



**REPORT**

# Preliminary Hydrogeological Assessment

*Proposed Residential Subdivision, Bradford Highlands Golf Course,  
23 Brownlee Drive, Bradford, Ontario L3Z 2A4*

Submitted to:

**Bradford Highlands Joint Venture**

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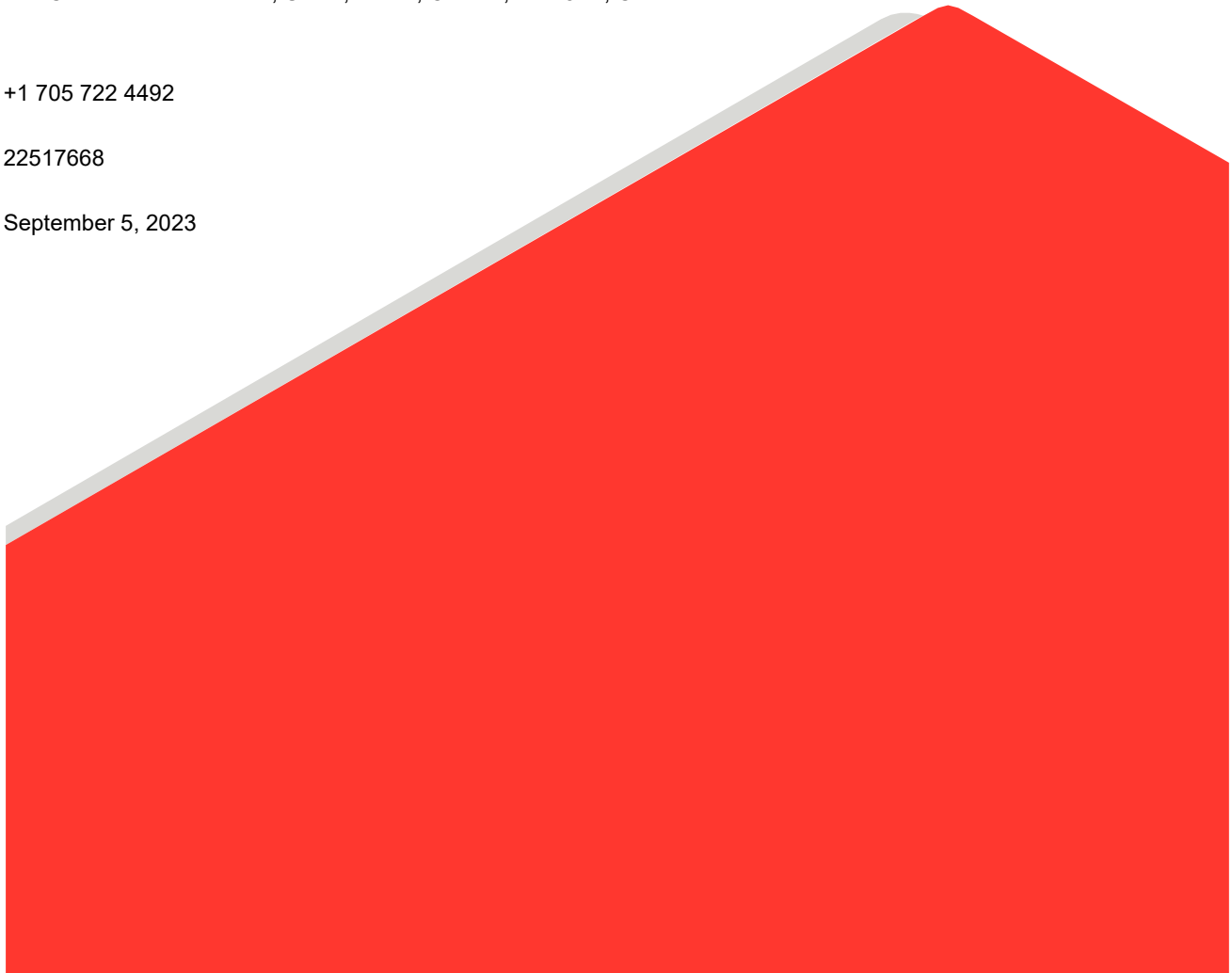
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22517668

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## Distribution List

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## 1.0 INTRODUCTION

WSP Canada Inc (“WSP”), formerly Golder Associates Ltd. (Golder), was retained by Bradford Highlands Joint Venture. (the ‘Client’) to provide geotechnical and hydrogeological consulting services in support of the design for the proposed residential development (the ‘Project’) to be located at 23 Brownlee Drive, Bradford, Ontario (the ‘Site’; Figure 1). The terms of reference for the consulting services are included in Golder’s proposal No. CX22517668, dated February 9, 2022. Authorization to proceed with the investigation was provided in the form of the signed proposal received from the Client on February 16, 2022.

This report provides the results of the hydrogeological assessment and should be read in conjunction with the “Important Information and Limitations of This Report” in Appendix A which forms an integral part of this document. The reader’s attention is specifically drawn to this information, as it is essential for the proper use and interpretation of this report. The data, interpretations and recommendations contained in this report pertain to a specific project as described in the report and are not applicable to any other project or site location. If the project is modified in concept, location, or elevation, or if the project is not initiated within eighteen months of the date of the report, WSP should be given an opportunity to confirm that the recommendations in this report are still valid.

### 1.1 Scope of Work

The scope of work for the current hydrogeological investigation consisted of:

- Reviewing published information sources and data collected at the Site;
- Drilling and installation of monitoring wells;
- Collecting groundwater level measurements from the monitoring wells;
- Conducting hydraulic conductivity measurements at selected monitoring wells;
- Conducting groundwater quality sampling;
- Estimating short-term dewatering requirements;
- Update the previously completed water budget assessment completed previously by Golder in accordance with LSRCA guidelines; and
- Preparing a hydrogeological report compiling the results of both the 2018 investigation and current investigation.

## 2.0 STUDY AREA CHARACTERIZATION

The Site extends from Line 6 in the north to Line 5 in the south, and from Brownlee Drive in the west to Inverness Way in the East, in Bradford, Ontario (Figure 2, Appendix B). Based on the information provided by the Client, the proposed development will consist of a total of 946 residential units consisting of single detached units, semidetached units and townhouses. In addition, two stormwater management ponds are proposed to be constructed. At the time of this proposal preparation only preliminary plans were available for the proposed development.

### 2.1 Topography and Drainage

Based on publicly available topographic and drainage data, the ground surface at the Site slopes north to south, towards the Holland River with a geodetic elevation between approximately 251 metres above sea level (masl) and 219 masl. The closest surface water feature to the Site is the Holland River, bordering the site to the south. It is expected that surface water runoff at the Site would discharge to the Holland River.

## 2.2 Physiography and Geology

Physiographic mapping in the area (Chapman and Putnam, 2007) indicates that the Site lies within the physiographic region of southern Ontario known as the Schomberg Clay Plains. The Schomberg Clay Plains are composed of number of topographic basins located near Schomberg, Newmarket, and north of Lake Scugog. The overburden immediately below ground surface within the Schomberg Clay Plains generally consists of clay deposits underlain by a drumlinized till plain. Surficial mapping provided by the Ontario Geological Survey (OGS) indicates that the surficial geology at the Site consists of stone-poor, sandy silt to silty sand textured till. Bedrock at the Site consists of limestone of the Lindsay Formation.

## 2.3 Groundwater Use

Based on the long-standing development of the area it is expected that all properties in the vicinity of the Site are connected to the municipal water supply system, and no active private groundwater supply wells are present. A review was conducted of the Ministry of the Environment, Conservation and Parks (MECP) water well database for the vicinity of the Site (Figure 3; Appendix B). The MECP database indicates records for 104 water wells located within approximately 200 m of the Site. The results of the MECP database search are provided in Appendix C.

A total of 88 of the records are listed for use as domestic water supply, with the majority of the wells are indicated to be completed between 20 to 45 mbgs. Five of the wells are indicated to be completed at depths shallower than 20 m. Two well records are indicated to be for municipal supply purposes, however based on a review of the MECP Source Protection Information Atlas (<https://www.ontario.ca/page/source-protection>), there are no active municipal groundwater supply wells in the vicinity of the Site. Based on the MECP information it is assumed the designated wells, which were installed in 1962 and 1970, are no longer operational. The remaining well records are listed as abandonment records, unused boreholes, as observation wells, or have no listed completion details.

## 2.4 Previous Investigations

A hydrogeological assessment of the Site was completed at the Site in 2019, which was documented in the report '*Bradford Highlands Golf Course Redevelopment, Bradford, Ontario*', prepared for Diagram Developments Caledon Inc., date March 2018 (Golder, 2018). The following activities were completed as part of the 2018 hydrogeological investigation.

### 2.4.1 Monitoring Well Installation

Ten groundwater monitoring wells (BH2, BH3, BH4, BH5, BH8, BH9, BH11, BH14, BH16, and BH18) were installed across the Site as part of the concurrent geotechnical investigation. The monitoring wells were completed (i.e., screened) at depths between 4.3 to 6.9 m below ground surface (bgs). The location of the historical monitoring wells is presented on Figure 2 (Appendix B). Boreholes logs from the 2018 investigation are provided in Appendix D.

### 2.4.2 Groundwater Level Monitoring

Groundwater level measurements were collected at the 2018 wells using a manual, electric water level tape during six monitoring events spread over 2016 and 2017. The manual groundwater level readings are provided in Table A (attached).

### 2.4.3 Hydraulic Conductivity Testing

Single well response testing (i.e., rising head tests) were carried out at BH5, BH8, BH14, BH16, and BH18 in 2018. The testing was carried out by rapidly purging a known volume of water from each well with a dedicated disposable bailer and monitoring the subsequent water level recovery. The results of the 2018 single well response testing are provided in Appendix E, and summarized in Table A (attached).

#### 2.4.4 Surface Water Feature Assessment

Nine shallow piezometers (designated MP-01 through MP-09) were installed in April 2017 adjacent to existing drainage features at the Site (Figure 2; Appendix B). Each piezometer consisted of a short, stainless steel screen, attached to piece of iron black pipe, which was driven into the shallow overburden using a manual hammer. Groundwater level measurements were subsequently collected at each of the piezometers. Water level readings were collected in the spring (April) early summer (May) and early fall (October), and are provided in Table B.

The result of the drainage feature assessment program indicated that recharging groundwater conditions occur at nearly all monitored locations, and throughout the year. The drainage features were found to be dry over much of the year, and groundwater discharge was only at features on the north portion of the Site (MP-02, MP-03, and MP-04) and only during the spring monitoring event.

Piezometers MP-01 through MP-04 were abandoned in June 2017 following confirmation from the LSRCA that the three northern tributaries to the Site are considered ephemeral features and do not meet the definition of a “key natural feature”.

#### 2.4.5 Water Balance Assessment

A preliminary water balance was completed, based on the available Site development plans, information gathered from the drilling investigation, and climate and water surplus data obtained from Environment Canada. The pre-development annual runoff from the Site was estimated as approximately 87,710 m<sup>3</sup>, and the estimated annual infiltration was approximately 57,060 m<sup>3</sup>. Post-development, the annual estimated runoff was approximately 2566,140 m<sup>3</sup>, and the annual estimated infiltration was 22,560 m<sup>3</sup>. The impact of proposed LID features was estimated as well, and it was found that infiltration would increase approximately 6,925 m<sup>3</sup>, or 12%. An update was conducted to the 2018 water balance assessment, and has been provided under separate cover (Golder, 2022).

### 3.0 2022 FIELD INVESTIGATION

#### 3.1 Drilling and Well Installations

The current combined geotechnical and hydrogeological drilling program was carried out from March 14 to 16, 2022, during which time 18 boreholes (designated as BH22-1 to BH22-18) were advanced across the Site. The boreholes were advanced to depths ranging from 6.2 to 11.1 mbgs. The boreholes were advanced using a Geoprobe track mounted rig supplied and operated by Drill Tech Drilling & Shoring Inc. of Newmarket, Ontario, subcontracted to WSP. The approximate borehole locations are shown on Figure 2 (Borehole Location Plan; Appendix B). The results of the drilling program are presented on the Record of Borehole sheets in Appendix D.

Four boreholes were completed as 50-millimetre (mm) diameter monitoring wells, consisting of a PVC riser pipe, with a slotted screen sealed at a selected depth within the borehole. The annular borehole space around each screened interval was backfilled with silica sand, to a height of approximately 0.3 m above the top of the screen. The remaining annular space was backfilled to ground surface with bentonite chips. The well installation details are presented on the Record of Borehole sheets (Appendix D). The depths of the wells ranged from about 9.2 to 10.7 mbgs.

The results of the drilling program indicated that overburden deposits at the Site generally consisted of topsoil overlying native deposits of silty clay and silty clay to clayey silt till. A unit of sand and silty sand was identified at various boreholes across the Site, generally underlying the silty clay and silty clay till. Figure 4A and Figure 4B (Appendix B) provide geological cross-sections across the Site. Bedrock was not encountered at any of the borehole locations.

## 3.2 Groundwater Level Measurements

A groundwater level monitoring program was implemented as part of the current investigation, starting in April 2022. The program consisted of collecting quarterly manual groundwater level readings at each of the monitoring wells at the Site, and installation of pressure transducers at four of the monitoring wells (BH2, BH11, BH22-3, and BH22-09) to collect continuous water level readings. Manual water levels were measured at each location with an electric water level tape, which was cleaned between well locations. Table A attached, provides all available manual water level measurements collected to date at the Site. The groundwater hydrographs from the data logger measurements to date are presented in Appendix F.

The depth to groundwater at the Site was found to range from above grade (i.e., artesian) to approximately 4.51 mbgs, where the ground surface is defined as the existing grade. The water table across the Site was found to be situated within the silty clay unit, at elevations ranging from about 219.4 to 247.5 masl. Groundwater level monitoring over 2022 / 2023 (Appendix F) indicates that the groundwater level at the Site was highest during the spring (i.e., March, April, May) with water levels then declining over the summer months. At monitoring wells BH2, BH11 and BH22-3 the groundwater level was within about 0.2 m of ground surface during the spring period. The pattern of groundwater level fluctuations at well BH22-03 differed somewhat from the other wells. It is surmised that the water level readings before August 2022 are anomalously low due to an incomplete hydrostatic seal at the wellhead. Readings after August 2022 show a pattern of fluctuation consistent with the other wells, with the highest water levels noted during the spring months, and levels then declining in the summer of 2023. The range of fluctuations in the groundwater table over the year was 2.5 to 3 m. For well BH22-09, which is under confined conditions, water levels fluctuated by about 1 m.

Figure 5 (Appendix B) shows the inferred groundwater flow direction at the Site, which essentially mimics the topographic slope. Artesian conditions were noted at monitoring well BH16 in 2018, and at monitoring well BH22-03 during the current investigation. Well BH16 was screened within the silty clay and well BH22-03, although screened in the silty clay, contacted the underlying sand at the bottom of the screen. It is expected that the artesian conditions are associated with confined (i.e., pressurized) conditions in the deeper sand / silty sand unit.

## 3.3 Hydraulic Conductivity

Single-well response testing was carried in April 2022 as part of the current investigation. The testing was carried out by rapidly purging a known volume of water from each well with a dedicated inertial (i.e., Waterra) pump and monitoring the subsequent water level recovery with manual electric water level tape.

The data was analyzed using the AQTESOLV for Windows version 4.50 Professional software. The Bouwer-Rice (1976) method for unconfined conditions was used to analyse the single well response testing data. Testing was also completed as part of the 2018 investigation. The single-well response testing results from both investigations are provided in Appendix E.

The tested wells were screened within the silty clay (BH5, BH14 and BH16), sandy clay till (BH8 and BH18), and clayey silt till (BH22-05 and BH22-09). The hydraulic conductivity was measured to be between  $2 \times 10^{-6}$  m/s and  $3 \times 10^{-8}$  m/s in the silty clay,  $9 \times 10^{-8}$  m/s in the sandy clay till, and  $2 \times 10^{-7}$  m/s and  $4 \times 10^{-8}$  m/s in the clayey silt till. Geometric mean hydraulic conductivity value based on all the testing results was found to be  $1 \times 10^{-7}$  m/s.

## 3.4 Groundwater Quality

Groundwater quality samples were collected at monitoring well BH22-3 using low-flow sampling techniques, according to standard environmental practices. The samples were stored on ice following collection, and were delivered to Caduceon Laboratories of Barrie, Ontario for analysis of a subset of the Provincial Water Quality Objectives (PWQO). The laboratory analytical data sheets are provided in Appendix G.



The analytical results indicate that the concentrations of the analyzed parameters were below their respective PWQO values, with the exception of total phosphorous [130 ug/L], total cobalt [1 ug/L], total iron [2310 ug/L], and total aluminium [1620 ug/L], each of which were reported at concentrations in excess of the PWQO in the unfiltered sample. The concentration of total suspended solids (TSS) was 206 mg/L. Elevated TSS concentrations are common for groundwater samples collected from relatively new monitoring wells completed in fine grained material, and the presence of elevated phosphorous, iron, cobalt, and aluminium concentrations is assumed to be a consequence of the relatively high TSS concentration.

In order to assess the impact of TSS on the sample, and to provide an indication of water quality following TSS removal (i.e., as part of a construction dewatering setup), an additional filtered sample was collected and submitted for the analysis of metals and total phosphorus. The analytical results from the filtered sample showed that the metals exceedances noted in the filtered sample were no longer present. The phosphorous concentration in the filtered sample was 20 ug/L, which is significantly lower than was noted in the unfiltered sample.

Prior to commencing any temporary construction dewatering activities, the suitability of the water for discharge will need to be confirmed by the contractor. It is recommended that samples be collected from the treatment system and submitted for laboratory analysis prior to commencing the full construction activities. The laboratory results should be provided to a Qualified Professional in order to confirm the discharge water is suitable for release under the applicable guidelines.

#### **4.0 DEWATERING EVALUATION**

At the time of reporting, no information was available regarding planned excavation depths required for construction. As such, WSP is currently unable to provide detailed comment on the water taking requirements, or potential concerns related to dewatering, at the Site. Based on the single well response testing results, it is expected the groundwater yield from the various clay-rich units (i.e., silty clay, clayey silt till, sandy clay) will be relatively limited. The occurrence of artesian conditions in the central portion of the Site indicates that the deeper sand unit (or units) exist under confined (i.e., pressurized) conditions. The possibility of artesian flow, or hydrostatic uplift associated with construction activities, should be considered a possibility and depressurization may be required to permit construction to proceed. When development plans have been finalized, this information should be provided to WSP to complete the dewatering evaluation.

## Signature Page

We trust that this report is sufficient to meet your current requirements. Should any point require additional clarification or should any questions arise, please do not hesitate to contact the undersigned.

Yours truly,

**WSP Canada Inc.**

*Patrick Merritt*

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PM/DD/rk

[https://golderassociates.sharepoint.com/sites/159365/project\\_files/6\\_deliverables/hydrog/final/22517668\\_rep\\_2023'09'05\\_bradford\\_highlands\\_rev0.docx](https://golderassociates.sharepoint.com/sites/159365/project_files/6_deliverables/hydrog/final/22517668_rep_2023'09'05_bradford_highlands_rev0.docx)

## REFERENCES

- Golder Associates Ltd. 2018. Hydrogeological Investigation, Bradford Highlands Golf Course Redevelopment, Bradford, Ontario. Report prepared for Digram Developments Caledon Inc. Dated March 2018.
- WSP Golder. 2022. Draft Water Balance Assessment, Bradford Highlands Golf Course Redevelopment. Report prepared for Digram Developments Caledon Inc. Dated October 2022.

**TABLES**

**Tables A and B**

**Table A**  
**Groundwater Level Measurements**

Well ID	Borehole Depth (mbgs)	Ground Surface (masl)	Measuring Point (masl)	Stick up (m)	Measurement Date	Water Level (mbtoc)	Water Level (mbgs)	Water Level (masl)	Hydraulic Conductivity (m/s)	Primary Unit
BH22-03	10.67	231.5	231.46	-0.04	26-Apr-22	Artesian	-	-	-	CLAYEY SILT TILL
					31-May-22	Artesian	-	-		
					18-Aug-22	Artesian	-	-		
					18-Nov-22	Artesian	-	-		
					14-Aug-23	Artesian	-	-		
BH22-05	9.10	224.0	223.91	-0.06	26-Apr-22	0.17	0.23	223.74	4E-08	CLAYEY SILT TILL
					31-May-22	0.29	0.35	223.62		
					18-Aug-22	0.91	0.97	223.00		
					18-Nov-22	0.76	0.82	223.16		
					14-Aug-23	0.43	0.49	223.48		
BH22-06	10.70	220.7	220.64	-0.04	26-Apr-22	0.33	0.37	220.31	-	SANDY CLAYEY SILT TILL
					31-May-22	0.49	0.53	220.15		
					18-Aug-22	1.24	1.28	219.41		
					18-Nov-22	0.79	0.83	219.85		
					14-Aug-23	0.26	0.30	220.39		
BH22-09	10.70	231.6	231.52	-0.07	26-Apr-22	0.84	0.91	230.68	2E-07	CLAYEY SILT TILL
					31-May-22	1.28	1.35	230.24		
					18-Aug-22	1.99	2.05	229.54		
					18-Nov-22	2.47	2.54	229.05		
					14-Aug-23	1.16	1.52	230.37		
BH2	5.20	245.7	245.5	-0.16	23-Mar-16	0.75	0.91	244.75	-	SILTY CLAY
					28-Mar-16	0.01	0.17	245.49		
					21-Oct-16	3.60	3.76	241.90		
					8-Dec-16	3.40	3.56	242.10		
					5-Apr-17	0.58	0.74	244.92		
					26-Apr-22	1.45	1.61	244.05		
					31-May-22	2.05	2.21	243.45		
					18-Aug-22	3.31	3.47	242.19		
					18-Nov-22	3.32	3.48	242.18		
14-Aug-23	2.16	2.32	243.34							

**Table A**  
**Groundwater Level Measurements**

Well ID	Borehole Depth (mbgs)	Ground Surface (masl)	Measuring Point (masl)	Stick up (m)	Measurement Date	Water Level (mbtoc)	Water Level (mbgs)	Water Level (masl)	Hydraulic Conductivity (m/s)	Primary Unit
BH3	5.20	245.4	245.3	-0.09	22-Mar-16	0.77	0.86	244.50	-	SILTY CLAY
					28-Mar-16	0.13	0.22	245.14		
					12-Sep-16	3.31	3.40	241.96		
					21-Oct-16	3.62	3.71	241.65		
					8-Dec-16	3.43	3.52	241.84		
					24-Feb-17	1.55	1.64	243.72		
					26-Apr-22	Buried	-	-		
					31-May-22	Buried	-	-		
					18-Aug-22	3.23	3.32	242.05		
					18-Nov-22	3.36	3.45	241.92		
					14-Aug-23	2.17	2.26	243.11		
BH4	5.20	245.2	245.1	-0.15	22-Mar-16	1.05	1.20	244.01		SILTY CLAY
					28-Mar-16	0.26	0.41	244.80		
					21-Oct-16	3.84	3.99	241.22		
					24-Feb-17	1.88	2.03	243.18		
					18-Apr-17	0.59	0.74	244.47		
					26-Apr-22	Buried	-	-		
					31-May-22	Buried	-	-		
					18-Aug-22	Buried	-	-		
					18-Nov-22	Buried	-	-		
BH5	6.10	248.2	248.1	-0.09	12-Sep-16	2.99	3.08	245.08	2E-06	SILTY CLAY
					8-Dec-16	3.22	3.31	244.85		
					5-Apr-17	0.59	0.68	247.48		
					26-Apr-22	Buried	-	-		
					31-May-22	Buried	-	-		
					18-Aug-22	Buried	-	-		
					18-Nov-22	3.36	3.45	244.72		
					14-Aug-23	1.16	1.25	246.91		
BH8	4.30	236.9	236.9	-0.05	23-Mar-16	0.69	0.74	236.19	9E-08	sandy CLAY
					28-Mar-16	0.34	0.39	236.54		

**Table A  
Groundwater Level Measurements**

Well ID	Borehole Depth (mbgs)	Ground Surface (masl)	Measuring Point (masl)	Stick up (m)	Measurement Date	Water Level (mbtoc)	Water Level (mbgs)	Water Level (masl)	Hydraulic Conductivity (m/s)	Primary Unit
					21-Oct-16	1.51	1.56	235.37		
					8-Dec-16	1.67	1.72	235.21		
					5-Apr-17	0.45	0.50	236.43		
					26-Apr-22	Buried	-	-		
					31-May-22	Buried	-	-		
					18-Aug-22	1.60	1.65	235.29		
					18-Nov-22	1.43	1.48	235.45		
					14-Aug-23	-	-	-		
BH9	5.8	236.2	236.20	-0.04	23-Mar-16	0.70	0.74	235.50	-	SILTY CLAY
					28-Mar-16	0.30	0.34	235.90		
					12-Sep-16	1.54	1.58	234.66		
					5-Apr-17	0.72	0.76	235.48		
					26-Apr-22	Buried	-	-		
					31-May-22	Buried	-	-		
					18-Aug-22	Buried	-	-		
					18-Nov-22	Buried	-	-		
					14-Aug-23	Buried	-	-		
BH11	6.9	233.2	233.05	-0.13	23-Sep-16	3.25	3.38	229.80	-	SILTY CLAY
					8-Dec-16	4.38	4.51	228.67		
					5-Apr-17	0.11	0.24	232.94		
					26-Apr-22	0.70	0.83	232.35		
					31-May-22	1.59	1.72	231.46		
					18-Aug-22	2.84	2.97	230.21		
					18-Nov-22	2.89	3.02	230.16		
					14-Aug-23	1.68	1.81	231.38		
BH14	6.1	220.3	220.48	-0.16	12-Sep-16	0.67	0.83	219.81	3E-08	SILTY CLAY
					8-Dec-16	0.24	0.40	220.24		
					5-Apr-17	0.05	0.21	220.43		
					26-Apr-22	0.12	0.28	220.36		
					31-May-22	0.25	0.41	220.23		
					18-Aug-22	0.29	0.45	220.19		

