

DATE November 4, 2016

PROJECT No. 1523044/7000

- TO Mr. Jim Burghout Claridge Homes (South Nepean) LP
- **FROM** Brian Henderson Brian Byerley

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DESKTOP HYDROGEOLOGICAL ASSESSMENT PROPOSED RESIDENTIAL DEVELOPMENT, BURNETT LANDS GREENBANK ROAD AT THE JOCK RIVER, OTTAWA, ONTARIO

This report presents the results of a desktop hydrogeological assessment carried out for the proposed residential development site to be located west of Greenbank Road, adjacent to the Jock River, in Ottawa, Ontario. The hydrogeological assessment is required by the City of Ottawa (City) prior to draft plan approval. Prior to development of the scope for the hydrogeological assessment, we reviewed correspondence regarding the request from the Planner at the City and had a telephone conversation with Michel Kearney from the City.

The purpose of this hydrogeological assessment was to determine the general soil and groundwater conditions across this site, by means of existing on-site borehole information and data from nearby sites, and to address possible construction-related impacts to private water supply wells. The on-site information was enhanced with published mapping and publicly available information. The water well records in the Ministry of the Environment and Climate Change (MOECC) Water Well Information System (WWIS) for nearby water wells were used to provide further information regarding hydrogeological conditions in the area and identify where nearby water well users are taking their water.

1.0 DESCRIPTION OF PROJECT AND SITE

A residential subdivision is planned to be developed on a site located west of Greenbank Road, adjacent to the Jock River, in Ottawa, Ontario. The approximate location of the site is shown on the Key Map insert provided on the Site Plan, Figure 1.

The following is known about the site and project (Figure 1):

- The site is located immediately west of Greenbank Road, approximately 400 metres south of the intersection with Jockvale Road. The southwest boundary of the site is adjacent to the Jock River and consists of a low-lying flood plain.
- The site is trapezoid-shaped and measures approximately 500 metres by up to 400 metres long.
- The site topography is relatively flat with a gentle downward slope from east to west. A shallow ditch (Burnett Municipal Drain) running north-south crosses the middle of the site.
- The majority of the site is currently undeveloped and predominately consists of agricultural land with localized vegetation and trees.



- It is understood that the proposed development will include conventional residential dwellings (semi-detached and townhouse) as well as access roads and services within the subdivision.
- Greenbank Road will be shifted to the west and will cross the eastern portion of the site.

2.0 GEOLOGY AND HYDROGEOLOGY

The following sections describe the published local geology and hydrogeology in the vicinity of the site.

2.1 Surficial Geology

Based on published mapping (Figure 2), topography and the ground conditions encountered during previous investigations in the area, the study area can be roughly divided into two sections, as follows:

- Western and northern portions of the site: A thick deposit of silty clay which extends to depths of up to more than 8.2 metres below the existing ground surface.
- Central and eastern portions of the site: Very stiff to stiff layer of silty clay overlying glacial till, or glacial till near the ground surface.

Published mapping indicates the bedrock surface to be at depths in the range of 5 to 15 metres below the ground surface in the vicinity of the site (Figure 3).

2.2 Bedrock Geology

The Ontario Geological Survey bedrock geology mapping indicates that the study area is underlain by interbedded dolostone, shale and sandstone of the Oxford Formation (Figure 4).

2.3 Hydrogeology

2.3.1 Overburden Aquifer

The clay and glacial till deposits in the area are generally not capable of supplying sufficient quantities of groundwater to be considered an aquifer. As a result, the principal aquifer within the vicinity of the site is considered to be the underlying bedrock formations.

2.3.2 Bedrock Aquifers

The Oxford formation is considered to be a highly transmissive aquifer, and well yields in this formation have been reported between 45 and 115 L/min. Generally, the Oxford Formation provides an adequate resource for domestic water supplies. Groundwater flow in the Oxford formation is controlled predominately by fractures, as the primary porosity has been reduced by cementation.

2.3.3 Local Water Supply Wells

There are a total of 4 water wells identified in the MOECC Water Well Information System (WWIS), with a location accuracy of 300 metres or less, located within 100 metres of the site. The WWIS indicates that all of the wells were constructed to be used as water supply (domestic or livestock). The depth of the wells ranges from 21 to 67 metres, and the depth to the static water level water ranges from 2 to 5 metres (for wells where depth information is available in the WWIS).



3.0 SITE SPECIFIC GEOLOGY AND HYDROGEOLOGY

3.1 General

Golder Associates completed a preliminary geotechnical investigation at this site in 2011, as part of the "due diligence" process associated with Claridge Homes acquiring this property. That investigation included a limited number of very widely spaced testholes.

Golder Associates also previously completed several geotechnical investigations within or in the vicinity of the site, including a preliminary investigation for a residential development to be located immediately north of this property and for the proposed South Nepean Collector sewer, which is proposed to cross the site.

Based on a review of those previous studies and published geological mapping, the subsurface conditions on northern and western portions of the site are expected to consist of a thick deposit of clay, but the clay is expected to thin towards the central and southern portions of the site where glacial till is expected at shallow depths. Available borehole logs are included in Attachment A.

3.2 Site Specific Geology

Fill and Topsoil

Topsoil exists at the ground surface at all of the borehole locations. With the exception of borehole BH15-17. The topsoil varies from about 150 to 370 millimetres in thickness. About 2.0 metres of fill exists at borehole BH15-17. The fill consists of sandy silt and clayey silt, with varying amounts of gravel and organic matter. Topsoil exists below the fill at borehole BH15-17.

Sensitive Silty Clay

The topsoil is underlain by a deposit of silty clay. The upper 0.6 to 3.1 metres of the silty clay deposit have been weathered to a grey brown crust. The silty clay below the depth of weathering is grey in colour. The silty clay deposit in boreholes 16-102, BH11-2, BH11-5, and BH15-9/15-9A was fully penetrated and extends to depths ranging from about 3.1 to 4.3 metres below the existing ground surface. The unweathered grey silty clay in the remaining boreholes was not fully penetrated but was proven to depths of about 3.4 to 8.2 metres below the ground surface prior to the boreholes being terminated.

Upper Sandy Silt to Silty Sand

A layer of silty sand with some silt exists beneath the silty clay at borehole 16-103. A possible sand layer was also encountered at the ground surface at boreholes BH16-301 and BH16-302. The sandy soil is about 0.3 to 0.9 metres thick.

Glacial Till

Glacial till was encountered beneath the silty clay and silty sand deposits or below the topsoil in all boreholes with the exception of BH11-1, BH11-2, BH11-3, BH11-6, BH03-3, BH15-11, BH15-10, 16-101 and 16-104 at depths of about 0.3 to 4.3 metres below the ground surface. The glacial till consists of a heterogeneous mixture of gravel, cobbles, and boulders in a matrix of silty sand to sandy silt. The glacial till was proven to depths of about 5.2 to 7.6 metres below the ground surface.

A layer of sandy soil was encountered below or within the glacial till in boreholes BH11-2, BH11-3, BH15-7, BH15-9A, 15-10 and 16-106. The sandy layer was proven to be at least about 0.3 and 1.4 metres thick, extending to depths of at least 9.1 metres below the ground surface.



Auger Refusal and Bedrock

Refusal to auger advancement was encountered at boreholes 16-103, 16-105, 16-106, 16-107/16-107A, BH15-17A, and PH15-103 at depths of about 1.7 to 7.3 metres below the ground surface. Refusal may indicate the bedrock surface, but it likely reflects the presence of cobbles and/or boulders in the glacial till deposit.

Bedrock was encountered at boreholes BH15-7, BH15-8, BH16-301 and BH16-302. The boreholes were extended into the bedrock to depths of about 1.8 to 3.2 metres below the top of bedrock using rotary diamond drilling techniques while retrieving NQ or HQ sized core.

The following table summarizes the bedrock surface depths and elevations encountered at the borehole locations.

Borehole Number	Ground Surface Elevation (masl)	Depth to Bedrock (m)	Bedrock Surface Elevation (masl)
BH15-7	92.84	6.20	86.64
BH15-8	92.19	8.89	83.30
BH16-301	93.16	9.80	83.36
BH16-302	93.06	8.02	85.04

The bedrock encountered in the boreholes consists of grey limestone and dolomite, with black shale interbeds. The bedrock is fresh and thinly to medium bedded.

3.3 Hydrogeology

A number of hydrogeological investigations have been completed on and nearby the site. Monitoring wells were sealed into various boreholes to allow for hydraulic response testing and measurements of the groundwater level. Estimates of hydraulic conductivity in monitoring wells where testing was completed as well as measured groundwater levels are provided in the following table.

Borehole Number	Geologic Unit	Ground Surface Elevation (masl)	Groundwater Depth (m)	Groundwater Elevation (masl)	Date of Measurement	Estimated Hydraulic Conductivity (m/s)
BH11-1A	Silty Clay	-	1.23	-	Feb 7, 2011	-
BH11-2A	Silty Clay	-	0.95	-	Feb 7, 2011	-
BH11-3	Glacial Till	-	1.53	-	Feb 7, 2011	-
BH15-7	Bedrock	92.84	2.17	90.67	Apr 24, 2015	5x10 ⁻⁷
BH15-9A	Gravelly sand (interbedded within glacial till)	92.27	0.92	91.35	Aug 25, 2015	3x10⁻⁵
16-101	Silty Clay	91.82	1.09	90.73	Mar 7, 2016	-
16-103	Silty Clay/ Clay/Silty Sand Till	93.51	0.91	92.60	Mar 7, 2016	-



Water levels across the area surrounding the site range from 0.91 to 2.17 metres depth. 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.

4.0 POTENTIAL IMPACTS TO EXISTING GROUNDWATER USERS

There are a total of 4 wells in the WWIS database that were constructed as water supply wells, located within 100 metres of the site. Details regarding the water supply wells are presented in the following table. Refer to Figure 1 for the well locations.

