Appendix T
Hydrogeological Assessment

HDR Corporation

Final Report on Preliminary Hydrogeological Investigation

Regional Road Corridor Improvements, Winston Churchill Boulevard, Bush Street, Old Main Street, Mississauga Road, Olde Base Line Road

GEOTETOB21649AA

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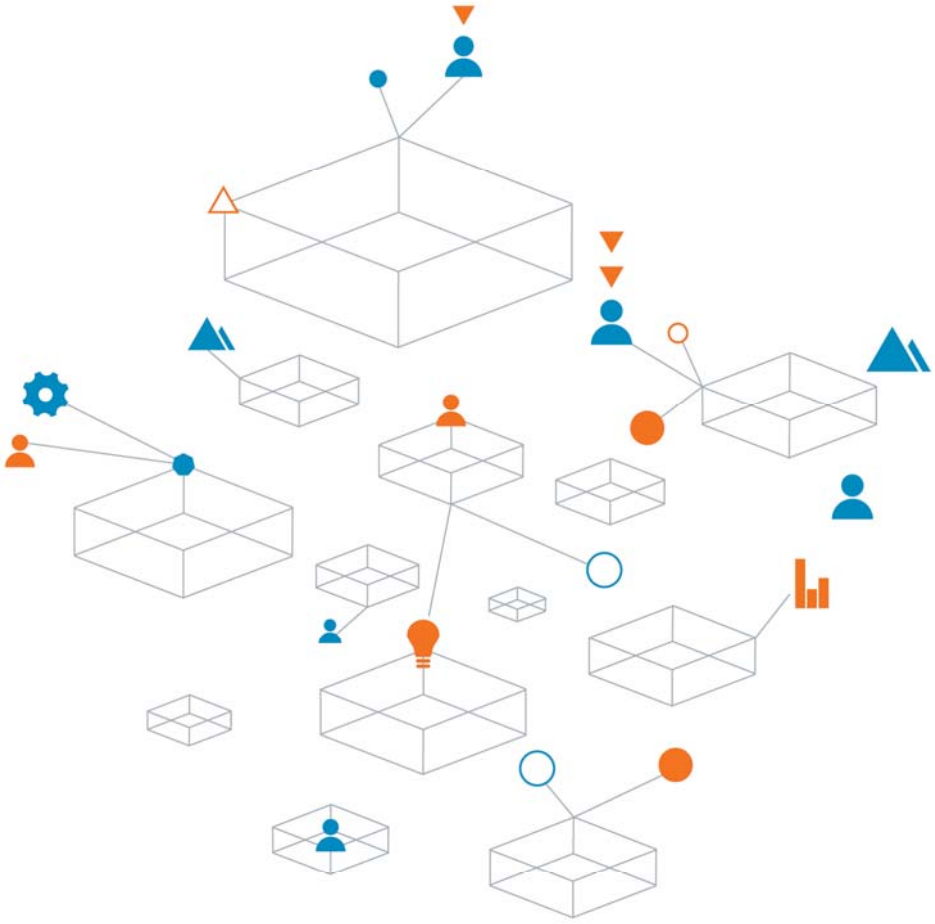

Trust is the cornerstone of all our projects

March 11, 2014

HDR Corporation
100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8

Attention: Tyrone Gan, P.Eng., Senior Vice President
Director of Transportation, Canada

RE: Preliminary Hydrogeological Investigation
Proposed Regional Road Corridor Improvements
Winston Churchill Boulevard, Bush Street, Old Main Street, Mississauga Road, and Olde Base Line Road
Town of Caledon, Regional Municipality of Peel, Ontario

Dear Mr. Gan:

Coffey Geotechnics Inc. (Coffey) is pleased to provide HDR Corporation with a final report on our preliminary hydrogeological investigation for the above-noted project. The report presents Coffey's understanding of the geologic and hydrogeological setting of the study area based on investigative drilling, data collection, analysis, and review.

We trust that this information meets your present requirements. If we can be of additional assistance in this regard, please contact this office.

For and on behalf of Coffey,

W. Brad Benson, P.Eng.
Senior Hydrogeologist

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List of Acronyms and Definitions

Coffey	Coffey Geotechnics Inc.
HDR	HDR Corporation
BH	Borehole
K	Hydraulic conductivity
masl	Metres Above Sea Level
mbgs	Metres Below Ground Surface
MOE	Ontario Ministry of the Environment
O.Reg.903	Ontario's Wells Regulation
PTTW	Permit to Take Water
EcoLog ERIS	Environmental Risk Information Service
WWR	Water Well Record

1 INTRODUCTION

Coffey Geotechnics Inc. (Coffey) was retained by HDR Corporation (HDR) on behalf of The Regional Municipality of Peel (Region of Peel) to conduct a preliminary hydrogeological investigation as part of a Schedule C Class Environmental Assessment Study in support of proposed improvements to a regional road corridor which is bounded by Winston Churchill Boulevard, Bush Street, Old Main Street, Mississauga Road and Olde Base Line Road in the Town of Caledon in the Region of Peel, Ontario (hereafter referred to as the Site). The location of the Site is shown on **Figure 1**.

The roads that make up the Site are currently two-lane urban roads with gravel shoulders. Based on information provided at the outset of the study, it was understood that the proposed road improvement works will focus on pavement structure upgrades, improved adequacy for heavy truck usage, road geometry and traffic safety, road drainage deficiencies, and pedestrian and bicycle traffic. The total length of the roads to be improved is approximately 17 km. The roads cross several small streams with existing pipe culverts.

The services that Coffey provided to HDR Corporation included a preliminary geotechnical investigation and pavement design, a culvert condition survey, a contamination overview study, and a preliminary hydrogeological investigation. The reports for the geotechnical investigation, the culvert condition survey, and the contamination overview study are provided under separate cover.

The primary objectives of the preliminary hydrogeological investigation were to characterize the baseline subsurface hydrogeologic conditions before the start of the proposed road improvement works at the Site, to identify water supply wells and other groundwater features that may be at risk of being affected by the road improvement works, to evaluate potential impacts to groundwater resources resulting from the road works, and to develop appropriate measures or plans to monitor and mitigate the potential impacts.

2 SCOPE OF WORK AND METHOD OF INVESTIGATION

2.1 General

The preliminary hydrogeological investigation began with a review of previously completed geotechnical reports and published information for the Site, including previously published regional physiographic and geologic mapping and watershed planning reports. Many of these documents are referred to throughout various sections of this report and the relevant details are provided in the References section following the text of the report.

In particular, the work completed under the preliminary hydrogeological investigation consisted of the following tasks:

- Reviewing and interpreting available reports and published data;
- Drilling twelve (12) boreholes and installing ten (10) 50-millimetre (mm) diameter groundwater monitoring wells;
- Developing the groundwater monitoring wells and performing in-situ hydraulic conductivity testing (slug tests) for the encountered aquifer formations;
- Measuring groundwater levels manually in the monitoring wells located at the Site;
- Reviewing information on the presence of water wells within 500 m of the roads at the Site as obtained from the Ministry of the Environment (MOE) water well information system;
- Reviewing environmental records obtained from an EcoLog ERIS database search to identify potential contaminant sources;
- Assessing potential impacts resulting from the proposed road improvement works on groundwater wells and other groundwater resources in the vicinity of the Site;
- Developing reasonable monitoring and mitigation measures for potentially impacted water supply wells or watercourses; and
- Preparing this report.

2.2 Borehole Drilling and Monitoring Well Installation

Twelve (12) boreholes were drilled at the Site in December 2012 and January 2013 in conjunction with the hydrogeological investigation. Groundwater monitoring wells were installed in ten (10) of the boreholes. The borehole and monitoring well locations were distributed at selected locations near culverts or stream crossings along the road alignments for Winston Churchill Boulevard (BH 25-WC, BH H1-WC, BH 10-WC and BH 8-WC), Olde Base Line Road (BH H3-OBL, BH H2-OBL and BH H1-OBL), Mississauga Road (BH H1-MR, BH H2-MR, BH H3-MR and BH H4-MR) and Bush Street (BH H1-BS). The borehole locations were selected based on the presence of flowing streams and the associated potential for shallow groundwater to be encountered. The locations of the boreholes and monitoring wells are shown on **Figure 2**.

The boreholes were advanced using a truck-mounted power auger drill rig supplied and operated by HL Drilling and Construction of Mississauga, Ontario. The boreholes were advanced using 108-mm inside diameter hollow stem augers and the drilling was monitored on a full-time basis by Coffey staff. Standard penetration testing and soil sampling were carried out in the boreholes at regular intervals of depth using 50-mm diameter split-spoon sampling equipment. The boreholes were advanced to depths ranging from 2.1 to 6.7 m below ground surface. All but one of the boreholes (BH 25-WC) were terminated due to auger refusal on what was generally inferred to be bedrock at depths ranging from 2.1 to 5.0 m. During the field work, Coffey staff carried out soil sampling and field testing, recorded the geologic conditions, classified the soil samples by tactile and visual methods and measured the groundwater levels. Copies of the borehole logs are provided in **Appendix A**. Grain size analyses were carried out for selected soil samples and the resulting grain size distribution curves are included in **Appendix A**.

For the purpose of assessing groundwater conditions at the Site, monitoring wells were installed in all of the boreholes except BH 8-WC and BH H1-BS. The monitoring wells were constructed with 50-mm diameter PVC well screen and pipe, which were pre-packaged by the supplier and transported to the Site by the drilling contractor. The monitoring wells were constructed with machine-slotted well screens ranging in length from 0.9 to 3.0 m, depending on the depth of the borehole and the encountered water table. The borehole annulus was backfilled with commercial filter sand to approximately 0.3 to 0.9 m above the well screen. The remainder of the annulus was backfilled with granular bentonite. The monitoring wells were covered with flush-mounted steel protective covers.

Ground surface and top of pipe elevations at the borehole locations were surveyed by Coffey using GPS surveying equipment. The elevations were referenced to geodetic datum.

Information on the monitoring well depth and screened intervals is summarized in **Table 1**, below.

Table 1: Information on Groundwater Monitoring Wells

Well ID	Well Location	Ground Surface Elevation (m)	Borehole Bottom		Well Screen Interval Depth (mbgs)		Well Screen Interval Elevation (m)	
			Depth (mbgs)	Elevation (m)	from	to	from	to
BH H1-WC	Winston Churchill Boulevard	401.6	5.0	396.6	4.1	2.6	397.5	399.0
BH 10-WC		395.0	3.9	391.1	3.4	1.8	391.6	393.2
BH 25-WC		412.1	6.7	405.4	5.8	2.7	406.3	409.4
BH H1-OBL	Olde Base Line Road	372.1	3.9	368.2	3.8	2.3	368.3	369.8
BH H2-OBL		371.2	3.1	368.1	3.0	1.5	368.2	369.7
BH H3-OBL		370.0	3.5	366.5	3.0	1.5	367.0	368.5
BH H1-MR	Mississauga Road	390.1	3.7	386.4	3.0	1.5	387.1	388.6
BH H2-MR		395.3	2.3	393.0	1.8	0.9	393.5	394.4
BH H3-MR		400.5	2.4	398.1	2.0	1.1	398.5	399.4
BH H4-MR		405.2	4.9	400.3	4.3	2.7	400.9	402.5

Notes: Elevations in metres relative to geodetic datum
mbgs = metres below ground surface

2.3 Installation of Streambed Piezometers

As part of the hydrogeological investigation, four (4) streambed monitoring stations were established in January 2013 at locations near stream crossings (where surface water was present) within the road allowances for the Site in order to obtain information on the interaction between groundwater and surface water. At each monitoring station, a pointed mini-piezometer (19 mm diameter) was driven into the streambed and a staff gauge was established in the stream adjacent to the piezometer. Water levels were subsequently monitored in the piezometer and in the adjacent stream and the head difference between the groundwater elevation inside the piezometer and the surface water elevation outside of the piezometer was recorded. The locations of the piezometers/streambed monitoring stations on Mississauga Road (PZ-1) and Olde Base Line Road (PZ-2, PZ-3, PZ-4) are shown on Figure 2. The installation details for the four (4) piezometers are summarized in Table 2, below.

Table 2: Information on Streambed Piezometers

Piezometer ID	Total Length of Piezometer (m)	Length of Piezometer below Streambed (m)	Length of Piezometer above Streambed (m)	Depth from Streambed to Middle of Piezometer Screen (m)
PZ-1	1.96	0.96	1.0	0.74
PZ-2	1.96	1.13	0.83	0.91
PZ-3	1.96	0.98	0.98	0.76
PZ-4	1.96	0.96	1.0	0.74

2.4 Hydraulic Conductivity Testing and Groundwater Level Monitoring

Coffey developed the groundwater monitoring wells at the Site by purging and surging the well water to remove mobile particulates. The purpose of the well development was to improve the hydraulic connection between the well and the geologic materials in the vicinity of the well. After development, rising head hydraulic conductivity tests (slug tests) were conducted on the groundwater monitoring wells to facilitate an assessment of the hydraulic conductivity of the soil strata adjacent to the well screens. From one to four separate tests were carried out in each of the eight tested wells.

A summary of the hydraulic conductivity test (slug test) methodology is as follows:

- The static groundwater level in each monitoring well was initially measured and recorded;
- Water was removed from each tested well using a bailer or an inertial pump and low density tubing to achieve a known drawdown;
- The rising water level in each well was then measured and recorded at regular time intervals until the water level had recovered to approximately 90% of the static water level;
- The water level data from the monitoring wells were analysed using AQTESOLV Professional V4.5 and the Bouwer-Rice method to estimate the hydraulic conductivity (K) of the soil adjacent to the screened portion of the well.

The hydraulic conductivity test data and analysis for each well is provided in Appendix B. Groundwater levels were measured manually in the monitoring wells on several occasions in the period between January 4 and April 4, 2013.

3 SITE CONDITIONS

3.1 Site Description

The Site is rectangular in shape and consists of portions of Mississauga Road (Peel Road 1, approximately 5 km length) and Winston Churchill Boulevard (Peel Road 19, approximately 6 km length) on the northeast and southwest sides, respectively. On the southeast side, the Site consists of a 2.6 km length of Olde Base Line Road (Peel Road 12) and on the northwest side by a similar length of Bush Road (Peel Road 11). The Site is located in the Town of Caledon in the Region of Peel, and encompasses Lots 1 to 9 and part of Lot 10, Concessions 5 and 6 West of Hurontario Street in the Geographic Township of Caledon. Winston Churchill Boulevard forms the border between the Town of Caledon and the Town of Erin in the County of Wellington to the west. The community of Belfountain is located at the intersection of Mississauga Road and Bush Street. Mississauga Road becomes Old Main Street in the community of Belfountain, south of Bush Street. The community of Erin is located approximately 3 km west of the Site.

Existing land use in the vicinity of the Site is shown in the aerial photographic images on **Figures 1 and 2**. In general, land use within the Site is predominantly agricultural and rural residential, with some natural areas that are bush-covered.

According to the Oak Ridges Moraine Atlas which is available online (at http://www.mah.gov.on.ca/page334.aspx), the Site is not located within an area where the Oak Ridges Moraine Conservation Plan is applicable. According to Niagara Escarpment Plan (NEP) maps available online at (http://www.escarpment.org/landplanning), portions of the Site are located within the Niagara Escarpment Plan Area. Near the southeast corner of the Site, the lands adjacent to Mississauga Road and Olde Base Line Road are mapped as Escarpment Protection Area or Escarpment Rural Area. Near the northeast corner of the Site, the community of Belfountain was shown on the NEP map as a minor urban centre and lands adjacent to Mississauga Road and Bush Street were shown as Escarpment Rural Area, Escarpment Protection Area, or Escarpment Natural Area.

3.2 Climate

An Environment Canada meteorological station, identified as Georgetown WWTP (Station ID 6152695), is located approximately 13.5 km southeast of the Site. The average monthly precipitation and temperature data (30-year normals) for this station for the period between 1971 and 2000 are provided in **Table 3**, below. The data indicate that the mean annual precipitation is 885 mm, with annual mean rainfall of 743.8 mm (84% of the total average annual precipitation). Total precipitation varies moderately by season with the highest average monthly precipitation of 84.9 mm recorded in August and the lowest monthly precipitation of 58.6 mm recorded in February.

The mean annual daily temperature is 6.8 °C. The coldest month is January with a mean daily temperature of -6.6°C and the warmest month is July with a mean daily temperature of 19.7°C

Table 3: Climate Data Summary (1971 – 2000) for Georgetown WWTP Station

Month	Average Daily Temperature (°C)	Average Rainfall (mm)	Average Snowfall (cm)	Average Precipitation (mm)
January	-6.6	29.5	37.3	66.7
February	-5.5	27.2	31.4	58.6
March	-1	43.7	22.7	66.3
April	5.8	68.7	6.7	75.4
May	12.3	74.6	0.3	74.9
June	17	80.1	0	80.1
July	19.7	74.9	0	74.9
August	18.8	84.9	0	84.9
September	14.4	84.3	0	84.3
October	8.1	66.7	0.5	67.2
November	2.4	70.1	8.9	79.0
December	-3.4	39.1	33.8	72.7
Year	6.8	743.8	141.5	885

NOTE: Data were obtained from Environment Canada website.

3.3 Physiography and Drainage

The majority of the Site is located in the physiographic region identified as the Horseshoe Moraines, with a small portion of the Site along Bush Street located in the physiographic region identified as the Guelph Drumlin Field (Chapman and Putnam, 1984). The northeast corner of the Site skirts the physiographic region identified as the Niagara Escarpment. The Horseshoe Moraines are characterized by hummocky terrain containing mostly till soils with numerous depressions often being filled with water. The soils of the Horseshoe Moraines are predominantly composed of sandy silt till (Wentworth Till). The area of the Guelph Drumlin Field is characterized by a gently sloping topography in a southeasterly direction towards the West Credit and Main Credit Rivers, which are located to the north and east of the Site. The soils in the Guelph Drumlin Field are primarily composed of sandy silt till (Port Stanley Till) and the valley areas within the Guelph Drumlin Field contain glaciofluvial outwash sands and gravels that appear to extend to bedrock at many locations (CVCA, 1998). The physiographic region identified as the Niagara Escarpment occurs east and south of the Site. The Niagara Escarpment is a major topographic break in the bedrock, formed as a result of differential erosion of softer underlying Queenston Formation shale to the east and the harder carbonate Amabel Formation dolostone to the west (Chapman and Putnam, 1984).

The Site is located within the Credit River watershed under the jurisdiction of the Credit Valley Conservation Authority (CVCA). The Credit River is almost 90 km long and meanders southeast from its headwaters in Orangeville, Erin and Mono through nine municipalities, eventually draining into Lake Ontario at Port Credit, Mississauga. The West Credit River (also referred to as the Erin Branch) flows from west to east and skirts the northeast corner of the Site at Belfountain. The West Credit River merges with the main branch approximately 1 km northeast of the Site (Forks of the Credit).

West Credit River merges with the main branch approximately 1 km northeast of the Site (Forks of the Credit).

Topographic relief at the Site is largely the result of glacial and glaciofluvial features that dominate the local landscape. Based on topographic mapping, the ground surface at the Site ranges from a maximum elevation of approximately 433 m near the north-central part to a minimum elevation of approximately 370 m southeast of the intersection of Olde Base Line Road and Mississauga Road. Mapping indicated the presence of several watercourses in the area contained by the Site. With the exception of a small watercourse crossing Bush Street and flowing north to the West Credit River, the watercourses generally flowed in a southerly direction, crossing Mississauga Road, Olde Base Line Road, and Winston Churchill Boulevard in the south half of the Site.

The northeast corner of the Site near the downstream reach of the West Credit River is part of an Environmentally Significant Area (ESA), Credit Forks-Devil's Pulpit, as well as part of a provincially significant Life Science ANSI (Area of Natural or Scientific Interest), the Credit Forks ANSI (CVCA, 1998). An ESA is an area where ecosystem functions or features warrant special protection. A Life Science ANSI is a significant representative segment of Ontario's biodiversity and natural landscapes including specific types of forests, valleys and wetlands, their native plants and animals, and their supporting environments. The portion of the Site north of The Grange Side Road is classified as Belfountain Wetland Class 7 (CVCA, 1998). In Ontario, Class 4 to 7 wetlands, while not being provincially significant, often play important regional roles in terms of hydrology or biology (CVCA, 1998).

3.4 Surficial Geology

The Niagara Escarpment is the most significant geological feature near the Site. The escarpment was formed through differential erosion of the bedrock units by marine intrusion and fluvial erosion prior to glaciation. The glaciation that occurred during the Pleistocene Epoch not only further eroded and scoured through repeated ice advance and retreat, but also resulted in the overburden deposits in the area near the Site (CVCA, 2007). West of (above) the escarpment, including the area of the Site, the overburden thickness is highly variable ranging from 0 m at the escarpment where bedrock outcrops to 50 m near Orangeville, approximately 15.5 km northwest of the Site.

A regional description of the surficial geology in the vicinity of the Site is provided in the Surficial Geology of Southern Ontario (GIS based geological map), Scale 1:50,000 (Ontario Geological Survey, 2010). A section of this map showing the surficial geology at the Site and surrounding areas is shown on Figure 3.

The surficial geology at the Site is mapped as predominantly Wentworth Till, a poorly sorted sandy silt to silty sand-textured till. The northern portion of the Site along Bush Street as well as the area to the north of the Site is shown to be covered by glaciofluvial outwash deposits consisting of gravel and gravelly sand, frequently overlain by sand or silt. Paleozoic bedrock exposures are mapped at the southeast corner of the Site, extending to the north and south, and close to the northeast corner of the Site. East of the Site, and east of the Niagara Escarpment, the mapping showed the presence of predominantly Halton Till, a clay to silt-textured till (derived from glaciolacustrine deposits or shale). Some patches of ice-contact deposits consisting of sand and gravel with minor silt, clay and till were shown near the northeast and southwest corners of

the Site and in the area west of the Site. Modern alluvial deposits (consisting of clay, silt, sand, gravel, and organic remains) associated with the West Credit River and the main branch of the Credit River exist north and east of the Site.

The underlying bedrock at the Site and generally in the area above (west of) the Niagara Escarpment is mapped as Middle Silurian aged Amabel Formation dolostone. The formation is typically massive, unbedded, light grey to brown weathering, finely crystalline dolostone. The porosity is reportedly variable and may be intergranular or vuggy (Ontario Geological Survey Map 2339, Paleozoic Geology, Orangeville Area, 1976). East of the Site and below (east of) the Niagara Escarpment, the surficial bedrock is mapped as Queenston Formation shale.

4 SUBSURFACE SOIL CONDITIONS

Eleven of the twelve boreholes advanced for the hydrogeological investigation were terminated due to auger refusal on what was generally inferred to be bedrock at depths ranging from 2.1 to 5.0 m below ground surface. BH 25-WC near the northwest corner of the Site was advanced to a depth of 6.7 m and was terminated in sand and gravel with some silt.

All of the boreholes encountered surficial fill material, which extended to depths ranging from approximately 0.7 to 3.8 m. With the exception of BH H1-BS on Bush Street, all of the boreholes encountered sand and gravel fill at surface, extending to depths ranging from approximately 0.7 to 2.3 m. Beneath the sand and gravel fill, the encountered fill material was variable in nature and included silty sand, sandy silt, clayey silt, and silty clay. Borehole BH H1-BS on Bush Street encountered sandy silt fill at surface and was terminated in what was inferred to be sandy silt fill due to auger refusal at a depth of approximately 2.7 m. A layer of clayey silt was encountered within the fill at that location. Borehole BH H2-OBL was terminated in possible fill material (organic silt, some clay) due to auger refusal at a depth of approximately 3.1 m below ground surface.

On Winston Churchill Boulevard, on the west side of the Site, the boreholes encountered predominantly granular soil beneath the upper fill. In the north portion of the Site, BH 25-WC encountered a relatively thin stratum of clayey silt from approximately 3.8 to 4.6 m depth, underlain by sand and gravel with some silt. BH 25-WC was terminated in the sand and gravel at a depth of 6.7 m. In the south portion of the Site, BH H1-WC and BH 8-WC encountered silty sand beneath the upper fill and were terminated in the silty sand due to auger refusal at depths of 5.0 and 2.4 m, respectively. BH10-WC encountered sandy silt beneath the fill, between approximately 1.1 and 3.0 m depth. The sandy silt was underlain by silty sand and BH10-WC was terminated in that material at a depth of 3.9 m.

On Mississauga Road, on the east side of the Site, the boreholes also encountered predominantly granular soil beneath the upper fill. BH H4-MR encountered sandy silt beneath the fill and was terminated in the sandy silt due to auger refusal at a depth of 4.9 m. South of BH H4-MR, BH H3-MR encountered gravelly sand with some silt beneath the fill and was terminated in the gravelly sand at a depth of 2.3 m. Further to the south, BH H2-MR and BH H1-MR encountered silty sand beneath the fill and were terminated in the silty sand at depths of 2.1 and 3.5 m, respectively.

On Olde Base Line Road, on the south side of the Site, the native soils encountered in the boreholes were typically finer grained. BH H3-OBL encountered silty clay between approximately 1.5 and 3.0 m depth, underlain by sandy silt with some clay. The borehole was terminated in that material due to auger refusal at a depth of 3.5 m. Further to the east, BH H1-OBL encountered silt with some sand and some clay at approximately 2.3 m depth and was terminated in that material at a depth of 3.8 m. As previously noted, BH H2-OBL was terminated in organic silt with some clay that was inferred to be fill at a depth of 3.1 m.

5 GROUNDWATER CONDITIONS

5.1 Groundwater Level Measurements

5.1.1 Monitoring Wells

The groundwater level data for the monitoring wells are summarized in **Table 4,** below. The screen elevations of these monitoring wells are shown in **Table 2** and on the borehole logs provided in **Appendix A**. A number of groundwater level monitoring events were carried out in the period from January to April 2013, although not all of the monitoring wells were access for each event. Groundwater levels in the monitoring wells were measured at depths ranging from 0.5 m to 2.9 m below existing ground surface. The corresponding groundwater elevations ranged from a high of 411.2 m at BH 25-WC, located on Winston Churchill Boulevard near the northwest corner of the Site, to a low of 367.2 m measured at BH H3-OBL on Olde Base Line Road near the southwest corner of the Site. The recorded groundwater elevations generally followed the ground surface topographic elevations, which ranged from approximately 412 to 368 m across the Site. The shallow groundwater flow direction was indicated to be generally towards the south.

The highest groundwater levels at the monitoring locations were typically measured on April 4, 2013 and the lowest levels were measured on January 4, 2013. At individual monitoring locations, the measured groundwater levels in the period from January 14 to April 4, 2013 generally varied by approximately 0.1 to 0.6 m. On April 4, 2013, the measured groundwater levels ranged from approximately 0.3 to 1.5 m below ground surface at the monitoring locations.

5.1.2 Streambed Piezometers

The interaction between groundwater and surface water was monitored at the four streambed monitoring stations (shown on **Figure 2**) and the results are summarized in **Table 5**, below. The results show the groundwater elevation measured in the streambed piezometer and the surface water elevation in the adjacent watercourse for each monitoring event, together with the inferred vertical hydraulic gradient. The hydraulic gradient is a function of the head difference between the groundwater and surface water elevations and the depth from the streambed to the mid-point of the piezometer screen. A positive vertical hydraulic gradient (i.e., upward gradient) indicates that there is local groundwater discharge to surface water and a negative vertical hydraulic gradient (i.e., downward gradient) indicates that there is local recharge from surface water to groundwater.

Water level measurements in the streambed piezometers were carried out on January 14, January 21, February 13, and April 4, 2013. At PZ-1 on Winston Churchill Boulevard, the monitoring results indicated that there was a negative hydraulic gradient on January 14, indicating that surface water was recharging groundwater, and a relatively small positive gradient (ranging from 0.04 to 0.15) on the other monitoring occasions indicating that there was local groundwater discharge to surface water.

PZ-2, PZ-3, and PZ-4 were located in relatively close proximity on Olde Base Line Road, with PZ-2 and PZ-3 located on upstream and downstream ends of a culvert on the same watercourse. PZ-4 was located approximately 400 m west of PZ-2 and PZ-3. At PZ-2 on the upstream (north) end of the culvert, the monitoring indicated there was generally neither groundwater recharge nor discharge (i.e., gradient near zero). On the downstream (south) end of the culvert, the monitoring

at PZ-3 indicated a negative gradient on January 14 (groundwater recharge) and a slight positive gradient of 0.03 to 0.09 (groundwater discharge) at the time of the other monitoring events. At PZ-4, the monitoring indicated that there was a slight negative gradient (-0.04 to -0.07) during three of the four monitoring events, indicating groundwater recharge, and slight positive gradient (0.03) on January 21, indicating groundwater discharge.

In summary, the water level monitoring carried out in the streambed piezometers on Winston Churchill Boulevard and Olde Base Line Road indicated that conditions were variable, with both groundwater recharge and discharge conditions recorded at each piezometer location during different monitoring events. In general, slight discharge conditions predominated at PZ-1 and PZ-3 and slight recharge conditions predominated at PZ-4.

It should be noted that groundwater and surface water conditions vary depending on factors such as temperature, season, precipitation, construction activity and other situations, which may be different from those encountered at the time of the monitoring. The potential for groundwater level fluctuations at the Site should be considered when designing and developing the construction plans for the project.

Table 4: Summary of Groundwater Level Measurements

Well ID	Well Location	Ground Surface Elevation (ml)	Groundwater Level											
			04-Jan-2013		14-Jan-2013		15-Jan-2013		21-Jan-2013		13-Feb-2013		04-Apr-2013	
			Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (ml)	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)	Depth (mbgs)	Elevation (m)
BH H1-WC	Winston Churchill Boulevard	401.60	-	-	1.30	400.30	-	-	1.34	400.26	1.30	400.30	1.29	400.31
BH 10-WC		395.04	-	-	2.21	392.83	-	-	2.55	392.49	Snow Cover	-	Frozen	-
BH 25-WC		412.10	-	-	-	-	0.96	411.14	0.97	411.13	0.99	411.11	0.91	411.19
BH H1-OBL	Olde Baseline Road	372.14	1.28	370.86	1.28	370.86	-	-	1.23	370.91	1.23	370.91	1.17	370.97
BH H2-OBL		371.22	2.31	368.91	1.49	369.73	-	-	1.79	369.43	1.78	369.44	1.46	369.76
BH H3-OBL		370.02	2.86	367.16	1.46	368.56	-	-	1.15	368.87	1.10	368.92	0.84	369.18
BH H1-MR	Mississauga Road	390.06	-	-	-	-	0.63	389.43	0.62	389.44	Frozen	-	0.60	389.46
BH H2-MR		395.29	-	-	-	-	1.05	394.24	1.06	394.23	1.00	394.29	1.04	394.25
BH H3-MR		400.50	-	-	-	-	0.33	400.17	0.46	400.04	Frozen	-	0.31	400.19
BH H4-MR		405.20	-	-	-	-	0.75	404.45	0.76	404.44	0.71	404.49	0.70	404.50

Notes:

-: not measured
Elevations in metres relative to geodetic datum
mbgs = metres below ground surface

Table 5: Summary of Water Level Measurements for Groundwater and Surface Water Interaction

Streambed Monitoring Station	Streambed Elevation (m)	Reference Elevation (m)	Depth from Streambed to Middle of Piezometer Screen (m)	14-Jan-2013			21-Jan-2013		
				Measurement from Reference Point (m)	Water Level Elevation (m)	Vertical Hydraulic Gradient	Measurement from Reference Point (m)	Water Level Elevation (m)	Vertical Hydraulic Gradient
PZ-1	400.08	401.08	0.74	- 1.00	400.08	- 0.24	- 0.81	400.28	0.09
SG-1	400.03	400.23		+ 0.23	400.26		+ 0.18	400.21	
PZ-2	370.47	371.30	0.91	- 0.40	370.90	0.0	- 0.44	370.86	0.08
SG-2	370.43	370.43		+ 0.47	370.90		+ 0.36	370.79	
PZ-3	370.58	371.56	0.76	- 0.83	370.73	- 0.14	- 0.76	370.81	0.09
SG-3	370.58	370.58		+ 0.26	370.84		+ 0.16	370.74	
PZ-4	369.52	370.52	0.74	- 0.74	369.78	- 0.07	- 0.81	369.71	0.03
SG-4	369.45	369.45		+ 0.38	368.83		+ 0.24	369.69	

Streambed Monitoring Station	Streambed Elevation (m)	Reference Elevation (m)	Depth from Streambed to Middle of Piezometer Screen (m)	13-Feb-2013			04-Apr-2013		
				Measurement from Reference Point (m)	Water Level Elevation (m)	Vertical Hydraulic Gradient	Measurement from Reference Point (m)	Water Level Elevation (m)	Vertical Hydraulic Gradient
PZ-1	400.08	401.08	0.74	- 0.69	400.39	0.15	- 0.77	400.31	0.04
SG-1	400.03	400.03		+ 0.25	400.28		+ 0.25	400.28	
PZ-2	370.47	371.30	0.91	- 0.52	370.78	0.0	--	--	--
SG-2	370.43	370.43		+ 0.36	370.78		+ 0.41	370.84	
PZ-3	370.58	371.56	0.76	- 0.80	370.76	0.05	- 0.77	370.79	0.03
SG-3	370.58	370.58		+ 0.15	370.73		+ 0.19	370.77	
PZ-4	369.52	370.52	0.74	- 0.85	369.67	- 0.04	- 0.76	369.76	- 0.04
SG-4	369.45	369.45		+ 0.26	369.71		+ 0.34	369.79	

Notes: 1. PZ indicates piezometer in stream and associated measurements are for depth to groundwater level below top of piezometer.
2. SG indicates staff gauge and associated measurements are for depth of surface water in stream above streambed.
3. Elevations in metres relative to geodetic datum.
4. A positive vertical gradient indicates local groundwater discharge to surface water. A negative vertical gradient indicates local surface water recharge to groundwater.

5.2 Hydraulic Conductivity Testing

The results of the hydraulic conductivity testing in the monitoring wells are summarized in **Table 6**, below. Included in **Table 6** is a description of the soils (stratigraphic unit) encountered in the associated borehole adjacent to the screened portion of the monitoring well and the sand pack, below the groundwater table. Also included in **Table 6** is an estimate of the hydraulic conductivity for the soil adjacent to the well screen that was based on the grain size distribution curves shown in **Appendix A** and the empirical method derived by Hazen for estimating hydraulic conductivity based on the effective grain size (D_{10}).

Table 6: Summary of In-situ Hydraulic Conductivity (K) Test Results

Monitoring Well ID	Slug Test Results				Estimated from Grain Size Distribution	Stratigraphic Unit
	Estimated K Trial 1 (cm/sec)	Estimated K Trial 2 (cm/sec)	Estimated K Trial 3 (cm/sec)	Estimated K Trial 4 (cm/sec)	Estimated K (cm/sec)	
BH H1-WC	1.0×10^{-5}	-	-	-	-	Silty Sand/Sandy Silt Fill Silty Sand
BH H10-WC	-	-	-	-	4.9×10^{-5}	Sandy Silt/Silty Sand
BH 25-WC	9.1×10^{-5}	-	-	-	8.1×10^{-5}	Silty Sand Fill Clayey Silt Sand/Gravel, some silt
BH H1-MR	1.4×10^{-4}	-	-	-	4.4×10^{-6}	Silty Sand, some clay
BH H2-MR	2.9×10^{-4}	3.7×10^{-4}	3.2×10^{-4}	3.0×10^{-4}	-	Silty Clay Fill Silty Sand
BH H3-MR	3.3×10^{-4}	3.5×10^{-4}	-	-	5.5×10^{-5}	Silty Sand Fill Gravelly Sand, some silt
BH H4-MR	9.9×10^{-5}	1.1×10^{-4}	-	-	7.3×10^{-6}	Sandy Silt
BH H1-OBL	2.7×10^{-4}	2.8×10^{-4}	-	-	2.6×10^{-6}	Silt, some sand
BH H3-OBL	2.8×10^{-4}	-	-	-	-	Silty Clay, some sand Sandy Silt, some clay

In general, there was relatively little variation in the hydraulic conductivity values estimated from the slug tests between monitoring locations. The estimated hydraulic conductivity values from the slug tests ranged from a high of approximately 4 x 10^{-4} centimetres per second (cm/sec) at BH H2-MR and BH H3-MR on Mississauga Road to a low of approximately 1 x 10^{-5} cm/sec at BH H1-WC on Winston Churchill Boulevard. The monitoring well in BH H1-WC was screened within variable fill material described as silty sand with some gravel and sandy silt, underlain by native silty sand. The estimated hydraulic conductivity from the slug test for that location was slightly lower than would have been anticipated for soils of that nature. Elsewhere, the estimated hydraulic values varied over a relatively narrow range of 9 x 10^{-5} to 4 x 10^{-4} cm/sec and were considered to be generally consistent with the soil types.

For BH 25-WC, the hydraulic conductivity estimated from the grain size distribution curve for a borehole soil sample was relatively close to the hydraulic conductivity value estimated from the slug test. Elsewhere, the hydraulic conductivity values estimated from the grain size distribution curves were approximately 1 to 2 orders of magnitude lower than the values estimated from the slug tests. In general, the hydraulic conductivity values from the slug tests appeared to be more consistent with the soil types than the values estimated from the grain size distribution curves.

5.3 Hydrostratigraphy

In general, it was considered that the sands and silts encountered below the upper fill and below the water table at the borehole locations would constitute a shallow unconfined aquifer for the purpose of assessment. At some borehole locations, the overlying fill was also saturated and would constitute part of the surficial aquifer. The results of the slug tests indicated that the surficial aquifer at the borehole locations was slightly permeable, with a typical hydraulic conductivity on the order of 9 x 10^{-5} to 1 x 10^{-4} cm/sec.

The upper bedrock underlying the overburden would potentially constitute a separate aquifer. In approximately the southern half of the Site, what was inferred to be bedrock was encountered in the boreholes at depths ranging from 2.1 to 5.0 m below ground surface. Fracturing is present in the bedrock units and is most pervasive in the upper few metres of bedrock and areas close to the escarpment face (CVCA, 2012). The characteristics of the bedrock aquifer were not investigated, which was consistent with the relatively shallow nature of the proposed works at the Site.

5.4 Regional Groundwater Recharge

Recharge is the process by which groundwater is replenished and involves the vertical infiltration of water through the subsoil deposits and geologic materials to the saturated zone. The amount of groundwater recharge in a particular area depends on surficial geology, topography, and the land development nature and extent in the area.

The Site is located within a rural area that is largely undeveloped and contains area of natural vegetation. The major sources of recharge in the area near the Site are precipitation and freshet. The lower reach of the West Credit River is located approximately 300 m north of Bush Street. The north potion of the Site along Bush Street is part of the valley area of the West Credit River. According to the West Credit Subwatershed Study Characterization Report (CVCA, 1998), the valley areas within the Guelph Drumlin Field contain glacio-fluvial outwash sands and gravels that appear to extend to bedrock at many locations. The valley areas are therefore generally considered as recharge areas that provide base flow to the West Credit River and its tributaries.

Most of the remaining portion of the Site is located within the Horseshoe Moraine physiographic region, which is characterized by hummocky terrain containing mostly till soils with numerous depressions that may seasonally contain standing water. The area typically has a moderately low infiltration rate because of the relatively low permeability near surface soils, but the hummocky nature of the ground surface may result in greater recharge as water is trapped in depressions and infiltrates into the groundwater table (CVCA, 1998). Calibrated mapping of groundwater recharge contained within the Assessment Report: Credit Valley Source Protection Area (CVCA, 2012) indicated that the northwestern portion of the Site, generally corresponding with the area mapped within the Guelph Drumlin Field, had a relatively high recharge rate on the order of 400 mm/year. The remainder of the Site was generally shown to have a moderate to high groundwater recharge rate.

5.5 Groundwater Use in the Study Area

Review of mapping of municipal residential drinking water systems on the MOE website indicated that some communities in the vicinity of the Site are currently serviced by municipal residential drinking water systems. These included the community of Inglewood to the northeast of the Site, the community of Cheltenham to the east of the Site, and the community of Terra Cotta to the southeast of the Site, which are currently serviced by the Peel Region Municipal Groundwater Drinking System, and the community of Erin to the west of the Site which is currently serviced by the Town of Erin Municipal Groundwater Drinking System. The community of Belfountain, located at the northeast corner of the Site at the intersection of Bush Street and Old Main Street (Mississauga Road), is not supplied by a municipal residential drinking water system. Mapping contained in the Assessment Report: Credit Valley Source Protection Area (CVCA, 2012) indicated that estimated groundwater capture zones associated with surrounding municipal water supply systems did not extend to within 500 m of the Site, although a portion of the West Credit River north of the Site was shown as a vulnerable surface water zone. The results of the water well survey summarized below indicated that there are a considerable number of private water supply wells within 500 m of the road alignments within the Site.

As part of the hydrogeological investigation, Coffey requested a search of the MOE water well information system (WWIS) database to identify potentially active water supply wells near the Site. A request was submitted to the MOE for a summary of provincial water well records from the WWIS database for the area located within 500 m on both sides of the road alignments within the Site. A tabularized summary of the water well record information provided by the MOE is included in **Appendix C**.

The WWIS database search identified 261 well records for wells that were shown to be located within approximately 500 m of the Site. The locations of those wells, based on the coordinates recorded in the WWIS database, are shown on **Figure 4A**. The wells were categorized based on the information regarding final status and well use recorded on the water well records. That information is shown on **Figure 4A** and is summarized below.

Reported Well Use	Number of Associated Well Records
Domestic	209
Domestic/Livestock	15
Livestock	2
Public	4
Irrigation	2
Test Hole/Monitoring Wells	6
Not Used	6
Abandoned	12
Not Stated	5

Of the 261 well records identified, 232 of the associated wells were shown to have been installed for water supply, with recorded uses as indicated above. The majority of the wells (224) were reportedly installed for domestic or domestic/livestock use. Four wells were reportedly installed for public use and the remaining four water supply wells were reportedly installed for irrigation or livestock use.

For the five (5) well records (Well IDs 4906949, 4908526, 4908527, 7121555 and 7190296) with no recorded information on final status or groundwater use, copies of the associated water well record sheets were obtained from the MOE and are included in **Appendix C**. Review of the well record sheets indicated that three (3) wells (Well IDs 4906949, 4908526 and 4908527) were relatively deep (deeper than 30 m) bedrock wells with no information on final status and water use. Two of the wells (Well IDs 7121555 and 7190296) were shown to have been abandoned.

Twenty-one (21) of the wells that were drilled for water supply were reportedly completed in the overburden and the remainder were completed in the bedrock. Where it was recorded on the water well records, the groundwater quality was generally reported as being fresh. On four records, three for wells completed in the bedrock and one for a well completed in the overburden, the water quality was reported as being "mineral", "sulphur", or "salty".

Coffey understands that the proposed road improvement works at the Site will focus on pavement structure upgrades, improved adequacy for heavy truck usage, road geometry and traffic safety, road drainage deficiencies, and pedestrian and bicycle traffic. The proposed road improvement work may involve shallow excavation (to an estimated maximum depth of 3 m) for culvert replacements or extensions, which would have the potential to impact local shallow groundwater supply wells, if present. For all but five (5) of the 232 wells that were reportedly installed for water supply, the reported depth was greater than 10 m. Based on the depth of the proposed works, it was considered that wells that were greater than 10 m in depth were unlikely to be impacted by interference effects from dewatering activities associated with the proposed works.

Five shallow wells were identified with a reported depth of less than 10 m (Well IDs 4901025, 4904879, 4900994, 4904489 and 6700805). Coffey requested copies of the water well record sheets for the five shallow wells and those are included in **Appendix C**. In general, shallow groundwater supply wells would be considered to be potentially susceptible to interference effects from dewatering activities associated with the proposed works. The recorded locations of both shallow and deep water supply wells within 500 m of the road alignments of the Site are shown on **Figure 4B.** For the five identified shallow wells, the records indicated that two were drilled wells

(Well IDs 4900994 and 4904489) completed in the limestone bedrock at a depth of 9.1 m. It is considered unlikely that those wells would be significantly impacted by groundwater interference effects from the proposed works. The records indicated that the other three wells were bored wells completed in the overburden at depths ranging from 4.9 to 7.6 m. The overburden at the well locations was variously described as red clay and gravel, shale clay and shale, and gravel with sand. There is a potential that other shallow water supply wells are present at the Site for which there are no corresponding provincial water well records.

