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**A REPORT TO**
**J & J DEVELOPMENTS**

# A GEOTECHNICAL INVESTIGATION FOR PROPOSED RESIDENTIAL DEVELOPMENT

**NORTH OF BIRDIE SMITH COURT**
**(PART OF LOT 35, CONCESSION 6)**

**TOWNSHIP OF UXBRIDGE (UDORA)**

**REFERENCE NO. 2209-S119**

**NOVEMBER 2022**

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## ENCLOSURES

## 1.0 INTRODUCTION

In accordance with the written authorization from Mr. John Cooper of J & J Developments, dated July 11, 2022, a geotechnical investigation was carried out on a parcel of vacant land at the north of Birdie Smith Court (Part of Lot 35, Concession 6) in the Township of Uxbridge (Udora).

Previous investigations were completed for the subject site and the following reports are provided for our review:

- *Sewage Impact Assessment (D-5-4) and Water Supply Study (D-5-5) completed by WSP Canada Inc. dated June 21, 2019.*
- *Phase Two Environmental Site Assessment completed by WSP Canada Inc. dated December 21, 2016.*

The purpose of the supplementary investigation is to reveal the subsurface conditions and to determine the engineering properties of the disclosed soils for the design and construction of a proposed residential development. The geotechnical findings and resulting recommendations are presented in this Report.

## 2.0 SITE AND PROJECT DESCRIPTION

The subject site, which is identified as "Part of Lot 35, Concession 6", is situated in a rural community of Udora within The Township of Uxbridge. The site is situated on the Newmarket Till, consisting of sandy silt to silty sand till.

The subject site is irregular in shape and encompasses a total area of approximately 2 hectares. It is situated to the north of Birdie Smith Court, to the southwest of Ravenshoe Road and Durham Road No. 1. It has a legal description of "Part of Registered Plan 64 and Part of Plan 40M-2318, Township of Uxbridge". At the time of investigation, the site was a vacant land covered with grass, brush and trees. The existing site gradient is relatively flat with minor undulations.

It is understood that the site will be developed into multiple residential dwellings with municipal roads and private services meeting the Town/Region standards. Details of the development, however, are not available for review at the time of report preparation.

## 3.0 FIELD WORK

The field work, consisting of two (2) boreholes extending to a depth of 6.4 m and 6.5 m below the prevailing ground surface, was carried out on August 24, 2022. The locations of both boreholes are shown on the Borehole Location Plan, Drawing No. 1. To differentiate the current boreholes from those of the previous investigations, the current boreholes are labelled in 100-series.

The boreholes were advanced at intervals to the sampling depths by a track-mounted machine using solid stem augers and equipped with split spoon sampler for soil sampling. Standard Penetration Tests, using the procedures described on the enclosed "List of Abbreviations and Terms", were performed at the sampling depths. The test results are recorded as the Standard Penetration Resistance (or 'N' values) of the subsoil. The relative density of the non-cohesive strata and the consistency of the cohesive strata are inferred from the 'N' values. Split-spoon samples were recovered for soil classification and laboratory testing. The field work was supervised and the findings were recorded by the Geotechnical Technician.

The ground elevation at each borehole and monitoring well location was determined using hand-held Global Navigation Satellite System (GNSS) survey equipment.

## 4.0 SUBSURFACE CONDITIONS

All boreholes were carried out on the open field, which revealed that beneath a layer of topsoil and a layer of sand fill in places, the site is generally underlain by silty sand till/sandy silt till deposits with layers of sands and silts within the depth of investigation.

Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs, comprising Figures 1 and 2. Borehole Logs from previous investigations are also included in the Appendix A of this report. The engineering properties of the disclosed soils are discussed herein.

### 4.1 Topsoil (All Boreholes)

A layer of topsoil, approximately 10 to 60 cm in thickness, was contacted at the ground surface in all boreholes. Thicker topsoil may be encountered in treed areas or localized low-lying areas beyond the borehole locations.

4.2 **Sand Fill** (MW17-1 and MW17-3)

A layer of sand fill was contacted below the topsoil in MW17-1 and MW17-3. It extends to a depth of 1.2 m and 1.5 m below grade, respectively. The obtained 'N' values are 4, 8, 13 and 23 blows per 30 cm of penetration, showing the sand fill is compact at lower depth while being loose near the ground surface.

4.3 **Sandy Silt Till/Silty Sand Till** (All Boreholes)

The sandy silt till and/silty sand till deposits predominates the soil stratigraphy within the depth of investigation. They generally consist of a random mixture of soil particles ranging from clay to gravel, with sand and silt being the dominant fraction. Occasional layers of clayey silt and sand can be found interbedded within the till deposits. Grain size analysis was performed on 1 representative sample of sandy silt till, and the result is plotted on Figure 3.

The recorded 'N' values range from 7 to over 100 blows, with a median of 34 blows per 30 cm of penetration, indicating the till is loose to very dense, being generally dense in relative density. The low 'N' values were contacted near the ground surface, likely being disturbed by weathering process.

The natural water content values range from 8% to 25%, with a median of 9%, indicating the silt till is generally in moist conditions. High water content is contacted near ground surface, likely an indication of higher organic content due to rootlet penetration, topsoil and weathering.

The engineering properties of the till deposits are presented below:

- Highly frost susceptible and low water erodibility.
- In excavation, the till will generally be stable in relatively steep cut; however, prolonged exposure of an excavated slope may be prone to localized sloughing.

4.4 **Silty Sand/Sandy Silt** (Borehole 1, 3 and 102)

Native sandy silt deposit was encountered near the ground surface in Boreholes 1 and 3 while a layer of silty sand was contacted within the sandy silt till in Borehole 102. Grain size analysis was performed on 1 representative sample of the silty sand deposit and the result is plotted on Figure 4.

The recorded 'N' values range from 6 to 18, with a median of 10 blows per 30 cm of penetration, indicating the silty sand/sandy silt is lose to compact, generally compact in relative density.

The natural water content was determined for the silty sand samples in Borehole 102, which has a value of 17% and 21%, indicating the silty sand is wet. According to WSP, the sandy silt deposit found in Boreholes 1 and 3 is in moist condition.

The engineering properties of the silty sand/sandy silt deposits are presented below:

- High frost susceptibility and high water erodibility.
- Where the silty sand and sandy silt is wet, they are susceptible to impact disturbance, which may result in reduction in shear strength.
- In excavation, the sand and silt will slough readily and run with water seepage, if any, and will boil with a piezometric head of about 0.3 m.

4.5 **Sand** (Boreholes 2, MW2, MW3, MW17-1 and MW17-2)

Native sand deposit was contacted near the ground surface in Borehole 2, MW3 and MW17-2. A lower sand deposit was also contacted in MW2 and MW17-1. Based on the description in WSP's Borehole Logs, the sand is generally fine to coarse grained with a trace to some gravel.

The obtained 'N' values ranged from 6 to over 100, with a median of 36 blows per 30 cm of penetration. This indicates the relative density of the sand deposit is loose to very dense, being generally dense. The loose sand was contacted in MW17-2 near the ground surface, likely being disturbed or weakened from weathering as a trace to some organics were identified by WSP.

The engineering properties of the sand deposit are presented below:

- Low frost susceptibility and high water erodibility.
- In excavation, the sand will slough readily to its angle of repose and run with water seepage, if any, and will boil with a piezometric head of about 0.3 m.

## 5.0 GROUNDWATER CONDITION

The boreholes, namely Boreholes 1, 2, 3, 101 and 102, were checked for the presence of groundwater and the occurrence of cave-in upon completion of drilling. They were dry and open with no occurrence of cave-in.

Subsequently, the groundwater levels were recorded in the monitoring wells (MW1, MW2, MW3, MW17-1, MW17-2 and MW17-3) and the recorded data are included in Appendix A. The groundwater levels in monitoring wells are summarized in Table 1.

**Table 1** – Groundwater Levels in Monitoring Wells

| MW No. | Ground El. (m) | Aug. 3, 2016 | | Aug. 10, 2016 | | Apr. 2, 2019 | | May 14, 2019 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Depth (m) | El. (m) | Depth (m) | El. (m) | Depth (m) | El. (m) | Depth (m) | El. (m) |
| MW1 | 252.7 | 10.3 | 242.4 | - | - | - | - | - | - |
| MW2 | 253.5 | 13.2 | 240.3 | 13.6 | 239.9 | - | - | - | - |
| MW3 | 259.8 | 7.0 | 252.8 | 7.2 | 252.6 | - | - | - | - |
| MW17-1 | 250.2 | - | - | - | - | 0.4 | 249.8 | 0.2 | 250.0 |
| MW17-2 | 251.8 | - | - | - | - | 1.4 | 250.4 | 0.6 | 250.2 |
| MW17-3 | 250.8 | - | - | - | - | 1.6 | 249.2 | 0.7 | 250.1 |

Based on the natural water content of the boreholes and the groundwater records, the recorded groundwater may represent the presence of localized water in the sand and silt seams/layers and is subject to seasonal fluctuations.

## 6.0 DISCUSSION AND RECOMMENDATIONS

All boreholes were carried out on the open field, which revealed that beneath a layer of topsoil and a layer of sand fill in places, the site is generally underlain by silty sand till/sandy silt till deposits with layers of sands and silts within the depth of investigation.

The groundwater levels were recorded at depths of between El. 252.8 m and 239.9 m in the monitoring wells. Based on the natural water content of the boreholes and the groundwater

records, the recorded groundwater may represent the presence of localized water in the sand and silt seams/layers and is subject to seasonal fluctuations.

It is understood that the site will be developed into multiple residential dwellings with municipal roads and private services meeting the Town/Region standards. Details of the development, however, are not available for review at the time of report preparation. The geotechnical findings warranting special consideration for the proposed development are presented below:

1. The topsoil should be removed prior to site grading. It can only be reused for landscaping purposes. Any surplus must be disposed off site.
2. In areas where earth fill is required to raise the site, the earth fill can be placed in an engineered manner for building foundations, underground services, slab-on-grade and pavement construction.
3. The proposed structures can be supported on conventional spread and strip footings founded on sound native soils or engineered fill at the designed bearing level. The footing subgrade must be inspected by either the geotechnical engineer, or the geotechnical technician under the supervision of the geotechnical engineer.
4. In conventional design, the foundation wall must be damp-proofed and provided with a perimeter subdrain at wall base, connected to a positive outlet.
5. A Class 'B' bedding, consisting of compacted 19-mm Crusher-Run Limestone (CRL), or equivalent, is recommended for construction of the underground services.