Well ID	Depth of Well (m)	Depth to Static Water Level (m)	Depth to Water Found (m)	Available Drawdown (m)	Type of Well
1506043	20.7	3.0	15.8	17.7	Bedrock
1510111	32.6	1.8	32.0	30.8	Bedrock
7156858	67.1	4.9	64.0	62.2	Bedrock
7165137					

The well record associated with Well ID 7165137 is for an extension of the well casing (above ground). As such no details regarding the original construction of the well are available. The original well record for the well is not available. From the available well records, water supply wells in the area generally obtain water from the bedrock aquifer. As such it is likely that Well ID 7165137 is completed in a similar fashion.

The available drawdown in the wells, calculated as the difference between the static water level and the depth of the well) ranges from 17.7 to 62.2 metres. Considering that the overburden thickness in the area is mapped between 5 and 15 metres in thickness, a temporary drawdown, due to construction dewatering for the installation of services, could temporarily reduce the available drawdown in the wells, but not likely to the degree that could negatively impact water supply. It is understood that there are no structures or land uses planned for the site that would permanently lower the groundwater levels in the area surrounding the site (i.e., deep drained foundations).

Prior to construction at the site, it is recommended that at well survey be completed of the residences with wells located within approximately 100 metres of the property boundary. Information to be collected during the well survey could include the depth of the well, type of pump, and static water level. Water quality samples could be collected and analyzed for a typical suite of parameters (i.e. the 'subdivision package' as per MOECC Procedure D-5-5).

5.0 LIMITATIONS AND USE OF MEMORANDUM

This technical memorandum was prepared for the exclusive use of Claridge Homes (South Nepean) LP. The technical memorandum, which specifically includes all tables, figures and appendices, is based on data gathered by Golder Associates Ltd., and information provided to Golder Associates Ltd. by others. The information provided by others has not been independently verified or otherwise examined by Golder Associates Ltd. to determine the accuracy or completeness. Golder Associates Ltd. has relied in good faith on this information and does not accept responsibility for any deficiency, misstatements, or inaccuracies contained in the information as a result of omissions, misinterpretation or fraudulent acts.

The services performed as described in this technical memorandum were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.



Any use which a third party makes of this technical memorandum, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made, or actions taken based on this technical memorandum.

6.0 CLOSURE

We trust this submission satisfies the requirements for a desktop hydrogeological assessment of the proposed Burnett Lands residential development, in Ottawa, Ontario. If you have any questions regarding this report, please contact the undersigned.

GOLDER ASSOCIATES LTD.

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Attachments: Figures 1 to 4 Attachment A – Borehole Logs



















ATTACHMENT A

Borehole Logs



LOCATION: See Site Plan

RECORD OF BOREHOLE: BH 11-1

BORING DATE: January 25, 2011

SHEET 1 OF 1

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

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LOCATION: See Site Plan

SAMPLER HAMMER, 64kg; DROP, 760mm

RECORD OF BOREHOLE: BH 11-1A

SHEET 1 OF 1 DATUM: Local

BORING DATE: January 25, 2011

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LOCATION: See Site Plan

RECORD OF BOREHOLE: BH 11-2

BORING DATE: January 28, 2011

SHEET 1 OF 1

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

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LOCATION: See Site Plan

RECORD OF BOREHOLE: BH 11-2A

BORING DATE: January 28, 2011

SHEET 1 OF 1

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

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LOCATION: See Site Plan

RECORD OF BOREHOLE: BH 11-3

BORING DATE: January 25, 2011

SHEET 1 OF 1

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

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5		Loose to co some grave TILL)	npact grey SANDY SILT, , with cobbles (GLACIAL		4.88	5	50 DO	9												
			hala		5 70	6	DO	27												Standpipe W.L. in Standpipe
6			IUE		0.70															at 1.53 m depth below ground surface on February 7, 2011
7																				
8																				
9																				
10																		1		

LOCATION: See Site Plan

RECORD OF BOREHOLE: BH 11-4

SHEET 1 OF 1

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: January 28, 2011

	Τ	Q	SOIL PROFILE			SA	MPL	ES	DYNA			ION S/0.3m)	HYDRAUL		NDUCI	TIVITY,			
SCALE	2	IETHO		ŌŢ		~		щ	1	20	, BLOWS 40	60	80	10 ⁻⁶	10	-5 1	0-4 1	0 ⁻³	STING	PIEZOMETER OR
TH S		M DN	DESCRIPTION	A PL	ELEV.	1BER	ĥ	S/0.3	SHEA	R STRE	NGTH	nat V	⊢ Q- ●	WATE	RCC	NTENT	PERCE	I	DITIC	
DEP	2	ORIN		IRAT	DEPTH (m)	Ŋ	F	ŇO	Cu, kF	a		rem V. 6	Ð U- O	Wp —		-0 ^W		WI	ADI	INGTALLATION
		8		S	(,			B	2	20	40	60	80	20	40) 6	60 8	30		
_	0		GROUND SURFACE	222	0.00															
-			Very stiff to stiff arey brown SILTY CLAY		0.22															
-			(Weathered Crust)																	-
Ē																				
Ē																				
-	1					1	50 DO	6												-
-		(m																		-
E		w Ste																		
E	0017	Holl					50	,												-
F	2 2	Diam.					DO	2												-
-	1	- m																		-
-		20(⊕			+								-
E			Loose grey SANDY SILT, some gravel		2.51		50													
E						3	DO	7												-
F	3					<u> </u>														-
-						4	50	5												
Ē							DO													
E		_	End of Borehole	PVKI	3.66															-
È.	4																			-
-																				-
-																				-
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н Н																				-
S.G				1																
ΨĽ-	9																			-
GAI				1																-
GPJ																				-
1 1																				-
1210	0			1																-
101	-																			
001				1	1	I		1			1	1	1	1			1	1		
Нан Нан	DEP	THS	SCALE							G	olde	r							LC)GGED: PAH
SIM 1	: 5	0							V	As	<u>soci</u>	<u>ates</u>							CH	ECKED:

LOCATION: See Site Plan

RECORD OF BOREHOLE: BH 11-5

BORING DATE: January 25, 2011

SHEET 1 OF 1 DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

ш		QO	SOIL PROFILE			SA	MPLI	ES	DYNAM		ETRAT	ON 5/0.3m	Ì	HYDR	AULIC C	ONDUC	FIVITY,		.0	
SCAL	2 L	ИЕТН		LOT		Ľ		30m	20) 4	40	60	80	1	0 ⁻⁶ 1	0 ⁻⁵ 1	0-4 1	0-3	ONAL	PIEZOMETER OR
PTH	ME	SING P	DESCRIPTION	ATA P	ELEV.	JMBE	ЦУРЕ	NS/0.	SHEAR Cu, kPa		IGTH	nat V	- Q- ● - U- O	W	ATER C		PERCE	NT	B. TE	STANDPIPE INSTALLATION
DE		BOR		STR/	(m)	Z		BLO	20) 4	10	60	80	W	p	+0 6		WI BO	∠ A	
_	_		GROUND SURFACE							-										
-	Ĭ		TOPSOIL		0.00															
-			Very stiff to stiff grey brown SILTY CLAY, some sand seams (Weathered		0.25															
E			Crust)																	
-	1																			
F	1					1	DO	7												-
-																				
-																				
-						2	50 DO	2												-
F	2	Stem)																		
-		lollow :							Ð			+								
-	ŀ	wer Ai iam. (F	Stiff grey SILTY CLAY, some silt seams		2.59	1	50	w/u												
E	3						DO													_
-	Ĭ	200																		-
-									⊕		+									
-			Loose to very loose grey SANDY SILT, some gravel (GLACIAL TILL)		3.51															
-	4																			-
-						4	50 DO	5												
-																				-
-																				-
-	5					5	50 DO	2												_
-	ŀ		End of Borehole	9722	5.18															
-																				-
-																				
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11/16																				
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S.GD																				
AL-MI	9																			-
2 - G																				
64.GF																				
2102																				
1011	10																			_
S 001			I	1	I	I					<u> </u>	1		1	<u> </u>	<u> </u>	<u> </u>	1	1	
S-BHS	DEF	PTH S	SCALE					(G	olde	r							LC)GGED: PAH
MΙδ	1:5	50							V	Ass	<u>oci</u>	<u>ates</u>							CH	ECKED:

LOCATION: See Site Plan

RECORD OF BOREHOLE: BH 11-6

SHEET 1 OF 1

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: January 28, 2011

	ц	DO	3	SOIL PROFILE			SA	AMPL	ES	DYNA	AIC PEN	ETRATI	DN /0.3m	ì	HYDR	AULIC C	ONDUCT	IVITY,		. (1)	
	SCAL	AETH			LOT		۲ ۲		30m	2	0 4	40 (50 8	10	1	0 ⁻⁶ 1	0-5 1	D ⁻⁴ 10	D-3	ONAL	PIEZOMETER OR
H	METR	NG N		DESCRIPTION	TA PI	ELEV.	MBEI	ΥPE	VS/0.3	SHEAF		IGTH I	natV.+	Q - ●	w	ATER C	ONTENT	PERCEI	NT	B. TE	STANDPIPE INSTALLATION
Ĺ	DE DE	BOR			STRA	(m)	₽	F	BLOW	2	a 0 /	10 4	20 0	0-0	W	p ├──	W		WI	LAI	
			+	GROUND SURFACE							0 2					20 4					
E	0			TOPSOIL		0.00															
F			Ī	Very stiff to stiff grey brown SILTY CLAY (Weathered Crust)		0.25	1														
Ē																					
E																					
F	1		ē																		-
E			v Ster																		
È		Auger	(Hollo																		
Ē		Power	Diam.				1	50 DO	5												
-	2		0 mm																		-
F			50																		
Ē														+							
Ē										\oplus			+								-
F	3										\oplus		+								-
F																					:
-				End of Borehole		3.35															
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₩ UEV	8				1																-
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GDT					1																
-MIS.	9				1																_
GAL					1																-
GPJ																					
0264.																					-
1121	10				1																
11 10																					
HS 00	DF	РТ⊦	1.5	CALE						Â										10) GGED: PAH
AIS-B	1:	 50		-					1	V	FG Ass	olde:	r Mes							СН	ECKED:
2												000									