5.6 Potential Contaminant Sources

Coffey assembled information regarding potential contaminant sources within a 250 m search radius around the Site by requesting an environmental database review report from Environmental Risk Information Services Ltd. (EcoLog ERIS report). A copy of the report is provided in **Appendix D**. The EcoLog ERIS report included search results of various federal, provincial and private environmental database sources. Two mappable records were identified for the Site, which were shown on the site diagram in Section ii of the EcoLog ERIS report in **Appendix D**. One record (SPL-1) was identified from the Ontario Spills database and was related to the release of approximately 18 litres of oil from a transformer in 2000 at a location at 5262 Winston Churchill Boulevard. The second record (CA-1) was related to an application for a Certificate of Approval for the installation of a small emergency diesel-powered generator at a site at 15801 Mississauga Road.

The EcoLog ERIS report also indicated potential soil or groundwater contaminant sources that were identified in the database search put could not be plotted on the map because of insufficient address information. These included the following:

- 2 locations within a 250 m radius of the Site were recorded as gas stations;
- 2 locations within a 250 m radius of the Site were registered in the Ontario Regulation 347 Waste Generators database;
- 6 spills were recorded within a 250 m radius of the Site.

Additional information on potential contaminant sources in the vicinity of the Site is provided in the separate contamination overview study prepared by Coffey.

Regional scale groundwater vulnerability mapping contained in the the Assessment Report: Credit Valley Source Protection Area (CVCA, 2012) indicated that approximately the southeastern third of the Site was a high groundwater vulnerability area, presumably because of the relatively thin overburden indicated by geological mapping for that area. The northwestern margin of the Site was also mapped as a high groundwater vulnerability area, presumably because of high permeability soils indicated by mapping for that area.

6 EVALUATION OF POTENTIAL IMPACTS

Coffey understands that the proposed regional road corridor Improvements will address the current road pavement structure deficiencies, road safety issues and stormwater management and drainage deficiencies to accommodate current and future road traffic operations. As a result, the following aspects will be included in the road improvements:

- Pavement design, rehabilitation and upgrade strategy;
- Road embankment construction, pavement subgrade preparation; and
- Culvert re-construction and/or extension, where necessary;

From a hydrogeological perspective, the construction of pavement upgrades is considered unlikely to impact groundwater levels and construction dewatering is not anticipated. A culvert condition survey is being conducted and reported separately. The survey results will provide additional information for road improvement design, including culvert replacement or extension. It is anticipated that the construction of replacement culverts and/or culvert extensions may involve excavation extending to or below the water table. As a result, there is a potential that localized construction dewatering will be necessary. Accordingly, construction dewatering rates and the associated zone of groundwater influence should be estimated. Generally, dewatering requirements may be variable depending on the size of the excavation (length, width and depth), aquifer properties and construction methods. Site specific dewatering estimates can be made based on the aquifer properties (hydraulic conductivity values, groundwater levels) as indicated in Section 5.1 and 5.2 of this report and when the design information is available.

In addition to localized groundwater dewatering, culvert reconstruction would potentially require diversion of surface water in the affected watercourse, which was not addressed in this report. Monitoring of streambed piezometers at selected locations as described in Section 5.1 indicated that conditions were variable, with both groundwater recharge and discharge conditions recorded at each monitoring location during different monitoring events. Based on the relatively localized nature and anticipated short term duration of potential culvert reconstruction, related impacts to the associated watercourses from a temporary interruption of groundwater discharge are not anticipated; however, those conditions should be assessed further when the design for the upgrades has been completed.

As indicated in Section 5.5, a search of the MOE water well records identified records for 232 water supply wells in the area located within 500 m of the road alignments within the Site. The majority of the wells (224) were reportedly installed for domestic or domestic/livestock use. The records indicated that all but five (5) of the water supply wells were installed at depths of 10 m or greater, predominantly in the bedrock. Shallow water wells may be present for which there is no associated water well record. Coffey considers that shallow water supply wells with a depth of less than 10 m are vulnerable to interference effects from construction dewatering, depending on the location of the well relative to the estimated zone of influence. Based on the shallow nature of the proposed works and the moderate permeability of the soils encountered in the boreholes at the Site, it is anticipated that the associated zone of groundwater influence for locations of excavation below the encountered water table will be relatively small.

Specific potential contaminant sources identified from the review of environmental databases in Section 5.6 were limited, and were considered unlikely to impact groundwater quality in association with groundwater dewatering for culvert upgrades, if necessary. Once the locations of culvert

upgrades have been confirmed and the potential for associated construction dewatering has been assessed, reference should be made to information contained in the separate contamination overview study to further assess the potential for impacts to groundwater quality from potential contaminant sources to be present in the vicinity of any excavations extending to the water table.

7 MONITORING AND MITIGATION PLAN

7.1 General

The potential dewatering rate and associated zone of influence should be estimated prior to construction for those construction activities where excavation extending below the water table is anticipated. The dewatering requirements may be variable depending on the size of the excavation (length, width and depth), aquifer properties and construction methods. A Permit to Take Water in support of the construction dewatering should be obtained from the MOE if the estimated dewatering rate is above 50,000 L/day, to ensure compliance with Ontario Regulation 387/04 and the Ontario Water Resources Act (OWRA). A well-described monitoring, mitigation, and contingency plan should be developed in conjunction with the PTTW application.

Where construction dewatering is anticipated, a monitoring program for groundwater levels and water quality should be undertaken to confirm that the dewatering impacts are within the predicted range. The following are general measures that should be undertaken for the monitoring and mitigation plans:

1. Planning and administration of the monitoring plan should be performed under the supervision of a qualified person.

2. A door-to-door survey of properties located within 150 m of the proposed dewatering locations should be carried out to document the presence and use of water supply wells. If shallow wells (less than 10 m depth) are identified, then the wells should be monitored for water level and water quality prior to, during, and after completion of the construction works, subject to the owner's permission.

3. Sufficient monitoring wells should be provided to document the effect of the dewatering on the local groundwater level. Depending on the location of the dewatering activities, the monitoring wells installed in conjunction with this investigation may or may not be suitable. It is anticipated that one or more of the monitoring wells installed for this investigation would be suitable for monitoring variations in the groundwater level that are unrelated to the proposed works (i.e., background conditions). Groundwater level monitoring should be carried out prior to, during, and after completion of the construction works. In addition, for culvert reconstruction the water level and flow rate in the affected watercourse should be routinely monitored.

4. Monitoring of groundwater quality and quantity should be documented and frequently assessed.

5. Water removed from the excavations should be treated as necessary prior to disposal so as not to result in environmental impacts to the receiving watercourse. Treatment could include the use of filtration, settlement tanks, or other approved devices. Approval for discharge should be obtained from the appropriate regulatory agencies.

6. Records of daily water quantity pumped, treatment method used, water quality parameters tested, and the method of discharge should be maintained and updated regularly by the construction contractor.

7. In conformance with O. Reg. 903 under the Ontario Water Resources Act, the installation and eventual decommissioning of the wells and pumping system should be carried out by a licensed contractor and under the supervision of a licensed water well technician.

7.2 Water Level Monitoring and Mitigation Plan

The following groundwater monitoring and mitigation plans are proposed. The monitoring plan can be adjusted based on the construction method(s).

7.2.1 Pre-construction

It is recommended that, at a minimum, a door-to-door survey be carried out for properties located within 150 m of the proposed dewatering location to document the presence and use of water supply wells and to determine if shallow water wells are in use for water supply. If a shallow water well (less than 10 m depth) is identified, then the potential for related interference effects should be assessed and a suitable program of groundwater level monitoring should be incorporated into the construction dewatering plan to document the effects of the dewatering activities on the well(s). In addition, it is recommended that, with the property owner's permission, a sample of water be obtained from any identified shallow water wells to document the groundwater quality. At a minimum, the water quality monitoring should include microbiological parameters (E. coli, total coliform), nitrate, chloride, sodium, hardness, and electrical conductivity.

It is recommended that baseline conditions be assessed by monitoring water levels in existing monitoring wells at quarterly intervals for up to one year prior to the commencement of construction activities. In addition, water level measurements for groundwater monitoring should be undertaken on a weekly basis for a minimum of two weeks prior to the start of construction.

7.2.2 During Construction

To observe the effects of the construction activities on the aquifer(s), regular water level monitoring should be conducted on available monitoring wells and in any accessible shallow wells identified within 150 m of the proposed dewatering activities, subject to the property owner's permission and provided that the well can be accessed safely. Water level monitoring in monitoring wells and in the affected watercourse should be carried out at a minimum of weekly intervals during construction dewatering. Water level and water quality monitoring in private wells should be carried out at a minimum of monthly intervals during construction dewatering. If the potential for interference with private water supplies is indicated, then the frequency of water level monitoring should be increased.

7.2.3 Post-construction

To identify the effect of the construction activities on the aquifer(s) within the vicinity of the Site after completion of the construction work, groundwater level monitoring should continue at weekly intervals in available monitoring wells and monthly intervals in nearby shallow wells for a period of at least one month after construction is completed. If an impact attributable to the dewatering is detected during the post-construction period, then monitoring should continue until there is no longer an effect on the water levels in the vicinity of the Site.

7.3 Dewatering Discharge Monitoring and Mitigation Plan

As there is unlikely to be a municipal sewer system in the vicinity of the proposed dewatering activities, it is anticipated that the dewatering discharge would have to be conveyed to a nearby watercourse. Prior to construction, the quality of the shallow groundwater and the nearby watercourse in areas of anticipated construction dewatering should be assessed for compatibility and to identify baseline conditions. At a minimum, water samples should be analysed for the inorganic parameters identified in the provincial water quality objectives (PWQO). Discharge to a watercourse should be carried out in consultation with, and based on approval from, appropriate regulatory agencies, including the MOE and CVCA. Depending on the sensitivity of the affected watercourse, additional biological assessment may be necessary.

7.3.1 Pre-construction

Suitable dewatering method(s) and volume of discharge need to be identified by the contractor using technical evaluation reports and proposed dewatering plan(s). Prior to construction, and where required, appropriate approvals should be in place for discharging water into a local watercourse, assuming that a municipal sewer system is not available. The location(s) of the point of discharge with respect to the dewatering systems need to be confirmed by the contractor and appropriate erosion and sedimentation control (ESC) measures such as filter bags, straw bales, and silt fences should be implemented.

7.3.2 During Construction

Discharge locations should be monitored on a daily basis. Discharge volume should be measured manually or by using a digital totalizing flow meter (on-line flow meter). In case of pumping at higher than expected dewatering rates, the pump capacity should be controlled and set at the rate specified in the PTTW obtained from MOE.

To document discharge quality, a sample should be collected upon commencement of discharge for analysis of the inorganic parameters identified in the PWQOs. During discharge, field parameters including temperature, pH, conductivity, and turbidity should be monitored at least once each working day for the first week and weekly thereafter. Sufficient chemical analysis of representative samples should be carried out so that field turbidity measurements can be used to estimate the corresponding suspended solids concentration.

If any impacts attributable to the dewatering are noted, then appropriate mitigation measures should be initiated. In the event of excessive sediment, these measures could potentially include use of additional straw bales, splash pads, and/or rock check dams to be installed downstream of the point of discharge.

7.3.3 Post-construction

Removal of the ESC features should be conducted at all discharge locations at the end of the dewatering activities. Approximately one week after the dewatering ends or mitigation measures have ended, the discharge point should be re-inspected to confirm that there are no disturbances.

8 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the subsurface investigation and hydrogeological assessment, the following summary of conclusions and recommendations is provided:

- Eleven of the twelve boreholes advanced for the hydrogeological investigation were terminated due to auger refusal on what was inferred to be bedrock at depths ranging from 2.1 to 5.0 m below ground surface. BH 25-WC near the northwest corner of the Site was advanced to a depth of 6.7 m and was terminated in sand and gravel with some silt. On Winston Churchill Boulevard and Mississauga Road, the boreholes encountered primarily granular soils beneath the upper fill. On Olde Base Line Road, the native soils encountered below the upper fill were typically finer grained.

- Groundwater levels were measured in the monitoring wells at depths ranging from 0.5 to 2.9 m below existing ground surface. The recorded groundwater elevations generally followed the ground surface topographic elevations, and ranged from approximately 411 to 369 m across the Site. The shallow groundwater flow direction was indicated to be generally towards the south.

- Water level monitoring carried out in the streambed piezometers on Winston Churchill Boulevard and Olde Base Line Road indicated that conditions were variable, with both groundwater recharge and discharge conditions recorded at each piezometer location during different monitoring events.

- In general, it was considered that the sands and silts encountered below the upper fill and below the water table at the borehole locations would constitute a shallow unconfined aquifer for the purpose of assessment. At some borehole locations, the overlying fill was also saturated and would constitute part of the surficial aquifer. The results of the slug tests indicated that the surficial aquifer at the borehole locations was slightly permeable, with a typical hydraulic conductivity on the order of 9×10^{-5} to 1×10^{-4} cm/sec. The upper bedrock underlying the overburden would potentially constitute a separate aquifer.

- A search of the MOE water well information system identified 261 well records for the area located within approximately 500 m of the road alignments within the Site. Of those records, 232 of the associated wells were shown to have been installed for water supply, most (224) for domestic or domestic/livestock use. All but five (5) of those wells were reportedly drilled to depths greater than 10 m, with most completed in the bedrock.

- From a hydrogeological perspective, the construction of pavement upgrades is considered unlikely to impact groundwater levels and construction dewatering is not anticipated. It is anticipated that the construction of replacement culverts and/or culvert extensions may involve excavation extending below the water table. As a result, there is a potential that localized construction dewatering will be necessary. Construction dewatering rates and the associated zone of groundwater influence should be estimated after the extent of the culvert works has been determined. Based on the relatively localized nature and anticipated short term duration of potential culvert reconstruction, related impacts to the associated watercourses from a temporary interruption of groundwater discharge are not anticipated; however, those conditions should be assessed further when the design for the upgrades has been completed.

- Coffey considers that shallow water supply wells with a depth less than 10 m are vulnerable to interference effects from construction dewatering, depending on the location of the well relative to the estimated zone of influence. The review of water well records indicated that five (5) wells were completed to depths less than 10 m, although shallow wells may be present for which there is no associated well record. Based on the shallow nature of the proposed works and the moderate permeability of the soils encountered in the boreholes at the Site, it is anticipated that the associated zone of groundwater influence for locations of excavation below the encountered water table will be relatively small.

- The potential dewatering rate and zone of influence should be estimated on a site specific basis prior to construction for those construction activities where excavation below the water table is anticipated. A Permit to Take Water in support of the construction dewatering should be obtained from the MOE if the estimated dewatering rate is above 50,000 L/day, to ensure compliance with Ontario Regulation 387/04 and the Ontario Water Resources Act (OWRA).

- As there is unlikely to be a municipal storm sewer system in the vicinity of dewatering activities for culvert replacement, it is anticipated that discharge from dewatering would have to be conveyed to a nearby watercourse. Discharge to a watercourse should be carried out in consultation with, and based on approval from, appropriate regulatory agencies. A program of water quality monitoring should be carried out in conjunction with the discharge.

- In addition to the potential requirement for groundwater dewatering in association with proposed culvert upgrades, there is a potential that diversion of surface water in the affected watercourse would also be necessary. Diversion of surface water would potentially be subject to the requirement for a PTTW.

- Coffey recommends that a monitoring program be implemented before, during, and after any construction dewatering in association with the proposed culvert upgrades. A door-to-door survey should be carried out for properties located within 150 m of proposed dewatering activities to document the presence and use of water supply wells. If shallow water supply wells are identified, then they should be included in the monitoring program, subject to the owner's permission.

- Coffey recommends the decommissioning of existing groundwater monitoring wells from this investigation after completion of the construction of the project. If the monitoring wells would be damaged or destroyed by the proposed works, then they should be properly decommissioned in advance of the proposed construction. In conformance with Ontario's Wells Regulation (O.Reg. 903) of the Ontario Water Resources Act, the decommissioning of groundwater wells must be carried out by a licensed well contractor.

9 STATEMENT OF LIMITATIONS

The contents of this hydrogeological report are subject to the attached 'Important information about your Coffey Report' sheet. The reader's attention is specifically drawn to these conditions as it is considered essential that they be followed for proper use and interpretation of this report.

For and on behalf of Coffey,

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CY/WBB/IL/VW/bb

10 REFERENCES

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

Credit Valley Conservation Authority (CVCA), 1998, West Credit Subwatershed Study Characterization Report.

Credit Valley Conservation Authority (CVCA), 2007, Interim Watershed Characterization Report for the Credit River Watershed.

Credit Valley Conservation Authority (CVCA), 2012, Updated Approved Assessment Report: Credit Valley Source Protection Area.

Environment Canada (2013) Canadian National Climate Archive, Canadian Climate Norms and Averages (1971 – 2000), Georgetown WWTP – Station ID 6152695 – Website: http://www.climate.weatheroffice.gc.ca/climate_normals/results_e.html?stnID=4923&prov=&lang=e&dCode=4&dispBack=1&StationName=georgetown_wwtp&SearchType=Contains&province=ALL&provBut=&month1=0&month2=12

MOE municipal residential drinking water systems website http://www.ene.gov.on.ca/environment/dwo/en/mapping/report/index.htm

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Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

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Important information about your **Coffey** Report

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report*

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment.
Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

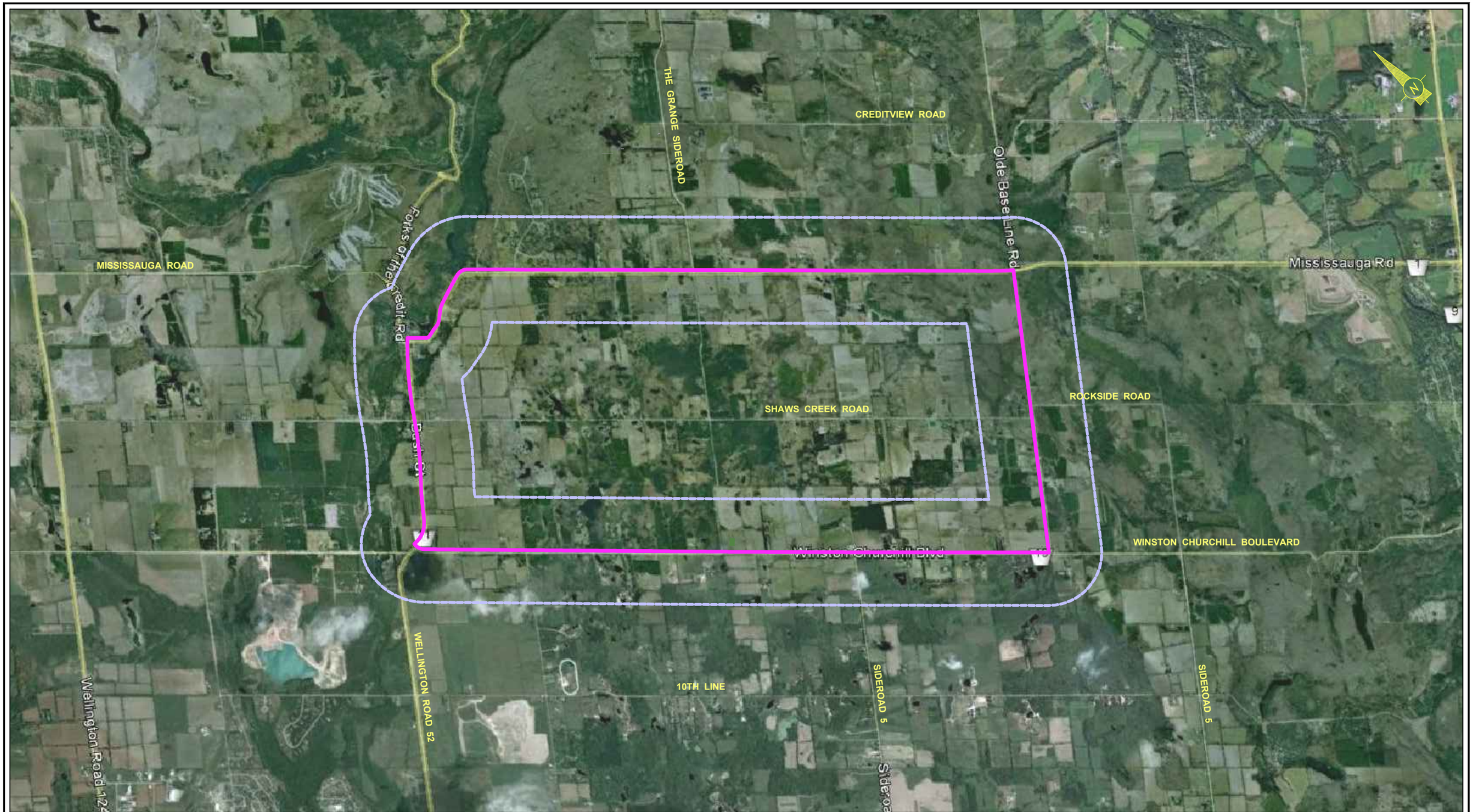
Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.

Figures



LEGEND

Study Area (500m Radius)

Notes:
1. Figure should be read in conjunction with associated report.
2. Satellite image:©2011 Google and©2012 Digital Globe.

0 500 1000 1500
METRES
(approximate)

drawn	CY/MV
approved	WBB
date	JULY 2013
scale	AS SHOWN
original size	Tabloid

coffey

client: HDR CORPORATION FOR THE REGIONAL MUNICIPALITY OF PEEL

project: HYDROGEOLOGICAL INVESTIGATION
REGIONAL ROAD CORRIDOR IMPROVEMENTS
WINSTON CHURCHILL BOULEVARD, BUSH STREET,
OLDE BASE LINE ROAD, MISSISSAUGA ROAD
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL

title: SITE LOCATION PLAN

project no: GEOTETOB21649AA

figure no: 1

F:\GEOT\ENVIRO\0 Projects\GEOTETOB 10000AA to --\21649AA -Regional Road Corridor Improvement - Peel\HydroG Investigation\Figures\21649AA_Fiig1-Fig3 Caledon_July_2013.dwg

LEGEND

- Study Area (500m Radius)
- Streambed Monitoring Station by Coffey, January 2013
- Monitoring Well by Coffey, January 2013
- Borehole by Coffey, January 2013

Notes:
1. Figure should be read in conjunction with associated report.
2. Satellite image:©2011 Google and©2012 Digital Globe.

0 200 400 600 800
METRES

drawn	CY/MV
approved	WBB
date	JULY 2013
scale	AS SHOWN
original size	Tabloid

coffey

client: HDR CORPORATION FOR THE REGIONAL MUNICIPALITY OF PEEL

project: HYDROGEOLOGICAL INVESTIGATION
REGIONAL ROAD CORRIDOR IMPROVEMENTS
WINSTON CHURCHILL BOULEVARD, BUSH STREET,
OLDE BASE LINE ROAD, MISSISSAUGA ROAD
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL

title: BOREHOLE AND MONITORING WELL LOCATION PLAN

project no: GEOTETOB21649AA

figure no: 2

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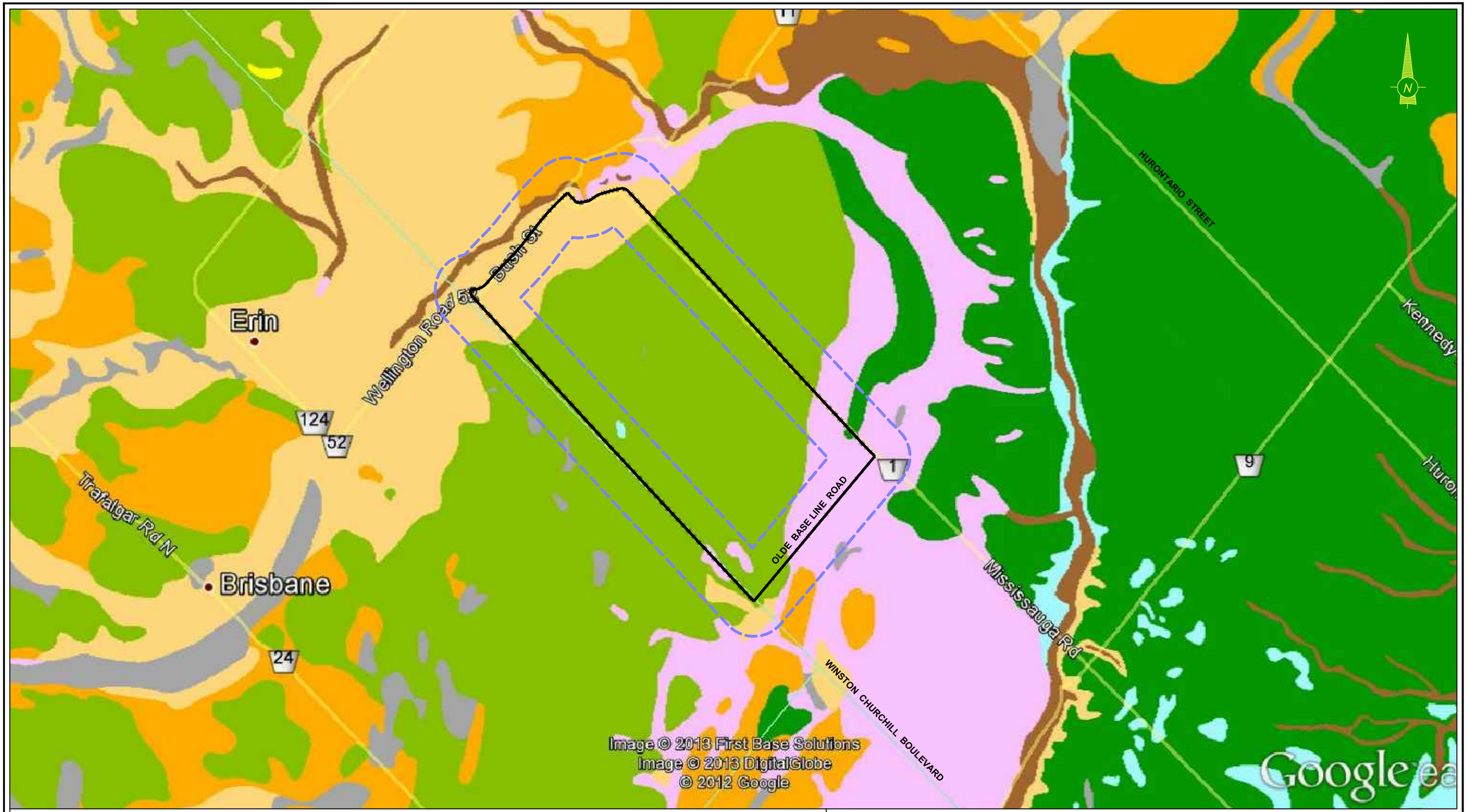

LEGEND

- Till — Stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain
- Till — Clay to silt-textured till (derived from glaciolacustrine deposits or shale)
- Paleozoic bedrock
- Modern alluvial deposits — clay, silt, sand, gravel, may contain organic remains
- Glaciofluvial deposits — river deposits and delta topset facies
- Ice contact stratified deposits — sand and gravel, minor silt, clay and till
- Fine textured glaciolacustrine deposits — silt and clay, minor sand and gravel Massive to well laminated
- Organic deposits — peat, muck, marl
- Study Area (500m Radius)

0 500 1000 1500 2000
METRES (approximate)

Notes:
1. Figure should be read in conjunction with associated report.
2. Satellite image:©2011 Google and©2012 Digital Globe.

drawn	CY/MV
approved	WBB
date	JULY 2013
scale	AS SHOWN
original size	Tabloid

coffey

client: HDR CORPORATION FOR THE REGIONAL MUNICIPALITY OF PEEL

project: HYDROGEOLOGICAL INVESTIGATION
REGIONAL ROAD CORRIDOR IMPROVEMENTS
WINSTON CHURCHILL BOULEVARD, BUSH STREET,
OLDE BASE LINE ROAD, MISSISSAUGA ROAD
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL

title: SURFICIAL GEOLOGY MAP

project no: GEOTETOB21649AA

figure no: 3

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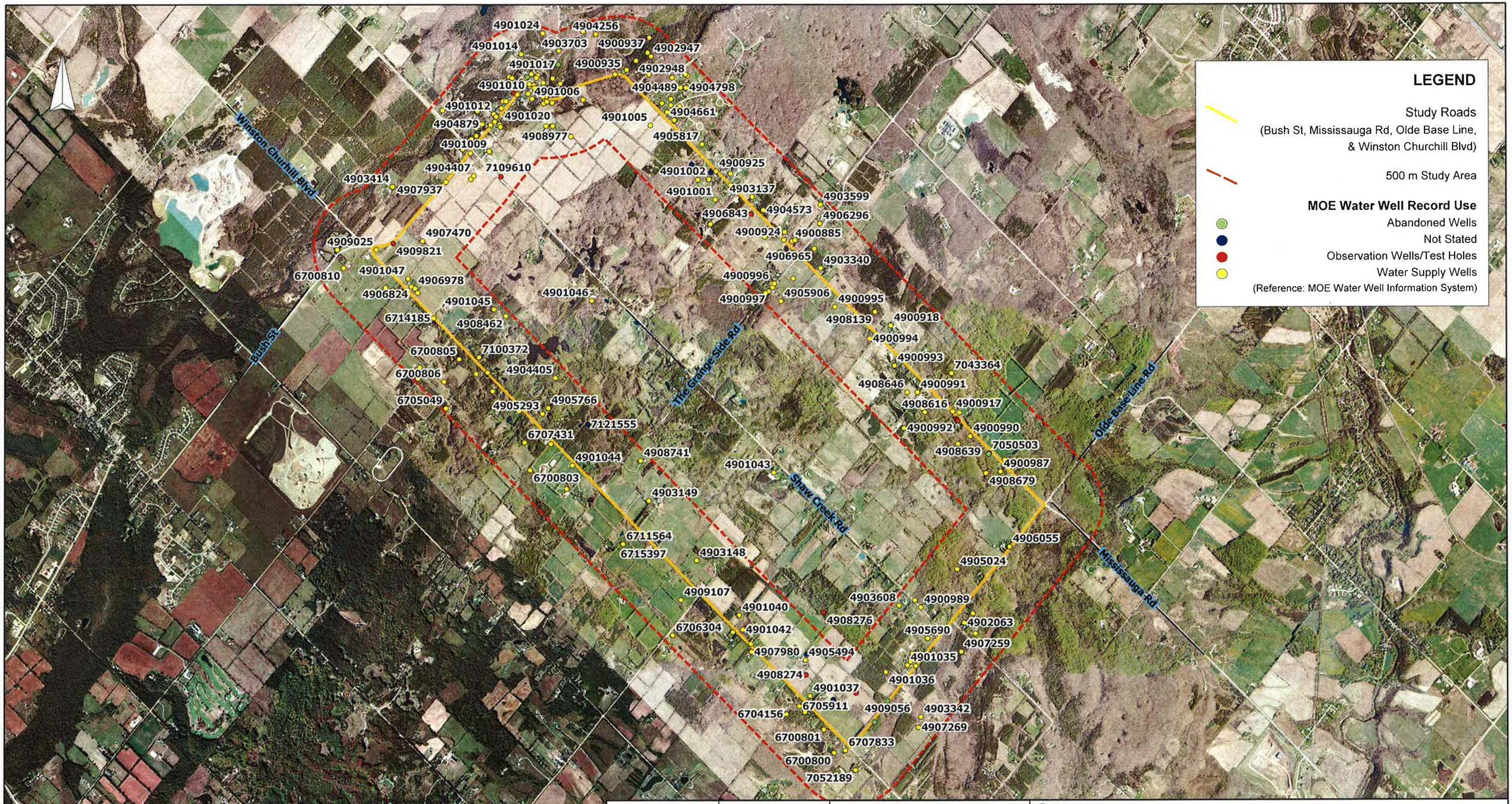


drawn	JP
approved	WBB
date	Jul. 2013
scale	1:30000
original size	Letter

coffey

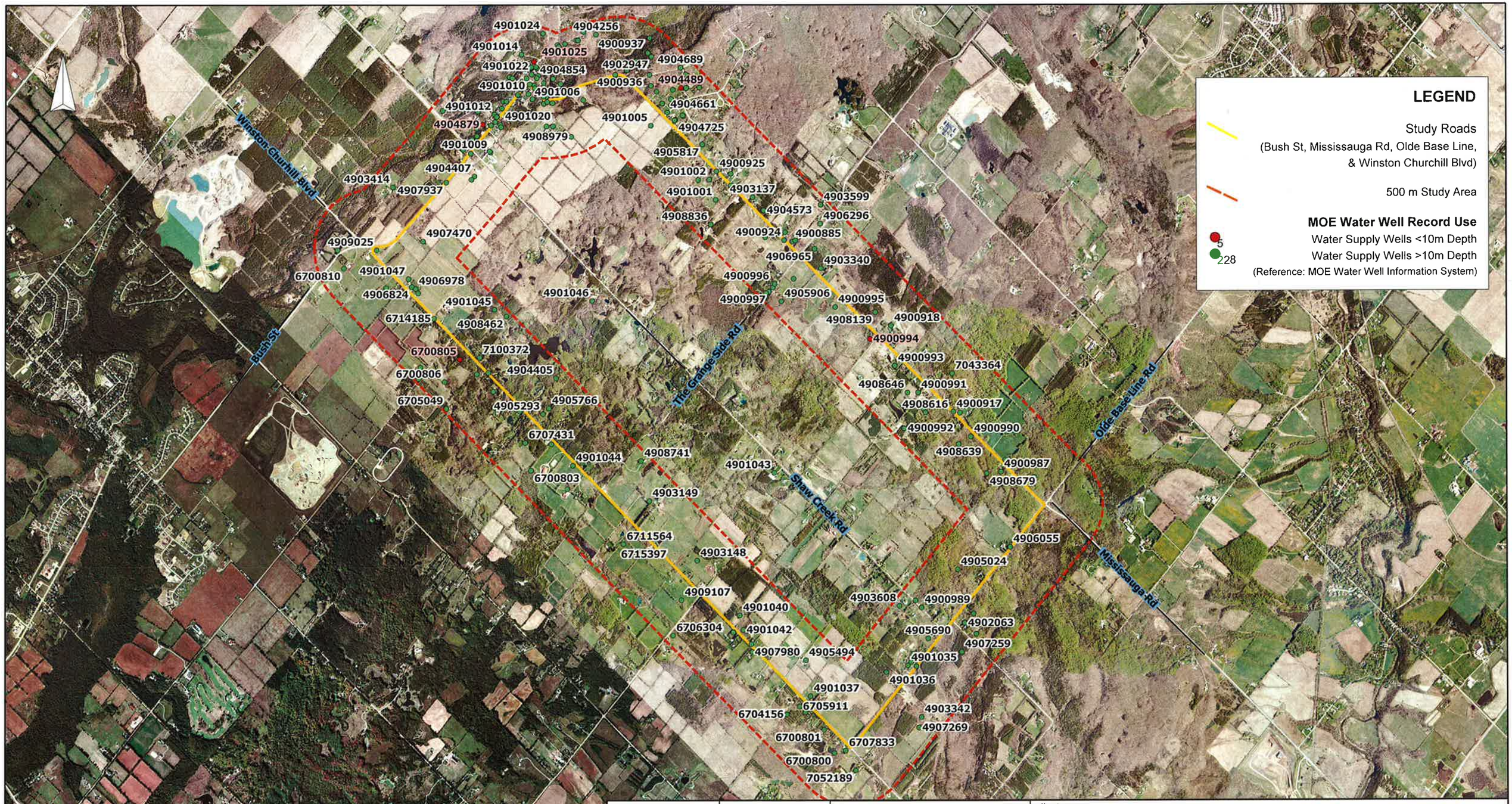
client: **HDR Corporation for Region of Peel**

project: **HYDROGEOLOGICAL INVESTIGATION
WINSTON CHURCHILL BLVD, MISSISSAUGA RD,
BUSH ST & OLDE BASE LINE RD
TOWN OF CALEDON, REGION OF PEEL**

title: **WATER WELL USE MAP**

project no: **GEOTETOB21649AA**

figure no: **4A**



drawn	JP
approved	WBB
date	Jul. 2013
scale	1:30000
original size	Tabloid

coffey

client: **HDR Corporation for Region of Peel**

project: **HYDROGEOLOGICAL INVESTIGATION
WINSTON CHURCHILL BLVD, MISSISSAUGA RD,
BUSH ST & OLDE BASE LINE RD
TOWN OF CALEDON, REGION OF PEEL**

title: **WATER SUPPLY WELL RISK ASSESSMENT MAP**

project no: **GEOTETOB21649AA**

figure no: **4B**

Appendix A

Borehole Logs
And Grain Size Distribution Curves

Log of Borehole H1 (Mississauaga Road)

Project No. GEOTETOB21649AA

Drawing No. 1

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Mississauga Road (St. 1 + 050), Caledon, ONT

Date Drilled: January 8, 2013

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit |—○—|
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. / DEPTH	DEPTH	N Value (20 40 60 80) / Shear Strength (0.1 0.2 MPa)	Organic Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Natural Unit Weight kN/m³
		brown, moist, **SAND AND GRAVEL; FILL**	390.06	0	○	×		
			389.46					
				1	○	×		
			388.54					
		brown, moist, fine grained, **SILTY SAND** , some clay, trace gravel, trace rootlets	1.52					
				2	○	×		
		wet below 2.3 m						
				3	○	×		
			386.50					
		dolostone/shale fragments at 3.5 m	3.56					
		END OF BOREHOLE						
		Notes: 1. Auger refusal at 3.7 m. 2. 50 mm dia. monitoring well installed upon completion of drilling.		4				

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Time	Water Level (m)	Cave Depth (m)
Upon Completion	2.82	
January 21, 2013	0.62	
April 4, 2013	0.6	

Log of Borehole H2 (Mississauaga Road)

Project No. GEOTETOB21649AA

Drawing No. 2

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Mississauga Road (St. 1 + 350), Caledon, ONT

Date Drilled: January 8, 2013

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test ——
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit |—○—|
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. / DEPTH	DEPTH	N Value 20 40 60 80 / Shear Strength 0.1 0.2 MPa	Organic Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Natural Unit Weight kN/m³
		brown, moist, **SAND AND GRAVEL; FILL**	395.29	0	○	×		
		brown/black, moist, **organic SILT**, some clay, trace gravel, trace rootlets; possible FILL	394.53 / 0.76					
▼			394.25	1	○	×		
		brown, moist, **SILTY SAND** , trace clay, trace gravel	393.77 / 1.52		77/254 mm ○	×		
		dolostone fragments below 2.0 m		2	50/102 mm ○	×		
		END OF BOREHOLE	393.06 / 2.23					

Notes:
1. Auger refusal at 2.1 m.
2. 50 mm dia. monitoring well installed upon completion of drilling.

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Time	Water Level (m)	Cave Depth (m)
Upon Completion	1.07	
January 21, 2013	1.06	
February 13, 2013	1.01	
April 4, 2013	1.04	

Log of Borehole H3 (Mississauaga Road)

Project No. GEOTETOB21649AA

Drawing No. 3

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Mississauga Road (St. 1 + 950), Caledon, ONT

Date Drilled: January 8, 2013

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. / DEPTH	DEPTH	N Value (20 40 60 80) / Shear Strength (0.1 0.2 MPa)	Organic Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Natural Unit Weight kN/m³
		brown, moist, **SAND AND GRAVEL; FILL**	400.50	0				
			400.19		○	×		
		brown, moist, **SILTY SAND** , trace clay, trace gravel; FILL	399.74 / 0.76	1	○	×		
		brown, moist to wet, **GRAVELLY SAND** , some silt, trace clay	398.98 / 1.52	2	○	×		
		dolostone fragments at 2.3 m	398.11		50/102 mm ○	×		
		END OF BOREHOLE Notes: 1. Auger refusal at 2.3 m. 2. 50 mm dia. monitoring well installed upon completion of drilling.	2.39					

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Time	Water Level (m)	Cave Depth (m)
Upon Completion	1.63	
January 21, 2013	0.46	
April 4, 2013	0.31	

Log of Borehole H4 (Mississauga Road)

Project No. GEOTETOB21649AA

Drawing No. 4

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Mississauga Road (St. 2 + 300), Caledon, ONT

Date Drilled: January 9, 2013

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test ——
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. / DEPTH	DEPTH	N Value / Shear Strength (MPa)	Organic Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Weight kN/m³
			405.20	0	20 40 60 80 / 0.1 0.2 MPa	25 50 75 / 10 20 30		
		brown, **SAND AND GRAVEL; FILL**	404.50					
		grey, moist, **SANDY SILT**, trace clay, trace gravel; **FILL**	404.44 / 0.76	1				
			403.68					
		brownish grey, moist, **SANDY SILT**, trace clay, trace gravel	1.52	2				
		wet below 2.3 m		3				
				4				
					50/152 mm			
			400.32					
		END OF BOREHOLE Notes: 1. Auger refusal at 4.9 m. 2. 50 mm dia. monitoring well installed upon completion of drilling.	4.88	5				

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Time	Water Level (m)	Cave Depth (m)
Upon Completion	4.10	
January 21, 2013	0.76	
February 13, 2013	0.72	
April 4, 2013	0.70	

Log of Borehole H1 (Olde Base Line Road)

Project No. **GEOTETOB21649AA** Drawing No. **5**

Project: **Hydrogeological Inv. - Regional Road Corridor Improvements** Sheet No. **1** of **1**

Location: **Olde Base Line Road (St. 1 + 400), Caledon, ONT**

Date Drilled: **December 17, 2012**

Drill Type: **CME-55 (Hollow Stem Augers)**

Datum: **Geodetic**

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. / DEPTH	DEPTH	N Value 20 40 60 80 / Shear Strength 0.1 0.2 MPa	Organic Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Natural Unit Weight kN/m³
		brown, moist, **SAND AND GRAVEL; FILL**	372.14	0	○	×		
			370.97	1	○	×		
				2	○	×		
		brown/red, moist, **SILT**, some sand, some clay, trace gravel	369.85 2.29	3	○	×		
		grey, limestone fragments at 3.8 m	368.25		50/76 mm ○	×		
		END OF BOREHOLE	3.89	4				

Notes:
1. Auger refusal at 3.8 m.
2. 50 mm dia. monitoring well installed upon completion of drilling.

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Time	Water Level (m)	Cave Depth (m)
Upon Completion	1.14	
January 21, 2013	1.23	
February 13, 2013	1.23	
April 4, 2013	1.17	

Log of Borehole H2 (Olde Base Line Road)

Project No. GEOTETOB21649AA

Drawing No. 6

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Olde Base Line Road (St. 0 + 950), Caledon, ONT

Date Drilled: December 17, 2012

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test ——
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit |—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. / DEPTH	DEPTH	N Value (20 40 60 80) / Shear Strength (0.1 0.2 MPa)	Organic Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Natural Unit Weight kN/m³
			371.22	0				
		brown, moist, **SAND AND GRAVEL; FILL**						
				1				
			369.76					
			369.29					
		brown/black/red, moist, **organic SILT**, some clay, trace sand, trace gravel, trace rootlets; possible FILL	1.93	2				
		grey limestone fragments at 3.0 m		3	50/25 mm			
			368.15					
		END OF BOREHOLE	3.07					
		Notes: 1. Auger refusal at 3.1 m. 2. 50 mm dia. monitoring well installed upon completion of drilling.						