The recommendations appropriate for the project described in Section 2.0 are presented herein. One must be aware that the subsurface conditions may vary between boreholes. Should this become apparent during construction, the geotechnical engineer must be consulted to determine whether the following recommendations require revision.

## 6.1 **Site Preparation**

In areas where earth fill is required to raise the site, the earth fill should be placed in an engineered manner for building foundations, underground services, slab-on-grade and pavement construction. The engineering requirements for a certifiable fill are presented below:

1. Topsoil, vegetation and organic-containing material must be removed.

2. Any existing earth fill and/or weathered soils should be subexcavated, sorted free of topsoil/organic inclusions and any deleterious materials, before reusing for engineered fill construction. The exposed subgrade must be inspected and proof-rolled prior to any fill placement.
3. Inorganic soils must be used for engineered fill construction, and they must be uniformly compacted to at least 98% Standard Proctor dry density (SPDD) up to the proposed finished grade in lifts no more than 20 cm thick. The soil moisture must be properly controlled on the near the optimum. If the footings are to be built soon after the fill placement, the densification process for the engineered fill must be increased to 100% SPDD.
4. If imported fill is to be used, it should be inorganic soils, free of any deleterious material with environmental issue (contamination). Any potential imported earth fill from off site must be reviewed for geotechnical and environmental quality by the appropriate personnel as authorized by the developer or agency, before it is hauled to the site.
5. If the engineered fill is to be left over the winter months, adequate earth cover, or equivalent, must be provided for protection against frost action.
6. The engineered fill must not be placed during the period when freezing ambient temperatures occur either persistently or intermittently. This is to ensure that the fill is free of frozen soils, ice and snow.
7. The engineered fill must extend over the entire graded area, and the engineered fill envelope must be clearly and accurately defined in the field and precisely documented by qualified surveyors.
8. The edge of the engineered fill must be maintained at a gradient flatter than 3H:1V, so that it is suitable for safe operation of the compactor and the required compaction can be achieved.
9. The fill operation must be supervised and monitored on a full time basis by the geotechnical technician under the guidance of the geotechnical engineer.
10. The footing and underground services subgrade must be inspected by the geotechnical consulting firm that supervised the engineered fill placement. This is to ensure that the foundations are placed within the engineered fill envelope, and the integrity of the fill has not been compromised by interim construction, environmental degradation and/or disturbance by the footing excavation.
11. Any excavation carried out in certified engineered fill must be reported to the geotechnical consultant who supervised the fill placement in order to document the locations of excavation and/or to supervise reinstatement of the excavated areas to engineered fill status. If construction on the engineered fill does not commence within a

period of 2 years from the date of certification, the condition of the engineered fill must be assessed for recertification.

12. Despite stringent control in the placement of the engineered fill, variations in soil type and density may occur in the engineered fill. Therefore, the building foundation must be properly reinforced and designed by structural engineer for the project; an abrupt differential settlement of 15 mm should be considered in the design of the foundation.

## 6.2 **Foundations**

The proposed structures can be supported on conventional spread and strip footings founded on native soil or engineered fill. The recommended design bearing pressures for the design of conventional spread and strip footings at the Ultimate Limit State (ULS) and Serviceability Limit State (SLS) are provided below:

- Maximum Soil Bearing Pressure at SLS = 150 kPa
- Factored Ultimate Bearing Pressure at ULS = 250 kPa

The total and differential settlements of foundations designed with the recommended bearing pressures at SLS are estimated to be 25 mm and 20 mm, respectively.

During construction, the foundation subgrade should be inspected by either the geotechnical engineer or the senior geotechnical technician to ensure that the revealed conditions are compatible with the foundation design requirements.

Where water seepage is evident or the foundation subgrade is wet, the footings must be poured with concrete immediately after the subgrade inspection. Alternatively, a mud slab of 8 to 10 cm should be provided at the bearing surface.

Footings exposed to weathering or in unheated areas should have at least 1.5 m of earth cover for protection against frost action.

The building foundation must meet the requirements specified in the latest Ontario Building Code, and the proposed structures should be designed to resist an earthquake force using Site Classification ‘D’ (stiff soil).

## 6.3 Basement Construction

The basement walls should be designed to sustain the lateral earth pressure calculated using the soil parameters stated in Section 6.7. Any applicable surcharge loads adjacent to the proposed basement must also be considered.

In conventional design, perimeter subdrains and damp-proofing of the basement walls will be required, as shown on Drawing No. 2. The subdrains should be encased in a fabric filter to protect them against blockage by silting and connected to positive outlets. Where in-situ soil is used for foundation wall backfill, prefabricated drainage boards should be used along the basement walls.

The subgrade for conventional slab-on-grade construction should consist of sound native soil or properly compacted inorganic earth fill. In preparation of the subgrade, it should be inspected and assessed by proof-rolling prior to slab-on-grade construction.

The concrete slab should be constructed on granular bedding, consisting of 19-mm CRL, or equivalent, having a minimum thickness of 15 cm and compacted to 100% SPDD.

## 6.4 Underground Services

The subgrade for the underground services should consist of sound native soil or properly compacted inorganic earth fill. In areas where loose subgrade or soft spots are encountered, they should be subexcavated and replaced with bedding material, properly compacted to at least 98% SPDD.

A Class ‘B’ granular bedding, consisting of compacted 19-mm CRL, or equivalent, is recommended for construction of underground services.

Openings to subdrains and catch basins should be shielded with a fabric filter to prevent silting. The pipe joints connected into the manholes and catch basins should be leak-proof or wrapped with an appropriate waterproof membrane. This is to prevent migration of fines due to leakage, leading to weakening of subgrade support and settlement of underground services.

In order to prevent pipe floatation when the underground services trench is deluged with water, a soil cover of at least two times the diameter of the pipe should be in place at all times after completion of the pipe installation.

The service pipes and metal fittings should be protected against corrosion. In determining the mode of protection, an estimated electrical resistivity of the disclosed soil types can be used. The proposed anode weight must meet the minimum requirements as specified by Town Standard.

## 6.5 Backfilling in Trenches and Excavation Areas

The on-site inorganic soils are generally suitable for structural backfill. They should be sorted free of any organics or other deleterious material, if any prior to backfilling. Any oversized boulder (over 15 cm in size) should not be used for backfill.

The backfill in-service trenches or beside foundation walls should be compacted to at least 95% SPDD. In the zone within 1.0 m below the pavement or slab-on-grade, the backfill should be compacted to at least 98% SPDD, with the water content 2% to 3% drier than the optimum moisture content. The lift of each backfill layer should be limited to a thickness of 20 cm.

In normal construction practice, the problem areas of ground settlement largely occur adjacent to foundation walls, columns, manholes, catch basins and services crossings. In areas which are inaccessible to a heavy compactor, granular backfill should be used so that compaction can be achieved with light-duty vibratory compactor.

## 6.6 Pavement Design

The recommended pavement design for local road is presented in Table 2.

**Table 2** – Pavement Design

| Course | Thickness (mm) | OPS Specifications |
|---|---|---|
| Asphalt Surface | 40 | HL3 |
| Asphalt Binder | 50 | HL8 |
| Granular Base | 150 | Granular ‘A’ or equivalent |
| Granular Sub-base | 300 | Granular ‘B’ or equivalent |

Prior to the placement of granular materials, the subgrade should be inspected and proof-rolled. Any soft spot or wet subgrade identified should be sub-excavated and replaced by inorganic soil or granular materials, compacted to at least 98% SPDD, with the water content at 2% to 3% drier than the optimum moisture content. The lift of each backfill layer should be limited to a thickness of 20 cm. The granular base and sub-base should be compacted to 100% SPDD.

Along the perimeter where surface runoff may drain onto the pavement, an intercept subdrain system should be installed to prevent infiltrating precipitation from seeping into the granular bases. The subdrains should consist of filter wrapped weepers connected into the catch basins and backfilled with free-draining granular material.

## 6.7 Soil Parameters

The recommended soil parameters for the project design are given in Table 3.

**Table 3** – Soil Parameters

| **Unit Weight and Bulk Factor** | **Bulk Unit Weight ($kN/m^3$)** | **Estimated Bulk Factor** | |
|---|---|---|---|
| | | **Loose** | **Compacted** |
| Sandy Silt Till/Silty Sand Till | 22.5 | 1.25 | 1.00 |
| Sand | 20.5 | 1.20 | 0.98 |
| Silty Sand/Sandy Silt | 21.0 | 1.20 | 1.00 |
| **Lateral Earth Pressure Coefficients** | **Active $K_a$** | **At Rest $K_0$** | **Passive $K_p$** |
| Sandy Silt Till/Silty Sand Till/Silty Sand/ Sandy Silt | 0.33 | 0.50 | 3.00 |
| Sand | 0.30 | 0.45 | 3.30 |
| **Estimated Coefficients of Permeability (K) and Percolation Time (T)** | | | |
| | | **K (cm/sec)** | **T (min/cm)** |
| Sandy Silt Till/Silty Sand Till | | $10^{-6}$ | 50 |
| Silty Sand/Sandy Silt | | $10^{-5}$ | 20 |
| Sand | | $10^{-3}$ to $10^{-4}$ | 8 to 12 |
| **Estimated California Bearing Ratio** | | | |
| Sandy Silt Till/Silty Sand Till/Silty Sand/Sandy Silt | | 5% | |
| Sand | | 10% | |

| | |
|---|---|
| **Estimated Electrical Resistivity** | |
| Sandy Silt Till/Silty Sand Till/Silty Sand/Sandy Silt | 4500 ohm.cm |
| Sand | 6000 ohm.cm |
| **Coefficients of Friction** | |
| Between Concrete and Granular Base | 0.50 |
| Between Concrete and Sound Native Soil | 0.35 |

## 6.8 Excavation

Excavation should be carried out in accordance with Ontario Regulation 213/91. The types of soils are classified in Table 4.

**Table 4** – Classification of Soils for Excavation

| Material | Type |
|---|---|
| Wet soils | 4 |
| Sand Fill/Compacted Earth Fill, Drained soils | 3 |
| Sandy Silt Till/Silty Sand Till | 2 |

In excavation, any groundwater seepage is expected to be limited in quantity and can be removed by conventional pumping from sumps.

Prospective contractors may be asked to assess the in-situ subsurface conditions for soil cuts by digging test pits to the intended bottom of excavation. The test pits should be allowed to remain open for a few hours to assess the trenching conditions.

