

REPORT

Geotechnical and Hydrogeological Investigation

New Ottawa Hospital (Phase 2)

Submitted to:

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1.0 INTRODUCTION

This report presents the results of a geotechnical investigation carried out in support of the proposed development of the new campus of The Ottawa Hospital (TOH) on an approximately 50-acre site located in the northeast corner of the Canadian Experimental Farm in the City of Ottawa. The site is located in the southwest quadrant of the intersection of Carling Avenue and Preston Street.

The overall development includes a number of major components including:

- Design and construction of a new main hospital complex located on the west side of the site bounded by Carling Ave. and a new research facility development to the north, and Prince of Wales Dr. to the south.
- Design and construction of a new parkade structure and access roads on the east side of the site.
- A future research facility in the northwest portion of the site along Carling Ave.
- A new University of Ottawa Heart Institute in the southern portion of the site.

This report has been prepared in support of the design and construction of the new Ottawa Hospital structure(s). Concurrent with the investigations completed for this report, additional investigations were completed for the proposed new parkade structure and access roads from Carling Ave. and Prince of Wales Dr., as well as for the future research facility and Heart Institute. These investigations are presented under separate cover. Environmental investigations formed part of this assignment and are also presented under separate cover.

The purpose of this geotechnical investigation is to assess the general subsurface conditions at the location of the proposed new hospital building by drilling boreholes and completing associated field and laboratory testing. This study also uses available subsurface information from previous studies at this site completed by Golder as well as previous investigation data (completed by others) supplied by the client. Based on interpretation of the new factual information obtained combined with existing subsurface information from previous studies, engineering guidelines are provided.

The reader is referred to the "Important Information and Limitations of This Report", which follows the text but forms an integral part of this document.

2.0 DESCRIPTION OF PROJECT AND SITE

Plans are being prepared for development of the first phase of the new Ottawa Hospital Campus located on the south side of Carling Avenue near Preston Street in a portion of what was the Ottawa Experimental Farm (see Site Plan, Figure 1). The first portion of the development will include the main hospital structure in approximately the center of the site.

The following is a summary of the proposed Hospital Structure and new campus, based on information provided to us:

- The new main Hospital building will be a large multi-storey structure with 12 floors above grade on one side and 7 floors above grade on the other.
- The details of the proposed structure are not known but the preliminary plans provided indicate the main level of the building (Level 01) will have a Finished Floor Elevation (FFE) of 80.36 m. The ambulance and garage level (Level E) will have a FFE of 75.36 and the basement (Level B) is indicated to have a FFE of 70.36 m. The B level is understood to extend across the majority of the footprint of the building.



Cooling Towers and a Central Utility Plant (CUP) are proposed at the south-west limit of the site in a separate structure with FFE of 73.5 m, It is understood that this may be replaced with, or incorporated into multiple utility levels extending down to the B1 level at the south end of the site.

Golder Associates, and others, have completed several geotechnical and environmental investigations within the vicinity of the new Hospital structure. The results of these investigations were included in the following reports (some of which were obtained from Golder's archive, and some of which were provided to Golder for use as part of this study):

- Stantec Consulting Ltd. "Phase II Environmental Site Assessment, New Ottawa Hospital Civic Campus, Ottawa, ON" dated September 2017.
- Golder Report, titled "Soil Investigation, Proposed Sewer, Ottawa Observatory, Ottawa, ON", dated 1984 (Report No. 881-2144).
- Stantec Consulting Ltd. Report to Public Services and Procurement Canada "Geotechnical Data Report, The Proposed Sir John Carling West Annex Building Demolition, 930 Carling Avenue, Ottawa, Ontario" dated July 2020.
- Paterson Group Consulting Engineers Report titled "Environmental Investigation of Existing Fault Line, Proposed New Hospital Campus - Carling Avenue, Ottawa, Ontario" dated 2017.

Based on the results of the current investigation, previous subsurface investigations and published geological mapping, the ground conditions at the site consist of variable deposits of fill overlying silty clay, glacial till, and sand and gravel. Bedrock was proven at depths ranging from 8 to 17 m in previous investigations. The bedrock consists of Bobcaygeon Formation, nodular, limestone and shaley limestone.

3.0 PROCEDURE

The fieldwork for this investigation was carried out between May 5th and June 11th, 2021. At that time, thirty-two boreholes (numbered 21-201 to 21-219, 21-221, 21-222, and 21-224 to 21-226) were advanced at the site at the approximate locations shown on the attached Site Plan, Figure 1. Due to the location of boreholes 21-223 and 21-220 these boreholes were not advanced during the investigation. These areas will be sampled separately following the demolition/remediation of the existing Annex Building (while excavations are open). Eight boreholes (numbered 21-101 to 21-108) were advanced along the south and west sides of the site where parking lots and internal roadways are proposed.

The boreholes were advanced to depths ranging from 1.5 to 21.6 m below the existing ground surface using a track-mounted continuous flight hollow-stem auger drill rig supplied and operated by George Downing Estate Drilling of Hawkesbury, Ontario and a truck-mounted auger drill rig supplied and operated by CCC Geotechnical and Environmental Drilling of Ottawa, Ontario. Wash boring techniques were used to advance boreholes 21-201, 21-202, 21-205, 21-207, 21-219 and 21-221 through cobbles and boulders within the glacial till and/or sand and gravel layers. Standard Penetration Tests (SPTs) were carried out in the boreholes at regular intervals of depth and disturbed samples of the soils encountered were recovered using split spoon sampling equipment.

Portions of boreholes 21-201, 21-203, 21-204, 21-205A, 21-208, 21-209, 21-212 and 21-222 were advanced, without sampling, using dynamic cone penetration testing (DCPT) to depths of 10.9 to 16.9 m below ground surface, where cone refusal was encountered.



Upon encountering refusal, selected boreholes were extended into the bedrock using rotary diamond drilling techniques while retrieving NQ or HQ sized core. Within these boreholes, the drilled lengths in the bedrock ranged between 3.3 and 9.4 m.

Monitoring wells were sealed into boreholes 21-201, 21-202, 21-204, 21-213, 21-215, 21-218, 21-219, 21-221, 21-222, 21-224, 21-225, and 21-226. Multi-level monitoring wells were sealed into boreholes 21-221 and 21-222. These wells were installed to allow subsequent measurement of the groundwater levels and hydraulic conductivity testing. The groundwater levels in the monitoring wells were measured on May 28, June 9, June 18th and 24th, 2021.

The fieldwork was supervised by a member of our engineering staff who located the boreholes, directed the drilling operations and in situ testing, and logged the boreholes and samples.

Upon completion of the drilling operations, samples of the soil and rock core obtained in the boreholes were transported to our laboratory for further examination and for laboratory testing. The laboratory testing included determination of natural water content, Atterberg limits, grain size distribution, and Uniaxial Compressive Strength (UCS) testing.

Groundwater samples from boreholes 21-201, 21-213, 21-215 and 21-221(S) were submitted to AGAT Laboratories for basic chemical analysis related to potential sulphate attack on buried concrete elements and corrosion of buried ferrous elements.

A Vertical Seismic Profile (VSP) casing was installed into borehole 21-207 for the purposes of downhole geophysical testing. Shear wave velocities were measured at the site on May 3, 2022. A summary of the results is included in Appendix F.

The borehole locations were selected, marked in the field, and surveyed in the field by Golder Associates Ltd.

Borehole locations and elevations were surveyed using a Trimble R8 Global Positioning System (GPS) unit.

The elevations are referenced to Geodetic datum but have been obtained for the purposes of providing geotechnical information. The borehole elevations should not be used in place of a proper topographic survey of the site.

Concurrently, geotechnical investigations were completed at the site for the new parkade structure to the northeast of the Hospital, the future University of Ottawa Heart Institute to the southeast of the Hospital and a future Research Building to the north of the Hospital. The results of these investigations are presented in separate reports. The locations of the various boreholes in these areas are, however, shown on the current borehole location plan for reference. Borehole records for these areas are also included in Appendix A for reference (though the sub-surface conditions in these areas are not discussed in detail in this report).

4.0 SUBSURFACE CONDITIONS

4.1 General

Information on the subsurface conditions is provided as follows:

- Borehole records from the current investigation are provided in Appendix A.
- The results of the natural water content and Atterberg limit tests are provided on the Record of Borehole
- Photographs of the rock core are provided on Figures B-1 to B-26 in Appendix B.



Borehole records from the previous boreholes advanced in the area of the site are provided in Appendix C.

- The results of the basic chemical analyses are provided in Appendix D.
- Grain size distribution testing results are provided on Figures 2, 3A, 3B, 5A to 5D and 7A to 7C.
- Plasticity charts for the silty clay (weathered crust) and glacial till are provided on Figures 4A, 4B and 6.
- Results of UCS testing of rock cores are provided in Figure 8.
- The results of shear wave velocity measurements are included in Appendix F.

In general, the subsurface conditions on this site consist of topsoil, variable deposits of fill, overlying localized areas of silty clay, glacial till and silty sand/sand and gravel deposits over bedrock. Refusal to augering, dynamic cone penetration and/or bedrock was encountered at depths of 7.1 to 16.9 m in the current investigation. This corresponds to elevations ranging from 61.2 m to 71.1 m (61.2 m to 68.1 m considering only those holes where bedrock was proven through coring).

The following sections present a more detailed overview of the subsurface conditions on this site. It should be noted that the subsurface conditions encountered in previous investigations have also been used to supplement the current investigations.

4.2 Topsoil and Fill

Topsoil exists at the ground surface at all the boreholes advanced within the hospital footprint as well as in boreholes 21-101 to 21-108 located around the south exterior of the footprint. The topsoil has a thickness ranging from about 150 to 460 mm at the borehole locations. In borehole 21-221 a 460 mm thick layer of topsoil was encountered beneath the fill layer at a depth of about 0.8 m below existing ground surface.

Heterogeneous fill was encountered below the topsoil at all the borehole locations advanced during the current investigation, with the exception of boreholes 21-104, 21-106 and 21-108. The fill extended to depths ranging from 0.7 to 8.4 m below ground surface with thicknesses ranging from 0.2 to 8.2 m. The fill varied in consistency including silty clay, silty sand, gravelly sand, gravel and sand to sandy gravel with various amounts of cobbles, organics, wood, brick, ash, and other debris.

Standard penetration tests carried out within the fill deposit gave SPT 'N' values ranging from 1 to greater than 50 blows per 0.3 m of penetration, but more typically in the range of 5 to 30 blows per 0.3 m of penetration, indicating a loose to compact state of packing. The higher SPT 'N' values are likely due to the presence of cobbles and boulders in the fill.

The results of gradation testing carried out on one sample of the clay fill and one sample of the granular fill are provided on Figure 2. The measured water content of select samples of the fill ranged from 4 to 36%.

4.3 Upper Silty Sand and Sandy Silt

A discontinuous layer of silty sand to sandy silt was encountered below the fill in boreholes 21-218, 21-222 and 21-108 and previous boreholes 16-2, 16-5 to 16-7, 16-9, 16-14, MW 17-04 to 17-07, MW17-09, MW 20-15, and BH5. The silty sand to sandy silt extends to depths ranging from 1.4 to 9.1 m below the existing ground surface at the locations where it was encountered.

Standard penetration tests carried out within the silty sand to sandy silt deposit gave SPT 'N' values ranging from 2 to 4 blows per 0.3 m of penetration, indicating a very loose state of packing.



The results of gradation testing carried out on one sample of this silty sand/sandy silt is provided on Figure 5B. The water content of the sample was measured to be 18%. Portions of these layers may also be coarser layers of glacial till within the overall deposit, as opposed to a separate soil layer.

4.4 Silty Clay

A deposit of silty clay to clay (hereafter referred to as silty clay) was encountered beneath the fill and upper silty sand (where present) in boreholes 21-202, 21-203, 21-205, 21-207, 21-208, 21-210, 21-212, 21-215, 21-221, 21-225, 21-226 as well as previous boreholes MW 16-2, 16-3, 16-9, 16-14, 20-18, BH5 to BH8, AP-4 and AP-5.

The upper portion of the deposit in boreholes 21-202, 21-203, 21-205, 21-207, 21-208, 21-210, 21-212, 21-215, 21-221, 21-225, 21-226, as well as previous boreholes 16-9, BH5 to BH8, and AP-5 is generally grey-brown in colour (i.e., weathered) and extends to depths ranging from about 1.1 to 5.3 m below the existing ground surface. Standard penetration tests carried out within this deposit gave SPT 'N' values ranging from 4 to 17 blow per 0.3 m of penetration indicating a generally very stiff to stiff consistency for the weathered deposit.

The silty clay below the upper weathered portion, at 21-221 and 16-9, and the entire silty clay deposit at boreholes MW 16-2, 16-3, 16-14, 20-18, and AP-4 is grey in color. The lower grey silty clay, where fully penetrated, extends to depths of between 6.9 to 9.1 m below the existing ground surface (i.e., elevations 66.7 to 71.9 m). The results of in situ vane shear testing in the unweathered portion of this deposit gave undrained shear strength values generally ranging from 42 to 72 kPa indicating a firm to stiff consistency. The lower, unweathered clay is typically more compressible and sensitive to disturbance.

The results of gradation testing carried out on one sample of the silty clay are provided on Figures 3A and 3B. Atterberg limit testing carried out on samples of the weathered deposit gave plasticity index values of 28 to 62% and liquid limit values of 51 to 88%, indicating a soil of high plasticity. The results of the Atterberg Limits testing are presented on Figures 4A and 4B. The measured water content of selected samples of the weathered silty clay ranges from 29 to 54%.

4.5 Glacial Till

Glacial till was encountered below the fill and/or silty sand/sandy silt or clay (where encountered) at all locations advanced during the current investigation as well as previous boreholes 20-15 to 20-18, BH1 to BH10, and AP-2, AP-3, AP-5 and AP-6. The till was encountered at depths ranging from 0.7 to 8.4 m below existing ground surface. In general, the glacial till consists of a heterogeneous mixture of cobbles, boulders, and gravel in a matrix of silty sand. Localized zones of silty clay may also be present within the till.

The glacial till was not fully penetrated at boreholes 21-209 to 21-212, 21-215, 21-217 to 21-219, 21-222, 21-225, 21-226, 21-101 to 21-108 as well as previous boreholes 20-15 to 20-18, BH1 to BH10, and AP-2, AP-3, AP-5 and AP-6, but proven to extend to depths from 1.5 to up to 14.3 m below existing ground surface at these locations. Where fully penetrated, the glacial till extends to depths ranging from 4.9 to 16.9 m below ground surface.

The results of standard penetration tests carried out within the glacial till gave SPT 'N' values ranging from 'weight of hammer' to greater than 50 blows, but generally between 2 and 42 blows per 0.3 m of penetration, indicating a very loose to dense state of packing. It should be noted the higher values may be due to the presence of cobbles/ boulders or the bedrock surface rather than the density of the soil matrix, and lower values may be due to soil disturbance induced during drilling and sampling.



The results of gradation testing carried out selected samples of the glacial till are provided on Figures 5A to 5D. Atterberg limit testing carried out on the fine portion of one sample of the glacial till gave a plasticity index value of 4% and liquid limit value of 16%, indicating low plasticity fines. The results of the Atterberg Limits testing are presented on Figure 6. The measured water content of selected samples of the glacial till ranged from 5 to 16%.

4.6 Lower Layered Sandy Gravel, Gravelly Sand, and Sand

A layered deposit of gravelly sand, sand, and sandy gravel with layers of sandy silt was encountered beneath the glacial till in boreholes 21-201 to 21-208 at depths ranging from about 4.9 to 12.2 m below the existing ground surface (i.e., elevations 69.5 to 77.6 m). The sandy deposit was not fully penetrated by boreholes 21-201, 21-203, 21-204, 21-205, 21-206 and 21-208 but was proven/inferred to extend to depths ranging from about 10.9 to 16.9 m below the existing ground surface (i.e., elevations 64.5 to 70.2 m). Where fully penetrated at boreholes 21-202 and 21-207, the sand and gravel deposit extend to depths of 12.2 m and 16.5 m (i.e., elevations 64.7 m and 68.1 m).

Standard penetration tests carried out within the layered deposit gave SPT 'N' values ranging from 1 to greater than 50 blows per 0.3 m of penetration, but more typically in the range of 2 to 35 blows per 0.3 m of penetration, indicating a generally very loose to dense state of packing.

The measured natural water content of select samples of the layered sand and gravel ranged between 7 and 24%. The results of gradation testing carried out on select samples of the lower layered sand and gravel are provided on Figures 7A to 7C.

These layers may also be coarser layers or lenses of the glacial till within the overall deposit, as opposed to a unique geological layer.

4.7 Refusal and Bedrock

Refusal to Dynamic Cone Penetration Testing (DCPT) was encountered in boreholes 21-201, 21-203, 21-204, 21-208, 21-209, 21-212, 21-222 as well as previous boreholes BH3, BH4A, BH5 and BH6. Auger refusal was encountered below the glacial till and/or sand and gavel deposits at boreholes 21-202, 21-206, 21-207, 21-210, 21-211, 21-213, 21-214, 21-215, 21-216, 21-217, 21-218, 21-219, 21-221, 21-224, 21-225, 21-226 as well as previous boreholes MW17-04, 17-06, 17-08, 16-5, 16-6, BH1 to 3, BH8, BH 9, BH9A, and BH10.

DCPT refusal or refusal to augering was encountered at depths ranging from 2.7 to 16.9 m below the existing ground surface (i.e., Elevations from 61.2 to 82.4 m) within the hospital footprint during the current investigation. DCPT refusal and auger refusal could indicate the presence of the bedrock surface, or boulders/cobbles within the glacial till/sandy and gravely deposits.

Bedrock was proven at boreholes 21-202, 21-207, 21-213, 21-214, 21-216, 21-219, 21-221 and 21-224 by extending the borehole into the bedrock using rotary diamond drilling techniques while retrieving NQ or HQ sized core. Within these boreholes, the cored lengths in the bedrock ranged from 3.3 to 9.4 m. Where bedrock was proven through coring, the bedrock elevation ranged from 61.2 to 68.6 m elevation.

The cored bedrock generally consists of fresh, thinly to medium bedded, grey to dark grey, fine to medium grained, non-porous, shaley, nodular shaley limestone bedrock. At borehole 21-202 a possible healed fault was noted at a depth of 18.5 to 19.4 m.

The Rock Quality Designation (RQD) values measured on the recovered bedrock core samples ranges from 61% to 100% indicating fair to excellent quality rock. It is common for bedrock in the area to be more weathered and disturbed in the upper 1 m to 2 m and improve in quality below that depth.



Results of UCS testing carried out on five samples of bedrock gave strengths ranging from 59 to 157 MPa, indicative of strong to very strong bedrock.

Photographs of the bedrock core are provided in Appendix B.

The depth and elevations of the bedrock surface, as well as the ground surface elevation, at the borehole locations in the current and previous investigations are summarized in the table below.

Table 1: Summary of Auger Refusal/Bedrock Depths and Elevations

Report no.	BH No.	Ground Surface Elevation (m)	Refusal Depth (m)	Bedrock Elevation (m)
	21-201	82.46	12.88 ^D	69.58 ^D
	21-202	81.20	16.49	64.71
	21-203	81.36	16.90 ^D	64.46 ^D
	21-204	81.09	10.88 ^D	70.21 ^D
	21-206	77.09	12.09 ^R	65.00 ^R
	21-207	80.26	12.17	68.09
	21-208	80.77	14.33 ^D	66.44 ^D
	21-209	81.03	10.88 ^D	70.15 ^D
	21-210	80.23	9.15 ^R	71.08 ^R
	21-211	79.60	10.77 ^R	68.83 ^R
	21-212	79.89	13.19 ^D	66.70 ^D
Current	21-213	76.11	12.20	63.91
	21-214	75.82	8.28	67.55
	21-215	72.79	7.06 ^R	65.73 ^R
	21-216	74.34	11.13	63.21
	21-217	75.19	8.84 ^R	66.35 ^R
	21-218	78.54	13.59 ^R	64.95 ^R
	21-219	79.40	10.84	68.56
	21-221	74.59	13.41	61.18
	21-222	78.83	14.02 ^D	64.81 ^D
	21-224	78.90	16.92	61.98
	21-225	75.21	12.98 ^R	62.23 ^R
	21-226	76.25	10.67 ^R	65.58 ^R
	17-04	85.13	2.74 ^R	82.39 ^R
Stantec 2017	17-06	-	4.60 ^R	-
and 2020	17-08	-	5.49 ^R	-
Investigations	16-5	-	6.71 ^R	-
	16-6	-	7.32 ^R	-



Report no.	BH No.	Ground Surface Elevation (m)	Refusal Depth (m)	Bedrock Elevation (m)
	BH1	-	7.34 ^R	-
	BH2	-	8.18 ^R	-
	BH3	-	11.20 ^D	-
	BH4A	-	11.15 ^D	-
Paterson Report	BH5	-	10.26 ^D	-
PE4096	BH6	-	10.31 ^D	-
	BH8	-	8.86 ^R	-
	BH9	-	3.43 ^R	-
	BH 9A	-	3.25 ^R	-
	BH 10	-	7.29 ^R	-

Note R Denotes auger refusal, bedrock surface not confirmed through coring.

4.8 Groundwater

Monitoring wells were sealed into boreholes 21-201, 21-202, 21-204, 21-213, 21-215, 21-218, 21-219, 21-221, 21-222, 21-224, 21-225, and 21-226. Multi-level monitoring wells were sealed into borehole 21-221 and 21-222. These were installed to allow subsequent measurement of the groundwater levels and hydraulic conductivity testing. The following table summarizes the measured groundwater levels and hydraulic conductivity testing carried out in both the current and previous investigations.

Table 2: Summary of Groundwater Conditions

		0	Grou	ındwater Leve	el			
Report No.	Borehole No.	Ground Surface Elevation (m)	Date	Depth (m below ground surface)	Elevation (m)	Hydraulic Conductivity (cm/s)	Geological Strata Screened	
	04 004	00.46	June 18, 2021	6.45	76.01	2,40-2	Glacial till/	
	21-201	82.46	June 24, 2021	6.50	75.96	2x10 ⁻²	Sand and Gravel	
	21-202	81.20	June 9, 2021	5.15	76.04	4x10 ⁻³	Limestone	
		01.20	June 18, 2021	5.26	75.93		bedrock	
	21-204	04 81.09	June 18, 2021	5.16	75.93	1x10 ⁻³	Glacial till	
			June 24, 2021	5.21	75.88		Glaciai tili	
Current	21-213	76.11	June 9, 2021	0.70	75.40	8x10 ⁻⁴	Glacial till/ gravelly sand	
	21-215	72.79	June 9, 2021	2.39	70.40	3x10 ⁻⁴	Glacial till	
	04.040	21-218 78.54	May 27, 2021	5.83	72.71	Not tested	Sandy silt/	
	21-210		June 9, 2021	6.02	72.52		glacial till	
	24 240	24 240 7	May 28,	May 28, 2021	2.80	76.60	Not tooted	Fill/
	21-219	I-219 79.40	June 9, 2021	2.93	76.47	Not tested	glacial till	



^D Denotes DCPT refusal, bedrock surface not confirmed through coring

			Grou	ındwater Leve	el		
Report No.	Borehole No.	Ground Surface Elevation (m)	Date	Depth (m below ground surface)	Elevation (m)	Hydraulic Conductivity (cm/s)	Geological Strata Screened
	21-221		May 28, 2021	1.35	73.23	1x10 ⁻²	Glacial till/
	(Shallow)	74.59	June 9, 2021	1.43	73.15		sand
	21-221		May 28, 2021	2.33	72.26	1x10 ⁻⁴	Limestone
	(Deep)		June 9, 2021	2.41	72.18	1210	bedrock
	21-222		May 21, 2021	6.42	72.41	Not tested	Fill
	(Shallow)	78.83	June 9, 2021	6.52	72.31	Not tested	1 111
	21-222	70.03	May 21, 2021	5.65	73.18	Not tested	Glacial till
	(Deep)		June 9, 2021	6.79	72.04	Not tested	Glacial till
	21-224	78.90	May 27, 2021	6.31	72.59	Not tested	Fill
	21-224		June 9, 2021	6.49	72.41	Not tested	FIII
	21-225	75.21	May 28, 2021	3.54	71.68	Not tested	Fill/
	21-223	7 3.2 1	June 9, 2021	3.63	71.59	Not tested	silty clay
	21-226	76.25	May 28, 2021	2.83	72.48	Not tested	Fill/silty
	21-220	70.23	June 9, 2021	3.00	72.31	Not tested	clay/glacial till
	MW 20-15	79.71	Feb 12, 2020	5.90	73.81		
	MW 20-16	79.55	Feb 12, 2020	6.10	73.45		
	MW 20-17	78.67	Feb 12, 2020	2.90	75.77		
	MW 20-18	75.04	Feb 12, 2020	6.90	68.14		
	MW 17-04	85.13	Aug 3, 2017	1.61	83.52		
	MW 17-05	-	Aug 3, 2017	3.43	-		
	MW 17-06	-	Aug 3, 2017	Dry	-		
	MW 17-07	-	Aug 3, 2017	4.58	-		
	MW 17-08	-	Aug 3, 2017	5.21	-		
Stantec 2017	MW 17-09	-	Aug 3, 2017	2.24	-		
and 2020	MW 17-10	-	Aug 3, 2017	2.79	-	-	-
Investigations	MW 16-1A	78.05	March 16, 2017	9.25	68.80		
	MW 16-3	77.34	March 16, 2017	5.29	72.05		
	MW 16-5	77.89	March 16, 2017	3.77	74.12		
	MW 16-6	-	March 16, 2017	2.28	-		
	MW 16-7	75.35	March 16, 2017	4.79	70.56		
	MW 16-7A	75.19	Aug 8, 2016	5.07	70.12		
	MW 16-8	74.87	Aug 8, 2016	5.27	69.60		
	MW 16-9	73.79	Aug 8, 2016	5.16	68.63		



		0	Grou	ındwater Leve	el		Geological Strata Screened
Report No.	Borehole No.	Ground Surface Elevation (m)	Date	Depth (m below ground surface)	Elevation (m)	Hydraulic Conductivity (cm/s)	
	MW 16-14	79.51	Aug 8, 2016	7.23	72.28		
	BH1	-	Aug. 8, 2017	2.74	-		
	BH2	-	Aug. 9, 2017	1.85	-		
	BH3	-	Aug. 9, 2017	3.98	-		
Paterson	BH4A	-	Aug. 8, 2017	2.12	-		
Report PE4096	BH5	-	Aug. 8, 2017	4.40	-	-	-
	BH6	-	Aug. 8, 2017	3.45	-		
	BH8	-	Aug. 8, 2017	4.52	-		
	BH 10	-	Aug. 8, 2017	3.89	-		

It should be noted that groundwater levels are expected to fluctuate seasonally. Higher groundwater levels are expected during wet periods of the year, such as spring.

5.0 DISCUSSION

5.1 General

This section of the report provides engineering guidelines related to the geotechnical design aspects of the proposed hospital building based on our interpretation of the factual information and project requirements. Reference should be made to the "Important Information and Limitations of This Report", which follows the text but forms an integral part of this document.

5.2 Site Grading

The proposed hospital development has a complex grading scheme, further complicated by the fact that the site is sloping from south to north.

It is currently understood the majority of the new hospital building (the towers and the concourse area between them) will have a basement level (Level B) with a Finished Floor Elevation of 70.36 m. Other areas will have a basement level at the emergency entrance level (Level E) of 75.36 m.

Based on the information provided it is understood the exterior areas to the east of the building will lowered to the B level. The emergency vehicle access road to the south of the building will be lowered to approximately the E level. The parking area to the south of the building will remain approximately at existing grade (with a bridge structure connecting it to the main building over the lowered emergency vehicle access). At the north of the building, between the towers there are connections to the Main (01) level of the building at 80.36 which require raising the grade and the use of new retaining walls and slopes.



Grade Lowering

The development will require lowering the grade by up to 12 m on the south and east sides of the site where the grade will be as low as the B level on the south end of the site. These grade changes may require significant (10 m to 12 m high) slopes and/or retaining walls on the east and south sides of the project.

The design of the various slopes and retaining walls on the east side of the site will require additional geotechnical input based on final grades, locations, etc. during detailed design but they are likely to be significant construction elements. The extensive grade lowering will also mean that the areas south and east of the hospital will be below the existing groundwater table. The roads, parking lots, slopes, walls, etc. in these areas will need to incorporate significant permanent drainage works.

Grade Raising

From a geotechnical perspective, the site is underlain by discontinuous fill overlying localized silty clay (mostly weathered crust) deposits and native glacial till and silt/sand deposits. The majority of these soils would not be expected to be sensitive to typical grade raises which would accompany the development.

The northwest corner of the site (at Borehole BH21-221) encountered unweathered, sensitive silty clay. This sensitive silty clay was not widespread in the current borehole investigation but was also encountered in some of the historical boreholes to the east of Borehole BH21-221. The exact extent of this clay is not known with certainty, but it seems to mainly be present at the north end of the two "wings" of the building as well as potentially below the area between them (where the roundabout is located). The presence of this layer is not a significant concern for moderate changes in grade if needed, but if significant raising of the grade (more than say 1.5 m) is required this area should be reviewed in more detail during detailed design.

As a more general guideline regarding the site grading, preparation for filling of the site should include stripping the topsoil (including buried topsoil) as well as any deleterious fill material (it is possible that portions of the existing fill material can be re-used or left in place, but they should be reviewed at the time of excavation). The excavation can be brought up to grade with compacted engineered fill consisting of Granular B Type I or Type II (S.P. F-3147) where under hard surfaces or structures; where it is below landscaped areas general earth fill may be used.

Engineered fill should be placed in maximum 300 mm thick lifts and should be compacted to at least 95% of the material's Standard Proctor Maximum Dry Density (SPMDD) under pavements and hard surfaces, or 100% where under foundations and structures. It is possible that portions of the existing granular fill material could be suitable for re-use as engineered fill below non-structural elements (i.e., not below foundations) if needed, but the material would need to be reviewed during construction and suitable portions of the soil set aside for re-use.

5.3 Frost Protection

All perimeter and exterior foundation elements or interior foundation elements in unheated areas should be provided with a minimum of 1.5 m of earth cover for frost protection purposes. Isolated, unheated exterior footings/pile caps should be provided with a minimum of 1.8 m of earth cover.

Insulation of the bearing surface with high density polystyrene rigid foam insulation could be considered as an alternative to earth cover for frost protection. Additional guidance on insulation details can be provided if and when required but require further understanding of the proposed design.



5.4 Seismic Design Considerations

5.4.1 Liquefaction Assessment

Liquefaction is a phenomenon whereby seismically induced shaking generates shear stresses within silty or sandy soils under undrained conditions. In loose soil deposits, these stresses may have the potential to densify the soil (leading to potentially large surface settlements) and may generate excess pore pressures. The excess pore pressures can lead to sudden temporary losses in shear strength.

The site is underlain by deposits of sandy glacial till, as well as deposits of sand and gravel. SPT 'N' values within these deposits are highly variable, ranging from less than 5 to greater than 50. Very low SPT test results in granular soil can often be caused by disturbance due to drilling, or unbalanced porewater pressures during testing. Similarly, very high SPT test results are often a result of cobbles and boulders, and not the density of the soil matrix itself. The average SPT N values for the site are in the in the range of 15 to 20 blows per 300 mm of penetration, with lower and higher values distributed both horizontally and vertically throughout the boreholes.

A preliminary seismic liquefaction assessment was completed for the site. The methodology used to assess liquefaction potential is consistent with the "simplified" approach outlined by Idriss and Boulanger (2008). It involves comparing the cyclic shear stresses applied to the soil by the design earthquake, represented as the cyclic stress ratio (CSR), to the cyclic shear strength, represented as the cyclic resistance ratio (CRR) provided by the soil.

The liquefaction assessment was carried out using the in situ SPT data collected at the various borehole locations. The design groundwater level was based on the measured groundwater levels in the monitoring wells installed in boreholes closest to the building location during the current investigation. The CRR with depth was calculated using the distribution of SPT 'N' values, estimated pore water pressure, and estimated fines content (based on visual observations and laboratory testing of selected samples). The assessment was based on an earthquake with a magnitude of 6.4 and a peak ground acceleration of 0.300 g (corresponding to a seismic event with a 2% probability of exceedance in 50 years).

Based on the typical range of SPT 'N' values, the site is not considered to be at large-scale risk of seismic liquefaction. Although there are low SPT 'N' values recorded throughout the soil strata, they are relatively uniformly distributed throughout the site (i.e., they are not indicative of a particular zone or layer of very loose soil and are more likely indicative of drilling and testing disturbance or random variations in the soil). Similarly, the very high values are not considered representative of the site as they are likely a result of cobbles and boulders (which also affect the test results) distributed more or less randomly through the soil.

In addition, a shear wave velocity measurement was completed in Borehole 21-207 in May 2022. The results of the shear wave velocity measurement are included in Appendix F. The results indicate that the average shear wave velocity, Vs in the overburden is approximately 570 m/s, with no unusually low zones or layers. Shear wave velocities in excess of 200 m/s to 220 m/s are generally indicative of dilatant soil behaviour and soils with Vs values greater than this would not typically be considered liquefiable regardless of the magnitude of earthquake event.

5.4.2 Seismic Site Response Classification

Based on the shear wave velocities measured at the site, a Site Class C may be assumed (Very Dense Soil, with V_s values of 360 m/s to 760 m/s).



5.5 Foundation Design

The subsurface conditions present at the site are variable deposits of fill, localized deposits of silty clay, with glacial till overlying sand and gravel in some locations over shaley limestone bedrock. It is likely that the majority of the main hospital will be supported on deep foundations (piles). Shallow foundations would likely be appropriate for smaller structures such as retaining walls, stand-alone structures, or potentially more lightly loaded areas such as podiums. There are also some areas where it may be feasible to support the main hospital building on shallow foundations on rock.

Discussion related to both foundation types is presented below.

5.5.1 Deep Foundations

Two types of deep foundations would typically be used in the area to support large, relatively heavy, buildings:

- Driven steel piles (typically H sections or pipe piles);
- Drilled, cast-in-place concrete piles with rock sockets.

Driven steel piles (either single piles or in groups) are often the most cost-effective in terms of supporting moderate vertical loads and are commonly used in the area. Driven piles would, however, require relatively large pile groups to carry large column loads. In some areas of the project the bedrock may be relatively close to the underside of the pile cap, limiting the feasibility of installing piled foundations in some areas.

Drilled, cast-in-place piles are less common in the area but are used on a variety of projects. Drilled piles are not as ideally suited to the conditions at this site because the drilling conditions are not ideal (the glacial till contains cobbles and boulders; flowing sands were encountered below the water table in some locations during the investigation) and there is a need to deal with excess soil and groundwater during construction. Drilled piles are, however, feasible if properly designed and constructed and do have some advantages in that they can be designed to carry very large loads. This is particularly relevant if there are large lateral and uplift loads because the presence of a rock socket provides significant resistance compared to driven piles. In addition, with the majority of the building incorporating the basement level, there are large areas that may be relatively close to the bedrock surface. Driven piles will not penetrate the bedrock significantly, potentially leading to very short piles with no lateral or uplift resistance. This is not a concern for drilled piles since the resistance can be developed in the rock socket.

Discussion related to the design of both types of piles is provided below.

5.5.1.1 Driven Steel Piles

The proposed hospital structure may be supported on driven steel piles. Steel H-piles and closed-ended steel pipe piles are both commonly used in the area.

In general, the subsurface conditions in the vicinity of the proposed hospital building consist of variable deposits of fill with some localized areas of silty clay overlying a deposit of glacial till, overlying localized deposits of interlayered sands which in turn overlies shaley limestone bedrock. A piled foundation system could be used to transfer the foundation loads through the overburden soils to the underlying bedrock.

5.5.1.1.1 Axial Resistance

Piles driven to sound rock generate high ultimate geotechnical capacities, generally equal to or in excess of the structural capacity of the steel section (i.e., with increased loading or driving stresses, the steel section will



become damaged and fail before the bedrock yields). For the purposes of design, the ultimate geotechnical resistance of the rock may be assumed to be equal to the ultimate resistance of the steel section.

A resistance factor of 0.4 should be applied to this value to obtain the factored geotechnical resistance of a pile driven to sound rock. The resistance factor may be increased to 0.5 if a program of dynamic (PDA) testing is implemented, or 0.6 if static load testing is performed.

As an example, an HP310x79 has an ultimate resistance of 3,493 kN (based on the cross-sectional area, assuming 350 MPa yield stress and ignoring buckling, bending, lateral loads, sacrificial thicknesses or other more complex conditions which may reduce the structural capacity). The factored geotechnical resistance of an HP310x79 driven to sound rock may therefore be assumed to be 1,397 kN (3,493 kN x 0.4). A similar methodology may be used to estimate the geotechnical resistance of other pile sections.

Settlements for piles driven to sound rock are generally negligible, and the geotechnical resistance mobilized at 25 mm of settlement (a typical SLS condition) would be expected to exceed the factored axial resistance at ULS. Geotechnical SLS considerations therefore do not generally govern the design of pile driven to sound rock.

5.5.1.1.2 Uplift Resistance

The uplift resistance of a driven pile is a result of skin friction acting along the surface area of the embedded pile. The unfactored shaft resistance may be assumed to be equal to:

 $q_s = \beta \sigma_v$

Where:

qs = the unfactored shaft resistance (in kPa);

 β -= a shaft resistance factor based on soil type and strength (use 0.8);

 σ_{v} ' = the vertical effective stress at the adjacent to the pile at depth z, equal to zy';

γ'= the effective unit weight of the soil which may be assumed to be 9 kN/m³

A resistance factor of 0.3 should be applied to this value, to obtain the factored geotechnical uplift resistance. The dead weight of the pile itself, with an appropriate resistance factor for dead weight, may also be added to the geotechnical resistance in calculating the total uplift resistance.

The total uplift resistance of a pile group is the lesser of the sum of the individual pile resistances as described above, or the resistance of a single "block" of soil with a perimeter equal to the perimeter of the pile group (the mass of the soil inside the "block" may be included in the calculation; use a soil weight of 9 kN/m³).

It should be noted that the uplift resistance of piles is highly dependent upon the installation of the piles as well as the layout of the pile groups. If the piles are relied upon to resist significant uplift loads, and uplift governs the design, consideration may be given to carrying out a tension test to confirm the uplift capacity.

5.5.1.1.3 Negative Friction

The raising of the grade or lowering of the groundwater table at the site may cause settlement of the existing soils. Localized settlement could also potentially be caused during a seismic event (see Section 5.4.1 above). In any of these cases, the potential will exist to develop negative skin friction (or downdrag) along the piles, and this should be considered in the design.

The magnitude of negative friction depends on the pile loading, pile dimensions and the final configuration of the site as well as the details of the below-grade portions of the building. The location of negative friction forces is also dependent on the location of the neutral axis of the pile which can only be determined once all of the pile



details are known. For preliminary design, however, the negative friction can be assumed to be equal to the shaft friction calculated as described above for uplift resistance (the resistance factor of 0.3 should not be applied).

Negative friction is typically only considered in conjunction with dead and sustained live loads (not transient loads such as wind, earthquake and transient live loads) in evaluating the structural capacity of the pile. Negative friction does not impact the geotechnical resistance of the piles.

5.5.1.1.4 Lateral Resistance

The lateral resistance of a slender pile is typically governed by limiting the deflection which will occur under loading to some acceptable level. The geotechnical parameter most commonly used to determine lateral deflection of piles is the coefficient of horizontal subgrade reaction (k_h). For this site, k_h may be assumed to be:

$$k_h = \eta_h z$$

Where:

 k_h = the modulus of subgrade reaction (kN/m³);

 η_h = a coefficient based on soil type (use 4.4 MPa/m); and,

z = the depth under consideration

The value above is for a single pile group. Group interaction must be considered when piles are spaced closely together. Group effects may be accounted for by reducing the coefficient of horizontal reaction (kh) by an appropriate factor as follows:

Table 3: Coefficient of Horizontal Subgrade Rection Reduction Factors

Pile Spacing in Direction of Loading (d = Pile Diameter)	Reduction Factor
6d	1.0
3d	0.25

Values for other spacings may be interpolated from the values above. No reduction is required for the first row of piles (i.e., the row which bears against undisturbed soil with no piles in front).

It should be noted that the method of applying a linear "spring" to represent the soil reaction to loading is a significant simplification of the soil/pile behaviour. If lateral load resistance governs the pile design, more rigorous, non-linear methods of analysing resistance exist, one common one being the method of p-y curves. These methods, however, require knowledge of the pile size, location, loading, pile cap construction, etc. and are therefore typically more suited to the detailed design phase when these items are known. Golder can provide additional assistance during detailed design, if required.

5.5.1.1.5 Construction Considerations

The piles will be driven to bedrock through a layer of glacial till which is known to contain cobbles and boulders. Piles can deflect or become damaged if they encounter boulders in the glacial till. Piles (both H-piles and pipe piles) should be equipped with pile points (e.g., Titus Standard H Point, or similar) to provide additional protection to the pile tips against damage from boulders during driving. Even with this measure, it should be expected that damage may occur to some piles and replacement piles will be required. For piles driven to refusal on bedrock, and as described in OPSS 903, it is a generally accepted practice to reduce the hammer energy after abrupt peaking is met on the bedrock surface, and then gradually increase the energy over a series of blows to seat the pile.



Provision should be made for restriking all piles at least once to confirm the design set and/or the permanence of the set and to check for upward displacement due to driving adjacent piles. Piles that do not meet the design set criteria on the first restrike should receive additional restriking until the design set is met. All restriking should be performed a minimum of 48 hours after the previous set.

Pile driving criteria depend not only on the details of the pile (size, length, load, etc.) but also on the equipment used for installation. Preliminary pile driving criteria should be established prior to construction using wave equation analysis (WEAP or similar) or other approved means and confirmed through a program of dynamic (PDA) testing carried out at an early stage in the piling program. Additional PDA testing should be used to confirm the pile capacities at regular intervals as the project progresses. As a preliminary guideline, the specification should require that at least 10% of the piles be included in the dynamic testing program. CASE method estimates of the capacities should be provided for all piles tested. These estimates should be provided by means of a field report on the day of testing; CAPWAP analyses should be carried out for at least one half of the piles tested, with the results provided no later than three days following testing. The final report should be stamped by an engineer licensed in the province of Ontario. The PDA testing program will justify an increase in the geotechnical resistance factor to 0.5 as discussed above.

The driving energies required confirm the ultimate geotechnical resistance of the pile (typically the testing is intended to prove a load of twice the design load) may be significantly higher than the energy required to install the pile. Insufficient energy is a common problem in demonstrating the true ultimate capacity of piles during PDA testing, and larger pile driving hammers may be required for the testing. It is also likely that the stresses induced in the piles during driving and testing will be limiting factor in pile testing, not the capacity of the bedrock to resist the loading (i.e., it is common to damage or break a pile during driving and/or testing long before the bedrock yields).

The piling specifications should be reviewed by an experienced geotechnical engineer prior to tender, as should the contractor's submission (shop drawings, equipment, procedures, preliminary set criteria, etc.) prior to construction. Piling operations should be inspected on a full-time basis by geotechnical personnel to monitor the pile locations and plumbness, initial sets, penetrations on restrike, and to check the integrity of the piles following installation.

Given the large number of piles that will be required for the proposed building(s) (including potentially at future phases), consideration could be given to carrying out a test pile program to optimize the pile design and to better define the ultimate pile capacity. The test program could be completed prior to construction of the hospital building. This would require mobilization of pile driving equipment to the site prior to building construction but would allow for optimization of the pile design for the hospital building (and potentially for future buildings on the site as well).

5.5.1.2 Drilled Cast-in-Place Piles

If drilled piles are used to support the main hospital building (or portions of it) they will be drilled through the overburden (fill, silty clay, glacial till and sandy soils) into the underlying limestone bedrock. Casing will be required to advance the piles through the soil. The casing should be extended so that it is "seated" a minimum of 500 mm into the bedrock.



5.5.1.2.1 Axial Geotechnical Resistance

Rock socketed, drilled piles may be designed on the basis of end bearing and sidewall friction provided that the base of the socket can be adequately cleaned and inspected. If, due to the difficulty in socketing liners into the limestone bedrock to completely cut off the water infiltration, it is not feasible to dewater and clean the base of the socket, or to inspect the base prior to concreting then end-bearing support may not be fully developed (without significant settlement of the pile) and should be neglected in the design.

Where cleaning and inspecting the base in detail is not feasible, the axial geotechnical resistance for rock-socketed caissons is generally assumed to be based on the sidewall (shaft) resistance of the rock socket only (there is a contribution to shaft resistance from the soil overburden, but it is small compared to the rock socket and it typically neglected). This is particularly the case for longer, narrower shafts where it is more difficult to reliably clean the base, and the contribution from end bearing is smaller in any case.

5.5.1.2.1.1 End Bearing ULS Resistance

If the ends of the drilled piles can be adequately cleaned and inspected, then end bearing resistance of the rock socket may be considered. For preliminary design, the end bearing resistance may be assumed as follows.

Table 4: Factored End Bearing Resistance for Rock-Socketed Piles

Depth of Rock Socket	Factored ULS Bearing Resistance
500 mm	5 MPa
Greater of 1.5 m or Pile Diameter	10 MPa

The above values assume the base of the pile has been completely cleaned of loose rock, drilling mud, slough, mud, rock flour, etc. to ensure the concrete is case on clean, undisturbed bedrock. All pile bases should be cleaned, pumped dry, probed, and visually inspected using a down-hole camera under the full-time supervision of a geotechnical engineer to ensure the base is sound and free of soft or deleterious material. Failure to ensure an adequate base could lead to significant settlement of the foundations under load.

5.5.1.2.1.2 Shaft ULS Resistance

For longer, more slender rock sockets (particularly for smaller diameter shafts) it can be difficult to clean and inspect the shaft base, and it is common practice to rely on shaft friction only.

The factored geotechnical shaft resistance at ULS of 1.0 MPa for piles socketed into sound rock. For preliminary design this condition can be assumed to be met at 0.5 m below the bedrock surface (i.e., the first 0.5 m of rock socket capacity can conservatively be ignored). This value assumes that the side wall of the socket will be cleaned of any cuttings or smeared material.

5.5.1.2.1.3 SLS Resistance

Provided the rock socket is carefully cleaned and confirmed to be clean and free of soft material, the SLS resistance for 25 mm of settlement is typically greater than the factored ultimate axial resistance. Note this does not account for settlement of any soft material remaining in the base of the pile which would be significant under large loads, further reinforcing the need to adequately clean and inspect all rock sockets.

Group action for lateral and vertical loading should be considered when the pile spacing in the direction of the loading is less than three to four pile diameters.



5.5.1.2.2 Uplift Resistance

The factored ultimate uplift resistance of a rock-socketed drilled pile is also based on the shaft resistance of the socket which may be assumed to be 750 kPa (the resistance factor for uplift is lower than for compression). The dead weight of the pile itself, with an appropriate resistance factor for dead weight, may also be added to the geotechnical resistance in calculating the total uplift resistance.

Failure within the rock mass or rock cone pull-out should also be considered for the caisson uplift resistance. The same theory applied to rock anchors below should be considered for uplift of piles.

5.5.1.2.3 Negative Friction

The potential for negative friction to develop along any drilled piles should also be considered as per Section 5.5.1.1.3 above for driven piles.

5.5.1.2.4 Lateral Resistance

The contribution to lateral resistance of the soil overburden on the drilled piles may be assumed as for driven piles discussed in Section 5.5.1.1.4 above.

To provide full fixity within the rock sockets for the purposes of lateral resistance, the caissons should be provided with a minimum socket length equal to the greater of twice the caisson diameter below the depth of any broken or highly weathered surficial bedrock (which can be assumed to be 0.5 m).

5.5.1.2.5 Construction Considerations

Drilled piles will need to be advanced through a variety of overburden soils below the groundwater table. Flowing soils were encountered during the ground investigation and should be anticipated during construction. Casing will be required over the full length of the piles. The soils at the site contain cobbles and boulders, the presence of which should also be considered during construction. Temporary casing and liners will be required over the entire length of the drilled shafts in overburden. The shafts will be installed below the water table and may require pumping of groundwater to facilitate cleaning the sockets as well as inspection of the pile. Pile concrete should be placed by tremie.

The capacity of drilled shafts is highly dependent upon the methodology and quality of construction; in particular the rock socket. The piling specifications should be reviewed by an experience geotechnical engineer prior to tender, as should the contractor's submission (shop drawings, equipment, procedures, methods of installing casings, cleaning the rock sockets, etc.) prior to construction. Piling operations should be inspected on a full-time basis by geotechnical personnel to monitor the pile locations and plumbness, casing lengths, socket conditions, concreting procedures, etc. during construction.

Given the large number of piles that will be required for the proposed building(s) (including potentially at future phases), consideration could be given to carrying out a test pile program to optimize pile design and to better define the ultimate capacity of the rock sockets (as well as the required resistance factors). The test program could be completed prior to construction of the hospital building. This would require mobilization of piling equipment to the site prior to building construction but would allow for optimization of the pile design for the hospital building, as well as potentially for future development.

5.5.2 Shallow Footings

5.5.2.1 Shallow Foundations on Rock

The currently proposed building has a basement FFE of 70.36. Where bedrock was cored in the current investigation the top of bedrock elevation ranged from approximately 61.2 m to 68.6 m, or 1.8 m to 9.2 m below the FFE. Allowing for the thickness of the floor, granular base, drainage works, thickness of footings, etc., it is



possible that in some areas it may be feasible to found portions of the building on the bedrock surface. Where the rock surface is relatively close to the FFE two options could be considered:

- Lower the foundation elevation to the as-found rock surface and adjust the column length;
- Construct a concrete pier to fill in the gap between the rock surface and the underside of footing (essentially thickening the concrete).

The following geotechnical bearing resistances may be assumed for shallow foundations on rock:

Prepared Bearing Stratum	Factored ULS Bearing Resistance (kPa)	SLS Bearing Resistance (kPa)
Slightly Weathered to Fresh Bedrock (Footings on Bedrock, or Concrete Piers on Bedrock)	5,000	N/A

The above values are based on the following assumptions:

- The bedrock has not been excessively disturbed, and any loose/broken rock has been removed.
- The water table must be drawn down below the bottom of the excavation and should be maintained at that level throughout the placement of concrete.
- There is no practical limit on the size of footings on rock.

The above values are based on the bearing resistance of the rock (i.e., the geotechnical resistance of the foundation). If the option to place additional concrete between the as-found rock surface and the underside of the footing is adopted, it will have no impact on the bearing resistance of the rock (and the values above may be used). The suitability of the concrete pier should, however, be assessed by the structural engineer to confirm the pier itself has adequate capacity.

Settlement of footings on bedrock is typically negligible under services loads and SLS conditions do not govern the design of foundations on rock for typical building foundation loads.

It must be understood that while it is likely that there are some areas where a shallow foundation on rock may be feasible, there are many areas where it almost certainly is not (for example there are areas within the hospital footprint where the rock is more than 9 m below the FFE). If the option of founding a portion(s) of the building on rock is pursued, then it will be necessary to further delineate the bedrock surface during detailed design to confirm for which portions of the building this option is feasible.

For lateral sliding resistance, an unfactored interface friction coefficient of 0.7 may be used for the design of foundations placed on competent bedrock. A resistance factor of 0.8 should be applied to the sliding resistance.

5.5.2.2 Shallow Foundations on Soil

While unlikely to be appropriate for the majority of the main hospital structure, it may be feasible to support smaller structures (such as retaining walls, canopies, podiums, smaller buildings, etc.) on shallow foundations on soil overburden.

For the purposes of preliminary design, spread footings founded on native soils (weathered silty clay, glacial till or sand and gravel) or engineered fill, may be assumed to have a factored bearing resistance of 200 kPa and an SLS bearing resistance of 150 kPa for pad footings up to 3 m wide and strip footings up to 2 m wide. The SLS



values provided correspond to anticipated total and differential settlement values of 25 and 20 mm, respectively. Where shallow foundations are used any settlement of the footings should be assumed to be entirely differential with respect to portions of the structure founded on piles (i.e., the footing will settle up to 25 mm and the settlement of the pile will be negligible).

There are a variety of soil types (and potentially foundation depths) present at the site. These preliminary bearing resistance values should be reviewed by an experienced geotechnical engineer during the design phase based on the locations and elevations of any proposed shallow foundations. It is also noted that there are a number of locations where relatively deep deposits of fill material were encountered in the recent investigation including boreholes BH21-209, 210, 214, 216, 217, 218, 219, 222, 224, 225 and 226 (and it could be deep in other locations as well). At these boreholes the fill was found to vary in thickness from 3 m to more than 8 m. The fill material is unlikely to be suitable as a bearing sub-grade for building structures (though it may be adequate for other structures which are not settlement sensitive). Again, careful review of any shallow foundation locations and depths should be completed during detailed design.

There is a large portion of the site where the former Sir John A. Carling Building will be removed (including the existing piled foundations). It is understood that there will be a large excavation in this area, which will be backfilled under the supervision of the team completing the remediation. If the excavation is backfilled with engineered fill placed and compacted in accordance with common practice, then it is expected that it will be adequate to support shallow foundations using the design parameters above. The construction records from the backfilling of the area should, however, be reviewed by an experienced geotechnical engineer to confirm this assumption.

For ULS sliding resistance of a cast-in-place footing placed on soil an unfactored friction coefficient of 0.45 may be used. A geotechnical resistance factor of 0.8 should be applied to the sliding resistance.

5.5.3 Ground Anchors

The use of rock anchors to resist uplift forces on the foundations could be considered where additional uplift resistance is required.

In designing grouted rock anchors, consideration should be given to four possible anchor failure modes:

- i) Failure of the steel tendon or top anchorage
- ii) Failure of the grout/tendon bond
- iii) Failure of the rock/grout bond, and
- iv) Failure within the rock mass, or rock cone pull-out.

Potential failure modes i) and ii) are structural and are best addressed by a structural engineer.

For potential failure mode iii), the *factored* bond stress at the grout/rock interface may be taken as 1,000 kPa (or 1/30 of the compressive strength of the grout) for ULS design purposes. This value should be used in calculating the resistance under ULS conditions. If the response of the anchor under SLS conditions needs to be evaluated, it may conservatively be taken as the elastic elongation of the unbonded portion of the anchor under the design loading.

For potential failure mode iv), the resistance is calculated based on the weight of the potential mass of rock and soil which could be mobilized by the anchor. This is typically considered as the mass of rock included within a cone (or wedge for a line of closely spaced anchors) having an apex at the tip of the anchor and having an apex



angle of 60 degrees. For each individual anchor, the ULS factored geotechnical resistance can be calculated based on the following equation:

$$Q_r = \varphi \frac{\pi}{3} \gamma' D^3 \tan^2 -\theta$$

Where: Q_r = Factored uplift resistance of the anchor (kN);

 φ = Geotechnical resistance factor (use 0.4);

 γ' = Effective unit weight of rock and soil (use 10 kN/m³ below the groundwater level);

D = Anchor length in metres; and,

 θ = one-half of the apex angle of the rock failure cone (use 30°).

For a group of anchors or for a line of closely spaced anchors, the resistance must consider the potential overlap between the rock masses mobilized by individual anchors. In the case of group effects for a series of rock anchors in a rectangle with width "a" and length "b" installed to a depth "D", the equation for the volume of the truncated trapezoid failure zone would be as follows:

$$V = \frac{4}{3} D^3 \sin^2 \varphi + aD^2 \sin \varphi + bD^2 \sin \varphi + abD$$

Where: V = Volume of the truncated trapezoid failure zone (m^3);

D = Depth of anchor group (m);

a = Width of anchor group (m);

b = Length of the anchor group (m); and,

 φ = $\frac{1}{2}$ of the apex angle of the rock failure cone, use 30°.

The ULS factored geotechnical resistance for the truncated trapezoid failure formed by the group of anchors can then be calculated based on the following equation:

$$Q_r = \varphi \gamma' V$$

Where: Qr = Factored uplift resistance of the anchor (KN);

φ = Geotechnical resistance factor, use 0.4;

 γ = Effective unit weight of rock and soil, use 10 kN/m³ below the water table; and,

V = Volume of truncated trapezoid (m³).

It is recommended that proof load tests be carried out on any new anchors to confirm their resistance. The proof load tests should be carried out in accordance with the Post Tensioning Institute (PTI) Recommendations for Prestressed Rock and Soil Anchors (2004).

A geotechnical engineer should be present during the installation and testing of the anchors. Care must be taken during grouting to ensure that the grouting pressure is sufficient to bond the entire length of the grouted area with minimum voids.

Confirmation of sufficient embedment into the rock beneath the foundations should be carried out during construction to make sure that the anchors are being installed in rock of adequate quality. The anchor holes must be thoroughly flushed with water to remove all debris and rock flour. It is essential that rock flour be completely



removed from the holes to be grouted to promote an adequate bond between the grout and the rock. Prestressing of the anchors prior to loading will minimize anchor movement due to service loads.

5.5.4 Lateral Earth Pressures

The lateral earth pressures acting on below-grade portions of the structure will depend on the type and method of placement of the backfill materials, the nature of the soils behind the backfill, the magnitude of surcharge including construction loadings, the freedom of lateral movement of the structure, and the drainage conditions behind the walls.

The following recommendations are made concerning the design of the walls:

- Select, free draining granular fill should be used as backfill behind the walls. Longitudinal drains or weep holes should be installed to provide positive drainage of the granular backfill.
- A minimum compaction surcharge of 12 kPa should be included in the lateral earth pressures for the structural design of the walls. Care must be taken during the compaction operation not to overstress the wall. Heavy construction equipment should be maintained at a distance of at least 1 m away from the walls while the backfill soils are being placed. Hand-operated compaction equipment should be used to compact the backfill soils within a 1 m wide zone adjacent to the walls. Other surcharge loadings should be accounted for in the design, as required.

The following values in the table below provide preliminary guidelines for the lateral earth pressures for static (i.e., not earthquake) loading conditions for planning purposes. These lateral earth pressure coefficients assume that the ground above the wall will be flat, not sloping. If the inclination of the slope above the wall changes, new lateral earth pressures will need to be calculated (or the soil above the wall treated as a surcharge).

Material	Sand and Gravel, Granular A and Granular B Type II	Glacial Till, Granular B Type I, Earth Fill and SSM
Soil Unit Weight:	21 to 22 kN/m ³	20 kN/m3
Coefficients of static lateral earth pressure: Active, K _a At rest, K _o Passive, K _P	0.27 0.43 3.70	0.33 0.50 3.00

The following values in the table below provide guidelines for the dynamic lateral earth pressures for earthquake loading conditions for planning purposes. These lateral earth pressure coefficients assume that the ground above the wall will be flat, not sloping. If the inclination of the slope above the wall changes, new lateral earth pressures will need to be calculated.

Material	Sand and Gravel, Granular A and Granular B Type II	Glacial Till, Granular B Type I, Earth Fill and SSM
Soil Unit Weight:	21 to 22 kN/m ³	20 kN/m3



Material	Sand and Gravel, Granular A and Granular B Type II	Glacial Till, Granular B Type I, Earth Fill and SSM
Coefficients of lateral earth pressures during earthquake loading:		
Active, Kae (Non-Yielding)	0.51	0.61
Active, K _{ae} (Yielding)	0.38	0.46
Passive, K _{Pe} (Non-Yielding)	3.62	2.88
Passive, K _{Pe} (Yielding)	3.67	2.95

- If the wall allows lateral yielding, active earth pressures may be used in the geotechnical design of the structure. The movement to allow active pressures to develop within the backfill, and thereby assume an unrestrained structure, may be taken as:
 - Rotation of approximately 0.002 about the base of a vertical wall (where the rotation is calculated as the horizontal displacement divided by the height of the wall);
 - Horizontal translation of 0.001 times the height of the wall; or,
 - A combination of both.
- If the wall does not allow lateral yielding (i.e., restrained structure where the rotational or horizontal movement is not sufficient to mobilize an active earth pressure condition), at-rest earth pressures (plus any compaction surcharge) should be assumed for geotechnical design.

5.6 Slab on Grade

If a slab on grade construction is adopted for the new structure, then the existing topsoil, any fill with organic matter, and any wet or disturbed material should be removed from within the proposed building footprint to provide more predictable performance of the new floor slab.

Provision should be made for at least 200 mm of City of Ottawa SP F-3147 Granular A to form the base for the floor slab. The granular base should be compacted to a minimum of 100% of the material's Standard Proctor Maximum Dry Density (SPMDD).

There are a number of locations where the thickness of the fill may make complete removal and replacement impractical. These areas should be reviewed once the final floor elevations in various portions of the building are fixed. Portions of the existing fill at this site could remain below the new floor slab, provided that the surface of the fill at subgrade level is proof rolled to expose soft or weak areas in the presence of geotechnical personnel. Any soft or weak areas should be excavated and replaced with additional engineered fill.

Any engineered fill required to raise the grade to the underside of the Granular A, including the repair of weak or soft areas, should consist of City of Ottawa SP F-3147 Granular B Type II. The under-slab fill should be placed in maximum 300 mm thick lifts and should be compacted to at least 95 % of the material's Standard Proctor maximum dry density (SPMDD) using suitable vibratory compaction equipment.

5.7 Excavations & Groundwater Control

5.7.1 Temporary Excavations

Based on the preliminary site plan provided, the lowest level of the main hospital building (Level B) has a FFE of 70.36 m. Topographic information has not been provided but based on the borehole elevations the existing grade at the north end of the site is at approximately 73 m to 75 m elevation. This implies relatively shallow excavations



would be required at the north end. At the south end of the site, however, the existing grade raises up to around 82 m to 83 m elevation, which implies excavations on the order of 12 m to reach the B level. Where the grade is lowered to the E level (75.36 m) excavations on the order of 7 m would be required at the south end.

A smaller excavation is also required for the proposed cooling tower and Central Utility Plant located at the south end of the site. The finished floor elevation of the cooling tower is indicated to be 73.5 m with an existing grade of approximately 82.5 m, implying an excavation of 9 to 10 m.

It is noted that the site has relatively complex grading. Unlike a typical building where basement levels are below grade, at this site there is a combination of true, below-grade basement levels, as well as areas where the exterior grade will be lowered to the basement level permanently. This means that a typical large, single excavation over the footprint of the building will not apply, but the excavations will need to be made in a series of permanent and temporary steps, terraces, slopes, etc. some of which may eventually be backfilled and some of which will be permanent.

Excavations for the construction of the foundations, basement levels and site grading will be through the existing fill, and into the underlying silty clay, glacial till and silty sand and sand and gravel deposits. No unusual problems are anticipated with excavating the overburden using conventional hydraulic excavating equipment. Cobbles and boulders should be expected in the fill, glacial till and sand and gravel deposits. Debris (e.g., organics, brick, metal, wood, stone, concrete, etc.) should also be expected in the fill.

It is understood that the foundations for the former Sir John Carling building (which are within the footprint of the proposed hospital building) will be removed prior to development of the hospital, as well as any demolition debris which was left in place during demolition. It is important that the condition of the area around the Sir John Carling Building be confirmed and documented carefully to aid in construction planning for the new building. Given the size and long history of the site it is possible that the remains of other buried structures, debris, etc. may be encountered in other areas as well.

Above the groundwater level and within the fill, silty sand, native silty clay and glacial till side slopes should be stable in the short term at 1 horizontal to 1 vertical; these soils would be classified as Type 3 soils in accordance with the Occupational Health and Safety Act of Ontario (OHSA). Excavations within the silty and sandy soils (both fill and native) *below the water table* would be classified as a Type 4 soil; these excavations would therefore require side slopes at a minimum slope of 3H:1V (i.e., flatter than 3H:1V). Where groundwater levels are lowered and maintained below the depth of excavation, unsupported side slopes may be steepened to 1H:1V.

It is expected that open-cut methods will generally be feasible in most areas provided sufficient space exists to accommodate the excavations, though given the height they will likely require benching, access ramps, etc. to be incorporated into the design. It is also likely that they will need to incorporate permanent drainage works as there will be a significant portion of the slopes that are below the existing water table.

It should be noted that the height of the excavations (up to 12 m) exceeds the height for prescriptive design under the OHSA. Deeper portions of the excavation (even if open cut) will require an engineered design to comply with the relevant regulations.

Where sufficient space does not exist (for example at the south end of the site where the deep excavations extend to the property line) or if it is preferable to limit the size and impact of the excavation as well as associated excavation and backfilling the temporary excavations could be carried out using a shoring system to ensure support for the soil and provide for worker safety. Shoring for this type of project would typically include tied back sheet pile walls or soldier pile and lagging systems (if a soldier pile and lagging system is employed the potential



for flowing sands below the water table must be considered and addressed as part of the shoring/dewatering design).

This type of shoring system is typically designed and constructed by a specialist contractor. In addition to supporting the soils surrounding the excavation, the design of temporary support systems (and in particular the selection of the appropriate design earth pressures; higher design earth pressures are required if it is necessary to limit the deflection of the shoring) will need to consider the support requirements of adjacent structures, roads, utilities, etc.

Temporary excavations for site services (if required) will be through similar soils as discussed above. These excavations can also likely be made with sloping excavations where space permits. Where space does not exist, excavations for temporary services could be carried out with vertical sides and fully braced, steel trench boxes or shoring systems.

5.7.2 Groundwater Control

Significant portions of the proposed excavation(s) will be below the measured groundwater levels, which were found to be at Elevations ranging from 68.1 m to up to 83.5 m (but were typically between 70 m and 77 m in most of the current boreholes). Groundwater levels at the south end of the hospital building were typically found to be 75 m to 76 m elevation (compared with the proposed B elevation of 70.36 m; localized deeper excavations will be required for pile caps, grade beams, utilities, drainage, granular layers, the concrete slab, etc.).

The exterior area to the east of the building will also be permanently lowered to the B level (and therefore below the groundwater level). The emergency access road at the south of the building is at a proposed elevation of 74.75 m, which is also below the groundwater level at the south end of the site.

Further to the north the measured groundwater levels appear to drop and were found to be in the range of approximately 72 m to 73 m in Boreholes 21-221, 222 and 224. At the proposed cooling tower and Central Utility Plant, the groundwater level was found to be at approximately 76 m elevation (compared with a proposed floor elevation of 73.5 m).

Based on our current understanding of the required excavations and the existing sub-surface conditions, it is expected that the excavations will be below the existing groundwater levels in predominantly silty and sandy soils. It will be necessary to temporarily lower the groundwater table below the depth of excavation during construction. Given the size of the excavations it is expected there will be a significant groundwater inflow and careful groundwater management will be required. This groundwater management will need to include active dewatering from wells and well-point systems in the deeper parts of the excavation (including in the floor of the interior of the excavation). Where the excavations are only slightly below the water table (which may be the case at the north end) it may be feasible to manage groundwater inflow by pumping from properly filtered sumps.

The soils at the site are expected to be sensitive to disturbance, including from unbalanced water pressures. Failure to adequately control groundwater will likely result in excessive soil disturbance in the base of the excavation, as well as potentially piping, heave and other safety concerns for temporary excavations.

The contractor is typically responsible for the design of a temporary groundwater control system, including assessing the appropriate type of pump(s) and other equipment as well as their arrangement. Given the extent of dewatering required the contractor should be required to submit a detailed de-watering work plan for review.

For any pumping that exceeds a rate 50,000 l/day, but is less than 400,000 l/day, a Ministry of Environment, Conservation and Parks (MECP) Environmental Activity and Sector Registration (EASR) is required and must be supported by a water taking plan and a discharge plan. For pumping that exceeds 400,000 L/day, an MECP Permit to Take Water (PTTW) is required and must be supported by a hydrogeological report.



Based on the available groundwater information at the site as well as our understanding of the extent and depth of the required excavations, the groundwater control requirements during excavation will be significant. A PTTW will be required for this project.

In addition, the exact excavation extent and depths should be reviewed in order to determine the potential extent of groundwater drawdown. It is possible that due to the sandy nature of the sub-surface soils the groundwater drawdown could extend outside the site boundary. This is particularly relevant at the south end of the site where the depth of groundwater lowering is highest and existing roads and buildings are present near the site.

A hydrogeological study will be required, based on the proposed excavation depths and locations to support the application for a PTTW, refine estimated dewatering volumes and determine the potential extent of groundwater drawdown during construction.

In addition to the temporary dewatering, in exterior areas where the grade is being permanently lowered below the groundwater level, permanent drainage works will be required. Based on the preliminary designs this will include the area to the south and east of the building which is being lowered to the B level as well as the lowered emergency access road on the south side of the building. The majority of the slopes and retaining walls which make up the up to 12 m grade difference will also require permanent drainage.

5.8 Foundation Wall Backfill and Drainage

The fill materials and natural soils at this site are considered frost susceptible and should not be used as backfill against exterior, unheated, or well insulated foundation elements. To avoid problems with frost adhesion and heaving, the foundation and basement walls should be backfilled with non-frost susceptible sand or sand and gravel conforming to the requirements of City of Ottawa SP F-3147.

To avoid ground settlements around the foundations, which could affect site grading and drainage, all of the backfill materials should be placed in 300 mm lifts and be compacted to at least 95% of the materials SPMDD.

In areas where pavements or other hard surfacing will about the building, differential frost heaving could occur between the granular fill and other areas. To reduce this differential heaving, the backfill adjacent to the wall should be placed to form a frost taper. The frost taper should be brought up to pavement subgrade level from 1.5 m below finished exterior grade at a slope of 3 horizontal to 1 vertical, or flatter, away from the wall. The fill should be placed in maximum 300 mm thick lifts and should be compacted to at least 95% of the material's SPMDD using suitable vibratory compaction equipment.

The foundation wall should be wrapped in a drainage board (Miridrain or similar) and be drained by means of a perforated pipe subdrain in a surround of 19 mm clear stone, fully wrapped in a geotextile, which leads by positive drainage to a storm sewer or to a sump pit from which the water is pumped. The basement levels will be below the existing groundwater table and should also be provided with sub-drains below the lowest floor level. For preliminary design these can be assumed to be similar perforated pipe drains as the foundation walls placed on 6 m centres below the floor.

Long-term flow estimates (for sizing permanent drains, pumps, sumps, discharge flows, etc.) can be determined based on the proposed final basement (and excavation) layout and depth as part of the hydrogeological study required for the PTTW discussed above.

5.9 Site Servicing

Excavations for site servicing should be carried out per guidelines in Section 5.7 above.



Bedding for the service pipes, maintenance holes, or valve chamber structures may be placed on undisturbed native inorganic soil or the limestone bedrock. The existing fill may be suitable for support of site services (and in many locations may extend too deep for practical removal. Where existing fill is encountered in the base of service trenches it should be reviewed and approved by a qualified geotechnical engineer. If the existing fill at the base of the excavation is not found to be suitable then it may require re-compaction or sub-excavation and replacement up to the bottom of the bedding layer using engineered fill.

Engineered fill, if required, should consist of either imported Granular B Type II (City of Ottawa SP F-3147) or suitable materials previously excavated at the site (including existing pavement granular, inorganic sandy fill, or compactable glacial till). The suitability of re-using the existing fill and native soil would need to be confirmed at the time of construction by the geotechnical engineer. Engineered fill (either imported or re-used on site) should be placed in maximum 300 mm thick lifts and compacted to at least 95% of the material's SPMDD using suitable vibratory compaction equipment. The engineered fill should extend down and away from the bottom of the bedding to the undisturbed native subgrade at a slope of 1 horizontal to 1 vertical. If this cannot be achieved due to space restrictions, the geotechnical engineer should be consulted to assess potential alternatives.

Re-use of excavated materials would also need to take into account environmental considerations. Further discussion on soil quality and the potential for re-use of the existing fill is provided in the Phase II ESA report, which is provided under separate cover.

