

DISCLAIMER

This report was commissioned and obtained by AECOM, an engineer retained by the Township for the completion of the Culvert replacement project ("Project").

We note that other reports in relation to the Project were also completed by the author, V.A. Woods Associates Limited ("VA Woods").

Various legal proceedings have been commenced against VA Woods in relation to its work on the Project. In such circumstances, the reader should be aware that certain persons take issue with VA Woods work on the Project. The readers should not conclude or believe that AECOM or the Township are in agreement that the facts, analysis, or conclusions in this report are correct (or incorrect) and the Township makes no representations regarding the accuracy of the facts, analysis, or conclusions of the report.

During the course of the Project other data was obtained and other reports completed by other engineers and contracting firms.

Further, it is alleged in various legal proceedings that, subsequent to this report, the Project resulted in settlement of the subject building and other nearby buildings and it is alleged that the events at the site and in the area may affect the conclusions in this report.

The Township strongly advises against reliance on this report. The Township makes absolutely no representations or warranties of the accuracy or suitability of this report. Any interested person should complete their own investigations of the subject property.

The Township has no liability for the use of this report by any person.



### V. A. WOOD ASSOCIATES LIMITED CONSULTING GEOTECHNICAL ENGINEERS

1080 TAPSCOTT ROAD, UNIT 24, SCARBOROUGH, ONTARIO M1X 1E7 TELEPHONE: (416) 292-2868 • FAX No: (416) 292-5375

### GEOTECHNICAL INVESTIGATION CULVERT RECONSTRUCTION BROCK STREET/CENTENNIAL DRIVE UXBRIDGE, ONTARIO

Ref. No. 7171-17-6

Revised February 2018

Prepared for:

AECOM 300 Water Street Whitby, Ontario L1N 9J2

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### 1.0 INTRODUCTION

V.A. Wood Associates Limited was retained by AECOM to carry out a geotechnical investigation for the proposed reconstruction of the existing culvert at Brock Street and Centennial Drive in Uxbridge, Ontario.

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The replacement culvert will be a twin concrete structure and will be built by cut and fill. There are existing buildings along and adjacent the culvert alignment and shoring works to protect these buildings are required.

The culverts are located at the base of a wide valley which has been filled over the years and subsequently developed.

The purpose of the investigation was to reveal the subsurface conditions and to determine the relevant soil properties for the design and construction of the foundation of the replacement culvert and reinstatement of the road pavement, restoration of parking lot, and provide recommendations for shoring and dewatering works.

### 2.0 FIELD WORK

The field work was carried out between August 26 and August 30, 2017 and consisted of eleven boreholes at the locations shown on Enclosure 1. The boreholes were advanced to the sampling depths by means of a power-auger machine, equipped for soil sampling. Standard Penetration tests were carried out at frequent intervals of depth and the results are shown on the Borehole Logs as N-values.

Monitoring wells, consisting of 50 mm diameter PVC pipes with 1.5 to 3 m screens at the bottom were installed in ten of the boreholes.

The field work was supervised by a soils technician and the soil samples were transported to our soils laboratory for further examination, classification and testing. The ground elevation at each borehole location was provided by I. B. W. Surveyors.

### 3.0 SUBSURFACE CONDITIONS

Full details of the soils encountered in each borehole are given on the Borehole Logs, Enclosures 2 to 12 inclusive, and the following notes are intended to summarize this data.

All of the boreholes were augered to a depth of 0.75 m. No sampling or testing was carried out over this section.

From a depth of 0.75 m, all of the boreholes encountered a layer of <u>fill</u>, which extended to a depth of between 2.9 and 4.4 m below grade. The fill varies in composition from gravelly sand to sandy silt, with seams of silty clay in places. Standard Penetration tests in the fill gave N-values between 1 and 34 blows/300mm, and generally less than 10 blows/300 mm.

Based on the test results, the fill is considered to be in a generally loose to very loose condition.

Except in Boreholes 2, 3 and 10, the fill was underlain by a deposit of <u>silt sand</u>, which extended to a depth of between 3.6 and 7 m below grade. This deposit generally contained peat, wood fragments and/or topsoil, and is likely to be alluvial in origin. Standard Penetration tests in this deposit gave N-values between 4 and 12 blows/300mm (24 blows/300mm in Borehole 9). The grain size distribution of the silty sand sections of this deposit are shown in Enclosures 13 and 14. Based on the test results, the silty sand with peat/wood/ topsoil is considered to have a generally loose relative density. It is noted that the alluvial deposit in most of the boreholes contained tree trunks and/or stumps.

The fill in Boreholes 2, 3 and 10, and the silty sand in Boreholes 4, 7 and 9 were underlain by a deposit of **gravelly sand**, which extended to a depth of between 5.5 and 6.6 m below grade. This deposit is comprised generally of well graded sand and fine to medium subrounded gravel and is likely alluvial in origin. Standard Penetration tests in this deposit gave N-values between 4 and 15 blows/300mm. The grain size distribution of representative samples of the gravelly sand are shown in Enclosures 15 to 18.

Based on the test results, the gravelly sand is considered to have a generally loose to medium compact relative density.

The silty sand in Boreholes 1, 5, 6, 8 and 9, and the gravelly sand in Boreholes 2, 3, 4, 9 and 10 were underlain by a deposit of <u>sandy silt</u>, which extended to a depth of between 17 and more than 9.6 m below grade (maximum depth investigated). This deposit is comprised of bedded silt and very fine sand. Standard Penetration tests in this deposit gave N-values between 3 and 40 blows/300mm. The grain size distribution of representative samples of the sandy silt are shown in Enclosures 19<sup>'</sup> to 24.

Based on the test results, the sandy silt is considered to have a generally compact relative density (loose or dense in places).

The sandy silt in Borehole 11 was underlain by a deposit of <u>sandy silt till</u>, which extended to a depth of more than 9.6 m below grade (maximum depth investigated). This glacial deposit is comprised of a sandy silt matrix which contained traces of fine gravel. Standard Penetration tests in this deposit gave N-values between 6 and 23 blows/300mm. The grain size distribution of a representative sample of the sandy silt till is shown in Enclosure 25.

Based on the test results, the sand and gravel is considered to have a dense relative density

Based on the test results, the sandy silt till is considered to have loose to dense relative density.

The sandy silt in Boreholes 2 and 3 was underlain by a deposit of <u>sand and gravel</u>, which extended to a depth of more than 9.6 m below grade (maximum depth investigated). Standard Penetration tests in this deposit gave N-values between 31 and 44 blows/300mm.

Based on the test results, the sand and gravel is considered to have a dense relative density.

A longitudinal profile showing the summarized soil conditions is shown in Enclosure 1a.

### 4.0 **GROUNDWATER CONDITIONS**

A monitoring well was installed in all of the boreholes, except in Borehole 6 which was located in the middle of the road (Brock Street). The construction of the monitoring wells are shown on the Monitoring Well Logs in Enclosures 2A to 12A. Monitoring of the ground water was carried out and the findings are as follows:

Date	Well No.	Location of	Ground Water
		Depth	Elevation
	MWI	1.4 m	261.61
	MW2	0.15 m	262.66
September 15,	MW3	Ground Su	rface (262.7)
2017	MW4	1.68 m	261.36
	MW5	2.74 m	262.96
41	MW7	3.29 m	262.39
	MW8	1.22 m	264.59
	MW9	1.68 m	263.55
	MW10	2.32 m	262.45
	MW11	3.11 m	261.64
	MWI	no change	
	MW2	0.18	262.63
September 26,	MW3	1.5	261.2
2017	MW4	2.3	260.74
	MW5	no change	
	MW7	no change	
	MW8	no change	
	MW9	no change	
	<b>MW10</b>	no change	
	MWI I	no change	

### 5.0 DISCUSSION AND RECOMMENDATIONS

5.1 <u>General</u>

The boreholes encountered 2.9 to 4.3 m of generally loose fill, followed by 0 to 3 m of silty sand with peat/wood, then 0 to 3.5 m of gravelly sand, then native bedded silt and fine sand, underlain by sand and gravel or sandy silt till in places. The ground water table is located a depth of between zero (artesian condition) and 3.29 m (Elev. 261.2 to Elev. 264.6).