RECORD OF BOREHOLE: 15-7

SHEET 1 OF 2 DATUM: CGVD28

LOCATION: N 5013739.7 ;E 364291.3

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: August 12, 2015

	6	3	SOIL PROFILE			SA	MPL	ES	DYNAMIC PENETRATION	HYDRAULIC CONDUCTIVITY, k. cm/s	.0	
IE I KES	UC METU	ע אבו ד	DESCRIPTION	A PLOT	ELEV.	1BER	ΡE	S/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - ●	10 ⁻⁸ 10 ⁻⁶ 10 ⁻⁴ 10 ⁻²	DITIONAL	PIEZOMETER OR STANDPIPE
N			DESCINITION	STRAT	DEPTH (m)	NUN	Ł	BLOWS	Cu, kPa rem V. ⊕ U - ○ 20 40 60 80	Wp	ADI	INSTALLATION
0			GROUND SURFACE TOPSOIL - (ML/SM) sandy SILT to SILTY SAND; dark brown; moist		92.84 0.00 92.56	1	AS	-				Native Backfill
1			(SM) gravelly SILTY SAND; grey brown, with oxidation staining, presence of cobbles and boulders inferred from auger resistance (GLACIAL TILL); non-cohesive, moist to wet, compact to		0.20	2	SS	>50				Bentonite Seal
2			very dense			3	ss	17				
3	Auger	(Hollow Stem)				4	ss	46				
	Power.	200 mm Diam.	(SM) SILTY SAND, fine, trace gravel; brown; non-cohesive, wet, compact		<u>89.64</u> 3.20	5	ss	12				Native Backfill
4			(SM) gravelly SILTY SAND; grey (GLACIAL TILL); non-cohesive, wet, compact		88.72 4.12	6	ss	22			м	
5		-	(ML) gravelly sandy SILT; grey (GLACIAL TILL); non-cohesive, wet, compact		87.81 5.03	7	SS	21				
6			Pershele continued on DECODD OF		86.64	9	ss	>50				
			DRILLHOLE 15-7		0.2							
7												
8												
9												
10												
11												
12												
13												
14												
14												
15												
DE	PT	<u> </u>	CALE	_	1	I	1				L	l DGGED: PAH
1:	75								Associates		СН	ECKED: SD

PI	RO	JEC.	T: 1523645		RE	C	ORD	0	FC	DR	RIL	.LI	HC	DL	E:		1	15-7										Sł	HEET 2 OF 2	
LO		ATIC .INAT	N: N 5013739.7 ;E 364291.3 TION: -90° AZIMUTH:						dril Dril Dril	_LIN _L R _LIN	g d IG: G C	ATE CM	:: 4 E 85 FRA	Augu 50 ACTC	ist 1 DR:	2, 2 Ma	201 arat	5 hon Drill	ing									D	ATUM: CGVD28	•
DEPTH SCALE METRES		DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH COLOUR RETURN	JN - FLT - SHR- VN - CJ - REC TOTAL	Joint Fault Shea Vein Conju	ugate RY DLID RE %	R.Q. 888	BD- FO- OR- CL- D. 1	Bedo Folia Cont Ortho Clea RAC NDE PER	ding act ogona vage T. X	al	P C U S IF	L - F :U- C :N- U T - S R - Ir	Planar Curved Jndulating Stepped rregular	F K S F N	20- P(- SI M- SI to - R(1B- M	olishe icker noot ough echa	nical	Brea Brea HYE ONE K, Q	ak si DRAU DUCT cm/s 01	BR - bbrevi f abbr ymbol ILIC TVITY ec 7,01	Brok For ac ations eviatio s.	en R ddition refer ns &	ock al to list		
_			BEDROCK SURFACE		86.64																									
- 7			Fresh, thinly to medium bedded, grey LIMESTONE		6.20	2	85 85-100																						Peltonite Seal Granitic Sand 32 mm Diam. PVC #10 Slot Screen	1911,000,000,000,000,000 1911,000,000,000,000 1912,000,000,000,000,000
							Q																							
	2		End of Drillhole		9.30																								Cave WL in Screen at Elev. 90.67 m on Aug. 24, 2015	
- 14 - 14 - 15 - 15	5																													
- - - - - - - - - - - - - - - - - - -	6																													
- 17 - 17 - 18 - 18	3																													
4B 1523645.6PJ GAL-MISS.GUI U9/23/19 17 11 11 11 11 11 11 11 11 11 11 11 11 1)																													
DI NIS-RCK 00	EP : 7	TH S	CALE					Ĵ	j	G	io sc	lde oci	er at	es														LC CH	DGGED: PAH ECKED: SD	

LOCATION: N 5013747.0 ;E 364141.5

SAMPLER HAMMER, 64kg; DROP, 760mm

RECORD OF BOREHOLE: 15-8

SHEET 1 OF 2 DATUM: CGVD28

BORING DATE: August 11-12, 2015

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 30m STRATA PLOT 60 80 10⁻⁸ 10⁻⁶ 10-4 10⁻² OR 20 40 NUMBER STANDPIPE INSTALLATION ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - ○ WATER CONTENT PERCENT BLOWS/0. DESCRIPTION DEPTH -OW - WI Wp 🛏 (m) 20 40 60 80 20 40 60 80 GROUND SURFACE 92.19 0 TOPSOIL - (CL/ML) CLAYEY SILT; dark 0.00 1 AS brown; moist 0.20 (CI) sandy SILTY CLAY; grey brown, contains silty sand seams (WEATHERED CRUST); cohesive, w>PL, very stiff 2 SS 6 90.88 (SM) gravelly SILTY SAND; grey brown, presence of cobbles and boulders 1.31 inferred from auger resistance (GLACIAL 3 SS 19 TILL); non-cohesive, wet, compact 2 90.06 (SM) gravelly SILTY SAND; grey (GLACIAL TILL); non-cohesive, wet, 2.13 very loose to compact 4 SS 2 3 5 SS 3 Stem) 4 Power Auger Diam. (Hollow S 6 SS 1 MH 7 SS 2 E 5 50 SS 5 8 6 9 SS 5 10 SS 10 84.57 (SM) gravelly SILTY SAND; dark grey, 7.62 inferred from auger resistance (GLACIAL TILL); non-cohesive, wet, dense to very 11 SS 48 М dense 12 SS 90 XX 83.30 Borehole continued on RECORD OF 8.89 c DRILLHOLE 15-8 10 11 12 Σ 1523645.GPJ GAL-MIS.GDT 09/23/15 13 14 15 MIS-BHS 001 DEPTH SCALE LOGGED: PAH Golder 1:75 CHECKED: SD sociates

PF	ROJEC	T: 1523645		RE	ECC	ORD	C)F	D	RII		H	C	.E		1	5-8									S	HEET 2 OF 2	
LC		DN: N 5013747.0 ;E 364141.5						DR DR		NG I RIG:	DAT	E: /	Augi 50	ust 1	1-1	2, 2	015									D	ATUM: CGVD28	
		TION: -90 AZIMUTH:						DR		NG		ITR/		OR:	Ma	arath	ion Dril	lling		<u></u>			00	Der	Las F	Deels		
PTH SCALE METRES	ING RECORD	DESCRIPTION	IBOLIC LOG	ELEV. DEPTH	RUN No.	COLOUR RETURN	FLT SHF VN CJ RE	- Joil - Fau R- She - Vei - Coi	nt ult ear njuga ERY	rte R.O	FO CO OR CL	- Bed - Folia - Con - Orth - Clea FRAC INDE	ation tact ogon wage	al	U S	L - Pi U- Cu N- Ur T - St R - Irr	anar urved ndulating epped egular	Ro ME	- Polis - Slick 1- Smo - Rou 3- Mec	sned kensio ooth gh hanic	al Brind	eak /DRA	NOTE abbre of abb symbo	- Bro For a viation previation of s.	additio s refer ons &	nal r to list		
DEF	DRILL		SYN	(m)		FLUSH	TOT. CORE	AL 36	SOLIE ORE 9	0 08 09 00 00 00 00 00 00 00 00 00 00 00 00	845 845	PEF 0.25	20 m								10 ⁻⁸ ×	(, cm/						
- 9		BEDROCK SURFACE Fresh, thinly to medium bedded, grey		83.30 8.89																								
	Te Drill	LIMESTONE			1	100																						-
- - 10	Rotary NQ Co										++																	-
		End of Drillholo		81.52 10.67	2	100																						-
11				10.07																								_
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DE	PTH S	SCALE	_				Ć			Go	bld	er	tes						_1_	1			<u>. </u>	. (L	OGGED: PAH	