At least 150 mm of Granular A (City of Ottawa SP F-3147) should be used as pipe bedding for sewer and water pipes. Where unavoidable disturbance to the subgrade surface occurs during construction, it may be necessary to place a sub-bedding layer consisting of 300 mm of compacted Granular B Type II (S.P. F-3147) beneath the Granular A. The bedding material should in all cases extend to the spring line of the pipe and should be compacted to at least 95% of the material's SPMDD. The use of clear crushed stone as a bedding layer should be discouraged since fine particles from the sandy backfill materials and native soils could potentially migrate into the voids in the clear crushed stone and cause loss of lateral pipe support.

5.10 Trench Backfill

All trench backfill should conform to City of Ottawa specification SP F-2120.

Trench backfill above the pipe cover material may consist of approved excavated material such as the existing fill (provided that it is free of organic matter and other deleterious materials) and non-clayey native soils, where the service pipes will be overlain by pavements or other hard surfacing. Fill that contains organic matter or deleterious materials is not suitable for reuse as trench backfill and should be wasted upon excavation.

Imported backfill, if required, should consist of compactable and inorganic earth borrow (OPSS.MUNI 206/212) or Select Subgrade Material (SP F-3147). Imported materials should be reviewed and accepted by the geotechnical engineer prior to arrival on site.

Where the trench will be covered with hard surfaced areas (e.g., pavements and sidewalks), the type of material placed in the frost zone (down to 1.8 m depth) should match the soil exposed on the trench walls for frost heave compatibility.

All trench backfill should be placed in maximum 300 mm loose lifts and be uniformly compacted to at least 95% of the material's SPMDD. Backfilling operations during cold weather should avoid inclusions of frozen lumps of material, snow, and ice.



If the construction schedule allows, delay between service installation/trench backfilling and final paving should be made to allow for settlement of the trench backfill material, which will reduce the magnitude of differential movement (i.e., sagging) of pavements placed over backfilled trenches.

5.11 Pavement Design

It is understood that new internal access roads and parking lots will be required as part of the new development.

5.11.1 Profile Grade

Because the site is underlain predominantly by granular soils with localized weathered silty clay. No significant post-construction primary consolidation or secondary compression settlements of the subgrade soils are expected. Some settlement above the service trenches should be expected due to settlement of backfill. The magnitude of that settlement, however, should be within tolerable limits, provided that compaction of service trench backfill is carried out in accordance with the guidelines provided above.

5.11.2 Subgrade Preparation

The pavement subgrade will generally consist of the existing heterogenous fill, or native silty sand, silty clay and glacial tills. The subgrade may also include backfill in existing utility trenches and other previous excavations.

Portions of the existing fill may need to be removed to accommodate the full depth of the new pavement structure. As a general guideline, in preparation for pavement construction, all deleterious material (i.e., loose, disturbed or contaminated soil, or soil containing organic material) should be removed from all pavement areas. It should generally be feasible to leave the existing inorganic fill in place beneath the pavement structure. Where this is the case, the subgrade should be proof rolled prior to the placement of new fill. The purpose of the proof rolling is to provide surficial densification of the existing inorganic fill and to locate any isolated areas of soft or loose soil, which would require sub-excavation and replacement with suitable fill.

Sections requiring grade raising to the proposed subgrade level should be filled using acceptable (compactable and inorganic) earth borrow (OPSS.MUNI 206/212), Select Subgrade Material (OPSS.MUNI 1010) or additional granular base if grade changes are minor. All fill should be placed in maximum 300 mm thick lifts and should be compacted to at least 95% of the material's SPMDD using suitable vibratory compaction equipment.

5.11.3 Pavement Drainage

The subgrade surface should be crowned or sloped to promote drainage of the roadway granular structure. Perforated pipe subdrains should be provided along the low sides of the roadway along the entire length. The geotextile should consist of a Class I nonwoven geotextile to OPSS 1860. The geotextile should have a maximum Apparent Opening Size A.O.S. of 212 µm. The subdrains should be connected to the catch basins such that the pavement structure will be positively drained and will intercept flows within the subbase. Subdrains should not be allowed to drain on existing slopes.

Backfilling of catch basin laterals located below subgrade level should be completed using acceptable native soils or fill which match the material types exposed on the lateral trench walls. This will reduce potential problems associated with differential frost heaving.

5.11.4 Granular Pavement Materials

Good drainage significantly improves the freeze-thaw resistance of the asphaltic concrete and decreases the frequency of transverse cracking, thereby extending the life of the pavement. The granular base and sub-base for new construction should consist of Granular A and Granular B Type II, respectively (S.P. F-3147).



Based on the results of the subsurface investigation, the existing fill within the project limits would generally not meet the requirements for Granular A or Granular B Type II. As outlined in Section 5.12 the existing fill material could be re-used as general trench backfill or as subgrade material for pavements.

5.11.5 Pavement Design

The preliminary design for the roadways were subdivided into four categories:

- Parking Areas
- Local Routes (which will <u>not</u> be subjected to Bus Traffic or Heavy Truck Traffic)
- Collector/Bus Routes
- Rigid Concrete Pavements

These pavement designs are preliminary based on our understanding of the project and experience with similar projects/developments. These pavement sections should be confirmed during detailed design based on the location, geometry, loading, drainage, etc. of the various sections)

5.11.5.1 Parking Areas

The pavement structure for parking areas should be:

Pavement Component	Thickness (mm)
Asphaltic Concrete	50
S.P.F-3147 Granular A Base	150
S.P.F-3147 Granular B Type II Subbase	400

The composition of the asphaltic concrete pavement should be as follows:

Superpave 12.5 mm Surface Course – One lift of 50 mm

The asphaltic concrete should meet the requirements of City of Ottawa specification F-3106. The Performance Graded Asphalt Cement (PGAC) should consist of PG 58-34 for Traffic Category B.

5.11.5.2 Local Routes (No Buses)

The pavement structure for local and access roads, not exposed to bus or heavy truck traffic, should be:

Pavement Component	Thickness (mm)
Asphaltic Concrete	90
S.P.F-3147 Granular A Base	150
S.P.F-3147 Granular B Type II Subbase	400

The composition of the asphaltic concrete pavement should be as follows:

Superpave 12.5 mm Surface Course – One lift of 40 mm



Superpave 19.0 mm Binder Course – One lift of 50 mm

The asphaltic concrete should meet the requirements of City of Ottawa specification F-3106. The Performance Graded Asphalt Cement (PGAC) should consist of PG 58-34 for Traffic Category B.

5.11.5.3 Collector Routes

The pavement structure for collector routes should be:

Pavement Component	Thickness (mm)
Asphaltic Concrete	120
S.P.F-3147 Granular A Base	150
S.P.F-3147 Granular B Type II Subbase	400

The composition of the asphaltic concrete pavement should be as follows:

- Superpave 12.5 FC1 mm Surface Course One lift of 50 mm
- Superpave 19.0 mm Binder Course One lift of 70 mm

The asphaltic concrete should meet the requirements of City of Ottawa specification F-3106. The Performance Graded Asphalt Cement (PGAC) should consist of PG 64-34 for Traffic Category C.

The above pavement designs assume that the trench backfill has been acceptably prepared (i.e., where the bottom of the excavation is free of organics, has been adequately compacted to the required density, and the subgrade surface is not disturbed by construction operations or precipitation).

5.11.5.4 Rigid Pavements

If required, a preliminary design section for rigid pavements is presented below.

Pavement Component	Thickness (mm)
Portland Cement Concrete	200
S.P.F-3147 Granular A Base	150
S.P.F-3147 Granular B Type II Subbase	400

The Portland cement concrete should meet the requirements of CSA A 23.1 Class C2 exposure. Concrete joint specifications and spacing should be in accordance with OPSD 552.020 and 551.010.

5.11.6 Pavement Structure Compaction

Adequate compaction of the granular roadway materials will be essential to the continued acceptable performance of the roadway. Compaction should be carried out in conformance with procedures outlined in OPSS 501 "Construction Specification for Compacting" with compacted densities of the various materials being in accordance with Subsection 501.08.02 Method A. The granular base and subbase material should be uniformly compacted to at least 100% of the Standard Proctor Maximum Dry Density (SPMDD) using suitable vibratory compaction equipment. Compaction of the asphaltic concrete should be carried out in accordance with OPSS 310. Table 10.



The placement and compaction of any engineered fill, as well as sewer and watermain bedding and backfill, should be inspected to ensure that the materials used conform to the specifications from both a grading and compaction viewpoint. In addition, testing and sampling of the asphaltic and Portland cement concrete used on site should be carried out to make sure that the materials used, and level of compaction achieved, during construction meet the project requirements.

5.11.7 Joints, Tie-ins with Existing Pavements, Pavement Resurfacing

At intersections, the new pavement structure should be continued at least to the limits of construction or the end of the curb "return" (i.e., the start of the constant width portion of the side road). At these streets, the pavement should be milled back beyond the curb return an additional 300 mm to a depth of 40 mm to accept the surface course asphaltic concrete.

The pavement granular and subgrade level should be tapered between the new and existing pavements by using 10H:1V tapers up or down as required.

A tack coat should be provided on all and vertical and milled horizontal surfaces. The tack coat should consist of SS-1 emulsified asphalt diluted with an equal amount of water. The undiluted and emulsified asphalt shall be in conformance with OPSS 1103.

5.12 Reuse of Existing Soils

From a geotechnical perspective, the native glacial till (provided it has suitable water content to be compactable), may be reused on this project as backfill within service trenches, provided the materials are frost compatible. The existing soils are likely be suitable for reuse as pavement structure base or subbase materials, or as engineered fill. The heterogeneous fill and buried topsoil encountered on site contains organic matter and debris, and therefore would also not be considered suitable for reuse as base and subbase material (but portions may be used for trench backfill and site grading if reviewed and approved during excavation).

Reclaimed Asphalt Pavement (RAP) and/or Reclaimed Concrete Material (RCM) may be used on this project as granular material as stated in OPSS.MUNI 1010 "Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material".

Reclaimed asphalt pavement may be used in the asphaltic concrete mixes in accordance with OPSS.MUNI 1151.

5.13 Corrosion and Cement Type

Groundwater samples from boreholes 21-201, 21-213, 21-215 and 21-221 (S) were submitted to AGAT Laboratories for basic chemical analyses related to potential sulphate attack on buried concrete elements and potential corrosion of buried ferrous elements. The results of this testing are provided in Appendix D and are summarized in the following table.

Table 5: Results of Basic Chemical Testing

Borehole Number	Sample Type	Chloride (mg/L)	Sulphate (mg/L)	Electrical Conductivity (µS/cm)	рН
21-201	Groundwater	216	130	1500	7.79
21-213	Groundwater	225	74.3	1310	7.87
21-215	Groundwater	267	305	1980	7.66
21-221 (Shallow)	Groundwater	497	169	2420	7.70



The water-soluble sulphate (SO4) content in the tested samples was above 150 mg/L and below 1,500 mg/L. As such, concrete made with Moderate Sulfate Resistance (S-3) type cement should be acceptable for buried concrete elements.

Based on ASTM STP1013 (Chaker and Palmer, 1989), and the results of the corrosivity testing indicate an elevated potential for corrosion of exposed ferrous metal (e.g., steel, iron, etc.), which should be considered in the design of substructures. Corrosion protection systems or steel coatings may be required but should be selected by a structural engineer. The results also indicate a higher chloride content, which should be considered in the design of substructures.

6.0 ADDITIONAL CONSIDERATIONS

At the time of the writing of this report, only preliminary design details for the proposed hospital were available. Golder Associates should be retained to review the final drawings and specifications for this project prior to construction to ensure that the guidelines in this report have been adequately interpreted.

All prepared subgrade surfaces for roadways, parking areas, floor slabs, foundations, etc. should be reviewed by Golder to ensure that they have been adequately prepared. The installation of piled foundations should be reviewed on a full-time basis by Golder. The placing and compaction of any engineered fill should be inspected and tested to ensure that the materials used conform to the specifications from both a grading and compaction viewpoint.

It should also be noted that the soil samples retrieved as part of the geotechnical investigation are generally only maintained for a period of 3 months following issuance of the report.

Ontario Regulation 903 requires abandonment of the monitoring wells installed within the boreholes for this investigation; however, these devices will be useful during construction. It is therefore proposed that decommissioning of these devices be made part of the construction contract. Some of those devices will be useful during dewatering to monitor the progress of groundwater lowering.



7.0 CLOSURE

We trust this report satisfies your current requirements. If you have any questions regarding this report, please contact the undersigned.

Golder Associates Ltd.

Bridgit Bocage, M.Eng., P.Eng.

for for

Geotechnical Engineer



Chris Hendry, P.Eng. Senior Geotechnical Engineer, Associate

KM/BB/CH/ml

https://golderassociates.sharepoint.com/sites/140130/project files/6 deliverables/geotechnical/2000- hospital/revised_final_august 2022/21451149(2000)-r-rev2_geo-hydro phase 2 hospital-2022sept6.docx

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IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) 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 practicing 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 Golder by the Client <u>Parsons Corporation</u>. 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. Golder cannot be responsible for use of this report, or portions thereof, unless Golder 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 Golder's express written consent. If the report was prepared to be included for a specific permit application process, then the client may authorize the use of this report for such purpose by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process, provided this report is not noted to be a draft or preliminary report, and is specifically relevant to the project for which the application is being made. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, 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 Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client cannot rely upon the electronic media versions of Golder'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 Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder 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. Golder cannot 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 Groundwater 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, Golder does not warrant or guarantee the exactness of the descriptions.

Golder Associates Page 1 of 2

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT (cont'd)

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 Golder 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: Golder 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 Golder's report. Golder 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 Golder's report.

During construction, Golder 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 Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder 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, Golder'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 Golder 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 Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

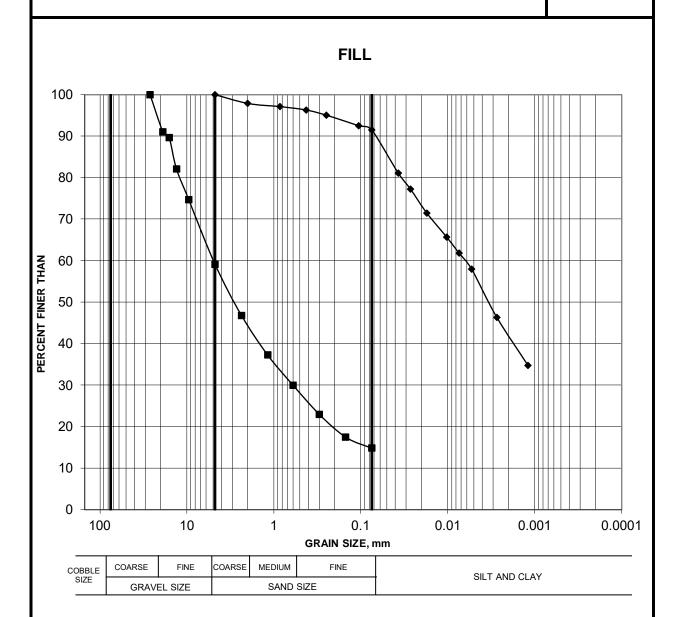
Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage unless specifically involved in the detailed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

Golder Associates Page 2 of 2



GRAIN SIZE DISTRIBUTION

FIGURE 2



				Constituents (%)			
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay
-	21-213	2	0.76-1.37	41	44	1	15
-	21-217	4	2.29-2.90	0	9	49	42

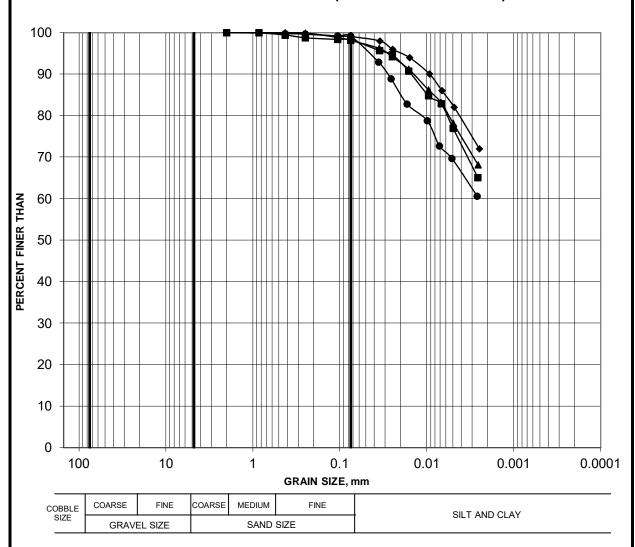
Project: 21451149/2000



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SILTY CLAY TO CLAY (WEATHERED CRUST)



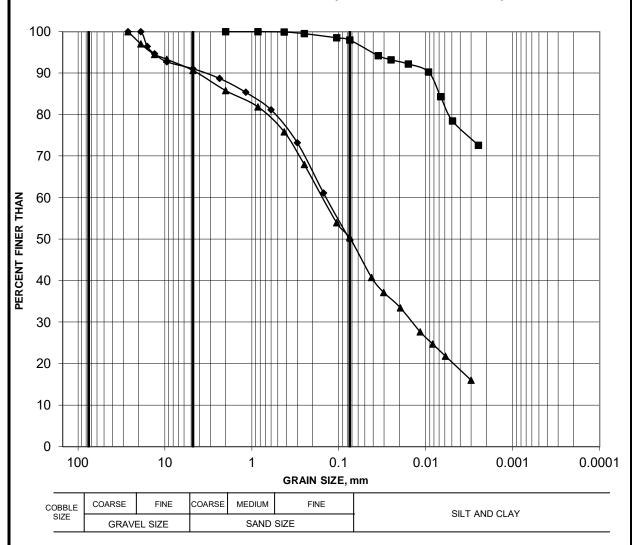
					Constitu	ents (%)	
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay
-	21-205	3	1.52-2.13	0	2	39	59
-	21-212	4	2.29-2.90	0	1	31	68
	21-221	5	3.05-3.66	0	2	33	65
-	21-226	5	3.05-3.66	0	1	43	56

Project: 21451149/2000



Created by:	CW
Checked by:	MI

SILTY CLAY TO CLAY (WEATHERED CRUST)

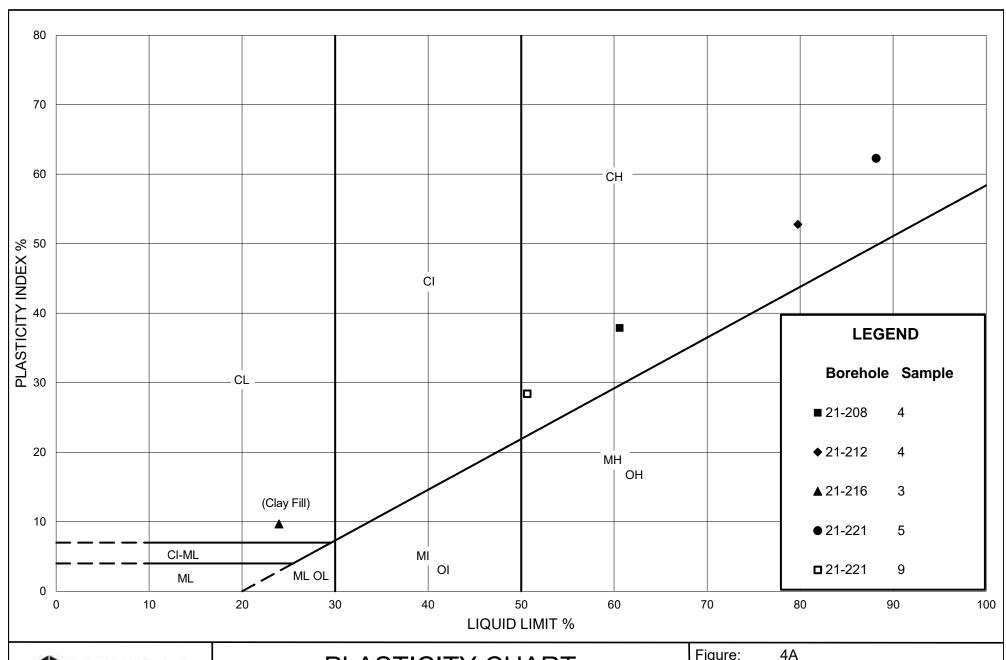


				Constituents (%)			
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay
-	22-111	3	1.52-2.13	0	2	30	68
→	22-111	4	2.29-2.90	9	41	Ę	50
	22-112	4	2.29-2.90	9	41	37	13

Project: 21451149/2000



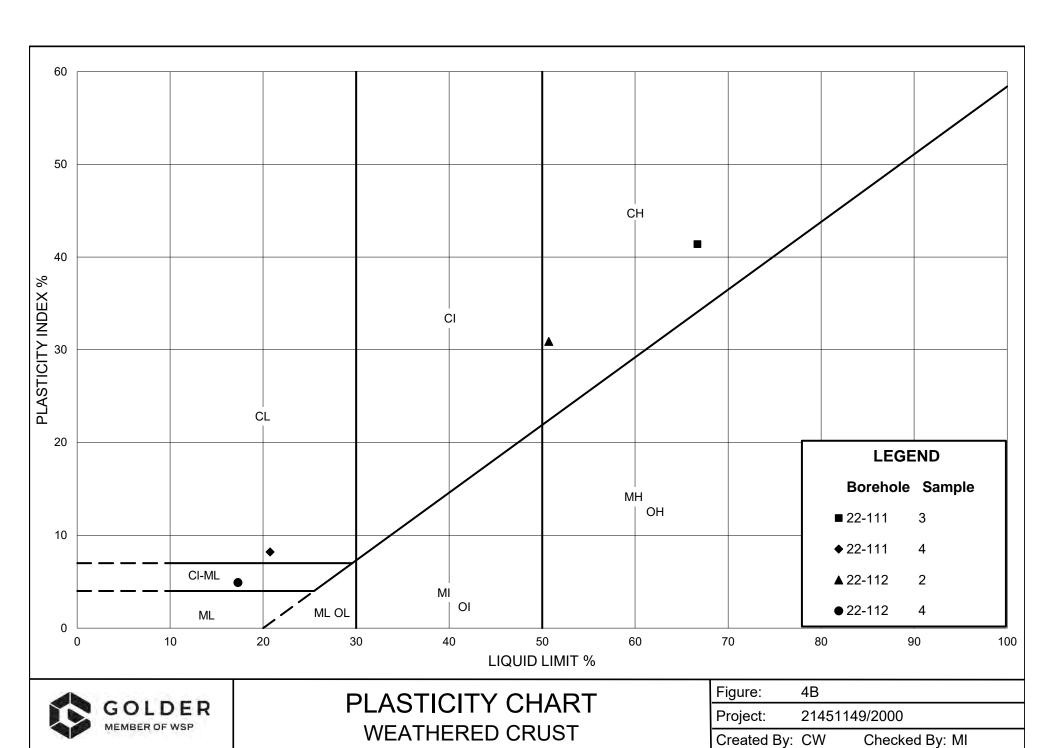
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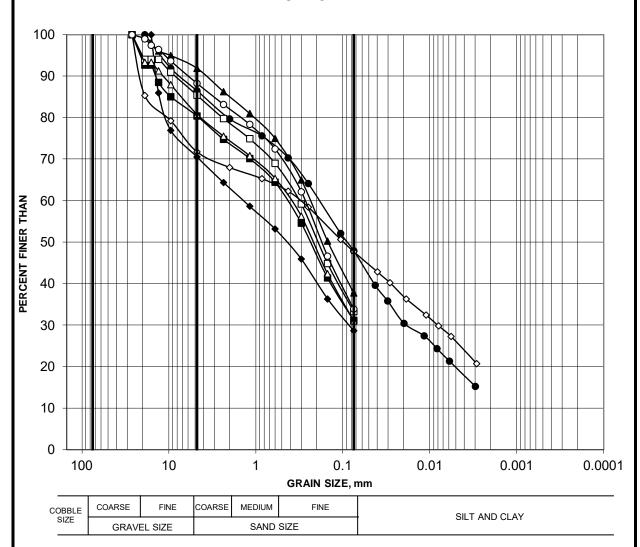


PLASTICITY CHART
SILTY CLAY TO CLAY (WEATHERED CRUST)

Figure:	4A		
Project:	21451149/2000		
Created By:	CW	Checked By: MI	



GLACIAL TILL



				Constituents (%)				
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay	
-	21-103	2	0.91-1.52	20	49	3	1	
-	21-107	2	0.91-1.52	30	41	2	.9	
	21-201	2	0.76-1.37	8	54	3	8	
-	21-208	5	3.05-3.66	14	38	35	13	
	21-208	9	6.10-6.71	15	52	3	3	
- →	21-210	5	3.05-3.66	28	24	30	18	
	21-210	9	6.10-6.86	19	50	3	1	
⊸	21-212	10	6.86-7.47	12	54	3	4	

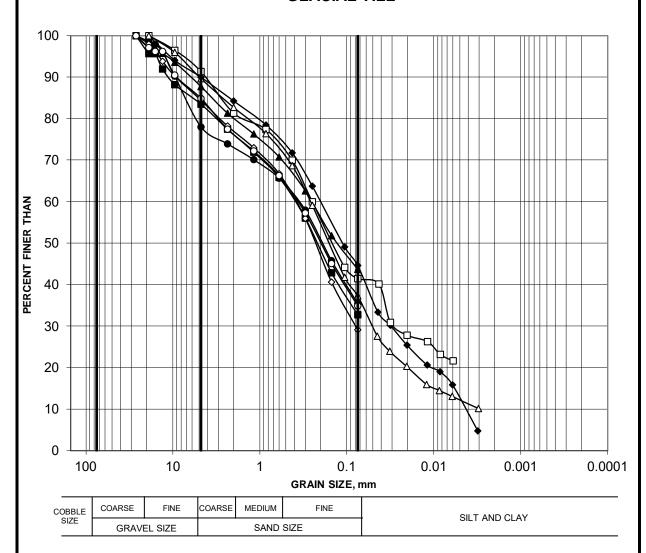
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GLACIAL TILL



				Constituents (%)			
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay
-	21-216	13	9.14-9.75	17	50	3	33
—	21-216	6	3.81-4.42	10	45	41	4
	21-216	7	4.57-5.18	12	44	2	14
-	21-217	10	6.86-7.47	22	43	3	35
	21-218	10	6.86-7.47	9	50	26	15
-	21-218	15	10.67-11.28	16	55	2	29
	21-221	11	8.38-8.99	10	53	29	8
- 0-	21-221	12	9.14-9.75	15	50	3	35

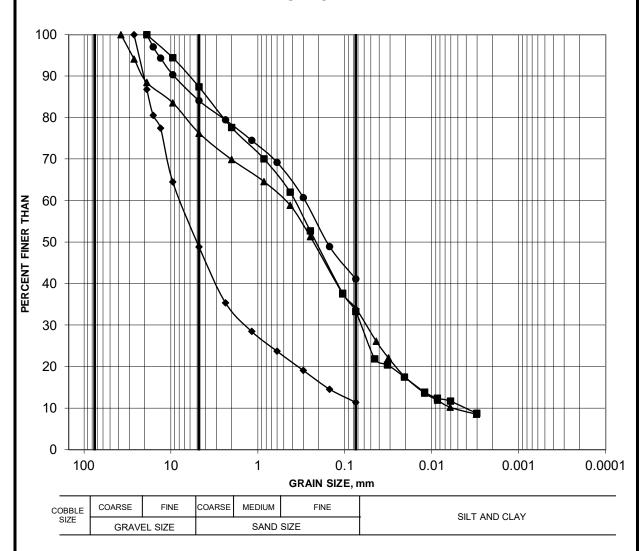
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GLACIAL TILL



				Constituents (%)			
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay
-	21-221	14	9.14-9.75	13	54	26	7
-	21-221	15B	11.73-12.04	51	38		11
	21-222	14	9.91-10.52	24	42	28	6
-	21-226	8	5.33-5.94	16	43		41

Project: 21451149/2000

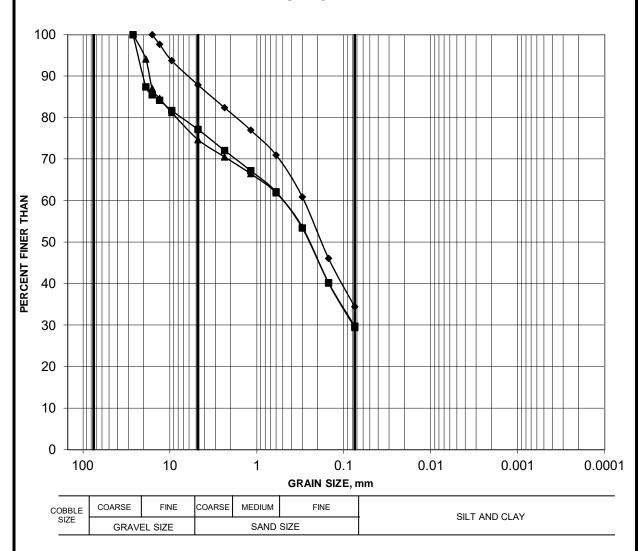


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GRAIN SIZE DISTRIBUTION

FIGURE 5D



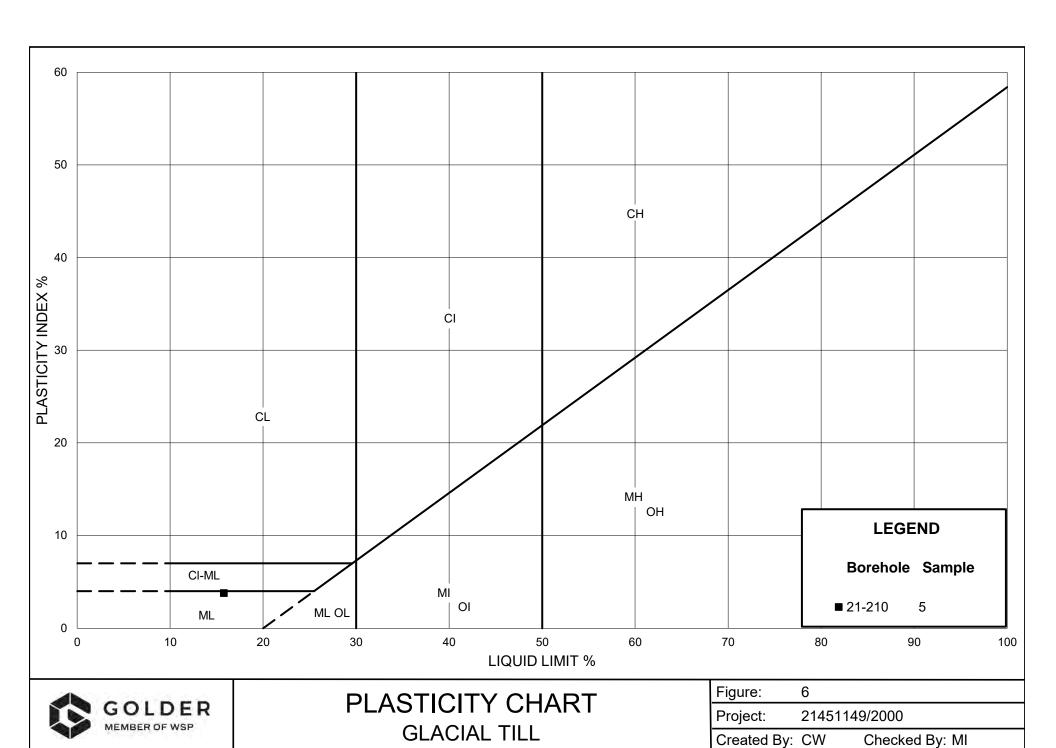


				Constituents (%)			
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay
-	22-109	5	3.05-3.66	23	47	30)
-	22-110	6	3.81-4.42	12	54	34	ļ
	22-113	22-113 6 3.81-4		25	25 46 29		

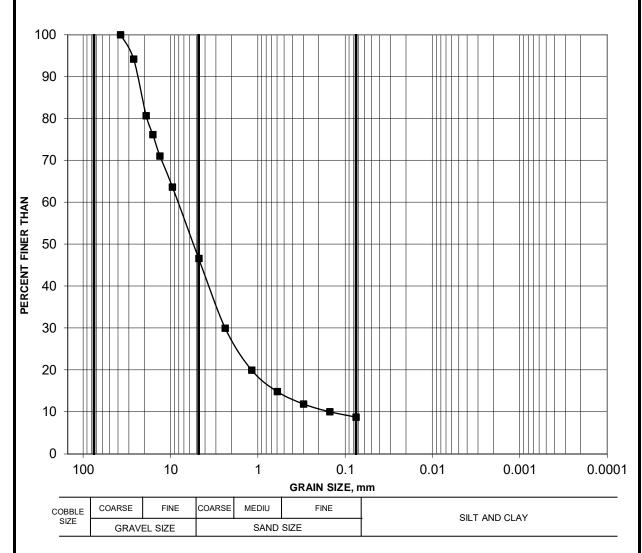
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				Constituents (%)					
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay		
-	21-201	13	9.14-9.75	53	38		9		

Project: 2151149/2000

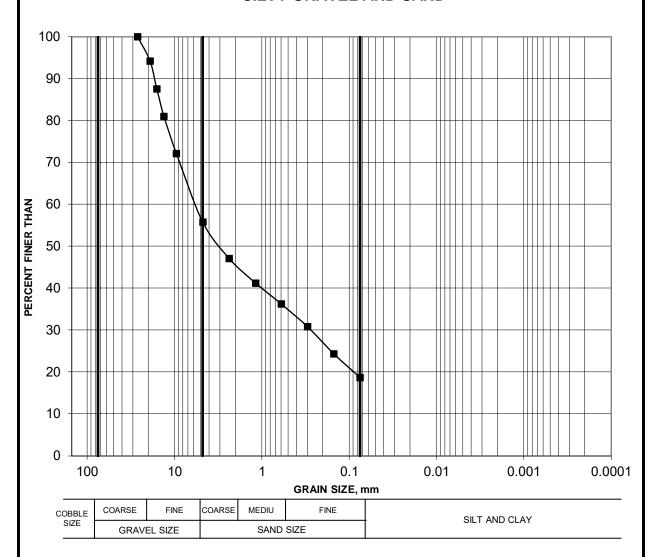


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GRAIN SIZE DISTRIBUTION

FIGURE 7B





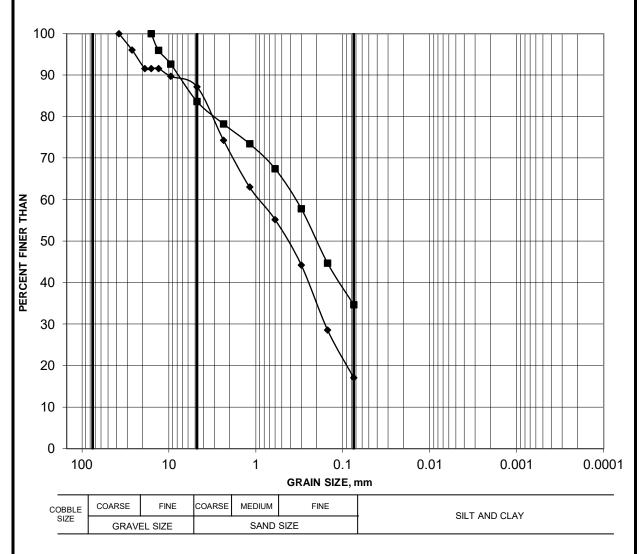
				Constituents (%)				
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay	
-	22-110 3 1.52-2.13		1.52-2.13	44 37 1			19	

Project: 21451149/2000



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Checked by:	MI		

GRAVELLY SILTY SAND



				Constituents (%)			
	Borehole	Sample	Depth (m)	Gravel	Sand	Silt	Clay
-	21-205	9	6.10-6.71	16	49	3	5
-	21-205	21-205 16 11.43-12.04		13	70	1	7

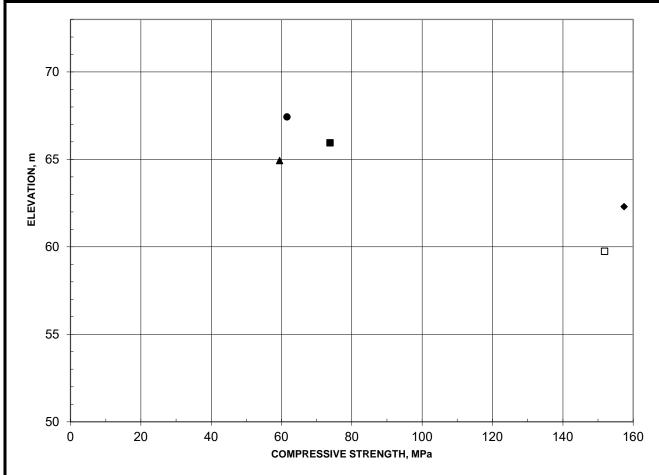
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ASTM D7012 - Method C UNCONFINED COMPRESSIVE STRENGTH OF ROCK CORE SUMMARY OF LABORATORY TEST RESULTS

FIGURE 8



	Borehole	Depth	L/D Bulk Density		Lithology	UCS	Failure
	(m)		(kg/m³)	Littlology	(MPa)	Туре	
-	BH21-207 RC1	14.3	2.4	2690	Limestone	74	1
-	BH21-213 RC1	13.8	2.4	2693	Limestone	157	1
	BH21-214 RC1	10.9	2.2	2661	Limestone	59	1
-	BH21-219 RC1	12.0	2.4	2685	Limestone	62	1
	BH21-221 RC1	14.8	2.5	2681	Limestone	152	1

Notes:

Failure Types

1. Well formed cones on both ends

Remarks

- Cores tested in vertical direction.
- Cores tested in air-dry condition.
- Time to failure > 2 and < 15 minutes.

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APPENDIX A

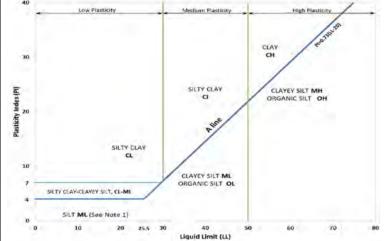
Method of Soil Classification and Terms
Lithological and Geotechnical
Rock Description Terminology
Record of Borehole Logs
Current Investigation



METHOD OF SOIL CLASSIFICATION

The Golder Associates Ltd. Soil Classification System is based on the Unified Soil Classification System (USCS)

Organic or Inorganic	Soil Group	Туре	of Soil	Gradation or Plasticity			$Cu = \frac{D_{60}}{D_{10}}$ $Cc = \frac{(D_{30})^2}{D_{10}xD_{60}}$		$Cu = \frac{D_{60}}{D_{10}} \qquad \qquad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$		$Cc = \frac{(D_{30})^2}{D_{10}xD_{60}}$		$Cc = \frac{(D_{30})^2}{D_{10}xD_{60}}$		$Cc = \frac{(D_{30})^2}{D_{10}xD_{60}}$		$Cc = \frac{(D_{30})^2}{D_{10}xD_{60}}$		USCS Group Symbol	Group Name
(ss)		of is nm)	Gravels © with o ⊆ E ≤12%			<4		≤1 or ≥	≥3		GP	GRAVEL								
	3 75 mm)	GRAVELS (>50% by mass of coarse fraction is larger than 4.75 mm)	fines (by mass)	Well Graded		≥4		1 to 3	3		GW	GRAVEL								
by ma	SOILS an 0.07	GRA 50% by parse f	Gravels with >12%	Below A Line			n/a				GM	SILTY GRAVEL								
GANIC it ≤30%	AINED	V) o prel	(by mass)	Above A Line			n/a			≤30%	GC	CLAYEY GRAVEL								
INORGANIC (Organic Content ≤30% by mass)	COARSE-GRAINED SOILS (>50% by mass is larger than 0.075 mm)	of is mm)	Sands with ≤12%	Poorly Graded		<6		≤1 or ≩	≥3	-0070	SP	SAND								
rganic	COAR by ma	SANDS % by mass se fraction than 4.75	fines (by mass)	Well Graded		≥6		1 to 3	3		SW	SAND								
9	%09<)	SANDS (≥50% by mass of coarse fraction is smaller than 4.75 mm)	Sands with >12%	Below A Line			n/a				SM	SILTY SAND								
		S)	fines (by mass)	Above A Line			n/a				SC	CLAYEY SAND								
Organic	Soil			Laboratory	Field Indicators					Organic	USCS Group	Primary								
or Inorganic	Group	Type of Soil		Tests	Dilatancy	Dry Strength	Shine Test	Thread Diameter	Toughness (of 3 mm thread)	Content	Symbol	Name								
		L plot	SILTS (Non-Plastic or PI and LL plot below A-Line on Plasticity Chart below)	Liquid Limit	Rapid	None	None	>6 mm	N/A (can't roll 3 mm thread)	<5%	ML	SILT								
(ss	75 mm	SILTS			Slow	None to Low	Dull	3mm to 6 mm	None to low	<5%	ML	CLAYEY SILT								
by ma	OILS an 0.0			SILTS lic or P llow A- lart be		Slow to very slow	Low to medium	Dull to slight	3mm to 6 mm	Low	5% to 30%	OL	ORGANIC SILT							
INORGANIC (Organic Content ≤30% by mass)	FINE-GRAINED SOILS (250% by mass is smaller than 0.075 mm)			n-Plast be or Ch	n-Plast be or Ch	n-Plast be or	n-Plast be or	o be O	o OC	o Or Clas	Liquid Limit	Slow to very slow	Low to medium	Slight	3mm to 6 mm	Low to medium	<5%	МН	CLAYEY SILT	
INORG	-GRAII	Š		≥50	None	Medium to high	Dull to slight	1 mm to 3 mm	Medium to high	5% to 30%	ОН	ORGANIC SILT								
ganic (FINE by mas	plot	e on nart	Liquid Limit <30	None	Low to medium	Slight to shiny	~ 3 mm	Low to medium	0%	CL	SILTY CLAY								
(O	%09≥	CLAYS	CLAYS (Pl and LL plot above A-Line on Plasticity Chart below)	Liquid Limit 30 to 50	None	Medium to high	Slight to shiny	1 mm to 3 mm	Medium	to 30%	CI	SILTY CLAY								
) (Pla		Liquid Limit ≥50	None	High	Shiny	<1 mm	High	(see Note 2)	СН	CLAY								
HLY ANIC LS	anic >30% ass)		mineral soil tures					•		30% to 75%		SILTY PEAT, SANDY PEAT								
HIGHLY ORGANIC SOILS	(Organic Content >30% by mass)	Predominantly peat, may contain some mineral soil, fibrous or amorphous peat						Γ		75% to 100%	PT	PEAT								



Note 1 – Fine grained materials with PI and LL that plot in this area are named (ML) SILT with slight plasticity. Fine-grained materials which are non-plastic (i.e. a PL cannot be measured) are named SILT

Note 2 – For soils with <5% organic content, include the descriptor "trace organics" for soils with between 5% and 30% organic content include the prefix "organic" before the Primary name.

Dual Symbol — A dual symbol is two symbols separated by a hyphen, for example, GP-GM, SW-SC and CL-ML.

For non-cohesive soils, the dual symbols must be used when the soil has between 5% and 12% fines (i.e. to identify transitional material between "clean" and "dirty" sand or gravel.

For cohesive soils, the dual symbol must be used when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart (see Plasticity Chart at left).

Borderline Symbol — A borderline symbol is two symbols separated by a slash, for example, CL/CI, GM/SM, CL/ML. A borderline symbol should be used to indicate that the soil has been identified as having properties that are on the transition between similar materials. In addition, a borderline symbol may be used to indicate a range of similar soil types within a stratum.

ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES AND TEST PITS

PARTICI E SIZES OF CONSTITUENTS

Soil Constituent	Particle Size Description	Millimetres	Inches (US Std. Sieve Size)
BOULDERS	Not Applicable	>300	>12
COBBLES	Not Applicable	75 to 300	3 to 12
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425	(10) to (4) (40) to (10) (200) to (40)
SILT/CLAY	Classified by plasticity	<0.075	< (200)

MODIFIERS FOR SECONDARY AND MINOR CONSTITUENTS

Percentage by Mass	Modifier
>35	Use 'and' to combine major constituents (i.e., SAND and GRAVEL)
> 12 to 35	Primary soil name prefixed with "gravelly, sandy, SILTY, CLAYEY" as applicable
> 5 to 12	some
≤ 5	trace

PENETRATION RESISTANCE

Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split-spoon sampler for a distance of 300 mm (12 in.). Values reported are as recorded in the field and are uncorrected.

Cone Penetration Test (CPT)

An electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm² pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (q_i), porewater pressure (u) and sleeve frictions are recorded electronically at $25\ \text{mm}$ penetration intervals.

Dynamic Cone Penetration Resistance (DCPT); Nd:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

PH: Sampler advanced by hydraulic pressure PM: Sampler advanced by manual pressure WH: Sampler advanced by static weight of hammer WR: Sampler advanced by weight of sampler and rod

SAMPLES

AS	Auger sample
BS	Block sample
CS	Chunk sample
DD	Diamond Drilling
DO or DP	Seamless open ended, driven or pushed tube sampler – note size
DS	Denison type sample
GS	Grab Sample
MC	Modified California Samples
MS	Modified Shelby (for frozen soil)
RC	Rock core
SC	Soil core
SS	Split spoon sampler – note size
ST	Slotted tube
TO	Thin-walled, open – note size (Shelby tube)
TP	Thin-walled, piston – note size (Shelby tube)
WS	Wash sample

SOIL TESTS

COIL ILCIO	
w	water content
PL, w _p	plastic limit
LL , w _L	liquid limit
С	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test1
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement ¹
D _R	relative density (specific gravity, Gs)
DS	direct shear test
GS	specific gravity
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO ₄	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V (FV)	field vane (LV-laboratory vane test)
γ	unit weight

Tests anisotropically consolidated prior to shear are shown as CAD, CAU.

NON-COHESIVE (COHESIONLESS) SOILS

Compactness²

Term	SPT 'N' (blows/0.3m) ¹
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	>50

- 1. SPT 'N' in accordance with ASTM D1586, uncorrected for the effects of overburden pressure.
- Definition of compactness terms are based on SPT 'N' ranges as provided in Terzaghi, Peck and Mesri (1996). Many factors affect the recorded SPT 'N' value, including hammer efficiency (which may be greater than 60% in automatic trip hammers), overburden pressure, groundwater conditions, and grainsize. As such, the recorded SPT 'N' value(s) should be considered only an approximate guide to the soil compactness. These factors need to be considered when evaluating the results, and the stated compactness terms should not be relied upon for design or construction.

Field Moisture Condition

Term	Description
Dry	Soil flows freely through fingers.
Moist	Soils are darker than in the dry condition and may feel cool.
Wet	As moist, but with free water forming on hands when handled.

COHESIVE SOILS

Consistency

Term	Undrained Shear Strength (kPa)	SPT 'N' ^{1,2} (blows/0.3m)
Very Soft	<12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	>200	>30

- SPT 'N' in accordance with ASTM D1586, uncorrected for overburden pressure effects; approximate only.
- SPT 'N' values should be considered ONLY an approximate guide to consistency; for sensitive clays (e.g., Champlain Sea clays), the N-value approximation for consistency terms does NOT apply. Rely on direct measurement of undrained shear strength or other manual observations.

Water Content

Term	Description
w < PL	Material is estimated to be drier than the Plastic Limit.
w ~ PL	Material is estimated to be close to the Plastic Limit.
w > PL	Material is estimated to be wetter than the Plastic Limit.

Unless otherwise stated, the symbols employed in the report are as follows:

I.	GENERAL	(a) w	Index Properties (continued) water content
π	3.1416	w _i or LL	liquid limit
ln x	natural logarithm of x	W_p or PL	plastic limit
log ₁₀	x or log x, logarithm of x to base 10	I _p or PI	plasticity index = (w₁ – w₂)
g	acceleration due to gravity	NP	non-plastic
ť	time	Ws	shrinkage limit
		IL	liquidity index = $(w - w_p) / I_p$
		Ic	consistency index = $(w_1 - w) / I_p$
		emax	void ratio in loosest state
		emin	void ratio in densest state
		ID	density index = $(e_{max} - e) / (e_{max} - e_{min})$
II.	STRESS AND STRAIN		(formerly relative density)
γ	shear strain	(b)	Hydraulic Properties
Δ	change in, e.g. in stress: $\Delta \sigma$	h	hydraulic head or potential
3	linear strain	q	rate of flow
ϵ_{V}	volumetric strain	V	velocity of flow
η	coefficient of viscosity	İ	hydraulic gradient
υ	Poisson's ratio	k	hydraulic conductivity
σ	total stress		(coefficient of permeability)
σ'	effective stress ($\sigma' = \sigma - u$)	j	seepage force per unit volume
σ'_{vo}	initial effective overburden stress		
σ1, σ2, σ3	principal stress (major, intermediate,		
	minor)	(c)	Consolidation (one-dimensional)
		Cc	compression index
σoct	mean stress or octahedral stress		(normally consolidated range)
	$= (\sigma_1 + \sigma_2 + \sigma_3)/3$	C_r	recompression index
τ	shear stress		(over-consolidated range)
u	porewater pressure	Cs	swelling index
E	modulus of deformation	C_{α}	secondary compression index
G	shear modulus of deformation	m_v	coefficient of volume change
K	bulk modulus of compressibility	Cv	coefficient of consolidation (vertical direction)
		Ch	coefficient of consolidation (horizontal direction)
	OO! PROPERTIES	T _v	time factor (vertical direction)
III.	SOIL PROPERTIES	U	degree of consolidation
(-)	Index Decembles	σ′ _p	pre-consolidation stress
(a)	Index Properties	OCR	over-consolidation ratio = σ'_p / σ'_{vo}
ρ(γ)	bulk density (bulk unit weight)*	(4)	Chaor Ctronath
ρα(γα)	dry density (dry unit weight)	(d)	Shear Strength
$\rho_{w}(\gamma_{w})$	density (unit weight) of water	τ _p , τ _r	peak and residual shear strength
ρs(γs)	density (unit weight) of solid particles	φ′ δ	effective angle of internal friction
γ'	unit weight of submerged soil	O	angle of interface friction
_	$(\gamma' = \gamma - \gamma_W)$	μ	coefficient of friction = tan δ
D_R	relative density (specific gravity) of solid	c′	effective cohesion
	particles (D _R = ρ_s / ρ_w) (formerly G _s)	Cu, Su	undrained shear strength (ϕ = 0 analysis)
е	void ratio	р	mean total stress $(\sigma_1 + \sigma_3)/2$
n	porosity	p′	mean effective stress $(\sigma'_1 + \sigma'_3)/2$
S	degree of saturation	q	$(\sigma_1 - \sigma_3)/2$ or $(\sigma'_1 - \sigma'_3)/2$
		q_u	compressive strength (σ_1 - σ_3)
		St	sensitivity
* Density symbol is ρ . Unit weight symbol is γ Notes: 1 $\tau = c' + \sigma' \tan \phi'$			$\tau = c' + \sigma' \tan \phi'$
	$\rho = \rho = \rho = \rho $ (i.e. mass density multiplied by	2	shear strength = (compressive strength)/2
	eration due to gravity)		
	÷ ,		

WEATHERING CLASSIFICATION

Fresh (W1): no visible sign of rock material weathering.

Slightly Weathered (W2): discoloration indicates weathering of rock mass material on discontinuity surfaces. Less than 5% of rock mass is altered or weathered.

Moderately Weathered (W3): less than 50% of the rock mass is decomposed and/or disintegrated to a soil. Fresh or discoloured rock is present either as a discontinuous framework or as corestones.

Highly Weathered (W4): more than 50% of the rock mass is decomposed and/or disintegrated to a soil. Fresh or discoloured rock is present either as a discontinuous framework or as corestones.

Completely Weathered (W5): 100% of the rock mass is decomposed and/or disintegrated to a soil. The original mass structure is still largely intact.

Residual Soil (W6): all rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

BEDDING THICKNESS

Description	Bedding Plane Spacing
Very thickly bedded	Greater than 2 m
Thickly bedded	0.6 m to 2 m
Medium bedded	0.2 m to 0.6 m
Thinly bedded	60 mm to 0.2 m
Very thinly bedded	20 mm to 60 mm
Laminated	6 mm to 20 mm
Thinly laminated	Less than 6 mm

JOINT OR FOLIATION SPACING

Description	<u>Spacing</u>
Very wide	Greater than 3 m
Wide	1 m to 3 m
Moderately close	0.3 m to 1 m
Close	50 mm to 300 mm
Very close	Less than 50 mm

GRAIN SIZE

<u>Term</u>	<u>Size*</u>
Very Coarse Grained	Greater than 60 mm
Coarse Grained	2 mm to 60 mm
Medium Grained	60 microns to 2 mm
Fine Grained	2 microns to 60 microns
Very Fine Grained	Less than 2 microns

Note: * Grains greater than 60 microns diameter are visible to the naked eye

CORE CONDITION

Total Core Recovery (TCR)

The percentage of solid drill core recovered regardless of quality or length, measured relative to the length of the total core run.

Solid Core Recovery (SCR)

The percentage of solid drill core, regardless of length, recovered at full diameter, measured relative to the length of the total core run.

Rock Quality Designation (RQD)

The percentage of solid drill core, greater than 100 mm length, recovered at full diameter, as measured along the centerline axis of the core, relative to the length of the total core run. RQD varies from 0% for completely broken core to 100% for core in solid segments.

DISCONTINUITY DATA

Fracture Index

A count of the number of discontinuities (physical separations) in the rock core, including both naturally occurring fractures and mechanically induced breaks caused by drilling.

Dip with Respect to Core Axis

The angle of the discontinuity relative to the axis (length) of the core. In a vertical borehole, a discontinuity with a 90° angle is horizontal.

Description and Notes

An abbreviation description of the discontinuities, whether naturally occurring separations such as fractures, bedding planes and foliation planes or mechanically induced features caused by drilling such as ground or shattered core and mechanically separated bedding or foliation surfaces. Additional information concerning the nature of fracture surfaces and infillings are also noted.

Abbreviations

AXJ Axial Joint BD Bedding BC Broken Core CC Continuous Core CL Closed CO Contact CU Curved CT Coated FLT Fault FOL Foliation FR Fracture GO Gouge IN Infilled IR Irregular	KV Karstic Void K Slickensided LC Lost Core MB Mechanical Bre PL Planar PO Polished RO Rough SA Slightly Altered SH Shear SM Smooth SR Slightly Rough SY Stylolite UN Undulating VN Vein
JN Joint	VR Very Rough
	vit very reagin

ISRM Intact Rock Material Strength Classification

Grade	Description	Approx. Range of Uniaxial Compressive Strength (MPa)
R0	Extremely weak rock	0.25 – 1.0
R1	Very weak rock	1.0 – 5.0
R2	Weak rock	5.0 – 25
R3	Medium strong rock	25 – 50
R4	Strong rock	50 -100
R5	Very strong rock	100 -250
R6	Extremely strong rock	>250

1/1



RECORD OF BOREHOLE: 21-01

SHEET 1 OF 1

LOCATION: N 5028807.8 ;E 366831.0 SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: June 11, 2021

DATUM: NAD 1983

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

Щ	兒	SOIL PROFILE	1.		SA	MPL	\blacksquare	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	ᇦᇦ	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ 20 40 60 80	10 ⁻⁶ 10 ⁻⁸ 10 ⁻⁴ 10 ⁻³ WATER CONTENT PERCENT Wp	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
. 0		GROUND SURFACE		65.05							
	Auger Hollow Stern)	ASPHALTIC CONCRETE FILL - (SW/GW) gravelly SAND to sandy GRAVEL, angular; grey (PAVEMENT STRUCTURE) FILL - (SW) gravelly SILTY SAND; dark brown to brown; non-cohesive, moist to		0.05 64.44 0.61	1	SS	14				Flush Mount Casing Backfill Bentonite Seal Silica Sand
1	Power Auger 0 mm Diam. (Hollow S	wet, compact FILL - Wood; brown; non-cohesive, moist	***	63.8 <u>5</u> 1.20 1.30	2	SS	18				52 mm Diam. PVC #10 Slot Screen
2	200	FILL/WASTE - (SM) gravelly SILTY \SAND; dark brown to black, contains \asphalt; non-cohesive, moist, compact \FILL - (SM) gravelly SILTY SAND; \brown, with black staining; non-cohesive, \moist to wet, compact		1.45 63.37 1.68 63.14 1.91	3	SS	>50				Cave
3		FILL - (GW) sandy GRAVEL; grey; non-cohesive, moist, very dense End of Borehole Auger Refusal									
4											
5											
6											
7											
8											
9											
10											
DE	PTH S	CALE	•		1	1	>) GOLDEI	2	LC	OGGED: RI

SAMPLER HAMMER, 64kg; DROP, 760mm

RECORD OF BOREHOLE: 21-02

SHEET 1 OF 2

DATUM: NAD 1983

LOCATION: N 5028720.9 ;E 366811.1 BORING DATE: May 18, 2021

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

<u>,</u>	면	SOIL PROFILE		,	SA	MPL		DYNAMIC PENETRA RESISTANCE, BLO			HYDRAUL k,	cm/s	NDUCT	IVIIY,		ود	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD		LOT		K.		.30m	20 40	60 80	`	10 ⁻⁶	10	⁻⁵ 10) ⁻⁴ 1	0-3	ADDITIONAL LAB. TESTING	OR
MET	SING	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	IMBE	TYPE	BLOWS/0.30m	SHEAR STRENGTH Cu, kPa	nat V. + Q - rem V. ⊕ IJ -				NTENT			DDIT B. TE	STANDPIPE INSTALLATION
7	BOR		STRA	(m)	Ŋ	[]	3101				Wp ⊢		OW 60			Z Z	
		GROUND SURFACE	700	65.67		Н	ш	20 40	60 80	\dashv	20	40) 60	υ ξ	80	+	
0	Ê	TODCOIL (CM) CILTY CAND: 4-4-	EEE	0.00		\Box				1					1	+	
	Ster	brown, contains organic matter (rootlets); non-cohesive, moist	/‱	0.15	1	ss	9				0					м	
	Holov	FILL - (SM) gravelly SILTY SAND; dark	\bowtie														
	wer A	FILL - (SM) gravelly SILTY SAND; dark brown, contains brick, ash, organic matter and silty clay layers;				1											Bentontie Seal
1	Power Auger 200 mm Diam. (Holow Stem)	non-cohesive, moist, loose to compact			2	ss	>50										
	200			64.40		4											
ŀ		Borehole continued on RECORD OF		1.27													-
		DRILLHOLE 21-02															
2																	
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LOCATION: N 5028720.9 ;E 366811.1

INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 21-02

DRILLING DATE: May 18, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2

DATUM: NAD 1983

HSCALE	METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	COLOUR % RETURN	V C	HR- N - J -	Joint Fault Shea Vein Conj	ar jugat	te	OI CI	0- C R- 0 L - C	eddir oliatio ontac rthog leava	t onal	IR - Irregular	PO- Po K - Sli SM- Sn Ro - Ro MB- Me	cken: nooth ugh	sided	Brea	NC abb of a k syr		or add ions r iation	ditiona refer to s &	al o list			
DEPT	ME	DRILLING		SYMBC	DEPTH (m)	RU		TOT/ CORE	AL : % (SOLI SORE	D :%	R.Q.I	D. 0	RAC NDE PER 1.25 r	X DI	P w.r.f CORE AXIS	DISCONTINUITY TYPE AND SURF. DESCRIPTION		Jcon	Jr Ja	1	YDRA NDUC K, cm.	OLIC TIVIT /sec		ametr int Lo Index (MPa)	AV	MC 2' 'G.		
	2		BEDROCK SURFACE Fresh, thinly to medium bedded, grey to dark grey, fine to medium grained, non-porous, very strong SHALEY NODULAR LIMESTONE - Broken core from 1.44 m to 1.55 m		64.40	1	100																				Si	entontie Seal lica Sand CS = 130 MPa	
	3	Drill				2	100																				32 #1	? mm Diam. PVC 0 Slot Screen	
	5	Rotary Drill				3	100																						
	7				58.38	4	100																				Si	lica Sand	
	8		End of Drillhole Note(s): 1. Water level in screen measured at 2.09 m (Elev. 63.59 m) on May 28, 2021		7.29																								-
GDT 6/16/22	9																												-
MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22	11																												- - - - - - - - -
MIS-RCK 002	DE 1:		SCALE		,	11	,)	(G	C)	L		DER		•		•	•		1				GGED: RI CKED: KM/CH	

RECORD OF BOREHOLE: 21-03

SHEET 1 OF 2

LOCATION: N 5028765.9 ;E 366781.2

BORING DATE: May 18, 2021

DATUM: NAD 1983

,	QQ	SOIL PROFILE			SA	MPLES	DYN/ RESI	AMIC PE STANCE	NETRAT , BLOW	ION S/0.3m	1	HYDRAI	JLIC COI k, cm/s	NDUCTIV	ITY,	٥ر	PIEZOMETER
METRES	BORING METHOD		LOT		ır.	5		20	40	60	80	10"	10-5	10-4	10 ⁻³	ADDITIONAL LAB. TESTING	OR
MET	SING	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	SHE	AR STRE Pa	NGTH	nat V. + rem V. €	- Q - • U - O		TER CO	NTENT PE		DDIT B. TE	STANDPIPE INSTALLATION
i	BOR		STR/	(m)	Z	[80	Wp 20		OW 60	- WI 80	₹ 5	
0		GROUND SURFACE		64.97						Ĭ			Ì	Ĭ	Ĭ		
Ů۲		TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic		0.00 64.72													
	Stem)	matter (rootlets); non-cohesive, moist, loose		0.25		SS 5	5										
	low S	FILL - (SM) SILTY SAND, trace gravel;	′														
	ar Aug n. (Ho	FILL - (SM) SILTY SAND, trace gravel; dark brown to grey brown, contains organic matter and brick fragments;															Bentontie Seal
1	Pow n Diar	non-cohesive, moist, compact			2	SS 1	0										
	Power Auger 200 mm Diam. (Hollow S																
		(SM) gravelly SILTY SAND: grev brown		63.45 1.52	3	SS >	50										
t		(SM) gravelly SILTY SAND; grey brown (GLACIAL TILL); non-cohesive, moist, very dense	N. I.	1.68													_
2		Borehole continued on RECORD OF DRILLHOLE 21-03	1														
		DINILLI IOLL 2 I-U3															
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DEF	PTH S	CALE			\ <u>'</u>			G	0	L D	E	 R				L	OGGED: RI

INCLINATION: -90°

RECORD OF DRILLHOLE: 21-03

SHEET 2 OF 2

DATUM: NAD 1983

LOCATION: N 5028765.9 ;E 366781.2

AZIMUTH: ---

DRILLING DATE: May 18, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

DEPTH SCALE METRES	RECORD		IC LOG	ELEV.	No.	COLOUR % RETURN	SI VI	HR- 8 N - N	loint ault Shear /ein Conju			OR	- Bed - Fol - Cort - Ort - Cle	hogo	nal	PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular	PO-P K - S SM- S Ro - R MB- M	licken	sided	i Break				Rock onal r to lis		
METR	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	DEPTH (m)	RUN No	-USH	RE	COVI		- R.	848 % Q.D.	FF IN F 0.	ACT IDEX PER 25 m	DIP CC A)	w.r.t. DRE XIS	DISCONTINUITY I	DATA	Jcor	n Jr Ja	CON K	DRAL IDUCT , cm/s	JLIC TIVITY sec	MP (MP (Diame	etral Load ex Pa)	RMC -Q' AVG.	
		BEDROCK SURFACE		63.29 1.68			\prod				Щ		\prod	Щ	\prod			$oxed{\Box}$	П	П	Ш	П		\prod		Destanti C. J.
- 2		Fresh, thinly to medium bedded, grey to dark grey, fine to medium grained, non-porous, very strong SHALEY NODULAR LIMESTONE - Broken core from 2.05 m to 2.07 m		1.00	1	100															3000000000			_		Bentontie Seal UCS = 130 MPa Silica Sand
. 3	Rotary Drill NQ Core	- Broken core from 3.57 m to 3.58 m		_	2	100																		-		32 mm Diam. PVC #10 Slot Screen
. 5		- Broken core from 4.64 m to 4.66 m		59.66	3	100																				
		End of Drillhole		5.31			Ш	Ш	Ш	Ħ		1									20					Litt
		Note(s):																								
- 6		1. Water level in screen measured at 2.59 m (Elev. 62.38 m) on May 28, 2021																								
		2. Water level in screen measured at 2.67 m (Elev. 62.30 m) on June 23, 2021																								
- 7																										
- 8																										
- 10																										
- 11																										
DE	PTH S	CALE	<u> </u>	<u> </u>	11) TTT) (L	D	ER									LC	DGGED: RI

1:50

RECORD OF BOREHOLE: 21-04

SHEET 1 OF 1

LOCATION: N 5028747.0 ;E 366692.9

BORING DATE: May 13, 2021

DATUM: NAD 1983

CHECKED: KM/CH

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SAMPLES HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE BORING METHOD DEPTH SCALE METRES ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 67.61 TOPSOIL - (ML) sandy SILT; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose 67.31 0.30 SS 5 FILL - (CL/CI) SILTY CLAY, trace to some sand, trace gravel; grey brown, contains concrete fragments and organic matter; cohesive, w>PL, firm SS 6 0 2 Power Auger 3 SS 5 2 FILL - (GM/SM) SILTY GRAVEL and SAND; dark brown, contains concrete, brick and wood fragments; non-cohesive, moist to wet, compact to 0 SS 18 М very loose SS SS >50 End of Borehole Auger Refusal MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 9 10 **NSD** GOLDER DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-05

SHEET 1 OF 2

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028738.6 ;E 366737.3

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: May 14, 2021

DATUM: NAD 1983

<u>.</u> L	НОР	SOIL PROFILE	1.		SA	MPL		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	구의	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ 20 40 60 80	10 ⁸ 10 ⁵ 10 ⁴ 10 ³ WATER CONTENT PERCENT Wp	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.58			H		20 40 00 00		
	Power Auger 200 mm Diam. (Hollow Stem)	TOPSOIL - (ML/SM) SILTY SAND to sandy SILT, trace gravel; dark brown, contains brick fragments and organic matter (rootlets); non-cohesive, moist, loose FILL - (SM) gravelly SILTY SAND, some low-plastisity fines; dark brown, contains concrete, carpet and organic matter		0.00 65.35 0.23	1	SS	12		0	МН	Bentonite Seal
1	Rotary Drill NQ Core 200 rr	(rootlets); non-cohesive, moist, loose CONCRETE	**************************************	64.34 1.24	1	RC					Bentonite Seal
2	Rota	FILL - (SM) gravelly SILTY SAND; brown; non-cohesive, moist to wet Borehole continued on RECORD OF DRILLHOLE 21-05		63.79 1.79 1.95							
3											
4											
5											
6											
7											
8											
9											
10											
DE	PTH S	CALE	•		1	10	>) GOLDEI	2	L	DGGED: RI

INCLINATION: -90°

LOCATION: N 5028738.6 ;E 366737.3

AZIMUTH: ---

RECORD OF DRILLHOLE: 21-05

DRILLING DATE: May 14, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2

DATUM: NAD 1983

PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular DRILLING RECORD SYMBOLIC LOG DEPTH SCALE METRES ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % TYPE AND SURFACE DESCRIPTION 0400 BEDROCK SURFACE 63.63 Fresh, thinly to medium bedded, grey to UCS = 97 MPa dark brey, fine to medium grained, non-porous, strong SHALEY NODULAR LIMESTONE Bentonite Seal Silica Sand Rotary Drill g 0-25 38 mm Diam. PVC #10 Slot Screen End of Drillhole Note(s): 1. Water level in screen measured at 2.72 m (Elev. 62.86 m) on May 28, 2021 2. Water level in screen measured at 2.73 m (Elev. 62.85 m) on June 2, 2021 10 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22 **GOLDER** DEPTH SCALE LOGGED: RI 1:50 CHECKED: KM/CH

RECORD OF BOREHOLE: 21-06

SHEET 1 OF 2

LOCATION: N 5028643.3 ;E 366748.4 BORING DATE: May 12, 2021 DATUM: NAD 1983 SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 67.00 TOPSOIL - (ML) sandy SILT, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, 0.15 SS 11 Bentonite Seal FILL - (SC) SILTY CLAYEY SAND, some low-medium plasticity fines, trace gravel; brown to dark brown, with black staining, contains wood, organic matter (rootlets); cohesive, moist, compact SS 14 2 Backfill 3 SS 15 MH Bentonite Sea Borehole continued on RECORD OF DRILLHOLE 21-06

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

9

10

WSD GOLDER

INCLINATION: -90°

LOCATION: N 5028643.3 ;E 366748.4

AZIMUTH: ---

RECORD OF DRILLHOLE: 21-06

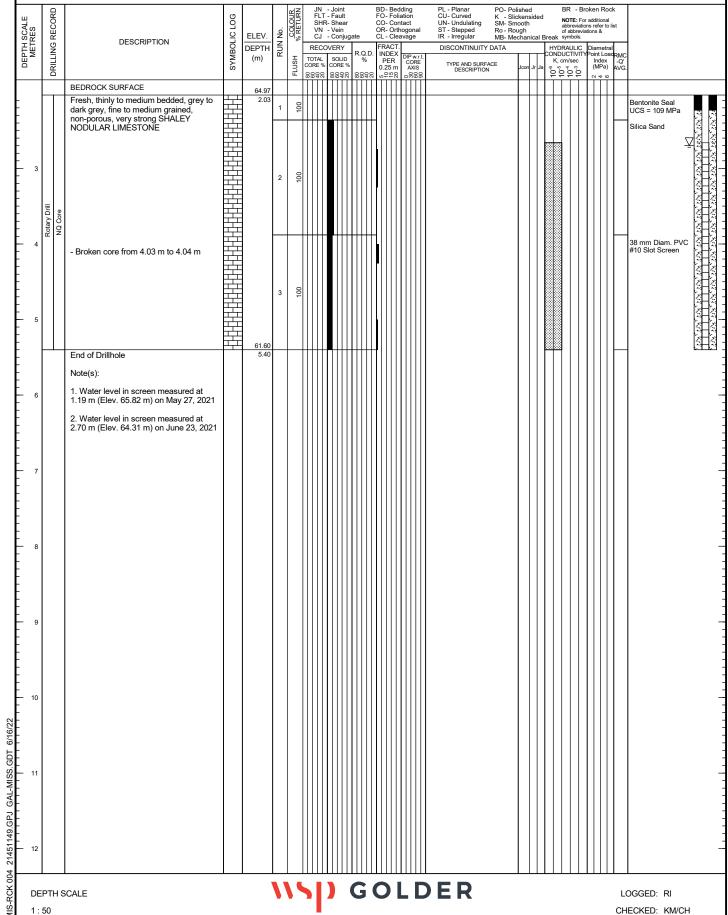
DRILLING DATE: May 12, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2

DATUM: NAD 1983



1:50

RECORD OF BOREHOLE: 21-07

SHEET 1 OF 2

LOCATION: N 5028686.9 ;E 366770.2

BORING DATE: May 17, 2021

DATUM: NAD 1983

CHECKED: KM/CH

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD DEPTH SCALE METRES ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 66.70 TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace gravel, trace clay; dark brown, contains organic matter (rootlets); \non-cohesive, moist, loose 66.47 0.23 SS 8 Bentonite Seal FILL - (SM) SILTY SAND, trace gravel, trace to some clay; dark brown to brown, contains ash, organic matter, brick fragments, concrete fragments, silty clay layers and wood; non-cohesive, moist, SS 19 loose to very dense 64 mm Diam. VSP Pipe 3 SS >50 2 4 SS >50 Borehole continued on RECORD OF DRILLHOLE 21-07 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 9 10 **NSD** GOLDER DEPTH SCALE LOGGED: RI

INCLINATION: -90°

LOCATION: N 5028686.9 ;E 366770.2

AZIMUTH: ---

RECORD OF DRILLHOLE: 21-07

DRILLING DATE: May 17, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2 DATUM: NAD 1983