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Time	Water Level (m)	Cave Depth (m)
Upon Completion	2.21	
January 21, 2013	1.79	
February 13, 2013	1.81	
April 4, 2013	1.46	

Log of Borehole H3 (Olde Base Line Road)

Project No. GEOTETOB21649AA

Drawing No. 7

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Olde Base Line Road (St. 0 + 750), Caledon, ONT

Date Drilled: December 18, 2012

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test ——
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit |—○—|
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. / DEPTH	DEPTH	N Value 20 40 60 80 / Shear Strength 0.1 0.2 MPa	Organic Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Natural Unit Weight kN/m³
		brown, moist, **SAND AND GRAVEL; FILL**	370.02	0	○	×		
		dark brown, moist, **SILTY CLAY**, trace sand, trace gravel; FILL	369.26 / 0.76 / 369.18	1	○	×		
		brown, moist, **SILTY CLAY**, some sand, trace gravel	368.50 / 1.52	2	○	×		
			366.97	3	○	×		
		brown, moist to wet, **SANDY SILT**, some clay, trace gravel, fragments of limestone	3.05 / 366.51					
		END OF BOREHOLE Notes: 1. Auger refusal at 3.5 m. 2. 50 mm dia. monitoring well installed upon completion of drilling.	3.51	4				

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Time	Water Level (m)	Cave Depth (m)
Upon Completion	3.02	
January 21, 2013	1.15	
February 13, 2013	1.11	
April 4, 2013	0.84	

Log of Borehole BH8 (Winston Churchill Blvd.)

Project No. GEOTETOB21649AA

Drawing No. 8

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Winston Churchill Blvd. (St. 1 + 450), Caledon, ONT

Date Drilled: January 7, 2013

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test ——
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit |—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. DEPTH	DEPTH	N Value 20 40 60 80 / Shear Strength 0.1 0.2 MPa	Organic Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Natural Unit Weight kN/m³
		brown, moist, **SAND AND GRAVEL; FILL**		0				
		brown, moist, **SILTY SAND**, trace gravel	1.1	1				
		limestone fragments at 2.3 m		2	55/76 mm			
		END OF BOREHOLE Notes: 1. Auger refusal at 2.4 m. 2. Borehole backfilled with bentonite upon completion.	2.36					

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Time	Water Level (m)	Cave Depth (m)
Upon Completion	Dry	

Log of Borehole BH10 (Winston Churchill Blvd.)

Project No. GEOTETOB21649AA

Drawing No. 9

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Winston Churchill Blvd. (St. 1 + 850), Caledon, ONT

Date Drilled: January 7, 2013

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ⊠
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. / DEPTH	DEPTH	N Value 20 40 60 80 / Shear Strength 0.1 0.2 MPa	Organic Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Natural Unit Weight kN/m³
		grey, moist, **SAND AND GRAVEL; FILL**	395.04	0	○	×		
		brown, moist, **SANDY SILT** , trace clay, trace gravel	394.28 0.76	1	○	×		
				2	○	×		
			392.49	3	○	×		
		brown, wet, **SILTY SAND** , trace clay, trace gravel	391.99 3.05		○	×		
			391.15		50/76 mm	×		
		END OF BOREHOLE Notes: 1. Auger refusal at 3.9 m. 2. 50 mm dia. monitoring well installed upon completion of drilling.	3.89	4				

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Time	Water Level (m)	Cave Depth (m)
Upon Completion	3.25	
January 21, 2013	2.55	

Log of Borehole H1 (Winston Churchill Blvd.)

Project No. GEOTETOB21649AA

Drawing No. 10

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Winston Churchill Blvd. (St. 2 + 210), Caledon, ONT

Date Drilled: December 19, 2012

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test ——
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit |—○—|
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. DEPTH	DEPTH	N Value 20 40 60 80 / Shear Strength 0.1 0.2 MPa	Organic Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Natural Unit Weight kN/m³
		brown, moist, **SAND AND GRAVEL; FILL**	401.60	0	○	×		
		grey, moist, **CLAYEY SILT** , trace gravel, trace sand, trace rootlets; FILL	400.84 0.76	1	○	×		
			400.31					
				2	○	×		
		brown, wet, **SILTY SAND** , some gravel; probable FILL	399.24 2.36		○	×		
		brown, moist, **SANDY SILT** , trace clay, trace gravel; probable FILL	398.55 3.05	3	○	×		
		grey to brown, moist, **SILTY SAND** , trace clay, trace gravel	397.79 3.81	4	○	×		
					92/305 mm ○	×		
		END OF BOREHOLE Notes: 1. Auger refusal at 5.0 m. 2. 50 mm dia. monitoring well installed upon completion of drilling.	396.57 5.03	5				

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Time	Water Level (m)	Cave Depth (m)
Upon Completion	3.20	
January 21, 2013	1.34	
February 13, 2013	1.32	
April 4, 2013	1.29	

Log of Borehole BH25 (Winston Churchill Blvd.)

Project No. GEOTETOB21649AA

Drawing No. 11

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Winston Churchill Blvd. (St. 4 + 790), Caledon, ONT

Date Drilled: January 4, 2013

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit |—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. / DEPTH	DEPTH	N Value 20 40 60 80 / Shear Strength MPa 0.1 0.2	Organic Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Natural Unit Weight kN/m³
		brown, moist, **SAND AND GRAVEL**, trace silt; FILL	412.10	0	○	×		
▽		grey below 0.8 m	411.19	1	○	×		
		brown, moist, **SILTY SAND** , trace clay, trace gravel; FILL	410.58 1.52					
		partly decomposed wood below 2.3 m		2	○	×		
				3	○	×	12	
		grey, wet, **CLAYEY SILT** , trace sand, trace gravel	408.29 3.81	4	○	×		
		grey, wet, **SAND AND GRAVEL**, some silt, trace clay	407.53 4.57	5	○	×		
				6	○	×		
		END OF BOREHOLE Notes: 1. 50 mm dia. monitoring well installed upon completion of drilling.	405.39 6.71	7				

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Time	Water Level (m)	Cave Depth (m)
Upon Completion	3.46	
January 21, 2013	0.97	
February 13, 2013	1.00	
April 4, 2013	0.91	

Log of Borehole H1 (Bush Street)

Project No. GEOTETOB21649AA

Drawing No. 12

Project: Hydrogeological Inv. - Regional Road Corridor Improvements

Sheet No. 1 of 1

Location: Bush Street (St. 1 + 400), Caledon, ONT

Date Drilled: January 7, 2013

Drill Type: CME-55 (Hollow Stem Augers)

Datum: Geodetic

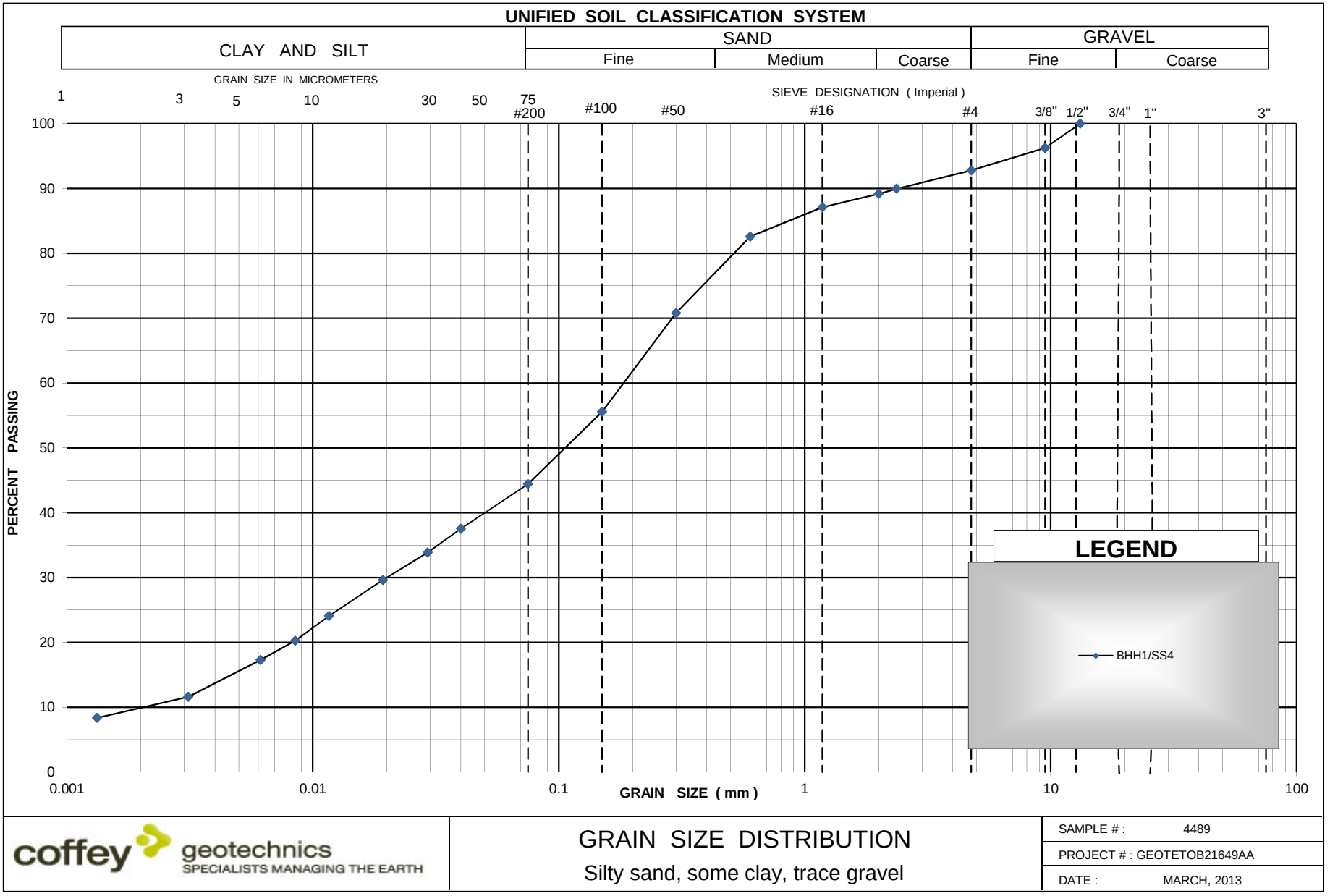
Auger Sample ☒
SPT (N) Value ○ ⧅
Dynamic Cone Test ——
Shelby Tube ■
Field Vane Test ✚
Sensitivity S
Piezometric Water Level ▼

Organic Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. DEPTH	DEPTH	N Value 20 40 60 80 / Shear Strength 0.1 0.2 MPa	Organic Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Natural Unit Weight kN/m³
		brown, moist, **SANDY SILT**, some clay, trace gravel; FILL		0	○			
				1	○			
		brown, moist, **CLAYEY SILT**, trace sand, trace gravel, limestone fragments; probable FILL	1.52	2	○			
		brown, moist, **SANDY SILT**, trace clay, trace gravel; probable FILL	2.29		65/305 mm ○			
		END OF BOREHOLE Notes: 1. Auger refusal at 2.7 m. 2. Borehole backfilled with bentonite upon completion.	2.74	3				

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Time	Water Level (m)	Cave Depth (m)
Upon Completion	Dry	

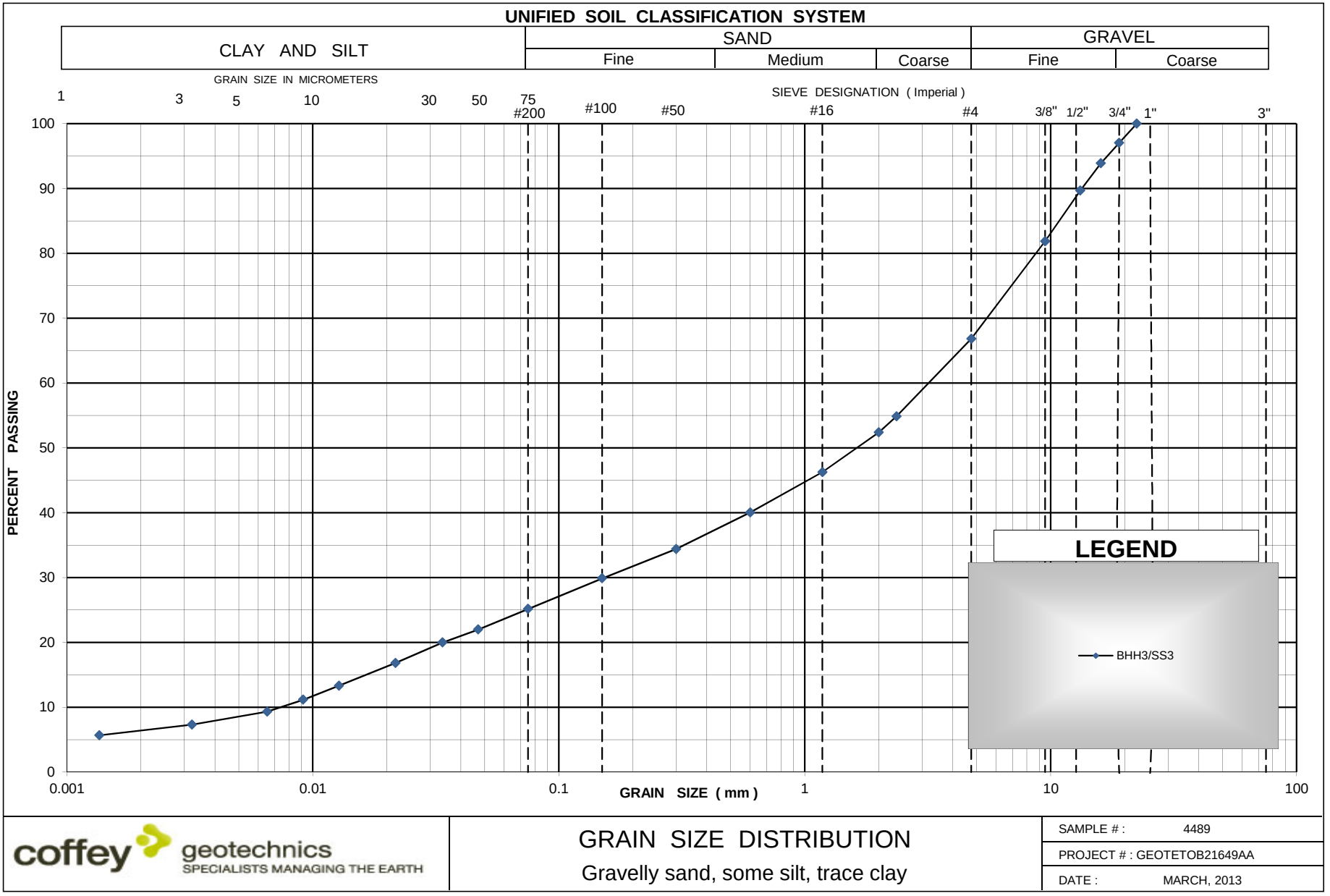


coffey geotechnics
SPECIALISTS MANAGING THE EARTH

GRAIN SIZE DISTRIBUTION

Silty sand, some clay, trace gravel

SAMPLE # :	4489
PROJECT # :	GEOTETOB21649AA
DATE :	MARCH, 2013

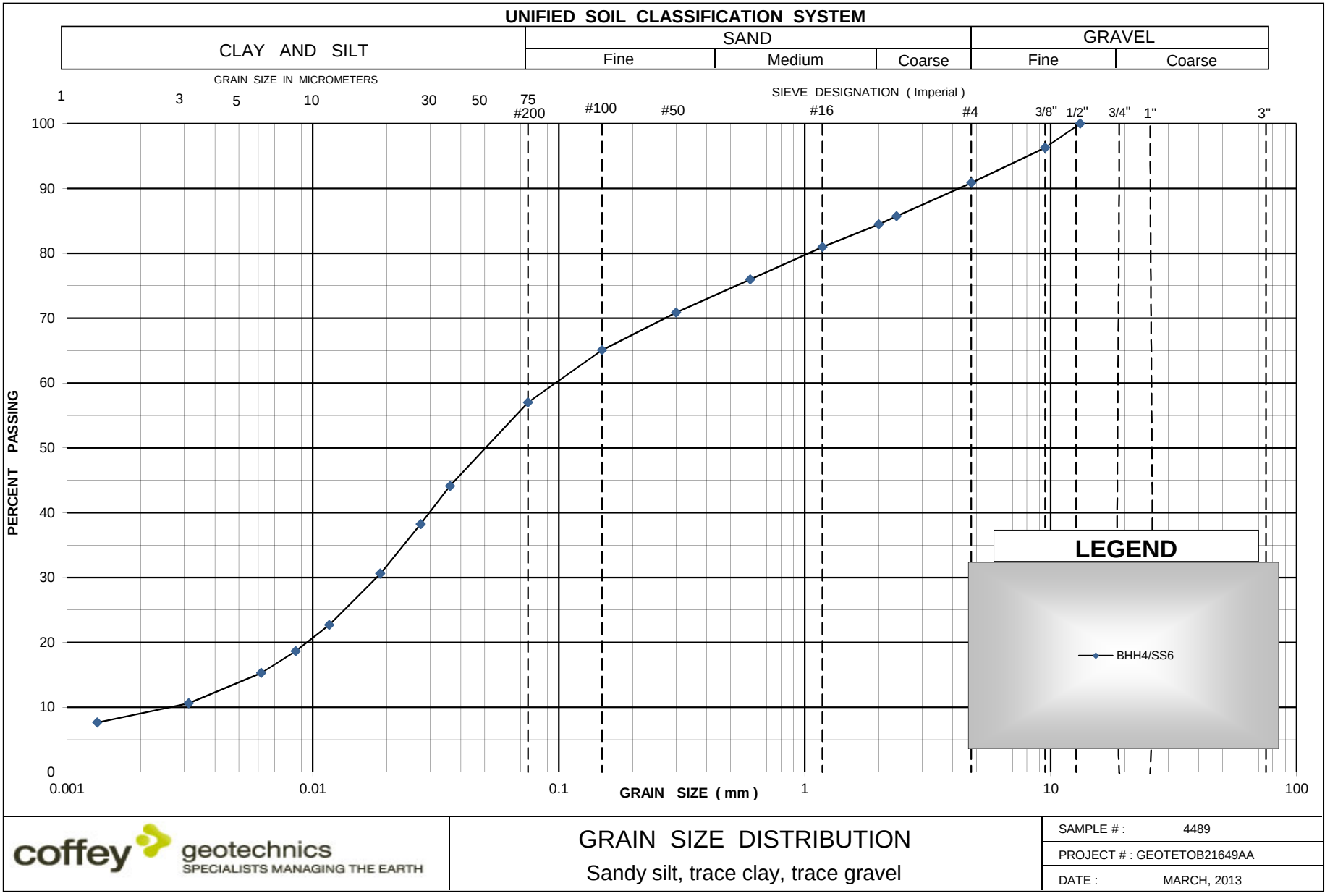


coffey geotechnics
SPECIALISTS MANAGING THE EARTH

GRAIN SIZE DISTRIBUTION

Gravelly sand, some silt, trace clay

SAMPLE # :	4489
PROJECT # :	GEOTETOB21649AA
DATE :	MARCH, 2013

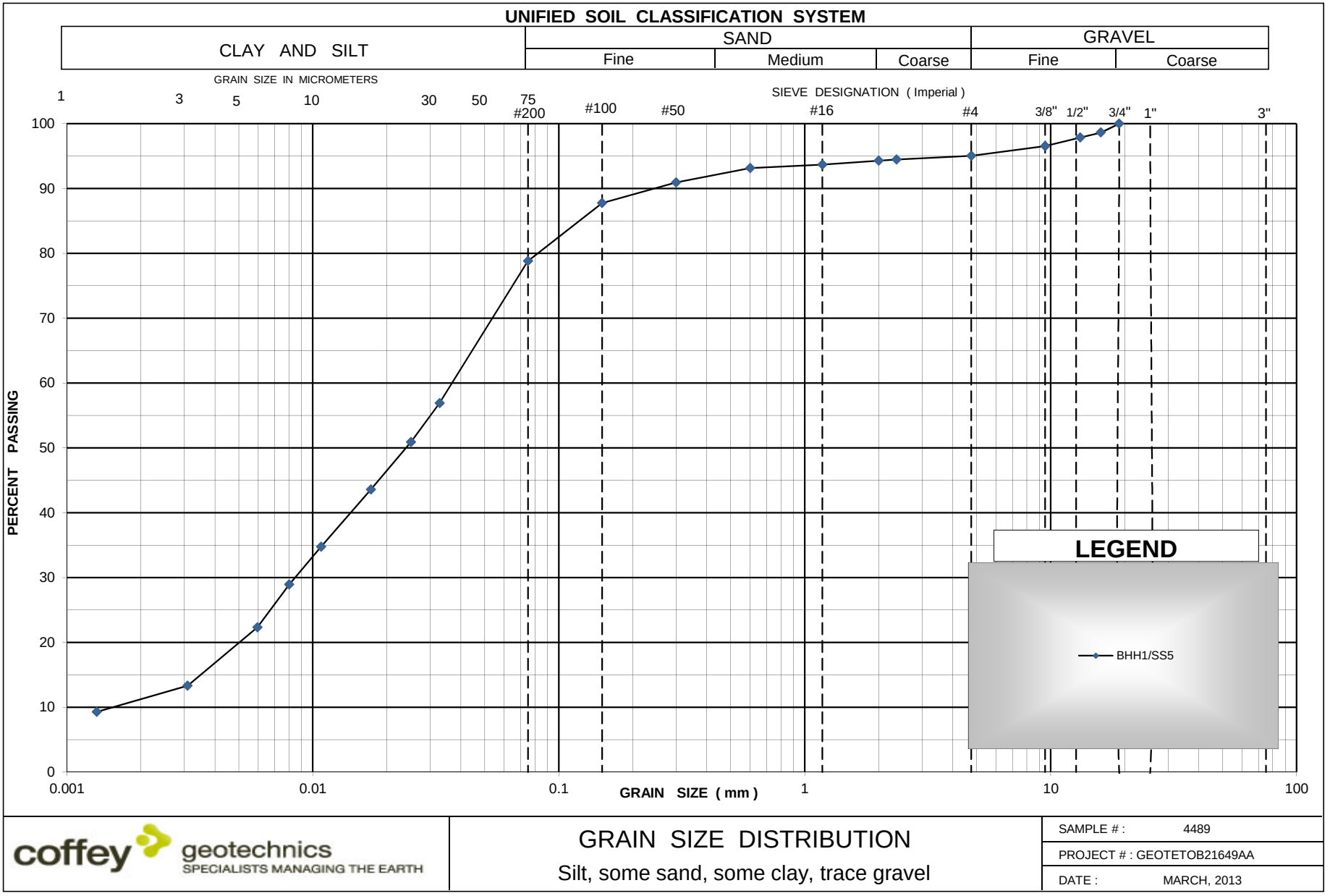


coffey geotechnics
SPECIALISTS MANAGING THE EARTH

GRAIN SIZE DISTRIBUTION

Sandy silt, trace clay, trace gravel

SAMPLE # :	4489
PROJECT # :	GEOTETOB21649AA
DATE :	MARCH, 2013

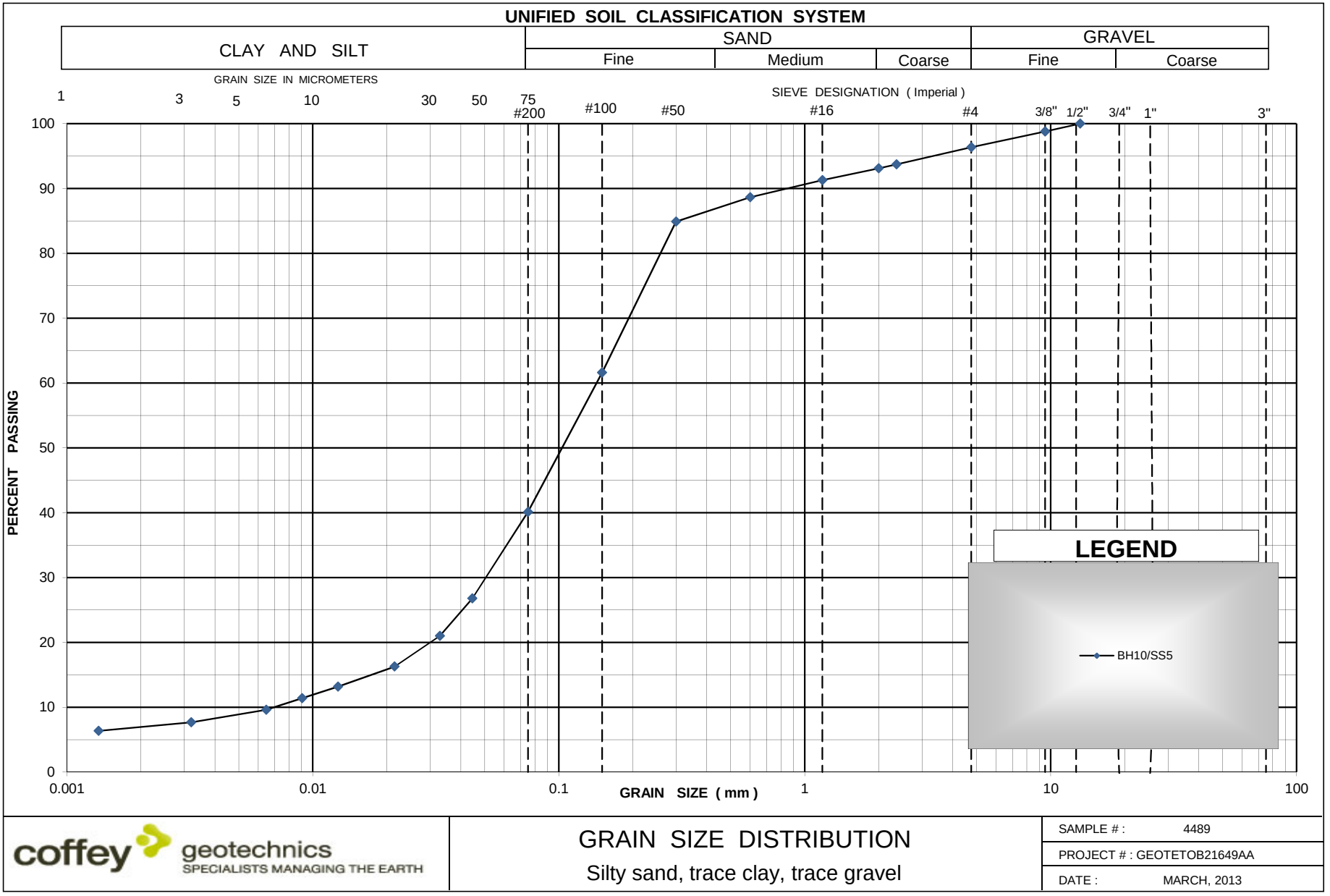


coffey geotechnics
SPECIALISTS MANAGING THE EARTH

GRAIN SIZE DISTRIBUTION

Silt, some sand, some clay, trace gravel

SAMPLE # :	4489
PROJECT # :	GEOTETOB21649AA
DATE :	MARCH, 2013



coffey geotechnics
SPECIALISTS MANAGING THE EARTH

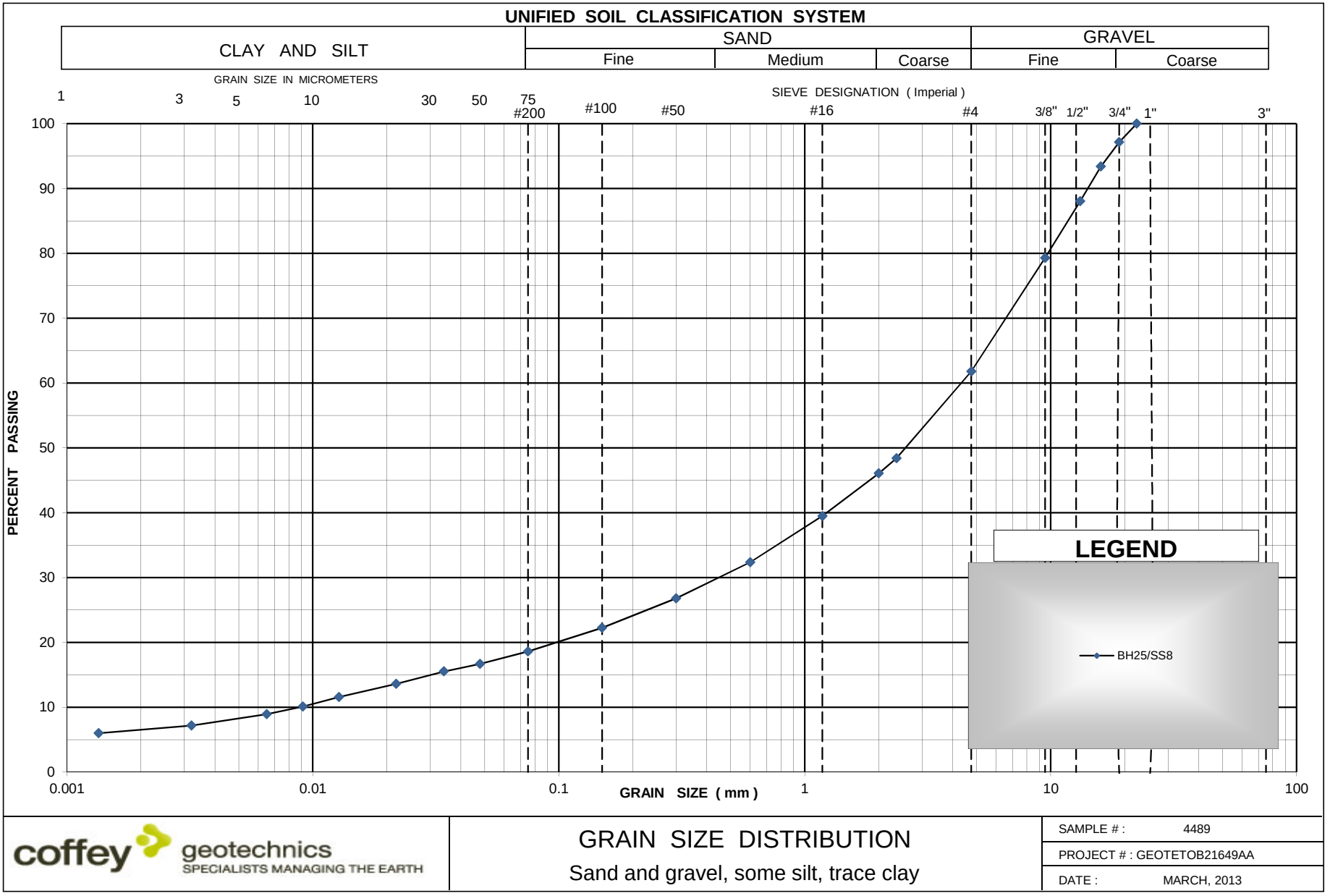
GRAIN SIZE DISTRIBUTION

Silty sand, trace clay, trace gravel

SAMPLE # : 4489

PROJECT # : GEOTETOB21649AA

DATE : MARCH, 2013



coffey geotechnics
SPECIALISTS MANAGING THE EARTH

GRAIN SIZE DISTRIBUTION

Sand and gravel, some silt, trace clay

SAMPLE # : 4489

PROJECT # : GEOTETOB21649AA

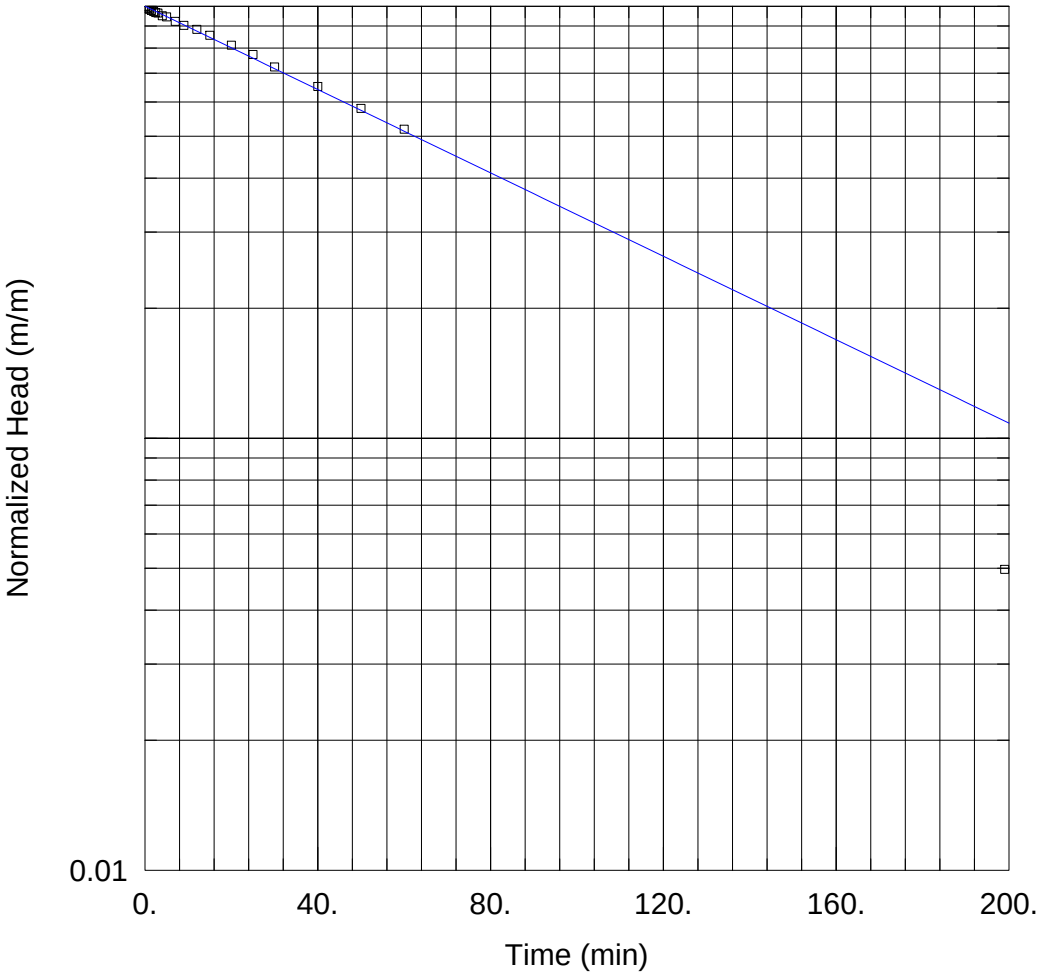
DATE : MARCH, 2013

Appendix B

In-situ Hydraulic Conductivity Testing Results

In-Situ Hydraulic Conductivity Test 1 (BH H1-WC)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 8.712E-6 cm/sec y0 = 1.811 m

AQUIFER DATA

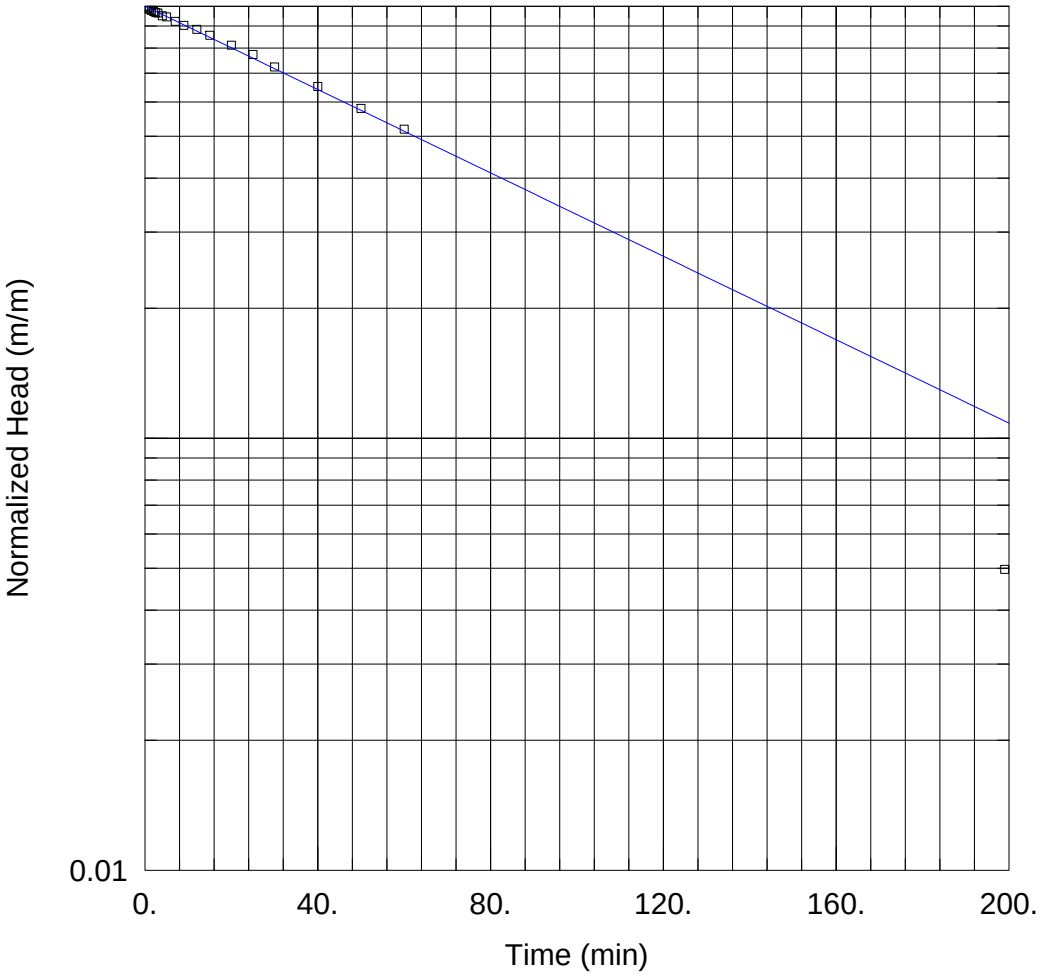
Saturated Thickness: 3.67 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H1-WC)

Initial Displacement: 1.81 m
Static Water Column Height: 3.67 m
Total Well Penetration Depth: 2.62 m
Screen Length: 1.2 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 1 (BH H1-WC)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 1.023E-5 cm/sec y0 = 1.811 m

AQUIFER DATA

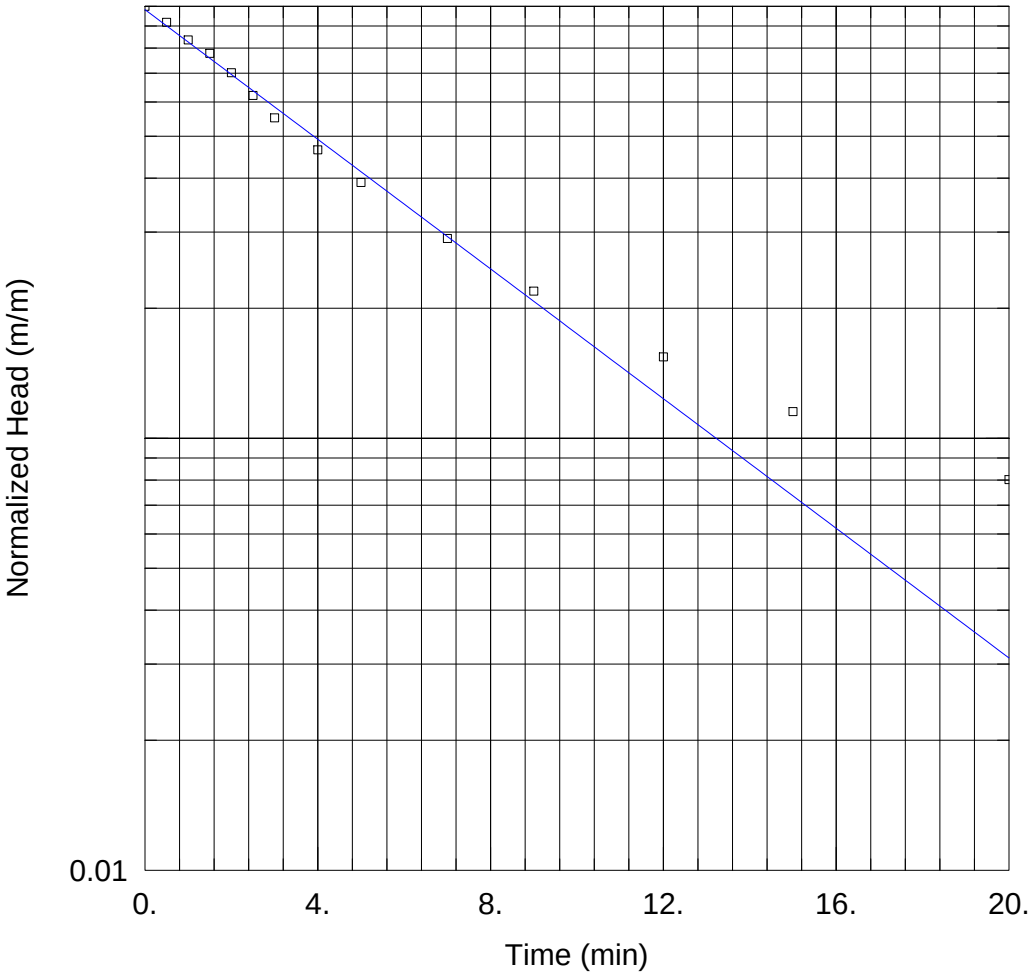
Saturated Thickness: 2.65 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H1-WC)

Initial Displacement: 1.81 m
Static Water Column Height: 3.67 m
Total Well Penetration Depth: 2.62 m
Screen Length: 1.2 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 1 (BH 25-WC)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 9.111E-5 cm/sec y0 = 4.772 m

AQUIFER DATA

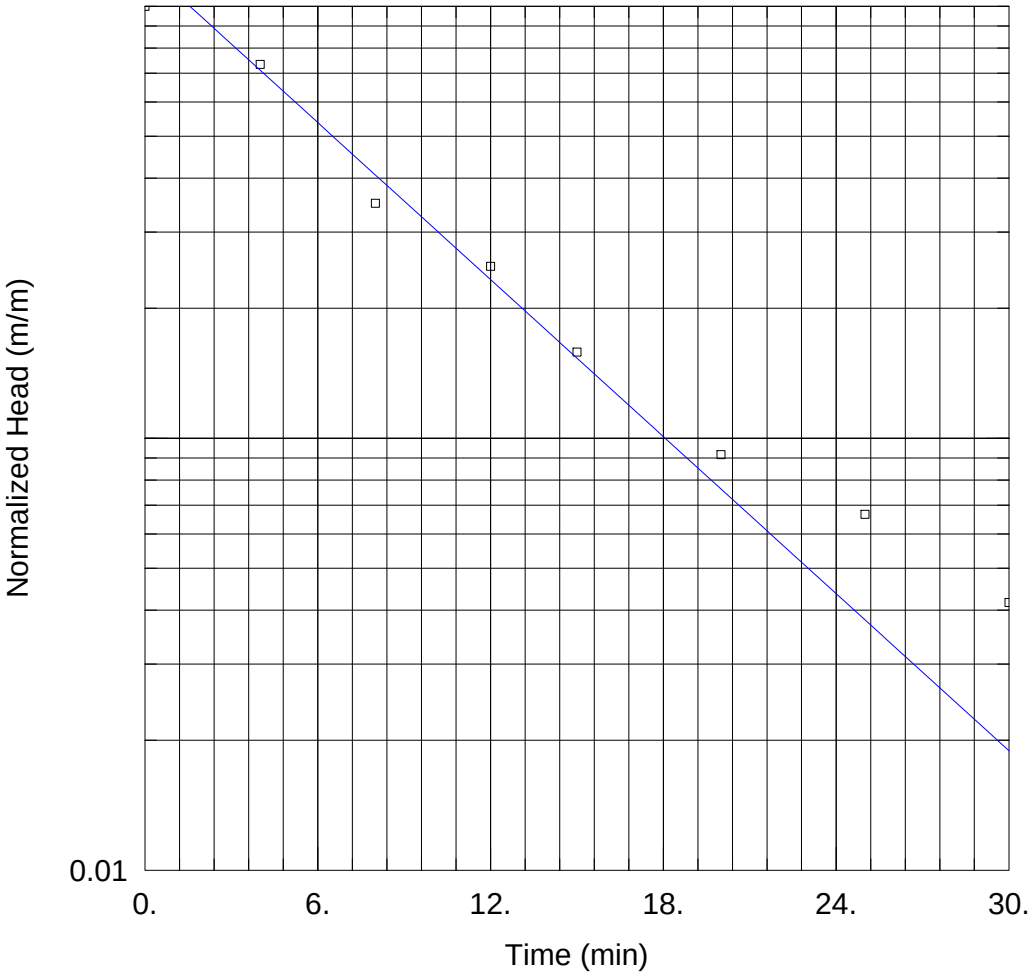
Saturated Thickness: 5.75 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 25-WC)