RECORD OF BOREHOLE: 15-9

BORING DATE: August 10, 2015

SHEET 1 OF 1

DATUM: CGVD28

LOCATION: N 5013812.4 ;E 364008.0 SAMPLER HAMMER, 64kg; DROP, 760mm

		Q		SOIL PROFILE			SA	MPL	ES	DYNA			ON /0.2m)	HYDR	AULIC C	ONDUC	FIVITY,			
CALE	3	ETHO			ОТ	1			Б	RESIS	20 4	BLOWS	70.3m 60	80	1	к, стл/s	s 10 ⁻⁶ 1	0-4 1	0-2	STING	PIEZOMETER OR
TH S		Ш Ш	DESCI		A PL(ELEV.	BER	띮	\$/0.30	SHEA	R STREM	IGTH I	nat V. +	- Q - ●		Ĭ /ATER C	ONTEN	ĭ PERCE	ĭ NT	TES	STANDPIPE
DEP		ORIN	DESCR	RIPTION	RAT/	DEPTH	MUN	Σ	SMO	Cu, kF	a	1	em V. ∉	∍ū-ŏ	w	p	W		WI	ADC LAB.	INSTALLATION
		B			STI	(m)			BLO	2	20 4	0 0	50	80	2	20 ·	40	50 E	30		
	0		GROUND SURFACE			92.27															
Ē	Ĩ		TOPSOIL - (ML) sar	ndy SILT; dark		0.00															
Ē			(CI) sandy SILTY CI	LAY; grey brown,																	
Ē			(WEATHERED CRU	JST); cohesive,																	
Ē	1		w>PL, very stiff				1	SS	4												
E			Ê																		
E		_ i					2	SS	1												
Ē	2	Auge																			-
Ē		ower				89.83	-			Ð		+									
Ē		ן ר	grey; cohesive, w>F	PL, firm to stiff		2.44						+									
F	3	000	87																		- - -
Ē							3	SS	2												-
F							<u> </u>														
E-	4									⊕		+									
E			Brobable Clasic Till	I		87.95	-					+									
E			End of Borehole	l	MAZ	4.50	4	SS	>50												
E	5		Auger Refusal on Pr	robable Boulder																	
Ē			Note:																		
E			Refer to Record of E	Borehole 15-9A for																	
E	6		deeper stratigraphy.																		-
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3645																					
152	CI																				_
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SH8 C	DEP	ΡTΗ	SCALE								Vc.	Jde	r							LC	DGGED: PAH
SIM 1	1:7	5								V	Ass	OCi7	<u>tes</u>							СН	ECKED: SD

RECORD OF BOREHOLE: 15-9A LOCATION: N 5013812.4 ;E 364008.0

BORING DATE: August 10-11, 2015

SHEET 1 OF 1

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

	SOIL PROFILE			SA	MPL	ES	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	ں _	
METRES 30RING MET	DESCRIPTION	TRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	LOWS/0.30m	20 40 60 80 SHEAR STRENGTH nat V. + Q - Cu, kPa rem V. ⊕ U -		ADDITIONA LAB. TESTIN	OR STANDPIPE INSTALLATION
0	GROUND SURFACE Refer to Record of Borehole 15-9 for stratigraphy		92.27							Bentonite Seal ⊈
d bower Auger Power Auger mm Diam. (Hollow Stem)	(ML) gravelly sandy SILT; grey, presence of cobbles and boulders inferred from auger refusal and auger		87.70 4.57	1	SS	1				Native Backfill
6 7	resistance (GLACIAL TILL); non-cohesive, wet, very loose to compact		84.80	2 3 4	SS SS SS	2 2 17				Bentonite Seal Native Backfill and Granitic Sand
9	End of Borehole	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	<u>83.13</u> 9.14	5	SS AS	6			М	38 mm Diam. PVC #10 Slot Screen
10										WL in Screen at Elev. 91.35 m on Aug. 24, 2015
12										
13										

LOCATION: N 5013731.1 ;E 364221.7

SAMPLER HAMMER, 64kg; DROP, 760mm

RECORD OF BOREHOLE: 15-17

BORING DATE: August 11, 2015

SHEET 1 OF 1

DATUM: CGVD28

ш	Т	ОD	SOIL PROFILE			SA	MPLI	ES	DYNAMIC PEN RESISTANCE	IETRATI	DN /0.3m	Ì	HYDR/	AULIC C	ONDUC	TIVITY,		.0	
SCAL		METH		LOT		ĸ		30m	20	40 6	60 i	80	10) ⁻⁸ 1	0 ⁻⁶ 1	0-4 1	0 ⁻²	IONAL STIN(PIEZOMETER
EPTH	L ≥	RING I	DESCRIPTION	ATA P	ELEV. DEPTH	JMBE	TYPE	WS/0.	SHEAR STREI Cu, kPa	IGTH I	nat V. + em V. ∉	- Q - ● 9 U - O	W	ATER C		PERCE	NT	AB. TE	STANDPIPE INSTALLATION
D		BOF		STR/	(m)	ž		BLO'	20	40 (i0	80	2 W	0 4	ю (50 E	WI 10	۲ ×	
_	0	_	GROUND SURFACE	××××	93.79														
Ē			brown and red brown, contains organic		0.00	1	SS	15											
Ē			maller, non-conesive, moisi, compact																
-	1				92.57	2	SS	15											
Ē			FILL - (ML) CLAYEY SILT, some gravel; dark grey; cohesive, w>PL		1.22	3	ss	7											
E	2	w Stam	2000 000		91.75														_
-		Auger	TOPSOIL - (OL) ORGANIC SILT; black; moist	AXX	2.04 2.23	4	SS	11											
Ē		Diam	(ML) gravelly sandy SILT; grey brown, presence of cobbles and boulders			5	ss	24											
F	3		inferred from auger resistance (GLACIAL TILL); non-cohesive, wet, compact																
Ē		5	ŭ		00.42	6	ss	29											
Ē			(SM) gravelly SILTY SAND; grey,		3.66	_													
Ē	4		inferred from auger resistance (GLACIAL TILL): non-cohesive, wet, compact			'	55	20											
Ē			···,·····,····,····			8	ss	13											-
-	5		End of Borehole	21/14/2	88.91 4.88														-
-																			
Ē																			-
-	6																		
Ē																			
-	7																		_
-																			
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Ē	8																		
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-	9																		_
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F	12																		-
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1111																			
1 00	13																		-
IS.GL																			
AL-M	14																		-
5 L																			
345.G																			
1523(15																		-
001																			
S-BHS	DEP	тн	SCALE					(G	olde	r							LC	OGGED: PAH
MIS	1:7	5							V Ass	ocia	tes							CH	ECKED: SD

RECORD OF PROBEHOLE: 15-17A

LOCATION: N 5013728.8 ;E 364221.0

BORING DATE: August 12, 2015

SHEET 1 OF 1

DATUM: CGVD28

ш	Τ	QO	SOIL PROFILE			SA	AMPL	ES	DYNAMIC PE		ON /0.3m)	HYDRAULIC	C CONDU	CTIVITY,		.0	
SCAL		METH		LOT		щ		30m	20	40 (50 8	0	10 ⁻⁸	10-6	10 ⁻⁴ 1	0-2	IONAL	PIEZOMETER
EPTH MET		RING I	DESCRIPTION	ATA P	ELEV.	JMBE	TYPE	WS/0.	SHEAR STRE Cu, kPa	NGTH	natV.+ remV.⊕	Q - ● U - ○	WATER			NT	AB. TE	STANDPIPE
B		BOF		STR/	(m)	ž	ľ	BLO	20	40	60 8	0	Wp — 20	40	60 8	WI 30	A J	
_	0	_	GROUND SURFACE		93.62													
Ē			Refer to Record of Borehole 15-17 for stratigraphy		0.00													
Ē																		-
Ē	1																	-
Ē																		
Ē																		
Ē	2	/ Stem																_
Ē		Hollow																
E	3	ower/																:
Ē	ľ																	
Ē		20																
-	4																	
-																		
Ē	_		Probable Classici Till	- 4347	88.74													
Ē	5				4.00													
-	+		End of Probehole	160	88.08 5.54													
Ē.	6		Auger Refusal															
Ē																		
Ē																		-
Ē	7																	-
-																		
-	0																	
Ē	°																	
Ē																		
-	9																	
-																		-
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Ē	10																	
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Ē	1																	
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Ē																		
	12																	_
5 JN																		
9/23/1																		
й — 1 Г	3																	
IIS.GI																		
AL-1	4																	
D L																		
345.G																		
15236	15																	-
001					1													
BHS [DEF	тн	SCALE					1		പിപ്പം	r						LC	DGGED: PAH
MIS	1:7	5							V As	SOCI2	ites						СН	ECKED: SD

LOCATION: N 5013713.1 ;E 364379.7

SAMPLER HAMMER, 64kg; DROP, 760mm

RECORD OF PROBEHOLE: 15-103

BORING DATE: August 13, 2015

SHEET 1 OF 1

DATUM: CGVD28

	щ			SOIL PROFILE			SA	AMPL	ES	DYNAMIC PENET RESISTANCE, BL	RATION .OWS/0.3m	ì	HYDR	AULIC Co	ONDUCT	TIVITY,		ı۵	
	SCAL		METH		LOT		щ		30m	20 40	60 8	30	1	0 ⁻⁸ 1	D ⁻⁶ 1	0 ⁻⁴ 10	0-2	IONAI	OR
	MET		SING	DESCRIPTION	ATA P	ELEV.	MBE	LYPE	NS/0.	SHEAR STRENG	TH nat V. + rem V. ⊕	Q - • U - O	W	ATER C		PERCE	NT	DDIT B. TE	INSTALLATION
	Ö		BOR		STR/	(m)	z	[BLOV	20 40	60 8	30	W	p —	 0		WI KO	۲A	
				GROUND SURFACE		94.22		1		20 40									
Ē	- 0			TOPSOIL		0.00 93.92													
E				Probable Silty Clay (Weathered Crust)		0.30 93.61													
Ē			Ê	Probable Glacial Till, presence of cobbles and boulders inferred from		0.61													
F	- 1		w Ster	auger refusal and auger resistance															-
Ē		Auger	, Hollo																
Ē		ower /	iam. (
Ē	- 2	ď	L L L L L																
Ē			200																
Ē																			
Ē	- 3					00.97													-
Ē				Probable Glacial Till		3.35						Į.							
E												ŕ							
F	- 4																		-
F		Ы																	
E													127						
Ē	- 5												220						-
F													200						
E		_		End of Probehole	61552	88.43 5.79						>	200						
Ē	- 6			Auger Refusal at 3.35 m Dynamic Cone Refusal at 5.79 m															
Ē				Note:															
E																			
Ē	- 7			DCPT were angled upon completion at															-
Ē				vertical and were immovable/stuck. The															
Ē				4.5 metres of the drill rods remain in the															
Ē	- 8			ground from about 1.5 to 6 metres depth.															-
Ē																			
Ē	•																		
Ē	9																		
Ē																			
E	- 10																		_
E	10																		
Ē																			
E	- 11																		
E																			
E																			
E	- 12																		_
Ę																			
/15																			
9/23	- 13																		_
S.G																			
AL-M	- 14																		
ů J																			
5.GP																			
2364	- 15																		_
1 15.																			
00 SH	יח	-0-	- - н о																
IS-BI	1.	75							1	Gol	lder							СН	ECKED: SD
\geq										1330	viaits.							0.1	