The  $190 \pm m$  replacement culvert will be a twin closed concrete structure. It is noted that the subsurface conditions are not considered to be suitable for an open bottom culvert. It is understood that construction will be carried out in stages using open cuts, and that the creek will be effectively diverted at each stage. Full details of the proposed structure were not available at the time of this report and, therefore, the following recommendations should be reviewed when these details are available.

### 5.2 Foundations

It is understood that the invert of the culverts will be at Elev.  $260.5\pm$  at the inlet and Elev.  $259.81\pm$ at the outlet. Based on the Borehole Logs, the foundation subgrade will likely be comprised mainly of gravelly sand between Sta.  $0+150\pm$  and Sta.  $0+180\pm$ , and bedded silt and sand between Sta.  $0+215\pm$  and the outlet. These strata are considered capable of supporting an allowable bearing pressure (SLS bearing pressure) of at least 75 kPa.

From the inlet to Sta.  $0+150\pm$ , and between Sta.  $0+180\pm$  and Sta.  $0+215\pm$ , the Borehole Logs indicate that sand and peat exist below the invert. The peat should be removed and replaced with approved compacted fill. In this case, the footings on the compacted fill may be designed to the allowable bearing pressure of 75 kPa. Additional boreholes (using hollow stem augers) should be put down when the building at No. 30 and 32 is removed.

It is understood that driven piles may be used south of Brock Street. In this case, they can be designed using an allowable steel stress of 6.5 N/mm<sup>2</sup> (10,000 psi) and the coefficient of horizontal reaction can be based on  $n_h$  of 2200 kN/m<sup>3</sup> above the water table and 1300 kN/m<sup>3</sup> below the water table.

Soil Parameter	Existing Fill	Sand, Peat and Wood	Gravelly Sand	Sandy Silt	Compac- ted Fill (Granular)
Unit Weight	20 kN/m³	15 kN/m <sup>3</sup>	22 kN/m <sup>3</sup>	20 kN/m <sup>3</sup>	21 kN/m <sup>3</sup>
Friction Angle	28°	20°	30"	30°	32°
Cohesion	0	0	0	0	0
Coeff. of Earth Pressure At Rest	0.53	0.66	0.5	0.5	0.47
Coeff. of Active Earth Pressure	0.36	0.49	0.33	0.33	0.31
Coeff. of Passive Earth Pressure	2.8	2.0	3.0	3.0	3.2
Coefficient of Friction			0.45	0.4	0.4

For the design of members resisting lateral loads, the recommended soil parameters are:

All foundation excavations should be inspected by geotechnical personnel from V.A. Wood Associates Limited to ensure the founding soils are similar to those identified in the Borehole Logs and that they are capable of supporting the design loads.

### 5.3 Excavation Shoring and Groundwater Control

A brief review of the site history indicates that the culvert accommodates the flow from two creeks which have been dammed south of Highway 8. The floodplain from the two creeks extended from Toronto St. in the west to Bascom St. and Main St. in the east. The land from Centennial Dr. in the south and for a distance of  $100 \pm m$  to the north of Brock St. has been backfilled to accommodate Brock St. W and the development to the north and south.

To minimize the volume of excavation and the extent of the disturbed area, we recommend that sheet piles be used for shoring. The sheet pile design should be carried out by a specialist designer/contractor and should protect the adjacent structures. The soil parameters given on the table in the preceding page may be used for the preliminary design. We anticipate that the installation of the sheet piles by vibration will be less disruptive than driven sheet piles.

A review of the water levels in the monitoring wells indicates that they are 0.6 to  $4.5 \pm m$ above the invert of the culvert. The dewatering method will depend on the water level at the time of construction. The possibility of basal heave will depend on the extent of dewatering. If the water pressure under the base of the excavation is more than about 600 mm then basal heave will be a concern.

The dewatering works will cause a significant lowering of the ground water outside of the construction area. This will increase the effective pressures on the subsoils and could cause the settlement of the surrounding buildings and paved areas/ground surface. To prevent/minimize ground settlement and damage to the buildings and the lowering of the ground water outside of the construction area, a sheeted excavation is recommended below the water table. The sheeting should extend to a depth below the excavation grade at least equal to the water level above the excavation grade.

The main dewatering wells should be located within the excavation and the groundwater should not be lowered beyond what is required to build the culvert. Any well required outside of the excavation/sheet pile wall should be located as far as possible from the buildings and the ground water should not be lowered more than necessary. The ground water levels should be monitored through a system of monitoring well. A specialist dewatering consultant/contractor should be consulted for the design and construction and operation of the dewatering system.

A pre-construction survey and settlement monitoring of buildings, structures, paved areas, etc. within at least 100 m of the construction area is recommended. It is anticipated that selected excavated sand and gravelly sand may be re-used as backfill. Backfill should be placed in horizontal loose layers 150 to 200mm thick and compacted to at least 98% SPMDD.

To minimize potential problems, backfilling operations should follow closely after excavation so that only a minimal length of trench slope is exposed.

Should construction be carried out in the winter season, particular attention should be given to make sure frozen material is not used as backfill.

### 5.4 Pavements

The pavement for the roadways and the parking lots will be reinstated. It is anticipated that a heavy duty asphalt will be required for the roadway and light duty asphalt will be required for the parking lots. Considering the traffic requirements and subsoil conditions, the following pavement designs are recommended:

	Car Parking Areas	Roadways/Fire Route
	(Light Duty Asphalt)	(Heavy Duty Asphalt)
HL-3 Asphaltic Concrete	50 mm	40 mm
HL-8 Asphaltic Concrete		75 mm
Granular 'A' or 20 mm crusher run limes	tone 150 mm	150 mm
Granular 'B' or 50 mm crusher run limes	tone 200 mm	300 mm

The base and sub-base granular materials should be compacted to at least 98% SPMDD and the asphaltic concrete to 96% Marshall density. The thicknesses shown above are compacted thicknesses of the layers. We recommend that the top course asphalt not be placed until the base course asphalt has been in place for one winter season.

Frequent inspection by geotechnical personnel from V.A. Wood Associates Limited should be carried out during construction to verify the compaction of the subgrade, base courses and asphaltic concrete by in-situ density testing using nuclear gauges.

### 5.8 Soil Chemical Analysis

A sample of the existing fill from each the eleven boreholes were submitted for chemical analysis for metals and inorganic parameters for disposal purposes. The analysis was carried out by ALS Canada.

The test results are given in Appendix 'B' and reference to this shows that, except for SAR (sodium adsorption ratio) and EC (electrical conductivity) in all of the samples, and mercury in Sample BH6/5 and cadmium in Sample BH11/4, all of the parameters tested meet Table 1 standards of the current O/Reg 153/04 guidelines.

The cadmium and mercury values meet Table 2 standards for commercial/industrial property use. The high SAR and EC value were likely due to road salt.

### 6.0 STATEMENT OF LIMITATIONS

The Statement of Limitations presented on Appendix 'A' is an integral part of this report.

### V.A. WOOD ASSOCIATES LIMITED

Prepared b

Rehe Quiambao, P. Eng.

Reviewed by V. Wood, M.Eng., P.Eng.,

RQ/VW

### APPENDICES

APPENDIX 'A'

### STATEMENT OF LIMITATIONS

The conclusions and recommendations in this report are based on information determined at the borehole locations and on geological data of a general nature which may be available for the area investigated. Soil and groundwater conditions between and beyond the boreholes may differ from those encountered at the borehole locations and conditions may become apparent during construction which would not be detected or anticipated at the time of the soil investigation.