Initial Displacement: 4.86 m
Static Water Column Height: 5.75 m
Total Well Penetration Depth: 5.64 m
Screen Length: 2.74 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 1 (BH H1-MR)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001378 cm/sec y0 = 1.491 m

AQUIFER DATA

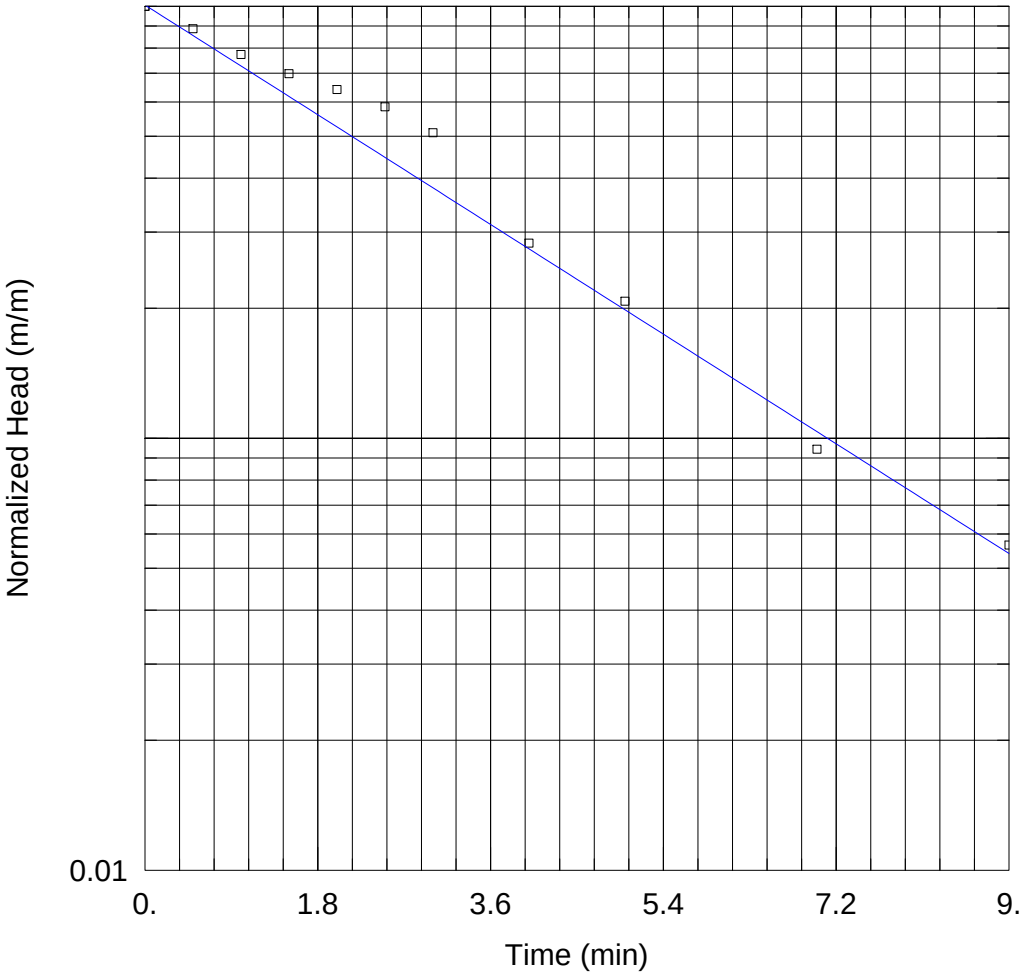
Saturated Thickness: 2.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H1-MR)

Initial Displacement: 1.2 m
Static Water Column Height: 2.9 m
Total Well Penetration Depth: 3.17 m
Screen Length: 1.22 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 1 (BH H2-MR)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0002887 cm/sec y0 = 0.2667 m

AQUIFER DATA

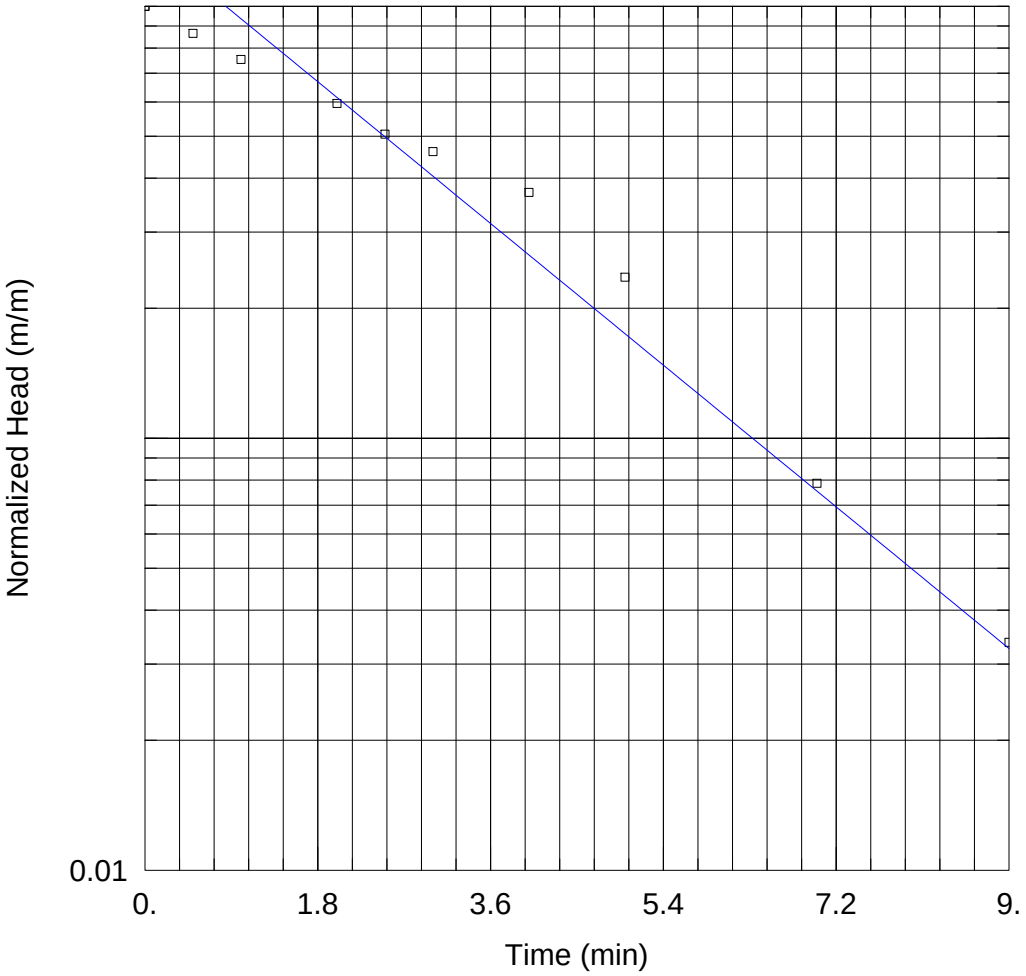
Saturated Thickness: 1.06 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H2-MR)

Initial Displacement: 0.265 m
Static Water Column Height: 1.06 m
Total Well Penetration Depth: 0.61 m
Screen Length: 0.61 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 2 (BH H2-MR)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0003746 cm/sec y0 = 0.6333 m

AQUIFER DATA

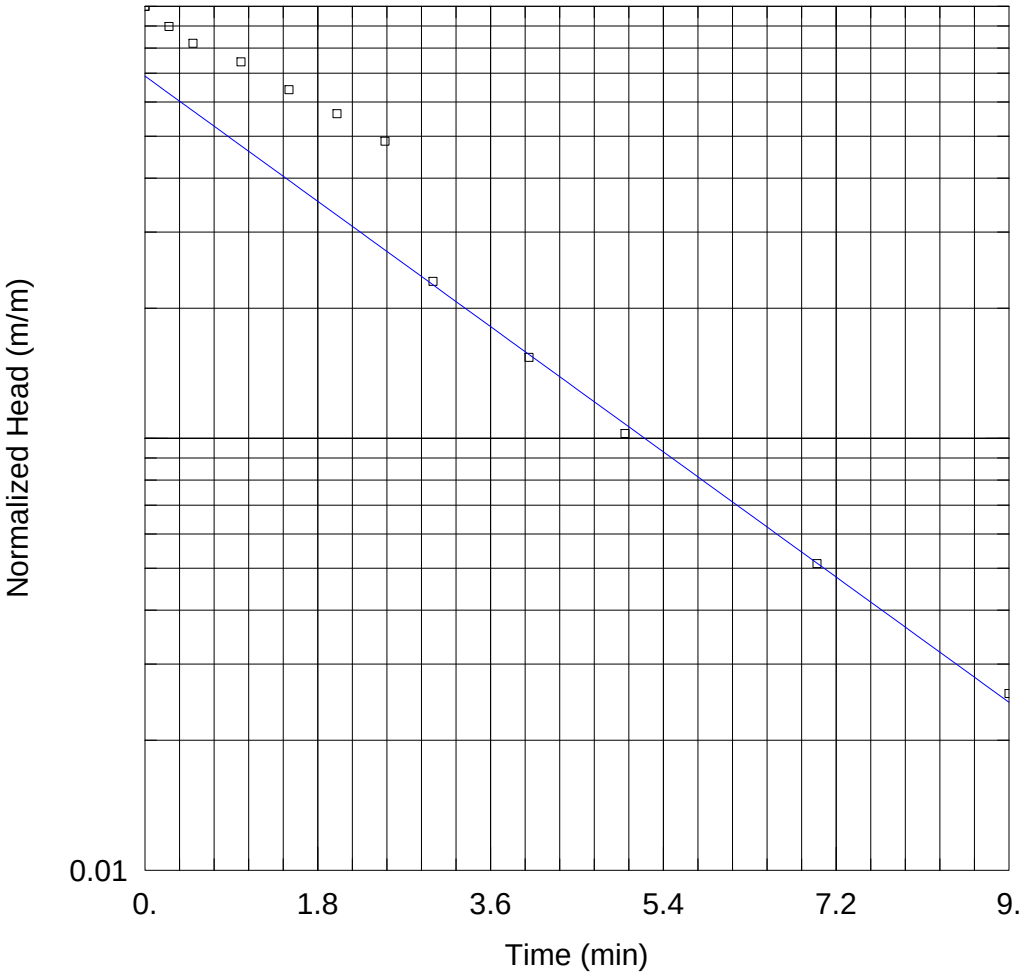
Saturated Thickness: 1.06 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H2-MR)

Initial Displacement: 0.445 m
Static Water Column Height: 1.06 m
Total Well Penetration Depth: 0.6 m
Screen Length: 0.6 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 3 (BH H2-MR)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0003244 cm/sec y0 = 0.2687 m

AQUIFER DATA

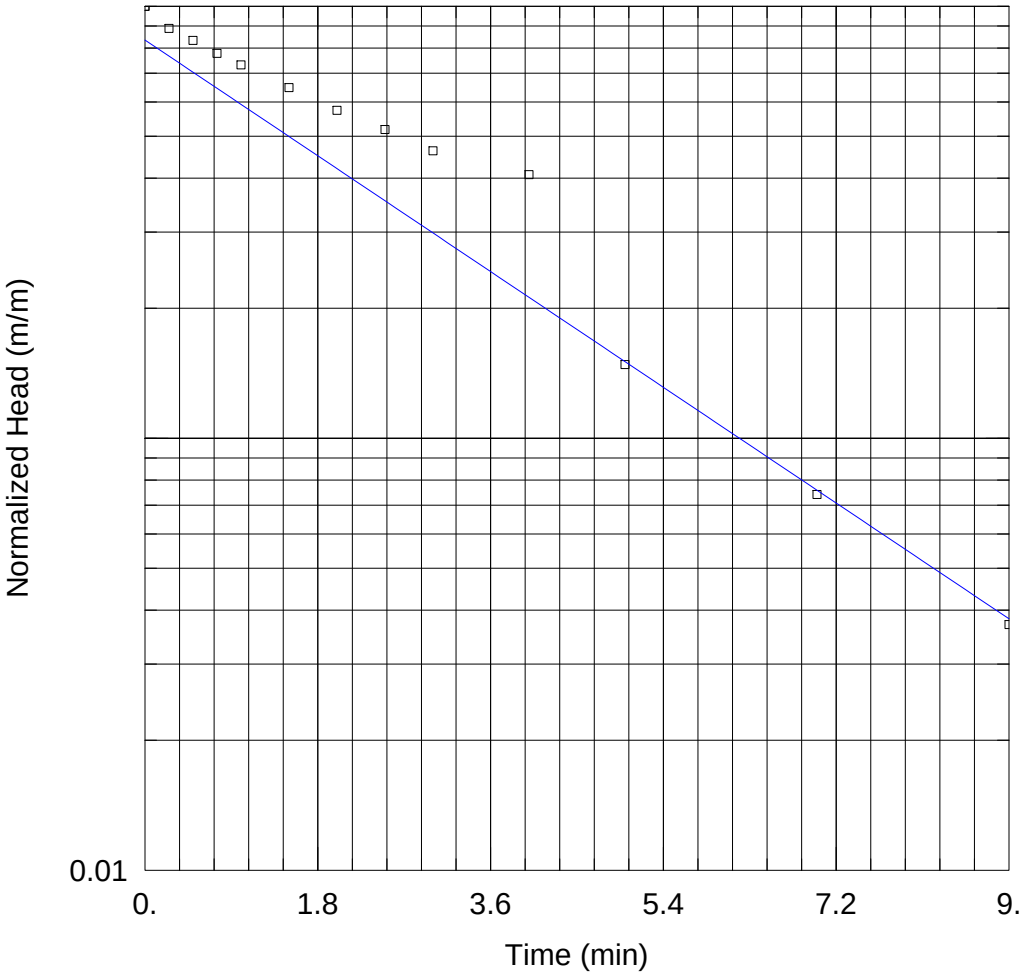
Saturated Thickness: 1.09 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H2-MR)

Initial Displacement: 0.39 m
Static Water Column Height: 1.09 m
Total Well Penetration Depth: 0.64 m
Screen Length: 0.64 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 4 (BH H2-MR)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0002998 cm/sec y0 = 0.451 m

AQUIFER DATA

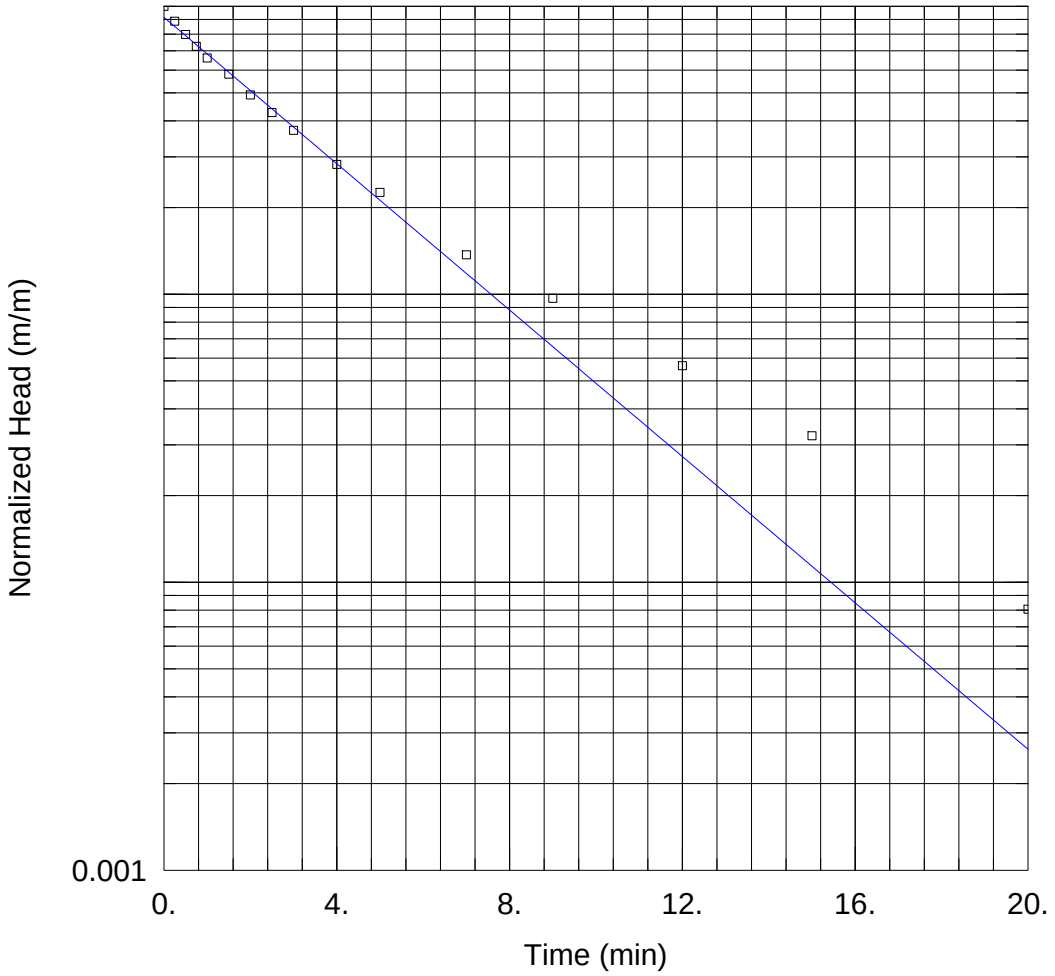
Saturated Thickness: 1.09 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H2-MR)

Initial Displacement: 0.54 m
Static Water Column Height: 1.09 m
Total Well Penetration Depth: 0.64 m
Screen Length: 0.64 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 1 (BH H3-MR)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0003343 cm/sec y0 = 1.135 m

AQUIFER DATA

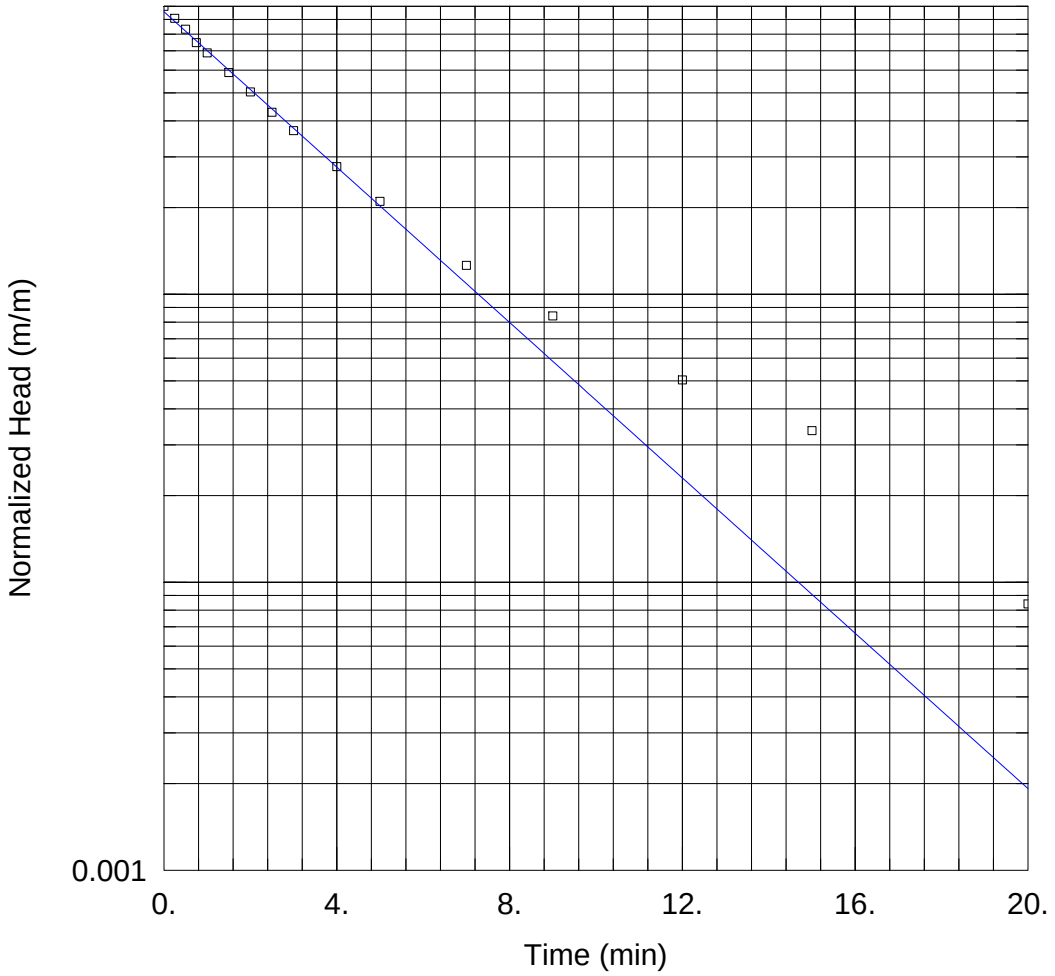
Saturated Thickness: 1.99 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H3-MR)

Initial Displacement: 1.24 m
Static Water Column Height: 1.99 m
Total Well Penetration Depth: 1.54 m
Screen Length: 0.6 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 2 (BH H3-MR)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0003548 cm/sec y0 = 1.138 m

AQUIFER DATA

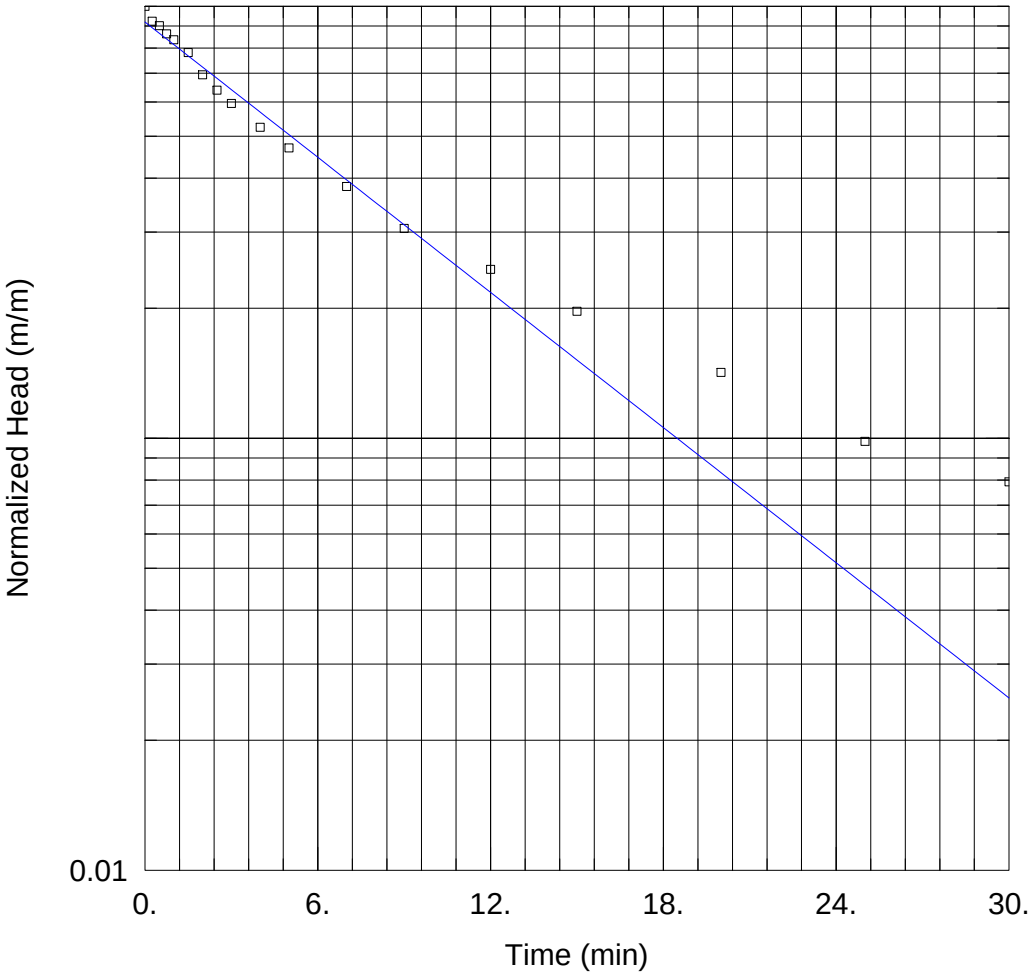
Saturated Thickness: 1.99 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H3-MR)

Initial Displacement: 1.19 m
Static Water Column Height: 1.99 m
Total Well Penetration Depth: 1.54 m
Screen Length: 0.6 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 1 (BH H4-MR)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 9.861E-5 cm/sec y0 = 1.682 m

AQUIFER DATA

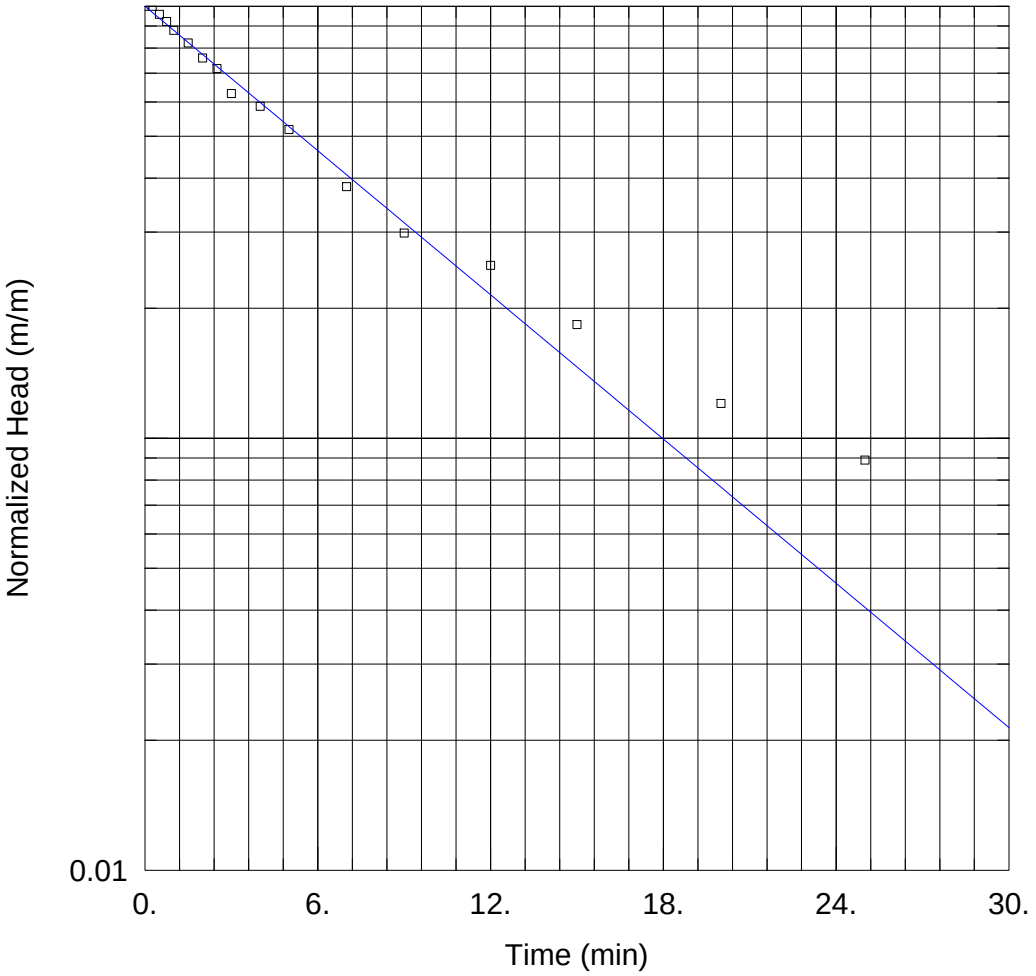
Saturated Thickness: 4.17 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H4-MR)

Initial Displacement: 1.83 m
Static Water Column Height: 4.17 m
Total Well Penetration Depth: 3.38 m
Screen Length: 1.22 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 2 (BH H4-MR)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001054 cm/sec y0 = 1.909 m

AQUIFER DATA

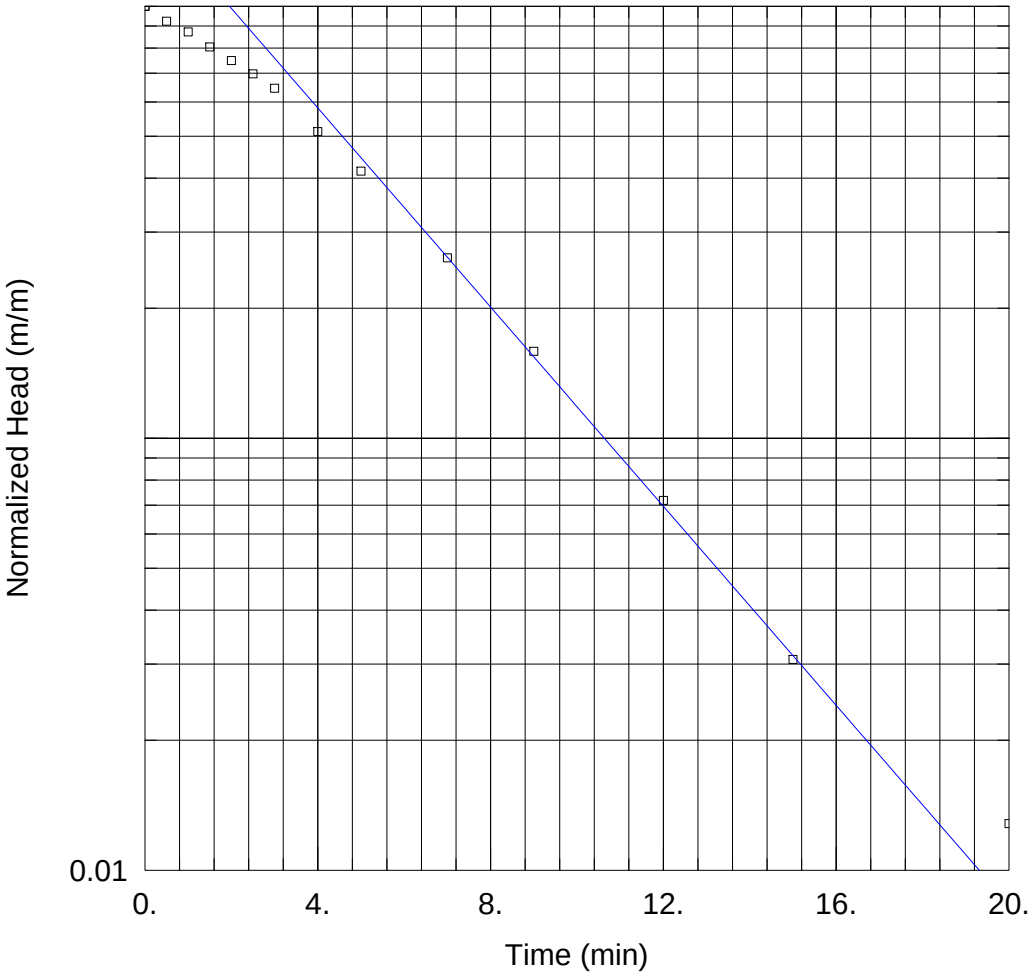
Saturated Thickness: 4.2 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H4-MR)

Initial Displacement: 1.91 m
Static Water Column Height: 4.2 m
Total Well Penetration Depth: 3.41 m
Screen Length: 1.22 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 1 (BH H1-OBL)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0002701 cm/sec y0 = 3.276 m

AQUIFER DATA

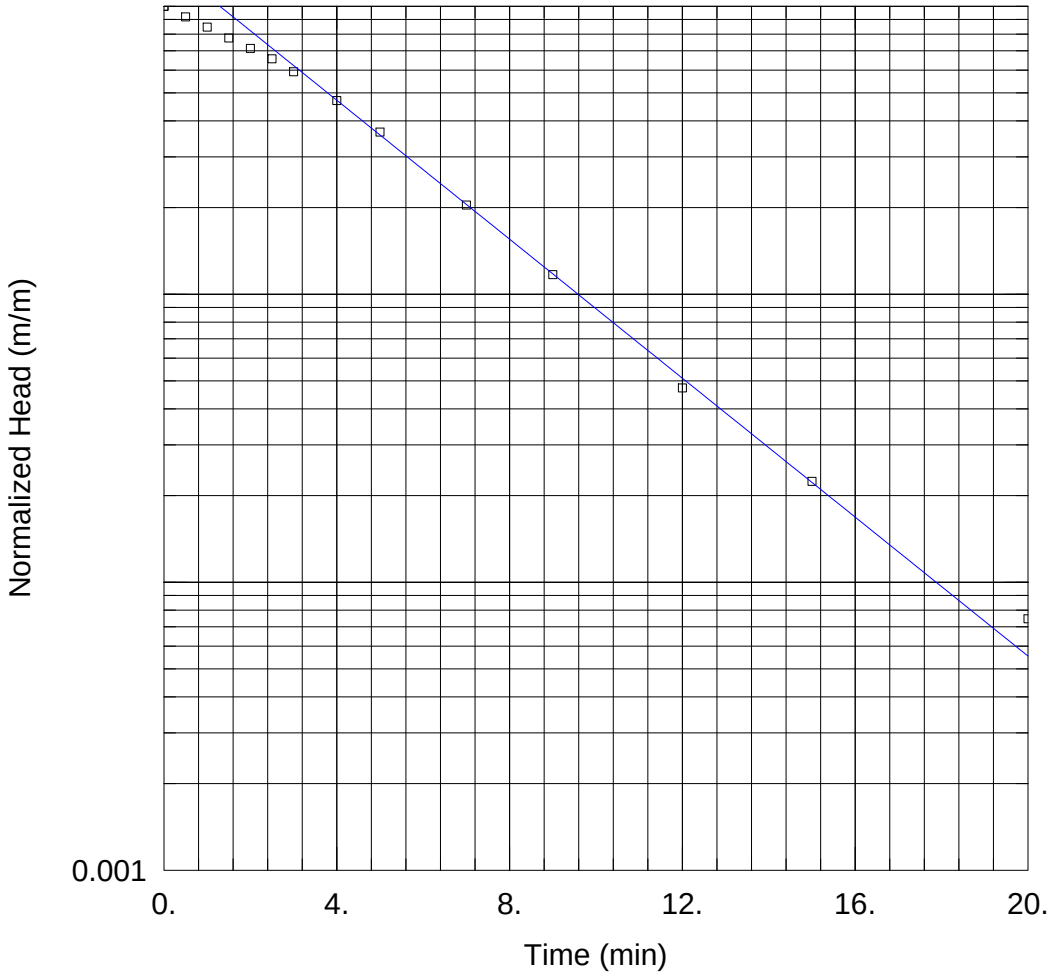
Saturated Thickness: 2.7 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H1-OBL)

Initial Displacement: 1.95 m
Static Water Column Height: 2.7 m
Total Well Penetration Depth: 3.67 m
Screen Length: 1.22 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 2 (BH H1-OBL)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0002828 cm/sec y0 = 2.879 m

AQUIFER DATA

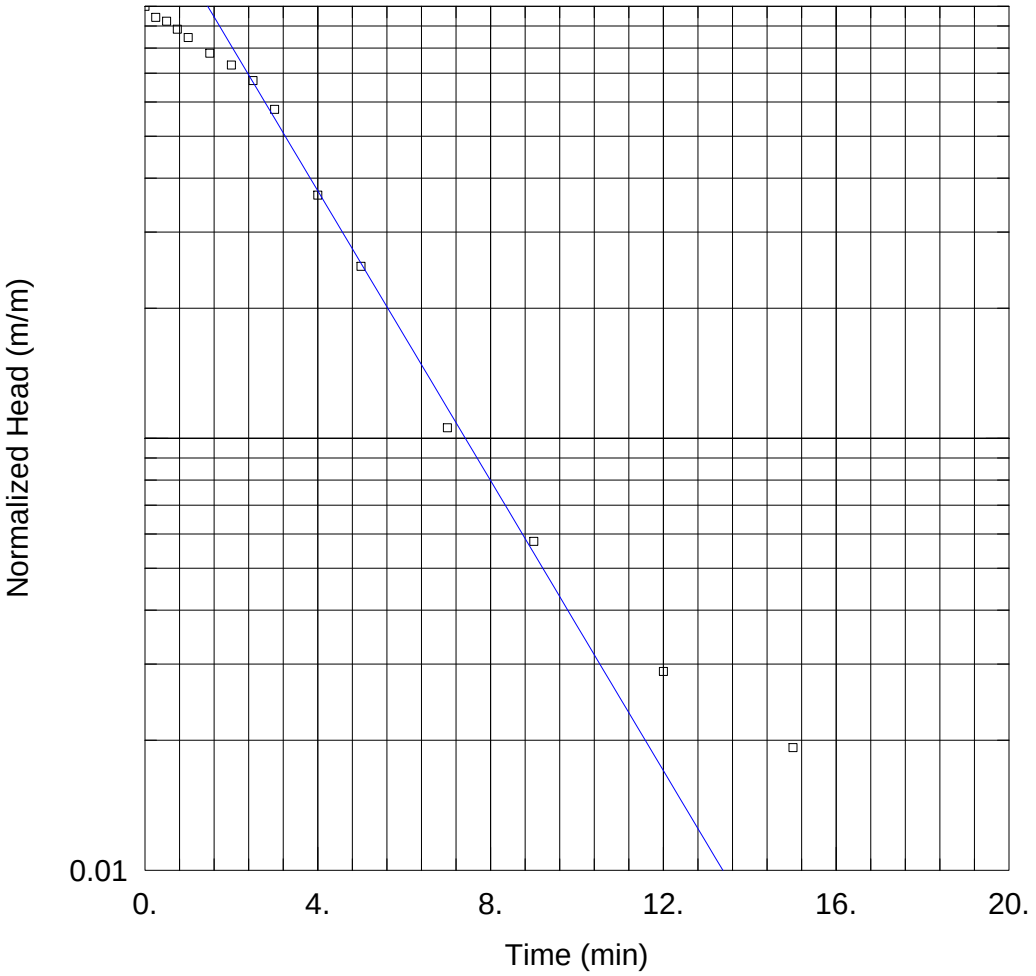
Saturated Thickness: 2.7 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH H1-OBL)

Initial Displacement: 2.01 m
Static Water Column Height: 2.7 m
Total Well Penetration Depth: 3.67 m
Screen Length: 1.22 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

In-Situ Hydraulic Conductivity Test 1 (H3-OBL)

Prepared By:	Prepared For:
Coffey Geotechnics Inc.	HDR Corp.
Project:	**Location:**
GEOTETOB21649AA	Caledon, Region of Peel



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.000281 cm/sec y0 = 1.822 m

AQUIFER DATA

Saturated Thickness: 2.38 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 25-WC)

Initial Displacement: 1.04 m
Static Water Column Height: 2.38 m
Total Well Penetration Depth: 1.75 m
Screen Length: 1.22 m
Casing Radius: 0.025 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

Appendix C

Summary Table for Water Well Records and MOE Water Well Record Sheets

Summary of Water Well Records Obtained from MOE

Project: GEOTETOB21649AA — *PRELIMINARY HYDROGEOLOGICAL INVESTIGATION*

Client: HDR Corporation for Region of Peel — *PROPOSED REGIONAL ROAD CORRIDOR IMPROVEMENTS*

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4900885	581604	4848143	1310	429.4	1	0.3	1	0.3		TOPSOIL			Bedrock	87	26.5	50	15.2	FRESH	23/05/1962	Water Supply	Domestic
					18	5.5	17	5.2		FINE SAND											
					32	9.8	14	4.3	BROWN	MEDIUM SAND	CLAY										
					78	23.8	46	14.0	BROWN	GRAVEL	CLAY										
					83	25.3	5	1.5		COARSE SAND	GRAVEL										
					87	26.5	4	1.2	BLUE	LIMESTONE											
4900917	583010	4846685	1201	393.9	58	17.7	58	17.7	GREY	LIMESTONE			Bedrock	40	12.2	23	7.0	FRESH	31/10/1957	Water Supply	Domestic
4900918	582464	4847423	1236	405.4	9	2.7	9	2.7	BROWN	CLAY	STONES		Bedrock	49	14.9	7	2.1	FRESH	15/06/1961	Water Supply	Domestic/ Livestock
					11	3.4	2	0.6	GREY	LIMESTONE											
					69	21.0	58	17.7	WHITE	SANDSTONE											
4900924	581533	4848154	1310	429.4	10	3.0	10	3.1	BROWN	CLAY			Overburden	60	18.3	42	12.8	FRESH	08/08/1967	Water Supply	Domestic
					35	10.7	25	7.6		CLAY	MEDIUM SAND										
					60	18.3	25	7.6		CLAY	MEDIUM SAND	STONES									
					62	18.9	2	0.6		GRAVEL											
4900925	580938	4848742	1314	431.0	40	12.2	40	12.2	PREVIOUSLY DUG				Bedrock	85	25.9	50	15.2	FRESH	22/11/1961	Water Supply	Domestic
					72	21.9	32	9.8		CLAY	GRAVEL										
					93	28.3	21	6.4	WHITE	LIMESTONE											
4900935	580130	4849589	1168	383.1	1	0.3	1	0.3		TOPSOIL			Bedrock	37	11.3	30	9.1	FRESH	25/05/1967	Abandoned-Supply	Not Used
					15	4.6	14	4.3	BROWN	CLAY	STONES										
					18	5.5	3	0.9		GRAVEL	MEDIUM SAND										
					37	11.3	19	5.8		LIMESTONE											
					39	11.9	2	0.6	BLUE	SHALE											
					40	12.2	1	0.3	RED	SHALE											
4900936	580155	4849605	1144	375.0	1	0.3	1	0.3		TOPSOIL			Bedrock	43	13.1	28	8.5	FRESH	05/06/1967	Water Supply	Domestic
					18	5.5	17	5.2	BROWN	CLAY	STONES										
					43	13.1	25	7.6	BROWN	LIMESTONE											
					45	13.7	2	0.6	BLUE	SHALE											
4900937	580329	4849762	1129	370.1	1	0.3	1	0.3		TOPSOIL			Bedrock	53	16.2	20	6.1	FRESH	09/06/1967	Water Supply	Domestic
					8	2.4	7	2.1	BROWN	CLAY	STONES										
					53	16.2	45	13.7	BROWN	LIMESTONE											
					56	17.1	3	0.9	BLUE	SHALE											
					57	17.4	1	0.3	RED	SHALE											
4900938	580347	4849883	1013	332.2	1	0.3	1	0.3		TOPSOIL			Bedrock	60	18.3	30	9.1	FRESH	30/06/1967	Water Supply	Domestic
					10	3.0	9	2.7	BROWN	CLAY	STONES										
					60	18.3	50	15.3	BROWN	LIMESTONE											
4900987	583428	4846171	1175	385.2	22	6.7	22	6.7		CLAY	GRAVEL		Bedrock	55	16.8	20	6.1	FRESH	01/12/1957	Water Supply	Domestic
					63	19.2	41	12.5	GREY	LIMESTONE											
4900989	582754	4844990	1145	375.3	14	4.3	14	4.3		CLAY	MEDIUM SAND	BOULDERS	Bedrock	33	10.1	18	5.5	FRESH	16/08/1967	Water Supply	Domestic
					43	13.1	29	8.8	GREY	LIMESTONE											
4900990	583164	4846473	1192	390.9	3	0.9	3	0.9		FILL			Bedrock	42	12.8	20	6.1	FRESH	14/09/1956	Water Supply	Domestic
					68	20.7	65	19.8	GREY	LIMESTONE											
4900991	582703	4846848	1213	397.8	42	12.8	42	12.8		LIMESTONE			Bedrock	30	9.1	12	3.7	FRESH	18/08/1955	Water Supply	Domestic
4900992	582590	4846537	1200	393.3	12	3.7	12	3.7	PREVIOUSLY DUG				Bedrock	50	15.2	15	4.6	FRESH	12/11/1957	Water Supply	Domestic/ Livestock
					60	18.3	48	14.6	GREY	LIMESTONE											
4900993	582501	4847077	1217	399.0	12	3.7	12	3.7	RED	CLAY	BOULDERS		Bedrock	45	13.7	8	2.4	FRESH	22/10/1965	Water Supply	Domestic
					29	8.8	17	5.2		CLAY	GRAVEL										
					52	15.8	23	7.0		LIMESTONE											
4900994	582284	4847307	1233	404.4	4	1.2	4	1.2		CLAY	STONES		Bedrock	28	8.5	10	3.0	FRESH	18/11/1957	Water Supply	Domestic
					30	9.1	26	7.9	GREY	LIMESTONE											
4900995	581982	4847580	1281	419.9	21	6.4	21	6.4	PREVIOUSLY DUG				Bedrock	55	16.8	14	4.3	FRESH	01/08/1961	Water Supply	Domestic
					49	14.9	28	8.5	BROWN	CLAY	GRAVEL	STONES									
					65	19.8	16	4.9	GREY	LIMESTONE											
4900996	581435	4847773	1322	433.3	40	12.2	40	12.2		BOULDERS	CLAY		Bedrock	95	29.0	43	13.1	FRESH	22/10/1963	Water Supply	Domestic
					55	16.8	15	4.6		MEDIUM SAND	CLAY										
					88	26.8	33	10.1	BLACK	CLAY	LIMESTONE										
					99	30.2	11	3.4	BLACK	LIMESTONE											
4900997	581405	4847707	1317	431.7	6	1.8	6	1.8		FILL			Bedrock	110	33.5	45	13.7	FRESH	17/04/1964	Water Supply	Domestic
					30	9.1	24	7.3		GRAVEL	BOULDERS										
					62	18.9	32	9.8		CLAY	GRAVEL										
					70	21.3	8	2.4		GRAVEL											
					93	28.3	23	7.0		HARDPAN	GRAVEL										
					112	34.1	19	5.8	BROWN	LIMESTONE											
4900998	581380	4847692	1316	431.6	30	9.1	30	9.2		GRAVEL	MEDIUM SAND		Bedrock	105	32.0	4	1.2	FRESH	27/01/1966	Water Supply	Domestic
					88	26.8	58	17.7		CLAY	BOULDERS										
					95	29.0	7	2.1	BLUE	SHALE											
					127	38.7	32	9.8	GREY	LIMESTONE											
4900999	581440	4847743	1318	432.2	50	15.2	50	15.3		GRAVEL	MEDIUM SAND		Bedrock	98	29.9	40	12.2	FRESH	02/02/1966	Water Supply	Domestic
					84	25.6	34	10.4		CLAY	BOULDERS										
					100	30.5	16	4.9		LIMESTONE	SHALE										
4901000	581367	4848178	1312	430.2	38	11.6	38	11.6		CLAY	MEDIUM SAND		Overburden	73	22.3	40	12.2	FRESH	22/03/1967	Water Supply	Domestic
					41	12.5	3	0.9		FINE SAND	GRAVEL										
					70	21.3	29	8.8	BROWN	FINE SAND	CLAY										
					73	22.3	3	0.9		MEDIUM SAND	GRAVEL										
					80	24.4	7	2.1		COARSE SAND	GRAVEL										

