

SCOPED HYDROGEOLOGY REPORT

for

HALL'S LAKE ESTATES

Report Prepared for:

Riteland Development Corporation
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Rexdale, Ontario
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Prepared by:



February 2015
Reference: 11-167



Civil - Environmental - Water Resources

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TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 INTRODUCTION	1
1.1 Report Scope and Qualifications	1
2.0 STUDY AREA	2
2.1 Background Studies and Reports	2
2.1.1 Soil Investigation	2
2.1.2 Preliminary Engineering and Stormwater Management Report	2
2.1.3 Functional Engineering Design Report	3
2.1.4 Natural Heritage Evaluation, Hall's Lake	3
2.1.5 Oak Ridges Moraine Natural Heritage Evaluation	3
2.2 Physiography	3
2.3 Topography and Drainage	3
2.4 Site Geology	4
2.4.1 Bedrock Geology	4
2.4.2 Overburden	4
2.5 Water Uses in the Area	4
2.6 Groundwater	5
2.7 Environmental Considerations	6
3.0 IMPACT ASSESSMENT	7
3.1 Water Table Depth, Well Water Quantity and Quality	7
3.2 Groundwater Flow Systems	8
3.2.1 Shallow Groundwater System	8
3.2.2 Deep Groundwater System	8
3.3 Municipal Water Supply	8
3.4 Potential Site Wells	8
3.5 On-Site Sewage Disposal and Nitrate Loading Analysis	9
4.0 MONITORING AND CONTINGENCY PLANNING	11
4.1 Wetland Features	11
4.2 Well Water Quantity and Quality	11
4.0 SUMMARY	12
REFERENCES	14
<u>APPENDICES</u>	
APPENDIX A: SUPPORTING GEOTECHNICAL INFORMATION	
APPENDIX B: WELL WATER RECORDS	
APPENDIX C: SITE WETLAND FEATURES	
APPENDIX D: NITRATE LOADING ANALYSIS	

1.0 INTRODUCTION

Calder Engineering Ltd. has been retained by Riteland Development Corporation to prepare a Scoped Hydrogeology Report for the proposed Hall's Lake Estates residential development in the Palgrave area of the Town of Caledon. The report is supporting documentation for the respective subdivision Draft Plan application and has been prepared to meet requirements of Section 7.1.18.5 of the Town of Caledon Official Plan.

The site location is shown in Figure 1.1. The site is bounded by Mount Wolfe Road to the west, an unopened road allowance and agricultural land to the north, an unopened road allowance and open space to the east, and a single family home and agricultural lands to the south. The legal description of the property is Part of Lot 20, Concession 10, former Township of Albion, Town of Caledon, Regional Municipality of Peel.

The overall site comprises 56.12 hectares (ha). It is proposed to develop the site with 28 estate residential lots using a combined rural and urban road cross-section, individual private septic systems for sewage disposal, and municipal water. Drainage and storm water would be managed with the application of Low Impact Development (LID) practices.

The objective of this report is to describe existing hydrogeological conditions on the site, identify potential impacts of the proposed project on the local groundwater system, and identify the process for future monitoring and contingency planning.

1.1 Report Scope and Qualifications

This report is a Scoped Hydrogeology Report providing a review and consolidation of existing information. Site specific information on groundwater conditions was obtained from previous investigations and reports prepared for the project, and additional documentation reviewed on local well records.

Hydrogeological information has been provided for this project by LGI Consulting Engineers Inc. (2006), Soil Engineers Ltd. (2015), and Calder Engineering Ltd. (2015). This Scoped Hydrogeological Report should be read in conjunction with these reports.

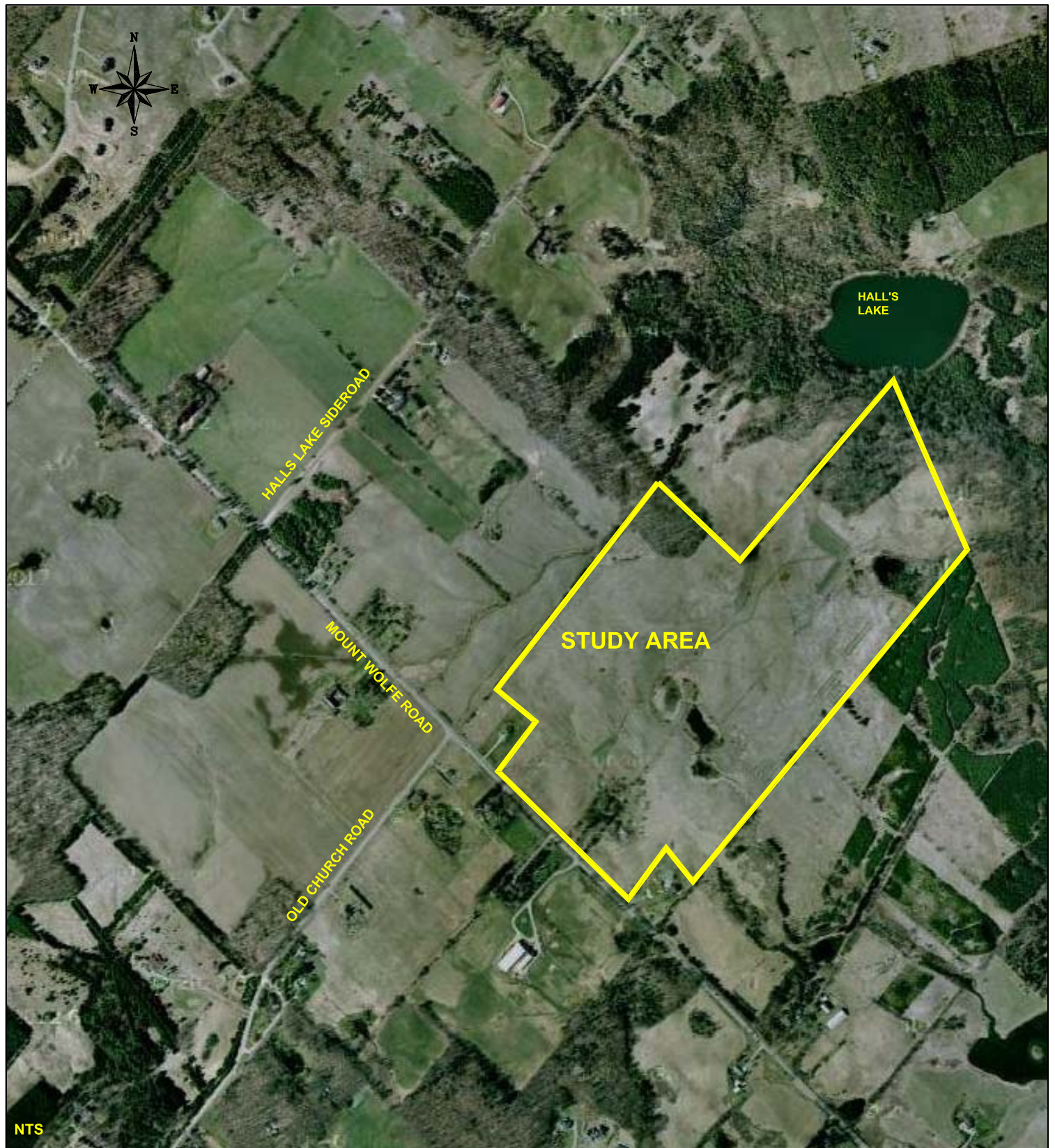


FIGURE 1.1
HALL'S LAKE ESTATES STUDY AREA LOCATION

Reference: Aerial Image from Google Earth
Image placement is approximate and not orthorectified



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2.0 STUDY AREA

2.1 Background Studies and Reports

A number of background studies and reports have been completed for the project as part of and pursuant to the original draft plan application in 1998. The following studies and reports provide relevant information on site hydrogeological and environmental conditions:

- A Soil Investigation for Proposed Residential Development, Mount Wolfe Road and Hall's Lake Sideroad, Town of Caledon, dated January 2015 and prepared by Soil Engineers Ltd.;
- Functional Servicing and Stormwater Management Report for Hall's Lake Estates, dated February 2015 and prepared by Calder Engineering Ltd.;
- Functional Engineering Design Report for the Proposed Hall's Lake Estates Subdivision, dated February 2006 and prepared by LGI Consulting Engineers Inc.;
- Natural Heritage Evaluation, Hall's Lake, dated December 2010 and prepared by SAAR Environmental Limited; and
- Oak Ridges Moraine Natural Heritage Evaluation – Proposed Hall's Lake Estates Subdivision, Town of Caledon, dated January 2014 and prepared by Savanta Inc.

A summary of these reports and key findings is provided in sections 2.1.1 through 2.1.5.

2.1.1 Soil Investigation

A geotechnical investigation was performed by Soil Engineers Ltd. (2015) comprising 10 boreholes ranging from 4.7 to 5.0 metres in depth. The boreholes locations and borehole logs are provided in Appendix A. Generally, the site consists of an approximately 250 to 400 millimetre layer of topsoil, which overlays silty clay or silty sand till.

It is indicated in the geotechnical investigation that the silty clay till is practically impervious with an estimated coefficient of permeability of 10^{-6} centimetres per second (cm/s) and the silty sand till has a moderate to relatively low permeability with an estimated coefficient of permeability in the range of 10^{-4} to 10^{-5} cm/s. The silty sand till dominates soil stratigraphy along the southern boundary of the site.

The presence of groundwater was detected at two of the ten boreholes: Borehole 2 at a depth of 0.6 metres and Borehole 8 at a depth of 2.4 metres. The observed groundwater was attributed to precipitation trapped in the fissures of weathered soil, and in the sand and silt layers laminated in the tills. The colour of the soil remained brown to the maximum investigated depth, indicating that the soils have oxidized and the permanent groundwater regime lies below the maximum investigated depth of approximately 5 metres.

2.1.2 Preliminary Engineering and Stormwater Management Report

A Preliminary Engineering and Stormwater Management Report was prepared by Calder Engineering Ltd. (2015). Identified in the report were preliminary road grades, proposed methods for site sanitary and water servicing, and plan for drainage and stormwater management. The information was noted as preliminary and subject to detailed design.

Detailed design of the road system, site sanitary and water services, and drainage and stormwater management infrastructure would be undertaken following Draft Plan Approval.

In addition, in this report the process and procedures for undertaking a features based water balance for the project was overviewed. It was identified that the features based water balance would be undertaken in two stages. The first stage would involve monitoring and baseline data collection to establish the current hydrologic and ecological conditions. The second stage would involve detailed technical analyses and assessment.

2.1.3 Functional Engineering Design Report

The Functional Engineering Design Report prepared by LGI Consulting Engineers Inc. (2006), although for a different Draft Plan version and stormwater management concept, contains a detailed summary of the project history and original planning context, and site physical conditions including topography and drainage, soils, geology, hydrogeology and groundwater.

2.1.4 Natural Heritage Evaluation, Hall's Lake

A description of environmental features on the site has been provided by SAAR Environmental Limited (2010). As reported by SAAR Environmental Limited, the site supports three types of key natural heritage features:

- Provincially Significant Wetlands;
- Significant Woodlands; and
- Riparian Valley.

Environmental features on the site were staked and surveyed in November 2007.

2.1.5 Oak Ridges Moraine Natural Heritage Evaluation – Proposed Hall's Lake Estates Subdivision, Town of Caledon

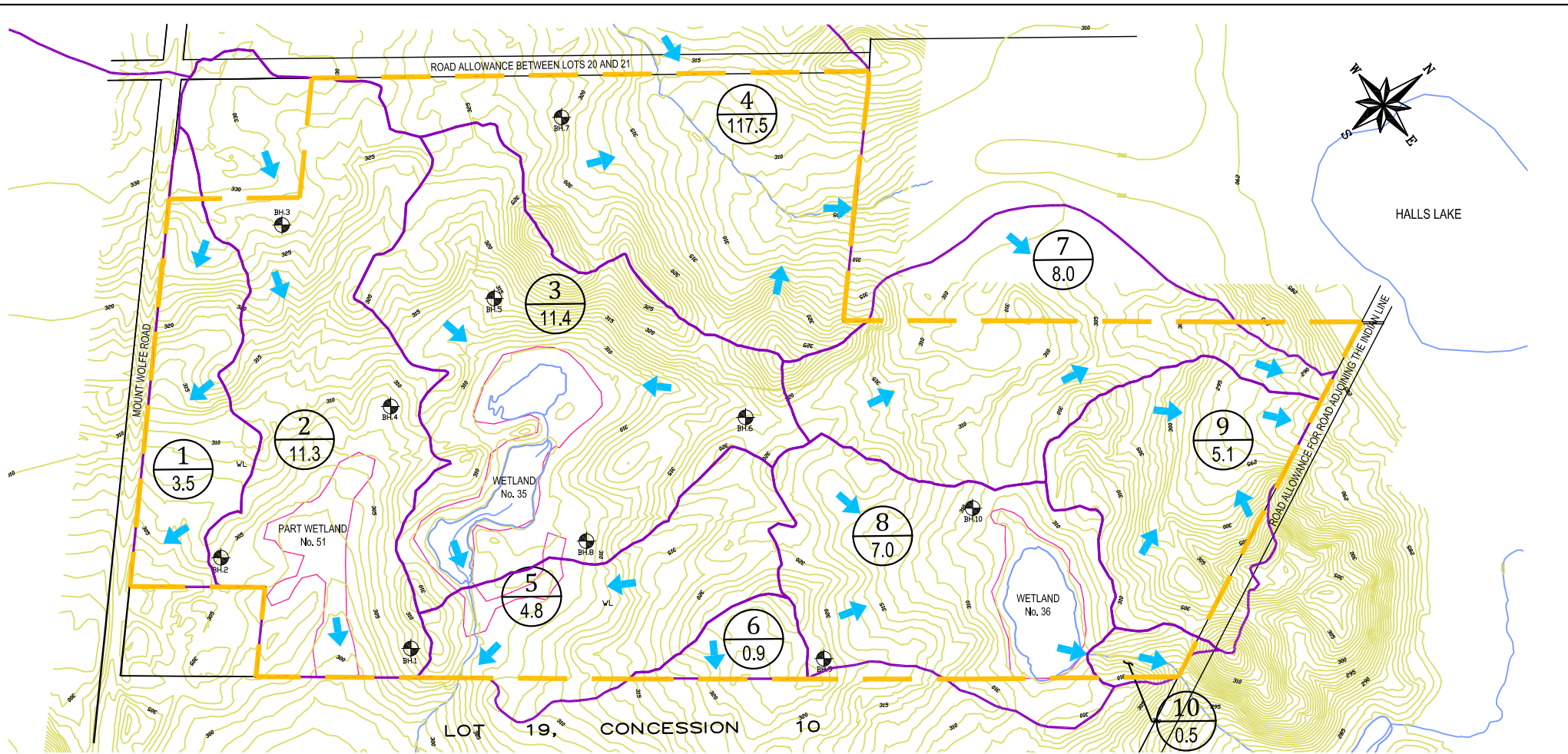
An updated Natural Heritage Evaluation was prepared by Savanta Inc. (2014) in support of revisions to the Draft Plan made in 2013, and to address 2011 review comments provided by the Town of Caledon and Toronto Region Conservation Authority on the 2010 Draft Plan.

2.2 Physiography

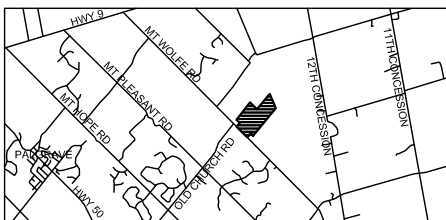
As reported by SAAR Environmental Limited (2010), the site is part of the Palgrave Moraine, an ice-contact stratified area of sands, gravels, and silts that originated as kame outwash deposits. The Palgrave Moraine is a strip of hummocky topography 5 to 7 kilometres in width extending from Caledon East to the Palgrave and Mount Wolfe area, and then east to King City (White, 1975).

2.3 Topography and Drainage

Existing topography and drainage patterns are shown on Figure 2.1. In general, the site comprises hummocky terrain consisting of hills, low-lying wetland areas, and a northwest to southeast trending topographic ridge which divides drainage. Lands to the south and west of the ridge drain to the Humber River Watershed. Lands to the north and east of the ridge drain to Hall's Lake and the Hall's Creek lowlands, which are part of the Holland River Watershed.




KEY PLAN



NTS



LEGEND

- PROPERTY LINE
-  BOREHOLE LOCATION
- DRAINAGE BOUNDARY
- 2

SUB-CATCHMENT ID
- 11.3

SUB-CATCHMENT AREA (ha)
- ➔ MAJOR FLOW DIRECTION
- KNHF WETLAND BOUNDARIES

NOTES

Calder Engineering Ltd. TOWN OF CALEDON

RITELAND DEVELOPMENT CORPORATION

HALL'S LAKE ESTATES
DRAFT PLAN APPLICATION (21T-98001C)
PART OF LOT 20, CONCESSION 10 (ALBION)
TOWN OF CALEDON, REGION OF PEEL

FIGURE 2.1
EXISTING DRAINAGE BOUNDARIES

The highest point in the surrounding area is Mount Wolfe, which is approximately at elevation 367 metres. The highest elevation on the site occurs in the northwest corner of the property (approximately 330 metres) and the lowest elevation in the eastern extremity adjacent to the Hall's Creek lowlands (approximately 280 metres). Slopes range from 0% to >25%.

The pre-development drainage patterns have been broken down into 10 catchments as shown on Figure 2.1. Catchments 1 to 6 drain to a tributary of the Humber River (Humber River Watershed) and Catchments 7 to 10 drain towards Hall's Lake and the Hall's Creek lowlands (Holland River Watershed).

There are two wetland areas on the site: one is located in Catchment 3 and is designated as Wetland No. 35, and the other is located in Catchment 8 and is designated as Wetland No. 36. These wetlands are part of the provincially significant Hall Lake-Kennifick Wetland Complex. The wetland designation numbers are from the Ontario Ministry of Natural Resources. An intermittent dry swale drains through Catchment 2. The lower segment of this swale is considered part of the provincially significant Hall Lake-Kennifick Wetland Complex (e.g., part of the northern extension of Wetland No. 51).

2.4 Site Geology

2.4.1 Bedrock Geology

On the site, bedrock is not observable at the existing ground surface and was not reached in any of the boreholes completed by Soil Engineers Ltd. (2015). The site is underlain by the Georgian Bay Formation. The Georgian Bay Formation is composed of a thinly bedded, olive green and grey siltstone, silty limestone and limestone intermingled with thin beds of green shale. White (1975) reports that the bedrock surface slopes to the southeast.

2.4.2 Overburden

Based on mapping created by White (1975), the overburden of the site is northern lower till and ice contact stratified drift. The overburden of southwest corner of the site extends into the northern lower till associated with the Mount Wolfe landform. The till was described as a "light brown-grey gravelly loam to sandy loam till". The remainder of the site is ice contact stratified drift described as "sand gravel and (locally) silt with a structure that is often disturbed".

The overburden as described by Soil Engineers Ltd. (2015), based on site specific field investigation, is a silty clay and silty sand till to a depth of at least 5 metres.

2.5 Water Uses in the Area

The surrounding area is rural with agricultural and estate residential land uses. Residences in the area are typically serviced by wells and on-site sewage disposal systems. The proposed development would be serviced by municipal water and individual private on-site sewage disposal systems.

The site is located outside the 2 to 25-year wellhead protection areas as identified on Schedule 'O' of the Town of Caledon Official Plan (2008).