**Table A  
Groundwater Level Measurements**

Well ID	Borehole Depth (mbgs)	Ground Surface (masl)	Measuring Point (masl)	Stick up (m)	Measurement Date	Water Level (mbtoc)	Water Level (mbgs)	Water Level (masl)	Hydraulic Conductivity (m/s)	Primary Unit
					18-Nov-22	0.28	0.44	220.20		
					14-Aug-23	0.28	0.44	220.20		
BH16	6.10	231.7	231.5	-0.12	12-Sep-16	2.82	2.94	228.72	1E-07	CLAYEY SILT to SILTY CLAY
					8-Dec-16	4.02	4.14	227.52		
					5-Apr-17	Artesian	-	-		
					26-Apr-22	Buried	-	-		
					31-May-22	Buried	-	-		
					18-Aug-22	Buried	-	-		
					18-Nov-22	4.41	4.53	227.13		
					14-Aug-23	0.89	1.01	230.65		
BH18	3.80	237.0	236.9	-0.1	12-Sep-16	1.73	1.83	235.12	9E-08	sandy CLAY
					8-Dec-16	1.26	1.36	235.59		
					5-Apr-17	0.04	0.14	236.81		
					26-Apr-22	0.37	0.47	236.49		
					31-May-22	0.87	0.97	235.98		
					18-Aug-22	1.44	1.54	235.41		
					18-Nov-22	1.09	1.19	235.77		
					14-Aug-23	0.44	0.54	236.42		

**Notes:**

1. m to c meters below top of casing
2. masl meters above sea level
3. m bgs meters below ground surface
4. Table to be read in conjunction with accompanying report
5. Superscript <sup>1</sup> denotes approximate stickups

**Table B**  
**Piezometer Water Level Measurements**

Well ID	Stick-Up (m)	Measurement Date	Water Level (mbtoc)	Water Level (mbgs)	Surface Water Depth (mbtoc)	Comments
MP-01	0.41	12-Apr-17	0.848	0.44	---	
		12-Apr-17	0.824	0.41	---	
		12-May-17	0.539	0.13	0.31	recharging
MP-02	0.36	12-Apr-17	0.624	0.26	---	
		12-Apr-17	0.068	-0.29	---	
		12-May-17	0.178	-0.18	0.33	discharging
MP-03	0.35	12-Apr-17	0.768	0.42	---	
		12-Apr-17	0.768	0.42	---	
		12-May-17	0.344	-0.01	0.36	discharging
MP-04	0.52	12-Apr-17	1.138	0.62	---	
		12-Apr-17	1.105	0.59	---	
		12-May-17	0.388	-0.13	0.43	discharging
MP-05	0.64	12-Apr-17	0.633	-0.01	---	
		12-Apr-17	0.631	-0.01	---	
		12-May-17	0.753	0.11	dry	recharging
		2-Oct-17	1.055	0.42	dry	recharging
MP-06	0.54	12-Apr-17	0.921	0.38	---	
		12-Apr-17	0.734	0.19	---	
		12-May-17	0.521	-0.02	0.53	discharging
		2-Oct-17	1.14	0.60	dry	recharging
MP-07	0.41	12-Apr-17	0.935	0.53	---	
		12-Apr-17	0.92	0.51	---	
		12-May-17	0.565	0.16	0.41	recharging
		2-Oct-17	1.085	0.68	dry	recharging
MP-08	0.57	12-Apr-17	1.045	0.48	---	
		12-Apr-17	1.035	0.47	---	
		12-May-17	0.571	0.00	0.57	
		2-Oct-17	0.59	0.02	dry	recharging



**Table B**  
**Piezometer Water Level Measurements**

Well ID	Stick-Up (m)	Measurement Date	Water Level (mbtoc)	Water Level (mbgs)	Surface Water Depth (mbtoc)	Comments
MP-09	0.51	12-Apr-17	0.618	0.11	---	
		12-Apr-17	0.779	0.27	---	
		12-May-17	0.509	0.00	0.59	
		2-Oct-17	0.53	0.02	dry	recharging

**Notes:**

1. m toC meters below top of casing
2. mbgs meters below ground surface
3. negative values denote water levels above ground surface
4. Initial April 12 reading immediately post installation. Second reading approximately 1 hour post installation.
5. Table to be read in conjunction with accompanying report

**APPENDIX A**

**Important Information and  
Limitations of This Report**

**Standard of Care:** WSP Canada Inc. (WSP) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

**Basis and Use of the Report:** This report has been prepared for the specific site, design objective, development and purpose described to WSP by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. WSP can not be responsible for use of this report, or portions thereof, unless WSP is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without WSP's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, WSP may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to WSP. The report, all plans, data, drawings and other documents as well as all electronic media prepared by WSP are considered its professional work product and shall remain the copyright property of WSP, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of WSP. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of WSP's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, communications between WSP and the Client, and to any other reports prepared by WSP for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. WSP can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

**Soil, Rock and Ground water Conditions:** Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, WSP does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that WSP interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on

adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

**Sample Disposal:** WSP will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

**Follow-Up and Construction Services:** All details of the design were not known at the time of submission of WSP's report. WSP should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of WSP's report.

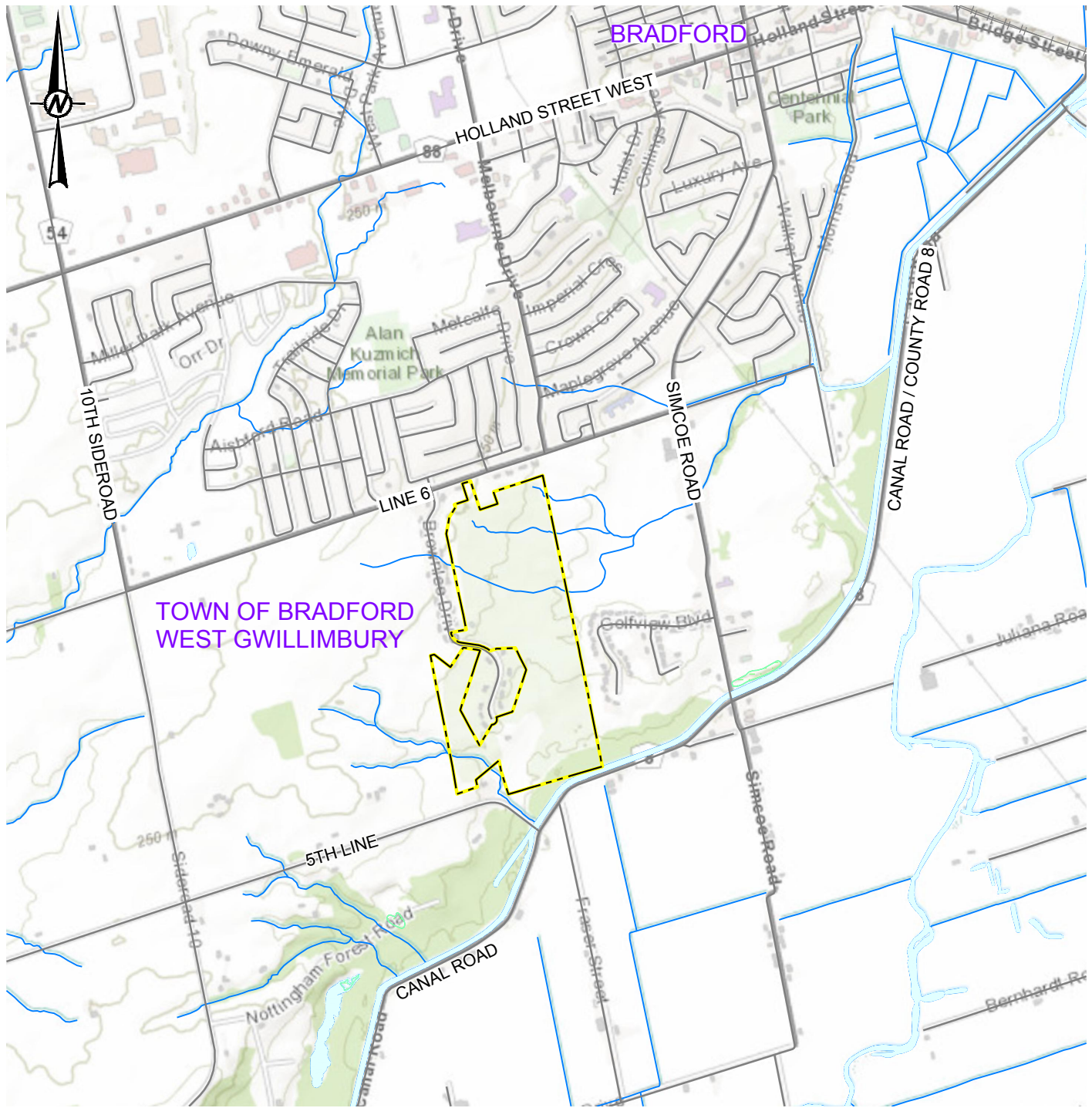
During construction, WSP should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of WSP's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in WSP's report. Adequate field review, observation and testing during construction are necessary for WSP to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, WSP's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

**Changed Conditions and Drainage:** Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that WSP be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that WSP be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. WSP takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

**APPENDIX B**

**Figures**



**LEGEND**

- APPROXIMATE PHASE TWO PROPERTY
- ROAD
- RAILWAY
- WATERCOURSE
- WATER AREA, PERMANENT
- WOODED AREA

**REFERENCE(S)**

BASE DATA - MNR LIO, OBTAINED 2015  
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 PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT  
**BRADFORD HIGHLANDS**

PROJECT  
**BRADFORD HIGHLANDS GOLF COURSE REDEVELOPMENT**  
 2789 LINE 6 AND 23 BROWNLEE DRIVE  
 TOWN OF BRADFORD WEST GWILLIMBURY, ONTARIO

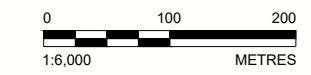
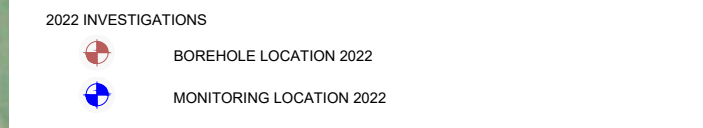
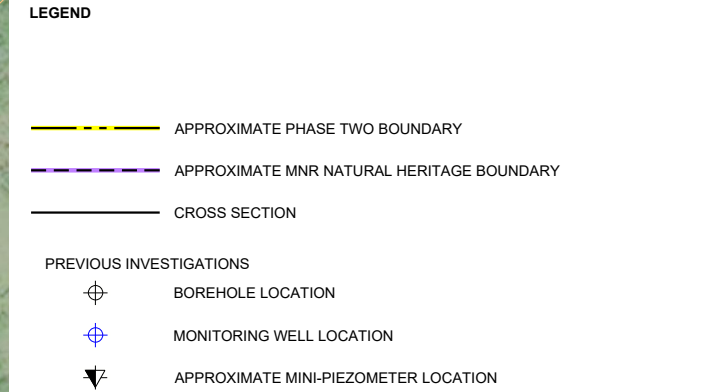
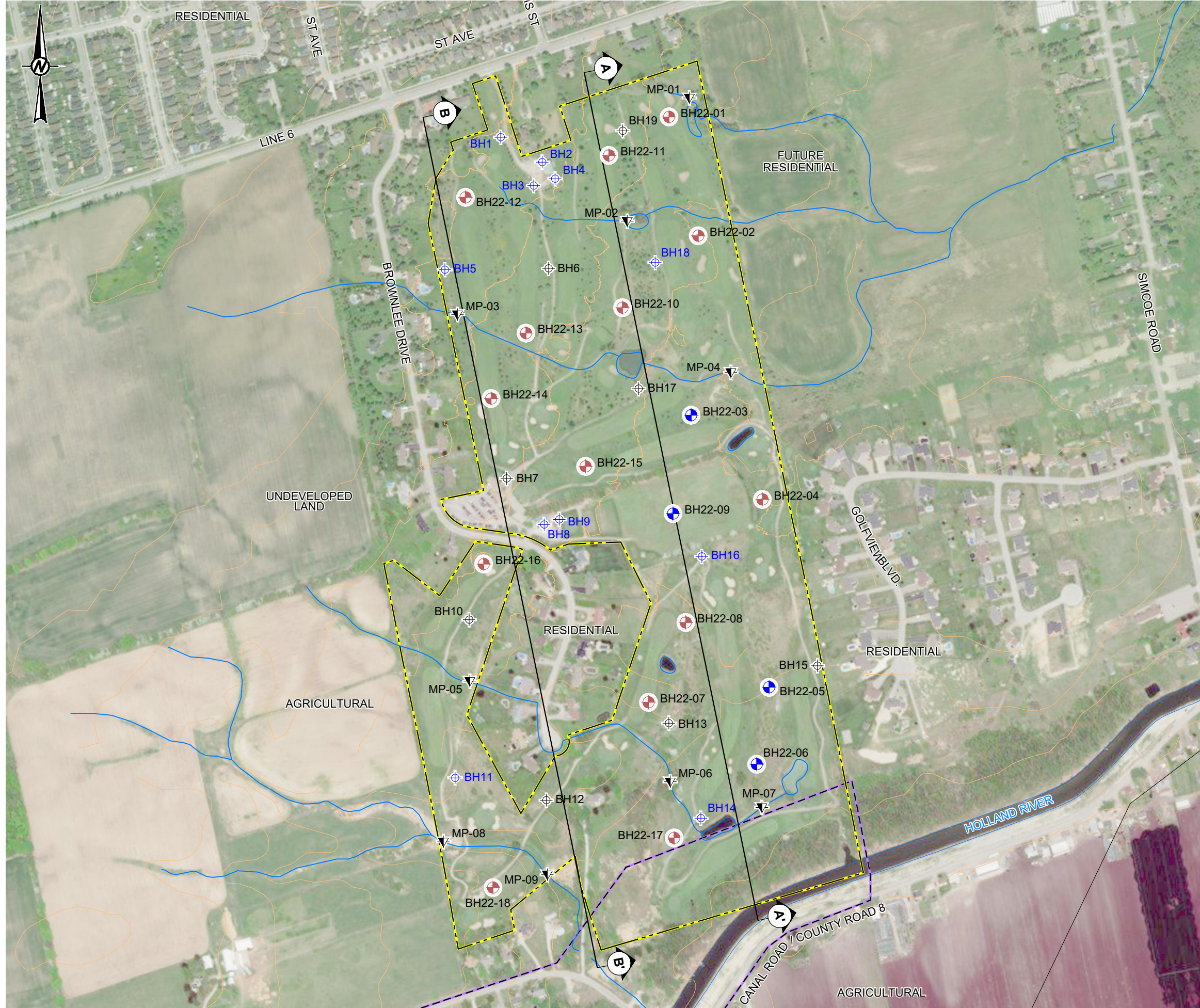
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CONSULTANT	YYYY-MM-DD	2022-10-13
	PREPARED	JPR
	DESIGN	
	REVIEW	PM
	APPROVED	DPD

PROJECT No.	CONTROL	Rev.	FIGURE
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 BOREHOLE LOCATION SURVEY: RADY-PENTEK & EDWARD SURVEYING LTD., JULY 28, 2016  
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 BRADFORD HIGHLANDS

**PROJECT**  
 BRADFORD HIGHLANDS GOLF COURSE REDEVELOPMENT  
 2789 LINE 6 AND 23 BROWNLEE DRIVE  
 TOWN OF BRADFORD WEST GWILLIMBURY, ONTARIO

**TITLE**  
 SITE BOREHOLE PLAN

CONSULTANT	YYYY-MM-DD	2022-10-13
	PREPARED	JPR
	DESIGN	
	REVIEW	PM
	APPROVED	DPD

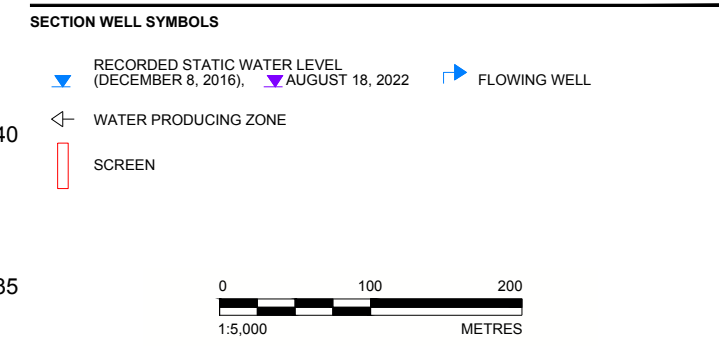
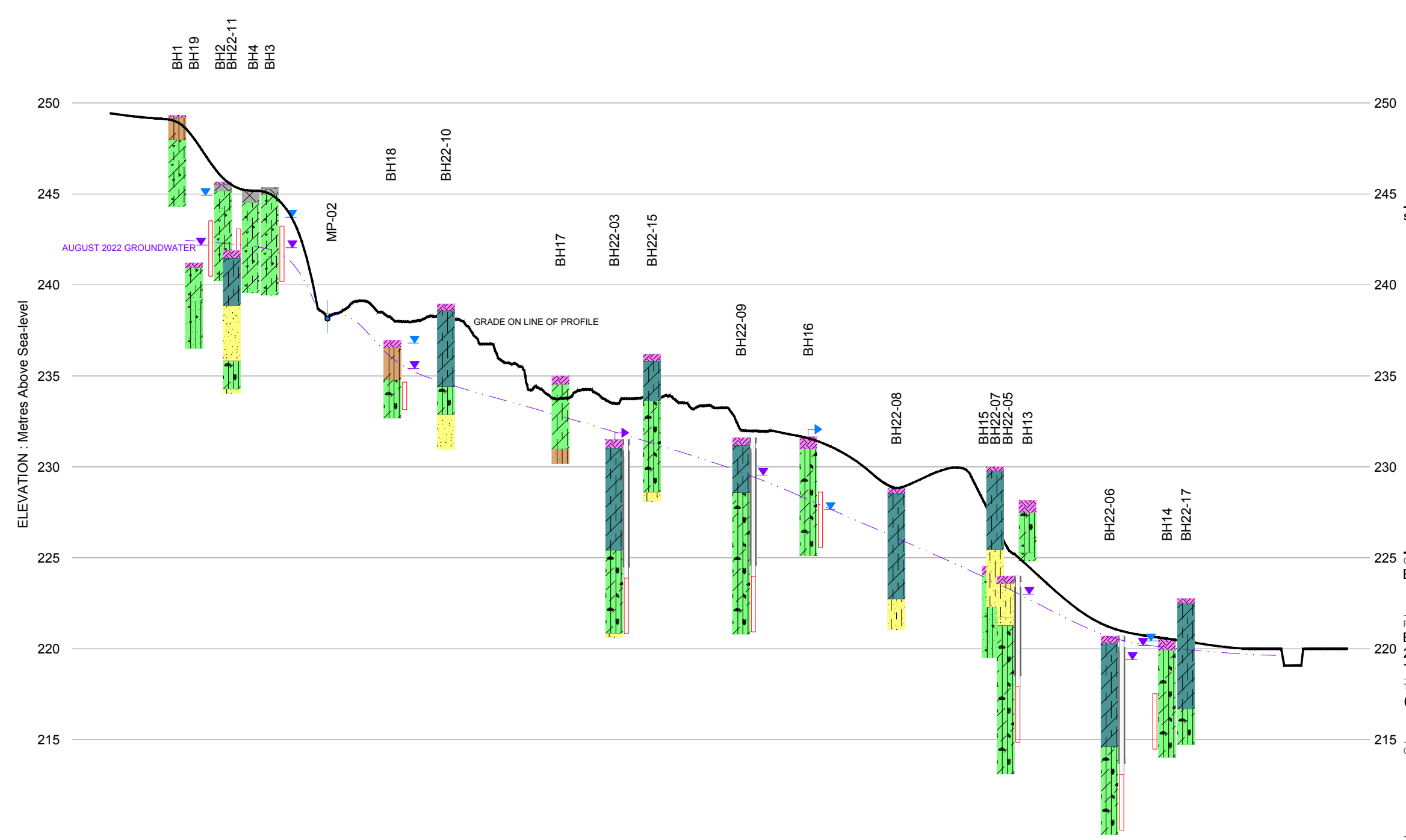
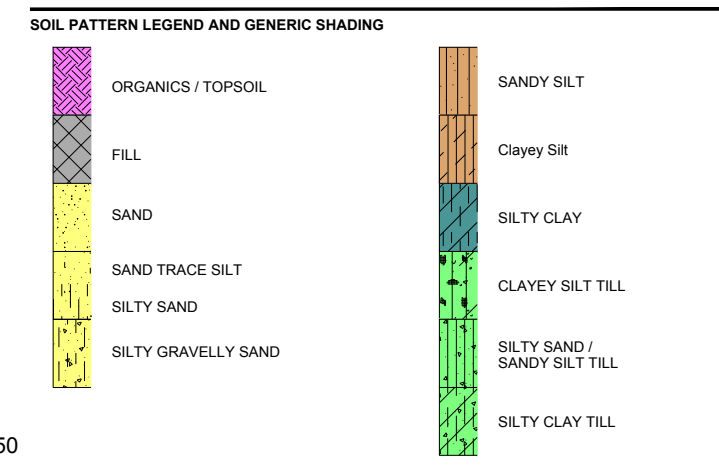
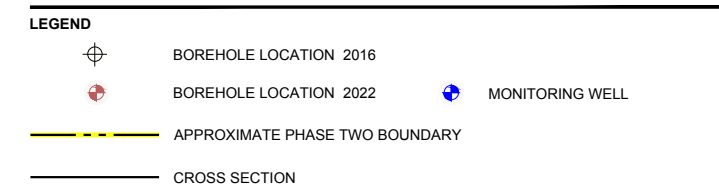
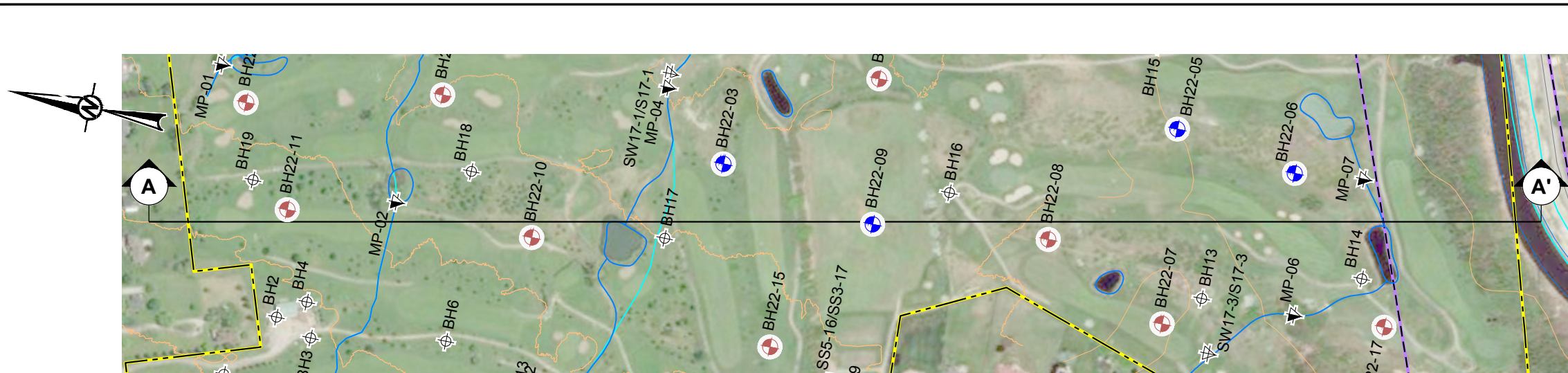
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 BOUNDARIES BETWEEN SOIL STRATA HAVE BEEN DETERMINED ONLY AT WELL AND TEST WELL LOCATIONS. BETWEEN THE WELLS AND TEST WELLS, BOUNDARIES ARE NOT PROVEN BUT ARE ASSUMED FROM GEOLOGICAL EVIDENCE  
 BOREHOLE LOCATION SURVEY: RADY-PENTEK & EDWARD SURVEYING LTD., JULY 28, 2016  
 PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT  
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PROJECT  
 BRADFORD HIGHLANDS GOLF COURSE REDEVELOPMENT  
 2789 LINE 6 AND 23 BROWNLEE DRIVE  
 TOWN OF BRADFORD WEST GWILLIMBURY, ONTARIO