## 7.0 LIMITATIONS OF REPORT

This report was prepared by Soil Engineers Ltd. for the account of J & J Developments, and for review by the designated consultants, financial institutions and government agencies. The material in the report reflects the judgement of Jonathan Fung, B.A.Sc., and Kin Fung Li, P.Eng., in light of the information available to it at the time of preparation.

Use of this report is subject to the conditions and limitations of the contractual agreement. Any use which a Third Party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of such Third Party. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

**SOIL ENGINEERS LTD.**

Jonathan Fung, B.A.Sc.


Kin Fung Li, P.Eng.

JF/KL

# LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

## SAMPLE TYPES

AS Auger sample
CS Chunk sample
DO Drive open (split spoon)
DS Denison type sample
FS Foil sample
RC Rock core (with size and percentage recovery)
ST Slotted tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash sample

## PENETRATION RESISTANCE

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows for each foot of penetration of a 2-inch diameter, 90° point cone driven by a 140-pound hammer falling 30 inches.

Plotted as '—●—'

Standard Penetration Resistance or 'N' Value:

The number of blows of a 140-pound hammer falling 30 inches required to advance a 2-inch O.D. drive open sampler one foot into undisturbed soil.

Plotted as '○'

WH Sampler advanced by static weight
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
NP No penetration

## SOIL DESCRIPTION

Cohesionless Soils:

| 'N' (blows/ft) | Relative Density |
|---|---|
| 0 to 4 | very loose |
| 4 to 10 | loose |
| 10 to 30 | compact |
| 30 to 50 | dense |
| over 50 | very dense |

Cohesive Soils:

| Undrained Shear Strength (ksf) | 'N' (blows/ft) | Consistency |
|---|---|---|
| less than 0.25 | 0 to 2 | very soft |
| 0.25 to 0.50 | 2 to 4 | soft |
| 0.50 to 1.0 | 4 to 8 | firm |
| 1.0 to 2.0 | 8 to 16 | stiff |
| 2.0 to 4.0 | 16 to 32 | very stiff |
| over 4.0 | over 32 | hard |

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding

△ Laboratory vane test

☐ Compression test in laboratory

For a saturated cohesive soil, the undrained shear strength is taken as one half of the undrained compressive strength

## METRIC CONVERSION FACTORS

1 ft = 0.3048 metres
1lb = 0.454 kg
1 inch = 25.4 mm
1ksf = 47.88 kPa

**JOB NO.:** 2209-S119

# LOG OF BOREHOLE: BH-101

**FIGURE NO.:** 1

**PROJECT DESCRIPTION:** Proposed Residential Development

**METHOD OF BORING:** Flight-Auger

**PROJECT LOCATION:** North of Birdie Smith Court, Township of Uxbridge (Udora) (Part of Lot 35, Concession 6)

**DRILLING DATE:** October 5, 2022

| El. (m) / Depth (m) | SOIL DESCRIPTION | SAMPLES Number | Type | N-Value | Depth Scale (m) |
|---|---|---|---|---|---|
| 253.4 / 0.0 | Ground Surface | | | | |
| | **10 cm TOPSOIL** | 1 | DO | 13 | 0 |
| | Compact to very dense | | | | |
| | **SANDY SILT TILL** | 2 | DO | 16 | 1 |
| | a trace of gravel<br>occ. cobbles and boulders | 3 | DO | 23 | 2 |
| | | 4 | DO | 49 | 3 |
| | | 5 | DO | 50/30 | |
| | brown / grey | 6 | DO | 85 | 4 |
| | | 7 | DO | 78 | 5 |
| 246.8 / 6.5 | **END OF BOREHOLE** | | | | 6 |
| | | | | | 7 |
| | | | | | 8 |
| | | | | | 9 |
| | | | | | 10 |

Dynamic Cone (blows/30 cm) 10 30 50 70 90

Shear Strength (kN/m²) 50 100 150 200

Penetration Resistance (blows/30 cm) 10 30 50 70 90

Atterberg Limits PL LL

Moisture Content (%) 10 20 30 40

8 9 8 8 8 10 9

WATER LEVEL

W.L. @ El. 247.6 m upon completion

**Soil Engineers Ltd.**

**JOB NO.:** 2209-S119

# LOG OF BOREHOLE: BH-102

**FIGURE NO.:** 2

**PROJECT DESCRIPTION:** Proposed Residential Development

**METHOD OF BORING:** Flight-Auger

**PROJECT LOCATION:** North of Birdie Smith Court, Township of Uxbridge (Udora) (Part of Lot 35, Concession 6)

**DRILLING DATE:** October 5, 2022

| El. (m) / Depth (m) | SOIL DESCRIPTION | SAMPLES Number | Type | N-Value |
|---|---|---|---|---|
| 253.1 / 0.0 | Ground Surface | | | |
| | **40 cm TOPSOIL** | 1 | DO | 7 |
| | Brown, compact | | | |
| | **SANDY SILT TILL** | 2 | AS | 24 |
| | a trace of gravel<br>occ. cobbles and boulders | | | |
| | | 3 | DO | 16 |
| 251.0 / 2.1 | Brown, loose to compact — wet | | | |
| | **SILTY SAND** | 4 | DO | 6 |
| | occ. clay layers | | | |
| | | 5 | DO | 17 |
| 249.0 / 4.1 | Brown, dense to very dense | | | |
| | **SANDY SILT TILL** | 6 | DO | 45 |
| | a trace of gravel<br>occ. cobbles and boulders | | | |
| 246.7 / 6.4 | **END OF BOREHOLE** | 7 | DO | 50/28 |

Depth Scale (m): 0 1 2 3 4 5 6 7 8 9 10

Dynamic Cone (blows/30 cm): 10 30 50 70 90

Shear Strength (kN/m²): 50 100 150 200

Penetration Resistance (blows/30 cm): 10 30 50 70 90

Atterberg Limits: PL — LL

Moisture Content (%): 10 20 30 40

Moisture Content (%): 25, 9, 9, 17, 21, 14, 16

WATER LEVEL: W.L. @ El. 247.3 m upon completion

**Soil Engineers Ltd.**

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# GRAIN SIZE DISTRIBUTION

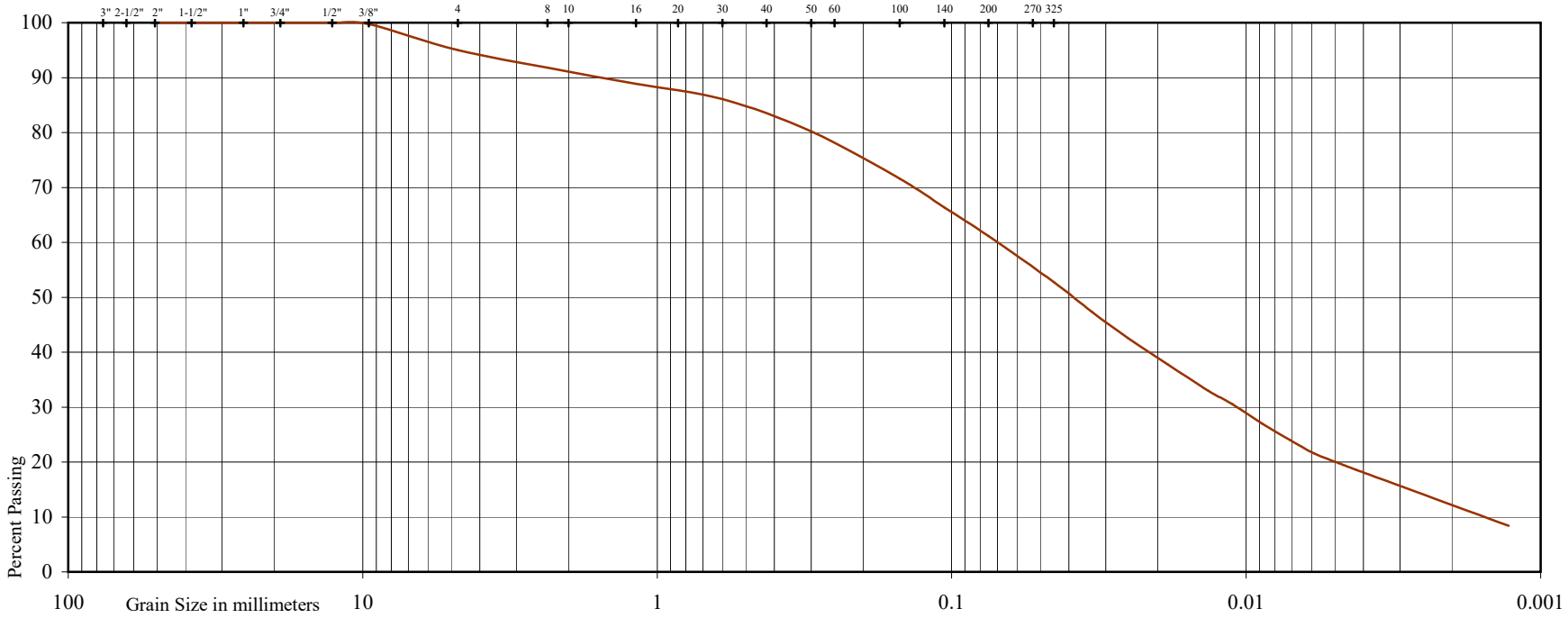
Reference No: 2209 - S119

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: North of Birdie Smith Court, Town of Uxbridge (Udora)

(Part of Lot 35, Concession 6)