Well records on file with the Ontario Ministry of Environment (MOE) were reviewed to identify potential local well water uses. As of December 2013, twenty (20) well records were

identified within 500 metres of the property and along a 500 metres corridor associated with proposed watermain extension from Bruno Ridge Drive to the site (to service the site with municipal water). These include 1 record on the property with overall total of 20 records comprising, 2 abandonment records, 17 domestic supply wells, and 1 with no use listed. A summary of local well records on file with the MOE is provided in Appendix B. The approximate locations of identified wells are shown on Figure 2.2. It should be noted that some of the wells are greater than 500 metres from where construction is proposed.

2.6 Groundwater

The subject lands are located in the headwater regions of the Lake Ontario and Georgian Bay watersheds and more specifically, the headwaters of the Humber River and Holland River.

Locally, the site is located partially in the physiographic areas of the Mount Wolfe South Slopes and Hall's Lake Lowlands. The Mount Wolfe South Slopes are considered regional groundwater recharge areas and the Hall's Lake Lowlands represent an area of groundwater discharge for local unconfined aquifers.

Review of local well records indicate that area wells typically obtain water from confined sand and gravel aquifers which underlie the silty clay/silty sand overburden. A small number of wells were identified to be located at shallow elevations in unconfined aquifers.

Groundwater flow can generally be described in terms of shallow and deep systems. Shallow groundwater flow on the site will follow surface topography and flow down slopes. The ridge on the site forms a local divide for shallow groundwater flow. To the north of the ridge, shallow groundwater will flow north-easterly towards Hall's lake and the Hall's Creek lowlands. South of the ridge, shallow groundwater will flow southward to the low lying areas on the south half of the site and off-site to topographic lows.

Flow direction in the deeper confined aquifer(s) and regional groundwater system has not been assessed. Description of the geology and groundwater resources at a regional scale has been provided by Toronto and Region Conservation (2008). It is indicated by Toronto and Region Conservation (2008) that the site is overlain by the Halton Till which subsequently overlies the Oak Ridges Moraine Aquifer.

Soil investigations conducted on the site by Soil Engineers Ltd. (2006) included 10 boreholes. The presence of groundwater was detected at two of the ten boreholes: Borehole 2 at a depth of 0.6 metres and Borehole 8 at a depth of 2.4 metres. The observed groundwater was attributed to precipitation trapped in the fissures of weathered soil, and in the sand and silt layers laminated in the tills. The colour of the soil remained brown to the maximum investigated depth, indicating that the soils have oxidized and the permanent groundwater regime lies below the maximum investigated depth of approximately 5 metres.

Groundwater yield from the silty clay till is expected to be limited due to the low permeability. Groundwater yield in the silty sand till is expected to be some to moderate due to the increased permeability. Silty clay till was encountered in all boreholes except 1, 2 and 9. Silty sand till was encountered in boreholes 1, 2, 8, 9 and 10.

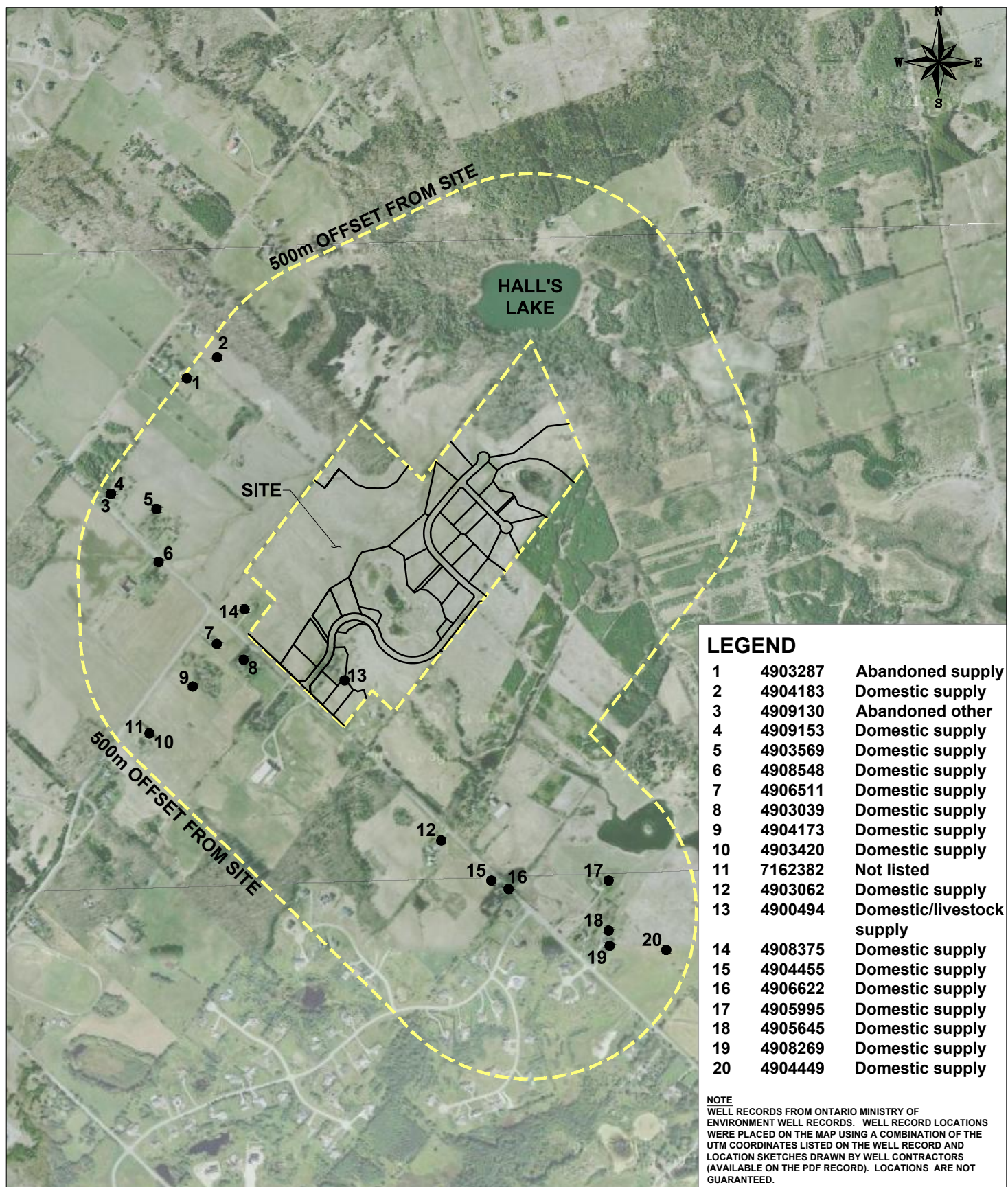


FIGURE 2.2
MOE Well Records Within 500m of Site (as of December 2013)

AERIAL IMAGE FROM GOOGLE MAPS
IMAGE PLACEMENT IS APPROXIMATE AND NOT ORTHORECTIFIED

2.7 Environmental Considerations

As reported by SAAR Environmental Limited, the site supports three types of key natural heritage features:

- Provincially Significant Wetlands;
- Significant Woodlands; and
- Riparian Valley.

Two wetland features have been identified on the project site that are part of the provincially significant Hall Lake-Kenniflick Wetland Complex. These features were staked and surveyed in November 2007. Site walks in 2013 by Savanta Inc. have indicated that the wetland feature boundaries are similar to what was previously established.

Further to the above, correspondence received from the Ministry of Natural Resources dated March 16th, 2009 confirms that wetland boundaries and vegetation communities for the two wetland features are associated with wetlands numbers 35 and 36 of the provincially significant Hall Lake-Kenniflick Wetland Complex. In addition, it was identified in this correspondence that part of the dry swale in the western part of the site is associated with Wetland No. 51 of this complex. This correspondence is provided in Appendix C. Discussion of these wetland features has been provided by SAAR Environmental Limited (2010) and Savanta Inc. (2014).

Currently, monitoring of water levels in these wetland features is on-going. The nature of surface and groundwater interaction in these features will be assessed as part of a features based water balance to be conducted following Draft Plan approval. Description of the monitoring program has been provided by Calder Engineering Ltd. (2015).

3.0 IMPACT ASSESSMENT

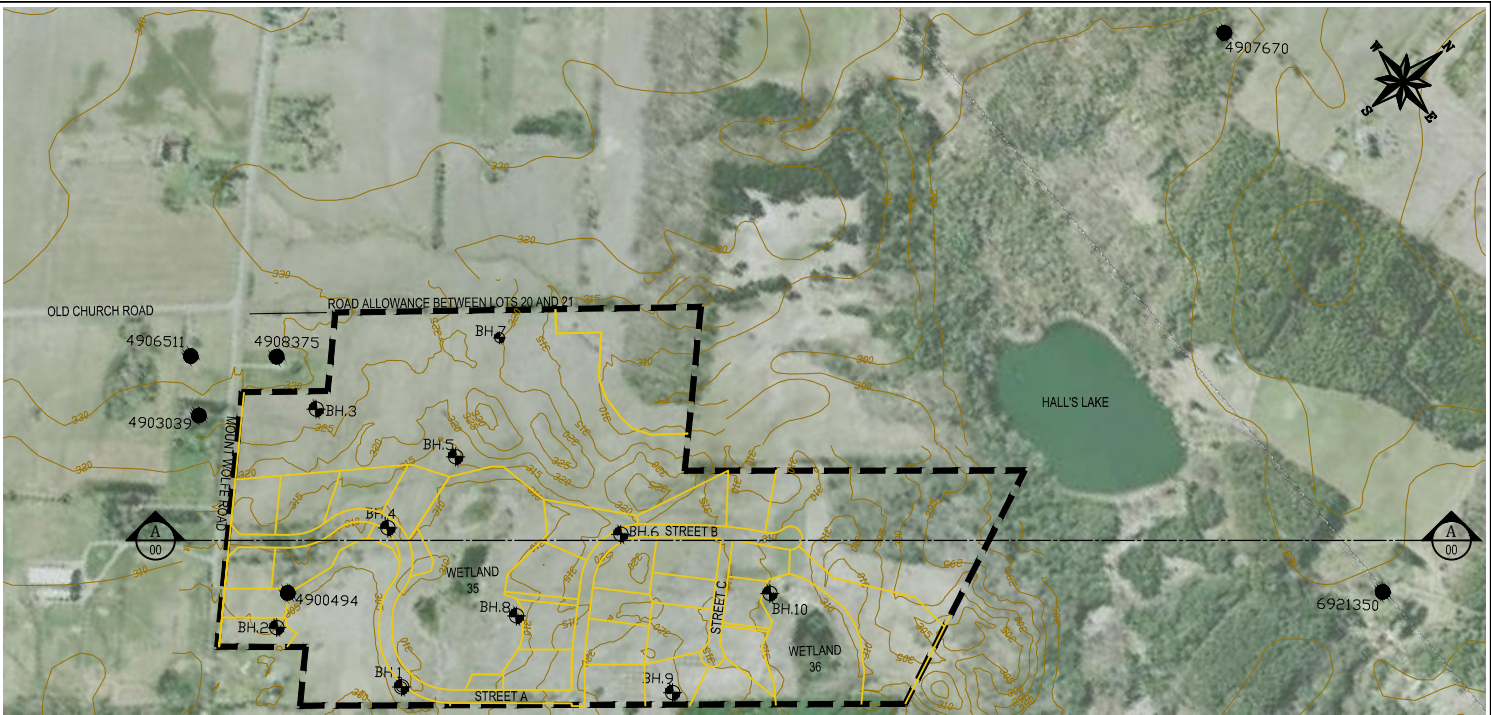
The proposed development consists of 28 estate residential lots using a combined rural and urban road cross-section, individual private septic systems for sewage disposal, and municipal water.

A discussion of potential impacts from the development on hydrogeological conditions is provided in sections 3.1 through 3.5. An east-west stratigraphy cross-section through the site is provided in Figure 3.1. This figure was prepared based on review of existing topography, well records, and boreholes.

3.1 Water Table Depth, Well Water Quantity and Quality

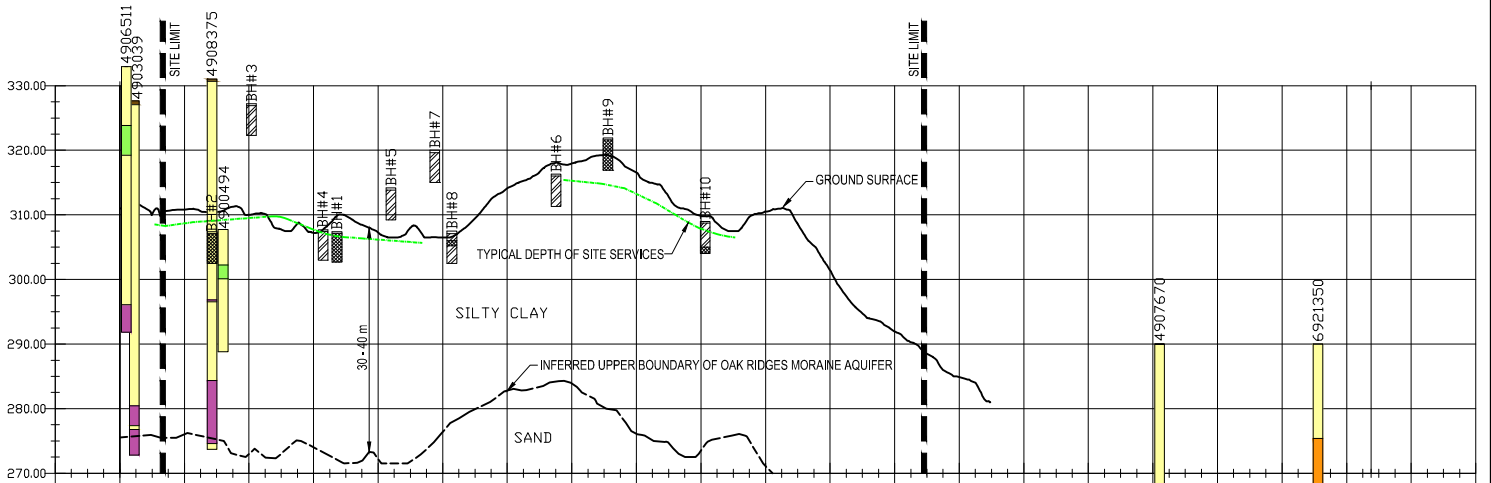
No impacts are anticipated on local water table levels, well water quantity, or well water quality. This statement is made based on the following rationale:

- construction of services and homes is expected to occur above the water table and thus no dewatering would be required
- construction of services and homes is expected to be within the top several metres of the overlying silty clay and silty sand tills which typically are of low permeability
- construction of the on-site sewage disposal systems (e.g., leaching beds) is expected to be within the top 0.5 metres of the overlying silty clay and silty sand tills which typically are of low permeability
- it is anticipated that the on-site sewage disposal systems will be Class 4 systems with tertiary treatment units
- ten boreholes drilled on the site have indicated that the overlying silty clay and silty sand tills are at least 5 metres in thickness
- review of water well records indicates that the overlying silty clay and silty sand tills may be up to 40 metres in thickness
- private domestic water supply wells in the local area are typically at a depth of greater than 40 metres and draw water from soil water bearing zones under the overlying silty clay and silty sand tills
- no deep storm or sanitary sewers are anticipated to be constructed which would intercept water-bearing soil zones
- pre-development drainage patterns are in general to remain similar under post-development conditions
- Low Impact Development practices are proposed for implementation, where feasible, to reduce potential increased surface runoff volumes and provide, as far as practical, a natural hydrologic water balance



SITE PLAN VIEW

SCALE: NTS



SITE SECTION VIEW

SCALE: NTS

STRATIGRAPHY EXTRAPOLATED BASED ON ONTARIO MINISTRY OF ENVIRONMENT WELL RECORDS AND SITE BOREHOLE LOGS.

NOTES

1. STRATIGRAPHY EXTRAPOLATED FROM ONTARIO MINISTRY OF ENVIRONMENT WELL RECORDS AND SITE BOREHOLE LOGS.
2. CONTOURS WITHIN SITE BOUNDARIES FROM FIRST BASE SOLUTIONS INC. CONTOUR INTERVAL ILLUSTRATED IS 5m.
3. CONTOURS FOR EXTERNAL AREAS FROM THE ATLAS OF CANADA - TOPORAMA (NATURAL RESOURCES CANADA). CONTOUR INTERVAL ILLUSTRATED IS 10m.
4. IMAGE FROM GOOGLE MAPS. IMAGE PLACEMENT IS APPROXIMATE AND NOT ORTHORECTIFIED.
5. WELL RECORDS FROM ONTARIO MINISTRY OF ENVIRONMENT WELL RECORDS. WELL RECORD LOCATIONS WERE PLACED ON THE MAP USING A COMBINATION OF THE UTM COORDINATES LISTED ON THE WELL RECORD AND LOCATION SKETCHES DRAWN BY WELL CONTRACTORS (AVAILABLE ON THE PDF RECORD). LOCATIONS ARE NOT GUARANTEED. GROUND SURFACE ELEVATION ESTIMATED FROM AVAILABLE CONTOUR INFORMATION. THE MOST COMMON SOIL MATERIAL AS LISTED ON THE WELL RECORD WAS USED TO DESCRIBE EACH SOIL LAYER.
6. BORE HOLE LOGS ADAPTED FROM "A SOIL INVESTIGATION FOR PROPOSED RESIDENTIAL DEVELOPMENT, MOUNT WOLFE ROAD AND HALL'S LAKE SIDEROAD" BY SOIL ENGINEERS LTD. AND DATED JANUARY, 2006. BOREHOLES GENERALLY EXTENDED 5m BELOW THE PREVAILING GROUND SURFACE.

LEGEND

PLAN

- SITE BOUNDARY
- PROPOSED LOT LINE
- CONTOUR
- BH.10 BOREHOLE LOCATION (SOIL ENGINEERS LTD., 2006)
- WELL RECORD LOCATION

SECTION

- | | |
|--------------|------------------|
| WELL RECORDS | BOREHOLE RECORDS |
| LOAM | TOPSOIL |
| CLAY | SILTY CLAY, TILL |
| SILT | SILTY SAND, TILL |
| SAND | |
| GRAVEL | |
| SHALE | |



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Nitrate loading computations have been completed to assess the potential for off-site impact on domestic wells. These computations are provided in Section 3.5.

Potential impacts will be assessed and mitigated, if required, by establishment of a well monitoring program to document baseline conditions, provide routine monitoring during construction, and continue until one year after installation of underground services. The well monitoring program would be initiated following Draft Plan approval and is further discussed in Section 4.2.

3.2 Groundwater Flow Systems

3.2.1 Shallow Groundwater System

Shallow groundwater flow on the site will typically follow surface topography. The ridge on the site forms a local divide for shallow groundwater flow. To the north of the ridge, shallow groundwater will flow north-easterly towards Hall's lake and the Hall's Creek lowlands. South of the ridge, shallow groundwater will flow southward to the low lying areas on the south half of the site and off-site to topographic lows.

No impacts are expected on the shallow groundwater flow system as existing drainage patterns will be generally maintained and no sewers are anticipated to be installed. In addition, Low Impact Development practices are proposed for implementation, where feasible, to reduce potential increased surface runoff volumes and maintain, as far as practical, the natural hydrologic water balance.

In addition to the above, no impacts are anticipated on surface water bodies due to on-site sewage disposal. This statement is made as the standard minimum setback from water bodies for septic system leaching beds, as specified in the 2012 Ontario Building Code (Ministry of Municipal Affairs and Housing, 2012) to minimize the risk of chemical and bacteriological impacts, is 15 metres. With this project, a minimum 30 metre setback will be provided to the wetland features due to existence of the minimum vegetation protection zone (MVPZ) and in excess of an approximately 300 metre setback from Hall's Lake.