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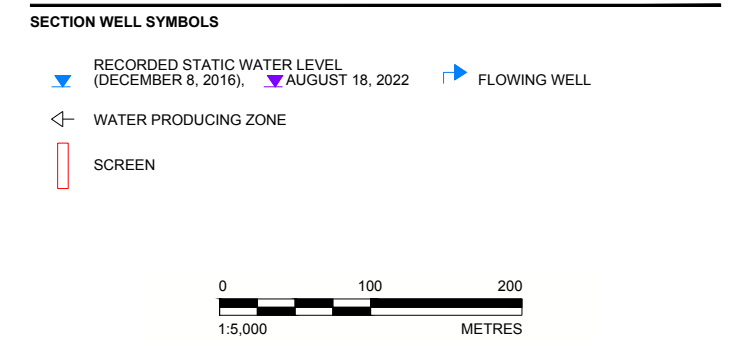
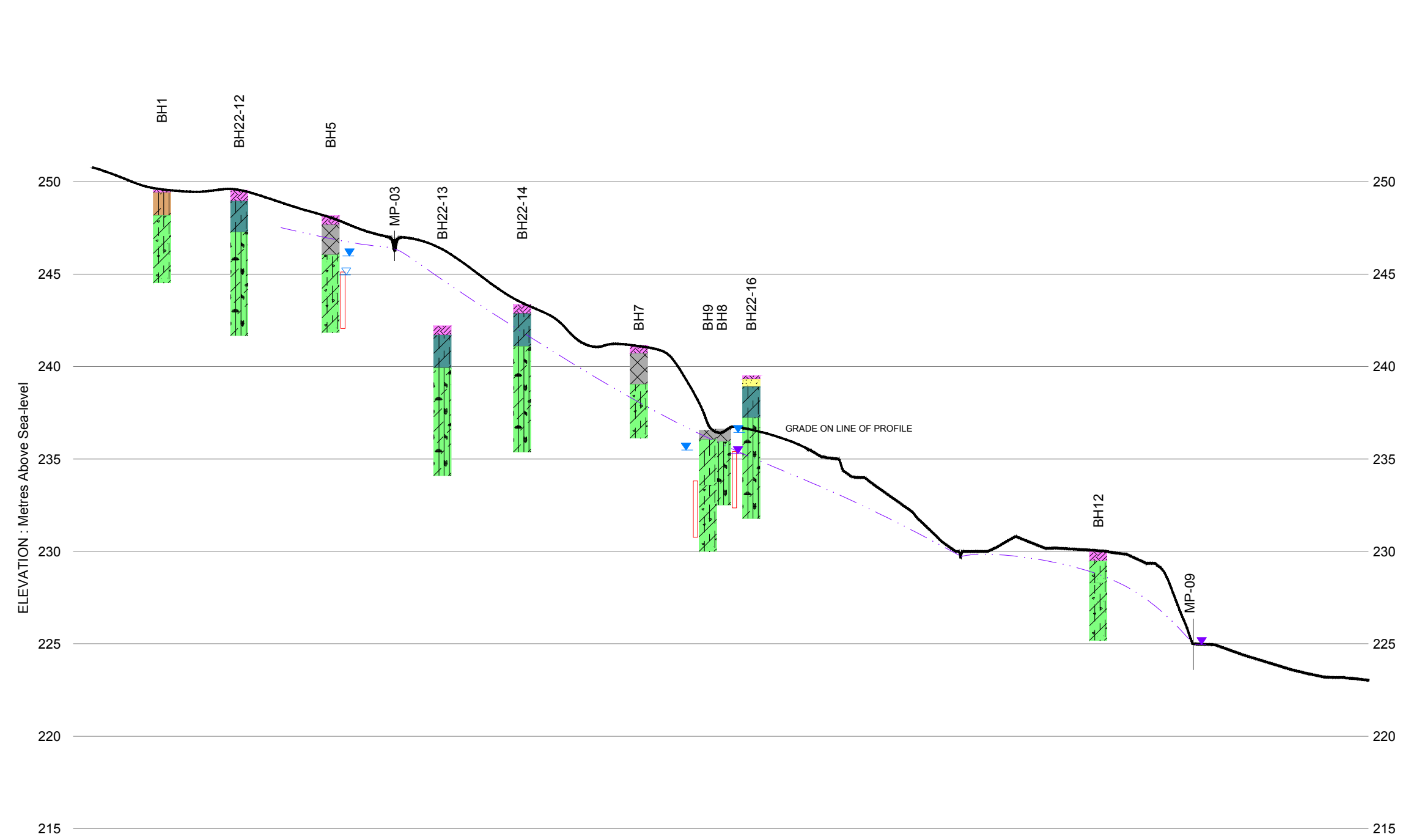
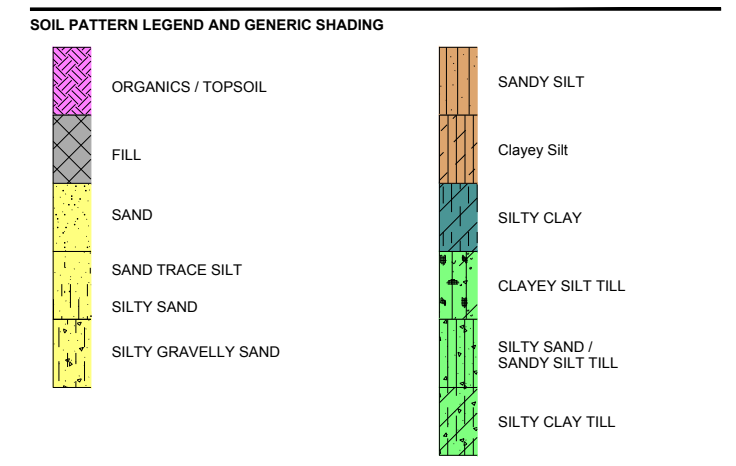
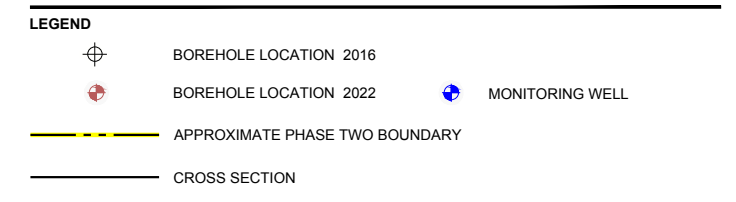
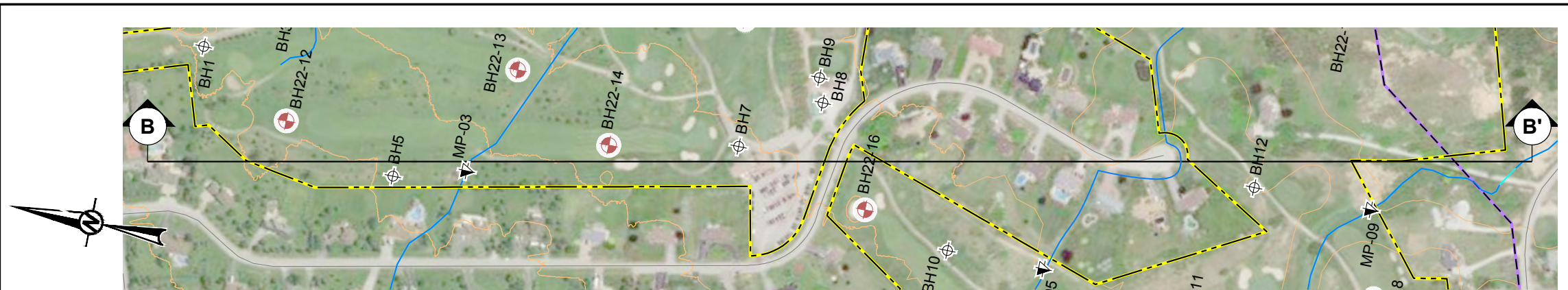
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	PREPARED	
	DESIGN	JPR
	REVIEW	PM
	APPROVED	DPD

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**REFERENCE(S)**  
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 MINISTRY OF ENVIRONMENT WATER WELL RECORDS, QUEEN'S PRINTER. LOCATION AND ELEVATIONS OF FIELD VERIFIED WELLS ARE SUBJECT TO REVISION.  
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 BOREHOLE LOCATION SURVEY: RADY-PENK & EDWARD SURVEYING LTD., JULY 28, 2016  
 PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT  
**BRADFORD HIGHLANDS**

PROJECT  
**BRADFORD HIGHLANDS GOLF COURSE REDEVELOPMENT**  
 2789 LINE 6 AND 23 BROWNLEE DRIVE  
 TOWN OF BRADFORD WEST GWILLIMBURY, ONTARIO

TITLE  
**CROSS-SECTION B - B'**

CONSULTANT	YYYY-MM-DD	2022-10-13
	PREPARED	
	DESIGN	JPR
	REVIEW	PM
	APPROVED	DPD

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**LEGEND**

- APPROXIMATE PHASE TWO BOUNDARY
- APPROXIMATE MNR NATURAL HERITAGE BOUNDARY
- PREVIOUS INVESTIGATIONS**
  - ⊕ BOREHOLE LOCATION
  - ⊕ MONITORING WELL LOCATION
  - ▽ APPROXIMATE MINI-PIEZOMETER LOCATION
- 2022 INVESTIGATIONS**
  - ⊕ BOREHOLE LOCATION 2022
  - ⊕ MONITORING LOCATION 2022
- ← INFERRED GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION CONTOUR (mASL)
- 210.00 GROUNDWATER ELEVATION (mASL)



**REFERENCE(S)**  
 BASE DATA - MNR LIO, OBTAINED 2015  
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 BOREHOLE LOCATION SURVEY: RADY-PENTEK & EDWARD SURVEYING LTD., JULY 28, 2016  
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**PROJECT**  
 BRADFORD HIGHLANDS GOLF COURSE REDEVELOPMENT  
 2789 LINE 6 AND 23 BROWNLEE DRIVE  
 TOWN OF BRADFORD WEST GWILLIMBURY, ONTARIO

**TITLE**  
 SHALLOW GROUNDWATER FLOW AUGUST 2022

CONSULTANT	YYYY-MM-DD	2022-10-13
	PREPARED	JPR
	DESIGN	
	REVIEW	PM
	APPROVED	DPD

PROJECT No. 22517668      CONTROL 0002      Rev. ---      FIGURE 5

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**APPENDIX C**

**MECP Water Well Database  
Search Results**

LABEL	CON LOT	DATE mmm-yr	EASTING NORTHING	ELEV masl	WTR FND mbgl Qu	SCR TOP LEN mbgl m	SWL mbgl	RATE L/min	TIME min	PL mbgl	DRILLER METHOD	TYPE STAT	WELL NAME DESCRIPTION OF MATERIALS
5191	4 13	Feb-61	613758 4882250	223.7	18.9 Fr	24.1 -2.4 21.6 -2.4	FLW	877	720	2.1	4823 CT	TH NU	<b>MOE# 5705191</b> 0.0 TPSL 0.3 YLLW CLAY 2.4 HPAN GRVL CLAY 18.9 GRVL SAND 26.5
5192	4 13	Mar-62	613789 4882290	223.4	20.4 Fr	24.1 -2.1 21.6 -2.4	-0.3	1864	2880	14.3	4610 CT	WS MU	<b>MOE# 5705192 TAG#ASSMNT</b> 0.0 TPSL 0.3 BRWN SAND 0.9 BRWN SAND CLAY 1.5 CLAY BLDR FSND 7.6 GRVL SAND 8.5 BLUE CLAY GRVL 9.1 BRWN SAND CLAY 20.4 FSND 23.5 SAND GRVL 26.2
5197	4 14	Jan-66	614154 4882331	220.1	32.3 Fr		0.6	91	240	5.5	3414 CT	WS ST	<b>MOE# 5705197</b> 0.0 PEAT 1.5 SILT 19.2 CLAY BLDR 31.7 GRVL 32.3
5252		Apr-65	614179 4884014	232.0	11.6 Fr		8.5	5			3109 BR	WS ST	<b>MOE# 5705252</b> 0.0 TPSL 0.3 CLAY 7.3 BLUE CLAY STNS 11.6 MSND 11.9 BLUE CLAY STNS 15.2
5254	6 12	Dec-65	613288 4883701	260.0	15.8 Fr		6.7	9			3109 BR	WS ST	<b>MOE# 5705254</b> 0.0 TPSL 0.6 CLAY 14.6 CLAY MSND STNS 22.3
7323	5 13	May-70	613662 4883681	250.9	7.3 Fr		1.2				3109 BR	WS DO	<b>MOE# 5707323</b> 0.0 TPSL 0.6 BRWN CLAY 7.3 GRVL 7.9
7609	4 13	Sep-70	613712 4882291	226.8	20.7 Fr	22.3 -4.3	1.5	1918	60	17.7	1621 CT	WS MU	<b>MOE# 5707609</b> 0.0 TPSL 0.3 CLAY MSND GRVL 20.7 FSND CSND GRVL 26.2 CLAY 27.1
8894	5 13	May-72	613740 4882422	226.8	3.0 Fr		2.4				4102 BR	WS DO	<b>MOE# 5708894</b> 0.0 TPSL 0.6 BRWN CLAY 8.2 BLUE CLAY STNS 12.8
9028	4 14	Aug-72	614282 4882421	220.1	32.6 Fr	31.7 -0.9	1.8	23	4320	8.5	3414 CT	WS DO	<b>MOE# 5709028</b> 0.0 CLAY 6.4 CLAY GRVL 31.7 SAND GRVL CLAY 32.6
9445	5 12	Oct-72	613302 4883571	258.8	20.7 Fr		7.3				3109 BR	WS DO	<b>MOE# 5709445</b> 0.0 TPSL 0.6 BRWN CLAY SAND 9.8 BLUE CLAY STNS 20.7 GRVL 21.6
12974	4 14	Nov-75	614412 4882471	220.1	71.6 -	73.8 -1.2	4.0	45		75.0	3903 RC	WS DO	<b>MOE# 5712974</b> 0.0 BLCK WDFR CLAY 3.0 GREY CLAY SAND LYRD 27.4 GREY CLAY STNS HARD 71.6 GREY SAND STNS LOOS 75.0
15872	4 13	Sep-78	614112 4882371	220.1	71.3 -	71.6 -1.2	2.4	36	180	51.8	3903 CT	WS DO	<b>MOE# 5715872</b> 0.0 BLCK WDFR 0.3 GREY CLAY 9.1 GREY CLAY SILT SOFT 29.0 GREY CLAY STNS HARD 62.5 GREY CLAY SILT SOFT 71.3 GREY FSND 72.8
16510	5 13	Oct-79	613712 4883671	249.9	9.1 - 6.1 -		5.5		30	9.1	4919 BR	WS DO	<b>MOE# 5716510</b> 0.0 BRWN TPSL HARD 0.3 BRWN CLAY CMTD 6.1 BRWN CLAY STNS SAND 10.7
20489	4 13	Apr-85	613562 4882271	235.9	15.2 -		15.2		30	18.9	4919 BR	WS DO	<b>MOE# 5720489</b> 0.0 BRWN TPSL HARD 0.3 BRWN CLAY HARD 6.1 BRWN SAND LOOS 19.8

LABEL	CON LOT	DATE mmm-yr	EASTING NORTHING	ELEV masl	WTR FND mbgl Qu	SCR TOP LEN mbgl m	SWL mbgl	RATE L/min	TIME min	PL mbgl	DRILLER METHOD	TYPE STAT	WELL NAME DESCRIPTION OF MATERIALS
20513	5 14	Feb-86	614436 4882899	228.0	10.7 Fr	25.3 -0.9	12.8	36	60	18.3	1413 RR	WS DO	<b>MOE# 5720513</b> 0.0 BRWN SAND CLAY TPSL 0.3 BRWN CLAY SAND SILT 4.6 BRWN SAND CLAY SILT 4.9 BRWN CLAY SAND SILT 10.7 BRWN GRVL SAND LOOS 11.0 BRWN GRVL CLAY SAND 13.1 BRWN GRVL CLAY SAND 24.4 BRWN SAND SILT LOOS 26.2
21229	5 13	Oct-86	613496 4883560	253.9	121.9 Fr		38.1	18	60	121.9	3108 RC	WS DO	<b>MOE# 5721229</b> 0.0 BRWN CLAY 5.5 BRWN CLAY SNDY 10.1 SAND GRVL STNS 11.3 SAND CLAY STNS 15.8 BLUE CLAY SNDY 21.9 BLUE CLAY 41.8 BLUE CLAY SNDY 53.0 BLUE SAND CLAY 71.3 BLUE CLAY 118.9 BLUE CLAY SHLE 120.4 BRWN LMSN 122.5
21625	5 13	Apr-87	613508 4883614	253.9	58.5 Fr	60.0 -0.9	30.5	100	120	42.7	3108 RC	WS DO	<b>MOE# 5721625</b> 0.0 BRWN CLAY SNDY 8.5 BLUE CLAY SNDY 23.5 SAND 24.4 BLUE CLAY 49.4 SAND 50.0 BLUE CLAY 52.7 SAND 54.9 BLUE CLAY 58.5 CSND 61.0
21626	5 13	Apr-87	613479 4883525	253.0	59.4 Fr	61.3 -0.9	30.5	68	120	56.7	3108 RC	WS DO	<b>MOE# 5721626</b> 0.0 BRWN CLAY 3.0 STNS 3.7 BLUE CLAY 14.9 BLUE CLAY SNDY 48.2 SAND 48.8 BLUE CLAY SNDY 58.2 SAND 62.2
21627	5 13	Mar-87	613450 4883495	253.9	49.7 Fr	51.8 -1.8	30.5	91	90	53.3	3108 RC	WS DO	<b>MOE# 5721627</b> 0.0 SAND FILL 2.1 BRWN CLAY SNDY 5.5 BLUE CLAY 49.7 BLUE SAND 53.9
21642	5 13	Apr-87	613443 4883528	253.9	52.7 Fr	53.9 -0.9	30.5	91	120	53.3	3108 RC	WS DO	<b>MOE# 5721642</b> 0.0 BRWN CLAY STNS 8.5 BLUE CLAY SNDY STNS 37.2 BLUE CLAY 52.4 BLUE SAND 54.9
21715	5 13	Jun-87	613495 4883650	254.8	54.9 Fr	55.5 -0.9	30.8	91	120	55.8	3108 RC	WS DO	<b>MOE# 5721715</b> 0.0 BRWN CLAY GRVL STNS 14.6 BLUE CLAY SNDY GRVL 32.0 BLUE CLAY 46.6 BLUE CLAY SNDY 54.3 BLUE SAND 56.4
21909	5 13	Jul-87	613787 4883702	245.7	37.5 Fr	37.5 -0.9	23.5	23	120	36.6	3108 RC	WS CO	<b>MOE# 5721909</b> 0.0 BRWN CLAY 2.4 SAND GRVL STNS 10.4 BLUE SAND CLAY STNS 28.0 BLUE CLAY 36.6 BLUE SAND 38.4
21910	5 13	Jul-87	613815 4882923	232.9	27.4 Fr	28.7 -0.9	7.6	182	60	27.4	3108 RC	WS DO	<b>MOE# 5721910</b> 0.0 BRWN CLAY 3.7 BLUE CLAY SNDY 14.9 BLUE CLAY 27.4 BLUE SAND 29.6
21914	5 13	Jul-87	613537 4883124	246.9	36.6 Fr	37.5 -0.9	24.7	114	60	38.1	3108 RC	WS DO	<b>MOE# 5721914</b> 0.0 BRWN SAND CLAY 3.7 BLUE SAND CLAY STNS 26.8 BLUE SAND CLAY 36.6 BLUE SAND 38.4
21916	5 13	Jul-87	613524 4883187	249.9	36.0 Fr	36.6 -0.9	27.4	82	120	36.0	3108 RC	WS DO	<b>MOE# 5721916</b> 0.0 BRWN CLAY SNDY STNS 2.7 BLUE CLAY SNDY STNS 17.4 BLUE CLAY SNDY 21.6 BLUE CLAY 35.4 BLUE SAND 37.5

LABEL	CON LOT	DATE mmm-yr	EASTING NORTHING	ELEV masl	WTR FND mbgl Qu	SCR TOP LEN mbgl m	SWL mbgl	RATE L/min	TIME min	PL mbgl	DRILLER METHOD	TYPE STAT	WELL NAME DESCRIPTION OF MATERIALS
21917	5 13	Jul-87	613583 4883146	245.1	35.7 Fr	36.9 -0.9	23.8	45	120	36.6	3108 RC	WS DO	<b>MOE# 5721917</b> 0.0 BRWN CLAY SNDY 3.0 BLUE CLAY SNDY STNS 19.5 BLUE CLAY SNDY 28.3 BLUE CLAY 35.7 BLUE SAND 37.8
22332	5 13	Oct-87	613821 4882876	231.3	26.5 Fr	28.3 -0.9	9.8	182	60	27.4	3108 RC	WS DO	<b>MOE# 5722332</b> 0.0 BRWN CLAY 5.2 BLUE GRVL SNDY CLAY 9.8 BLUE CLAY HARD 17.7 BLUE CLAY SNDY 26.5 BLCK SAND 29.3
22333	5 13	Oct-87	613799 4882792	230.4	29.0 Fr	29.9 -0.9	9.4	341	60	29.0	3108 RC	WS DO	<b>MOE# 5722333</b> 0.0 BLCK TPSL 0.6 BRWN CLAY 5.5 BLUE CLAY GVLY 23.5 BLUE CLAY SNDY SOFT 25.9 BLUE CLAY HARD 27.7 BLUE CLAY 29.0 BLCK SAND GRVL 30.8
22335	5 13	Oct-87	613797 4882962	234.4	28.7 Fr	29.6 -1.2	11.9	136	60		3108 RC	WS DO	<b>MOE# 5722335</b> 0.0 BRWN CLAY 5.2 BLUE SAND GRVL CLAY 14.0 BLUE CLAY HARD 18.6 BLUE CLAY SNDY SOFT 28.7 BLCK SAND 30.8
22337	5 13	Oct-87	613466 4883468	253.0	60.0 Fr	61.0 -0.9	30.5	227	120	54.9	3108 RC	WS DO	<b>MOE# 5722337</b> 0.0 BRWN CLAY SNDY STNS 5.5 BLUE CLAY STNS SNDY 20.7 BLUE CLAY 40.5 BLUE CLAY SNDY 54.3 BLUE FSND CLAY LYRD 60.0 BLUE MSND 61.9
22338	5 13	Oct-87	613768 4882878	233.2	30.5 Fr	31.7 -0.9	12.2	136	90	30.5	3108 RC	WS DO	<b>MOE# 5722338</b> 0.0 BRWN CLAY 6.7 BLUE SAND CLAY STNS 13.1 BLUE CLAY 23.5 BLUE CLAY SNDY 28.0 BLUE SAND 32.6
22340	5 13	Oct-87	613545 4883324	250.2	38.1 Fr	39.9 -0.9	29.3	68	90	38.1	3108 RC	WS DO	<b>MOE# 5722340</b> 0.0 BRWN CLAY STNS 7.0 BLUE GRVL SNDY CLAY 21.0 BLUE CLAY 32.6 BLUE CLAY SNDY 38.1 BLUE SAND 40.8
22341	5 13	Oct-87	613535 4883388	250.5	44.2 Fr	45.7 -0.9	28.7	114	120		3108 RC	WS DO	<b>MOE# 5722341</b> 0.0 BRWN CLAY STNS 5.8 BLUE GRVL SNDY CLAY 19.8 BLUE CLAY 36.6 BLUE CLAY SNDY 40.8 BLUE SAND CLAY LYRD 44.2 BLUE SAND 46.6
22342	5 13	Oct-87	613563 4883267	250.2	36.9 Fr	38.1 -0.9	28.3	64	120		3108 RC	WS DO	<b>MOE# 5722342</b> 0.0 BRWN CLAY SNDY STNS 8.2 BLUE CLAY SNDY STNS 18.3 BLUE CLAY 36.9 SAND 39.0
22452	5 13	Oct-87	613681 4883052	235.9	30.5 Fr	31.7 -0.9	20.1	45	120	30.5	3108 RC	WS PU	<b>MOE# 5722452</b> 0.0 BRWN SAND CLAY 4.9 BLUE SAND CLAY STNS 13.4 BLUE CLAY 30.5 BLUE SAND 32.6
22453	5 13	Oct-87	613579 4883202	246.9	33.8 Fr	34.7 -0.9	25.9	45	120	32.6	3108 RC	WS DO	<b>MOE# 5722453</b> 0.0 BRWN CLAY SNDY STNS 5.8 BLUE CLAY SNDY STNS 21.9 BLUE CLAY 33.8 BLUE SAND 35.7