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4901001	580935	4848496	1308	429.0	24	7.3	24	7.3		PREVIOUSLY DUG											
					80	24.4	56	17.1		CLAY	GRAVEL	BOULDERS	Bedrock	80	24.4	34	10.4	FRESH	04/07/1959	Water Supply	Domestic
					91	27.7	11	3.4		GRAVEL	LIMESTONE										
4901002	580878	4848671	1309	429.1	40	12.2	40	12.2		PREVIOUSLY DUG											
					80	24.4	40	12.2		COARSE SAND	STONES		Bedrock	85	25.9	35	10.7	FRESH	03/11/1959	Water Supply	Domestic
					93	28.3	13	4.0		LIMESTONE											
4901004	580783	4848666	1312	430.3	1	0.3	1	0.3		TOPSOIL											
					20	6.1	19	5.8		GRAVEL											
					45	13.7	25	7.6		CLAY	STONES		Bedrock	75	22.9	51	15.5	FRESH	07/09/1967	Water Supply	Domestic
					55	16.8	10	3.1		HARDPAN											
					74	22.6	19	5.8		CLAY	STONES										
					80	24.4	6	1.8		LIMESTONE											
4901005	580366	4849130	1246	408.5	8	2.4	8	2.4		PREVIOUSLY DUG											
					35	10.7	27	8.2	BROWN	CLAY	STONES										
					54	16.5	19	5.8	BROWN	CLAY	GRAVEL		Bedrock	115	35.1	55	16.8	FRESH	30/12/1966	Water Supply	Domestic
					81	24.7	27	8.2	BROWN	CLAY	STONES	GRAVEL									
					122	37.2	41	12.5	BROWN	LIMESTONE											
4901006	579779	4849344	1195	391.7	27	8.2	27	8.2		GRAVEL	STONES										
					32	9.8	5	1.5		BOULDERS											
					45	13.7	13	4.0		GRAVEL	MEDIUM SAND		Bedrock	50	15.2	45	13.7	FRESH	09/03/1959	Water Supply	Domestic/ Livestock
					49	14.9	4	1.2		MEDIUM SAND											
					50	15.2	1	0.3	WHITE	LIMESTONE											
4901007	579352	4849464	1158	379.5	2	0.6	2	0.6		TOPSOIL											
					15	4.6	13	4.0		CLAY	BOULDERS		Bedrock	45	13.7	30	9.1	FRESH	04/04/1962	Water Supply	Domestic
					38	11.6	23	7.0	BROWN	CLAY											
					73	22.3	35	10.7	RED	SHALE											
4901008	579460	4849367	1172	384.4	1	0.3	1	0.3		TOPSOIL											
					18	5.5	17	5.2		STONES	GRAVEL										
					42	12.8	24	7.3	BROWN	CLAY	GRAVEL		Bedrock	60	18.3	17	5.2	FRESH	09/04/1962	Water Supply	Domestic
					54	16.5	12	3.7	RED	SHALE											
					60	18.3	6	1.8	BLUE	SHALE											
4901009	578984	4848882	1217	398.9	3	0.9	3	0.9	BLACK	TOPSOIL	MEDIUM SAND										
					38	11.6	35	10.7		GRAVEL											
					62	18.9	24	7.3	WHITE	CLAY	STONES		Bedrock	68	20.7	50	15.2	FRESH	16/07/1962	Water Supply	Public
					68	20.7	6	1.8	WHITE	CLAY	MEDIUM SAND										
					72	21.9	4	1.2		SANDSTONE											
4901010	579304	4849391	1174	384.8	25	7.6	25	7.6		HARDPAN	BOULDERS										
					36	11.0	11	3.4		GRAVEL			Bedrock	90	27.4	20	6.1	FRESH	29/03/1965	Water Supply	Domestic
					120	36.6	84	25.6	RED	SHALE											
4901011	579622	4849394	1174	385.0	12	3.7	12	3.7		PREVIOUSLY DUG											
					48	14.6	36	11.0	GREY	LIMESTONE			Bedrock	40	12.2	38	11.6	FRESH	21/06/1965	Water Supply	Domestic
4901012	579011	4849211	1176	385.7	39	11.9	39	11.9		CLAY	STONES		Overburden	39	11.9	24	7.3	FRESH	10/07/1954	Water Supply	Domestic
4901014	579240	4849728	1160	380.5	35	10.7	35	10.7		PREVIOUSLY DUG											
					147	44.8	112	34.2	BLUE	SHALE			Bedrock	140	42.7	20	6.1	FRESH	30/01/1956	Water Supply	Domestic
4901016	579285	4849524	1159	380.1	73	22.3	73	22.3		PREV. DRILLED											
					83	25.3	10	3.1	RED	SHALE			Bedrock	47	14.3	30	9.1	FRESH	24/04/1962	Water Supply	Domestic
4901017	579561	4849643	1138	373.1	1	0.3	1	0.3		TOPSOIL											
					15	4.6	14	4.3		BOULDERS	GRAVEL										
					22	6.7	7	2.1	GREY	CLAY	GRAVEL		Bedrock						10/05/1962	Abandoned-Supply	
					62	18.9	40	12.2	GREY	LIMESTONE											
					100	30.5	38	11.6	RED	SHALE											
4901018	579581	4849479	1091	357.7	5	1.5	5	1.5		GRAVEL	STONES										
					19	5.8	14	4.3	GREY	GRAVEL	CLAY										
					58	17.7	39	11.9	GREY	LIMESTONE				75	22.9	50	15.2	FRESH	16/05/1962	Water Supply	Domestic
					75	22.9	17	5.2	RED	SHALE											
4901020	579076	4849263	1178	386.3	10	3.0	10	3.1		CLAY	BOULDERS		Bedrock								
					50	15.2	40	12.2		CLAY	GRAVEL										
					58	17.7	8	2.4		GRAVEL	BOULDERS			61	18.6	24	7.3	FRESH	24/04/1964	Water Supply	Domestic
					62	18.9	4	1.2		SHALE	LIMESTONE										
4901021	578822	4848994	1183	387.9	30	9.1	30	9.2		PREVIOUSLY DUG											
					50	15.2	20	6.1		QUICKSAND											
					110	33.5	60	18.3		HARDPAN	BOULDERS		Bedrock	170	51.8	20	6.1	FRESH	06/08/1964	Water Supply	Domestic
					120	36.6	10	3.1	BLUE	CLAY											
					170	51.8	50	15.3	GREY	LIMESTONE											
4901022	579329	4849559	1149	376.6	10	3.0	10	3.1		HARDPAN	BOULDERS										
					20	6.1	10	3.1		GRAVEL			Bedrock	80	24.4	44	13.4	FRESH	02/04/1965	Water Supply	Domestic
					110	33.5	90	27.5	RED	SHALE											
4901023	578871	4849235	1149	376.8	45	13.7	45	13.7		GRAVEL											
					66	20.1	21	6.4	GREY	CLAY			Overburden	68	20.7	3	0.9	FRESH	18/11/1965	Water Supply	Domestic
					70	21.3	4	1.2		BOULDERS											
4901024	579423	4849909	1206	395.3	133	40.5	133	40.6		CLAY	GRAVEL	STONES									
					270	82.3	137	41.8	RED	SHALE			Bedrock	150	45.7	80	24.4	FRESH	01/11/1967	Water Supply	Domestic

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4901025	579347	4849667	1112	364.6	3	0.9	3	0.9		TOPSOIL			Bedrock	15	4.6	8	2.4	FRESH	22/07/1967	Water Supply	Domestic
					8	2.4	5	1.5		CLAY	STONES										
					16	4.9	8	2.4		CLAY	SHALE										
4901035	582642	4844488	1146	375.7	2	0.6	2	0.6	BROWN	CLAY			Bedrock	45	13.7	8	2.4	FRESH	06/06/1959	Water Supply	Domestic
					45	13.7	43	13.1		LIMESTONE											
4901036	582457	4844427	1147	376.2	57	17.4	57	17.4	WHITE	LIMESTONE			Bedrock	50	15.2	24	7.3	FRESH	03/11/1962	Water Supply	Domestic
4901037	581806	4844212	1172	384.1	11	3.4	11	3.4		GRAVEL	CLAY		Bedrock	48	14.6	15	4.6	FRESH	04/03/1967	Water Supply	Domestic
					80	24.4	69	21.0	GREY	LIMESTONE											
4901040	581186	4844905	1206	395.4	4	1.2	4	1.2		TOPSOIL	MEDIUM SAND		Bedrock	42	12.8	10	3.0	FRESH	25/08/1958	Water Supply	Irrigation
					58	17.7	54	16.5		LIMESTONE											
4901042	581217	4844780	1201	393.6	17	5.2	17	5.2		CLAY	GRAVEL		Bedrock	35	10.7	26	7.9	FRESH	19/11/1965	Water Supply	Domestic
					66	20.1	49	14.9	GREY	LIMESTONE											
4901043	581470	4846139	1267	415.4	40	12.2	40	12.2		CLAY	GRAVEL	STONES	Bedrock	54	16.5	20	6.1	FRESH	27/12/1963	Water Supply	Irrigation
					67	20.4	27	8.2	BLACK	LIMESTONE											
4901044	579728	4846181	1324	434.0	1	0.3	1	0.3		TOPSOIL			Bedrock	160	48.8	20	6.1	FRESH	27/06/1960	Water Supply	Domestic/ Livestock
					24	7.3	23	7.0	BROWN	CLAY	GRAVEL										
					95	29.0	71	21.7	GREY	HARDPAN											
					104	31.7	9	2.7		COARSE SAND											
					155	47.2	51	15.6	GREY	CLAY											
					158	48.2	3	0.9		COARSE SAND											
					165	50.3	7	2.1	GREY	LIMESTONE											
4901045	579035	4847523	1284	421.0	70	21.3	70	21.4	BROWN	STONES	CLAY		Bedrock	126	38.4	42	12.8	FRESH	21/04/1960	Water Supply	Domestic
					102	31.1	32	9.8		HARDPAN	STONES										
					124	37.8	22	6.7	GREY	LIMESTONE											
					128	39.0	4	1.2	BROWN	CLAY	LIMESTONE										
4901046	579877	4847609	1295	424.7	10	3.0	10	3.1		CLAY			Bedrock	104	31.7	35	10.7	FRESH	05/12/1967	Water Supply	Domestic
					95	29.0	85	25.9		GRAVEL											
					104	31.7	9	2.7		SANDSTONE											
4901047	578289	4847781	1236	405.2	20	6.1	20	6.1		CLAY	MEDIUM SAND	STONES	Bedrock	25	7.6	33	10.1	FRESH	27/05/1950	Water Supply	Domestic/ Livestock
					25	7.6	5	1.5		MEDIUM SAND											
					60	18.3	35	10.7		CLAY	MEDIUM SAND	STONES									
					102	31.1	42	12.8		LIMESTONE											
4901048	578747	4848905	1192	390.8	1	0.3	1	0.3		TOPSOIL			Bedrock	82	25.0	43	13.1	FRESH	14/10/1967	Water Supply	Domestic
					55	16.8	54	16.5	BROWN	CLAY	STONES										
					58	17.7	3	0.9	BROWN	MEDIUM SAND											
					70	21.3	12	3.7	BROWN	CLAY	GRAVEL										
					87	26.5	17	5.2	BROWN	MEDIUM SAND											
					105	32.0	18	5.5	BROWN	CLAY	GRAVEL										
					107	32.6	2	0.6	RED	SHALE	STONES										
4902063	583130	4844862	1145	375.4	3	0.9	3	0.9	BROWN	TOPSOIL	MEDIUM SAND		Bedrock	34	10.4	24	7.3	FRESH	24/08/1967	Water Supply	Domestic
					12	3.7	9	2.7	BROWN	CLAY											
					32	9.8	20	6.1		GRAVEL	CLAY										
					40	12.2	8	2.4	WHITE	LIMESTONE											
4902928	580334	4849763	1133	371.5	5	1.5	5	1.5	BROWN	CLAY	STONES		Bedrock						12/02/1968	Abandoned-Supply	
					53	16.2	48	14.6	BROWN	LIMESTONE											
					58	17.7	5	1.5	RED	SHALE											
					60	18.3	2	0.6	BLUE	SHALE											
4902929	580334	4849753	1142	374.3	6	1.8	6	1.8	BROWN	CLAY	STONES		Bedrock	55	16.8	20	6.1	FRESH	14/02/1968	Water Supply	Domestic
					53	16.2	47	14.3	BROWN	LIMESTONE											
					56	17.1	3	0.9	GREY	CLAY											
					61	18.6	5	1.5	RED	CLAY											
4902947	580364	4849723	1179	386.7	1	0.3	1	0.3		TOPSOIL			Bedrock	25	7.6	8	2.4	FRESH	25/06/1968	Water Supply	Domestic
					5	1.5	4	1.2	BROWN	CLAY	STONES										
					44	13.4	39	11.9	BROWN	LIMESTONE											
					49	14.9	5	1.5	GREY	LIMESTONE											
					57	17.4	8	2.4	BLUE	SHALE											
4902948	580234	4849683	1081	354.5	1	0.3	1	0.3		TOPSOIL			Bedrock	50	15.2	30	9.1	FRESH	22/01/1968	Water Supply	Domestic
					15	4.6	14	4.3	BROWN	CLAY	STONES										
					45	13.7	30	9.2	BROWN	LIMESTONE											
					51	15.5	6	1.8	GREY	LIMESTONE											
					53	16.2	2	0.6	RED	SHALE											
4903134	581629	4848153	1312	430.1	12	3.7	12	3.7		CLAY	BOULDERS		Bedrock						23/07/1968	Water Supply	Domestic
					37	11.3	25	7.6		CLAY	MEDIUM SAND	STONES									
					67	20.4	30	9.2		MEDIUM SAND											
					69	21.0	2	0.6		LIMESTONE											
4903135	581539	4848223	1313	430.5	1	0.3	1	0.3		TOPSOIL			Bedrock						15/05/1968	Water Supply	Domestic
					73	22.3	72	22.0		CLAY	GRAVEL	BOULDERS									
					85	25.9	12	3.7	GREY	BOULDERS											
					103	31.4	18	5.5	GREY	LIMESTONE											
4903137	581254	4848523	1328	435.3	30	9.1	30	9.2		MEDIUM SAND	BOULDERS		Bedrock						29/10/1968	Water Supply	Domestic
					80	24.4	50	15.3		CLAY	MEDIUM SAND	STONES									
					85	25.9	5	1.5	BROWN	LIMESTONE											
4903143	579089	4849323	1174	385.1	14	4.3	14	4.3		BOULDERS			Bedrock						06/05/1968	Water Supply	Domestic
					62	18.9	48	14.6		CLAY	MEDIUM SAND	STONES									
					68	20.7	6	1.8		SHALE											

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4903144	579139	4849533	1123	368.3	12	3.7	12	3.7		FILL			Bedrock	119	36.3	70	21.3	FRESH	16/07/1968	Water Supply	Domestic
					63	19.2	51	15.6		BOULDERS											
					105	32.0	42	12.8		LIMESTONE											
					120	36.6	15	4.6	RED	SHALE											
4903148	580814	4845373	1246	408.6	44	13.4	44	13.4		CLAY	GRAVEL		Bedrock	85	25.9	15	4.6	FRESH	12/01/1968	Water Supply	Domestic
					92	28.0	48	14.6	GREY	LIMESTONE											
4903149	580394	4845883	1293	423.8	60	18.3	60	18.3		CLAY	GRAVEL		Bedrock	175	53.3	20	6.1	FRESH	23/07/1968	Water Supply	Domestic/ Livestock
					110	33.5	50	15.3		CLAY											
					125	38.1	15	4.6	BROWN	LIMESTONE											
					195	59.4	70	21.4	GREY	LIMESTONE											
4903340	581854	4847913	1286	421.7	50	15.2	50	15.3		GRAVEL	BOULDERS		Bedrock	127	38.7	20	6.1	FRESH	04/11/1969	Water Supply	Domestic/ Livestock
					128	39.0	78	23.8	GREY	LIMESTONE											
4903342	582764	4844043	1144	375.2	32	9.8	32	9.8	BROWN	CLAY	STONES		Bedrock	62	18.9	30	9.1	FRESH	26/07/1969	Water Supply	Domestic/ Livestock
					63	19.2	31	9.5	GREY	LIMESTONE											
4903373	582794	4845073	1147	376.2	1	0.3	1	0.3		TOPSOIL			Bedrock	40	12.2	14	4.3	FRESH	03/12/1969	Water Supply	Domestic
					40	12.2	39	11.9	BROWN	LIMESTONE											
4903414	578144	4848573	1182	387.5	56	17.1	56	17.1		BOULDERS	GRAVEL		Bedrock	177	53.9	45	13.7	FRESH	03/12/1969	Water Supply	Domestic/ Livestock
					64	19.5	8	2.4		GRAVEL											
					92	28.0	28	8.5	BROWN	CLAY	GRAVEL										
					98	29.9	6	1.8		GRAVEL											
					127	38.7	29	8.8		CLAY	GRAVEL										
					155	47.2	28	8.5	GREY	HARDPAN											
					158	48.2	3	0.9	BLUE	SHALE											
					177	53.9	19	5.8	GREY	LIMESTONE											
					180	54.9	3	0.9	BLUE	SHALE											
4903502	582714	4844483	1134	371.6	2	0.6	2	0.6	BROWN	TOPSOIL			Bedrock	47	14.3	23	7.0	FRESH	23/09/1970	Water Supply	Domestic
					50	15.2	48	14.6	BROWN	LIMESTONE											
4903599	581844	4848463	1324	434.0	2	0.6	2	0.6	BLACK	TOPSOIL			Bedrock	90	27.4	52	15.9	FRESH	01/06/1971	Water Supply	Domestic
					18	5.5	16	4.9	BLUE	BOULDERS	CLAY										
					60	18.3	42	12.8	BROWN	CLAY	GRAVEL										
					105	32.0	45	13.7	GREY	ROCK											
4903608	582564	4845003	1153	378.1	3	0.9	3	0.9	BLACK	TOPSOIL			Bedrock	60	18.3	10	3.0	FRESH	03/06/1971	Water Supply	Domestic
					6	1.8	3	0.9	BROWN	CLAY	GRAVEL										
					18	5.5	12	3.7	BROWN	ROCK											
					75	22.9	57	17.4	GREY	ROCK											
4903703	579614	4849823	1183	388.0	1	0.3	1	0.3		TOPSOIL			Bedrock	160	48.8	110	33.5	FRESH	04/11/1971	Water Supply	Domestic
					25	7.6	24	7.3	BROWN	CLAY	STONES										
					35	10.7	10	3.1	BROWN	CLAY	GRAVEL										
					75	22.9	40	12.2	BROWN	CLAY	STONES										
					83	25.3	8	2.4	BLUE	CLAY											
					115	35.1	32	9.8	BLUE	CLAY	ROCK										
					160	48.8	45	13.7	BROWN	ROCK											
					175	53.3	15	4.6	BLUE	CLAY	ROCK										
					215	65.5	40	12.2	RED	CLAY	ROCK										
					220	67.1	5	1.5	BLUE	CLAY	ROCK										
					255	77.7	35	10.7	RED	CLAY	ROCK										
4903764	583204	4844943	1147	376.2	9	2.7	9	2.7	BROWN	CLAY	STONES		Bedrock	85	25.9	36	11.0	FRESH	15/11/1971	Water Supply	Domestic
					58	17.7	49	14.9	GREY	LIMESTONE	CLAY										
					90	27.4	32	9.8	GREY	LIMESTONE											
4903832	579314	4849473	1163	381.5	28	8.5	28	8.5	BROWN	GRAVEL	CLAY		Bedrock	112	34.1	50	15.2	FRESH	24/05/1972	Water Supply	Domestic
					35	10.7	7	2.1	GREY	LIMESTONE	SHALE										
					90	27.4	55	16.8	BLUE	SHALE	LIMESTONE										
					118	36.0	28	8.5	GREY	LIMESTONE											
4903893	579564	4849763	1175	385.2	1	0.3	1	0.3		TOPSOIL			Bedrock	195	59.4	100	30.5	FRESH	09/12/1972	Water Supply	Domestic
					20	6.1	19	5.8	BROWN	CLAY	STONES										
					25	7.6	5	1.5	BROWN	CLAY	GRAVEL										
					40	12.2	15	4.6	BROWN	CLAY	STONES										
					58	17.7	18	5.5	GREY	CLAY	GRAVEL										
					65	19.8	7	2.1	RED	CLAY	GRAVEL										
					80	24.4	15	4.6	GREY	CLAY	GRAVEL										
					100	30.5	20	6.1	GREY	CLAY	ROCK										
					130	39.6	30	9.2	BROWN	CLAY	ROCK										
					180	54.9	50	15.3	RED	CLAY	ROCK										
					265	80.8	85	25.9	RED	CLAY											
4903964	582669	4844518	1144	375.1	7	2.1	7	2.1	BROWN	BOULDERS	CLAY		Bedrock	50	15.2	38	11.6	FRESH	14/09/1972	Water Supply	Domestic
					60	18.3	53	16.2	BROWN	LIMESTONE											
4904041	579374	4849613	1127	369.5	2	0.6	2	0.6	BROWN	TOPSOIL			Bedrock	105	32.0	40	12.2	FRESH	16/11/1972	Water Supply	Domestic
					16	4.9	14	4.3	WHITE	GRAVEL	CLAY										
					25	7.6	9	2.7	WHITE	FINE SAND	CLAY										
					32	9.8	7	2.1	WHITE	MEDIUM SAND	SHALE										
					47	14.3	15	4.6	GREY	CLAY	SAND										
					57	17.4	10	3.1	GREY	CLAY	LIMESTONE										
					92	28.0	35	10.7	GREY	LIMESTONE	CLAY										
					180	54.9	88	26.8	RED	SHALE											

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4904255	579712	4849856	1187	389.3	25	7.6	25	7.6	BROWN	CLAY	STONES		Bedrock	120	36.6	75	22.9	FRESH	16/05/1973	Water Supply	Domestic/ Livestock
					35	10.7	10	3.1	BROWN	CLAY	STONES	SAND									
					60	18.3	25	7.6	BROWN	CLAY	GRAVEL										
					65	19.8	5	1.5	RED	CLAY	STONES										
					90	27.4	25	7.6	BLUE	SHALE											
					125	38.1	35	10.7	BROWN	ROCK											
					180	54.9	55	16.8	RED	SHALE											
4904256	579882	4849907	1113	365.0	1	0.3	1	0.3		TOPSOIL			Bedrock	150	45.7	105	32.0	FRESH	07/04/1973	Water Supply	Domestic
					40	12.2	39	11.9	BROWN	CLAY	SAND	STONES									
					75	22.9	35	10.7	BROWN	CLAY	SAND	GRAVEL									
					80	24.4	5	1.5	GREY	CLAY	SAND	GRAVEL									
					95	29.0	15	4.6	GREY	ROCK											
					150	45.7	55	16.8	BROWN	ROCK											
					228	69.5	78	23.8	RED	SHALE											
4904405	579572	4846935	1308	429.0	1	0.3	1	0.3		TOPSOIL			Bedrock	156	47.5	45	13.7	FRESH	26/08/1974	Water Supply	Domestic
					20	6.1	19	5.8	BROWN	CLAY	STONES										
					95	29.0	75	22.9	BROWN	CLAY	SAND	GRAVEL									
					145	44.2	50	15.3	BROWN	CLAY											
					149	45.4	4	1.2	BROWN	CLAY	GRAVEL										
					207	63.1	58	17.7	GREY	ROCK											
4904407	578846	4848676	1207	395.7	1	0.3	1	0.3	BROWN	TOPSOIL			Overburden	55	16.8	40	12.2	FRESH	23/07/1974	Water Supply	Domestic
					30	9.1	29	8.8	BROWN	GRAVEL	SAND	BOULDERS									
					32	9.8	2	0.6	GREY	GRAVEL											
					52	15.8	20	6.1	BROWN	GRAVEL	SAND	BOULDERS									
					55	16.8	3	0.9	GREY	GRAVEL											
4904488	580349	4849567	1213	397.8	30	9.1	30	9.2	BROWN	CLAY	SAND		Bedrock	38	11.6	28	8.5	FRESH	29/09/1974	Water Supply	Domestic
					38	11.6	8	2.4	BROWN	LIMESTONE											
4904489	580624	4849458	1249	409.6	22	6.7	22	6.7	BROWN	SAND	BOULDERS	GRAVEL	Bedrock	29	8.8	15	4.6	FRESH	05/09/1974	Water Supply	Domestic
					25	7.6	3	0.9	BROWN	SANDSTONE											
					30	9.1	5	1.5	BROWN	LIMESTONE											
4904555	579438	4849307	1180	386.8	3	0.9	3	0.9	BROWN	TOPSOIL			Bedrock	43	13.1	9	2.7	FRESH	09/04/1974	Water Supply	Domestic
					28	8.5	25	7.6	BROWN	CLAY	BOULDERS										
					43	13.1	15	4.6	WHITE	GRAVEL	SAND										
					48	14.6	5	1.5	WHITE	LIMESTONE											
4904573	581351	4848411	1322	433.5	21	6.4	21	6.4	BROWN	CLAY	BOULDERS		Bedrock	77	23.5	53	16.2	FRESH	17/09/1974	Water Supply	Domestic
					53	16.2	32	9.8	BROWN	GRAVEL	CLAY										
					72	21.9	19	5.8	GREY	SAND											
					80	24.4	8	2.4	GREY	LIMESTONE											
4904661	580509	4849246	1251	410.0	18	5.5	18	5.5	BROWN	CLAY	BOULDERS		Bedrock	44	13.4	39	11.9	FRESH	07/05/1975	Water Supply	Domestic
					41	12.5	23	7.0	BROWN	SAND											
					62	18.9	21	6.4	GREY	LIMESTONE											
4904662	580648	4849216	1261	413.3	1	0.3	1	0.3	BROWN	TOPSOIL			Bedrock	120	36.6	60	18.3	FRESH	15/05/1975	Water Supply	Domestic
					27	8.2	26	7.9	BROWN	SAND	BOULDERS										
					89	27.1	62	18.9	GREY	SAND											
					136	41.5	47	14.3	BROWN	LIMESTONE											
4904689	580618	4849631	1239	406.3	32	9.8	32	9.8		PREV. DRILLED			Bedrock	35	10.7	24	7.3	FRESH	20/03/1975	Water Supply	Domestic
					45	13.7	13	4.0	WHITE	LIMESTONE											
4904724	580682	4849561	1254	411.3	45	13.7	45	13.7		PREV. DRILLED			Bedrock	40	12.2	32	9.8	FRESH	12/07/1975	Water Supply	Domestic
					61	18.6	16	4.9		LIMESTONE											
4904725	580580	4849183	1251	410.2	58	17.7	58	17.7	BROWN	SAND	BOULDERS		Bedrock	62	18.9	50	15.2	FRESH	28/07/1975	Water Supply	Domestic
					81	24.7	23	7.0	BROWN	LIMESTONE											
4904726	580541	4849306	1249	409.4	39	11.9	39	11.9	BROWN	BOULDERS	SAND		Bedrock	44	13.4	35	10.7	FRESH	17/08/1975	Water Supply	Domestic
					60	18.3	21	6.4	YELLOW	LIMESTONE											
4904727	580640	4849222	1260	413.0	61	18.6	61	18.6	BROWN	SAND	STONES	BOULDERS	Bedrock	78	23.8	59	18.0	FRESH	22/08/1975	Water Supply	Domestic
					91	27.7	30	9.2	WHITE	LIMESTONE											
4904728	580555	4849441	1250	409.7	20	6.1	20	6.1	BROWN	SAND	STONES	BOULDERS	Bedrock	29	8.8	12	3.7	FRESH	27/08/1975	Water Supply	Domestic
					60	18.3	40	12.2	WHITE	LIMESTONE											
4904750	579384	4849547	1139	373.5	2	0.6	2	0.6	BROWN	TOPSOIL			Bedrock	59	18.0	30	9.1	FRESH	02/09/1975	Water Supply	Domestic
					34	10.4	32	9.8	GREY	CLAY	STONES	CLAY									
					65	19.8	31	9.5	GREY	LIMESTONE											
4904772	580617	4849298	1254	411.1	20	6.1	20	6.1	BROWN	BOULDERS	SAND	GRAVEL	Bedrock	50	15.2	46	14.0	FRESH	08/10/1975	Water Supply	Domestic
					42	12.8	22	6.7	BROWN	SAND	GRAVEL										
					44	13.4	2	0.6	WHITE	LIMESTONE											
					47	14.3	3	0.9	BROWN	SAND	GRAVEL										
					84	25.6	37	11.3	WHITE	LIMESTONE											
4904798	580670	4849458	1250	409.7	35	10.7	35	10.7	BROWN	SAND	GRAVEL	BOULDERS	Bedrock			58	17.7	FRESH	23/10/1975	Water Supply	Domestic
					63	19.2	28	8.5	BROWN	SAND	GRAVEL										
					91	27.7	28	8.5		LIMESTONE											
4904812	580541	4849360	1245	408.1	21	6.4	21	6.4	BROWN	SAND	BOULDERS		Bedrock	30	9.1	22	6.7	FRESH	27/10/1975	Water Supply	Domestic
					29	8.8	8	2.4	YELLOW	LIMESTONE											
					63	19.2	34	10.4	WHITE	LIMESTONE											
4904813	578861	4849089	1172	384.2	24	7.3	24	7.3	BROWN	SAND	BOULDERS		Overburden	98	29.9	33	10.1	FRESH	28/11/1975	Water Supply	Domestic
					78	23.8	54	16.5	GREY	SAND	GRAVEL	CLAY									
					98	29.9	20	6.1	GREY	GRAVEL	SAND										

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4904816	579434	4849486	1131	370.7	25	7.6	25	7.6	BROWN	SAND	BOULDERS		Bedrock	76	23.2	38	11.6	FRESH	23/12/1975	Water Supply	Domestic
					28	8.5	3	0.9	RED	SAND	CLAY										
					30	9.1	2	0.6	GREY	SAND	CLAY										
					33	10.1	3	0.9	RED	SAND	CLAY										
					47	14.3	14	4.3	GREY	SAND	CLAY										
					58	17.7	11	3.4	GREY	STONES	ROCK										
					78	23.8	20	6.1	GREY	ROCK											
4904854	579373	4849527	1142	374.3	20	6.1	20	6.1	BROWN	SAND	BOULDERS		Bedrock	53	16.2	18	5.5	Not stated	23/12/1975	Water Supply	Domestic
					54	16.5	34	10.4	RED	SHALE											
4904879	578914	4849123	1173	384.5	15	4.6	15	4.6	BROWN	STONES	SAND	BOULDERS	Overburden	19	5.8	5	1.5	FRESH	25/05/1976	Water Supply	Domestic
					19	5.8	4	1.2		GRAVEL	SAND										
4904913	578714	4849123	1160	380.2	118	36.0	118	36.0	BROWN	CLAY	GRAVEL		Bedrock	182	55.5	41	12.5	FRESH	21/05/1976	Water Supply	Public
					163	49.7	45	13.7	GREY	LIMESTONE	SHALE										
					182	55.5	19	5.8	RED	SHALE											
4904971	580464	4849323	1242	407.4	22	6.7	22	6.7	BROWN	SAND	BOULDERS	CLAY	Bedrock	41	12.5			FRESH	27/08/1976	Water Supply	Domestic
					60	18.3	38	11.6	WHITE	LIMESTONE											
4904973	580664	4849573	1255	411.4	32	9.8	32	9.8	BROWN	SAND	BOULDERS		Bedrock	54	16.5	34	10.4	FRESH	23/09/1976	Water Supply	Domestic
					60	18.3	28	8.5	WHITE	LIMESTONE											
4905014	580549	4849543	1242	407.2	35	10.7	35	10.7	BROWN	SAND	GRAVEL	BOULDERS	Bedrock	78	23.8	31	9.5	FRESH	13/04/1976	Water Supply	Domestic
					84	25.6	49	14.9	WHITE	LIMESTONE											
4905024	583064	4845323	1142	374.3	4	1.2	4	1.2	BROWN	CLAY	SAND	SOFT	Bedrock	64	19.5	28	8.5	FRESH	11/12/1976	Water Supply	Domestic
					18	5.5	14	4.3	RED	CLAY	SAND	BOULDERS									
					72	21.9	54	16.5	BROWN	LIMESTONE	HARD										
4905033	579164	4849523	1115	365.4	19	5.8	19	5.8		PREV. DRILLED			Bedrock	97	29.6	28	8.5	FRESH	20/12/1976	Water Supply	Domestic
					30	9.1	11	3.4	BROWN	SAND	BOULDERS										
					33	10.1	3	0.9	GREY	CLAY											
					96	29.3	63	19.2	GREY	SAND	STONES	CLAY									
					130	39.6	34	10.4	GREY	SHALE	HARD										
					140	42.7	10	3.1	RED	SHALE	SOFT										
4905053	581064	4848723	1329	435.6	1	0.3	1	0.3	BROWN	TOPSOIL			Overburden	85	25.9	60	18.3	FRESH	23/07/1975	Water Supply	Domestic
					40	12.2	39	11.9		GRAVEL	BOULDERS										
					84	25.6	44	13.4		GRAVEL	PACKED										
					85	25.9	1	0.3		COARSE GRAVEL											
4905075	582264	4847623	1240	406.6	6	1.8	6	1.8	BROWN	CLAY			Bedrock	65	19.8	10	3.0	FRESH	24/09/1976	Water Supply	Domestic
					65	19.8	59	18.0	GREY	LIMESTONE											
4905085	578914	4849273	1157	379.2	14	4.3	14	4.3	BROWN	OVERBURDEN	CLAY	STONES	Bedrock	150	45.7	46	14.0	MINERIAL	27/09/1976	Water Supply	Domestic
					30	9.1	16	4.9	BROWN	SAND	CLAY										
					82	25.0	52	15.9	BROWN	CLAY											
					115	35.1	33	10.1	GREY	CLAY	STONES										
					145	44.2	30	9.2	GREY	SHALE	LAYERED										
					195	59.4	50	15.3	RED	SHALE											
4905174	580414	4849423	1236	405.2	24	7.3	24	7.3	BROWN	SAND	BOULDERS		Bedrock	39	11.9	21	6.4	FRESH	23/06/1977	Water Supply	Domestic
					63	19.2	39	11.9	WHITE	LIMESTONE	HARD										
4905176	580784	4849463	1258	412.6	6	1.8	6	1.8	BROWN	SAND			Bedrock	43	13.1	39	11.9	FRESH	27/07/1977	Water Supply	Domestic
					30	9.1	24	7.3	BROWN	SAND	BOULDERS	CLAY									
					32	9.8	2	0.6	BROWN	SAND	CLAY										
					35	10.7	3	0.9	BROWN	SANDSTONE											
					42	12.8	7	2.1	BROWN	LIMESTONE	LIGHT-COLOURED										
					71	21.6	29	8.8	WHITE	LIMESTONE											
4905259	579114	4849323	1177	385.9	57	17.4	57	17.4		GRAVEL	BOULDERS		Bedrock	135	41.1	59	18.0	FRESH	29/10/1977	Water Supply	Domestic
					92	28.0	35	10.7		CLAY	STONES										
					99	30.2	7	2.1		SHALE											
					131	39.9	32	9.8		DOLOMITE	SHALE										
					145	44.2	14	4.3		SANDSTONE											
					200	61.0	55	16.8	RED	SHALE											
4905271	579364	4849623	1125	368.9	22	6.7	22	6.7	BROWN	CLAY	SAND	BOULDERS	Bedrock	77	23.5	45	13.7	FRESH	13/10/1977	Water Supply	Domestic
					53	16.2	31	9.5	GREY	CLAY	STONES	LAYERED									
					92	28.0	39	11.9	GREY	SHALE	SOAPSTONE	LAYERED									
					95	29.0	3	0.9	RED	SHALE											
4905293	579464	4846623	1312	430.2	13	4.0	13	4.0	BROWN	CLAY	STONES		Bedrock	140	42.7	24	7.3	FRESH	01/10/1977	Water Supply	Domestic
					27	8.2	14	4.3	BROWN	COARSE GRAVEL	COARSE SAND	STONES									
					30	9.1	3	0.9	BROWN	MEDIUM SAND											
					97	29.6	67	20.4	BROWN	COARSE GRAVEL	CLAY	STONES									
					115	35.1	18	5.5	GREY	HARDPAN	ROCK	LAYERED									
					150	45.7	35	10.7	GREY	ROCK											
4905347	580364	4849473	1218	399.3	16	4.9	16	4.9	BROWN	SAND	CLAY	BOULDERS	Bedrock	58	17.7	22	6.7	FRESH	10/05/1978	Water Supply	Domestic
					61	18.6	45	13.7	BROWN	LIMESTONE											