3.2.2 Deep Groundwater System

No impacts to the deep regional groundwater system are anticipated as the site is small in the overall context of the regional system, the surficial silty clay/silty sand tills are typically of low permeability and anticipated to be in the order of 5 to 40 metres in thickness, and the site water balance will be maintained.

3.3 Municipal Water Supply

No impacts on municipal water supplies are anticipated as the site is outside of the 2 through 25-year wellhead protection areas identified on Schedule 'O' of the Town of Caledon's Official Plan (2008), the site is small in the overall context of the regional system, the surficial silty clay/silty sand tills are typically of low permeability and anticipated to be in the order of 5 to 40 metres in thickness, and the site water balance will be maintained.

3.4 Potential Site Wells

Review of well records on file with the MOE has indicated potentially one well located on the subject site. Staff of Calder Engineering Ltd. have undertaken several site visits and not

located this well. Should this well be discovered during site grading, services construction, and home construction, it will be recommended that it be decommissioned in general conformance with existing regulations.

3.5 On-Site Sewage Disposal and Nitrate Loading Analysis

Sanitary servicing for the proposed subdivision will be by individual on-site sewage disposal systems (e.g., septic systems). Subject to detailed design, it is anticipated that the on-site sewage disposal systems would comprise a septic tank(s) sized at twice the daily design flow, effluent filter, tertiary treatment unit, area bed, and ancillary piping, pumping system(s), and controls. A tertiary treatment unit is anticipated to be required to fit the respective area bed within the lot structure envelope in conjunction with the dwelling and driveway features. Alternative tertiary treatment units can be found in Supplementary Standard SB-5, Approved Treatment Units, of the Ontario Building Code. The requirement for a tertiary treatment unit would be determined following Draft Plan approval and in conjunction with the Building Permit application process.

With a typical tertiary treatment system, an area bed with a size of 450 square metres and in-situ soil percolation rate or 'T' time of greater than 50 minutes per centimeter can accommodate a maximum daily design flow of 3,600 litres per day. Preliminary layout of the lots by Calder Engineering Ltd. (2015) indicates that the proposed lots can accommodate on-site sewage disposal systems of the noted size. By way of example, a maximum daily design flow of 3,600 litres per day is representative of an approximately 360 square metre (3,875 square foot) home with four bedrooms. This is consistent with the size of homes anticipated for the proposed subdivision.

In addition to the above, a nitrate loading analysis was conducted to determine if the proposed 28 lots could be developed on the subject site and meet Ontario Ministry of the Environment Reasonable Use Guidelines. The maximum acceptable concentration of nitrate nitrogen in groundwater based on the Ontario Ministry of the Environment Ontario Drinking Water Standards is 10 mg/L.

The nitrate loading analysis and calculations are provided in Appendix D. Background nitrate concentrations of 0.5 and 1.0 mg/L have been used in the calculations. These are assumed values. Consistent with MOE guidelines, nitrate loadings calculations have been undertaken based on a sanitary hydraulic loading of 28,000 litres per day (e.g., 1,000 litres per day per dwelling).

As shown in Appendix D, the determined nitrate loading from the proposed development is 0.9 mg/L. Inclusive of an assumed groundwater background nitrate concentration of 0.5 mg/L this would result in a groundwater nitrate concentration of 1.4 mg/L. Similarly, inclusive of an assumed groundwater background nitrate concentration of 1.0 mg/L this would result in a groundwater nitrate concentration of 1.9 mg/L. These values, when compared to the MOE guideline of 10 mg/L, suggest that there is minimal potential for impact on groundwater resources beyond property lines of the proposed development.

The calculations made reflect the theoretical nitrate loading associated with recharge water to the groundwater system and assume (i) no nitrate attenuation between the septic system leaching bed and the receiving groundwater system, and (ii) no dilution from lateral movement of groundwater. These are both factors which would typically further decrease nitrate concentrations in groundwater. In addition, the native surficial soils are typically silts

and not obviously hydrogeologically sensitive such as karstic areas, areas with thin soil cover and fractured bedrock, or areas with highly permeable soils.

Assuming that the hydraulic gradient of the local groundwater system follows topography, then the shallow groundwater flow would typically be towards topographic low areas on the subject site and identified wetland features.

4.0 MONITORING AND CONTINGENCY PLANNING

4.1 Wetland Features

Currently, monitoring of water levels in site wetland features is on-going. The nature of surface and groundwater interaction in these features will be assessed as part of a features based water balance to be conducted following Draft Plan approval.

At this stage, it is anticipated that a Contingency and Mitigation Plan would be implemented and carried through to assumption of the Subdivision. This would include on-going water level and environmental monitoring of the wetland features, and annual reporting. The Contingency and Mitigation Plan would identify procedures and processes that the Owner should follow in the event that identified critical water level elevations in wetland features are exceeded or vegetation communities are identified as being impacted during the course of routine monitoring.

The Contingency and Mitigation Plan would be developed at the detailed engineering design stage following Draft Plan approval

4.2 Well Water Quantity and Quality

Potential impacts on well water quantity and quality will be assessed by establishment of a well monitoring program to document baseline conditions, provide routine monitoring during construction, and continue until one year after installation of underground services. The well monitoring program would be initiated following Draft Plan approval. Consistent with Region of Peel Guidelines for Hydrogeologic Assessment and Reporting Requirements (2009), it is anticipated the well monitoring program would be made a condition of Draft Plan approval.

Consistent with Region of Peel Guidelines for Hydrogeologic Assessment and Reporting Requirements (2009), the well monitoring program is proposed to comprise the below items.

1. Preparation of a baseline hydrogeologic report defining site conditions, local well conditions, and baseline monitoring results. Baseline monitoring would measurement of static water levels and water quality sampling of accessible wells located within 500 metres of the site and proposed construction areas. As a minimum, water quality sampling would include analyses for the following parameters:

- bacteriological analysis for Total coliform and E-coli counts
- chemical analysis for nitrate

The baseline hydrogeologic report would also provide a proposed contingency plan for replacement of private well supplies that could potentially be affected by the proposed development.

2. Monitoring of groundwater levels and well water quality during construction.
3. Monitoring of groundwater levels and well water quality for 1 year after completion of construction of underground services and submission of a summary report.

4.0 SUMMARY

1. Calder Engineering Ltd. has been retained by Riteland Development Corporation to prepare a Scoped Hydrogeology Report for the proposed Hall's Lake Estates residential development in the Palgrave area of the Town of Caledon. The report is supporting documentation for the respective subdivision Draft Plan application and has been prepared to meet requirements of Section 7.1.18.5 of the Town of Caledon Official Plan.
2. The overall site comprises 56.12 ha. It is proposed to develop the site with 28 estate residential lots using a combined rural and urban road cross-section, individual private septic systems for sewage disposal, and municipal water. Drainage and storm water would be managed with the application of Low Impact Development (LID) practices.
3. This report is a Scoped Hydrogeology Report providing a review and consolidation of existing information. Site specific information on groundwater conditions was obtained from previous investigations and reports prepared for the project, and additional documentation reviewed on local well records.
4. Generally, it has been reported that the site consists of a 250 to 400 millimetre layer of topsoil, which overlays a silty clay till or a silty sand till. The depth of the permanent groundwater table has been reported to be below a depth of 5 metres from the ground surface with a perched groundwater table at shallower depths in some places. Groundwater yield from the silty clay till is expected to be limited due to the low permeability. Groundwater yield in the silty sand till is expected to be some to moderate due to the increased permeability.
5. The development site is outside of the 2 to 25-year wellhead protection areas identified on Schedule 'O' of the Town of Caledon's Official Plan.
6. Sanitary servicing for the proposed subdivision will be by individual on-site sewage disposal systems (e.g., septic systems). A nitrate loading analysis was conducted to determine if the proposed 28 lots could be developed on the subject site and meet Ontario Ministry of the Environment Reasonable Use Guidelines. The maximum acceptable concentration of nitrate nitrogen in groundwater based on the Ontario Ministry of the Environment Ontario Drinking Water Standards is 10 mg/L. The determined nitrate loading from the proposed development is 0.9 mg/L. Inclusive of an assumed groundwater background nitrate concentration of 0.5 mg/L this would result in a groundwater nitrate concentration of 1.4 mg/L. Similarly, inclusive of an assumed groundwater background nitrate concentration of 1.0 mg/L this would result in a groundwater nitrate concentration of 1.9 mg/L. These values suggest, when compared to the MOE guideline of 10 mg/L, that there is minimal potential for impact on groundwater resources beyond property lines of the proposed development.
7. The proposed development is not anticipated to have an impact on local groundwater levels, well water quantity, or well water quality.
8. Potential impacts on well water quantity and quality will be assessed by establishment of a well monitoring program to document baseline conditions, provide routine monitoring during construction, and continue until one year after installation of underground services. The well monitoring program would be initiated following Draft

Plan approval. Consistent with the 2009 Region of Peel Guidelines for Hydrogeologic Assessment and Reporting Requirements, it is anticipated the well monitoring program would be made a condition of Draft Plan approval.

9. The well monitoring program would also include preparation and submission of baseline hydrogeologic report defining site conditions, local well conditions, and baseline monitoring results, and would also provide a proposed contingency plan for replacement of private well supplies that could potentially be affected by the proposed development.

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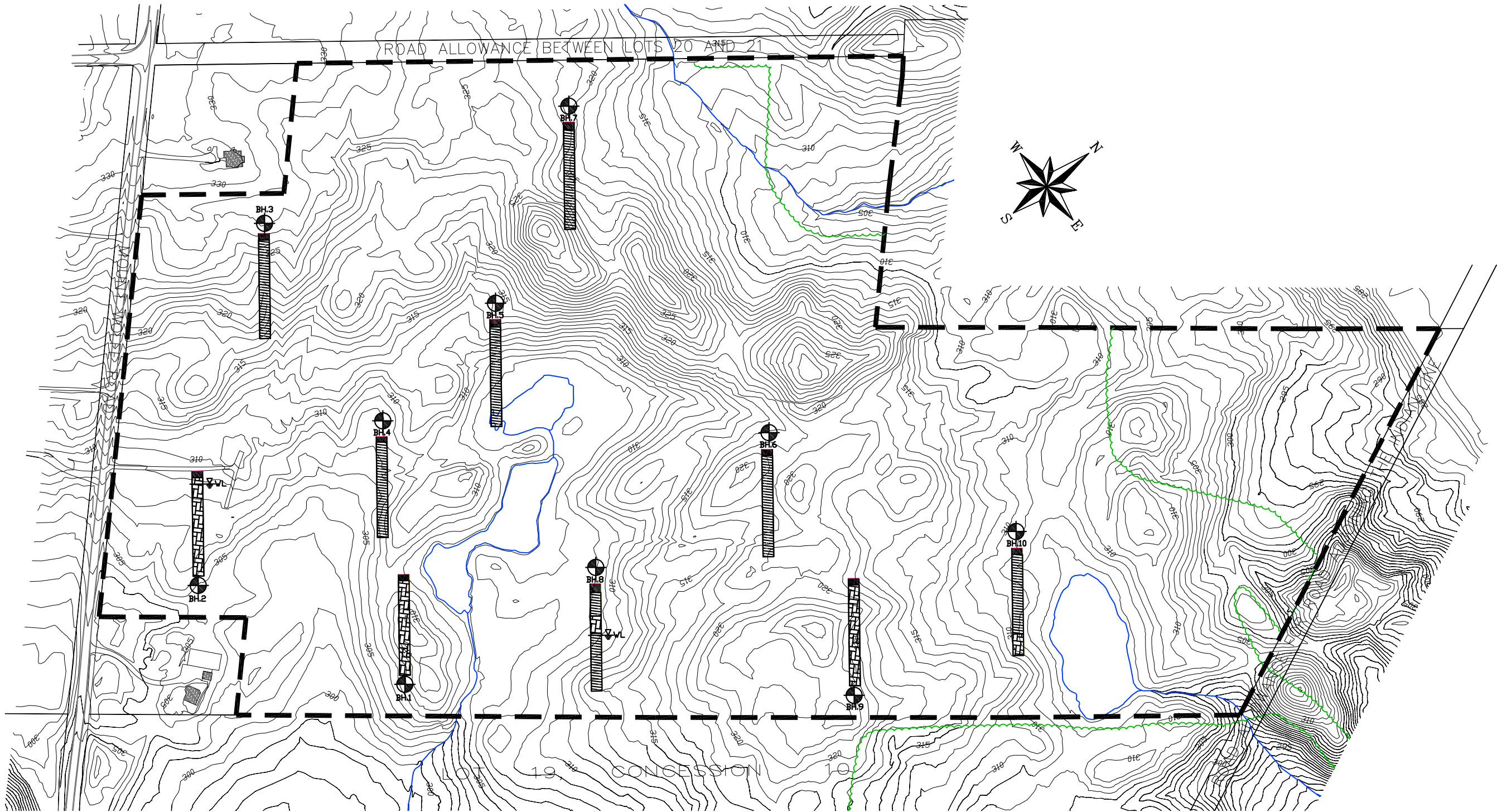
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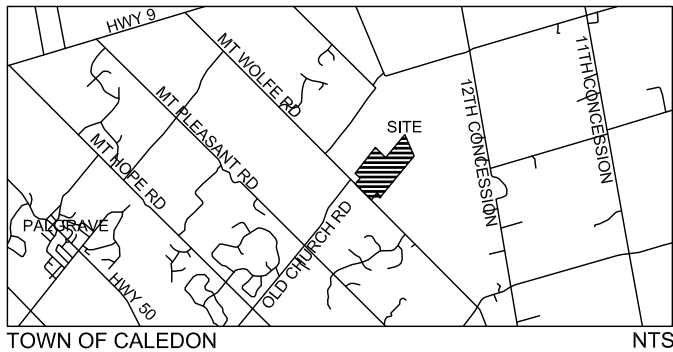
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APPENDIX A

SUPPORTING GEOTECHNICAL INFORMATION



KEY PLAN



LEGEND

	SITE BOUNDARY		BOREHOLE LOCATION
	EXISTING BUILDING		TOPSOIL
	TREE LINE		SILTY CLAY TILL
	STREAM OR WATER BODY		SILTY SAND TILL
	EXISTING PAVED ROAD		
	MAJOR CONTOUR (5m INTERVALS)		
	OBSERVED WATER LEVEL OR CAVE-IN ELEVATION		

NOTES

1. CONTOURS AND SPOT ELEVATIONS FROM FIRST BASE SOLUTIONS INC. TOPOGRAPHY DEVELOPED FROM ORTHOPHOTOGRAPHY TAKEN IN THE SPRING OF 2009.
2. MAJOR CONTOUR INTERVAL IS 5m, MINOR CONTOUR INTERVAL IS 1m.
3. BOREHOLE RECORDS ADAPTED FROM "A SOIL INVESTIGATION FOR PROPOSED RESIDENTIAL DEVELOPMENT, MOUNT WOLFE ROAD AND HALL'S LAKE SIDEROAD" BY SOIL ENGINEERS LTD. AND DATED 2015.
4. FEATURE LOCATIONS (e.g. TREELINES, BUILDINGS, ETC.) ARE APPROXIMATE.
5. IF NO OBSERVED WATER LEVEL SHOWN, THE BOREHOLE WAS DRY ON COMPLETION.



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TOWN OF CALEDON

RITELAND DEVELOPMENT CORPORATION

HALL'S LAKE ESTATES
DRAFT PLAN APPLICATION (21T-98001C)
PART OF LOT 20, CONCESSION 10 (ALBION)
TOWN OF CALEDON, REGION OF PEEL