LABEL	CON LOT	DATE mmm-yr	EASTING NORTHING	ELEV masl	WTR FND mbgl Qu	SCR TOP LEN mbgl m	SWL mbgl	RATE L/min	TIME min	PL mbgl	DRILLER METHOD	TYPE STAT	WELL NAME DESCRIPTION OF MATERIALS
22454	5 13	Oct-87	613599 4883090	243.2	32.0 Fr	39.0 -0.9	21.9	91	120	38.7	3108 RC	WS DO	<b>MOE# 5722454</b> 0.0 BRWN CLAY SNDY 3.7 BLUE CLAY SNDY STNS 8.2 SAND GRVL 9.8 BLUE CLAY SNDY STNS 25.3 BLUE CLAY 32.0 BLUE SAND 39.9
22611	5 13	Nov-87	613810 4882826	230.7	26.2 Fr	27.1 -0.9	10.1	227	60	25.9	3108 RC	WS DO	<b>MOE# 5722611</b> 0.0 BRWN CLAY 4.9 BLUE CLAY 7.6 BRWN CLAY SNDY 12.2 BLUE CLAY 26.2 BLUE SAND 28.0
22619	4 13	Nov-87	613958 4882333	220.1	37.5 Fr	36.3 -1.2	10.7	55	90	18.3	1413 RC	WS DO	<b>MOE# 5722619</b> 0.0 BRWN CLAY STNS 9.8 BRWN SAND LOOS 17.4 BRWN SAND PCKD 25.0 BRWN SAND LOOS 34.4 BRWN SAND GRVL CLN 37.5
23710	5 13	Jul-88	613609 4882980	240.8	31.1 Fr	34.4 -0.9	20.7	91	180		3108 RC	WS DO	<b>MOE# 5723710</b> 0.0 BRWN CLAY 4.3 BRWN CLAY GRVL 6.1 BLUE CLAY GRVL 14.0 BLUE CLAY 21.3 BRWN CLAY 24.7 BLUE CLAY 27.4 BLUE CLAY SAND 31.1 BLUE SAND 35.4
23711	5 13	Aug-88	613736 4882763	230.1	32.6 Fr	32.9 -0.9	12.2	205	60	22.9	3108 RC	WS DO	<b>MOE# 5723711</b> 0.0 BRWN CLAY GRVL 7.3 BLUE CLAY 12.5 BLUE CLAY GRVL 22.9 BRWN CLAY GRVL 26.8 BLUE CLAY SAND GRVL 32.6 SAND GRVL 33.8
23713	5 13	Aug-88	613722 4882727	230.4	32.3 Fr	32.3 -0.9	11.9	341	120		3108 RC	WS DO	<b>MOE# 5723713</b> 0.0 BRWN CLAY GRVL 6.7 BRWN SAND 8.5 BLUE CLAY GRVL 26.8 BRWN CLAY 28.7 SAND 31.1 BLUE CLAY 32.3 GRVL 33.2
24026	5 13	Sep-88	613755 4882841	233.2	32.9 Fr	34.4 -0.9	12.8	273	60	21.3	3108 RC	WS DO	<b>MOE# 5724026</b> 0.0 BRWN CLAY 7.0 BLUE CLAY GRVL 9.8 BLUE CLAY 29.9 BLUE CLAY SAND 32.9 BLUE SAND 35.4
24027	5 13	Sep-88	613748 4882797	232.3	32.6 Fr	34.1 -0.9	12.2	341	60		3108 RC	WS DO	<b>MOE# 5724027</b> 0.0 BRWN CLAY GRVL 7.9 BLUE CLAY GRVL 23.2 BLUE CLAY 32.0 BLUE CLAY SAND 32.6 BLUE SAND 35.1
24224	5 13	Oct-88	613829 4883728	243.2	37.2 Fr	38.4 -0.9	10.7	68	60	38.1	3108 RC	WS DO	<b>MOE# 5724224</b> 0.0 BRWN CLAY 1.2 BRWN SAND 18.3 BRWN CLAY SAND LYRD 22.9 BLUE CLAY 31.4 BLUE SILT CLAY 32.0 BLUE CLAY 37.2 BLUE SAND 39.3
24359	5 13	Nov-88	613477 4883632	254.8	25.3 Fr	25.3 -0.9	8.8	36	120		3108 RC	WS DO	<b>MOE# 5724359</b> 0.0 BRWN CLAY 3.0 BRWN CLAY SAND GRVL 12.5 BLUE CLAY GRVL 19.5 BLUE CLAY 23.5 BLUE CLAY SAND 25.3 BLUE SAND 26.2
24360	5 13	Nov-88	613475 4883610	254.8	23.8 Fr	24.7 -0.9	7.6	91	60		3108 RC	WS DO	<b>MOE# 5724360</b> 0.0 BRWN CLAY SAND GRVL 8.2 BLUE CLAY GRVL 19.2 SAND 19.8 BLUE CLAY SAND 23.8 SAND 25.6



LABEL	CON LOT	DATE mmm-yr	EASTING NORTHING	ELEV masl	WTR FND mbgl Qu	SCR TOP LEN mbgl m	SWL mbgl	RATE L/min	TIME min	PL mbgl	DRILLER METHOD	TYPE STAT	WELL NAME DESCRIPTION OF MATERIALS
24362	5 13	Nov-88	613546 4883653	253.9	44.8 Fr	45.7 -0.9	31.7	273	60	45.7	3108 RC	WS DO	<b>MOE# 5724362</b> 0.0 BRWN CLAY 2.1 BRWN CLAY SAND GRVL 14.3 BLUE CLAY GRVL 25.0 BLUE CLAY 35.1 BLUE CLAY SAND 36.9 BLUE CLAY 44.8 SAND 46.6
24659	5 13	Feb-89	613869 4883778	242.9	37.8 Fr	38.7 -0.9	19.5	91	120	38.1	3108 RC	WS DO	<b>MOE# 5724659</b> 0.0 BRWN CLAY 4.9 BLUE CLAY 23.2 SILT 24.4 BLUE SAND 32.9 BLUE CLAY SAND 37.8 BLUE SAND 39.6
24660	5 13	Feb-89	613863 4883775	241.7	34.7 Fr	36.9 -0.9	22.3	32	120	36.6	3108 RC	WS DO	<b>MOE# 5724660</b> 0.0 BRWN CLAY 4.0 BRWN CLAY GRVL 9.1 BLUE CLAY 10.7 SAND 17.1 BLUE CLAY 20.1 BLUE CLAY SAND GRVL 27.4 BLUE CLAY 30.5 GRN CLAY GRVL 34.7 BLUE SAND 37.8
24694	5 13	Mar-89	613629 4883694	251.8	44.5 Fr	44.8 -0.9	26.2	91	60	44.2	3108 RC	WS DO	<b>MOE# 5724694</b> 0.0 FILL 0.6 GRVL 7.9 BRWN GRVL SAND 19.5 BLUE CLAY HARD 35.4 BLUE CLAY SOFT 39.9 BLUE SAND 41.1 BLUE CLAY GRVL 44.5 BLUE SAND 45.7
24898	5 13	May-89	613548 4883067	244.8	30.8 Fr	32.6 -1.8	22.3	45	120	32.0	3108 RC	WS DO	<b>MOE# 5724898</b> 0.0 BRWN CLAY GRVL STNS 7.3 BLUE CLAY SAND GRVL 25.6 BLUE CLAY 30.8 BLUE SAND 34.7
24899	5 13	May-89	613500 4883296	251.8	49.4 Fr	49.4 -1.8	32.6	27	180	50.6	3108 RC	WS DO	<b>MOE# 5724899</b> 0.0 TPSL 0.6 BRWN CLAY SAND GRVL 7.0 BLUE CLAY SAND GRVL 15.8 BLUE CLAY 34.7 BLUE FSND SILT 51.5 BLUE SILT 52.7
27944	4 14	Mar-91	614308 4882455	219.8	25.0 Fr	24.1 -0.9	4.6	23	720	22.9	1350 CT	WS DO	<b>MOE# 5727944</b> 0.0 BRWN SAND GRVL FILL 1.8 BLCK TPSL PEAT 4.3 GREY CLAY 7.9 GREY SILT CLAY 13.7 GREY CLAY 24.4 BRWN SAND GRVL 25.9
28003	5 14	May-91	614433 4882941	233.2	29.6 Fr	28.7 -0.9	10.7	227	90	27.4	4645 RC	WS DO	<b>MOE# 5728003</b> 0.0 BRWN CLAY SILT STNS 9.1 GREY CLAY SILT STNS 11.0 BRWN CLAY SILT STNS 15.2 GREY CLAY SILT STNS 21.3 GREY FSND CSND 30.5
28004	5 14	May-91	614421 4883001	235.0	30.5 Fr	29.6 -0.9	10.7	273	90	27.4	4645 RC	WS DO	<b>MOE# 5728004</b> 0.0 BRWN CLAY SILT STNS 11.0 GREY CLAY SILT STNS 11.3 BRWN CLAY SILT STNS 15.2 GREY CLAY SILT STNS 19.8 GREY CLAY DNSE 21.3 GREY FSND CSND 30.5
28005	5 14	May-91	614427 4882970	233.8	29.3 Fr	28.3 -0.9	10.7	273	90	27.4	4645 RC	WS DO	<b>MOE# 5728005</b> 0.0 BRWN CLAY SILT STNS 9.1 GREY CLAY SILT STNS 11.0 BRWN CLAY SILT STNS 15.2 GREY CLAY SILT STNS 19.8 GREY CLAY SILT STNS 21.3 GREY FSND CSND 30.5

LABEL	CON LOT	DATE mmm-yr	EASTING NORTHING	ELEV masl	WTR FND mbgl Qu	SCR TOP LEN mbgl m	SWL mbgl	RATE L/min	TIME min	PL mbgl	DRILLER METHOD	TYPE STAT	WELL NAME DESCRIPTION OF MATERIALS
28006	5 14	May-91	614445 4882880	231.3	30.5 Fr	29.6 -0.9	10.7	227	120	27.4	4645 RC	WS DO	<b>MOE# 5728006</b> 0.0 BRWN CLAY SILT STNS 11.0 GREY CLAY SILT STNS 11.6 BRWN CLAY SILT STNS 15.8 GREY CLAY SILT STNS 22.9 GREY FSND CSND 30.5
28227	5 14	Jun-91	614415 4883060	231.3	30.5 Fr	29.6 -0.9	10.7	273	90	27.4	4645 RC	WS DO	<b>MOE# 5728227</b> 0.0 BRWN CLAY SILT STNS 9.1 GREY CLAY SILT STNS 11.3 BRWN CLAY SILT STNS 15.2 GREY CLAY SILT STNS 19.8 GREY CLAY SILT STNS 21.3 30.5
28228	5 14	Jun-91	614443 4882912	232.3	30.5 Fr	29.6 -0.9	10.7	273	90	27.4	4645 RC	WS DO	<b>MOE# 5728228</b> 0.0 BRWN CLAY SILT STNS 9.1 GREY CLAY SILT STNS 11.3 BRWN CLAY SILT STNS 15.2 GREY CLAY SILT STNS 19.8 GREY CLAY DNSE 21.3 GREY FSND CSND 30.5
28363	4 13	Sep-91	614042 4881690	219.8	29.6 Fr	30.5 -1.8	2.4	341	120		3108 RC	WS DO	<b>MOE# 5728363</b> 0.0 TPSL CLAY 3.0 BLUE CLAY 6.1 BLUE CLAY WDFR 12.2 BLUE CLAY 29.6 BRWN SAND 32.3
31235	4 14	Oct-94	614255 4882412	219.8	25.9 Fr	24.7 -1.2	6.1	18	2880	24.4	4645 RC	WS DO	<b>MOE# 5731235</b> 0.0 BRWN SAND 1.5 GREY CLAY 12.2 GREY SAND GRVL LOOS 12.8 GREY SILT CLAY SOFT 16.2 GREY SILT CLAY SOFT 22.9 GREY SILT CSND LOOS 25.9 GREY SILT SAND CLAY 31.1
32848	5 13	Jul-97	613427 4883602	255.7	57.9 Fr	58.5 -1.2 58.5 -1.2	34.1	18	360	57.6	6782 CT	WS DO	<b>MOE# 5732848</b> 0.0 GREY FILL 1.5 TPSL 2.1 GREY CLAY MSND MGVL 31.7 GREY CLAY MSND 50.9 GREY FSND 60.4
34355	5 15	Apr-99	614289 4882747	224.0	25.9 Fr	24.1 -1.2	7.6	496	360	11.0	4645 RC	WS DO	<b>MOE# 5734355</b> 0.0 BRWN CLAY STNS HARD 6.7 GREY CLAY STNS LYRD 19.8 BRWN SAND GRVL LOOS 25.9
35161	5 14	May-00	614169 4883011	228.0	25.9 Fr	24.7 -1.2	12.5	91	180	19.2	4645 RC	WS DO	<b>MOE# 5735161 TAG#ASSMNT</b> 0.0 BRWN FILL SOFT 0.6 BRWN SAND CLAY SOFT 4.3 GREY CLAY STNS HARD 17.1 BRWN CLAY SAND LYRD 19.2 BRWN SAND GRVL LOOS 25.9
35985	5 15	Mar-01	614346 4883115	229.8	25.9 Fr	24.7 -1.2	13.1	45	240	20.7	4645 RC	WS DO	<b>MOE# 5735985</b> 0.0 BRWN FILL CLAY SOFT 4.9 BRWN CLAY HARD 11.6 BRWN SAND SILT SOFT 12.2 GREY CLAY STNS HARD 20.1 GREY SAND SILT LOOS 25.9
35986	5 15	Mar-01	614375 4883113	229.2	25.9 Fr	24.7 -1.2	13.1	227	60	14.9	4645 RC	WS DO	<b>MOE# 5735986</b> 0.0 BRWN CLAY FILL 4.9 BRWN CLAY DNSE 11.6 BRWN SAND SILT LOOS 12.2 GREY CLAY STNS HARD 20.4 GREY SAND LOOS 25.9
35987	5 15	Apr-01	614297 4883116	229.5	29.0 Fr	27.7 -1.2	13.1	45	300	23.2	4645 RC	WS DO	<b>MOE# 5735987</b> 0.0 BRWN FILL SOFT 4.9 BRWN CLAY STNS HARD 11.6 GREY CLAY DNSE 16.5 GREY SILT SAND LOOS 19.8 GREY SAND LOOS 29.0

LABEL	CON LOT	DATE mmm-yr	EASTING NORTHING	ELEV masl	WTR FND mbgl Qu	SCR TOP LEN mbgl m	SWL mbgl	RATE L/min	TIME min	PL mbgl	DRILLER METHOD	TYPE STAT	WELL NAME DESCRIPTION OF MATERIALS
35988	5 15	May-01	614281 4883111	228.9	25.9 Fr	24.7 -1.2	12.8	45	300	18.9	4645 RC	WS DO	<b>MOE# 5735988</b> 0.0 BRWN FILL SOFT 4.9 BRWN CLAY HARD 12.2 GREY CLAY DNSE 19.2 GREY SAND LOOS 25.9
36586	5 13	Oct-01	613751 4882370	224.6	24.4 Fr	23.2 -1.2	17.1	27	180	22.9	4645 RC	WS DO	<b>MOE# 5736586</b> 0.0 BLCK TPSL HARD 0.3 BRWN CLAY STNS HARD 10.7 GREY CLAY DNSE 15.5 BRWN SAND LOOS 22.9 BRWN SAND GRVL LOOS 24.4 GREY CLAY HARD 24.4
37569	4 13	Jan-03	613757 4882270	224.0			NR				2801 -	AB -	<b>MOE# 5737569</b> 0.0
37595	5 15	Aug-02	614185 4883106	228.0	25.9 Fr	24.7 -1.2	13.1	227	120	14.6	4645 RC	WS DO	<b>MOE# 5737595</b> 0.0 BRWN CLAY STNS HARD 4.0 GREY CLAY DNSE 11.3 GREY CLAY STNS HARD 21.3 GREY SAND LOOS 25.9
38525	4 13	Oct-03	613617 4882058	231.3	24.1 -	22.9 -1.5	17.4	205	60	20.1	1663 RC	WS DO	<b>MOE# 5738525 TAG#A001444</b> 0.0 BLCK TPSL 0.3 BRWN CLAY GRVL 14.9 BRWN FSND MGVL 24.7 BRWN FSND 30.5
38753	5 15	Feb-04	614343 4882861	230.7	22.9 Fr	21.6 -1.2	13.7	1046	180	15.8	4645 RC	WS DO	<b>MOE# 5738753 TAG#A003587</b> 0.0 BRWN CLAY STNS HARD 10.4 GREY CLAY STNS HARD 19.2 GREY SAND LOOS 22.9
38754	5 15	Feb-04	614343 4882861	230.7	22.9 Fr	21.6 -1.2	13.7	1046	180	15.8	4645 RC	WS DO	<b>MOE# 5738754 TAG#A003590</b> 0.0 BRWN CLAY STNS HARD 10.4 GREY CLAY STNS HARD 19.2 GREY SAND LOOS 22.9
39065	4 13	Aug-04	613711 4882256	226.8			7.9				1663 OTH	AS NU	<b>MOE# 5739065</b> 0.0 BRWN SAND 0.3 YLLW 1.5 BRWN SAND 1.8 YLLW 7.6 PRDG 7.9
39101	5 14	Aug-04	614258 4882824	227.7	20.1 Un	17.1 -2.1	9.8	27	180	11.0	7178 RC	WS DO	<b>MOE# 5739101 TAG#A006251</b> 0.0 BRWN CLAY STNS 4.0 BRWN CLAY SILT 9.1 BLUE CLAY 18.0 BRWN SAND GRVL 20.1 BLUE CLAY 28.0
39754	5 14	May-05	614254 4882761	224.3			NR				1350 CT	AB DO	<b>MOE# 5739754 TAG#A014296</b> 0.0 BRWN CLAY SILT 4.0 BRWN GRVL BLDR 11.6
39755	5 14	May-05	614247 4882782	224.9	20.1 Un		7.6	86	60	9.4	1350 CT	WS DO	<b>MOE# 5739755 TAG#A014295</b> 0.0 BRWN CLAY SILT 4.0 BRWN GRVL BLDR 11.0 GREY CLAY GRVL SAND 18.3 BRWN SAND MSND 21.9
39978		Jul-05	614258 4882824	227.7		19.5 -1.5	9.4	68	120	13.1	7178 RC	WS DO	<b>MOE# 5739978 TAG#A006251</b> 0.0 BRWN SAND GRVL 21.0 BLUE CLAY 21.6
40135	5 14	Aug-05	614242 4882989	236.8	22.9 Un	21.6 -1.2	13.7	50	180	14.9	4645 RC	WS DO	<b>MOE# 5740135 TAG#A031010</b> 0.0 BRWN CLAY STNS 6.7 GREY CLAY 19.8 GREY SAND 22.9
40153	6 14	Aug-05	614189 4883101	228.9	25.0 Fr	22.9 -3.0	15.2	91	180		1413 RA	WS DO	<b>MOE# 5740153 TAG#A029629</b> 0.0 BRWN CLAY HARD 5.2 GREY CLAY HARD 19.8 GREY FSND 25.9

LABEL	CON LOT	DATE mmm-yr	EASTING NORTHING	ELEV masl	WTR FND mbgl Qu	SCR TOP LEN mbgl m	SWL mbgl	RATE L/min	TIME min	PL mbgl	DRILLER METHOD	TYPE STAT	WELL NAME DESCRIPTION OF MATERIALS
40154	6 14	Aug-05	614234 4883102	229.2	24.1 Fr	23.2 -1.5	14.9	73	60	21.9	1413 RC	WS DO	<b>MOE# 5740154 TAG#A029636</b> 0.0 BRWN CLAY GRVL SOFT 7.0 GREY CLAY DNSE 20.7 GREY SAND GRVL DRTY 22.9 GREY SAND 24.7
40155	6 14	Aug-05	614201 4882902	233.5	25.9 Fr	25.0 -1.5	14.9	132	60	22.9	1413 RC	WS DO	<b>MOE# 5740155 TAG#A029637</b> 0.0 BRWN SAND GRVL SOFT 1.8 BRWN CLAY DNSE 7.0 GREY CLAY DNSE 22.3 GREY SAND GRVL LYRD 24.1 GREY SAND GRVL LYRD 26.5
41127	6 14	Sep-06	614130 4884023	235.0			6.1				7178 -	AS -	<b>MOE# 5741127</b> 0.0 0.6 STNS 5.5 10.1
41128	6 14	Sep-06	614134 4883991	234.1			5.5				7178 -	AS -	<b>MOE# 5741128</b> 0.0 12.5
41200	6 14	Sep-06	614253 4883106	228.6	24.1 Fr	23.2 -0.9	13.7	77	60		1413 RA	WS DO	<b>MOE# 5741200 TAG#A038610</b> 0.0 BRWN CLAY 5.2 GREY CLAY 20.7 BLCK SAND 24.1
7041190	4 13	Oct-06	613771 4882283	223.1	307.8 Un 306.0 Un 303.9 Un		54.9	9	60	55.8	2662 RA	OW -	<b>MOE# 7041190 TAG#A041125</b> 0.0 GREY GRVL 0.3 BLCK TPSL 0.9 BRWN CLAY SNDY 2.4 GREY CLAY SLTY GRVL 5.8 GREY SILT 6.7 GREY CLAY SNDY GRVL 16.5 GREY SAND SLTY GRVL 19.5 GREY SAND GRVL 25.6 GREY SAND GRVL 26.8 GREY CLAY SLTY 30.8 GREY FSND SILT 35.7 GREY CLAY SLTY GRVL 41.5 GREY CLAY SLTY SAND 44.5 GREY CLAY SLTY 46.0 GREY SAND SLTY GRVL 48.8 GREY SILT SNDY CLAY 56.1 GREY SAND SLTY 57.6
7041193	4 13	Oct-06	613774 4882281	223.1		75.9 -10.1	NR				2662 RA	OW -	<b>MOE# 7041193 TAG#A041126</b> 0.0 GREY GRVL FILL 0.6 BLCK TPSL 3.0 BRWN CLAY SNDY GRVL 7.9 GREY CLAY SLTY GRVL 13.1 GREY CLAY SLTY GRVL 22.9 GREY CLAY GRVL SNDY 49.1 GREY SAND 54.9 GREY CLAY 60.0 GREY SAND 65.8 GREY SAND GRVL 82.9 GREY SAND GRVL 88.1 GREY CLAY SNDY GRVL 89.0
7049141	6 14	Jul-07	614264 4882863	229.8	22.9 Fr		10.7	55	60		1413 RA	WS DO	<b>MOE# 7049141 TAG#A060253</b> 0.0 BRWN CLAY HARD 5.2 GREY CLAY STNS HARD 18.3 BLCK SAND MSND 23.8
7051151	6 14	Aug-07	614306 4882832	227.7	22.9 Fr	22.9 -0.9	9.1	150	60		1413 RA	WS DO	<b>MOE# 7051151 TAG#A060272</b> 0.0 BRWN CLAY PCKD 6.4 GREY CLAY STNS HARD 19.8 GREY MSND 23.8
7104868	5 14	Mar-08	614199 4882860	229.8	25.9 Fr		11.6	91	180	13.1	4645 RC	WS DO	<b>MOE# 7104868 TAG#A022296</b> 0.0 BRWN CLAY STNS HARD 7.6 GREY CLAY SILT HARD 15.5 GREY CLAY HARD 22.3 GREY SAND LOOS 25.9
7107245	5 14	May-08	614181 4883101	228.3	25.9 Fr		4.9	27	180	24.1	4645 RC	WS DO	<b>MOE# 7107245 TAG#A062865</b> 0.0 BRWN CLAY HARD 7.9 GREY CLAY STNS HARD 21.6 BRWN SAND LOOS 25.9

LABEL	CON LOT	DATE mmm-yr	EASTING NORTHING	ELEV masl	WTR FND mbgl Qu	SCR TOP LEN mbgl m	SWL mbgl	RATE L/min	TIME min	PL mbgl	DRILLER METHOD	TYPE STAT	WELL NAME DESCRIPTION OF MATERIALS
7115769	5 14	Sep-08	614226 4883009	235.6	25.9 Fr	24.7 -1.2	12.2	23	60	19.8	4645 RC	WS DO	<b>MOE# 7115769 TAG#A071384</b> 0.0 BRWN CLAY STNS HARD 7.0 GREY CLAY HARD 19.5 GREY SAND LOOS 25.9
7115770	5 14	Sep-08	614305 4883079	231.0	25.9 Fr	24.7 -1.2	13.4	23	60	19.8	4645 RC	WS DO	<b>MOE# 7115770 TAG#A071379</b> 0.0 BRWN CLAY STNS HARD 9.1 GREY CLAY HARD 18.6 GREY SAND LOOS 25.9
7128920	5 14	Mar-08	614217 4883041	232.0	22.9 Fr		12.5	41	180	20.4	4645 RC	WS DO	<b>MOE# 7128920 TAG#A022293</b> 0.0 BRWN CLAY STNS HARD 7.9 GREY CLAY HARD 18.9 GREY SAND LOOS 22.9
7130793	5 14	Jul-09	614310 4883129	229.8	21.3 Un	21.3 -1.5	12.8	55	60	14.9	1663 RC	WS DO	<b>MOE# 7130793 TAG#A075139</b> 0.0 BRWN TPSL 0.6 BRWN CLAY GRVL 8.8 GREY CLAY GRVL SILT 18.3 GREY SILT 19.2 GREY SAND GRVL CLAY 20.7 GREY FSND 22.3 GREY FSND 23.2 GREY SAND SLTY 25.3
7130803	5 14	Jul-09	614299 4883106	229.2		27.1 -1.2	NR				1663 OTH	AS NU	<b>MOE# 7130803</b> 0.0
7140469	4 13	Sep-09	613638 4882276	232.6			NR				1663 OTH	AS NU	<b>MOE# 7140469</b> 0.0 BRWN TPSL 0.3 BRWN SAND FILL 1.8 YLLW 2.1 BRWN SAND 6.1 YLLW 13.4 YLLW 13.7
80101	5 14	Feb-12	614214 4883109	226.5	24.4 Fr	23.5 -0.9	11.3	45	60		1413 RC	WS DO	<b>MOE# 7180101 TAG#A124847</b> 0.0 BRWN CLAY HARD 5.2 GREY CLAY STNS HARD 21.3 BLCK SAND FGRD MGRD 24.4
7236235		Dec-14	613773 4882290	223.1	2.7 Un	24.4 -3.0	NR				7437 BR	AB Oth	<b>MOE# 7236235 TAG#A041126</b> 0.0
7236236		Dec-14	613771 4882286	223.1	9.1 Un		NR				7437 DG	AB Oth	<b>MOE# 7236236 TAG#A041125</b> 0.0
7236237		Dec-14	613780 4882279	222.8	4.0 Un		NR				7437 DG	AB Oth	<b>MOE# 7236237</b> 0.0
7294115	4 13	May-17	613845 4882309	220.1		31.4 -1.5	0.9	64	60	11.9	1663 RC	WS DO	<b>MOE# 7294115 TAG#A213043</b> 0.0 BRWN CLAY GRVL 0.6 BLCK TPSL 1.5 BRWN CLAY GRVL 4.3 GREY CLAY GRVL 22.3 GREY CLAY SILT 29.9 GREY CLAY 31.4 GREY FSND 32.9

QUALITY:		TYPE:		USE:		METHOD :			
Fr	Fresh	WS	Water Supply	CO	Comercial	NU	Not Used	CT	Cable Tool
Mn	Mineral	AQ	Abandoned Quality	DO	Domestic	IR	Irrigation	JT	Jetting
Sa	Salty	AS	Abandoned Supply	MU	Municipal	AL	Alteration	RC	Rotary Conventional
Su	Sulphur	AB	Abandonment Record	PU	Public	MO	Monitoring	RA	Rotary Air
--	Unrecorded	TH	Test Hole or Observation	ST	Stock	-	Not Recorded	BR	Boring

Easting and Northings UTM NAD 83 Zone 17, Translated from Recorded UTM NAD, subject to Field Verified Location or Improved Location Accuracy.

