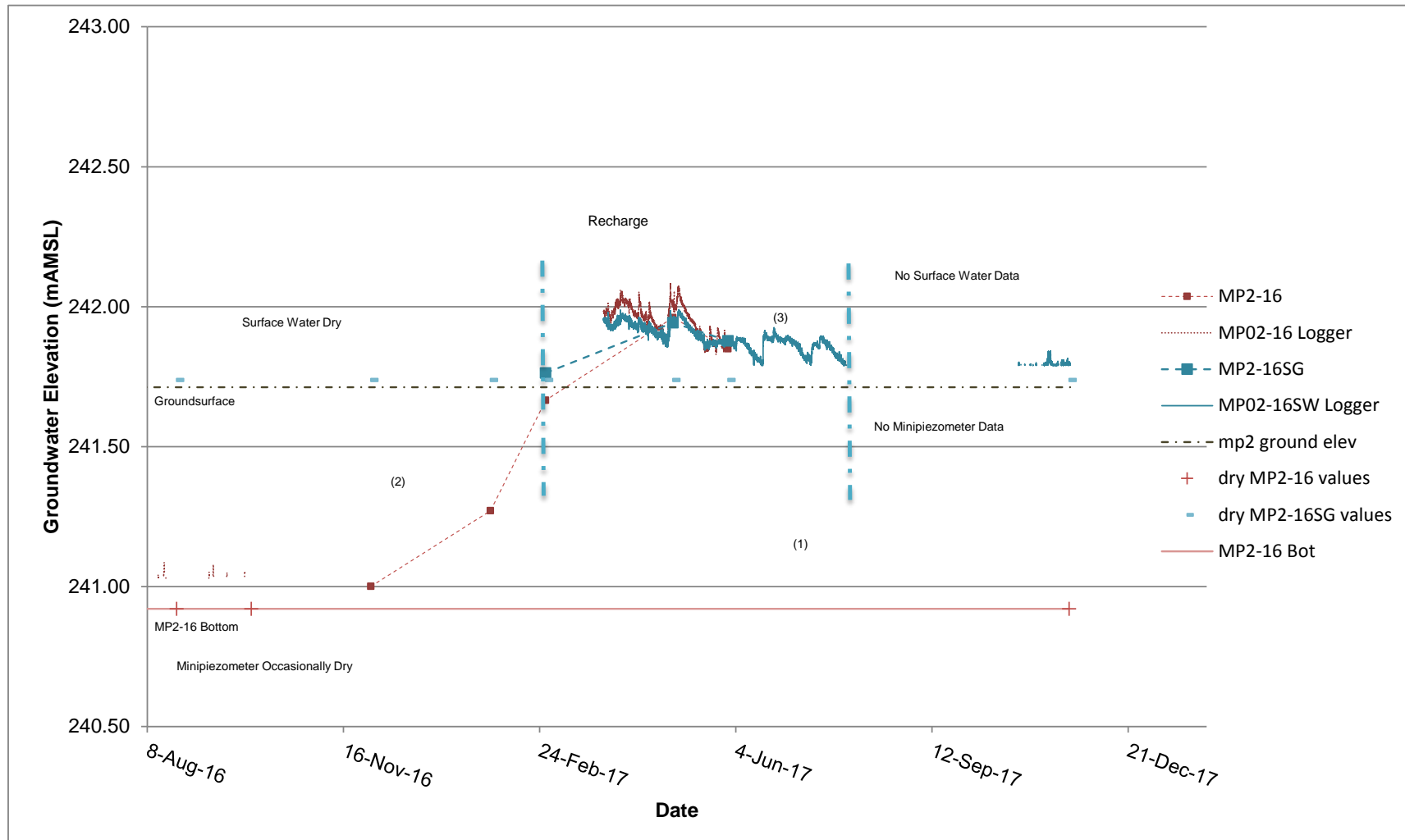


Note: (1) Minipiezometer commonly dry Aug 2016 to Nov 2017
 (2) Groundsurface of MP1 estimated
 (3) No datalogger data available



County of Simcoe
 Environmental Resource Recovery Centre (ERRC)
 Updated Hydrogeological Assessment
 2976 Horseshoe Valley Road, Springwater

MINIPIEZOMETER GROUNDWATER ELEVATION HYDROGRAPHS



Note: (1) Minipiezometer commonly dry Aug 2016 to Nov 2017

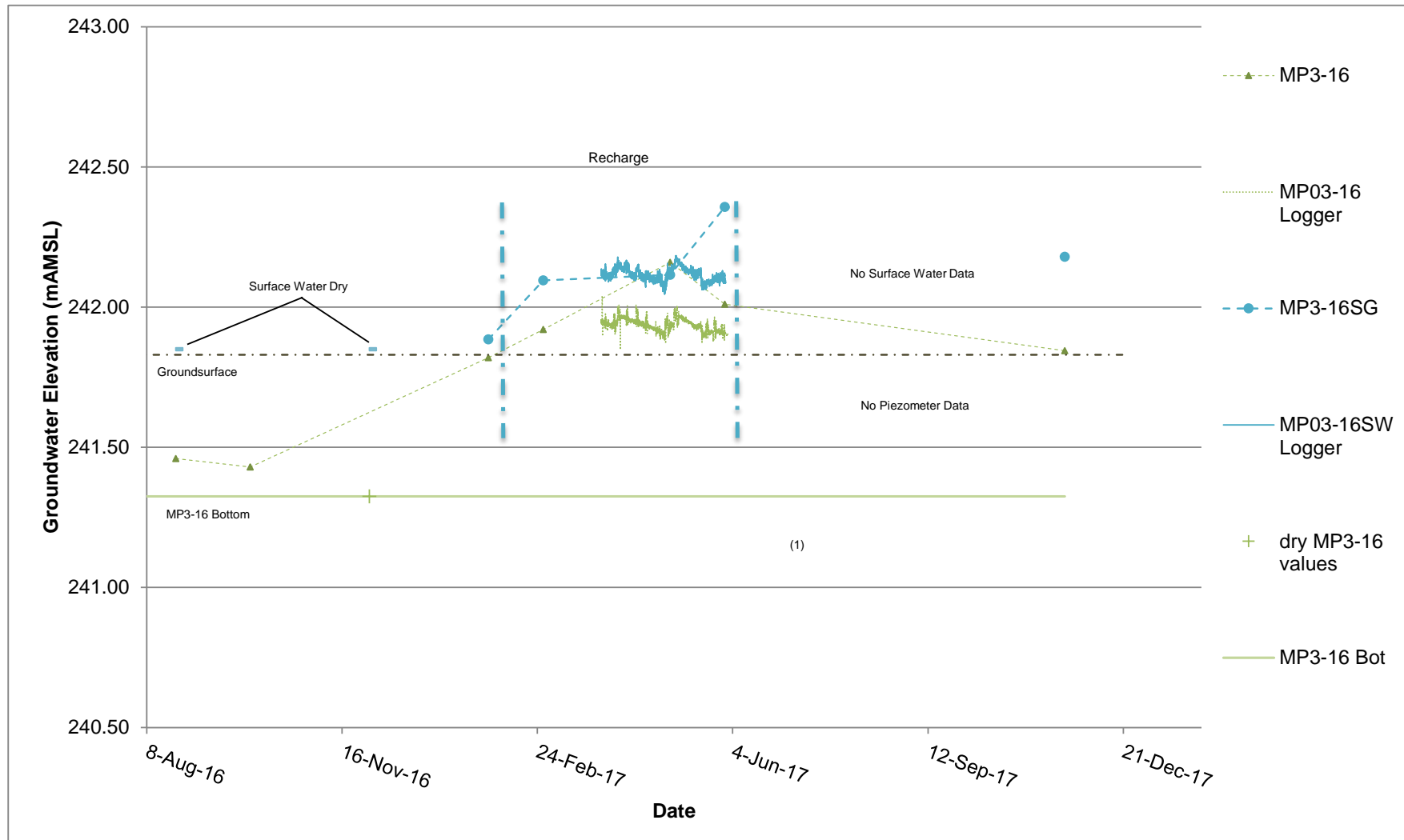
(2) No Data Logger data available

(3) MP2-16 data logger data unavailable



County of Simcoe
 Environmental Resource Recovery Centre (ERRC)
 Updated Hydrogeological Assessment
 2976 Horseshoe Valley Road, Springwater

MINIPIEZOMETER GROUNDWATER ELEVATION HYDROGRAPHS



Note: (1) Minniezometer commonly dry Aug 2016 to Nov 2017

(2) Water Levels are Dry, Datalogger data unavailable



County of Simcoe
 Environmental Resource Recovery Centre (ERRC)
 Updated Hydrogeological Assessment
 2976 Horseshoe Valley Road, Springwater

MINNIEZOMETER GROUNDWATER ELEVATION HYDROGRAPHS

Appendix F

MOECC Well Records

Appendix F.1 Well Record Formation Report

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

20/81

31062

11 1906252 19705

COUNTY OR DISTRICT: Durham TOWNSHIP: Beaverton (THORNTON) CON. BLOCK TRACT SURVEY ETC: 5 LOT: 15

164 Beaverton DATE COMPLETED: DAY 27 MO 08 YR 81

NG: 20600 RC: 5 ELEVATION: 0750 RC: 5 BASIN CODE: 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH FEET	
				FROM	TO
Black	Topsoil			0	1
Clay and Stone				1	20
Clay and Gravel				20	25
Coarse Gravel				25	28



31 0001802 0020 0512 0025 0511 0028 31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-13	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
15-18	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
20-23	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
25-28	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
30-35	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH FEET
9.6	STEEL	1/8	0-20.28
4	STEEL		20.28-30

SCREEN

SIZE OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
	4.4	10

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER ETC.
10-13		
18-21		
26-29		

71 PUMPING TEST

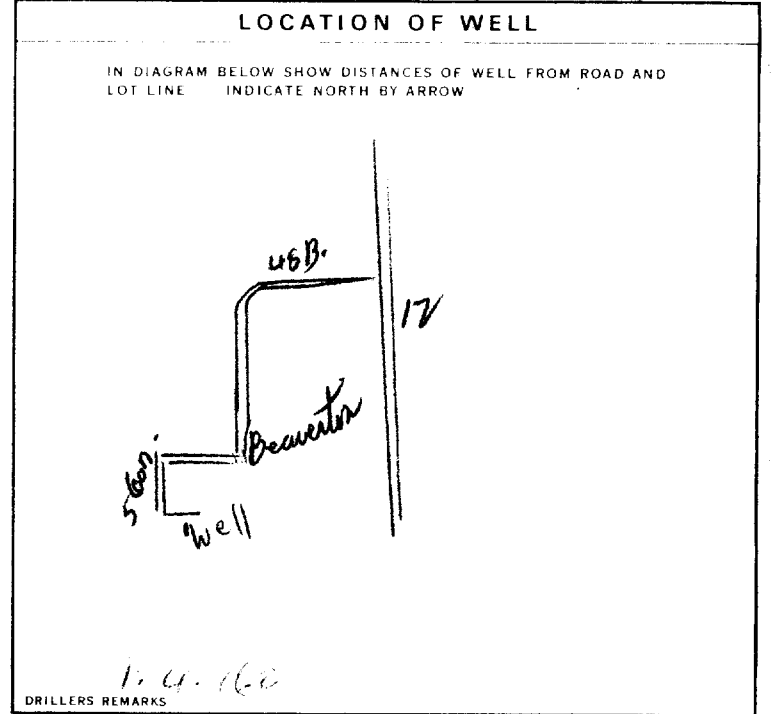
PUMPING TEST METHOD: 1 PUMP 2 MILLER

PUMPING RATE: 0002 GPM

DURATION OF PUMPING: 02 HOURS 00 MIN.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING PUMPING
010	022	15 MINUTES: 022, 30 MINUTES: 022, 45 MINUTES: 022, 60 MINUTES: 022

RECOMMENDED PUMP TYPE: SHALLOW DEEP



FINAL STATUS OF WELL: 1 WATER SUPPLY

WATER USE: 1 DOMESTIC

METHOD OF DRILLING: 1 CABLE TOOL

CONTRACTOR: Jordan Newman, Licence Number: 5415

NAME OF DRILLER OR BORER: Newman Well Drilling, Licence Number: 5415

SIGNATURE OF CONTRACTOR: Jordan Newman

MISSION DATE: DAY 13 MO 1 YR 81

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 5415 DATE RECEIVED: 29 01 82

DATE OF INSPECTION: INSPECTOR:

REMARKS:

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

Well Owner's Information and Location of Well Information

Form containing well owner information: RR#/Street Number/Name (HWY. 6/10 at COUNTY RD. 18), City/Town/Village (ROCKFORD), GPS Reading (NAD 8.3, Zone 17, Easting 596437, Northing 4929983), Unit Make/Model (Garmin eTREX Venture), Mode of Operation (Undifferentiated).

Log of Overburden and Bedrock Materials (see instructions)

Table with columns: General Colour, Most common material, Other Materials, General Description, Depth From, Depth To. Entry: Brown, Sandy clay, stones, bedrock, Hard, 0, 9 1/2'

Hole Diameter and Water Record sections. Hole Diameter: Depth 0 to 9 1/2', Diameter 6". Water Record: Fresh water, no gas, sulphur, or minerals.

Construction Record section. Casing: 2" Plastic, Sch. 40, 0 to 3'6". Screen: 2" Plastic, 10 slot, 9'6" to 3'6".

Test of Well Yield table. Pumping test method: Static Level, Pumping rate 1, Duration 2, Final water level 3, Recommended pump type 4, Recommended pump depth 5, Recommended pump rate 10-60.

Plugging and Sealing Record section. Depth set at 9'6" to 2'6" (Sand) and 2'6" to 0' (Holeplug). Method of Construction: Rotary (air). Water Use: Not used. Final Status of Well: Observation well.

Location of Well section. Diagram showing well location relative to RD. 18 (75' distance) and HWY. 6 (200' distance). Audit No. Z 37291, Date Well Completed 2005 07 06.

Well Contractor/Technician Information section. Contractor: DAVIDSON WELL DRILLING LIMITED, Licence No. 1737. Technician: FENTON DOUG, Licence No. T2003. Date Submitted: 2005 09 30.

Ministry Use Only section. Data Source, Date Received (NOV 27 2005), Date of Inspection, Well Record Number.

A023714

Instructions for Completing Form

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

Well Owner's Information and Location of Well Information

Ministry Use Only									
MUN								CON	LOT

GREY SYDENHAM
 RR#/Street Number/Name: HWY. 6/10 at COUNTY RD. 18 City/Town/Village: ROCKFORD Site/Compartment/Block/Tract etc.
 GPS Reading: NAD 83 Zone 17 Easting 596437 Northing 4929983 Unit Make/Model: Garmin eTREX 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	Ft.
Brown	Sandy clay	Stones		0'	9'6"		
Brown	Bedrock			9'6"	23'		

Hole Diameter			Construction Record				Test of Well Yield							
Depth From	Metres To	Diameter Centimetres	Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Metres To	Pumping test method	Time min	Draw Down Water Level Metres	Time min	Recovery Water Level Metres		
0	23'	6"	2"	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Fibreglass <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	Sch. 40	0'	13'	Pump intake set at - (metres)	Static Level					
Water Record			Casing				Screen				Test of Well Yield			
Water found at ___ Metres / Kind of Water			Screen				Pumping rate - (litres/min)				Recovery			
Fresh <input type="checkbox"/> Sulphur <input type="checkbox"/> Salty <input type="checkbox"/> Minerals <input type="checkbox"/>			Slot No.				Duration of pumping				Final water level end of pumping			
After test of well yield, water was			No Casing or Screen				Recommended pump type				Recommended pump depth			
Clear and sediment free <input type="checkbox"/>			Open hole <input type="checkbox"/>				Recommended pump rate (litres/min)				Recommended pump rate (litres/min)			
Other, specify							If flowing give rate - (litres/min)				If pumping discontinued, give reason.			
Chlorinated <input type="checkbox"/> Yes <input type="checkbox"/> No														

Plugging and Sealing Record Annular space Abandonment

Depth set at - Metres	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
23' to 12'	Sand	
12' to 0'	Holeplug	

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: DAVIDSON WELL DRILLING LIMITED Well Contractor's Licence No.: 1737

Business Address (street name, number, city, etc.): 147 NORTH ST. W. WINGHAM, ONTARIO. N0G 2W0

Name of Well Technician (last name, first name): FENTON DOUG Well Technician's Licence No.: T2003

Signature of Technician/Contractor: X J. C. Davidson Date Submitted: 2005/09/30

Location of Well

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

Audit No. Z 37292 Date Well Completed 2005 07 06

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

Ministry Use Only

Data Source Contractor 1737

Date Received NOV 21 2005 Date of Inspection

Remarks Well Record Number

A023714

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 _____

Address of Well Location (County/District/Municipality) **GREY** Township **SYDENHAM** Lot _____ Concession _____
 RR#/Street Number/Name **HWY. 6/10 at COUNTY RD. 18** City/Town/Village **ROCKFORD** Site/Compartment/Block/Tract etc. _____
 GPS Reading NAD Zone Easting Northing Unit Make/Model Mode of Operation: Undifferentiated Averaged
 Differentiated, specify _____
8.3 17 596437 4929983 Garmin eTREX Venture

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth	
				From	To
Brown	Sandy clay	Stones		0'	9 1/2'
Grey brn.	Bedrock		Hard	9 1/2'	59'

Hole Diameter			Construction Record				Test of Well Yield					
Depth From	Metres To	Diameter Centimetres	Inside diam	Material	Wall thickness	Depth From	Metres To	Pumping test method	Draw Down	Recovery		
0'	23'	10"						Time min	Water Level Metres	Time min	Water Level Metres	
0'	59'	6"	Casing									
Water Record			6"	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	.219"	0'	23'	Pump intake set at - (metres)	Static Level			
Water found at	Metres	Kind of Water	2"	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	Sch. 40	0'	49'	Pumping rate - (litres/min)	1	1		
<input type="checkbox"/> m	<input type="checkbox"/> Fresh <input type="checkbox"/> Sulphur <input type="checkbox"/> Gas <input type="checkbox"/> Salty <input type="checkbox"/> Minerals <input type="checkbox"/> Other:		Screen				Duration of pumping _____ hrs + _____ min					
<input type="checkbox"/> m	<input type="checkbox"/> Fresh <input type="checkbox"/> Sulphur <input type="checkbox"/> Gas <input type="checkbox"/> Salty <input type="checkbox"/> Minerals <input type="checkbox"/> Other:		2"	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized				Final water level end of pumping _____ metres	3	3		
After test of well yield, water was			Outside diam	<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	Slot No.	49'	59'	Recommended pump type.	4	4		
<input type="checkbox"/> Clear and sediment free <input type="checkbox"/> Other, specify _____			No Casing or Screen				Recommended pump depth. _____ metres					
Chlorinated <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Open hole				Recommended pump rate. (litres/min)	10	10			

Plugging and Sealing Record Annular space Abandonment

Depth set at - Metres	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0' 23'	10" - Benseal	
0' 47'	Holeplug	
47' 59'	Sand	

Method of Construction

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

Water Use

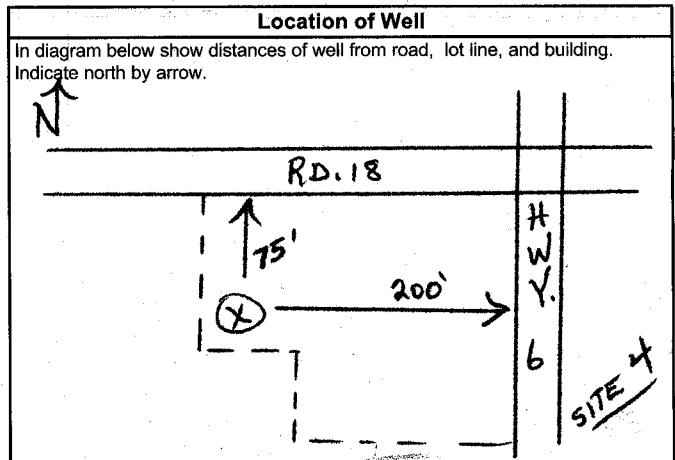
Domestic Industrial Public Supply Other
 Stock Commercial Not used
 Irrigation Municipal Cooling & air conditioning

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 **DAVIDSON WELL DRILLING LIMITED** Well Contractor's Licence No. **1737**
 Business Address (street name, number, city etc.) **147 NORTH ST. W. WINGHAM, ONT. N0G 2W0**
 Name of Well Technician (last name, first name) **FENTON DOUG** Well Technician's Licence No. **T2003**
 Signature of Technician/Contractor **X J.C. Davidson** Date Submitted _____



Audit No. **Z 37293** Date Well Completed **2005 07 07**

Was the well owner's information package delivered? Yes No Date Delivered _____

Ministry Use Only

Data Source _____ Contractor **1737**
 Date Received **NOV 21 2005** Date of Inspection _____
 Remarks _____ Well Record Number _____

A023714

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

Well Owner's Information and Location of Well Information

MUN		CON		LOT	
-----	--	-----	--	-----	--

RR#/Street Number/Name: **GREY HWY. 6/10 at COUNTY RD. 18** City/Town/Village: **ROCKFORD** Site/Compartment/Block/Tract etc.

GPS Reading: NAD **83** Zone **17** Easting **596437** Northing **4929983** Unit Make/Model: **Garmin eTREX Venture** Mode of Operation: Undifferentiated Averaged Differentiated, specify

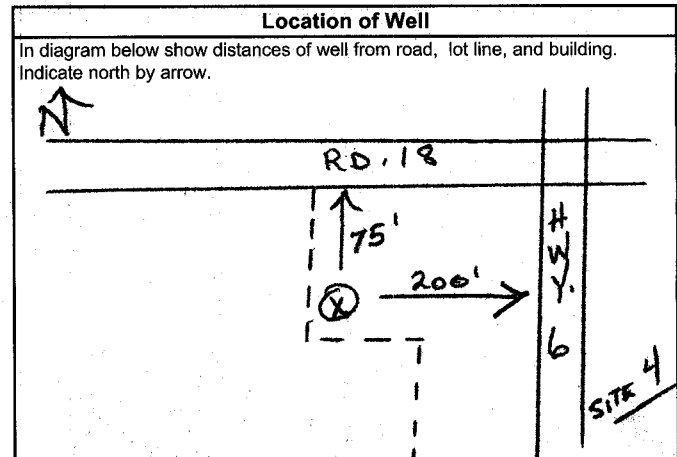
Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Metres To	Feet To
Brown	Sandy clay	Stones		0	9 1/2'	9 1/2'
Brown	Bedrock		Hard	9 1/2'	43'	43'

Hole Diameter			Construction Record				Test of Well Yield							
Depth From	Metres To	Diameter Centimetres	Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Metres To	Pumping test method	Time min	Water Level Metres	Recovery Time min	Water Level Metres		
0	22'	10"	6"	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass	.219"	0'	22'	Pump intake set at - (metres)	Static Level					
0	43'	6"	Casing											
Water Record			2"	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Concrete	Sch. 40	0'	33'	Pumping rate - (litres/min)	1		1			
Water found at Metres / Kind of Water			Screen											
Fresh Sulphur Gas Salty Minerals Other:			Outside diam	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Concrete	Slot No.	33'	43'	Duration of pumping	2		2			
After test of well yield, water was			No Casing or Screen											
Clear and sediment free			<input type="checkbox"/> Open hole											
Other, specify														
Chlorinated <input type="checkbox"/> Yes <input type="checkbox"/> No														
							Recommended pump type				4		4	
							Recommended pump depth				5		5	
							Recommended pump rate				10		10	
							If flowing give rate -				20		20	
							If pumping discontinued, give reason.				30		30	
											40		40	
											50		50	
											60		60	

Plugging and Sealing Record Annular space Abandonment

Depth set at - Metres	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0' 22'	10" - Benseal	
0' 31'	Holeplug	
31' 43'	Sand	



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 37294** Date Well Completed **2005 07 07**

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

Well Contractor/Technician Information

Name of Well Contractor: **DAVIDSON WELLDRIILLING LIMITED** Well Contractor's Licence No. **1737**

Business Address (street name, number, city etc.): **147 NORTH ST. W. WINGHAM, ONT. N0G 2W0**

Name of Well Technician (last name, first name): **FENTON DOUG** Well Technician's Licence No. **T2003**

Signature of Technician/Contractor: **X C. Davidson** Date Submitted **2005 09 30**

Ministry Use Only

Data Source Contractor **1737**

Date Received **NOV 21 2005** Date of Inspection

Remarks Well Record Number

A023714

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

Table with columns for MUN, CON, and LOT.

Well Owner's Information and Location of Well Information

Form containing RR#/Street Number/Name (HWY. 6/10 at COUNTY RD. 18), City/Town/Village (ROCKFORD), Site/Compartment/Block/Tract etc., GPS Reading, NAD, Zone, Easting, Northing, Unit Make/Model (Garmin eTREX Venture), and Mode of Operation.

Log of Overburden and Bedrock Materials (see instructions)

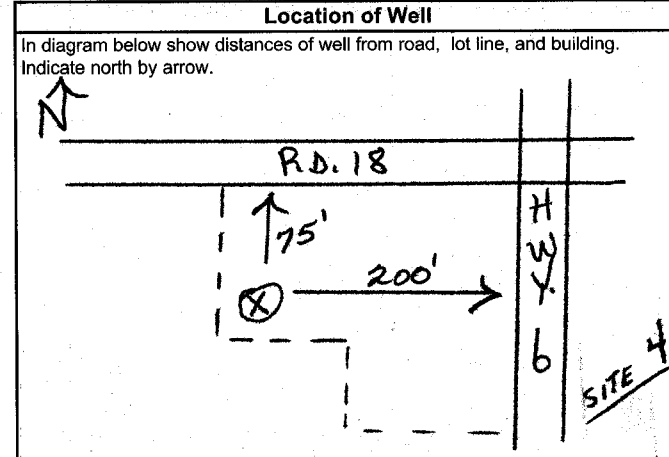
Table with columns: General Colour, Most common material, Other Materials, General Description, Depth From, and Depth To. Includes entries for Sandy clay, Bedrock, and Hard.

Hole Diameter and Water Record sections. Hole diameter table shows depths from 0 to 33' with diameters of 10" and 6". Water record section includes fields for water found at various depths and kind of water.

Construction Record section. Includes Casing and Screen details with columns for Inside diam, Material, Wall thickness, and Depth. Casing includes 6" and 2" diameters. Screen includes 2" diameter.

Test of Well Yield table. Columns: Pumping test method, Draw Down (Time, Water Level), and Recovery (Time, Water Level). Rows show pumping rate, duration, and final water level end of pumping.

Plugging and Sealing Record section. Includes table for depth set at (0' to 33') and material type (Benseal, Holeplug, Sand). Also includes Method of Construction and Water Use sections.



Final Status of Well and Well Contractor/Technician Information sections. Includes checkboxes for Water Supply, Recharge well, etc. Contractor: DAVIDSON WELL DRILLING LIMITED, Licence No. 1737. Technician: FENTON DOUG, Licence No. T2003.

Audit No. Z 37295, Date Well Completed 2005 07 07, Date Delivered, and package delivered status.

Ministry Use Only section. Includes Data Source, Contractor (1737), Date Received (NOV 21 2005), Date of Inspection, and Well Record Number.



Ontario

WATER WELL RECORD

31D/6E

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

11 4605898 46.008 105
 COUNTY OR DISTRICT: ONTARIO TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: THOROUGH
 CON., BLOCK, TRACT, SURVEY: 3
 DATE COMPLETED: DAY 18 MO. 06 YR. 74
 BEAVERTON CEDAR BEACH

4605898 17 645932 4920573 4 740 5 22 MAY 05, 1975 63
 LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	CLAY	GRAVEL	HARD	0	18
GREY	CLAY	GRAVEL	HARD	18	52
GREY	GRAVEL		POROUS	52	53

31 0018606/11 0052205/11 005321/1
 32 10 14 15 21 32 43 54 65 75 80

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
10-13	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	14	
2	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		
15-18	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	19	
2	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		
20-23	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	24	
2	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		
25-28	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	29	
2	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		
30-33	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	34 80	
2	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	1 <input checked="" type="checkbox"/> STEEL	188	0	13-16
2	2 <input type="checkbox"/> GALVANIZED			
3	3 <input type="checkbox"/> CONCRETE			
4	4 <input type="checkbox"/> OPEN HOLE			
17-18	1 <input type="checkbox"/> STEEL			20-23
2	2 <input type="checkbox"/> GALVANIZED			
3	3 <input type="checkbox"/> CONCRETE			
4	4 <input type="checkbox"/> OPEN HOLE			
24-25	1 <input type="checkbox"/> STEEL			27-30
2	2 <input type="checkbox"/> GALVANIZED			
3	3 <input type="checkbox"/> CONCRETE			
4	4 <input type="checkbox"/> OPEN HOLE			

SCREEN

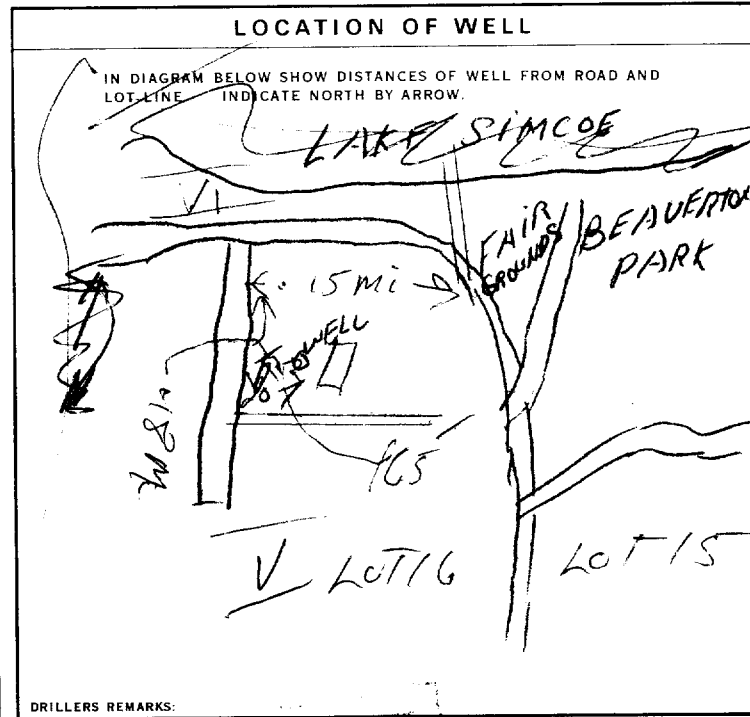
SIZE(S) OF OPENING (SLOT NO.)	31-33 DIAMETER	34-38 LENGTH	39-40
	INCHES	FEET	FEET
MATERIAL AND TYPE		DEPTH TO TOP OF SCREEN	41-44 80
		FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	(CEMENT GROUT LEAD PACKER, ETC.)
FROM TO		
10-13 14-17		
18-21 22-25		
26-29 30-33 80		

71 PUMPING TEST

PUMPING TEST METHOD	10 PUMPING RATE	11-14 DURATION OF PUMPING
1 <input checked="" type="checkbox"/> PUMP 2 <input type="checkbox"/> BAILER	0020 GPM	01 15-16 HOURS 00-18 MINS
STATIC LEVEL	WATER LEVEL END OF PUMPING	25 WATER LEVELS DURING
001	006	1 <input checked="" type="checkbox"/> PUMPING 2 <input type="checkbox"/> RECOVERY
19-21 FEET	22-24 FEET	15 MINUTES 26-28 FEET
006	006	30 MINUTES 29-31 FEET
		45 MINUTES 32-34 FEET
		60 MINUTES 35-37 FEET
006		
IF FLOWING GIVE RATE	38-41 PUMP INTAKE SET AT	42 WATER AT END OF TEST
	25 FEET	1 <input checked="" type="checkbox"/> CLEAR 2 <input type="checkbox"/> CLOUDY
	GPM	
RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
1 <input checked="" type="checkbox"/> SHALLOW 2 <input type="checkbox"/> DEEP	025 FEET	0006 GPM
	50-53 004.0 GPM / FT. SPECIFIC CAPACITY	



54 FINAL STATUS OF WELL

1 <input checked="" type="checkbox"/> WATER SUPPLY	5 <input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY
2 <input type="checkbox"/> OBSERVATION WELL	6 <input type="checkbox"/> ABANDONED, POOR QUALITY
3 <input type="checkbox"/> TEST HOLE	7 <input type="checkbox"/> UNFINISHED
4 <input type="checkbox"/> RECHARGE WELL	

55-56 WATER USE

1 <input checked="" type="checkbox"/> DOMESTIC	5 <input type="checkbox"/> COMMERCIAL
2 <input type="checkbox"/> STOCK	6 <input type="checkbox"/> MUNICIPAL
3 <input type="checkbox"/> IRRIGATION	7 <input type="checkbox"/> PUBLIC SUPPLY
4 <input type="checkbox"/> INDUSTRIAL	8 <input type="checkbox"/> COOLING OR AIR CONDITIONING
9 <input type="checkbox"/> OTHER	9 <input type="checkbox"/> NOT USED

57 METHOD OF DRILLING

1 <input type="checkbox"/> CABLE TOOL	6 <input type="checkbox"/> BORING
2 <input checked="" type="checkbox"/> ROTARY (CONVENTIONAL)	7 <input type="checkbox"/> DIAMOND
3 <input type="checkbox"/> ROTARY (REVERSE)	8 <input type="checkbox"/> JETTING
4 <input type="checkbox"/> ROTARY (AIR)	9 <input type="checkbox"/> DRIVING
5 <input type="checkbox"/> AIR PERCUSSION	

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
R.F. BROADWAY	1473
ADDRESS	
Box 397 SUTTON WEST ONT L0E 1P0	
NAME OF DRILLER OR BORER	LICENCE NUMBER
NORM POWELL	
SIGNATURE OF CONTRACTOR	SUBMISSION DATE
R.F. Broadway	DAY 18 MO. June YR. 74

OFFICE USE ONLY

DATA SOURCE	58 CONTRACTOR	59-62 DATE RECEIVED	63-68 80
1 1473		04 07 74	
DATE OF INSPECTION	INSPECTOR		
Oct. 28/74	J.B.		
REMARKS:			
Not Vented - informed owner.	P/J.B.		
R.P. 222 - Lot 24 CSS.S8	W/J.B.		