MAP 4A
SOIL AND SOIL CLASSIFICATION MAP - BOREHOLES

JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 1

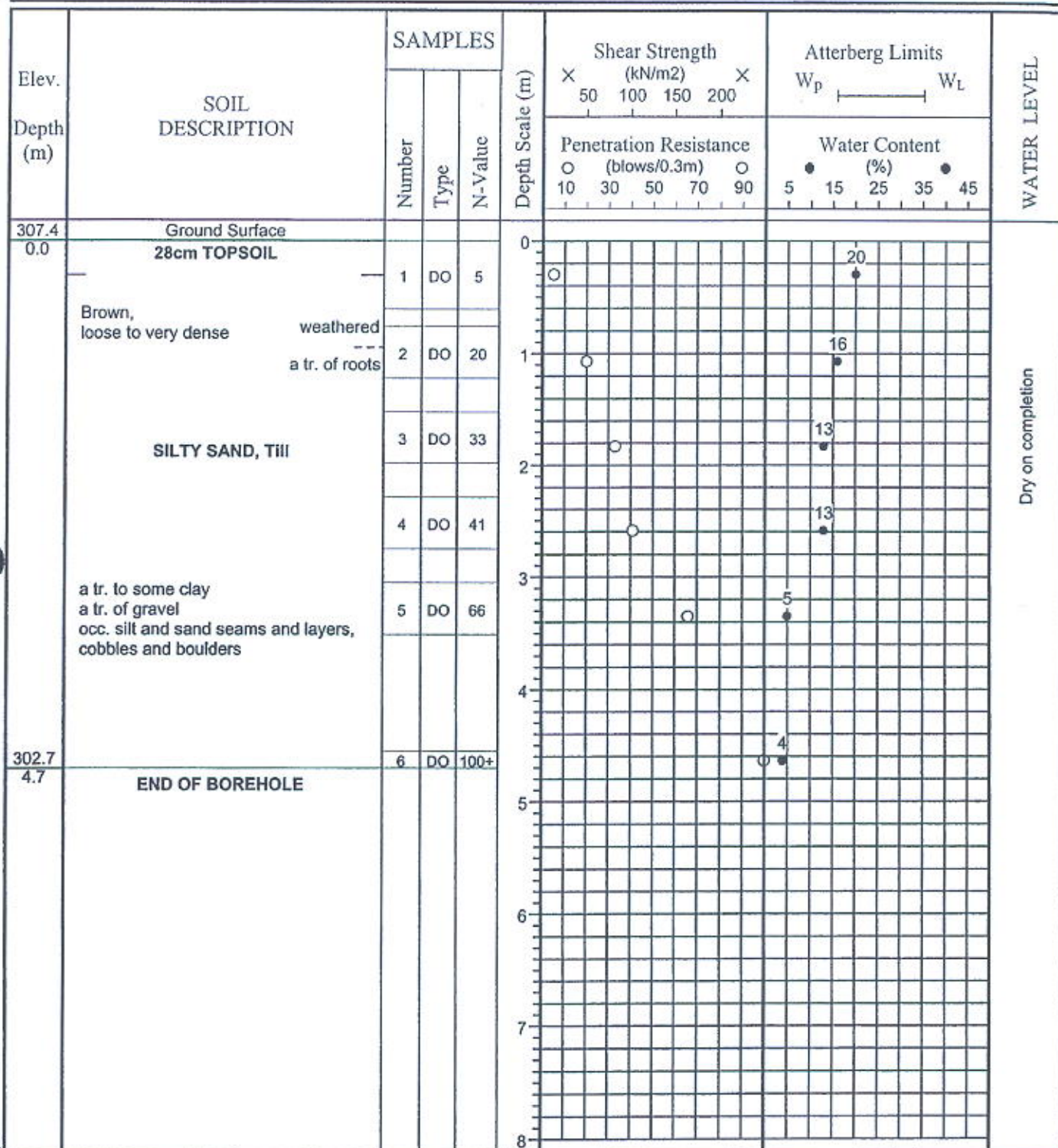
FIGURE NO.: 1

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006

**Soil Engineers Ltd.**

JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 2

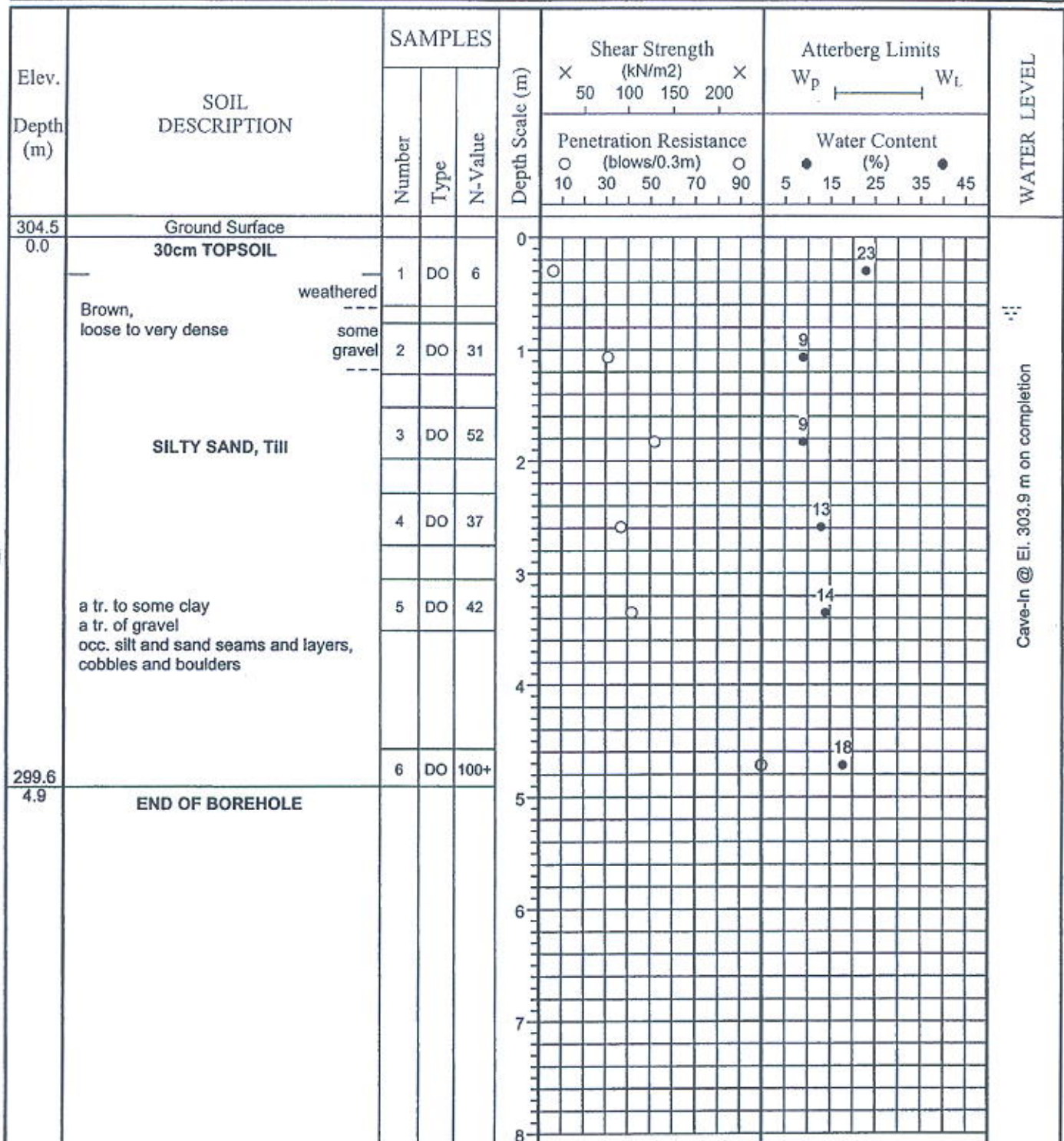
FIGURE NO.: 2

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006

**Soil Engineers Ltd.**

JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 3

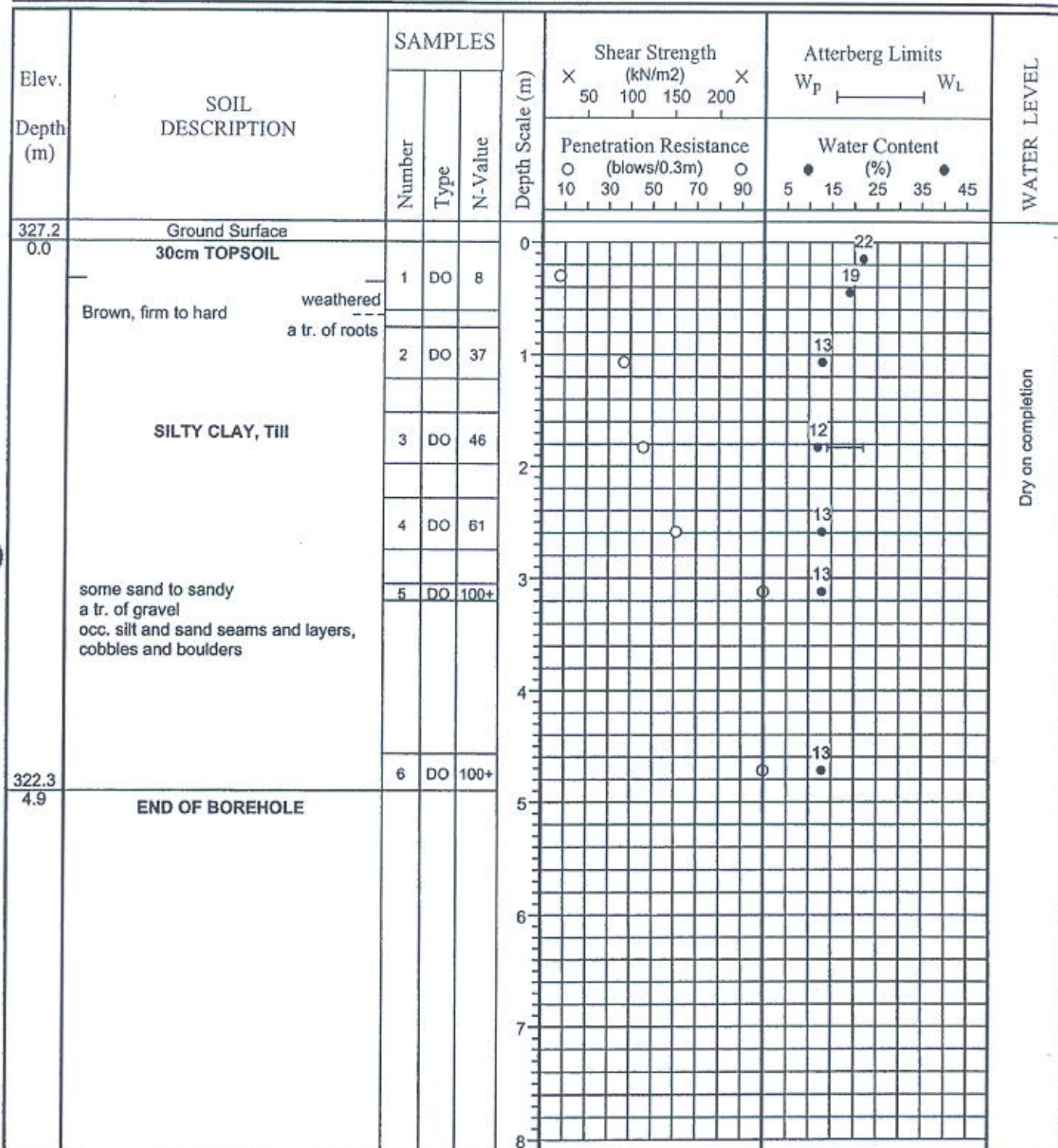
FIGURE NO.: 3

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006

**Soil Engineers Ltd.**

JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 4

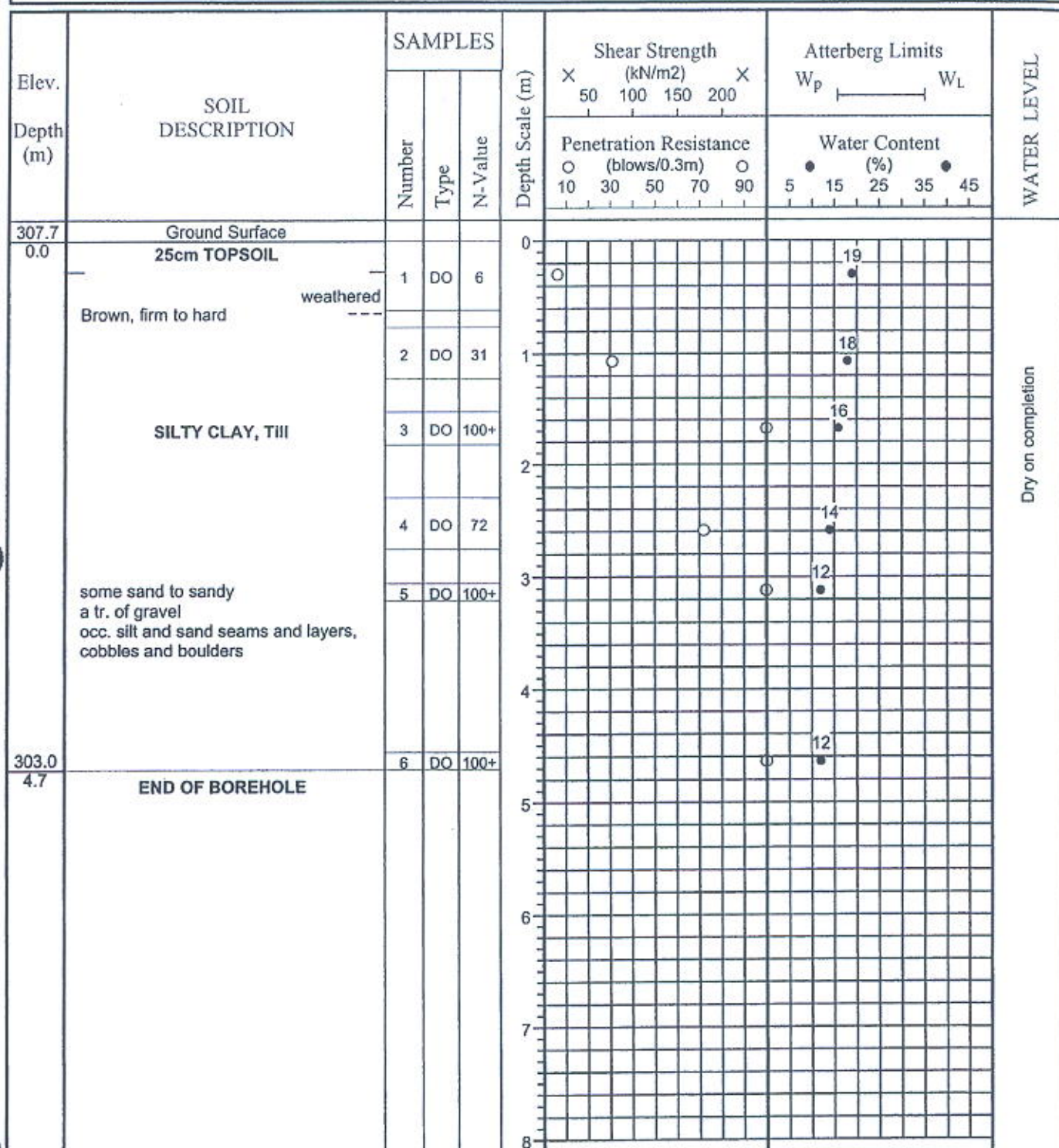
FIGURE NO.: 4

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006



JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 5

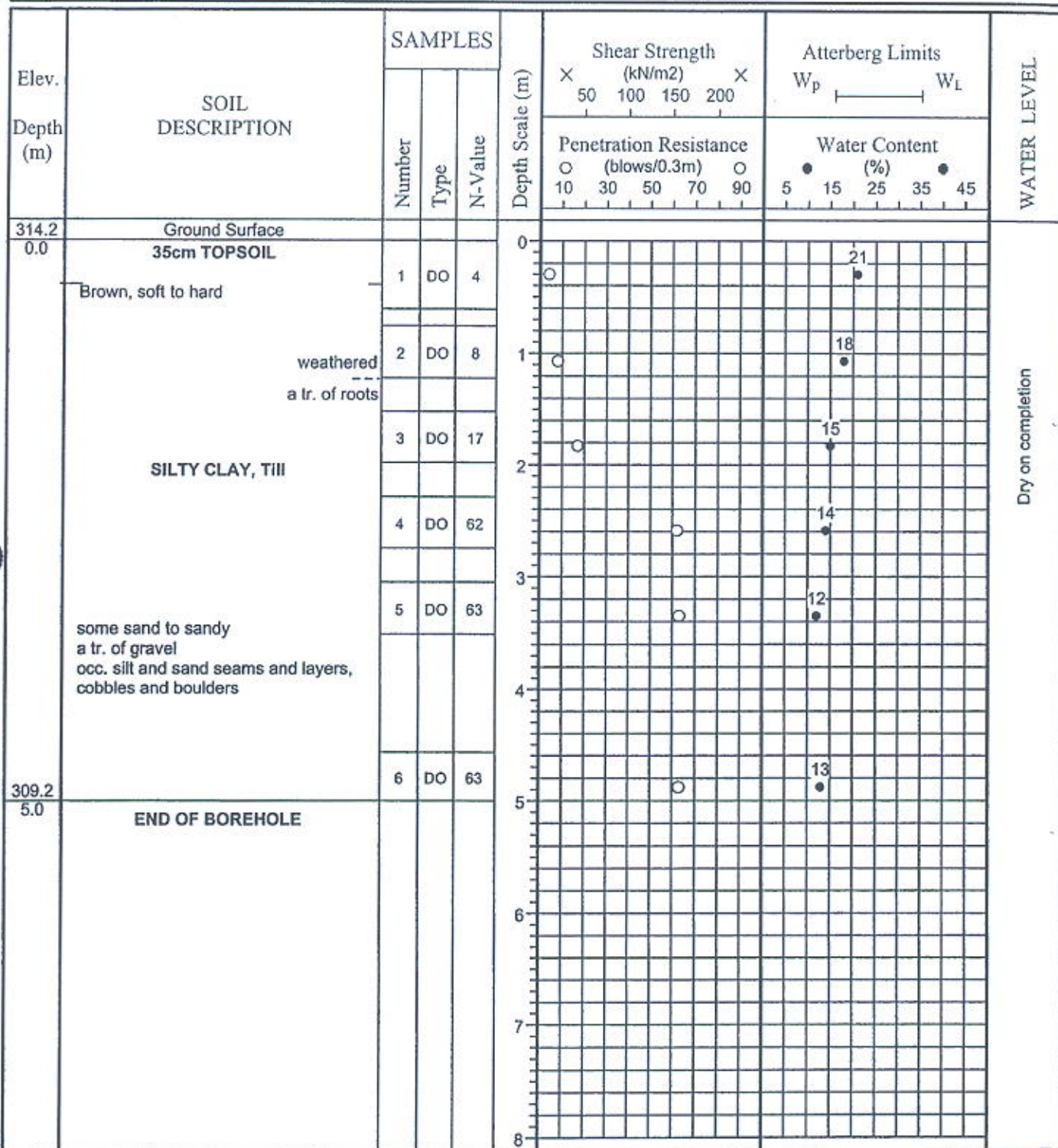
FIGURE NO.: 5

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006

**Soil Engineers Ltd.**

JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 6

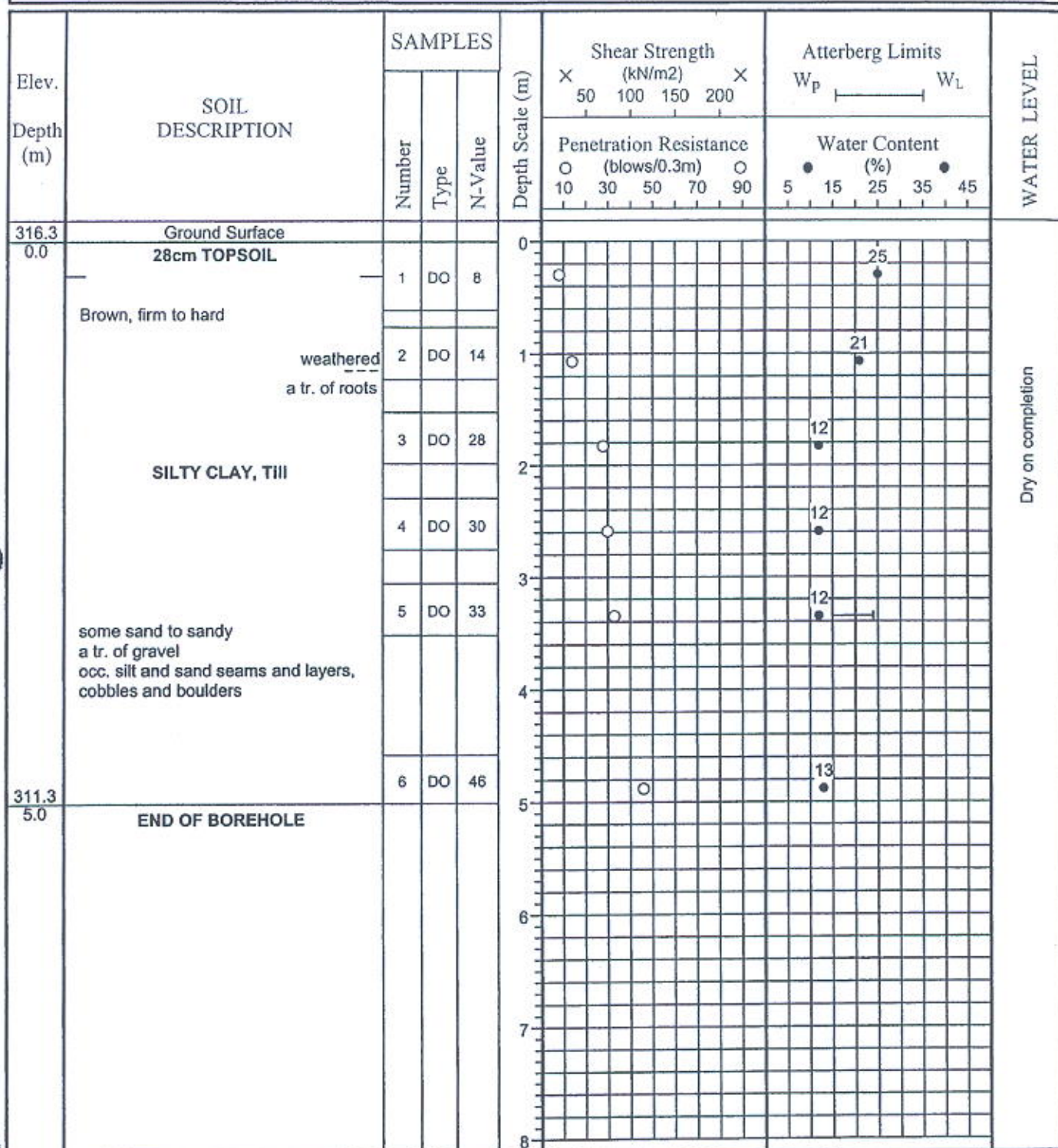
FIGURE NO.: 6

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006

**Soil Engineers Ltd.**

JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 7

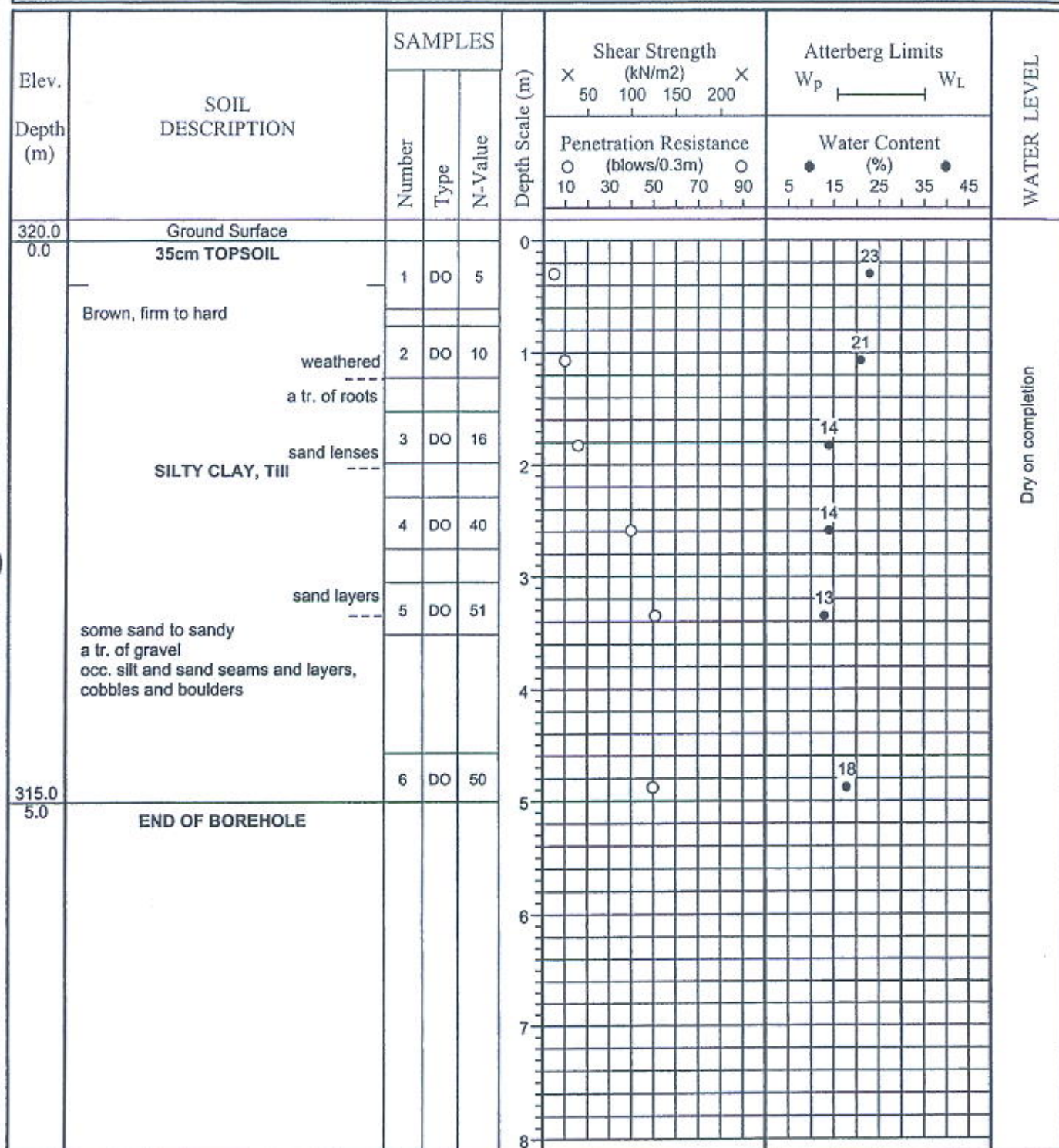
FIGURE NO.: 7