Borehole No: 101

Sample No: 4

Depth (m): 2.5

Elevation (m): 250.9

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = 8

Estimated Permeability (cm./sec.) = $10^{-6}$

Classification of Sample [& Group Symbol]: SANDY SILT TILL

some clay, a trace of gravel

Figure: 3

**Soil Engineers Ltd.**

# GRAIN SIZE DISTRIBUTION

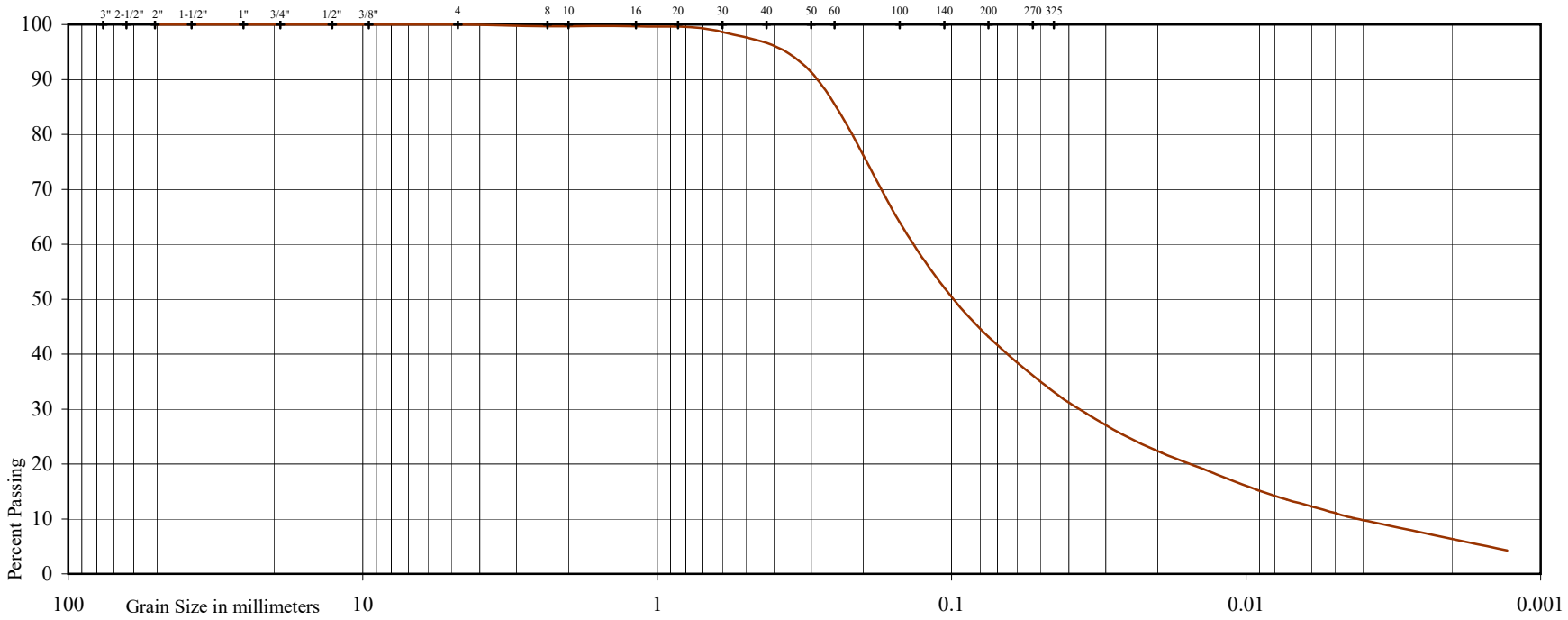
Reference No: 2209 - S119

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: North of Birdie Smith Court, Township of Uxbridge (Udora)

(Part of Lot 35, Concession 6)

Borehole No: 102

Sample No: 5

Depth (m): 3.3

Elevation (m): 249.8

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

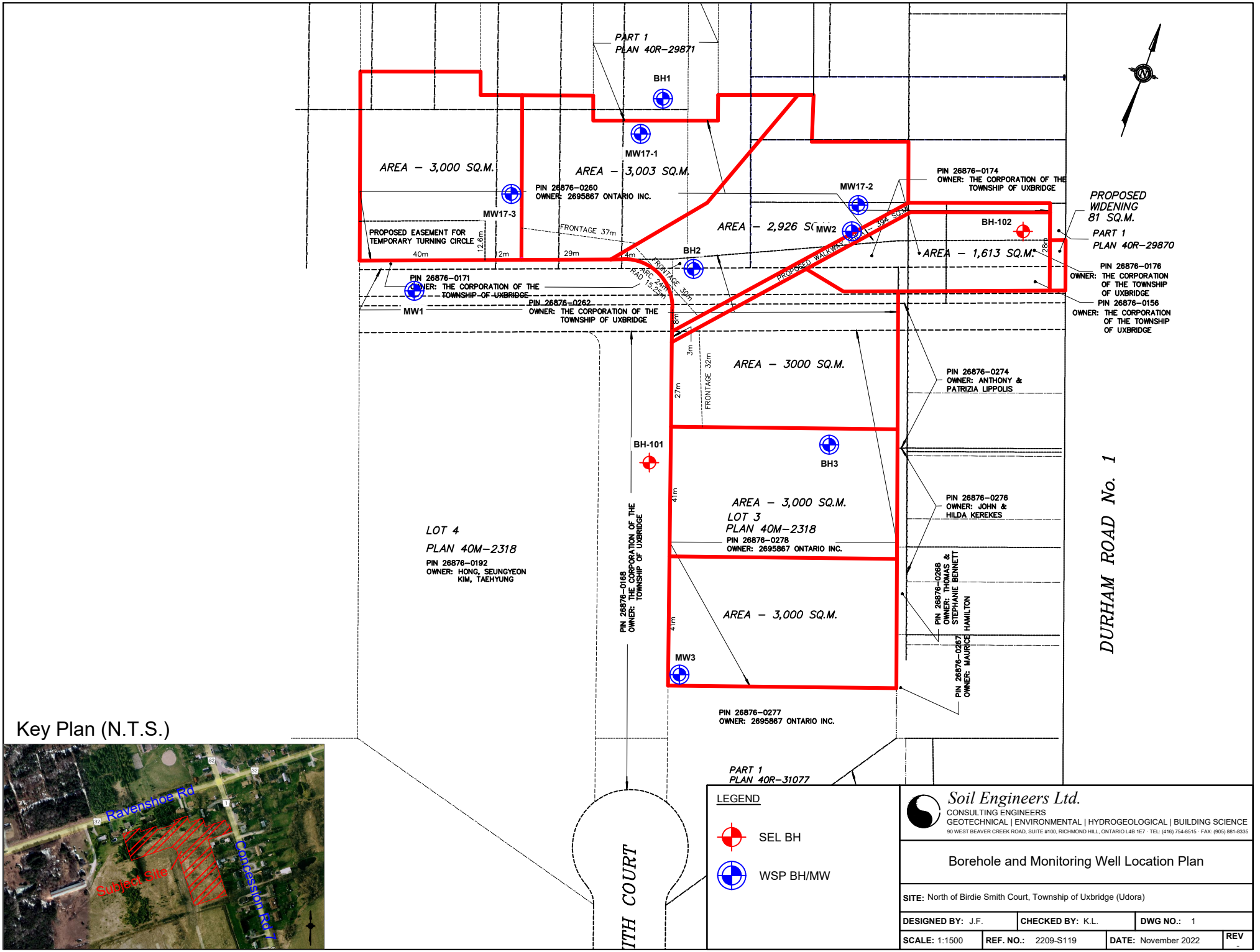
Moisture Content (%) = 21

Estimated Permeability (cm./sec.) = $10^{-5}$

Classification of Sample [& Group Symbol]: SILTY SAND

a trace of clay

Figure: 4

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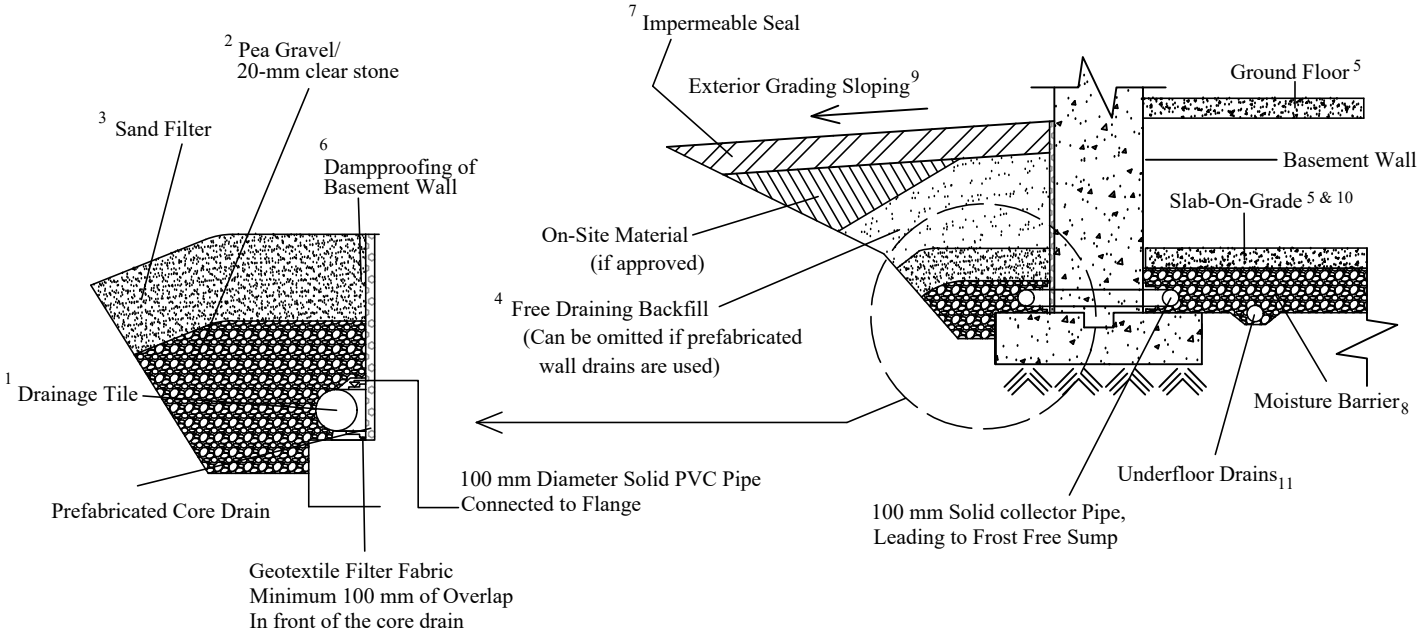
# Borehole and Monitoring Well Location Plan

**SITE:** North of Birdie Smith Court, Township of Uxbridge (Udora)

| | | | |
|---|---|---|---|
| **DESIGNED BY:** J.F. | **CHECKED BY:** K.L. | **DWG NO.:** 1 | |
| **SCALE:** 1:1500 | **REF. NO.:** 2209-S119 | **DATE:** November 2022 | **REV** - |




## NOTES:

1. **Drainage tile**: consists of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet. Invert to be at minimum of 150 mm (6") below underside of basement floor slab.

2. **Pea gravel**: at 150 mm (6") on the top and sides of drain. If drain is not placed on concrete footing, provide 100 mm (4") of pea gravel below drain. The pea gravel may be replaced by 20 mm clear stone provided that the drain is covered by a porous geotextile membrane of Terrafix 270R or equivalent.

3. **Filter material**: consists of C.S.A. fine concrete aggregate. A minimum of 300 mm (12") on the top and sides of gravel. This may be replaced by an approved porous geotextile membrane of Terrafix 270R or equivalent.