UTM 99 Z 999999 E

9 R 999999 N

Elev. 09 RI

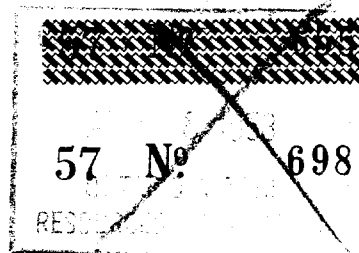
Basin 12 B



ONTARIO

The Water-well Drillers Act, 1954

Department of Mines



Water-Well Record

County or Territorial District Simcoe Township, Village, Town or City Flos

Con. 3 Street and Number (if in Village, Town or City)

Owner [Redacted] Address Rt 9 Shelburne

Date completed Aug 28 / 1957
(day) (month) (year)

Pipe and Casing Record

Pumping Test

Casing diameter(s) 2"
Length(s) 100 feet
Type of screen Johnson (2) (60%)
Length of screen 8 feet

Static level 90 feet from top
Pumping rate 300 gph
Pumping level 95 feet from top
Duration of test 3 H.R.

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
clay with boulders	top	30 feet			
Hard pan	30	47			
gravel with foam	47	94			
clay	94	100	100	90 from top	fresh
gravel with sand	100	110			

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

Home & farm uses gardens

Is water clear or cloudy? clear

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

Drilling firm Alex. Cameron

Address 22 Medhurst Ave

Name of Driller

Address

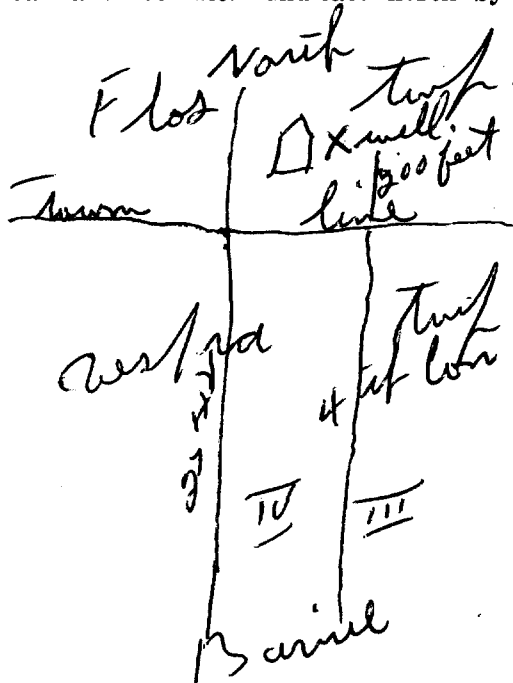
Licence Number 1198

I certify that the foregoing statements of fact are true

Date Aug 21 / 1957 Alex Cameron
Signature of Licensee

Location of Well

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



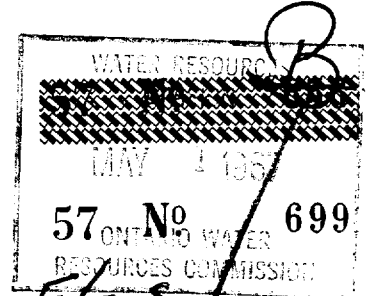
CSS.S8

well is directly opposite 4th line

WAM

WAM

E



UTM 17z 596438 E

5R 4929620 N

The Ontario Water Resources Commission Act

Elev. 5R 0825

WATER WELL RECORD

Basin 22 County or District SIMCOE

Township, Village, Town or City FLOES

Con. I Lot 3

Date completed 4 FEB. 1967 (day month year)

Address R.R. 1 PHELPSTON.

Casing and Screen Record

Inside diameter of casing 4"
 Total length of casing 76'
 Type of screen COOK SLOT 16
 Length of screen 4'
 Depth to top of screen 76'
 Diameter of finished hole 4"

Pumping Test

Static level 42'
 Test-pumping rate 10 G.P.M.
 Pumping level 48'
 Duration of test pumping 1 HR.
 Water clear or cloudy at end of test CLEAR.
 Recommended pumping rate 5 G.P.M.
 with pump setting of 60' feet below ground surface

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
Dug well	0	42		
HARD PAN	42	74		
COARSE SAND	74	80	74	FRESH

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

FARM

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

Drilling or Boring Firm

A. CAMERON

Address R.R. 1 MIDHURST.

Licence Number 2563

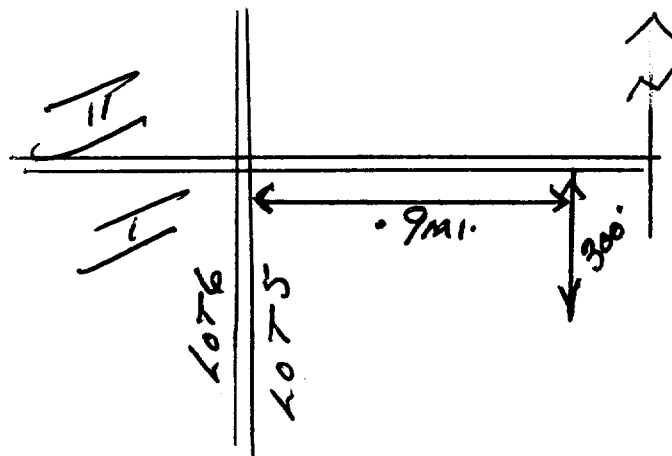
Name of Driller or Borer SAME

Date APR 02/67

(Signature of Licensed Drilling or Boring Contractor)

Location of Well

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





The Ontario Water Resources Commission Act WATER WELL RECORD

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

11 5706833-1P 57016 CON. 03

COUNTY OR DISTRICT SIMCOE TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE VESPRE TWP CON., BLOCK, TRACT, SURVEY, ETC. 8 III LOT 001

OWNER (SURNAME FIRST) [REDACTED] RH1 MIDHURST DATE COMPLETED DAY 15 MO OCT YR 69

228520 4 ELEVATION 0825 6 BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
GREY	SAND	CLAY BOULDERS	HARD	0	39
	SAND			39	87
	SILT			87	104
	SAND			104	113

31 00392090513 0087 09 0104 06 0113 09

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0104 10-13	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
15-18	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
20-23	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
25-28	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
30-33	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
05 10-11	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	188	0	0110
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE			20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE			27-30

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13 14-17	
18-21 22-25	
26-29 30-33 80	

71 PUMPING TEST

PUMPING TEST METHOD: 1 PUMP 2 BAILER

PUMPING RATE: 0007 GPM.

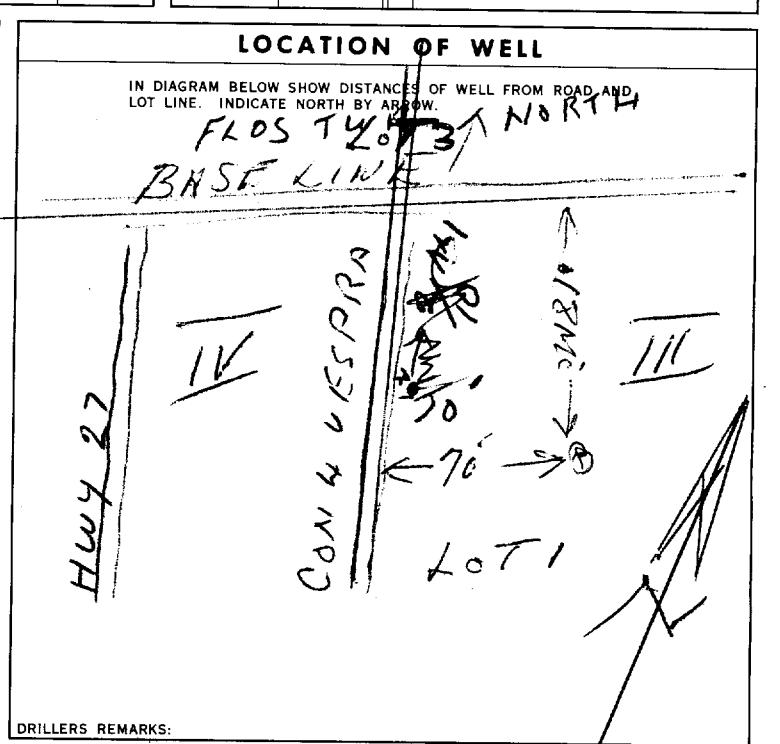
DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	RECOVERY
059 FEET	088 FEET	15 MINUTES: 059 FEET 30 MINUTES: 059 FEET 45 MINUTES: 059 FEET 60 MINUTES: 059 FEET	1 <input checked="" type="checkbox"/> PUMPING RECOVERY

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: 095 FEET

RECOMMENDED PUMPING RATE: 0007 GPM.



FINAL STATUS OF WELL

1 WATER SUPPLY
2 OBSERVATION WELL
3 TEST HOLE
4 RECHARGE WELL

5 ABANDONED, INSUFFICIENT SUPPLY
6 ABANDONED, POOR QUALITY
7 UNFINISHED

WATER USE

1 DOMESTIC
2 STOCK
3 IRRIGATION
4 INDUSTRIAL
5 OTHER

6 COMMERCIAL
7 MUNICIPAL
8 PUBLIC SUPPLY
9 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

WELL CONTRACTOR

NAME OF WELL CONTRACTOR: ANDERSON DRILLING LICENCE NUMBER: 3326

ADDRESS: 58 CAMPBELL AVE. BARIE ONT

NAME OF DRILLER OR BORER: ANDERSON LICENCE NUMBER: 3326

CONTRACTOR: as Anderson SUBMISSION DATE: DAY 16 MO OCT YR 69

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 1204 DATE RECEIVED: 191169

DATE OF INSPECTION: JAN 27 1970 INSPECTOR: P/J.B.

REMARKS: CSS.S8

RC COPY



WATER WELL RECORD

310/rw

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

11 5709928 57010 000 01

COUNTY OR DISTRICT: SIMCOE TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: VESPERA

CON., BLOCK, TRACT, SURVEY, ETC.: 3 3 LOT 25-27: 002

DATE COMPLETED: DAY 06 MO. 06 YR. 73

ADDRESS: RR'1 MIDHURST ONT

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	CLAY			0	35
GREY	SAND	CLAY	STONES	35	85
BROWN	"	"		85	105
"	"			105	112

31 010356105 0085228105/2 0105628105 01112628

32

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
05	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	188	0	0109
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE			20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 0010

DIAMETER: 05.000

LENGTH: 03

MATERIAL AND TYPE: JOHNSON SS

DEPTH TO TOP OF SCREEN: 069

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 PUMP 2 BAILER

PUMPING RATE: 0007 1/2 GPM

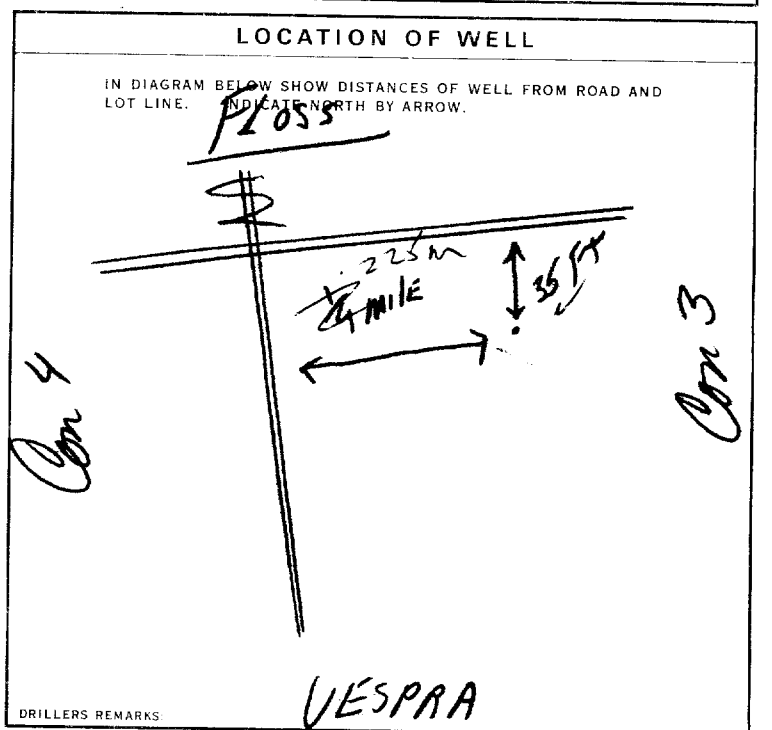
DURATION OF PUMPING: 01 15-16 HOURS 00 17-18 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING PUMPING			
078	085	15 MINUTES: 085	30 MINUTES: 085	45 MINUTES: 085	60 MINUTES: 085

IF FLOWING, GIVE RATE: 0007 GPM

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: 0007 GPM



FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF DRILLING

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

NAME OF WELL CONTRACTOR: KNEISEN WATER WELLS LICENCE NUMBER: 3203

ADDRESS: RR'1 BARRIE ONT

DRILLER OR BORER: A KNEISEN LICENCE NUMBER: 3213

DATE RECEIVED: 8 6 73

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 3203 DATE RECEIVED: 100778

DATE OF INSPECTION: INSPECTOR: [Signature]

REMARKS: [Signature]

CSS.S8



The Ontario Water Resources Commission Act WATER WELL RECORD

310/12w.

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

11 5709954 57003 CON 01

COUNTY OR DISTRICT: Simcoe TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Flos CON., BLOCK, TRACT, SURVEY, ETC.: I LOT: 25-27

OWNER (SURNAME FIRST): [REDACTED] ADDRESS: R#2 Phelpston ont DATE COMPLETED: 03

WELL NO.: 928818 ELEVATION: 4 855 BASIN CODE: 5 22 DATE: MAR 17, 1975 246

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
			<u>Pit</u>	<u>0</u>	<u>5</u>
<u>1. brown</u>	<u>sand</u>	<u>gravel, clay boulders</u>		<u>5</u>	<u>40</u>
<u>yellow</u>	<u>sand</u>	<u>gravel, boulders</u>	<u>loose</u>	<u>40</u>	<u>100</u>
<u>yellow</u>	<u>sand</u>		<u>fine</u>	<u>100</u>	<u>113</u>
<u>grey</u>	<u>clay</u>			<u>113</u>	<u>140</u>
<u>grey</u>	<u>clay</u>	<u>sand</u>	<u>fine</u>	<u>140</u>	<u>174</u>
<u>grey</u>	<u>sand</u>		<u>medium</u>	<u>174</u>	<u>178</u>

31 00005 23 004002811651 010025281113 0113508 0140205 017426508

32 0178209

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
10-13	<input checked="" type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
17-18	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
20-23	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
25-28	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
30-33	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	<input checked="" type="checkbox"/> STEEL	<u>.188</u>	<u>5</u>	<u>0175</u>
17-18	<input type="checkbox"/> GALVANIZED			
24-25	<input type="checkbox"/> STEEL			

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 012

DIAMETER: 06.000 INCHES

LENGTH: 03 FEET

MATERIAL AND TYPE: stainless steel

DEPTH TO TOP OF SCREEN: 0175 FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: PUMP BAILER

PUMPING RATE: 0020 GPM.

DURATION OF PUMPING: 01 HOURS 30 MINS.

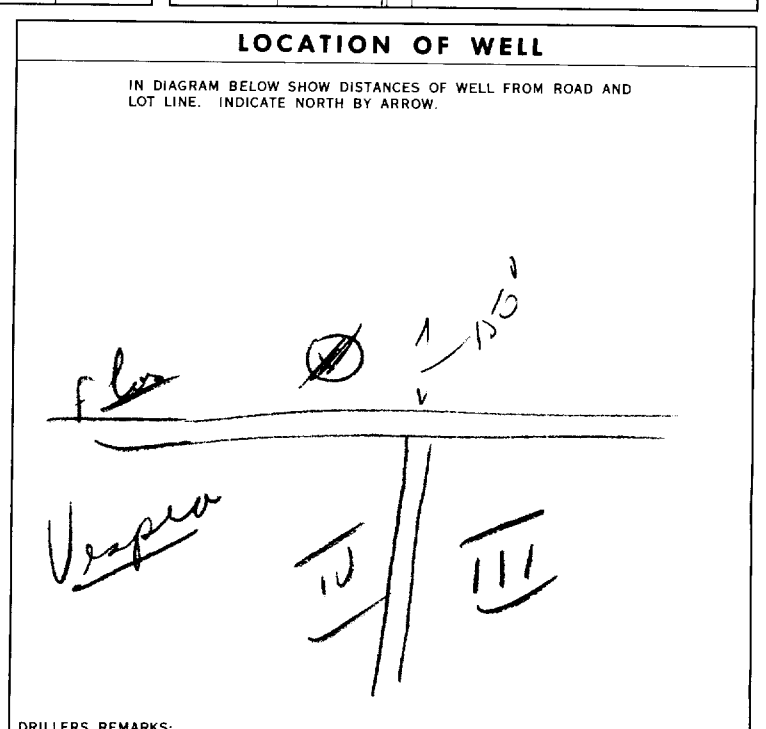
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
<u>093</u> FEET	<u>147</u> FEET	15 MINUTES: <u>094</u> FEET	30 MINUTES: <u>093</u> FEET	45 MINUTES: <u>093</u> FEET	60 MINUTES: <u>093</u> FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: 118 FEET

RECOMMENDED PUMPING RATE: 0009 GPM.

50-53 000.4 GPM./FT. SPECIFIC CAPACITY



FINAL STATUS OF WELL

WATER SUPPLY

WATER USE

DOMESTIC

METHOD OF DRILLING

CABLE TOOL

CONTRACTOR

NAME OF WELL CONTRACTOR: H. HAMMERS LICENCE NUMBER: 2514

ADDRESS: RPT# 3 Barrie, Ont.

NAME OF DRILLER OR BORER: G. Hammes LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Henry Hammes SUBMISSION DATE: _____

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 2514 DATE RECEIVED: 100773

DATE OF INSPECTION: _____ INSPECTOR: _____

REMARKS: _____

CS5.58



Ontario

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

31 D 12 W

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

11

5713446

MUNICIP. 57016

CON. CON

09

COUNTY OR DISTRICT Simcoe	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE Vespra	CON., BLOCK, TRACT, SURVEY, ETC. 4	LOT 001
ADDRESS RR #1 MIDHURST ONT		DATE COMPLETED DAY 21 MO 05 YR. 75	

ZONE 21	EASTING 17 597450	NORTHING 4928550	RC 5	ELEVATION 0840	RC 5	BASIN CODE 22
-------------------	-----------------------------	----------------------------	----------------	--------------------------	----------------	-------------------------

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
Brown	Topsoil			0	1
"	Sand		Loose	1	19
"	"	gravel, stones	Packed	19	73
"	"			73	98
"	clay	silt		98	125
"	Sand		Wet	125	125
"	"		Dead	128	-

31	0001602	001962877	00736281112	0098628	012520506	012862891	1
32	0128628						

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	1 <input checked="" type="checkbox"/> STEEL	258	0	0125
17-18	1 <input type="checkbox"/> STEEL			20-23
24-25	1 <input type="checkbox"/> STEEL			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 012	DIAMETER 05000	LENGTH 03
MATERIAL AND TYPE Johnson SS		DEPTH TO TOP OF SCREEN 0125

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD 1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> DRILLER	PUMPING RATE 0007 GPM	DURATION OF PUMPING 15-16 01 HOURS 17-18 20 MINS
STATIC LEVEL 078 FEET	WATER LEVEL END OF PUMPING 103 FEET	WATER LEVELS DURING PUMPING 15 MINUTES 103 FEET 30 MINUTES 103 FEET 45 MINUTES 103 FEET 60 MINUTES 103 FEET
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST 1 <input checked="" type="checkbox"/> CLEAR 2 <input type="checkbox"/> CLOUDY
RECOMMENDED PUMP TYPE <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP	RECOMMENDED PUMP SETTING 110 FEET	RECOMMENDED PUMPING RATE 0007 GPM

LOCATION OF WELL

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

County Rd 22

600ft

60ft

FLBTP

47th CON

DRILLERS REMARKS:

FINAL STATUS OF WELL 54

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

WATER USE 55-56

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

METHOD OF DRILLING 57

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

CONTRACTOR

NAME OF WELL CONTRACTOR
R. Nielsen Water Wells LICENCE NUMBER **3203**

ADDRESS
RR #1 Barrie Ont

NAME OF DRILLER OR BORER
George Hunt LICENCE NUMBER **3135**

SIGNATURE OF CONTRACTOR
[Signature] SUBMISSION DATE
DAY **23** MO **5** YR **75**

OFFICE USE ONLY

DATA SOURCE
3203

CONTRACTOR
3203

DATE RECEIVED
23 08 78

DATE OF INSPECTION

INSPECTOR

REMARKS:

P JUNET

WI

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

11

5724421

MUNICIPALITY 57,003

CON. 101

COUNTY OR DISTRICT: [REDACTED] TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: [REDACTED] CON. BLOCK, TRACT, SURVEY ETC: 1 LOT: 25-27 3

DATE COMPLETED: 48-53 DAY 11 MO 1 YR 89

R.R. #2 PHELIPSTON ONTARIO

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	TOP SOIL			0	1
BROWN	SAND	STONES		1	31
GREY	SAND	CLAY		31	106
BROWN	SAND		MEDIUM	106	113
BROWN	SAND		FINE	113	118
GREY	CLAY	SAND		118	146
GREY	CLAY			146	170
GREY	SAND		FINE CEMENTED	170	178
TOTAL DEPTH				178'	

31 [] 32 []

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER		
170	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS
	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS
	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS
	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
5	1 <input checked="" type="checkbox"/> STEEL 2 <input checked="" type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC	.188	2' ABOVE GROUND	171
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC			20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 4" 10 SLOT, 2" 12 SLOT

DIAMETER: 5 INCHES

LENGTH: 7 FEET

MATERIAL AND TYPE: JOHNSON STAINLESS

DEPTH TO TOP OF SCREEN: 171 FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 PUMP, 2 BAILER

PUMPING RATE: 8 GPM

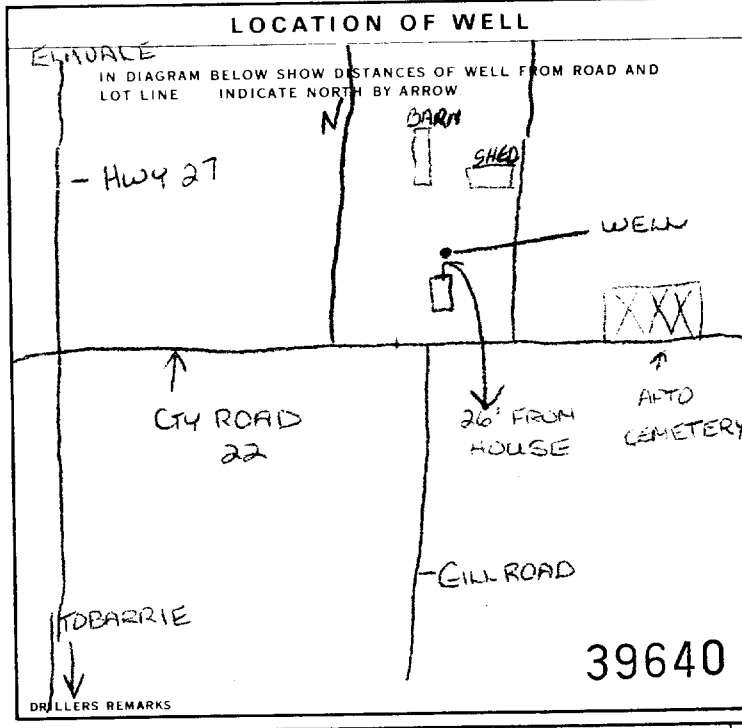
DURATION OF PUMPING: 2 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
92 FEET	140 FEET	15 MINUTES: 116 FEET	30 MINUTES: 138 FEET	45 MINUTES: 140 FEET	60 MINUTES: 140 FEET

RECOMMENDED PUMP TYPE: SHALLOW, DEEP

RECOMMENDED PUMP SETTING: 165 FEET

RECOMMENDED PUMPING RATE: 10 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, 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: BUE & BUKER DRILLING LTD

WELL CONTRACTOR'S LICENCE NUMBER: 1467

ADDRESS: R.R. #1 BOX 7 BARRIE ONTARIO

NAME OF WELL TECHNICIAN: BRIAN BUKER

WELL TECHNICIAN'S LICENCE NUMBER: T0226

SIGNATURE OF TECHNICIAN/CONTRACTOR: Brian Buker

SUBMISSION DATE: DAY 24 MO 1 YR 89

OFFICE USE ONLY

DATA SOURCE: 1467

DATE RECEIVED: JAN 27 1989

DATE OF INSPECTION: []

INSPECTOR: []

REMARKS: WDE

CSS.ES

WATER WELL RECORD

5729792

MUNICIPALITY OF WELL # 3 CON

03

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

COUNTY OR DISTRICT: [REDACTED] TOWNSHIP, BOROUGH CITY, TOWN, VILLAGE: **WESPREA CRAIGHURST** CON. BLOCK, TRACT, SURVEY, ETC.: **CON 3** LOT: **1**

DATE COMPLETED: DAY **18** MO **NOV** YR **92**

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BLACK	TOP SOIL			0	1
RED	SAND			1	6
GRAY	CLAY	SAND		6	8.5
	(MEDIUMS SAND)			8.5	9.6
GRAY	CLAY	SILT		9.6	17.0
	(MEDIUMS SAND)			17.0	17.5
GRAY	CLAY	SILT		17.5	19.0
	WATER BEARING SAND			19.0	22.0

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER	
190	<input checked="" type="checkbox"/> FRESH <input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR <input type="checkbox"/> MINERALS <input type="checkbox"/> GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
6 1/4	STEEL GALVANIZED CONCRETE OPEN HOLE PLASTIC	.188	0	210

SCREEN

SIZE OF OPENING (SLOT NO.): **30** DIAMETER: **6** INCHES LENGTH: **4** FEET

MATERIAL AND TYPE: **STAINLESS** DEPTH TO TOP OF SCREEN: **210** FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER, ETC.
18-25	CUTTINGS - DENSIFAL	
26-29	K-PACKER	

71 PUMPING TEST

PUMPING TEST METHOD: PUMP BAILER

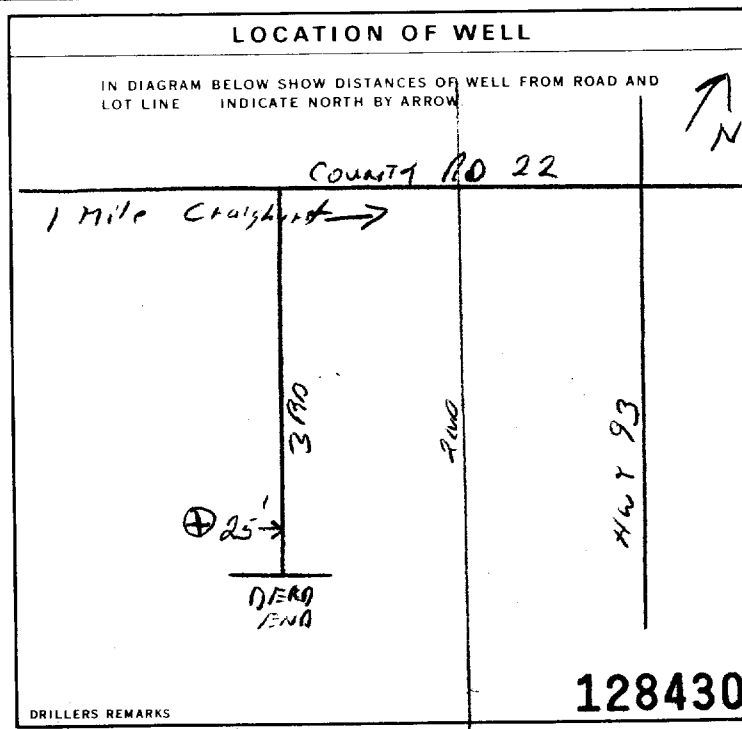
PUMPING RATE: **25** GPM DURATION OF PUMPING: **1** HOURS **0** MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
180 FEET	180 FEET	15 MINUTES: 86 FEET	30 MINUTES: 20 FEET	45 MINUTES: 2 FEET	60 MINUTES: 35 FEET

IF FLOWING, GIVE RATE: **1/2** GPM

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: **150** FEET RECOMMENDED PUMPING RATE: **25** GPM



FINAL STATUS OF WELL

WATER SUPPLY ABANDONED, INSUFFICIENT SUPPLY

OBSERVATION WELL ABANDONED, POOR QUALITY

TEST HOLE UNFINISHED

RECHARGE WELL DEWATERING

WATER USE

DOMESTIC COMMERCIAL

STOCK MUNICIPAL

IRRIGATION PUBLIC SUPPLY

INDUSTRIAL COOLING OR AIR CONDITIONING

OTHER NOT USED

METHOD OF CONSTRUCTION

CABLE TOOL BORING

ROTARY (CONVENTIONAL) DIAMOND

ROTARY (REVERSE) JETTING

ROTARY (AIR) DRIVING

AIR PERCUSSION DIGGING OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: **Drury Well Drilling** WELL CONTRACTOR'S LICENCE NUMBER: **1851**

ADDRESS: **RR #1 Barrie L4M 4G8**

NAME OF WELL TECHNICIAN: **HARRY HASTINGS** WELL TECHNICIAN'S LICENCE NUMBER: **T-2041**

SIGNATURE OF TECHNICIAN/CONTRACTOR: *[Signature]* SUBMISSION DATE: DAY **11** MO **01** YR **93**

OFFICE USE ONLY

DATE RECEIVED: **1851** **JAN 15 1993**

REMARKS: **CSS.ES**

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

11

5736248

Municipality
57003

Con.
CON 01

County or District SIMCOE	Township/Borough/City/Town/Village FLOS	Con block tract survey, etc. 1	Lot 1
Address RR#2 PHELSTON ONT		Date completed 29 6 01 day month year	
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	To
BROWN	TOP SOIL			0	1
BROWN	SAND			1	7
GRAY	SAND	CLAY/STONES		7	52
GRAY	CLAY	SAND		52	64
BROWN	SAND			64	71
GRAY	SAND	CLAY		71	—
TOTAL DEPTH 71 feet					

31

32

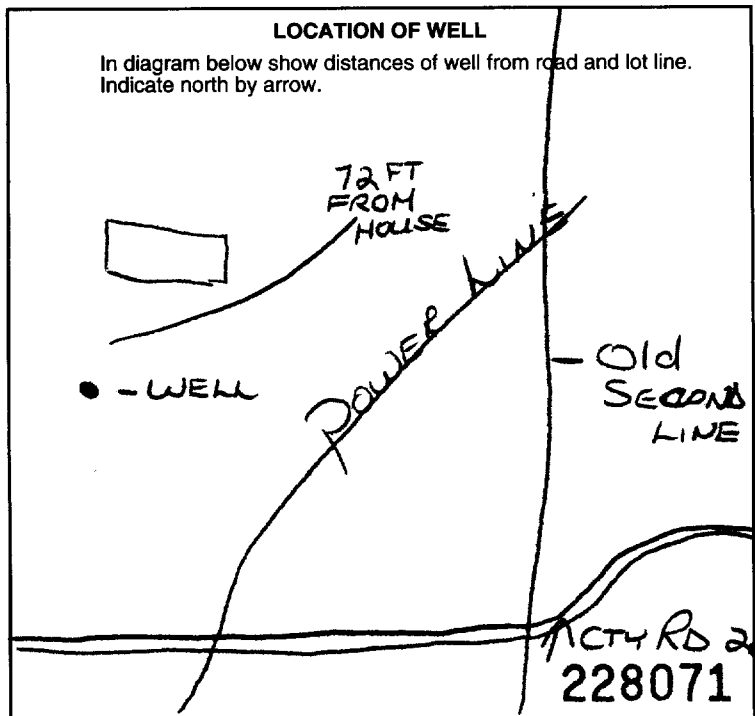
41 WATER RECORD	
Water found at - feet	Kind of water
64	<input checked="" type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <input type="checkbox"/> Gas
15-18	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <input type="checkbox"/> Gas
20-23	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <input type="checkbox"/> Gas
25-28	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <input type="checkbox"/> Gas
30-33	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <input type="checkbox"/> Gas

51 CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
5	Steel	.188	1 FT ABOVE GROUND	67
17-18	Steel			20-23
24-25	Steel			27-30

60 SCREEN	Sizes of opening (Slot No.)	Diameter	Length
	14	5 inches	4 feet
	Material and type STAINLESS STEEL		Depth at top of screen 67 feet

61 PLUGGING & SEALING RECORD		
<input type="checkbox"/> Annular space <input type="checkbox"/> Abandonment		
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)
From	To	
10-13	14-17	R PACKER Hole Plug
18-21	22-25	
26-29	30-33	

71 PUMPING TEST	
Pumping test method <input checked="" type="checkbox"/> Pump <input type="checkbox"/> Bailor	Pumping rate 5 GPM
Duration of pumping 3 Hours	Water levels during <input checked="" type="checkbox"/> Pumping <input type="checkbox"/> Recovery
Static level 19' feet	Water level end of pumping 58 feet
15 minutes 41 feet	30 minutes 56 feet
45 minutes 58 feet	60 minutes 58 feet
If flowing give rate GPM	Pump intake set at 67 feet
Recommended pump type <input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep	Recommended pump setting 67 feet
	Water at end of test <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Cloudy
	Recommended pump rate 6 GPM



54 FINAL STATUS OF WELL		
<input checked="" type="checkbox"/> Water supply	<input type="checkbox"/> Abandoned, insufficient supply	<input type="checkbox"/> Unfinished
<input type="checkbox"/> Observation well	<input type="checkbox"/> Abandoned, poor quality	<input type="checkbox"/> Replacement well
<input type="checkbox"/> Test hole	<input type="checkbox"/> Abandoned (Other)	
<input type="checkbox"/> Recharge well	<input type="checkbox"/> Dewatering	

55-56 WATER USE		
<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not use
<input type="checkbox"/> Stock	<input type="checkbox"/> Municipal	<input type="checkbox"/> Other
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Public supply	
<input type="checkbox"/> Industrial	<input type="checkbox"/> Cooling & air conditioning	

57 METHOD OF CONSTRUCTION		
<input checked="" type="checkbox"/> Cable tool	<input type="checkbox"/> Air percussion	<input type="checkbox"/> Driving
<input type="checkbox"/> Rotary (conventional)	<input type="checkbox"/> Boring	<input type="checkbox"/> Digging
<input type="checkbox"/> Rotary (reverse)	<input type="checkbox"/> Diamond	<input type="checkbox"/> Other
<input type="checkbox"/> Rotary (air)	<input type="checkbox"/> Jetting	

Name of Well Contractor BUIE + BUIEK DRILLING LTD	Well Contractor's Licence No. 1467
Address RR#1 BOX 7 BARRIE ONT	
Name of Well Technician BRIAN BUIEK	Well Technician's Licence No. TO226
Signature of Technician/Contractor <i>Brian Buike</i>	Submission date 15 09 01 day mo yr

MINISTRY USE ONLY	58 Data source	59-62 Contractor	63-68 Date received
		1467	SEP 19 2001
	Date of inspection	Inspector	
Remarks			