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4905356	579064	4849123	1192	390.8	3	0.9	3	0.9	GREY	CLAY	STONES	SOFT	Bedrock	170	51.8	55	16.8	FRESH	05/05/1978	Water Supply	Domestic
					10	3.0	7	2.1	BROWN	STONES	SAND	CLAY									
					21	6.4	11	3.4	BROWN	SAND	CLAY	BOULDERS									
					75	22.9	54	16.5	GREY	CLAY	SAND	BOULDERS									
					77	23.5	2	0.6	RED	CLAY	SAND	STONES									
					98	29.9	21	6.4	BLUE	CLAY	SAND	HARD									
					105	32.0	7	2.1	GREY	SHALE	CLAY	SAND									
					135	41.1	30	9.2	GREY	LIMESTONE	SHALE	LAYERED									
					138	42.1	3	0.9	RED	SANDSTONE	SOFT										
					140	42.7	2	0.6	GREY	SANDSTONE	HARD										
					173	52.7	33	10.1	RED	SHALE	SANDSTONE	SOFT									
4905467	581264	4844773	1202	394.1	28	8.5	28	8.5	BROWN	OVERBURDEN	GRAVEL	STONES	Bedrock	75	22.9	34	10.4	FRESH	31/07/1978	Water Supply	Domestic
					80	24.4	52	15.9	GREY	ROCK	LIMESTONE										
4905490	579514	4849523	1103	361.7	48	14.6	48	14.6	BROWN	COARSE GRAVEL	STONES		Bedrock	155	47.2	57	17.4	Not stated	18/10/1977	Water Supply	Domestic
					80	24.4	32	9.8	GREY	CLAY	STONES										
					95	29.0	15	4.6	GREY	CLAY	SOFT										
					112	34.1	17	5.2	GREY	CLAY	ROCK										
					143	43.6	31	9.5	GREY	ROCK	CLAY										
					180	54.9	37	11.3	RED	SHALE											
4905494	581764	4844523	1175	385.2	4	1.2	4	1.2	BROWN	CLAY			Bedrock	128	39.0	20	6.1	FRESH	22/06/1978	Water Supply	Livestock
					24	7.3	20	6.1	GREY	DOLOMITE	FRACTURED										
					138	42.1	114	34.8	GREY	DOLOMITE											
4905579	581064	4848623	1324	434.1	85	25.9	85	25.9		CLAY	BOULDERS	SAND	Bedrock	121	36.9	49	14.9	FRESH	18/05/1979	Water Supply	Domestic
					131	39.9	46	14.0		LIMESTONE											
4905619	578914	4849273	1157	379.2	26	7.9	26	7.9	BROWN	CLAY	HARD		Bedrock	150	45.7	52	15.9	FRESH	02/11/1979	Water Supply	Domestic
					95	29.0	69	21.0	GREY	CLAY	STONES										
					134	40.8	39	11.9	GREY	SHALE	STONES										
					180	54.9	46	14.0	RED	SHALE											
4905690	582814	4844723	1137	372.9	18	5.5	18	5.5	BROWN	SAND	GRAVEL		Bedrock	35	10.7	15	4.6	FRESH	20/11/1977	Water Supply	Domestic
					42	12.8	24	7.3	BROWN	LIMESTONE											
4905766	579514	4846673	1307	428.6	55	16.8	55	16.8	BROWN	GRAVEL	STONES	CLAY	Bedrock	175	53.3	39	11.9	FRESH	20/04/1980	Water Supply	Domestic
					120	36.6	65	19.8	BROWN	FINE GRAVEL	COARSE SAND	CLAY									
					145	44.2	25	7.6	GREY	CLAY	STONES										
					180	54.9	35	10.7	GREY	STONES	LIMESTONE										
4905817	580814	4848973	1325	434.3	79	24.1	79	24.1	BROWN	CLAY	STONES		Bedrock	114	34.7	75	22.9	FRESH	24/09/1981	Water Supply	Domestic
					87	26.5	8	2.4	BROWN	STONES											
					115	35.1	28	8.5	GREY	STONES											
4905861	583464	4846273	1181	387.1	5	1.5	5	1.5	BROWN	CLAY	STONES		Bedrock	60	18.3	19	5.8	FRESH	02/07/1981	Water Supply	Domestic
					76	23.2	71	21.7	GREY	LIMESTONE											
4905863	578864	4849023	1174	384.9	12	3.7	12	3.7		GRAVEL	BOULDERS		Bedrock	140	42.7	60	18.3	FRESH	19/06/1981	Water Supply	Domestic
					36	11.0	24	7.3		SAND	STONES										
					50	15.2	14	4.3		GRAVEL	BOULDERS										
					85	25.9	35	10.7		CLAY	STONES										
					98	29.9	13	4.0	GREY	CLAY	SAND	SILTY									
					114	34.7	16	4.9	GREY	CLAY	STONES										
					126	38.4	12	3.7	BLUE	SHALE											
					155	47.2	29	8.8	GREY	DOLOMITE	SHALE										
					172	52.4	17	5.2		SANDSTONE											
4905867	578814	4848873	1203	394.3	20	6.1	20	6.1		BOULDERS	GRAVEL	CLAY	Overburden	82	25.0	30	9.1	FRESH	20/08/1981	Water Supply	Domestic
					67	20.4	47	14.3		FINE SAND											
					79	24.1	12	3.7		CLAY	BOULDERS										
					83	25.3	4	1.2		STONES											
4905906	581514	4847623	1302	426.8	61	18.6	61	18.6	WHITE	BOULDERS	SAND		Bedrock	110	33.5	35	10.7	SULPHUR	06/08/1981	Water Supply	Domestic
					67	20.4	6	1.8	BROWN	LIMESTONE											
					73	22.3	6	1.8	BROWN	CLAY	BOULDERS										
					89	27.1	16	4.9	RED	CLAY	STONES										
					112	34.1	23	7.0	BLACK	STONES	HARD	VERY									
4906055	583514	4845523	1146	375.6	17	5.2	17	5.2	BROWN	CLAY	BOULDERS		Bedrock	26	7.9	18	5.5	Not stated	25/11/1982	Water Supply	Domestic
					22	6.7	5	1.5	WHITE	LIMESTONE											
					25	7.6	3	0.9	WHITE	GRAVEL	LOOSE										
					31	9.4	6	1.8	WHITE	LIMESTONE											
					36	11.0	5	1.5	WHITE	GRAVEL											
					44	13.4	8	2.4	WHITE	LIMESTONE											
4906296	581842	4848299	1312	430.3	50	15.2	50	15.3	BROWN	SAND	STONES	BOULDERS	Bedrock	75	22.9	44	13.4	FRESH	02/05/1985	Water Supply	Domestic
					55	16.8	5	1.5	BROWN	SANDSTONE	SOFT										
					59	18.0	4	1.2	BROWN	SAND	GRAVEL	BOULDERS									
					73	22.3	14	4.3	BROWN	SANDSTONE	HARD	LAYERED									
					91	27.7	18	5.5	GREY	LIMESTONE		HARD									
4906310	579338	4849346	1176	385.5	35	10.7	35	10.7	BROWN	CLAY	STONES		Overburden	40	12.2	20	6.1	FRESH	31/05/1985	Water Supply	Public
					38	11.6	3	0.9	RED	CLAY	GRAVEL										
					40	12.2	2	0.6		GRAVEL	SAND										
4906377	579397	4849397	1173	384.5	40	12.2	40	12.2		PREV. DRILLED			Bedrock	121	36.9	56	17.1	Not stated	10/10/1991	Water Supply	Domestic
					45	13.7	5	1.5	GREY	CLAY		LOOSE									
					51	15.5	6	1.8	RED	SHALE		HARD									
					130	39.6	79	24.1	GREY	LIMESTONE											
					140	42.7	10	3.1	RED	SHALE											

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4906378	579513	4849315	1191	390.4	13	4.0	13	4.0	BROWN	SAND	GRAVEL	LOOSE	Bedrock	47	14.3	12	3.7	FRESH	18/01/1986	Water Supply	Domestic
					27	8.2	14	4.3	BROWN	GRAVEL	SAND	LOOSE									
					30	9.1	3	0.9	BLUE	CLAY		LOOSE									
					55	16.8	25	7.6	GREY	LIMESTONE		HARD									
					56	17.1	1	0.3	BLUE	CLAY		HARD									
4906385	579728	4849854	1185	388.6	65	19.8	65	19.8		GRAVEL	BOULDERS	CLAY	Bedrock	125	38.1	105	32.0	FRESH	22/07/1985	Water Supply	Domestic
					77	23.5	12	3.7	GREY	CLAY	STONES										
					104	31.7	27	8.2	GREY	SHALE											
					125	38.1	21	6.4		SANDSTONE											
					128	39.0	3	0.9	BLUE	SHALE											
					172	52.4	44	13.4	RED	SHALE											
4906462	581455	4847775	1320	432.9	8	2.4	8	2.4	BROWN	SAND	GRAVEL	CLAY	Bedrock	105	32.0	34	10.4	FRESH	25/04/1985	Water Supply	Domestic
					16	4.9	8	2.4	BROWN	CLAY	GRAVEL										
					23	7.0	7	2.1	BROWN	GRAVEL	SAND										
					91	27.7	68	20.7	BROWN	CLAY	GRAVEL										
					110	33.5	19	5.8	GREY	LIMESTONE											
4906488	579324	4849607	1137	372.7	7	2.1	7	2.1	BROWN	CLAY	STONES		Bedrock	132	40.2	55	16.8	FRESH	08/07/1986	Water Supply	Domestic
					25	7.6	18	5.5	RED	CLAY											
					45	13.7	20	6.1	GREY	CLAY											
					82	25.0	37	11.3	GREY	ROCK											
					84	25.6	2	0.6	BLUE	SHALE											
					132	40.2	48	14.6	RED	SHALE											
4906526	582685	4844589	1142	374.5	15	4.6	15	4.6	BROWN	CLAY	STONES	BOULDERS	Bedrock	115	35.1	10	3.0	FRESH	05/09/1986	Water Supply	Domestic
					87	26.5	72	22.0	GREY	LIMESTONE		HARD									
					95	29.0	8	2.4	BLUE	SHALE		HARD									
					115	35.1	20	6.1	RED	SHALE	WATER-BEARING	HARD									
					140	42.7	25	7.6	BLUE	SHALE	WATER-BEARING	HARD									
4906548	583716	4846128	1175	385.4	2	0.6	2	0.6	BROWN	CLAY	STONES		Bedrock	60	18.3	30	9.1	FRESH	23/09/1986	Water Supply	Domestic
					25	7.6	23	7.0	BROWN	LIMESTONE											
					43	13.1	18	5.5	BROWN	LIMESTONE											
					80	24.4	37	11.3	GREY	LIMESTONE											
4906608	579325	4849619	1131	370.9	12	3.7	12	3.7	RED	CLAY	GRAVEL	LOOSE		24	7.3	5	1.5	FRESH	26/03/1987	Water Supply	Domestic
					14	4.3	2	0.6	RED	CLAY	GRAVEL	BOULDERS									
					20	6.1	6	1.8	GREY	CLAY											
					22	6.7	2	0.6	GREY	CLAY	GRAVEL	BOULDERS									
					24	7.3	2	0.6	GREY	CLAY	GRAVEL	BOULDERS									
					29	8.8	5	1.5	GREY	LIMESTONE		HARD									
					33	10.1	4	1.2	BLUE	CLAY		LOOSE									
4906649	583229	4844768	1150	377.0	12	3.7	12	3.7	BROWN	CLAY	BOULDERS		Bedrock	95	29.0	48	14.6	FRESH	12/06/1987	Water Supply	Domestic
					95	29.0	83	25.3	GREY	LIMESTONE											
4906673	579338	4849346	1176	385.5	35	10.7	35	10.7	BROWN	CLAY	SAND	STONES	Bedrock	90	27.4	57	17.4	FRESH	19/08/1987	Water Supply	Domestic
					45	13.7	10	3.1	RED	CLAY	GRAVEL										
					60	18.3	15	4.6	GREY	CLAY	GRAVEL										
					85	25.9	25	7.6	BLUE	SHALE											
					105	32.0	20	6.1	GREY	ROCK											
					120	36.6	15	4.6	BLUE	SHALE											
					130	39.6	10	3.1	RED	SHALE											
4906792	579549	4849813	1169	383.3	24	7.3	24	7.3	BROWN	COARSE GRAVEL	BOULDERS		Bedrock	180	54.9	125	38.1	FRESH	08/10/1987	Water Supply	Domestic
					42	12.8	18	5.5	BROWN	COARSE GRAVEL	BOULDERS										
					105	32.0	63	19.2		SHALE	CLAY	LAYERED									
					112	34.1	7	2.1	BROWN	SANDSTONE											
					180	54.9	68	20.7	RED	SHALE											
4906802	579320	4849612	1134	372.0	21	6.4	21	6.4	BROWN	CLAY	STONES	BOULDERS	Bedrock	117	35.7	62	18.9	FRESH	26/01/1988	Water Supply	Domestic
					28	8.5	7	2.1	GREY	CLAY											
					121	36.9	93	28.4	RED	SHALE											
4906824	578318	4847713	1236	405.3	18	5.5	18	5.5	BROWN	CLAY	BOULDERS	GRAVEL	Bedrock	66	20.1	19	5.8	FRESH	20/11/1987	Water Supply	Domestic
					38	11.6	20	6.1	BROWN	GRAVEL	SAND										
					70	21.3	32	9.8	WHITE	LIMESTONE											
4906843	581246	4848377	1327	435.1	6	1.8	6	1.8	BROWN	TOPSOIL			Bedrock	33	10.1			FRESH	04/04/1988	Observation Wells	Not Used
					97	29.6	91	27.8	BROWN	SAND	SILT	CLAY									
					108	32.9	11	3.4	GREY	LIMESTONE	FRACTURED										
4906844	581247	4848376	1327	435.1	6	1.8	6	1.8	BROWN	TOPSOIL			Overburden	33	10.1			FRESH	01/05/1988	Observation Wells	Not Used
					57	17.4	51	15.6	BROWN	SAND	GRAVEL	SAND									
4906846	579180	4849396	1171	384.0	7	2.1	7	2.1	BROWN	TILL	SAND	GRAVEL	Bedrock	7	2.1			FRESH	24/04/1988	Observation Wells	Not Used
					17	5.2	10	3.1	GREY	LIMESTONE											
4906918	579035	4849190	1180	386.8	5	1.5	5	1.5	BROWN	TOPSOIL			Bedrock			30	9.1	SALTY	22/09/1988	Water Supply	Domestic
					10	3.0	5	1.5		GRAVEL											
					30	9.1	20	6.1		GRAVEL											
					45	13.7	15	4.6		GRAVEL											
					65	19.8	20	6.1	RED	SHALE	WATER-BEARING										
4906949	580728	4848798	1315	431.0	1	0.3	1	0.3		TOPSOIL			Bedrock			48	14.6		15/06/1988		
					5	1.5	4	1.2		BOULDERS	GRAVEL										
					17	5.2	12	3.7		SAND	GRAVEL	BOULDERS									
					22	6.7	5	1.5		BOULDERS	GRAVEL	SAND									
					28	8.5	6	1.8	BROWN	BOULDERS	CLAY										
					103	31.4	75	22.9		LIMESTONE											

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4906965	581797	4848082	1301	426.7	15	4.6	15	4.6	BROWN	CLAY	STONES		Bedrock	68	20.7	53	16.2	FRESH	12/06/1988	Water Supply	Domestic/ Livestock
					63	19.2	48	14.6	BROWN	CLAY	SAND	GRAVEL									
					85	25.9	22	6.7	BROWN	ROCK											
					145	44.2	60	18.3	GREY	ROCK											
4906977	582701	4845051	1146	375.7	60	18.3	60	18.3	BROWN	CLAY	SAND		Overburden	165	50.3	54	16.5	FRESH	06/07/1988	Water Supply	Domestic
					147	44.8	87	26.5	BLUE	CLAY											
					165	50.3	18	5.5	BLUE	CLAY	SILT	SAND									
					170	51.8	5	1.5		COARSE SAND											
4906978	578351	4847696	1238	405.9	32	9.8	32	9.8	BROWN	CLAY	GRAVEL	BOULDERS	Bedrock	70	21.3	20	6.1	FRESH	20/09/1988	Water Supply	Domestic
					58	17.7	26	7.9	BROWN	GRAVEL	SAND										
					75	22.9	17	5.2	WHITE	LIMESTONE											
4906996	579033	4849190	1180	386.7	5	1.5	5	1.5	BROWN	TOPSOIL			Bedrock			30	9.1		22/09/1988	Water Supply	Domestic
					10	3.0	5	1.5		GRAVEL											
					30	9.1	20	6.1		GRAVEL											
					45	13.7	15	4.6		GRAVEL											
					65	19.8	20	6.1	RED	SHALE	WATER-BEARING										
4907142	579458	4849367	1172	384.3	1	0.3	1	0.3	BROWN	TOPSOIL			Bedrock	86	26.2	37	11.3	FRESH	04/07/1989	Water Supply	Domestic
					49	14.9	48	14.6	BROWN	CLAY	SILT	GRAVEL									
					60	18.3	11	3.4	BLUE	CLAY											
					65	19.8	5	1.5	RED	SHALE											
					70	21.3	5	1.5	BLUE	SHALE											
					75	22.9	5	1.5	RED	SHALE											
					86	26.2	11	3.4	BLUE	SHALE											
4907259	583107	4844611	1149	376.9	30	9.1	30	9.2	BROWN	CLAY	BOULDERS		Bedrock	60	18.3	33	10.1	FRESH	16/01/1990	Water Supply	Domestic
					36	11.0	6	1.8	BROWN	SAND	GRAVEL										
					70	21.3	34	10.4	BROWN	LIMESTONE											
4907269	582743	4843952	1144	375.0	1	0.3	1	0.3	BROWN	TOPSOIL			Bedrock	50	15.2	30	9.1	FRESH	06/11/1989	Water Supply	Domestic
					30	9.1	29	8.8	BROWN	CLAY	GRAVEL	STONES									
					60	18.3	30	9.2	BROWN	LIMESTONE											
4907305	579325	4849619	1131	370.9	33	10.1	33	10.1		PREV. DRILLED			Bedrock	105	32.0	50	15.2	FRESH	09/05/1987	Water Supply	Domestic
					45	13.7	12	3.7	GREY	LIMESTONE	CLAY										
					49	14.9	4	1.2	RED	SHALE		HARD									
					90	27.4	41	12.5	GREY	LIMESTONE	CLAY	LAYERED									
					110	33.5	20	6.1	RED	SHALE		HARD									
4907405	578374	4847658	1240	406.4	55	16.8	55	16.8	BROWN	SAND	CLAY	GRAVEL	Bedrock	66	20.1	22	6.7	FRESH	17/07/1990	Water Supply	Domestic
					73	22.3	18	5.5	WHITE	LIMESTONE											
4907470	578410	4848108	1233	404.1	1	0.3	1	0.3	BLACK	TOPSOIL			Bedrock	105	32.0	33	10.1	FRESH	18/05/1990	Water Supply	Domestic
					28	8.5	27	8.2	BROWN	COARSE GRAVEL	CLAY										
					33	10.1	5	1.5	WHITE	SOAPSTONE											
					78	23.8	45	13.7	WHITE	LIMESTONE											
					105	32.0	27	8.2	GREY	ROCK											
4907527	579431	4849421	1147	376.2	1	0.3	1	0.3	BLACK	TOPSOIL			Bedrock	44	13.4	16	4.9	FRESH	31/08/1990	Water Supply	Domestic
					21	6.4	20	6.1	BROWN	CLAY	STONES										
					39	11.9	18	5.5	GREY	GRAVEL	CLAY										
					43	13.1	4	1.2	BROWN	LIMESTONE	BOULDERS										
					44	13.4	1	0.3	GREY	GRAVEL											
4907566	579432	4849369	1170	383.7	1	0.3	1	0.3		TOPSOIL			Bedrock	57	17.4	21	6.4	Not stated	07/10/1991	Water Supply	Domestic
					11	3.4	10	3.1	BROWN	STONES	GRAVEL										
					42	12.8	31	9.5	GREY	GRAVEL	CLAY										
					55	16.8	13	4.0	GREY	LIMESTONE	FRACTURED										
					60	18.3	5	1.5	BLUE	SHALE											
					69	21.0	9	2.7	BLUE	SHALE											
					96	29.3	27	8.2	BLUE	SHALE											
4907667	579467	4849324	1184	388.1	1	0.3	1	0.3	BROWN	TOPSOIL			Bedrock	90	27.4	54	16.5	Not stated	22/07/1992	Water Supply	Domestic
					20	6.1	19	5.8		SAND	GRAVEL	STONES									
					61	18.6	41	12.5	BROWN	CLAY	SAND	GRAVEL									
					66	20.1	5	1.5	RED	SHALE											
					103	31.4	37	11.3	BLUE	SHALE											
4907835	580054	4849565	1196	392.1	1	0.3	1	0.3		TOPSOIL			Bedrock	59	18.0	34	10.4	FRESH	10/05/1994	Water Supply	Domestic
					18	5.5	17	5.2	BROWN	SILT	STONES										
					29	8.8	11	3.4	BROWN	SILT											
					33	10.1	4	1.2	GREY	SILT	GRAVEL										
					42	12.8	9	2.7	BROWN	SILT	CLAY	GRAVEL									
					62	18.9	20	6.1	RED	SHALE											
					90	27.4	28	8.5	BLUE	SHALE											
					106	32.3	16	4.9	BLUE	LIMESTONE	HARD										
4907867	578567	4849237	1179	386.7	62	18.9	62	18.9		GRAVEL	BOULDERS		Overburden	58	17.7	48	14.6	FRESH	12/07/1994	Water Supply	Domestic
4907914	579020	4849145	1181	387.3	29	8.8	29	8.8	BROWN	CLAY	BOULDERS	PACKED	Overburden						04/11/1994	Water Supply	Domestic
					45	13.7	16	4.9	BLUE	CLAY	STONES	SAND									
					80	24.4	35	10.7	BLUE	CLAY	STONES	SAND									
					97	29.6	17	5.2	BLUE	CLAY	STONES	SAND									
					99	30.2	2	0.6	BLUE	CLAY	SAND	DENSE									

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4907937	578605	4848620	1205	395.0	15	4.6	15	4.6		GRAVEL	BOULDERS		Bedrock	84	25.6	49	14.9	FRESH	24/10/1994	Water Supply	Domestic
					30	9.1	15	4.6		SAND											
					76	23.2	46	14.0	BROWN	CLAY											
					80	24.4	4	1.2		ROCK	FRACTURED										
					95	29.0	15	4.6		LIMESTONE											
4907980	581289	4844657	1207	395.6	10	3.0	10	3.1	BROWN	CLAY	STONES		Bedrock	60	18.3	10	3.0	FRESH	29/03/1995	Water Supply	Domestic
					70	21.3	60	18.3	GREY	LIMESTONE											
4908028	579359	4849439	1163	381.2	1	0.3	1	0.3		TOPSOIL			Bedrock	45	13.7	45	13.7	FRESH	17/08/1995	Water Supply	Domestic
					6	1.8	5	1.5	BROWN	CLAY	GRAVEL										
					22	6.7	16	4.9	BROWN	CLAY	STONES	GRAVEL									
					33	10.1	11	3.4	GREY	GRAVEL	CLAY										
					40	12.2	7	2.1	RED	SHALE	SOFT										
					50	15.2	10	3.1	BLUE	SHALE											
					52	15.8	2	0.6	RED	SHALE											
					62	18.9	10	3.1	BLUE	SHALE	SOFT	LAYERED									
					64	19.5	2	0.6	RED	SHALE											
					75	22.9	11	3.4	BLUE	SHALE											
					111	33.8	36	11.0	GREY	SHALE	LIMESTONE	HARD									
4908046	579773	4849928	1204	394.9	1	0.3	1	0.3		TOPSOIL			Bedrock	120	36.6	113	34.5	Not stated	03/10/1995	Water Supply	Domestic
					18	5.5	17	5.2	BROWN	CLAY	STONES										
					58	17.7	40	12.2	BROWN	CLAY	GRAVEL										
					70	21.3	12	3.7	GREY	CLAY	GRAVEL										
					88	26.8	18	5.5	BLUE-GREY	CLAY											
					105	32.0	17	5.2	BLUE	SHALE											
					127	38.7	22	6.7	BLUE	LIMESTONE											
					234	71.3	107	32.6	RED	SHALE											
4908139	582327	4847540	1236	405.1	10	3.0	10	3.1	WHITE	LIMESTONE	FRACTURED		Bedrock	70	21.3	17	5.2	FRESH	21/03/1996	Water Supply	Domestic
					40	12.2	30	9.2	WHITE	LIMESTONE	HARD										
					60	18.3	20	6.1	BLUE	LIMESTONE	HARD										
					70	21.3	10	3.1	WHITE	LIMESTONE	HARD										
4908201	579212	4849382	1174	384.9	18	5.5	18	5.5	BROWN	CLAY	BOULDERS	DENSE	Bedrock	110	33.5	68	20.7	FRESH	22/04/1997	Water Supply	Domestic
					46	14.0	28	8.5	BROWN	CLAY	STONES	DENSE									
					85	25.9	39	11.9	BLUE	CLAY	STONES	DENSE									
					99	30.2	14	4.3	BLUE	CLAY	DENSE										
					131	39.9	32	9.8	GREY	LIMESTONE	HARD										
					168	51.2	37	11.3	RED	SHALE	HARD										
4908259	579615	4849394	1172	384.2	1	0.3	1	0.3		TOPSOIL			Bedrock	115	35.1	76	23.2	FRESH	25/09/1997	Water Supply	Domestic
					15	4.6	14	4.3	BROWN	GRAVEL	SANDY	ROCK									
					42	12.8	27	8.2	BROWN	GRAVEL	CLAY										
					54	16.5	12	3.7	GREY	CLAY	ROCK										
					63	19.2	9	2.7	RED	SHALE											
					105	32.0	42	12.8	GREEN	SHALE											
					129	39.3	24	7.3	GREY	LIMESTONE	SHALE										
					142	43.3	13	4.0	GREY	SANDSTONE											
					149	45.4	7	2.1	RED	SHALE											
					151	46.0	2	0.6	GREEN	SHALE											
					170	51.8	19	5.8	RED	SHALE											
4908260	579070	4849102	1201	393.8	30	9.1	30	9.2	BROWN	CLAY	SAND	STONES	Bedrock	105	32.0	35	10.7	FRESH	22/10/1997	Water Supply	Domestic
					98	29.9	68	20.7	BROWN	CLAY	SAND	GRAVEL									
					154	46.9	56	17.1	BLUE-GREY	SHALE											
					160	48.8	6	1.8	RED	SHALE											
4908261	578985	4849116	1175	385.3	45	13.7	45	13.7	BROWN	CLAY	SAND	STONES	Bedrock	105	32.0	36	11.0	FRESH	23/10/1997	Water Supply	Domestic
					95	29.0	50	15.3	BROWN	CLAY	SAND	GRAVEL									
					99	30.2	4	1.2	RED	SHALE											
					154	46.9	55	16.8	BLUE-GREY	SHALE											
					160	48.8	6	1.8	RED	SHALE											
4908274	581768	4844395	1180	386.8	8	2.4	8	2.4	BROWN	CLAY	STONES		Bedrock	24	7.3	12	3.7	FRESH	25/03/1997	Test Hole	
					36	11.0	28	8.5	BROWN	LIMESTONE	LIGHT-COLOURED										
					42	12.8	6	1.8	BROWN	LIMESTONE	FRACTURED										
					46	14.0	4	1.2	GREY	LIMESTONE	DENSE										
					47	14.3	1	0.3	GREY	LIMESTONE	LIGHT-COLOURED	SOFT									
					62	18.9	15	4.6	GREY	LIMESTONE	HARD										
					70	21.3	8	2.4	GREY	LIMESTONE	LIGHT-COLOURED	SOFT									
					102	31.1	32	9.8	BROWN	LIMESTONE											
					120	36.6	18	5.5	GREY	LIMESTONE											
4908276	581915	4844935	1201	393.9	8	2.4	8	2.4	BROWN	CLAY	STONES		Bedrock	30	9.1	10	3.0	FRESH	21/03/1997	Test Hole	
					40	12.2	32	9.8	BROWN	LIMESTONE	LIGHT-COLOURED										
					44	13.4	4	1.2	GREY	LIMESTONE	HARD										
					46	14.0	2	0.6	BROWN	LIMESTONE											
					47	14.3	1	0.3	GREY	LIMESTONE											
					50	15.2	3	0.9	GREY	LIMESTONE											
					61	18.6	11	3.4	GREY	LIMESTONE	HARD										
					68	20.7	7	2.1	GREY	LIMESTONE	LIGHT-COLOURED	SOFT									
					87	26.5	19	5.8	GREY	LIMESTONE	DARK-COLOURED	HARD									
					101	30.8	14	4.3	BROWN	LIMESTONE	SOFT										
					120	36.6	19	5.8	GREY	LIMESTONE	DOLOMITE										

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4908287	581381	4844599	1202	394.0	2	0.6	2	0.6	BLACK	TOPSOIL			Bedrock	60	18.3	11	3.4	FRESH	18/10/1996	Water Supply	Domestic
					65	19.8	63	19.2	WHITE	LIMESTONE											
4908300	579279	4849618	1129	370.3	1	0.3	1	0.3		TOPSOIL			Bedrock	95	29.0	63	19.2	FRESH	13/01/1998	Water Supply	Domestic
					25	7.6	24	7.3	BROWN	CLAY	STONES										
					61	18.6	36	11.0	BROWN	CLAY	GRAVEL										
					95	29.0	34	10.4	GREY	SHALE											
					142	43.3	47	14.3	RED	SHALE											
4908409	579237	4849428	1173	384.7	1	0.3	1	0.3		TOPSOIL			Bedrock	45	13.7	36	11.0	FRESH	28/01/1999	Water Supply	Domestic
					6	1.8	5	1.5	BROWN	SAND	GRAVEL										
					21	6.4	15	4.6		STONES	BOULDERS	GRAVEL									
					30	9.1	9	2.7	BROWN	GRAVEL	SAND										
					52	15.8	22	6.7	GREY	LIMESTONE											
					60	18.3	8	2.4	BLUE	SHALE											
					83	25.3	23	7.0	BLUE	SHALE	LIMESTONE	LAYERED									
					98	29.9	15	4.6	BLUE	LIMESTONE											
4908462	579138	4847466	1278	419.2	1	0.3	1	0.3		TOPSOIL			Bedrock	76	23.2	69	21.0	FRESH	29/07/1999	Water Supply	Domestic
					49	14.9	48	14.6	BROWN	GRAVEL	STONES	SAND									
					53	16.2	4	1.2	GREY	LIMESTONE	WEATHERED										
					72	21.9	19	5.8	BLUE	SHALE	SOFT										
					74	22.6	2	0.6	RED	SHALE	SOFT										
					131	39.9	57	17.4	GREY	LIMESTONE											
					134	40.8	3	0.9	RED	SHALE											
					150	45.7	16	4.9	GREY	SANDSTONE											
					175	53.3	25	7.6	RED	SHALE											
4908511	580573	4849178	1251	410.1	1	0.3	1	0.3		TOPSOIL			Bedrock	94	28.7	63	19.2	FRESH	28/07/1999	Water Supply	Domestic
					18	5.5	17	5.2	BROWN	CLAY	BOULDERS										
					55	16.8	37	11.3	BROWN	CLAY	STONES										
					83	25.3	28	8.5	GREY	CLAY	BOULDERS	GRAVEL									
					163	49.7	80	24.4	GREY	LIMESTONE	LAYERED										
4908525	582202	4844243	1153	378.2	1	0.3	1	0.3	BLACK	TOPSOIL			Bedrock	53	16.2	1	0.3	Not stated	01/09/1999	Test Hole	Not Used
					12	3.7	11	3.4	BROWN	CLAY	STONES										
					45	13.7	33	10.1	BLACK	ROCK											
					150	45.7	105	32.0	GREY	ROCK											
					151	46.0	1	0.3	GREEN	SHALE											
4908526	581771	4844571	1173	384.5	23	7.0	23	7.0	BROWN	ROCK			Bedrock	27	8.2	14	4.3	Not stated	21/09/1999		
					138	42.1	115	35.1	GREY	ROCK											
					139	42.4	1	0.3	BLUE	SHALE											
4908527	582008	4844183	1171	384.0	3	0.9	3	0.9	BROWN	CLAY			Bedrock	34	10.4			Not stated	22/09/1999		
					4	1.2	1	0.3	BROWN	ROCK											
					7	2.1	3	0.9	BROWN	ROCK	FRACTURED										
					31	9.4	24	7.3	BROWN	ROCK											
					142	43.3	111	33.9	GREY	ROCK											
					144	43.9	2	0.6	BLUE	SHALE											
4908550	583069	4846676	1202	394.0	1	0.3	1	0.3		TOPSOIL			Bedrock	66	20.1	13	4.0	FRESH	16/02/2000	Water Supply	Domestic
					10	3.0	9	2.7	BROWN	SAND	STONES										
					21	6.4	11	3.4	BROWN	LIMESTONE											
					78	23.8	57	17.4	GREY	LIMESTONE	LAYERED										
4908616	582769	4846677	1199	393.0	2	0.6	2	0.6	BLACK	TOPSOIL			Bedrock	48	14.6	20	6.1	FRESH	21/12/1999	Water Supply	Domestic
					22	6.7	20	6.1	BROWN	CLAY	SANDY	BOULDERS									
					50	15.2	28	8.5	BROWN	LIMESTONE											
4908639	583060	4846406	1192	390.7	6	1.8	6	1.8	BROWN	CLAY	STONES		Bedrock	27	8.2	24	7.3	FRESH	23/10/2000	Water Supply	Domestic
					29	8.8	23	7.0	GREY	LIMESTONE											
					83	25.3	54	16.5	BLUE	LIMESTONE	SHALE										
4908646	582613	4846847	1221	400.4	1	0.3	1	0.3		TOPSOIL			Bedrock	61	18.6	17	5.2	FRESH	24/10/2000	Water Supply	Domestic
					5	1.5	4	1.2	BROWN	CLAY	GRAVEL										
					29	8.8	24	7.3	GREY	LIMESTONE											
					69	21.0	40	12.2	BLUE	LIMESTONE											
					103	31.4	34	10.4	GREY	LIMESTONE											
4908679	583305	4846155	1174	384.9	1	0.3	1	0.3	BLACK	TOPSOIL			Bedrock	80	24.4	28	8.5	FRESH	11/05/2000	Water Supply	Domestic
					6	1.8	5	1.5	BROWN	TOPSOIL	CLAY	SANDY									
					81	24.7	75	22.9	GREEN	LIMESTONE											
					82	25.0	1	0.3	GREEN	SHALE											
4908681	582750	4846711	1201	393.7	11	3.4	11	3.4	BROWN	CLAY	STONES		Bedrock	117	35.7	11	3.4	FRESH	30/10/2000	Water Supply	Domestic
					19	5.8	8	2.4	GREEN	CLAY	STONES										
					28	8.5	9	2.7	GREEN	GRAVEL											
					34	10.4	6	1.8	GREEN	CLAY	STONES										
					114	34.7	80	24.4	GREEN	LIMESTONE											
					124	37.8	10	3.1	BROWN	LIMESTONE											
					125	38.1	1	0.3	BLUE	SHALE											
4908684	581619	4847821	1309	429.2	22	6.7	22	6.7	BROWN	CLAY	BOULDERS	STONES	Bedrock	94	28.7	35	10.7	FRESH	31/10/2000	Water Supply	Domestic
					54	16.5	32	9.8	BROWN	CLAY	GRAVEL										
					73	22.3	19	5.8	GREEN	CLAY	STONES										
					98	29.9	25	7.6	GREEN	LIMESTONE											

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
4908686	579519	4849115	1218	399.4	3	0.9	3	0.9		FILL			Bedrock	89	27.1	77	23.5	Not stated	09/02/2001	Water Supply	Domestic
					13	4.0	10	3.1	BROWN	CLAY	GRAVEL										
					31	9.4	18	5.5	BROWN	GRAVEL	CLAY										
					48	14.6	17	5.2		SAND	GRAVEL										
					60	18.3	12	3.7	GREY	CLAY	SILTY										
					152	46.3	92	28.1	BLUE	SHALE	LAYERED										
					176	53.6	24	7.3	RED	SHALE											
4908741	580320	4846228	1299	426.0	18	5.5	18	5.5	BROWN	CLAY	STONES		Bedrock	144	43.9	12	3.7	FRESH	17/05/2001	Water Supply	Domestic
					56	17.1	38	11.6	BROWN	SAND	GRAVEL										
					98	29.9	42	12.8	GREY	CLAY	STONES										
					147	44.8	49	14.9	BROWN	LIMESTONE											
4908830	579562	4849797	1174	384.8	31	9.4	31	9.5	BROWN	BOULDERS	COARSE GRAVEL	HARD	Bedrock	200	61.0	97	29.6	FRESH	23/07/2001	Water Supply	Domestic
					50	15.2	19	5.8	RED	CLAY	FINE GRAVEL	SOFT									
					85	25.9	35	10.7	GREY	CLAY	FINE GRAVEL	LAYERED									
					105	32.0	20	6.1	BLUE	LIMESTONE											
					120	36.6	15	4.6	BLUE	SHALE											
					200	61.0	80	24.4	RED	SHALE											
4908836	580896	4848283	1306	428.3	1	0.3	1	0.3		TOPSOIL			Bedrock	86	26.2	33	10.1	FRESH	19/09/2001	Water Supply	Domestic
					80	24.4	79	24.1	BROWN	SAND	BOULDERS										
					82	25.0	2	0.6	GREY	LIMESTONE	FRACTURED										
					90	27.4	8	2.4	BROWN	LIMESTONE											
					116	35.4	26	7.9	GREY	LIMESTONE											
4908977	579679	4849026	1238	405.8															09/04/2002	Abandoned-Other	
4908979	579679	4849026	1238	405.8	1	0.3	1	0.3	BLACK	TOPSOIL			Bedrock	65	19.8	19	5.8	Not stated	04/04/2002	Water Supply	Domestic
					9	2.7	8	2.4	BROWN	GRAVEL	SILT										
					24	7.3	15	4.6	BROWN	GRAVEL	SAND	SILT									
					32	9.8	8	2.4	GREY	SAND	GRAVEL										
					53	16.2	21	6.4	BROWN	GRAVEL	SILT	STONES									
					68	20.7	15	4.6	BLUE	SHALE											
					75	22.9	7	2.1	RED	SHALE											
					110	33.5	35	10.7	BLUE	SHALE											
					136	41.5	26	7.9	GREY	LIMESTONE											
					148	45.1	12	3.7	RED	SHALE	LIMESTONE	LAYERED									
					178	54.3	30	9.2	RED	SHALE	LAYERED										
4909025	578011	4848027	1206	395.4	26	7.9	26	7.9	BROWN	GRAVEL	STONES		Bedrock	49	14.9	28	8.5	FRESH	26/07/2002	Water Supply	Domestic
					48	14.6	22	6.7	GREY	GRAVEL	SILT										
					52	15.8	4	1.2	GREY	LIMESTONE	GRAVEL										
4909056	582473	4844179	1138	373.1															21/10/2002	Abandoned-Other	Not Used
4909107	580682	4845030	1210	396.7	21	6.4	21	6.4	BROWN	CLAY	STONES		Bedrock	78	23.8	20	6.1	FRESH	20/02/2003	Water Supply	Livestock
					40	12.2	19	5.8	GREY	CLAY	STONES										
					48	14.6	8	2.4	BLACK	LIMESTONE											
					72	21.9	24	7.3	BROWN	LIMESTONE											
					83	25.3	11	3.4	BROWN	LIMESTONE											
					95	29.0	12	3.7	GREY	LIMESTONE											
4909426	579463	4849114	1208	395.9	8	2.4	8	2.4	BROWN	SAND	STONES		Bedrock	70	21.3	65	19.8	FRESH	27/04/2004	Water Supply	Domestic
					25	7.6	17	5.2	BROWN	CLAY	STONES										
					56	17.1	31	9.5	GREY	CLAY	STONES										
					59	18.0	3	0.9	WHITE	LIMESTONE											
					105	32.0	46	14.0	RED	SHALE	LAYERED										
					140	42.7	35	10.7	GREY	LIMESTONE											
					150	45.7	10	3.1	RED	SHALE											
4909821	578157	4848084	1195	391.9	3	3.0	3		BROWN	SAND	GRAVEL		Overburden	11	3.6				16/06/2005	Test Hole	Not Used
					5	4.5	2		BROWN	SAND	SILT	WATER-BEARING									
4909875	578977	4848892	1215	398.2	56	18.3	56	18.3	BROWN	SAND	GRAVEL	STONES	Bedrock	70	23.0	36	11.8	FRESH	11/08/2005	Water Supply	Public
					59	19.2	3	0.9	BROWN	LIMESTONE											
					65	21.3	7	2.1	GREY	CLAY	GRAVEL										
					74	24.4	9	3.1	GREY	LIMESTONE											
6700800	582019	4843723	1125	368.9	4	1.2	4	1.2		TOPSOIL			Bedrock	30	9.1	12	3.7	FRESH	05/05/1962	Water Supply	Domestic
					70	21.3	66	20.1	GREY	LIMESTONE											
6700801	581927	4843924	1162	381.0	5	1.5	5	1.5		FILL			Bedrock	45	13.7	30	9.1	FRESH	04/09/1967	Water Supply	Domestic
					78	23.8	73	22.3	GREY	LIMESTONE											
6700803	579365	4846135	1304	427.7	2	0.6	2	0.6		TOPSOIL			Overburden	107	32.6	34	10.4	FRESH	06/08/1962	Water Supply	Domestic
					30	9.1	28	8.5		BOULDERS											
					80	24.4	50	15.3		FINE SAND											
					107	32.6	27	8.2		GRAVEL											
6700805	578740	4847088	1263	414.2	2	0.6	2	0.6		TOPSOIL			Overburden	24	7.3	30	9.1	FRESH	10/11/1965	Water Supply	Domestic
					24	7.3	22	6.7		CLAY	STONES										
					25	7.6	1	0.3	BROWN	CLAY	GRAVEL										
6700806	578612	4846892	1267	415.5	75	22.9	75	22.9		GRAVEL	MEDIUM SAND	BOULDERS	Bedrock	120	36.6	50	15.2	FRESH	29/07/1966	Water Supply	Domestic/ Livestock
					130	39.6	55	16.8	GREY	LIMESTONE											
6700807	578402	4846935	1278	419.1	14	4.3	14	4.3		CLAY	STONES		Bedrock	90	27.4	97	29.6	FRESH	30/03/1959	Water Supply	Domestic/ Livestock
					23	7.0	9	2.7		SILT	STONES										
					55	16.8	32	9.8		HARDPAN											
					65	19.8	10	3.1		HARDPAN	BOULDERS										
					98	29.9	33	10.1	BROWN	ROCK											
6700809	578096	4847700	1224	401.4	18	5.5	18	5.5	BROWN	CLAY	BOULDERS		Overburden	42	12.8	83	25.3	FRESH	15/09/1962	Water Supply	Domestic/ Livestock
					60	18.3	42	12.8		MEDIUM SAND	GRAVEL										
6700810	577731	4847865	1205	395.2	57	17.4	57	17.4		CLAY	STONES		Bedrock	64	19.5	54	16.5	FRESH	12/10/1966	Water Supply	Domestic/ Livestock
					66	20.1	9	2.7	GREY	LIMESTONE											