4. **Free-draining backfill**: OPSS Granular 'B' or equivalent, compacted to 95% to 98% (maximum) Standard Proctor dry density. Do not compact closer than 1.8 m (6') from wall with heavy equipment. This may be replaced by on-site material if prefabricated wall drains (Miradrain) extending from the finished grade to the bottom of the basement wall are used.

5. **Do not backfill** until the wall is supported by the basement floor slab and ground floor framing, or adquate bracing.

6. **Dampproofing** of the basement wall is required before backfilling

7. **Impermeable backfill seal** of compacted clay, clayey silt or equivalent. If the original soil in the vicinity is a free-draining sand, the seal may be omitted.

8. **Moisture barrier**: 20-mm clear stone or compacted OPSS Granular 'A', or equivalent. The thickness of this layer should be 150 mm (6") minimum.

9. **Exterior Grade**: slope away from basement wall on all the sides of the building.

10. **Slab-On-Grade** should not be structurally connected to walls or foundations.

11. **Underfloor drains*** should be placed in parallel rows at 6 to 8 m (20'-25') centre, on 100 mm (4") of pea gravel with 150 mm (6") of pea gravel on top and sides. The invert should be at least 300 mm (12") below the underside of the floor slab. The drains should be connected to positive sumps or outlets. Do not connect the underfloor drains to the perimeter drains.

* Underfloor drains can be deleted where not required.

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Details of Perimeter Drainage System

| | | | |
|---|---|---|---|
| **SITE** North of Birdie Smith Court, Township of Uxbridge (Udora) | | | |
| **DESIGNED BY** K.L. | **CHECKED BY** B.S. | **DWG NO.** 2 | |
| **SCALE** N.T.S. | **REF. NO.** 2209-S119 | **DATE** November 2022 | **REV** - |

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90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

| BARRIE | MISSISSAUGA | OSHAWA | NEWMARKET | GRAVENHURST | HAMILTON |
|---|---|---|---|---|---|
| TEL: (705) 721-7863 | TEL: (905) 542-7605 | TEL: (905) 440-2040 | TEL: (905) 853-0647 | TEL: (705) 684-4242 | TEL: (905) 777-7956 |
| FAX: (705) 721-7864 | FAX: (905) 542-2769 | FAX: (905) 725-1315 | FAX: (905) 881-8335 | FAX: (705) 684-8522 | FAX: (905) 542-2769 |


# APPENDIX A

## PREVIOUS BOREHOLE LOGS

## REFERENCE NO. 2209-S119

# LOG OF BOREHOLE BH1

**project |** PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO
**project no. |** 161-09454-00
**client |** TONI RISI, CAPRIS INVESTMENT LTD.
**rig type |** CME 75, track-mounted
**date started |** 2016/07/26
**location |** UDORA, ONTARIO
**method |** Solid stem augers, 150 mm dia.
**supervisor |** EJP
**position |** E: 644849 N: 4901848 (17T, Geodetic)
**coring |** *n/a*
**reviewer |** DAO

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) | Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa) | Water Content (%) & Plasticity | PID Readings | Well Details | Lab Data and Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 245.0 | **GROUND SURFACE** | | | | | | | | | | |
| | | TOPSOIL: 200mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST | | 1 | SS | 7 | | | | 0 ppm | | |
| | | SANDY SILT: BROWN SANDY SILT, SOME TO TRACE CLAY, LOOSE TO COMPACT, MOIST | | 2 | SS | 6 | 244 | | | 0 ppm | | |
| | | | | 3 | SS | 18 | 243 | | | 0 ppm | | ...at 1.5m, slight odour in soil sample to 2.1m<br>*SS3 chemistry:* M&I |
| | 242.6 / 2.4 | SILTY SAND TILL: BROWN SILTY SAND TILL, SOME GRAVEL, TRACE COBBLES, TRACE CLAY, MOIST, LOOSE TO DENSE | | 4 | SS | 22 | | | | 0 ppm | | |
| 3 | | | | 5 | SS | 36 | 242 | | | 0 ppm | | ...at 3.0m, slight odour in soil sample to 3.7m |
| | 241.3 / 3.7 | BOREHOLE TERMINATED AT 3.7m BELOW GROUND SURFACE IN SILTY SAND TILL. | | | | | | | | | | |
| | | **END OF BOREHOLE** | | | | | | | | | | |
| | | Borehole was dry and open upon completion. | | | | | | | | | | |

Penetration Test Values (Blows / 0.3m): × Dynamic Cone (10, 20, 30, 40)
Undrained Shear Strength (kPa): ○ Unconfined, + Field Vane, ● Pocket Penetrometer, ■ Lab Vane (40, 80, 120, 160)
Water Content (%) & Plasticity: PL, MC, LL (10, 20, 30)
Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

# LOG OF BOREHOLE BH2

WSP

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/26 |
| **location \|** | UDORA, ONTARIO | **method \|** | Solid stem augers, 150 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644893 N: 4901822 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) | Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa) | Water Content (%) & Plasticity | PID Readings | Well Details | Lab Data and Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 246.0 | **GROUND SURFACE** | | | | | | | | | | |
| 0 | 245.8 / 0.2 | TOPSOIL: 500mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST | | 1 | SS | 33 | | | | 0 ppm | | |
| | | SAND: BROWN MEDIUM GRAINED SAND, TRACE CLAY, LOOSE TO COMPACT, MOIST | | | | | | | | | | |
| | 245.1 / 0.9 | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE CLAY, TRACE GRAVEL, MOIST, LOOSE | | 2 | SS | 15 | 245 | | | 0 ppm | | *SS2 chemistry:* PAHs |
| 1 | | | | 3 | SS | 13 | | | | 0 ppm | | *SS3 chemistry:* PCBs |
| 2 | | | | 4 | SS | 13 | 244 | | | 0 ppm | | *SS4 chemistry:* M&I |
| | 243.1 / 2.9 | SAND: BROWN MEDIUM GRAINED SAND, SOME GRAVEL, LOOSE, MOIST | | | | | | | | | | |
| 3 | 242.8 / 3.2 | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE CLAY, TRACE GRAVEL, TRACE COBBLES, MOIST, LOOSE TO COMPACT | | 5 | SS | 12 | 243 | | | 0 ppm | | *SS5 chemistry:* CCME(F1-F4), BTEX, VOCs, PHCs |
| | 242.3 / 3.7 | BOREHOLE TERMINATED AT 3.7m BELOW GROUND SURFACE IN SANDY SILT TILL. | | | | | | | | | | |
| | | **END OF BOREHOLE** | | | | | | | | | | |

Penetration Test Values (Blows / 0.3m): Dynamic Cone — 10, 20, 30, 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40, 80, 120, 160

Water Content (%) & Plasticity: PL, MC, LL — 10, 20, 30

Borehole was dry and open upon completion.

# LOG OF BOREHOLE BH3

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/26 |
| **location \|** | UDORA, ONTARIO | **method \|** | Solid stem augers, 150 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644929 N: 4901793 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) | Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa) | Water Content (%) & Plasticity | PID Readings | Well Details | Lab Data and Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SUBSURFACE PROFILE | | SAMPLE | | | | Dynamic Cone 10 20 30 40; Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160 | PL MC LL 10 20 30 | | | GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL |
| 0 | 248.0 | **GROUND SURFACE** | | | | | 248 | | | | | |
| | 247.8 / 0.2 | TOPSOIL: 600mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST | | 1 | SS | 9 | | | | 0 ppm | | |
| | | SANDY SILT: BROWN SANDY SILT TILL, SOME TO TRACE CLAY, MOIST, LOOSE | | | | | | | | | | |
| 1 | | | | 2 | SS | 12 | 247 | | | 0 ppm | | *SS2 chemistry:* Pest. |
| | | | | 3 | SS | 11 | | | | 0 ppm | | |
| 2 | 245.7 | | | | | | 246 | | | | | |
| | 2.3 | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME CLAY, TRACE GRAVEL, MOIST, LOOSE | | 4 | SS | 19 | | | | 0 ppm | | *SS4 chemistry: CCME(F1-F4), BTEX, VOCs, PHCs* |
| 3 | | | | | | | 245 | | | | | |
| | | | | 5 | SS | 11 | | | | 0 ppm | | *SS5 chemistry:* PAHs |
| | 244.3 / 3.7 | BOREHOLE TERMINATED AT 3.7m BELOW GROUND SURFACE IN SANDY SILT TILL. | | | | | | | | | | |
| | | **END OF BOREHOLE** | | | | | | | | | | |
| | | Borehole was dry and open upon completion. | | | | | | | | | | |

# LOG OF BOREHOLE MW1

WSP

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/25 |
| **location \|** | UDORA, ONTARIO | **method \|** | Hollow stem augers, 215 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644831 N: 4901800 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery |
|---|---|---|---|---|---|---|
| 0 | 252.7 | **GROUND SURFACE** | | | | |
| | 252.6 / 0.1 | TOPSOIL: 300mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST | | 1 | SS | 10 |
| | | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, COMPACT | | 2 | SS | 14 |
| 1 | | | | 3 | SS | 10 |
| 2 | | | | 4 | SS | 11 |
| 3 | | | | 5 | SS | 18 |
| | 249.2 / 3.5 | SAND: BROWN COARSE GRAINED SAND, SOME GRAVEL, LOOSE TO COMPACT, WET | | | | |
| | 248.9 / 3.8 | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, COMPACT | | 6 | SS | 19 |
| 4 | | | | 7 | SS | 90 / 225mm |
| 5 | | | | | | |
| 6 | | | | 8 | SS | 50 / 50mm |
| 7 | | | | | | |

Elevation Scale (mASL): 252, 251, 250, 249, 248, 247, 246

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Water Content (%) & Plasticity — PL, MC, LL: 10, 20, 30

PID Readings: 0 ppm

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

*SS3 chemistry:* M&I

*SS4 chemistry:* Pest.