BEDROCK SURFACE	UCS = 95 MPa
BEDROCK SURFACE Fresh, thinly to medium bedded, grey to dark grey, fine to medium grained, non-porous, strong SHALEY NODULAR LIMESTONE - Lost core from 2.54 m to 2.64 m - Broken core from 3.08 m to 3.10 m - 5 - 6 - Broken core from 6.21 m to 6.23 m	UCS = 95 MPa
dark grey, fine to medium grained, non-porous, strong SHALEY NODULAR LIMESTONE - Lost core from 2.54 m to 2.64 m - Broken core from 3.08 m to 3.10 m 2	UCS = 95 MPa
- Lost core from 2.54 m to 2.64 m - Broken core from 3.08 m to 3.10 m 2 8 - Broken core from 6.21 m to 6.23 m	UCS = 95 MPa
2 8 2 2 8 2 2 2 8 2 2 2 2 2 2 2 2 2 2 2	UCS = 95 MPa
2 8 3 3 8 3 8 3 8 3 8 3 8 3 8 3 8 3 8 3	- - - - -
3 8 - Broken core from 6.21 m to 6.23 m	-
3 8 3 5 5 6 6 7 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7	
3 8 3 5 5 6 6 7 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7	
- 6 - Broken core from 6.21 m to 6.23 m	UCS = 106 MPa
- Broken core from 6.21 m to 6.23 m	
<u>┣</u>	
	64 mm Diam. VSP
	-
	- - - -
55.79	
End of Borehole 10.91	-
DEPTH SCALE 1:50 CONTROL 11 CONTROL 12	
3 5 1 2 - 12	=
	=
DEPTH SCALE 1:50 COLDER	

RECORD OF BOREHOLE: 21-08

SHEET 1 OF 1

LOCATION: N 5028762.3 ;E 366650.3

BORING DATE: May 18, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

S	THOP		SOIL PROFILE	 -		SA	MPL		DYNAMIC P RESISTANO			/,		AULIC C k, cm/s				ING	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD		DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE	BLOWS/0.30m	20 SHEAR STF Cu, kPa			30	W	ATER C	ONTENT	PERCE		ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
7	FOR ROR			STRA	(m)	≥	Ľ	BLOV	20			30	l vv	p			WI 80	K &	
0			GROUND SURFACE		66.02														
		Stem)	TOPSOIL - (SM) gravelly SILTY SAND; brown, contains organics; cohesive, moist, dense		0.00 0.15	İ													
	rger	wollo	\moist, dense FILL - (SM) gravelly SILTY SAND, trace	℅		1	SS	30					0						
	wer Au	am. (F	Initiat, derise FILL - (SM) gravelly SILTY SAND, trace organics andgravel; brown, contains brick fragments; cohesive, moist, dense to very dense																
1	Power Auger	m D	to very dense			2	ss	>50					0						
		200		\bowtie	64.80														
			End of Borehole Auger Refusal		1.22														
2																			
2																			
3																			
3																			
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10																			
DF	PTF	H S¢	CALE			1	19) G	0	L D	E	R					LC	OGGED: AKP
	50		-			•	•						•						ECKED: KM/CH

RECORD OF BOREHOLE: 21-09

SHEET 1 OF 2

DATUM: NAD 1983

LOCATION: N 5028717.0 ;E 366649.1 BORING DATE: May 18, 2021

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

ر. ا	BORING METHOD	SOIL PROFILE	L		SA	MPL		DYNAMIC RESISTA		WS/0.3n			RAULIC C k, cm/s	6			₽ _S	PIEZOMETER
METRES	, MET		STRATA PLOT	ELEV.	ER	ш	BLOWS/0.30m	20	40	60	80		10 ⁻⁶ 1		1	10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
Ψ	RING	DESCRIPTION	'ATA	DEPTH	NUMBER	TYPE)/S/\(SHEAR S Cu, kPa	TRENGTI	nat V rem \	+ Q- ● '. ⊕ U- O	\ \	VATER C			ENT I WI	ADDI AB. T	INSTALLATION
ב	BO		STR	(m)	Z		BLO	20	40	60	80	l W				80	"]	
_		GROUND SURFACE		66.35				Ţ	Ť									
0		TOPSOIL - (SM) gravelly SILTY SAND; brown, contains organics; non-cohesive,		0.00														
	Auger (Hollow Stem)	\moist, loose /	/‱	0.15	1	SS	10											
	low S	FILL - (SM) gravelly SILTY SAND; dark brown to brown, trace organics; non-cohesive, moist, loose to dense	\bowtie															
	r Aug	non-cohesive, moist, loose to dense	\bowtie															
1	Power Auger 200 mm Diam. (Hollow		\bowtie															
	0 mm		\bowtie		2	SS	41					0					М	
	20		\bowtie															
	\perp	Borehole continued on RECORD OF	XXX	64.78 1.57	3	SS	>50											
		DRILLHOLE 21-09																
2																		
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DE	PTH S	SCALE			11	1	۱,		G O	LI	DE	R					LC	GGED: AKP
	50				_		- [l '	_			-						ECKED: KM/CH

INCLINATION: -90°

LOCATION: N 5028717.0 ;E 366649.1

AZIMUTH: ---

RECORD OF DRILLHOLE: 21-09

DRILLING DATE: May 18, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2

DATUM: NAD 1983

BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 64.78 Fresh, thinly bedded, medium to dark brownish grey, fine grained, non-porous, strong SHALEY NODULAR LIMESTONE - veritcal join from 2.04 to 2.09 m depth Rortary Drill - vertical joint from 2.38 to 2.43 m depth End of Drillhole 5 6 9 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22 10 11 **GOLDER** DEPTH SCALE LOGGED: AKP 1:50 CHECKED: KM/CH

RECORD OF BOREHOLE: 21-10

SHEET 1 OF 2

LOCATION: N 5028684.9 ;E 366642.2

BORING DATE: May 18, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

Щ	보	SOIL PROFILE	1 .		SA	MPL	\blacksquare	DYNAMIC PENETRA RESISTANCE, BLOV	/S/0.3m	k,	IC CONDUCT cm/s		阜	PIEZOMETER
RES	MET		LOT		ĸ		.30m	20 40	60 80	10 ⁻⁶	10 ⁻⁵ 1	0 ⁻⁴ 10 ⁻³	NON	OR STANDPIPE
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	SHEAR STRENGTH Cu, kPa	nat V. + Q - ● rem V. ⊕ U - ∩		R CONTENT		IΞω	INSTALLATION
7	BOR		TRA	(m)	Ž	[3101			Wp ⊢			₹\$	
		GROUND SURFACE	100	66.19			ш	20 40	60 80	20	40 6	80		
0	П	TOPSOIL - (SM) gravelly SILTY SAND;	EEE	0.00										
		brown, contains organics; non-cohesive, moist, loose	/‱	0.15	1	ss	10							
	-	FILL - (SM) gravelly SILTY SAND; dark												
	/ Stem)	fragments and clay pockets;												
1	uger	non-cohesive, moist, loose to compact												
	wer A				2	SS	15							Bentonite Seal
	Po mr					-								Delitorite Seal
	Power Auger 200 mm Diam. (Hollow S					1								
					3	SS	>50							
2														
	\vdash	Borehole continued on RECORD OF	- XXXX	64.01 2.18										=
		DRILLHOLE 21-10												
3														
4														
_														
5														
6														
_														
7														
8														
9														
9														
10														
DE	ртн (SCALE			1	10) GO	LDF	2			1.	OGGED: AKP
ے ر					-	•	-			•			L	COULD. AIN

AZIMUTH: ---

RECORD OF DRILLHOLE: 21-10

21-10 SHEET 2 OF 2 DATUM: NAD 1983

LOCATION: N 5028684.9 ;E 366642.2

INCLINATION: -90°

DRILLING DATE: May 18, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	COLOUR % RETURN	;	JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conju		FC CC OF CL	D- Bed D- Foli D- Con R- Orth Clea	ation itact nogona	IR - Irregular	K - g SM- Ro- MB-	Polished Slickensid Smooth Rough Mechanid	ded	Break s	BR - I IOTE: I Ibbrevia If abbre ymbols	For autions viatio	ddition	al		
DEPTH	DRILLING		SYMBO	DEPTH (m)	RUN	FLUSH	TO'COF			D. II 0	RACT. NDEX PER .25 m	DIP w. COR AXIS	DISCONTINU r.t. E TYPE AND SU DESCRIPT	ITY DATA	Jcon J	r Ja	HYDF	RAULIO JCTIVI m/sec	TYP	oint Lo Index (MPa	tral pacRM x -Q a) AV	nc Y G.	
		BEDROCK SURFACE Fresh, thinly to medium bedded, medium	-	64.01 2.18						Ш	₩					ł			+	$\frac{1}{1}$	\perp	Bentonite Seal	
- 3	Rotary Drill NQ Core	grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE -broken core from 2.38 to 2.45 m depth - vertical joint from 2.69 to 4.06 m			1																	Silica Sand $\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	
					2																	38 mm Diam. PVC #10 Slot Screen	
- 5		- broken core from 5.1 to 5.22 m depth		60.70																			
- 6		End of Drillhole Note(s): 1. Water level in screen measured at 2.66 m (Elev. 63.53 m) on May 28, 2021		5.49																			
- 7		Water level in screen measured at 2.66 m (Elev. 63.53 m) on June 23, 2021																					
- 8																							
- 9																							
- 10																							
- 11																							
- 12																							
DE	PTH S	CALE			\ '	/ '		 	G				DER								<u> </u>	LOGGED: AKP	

1:50

RECORD OF BOREHOLE: 21-11

SHEET 1 OF 1

CHECKED: CH

LOCATION: N 5028623.7 ;E 366685.5

BORING DATE: May 13, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmDYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 67.35 TOPSOIL - (SM) SILTY SAND, some clay; dark brown, contains organic matter (rootlets); non-cohesive, moist, 67.05 0.30 SS 3 FILL - (SM) gravelly SILTY SAND, trace to some clay, dark brown, contains organic matter; non-cohesive, moist to wet, very loose to compact SS 11 3 SS >50 65.67 End of Borehole Auger Refusal MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 9 10 WSD GOLDER DEPTH SCALE LOGGED: RI

1:50

RECORD OF BOREHOLE: 21-12

SHEET 1 OF 2

CHECKED: CH

LOCATION: N 5028586.9 ;E 366762.5

BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmDYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH OW Wp -(m) GROUND SURFACE 68.72 TOPSOIL - (SM) gravelly SILTY SAND; brown, contains organics; non-cohesive, moist 0.15 SS 26 FILL - (SM) gravellly SILTY SAND; dark brown to brown with black mottling; non-cohesive, moist, compact 2 SS 20 67.32 Borehole continued on RECORD OF DRILLHOLE 21-12 2 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 9 10 WSD GOLDER DEPTH SCALE LOGGED: AKP

LOCATION: N 5028586.9 ;E 366762.5

INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 21-12

DRILLING DATE: May 19, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2

DATUM: NAD 1983

DEPTH SCALE METRES		DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	% RETURN	SI VI C.	HR- N - J -	Join Faul Shea Vein Con	ar i juga	ite	B C C	D- E O- F O- C DR- C	Bedd oliat Conta Ortho Cleav	ing tion act gona /age	ıl	PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular	PO- Po K - Sli SM- Sn Ro - Ro MB- Me	lishe cken nooth ugh echai	d sided n		No ab	OTE: F	or actions	en Ro dditiona refer to ns &	al olist		
DEPTI-		DRILLING		SYMBC	DEPTH (m)	IN RUI	≝ °	TOTA CORE	L % (SOLI SORE	ID E %	R.Q. %	١,	PEI 0.25	m	OIP w.i	r.t. E	TYPE AND SURFA DESCRIPTION		Joor	n Jr Já	10°6 100 H,	YDR. NDU K, cm	AULIC CTIVIT 1/sec	TYPO	iametroint Lo Index (MPa)	ral adRN -(MC Q' VG.	
- - - - - - - - - - - - - - - - - - -	Rotary Drill	NQ Core	BEDROCK SURFACE Fresh, thinly bedded, medium to dark brownish grey, fine grained, non-porous, strong SHALEY NODULAR LIMESTONE - broken core from 1.61 to 1.70 m depth - broken core from 2.15 to 2.19 m depth		67.32 1.40																								
- 3			End of Drillhole		2.97																								
- 5 																													
- 7 - 7 																													
	9																												-
10 10 10 10 10 10 10 10																													
D 424 D	EP ⁻		CALE			11	•	•)	(G		O	L	.	D	ER											GGED: AKP

RECORD OF BOREHOLE: 21-13

SHEET 1 OF 2

LOCATION: N ;E BORING DATE: May 13, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

A "	윋	\downarrow	SOIL PROFILE	 -		SA	MPL		DYNAMIC P RESISTANC			λ,		AULIC CC k, cm/s			NG NG	PIEZOMETER
METRES	BORING METHOD		DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	20 SHEAR STR Cu, kPa	40 ENGTH	60 to 10 nat V. + rem V. ⊕	Q - • U - O		OF 10 ATER CO	PERCEI	NT	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
ז	BO	1		STR	(m)	z		BLO	20	40	60 8	30	2		0 8		, ,	
0	L.		GROUND SURFACE TOPSOIL - (ML) sandy SILT, trace clay;	85-	0.00					1								
1	Auger	stem)	(coollets); non-cohesive, moist FILL - (CL/CI) SILTY CLAY, trace sand, trace gravel; grey brown, contains organic matter; cohesive, w~PL, firm (SM/ML) SILTY SAND to sandy SILT,		0.00	2	SS						0				м	
2	Power Auger	200 mm Diam.				3	SS	10					0					
3			Borehole continued on RECORD OF		2.97													
			DRILLHOLE 21-13															
4																		
5																		
6																		
7																		
8																		
9																		
10																		
DE	PTH	lsc L	CALE	1		11	10) G	O	LD	E	R				١٥	GGED: RI

LOCATION: N ;E

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

1:50

RECORD OF DRILLHOLE: 21-13

DRILLING DATE: May 13, 2021

SHEET 2 OF 2

CHECKED: CH

DATUM: NAD 1983

DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE Slightly weathered to fresh, thinly to 2.97 medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE - broken core from 2.97 to 3.05 m depth - vertical joint from 2.97 to 3.27 m depth Rotary Drill NQ Core - lost core from 3.88 to 4.30 m depth End of Drillhole 4.98 6 10 11 12 **GOLDER** DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-201

SHEET 1 OF 2

LOCATION: N 5028309.4 ;E 366459.5 BORING DATE: June 8, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

ဟ	BORING METHOD		SOIL PROFILE	 		Si	AMPL		RESIS	TANCE	NETRAT , BLOW	S/0.3m			k, cm/s	ONDUCT		2	ING ING	PIEZOMETER
METRES	G ME		DESCRIPTION	STRATA PLOT	ELE\	/. H	씱	BLOWS/0.30m		20 L R STRE	40 NGTH	60 nat V. +	80 - Q - ●	10 W/) ⁻⁵ 10 L ONTENT		10 ⁻³ ENT	ADDITIONAL LAB. TESTING	OR STANDPIPE
Ī	ORIN		DESCRIPTION	'RAT	DEPT (m)	귀불	TYPE	OWS.	Cu, kF			rem V. (9 Ū- Ŏ			-OW		WI	ADD LAB.	INSTALLATION
	á	GROUND S	LIDEACE	ST		-		В		20	40	60	80	20) 4	0 6	0	80	+	
0		TOPSOIL -	(SM) SILTY SAND; dark	EEE	82.4															
			tains organic matter (rootlets) ve, moist, loose		82.0	08 1	SS	5												
		brown, con	SILTY SAND, brown to dark tains organic matter;		0.3	38														
		non-cohesi	ve, moist, loose		81.7															Bentonite Seal
1		cobbles and	'SAND, grey brown, contains d boulders (GLACIAL TILL); ve, moist to wet, loose to			2	SS	9						0					м	
		compact																		
						\vdash														8
						3	SS	19												
2	(moto																			
	uger	800																		
	Power Auger	2				4	SS	15												
	Power Auger																			
3	100	I (SM/GM) S	ILTY gravelly SAND to SILTY		79.4 3.0		SS	>50												
		contains co	VEL; grey to red brown, obbles and boulders; ve, moist to wet, compact to																	
		very dense		排																
4				排			1													
4				17.		6	SS	14												
				17.		-	-													Backfill
				挪		7	ss	76												
5	+	(SP/GP) G	ravelly SAND to Sandy		77.4															
		GRAVEL, s	some non-plastic fines; brown bbles and boulders;	,		8	RC	-												Backfill June 18, 2021
			ve, wet, very dense																	
6																				
						9	RC	-												
				• •																
						-	-													Suite 24, 2021
7	Duing			• •																
	/ash Bc	20																		
	Rotary Drill/Wash Boring	2		, ,		10	RC	-												
	Rotary			, .																Bentonite Seal
8				• •																
						-	ss	>50												,
				• •																Silica Sand
9						12	RC	-												[8]
٥						-	-													
				• •		13	SS	102						0					М	32 mm Diam. PVC #10 Slot Screen
10	_L			_	<u> </u>	14	RC	-	L	ļ	- -	 		 				 	-	<u> </u> 2
		cc	NTINUED NEXT PAGE																	
DEI	PTH	SCALE				1	1			G	0	LD	E	R					L	OGGED: RI
1:						•	-							_						IECKED: CH

RECORD OF BOREHOLE: 21-201

SHEET 2 OF 2

LOCATION: N 5028309.4 ;E 366459.5 BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

3 07	–		- L		ЭА	MPL		DYNAMIC PENE RESISTANCE, B			ί,		k, cm/s	ONDUCT			₽ _R	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENG Cu, kPa 20 40	GTH n	at V. + em V. ⊕	Q - • U - O		ATER CO	ONTENT	PERCE	10 ⁻³ ENT WI 80	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
		CONTINUED FROM PREVIOUS PAGE	100					20 40) 6	0 80)	20) 41	0 6	1	80		
10 —		(SP/GP) Gravelly SAND to Sandy GRAVEL, some non-plastic fines; brown, contains cobbles and boulders; non-cohesive, wet, very dense			14	RC	-											1,741,741,741,741,741,741,741,741,741,74
. 11 11 11 11 11 11 11 11 11 11 11 11 11	Kotary Drill/Wash Boring NW Casing																	32 mm Diam. PVC #10 Slot Screen
:IQ >zeto2	Rotary Dri				16	RC	•											
Ld5C	2	Dynamic Cone Penetration Test		69.78 12.68 69.58	17	SS	89					120						Cave
13	,,	(DCPT) End of Borehole DCPT Refusal 1. Water level in screen measured at		12.88														
14		6.5 m (Elev. 75.95 m) on June 24, 2021 2. Water level in screen measured at 6.45 m (Elev. 76.01) on June 18, 2021																
15																		
16																		
17																		
18																		
19																		
20		CALE			<u> </u>) G (<u> </u>		<u> </u>							DGGED: RI

RECORD OF BOREHOLE: 21-201

SHEET 1 OF 2

LOCATION: N 5028309.4 ;E 366459.5 BORING DATE: June 8, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

[보	SOIL PROFILE	1		S	AMPL		DYNAMIC PENETRA RESISTANCE, BLOV	/S/0.3m		k, c	C CONDUC m/s	,	무일	PIEZOMETER
METRES	BORING METHOD		2LOT		l K		.30m	20 40	60 80	_`	10 ⁻⁶		10 ⁻⁴ 10 ⁻³	[일입	OR STANDPIPE
MET	3ING	DESCRIPTION	STRATA PLOT	ELEV.	-1 =	TYPE	BLOWS/0.30m	SHEAR STRENGTH Cu, kPa	nat V. + Q rem V. ⊕ U	} - ● J - ○			T PERCENT	. E	INSTALLATION
	BOF		STR/	(m)	Įź	ľ	BLO	20 40	60 80		Wp ├ ─ 20	→ O ^W	′—— I W 60 80		
		GROUND SURFACE	1	82.46		П		70				- 10	1 1		
0		TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets):		0.00											
		non-cohesive, moist, loose		82.08		ss	5								
		FILL - (SM) SILTY SAND, brown to dark brown, contains organic matter;	\bowtie	0.38	<u>"</u>										
		non-cohesive, moist, loose (SM) SILTY SAND, grey brown, contains		81.70		1									Bentonite Seal
1		cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to			2	SS	9				0			м	
		compact		1	-										
						1									
_	1				3	SS	19								
2	100			1	\vdash	$\mid \mid$									
	Auger					1									
	Power /			1	4	ss	15								
	Power Auger]									
3	000	I (SM/GM) SILTY gravelly SAND to SILTY		79.41 3.05											
		sandy GRAVEL; grey to red brown, contains cobbles and boulders;			5	SS	>50								
		non-cohesive, moist to wet, compact to very dense													
		vory delige				↓									
4															
			排		6	SS	14								
			1		-	$\mid \mid$									Backfill
			1		7	ss	76								
				77.48	3		, ,								
5		(SP/GP) Gravelly SAND to Sandy GRAVEL, some non-plastic fines; brown,	• •	4.98	8	RC									Backfill June 18, 2021
		contains cobbles and boulders; non-cohesive, wet, very dense	• •		Ľ										
6			<i>``</i>		9	RC	_								
			• •		"										
			• •												
						1									
7	g.		i i												June 24, 2021
	h Borii	מַ	• •												
	Rotary Drill/Wash Boring														
	Iry Dril				10	RC	-								Bentonite Seal
8	Rota														
٥			• •												
			• •		-	ss	>50								
			• •												Silica Sand
					12	RC	-								
9			•												[8
				:											32 mm Diam. PVC
					13	SS	102				0			М	#10 Slot Screen
					<u></u>										
10	_L			ļ	14	RC	-	4				-4	-		<u>. </u>
		CONTINUED NEXT PAGE													
רר	DT□	SCALE			1	1) GO	ו חו	F)				.OGGED: RI
חבו	· 1 H	JOALE			•	•	7	- -			•			L	OGGED. KI

RECORD OF BOREHOLE: 21-201

SHEET 2 OF 2

DATUM: NAD 1983

LOCATION: N 5028309.4 ;E 366459.5

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: June 8, 2021

<u>,</u>	9	SOIL PROFILE			SA	MPL	-	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	로 PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - ○ 20 40 60 80	10 ⁻⁸ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³ WATER CONTENT PERCENT Wp	9 PIEZOMETER OR STANDPIPE INSTALLATION
10		CONTINUED FROM PREVIOUS PAGE	A 5 A 5							121
	Rotary Drill/Wash Boring NW Casing	(SP/GP) Gravelly SAND to Sandy GRAVEL, some non-plastic fines; brown, contains cobbles and boulders; non-cohesive, wet, very dense			14 15 16		- >50			32 mm Diam. PVC #10 Slot Screen
13	DCPT	Dynamic Cone Penetration Test (DCPT) End of Borehole DCPT Refusal		69.78 12.68 69.58 12.88	17	ss	89		120	Cave
· 14		1. Water level in screen measured at 6.5 m (Elev. 75.95 m) on June 24, 2021 2. Water level in screen measured at 6.45 m (Elev. 76.01) on June 18, 2021								
16										
17										
18										
19										
20										
DEI	PTH S	CALE			1	1	>) GOLDER	₹	LOGGED: RI

RECORD OF BOREHOLE: 21-202

SHEET 1 OF 3

LOCATION: N 5028386.4 ;E 366468.2

BORING DATE: May 25, 2021

DATUM: NAD 1983

DEFTI SCALE METRES	BORING METHOD	GROUND SURFACE TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose FILL - (SM) SILTY SAND; dark brown to brown, contains organic matter; non-cohesive, moist, very loose (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive, w <pl, stiff<="" th="" very=""><th>STRATA PLOT</th><th>ELEV. DEPTH (m) 81.20 0.00 80.95 0.25</th><th>Z</th><th>TYPE</th><th>BLOWS/0.30m</th><th>SHEAR Cu, kPa</th><th>STRE</th><th>40 NGTH</th><th>nat V. rem V.</th><th>80 + Q - ⊕ U -</th><th>` •</th><th></th><th></th><th></th><th>T PERCE</th><th>10⁻³ ENT</th><th>ADDITIONAL LAB. TESTING</th><th>PIEZOMET OR STANDPIF INSTALLAT</th><th>IPE</th></pl,>	STRATA PLOT	ELEV. DEPTH (m) 81.20 0.00 80.95 0.25	Z	TYPE	BLOWS/0.30m	SHEAR Cu, kPa	STRE	40 NGTH	nat V. rem V.	80 + Q - ⊕ U -	` •				T PERCE	10 ⁻³ ENT	ADDITIONAL LAB. TESTING	PIEZOMET OR STANDPIF INSTALLAT	IPE
1	BORING	GROUND SURFACE TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose FILL - (SM) SILTY SAND; dark brown to brown, contains organic matter; non-cohesive, moist, very loose (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,		B1.20 0.00 80.95			BLOWS/			нотн	rem V.	∓ ų- ⊕ U-	ŏ		IEK C	אם ו אוע IEN		⊏IN I	B.	INSTALLAT	
1	B	TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose FILL - (SM) SILTY SAND; dark brown to brown, contains organic matter; non-cohesive, moist, very loose (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,		81.20 0.00 80.95		ss	BL	20) .				I	Wp		$ ^{\text{W}}$		WI	∢		
1		TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose FILL - (SM) SILTY SAND; dark brown to brown, contains organic matter; non-cohesive, moist, very loose (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,		0.00 80.95		ss	\dashv			40	60	80	_	20	4	0	60	80			
		FILL - (SM) SILTY SAND; dark brown to brown, contains organic matter; non-cohesive, moist, very loose (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,		80.95 0.25		ss							_				+	+	+		1
		brown, contains organic matter; non-cohesive, moist, very loose (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,				ı - I	3														
		(CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,		3	<u> </u>																
		sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,		1																Bentonite Seal	
2		sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,		79.98	2	ss	4														
2		(WEATHERED CRUST); cohesive,		1.22																	
2		vv~ı ∟, very sun																			X
		(SM) gravelly SILTY SAND; grey brown, possible cobbles and boulders		79.37 1.83		SS	14														8
		(GLACIAL TILL); non-cohesive, moist, loose to dense																			×
																					8
					4	SS	16														8
3																					×
					5	SS	10														8
																					8
																					8
4					6	ss	36														8
	<u>-</u>																				8
	200 mm Diam. (Hollow Stem)																				8
Power Auger	n. (Holle				7	SS	7													_	_8
Pow	ım Diar			75.8 <u>6</u>																June 9, 2021	
	200 n	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders		5.34		00															\checkmark
		(GLACIAL TILL); non-cohesive, wet, very loose			8	SS	2													Backfill	×
6		(SM) gravelly SILTY SAND; grey,		75.10 6.10																	8
		contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,			9	ss	wн														
		very loose																			
7		(SM/GM) gravelly SILTY SAND to SILTY		74.34 6.86																	8
		sandy GRAVEL; brown, contains cobbles and boulders; non-cohesive, wet, dense	欁		10	ss	45														×
		, 	歴	:		$ \cdot $															*
			M																		8
8			脒	70.0-	11	SS	34														8
		(SW) gravelly SAND, fine to coarse, trace to some silt; grey brown, possible	(3)	72.97 8.23																	8
		cobbles and boulders; non-cohesive, wet, compact			12	ss	16														×
					Ĺ																8
9				:																	
					13	ss	24														*
																					*
10	.L			1	_14 _	s <u>s</u>	<u>14</u>	+			 	_	-				-	 	-		_8
		CONTINUED NEXT PAGE															$oxed{oxed}$				

RECORD OF BOREHOLE: 21-202

SHEET 2 OF 3

DATUM: NAD 1983

LOCATION: N 5028386.4 ;E 366468.2

BORING DATE: May 25, 2021

Щ	QQ	SOIL PROFILE			SA	MPLE		DYNAMIC PENETRA RESISTANCE, BLOW	TON \ S/0.3m		HYDRAULIC CON k, cm/s	IDUCTIVIT	Υ,		PIEZOMETER
TRES	MET		PLOT	ELEV.	띪).30m	20 40	60 80	`	10 ⁻⁶ 10 ⁻⁵		10 ⁻³	TIONA	OR STANDPIPE
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	DEPTH	NUMBER	TYPE	BLOWS/0.30m	SHEAR STRENGTH Cu, kPa	nat V. + Q - rem V. ⊕ U -	•	WATER CON	OW OW	CENT WI	ADDITIONAL LAB. TESTING	INSTALLATION
	M			(m)	_		BL	20 40	60 80		20 40	60	80	\perp	
10		CONTINUED FROM PREVIOUS PAGE (SW) gravelly SAND, fine to coarse,	- 												×
	tem)	trace to some silt; grey brown, possible cobbles and boulders; non-cohesive, wet, compact			14	ss	14								
11	Power Auger mm Diam. (Hollow Stem)				15	SS	27								
	200 mm	(SW) gravelly SAND, fine to coarse, trace to some silt; brown, contains cobbles and boulders; non-cohesive,		69.6 <u>1</u> 11.59	16	ss	1								Backfill
12		wet, compact to dense			17	ss	12								
13					18		>50								Backfill
					19	RC	טט								
					20	ss	43								
14	oring														
	/ Drill/Wash B														
	Rotary Drill/Wash Boring NW Casing														
	Rota														
15															
					21	SS	32								
						1									
16															
															Bentonite Seal
		Borehole continued on RECORD OF		64.7 <u>1</u> 16.49		ss	>50								
		DRILLHOLE 21-202													
17															
18															
19															
20															
20				L											
	•				-) GO							

RECORD OF DRILLHOLE: 21-202 PROJECT: 21451149 SHEET 3 OF 3 LOCATION: N 5028386.4 ;E 366468.2 DRILLING DATE: May 25, 2021 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PO- Polished BR
K - Slickensided
SM- Smooth abbre
Ro - Rough of abb
MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD NOTE: For additional abbreviations refer to lis of abbreviations & SYMBOLIC LOG DEPTH SCALE METRES Š ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTI INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 64.71 Bentonite Seal Slightly weathered to fresh, thickly to massive bedded, medium brownish grey, fine to coarse grained, faintly porous, strong LIMESTONE, with thin shale partings Silica Sand 9 17 - Broken core from 16.49 m to 16.58 m Broken core from 16.82 m to 16.85 m
 Broken core from 17.56 m to 17.59 m 18 32 mm Diam. PVC #10 Slot Screen Rotary Drill 19 ğ - Broken/lost core from 19.25 m to 19.36 m 20 21 Silica Sand 25 End of Drillhole 22 Note(s): 1. Water level in screen measured at 5.15 m (Elev. 76.04 m) on June 9, 2021 23 24 25

WSD GOLDER

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

DEPTH SCALE

1:50

RECORD OF BOREHOLE: 21-202

SHEET 1 OF 3

LOCATION: N 5028386.4 ;E 366468.2

BORING DATE: May 25, 2021

DATUM: NAD 1983

H F	НОБ	SOIL PROFILE			SA	MPL		YNAMIC PEI RESISTANCE	NETRAT , BLOW	TION 'S/0.3m		HYDRAU k	ILIC CON	IDUCTIV	ITY,	무양	PIEZOMETER
METRES	BORING METHOD		STRATA PLOT	ELEV.	3ER	Щ	BLOWS/0.30m		40 NCTH	60 not \/	80	10-6	i_	10 ⁻⁴	10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
ME	ORING	DESCRIPTION	RATA	DEPTH	NUMBER	TYPE	OWS/	SHEAR STRE Cu, kPa	NGIH	rem V.	# Q- • • U- O	Wp		OW OW		ADDI LAB.	INSTALLATION
_	B(GROUND SURFACE	ST	(m)			BL	20	40	60	80	20	40	60	80	-	
0				81.20 0.00													
		TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose		80.95 0.25		ss	3										
		FILL - (SM) SILTY SAND; dark brown to brown, contains organic matter;	\bowtie														
		non-cohesive, moist, very loose	\bowtie														Bentonite Seal
1				79.98	2	ss	4										
		(CI/CH) SILTY CLAY to CLAY, trace		1.22													
		sand; grey brown, highly fissured (WEATHERED CRUST); cohesive, w <pl, stiff<="" td="" very=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>8</td></pl,>															8
		(SM) gravelly SILTY SAND, grey brown		79.37 1.83		SS	14										
2		possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist,															
		loose to dense															
					4	ss	16										
3																	
-																	
					5	SS	10										
4					6	00	36										
					0	SS	30										
	Stem)																
	uger Hollow (7	SS	7										
5	Power Auger Diam. (Hollo																June 9, 2021
	Power Auger 200 mm Diam. (Hollow Stem)	(SM) gravelly SILTY SAND; grey,		75.8 <u>6</u> 5.34													
	20	contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,			8	ss	2										D Letti
6		very loose		75.40													June 9, 2021 □ Backfill
-		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders		75.1 <u>0</u> 6.10													
		(GLACIAL TILL); non-cohesive, wet, very loose			9	SS	WH										
		•		74.34													
7		(SM/GM) gravelly SILTY SAND to SILTY sandy GRAVEL; brown, contains		6.86													
		cobbles and boulders; non-cohesive, wet, dense			10	SS	45										
					11	SS	34										
8				72.97		33	5+										
		(SW) gravelly SAND, fine to coarse, trace to some silt; grey brown, possible															
		cobbles and boulders; non-cohesive, wet, compact			12	ss	16										
9																	
J																	
					13	SS	24										
10	LL			1	14_	ss	<u>14</u>	-+	-	 		 	+	-		_	
		CONTINUED NEXT PAGE															

1:50

RECORD OF BOREHOLE: 21-202

SHEET 2 OF 3

CHECKED: CH

LOCATION: N 5028386.4 ;E 366468.2

BORING DATE: May 25, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp F (m) --- CONTINUED FROM PREVIOUS PAGE --(SW) gravelly SAND, fine to coarse, trace to some silt; grey brown, possible cobbles and boulders; non-cohesive, SS 14 14 11 15 SS 27 (SW) gravelly SAND, fine to coarse, 16 SS trace to some silt; brown, contains cobbles and boulders; non-cohesive, 12 wet, compact to dense 17 SS 12 SS >50 13 Backfill 19 RC DD 20 SS 43 Rotary Drill/Wash Boring 14 SS 21 32 16 Bentonite Seal SS |>50 Borehole continued on RECORD OF 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 **GOLDER** DEPTH SCALE LOGGED: RI

RECORD OF DRILLHOLE: 21-202 PROJECT: 21451149 SHEET 3 OF 3 LOCATION: N 5028386.4 ;E 366468.2 DRILLING DATE: May 25, 2021 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PO- Polished BR
K - Slickensided
SM- Smooth abbre
Ro - Rough of abb
MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD NOTE: For additional abbreviations refer to lis of abbreviations & SYMBOLIC LOG DEPTH SCALE METRES Š ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTI INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 64.71 Bentonite Seal Slightly weathered to fresh, thickly to massive bedded, medium brownish grey, fine to coarse grained, faintly porous, strong LIMESTONE, with thin shale partings Silica Sand 9 17 - Broken core from 16.49 m to 16.58 m Broken core from 16.82 m to 16.85 m
 Broken core from 17.56 m to 17.59 m 18 32 mm Diam. PVC #10 Slot Screen Rotary Drill 19 ğ - Broken/lost core from 19.25 m to 19.36 m 20 21 Silica Sand 25 End of Drillhole 22 Note(s): 1. Water level in screen measured at 5.15 m (Elev. 76.04 m) on June 9, 2021 23 24 25

WSD GOLDER

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/13/22

RECORD OF BOREHOLE: 21-203

SHEET 1 OF 2

LOCATION: N 5028375.5 ;E 366524.0

BORING DATE: May 19, 2021

DATUM: NAD 1983

, T	9	SOIL PROFILE			SA	MPLE	ES	DYNAN RESIS	IIC PE	NETRA E, BLOV	TION /S/0.3m	n		HYDR	RAULIC k, cr	CONI	DUCT	IVITY,		ا ي ا	PIEZOMETER
METRES	BORING METHOD		LOT		Ä		.30m	2	0	40	60	80			10 ⁻⁶	10-5	10		10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
MET	SING	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	SHEAF Cu, kPa	STRI	ENGTH	nat V	. + ⁄. ⊕	Q - • U - O					PERC		DDDIT VB. TE	INSTALLATIO
i	BOF		STR,	(m)	ž		BLO	2		40	60	80			'p —— 20	40	⊖ <u>W</u> 6		WI 80	4 4	
0		GROUND SURFACE		81.36																	
J		TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic				$ \uparrow$						T									
		matter (rootlets); non-cohesive, moist, loose	/⋘	0.25	1	SS	31														
		FILL - (SM) SILTY SAND; brown; non-cohesive, moist, compact	ʹ⋘																		
			\bowtie	80.45		1															
1		(CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured,		0.91	2	ss	4														
		contains organic matter (WEATHERED CRUST); cohesive, w>PL, very stiff to		\$																	
		stiff																			
		(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to			3	ss	15														
2		wet, loose to compact																			
						1															
					4	SS	20														
3						<u> </u>															
					5	SS	17														
						$\mid \cdot \mid$															
4						1															
4					6	ss	15														
	Power Auger 200 mm Diam. (Hollow Stem)																				
	Auger				7	ss	15														
5	Power Auger Diam. (Hollov																				
	mm 0	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders		76.0 <u>2</u> 5.34		$\mid \cdot \mid$															$\bar{\Delta}$
	20	(GLACIAL TILL); non-cohesive, wet,			8	SS	4														
		loose to dense																			
6																					
					9	ss	12														
				\$,		14														
7																					
					10	SS	11														
8					11	SS	42														
				72.98		$ \ $															
		(SW) SAND, fine to coarse, trace to	TAR	8.38																	
		some gravel; grey; non-cohesive, wet, loose to compact			12	ss	5														
9																					
						$\mid \cdot \mid$															
					13	SS	10														
					14	ss	17														
10		CONTINUED NEXT PAGE	T-'-	T							7-	_		Ī — —		7-			T-		
					_		_)	_						1			I			

RECORD OF BOREHOLE: 21-203

SHEET 2 OF 2

LOCATION: N 5028375.5 ;E 366524.0 BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

Ц	모	SOIL PROFILE			SA	MPLE		DYNAMIC PENETRATESISTANCE, BLOW	S/0.3m	į	HYDRAULIC k, cn	/s		무의	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH	nat V. +	80 - Q - •	10 ⁻⁶ WATER	10 ⁻⁵ 10 CONTENT I	PERCENT	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
7 ∏ F ⋝	BORIN	2255.3. 7.50	STRAT	DEPTH (m)	Ž		BLOW	Cu, kPa	rem V. €	9 U-O	Wp I	OW	— ⊣ wı	AD LAB	1143 TALLATION
-10		CONTINUED FROM PREVIOUS PAGE				H		20 40	60	80	20	40 60	80		
10		(SW) SAND, fine to coarse, trace to some gravel; grey; non-cohesive, wet,													
		loose to compact		-	14	SS	17								
						1									
					15	ss	20								
11					13	33	25								
						1									
		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders;		69.77 11.59	16	ss	100								
12		non-cohesive, wet, very dense													
		(GW/SW) gravelly SAND to sandy		69.16 12.20		-									
	, tem	(GW/SW) gravelly SAND to sandy GRAVEL, some silt; grey, contains cobbles and boulders; non-cohesive,			17	ss	74								
	iger	wet, very dense	• •]									
13	Power Auger		, ,												
	P P		• •												
	000		• •												
			, ,												
14		(SM/ML) SILTY SAND to sandy SILT,		67.34 14.02	18	ss	13								
		trace to some gravel; grey; non-cohesive, wet, compact													
15				66.12											
		(SW) gravelly SAND, fine to coarse, some silt; grey; non-cohesive, wet,		15.24]									
		dense			19	SS	41								
16	\dashv	Dynamic Cone Penetration Test (DCPT)		65.5 <u>1</u> 15.85		$ \ $					162				
				:							162				
	DCPT			1					<	<u></u>					
				64.46											
17		End of Borehole DCPT Refusal		16.90											
		251 Thoracal													
18															
,.															
19															
20															
רב	DTL	SCALE.			1	16) GO	חו	F	D	•		100	CED: PI
υE	rIH	SCALE			-	•	7		L					LOC	GGED: RI

RECORD OF BOREHOLE: 21-203

SHEET 1 OF 2

LOCATION: N 5028375.5 ;E 366524.0

BORING DATE: May 19, 2021

DATUM: NAD 1983

ES	ETHOD	SOIL PROFILE	6		SAMPL	_	DYNAMI RESISTA				80	HYDRAI	k, cm/s			10 ⁻³	NAL STING	PIEZOMETER OR
METRES	BORING METHOD	DESCRIPTION	A DE	EV. PTH m)	TYPE	BLOWS/0.30m	SHEAR S Cu, kPa	STRENG	GTH r	ıat V. + em V. €	Q - • U - O		TER CO	ONTEN	T PERC		ADDITIONAL LAB. TESTING	STANDPIPE INSTALLATION
		GROUND SURFACE	1 1	31.36			20	40	, ,	0	80	20	41	J	00	80		
0		TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose		0.00 81.11 0.25 1	ss	31												
1		FILL - (SM) SILTY SAND; brown; non-cohesive, moist, compact (CI/CH) SILTY CLAY to CLAY trace		30.45 0.91														
		(CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured, contains organic matter (WEATHERED CRUST); cohesive, w>PL, very stiff to stiff	WW	1.07	ss	4												
2		(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact		3	ss	15												
				4	ss	20												
3				5	ss	17												
4	m)			6	ss	15												
5	Power Auger mm Diam. (Hollow Stem)			7	ss	15												
	200 mm l	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense	7	76.0 <u>2</u> 5.34	ss	4												Ā
6				9	ss	12												
7				10	ss	11												
8				11	ss	42												
		(SW) SAND, fine to coarse, trace to some gravel; grey; non-cohesive, wet, loose to compact	7	72.98 8.38	s ss	5												
9				13	s	10												
10	_L	CONTINUED NEXT PAGE			ss	<u>17</u>										+	- -	
			1		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \)	<u> </u>	<u> </u>						1			

MIS-BHS 001

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RECORD OF BOREHOLE: 21-203

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028375.5 ;E 366524.0

BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SW) SAND, fine to coarse, trace to some gravel; grey; non-cohesive, wet, loose to compact SS 14 17 15 SS 29 (SM) gravelly SILTY SAND; grey, 16 SS 100 contains cobbles and boulders; non-cohesive, wet, very dense 12 (GW/SW) gravelly SAND to sandy GRAVEL, some silt; grey, contains cobbles and boulders; non-cohesive, SS 17 74 wet, very dense Power Auger 13 14 18 SS 13 (SM/ML) SILTY SAND to sandy SILT, trace to some gravel; grey; non-cohesive, wet, compact 15 (SW) gravelly SAND, fine to coarse, some silt; grey; non-cohesive, wet, 19 SS 41 162 Dynamic Cone Penetration Test (DCPT) 162 64.46 End of Borehole DCPT Refusal 18 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-204

SHEET 1 OF 2

LOCATION: N 5028364.7 ;E 366570.7

BORING DATE: June 9, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

إ	원	SOIL PROFILE	1.		SA	MPLI		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	PIEZOMETER
METRES	BORING METHOD		STRATA PLOT	E. E.	띪		BLOWS/0.30m	20 40 60 80	K, cm/s	OR STANDPIPE
ME	RING	DESCRIPTION	ATA F	ELEV. DEPTH	NUMBER	TYPE	MS/0	SHEAR STRENGTH nat V. + Q - ■ Cu, kPa rem V. ⊕ U - C	WATER CONTENT PERCENT	INSTALLATION
5	BOF		STR	(m)	Z		BLO	20 40 60 80	Wp	
		GROUND SURFACE	1	81.09				20 40 00 00	20 40 00 00	
0		TOPSOIL -(SM) SILTY SAND; dark brown, contains organic matter (rootlets);		0.00						
		\non-cohesive, moist, loose /	/‱	0.15	1	ss	5			
		FILL - (SP) SAND, fine to medium, some silt; brown to dark brown, contains		80.48						Bentonite Seal
		organic matter; non-cohesive, moist, loose	∕⋘	0.61	F					
1		FILL - (SM) SILTY SAND, trace gravel; brown to dark brown, contains organic		3						🛚
		brown to dark brown, contains organic matter; non-cohesive, moist, loose	\bowtie	1	2	SS	6			
				79.57	_	$\mid \cdot \mid$				
		(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders		1.52		1				
		(GLACIAL TILL); non-cohesive, moist to		1	3	ss	6			
2		wet, loose to compact								
				1						
					,		اا			
				1	4	SS	11			
3				1		$\mid \mid$				
										Backfill
				3	5	ss	19			
				1						
		(SM) gravelly SILTY SAND; grey,		77.28 3.81		+				
4	(mř	contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,			6	SS	15			
	w Ste	compact		1		33	,3			
	Auge (Holk			1		1				
	Power Auger 200 mm Diam. (Hollow Stem)			1						Backfill
5	J mm (7	SS	25			
١	200			1						June 18, 2021
				1	8	SS	>50			June 24, 2021 Bentonite Seal
				1	ŕ	-				25 NOTING OGAI
				1						Silica Sand
6										Silica Sand
				1						
					9	SS	18			[4
				1		$\mid \mid$				
7						1				
				1	10	ss	11			
				3	_	$\mid \cdot \mid$				50 mm Diam. PVC #10 Slot Screen
					11	SS	16			
8				1	''	33	10			
				1		$\mid \mid$				
				1		1				
				1	12	ss	21			
9				1		1				
Ĭ	\vdash	(SW) gravelly SAND, fine to coarse,		71.94		$\mid \cdot \mid$				🕌
		some silt; grey; non-cohesive, wet, compact			13	SS	24			
	DCPT	σοπιρασι	× .	74.00	'3	33	-4			Cave
		Dynamic Cone Penetration Test		71.3 <u>3</u> 9.76						
10	⊢∟	(OCPT)	\ <u>\</u> \(\) \	+		+ +	-	+-> +	 	 ×
		CONTINUED NEXT PAGE								
DE	ртн 9	SCALE			1	16) GOLDE		OGGED: RI
		· 			•	•	-		CH	

1:50

RECORD OF BOREHOLE: 21-204

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028364.7 ;E 366570.7

BORING DATE: June 9, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmDYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH OW Wp ⊢ (m) --- CONTINUED FROM PREVIOUS PAGE ---10 Dynamic Cone Penetration Test (DCPT) 70.21 End of Borehole DCPT Refusal 11 105 Note(s): 1. Water level in screen measured at 5.21 m (Elev. 75.88 m) on June 24, 2021 2. Water level in screen measured at 5.16 m (Elev. 75.93 m) on June 18, 2021 12 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-204

SHEET 1 OF 2

LOCATION: N 5028364.7 ;E 366570.7 BORING DATE: June 9, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

<u> </u>	皇	SOIL PROFILE		1	SA	MPLI		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	PIEZOMETER
METRES	BORING METHOD		STRATA PLOT	E. E	띪		BLOWS/0.30m	20 40 60 80	K, cm/s 10° 10° 10° 10° 10° 10° 10° 10° 10° 10°	OR STANDPIPE
ME	RING	DESCRIPTION	ATA I	ELEV. DEPTH	NUMBER	TYPE	MS/0	SHEAR STRENGTH nat V. $+$ Q - \bullet rem V. \oplus U - O	WATER CONTENT PERCENT LG W	INSTALLATION
י ו	BOF		STR	(m)	ž		BLO	20 40 60 80	W _P	
		GROUND SURFACE		81.09						
0		TOPSOIL -(SM) SILTY SAND; dark brown, contains organic matter (rootlets);		0.00						
		\non-cohesive, moist, loose	′‱	0.15	1	ss	5			
		FILL - (SP) SAND, fine to medium, some silt; brown to dark brown, contains	\bowtie	80.48						Bentonite Seal
		organic matter; non-cohesive, moist, loose	₩	0.61		+				
1		FILL - (SM) SILTY SAND, trace gravel; brown to dark brown, contains organic			2	ss	6			■
		matter; non-cohesive, moist, loose	\bowtie							
				79.57		1				
		(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders		1.52						
2		(GLACIAL TILL); non-cohesive, moist to wet, loose to compact			3	SS	6			
-		·				+				
						1				
					4	ss	11			
				1						
3					\vdash	$\mid \mid$				Backfill
					5	ss	19			
				1						
				77.28		1				
4	-	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders		3.81						
	v Sterr	(GLACIAL TILL); non-cohesive, wet, compact		1	6	SS	15			
	Auger				_	$\mid \mid$				
	Power Auger Diam. (Hollo					1				Backfill
	Power Auger 200 mm Diam. (Hollow Stem)				7	ss	25			
5	200									June 18, 2021
					8	SS	>50			June 24, 2021
					۴	- 3	- 50			Bentonite Seal
				1						Silica Sand
6										Silica Sand
				1						활
					9	SS	18			
7				1						
				1	10	SS	11			<u> </u>
						$ \ $				50 mm Diam. PVC #10 Slot Screen
ا					11	ss	16			[]
8					L					
				1	F					
					12	ss	21			
				1	'-	55	- '			
9				71.94						
Ì		(SW) gravelly SAND, fine to coarse, some silt; grey; non-cohesive, wet,		9.15						
	DCPT	compact		1	13	ss	24			Cave
	<u>ظ</u>	Dynamia Conc Beneticalia: T4		71.33						🕌
10	_L	Dynamic Cone Penetration Test (DCPT)	2	9.10	 	$\downarrow \downarrow$	_			
		CONTINUED NEXT PAGE	L		L		_			
					11	16) GOLDE	<u> </u>	
DΕΙ	PIH S	SCALE			-	•	7	GOLDE	T	OGGED: RI

RECORD OF BOREHOLE: 21-204

SHEET 2 OF 2

LOCATION: N 5028364.7 ;E 366570.7

BORING DATE: June 9, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmDYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH OW Wp ⊢ (m) --- CONTINUED FROM PREVIOUS PAGE ---10 Dynamic Cone Penetration Test (DCPT) 70.21 End of Borehole DCPT Refusal 11 105 Note(s): 1. Water level in screen measured at 5.21 m (Elev. 75.88 m) on June 24, 2021 2. Water level in screen measured at 5.16 m (Elev. 75.93 m) on June 18, 2021 12 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: RI 1:50 CHECKED: CH

RECORD OF BOREHOLE: 21-205

E: 21-205 SHEET 1 OF 2

LOCATION: N 5028354.6 ;E 366633.4 SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: June 8, 2021

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DATUM: NAD 1983

L L	보	SOIL PROFILE	1.		SA	AMPLI		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	닐일	PIEZOMETER
METRES	BORING METHOD		STRATA PLOT	ELEV.	띪		BLOWS/0.30m	20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10	P \(\text{\tint{\text{\text{\text{\text{\text{\tint{\text{\tint{\text{\tint{\text{\text{\text{\text{\tint{\text{\text{\text{\tint{\text{\text{\tint{\text{\tint{\text{\tint{\text{\text{\tint{\text{\tint{\tint{\text{\tint{\text{\tint{\tint{\tint{\text{\tint{\tint{\text{\tint{\tint{\tint{\tint{\tint{\tint{\text{\tint{\text{\tint{\text{\tint{\tint{\tint{\tint{\tint{\tint{\text{\tin{\tin	OR STANDPIPE
M M	RING	DESCRIPTION	ATA	DEPTH	NUMBER	TYPE	WS/C	$\begin{array}{lll} \text{SHEAR STRENGTH} & \text{nat V.} \; + \; \text{Q} \; - \\ \text{Cu, kPa} & \text{rem V.} \; \bigoplus \; \; \text{U} \; - \end{array}$	Ͻ Ι	IT AB. T	INSTALLATION
ב	BOI		STR	(m)	Ž		BLO	20 40 60 80	Wp WV V		
		GROUND SURFACE		81.68							
0		TOPSOIL - (SM/ML) SILTY SAND to		0.00							
		sandy SILT, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose		81.38 0.30	1	ss	1				
		FILL - (SM) SILTY SAND; dark brown to	′‱	3		1					
		brown, contains organic matter; non-cohesive, moist, compact	\otimes			1					
1					2	ss	10				
		(CI/CH) SILTY CLAY to CLAY, trace	₩	80.46 1.22	1						
		sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,				1					
		w <pl, stiff<="" td="" very=""><td></td><td></td><td>١.</td><td></td><td></td><td></td><td></td><td> </td><td></td></pl,>			١.						
2					3	SS	17			MH	
_						1					
						1					
				78.94		ss	12				
		(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders		2.74							
3		(GLACIAL TILL); non-cohesve, moist to wet, compact				$ \ $					
		, <u>-</u>			5	ss	16				
				1							
				1		+					
4					6	SS	12				
	(me)					1					
	Power Auger 200 mm Diam. (Hollow Stem)			76.80							
5	Power Auger Diam. (Hollo	(SM) gravelly SILTY SAND; grey, contains cobles and boulders (GLACIAL		4.88		SS	16				
	Pow m Dia	TILL); non-cohesive, wet, compact		76.34		 					
	200 m	(SW) gravelly SAND, fine to coarse; grey; non-cohesive, wet, wet, loose to	100	5.34							
		compact		1	8	ss	8				
6						+					
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					9	ss	4		0	М	
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7					10	ss	4				
					11	SS	14				
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DΕ	riH S	SCALE			•	•	7		T.	LOG	GED: RI

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RECORD OF BOREHOLE: 21-205

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028354.6 ;E 366633.4

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30rr NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SW) gravelly SAND, fine to coarse; grey; non-cohesive, wet, wet, loose to compact SS 12 14 11 15 SS 67 Power Auger 16 SS 4 0 М 12 69.18 12.50 17 SS 62 (SW) gravelly SAND, fine to coarse, some silt; grey non-cohesive; wet, very dense 13 SS 51 18 (SM/GM) SILTY sandy GRAVEL to SILTY gravelly SAND; grey; non-cohesive, wet, very dense SS 79 Rotary Drill NW Casing 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-205A

SHEET 1 OF 2

LOCATION: N 5028354.6 ;E 366633.4 BORING DATE: June 8, 2021 DATUM: NAD 1983

Ţ	ç		SOIL PROFILE			SA	MPLE		DYNAM RESIST	IC PENET ANCE, BL	RATIO OWS/	N).3m	\	HYDRAU k	ILIC CC k, cm/s	NDUCT	IVITY,		وّد	PIEZOMETER
METRES	ODING METHOD			LOT		ik.		.30m	20	40	6	8 (30 ·	10 ⁻⁶	10	⁻⁵ 1	0 ⁻⁴ 1	10 ⁻³	ADDITIONAL LAB. TESTING	OR
MET	2		DESCRIPTION	TAP	ELEV. DEPTH	NUMBER	TYPE	VS/0.		STRENG	TH n	at V. +	Q- •				PERCE		B. TE	STANDPIPE INSTALLATION
۲_	000			STRATA PLOT	(m)	Š	-	BLOWS/0.30m											½ ½	
	F	\rightarrow	GROUND SURFACE	S			H	ш	20	40	6) 8	80	20	40) 6	0	80	++	
0		- 1	For soil stratigraphy refer to record of borehole 21-205		81.68 0.00		\vdash												++	
		(me)	borehole 21-205																	
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	Auge	위 위																		
	Power Auger	jam.																		
1	Δ.	200 mm Diam. (Hollow Stem)																		
		200																		
		Ш	Dynamic Cone Penetration Test (DCPT)		80.16 1.52															
			Dynamic Cone Penetration Test (DCF1)		1.52															
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RECORD OF BOREHOLE: 21-205A

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028354.6 ;E 366633.4

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmDYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---10 Dynamic Cone Penetration Test (DCPT) 71.09 10.59 End of Borehole DCPT Refusal 11 12 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 WSD GOLDER DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-205A

SHEET 1 OF 2

LOCATION: N 5028354.6 ;E 366633.4 BORING DATE: June 8, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

ا پر	HOD.	SOIL PROFILE	ı		SA	AMPL				ETRATION S.		,	HYDRAULIC k, cr				₽ ^K	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m		R STREN	IGTH r	0 80 lat V. + em V. ⊕	Q - • U - O	Wp -	CONTEN	T PERCE	WI	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
	ш	GROUND SURFACE	ß	-		\vdash	B	2	0 4	0 6	0 80	0	20	40	60 8	30	+	
0		For soil stratigraphy refer to record of	1	81.68 0.00											+		++	
1	Power Auger 200 mm Diam (Hollow Stem)			80.16														
2		Dynamic Cone Penetration Test (DCPT)		1.52				!										
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	DCPT								 									
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10		CONTINUED NEXT PAGE								,								
DEI	PTH	SCALE			1	1		1)	G	OL	.D	ΕI	R				LOC	GGED: RI

RECORD OF BOREHOLE: 21-205A

SHEET 2 OF 2

LOCATION: N 5028354.6 ;E 366633.4

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

CONTINUED PRIOR APRIL PRIOR	», ALE	ГНОБ	SOIL PROFILE	 -		SA	MPL			IIC PENE ANCE, B			,			CONDUC			NG NG	PIEZOMETER
0	METRES	BORING MET	DESCRIPTION	STRATA PLOT	DEPTH	NUMBER	TYPE	3LOWS/0.30m	SHEAR Cu, kPa	STRENC	THTE	nat V. + em V. ⊕	Q - ● U - O	V W	VATER C	ONTENT	PERCE	NT WI	ADDITION, LAB. TESTI	OR STANDPIPE INSTALLATION
Dynamic Core Pereintinion Test (DCPT)			CONTINUED FROM PREVIOUS PAGE	37					20	, 40	, (,u 8	U		20		.υ <u>ε</u>	JU	+	
10 DOFF Refused 11 10 10 DOFF Refused 12 12 13 14 14 15 15 16 16 16 16 16 16 16 16 16 16 16 16 16				1				П												
10 DOFF Refused 11 10 10 DOFF Refused 12 12 13 14 14 15 15 16 16 16 16 16 16 16 16 16 16 16 16 16		CPT									i					1				
End of Boeroide COFT Feduciae 12					71.09								-							
					10.59									114						
			DCPT Refusal																	
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RECORD OF BOREHOLE: 21-205

SHEET 1 OF 2

CHECKED: CH

LOCATION: N 5028354.6 ;E 366633.4

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp I (m) GROUND SURFACE 81.68 TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace gravel; dark brown, contains organic matter (rootlets); 81.38 0.30 SS non-cohesive, moist, loose FILL - (SM) SILTY SAND; dark brown to brown, contains organic matter; non-cohesive, moist, compact SS 10 80.46 1.22 (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive, w<PL, very stiff SS 17 0 МН SS 12 (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesve, moist to wet, compact SS 16 SS 12 SS 16 (SM) gravelly SILTY SAND; grey, contains cobles and boulders (GLACIAL TILL); non-cohesive, wet, compact (SW) gravelly SAND, fine to coarse; grey; non-cohesive, wet, wet, loose to compact SS 0 SS SS 10 11 SS 14 21451149.GPJ GAL-MIS.GDT 6/13/22 SS 24 13 SS 17 14 SS CONTINUED NEXT PAGE **NSD** GOLDER DEPTH SCALE LOGGED: RI

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RECORD OF BOREHOLE: 21-205

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028354.6 ;E 366633.4

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30rr NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SW) gravelly SAND, fine to coarse; grey; non-cohesive, wet, wet, loose to compact SS 12 14 11 15 SS 67 Power Auger 16 SS 4 0 М 12 69.18 12.50 17 SS 62 (SW) gravelly SAND, fine to coarse, some silt; grey non-cohesive; wet, very dense 13 SS 51 18 (SM/GM) SILTY sandy GRAVEL to SILTY gravelly SAND; grey; non-cohesive, wet, very dense SS 79 Rotary Drill NW Casing 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-206

SHEET 1 OF 2

LOCATION: N 5028404.8 ;E 366638.6

BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

Щ.	HOD.	SOIL PROFILE	1.		SA	MPLE		DYNAMIC PENETRATIO RESISTANCE, BLOWS/0).3m	HYDRAL	LIC CONDU , cm/s	ictivify,		^R F	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	_	STRATA PLOT	ELEV.	3ER	س	BLOWS/0.30m	20 40 60 SHEAR STRENGTH na		10 ⁻⁶	i		10 ⁻³ L	ADDITIONAL LAB. TESTING	OR STANDPIPE
- 표	ORING	DESCRIPTION	RATA	DEPTH	NUMBER	TYPE	OWS/	Cu, kPa re	m V. ⊕ U - O	Wp I	TER CONTE	W	=N I WI	ADD LAB.	INSTALLATION
-	BC		STI	(m)	_	Н	B	20 40 60	80	20	40		80		
. 0	<u> </u>	GROUND SURFACE TOPSOIL - (SM) SILTY SAND; dark		77.09		H	-								
		brown, contains organic matter; \non-cohesive, moist, loose		0.15		ss	9								
		FILL -(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders;	′ ₩												
		non-cohesive, moist, compact to very dense	\bowtie			1									
. 1		uense			2	ss	>50								
			\bowtie			1									
				75.57											
		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders		1.52											
2		(GLACIAL TILL); non-cohesive, moist to wet, loose to compact			3	SS	7								
						<u> </u>									
					4	SS	8								
. 3]									
					5	SS	10								
						-									
. 4															
					6	SS	13								
	(mg					1									
	Power Auger 200 mm Diam. (Hollow Stem)														
. 5	Power Auger Diam. (Hollo				7	SS	9								
	Powe n Dian			71.75		-									
	200 m	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders		5.34		1									
		(GLACIAL TILL); non-cohesive, wet, compact			8	SS	10								
- 6		,				-									
					9	ss	13								
						-									
7						1									
					10	SS	13								
				69.47		-									
		(SP/SM) gravelly SAND to SILTY SAND,		7.62		1									
- 8		some gravel; grey; non-cohesive, moist to wet, loose to very dense	1		11	ss	23								
			排												
			1			1									
			1		12	SS	16								
. 9			W			$\mid \mid$									
			W												
			 		13	ss	3								
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		CONTINUED NEXT PAGE													
DE	PTH S	SCALE			1	10) GOL	DE	R				LO	GGED: BW
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RECORD OF BOREHOLE: 21-206

SHEET 2 OF 2

CHECKED: CH

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028404.8 ;E 366638.6

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: May 19, 2021

DATUM: NAD 1983

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH OW. Wp -(m) --- CONTINUED FROM PREVIOUS PAGE --10 (SP/SM) gravelly SAND to SILTY SAND, some gravel; grey; non-cohesive, moist to wet, loose to very dense SS 14 11 15 SS 10 16 SS >50 12 End of Borehole Auger Refusal Note(s): 1. Methane gas noted at a depth of 9.90 mbgs 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 WSD GOLDER DEPTH SCALE LOGGED: BW

RECORD OF BOREHOLE: 21-206

SHEET 1 OF 2

LOCATION: N 5028404.8 ;E 366638.6

BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

S ALE	THOD	SOIL PROFILE	1 ⊢		SA	MPLES		AMIC PEN ISTANCE,			ζ,		AULIC Co k, cm/s				¥ B RG	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD		STRATA PLOT	ELEV.	3ER	TYPE	00.00				80		O ⁻⁶ 1 ATER C			10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
ME	ORING	DESCRIPTION	RATA	DEPTH		TYPE	Cu, k	AR STREN Pa	IGIH	rem V. €	9 U- O	Wp	ATER C	ONTEN	PERC	I WI	ADD	INSTALLATION
_	B		STI	(m)	_	ā	á	20 4	10	60	80	2				80	\perp	
0		GROUND SURFACE TOPSOIL - (SM) SILTY SAND; dark		77.09		H												
		brown, contains organic matter; \non-cohesive, moist, loose		0.15		SS S	9											
		FILL -(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders;	ʹ⋘	*														
		non-cohesive, moist, compact to very dense		Š														
1		ucise			2	SS >	50											
				*		$\left\{ \ \right\}$												
				75.57														
		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders		1.52														
2		(GLACIAL TILL); non-cohesive, moist to wet, loose to compact			3	SS	7											
						$ \cdot $												
					4	SS	3											
3						}												
					5	SS 1	0											
						-												
4																		
					6	SS 1	3											
	Ê																	
	Power Auger 200 mm Diam. (Hollow Stem)																	
5	Power Auger Diam. (Hollo				7	SS !	9											
	Powe n Diam			71.75	_													
	200 mr	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders		5.34														
		(GLACIAL TILL); non-cohesive, wet, compact		1	8	SS 1	0											
6		- SSpast																
						1												
					9	SS 1	3											
7																		
					10	SS 1	3											
				3														
		(SP/SM) gravelly SAND to SILTY SAND,		69.47 7.62														
8		some gravel; grey; non-cohesive, moist to wet, loose to very dense	掛		11	SS 2	3											
-			1															
			1															
			掛		12	SS 1	6											
9			掛															
-			掛															
			1		13	ss :	3											
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RECORD OF BOREHOLE: 21-206

SHEET 2 OF 2

LOCATION: N 5028404.8 ;E 366638.6

BORING DATE: May 19, 2021

DATUM: NAD 1983 PENETRATION TEST HAMMER, 64kg; DROP, 760mm

	ДОН	SOIL PROFILE			SA	MPLE		DYNAMIC PEN RESISTANCE,	ETRAT BLOW	ION 3/0.3m)	HYDRAU k	ILIC CON c, cm/s	DUCTIV	/ITY,		ا و د	PIEZOMETER
TRES	3 MET		PLOT	ELEV.	3ER	ш	0.30m		1		80	10-6		10 ⁻⁴			ADDITIONAL LAB. TESTING	OR STANDPIPE
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	SHEAR STREN Cu, kPa				Wp I		OW	<u></u> п	ΝI	ADDI LAB. 7	INSTALLATION
_		CONTINUED FROM PREVIOUS PAGE					ш	20 4	10	60	80	20	40	60	8	0		
10		(SP/SM) gravelly SAND to SILTY SAND, some gravel; grey; non-cohesive, moist																
		to wet, loose to very dense			14	SS	7											
	Stem)																	
	ger ollow 8																	
11	wer Au am. (H				15	SS	10											
	Power Auger 200 mm Diam. (Hollow Stem)																	
	200				16	ss	>50											
12	Ш	End of Borehole	41.	65.00 12.09														
		Auger Refusal																
		Note(s):																
		Methane gas noted at a depth of 9.90 mbgs																
13																		
14																		
45																		
15																		
16																		
.0																		
17																		
18																		
19																		
20																		
		CALE			N 1) G										

1:50

RECORD OF BOREHOLE: 21-207

SHEET 1 OF 3

CHECKED: CH

LOCATION: N 5028410.7 ;E 366583.4

BORING DATE: June 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT BLOWS/0 DESCRIPTION INSTALLATION DEPTH -OW Wp -(m) GROUND SURFACE 80.26 TOPSOIL - (SM) SILTY SAND, trace 80.03 0.23 gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, SS 0.38 Bentonite Seal FILL - (SM) gravelly SILTY SAND. angular; grey; non-cohesive, moist, very loose______FILL - (SP) SAND, fine to medium, trace SS 5 silt; brown; non-cohesive, moist, very (CI/CH) SILTY CLAY to CLAY, trace siltl; grey brown, highly fissured (WEATHERED CRUST); cohesive, w~PL to w>PL, very stiff 3 SS SS 6 (SM) gravelly SILTY SAND; brown to grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose SS 9 (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, SS Rotary Drill/ Wash Boring NW Casing SS 5 74.92 (SM) gravelly SILTY SAND; grey, contains cobbles and boulders 64 mm Diam, VSP (GLACIAL TILL); non-cohesive, wet, SS 9 loose to compact SS SS 10 11 11 SS 10 GAL-MIS.GDT 6/16/22 12 SS 13 9 13 SS 15 21451149.GPJ CONTINUED NEXT PAGE 00 **NSD** GOLDER DEPTH SCALE LOGGED: RI

1:50

RECORD OF BOREHOLE: 21-207

SHEET 2 OF 3

CHECKED: CH

LOCATION: N 5028410.7 ;E 366583.4

BORING DATE: June 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact (SW) gravelly SAND, trace to some silt; grey, contains cobbles and boulders; non-cohesive, wet, loose to very dense Rotary Drill/ Wash E 14 SS 4 64 mm Diam, VSP 15 RC12 SS >50 16 68.09 Borehole continued on RECORD OF DRILLHOLE 21-207 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 WSD GOLDER DEPTH SCALE LOGGED: RI

LOCATION: N 5028410.7 ;E 366583.4

GAL-MISS.GDT 6/16/22

21451149.GPJ

RECORD OF DRILLHOLE: 21-207

DRILLING DATE: June 4, 2021

SHEET 3 OF 3

DATUM: NAD 1983

DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PO- Polished BR K - Slickensided SM- Smooth abbrev of abb MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD DEPTH SCALE METRES NOTE: For additional abbreviations refer to lis of abbreviations & SYMBOLIC LOG ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. % (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 68.09 Fresh, thinly to medium bedded, medium 12.17 bedded, medium grey to brownish grey, fine to medium grained, non-porous, strong SHALEY NODULAR LIMESTONE 64 mm Diam. VSP 100 - Broken/lost core from 12.17 m to 13 100 14 UCS = 74 MPa 15 16 100 Rotary Drill - Mud seam from 16.66 m to 16.69 m HQ Core 17 64 mm Diam. VSP - Heavy fossilferous/bioturbated from 17.60 m to 21.61 m 100 18 - Heavy calcite veining from 18.40 m to 21.61 m $\,$ 19 100 20 - Broken core from 20.54 m to 20.59 m 100 21 End of Drillhole 21.61 Note(s):

1. Water level in screen measured at 3.32 m (Elev. 76.94 m) on June 9, 2021 22 **GOLDER** DEPTH SCALE LOGGED: RI 1:50 CHECKED: CH

RECORD OF BOREHOLE: 21-207

SHEET 1 OF 3

LOCATION: N 5028410.7 ;E 366583.4 BORING DATE: June 4, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

ا پر ا	무	SOIL PROFILE	1,		SA	MPLE		NAMIC PENE SISTANCE, B	LOWS/0	.3m	乀.	k, cr	CONDUC n/s	, , , , , , , , , , , , , , , , , , ,		₽₽₽	PIEZOMETER
DEP IN SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH		TYPE	BLOWS/0.30m	20 40 HEAR STRENG	STH na	t V. +			CONTEN	IT PERC		ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
7 _	BOR		STRA	(m)	Ī	-	BLOV	, кРа 20 40				Wp - — 20		V 60	-I WI 80	- FAE	
0		GROUND SURFACE		80.26		П		1			-	20		Ĭ	Ĭ		_
		TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose		0.00 80.03 0.23 0.38	1	ss	1										Bentonite Seal
1		FILL - (SM) gravelly SILTY SAND, angular; grey; non-cohesive, moist, very loose FILL - (SP) SAND, fine to medium, trace		79.50 0.76													
		silt; brown; non-cohesive, moist, very loose (CI/CH) SILTY CLAY to CLAY, trace siltl; grey brown, highly fissured (WEATHERED CRUST); cohesive,			2	ss	5										
2		(WEATHERED CRUST); cohesive, w~PL to w>PL, very stiff			3	ss	7										
3		(SM) gravelly SILTY SAND; brown to grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive,		77.52 2.74	4	SS	6										
		moist to wet, loose			5	ss	9										
4		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,		76.45 3.81		ss	5										
	ring	loose			Ĺ												
5	/ Drill/ Wash Boring NW Casing				7	ss	5										
6	Rotary [(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact		74.9 <u>2</u> 5.34		ss	9										64 mm Diam. VSP Pipe
о					9	SS	7										
7					10	SS	11										
8					11	ss	10										
					12	ss	13										
9																	
					13	ss	15										
10	_L			1		$\dagger \dagger$	-	-+ -	+				-+	-	+		
			1	1	•			G	<u> </u>							1	