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006

**Soil Engineers Ltd.**

JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 8

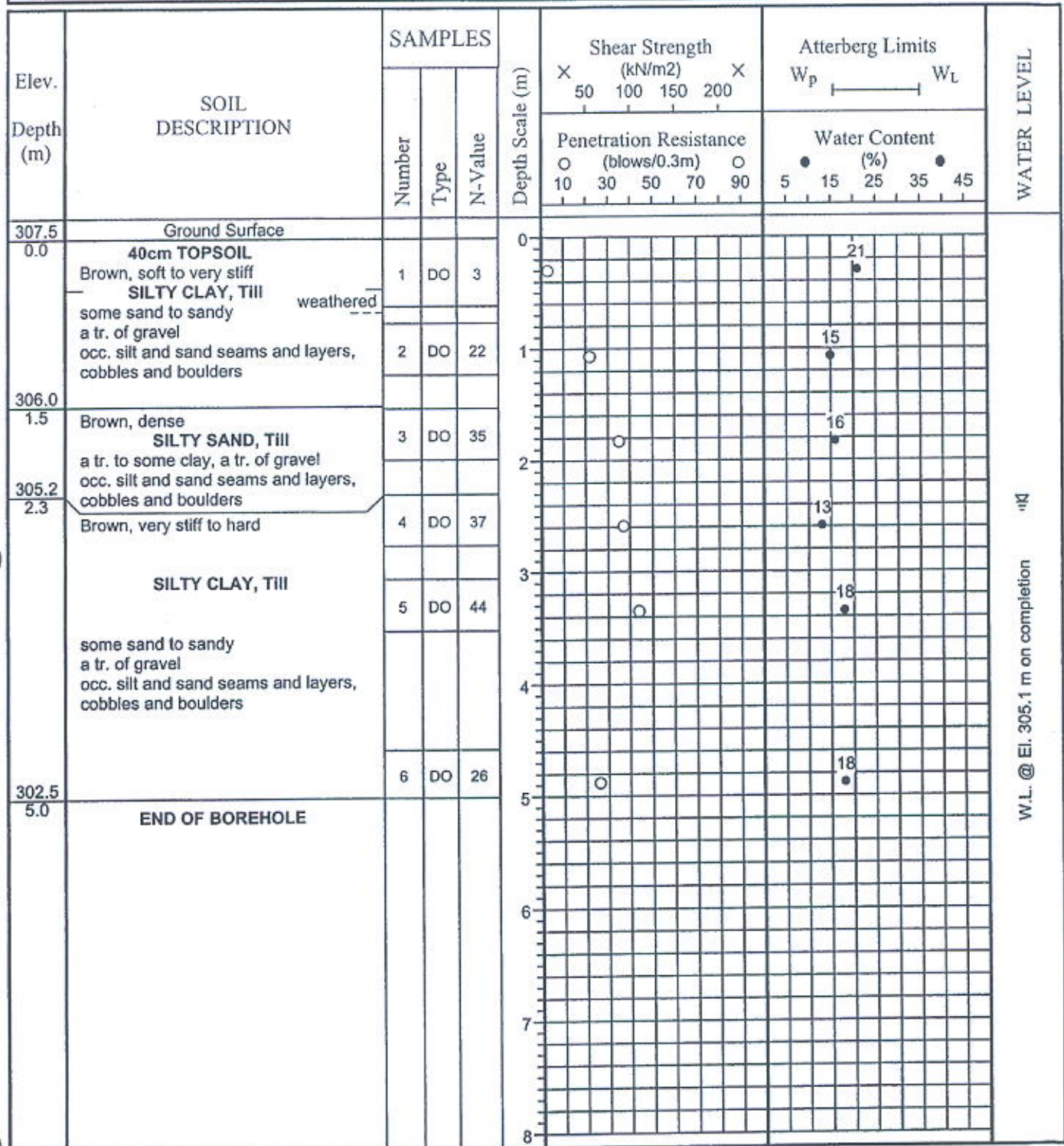
FIGURE NO.: 8

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006

**Soil Engineers Ltd.**

JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 9

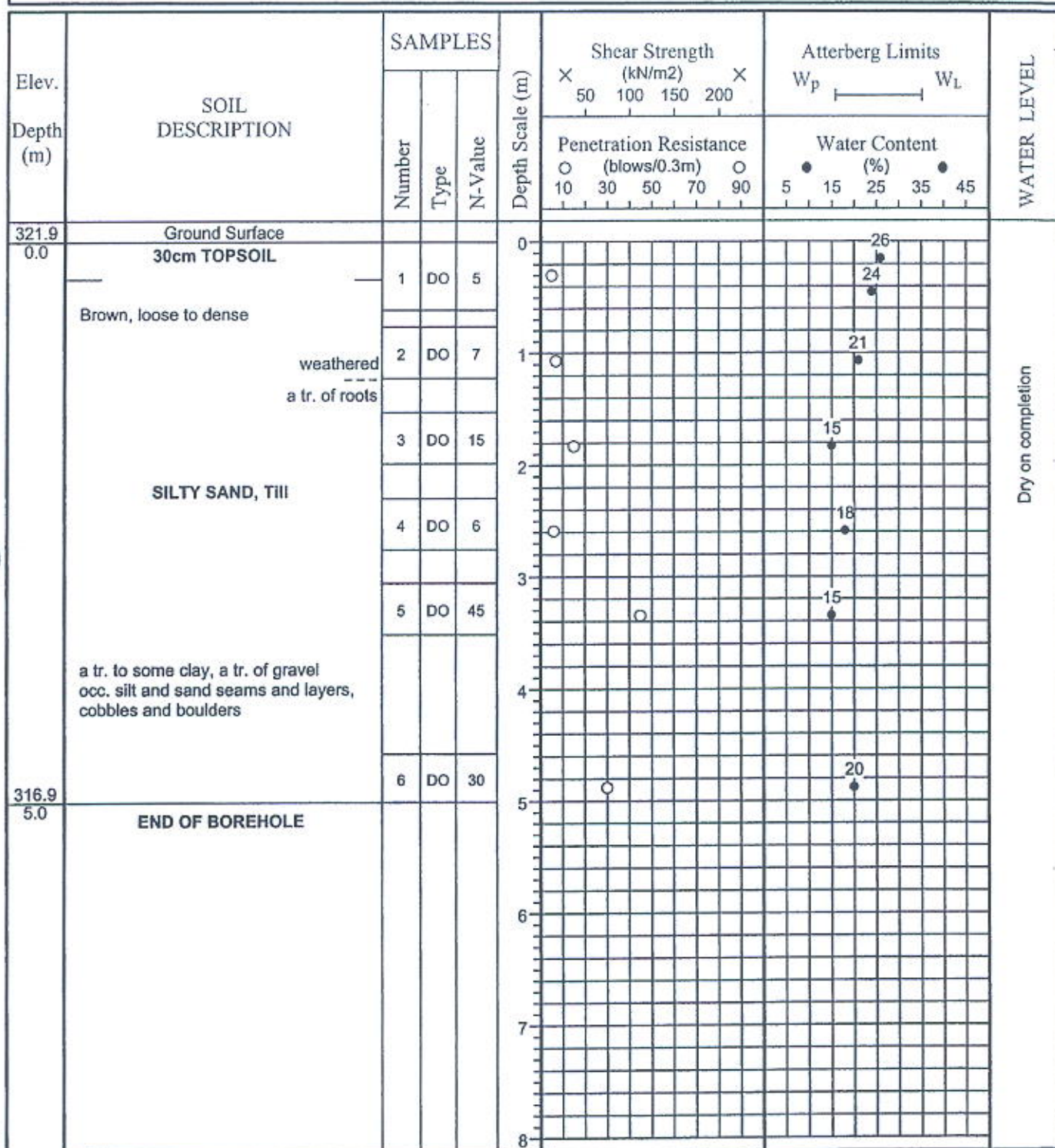
FIGURE NO.: 9

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006



JOB NO.: 0511-S088

LOG OF BOREHOLE NO.: 10

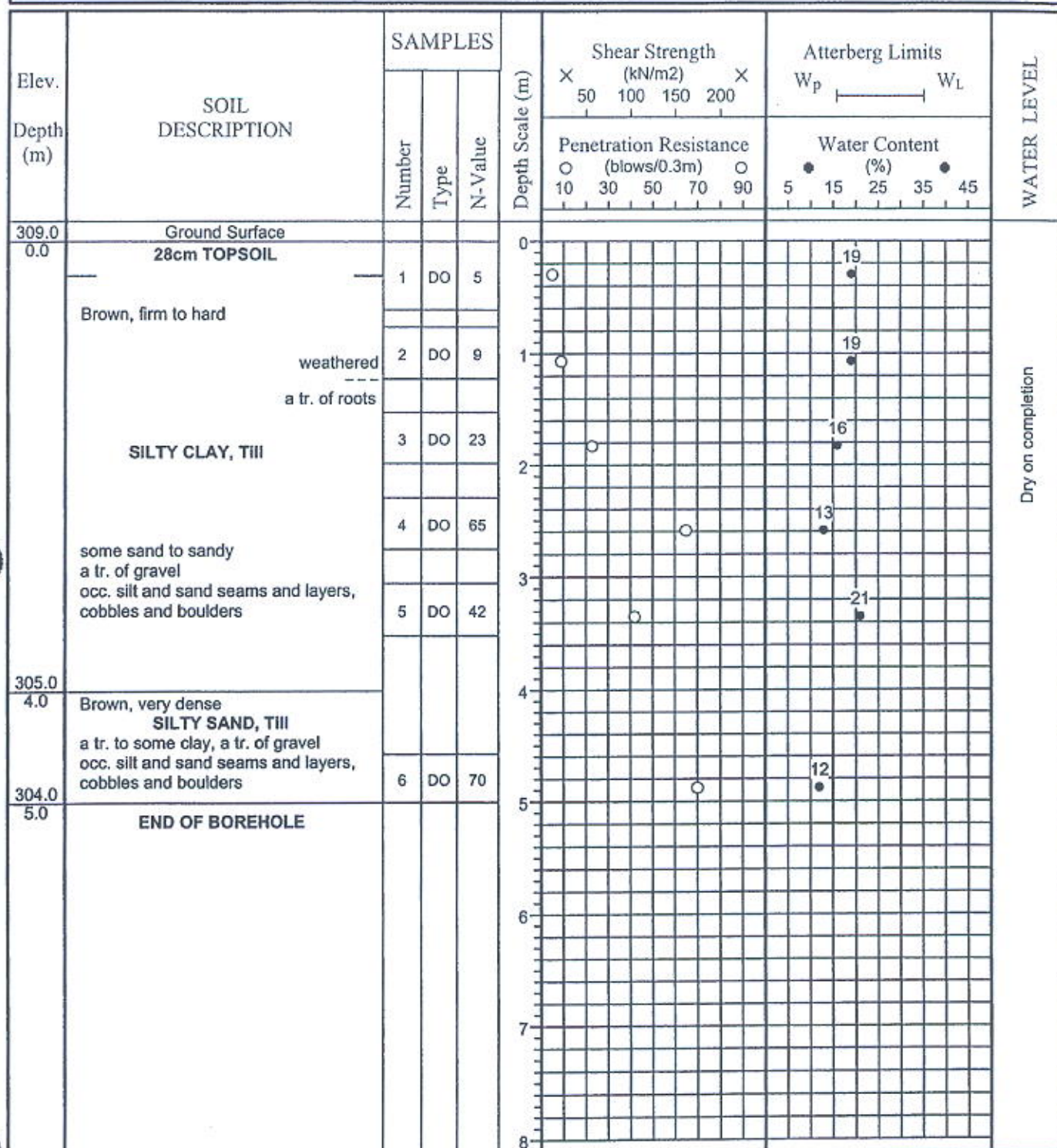
FIGURE NO.: 10

JOB DESCRIPTION: Proposed Residential Development

JOB LOCATION: Mount Wolfe Rd./Hall's Lake Sideroad
Town of Caledon

METHOD OF BORING: Flight-Auger

DATE: January 6, 2006

**Soil Engineers Ltd.**



Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

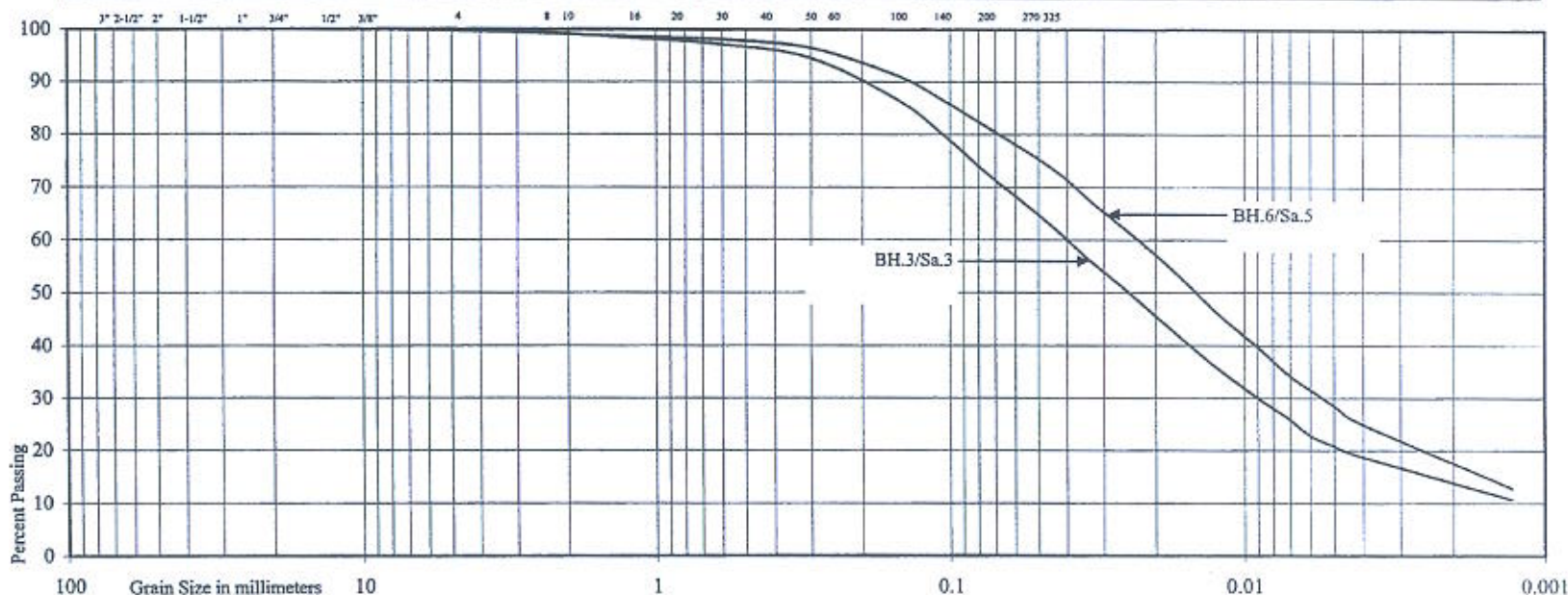
Reference No: 0511-S088

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development
 Location: Mount Wolfe Rd./Hall's Lake Sideroad, Town of Caledon
 Borehole No: 3 6
 Sample No: 3 5
 Depth (m): 1.8 3.4
 Elevation (m): 325.4 312.9

BH./Sa.	3/3	6/5
Liquid Limit (%) =	22	24
Plastic Limit (%) =	14	15
Plasticity Index (%) =	9	9
Moisture Content (%) =	12	12
Estimated Permeability (cm./sec.) =	10 ⁻⁶	10 ⁻⁶

Classification of Sample [& Group Symbol]: SILTY CLAY, Till
 some sand to sandy, a tr. of gravel