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

11

6712854

Municipality 67003

Con. CON 01

County or District: WELLINGTON
Township/Borough/City/Town/Village: ERIN
Con block tract survey, etc.: I
Lot: 1
Address: [REDACTED]
Date completed: 06 11 98 (day month year)

21
Northing: 10-17, 18-24, 25-26, 30-31, 31-47
Elevation: 25-30, 30-47
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
BR	CLAY	STONES		0	26"
GR	LIMESTONE			26"	70

31
32
10-15, 21, 32, 45, 54, 65, 75, 80

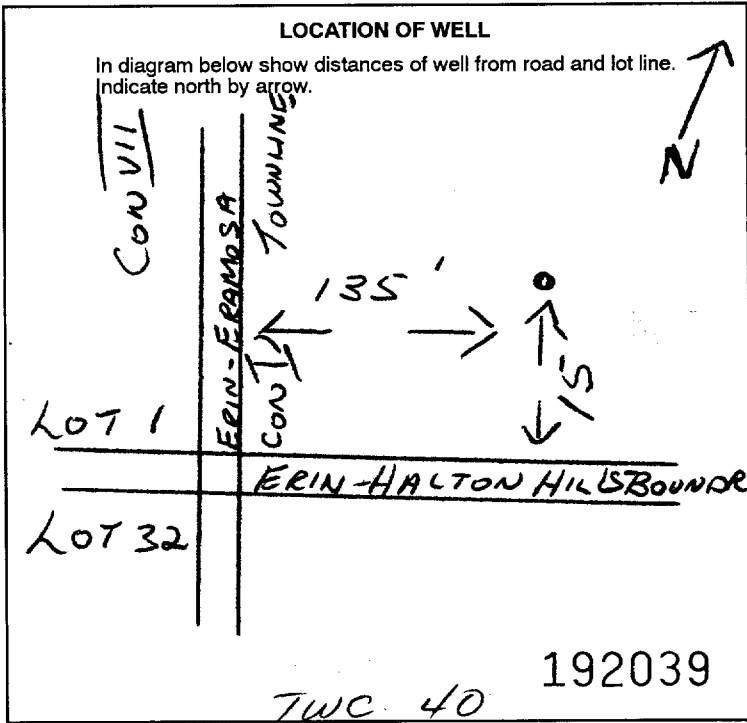
WATER RECORD			
Water found at - feet	Kind of water		
48-55	1 <input checked="" type="checkbox"/> Fresh	3 <input type="checkbox"/> Sulphur	14
	2 <input type="checkbox"/> Salty	4 <input type="checkbox"/> Minerals	
		6 <input type="checkbox"/> Gas	

CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
6 1/4	1 <input checked="" type="checkbox"/> Steel	188	0	342"
	2 <input type="checkbox"/> Galvanized			
	3 <input type="checkbox"/> Concrete			
	4 <input type="checkbox"/> Open hole			
	5 <input type="checkbox"/> Plastic			

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

PLUGGING & SEALING RECORD			
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)	
From	To		

PUMPING TEST		Pumping rate	Duration of pumping
71	1 <input type="checkbox"/> Pump 2 <input type="checkbox"/> Bailer	10 GPM	Hours 30 Mins



FINAL STATUS OF WELL

WATER USE

METHOD OF CONSTRUCTION

Name of Well Contractor: LANG WELL DRILLING
Well Contractor's Licence No.: 3317
Address: RRI HILLSBURGH ONT
Name of Well Technician: ROY LANG
Well Technician's Licence No.: T-0158
Signature of Technician/Contractor: R. Lang
Submission date: 26 12 98 (day mo yr)

MINISTRY USE ONLY

Data source: 3317
Date received: JAN 07 1999
Date of inspection: [REDACTED]
Inspector: [REDACTED]
Remarks: CSS.ES9

Well Owner's Information

Address of Well Location (Street Number/Name) **7 PINEHILL DRIVE** Township **INDUSTRIAL SPRINGWATER**

County/District/Municipality **SIMCOE** City/Town/Village **PHHELPSTON** Province **Ontario** Postal Code **L0L2K0**

UTM Coordinates Zone **17** Easting **532492** Northing **9408** Municipal Plan and Sublot Number _____ Other _____

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
Brown	Sand			0'	10'
Grey	Clay			10'	70'
Grey	Silt			70'	120'
Grey	Clay			120'	165'
Grey	Sand		fine	165'	177'

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m ³ /ft ³)
0' 20'	14 Bags 3/8 Hole plug	

Results of Well Yield Testing

After test of well yield, water was:	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
<input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify _____				
If pumping discontinued, give reason:	Static Level	6.5		135
	1		1	121
Pump intake set at (m/ft)	2		2	113.4
	3		3	106.4
Pumping rate (l/min / GPM)	4		4	99.8
	5		5	93.8
Duration of pumping	10		10	69.1
	15		15	52.1
Final water level end of pumping (m/ft)	20		20	40
	25		25	31.5
If flowing give rate (l/min / GPM)	30		30	25.6
	40		40	18.3
Recommended pump depth (m/ft)	50		50	14.5
	60		60	12.5
Recommended pump rate (l/min / GPM)				
Well production (l/min / GPM)				
Disinfected?				
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				

Method of Construction

<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Monitoring
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning	
<input type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial		
<input checked="" type="checkbox"/> Other, specify Air Rotary		<input type="checkbox"/> Other, specify _____		

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
6"	Steel	0.219	+2'	172'	<input checked="" type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____ <input type="checkbox"/> Other, specify _____

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To
5"	Steel	6'	172'	177'

Water Details

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

Well Contractor and Well Technician Information

Business Name of Well Contractor **LONE STAR WELL DIGGING LTD** Well Contractor's Licence No. **3413**

Business Address (Street Number/Name) **P.O. Box 280** Municipality **LEFROY**

Province **ONT** Postal Code **L0L1W0** Business E-mail Address _____

Bus. Telephone No. (inc. area code) **7054364359** Name of Well Technician (Last Name, First Name) **JIM MOORE**

Well Technician's Licence No. **T401** Signature of Technician and/or Contractor **Jim Moore** Date Submitted **20110104**

Map of Well Location

Please provide a map below following instructions on the back.

Comments: **30 ft from House
100 ft from Road**

Well owner's information package delivered Yes No

Date Package Delivered **20110104**

Date Work Completed **20110104**

Ministry Use Only

Audit No. **Z123297**

Received **FEB 09 2011**

Address of Well Location (Street Number/Name) **2928 HORSESHOE VALLEY RD W** Township **SPRINGWATER** Lot **H1** Concession **PRWCON2**
 County/District/Municipality **SIMCOE** City/Town/Village **BARRIE** Province **Ontario** Postal Code
 UTM Coordinates Zone Easting Northing Municipal Plan and Sublot Number Other
 NAD 83 **17 59 7948 4929751**

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
BROWN	SAND			0	3.1
GREY	CLAY	STONE TILL		3.1	9.7
BROWN	SAND		f to med.	9.7	24.4
BROWN	SAND		CS.	24.4	32.0
BROWN	SAND		med.	32.0	36.6
BROWN	SILT	CLAY		36.6	42.7

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0 to 7m	BENTONITE GROUT	380 Ltr

Results of Well Yield Testing

After test of well yield, water was:		Draw Down		Recovery	
<input checked="" type="checkbox"/> Clear and sand free	<input type="checkbox"/> Other, specify	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason:		Static Level	3.64m		
Pump intake set at (m/ft)		1	14.10	1	
Pumping rate (l/min / GPM)		2	16.02	2	
Duration of pumping		3	16.29	3	
Final water level end of pumping (m/ft)		4	16.38	4	
If flowing give rate (l/min / GPM)		5	16.44	5	
Recommended pump depth (m/ft)		10	16.56	10	
Recommended pump rate (l/min / GPM)		15	16.61	15	
Well production (l/min / GPM)		20	16.66	20	
Disinfected?		25	16.68	25	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		30	16.70	30	
		40	16.73	40	
		50	16.76	50	
		60	16.78	60	

Method of Construction

<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input checked="" type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Monitoring
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning	
<input type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial		
<input type="checkbox"/> Other, specify		<input type="checkbox"/> Other, specify		

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
15.5	STEEL	1.188	7.5	31.7	<input checked="" type="checkbox"/> Water Supply
14	STEEL	1.219	30.7	31.7	<input type="checkbox"/> Replacement Well

Construction Record - Screen

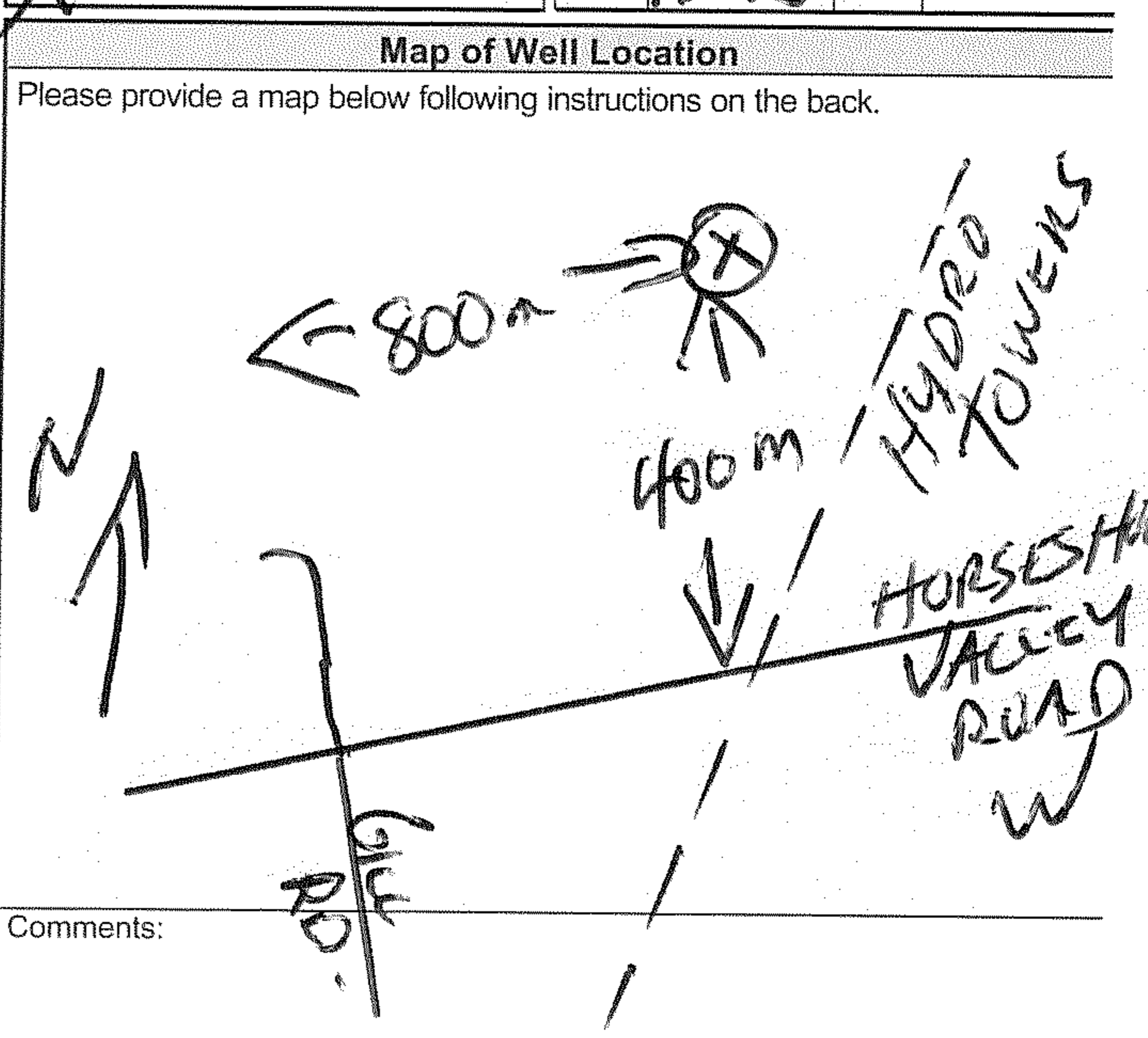
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)		Status of Well
			From	To	
15	S. STEEL	016	29.7	36.0	<input type="checkbox"/> Test Hole

Water Details

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	Diameter (cm/in)
32m	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	0 to 7	26
		7 to 42	22

Well Contractor and Well Technician Information

Business Name of Well Contractor: **AQUAN WRIGHT WATER WORKS** Well Contractor's Licence No.: **5528**
 Business Address (Street Number/Name): **4121 Hwy 93 Hillside** Municipality:
 Province: **ON** Postal Code: **L0R 1W0** Business E-mail Address: **awww@bellnet.ca**



Well owner's information

Bus. Telephone No. (inc. area code): **705 835 5646** Name of Well Technician (Last Name, First Name): **GAVIN WRIGHT**
 Well Technician's Licence No.: **2976** Signature of Technician and/or Contractor: *[Signature]* Date Submitted: **20130925**

Ministry Use Only

Date Package Delivered: **20130925** Audit No.: **Z 176828**
 Date Work Completed: **20130925** **JAN 09 2014**

Appendix F.2 Individual Records

UTM 99 Z 999999 E

9 R 999999 N

Elev. 09 RI

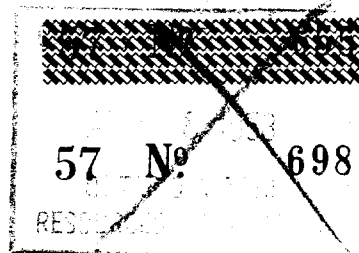
Basin 12 B



ONTARIO

The Water-well Drillers Act, 1954

Department of Mines



Water-Well Record

County or Territorial District Sims Township, Village, Town or City F105

Con. 3 Street and Number (if in Village, Town or City)

Owner [Redacted] Address Rt 9 Shelburne

Date completed Aug 28 / 1957
(day) (month) (year)

Pipe and Casing Record

Pumping Test

Casing diameter(s) 2"
Length(s) 100 feet
Type of screen Johnson (2) (60%)
Length of screen 8 feet

Static level 90 feet from top
Pumping rate 300 gph
Pumping level 95 feet from top
Duration of test 3 H.R.

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
Clay with boulders	Top	30 feet			
Hard pan	30	47			
gravel with foam	47	94			
Clay	94	100	100	90 from top	fresh
gravel with sand	100	110			

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

Home & farm uses gardens

Is water clear or cloudy? Clear

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

Drilling firm Alex. Cameron

Address 22 Medhurst Ave

Name of Driller

Address

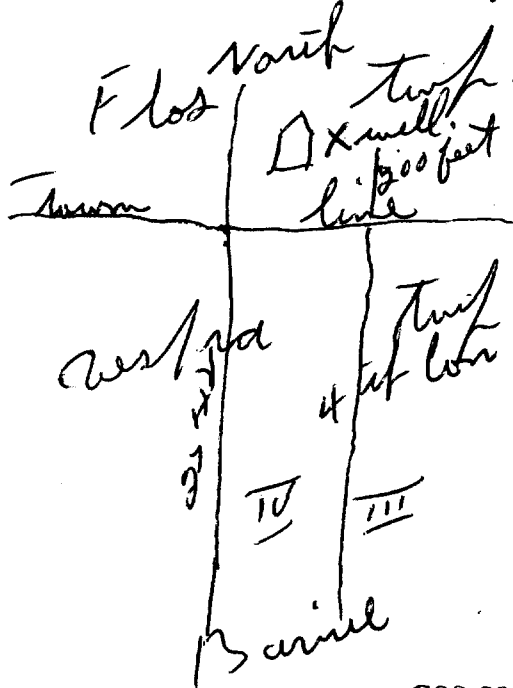
Licence Number 1198

I certify that the foregoing statements of fact are true

Date Aug 21 / 1957 Alex Cameron
Signature of Licensee

Location of Well

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



CSS.S8

well is directly opposite 4th line

WAM

WAM

E



WATER WELL RECORD

310/rw

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

11 5709928 57010 000 01

COUNTY OR DISTRICT: SIMCOE TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: VESPERA

CON., BLOCK, TRACT, SURVEY, ETC.: 3 3 LOT 25-27: 002

DATE COMPLETED: DAY 06 MO. 06 YR. 73

ADDRESS: RR#1 MIDHURST ONT

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	CLAY			0	35
GREY	SAND	CLAY	STONES	35	85
BROWN	"	"		85	105
"	"			105	112

31 010356105 0085228105/2 0105628105 01112628

32

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
05	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	188	0	0109
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE			20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 0010

DIAMETER: 05.000

LENGTH: 03

MATERIAL AND TYPE: JOHNSON SS

DEPTH TO TOP OF SCREEN: 069

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER ETC.
10-13	LEAD	PACKER
18-21		
22-25		
26-29		
30-33		
80		

71 PUMPING TEST

PUMPING TEST METHOD: 1 PUMP 2 BAILER

PUMPING RATE: 0007 1/2 GPM

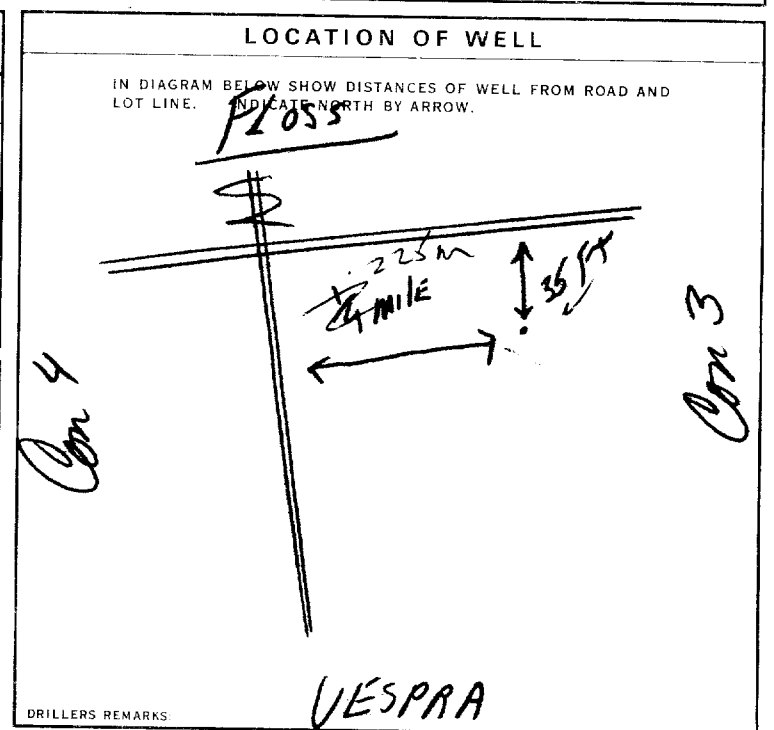
DURATION OF PUMPING: 01 00 HOURS MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING PUMPING			
19-21 FEET	22-24 FEET	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
078	085	085	085	085	085

IF FLOWING, GIVE RATE: 001.1 GPM

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: 0007 GPM



FINAL STATUS OF WELL

1 WATER SUPPLY 5 ABANDONED, INSUFFICIENT SUPPLY

2 OBSERVATION WELL 6 ABANDONED, POOR QUALITY

3 TEST HOLE 7 UNFINISHED

4 RECHARGE WELL

WATER USE

1 DOMESTIC 5 COMMERCIAL

2 STOCK 6 MUNICIPAL

3 IRRIGATION 7 PUBLIC SUPPLY

4 INDUSTRIAL 8 COOLING OR AIR CONDITIONING

9 NOT USED

METHOD OF DRILLING

1 CABLE TOOL 6 BORING

2 ROTARY (CONVENTIONAL) 7 DIAMOND

3 ROTARY (REVERSE) 8 JETTING

4 ROTARY (AIR) 9 DRIVING

5 AIR PERCUSSION

NAME OF WELL CONTRACTOR: KNEISEN WATER WELLS LICENCE NUMBER: 3203

ADDRESS: RR#1 BARRIE ONT

DRILLER OR BORER: A KNEISEN LICENCE NUMBER: 3213

DRILLER SIGNATURE: [Signature] SUBMISSION DATE: DAY 8 MO. 6 YR. 73

DATA SOURCE: 1 CONTRACTOR: 3203 DATE RECEIVED: 100778

DATE OF INSPECTION: INSPECTOR: [Signature]

REMARKS: [Signature]

OFFICE USE ONLY: CSS.S8



The Ontario Water Resources Commission Act WATER WELL RECORD

310/12w.

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

11 5709954 57003 CON 01

COUNTY OR DISTRICT: Simcoe TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Flos CON., BLOCK, TRACT, SURVEY, ETC.: I LOT: 25-27

OWNER (SURNAME FIRST): [REDACTED] ADDRESS: R#2 Phelpston Ont DATE COMPLETED: 03

WELL NO.: 928818 ELEVATION: 4 855 5 22 BASIN CODE: II III IV DATE: DAY 12 MO 04 YR 73

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
			Pit	0	5
I. brown	sand	gravel, clay boulders		5	40
yellow	sand	gravel, boulders	loose	40	100
yellow	sand		fine	100	113
grey	clay			113	140
grey	clay	sand	fine	140	174
grey	sand		medium	174	178

31 01005 23 004002811651 01005281113 0113508 0140205 017426508

32 0178209

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
10-13	<input checked="" type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
17-18	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
20-23	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
25-28	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
30-33	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	<input checked="" type="checkbox"/> STEEL	.188	5	0175
17-18	<input type="checkbox"/> GALVANIZED			
24-25	<input type="checkbox"/> STEEL			

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 012

DIAMETER: 06-000 INCHES

LENGTH: 03 FEET

MATERIAL AND TYPE: stainless steel

DEPTH TO TOP OF SCREEN: 0175 FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: PUMP BAILER

PUMPING RATE: 0020 GPM.

DURATION OF PUMPING: 01 HOURS 30 MINS.

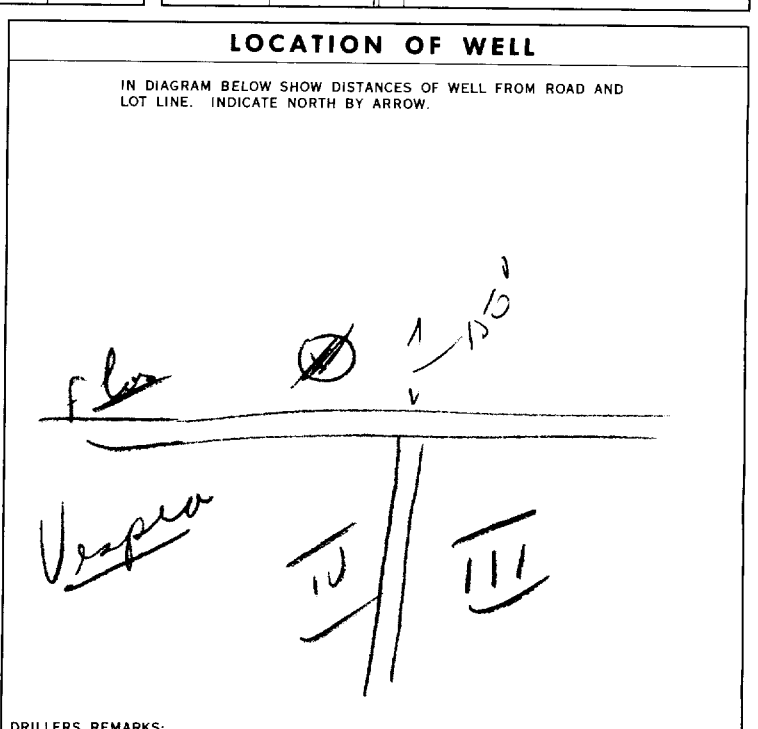
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
093 FEET	147 FEET	15 MINUTES: 094 FEET	30 MINUTES: 093 FEET	45 MINUTES: 093 FEET	60 MINUTES: 093 FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: 118 FEET

RECOMMENDED PUMPING RATE: 0009 GPM.

50-53 000.4 GPM./FT. SPECIFIC CAPACITY



FINAL STATUS OF WELL

WATER SUPPLY

WATER USE

DOMESTIC

METHOD OF DRILLING

CABLE TOOL

CONTRACTOR

NAME OF WELL CONTRACTOR: H. HAMMERS

LICENCE NUMBER: 2514

ADDRESS: RPT# 3 Barrie, Ont.

NAME OF DRILLER OR BORER: G. Hammars

LICENCE NUMBER: [REDACTED]

SIGNATURE OF CONTRACTOR: Henry Hammars

SUBMISSION DATE: DAY MO YR

OFFICE USE ONLY

DATA SOURCE: 1

CONTRACTOR: 2514

DATE RECEIVED: 100773

DATE OF INSPECTION: [REDACTED]

INSPECTOR: [REDACTED]

REMARKS: [REDACTED]

DRILLERS REMARKS: [REDACTED]

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

11

5724421

MUNICIPALITY 57,003

CON. 101

COUNTY OR DISTRICT: [REDACTED] TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: [REDACTED] CON. BLOCK, TRACT, SURVEY ETC: 1 LOT: 25-27 3

DATE COMPLETED: 48-53 DAY 11 MO 1 YR 89

R.R. #2 PHELIPSTON ONTARIO

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	TOP SOIL			0	1
BROWN	SAND	STONES		1	31
GREY	SAND	CLAY		31	106
BROWN	SAND		MEDIUM	106	113
BROWN	SAND		FINE	113	118
GREY	CLAY	SAND		118	146
GREY	CLAY			146	170
GREY	SAND		FINE CEMENTED	170	178
TOTAL DEPTH				178'	

31 [] 32 []

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER		
170	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS
	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS
	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS
	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
5	1 <input checked="" type="checkbox"/> STEEL 2 <input checked="" type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC	.188	2' ABOVE GROUND	171
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC			20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 4" 10 SLOT, 2" 12 SLOT

DIAMETER: 5 INCHES

LENGTH: 7 FEET

MATERIAL AND TYPE: JOHNSON STAINLESS

DEPTH TO TOP OF SCREEN: 171 FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 PUMP, 2 BAILER

PUMPING RATE: 8 GPM

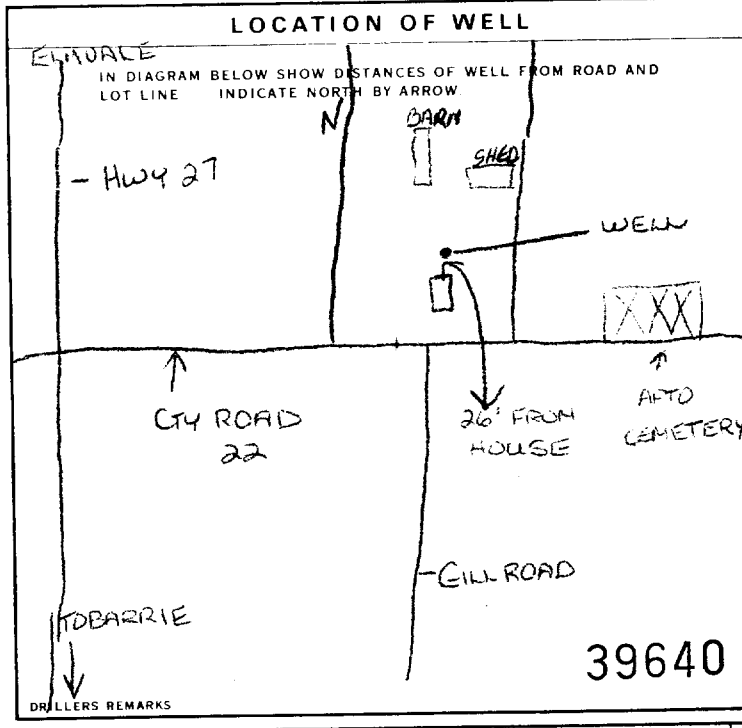
DURATION OF PUMPING: 2 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
92 FEET	140 FEET	15 MINUTES: 116 FEET	30 MINUTES: 138 FEET	45 MINUTES: 140 FEET	60 MINUTES: 140 FEET

RECOMMENDED PUMP TYPE: SHALLOW, DEEP

RECOMMENDED PUMP SETTING: 165 FEET

RECOMMENDED PUMPING RATE: 10 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, 8 DEWATERING

WATER USE

1 DOMESTIC, 2 STOCK, 3 IRRIGATION, 4 INDUSTRIAL, 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, 10 DIGGING, 11 OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: BUE & BUKER DRILLING LTD

WELL CONTRACTOR'S LICENCE NUMBER: 1467

ADDRESS: R.R. #1 BOX 7 BARRIE ONTARIO

NAME OF WELL TECHNICIAN: BRIAN BUKER

WELL TECHNICIAN'S LICENCE NUMBER: T0226

SIGNATURE OF TECHNICIAN/CONTRACTOR: Brian Buker

SUBMISSION DATE: DAY 24 MO 1 YR 89

OFFICE USE ONLY

DATA SOURCE: 1467

DATE RECEIVED: JAN 27 1989

DATE OF INSPECTION: []

INSPECTOR: []

REMARKS: WDE

CSS.ES

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

11

5736248

Municipality 57003

Con. CON

01

County or District: SIMCOE Township/Borough/City/Town/Village: FLOS Con block tract survey, etc.: 1 Lot: 25-27: 1
 Address: RR#2 PHELSTON ONT Date completed: 29 6 01
 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	To
BROWN	TOP SOIL			0	1
BROWN	SAND			1	7
GRAY	SAND	CLAY/STONES		7	52
GRAY	CLAY	SAND		52	64
BROWN	SAND			64	71
GRAY	SAND	CLAY		71	—
TOTAL DEPTH 71 feet					

31 32

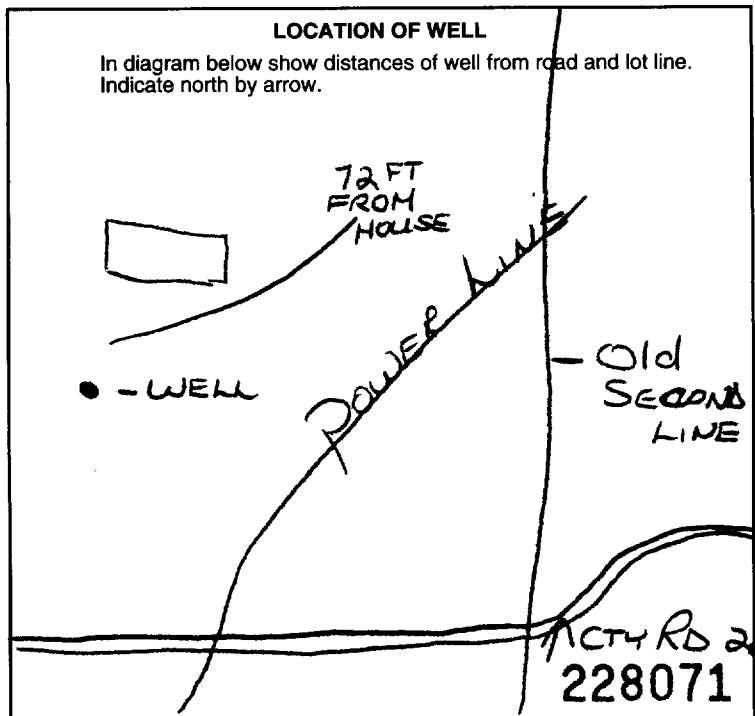
41 WATER RECORD	
Water found at - feet	Kind of water
64	1 <input checked="" type="checkbox"/> Fresh 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas 6 <input type="checkbox"/>
15-18	1 <input type="checkbox"/> Fresh 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas 6 <input type="checkbox"/>
20-23	1 <input type="checkbox"/> Fresh 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas 6 <input type="checkbox"/>
25-28	1 <input type="checkbox"/> Fresh 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas 6 <input type="checkbox"/>
30-33	1 <input type="checkbox"/> Fresh 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas 6 <input type="checkbox"/>

51 CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
5	1 <input checked="" type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic	.188	1 FT ABOVE GROUND	67
17-18	1 <input type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic			20-23
24-25	1 <input type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic			27-30

SCREEN	Sizes of opening (Slot No.)	Diameter	Length
		14	5 inches
	Material and type: STAINLESS STEEL		Depth at top of screen: 67 feet

61 PLUGGING & SEALING RECORD		
<input type="checkbox"/> Annular space		<input type="checkbox"/> Abandonment
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)
From	To	
10-13	14-17	R PACKER Hole Plug
18-21	22-25	
26-29	30-33	

71 PUMPING TEST	
Pumping test method: 1 <input checked="" type="checkbox"/> Pump 2 <input type="checkbox"/> Bailor	Pumping rate: 5 GPM
Static level: 19.21 feet	Water level end of pumping: 22.24 feet
Water levels during: 15 minutes: 41 feet	30 minutes: 56 feet
45 minutes: 58 feet	60 minutes: 58 feet
If flowing give rate: GPM	Pump intake set at: 67 feet
Recommended pump type: <input checked="" type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep	Recommended pump setting: 67 feet
	Recommended pump rate: 6 GPM



54 FINAL STATUS OF WELL

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

55-56 WATER USE

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

57 METHOD OF CONSTRUCTION

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

Name of Well Contractor: BUIE + BUIEK DRILLING LTD 1467
 Address: RR#1 BOX 7 BARRIE ONT
 Name of Well Technician: BRIAN BUIEK
 Signature of Technician/Contractor: Brian BuiEK
 Well Contractor's Licence No.: 1467
 Well Technician's Licence No.: TO226
 Submission date: 15 09 01

MINISTRY USE ONLY

Data source: 1467 Date received: SEP 19 2001
 Date of inspection: Inspector:
 Remarks:

Measurements recorded in: Metric Imperial

Page 1 of 1

Address of Well Location (Street Number/Name) **2928 HORSESHOE VALLEY RD W** Township **SPRINGWATER** Lot **H1** Concession **PRWCON2**
 County/District/Municipality **SIMCOE** City/Town/Village **BARRIE** Province **Ontario** Postal Code
 UTM Coordinates Zone Easting Northing Municipal Plan and Sublot Number Other
 NAD 83 **17 59 7948 4929751**

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
BROWN	SAND			0	3.1
GREY	CLAY	STONE TILL		3.1	9.7
BROWN	SAND		f to med.	9.7	24.4
BROWN	SAND		CS.	24.4	32.0
BROWN	SAND		med.	32.0	36.6
BROWN	SILT	CLAY		36.6	42.7

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0 to 7m	BENTONITE GROUT	380 Ltr

Results of Well Yield Testing

After test of well yield, water was:		Draw Down		Recovery	
<input checked="" type="checkbox"/> Clear and sand free	<input type="checkbox"/> Other, specify	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason:		Static Level	3.64m		
Pump intake set at (m/ft)		1	14.10	1	
Pumping rate (l/min / GPM)		2	16.02	2	
Duration of pumping		3	16.29	3	
Final water level end of pumping (m/ft)		4	16.38	4	
If flowing give rate (l/min / GPM)		5	16.44	5	
Recommended pump depth (m/ft)		10	16.56	10	
Recommended pump rate (l/min / GPM)		15	16.61	15	
Well production (l/min / GPM)		20	16.66	20	
Disinfected?		25	16.68	25	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		30	16.70	30	
		40	16.73	40	
		50	16.76	50	
		60	16.78	60	