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

1:50

RECORD OF BOREHOLE: 21-207

SHEET 2 OF 3

CHECKED: CH

DATUM: NAD 1983

LOCATION: N 5028410.7 ;E 366583.4 BORING DATE: June 4, 2021

SAMPLER HAMMER, 64kg; DROP, 760mm

		EN HAMMEN, 04kg, DNOF, 700HIIII			_											1 O4kg, DKOF, 700Hill
1	BORING METHOD	SOIL PROFILE	1_		SA	MPL		DYNAMIC PENE RESISTANCE, E	LOWS/0.3m	ζ,	k, c	C CONDUCT cm/s			AL NG	PIEZOMETER
METRES	MET		STRATA PLOT	ELEV.	ËR	ш	BLOWS/0.30m	20 40		80	10-6		0-4 10)-3	ADDITIONAL LAB. TESTING	OR STANDPIPE
Ψ	RING	DESCRIPTION	ATA	DEPTH	NUMBER	TYPE	MS/(SHEAR STRENG Cu, kPa	TH nat V. rem V	+ Q- ● .⊕ U- O	WATE	R CONTENT	PERCEN	NT	AB. T	INSTALLATION
i	BO		STR	(m)	Ž		BLO	20 40	60	80	Wp ⊢ 20		60 81		, ,	
10		CONTINUED FROM PREVIOUS PAGE														
10		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,														
		(GLACIAL TILL); non-cohesive, wet, loose to compact														
	Б	· '		69.59												
	Rotary Drill/ Wash Boring	(SW) gravelly SAND, trace to some silt; grey, contains cobbles and boulders;		10.67												
11	Vash	non-cohesive, wet, loose to very dense			14	SS	4									
	otary															64 mm Diam. VSP Pipe
	ř				15	RC	-									
				1												
12				68.09	16	SS	>50									
	·	Borehole continued on RECORD OF DRILLHOLE 21-207		12.17												
		DRILLHOLE 21-207														
3																
_																
4																
_																
5																
6																
7																
3																
9																
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_			•			\ e			<u> </u>	\ F	<u> </u>			'		
ıЕ	PTH	SCALE			1	,	7) G(ノLL	ノロ	K				LC	OGGED: RI
	50														011	ECKED: CH

RECORD OF DRILLHOLE: 21-207

LOCATION: N 5028410.7 ;E 366583.4 DRILLING DATE: June 4, 2021 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PO- Polished BR K - Slickensided SM- Smooth abbrev of abb MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD DEPTH SCALE METRES NOTE: For additional abbreviations refer to lis of abbreviations & SYMBOLIC LOG ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. % (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 68.09 Fresh, thinly to medium bedded, medium 12.17 bedded, medium grey to brownish grey, fine to medium grained, non-porous, strong SHALEY NODULAR LIMESTONE 64 mm Diam. VSP 100 - Broken/lost core from 12.17 m to 13 100 14 UCS = 74 MPa 15 16 100 Rotary Drill - Mud seam from 16.66 m to 16.69 m HQ Core 17 64 mm Diam. VSP - Heavy fossilferous/bioturbated from 17.60 m to 21.61 m 100 18 - Heavy calcite veining from 18.40 m to 21.61 m $\,$ 19 100 20 GAL-MISS.GDT 6/13/22 - Broken core from 20.54 m to 20.59 m 100 21 End of Drillhole 21.61 Note(s):

1. Water level in screen measured at 3.32 m (Elev. 76.94 m) on June 9, 2021 22 **GOLDER** DEPTH SCALE LOGGED: RI

1:50

21451149.GPJ

CHECKED: CH

SHEET 3 OF 3

RECORD OF BOREHOLE: 21-208

SHEET 1 OF 2

DATUM: NAD 1983

LOCATION: N 5028416.5 ;E 366534.7 BORING DATE: June 1, 2021

SAMPLER HAMMER, 64kg; DROP, 760mm

پر	ТНОБ	SOIL PROFILE	L		SA	MPL	\blacksquare	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	₹S PIEZOMETE	ΞR
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● Cu, kPa U - O 20 40 60 80	10° 10° 10° 10° 10° WATER CONTENT PERCENT Wp W W W W 20 40 60 80	PIEZOMETE OR STANDPIPI INSTALLATIO	E
		GROUND SURFACE	0,	80.77			-	20 40 60 80	20 40 60 80		_
0 -		TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); \non-cohesive, moist, loose FILL - (SP) SAND, fine to medium, trace silt; brown; non-cohesive, moist, loose				SS	6				
1		(CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured, contains thin lamination of silty sand and very thin beds of gravelly silty sand (WEATHERED CRUST); cohesive,		79.86 0.91	2	SS	9				
2		w~PL to w>PL, very stiff			3	ss	13		•		
					4	ss	8		 		
3		(SM/ML) SILTY SAND to sandy SILT, some gravel, some low plasticity fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive,		77.57 3.20	5	ss	8		0	мн	
4	(u	moist to wet, loose to compact (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,		76.6 <u>5</u> 4.12	6	ss	13				
5	Power Auger 200 mm Diam. (Hollow Stem)	compact to loose			7	ss	7				
6	200 mm	(SM) SILTY SAND, some gravel to gravelly, some low plasticity fines; grey, contains thin beds of gravelly sand, very thin beds of silty sand, cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense		75.4 <u>3</u> 5.34	8	ss	7		0		
					9	ss	8			мн	
7					10	ss	9				
8					11	ss	21				
9					12	ss	9		0		
					13	SS	9				
10	_L			1	_14 .	SS	<u>24</u>	+		-	
DEF	PTH S	CALE		<u> </u>	\ '	/ 5) GOLDE	2	LOGGED: RI	

RECORD OF BOREHOLE: 21-208

SHEET 2 OF 2

LOCATION: N 5028416.5 ;E 366534.7

BORING DATE: June 1, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp F (m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SM) SILTY SAND, some gravel to (Silv) Silch T SAND, Solfine gravel to gravelly, some low plasticity fines; grey, contains thin beds of gravelly sand, very thin beds of silty sand, cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense SS 14 24 11 15 SS 41 (SW) gravelly SAND, fine to coarse, trace to some silt; grey; non-cohesive, wet, compact 16 SS 29 0 12 SS 17 19 Dynamic Cone Penetration Test (DCPT) 114 14 End of Borehole DCPT Refusal 105 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: RI 1:50 CHECKED: CH

RECORD OF BOREHOLE: 21-208

SHEET 1 OF 2

DATUM: NAD 1983

LOCATION: N 5028416.5 ;E 366534.7 BORING DATE: June 1, 2021

SAMPLER HAMMER, 64kg; DROP, 760mm

ا پر	THOD	SOIL PROFILE	L		SA	MPL	\blacksquare	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	₽ PIEZOMETI	ER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● Cu, kPa U - O 20 40 60 80	10° 10° 10° 10° 10° WATER CONTENT PERCENT Wp W W W W 20 40 60 80	PIEZOMETI OR STANDPIP INSTALLATI	PΕ
		GROUND SURFACE	0,	80.77			-	20 40 60 80	20 40 60 80	1	
0 -		TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); \non-cohesive, moist, loose FILL - (SP) SAND, fine to medium, trace silt; brown; non-cohesive, moist, loose]	SS	6				
1		(CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured, contains thin lamination of silty sand and very thin beds of gravelly silty sand (WEATHERED CRUST); cohesive,		79.86 0.91	2	SS	9				
2		w~PL to w>PL, very stiff			3	ss	13		•		
					4	ss	8		 		
3		(SM/ML) SILTY SAND to sandy SILT, some gravel, some low plasticity fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive,		77.57 3.20	5	ss	8		0	мн	
4	(u	moist to wet, loose to compact (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,		76.6 <u>5</u> 4.12	- 6	ss	13				
5	Power Auger 200 mm Diam. (Hollow Stem)	compact to loose			7	ss	7				
6	200 mm	(SM) SILTY SAND, some gravel to gravelly, some low plasticity fines; grey, contains thin beds of gravelly sand, very thin beds of silty sand, cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense		75.4 <u>3</u> 5.34	8	ss	7		0		
					9	ss	8			мн	
7					10	ss	9				
8					11	ss	21				
9					12	ss	9		0		
					13	ss	9				
10	_L			1	14	SS	<u>24</u>				
DEF	PTH S	CALE		<u> </u>	\ '	/ 6) GOLDE	?	LOGGED: RI	

1:50

RECORD OF BOREHOLE: 21-208

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028416.5 ;E 366534.7

BORING DATE: June 1, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp F (m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SM) SILTY SAND, some gravel to (Silv) Silch T SAND, Solfine gravel to gravelly, some low plasticity fines; grey, contains thin beds of gravelly sand, very thin beds of silty sand, cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense SS 14 24 11 15 SS 41 (SW) gravelly SAND, fine to coarse, trace to some silt; grey; non-cohesive, wet, compact 16 SS 29 0 12 SS 17 19 Dynamic Cone Penetration Test (DCPT) 114 14 End of Borehole DCPT Refusal 105 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: RI

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RECORD OF BOREHOLE: 21-209

SHEET 1 OF 2

LOCATION: N 5028422.9 ;E 366480.2

BORING DATE: June 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 81.03 TOPSOIL - (SM) SILTY SAND, some gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, SS 14 80.57 compac FILL - (SM) gravelly SILTY SAND, some clay; dark brown to grey brown, contains clay layers and organic matter (rootlets); non-cohesive, moist, compact to loose SS 13 SS 5 FILL - (CL/CI) SILTY CLAY, soem sand, trace gravel; grey brown, contains roganic matter; cohesive, w>PL, soft to SS 2 SS 4 FILL - (SM) gravelly SILTY SAND; grey brown, contains clay layers and nodules; 3.66 non-cohesive, wet, very loose SS 3 FILL - (CL/CI) SILTY CLAY, trace sand; grey brown, highly fissured; cohesive, w>PL, soft to firm Power Auge SS 4 (SM) gravelly SILTY SAND; grey, contains cobbles and boulders 5.11 75.69 (GLACIAL TILL); non-cohesive, wet, very loose (SM) gravelly SILTY SAND; grey, contains cobbles and boulders SS (GLACIAL TILL); non-cohesive, wet, very loose to compact SS SS 10 5 11 SS 11 GAL-MIS.GDT 6/16/22 12 SS 9 13 SS 13 21451149.GPJ Dynamic Cone Penetration Test (DCPT) CONTINUED NEXT PAGE **NSD** GOLDER DEPTH SCALE LOGGED: RI 1:50 CHECKED: CH

RECORD OF BOREHOLE: 21-209

SHEET 2 OF 2

LOCATION: N 5028422.9 ;E 366480.2

BORING DATE: June 10, 2021

اب	0	SOIL PROFILE		JA.	MPLE	-3	DYNAMIC PENETRAT RESISTANCE, BLOWS	ION \ S/0.3m \	HYDRAULIC CO k, cm/s		ا ن، ا	DIE 701
METRES	BORING METHOD	DESCRIPTION	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 I I SHEAR STRENGTH Cu, kPa	60 80 nat V. + Q - ● rem V. ⊕ U - ○	10 ⁻⁶ 10 WATER CO	10-4 10-3 NTENT PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		CONTINUED FROM PREVIOUS PAGE			\dashv	1	20 40	60 80	20 40	60 80	+	
10 -	DCPT	Dynamic Cone Penetration Test (DCPT) End of Borehole	70.1 <u>5</u> 10.88									
11		DCPT Refusal	10.00									
12												
13												
14												
15												
16												
17												
18												
19												
20												

RECORD OF BOREHOLE: 21-209

SHEET 1 OF 2

LOCATION: N 5028422.9 ;E 366480.2

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: June 10, 2021

DATUM: NAD 1983

ا يا	된	SOIL PROFILE	⊢ I		SA	MPLE		YNAMIC PI RESISTANC	E, BLOV	/S/0.3m	ζ,		k, cm/s				₹ S S	PIEZOMETER
METRES	BORING METHOD		STRATA PLOT	ELEV.	ЗËR	س	BLOWS/0.30m	20	40 ENCTH		80	10			1	10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
ME	RING	DESCRIPTION	ATA	DEPTH	NUMBER	TYPE	/S/MC	HEAR STR Cu, kPa	⊫nGTH	nat V rem V. 6	+ Q- ● 9 U- O		ATER C			ENT WI	ADDI AB. T	INSTALLATION
_	BO	<u> </u>	STR	(m)	Z		BLC	20	40	60	80	20 20				80 80		
0		GROUND SURFACE		81.03														
Ĭ		TOPSOIL - (SM) SILTY SAND, some gravel; dark brown, contains organic		0.00														
		matter (rootlets); non-cohesive, moist, compact		80.57	1	SS	14											
		FILL - (SM) gravelly SILTY SAND, some		0.46														
		clay; dark brown to grey brown, contains clay layers and organic matter (rootlets);	₩															
1		non-cohesive, moist, compact to loose	▓		2	ss	13											
			₩															
			▓															
			▓															
			▓		3	SS	5											
2		FILL - (CL/CI) SILTY CLAY, soem sand,	₩	78.90 2.13														
		trace gravel; grey brown, contains roganic matter; cohesive, w>PL, soft to	₩															
		firm	₩		4	ss	2											
			₩															
3			₩															
			₩		5	SS	4											
			₩	77 07														
		FILL - (SM) gravelly SILTY SAND; grey		77.3 <u>7</u> 3.66														
4		brown, contains clay layers and nodules; non-cohesive, wet, very loose	₩															
			₩		6	ss	3											
	(moto	Ē	₩	76 40														
	. 13	FILL - (CL/Cl) SILTY CLAY trace sand:		76.46 4.57														
		grey brown, highly fissured; cohesive, w>PL, soft to firm	₩		7	ss	4											
5	Power			75.92 5.11														
	000	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,		75.69 5.34														
		\very loose			8	ss	7											
		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders			ਁ		1											
6		(GLACIAL TILL); non-cohesive, wet, very loose to compact																
					9	ss	4											
7																		
					10	ss	5											
					11	ss	11											
8						~												
					12	SS	11											
9																		
					13	ss	13											
	\perp			71.27														
10	DCPT	Dynamic Cone Penetration Test (DCPT)		9.76			_[_11_,			L	<u> </u>		L		<u></u>		
١٠	_	CONTINUED NEXT PAGE			-	$ \]$												_
					1	16		1		Ī	E	D		-		1		0055 -:
DEF	PTH	SCALE				•	7 [) G		L		T					LO	GGED: RI

1:50

RECORD OF BOREHOLE: 21-209

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028422.9 ;E 366480.2

BORING DATE: June 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmHYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES BORING METHOD DEPTH SCALE METRES ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---10 Dynamic Cone Penetration Test (DCPT) 70.15 End of Borehole DCPT Refusal 11 12 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 WSD GOLDER DEPTH SCALE LOGGED: RI

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1:50

RECORD OF BOREHOLE: 21-210

SHEET 1 OF 1

CHECKED: CH

LOCATION: N 5028466.5 ;E 366489.7

BORING DATE: June 2, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT BLOWS/0 DESCRIPTION INSTALLATION DEPTH -OW Wp | (m) GROUND SURFACE 80.23 TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, loose FILL -(SM) SILTY SAND, trace gravel, 80.00 0.23 SS 10 79.62 some clay; dark brown, contains organic matter and silty clay layers; non-cohesive, moist, compact FILL - (CI/CH) SILTY CLAY to CLAY, trace to some sand, trace gravel; grey brown, highly fissured, contains silty sand pockets/nodules/layers and organic matter; cohesive, w~PL, firm to stiff SS 9 2 3 SS 4 0 2 FILL - (SW) SAND, fine to coarse, trace 2.44 SS 5 0 gravel; brown, contains organic matter (wood/rootlets); non-cohesive, moist, (ML/SM) sandy SILT to SILTY SAND, some gravel to gravelly, some low 3.05 plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, 5 SS 8 Ю мн wet, loose to compact SS 12 SS 25 0 74.89 5.34 (SM) SILTY SAND, some gravel to gravelly; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, SS 21 wet, compact to dense 0 SS 27 МН SS 10 23 11 SS 13 21451149.GPJ GAL-MIS.GDT 6/16/22 SS 46 End of Borehole Auger Refusal 10 ****\$|) **GOLDER** DEPTH SCALE LOGGED: RI

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RECORD OF BOREHOLE: 21-210

SHEET 1 OF 1

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028466.5 ;E 366489.7

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: June 2, 2021

DATUM: NAD 1983

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT BLOWS/0 DESCRIPTION INSTALLATION DEPTH -OW Wp | (m) GROUND SURFACE 80.23 TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, loose FILL -(SM) SILTY SAND, trace gravel, 80.00 0.23 SS 10 79.62 some clay; dark brown, contains organic matter and silty clay layers; non-cohesive, moist, compact FILL - (CI/CH) SILTY CLAY to CLAY, trace to some sand, trace gravel; grey brown, highly fissured, contains silty sand pockets/nodules/layers and organic matter; cohesive, w~PL, firm to stiff SS 9 2 3 SS 4 0 2 FILL - (SW) SAND, fine to coarse, trace 2.44 SS 5 0 gravel; brown, contains organic matter (wood/rootlets); non-cohesive, moist, (ML/SM) sandy SILT to SILTY SAND, some gravel to gravelly, some low 3.05 plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, 5 SS 8 Ю мн wet, loose to compact SS 12 SS 25 0 74.89 5.34 (SM) SILTY SAND, some gravel to gravelly; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, SS 21 wet, compact to dense 0 SS 27 МН SS 10 23 11 SS 13 21451149.GPJ GAL-MIS.GDT 6/13/22 SS 46 End of Borehole Auger Refusal 10 ****\$|) **GOLDER** DEPTH SCALE LOGGED: RI 1:50 CHECKED: CH

DEPTH SCALE

1:50

RECORD OF BOREHOLE: 21-211

SHEET 1 OF 2

LOGGED: RI

CHECKED: CH

LOCATION: N 5028465.6 ;E 366539.9

BORING DATE: May 20, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp I (m) GROUND SURFACE 79.60 TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace gravel; dark brown, contains organic matter (rootlets); 0.15 SS 10 0.30 non-cohesive, moist, loose FILL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter; non-cohesive, moist, compact FILL - (CL/CI) sandy SILTY CLAY, trace gravel; grey brown to grey, contains organic matter; cohesive, w~PL to w>PL, stiff SS 5 2 3 SS 3 FILL - (SM) gravelly SILTY SAND, trace to some clay; grey brown, contains organic matter; non-cohesive, moist to wet, very loose SS 2 FILL - (SW) SAND, fine to coarse, trace gravel; brown, contains silty clay to clayey silt lens; non-cohesive, mosit, SS 3 SS 2 Power Auger SS 2 (SM) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, SS 3 moist to wet, very loose to dense SS SS 10 10 11 SS 12 21451149.GPJ GAL-MIS.GDT 6/16/22 12 SS 3 13 SS 11 14 SS 41 CONTINUED NEXT PAGE 00 **NSD** GOLDER

1:50

RECORD OF BOREHOLE: 21-211

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028465.6 ;E 366539.9

BORING DATE: May 20, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmHYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp ⊢ (m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SM) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, SS 41 14 moist to wet, very loose to dense 68.83 15 SS >50 End of Borehole Auger Refusal 11 12 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 WSD GOLDER DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-211

SHEET 1 OF 2

LOCATION: N 5028465.6 ;E 366539.9

BORING DATE: May 20, 2021

DEPTH SCALE METRES	_			_		MPLE		DYNAMIC PEI RESISTANCE	, BLOW	S/0.3m	_	k	, cm/s			무의	PIEZOMETER
c ::.	M		STRATA PLOT		H.		BLOWS/0.30m		40	60	80	10 ⁻⁶		10	10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
. ≝	BORING METHOD	DESCRIPTION	ATA F	ELEV. DEPTH	NUMBER	TYPE	/\S/0	SHEAR STRE Cu, kPa	NGTH	nat V	+ Q- ● ⊕ U- O		TER CON			DDDIT NB. TE	INSTALLATION
5	BOF		STR/	(m)	ž		BLO	20	40	60	80	Wp H 20	40	OW 60	WI 80	44	
		GROUND SURFACE		79.60				Ī	Ĭ	Ĩ				Ĩ	Ī		
0		TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace gravel; dark brown,		0.00													
		contains organic matter (rootlets);		0.15 0.30	1	SS	10										
		non-cohesive, moist, loose	[]] !														
		FILL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter; non-cohesive, moist, compact	¦⋙														
1		FILL - (CL/CI) sandy SILTY CLAY, trace	∵‱														
		gravel; grey brown to grey, contains organic matter; cohesive, w~PL to	\otimes		2	SS	5										
		w>PL, stiff															
			\otimes		3	SS	3										
2			\otimes		-												
				77.31													
		FILL - (SM) gravelly SILTY SAND, trace to some clay; grey brown, contains		2.29													
		organic matter; non-cohesive, moist to		76.86	4	SS	2										
		wet, very loose FILL - (SW) SAND, fine to coarse, trace		2.74													
3		gravel; brown, contains silty clay to clayey silt lens; non-cohesive, mosit,															
		very loose			5	ss	3										
			\bowtie		3	33	٥										
			\otimes														
			\otimes														
4			\bowtie		6	ss	2										
			\otimes														
	Stem)																
	Power Auger 200 mm Diam. (Hollow Stem)		\otimes		_												
5	Power Auger Diam. (Hollo		\bowtie		7	SS	2										
	Pow		\bowtie	74.26													
	90 m	(SM) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and		5.34													
	2	boulders (GLACIAL TILL); non-cohesive,			8	ss	3										
		moist to wet, very loose to dense															
6																	
					9	SS	4										
7																	
					10	ss	10										
8					11	SS	12										
					12	ss	3										
				1													
9																	
				1													
					13	SS	11										
10	_L	L		1	_14 _	S <u>S</u>	41		-	↓	-	├	+ .		 ↓	- -	
		CONTINUED NEXT PAGE	\perp														
		SCALE			11	16) G	0) E I	D					GGED: RI

RECORD OF BOREHOLE: 21-211

SHEET 2 OF 2

LOCATION: N 5028465.6 ;E 366539.9

BORING DATE: May 20, 2021

<u> </u>	루	SOIL PROFILE			SAN	/PLE		DYNAMIC PEN RESISTANCE,	BLOWS	ON /0.3m	\	k, (m/s	CTIVITY,		اوږ	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION		ELEV.	NUMBER	TYPE	BLOWS/0.30m	20 SHEAR STREI Cu, kPa		60 80 L L nat V. + em V. ⊕			R CONTEN		D ⁻³ NT	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
ذ	ВОБ		STR/	(m)	z		BLO/			60 80		Wp ⊢ 20	→ O ^V	60 8		45	
10	$\overline{}$	CONTINUED FROM PREVIOUS PAGE (SM) gravelly SILTY SAND to sandy				+	+										
	Power Auger	SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very loose to dense		68.83		SS A	41										
11		End of Borehole Auger Refusal		10.77	15	33 /	230										
12																	
40																	
13																	
14																	
15																	
16																	
17																	
17																	
18																	
19																	
20																	

RECORD OF BOREHOLE: 21-212

SHEET 1 OF 2

LOCATION: N 5028459.5 ;E 366591.9 SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: June 10, 2021

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

رَٰڐٍ	HOD	SOIL PROFILE	L		SA	MPL	\blacksquare	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	k, cm/s	^A &	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● Cu, kPa nat V. + Q - ● rem V. ⊕ U - ○	10 ⁸ 10 ⁵ 10 ⁴ 10 WATER CONTENT PERCEN Wp	ADDITIC	OR STANDPIPE INSTALLATION
0		GROUND SURFACE		79.89				25 45 55 66			
U		TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose FILL - (SP) SAND, fine to medium, trace silt; brown to dark brown, contains organic matter; non-cohesive, moist,		0.30 79.13	1	SS	7				
1		\langle loose (Ci/CH) SILTY CLAY to CLAY, trace to some sand; grey brown, highly fissured (WEATHERED CRUST); cohesive, w>PL, very stiff		0.76	2	SS	12		0		
2					3	ss	17				
					4	ss	13		а	мн	
3		COMO TENER DE TOTAL CAMPA		76.38 3.51	5	ss	8				
4		(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact		3.51	6	ss	12		0		
5	Power Auger mm Diam. (Hollow Stem)				7	ss	13				
	Po 200 mm Di	(SM) SILTY SAND, some gravel to gravel; contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact		74.5 <u>5</u> 5.34	8	SS	6				
6		·			9	ss	6		0		
7					10	ss	5			мн	
					11	ss	12				
8					12	ss	15				
9					13						
10	рсьц	Dynamic Cone Penetration Test (DCPT) CONTINUED NEXT PAGE		70.1 <u>3</u> 9.76		 	_			_	
	DTU O	CALE			1	\) GOLDE	<u> </u>	100	GED: RI

RECORD OF BOREHOLE: 21-212

SHEET 2 OF 2

LOCATION: N 5028459.5 ;E 366591.9

BORING DATE: June 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

METRES	BORING METHOD	SOIL PROFILE	TET	1	MPLES		MIC PENE STANCE, E			λ,	HYDRAUL k, (AAL ING	PIEZOMETER
ETRE	IG ME	DESCRIPTION	STRATA PLOT		TYPE BLOWS/0.30m	SHEA	20 4 L L R STREN Pa				10 ⁻⁶ WATE	10 ⁻⁵ R CONTI	10 ⁻⁴ ENT PE	10 ⁻³ RCENT	ADDITIONAL LAB. TESTING	OR STANDPIPE
j ∑	30RIN	DESCRIF HON	(m)	N N	_ \s	Cu, kF					VVP I		W	— wı	ADE LAB.	INSTALLATION
	ш	CONTINUED FROM PREVIOUS PAGE				1	20 4	0 6	0 80)	20	40	60	80		
10	\top	Dynamic Cone Penetration Test			\vdash	+ 5										
		(DCPT)				'										
						1 !										
						'\										
11																
						1 1										
							` \.									
	DCPT															
							<									
12							\									
								`\.								
								`	\							
									`\							
13										`\						
}	\perp	End of Borehole DCPT Refusal	66.70													
		DCPT Refusal														
		Note(s):														
14		Water level in open hole at 7.47 m														
14		upon completion of drilling														
15																
16																
47																
17																
18																
19																
20																
				<u>_</u>												
DEF	PTH S	CALE		1	15		G	O L	.D	E	2				LC	OGGED: RI
1:5	50			-	_					_					СН	ECKED: CH

RECORD OF BOREHOLE: 21-212

SHEET 1 OF 2

LOCATION: N 5028459.5 ;E 366591.9

BORING DATE: June 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

ESEL	ETHO	SOIL PROFILE	ь I		MPLI		DYNAMIC PENET RESISTANCE, BL		80		AULIC C k, cm/s			10 ⁻³	TING	PIEZOMETER OR
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	_ =	TYPE	BLOWS/0.30m	SHEAR STRENGT Cu, kPa	- 1	1	W	/ATER C	ONTEN	Γ PERCE	ENT	ADDITIONAL LAB. TESTING	STANDPIPE INSTALLATION
1	BO		R (m)	Ž		BLO	20 40		80	VV				WI 80	, ,	
0		GROUND SURFACE TOPSOIL - (SM) SILTY SAND; dark	79.89 55 0.00													
		brown, contains organic matter (rootlets); non-cohesive, moist, loose	79.59	. 1	SS	7										
		FILL - (SP) SAND, fine to medium, trace silt; brown to dark brown, contains	0.30] '	33	'										
		organic matter; non-cohesive, moist,	79.13													
1		loose (CI/CH) SILTY CLAY to CLAY, trace to	0.76													
		(CI/CH) SILTY CLAY to CLAY, trace to some sand; grey brown, highly fissured (WEATHERED CRUST); cohesive,		2	SS	12					0					
		w>PL, very stiff														
2				3	SS	17										
				4	SS	13					р <u>—</u>				MH	
3																
		(SM) groupilly SILTV SAND, group begins	76.38 3.5		SS	8										
		(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist,	3.5													
4		compact														
				6	SS	12				0						
	Stom	(E)														
	Power Auger															
5	ower /	Diam		7	SS	13										
	L E		74.55	<u>.</u>												
	۲	(SM) SILTY SAND, some gravel to gravel; contains cobbles and boulders	5.32													
		(GLACIAL TILL); non-cohesive, wet, loose to compact		8	SS	6										
6																
				9	SS	6				0						
7				100	00	_									,,,	
				10	SS	э									МН	
				,.	00	10										
8				11	SS	12										
				1	00	15				_						
				12	SS	15				0						
9																
					SS	11										
ŀ	DCPT	Dynamic Cone Penetration Test	70.13 9.76	5			!									
10		(DCPT)	и» — –	1	tΗ	-		-+						†		
				•					_		1	<u> </u>	1			
DEF	PTH	SCALE		1,	1,	>) G C	LD	E	K					LC	OGGED: RI

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RECORD OF BOREHOLE: 21-212

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028459.5 ;E 366591.9

BORING DATE: June 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmHYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH OW Wp ⊢ (m) --- CONTINUED FROM PREVIOUS PAGE ---10 Dynamic Cone Penetration Test (DCPT) 11 12 13 End of Borehole DCPT Refusal Note(s): 1. Water level in open hole at 7.47 m 14 upon completion of drilling 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 WSD GOLDER DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-213

SHEET 1 OF 3

LOCATION: N 5028443.0 ;E 366650.3 BORING DATE: May 31, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

Щ	JOH.	SOIL PROFILE	1.		SA	MPLI		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - ○	k, cm/s 10° 10° 10° 10° 10° 10° 10° 10° 10° 10°	OR STANDPIPE INSTALLATION
	BO		STR	(m)	_		BLC	20 40 60 80	20 40 60 80	
- 0		GROUND SURFACE TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, compact FILL - (SM) gravelly SILTY SAND; dark		76.11 0.00 75.91 0.20	1	ss	20			Bentonite Seal
1		brown, contains concrete and organic matter; non-cohesive, moist, compact FILL - (SM/GM) SILTY gravelly SAND to SILTY sandy GRAVEL, angular; dark brown to grey brown; non-cohesive, moist, dense		75.2 <u>0</u> 0.91	2	ss	33		О М	June 9, 2021
2		FILL - (SM) gravelly SILTY SAND, trace to some clay; brown to grey brown, contains silty clay layers and organic matter (rootlets/wood); non-cohesive, moist to wet, very loose to compact		74.59 1.52	3	ss	6			June 9, 2021
					4	ss	10			Backfill
3						1				
				72.30	5	SS	4			
4		FILL - (SW) gravelly SAND, fine to coarse; brown; non-cohesive, wet, very loose		3.81	6	SS	1			
5	Power Auger 200 mm Diam. (Hollow Stem)				7	ss	1			Bentonite Seal
	Po 200 mm Di	(SM) gravelly SILTY SAND; grey, possible sand layer from 8.38 m to 8.99 m, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense		70.77 5.34	8	ss	10			
6					9	ss	10			9
. 7										Native Sand and Gravel
					10	SS	20			
- 8					11	ss	24			
. 9					12	SS	13			
9					13	ss	40			
10					14	ss	> <u>50</u>			
				I	<u> </u>		_	100105		
DE	PTH S	CALE			1	7)) GOLDE	K	OGGED: RI

RECORD OF BOREHOLE: 21-213

SHEET 2 OF 3

LOCATION: N 5028443.0 ;E 366650.3 BORING DATE: May 31, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

щ	9		SOIL PROFILE			SAMPLES			DYNAMIC PENETRA RESISTANCE, BLOW	TION \ VS/0.3m \	HYDRAULIC CONDUCTIVITY, k, cm/s	ی ا	PIEZOMETER	
DEPTH SCALE METRES	i i	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH Cu, kPa	60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻¹ WATER CONTENT PERCEN	S. TES	OR STANDPIPE INSTALLATION	
DE	0	BOR		STRA	(m)	N	_	BLOV	20 40	60 80	Wp			
- 10			CONTINUED FROM PREVIOUS PAGE											
10		w Stem)	(SM) gravelly SILTY SAND; grey, possible sand layer from 8.38 m to 8.99 m, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense (SW) gravelly SAND, fine to coarse, some silt; grey; non-cohesive, wet,		65.44 10.67								50 mm Diam. PVC #10 Slot Screen	
- 11	Power Auger	200 mm Diam. (Hollow Stem)	dense to very loose	สสส	64.52 11.59	15	SS	40						
- 12			(GLACIAL TILL); non-cohesive, wet, loose		63.91	16	SS	4						
			Borehole continued on RECORD OF DRILLHOLE 21-213 Note(s):		12.2									
- 13			Methane gas noted at a depth of 11.59 mbgs										-	
- 14														
14														
15														
16														
17														
18														
19														
20) GO					

1:50

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

CHECKED: CH

LOCATION: N 5028443.0 ;E 366650.3

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

1:50

RECORD OF DRILLHOLE: 21-213

DRILLING DATE: May 31, 2021

SHEET 3 OF 3

CHECKED: CH

DATUM: NAD 1983

DRILL RIG: CME 75

INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. % (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 63.91 Fresh, thinly to medium bedded, medium Silica Sand grey to brownish grey, fine to medium grained, non-porous, very strong SHALEY LIMESTONE - Broken core from 12.38 m to 12.40 m 13 100-0 UCS = 157 MPa Rotary Drill NQ Core 14 Bentonite Seal 15 100 End of Drillhole 16 Note(s): 1. Water level in screen measured at 0.71 m (Elev. 75.40 m) on June 9, 2021 17 18 19 20 21 22 **GOLDER** DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-213

21-213 SHEET 1 OF 3

LOCATION: N 5028443.0 ;E 366650.3

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: May 31, 2021

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

Τ	QOF	SOIL PROFILE			SA	MPLE		YNAMIC PENETRATION ESISTANCE, BLOWS/0.3m	1	HYDR	AULIC CONDU k, cm/s	ICTIVITY,	9	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 HEAR STRENGTH nat V u, kPa rem V. 0	80 + Q- ● • U- O	w w	0 ⁻⁶ 10 ⁻⁵ /ATER CONTE	W WI	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	ш	GROUND SURFACE	.S	76.11		\vdash	.B	20 40 60	80	+-	20 40	60 80	+	
0 -		TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, compact FILL - (SM) gravelly SILTY SAND; dark		0.00 75.91 0.20	1	SS	20							Bentonite Seal
1		brown, contains concrete and organic matter; non-cohesive, moist, compact FILL - (SM/GM) SILTY gravelly SAND to SILTY sandy GRAVEL, angular; dark brown to grey brown; non-cohesive, moist, dense		75.20 0.91	2	ss	33			0			М	June 9, 2021 —— —————————————————————————————————
2		FILL - (SM) gravelly SILTY SAND, trace to some clay; brown to grey brown, contains silty clay layers and organic matter (rootlets/wood); non-cohesive, moist to wet, very loose to compact		74.59 1.52	3	ss	6							June 9, 2021
					4	ss	10							Backfill
3					5	SS	4							
4		FILL - (SW) gravelly SAND, fine to coarse; brown; non-cohesive, wet, very loose		72.3 <u>0</u> 3.81	6	ss	1							
5	Power Auger 200 mm Diam. (Hollow Stem)				7	SS	1							Bentonite Seal
6	200 mm	(SM) gravelly SILTY SAND; grey, possible sand layer from 8.38 m to 8.99 m, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense		70.77 5.34	8	SS	10							
					9	ss	10							
7					10	ss	20							Native Sand and Gravel
8					11	ss	24							
9					12	SS	13							
					13	SS	40							
10	_L	CONTINUED NEXT PAGE			14	SS	> <u>50</u>			 	+-	_ +	-	
		OGNINGED IVENTI AGE		<u> </u>	<u> </u>		_			<u> </u>				
		CONTINUED NEXT PAGE						GOLD	E	 				OGGED: F

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

1:50

RECORD OF BOREHOLE: 21-213

SHEET 2 OF 3

CHECKED: CH

DATUM: NAD 1983

LOCATION: N 5028443.0 ;E 366650.3 BORING DATE: May 31, 2021

SAMPLER HAMMER, 64kg; DROP, 760mm

щ	9	<u> </u>	SOIL PROFILE			SAMPLES			DYNAMIC PENETRA RESISTANCE, BLOW	VS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	ى ا	PIEZOMETER	
DEPTH SCALE METRES	į	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH Cu, kPa	60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 WATER CONTENT PERCEN	———1 ≥ ≌	OR STANDPIPE INSTALLATION	
DEP N		BORIL	52001 11011	STRAT	DEPTH (m)	NON	_	BLOW	Cu, kPa 20 40	rem V. ⊕ U - ○ 60 80	Wp	LABD	INOTALLATION	
- 10			CONTINUED FROM PREVIOUS PAGE						20 40		20 40 00 00			
		w Stem)	(SM) gravelly SILTY SAND; grey, possible sand layer from 8.38 m to 8.99 m, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense (SW) gravelly SAND, fine to coarse, some silt; grey; non-cohesive, wet,		65.44 10.67								50 mm Diam. PVC #10 Slot Screen	
- 11	Power Auger	200 mm Diam. (Hollow Stem)	dense to very loose	and this	64.52 11.59	15	SS	40					717 717 717 717 717	
12			(GLACIAL TILL); non-cohesive, wet, loose		63.91	16	SS	4						
			Borehole continued on RECORD OF DRILLHOLE 21-213 Note(s):		12.2									
- 13			Methane gas noted at a depth of 11.59 mbgs										-	
14														
15														
16														
17														
18														
19														
20														
20						1								

LOCATION: N 5028443.0 ;E 366650.3

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/13/22

1:50

RECORD OF DRILLHOLE: 21-213

DRILLING DATE: May 31, 2021

SHEET 3 OF 3

CHECKED: CH

DATUM: NAD 1983

DRILL RIG: CME 75

INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. % (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 63.91 Fresh, thinly to medium bedded, medium Silica Sand grey to brownish grey, fine to medium grained, non-porous, very strong SHALEY LIMESTONE - Broken core from 12.38 m to 12.40 m 13 100-0 UCS = 157 MPa Rotary Drill NQ Core 14 Bentonite Seal 15 100 End of Drillhole 16 Note(s): 1. Water level in screen measured at 0.71 m (Elev. 75.40 m) on June 9, 2021 17 18 19 20 21 22 **GOLDER** DEPTH SCALE LOGGED: RI

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1:50

RECORD OF BOREHOLE: 21-214

SHEET 1 OF 2

CHECKED: CH

LOCATION: N 5028490.1 ;E 366670.1

BORING DATE: May 22, 2021

DATUM: NAD 1983

PENETRATION TEST HAMMER, 64kg; DROP, 760mm SAMPLER HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE ELEV. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ TYPE WATER CONTENT PERCENT BLOWS/0 DESCRIPTION INSTALLATION DEPTH -OW Wp H (m) GROUND SURFACE 75.83 TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, 0.15 SS 21 FILL - (SM) gravelly SILTY SAND; dark brown, contains concrete fragments, silty clay layers, organic matter and asphalt 2 SS >50 fragments; non-cohesive, mosit, compact to very dense 3 SS 18 FILL -(SW) SAND, fine to coarse, some gravel, some silt; brown, contains silty sand layers and silty clay layers; non-cohesive, mosit to wet, compact to very loose SS 5 SS 2 FILL - (CL/CI) sandy SILTY CLAY: grey Auger brown, contains silty sand layers; cohesive, w>PL, soft to firm SS 4 71.26 FILL - (SM) CLAYEY SILTY SAND, some gravel; dark grey brown, with black staining, contains organic matter; SS 2 non-cohesive, wet, very loose FILL - (SW) SAND, fine to coarse, some 5.37 gravel, trace to some silt; brown, silty SS 49 clay layers; non-cohesive, wet, dense FILL - (SM) gravelly SILTY SAND; grey, with black staining and oxidation 70.04 staining, contains silty clay layers, possible organic matter; non-cohesive, 9 SS >50 wet, loose to very loose 10 SS 5 68.97 (SM) gravelly SILTY SAND; grey, 6.86 contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, SS 11 10 compact 12 SS 14 Borehole continued on RECORD OF DRILLHOLE 21-214 21451149.GPJ GAL-MIS.GDT 6/16/22 9 10 **NSD** GOLDER DEPTH SCALE LOGGED: RI

1:50

LOCATION: N 5028490.1 ;E 366670.1

RECORD OF DRILLHOLE: 21-214

DRILLING DATE: May 22, 2021

DRILL RIG: CME 75

SHEET 2 OF 2 DATUM: NAD 1983

CHECKED: CH

INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 67.55 Fresh to slightly weathered, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, strong SHALEY LIMESTONE - Broken core from 8.51 m to 8.58 m - Broken/lost core from 9.08 m to 9.16 m - Broken/lost core from 9.25 m to 9.35 m 100 10 Rotary Drill NQ Core - Broken/lost core from 10.57 m to UCS = 59 MPa 11 12 - Broken core from 12.16 m to 12.27 m End of Drillhole 13 14 15 16 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22 17 18 **GOLDER** DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-214

SHEET 1 OF 2

LOCATION: N 5028490.1 ;E 366670.1

BORING DATE: May 22, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

S FE	THO F		SOIL PROFILE	<u> </u>		SA	MPL	_	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	PIEZOMETER
METRES	BORING METHOD		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - Cu, kPa rem V. ⊕ U - C	Wp 	PIEZOMETER OR
	_	\dashv	GROUND SURFACE	S	75.83			ш	20 40 60 80	20 40 60 80	
0		1	TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose		0.00	ı	SS	21			
1			FILL - (SM) gravelly SILTY SAND; dark brown, contains concrete fragments, silty clay layers, organic matter and asphalt fragments; non-cohesive, mosit, compact to very dense			2	SS	>50			
2			FILL -(SW) SAND, fine to coarse, some gravel, some silt; brown, contains silty sand layers and silty clay layers; non-cohesive, mosit to wet, compact to very loose		74.0 <u>0</u> 1.83	3	SS	18			
3			voly local			4	SS	7			
		w Stem)	FILL - (CL/CI) sandy SILTY CLAY: grey		72.02 3.81	5	SS	2			
4	Power Auger	mm Diam. (Hollo	brown, contains silty sand layers; cohesive, w>PL, soft to firm		71.26	6	SS	4			
5		2001	FILL - (SM) CLAYEY SILTY SAND, some gravel; dark grey brown, with black staining, contains organic matter; non-cohesive, wet, very loose		4.57 70.46	7	ss	2			
6		-	FILL - (SW) SAND, fine to coarse, some gravel, trace to some silt; brown, silty clay layers; non-cohesive, wet, dense FILL - (SM) gravelly SILTY SAND; grey, with black staining and oxidation staining, contains silty clay layers,		5.37 70.04 5.79	8	ss	49			
			possible organic matter; non-cohesive, wet, loose to very loose		68.97	9	SS	>50 5			
7			(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact		6.86		SS	10			
8			Borehole continued on RECORD OF		67.55 8.28	12	SS	14			
9			DRILLHOLE 21-214								
10											
DE	PTŀ	H S	CALE			1	1	>) GOLDE	R	LOGGED: RI CHECKED: CH

1:50

RECORD OF DRILLHOLE: 21-214

DRILLING DATE: May 22, 2021

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028490.1 ;E 366670.1 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 67.55 Fresh to slightly weathered, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, strong SHALEY LIMESTONE - Broken core from 8.51 m to 8.58 m - Broken/lost core from 9.08 m to 9.16 m - Broken/lost core from 9.25 m to 9.35 m 100 10 Rotary Drill NQ Core - Broken/lost core from 10.57 m to UCS = 59 MPa 11 12 - Broken core from 12.16 m to 12.27 m End of Drillhole 13 14 15 16 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/13/22 17 18 **GOLDER** DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-215

SHEET 1 OF 1

LOCATION: N 5028548.6 ;E 366698.7 BORING DATE: May 28, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

П	1	읽	SOIL PROFILE	1.		SA	AMPL	-	DYNAMIC PENETRA RESISTANCE, BLOV	IION \ /S/0.3m \	HYDRAULIC C k, cm/s	ONDUCTIVITY,	15	PIEZOMETER
METRES		BORING METHOD		STRATA PLOT	E. E	监		BLOWS/0.30m	20 40	60 80			TAB. TESTING	OR STANDPIPE
ME:	1	SING	DESCRIPTION	ATA F	ELEV.	NUMBER	TYPE	0/S/v	SHEAR STRENGTH Cu, kPa	nat V. + Q - ● rem V. ⊕ U - O		ONTENT PERC	ENT G	INSTALLATION
i		BOF		STR	(m)	ž	ľ	BLO	20 40	60 80	Wp ├		1 WI	
	T		GROUND SURFACE	†"	72.79				20 40				Ť	
0			TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets) non-cohesive, moist, loose FILL - (SM) SILTY SAND, fine to medium; brown, contains organic matter		0.00 72.41 0.38	1	ss	6						Bentonite Seal
1			(rootlets); non-cohesive, moist, loose to compact		71.57	2	ss	10						
			(CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured, contains thin to thick laminations of silty sand (WEATHERED CRUST); cohesive w>PL, very stiff	,	1.22									
2			(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders		70.73 2.06	3	ss	8						Backfill
			(GLACIAL TILL); non-cohesive, moist to wet, loose			4	ss	8						Backfill June 9, 2021
3	Power Auger	mm Diam. (Hollow Stem)				5	ss	8						Bentonite Seal
	Po	nm Di												Silica Sand
4		200 1			68.22	6	ss	9						
5			(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TIL); non-cohesive, wet, loose to very dense		4.57		ss	6						
							1							
6						8	ss	7						50 mm Diam. PVC #10 Slot Screen
						9	SS	9						
							1							
7			End of Borehole Auger Refusal Note(s):		65.73 7.06	10	SS	>50						
8			1. Water level in screen measured at 2.39 m (Elev. 70.40 m) on June 9, 2021											
9														
40														
							\			I DE				
10 DE 1:			CALE			1	1	•) GO	LDEI	₹			OGGED: RI

RECORD OF BOREHOLE: 21-215

SHEET 1 OF 1

LOCATION: N 5028548.6 ;E 366698.7

BORING DATE: May 28, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

SSE			SOIL PROFILE	F			MPLE		DYNAMIC PENETRA RESISTANCE, BLOV	/S/0.3m	,	HYDRAU k	LIC CONE c, cm/s			NAL	PIEZOMETER
METRES	BOBING METHOD	AING ME	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH Cu, kPa	60 8 nat V. + rem V. ⊕	Q - • U - O	WAT	10 ⁻⁵ TER CONT			ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
<u>.</u>		ģ		STR/	(m)	z		BLO\	20 40		30	Wp H 20	40	⊖ ^{vv} 60	⊣ WI 80		
0			GROUND SURFACE		72.79												
Ü			TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets);		0.00												
			non-cohesive, moist, loose		72.41 0.38		SS	6									Bentonite Seal
			FILL - (SM) SILTY SAND, fine to medium; brown, contains organic matter (rootlets); non-cohesive, moist, loose to	\bowtie			-										×
			compact	\bowtie			1										
1					71.57	2	ss	10									
			(CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured.		1.22												
			sand; grey brown, highly fissured, contains thin to thick laminations of silty sand (WEATHERED CRUST); cohesive,				1										
			w>PL, very stiff			3	ss	8									Backfill
2			(SM) gravelly SILTY SAND: arev brown		70.73 2.06												
			(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to				$ \cdot $										Backfill June 9, 2021
			wet, loose			4	ss	8									
						L											
3		Stem)															
	١.	ollow 5				5	SS	8									Bentonite Seal
	Power Auger	m. (H															
	Pov	mm Diam. (Hollow]										Silica Sand
4		200 n				6	SS	9									
						ਁ											
			(SM) was called SH TV SAND, areas		68.22 4.57		1										
			(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TIL); non-cohesive, wet, loose		4.57	7	ss	6									
5			to very dense			′	33	0									
							1										
								_									50 mm Diam. PVC 2.1 #10 Slot Screen
						8	SS	7									
6																	
						9	SS	9									
								. 50									
7		Ц	End of Borehole		65.73 7.06		SS	-50									[4]
			Auger Refusal		'00												
			Note(s):														
			1. Water level in screen measured at 2.39 m (Elev. 70.40 m) on June 9, 2021														
8			,														
9																	
10																	
						<u> </u>	Ц	Щ			_						
DE	PT	ΉS	CALE			1	1,	>) GO	LD	ΕI	R				L	OGGED: RI
1:	50								<u> </u>							СН	ECKED: CH

1:50

RECORD OF BOREHOLE: 21-216

SHEET 1 OF 3

CHECKED: CH

LOCATION: N 5028587.2 ;E 366636.0

BORING DATE: May 5, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 74.34 TOPSOIL - (SM/ML) mixture of SILTY SAND and SILTY CLAY; dark brown; \non-cohesive, loose 0.15 SS FILL - (CL/CI) SILTY CLAY, trace gravel; grey brown; cohesive, w~PL, very stiff SS 7 SS 6 + 0 FILL - (SM) gravelly SILTY SAND, fine to medium brown, contains clay seams; SS non-cohesive, moist, compact 16 SS 12 (SM/ML) SILTY SAND to sandy SILT, some gravel; grey brown to grey (GLACIAL TILL); moist to wet, loose to very dense SS 12 0 МН SS 10 0 М SS 8 SS SS 0 10 6 11 SS 4 21451149.GPJ GAL-MIS.GDT 6/16/22 12 SS 9 13 SS 6 0 М 14 CONTINUED NEXT PAGE **NSD** GOLDER DEPTH SCALE LOGGED: RI/BW

RECORD OF BOREHOLE: 21-216

SHEET 2 OF 3

DATUM: NAD 1983

LOCATION: N 5028587.2 ;E 366636.0 BORING DATE: May 5, 2021

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

, F	НОБ	SOIL PROFILE	1.	1	SA	MPL		DYNAMIC F RESISTAN			1		cm/s				AL NG	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV.		TYPE	BLOWS/0.30m	20 SHEAR ST Cu, kPa			80	10 ⁻⁶ WATE	10 ⁻⁵ R CONTE			3 T	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
	BOR		STRA	DEPTH (m)	Ž	-	BLOW	Сu, кРа 20	40		80	Wp ⊢ 20	40	W 60	 W 80	/I	LAE	
10		CONTINUED FROM PREVIOUS PAGE	la la la															
10		(SM/ML) SILTY SAND to sandy SILT, some gravel; grey brown to grey		X	١													
	iger	some gravel; grey brown to grey (GLACIAL TILL); moist to wet, loose to very dense			14	SS	4											
	Power Auger	very define		Į.														
	Pow																	
11				63.21	1	SS	>50											
İ		Borehole continued on RECORD OF DRILLHOLE 21-216	1	11.13														
		DRILLHOLE 21-210																
12																		
										1								
										1								
13																		
										1								
										1								
14										1								
15																		
16																		
17										1								
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19										1								
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20										1								
DFI	PTH S	SCALE			1	1) (0	LD	E	R					10	OGGED: RI/BW
	50	- -			•	•	-					•						ECKED: CH

INCLINATION: -90°

RECORD OF DRILLHOLE: 21-216

SHEET 3 OF 3

DATUM: NAD 1983

LOCATION: N 5028587.2 ;E 366636.0

AZIMUTH: ---

DRILLING DATE: May 5, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	COLOUR % RETURN	SH	- Jo T - Fa IR- Sh I - Ve - Co	near ein	jate		CO- OR- CL -	Bedd Foliat Conta Ortho Cleav	ict aonal	IR - Irregular MB- M	licke	ensi	ided				or ad tions viation	en R ddition refer ns &	nal to list		
DEPTH	DRILLING	DESCRIPTION	SYMBOL	DEPTH (m)	RUN	HSU.	TOTAL CORE		RE %		848 Q.D.	FRA INE PE 0.2:	ER 5 m	OIP w.r. CORE AXIS	t. TYPE AND SURFACE DESCRIPTION	Jo	con .	Jr Ja	l RC	DCK ENGT DEX	тн	WE EF IN	ATH RING DEX	-	Q VG.	
		BEDROCK SURFACE		63.21			ΔÌ	Ĭ	Ï	Ĭ	İ					İ]	İ		Ī		I	Í	\prod		
		Fresh, thinly to medium bedded, medium	莊	11.13					П				Ш	П		T							Т	П		
		to brownish grey, fine to medium grained, non-porous, strong SHALEY LIMESTONE	茔							ı			Ш			1				ı						
		LIMESTONE - Broken core from 11.23 m to 11.25 m				100				ı			Ш			1				ı						
		- Broken core from 11.5 m to 11.51 m	莊		1)1				ı			Ш			1				ı						
- 12			註							ı			Ш			1				ı						
			鞋							ı			╝			1				ı						
		- Broken/lost core from 12.13 m to 12.37 m							П	I			Ш			1										
		- Broken core from 12.54 m to 12.55 m	肆										111			1										
													Ш			1										
- 13	Ē	σ ₀	肆			00							Ш			1										
	Rotary Drill	- Broken core from 13.14 m to 13.15 m	註		2	10							Ш			1										
	Rot	2	肆										Ш			1										
													Ш			1										
			評																							
			i.				$\parallel \parallel$		\parallel	Ĭ	\parallel	1													\neg	
- 14		- Mud seam from 14.03 m to 14.06 m	肆																							
		- Mud seam from 14.28 m to 14.3 m	囍							j																
		- Mud seam from 14.25 m to 14.3 m	F		3	100				j		F														
		- Mud seam from 14.55 m to 14.58 m	FF.			_				ı			Ш			1										
										ı			Ш			1										
- 15										ı			Ш			1										
	\perp	End of Drillhole	크	59.10 15.24			Н		Н	Ħ	-	$\ \ $	Ш			1								┞	_	
		End of Brilling		10.21									Ш			1					П					
													Ш			1					П					
													Ш			1					П					
- 16													Ш			1					П					
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- 17													Ш			1					П					
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DE	PTH	SCALE		'	11	1	۱,			C	j (O		. [DER										LOGGED: RI/BW	
1:	50									_				_										,	CHECKED: CH	

1:50

RECORD OF BOREHOLE: 21-216

SHEET 1 OF 3

CHECKED: CH

LOCATION: N 5028587.2 ;E 366636.0

BORING DATE: May 5, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 74.34 TOPSOIL - (SM/ML) mixture of SILTY SAND and SILTY CLAY; dark brown; \non-cohesive, loose 0.15 SS FILL - (CL/CI) SILTY CLAY, trace gravel; grey brown; cohesive, w~PL, very stiff SS 7 SS 6 + 0 FILL - (SM) gravelly SILTY SAND, fine to medium brown, contains clay seams; SS non-cohesive, moist, compact 16 SS 12 (SM/ML) SILTY SAND to sandy SILT, some gravel; grey brown to grey (GLACIAL TILL); moist to wet, loose to very dense SS 12 0 МН SS 10 0 М SS 8 SS SS 0 10 6 11 SS 4 21451149.GPJ GAL-MIS.GDT 6/13/22 12 SS 9 13 SS 6 0 М 14 CONTINUED NEXT PAGE **NSD** GOLDER DEPTH SCALE LOGGED: RI/BW

RECORD OF BOREHOLE: 21-216

SHEET 2 OF 3

DATUM: NAD 1983

LOCATION: N 5028587.2 ;E 366636.0 BORING DATE: May 5, 2021

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

ا پڇ	HOD	SOIL PROFILE	-		SA	MPL		DYNAMIC P RESISTANO			,	HYDRAULIC k, c	m/s			NG NG	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV.		TYPE	BLOWS/0.30m	20 SHEAR STR			30	10 ⁻⁶ WATER	10 ⁻⁵ R CONTEN		10 ⁻³ ENT	ADDITIONAL LAB. TESTING	OR STANDPIPE
7 P ≦	ORIN	DESCRIPTION	IRAT/	DEPTH (m)	N	Σ	LOWS	SHEAR STF Cu, kPa		rem V. \oplus	ũ-ŏ	wp —		V	-I WI	ADC LAB.	INSTALLATION
		CONTINUED EDOM DDE VIOUS DAGE	ြ	()			<u> </u>	20	40	60 8	30	20	40	60	80		
10	\top	CONTINUED FROM PREVIOUS PAGE (SM/ML) SILTY SAND to sandy SILT,			\vdash								+	+		+	
	<u></u>	some gravel; grey brown to grey (GLACIAL TILL); moist to wet, loose to		Ž	14	SS	4										
	Power Auger	very dense			-	-											
	Powe																
11				63.21	1	SS	>50										
Ī	_	Borehole continued on RECORD OF DRILLHOLE 21-216	122	11.13													
		5.022.1022.2.10															
12																	
				1													
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	оты с	SCALE			1	١,) G	U	LD		K				10	GGED: RI/BW

RECORD OF DRILLHOLE: 21-216

DLE: 21-216 SHEET 3 OF 3

LOCATION: N 5028587.2 ;E 366636.0

DRILLING DATE: May 5, 2021 DRILL RIG: CME 75 DATUM: NAD 1983

INCLINATION: -90°

AZIMUTH: ---

DRILLING CONTRACTOR: Downing Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	COLOUR W RETIRN		JN FLT SHF VN CJ	- Si - Ve - Co	ear in onju	gate		OF CL)- Be)- Fo)- Co R- Or - Cle	ntac thog eava	ct jonal	CU- Curved K UN- Undulating St I ST - Stepped Ro IR - Irregular M	O- Po - Sli M- Sr o - Ro IB- Me	icken	side	Brea	No ab of ak sy	DTE: brevi abbre mbol:	For a lation: eviati s.	s refe ons &	onal er to l &		
DEPTH ME	RILLING		SYMBC	DEPTH (m)	RU	FLUSH	TO	TAL RE %	SO	DLID RE %	6	.Q.D %	. IN I 0.	RACT NDEX PER 25 m	DI	P w.r CORE AXIS	DISCONTINUITY DAT	TA	Jcor	n Jr J	ST	ROCI RENG INDE	STH X	"	EAT RIN NDE	X	Q AV	3.
		BEDROCK SURFACE		63.21		4	88	348	88	348	8 1	848	2 2	111	10	888 	BESONI HON		+	H	75	11	<u>F</u>	×	¥ %	. ≱	╁	
Ī		Fresh, thinly to medium bedded, medium to brownish grey, fine to medium	譯	11.13					I		ı	Ħ	I	Ħ	T	Ħ			T	Ħ	Ī					T		
		to brownish grey, fine to medium grained, non-porous, strong SHALEY LIMESTONE	堊																									
12		- Broken core from 11.23 m to 11.25 m - Broken core from 11.5 m to 11.51 m			1	007	8																					
		- Broken/lost core from 12.13 m to 12.37 m						H	ŀ													F						_
		- Broken core from 12.54 m to 12.55 m	藍						ı				ı															
13	Rotary Drill	- Broken core from 13.14 m to 13.15 m			2	9	2																					
14		- Mud seam from 14.03 m to 14.06 m							l																			_
		- Mud seam from 14.28 m to 14.3 m																										
		- Mud seam from 14.41 m to 14.45 m - Mud seam from 14.55 m to 14.58 m			3	00																						
15																												
}		End of Drillhole	175	59.10 15.24			$\parallel \parallel$	+		\parallel		\mathbb{H}	$\ $														\vdash	-
- 16																												
18																												
19																												
- 20																												
- 21																												
DEI		SCALE	•	,	11	1	\)			;	C)	L		DER							- 1	1-1			LOGGED: RI/BW HECKED: CH

RECORD OF BOREHOLE: 21-217

SHEET 1 OF 1

LOCATION: N 5028539.7 ;E 366660.8

BORING DATE: May 5, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

١, ٢	BORING METHOD	SOIL PROFILE	+	SAM	IPLES	DYNAMIC PENETRA RESISTANCE, BLO			k	, cm/s	UCTIVITY,	I NG I	PIEZOMETER
METRES	ME	DESCRIPTION LA TARY TO DESCRIPTION	EV.	۳ <u>۳</u>	TYPE BLOWS/0.30m	20 40	60 80		10-6	1	10 ⁻⁴ 10	ADDITIONAL LAB. TESTING	OR STANDPIPE
M	RING	DESCRIPTION E DEF	PTH	NUMBER	TYPE WS/0.3	SHEAR STRENGTH Cu, kPa	nat V. + Q - rem V. ⊕ U -	Ö		ER CONT	ENT PERCEN	AB. T	INSTALLATION
ا د	BOF	[] K	m)	Ž	BLO	20 40	60 80		Wp F 20	40	W 1 \ 60 8	" "	
\neg		ODOUND OUDEAGE	5.19	\dashv	† -		00 00	\dashv	20	40	00 8		
0		TOPSOIL - (SM) SILTY SAND; dark	0.00					1					
			4.98 0.21	1 :	SS 7								
		brown, contains clay seams; non-cohesive, moist, loose to dense											
		non-cohesive, moist, loose to dense	-										
1				2	SS 7				0				
				3	SS 39								
2				4									
			2.90	\dashv									
		cohesive, w>PL, very stiff		4	SS 14					0		мн	
				[]								"	
3		7.	2.14										
		(SM) gravelly silty sand, grey brown to grey contains cobbles (GLACIAL TILL);	3.05	1									
		non-cohesive, moist to wet, loose to very dense		5	SS 19								
				_									
		=	\vdash	\dashv									
4	l	S S S S S S S S S S S S S S S S S S S		6	SS 27								
	uger			Ĭ	20 21								
	Power Auger	÷	\vdash	\dashv									
	8 6	200 mm Diam, (Hollow Stern)											
٠	8	500		7	SS 8								
5													
			-	\dashv									
				8 :	SS 8								
				١ (0								
6			\vdash	\dashv									
				9 :	SS 6				0				
			F	\Box									
7									_				
				10	SS 7				0			MH	
			-	\dashv									
			\vdash	\dashv									
				11 :	SS 12								
8													
			L										
			-	12	SS >50				0				
			6.35										
9		End of Borehole Auger Refusal	8.84										
		J											
10													
DF	РТН	H SCALE		11	5) GO	LDE	F	5			LOG	GED:
	50	- 			-				•			CHEC	

RECORD OF BOREHOLE: 21-217

SHEET 1 OF 1

LOCATION: N 5028539.7 ;E 366660.8

BORING DATE: May 5, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

ļ	HOD	SOIL PROFILE			SA	MPLE		DYNAMIC PENE RESISTANCE, E	TRATIONS	ON /0.3m	7	HYDRA	AULIC Co	ONDUC	TIVITY,		4º5	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 I I SHEAR STREN Cu, kPa	GTH r	uat V. + em V. ⊕		W	ATER C	ONTEN	T PERC	WI	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
	ш	GROUND SURFACE	S	75.19		+	m	20 40) (0 8	0	2	20 4	10	60	80	+	
0 -		TOPSOIL - (SM) SILTY SAND; dark brown, contains rootlets; moist FILL - (SM) gravelly SILTY SAND; grey brown, contains clay seams; non-cohesive, moist, loose to dense		0.00 74.98 0.21	1	SS	7											
1					2	SS	7					0						
2				72.90	3	SS	39											
3		FILL - (CI/CH) SILTY CLAY; grey brown; cohesive, w>PL, very stiff		72.14	4	SS	14						0				МН	
		(SM) gravelly sitty sand, grey brown to grey contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense		3.05	5	SS	19											
4	Power Auger				6	SS	27					0						
5	7 200 mm [7	SS	8											
6					8	SS	8											
					9	SS	6					0						
7					10	SS	7					0					МН	
8					11		12											
9		End of Borehole Auger Refusal		66.35 8.84	12	SS >	>50					0						
10																		
DEF		SCALE		•	11	1) G() l	. D	ΕI	₹	•	•	•			GGED:

RECORD OF BOREHOLE: 21-218

SHEET 1 OF 2

LOCATION: N 5028493.7 ;E 366635.3

BORING DATE: May 7, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp I (m) GROUND SURFACE 78.54 TOPSOIL - (SM) SILTY SAND, some gravel; dark brown, contains organic matter (rootlets); moist 0.15 SS 46 FILL - (CL/CI) SILTY CLAY, trace gravel; grey brown, contains organic matter (rootlets); cohesive, w~PL, hard FILL - (SM) gravelly SILTY SAND, fine to coarse; grey to brown, contains brick 0.76 SS particles and concrete; non-cohesive, dry to moist, compact to very dense 30 Bentonite Seal SS 23 SS 74 5 SS 29 Backfill SS 19 Power Auger SS 22 Bentonite Seal (SW) SAND, fine to coarse, trace gravel; brown; non-cohesive, moist, very loose SS 2 May 28, 2021 June 9, 2021 Silica Sand SS 3 (ML/SM) Sandy SILT to SILTY SAND, some low-med plasticity fines; brown, contains clay seams; non-cohesive, moist, loose SS 10 4 MH (SM) gravelly SILTY SAND; grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to compact 50 mm Diam. PVC #10 Slot Screen 11 SS 9 21451149.GPJ GAL-MIS.GDT 6/16/22 12 SS 10 9 13 SS 23 Silica Sand 14 CONTINUED NEXT PAGE MIS-BHS 001 **GOLDER** DEPTH SCALE LOGGED: RI 1:50 CHECKED: CH

RECORD OF BOREHOLE: 21-218

SHEET 2 OF 2

LOCATION: N 5028493.7 ;E 366635.3 BORING DATE: May 7, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

ا پ	위	SOIL PROFILE	1.	1	SA	MPL		DYNAMIC PENETRA RESISTANCE, BLOW	'S/0.3m	HYDRAUI k,	LIC CONDUCT cm/s	IIVII T,	일두	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH Cu, kPa	60 80 nat V. + Q - ● rem V. ⊕ U - ○		10 ⁻⁵ 1 ER CONTENT		ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
ă	BOF		STR/	(m)	ž		BLO	20 40	60 80	Wp F 20		—— I WI 60 80	45	
- 10		CONTINUED FROM PREVIOUS PAGE (SM) gravelly SILTY SAND; grey,					\Box							1 22
		contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to compact			14	SS	7							
- 11					15	SS	4			0			М	
	ger ollow Stem)													
12	Power Auger 200 mm Diam. (Hollow Stem)				16	SS	5							Bentonite Seal
	200				17	ss	9							
13														
15				64.95	18	SS	11							
		End of Borehole Auger Refusal	- nxixi	13.59										
14		Note(s): 1. Water level in screen measured at												
		6.02 m (Elev. 72.52 m) on June 9, 2021												
15		2. Water level in screen measured at 5.83 m (Elev. 72.71 m) on May 28, 2021												
16														
17														
18														
19														
. 20														
20							_							
DEI	PTH S	CALE			1	10	>) GO	LDE	R			L	OGGED: RI

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

RECORD OF BOREHOLE: 21-218

SHEET 1 OF 2

LOCATION: N 5028493.7 ;E 366635.3 BORING DATE: May 7, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

щ	<u>О</u> О	SOIL PROFILE			SA	MPL	.ES	DYNAMIC PENETRATION \ RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	٥٦	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	•	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○		ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
- 0		GROUND SURFACE TOPSOIL - (SM) SILTY SAND, some gravel; dark brown, contains organic matter (rootlets); moist FILL - (CL/Cl) SILTY CLAY, trace gravel; grev brown, contains organic matter	s liii	78.54 0.00 0.15	1	ss	46	20 40 60 80	20 40 60 80		
- 1		(rootlets); cohesive, w~PL, hard FILL - (SM) gravelly SILTY SAND, fine to coarse; grey to brown, contains brick particles and concrete; non-cohesive, dry to moist, compact to very dense		77.78 0.76	2	SS	30				Bentonite Seal
- 2					3	SS	23				- - - - - - - - -
- 3					5	ss					× = 1
- 4					6	ss	19				Backfill
- 5	Power Auger	(SW) SAND, fine to coarse, trace gravel; brown; non-cohesive, moist, very loose		72 24	7	ss	22				Bentonite Seal
- 6		(SW) SAND, fine to coarse, trace gravel; brown; non-cohesive, moist, very loose		73.21 5.33	8	SS	2			- [May 28, 2021
- 7		(ML/SM) Sandy SILT to SILTY SAND, some low-med plasticity fines; brown, contains clay seams; non-cohesive, moist, loose		71.99 6.55	9	SS	3				\text{\frac{\partial \text{\tin\text{\ti}\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\ti}\tinz{\text{\text{\text{\text{\text{\text{\text{\text{\text{\ti}\tint{\text{\text{\text{\text{\text{\text{\text{\text{\tin\tin\tin\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\ti}\}\tint{\text{\tint{\text{\tin}\tiint
- 8		(SM) gravelly SILTY SAND; grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to compact		71.22 7.32	11	SS	9				50 mm Diam. PVC 2 2 2 3 4 10 Slot Screen
					12	ss	10				
- 9					13	ss					Silica Sand
- 10	_ L	CONTINUED NEXT PAGE			14	SS	7_		<u> </u>		<u> </u> 264 <u> </u>
DEI		SCALE			1	1) GOLDE	R		OGGED: RI ECKED: CH

RECORD OF BOREHOLE: 21-218

SHEET 2 OF 2

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028493.7 ;E 366635.3 SAMPLER HAMMER, 64kg; DROP, 760mm BORING DATE: May 7, 2021

DATUM: NAD 1983

, PE	THOD	SOIL PROFILE	1 -		SA	MPL		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	₽ _S	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ⊕ rem V. ⊕ U - ○ 20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³ WATER CONTENT PERCENT Wp	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
10		CONTINUED FROM PREVIOUS PAGE (SM) gravelly SILTY SAND; grey,								\perp	12.
		(Silv) gravelily Salt in Salto, grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to compact			14	SS	7				
11	stem)				15	SS	4		0	м	
12	Power Auger 200 mm Diam. (Hollow Stem)				16	ss	5				Bentonite Seal
	200 n				17	ss	9				
13				64.95	18	SS	11				
· 14		End of Borehole Auger Refusal Note(s): 1. Water level in screen measured at 6.02 m (Elev. 72.52 m) on June 9, 2021		13.59							
15		2. Water level in screen measured at 5.83 m (Elev. 72.71 m) on May 28, 2021									
16											
17											
18											
19											
20											
DF	PTH S	CALE	•	•	1	1	<u>, </u>) GOLDE	R	LC	OGGED: RI

RECORD OF BOREHOLE: 21-219

SHEET 1 OF 3

LOCATION: N 5028505.1 ;E 366485.3 BORING DATE: May 6, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

ا لِا	모	SOIL PROFILE	1.		SF	MPLI		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	k, cm/s	PIEZOMETER
METRES	BORING METHOD		STRATA PLOT		监		BLOWS/0.30m	20 40 60 80	K, cm/s	OR STANDPIPE
MET	NG ING	DESCRIPTION	TAF	ELEV. DEPTH	NUMBER	TYPE	VS/0	SHEAR STRENGTH nat V. + Q - € Cu, kPa rem V. ⊕ U - C	WATER CONTENT PERCENT	INSTALLATION
1	BOR		TRA	(m)	≥		320			
+		GROUND SURFACE	0,	79.40		H		20 40 60 80	20 40 60 80	
0	\top	TOPSOIL - (SM) SILTY SAND, some	EEE	0.00		H	1			
		gravel; dark brown, contains organic matter (rootlets); moist, loose	/‱	0.15	1	ss	7			
		FILL - (SM) SILTY SAND, trace gravel; brown; non-cohesive, moist, loose		*						Pontonita Saal
		2.3711, non conceive, molat, locat		*]				Bentonite Seal
1			\bowtie							
			\bowtie	×	2	SS	7			mer.
				77.88		$ \ $				Silica Sand
		FILL - (CI/CH) SILTY CLAY, trace sand; grey brown, fissured; cohesive, w~PL,		1.52		1				l ä
		grey brown, fissured; cohesive, w~PL, stiff to very stiff		*	3	ss	7			
2										
				X		$ \ $				
			\bowtie		4	ss	8			
				Š	*	33	٥			May 28, 2021
3			\bowtie	*		<u> </u>				June 9, 2021 ¥
										38 mm Diam. PVC #10 Slot Screen
				1	5	ss	16			🕍
						$ \ $				
		(SW) gravelly SILTY SAND; grey, contains cobbles (GLACIAL TILL);		75.59 3.81		1				l ß
4		non-cohesive, moist to wet, loose to very		4	6	ss	42			
		dense								
	Stem)									
	Power Auger 200 mm Diam. (Hollow Stem)				,		_			
5	Power Auger Diam. (Hollo			1	7	SS	5			[5
	m Dig					$ \ $				Silica Sand
	200 r									
					8	ss	8			2
6					_					
υ				4		$ \ $				
					9	ss	7			
				4						
						1				
7				1						
					10	SS	12			
						$ \ $				
				1		1				
8					11	ss	12			Bentonite Seal
				1						
						$ \cdot $				
				4	12	ss	34			
9				3		1				
					13	SS	12			
						$ \ $				
10				4	14	SS	<u>18</u>		 	
		CONTINUED NEXT PAGE		1						
			•	•	•	1 6) GOLDE	D	
	оты с	SCALE				4	•	• L-LJ J	■	OGGED: RI/BW