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**APPENDIX D**

**Borehole Logs and Well  
Completion Details**



LOG OF BOREHOLE BH22-01

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-29-2022 to Mar-29-2022  
 Equipment: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY: PM  
 COMPILED BY: FJ

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80	100							W <sub>p</sub>
0.00	Ground Surface <b>TOPSOIL:</b> (500 mm)																		
0.50	<b>SILTY CLAY:</b> Brown to grey, trace gravel, cobble fragment, cohesive w<PL, stiff to hard.  ----- water		1	SS	18														
			2	SS	11														
			3	SS	10														
			4	SS	18														
			5	SS	34														
4.57	<b>SANDY CLAYEY SILT TILL:</b> Grey, trace gravel, cohesive w>PL, very stiff to hard.		6	SS	27														
			7	SS50/127mm															
7.62	<b>SILTY SAND:</b> Grey, some plastic fines, wet, very dense.		8	SS	61														

Continued Next Page

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

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 WILLOW GROVE, ONTARIO L7R 4K6  
 TEL: (519) 875-1111 FAX: (519) 875-1112  
 WWW.SOILRECORDING.COM



LOG OF BOREHOLE BH22-01

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-29-2022 to Mar-29-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)										W <sub>p</sub>
	Continued																	

8.10	<p><b>END OF BOREHOLE</b></p> <p>Notes: 1). Upon completion of drilling, borehole had caved at 6.1 meter below ground surface (mbgs).</p>																		
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WSP SOIL RECORDING SYSTEM INC. 1000 SHEPPARD AVENUE EAST, SUITE 100, SCARBOROUGH, ONTARIO M1B 4Y7  
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GROUNDWATER ELEVATIONS

Measurement

GRAPH NOTES + 3, x 3: Numbers refer to Sensitivity ○ ●=3% Strain at Failure



PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision CLIENT: Bradford Highlands Joint Venture PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario DATUM: UTM NAD , ZONE BH LOCATION:	Method: Solid Stem Auger Diameter: 152 mm Date: Mar-30-2022 to Mar-30-2022 Equipment: Drill Tech Geoprobe 420M	REF. NO.: 22517668 ENCL NO.: ORIGINATED BY: PM COMPILED BY: FJ
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SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT			POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)					W <sub>p</sub>	W				W <sub>L</sub>
0.00	Ground Surface <b>TOPSOIL:</b> (400 mm)	[Pattern]																
0.40	<b>SILTY CLAY:</b> Brown, trace gravel, cohesive w<PL, soft to very stiff.	[Pattern]	1	SS	7													
1		[Pattern]	2	SS	3													
2		[Pattern]	3	SS	17													
2.28	<b>CLAYEY SILT TILL:</b> Brown to grey, trace sand, trace gravel, cohesive w<PL, hard.  ----- grey	[Pattern]	4	SS	31													
3		[Pattern]	5	SS	46													
4		[Pattern]																
5		[Pattern]	6	SS	46													
6		[Pattern]																
6		[Pattern]																
6.20	<b>END OF BOREHOLE</b>  Notes: 1). Borehole was terminated due to auger refusal. 2). Upon completion of drilling, borehole had caved at 5.5 meters below ground surface (mbgs) and groundwater level was at approximately at 0.7 meters below ground surface (mbgs).	[Pattern]	7	SS	50/100mm													

WSP SOIL TECHNOLOGY 2017 INC. 8550 CHURCHILL AVE. UNIT 101, BRADFORD, ONTARIO L7R 4R7

**GROUNDWATER ELEVATIONS**  
 Measurement  1st  2nd  3rd  4th

**GRAPH NOTES** + 3, × 3: Numbers refer to Sensitivity      ○ ●=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision CLIENT: Bradford Highlands Joint Venture PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario DATUM: UTM NAD , ZONE BH LOCATION:	Method: Solid Stem Auger Diameter: 152 mm Date: Mar-24-2022 to Mar-24-2022 Equipment: Drill Tech Geoprobe 420M	REF. NO.: 22517668 ENCL NO.: ORIGINATED BY: PM COMPILED BY: FJ
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SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)										
0.00	Ground Surface <b>TOPSOIL:</b> (500 mm)	[Pattern]															GR SA SI CL	
0.50	<b>SILTY CLAY:</b> Brown, cohesive w~PL, firm to very stiff.  ----- water     ----- oxidizing staining	[Pattern]	1	SS	4													
		[Pattern]	2	SS	15													
		[Pattern]	3	SS	13													
		[Pattern]	4	SS	17													
		[Pattern]	5	SS	30													
		[Pattern]	6	SS	20													
6.10	<b>CLAYEY SILT TILL:</b> Grey, trace gravel, trace sand, cohesive w~PL, very stiff to hard.	[Pattern]	7	SS	23													
		[Pattern]	8	SS	41													

WSP SOIL TECHNOLOGY 2017 INC. 8550 HWY 104 UNIT 10  
 WINDSOR, ONTARIO L9P 4R8 CANADA TEL: 519-251-1111 FAX: 519-251-1112

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-24-2022 to Mar-24-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)										WATER CONTENT (%)
	Continued																	
	<b>CLAYEY SILT TILL:</b> Grey, trace gravel, trace sand, cohesive w-PL, very stiff to hard.(Continued)		9	SS	76													
10.67	<b>SILTY SAND:</b> Grey wet very dense		10	SS50/127mm														
10.87	<b>END OF BOREHOLE</b>  Notes: 1). Upon completion of drilling, groundwater level was at approximately 0.30 meter below ground surface (mbgs). 2). A 50mm diameter monitoring well was installed with screens from 7.6 mbgs to 10.6 mbgs.																	

GROUNDWATER ELEVATIONS      **GRAPH NOTES**      + 3, × 3: Numbers refer to Sensitivity      ○ ●=3% Strain at Failure

Measurement      1st      2nd      3rd      4th

WSP SOIL RECORDING SYSTEM INC. 1000 SHEPPARD AVE. E. UNIT 101 SCARBOROUGH, ONTARIO M1B 4Y7  
 TEL: (416) 291-1111 FAX: (416) 291-1112 WWW.WSPINC.COM

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision CLIENT: Bradford Highlands Joint Venture PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario DATUM: UTM NAD , ZONE BH LOCATION:	Method: Solid Stem Auger Diameter: 152 mm Date: Mar-23-2022 to Mar-23-2022 Equipment: Drill Tech Geoprobe 420M	REF. NO.: 22517668 ENCL NO.: ORIGINATED BY PM COMPILED BY FJ
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SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			20	40							60
0.00	Ground Surface <b>TOPSOIL:</b> (300 mm)	[Symbol]														
0.30	<b>SILTY CLAY:</b> Brown, cohesive w<PL, soft to very stiff.	[Symbol]	1	SS	4											
1			2	SS	9											
2			3	SS	17											
3			4	SS	19											
4			5	SS	26											
4.57	<b>SILTY SAND:</b> Brown, wet, compact.	[Symbol]	6	SS	26											
5.07	<b>CLAYEY SILT TILL:</b> Grey, trace sand, trace gravel, cohesive w<PL, very stiff to hard.	[Symbol]														
6			7	SS	40											
7			8	SS	41											
8																

WSP SOIL TECHNOLOGY 2017 INC. 8550 HWY 104 UNIT 10  
 WINDSOR, ONTARIO L9P 4R4 CANADA TEL: 519-251-1500 FAX: 519-251-1501

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-23-2022 to Mar-23-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)										
	Continued																	
	<b>CLAYEY SILT TILL:</b> Grey, trace sand, trace gravel, cohesive w<PL, very stiff to hard.(Continued)		9	SS	39													
9																		
10																		
11			10	SS	28													

11.13	<b>END OF BOREHOLE</b>																
	Notes: 1). Upon completion of drilling, groundwater level was at approximately 0.91 meter below ground surface (mbgs).																

WSP SOIL TECHNOLOGY 300 ST. JOHN STREET TORONTO, ONTARIO M5V 2E2

**GROUNDWATER ELEVATIONS**  
 Measurement

**GRAPH NOTES** + 3, x 3: Numbers refer to Sensitivity      ○ = 3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-25-2022 to Mar-25-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC NATURAL LIQUID LIMIT			POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)		
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	20	40	60	80	100	W <sub>p</sub>				w	W <sub>L</sub>
0.00	Ground Surface <b>TOPSOIL:</b> (450 mm)																	
0.45	<b>SILTY SAND:</b> Brown, trace gravel, wet, compact.		1	SS	16													
1			2	SS	19													
2			3	SS	21													
2.28	<b>SAND:</b> Brown, some silt, trace to some gravel, cobble fragment, moist to wet, dense.		4	SS	39													
2.74	<b>CLAYEY SILT TILL:</b> Grey, trace gravel, cohesive w<PL, very stiff to hard.		5	SS	28													
3			6	SS	64													
4			7	SS	30													
5			8	SS	50/270mm													
6																		
7																		
8																		

WSP SOIL TECHNOLOGY 2017 INC. 8550 HWY 104, UNIT 10, BRADFORD, ONTARIO L7R 4R7

Continued Next Page

**GROUNDWATER ELEVATIONS**  
 Measurement            

**GRAPH NOTES**    + 3, × 3: Numbers refer to Sensitivity    ○ ●=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-25-2022 to Mar-25-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)		
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)										WATER CONTENT (%)	
Continued	<b>CLAYEY SILT TILL:</b> Grey, trace gravel, cohesive w<PL, very stiff to hard. (Continued)		9	SS	35														
9																			
10																			
10.87	<b>END OF BOREHOLE</b>  Notes: 1). Upon completion of drilling, groundwater level was at approximately 0.30 meter below ground surface (mbgs). 2). A 50mm diameter monitoring well was installed with screens from 6.10mbgs to 9.14 mbgs.		10	SS	40														

WSP SOIL TECHNOLOGY 300 ST. RICHMOND ST. TORONTO, ONTARIO M5S 1A5 CANADA TEL: 416-291-1000 FAX: 416-291-1001

**GROUNDWATER ELEVATIONS**  
 Measurement

**GRAPH NOTES** + 3, x 3: Numbers refer to Sensitivity      ○ = 3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-29-2022 to Mar-29-2022  
 Equipment: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY PM  
 COMPILED BY FJ

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)		
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80							100	W <sub>p</sub>
0.00	Ground Surface <b>TOPSOIL:</b> (450 mm)																		
0.45	<b>SILTY CLAY:</b> Brown to grey, cohesive w<PL to w>PL, soft to very stiff.  ----- w>PL  ----- no soil sample recovery  ----- grey	[Hatched pattern]	1	SS	10														
			2	SS	7														
			3	SS	3														
			4	SS	15														
			5	SS	16														
			6	SS	7														
6.10	<b>SANDY CLAYEY SILT TILL:</b> Grey, trace gravel, cobbles fragment, cohesive w<PL, hard.		7	SS	56														
			8	SS	89														

Continued Next Page

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity  
 ○ ●=3% Strain at Failure

WSP SOIL RECORDING SYSTEM INC. 855-888-8888  
 1000 SHEPPARD AVENUE EAST, SUITE 100, AURORA, ONTARIO L4G 1V4



PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-29-2022 to Mar-29-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)										W <sub>p</sub>
Continued	<b>SANDY CLAYEY SILT TILL:</b> Grey, trace gravel, cobbles fragment, cohesive w<PL, hard.(Continued)																	
9			9	SS50/127mm														
10			10	SS50/152mm														
10.92	<b>END OF BOREHOLE</b>  Notes: 1). Upon completion of drilling, groundwater level was at approximately 1.5 meter below ground surface (mbgs). 2). A 50mm diameter monitoring well was installed with screens from 7.62 mbgs to 10.67 mbgs.																	

WSP SOIL TECHNOLOGY 300 ST. JOHN STREET, BRANTFORD, ONTARIO N3S 1Y9

**GROUNDWATER ELEVATIONS**  
 Measurement

**GRAPH NOTES** + 3, x 3: Numbers refer to Sensitivity      ○ ●=3% Strain at Failure



# LOG OF BOREHOLE BH22-07

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-23-2022 to Mar-23-2022  
 Equipment: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY PM  
 COMPILED BY FJ

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			20	40							60
0.00	Ground Surface <b>TOPSOIL:</b> (250 mm)															
0.25	<b>SILTY CLAY:</b> Brown, trace sand, trace gravel, cobble fragment, cohesive w-PL, firm to hard.  ----- water		1	SS	6											
			2	SS	7											
1			3	SS	17											
2			4	SS	20											
3			5	SS	38											
4.57	<b>SILTY SAND:</b> Brown, trace gravel, rock fragments, moist, very dense.  ----- no soil sample recovery		6	SS50/152mm												
5			7	SS50/25mm												
6			8	SS50/25mm												
7.69	<b>END OF BOREHOLE</b>															

WSP SOIL PROFILE LOGS: 2017 - 2022. WSP CONSULTING INC. 1000 SHEPPARD AVE. E. UNIT 101, SCARBOROUGH, ONTARIO M1S 1T5. TEL: (416) 291-1111. FAX: (416) 291-1112. WWW.WSPCONSULTING.COM

Notes: Continued Next Page

GROUNDWATER ELEVATIONS  
 Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3, x 3: Numbers refer to Sensitivity ○ = 3% Strain at Failure



LOG OF BOREHOLE BH22-07

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-23-2022 to Mar-23-2022  
 Equipmt: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY PM  
 COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80	100						
	Continued 1). Upon completion of drilling, borehole had caved at 5.4 meter below ground surface (mbgs).																

WSP SOIL RECORDING UNIT: 1800 ECHINGWILE CDB  
 1000 LINDSEY PARK (2022) 507-9999 (MUNICIPALITY) 4-37

GROUNDWATER ELEVATIONS  
 Measurement

GRAPH NOTES +<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity ○ ●=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-24-2022 to Mar-24-2022  
 Equipment: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY: PM  
 COMPILED BY: FJ

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)		
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)											W <sub>p</sub>	w
0.00	Ground Surface <b>TOPSOIL:</b> (300 mm)																			
0.30	<b>SILTY CLAY:</b> Brown to grey, trace sand, cohesive w<PL, firm to hard.		1	SS	6															
1			2	SS	7															
2			3	SS	15															
3			4	SS	29															
4			5	SS	34															
5			6	SS	97															
6.10	<b>SILTY SAND:</b> Grey, trace gravel, moist to wet, very dense.		7	SS50/101mm																
7			8	SS	50															
7.75	<b>END OF BOREHOLE</b>																			

WSP SOIL TECHNOLOGY 2017 INC. 8550 HWY 104 UNIT 10  
 10000 HWY 104 UNIT 10 BRADFORD ONTARIO L7R 4R5

Continued Next Page

GROUNDWATER ELEVATIONS

Measurement

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity  
 ○ ●=3% Strain at Failure



LOG OF BOREHOLE BH22-08

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-24-2022 to Mar-24-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV. DEPTH	DESCRIPTION	STRATA PLOT NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80	100						
	Continued																
	Notes: 1). Upon completion of drilling, borehole had caved at 4.2 meter below ground surface (mbgs) and groundwater was at approximate depth of 1.8 mbgs.																

WSP SOIL RECORDING SYSTEM INC. 855-888-8888  
 1000 SHEPPARD AVENUE EAST, SUITE 100, BRAMPTON, ONTARIO L6Y 4R7

GROUNDWATER ELEVATIONS  
 Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3, x 3: Numbers refer to Sensitivity ○ = 3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-23-2022 to Mar-23-2022  
 Equipment: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY PM  
 COMPILED BY FJ

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)		
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)										W <sub>p</sub>	w
0.00	Ground Surface <b>TOPSOIL:</b> (450 mm)																		
0.45	<b>SILTY CLAY:</b> Brown, trace sand, trace organics, cohesive w<PL, firm.		1	SS	4														
			2	SS	4														
			3	SS	6														
			4	SS	8														
3.04	<b>CLAYEY SILT TILL:</b> Brown to grey, trace sand, trace gravel, cohesive w<PL to w~PL, very stiff to hard.		5	SS	17														
			6	SS	34														
			7	SS	24														
			8	SS	28														

Continued Next Page

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

WSP SOIL RECORDING SYSTEM - INQUIRY@WSPINC.COM  
 WSP 1000 EASTERN AVENUE, SUITE 100, BRADFORD, ONTARIO L7R 4R7



LOG OF BOREHOLE BH22-09

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-23-2022 to Mar-23-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)										
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	20							40	60	80	100	20	40	60	80	100	10
	Continued																							
	<b>CLAYEY SILT TILL:</b> Brown to grey, trace sand, trace gravel, cohesive w<PL to w~PL, very stiff to hard.(Continued)	9	9	SS50/101mm																				
		10	10	SS50/127mm																				
10.80	<b>END OF BOREHOLE</b>  Notes: 1). A 50mm diameter monitoring well was installed with screens from 7.62 mbgs to 10.67 mbgs.																							

WSP SOIL RECORDING UNIT INC. 1000 SHEPPARD AVE. E. UNIT 10  
 SCARBOROUGH, ONTARIO M1B 4Y7  
 TEL: (416) 291-1111 FAX: (416) 291-1112

**GROUNDWATER ELEVATIONS**  
 Measurement 1st 2nd 3rd 4th

**GRAPH NOTES**  
 + 3, × 3: Numbers refer to Sensitivity      ○ = 3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision CLIENT: Bradford Highlands Joint Venture PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario DATUM: UTM NAD , ZONE BH LOCATION:	Method: Solid Stem Auger Diameter: 152 mm Date: Mar-26-2022 to Mar-26-2022 Equipment: Drill Tech Geoprobe 420M
REF. NO.: 22517668	ENCL NO.:
ORIGINATED BY PM	COMPILED BY FJ

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)								
0.00	Ground Surface <b>TOPSOIL:</b> (400 mm)	[Strata Plot]														
0.40	<b>SILTY CLAY:</b> Brown to grey, trace gravel, cohesive w~PL, stiff to hard.  ----- wet    ----- grey	[Strata Plot]	1	SS	10											
			2	SS	19											
			3	SS	26											
			4	SS	24											
			5	SS	15											
4.57	<b>SANDY CLAYEY SILT TILL:</b> Grey, trace gravel, cobbles fragment, cohesive w<PL, hard.	[Strata Plot]	6	SS50/127mm												
6.09	<b>SAND:</b> Grey, trace silt, cobbles fragment, wet, dense to very dense.	[Strata Plot]	7	SS	60											
			8	SS	35											

WSP/2022/03/26/22/10/BH22-10/LOG OF BOREHOLE BH22-10

Continued Next Page

**GROUNDWATER ELEVATIONS**

Measurement    1st    2nd    3rd    4th

**GRAPH NOTES**

+ 3 , × 3 : Numbers refer to Sensitivity    ○ ● = 3% Strain at Failure





LOG OF BOREHOLE BH22-10

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-26-2022 to Mar-26-2022  
 Equipment: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY PM  
 COMPILED BY FJ

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT			POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV. DEPTH	DESCRIPTION	STRATA PLOT NUMBER	TYPE	"N" BLOWS 0.3 m	20			40	60	80	100	W <sub>p</sub>		w	W <sub>L</sub>	GR			
7.98	Continued <b>END OF BOREHOLE</b>  Notes: 1). Upon completion of drilling, borehole had caved at 7.01 meter below ground surface (mbgs) and groundwater level was at approximately 4.8 meter below ground surface (mbgs).																		

WSP SOIL RECORDING REPORT: BRHAD-225176668-001-01  
 2022 MAR 26 10:01 AM LOCAL TIME (GMT-5:00) PROJECT: 225176668-001

GROUNDWATER ELEVATIONS  
 Measurement

GRAPH NOTES + 3, x 3: Numbers refer to Sensitivity = 3% Strain at Failure



### LOG OF BOREHOLE BH22-11

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-29-2022 to Mar-29-2022  
 Equipment: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY PM  
 COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT			POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)			
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)					W <sub>p</sub>	w				W <sub>L</sub>	GR	SA
0.00	Ground Surface <b>TOPSOIL:</b> (450 mm)																			
0.45	<b>SILTY CLAY:</b> Brown, trace gravel, cohesive w<PL, firm to very stiff.		1	SS	6															
			2	SS	11															
			3	SS	14															
			4	SS	26															
3.04	<b>SAND:</b> Brown, some silt, wet, dense to very dense.		5	SS	38															
			6	SS50/127mm																
6.09	<b>SANDY CLAYEY SILT TILL:</b> Grey, cohesive w<PL, hard.		7	SS50/101mm																
7.62			8	SS50/152mm																
7.87	<b>END OF BOREHOLE</b>																			

Continued Next Page

GROUNDWATER ELEVATIONS  
 Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3 , × 3 : Numbers refer to Sensitivity

○ ● = 3% Strain at Failure

WSP 2022/03/29 10:00 AM 2022/03/29 10:00 AM 2022/03/29 10:00 AM 2022/03/29 10:00 AM



LOG OF BOREHOLE BH22-11

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-29-2022 to Mar-29-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)											W <sub>p</sub>
	Continued																	
	Notes: 1). Upon completion of drilling, borehole had caved at 6.1 meter below ground surface (mbgs) and groundwater level was at approximately 1.5 meter below ground surface (mbgs).																	

WSP SOIL RECORDING SYSTEM INC. 1000 SHEPPARD AVENUE EAST  
 SUITE 1000 SCARBOROUGH, ONTARIO M1S 1T5 CANADA TEL: (416) 291-1111 FAX: (416) 291-1112

GROUNDWATER ELEVATIONS

Measurement

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ●=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision CLIENT: Bradford Highlands Joint Venture PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario DATUM: UTM NAD , ZONE BH LOCATION:	Method: Solid Stem Auger Diameter: 152 mm Date: Mar-28-2022 to Mar-28-2022 Equipment: Drill Tech Geoprobe 420M	REF. NO.: 22517668 ENCL NO.: ORIGINATED BY PM COMPILED BY FJ
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SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)										
0.00	Ground Surface <b>TOPSOIL:</b> (600 mm)																GR SA SI CL	
0.60	<b>SILTY CLAY:</b> Brown, cohesive w~PL, firm to stiff.		1	SS	5													
1			2	SS	7													
2			3	SS	11													
2.28	<b>SANDY CLAYEY SILT TILL:</b> Brown, trace gravel, cohesive w<PL, very stiff to hard.		4	SS	17													
3			5	SS	25													
4			6	SS	36													
5			7	SS50/152mm														
6			8	SS50/101mm														
7																		
7.87	<b>END OF BOREHOLE</b>																	

WSP SOIL RECORDING SYSTEM: BRAD.HIGHLANDS.COM  
 WSP LOG DATA FROM 10/25/21 TO 10/25/21 BY BRAD.HIGHLANDS.COM

Continued Next Page

GROUNDWATER ELEVATIONS  
 Measurement

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity      ○ ●=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-28-2022 to Mar-28-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT NUMBER	TYPE	"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)					W <sub>p</sub>	W	W <sub>L</sub>			
Continued								20 40 60 80 100	20 40 60 80 100	10 20 30					
	Notes: 1). Upon completion of drilling, groundwater level was at approximately 1.5 meter below ground surface (mbgs).														

WSP SOIL RECORDING REPORT: BRDF-HIGHLANDS-001  
 WSP SOIL RECORDING UNIT: (425) 271-8747 FAX: (425) 271-8747

GROUNDWATER ELEVATIONS  
 Measurement

GRAPH NOTES +<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity ○ ●=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision CLIENT: Bradford Highlands Joint Venture PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario DATUM: UTM NAD , ZONE BH LOCATION:	Method: Solid Stem Auger Diameter: 152 mm Date: Mar-28-2022 to Mar-28-2022 Equipment: Drill Tech Geoprobe 420M	REF. NO.: 22517668 ENCL NO.: ORIGINATED BY PM COMPILED BY FJ
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SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT			POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)		
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80	100	W <sub>p</sub>	w				W <sub>L</sub>	GR
0.00	Ground Surface <b>TOPSOIL:</b> (510 mm)																		
0.51	<b>SILTY CLAY:</b> Brown, trace gravel, trace sand, cohesive w-PL, firm to very stiff.		1	SS	5														
1			2	SS	23														
2			3	SS	19														
2.28	<b>CLAYEY SILT TILL:</b> Brown, trace sand, trace gravel, cohesive w<PL, very stiff to hard.		4	SS	27														
3			5	SS	37														
4			6	SS	32														
5			7	SS	31														
6			8	SS50/139mm															
7	no soil sample recovery																		
8																			

WSP SOIL TECHNOLOGY 2017 INC. 8550 HWY 104 UNIT 100, BRADFORD ONTARIO L7R 4R7



LOG OF BOREHOLE BH22-13

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-28-2022 to Mar-28-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)										W <sub>p</sub>
	Continued																	
8.10	<b>END OF BOREHOLE</b>  Notes: 1). Upon completion of drilling, borehole had caved at approximately 7.3 meter below ground surface (mbgs).																	