We recommend that we be retained to ensure that all necessary stripping, subgrade preparation and compaction requirements are met, and to confirm that the soil conditions do not deviate materially from those encountered in the boreholes. <u>In cases where this recommendation is not</u> <u>followed</u>, the company's responsibility is limited to interpreting accurately the information encountered at the borehole locations.

This report is applicable only to the project described in the introduction, constructed substantially in accordance with details of alignment and elevations quoted in the text.

APPENDIX 'B' Soil Chemical Analysis



V.A. WOOD ASSOCIATES LIMITED ATTN: Vic Wood 1080 Tapscott Rd Unit 24 Scarborough ON M1X 1E7 Date Received:11-SEP-17Report Date:18-SEP-17 13:36 (MT)Version:FINAL

Client Phone: 416-292-2868

### Certificate of Analysis

Lab Work Order #: L1989352 Project P.O. #: 'NOT SUBMITTED Job Reference: 7171 C of C Numbers: 15-557089 Legal Site Desc:

Mathy Mahadey Account Manager C

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### ANALYTICAL REPORT

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# Summary of Guideline Exceedances

Guidolino						
ouidelille						
ALS ID	Client ID	Grouping	Analyte	Result	Guidalina Limit	:
				IIII		Unit
Untario Ke	En l	Indards - T1-Soil-Res/Park/I	nst/Ind/Com/Commu Property Use			
L1989352-1	7171-BH1/2	Saturated Paste Extractables				
L1989352-2	7171-BH2/3	Physical Tests		6.09	2.4	SAR
		Saturated Paste Extractablee	Conductivity	1.36	0.57	mS/cm
L1989352-3	7171-BH3/3	Dhuriod Tooto	SAR	43.3	2.4	SAR
		n nysidar resis Satrirated Deete Extractobloc	Conductivity	1.22	0.57	mS/cm
L1989352-4	7171-BH4/4	Devicion I asic EAll dulables	SAR	55.3	2.4	SAR
		r rijsioal i esis Saturated Daste Evtractabloc	Conductivity	1.26	0.57	mS/cm
L1989352-5	7171-BH5/5	Devicional Tooto	SAR	3.49	2.4	SAR
		Purpaical Tests Saturated Daste Extractables	Conductivity	0.693	0.57	mS/cm
1 1080353 6	11080353 6 7174 DHC/E		SAR	18.9	2.4	SAR
1-1-2000001-1		Physical Tests	Conductivity	2.15	0.57	mS/cm
		Saturated Paste Extractables	SAR	42.2	2.4	SAR
1 1080357.7	7474_BH7/4	Metals	Mercury (Hg)	0.361	0.27	6/6n
		Physical lesits	Conductivity	1.14	0.57	mS/cm
1 1000253 0	7474 0110/6	Saturated Paste Extractables	SAR	9.10	2.4	SAR
L 1 303012-0		Physical Tests	Conductivity	0.576	0.57	mS/cm
1 4000150 0		Saturated Paste Extractables	SAR	10.6	2.4	SAR
R-1908332-9	11/1-6H9/3	Physical Tests	Conductivity	0.665	0.57	mS/cm
1 1080352-10	11080352-10 7171 DL10/E	Saturated Paste Extractables	SAR	8.04	2.4	SAR
F1200002-10		Physical lests	Conductivity	0.681	0.57	mS/cm
11080357-11	11080352-11 7174_DH111/		SAR	3.38	2.4	SAR
L 1303002-1 1		Physical lests	Conductivity	0.711	0.57	mS/cm
		Jakurated Paste Extractables	SAR	16.8	2.4	SAR
		Metals	Cadmium (Cd)	1.81	1.2	5/6n

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

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Lab ID         L1989352-1         L1989352-3         L1989352-5         L1989352-5         L1989352-5         L1989352-5         L1989352-5         L1989352-5         L1989352-5         L1989352-5         L1989352-7         L1989352-5         L1989352-5         L1989352-5         L1989352-5         L1989352-5         L1989352-7         L1989352-7         L1989352-6         L1989352-7         L1989352-7         L1989352-6         L1989352-7         L1989352-6         L1989352-7         L1989352-6         L1989352-7         L1989352-6         L1989352-7         L1989352-6         L1989352-7         L108127-7         L1011-7         L101-7         L101-1         L101-1 <th></th>												
29-AUG-17         29-AUG-17         30-AUG-17         30-AUG-17         29-AUG-17         20-AUG-17         20-AUG-17 <t< th=""><th></th><th></th><th>Lab ID</th><th>L1989352-1</th><th>L1989352-2</th><th>L1989352-3</th><th>L1989352-4</th><th>L1989352-5</th><th>L1989352-6</th><th>L1989352-7</th><th>Ð .</th><th>L1989352-9</th></t<>			Lab ID	L1989352-1	L1989352-2	L1989352-3	L1989352-4	L1989352-5	L1989352-6	L1989352-7	Ð .	L1989352-9
7171-BH1/2       7171-BH2/3       7171-BH3/3       7171-BH4/4       7171-BH6/5       7171-BH6/5       7171-BH6/5       7171-BH6/5       7171-BH6/5         0239       1.36       1.22       1.26       0.693       2.15       1.14       0.576         0239       1.36       1.22       1.26       0.693       2.15       1.14       0.576         2.84       13.9       13.3       51.6       14.2       21.5       3.95       19.8         8.04       8.75       7.76       7.16       7.68       7.64       7.94       7.42			Sample Date	29-AUG-17	29-AUG-17	30-AUG-17	30-AUG-17	29-AUG-17	29-AUG-17	28-AUG-17		26-AUG-17
0.239     1.36     1.22     1.26     0.693     2.15     1.14     0.576       2.84     13.9     13.3     51.6     14.2     21.5     3.95     19.8       8.04     8.75     7.76     7.16     7.68     7.44     7.94     7.42			Sample ID	7171-BH1/2	7171-BH2/3	7171-BH3/3	7171-BH4/4	7171-BH5/5	7171-BH6/5	7171-BH7/4	7171-BH8/5	7171-BH9/3
0.239     1.36     1.22     1.26     0.693     2.15     1.14     0.576       2.84     13.9     13.3     51.6     14.2     21.5     3.95     19.8       8.04     8.75     7.76     7.16     7.68     7.44     7.94     7.42												
0.239 1.36 1.22 1.26 0.693 2.15 1.14 0.576 2.84 13.9 13.3 51.6 14.2 21.5 3.95 19.8 8.04 8.75 7.76 7.16 7.68 7.44 7.94 7.42	Ð		Guide Limits									
0.239 1.36 1.22 1.26 0.693 2.15 1.14 0.576 2.84 13.9 13.3 51.6 14.2 21.5 3.95 19.8 8.04 8.75 7.76 7.16 7.68 7.44 7.94 7.42	Analyte	Unit										
2.84 13.9 13.3 51.6 14.2 21.5 3.95 19.8 8.04 8.75 7.76 7.16 7.68 7.44 7.94 7.42	Conductivity	mS/cm	0.57	0.239	1.36	1.22	1.26	0.693	2.15	1.14	0.576	0.665
8.04 8.75 7.76 7.16 7.68 7.44 7.94 7.42	% Moisture	%	3	2.84	13.9	13.3	51.6	14.2	21.5	3.95	19.8	17.7
suide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use	Hd	pH units	(e) 1	8.04	8.75	7.76	7.16	7.68	7.44	7.94	7.42	7.58
	Guide Limit #1: T1-Soil-Res/Park/Inst/	Ind/Com/Commu	I Property Use									