Method of Construction

<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input checked="" type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Monitoring
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning	
<input type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial		
<input type="checkbox"/> Other, specify		<input type="checkbox"/> Other, specify		

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
15.5	STEEL	1.188	7.5	31.7	<input checked="" type="checkbox"/> Water Supply
14	STEEL	1.219	30.7	31.7	<input type="checkbox"/> Replacement Well

Construction Record - Screen

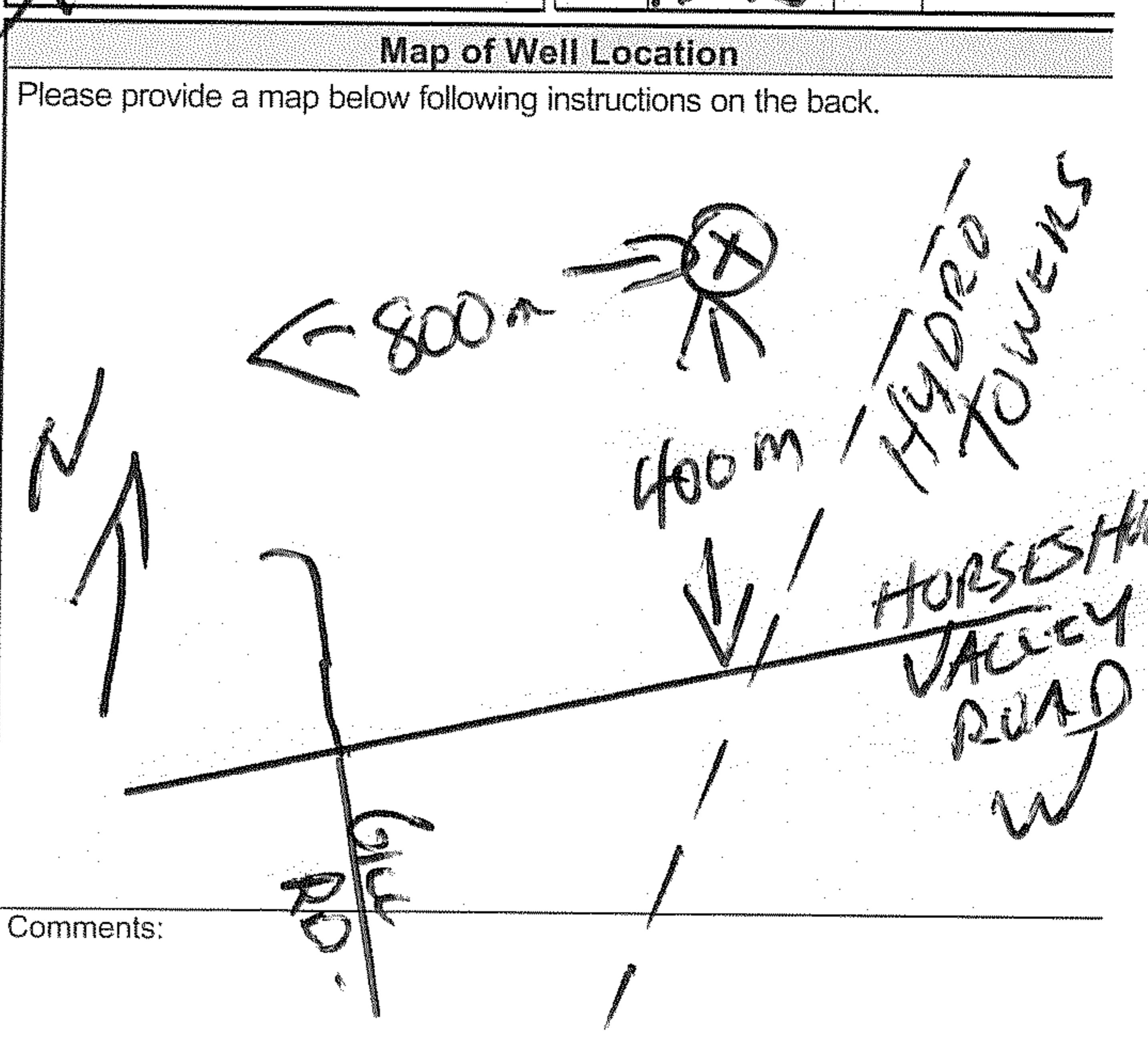
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)		Status of Well
			From	To	
15	S. STEEL	016	29.7	36.0	<input type="checkbox"/> Test Hole

Water Details

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	Depth (m/ft)		Diameter (cm/in)
		From	To	
32m		0	7	26
		7	42	22

Well Contractor and Well Technician Information

Business Name of Well Contractor: **AQUAN WRIGHT WATER WORKS** Well Contractor's Licence No.: **5528**
 Business Address (Street Number/Name): **4121 Hwy 93 Hillside** Municipality:
 Province: **ON** Postal Code: **L0R 1W0** Business E-mail Address: **awww@bellnet.ca**



Well owner's information

Date Package Delivered: **20130925** Date Work Completed: **20130925**

Yes No

Ministry Use Only

Audit No.: **Z 176828**
 JAN 09 2014

A023714

Instructions for Completing Form

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

Well Owner's Information and Location of Well Information

Ministry Use Only									
MUN								CON	LOT

RR#/Street Number/Name: **GREY HWY. 6/10 at COUNTY RD. 18**
 City/Town/Village: **SYDENHAM ROCKFORD**
 Site/Compartment/Block/Tract etc.:

GPS Reading: NAD **83** Zone **17** Easting **596437** Northing **4929983**
 Unit Make/Model: **Garmin eTREX** 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	Ft.
Brown	Sandy clay	Stones		0'	9'6"		
Brown	Bedrock			9'6"	23'		

Hole Diameter

Depth From	Depth To	Diameter
0	23'	6"

Water Record

Water found at ___ Metres / Kind of Water

Fresh Sulphur Gas Salty Minerals

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

Chlorinated Yes No

Construction Record

Inside diam	Material	Wall thickness	Depth From	Depth To
2"	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	Sch. 40	0'	13'

Screen

Outside diam	Material	Slot No.	Depth From	Depth To
2"	<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	10	13'	23'

No casing or screen Open hole

Test of Well Yield

Pumping test method	Draw Down Time min	Water Level Metres	Recovery Time min	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 <input type="checkbox"/> Shallow <input type="checkbox"/> Deep	4		4	
Recommended pump depth. ___ metres	5		5	
Recommended pump rate. (litres/min)	10		10	
If flowing give rate - (litres/min)	15		15	
	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	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
23' to 12'	Sand	
12' to 0'	Holeplug	

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

Location of Well

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

Audit No. **Z 37292** Date Well Completed **2005 07 06**

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

Well Contractor/Technician Information

Name of Well Contractor: **DAVIDSON WELL DRILLING LIMITED** Well Contractor's Licence No. **1737**

Business Address (street name, number, city, etc.): **147 NORTH ST. W. WINGHAM, ONTARIO. N0G 2W0**

Name of Well Technician (last name, first name): **FENTON DOUG** Well Technician's Licence No. **T2003**

Signature of Technician/Contractor: **X J. C. Davidson** Date Submitted **2005 09 30**

Ministry Use Only

Data Source: Contractor **1737**

Date Received **NOV 21 2005** Date of Inspection

Remarks: Well Record Number

UTM 99 Z 999999 E

9 R 999999 N

Elev. 09 RI

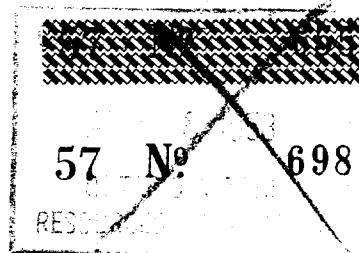
Basin 12 B



ONTARIO

The Water-well Drillers Act, 1954

Department of Mines



Water-Well Record

County or Territorial District Simcoe Township, Village, Town or City Flos

Con. 3 Street and Number (if in Village, Town or City)

Owner [Redacted] Address Rt 9 Shelburne

Date completed Aug 28 / 1957
(day) (month) (year)

Pipe and Casing Record

Pumping Test

Casing diameter(s) 2"
Length(s) 100 feet
Type of screen Johnson (2) (60%)
Length of screen 8 feet

Static level 90 feet from top
Pumping rate 300 g.p.h.
Pumping level 95 feet from top
Duration of test 3 H.R.

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
Clay with boulders	Top	30 feet			
Hard pan	30	47			
gravel with foam	47	94			
Clay	94	100	100	90 from top	fresh
gravel with sand	100	110			

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

Home & farm uses gardens

Is water clear or cloudy? clear

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

Drilling firm Alex. Cameron

Address 22 Medhurst

Art

Name of Driller

Address

Licence Number 1198

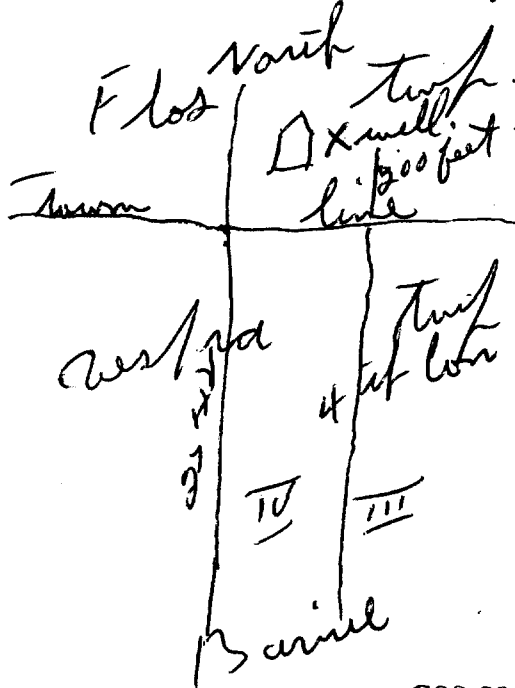
I certify that the foregoing statements of fact are true

Date Aug 21 / 1957 Alex Cameron

Signature of Licensee

Location of Well

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



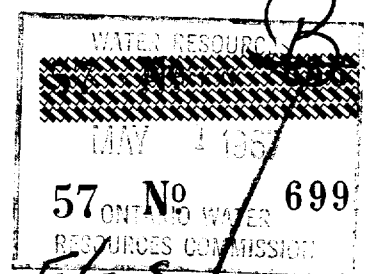
CSS.S8

well is directly opposite 4th line

WAM

WAM

E



UTM 17z 596438 E

5R 4929620 N

The Ontario Water Resources Commission Act

Elev. 5R 0825

WATER WELL RECORD

Basin 22 County or District SIMCOE

Township, Village, Town or City FLOES

Con. I Lot 3

Date completed 4 FEB. 1967 (day month year)

Address R.R. 1 PHELPSSTON.

Casing and Screen Record

Inside diameter of casing 4"
 Total length of casing 76'
 Type of screen COOK SLOT 16
 Length of screen 4'
 Depth to top of screen 76'
 Diameter of finished hole 4"

Pumping Test

Static level 42'
 Test-pumping rate 10 G.P.M.
 Pumping level 48'
 Duration of test pumping 1 HR.
 Water clear or cloudy at end of test CLEAR.
 Recommended pumping rate 5 G.P.M.
 with pump setting of 60' feet below ground surface

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
Dug well	0	42		
HARD PAN	42	74		
COARSE SAND	74	80	74	FRESH

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

FARM

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

Drilling or Boring Firm

A. CAMERON

Address R.R. 1 MIDHURST.

Licence Number 2563

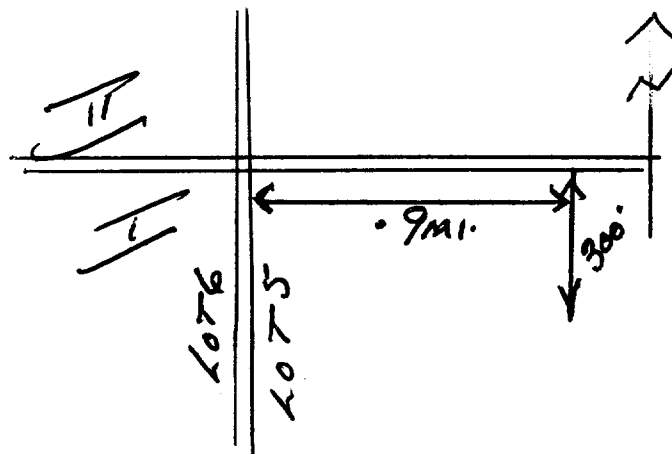
Name of Driller or Borer SAME

Date APR 02/67

(Signature of Licensed Drilling or Boring Contractor)

Location of Well

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





The Ontario Water Resources Commission Act WATER WELL RECORD

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

11 5706833-1P 57016 CON. 03

COUNTY OR DISTRICT SIMCOE TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE VESPRE TWP CON., BLOCK, TRACT, SURVEY, ETC. 8 III LOT 001

OWNER (SURNAME FIRST) [REDACTED] RH1 MIDHURST DATE COMPLETED 15 MO. OCT YR. 69

228520 4 ELEVATION 0825 6 BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
GREY	SAND	CLAY BOULDERS	HARD	0	39
	SAND			39	87
	SILT			87	104
	SAND			104	113

31 00392090513 0087 09 0104 06 0113 09

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0104	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
15-18	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
20-23	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
25-28	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
30-33	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
05-10-11	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	188	0	0110
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE			20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE			27-30

61 SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
012	05.000	03

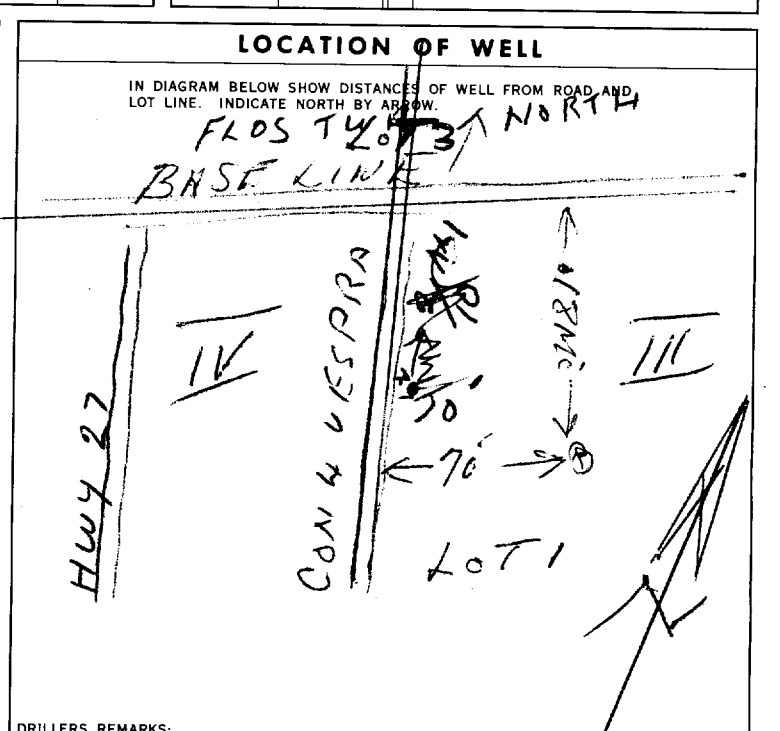
MATERIAL AND TYPE STAINLESS STEEL 4010 DEPTH TO TOP OF SCREEN 41-44 FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> BAILER	0007 GPM.	01 15-16 HOURS 00 17-18 MINS.
STATIC LEVEL 19-21 FEET 059	WATER LEVEL END OF PUMPING 22-24 FEET 088	WATER LEVELS DURING
		15 MINUTES 26-28 FEET 059
		30 MINUTES 29-31 FEET 059
		45 MINUTES 32-34 FEET 059
		60 MINUTES 35-37 FEET 059
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT 38-41 GPM.	WATER AT END OF TEST 42 FEET
RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING 095 FEET	RECOMMENDED PUMPING RATE 0007 GPM.
<input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP		
50-53	000.8 GPM./FT. SPECIFIC CAPACITY	



FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF DRILLING

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

WELL CONTRACTOR

NAME OF WELL CONTRACTOR ANDERSON DRILLING LICENCE NUMBER 3326
ADDRESS 58 CAMPBELL AVE
~~ANDERSON~~ BARRIE ONT
NAME OF DRILLER OR BORER ANDERSON LICENCE NUMBER 3326
CONTRACTOR as Anderson SUBMISSION DATE DAY 16 MO OCT YR 69

OFFICE USE ONLY

DATA SOURCE 1 CONTRACTOR 1204 DATE RECEIVED 191169
DATE OF INSPECTION JAN 27 1970 INSPECTOR P/J.B.
REMARKS CSS.S8

RC COPY

J.R.



WATER WELL RECORD

310/rw

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

11 5709928 57010 000 01

COUNTY OR DISTRICT: SIMCOE TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: VESPERA

CON., BLOCK, TRACT, SURVEY, ETC.: 3 3 LOT 25-27: 002

DATE COMPLETED: DAY 06 MO. 06 YR. 73

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	CLAY			0	35
GREY	SAND	CLAY	STONES	35	85
BROWN	"	"		85	105
"	"			105	112

31 010356105 0085228105/2 0105628105 01112628

32

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
10-11	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	188	0 0109
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE		20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE		27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 0010

DIAMETER: 05.000

LENGTH: 03

MATERIAL AND TYPE: JOHNSON SS

DEPTH TO TOP OF SCREEN: 069

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER ETC.
10-13	LEAD	PACKER
18-21		
26-29		

71 PUMPING TEST

PUMPING TEST METHOD: 1 PUMP 2 BAILER

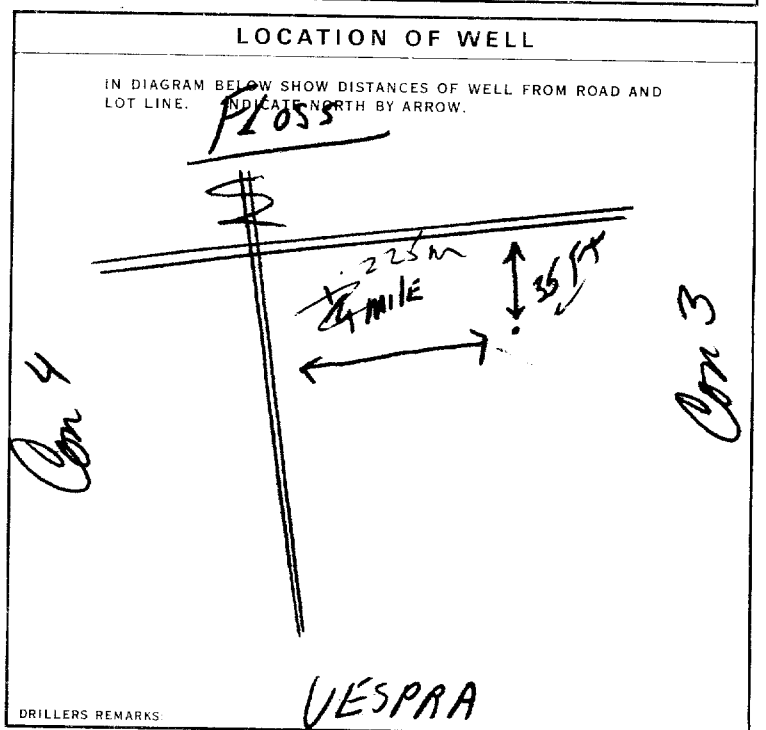
PUMPING RATE: 0007 1/2 GPM

DURATION OF PUMPING: 01 00 HOURS MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING
078	085	15 MINUTES: 085 30 MINUTES: 085 45 MINUTES: 085 60 MINUTES: 085

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: 0007 GPM/FT. SPECIFIC CAPACITY



FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF DRILLING

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

NAME OF WELL CONTRACTOR: KNEISEN WATER WELLS LICENCE NUMBER: 3203

ADDRESS: RR'1 BARRIE ONT

DRILLER OR BORER: A KNEISEN LICENCE NUMBER: 3213

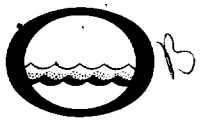
DATE RECEIVED: 8 6 73

DATA SOURCE: 1 CONTRACTOR: 3203 DATE RECEIVED: 100778

DATE OF INSPECTION: INSPECTOR: [Signature]

REMARKS: [Signature]

OFFICE USE ONLY: CSS.S8



The Ontario Water Resources Commission Act WATER WELL RECORD

310/12w.

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

11 5709954 57003 CON 01

COUNTY OR DISTRICT: Simcoe TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Flos CON., BLOCK, TRACT, SURVEY, ETC.: I LOT: 25-27

OWNER (SURNAME FIRST): [REDACTED] ADDRESS: R#2 Phelpsston Ont DATE COMPLETED: 03

WELL NO.: 928818 ELEVATION: 4 855 BASIN CODE: 5 22 DATE: MAR 17, 1975 246

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
			<u>Pit</u>	<u>0</u>	<u>5</u>
<u>1. brown</u>	<u>sand</u>	<u>gravel, clay boulders</u>		<u>5</u>	<u>40</u>
<u>yellow</u>	<u>sand</u>	<u>gravel, boulders</u>	<u>loose</u>	<u>40</u>	<u>100</u>
<u>yellow</u>	<u>sand</u>		<u>fine</u>	<u>100</u>	<u>113</u>
<u>grey</u>	<u>clay</u>			<u>113</u>	<u>140</u>
<u>grey</u>	<u>clay</u>	<u>sand</u>	<u>fine</u>	<u>140</u>	<u>174</u>
<u>grey</u>	<u>sand</u>		<u>medium</u>	<u>174</u>	<u>178</u>

31 00005 23 004002811651 010025281113 0113508 0140205 017426508

32 0178209

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
10-13	<input checked="" type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
17-18	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
20-23	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
25-28	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
30-33	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	<input checked="" type="checkbox"/> STEEL	<u>.188</u>	<u>5</u>	<u>0175</u>
17-18	<input type="checkbox"/> GALVANIZED			
24-25	<input type="checkbox"/> STEEL			

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 012

DIAMETER: 06.000 INCHES

LENGTH: 03 FEET

MATERIAL AND TYPE: stainless steel

DEPTH TO TOP OF SCREEN: 0175 FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: PUMP BAILER

PUMPING RATE: 0020 GPM.

DURATION OF PUMPING: 01 HOURS 30 MINS.

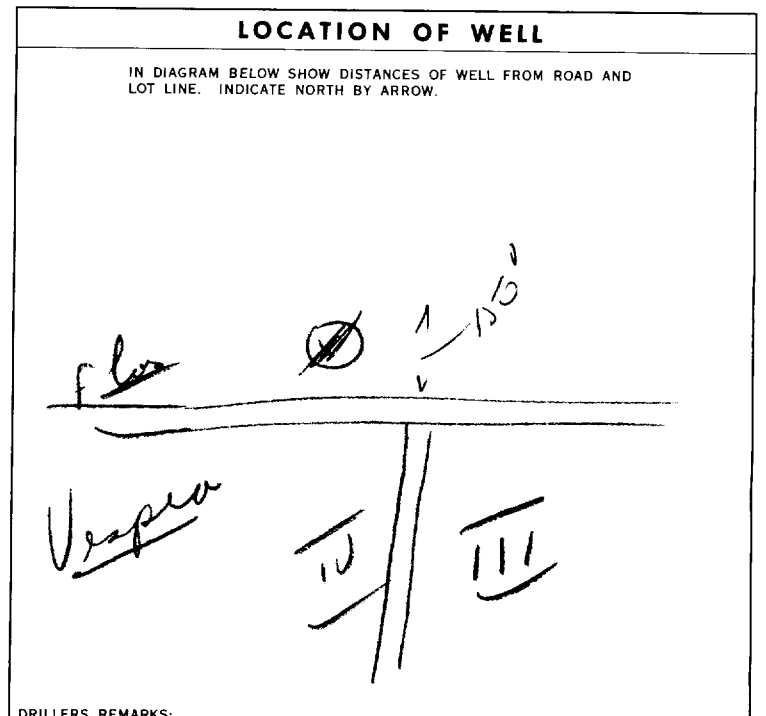
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
<u>093</u> FEET	<u>147</u> FEET	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
		<u>094</u> FEET	<u>093</u> FEET	<u>093</u> FEET	<u>093</u> FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: 118 FEET

RECOMMENDED PUMPING RATE: 0009 GPM.

50-53 000.4 GPM./FT. SPECIFIC CAPACITY



FINAL STATUS OF WELL

WATER SUPPLY

WATER USE

DOMESTIC

METHOD OF DRILLING

CABLE TOOL

CONTRACTOR

NAME OF WELL CONTRACTOR: H. HAMMERS LICENCE NUMBER: 2514

ADDRESS: R#3 Barrie, Ont.

NAME OF DRILLER OR BORER: G. Hammes LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Henry Hammes SUBMISSION DATE: _____

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 2514 DATE RECEIVED: 100773

DATE OF INSPECTION: _____ INSPECTOR: _____

REMARKS: _____

CS5.58



Ontario

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

31 D 12 W

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

11

5713446

MUNICIP. 57016

CON. CON

09

COUNTY OR DISTRICT Simcoe	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE Vespra	CON., BLOCK, TRACT, SURVEY, ETC. 4	LOT 001
ADDRESS RR #1 MIDHURST ONT		DATE COMPLETED DAY 21 MO 05 YR. 75	

ZONE 21	EASTING 17 597450	NORTHING 4928550	RC 5	ELEVATION 0840	RC 5	BASIN CODE 22
-------------------	-----------------------------	----------------------------	----------------	--------------------------	----------------	-------------------------

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
Brown	Topsoil			0	1
"	Sand		Loose	1	19
"	"	gravel, stones	Packed	19	73
"	"			73	98
"	clay	silt		98	125
"	Sand		Wet	125	125
"	"		Dead	128	-

31	0001602	001962877	00736281112	0098628	012520506	012862891	1
32	0128628						

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	1 <input checked="" type="checkbox"/> STEEL		0	0125
	2 <input type="checkbox"/> GALVANIZED	258		
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			
17-18	1 <input type="checkbox"/> STEEL			20-23
	2 <input type="checkbox"/> GALVANIZED			
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			
24-25	1 <input type="checkbox"/> STEEL			27-30
	2 <input type="checkbox"/> GALVANIZED			
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 012	DIAMETER 05000	LENGTH 03
MATERIAL AND TYPE Johnson SS		DEPTH TO TOP OF SCREEN 0125

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD 1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> DRILLER	PUMPING RATE 0007 GPM.	DURATION OF PUMPING 15-16 01 HOURS 17-18 20 MINS.
STATIC LEVEL 078 FEET	WATER LEVEL END OF PUMPING 103 FEET	WATER LEVELS DURING PUMPING
		15 MINUTES 103 FEET 30 MINUTES 103 FEET 45 MINUTES 103 FEET 60 MINUTES 103 FEET
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
		1 <input checked="" type="checkbox"/> CLEAR 2 <input type="checkbox"/> CLOUDY
RECOMMENDED PUMP TYPE <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP	RECOMMENDED PUMP SETTING 110 FEET	RECOMMENDED PUMPING RATE 0007 GPM.

LOCATION OF WELL

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

County Rd 22

600ft

60ft

FLBTP

47th CON

DRILLERS REMARKS:

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF DRILLING

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

CONTRACTOR

NAME OF WELL CONTRACTOR
R. Nielsen Water Wells LICENCE NUMBER **3203**

ADDRESS
RR #1 Barrie Ont

NAME OF DRILLER OR BORER
Godwin LICENCE NUMBER **3135**

SIGNATURE OF CONTRACTOR
[Signature]

SUBMISSION DATE
DAY **23** MO **5** YR **75**

OFFICE USE ONLY

DATA SOURCE
3203

CONTRACTOR
3203

DATE RECEIVED
23 08 78

DATE OF INSPECTION

INSPECTOR

REMARKS:

P JUNET

WI

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

11

5724421

MUNICIPALITY 57,003

CON. 101

COUNTY OR DISTRICT: [REDACTED] TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: [REDACTED] CON. BLOCK, TRACT, SURVEY ETC: 1 LOT: 25-27: 3

DATE COMPLETED: 48-53: DAY 11 MO 1 YR 89

R.R.#2 PHELIPSTON ONTARIO

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	TOP SOIL			0	1
BROWN	SAND	STONES		1	31
GREY	SAND	CLAY		31	106
BROWN	SAND		MEDIUM	106	113
BROWN	SAND		FINE	113	118
GREY	CLAY	SAND		118	146
GREY	CLAY			146	170
GREY	SAND		FINE CEMENTED	170	178
TOTAL DEPTH				178'	

31 [] 32 []

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER		
170	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS
	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS
	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS
	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
5	1 <input checked="" type="checkbox"/> STEEL 2 <input checked="" type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC	.188	2' ABOVE GROUND	171
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC			20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 4" 10 SLOT, 2" 12 SLOT

DIAMETER: 5 INCHES

LENGTH: 7 FEET

MATERIAL AND TYPE: JOHNSON STAINLESS

DEPTH TO TOP OF SCREEN: 171 FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 PUMP 2 BAILER

PUMPING RATE: 8 GPM

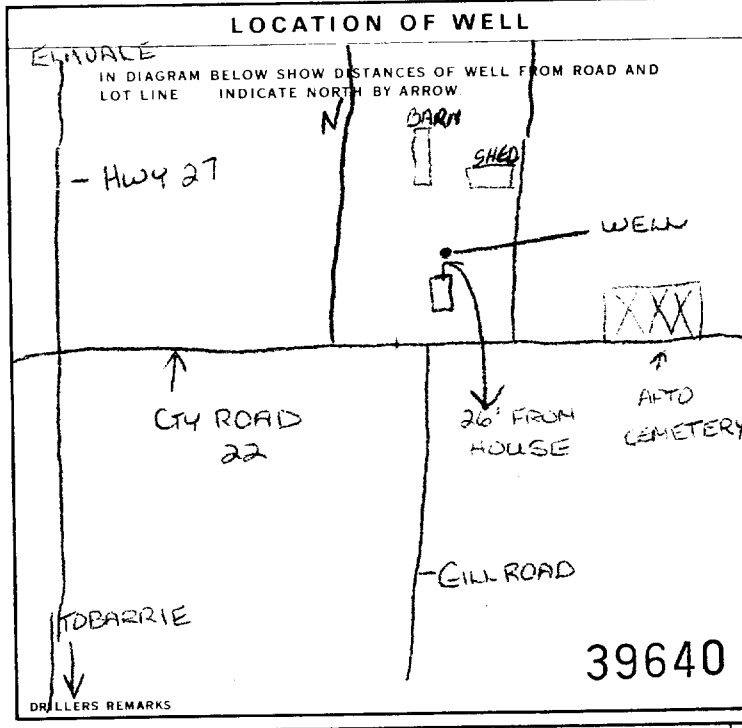
DURATION OF PUMPING: 2 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
92 FEET	140 FEET	15 MINUTES: 116 FEET	30 MINUTES: 138 FEET	45 MINUTES: 140 FEET	60 MINUTES: 140 FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: 165 FEET

RECOMMENDED PUMPING RATE: 10 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

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
10 DIGGING

CONTRACTOR

NAME OF WELL CONTRACTOR: BUE & BUKER DRILLING LTD

WELL CONTRACTOR'S LICENCE NUMBER: 1467

ADDRESS: R.R.#1 BOX 7 BARRIE ONTARIO

NAME OF WELL TECHNICIAN: BRIAN BUKER

WELL TECHNICIAN'S LICENCE NUMBER: T0226

SIGNATURE OF TECHNICIAN/CONTRACTOR: Brian Buker

SUBMISSION DATE: DAY 24 MO 1 YR 89

OFFICE USE ONLY

DATA SOURCE: 1467

DATE RECEIVED: JAN 27 1989

DATE OF INSPECTION: []

INSPECTOR: []

REMARKS: WDE

CSS.ES

WATER WELL RECORD

5729792

MUNICIPALITY OF WELL # 3 CON

03

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

COUNTY OR DISTRICT: [REDACTED] TOWNSHIP, BOROUGH CITY, TOWN, VILLAGE: **WESPREA**
CRAIGHURST CON. BLOCK, TRACT, SURVEY, ETC.: **CON 3** LOT: **1**
 DATE COMPLETED: DAY **18** MO **NOV** YR **92**

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BLACK	TOP SOIL			0	1
RED	SAND			1	6
GRAY	CLAY	SAND		6	8.5
	(MEDIUMS)	(SAND)		8.5	9.6
GRAY	CLAY	SILT		9.6	17.0
	(MEDIUMS)	(SAND)		17.0	17.5
GRAY	CLAY	SILT		17.5	19.0
	WATER BEARING SAND			19.0	22.0

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER		
190	<input checked="" type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR <input type="checkbox"/> MINERALS <input type="checkbox"/> GAS
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR <input type="checkbox"/> MINERALS <input type="checkbox"/> GAS
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR <input type="checkbox"/> MINERALS <input type="checkbox"/> GAS
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR <input type="checkbox"/> MINERALS <input type="checkbox"/> GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
6 1/4	STEEL GALVANIZED CONCRETE OPEN HOLE PLASTIC	.188	0	210
	STEEL GALVANIZED CONCRETE OPEN HOLE PLASTIC			
	STEEL GALVANIZED CONCRETE OPEN HOLE PLASTIC			

SCREEN

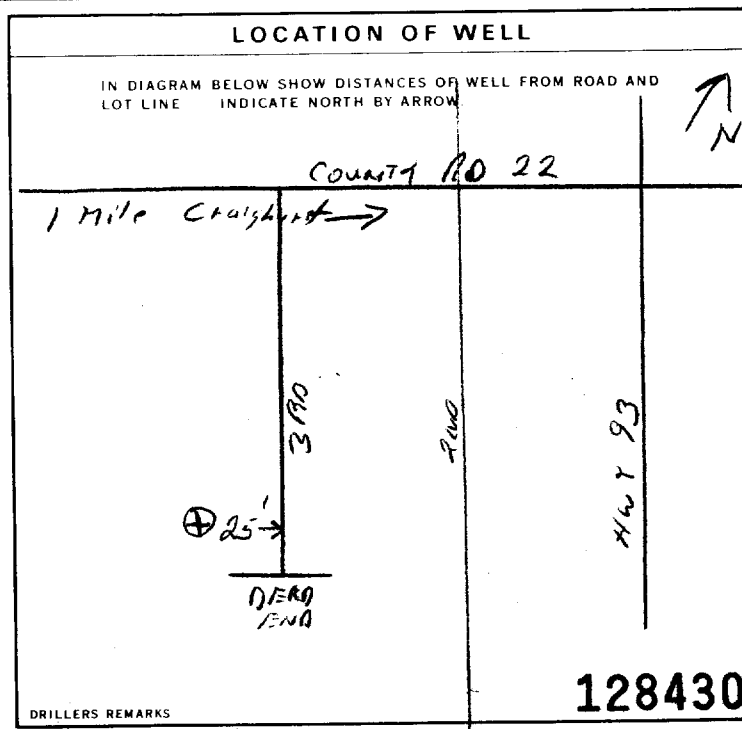
SIZE OF OPENING (SLOT NO.): **30** DIAMETER: **6** INCHES LENGTH: **4** FEET
 MATERIAL AND TYPE: **STAINLESS** DEPTH TO TOP OF SCREEN: **210** FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER, ETC.
18-21	CUTTINGS	GENERAL
26-29	K-PACKER	