LOCATION: See Site Plan

RECORD OF BOREHOLE: 16-101

BORING DATE: February 23, 2016

SHEET 1 OF 1

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

S L	тнор	SOIL PROFILE			SA	MPLE	ES E	DYNAM RESIS	IIC PEN TANCE,	ETRA BLOW	TION /S/0.3m	``	HYDRA	ULIC CO k, cm/s		TIVITY,			PIEZOMETER
METRE	DRING ME	DESCRIPTION	RATA PLO	LEV. PTH	NUMBER	ТҮРЕ	OWS/0.30n	2 SHEAF Cu, kP	0 4 R STREM	IGTH	60 € nat V. + rem V. ⊕	Q - ● U - ○	10 W/ Wp	10 ATER CO	0 ⁻⁵ 1 0 0 0 0 0 0 0 0 0 0 0 0 0		0 ⁻³ NT WI	ADDITION LAB. TEST	OR STANDPIPE INSTALLATION
_	ğ	GROUND SURFACE	U SI	(m)	_		B	2	0 4	0	60 8	30	20) 4	06	8 0	0		
1		TOPSOIL - (ML) sandy SILT; brown (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown (Weathered Crust); cohesive, w>PL, stiff to very stiff		0.00	1 (GRAB GRAB SS	4							0					∠
2				-	4	SS	4					>96		C)				Native Backfil
3	ower Auger Diam (Hollow Stem)	(CI/CH) SILTY CLAY to CLAY; grey; cohesive, w>PL, firm		88.77 3.05	5	SS	1	Ð		+					0				Bentonite Seal
5	g 1 mm 000	200 mm 1		-	6	SS	РН	Ð	+	-						0			Silica Sand
6				_	7	SS	wн	⊕	+							C	, ,		#10 Slot Screen
7		End of Borehole	8	84.20 7.62				⊕ ⊕	++	_									
8																			
9																			
DEI	PTH	1 SCALE						Â	G		er							LC	DGGED: CG

RECORD OF BOREHOLE: 16-102

LOCATION: See Site Plan

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: February 22, 2016

SHEET 1 OF 1

DATUM: Geodetic

ш	Т	QC	SOIL PROFILE			SA	MPL	ES	DYNA			TION	}	HYDR	AULIC (CONDUC	TIVITY,		0	
SCALE		IETHC		OT.		~		m		20	, BLOW 40	60	80	1	0 ⁻⁶	s 10⁻⁵ 1	0 ⁻⁴ 1	0 ⁻³	STING	PIEZOMETER OR
OTH S		≥ DN	DESCRIPTION	TA PL	ELEV.	MBEF	ΥPE	/S/0.3	SHEA	L R STRE	NGTH	nat V.	+ Q- •	W	ATER (I F PERCE	NT	BDITIO	STANDPIPE INSTALLATION
DEF		BORI		TRA	DEPTH (m)	Ĩ	←	BLOW	CU, KF	a	10	rem v.	⊕ U - O	w	р — —	W	I	WI	LAE	
			GROUND SURFACE	0)	92.01			ш		20	40	60	80		20	40 0	30 8	30		
-	0		TOPSOIL - (ML) CLAYEY SILT; dark		0.00	1 0	GRA	3 -												
E			(CI/CH) SILTY CLAY to CLAY; grey	Ī	0.23	2 1	GRAE	a -												
F			brown (Weathered Crust); cohesive, w>PL, very stiff																	-
E																				
-	1					3	SS	6												-
Ē																				
-			(CI/CH) SILTY CLAY to CLAY; grey;		90.49 1.52															:
E			cohesive, w~PL, firm			4	SS	1												
-	2																			-
E																				-
E									•	+										
-									⊕	+										
-	3		(SM) SILTY SAND, some gravel: grev		88.96 3.05															-
Ē		(ma)	contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet,			5	TP	PH												
-	ş	llow S	very loose to compact																	
Ē	or Au	im. (Ho																		-
-	4	nm Dia				6	SS	7												-
Ē		200 r																		
F																				
Ē						7	SS	4												
-	5																			-
Ē																				
-						8	SS	8												
Ē																				
-	6																			-
Ē							66	17												
-							00	''												
Ē																				
-	7																			-
Ē						10	SS	2												
-					84.39															
Ē			End of Borehole		7.62															
≥-	8																			-
9 T																				
5/24/																				
10 10 10				1																
IIS.GI	9			1																-
AL-N				1																
о Г				1																
144.G				1																
15230	0																			-
. 100														1						
SH ^B C	DEP	TH S	CALE					1	A	V c	old	٩r							LC	DGGED: DG
ώ Μ	: 5	0							V	As	SOC	iates	5						СН	ECKED: CK

RECORD OF BOREHOLE: 16-102A

LOCATION: See Site Plan

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: February 22, 2016

SHEET 1 OF 1

DATUM: Geodetic

L	ц	DC	SOIL PROFILE			SA	MPL	.ES	DYNAMIC PE		DN /0.3m	\ \	HYDR		ONDUCT	IVITY,		0	
	SES	ЛЕТН		LOT		æ		30m	20	40 (50 8	10	1	0 ⁻⁶ 1) ⁻⁵ 1	0-4 10	D-3	STINC	PIEZOMETER OR
Ē	METH	N D N	DESCRIPTION	TA PI	ELEV.	MBEI	ΥPE	VS/0.3	SHEAR STRI	NGTH	natV.+	Q - ●	w	ATER C		PERCE	NT	B. TE	STANDPIPE INSTALLATION
Ĺ	5	BOR		STRA	(m)	N		BLOV	20	10 6	an 8	0	W		W		WI	LAI	
	0		GROUND SURFACE		92.01									-					
F	0		TOPSOIL - (ML) CLAYEY SILT; dark brown		0.00 91.78														-
F			(CI/CH) SILTY CLAY to CLAY; grey		0.23														:
Ē			w>PL, very stiff																-
F		em)																	-
F	1	low 13																	
E		er Aug																	-
F		Powe	(CI/CH) SILTY CLAY to CLAY; grey;		90.49														-
E		200 m	cohesive, w~PL, firm																-
F	2																		-
E																			-
E						1	TP	PH											-
F			End of Borehole	1992	89.27 2.74														-
F	3		Note: Soil stratigraphy inferred from BH																-
F			16-102																-
Ē																			-
F																			-
F	4																		-
F																			-
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F																			-
F	5																		-
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F	7																		-
Ē																			-
E																			-
Ē																			-
E	8																		-
JEM																			-
4/16																			-
05/2																			2
GDT	9																		-
-MIS.	Ű																		-
GAL																			-
GPJ																			-
3044	10																		-
152	.0																		
S 001				•	•	-	•				•		•						
S-BH	DE		SUALE							olde	r							LC	JGGED: DG
Σ	113	50							V AS	<u>SOC17</u>	<u>ues</u>							СH	EURED. UR