Analytical result for this parameter exceeds GuideIne Limit. Assessment against GuideIne Limit cannot be made.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

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Physical Tests - SOIL

Lab ID L16 Sample Date 26 Sample ID 717 #1 #2 0.57 * **********************************						
Guide Limits Unit #1 #2 mS/cm 0.57 - 2014 pHunits -		0	L àample Samț	ab ID Date ole ID	L1989352-10 26-AUG-17 7171-BH10/5	L1989352-11 26-AUG-17 7171-BH11/4
mS/cm 0.57 % - PH units -	Analyte		Suide L #1	imits #2		
- stinut Ha	Conductivity	mS/cm	0.57		0.6831412	AL MARCH
- Print Ha	% Moisture	%		×,	17.1	14.2
Ŭ,	Hq	pH units	•	×	10,85	7.33

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

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ANALYTICAL REPORT

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Cvanides - SOII

UVALIACE - SOIL											
		Lab ID Sample Date Sample ID	L1989352-1 29-AUG-17 7171-BH1/2	L1989352-2 29-AUG-17 7171-BH2/3	L1989352-3 30-AUG-17 7171-BH3/3	L1989352-4 30-AUG-17 7171-BH4/4	L1989352-5 29-AUG-17 7171-BH5/5	L1989352-6 29-AUG-17 7171-BH6/5	L1989352-7 28-AUG-17 7171-BH7/4	L1989352-8 26-AUG-17 7171-BH8/5	L1989352-9 26-AUG-17 7171-BH9/3
Analyte	Unit	Guide Limits #1 #2	a2								
Cyanide, Weak Acid Diss	6/6n	0.051 -	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Cuide I imit #1. T1 Soil Declarbd40-40		-									

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made. Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

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## ANALYTICAL REPORT

L1989352 CONTD.... Job Referent 7171 PAGE L 714 18-SEP-17 13:36 (MT)

Cyanides - SOIL

				L198352-11 26-AUG-17 7171-BH11/4	Lab ID L1989352-10 L1989352-11 le Date 26-AUG-17 26-AUG-17 mple ID 7171-BH10/5 7171-BH11/4 #2	Lab ID e Date ple ID #2 #2	Sampl Sam Guide #1	CUnit	Analyte
			Unit	<0.050	<0.050	•	ug/g 0.051	6/6n	cyaniue, weak Acid Diss
		Unit	Unit				0.064		Cyanide, Weak Acid Diss
		:	:			#2	Ŧ	Unit	Analyte
		Guide Limits	Guide Limíts						
Unit	Unit						Guide		
Unit	Unit								
Guide Limits Unit #1 #2	Guide Limits Unit #1 #2					and allo	202		
Sample ID 7171-BH10/5 Guide Limits Unit #1 #2	Sample ID 7171-BH10/5 Guide Limits Unit #1 #2	Sample ID 7171-BH10/5 7171-BH11/4	Samula IT 222 Interes		26-AUG-17	e Date	Sampl		
Sample Date 26-AUG-17 Sample ID 7171-BH10/5 Guide Limits Unit #1 #2	Sample Date 26-AUG-17 Sample ID 7171-BH10/5 Guide Limits Unit #1 #2			L1989352-11	L1989352-10				

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

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ANALYTICAL REPORT

L1989352 CONT'D.... Job Referenr 7171 PAGE 14 18-SEP-17 13:36 (MT)

Saturated Paste Extractables - SOII

		Lab ID Sample Date Sample ID	Lab ID le Date nple ID	L1989352-1 29-AUG-17 7171-BH1/2	L1989352-2 29-AUG-17 7171-BH2/3	L1989352-3 30-AUG-17 7171-BH3/3	L1989352-4 30-AUG-17 7171-BH4/4	L1989352-5 29-AUG-17 7171-BH5/5	L1989352-6 29-AUG-17 7171-BH6/5	L1989352-7 28-AUG-17 7171-BH7/4	L1989352-8 26-AUG-17 7171-BH8/5	L1989352-9 26-AUG-17 7171-BH9/3
Analyte	Unit	Guide Limits #1 #2	mits £2									
SAR	SAR	2,4		S. 6.09	43.3 EARLIN	10-1555 even	Nº 349	ALLEN BIOLEN	Will DOG FRAM		40.6	Contraction of the second
Calcium (Ca)	mg/L	÷	e Q	1.1	3.7	1.8	134	3.7	80 SO	20120000000000000000000000000000000000		5
Magnesium (Mg)	mg/L	14	9	1.0	<1.0	<1.D	6.2	<1.0	0,1>	1.7	4.1	
Sodium (Na)	mg/L	e	•	36.9	301	267	152	133	456	199	110	105

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.



### ANALYTICAL REPORT

L1989352 CONTD.... Job Reference 7171 PAGE L 14 18-SEP-17 13:36 (MT)

# Saturated Paste Extractables - SOIL

		Sampl Sam	Lab ID Sample Date Sample ID	Lab ID L1989352-10 L1989352-11 Imple Date 26-AUG-17 26-AUG-17 Sample ID 7171-BH10/5 7171-BH11/4	L1989352-11 26-AUG-17 7171-BH11/4
Analyte	Unit	Guide #1	Guide Limits #1 #2		
SAR	SAR	24	-	3.38 aven	16.8 secur
Calcium (Ca)	mg/L		i.	43.3	
Magnesium (Mg)	mg/L	•	÷	<1.0	<1.0
Sodium (Na)	mg/L	*	a;	80.8	140

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

### ANALYTICAL\_{EPORT

Job Referenc 171 PAGE 9 14 18-SEP-17 13:36 (MT)

L1989352 CONT'D....

Metals - SOIL											
		Lab I Sample Da Sample I	ID         L1989352-1           Ite         29-AUG-17           ID         7171-BH1/2	L1989352-2 29-AUG-17 7171-BH2/3	L1989352-3 30-AUG-17 7171-BH3/3	L1989352-4 30-AUG-17 7171-BH4/4	L1989352-5 29-AUG-17 7171-BH5/5	L1989352-6 29-AUG-17 7171-BH6/5	L1989352-7 28-AUG-17 7171-BH7/4	L1989352-8 26-AUG-17 7171-BH8/5	L1989352-9 26-AUG-17 7171-BH9/3
Analyte	Unit	Guide Limi #1 #2	<u>it</u>								
Anümony (Sb)	6/6n	1.3	<1.0	<1,D	<1.0	0.12	<1 D	<10		5	
Arsenic (As)	6/ôn	18	1.7	1.6	1.8	2.1	1.6	6.1	1.6	2.6	2.8
Barium (Ba)	6/6n	220	28.8	30.7	27.4	98.3	38.6	46.8	33.0	77.2	88.5
Beryllium (Be)	B/Bn	2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Boron (B)	6/6n	36	5.5	<5.0	<5.0	7.2	<5.0	<5.0	<5.0	6.9	6 8
Boron (B), Hot Water Ext.	6/6n	36	<0.10	0.19	0,17	0.85	0.10	0.56	0 18	0.31	0.45
Cadmium (Cd)	6/6n	1.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium (Cr)	6/ôn	20	14.3	9.0	9.3	12.7	10.2	10.4	8.7	15.8	17.0
Cobalt (Co)	6,6n	21	3.3	2.6	2.8	2.5	3.1	3.3	2.6	4.9	57
Copper (Cu)	6/6n	92	8.1	7.7	7.8	6,0	5.8	6,9	5.5	12.5	13.1
Lead (Pb)	6/6n	120	6.3	21.7	21.3	3.2	6.0	83.3	34.1	35.5	75.7
Mercury (Hg)	6,6n	0.27	0.0095	0.0462	0,0939	0.0300	0.0202	0.361	0.0344	0,0938	0.0635
Malybdenum (Mo)	6/6n	7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.1>	<1.0	<1.0 <
Nickel (Ni)	6/6n	82	7.0	6.1	6.4	5.2	6.3	6.9	4.9	10.1	12.2
Selenium (Se)	6/6n	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1,0	<1.0	<10	<1.0 1.0
Silver (Ag)	6/6n	0.5	<0.20	<0,20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (TI)	б/бп	* •	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	6/6n	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium (V)	6/6n	98	16.6	18.1	18.0	16.0	20.7	20.8	18,2	28.0	28.7
Zinc (Zn)	6/6n	290	26.5	42.4	64.4	24.1	20,0	31.2	29.6	44.8	70.9
Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use	m/Commu	Property Us	ð								

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Analytical result for this parameter exceeds Guide Limit. Assessment against Guideline Limit cannot be made.