**library:** genivar - library.glb **report:** gen log v1 **file:** 161-09454-00_gint logs_sept.gpj

*(continued next page)*

# LOG OF BOREHOLE MW1

WSP

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/25 |
| **location \|** | UDORA, ONTARIO | **method \|** | Hollow stem augers, 215 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644831 N: 4901800 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) |
|---|---|---|---|---|---|---|---|
| | | *(continued)* | | | | | |
| 8 | | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, COMPACT *(continued)* | | 9 | SS | 96 / 200mm | 245 |
| 9 | | | | 10 | SS | 87 / 225mm | 244 |
| 10 | | | | | | | 243 |
| 11 | | ...at 10.7 m, light brown sandy silt till, some to trace gravel, some to trace clay, trace cobbles, compact, moist to wet to 15.3 m | | 11 | SS | 50 / 50mm | 242 |
| 12 | | | | 12 | SS | 50 / 50mm | 241 |
| 13 | | | | | | | 240 |
| 14 | | | | 13 | SS | 50 / 100mm | 239 |
| | | | | | | | 238 |

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane; 40 80 120 160

Water Content (%) & Plasticity: PL MC LL; 10 20 30

PID Readings: 0 ppm

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL



*(continued next page)*

# LOG OF BOREHOLE MW1

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/25 |
| **location \|** | UDORA, ONTARIO | **method \|** | Hollow stem augers, 215 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644831 N: 4901800 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) | Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa) | Water Content (%) & Plasticity | PID Readings | Well Details | Lab Data and Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | | *(continued)* | | | | | | Dynamic Cone: 10 20 30 40<br>Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160 | PL MC LL: 10 20 30 | | | GRAIN SIZE DISTRIBUTION (%) (MIT)<br>GR SA SI CL |
| | 237.4 | | | 14 | SS | 50 / 50mm | | | | 0 ppm | | |
| | 15.3 | BOREHOLE TERMINATED AT 15.3m BELOW GROUND SURFACE IN SANDY SILT TILL. | | | | | | | | | | |
| | | **END OF BOREHOLE** | | | | | | | | | | |

Borehole was dry and open upon completion.

50 mm monitoring well installed.
No. 10 screen installed.

WATER LEVEL MONITORING

| Date | Depth (m) | Elevation (m) |
|---|---|---|
| Aug 3, 2016 | 10.3 | 242.4 |

# LOG OF BOREHOLE MW2

WSP

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/26 |
| **location \|** | UDORA, ONTARIO | **method \|** | Hollow stem augers, 215 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644966 N: 4901867 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery |
|---|---|---|---|---|---|---|
| 0 | 253.5 | **GROUND SURFACE** | | | | |
| | 253.3 / 0.2 | TOPSOIL: 600mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST | | 1 | SS | 7 |
| | | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT | | 2 | SS | 10 |
| 1 | | | | 3 | SS | 11 |
| 2 | 251.2 / 2.3 | CLAYEY SILT: BROWN CLAYEY SILT, SOME SAND, TRACE GRAVEL, MOIST, LOOSE TO COMPACT, WET | | 4 | SS | 9 |
| | 250.6 / 2.9 | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT | | 5 | SS | 21 |
| 3 | | | | 6 | SS | 54 |
| 4 | | | | 7 | SS | 83 |
| 5 | | | | 8 | SS | 50 / 75mm |
| 6 | | | | | | |
| 7 | | | | | | |

Elevation Scale (mASL): 253, 252, 251, 250, 249, 248, 247

Penetration Test Values (Blows / 0.3m): × Dynamic Cone — 10, 20, 30, 40

Undrained Shear Strength (kPa): ○ Unconfined, + Field Vane, ● Pocket Penetrometer, ■ Lab Vane — 40, 80, 120, 160

Water Content (%) & Plasticity: PL, MC, LL — 10, 20, 30

PID Readings: 0 ppm

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

*SS3 chemistry:* M&I

2 21 56 21

*SS4 chemistry:* PAHs

*SS5 chemistry:* CCME(F1-F4), BTEX, VOCs, PHCs

*SS6 chemistry:* PCBs

*(continued next page)*

# LOG OF BOREHOLE MW2

WSP

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/26 |
| **location \|** | UDORA, ONTARIO | **method \|** | Hollow stem augers, 215 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644966 N: 4901867 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) | Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa) | Water Content (%) & Plasticity | PID Readings | Well Details | Lab Data and Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *(continued)* | | | | | 246 | Penetration Test Values (Blows / 0.3m): × Dynamic Cone 10 20 30 40; Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane 40 80 120 160 | PL MC LL 10 20 30 | | | GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL |
| 8 | | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT *(continued)* | | 9 | SS | 50 / 25mm | 245 | | | 0 ppm | | |
| 9 | | | | 10 | SS | 50 / 25mm | 244 | | | 0 ppm | | |
| 10 | | | | | | | 243 | | | | | |
| 11 | | | | 11 | SS | 50 / 75mm | 242 | | | 0 ppm | | |
| 12 | | | | 12 | SS | 50 / 50mm | 241 | | | 0 ppm | | |
| 13 | | ...at 12.7 m, brown medium to coarse grained sand, some gravel, very dense, wet to 12.8 m | | 13 | SS | 50 / 25mm | 240 | | | 0 ppm | | |
| 14 | 239.2 / 14.3 | SAND: BROWN MEDIUM TO COARSE GRAINED SAND, SOME GRAVEL,VERY DENSE, WET | | | | | 239 | | | | | ...at 14.3m, slight odour in soil sample to 16.9m |

*(continued next page)*

# LOG OF BOREHOLE MW2

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/26 |
| **location \|** | UDORA, ONTARIO | **method \|** | Hollow stem augers, 215 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644966 N: 4901867 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) |
|---|---|---|---|---|---|---|---|
| 15 | | *(continued)* | | | | | |
| | | SAND:<br>BROWN MEDIUM TO COARSE GRAINED SAND, SOME GRAVEL,VERY DENSE, WET<br>*(continued)* | | 14 | SS | 50 / 50mm | |
| 16 | | | | | | | 238 |
| | 236.6 | | | | | | 237 |
| | 16.9 | BOREHOLE TERMINATED AT 16.9m<br>BELOW GROUND SURFACE IN SAND. | | 15 | SS | 50 / 75mm | |

**END OF BOREHOLE**

Borehole was dry and open upon completion.

50 mm monitoring well installed.
No. 10 screen installed.

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Water Content (%) & Plasticity
PL MC LL
10 20 30

PID Readings: 0 ppm / 0 ppm

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

WATER LEVEL MONITORING

| Date | Depth (m) | Elevation (m) |
|---|---|---|
| Aug 3, 2016 | 13.2 | 240.3 |
| Aug 10, 2016 | 13.6 | 239.9 |

# LOG OF BOREHOLE MW3

WSP

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/25 |
| **location \|** | UDORA, ONTARIO | **method \|** | Hollow stem augers, 215 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644953 N: 4901706 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth (m) | Elev (m) | STRATIGRAPHY | Graphic | Sample No. | Type | SPT N-Value / Core Recovery |
|---|---|---|---|---|---|---|
| 0 | 259.8 | **GROUND SURFACE** | | | | |
| | 259.6 | TOPSOIL: 100mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST | | 1 | SS | 35 |
| | 0.2 | SAND: BROWN MEDIUM GRAINED SAND, SOME TO TRACE ORGANICS, SOME TO TRACE CLAY, GRAVEL, DRY, LOOSE TO COMPACT | | | | |
| 1 | 259.0 | | | 2 | SS | 22 |
| | 0.8 | SAND AND GRAVEL: BROWN SAND AND GRAVEL FILL, DRY, COMPACT | | | | |
| | | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT | | | | |
| 2 | 258.3 | | | 3 | SS | 13 |
| | 1.5 | SAND: BROWN MEDIUM TO COARSE GRAINED SAND, SOME GRAVEL, LOOSE TO COMPACT, DRY | | | | |
| | 257.5 | | | | | |
| | 2.3 | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT | | 4 | SS | 19 |
| 3 | | | | 5 | SS | 65 |
| 4 | | | | 6 | SS | 58 |
| 5 | | | | 7 | SS | 62 |
| 6 | | ...at 6.1 m, brown medium to coarse grained sand lens, trace gravel, wet to saturated to 6.3 m | | 8 | SS | 50 / 75mm |
| 7 | | | | | | |

Elevation Scale (mASL): 259, 258, 257, 256, 255, 254, 253

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Water Content (%) & Plasticity — PL, MC, LL: 10, 20, 30; Water level on completion

PID Readings: 0 ppm

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

*SS3 chemistry:* M&I

14 40 34 12

*(continued next page)*

# LOG OF BOREHOLE MW3

WSP

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/25 |
| **location \|** | UDORA, ONTARIO | **method \|** | Hollow stem augers, 215 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644953 N: 4901706 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | Sample Number | Sample Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) |
|---|---|---|---|---|---|---|---|
| | | *(continued)* | | | | | |
| 8 | | SANDY SILT TILL:<br>BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT<br>*(continued)*<br>...at 7.7 m, brown medium to coarse grained sand lens, trace silt, trace clay, saturated to 8.0 m | | 9 | SS | 58 | 252 |
| 9 | | ...at 9.1 m, brown medium to coarse grained sand lens, trace silt, trace clay, saturated to 9.4 m | | 10 | SS | 80 / 250mm | 251 |
| 10 | | | | | | | 250 |
| 11 | | ...at 10.7 m, greyish brown medium to coarse grained sand lens, trace silt, trace clay, saturated to 10.8 m | | 11 | SS | 100 / 225mm | 249 |
| 12 | | | | 12 | SS | 70 | 248 |
| 13 | | | | | | | 247 |
| 14 | | | | 13 | SS | 90 / 175mm | 246 |
| | | | | | | | 245 |

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Water Content (%) & Plasticity — PL, MC, LL: 10, 20, 30; Water level on completion

PID Readings: 0 ppm

Well Details

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

*(continued next page)*

# LOG OF BOREHOLE MW3

| | | | | | |
|---|---|---|---|---|---|
| **project \|** | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO | | | **project no. \|** | 161-09454-00 |
| **client \|** | TONI RISI, CAPRIS INVESTMENT LTD. | **rig type \|** | CME 75, track-mounted | **date started \|** | 2016/07/25 |
| **location \|** | UDORA, ONTARIO | **method \|** | Hollow stem augers, 215 mm dia. | **supervisor \|** | EJP |
| **position \|** | E: 644953 N: 4901706 (17T, Geodetic) | **coring \|** | *n/a* | **reviewer \|** | DAO |

| Depth Scale (m) | Elev / Depth (m) | STRATIGRAPHY | Graphic Plot | SAMPLE Number | SAMPLE Type | SPT N-Value / Core Recovery | Elevation Scale (mASL) | Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa) | Water Content (%) & Plasticity | PID Readings | Well Details | Lab Data and Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | | *(continued)* | | | | | | | | | | GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL |
| | | SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT *(continued)* | | 14 | SS | 74 | | | | 0 ppm | | |
| | 244.0 | | | | | | 244 | | | | | |
| | 15.9 | BOREHOLE TERMINATED AT 15.8m BELOW GROUND SURFACE IN SANDY SILT TILL. | | | | | | | | | | |
| | | **END OF BOREHOLE** | | | | | | | | | | |

Penetration Test Values (Blows / 0.3m): × Dynamic Cone — 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane — 40 80 120 160

Water Content (%) & Plasticity: PL MC LL — 10 20 30; Water level on completion

Unstabilized water level at 15.5 m below ground surface; borehole was open upon completion.