LOCATION: See Site Plan

RECORD OF BOREHOLE: 16-103

BORING DATE: February 19, 2016

SHEET 1 OF 1

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

				1			REDID I ANGE, BL	OWS/0.3m	$\overline{\langle}$		κ, cm/s			μĥ	PIEZOMETER
2	DESCRIPTION	TRATA PLO	ELEV. DEPTH (m)	NUMBER	TYPE	LOWS/0.30m	20 40 J J SHEAR STRENGT Cu, kPa	60 ⊣ TH nat V. ⊣ rem V. €	80 ⊢ Q - ● ● U - ○	10 WA Wp	-6 10 TER CC	-5 10 NTENT ⊖W	PERCENT	ADDITION ^A LAB. TESTIN	OR STANDPIPE INSTALLATION
-	GROUND SURFACE	ώ	00.54			B	20 40	60	80	20) 40) 60	0 80	-	
\square	TOPSOIL - (ML) CLAYEY SILT; dark	EEE	93.51	1 0	RAB	-									
	CI/CH) SILTY CLAY to CLAY; grey brown (Weathered Crust); cohesive, w>PL, very stiff		0.15	2 (GRAB	-									Bentonite Seal
				3	SS	10					c)			Silica Sand
	(SM) SILTY SAND, some gravel; brown; non-cohesive, wet, loose		91.69 1.82 91.38	4	SS	4					0				51 mm Diam. PVC
	(SM) SIL LY SAND, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense		2.13	5	SS	11				0					#10 Slot Screen
2															Silica Sand
iam. (Hollow Sten				6	SS	4				0					W.L. in Screen at Elev. 92.60 m on March 7, 2016
200 mm D				7	SS	25				0					
				8	SS	33				0					
				9	SS	40				0					
				10	SS	58				0					
	End of Borobole		86.25	11	ss	>50				0					
	Auger Refusal														
п 5	UALE						Gol	der							
	200 mm Diam. (Hollow Stem) 200 mm Diam. (Hollow Stem)	Umon CIC/CH) SILTY CLAY to CLAY; grey brown (Weathered Crust); cohesive, w (CIC/CH) SILTY SAND, some gravel; brown; non-cohesive, wet, loose (SM) SILTY SAND, some gravel; grey, contains cobles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense (GLACIAL TILL); non-cohesive, wet, loose to very dense End of Borehole Auger Refusal H SCALE H SCALE	TOPSOIL - (NL) CLAYEY SILT; dark brown (CI/CH) SILTY CLAY to CLAY; grey brown (Weathered Crust); cohesive, w>PL, very stiff (SM) SILTY SAND, some gravel; brown; non-cohesive, wet, loose (SM) SILTY SAND, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense End of Borehole Auger Refusal	Umore of Borehole Auger Refusal 0.00 Brown (Cl/CH) SILTY CLAY to CLAY; grey brown (Weathered Crust); cohesive, w-PL, very stiff 0.15 (SM) SILTY SAND, some gravel; brown; non-cohesive, wet, loose 1.82 (SM) SILTY SAND, some gravel; grey, contains cobbles and boulders 0.33 (GLACIAL TILL); non-cohesive, wet, loose 0.41 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose to very dense 0.42 (GLACIAL TILL); non-cohesive, wet, loose 0.42	UPOSOIL - (ML) CLAYEY SILT; dark 0.00 Drown 0.16 C(U/CH) SILTY CLAV to CLAY; grey 0.16 S(M) SILTY SAND, some gravel; brown; 1.82 non-cohesive, wet, loose 91.69 S(M) SILTY SAND, some gravel; brown; 1.82 non-cohesive, wet, loose 91.69 S(M) SILTY SAND, some gravel; brown; 1.82 non-cohesive, wet, loose 91.69 S(M) SILTY SAND, some gravel; grey, cohains cobbles and boulders 91.69 S(ML) TILLY; non-cohesive, wet, loose to very dense 91.69 R 9 G(BLACL TILL); non-cohesive, wet, loose to very dense 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9 R 9	Ling of Borehole Auger Refusal H SCALE H SCALE	UPSOLL - (ML) CLAY to CLAY: grey 0.00 0.15 <td>Urown 0.00 Breas - (Ch(H) SILTY CLAY to CLAY; grey 0.15 4 85 4 (SM) SILTY SAND, some gravel; brown; 0.15 4 85 4 (SM) SILTY SAND, some gravel; brown; 0.15 4 85 4 (SM) SILTY SAND, some gravel; brown; 0.13 5 55 11 (SM) SILTY SAND, some gravel; brown; 0.3 5 5 11 (SM) SILTY SAND, some gravel; brown; 0.3 5 5 11 (CLACAL TILL); non-cohesive, wet; 0 5 55 11 (SA) SILTY SAND, some gravel; proving 0 5 55 11 (CLACAL TILL); non-cohesive, wet; 0 5 55 40 (SA) SILTY BAND, some gravel; proving 0 55 40 4 5 55 (CLACAL TILL); non-cohesive, wet; 0 0 55 40 4 5 56 (SA) Provide 7 55 25 1 8 50 6 56 (SA) Provide 7 7 10 55</td> <td>UPSOLL - (ML) CLAYEY SLT, dark 0.00 0.15 0.00 0.00 (CiUCH) SLTY CLAY to CLAY; grey, brown (Wenchered Crust); cohesive, werk, verg stiff 0.16 0.15 0.00 (SM) SLTY SAND, some gravel; brown; non-cohesive, wet, losse 0.16 0.15 0.00 0.00 (SM) SLTY SAND, some gravel; prey, contains cobbles and boulders (CLACIALT); non-cohesive, wet, losse to very dense 0.16 0.15 5 55 11 (GM) SLTY SAND, some gravel; prey, contains cobbles and boulders (CLACIALT); non-cohesive, wet, losse to very dense 0.15 5 55 11 (GM) GLTY SAND, some gravel; prey, contains cobbles and boulders (CLACIALT); non-cohesive, wet, losse to very dense 0.15 1 5 55 11 (GLACIALT); non-cohesive, wet, losse to very dense 0.55 11 55 30 9 55 40 (GLACIALT); non-cohesive, wet, losse 0.55 11 55 58 11 10 55 58 (GLACIALT); non-cohesive, wet, losse 0.55 1 55 58 10 (GLACIALT); non-cohesive, wet, losse 0.55 1 58 50 (GLACIALT); non-cohesive, wet, losse 0.55 1<!--</td--><td>TOPOOL - (M) CLAY' IS CLAY, grey toom (Wedge Cust); cohesive, we too 1 - Read - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -</td><td>Drown (DiCC) (M) CLAY SILT: 64K 000 Doad (S) Clay Silt (CLAY) (prey wePL, very stit 015 Doad (S) Silt (CLAY) (prey wePL, very stit 016 2 288 4 (SM) SILTY SAND, some gravel; brown, non-octesive, wel; losse (CLAC) (LL); non-contenive, wel; (CLAC) (LL); non-contenive; (LL); non-contenive; (LL); non-contenive; (LL); non-contenive;</td><td>UPCON</td><td>Toron Toron <th< td=""><td>Torson </td><td>IOSANE IOSANE IOSANE</td></th<></td></td>	Urown 0.00 Breas - (Ch(H) SILTY CLAY to CLAY; grey 0.15 4 85 4 (SM) SILTY SAND, some gravel; brown; 0.15 4 85 4 (SM) SILTY SAND, some gravel; brown; 0.15 4 85 4 (SM) SILTY SAND, some gravel; brown; 0.13 5 55 11 (SM) SILTY SAND, some gravel; brown; 0.3 5 5 11 (SM) SILTY SAND, some gravel; brown; 0.3 5 5 11 (CLACAL TILL); non-cohesive, wet; 0 5 55 11 (SA) SILTY SAND, some gravel; proving 0 5 55 11 (CLACAL TILL); non-cohesive, wet; 0 5 55 40 (SA) SILTY BAND, some gravel; proving 0 55 40 4 5 55 (CLACAL TILL); non-cohesive, wet; 0 0 55 40 4 5 56 (SA) Provide 7 55 25 1 8 50 6 56 (SA) Provide 7 7 10 55	UPSOLL - (ML) CLAYEY SLT, dark 0.00 0.15 0.00 0.00 (CiUCH) SLTY CLAY to CLAY; grey, brown (Wenchered Crust); cohesive, werk, verg stiff 0.16 0.15 0.00 (SM) SLTY SAND, some gravel; brown; non-cohesive, wet, losse 0.16 0.15 0.00 0.00 (SM) SLTY SAND, some gravel; prey, contains cobbles and boulders (CLACIALT); non-cohesive, wet, losse to very dense 0.16 0.15 5 55 11 (GM) SLTY SAND, some gravel; prey, contains cobbles and boulders (CLACIALT); non-cohesive, wet, losse to very dense 0.15 5 55 11 (GM) GLTY SAND, some gravel; prey, contains cobbles and boulders (CLACIALT); non-cohesive, wet, losse to very dense 0.15 1 5 55 11 (GLACIALT); non-cohesive, wet, losse to very dense 0.55 11 55 30 9 55 40 (GLACIALT); non-cohesive, wet, losse 0.55 11 55 58 11 10 55 58 (GLACIALT); non-cohesive, wet, losse 0.55 1 55 58 10 (GLACIALT); non-cohesive, wet, losse 0.55 1 58 50 (GLACIALT); non-cohesive, wet, losse 0.55 1 </td <td>TOPOOL - (M) CLAY' IS CLAY, grey toom (Wedge Cust); cohesive, we too 1 - Read - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -</td> <td>Drown (DiCC) (M) CLAY SILT: 64K 000 Doad (S) Clay Silt (CLAY) (prey wePL, very stit 015 Doad (S) Silt (CLAY) (prey wePL, very stit 016 2 288 4 (SM) SILTY SAND, some gravel; brown, non-octesive, wel; losse (CLAC) (LL); non-contenive, wel; (CLAC) (LL); non-contenive; (LL); non-contenive; (LL); non-contenive; (LL); non-contenive;</td> <td>UPCON</td> <td>Toron Toron <th< td=""><td>Torson </td><td>IOSANE IOSANE IOSANE</td></th<></td>	TOPOOL - (M) CLAY' IS CLAY, grey toom (Wedge Cust); cohesive, we too 1 - Read - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Drown (DiCC) (M) CLAY SILT: 64K 000 Doad (S) Clay Silt (CLAY) (prey wePL, very stit 015 Doad (S) Silt (CLAY) (prey wePL, very stit 016 2 288 4 (SM) SILTY SAND, some gravel; brown, non-octesive, wel; losse (CLAC) (LL); non-contenive, wel; (CLAC) (LL); non-contenive; (LL); non-contenive; (LL); non-contenive; (LL); non-contenive;	UPCON	Toron Toron <th< td=""><td>Torson </td><td>IOSANE IOSANE IOSANE</td></th<>	Torson	IOSANE IOSANE

LOCATION: See Site Plan

RECORD OF BOREHOLE: 16-104

BORING DATE: February 23, 2016

SHEET 1 OF 1

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

	Т	0	SOIL PROFILE			SA	MPI	ES	DYNA	MIC P	ENET	RATIO	ON)		HYDR	AULIC C	ONDUC	TIVITY	,		\neg	
SALE		THO		L L				Ε	RESIS	STANC	CE, BL	.ows	/0.3m	~	`,		k, cm/s	0-5	10-4	40-3	AL	UNG	PIEZOMETER
H SC		ME		PLC	ELEV.	ËR	ш	0.30				е ти <i>г</i>		80		1					−Ê	ES	STANDPIPE
EPT		RINC	DESCRIPTION	ATA	DEPTH	NM	μĘ	/S/	Cu, kF	Pa	REING	in r	em V. ∈	+ Q- ⊕ U-	. 0	V\ \\\					DDD	AB.	INSTALLATION
		BO		STR	(m)	Z		BLO		20	40	6	0	80		~~~~	20 4	40	60	80		· _	
	_		GROUND SURFACE		91.25																		
- '			TOPSOIL - (ML) CLAYEY SILT to CLAY;		0.00	1	GRAE	3 -															
-			(CI/CH) SILTY CLAY trace sand: grey		90.95		-																
E			brown, with red mottling (Weathered			2	GRAE	-															
-							-																
<u> </u>	1																						
-						3	SS	4									0						
F						<u> </u>																	
-																							
-						4	TP	PH										0					
	2																						-
E																							
_									Ð						+								
-									⊕				-	+									
E																							
- :	3		(CI/CH) SILTY CLAY to CLAY: grev:		88.20 3.05																		-
-			cohesive, w>PL, soft to firm			5	SS	PH											0				
-																			Ĭ				
E		Stem																					
E.	4	ollow							⊕		+												_
È	- -	E E																					
E.	0	Dia							Ð		+												
F		200 m				<u> </u>																	
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-									Ð		t												
- (6																						
-																							
F						7	SS	PH										0					
Ē					84.54 6.71																		
E.	-		sand, trace gravel; grey; cohesive,						Ф			+											
È	ʻ								Ψ			т											
Ē														>9	6								
Ē																							
-																							
;	8					8	SS	PH									0						-
Π Π Γ			End of Dorobolo		83.01	<u> </u>																	
4/16					0.24																		
05/2																							
10 1																							
IS.G	9																						-
¥¥																							
ð -																							
GP -																							
3044																							
152.																							_
00				1	I	I	I										1						
D BHS)EP	TH S	SCALE					((Ť	N	പ	de	r									LC	GGED: CG
ŚW 1	: 5	0							V	A	<u>SSO</u>	<u>Ci2</u>	ites									CHE	ECKED: CK