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### ANALYTICA REPORT

Metals - SOIL

		_	Lab ID	L1989352-10	L1989352-11
		Sample Date	Date	26-AUG-17	26-AUG-17
		Sam	Sample ID	7171-BH10/5	7171-BH11/4
		Guide Limite	imite		
Analyte	Unit	#	#2		
Antimony (Sb)	6/6n	1.3		<10 510	0.52
Arsenic (As)	6/6n	18	9	- <del>-</del>	66
Barium (Ba)	6/6n	220		22.9	38.1
Beryllium (Be)	6/6n	2.5	8	<0.50	<0.50
Boron (B)	6/6n	36		<5.0	<50
Boron (B), Hot Water Ext.	6/6n	36	Ŕ	0.26	0.33
Cadmium (Cd)	6/ōn	1.2	ž	<0.50	181
Chromium (Cr)	6/6n	20	X	7.9	11.7
Cobalt (Co)	6/6n	21	ä	2.2	3.4
Copper (Cu)	6/6n	92	j,	3.7	8.2
Lead (Pb)	6/6n	120	•	6.6	37.0
Mercury (Hg)	6/6n	0.27		_0.0263	0.0332
Molybdenum (Mo)	6/6n	2	×	<1.D	<1.0
Nickel (Ni)	6/6n	82	10	4.0	6.9
Selenium (Se)	6/6n	1.5	5.95	<1.0	<1.0
Silver (Ag)	6/6n	0,5	•	<0.20	<0.20
Thallium (TI)	6 <i>1</i> 6n	-	s)	<0.50	<0.50
Uranium (U)	6∕6n	2.5	×	<1.0	<1.0
Vanadium (V)	6/6n	86	×	21.7	22.5
Zinc (Zn)	5/6n	290	19	30.3	40.0

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made. May Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

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### **ANALYTICAL** *REPORT*

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opeciated metals - SUIL											
		Lab ID Sample Date Sample ID	L1989352-1 29-AUG-17 7171-BH1/2	L1989352-2 29-AUG-17 7171-BH2/3	L1989352-3 30-AUG-17 7171-BH3/3	L1989352-4 30-AUG-17 7171-BH4/4	L1989352-5 29-AUG-17 7171-BH5/5	L1989352-6 29-AUG-17 7171-BH6/5	L1989352-7 28-AUG-17 7171-BH7/4	L1989352-8 26-AUG-17 7171-BH8/5	L1989352-9 26-AUG-17 7171-BH9/3
Analyte	Unit	Guide Limits #1 #2									
Chromium, Hexavalent	6/6n	ug/g 0.66 -	<0.20	<0.20	<0.20	0.26	<0.20	<0.20	<0.20	<0.20	<0.20
Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property U	om/Commu	u Property Use									

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

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## ANALYTICAL REPORT

L1989352 CONT'D.... Job Referen 717 PAGE 1. 14 18-SEP-17 13:36 (MT)

Speciated Metals - SOIL

		Sample Sam	Lab ID Sample Date Sample ID	Lab ID L1989352-10 L1989352-11 e Date 26-AUG-17 26-AUG-17 hple ID 7171-BH10/5 7171-BH11/4	L1989352-10 L1989352-11 26-AUG-17 26-AUG-17 7171-BH10/5 7171-BH11/4
Analyte	Unit	Guide Limits #1 #2	Limits #2		
Chromium, Hexavalent	6,6n	0.66	4	<0.20	<0.20

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made. Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

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)		R	Reference I PAGE 13 ( 13:363 (MT)
Qualifiers for Individual Parameters Listed: Ouslifier	al Parameters Listu	ed:	
	addin SAR represents	Reported SAR represents a maximum value. Actual SAR may be	mav be lower if both Ca and Mo were defectable
Methods Listed (if applicable);	icable):		
ALS Test Code	Matrix	Test Description	Method Reference**
B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011) HW EXTR, EPA 6010B	I) HW EXTR, EPA 6010B
A dried solid sample	is extracted with ca	licium chloride, the sample undergoes a	A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.
Analysis conducted ii CN-WAD-R511-WT	n accordance with t Soil	the Protocot for Analytical Methods Used Cyanide (WAD)-O.Reg 153/04 (July 2011)	Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). <b>CN-WAD-R511-WT</b> Soil Cyanide (WAD)-O.Reg 153/04 (July MOE 3015/APHA 4500CN I-WAD 2011). 2011)
The sample is extrac chloride then reacts v	ted with a strong be with a combination	The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.	The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.
Analysis conducted i CR-CR6-IC-WT	n accordance with t Soil	the Protocol for Analytical Methods Used Havavalant Chromium in Soil	Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). CR-CRAIC-WT Soil Hevevalent Chromium in Soil
This analysis is carri The procedure involv	ed out using proced es analysis for chro	lures adapted from "Test Methods for Ev mium (VI) by ion chromatography using	This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.
Analysis conducted i.	n accordance with t	the Protocol for Analytical Methods Used	Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).
EC-WT	Soil	Conductiyity (EC)	MOEE E3138
A representative sub	sample is tumpled	A representative subsample is tumbled with de-ionized (DI) water. The ratio of w	ratio of water to soil is 2:1 v/w. After turnbling the sample is then analyzed by a conductivity meter.
Analysis conducted i HG-200.2-CVAA-WT	n accordance with t Soil	the Protocol for Analytical Methods Used Mercury in Soil by CVAAS	Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). <b>IG-200.2-CVAA-WT</b> Soil Mercury in Soil by CVAAS EPA 200.2/1631E (mod)
Soil samples are dig	ested with nitric and	2	analysis by CVAAS.
Analysis conducted i	n accordance with 1	the Protocol for Analytical Methods User	Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).
MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a sample matrix, some during sampling, stoi	heated strong acid metals may be on rage, or digestion.	digestion with HNO3 and HCl and is inte ly partially recovered, including Al, Ba, B Analysis is by Collision/Reaction Cell ICl	This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including AI, Ba, Be, Cr, Sr, Ti, Ti, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Analysis conducted i of the Analytical Tes	in accordance with t Group (ATG) has	the Protocol for Analytical Methods User been requested (the Protocol states that	Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).
MOISTURE-WT	Soil	% Moisture	Gravimetric: Oven Dried
PH-WT	Soil	Hd	MOEE E3137A