71 PUMPING TEST

PUMPING TEST METHOD: PUMP BAILER
 PUMPING RATE: **25** GPM DURATION OF PUMPING: **1** HOURS **0** MINS
 STATIC LEVEL: **180** FEET WATER LEVEL END OF PUMPING: **86** FEET
 WATER LEVELS DURING: 15 MINUTES: **20** FEET 30 MINUTES: **2** FEET 45 MINUTES: **2** FEET 60 MINUTES: **2** FEET
 IF FLOWING, GIVE RATE: **1/2** GPM PUMP INTAKE SET AT: **1** FEET WATER AT END OF TEST: CLEAR CLOUDY
 RECOMMENDED PUMP TYPE: SHALLOW DEEP
 RECOMMENDED PUMP SETTING: **150** FEET RECOMMENDED PUMPING RATE: **25** GPM



FINAL STATUS OF WELL

WATER SUPPLY ABANDONED, INSUFFICIENT SUPPLY
 OBSERVATION WELL ABANDONED, POOR QUALITY
 TEST HOLE UNFINISHED
 RECHARGE WELL DEWATERING

WATER USE

DOMESTIC COMMERCIAL
 STOCK MUNICIPAL
 IRRIGATION PUBLIC SUPPLY
 INDUSTRIAL COOLING OR AIR CONDITIONING
 OTHER NOT USED

METHOD OF CONSTRUCTION

CABLE TOOL BORING
 ROTARY (CONVENTIONAL) DIAMOND
 ROTARY (REVERSE) JETTING
 ROTARY (AIR) DRIVING
 AIR PERCUSSION DIGGING OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: **Drury Well Drilling** WELL CONTRACTOR'S LICENCE NUMBER: **1851**
 ADDRESS: **RR#1 Barrie L4M4Y8**
 NAME OF WELL TECHNICIAN: **HARRY HASTINGS** WELL TECHNICIAN'S LICENCE NUMBER: **T-2041**
 SIGNATURE OF TECHNICIAN/CONTRACTOR: *[Signature]* SUBMISSION DATE: DAY **11** MO **01** YR **93**

OFFICE USE ONLY

DATA SOURCE: **1851** CONTRACTOR: **1851** DATE RECEIVED: **JAN 15 1993**
 DATE OF INSPECTION: _____ INSPECTOR: _____
 REMARKS: _____
 CSS.ES

5729793

MUNICIPALITY: 57016 CON
WELL # 2 LOT 03

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

COUNTY OR DISTRICT: SIMCOE TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: VESPREA CON BLOCK TRACT SURVEY ETC: CON 3 LOT 25-27: 1

OWN: [REDACTED] ADDRESS: 318 Centre St. Thornhill L4J 1G7 DATE COMPLETED: NOV 27 1992

ZONE EASTING NORTHING RC ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)					
GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BLACK	TOP SOIL			0	1
RED	SAND			1	3
GRAY	SAND	CLAY		3	20
MEDIUM	SAND			20	24
GRAY	CLAY	SILT		24	155
	WATER BEARING SAND			155	170

31 32

41 WATER RECORD

WATER FOUND AT - FEET: 155

KIND OF WATER: FRESH SALTY SULPHUR MINERALS GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
6 1/4	STEEL GALVANIZED CONCRETE OPEN HOLE PLASTIC	1/88	0	157

SCREEN

SIZE OF OPENING (SLOT NO): 14 DIAMETER: 6 INCHES LENGTH: 4 FEET

MATERIAL AND TYPE: STAINLESS DEPTH TO TOP OF SCREEN: 157 FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: PUMP AIR BAILER PUMPING RATE: 4 GPM DURATION OF PUMPING: 2 HOURS

STATIC LEVEL: 5 FEET WATER LEVEL END OF PUMPING: 149 FEET

WATER LEVELS DURING: 15 MINUTES: 92 FEET 30 MINUTES: 22 FEET 45 MINUTES: [REDACTED] FEET 60 MINUTES: 5 FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP RECOMMENDED PUMP SETTING: 150 FEET RECOMMENDED PUMPING RATE: 4 GPM

LOCATION OF WELL

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

COUNTY RD 22

150' 100' 200' WILL

CON 3

128427

FINAL STATUS OF WELL: WATER SUPPLY OBSERVATION WELL TEST HOLE RECHARGE WELL ABANDONED INSUFFICIENT SUPPLY ABANDONED POOR QUALITY UNFINISHED DEWATERING

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

METHOD OF CONSTRUCTION: CABLE TOOL ROTARY (CONVENTIONAL) ROTARY (REVERSE) ROTARY (AIR) AIR PERCUSSION BORING DIAMOND JETTING DRIVING DIGGING OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Deeks Well Drilling WELL CONTRACTOR'S LICENCE NUMBER: 1851

ADDRESS: [REDACTED]

NAME OF WELL TECHNICIAN: LARRY HASTINGS WELL TECHNICIAN'S LICENCE NUMBER: 72044

SIGNATURE OF TECHNICIAN/CONTRACTOR: [Signature] SUBMISSION DATE: DAY 31 MO. 12 YR 92

OFFICE USE ONLY

DATA SOURCE: 1851 CONTRACTOR: 1851 DATE RECEIVED: JAN 15 1993

DATE OF INSPECTION: INSPECTION: REMARKS: CSS.ES

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

11

5736248

Municipality
57003

Con.
CON 01

County or District: SIMCOE
Township/Borough/City/Town/Village: FLOS
Con block tract survey, etc.: 1
Lot: 1
Address: RR#2 PHELSTON ONT
Date completed: 29 6 01
Basin Code: ii iii iv

General colour	Most common material	Other materials	General description	Depth - feet	
				From	To
BROWN	TOP SOIL			0	1
BROWN	SAND			1	7
GRAY	SAND	CLAY/STONES		7	52
GRAY	CLAY	SAND		52	64
BROWN	SAND			64	71
GRAY	SAND	CLAY		71	—
TOTAL DEPTH 71 feet					

31
32

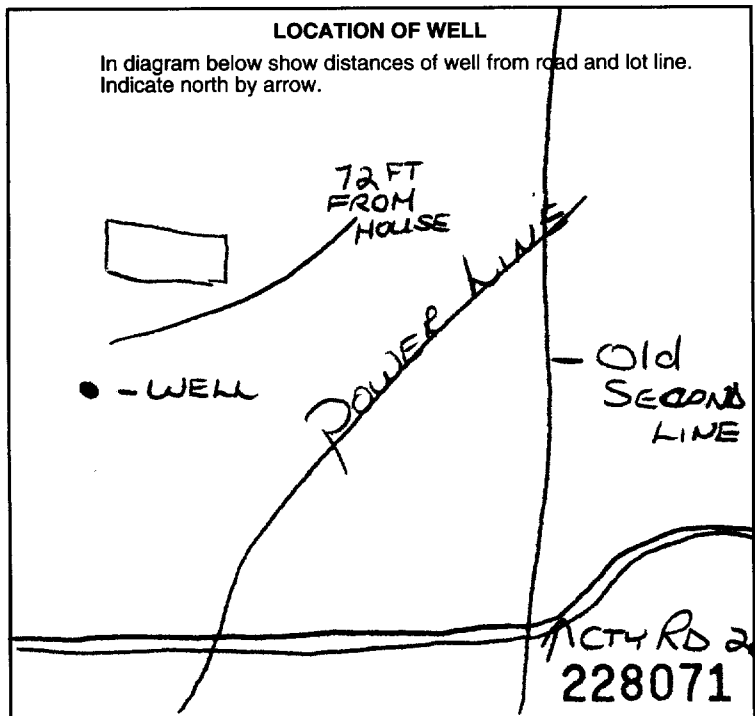
WATER RECORD	
Water found at - feet	Kind of water
64	1 <input checked="" type="checkbox"/> Fresh 2 <input type="checkbox"/> Salty 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas
15-18	1 <input type="checkbox"/> Fresh 2 <input type="checkbox"/> Salty 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas
20-23	1 <input type="checkbox"/> Fresh 2 <input type="checkbox"/> Salty 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas
25-28	1 <input type="checkbox"/> Fresh 2 <input type="checkbox"/> Salty 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas
30-33	1 <input type="checkbox"/> Fresh 2 <input type="checkbox"/> Salty 3 <input type="checkbox"/> Sulphur 4 <input type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas

CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
5	1 <input checked="" type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic	.188	1 FT ABOVE GROUND	67
17-18	1 <input type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic			20-23
24-25	1 <input type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic			27-30

SCREEN	Sizes of opening (Slot No.)	Diameter	Length
		14	5 inches
	Material and type		Depth at top of screen
	STAINLESS STEEL		67 feet

PLUGGING & SEALING RECORD		
<input type="checkbox"/> Annular space <input type="checkbox"/> Abandonment		
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)
From	To	
10-13	14-17	R PACKER Hole Plug
18-21	22-25	
26-29	30-33	

PUMPING TEST	Pumping test method		Pumping rate	Duration of pumping		
	1 <input checked="" type="checkbox"/> Pump	2 <input type="checkbox"/> Bailor	5 GPM	3 Hours	— Mins	
	Static level	Water level end of pumping	Water levels during			
	19-21 12 feet	22-24 58 feet	15 minutes 41 feet	30 minutes 56 feet	45 minutes 58 feet	60 minutes 58 feet
If flowing give rate		Pump intake set at	Water at end of test			
GPM		feet	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Cloudy			
Recommended pump type		Recommended pump setting	Recommended pump rate			
<input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep		67 feet	6 GPM			



FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

Name of Well Contractor: BUIE + BUIEK DRILLING LTD
Address: RR#1 BOX 7 BARRIE ONT
Name of Well Technician: BRIAN BUIEK
Signature of Technician/Contractor: Brian Buike
Well Contractor's Licence No.: 1467
Well Technician's Licence No.: T0226
Submission date: 15 09 01

MINISTRY USE ONLY

Data source: 1467
Date received: SEP 19 2001
Date of inspection: _____
Inspector: _____
Remarks: _____

A 050785
A050785

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Well Owner's Information and Location of Well Information

Ministry Use Only										
MUN								CON		LOT

RR#/Street Number/Name: **3 Maltman Court**
 City/Town/Village: **Springwater**
 Site/Compartment/Block/Tract etc.: **18**
 GPS Reading: **3**
 NAD: **83** Zone: **17** Easting: **598838** Northing: **4929105**
 Unit Make/Model: **Phelps-ton** 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	To
brown	Sand		Packed	0	19'
grey	clay	Silt	Soft	19'	210'
brown	Sand	gravel	loose	210'	219'

Hole Diameter

Depth	Metres	Diameter
From	To	Centimetres
0	20'	8 3/4"
20'	219'	7"

Water Record

Water found at **210'** / 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	To
Casing				
6 1/8"	<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	2.19	12'	215'
5 1/4"	<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	2.19	213'	215'
Screen				
5 1/2"	<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	Slot No. 12	215'	219'
No Casing or Screen				
<input type="checkbox"/> Open hole				

Test of Well Yield *Feet*

Pumping test method	Draw Down		Recovery	
	Time min	Water Level Metres	Time min	Water Level Metres
Pump				
Pump intake set at - (metres) 20'	Static Level	6"		
Pumping rate - (litres/min) 15gpm	1	5'5"	1	6"
Duration of pumping 1 hrs + 00 min	2	6'7"	2	
Final water level end of pumping 6'9" metres	3	6'9"	3	
Recommended pump type. <input checked="" type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep	4		4	
Recommended pump depth. 20' + metres	5		5	
Recommended pump rate. 75gpm (litres/min)	10		10	
If flowing give rate - (litres/min)	15		15	
	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60	6'9"	60	

Plugging and Sealing Record Annular space Abandonment

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

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

Location of Well

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

Audit No. **Z 73329** Date Well Completed **2007** **06** **27**

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

Well Contractor/Technician Information

Name of Well Contractor: **Canadian Well Drilling** Well Contractor's Licence No.: **C-7075**
 Business Address (street name, number, city etc.): **12493 Hwy 27 N Midhurst ON L0C-1X0**
 Name of Well Technician (last name, first name): **Fleming Peter** Well Technician's Licence No.: **Y-2874**
 Signature of Technician/Contractor: *Peter Fleming* Date Submitted: **2007** **08** **12**

Ministry Use Only

Data Source: **Contractor**
 Date Received: **OCT 9 2007** Date of Inspection: **7 075**
 Remarks: _____ Well Record Number: _____

Well Owner's Information

lot 16 Gallagher Cres
County/District/Municipality: **Simcoe**
City/Town/Village: **Springwater**
Province: **Ontario** Postal Code: **L0L1X0**
UTM Coordinates: NAD 83 Zone Easting: **17598030** Northing: **4928213**
GPS Unit Make: _____ Model: _____ Mode of Operation: Undifferentiated Averaged Differentiated, specify _____

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

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres)	
				From	To
brown	Sand		loose	0	20'
grey	clay	silt	hard	20'	52'
brown	Sand	gravel	loose	52'	60'

Annular Space/Abandonment Sealing Record

Depth Set at (Metres)	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
0 to 20'	grout	40 gal

Results of Well Yield Testing

Time (Min)	Draw Down		Recovery	
	Water Level (Metres)	Time (Min)	Water Level (Metres)	Time (Min)
Static Level	8'	Static Level		
1	12'1"	1	9'3"	
2	14'2"	2	8'	
3	14'6"	3		
4	14'6"	4		
5		5		
10		10		
15		15		
20		20		
25		25		
30		30		
40		40		
50		50		
60	14'6"	60		

Check box if after test of well yield, water was:
 Clear and sand free
 Cannot develop to sand-free state
 If pumping discontinued, give reason: _____
 Pumping test method: **PUMP**
 Pump intake set at (Metres): **20'**
 Pumping rate (Litres/min): **15 gpm**
 Duration of pumping: **1 hrs 00 min**
 Final water level end of pumping (Metres): **14'6"**
 Recommended pump type: Shallow Deep
 Recommended pump depth: **30'** Metres
 Recommended pump rate (Litres/min): **15 gpm** +
 If flowing give rate (Litres/min): _____

Method of Construction

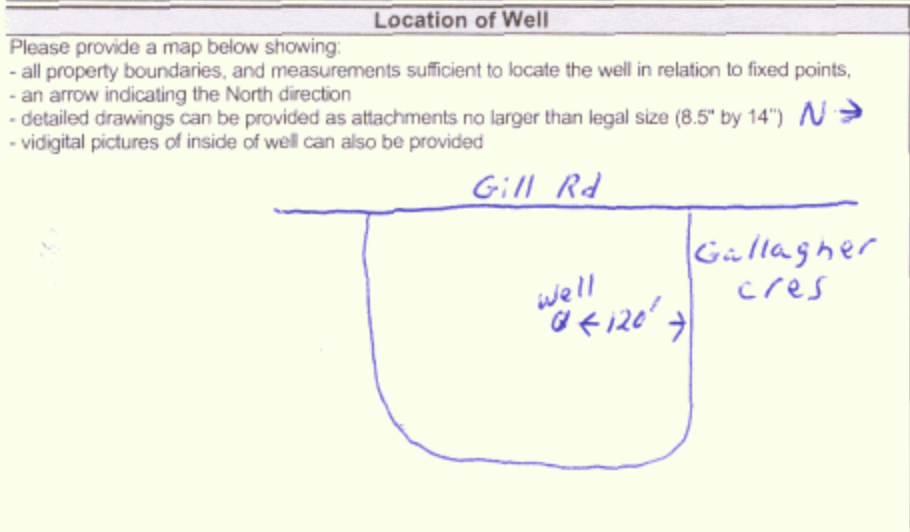
Cable Tool Diamond Rotary (Conventional) Jetting Rotary (Reverse) Driving Rotary (Air) Digging Air percussion Boring Other, specify _____

Water Use

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

Status of Well

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



Water Details

Water found at Depth	Kind of Water
5'6" Metres <input type="checkbox"/> Gas	<input checked="" type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals
Metres <input type="checkbox"/> Gas	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals
Metres <input type="checkbox"/> Gas	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals

Casing Used	Screen Used	Casing and Well Details
<input type="checkbox"/> Galvanized <input checked="" type="checkbox"/> Steel 2.19 <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete	<input type="checkbox"/> Galvanized <input checked="" type="checkbox"/> Steel 16 slot 6" <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete	Diameter of the Hole (Centimetres): 7" Depth of the Hole (Metres): 60' Wall Thickness (Metres): 2.19
No Casing and Screen Used		Inside Diameter of the Casing (Metres): 6 1/2"
<input type="checkbox"/> Open Hole		Depth of the Casing (Metres): 56'

Date Well Completed (yyyy/mm/dd): **2008 04 10**
 Was the well owner's information package delivered? Yes No
 Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd): _____

Well Contractor and Well Technician Information

Business Name of Well Contractor: **Canadian Well Drilling** Well Contractor's Licence No.: **7 0 7 5**
 Business Address (Street No./Name, number, RR): **9 Bertram Ind Park** Municipality: **Springwater**
 Province: **ON** Postal Code: **L0L1X0** Business E-mail Address: _____
 Bus. Telephone No. (inc. area code): **7 10 5 7 2 8 9 8 7 2** Name of Well Technician (Last Name, First Name): **Fleming Peter**
 Technician's Licence No.: **7 4** Signature of Technician: **Peter Fleming** Date Submitted (yyyy/mm/dd): **2008/4/10**

Ministry Use Only

Audit No.: **2 78235** Well Contractor No.: _____
 Date Received (yyyy/mm/dd): **JUN 2 2008** Date of Inspection (yyyy/mm/dd): _____
 Remarks: _____

Measurements recorded in: Metric Imperial

Page ___ of ___

Well Owner's Information

First Name: 2055614 Ontario Inc. Last Name/Organization: 2055614 Ontario Inc. E-mail Address: Well Constructed by Well Owner
 Mailing Address (Street Number/Name): 526 Welham Rd. Unit #1 Municipality: ON Province: ON Postal Code: L4W 0Z7 Telephone No. (inc. area code): 770 5770 4322

Well Location

Address of Well Location (Street Number/Name): 32 Gallagher cres Township: Springwater Lot: 2 Concession:
 County/District/Municipality: Simcoe City/Town/Village: Midhurst Province: Ontario Postal Code: L0L 1X0
 UTM Coordinates: Zone: 18 Easting: 175981 Northing: 914928054 Municipal Plan and Sublot Number: Other:

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
brown	Sand Fine		loose	0	18'
grey	clay	silt	soft	18'	72'
brown	fine sand		loose	72'	80'

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m ³ /ft ³)	
			From
0	21'	grout	40 gal

Results of Well Yield Testing

After test of well yield, water was:	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
<input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify				
If pumping discontinued, give reason:	Static Level	34'		
	1	42'	1	34'
	Pump intake set at (m/ft)	70'	2	
	2	45'	2	
	Pumping rate (l/min / GPM)	12 gpm	3	
	3	45'	3	
Duration of pumping	1 hrs + 00 min	4		
5		5		
Final water level end of pumping (m/ft)	45'	10		10
If flowing give rate (l/min / GPM)	15			15
	20			20
	25			25
	30			30
	40			40
	50			50
Recommended pump depth (m/ft)	60'	60		60
Recommended pump rate (l/min / GPM)	12 gpm +			
Well production (l/min / GPM)	15 gpm +			
Disinfected?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			

Method of Construction

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
6 3/8"	Steel	1.88	72'	76'	<input checked="" type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify <input type="checkbox"/> Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To
6"	Steel	8	76'	80'

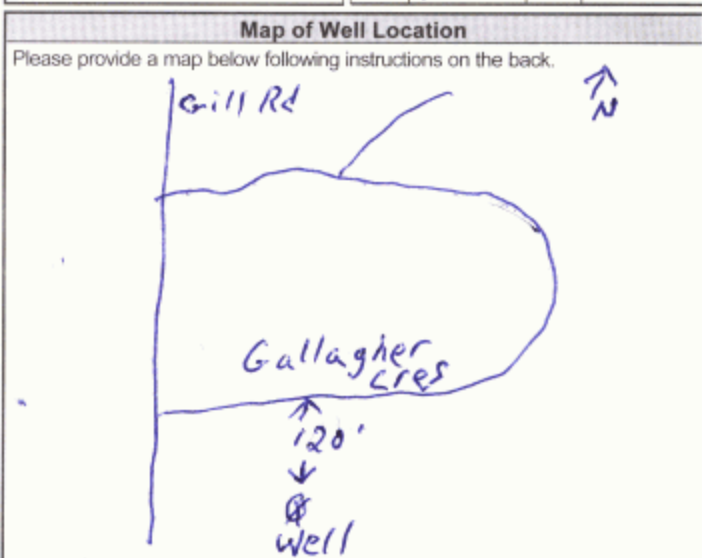
Water Details

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Hole Diameter	
		Depth (m/ft)	Diameter (cm/in)
72'	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	0	8 3/4"
		21'	7"

Well Contractor and Well Technician Information

Business Name of Well Contractor: Canadian Well Drilling Well Contractor's Licence No.: 7075
 Business Address (Street Number/Name): 12493 Hwy 27N Midhurst Municipality: Springwater
 Province: ON Postal Code: L0L 1X0 Business E-mail Address:

Bus. Telephone No. (inc. area code): 705 728 9872 Name of Well Technician (Last Name, First Name): Fleming Peter
 Well Technician's Licence No.: 2874 Signature of Technician and/or Contractor: [Signature] Date Submitted: 20090629



Comments:

Well owner's information package delivered: Yes No Date Package Delivered: YYY Y MM DD Date Work Completed: 20090629

Ministry Use Only
 Audit No: Z 94347
 JUL 22 2009

Measurements recorded in: Metric Imperial

Well Owner's Information

First Name: 2055614 Ontario Inc. Last Name / Organization: Ontario Inc. E-mail Address: [blank] Well Constructed by Well Owner

Mailing Address (Street Number/Name): 526 Welham Rd. Unit 11, Barrie, ON L4N 8Z7 Telephone No. (inc. area code): 705-720-4322

Well Location

Address of Well Location (Street Number/Name): 32 Township: [blank] Lot: [blank] Concession: [blank]

County/District/Municipality: Gallop Creek City/Town/Village: Midhurst Province: Ontario Postal Code: L0L 1X0

UTM Coordinates: Zone: 18 Easting: 175981 Northing: 174928575 Municipal Plan and Sublot Number: [blank] Other: [blank]

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
brown	Sand Fine		loose	0	17'
grey	clay	Silt	soft	17'	73'
brown	Sand medium		loose	73'	80'

Annular Space			
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)	
From	To		
0	21'	grout	40sfel

Results of Well Yield Testing					
After test of well yield, water was:		Draw Down		Recovery	
<input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify		Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason:		Static Level	5'		
Pump intake set at (m/ft): 40'		1		1	
Pumping rate (l/min / GPM): 10 gpm		2		2	
Duration of pumping: 1 hrs +00 min		3		3	
Final water level end of pumping (m/ft): 29'		4		4	5'
If flowing give rate (l/min / GPM):		5	29'	5	
Recommended pump depth (m/ft): 40'		10		10	
Recommended pump rate (l/min / GPM): 15 gpm		15		15	
Well production (l/min / GPM): 25 gpm		20		20	
Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		25		25	
		30		30	
		40		40	
		50		50	
		60	29'	60	

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

Construction Record - Casing			Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	
			From	To
6 3/8"	Steel	1.88	+2'	76'

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

Construction Record - Screen				
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To
5"	steel	12	76'	80'

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	Diameter (cm/in)
		From	To
74'	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	0	21'
		21'	80'

Well Contractor and Well Technician Information

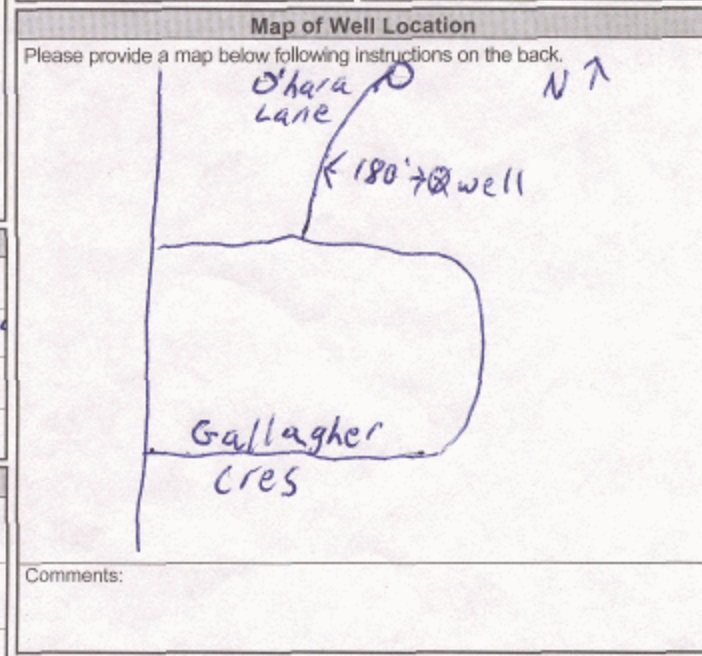
Business Name of Well Contractor: Canadian Well Drilling Well Contractor's Licence No.: 7075

Business Address (Street Number/Name): 12493 Hwy 27 N Midhurst Municipality: Springwater

Province: ON Postal Code: L0L 1X0 Business E-mail Address: [blank]

Bus. Telephone No. (inc. area code): 705-728-9872 Name of Well Technician (Last Name, First Name): Fleming Peter

Well Technician's Licence No.: 2874 Signature of Technician and/or Contractor: Peter Fleming Date Submitted: 2009/10/00



Well owner's information package delivered: <input type="checkbox"/> Yes <input type="checkbox"/> No	Date Package Delivered: Y Y Y Y M M D D	Ministry Use Only Audit No. Z 94340 DEC 16 2009
Date Work Completed: Y Y Y Y M M D D	2009/10/00	

Well Owner's Information

Address of Well Location (Street Number/Name) **7 PINEHILL DRIVE** Township **INDUSTRIAL SPRINGWATER**

County/District/Municipality **SIMCOE** City/Town/Village **PHHELPSTON** Province **Ontario** Postal Code **L0L 2K0**

UTM Coordinates Zone **17** Easting **532492** Northing **9408** Municipal Plan and Sublot Number _____ Other _____

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
Brown	Sand			0'	10'
Grey	Clay			10'	70'
Grey	Silt			70'	120'
Grey	Clay			120'	165'
Grey	Sand		fine	165'	177'

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m ³ /ft ³)
0' 20'	14 Bags 3/8 Hole plug	

Results of Well Yield Testing

After test of well yield, water was:	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
<input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify _____				
If pumping discontinued, give reason:	Static Level	6.5		135
	1		1	121
Pump intake set at (m/ft)	2		2	113.4
	3		3	106.4
Pumping rate (l/min / GPM)	4		4	99.8
	5		5	93.8
Duration of pumping	10		10	69.1
	15		15	52.1
Final water level end of pumping (m/ft)	20		20	40
	25		25	31.5
If flowing give rate (l/min / GPM)	30		30	25.6
	40		40	18.3
Recommended pump depth (m/ft)	50		50	14.5
	60		60	12.5
Recommended pump rate (l/min / GPM)				
Well production (l/min / GPM)				
Disinfected?				
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				

Method of Construction

<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Monitoring
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning	
<input type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial		
<input checked="" type="checkbox"/> Other, specify Air Rotary		<input type="checkbox"/> Other, specify _____		

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
6"	Steel	0.219	+2'	172'	<input checked="" type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____ <input type="checkbox"/> Other, specify _____

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To
5"	Steel	6'	172'	177'

Water Details

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

Well Contractor and Well Technician Information

Business Name of Well Contractor: **LONE STAR WELL DIGGING LTD** Well Contractor's Licence No.: **3413**

Business Address (Street Number/Name): **P.O. Box 280** Municipality: **LEFROY**

Province: **ONT** Postal Code: **L0L1W0** Business E-mail Address: _____

Bus. Telephone No. (inc. area code): **7054364359** Name of Well Technician (Last Name, First Name): **JIM MOORE**

Well Technician's Licence No.: **T401** Signature of Technician and/or Contractor: **Jim Moore** Date Submitted: **20110104**

Map of Well Location

Please provide a map below following instructions on the back.

Comments: **30 ft from House
100 ft from Road**

Well owner's information package delivered: Yes No

Date Package Delivered: **20110104**

Date Work Completed: **20110104**

Ministry Use Only

Audit No.: **2123297**

Received: **FEB 09 2011**

Well ID: A127584 (below)

Measurements recorded in: Metric Imperial

Page _____ of _____

Address of Well Location (Street Number/Name): 10 Gallagher
 Township: Springwater Lot: _____ Concession: _____
 County/District/Municipality: Simcoe City/Town/Village: Midhurst Province: Ontario Postal Code: L0L1X0
 UTM Coordinates: Zone 17 Easting 598049 Northing 4928327 Municipal Plan and Sublot Number: _____ Other: _____

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
<u>brown</u>	<u>sand</u>		<u>loose</u>	<u>0</u>	<u>18'</u>
<u>grey</u>	<u>clay</u>	<u>silt</u>	<u>hard</u>	<u>18'</u>	<u>45'</u>
<u>brown</u>	<u>medium sand</u>		<u>loose</u>	<u>45'</u>	<u>51'</u>

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
<u>0</u> to <u>20'</u>	<u>grout</u>	<u>40 gal</u>

Results of Well Yield Testing

Time (min)	Water Level (m/ft)	Recovery	
		Time (min)	Water Level (m/ft)
Static Level	<u>3'</u>		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60	<u>20</u>	60	<u>3'</u>

After test of well yield, water was:
 Clear and sand free
 Other, specify _____
 If pumping discontinued, give reason: _____
 Pump intake set at (m/ft): 35'
 Pumping rate (l/min / GPM): 15 gpm
 Duration of pumping: 1 hrs 00 min
 Final water level end of pumping (m/ft): 20'
 If flowing give rate (l/min / GPM): _____
 Recommended pump depth (m/ft): 35'
 Recommended pump rate (l/min / GPM): 15 plus 9 gpm
 Well production (l/min / GPM): 30
 Disinfected? Yes No

Method of Construction

Cable Tool Diamond Public Commercial Not used
 Rotary (Conventional) Jetting Domestic Municipal Dewatering
 Rotary (Reverse) Driving Livestock Test Hole Monitoring
 Boring Digging Irrigation Cooling & Air Conditioning
 Air percussion Industrial Other, specify _____
 Other, specify DR 24

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
<u>6 1/8</u>	<u>Steel</u>	<u>1.88</u>	<u>72</u>	<u>48'</u>	<input checked="" type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____ <input type="checkbox"/> Other, specify _____
<u>5 3/8</u>	<u>Steel</u>	<u>1.88</u>	<u>46</u>	<u>48'</u>	

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To
<u>6"</u>	<u>S Steel</u>	<u>16</u>	<u>47'</u>	<u>51'</u>

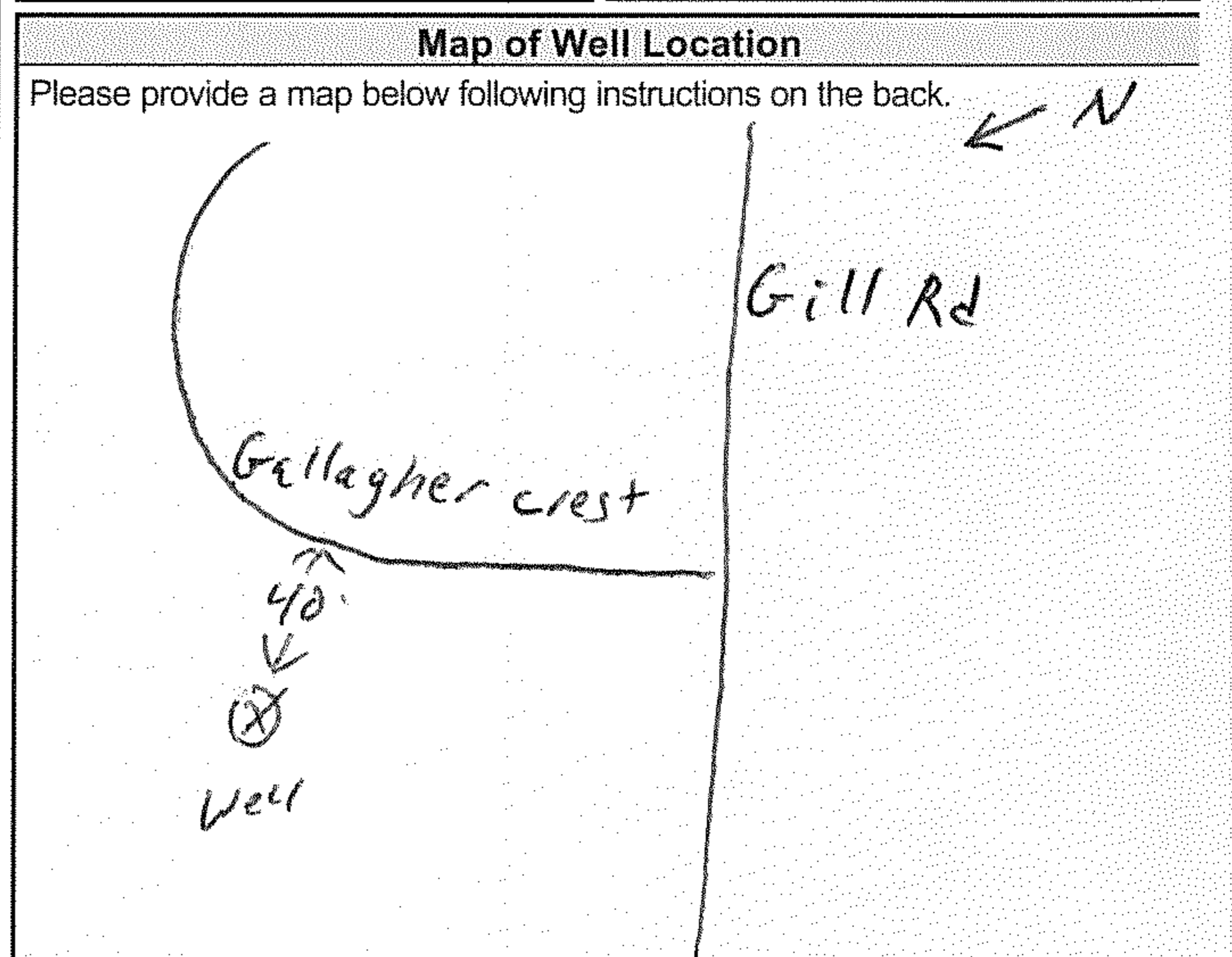
Water Details

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	Diameter (cm/in)
<u>45'</u>	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	<u>0</u> to <u>47'</u>	<u>6 1/4"</u>
<u>(m/ft)</u>	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	<u>47</u> to <u>51'</u>	<u>6"</u>
<u>(m/ft)</u>	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____		