LOCATION: See Site Plan

RECORD OF BOREHOLE: 16-104A

BORING DATE: February 23, 2016

SHEET 1 OF 1

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

	Т	0				54	MPI	ES	DYNAMI	C PEN	ETRATI	NC	\	HYDR		ONDUC	TIVITY,			
ALE	,	THOL		⊢		SA	vir L	 	RESISTA	NCE,	BLOWS	/0.3m	K,		k, cm/s	3	.,	2	ING	PIEZOMETER
1 SC	Ľ	ME		PLO.		н	μ.).30n	20	4	0 6	50 E	30	1	0-6	0 ⁻⁵ 1	0 ⁻⁴ 1	0-3	TION EST	OR STANDPIPF
	Ĭ	RING	DESCRIPTION	ATA	DEPTH	IMBI	ΓΥΡΕ	NS/C	SHEAR S Cu, kPa	STREN	IGTH I	natV.+ remV.⊕	Q - ● U - ○	W	ATER C	ONTENT	PERCE	NT	DDI B. T	INSTALLATION
DE		BOF		STR/	(m)	۲	'-	BLOV			م	 	20	W	p			WI		
	+		GROUND SURFACE		01.05			F	20	4		ω ε 	50			+0 (50 1	50		
F	0		TOPSOIL - (ML) CLAYEY SILT to CLAY;	EEE	0.00															
F			dark brown	EEE	90.95															
F			brown, with red mottling (Weathered		0.30															
Ē			Crust); cohesive, w>PL, stiff to very stiff																	
F																				
E	'																			-
E																				
E																				
F																				
1	2																			-
F		/ Sten																		-
F		-uger Hollow																		
E		wer A am. (†																		
F		m Di Di Di																		-
F	3	200 n	CI/CH) SILTY CLAY to CLAY: arev:		88.20 3.05															-
Ē			cohesive, w>PL, soft to firm																	
-																				
E																				
E	4																			-
Ē																				
F																				
F																				
E						1	TP	PH							-			0	с	
F	5				86.12															-
È			End of Borehole		5.13															
F			Note: Soil stratigraphy inferred from BH																	-
F			10-10-																	
E	6																			
E	Ŭ																			
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-																				
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16]																				
5/24/																				
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9.0	9																			-
Ĭ																				
GAI																				
GPJ																				
044																				
1523	10																			-
<u>6</u>															L					
SHS	DEF	PTH S	SCALE								14.	*							L	DGGED: CG
AIIS-F	1:5	50								+ U(155	OCi2	tes							СН	ECKED: CK

LOCATION: See Site Plan

RECORD OF BOREHOLE: 16-105

BORING DATE: February 22, 2016

SHEET 1 OF 1

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

	Т	0	Τ	SOIL PROFILE			SA	MPL	ES	DYNAMIC PEN		ON /0.3m	<u>\</u>	HYDR/		ONDUC	TIVITY,			
SCALE	2	IETHO	ŀ		01		~		20m	20	10	50.511 50	80	10	0 ⁻⁶ 1	, 0 ⁻⁵ 1	Q ⁻⁴ 1	Q ⁻³	STING	PIEZOMETER OR
PTH S		2 D N		DESCRIPTION	TA PL	ELEV.	MBEF	ΥΡΕ	/S/0.3	SHEAR STRE	NGTH	iat V. +	- Q- •	w	ATER C	I ONTEN	I F PERCE	I NT	DITIO 3. TE	STANDPIPE INSTALLATION
DEF	-	BORI			TRA	DEPTH (m)	Ĩ	Ĥ	LOW	си, кра		em v. ∉	¥ U- O	Wp	⊳	—0 ^W		WI	LAE	
	-		+	GROUND SURFACE	S					20	40	50	80	2	20 4	40	<u>60 8</u>	30		
-	0		┥	TOPSOIL - (ML) CLAYEY SILT; dark	EEE	92.39	1	GRAE	-											
F				brown (CL/CI) SILTY CLAY: arey brown		0.15	2	GRAF	_											
F				(Weathered Crust); cohesive, w>PL, stiff																
E																				
È.	1																			
F							3	SS	5											-
F																				-
E																				
F							4	SS	3											
-	2																			-
E						90.03														-
-				contains cobbles and boulders		2.36														
F				(GLACIAL TILL); non-cohesive, wet, loose to compact			5	SS	7											-
F	3		em)																	-
E		e	to No																	
Ē		er Aug	- (Hol				6	SS	3											
E		Powe	n Dian																	
E	4		20 20 20																	-
-			~				7	SS	6											
-																				
E							<u> </u>													
-							8	SS	7											
-	5																			-
-																				
-								22	7											-
-								55	ľ											
E	6																			-
F																				
Ē							10	SS	26											
E																				
E	7					85.38														
F				End of Borehole Auger Refusal		7.01														-
Ē																				
E																				
F																				
∑- Ш	8																			-
16 J																				
5/24/																				
Ö L																				
S.GI	9																			
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4.GP																				
1 1	10																			
1 15																				
12 00	רי	ידנ	10																	
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Σ		~~								AS	OCL	ucs							01	

LOCATION: See Site Plan

SAMPLER HAMMER, 64kg; DROP, 760mm

RECORD OF BOREHOLE: 16-106

BORING DATE: February 18, 2016

SHEET 1 OF 1

DATUM: Geodetic

щ		QQ	SOIL PROFILE			SA	MPL	ES	DYNAMIC PENETRA RESISTANCE, BLOV	TION /S/0.3m		HYDRAULIC C k, cm/s	ONDUCT	IVITY,		<u>ہ</u> ۲	
TH SCAL ETRES		G METH	DESCRIPTION	A PLOT	ELEV.	BER	ЪЕ	3/0.30m	20 40 SHEAR STRENGTH	60 8 nat V. +	0 Q - ●	10 ⁻⁶ 1 WATER C	0 ⁻⁵ 10 ONTENT	PERCEN	3 T	TESTIN	
DEPT		BORIN	DESCRIPTION	STRAT/	DEPTH (m)	MUN	Σ	BLOWS	Cu, kPa	rem V. ⊕	0 - Ū	Wp		W	vi	ADC LAB.	INSTALLATION
- 0					92.78				20 40		0	20					
-			brown		0.00	1	GRAB	-									
-			(Weathered Crust); cohesive, w>PL, stiff to very stiff														
-																	
						3	SS	6									
-																	
-						4	ss	4									
- 2					90.49												-
-		em)	(SM) SILTY SAND, some gravel; grey brown to grey, contains cobbles and boulders (GLACIAL_TILL): pon-cobesive		2.29	5	ss	2									
-	iger	ollow St	wet, very loose					-									
— 3 - -	^o wer Au	Diam. (H															-
-	ľ	200 mm				6	SS	1									
-			(ML) SANDY SILT, some gravel; grey,		88.97 3.81												
- 4 -			contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact			7	ss	15									-
-					88.21												
Ē			(SM) SILTY SAND, fine; grey; non-cohesive, wet, compact		4.57	8	SS	15								мн	
- 5 - -																	-
-								10									
-					86.84			10									
- 6 - -		Ц	(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders (GLACIAL TILL): pop-cobesive wet		5.94 6.10												-
-			End of Borehole Auger Refusal														
-																	
7 - -																	-
-																	
⊑8 ⊒																	-
24/16																	
1 05/2																	
MIS.GE																	-
GAL-I																	
44.GPJ																	
15230																	-
15 001				1	1	I						1					
	= P I	н S I	UALE					(Gold	er iates						CH	ECKED: CK

LOCATION: See Site Plan

RECORD OF BOREHOLE: 16-107

BORING DATE: February 18, 2016

SHEET 1 OF 1

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

ŀ	ш		a	SOIL PROFILE			SA	MPL	ES			ATION WS/0.3m)	HYDR		ONDUCT	FIVITY,		0	
	SCALI		H H		OT.		~		m	20	40	60	80	1	0 ⁻⁶ 1	, 0⁻⁵ 1	0-4 10) ⁻³	STINC	PIEZOMETER OR
	TH S		∑ U	DESCRIPTION	A PL	ELEV.	1BEF	Ŕ	S/0.3	SHEAR ST	RENGTH	I nat V.	+ Q- ●	w	ATER C	ONTENT	PERCEI	NT	DITIO	STANDPIPE
	d ⊿ DEP				RAT	DEPTH (m)	Ŋ		ŇO	Cu, kPa		rem V	.⊕ U-O	w	p	W		wi	ADI	INGTALLATION
			ñ		ST	(11)			В	20	40	60	80	2	20 4	40 6	60 8	0		
	- 0		_		222	93.14														
				brown	T	0.00	1.0	GRAB	-											
				(CL/CI) SILTY CLAY; grey brown (Weathered Crust): cobesive w>PL stiff			2 (GRAB	-											
			Sterr	to very stiff																
		Jaer	lo				<u> </u>													
	- 1	ver AI	Щ.				3	ss	4											-
		Pov	m Dia			01 77														
ł			ш 00	(SM) SILTY SAND; grey, contains		1.37														
				cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense			_		. 50											
ł						91.16	5	55	>50											
ŀ	- 2			End of Borehole	UAN.	1.98														
ŀ				Auger Refusal																-
ļ																				
ļ	- 3																			
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/16 、																				
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T 0	-																			
3.GD	9																			
Ψ-,																				
GAL																				
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944.0																				
5230	- 10																			-
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-TS 0	יח	=рт	Чο	CAI F						Â	~ ·								10)GGED CG
IS-BI	1.	50									Gold	ler	9						<u>с</u> ц	
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RECORD OF BOREHOLE: 16-107A