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d.		lyzed		a, Ca	é							rior to		mes no
L1989352 CONT'D Job Reference: <sup>–</sup> PAGE 14 o. 18-SEP-17 13:36 (MT)		A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.	, 2011).	A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.	2011).							applicable tests, surrogates are added to samples prior to		Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information.
¥		rated from the s	tion Act (July 1,	VOES. The con	tion Act (July 1,							rogates are add		or non-infringe
		us layer is sepa	unmental Protec	zed using a JCF e.	inmental Protec							cable tests, sur		ticular purpose,
		ites. The aqueo	V.1 of the Envir	l and then analy to any guidelin	/.1 of the Enviro			t helow					×.	fitness for a par
tion		at least 30 minu	es under Part X	e solid, acidified t for comparisor	es under Part XV			Refer to the lis				ironmental sam listed there.	iew.	ut not limited to
e Ir Orma	stence**	by shaking for	nent of Properti 0C	eparated from th rameters are no	nent of Properti	formance.		vsis for that test				ally occur in env surrogates are	ling final QC rev	ied, including, b
Reference Ir Crmation	Method Reference**	chloride solutior	d in the Assessme SW846 6010C	ous extract is se se individual pa	is Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).	s to improve per		formed analytical analysis for that test. Refer to the list helow		D, CANADA		, but that do not normally occur in environmental samples. For boratory objectives for surrogates are listed there. tion.	to change, penc	pressed or impl
Ŕ		0.01M calcium	al Methods Use (July 2011)	water, the aque arameters. The	al Methods Used	erence method:		/ that performed		ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA	- A40 	analyte(s), but ti olumn, laborato ile r explanation.	a laboratory. conormon. ark are subject	y kind, either ex
	Test Description	id with 20mL of	Protocol for Analytical Methoc SAR-O.Reg 153/04 (July 201	with deionized i	col for Analytics	om specified ref		te the laboratory	c	NTAL - WATER		aviour to target a splay the D.L. c th of sample.L. c weight of samp adjusted weight ts per million. and definition fo	received by the ED IN ACCEPTABLE DRAFT waterm	t warranty of an tion.
		imple is extracte	se with the Proto SAR	ple is extracted A requirements	e with the Proto	modifications fr		t code(s) indica	Laboratory Location	S ENVIRONME	3	e similar in beh n reports that di sed on dry weig n based on wel t on volume, pa i on volume, pa	the samples as Es were recervi reports with the	id "as is" withou is in the informe
ipplicable):	Matrix	ortion of the sa and electrode.	ed in accordanc Soil	gated solid sam ted as per CAL/	ed in accordanc	ay incorporate	Imbers:	of the above tes.		ALS	EPORT TERMS	ppounds that ar k on recovery. It per kilogram ba ams per kilogram ms per kilogram entration baseo I limit.	id relate only to TATED, ALL SAMPL unsigned test I	elines is provide rors or omissior
Methods Listed (if applicable):	ALS Test Code	t minimum 10g p sing a pH meter	Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). SAR-R511-WT Soil SAR-O.Reg 153/04 (July 2011) SW846 6010C	A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyze and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.	Analysis conducted in accordance with the Protocol for Analytical Method	**ALS test methods may incorporate modifications from specified reference methods to improve performance.	Chain of Custody Numbers:	15-557089 The last two letters of the above test code(s) indicate the laboratory that per	Laboratory Definition Code	WT	GLOSSARY OF REPORT TERMS	Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there. mg/kg - milligrams per kilogram based on dy weight of sample mg/kg lwt - milligrams per kilogram based on ipid-adjusted weight mg/kg lwt - milligrams per kilogram based on ipid-adjusted weight mg/kg lwt - milligrams per kilogram based on volume, parts per million. < - Less than.	Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.	Application of guidelines is provided "as is" without war responsibility for errors or omissions in the information.
Mett	ALS	≪ ⊐	s, s	4 0	A	SAA**	Cha	15 The	La	2	G	ns See Bee See See See See See See See See	Te. UNI	Ap

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### Quality Control Report

		Workorder	: L198935	52 F	Report Date:	18-SEP-17		Page 1 of	8
Client:	V.A. WOOD ASSOCI, 1080 Tapscott Rd Uni Scarborough ON M1	t 24							
Contact:	Vic Wood			E					
Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed	
B-HWS-R511-V	VT Soil								
Batch	R3828286								
WG2615585 Boron (B)	5-4 DUP Hot Water Ext.	L1988852-3 0.14	0.14		ug/g	2.1	30	14-SEP-17	
WG2615585		HOTB-SAL_			09/9	2.1	30	14-327-17	
	Hot Water Ext.	NOT D-OAC_	128.3		%		70-130	14-SEP-17	
WG2615585	-3 LCS								
Boron (B), H	Hot Water Ext.		97.8		%		70-130	14-SEP-17	
WG2615585			-0.40				0.4		
	Hot Water Ext.		<0.10		ug/g		0.1	14-SEP-17	
Batch WG2616578	R3829177	1 40000 50 44							
	-4 DUP lot Water Ext.	L1989352-11 0.33	0.33		ug/g	1.2	30	15-SEP-17	
WG2616578	-2 IRM	HOTB-SAL_	SOIL5		•••				
Boron (B), H	lot Water Ext.		125.0		%		70-130	15-SEP-17	
V 16578									
Boron (B), ⊦	iot Water Ext.		110.6		%		70-130	15-SEP-17	
WG2616578	-1 MB lot Water Ext.		<0.10		ug/g		0.1		
• •			-0.10		ugry		0.1	15-SEP-17	
CN-WAD-R511-									
Batch WG2613570-	R3830913 -3 DUP	L1989325-1							
	eak Acid Diss	<0.050	<0.050	RPD-NA	ug/g	N/A	35	15-SEP-17	
WG2613570-	2 LCS	23		э.					
Cyanide, We	ak Acid Diss		95.0		%		80-120	15-SEP-17	
WG2613570-									
	eak Acid Diss		<0.050		ug/g		0.05	15-SEP-17	
WG2613570- Cyanide, We		L1989325-1	99.6		%		70-130	15-SEP-17	
			00.0		70		70-130	10-021-17	
CR-CR6-IC-WT	Soll								
Batch WG2613572-	R3826444 4 CRM	WT-SQC012							
Chromium, H		in out of the	94.9		%		70-130	13-SEP-17	
WG2613572-	3 DUP	L1989232-1							
Chromium, H	lexavalent	<0.20	<0.20	RPD-NA	ug/g	N/A	35	13-SEP-17	
WG2613572-			06 5		0/				
Chromium, H			96.5		%		80-120	13-SEP-17	
WG2613572- Chromium, H			<0.20		ug/g		0.2	13-SEP-17	
)					-9.9		_		



### Quality Control Report

			Workorder:	L198935	52	Report Date:	18-SEP-17		Page 2	2 01	f 8
Client:		DD ASSOCIA scott Rd Unit	TES LIMITED 24								
	Scarborou	igh ON M1>	(1E7								
Contact:	VIc Wood										
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyze	d	
CR-CR6-IC-WT		Soil									
Batch	R3830869										

WG2617273-3 CRM Chromium, Hexavalen		85.7 SQC012		%		70-130	18-SEP-17
WG2617273-4 DUP Chromium, Hexavalen		0 <b>2202-1</b> 0 <0.20		us la			
WG2617273-2 LCS	-0.2	0 \0.20	RPD-NA	ug/g	N/A	35	18-SEP-17
Chromium, Hexavalen	t	96.5		%		80-120	18-SEP-17
WG2617273-1 MB Chromium, Hexavalen		<0.20	×	ug/g		0.2	18-SEP-17
EC-WT	Soil		<u>14</u>				
Batch R3828610	ł						
WG2615587-4 DUP Conductivity	<b>WG2</b> 0.189	615587-3 0.190		mS/cm	0,6	20	14-SEP-17
Wେଂଶ୍15863-1 LCS							
uctivity WG2615587-1 MB		99.6		%		90-110	14-SEP-17
Conductivity		<0.0040		mS/cm		0.004	14-SEP-17
Batch R3828774							
WG2615589-4 DUP Conductivity	<b>WG2</b> 1.60	5 <b>15589-3</b> 1.62		mS/cm	1.1	20	14-SEP-17
WG2615865-1 LCS Conductivity		99.1		%		90-110	14.050.47
WG2615589-1 MB						90-110	14-SEP-17
Conductivity		<0.0040		mS/cm		0.004	14-SEP-17
1G-200.2-CVAA-WT	Soil		9				
Batch R3828494							
WG2615554-2 CRM Mercury (Hg)	WT-C	ANMET-TILL1 96.6		%		70-130	14-SEP-17
WG2615554-6 DUP Mercury (Hg)	WG26 0.093	15554-5 9 0.0839		ua/a			
WG2615554-3 LCS	0.000	0,0000		ug/g	11	40	14-SEP-17
Mercury (Hg)		103.5		%		80-120	14-SEP-17
WG2615554-1 MB Mercury (Hg)		<0.0050	¥0	mg/kg		0.005	14-SEP-17
1ET-200.2-CCMS-WT	Soil						