RECORD OF BOREHOLE: 21-219

SHEET 2 OF 3

DATUM: NAD 1983

BORING DATE: May 6, 2021 LOCATION: N 5028505.1 ;E 366485.3

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

(SW) grav contains c non-cohes dense	SOIL PROFILE DESCRIPTION JED FROM PREVIOUS PAGE Illy SILTY SAND; grey, bbles (GLACIAL TILL); ve, moist to wet, loose to very		ELEV. DEPTH (m)	BER	TYPE	30m	2				,	10	k, cm/s	ONDUCT		0 ⁻³	ADDITIONAL LAB. TESTING	PIEZOMETER OR
CONTIN	JED FROM PREVIOUS PAGE	-	DEPTH	NUMBER	YPE	3/0.30			v 6	J 8	U	10	, 10	, 10	ا ر	U .	Ow	UK
CONTIN	JED FROM PREVIOUS PAGE	-	DEPTH (m)	₽	1 ≻		SHEAR	STREN	GTH n	at V. +		W		ONTENT		NT	1 등 쁜 [STANDPIPE INSTALLATION
CONTIN	Ilv SILTY SAND: grev.	-	()		-	-OW	Cu, kPa	a	re	em V. 🕀	Ű-Ö			OW.		WI	ADE LAB.	INSTALLATION
(SW) grav contains c non-cohes dense	Ilv SILTY SAND: grev.			\vdash	-	B	2	0 41	0 6	8 0	0	2				80 	+	
contains connon-cohes dense	bbles (GLACIAL ŤILĹ); ve, moist to wet, loose to very																	
o dense ≩ Borehole o		/ 1888		14	SS	18												
Borehole o																		
Borehole of DRILLHOI			68.56	15	SS	>50												
	ontinued on RECORD OF E 21-219		10.84															
				1														
- -	SCALE	SCALE	SCALE	SCALE	SCALE SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE GOLD	SCALE	SCALE	SCALE NSI) GOLDER	SCALE	SCALE GOLDER	SCALE	SCALE NSD GOLDER LO

1:50

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

CHECKED: CH

RECORD OF DRILLHOLE: 21-219 PROJECT: 21451149 DRILLING DATE: May 6, 2021 LOCATION: N 5028505.1 ;E 366485.3

INCLINATION: -90°

AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 3 OF 3

DATUM: NAD 1983

PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 68.56 Fresh to slightly weathered, thickly to 10.84 Fresh to slightly weathered, thickly to massive bedded, medium brownish grey, fine to coarse grained, faintly porous, strong LIMESTONE, with thin partings of shale - vertical joint from 11.11 to 11.27 m - broken core from 11.31 to 11.32 m - vertical joint from 11.45 to 11.59 m - broken core from 11.54 to 11.59 m - lost core from 11.59 to 11.64 m 11 2 - lost core from 11.59 to 11.64 m 12 UCS = 62 MPa - vertical bedding from 12.35 to 12.45 m Rotary Drill Bentonite Seal 13 - vertical joint from 13.23 to 13.45 m and 14.63 to 14.69 m 14 End of Drillhole 14.69 15 16 17 18 19 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22 20 **GOLDER** DEPTH SCALE LOGGED: RI/BW 1:50 CHECKED: CH

1:50

RECORD OF BOREHOLE: 21-219

SHEET 1 OF 3

CHECKED: CH

LOCATION: N 5028505.1 ;E 366485.3

BORING DATE: May 6, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp ⊢ (m) GROUND SURFACE 79.40 TOPSOIL - (SM) SILTY SAND, some gravel; dark brown, contains organic (matter (rootlets); moist, loose FILL - (SM) SILTY SAND, trace gravel; brown; non-cohesive, moist, loose 0.15 SS Bentonite Seal SS 7 Silica Sand 77.88 FILL - (CI/CH) SILTY CLAY, trace sand; grey brown, fissured; cohesive, w~PL, stiff to very stiff SS SS 8 May 28, 2021 June 9, 2021 38 mm Diam. PVC #10 Slot Screen SS 16 (SW) gravelly SILTY SAND; grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to very SS 42 SS 5 Silica Sand SS SS SS 12 10 Bentonite Seal 11 SS 12 21451149.GPJ GAL-MIS.GDT 6/13/22 12 SS 34 13 SS 12 14 SS 18 CONTINUED NEXT PAGE MIS-BHS 001 WSD GOLDER DEPTH SCALE LOGGED: RI/BW

RECORD OF BOREHOLE: 21-219

SHEET 2 OF 3

LOCATION: N 5028505.1 ;E 366485.3 BORING DATE: May 6, 2021 DATUM: NAD 1983 SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmHYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp ⊢ (m) --- CONTINUED FROM PREVIOUS PAGE ---(SW) gravelly SILTY SAND; grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to very Rotary Drill HW Casing SS 14 18 68.56 15 SS >50 Borehole continued on RECORD OF 11 DRILLHOLE 21-219 12 13 14

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

15

16

17

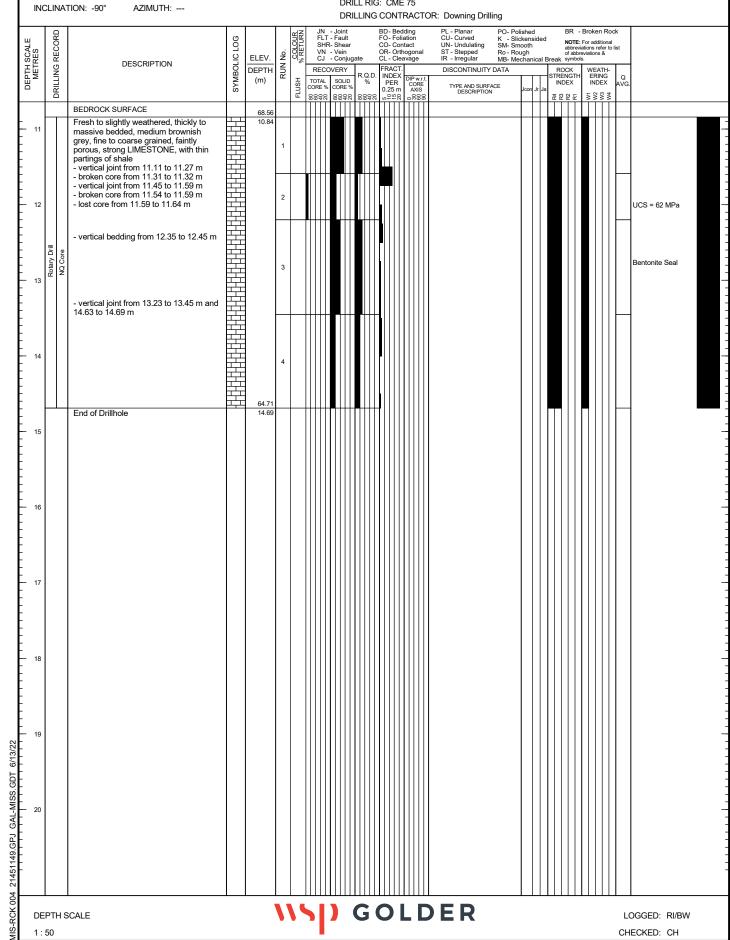
18

19

20

WSD GOLDER

RECORD OF DRILLHOLE: 21-219 PROJECT: 21451149 SHEET 3 OF 3 DRILLING DATE: May 6, 2021 LOCATION: N 5028505.1 ;E 366485.3 DATUM: NAD 1983 DRILL RIG: CME 75



CHECKED: CH

1:50

RECORD OF BOREHOLE: 21-221

SHEET 1 OF 3

LOCATION: N 5028600.7 ;E 366490.8 BORING DATE: May 21, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

Ц	JOH.	SOIL PROFILE	1.		SA	MPL	\blacksquare	RESIST	ANCE, E	ETRATI BLOWS	/0.3m		HYDK	k, cm/s	ONDUC	IIVII T,		무일	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	SHEAR Cu, kPa	STREN		60 € nat V. + rem V. ⊕	Q - ● U - O	W	0 ⁻⁶ 1 L /ATER C	1	PERCE	10 ⁻³ ENT WI	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
1	BO		STR	(m)	Ž		BLC	20	4(0 (30 0	30		-			80	<u> </u>	
0		GROUND SURFACE TOPSOIL - (SM) SILTY SAND, trace	 	74.59														-	
		gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, compact FILL - (SM) gravelly SILTY SAND: dark		0.00 74.39 0.20	1	SS	12												
1		brown to brown, contains organic matter and brick; non-cohesive, moist, compact_ TOPSOIL - (SM) SILTY SAND, fine; dark brown, contains organic matter; non-cohesive, moist, compact		73.83 0.76 73.37 1.22	2	ss	12												Bentonite Seal
		(SM) SILTY SAND, fine to medium; brown; on-cohesive, moist, compact		1.22			40												May 28, 2021 June 9, 2021
2		(CI/CH) SILTY CLAY to CLAY, trace to some sand; grey brown, highly fissured, contains thin laminations of silty sand		72.61 1.98	3	SS	12												May 28, 2021
		(WEATHERED CRUST); cohesive, w>PL, stiff to very stiff			4	SS	11												May 28, 2021 June 9, 2021
3																			
					5	SS	3							 	0		 	МН	XXXXX
4																			
•	Stem)				6	SS	2												
5	Power Auger 200 mm Diam. (Hollow St			69.25	7	SS	2												Backfill
	200 mr	(CI/CH) SILTY CLAY to CLAY; grey; cohesive, firm to stiff		5.34	8	ss	-	Φ Φ	-	+ +									XXXXXXXXX
6										·									X
					9	ss	1							-	10				XXXXX
7								Φ Φ			+								XXXXXX
											,								XXXXX
8		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact		66.66 7.93	10	SS	6												
		very roose to compact			11	ss	15						0					МН	
9																			Bentonite Seal
					12	SS	17						0					М	
10		CONTINUED NEXT PAGE	_r.x87X	 	13	S <u>S</u>	<u>20</u>	+			 				 		†		-
	י ידר	CCALE	1		7	16)	C	<u> </u>		EI	D				1		IOGGED: RI

1:50

RECORD OF BOREHOLE: 21-221

SHEET 2 OF 3

CHECKED: CH

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028600.7 ;E 366490.8 SAMPLER HAMMER, 64kg; DROP, 760mm BORING DATE: May 21, 2021

DATUM: NAD 1983

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp I (m) --- CONTINUED FROM PREVIOUS PAGE --(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, SS Native Sand 13 20 very loose to compact 0 11 14 SS 3 МН (SW) SAND, fine to coarse, trace gravel; grey; non-cohesive, wet, very dense 62.85 11.74 15 SS 83 (SM) SILTY sandy GRAVEL; grey, contains cobbles and boulders 0 32 mm Diam. PVC #10 Slot Screen 'S' 12 (GLACIAL TILL); non-cohesive, wet, very dense 62.09 12.50 SS 114 16 (SM/ML) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense 13 17 SS >50 (SM/ML) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, Drill Silica Sand RC wet, very dense Bentonite Seal 60.63 Borehole continued on RECORD OF DRILLHOLE 21-221 15 16 17 18 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 MIS-BHS 001 ****\$|) **GOLDER** DEPTH SCALE LOGGED: RI

INCLINATION: -90°

LOCATION: N 5028600.7 ;E 366490.8

AZIMUTH: ---

RECORD OF DRILLHOLE: 21-221

DRILLING DATE: May 21, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 3 OF 3

DATUM: NAD 1983

PO- Polished BR K - Slickensided SM- Smooth abbrev of abb MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD NOTE: For additional abbreviations refer to list of abbreviations & SYMBOLIC LOG DEPTH SCALE METRES ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 60.63 Fresh, thinly to medium bedded, medium 13.96 grey to brownish grey, fine to medium grained, non-porous, very strong SHALEY LIMESTONE Bentonite Seal Silica Sand 100 UCS = 152 MPa 15 - broken core from 15.55 m to 15.56 m Rotary Dril NQ Core 16 32 mm Diam. PVC #10 Slot Screen 'D' 9 17 9 End of Drillhole Note(s): 18 1. Water level in screen measured at 1.35 m (Elev. 73.23 m) on May 28, 2021 (Shallow) 2. Water level in screen measured at 1.43 m (Elev. 73.15 m) on June 9, 2021 (Shallow) 19 3. Water level in screen measured at 2.33 m (Elev. 72.26 m) on May 28, 2021 4. Water level in screen measured at 2.41 m (Elev. 72.18 m) on June 9, 2021 (Deep) 20 21 22 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22 23 **GOLDER** DEPTH SCALE LOGGED: RI 1:50 CHECKED: CH

RECORD OF BOREHOLE: 21-221

SHEET 1 OF 3

LOCATION: N 5028600.7 ;E 366490.8

BORING DATE: May 21, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

T gn co F b a) T b n (% b	DESCRIPTION GROUND SURFACE TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, compact FILL - (SM) gravelly SILTY SAND; dark prown to brown, contains organic matter and brick; non-cohesive, moist, compact to the compact of the compact of the compact organic matter; non-cohesive, moist, compact SM) SILTY SAND, fine to medium; prown; on-cohesive, moist, compact CI/CH) SILTY CLAY to CLAY, trace to come sand; grey brown, highly fissured, contains thin laminations of sitly sand WEATHERED CRUST); cohesive, wPL, stiff to very stiff		ELEV. DEPTH (m) 74.59 0.00 74.39 0.20 73.83 0.76 73.37 1.22	1 2	SS	BLOWS/0.30m	SHEA Cu, kF	R STRE	40 ENGTH	nat V. rem V	80 + Q - (y W	VATER C	ONTENT	F PERCE	IO ³ ENT WI 80	ADDITIONAL LAB. TESTING	PIEZOMET OR STANDPI INSTALLAT	IPE
	GROUND SURFACE TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic natter (rootlets); non-cohesive, moist, compact FILL - (SM) gravelly SILTY SAND; dark orown to brown, contains organic matter and brick; non-cohesive, moist, compact TOPSOIL - (SM) SILTY SAND, fine; dark orown, contains organic matter; non-cohesive, moist, compact SM) SILTY SAND, fine to medium; orown; on-cohesive, moist, compact CI/CH) SILTY CLAY to CLAY, trace to some sand; grey brown, highly fissured, contains thin laminations of silty sand WEATHERED CRUST); cohesive,		DEPTH (m) 74.59 0.00 74.39 0.20 73.83 0.76	1	SS		Cu, kF	Pa .		rem V	.⊕ U-0	o w	'p ——	OW		WI	ADDI LAB. T	INSTALLA	
	TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic natter (rootlets); non-cohesive, moist, compact soft of the contains organic matter and brick; non-cohesive, moist, compact properties of the contains organic matter; non-cohesive, moist, compact properties, moist, compact properties, moist, compact properties, moist, compact prown; on-cohesive, moist, compact som, son-cohesive, moist, compact prown; on-cohesive, moist, cohesive, prown; on-cohesive, prown; prown; prown; on-cohesive, prown;		74.59 0.00 74.39 0.20 73.83 0.76	1	SS			20	40	60	80								_
T gn co F b a) T b n (% b	TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic natter (rootlets); non-cohesive, moist, compact soft of the contains organic matter and brick; non-cohesive, moist, compact properties of the contains organic matter; non-cohesive, moist, compact properties, moist, compact properties, moist, compact properties, moist, compact prown; on-cohesive, moist, compact som, son-cohesive, moist, compact prown; on-cohesive, moist, cohesive, prown; on-cohesive, prown; prown; prown; on-cohesive, prown;		73.83 0.76	1	-	12			+							1	-		_
	gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, compact FILL - (SM) gravelly SILTY SAND; dark brown to brown, contains organic matter and brick; non-cohesive, moist, compact or compact or contains organic matter; non-cohesive, moist, compact or contains thin laminations of silty sand or contains thin laminations of silty sand of contains thin laminations of silty sand or contains thin laminations of silty sand or contains thin laminations of silty sand or contains thin laminations of silty sand or contains thin laminations of silty sand or contains thin laminations of silty sand or contains thin laminations of silty sand or contains the contains thin laminations of silty sand or contains the cont		73.83 0.76	1	-	12						1	1		1	1		i	
	compact Fill L - (SM) gravelly SILTY SAND; dark orown to brown, contains organic matter and brick; non-cohesive, moist, compact of CPSOIL - (SM) SILTY SAND, fine; dark orom, contains organic matter; non-cohesive, moist, compact SM) SILTY SAND, fine to medium; orown; on-cohesive, moist, compact orown; on-cohesive, moist, compact orown; on-cohesive, moist, compact oroma sand; grey brown, highly fissured, contains thin laminations of silty sand WEATHERED CRUST); cohesive,		73.83 0.76		-	14													
b a T b n (% b	orown to brown, contains organic matter and brick; non-cohesive, moist, compact POPSOIL - (SM) SILTY SAND, fine; dark orown, contains organic matter; ion-cohesive, moist, compact SM) SILTY SAND, fine to medium; on-cohesive, moist, compact color, on-cohesive, moist, compact color, on-cohesive, moist, compact color, on-cohesive, moist, compact color, on-cohesive, moist, compact color, on-cohesive, moist, cohesins thin laminations of silty sand wearthered crust; cohesive,		0.76 73.37	2															Н
	TOPSOIL - (SM) SILTY SAND, fine; dark forown, contains organic matter; non-cohesive, moist, compact SM) SILTY SAND, fine to medium; orown; on-cohesive, moist, compact CI/CH) SILTY CLAY to CLAY, trace to some sand; grey brown, highly fissured, contains thin laminations of silty sand WEATHERED CRUST); cohesive,		73.37	2														Bentonite Seal	Ш
	non-cohesive, moist, compact SM) SILTY SAND, fine to medium; brown; on-cohesive, moist, compact CI/CH) SILTY CLAY to CLAY, trace to some sand; grey brown, highly fissured, contains thin laminations of silty sand WEATHERED CRUST); cohesive,		73.37 1.22	2															Ш
(()	CI/CH) SILTY CLAY to CLAY, trace to some sand; grey brown, highly fissured, contains thin laminations of silty sand WEATHERED CRUST); cohesive,		1.22		SS	12												,	▃▋▐
c (come sand; grey brown, highly fissured, contains thin laminations of silty sand WEATHERED CRUST); cohesive,		1		1													May 28, 2021 Sune 9, 2021	₹
c (come sand; grey brown, highly fissured, contains thin laminations of silty sand WEATHERED CRUST); cohesive,		4																
c (come sand; grey brown, highly fissured, contains thin laminations of silty sand WEATHERED CRUST); cohesive,	WW.	72.61	3	SS	12													
- 1 (WEATHERED CRUST); cohesive,		1.98		$\mid \mid$													_	_88
V	v>PL, stiff to very stiff				1													May 28, 2021 5	
				4	ss	11													
					1														
				5	ss	3								-	_	\vdash	МН		
]														
					$\mid \mid$														
				6	ss	2													
Stem																			
Hollow				7	ss	2												Backfill	
Jiam. (
J	CI/CH) SILTY CLAY to CI AY: grev:		69.2 <u>5</u> 5.34																
ŏ 8	cohesive, firm to stiff			8	SS	_	⊕		+										
]		₩		-										
				٥	80	,								<u></u> _					
				9	33														
					1														
							\oplus			+									
							0				+								
			66 66																
(SM) gravelly SILTY SAND; grey,		7.93	10	SS	6													
1 (GLACIAL TILL); non-cohesive, wet,				1														Ä
'	,puo.																		
				11	SS	15						0					MH		
					$\mid \mid$													Bentonite Seel	
					1													Somonico Obai	
				12	ss	17						0					М		
_L	CONTINUED NEXT PAGE		1	13	ss	<u>20</u>		 		+-	-	+		+		+			
	CONTINUED NEXT PAGE					l		1	1	- 1			1	1	1				
				-	_		_	_	_		ÞΕ								
Lollow Stem)	(((CI/CH) SILTY CLAY to CLAY; grey; cohesive, firm to stiff (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact	(SM) gravelly SILTY SAND: grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact 11 SS 12 SS	SS	SS SS C ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACAL TILL); non-cohesive, wet, very loose to compact 11	SS SS C ⊕	SS - ⊕ + + ⊕ + ⊕ + ⊕	S S - + + + +	8 SS - (+ + + + + + + + + + + + + + + + + +	(SM) gravelly SiLTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact 11 SS 15 O 12 SS 17 O	SS 1 + + + + + + + + + +	(SM) gravelly SiLTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact 11 SS 15 0 0 + + + + + + + + + + + + + + + + +	8 SS - ⊕ + + + + + + + + + + + + + + + + + +	S S S C C C C C C C	SS 1

RECORD OF BOREHOLE: 21-221

SHEET 2 OF 3

DATUM: NAD 1983

LOCATION: N 5028600.7 ;E 366490.8

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: May 21, 2021

<u>ш</u>	9		SOIL PROFILE	1.	1	SA	MPLI		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUC k, cm/s	, , , , , , , , , , , , , , , , , , ,	글일	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD		DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + C cu, kPa rem V. ⊕ U) - •	10 ⁻⁶ 10 ⁻⁵ 10 10 10 10 10 10 10 10 10 10 10 10 10		ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
_	BC	4		STF	(m)	_	Н	BLC	20 40 60 80		•	60 80		
10 -			CONTINUED FROM PREVIOUS PAGE (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact			13	ss	20						Native Sand
11	_	ow Stem)	(SW) SAND, fine to coarse, trace gravel; grey; non-cohesive, wet, very dense		63.31 11.28	14	SS	3			0		МН	
12	Power Auger	200 mm Diam. (Holle	(SM) SILTY sandy GRAVEL; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense		62.85 11.74	15	SS	83			0		М	32 mm Diam. PVC #10 Slot Screen 'S'
12			(SM/ML) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense		62.09 12.50									
13	/ Drill	Casing	(SM/ML) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive,		61.1 <u>8</u> 13.41	17		>50						Silica Sand
14	Rotary Drill	NW	boulders (GLACIAL TILL); non-cohesive, wet, very dense Borehole continued on RECORD OF DRILLHOLE 21-221		60.63 13.96	1	RC	-						Bentonite Seal
15														
16														
17														
18														
19														
20														
DEI	PTH	- I S	CALE	•	•	1	1.	>) GOLDI	ΕF	₹	. '	L	DGGED: RI

INCLINATION: -90°

LOCATION: N 5028600.7 ;E 366490.8

AZIMUTH: ---

RECORD OF DRILLHOLE: 21-221

DRILLING DATE: May 21, 2021

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 3 OF 3

DATUM: NAD 1983

PO- Polished BR K - Slickensided SM- Smooth abbrev of abb MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD NOTE: For additional abbreviations refer to list of abbreviations & SYMBOLIC LOG DEPTH SCALE METRES ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 60.63 Fresh, thinly to medium bedded, medium 13.96 grey to brownish grey, fine to medium grained, non-porous, very strong SHALEY LIMESTONE Bentonite Seal Silica Sand 100 UCS = 152 MPa 15 - broken core from 15.55 m to 15.56 m Rotary Dril NQ Core 16 32 mm Diam. PVC #10 Slot Screen 'D' 9 17 9 End of Drillhole Note(s): 18 1. Water level in screen measured at 1.35 m (Elev. 73.23 m) on May 28, 2021 (Shallow) 2. Water level in screen measured at 1.43 m (Elev. 73.15 m) on June 9, 2021 (Shallow) 19 3. Water level in screen measured at 2.33 m (Elev. 72.26 m) on May 28, 2021 4. Water level in screen measured at 2.41 m (Elev. 72.18 m) on June 9, 2021 (Deep) 20 21 22 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/13/22 23 **GOLDER** DEPTH SCALE LOGGED: RI 1:50 CHECKED: CH

RECORD OF BOREHOLE: 21-222

SHEET 1 OF 2 DATUM: NAD 1983

LOCATION: N 5028541.6 ;E 366553.3

BORING DATE: May 12, 2021

1	무	SOIL PROFILE			SA	MPLE	≣S	DYNAMIC PENETRA RESISTANCE, BLOW	ION \ S/0.3m		HYDRAULIC CONI k, cm/s	DUCTIVITY,	٥٦١	PIEZOMETER
METRES	MET		PLOT		띪		.30m	20 40	60 80	`	10 ⁻⁶ 10 ⁻⁵	10 ⁻⁴ 10 ⁻³	TIONA	OR STANDPIPE
ME	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	SHEAR STRENGTH Cu, kPa	nat V. + Q - rem V. ⊕ U -	0		TENT PERCENT		INSTALLATION
	ā	GROUND SURFACE	S			\vdash	В	20 40	60 80		20 40	60 80		
0	Т	TOPSOIL - (SM) SILTY SAND; brown,	EEE	78.83 0.00										
		contains organic matter (rootlets); non-cohesive, moist, loose	/₩	0.15	1	ss	14							
		FILL - (CL/CI) SILTY CLAY, trace to some sand, some gravel; brown,	⅓											Bentonite Seal
		contains brick fragments; cohesive,	i 🎇	77.92		1								
1		FILL - (SM) gravelly SILTY SAND; grey brown, possible cobbles and boulders; non-cohesive, moist, compact to loose	/₩	0.91	2	ss	5				0			
		FILL - (CL/CI) SILTY CLAY, some sand, some gravel; grey brown; cohesive,	′ ₩											
		w~PL, stiff FILL - (SM) gravelly SILTY SAND, fine to	- 💥	77.1 <u>5</u>										
2		coarse; brown to grey brown, concrete fragments, brick fragments, organic			3	SS	7							
		matter and wood; non-cohesive, moist, loose to very dense												
					4	SS	18							
3														
					5	ss	5							
														Backfill
4					6	SS	>50							
	e e													
	ow Stem)													
5	Power Auger mm Diam. (Hollow				7	SS	65				0			
	Power Im Diar			73.4 <u>9</u>										
	200 m	FILL -(SM) gravelly SILTY SAND; grey brown, contains concrete and brick		5.34										
		fragments; non-cohesive, moist, compact			8	SS	24							May 28, 2021 ¥
6														Backfill May 28, 2021
					9	SS	11							
7		FILL - (GP) sandy GRAVEL; grey,	₩	71.97 6.86										June 9, 2021 ¥ ₩
		contains concrete fragments; non-cohesive, wet, dense			10	ss	35							
				71.21										
		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders		7.62		1								June 9, 2021 🗸
8		(GLACIAL TILL); non-cohesive, wet, loose to dense			11	ss	35				0			
					12	ss	17							
					'2	33	17							
9						1								
					13	ss	9							
]								Bentonite Seal
10	_L				14	s <u>s</u>	<u>14</u>			_	├ -			
		CONTINUED NEXT PAGE												
DE	PTH S				1	16) GO	DE		D			OGGED: RI/BW

1:50

RECORD OF BOREHOLE: 21-222

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028541.6 ;E 366553.3

BORING DATE: May 12, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp ⊢ (m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, 0 Bentonite Seal МН SS 14 14 loose to dense Silica Sand 11 15 SS 39 38 mm Diam. PVC #10 Slot Screen 'D' 16 SS 9 12 SS 17 33 0 Dynamic Cone Penetration Test (DCPT) Silica Sand 109 End of Borehole DCPT Refusal 1. Water level in screen measured at 1. Water level in Sciedifficaduled at 5.65 m (Elev. 73.18 m) on May 28, 2021 (Deep) 2. Water level in screen measured at 6.79 m (Elev. 72.04 m) on June 9, 2021 15 (Deep) 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 **GOLDER** DEPTH SCALE LOGGED: RI/BW

RECORD OF BOREHOLE: 21-222A

SHEET 1 OF 1

LOCATION: N 5028541.6 ;E 366553.3

BORING DATE: May 12, 2021

DATUM: NAD 1983

» ALE	THOD	SOIL PROFILE	_		SAMF	_	DYNAMIC PENI RESISTANCE,	BLOWS/0.3m	, k, c	C CONDUCTIVITY, cm/s	NG A	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	A DE	LEV. EPTH (m)	NUMBER	BLOWS/0.30m	20 4 SHEAR STREN Cu, kPa 20 4	IGTH nat V. + Q - rem V. ⊕ U -	• WATE Wp ⊢ 20	10 ⁻⁵ 10 ⁻⁴ 10 ⁻³ R CONTENT PERCENT W 40 60 80	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
0		GROUND SURFACE For soil stratigraphy refer to record of	.	78.83 0.00								
1		borehole 21-222										Bentonite Seal
2												Backfill
3	Power Augger 200 mm Diam. (Hollow Stem)											Bentonite Seal
5	Pov 200 mm Di											Silica Sand
6												50 mm Diam. PVC ##10 Slot Screen 'S' #May 28, 2021 June 9, 2021
7		End of Borehole		71.21 7.62								্থ্য <u>ক্ষ্ণেক্ষ্</u>
8		Note(s): 1. Water level in screen measured at 6.42 m (Elev. 72.41 m) on May 28, 2021 (Shallow) 2. Water level in screen measured at 6.52 m (Elev. 72.31 m) on June 9, 2021 (Shallow)										
9												
		CALE						OLDE	<u> </u>			

1:50

RECORD OF BOREHOLE: 21-222A

SHEET 1 OF 1

CHECKED: CH

LOCATION: N 5028541.6 ;E 366553.3

BORING DATE: May 12, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp F (m) GROUND SURFACE 78.83 For soil stratigraphy refer to record of borehole 21-222 Bentonite Seal Backfill 2 Bentonite Seal Silica Sand 50 mm Diam. PVC #10 Slot Screen 'S' May 28, 2021 June 9, 2021 End of Borehole Note(s): 1. Water level in screen measured at 6.42 m (Elev. 72.41 m) on May 28, 2021 (Shallow)
2. Water level in screen measured at 6.52 m (Elev. 72.31 m) on June 9, 2021 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22 9 10 **GOLDER** DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-222

SHEET 1 OF 2 DATUM: NAD 1983

LOCATION: N 5028541.6 ;E 366553.3 SAMPLER HAMMER, 64kg; DROP, 760mm BORING DATE: May 12, 2021

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

اِ	원		SOIL PROFILE	1.		S/	AMPL	-	DYNAMIC PENETRA RESISTANCE, BLOV	11ON VS/0.3m			JLIC CC k, cm/s	NDUCTIV	ΊΙΥ,	구호	PIEZOMETER
METRES	BORING METHOD			STRATA PLOT	EI EV	띪		BLOWS/0.30m	20 40		30	10°				ADDITIONAL LAB. TESTING	OR STANDPIPE
ME:	3ING		DESCRIPTION	ATA I	ELEV. DEPTH	NUMBER	TYPE	MS/0	SHEAR STRENGTH Cu, kPa	nat V. + rem V. ⊕	Q - • U - O			NTENT P		AB. TI	INSTALLATION
5	BOF			STR/	(m)	ž	1	BLO.	20 40		30	Wp 20			I WI 80	4 5	
		GROU	ND SURFACE	<u> </u>	78.83		T							. 00			
0	П		OIL - (SM) SILTY SAND; brown,	EEE	0.00												
		\non-co	ns organic matter (rootlets); ohesive, moist, loose	/‱	0.15		ss	14									
		FILL -	(CL/CI) SILTY CLAY, trace to sand, some gravel; brown,			L											Bentonite Seal
		contai	ns brick fragments; cohesive,	¦‱													
1		FILL -	very stiff (SM) gravelly SILTY SAND; grey	'.₩	77.92 0.91	1											×
		non-co	, possible cobbles and boulders; bhesive, moist, compact to loose	/‱		2	SS	5									
		FILL -	(CL/CI) SILTY CLAY, some sand, gravel; grey brown; cohesive,	′ ‱													
		w~PL,	stiff	\longrightarrow	77.1 <u>5</u>												
		FILL -	(SM) gravelly SILTY SAND, fine to		1.68	3	SS	7									
2		fragme	ents, brick fragments, organic r and wood; non-cohesive, moist,			L											
			to very dense				-										
						4	SS	18				$ \circ $					
3							-										
٥							1										
						5	SS	5									
																	Backfill
4						6	SS	>50									
							1										
	á	Ê				L											
	1 3	n Mo															Backfill May 28, 2021
5	Auge	Diam. (Hollow				7	SS	65				0					
٦	Power Auger	E					-										
		FILL -((SM) gravelly SILTY SAND; grey	****	73.4 <u>9</u> 5.34		-										
	8		contains concrete and brick ents; non-cohesive, moist,			8	SS	24									May 28, 2021
		compa		\bowtie													
6																	
				\bowtie													
						9	SS	11									
				\bowtie	71.97		+										June 9, 2021 💆
7			(GP) sandy GRAVEL; grey,		6.86		1										Sano 0, 2021
		non-co	ns concrete fragments; ohesive, wet, dense			10	ss	35									
						L											
		(SM)	gravelly SILTY SAND; grey,		71.21 7.62		-										Cave
		contail	ns cobbles and boulders CIAL TILL); non-cohesive, wet,			11	SS	35									June 9, 2021
8			to dense			''	33	33									
						\vdash	1										
						12	SS	17									
9							-										
							1										
						13	SS	9									
																	Bentonite Seal
						44	1										
10		-	CONTINUED NEXT PAGE		† -	14	SS	14	+	-+		t — — -	+		+-:	_	-
						Ļ	<u> </u>										
DEI	PTH	SCALE				1	1.	5) GO	LD	ΕI	R				L	OGGED: RI/BW
									_	•							ECKED: CH

1:50

RECORD OF BOREHOLE: 21-222

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028541.6 ;E 366553.3

BORING DATE: May 12, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp ⊢ (m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, 0 Bentonite Seal МН SS 14 14 loose to dense Silica Sand 11 15 SS 39 38 mm Diam. PVC #10 Slot Screen 'D' 16 SS 9 12 SS 17 33 0 Dynamic Cone Penetration Test (DCPT) Silica Sand 109 End of Borehole DCPT Refusal 1. Water level in screen measured at 1. Water level in Sciedifficaduled at 5.65 m (Elev. 73.18 m) on May 28, 2021 (Deep) 2. Water level in screen measured at 6.79 m (Elev. 72.04 m) on June 9, 2021 15 (Deep) 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 **GOLDER** DEPTH SCALE LOGGED: RI/BW

RECORD OF BOREHOLE: 21-224

SHEET 1 OF 3

LOCATION: N 5028516.4 ;E 366593.7

BORING DATE: May 10, 2021

DATUM: NAD 1983

ļ	QQ	SOIL PROFILE			SA	MPLE	≣S	DYNAN RESIS	IIC PE	NETRA E, BLOW	TION /S/0.3m		HYDRA	AULIC (k, cm	CONDU	CTIVITY,		٥٦	DIEZOMETE	-P
METRES	BORING METHOD		LOT		ĸ		30m	2		40	60	80	10		10 ⁻⁵	10-4	10 ⁻³	ADDITIONAL LAB. TESTING	PIEZOMETE OR	
METI	NG	DESCRIPTION	TAP	ELEV.	NUMBER	TYPE	.0/S/	SHEAF Cu, kPa		ENGTH	nat V.	+ Q- ● ⊕ U- O	W			NT PERC	ENT		STANDPIPE INSTALLATIO	
)	BOR		STRATA PLOT	DEPTH (m)	₽	-	BLOWS/0.30m			46			W		— O		-l WI	[\f		
		GROUND SURFACE	0)	70.00		\vdash	ш	2	U	40	60	80	2	20	40	60	80			_
0	Т	TOPSOIL - (SM) SILTY SAND, trace		78.90		\vdash					+								Bentonite Seal	
		organic matter; dark brown; moist FILL - (SM) gravelly SILTY SAND, fine to	₩	0.15	1	SS	41													₿
		coarse: dark brown to brown, contains	\bowtie																	₿
		concrete fragments; non-cohesive, moist, loose to very dense	\bowtie	3																▩
			\bowtie	4	2	ss	71													₿
1			\bowtie	1	2] 33														
			\bowtie	3																
			\bowtie			$\left\{ \ \ \right\}$													Backfill	₿
			\bowtie	1	3	ss	61													
2			\bowtie		,		01													
			\bowtie			1														
			\bowtie																	
			\bowtie		4	ss	22													
			\bowtie																	ì
3			\bowtie			$\mid \cdot \mid$														
			\bowtie		5	SS	16													
			\bowtie																Bentonite Seal	
			\bowtie																	
4			\bowtie																	
			\bowtie		6	ss	22													
	_		\bowtie																Silica Sand	T
	Power Auger 200 mm Diam. (Hollow Stem)		\bowtie			$\mid \cdot \mid$														1
	uger		\bowtie		7	SS	29													ैं
5	Power Auger Diam. (Hollo		\bowtie																	
	Po iii mr		\bowtie			1														1
	200 n		\bowtie																	
			\bowtie		8	SS	43													2
6			\bowtie			$\mid \mid$													50 5: 51/6	
ŭ			\bowtie			1													50 mm Diam. PVC #10 Slot Screen	
			\bowtie		9	SS	15												May 28, 2021 \ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \	
			\bowtie																June 9, 2021 <u>¥</u>	Š
			\bowtie			1														
7			\bowtie																	
			\bowtie	4	10	SS	20													Š
				4	11	ss	>50													
8					12	ss	6													
o				4															Siling Sand	Š
		(SM) gravally SILTV SAND; grav braves		70.52 8.38															Silica Sand	
		(SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL		0.36	4.		_													1
		TILL); non-cohesive, wet, loose to compact		1	13	SS	24													ž,
9						$\mid \cdot \mid$														
				1		1														
					14	ss	11												Bentonite Seal	
10	<u> </u>			1	<u>15</u>	s <u>s</u>	9				\perp		<u> </u>		1		1	_		
ıU	_	CONTINUED NEXT PAGE												-				_		
		i	1		•			•						I					<u> </u>	_
DE	PTH S	CALE			1	10	6		G	U	\mathbf{L}	E	K					L	OGGED:	

1:50

RECORD OF BOREHOLE: 21-224

SHEET 2 OF 3

CHECKED: CH

LOCATION: N 5028516.4 ;E 366593.7

BORING DATE: May 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE --10 (SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, loose to SS 15 9 compact 11 16 SS 8 (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, 17 SS 18 compact to very dense 12 SS 25 18 13 19 SS 50 Bentonite Seal 200 14 SS 57 (SW) SAND, fine to coarse, trace gravel; grey, contains thin beds of gravelly silty SS 23 sand; non-cohesive, wet, compact 21 15 (SM) gravelly SILTY SAND; gery, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, 22 SS 91 very dense 16 23 SS >50 Borehole continued on RECORD OF DRILLHOLE 21-224 18 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 MIS-BHS 001 **NSD** GOLDER DEPTH SCALE LOGGED:

1:50

RECORD OF DRILLHOLE: 21-224

DRILLING DATE: May 10, 2021

SHEET 3 OF 3

CHECKED: CH

LOCATION: N 5028516.4 ;E 366593.7 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 61.98 Fresh, thinly to medium bedded, medium 17 100 grey to brownish grey, fine to medium grained, non-porous, medium strong to weak SHALEY LIMESTONE 100 2 18 Rotary Drill Bentonite Seal 19 100 3 - broken core from 19.80 m to 19.82 m 20 depth End of Drillhole 21 22 23 24 25 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22 26 **GOLDER** DEPTH SCALE LOGGED:

1:50

RECORD OF BOREHOLE: 21-224

SHEET 1 OF 3

CHECKED: CH

LOCATION: N 5028516.4 ;E 366593.7 BORING DATE: May 10, 2021 DATUM: NAD 1983 SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL -AB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp F (m) GROUND SURFACE 78.90 TOPSOIL - (SM) SILTY SAND, trace Bentonite Seal organic matter; dark brown; moist 0.15 SS 41 FILL - (SM) gravelly SILTY SAND, fine to coarse; dark brown to brown, contains concrete fragments; non-cohesive, moist, loose to very dense SS 71 Backfill 3 SS 61 SS 22 5 SS 16 Bentonite Seal SS 22 Silica Sand SS 29 SS 43 50 mm Diam. PVC #10 Slot Screen May 28, 2021 SS 15 ∇ June 9, 2021 SS 10 20 SS >50 6 12 SS Silica Sand MIS-BHS 001_21451149.GPJ GAL-MIS.GDT 6/13/22 (SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, loose to SS 24 Bentonite Seal 14 SS 11 15 CONTINUED NEXT PAGE **GOLDER** DEPTH SCALE LOGGED:

RECORD OF BOREHOLE: 21-224

SHEET 2 OF 3

LOCATION: N 5028516.4 ;E 366593.7

BORING DATE: May 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE --10 (SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, loose to SS 15 9 compact 11 16 SS 8 (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, 17 SS 18 compact to very dense 12 SS 25 18 13 19 SS 50 Bentonite Seal 200 14 SS 57 (SW) SAND, fine to coarse, trace gravel; grey, contains thin beds of gravelly silty SS 23 sand; non-cohesive, wet, compact 21 15 (SM) gravelly SILTY SAND; gery, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, 22 SS 91 very dense 16 23 SS >50 Borehole continued on RECORD OF DRILLHOLE 21-224 18 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 MIS-BHS 001 **NSD** GOLDER DEPTH SCALE LOGGED: 1:50 CHECKED: CH

LOCATION: N 5028516.4 ;E 366593.7

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/13/22

1:50

RECORD OF DRILLHOLE: 21-224

DRILLING DATE: May 10, 2021

SHEET 3 OF 3

CHECKED: CH

DATUM: NAD 1983

DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 61.98 Fresh, thinly to medium bedded, medium 17 100 grey to brownish grey, fine to medium grained, non-porous, medium strong to weak SHALEY LIMESTONE 100 2 18 Rotary Drill Bentonite Seal 19 100 3 - broken core from 19.80 m to 19.82 m 20 depth End of Drillhole 21 22 23 24 25 26 **GOLDER** DEPTH SCALE LOGGED:

RECORD OF BOREHOLE: 21-225

 F BOREHOLE:
 21-225
 SHEET 1 OF 2

 BORING DATE:
 May 3, 2021
 DATUM:
 NAD 1983

LOCATION: N 5028560.9 ;E 366591.4 SAMPLER HAMMER. 64kg: DROP. 760mm

ן י	연	SOIL PROFILE			SA	MPLI		YNAMIC PENETRATION \ ESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVIT k, cm/s	Y,	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)		TYPE	BLOWS/0.30m	20 40 60 80 HEAR STRENGTH nat V. + Q rem V. ⊕ U 20 40 60 80	10 ⁶ 10 ⁵ 10 ⁴ WATER CONTENT PER Wp W 20 40 60	TABDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATIO
0		GROUND SURFACE		75.21							_
-		TOPSOIL - (SM) SILTY SAND; dark brown, contains brick and organic matter (rootlets); moist FILL - (SM) gravelly SILTY SAND;		0.00 74.98 0.23	1	ss	>50				
1		brown, contains cobbles and boulders; non-cohesive, dry, very dense		×××××××××××××××××××××××××××××××××××××××	2	ss	78				Bentonite Seal
		FILL - (CI/CH) SILTY CLAY, some sand,		73.69 1.52							
2		trace gravel; grey brown; cohesive, w~PL, very stiff		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	3	ss	12				Silica Sand
					4	ss	10				50 mm Diam. PVC
3		(Cl/CH) SILTY CLAY, trace sand; grey brown, slightly fissured (WEATHERED CRUST); cohesive, W~PL, very stiff		72.16 3.05	5	ss	13				#10 Slot Screen
		(SM) gravelly SILTY SAND; grey brown to grey (GLACIAL TILL); non-cohesive,		71.40 3.81							May 28, 2021
4	(1	to grey (GLACIAL TILL); non-cohesive, moist to wet, compact			6	SS	12				
5	Power Auger 200 mm Diam. (Hollow Stem)				7	SS	15				Silica Sand
	200 mm [8	ss	19				
6					9	ss	10				Š
7					10	ss	20				
8					11	SS	23				Bentonite Seal
9					12	SS	13				
					13	ss	12				
10		 			14_	SS	<u>11</u>			_	
		CONTINUED NEXT PAGE									

RECORD OF BOREHOLE: 21-225

SHEET 2 OF 2

LOCATION: N 5028560.9 ;E 366591.4 BORING DATE: May 3, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

ų l	원		SOIL	PROFILE	1.	1	SA	MPLI		DYNAM RESIST	ANCE, E	BLOWS	ЛN /0.3m	(HYDKA	AULIC CO k, cm/s	טטטאר	IIVIIY,		구호	PIEZOMETE	R
RES	MET				PLOT	E1 E1	 #	l	.30m	20			1	30	10			1	10 ⁻³	TION/	OR STANDPIPE	
DEPTH SCALE METRES	BORING METHOD		DESCRIPTION	ON	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	SHEAR Cu, kPa	STREN	GTH	nat V. + em V. €	Q - • U - O	W/	ATER CO	ONTENT OW	PERCE		ADDITIONAL LAB. TESTING	INSTALLATIO	
دَ	BOF				STR	(m)	ž		BLO	20				30	Wp 2				WI 80	47		
40			TINUED FROM PRE										Ĺ	Ĺ				Ĺ	Ĭ			
10		(SM) gra	avelly SILTY SAN GLACIAL TILL):	ID; grey brown																		
		moist to	GLÁCIAL TILL); wet, compact	51.00110,			14	SS	11													
								1														
11		otem)					15	ss	10												Bentonite Seal	
	ger	Molic																				
	ver Au	Ĕ.						1														
	Pov	E					16	ss	11													
12	Power Auger	200 1																				
							H	$\mid \mid$														XX
							17	SS	13													燚
							"														Cave	燹
,.						62.23		1														燚
13		End of E Auger R	Borehole efusal			12.98																
		Note(s):																				
		1. Water	r level in screen r	measured at																		
		3.63 m (Elev. 71.59 m) o	n June 9, 2021																		
14		2. Water 3.54 m (r level in screen r Elev. 71.68 m) o	neasured at n May 28, 2021																		
		3. Water	r level measured	•																		
		2.96 m d	on May 5, 2021	•																		
15																						
16																						
17																						
18																						
.0																						
19																						
20																						
DE	PTH	SCALE					1	10)	G (DI	. D	E	R					LO	OGGED: RI	
4.	50												_							СН	ECKED: CH	

RECORD OF BOREHOLE: 21-225

LE: 21-225 SHEET 1 OF 2 lay 3, 2021 DATUM: NAD 1983

LOCATION: N 5028560.9 ;E 366591.4

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: May 3, 2021

ا _. إ	异	SOIL PROFILE	1.		SA	MPL		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	k, cm/s	₽ PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V + Q - O Cu, kPa rem V. ⊕ U - O	Mb - O I MI	PIEZOMETER OR STANDPIPE INSTALLATION
\dashv		GROUND SURFACE	0)	75.21	\vdash		п.	20 40 60 80	20 40 60 80	
0		TOPSOIL - (SM) SILTY SAND; dark brown, contains brick and organic matter		0.00 74.98	l					
		\(\text{(rootlets); moist}\) \(\text{FILL - (SM) gravelly SILTY SAND;}\) \(\text{brown, contains cobbles and boulders;}\)		0.23		SS	>50			
		non-cohesive, dry, very dense								
1					2	SS	78			Bentonite Seal
		FILL - (CI/CH) SILTY CLAY, some sand,		73.69 1.52						
		trace gravel; grey brown; cohesive, w~PL, very stiff			3	SS	12			i i
2										Silica Sand
					4	SS	10			
										50 mm Diam. PVC #10 Slot Screen
3		(CI/CH) SILTY CLAY, trace sand; grey		72.16 3.05						#10 Olot Golden
		brown, slightly fissured (WEATHERED CRUST); cohesive, W~PL, very stiff			5	ss	13			
				74.40						May 28, 2021 June 9, 2021
		(SM) gravelly SILTY SAND; grey brown to grey (GLACIAL TILL); non-cohesive,		71.40 3.81						
4		moist to wet, compact			6	ss	12			
	1	•								
	r Stem)				7	ss	15			
5	200 mm Diam (Hollow									Silica Sand
J	Powel									
	000					1				
	1				8	SS	19			
6					_					
					9	SS	10			
7										
					10	SS	20			
8					11	SS	23			Bentonite Seal
					12	SS	13			
9										
					_					
					13	SS	12			
						_				
10	L	CONTINUED NEXT PAGE		1	14	S <u>S</u>	11	+	 	
			<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u></u>			
DE	РТН	SCALE			1	10	5) GOLDE	K	LOGGED: RI

RECORD OF BOREHOLE: 21-225

SHEET 2 OF 2

LOCATION: N 5028560.9 ;E 366591.4 BORING DATE: May 3, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

Щ.	로	SOIL PROFILE	1.		SA	MPL		DYNAMIC PENETRA RESISTANCE, BLOW	TON \ S/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	무일	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD		STRATA PLOT		l K		BLOWS/0.30m	20 40	60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻⁵		OR STANDPIPE
MET	ING	DESCRIPTION	TAF	ELEV. DEPTH	NUMBER	TYPE	VS/0	SHEAR STRENGTH Cu, kPa	nat V. + Q - ● rem V. ⊕ U - ○	WATER CONTENT PERCEN	L IN THE	INSTALLATION
3	BOR		TRA	(m)	≥		310			Wp		
\dashv		CONTINUED FROM PREVIOUS PAGE	-			Н	ш	20 40	60 80	20 40 60 80		
10	\top	(SM) gravelly SILTY SAND; grey brown	933			H						
		to grey (GLACIAL TILL); non-cohesive, moist to wet, compact			14	ss	11					
				1								
11	(E			1	15	ss	10					
	ow Ste											Bentonite Seal
	Auge (Holk			1								
	Power Auger 200 mm Diam. (Hollow Stem)			2	16	SS	44					
	0 mm				10	33	''					
12	20											
				1								
					17	SS	13					Cave
13		End of Borehole		62.23 12.98								🔯
		Auger Refusal										
		Note(s):										
		1. Water level in screen measured at 3.63 m (Elev. 71.59 m) on June 9, 2021										
14		Water level in screen measured at										
		3.54 m (Elev. 71.68 m) on May 28, 2021										
		3. Water level measured at a depth of 2.96 m on May 5, 2021										
15												
16												
10												
17												
18												
19												
20												
20												
			-	1	1) GO				l
DEF	PTH S	SCALE			1	1	•	J G O	ᆸᄱᇉ	K	L	OGGED: RI

RECORD OF BOREHOLE: 21-226

SHEET 1 OF 2

LOCATION: N 5028544.1;E 366622.8 BORING DATE: May 4, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

METRES	BORING METHOD	-	SOIL PROFILE	F			AMPL		DYNAMIC PENET RESISTANCE, B	LOWS/0	3m	ζ,		k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER
ETRE	G ME		DESCRIPTION	STRATA PLOT	ELEV	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENG	1	1				O ⁻⁵ ONTEN	1	10 ⁻³ ENT	TEST	OR STANDPIPE
Σ	ORIN		DESCRIPTION	'RAT	DEPTI (m)	N	Įξ	OWS	SHEAR STRENG Cu, kPa	rer	n V. 🕁	Ü-Ö			OW OW			ADE LAB.	INSTALLATION
	B	-		ST	(111)	\perp	\perp	BL	20 40	60	80)	2	0	40	60	80	+	
0	-		GROUND SURFACE TOPSOIL - (SM) SILTY SAND; dark	 	75.3°		-								1			-	_
		L	brown; moist		75.08	3									1				
			FILL - (SM) SILTY SAND, fine to coarse, some gravel, trace clay; brown;		0.2	1	SS	12											
			some gravel, trace clay; brown; non-cohesive, moist, loose to dense				-								1				
							1								1				Bentonite Seal
1						2	ss	38											Bernorine Gear
				\bowtie															
							-												
						3	SS	95											
2							1								1				Silica Sand
					73.02	2									1				
			FILL - (CL/CH) SILTY CLAY, trace sand; grey brown, with black mottling, contains		2.29		ss	21											
			organic matter; w <pl, stiff<="" td="" very=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td></pl,>												1				
															1				
3		+	(CI/CH) SILTY CLAY, trace sand; grey	****	72.20		-								1				
			brown, highly fissured (WEATHERED CRUST); cohesive, w <pl, stiff="" td="" to="" very<=""><td></td><td></td><td>5</td><td>SS</td><td>12</td><td></td><td></td><td></td><td></td><td></td><td>0</td><td>1</td><td></td><td></td><td>мн</td><td></td></pl,>			5	SS	12						0	1			мн	
			stiff					-											50 mm Diam. PVC
							1								1				#10 Slot Screen May 28, 2021
4						_									1				June 9, 2021
						6	SS	5							1				
		٦				\vdash	4												
		v Stem)	(SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL		70.74 4.5		1								1				[[
	uger	200 mm Diam. (Hollow	TILL); non-cohesive, moist to wet,			7	SS	19							1				
5	Power Auger	am. (compact to very dense												1				
	Po	ā L					1								1				
		200													1				Silica Sand
						8	SS	11					0		1			М	
6					1	\vdash	+								1				
							1								1				
						9	SS	13							1				
						L									1				
							1												
7																			
						10	SS	9											
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							1												
8						11	ss	15							1				Bentonite Seal
5]								1				
						F	-												
						10	SS	11							1				
					1	12	35	11							1				
9						\vdash	1								1				
					1		1								1				
						13	SS	10							1				
						L									1				
10					1_	14	ss	<u>32</u>					L		1_		1		
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DE	PTH	I SC	CALE			1	1,	7) G (ノ L	D		K					L	OGGED: RI
1:	50																	CH	ECKED: CH

1:50

RECORD OF BOREHOLE: 21-226

SHEET 2 OF 2

CHECKED: CH

LOCATION: N 5028544.1 ;E 366622.8

BORING DATE: May 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SAMPLES HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE --10 (SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, Bentonite Seal SS 32 14 compact to very dense Cave 15 SS 87 End of Borehole Auger Refusal Note(s): 1. Water level in screen measured at 3.77 m (Elev. 72.48 m) on May 28, 2021 2. Water level in screen measured at 3.94 m (Elev. 72.31 m) on June 9, 2021 12 3. Water level measured at a depth of 2.40 m on May 5, 2021 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: RI

RECORD OF BOREHOLE: 21-226

SHEET 1 OF 2

LOCATION: N 5028544.1 ;E 366622.8 BORING DATE: May 4, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

METRES	BORING METHOD	SOII	L PROFILE	Ļ			AMPL	\blacksquare	DYNAM RESIST	ANCE,	BLOW	S/0.3m	,		k, cm/	s	CTIVITY		ADDITIONAL LAB. TESTING	PIEZOMETER
ETRE	G ME	PEOCRIPT	ION	STRATA PLOT	ELEV.	NUMBER	TYPE	BLOWS/0.30m	20 SHEAR		1	- 1	80 - Q - ●			10 ⁻⁵ CONTE	10 ⁻⁴ NT PER	10 ⁻³ CENT	TEST	OR STANDPIPE
Σ	ORIN	DESCRIPTI	ION	'RAT	DEPTH (m)	NOM	\[\]	OWS.	Cu, kPa	1		rem V.	Q - • U - O	w			N		ADE LAB.	INSTALLATION
	ĕ			ST	(111)	_	1	B	20	1 4	40	60	80	2	20	40	60	80		
0	-	GROUND SURFACE TOPSOIL - (SM) SILTY	SAND: dark		75.31 0.00		₩					+				+				_
		brown; moist			75.08	3														
		FILL - (SM) SILTY SAND some gravel, trace clay;	D, fine to coarse, brown;		0.23	1	SS	12												
		some gravel, trace clay; non-cohesive, moist, loo	se to dense				-													
							1													Bentonite Seal
1						2	ss	38												Berkerike Gear
						\vdash	-													
						3	SS	95												
2							1													Silica Sand
				\bowtie	73.02															
		FILL - (CL/CH) SILTY CI grey brown, with black m	LAY, trace sand;		2.29		SS	21												
		organic matter; w <pl, td="" ve<=""><td>ery stiff</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></pl,>	ery stiff																	
3		(CI/CH) SILTY CLAY, tra	ace sand; grev	****	72.26 3.05		-													
		brown, highly fissured (V CRUST); cohesive, w <p< td=""><td>VEATHERED</td><td></td><td></td><td>5</td><td>SS</td><td>12</td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td><td></td><td></td><td></td><td>мн</td><td></td></p<>	VEATHERED			5	SS	12							0				мн	
		stiff	_, oun to vory			ا آ		-												50 mm Diam. PVC
							1													#10 Slot Screen May 28, 2021
4																				June 9, 2021
					1	6	SS	5												
		=				\vdash	-													[8
	l	(SM) gravelly SILTY SAI to grey, contains cobbles	ND; grey brown		70.74 4.57		1													
	uger	위 TILL); non-cohesive, mo	s (GLACIAL pist to wet,			7	SS	19												
5	Power Auger	compact to very dense	•																	
	8 6	[] E					1													
	8	200					L													Silica Sand
						8	SS	11						0					М	
6					1	-	1													
							1													
						9	SS	13												
7																				
						10	SS	9												
						\vdash	\mathbf{I}													
							1													
8						11	SS	15												Bentonite Seal
J																				
						F	-													
						1	200													
					1	12	SS	11												
9							1													
					1		1													
						13	SS	10												
,,						14	ss	32				1								
10		CONTINUED NE	— — — — — — XT PAGE	ممع ا	T	<u>1</u>	Ť					T		T		T-		- T		
		1		1		•				_					1					I
DE	PTH	SCALE				1	1,	7)	Ğ	U	L D	E	K					L	OGGED: RI
1:	50																		CH	IECKED: CH

RECORD OF BOREHOLE: 21-226

SHEET 2 OF 2

LOCATION: N 5028544.1 ;E 366622.8

BORING DATE: May 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SAMPLES HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE --10 (SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, Bentonite Seal SS 32 14 compact to very dense Cave 15 SS 87 End of Borehole Auger Refusal Note(s): 1. Water level in screen measured at 3.77 m (Elev. 72.48 m) on May 28, 2021 2. Water level in screen measured at 3.94 m (Elev. 72.31 m) on June 9, 2021 12 3. Water level measured at a depth of 2.40 m on May 5, 2021 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22 19 20 **NSD** GOLDER

DEPTH SCALE 1:50

LOGGED: RI CHECKED: CH

1:50

RECORD OF BOREHOLE: 22-01

SHEET 1 OF 2

CHECKED: BB

LOCATION: N 5028666.0 ;E 366664.4

BORING DATE: February 23, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 66.19 TOPSOIL - (SM/ML) gravelly SILTY SAND to sandy SILT, trace clay; brown to dark brown, contains rootlets; SS 27 non-cohesive, moist, compact No Sample Recovery Power Auger Possible Sand Fill, very loose ss wr FILL - (SP) SAND, fine to medium, some silt and clay; brown; non-cohesive, 1.52 moist, very dense 2A SS >50 Borehole continued on RECORD OF 2 DRILLHOLE 22-01 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 **NSD** GOLDER DEPTH SCALE LOGGED: BW

INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 64.36 Fresh to slightly weathered, thinly to medium bedded, grey to dark grey, fine to medium grained, slighly porous, strong SHALEY LIMESTONE - broken core from 2.48 to 2.50 m depth - broken core from 2.52 to 2.70 m depth 62.84 3.35 End of Drillhole 10 11 **GOLDER** DEPTH SCALE LOGGED: BW

CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

1:50

RECORD OF BOREHOLE: 22-02

SHEET 1 OF 1

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028644.0 ;E 366711.2

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: February 22, 2022

DATUM: NAD 1983

<u> </u>	HOD		SOIL PROFILE	1.		SA	MPL		DYNAMIC PENETRAT RESISTANCE, BLOW		HYDRAULIC CONDUCTIVITY, k, cm/s	닐잉	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 I I SHEAR STRENGTH Cu, kPa	60 80 nat V. + Q - ● rem V. ⊕ U - ○	10 ⁶ 10 ⁵ 10 ⁴ 11 WATER CONTENT PERCEI		OR STANDPIPE INSTALLATION
\dashv	ď	+	GROUND SURFACE	ST				В	20 40	60 80	20 40 60 8	0	
- 0		\dashv		EEE	66.60					+ + -			
			TOPSOIL - (SM/ML) gravelly SILTY SAND to sandy SILT, some clay; dark brown, contains rootlets; non-cohesive, moist, compact			1	SS	25					
1	er	low Stem)	FILL - (SM/SP) SILTY SAND to SAND, fine to medium, some clay, trace gravel; brown to light brown; non-cohesive, moist, compact		0.61	2	ss	20					
	r Aug	된-	FILL - (SP) SAND, fine to medium, some	₩	65.23 1.37								
	Power Auger	00 mm Dian	silt; black and reddish brown; non-cohesive, moist, dense to very dense			3	ss	>50					
2		2											
					63.71	4	SS	35					
3			End of Borehole Auger Refusal		2.89								
4													
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				<u> </u>	I	1	<u> </u>) GO	DEI			
DE	PTH	H S	CALE			•	•	7		LUEI	T.	LOG	GED: BW

DEPTH SCALE

1:50

RECORD OF BOREHOLE: 22-03

SHEET 1 OF 2

LOGGED: BW

CHECKED: BB

LOCATION: N 5028663.0 ;E 366719.8

BORING DATE: February 23, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmHYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp ⊢ (m) GROUND SURFACE 66.71 TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, some clay; brown, contains rootlets; non-cohesive, moist, compact SS 14 FILL - (SP) SAND, fine to medium, some silt; brown to light brown, mottled reddish orangish black; non-cohesive, moist, loose to very Power Auger n Diam. (Hollow § ss 17 200 mm 3 SS 6 SS >50 Borehole continued on RECORD OF DRILLHOLE 22-03 2.31 8 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 **NSD** GOLDER

RECORD OF DRILLHOLE: 22-03 PROJECT: 21451149 SHEET 2 OF 2 DRILLING DATE: February 23, 2022 LOCATION: N 5028663.0 ;E 366719.8 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 64.40 Fresh to slightly weathered, thinly to 2.31 medium bedded, grey, fine to medium grained, slightly porous, strong LIMESTONE, with laminations of shale broken core from 2.58 to 2.62 m depth - vertical joint from 2.70 to 3.04 m depth - brocken core from 2.83 to 2.91 m depth Rotary Dril UCS = 108 MPa End of Drillhole 10

WSD GOLDER

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

11

12

RECORD OF BOREHOLE: 22-04

SHEET 1 OF 1

LOCATION: N 5028673.4 ;E 366740.3

BORING DATE: February 22, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

щ		₽	SOIL PROFILE			SA	MPL	ES	DYNAMIC RESISTAN	PENETRA CE, BLOV	TION /S/0.3m	7	HYDRAULIC k, cm	CONDUC /s	TIVITY,		٥ر	PIEZOMETER
DEPTH SCALE METRES		BORING METHOD		STRATA PLOT		œ		BLOWS/0.30m	20	40		80	10 ⁻⁶	10 ⁻⁵ 1	0-4	10 ⁻³	ADDITIONAL LAB. TESTING	OR
ĘĘ.		9	DESCRIPTION	ΑP	ELEV.	NUMBER	TYPE	S/0.:	SHEAR ST Cu, kPa	RENGTH			WATER	CONTEN		ENT	E #	STANDPIPE INSTALLATION
7		ORII		I.R.A.I	DEPTH (m)	Ž	\vdash	Ŏ.	Cu, kPa		rem V. ⊕	9 U-O	Wp I	OW		WI	[AB]	
		ă		ST	(111)			Б	20	40	60	80	20			80		
0	L		GROUND SURFACE		66.40													
			TOPSOIL - (SM) gravelly SILTY SAND, some clay; brown to dark brown, contains rootlets; non-cohesive, moist,		0.00													
			contains rootlets; non-cohesive, moist,			1	ss	20										
			compact		65.79													
		[=	FILL - (SM/SP) SAND to SILTY SAND,		0.61													
		Ster	FILL - (SM/SP) SAND to SILTY SAND, trace clay; brown mottled black; non-cohesive, moist, compact	\bowtie	1													
1	der		non-conesive, moist, compact	\bowtie	1	2	ss	25										
	- Au	[E		\bowtie	1													
	Owe	mm Diam. (Hollow Stem)		\bowtie	64.88													
	ľ	E	FILL - (CL) CLAY, some gravel; brown; cohesive, w>PL, hard	₩	1.52													
		200	cohesive, w>PL, hard	\bowtie	1	3	SS	63										
2				\bowtie	1	ľ	33	03										
2			TILL (MI) grouply condy SII Tybroup	₩	64.27 2.13													
			FILL - (ML) gravelly sandy SILT; brown to black; non-cohesive, wet, dense to		1	H .	50	ر ا										
	\vdash	ᅫ	very dense	XXX	63.93 2.47	4	SS	>00 <										
	ĺ		End of Borehole Auger Refusal															
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DE	P	TH S	CALE			11	10) (Oi	LD	E	R				LC	GGED: BW
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1:50

RECORD OF BOREHOLE: 22-05

SHEET 1 OF 1

CHECKED: BB

LOCATION: N 5028687.2 ;E 366714.1

BORING DATE: February 22, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmHYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30rr NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp ⊢ (m) GROUND SURFACE 66.26 TOPSOIL - (SM/ML) gravelly SILTY SAND to sandy SILT, some clay; brown to dark brown, contains rootlets; SS 18 non-cohesive, moist, compact 65.65 FILL - (CI) SILTY CLAY, trace sand and gravel; brown; cohesive, w>PL, very stiff SS 24 200 64.77 End of Borehole Auger Refusal 2 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 WSD GOLDER DEPTH SCALE LOGGED: BW

RECORD OF BOREHOLE: 22-06

SHEET 1 OF 1

LOCATION: N 5028724.0 ;E 366710.8

BORING DATE: February 22, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

0	200 mm Diam. (Hollow Stem)	GROUND SURFACE TOPSOIL - (SM) SILTY SAND, trace to some clay; brown to dark brown, contains rootlets; non-cohesive, moist, very dense FILL - (SM) SILTY SAND, some gravel; brown, contains brick fragments, potential cobbles; non-cohesive, moist, compact	Munimum STRATA PLOT	ELEV. DEPTH (m) 65.86 0.00	z	TYPE	BLOWS/0.30m	20 40 I I SHEAR STRENGTH Cu, kPa	60 80 nat V. + Q - ● rem V. ⊕ U - ○	WATE	10 ⁻⁵ 10 ⁻ R CONTENT F	PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0 Tabunar Airner	stem)	GROUND SURFACE TOPSOIL - (SM) SILTY SAND, trace to some clay; brown to dark brown, contains rootlets; non-cohesive, moist, very dense FILL - (SM) SILTY SAND, some gravel; brown, contains brick fragments, potential cobbles; non-cohesive, moist,	Munimum STRAT,	(m) 65.86		Ţ	BLOWS	Cu, kPa	rem V. ⊕ Ū - Ŏ				AB.	INSTALLATION
O Dower Airner	stem)	TOPSOIL - (SM) SILTY SAND, trace to some clay; brown to dark brown, contains rootlets; non-cohesive, moist, very dense FILL - (SM) SILTY SAND, some gravel; brown, contains brick fragments, potential cobbles; non-cohesive, moist,	LS minimum XX	65.86			l <u>m</u>			1	OW_	WI	`-'	
1 Power Aurer	200 mm Diam. (Hollow Stem)	TOPSOIL - (SM) SILTY SAND, trace to some clay; brown to dark brown, contains rootlets; non-cohesive, moist, very dense FILL - (SM) SILTY SAND, some gravel; brown, contains brick fragments, potential cobbles; non-cohesive, moist,						20 40	60 80	20	40 60	80	++	
	200 mm Diam. (Hollow Stem)	some clay; brown to dark brown, contains rootlets; non-cohesive, moist, very dense FILL - (SM) SILTY SAND, some gravel; brown, contains brick fragments, potential cobbles; non-cohesive, moist,			i .						+		++	
	200 mm Diam. (Hollow St	FILL - (SM) SILTY SAND, some gravel; brown, contains brick fragments, potential cobbles; non-cohesive, moist, compact		65.25		ss	76							
	200 mm Diam.	compact		0.61										
	200				2	SS	17							
2					3	ss	>50							
		End of Borehole Auger Refusal		63.90 1.96										
3														
4														
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6														
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10														
DEP.	THS	CALE	1	<u> </u>	<u>\</u> '	1) GO	LDF	R		I	100	GGED: BW

1:50

RECORD OF BOREHOLE: 22-07

SHEET 1 OF 1

CHECKED: BB

LOCATION: N 5028758.6 ;E 366723.0

BORING DATE: February 24, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 66.05 TOPSOIL - (SM/ML) SILTY SAND to sandy SILT; brown, contains rootlets and 5 cm clay bed; non-cohesive, moist, SS 12 compact FILL - (CH) CLAY; brown; cohesive, w~PL, hard Power Auger n Diam. (Hollow FILL - (SM) SILTY SAND; brown, contains rock fragments, wood chips, gravel pockets; non-cohesive, moist, loose to very dense 64.9<u>9</u> 2 SS 33 3 SS 5 2 4 SS >50 Borehole continued on RECORD OF DRILLHOLE 22-07 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 WSD GOLDER DEPTH SCALE LOGGED: BW

INCLINATION: -90°

RECORD OF DRILLHOLE: 22-07

SHEET 1 OF 1 DATUM: NAD 1983

LOCATION: N 5028758.6 ;E 366723.0 AZIMUTH: --- DRILLING DATE: February 24, 2022

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

CALE	ECOR		SLOG	ELEV.	O	COLOUR % RETURN	i	JN - FLT - SHR- VN -	· Veir	1	ıte.	(CO- (Bedo Folia Cont Ortho	ling tion act ogona vage	al	PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular	PO- Po K - SI SM- Si Ro - Ro MB- M	icker	nside	ed		OTE		ddition refer ns &	1		
METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	DEPTH (m)	RUN No.		RI	CJ - ECO' TAL	VERY	Y	R.Q.	.D.	FRA IND	CT.			DISCONTINUITY [DATA	echa	nical	_s	ROC TREN INDE	CK IGTH	WE	EATH RING IDEX	1- I	Q AVG.	
ă	DRIL		SY	,		FLUSH	COR 88	SE %	CORE		889		0.25	m 02	COR AXIS	S S S S S	TYPE AND SURFACE DESCRIPTION	CE	Jco	n Jr J	Ja	1NDE		1	S S		avG.	
}	_	BEDROCK SURFACE Fresh to slightly weathered, thinly to	1,1	63.66 2.39			\coprod	Щ	Щ	Щ		Щ	\parallel	\coprod	\coprod	\parallel			\perp	\parallel			\parallel		Н	\parallel		
- 3		medium bedded, grey, fine to medium grained, slightly porous, LIMESTONE, with thin to thick laminations of shale - vertical joint from 2.87 to 3.3 m depth			1																							
		- vertical joint from 3.23 to 3.27 m depth																										
- 4	Rotary Drill NQ Core				2																							
		- vertical joint from 4.75 to 5.4 m depth																								_		
- 5		End of Drillhole		60.65 5.40	3																							
		LIG OF DIRECTOR		5.40																								
- 6																												
- 7																												
- 8																												
- 9																												
- 10																												
- 11																												
- 12																												
DEI	PTH S	CALE		,	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			<u> </u>			∭ G		$\ $			III.	ER										10	DGGED: BW

1:50

RECORD OF BOREHOLE: 22-08

SHEET 1 OF 1

CHECKED: BB

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028712.6 ;E 366753.6

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: February 25, 2022

DATUM: NAD 1983

HYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 65.77 TOPSOIL - (SM/ML) SILTY SAND to sandy SILT; brown, contains rootlets; non-cohesive, moist, compact SS 17 FILL - (CH) CLAY, trace silt, sand, and gravel; brown mottled black and red, contains gravel, cobbles, and weathered bedrock; cohesive, w>PL, very stiff to Power Auger mm Diam. (Hollow § ss 17 2 hard SS 63 2 End of Borehole Auger Refusal MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 WSD GOLDER DEPTH SCALE LOGGED: BW