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
6700812	577599	4848106	1189	390.0	20	6.1	20	6.1		GRAVEL	STONES		Bedrock	195	59.4	24	7.3	FRESH	10/07/1965	Water Supply	Domestic
					25	7.6	5	1.5		CLAY											
					100	30.5	75	22.9		MEDIUM SAND											
					158	48.2	58	17.7		CLAY	STONES										
					200	61.0	42	12.8	GREY	ROCK	SHALE										
6703360	579034	4846813	1281	420.0	103	31.4	103	31.4		CLAY	STONES	GRAVEL	Bedrock	110	33.5	35	10.7	FRESH	03/03/1969	Water Supply	Domestic
					132	40.2	29	8.8	GREY	LIMESTONE											
6703570	578889	4846963	1278	418.9	32	9.8	32	9.8	BROWN	MEDIUM SAND	GRAVEL	BOULDERS	Overburden	18	5.5	35	10.7	SULPHUR	08/09/1969	Water Supply	Domestic
					58	17.7	26	7.9		MEDIUM SAND	GRAVEL										
6704156	581604	4844053	1161	380.8	48	14.6	48	14.6	GREY	LIMESTONE	CLAY		Bedrock	65	19.8	28	8.5	FRESH	27/11/1971	Water Supply	Domestic
					92	28.0	44	13.4	GREY	LIMESTONE											
6704540	579044	4846673	1301	426.6	128	39.0	128	39.0		CLAY	GRAVEL	BOULDERS	Bedrock	153	46.6	61	18.6	FRESH	06/12/1972	Water Supply	Domestic
					155	47.2	27	8.2	GREY	LIMESTONE											
6704624	578164	4847653	1230	403.3	1	0.3	1	0.3	BROWN	TOPSOIL			Bedrock	105	32.0	40	12.2	FRESH	24/05/1973	Water Supply	Domestic
					18	5.5	17	5.2	BROWN	GRAVEL											
					58	17.7	40	12.2	GREY	CLAY	STONES										
					70	21.3	12	3.7	YELLOW	DOLOMITE											
					105	32.0	35	10.7	GREY	DOLOMITE											
					136	41.5	31	9.5	BROWN	DOLOMITE											
6705049	578631	4846660	1296	424.8	1	0.3	1	0.3		TOPSOIL			Bedrock	210	64.0	24	7.3	FRESH	16/03/1974	Water Supply	Domestic
					25	7.6	24	7.3	BROWN	CLAY	STONES										
					95	29.0	70	21.4	BROWN	CLAY	SAND	GRAVEL									
					105	32.0	10	3.1	BROWN	CLAY	SAND	STONES									
					115	35.1	10	3.1	BROWN	CLAY	SAND	GRAVEL									
					125	38.1	10	3.1	BROWN	CLAY	SAND	STONES									
					150	45.7	25	7.6	GREY	ROCK											
					185	56.4	35	10.7	BROWN	ROCK											
					210	64.0	25	7.6	BROWN	LIMESTONE											
6705911	581714	4844123	1176	385.6	1	0.3	1	0.3		FILL			Bedrock	65	19.8	25	7.6	FRESH	07/06/1975	Water Supply	Domestic
					94	28.7	93	28.4	GREY	LIMESTONE											
6705937	579154	4846703	1293	423.9	132	40.2	132	40.3		CLAY	STONES	GRAVEL	Bedrock	157	47.9	45	13.7	FRESH	09/10/1975	Water Supply	Domestic
					170	51.8	38	11.6	GREY	LIMESTONE											
6706095	577674	4848023	1202	394.1	1	0.3	1	0.3		TOPSOIL			Overburden	70	21.3	21	6.4	FRESH	18/06/1976	Water Supply	Domestic
					10	3.0	9	2.7	BROWN	CLAY	STONES										
					25	7.6	15	4.6	BROWN	CLAY	SAND										
					68	20.7	43	13.1	BROWN	CLAY	GRAVEL										
					70	21.3	2	0.6		GRAVEL											
6706304	580614	4844723	1201	393.9	29	8.8	29	8.8	BROWN	CLAY	BOULDERS		Bedrock	123	37.5	10	3.0	FRESH	13/07/1976	Water Supply	Domestic
					59	18.0	30	9.2	BROWN	CLAY	GRAVEL	LOOSE									
					125	38.1	66	20.1	BLUE	LIMESTONE											
6706548	578014	4847873	1199	393.2	45	13.7	45	13.7	BROWN	CLAY	SANDSTONE		Bedrock	123	37.5	9	2.7	FRESH	11/10/1977	Water Supply	Domestic
					60	18.3	15	4.6	GREY	CLAY	SANDSTONE	GRAVEL									
					123	37.5	63	19.2	BROWN	ROCK	LIGHT-COLOURED										
6707160	581764	4844073	1171	384.0	15	4.6	15	4.6	GREY	LIMESTONE	CLAY		Bedrock	35	10.7	27	8.2	FRESH	24/04/1979	Water Supply	Domestic
					108	32.9	93	28.4	GREY	LIMESTONE											
6707431	579314	4846373	1312	430.2	2	0.6	2	0.6	BLACK	TOPSOIL			Overburden	165	50.3	15	4.6	FRESH	01/07/1980	Water Supply	Domestic
					11	3.4	9	2.7	BLACK	OVERBURDEN	STONES										
					13	4.0	2	0.6	BROWN	FINE SAND	QUICKSAND	LIGHT-COLOURED									
					58	17.7	45	13.7	BROWN	CLAY	STONES										
					122	37.2	64	19.5	BROWN	CLAY	MEDIUM SAND										
					134	40.8	12	3.7	GREY	CLAY	STONES										
					180	54.9	46	14.0	GREY	STONES	LIGHT-COLOURED										
6707833	582116	4843746	1129	370.1	2	0.6	2	0.6		CLAY	STONES		Bedrock	90	27.4	9	2.7	FRESH	20/07/1983	Water Supply	Domestic
					8	2.4	6	1.8	GREY	LIMESTONE											
					57	17.4	49	14.9	GREY	LIMESTONE											
					72	21.9	15	4.6	BROWN	LIMESTONE											
					104	31.7	32	9.8	GREY	LIMESTONE											
6709215	578387	4846916	1276	418.5	5	1.5	5	1.5	BROWN	OVERBURDEN			Bedrock	115	35.1	46	14.0	FRESH	10/10/1987	Water Supply	Domestic
					14	4.3	9	2.7	BROWN	CLAY	STONES										
					38	11.6	24	7.3	BROWN	MEDIUM SAND	GRAVEL										
					63	19.2	25	7.6	GREY	CLAY	ROCK										
					135	41.1	72	22.0	GREY	ROCK	LIMESTONE										
6709541	578989	4846975	1284	421.1	85	25.9	85	25.9	BROWN	CLAY	STONES	GRAVEL	Bedrock	145	44.2	36	11.0	FRESH	18/07/1988	Water Supply	Domestic
					102	31.1	17	5.2	GREY	CLAY	STONES										
					147	44.8	45	13.7	GREY	LIMESTONE											
6710328	579191	4846699	1296	425.0	65	19.8	65	19.8	BROWN	GRAVEL	BOULDERS	CLAY	Bedrock	137	41.8	3	0.9	FRESH	17/01/1990	Water Supply	Domestic
					120	36.6	55	16.8	GREY	CLAY	STONES										
					140	42.7	20	6.1	GREY	LIMESTONE											
6710534	581132	4844757	1205	395.1	2	0.6	2	0.6		FILL			Bedrock	38	11.6	34	10.4	FRESH	04/07/1990	Water Supply	Domestic
					6	1.8	4	1.2	BROWN	CLAY	STONES										
					74	22.6	68	20.7	GREY	LIMESTONE											
6710552	581297	4844588	1205	395.2	11	3.4	11	3.4	BROWN	CLAY	STONES		Bedrock	105	32.0			FRESH	12/10/1990	Water Supply	Domestic
					38	11.6	27	8.2		LIMESTONE	CLAY										
					114	34.7	76	23.2	GREY	LIMESTONE											

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
6710553	579681	4845977	1322	433.3	12	3.7	12	3.7	BROWN	CLAY	SAND		Bedrock	195	59.4			FRESH	01/11/1990	Water Supply	Domestic
					82	25.0	70	21.4	BROWN	CLAY	BOULDERS	GRAVEL									
					140	42.7	58	17.7	GREY	CLAY	STONES										
					198	60.4	58	17.7	GREY	LIMESTONE											
6710794	579275	4846651	1307	428.5	8	2.4	8	2.4	BROWN	CLAY	SAND		Bedrock	210	64.0			FRESH	25/07/1991	Water Supply	Domestic
					75	22.9	67	20.4	BROWN	CLAY	GRAVEL	STONES									
					108	32.9	33	10.1	GREY	CLAY	STONES	SAND									
					185	56.4	77	23.5	GREY	LIMESTONE											
					193	58.8	8	2.4	BROWN	LIMESTONE											
					219	66.8	26	7.9	GREY	LIMESTONE											
6711342	579540	4846364	1319	432.6	24	7.3	24	7.3	GREY	CLAY	GRAVEL	STONES	Bedrock	195	59.4			FRESH	26/10/1993	Water Supply	Domestic
					95	29.0	71	21.7	GREY	CLAY	STONES	GRAVEL									
					134	40.8	39	11.9	GREY	CLAY	STONES										
					215	65.5	81	24.7	GREY	LIMESTONE											
6711564	580175	4845507	1276	418.3	88	26.8	88	26.8	GREY	CLAY	SAND	STONES	Bedrock	163	49.7			FRESH	24/10/1994	Water Supply	Domestic
					93	28.3	5	1.5		BOULDERS											
					136	41.5	43	13.1	GREY	CLAY	SAND	GRAVEL									
					163	49.7	27	8.2	GREY	LIMESTONE											
6712134	578800	4848946	1189	390.0	30	9.1	30	9.2	BROWN	SAND	GRAVEL		Bedrock						20/12/1996	Test Hole	Not Used
					396	120.7	366	111.6	GREY	ROCK	LIMESTONE	DOLOMITE									
					400	121.9	4	1.2	RED	ROCK	GREENSTONE	SHALE									
6714185	578515	4847440	1251	410.1	22	6.7	22	6.7	BROWN	CLAY	STONES		Bedrock	93	28.3			FRESH	17/09/2002	Water Supply	Domestic
					63	19.2	41	12.5	GREY	CLAY	STONES										
					97	29.6	34	10.4	GREY	LIMESTONE											
6714753	579263	4846643	1305	428.0	33	10.9	33	10.9	BROWN	COARSE SAND	COARSE GRAVEL		Bedrock						18/11/2003	Water Supply	Domestic
					89	29.2	56	18.3	GREY	COARSE SAND	COARSE GRAVEL										
					123	40.2	34	11.0	GREY	CLAY	STONES										
					150	49.3	28	9.1	GREY	LIMESTONE											
6715397	580353	4845423	1261	413.6	31	9.4	31	9.5	BROWN	CLAY	STONES		Bedrock	124	37.8			FRESH	06/07/2005	Water Supply	Domestic
					111	33.8	80	24.4	GREY	CLAY	STONES										
					126	38.4	15	4.6	GREY	LIMESTONE											
7043364	582996	4847016	1220	399.9	56	18.3	56	18.3	BROWN	CLAY			Bedrock	136	44.5	49	16.0	FRESH	13/02/2007	Water Supply	Domestic
					91	29.9	35	11.6	BROWN	CLAY											
					136	44.5	45	14.6	GREY	LIMESTONE											
7050503	583328	4846327	1182	387.6	3	0.9	3	0.9											21/08/2007	Observation Wells	Monitoring
7050504	583326	4846322	1182	387.5	3	0.9	3	0.9	GREY			HARD							21/08/2007	Observation Wells	Monitoring
7052189	582203	4843576	1126	369.2	26	7.9	26	7.9	GREY			HARD		89	27.1	12	3.7	FRESH	23/10/2007	Water Supply	Domestic
					67	20.4	41	12.5	BROWN	CLAY	STONES										
					100	30.5	33	10.1	BROWN	LIMESTONE											
7054003	582363	4843993	1147	376.2					GREY	LIMESTONE									06/12/2007	Abandoned-Supply	
7100372	578913	4847106	1284	421.0	23	7.0	23	7.0						135	41.1	36	11.0	FRESH	14/11/2007	Water Supply	Domestic
					46	14.0	23	7.0	BROWN	GRAVEL	STONES										
					100	30.5	54	16.5	BROWN	CLAY	STONES										
					142	43.3	42	12.8	GREY	CLAY	STONES										
7102222	583328	4846323	1182	387.6					GREY	LIMESTONE									08/02/2008	Abandoned-Other	Monitoring
7102223	583326	4846322	1182	387.5															08/02/2008	Abandoned-Other	Monitoring
7104809	579297	4849532	1157	379.4															20/04/2008	Abandoned-Supply	Domestic
7106064	578821	4848647	1217	399.0	39	11.9	39	11.9						43	13.1	32	9.8	FRESH	28/04/2008	Water Supply	Domestic
					43	13.1	4	1.2	BROWN	GRAVEL	CLAY	STONES									
7109610	579143	4848750	1233	404.3					GREY	ROCK	GRAVEL					37	11.3		19/06/2008	Abandoned-Supply	Not Used
7121555	579856	4846537	1304	427.7															24/03/2009		
7130849	583039	4846624	1198	392.9	2	0.8	2	0.8						6	2.1	3	0.9	FRESH	25/08/2009	Test Hole	Monitoring
					2	0.8	0	1.0	BROWN	SAND	CLAY	LOOSE									
	583039	4846624	1199	393.0	2	0.8	2	0.8	GREY	LIMESTONE	DOLOMITE	ROCK									
					2	0.8	0	0.0	BROWN	SAND	CLAY	LOOSE									
	583039	4846624	1199	393.1	2	0.8	0	0.0	GREY	LIMESTONE	DOLOMITE	ROCK									
					2	0.8	2	0.8	GREY	LIMESTONE	DOLOMITE	ROCK									
	583049	4846610	1198	392.9	2	0.8	0	0.0	BROWN	SAND	CLAY	LOOSE									
					2	0.8	2	0.8	GREY	LIMESTONE	DOLOMITE	ROCK									
	583049	4846610	1199	393.0	2	0.8	0	0.0	BROWN	SAND	CLAY	LOOSE									
					2	0.8	2	0.8	GREY	LIMESTONE	DOLOMITE	ROCK									
	583049	4846610	1199	393.1	2	0.8	2	0.8	BROWN	SAND	CLAY	LOOSE									
					2	0.8	0	0.0	BROWN	SAND	CLAY	LOOSE									
	583055	4846607	1198	392.9	2	0.8	2	0.8	GREY	LIMESTONE	DOLOMITE	ROCK									
					2	0.8	0	0.0	BROWN	SAND	CLAY	LOOSE									
	583055	4846607	1199	393.0	2	0.8	2	0.8	GREY	LIMESTONE	DOLOMITE	ROCK									
					2	0.8	0	0.0	BROWN	SAND	CLAY	LOOSE									
	583055	4846607	1199	393.1	2	0.8	2	0.8	GREY	LIMESTONE	DOLOMITE	ROCK									
					2	0.8	0	0.0	BROWN	SAND	CLAY	LOOSE									
7140490	579080	4848673	1232	404.1	1	0.3	1	0.3	GREY	LIMESTONE	DOLOMITE	ROCK		93	28.3	53	16.1	Untested	20/10/2009	Test Hole	Test Hole
					43	13.1	42	12.8	BROWN	TOPSOIL											
					59	18.0	16	4.9	BROWN	SAND	GRAVEL	STONES									
					65	19.8	6	1.8	BROWN	FINE SAND											
					72	21.9	7	2.1	BROWN	SAND	GRAVEL										
					112	34.1	40	12.2	BROWN	CLAY	GRAVEL										

Summary of Water Well Records Obtained from MOE

WELL_ID	Easting	Northing	Elevation		Depth		Thickness		MaterialColor	Material	Material2	Material3		Water_Depth		Static_lev		Water_kind	Date Complete	Final_Status	Use
			ft	m	ft	m	ft	m					Well Type	ft	m	ft	m				
7155173	578401	4847013			2	0.6	2	0.6	GREY	LIMESTONE											
					67	20.4	65	19.8	BROWN	TOPSOIL											
					72	21.9	5	1.5	BROWN	CLAY	SILT	STONES		90	27.4	37	11.4	Untested	12/10/2010	Water Supply	Domestic
					85	25.9	13	4.0		LIMESTONE											
					122	37.2	37	11.3	BROWN	LIMESTONE											
7162432	583474	4846516			12	3.7	12	3.7	GREY	LIMESTONE											
					47	14.3	35	10.7	BROWN	CLAY	GRAVEL	STONES		43	13.1	30	9.1	FRESH	11/11/2010	Water Supply	Domestic
					82	25.0	35	10.7	BROWN	LIMESTONE											
7172496	581497	4848050							GREY	LIMESTONE						4	1.3	FRESH	01/11/2011	Abandoned-Other	Other
7172497	581619	4848046														7	2.4		26/10/2011	Abandoned-Other	Other
7190296	580895	4848731																	12/10/2012		

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 | 4906949 | MUNICIP 49002 | CON. IHS W 5

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Peel	Caledon (CALEDON) -	V W WHS	8

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Enterac Prop Corp	1 University Ave Suite 1204 Toronto	DAY 15 MO 6 YR 88

21 | ZONE | EASTING | NORTHING | RC | ELEVATION | RC | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
	Topsoil			0	1
	boulders	gravel		1	5
	sand	gravel & boulders		5	17
	boulders	gravel & sand		17	22
	boulders	& brown clay		22	28
	Limestone			28	103

31

32

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
8	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.322	0	29
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE 5 ☐ PLASTIC		29	103
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
28	25	Benseal
25	6	backfill
6	0	concrete

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☑ PUMP 2 ☐ BAILER | PUMPING RATE 30 GPM | DURATION OF PUMPING 48 HOURS MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
48.45 FEET	81.63 FEET	73.65 FEET	FEET	FEET	74.73 FEET

WATER LEVELS DURING: 1 ☑ PUMPING 2 ☐ RECOVERY

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

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

FINAL STATUS OF WELL

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

WATER USE

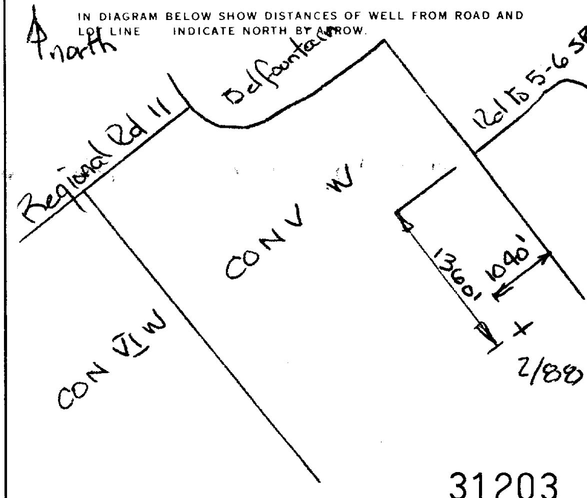
1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

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

LOCATION OF WELL 2/88

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



31203

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR: International Water Supply | WELL CONTRACTOR'S LICENCE NUMBER: 2801
ADDRESS: P.O. Box 310 Barrie
NAME OF WELL TECHNICIAN: RC Magee | WELL TECHNICIAN'S LICENCE NUMBER: T-0117
SIGNATURE OF TECHNICIAN/CONTRACTOR | SUBMISSION DATE: DAY 28 MO. 6 YR. 88

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 2801 | DATE RECEIVED DEC 01 1988
DATE OF INSPECTION | INSPECTOR
REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

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

11 | 4908526 | Municipality 49002 | Con. H.S. W | 06

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
PEEL	CALEDON	VII WHS	1

Address: STAN DENITHOED RR1 MOFFAT ONT. LOP 1J0

Date completed: 21 day 09 month 99 year

21 | UTM | Northing | RC | Elevation | RC | Basin Code | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
BR.	ROCK			0	23
GR.	ROCK			23	138
BLUE	SHALE			138	139

31

32

41 WATER RECORD

Water found at - feet	Kind of water
27	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
36	
47	
56	
83-85	
91-94	
101	
110-116	

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
8	☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic		0	20'6"
6¾				
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

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

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

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

71 PUMPING TEST

Pumping test method: 1 ☐ Pump 2 ☐ Bailer

Pumping rate: GPM

Duration of pumping: Hours Mins

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

If flowing give rate: GPM

Pump intake set at: feet

Water at end of test: ☐ Clear ☐ Cloudy

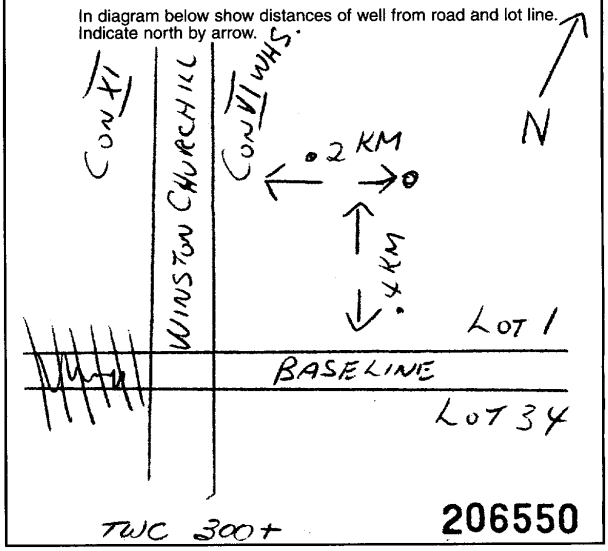
Recommended pump type: ☐ Shallow ☐ Deep

Recommended pump setting: feet

Recommended pump rate: GPM

LOCATION OF WELL

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



TWC 300+

206550

FINAL STATUS OF WELL 54

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

WATER USE 55-56

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

METHOD OF CONSTRUCTION 57

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

Name of Well Contractor	Well Contractor's Licence No.
LANG WELL DRILLING LTD	3317
Address: RR1 HILLSBURGH ONT.	
Name of Well Technician: JOE LEGGE	Well Technician's Licence No.: T-1817
Signature of Technician/Contractor: P. Lang.	Submission date: 30 day 11 mo 99 yr

MINISTRY USE ONLY

Data source 58 | Contractor 3317 59-62 | Date received JAN 11 2000 63-68 | 80

Date of inspection | Inspector

Remarks: CSS.ES0

0506 (11/98) Front Form 9

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Ontario **Ministry of the Environment**

The Ontario Water Resources Act

WATER WELL RECORD

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

11 **4908527** Municipality 49002 Con HS W 06

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
PEEL	CALEDON	VII WHS	1

Owner's surname	First Name	Address	Date completed
[redacted]		[redacted] RR1 MOFFAT ONT. LOP 1J0	22 09 99 (day month year)

21 Zone | Easting | Northing | RC | Elevation | RC | Basin Code | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
BR.	CLAY			0	3
BR.	ROCK			3	4
BR.	ROCK		BROKEN	4	7
BR.	ROCK		SOLID	7	31
GR.	ROCK			31	142
BLUE	SHALE			142	144

31

32

41 WATER RECORD

Water found at - feet	Kind of water
34	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
60	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
95-98	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
106-110	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
8	1 ☒ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic		0	20'6"
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

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

Material and type | Depth at top of screen feet

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

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

71 PUMPING TEST

Pumping test method 1 ☐ Pump 2 ☐ Bailer | Pumping rate GPM | Duration of pumping Hours Mins

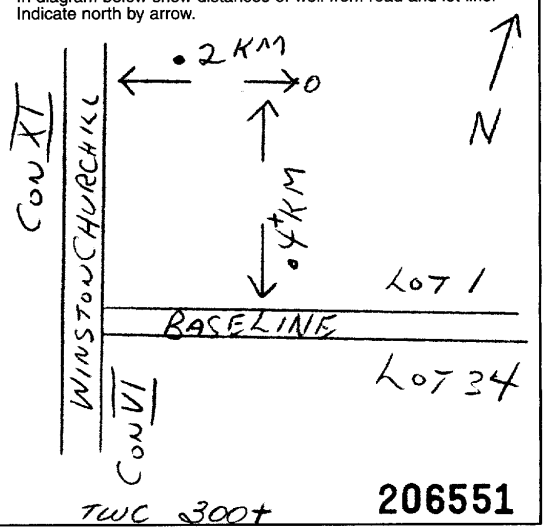
Static level feet	Water level end of pumping feet	Water levels during 1 ☐ Pumping 2 ☐ Recovery: 15 minutes feet	30 minutes feet	45 minutes feet	60 minutes feet

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

Recommended pump type ☐ Shallow ☐ Deep | Recommended pump setting feet | Recommended pump rate GPM

LOCATION OF WELL

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



206551

FINAL STATUS OF WELL 54

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

WATER USE 55-56

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

METHOD OF CONSTRUCTION 57

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

Name of Well Contractor	Well Contractor's Licence No.
LAING WELL DRILLING LTD.	3317
Address: RR1 HILLSBURGH ONT.	
Name of Well Technician: JOE LEGGE	Well Technician's Licence No.: T1817
Signature of Technician/Contractor: R. Laing	Submission date: day 20 mo 11 yr 99

MINISTRY USE ONLY

Data source 58	Contractor 59-62: 3317	Date received 63-68: JAN 11 2000	80
Date of inspection	Inspector		
Remarks			

CSS.ES0

0506 (11/98) Front Form 9

2 - MINISTRY OF THE ENVIRONMENT COPY

Ontario — Ministry of the Environment

Well Tag No. A080096 — A080096

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☑ Imperial

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	CREDIT VALLEY CONSERVATION.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
1255 OLD DERRY RD.	MISSISSAUGA	ON	L5N6R4	9056701615

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
WINSTON CHURCHILL BLVD	CALEDON	6	6 WHS

County/District/Municipality	City/Town/Village	Province	Postal Code
PEEL	CALEDON	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	579855	4846537		

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
* This well Record is for Upgading a well - audit # NOT FOUND. We dug down 5' and re-grouted the annular space of the 6" Casing with Bentonite. well was Tagged and GPS Located.					

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)

Method of Construction

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

Well Use

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

Construction Record - Casing

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

Construction Record - Screen

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

Status of Well

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

Water Details

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

Hole Diameter

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

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)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Tom's Well Drilling Inc.	7143

Business Address (Street Number/Name)	Municipality
8 John Ave	New Tec

Province	Postal Code	Business E-mail Address
ON	L9R1J8	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
7054358851	EBDON STEVE

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2934		20090324

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	20090324	20090324

Ministry Use Only

Audit No. Z 91088

Received APR 06 2009

0506E (12/2007)

Ministry's Copy

Ontario — Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)* DECOMMISSION NO TAG.

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: ☒ Metric ☐ Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
[redacted]	[redacted]		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
16730 MISSISSAUGA ROAD	CALEDON	ONTARIO	L7K1L9	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
16730 MISSISSAUGA ROAD	CALEDON	7	5 W

County/District/Municipality	City/Town/Village	Province	Postal Code
PEEL	CALEDON	Ontario	L7K1L8

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	580895	4848731		

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
	- DECOMMISSIONED PER MOE REG 903.1.1				
	- ALL DEBRIS REMOVED FROM WELL & PROPERTY				
	- POURED SEAL & GRADED TO SURFACE				
	- TOP 2.4m WELL CASING (ENTIRE LENGTH) REMOVED				

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0.0	1.8	GRADE TO SURFACE	
1.8	2.4	BENTONITE	
	2.4	EOH	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
90	CONCRETE		0.0	2.4

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
2.1 (m/ft) ☐ Gas	☒ Fresh ☐ Untested ☐ Other, *specify*			
(m/ft) ☐ Gas	Water found at Depth: Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*			
(m/ft) ☐ Gas	Water found at Depth: Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*			

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

Comments: MAP ATTACHED

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
SONIC SOIL SAMPLING INC.	7147

Business Address (Street Number/Name)	Municipality
68 MILLWAY AVENUE	YORK

Province	Postal Code	Business E-mail Address
ONTARIO	L4K3V2	sonic@sonicsoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
0566005011	ARCHIBALD, ALAN

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
881		2012/10/12

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☒ Yes ☐ No	2012/10/12	Audit No. Z142278
	Date Work Completed 2012/10/12	Received 2012 25

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

Ministry's Copy

UTM 17 Z 582270 E
9 R 4847084 N
Elev. 95 R
Basin 24

Hurontario St. West

ONTARIO

The Water-well Drillers Act, 1954
Department of Mines

49 No 994

GROUND WATER BRANCH
FEB 27 1958
ONTARIO WATER RESOURCES COMMISSION

Water-Well Record

[redacted]

...ip, Village, Town or City Caledon
... Village, Town or City)
Owner ... Address ...
Date completed 18 (day) Nov. (month) 57 (year)

Pipe and Casing Record

Casing diameter(s) 4"
Length(s) 5'
Type of screen pipe
Length of screen

Pumping Test

Static level 10'
Pumping rate 4 G.P.M.
Pumping level 10'
Duration of test 4 hrs.

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)
stony clay	0	4			
grey limestone	4	30	28	18	fresh

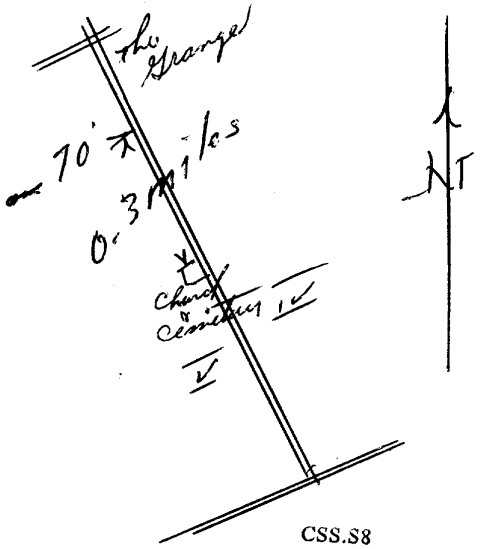
For what purpose(s) is the water to be used?
House
Is water clear or cloudy? clear
Is well on upland, in valley, or on hillside?
upland
Drilling firm G. McClure
Address R.R.1 Inglewood
Name of Driller
Address Licensee
Licence Number

I certify that the foregoing statements of fact are true.

Date ... G. McClure
Signature of Licensee

Location of Well

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



Form 5

CSS.S8

WATER RESOURCES DIVISION
SEP 27 1967
ONTARIO WATER

B
49 No 1025

UTM 17 Z 579333 E
5 R 4849444 N
Elev. 9 R 1212

Basin 24

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District Peel
Township, Village, Town or City Belfountain
Date completed 22 (day) July (month) 1967 (year)
Address Belfountain

[redacted]

Casing and Screen Record

Inside diameter of casing 36"
Total length of casing 16'
Type of screen
Length of screen
Depth to top of screen
Diameter of finished hole 36"

Pumping Test

Static level 8'
Test-pumping rate Conditional G.P.M.
Pumping level
Duration of test pumping
Water clear or cloudy at end of test Clear
Recommended pumping rate 1 G.P.M.
with pump setting of 16 feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
Top soil	0	3	15'	Fresh
Clay — stone	3	8		
Shale clay & Shale	8	16		

For what purpose(s) is the water to be used? Residence
Is well on upland, in valley, or on hillside? Hillside
Drilling or Boring Firm G. Tortington
Address R.R. 1 Orangeville
Licence Number 120
Name of Driller or Borer G. Tortington
Address Orangeville
Date July 22 1967

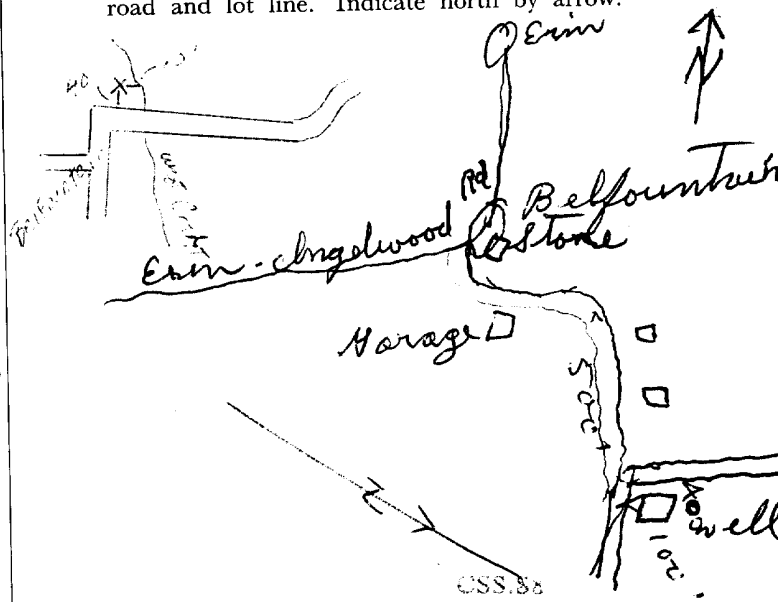
G. Tortington
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

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



30M/13W

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

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

11 | 4904489 | MUNICIP. 49002 | CON. HS W C 04

COUNTY OR DISTRICT: Peel | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Caledon | CON., BLOCK, TRACT, SURVEY, ETC.: W | LOT: 008

OWNER (SURNAME FIRST): [redacted] | ADDRESS: Hawthorne Court Ontario | DATE COMPLETED: 05 OCT 75

ZONE | EASTING | NORTHING | RC | ELEVATION | RC | BASIN CODE

4904489 | 17 | 580610 | 4849235 | 4 | 1375 | 5 | 24 | OCT 20, 1975 | 81

[redacted]

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
light brown	sand	boulders fine gravel		0	22
brown	sandstone			22	25
brown	limestone			25	30

31 | 0022|6|28|3|1|1 | 0025|6|18 | 0030|6|15

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
027	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
05	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	027
05	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE		27	030
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☑ BAILER | PUMPING RATE: 0015 GPM | DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☑ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
015 FEET	017 FEET		017 FEET	017 FEET	017 FEET	017 FEET

IF FLOWING GIVE RATE: GPM | PUMP INTAKE SET AT: 25 FEET | WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY

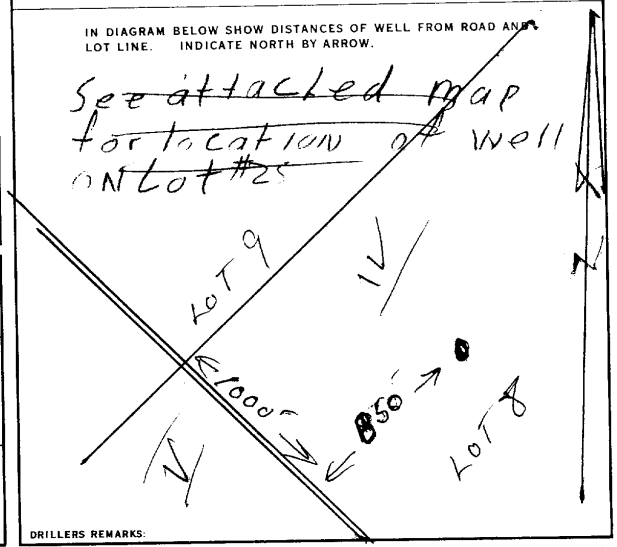
RECOMMENDED PUMP TYPE: ☑ SHALLOW ☐ DEEP | RECOMMENDED PUMP SETTING: 028 FEET | RECOMMENDED PUMPING RATE: 0015 GPM

0075 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

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

See attached map for location of well on Lot #25



DRILLERS REMARKS:

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

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

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

CONTRACTOR

NAME OF WELL CONTRACTOR: Robert Verheul | LICENCE NUMBER: 5211

ADDRESS: RR #1 Terra Cotta

NAME OF DRILLER OR BORER: Robert Verheul | LICENCE NUMBER: 5211

SIGNATURE OF CONTRACTOR: Robert Verheul | SUBMISSION DATE: DAY 5 MO. Sept YR. 75

OFFICE USE ONLY

DATA SOURCE 58: 1 | CONTRACTOR 59-62: 5211 | DATE RECEIVED 63-68: 011174

DATE OF INSPECTION: JAN. 20/75 | INSPECTOR: J.B.

REMARKS: Sub-Div. Lot #25 [redacted] | P/S.B. | WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

Ontario

WATER WELL RECORD

40 Pile

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

11 | 4904879 | MUNICIP. 49002 | CON. HS W 05

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	CALEDON	HSW. CON 5	010

[redacted] CEDER DR.

DATE COMPLETED 05 DAY 25 MO. MAY YR. 76

ELEVATION 1365 RC. 5 BASIN CODE 2+ 489

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	STONES	SAND	SMALL BOULDERS	0	15
	GRAVEL	SAND		15	19

31 | 0015 6 1228 13 0019 1128

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0019	1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
34	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☑ CONCRETE 4 ☐ OPEN HOLE		0	0019
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

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

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☑ PUMP 2 ☐ BAILER

PUMPING RATE: 0007 GPM

DURATION OF PUMPING: 04 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
005 FEET	006 FEET	FEET	FEET	FEET	FEET

WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

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

RECOMMENDED PUMP TYPE: ☑ SHALLOW ☐ DEEP

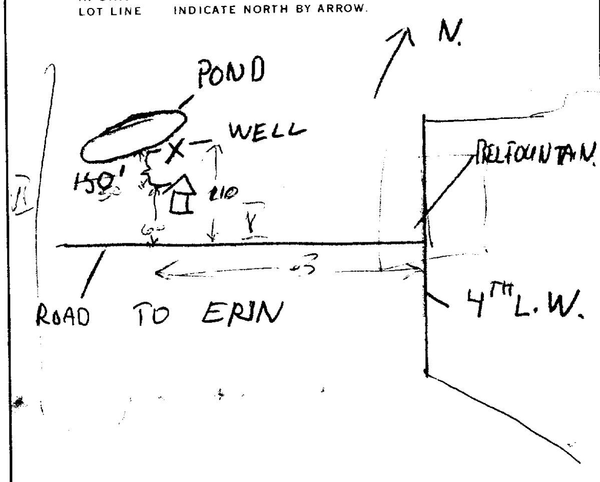
RECOMMENDED PUMP SETTING: 012 FEET

RECOMMENDED PUMPING RATE: 0005 GPM

50-53 ——— GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 7848

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



DRILLERS REMARKS

FINAL STATUS OF WELL 1

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

WATER USE 01

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

METHOD OF DRILLING 6

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

CONTRACTOR

NAME OF WELL CONTRACTOR: JACKSON CO — LICENCE NUMBER 2918

ADDRESS: RR#1 TERRA COTTA

NAME OF DRILLER OR BORER: JACK VERHEUL — LICENCE NUMBER 2918

SIGNATURE OF CONTRACTOR: Jack Verheul — SUBMISSION DATE DAY 25 MO MAY YR 76

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 2918 | DATE RECEIVED 070676

DATE OF INSPECTION | INSPECTOR

REMARKS: This well is polluted city christmas ... Lindy's well installed pump

P 9P

CSS.SS

WI

/MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

UTM Z E N

Elev. R

The Ontario Water Resources Commission Act

WATER WELL RECORD

67 No 805

Basin County or District Prince Wellington Township, Village, ~~Town or City~~ Orin

Con XI Lot 10 Date completed 10 (day) Nov. (month) 1965 (year)

[redacted] 35T ress Coobrasville

Casing and Screen Record

Inside diameter of casing 36"

Total length of casing 25'

Type of screen —

Length of screen —

Depth to top of screen

Diameter of finished hole 36"

Pumping Test

Static level 18'

~~Test pumping~~ Coming in rate ½ G.P.M.

Pumping level

Duration of test pumping

Water clear or cloudy at end of test Clear

Recommended pumping rate 1½ G.P.M.

with pump setting of 23' feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
top soil	0	2		
stoney clay	2	24		
red clay & gravel	24	25'	24	fresh

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

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

Drilling or Boring Firm G. Tartington

Address R.R. 1 Orangeville

Licence Number 72

Name of Driller or Borer as above

Address

Date Jan. 20/66

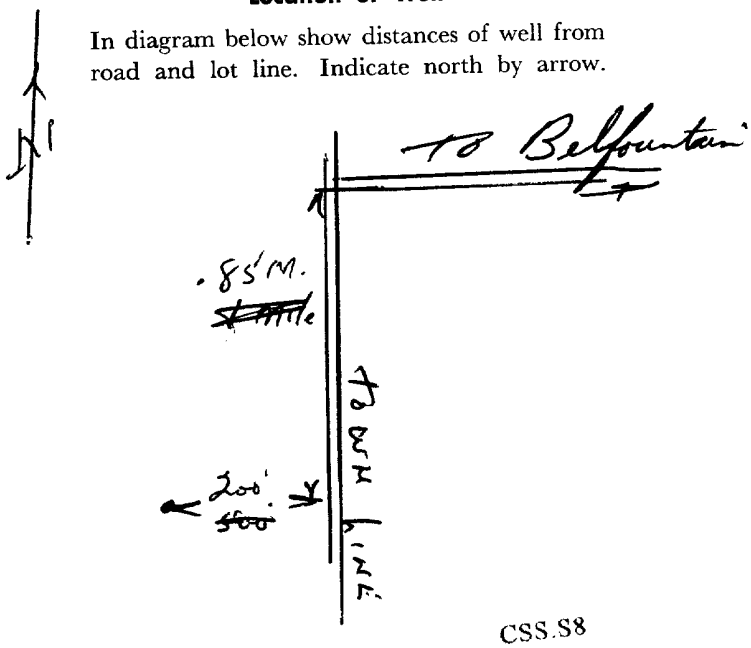
G. Tartington
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

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



CSS.S8

Appendix D

EcoLog ERIS Environmental Database Report

Canada's Primary Environmental Risk Information Service

Project Site:	**Un-named** **Bush St** **Brampton, ON**
Client:	**MAGDI WIDAATALLA** **Coffey Geotechnics Inc.** **20 Meteor Drive** **Toronto, ON M9W1A4**
ERIS Project No:	**20121207016**
Report Type:	**Custom Report - .25km Search Radius**
Prepared By:	**Shermin Haider** shaider@eris.ca
Date:	**December 17, 2012**

Table of Contents

Order Number: 20121207016
Site Name: Un-named
Site Address: Bush St Brampton, ON
Report Type: Custom Report, 0.25 km Search Radius

Report Summary

Order Number: 20121207016
Site Name: Un-named
Site Address: Bush St Brampton, ON
Report Type: Custom Report, 0.25 km Search Radius

Number of Mappable Records Surrounding the Site

Database		Selected	On-site	Within 0.25	0.25km to 0.25km	Total
AAGR	Abandoned Aggregate Inventory	N	0	0	0	0
AGR	Aggregate Inventory	N	0	0	0	0
AMIS	Abandoned Mine Information System	N	0	0	0	0
ANDR	Anderson's Waste Disposal Sites	N	0	0	0	0
AUWR	Automobile Wrecking & Supplies	N	0	0	0	0
BORE	Borehole	N	0	9	0	9
CA	Certificates of Approval	Y	1	1	0	1
CFOT	Commercial Fuel Oil Tanks	N	0	0	0	0
CHEM	Chemical Register	N	0	0	0	0
COAL	Coal Gasification Plants	N	0	0	0	0
CONV	Compliance and Convictions	Y	0	0	0	0
CPU	Certificates of Property Use	N	0	0	0	0
DRL	Drill Hole Database	N	0	0	0	0
EASR	Environmental Activity and Sector Registry	N	0	0	0	0
EBR	Environmental Registry	Y	0	0	0	0
ECA	Environmental Compliance Approval	N	0	0	0	0
EEM	Environmental Effects Monitoring	N	0	0	0	0
EHS	ERIS Historical Searches	Y	0	0	0	0
EIIS	Environmental Issues Information System	N	0	0	0	0
EXP	List of TSSA Expired Facilities	N	0	1	0	1
FCON	Federal Convictions	N	0	0	0	0
FCS	Contaminated Sites on Federal Land	N	0	0	0	0
FOFT	Fisheries & Oceans Fuel Storage Tanks	N	0	0	0	0
FST	Fuel Storage Tank	Y	0	0	0	0
GEN	Ontario Regulation 347 Waste Generators Summary	Y	0	0	0	0
HINC	TSSA Historic Incidents	N	0	1	0	1
IAFT	Indian & Northern Affairs Fuel Tanks	N	0	0	0	0
INC	TSSA Incidents	N	0	0	0	0
LIMO	Landfill Inventory Management Ontario	N	0	0	0	0
MINE	Canadian Mine Locations	N	0	0	0	0
MNR	Mineral Occurrences	N	0	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	N	0	0	0	0
NCPL	Non-Compliance Reports	N	0	0	0	0
NDFT	National Defence & Canadian Forces Fuel Storage Tanks	N	0	0	0	0
NDSP	National Defence & Canadian Forces Spills	N	0	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	N	0	0	0	0
NEES	National Environmental Emergencies System (NEES)	N	0	0	0	0
NPCB	National PCB Inventory	Y	0	0	0	0
NPRI	National Pollutant Release Inventory	Y	0	0	0	0
OGW	Oil and Gas Wells	N	0	0	0	0
OOGW	Ontario Oil and Gas Wells	N	0	0	0	0
OPCB	Inventory of PCB Storage Sites	N	0	0	0	0

Report Summary

Order Number: 20121207016
Site Name: Un-named
Site Address: Bush St Brampton, ON
Report Type: Custom Report, 0.25 km Search Radius

Database		Selected	On-site	Within 0.25	0.25km to 0.25km	Total
ORD	Orders	N	0	0	0	0
PAP	Canadian Pulp and Paper	N	0	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	N	0	0	0	0
PES	Pesticide Register	N	0	0	0	0
PINC	TSSA Pipeline Incidents	N	0	0	0	0
PRT	Private and Retail Fuel Storage Tanks	Y	0	0	0	0
PTTW	Permit to Take Water	N	0	0	0	0
REC	Ontario Regulation 347 Waste Receivers Summary	N	0	0	0	0
RSC	Record of Site Condition	N	0	0	0	0
RST	Retail Fuel Storage Tanks	N	0	0	0	0
SCT	Scott's Manufacturing Directory	Y	0	0	0	0
SPL	Ontario Spills	Y	1	1	0	1
SRDS	Wastewater Discharger Registration Database	N	0	0	0	0
TANK	Anderson's Storage Tanks	N	0	0	0	0
TCFT	Transport Canada Fuel Storage Tanks	N	0	0	0	0
VAR	Variances for Abandonment of Underground Storage Tanks	N	0	0	0	0
WDS	Waste Disposal Sites - MOE CA Inventory	Y	0	0	0	0
WDSH	Waste Disposal Sites - MOE 1991 Historical Approval Inventory	Y	0	0	0	0
WWIS	Water Well Information System	N	0	193	0	193
		TOTAL	2	206	0	206

The databases chosen by the client as per the submitted order form are denoted in the 'Selected' column in the above table. Counts have been provided outside the primary buffer area for cursory examination only. These records have not been examined or verified, therefore, they are subject to change.