Figure: 11



Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

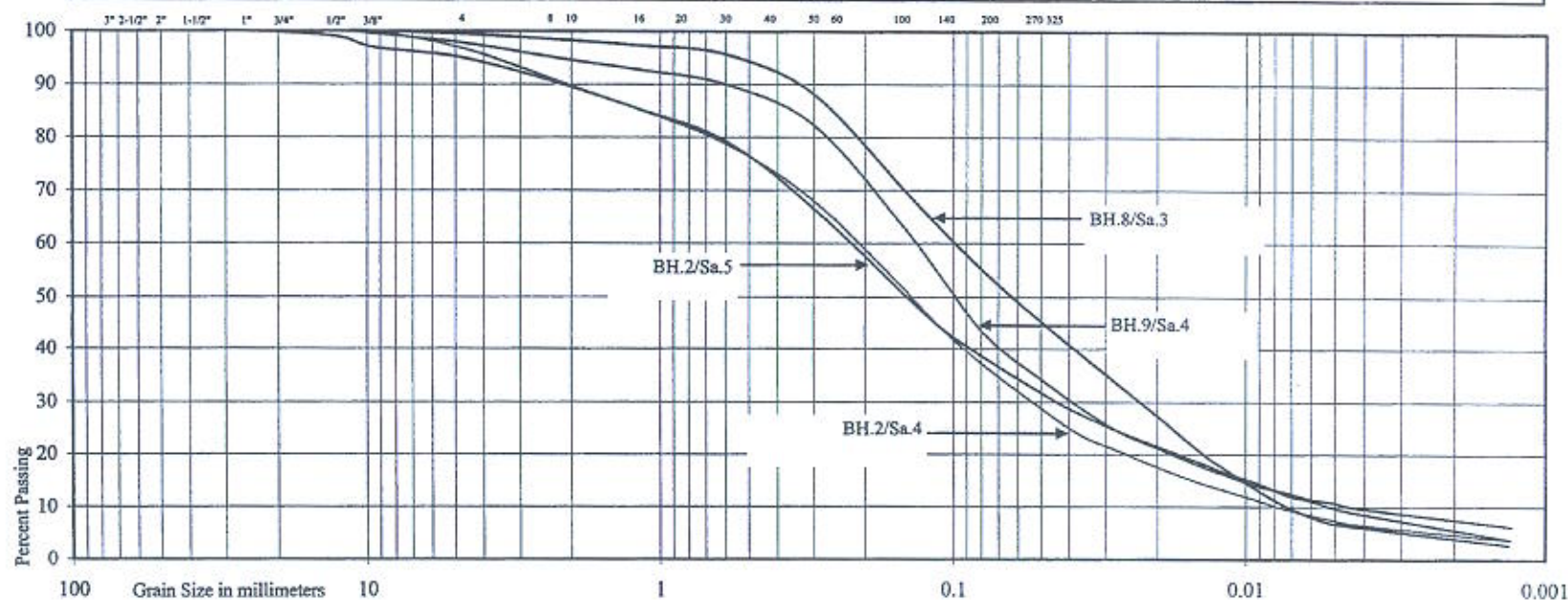
Reference No: 0511-S088

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: Mount Wolfe Rd./Hall's Lake Sideroad, Town of Caledon

Borehole No: 2 2 8 9

Sample No: 4 5 3 4

Depth (m): 2.6 3.4 1.8 2.6

Elevation (m): 301.9 301.1 305.7 319.3

Classification of Sample [& Group Symbol]:

SILTY SAND, Till

a tr. to some clay, a tr. of gravel

BH./Sa.	2/4	2/5	8/3	9/4
Liquid Limit (%) =	-	-	-	-
Plastic Limit (%) =	-	-	-	-
Plasticity Index (%) =	-	-	-	-
Moisture Content (%) =	13	14	16	18
Estimated Permeability (cm./sec.) =	10^{-4}	10^{-5}	10^{-4}	10^{-5}

Figure: 12

APPENDIX B

WELL WATER RECORDS

Number	Well ID	Record Date	Easting	Northing	Most Common Material			Water found depth	Reported Use and Status
1	4903287	August 1969	598354.50	4868523.00		loam	0 to 2 ft	NL	Abandoned - Supply
						clay	2 to 24 ft		
						hardpan	24 to 40 ft		
						medium sand	40 to 47 ft		
						hardpan	47 to 70 ft		
						silt	70 to 78 ft		
						fine sand	78 to 150 ft		
						clay	150 to 178 ft		
						medium sand	178 to 182 ft		
						clay	182 to 193 ft		
						medium sand	193 to 220 ft		
						clay	220 to 248 ft		
2	4904183	October 1973	598445.50	4868586.00		clay	0 to 12 ft	150 ft	Domestic Water Supply
						sand	12 to 125 ft		
						silt	125 to 150 ft		
						fine sand	150 to 168 ft		
3	4909130	May 2003	598638.00	4868615.00	NL			NL	Abandoned - Other
4	4909153	June 2003	598638.00	4868615.00		loam	0 to 1 ft	164 ft	Domestic Water Supply
						clay	1 to 25 ft		
						clay	25 to 65 ft		
						sand	65 to 66 ft		
						clay	66 to 113 ft		
						sand	113 to 138 ft		
						clay	138 to 140 ft		
						sand	140 to 149 ft		
						clay	149 to 153 ft		
						sand	153 to 165 ft		
5	4903569	March 1971	598264.50	4868133.00		clay	0 to 12 ft	136 ft	Domestic Water Supply
						gravel	12 to 52 ft		
						medium sand	52 to 108 ft		
						silt	108 to 136 ft		

						medium sand	136 to 149 ft		
						clay	149 to 155 ft		
6	4908548	March 2000	598271.00	4867974.00		clay	0 to 20 ft	140 ft	Domestic Water Supply
						clay	20 to 115 ft		
						clay	115 to 150 ft		
7	4906511	December 1986	598444.50	4867730.00		clay	0 to 17 ft	121 ft	Domestic Water Supply
						clay	17 to 30 ft		
						gravel	30 to 45 ft		
						clay	45 to 121 ft		
						fine sand	121 to 126 ft		
						fine sand	126 to 135 ft		
8	4903039	August 1968	598524.50	4867683.00		loam	0 to 2 ft	172 ft	Domestic Water Supply
						clay	2 to 32 ft		
						clay	32 to 64 ft		
						clay	64 to 102 ft		
						clay	102 to 155 ft		
						coarse sand	155 to 165 ft		
						clay	165 to 167 ft		
						fine sand	167 to 172 ft		
						fine sand	172 to 180 ft		
9	4904173	October 1973	598372.50	4867603.00		loam	0 to 2 ft	195 ft	Domestic Water Supply
						loam	2 to 6 ft		
						clay	6 to 42 ft		
						clay	42 to 103 ft		
						clay	103 to 195 ft		
						fine sand	195 to 200 ft		
10	4903420	April 1970	598244.50	4867463.00		loam	0 to 3 ft	249 ft	Domestic Water Supply
						medium sand	3 to 39 ft		
						clay	39 to 124 ft		
						gravel	124 to 129 ft		
						clay	129 to 179 ft		
						clay	179 to 205 ft		
						clay	205 to 245 ft		
						fine sand	245 to 256 ft		
11	7162382	April 2011	598242.00	4867463.00	NL			NL	NL

12	4903062	November 1968	599114.50	4867143.00		loam	0 to 4 ft	18 ft	Domestic Water Supply
						clay	4 to 22 ft		
13	4900494	August 1964	598825.50	4867621.00		clay	0 to 21 ft	45 ft	Livestock/Domestic Water Supply
						gravel	21 to 25 ft		
						clay	25 to 31 ft		
						clay	31 to 45 ft		
						clay	45 to 62 ft		
14	4908375	November 1998	598996.50	4868166.00		loam	0 to 1 ft	153 ft	Domestic Water Supply
						clay	1 to 16 ft		
						clay	16 to 21 ft		
						clay	21 to 28 ft		
						clay	28 to 112 ft		
						sand	112 to 113 ft		
						clay	113 to 153 ft		
						medium sand	153 to 177 ft		
						coarse sand	177 to 185 ft		
						clay	185 to 188 ft		
15	4904455	October 1974	599264.50	4867023.00		clay	0 to 15 ft	NL	Domestic Water Supply
						sand	15 to 18 ft		
						clay	18 to 37 ft		
						clay	37 to 85 ft		
						silt	85 to 142 ft		
						clay	142 to 302 ft		
						shale	302 to 307 ft		
16	4906622	June 1987	599315.50	4866998.00		sand	0 to 15 ft	131 ft	Domestic Water Supply
						clay	15 to 35 ft		
						clay	35 to 51 ft		
						clay	51 to 77 ft		
						silt	77 to 98 ft		
						clay	98 to 129 ft		
						fine sand	129 to 139 ft		
17	4905995	March 1983	599614.50	4867023.00		loam	0 to 2 ft	18 ft	Domestic Water Supply
						clay	2 to 14 ft		
						clay	14 to 18 ft		
						coarse sand	18 to 21 ft		

						clay	21 to 35 ft		
18	4905645	May 1979	599614.50	4866873.00		clay	0 to 10 ft	194 ft	Domestic Water Supply
						clay	10 to 70 ft		
						clay	70 to 100 ft		
						clay	100 to 194 ft		
						coarse gravel	194 to 195 ft		
						sand	195 to 199 ft		
19	4908269	January 1998	599618.00	4866828.00		loam	0 to 1 ft	195 ft	Domestic Water Supply
						clay	1 to 19 ft		
						clay	19 to 144 ft		
						silt	144 to 160 ft		
						clay	160 to 188 ft		
						fine sand	188 to 202 ft		
						silt	202 to 204 ft		
20	4904449	October 1974	599786.50	4866816.00		clay	0 to 18 ft	185 ft	Domestic Water Supply
						clay	18 to 94 ft		
						silt	94 to 185 ft		
						fine sand	185 to 200 ft		

Full Well Record Information

Well ID

Well ID Number: 4900494

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	020
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598825.50 Northing: 4867621.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther MaterialsGeneral Description				Depth From	Depth To
BRWN	CLAY	MSND		0 ft	21 ft
	GRVL			21 ft	25 ft
BRWN	CLAY	MSND	BLDR	25 ft	31 ft
BLUE	CLAY	MSND	BLDR	31 ft	45 ft
BLUE	CLAY	MSND		45 ft	62 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant (Material and Type)	Volume Used Placed
---------------	-------------	--	--------------------------

Method of Construction & Well Use

Method of Construction	Well Use
Boring	Livestock Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
30 inch	CONCRETE		62 ft

Construction Record - Screen

Outside Material Depth Depth
Diameter From To

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 1308

Results of Well Yield Testing

After test of well yield, water was CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 1 GPM

Duration of Pumping 1 h:0 m

Final water level 60 ft

If flowing give rate

Recommended pump depth 60 ft

Recommended pump rate 1 GPM

Well Production PUMP

Disinfected?

Draw Down & Recovery

Draw Down Time Draw Down Water level Recovery Time Recovery Water level
(min) (min)

SWL 25 ft

1 1

2 2

3 3

4 4

5 5

10 10

15 15

20 20

25 25

30 30

40 40

45 45

50 50

60 60

Water Details

Water Found at Depth Kind

45 ft Fresh

Hole Diameter

Depth Depth Diameter

From To

Audit Number:

Date Well Completed: June 20, 1964

Date Well Record Received by MOE: August 11, 1964

Full Well Record Information

Well ID

Well ID Number: 4903039

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	020
Concession	CON 09
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598524.50 Northing: 4867683.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther MaterialsGeneral Description			Depth	Depth
			From	To
	LOAM		0 ft	2 ft
BRWN	CLAY	MSND	2 ft	32 ft
BRWN	CLAY	GRVL	32 ft	64 ft
BLUE	CLAY	GRVL	64 ft	102 ft
	CLAY	SILT	102 ft	155 ft
	CSND		155 ft	165 ft
BLUE	CLAY		165 ft	167 ft
	FSND	SILT	167 ft	172 ft
	FSND		172 ft	180 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant	Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of ConstructionWell Use

Cable ToolDomestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
7 inch	STEEL		177 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
		177 ft	180 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 3108

Results of Well Yield Testing

After test of well yield, water was CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 6 GPM

Duration of Pumping 2 h: 30 m

Final water level 120 ft

If flowing give rate

Recommended pump depth 175 ft

Recommended pump rate 6 GPM

Well Production PUMP

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
SWL	70 ft		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	

45	45
50	50
60	60

Water Details

Water Found at Depth Kind

172 ft Not Stated

Hole Diameter

Depth Depth Diameter

From To

Audit Number:

Date Well Completed: June 30, 1968

Date Well Record Received by MOE: August 12, 1968

Full Well Record Information

Well ID

Well ID Number: 4903062

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	019
Concession	CON 09
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 599114.50 Northing: 4867143.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
	LOAM			0 ft	4 ft
	CLAY			4 ft	22 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant (Material and Type)	Volume Used Placed
---------------	-------------	--	--------------------------

Method of Construction & Well Use

Method of Construction Well Use

Boring Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
36 inch	CONCRETE		22 ft

Construction Record - Screen

Outside Material Depth Depth
Diameter From To

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 4919

Results of Well Yield Testing

After test of well yield, water was CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate

Duration of Pumping

Final water level

If flowing give rate

Recommended pump depth 20 ft

Recommended pump rate 1 GPM

Well Production

Disinfected?

Draw Down & Recovery

Draw Down Time Draw Down Water level Recovery Time Recovery Water level
(min) (min)

SWL 15 ft

1	1
2	2
3	3
4	4
5	5
10	10
15	15
20	20
25	25
30	30
40	40
45	45
50	50
60	60

Water Details

Water Found at Depth Kind

18 ft Fresh

Hole Diameter

Depth **Depth** **Diameter**
From **To**

Audit Number:

Date Well Completed: October 07, 1968

Date Well Record Received by MOE: November 25, 1968

Full Well Record Information

Well ID

Well ID Number: 4903287

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	021
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598354.50 Northing: 4868523.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour		Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN		LOAM			0 ft	2 ft
		CLAY			2 ft	24 ft
		HPAN			24 ft	40 ft
		MSND			40 ft	47 ft
		HPAN			47 ft	70 ft
		SILT			70 ft	78 ft
		FSND	CLAY		78 ft	150 ft
		CLAY			150 ft	178 ft
		MSND	SILT		178 ft	182 ft
		CLAY			182 ft	193 ft
GREY		MSND	SILT		193 ft	220 ft
		CLAY			220 ft	248 ft

Annular Space/Abandonment Sealing Record

Depth **Depth** **Type of Sealant Used** **Volume**
From To (Material and Type) Placed

Method of Construction & Well Use

Method of Construction **Well Use**

Cable Tool

Status of Well

Abandoned-Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
5 inch	STEEL		248 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
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Well Contractor and Well Technician Information

Well Contractor's Licence Number: 1104

Results of Well Yield Testing

After test of well yield, water was

If pumping discontinued, give reason

Pump intake set at

Pumping Rate

Duration of Pumping

Final water level

If flowing give rate

Recommended pump depth

Recommended pump rate

Well Production

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
----------------------	-----------------------	---------------------	----------------------

SWL

1	1
2	2
3	3
4	4
5	5
10	10
15	15
20	20
25	25

30	30
40	40
45	45
50	50
60	60

Water Details

Water Found at Depth Kind

Hole Diameter

Depth Depth Diameter
From To

Audit Number:

Date Well Completed: July 02, 1969

Date Well Record Received by MOE: August 18, 1969

Full Well Record Information

Well ID

Well ID Number: 4903420

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	020
Concession	CON 09
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598244.50 Northing: 4867463.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther Materials			General Description	Depth From	Depth To
BRWN	LOAM	MSND		0 ft	3 ft
YLLW	MSND	CLAY	GRVL	3 ft	39 ft
BLUE	CLAY	MSND		39 ft	124 ft
BLUE	GRVL	MSND		124 ft	129 ft
BLUE	CLAY	MSND		129 ft	179 ft
BLUE	CLAY	GRVL		179 ft	205 ft
BLUE	CLAY	MSND		205 ft	245 ft
	FSND			245 ft	256 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant Used	Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of ConstructionWell Use

Cable Tool Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
5 inch	STEEL		253 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
5 inch		253 ft	256 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 3108

Results of Well Yield Testing

After test of well yield, water was

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 7 GPM

Duration of Pumping 3 h:0 m

Final water level 160 ft

If flowing give rate

Recommended pump depth 200 ft

Recommended pump rate 7 GPM

Well Production BAILER

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
----------------------	-----------------------	---------------------	----------------------

SWL	145 ft		
-----	--------	--	--

1		1	
---	--	---	--

2		2	
---	--	---	--

3		3	
---	--	---	--

4		4	
---	--	---	--

5		5	
---	--	---	--

10		10	
----	--	----	--

15	160 ft	15	
----	--------	----	--

20		20	
----	--	----	--

25		25	
----	--	----	--

30	160 ft	30	
----	--------	----	--

40		40	
----	--	----	--

45	160 ft	45	
----	--------	----	--

50		50
60	160 ft	60

Water Details

Water Found at Depth Kind

249 ft	Not Stated
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Hole Diameter

Depth Depth Diameter

From To

Audit Number:

Date Well Completed: March 19, 1970

Date Well Record Received by MOE: April 13, 1970

Full Well Record Information

Well ID

Well ID Number: 4903569

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	021
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598264.50 Northing: 4868133.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther MaterialsGeneral Description			Depth	Depth
			From	To
BRWN	CLAY	MSND	0 ft	12 ft
	GRVL	MSND	12 ft	52 ft
	MSND		52 ft	108 ft
	SILT		108 ft	136 ft
	MSND		136 ft	149 ft
BLUE	CLAY		149 ft	155 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant Used	Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of Construction **Well Use**

Cable Tool Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside	Open Hole OR material	Depth	Depth
Diameter		From	To

7 inch STEEL 145 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
6 inch		145 ft	149 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 5206

Results of Well Yield Testing

After test of well yield, water was CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 6 GPM

Duration of Pumping 4 h:0 m

Final water level 140 ft

If flowing give rate

Recommended pump depth 145 ft

Recommended pump rate 6 GPM

Well Production BAILER

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
----------------------	-----------------------	---------------------	----------------------

SWL	105 ft		
-----	--------	--	--

1		1	
---	--	---	--

2		2	
---	--	---	--

3		3	
---	--	---	--

4		4	
---	--	---	--

5		5	
---	--	---	--

10		10	
----	--	----	--

15		15	105 ft
----	--	----	--------

20		20	
----	--	----	--

25		25	
----	--	----	--

30		30	105 ft
----	--	----	--------

40		40	
----	--	----	--

45		45	105 ft
----	--	----	--------

50		50	
----	--	----	--

60	60	105 ft
----	----	--------

Water Details

Water Found at Depth Kind

136 ft	Fresh
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Hole Diameter

Depth Depth Diameter

From To

Audit Number:

Date Well Completed: January 08, 1971

Date Well Record Received by MOE: March 02, 1971

Full Well Record Information

Well ID

Well ID Number: 4904173

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	020
Concession	CON 09
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598372.50 Northing: 4867603.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour		Most Common Material		Other Materials		General Description		Depth	Depth
								From	To
BRWN	LOAM							0 ft	2 ft
BRWN	LOAM							2 ft	6 ft
BRWN	CLAY		SAND		GRVL			6 ft	42 ft
GREY	CLAY		CSND					42 ft	103 ft
BLUE	CLAY		SAND					103 ft	195 ft
BLUE	FSND							195 ft	200 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant	Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of Construction Well Use

Cable Tool Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside	Open Hole OR material	Depth	Depth
Diameter		From	To

7 inch STEEL 195 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
6 inch		195 ft	200 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 3108

Results of Well Yield Testing

After test of well yield, water was CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 20 GPM

Duration of Pumping 4 h:0 m

Final water level 160 ft

If flowing give rate

Recommended pump depth 175 ft

Recommended pump rate 7 GPM

Well Production BAILER

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
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SWL 82 ft

1		1	
---	--	---	--

2		2	
---	--	---	--

3		3	
---	--	---	--

4		4	
---	--	---	--

5		5	
---	--	---	--

10		10	
----	--	----	--

15		15	82 ft
----	--	----	-------

20		20	
----	--	----	--

25		25	
----	--	----	--

30		30	82 ft
----	--	----	-------

40		40	
----	--	----	--

45		45	82 ft
----	--	----	-------

50		50	
----	--	----	--

60

60

82 ft

Water Details

Water Found at Depth Kind

195 ft

Not Stated

Hole Diameter

Depth Depth Diameter

From To

Audit Number:

Date Well Completed: October 03, 1973

Date Well Record Received by MOE:October 19, 1973

Full Well Record Information

Well ID

Well ID Number: 4904183

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	021
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598445.50 Northing: 4868586.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour		Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN		CLAY			0 ft	12 ft
BRWN		SAND			12 ft	125 ft
		SILT			125 ft	150 ft
		FSND			150 ft	168 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant Used	Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of Construction Well Use

Rotary (Convent.) Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
6 inch	STEEL		160 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
6 inch		160 ft	168 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 5206

Results of Well Yield Testing

After test of well yield, water was	CLEAR
If pumping discontinued, give reason	
Pump intake set at	
Pumping Rate	4 GPM
Duration of Pumping	10 h:0 m
Final water level	160 ft
If flowing give rate	
Recommended pump depth	160 ft
Recommended pump rate	4 GPM
Well Production	PUMP
Disinfected?	