RECORD OF BOREHOLE: 22-09

SHEET 1 OF 1

LOCATION: N 5028659.6 ;E 366771.6 SAMPLER HAMMER, 64kg; DROP, 760mm BORING DATE: February 22, 2022

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DATUM: NAD 1983

<u> </u>	오	SOIL PROFILE	1.		31	MPL	\blacksquare	DYNAMIC PENETRATESISTANCE, BLOW		k, cm/s	-	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 I I SHEAR STRENGTH Cu, kPa		Wp I O		PIEZOMETER OR STANDPIPE INSTALLATION
	ш	GROUND SURFACE	ς.			\vdash	В	20 40	60 80	20 40 60	80	+
0		TOPSOIL - (SM) SILTY SAND; brown, contains rootlets; non-cohesive, moist, compact		66.89 0.00 66.28		ss	10					
1	Power Auger 200 mm Diam. (Hollow Stem)	FILL - (CI) SILTY CLAY; brown, contains brick fragments; cohesive, w>PL, firm		0.61	2	ss	6			φ	М	н
2	Po 200 mm D	(SM) SILTY SAND, trace clay, trace gravel; brown; non-cohesive, wet, compact		65.37 1.52	3	SS	24					
		End of Borehole		64.40 2.49	4	SS	>50					
3		Auger Refusal										
4												
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7												
8												
9												
10												
	PTH S	L SCALE		I	7	/) GO	I DFI			LOGGED: BW

1:50

RECORD OF BOREHOLE: 22-10

SHEET 1 OF 1

CHECKED: BB

LOCATION: N 5028648.4 ;E 366795.1

BORING DATE: February 24, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp ⊢ (m) GROUND SURFACE 67.17 TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace to some clay; brown, contains rootlets, small gravel bed; SS 27 non-cohesive, moist, compact FILL - (SM) SILTY SAND, some clay; brown mottled black; non-cohesive, moist, compact ss 10 FILL - (SM/ML) gravelly SILTY SAND to sandy SILT; brown with a grey area, contains gravel bed; cohesive, w>PL, SS 20 0 МН hard 2 64.88 FILL - (SP) SAND, some silt, fine to medium; brown to light brown; SS non-cohesive, moist, compact 11 5 SS >50 63.64 3.53 Borehole continued on RECORD OF DRILLHOLE 22-10 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 **NSD** GOLDER DEPTH SCALE LOGGED: BW

RECORD OF DRILLHOLE: 22-10 PROJECT: 21451149 SHEET 1 OF 1 DRILLING DATE: February 24, 2022 LOCATION: N 5028648.4 ;E 366795.1 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 63.64 Fresh to slightly weathered, thinly to medium bedded, grey, fine to medium grained, slightly porous, strong LIMESTONE, with thin to thick laminations of shale Rotary Drill End of Drillhole 6.91 9 10 11 12 13

WSD GOLDER

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

RECORD OF BOREHOLE: 22-11

SHEET 1 OF 2

LOCATION: N 5028697.0 ;E 366812.2

BORING DATE: March 14, 2022

DATUM: NAD 1983

ן י	QQ	SOIL PROFILE			SA	MPLE	≣S	DYNAMIC PENE RESISTANCE, I	ETRAT BLOWS	ION 5/0.3m	1	HYDRAUL k,	IC CONE cm/s	UCTIV	ITY,		ا ي ا	PIEZOMETER
RES	METH		LOT		<u>~</u>		30m	20 4			30	10-6	10 ⁻⁵	10-4	10) ⁻³	STIN	OR
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	SHEAR STREN Cu, kPa	GTH	nat V. + rem V. ⊕	Q - • U - O		R CONT		ERCE		ADDITIONAL LAB. TESTING	STANDPIPE INSTALLATION
נ	ВО		STR	(m)	~		BLC	20 4	0	60 8	30	20	40	60			`-'	
,		GROUND SURFACE		66.07														
0		ASPHALTIC CONCRETE	/ XXX	0.05 65.84														
	Stem)	FILL - (SW/GW) SAND and GRAVEL; grey, crushed stone (PAVEMENT		0.23		1												
	N N	NSTRUCTURE); non-cohesive, moist	/‱		1	AS	.											
	Auge (Holl	FILL - (SW/SM) SAND and SILTY		65.31	'													
	wer iam.	SAND, some gravel, trace clay; brown; \non-cohesive, moist	Æ	0.76	2	SS	>50											
1	Power Auger 7 mm Diam. (Hollow §	Weathered LIMESTONE			Ě	"												
	200 n		坩坩															
	10			64.62														
		Borehole continued on RECORD OF DRILLHOLE 22-11		1.45														
		DRILLHOLE 22-11																
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MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

1:50

RECORD OF DRILLHOLE: 22-11

DRILLING DATE: March 14, 2022

SHEET 2 OF 2 DATUM: NAD 1983

CHECKED: BB

LOCATION: N 5028697.0 ;E 366812.2 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished BR - Broken Rock St. - Slickensided SM- Smooth Smooth Snogh MB- Mechanical Break Symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 64.62 Slightly weathered to fresh, medium bedded, medium grey to dark grey, fine to medium grained, slightly porous, strong LIMESTONE, with interbedded shale UCS = 89 MPa Rotary Drill NQ Core 3 61.44 4.63 End of Drillhole 6 10 11 **GOLDER** DEPTH SCALE LOGGED: JS

RECORD OF BOREHOLE: 22-12

SHEET 1 OF 2

LOCATION: N 5028737.1 ;E 366786.1

BORING DATE: March 14, 2022

DATUM: NAD 1983

Ц	ДQН				SAMP		DYNAMIC PENETR RESISTANCE, BLO		HYDRAULIC CONDUCTIVITY, k, cm/s	ا ة اـ	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	PTH	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH Cu, kPa	60 80 I nat V. + Q - ● rem V. ⊕ U - ○	10 ⁶ 10 ⁵ 10 ⁴ 11 WATER CONTENT PERCEI Wp	ADDITIC	OR STANDPIPE INSTALLATION
0		GROUND SURFACE		5.45		Ē	20 40	30 00	20 40 00 0		
	Power Auger) mm Diam. (Hollow Stem)	ASPHALTIC CONCRETE FILL - (SW/GW) SAND and GRAVEL; grey, crushed gravel (PAVEMENT STRUCTURE); non-cohesive, moist FILL - (SW) SAND, some silt and gravel; brown, contains cobbles; non-cohesive, moist FILL - (SM) SILTY SAND, some clay and gravel; brown with mottling; slightly cohesive, moist to wet, compact	/ 6 6	0.05 5.17 0.28 4.38 1.07		->50					
2	200		6	3.37	s	15					
		Weathered LIMESTONE Borehole continued on RECORD OF DRILLHOLE 22-12		2.08							
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10											
10 DE) GO				

INCLINATION: -90°

LOCATION: N 5028737.1 ;E 366786.1

AZIMUTH: ---

RECORD OF DRILLHOLE: 22-12

DRILLING DATE: March 14, 2022

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2 DATUM: NAD 1983

BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 63.24 Slightly weathered to fresh, medium bedded, grey to dark grey, fine to medium grained, slightly porous, NODULAR LIMESTONE, with shale interbedded Rotary Drill NQ Core 3 59.79 5.66 End of Drillhole 10 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22 11 12 **GOLDER** DEPTH SCALE LOGGED: JS 1:50 CHECKED: BB

RECORD OF BOREHOLE: 22-13

SHEET 1 OF 2

LOCATION: N 5028787.1 ;E 366761.0 BORING DATE: March 8, 2022 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

ا لِا	된 된	SOIL PROFILE			SA	SAMPLES	RESISTANCE, BLOWS/0.3m					HYDRAULIC CONDUCTIVITY, k, cm/s					일	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	SH Cu	20 L EAR STRE kPa	40 NGTH	nat V. +	80	10° WA Wp	TER CC		PERCE		ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
נ	BO		STR	(m)	z		BEL	20	40	60	80	20				80	\ <u>`</u>	
0		GROUND SURFACE		65.04		\Box											\Box	
		ASPHALTIC CONCRETE FILL - (SW/GW) SAND and GRAVEL;		0.05														
		grey, crushed stone (PAVEMENT STRUCTURE); non-cohesive, moist,	\bowtie	64.63														
		\compact	/‱	0.41	1	AS	-											
	ءا	FILL - (SM) SILTY SAND, some gravel and clay; brown; non-cohesive, moist	/₩	64.28 0.76														
1	Stem)	FILL - (SW) SAND, some gravel, trace	`₩		2	SS >												
	nger	to some silt, trace clay; brown; non-cohesive, moist, dense to very			2	33 /	30											
	ver A	dense	\otimes															
	P P																	
	200 mm Diam (Hollow				3	ss :	37											
2	"	possible weathered LIMESTONE	- 💥	63.01 2.03														
		possible weathered Lilvies TONE	H	2.00	4	SS >	50											
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	\perp		跓	62.32												1		
		Borehole continued on RECORD OF DRILLHOLE 22-13		2.72												1		
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RECORD OF DRILLHOLE: 22-13

SHEET 2 OF 2 LOCATION: N 5028787.1 ;E 366761.0 DRILLING DATE: March 8, 2022 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 62.32 Fresh, medium to thinly bedded, grey, fine to medium grained, slightly porous, strong NODULAR LIMESTONE, with shale interbedded Rorary Drill NQ Core 3 End of Drillhole 10 11 12

DEPTH SCALE

1:50

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

GOLDER

1:50

RECORD OF BOREHOLE: 22-14

SHEET 1 OF 2

CHECKED: BB

LOCATION: N 5028810.9 ;E 366851.2

BORING DATE: March 8, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmDYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 65.14 ASPHALTIC CONCRETE FILL - (SW/GW) SAND and GRAVEL; grey, crushed stone (PAVEMENT STRUCTURE); non-cohesive, moist 64.89 0.25 AS FILL - (SW) SAND, some silt and gravel, trace clay; brown; non-cohesive, moist 64.30 SS >50 Possible weathered LIMESTONE 63.79 Borehole continued on RECORD OF 1.35 DRILLHOLE 22-14 2 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 **NSD** GOLDER DEPTH SCALE LOGGED: JS

RECORD OF DRILLHOLE: 22-14

SHEET 2 OF 2 LOCATION: N 5028810.9 ;E 366851.2 DRILLING DATE: March 8, 2022 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 63.79 Fresh, medium bedded, grey, fine to medium grained, slightly porous, strong NODULAR LIMESTONE, with thin shaley beds Rotary Drill NQ Core 60.36 End of Drillhole MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22 10 11

DEPTH SCALE 1:50

GOLDER

RECORD OF BOREHOLE: 22-15

SHEET 1 OF 2

LOCATION: N 5028690.4 ;E 366474.2 BORING DATE: May 16, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

Щ	5	요	SOIL PROFILE					ES	DYNAMIC PENETRA RESISTANCE, BLOV	HYDRAULIC CONDUCTIVITY, k, cm/s					P P P P P P P P P P P P P P P P P P P	PIEZOMETER		
DEPTH SCALE METRES	!	BORING METHOD		STRATA PLOT		l K		BLOWS/0.30m	20 40	60	80	10 ⁻⁶	10-5			0 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
ř. E.P.		<u> </u>	DESCRIPTION	TAF	ELEV. DEPTH	NUMBER	TYPE	VS/0	SHEAR STRENGTH Cu, kPa	nat V	+ Q- ● Đ U- O		ER CON				DDIT B. TE	INSTALLATION
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\dashv		\dashv	GROUND SURFACE	0,	66.93		H		20 40	60	80	20	40	60	υ ξ	30	+	
0		П	ASPHALTIC CONCRETE		0.00		Н				+		-+					
			CEMENTITIOUS CONCRETE	A 4	0.15													
				7 4	66.32	1	GRAB	-										
			FILL - (SP) SAND, medium, trace gravel; brown; non-cohesive, moist to wet,		0.61		1											
. 1			compact	\bowtie														
·				\bowtie														
			FILL - (SM/ML) gravelly SILTY SAND to	₩	65.6 <u>3</u> 1.30	<u> </u>												
		em)	FILL - (SM/ML) gravelly SILTY SAND to sandy SILT, some clay; brown grey with black staining, contains organics; slightly	\bowtie		2	SS	25										
	Ļ	ow St	cohesive, moist, compact	\bowtie		3	ss	36										
2	- Auge	(물	TOPSOIL - (ML) sandy SILT some clay:		64.95 1.98													
	ower	200 mm Diam. (Hollow Stem)	TOPSOIL - (ML) sandy SILT, some clay; dark brown, contains organics; non-cohesive, moist, loose		2.13		1											
		mm.	(SM/ML) SILTY SAND to sandy SILT, some clay and gravel; grey (GLACIAL															
		200	some clay and gravel; grey (GLACIAL TILL); non-cohesive, moist, compact			4	SS	22										
			•															
3					1													
						5	ss	16										
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							1											
. 4						6	ss	>50										
		Н	Borehole continued on RECORD OF	1992)	62.79 4.14		1											
			DRILLHOLE 22-15															
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DF	РТ	TH S	CALE			1	19) GO	LD	EI	R					10	OGGED: JS
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INCLINATION: -90°

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

RECORD OF DRILLHOLE: 22-15

SHEET 2 OF 2

DATUM: NAD 1983

LOCATION: N 5028690.4 ;E 366474.2

AZIMUTH: ---

DRILLING DATE: May 16, 2022

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

DESCRIPTION		Ω	I	1			ωZ	J	JN			LIIN					PL - Planar CU- Curved	PO- P	olishe	d		Е	BR -	- Bro	ken	n Ro	ck	T	4
End of Drillivie End of Drill	SALE	SCOR		FOG		·	OLOUP RETUR	F	SHR VN	- She - Vei	ear n			:O- C	Conta	ct	UN- Undulating	K-S	licken	sided	t		OTE.		- 4-64				
Period Supervice Conduction and Supervice Cond	TH S(ETRE	NG RI	DESCRIPTION	30LIC		Ž N N	0 ~	RE			v		- 1		CT.		DISCONTINUITY		lechar	nical	Brea H	ak s YDR	ymbol	ıcl	Dian	metro	al le	1	
Period Supervice Conduction and Supervice Cond	DEP. M	SILLIN		SYME		2	HSI					R.Q.	.D.	PEF 0.25	X	IP w.r.	t. TYPE AND SURF	ACE	lcon	ı .lr .la	co	NDU K, cr	n/sed	VITY C	Point In: (M	t Loa dex (Pa)	-Q'	;	
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DEPTHISOME Disconsider the second of the se	_		shaley LIMESTONE	莊																									=
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- 10 - 11 - 12 - 13 - 14 - 15 GOLDER LOCGED: JS	-																												-
- 10 - 11 - 12 - 13 - 14 DEPTH SCALE **SOLDER LOGGED: JS	8 _																												4
- 10 - 11 - 12 - 13 - 14 DEPTH SCALE **SOLDER LOGGED: JS	-																												=
- 10 - 11 - 12 - 13 - 14 DEPTH SCALE **SOLDER LOGGED: JS	-																												1
- 10 - 11 - 12 - 13 - 14 DEPTH SCALE **SOLDER LOGGED: JS	-]
- 10 - 11 - 12 - 13 - 14 DEPTH SCALE **SOLDER LOGGED: JS	- - - a																												-
DEPTH SCALE NOGGED: JS	-																												-
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MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

RECORD OF BOREHOLE: 22-16

SHEET 1 OF 1

LOCATION: N 5028730.7 ;E 366508.7

BORING DATE: May 16, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

	_	$\overline{}$	SOIL DROEILE			- C	MDI		DYNAMIC PENETRA	ATION \	\neg	HYDRAULIC CO	ONDUCT	IVITY.			
DEPTH SCALE METRES	DODING METHOD	<u> </u>	SOIL PROFILE	 -		S/	MPL		DYNAMIC PENETRA RESISTANCE, BLOV	``\		k, cm/s			- 2	ADDITIONAL LAB. TESTING	PIEZOMETER
H SC TRE	N I	M		STRATA PLOT	ELEV.	Ë	ш	BLOWS/0.30m	20 40	60 80	_		0 ⁻⁵ 10			TION	OR STANDPIPE
ME	1 2		DESCRIPTION	ATA	DEPTH	NUMBER	TYPE	MS/(SHEAR STRENGTH Cu, kPa	nat V. + Q - € rem V. ⊕ U - €	$^{\circ}$	WATER CO		PERCE		VDDI	INSTALLATION
D	ä			STR/	(m)	ž		BLO	20 40	60 80		Wp 20 4			WI O	4 4	
		1	GROUND SURFACE		65.97				20 40		十	20 4			Ī		
_ 0	П	П	ASPHALTIC CONCRETE		0.00						+						-
_			CEMENTITIOUS CONCRETE	P 4													- -
_			FILL - (SP) SAND, medium, trace gravel; brown; non-cohesive, moist, loose	\bowtie	0.33	1	GRAE	- 1									-
-				\bowtie			1										-
Ι.		<u>۔</u>		\bowtie													=
- 1		Sten	(PT) fibrous PEAT		64.90 1.07	2	SS	9									-
	nger	wollok			64.60												-
	wer A	200 mm Diam. (Hollow Stem)	(SM/ML) SILTY SAND to sandy SILT, some plastic fines and gravel; grey		1.37		-										3
_	Po	m Dis	some plastic fines and gravel; grey (GLACIAL TILL); cohesive, w>PL, soft				00										_
- - 2		m 00:				3	SS	8									<u>-</u>
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- 3	H	Ч	End of Borehole		63.00 2.97		1										=
E	Ī		Auger Refusal														=======================================
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RECORD OF BOREHOLE: 22-17

SHEET 1 OF 2

DATUM: NAD 1983

LOCATION: N 5028822.0 ;E 366648.8 BORING DATE: May 17, 2022

SAMPLER HAMMER, 64kg; DROP, 760mm

Ц			SOIL PROFILE	1.		SA	MPL	-	RESISTA	PENETF NCE, BLO	OWS/0.	3m	ζ.		k, cm/s		IIVII Y,		²	PIEZOMETER
DEPTH SCALE METRES		BORING METHOD		STRATA PLOT	[_, _, ,	띪		BLOWS/0.30m	20	40	60	80			⁵ 10			10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
Ä.		SING NG	DESCRIPTION	4TA F	ELEV. DEPTH	NUMBER	TYPE	MS/0	SHEAR S Cu, kPa	STRENGT	H nat ren	V. + C 1 V. ⊕ L	2 - € J - O			ONTEN			DD11	INSTALLATION
วี		BOF		STR	(m)	ž		BLO/	20	40	60	80		Wp 20		.0 W		WI 80	4 5	
	T		GROUND SURFACE	<u> </u>	64.87				20		30	30		1	- 4	Ĭ	Ī	T	\dagger	
0		\top	ASPHALTIC CONCRETE	12.00.00	0.00														\dagger	
			CEMENTITIOUS CONCRETE	7 4 A	64.46															
		(Ē	FILL - (SP) SAND, medium, trace gravel; brown; non-cohesive, moist, compact		0.41	1	GRAE	.												
	L	Sk	blown, non-conesive, moist, compact	\bowtie																
1	Auge	Holl Holl		\bowtie																
•	Power Auger	200 mm Diam. (Hollow Stem)	EILL (SM) SILTY SAND with grovel	₩	63.70 1.17															
	Δ.	E E	FILL - (SM) SILTY SAND, with gravel, some clay; brown; non-cohesive, moist,		3															
		200	FILL - (SW) gravelly SAND, medium to	₩	63.35 1.52	2	ss	28												
			coarse, some silt; brown; non-cohesive, moist, compact			3	ss	25												
2	L	╽	Weathered LIMESTONE	\bowtie			-													
		\neg	Borehole continued on RECORD OF	1	2.08															
			DRILLHOLE 22-17																	
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INCLINATION: -90°

LOCATION: N 5028822.0 ;E 366648.8

AZIMUTH: ---

RECORD OF DRILLHOLE: 22-17

DRILLING DATE: May 17, 2022

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2

DATUM: NAD 1983

BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 62.79 Slightly weathered to fresh, bedded, ongular, grey to dark grey, fine to medium grained, slightly porous, medium strong LIMESTONE, with thin to thick laminations of shale Rotary Drill End of Drillhole 10 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22 11 12 **GOLDER** DEPTH SCALE LOGGED: JS 1:50 CHECKED: BB

1:50

RECORD OF BOREHOLE: 22-18

SHEET 1 OF 1

CHECKED: BB

LOCATION: N 5028897.8 ;E 366806.6

BORING DATE: May 16, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmHYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES BORING METHOD DEPTH SCALE METRES ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp ⊢ (m) GROUND SURFACE 63.14 0.00 0.13 62.78 0.36 ASPHALTIC CONCRETE **CEMENTITIOUS CONCRETE** FILL - (SP) SAND, medium, trace gravel; brown; non-cohesive, moist, compact GRAB 2 SS |>50 62.05 1.09 End of Borehole Auger Refusal 2 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 WSD GOLDER DEPTH SCALE LOGGED: JS

1:50

RECORD OF BOREHOLE: 22-19

SHEET 1 OF 2

CHECKED: BB

LOCATION: N 5028860.2 ;E 366863.0

BORING DATE: May 17, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmDYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT 80 10⁻⁵ NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH OW Wp ⊢ (m) GROUND SURFACE 63.81 ASPHALTIC CONCRETE 0.15 63.45 0.36 CEMENTITIOUS CONCRETE FILL - (SP) gravelly SAND, medium brown; non-cohesive, moist, compact 2 SS >50 62.82 Borehole continued on RECORD OF DRILLHOLE 22-19 2 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 WSD GOLDER DEPTH SCALE LOGGED: JS

INCLINATION: -90°

RECORD OF DRILLHOLE: 22-19

: 22-19 SHEET 2 OF 2 7, 2022 DATUM: NAD 1983

LOCATION: N 5028860.2 ;E 366863.0

AZIMUTH: ---

DRILLING DATE: May 17, 2022

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SCALE RES	RECORD		IC LOG	ELEV.	No.	COLOUR % RETURN	JN FL1 SH VN CJ	- Jo T - Fa R- SI - V	oint ault hear ein onjug	gate		CO- OR-	Bedo Folia Cont Ortho	ding tion act ogona vage	nal	PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular	PO- Pol K - Slic SM- Sm Ro - Roi MB- Me	lishe cken: nooth ugh char	d sided	Breal	abl of a	TE: F brevia abbre nbols.	or ad tions i viation	en Ro Iditiona refer t ns &				
DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	DEPTH (m)	5	HSU.	REC	OVE SI 6 CC		R.	348 % Q.D.	FRA INC PE 0.2	CT.	DIP w.	v.r.t. RE IS	DISCONTINUITY I	DATA	Jcon	П	CON	DRA IDUC (, cm.	ULIC TIVI /sec	TYPo	iamet bint Lo Index (MPa	tral pack (.			
- 1 -	Rotary Drill NQ Core	BEDROCK SURFACE Fresh, bedded, nodular grey to dark grey, slightly porous, fine to medium grained, medium strong LIMESTONE, with thin to thick laminations of shale		62.82 0.99	1																							
3		End of Drillhole		2.54																								
5																												
7																												
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DEF	PTH S	CALE			11			<u></u>		 G	<u> </u>				III D	ER		L		Ш					Ц	LOGGI	ED: JS	

RECORD OF BOREHOLE: 22-20

SHEET 1 OF 1

LOCATION: N ;E BORING DATE: May 17, 2022 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE	1 - 1	s	AMPLES		MIC PENETI TANCE, BL	OWS/0.3m	ζ,	l .	cm/s		₽ _S	PIEZOMETER
TRES	ME		STRATA PLOT	EV. H	TYPE BLOWS/0.30m	2	0 40	60	80			10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
F.≘	NING.	DESCRIPTION	ATA DEI	EV. PTH MBER	TYPE WS/0.3	SHEAF Cu, kP	R STRENGT	H nat V. rem V.	+ Q- ● ⊕ U- ○		R CONTE		AB. T	INSTALLATION
ם ב	BOF		STR/	m) 🗵	BLO	,	0 40	60	80	Wp ⊢ 20	40	80	4 4	
		GROUND SURFACE	+ +	\top	 -	1 -	- 40			70	70	T		
- 0	Ē	ASPHALTIC CONCRETE		0.00										
	Power Auger mm Diam. (Hollow Stem)	CEMENTITIOUS CONCRETE FILL - (SW) gravelly SAND, medium;		0.15	4									
	Auger	brown; non-cohesive, moist, looset to		1	GRAB -									
	Power Auger Diam. (Hollov	compact]									
- 1	2 0	FILL - (CL/SW) SILTY CLAY and SAND,		0.81 2	SS >50)								
<u>'</u>	200 r	FILL - (CL/SW) SILTY CLAY and SAND, some gravel; dark brown, mottled; cohesive, w <pl, stiff<="" td=""><td>曲</td><td>1.01</td><td>7 </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></pl,>	曲	1.01	7									
		Assumed weathered LIMESTONE End of Borehole		1.24										
		Auger Refusal												
- 2														
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DE	PTH S	SCALE		1	15		GC	LC	EI	R			LC	OGGED: JS
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RECORD OF BOREHOLE: 22-21

SHEET 1 OF 2

CHECKED: BB

LOCATION: N 5028698.9 ;E 366848.5

BORING DATE: June 20, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER BLOWS/0.30m STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 66.25 ASPHALTIC CONCRETE FILL - (SW/GP) SAND and GRAVEL, some silt; grey (PAVEMENT STRUCTURE); non-cohesive, moist, 0.15 65.89 0.36 1 AS compact Bentonite Seal FILL - (SM) SILTY SAND, some clay and gravel; brown; slightly to non-cohesive, w<PLto moist, firm to loose SS >50 65.18 Borehole continued on RECORD OF DRILLHOLE 22-21 2 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 **NSD** GOLDER DEPTH SCALE LOGGED: JS

RECORD OF DRILLHOLE: 22-21 PROJECT: 21451149 SHEET 2 OF 2 LOCATION: N 5028698.9 ;E 366848.5 DRILLING DATE: June 20, 2022 DATUM: NAD 1983 DRILL RIG: CME 55 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 65.18 Slightly weatrhered to fresh, bedded, Bentonite Seal nodular, grey/dark grey, fine to mediuim grained, slightly porous, medium strong SHALEY LIMESTONE Silica Sand Rotary Drill NQ Core 32 mm PVC #10 Slot Screen End of Drillhole 9 10

DEPTH SCALE 1:50

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

11



RECORD OF BOREHOLE: 22-22

SHEET 1 OF 1

LOCATION: N 5028665.1 ;E 366827.6

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: June 21, 2022

DATUM: NAD 1983

, F	THOD	SOIL PROFILE	⊢		SA	MPLE		DYNAMIC RESISTAN			ζ,		, cm/s			NG P	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD		STRATA PLOT	ELEV.	3ER	ا س	BLOWS/0.30m	20 SUEAD ST	40 DENCTH		80	10 ⁻⁶			10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
	RING	DESCRIPTION	RATA	DEPTH	NUMBER	TYPE	/SMC	SHEAR ST Cu, kPa	RENGIH	rem V.	+ Q- ● ∌ U- O	WAI Wp F	ER CO	PERCE	=N I WI	ADDI -AB. 1	INSTALLATION
1	BC		STF	(m)	_		BLC	20	40	60	80	20	40		80		
. 0		GROUND SURFACE		66.67			_			4						$\perp \perp$	
	Ê	ASPHALTIC CONCRETE (NEW) ASPHALTIC CONCRETE (OLD)	1	0.05 66.42]											
	w Ste	FILL - (SW) gravelly SAND; brown (PAVEMENT STRUCTURE); non-cohesive, moist		0.25 66.22 0.45	1	AS	-										
	Auger (Hollo	\(\text{non-cohesive, moist}\) FILL -(ML) CLAYEY SILT, some sand,	í‱	0.45													
	Power Auger 200 mm Diam. (Hollow Stem)	trace gravel; brown; cohesive, w <pl,< td=""><td></td><td></td><td></td><td>1 </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></pl,<>				1											
1	m m	firm			2	ss	14										
	200					1											
ŀ		End of Borehole		65.17 1.50													
		Auger Refusal															
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DEI	PTH S	SCALE			1	1	7) (J	LL		K				LO	GGED: JS

RECORD OF BOREHOLE: 22-23

SHEET 1 OF 1

LOCATION: N 5028620.8 ;E 366797.6

BORING DATE: June 21, 2022

DATUM: NAD 1983

T ر	9	SOIL PROFILE			SA	MPLE		YNAMI ESIST <i>A</i>	C PEN ANCE,	ETRAT BLOWS	ON 8/0.3m	1	HYDRA	ULIC Co k, cm/s	ONDUC	CTIVITY,		그의	PIEZOMETER
METRES	BORING METHOD		STRATA PLOT		H.		SI C	20	4	10	60	80	10	⁻⁶ 1	0 ⁻⁵	10 ⁻⁴	10 ⁻³	ADDITIONAL LAB. TESTING	OR
MET	SING	DESCRIPTION	TA F	ELEV. DEPTH	NUMBER	TYPE	SI	HEAR S u, kPa	STREN	NGTH	nat V. ·	+ Q - ● Ð U - O				T PERC		DDIT B. TE	STANDPIPE INSTALLATION
i	BOF		STR/	(m)	z	[20	,		60	80	Wp 20			60	- WI 80	45	
		GROUND SURFACE		67.47			t			Ī	Ī		Î		Ĭ		T		
0		ASPHALTIC CONCRETE		0.00 67.27															
		FILL - (SW) SAND, some gravel; brown	***	0.20															
		(PAVEMENT STRUCTURE); non-cohesive, moist	. 💥	66.96	1	AS	1												
		FILL - (ML) CLAVEY SILT some sand	′‱	0.51															
		and gravel; grey, contains organic s; cohesive, w <pl, firm<="" td=""><td>\otimes</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></pl,>	\otimes																
1	Stem)	55.155.15, 11 1 2, 11111	\otimes		2	ss	7												
	- No		\otimes																
	Power Auger n Diam. (Hollow §			65.95															
	ower Diam.	FILL - (ML/SM) CLAYEY SILT to SILTY CLAY, some gravel; grey, contains	\mathbb{W}	1.52															
	립	organics and debris, slightly conesive,	\otimes		3	ss	7												
2	200 mm	moist, loose	\otimes																
																			\leftarrow
		- Becomes wet at a depth of 2.59 m			4	SS	В												$\bar{\Delta}$
3		End of Borehole Auger Refusal		64.42 3.05															
		or boronolo ragor nelasar		3.00															
4																			
5																			
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8																			
9																			
10																			
		SCALE			N 1	1 K	- N			O I		ΕI							

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RECORD OF BOREHOLE: 22-24

SHEET 1 OF 2

CHECKED: BB

LOCATION: N 5028558.6 ;E 366757.3

BORING DATE: June 20, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ BLOWS/0. WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 70.64 ASPHALTIC CONCRETE 0.05 Flush Mount FILL - (GP/SW) SAND and GRAVEL; grey (PAVEMENT STRUCTURE); unon-cohesive, moist FILL - (SW) gravelly SAND, some silt, clay; brown; non-cohesive, moist, AS 1 Casing 70.34 2 AS compact 2A (SM) SILTY SAND, some clay and gravel; brown (GLACIAL TILL); non-cohesive, moist, copmact 0.91 SS 17 2B Bentonite Seal SS >50 3 68.68 1.96 Borehole continued on RECORD OF DRILLHOLE 22-24 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 **NSD** GOLDER DEPTH SCALE LOGGED: JS

INCLINATION: -90°

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

1:50

LOCATION: N 5028558.6 ;E 366757.3

AZIMUTH: ---

RECORD OF DRILLHOLE: 22-24

DRILLING DATE: June 20, 2022

DRILL RIG: CME 55

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2

DATUM: NAD 1983

CHECKED: BB

PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 68.68 Slightly weathered to fresh, Bentonite Seal bedded/nodular, grey to dark grey, fine to medium grained, slightly porous, medium strong SHALEY LIMESTONE Silica Sand Rotary Dril NQ Core 3 38 mm Diam. PVC #10 Slot Screen End of Drillhole Note(s): 1. Water level in screen measured at a depth of 2.56 m (Elev. 68.08 m) on August 4, 2022. 9 10 11 **GOLDER** DEPTH SCALE LOGGED: JS

RECORD OF BOREHOLE: 22-109

BORING DATE: March 30, 2022

SHEET 1 OF 2 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028410.9 ;E 366670.1

, FE	ТНОБ	SOIL PROFILE	L		SA	MPL		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUC k, cm/s		₽g	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - Cu, kPa rem V. ⊕ U -	•	WATER CONTENT	WI	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
\dashv	_	GROUND SURFACE	- S	76.78			ш	20 40 60 80	+	20 40 (80 80	++	
0		FILL - (CI/CL) SILTY CLAY; brown, trace organics; cohesive, w~PL, firm FILL - (SW) gravelly SAND, some silt; grey to brown, contains debris; non-cohesive, moist, compact		0.00 76.55 0.23	1	SS	19			0			
1		FILL - (SM/ML) sandy SILT to SILTY SAND, some clay; grey brown; non-cohesive, moist, dense		0.76 75.26	2	ss	44						
2		(SM) gravelly SILTY SAND, some clay; grey (GLACIAL TILL); slightly cohesive, moist to wet, very loose to compact		1.52	3	ss	6						
					4	ss	8						
3													
					5	SS	3			0		М	
4	Stem)				6	ss	3						
5	Power Auger 200 mm Diam. (Hollow Stem)				7	ss	2			0			
6	20				8	SS	7						
					9	SS	15			0			
7					10	ss	20			0			
8					11	ss	1						
					12	ss	18			0			
9		- Wet below 9.14 m depth											
10	DCPT	Dynamic Cone Penetration Test (DCPT)		67.03 9.75	13	ss	12						. =
10		CONTINUED NEXT PAGE	1	T			-	T <u>-</u>	1				
DE	PTH S	CALE	1	•	1	1	\) GOLDE	F	5		LOC	GGED: JS

1:50

RECORD OF BOREHOLE: 22-109

SHEET 2 OF 2

CHECKED: BB

LOCATION: N 5028410.9 ;E 366670.1

BORING DATE: March 30, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmDYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD DEPTH SCALE METRES ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---10 Dynamic Cone Penetration Test (DCPT) 11 End of Borehole DCPT Refusal 12 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 19 20 WSD GOLDER DEPTH SCALE LOGGED: JS

RECORD OF BOREHOLE: 22-110

SHEET 1 OF 2

LOCATION: N 5028453.1 ;E 366678.7

BORING DATE: April 1, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm SAMPLES DYNAMIC PENETRATION
RESISTANCE BLOWS/0.3m HYDRAULIC CONDUCTIVITY, SOIL PROFILE

METRES	ļ 掉	į L	SOIL PROFILE			SAI	MPLES	RESIS	STANCE,	, BLOWS	3/0.3m	_		k, cm/s				ᅵᇽᅂᅵ	PIEZOMETER
ZES	/ET	<u>i</u>		10 <u>-</u>		~	0 M		20	40	60 8	30	1	0-6 10) ⁻⁵ 10	0-4 1	0-3	NO I	OR
	BORING METHOD	<u>.</u> [DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE BLOWS/0.30m	SHEA	AR STREI Pa	NGTH	nat V. +	Q - •	W	ATER CO	ONTENT	PERCE	NT	ADDITIONAL LAB. TESTING	STANDPIPE INSTALLATION
Σ	8	:	DESCRIPTION	ZAT.	DEPTH]]	_ ≥	Cu, kF	Pa		rem V. 🕀	U - O	l w	р ——				AB	INSTALLATION
	B	i		STF	(m)		BLC		20	40	60 8	80		20 4			30	-	
		†	GROUND SURFACE		75.74			1	Ť		Ī								
0		\dashv	TOPSOIL - (ML) sandy SILT, some clay:	EZZ	75.74 0.00 0.08	H	+	+	+-		1							\vdash	
	1	- 1\	black, contains organics; moist /	1‱	0.08														
	1	- 1	FILL - (SW) gravelly SAND, some silt:	$\otimes\!\!\!\otimes$	3	1	SS 2												
	1	- 1	dark brown to grey; non-cohesive, moist,	\bowtie	x														
	1		very loose to compact	\bowtie	Á '	_													
	1			\bowtie	á '														
	1			\bowtie	8														
1	1			$\otimes\!\!\!\otimes$	3	2	SS 10												
	1				3	-	00 10												
	1			\bowtie	ă ¹														
	il			\bowtie	74.22														
	il	Γ	(GM/SM) SILTY GRAVEL and SAND;		1.52														
			grey; non-cohesive, moist to wet, loose	, , ,	1								_					١ ا	
	il			* *		3	SS 6						0					М	
2	il																		
I	il			N.															
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					4						1								
l				> >		4	SS 4	1											
ļ					70.04			1											
ا ِ		H	(SM) SILTY SAND, some gravel, trace	B	72.84						1								
3			to some low plasticity fines: graver, trace		<u> </u>	\vdash					1								
l			(SM) SILTY SAND, some gravel, trace to some low plasticity fines; grey, contains cobbles and boulders		1 '						1								
l		- 1	(GLACIAL TILL); moist to wet, loose to	1988	a '	5	SS 28				1		0						
			dense		Ž						1								
l				1212	4	\vdash					1								
					3	\vdash					1								
4					4			1											
					8	6	SS 6				1		0					М	
l					a '			1											
ļ		te l			4	\vdash		1											
ļ	[[200 mm Diam. (Hollow Stem)		WK.	4	\vdash					1								
ļ	Power Auger	읗			a '			1											
I	ĬŽ.	اجْ			4 '	7	SS 8	1											
5	owe	Jan			3						1								
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ļ				1888	4	12	SS 28				1								
إ					3			1											
9					1						1								
I					8						1								
ļ					a '			1											
ļ					a '	13	SS 28				1								
ļ					65.99				1										
ı	اير	+	Dynamic Cone Penetration Test (DCPT)	TWEE	9.75														
10	DCPT	_L		-	\perp	_↓	- 4-	. ∟	 	. L	↓		↓			L	↓		
-	ĺ		CONTINUED NEXT PAGE						1										
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			2415			11	6	17	G	O		FI	D					10	OGGED: KG
ררי	DTI	16,				-												L(JUGEU. NG
DEI	PTH	1 S(CALE			•	•												ECKED: BB

1:50

RECORD OF BOREHOLE: 22-110

SHEET 2 OF 2

CHECKED: BB

LOCATION: N 5028453.1 ;E 366678.7

BORING DATE: April 1, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmHYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES BORING METHOD DEPTH SCALE METRES ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---10 Dynamic Cone Penetration Test (DCPT) End of Borehole DCPT Refusal 11 12 13 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 19 20 WSD GOLDER DEPTH SCALE LOGGED: KG

1:50

RECORD OF BOREHOLE: 22-111

SHEET 1 OF 1

CHECKED: BB

LOCATION: N 5028484.1 ;E 366691.3

BORING DATE: March 29, 2022

DATUM: NAD 1983

METINES	QQ	SOIL PROFILE			SA	MPL		DYNAMIC PER RESISTANCE	NETRAT , BLOW	ION 5/0.3m	>	HYDRAULIC k, cm	CONDUC 's	TIVITY,		1º	PIEZOMETER
	METH		LOT		l K		.30m	20	40	60 8	30			10-4	10 ⁻³	TONA STIN	OR
	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	SHEAR STRE Cu, kPa	NGTH	nat V. + rem V. ⊕	Q - • U - O	WATER Wp I	CONTEN		NT WI	ADDITIONAL LAB. TESTING	STANDPIPE INSTALLATIO
	BO		STR	(m)	z		BLC	20	40	60 8	30	20			80		
0		GROUND SURFACE		75.13												\perp	
		TOPSOIL - (ML) sandy SILT, some clay; black, contains organics; non-cohesive,	K	0.00 0.08	I												
		moist FILL - (SW) gravelly SAND, some silt;	/‱		1	SS	13										
		dark grey, contains bricks; non-cohesive, moist, compact	/₩	74.52 0.61													
		FILL - (SP/SM) SAND, fine, some silt to															
1		silty, trace to some clay; dark grey; non-cohesive, moist, compact	\otimes		2	ss	19										
			\boxtimes	73.76													
		(CH) CLAY; brown, mottled, fissured (WEATHERED CRUST); cohesive,		1.37													
		w <pl, firm="" stiff<="" td="" to=""><td></td><td></td><td>3</td><td>SS</td><td>8</td><td></td><td></td><td></td><td></td><td> </td><td></td><td>L</td><td></td><td>мн</td><td></td></pl,>			3	SS	8							L		мн	
2				70.00		33	0					'		'			
	Stem			73.00 2.13													
	uger	mottled (WEATHERED CRUST); cohesive moist to wet, soft		ł													
	Power Auger			1	4	SS	3					⊢•				М	
- 1	200 mm Diam (Hollow	(ML/SM) sandy SILT to SILTY SAND,		72.23 2.90													
3	200	(ML/SM) sandy SIET to SIETY SAND, some clay, some gravel; brown		2.90													
		(GLACIAL TILL); slightly cohesive, moist to wet, compact			5	SS	14										
4							40										
					6	SS	16										
5					7	SS	18										
Ĭ.		End of Borehole	200	69.95 5.18													
		Life of Boleriole		0.10													
6																	
7																	
8																	
۱ ٔ																	
9																	
0																	
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RECORD OF BOREHOLE: 22-112

SHEET 1 OF 1

DATUM: NAD 1983

LOCATION: N 5028510.1 ;E 366728.4 BORING DATE: March 29, 2022

SAMPLER HAMMER, 64kg; DROP, 760mm

╝. ┃	웃	SOIL PROFILE	١.		SF	MPLE		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	k, cm/s	₽ PIEZOMET	ER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q. ● nat V. \ Q. ● U - O	10 ⁶ 10 ⁵ 10 ⁴ 10 ³ WATER CONTENT PERCENT Wp	9 PIEZOMET OR STANDPIF INSTALLATI	PE
\dashv	_	GROUND SURFACE	S	73.59	\vdash	\vdash	ш	20 40 60 80	20 40 60 80		
- 0		TOPSOIL - (SM) SILTY SAND, trace clay, trace gravel; dark brown; non-cohesive, moist FILL - (SP) SAND, fine; grey to brown; non-cohesive, moist, compact		0.00 73.29 0.30 72.98	1	SS	17				
- 1		(CH) CLAY, some to trace sand; brown (WEATHERED CRUST); cohesive, w <pl, soft="" stiff<="" td="" to=""><td></td><td>0.61</td><td>2</td><td>ss</td><td>8</td><td></td><td>— o — 1</td><td></td><td></td></pl,>		0.61	2	ss	8		— o — 1		
	er low Stem)										
- 2	Power Auger 200 mm Diam. (Hollow Stem)			71.30	3	ss	5				
	200	(CL-ML) SILTY CLAY to CLAYEY SILT, some sand; brown; cohesive, w>PL, wet, soft		2.29	4	SS	3		HC	МН	
- 3		(ML) sandy SILT, some clay, some gravel; brown (GLACIAL TILL); slightly cohesive, wet, compact		70.69 2.90	5	ss	11		0		
- 4		End of Borehole		69.80 3.79							
- 5											
- 6											
7											
- 8											
. 9											
- 10											
DEI	PTH S	SCALE			1	16	5) GOLDE	R	LOGGED: JS	

RECORD OF BOREHOLE: 22-112A

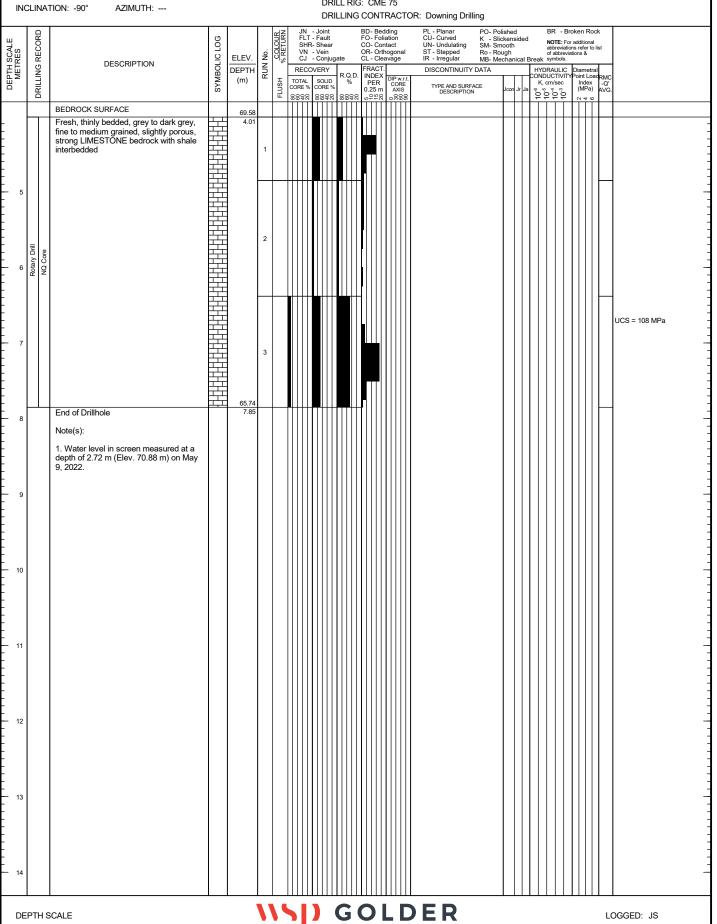
SHEET 1 OF 2

LOCATION: N 5028510.1; E 366728.4 BORING DATE: March 31, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

SALE	BORING METHOD	SOIL PROFILE			SA	MPLE		DYNAMIC PEN RESISTANCE,			7		cm/s			ING	PIEZOMETER
DEPTH SCALE METRES	G ME	DECODIDATE:	STRATA PLOT	ELEV.	BER	ا پر ا	BLOWS/0.30m			60 8 Lat V. +		10 ⁻⁶ WAT	10 ⁻⁵ ER CON		0 ⁻³ L NT	ADDITIONAL LAB. TESTING	OR STANDPIPE
7 7 R	ORIN	DESCRIPTION	RATA	DEPTH (m)	NUMBER	TYPE	OWS	SHEAR STREN Cu, kPa	r	em V. \oplus	Ŭ- O		LICOON		WI	ADD LAB.	INSTALLATION
\dashv	ă	ODOLINID OLIDE COE	ST	(111)			ᆸ	20 4	10 6	60 8 I	0	20	40		30		
0	$\overline{}$	GROUND SURFACE For soil stratigraphy refer to Record of		73.59 0.00													
2		Borehole 22-112		0.00													Bentonite Seal Silica Sand \$\sqrt{2}\$ 50 mm Diam. PVC #10 Slot Screen
. 4 —		Borehole continued on RECORD OF DRILLHOLE 22-112A		69.58													
7																	
8																	
· 10																	
DEP 1:5		CALE			1	10) G	O L	. D	Εŀ	R					DGGED: JS ECKED: BB

RECORD OF DRILLHOLE: 22-112A PROJECT: 21451149 SHEET 2 OF 2 LOCATION: N 5028510.1 ;E 366728.4 DRILLING DATE: March 31, 2021 DATUM: NAD 1983 DRILL RIG: CME 75



MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

1:50

RECORD OF BOREHOLE: 22-113

SHEET 1 OF 2

LOCATION: N 5028442.6 ;E 366704.3

BORING DATE: March 30-31, 2021

DATUM: NAD 1983

CHECKED: BB

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 76.05 FILL - (CI/CL) SILTY CLAY; brown, FILL - (GIVCL) SILL IT CLAT, BIOWN, contains organics; cohesive, w-PL, firm FILL - (SW) SAND, some to trace clay and silt, some gravel, some asphalt; brown; non-cohesive, moist, compact 0.13 SS 12 74.98 2 ss 7 FILL - (ML) CLAYEY SILT, some sand, some gravel; grey; cohesive, stiff (SM) gravelly SILTY SAND, some clay; brown (GLACIAL TILL); slightly 1.52 cohesive, wet, compact to loose SS 14 SS 5 (SM) gravelly SILTY SAND, some clay; grey brown (GLACIAL TILL); slightly cohesive, wet, compact to loose SS 7 Power Auger SS 9 0 SS 10 (SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, loose to compact SS 14 0 SS 14 0 SS 10 9 11 SS 10 Borehole continued on RECORD OF 21451149.GPJ GAL-MIS.GDT 9/6/22 8.36 DRILLHOLE 22-113 9 10 00 **NSD** GOLDER DEPTH SCALE LOGGED: JS

RECORD OF DRILLHOLE: 22-113 PROJECT: 21451149 SHEET 2 OF 2 LOCATION: N 5028442.6 ;E 366704.3 DRILLING DATE: March 30-31, 2021 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished BR - Broken Rock St. - Slickensided SM- Smooth Smooth Snogh MB- Mechanical Break Symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG Š ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. % (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 67.69 Fresh to Slightly weathered, thinly to medium bedded, grey to dark grey, slightly porous, strong LIMESTONE with shale interbedded 10 Rotary Drill UCS = 107 MPa 11

12 63.87 End of Drillhole 13 14 15 16 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

DEPTH SCALE 1:50

17

18



21451149.GPJ GAL-MIS.GDT 9/6/22

MIS-BHS 001

RECORD OF BOREHOLE: 22-301

SHEET 1 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp ⊢ (m) GROUND SURFACE 84.60 TOPSOIL - (SM) SILTY SAND, some plastic fines; brown, contains organic matter (rootlets); non-cohesive, moist, 84.30 0.30 SS 6 FILL - (SM) SILTY SAND, some plastic fines, trace gravel; brown, mottled; white/grey and black; non-cohesive, moist, loose SS 8 FILL - (SM) SILTY SAND; brown, mottled black and grey, contains large gravel seams; non-cohesive, moist, compact to dense SS 18 0 SS 33 (SM) gravelly SILTY SAND; brown to grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist to 3.05 Silica Sand SS 16 wet, loose to very dense SS 15 32 mm Diam. PVC #10 Slot Screen Wash Bore SS 10 NW/NQ SS 16 SS 33 Silica Sand SS 10 15 lo 11 SS 9 12 SS Bentonite 13 SS 20 14 SS 26 CONTINUED NEXT PAGE **GOLDER** DEPTH SCALE LOGGED: JS 1:50 CHECKED: BB

RECORD OF BOREHOLE: 22-301

SHEET 2 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

Щ	무	SOIL PROFILE			SA	MPLE		YNAMIC PE ESISTANCE	NETRAT E, BLOW	FION S/0.3m	-	HYDR	k, cm/s	NDUCTIV	TI Y,	٥٦	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD		2LOT	E1 E1	띪		.30m	20	40	60	80		0 ⁻⁶ 10			ADDITIONAL LAB. TESTING	OR STANDPIPE
MEL	RING	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	HEAR STRE u, kPa	NGTH	nat V. + rem V. €	Q - • U - O		/ATER CO	NTENT P	ERCENT WI	AB. TI	INSTALLATION
۵	BOI		STR	(m)	Z		BLO	20	40	60	80		20 4i			1,7	
- 10		CONTINUED FROM PREVIOUS PAGE	21.21.21														
		(SM) gravelly SILTY SAND; brown to grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense			14	SS	26										
- 11					15	SS	6					0					
					16	SS	9										
12																	
					17	SS	30										
- 13					18	SS	60										
· 14					19	ss	10					0					Bentonite
- 15	Wash Bore NW/NQ Casing				20	SS	17										
					21	SS	17										
16																	
					22	SS	47										
17																	
18																	
		(SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense		66.31 18.29	23	SS	>50										
19					24	SS	>50										Cave
20		CONTINUED NEW 2005					_	_			- -						
		CONTINUED NEXT PAGE			_	Щ	_) G				<u> </u>					

RECORD OF BOREHOLE: 22-301

SHEET 3 OF 4

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028264.4 ;E 366704.1

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: March 3, 2022

DATUM: NAD 1983

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp ⊢ (m) --- CONTINUED FROM PREVIOUS PAGE ---20 (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense SS 25 >50 21 22 26 SS >50 0 No Recovery
Possible (SM) SILTY SAND, with cobbles and boulders (GLACIAL TILL); 27 SS >50 24 Cave Wash Bore 25 SS 28 >50 26 (ML/SM) sandy SILT to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); slightly cohesive, moist, very dense 27 29 SS 58 0 28 SS 21451149.GPJ GAL-MIS.GDT 9/6/22 29 Bentonite 31 SS 51 CONTINUED NEXT PAGE WSD GOLDER DEPTH SCALE LOGGED: JS 1:50 CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

RECORD OF BOREHOLE: 22-301

SHEET 4 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

		I						DVALANI	IO DENETDA	TION		HYDRAU						og, 2o. , . oo
DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE	I		SA	MPL	_		IC PENETRA ANCE, BLOV	VS/0.3m	λ,	HYDRAU k	t, cm/s				NG A	PIEZOMETER
I SC/	MET		STRATA PLOT	EL EV	H		BLOWS/0.30m	20			30	10 ⁻⁶				0 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
PTF	SING	DESCRIPTION	TA I	ELEV. DEPTH	NUMBER	TYPE	NS/0	SHEAR Cu, kPa	STRENGTH	nat V. + rem V. ⊕	Q - • U - O				PERCE		DDDI	INSTALLATION
DE	BOF		STR/	(m)	z	ľ	BLO	20			30	Wp F 20	40		—— I	WI BO	\ \	
		CONTINUED FROM PREVIOUS PAGE					Ī	20				1	40	, 0		Ĭ		
- 30	П	(ML/SM) sandy SILT to SILTY SAND																-
-		some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL);			31	SS	51											-
-	ore prince	slightly cohesive, moist, very dense				1												-
-	Ish Bo																	Bentonite -
- - 31	Wash Bore																	-
-																		-
-				53.20														<u> </u>
-		Borehole continued on RECORD OF DRILLHOLE 22-301		31.4														=
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- - 40																		
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DE	PTH	SCALE			1	1	•		GO	LU		~						DGGED: JS
1:	50																CH	ECKED: BB

RECORD OF DRILLHOLE: 22-301 PROJECT: 21451149 SHEET 4 OF 4 LOCATION: N 5028264.4 ;E 366704.1 DRILLING DATE: March 3, 2022 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. % (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 53.20 Moderately weathered, thinly to medium 31.40 bedded, grey to dark grey, medium to fine grained, slightly porous, medium strong LIMESTONE with shale interbedded 32 33 Bentonite 34 35 49.24 End of Drillhole Note(s): 1. Water level in screen measured at a 36 depth of 3.41 m (Elev. 81.19 m) on May 9, 2022. 37 38 39 40

WSD GOLDER

DEPTH SCALE

41

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

RECORD OF BOREHOLE: 22-302

SHEET 1 OF 4

LOCATION: N 5028297.1 ;E 366679.0

BORING DATE: May 3 & 4, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

ا را		SOIL PROFILE	L		SA	MPLE		DYNAM RESIST	IC PENE ANCE, BI	LOWS	/0.3m	λ.		AULIC C k, cm/s	3	τινιτΥ,		₽	PIEZOMETER
METRES	BORING METHOD	DECODIOTIO:	STRATA PLOT	ELEV.	BER	ہر	BLOWS/0.30m	20 SHEAR			1	30 '		0 ⁻⁶ 1 ATER C	1	1	10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
M	NORIN	DESCRIPTION	TRATA	DEPTH (m)	NUMBER	TYPE	LOWS		STRENG	r	em V. ⊕	ŭ-Ō	w _i	p 	—⊖ ^W		-I WI	ADD LAB.	INSTALLATION
	Δ.	GROUND SURFACE	S	<u> </u>		\vdash	m	20	40	6	00 8	30	2	20 4	40	60	80	+	
0	\Box	TOPSOIL - (SM/ML) SILTY SAND to		83.23 0.00															
		sandy SILT, some clay; reddish dark brown, contains organics; non-cohesive,		82.98 0.25	1	ss	5												
		\moist, loose FILL - (SP) SAND, fine to medium;		82.62 0.61															
		brown, mottled orange; non-cohesive, moist, loose		0.01															
1		(SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, brown, contains cobbles and boulders																	
		(GLACIAL TILL); non-cohesive, moist, compact																	
		compact			2	SS	23						0					М	
2																			
3																			
J					3	SS	21												
				79.42															
4		(SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey		3.81															
		brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive,																	
		wet, compact			4	ss	21												
	e jing				"	33	۱ ا												
5	Wash Bore HW/HQ Casing					1													
	» i																		
6					5	ss	22						0					м	
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7																			
8																			
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9						1													
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		CONTINUED NEXT PAGE																	
	оты е	CALE			V	10	١,		GC) L	D	ΕI	R					10	GGED: JS

RECORD OF BOREHOLE: 22-302

SHEET 2 OF 4

LOCATION: N 5028297.1 ;E 366679.0

BORING DATE: May 3 & 4, 2022

DATUM: NAD 1983

THE SHAPE OF THE S	BORING METHOD	DESCRIPTION CONTINUED FROM PREVIOUS PAGE (SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey brown to grey, contains cobbles and	STRATA	LEV. EPTH (m)	NUMBER	TYPE		OYNAMIO RESISTA 20	40			`\	HYDR					10 ⁻³	₹≧	PIEZOMETER OR
10 -	BORING	CONTINUED FROM PREVIOUS PAGE (SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey brown to grey, contains cobbles and		LEV. EPTH (m)	/BE	1111 1 -						80		10 ⁻⁶	10 ⁻⁵	10⁻⁴	1	10	ວິນ [
10 -	BOF	(SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey brown to grey, contains cobbles and		(m)	\leq	TYPE		SHEAR S Cu, kPa	TRENG	STH	nat V	- Q - • U - O	٧		CONT				ADDITIONAL LAB. TESTING	STANDPIPE INSTALLATION
		(SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey brown to grey, contains cobbles and			z	· 6		20	40			80	VV	/p 20	40	⊖ <mark>W</mark> 60		WI 80	4 5	
		(SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey brown to grey, contains cobbles and	1 1			Ť	\top	20			Ĭ				70	00		Ĭ		
11		SAND, some gravel, some clay, grey brown to grey, contains cobbles and																		
11																				
11		boulders (GLACIAL TILL); non-cohesive, wet, compact																		
11		noi, osinpaoi																		
"				72.2 <u>6</u>																
		(SM/SW) SILTY SAND to SAND, some silt and gravel; grey brown to grey,		10.97																
		contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,																		
		very dense																		
12				ŀ	7	SS >	50													
				ŀ																
13																				
14																				
	ing.																			
15	Wash bore HW/HQ Casing																			
	W/HC				8	SS >	50													
	-																			
16																				
17																				
					9	SS >	50													
18																				
19																				
20	_L			_4	_	- -	_ _	_+-	-		↓		↓	-	- 4 -	-		 	- -	
		CONTINUED NEXT PAGE																		
DED	THE	CALE			11	6			G (וכ		EI	P						10	GGED: JS

RECORD OF BOREHOLE: 22-302

2-302 SHEET 3 OF 4

LOCATION: N 5028297.1 ;E 366679.0 SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: May 3 & 4, 2022

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DATUM: NAD 1983

١, ٢	ТНОБ	SOIL PROFILE	1 -		SA	MPLES	DYNAMIC PE RESISTANCI	NETRATIC E, BLOWS	ON '0.3m),		ILIC COND x, cm/s			₽ _Q	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE BLOWS/0.30m	20 SHEAR STRI Cu, kPa	ENGTH r	0 80 lat V. + em V. ⊕	Q - • U - O	10 ⁻⁶ WAT Wp I 20	TER CONT	ENT PERCE	10 ⁻³ ENT I WI 80	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
20		CONTINUED FROM PREVIOUS PAGE	יישועש													
21		(SM/SW) SILTY SAND to SAND, some silt and gravel; grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense			_10_	SS >5										
23	Wash Bore HW/HQ Casing				_11	SS >5										
26		Borehole continued on RECORD OF DRILLHOLE 22-302		56.08 27.15	- 12	SS >5										
28		DRILLHOLE 22-302														
29																
30																
DEF	PTH S	CALE			1,	17) G	OL	. D	E	₹				LOG	GED: JS

RECORD OF DRILLHOLE: PROJECT: 21451149

22-302

SHEET 4 OF 4 LOCATION: N 5028297.1 ;E 366679.0 DRILLING DATE: May 3 & 4, 2022 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION W3 W4 BEDROCK SURFACE 56.08 Slightly to moderately weathered, medium bedded, grey to dark grey, fine to medium grained, slightly to non-porous, weak to medium strong LIMESTONE, with laminations of shale Rotary Drill HQ Core 54.56 28.67 End of Drillhole 29 30 31 32 33 34 35 MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22 36 37

GOLDER

DEPTH SCALE

1:50

RECORD OF BOREHOLE: 22-303

SHEET 1 OF 3

DATUM: NAD 1983

LOCATION: N 5028341.5 ;E 366652.0

BORING DATE: April 5, 2022

.	<u> </u>	SOIL PROFILE			SA	MPL		DYNAMIC PENE RESISTANCE, E	TRATIONS	ON /0.3m)	HYDRAU	LIC CONDUC , cm/s	TIVITY,	ېږ	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	ATA D	ELEV.	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENG Cu, kPa			80 - Q - • 9 U - O		10 ⁻⁵ TER CONTEN		ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
	B0	ODOLINID OLIDEACE	STR	(m)			BLC	20 40) (60	80	20		60 80		
0		GROUND SURFACE TOPSOIL - (ML/CL) SILTY CLAY to CLAYEY SILT, trace sand; brown, contains organic matter; slightly cohesive		80.57 0.00 0.10	1	SS	8									
1		FILL - (ML/CL) CLAYEY SILT to SILTY CLAY, some sand; brown; cohesive, w <pl, firm="" stiff<="" td="" to=""><td></td><td></td><td>2</td><td>SS</td><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></pl,>			2	SS	8									
2					3	SS	10						0		М	
		(ML/SM) sandy SILT to SILTY SAND, some gravel; brown (GLACIAL TILL); slightly cohesive, wet, loose to dense		78.13 2.44	4	SS	8									
3					5	SS	28					0			м	Bentonite
4		(SM) gravelly SILTY SAND to SITY SAND, some gravel, some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense		76.76 3.81	6	SS	25									⊻
5	Wash Boring HW Casing				7	SS	51									
					8	SS	30									
6					9	SS	12									
7																Silica Sand
8					10	SS	23					0			М	
9																32 mm Diam. PVC #10 Slot Screen
10					11	SS	20									
10		CONTINUED NEXT PAGE														

1:50

RECORD OF BOREHOLE: 22-303

SHEET 2 OF 3

CHECKED: BB

LOCATION: N 5028341.5 ;E 366652.0

BORING DATE: April 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmDYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT 80 BLOWS/0.30rr NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---10 (SM) gravelly SILTY SAND to SITY (SMI) graveily sile if SAND to 3111 SAND, some gravel, some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense 32 mm Diam. PVC #10 Slot Screen 11 12 SS 83 Silica Sand 12 13 SS 0 13 Wash Boring HW Casing SS >50 14 Bentonite 15 15 SS 48 16 16 SS >50 Borehole continued on RECORD OF DRILLHOLE 22-303 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: JS

RECORD OF DRILLHOLE: 22-303 PROJECT: 21451149 SHEET 3 OF 3 LOCATION: N 5028341.5 ;E 366652.0 DRILLING DATE: April 5, 2022 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 63.55 Slightly weathered to fresh, thinly to medium bedded, fine grained, slightly porous, strong LIMESTONE with shale interbedded 18 UCS = 120 MPa Rotary Drill 19 3 20 End of Drillhole 20.22 Note(s): 1. Water level in screen measured at a depth of 4.11 m (Elev. 76.46 m) on May 9, 2022. 21 22 23 24 25 26 27 **GOLDER** DEPTH SCALE LOGGED: JS

CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

1:50

RECORD OF BOREHOLE: 22-304

SHEET 1 OF 2

LOCATION: N 5028379.9 ;E 366670.3 BORING DATE: May 6, 2022 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

	ТНОБ	SOIL PROFILE	<u> </u>	\Box		MPLE		DYNAMIC PEN RESISTANCE			,		AULIC Co k, cm/s			0-3	ING	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	SHEAR STRE Cu, kPa	40 NGTH 40	nat V. + rem V. ⊕	Q - • U - O	W	ATER C	ONTENT	PERCE	0 ⁻³ NT WI 80	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
0		GROUND SURFACE		77.64														
1		TOPSOIL - (ML) CLAYEY SILT, some sand; dark brown, contains organics; cohesive FILL - (ML/CL) CLAYEY SILT to SILTY CLAY, some sand and gravel; brown, fissured; cohesive, w-PL stiff (ML/CL) CLAYEY SILT to SILTY CLAY; brown; cohesive, w-PL, stiff (SM) SILTY SAND, some clay and gravel; brown to brown grey (GLACIAL		77.03 0.61 76.73 0.91	1B 2A 2B		12					0						
2		TILL); non-cohesive, moist, compact (SW/SM) SAND, some silt to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to compact		76.12 1.52	3	SS	17											
3				XXXXXXXX	4	SS	20					0					м	
					5	SS	19											
4	(H			XXXXX	6	SS	19											
5	Power Auger 200 mm Diam. (Hollow Stem)	- wet from about 4.7 m depth		XILLIXXIL	7	ss	9					0						
6	200 m				8	ss	7					0					м	
					9	SS	5											
7					10	ss	7											
9					11	SS	15											
10			_ps23	r_		\vdash \dashv	-	+	-	+						†	- -	
DEF	PTH S	CALE			7	\	<u> </u>) G	0	L D	ΕI	R					LO	GGED: JS

RECORD OF BOREHOLE: 22-304

SHEET 2 OF 2

LOCATION: N 5028379.9 ;E 366670.3

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm
PENETRATION TEST HAMMER, 64kg; DROP, 760mm

SEE	BORING METHOD	SOIL PROFILE	 		SA	MPLES			ENETRA E, BLOW		,		ULIC CC k, cm/s		2	ING ING	PIEZOMETER
DEPTH SCALE METRES	G ME	DECODIDATION	STRATA PLOT	ELEV.	NUMBER	TYPE TYPE	SHE	20 EAR STE	40 RENGTH	- 1	80 - Q - ●	10 W/	of 10 ATER CO	1	O ⁻³ INT	ADDITIONAL LAB. TESTING	OR STANDPIPE
ME	ORIN K	DESCRIPTION	RATA	DEPTH	NUM	TYPE	Cu,	kPa	LINOTTI	nat V	9 Ū- Ŏ	Wp			WI	ADD LAB.	INSTALLATION
	ă		-	(m)	_	ā	4	20	40	60	80	20			30 T	\perp	
10		CONTINUED FROM PREVIOUS PAGE (SW/SM) SAND, some silt to SILTY	OPSP			\vdash		+		-						+	
		SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to compact															
· 11	em)	- Becomes dense from 10.70 m depth (SW) SAND, some silt; grey; non-cohesive, wet, dense		66.87 10.77	12	SS 4	7										
	Power Auger 200 mm Diam. (Hollow Stem)																
12	2001	Dynamic Cone Penetration Test (DCPT)		65.44			l l										
				04.04						+	·						
13 .		End of Borehole DCPT Refusal	MIN.	64.61 13.03								150					
· 14																	
15																	
- 16																	
- 17																	
18																	
19																	
20																	
DEF	PTH S	CALE	•		1	15		G	0	LD	E	R				L(OGGED: JS
	50				_		1	_									ECKED: BB

1:50

RECORD OF BOREHOLE: 22-305

SHEET 1 OF 2

CHECKED: BB

LOCATION: N 5028359.6 ;E 366683.8

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp ⊢ (m) GROUND SURFACE 78.37 TOPSOIL/FILL - (SM/ML) SILTY SAND to SAND, some silt and clay; dark brown, mottled, contains organics; moist, loose SS 9 FILL - (SM/SW) SILTY SAND to SAND, some silt, clay and gravel; brown, mottled; non-cohesive, moist, compact SS 24 76.85 (SW/SM) gravelly SILTY SAND to SAND, some silt and gravel, some clay, grey, contains cobbles and boulders (GLACIAL TILL); moist to wet, loose to SS 9 М compact SS 13 SS 5 (SM/SW) SILTY SAND to SAND, some silt, clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); wet, compact to very dense SS 20 SS 12 21451149.GPJ GAL-MIS.GDT 9/6/22 9 SS 52 CONTINUED NEXT PAGE MIS-BHS 001 WSD GOLDER DEPTH SCALE LOGGED: JS

RECORD OF BOREHOLE: 22-305

SHEET 2 OF 2

LOCATION: N 5028359.6 ;E 366683.8

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mmHYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT BLOWS/0.30m 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - ○ WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---(SM/SW) SILTY SAND to SAND, some silt, clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); wet, compact to very dense Dynamic Cone Penetration Test (DCPT) 11 12 13 120 End of Borehole DCPT Refusal 14 15 16 17 18 MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 19 20 **NSD** GOLDER DEPTH SCALE LOGGED: JS 1:50 CHECKED: BB

RECORD OF BOREHOLE: 22-306

SHEET 1 OF 3

LOCATION: N 5028318.0 ;E 366714.1

BORING DATE: March 24 & 25, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

Щ	오	SOIL PROFILE			SA	MPLI		DYNAMIC PENETE RESISTANCE, BLC)WS/0.3m	`\	k,	IC CONDUCTIVITY cm/s	و ا	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTI Cu, kPa	60 8	B0 • Q - ● • U - O	10 ⁻⁶ WATI Wp H	10 ⁻⁵ 10 ⁻⁴ ER CONTENT PERC	TABDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
	BO		STF	(m)	_	Ш	BLC	20 40	60 8	80	20	40 60	80	
- 0		GROUND SURFACE TOPSOIL - (SM) SILTY SAND, some clay; dark brown, contains organics; non-cohesive, wet, loose		82.80 0.00 82.34	1	ss	4							
- 1		Fill - (SM) SILTY SAND, some gravel and clay; brown, slightly mottled; non-cohesive, wet, very loose		0.46	2	ss	3						М	
		(SM/SW) SILTY SAND to SAND, some		81.28 1.52			3						W	
- 2		(SM/SW) SILTY SAND to SAND, some clay, slit and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, compact to very dense			3	SS	18							
					4	ss	54				0			
- 3					5	ss	15							
- 4														
					6	SS	16				0			
- 5	Wash Bore HW/HQ Casing				7	SS	18							
. 6	Ι				-8	SS	>50							
				76.09	9	SS	23				0			
- 7		(SM/SW) SILTY SAND to SAND, some clay, silt, and gravel; grey (GLACIAL TILL); non-cohesive to slightly cohesive, wet, loose to compact		6.71										
- 8					10	SS	3							
- 9					11	ss	10							
• 10														
		CONTINUED NEXT PAGE												
DE	PTH S	CALE			1	16) GO	LD	E	2		1	OGGED: JS

RECORD OF BOREHOLE: 22-306

SHEET 2 OF 3

LOCATION: N 5028318.0 ;E 366714.1

BORING DATE: March 24 & 25, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

ш.	ДОН	SOIL PROFILE	1,		SA	MPLES		MIC PENE STANCE, E	TRATIO BLOWS/0	N 0.3m	\ .	HYDRA	ULIC CC k, cm/s	NDUCT	IVITY,		NG AE	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHE/Cu, k	20 40 R STRENG Pa 20 40	GTH na	at V. + em V. ⊕	Q - • U - O	10 W/ Wp 20	ATER CC	NTENT	PERCE	0 ⁻³ NT WI 80	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
10		CONTINUED FROM PREVIOUS PAGE								. 50	-							ж
10		(SM/SW) SILTY SAND to SAND, some clay, silt, and gravel; grey (GLACIAL TILL); non-cohesive to slightly cohesive, wet, loose to compact - dense		71.83	12	SS 3	2											
11		(SM/SW) SILTY SAND to SAND, some clay and gravel; grey (GLACIAL TILL); non-cohesive, wet, compact to very dense		10.97														
12					13	SS >	0											
13	Wash Bore HW/HQ Casing				14	SS 2	9											
15					15	SS >	0											
16					16	SS 2	7											
17		Borehole continued on RECORD OF DRILLHOLE 22-306		65.22 17.58		-												
18																		
19																		
20																		
		CALE			1	16	13	G	1									GED: JS