50 mm monitoring well installed.
No. 10 screen installed.

WATER LEVEL MONITORING

| Date | Depth (m) | Elevation (m) |
|---|---|---|
| Aug 3, 2016 | 7.0 | 252.8 |
| Aug 10, 2016 | 7.2 | 252.6 |

# BOREHOLE NO. MW17-1



**PROJECT NAME:** UDORA PHASE TWO ESA
**PROJECT NO.:** 161-09454-00
**CLIENT:** CAPRIS INV. INC.
**DATE COMPLETED:** Sep 20, 2017
**BOREHOLE TYPE:** SPLIT SPOON / HOLLOW STEM AUGER
**SUPERVISOR:** DAO / JW
**GROUND ELEVATION:** 250.2 mASL
**REVIEWER:** SJD

| DEPTH (m) | STRATIGRAPHIC DESCRIPTION | STRATIGRAPHY | MONITOR DETAILS | SAMPLE TYPE | SAMPLE N VALUE | SAMPLE % WATER | SAMPLE % RECOVERY | SAMPLE PID/TOV (ppm) | CONE PENETRATION "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu) | WATER CONTENT % ($W_P$, $W_L$) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | | | | | | | | | | | |
| 0.4 | SAND TOPSOIL:DARK BROWN SAND TOPSOIL, TRACE TO SOME SILT, TRACE ROOTLETS / ORCANICS, MOIST. | | | SS1 | 4 | | 0 | 0.0 | | | |
| | SAND FILL: ORANGY BROWN, SAND FILL, TRACE TO NO SILT, TRACE ROOTLETS, MOIST, LOOSE. | | | | | | | | | | |
| 1.0 | | | | SS2 | 13 | | 1 | 0.0 | | | WATER LEVEL AT 0.82 mBGS ON SEPT. 20, 2017 |
| 1.2 | SILTY SAND TILL: GREYISH BROWN SILTY SAND TILL, TRACE GRAVEL, TRACE CLAY, MOIST TO WET, LOOSE. | | | | | | | | | | |
| 2.0 | | | | SS3 | 8 | | 0 | 0.0 | | | WATER LEVEL AT 2.04 mBGS ON SEPT. 22, 2017 |
| 2.3 | SILTY SAND TILL: GREYISH BROWN SILTY SAND TILL, SOME COBBLES, TRACE TO SOME CLAY, MOIST TO WET, LOOSE TO DENSE. - 0.1 m OF COBBLES FROM 2.63 m TO 2.74 m | | | SS4 | 17 | | 1 | 0.0 | | | |
| 3.0 | | | | SS5 | 26 | | 1 | 0.0 | | | |
| 4.0 | | | | | | | | | | | |
| 4.6 | SAND AND GRAVEL: BROWN, SAND AND FINE GRAVEL, SOME COBBLES, VERY DENSE, SATURATED. | | | SS6 | 50 for 3" | | 0 | 0.0 | | | |
| 5.0 | | | | | | | | | | | |
| 6.0 | | | | SS7 | 50 for 2" | | 0 | 0.0 | | | |
| 6.7 | BOREHOLE TERMINATED AT 6.7 m IN SAND AND GRAVEL. | | | | | | | | | | |
| 7.0 | | | | | | | | | | | |
| 8.0 | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | |
| 10.0 | | | | | | | | | | | |

# BOREHOLE NO. MW17-2



**PROJECT NAME:** UDORA PHASE TWO ESA
**PROJECT NO.:** 161-09454-00
**CLIENT:** CAPRIS INV. INC.
**DATE COMPLETED:** Sep 21, 2017
**BOREHOLE TYPE:** SPLIT SPOON / HOLLOW STEM AUGER
**SUPERVISOR:** DAO / JW
**GROUND ELEVATION:** 251.8 mASL
**REVIEWER:** SJD

| DEPTH (m) | STRATIGRAPHIC DESCRIPTION | STRATIGRAPHY | MONITOR DETAILS | SAMPLE TYPE | N VALUE | % WATER | % RECOVERY | PID/TOV (ppm) | CONE PENETRATION "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu) | WATER CONTENT % ($W_P$, $W_L$) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | | | | | | | | | | | |
| 0.2 | SAND TOPSOIL: SOME SILT, TRACE ORGANICS. | | | | | | | | | | |
| | SAND: DARK BROWN, SAND, SOME SILT, TRACE TO SOME ORGANICS, MOIST, LOOSE. | | | SS1 | 5 | | 0 | 0.0 | | | |
| 1.0 | | | | SS2 | 9 | | 0 | 0.0 | | | |
| 1.1 | SILTY SAND TILL: BROWN, SILTY SAND TILL, TRACE CLAY, TRACE GRAVEL, TRACE ORGANICS, MOIST, LOOSE. | | | | | | | | | | |
| 1.5 | SILTY SAND / SANDY SILT TILL: BROWN TO GREYISH BROWN, SILTY SAND TO SANDY SILT TILL, TRACE CLAY, TRACE GRAVEL, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT. | | | SS3 | 12 | | 0 | 0.0 | | | |
| 2.0 | | | | | | | | | | | |
| | | | | SS4 | 12 | | 1 | 0.0 | | | WATER LEVEL AT 5.67 mBGS ON SEPT. 21, 2017 |
| 3.0 | | | | SS5 | 11 | | 1 | 0.0 | | | |
| 4.0 | | | | SS6 | 20 | | 1 | 0.0 | | | |
| 4.6 | SANDY SILT TILL: SANDY SILT TILL, VARVED CLAY LAYERS, SOME CLAY, TRACE COBBLES, TRACE GRAVEL, VERY DENSE | | | SS7 | 59 | | 1 | 0.0 | 84 | | |
| 5.0 | | | | | | | | | | | |
| 6.0 | | | | | | | | | | | WATER LEVEL AT 2.75 mBGS ON SEPT. 22, 2017 |
| 6.1 | SANDY SILT TILL: LIGHT BROWN TO GREY SANDY SILT TILL, TRACE TO SOME GRAVEL, TRACE COBBLES, MOIST, VERY DENSE. | | | SS8 | 60 for 3" | | 0 | | | | |
| 6.7 | BOREHOLE TERMINATED AT 6.7 m IN SANDY SILT TILL. | | | | | | | | | | |
| 7.0 | | | | | | | | | | | |
| 8.0 | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | |
| 10.0 | | | | | | | | | | | |

# BOREHOLE NO. MW17-3



**PROJECT NAME:** UDORA PHASE TWO ESA
**PROJECT NO.:** 161-09454-00
**CLIENT:** CAPRIS INV. INC.
**DATE COMPLETED:** Sep 20, 2017
**BOREHOLE TYPE:** SPLIT SPOON / HOLLOW STEM AUGER
**SUPERVISOR:** DAO / JW
**GROUND ELEVATION:** 250.8 mASL
**REVIEWER:** SJD

| DEPTH (m) | STRATIGRAPHIC DESCRIPTION | STRATIGRAPHY | MONITOR DETAILS | SAMPLE TYPE | N VALUE | % WATER | % RECOVERY | PID/TOV (ppm) | CONE PENETRATION "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu) | WATER CONTENT % ($W_P$, $W_L$) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | SAND TOPSOIL: BROWN, TRACE ROOTLETS, MOIST. | | | SS1 | 8 | | 0 | 0.0 | | | |
| 0.4 | SAND FILL: BROWN TO ORANGEY BROWN, SAND FILL, MOIST, LOOSE TO COMPACT. | | | SS2 | 23 | | 0 | 0.0 | | | |
| 1.5 | SILTY SAND TO SANDY SILT TILL: GREYISH BROWN, SILTY SAND TO SANDY SILT TILL, TRACE CLAY, TRACE COBBLES, TRACE GRAVEL, MOIST TO SATURATED, COMPACT. | | | SS3 | 34 | | 0 | 0.0 | | | |
| | | | | SS4 | 19 | | 1 | 0.0 | | | WATER LEVEL AT 2.44 mBGS ON SEPT. 22, 2017<br>WATER LEVEL AT 2.7 mBGS ON SEPT. 20, 2017 |
| 3.1 | SANDY SILT TILL: GREYISH BROWN, SANDY SILT TILL, SOME COBBLES, TRACE CLAY, TRACE GRAVEL, VERY SATURATED. | | | SS5 | 10 | | 0 | 0.0 | | | |
| 3.8 | SILTY SAND TO SANDY SILT TILL: SILTY SAND TO SANDY SILT TILL, FINE GRAVEL, COMPACT TO DENSE, VERY SATURATED. | | | SS6 | 18 | | 1 | 0.0 | | | |
| 4.6 | BOREHOLE TERMINATED AT 4.6 m IN SILTY SAND TO SANDY SILT TILL. | | | | | | | | | | |