Well Contractor and Well Technician Information

Business Name of Well Contractor: Canadian Well Drilling Well Contractor's Licence No.: 7075
 Business Address (Street Number/Name): 12493 Hwy 27 N Midhurst Municipality: Springwater
 Province: ON Postal Code: L0L1X0 Business E-mail Address: _____

Bus. Telephone No. (inc. area code): 705 728 8872 Name of Well Technician (Last Name, First Name): Fleming Pete
 Well Technician's Licence No.: 2874 Signature of Technician and/or Contractor: Pete Fleming Date Submitted: 2013 08 27



Comments: _____

Well owner's information package delivered: Yes No
 Date Package Delivered: 2013 07 27 Date Work Completed: 2013 07 27
Ministry Use Only
 Audit No.: 2155554
 OCT 07 2013

Measurements recorded in: Metric Imperial

Page 1 of 1

Address of Well Location (Street Number/Name) **2928 HORSESHOE VALLEY RD W** Township **SPRINGWATER** Lot **H1** Concession **PRWCON2**
 County/District/Municipality **SIMCOE** City/Town/Village **BARRIE** Province **Ontario** Postal Code _____
 UTM Coordinates Zone Easting Northing Municipal Plan and Sublot Number Other
 NAD 83 **17 59 7948 4929751**

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
BROWN	SAND			0	3.1
GREY	CLAY	STONE TILL		3.1	9.7
BROWN	SAND		f to med.	9.7	24.4
BROWN	SAND		CS.	24.4	32.0
BROWN	SAND		med.	32.0	36.6
BROWN	SILT	CLAY		36.6	42.7

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m ³ /ft ³)
0 to 7m	BENTONITE GROUT	380 Ltr

Results of Well Yield Testing

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

If pumping discontinued, give reason: _____

Pump intake set at (m/ft) **25 m**

Pumping rate (l/min / GPM) **350 L/m**

Duration of pumping **2 hrs + 30 min**

Final water level end of pumping (m/ft) **16.92 m**

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

Recommended pump depth (m/ft) **25 m**

Recommended pump rate (l/min / GPM) **350 L/m**

Well production (l/min / GPM) _____

Disinfected? Yes No

Time (min)	Draw Down		Recovery	
	Water Level (m/ft)	Time (min)	Water Level (m/ft)	Time (min)
Static Level	3.64 m			
1	14.10	1		
2	16.02	2		
3	16.29	3		
4	16.38	4		
5	16.44	5		
10	16.56	10		
15	16.61	15		
20	16.66	20		
25	16.68	25		
30	16.70	30		
40	16.73	40		
50	16.76	50		
60	16.78	60		

Method of Construction

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		Status of Well
			From	To	
15.5	STEEL	1.188	7.5	31.7	<input checked="" type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____ <input type="checkbox"/> Other, specify _____
14	STEEL	1.219	30.7	31.7	

Construction Record - Screen

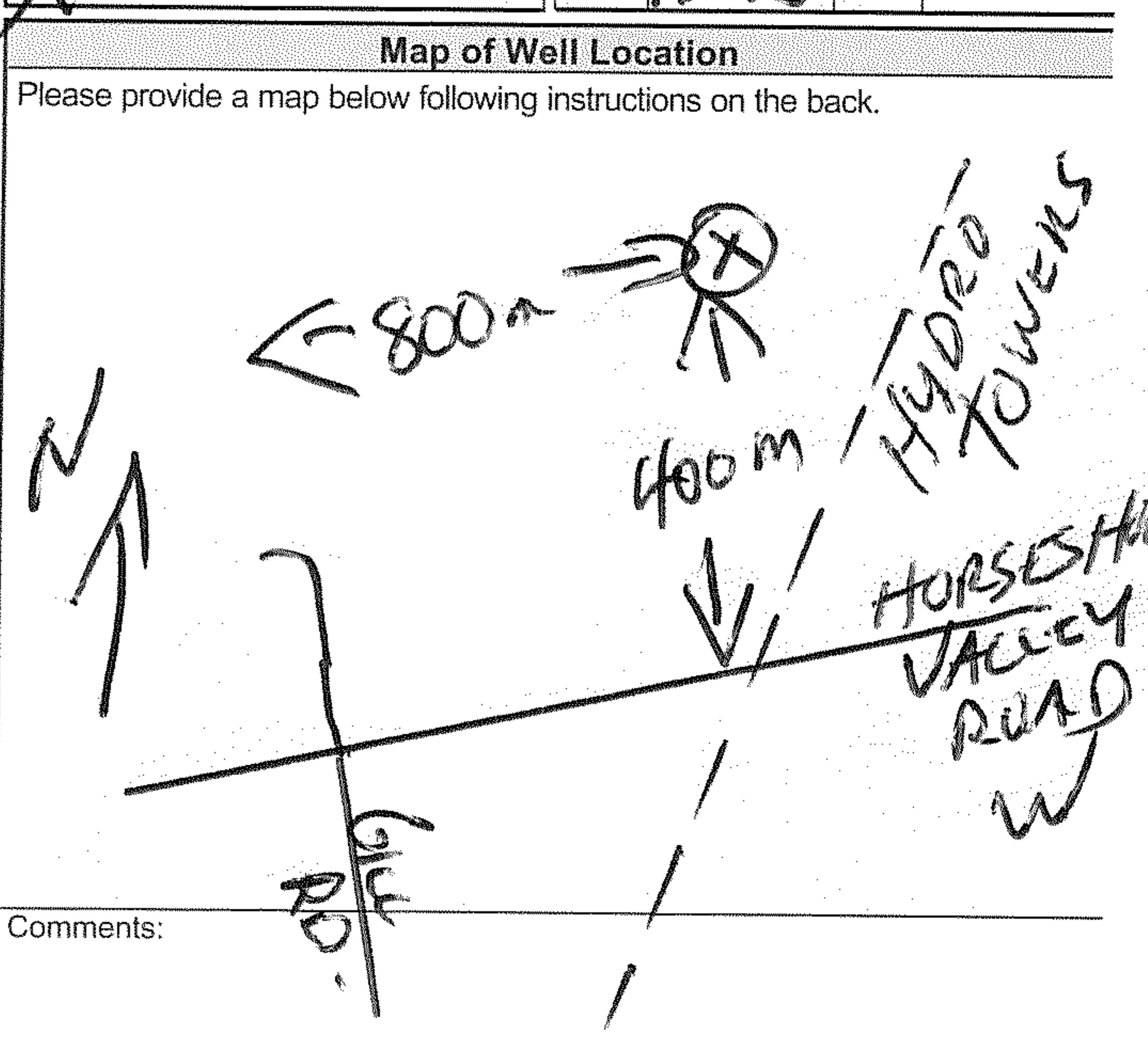
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To
15	S. STEEL	016	29.7	36.0

Water Details

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	Depth (m/ft)	Diameter (cm/in)
32 m		0	26
		7	22

Well Contractor and Well Technician Information

Business Name of Well Contractor **AQUAN WRIGHT WATER WORKS** Well Contractor's Licence No. **5528**
 Business Address (Street Number/Name) **4121 Hwy 93 Hillisdale** Municipality _____
 Province **ON** Postal Code **L0R 1W0** Business E-mail Address **awww@bellnet.ca**



Bus. Telephone No. (inc. area code) **705 835 5646** Name of Well Technician (Last Name, First Name) **GAVIN WRIGHT**
 Well Technician's Licence No. **2976** Signature of Technician and/or Contractor *[Signature]* Date Submitted **20130925**

Well owner's information package delivered Yes No

Date Package Delivered **20130925** Date Work Completed **20130925**

Ministry Use Only
 Audit No. **Z 176828**
 JAN 09 2014



Well Tag #: A162470
A162470

Measurements recorded in: Metric Imperial

Well Owner's Information

First Name: Mailing Address (Street Number/Name): 1-526 Wellham Road
Last Name / Organization: DREAMWOOD Homes
Municipality: Barrie
Province: ON
Postal Code: L4N 8Z7
Telephone No. (inc. area code): 705 733 4432
E-mail Address: Well Constructed by Well Owner

Well Location

Address of Well Location (Street Number/Name): 22 Gallagher Cres
Township: Springwater
County/District/Municipality: Simcoe
Province: Ontario
UTM Coordinates: NAD 83 17 59 82 97 49 28 253
Municipal Plan and Sublot Number: Other

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
brown	Sand		loose	0	17'
grey	clay	silt	hard	17'	101'
brown	sand		loose	101'	112'

Annular Space			
Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	20	grout	40 gal

Method of Construction	Well Use
<input type="checkbox"/> Cable Tool <input type="checkbox"/> Rotary (Conventional) <input type="checkbox"/> Rotary (Reverse) <input type="checkbox"/> Boring <input type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify DR 24	<input type="checkbox"/> Public <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> Other, specify

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		<input checked="" type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify <input type="checkbox"/> Other, specify
			From	To	
6 1/8	Steel	1.88	0	104	
5 3/8	Steel	1.88	102	104	

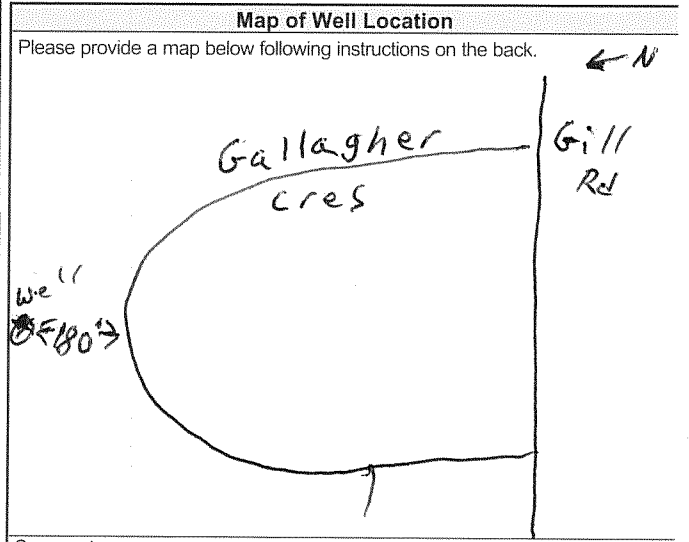
Construction Record - Screen				
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To
6"	S Steel	8	104'	112'

Water Details		Hole Diameter	
Water found at Depth: 112' (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft) From: 0	Depth (m/ft) To: 104
Water found at Depth: (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested	Depth (m/ft) From: 104	Depth (m/ft) To: 112
Water found at Depth: (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested		

Well Contractor and Well Technician Information
Business Name of Well Contractor: Canadian Well Drilling
Well Contractor's Licence No.: 7075
Business Address (Street Number/Name): 12493 Hwy 27 N Midhurst
Municipality: Springwater
Province: ON
Postal Code: L0L 1X0
Business E-mail Address:

Name of Well Technician (Last Name, First Name): Fleming Pete
Signature of Technician and/or Contractor: [Signature]
Date Submitted: 20140630
Well Technician's Licence No.: 2874

Results of Well Yield Testing				
After test of well yield, water was: <input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason: Pump intake set at (m/ft): 100' Pumping rate (l/min / GPM): 159 gpm Duration of pumping: 1 hrs + 00 min Final water level end of pumping (m/ft): 90' If flowing give rate (l/min / GPM): Recommended pump depth (m/ft): 100' Recommended pump rate (l/min / GPM): 159 gpm Well production (l/min / GPM): 189 gpm Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Static Level	55'		
	1		1	
	2		2	
	3		3	
	4		4	
	5		5	
10		10		
15		15		
20		20		
25		25		
30	90'	30	55'	
40		40		
50		50		
60	90'	60	55'	



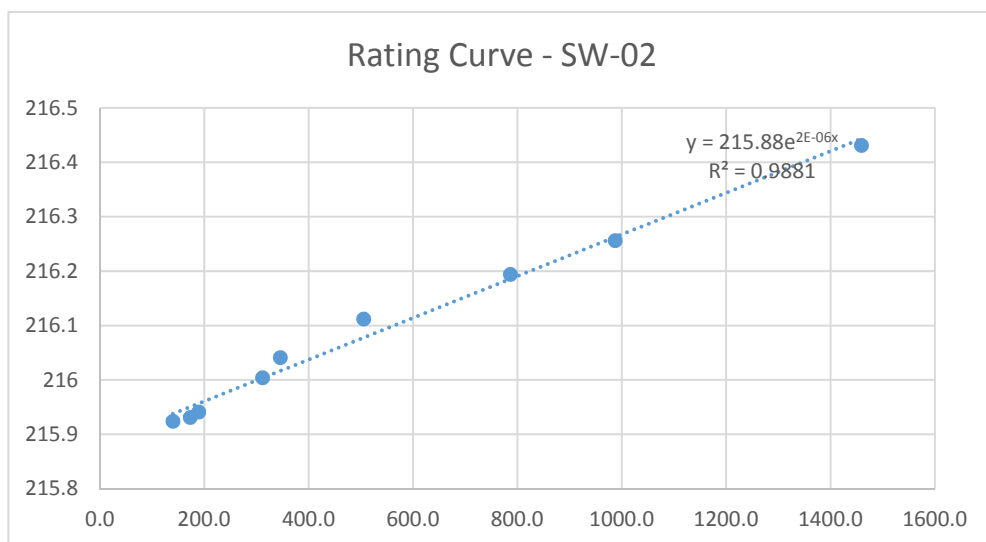
Comments:
Well owner's information package delivered: Yes No
Date Package Delivered: YYY Y MM DD
Date Work Completed: 20140611
Ministry Use Only
Audit No.: 2186192
JUL 21 2014

Appendix G

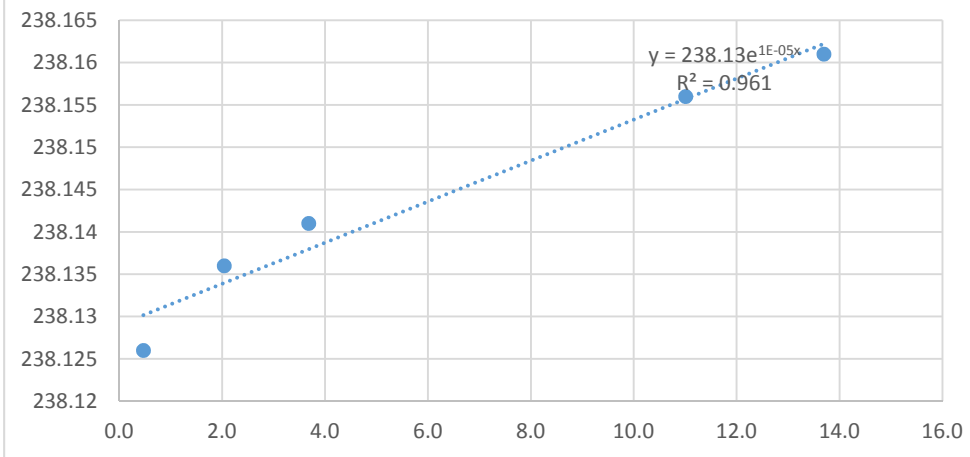
Surface Water Monitoring Data

SW-01				
Benchmark Elevation (m):	239.011			
Date	Time	BM to WS (m)	Water Surface Elevation (m)	Flow Rate (Lps)
7/20/2016	9:15	Dry	Dry	Dry
9/1/2016	13:38	Dry	Dry	Dry
10/27/2016	10:58	Dry	Dry	Dry
11/30/2016	9:40	Dry	Dry	Dry
12/30/2016	13:08	Dry	Dry	Dry
1/30/2017	10:45	0.885	238.126	0.5
2/27/2017	12:50	0.870	238.141	3.7
3/28/2017	13:10	0.855	238.156	11.0
5/3/2017	13:10	0.850	238.161	13.7
5/31/2017	8:20	0.875	238.136	2.0

SW-02				
Benchmark Elevation (m):	218.576			
Date	Time	BM to WS (m)	Water Surface Elevation (m)	Flow Rate (Lps)
7/20/2016	10:40	2.645	215.931	172.9
9/1/2016	11:30	2.652	215.924	139.8
10/27/2016	9:45	2.635	215.941	189.3
11/30/2016	12:05	2.535	216.041	345.5
12/30/2016	12:15	2.572	216.004	311.5
1/30/2017	Unable to access monitoring location safely			
2/27/2017	12:15	2.382	216.194	786.4
3/28/2017	12:25	2.32	216.256	987.3
5/3/2017	12:05	2.145	216.431	1459.2
5/31/2017	7:45	2.464	216.112	505.4



Rating Curve - SW-01



Appendix H

Laboratory Analytical Reports

Your P.O. #: 73504533
Your Project #: 086822-03-5.0
Your C.O.C. #: 572334-01-01

Attention: Jennifer Balkwill

GHD Limited
651 Colby Dr
Waterloo, ON
N2V 1C2

Report Date: 2016/09/07
Report #: R4156757
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B6H9596

Received: 2016/08/24, 08:15

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	4	N/A	2016/08/25	CAM SOP-00448	SM 22 2320 B m
Carbonate, Bicarbonate and Hydroxide	4	N/A	2016/08/26	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	4	N/A	2016/08/25	CAM SOP-00463	EPA 325.2 m
Colour	4	N/A	2016/08/26	CAM SOP-00412	SM 22 2120C m
Dissolved Organic Carbon (DOC) (1)	4	N/A	2016/08/26	CAM SOP-00446	SM 22 5310 B m
Fluoride	4	2016/08/24	2016/08/25	CAM SOP-00449	SM 22 4500-F C m
Hardness (calculated as CaCO3)	4	N/A	2016/08/30	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	4	N/A	2016/08/29	CAM SOP-00447	EPA 6020A m
Total Metals Analysis by ICPMS	3	N/A	2016/09/02	CAM SOP-00447	EPA 6020A m
Total Metals Analysis by ICPMS	1	N/A	2016/09/03	CAM SOP-00447	EPA 6020A m
Ion Balance (% Difference)	4	N/A	2016/08/30		
Total Ammonia-N	2	N/A	2016/08/26	CAM SOP-00441	EPA GS I-2522-90 m
Total Ammonia-N	2	N/A	2016/08/29	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	1	N/A	2016/08/25	CAM SOP-00440	SM 22 4500-NO3I/NO2B
Nitrate (NO3) and Nitrite (NO2) in Water (2)	3	N/A	2016/08/26	CAM SOP-00440	SM 22 4500-NO3I/NO2B
Organic Nitrogen	4	N/A	2016/08/29		
pH	4	N/A	2016/08/25	CAM SOP-00413	SM 4500H+ B m
Field pH (3)	4	N/A	2016/09/02		Field pH Meter
Orthophosphate	4	N/A	2016/08/25	CAM SOP-00461	EPA 365.1 m
Sulphate by Automated Colourimetry	4	N/A	2016/08/25	CAM SOP-00464	EPA 375.4 m
Sulphide	4	N/A	2016/08/25	CAM SOP-00455	SM 22 4500-S G m
Total Dissolved Solids	4	N/A	2016/08/26	CAM SOP-00428	SM 22 2540C m
Field Temperature (3)	4	N/A	2016/09/06		Field Thermometer
Total Kjeldahl Nitrogen in Water	4	2016/08/26	2016/08/26	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	4	2016/08/29	2016/08/29	CAM SOP-00407	SM 22 4500 P B H m
Low Level Total Suspended Solids	4	N/A	2016/08/25	CAM SOP-00428	SM 22 2540D m
Turbidity	4	N/A	2016/08/25	CAM SOP-00417	SM 22 2130 B m
Un-ionized Ammonia	4	2016/08/24	2016/09/06		

Remarks:

Your P.O. #: 73504533
Your Project #: 086822-03-5.0
Your C.O.C. #: 572334-01-01

Attention: Jennifer Balkwill

GHD Limited
651 Colby Dr
Waterloo, ON
N2V 1C2

Report Date: 2016/09/07
Report #: R4156757
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B6H9596

Received: 2016/08/24, 08:15

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Maxxam Analytics is accredited for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
- (2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
- (3) This is a field test, therefore, the results relate to items that were not analysed at Maxxam Analytics Inc.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Madison Bingley, Project Manager
Email: MBingley@maxxam.ca
Phone# (613)274-3549

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF WATER

Maxxam ID		CYC212			CYC213		
Sampling Date		2016/08/22 17:05			2016/08/22 10:35		
COC Number		572334-01-01			572334-01-01		
	UNITS	GW-86882-082216-SA-MW04	RDL	QC Batch	GW-86882-082316-SA-MW01	RDL	QC Batch
Calculated Parameters							
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	130	1.0	4632822	200	1.0	4632822
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.2	1.0	4632822	2.1	1.0	4632822
Hardness (CaCO3)	mg/L	140	1.0	4632688	170	1.0	4632688
Hydrox. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	4632822	ND	1.0	4632822
Ion Balance (% Difference)	%	1.34	N/A	4633035	3.30	N/A	4633035
Total Organic Nitrogen	mg/L	0.16	0.10	4633247	0.36	0.10	4633247
Total Un-ionized Ammonia	mg/L	ND	0.00084	4633087	0.0014	0.0005	4633087
Field Measurements							
Field Temperature	Celcius	9.83	N/A	ONSITE	10.48	N/A	ONSITE
Field pH	pH	7.97		ONSITE	7.71		ONSITE
Inorganics							
Total Ammonia-N	mg/L	ND	0.050	4636625	0.12	0.050	4636625
Colour	TCU	ND	2	4634074	ND	2	4634074
Total Dissolved Solids	mg/L	214	10	4636293	328	10	4635313
Fluoride (F-)	mg/L	ND	0.10	4633973	ND	0.10	4633973
Total Kjeldahl Nitrogen (TKN)	mg/L	0.16	0.10	4636732	0.48	0.10	4636732
Dissolved Organic Carbon	mg/L	2.3	0.20	4635571	0.74	0.20	4635571
Orthophosphate (P)	mg/L	ND	0.010	4634029	ND	0.010	4634029
pH	pH	7.98		4633983	8.05		4633983
Total Phosphorus	mg/L	1.9	0.2	4638824	3.8	0.2	4638824
Total Suspended Solids	mg/L	610	2	4634800	2000	5	4634800
Dissolved Sulphate (SO4)	mg/L	23	1.0	4634024	31	1.0	4634024
Sulphide	mg/L	ND	0.020	4633388	ND	0.020	4633388
Turbidity	NTU	4.2	0.1	4633223	15	0.1	4633223
Alkalinity (Total as CaCO3)	mg/L	130	1.0	4633984	200	1.0	4633984
Dissolved Chloride (Cl)	mg/L	2.2	1.0	4634011	7.6	1.0	4634011
Nitrite (N)	mg/L	ND	0.010	4634061	0.019	0.010	4634067
Nitrate (N)	mg/L	0.12	0.10	4634061	0.80	0.10	4634067
Nitrate + Nitrite (N)	mg/L	0.12	0.10	4634061	0.81	0.10	4634067
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected N/A = Not Applicable							

RESULTS OF ANALYSES OF WATER

Maxxam ID		CYC214		CYC215		
Sampling Date		2016/08/22 15:45		2016/08/22 13:45		
COC Number		572334-01-01		572334-01-01		
	UNITS	GW-86882-082216-SA-MW02	RDL	GW-86882-081916-SA-MW03	RDL	QC Batch
Calculated Parameters						
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	240	1.0	270	1.0	4632822
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.0	1.0	1.9	1.0	4632822
Hardness (CaCO3)	mg/L	230	1.0	260	1.0	4632688
Hydrox. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	ND	1.0	4632822
Ion Balance (% Difference)	%	1.44	N/A	2.13	N/A	4633035
Total Organic Nitrogen	mg/L	0.69	0.10	0.17	0.10	4633247
Total Un-ionized Ammonia	mg/L	0.0010	0.0005	ND	0.0005	4633087
Field Measurements						
Field Temperature	Celcius	9.70	N/A	10.93	N/A	ONSITE
Field pH	pH	7.56		7.30		ONSITE
Inorganics						
Total Ammonia-N	mg/L	0.13	0.050	ND	0.050	4636413
Colour	TCU	ND	2	ND	2	4634074
Total Dissolved Solids	mg/L	300	10	336	10	4636293
Fluoride (F-)	mg/L	ND	0.10	ND	0.10	4633973
Total Kjeldahl Nitrogen (TKN)	mg/L	0.82	0.10	0.17	0.10	4636732
Dissolved Organic Carbon	mg/L	1.0	0.20	2.9	0.20	4635571
Orthophosphate (P)	mg/L	ND	0.010	ND	0.010	4634029
pH	pH	7.96		7.88		4633983
Total Phosphorus	mg/L	2.4	0.2	0.13	0.02	4638824
Total Suspended Solids	mg/L	3000	5	300	4	4634800
Dissolved Sulphate (SO4)	mg/L	12	1.0	20	1.0	4634024
Sulphide	mg/L	ND	0.020	ND	0.020	4633388
Turbidity	NTU	23	0.1	6.7	0.1	4633223
Alkalinity (Total as CaCO3)	mg/L	240	1.0	270	1.0	4633984
Dissolved Chloride (Cl)	mg/L	2.8	1.0	3.5	1.0	4634011
Nitrite (N)	mg/L	0.012	0.010	ND	0.010	4634061
Nitrate (N)	mg/L	1.54	0.10	ND	0.10	4634061
Nitrate + Nitrite (N)	mg/L	1.56	0.10	ND	0.10	4634061
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected N/A = Not Applicable						

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		CYC212		CYC213		CYC214		
Sampling Date		2016/08/22 17:05		2016/08/22 10:35		2016/08/22 15:45		
COC Number		572334-01-01		572334-01-01		572334-01-01		
	UNITS	GW-86882-082216-SA-MW04	RDL	GW-86882-082316-SA-MW01	RDL	GW-86882-082216-SA-MW02	RDL	QC Batch

Metals								
Total Aluminum (Al)	ug/L	5000	5.0	16000	5.0	22000	25	4644849
Total Antimony (Sb)	ug/L	ND	0.50	ND	0.50	ND	0.50	4644849
Total Arsenic (As)	ug/L	ND	1.0	3.5	1.0	3.0	1.0	4644849
Total Barium (Ba)	ug/L	260	2.0	220	2.0	310	2.0	4644849
Total Beryllium (Be)	ug/L	ND	0.50	0.59	0.50	0.79	0.50	4644849
Total Boron (B)	ug/L	ND	10	31	10	25	10	4644849
Total Cadmium (Cd)	ug/L	ND	0.10	ND	0.10	ND	0.10	4644849
Dissolved Calcium (Ca)	ug/L	42000	200	50000	200	72000	200	4636483
Total Chromium (Cr)	ug/L	9.0	5.0	22	5.0	58	5.0	4644849
Total Cobalt (Co)	ug/L	4.3	0.50	11	1.0	22	1.0	4644849
Total Copper (Cu)	ug/L	14	1.0	34	1.0	55	1.0	4644849
Total Iron (Fe)	ug/L	8200	100	25000	100	39000	100	4644849
Total Lead (Pb)	ug/L	3.3	0.50	8.8	0.50	11	0.50	4644849
Dissolved Magnesium (Mg)	ug/L	8000	50	10000	50	13000	50	4636483
Total Manganese (Mn)	ug/L	360	2.0	1300	2.0	1700	2.0	4644849
Total Molybdenum (Mo)	ug/L	1.5	0.50	11	0.50	34	0.50	4644849
Total Nickel (Ni)	ug/L	6.7	1.0	19	2.0	34	2.0	4644849
Total Phosphorus (P)	ug/L	2000	100	6500	100	2200	100	4644849
Dissolved Potassium (K)	ug/L	1400	200	2600	200	2400	200	4636483
Total Selenium (Se)	ug/L	ND	2.0	ND	2.0	ND	2.0	4644849
Total Silver (Ag)	ug/L	ND	0.10	ND	0.10	ND	0.10	4644849
Dissolved Sodium (Na)	ug/L	8200	100	29000	100	7000	100	4636483
Total Sodium (Na)	ug/L	9100	100	33000	100	9300	100	4644849
Total Thallium (Tl)	ug/L	0.078	0.050	0.21	0.050	0.38	0.050	4644849
Total Tungsten (W)	ug/L	ND	1.0	ND	1.0	31	1.0	4644849
Total Uranium (U)	ug/L	2.5	0.10	3.1	0.10	1.4	0.10	4644849
Total Vanadium (V)	ug/L	11	0.50	38	0.50	51	0.50	4644849
Total Zinc (Zn)	ug/L	17	5.0	51	5.0	79	5.0	4644849
Total Zirconium (Zr)	ug/L	1.6	1.0	8.2	1.0	9.2	1.0	4644849

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		CYC214		CYC215		
Sampling Date		2016/08/22 15:45		2016/08/22 13:45		
COC Number		572334-01-01		572334-01-01		
	UNITS	GW-86882-082216-SA-MW02 Lab-Dup	RDL	GW-86882-081916-SA-MW03	RDL	QC Batch
Metals						
Total Aluminum (Al)	ug/L		25	4400	5.0	4644849
Total Antimony (Sb)	ug/L		0.50	ND	0.50	4644849
Total Arsenic (As)	ug/L		1.0	ND	1.0	4644849
Total Barium (Ba)	ug/L		2.0	100	2.0	4644849
Total Beryllium (Be)	ug/L		0.50	ND	0.50	4644849
Total Boron (B)	ug/L		10	15	10	4644849
Total Cadmium (Cd)	ug/L		0.10	ND	0.10	4644849
Dissolved Calcium (Ca)	ug/L	72000	200	82000	200	4636483
Total Chromium (Cr)	ug/L		5.0	8.5	5.0	4644849
Total Cobalt (Co)	ug/L		1.0	4.2	0.50	4644849
Total Copper (Cu)	ug/L		1.0	14	1.0	4644849
Total Iron (Fe)	ug/L		100	6500	100	4644849
Total Lead (Pb)	ug/L		0.50	2.3	0.50	4644849
Dissolved Magnesium (Mg)	ug/L	13000	50	13000	50	4636483
Total Manganese (Mn)	ug/L		2.0	260	2.0	4644849
Total Molybdenum (Mo)	ug/L		0.50	2.4	0.50	4644849
Total Nickel (Ni)	ug/L		2.0	8.4	1.0	4644849
Total Phosphorus (P)	ug/L		100	120	100	4644849
Dissolved Potassium (K)	ug/L	2300	200	2100	200	4636483
Total Selenium (Se)	ug/L		2.0	ND	2.0	4644849
Total Silver (Ag)	ug/L		0.10	ND	0.10	4644849
Dissolved Sodium (Na)	ug/L	6800	100	9600	100	4636483
Total Sodium (Na)	ug/L		100	10000	100	4644849
Total Thallium (Tl)	ug/L		0.050	0.088	0.050	4644849
Total Tungsten (W)	ug/L		1.0	ND	1.0	4644849
Total Uranium (U)	ug/L		0.10	2.9	0.10	4644849
Total Vanadium (V)	ug/L		0.50	9.3	0.50	4644849
Total Zinc (Zn)	ug/L		5.0	20	5.0	4644849
Total Zirconium (Zr)	ug/L		1.0	1.5	1.0	4644849
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected						

TEST SUMMARY

Maxxam ID: CYC212
Sample ID: GW-86882-082216-SA-MW04
Matrix: Water

Collected: 2016/08/22
Shipped:
Received: 2016/08/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	4633984	N/A	2016/08/25	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	4632822	N/A	2016/08/26	Automated Statchk
Chloride by Automated Colourimetry	KONE	4634011	N/A	2016/08/25	Alina Dobreanu
Colour	SPEC	4634074	N/A	2016/08/26	Viorica Rotaru
Dissolved Organic Carbon (DOC)	TOCV/NDIR	4635571	N/A	2016/08/26	Anastasia Hamanov
Fluoride	ISE	4633973	2016/08/24	2016/08/25	Surinder Rai
Hardness (calculated as CaCO3)		4632688	N/A	2016/08/30	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	4636483	N/A	2016/08/29	Arefa Dabhad
Total Metals Analysis by ICPMS	ICP/MS	4644849	N/A	2016/09/02	Cristina Petran
Ion Balance (% Difference)	CALC	4633035	N/A	2016/08/30	Automated Statchk
Total Ammonia-N	LACH/NH4	4636625	N/A	2016/08/29	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	4634061	N/A	2016/08/26	Chandra Nandlal
Organic Nitrogen	CALC	4633247	N/A	2016/08/29	Automated Statchk
pH	AT	4633983	N/A	2016/08/25	Surinder Rai
Field pH	PH	ONSITE	N/A	2016/08/24	Madison Bingley
Orthophosphate	KONE	4634029	N/A	2016/08/25	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	4634024	N/A	2016/08/25	Deonarine Ramnarine
Sulphide	ISE/S	4633388	N/A	2016/08/25	Neil Dassanayake
Total Dissolved Solids	BAL	4636293	N/A	2016/08/26	Lu Wang(Alice)
Field pH	PH	ONSITE	N/A	2016/08/24	Madison Bingley
Total Kjeldahl Nitrogen in Water	SKAL	4636732	2016/08/26	2016/08/26	Amarinder Sawhney
Total Phosphorus (Colourimetric)	LACH/P	4638824	2016/08/29	2016/08/29	Sarabjit Raina
Low Level Total Suspended Solids	BAL	4634800	N/A	2016/08/25	Zahid Soikot
Turbidity	AT	4633223	N/A	2016/08/25	Neil Dassanayake
Un-ionized Ammonia	CALC/NH3	4633087	2016/09/06	2016/09/06	Automated Statchk