LOCATION: N 5028318.0 ;E 366714.1

GAL-MISS.GDT 9/6/22

MIS-RCK 004 21451149.GPJ

RECORD OF DRILLHOLE: 22-306

DRILLING DATE: March 24 & 25, 2022

SHEET 3 OF 3

DATUM: NAD 1983

DRILL RIG: CME 75

INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 65.22 Moderately weathered to fresh, fine to 17.58 medium bedded, grey to dark grey, fine grained, slightly porous, strong LIMESTONE, with shale bedding, some 18 beds have nodular sections 19 20 21 22 Rotary Drill 63.5 mm Diam. VSP UCS = 122 MPa 23 24 25 26 End of Drillhole 26.92 27 **GOLDER** DEPTH SCALE LOGGED: JS 1:50 CHECKED: BB

SAMPLER HAMMER, 64kg; DROP, 760mm

RECORD OF BOREHOLE: 22-307

SHEET 1 OF 4

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028283.4 ;E 366737.4

BORING DATE: May 2, 2022

DATUM: NAD 1983

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp F (m) GROUND SURFACE 83.57 TOPSOIL - (SM) SILTY SAND, fine; dark brown, contains organics; non-cohesive, moist, loose 0.15 SS 0 Fill - (SM) Gravelly SILTY SAND, some clay; brown, contains organics; non-cohesive, moist, loose (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very loose to compact SS SS 29 0 (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact SS 19 Wash Bore 0 SS 12 5 21451149.GPJ GAL-MIS.GDT 9/6/22 9 SS 11 SS 15 CONTINUED NEXT PAGE MIS-BHS 001 **NSD** GOLDER DEPTH SCALE LOGGED: JS 1:50 CHECKED: BB

RECORD OF BOREHOLE: 22-307

SHEET 2 OF 4

LOCATION: N 5028283.4 ;E 366737.4

BORING DATE: May 2, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES DEPTH SCALE METRES BORING METHOD ADDITIONAL LAB. TESTING PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0.3 SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) --- CONTINUED FROM PREVIOUS PAGE ---(SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet to moist, compact to very dense 12 SS 21 13 14 Wash Bore 15 SS 60 16 17 18 10 SS >50 21451149.GPJ GAL-MIS.GDT 9/6/22 19 20 CONTINUED NEXT PAGE **NSD** GOLDER DEPTH SCALE LOGGED: JS 1:50 CHECKED: BB

RECORD OF BOREHOLE: 22-307

SHEET 3 OF 4

LOCATION: N 5028283.4 ;E 366737.4

BORING DATE: May 2, 2022

DATUM: NAD 1983

4	우	SOIL PROFILE			- SA	MPL		DYNAMIC PENE RESISTANCE, B	LOWS/0.3m		k, c	CONDUCTIV m/s		ا ي _	DIEZONACTED
METRES	BORING METHOD	DESCRIPTION	1 24 1-	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENC Cu, kPa	60	80	10 ⁻⁶ WATEF	10 ⁻⁵ 10 ⁻⁴ R CONTENT P	ERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	m	CONTINUED FROM PREFIGURE DAGE	ST	(111)			В	20 40	60	80	20	40 60		++	
20	\neg	CONTINUED FROM PREVIOUS PAGE	933							+		+		++	
. 21		Borehole continued on RECORD OF DRILLHOLE 22-307		63.22 20.35											
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															

RECORD OF DRILLHOLE: 22-307 PROJECT: 21451149 SHEET 4 OF 4 LOCATION: N 5028283.4 ;E 366737.4 DRILLING DATE: May 2, 2022 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ġ ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. % (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 63.22 Slightly weathered, bedded, grey to dark grey, fine to medium grained, slightly porous, strong SHALEY LIMESTONE 21 Rotary Drill UCS = 93 MPa 2 22 End of Drillhole 23 24 25 26 27 28 29

WSD GOLDER

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

30

DEPTH SCALE

1:50

1:50

RECORD OF BOREHOLE: 22-308

SHEET 1 OF 3

CHECKED: BB

LOCATION: N 5028305.1 ;E 366766.9

BORING DATE: April 28 & 29, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL -AB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp F (m) GROUND SURFACE 82.93 TOPSOIL - (SM) SILTY SAND, some 0.00 plastic fines; brown, contains rootlets, trace to some organics; non-cohesive, Bentonite Seal SS 3 (SM) SILTY SAND, some plastic fines; brown (GLACIAL TILL); non-cohesive, v_{i}^{\prime} wet, very loose 0.76 (SM) gravelly SILTY SAND, trace plastic fines; brown, mottled black and orange, SS 16 0 М contains rock fragments, potential cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense SS 27 0 SS 38 5 SS 20 SS 17 Silica Sand & Bentonite Wash Bore SS 32 0 HW Casin SS 19 76.83 (SM) gravelly SILTY SAND, trace plastic fines; grey, contains rock fragments, potential cobbles and boulders SS 7 , (GLACIAL TILL); non-cohesive, wet, loose to very dense 10 SS 29 Bentonite Seal 21451149.GPJ GAL-MIS.GDT 9/6/22 Silica Sand 11 SS 30 32 mm Diam. PVC #10 Slot Screen CONTINUED NEXT PAGE MIS-BHS 001 **GOLDER** DEPTH SCALE LOGGED: BW

RECORD OF BOREHOLE: 22-308

22-308 SHEET 2 OF 3 8 29, 2022 DATUM: NAD 1983

LOCATION: N 5028305.1 ;E 366766.9

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: April 28 & 29, 2022

Ш	면	SOIL PROFILE	_		SA	MPL		DYNAMIC PENETRAT RESISTANCE, BLOW		HYDRAULIC CONDUCTIVITY, k, cm/s	٩ ا	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH Cu, kPa	60 80 nat V. + Q - ● rem V. ⊕ U - ○	10 ⁶ 10 ⁵ 10 ⁴ 10 ³ WATER CONTENT PERCENT Wp W W W W W W W W W	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
- 10		CONTINUED FROM PREVIOUS PAGE (SM) gravelly SILTY SAND, trace plastic fines; grey, contains rock fragments, potential cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense			12		24	20 40	30	20 40 60 60		32 mm Diam. PVC #10 Slot Screen
- 13	Wash Bore HW Casing				13	SS	14					
- 14	Was				14	SS	33					Bentonite Seal
- 16					15	SS	46					
17		Borehole continued on RECORD OF DRILLHOLE 22-308		65.66 17.27	16	SS	55					UCS = 125 MPa Bentonite & Pellets
- 18 - 19												
- 20												
DE	PTH :	SCALE			1	10	>) GO	LDE	R		OGGED: BW

RECORD OF DRILLHOLE: 22-308 PROJECT: 21451149 SHEET 3 OF 3 LOCATION: N 5028305.1 ;E 366766.9 DRILLING DATE: April 28 & 29, 2022 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 65.66 Fresh to slightly weathered, thinly to medium bedded, light to dark grey, fine to medium grained, non to slightly porous, medium strong to strong LIMESTONE, with thin to medium beds Bentonite & Pellets 18 Rotary Drill 19 Silica Sand - vertical joint from 19.20 to 19.27 m depth - vertical joint from 19.41 to 19.47 m depth 20 4 End of Drillhole Note(s): 1. Water level in screen measured at a depth of 6.01 m (Elev. 76.93 m) on May 9, 2022. 21 22 23 24 25 26 27

DEPTH SCALE 1:50

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22



RECORD OF BOREHOLE: 22-309

SHEET 1 OF 3

LOCATION: N 5028348.8 ;E 366737.3 BORING DATE: May 5, 2022 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

, FE	원	SOIL PROFILE	1 -		SA	MPLE		NAMIC PEN SISTANCE			ζ,		AULIC Co k, cm/s				NG PE	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	SHE Cu,	20 L EAR STRE kPa	40 NGTH		30	W	ATER C		PERC	10 ⁻³ ENT I WI	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
	8		STF	(m)	_		N BL	20	40	60	30					80	1-1	
. 0		GROUND SURFACE TOPSOIL - (ML/CL) CLAYEY SILT to SILTY CLAY, some sand, trace gravel; dark brown, contains organics; cohesive, W <pl, (glacial="" (sm)="" and="" boulders="" brown,="" clay="" cobbles="" compact<="" contains="" gravel;="" moist,="" non-cohesive,="" sand,="" silty="" some="" stiff="" td="" till);=""><td>1999</td><td>81.69 0.00 81.49 0.20</td><td>1</td><td>SS</td><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></pl,>	1999	81.69 0.00 81.49 0.20	1	SS	9											
					2	SS	10					0						
2																		
3					3	SS	18											
4		(SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact		77.88 3.81														
5	Wash Bore HW/HQ Casing				4	SS	19					0					ММ	
6		(SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very dense		75.90 5.79	5	SS >	50											
7																		
9		(SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very loose		72.8 <u>5</u> 8.84	6	ss	1											
10		CONTINUED NEXT PAGE																
			1	1	7 1			G			E	<u> </u>		<u> </u>	1		1 1	
DE	PTH S	CALE			1	7	17	G	U	LU		K					LO	GGED: JS

RECORD OF BOREHOLE: 22-309

SHEET 2 OF 3

LOCATION: N 5028348.8 ;E 366737.3

BORING DATE: May 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm PENETRATION TEST HAMMER, 64kg; DROP, 760mm

METRES	BORING METHOD	SOIL PROFILE	TET		AMPI		DYNAMIC RESISTAL			,	HYDRAUI k,			0-3	ADDITIONAL LAB. TESTING	PIEZOMETER
ETRE	IG ME	DESCRIPTION		LEV. EPTH	TYPE	BLOWS/0.30m	20 SHEAR S	40 TRENGTH	- 1	80 - Q - ●	10 ⁻⁶ WAT	10 ⁻⁵ ER CONT	10 ⁻⁴ ENT P	0 ⁻³ I NT	TEST	OR STANDPIPE
ΓΣ	ORIN	DESCRIPTION	RAT/	EPTH Z	=	OWS.	SHEAR S' Cu, kPa		rem V. 6	9 Ū-Ŏ	Wp H				ADC LAB.	INSTALLATION
	ã			···/	+	BL	20	40	60	80	20	40	60	80 T		
10		CONTINUED FROM PREVIOUS PAGE (SM) SILTY SAND, some clay and	939	+	+	\vdash						_	+			
		gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive,														
		moist, very loose														
				70.72												
11		(SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense		10.97												
		boulders (GLACIAL TILL); non-cohesive,														
		wer, compact to very derise														
12																
				7	SS	19										
					1											
13																
	_ b															
	Bore															
14	Wash Bore HW/HQ Casing															
14	Í															
15																
				8	ss	81										
10																
16																
17																
				64.10												
ŀ		Borehole continued on RECORD OF	Y. X/2/X	64.10 17.59												
		DRILLHOLE 22-309														
18																
19																
20																
DFI	PTH S	SCALE		1	1	5) (O	LD	E	R				10	OGGED: JS
اےر	50	· ·			•	-					•					ECKED: BB

INCLINATION: -90°

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

1:50

LOCATION: N 5028348.8 ;E 366737.3

AZIMUTH: ---

RECORD OF DRILLHOLE: 22-309

DRILLING DATE: May 5, 2022

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 3 OF 3

DATUM: NAD 1983

CHECKED: BB

BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUNI FRACT. INDEX PER 0.25 m DEPTH RECOVERY DISCONTINUITY DATA Diametra Point Loa Index (MPa) R.Q.D. % (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 64.10 Slightly weathered, thinly to medium bedded, grey, medium to fine grained, slightly porous, medium strong to strong SHALEY LIMESTONE 18 Rotary Drill 19 End of Drillhole 20 21 22 23 24 25 26 27 **GOLDER** DEPTH SCALE LOGGED: JS

RECORD OF BOREHOLE: 22-310

SHEET 1 OF 3

LOCATION: N 5028376.9 ;E 366714.5

BORING DATE: April 6-8, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

, F	HOD.	SOIL PROFILE	1.	1	SA	AMPL	-	DYNAMIC PENETRA RESISTANCE, BLOV	S/0.3m	11101	AULIC CONDUC k, cm/s		Ag N	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH Cu, kPa 20 40	nat V. + Q - ● rem V. ⊕ U - ○	w w	/ATER CONTENT	10 ⁻⁴ 10 ⁻³ T PERCENT WI 60 80	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
0		GROUND SURFACE	1	80.54				20 40	00 00	 	40	00 00		
0		TOPSOIL - (ML) sandy SILT, some clay; dark brown, contains organic matter; slightly cohesive, w-PL/frozen, compact (CL) SILTY CLAY; brown; cohesive, w <pl, stiff="" stiff<="" td="" to="" very=""><td></td><td>0.00 80.18 0.36</td><td>1</td><td>ss</td><td>14</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></pl,>		0.00 80.18 0.36	1	ss	14							
1					2	SS	12							Bentonite
2					3	ss	15				⊢ →		мн	Ā
	tem)				4	ss	12				⊢ →	1	мн	Silica Sand
3	Power Auger 200 mm Diam. (Hollow Stem)	(SM) gravelly silty sand, some clay; grey brown to brown (GLACIAL TILL); slightly cohesive, compact		77.49 3.05 76.88	5	ss	21			0			МН	्राह्म स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना
4	200 m	(SM) SILTY SAND, some clay, some gravel; grey brown to grey (GLACIAL TILL); non-cohesive, wet, compact to loose		3.66	6	ss	14							
5				75.36	7	ss	6			0				51 mm Diam. PVC #10 Slot Screen
6		(SM) SILTY SAND, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose		5.18	8	ss	9							
Ĭ				73.83	9	ss	9							
7		(SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose		6.71										
8	Wash Boring HW Casing				10	SS	9						М	
9					11	ss	4			0				
10		CONTINUED NEXT PAGE			<u> </u> 	 	_		+					
				<u> </u>	1								<u> </u>	
DE	PTH	SCALE			1	1	2) GO	LVE	K			L	OGGED: JS

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

RECORD OF BOREHOLE: 22-310

SHEET 2 OF 3

DATUM: NAD 1983

LOCATION: N 5028376.9 ;E 366714.5 BORING DATE: April 6-8, 2022

SAMPLER HAMMER, 64kg; DROP, 760mm

								DVNAMIC PENETRA	TION \	HYDRAULIC CONDUCTIVITY,		
S ALE	밀	SOIL PROFILE	-		SAI	ИPL		DYNAMIC PENETRA RESISTANCE, BLOV	``\	k, cm/s	₹ã	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD		STRATA PLOT	ELEV.	NUMBER	Щ	BLOWS/0.30m	20 40	60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
EPT	N N	DESCRIPTION	RATA	DEPTH	UME	TYPE	/SMC	SHEAR STRENGTH Cu, kPa	rem V. ⊕ U - O	WATER CONTENT PERCENT Wp	ADDI	INSTALLATION
	BO		STF	(m)			BLC	20 40	60 80	20 40 60 80		
- 10		CONTINUED FROM PREVIOUS PAGE	אאאא									_
-		(SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose										-
-		TILL); slightly cohesive, wet, loose										-
-				69.87								-
-		(SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose to		10.67								-
— 11 -		TILL); slightly cohesive, wet, loose to compact			12	SS	11					-
-												-
-												-
•												-
- - 12												_
												=
-					13	SS	4					-
					-	-						=
	uring	Buis										- -
- 13 -	Wash Boring	HW Casing										-
	×	Σ										-
												-
												=
– 14					14	SS	46					_
		L		66.21								-
•		(SM/ML) SILTY SAND to sandy SILT, some clay and gravel; grey (GLACIAL TILL); slightly cohesive, wet, very dense		14.33								-
		TILL); slightly cohesive, wet, very dense										-
- - 15												
												-
•												-
-					15	SS	55					-
												=
- 16				64.39								-
		Borehole continued on RECORD OF DRILLHOLE 22-310		16.15								-
												-
												-
- - 17												_
												-
												=
												-
- 18												<u>-</u>
												=
												=
												-
												-
- 19 -												-
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												-
												- -
- 20												_
DF	PTH	H SCALE			11	•) GO	LDE	R	LC	OGGED: JS
1:		. 			• 1					•		ECKED: BB
• • •											J. II	

INCLINATION: -90°

RECORD OF DRILLHOLE: 22-310

SHEET 3 OF 3

DATUM: NAD 1983

LOCATION: N 5028376.9 ;E 366714.5

AZIMUTH: ---

DRILLING DATE: April 6-8, 2022

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	No.	COLOUR % RETURN	V C	SHR- /N - CJ -	Join Fau She Veir Con	ar jugat	e	OF CL	0 - Be 0 - Fo 0 - Co R - Or Cle	ntac thog eava	t onal	CU- Curved K UN- Undulating SM ST - Stepped Ro IR - Irregular ME	O- Polis - Slick M- Smo o- Rou B- Med	kensi	ded cal E	Break	NO abb of a sym	TE: For reviation by the second secon	or ad tions viation			- 1		
MET	DRILLING	DESCRIPTION	SYMBOL	DEPTH (m)	RUN	FLUSH	TOT.	AL E %	SOL CORE	D : %	8848 8.Q.E	0.	RAC NDEX PER .25 n	n c	P w.r.t ORE AXIS	DISCONTINUITY DATA	A	Joon J	r Ja	HYI CONI K,	DRAI DUC , cm/	ULIC TIVIT	: Di	iame	etral oade x a) Δ	- 1		
		BEDROCK SURFACE		64.39			Щ	Щ	Щ	\prod	\prod	П	\prod	\prod	Щ				I				Ţ	П	\prod			
- 17	Rotary Drill HQ Core	Fresh, thinly to medium bedded, grey, medium to fine grained, slightly porous, medium strong to strong LIMESTONE with shale interbedded		16.15	1																							
18	Ro H				2																							
	Щ	End of Drillhole	井	61.36 19.18			Щ	Щ	Н		Н														╟			
		Note(s): 1. Water level in screen measured at a depth of 1.99 m (Elev. 78.55 m) on May		10.10																								
20		9, 2022.																										
21																												
- 22																												
- 23																												
· 24																												
- 25																												
26																												
	T'' ^	CALE	1	,	11	(, I	<u> </u>		<u> </u>)		F	FD			1					1	- 1	100	2ED. 10	
DEF 1 : 5		CALE			7	•	7	ľ			7	-		_	L	DER											GED: JS KED: BB	

RECORD OF BOREHOLE: 22-401

SHEET 1 OF 2

LOCATION: N 5028655.7 ;E 366449.5

BORING DATE: March 16-17, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

SEL	THOD		SOIL PROFILE	FC			MPL	-	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s 10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³	PIEZOMETER
METRES	BORING METHOD		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - O		PIEZOMETER OR STANDPIPE INSTALLATION
\exists	- 4	+	GROUND SURFACE	ò	68.56			Ф	20 40 60 80	20 40 60 80	
0			TOPSOIL/FILL - (SP) SAND, fine, some silt, dark brown, contains organics; non-cohesive, moist FILL - (SW) SAND, some low plasticity fines; brown, contains brick, concrete		0.00	1	ss	12			
1			and cinders; non-cohesive, moist, loose to very dense			2	SS	25			
2						3	ss	6			
					65.82		ss	>50			Bentonite $\sqrt{2}$ May 9, 2022
3		m)	TOPSOIL - (SP) SAND, fine, some silt; black, contains rootlets; non-cohesive, moist, loose		2.74 65.21	_	ss	9			
	Power Auger	Diam. (Hollow Stem)	(SW/SM) SAND to SILTY SAND, some low plasticity fines; grey (GLACIAL TILL); slightly cohesive, moist to wet, very loose to loose		3.35	5	33	B			
4		200 mm Di				6	SS	2			
5			(SW/SM) SAND to SILTY SAND, some		63.38 5.18	7	ss	6			Silica Sand
6			(SWI/SM) SAND to SILTY SAND, some low plasticity fines, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose to dense		3.10	8	ss	7			
						9	SS	45			32 mm Diam. PVC #10 Slot Screen
7						10	ss	28			
8			(SW) SAND, some gravel, some low plasticity fines; grey (GLACIAL TILL); non-cohesive, moist, compact to very dense		60.94 7.62	11	ss	28		0	
	Wash Boring	NW casing	(SW/SM) SILTY SAND, some gravel, some low plasticity fines; grey (GLACIAL TILL); non-cohesive, moist, compact		60.0 <u>3</u> 8.53		SS	>50			Silica Sand
9					50.00	13	ss	28			Bentonite
10			Borehole continued on RECORD OF DRILLHOLE 22-401		58.83 9.73						-
DE	PTŀ	- I	CALE	1	1	1	1	•) GOLDEI	3	LOGGED: JS

RECORD OF DRILLHOLE: PROJECT: 21451149

LOCATION: N 5028655.7 ;E 366449.5

22-401

DRILLING DATE: March 16-17, 2022

DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished BR - Broken Rock St. - Slickensided SM- Smooth Smooth Snogh MB- Mechanical Break Symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION FRACT. INDEX PER 0.25 m RUN DEPTH RECOVERY DISCONTINUITY DATA Diametra oint Loa Index (MPa) R.Q.D. % (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 0000 BEDROCK SURFACE 58.83 Slightly weathered to fresh, thinly to medium bedded, grey to dark grey, fine grained, slightly porous, strong LIMESTONE with shale interbedded 10 - Broken core from 9.73 m to 9.74 m - Broken core from 10.76 m to 10.88 m 11 Rotary Dril NQ Core Bentonite 12 UCS = 99 MPa 13 3 13.62 End of Drillhole Note(s): 14 1. Water level in screen measured at a depth of 2.30 m (Elev. 66.26 m) on May 9, 2022. 15 16 17 18 19 **GOLDER** DEPTH SCALE LOGGED: JS

1:50

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

CHECKED: BB

SHEET 2 OF 2

DATUM: NAD 1983

RECORD OF BOREHOLE: 22-402

SHEET 1 OF 1

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028686.9 ;E 366502.4

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: March 7, 2022

DATUM: NAD 1983

ا يا	웃	SOIL PROFILE	1.	1	J 0/	MPLE		DYNAMIC PENETRATION RESISTANCE, BLOWS/0		k, cm/s	5	 	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE	BLOWS/0.30m	20 40 60 I I I I I I I I I I I I I I I I I I I	80 V. + Q - ●	WATER O	10 ⁻⁵ 10 ⁻⁴ 10 ⁻³ CONTENT PERCENT	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
7 □ 5	30RII		TRAT	DEPTH (m)	Š	F	NON:			Wp I	→ W WI	LAB	IIIO IALLA IION
	ш	GROUND SURFACE	, v			H	Ш	20 40 60	80	20	40 60 80	++	
0		TOPSOIL/FILL - (SP) SAND, fine, some silt; dark brown, contains organics; non-cohesive, frozen FILL - (SW) gravelly SAND to SAND, some gravel, some low plasticity fines; brown; non-cohesive, moist, compact		66.73 0.00 0.15		ss	17						
1		brown, nor-edicaste, most, compact			2	ss	19						
2	Power Auger	FILL - (SM) SILTY SAND, some low plasticity fines; brown; non-cohesive, moist, loose		65.21 1.52	3	SS	6						
	Power	(PT) Fibrous PEAT		64.44]							
3	200 mm	(SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some low plasticity fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive to slightly cohesive, wet, loose to very		2.29 64.24 2.49	4	ss	8						
3		to slightly cohesive, wet, loose to very dense				1				0			
					5	ss	75					М	
4					6	SS	>58						
		End of Borehole Auger Refusal	726	62.51 4.22									
5													
6													
7													
8													
9													
10													
	ртн	SCALE	•		1	16) GOL	DF	R		1.00	GGED: JS

1:50

RECORD OF BOREHOLE: 22-403

BORING DATE: February 28, 2022

LOCATION: N 5028704.0 ;E 366527.3 SAMPLER HAMMER, 64kg; DROP, 760mm SHEET 1 OF 2 DATUM: NAD 1983

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

CHECKED: BB

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT 80 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 65.74 FILL/TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, SS 42 65.36 moist/frozen, dense 0.38 65.18 FILL - (SM) gravelly SILTY SAND, angular; grey brown; non-cohesive, moist, dense FILL - (SM) gravelly SILTY SAND; dark brown to black, contains ash and coal; non-cohesive, moist, loose ss 9 64.52 1.22 (PT) Amorphous PEAT; black; non-cohesive, moist, loose 64.06 (SM) gravelly SILTY SAND; grey brown, possible cobbles (GLACIAL TILL); non-cohesive, wet, loose 3 SS 9 (SM) gravelly SILTY SAND; grey, possible cobbles (GLACIAL TILL); non-cohesive, wet, very loose 0 SS 3 М 62.69 3.05 Borehole continued on RECORD OF DRILLHOLE 22-403 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 MIS-BHS 001 **NSD** GOLDER DEPTH SCALE LOGGED: RI

INCLINATION: -90°

LOCATION: N 5028704.0 ;E 366527.3

AZIMUTH: ---

RECORD OF DRILLHOLE: 22-403

DRILLING DATE: February 28, 2022

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2

DATUM: NAD 1983

PO- Polished BR
K - Slickensided
SM- Smooth abbre
Ro - Rough of abb
MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD NOTE: For additional abbreviations refer to list of abbreviations & SYMBOLIC LOG DEPTH SCALE METRES Š ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTI INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 62.69 Fresh, thinly to medium bedded, medium 3.05 grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE 100 - Broken core from 3.15 m to 3.17 m - Broken/lost core from 3.56 m to 3.62 m 8 2 - Broken core from 3.99 m to 4.08 m - Broken core from 4.29 m to 4.32 m - Broken core from 4.45 m to 4.46 m 3 - Broken core from 5.28 m to 5.29 m 100 - Broken core from 6.15 m to 6.19 m Rotary Drill NQ Core - Broken/lost core from 6.88 m to 7.65 m - Lost core from 7.62 m to 7.97 m UCS = 132 MPa - Broken core from 8.73 m to 8.74 m - Broken core from 9.77 m to 9.79 m 100 10 Broken core from 10.36 m to 10.38 m End of Drillhole 11 21451149.GPJ GAL-MISS.GDT 9/6/22 12 13 **GOLDER** DEPTH SCALE LOGGED: RI 1:50 CHECKED: BB

RECORD OF BOREHOLE: 22-404

SHEET 1 OF 1

LOCATION: N 5028735.4 ;E 366573.4 SAMPLER HAMMER, 64kg; DROP, 760mm BORING DATE: March 1, 2022

DATUM: NAD 1983
PENETRATION TEST HAMMER, 64kg; DROP, 760mm

٧, إ	ГНОБ	SOIL PROFILE	L		SA	MPLE		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	₽ _Q	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q. ● Cu, kPa U - O 20 40 60 80	10 ⁶ 10 ⁵ 10 ⁴ 10 WATER CONTENT PERCEN Wp	ADDITIC	OR STANDPIPE INSTALLATION
_		GROUND SURFACE	†"	65.53			1	20 40 00 00	20 40 00 80		
0		TOPSOIL/FILL - (SM) SILTY SAND, trace gravel; brown to dark brown, contains organic matter (rootlets); non-cohesive, moist/frozen, very dense / FILL - (SM) gravelly SILTY SAND; brown; non-cohesive, moist/frozen, very dense		0.00 65.33 0.20 65.00 0.53	1	ss	65				
1		FILL - (SM) SILTY SAND, trace to some gravel; black, contains ash/slag; non-cohesive, moist, very dense to compact FILL - (SM) gravelly SILTY SAND;		64.62 0.91 64.31 1.22 64.01	2	SS	24				
2	w Stem)	brown; non-cohesive, moist, compact (PT) Amorphous PEAT; black; non-cohesive, moist, loose (SM) gravelly SILTY SAND; grey, possible coheles and houlders.		1.52	3	ss	6				
	Power Auger 200 mm Diam. (Hollow	(GLACIAL TILL); non-conesive, wet, very loose to dense			4	ss	3				
3	200]					
					5	SS	6				
4					6	ss	44		0		
5		(SM) gravelly SAND, fine to coarse, some silt; grey, possible cobbles and boulders; non-cohesive, wet, very dense End of Borehole	784	60.96 4.57 60.65 4.88	7	ss >	>50				
6											
7											
8											
9											
10											
DE	PTH S	I SCALE	1		7	\ <u>\</u>	<u> </u>) GOLDE	3	LOG	GED: RI

RECORD OF BOREHOLE: 22-405

BORING DATE: February 25, 2022

LOCATION: N 5028745.9 ;E 366607.5

SHEET 1 OF 2

DATUM: NAD 1983

Щ		g Q	SOIL PROFILE			SA	MPL		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	ا ي ٍ	PIEZOMETER
METRES		BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - ○ 20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³ WATER CONTENT PERCENT Wp	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
0			GROUND SURFACE TOPSOIL - (SM/ML) SILTY SAND to sandy SILT; brown, contains organic matter (rootlets); non-cohesive, moist/frozen, compact FILL - (CI/CH) SILTY CLAY to CLAY; prown; cohesive, wsPI to w-PI frozen.		67.19 0.00 0.08	1	ss	21				Bentonite Seal
1	r Auger	. (Hollow Stem)	brown, cohesive, w <pl firm="" frozen="" stiff<="" td="" thawed,="" to="" very="" w~pl,=""><td></td><td>65.67</td><td>2</td><td>ss</td><td>3</td><td></td><td></td><td></td><td></td></pl>		65.67	2	ss	3				
2	Powe	200 mm Diam. (Hollow	FILL - (SP) SAND, fine to medium, trace low plasticity fines; brown, mottled reddish black; non-cohesive, moist, compact		1.52	3	ss	12			1	Backfill
3			Borehole continued on RECORD OF DRILLHOLE 22-405		64.17 3.02	4	SS	22				
4			DRILLHOLE 22-405									
5												
6												
7												
8												
9												
10			CALE			1 1	\) GOLDE			OGGED: BW

RECORD OF DRILLHOLE: 22-405 PROJECT: 21451149 SHEET 2 OF 2 LOCATION: N 5028745.9 ;E 366607.5 DRILLING DATE: February 25, 2022 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished
K - Slickensided
SM- Smooth
RO- Rough
MB- Mechanical Break

BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols. JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage DRILLING RECORD DEPTH SCALE METRES SYMBOLIC LOG 2 ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION W3 W4 BEDROCK SURFACE 64.17 Backfill Fresh to slightly weathered, thinly to medium bedded, pale grey to black, fine to medium grained, non to slightly porous, medium strong SHALEY LIMESTONE 3.02 Bentonite Seal Silica Sallay 9, 2022 Rotary Drill ğ UCS = 141 MPa PVC #10 Slot Screen 61.10 End of Drillhole Note(s): 1. Water level in screen measured at a depth of 4.00 m (Elev. 63.18 m) on May 9, 2022. 10 11 12

DEPTH SCALE 1:50

13

21451149.GPJ GAL-MISS.GDT 9/6/22



LOGGED: BW

CHECKED: BB

RECORD OF BOREHOLE: 22-406

SHEET 1 OF 1 BORING DATE: March 1, 2022 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028716.8 ;E 366617.5

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

Щ		SOIL PROFILE	1.		SA	MPLE		DYNAMIC PENETR. RESISTANCE, BLO			HYDRAULIC (k, cm/	s		무의	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 I SHEAR STRENGTH Cu, kPa	60 80 nat V. + Q - (•		10 ⁻⁵ 10 ⁻⁴ CONTENT P		ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
	ă	ODOLIND OLIDE: 35	ST			\sqcup	В	20 40	60 80	+	20	40 60	80	+	
0		GROUND SURFACE TOPSOIL - (ML/SM) sandy SILT to SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist/frozen, compact FILL - (CL) SILTY CLAY, some sand,		66.23 0.00 66.03 0.20	1	ss	14								
1	Power Auger 200 mm Diam. (Hollow Stem)	trace gravel; grey brown, contains brick; cohesive, w~PL, stiff FILL - (SM) gravelly SILTY SAND, angular; brown; non-cohesive, moist, compact FILL - (SM/ML) gravelly SILTY SAND to sandy SILT; dark brown, contains concrete, brick and ash; non-cohesive,		0.76 65.16 1.07	2	ss	28								
2	200 mm	concrete, brick and ash; non-cohesive, moist, compact to loose			3	ss	8								
		(SM/ML) Gravelly SAND and SILT; grey brown, possible cobbles (GLACIAL TILL); non-cohesive, moist to wet, very dense		63.94 2.29 63.59 2.64	4	SS	>55				0			М	
3		End of Borehole Auger Refusal		,											
4															
5															
6															
7															
8															
9															
10															
DE	PTH S	SCALE			1	10	5) GO	LDE	F	3			LO	GGED: RI

RECORD OF BOREHOLE: 22-407

SHEET 1 OF 1

DATUM: NAD 1983

LOCATION: N 5028700.7 ;E 366579.9 SAMPLER HAMMER, 64kg; DROP, 760mm BORING DATE: March 7, 2022

SALE	된	SOIL PROFILE	 -	1		MPLI		DYNAMIC PENETRA RESISTANCE, BLOW	S/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	³ ₹	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH Cu, kPa	nat V. + Q - ● rem V. ⊕ U - ○	1 1 1 1		OR STANDPIPE INSTALLATION
_	B		STF	(m)	_		BLC	20 40	60 80	20 40 60	80	
0	_	GROUND SURFACE FILL - (SW) SAND, some silt, some		66.96								
		gravel; dark brown, contains brick; non-cohesive, moist/frozen, compact		×	1	SS	14					
		FILL - (CI/CH) SILTY CLAY to CLAY, some sand, some gravel; grey; cohesive, w~PL, stiff		66.3 <u>5</u> 0.61								
1		concave, with E, sun			2	ss	6					
	í	FILL - (SW) SAND, some silt, some gravel; brown, with layers of black asphalt; non-cohesive, moist to wet,		65.44 1.52		ss	41					
2	Auger	dense to loose			3	. 55	41					
	200 mm Diam (Hollow Stom)	min Danie			4	SS	8					
3	000	707		×								
				63.30	5	SS	4					
4		(SW) SAND, some low plasticity fines, some gravel; grey, contains cobbles (GLACIAL TILL); non-cohesive, wet,		3.66								
		dense		62.39	6	SS	3					
		End of Borehole Auger Refusal	PERX	4.57	7	SS	>50					
5												
6												
7												
8												
9												
10												
					1) GO	I DE			
DE	PTH	SCALE			4	•	2) GO		R	LC CHI	GGED: JS

RECORD OF BOREHOLE: 22-408

SHEET 1 OF 2

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028677.3 ;E 366555.2

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: March 3, 2022

DATUM: NAD 1983

Ц	5		SOIL PROFILE	1.		SA	MPL		DYNAMIC PENETRA RESISTANCE, BLOW	S/0.3m	HY		C CONE m/s	UCTIVI	ΙY,	물일	PIEZOMETER
METRES	BORING METHOD			STRATA PLOT	ELEV.	ER		BLOWS/0.30m	20 40	60 80		10 ⁻⁶	10 ⁻⁵	10-4	10 ⁻³	ADDITIONAL LAB. TESTING	OR STANDPIPE
Ψ	O O		DESCRIPTION	ATA	DEPTH	NUMBER	TYPE)/S/M	SHEAR STRENGTH Cu, kPa	nat V. + Q - ● rem V. ⊕ U - O				ENT PE	RCENT	ADDI.	INSTALLATION
ב	, a	ġ		STR	(m)	Ž		BLO	20 40	60 80		Wp ├─ 20	40	60	- WI 80	` `	
_		\dashv	GROUND SURFACE		66.02		П					Ĩ	Ť	Ť	ij		
0		П	TOPSOIL/FILL - (SM/ML) SILTY SAND to sandy SILT, trace gravel; dark brown,		0.00 65.79												
			contains organic matter (rootlets);		0.23 65.56	1	ss	12									
			\non-cohesive, moist/frozen, compact	/ I	0.46												
			trace gravel; grey brown; cohesive, /w~PL, stiff	′‱	65.11		-										
1		l	FILL - (SM) gravelly SILTY SAND, sub-rounded to sub-angular; brown;	/ ₩	0.91	2	SS	15									
			non-cohesive, moist, compact		1.07		33	13									
		1 # 1	FILL - (SM) gravelly SILTY SAND; black, contains ash, slag and brick;	i‱	64.50		1										
			non-cohesive, moist, compact FILL - (SM) SILTY SAND, trace to some		1.52		1										
	er Au	Ë,	gravel; grey, contains organic matter;		1.68	3	ss	3									
2	Pow	밑	non-cohesive, moist, compact to loose (SM) gravelly SILTY SAND; grey brown														
		200 mr	(GLACIAL TILL); non-cohesive, moist to wet, very loose				$\mid \mid$				0						
		2	(SM) gravelly SILTY SAND; grey, possible cobbles and boulders			4	SS	4									
			(GLACIAL TILL); non-cohesive, wet,			+	00	7									
3			very loose to loose				<u> </u>										
						5	SS	9									
		Ц			62.30												
			Borehole continued on RECORD OF DRILLHOLE 22-408		3.72												
4																	
5																	
6																	
U																	
7																	
8																	
9																	
10																	
DE	рті	нο	CALE			1	16) GO	I D F	P					10	GGED: RI
חב	.r 11	17 3	UALL			•	•	7								CHE	GGED. KI

RECORD OF DRILLHOLE: 22-408 PROJECT: 21451149 SHEET 2 OF 2 LOCATION: N 5028677.3 ;E 366555.2 DRILLING DATE: March 3, 2022 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PO- Polished BR K - Slickensided SM- Smooth abbrev of abbr MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD NOTE: For additional abbreviations refer to list of abbreviations & SYMBOLIC LOG DEPTH SCALE METRES Š ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION 8848 BEDROCK SURFACE 62.30 (SM) gravelly SILTY SAND; grey, 62:12 100 contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet 3.90 Slightly weathered to fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE 100 2 - Broken core from 3.84 m to 3.90 m - Broken core from 4.38 m to 4.39 m - Broken core from 4.75 m to 4.76 m - Broken/lost core from 6.23 m to 6.29 m - Broken/lost core from 7.09 m to 7.11 m 9 Rotary Drill - Broken core from 8.16 m to 8.18 m NO Core 100 UCS = 140 MPa - Broken/lost core from 9.55 m to 9.57 m 10 100 - Broken/lost core from 10.66 m to 10.67 m 11 12 8 13 End of Drillhole

GAL-MISS.GDT 9/6/22

MIS-RCK 004 21451149.GPJ

DEPTH SCALE

1:50

) GOLDER

LOGGED: RI

CHECKED: BB

RECORD OF BOREHOLE: 22-409

SHEET 1 OF 1 BORING DATE: March 7, 2022 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028655.4 ;E 366477.0

٠. ا د	THOD		SOIL PROFILE	-		SA	MPLE		DYNAMIC PENETR RESISTANCE, BLO		,	k, cm		A S	PIEZOMETER
METRES	BORING METHOD		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENGTH Cu, kPa 20 40	nat V. + rem V. ⊕	Q - •		10° 10° 10° 10° 10° 10° 10° 10° 10° 10°	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
		\dagger	GROUND SURFACE	-	67.62			1	20 40			7	1 00 00	+	
0		\	TOPSOIL/FILL - (SW/SM) SAND, some silt to silty sand, trace low plasticity fines; brown, contains organic matter (rootlets); non-cohesive, moist, compact FILL - (SW/SM) SAND, some silt to silty sand, some low plastic fines, trace gravel, trace organics; brown to dark		0.00 0.10	1	ss	16							
1			gravet, trace organics; brown to dark brown, mottling present; slightly cohesive, moist, very loose to loose			2	ss	7							
2					65.33	3	ss	3							
	Power Auger	9	(SW/SM) SAND to SILTY SAND, some low plastic fines, some gravel; light brown to grey (GLACIAL TILL); slightly cohesive, wet, loose		2.29	4	ss	5				0		М	
3	Powe	Dian					1								
		200 mm				5	ss	7							
4						6	ss	7							
5			(SW/SM) SAND to SILTY SAND, some low plastic fines, some gravel; grey (GLACIAL TILL); loose to compact		63.05 4.57	7	ss	11				ОН			
			End of Borehole		61.83 5.79	8	ss	9				0			
7			Auger Refusal		60										
8															
9															
10															
DE	PTH	1 S	CALE			1	15) GO	LD	ΕI	R		LOC	GGED: JS

1:50

RECORD OF BOREHOLE: 22-410

SHEET 1 OF 1

CHECKED: BB

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028654.1 ;E 366523.2

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: March 7, 2022

DATUM: NAD 1983

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SAMPLES HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE BLOWS/0. SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -OW Wp -(m) GROUND SURFACE 66.99 TOPSOIL/FILL FILL - (SW) SAND, some silt, some SS 29 gravel; brown; non-cohesive, moist, compact FILL - (ML-SM) sandy SILT to SILTY SAND, some low plasticity fines, some 0.76 SS 61 gravel; brown; non-cohesive, moist to wet, very dense 0 (SM) Gravelly SILTY SAND, some low plasticity fines; grey brown to grey (GLACIAL TILL): non-cohesive, wet, SS 16 compact 2 Power Auger SS 22 8 0 SS 5 11 М SS 13 SS >50 End of Borehole Auger Refusal MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 **NSD** GOLDER DEPTH SCALE LOGGED: JS

RECORD OF BOREHOLE: 22-411

SHEET 1 OF 2

LOCATION: N 5028653.8 ;E 366567.0 BORING DATE: March 2, 2022 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

S E	된 II	SOIL PROFILE	Ë			MPLE		DYNAMIC PENE RESISTANCE, B	LOWS	/0.3m	``\	10°	JLIC CON k, cm/s			0-3	IAG ING	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.30m	20 40 SHEAR STRENG Cu, kPa	TH i	60 8 L nat V. + em V. ⊕	Q - •	WA	TER CON	ITENT F	PERCE		ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
2	BOF		STR/	(m)	ž		BLO	20 40			0	Wp 20	40	○VV 60		WI BO	< 5	
0		GROUND SURFACE TOPSOIL - (SM) SILTY SAND, trace	222	66.72 0.00 66.54														
		gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist/frozen, compact FILL - (CL) SILTY CLAY, some sand.		66:54 0.18	1	ss	14											Bentonite Seal
1		trace gravel; grey brown, contains organic matter, ash and slag; cohesive, w-PL, stiff (SM) gravelly SILTY SAND; grey brown (GLACIAL TILL); non-cohesive, moist to		65.96 0.76	2	ss	5											Ā
		(GLÁČIAL TÍLL); non-cohesive, moist to wet, loose										0						Silica Sand
2	ger ollow Stem)			64.59	3	ss	8											
	Power Auger 200 mm Diam. (Hollow Stem)	(SM) gravelly SILTY SAND; grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense		2.13	4	SS	5											<u>√</u>
3	20																	32 mm Diam. PVC #10 Slot Screen 'B'
					5	SS	30					0						
4					6	ss	10										м	
		Borehole continued on RECORD OF		62.1 <u>5</u> 4.57														Silica Sand
5		DRILLHOLE 22-411																
6																		
7																		
8																		
9																		
10																		
	PTH S	I	1	I	7	\ <u>\</u>	<u> </u>) G (. D	ΕI	R				I	L(OGGED: RI

INCLINATION: -90°

LOCATION: N 5028653.8 ;E 366567.0

AZIMUTH: ---

RECORD OF DRILLHOLE: 22-411

DRILLING DATE: March 2, 2022

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

SHEET 2 OF 2

DATUM: NAD 1983

PO- Polished BR K - Slickensided SM- Smooth abbrev of abb MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD NOTE: For additional abbreviations refer to list of abbreviations & SYMBOLIC LOG DEPTH SCALE METRES ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 62.15 (SM) gravelly SILTY SAND; grey, 4.57 possible ccobbles and boulders ((GLACIAL TILL); non-cohesive, wet 4.73 Bentonite Seal Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE Silica Sand - Lost core from 4.57 m to 4.60 m - Broken/lost core from 4.69 m to 4.73 m - Broken core from 5.02 m to 5.03 m - Broken core from 5.79 m to 5.5 m 20 UCS = 89 MPa - Broken/lost core from 6.21 m to 6.24 m - Broken/lost core from 6.57 m to 6.56 m 32 mm Diam. PVC #10 Slot Screen 'A' 50 3 End of Drillhole Note(s): 1. Water level in screen 'A' measured at a depth of 2.41 m (Elev. 64.31 m) on May 9, 2022. 2. Water level in screen 'B' measured at a depth of 0.77 m (Elev. 65.95 m) on May 9, 2022. 10 11 12 GAL-MISS.GDT 9/6/22 13 MIS-RCK 004 21451149.GPJ **GOLDER** DEPTH SCALE LOGGED: RI 1:50 CHECKED: BB

PROJECT: 21451149

1:50

RECORD OF BOREHOLE: 22-412

SHEET 1 OF 1

CHECKED: BB

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

LOCATION: N 5028677.0 ;E 366602.3

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: March 1, 2022

DATUM: NAD 1983

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE SAMPLES BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE METRES PIEZOMETER STRATA PLOT NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● rem V. ⊕ U - O WATER CONTENT PERCENT BLOWS/0 DESCRIPTION Cu, kPa DEPTH -OW Wp ⊢ (m) GROUND SURFACE 66.38 TOPSOIL/FILL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, SS 15 66.02 0.36 moist/frozen, compact FILL - (CL) SILTY CLAY, some sand, trace gravel; grey brown; cohesive, w~PL, stiff 0.76 FILL - (SM) gravelly SILTY SAND; grey brown, contains silty clay layers; non-cohesive, moist, dense
FILL - (SM) gravelly SILTY SAND; black, contains ash and slag; non-cohesive, SS 49 moist, dense FILL - (SM) gravelly SILTY SAND; grey brown; non-cohesive, moist, compact SS 12 (PT) Amorphous PEAT; black; non-cohesive, moist 64.09 (SM) gravelly SILTY SAND; grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, wet, SS 7 loose to very dense 0 SS 9 М 62.47 6 SS >50 End of Borehole Auger Refusal 21451149.GPJ GAL-MIS.GDT 9/6/22 9 10 MIS-BHS 001 **NSD** GOLDER DEPTH SCALE LOGGED: JS

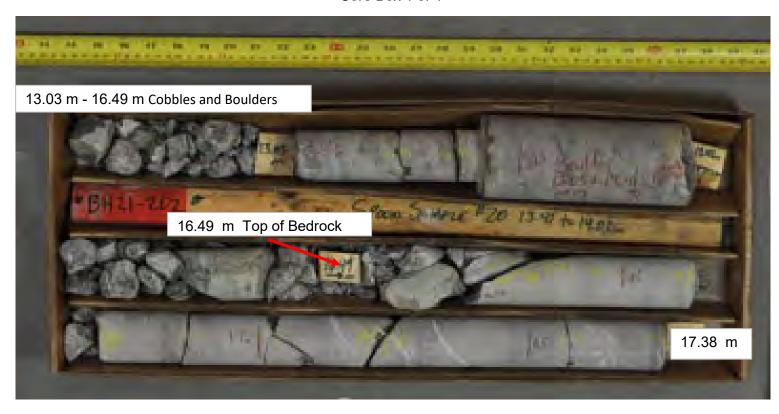
September 6, 2022 21451149-2000-01Rev2

APPENDIX B

Figures B-1 to B-26, Record of Rock Core Photographs



21-202 (Dry) Cored Length of 13.03 to 17.38 metres Core Box 1 of 4



CLIENT
Parsons Inc.

PROJECT

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

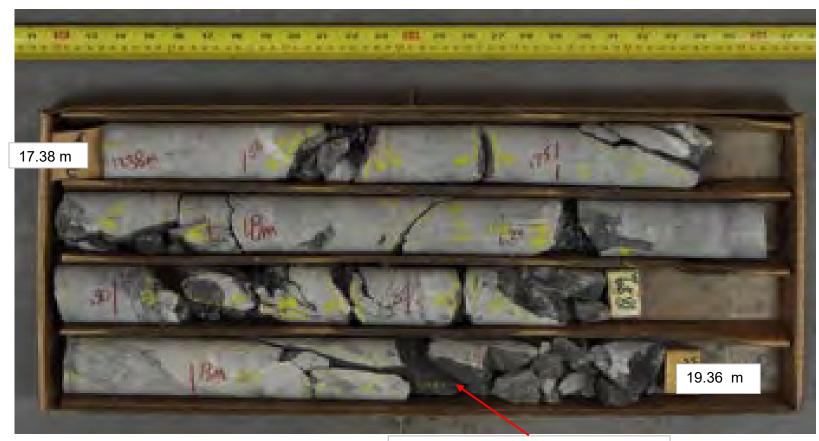


YYY/MM/DD	2021-08-05	
PREPARED	AKP	
DESIGN	AKP	
REVIEW		
APPROVED		

IIILL	
COREHOLE 21-202 (DR)	Y)
CORE PHOTOGRAPHS	

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-1

21-202 (Dry) Cored Length of 17.38 to 19.36 metres Core Box 2 of 4



Possible healed fault 18.53 to 19.36 m

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PROJECT

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

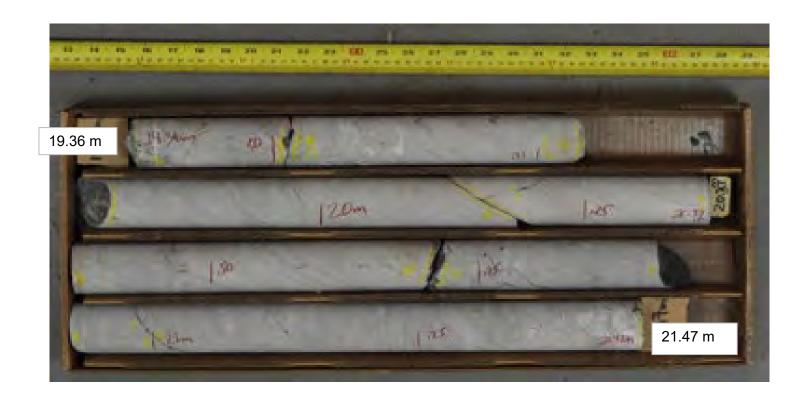


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PREPARED	AKP
DESIGN	AKP
REVIEW	
APPROVED	

IIILE	
COREHOLE	21-202 (DRY
CORE PHO	TOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-2

21-202 (Dry) Cored Length of 19.36 to 21.47 metres Core Box 3 of 4



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PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA



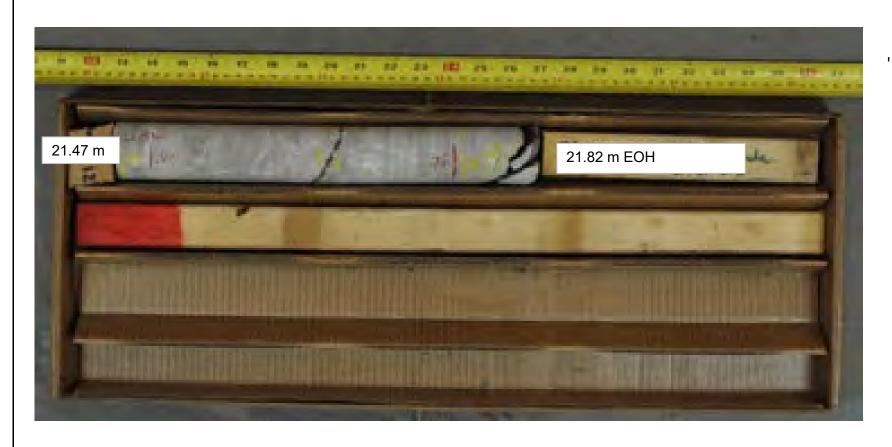
YYY/MM/DD	2021-08-05	
PREPARED	AKP	
DESIGN	AKP	
REVIEW		
APPROVED		

COREHOLE 21-202 (DRY
CORE PHOTOGRAPHS

TITLE

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-3

21-202 (Dry) Cored Length of 21.47 to 21.82 metres Core Box 4 of 4



CLIENT Parsons Inc.

DJECT

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA



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DESIGN	AKP
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APPROVED	

COREHOLE 21-202 (DRY)
CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-4

21-202 (Wet) Cored Length of 13.03 to 17.38 metres Core Box 1 of 4



CLIENT
Parsons Inc.

PROJECT

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT



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PREPARED	AKP	
DESIGN	AKP	
REVIEW		
APPROVED		

TITLE

COREHOLE 21-202 (WET)CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-5

21-202 (Wet) Cored Length of 17.38 to 19.36 metres Core Box 2 of 4



Possible healed fault 18.53 to 19.36 m

CLIENT Parsons Inc.

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

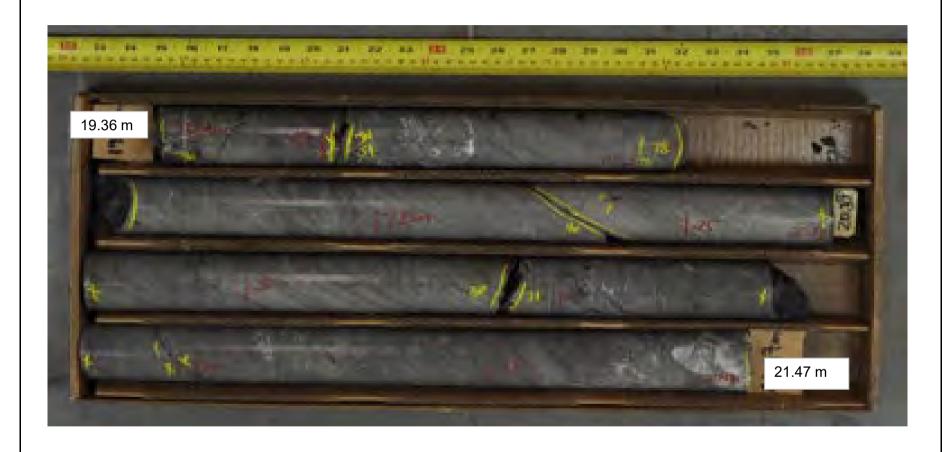
GOLDER
MEMBER OF WSP

YYY/MM/DD	2021-08-05
PREPARED	AKP
DESIGN	AKP
REVIEW	
APPROVED	

COREHOLE 21-202 (WET) **CORE PHOTOGRAPHS**

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-6

21-202 (Wet) Cored Length of 19.36 to 21.47 metres Core Box 3 of 4



CLIENT
Parsons Inc.

PROJEC

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA



YYY/MM/DD	2021-08-05
PREPARED	AKP
DESIGN	AKP
REVIEW	
APPROVED	

TITLE	
COREHOLE 21-202 (WET)	
CORE PHOTOGRAPHS	

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-7

21-202 (Wet) Cored Length of 21.47 to 21.82 metres Core Box 4 of 4



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CONSULTANT



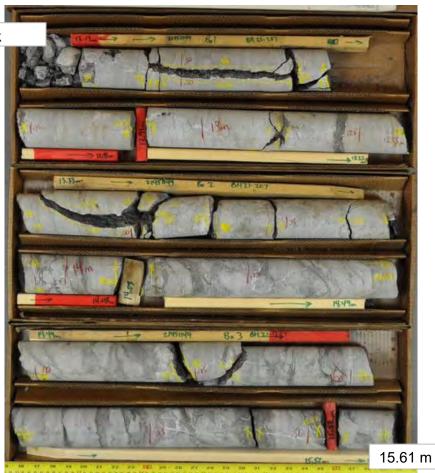
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PREPARED	AKP	
DESIGN	AKP	
REVIEW		
APPROVED		

- COREHOLE 21-202 (WET) CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-8

BH 21-207 (Dry) Cored Length of 12.17 to 15.61 metres Core Box 1 to 3 of 3

12.17 m Top of bedrock



CLIENT

Parsons Inc.

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT



YYY/MM/DD	2021-05-20	
PREPARED	KM	
DESIGN	KM	
REVIEW		
APPROVED		

BOREHOLE 21-207 (DRY) CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-9

BH 21-207 (Dry) Cored Length of 15.61 to 18.95 metres Core Box 4 to 6 of 9



Parsons Inc.

CONSULTANT

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

COLDER

MEMBER OF WSP

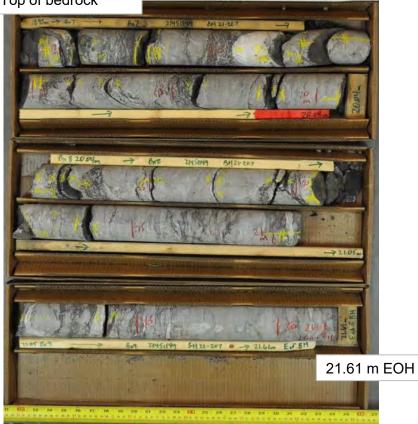
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PREPARED	KM
DESIGN	KM
REVIEW	
APPROVED	

BOREHOLE 21-207 (DRY) CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-10

BH 21-207 (Dry) Cored Length of 18.95 to 21.61 metres Core Box 7 to 9 of 9

18.95 m Top of bedrock



CLIENT

Parsons Inc.

PROJEC^{*}

TITLE

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT



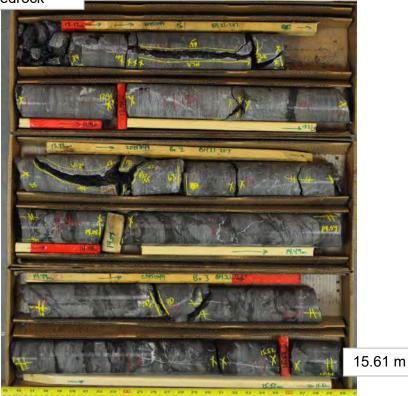
YYY/MM/DD	2021-05-20
PREPARED	KM
DESIGN	KM
REVIEW	
APPROVED	

BOREHOLE 21-207 (DRY
CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-11

BH 21-207 (Wet) Cored Length of 12.17 to 15.61 metres Core Box 1 to 3 of 9

12.17 m Top of bedrock



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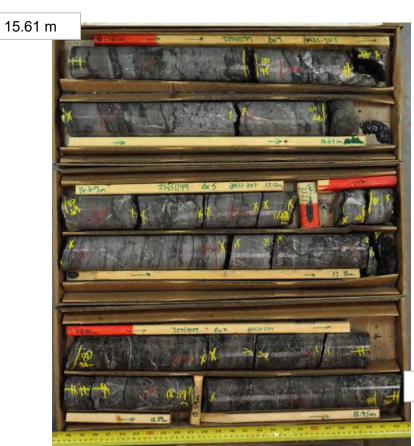


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DESIGN	KM
REVIEW	
APPROVED	

BORE	HOLE	21-207	(WET
CORE	PHOT	OGRAF	PHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-12

BH 21-207 (Wet) Cored Length of 15.61 to 18.95 metres Core Box 4 to 6 of 9



18.95 m

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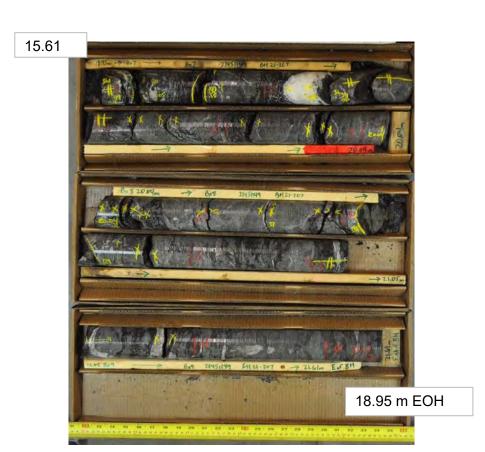
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TITLE
BOREHOLE 21-207 (WET
CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-13

BH 21-207 (Wet) Cored Length of 15.61 to 18.95 metres Core Box 4 to 6 of 9



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BOREHOLE 21-207 (WET)
CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-14

BH 21-213 (Dry) Cored Length of 12.20 to 15.80 metres Core Box 1 to 2 of 2

12.20 m Top of bedrock



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GOLDER MEMBER OF WSP

YYY/MM/DD	2021-05-20
PREPARED	KM
DESIGN	KM
REVIEW	
APPROVED	

BOREHOLE 21-213 (DRY)
CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-15

BH 21-213 (Wet) Cored Length of 12.20 to 15.80 metres Core Box 1 to 2 of 2

12.20 m Top of bedrock



CLIENT Parsons Inc.

PROJECT

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

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YYY/MM/DD	2021-05-20
PREPARED	KM
DESIGN	KM
REVIEW	
APPROVED.	

BOREHOLE 21-213 (WET) CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-16

BH 21-214 (Dry) Cored Length of 8.28 to 12.27 metres Core Box 1 to 2 of 2

8.28 m Top of bedrock



CLIENT

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PROJEC

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT



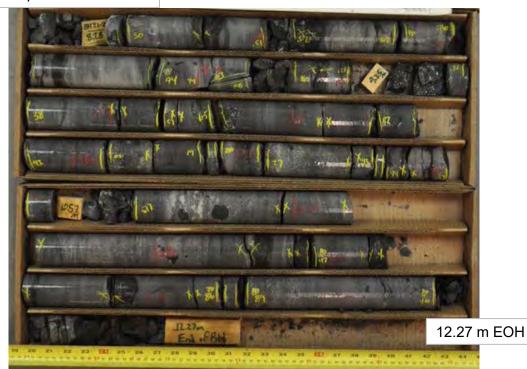
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ш	.E	
В	REHOLE 21-214	(DRY)
C	RE PHOTOGRAP	HS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-1/

BH 21-214 (Wet) Cored Length of 8.28 to 12.27 metres Core Box 1 to 2 of 2

8.28 m Top of bedrock



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GOLDER MEMBER OF WSP

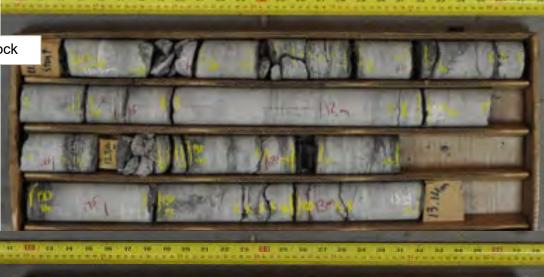
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PREPARED	KM
DESIGN	KM
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APPROVED	

BOREHOLE 21-214 (WET)
CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-18

21-216 (Dry) Cored Length of 11.13 to 15.24 metres Core Box 1 of 2

11.13 m Top of Bedrock





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PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT



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COREHOLE 21-216 (DRY) **CORE PHOTOGRAPHS**

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B19

21-216 (Wet) Cored Length of 11.13 to 13.14 metres Core Box 1 of 2

11.13 m Top of Bedrock 15.24 m EOH

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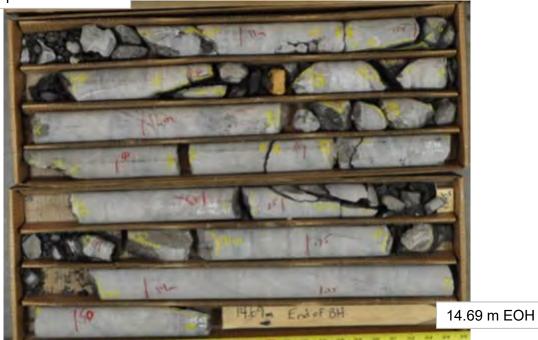
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PREPARED	AKP
DESIGN	AKP
REVIEW	
APPROVED	

 COREHOLE 21-216 (WET) **CORE PHOTOGRAPHS**

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-20

BH 21-219 (Dry) Cored Length of 10.83 to 14.69 metres Core Box 1 to 2 of 2

10.84 m Top of bedrock



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PREPARED	KM
DESIGN	KM
REVIEW	
APPROVED	

BOREHOLE 21-219 (DRY) CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	:IGURE
21451149	2000	0a	B-21

BH 21-219 (Wet) Cored Length of 10.83 to 14.69 metres Core Box 1 to 2 of 2

10.84 m Top of bedrock



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PREPARED	KM
DESIGN	KM
REVIEW	
APPROVED	

BOREHOLE 21-219 (WET) CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-22

BH 21-221 (Dry) Cored Length of 13.41 to 17.63 metres Core Box 1 to 2 of 2

13.41 m Cobbles and Boulders

13.96 m Top of Bedrock



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PROJECT

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YYY/MM/DD	2021-05-20
PREPARED	KM
DESIGN	KM
REVIEW	
APPROVED	

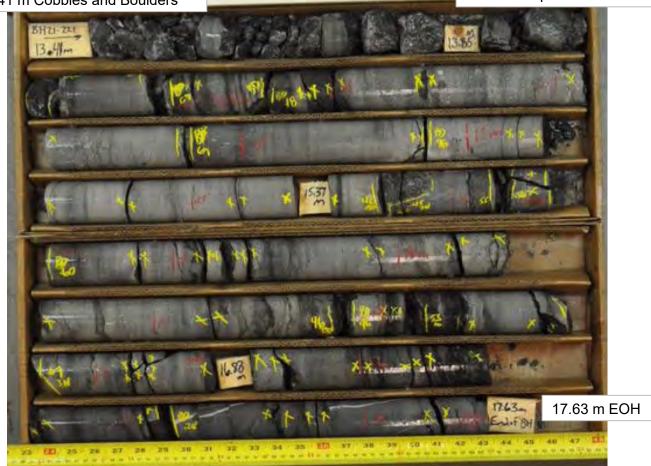
BOREHOLE 21-221 (DRY) CORE PHOTOGRAPHS

21451149	2000	0a	B-23
Z 170 1 170	2000	oa	2 20

BH 21-221 (Wet) Cored Length of 13.41 to 17.63 metres Core Box 1 to 2 of 2

13.41 m Cobbles and Boulders

13.96 m Top of Bedrock



CLIENT
Parsons Inc.

PROJEC

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT



YYY/MM/DD	2021-05-20
PREPARED	KM
DESIGN	KM
REVIEW	
APPROVED	

BOREHOLE 21-221 (WET) CORE PHOTOGRAPHS

PROJECT No. PHASE Rev.	B-24
	FIGURE

Boulders

21-224 (Dry) Cored Length of 15.98 to 20.22 metres Core Box 1 to 2 of 2

to "to 30 At 20 20 BM PS - PS NT NS NO NO AS NO AS NO PS NT NT NT NE NO AS 16.92 m Top of Bedrock

15.98 m Cobbles and 20.22 m EOH

Parsons Inc.

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT



YYY/MM/DD	2021-08-05
PREPARED	AKP
DESIGN	AKP
REVIEW	
APPROVED	
	PREPARED DESIGN REVIEW

- COREHOLE 21-224 (DRY) **CORE PHOTOGRAPHS**

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-25

Boulders

21-224 (Wet) Cored Length of 15.98 to 20.22 metres Core Box 1 to 2 of 2

16.92 m Top of Bedrock 15.98 m Cobbles and 20.22 m EOH

> CLIENT Parsons Inc.