WSP SOIL RECORDING UNIT: 1000 5500 10000 15000 20000 25000 30000 35000 40000 45000 50000 55000 60000 65000 70000 75000 80000 85000 90000 95000 100000

GROUNDWATER ELEVATIONS  
 Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3 , × 3 : Numbers refer to Sensitivity ○ ● = 3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision CLIENT: Bradford Highlands Joint Venture PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario DATUM: UTM NAD , ZONE BH LOCATION:	Method: Solid Stem Auger Diameter: 152 mm Date: Mar-25-2022 to Mar-25-2022 Equipment: Drill Tech Geoprobe 420M	REF. NO.: 22517668 ENCL NO.: ORIGINATED BY PM COMPILED BY FJ
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SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)		
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80							100	W <sub>p</sub>
0.00	Ground Surface <b>TOPSOIL:</b> (510 mm)																		
0.51	<b>SILTY CLAY:</b> Brown, trace rootlets, trace sand, cohesive w-PL, firm to stiff.		1	SS	5														
1			2	SS	4														
2			3	SS	13														
2.28	<b>CLAYEY SILT TILL:</b> Brown to grey, trace sand, trace gravel, cohesive w<PL, very stiff to hard.		4	SS	24														
3			5	SS	80														
4			6	SS50/152mm															
5			7	SS	46														
6			8	SS	52														

WSP SOIL RECORDING SYSTEM - BRADFORD HIGHLANDS JOINT VENTURE

Continued Next Page

**GROUNDWATER ELEVATIONS**

Measurement

**GRAPH NOTES**

+ 3 , × 3 : Numbers refer to Sensitivity

○ ● = 3% Strain at Failure





LOG OF BOREHOLE BH22-14

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-25-2022 to Mar-25-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80	100						
7.98	<p><b>END OF BOREHOLE</b></p> <p>Notes: 1). Upon completion of drilling, groundwater was at approximately 0.9 meter below ground surface (mbgs).</p>																

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GROUNDWATER ELEVATIONS

Measurement

GRAPH NOTES + 3, x 3: Numbers refer to Sensitivity ○ e=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision CLIENT: Bradford Highlands Joint Venture PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario DATUM: UTM NAD , ZONE BH LOCATION:	Method: Solid Stem Auger Diameter: 152 mm Date: Mar-23-2022 to Mar-23-2022 Equipment: Drill Tech Geoprobe 420M
REF. NO.: 22517668 ENCL NO.: ORIGINATED BY: PM COMPILED BY: FJ	

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)					W <sub>p</sub>	w				W <sub>L</sub>
0.00	Ground Surface <b>TOPSOIL:</b> (410 mm)																	
0.41	<b>SILTY CLAY:</b> Brown, cohesive w<PL, soft to very stiff.  grey, w~PL		1	SS	4													
1			2	SS	10													
2			3	SS	16													
3			4	SS	50													
2.59	<b>CLAYEY SILT TILL:</b> Grey, trace gravel, trace sand, cobble fragments, cohesive w<PL, very stiff to hard.																	
3			5	SS	51													
4																		
5			6	SS	24													
6																		
7			7	SS	83													
7.62	<b>SILTY SAND:</b> Grey, moist to wet, very dense.		8	SS	78													

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LOG OF BOREHOLE BH22-15

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-23-2022 to Mar-23-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)										W <sub>p</sub>
	Continued																	

8.10	<b>END OF BOREHOLE</b>  Notes: 1). Upon completion of drilling, borehole had caved at 5.2 meters below ground surface (mbgs).																		
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GROUNDWATER ELEVATIONS  
 Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3, x 3: Numbers refer to Sensitivity ○ e=3% Strain at Failure



LOG OF BOREHOLE BH22-16

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-23-2022 to Mar-23-2022  
 Equipment: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY PM  
 COMPILED BY FJ

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80							100
0.00	Ground Surface <b>TOPSOIL:</b> (200 mm)																	
0.20	<b>SAND:</b> Brown, trace gravel, moist, loose.		1	SS	8													
0.61	<b>SILTY CLAY:</b> Brown, trace gravel, cohesive w<PL, very stiff to hard.		2	SS	15													
			3	SS	32													
2.28	<b>SANDY CLAYEY SILT TILL:</b> Brown to grey, trace gravel, cobble fragment, cohesive w<PL, hard.		4	SS50/127mm														
			5	SS50/152mm														
			6	SS50/127mm														
			7	SS50/152mm														
7.72	<b>END OF BOREHOLE</b>		8	SS50/139mm														

WSP SOIL TECHNOLOGY 2017 INC. 8550 HWY 104 UNIT 10  
 10000 HWY 104 UNIT 10 BRADFORD ONTARIO L7R 4R3

Continued Next Page

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3 , × 3 : Numbers refer to Sensitivity

○ ● =3% Strain at Failure



LOG OF BOREHOLE BH22-16

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-23-2022 to Mar-23-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV. DEPTH	DESCRIPTION	STRATA PLOT NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80	100						
	Continued																
	Notes: 1). Upon completion of drilling, groundwater level was at approximately 1.5 meters below ground surface (mbgs).																

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GROUNDWATER ELEVATIONS  
 Measurement

GRAPH NOTES + 3, x 3: Numbers refer to Sensitivity ○ e=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision  
 CLIENT: Bradford Highlands Joint Venture  
 PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario  
 DATUM: UTM NAD , ZONE  
 BH LOCATION:

Method: Solid Stem Auger  
 Diameter: 152 mm  
 Date: Mar-25-2022 to Mar-25-2022  
 Equipment: Drill Tech Geoprobe 420M

REF. NO.: 22517668  
 ENCL NO.:  
 ORIGINATED BY PM  
 COMPILED BY FJ

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			20	40	60	80	100							W <sub>p</sub>
0.00	Ground Surface <b>TOPSOIL:</b> (300 mm)																		
0.30	<b>SILTY CLAY:</b> Brown to grey, trace gravel, trace rootlets, cohesive w<PL, soft to very stiff.  ----- wet    ----- grey		1	SS	3														
			2	SS	6														
1				3	SS	16													
2				4	SS	17													
3				5	SS	11													
4				6	SS	16													
6.09	<b>SANDY CLAYEY SILT TILL:</b> Grey, trace gravel, cohesive w<PL, hard.		7	SS	55														
			8	SS	60														

Continued Next Page

**GROUNDWATER ELEVATIONS**

Measurement

**GRAPH NOTES**

+ 3, × 3: Numbers refer to Sensitivity      ○ ●=3% Strain at Failure

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 BRADFORD ONTARIO L7R 4R7 CANADA TEL: 519-733-1111 FAX: 519-733-1112



LOG OF BOREHOLE BH22-17

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-25-2022 to Mar-25-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV. DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)									

8.02	<p><b>END OF BOREHOLE</b></p> <p>Notes: 1). Upon completion of drilling, borehole had caved at 7.3 meter below ground surface (mbgs) and borehole was dry.</p>																		
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**GROUNDWATER ELEVATIONS**

Measurement

**GRAPH NOTES** + 3, × 3: Numbers refer to Sensitivity      ○ = 3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision CLIENT: Bradford Highlands Joint Venture PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario DATUM: UTM NAD , ZONE BH LOCATION:	Method: Solid Stem Auger Diameter: 152 mm Date: Mar-24-2022 to Mar-24-2022 Equipment: Drill Tech Geoprobe 420M	REF. NO.: 22517668 ENCL NO.: ORIGINATED BY PM COMPILED BY FJ
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SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)										
0.00	Ground Surface <b>TOPSOIL:</b> (610 mm)		1	SS	4													
0.61	<b>SILTY CLAY:</b> Brown cohesive w<PL, stiff.		2	SS	12													
1.50	<b>CLAYEY SILT TILL:</b> Brown, trace sand, trace gravel, cohesive w<PL, very stiff to hard.		3	SS	22													
			4	SS	22													
			5	SS	30													
			6	SS50/127mm														
6.09	<b>SILTY SAND:</b> Brown, trace gravel, moist, very dense.		7	SS50/101mm														
			8	SS50/101mm														

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LOG OF BOREHOLE BH22-18

PROJECT: GEOTECHNICAL INVESTIGATION For Proposed Residential Subdivision	REF. NO.: 22517668
CLIENT: Bradford Highlands Joint Venture	Method: Solid Stem Auger
PROJECT LOCATION: 23 Brownlee Drive, Bradford, Ontario	Diameter: 152 mm
DATUM: UTM NAD , ZONE	Date: Mar-24-2022 to Mar-24-2022
BH LOCATION:	Equipment: Drill Tech Geoprobe 420M
	ORIGINATED BY PM
	COMPILED BY FJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	SHEAR STRENGTH (kPa)										W <sub>p</sub>
	Continued																	
8.10	<b>END OF BOREHOLE</b>  Notes: 1). Upon completion of drilling, groundwater level was at approximately 0.7 meter below ground surface (mbgs).	X																

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GROUNDWATER ELEVATIONS  
 Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3, x 3: Numbers refer to Sensitivity ○ = 3% Strain at Failure

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH1

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 11, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. + rem V. ⊕	Q - U - ⊙	Wp	W	Wi			
0		GROUND SURFACE		249.32													
		TOPSOIL		0.00	1A												
		(ML) CLAYEY SILT, trace gravel, trace to some sand; mottled brown; cohesive, w>PL to w~PL, stiff to very stiff		0.13	1B	DO	8										
1					2	DO	15										
		(CL) SILTY CLAY and SAND, trace to some gravel; brown to greyish-brown, (TILL); cohesive, w<PL to w~PL, stiff to hard		247.95													
				1.37	3	DO	11									MH	
2																	
		Sand seam in sample 4			4	DO	45										
3																	
		Sand and gravel seam at 3.3 mbgs			5	DO	50/152 mm										
4																	
		Coarse sand seam at 4.2 mbgs			6	DO	91										
5																	
		End of Borehole		244.32	7	DO	89										
				5.00													
6		NOTE: 1. Groundwater measured at a depth of 4.3 m below existing grade in open borehole upon completion of drilling March 11, 2016.															
7																	
8																	
9																	
10																	

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DEPTH SCALE  
1 : 50



LOGGED: CL  
CHECKED: NL

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH10

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 15, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
								20	40	60	80	nat V. + rem V. ⊕	Q - U - ⊙			Wp	W
0		GROUND SURFACE		237.49													
		TOPSOIL		0.00													
		(CL/ML) SILTY CLAY to CLAYEY SILT, trace sand; light brown; cohesive, w>PL to w~PL, stiff		237.29	1	DO	8						○				
1				0.20													
					2	DO	15						○				
2																	
					3	DO	11						○				
3																	
					4	DO	11						○				
4																	
		(CL) SILTY CLAY and SAND to sandy CLAY, trace to some gravel; greyish-brown, (TILL); cohesive, w~PL, very stiff to hard		234.39	5	DO	16						○		MH		
				3.10													
5		End of Borehole		232.77	6	DO	50/152 mm						○		MH		
				4.72													
6		NOTE: 1. Groundwater measured at a depth of 4.5 m below existing grade in open borehole upon completion of drilling March 15, 2016.															
7																	
8																	
9																	
10																	

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PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH11

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 16, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. rem V.	+ ⊕	- ⊖	Wp			W	Wi
0		GROUND SURFACE		233.55													
		TOPSOIL		0.00											Casing Silica Sand		
		(ML/CL) CLAYEY SILT to SILTY CLAY, trace gravel, trace to some sand; brown to mottled brown to brownish-grey to grey; cohesive, w>PL to w~PL, stiff to very stiff		233.14 0.41	1	DO	12										
1					2	DO	13										
2					3	DO	24								Hole Plug		
3					4	DO	17										
4					5	DO	19										
5					6	DO	23										
6					7	DO	26										
6		(CL) SILTY CLAY and SAND, trace gravel; grey, (TILL); cohesive, w~PL, hard		227.99 5.56	8	DO	50/152 mm										
7					9	DO	68										
8		End of Borehole		226.23 7.32													
8		NOTE: 1. Borehole dry upon completion of drilling March 16, 2016. 2. Groundwater measured at a depth of 3.3 m below existing grade on September 23, 2016. 3. Groundwater measured at a depth of 4.4 m below existing grade on December 8, 2016.															
9																	
10																	

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DEPTH SCALE  
1 : 50



LOGGED: CL  
CHECKED: NL

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH12

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 15, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								20    40    60    80		nat V. + rem V. ⊕ ⊙		10 <sup>-6</sup> 10 <sup>-5</sup> 10 <sup>-4</sup> 10 <sup>-3</sup>		W <sub>p</sub> W    W <sub>i</sub>			
0		GROUND SURFACE		228.74													
		TOPSOIL		0.00													
		(CL) SILTY CLAY, trace to some sand, trace to some gravel, cobble fragments; greyish-brown, oxidation staining, (TILL); cohesive, w~PL to w>PL, very stiff to hard		228.23 0.51	1	DO	6						○				
1					2	DO	16						○				
		(CL) SILTY CLAY and SAND, trace to some gravel; greyish-brown, (TILL); cohesive, w~PL, hard		227.04 1.70	3A	DO	46						○			MH	
2					3B	DO							○				
	Buggy Mount D-90 8" OD Solid Stem Auger				4	DO	50/ 127 mm						○				
3					5	DO	50/ 127 mm						○				
4					6	DO	50/ 76 mm						○				
5		End of Borehole		223.94 4.80									○				
6		NOTE: 1. Groundwater measured at a depth of 2.8 m below existing grade in open borehole upon completion of drilling March 15, 2016.															
7																	
8																	
9																	
10																	

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PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH13

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 21, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
								20		40		60		80			10 <sup>-6</sup>	
0		GROUND SURFACE		228.16														
		TOPSOIL		0.00														
	D-25 RT 4 1/4" O/D Hollow Stem Auger	(CL) sandy CLAY, trace gravel, trace to some sand; brown to greyish-brown, (TILL); cohesive, w~PL to w<PL, stiff to very stiff		227.47	1	DO	8											
1				0.69	2	DO	8									MH		
				(SM/SP-GW) SILTY SAND to SAND and GRAVEL; greyish-brown, (TILL); non-cohesive, moist to wet, dense		226.03	3	DO	23									
2					2.13	4	DO	48										
					225.26	2.90	5	DO	50/ 127 mm									
3		(CL) SILTY CLAY and SAND, some gravel; greyish-brown, (TILL); cohesive, w~PL, hard		224.83														
		End of Borehole Refusal on Boulder		3.33														
4		NOTE: 1. Groundwater measured at a depth of 2.1 m below existing grade in open borehole upon completion of drilling March 21, 2016.																
5																		
6																		
7																		
8																		
9																		
10																		

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DEPTH SCALE  
1 : 50



LOGGED: CL  
CHECKED: NL

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH14

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 21, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. rem V.	+ ⊕	- ⊖	Q	U			Wp
0		GROUND SURFACE		220.48													
		Mixed SILTY CLAY and TOPSOIL		0.00	1	DO	7									Casing Silica Sand 8-Dec-2016	
1		(CL) SILTY CLAY, trace sand; mottled brown to greyish-brown to brown, oxidation; cohesive, w>PL to w<PL, stiff to hard		219.79	2	DO	14										
				0.69	3	DO	21									Hole Plug	
2					4	DO	37										
3					5	DO	33									Silica Sand	
4					6	DO	17										
5					7	DO	22										
6																	
7		End of Borehole		213.93													
		NOTES: 1. Groundwater measured at a depth of 1.6 m below existing grade in open borehole upon completion of drilling March 21, 2016. 2. Groundwater measured at a depth of 0.7 m below existing grade September 12, 2016. 3. Grounwater measuted at a depth of 0.2 m below existing grade on December 8, 2016.		6.55													
8																	
9																	
10																	

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DEPTH SCALE  
 1 : 50



LOGGED: CL  
 CHECKED: NL

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH15

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 22, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT				
				224.54			20	40	60	80	10 <sup>-6</sup>	10 <sup>-5</sup>	10 <sup>-4</sup>	10 <sup>-3</sup>		
0		GROUND SURFACE		224.54												
		TOPSOIL		0.00	1A	DO	4									
		(CL) SILTY CLAY and SAND, some gravel; brown to mottled brown-grey, (TILL); cohesive, w-PL, very stiff to hard		224.06	1B											
1				0.48	2	DO	25									
2					3	DO	50									
3	D-25 RT 4 1/4" O/D Hollow Stem Auger				4	DO	50/127 mm									
4					5	DO	65									
5		End of Borehole		219.51	6	DO	82									MH
5				5.03												
6		NOTE: 1. Groundwater measured at a depth of 1.5 m below existing grade in open borehole upon completion of drilling March 22, 2016.														
7																
8																
9																
10																

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PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH16

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 21, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. rem V.		+		-			Wp
0	D-25 RT 4 1/4" O.D. Hollow Stem Auger	GROUND SURFACE		231.66													
		TOPSOIL		0.00	1	DO	10									Casing Silica Sand	
1		(ML/CL) CLAYEY SILT to SILTY CLAY, trace sand; mottled greyish-brown to grey; cohesive, w>PL to w<PL, stiff to very stiff		230.97	2	DO	11										
				0.69	3	DO	21										Hole Plug
2					4	DO	27										
3					5	DO	21										
4					6	DO	20										
5					7	DO	21										
6																	
7		End of Borehole		225.11													
		NOTES:		6.55													
8		1. Groundwater measured at a depth of 1.5 m below existing grade in open borehole upon completion of drilling March 21, 2016.															
		2. Groundwater measured at a depth of 2.8 m below existing grade September 12, 2016.															
9		3. Grounwater measured at a depth of 4.0 m below existing grade December 8, 2016.															
10																	

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PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH17

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 23, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. rem V.		+		-			Wp
0		GROUND SURFACE		235.02													
		TOPSOIL		0.00	1A	DO	7										
		(CL/ML) SILTY CLAY to CLAYEY SILT, trace sand, trace gravel; mottled brown to grey, oxidation; cohesive, w~PL to w>PL, firm to very stiff		234.51	1B												
1				0.51	2	DO	18										
2		Coarse sand seams at 1.8 and 1.9 mbgs			3	DO	22										
3					4	DO	27										
4					5	DO	20										
4		(ML) sandy SILT, trace gravel; grey; non-cohesive, wet, very dense		230.98													
				4.04	6	DO	50/102 mm										
5		End of Borehole		230.19													
				4.83													
5		NOTE: 1. Groundwater measured at a depth of 1.1 m below existing grade in open borehole upon completion of drilling March 23, 2016.															

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DEPTH SCALE  
 1 : 50



LOGGED: CL  
 CHECKED: NL

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH18

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 23, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
							20	40	60	80	nat V. rem V.	+ ⊕	- ⊖			Q - U
0		GROUND SURFACE		236.95												
		TOPSOIL		0.00	1A	DO	11								Casing Silica Sand	
		(ML) CLAYEY SILT, trace sand, trace gravel; brownish-grey; cohesive, w~PL to w>PL, very stiff		236.52 0.43	1B											
1					2	DO	23								Hole Plug 8-Dec-2016	
		Coarse sand seam at 1.9 mbgs			3	DO	29									
2	D-25 RT 4 1/4" O/D Hollow Stem Auger	(CL) sandy CLAY, trace to some gravel; mottled brown to grey, (TILL); cohesive, w~PL, hard		234.75 2.20	4	DO	80								Silica Sand	
					5	DO	80									
3					6	DO	54								10 Slot PVC Screen	
4		End of Borehole on Refusal		232.68 4.27												
5		NOTES: 1. Groundwater measured at a depth of 0.9 m below existing grade in open borehole upon completion of drilling March 23, 2016. 2. Groundwater measured at a depth of 1.7 m below existing grade September 12, 2016. 3. Groundwater measured at a depth of 1.3 m below existing grade on December 8, 2016.														

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PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH19

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 23, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								20 40 60 80		nat V. + Q - rem V. ⊕ U - ○		10 <sup>-6</sup> 10 <sup>-5</sup> 10 <sup>-4</sup> 10 <sup>-3</sup>		W <sub>p</sub>   W   W <sub>i</sub>			
0	D-25 RT 4" O.D. Solid Stem Auger	GROUND SURFACE		241.21													
		TOPSOIL		0.00	1A												
			(CL) sandy SILTY CLAY, trace to some gravel; mottled brown grey to greyish brown, (TILL); cohesive, w<PL to w>PL, firm to very stiff		240.93	1B	DO	6									
1					0.28												
						2	DO	22									
						3	DO	21									
2		(SM) SILTY SAND, trace to some gravel; greyish brown, (TILL); non-cohesive, moist, very dense		239.08													
				2.13													
					4	DO	72										
3																	
					5	DO	93/ 279 mm										
4																	
5		End of Borehole		236.51	6	DO	50/ 127 mm										
				4.70													
5		NOTE: 1. Groundwater measured at a depth of 1.6 m below existing grade in open borehole upon completion of drilling March 23, 2016.															
6																	
7																	
8																	
9																	
10																	

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PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH2

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 14, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
								20	40	60	80	nat V. +	rem V. ⊕	Q -	U -			Wp
0	Truck Mount CME 55 8" O/D Hollow Stem Auger	GROUND SURFACE		245.66														
		TOPSOIL		0.00														
		FILL-(CL) SILTY CLAY, trace sand, trace to some gravel; brown; cohesive, w~PL, firm		0.15	1	DO	5											Casing Silica Sand Metals, inorganics
1		(CL) SILTY CLAY and SAND, trace to some gravel, cobble fragments; greyish-brown, (TILL); cohesive, w~PL, very stiff to hard		245.15														
				0.51														
					2	DO	28											Hole Plug
2					3	DO	35											Silica Sand
3				4	DO	75											MH, VOC, PHC, pH	
				5	DO	90												
4				6	DO	95/279 mm												
				7	DO	50/51 mm												
5				8	DO	50/102 mm												
6		End of Borehole		240.22													VOC, PHC	
		NOTE: 1. Groundwater measured at a depth of 3.2 m below existing grade in open borehole upon completion of drilling March 14, 2016. 2. Groundwater measured at a depth of 3.4 m below existing grade in monitoring well on December 8, 2016.		5.44														
7																		
8																		
9																		
10																		

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DEPTH SCALE  
1 : 50



LOGGED: CL  
CHECKED: NL

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH3

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 11, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								20 40 60 80		nat V. + Q - rem V. ⊕ U - ○		10 <sup>-6</sup> 10 <sup>-5</sup> 10 <sup>-4</sup> 10 <sup>-3</sup>		Wp  -----  W  -----  Wi			
0	Buggy Mount D-90 8" O/D Hollow Stem Auger	GROUND SURFACE		245.36													
		FILL-(SW/GP) SAND and GRAVEL, some silt, asphalt fragments; brown; non-cohesive, moist, compact		0.00	1A										Metals, inorganic	Casing Silica Sand	
		FILL-(CL) SILTY CLAY, some sand, some gravel; brown; cohesive, w>PL, stiff		0.08	1B	DO	14										
1		(CL) SILTY CLAY and SAND, some gravel; brown to greyish-brown, (TILL); cohesive, w-PL, very stiff to hard		244.95													
				0.41													
					2	DO	49								VOC, PHC	Hole Plug	
2					3	DO	67									Silica Sand	
3					4	DO	81								VOC, PHC		
4					5	DO	67										
5				6	DO	80/ 229 mm											
6				7	DO	95/ 279 mm											
6				8	DO	75											
6		End of Borehole		239.44													
6				5.92													
7		NOTES:															
7		1. Groundwater measured at a depth of 2.8 m below existing grade in open borehole upon completion of drilling March 14, 2016.															
7		2. Groundwater measured at a depth of 3.3 m below existing grade September 12, 2016.															
7		3. Groundwater measured at a depth of 3.4 m below existing grade December 8, 2016.															
8																	
9																	
10																	

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DEPTH SCALE  
 1 : 50



LOGGED: CL  
 CHECKED: NL

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH4

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 14, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
								20	40	60	80	nat V. rem V.	+ ⊕	- ⊖			Q U
0	Truck Mount CME 55 8" O/D Hollow Stem Auger	GROUND SURFACE		245.21 0.00													
		FILL-(ML) CLAYEY SILT, some sand, some gravel; brown; cohesive, w>PL, stiff			1	DO	10										Casing Silica Sand Metals, inorganics
1		(CL) SILTY CLAY and SAND, trace to some gravel, cobble fragments; greyish-brown, (TILL); cohesive, w~PL, hard		244.52 0.69													Hole Plug
					2	DO	30										
					3	DO	34										Silica Sand
					4	DO	47										VOC, PHC
					5	DO	49										
					6	DO	50/25 mm										10 Slot PVC Screen
5				7	DO	91										VOC, PHC	
6		End of Borehole		239.57 5.64													
		NOTE: 1. Groundwater measured at a depth of 4.4 m below existing grade in open borehole upon completion of drilling March 14, 2016. 2. Monitoring well unable to be located due to golf course landscaping.															

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DEPTH SCALE  
 1 : 50



LOGGED: CL  
 CHECKED: NL

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH5

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 15, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								20 40 60 80		nat V. + Q - rem V. ⊕ U - ○		10 <sup>-6</sup> 10 <sup>-5</sup> 10 <sup>-4</sup> 10 <sup>-3</sup>		Wp  -----  W  -----  Wl			
0		GROUND SURFACE		248.16													
		TOPSOIL		0.00	1	DO	3									Casing Silica Sand	
		FILL-(ML) CLAYEY SILT and SAND; light brown; cohesive, w<PL to w>PL, firm		247.65 0.51	2	DO	6									Hole Plug	
					3	DO	6									MH	
		(CL) SILTY CLAY and SAND, some gravel; greyish-brown, (TILL); cohesive, w~PL to w>PL, hard		246.03 2.13	4	DO	46									MH	
		Coarse sand seam at 2.6 mbgs			5	DO	56									MH	
					6	DO	53									10 Slot PVC Screen	
					7	DO	50/76 mm										
		End of Borehole		241.84 6.32													
7		NOTES: 1. Groundwater measured at a depth of 3.4 m below existing grade in open borehole upon completion of drilling March 15, 2016. 2. Groundwater measured at a depth of 2.9 m below existing grade September 12, 2016. 3. Groundwater measured at a depth of 3.2 m below existing grade December 8, 2016.															