Maxxam ID: CYC213
Sample ID: GW-86882-082316-SA-MW01
Matrix: Water

Collected: 2016/08/22
Shipped:
Received: 2016/08/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	4633984	N/A	2016/08/25	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	4632822	N/A	2016/08/26	Automated Statchk
Chloride by Automated Colourimetry	KONE	4634011	N/A	2016/08/25	Alina Dobreanu
Colour	SPEC	4634074	N/A	2016/08/26	Viorica Rotaru
Dissolved Organic Carbon (DOC)	TOCV/NDIR	4635571	N/A	2016/08/26	Anastasia Hamanov
Fluoride	ISE	4633973	2016/08/24	2016/08/25	Surinder Rai
Hardness (calculated as CaCO3)		4632688	N/A	2016/08/30	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	4636483	N/A	2016/08/29	Arefa Dabhad
Total Metals Analysis by ICPMS	ICP/MS	4644849	N/A	2016/09/02	Cristina Petran
Ion Balance (% Difference)	CALC	4633035	N/A	2016/08/30	Automated Statchk
Total Ammonia-N	LACH/NH4	4636625	N/A	2016/08/29	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	4634067	N/A	2016/08/25	Chandra Nandlal
Organic Nitrogen	CALC	4633247	N/A	2016/08/29	Automated Statchk

TEST SUMMARY

Maxxam ID: CYC213
Sample ID: GW-86882-082316-SA-MW01
Matrix: Water

Collected: 2016/08/22
Shipped:
Received: 2016/08/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH	AT	4633983	N/A	2016/08/25	Surinder Rai
Field pH	PH	ONSITE	N/A	2016/08/24	Madison Bingley
Orthophosphate	KONE	4634029	N/A	2016/08/25	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	4634024	N/A	2016/08/25	Deonarine Ramnarine
Sulphide	ISE/S	4633388	N/A	2016/08/25	Neil Dassanayake
Total Dissolved Solids	BAL	4635313	N/A	2016/08/26	Gurpreet Kaur
Field pH	PH	ONSITE	N/A	2016/08/24	Madison Bingley
Total Kjeldahl Nitrogen in Water	SKAL	4636732	2016/08/26	2016/08/26	Amarinder Sawhney
Total Phosphorus (Colourimetric)	LACH/P	4638824	2016/08/29	2016/08/29	Sarabjit Raina
Low Level Total Suspended Solids	BAL	4634800	N/A	2016/08/25	Zahid Soikot
Turbidity	AT	4633223	N/A	2016/08/25	Neil Dassanayake
Un-ionized Ammonia	CALC/NH3	4633087	2016/09/06	2016/09/06	Automated Statchk

Maxxam ID: CYC214
Sample ID: GW-86882-082216-SA-MW02
Matrix: Water

Collected: 2016/08/22
Shipped:
Received: 2016/08/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	4633984	N/A	2016/08/25	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	4632822	N/A	2016/08/26	Automated Statchk
Chloride by Automated Colourimetry	KONE	4634011	N/A	2016/08/25	Alina Dobreanu
Colour	SPEC	4634074	N/A	2016/08/26	Viorica Rotaru
Dissolved Organic Carbon (DOC)	TOCV/NDIR	4635571	N/A	2016/08/26	Anastasia Hamanov
Fluoride	ISE	4633973	2016/08/24	2016/08/25	Surinder Rai
Hardness (calculated as CaCO3)		4632688	N/A	2016/08/30	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	4636483	N/A	2016/08/29	Arefa Dabhad
Total Metals Analysis by ICPMS	ICP/MS	4644849	N/A	2016/09/03	Cristina Petran
Ion Balance (% Difference)	CALC	4633035	N/A	2016/08/30	Automated Statchk
Total Ammonia-N	LACH/NH4	4636413	N/A	2016/08/26	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	4634061	N/A	2016/08/26	Chandra Nandlal
Organic Nitrogen	CALC	4633247	N/A	2016/08/29	Automated Statchk
pH	AT	4633983	N/A	2016/08/25	Surinder Rai
Field pH	PH	ONSITE	N/A	2016/08/24	Madison Bingley
Orthophosphate	KONE	4634029	N/A	2016/08/25	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	4634024	N/A	2016/08/25	Deonarine Ramnarine
Sulphide	ISE/S	4633388	N/A	2016/08/25	Neil Dassanayake
Total Dissolved Solids	BAL	4636293	N/A	2016/08/26	Lu Wang(Alice)
Field pH	PH	ONSITE	N/A	2016/08/24	Madison Bingley
Total Kjeldahl Nitrogen in Water	SKAL	4636732	2016/08/26	2016/08/26	Amarinder Sawhney
Total Phosphorus (Colourimetric)	LACH/P	4638824	2016/08/29	2016/08/29	Sarabjit Raina
Low Level Total Suspended Solids	BAL	4634800	N/A	2016/08/25	Zahid Soikot
Turbidity	AT	4633223	N/A	2016/08/25	Neil Dassanayake
Un-ionized Ammonia	CALC/NH3	4633087	2016/09/06	2016/09/06	Automated Statchk

TEST SUMMARY

Maxxam ID: CYC214 Dup
Sample ID: GW-86882-082216-SA-MW02
Matrix: Water

Collected: 2016/08/22
Shipped:
Received: 2016/08/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	4636483	N/A	2016/08/29	Arefa Dabhad

Maxxam ID: CYC215
Sample ID: GW-86882-081916-SA-MW03
Matrix: Water

Collected: 2016/08/22
Shipped:
Received: 2016/08/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	4633984	N/A	2016/08/25	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	4632822	N/A	2016/08/26	Automated Statchk
Chloride by Automated Colourimetry	KONE	4634011	N/A	2016/08/25	Alina Dobreanu
Colour	SPEC	4634074	N/A	2016/08/26	Viorica Rotaru
Dissolved Organic Carbon (DOC)	TOCV/NDIR	4635571	N/A	2016/08/26	Anastasia Hamanov
Fluoride	ISE	4633973	2016/08/24	2016/08/25	Surinder Rai
Hardness (calculated as CaCO ₃)		4632688	N/A	2016/08/30	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	4636483	N/A	2016/08/29	Arefa Dabhad
Total Metals Analysis by ICPMS	ICP/MS	4644849	N/A	2016/09/02	Cristina Petran
Ion Balance (% Difference)	CALC	4633035	N/A	2016/08/30	Automated Statchk
Total Ammonia-N	LACH/NH ₄	4636413	N/A	2016/08/26	Charles Opoku-Ware
Nitrate (NO ₃) and Nitrite (NO ₂) in Water	LACH	4634061	N/A	2016/08/26	Chandra Nandlal
Organic Nitrogen	CALC	4633247	N/A	2016/08/29	Automated Statchk
pH	AT	4633983	N/A	2016/08/25	Surinder Rai
Field pH	PH	ONSITE	N/A	2016/08/24	Madison Bingley
Orthophosphate	KONE	4634029	N/A	2016/08/25	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	4634024	N/A	2016/08/25	Deonarine Ramnarine
Sulphide	ISE/S	4633388	N/A	2016/08/25	Neil Dassanayake
Total Dissolved Solids	BAL	4636293	N/A	2016/08/26	Lu Wang(Alice)
Field pH	PH	ONSITE	N/A	2016/08/24	Madison Bingley
Total Kjeldahl Nitrogen in Water	SKAL	4636732	2016/08/26	2016/08/26	Amarinder Sawhney
Total Phosphorus (Colourimetric)	LACH/P	4638824	2016/08/29	2016/08/29	Sarabjit Raina
Low Level Total Suspended Solids	BAL	4634800	N/A	2016/08/25	Zahid Soikot
Turbidity	AT	4633223	N/A	2016/08/25	Neil Dassanayake
Un-ionized Ammonia	CALC/NH ₃	4633087	2016/09/06	2016/09/06	Automated Statchk

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C
-----------	-------

Revised Report (2016/09/07): Updated Unionized Ammonia values.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
4633223	Turbidity	2016/08/25			101	85 - 115	ND, RDL=0.1	NTU	6.3 (1)	20		
4633388	Sulphide	2016/08/25	89	80 - 120	93	80 - 120	ND, RDL=0.020	mg/L	NC (1)	20		
4633973	Fluoride (F-)	2016/08/25	NC	80 - 120	99	80 - 120	ND, RDL=0.10	mg/L	2.3 (1)	20		
4633983	pH	2016/08/25			101	98 - 103			0.083 (1)	N/A		
4633984	Alkalinity (Total as CaCO3)	2016/08/25			95	85 - 115	ND, RDL=1.0	mg/L	0.0013 (1)	25		
4634011	Dissolved Chloride (Cl)	2016/08/25	NC	80 - 120	99	80 - 120	ND, RDL=1.0	mg/L	1.2 (1)	20		
4634024	Dissolved Sulphate (SO4)	2016/08/25	NC	75 - 125	103	80 - 120	ND, RDL=1.0	mg/L	0.20 (1)	20		
4634029	Orthophosphate (P)	2016/08/25	102	75 - 125	101	80 - 120	ND, RDL=0.010	mg/L	NC (1)	25		
4634061	Nitrate (N)	2016/08/26	NC	80 - 120	99	80 - 120	ND, RDL=0.10	mg/L	0.77 (1)	25		
4634061	Nitrite (N)	2016/08/26	97	80 - 120	108	80 - 120	ND, RDL=0.010	mg/L	NC (1)	25		
4634067	Nitrate (N)	2016/08/25	94	80 - 120	98	80 - 120	ND, RDL=0.10	mg/L	NC (1)	25		
4634067	Nitrite (N)	2016/08/25	100	80 - 120	111	80 - 120	ND, RDL=0.010	mg/L	NC (1)	25		
4634074	Colour	2016/08/26			100	80 - 120	ND,RDL=2	TCU	NC (1)	25		
4634800	Total Suspended Solids	2016/08/25					ND,RDL=1	mg/L	NC (1)	25	99	85 - 115
4635313	Total Dissolved Solids	2016/08/26					ND, RDL=10	mg/L	4.7 (1)	25	98	90 - 110
4635571	Dissolved Organic Carbon	2016/08/26	NC	80 - 120	102	80 - 120	ND, RDL=0.20	mg/L	0.60 (1)	20		
4636293	Total Dissolved Solids	2016/08/26					ND, RDL=10	mg/L	1.8 (1)	25	101	90 - 110
4636413	Total Ammonia-N	2016/08/26	NC	80 - 120	100	85 - 115	ND, RDL=0.050	mg/L	1.8 (1)	20		
4636483	Dissolved Calcium (Ca)	2016/08/29	NC (2)	80 - 120	97	80 - 120	ND, RDL=200	ug/L	0.22 (3)	20		
4636483	Dissolved Magnesium (Mg)	2016/08/29	NC (2)	80 - 120	97	80 - 120	ND, RDL=50	ug/L	0.035 (3)	20		
4636483	Dissolved Potassium (K)	2016/08/29	100 (2)	80 - 120	96	80 - 120	ND, RDL=200	ug/L	3.0 (3)	20		
4636483	Dissolved Sodium (Na)	2016/08/29	99 (2)	80 - 120	97	80 - 120	ND, RDL=100	ug/L	3.0 (3)	20		
4636625	Total Ammonia-N	2016/08/29	99	80 - 120	99	85 - 115	ND, RDL=0.050	mg/L	NC (1)	20		
4636732	Total Kjeldahl Nitrogen (TKN)	2016/08/26	113	80 - 120	102	80 - 120	ND, RDL=0.10	mg/L	NC (1)	20	103	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
4638824	Total Phosphorus	2016/08/29	101	80 - 120	93	80 - 120	ND, RDL=0.004	mg/L	NC (1)	20	95	80 - 120
4644849	Total Aluminum (Al)	2016/09/02	104	80 - 120	106	80 - 120	ND, RDL=5.0	ug/L				
4644849	Total Antimony (Sb)	2016/09/02	110	80 - 120	105	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
4644849	Total Arsenic (As)	2016/09/02	102	80 - 120	102	80 - 120	ND, RDL=1.0	ug/L	NC (1)	20		
4644849	Total Barium (Ba)	2016/09/02	NC	80 - 120	105	80 - 120	ND, RDL=2.0	ug/L				
4644849	Total Beryllium (Be)	2016/09/02	103	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
4644849	Total Boron (B)	2016/09/02	NC	80 - 120	99	80 - 120	ND, RDL=10	ug/L	4.1 (1)	20		
4644849	Total Cadmium (Cd)	2016/09/02	102	80 - 120	102	80 - 120	ND, RDL=0.10	ug/L	NC (1)	20		
4644849	Total Chromium (Cr)	2016/09/02	97	80 - 120	99	80 - 120	ND, RDL=5.0	ug/L	NC (1)	20		
4644849	Total Cobalt (Co)	2016/09/02	94	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
4644849	Total Copper (Cu)	2016/09/02	101	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L	NC (1)	20		
4644849	Total Iron (Fe)	2016/09/02	97	80 - 120	99	80 - 120	ND, RDL=100	ug/L	NC (1)	20		
4644849	Total Lead (Pb)	2016/09/02	91	80 - 120	94	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
4644849	Total Manganese (Mn)	2016/09/02	NC	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L				
4644849	Total Molybdenum (Mo)	2016/09/02	108	80 - 120	103	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
4644849	Total Nickel (Ni)	2016/09/02	93	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L	NC (1)	20		
4644849	Total Phosphorus (P)	2016/09/02	110	80 - 120	101	80 - 120	ND, RDL=100	ug/L				
4644849	Total Selenium (Se)	2016/09/02	103	80 - 120	104	80 - 120	ND, RDL=2.0	ug/L	NC (1)	20		
4644849	Total Silver (Ag)	2016/09/02	98	80 - 120	99	80 - 120	ND, RDL=0.10	ug/L	NC (1)	20		
4644849	Total Sodium (Na)	2016/09/02	NC	80 - 120	100	80 - 120	ND, RDL=100	ug/L				
4644849	Total Thallium (Tl)	2016/09/02	91	80 - 120	93	80 - 120	ND, RDL=0.050	ug/L	NC (1)	20		
4644849	Total Tungsten (W)	2016/09/02	98	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L	NC (1)	20		
4644849	Total Uranium (U)	2016/09/02	101	80 - 120	99	80 - 120	ND, RDL=0.10	ug/L	NC (1)	20		
4644849	Total Vanadium (V)	2016/09/02	99	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
4644849	Total Zinc (Zn)	2016/09/02	102	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC (1)	20		

QUALITY ASSURANCE REPORT(CONT'D)

GHD Limited
Client Project #: 086822-03-5.0
Your P.O. #: 73504533
Sampler Initials: SA

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
4644849	Total Zirconium (Zr)	2016/09/02	110	80 - 120	107	80 - 120	ND, RDL=1.0	ug/L	NC (1)	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [CYC214-04]

(3) Duplicate Parent ID [CYC214-04]

VALIDATION SIGNATURE PAGE

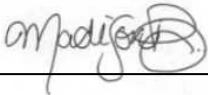
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Cristina Carriere, Scientific Services



Madison Bingley, Project Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #3000 GHD Limited	Company Name: Jennifer Balkwill	Quotation #: B40047	Maxxam Job #:		Bottle Order #:		
Attention: Jennifer Balkwill	Attention: Jennifer Balkwill	P.O. #:	572334		Barcode		
Address: 651 Colby Dr	Address:	Project: 086822-03-5.0	COC #:		Project Manager:		
Waterloo ON N2V 1C2		Project Name:	C#572334-01-01		Marissa Oddi		
Tel: (519) 884-7780 x3599 Fax: (519) 725-1394	Tel: (519) 884-7780 x3599 Fax: (519) 725-1394	Site #:	Sampled By: Sean Andreeu				
Email: Jennifer.Balkwill@ghd.com, ezhang@maxxam.ca, png	Email: Jennifer.Balkwill@ghd.com						

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY					ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects	
Regulation 153 (2011)		Other Regulations		Special Instructions	Field Filtered (please circle): Metals / Hg / Cr / VI	Dissolved Metals: Total Metals	Speciated: Arsenic (As), Nitrite (NO2), Nitrate (NO3), Sulfate (SO4), Phosphate (PO4), and Fluoride	DOC: Colour, Hardness	NH4 and Un-NH4, TKN, Org. Nitrogen	pH, Low-level TP, TDS	TSS, Sulphide	Turbidity, Ion Balance	# of Bottles	Comments	Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)	
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> CCME	<input type="checkbox"/> Sanitary Sewer Bylaw											<input checked="" type="checkbox"/>	
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Reg 558:	<input type="checkbox"/> Storm Sewer Bylaw												
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agr/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> MISA	Municipality _____												
<input type="checkbox"/> Table _____			<input type="checkbox"/> PWGO													
			<input type="checkbox"/> Other _____													
Include Criteria on Certificate of Analysis (Y/N)?																
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix												
1	GW-86882-082216-SA-MW01	AUG 22 2016	17:05	GW	Y	X	X	X	X	X	X	X	8			
2	GW-86882-082316-SAMW02	AUG 23 2016	10:35	GW	Y	↓	↓	↓	↓	↓	↓	↓	8			
3	GW-86882-082216-SA-MW02	AUG 22 2016	15:45	GW	Y	↓	↓	↓	↓	↓	↓	↓	8			
4	GW-86882-081916-SA-MW02	AUG 19, 2016	13:45	GW	Y	↓	↓	↓	↓	↓	↓	↓	8			
5																
6																
7																
8																
9																
10																

Marissa Oddi
B6H9596
KP7 ENV-1098

RUSH PREP

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only				
Shahera / Sean Andreeu		16/08/23	21:08	Asim BHAROU		2016/8/24	08:15		Time Sensitive	Temperature (°C) on Receipt	Custody Seal	Yes	No
										313/3	Present	<input checked="" type="checkbox"/>	<input type="checkbox"/>
											Intact	<input checked="" type="checkbox"/>	<input type="checkbox"/>

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS. SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM White: Maxxam Yellow: Client

Your P.O. #: 73507898
 Your Project #: 86822
 Site Location: 2976 HORSESHOE VALLEY RD,W
 Your C.O.C. #: na

Attention:86822 Distribution List

GHD Limited
 651 Colby Dr
 Waterloo, ON
 N2V 1C2

Report Date: 2017/06/21
 Report #: R4552758
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7C0195

Received: 2017/06/09, 17:01

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	1	N/A	2017/06/20	CAM SOP-00448	SM 22 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2017/06/14	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2017/06/20	CAM SOP-00463	EPA 325.2 m
Colour	1	N/A	2017/06/14	CAM SOP-00412	SM 22 2120C m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2017/06/12	CAM SOP-00446	SM 22 5310 B m
Fluoride	1	2017/06/13	2017/06/13	CAM SOP-00449	SM 22 4500-F C m
Hardness (calculated as CaCO3)	1	N/A	2017/06/15	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	1	N/A	2017/06/20	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	N/A	2017/06/15	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2017/06/15		
Total Ammonia-N	1	N/A	2017/06/19	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	1	N/A	2017/06/13	CAM SOP-00440	SM 22 4500-NO3I/NO2B
Organic Nitrogen	1	N/A	2017/06/19		
pH	1	N/A	2017/06/13	CAM SOP-00413	SM 4500H+ B m
Field pH (3)	1	N/A	2017/06/15		Field pH Meter
Orthophosphate	1	N/A	2017/06/13	CAM SOP-00461	EPA 365.1 m
Sulphate by Automated Colourimetry	1	N/A	2017/06/20	CAM SOP-00464	EPA 375.4 m
Sulphide	1	N/A	2017/06/13	CAM SOP-00455	SM 22 4500-S G m
Total Dissolved Solids	1	2017/06/12	2017/06/13	CAM SOP-00428	SM 22 2540C m
Field Temperature (3)	1	N/A	2017/06/15		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2017/06/14	2017/06/16	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2017/06/14	2017/06/15	CAM SOP-00407	SM 22 4500 P B H m
Low Level Total Suspended Solids	1	2017/06/13	2017/06/13	CAM SOP-00428	SM 22 2540D m
Turbidity	1	N/A	2017/06/13	CAM SOP-00417	SM 22 2130 B m
Un-ionized Ammonia	1	2017/06/10	2017/06/19		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

Your P.O. #: 73507898
Your Project #: 86822
Site Location: 2976 HORSESHOE VALLEY RD,W
Your C.O.C. #: na

Attention:86822 Distribution List

GHD Limited
651 Colby Dr
Waterloo, ON
N2V 1C2

Report Date: 2017/06/21
Report #: R4552758
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7C0195

Received: 2017/06/09, 17:01

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
- (2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
- (3) This is a field test, therefore, the results relate to items that were not analysed at Maxxam Analytics Inc.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rachael Watt, Customer Service Representative
Email: rwatt@maxxam.ca
Phone# (905)817-5755
=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF WATER

Maxxam ID		ENO960	ENO960		
Sampling Date		2017/06/09 11:00	2017/06/09 11:00		
COC Number		na	na		
	UNITS	GW-086822-060917- SH-001	GW-086822-060917- SH-001 Lab-Dup	RDL	QC Batch
Calculated Parameters					
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	200		1.0	5022620
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.9		1.0	5022620
Hardness (CaCO3)	mg/L	250		1.0	5022541
Hydrox. Alkalinity (calc. as CaCO3)	mg/L	ND		1.0	5022620
Ion Balance (% Difference)	%	13.1		N/A	5022621
Total Organic Nitrogen	mg/L	0.26		0.10	5022622
Total Un-ionized Ammonia	mg/L	ND		0.0005	5022623
Field Measurements					
Field Temperature	Celcius	9.10		N/A	ONSITE
Field pH	pH	6.59			ONSITE
Inorganics					
Total Ammonia-N	mg/L	ND		0.050	5027756
Colour	TCU	9	9	2	5027107
Total Dissolved Solids	mg/L	234		10	5023299
Fluoride (F-)	mg/L	0.11		0.10	5025360
Total Kjeldahl Nitrogen (TKN)	mg/L	0.26		0.10	5027267
Dissolved Organic Carbon	mg/L	11		0.20	5023651
Orthophosphate (P)	mg/L	ND		0.010	5024915
pH	pH	7.99			5025365
Total Phosphorus	mg/L	0.11		0.02	5027740
Total Suspended Solids	mg/L	170		3	5025928
Dissolved Sulphate (SO4)	mg/L	5.1		1.0	5035788
Sulphide	mg/L	ND		0.020	5025227
Turbidity	NTU	120	140	0.1	5024183
Alkalinity (Total as CaCO3)	mg/L	200		1.0	5035557
Dissolved Chloride (Cl)	mg/L	1.4		1.0	5035785
Nitrite (N)	mg/L	ND		0.010	5024139
Nitrate (N)	mg/L	0.42		0.10	5024139
Nitrate + Nitrite (N)	mg/L	0.42		0.10	5024139
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected					

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		ENO960		
Sampling Date		2017/06/09 11:00		
COC Number		na		
	UNITS	GW-086822-060917- SH-001	RDL	QC Batch
Metals				
Dissolved Aluminum (Al)	ug/L	950	5.0	5036026
Total Aluminum (Al)	ug/L	ND	5.0	5028135
Dissolved Antimony (Sb)	ug/L	1.1	0.50	5036026
Total Antimony (Sb)	ug/L	ND	0.50	5028135
Dissolved Arsenic (As)	ug/L	ND	1.0	5036026
Total Arsenic (As)	ug/L	ND	1.0	5028135
Dissolved Barium (Ba)	ug/L	48	2.0	5036026
Total Barium (Ba)	ug/L	29	2.0	5028135
Dissolved Beryllium (Be)	ug/L	ND	0.50	5036026
Total Beryllium (Be)	ug/L	ND	0.50	5028135
Dissolved Boron (B)	ug/L	21	10	5036026
Total Boron (B)	ug/L	17	10	5028135
Dissolved Cadmium (Cd)	ug/L	ND	0.10	5036026
Total Cadmium (Cd)	ug/L	ND	0.10	5028135
Dissolved Calcium (Ca)	ug/L	77000	200	5036026
Dissolved Chromium (Cr)	ug/L	ND	5.0	5036026
Total Chromium (Cr)	ug/L	ND	5.0	5028135
Dissolved Cobalt (Co)	ug/L	1.5	0.50	5036026
Total Cobalt (Co)	ug/L	ND	0.50	5028135
Dissolved Copper (Cu)	ug/L	3.5	1.0	5036026
Total Copper (Cu)	ug/L	ND	1.0	5028135
Dissolved Iron (Fe)	ug/L	2000	100	5036026
Total Iron (Fe)	ug/L	350	100	5028135
Dissolved Lead (Pb)	ug/L	1.1	0.50	5036026
Total Lead (Pb)	ug/L	ND	0.50	5028135
Dissolved Magnesium (Mg)	ug/L	14000	50	5036026
Dissolved Manganese (Mn)	ug/L	260	2.0	5036026
Total Manganese (Mn)	ug/L	170	2.0	5028135
Dissolved Molybdenum (Mo)	ug/L	15	0.50	5036026
Total Molybdenum (Mo)	ug/L	21	0.50	5028135
Dissolved Nickel (Ni)	ug/L	2.8	1.0	5036026
Total Nickel (Ni)	ug/L	ND	1.0	5028135
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected				

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		ENO960		
Sampling Date		2017/06/09 11:00		
COC Number		na		
	UNITS	GW-086822-060917- SH-001	RDL	QC Batch
Dissolved Phosphorus (P)	ug/L	160	100	5036026
Total Phosphorus (P)	ug/L	ND	100	5028135
Dissolved Potassium (K)	ug/L	2600	200	5036026
Dissolved Selenium (Se)	ug/L	ND	2.0	5036026
Total Selenium (Se)	ug/L	ND	2.0	5028135
Dissolved Silver (Ag)	ug/L	ND	0.10	5036026
Total Silver (Ag)	ug/L	ND	0.10	5028135
Dissolved Sodium (Na)	ug/L	6700	100	5036026
Total Sodium (Na)	ug/L	7100	100	5028135
Dissolved Thallium (Tl)	ug/L	ND	0.050	5036026
Total Thallium (Tl)	ug/L	ND	0.050	5028135
Dissolved Tungsten (W)	ug/L	ND	1.0	5036026
Total Tungsten (W)	ug/L	ND	1.0	5028135
Dissolved Uranium (U)	ug/L	0.18	0.10	5036026
Total Uranium (U)	ug/L	0.11	0.10	5028135
Dissolved Vanadium (V)	ug/L	2.3	0.50	5036026
Total Vanadium (V)	ug/L	ND	0.50	5028135
Dissolved Zinc (Zn)	ug/L	120	5.0	5036026
Total Zinc (Zn)	ug/L	ND	5.0	5028135
Dissolved Zirconium (Zr)	ug/L	ND	1.0	5036026
Total Zirconium (Zr)	ug/L	ND	1.0	5028135
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				
ND = Not detected				

TEST SUMMARY

Maxxam ID: ENO960
Sample ID: GW-086822-060917-SH-001
Matrix: Water

Collected: 2017/06/09
Shipped:
Received: 2017/06/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5035557	N/A	2017/06/20	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5022620	N/A	2017/06/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	5035785	N/A	2017/06/20	Alina Dobreanu
Colour	SPEC	5027107	N/A	2017/06/14	Viorica Rotaru
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5023651	N/A	2017/06/12	Anastasia Hamanov
Fluoride	ISE	5025360	2017/06/13	2017/06/13	Surinder Rai
Hardness (calculated as CaCO3)		5022541	N/A	2017/06/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	5036026	N/A	2017/06/20	Thao Nguyen
Total Metals Analysis by ICPMS	ICP/MS	5028135	N/A	2017/06/15	Prempal Bhatti
Ion Balance (% Difference)	CALC	5022621	N/A	2017/06/15	Automated Statchk
Total Ammonia-N	LACH/NH4	5027756	N/A	2017/06/19	Anastasia Hamanov
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5024139	N/A	2017/06/13	Chandra Nandlal
Organic Nitrogen	CALC	5022622	N/A	2017/06/19	Automated Statchk
pH	AT	5025365	N/A	2017/06/13	Surinder Rai
Field pH	PH	ONSITE	N/A	2017/06/09	Ronklin Gracian
Orthophosphate	KONE	5024915	N/A	2017/06/13	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	5035788	N/A	2017/06/20	Alina Dobreanu
Sulphide	ISE/S	5025227	N/A	2017/06/13	Tahir Anwar
Total Dissolved Solids	BAL	5023299	2017/06/12	2017/06/13	Xue Zheng Li(Scott)
Field pH	PH	ONSITE	N/A	2017/06/09	Ronklin Gracian
Total Kjeldahl Nitrogen in Water	SKAL	5027267	2017/06/14	2017/06/16	Bramdeo Motiram
Total Phosphorus (Colourimetric)	LACH/P	5027740	2017/06/14	2017/06/15	Amanpreet Sappal
Low Level Total Suspended Solids	BAL	5025928	2017/06/13	2017/06/13	Xue Zheng Li(Scott)
Turbidity	AT	5024183	N/A	2017/06/13	Neil Dassanayake
Un-ionized Ammonia	CALC/NH3	5022623	2017/06/19	2017/06/19	Automated Statchk

Maxxam ID: ENO960 Dup
Sample ID: GW-086822-060917-SH-001
Matrix: Water

Collected: 2017/06/09
Shipped:
Received: 2017/06/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Colour	SPEC	5027107	N/A	2017/06/14	Viorica Rotaru
Turbidity	AT	5024183	N/A	2017/06/13	Neil Dassanayake

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.3°C
-----------	-------

Metals bottle received with sediment.

Sample ENO960 [GW-086822-060917-SH-001] : Elevated ion balance result was confirmed by reanalysis.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

GHD Limited
Client Project #: 86822
Site Location: 2976 HORSESHOE VALLEY RD,W
Your P.O. #: 73507898
Sampler Initials: SH

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5023299	Total Dissolved Solids	2017/06/13					ND, RDL=10	mg/L	11 (1)	25	98	90 - 110
5023651	Dissolved Organic Carbon	2017/06/12	97	80 - 120	100	80 - 120	0.21, RDL=0.20	mg/L	4.3 (1)	20		
5024139	Nitrate (N)	2017/06/13	130 (2)	80 - 120	106	80 - 120	ND, RDL=0.10	mg/L	NC (1)	20		
5024139	Nitrite (N)	2017/06/13	7.1 (2)	80 - 120	98	80 - 120	ND, RDL=0.010	mg/L	NC (1)	20		
5024183	Turbidity	2017/06/13			99	85 - 115	ND, RDL=0.1	NTU	9.6 (3)	20		
5024915	Orthophosphate (P)	2017/06/13	118	75 - 125	100	80 - 120	ND, RDL=0.010	mg/L	NC (1)	25		
5025227	Sulphide	2017/06/13	96	80 - 120	96	80 - 120	ND, RDL=0.020	mg/L	NC (1)	20		
5025360	Fluoride (F-)	2017/06/13	80	80 - 120	95	80 - 120	ND, RDL=0.10	mg/L	0.48 (1)	20		
5025365	pH	2017/06/13			102	98 - 103			0.051 (1)	N/A		
5025928	Total Suspended Solids	2017/06/13					ND, RDL=1	mg/L	NC (1)	25	97	85 - 115
5027107	Colour	2017/06/14			101	80 - 120	ND, RDL=2	TCU	0.98 (3)	25		
5027267	Total Kjeldahl Nitrogen (TKN)	2017/06/16	102	80 - 120	99	80 - 120	ND, RDL=0.10	mg/L	11 (1)	20	97	80 - 120
5027740	Total Phosphorus	2017/06/15	95	80 - 120	92	80 - 120	ND, RDL=0.004	mg/L	3.6 (1)	20	91	80 - 120
5027756	Total Ammonia-N	2017/06/19	NC	80 - 120	101	85 - 115	ND, RDL=0.050	mg/L	0.028 (1)	20		
5028135	Total Aluminum (Al)	2017/06/15	114	80 - 120	106	80 - 120	ND, RDL=5.0	ug/L	13 (1)	20		
5028135	Total Antimony (Sb)	2017/06/15	107	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
5028135	Total Arsenic (As)	2017/06/15	107	80 - 120	107	80 - 120	ND, RDL=1.0	ug/L	NC (1)	20		
5028135	Total Barium (Ba)	2017/06/15	100	80 - 120	101	80 - 120	ND, RDL=2.0	ug/L	0.97 (1)	20		
5028135	Total Beryllium (Be)	2017/06/15	108	80 - 120	104	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
5028135	Total Boron (B)	2017/06/15	111	80 - 120	98	80 - 120	ND, RDL=10	ug/L				
5028135	Total Cadmium (Cd)	2017/06/15	105	80 - 120	103	80 - 120	ND, RDL=0.10	ug/L	NC (1)	20		
5028135	Total Chromium (Cr)	2017/06/15	102	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L	NC (1)	20		
5028135	Total Cobalt (Co)	2017/06/15	106	80 - 120	107	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
5028135	Total Copper (Cu)	2017/06/15	105	80 - 120	105	80 - 120	ND, RDL=1.0	ug/L	4.3 (1)	20		
5028135	Total Iron (Fe)	2017/06/15	102	80 - 120	104	80 - 120	ND, RDL=100	ug/L	2.3 (1)	20		

QUALITY ASSURANCE REPORT(CONT'D)

GHD Limited
Client Project #: 86822
Site Location: 2976 HORSESHOE VALLEY RD,W
Your P.O. #: 73507898
Sampler Initials: SH