LOCATION: See Site Plan

SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: February 18, 2016

SHEET 1 OF 1

DATUM: Geodetic

		Q	SOIL PROFILE			SA	MPLE	ES			ION	>	HYDR/		ONDUCT	IVITY,			
SCALE	ES	1ETHC		Ŀ.		~		0m	RESISTANC	40	5/U.3M 60 8	30	1	к, cm/s 0 ⁻⁶ 1	0 ⁻⁵ 1	0 ⁻⁴ 10	D-3	STING	PIEZOMETER OR
S HTc	METR	N Q N	DESCRIPTION	TA PL	ELEV.	MBEF	ΥPE	'S/0.3	SHEAR STR	ENGTH	nat V. +	Q - •	w	ATER C	ONTENT	PERCE	INT	DITIC 3. TES	STANDPIPE INSTALLATION
DEF	~	BORI		TRA	DEPTH (m)	NN	ŕ	ROW	си, кра		rem v. ⊕	U- 0	W				WI	LAE	
	+	-	GROUND SURFACE	S	Q3 1/			ш	20	40	<u>60 8</u>	30	2	4	ιυ 6 	8 0			
-	0		TOPSOIL - (ML) CLAYEY SILT; dark	EEE	0.00														
E		(mə	(CL/CI) SILTY CLAY; grey brown		0.15														-
F		low St	(Weathered Crust); cohesive, w>PL, stiff to very stiff																-
Ē		n. (Ho																	
-	1	m Diar																	-
Ē		200 m			91.77														-
-			(SM) SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL);		1.37 91.46														-
-			non-cohesive, wet, very dense		1.68														-
F	2		Auger Refusal																-
F			Note: Soil stratigraphy inferred from BH 16-107																-
-																			-
F																			-
F	3																		-
-																			-
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16 J																			-
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GAL-I																			-
SPJ (-
044.0																			-
1523	10																		_
S 001			1							I	_1	I	1	I	1	1	1		
S-BH	DEF	PTH S	SCALE					(Golde	r							LC	DGGED: CG
Ĭ	1:5	0								<u>isoci</u>	ates							CH	ECKED: CK

RECORD OF BOREHOLE: 16-301

LOCATION: N 5013712.6 ;E 364379.1

BORING DATE: March 4-7, 2016

SHEET 1 OF 2

DATUM: CGVD28

щ		ДQ	SOIL PROFILE		SA	MPL	ES	DYNAMIC PEN RESISTANCE	IETRATIO BLOWS/(N).3m	$\sum_{i=1}^{n}$	HYDRA	ULIC CO	ONDUCT	IVITY,		_, ()	
SCAL		METH		LOT	Ľ.		30m	20	40 60	80	0 `	10) ⁻⁸ 1)-6 1	0 ⁻⁴ 10	0-2	IONAL	PIEZOMETER
METI		SING I	DESCRIPTION		- MBE	ТҮРЕ	NS/0.	SHEAR STRE Cu, kPa	NGTH na	at V. + m V. ⊕	Q - ● U - O	W	ATER CO		PERCE	NT	AB. TE	STANDPIPE
B		BOF		(m) STR/	Ĩ	ľ	BLO	20	40 60) 80	0	2 Wp	0 4	 0 6	60 8	WI 80	A J	
— 0	, [_	GROUND SURFACE	93.16														
_			Probable Sand	0.00	1													
Ē																		∇
- 1			Probable Glacial Till	0.91	1													
-																		
Ē.																		
- 2	2																	
-																		
- 3	3																	
-																		
-																		
- 4	ŀ																	
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- 5	eh Bori	V Casir																
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- 6	6																	
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-																		
- 8	3																	
-																		
Ē																		WL in open borehole at 0.78 m depth below
- 9	,																	ground surface upon completion of
-				83.36														drilling
- 10			Borehole continued on RECORD OF DRILLHOLE 16-301	9.8														
-																		
E																		
— 11 E																		
-																		
- 12	2																	
Ę																		
13/16																		
/90 L	3																	
S.GD.																		
9 1 1																		
15.GP																		
15	5																	-
1.																		
D BHS (ΕP	TH S	SCALE				4		പ്പം								LC	DGGED: DWM
ŚW 1	: 7	5						V Ass	SOCIA	tes							СН	ECKED:

PF	ROJE	ECT: 1523645		REC	co	RD (DF	D	RIL	.Lł	10	LE	:		16	6-301									S⊦	IEET 2 OF 2
LC IN		TION: N 5013712.6 ;E 364379.1 NATION: -90° AZIMUTH:						DRIL DRIL DRIL	.LING .L RIC .LING	DA G: C	TE: 1 ME 8 NTRA	Mar 50 ACT	ch 4- OR:	-7, 2 CC	2010 CC	6									DA	TUM: CGVD28
DEPTH SCALE METRES	RILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	USH <u>COLOUR</u>	JN - FLT - SHR- VN - CJ - REC TOTAL	Joint Fault Shea Vein Conju COVEF	r igate ≷Y R LID ≷E%	BI C O C C	D - Bede D - Folia D - Cont R - Orth L - Clea FRAC INDE PER 0.25	ding ation tact ogor avage T. X E M	al Angle	P C U S IF C A	L - P U- C N- U T - S R - Ir DISC ORE VIS	lanar Curved Indulating tepped regular ONTINUITY	PO-F K -S SM-S Ro-F MB-M DATA	Polish Slicke Smoo Rough Mecha	ied inside th anica	ed I Bre HYE CONE K,	ak si DRAU DUCT cm/s	BR - bbrevia f abbrevia f a	Broke For ad ations is eviation s. Diam Point Ind (MF	en Ro ditional refer to is & etral Load ex Pa)	NCK	
- 10 - 11 - 11	totary Drill D	BEDROCK SURFACE Fresh, thinly to thickly bedded, grey DOLOMITE BEDROCK		83.36 9.80	1	100	8894	2 80	40 20	20		20	3		<u>788</u>					1			2	-		
- 12 - 13 - 13	<u>~</u>	End of Drillhole		<u>80.16</u> 13.00	3	100					-															WL in open borehole at 0.78 m depth below ground surface upon completion of
- 14 - 15 - 15																									,	drilling
- 17 - 17 - 18																										
- 19 - 20																										
Wf 91/3(19/10/10/10/10/10/10/10/10/10/10/10/10/10/																										
1 1523645.GPJ GAL-MISS.GDT 00 7 1 1523645.GPJ 05 7 15 1 15 1 15 1 15 1 15 1 15 1 15 1 1																										
DE DE 1:	EPTH : 75	H SCALE			 1		Ĝ	Ĵ	G		ler	tes	5		1	I			1		1 1				LC CHE	ogged: DWM Ecked:

RECORD OF BOREHOLE: 16-302

LOCATION: N 5013746.6 ;E 364217.4

BORING DATE: March 4, 2016

SHEET 1 OF 2

DATUM: CGVD28

ш	Τ	Q	SOIL PROFILE		SA	MPLE	B DYNA		IETRATIO BLOWS	0N 10.3m	۱ ۱	HYDRA	AULIC CO	ONDUCT	IVITY,		. (J	
SCAL		METH		LOT	Ľ			20 4	40 6	0 8	30	1() ⁻⁸ 1() ⁻⁶ 1(0 ⁻⁴ 1	0-2	IONAL STINC	PIEZOMETER OR
MFTH		ING N	DESCRIPTION		IMBE	μ	SHEA	R STRE	NGTH r	atV.+ emV.⊕	Q - ● U - O	W	ATER CO		PERCE	NT	DDITI B. TE	STANDPIPE INSTALLATION
DE		BOR		(m)	Ĭ			20	40 6	0 8	30	Wp 2	0 4	0 6	I	WI 30	ΡЧ	
_	0		GROUND SURFACE	93.06	;													
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-	1		Probable Glacial Till	0.91														
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PF LC IN	ROJ DCA	EC ⁻ TIO	Г: 1523645 N: N 5013746.6 ;E 364217.4 1ОN: -90° АΖІМИТН:		REC	0	RD (OF					OL E: M	arch	4, 2	16	6-302	2								SH	IEET 2 OF 2 ATUM: CGVD28
DEPTH SCALE METRES		חאורנואפ אבנטאט	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH <u>COLOUR</u>	JN FLT SHR VN CJ RE TOTA CORE	- Joir - Fau - She - Veir - Con COVE	ILLI it it it injugat ERY SOLID DRE %	R.Q.	BD- FO- CO- OR- CL-	Beddir Foliati Conta Orthog Cleava RACT. NDEX PER 0.25 m	Don ct gonal age B Ang		PL - F CU- C UN- L ST - S IR - II DISC DIP w.r.1	Planar Curved Indulating Stepped rregular CONTINUITY TYPE AND DESCR	PO- K - SM- Ro - MB- Y DATA	Polish Slicke Smoo Rougl Mech	ied inside th anical	d Brea HYD COND K, g	B ak of ak sy DRAU DUCTI cm/se	R - E DTE: F brevia abbrevia mbols. LIC VITY ac 2 0	Broke for add tions r viation Diame Oint I Inde (MP	en Ro ditional efer to s & etral Load ex ex ex a	ock Dist RMC -Q' AVG.	
-			BEDROCK SURFACE Fresh, thinly to thickly bedded, grey DOLOMITE BEDROCK		85.04 8.02	1	100																				
9 - 9 - 10	Rotary Drill	NQ Core				2	0																				-
- - - - - - - - - - - - - - - - - - -			End of Drillholo		81.86	3	0																				-
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