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
SWL	120 ft		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	130 ft
20		20	
25		25	
30		30	120 ft
40		40	
45		45	120 ft
50		50	
60		60	120 ft

Water Details

Water Found at Depth Kind

150 ft Fresh

Hole Diameter**Depth Depth Diameter**

From To

Audit Number:

Date Well Completed: July 01, 1973

Date Well Record Received by MOE: October 29, 1973

Full Well Record Information

Well ID

Well ID Number: 4904449

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	018
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 599786.50 Northing: 4866816.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour		Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN		CLAY			0 ft	18 ft
BLUE		CLAY			18 ft	94 ft
		SILT	QSND		94 ft	185 ft
		FSND			185 ft	200 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant Used	Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of Construction Well Use

Rotary (Convent.) Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
5 inch	STEEL		193 ft

Construction Record - Screen

Outside Diameter	Material	Depth	Depth
		From	To
5 inch		193 ft	196 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 5206

Results of Well Yield Testing

After test of well yield, water was CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 20 GPM

Duration of Pumping 2 h:0 m

Final water level 110 ft

If flowing give rate

Recommended pump depth 120 ft

Recommended pump rate 10 GPM

Well Production PUMP

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
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SWL	70 ft
-----	-------

1	1	
2	2	
3	3	
4	4	
5	5	
10	10	
15	15	70 ft
20	20	
25	25	
30	30	70 ft
40	40	
45	45	70 ft
50	50	
60	60	70 ft

Water Details

Water Found at Depth Kind

185 ft Fresh

Hole Diameter**Depth Depth Diameter**

From To

Audit Number:

Date Well Completed: August 15, 1974

Date Well Record Received by MOE: October 01, 1974

Full Well Record Information

Well ID

Well ID Number: 4904455

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	019
Concession	CON 09
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 599264.50 Northing: 4867023.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour		Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN		CLAY			0 ft	15 ft
BRWN		SAND			15 ft	18 ft
BRWN		CLAY			18 ft	37 ft
BLUE		CLAY			37 ft	85 ft
		SILT			85 ft	142 ft
BLUE		CLAY	GRVL		142 ft	302 ft
BLUE		SHLE			302 ft	307 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant (Material and Type)	Used Volume Placed
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Method of Construction & Well Use

Method of Construction Well Use

Rotary (Convent.) Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside	Open Hole OR material	Depth	Depth
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Diameter **From To**

Construction Record - Screen

Outside Material Depth Depth
Diameter From To

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 5206

Results of Well Yield Testing

After test of well yield, water was
If pumping discontinued, give reason
Pump intake set at
Pumping Rate
Duration of Pumping
Final water level
If flowing give rate
Recommended pump depth
Recommended pump rate
Well Production
Disinfected?

Draw Down & Recovery

Draw Down Time Draw Down Water level Recovery Time Recovery Water level
(min) (min)

SWL

1	1
2	2
3	3
4	4
5	5
10	10
15	15
20	20
25	25
30	30
40	40
45	45
50	50
60	60

Water Details

Water Found at Depth Kind

Hole Diameter

Depth Depth Diameter
From To

Audit Number:

Date Well Completed: June 24, 1974

Date Well Record Received by MOE: October 01, 1974

Full Well Record Information

Well ID

Well ID Number: 4905645

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	018
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 599614.50 Northing: 4866873.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther MaterialsGeneral Description			Depth	Depth
			From	To
	CLAY	FILL	0 ft	10 ft
BRWN	CLAY		10 ft	70 ft
BLGY	CLAY		70 ft	100 ft
BLGY	CLAY		100 ft	194 ft
	CGVL		194 ft	195 ft
GREY	SAND		195 ft	199 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant Used	Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of ConstructionWell Use

Cable ToolDomestic

Status of Well

Water Supply

Construction Record - Casing

Inside	Open Hole OR material	Depth	Depth
Diameter		From	To

194 ft

Construction Record - Screen

depth

From To

194 ft 197 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 4551

Results of Well Yield Testing

CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate

Duration of Pumping

180 ft

If flowing give rate

Recommended pump depth

3 GPM

BAILER

Disinfected?

Draw Down & Recovery

Recovery Water level

38 ft

1

2

3

4

5

10

15

20

25

30

40

45

50

60

60

Water Details

Water Found at Depth Kind

194 ft Fresh

Hole Diameter

Depth Depth Diameter

From To

Audit Number:

Date Well Completed: April 27, 1979

Date Well Record Received by MOE: May 28, 1979

Full Well Record Information

Well ID

Well ID Number: 4905995

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	018
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 599614.50 Northing: 4867023.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN	LOAM	STNS		0 ft	2 ft
BRWN	CLAY	STNS		2 ft	14 ft
BLUE	CLAY	STNS		14 ft	18 ft
BRWN	CSND			18 ft	21 ft
BLUE	CLAY	STNS	HARD	21 ft	35 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant (Material and Type)	Volume Placed
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Method of Construction & Well Use

Method of Construction	Well Use
Boring	Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
30 inch	GALVANIZED		15 ft

30 inch STEEL 35 ft

Construction Record - Screen

Outside Material Depth Depth
Diameter From To

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 3612

Results of Well Yield Testing

After test of well yield, water was CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 4 GPM

Duration of Pumping 2 h:0 m

Final water level 33 ft

If flowing give rate

Recommended pump depth 32 ft

Recommended pump rate 4 GPM

Well Production BAILER

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
-------------------------	-----------------------	------------------------	----------------------

SWL	11 ft		
-----	-------	--	--

1		1	
---	--	---	--

2		2	
---	--	---	--

3		3	
---	--	---	--

4		4	
---	--	---	--

5		5	
---	--	---	--

10		10	
----	--	----	--

15		15	31 ft
----	--	----	-------

20		20	
----	--	----	--

25		25	
----	--	----	--

30		30	30 ft
----	--	----	-------

40		40	
----	--	----	--

45		45	29 ft
----	--	----	-------

50		50	
----	--	----	--

60		60	28 ft
----	--	----	-------

Water Details

Water Found at Depth Kind

18 ft Not Stated

Hole Diameter**Depth Depth Diameter**

From To

Audit Number:

Date Well Completed: September 14, 1982

Date Well Record Received by MOE: March 09, 1983

Full Well Record Information

Well ID

Well ID Number: 4906511

Well Audit Number:

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	019
Concession	CON 09
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598444.50 Northing: 4867730.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther MaterialsGeneral Description			Depth	Depth
			From	To
BRWN	CLAY	SNDY	0 ft	17 ft
BLUE	CLAY		17 ft	30 ft
BRWN	GRVL		30 ft	45 ft
BLUE	CLAY		45 ft	121 ft
	FSND	DRTY	121 ft	126 ft
	FSND	CLN	126 ft	135 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant Used	Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of ConstructionWell Use

Rotary (Convent.) Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside	Open Hole OR material	Depth	Depth
Diameter		From	To

132 ft

Construction Record - Screen

Depth

From To

132 ft 135 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 5206

Results of Well Yield Testing

CLEAR

If pumping discontinued, give reason

Pump intake set at

5 GPM

6 h:0 m

125 ft

If flowing give rate

125 ft

5 GPM

PUMP

Disinfected?

Draw Down & Recovery

Recovery Water level

85 ft

1

2

3

4

5

10

15

20

25

30

40

45

50

60

60

Water Details

Water Found at Depth Kind

121 ft Fresh

Hole Diameter

Depth Depth Diameter

From To

Audit Number:

Date Well Completed: August 20, 1986

Date Well Record Received by MOE:December 16, 1986

Full Well Record Information

Well ID

Well ID Number: 4906622

Well Audit Number: 13801

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	018
Concession	CON 09
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 599315.50 Northing: 4866998.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther MaterialsGeneral Description			Depth	Depth
			From	To
YLLW	SAND	CLAY	0 ft	15 ft
YLLW	CLAY		15 ft	35 ft
BLUE	CLAY		35 ft	51 ft
BRWN	CLAY		51 ft	77 ft
BRWN	SILT		77 ft	98 ft
BLUE	CLAY		98 ft	129 ft
BLUE	FSND		129 ft	139 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant	Used Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of ConstructionWell Use

Rotary (Convent.) Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside	Open Hole OR material	Depth	Depth
--------	-----------------------	-------	-------

Diameter	From	To
6 inch STEEL		131 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
6 inch		135 ft	139 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 3108

Results of Well Yield Testing

After test of well yield, water was CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate	20 GPM
Duration of Pumping	1 h:0 m
Final water level	135 ft

If flowing give rate

Recommended pump depth	130 ft
Recommended pump rate	10 GPM

Well Production PUMP

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
SWL	63 ft		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
45		45	

50	50
60	60

Water Details

Water Found at Depth Kind

131 ft	Fresh
--------	-------

Hole Diameter

Depth	Depth	Diameter
From	To	

Audit Number:13801

Date Well Completed: June 09, 1987

Date Well Record Received by MOE:June 30, 1987

Full Well Record Information

Well ID

Well ID Number: 4908269

Well Audit Number: 185704

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	018
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 599618.00 Northing: 4866828.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther MaterialsGeneral Description			Depth	Depth
			From	To
	LOAM		0 ft	1 ft
BRWN	CLAY	STNS	1 ft	19 ft
GREY	CLAY	SLTY	19 ft	144 ft
GREY	SILT	WBRG	144 ft	160 ft
GREY	CLAY		160 ft	188 ft
BRWN	FSND	WBRG	188 ft	202 ft
GREY	SILT	CLAY	202 ft	204 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant	Used Volume
From	To	(Material and Type)	Placed

Method of Construction & Well Use

Method of ConstructionWell Use

Rotary (Air) Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Open Hole OR materialDepthDepth

Diameter		From	To
6 inch	STEEL		195 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
6 inch		195 ft	201 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 2576

Results of Well Yield Testing

After test of well yield, water was CLOUDY

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 2 GPM

Duration of Pumping 2 h:0 m

Final water level 132 ft

If flowing give rate

Recommended pump depth 175 ft

Recommended pump rate 2 GPM

Well Production BAILER

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
----------------------	-----------------------	---------------------	----------------------

SWL 60 ft

1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	112 ft
20		20	
25		25	
30		30	98 ft
40		40	
45		45	87 ft

50	50	
60	60	84 ft

Water Details

Water Found at Depth Kind

195 ft Fresh

Hole Diameter

Depth Depth Diameter

From To

Audit Number:185704

Date Well Completed: December 16, 1997

Date Well Record Received by MOE:January 06, 1998

Full Well Record Information

Well ID

Well ID Number: 4908375

Well Audit Number: 190466

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	020
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598996.50 Northing: 4868166.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour		Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN	LOAM				0 ft	1 ft
BRWN	CLAY		GRVL		1 ft	16 ft
BLUE	CLAY				16 ft	21 ft
BRWN	CLAY				21 ft	28 ft
GREY	CLAY	SAND	SILT		28 ft	112 ft
GREY	SAND	GRVL			112 ft	113 ft
BLUE	CLAY	SAND	GRVL		113 ft	153 ft
GREY	MSND				153 ft	177 ft
GREY	CSND				177 ft	185 ft
BLUE	CLAY				185 ft	188 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant (Material and Type)	Volume Used Placed
0 ft	20 ft		

Method of Construction & Well Use

Method of Construction	Well Use
Rotary (Convent.)	Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
6 inch	STEEL		180 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
6 inch		180 ft	183 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 1663

Results of Well Yield Testing

After test of well yield, water was CLEAR

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 20 GPM

Duration of Pumping 1 h:0 m

Final water level 73 ft

If flowing give rate

Recommended pump depth 100 ft

Recommended pump rate 20 GPM

Well Production PUMP

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
SWL	63 ft		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15	72 ft	15	
20		20	
25		25	
30	72 ft	30	
40		40	

45	73 ft	45
50		50
60	73 ft	60

Water Details

Water Found at Depth Kind

153 ft Fresh

Hole Diameter

Depth Depth Diameter
From To

Audit Number:190466

Date Well Completed: September 11, 1998

Date Well Record Received by MOE:November 03, 1998

Full Well Record Information

Well ID

Well ID Number: 4908548

Well Audit Number: 206450

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	021
Concession	CON 09
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598271.00 Northing: 4867974.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther MaterialsGeneral Description				Depth	Depth
				From	To
BRWN	CLAY	MSND		0 ft	20 ft
BLUE	CLAY	MSND		20 ft	115 ft
GREY	CLAY	MSND	FGVL	115 ft	150 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant Used	Volume
From	To	(Material and Type)	Placed
0 ft	13 ft		

Method of Construction & Well Use

Method of Construction	Well Use
Cable Tool	Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth	Depth
		From	To
8 inch	OPEN HOLE		15 ft
6 inch	STEEL		141 ft

Construction Record - Screen

Outside Diameter	Material	Depth	Depth
		From	To
4 inch		130 ft	150 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 6782

Results of Well Yield Testing

After test of well yield, water was CLOUDY

If pumping discontinued, give reason

Pump intake set at

Pumping Rate 5 GPM

Duration of Pumping 2 h:0 m

Final water level 54 ft

If flowing give rate

Recommended pump depth 75 ft

Recommended pump rate 5 GPM

Well Production BAILER

Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
-------------------------	-----------------------	------------------------	----------------------

SWL	26 ft
-----	-------

1	1
---	---

2	2
---	---

3	3
---	---

4	4
---	---

5	5
---	---

10	10
----	----

15	15	27 ft
----	----	-------

20	20
----	----

25	25
----	----

30	30	27 ft
----	----	-------

40	40
----	----

45	45
----	----

50	50
----	----

60	60
----	----

Water Details

Water Found at Depth Kind

140 ft Fresh

Hole Diameter

Depth **Depth** **Diameter**
From **To**

Audit Number:206450

Date Well Completed: January 02, 2000

Date Well Record Received by MOE:March 23, 2000

Full Well Record Information

Well ID

Well ID Number: 4909130

Well Audit Number: 242003

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	021
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598638.00 Northing: 4868615.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
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Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant (Material and Type)	Used Volume Placed
---------------	-------------	--	-----------------------

Method of Construction & Well Use

Method of Construction

Well Use
Not Known

Status of Well

Abandoned-Other

Construction Record - Casing

Inside Diameter	Open Hole OR material Depth From	Depth To
--------------------	--	-------------

Construction Record - Screen

Outside Diameter	Material Depth From	Depth To
---------------------	---------------------------	-------------

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 6454

Results of Well Yield Testing

- After test of well yield, water was
- If pumping discontinued, give reason
- Pump intake set at
- Pumping Rate
- Duration of Pumping
- Final water level
- If flowing give rate
- Recommended pump depth
- Recommended pump rate
- Well Production
- Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level (min)	Recovery Time	Recovery Water level
SWL			
1	1		
2	2		
3	3		
4	4		
5	5		
10	10		
15	15		
20	20		
25	25		
30	30		
40	40		
45	45		
50	50		
60	60		

Water Details

- Water Found at Depth Kind
- Hole Diameter
- Depth Depth Diameter

From To

Audit Number:242003

Date Well Completed: May 05, 2003

Date Well Record Received by MOE:May 23, 2003

Full Well Record Information

Well ID

Well ID Number: 4909153

Well Audit Number: 256553

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Township	CALEDON TOWN (ALBION)
Lot	021
Concession	CON 10
County/District/Municipality	PEEL
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 598638.00 Northing: 4868615.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General ColourMost Common MaterialOther Materials			General Description	Depth From	Depth To
BLCK	LOAM	SOFT		0 ft	1 ft
BRWN	CLAY	STNS	HARD	1 ft	25 ft
GREY	CLAY	DNSE		25 ft	65 ft
BRWN	SAND	LOOS		65 ft	66 ft
BRWN	CLAY	STNS	HARD	66 ft	113 ft
GREY	SAND	SILT	LYRD	113 ft	138 ft
GREY	CLAY	SOFT		138 ft	140 ft
BRWN	SAND	LOOS		140 ft	149 ft
GREY	CLAY	SOFT		149 ft	153 ft
GREY	SAND	LOOS		153 ft	165 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant Used	Volume
From	To	(Material and Type)	Placed
3 ft	30 ft		

Method of Construction & Well Use

Method of Construction	Well Use
Rotary (Convent.)	Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
6 inch	STEEL		145 ft
5 inch	STEEL		160 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
6 inch		160 ft	164 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 4645

Results of Well Yield Testing

After test of well yield, water was	CLEAR
If pumping discontinued, give reason	
Pump intake set at	
Pumping Rate	10 GPM
Duration of Pumping	1 h:0 m
Final water level	155 ft
If flowing give rate	
Recommended pump depth	155 ft
Recommended pump rate	8 GPM
Well Production	PUMP
Disinfected?	

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level	Recovery Time (min)	Recovery Water level
SWL	107 ft		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15	155 ft	15	
20		20	
25		25	
30	155 ft	30	
40		40	

45	155 ft	45
50		50
60	155 ft	60

Water Details

Water Found at Depth Kind

164 ft Fresh

Hole Diameter

Depth Depth Diameter
From To

Audit Number:256553

Date Well Completed: May 08, 2003

Date Well Record Received by MOE:June 23, 2003

Full Well Record Information

Well ID

Well ID Number: 7162382

Well Audit Number: Z116665

Well Tag Number: A103454

This table contains information from the original well record and any subsequent updates.

Well Location

10325 OLD CHURCH RD

Township CALEDON TOWN (ALBION)

Lot 020

Concession CON 09

County/District/Municipality PEEL

City/Town/Village

Province ON

Postal Code n/a

UTM Coordinates NAD83 — Zone 17
Easting: 598242.00
Northing: 4867463.00

Municipal Plan and Sublot Number

Other

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
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Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant (Material and Type)	Volume Used Placed
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Method of Construction & Well Use

Method of Construction	Well Use
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Status of Well

Construction Record - Casing

Inside Diameter	Open Hole OR material	Depth From	Depth To
-----------------	-----------------------	------------	----------

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
------------------	----------	------------	----------

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7143

Results of Well Yield Testing

- After test of well yield, water was
- If pumping discontinued, give reason
- Pump intake set at
- Pumping Rate
- Duration of Pumping
- Final water level
- If flowing give rate
- Recommended pump depth
- Recommended pump rate
- Well Production
- Disinfected?