GTA-BHS 001 S:\CLIENTS\GERANIUM\HIGHLAND\_GOLF\COURSE\_BRADFORD\02\_DATA\GINT\1543120-BG-0002.GPJ GAL-MIS.GDT 2-15-17 STB

DEPTH SCALE  
 1 : 50



LOGGED: CL  
 CHECKED: NL



PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH6

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 15, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. rem V.		+		-			Wp
0		GROUND SURFACE		242.51													
		TOPSOIL		0.00	1	DO	4										
		(CL) SILTY CLAY, trace sand; brown to mottled light brown; cohesive, w<PL to w~PL, stiff to very stiff		0.51	2	DO	12									MH	
					3	DO	21										
					4	DO	49										
		(CL) SILTY CLAY and SAND, trace to some gravel, cobble fragments; greyish-brown to grey, (TILL); cohesive, w~PL, hard		2.13	5	DO	75/279 mm										
					6	DO	42										
					7	DO	36										
5		End of Borehole		5.03													
6		NOTE: 1. Groundwater measured at a depth of 4.7 m below existing grade in open borehole upon completion of drilling March 15, 2016.															

GTA-BHS 001 S:\CLIENTS\GERANIUM\HIGHLAND\_GOLF\COURSE\_BRADFORD\02\_DATA\GINT\1543120-BG-0002.GPJ GAL-MIS.GDT 2-15-17 STB



PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH7

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 15, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. rem V.		+		-			Wp
0		GROUND SURFACE		241.08													
		TOPSOIL		0.00	1	DO	8										
		FILL-(ML) CLAYEY SILT, trace sand; light brown; cohesive, w>PL, stiff		240.62 0.46	2	DO	11										
					3	DO	11										
		(CL) SILTY CLAY and SAND, trace to some gravel, cobble fragments; greyish-brown, (TILL); cohesive, w~PL, hard		238.95 2.13	4	DO	40									MH, NP	
	Buggy Mount D-90 4" O.D. Solid Stem Auger				5	DO	50/ 127 mm										
					6	DO	32										
5		End of Borehole		236.05 5.03													
6		NOTE: 1. Groundwater measured at a depth of 4.2 m below existing grade in open borehole upon completion of drilling March 15, 2016.															

GTA-BHS 001 S:\CLIENTS\GERANIUM\HIGHLAND\_GOLF\COURSE\_BRADFORD\02\_DATA\GINT\1543120-BG-0002.GPJ GAL-MIS.GDT 2-15-17 STB

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH8

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 10, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		WATER CONTENT PERCENT			
								20	40	60	80	10 <sup>-6</sup>	10 <sup>-5</sup>		
0		GROUND SURFACE		236.62											
		FILL-(CL) SILTY CLAY, trace sand, mixed organics; brown to light brown; cohesive, w<PL, firm to stiff		0.00	1	DO	7								Casing
		(CL) sandy CLAY, trace to some gravel; mottled brown to brown to brownish-grey to grey, (TILL); cohesive, w>PL to w~PL, stiff to hard		235.93	2	DO	10								Hole Plug
1				0.69											Silica Sand
	Buggy Mount D-90 8" OD Hollow Stem Auger				3	DO	20								
2					4	DO	64/254 mm								
					5	DO	88							MH, BTEX, PHC	10 Slot PVC Screen
3															
4		End of Borehole		232.51	6	DO	50/152 mm							BTEX, PHC	
		NOTES: 1. Groundwater measured at a depth of 2.2 m below existing grade in open borehole upon completion of drilling March 10, 2016. 2. Groundwater measured at a depth of 1.5 m below existing grade September 12, 2016. 3. Monitoring well unable to be accessed due to damaged well cover.		4.11											
5															
6															
7															
8															
9															
10															

GTA-BHS 001 S:\CLIENTS\GERANIUM\HIGHLAND\_GOLF\COURSE\_BRADFORD\02\_DATA\GINT\1543120-BG-0002.GPJ GAL-MIS.GDT 2-15-17 STB

DEPTH SCALE  
 1 : 50



LOGGED: CL  
 CHECKED: NL

PROJECT: 1543120  
 LOCATION: See Figure 2

# RECORD OF BOREHOLE: BH9

SHEET 1 OF 1  
 DATUM: Geodetic

BORING DATE: March 11, 2016

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. rem V.		Wp		W			Wi
0	Buggy Mount D-90 8" O/D Hollow Stem Auger	GROUND SURFACE		236.24													
		FILL-(SP/GP) SAND and GRAVEL, some silt; grey; non-cohesive, moist, compact		0.00	1A	DO	12										Casing
		(CL) SILTY CLAY, trace sand; brown; cohesive, w>PL, stiff to very stiff to hard		0.51	1B												BTEX, PHC, pH
1					2	DO	14										Hole Plug
2					3	DO	21										MH
3					4	DO	37										BTEX, PHC, pH
		(CL) SILTY CLAY and SAND, trace to some gravel; greyish-brown to grey, (TILL); cohesive, w>PL, very stiff to hard		2.98													Silica Sand
				2.98	5	DO	35										
4					6	DO	60										
5					7	DO	28										
6				8	DO	46											
				9	DO	29											
7		End of Borehole		6.55													
8		NOTE: 1. Groundwater measured at a depth of 4.9 m below existing grade in open borehole upon completion of drilling March 11, 2016. 2. Monitoring well unable to be located due to golf course landscaping.															
9																	
10																	

GTA-BHS 001 S:\CLIENTS\GERANIUM\HIGHLAND\_GOLF\COURSE\_BRADFORD\02\_DATA\GINT\1543120-BG-0002.GPJ GAL-MIS.GDT 2-15-17 STB

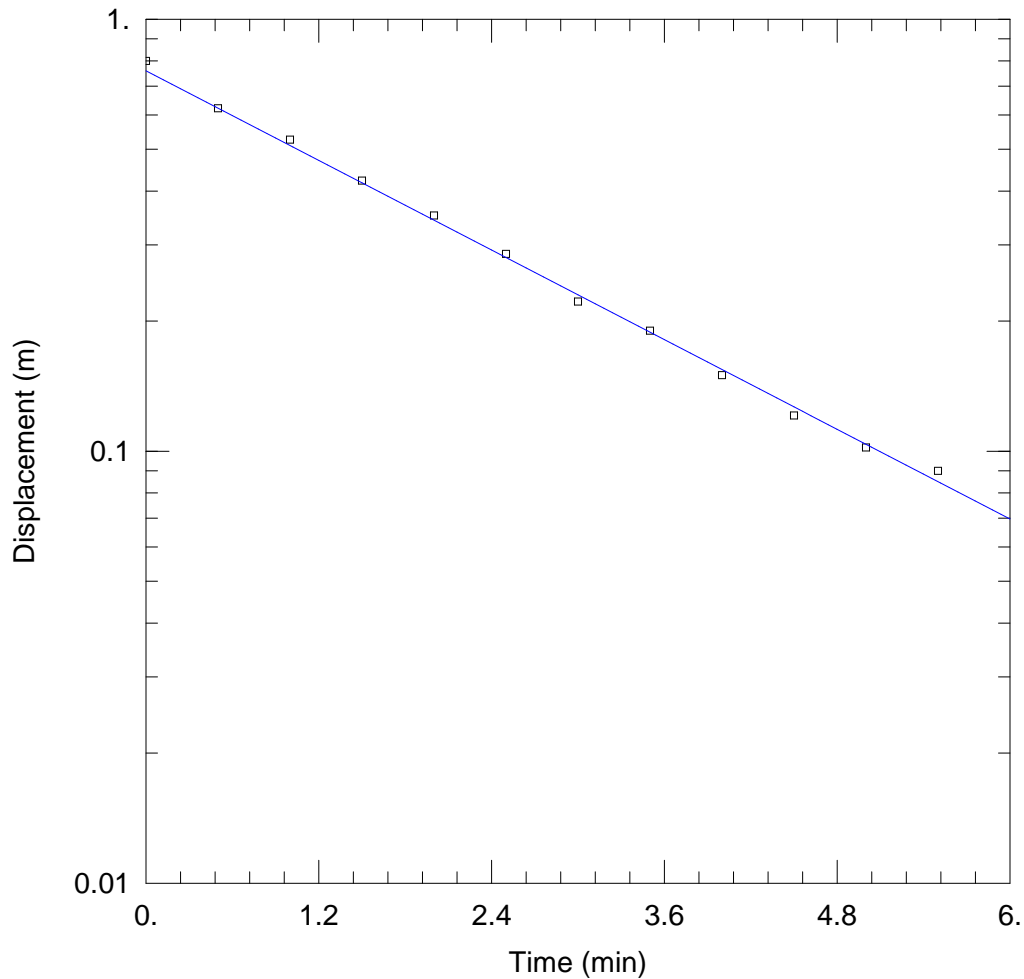
DEPTH SCALE  
1 : 50



LOGGED: CL  
CHECKED: NL

**APPENDIX E**

**Single Well Response Testing  
Results**



WELL TEST ANALYSIS

Data Set: \...\BH5.aqt  
Date: 03/06/18

Time: 11:14:39

PROJECT INFORMATION

Company: Golder

AQUIFER DATA

Saturated Thickness: 6.2 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH5)

Initial Displacement: 0.8 m  
Total Well Penetration Depth: 6. m  
Casing Radius: 0.025 m

Static Water Column Height: 6.2 m  
Screen Length: 3.05 m  
Well Radius: 0.075 m  
Gravel Pack Porosity: 0.

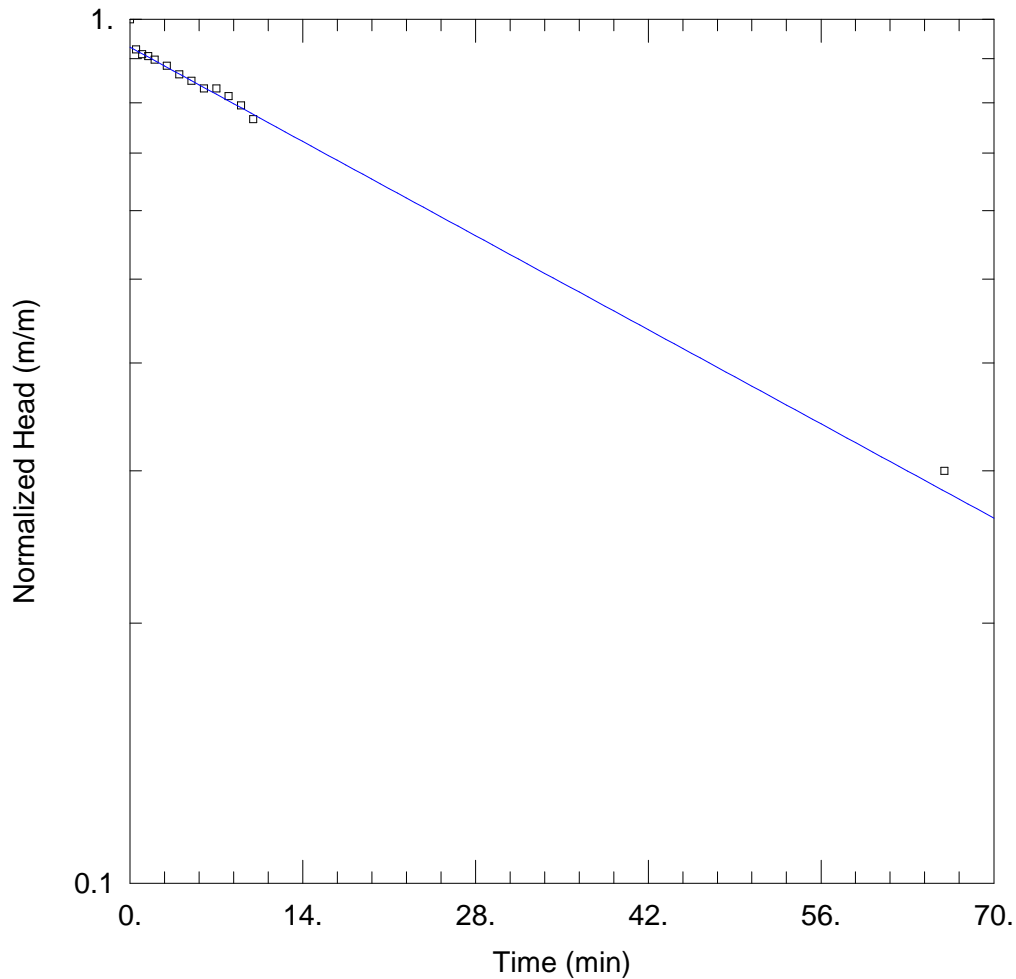
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 2.058E-6 m/sec

y0 = 0.7593 m



WELL TEST ANALYSIS

Data Set: \...\BH8.aqt  
Date: 03/06/18

Time: 11:15:16

PROJECT INFORMATION

Company: Golder

AQUIFER DATA

Saturated Thickness: 3.9 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH8)

Initial Displacement: 1.36 m  
Total Well Penetration Depth: 4.05 m  
Casing Radius: 0.025 m

Static Water Column Height: 3.9 m  
Screen Length: 3.05 m  
Well Radius: 0.075 m  
Gravel Pack Porosity: 0.

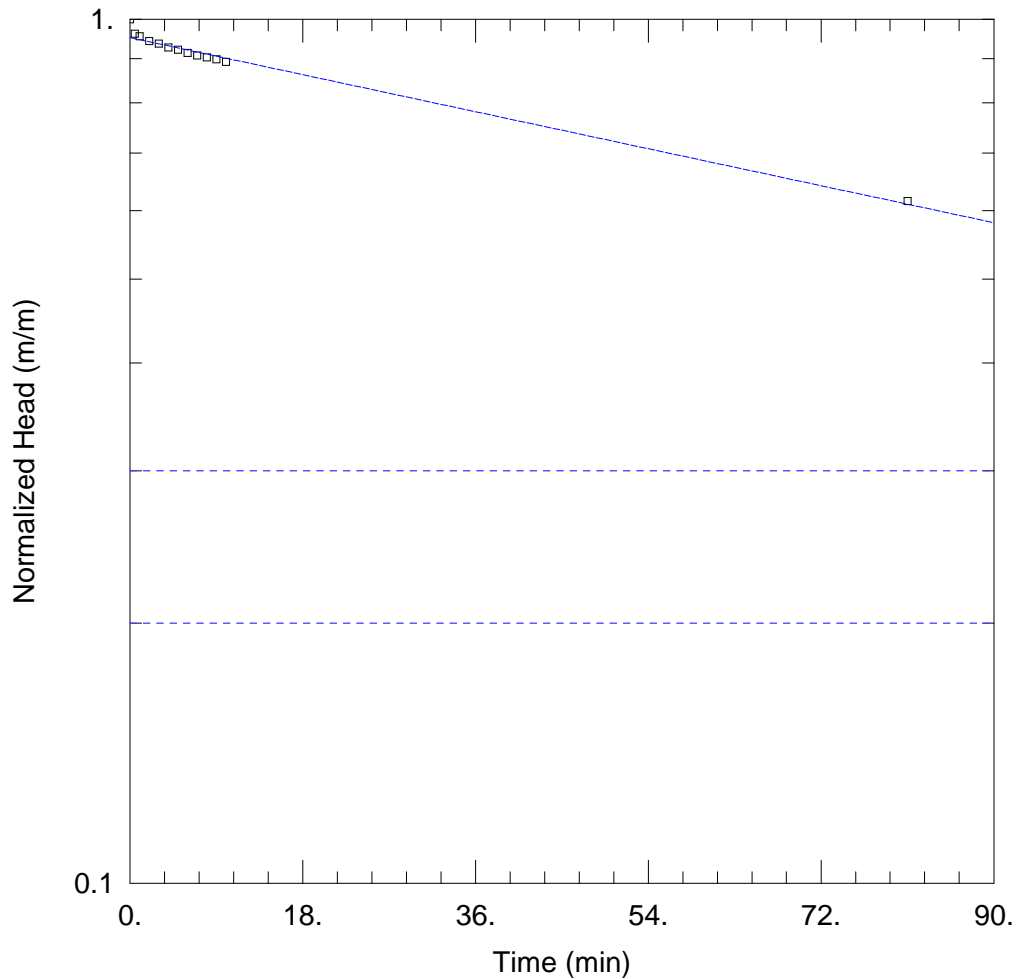
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 9.201E-8 m/sec

y0 = 1.262 m



WELL TEST ANALYSIS

Data Set: \...\BH14.aqt  
 Date: 03/06/18

Time: 11:16:05

PROJECT INFORMATION

Company: Golder

AQUIFER DATA

Saturated Thickness: 6.35 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH8)

Initial Displacement: 1.2 m  
 Total Well Penetration Depth: 5. m  
 Casing Radius: 0.025 m

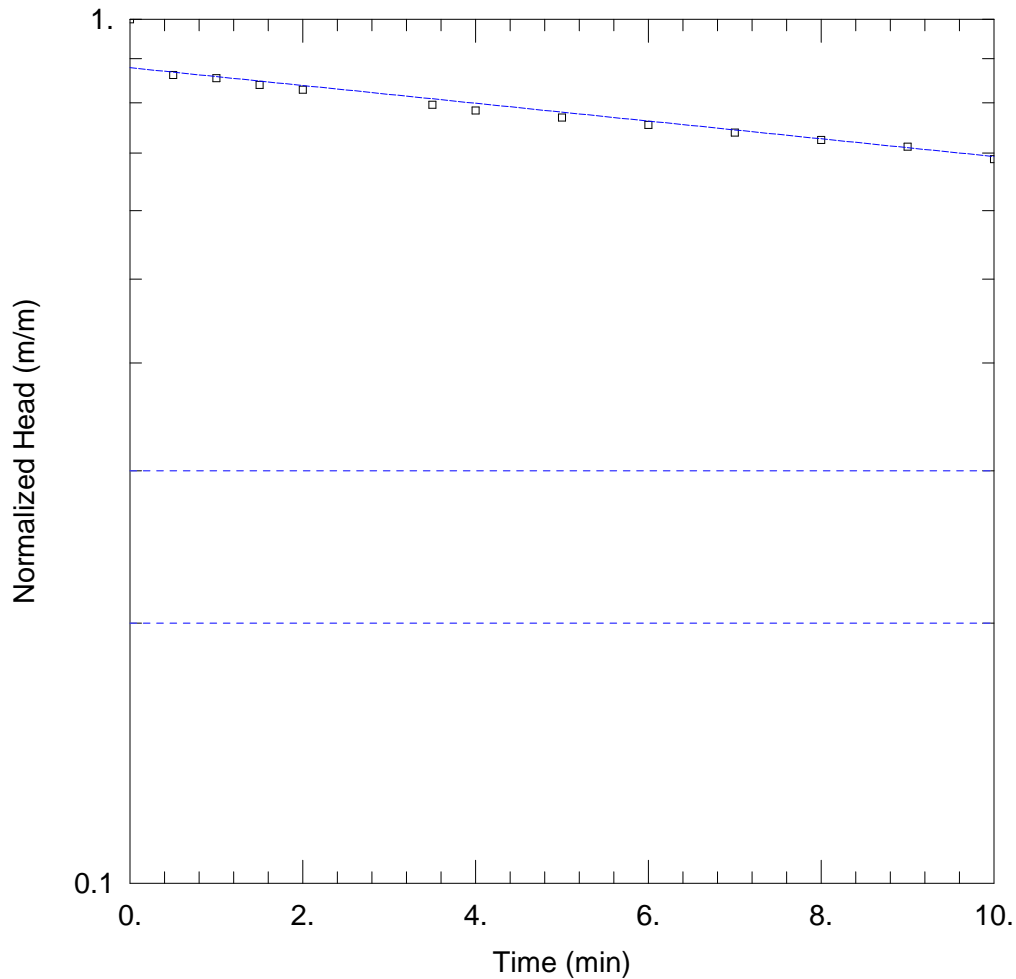
Static Water Column Height: 6.35 m  
 Screen Length: 3.05 m  
 Well Radius: 0.075 m  
 Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined  
 K = 2.583E-8 m/sec

Solution Method: Bouwer-Rice  
 y0 = 1.142 m





WELL TEST ANALYSIS

Data Set: \...\BH16.aqt  
 Date: 03/06/18

Time: 11:17:22

PROJECT INFORMATION

Company: Golder

AQUIFER DATA

Saturated Thickness: 6.35 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH16)

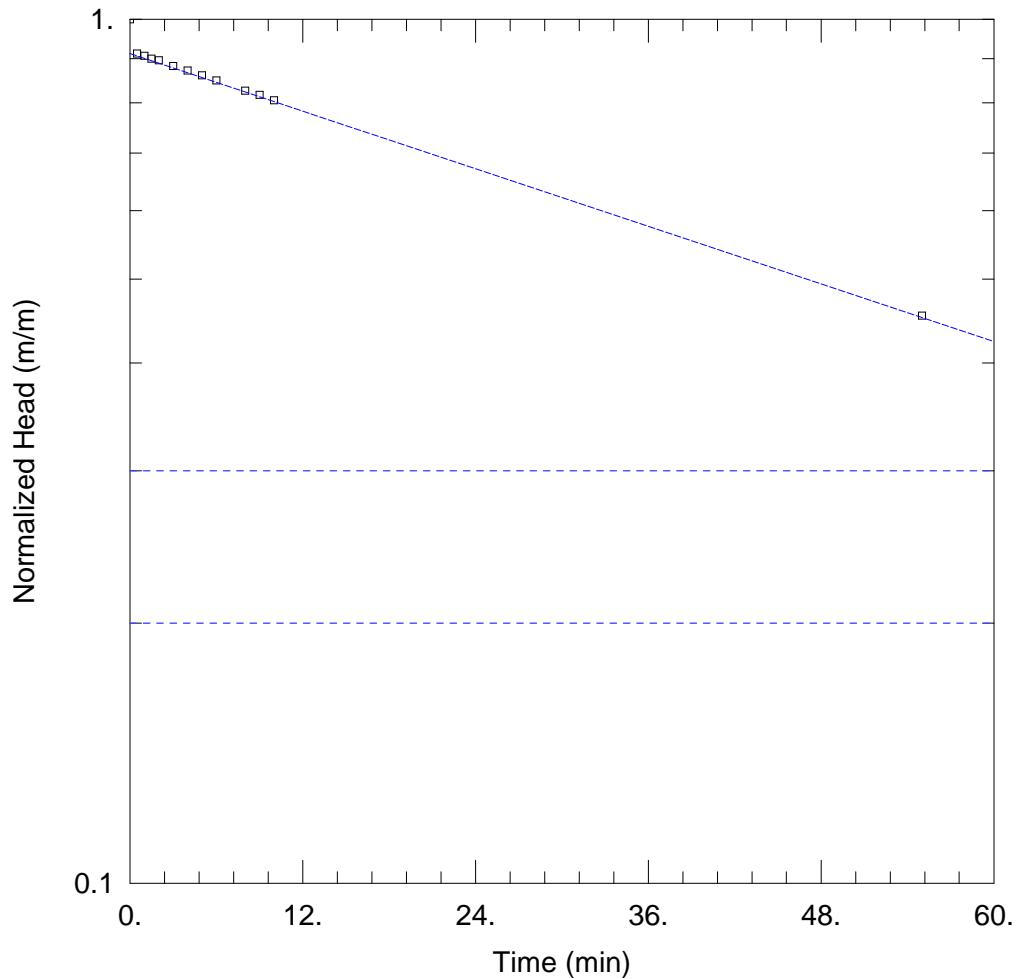
Initial Displacement: 1.2 m  
 Total Well Penetration Depth: 4.9 m  
 Casing Radius: 0.025 m

Static Water Column Height: 6.35 m  
 Screen Length: 3.05 m  
 Well Radius: 0.075 m  
 Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined  
 K = 1.109E-7 m/sec

Solution Method: Bouwer-Rice  
 y0 = 1.054 m



WELL TEST ANALYSIS

Data Set: \...\BH18.aqt  
Date: 03/06/18

Time: 11:20:10

PROJECT INFORMATION

Company: Golder

AQUIFER DATA

Saturated Thickness: 4.05 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH16)

Initial Displacement: 1.1 m  
Total Well Penetration Depth: 2.52 m  
Casing Radius: 0.025 m

Static Water Column Height: 4.05 m  
Screen Length: 1.5 m  
Well Radius: 0.075 m  
Gravel Pack Porosity: 0.