CONSULTANT

PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

MEMBER OF WSP

YYY/MM/DD	2021-08-05	
PREPARED	AKP	
DESIGN	AKP	
REVIEW		
APPROVED		Τ

- COREHOLE 21-224 (WET) CORE PHOTOGRAPHS

PROJECT No.	PHASE	Rev.	FIGURE
21451149	2000	0a	B-26

September 6, 2022 21451149-2000-01Rev2

APPENDIX C

Record of Borehole Logs, Previous Investigations



RECORD OF AUGER PROBE AP - 2

SHEET 1 of 1

LOCATION See Figure 2

1: 50

BORING DATE Feb.5,1988

DATUM GEODETIC

(FD)

CHECKED CRM

SAMPLER HAMMER, 83.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 780mm

ų l	ğ	SOIL PROFILE			SA	MPL	ES	DYNAMIC PENETRA RESISTANCE, BLOW	\$/0.3m	1	HYDRAULIC (CONDUCTIVITY,		ا ق	
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (M)	NUMBER	TYPE	BLOWS/0.3M	SHEAR STRENGTH Cu, kPa	nat.V	+ 0 • • U 0		ONTENT, PERCE	Т	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface													
		Grey silty sand, some gravel (FILL)	∇	0.08											
		Brown silty sand (FILL)	X	0.49											
N		Drown striy sand (Free)	X	0.82											
1			0	0.02											
			1.0												
			00)											
2															
). (
	tem)	Probably grey brown to grey	10	2											
	Auger olld S	silty sand, some gravel, trace clay, occasional	17	1											
3	Power Auger 150mm Dlam (Solid Stem)	cobble and boulder (GLACIAL TILL)													
	Po Im Di	(GEACIAL TILL)	1												
	150r		10	1											
4			0, .											İ	
			0												
			1.9												
			.0)]											
5			O.												
			1.0												
в	Ш		0												
		End of Hole		6.10											
1															
7															
	- 1														
8															
8															
		-													
10								0							

Golder Associates

RECORD OF AUGER PROBE AP-3

SHEET 1 of 1

LOCATION See Figure 2

BORING DATE Feb.5,1988

DATUM GEODETIC



SAMPLER HAMMER, 83.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

щ	90	SOIL PROFILE			SA	MPL	ES	DYNAMIC PENETRAT	0.3m		HYDRAULIC CONDUCTIVITY, k, CM/SEC	. 0	
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (M)	NUMBER	TYPE	BLOWS/0.3M	SHEAR STRENGTH	at.V + Q em.V 🖶 U	• 0	WATER CONTENT, PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	\top	Ground Surface ASPHALT	107	0.00									
		Brown silty sand, some grave (FILL)	XXX	0.23									
2			0.0	0.98									
4	Power Auger 150mm Dlam (Solid Stem)	Probably grey brown to grey silty clay becoming silty sand, some gravel, trace clay occasional cobble and boulder (GLACIAL TILL)											i
6			0										
7			0										
8			0										
9		End of Hole		9.14									
10								0					=

1: 50

Golder Associates

CHECKED CRN

RECORD OF AUGER PROBE AP-4 SHEET 1 of 1

LOCATION See Figure 2

BORING DATE Feb.5,1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 780mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm



ALE	ТНОВ	SOIL PROFILE	-		SA	MPLI	_	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3	1 m	HYDRAULIC CONDUCTIVIT	Y, T 28	DIEZO
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (M)	NUMBER	TYPE	BLOWS/0.3M	SHEAR STRENGTH Cu, kPa nat.V	+ Q € / ⊕ U C	WATER CONTENT, PER	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface	ST	0.00	-		ш		+			
		Ground Surface ASPHALT Dark grey silty sand, some gravel (FILL)		0.00								
1		Brown silty sand, trace gravel (Probably Fill)	X									
				1.28								
2	Œ											
3	Power Auger 150mm Dlam (Solid Stem)	Probably grey brown to grey SILTY CLAY										
4	150m											
5												
6		End of Hole		8.10								
7												
8												
9												
0								0			-	
DEPT	H SC	ALE					10	5 6 PERCENT AXIAL STRAIN A	T FAILURE		LOGGED	S.Leighton
1:	50							Golder Associa	ates		CHECKED	

RECORD OF AUGER PROBE AP-5

SHEET 1 of 1

LOCATION See Figure 2

BORING DATE Feb.5,1988

DATUM GEODETIC



SAMPLER HAMMER, 83.6kg, DROP, 760mm PENETRATION TEST HAMMER, 63.6kg, DROP, 780mm

ALE	THO	\$OIL PROFILE	1 =		SA	MPLI	_	DYNAMIC PENETRA RESISTANCE, BLOW	\$/0.3m	1	HYDRAULIC COND k, CM/SE	C C	NG ING	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (M)	NUMBER	TYPE	BLOWS/0.3M	SHEAR STRENGTH Cu, kPa	nat.V rem.V (H Q •	WATER CONTE	NT, PERCENT	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
- 0		Ground Surface		0.00					1					
		ASPHALT Grey slity sand and gravel (FILL)	X	0.00										
- 1		Very stiff grey brown SILTY CLAY, trace sand and gravel (Weathered Crust)		0.37	1 2	50 DO 50 DO	16							
				2.18										
			0		3	50 DO	25							
3			U											
			0											
4	ger		0											3
	Power Auger													
	Pow		0											
5		Grey brown to grey silty sand some gravel, trace clay.	Ž											
		occasional cobble and boulder (GLACIAL TILL)	1											
			0											
в			10.1											
			Bi											
7		4	0,											
e.	4													
			0.											
8			2											
			0											
-	Ц	5) / ///	1,1											
9		End of Hole		8.63										
	-													
													-	
10							-	6 PERCENT AXIAL ST		_			i	

DEPTH SCALE

1: 50

Golder Associates

LOGGED S.Leighton

CHECKED CRM

RECORD OF AUGER PROBE AP-6

SHEET 1 of 1

DATUM GEODETIC

LOCATION See Figure 2

SAMPLER HAMMER, 83.5kg, DROP, 760mm

BORING DATE Feb.5,1988

PENETRATION TEST HAMMER, 63.5kg, DROP, 780mm



HYDRAULIC CONDUCTIVITY, k, CM/SEC SOIL PROFILE DYNAMIC PENETRATION SAMPLES METHOD RESISTANCE, BLOWS/0.3m ADDITIONAL LAB. TESTING PIEZOMETER OR STANDPIPE ELEV. DESCRIPTION STRATA SHEAR STRENGTH nat.V.- + Q.- • rem.V.- ⊕ U.- O WATER CONTENT, PERCENT DEPTH INSTALLATION (M) 20 40 60 Ground Surface Medium brown silty sand, trace organic matter (FILL) 881-2044 0.00 0.24 Medium brown silty sand, trace gravel (FILL) 1.25 0 2 3 Probably grey brown to grey silty sand, some gravel, trace clay, occasional cobble and boulder Diam (GLACIAL TILL) 8 7 8 8 End of Hole 9.14 10 5-6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1: 50

Golder Associates

LOGGED S.Leighton CHECKED ORT

Monitoring Well: MW16-1

Project: Phase II Environmental Site Assessment

Client: Public Services and Procurement Canada

Sir John Carling Building Location:

122511246 Number:

Field investigator: J. Urben / B. Chenier Strata Drilling Group Contractor:

Drilling method: GM100 (Direct Push)

14-Mar-2016 Date started/completed: Ground surface elevation: 97.46 m RTD **Top of casing elevation:** 97.37 m RTD 444332.2 Easting: 5026985.7 Northing:

SUBSURFACE PROFILE						MPLE DETAILS		INST	ALLATION DETAILS
Graphic Log	Littiologic Description	Elevation (m RTD) Depth (m BGS)	Sample Number	Sample Type	Recovery	Lab Analyses		Diagram	Description
	Ground Surface TOPSOIL moist to wet CRUSHED CONCRETE (FILL) grey, silt, trace clay, dry	0.00 97.38 0.08	1	DP	17" 28%	pH, Phenols			Flushmount protec cover with concrete seal
	SANDY SILT (FILL) brown, trace gravel, trace concrete dust, dry	1.52	2	DP	47" 78%		<pre></pre>	-	— Bentonite backfill — 50 mm ID PVC pip
	SANDY SILT (FILL) grey, gravel, crushed concrete, brick fragments, dry	3.05	3	DP	31" 52%	Explosives	<pre></pre>		
	- becomes grey		4	DP	26" 43%	Metals & Inorganics, Phenols	<pre></pre>	▼	— Groundwater Leve 5.29 m BGS 17-Mar-16
	- becomes moist to wet CLAY grey, moist, black staining at 7.5 m BGS	90.45	5	DP	30" 50%	PHC, VOC, PAH, Field Duplicate	10		— Silica sand backfil — 50 mm ID slotted F pipe
	- becomes wet		6	DP	30" 50%				─ Slough
	Log	Ground Surface TOPSOIL moist to wet CRUSHED CONCRETE (FILL) grey, silt, trace clay, dry SANDY SILT (FILL) brown, trace gravel, trace concrete dust, dry SANDY SILT (FILL) grey, gravel, crushed concrete, brick fragments, dry - becomes grey - becomes moist to wet CLAY grey, moist, black staining at 7.5 m BGS	Graund Surface Ground Surface TOPSOIL Moist to wet CRUSHED CONCRETE (FILL) grey, silt, trace clay, dry SANDY SILT (FILL) brown, trace gravel, trace concrete dust, dry SANDY SILT (FILL) grey, gravel, crushed concrete, brick fragments, dry - becomes grey - becomes moist to wet CLAY grey, moist, black staining at 7.5 m BGS	Craphic Log Lithologic Description (m RTD) Depth (m BGS) Ground Surface 97.46 TOPSOIL TOPSOIL TOPSOIL GRUSHED CONCRETE (FILL) grey, silt, trace clay, dry 1 SANDY SILT (FILL) brown, trace grawel, trace concrete dust, dry SANDY SILT (FILL) grey, gravel, crushed concrete, brick fragments, dry - becomes grey 4 - becomes moist to wet - becomes wet - becomes wet	Ground Surface Ground Surface Ground Surface TOPSOIL moist to wet CRUSHED CONCRETE (FILL) grey, silt, trace clay, dry 1 DP SANDY SILT (FILL) grey, gravel, crushed concrete, brick fragments, dry - becomes grey Lithologic Description (m RTD) path (m BGS) 0.00 97.48 0.00 97.38 0.08 1 DP 95.94 1.52 DP 94.41 3.05 3 DP - becomes grey 4 DP CLAY grey, moist, black staining at 7.5 m BGS	Cround Surface	Ground Surface	Contact Cont	Caround Surface

 Screen Interval:
 5.64 - 8.69 m BGS

 Sand Pack Interval:
 5.33 - 8.69 m BGS

 Well Seal Interval:
 0.23 - 5.33 m BGS

Notes: m BGS - metres below ground surface DP - direct push sample ppm - parts per million by volume n/a - not available

PAH - polycyclic aromatic hydrocarbons PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4 VOC - volatile organic compounds

Field Duplicate - MW16-1A SS5



Borehole: BH16-2

Project: Phase II Environmental Site Assessment

Client: Public Services and Procurement Canada

Sir John Carling Building Location:

122511246 Number:

Field investigator: J. Urben / B. Chenier Strata Drilling Group Contractor:

Drilling method: GM100 (Direct Push)

Date started/completed: 14-Mar-2016 Ground surface elevation: 99.32 m RTD

Top of casing elevation: n/a Easting: 444365.8 5026932.5 Northing:

		SUBSURFACE PROFIL	E			SAI	INSTALLATION DETAILS			
Depth	Graphic Log	Lithologic Description	Elevation (m RTD) Depth (m BGS)	Sample Number	Sample Type	Recovery	Lab Analyses	%LEL Comb 20 40 60 80 1 1 1 1 ppm Comb OTOV	E Description	
(ft) (m)	17. 3. 12	Ground Surface TOPSOIL	99.32 0.00					200 400 600 800		
-		CLAYEY SILT brown with orange mottling, sand, gravel, d	99.17	1	DP	21" 70%	Explosives, PAH, Metals	<5		
5 —			97.80	2a	DP	19" 63%		<5		
		SILTY SAND grey-brown, with gravel, moist	1.52							
2 				2b	DP	19" 32%		<5		
		- becomes grey, dry				24"				
		- with sift, moist		3	DP	40%		0.02	⋖ ─ Bentonite backfill	
-		Will Sit, Host		4	DP	12" 20%	VOC, PHC			
6			93.22							
, - - -		No soil samples recovered	6.10							
5 —	77777	CLAY	91.70 7.62							
8		grey, gravel, trace silt, wet		6	DP	12" 20%		<pre></pre>		
1										
		End of Borehole	90.18	<u> </u>	1					
(to at a a	Notes: m BGS - metres below grou DP - direct push sample ppm - parts per million by vo n/a - not available		÷		PHC F1-F4 - pe	c aromatic hydroca troleum hydrocarb rganic compounds	on fractions 1 to 4	
) 5	tantec								



Project: Phase II Environmental Site Assessment

Client: Public Services and Procurement Canada

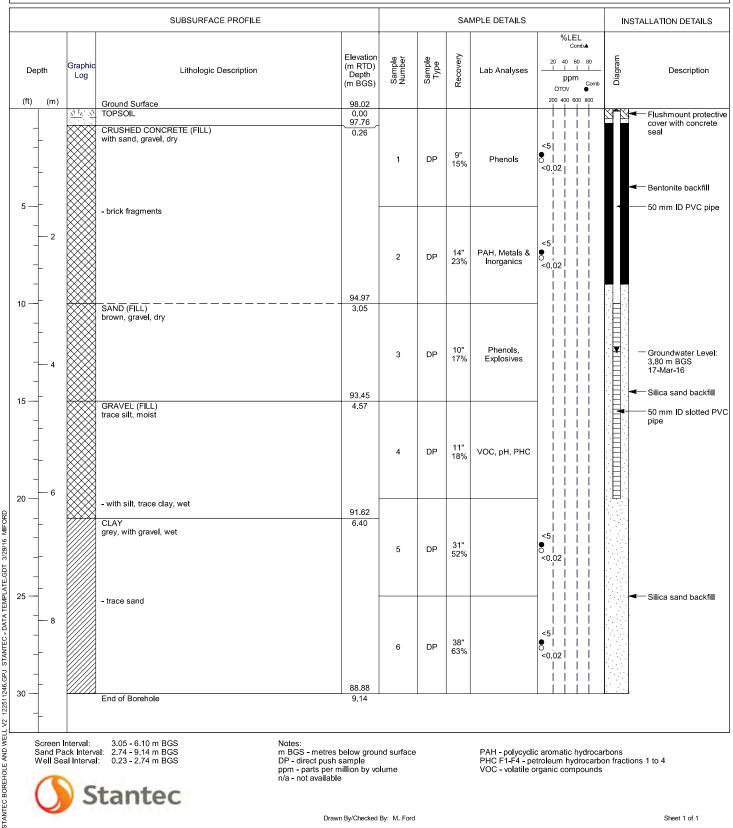
Sir John Carling Building Location:

122511246 Number:

Field investigator: J. Urben / B. Chenier Strata Drilling Group Contractor:

Drilling method: GM100 (Direct Push)

Date started/completed: 14-Mar-2016 Ground surface elevation: 98.02 m RTD 97.96 m RTD Top of casing elevation: 444386.4 Easting: 5026952 Northing:





2.74 - 9.14 m BGS 0.23 - 2.74 m BGS

m BGS - metres below ground surface DP - direct push sample ppm - parts per million by volume n/a - not available

PAH - polycyclic aromatic hydrocarbons PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4 VOC - volatile organic compounds



Borehole: BH16-4

Project: Phase II Environmental Site Assessment

Client: Public Services and Procurement Canada

Sir John Carling Building Location:

122511246 Number:

Field investigator: J. Urben / B. Chenier Strata Drilling Group Contractor:

Drilling method: GM100 (Direct Push)

Date started/completed: 14-Mar-2016 Ground surface elevation: 94.29 m RTD

Top of casing elevation: n/a Easting: 444468.1 5026816

Northing:

		SUBSURFACE PROFILE	<u> </u>			SAI	MPLE DETAILS		INSTALLATION DETAILS
Depth (ft) (m)	Graphic Log	Lithologic Description	(m BGS)	Sample Number	Sample Type	Recovery	Lab Analyses	%LEL Comb 20 40 60 80 1 1 1 1 ppm OTOV 200 400 600 800	E B Description
5		Ground Surface SILTY SAND grey, trace clay, gravel, moist	94.29 0.00	1	DP	24" 40%	PAH, Metals, Explosives, Field Duplicate		
2		SAND coarse to medium grained, with gravel	1.78	2	DP	24" 40%	Glycol, pH	<pre></pre>	
		SILTY SAND grey, with clay, gravel, wet	3.05	3	DP	36" 60%	VOC, PHC	<pre></pre>	⋖ ── Bentonite backfill
5 — - - - - - - - -				4	DP DP	29" 81% 29" 121%		<pre></pre>	
		Refusal on inferred bedrock End of Borehole	87.28 7.01	6	DP	36" 100%		<pre></pre>	
5 — 8 — 8 — — 8 — — 1 — 1									
() <	tantec	Notes: m BGS - metres below groui DP - direct push sample ppm - parts per million by vo n/a - not available)		PHC F1-F4 - pe VOC - volatile o	c aromatic hydroca troleum hydrocarb rganic compounds - BH16-4 SS7 (for	on fractions 1 to 4
)	carree	Drawn By/Checked						Sheet 1 of 1



Project: Phase II Environmental Site Assessment

Client: Public Services and Procurement Canada

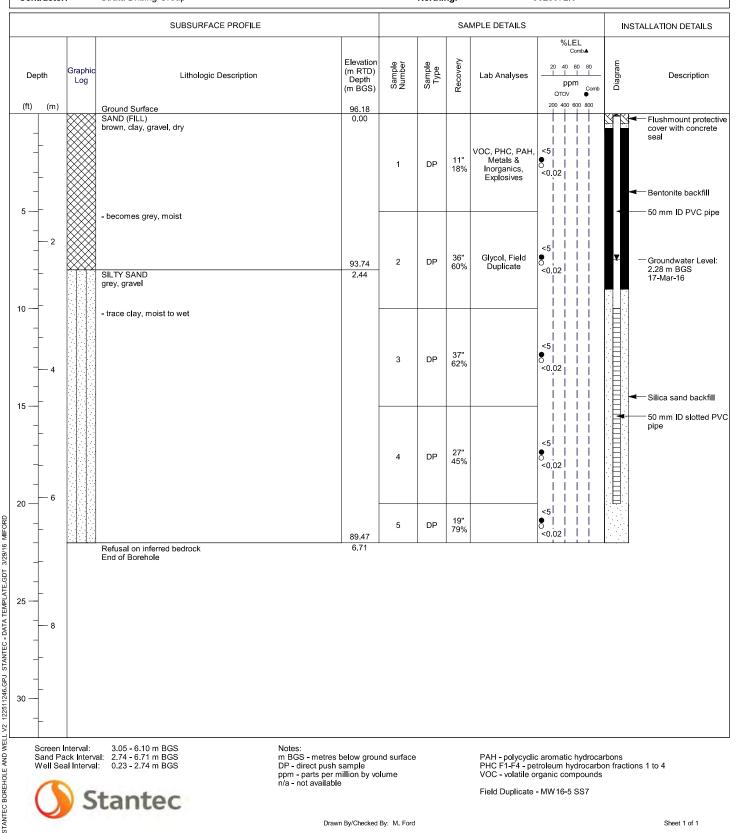
Sir John Carling Building Location:

122511246 Number:

Field investigator: J. Urben / B. Chenier Strata Drilling Group Contractor:

Drilling method: GM100 (Direct Push)

Date started/completed: 14-Mar-2016 Ground surface elevation: 96.18 m RTD 96,10 m RTD Top of casing elevation: 444404.1 Easting: 5026972.9 Northing:





2.74 - 6.71 m BGS 0.23 - 2.74 m BGS

Stantec

m BGS - metres below ground surface DP - direct push sample ppm - parts per million by volume n/a - not available

PAH - polycyclic aromatic hydrocarbons PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4 VOC - volatile organic compounds

Field Duplicate - MW16-5 SS7

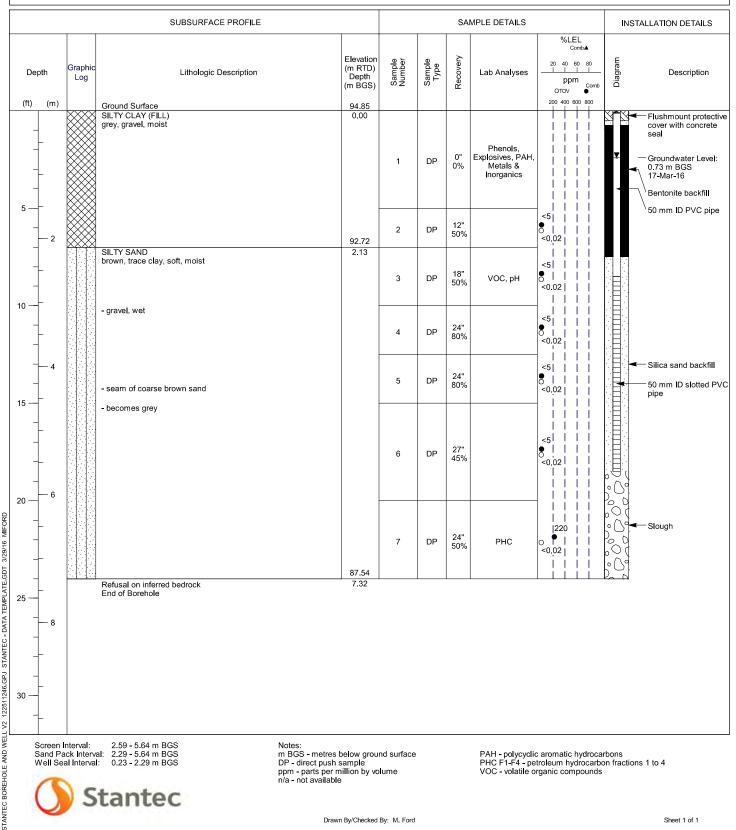
Project: Phase II Environmental Site Assessment Drilling method: GM100 (Direct Push) Client: Public Services and Procurement Canada Date started/completed:

Sir John Carling Building Location:

122511246 Number: Field investigator: J. Urben / B. Chenier Strata Drilling Group Contractor:

11-Mar-2016 / 14-Mar-2016

Ground surface elevation: 94.85 m RTD 94,82 m RTD Top of casing elevation: 444454.1 Easting: 5026972.9 Northing:



Sand Pack Interval: Well Seal Interval:

2.29 - 5.64 m BGS 0.23 - 2.29 m BGS

m BGS - metres below ground surface DP - direct push sample ppm - parts per million by volume n/a - not available

PAH - polycyclic aromatic hydrocarbons PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4 VOC - volatile organic compounds



Project: Phase II Environmental Site Assessment

Client: Public Services and Procurement Canada

Location: Sir John Carling Building

Number: 122511246

Field investigator: J. Urben / B. Chenier **Contractor:** Strata Drilling Group

Drilling method: GM100 (Direct Push)

Date started/completed:14-Mar-2016Ground surface elevation:95.47 m RTDTop of casing elevation:95.36 m RTDEasting:444336.2Northing:5027014.9

		SUBSURFACE PROFILE				SAI	MPLE DETAILS		INS	STALLATION DETAILS
Depth (ft) (m)	Graphic Log	Littologic Description	Elevation (m RTD) Depth (m BGS)	Sample Number	Sample Type	Recovery	Lab Analyses	%LEL Comb▲ 20 40 60 80 ppm OTOV 200 400 600 800	Diagram	Description
(11)	Z1 18. 71	with grass, sand, dry	95.47 0.00 95.16			24"		<5	N. A.	Flushmount protecti cover with concrete
- - - - 5		SILTY CLAY brown, soft, dry	0.30	2	DP	100% 24" 67%	Phenols, Metals, Explosives, PAH	<0.02		seal ▼ Bentonite backfill
2		SILTY SAND	92.73 2.74	3	DP	36" 60%		<pre></pre>		
-		brown, coarse grained sand, gravel - becomes wet		4	DP	24" 80%	PHC, VOC, Field Duplicate	60		
4		- grey SILTY SAND grey, trace clay, gravel, moist	90.90 4.57	5	DP	30" 100%		<5		On and the best seeds
- - - - - - - 6		gley, ildoe olay, gravel, illoist		6	DP	36" 60%		<pre></pre>		Groundwater Leve 4.79 m BGS 17-Mar-16 Silica sand backfill 50 mm ID slotted F
				7	DP	30" 50%		<pre></pre>		
25 — — 8 — —				8	DP	28" 47%		-		Slough
⊢	1111		86.33					Lirii	200	

 Screen Interval:
 3.66 - 6.71 m BGS

 Sand Pack Interval:
 3.35 - 6.71 m BGS

 Well Seal Interval:
 0.23 - 3.35 m BGS

Stantec

Notes: m BGS - metres below ground surface DP - direct push sample ppm - parts per million by volume n/a - not available

PAH - polycyclic aromatic hydrocarbons PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4 VOC - volatile organic compounds

Field Duplicate - MW16-2A SS4

Project: Phase II Environmental Site Assessment Client: Public Services and Procurement Canada

Location: 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario

122170088 Number: Field investigator: A. Parrott Contractor: Strata Drilling Group

Drilling method: Geoprobe (direct push)

Date started/completed: 26-Jul-2017 Ground surface elevation: 94.49 m RTD Top of casing elevation: 94.39 m RTD Easting: 444231.6325 5026850.536 Northing:

Contractor		Strata Drilling Group			Northi	ıy.		5026850.536		
		SUBSURFACE PROFILE				SAI	MPLE DETAILS		INSTALL	ATION DETAILS
Depth	Graphic Log	Stratigraphic Description	(m BGS)	Sample Number	Sample Type	Recovery	Lab Analyses	%LEL Comb 20 40 60 80 1 1 1 1 ppm OTOV 200 400 600 800	Diagram	Description
(ft) (m) 1	1/ 7/1/	Ground Surface TOPSOIL black-brown, organics, moist SILT	94.49 0.00 93.88 0.61	1			H-P, Metals, PAHs, Phenols, VOCs	<5	c c	lushmount protec over with concrete eal
3 — 1.0 4 — 1.5		brown-grey, moist	0.01	2	DP	100%	PHC F1-F4	<5		ackfilled with entonite
6 - 2.0			92.05	3	DP	100%		<5	- 5	0 mm ID PVC pip
8 2.5 9 0 3.0		SILTY SAND brown, trace gravel, wet - brown-grey	2.44	4			H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs	<5		
3.5		- grey		5	DP	80%		<pre><5 </pre>	-G	roundwater Leve .43 m BGS -Aug-17
4.5				6				0.02		ackfilled with silic
5.0				7	DP	80%		<0.02	5 p	0 mm ID slotted I ipe
6.0		End of Borehole	88.39 6.10					<0.02		
3 7.0										
7.5										
7 — 8.5 8 — 8.5 9 — 9.0										
0 9.5										
10.0										
Screen Ir Sand Pac Well Sea	k Interva Interval:	3.05 - 6.10 m BGS 4: 2.74 - 6.10 m BGS 0.23 - 2.74 m BGS	Notes: m BGS - metres below groun DP - direct push sample ppm - parts per million by vol n/a - not available				PHC F1-F4 - pe	ic aromatic hydrocai troleum hydrocarboi organic compounds tible soil vapour	n fractions 1 to	4
		Cullice					9	•		



Project: Phase II Environmental Site Assessment

Client: Public Services and Procurement Canada

Location: 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario

122170088 Number: Field investigator: A. Parrott Contractor: Strata Drilling Group Drilling method: Geoprobe (direct push)

Date started/completed: 26-Jul-2017 Ground surface elevation: 95.09 m RTD 95.03 m RTD Top of casing elevation: 444175.7424 Easting: 5026815.478 Northing:

		SUBSURFACE PROFIL	Ε			SA	MPLE DETAILS		INSTAL	LATION DETAILS
Depth (ft) (m)	Graphic Log	Stratigraphic Description	(m BGS) ampl	Sample Type	Recovery	Lab Analyses	%LEL Comb▲ 20 40 60 80 1 1 1 1 ppm OTOV 200 400 600 800	Diagram	Description
1 - 0.5	<u> </u>	Ground Surface TOPSOIL black-brown, organics, moist SANDY SILT brown, trace gravel, moist	95.09 0.00 94.78 0.30	1	DP	75%	H-P, Metals, PAHs, Phenols, VOCs			Flushmount protect cover with concrete seal Backfilled with
3 — 1.0 4 — 5 — 1.5		SILTY SAND brown, trace gravel, moist to wet	93.87 1.22	2		7370	PHC F1-F4	<pre><5</pre>		pentonite 50 mm ID PVC pipe
6 — 2.0 7 — 2.0 8 — 2.5 9 — 2.5				3	DP	50%	H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs	<pre></pre>		Backfilled with silic
3.0 11 3.5 12 13 4.0		- brown-grey		4	DP	n/a		<pre></pre>		50 mm ID slotted F pipe
14		SAND brown, wet Refusal at inferred bedrock End of Borehole	90.82 4.27 90.48 4.60	7 ,	/_DP_/	\n/a/		<5		Groundwater Leve on 3-Aug-17
5.0 17 ————————————————————————————————————										
6.0										
23 — 7.0 24 — 7.5										
6 - 8.0 7 - 8.5										
18 ± 0.3										
28 — 8.5 29 — 9.0 30 — 9.5										
29 — 9.0										
99 — 9.0 100 — 9.0 111 — 9.5 122 — 10.1 133 — 10.1 Screen Sand Pa	nterval: ack Interval	1.55 - 4.60 m BGS al: 1.25 - 4.60 m BGS 0.23 - 1.25 m BGS	Notes: m BGS - metres below gro DP - direct push sample ppm - parts per million by v n/a - not available				PHC F1-F4 - pe VOCs - volatile	ic aromatic hydroca troleum hydrocarbo organic compounds tible soil vapour	n fractions 1 to	o 4

Project: Phase II Environmental Site Assessment

Client: Public Services and Procurement Canada

Location: 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario

122170088 Number: Field investigator: A. Parrott Contractor: Strata Drilling Group Drilling method: Geoprobe (direct push)

Date started/completed: 26-Jul-2017 Ground surface elevation: 94.64 m RTD Top of casing elevation: 94.58 m RTD 444240.9625 Easting: Northing: 5026754.904

		SUBSURFACE PROF	LE , , , , , , , , , , , , , , , , , , ,			SA	MPLE DETAILS		INS	TALLATION DETAILS
Depth (ft) (m)	Graphic Log	Stratigraphic Descrip	(m BGS)	Sample Number	Sample Type	Recovery	Lab Analyses	%LEL Comb▲ 20 40 60 80	Diagram	Description
+	71 18 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ground Surface TOPSOIL	94.64 0.00 94.34						<u> </u>	Flushmount protecti
1 0.5 2 1.0 4 1.5		black, organics, moist SILTY SAND brown, trace gravel, moist to wet	0.30	1	DP	40%	H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs	<pre><5 </pre>		cover with concrete seal Backfilled with bentonite
6 — 2.0 7 — 2.0 8 — 2.5 9 — 2.5				2	DP	40%		<pre></pre>		
3.0 11 3.5 12 13 4.0				3	DP	100%		<pre></pre>		
4.5		- brown-grey						<0.02 - -		Backfilled with silicates and Groundwater Level:
17 — 5.5 18 — 5.5 19 — 6.0		- wet		5	DP	50%	H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs	<pre><5 </pre>		4.58 m BGS 3-Aug-17 50 mm ID slotted P pipe
21 6.5				6	DP	25%		<pre></pre>		
24 — 7.5			87.02						200	— Slough
26 — 8.0 27 — 8.5 28 — 8.5 29 — 9.0 30 — 9.5 31 — 9.5 32 — 10.0 Screen I Sand Pa	5		Notes: m BGS - metres below groun DP - direct push sample					c aromatic hydroca		
0		tantec	ppm - parts per million by vol n/a - not available	ume			PHC F1-F4 - pe	troleum hydrocarbo organic compounds tible soil vapour	n fractions	s 1 to 4
			Drawn By/Checked By: T. P.							



Project: Phase II Environmental Site Assessment Client: Public Services and Procurement Canada

Location: 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario

122170088 Number: Field investigator: A. Parrott Contractor: Strata Drilling Group Drilling method: Geoprobe (direct push)

Date started/completed: 26-Jul-2017 Ground surface elevation: 95.59 m RTD 95.52 m RTD Top of casing elevation: 444299.964 Easting: Northing: 5026787.713

		SUBSURFACE PROFILE				SA	MPLE DETAILS		INSTAL	LATION DETAILS
Depth (ft) (m)	Graphic Log	Stratigraphic Description	Elevation (m RTD) Depth (m BGS) 95.59	Sample Number	Sample Type	Recovery	Lab Analyses	%LEL Comb 20 40 60 80 1 1 1 1 ppm OTOV 200 400 600 800	Diagram	Description
1 — 0.5 2 — 0.5 3 — 1.0 4 —	7 44 10 44	TOPSOIL black, organics, moist SAND brown, trace silt and gravel, moist	94.98 0.61	1	DP	40%	H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs	<pre></pre>	- S	Flushmount protect cover with concrete seal Backfilled with sentonite
5 — 1.5 6 — 2.0 7 — 2.5		SILTY SAND brown, trace gravel, moist	93.15	2	DP	50%	H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs			
9 - 3.0		No soil samples recovered - augered through boulders	2.44	3	DP	20%				Backfilled with silicated
12				4	RC	n/a		1		50 mm ID slotted F pipe
5.0 17		SILTY SAND grey, trace gravel, moist Refusal at inferred bedrock End of Borehole	90.41 5.18 90.11 5.49							Groundwater Level 5.21 m BGS 3-Aug-17
21 — 6.5										
24 — 7.5 25 — 7.5 26 — 8.0										
27 — 28 — 8.5 29 — 9.0										
31 — 9.5 32 — 10.0 33 — 10.0										
Screen Ir Sand Pa Well Sea	ck Interva I Interval:	2.23 - 5.28 m BGS al: 1.93 - 5.49 m BGS 0.23 - 1.93 m BGS	Notes: m BGS - metres below groun DP - direct push sample RC - rock core ppm - parts per million by volu n/a - not available				PHC F1-F4 - pe	ic aromatic hydroca troleum hydrocarbo organic compounds tible soil vapour	n fractions 1 to	o 4
	_	5311000	Drawn By/Checked By: T. Pa	awlick / J. Ya	raskavitch					Sheet 1 of 1

Project: Phase II Environmental Site Assessment Client: Public Services and Procurement Canada

Location: 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario

122170088 Number: Field investigator: A. Parrott

Contractor: Strata Drilling Group Drilling method: Geoprobe (direct push)

Date started/completed: 27-Jul-2017 Ground surface elevation: 99.19 m RTD Top of casing elevation: 99.12 m RTD Easting: 444493.9007 5026676.009 Northing:

		SUBSURFACE PROFILE				SAI	MPLE DETAILS	%LEL	INSTALLATIO	ON DETAILS
Depth (ft) (m)	Graphic Log	Stratigraphic Description Ground Surface	Elevation (m RTD) Depth (m BGS)	Sample Number	Sample Type	Recovery	Lab Analyses	76LEL Comb▲ 20 40 60 80 1 1 1 1 ppm Comb OTOV ● 200 400 600 800	Diagram	Description
1 — 0.5 2 — 0.5 3 — 1.0 4 — 5 — 1.5		TOPSOIL black, organics, moist SAND (FILL) brown, trace gravel, moist SILTY SAND brown, trace gravel, moist	97.97 1.22	1	DP	30%	H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs	<pre></pre>	cover seal Backfi bentor	nount protective with concrete lled with nite n ID PVC pipe
6				3	DP	70%	LLD Matela	<pre><5</pre>	▼ — Groun 2.24 n 3-Aug	dwater Level: n BGS -17
11 — 3.5 12 — 4.0 13 — 4.0 14 — 4.5				5	DP DP	50% 25%	H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs	<pre><5 </pre>		lled with silica
16		- grey, wet		7	DP	80%		<pre><5 </pre>	sand	n ID slotted PV
21 — 6.5 22 — 7.0 23 — 7.0 24 — 7.5 25 — 7.5		End of Borehole	91.57 7.62	9	DP	100%			Slough	n
26		E. S. DOTOTOLO	7.02							
Screen In Sand Par Well Sea	ck Interval		Notes: m BGS - metres below groun DP - direct push sample ppm - parts per million by volun/a - not available				PHC F1-F4 - pe	ic aromatic hydrocai troleum hydrocarboi organic compounds tible soil vapour	n fractions 1 to 4	
V			Drawn By/Checked By: T. Pa	wlick / J. Ya	raskavitch				Si	neet 1 of 1

Project: Phase II Environmental Site Assessment

Client: Public Services and Procurement Canada

Location: 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario

122170088 Number: Field investigator: A. Parrott Contractor: Strata Drilling Group

Drilling method: Geoprobe (direct push)

Date started/completed: 27-Jul-2017 Ground surface elevation: 96.57 m RTD Top of casing elevation: 96.48 m RTD 444546.5613 Easting: 5026699.988 Northing:

		SUBSURFACE PROFIL	.E				SAI	MPLE DETAILS		INST	ALLATION DETAILS
Depth	Graphic Log	Stratigraphic Descripti	Eleva (m R Dep (m B	GS) B	Number	Sample Type	Recovery	Lab Analyses	%LEL Comb▲ 20 40 60 80	Diagram	Description
0.5	<u>1</u>	TOPSOIL black, organics, moist SILTY SAND brown, trace gravel, wet	90.3 0.0 96.3	00 26		DP	60%	H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs	<5		Flushmount protect cover with concretions seal Backfilled with bentonite
1.0		- moist		3				H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs	<pre></pre>		─ 50 mm ID PVC pip
2.5				4		DP	75%		<pre></pre>	.	— Groundwater Leve 2.79 m BGS 3-Aug-17
3.5						DP	75%		0		— Backfilled with silic sand
5.5		- grey		7		DP	50%		<pre></pre>		—50 mm ID slotted pipe
6.0		No sample recovered	90.4		9	DP	0%		<0.02		─ Slough
7.0		End of Borehole	89.2 7.3							601	
8.5											
9.5											
Screen II Sand Pa Well Sea	ck Interval	3.05 - 6.10 m BGS al: 2.74 - 6.40 m BGS 0.23 - 2.74 m BGS	Notes: m BGS - metres below g DP - direct push sample ppm - parts per million by n/a - not available		ace			PHC F1-F4 - pe	c aromatic hydroca troleum hydrocarbo organic compounds tible soil vapour	n fractions	1 to 4
		-311100	Drawn By/Checked By:	T. Pawlick /	J. Yarask	kavitch					Sheet 1 of 1

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Environmental Investigation of Existing Fault Line Proposed New Hospital Campus - Carling Avenue Ottawa, Ontario

FILE NO. DATUM **PE4096 REMARKS** HOLE NO. **BH 1 DATE** July 27, 2017 **BORINGS BY** Geoprobe **SAMPLE Photo Ionization Detector** Monitoring Well Construction PLOT **DEPTH** ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) RECOVERY VALUE r RQD STRATA NUMBER TYPE **Lower Explosive Limit %** N O **GROUND SURFACE** 80 0 TOPSOIL <u>0</u>.15 ΑU 1 2 FILL: Loose, brown silty clay, 0.61 SS 100 4 trace sand, gravel and organics SS 3 54 13 GLACIAL TILL: Compact, brown 1.22 1 silty sand, some gravel, trace clay, cobbles and boulders SS 4 38 10 2 SS 5 100 10 SS 6 100 8 3 GLACIAL TILL: Stiff to very soft, brown to grey silty clay, some sand and gravel, trace cobbles and SS 7 83 5 4 boulders 5 SS 8 2 96 6.10 6 SS 9 46 8 **GLACIAL TILL:** Loose, grey silty sand, trace gravel, cobbles, boulders and clay 7 7.34 End of Borehole Practical refusal to augering at 7.34m depth (GWL @ 2.74m - August 8, 2017) 200 300 400 500 RKI Eagle Rdg. (ppm) ▲ Full Gas Resp. △ Methane Elim.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Environmental Investigation of Existing Fault Line Proposed New Hospital Campus - Carling Avenue Ottawa, Ontario

FILE NO. DATUM **PE4096 REMARKS** HOLE NO. **BH 2 BORINGS BY** Geoprobe **DATE** July 27, 2017 **SAMPLE Photo Ionization Detector** Monitoring Well Construction PLOT **DEPTH** ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) RECOVERY VALUE r RQD STRATA NUMBER TYPE**Lower Explosive Limit %** N O **GROUND SURFACE** 80 0 **TOPSOIL** ΑU 1 0.15 FILL: Grey silty clay, trace sand SS 2 0.30 67 13 and gravel SS 3 62 6 1 FILL: Compact to loose, brown silty sand, some gravel and cobbles, trace clay and asphalt SS 4 83 1 2 SS 5 75 8 SS 6 83 1 3 **GLACIAL TILL:** Very soft to very stiff, brown silty clay, some sand, trace gravel, cobbles and boulders SS 7 42 17 4 - grey by 3.4m depth 5 SS 8 8 42 6 9 SS 83 6 7 SS 10 100 14 8 8.18 End of Borehole Practical refusal to augering at 8.18m depth (GWL @ 1.85m - August 9, 2017) 200 300 500 RKI Eagle Rdg. (ppm) ▲ Full Gas Resp. △ Methane Elim.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Environmental Investigation of Existing Fault Line Proposed New Hospital Campus - Carling Avenue Ottawa, Ontario

FILE NO. DATUM **PE4096 REMARKS** HOLE NO. **BH 3 BORINGS BY** Geoprobe **DATE** July 28, 2017 **SAMPLE Photo Ionization Detector** PLOT DEPTH ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) RECOVERY VALUE r RQD STRATA NUMBER TYPE**Lower Explosive Limit %** N O **GROUND SURFACE** 0 TOPSOIL ΑU 1 0.18 2 SS 83 6 SS 3 33 10 1 FILL: Loose to compact, brown silty clay, trace sand, gravel, SS 4 58 3 cobbles and boulders 2 SS 5 3 92 2.69 SS 6 11 3 ¥ SS 7 50 20 4 5 GLACIAL TILL: Very stiff to firm, SS 8 13 54 brown silty clay, trace sand, gravel, cobbles and boulders 6 9 - grey by 5.5m depth SS 25 7 7 SS 10 46 11 8 SS 11 100 10 9 SS 12 100 9 9.75 Dynamic Cone Penetration Test 10 commenced at 9.75m depth Inferred GLACIAL TILL 11 11.20 End of Borehole Practical DCPT refusal at 11.20m depth (GWL @ 3.98m - August 9, 2017) 200 300 500 RKI Eagle Rdg. (ppm) ▲ Full Gas Resp. △ Methane Elim.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Environmental Investigation of Existing Fault Line Proposed New Hospital Campus - Carling Avenue Ottawa, Ontario

DATUM FILE NO. **PE4096 REMARKS** HOLE NO. **BH 4** BORINGS BY CME 55 Power Auger **DATE** July 24, 2017 **SAMPLE Photo Ionization Detector** STRATA PLOT **DEPTH** ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) N VALUE or RQD RECOVERY NUMBER **Lower Explosive Limit % GROUND SURFACE** 80 0 Asphaltic concrete 1 FILL: Crushed stone with silt and 0.69 1 SS 2 25 14 GLACIAL TILL: Stiff, brown silty clay, some sand, gravel, cobbles and boulders SS 3 100 9 2.03 2 End of Borehole Practical refusal to augering at 2.03m depth (BH dry upon completion) 200 300 500 RKI Eagle Rdg. (ppm) ▲ Full Gas Resp. △ Methane Elim.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM

SOIL PROFILE AND TEST DATA

FILE NO.

Environmental Investigation of Existing Fault Line Proposed New Hospital Campus - Carling Avenue Ottawa, Ontario

PE4096 REMARKS HOLE NO. **BH 4A** BORINGS BY CME 55 Power Auger **DATE** July 24, 2017 **SAMPLE Photo Ionization Detector** Monitoring Well Construction STRATA PLOT DEPTH ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) RECOVERY N VALUE or RQD NUMBER TYPE **Lower Explosive Limit % GROUND SURFACE** 80 0 Asphaltic concrete FILL: Crushed stone with silt and 0.69 1 67 SS 1 22 2 SS 2 83 12 3 SS 3 4 11 GLACIAL TILL: Very stiff to firm, brown silty clay, some sand, gravel, 4 cobbles and boulders SS 4 19 67 5 - grey by 4.6m depth 6 SS 5 58 16 7 SS 6 50 5 8 9 SS 7 100 6 9.75 Dynamic Cone Penetration Test 10 commenced at 9.75m depth Inferred GLACIAL TILL 11 11.15 End of Borehole Practical DCPT refusal at 11.15m depth (GWL @ 2.12m - August 8, 2017) 200 300 500 RKI Eagle Rdg. (ppm) ▲ Full Gas Resp. △ Methane Elim.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM

SOIL PROFILE AND TEST DATA

FILE NO.

Environmental Investigation of Existing Fault Line Proposed New Hospital Campus - Carling Avenue Ottawa, Ontario

PE4096 REMARKS HOLE NO. **BH 5** BORINGS BY CME 55 Power Auger **DATE** July 24, 2017 **SAMPLE Photo Ionization Detector** Monitoring Well Construction PLOT **DEPTH** ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) RECOVERY VALUE STRATA NUMBER Lower Explosive Limit % N o H **GROUND SURFACE** 80 0 Asphaltic concrete 1 FILL: Crushed stone with silt and 1 FILL: Brown silty clay, some sand, SS 2 33 6 gravel and cobbles SS 3 50 4 Loose, brown SILTY SAND, trace 1.96 2 \gravel SS 4 100 Р Hard, brown SILTY CLAY 3 5 100 Ρ 4 **Y** SS 4 4 100 5 GLACIAL TILL: Soft to very stiff, brown silty clay, some sand, gravel, cobbles and boulders 6 5 SS 33 19 - grey by 4.6m depth 7 SS 6 88 11 8 9 SS 7 62 14 Dynamic Cone Penetration Test 10 commenced at 9.75m depth 10.26 Inferred GLACIAL TILL End of Borehole Practical DCPT refusal at 10.26m depth (GWL @ 4.40m - August 8, 2017) 200 300 500 RKI Eagle Rdg. (ppm) ▲ Full Gas Resp. △ Methane Elim.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Environmental Investigation of Existing Fault Line Proposed New Hospital Campus - Carling Avenue Ottawa, Ontario

FILE NO. DATUM **PE4096 REMARKS** HOLE NO. **BH 6 DATE** July 26, 2017 **BORINGS BY** Geoprobe **SAMPLE Photo Ionization Detector** Monitoring Well Construction PLOT **DEPTH** ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) RECOVERY VALUE r RQD STRATA NUMBER TYPELower Explosive Limit % N O **GROUND SURFACE** 0 TOPSOIL ΑU 1 0.15 2 FILL: Very loose, brown silty sand0.61 SS 50 3 some clay, trace gravel SS 3 100 11 1 Stiff to very stiff, brown SILTY SS 4 100 14 CLAY, trace sand 2 SS 5 22 100 SS 6 100 23 3 Ţ SS 7 100 11 4 5 GLACIAL TILL: Firm to hard, SS 8 39 75 brown silty clay, some sand, trace gravel, cobbles and boulders 6 9 - grey by 3.0m depth SS 33 16 7 SS 10 50 5 8 SS 11 100 26 9 SS 12 100 57 9.75 Dynamic Cone Penetration Test 10commenced at 9.75m depth. 10.31 Inferred GLACIAL TILL End of Borehole Practical DCPT refusal at 10.31m depth (GWL @ 3.45m - August 8, 2017) 200 300 500 RKI Eagle Rdg. (ppm) ▲ Full Gas Resp. △ Methane Elim.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM

SOIL PROFILE AND TEST DATA

FILE NO.

DEMARKO										PE409	96
REMARKS									HOLE N	o. BH 8	
BORINGS BY Geoprobe				D	ATE .	July 26, 2	017	1		БПО	
	PLOT		SAN	IPLE		DEPTH	ELEV.	1		n Detector	Vell
SOIL DESCRIPTION	1			×	M	(m)	(m)	● Vola	tile Organi	c Rdg. (ppm)	ng List
	STRATA	TYPE	NUMBER	% RECOVERY	VALUE r RQD			O Lowe	r Evnlos	ive Limit %	Monitoring Well Construction
ODOUND CUREACE	STI	F	Į,	ECC	N O P				-		ခြင်
GROUND SURFACE		×	4	- 14		0	_	20	40	60 80	
TOPSOIL 0.23			1 2	50	4						
Soft to stiff, brown SILTY CLAY,		ss	3	100	12						
trace sand1.35		<u>{</u> }				1-					
	\^^^^	ss	4	62	15						
		ss	5	100	20	2-	_				
		ss	6	100	8						
	^^^^	<u> </u>				3-	_				
	^^^^	\ \.7									
GLACIAL TILL: Very soft to very	^^^^	∦ ss	7	42	21	4-	_				
GLACIAL TILL: Very soft to very stiff, brown silty clay, some sand, trace gravel, cobbles and boulders	\^^^^										
trace graver, cobbies and bodiders	^^^^	ss		40		5-	_				48
- grey by 4.9m depth		\\\\\ >>	8	42	2						
						6-	_				
	\^^^^	ss	9	100	5						
	\^^^^	<u>Μ</u>				_					
	\^^^^					7-	_				
	\^^^^	∬ ss	10	100	3						
	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					8-	_				
9.00		∑ ss	11	100	50+						
End of Borehole	\ \[\frac{1}{\lambda \lambda \text{\lambda \ta \text{\lambda \tand \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\lambda \text{\text{\lambda \text{\lambda \tamba \tamba \text{\lambda \tamba									<u> </u>	
Practical refusal to augering at 8.86m depth											
(GWL @ 4.52m - August 8, 2017)											
								100 RKI E		900 400 g. (ppm)	500
										Methane Elin	n.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM									FILE NO.	PE4096)
REMARKS				_		luly oc. o	047		HOLE NO.	BH 9	
BORINGS BY Geoprobe			CAR		JAIE .	July 26, 2	.017	Dhote I	onization Det		=
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH (m)	ELEV. (m)		ile Organic Rdg.		Monitoring Well Construction
	STRATA	紐	BER	**************************************	VALUE r RQD	(111)	(111)	_			torin
ODOLIND OLIDEA OF	STR	TYPE	NUMBER	» ECO	N VA				r Explosive L		Moni
GROUND SURFACE TOPSOIL 0.23		Ş AU	1	Щ	-	0-	_	20	40 60	80	
FILL: Brown silty clay, some sand 0.30		SS	2	83	1						
gravel and topsoil0.61		ss	3	42	0	1-					
FILL: Brown silty sand, trace 1.22		()									
FILL: Brown silty clay, some sand, trace gravel and cobbles	[^^^^ ^^^	SS	4	50	21						
	<u> </u>	ss	5	100	24	2-					
GLACIAL TILL: Compact to dense,		₩ ~ ~		00	04						
brown silty sand, trace clay, gravel, cobbles and boulders		ss	6	83	31	3-	_				
3.43	^^^^	_						1 1 1 1 1 1		1 1 1 1 1 1 1 1 1	
End of Borehole											
Practical refusal to augering at 3.43m depth											
(BH dry upon completion)											
								100	200 300	400 50	00
								RKIE	agle Rdg. (p	pm)	
								▲ Full Ga	is Resp. \triangle Meth	nane Elim.	

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM										FILE NO.	PE409	6
REMARKS										HOLE NO	<u> </u>	
BORINGS BY Geoprobe					D	ATE .	July 26, 2	017	1		BH 9 <i>A</i>	1
	FO.10	5		SAN	/IPLE		DEPTH	ELEV.			Detector	Vell
SOIL DESCRIPTION		1		~	Ӽ	μо	(m)	(m)	• Vola	tile Organio	Rdg. (ppm)	Monitoring Well Construction
	4 E		34 X I	NUMBER	% RECOVERY	N VALUE or RQD			O Lowe	r Explos	ive Limit %	nitor
GROUND SURFACE	ŭ	E	+	N	REC	NO			20		60 80	§Ö
							0-	_				
												.
							1-	_				-
OVERBURDEN												.]
							2-	_				
	3.25						3-					
End of Borehole												
Practical refusal to augering at 3.25m depth												
(BH dry upon completion)												
									100	200 3	00 400 5	500
									RKIE	agle Rd	g. (ppm) . Methane Elim.	
	1	- 1					[.o 1.00p. A	. Wouldn't Lilli	•

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM									FILE NO.	PE4096	6
REMARKS									HOLE NO	<u> </u>	
BORINGS BY Geoprobe				D	ATE .	July 26, 20	017			BH10	
SOIL DESCRIPTION	PLOT		SAN	IPLE	ı	DEPTH	ELEV.			Detector Rdg. (ppm)	Well
	STRATA E	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)			ve Limit %	Monitoring Well Construction
GROUND SURFACE	Ø		Z	RE	z ö	0+		20	40 6	0 80	ž
TOPSOIL 0.56			1 2	50	1						
		ss	3	92	5						
		\mapsto				1+					
		ss	4	75	3						
GLACIAL TILL: Very soft to stiff, brown silty clay, trace sand, gravel		ss	5	100	4	2+					
and cobbles		ss	6	100	2						
ailtu alay layar from 2.42 to 2.44m		Δ				3+]
- silty clay layer from 2.13 to 2.44m and 2.64 to 3.02m depths		∇	_								
		ss	7	83	6	4+					
- grey by 4.6m depth											
		ss	8	50	7	5+					
		Δ									
	\^^^^/ \^^^^/	V	_			6+					
	\^^^^ \^^^^	ss	9	75	10						
7.29						7+					
End of Borehole											
Practical refusal to augering at 7.29m depth											
(GWL @ 3.89m - August 8, 2017)											
								100	200 30	00 400 5	00
								RKIE	agle Rdg		-•

September 6, 2022 21451149-2000-01Rev2

APPENDIX D

Basic Chemical Results, AGAT Laboratories Report No. 21Z766508





5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD 1931 ROBERTSON ROAD OTTAWA, ON K2H5B7

(613) 592-9600

ATTENTION TO: Kim MacDonald

PROJECT: 21451149 AGAT WORK ORDER: 21Z766508

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Lab Manager

DATE REPORTED: Jun 30, 2021

PAGES (INCLUDING COVER): 5 VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes	

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may
 incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may
 be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other
 third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the
 services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of
 merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines
 contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories (V1)

Page 1 of 5

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Western Enviro-Agricultural Laboratory Association (WEALA) Environmental Services Association of Alberta (ESAA) AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.



Certificate of Analysis

AGAT WORK ORDER: 21Z766508

PROJECT: 21451149

5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Kim MacDonald SAMPLED BY:James Sullivan

				(Wate	er) Inorgan	ic Chemistry					
DATE RECEIVED: 2021-06-25								ļ	DATE REPORTE	D: 2021-06-3	30
	S	AMPLE DES	CRIPTION:	BH21-10-GW		BH21-215-GW		BH21-213-GW	BH21-201-GW		BH21-2215-GW
		SAMI	PLE TYPE:	Water		Water		Water	Water		Water
		DATE S	SAMPLED:			2021-06-25		2021-06-25	2021-06-25		2021-06-25
				09:00		09:20		09:35	10:05		09:45
Parameter	Unit	G/S	RDL	2662463	RDL	2662465	RDL	2662466	2662467	RDL	2662468
рН	pH Units		NA	7,63	NA	7.66	NA	7.87	7.79	NA	7.70
Electrical Conductivity	μS/cm		2	1460	2	1980	2	1310	1500	2	2420
Chloride	mg/L		0.12	4.73	0.24	267	0.12	225	216	0.49	497
Sulphate	mg/L		0.10	458	0.19	305	0.10	74.3	130	0.38	169

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2662463 Dilution required, RDL has been increased accordingly.

Analysis perfored at AGAT Toronto (unless marked by *)

mayot Bhells AMMIST BHELD STANDARD CHEMIST



5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

AGAT WORK ORDER: 21Z766508

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 21451149 ATTENTION TO: Kim MacDonald SAMPLING SITE: SAMPLED BY:James Sullivan

RPT Date: Jun 30, 2021	Wate DUPLICAT	er An	alysis	REFEREN	NCE MA	TERIAL	METHOD	BI ANK	CDIVE			
RPT Date: Jun 30, 2021	DUPLICAT	E		REFEREN	NCE MA	TERIAL	METHOD	BI VVIK	CDIVE			
								DLAINI	SPINE	MAI	RIX SPI	KE
PARAMETER Batch Sample Dup #1	Dup #2	RPD	Method Blank	Measured		otable nits	Recovery		ptable nits	Recovery		ptable nits
ld Bup#1	<u> </u>			Value	Lower	Upper		Lower	Upper		Lower	Upper
(Water) Inorganic Chemistry												
pH 2661074 7.78	7.79	0.1%	NA	101%	98%	103%	NA			NA		
Electrical Conductivity 2661074 1130	1130	0.0%	< 2	108%	90%	110%	NA			NA		
Chloride 2662465 2662465 267	258	3.4%	< 0.10	97%	70%	130%	103%	80%	120%	NA	70%	130%
Sulphate 2662465 2662465 305	295	3.3%	< 0.10	96%	70%	130%	99%	80%	120%	NA	70%	130%

Comments: NA Signifies Not Applicable

Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Amanyot Bhelle AMANDOT EMELA 2 CHEMIET 2

Certified By:



5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 21451149 SAMPLING SITE: AGAT WORK ORDER: 21Z766508
ATTENTION TO: Kim MacDonald
SAMPLED BY:James Sullivan

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH



5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905 712.5122
webearth.agatlabs.com

Laboratory Use Only

Work Order #: 2127668

Chain	of	Custody	Record
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Chair of Custody Rose									ebear (n.a					antity:		no	01	11.1	110	8
Chain of Custody Reco Report Information: Company: Contact: Address: KIM MAC 1931 Role			sample, plea	Reg	gulatory Requestions of the check all applicable boxes			☐ Sew	er Use			Cus No	stody Se tes:	eal Intac	ct:	_6_ □Yes T_C	5	7. I	17.	1]N/A
Address: 1931 Pol	BEILTSON R	20.		— Та	able — Indicate One Ind/Com Res/Park Agriculture	Table Indicate O	ne	_	Region r. Water (-	1	Reg	gular 1	UND T FAT (Mo (Rush Sur	et Analy	ysls)	_	uired: to 7 Busi	iness Days	
Reports to be sent to: 1. Email: Kim-maco 2. Email:	lonaldeg	older.c	מים	Soil T	Texture (Check One) Coarse Fine	ССМЕ	[Obje	ectives (P er Indicate On			. [ل Day			⊔ _{Da}	•	L	Next Bus Day ay Apply):	siness
Project Information: Project: 2145114				Re	this submissi cord of Site Co		Cer	-	Guidel te of A		ls		*TA	r is excl	usive (of week	ends ar		ory holiday	
Sampled By: AGAT ID #: Please note: If quotation number	PO:		analysis	San	nple Matrix Le	gend	CrVI, DOC	0.	Reg 153	ON .		0. Reg 558	0. Re	eg 406	analy		ase cor	tact you	IF AGAT CP	ation (Y/N)
Invoice Information: Company: Contact: Address: Email:	Ві	ill To Same: Ye	No E	GW O P S SD SW	Ground Water Oil Paint Soil Sediment Surface Water		Field Filtered - Metals, Hg, C	& Inorganics	□ CrVI, □ Hg, □ HWSB F4 PHCs	Analyze F4G if required □ Yes □ PAHs	CBs 🗆 Aroclor	Landfill Disposal Characterization TCLP: TCLP: DM&I DVOS DABNS DB(e)PDPCB	Soils SPLP	Excess Soils Characterization Package ph, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	3	theriots	phutes		ally Hazardous or High Concentra
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix		nments/ Instructions	Y/N	Metals	Metals - BTEX, F1	Analyz	Total PCBs	Landfill	Excess :	Excess pH, ICF	Salt - E	Ha	3	Sul		Potentle
BH 21-10-GW	21-06-25			CW												VI	V	V		
BH 21-215-6W	11	970 PR		CW	+				-						\vdash	/	V	V		
BH 21-213- GW BH 21-201- GW	11	10:05		GW												VV	1			
BH 21- 7215- CW	11	9:45		GW												VV	11			
		AN PN																		
		AN PN				2 = -						M								
		AN PN										7	1							
		AN PN																		
		AN PN												land.						
Samples Relinquished By (Print Name and Sign): Samples Relinquished By (Print Name and Sign):	Sulci	21-06 -	Times	:35	Samples Record By (Print Name and Sign): Print Name and Sign):	M	has	-	211	Date Pate	25	Time	hot) C)	201	Page	(of	
Samples Relinquished By Point Name and Sign):	21/1	2012 to	J Time	16h	Bamples Received By (Print Name and Sign):	9/1/1	MUI!	7		Date Date	2 26	Time	10	-)()am Nº: T	11	481	36	

September 6, 2022 21451149-2000-01Rev2

APPENDIX E

Special Provision - Well Abandonment



WELL ABANDONMENT - Item No.

Special Provision

General Requirements

Monitoring wells are located in the work area and shall be properly decommissioned prior to any construction activities being undertaken. The wells are located at boreholes 21-201, 21-202, 21-204, 21-213, 21-215, 21-218, 21-219, 21-221, 21-222, 21-224, 21-225, and 21-226. The construction details of those wells are provided on the Record of Borehole Sheets in the geotechnical investigation report (no. 21451149-2000-01).

The well abandonment method must satisfy the minimum requirements of Ontario Regulation 903. Approval of the proposed abandonment methodology, including plugging material used, depth of plugging material and limit of the casing removal, must be obtained from the Contract Administrator before proceeding. In addition, the Contractor shall provide a copy of the well record (for the abandonment) to the Contract Administrator.

Without superseding the full scope of Ontario Regulation 903, the abandonment of the wells should at least include plugging the wells using an abandonment barrier, starting from the bottom, up to approximately two metres from the ground surface.

Basis of Payment

Payment at the Contract price for the tender item "Well Abandonment" shall be on a per well basis, the price of which shall include full compensation for all labour, equipment and materials required to properly abandon each monitoring well including reporting and documentation.

END OF SECTION

September 6, 2022 21451149-2000-01Rev2

APPENDIX F

GPR and MASW Technical Memorandums





TECHNICAL NOTE

TO: Bridgit Bocage

FROM: Mr. Erwan Pau-Corfa, WSP Canada Inc

Mr. Didier Leynaud, PhD, WSP Canada Inc.

SUBJECT: BH 21-207 DOWNHOLE SEISMIC SHEAR WAVE SURVEY

OTTAWA HOSPITAL, ON

PROJECT No.: 221-03780-0 **DATE:** May 3, 2022

1 CONTEXT

The Ottawa new Civic Hospital and its parking facilities require a geotechnical study in and around Queen Juliana Park. WSP was mandated to carry a downhole shear wave survey (VSP) in borehole 21-207 located south of 930 Carling Avenue.

1.1 SITE LOCATION

The selected borehole for downhole *in situ* testing is the BH-21-207 (Figure 1) which has a 21.21 m depth. Glacial till was encountered at 2.74 m depth and bedrock surface is at 12.17 m.



Figure 1: Ottawa Hospital VSP site location



2 METHODOLOGY

2.1 EQUIPMENT AND DATA ACQUISITION METHOD

The objective of downhole surveys is to get in situ seismic wave velocities for site-specific investigations and material characterization.

The downhole seismic technic determines the compressional (P) and shear (S) wave velocity of sub-surface geological layers (materials) for different depths. The results can be used for soil and rock mechanics, foundation studies and earthquake engineering. Downhole seismic testing is conducted in the near surface for site-specific engineering applications. The *in situ* densities and the P and S wave velocities allow to determine the dynamic elastic moduli of a material.

It shall be mentioned that boreholes shall be completed with casing and grout that closely match the formation density according to the ASTM procedures. Borehole preparation is one of the main parameter controlling the success of downhole seismic testing. If the coupling between casing and geological formation is not good enough, then seismic waves will be attenuated, and arrival times delayed.

DATA ACQUISITION

Borehole verticality was assumed, and no measurements were operated to confirm this parameter.

A geometrics Geode Seismograph was used to record the synchronized seismic data for different depths related to the triggering mechanism. The equipment is composed of a wall-lock 3C borehole geophone allowing shear waves measurements in 3 directions (X-Y-Z orientations) and a BHGC-4 controller (Annex). The geophone diameter is 1.9 inches (48 mm). The clamping mechanism is a steel spring controlled by a DC electric motor.

The S-wave source for side records is an 8-ft weighted beam struck using a sledgehammer on both ends. The P-wave source for the centre record is a polypropylene plate struck with a sledgehammer (Figure 2)

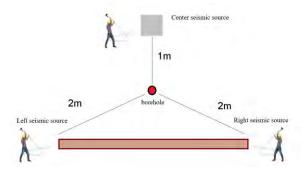


Figure 2: Seismic Source Diagram

A downhole seismic survey consists of measuring the time for seismic wave to propagate between an impulsive source (plate for P-wave, beam for S-wave) and a censor (geophone) moved at different depths in the borehole. The horizontal geophones are used to detect the first arrival for the S-wave while the vertical geophone is used for detecting the compressional P-wave arrival. At each depth, the sensor needs to be locked to the borehole wall using the clamping mechanism for coupling as well as possible the seismic signal propagating in the ground.

The P-wave propagating in the ground faster than the S-wave, its energy appears first on the seismic record. So, the S-wave needs to be amplified to be correctly visualized within the seismic



wave train. To do that we are using a reverse polarity generated by the seismic source (beam struck by a sledgehammer on its right and left side). The S-wave phase reversal allows a clear identification of the first S-wave arrival on the seismic record.

The main parameters controlling data quality for downhole seismic measurements are:

- Correct preparation of the borehole for a good coupling between the geophone and ground (borehole in the ground).
- Amplification of the shear wave using the reverse component for the horizontal censors (H1 and H2 components).
- Polarization of the signal to better visualize the maximum amplitude (in the 2D plane propagation, considering H1 + H2 components).

3 DATA PROCESSING

The data were recorded down to 20 metre depth by 1 metre increments.

The seismic data presents an acceptable signal to noise ratio allowing the picking of first P and S-wave arrivals for all the depths and all the components (Figure 3 & 4).

The processing can be summarized as follows:

- Components H1 and H2 stacked for both sources (right and left side of the beam).
- Picking of the first arrivals time for the P & S waves for each depth.
- Definition of the different layers for the calculation of the average seismic velocity.

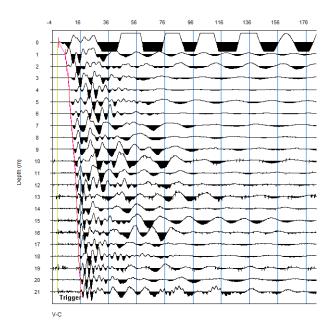


Figure 3: P-wave picking borehole 21-207



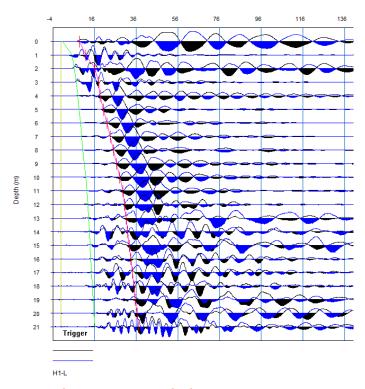


Figure 4: S-wave picking borehole 21-207



4 RESULTS AND DISCUSSION

The P and Shear waves velocity model for the borehole 21-207:

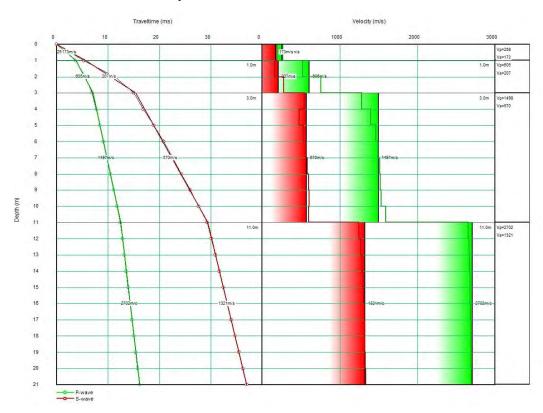


Figure 5: Seismic downhole velocity model, BH 21-207

V_S30 based on the first 20 m is 709.9 m/sec which corresponds to a C class (Figure 6).

		Aver	age properties in top 3	30 m
ass	Type of Soil profile	Soil shear wave average velocity \overline{V}_s (m/s)	Standard penetration resistance \overline{N}_{60}	Soil undrained shear strength s _u (kPa)
A	Hard rock	$\overline{V}_s > 1500$	-	-
В	Rock	$760 < \overline{V}_s \le 1500$	-	-
С	Very dense soil and soft rock	$360 < \overline{V}_{\scriptscriptstyle s} < 760$	$\overline{N}_{60} > 50$	s _u > 100
D	Stiff soil	$180 < \overline{V}_s < 360$	$15 \le \overline{N}_{60} \le 50$	$50 < s_u \le 100$
Е	(1)Soft soil	$\overline{V}_s < 180$	$\overline{N}_{60} < 15$	s _u < 50
F	(2)Others	Site s	pecific evaluation req	uired

Figure 6: Table 4.1.8.1A from the NBCC 2015 showing ranges of Vs30 values and their corresponding seismic site classification.

Downhole result is provided in Annex A and B with the corresponding borehole log. The seismic data is consistent with the geological information in the borehole log within a ± 1 m precision.



Prepared by:

Reviewed by:

Erwan Pau-Corfa, B. Sc Geophysicist Didier Leynaud, PhD
Team Leader – Geophysical and
Ecomorphological Studies
Solange Momy
Administrative Assistant

EPC/DL/sm

Encl. Appendix 1 – BH 21-207 Seismic model

Appendix 2 – Borehole 21-207 log



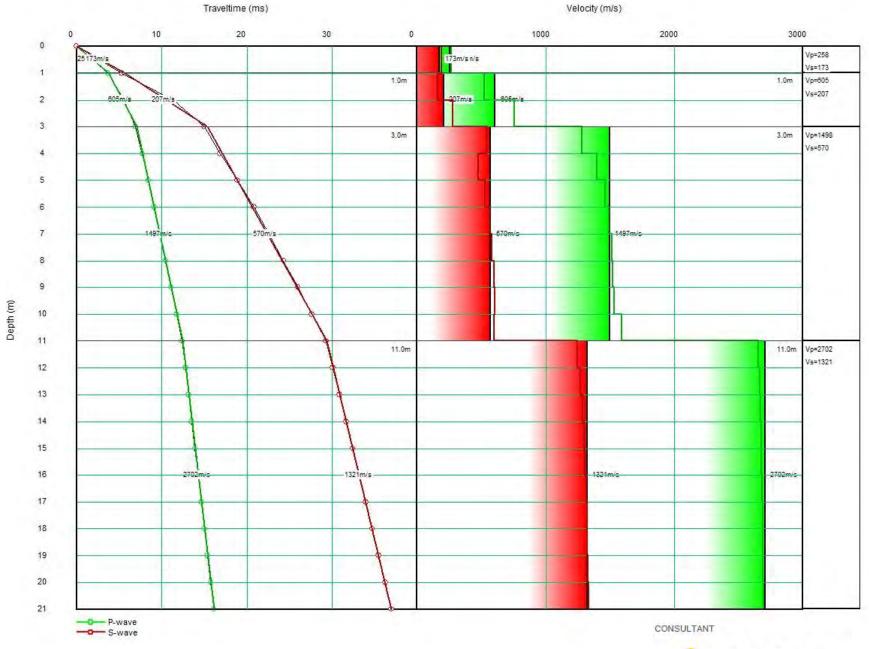
APPENDIX 1BH 21-207 SEISMIC MODEL



APPENDIX 2

BOREHOLE 21-207 LOG

DOWNHOLE SEISMIC SURVEY MODEL, BH 21-207, Ottawa civic hospital





PROJECT: 21451149

RECORD OF BOREHOLE: 21-207

SHEET 1 OF 3

LOCATION: N 5028410.7 ;E 366583.4 BORING DATE: June 4, 2021 DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

ا مارا	된	SOIL PROFILE	1.		S	AMPI	_	F	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	₽g₽	PIEZOMETER
METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - ○ 20 40 60 80	20 40 60 80 WATER CONTENT PERCENT Wp \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	ADDITIONAL LAB. TESTING	OR STANDPIPE INSTALLATION
0		GROUND SURFACE		80.26				20 40 00 00	20 40 00 00		
0		TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose lose filt - (SM) gravelly SILTY SAND, langular; grey; non-cohesive, moist,		0.00 80.03 0.23 0.38 79.50	1	ss	1				Bentonite Seal
1		compact FILL -(SP) SAND, fine to medium, trace silt; brown; non-cohesive, moist, compact		0.76	2	ss	5				
2		(CI/CH) SILTY CLAY to CLAY, trace siltl; grey brown, highly fissured (WEATHERED CRUST); cohesive, w~PL to w>PL, very stiff			3	ss	7				
		(SM) gravelly SILTY SAND; brown to		77.5 <u>2</u> 2.74	4	ss	6				
3		grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose			5	ss	9				
4		(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose		76.4 <u>5</u> 3.81		ss	5				
5	Rotary Drill/ Wash Boring NW Casing				7	ss	5				
	Rotary [(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact		74.9 <u>2</u> 5.34	8	ss	_o				64 mm Diam. VSP Pipe
6					9	SS	7				
7					10	\ \ \$5	11				
8					11	ss	10				
					12	ss	13				
9					13	ss	15				
10	_L	CONTINUED NEXT PAGE		1	-	_	L —				
DEI	отн с	SCALE	1		I	<u> </u>	,	GOLDER			DGGED: RI

PROJECT: 21451149

RECORD OF BOREHOLE: 21-207

SHEET 2 OF 3

DATUM: NAD 1983

LOCATION: N 5028410.7 ;E 366583.4

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: June 4, 2021

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

ш	HOD	SOIL PROFILE	1.		SA	AMPL	ES				DYNAMIC PENE RESISTANCE, B	BLOWS/0.3m	\	PIEZOMETER
DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	I nat V. + rem V. ⊕	U - O		NTENT PERCENT	IZW	OR STANDPIPE INSTALLATION
10		CONTINUED FROM PREVIOUS PAGE						20 40	8		20 40	, 30 80		
	oring	(SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact (SW) gravelly SAND, trace to some silt;		69.59 10.67										
11	Rotary Drill/ Wash Boring NW Casing	(SW) gravelly SAND, trace to some silt; grey, contains cobbles and boulders; non-cohesive, wet, loose to very dense				SS	4							64 mm Diam. VSP Pipe
12				68.09		RC SS	>50							
		Borehole continued on RECORD OF DRILLHOLE 21-207		12.17										
13														
										\ \				
14										\supset				
15									7					
16														
)						
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20										_				
DEI	PTH S	SCALE				1		GOL	DE	D			L	OGGED: RI

RECORD OF DRILLHOLE: 21-207 PROJECT: 21451149 SHEET 3 OF 3 LOCATION: N 5028410.7 ;E 366583.4 DRILLING DATE: June 4, 2021 DATUM: NAD 1983 DRILL RIG: CME 75 INCLINATION: -90° AZIMUTH: ---DRILLING CONTRACTOR: Downing Drilling PO- Polished BR K - Slickensided SM- Smooth abbrev of abb MB- Mechanical Break symbol JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular BR - Broken Rock DRILLING RECORD DEPTH SCALE METRES NOTE: For additional abbreviations refer to lis of abbreviations & SYMBOLIC LOG ELEV. DESCRIPTION RUN FRACT. INDEX PER 0.25 m ROCK STRENGTH INDEX DEPTH RECOVERY DISCONTINUITY DATA WEATH-ERING INDEX R.Q.D. (m) TOTAL CORE % SOLID CORE % TYPE AND SURFACE DESCRIPTION BEDROCK SURFACE 68.09 Fresh, thinly to medium bedded, medium 12.17 bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong to weak SHALEY NODULAR LIMESTONE 64 mm Diam. VSP - Broken/lost core from 12.17 m to 13 100 14 15 16 Rotary Drill HQ Core - Mud seam from 16.66 m to 16.69 m 17 64 mm Diam. VSP Pipe - Heavy fossilferous/bioturbated from 17.60 m to 21.61 m 18 - Heavy calcite veining from 18.40 m to 21.61 m 19 100 20 - Broken core from 20.54 m to 20.59 m 100 21 End of Drillhole 21.61 Note(s):

1. Water level in screen measured at 3.32 m (Elev. 76.94 m) on June 9, 2021 22

GAL-MISS.GDT 9/16/21

21451149.GPJ

DEPTH SCALE

1:50

S GOLDER

LOGGED: RI

CHECKED:



golder.com