## TABLE I-1: OBSERVED GROUNDWATER ELEVATIONS

**D-5-4 AND D-5-5 ASSESSMENT**
**PROPOSED PLAN OF SUBDIVISION, PART OF LOTS 34 AND 35, CONCESSION 6, UDORA, ON**

| Monitor Designation | T.O.P Elevation (mASL) | Ground Elevation (mASL) | PVC Casing Stick-up (m) | Measurement Date | Depth to Water | | Groundwater Elevation |
|---|---|---|---|---|---|---|---|
| | | | | | m bmp | m bgl | m ASL |
| MW17-1 | 245.52 | 244.93 | 0.73 | | | | |
| | | | | 20-Mar-19 | 2.17 | 1.44 | 243.35 |
| | | | | 21-Mar-19 | 2.08 | 1.35 | 243.44 |
| | | | | 2-Apr-19 | 1.16 | 0.43 | 244.36 |
| | | | | 14-May-19 | 0.97 | 0.24 | 244.55 |
| | | | | | | | |
| MW17-2 | 247.52 | 246.27 | 0.79 | | | | |
| | | | | 20-Mar-19 | 2.76 | 1.97 | 244.77 |
| | | | | 21-Mar-19 | 2.69 | 1.90 | 244.83 |
| | | | | 2-Apr-19 | 2.14 | 1.35 | 245.38 |
| | | | | 14-May-19 | 1.40 | 0.61 | 246.12 |
| | | | | | | | |
| MW17-3 | 246.53 | 244.333 | 0.82 | | | | |
| | | | | 20-Mar-19 | 2.73 | 1.91 | 243.80 |
| | | | | 21-Mar-19 | 2.72 | 1.90 | 243.81 |
| | | | | 2-Apr-19 | 2.40 | 1.58 | 244.13 |
| | | | | 14-May-19 | 1.52 | 0.70 | 245.01 |
| | | | | | | | |
| TW1 | 245.25 | 243.65 | 0.71 | | | | |
| | | | | 20-Mar-19 | - | - | - |
| | | | | 21-Mar-19 | 11.84 | 11.13 | 233.41 |
| | | | | 2-Apr-19 | 11.85 | 11.14 | 233.40 |
| | | | | 14-May-19 | 10.56 | 9.85 | 234.69 |
| | | | | | | | |
| TW19-1 | 253.58 | 252.21 | 0.93 | | | | |
| | | | | 20-Mar-19 | 14.82 | 13.89 | 238.76 |
| | | | | 21-Mar-19 | 15.82 | 14.89 | 237.76 |
| | | | | 28-Mar-19 | 14.10 | 13.17 | 239.48 |
| | | | | 2-Apr-19 | 14.17 | 13.24 | 239.41 |
| | | | | 14-May-19 | 12.38 | 11.45 | 241.20 |
| | | | | | | | |

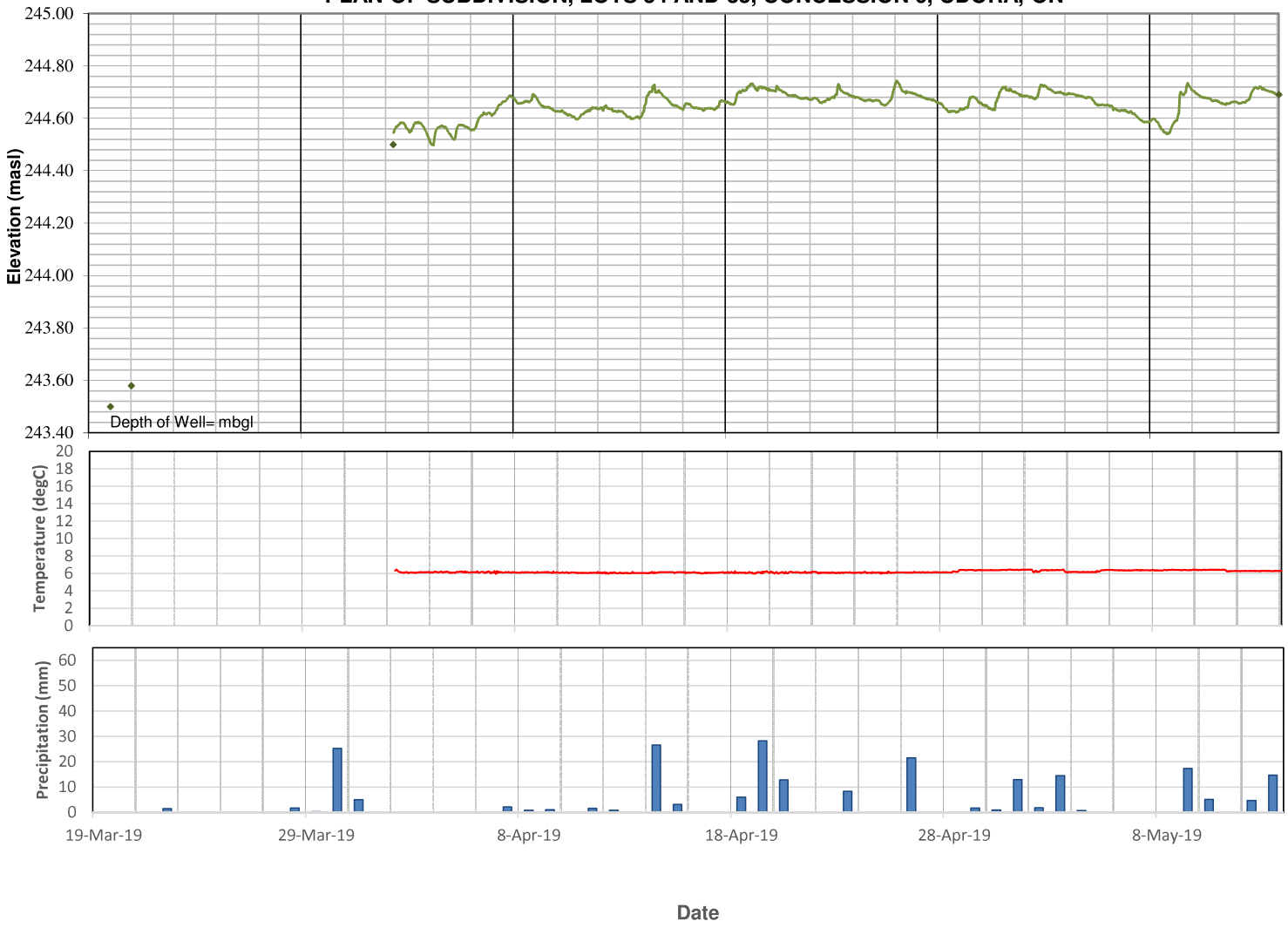
***Notes:***

1) "m ASL" indicates metres above sea level.
2) "m" indicates metres.
3) "m bmp" indicates metres below measurement point, which is the top of pipe (referred to as T.O.P.)
4) "m bgl" indicates metres below ground level.
5) Monitoring wells are installed with MONUMENTt casings.

# FIGURE I-1: HYDROGRPAH OF MONITORING WELL MW17-1

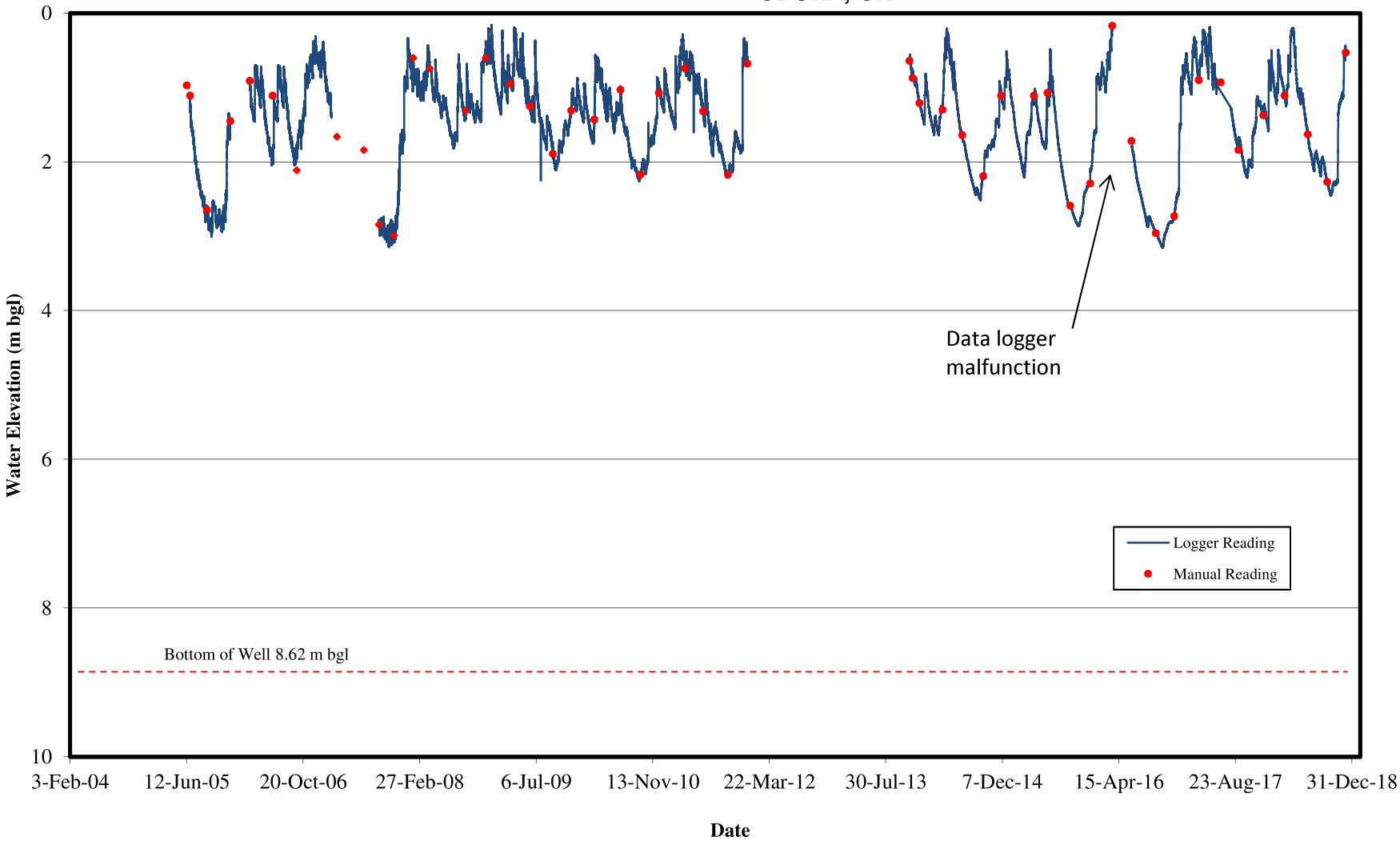
## UDORA D-5-4 AND D-5-5 ASSESSMENT

## PLAN OF SUBDIVISION, LOTS 34 AND 35, CONCESSION 6, UDORA, ON




Notes: 1) Climatic data March 2019 to present obtained from Uxbridge West Climatic Station located a 44°05'54.000" N 79°09'49.020" W 325.00 m asl

# FIGURE I-2 - HYDROGRAPH OF OW05-1 SHALLOW MONITORING WELL
## UDORA ESTATES DEVELOPMENT
## UDORA, ON




H:\Proj\18\12360-00\Tech\Phase 2\Report\D-5-4 and D-5-5 Report\Appendix I - Groundwater Level Monitoring\Figure I-3 - OW05-1 Hydrograph.xls,6/5/2019

# FIGURE I-2 - HYDROGRAPH OF LOT 14 WATER SUPPLY WELL
## UDORA ESTATES DEVELOPMENT
## UDORA, ON