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5028135	Total Lead (Pb)	2017/06/15	103	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
5028135	Total Manganese (Mn)	2017/06/15	101	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L	1.2 (1)	20		
5028135	Total Molybdenum (Mo)	2017/06/15	112	80 - 120	104	80 - 120	ND, RDL=0.50	ug/L	1.3 (1)	20		
5028135	Total Nickel (Ni)	2017/06/15	101	80 - 120	103	80 - 120	ND, RDL=1.0	ug/L	0.26 (1)	20		
5028135	Total Phosphorus (P)	2017/06/15	108	80 - 120	106	80 - 120	ND, RDL=100	ug/L				
5028135	Total Selenium (Se)	2017/06/15	113	80 - 120	110	80 - 120	ND, RDL=2.0	ug/L	NC (1)	20		
5028135	Total Silver (Ag)	2017/06/15	105	80 - 120	103	80 - 120	ND, RDL=0.10	ug/L	NC (1)	20		
5028135	Total Sodium (Na)	2017/06/15	NC	80 - 120	103	80 - 120	ND, RDL=100	ug/L	2.7 (1)	20		
5028135	Total Thallium (Tl)	2017/06/15	105	80 - 120	102	80 - 120	ND, RDL=0.050	ug/L	NC (1)	20		
5028135	Total Tungsten (W)	2017/06/15	109	80 - 120	107	80 - 120	ND, RDL=1.0	ug/L				
5028135	Total Uranium (U)	2017/06/15	104	80 - 120	100	80 - 120	ND, RDL=0.10	ug/L				
5028135	Total Vanadium (V)	2017/06/15	101	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L	NC (1)	20		
5028135	Total Zinc (Zn)	2017/06/15	104	80 - 120	109	80 - 120	ND, RDL=5.0	ug/L	NC (1)	20		
5028135	Total Zirconium (Zr)	2017/06/15	104	80 - 120	99	80 - 120	ND, RDL=1.0	ug/L				
5035557	Alkalinity (Total as CaCO3)	2017/06/20			94	85 - 115	ND, RDL=1.0	mg/L	0.55 (1)	20		
5035785	Dissolved Chloride (Cl)	2017/06/20	NC	80 - 120	104	80 - 120	ND, RDL=1.0	mg/L	0.19 (1)	20		
5035788	Dissolved Sulphate (SO4)	2017/06/20	NC	75 - 125	103	80 - 120	ND, RDL=1.0	mg/L	0.94 (1)	20		
5036026	Dissolved Aluminum (Al)	2017/06/20	101	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L				
5036026	Dissolved Antimony (Sb)	2017/06/20	103	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L				
5036026	Dissolved Arsenic (As)	2017/06/20	98	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L				
5036026	Dissolved Barium (Ba)	2017/06/20	99	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L				
5036026	Dissolved Beryllium (Be)	2017/06/20	103	80 - 120	103	80 - 120	ND, RDL=0.50	ug/L				
5036026	Dissolved Boron (B)	2017/06/20	102	80 - 120	103	80 - 120	ND, RDL=10	ug/L				
5036026	Dissolved Cadmium (Cd)	2017/06/20	100	80 - 120	100	80 - 120	ND, RDL=0.10	ug/L				
5036026	Dissolved Calcium (Ca)	2017/06/20	NC	80 - 120	97	80 - 120	ND, RDL=200	ug/L				
5036026	Dissolved Chromium (Cr)	2017/06/20	98	80 - 120	97	80 - 120	ND, RDL=5.0	ug/L	2.8 (1)	20		
5036026	Dissolved Cobalt (Co)	2017/06/20	96	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L				
5036026	Dissolved Copper (Cu)	2017/06/20	99	80 - 120	99	80 - 120	ND, RDL=1.0	ug/L				
5036026	Dissolved Iron (Fe)	2017/06/20	98	80 - 120	97	80 - 120	ND, RDL=100	ug/L				

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5036026	Dissolved Lead (Pb)	2017/06/20	93	80 - 120	94	80 - 120	ND, RDL=0.50	ug/L				
5036026	Dissolved Magnesium (Mg)	2017/06/20	98	80 - 120	98	80 - 120	ND, RDL=50	ug/L				
5036026	Dissolved Manganese (Mn)	2017/06/20	95	80 - 120	97	80 - 120	ND, RDL=2.0	ug/L				
5036026	Dissolved Molybdenum (Mo)	2017/06/20	102	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L				
5036026	Dissolved Nickel (Ni)	2017/06/20	95	80 - 120	95	80 - 120	ND, RDL=1.0	ug/L				
5036026	Dissolved Phosphorus (P)	2017/06/20	109	80 - 120	108	80 - 120	ND, RDL=100	ug/L				
5036026	Dissolved Potassium (K)	2017/06/20	NC	80 - 120	99	80 - 120	ND, RDL=200	ug/L				
5036026	Dissolved Selenium (Se)	2017/06/20	97	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L				
5036026	Dissolved Silver (Ag)	2017/06/20	89	80 - 120	97	80 - 120	ND, RDL=0.10	ug/L				
5036026	Dissolved Sodium (Na)	2017/06/20	NC	80 - 120	99	80 - 120	ND, RDL=100	ug/L				
5036026	Dissolved Thallium (Tl)	2017/06/20	93	80 - 120	94	80 - 120	ND, RDL=0.050	ug/L				
5036026	Dissolved Tungsten (W)	2017/06/20	97	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L				
5036026	Dissolved Uranium (U)	2017/06/20	100	80 - 120	100	80 - 120	ND, RDL=0.10	ug/L				
5036026	Dissolved Vanadium (V)	2017/06/20	98	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L				
5036026	Dissolved Zinc (Zn)	2017/06/20	96	80 - 120	97	80 - 120	ND, RDL=5.0	ug/L				
5036026	Dissolved Zirconium (Zr)	2017/06/20	104	80 - 120	102	80 - 120	ND, RDL=1.0	ug/L				

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(3) Duplicate Parent ID [ENO960-01]

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: GHD, LIMITED		Company Name:		Quotation #: B40047		<input checked="" type="checkbox"/> Regular TAT (5-7 days) Most analyses	
Contact Name: JENNIFER BALKWILL		Contact Name:		P.O. #/ AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: 65 COLBY DR. WATERLOO ON, N2Y 1C2 (519) 884-7780 (519) 725-3599		Address:		Project #: 086822		Rush TAT (Surcharges will be applied)	
Phone: 884-7780 (519) 725-3599		Phone: Fax:		Site Location: 210 HORSESHOE VALLEY RD. W.		<input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Days <input type="checkbox"/> 3-4 Days	
Email: jennifer.balkwill@ghd.com		Email:		Site #:		Date Required:	
				Sampled By: SIMON HOWELL		Rush Confirmation #:	
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY							
Regulation 153		Other Regulations		Analysis Requested		LABORATORY USE ONLY	
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/ Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/ Other <input type="checkbox"/> Table _____ FOR RSC (PLEASE CIRCLE) Y / N		<input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> MISA <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> PWQD Region <input type="checkbox"/> Other (Specify) <input type="checkbox"/> REG 558 (MIN. 3 DAY TAT REQUIRED)		REFERENCE TO BACK OF CQC METALS TOTAL METALS BARGE METALS DRINKING WATER TDS SULPHIDE TURBIDITY TSS PH CHLORINE CHLORAMPHENICOL		CUSTODY SEAL (Y) N Present Intact COOLER TEMPERATURES 7.8.17 COOLING MEDIA PRESENT: (Y) / N COMMENTS	
Include Criteria on Certificate of Analysis: Y / N							
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CVM	REFERENCE TO BACK OF CQC	HOLD- DO NOT ANALYZE
1 GW-086822-060917-SH-001	2017/06/09	11:00	GW	7	Y	Y Y Y Y Y Y Y	*FIELD FILTERED DISSOLVED METALS
2							
3							
4							FIELD CHEM pH = 6.59 TEMP. 9.10 °C
5							
6							
7							
8							
9							
10							
RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)		
<i>Simon Howell</i> / SIMON HOWELL	2017/06/09	17:00	<i>Rachael Watt</i> / RACHAEL WATT	2017/06/09	17:01		

09-Jun-17 17:01
Rachael Watt
B7C0195
MNI ENV-601

White: Maxxam - Yellow: Client

Your P.O. #: 73507898
Your Project #: 86822-03-5.0
Your C.O.C. #: 61833

Attention:86822-03-5.0 Distribution

GHD Limited
651 Colby Dr
Waterloo, ON
N2V 1C2

Report Date: 2017/11/28
Report #: R4878900
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7Q5941

Received: 2017/11/24, 15:29

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	1	N/A	2017/11/28	CAM SOP-00448	SM 22 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2017/11/28	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2017/11/28	CAM SOP-00463	EPA 325.2 m
Colour	1	N/A	2017/11/28	CAM SOP-00412	SM 22 2120C m
Fluoride	1	2017/11/27	2017/11/28	CAM SOP-00449	SM 22 4500-F C m
Hardness (calculated as CaCO3)	1	N/A	2017/11/28	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	1	N/A	2017/11/28	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	N/A	2017/11/28	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2017/11/28		
Total Ammonia-N	1	N/A	2017/11/28	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (1)	1	N/A	2017/11/28	CAM SOP-00440	SM 22 4500-NO3I/NO2B
Organic Nitrogen	1	N/A	2017/11/28		
pH	1	N/A	2017/11/28	CAM SOP-00413	SM 4500H+ B m
Field pH (2)	1	N/A	2017/11/28		Field pH Meter
Orthophosphate	1	N/A	2017/11/28	CAM SOP-00461	EPA 365.1 m
Sulphate by Automated Colourimetry	1	N/A	2017/11/28	CAM SOP-00464	EPA 375.4 m
Sulphide	1	N/A	2017/11/27	CAM SOP-00455	SM 22 4500-S G m
Total Dissolved Solids	1	2017/11/27	2017/11/27	CAM SOP-00428	SM 22 2540C m
Field Temperature (2)	1	N/A	2017/11/27		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2017/11/27	2017/11/27	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2017/11/27	2017/11/27	CAM SOP-00407	SM 22 4500 P B H m
Total Suspended Solids	1	2017/11/27	2017/11/27	CAM SOP-00428	SM 22 2540D m
Un-ionized Ammonia	1	2017/11/27	2017/11/28		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All

Your P.O. #: 73507898
Your Project #: 86822-03-5.0
Your C.O.C. #: 61833

Attention:86822-03-5.0 Distribution

GHD Limited
651 Colby Dr
Waterloo, ON
N2V 1C2

Report Date: 2017/11/28
Report #: R4878900
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7Q5941

Received: 2017/11/24, 15:29

data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

(2) This is a field test, therefore, the results relate to items that were not analysed at Maxxam Analytics Inc.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Tanya Fidlin, Project Manager

Email: tfidlin@maxxam.ca

Phone# (905)817-5700

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF WATER

Maxxam ID					FPX521			FPX521		
Sampling Date					2017/11/21 14:55			2017/11/21 14:55		
COC Number					61833			61833		
	UNITS	Criteria	M/I	A/O	GW-086822-112117-SH-001	RDL	QC Batch	GW-086822-112117-SH-001 Lab-Dup	RDL	QC Batch
Calculated Parameters										
Bicarb. Alkalinity (calc. as CaCO ₃)	mg/L	-	-	-	240	1.0	5286007			
Carb. Alkalinity (calc. as CaCO ₃)	mg/L	-	-	-	2.0	1.0	5286007			
Hardness (CaCO ₃)	mg/L	-	-	80:100	210	1.0	5285780			
Ion Balance (% Difference)	%	-	-	-	7.43	N/A	5286037			
Total Organic Nitrogen	mg/L	-	-	0.15	0.20	0.10	5286038			
Total Un-ionized Ammonia	mg/L	-	-	-	ND	0.0005	5286039			
Field Measurements										
Field Temperature	Celcius	-	-	-	6.08	N/A	ONSITE			
Field pH	pH	6.5:8.5	-	6.5:8.5	7.59		ONSITE			
Inorganics										
Total Ammonia-N	mg/L	-	-	-	ND	0.050	5286180			
Colour	TCU	-	-	5	ND	2	5286736	ND	2	5286736
Total Dissolved Solids	mg/L	-	-	500	240	10	5286299			
Fluoride (F-)	mg/L	-	1.5	-	ND	0.10	5286774			
Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	-	0.20	0.10	5286216			
Orthophosphate (P)	mg/L	-	-	-	ND	0.010	5286819	ND	0.010	5286819
pH	pH	6.5:8.5	-	6.5:8.5	7.96		5286773			
Total Phosphorus	mg/L	0.01	-	-	1.1	0.2	5286336			
Total Suspended Solids	mg/L	-	-	-	1400	50	5286660			
Dissolved Sulphate (SO ₄)	mg/L	-	-	500	8.7	1.0	5286818	8.8	1.0	5286818
Sulphide	mg/L	0.02	-	0.05	ND	0.020	5286022			
Alkalinity (Total as CaCO ₃)	mg/L	-	-	30:500	240	1.0	5286771			
Dissolved Chloride (Cl)	mg/L	-	-	250	ND	1.0	5286815	1.5	1.0	5286815
Nitrite (N)	mg/L	-	1	-	ND	0.010	5286784	ND	0.010	5286784
Nitrate (N)	mg/L	-	10	-	0.68	0.10	5286784	0.66	0.10	5286784
Nitrate + Nitrite (N)	mg/L	-	10	-	0.68	0.10	5286784	0.66	0.10	5286784
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate Criteria: Ontario Provincial Water Quality Objectives Ref. to MOEE Water Management document dated Feb.1999 M/I,A/O: Ontario Drinking Water Standards (SDWA 2002) M/I: Table 1 Microbiological Standards, Table 2 Chemical Standards, & Table 3 Radionuclide Standards (Maximum Acceptable Concentrations & Interim Maximum Acceptable Concentrations) A/O: Table 4 Aesthetic Objectives & Operational Guidelines N/A = Not Applicable ND = Not detected										

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID					FPX521			FPX521		
Sampling Date					2017/11/21 14:55			2017/11/21 14:55		
COC Number					61833			61833		
	UNITS	Criteria	M/I	A/O	GW-086822-112117-SH-001	RDL	QC Batch	GW-086822-112117-SH-001 Lab-Dup	RDL	QC Batch

Metals										
Dissolved Aluminum (Al)	ug/L	-	-	100	ND	5.0	5286423	ND	5.0	5286423
Total Aluminum (Al)	ug/L	-	-	100	21000	25	5287473			
Dissolved Antimony (Sb)	ug/L	20	6	-	ND	0.50	5286423	ND	0.50	5286423
Total Antimony (Sb)	ug/L	20	6	-	ND	0.50	5287473			
Dissolved Arsenic (As)	ug/L	100	25	-	ND	1.0	5286423	ND	1.0	5286423
Total Arsenic (As)	ug/L	100	25	-	2.3	1.0	5287473			
Dissolved Barium (Ba)	ug/L	-	1000	-	31	2.0	5286423	31	2.0	5286423
Total Barium (Ba)	ug/L	-	1000	-	290	2.0	5287473			
Dissolved Beryllium (Be)	ug/L	11	-	-	ND	0.50	5286423	ND	0.50	5286423
Total Beryllium (Be)	ug/L	11	-	-	0.65	0.50	5287473			
Dissolved Boron (B)	ug/L	200	5000	-	ND	10	5286423	ND	10	5286423
Total Boron (B)	ug/L	200	5000	-	16	10	5287473			
Dissolved Cadmium (Cd)	ug/L	0.2	5	-	ND	0.10	5286423	ND	0.10	5286423
Total Cadmium (Cd)	ug/L	0.2	5	-	ND	0.10	5287473			
Dissolved Calcium (Ca)	ug/L	-	-	-	60000	200	5286423	61000	200	5286423
Dissolved Chromium (Cr)	ug/L	-	50	-	ND	5.0	5286423	ND	5.0	5286423
Total Chromium (Cr)	ug/L	-	50	-	36	5.0	5287473			
Dissolved Cobalt (Co)	ug/L	0.9	-	-	ND	0.50	5286423	ND	0.50	5286423
Total Cobalt (Co)	ug/L	0.9	-	-	12	0.50	5287473			
Dissolved Copper (Cu)	ug/L	5	-	1000	ND	1.0	5286423	ND	1.0	5286423
Total Copper (Cu)	ug/L	5	-	1000	34	1.0	5287473			
Dissolved Iron (Fe)	ug/L	300	-	300	ND	100	5286423	ND	100	5286423
Total Iron (Fe)	ug/L	300	-	300	28000	100	5287473			
Dissolved Lead (Pb)	ug/L	5	10	-	ND	0.50	5286423	ND	0.50	5286423
Total Lead (Pb)	ug/L	5	10	-	9.3	0.50	5287473			
Dissolved Magnesium (Mg)	ug/L	-	-	-	14000	50	5286423	14000	50	5286423
Dissolved Manganese (Mn)	ug/L	-	-	50	5.1	2.0	5286423	5.2	2.0	5286423

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Lab-Dup = Laboratory Initiated Duplicate
 Criteria: Ontario Provincial Water Quality Objectives
 Ref. to MOEE Water Management document dated Feb.1999
 M/I,A/O: Ontario Drinking Water Standards (SDWA 2002)
 M/I: Table 1 Microbiological Standards, Table 2 Chemical Standards, & Table 3 Radionuclide Standards (Maximum Acceptable Concentrations & Interim Maximum Acceptable Concentrations)
 A/O: Table 4 Aesthetic Objectives & Operational Guidelines
 ND = Not detected

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID					FPX521			FPX521		
Sampling Date					2017/11/21 14:55			2017/11/21 14:55		
COC Number					61833			61833		
	UNITS	Criteria	M/I	A/O	GW-086822-112117- SH-001	RDL	QC Batch	GW-086822-112117- SH-001 Lab-Dup	RDL	QC Batch
Total Manganese (Mn)	ug/L	-	-	50	930	2.0	5287473			
Dissolved Molybdenum (Mo)	ug/L	40	-	-	0.61	0.50	5286423	0.64	0.50	5286423
Total Molybdenum (Mo)	ug/L	40	-	-	2.2	0.50	5287473			
Dissolved Nickel (Ni)	ug/L	25	-	-	ND	1.0	5286423	ND	1.0	5286423
Total Nickel (Ni)	ug/L	25	-	-	21	1.0	5287473			
Dissolved Phosphorus (P)	ug/L	-	-	-	ND	100	5286423	ND	100	5286423
Total Phosphorus (P)	ug/L	10	-	-	970	100	5287473			
Dissolved Potassium (K)	ug/L	-	-	-	1400	200	5286423	1500	200	5286423
Dissolved Selenium (Se)	ug/L	100	10	-	ND	2.0	5286423	ND	2.0	5286423
Total Selenium (Se)	ug/L	100	10	-	ND	2.0	5287473			
Dissolved Silver (Ag)	ug/L	0.1	-	-	ND	0.10	5286423	ND	0.10	5286423
Total Silver (Ag)	ug/L	0.1	-	-	ND	0.10	5287473			
Dissolved Sodium (Na)	ug/L	-	20000	200000	2700	100	5286423	2700	100	5286423
Total Sodium (Na)	ug/L	-	20000	200000	4700	100	5287473			
Dissolved Thallium (Tl)	ug/L	0.3	-	-	ND	0.050	5286423	ND	0.050	5286423
Total Thallium (Tl)	ug/L	0.3	-	-	0.25	0.050	5287473			
Dissolved Tungsten (W)	ug/L	30	-	-	ND	1.0	5286423	ND	1.0	5286423
Total Tungsten (W)	ug/L	30	-	-	ND	1.0	5287473			
Dissolved Uranium (U)	ug/L	5	20	-	0.39	0.10	5286423	0.38	0.10	5286423
Total Uranium (U)	ug/L	5	20	-	1.1	0.10	5287473			
Dissolved Vanadium (V)	ug/L	6	-	-	0.78	0.50	5286423	0.78	0.50	5286423
Total Vanadium (V)	ug/L	6	-	-	43	0.50	5287473			
Dissolved Zinc (Zn)	ug/L	30	-	5000	ND	5.0	5286423	ND	5.0	5286423
Total Zinc (Zn)	ug/L	30	-	5000	74	5.0	5287473			
Dissolved Zirconium (Zr)	ug/L	4	-	-	ND	1.0	5286423	ND	1.0	5286423
Total Zirconium (Zr)	ug/L	4	-	-	4.1	1.0	5287473			

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

Criteria: Ontario Provincial Water Quality Objectives

Ref. to MOEE Water Management document dated Feb.1999

M/I,A/O: Ontario Drinking Water Standards (SDWA 2002)

M/I: Table 1 Microbiological Standards, Table 2 Chemical Standards, & Table 3 Radionuclide Standards (Maximum Acceptable Concentrations & Interim Maximum Acceptable Concentrations)

A/O: Table 4 Aesthetic Objectives & Operational Guidelines

ND = Not detected

TEST SUMMARY

Maxxam ID: FPX521
Sample ID: GW-086822-112117-SH-001
Matrix: Water

Collected: 2017/11/21
Shipped:
Received: 2017/11/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5286771	N/A	2017/11/28	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5286007	N/A	2017/11/28	Automated Statchk
Chloride by Automated Colourimetry	KONE	5286815	N/A	2017/11/28	Deonarine Ramnarine
Colour	SPEC	5286736	N/A	2017/11/28	Viorica Rotaru
Fluoride	ISE	5286774	2017/11/27	2017/11/28	Surinder Rai
Hardness (calculated as CaCO3)		5285780	N/A	2017/11/28	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	5286423	N/A	2017/11/28	Thao Nguyen
Total Metals Analysis by ICPMS	ICP/MS	5287473	N/A	2017/11/28	Matthew Ritenburg
Ion Balance (% Difference)	CALC	5286037	N/A	2017/11/28	Automated Statchk
Total Ammonia-N	LACH/NH4	5286180	N/A	2017/11/28	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5286784	N/A	2017/11/28	Chandra Nandlal
Organic Nitrogen	CALC	5286038	N/A	2017/11/28	Automated Statchk
pH	AT	5286773	N/A	2017/11/28	Surinder Rai
Field pH	PH	ONSITE	N/A	2017/11/24	Amanda Sica
Orthophosphate	KONE	5286819	N/A	2017/11/28	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	5286818	N/A	2017/11/28	Alina Dobreanu
Sulphide	ISE/S	5286022	N/A	2017/11/27	Neil Dassanayake
Total Dissolved Solids	BAL	5286299	2017/11/27	2017/11/27	Xue Zheng Li (Scott)
Field pH	PH	ONSITE	N/A	2017/11/24	Amanda Sica
Total Kjeldahl Nitrogen in Water	SKAL	5286216	2017/11/27	2017/11/27	Rajni Tyagi
Total Phosphorus (Colourimetric)	LACH/P	5286336	2017/11/27	2017/11/27	Amanpreet Sappal
Total Suspended Solids	BAL	5286660	2017/11/27	2017/11/27	Xue Zheng Li (Scott)
Un-ionized Ammonia	CALC/NH3	5286039	2017/11/28	2017/11/28	Automated Statchk

Maxxam ID: FPX521 Dup
Sample ID: GW-086822-112117-SH-001
Matrix: Water

Collected: 2017/11/21
Shipped:
Received: 2017/11/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	5286815	N/A	2017/11/28	Deonarine Ramnarine
Colour	SPEC	5286736	N/A	2017/11/28	Viorica Rotaru
Dissolved Metals by ICPMS	ICP/MS	5286423	N/A	2017/11/28	Thao Nguyen
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5286784	N/A	2017/11/28	Chandra Nandlal
Orthophosphate	KONE	5286819	N/A	2017/11/28	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	5286818	N/A	2017/11/28	Alina Dobreanu

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.3°C
-----------	-------

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5286022	Sulphide	2017/11/27	92	80 - 120	95	80 - 120	ND, RDL=0.020	mg/L	NC (1)	20		
5286180	Total Ammonia-N	2017/11/28	100	80 - 120	99	85 - 115	ND, RDL=0.050	mg/L	NC (1)	20		
5286216	Total Kjeldahl Nitrogen (TKN)	2017/11/27	95	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	NC (2,1)	20	112	80 - 120
5286299	Total Dissolved Solids	2017/11/27					ND, RDL=10	mg/L	9.6 (1)	25	100	90 - 110
5286336	Total Phosphorus	2017/11/27	92	80 - 120	93	80 - 120	ND, RDL=0.004	mg/L	18 (1)	20	98	80 - 120
5286423	Dissolved Aluminum (Al)	2017/11/28	110 (3)	80 - 120	103	80 - 120	ND, RDL=5.0	ug/L	NC (4)	20		
5286423	Dissolved Antimony (Sb)	2017/11/28	110 (3)	80 - 120	103	80 - 120	ND, RDL=0.50	ug/L	NC (4)	20		
5286423	Dissolved Arsenic (As)	2017/11/28	105 (3)	80 - 120	98	80 - 120	ND, RDL=1.0	ug/L	NC (4)	20		
5286423	Dissolved Barium (Ba)	2017/11/28	103 (3)	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L	1.2 (4)	20		
5286423	Dissolved Beryllium (Be)	2017/11/28	108 (3)	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	NC (4)	20		
5286423	Dissolved Boron (B)	2017/11/28	107 (3)	80 - 120	100	80 - 120	ND, RDL=10	ug/L	NC (4)	20		
5286423	Dissolved Cadmium (Cd)	2017/11/28	108 (3)	80 - 120	100	80 - 120	ND, RDL=0.10	ug/L	NC (4)	20		
5286423	Dissolved Calcium (Ca)	2017/11/28	NC (3)	80 - 120	98	80 - 120	ND, RDL=200	ug/L	1.8 (4)	20		
5286423	Dissolved Chromium (Cr)	2017/11/28	104 (3)	80 - 120	97	80 - 120	ND, RDL=5.0	ug/L	NC (4)	20		
5286423	Dissolved Cobalt (Co)	2017/11/28	103 (3)	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	NC (4)	20		
5286423	Dissolved Copper (Cu)	2017/11/28	105 (3)	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	NC (4)	20		
5286423	Dissolved Iron (Fe)	2017/11/28	105 (3)	80 - 120	99	80 - 120	ND, RDL=100	ug/L	NC (4)	20		
5286423	Dissolved Lead (Pb)	2017/11/28	102 (3)	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	NC (4)	20		
5286423	Dissolved Magnesium (Mg)	2017/11/28	105 (3)	80 - 120	99	80 - 120	ND, RDL=50	ug/L	2.4 (4)	20		
5286423	Dissolved Manganese (Mn)	2017/11/28	106 (3)	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L	1.6 (4)	20		
5286423	Dissolved Molybdenum (Mo)	2017/11/28	106 (3)	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	4.5 (4)	20		
5286423	Dissolved Nickel (Ni)	2017/11/28	101 (3)	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	NC (4)	20		
5286423	Dissolved Phosphorus (P)	2017/11/28	111 (3)	80 - 120	111	80 - 120	ND, RDL=100	ug/L	NC (4)	20		
5286423	Dissolved Potassium (K)	2017/11/28	106 (3)	80 - 120	99	80 - 120	ND, RDL=200	ug/L	6.8 (4)	20		
5286423	Dissolved Selenium (Se)	2017/11/28	107 (3)	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L	NC (4)	20		
5286423	Dissolved Silver (Ag)	2017/11/28	104 (3)	80 - 120	96	80 - 120	ND, RDL=0.10	ug/L	NC (4)	20		
5286423	Dissolved Sodium (Na)	2017/11/28	105 (3)	80 - 120	98	80 - 120	ND, RDL=100	ug/L	0.068 (4)	20		

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5286423	Dissolved Thallium (Tl)	2017/11/28	101 (3)	80 - 120	95	80 - 120	ND, RDL=0.050	ug/L	NC (4)	20		
5286423	Dissolved Tungsten (W)	2017/11/28	105 (3)	80 - 120	99	80 - 120	ND, RDL=1.0	ug/L	NC (4)	20		
5286423	Dissolved Uranium (U)	2017/11/28	103 (3)	80 - 120	97	80 - 120	ND, RDL=0.10	ug/L	1.3 (4)	20		
5286423	Dissolved Vanadium (V)	2017/11/28	103 (3)	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	0.26 (4)	20		
5286423	Dissolved Zinc (Zn)	2017/11/28	104 (3)	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC (4)	20		
5286423	Dissolved Zirconium (Zr)	2017/11/28	108 (3)	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L	NC (4)	20		
5286660	Total Suspended Solids	2017/11/27					ND, RDL=10	mg/L	NC (1)	25	95	85 - 115
5286736	Colour	2017/11/28			101	80 - 120	ND,RDL=2	TCU	NC (5)	25		
5286771	Alkalinity (Total as CaCO3)	2017/11/28			93	85 - 115	ND, RDL=1.0	mg/L	2.7 (1)	20		
5286773	pH	2017/11/28			101	98 - 103			0.11 (1)	N/A		
5286774	Fluoride (F-)	2017/11/28	73 (6)	80 - 120	96	80 - 120	ND, RDL=0.10	mg/L	0.97 (1)	20		
5286784	Nitrate (N)	2017/11/28	98 (7)	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	3.5 (5)	20		
5286784	Nitrite (N)	2017/11/28	103 (7)	80 - 120	101	80 - 120	ND, RDL=0.010	mg/L	NC (5)	20		
5286815	Dissolved Chloride (Cl)	2017/11/28	117 (7)	80 - 120	105	80 - 120	ND, RDL=1.0	mg/L	NC (5)	20		
5286818	Dissolved Sulphate (SO4)	2017/11/28	102 (7)	75 - 125	98	80 - 120	ND, RDL=1.0	mg/L	0.65 (5)	20		
5286819	Orthophosphate (P)	2017/11/28	96 (7)	75 - 125	100	80 - 120	ND, RDL=0.010	mg/L	NC (5)	25		
5287473	Total Aluminum (Al)	2017/11/28	99	80 - 120	101	80 - 120	ND, RDL=5.0	ug/L				
5287473	Total Antimony (Sb)	2017/11/28	104	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L				
5287473	Total Arsenic (As)	2017/11/28	97	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L				
5287473	Total Barium (Ba)	2017/11/28	92	80 - 120	95	80 - 120	ND, RDL=2.0	ug/L				
5287473	Total Beryllium (Be)	2017/11/28	98	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L				
5287473	Total Boron (B)	2017/11/28	100	80 - 120	102	80 - 120	ND, RDL=10	ug/L				
5287473	Total Cadmium (Cd)	2017/11/28	97	80 - 120	98	80 - 120	ND, RDL=0.10	ug/L				
5287473	Total Chromium (Cr)	2017/11/28	93	80 - 120	96	80 - 120	ND, RDL=5.0	ug/L				
5287473	Total Cobalt (Co)	2017/11/28	91	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L				
5287473	Total Copper (Cu)	2017/11/28	95	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L				
5287473	Total Iron (Fe)	2017/11/28	94	80 - 120	97	80 - 120	ND, RDL=100	ug/L	NC (1)	20		
5287473	Total Lead (Pb)	2017/11/28	91	80 - 120	94	80 - 120	ND, RDL=0.50	ug/L				

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5287473	Total Manganese (Mn)	2017/11/28	91	80 - 120	95	80 - 120	ND, RDL=2.0	ug/L	2.6 (1)	20		
5287473	Total Molybdenum (Mo)	2017/11/28	100	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L				
5287473	Total Nickel (Ni)	2017/11/28	90	80 - 120	95	80 - 120	ND, RDL=1.0	ug/L				
5287473	Total Phosphorus (P)	2017/11/28	104	80 - 120	95	80 - 120	ND, RDL=100	ug/L				
5287473	Total Selenium (Se)	2017/11/28	97	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L				
5287473	Total Silver (Ag)	2017/11/28	92	80 - 120	95	80 - 120	ND, RDL=0.10	ug/L				
5287473	Total Sodium (Na)	2017/11/28	NC	80 - 120	97	80 - 120	ND, RDL=100	ug/L				
5287473	Total Thallium (Tl)	2017/11/28	90	80 - 120	93	80 - 120	ND, RDL=0.050	ug/L				
5287473	Total Tungsten (W)	2017/11/28	96	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L				
5287473	Total Uranium (U)	2017/11/28	94	80 - 120	95	80 - 120	ND, RDL=0.10	ug/L				
5287473	Total Vanadium (V)	2017/11/28	95	80 - 120	95	80 - 120	ND, RDL=0.50	ug/L				
5287473	Total Zinc (Zn)	2017/11/28	93	80 - 120	99	80 - 120	ND, RDL=5.0	ug/L				

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5287473	Total Zirconium (Zr)	2017/11/28	101	80 - 120	98	80 - 120	ND, RDL=1.0	ug/L				

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

(3) Matrix Spike Parent ID [FPX521-06]

(4) Duplicate Parent ID [FPX521-06]

(5) Duplicate Parent ID [FPX521-01]

(6) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(7) Matrix Spike Parent ID [FPX521-01]

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE INFORMATION Company Name: <u>GHD</u> Contact Name: <u>Jen Balkwill</u> Address: <u>651 Colby Drive</u> <u>Waterloo N2V 1C2</u> Phone: <u>519-884-7780</u> Fax: Email: <u>jennifer.balkwill@ghd.com</u>		REPORT INFORMATION (if differs from invoice) Company Name: Contact Name: Address: Phone: Fax: Email:		PROJECT INFORMATION Quotation #: <u>B40047</u> P.O. #: Project #: <u>086822-03-5.0</u> Site Location: Site #: Sampled By: <u>Simon Howell</u>		MAXXAM JOB NUMBER 24-Nov-17 15:29 Tanya Fidlin B7Q5941 MAF ENV-1309	
---	--	--	--	--	--	---	--

Note: For MOE Regulated Drinking Water samples, please use the Drinking Water CoC.

Regulation 153 (2011) Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC Table <input type="checkbox"/> Yes <input type="checkbox"/> No				Other Regulations CCME <input type="checkbox"/> Sanitary Sewer Bylaw Reg. 558 <input type="checkbox"/> Storm Sewer Bylaw MISA <input type="checkbox"/> Municipality: PWQO Other (specify):				ANALYSIS REQUESTED (Please be specific) MOE Regulated Drinking Water? (Y/N) <u>Y</u> Metals Field Filtered? (Y/N) <u>(Ass. only)</u> <u>Dissolved Metals, Total Metals</u> <u>Speciated Alk. Anions, F-</u> <u>Colour, Hardness</u> <u>NH4 and in-NH4, TKN</u> <u>Organic N</u> <u>pH, low level TP, TDS</u> <u>TSS sulphide</u> <u>Turbidity, Ion Balance.</u>				TURNAROUND TIME (TAT) REQUIRED PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS. Regular (Standard) TAT: <input checked="" type="checkbox"/> (5-7 working days for most tests) Rush TAT: <input type="checkbox"/> 1 day <input type="checkbox"/> 2 days <input type="checkbox"/> 3 days Rush Confirmation #: PN Date Req'd:			
Include Criteria on Certificate of Analysis (Y/N)?								TATs for certain tests are > 5 days. Please contact your Project Manager for details.							
SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM.								# of Cont. COMMENTS / TAT COMMENTS							
Sample Identification		Date Sampled		Time Sampled		Matrix (GW, SW, Soil, etc.)		MOE Regulated Drinking Water? (Y/N)		Metals Field Filtered? (Y/N)		# of Cont.		COMMENTS / TAT COMMENTS	
1 <u>GW-086822-112117-SH-001</u>		<u>NOV 21, 2017</u>		<u>14:55</u>		<u>GW</u>		<u>Y</u>		<u>Y</u>		<u>7</u>		<u>- Field chemistry pH=7.59</u> <u>T(oc)=6.08</u>	
2															
3															
4															
5															
6															
7															
8															
9															
10															
*RELINQUISHED BY (Signature/Print)		Date (YYYY/MM/DD)		Time		RECEIVED BY: (Signature/Print)		Date (YYYY/MM/DD)		Time		#JARS USED AND NOT SUBMITTED		Laboratory Use Only	
<u>Simon Howell / SIMON HOWELL</u>		<u>2017/11/24</u>		<u>15:24</u>		<u>Tanya Fidlin</u>		<u>2017/11/27</u>		<u>15:29</u>				Custody Seal Yes No Present <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Temperature (°C) on Receipt <u>12/1</u>	

HT

*MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.
 COC-1004 (10/11) - ENV. ENG. Maxxam Analytics International Corporation c/o Maxxam Analytics White: Maxxam Yellow: Mail Pink: Client

www.ghd.com