### Quality Control Report

Workorder: L1989352

Report Date: 18-SEP-17

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V.A. WOOD ASSOCIATES LIMITED 1080 Tapscott Rd Unit 24

Scarborough ON M1X 1E7

Contact: Vic Wood

Client:

est	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R382924	7							
WG2615554-2 CRN	1	WT-CANME			%		70.420	14 950 17
Antimony (Sb)			99.5 101.7		%		70-130 70-130	14-SEP-17 14-SEP-17
Arsenic (As)					%		70-130	
Barium (Ba)			103.1		%		70-130	14-SEP-17 14-SEP-17
Beryllium (Be)			98.5 3.3					
Boron (B)					mg/kg %		0-8.2	14-SEP-17
Cadmium (Cd)			108.8				70-130	14-SEP-17
Chromium (Cr)			104.3		%		70-130	14-SEP-17
Cobalt (Co)			103.0		%		70-130	14-SEP-17
Copper (Cu)			103.1				70-130	14-SEP-17
Lead (Pb)			102.6		%		70-130	14-SEP-17
Molybdenum (Mo)			109.9 102.1		%		70-130	14-SEP-17 14-SEP-17
ال (Ni)							70-130 0.11-0 <i>.</i> 51	14-SEP-17
Selenium (Se)			0.32 0.23		mg/kg mg/kg		0.13-0.33	14-SEP-17
Sliver (Ag)			0.23				0.13-0.33	14-SEP-17
Thallium (TI)					mg/kg %			
Uranium (U)			105.6 102.3		%		70-130 70-130	14-SEP-17 14-SEP-17
Vanadium (V)					%			
Zinc (Zn)			103.8		70		70-130	14-SEP-17
WG2615554-6 DUP Antimony (Sb)		WG2615554- 0.15	•5 0.18		ug/g	16	30	14-SEP-17
Arsenic (As)		1.78	1.81		ug/g	2.0	30	14-SEP-17
Barium (Ba)		27.4	27.5		ug/g	0.7	40	14-SEP-17
Beryllium (Be)		0.20	0.18		ug/g	8.3	30	14-SEP-17
Boron (B)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	14-SEP-17
Cadmium (Cd)		0.173	0.157		ug/g	9.6	30	14-SEP-17
Chromium (Cr)		9.32	9.21		ug/g	1.2	30	14-SEP-17
Cobalt (Co)		2.82	2.84		ug/g	0.7	30	14-SEP-17
Copper (Cu)		7.75	7.94		ug/g	2.4	30	14-SEP-17
Lead (Pb)		21.3	24.8		ug/g	15	40	14-SEP-17
Molybdenum (Mo)		0,28	0.27		ug/g	2.9	40	14-SEP-17
		6.38	6.47	4	ug/g	1.4	30	14-SEP-17
Nickel (Ni)								
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	14-SEP-17
5" nr (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	14-SEP-17

r (Ag)



### **Quality Control Report**

Workorder: L1989352

Report Date: 18-SEP-17

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V.A. WOOD ASSOCIATES LIMITED Client: 1080 Tapscott Rd Unit 24 Scarborough ON M1X 1E7 Vic Wood

Contact:

Fest	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-W	T Soil				4			
Batch R382	29247							
	DUP	WG2615554-6						
Thailium (TI)		0.060	0.064	93	ug/g	6.7	30	14-SEP-17
Uranium (U)		0.401	0.394		ug/g	1.6	30	14-SEP-17
Vanadium (V)		18.0	17.6		ug/g	1.8	30	14-SEP-17
Zinc (Zn)		64.4	66.7		ug/g	3.4	30	14-SEP-17
WG2615554-4 I Antimony (Sb)	LCS							
Arsenic (As)			99.2		%		80-120	14-SEP-17
Barium (Ba)			97.4		%		80-120	14-SEP-17
Beryllium (Be)			102.5		%		80-120	14-SEP-17
			90.6		%		80-120	14-SEP-17
Boron (B) Cadmium (Cd)			85.8		%		80-120	14-SEP-17
( ) ·			99.2		%		80-120	14-SEP-17
Cobalt (Co)			98.4		%		80-120	14-SEP-17
			100.2		%		80-120	14-SEP-17
Copper (Cu)			97.0		%		80-120	14-SEP-17
Lead (Pb) Molybdenum (Mo)			98.3		%		80-120	14-SEP-17
			100.8	2	%		80-120	14-SEP-17
Nickel (Ni)			98.0		%		80-120	14-SEP-17
Selenium (Se)			98.0		%		80-120	14-SEP-17
Silver (Ag)			99.5		%		80-120	14-SEP-17
Thallium (TI)			99.9		%		80-120	14-SEP-17
Uranium (U)			100.8		%		80-120	14-SEP-17
Vanadium (V)			100.9		%		80-120	14-SEP-17
Zinc (Zn)			93,5		%		80-120	14-SEP-17
WG2615554-1 M Antimony (Sb)	В		<0.10		mg/kg		0.1	14 SED 17
Arsenic (As)			<0.10		mg/kg		0.1	14-SEP-17
Barium (Ba)			<0.50		mg/kg		0.1	14-SEP-17
Beryllium (Be)			<0.10				0.3	14-SEP-17
Boron (B)			<5.0		mg/kg mg/kg			14-SEP-17
Cadmium (Cd)			<0.020		mg/kg		5 0.02	14-SEP-17
Chromium (Cr)			<0.50		mg/kg		0.02	14-SEP-17
Cobalt (Co)			<0.10		mg/kg			14-SEP-17
Copper (Cu)			<0.50	9			0.1	14-SEP-17
Le jb)			<0.50		mg/kg		0.5	14-SEP-17
5			-0.00		mg/kg		0.5	14-SEP-17



## **Quality Control Report**

Workorder: L1989352

Report Date: 18-SEP-17

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Client:	V.A. WOOD ASSOCIATES LIMITED
	1080 Tapscott Rd Unit 24
	Scarborough ON M1X 1E7

Contact: Vic Wood

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200,2-CCMS-WT Batch R3829247	Soil	ž						
WG2615554-1 MB								
Molybdenum (Mo)			<0.10		mg/kg		0,1	14-SEP-17
Nickel (Ni)			<0.50		mg/kg		0.5	14-SEP-17
Selenium (Se)			<0.20		mg/kg		0.2	14-SEP-17
Silver (Ag)			<0.10		mg/kg		0.1	14-SEP-17
Thallium (TI)			<0.050		mg/kg		0.05	14-SEP-17
Uranium (U)			<0.050		mg/kg		0.05	14-SEP-17
Vanadium (V)			<0.20		mg/kg		0.2	14-SEP-17
Zinc (Zn)			<2.0		mg/kg		2	14-SEP-17
MOISTURE-WT	Soil							
Batch R3825968								
WC2613568-3 DUP listure		<b>L1988852-2</b> 6.25	5.89	(A)	<b>%</b> a	6.1	20	12-SEP-17
WG2613568-2 LCS % Moisture			99.3		%		90-110	12-SEP-17
WG2613568-1 MB % Moisture			<0.10		%		0.1	12-SEP-17
PH-WT	Soil							
Batch R3827676								
<b>WG2613554-1 DUP</b> рН		L <b>1988849-1</b> 7.88	7.88	S J	pH units	0.00	0.3	13-SEP-17
<b>WG2614791-1 LCS</b> рН			6.97		pH units		6.9-7.1	13-SEP-17
SAR-R511-WT	Soil				2			
Batch R3828534								
WG2615589-4 DUP		WG2615589-3						
Calcium (Ca)		8.9	9.0		mg/L	1.3	30	14-SEP-17
Sodium (Na)		336	339	22	mg/L	0.7	30	14-SEP-17
Magnesium (Mg)		2.8	2.4		mg/L	15	30	14-SEP-17
WG2615589-2 IRM		WT SAR1						
Calcium (Ca)			96.0		%		70-130	14-SEP-17
Sodium (Na)			101.2		%		70-130	14-SEP-17
Magnesium (Mg)			95.7		%		70-130	14-SEP-17
WG2615589-1 MB								
Calcium (Ca)			<1.0		mg/L		1	14-SEP-17
/)m (Na)			<1.0	×.	mg/L		1	14-SEP-17