ECOLOG ERIS
Pinpointing Your Environmental Risks

80 Valleybrook Dr, Toronto, ON M3B 2S9
416-510-5204

Project Property: QUOTE
Bush St
Brampton, ON

ERIS Project #: 20121207016

Date: DEC-17-2012

LEGEND

- Project Property
- Database Location

Points of Interest
- Chimney
- Silo

Pipe & Transmission Lines
- Pipeline
- Transmission Line
- Transmission Tower
- Transformer Station

Rail
- Railway - Main
- Railway - Sidetrack
- Railway - Abandoned
- Bridge
- Tunnel

Transportation - Other
- Embankment
- Trail
- Runway

Hydrographic Features
- Permanent Waterway
- Intermittent Waterway
- Open Reservoir
- Dyke/Levee
- Dam
- Breakwall
- Wetland

Landuse Classifications
- Open Area
- Residential
- Commercial
- Resource and Industrial
- Government and Institutional
- Parks and Recreational
- Waterbody

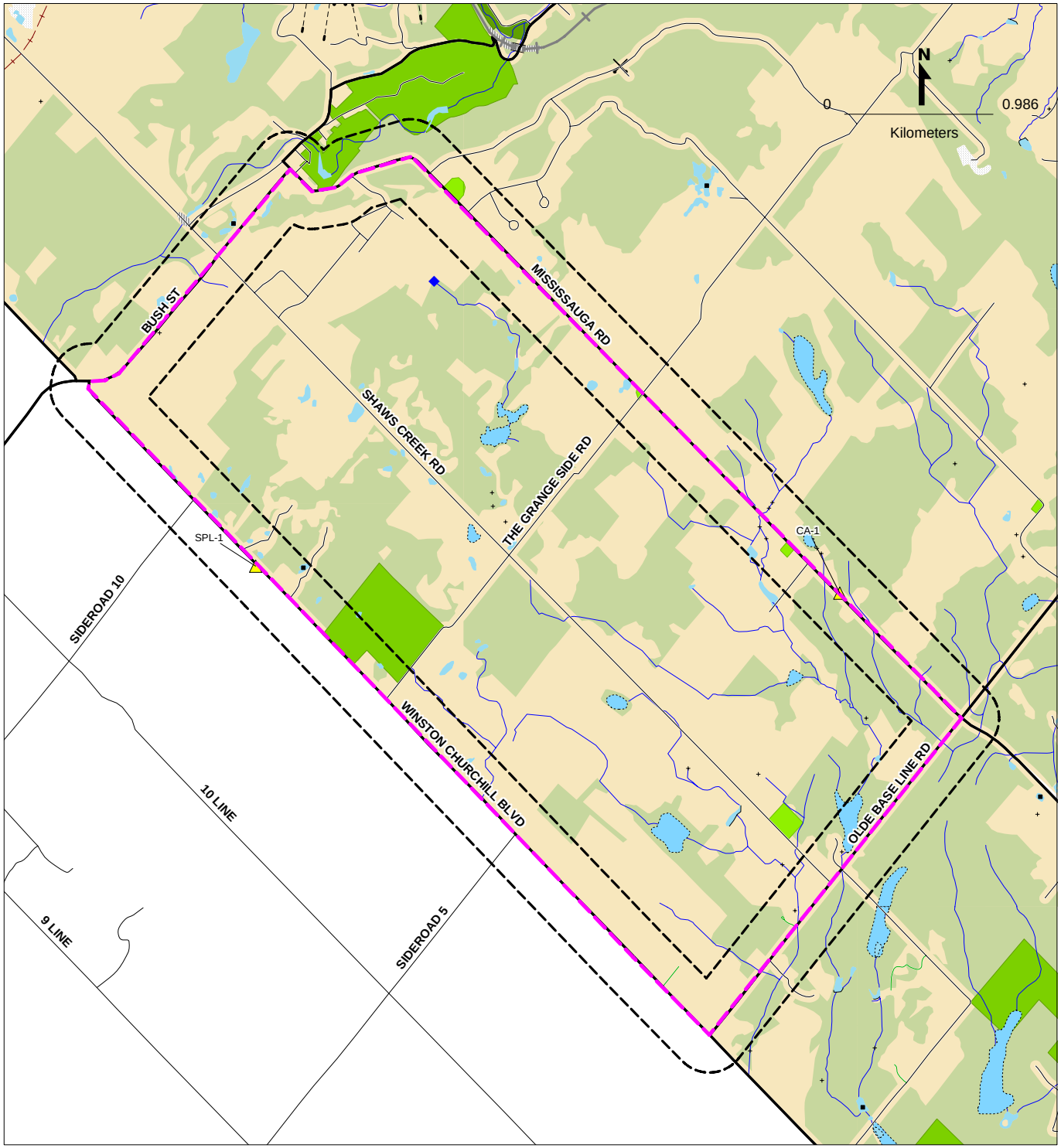
Recreation
- Golf Course/Driving Range
- Park/Sports Field
- Other Recreation Area
- Sports/Race Track
- Cemetery
- Campground

Vegetation
- Wooded Area
- Orchard
- Vineyard

Industrial Resources
- Conveyor
- Crane: Moveable
- Crane: Stationary
- Tank
- Rock Cut
- Auto Wrecker
- Lumber Yard
- Pit

This diagram is to be used solely for relative street location purposes.
It may not accurately portray street or site positions.

SITE DIAGRAM



Site Report

Order Number: 20121207016
Site Name: Un-named
Site Address: Bush St Brampton, ON
Report Type: Custom Report, 0.25 km Search Radius

FOR COMPLETE INFORMATION, REFER TO DETAIL REPORT

Ontario Spills

Map Key	Company Name	Address		City	Postal Code
SPL-1	ONTARIO HYDRO SERVICES COMPANY	LOT 10, CONCESSION 11 BLVD TRANSFORMER	5262 WINSTON CHURCHILL	ERIN TOWN	

Certificates of Approval

Map Key	Company Name	Address	City	Postal Code
CA-1		15801 Mississauga Road	Caledon	

Detail Report

Order Number: 20121207016
Site Name: Un-named
Site Address: Bush St Brampton ON
Report Type: Custom Report, 0.25 km Search Radius

If information is required for sites located beyond the selected address, please contact your ERIS representative.

Certificates of Approval

Fuel Storage Tank

Ontario Regulation 347 Waste Generators Summary

National Pollutant Release Inventory

Private and Retail Fuel Storage Tanks

Ontario Spills

Certificates of Approval

Map Key	Company	Address	Certificate #	Application Year	Issue Date	Approval Type	Status	Application Type
CA-1		15801 Mississauga Road Caledon	2837-576SFK	02	2/27/02	Industrial air	Approved	New Certificate of Approval
			Client Name:	The Corporation of the Regional Municipality of Peel				
			Client Address:	7750 Hurontario Street				
			Client City:	Brampton				
			Client Postal Code:	L6V 3W6				
			Project Description:	Approval is sought for the installation of a small emergency diesel genreator to ensure that electricity is available at all times, especially during a power failure.				
			Contaminants:					
			Emission Control:					
n/a	BETOMAT CONCRET PRODUCTS	PART LOT 10 CONC. V CALEDON TOWN	8-3038-87-	87	6/25/1987	Industrial air	Approved	
			Client Name:					
			Client Address:					
			Client City:					
			Client Postal Code:					
			Project Description:	CONCRETE BRICK MFG.				
			Contaminants:					
			Emission Control:					
n/a	R.M. OF PEEL	MISSISSAUGA RD. SLOPE STAB. CALEDON TOWN	3-0807-93-	93	7/26/1993	Municipal sewage	Approved	
			Client Name:					
			Client Address:					
			Client City:					
			Client Postal Code:					
			Project Description:					
			Contaminants:					
			Emission Control:					
n/a	PAPERTIOUS INVESTMENTS INC.	LOT 10, CON.5/STS.A/C&L CALEDON	3-0581-98-	98	5/20/1998	Municipal sewage	Approved	
			Client Name:					
			Client Address:					
			Client City:					
			Client Postal Code:					
			Project Description:					
			Contaminants:					
			Emission Control:					

Certificates of Approval

Map Key	Company	Address	Certificate #	Application Year	Issue Date	Approval Type	Status	Application Type
n/a		Part of Lot 10, Concession 5 Caledon	1503-4Q6QFE	00	10/25/00	Municipal & Private sewage	Approved	New Certificate of Approval
			Client Name:	Valleygrove Investments Inc.				
			Client Address:	2458 Dundas Street West				
			Client City:	Mississauga				
			Client Postal Code:	L5K 1R8				
			Project Description:	Construction of Sanitary sewers in the Town of Caledon (Bolton) under project 21T-89037c.				
			Contaminants:					
			Emission Control:					
n/a		Part of Lot 10, Concession 5 Caledon	8804-4Q7LKE	00	10/25/00	Municipal & Private water	Approved	New Certificate of Approval
			Client Name:	Valleygrove Investments Inc.				
			Client Address:	2458 Dundas Street West				
			Client City:	Mississauga				
			Client Postal Code:	L5K 1R8				
			Project Description:	Construction of watermains in the Town of Caledon (Bolton) under Project 21T-89037c.				
			Contaminants:					
			Emission Control:					
n/a		The Grange Sideroad Caledon	7076-5BAQVW	02	6/21/02	Municipal & Private water	Approved	New Certificate of Approval
			Client Name:	Douglas K. Wood				
			Client Address:	24 Foxchase Drive				
			Client City:	Caledon				
			Client Postal Code:	L7E 1H7				
			Project Description:	Approval is sought for the construction of watermains on Granitestone Drive and Grange Sideroad.				
			Contaminants:					
			Emission Control:					
n/a	Vincos Corp.	Part of Lot 10, Concession 5 Caledon	5442-5NKPJW	2003	6/17/2003	Municipal and Private Sewage Works	Approved	
			Client Name:					
			Client Address:					
			Client City:					
			Client Postal Code:					
			Project Description:					
			Contaminants:					
			Emission Control:					

Certificates of Approval

Map Key	Company	Address	Certificate #	Application Year	Issue Date	Approval Type	Status	Application Type
n/a	Vincos Corp.	Part of Lot 10, Concession 5 Caledon	9272-5TLK7Y	2003	12/9/2003	Municipal and Private Sewage Works	Approved	

Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Fuel Storage Tank

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	FLINKERT FARMS LTD	LOT 2 CON 11 PEEL TWP	3/16/1994	Licensed	August 2007	Private Fuel Outlet	Gasoline Station - Self Serve

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9000	1979		Liquid Fuel Single Wall UST - Gasoline

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	LAWRY & JEAN HOLLICK	LOT 34 CON 6 CALEDON	12/28/1990	Licensed	August 2007	Private Fuel Outlet	Gasoline Station - Self Serve

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9092	1982		Liquid Fuel Single Wall UST - Diesel
Active	9092	1982		Liquid Fuel Single Wall UST - Gasoline

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	FLINKERT FARMS LTD	LOT 2 CON 11 PEEL TWP	3/16/1994	Licensed	December 2008	Private Fuel Outlet	Gasoline Station - Self Serve

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9000	1979		Liquid Fuel Single Wall UST - Gasoline

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	LAWRY & JEAN HOLLICK	LOT 34 CON 6 CALEDON	12/28/1990	Licensed	December 2008	Private Fuel Outlet	Gasoline Station - Self Serve

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9092	1982		Liquid Fuel Single Wall UST - Diesel
Active	9092	1982		Liquid Fuel Single Wall UST - Gasoline

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	FLINKERT FARMS LTD	LOT 2 CON 11 PEEL TWP N0G 1P0			January 2010	Private Fuel Outlet	FS PRIVATE FUEL OUTLET - SELF SERVE

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9000	1979	Impressed Current	Liquid Fuel Single Wall UST - Gasoline

Fuel Storage Tank

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	LAWRY & JEAN HOLLICK	LOT 34 CON 6 CALEDON L0N 1E0			January 2010	Private Fuel Outlet	FS PRIVATE FUEL OUTLET - SELF SERVE

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9092	1982	Impressed Current	Liquid Fuel Single Wall UST - Diesel
Active	9092	1982	Impressed Current	Liquid Fuel Single Wall UST - Gasoline

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	FLINKERT FARMS LTD	LOT 2 CON 11 PEEL TWP N0G 1P0			June 2010	Private Fuel Outlet	FS PRIVATE FUEL OUTLET - SELF SERVE

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9000	1979	Impressed Current	Liquid Fuel Single Wall UST - Gasoline

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	LAWRY & JEAN HOLLICK	LOT 34 CON 6 CALEDON L0N 1E0			June 2010	Private Fuel Outlet	FS PRIVATE FUEL OUTLET - SELF SERVE

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9092	1982	Impressed Current	Liquid Fuel Single Wall UST - Diesel
Active	9092	1982	Impressed Current	Liquid Fuel Single Wall UST - Gasoline

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	FLINKERT FARMS LTD	LOT 2 CON 11 PEEL TWP N0G 1P0			June 2011	Private Fuel Outlet	FS PRIVATE FUEL OUTLET - SELF SERVE

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9000	1979	Impressed Current	Liquid Fuel Single Wall UST - Gasoline

Fuel Storage Tank

Map Key	Company	Address	License Issue Date	Tank Status	Tank Status As Of	Operation Type	Facility Type
n/a	LAWRY & JEAN HOLLICK	LOT 34 CON 6 CALEDON L0N 1E0			June 2011	Private Fuel Outlet	FS PRIVATE FUEL OUTLET - SELF SERVE

Status	Capacity (L)	Year of Installation	Corrosion Protection	Tank Fuel Type
Active	9092	1982	Impressed Current	Liquid Fuel Single Wall UST - Gasoline
Active	9092	1982	Impressed Current	Liquid Fuel Single Wall UST - Diesel

Ontario Regulation 347 Waste Generators Summary

Map Key	Company	Address	SIC Code	SIC Description	Waste Code	Waste Description
n/a	GRAND RIVER CONSERVATION AUTHORITY	CONESTOGO DAM, LOT 2, CONCESSION 4 PEEL TWP. N0B 2S0	8372	REG. CONS./IND. DEV. **Generator #:** ON0679504 **Approval Yrs:** 95,96,97,98	252	WASTE OILS & LUBRICANTS
n/a	GRAND RIVER CONSERVATION AUTHORITY	CONESTOGO DAM, R.R. #2 LOT 2, CONCESSION 4 PEEL TOWNSHIP N0B 2S0	8372	REG. CONS./IND. DEV. **Generator #:** ON0679504 **Approval Yrs:** 99,00,01,02,03,04	252	WASTE OILS & LUBRICANTS
n/a	CALEDON LANDSCAPING & MAINTENANCE	WINSTON CHURCHILL BLVD. C/O RR #1 TERRA COTTA CALEDON L0P 1N0	4213	SEPTIC TANK INSTAL. **Generator #:** ON1231400 **Approval Yrs:** 89	252	WASTE OILS & LUBRICANTS
n/a	CALEDON LANDSCAPING & MAINTENANCE	WINSTON CHURCHILL BLVD. LOT 9, CONC. 6 CALEDON L0P 1N0	4213	SEPTIC TANK INSTAL. **Generator #:** ON1231400 **Approval Yrs:** 92,93,97,98	252	WASTE OILS & LUBRICANTS
n/a	CALEDON LANDSCAPING & MAINTENANCE 08-574	WINSTON CHURCHILL BLVD. C/O RR #1 TERRA COTTA CALEDON L0P 1N0	4213	SEPTIC TANK INSTAL. **Generator #:** ON1231400 **Approval Yrs:** 94,95,96	252	WASTE OILS & LUBRICANTS
n/a	CALEDON LANDSCAPING & MAINTENANCE	WINSTON CHURCHILL BOULEVARD LOT 9, CONCESSION 6 CALEDON L0P 1N0	4213	SEPTIC TANK INSTAL. **Generator #:** ON1231400 **Approval Yrs:** 99,00,01	252	WASTE OILS & LUBRICANTS

National Pollutant Release Inventory

Map Key	Company	Address	NPRI #	Year	Longitude	Latitude
n/a	Union Gas Limited	Lot 9 Concession 11 Township of Peel	10141	2002		

Air	Water	Land	Units	Substances Released
29.802	0	0	tonnes	Oxides of nitrogen (expressed as NO2)
0.546	0	0	tonnes	PM10 - Particulate Matter <= 10 Microns
0.546	0	0	tonnes	PM2.5 - Particulate Matter <= 2.5 Microns

Map Key	Company	Address	NPRI #	Year	Longitude	Latitude
n/a	Union Gas Limited	Lot 9 Concession 11 Township of Peel	10141	2003		

Air	Water	Land	Units	Substances Released
68.00	0.00	0.00	tonnes	Oxides of nitrogen (expressed as NO2)
0.83	0.00	0.00	tonnes	PM10 - Particulate Matter <= 10 Microns
0.83	0.00	0.00	tonnes	PM2.5 - Particulate Matter <= 2.5 Microns

Map Key	Company	Address	NPRI #	Year	Longitude	Latitude
n/a	UNION GAS	Lot 9 Concession 11 Township of Peel	10141	2004	-79.7371	43.6743

Air	Water	Land	Units	Substances Released
88.00			tonnes	Oxides of nitrogen (expressed as NO2)
1.10			tonnes	PM10 - Particulate Matter <= 10 Microns
1.10			tonnes	PM2.5 - Particulate Matter <= 2.5 Microns

National Pollutant Release Inventory

Map Key	Company	Address	NPRI #	Year	Longitude	Latitude
n/a	UNION GAS	Lot 9 Concession 11 Township of Peel	10141	2005	-79.7371	43.6743

Air	Water	Land	Units	Substances Released
59.00			tonnes	Oxides of nitrogen (expressed as NO2)
0.72			tonnes	PM10 - Particulate Matter <= 10 Microns
0.72			tonnes	PM2.5 - Particulate Matter <= 2.5 Microns

Map Key	Company	Address	NPRI #	Year	Longitude	Latitude
n/a	Union Gas Limited	Lot 9 Concession 11 Township of Peel	10141	2006	-79.7371	43.6743

Air	Water	Land	Units	Substances Released
0.59			tonnes	PM10 - Particulate Matter <= 10 Microns
49.00			tonnes	Oxides of nitrogen (expressed as NO2)
0.59			tonnes	PM2.5 - Particulate Matter <= 2.5 Microns

Map Key	Company	Address	NPRI #	Year	Longitude	Latitude
n/a	Union Gas Limited	Lot 9 Concession 11 Township of Peel	10141	2007		

Air	Water	Land	Units	Substances Released
33.00			tonnes	Oxides of nitrogen (expressed as NO2)

Private and Retail Fuel Storage Tanks

Map Key	Company	Address	Location ID	Type	Expiry Date	Capacity (L)	Licence #
n/a	LAWRY & JEAN HOLLICK	LOT 34 CON 6 CALEDON	2540	private		18184.00	0001052614
n/a	MCNICHOL MOTORS DIV OF MONO ROAD ENTERPRISES LTD	LOT 34 CON 6 CALEDON EAST	2526	retail	1995-04-30	5000	0053302001
n/a	FLINKERT FARMS LTD	LOT 2 CON 11 PEEL TWP	11410	private		9000.00	0001043353

Ontario Spills

Map Key	Company	Address	Ref No.	Incident Dt	MOE Reported Dt	Contaminant Name	Contaminant Quantity
SPL-1	ONTARIO HYDRO SERVICES COMPANY	LOT 10, CONCESSION 11 5262 WINSTON CHURCHILL BLVD TRANSFORMER ERIN TOWN	180246	5/2/2000	5/2/2000		
			Incident Summary:	ONTARIO HYDRO: SLOW LEAK FROM A TRANSFORMER.APPROX 18L. PCB STATUS UKN.			
			Incident Cause:	OTHER CONTAINER LEAK			
			Incident Reason:	UNKNOWN			
			Nature of Impact:	Soil contamination			
			Receiving Medium:	LAND			
			Environmental Impact:	POSSIBLE			
n/a	ONTARIO HYDRO	LOT 6 CONC 11 MOTOR VEHICLE (OPERATING FLUID) ERIN TOWN	21910	7/12/1989	7/12/1989		
			Incident Summary:	ONTARIO HYDRO - 3 L HYDRAULIC FLUID TO ROAD SHOULDER.			
			Incident Cause:	PIPE/HOSE LEAK			
			Incident Reason:	MATERIAL FAILURE			
			Nature of Impact:				
			Receiving Medium:	LAND			
			Environmental Impact:	NOT ANTICIPATED			
n/a	ONTARIO HYDRO	LOT 3,CONC5. TRANSFORMER CALEDON TOWN	87457	6/23/1993	6/23/1993		
			Incident Summary:	ONTARIO HYDRO-25 LITERS HYDRAULIC OIL TO GROUND, CONTAINED,CLEANUP ONGOING			
			Incident Cause:	PIPE/HOSE LEAK			
			Incident Reason:	EQUIPMENT FAILURE			
			Nature of Impact:	Soil contamination			
			Receiving Medium:	LAND			
			Environmental Impact:	POSSIBLE			
n/a	CALEDON SKI CLUB	CALEDON SKI CLUB, MISSISSAUGA RD AND FORKS OF THE CREDIT RD, BELFONTAINE BELFONTAINE (MISSISSAUGA ROAD AND FORKS OF THE CREDIT) CALEDON TOWN	127847	6/13/1996	6/13/1996		
			Incident Summary:	CALEDON SKI CLUB-DUST SUP-RESSANT TO TOWN DITCHES,ROADS.REGION, WORKS.			
			Incident Cause:	UNKNOWN			
			Incident Reason:	CARELESS APPLICATION			
			Nature of Impact:	Multi Media Pollution			
			Receiving Medium:	LAND / WATER			
			Environmental Impact:	CONFIRMED			
n/a	HIGHLAND WELLS	763 BUSH ST BELFOUNTAIN N.W. CORNER OF CALEDON TWP CALEDON TOWN	170868	7/29/1999	7/29/1999		
			Incident Summary:	HIGHLAND WELLS: DRILLING OPERATION SLURRY DSCHRGEDTO BELFOUNTAIN CREEK			
			Incident Cause:	WASTEWATER DISCHARGE TO WATERCOURSE			
			Incident Reason:	NEGLIGENCE (APPARENT)			
			Nature of Impact:	Water course or lake			
			Receiving Medium:	WATER			
			Environmental Impact:	POSSIBLE			

Ontario Spills

Map Key	Company	Address	Ref No.	Incident Dt	MOE Reported Dt	Contaminant Name	Contaminant Quantity
n/a	Bajala Transport Ltd.	Olde Base Line Road Caledon	7316-5P9SDM	7/8/2003	7/8/2003	HYDRAULIC OIL	181 L
			Incident Summary:	Bajala Transport-40 Gal hydraulic w/ gravel to rd			
			Incident Cause:	Pipe Or Hose Leak			
			Incident Reason:	Equipment Failure - Malfunction of system components			
			Nature of Impact:	Soil Contamination			
			Receiving Medium:	Land			
			Environmental Impact:	Possible			
n/a		MISSISSAUGA RD., IN FRONT OF 1269 MISSISSAUGA RD.<UNOFFICIAL> Caledon	0854-6PENY3	5/2/2006	5/2/2006	DIESEL FUEL	10 L
			Incident Summary:	Ukn source,10 cubic yards of clean fill to ditch,clng up			
			Incident Cause:	Overturn - Truck Or Trailer			
			Incident Reason:				
			Nature of Impact:	Soil Contamination			
			Receiving Medium:	Land			
			Environmental Impact:	Possible			

Appendix: Ontario Database Descriptions

EcoLog Environmental Risk Information Services Ltd can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to EcoLog ERIS at the time of update. **Note:** Databases denoted with "*" indicates that the database will no longer be updated. See the individual database descriptions for more information.

Provincial Government Source Databases:

Abandoned Aggregate Inventory **Up to Sept 2002** **AAGR**

The MAAP Program maintains a database of all abandoned pits and quarries. Please note that the database is only referenced by lot and concession and city/town location. The database provides information regarding the location, type, size, land use, status and general comments.

Aggregate Inventory **Up to Jun 2011** **AGR**

The Ontario Ministry of Natural Resources maintains a database of all active pits and quarries. Please note that the database is only referenced by lot\concession and city/town location. The database provides information regarding the registered owner/operator, location, status, licence type, and maximum tonnage.

Abandoned Mines Information System **1800-Jan 2012** **AMIS**

The Abandoned Mines Information System contains data on known abandoned and inactive mines located on both Crown and privately held lands. The information was provided by the Ministry of Northern Development and Mines (MNDM), with the following disclaimer: "the database provided has been compiled from various sources, and the Ministry of Northern Development and Mines makes no representation and takes no responsibility that such information is accurate, current or complete". Reported information includes official mine name, status, background information, mine start/end date, primary commodity, mine features, hazards and remediation.

Borehole **1875-Aug 2011** **BORE**

A borehole is the generalized term for any narrow shaft drilled in the ground, either vertically or horizontally. The information here includes geotechnical investigations or environmental site assessments, mineral exploration, or as a pilot hole for installing piers or underground utilities. Information is from many sources such as the Ministry of Transportation (MTO) boreholes from engineering reports and projects from the 1950 to 1990's in Southern Ontario. Boreholes from the Ontario Geological Survey (OGS) including The Urban Geology Analysis Information System (UGAIS) and the York Peel Durham Toronto (YPDT) database of the Conservation Authority Moraine Coalition. This database will include fields such as location, stratigraphy, depth, elevation, year drilled, etc.
For all water well data or oil and gas well data for Ontario please refer to WWIS and OOGW.

Certificates of Approval **1985-Oct 30, 2011*** **CA**

This database contains the following types of approvals: Air & Noise, Industrial Sewage, Municipal & Private Sewage, Waste Management Systems and Renewable Energy Approvals. The MOE in Ontario states that any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste, must have a Certificate of Approval before it can operate lawfully. Fields include approval number, business name, address, approval date, approval type and status. This database will no longer be updated, as CofA's have been replaced by either Environmental Activity and Sector Registry (EASR) or Environmental Compliance Approval (ECA). Please refer to those individual databases for any information after Oct.31, 2011.

TSSA Commercial Fuel Oil Tanks 1948-Aug 2011 **CFOT**

Since May 2002, Ontario developed a new act where it became mandatory for fuel oil tanks to be registered with Technical Standards & Safety Authority (TSSA). This data would include all commercial underground fuel oil tanks in Ontario with fields such as location, registration number, tank material, age of tank and tank size.

Inventory of Coal Gasification Plants and Coal Tar Sites April 1987 and November 1988* **COAL**

This inventory includes both the "Inventory of Coal Gasification Plant Waste Sites in Ontario-April 1987" and the "Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario-November 1988) collected by the MOE. It identifies industrial sites that produced and continue to produce or use coal tar and other related tars. Detailed information is available and includes: facility type, size, land use, information on adjoining properties, soil condition, site operators/occupants, site description, potential environmental impacts and historic maps available. This was a one-time inventory.*

Compliance and Convictions 1989-Oct 2012 **CONV**

This database summarizes the fines and convictions handed down by the Ontario courts beginning in 1989. Companies and individuals named here have been found guilty of environmental offenses in Ontario courts of law.

Certificates of Property Use 1994-Oct 2012 **CPU**

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all CPU's on the registry such as (EPA s. 168.6) - Certificate of Property Use.

Drill Holes 1886-Oct 2011 **DRL**

The Ontario Drill Hole Database contains information on more than 113,000 percussion, overburden, sonic and diamond drill holes from assessment files on record with the department of Mines and Minerals. Please note that limited data is available for southern Ontario, as it was the last area to be completed. The database was created when surveys submitted to the Ministry were converted in the Assessment File Research Image Database (AFRI) project. However, the degree of accuracy (coordinates) as to the exact location of drill holes is dependent upon the source document submitted to the MNDM. Levels of accuracy used to locate holes are: centering on the mining claim; a sketch of the mining claim; a 1:50,000 map; a detailed company map; or from submitted a "Report of Work".

Environmental Activity and Sector Registry Oct 31, 2011-Nov 2012 **EASR**

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. The EASR allows businesses to register certain activities with the ministry, rather than apply for an approval. The registry is available for common systems and processes, to which preset rules of operation can be applied. The EASR is currently available for: heating systems, standby power systems and automotive refinishing. Businesses whose activities aren't subject to the EASR may apply for an ECA (Environmental Compliance Approval), Please see our ECA database.

Environmental Registry 1994-Oct 2012 **EBR**

The Environmental Registry lists proposals, decisions and exceptions regarding policies, Acts, instruments, or regulations that could significantly affect the environment. Through the Registry, thirteen provincial ministries notify the public of upcoming proposals and invite their comments. For example, if a local business is requesting a permit, license, or certificate of approval to release substances into the air or water; these are notified on the registry. Data includes: Approval for discharge into the natural environment other than water (i.e. Air) - EPA s. 9, Approval for sewage works - OWRA s. 53(1), and EPA s. 27 - Approval for a waste disposal site. For information regarding Permit to Take Water (PTTW), Certificate of Property Use (CPU) and (ORD) Orders please refer to those individual databases.

Environmental Compliance Approval **Oct 31, 2011-Nov 2012** **ECA**

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. In the past, a business had to apply for multiple approvals (known as certificates of approval) for individual processes and pieces of equipment. Today, a business either registers itself, or applies for a single approval, depending on the types of activities it conducts. Businesses whose activities aren't subject to the EASR may apply for an ECA. A single ECA addresses all of a business's emissions, discharges and wastes. Separate approvals for air, noise and waste are no longer required. This database will also include Renewable Energy Approvals. For CofA's prior to Nov 1st, 2011, please refer to the CA database. For all Waste Disposal Sites please refer to the WDS database.

List of TSSA Expired Facilities **Current to Feb 2012** **EXP**

This is a list of all expired facilities that fall under the TSSA (TSS Act & Safety Regulations), including the six regulations that exist under the Fuels Safety Division. It will include facilities such as private fuel outlets, bulk plants, fuel oil tanks, gasoline stations, marinas, propane filling stations, liquid fuel tanks, piping systems, etc. These tanks have been removed and automatically fall under the expired facilities inventory held by TSSA.

TSSA Fuel Storage Tanks **Current to Jun 2011** **FST**

The Technical Standards & Safety Authority (TSSA), under the *Technical Standards & Safety Act* of 2000 maintains a database of registered private and retail fuel storage tanks in Ontario with fields such as location, tank status, license date, tank type, tank capacity, fuel type, installation year and facility type.

Ontario Regulation 347 Waste Generators Summary **1986-Apr 2012** **GEN**

Regulation 347 of the Ontario EPA defines a waste generation site as any site, equipment and/or operation involved in the production, collection, handling and/or storage of regulated wastes. A generator of regulated waste is required to register the waste generation site and each waste produced, collected, handled, or stored at the site. This database contains the registration number, company name and address of registered generators including the types of hazardous wastes generated. It includes data on waste generating facilities such as: drycleaners, waste treatment and disposal facilities, machine shops, electric power distribution etc. This information is a summary of all years from 1986 including the most currently available data. Some records may contain, within the company name, the phrase "See & Use…" followed by a series of letters and numbers. This occurs when one company is amalgamated with or taken over by another registered company. The number listed as "See & Use", refers to the new ownership and the other identification number refers to the original ownership. This phrase serves as a link between the 2 companies until operations have been fully transferred.

TSSA Historic Incidents **2006-June 2009** **HINC**

This database will cover all incidences recorded by TSSA with their older system, before they moved to their new management system. TSSA's Fuels Safety Program administers the *Technical Standards & Safety Act* 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. We also work to protect the public, the environment and property from fuel-related hazards such as spills, fires and explosions. This database will include spills and leaks from pipelines, diesel, fuel oil, gasoline, natural gas, propane and hydrogen recorded by the TSSA.

TSSA Incidents **June 2009-Mar 2012** **INC**

TSSA's Fuels Safety Program administers the *Technical Standards & Safety Act* 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. Includes incidents from fuel-related hazards such as spills, fires and explosions. This database will include spills and leaks from diesel, fuel oil, gasoline, natural gas, propane and hydrogen recorded by the TSSA.

Landfill Inventory Management Ontario 2010 **LIMO**

The Landfill Inventory Management Ontario (LIMO) database is updated every year, as the ministry compiles new and updated information. The inventory will include small and large landfills. Additionally, each year the ministry will request operators of the larger landfills complete a landfill data collection form that will be used to update LIMO and will include the following information from the previous operating year. This will include additional information such as estimated amount of total waste received, landfill capacity, estimated total remaining landfill capacity, fill rates, engineering designs, reporting and monitoring details, size of location, service area, approved waste types, leachate of site treatment, contaminant attenuation zone and more. The small landfills will include information such as site owner, site location and certificate of approval # and status.

Mineral Occurrences 1846-Nov 2011 **MNR**

In the early 70's, the Ministry of Northern Development and Mines created an inventory of approximately 19,000 mineral occurrences in Ontario, in regard to metallic and industrial minerals, as well as some information on building stones and aggregate deposits. Please note that the "Horizontal Positional Accuracy" is approximately +/- 200 m. Many reference elements for each record were derived from field sketches using pace or chain/tape measurements against claim posts or topographic features in the area. The primary limiting factor for the level of positional accuracy is the scale of the source material. The testing of horizontal accuracy of the source materials was accomplished by comparing the planimetric (X and Y) coordinates of that point with the coordinates of the same point as defined from a source of higher accuracy.

Non-Compliance Reports 1992(water only), 1994-2010 **NCPL**

The Ministry of the Environment provides information about non-compliant discharges of contaminants to air and water that exceed legal allowable limits, from regulated industrial and municipal facilities. A reported non-compliance failure may be in regard to a Control Order, Certificate of Approval, Sectoral Regulation or specific regulation/act.

Ontario Oil and Gas Wells 1800-Feb 2012 **OOGW**

In 1998, the MNR handed over to the Ontario Oil, Gas and Salt Resources Corporation, the responsibility of maintaining a database of oil and gas wells drilled in Ontario. The OGSR Library has over 20,000+ wells in their database. Information available for all wells in the ERIS database include well owner/operator, location, permit issue date, well cap date, licence no., status, depth and the primary target (rock unit) of the well being drilled. All geology/stratigraphy table information, plus all water table information is also provide for each well record.

Ontario Inventory of PCB Storage Sites 1987-Oct 2004 **OPCB**

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of PCB storage sites within the province. Ontario Regulation 11/82 (Waste Management - PCB) and Regulation 347 (Generator Waste Management) under the Ontario EPA requires the registration of inactive PCB storage equipment and/or disposal sites of PCB waste with the Ontario Ministry of Environment. This database contains information on: 1) waste quantities; 2) major and minor sites storing liquid or solid waste; and 3) a waste storage inventory.

Orders 1994-Oct 2012 **ORD**

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all Orders on the registry such as (EPA s. 17) - Order for remedial work, (EPA s. 18) - Order for preventative measures, (EPA s. 43) - Order for removal of waste and restoration of site, (EPA s. 44) - Order for conformity with Act for waste disposal sites, (EPA s. 136) - Order for performance of environmental measures.

Pesticide Register 1988-Mar 2011 **PES**

The Ontario Ministry of Environment maintains a database of all manufacturers and vendors of registered pesticides.

TSSA Pipeline Incidents **June 2009-Mar 2012** **PINC**

TSSA's Fuels Safety Program administers the *Technical Standards & Safety Act* 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. This database will include spills, strike and leaks from recorded by the TSSA.

Private and Retail Fuel Storage Tanks **1989-1996*** **PRT**

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks and licensed retail fuel outlets. This database includes an inventory of locations that have gasoline, oil, waste oil, natural gas and/or propane storage tanks on their property. The MCCR no longer collects this information. This information is now collected by the Technical Standards and Safety Authority (TSSA).

Permit to Take Water **1994-Oct 2012** **PTTW**

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all PTTW's on the registry such as OWRA s. 34 - Permit to take water.

Ontario Regulation 347 Waste Receivers Summary **1986-2009** **REC**

Part V of the Ontario Environmental Protection Act ("EPA") regulates the disposal of regulated waste through an operating waste management system or a waste disposal site operated or used pursuant to the terms and conditions of a Certificate of Approval or a Provisional Certificate of Approval. Regulation 347 of the Ontario EPA defines a waste receiving site as any site or facility to which waste is transferred by a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents registered receivers of regulated wastes, identified by registration number, company name and address, and includes receivers of waste such as: landfills, incinerators, transfer stations, PCB storage sites, sludge farms and water pollution control plants. This information is a summary of all years from 1986 including the most currently available data.

Record of Site Condition **1997-Sept 2001, Oct 2004-Oct 2012** **RSC**

The Record of Site Condition (RSC) is part of the Ministry of the Environment's Brownfields Environmental Site Registry. Protection from environmental cleanup orders for property owners is contingent upon documentation known as a record of site condition (RSC) being filed in the Environmental Site Registry. In order to file an RSC, the property must have been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use (such as residential) proposed to take place on the property. The Record of Site Condition Regulation (O. Reg. 153/04) details requirements related to site assessment and clean up.
RSCs filed after July 1, 2011 will also be included as part of the new (O.Reg. 511/09).

Ontario Spills **1988-2011** **SPL**

This database identifies information such as location (approximate), type and quantity of contaminant, date of spill, environmental impact, cause, nature of impact, etc. Information from 1988-2002 was part of the ORIS (Occurrence Reporting Information System). The SAC (Spills Action Centre) handles all spills reported in Ontario. Regulations for spills in Ontario are part of the MOE's Environmental Protection Act, Part X.

Wastewater Discharger Registration Database **1990-2011** **SRDS**

Information under this heading is combination of the following 2 programs. The Municipal/Industrial Strategy for Abatement (MISA) division of the Ontario Ministry of Environment maintained a database of all direct dischargers of toxic pollutants within nine sectors including: Electric Power Generation; Mining; Petroleum Refining; Organic Chemicals; Inorganic Chemicals; Pulp & Paper; Metal Casting; Iron & Steel; and Quarries. All sampling information is now collected and stored within the Sample Result Data Store (SRDS).

TSSA Variances for Abandonment of Underground Storage Tanks **Current to October 2011** **VAR**

The TSSA, Under the Liquid Fuels Handling Code and the Fuel Oil Code, all underground storage tanks must be removed within two years of disuse. If removal of a tank is not feasible, you may apply to seek a variance from this code requirement. This is a list of all variances granted for abandoned tanks.

Waste Disposal Sites - MOE CA Inventory **1970-Nov 2012** **WDS**

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of known open (active or inactive) and closed disposal sites in the Province of Ontario. Active sites maintain a Certificate of Approval, are approved to receive and are receiving waste. Inactive sites maintain Certificate(s) of Approval but are not receiving waste. Closed sites are not receiving waste. The data contained within this database was compiled from the MOE's Certificate of Approval database. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number. All new Environmental Compliance Approvals handed out after Oct 31, 2011 for Waste Disposal Sites will still be found in this database.

Waste Disposal Sites - MOE 1991 Historical Approval Inventory **Up to Oct 1990*** **WDSH**

In June 1991, the Ontario Ministry of Environment, Waste Management Branch, published the "June 1991 Waste Disposal Site Inventory", of all known active and closed waste disposal sites as of October 30st, 1990. For each "active" site as of October 31st 1990, information is provided on site location, site/CA number, waste type, site status and site classification. For each "closed" site as of October 31st 1990, information is provided on site location, site/CA number, closure date and site classification. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number.

Water Well Information System **1955-2011** **WWIS**

This database describes locations and characteristics of water wells found within Ontario in accordance with Regulation 903. It includes such information as coordinates, construction date, well depth, primary and secondary use, pump rate, static water level, well status, etc. Also included are detailed stratigraphy information, approximate depth to bedrock and the approximate depth to the water table.

Federal Government Source Databases: Diagram Identifier:

Environmental Effects Monitoring **1992-2007*** **EEM**

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

Environmental Issues Inventory System **1992-2001*** **EIIS**

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

Federal Convictions **1988-Jun 2007** **FCON**

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Contaminated Sites on Federal Land **June 2000-Sept 2012** **FCS**

The Treasury Board of Canada Secretariat maintains an inventory of all known contaminated sites held by various Federal departments and agencies. This inventory does not include properties owned by Crown corporations, but does contain non-federal sites for which the Government of Canada has accepted some or all financial responsibility. All sites have been classified through a system developed by the Canadian Council of Ministers of the Environment. The database provides information on company name, location, site ID #, property use, classification, current status, contaminant type and plan of action for site remediation.

Fisheries & Oceans Fuel Tanks **1964-Sept 2003** **FOFT**

Fisheries & Oceans Canada maintains an inventory of all aboveground & underground fuel storage tanks located on Fisheries & Oceans property or controlled by DFO. Our inventory provides information on the site name, location, tank owner, tank operator, facility type, storage tank location, tank contents & capacity, and date of tank installation.

Indian & Northern Affairs Fuel Tanks **1950-Aug 2003** **IAFT**

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of all aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

National Analysis of Trends in Emergencies System (NATES) **1974-1994*** **NATE**

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

National Defence & Canadian Forces Fuel Tanks **Up to May 2001*** **NDFT**

The Department of National Defence and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

National Defence & Canadian Forces Spills **Mar 1999-Aug 2010** **NDSP**

The Department of National Defence and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

National Defence & Canadian Forces Waste Disposal Sites **2001-April 2007** **NDWD**

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

National Environmental Emergencies System (NEES) 1974-2003 **NEES**

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for all previous Environment Canada spill datasets. NEES is composed of the historic datasets – or Trends – which dates from approximately 1974 to present. **NEES Trends** is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

National PCB Inventory 1988-2008 **NPCB**

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. All federal out-of-service PCB containing equipment and all PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites.

National Pollutant Release Inventory 1993-2010 **NPRI**

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances.

Parks Canada Fuel Storage Tanks 1920-Jan 2005 **PCFT**

Canadian Heritage maintains an inventory of all known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Transport Canada Fuel Storage Tanks 1970-March 2007 **TCFT**

With the provinces of BC, MB, NB, NF, ON, PE, and QC; Transport Canada currently owns and operates 90 fuel storage tanks. This inventory will also include The Pickering Lands, which refers to the 7,530 hectares (18,600 acres) of land in Pickering, Markham and Uxbridge - owned by the Government of Canada since 1972. Properties on this land has been leased by the government since 1975, falls under the Site Management Policy of Transport Canada, but administered by Public Works and Government Services Canada. Our inventory provides information on the site name, location, tank age, capacity and fuel type.

Private Source Databases:

Anderson's Waste Disposal Sites 1860s-Present **ANDR**

The information provided in this database was collected by examining various historical documents which aimed to characterize the likely position of former waste disposal sites from 1860 to present. The research initiative behind the creation of this database was to identify those sites that are missing from the *Ontario MOE Waste Disposal Site Inventory*, as well as to provide revisions and corrections to the positions and descriptions of sites currently listed in the MOE inventory. In addition to historic waste disposal facilities, the database also identifies certain auto wreckers and scrap yards that have been extrapolated from documentary sources. *Please note that the data is not warranted to be complete, exhaustive or authoritive. The information was collected for research purposes only.*

Automobile Wrecking & Supplies 2001-Jun 2010 **AUWR**

This database provides an inventory of all known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Chemical Register 1992, 1999-Jun 2010 **CHEM**

This database includes information from both a one time study conducted in 1992 and private source and is a listing of facilities that manufacture or distribute chemicals. The production of these chemical substances may involve one or more chemical reactions and/or chemical separation processes (i.e. fractionation, solvent extraction, crystallization, etc.).

ERIS Historical Searches 1999-Apr 2012 **EHS**

EcoLog ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Canadian Mine Locations 1998-2009 **MINE**

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Oil and Gas Wells Oct 2001-Sept 2012 **OGW**

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickles' database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Canadian Pulp and Paper 1999, 2002, 2004, 2005, 2009 **PAP**

This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Retail Fuel Storage Tanks 2000-Jun 2010 **RST**

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks. Information is provided on company name, location and type of business.

Scott's Manufacturing Directory 1992-Mar 2011 **SCT**

Scott's Directories is a data bank containing information on over 70,000 manufacturers in Ontario. Even though Scott's listings are voluntary, it is the most comprehensive database of Ontario manufacturers available. Information concerning a company's address, plant size, and main products are included in this database. This database begins with 1992 information and is updated annually.

Anderson's Storage Tanks 1915-1953* **TANK**

The information provided in this database was collected by examining various historical documents, which identified the location of former storage tanks, containing substances such as fuel, water, gas, oil, and other various types of miscellaneous products. Information is available in regard to business operating at tank site, tank location, permit year, permit & installation type, no. of tanks installed & configuration and tank capacity. *Data contained within this database pertains only to the city of Toronto and is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.*