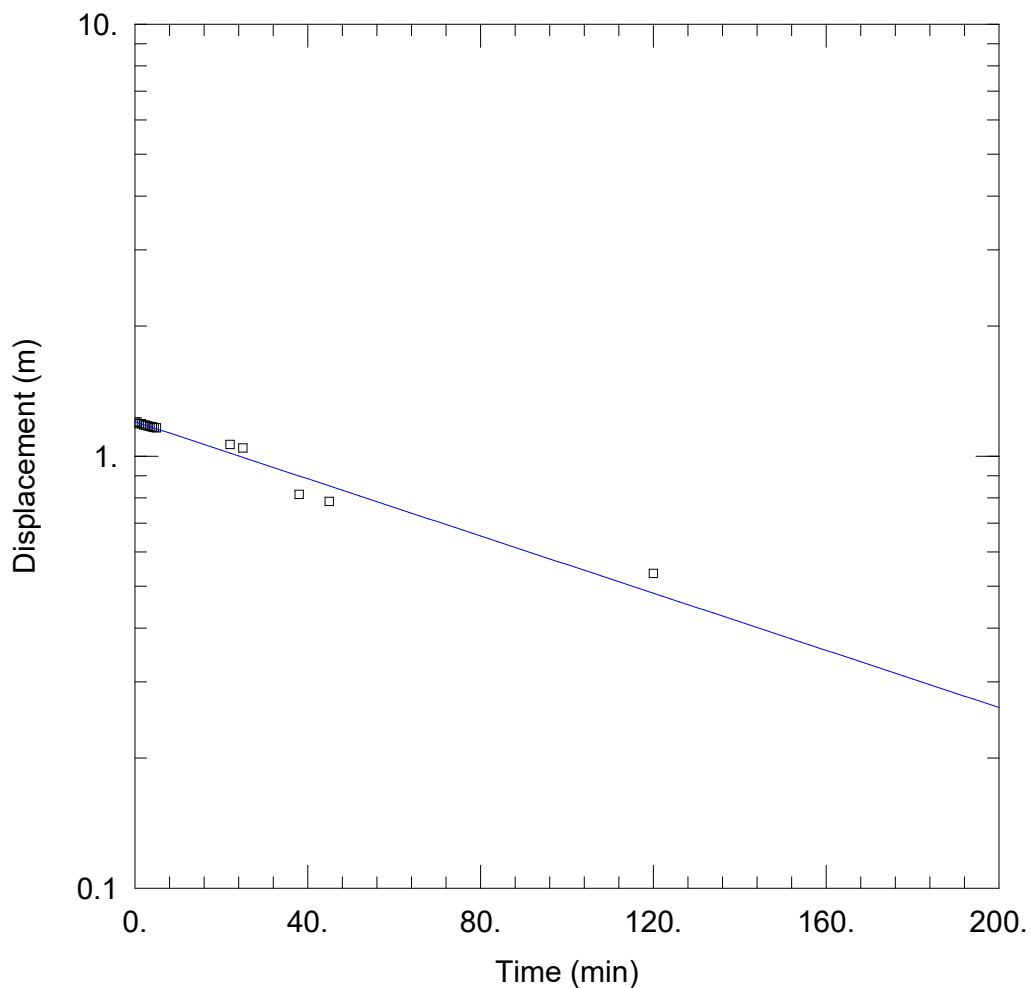
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 9.426E-8 m/sec

y0 = 1.004 m



### WELL TEST ANALYSIS

Data Set: C:\...\BH22-05.aqt

Date: 10/12/22

Time: 17:45:38

### PROJECT INFORMATION

Company: Golder Associates

Project: 22517668

Test Well: BH22-05

Test Date: 18'Aug'22

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA (BH22-05)

Initial Displacement: 1.2 m

Static Water Column Height: 8.25 m

Total Well Penetration Depth: 8.19 m

Screen Length: 3.05 m

Casing Radius: 0.0254 m

Well Radius: 0.076 m

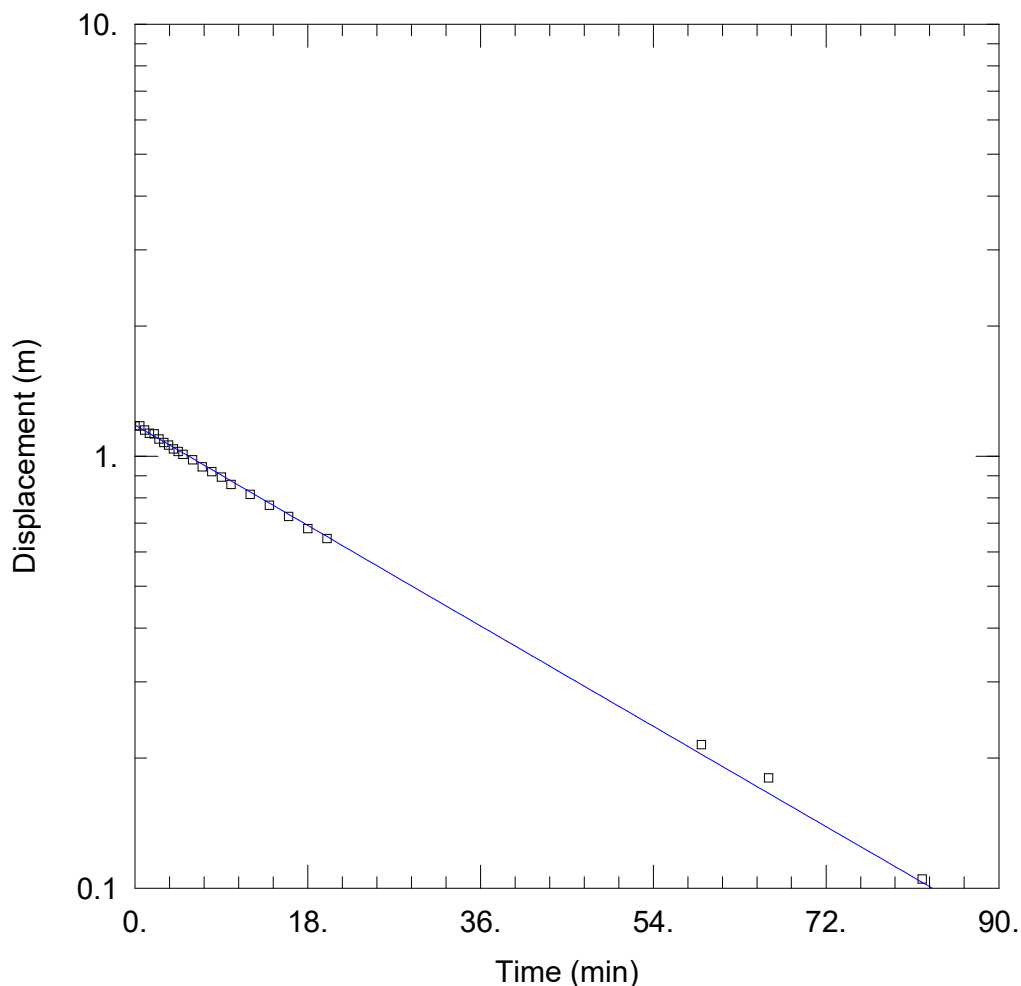
### SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 3.958E-8 m/sec

y0 = 1.202 m



### WELL TEST ANALYSIS

Data Set: C:\...\BH22-09.aqt  
 Date: 10/12/22

Time: 17:46:45

### PROJECT INFORMATION

Company: Golder Associates  
 Project: 22517668  
 Test Well: BH22-09  
 Test Date: 18'Aug'22

### AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA (BH22-9)

Initial Displacement: 1.175 m  
 Total Well Penetration Depth: 8.715 m  
 Casing Radius: 0.0254 m

Static Water Column Height: 8.785 m  
 Screen Length: 3.05 m  
 Well Radius: 0.076 m

### SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

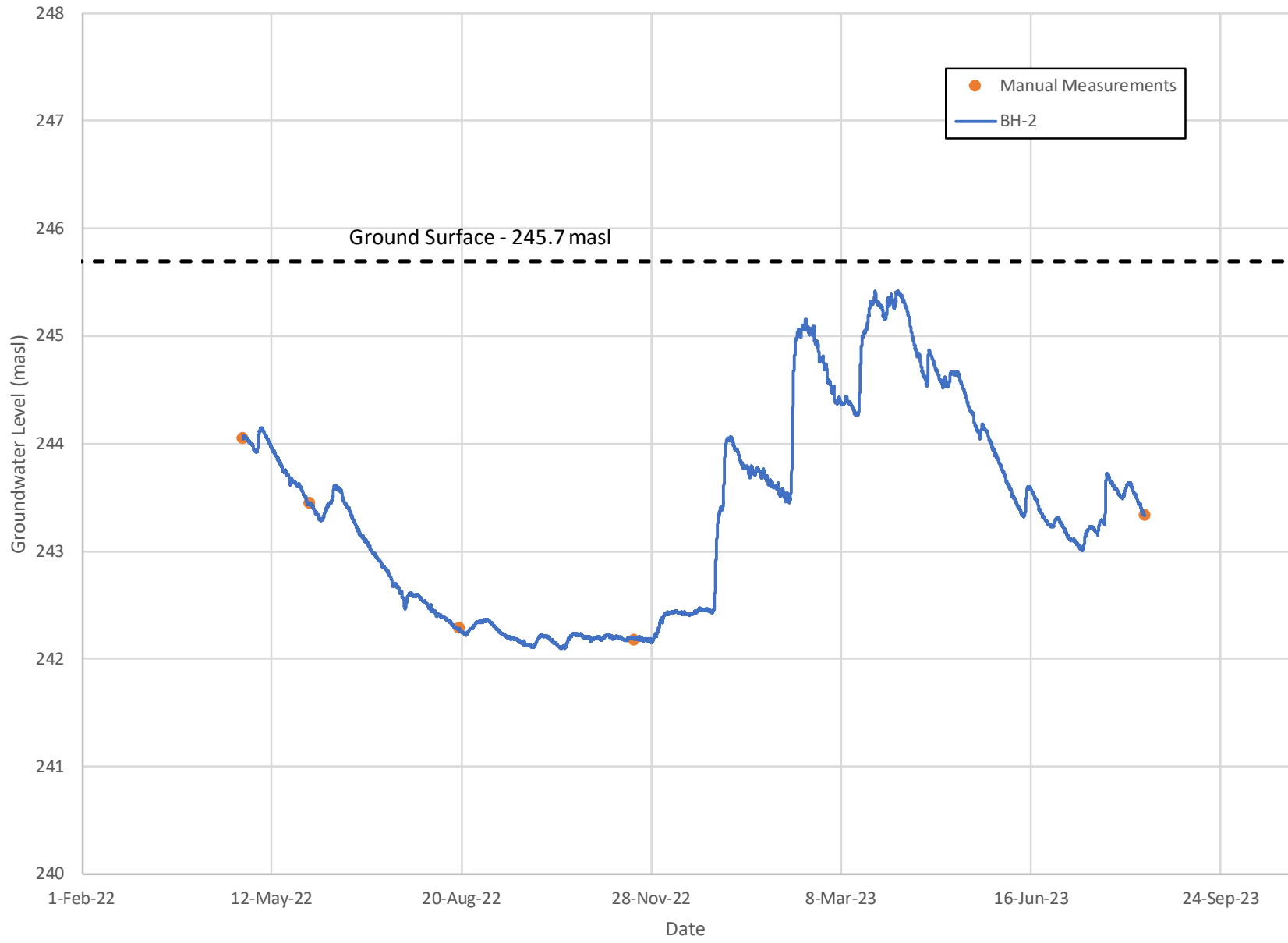
K = 1.576E-7 m/sec

y0 = 1.18 m

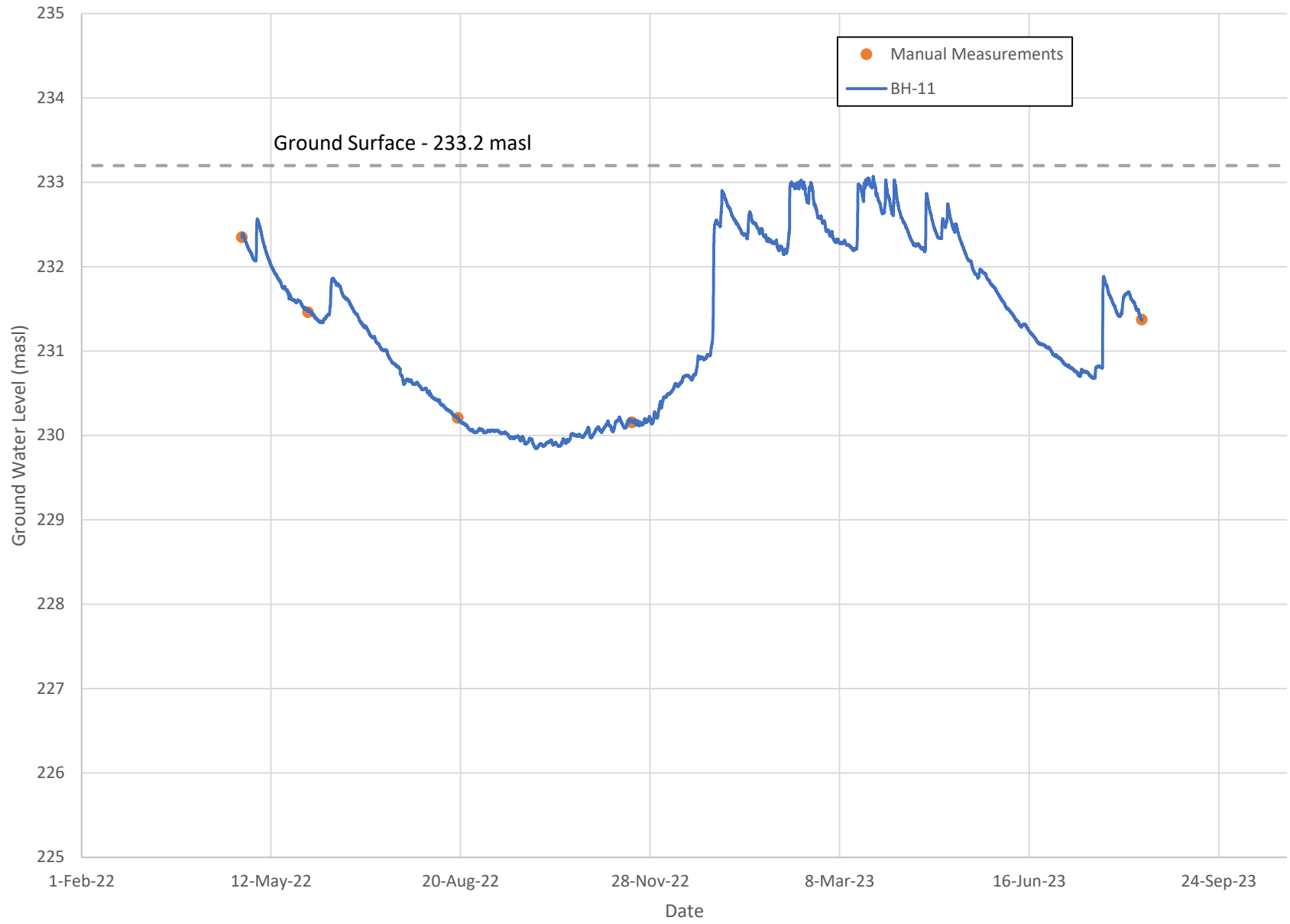
**APPENDIX F**

# Groundwater Hydrographs

### Groundwater Hydrograph BH-2



### Ground Water Hydrograph BH-11

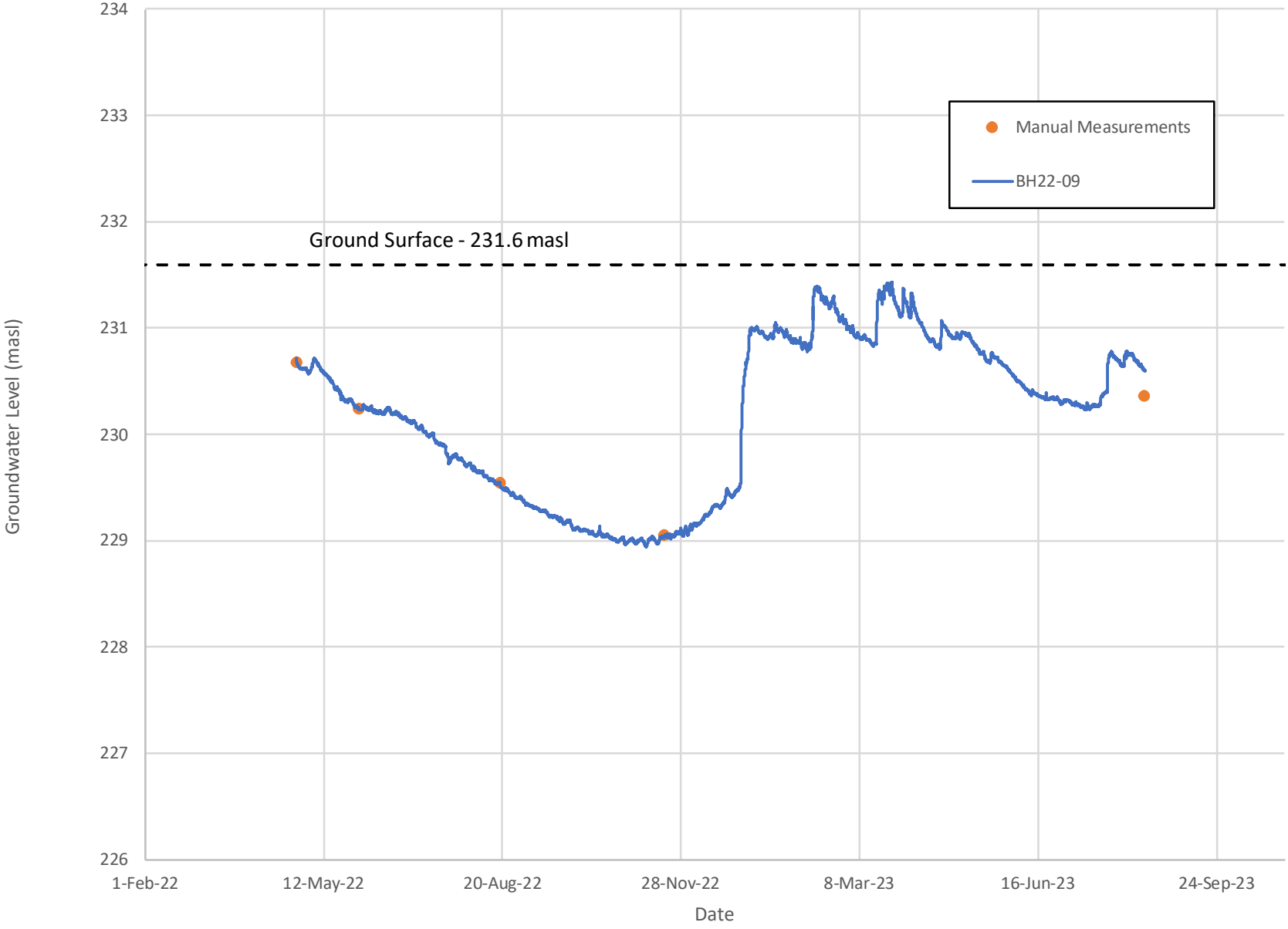


Ground Water Hydrograph - Well BH22-3





### Groundwater Hydrograph BH22-09



**APPENDIX G**

**Laboratory Analytical Results**

C.O.C.: ---

**REPORT No. B22-26593**

**Report To:**

**Golder Associates Ltd.**  
 121 Commerce Park Drive, Unit L,  
 Barrie ON. L4N 8X1 Canada  
**Attention:** Patrick Merritt

**Caduceon Environmental Laboratories**

112 Commerce Park Drive  
 Barrie ON L4N 8W8  
 Tel: 705-252-5743  
 Fax: 705-252-5746

DATE RECEIVED: 19-Aug-22

JOB/PROJECT NO.:

DATE REPORTED: 30-Aug-22

SAMPLE MATRIX: Groundwater

P.O. NUMBER: 22517668 (2000)

WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
Alkalinity (as CaCO3)	1	Holly Lane	SYL	22-Aug-22	A-ALK-03 (o)	SM 2320B
Cyanide	1	Kingston	TK	24-Aug-22	A-CN-001 (k)	SM 4500CN
Nitrogen - Ammonia (N)	1	Kingston	KD	25-Aug-22	A-NH3-001 (k)	SM4500-NH3-H
Nitrogen - Ammonia (N)	1	Holly Lane	KD	25-Aug-22	A-NH3-Unionized	Calc.
pH	1	Holly Lane	SYL	22-Aug-22	A-PH-01 (o)	SM 4500H
Sulphide	1	Kingston	TK	23-Aug-22	A-S2	SM4500-S2
A - Wet Chem	2	Kingston	amc	25-Aug-22	A-TPTKN-001 (P)(k)	E3516.2
Total Suspended Solids	2	Kingston	mci	22-Aug-22	A-TSS-001 (k)	SM2540D
Turbidity	1	Holly Lane	ST	23-Aug-22	A-TURB-01 (o)	SM 2130
B - Bacteriological	1	Barrie	EsT	19-Aug-22	B-EC-001 (b)	SM9222D
Glycols	1	Kingston	KPR	22-Aug-22	C-Glycol-01 (k)	EPA 8015
Oil & Grease	1	Kingston	MTY	24-Aug-22	C-O&G-001 (k)	SM 5520
Phenolics (4-aap)	1	Kingston	TK	25-Aug-22	C-PHEN-01 (k)	MOEE 3179
Chromium (VI)	1	Holly Lane	ST	26-Aug-22	D-CRVI-01 (o)	MOE E3056
Mercury	1	Holly Lane	PBK	23-Aug-22	D-HG-02 (o)	SM 3112 B
Metals - ICP-OES	2	Holly Lane	AHM	24-Aug-22	D-ICP-01 (o)	SM 3120
Metals - ICP-MS	2	Holly Lane	TPR	25-Aug-22	D-ICPMS-01 (o)	EPA 200.8

PWQO - Provincial Water Quality Objectives  
 Interim PWQO - Interim PWQO  
 PWQO - Provincial Water Quality Objectives



Christine Burke  
 Lab Manager

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

C.O.C.: ---

REPORT No. B22-26593

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 121 Commerce Park Drive, Unit L,  
 Barrie ON. L4N 8X1 Canada

**Attention:** Patrick Merritt

**Caduceon Environmental Laboratories**

112 Commerce Park Drive  
 Barrie ON L4N 8W8  
 Tel: 705-252-5743  
 Fax: 705-252-5746

DATE RECEIVED: 19-Aug-22

JOB/PROJECT NO.:

DATE REPORTED: 30-Aug-22

P.O. NUMBER: 22517668 (2000)

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		PWQO	
			Sample I.D.	Date Collected	Interim PWQO	PWQO
E coli	cfu/100mL	1	BH22-3 B22-26593-1 18-Aug-22	BH22-3-F B22-26593-2 18-Aug-22		100
pH @25°C	pH Units					8.5
Alkalinity(CaCO3) to pH4.5	mg/L	5				
Hardness (as CaCO3)	mg/L	1	289	231		
Cyanide (Free)	µg/L	5	< 5			5
Ammonia (N)-Total	µg/L	10	170			
Ammonia (N)-unionized	µg/L	10	< 10			20
Phosphorus-Total	µg/L	10	130	20	10	
Phenolics	µg/L	1	< 1			1
Sulphide	µg/L	10	60			
Turbidity	NTU	0.1	299			
Total Suspended Solids	mg/L	3	206	5		
Aluminum	µg/L	10	1620	40	75	
Antimony	µg/L	0.1	0.5	0.5	20	
Arsenic	µg/L	0.1	1.2	1.1	5	5
Beryllium	µg/L	2	< 2	< 2		11
Boron	µg/L	5	19	14	200	
Cadmium	µg/L	0.015	0.015	< 0.015	0.1	0.2
Chromium	µg/L	1	2	< 1		
Chromium (VI)	µg/L	1	< 1			1
Cobalt	µg/L	0.1	1.0	0.2	0.9	
Copper	µg/L	0.1	2.4	0.5	5	
Iron	µg/L	5	2310	31		300
Lead	µg/L	0.02	0.91	< 0.02	1	5

PWQO - Provincial Water Quality Objectives  
 Interim PWQO - Interim PWQO  
 PWQO - Provincial Water Quality Objectives



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 Lab Manager

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112 Commerce Park Drive  
 Barrie ON L4N 8W8  
 Tel: 705-252-5743  
 Fax: 705-252-5746

DATE RECEIVED: 19-Aug-22

JOB/PROJECT NO.:

DATE REPORTED: 30-Aug-22

P.O. NUMBER: 22517668 (2000)

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		PWQO	
			Sample I.D.	Date Collected	Interim PWQO	PWQO
			BH22-3 B22-26593-1 18-Aug-22	BH22-3-F B22-26593-2 18-Aug-22		
Mercury	µg/L	0.02	< 0.02			0.2
Molybdenum	µg/L	0.1	0.8	1.0		40
Nickel	µg/L	0.2	2.4	0.3		25
Selenium	µg/L	1	< 1	< 1		100
Silver	µg/L	0.1	< 0.1	< 0.1		0.1
Thallium	µg/L	0.05	< 0.05	< 0.05		0.3
Tungsten	µg/L	10	< 10	< 10		30
Uranium	µg/L	0.05	0.13	0.06		5
Vanadium	µg/L	0.1	2.7	0.4		6
Zinc	µg/L	5	11	< 5		20
Zirconium	µg/L	3	< 3	< 3		4
Oil and Grease-Anim/Veg. (Calculation)	µg/L	1000	2100			
Oil and Grease-Mineral	µg/L	1000	< 1000			
Oil & Grease-Total	µg/L	1000	2200			
Propylene Glycol	µg/L	3000	< 3000			44000
Ethylene Glycol	µg/L	2000	< 2000			2000
Diethylene Glycol	µg/L	3000	< 3000			11000
Total Glycols	µg/L	3000	< 3000			

PWQO - Provincial Water Quality Objectives  
 Interim PWQO - Interim PWQO  
 PWQO - Provincial Water Quality Objectives



Christine Burke  
 Lab Manager

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

C.O.C.: ---

**REPORT No. B22-26593**

**Report To:**

**Golder Associates Ltd.**  
 121 Commerce Park Drive, Unit L,  
 Barrie ON. L4N 8X1 Canada  
**Attention:** Patrick Merritt

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DATE RECEIVED: 19-Aug-22  
 DATE REPORTED: 30-Aug-22  
 SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:  
 P.O. NUMBER: 22517668 (2000)  
 WATERWORKS NO.

**Summary of Exceedances**

Interim PWQO		
	Found Value	Limit
<b>BH22-3</b>		
Phosphorus-Total (µg/L)	130	10
Cobalt (µg/L)	1.0	0.9
Aluminum (µg/L)	1620	75
<b>BH22-3-F</b>	Found Value	Limit
Phosphorus-Total (µg/L)	20	10

Provincial Water Quality Objectives		
	Found Value	Limit
<b>BH22-3</b>		
Iron (µg/L)	2310	300

PWQO - Provincial Water Quality Objectives  
 Interim PWQO - Interim PWQO  
 PWQO - Provincial Water Quality Objectives



Christine Burke  
 Lab Manager

R.L. = Reporting Limit  
 Test methods may be modified from specified reference method unless indicated by an \*  
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

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