Draw Down & Recovery

Draw Down Time (min)	Draw Down Water level (min)	Recovery Time	Recovery Water level
SWL			
1	1		
2	2		
3	3		
4	4		
5	5		
10	10		
15	15		
20	20		
25	25		
30	30		
40	40		
45	45		
50	50		
60	60		

Water Details

Water Found at Depth Kind

Hole Diameter

Depth **Depth** **Diameter**
From **To**

Audit Number: Z116665

Date Well Completed: October 12, 2010

Date Well Record Received by MOE: April 29, 2011

APPENDIX C

SITE WETLAND FEATURES

March 16, 2009

Ms. Linda Sober
SAAR Environmental
133 Highway 60 #6
Huntsville ON, P1H 1C2

Re: Update to the Provincially Significant Hall Lake- Kennifick Wetland Complex

Dear Ms. Sober:

An update has been done to the wetland boundaries and vegetation communities for Wetland Nos. 35 and 36 in the northwest portion of the provincially significant Hall Lake-Kennifick Wetland Complex. The changes are based on a surveyed wetland staking carried out on Nov. 2, 2007 with your consulting company, a professional surveyor, Toronto and Region Conservation Authority and MNR. In addition, the northern portion of an MNR identified wetland, to the west of Wetland No. 35, was also staked and inventoried on this day. This wetland is now part of Wetland No. 51.

On Jan. 10, 2008 and April 23, 2008 the adjacent landowner to the south allowed MNR to map the wetland boundary and vegetation communities for the remaining southern portion of this MNR identified wetland (Wetland No. 51), and five additional wetlands on his property. These wetlands (Wetland Nos. 51 to 56) have been included in the Hall Lake - Kennifick Wetland Complex. The wetlands vary in size with Wetland No. 51 at 3.64 ha, Wetland No. 52 at 0.07 ha, Wetland No. 53 at 0.09 ha, Wetland No. 54 at 0.82 ha, Wetland No. 55 at 0.12 ha and Wetland No. 56 at 0.23 ha.

The Hall Lake - Kennifick Wetland Complex occurs in an agricultural setting with scattered woodlots and hedgerows. It straddles the King Township and Town of Caledon portion of the Oak Ridges Moraine. The area is noted for its numerous kettle wetlands and headwater wetlands that drain into the two watersheds of the Humber River and the Holland River. The six wetlands (Wetland Nos. 51 to 56) being added to the complex are similar kettle and headwater wetlands in the Humber River watershed. They are only 45 to 135 metres from the nearest neighbouring wetlands and are connected by regenerating meadows, forests and hedgerows thus fulfilling the requirement that wetlands in a complex must be at least 750 metres from the nearest neighbouring wetland.

As well the wetlands under 2 ha (Wetland Nos. 52 to 56) have the following values:

- Wetland Nos. 52 and 53 support vernal pool indicator species (Fairy Shrimp)
- Wetland Nos. 52 and 53 support turtles
- Wetland Nos. 52, 53 and 54 support breeding amphibians
- Wetland Nos. 52 and 54 support waterfowl staging in the spring
- Wetland Nos. 52 to 56 occur between larger wetlands in the wetland complex or adjacent to the complex
- Wetland No. 54 supports a seepage discharge area and Wetland Nos. 54, 55 and 56 are in the headwater reach for a watercourse of the Humber River

Wetland No. 51 which is over 2 ha in size is on the headwater reach for a tributary of Humber River, and supports turtles, breeding amphibians and waterfowl staging/breeding.

A map is enclosed showing the updated wetland boundaries and wetland vegetation communities on an ortho-rectified digital photo base. An enclosed Table 1 summarizes the wetland vegetation communities for Wetland Nos. 35, 36, 51 to 56 and Table 2 summarizes the wildlife records for Wetland Nos. 35 to 38 and 51 to 56.

The updated wetland boundaries and communities have been put into Province's web-accessible digital warehouse (LIO – Land Information Centre) and can be accessed at <http://www.applio.lrc.gov.on.ca/lids/>. The information is stored under the "Wetland Unit" data class.

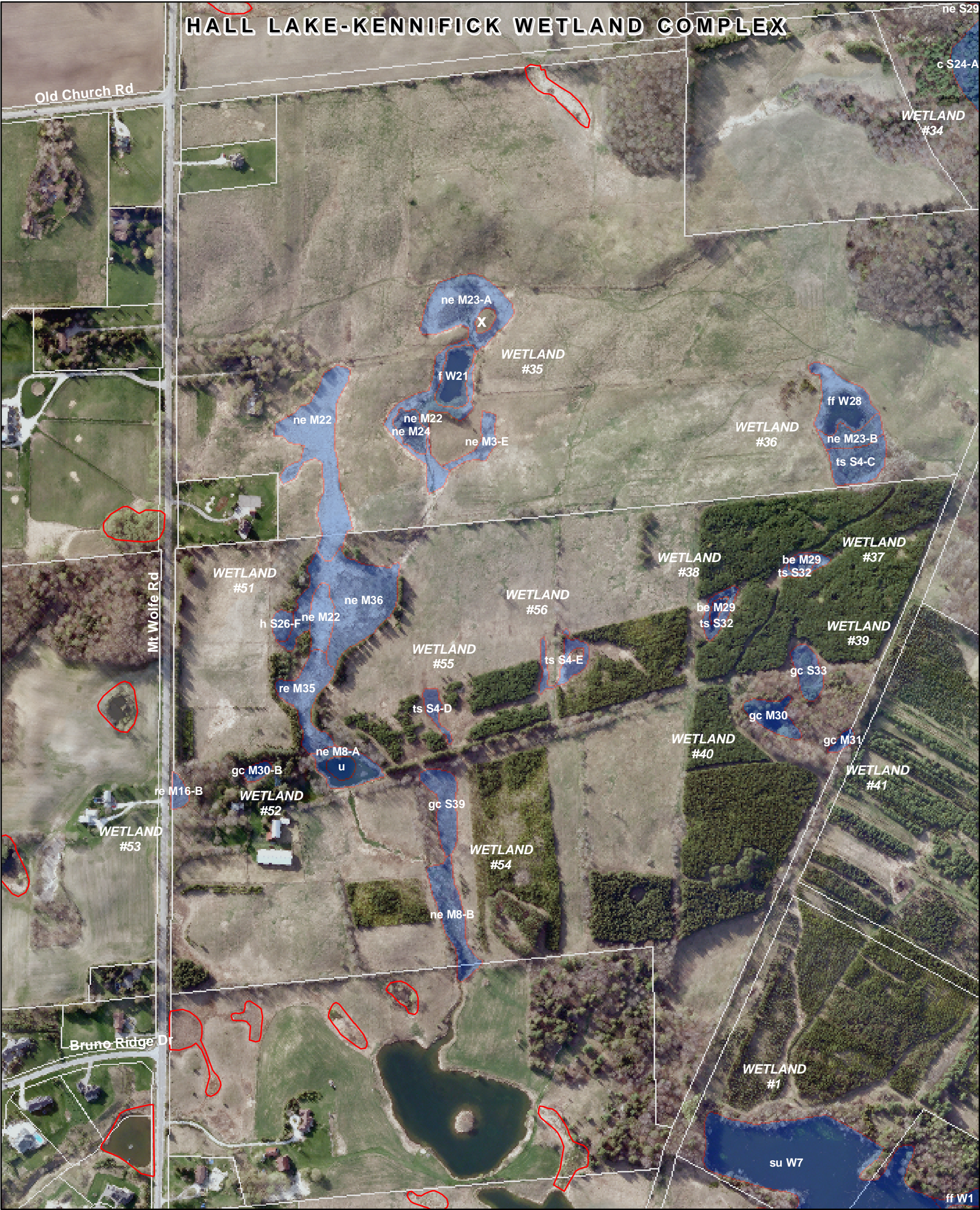
If you have any questions please do not hesitate to call me at 905-713-7370 or e-mail me at steve.varga@ontario.ca

Yours sincerely

A handwritten signature in cursive script that reads "Steve Varga".

Steve Varga
Inventory Biologist
MNR Aurora District

cc. Peel Region
Town of Caledon
Toronto and Region Conservation Authority





Ontario

 MNR Evaluated Wetland

 MNR Identified Wetland

 Parcel Fabric

PUBLICATION

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Cartography by Aurora District
Geomatics.

Universal Transverse Mercator
(6 degree) projection, Zone 17.
North American Datum 1983

Scale 1:5,000 (approx.)

SOURCE OF INFORMATION

Information provided by the Ministry of Natural Resources district office in Aurora.
Ministry of Natural Resources - Aurora District 50 Bloomington Road West, Aurora, ON L4G 3G8

Base information derived from the Ontario Base Map, 1983 at a scale of 1:10,000 and the Natural Resources Values Information System (NRVIS).

NOTE

The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should be viewed as illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation.

For detailed information on natural features such as their location, size or status, the individual files held by the Aurora district office of the Ministry of Natural Resources should be consulted.

Imagery capture date Spring 2007 copyright, J.D. Barnes and Land Information Ontario

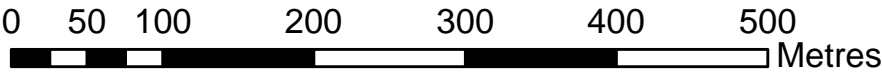


Table 1: Updates to Wetland Vegetation Communities for Wetland Nos. 35, 36, 51 to 56 in the Hall Lake - Kenniffick Wetland Complex

Wet-Field land #	Map Code	Vegetation Forms	Dominant Species (Size in hectares; site type: P- palustrine with no inflow, Pi- palustrine with inflow, I- Isolated; soil type; g-depth to mottling from top of mineral soil in cm and % coverage when available; G-depth to gley from top of mineral soil in cm and % coverage when available; sw-% standing water-depth in cm in spring (sp) when available; presence of seepage)
35	B	neM3-E fW-21	gc,ne* f*,su gc: Aster lanceolatus; ne: Phalaris arundinacea (0.175, P, silt, g-20-30%) f: Spirodela polyrhiza; su: Potamogeton zosteriformis, Ceratophyllum demersum (0.313, P, organic)
		neM22	ne* ne: Phalaris arundinacea (0.414, P, organic)
		neM23-A	gc,re,ne* gc: Bidens sp.; re: Typha latifolia; ne: Phalaris arundinacea (0.931, P, organic)
		neM24	ne*,ff ne: Phalaris arundinacea; ff: Lemna minor (0.191, P, organic)
36		neM23-B	gc,re,ne* gc: Bidens sp.; re: Typha latifolia; ne: Phalaris arundinacea, Carex utriculata (0.226, P, organic)
		tsS4-C	ts*,ne ts: Salix sp.; ne: Phalaris arundinacea (0.377, P, organic)
		ffW28	ne,f,ff* ne: Sparganium emersum; f: Potamogeton natans; ff: Lemna minor (0.529, P, organic)
51	1	neM8-A	re, ne* re: Typha latifolia; ne: Phalaris arundinacea (0.282, Pi, silty clay, sw-100%-70sp)
	2	reM35	u gc, re*, ne u: unvegetated (0.100, Pi, silty clay, sw-100%-200sp) gc: Eupatorium maculatum, Aster lanceolatus; re: Typha latifolia; ne: Phalaris arundinacea (0.515, Pi, silty clay, sw-40%-5-10sp)
	3	hS26-F	h*, ts, gc, ne h: Populus balsamifera; ts: Populus balsamifera, Cornus stolonifera; gc: Solidago altissima; ne: Phalaris arundinacea (0.102, Pi, silty clay, sw-10%-5sp)
	4	neM22	ne* ne: Phalaris arundinacea (1.139 + 0.247 = 1.386, Pi, sand, sw-10%-5sp)
	5	neM36	dh, ls, ne* dh: dead Ulmus americana trees; ls: Cornus stolonifera; ne: Phalaris arundinacea (1.255, Pi, silty clay, g-20-20%, G-20-80% sw-10%-5sp)
52	8	gcM30-B	gc*, ne gc: Sium suave; ne: grasses (0.074, I, silty clay, sw-100%-70)
53	9	reM16-B	re* re: Typha angustifolia (0.093, I, silty clay, sw-100%-50)
54	6	gcS39	ts, ls, gc*, ne ts: Ulmus americana; ls: Cornus stolonifera; gc: Aster puniceus, Eupatorium maculatum, Aster lanceolatus; ne: Phalaris arundinacea, Agrostis gigantea (0.335, Pi, silty clay, sw-20%-5, presence of seepage)
	7	neM8-B	re, ne* re: Typha latifolia; ne: Phalaris arundinacea, Carex lacustris (0.485, Pi, silty clay, sw-100%-40sp)
55	11	tsS4-D	ts*, ne ts: Cornus stolonifera; ne: Agrostis stolonifera (0.115, P, silty clay, g-40-30%, G-40-70%, sw-5%-5sp)
56	12	tsS4-E	ts*, ne ts: Cornus stolonifera; ne: Phalaris arundinacea (0.230, P, silty clay, g-40-30%, G-40-70%, sw-10%-5sp)

Vegetation Forms:

h - deciduous trees
dh - dead deciduous trees
ts - tall shrubs
ls - low shrubs
gc - herbs (ground cover)
re - robust emergents
ne - narrow leaved emergents
f - floating plants (rooted)
ff - free floating plants
su - submerged plants
u - unvegetated
* - dominant form

Map Codes:

M - Marsh
S - Swamp
W - Open Water Marsh

**Table 2: Wildlife Record Updates for Wetland Nos. 35, 36, 37, 38, 51 to 56
in the Hall Lake - Kennifick Wetland Complex**

Wetland No.	Wildlife Observations
	Observers: DS - Don Scott (landowner) observations over the past 20 years; MNR: SV- Steve Varga, MG - Michael Guindon and GV- Gina Varrin observations on Jan. 10, 2008 and April 23, 2008; SAAR Environmental: LS- Linda Söber observations in 1997,1998 & 2002
35	Spring Peepers and Wood Frogs calling at level 3 from northernmost pond, Chorus Frogs calling at level 3 from southernmost pond, Central Mudminnow - LS
36	Spring Peepers, Wood Frogs, Leopard Frogs & Chorus Frogs all calling at level 3 - LS
37	Spring Peeper call level 3, Wood Frog call level 2, Mallard, Pond Snails, Fairy Shrimp, Caddisfly larvae, Mosquito larvae, Mallard - SV, GV (April 23, 2008)
38	Wood Frog call level 2, Spring Peeper call level 3, Chorus Frog call level 1, Fairy Shrimp, Mosquito larvae, Backswimmers - SV, GV (April 23, 2008)
51	Spring Peepers call level 3 from southern part of wetland - LS; Snapping Turtles, Painted Turtles, Muskrat, Green Frogs call level 3 and 100's of tadpoles in southern pond, nesting Canada Geese and Mallard around southern pond, Waterfowl staging of Wood Duck, Canada Goose, & Mallard in southern pond - DS; White-tailed Deer tracks in snow and scat - SV, MG (Jan. 10, 2008); Spring Peeper call level 3, Chorus Frog call level 1, American Toad call level 1, Backswimmers, Pond Snails, Mosquito larvae and Red-winged Blackbird pair around southern pond, numerous White-tailed Deer tracks and scat in communities north of pond - SV, GV (April 23, 2008)
52	a number of Spring Peepers calling in the spring, a few ducks staging, Painted Turtles feeding - DS; Spring Peeper call level 2, Chorus Frog call level 1, Fairy Shrimp, Caddisfly larvae, Mosquito larvae - SV, GV (April 23, 2008)
53	Painted Turtles, a number of Spring Peepers calling in the spring - DS; Spring Peeper call level 2, Scuds, Fairy Shrimp, Mosquito larvae, Pond Snails, Caddisfly larvae, Freshwater Clams, Red-winged Blackbird pair - SV, GV (April 23, 2008)
54	White-tailed Deer tracks - SV, MG (Jan. 10, 2008); Spring Peeper call level 3, Mallard - SV, GV (April 23, 2008)
55	Song Sparrow calling on territory - SV, GV (April 23, 2008)

General Wildlife Records Around Wetland Nos. 51 to 56

Wild Turkey, White-tailed Deer, Coyote, Red Fox and Raccoon - DS

General Wildlife Records for the Upland Meadows Around Wetland Nos. 35 & 36

Abundant Bobolinks, Chippings Sparrow, Song Sparrow, Field Sparrow, Swamp Sparrow, Savannah Sparrow, Vesper Sparrow, Barn Swallow, Tree Swallow, Eastern Kingbird, Eastern Meadowlark, American Goldfinch, Black-capped Chickadee, Common Grackle, American Crow, Red-tailed Hawk, Northern Harrier (flying over), Meadow Vole, Red Fox scat, Coyote Tracks - LS

APPENDIX D

NITRATE LOADING ANALYSIS

HALL'S LAKE ESTATES NITRATE LOADING ANALYSIS AND CALCULATIONS

PART 1.0 - HALL'S LAKE ESTATES MEAN ANNUAL WATER BUDGET

Precipitation	=	940 mm	from 2003 MOE SMPDM
Evapotranspiration	=	542 mm	inferred from 2003 MOE SMPDM
Water Surplus	=	398 mm	computed (P - ET)
Runoff	=	139 mm	computed
Recharge (infiltration)	=	259 mm	computed

PART 2.0 - HALL'S LAKE ESTATES ANNUAL WASTEWATER EFFLUENT BUDGET

Design Flow - Existing Residential Building	=	0.00 m ³ /day	per MOE
Design Flow - Proposed Buildings	=	28.00 m ³ /day	calculated as 1,000 m ³ /day per unit
Total Design Flow	=	28.00 m ³ /day	
Total Gross Effluent Recharge	=	28.00 m ³ /day	A
Evaporation Losses	=	18.71 m ³ /day	B - based on 450 sq.m area bed per unit
Net Effluent Recharge	=	9.29 m ³ /day	A - B

PART 3.0 - HALL'S LAKE ESTATES ANNUAL NITRATE LOADING CALCULATIONS

The maximum acceptable concentration of nitrates (as Nitrogen) in groundwater based on the Ontario Drinking Water Standards (Ministry of the Environment, 2001) is 10 mg/L.

Assumptions:

1) Total Property Area	=	561,200 sq.m	
2) Average Daily Volume of Wastewater Effluent	=	28.00 m ³ /day	computed
3) Average Daily Volume of Effluent Recharge	=	9.29 m ³ /day	computed
4) Wastewater Nitrate Concentration	=	40 mg/L	40 mg/L per MOE
5) Site Mean Annual Recharge	=	259 mm	per Site Water Budget

Wastewater Groundwater Nitrate Mass Loading Rate:

$$9,290 \text{ L/day} \times 40 \text{ mg/L} = 371,595 \text{ mg/day}$$

Site Groundwater Recharge (Infiltration):

$$0.259 \text{ m/year} \times 561,200 \text{ sq.m} = 145,351 \text{ m}^3/\text{year}$$

$$398.2 \text{ m}^3/\text{day}$$

$$398,221 \text{ L/day}$$

Computed Groundwater Nitrate Loading:

$$\frac{\text{Groundwater Nitrate Mass Loading Rate}}{\text{Effluent Recharge} + \text{Groundwater Recharge}} = \frac{371,595}{407,511} = 0.91 \text{ mg/L}$$

$$\text{Max. Acceptable Concentration of Nitrates (as Nitrogen) in Groundwater} = 10 \text{ mg/L}$$

$$\text{Background Groundwater Nitrate Concentration (assumed):} = 0.50$$

$$\text{Site Groundwater Nitrate Concentration with Wastewater Effluent:} = 1.41$$

$$\text{Background Groundwater Nitrate Concentration (assumed):} = 1.00$$

$$\text{Site Groundwater Nitrate Concentration with Wastewater Effluent:} = 1.91$$