# Quality Control Report

			Workorder:	L1989352	2	Report Date:	18-SEP-17		Page 6 of 8
Client: Contact:	1080 Tap	DD ASSOCIATES scott Rd Unit 24 ugh ON M1X 1E							
ſest		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT		Soil							
Batch WG2615589- Magneslum				<1.0		mg/L		ĩ	14-SEP-17
	R3828541					2			
WG2615587- Calcium (Caj			WG2615587-3 7.0	6.6		mg/L	6.9	30	14-SEP-17
Sodium (Na)			4.4	4.1		mg/L	7.2	30	14-SEP-17
Magnesium (	(Mg)		1.9	1.7		mg/L	9.4	30	14-SEP-17
WG2615587-			WT SAR1						
Calcium (Ca)	1			97.4		%		70-130	14-SEP-17
Sodium (Na)				100.8		%		70-130	14-SEP-17
Magneslum (	Mg)			98.4		%		70-130	14-SEP-17
W 15587- C m (Ca)				<1.0				ar.	
Sodium (Na)						mg/L		1	14-SEP-17
Magnesium (	Mal			<1.0		mg/L		1	14-SEP-17
พอษาธรณฑ (	w9)			<1.0		mg/L		1	14-SEP-17

	Quality	Control Report	
Workorder:	L1989352	Report Date:	18-SEP-17

Client:	V.A. WOOD ASSOCIATES LIMITED 1080 Tapscott Rd Unit 24
Coct:	Scarborough ON M1X 1E7 Vic Wood

#### Legend:

				and the second
ALS Control Limit (Data Quality Objectives)				
Duplicate				
Relative Percent Difference				
Not Available				
Laboratory Control Sample				
Standard Reference Material				
Matrix Spike				
Matrix Spike Duplicate				
Average Desorption Efficiency				
Method Blank	2			
Internal Reference Material				
Certified Reference Material				
Continuing Calibration Verification				
Calibration Verification Standard				
Laboratory Control Sample Duplicate				
Parameter Qualifier Definitions:				
	Duplicate Relative Percent Difference Not Available Laboratory Control Sample Standard Reference Material Matrix Spike Matrix Spike Duplicate Average Desorption Efficiency Method Blank Internal Reference Material Certified Reference Material Continuing Calibration Verification Calibration Verification Standard Laboratory Control Sample Duplicate	Duplicate Relative Percent Difference Not Available Laboratory Control Sample Standard Reference Material Matrix Spike Matrix Spike Duplicate Average Desorption Efficiency Method Blank Internal Reference Material Certified Reference Material Continuing Calibration Verification Calibration Verification Standard Laboratory Control Sample Duplicate	Duplicate Relative Percent Difference Not Available Laboratory Control Sample Standard Reference Material Matrix Spike Matrix Spike Duplicate Average Desorption Efficiency Method Blank Internal Reference Material Certified Reference Material Continuing Calibration Verification Calibration Verification Standard Laboratory Control Sample Duplicate	Duplicate Relative Percent Difference Not Available Laboratory Control Sample Standard Reference Material Matrix Spike Matrix Spike Duplicate Average Desorption Efficiency Method Blank Internal Reference Material Certified Reference Material Continuing Calibration Verification Calibration Verification Standard Laboratory Control Sample Duplicate

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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V.A. WOOD ASSOCIATES LIMITED Client: 1080 Tapscott Rd Unit 24 Scarborough ON M1X 1E7 Vic Wood

Hold Time Exceedances:

	Sample						
ALS Product Description	ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
% Moisture							
	7	28-AUG-17 08:00	12-SEP-17 09:00	14	15	days	EHTR
	8	26-AUG-17 12:00	12-SEP-17 09:01	14	17	days	EHTR
	9	26-AUG-17 12:00	12-SEP-17 09:02	14	17	days	EHTR
	10	26-AUG-17 08:00	12-SEP-17 09:03	14	17	days	EHTR
	11	26-AUG-17 08:00	12-SEP-17 09:04	14	17	days	EHTR
Cyanides							
Cyanide (WAD)-O.Reg 153	3/04 (July 201	1)					
	7	28-AUG-17 08:00	12-SEP-17 08:00	14	15	days	EHTR
	8	26-AUG-17 12:00	12-SEP-17 08:00	14	17	days	EHTR
	9	26-AUG-17 12:00	12-SEP-17 08:00	14	17	days	EHTR
	10	26-AUG-17 08:00	12-SEP-17 08:00	14	17	days	EHTR
	11	26-AUG-17 08:00	12-SEP-17 08:00	14	17	days	EHTR

#### Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended. Exceeded ALS recommended hold time prior to sample receipt. EHTR: EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry. EHT: Exceeded ALS recommended hold time prior to analysis. ALS recommended hold time (see units). Rec. HT:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes. Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1989352 were received on 11-SEP-17 17:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order,

Nucs\*:

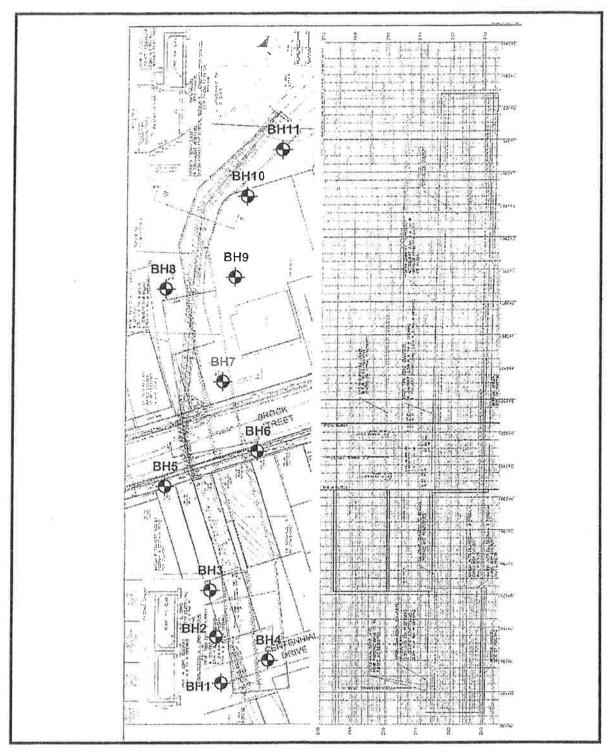
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Email 3     Frequent 1     Terrer 4     Email 3     Terrer 4     Entition       Doy of Threads with Report 10     Terrer 1     Terrer 4     Terrer 4     Terrer 4     Terrer 4       Doy of Threads with Report 10     Terrer 4     Terrer 4     Terrer 4     Terrer 4     Terrer 4       Doy of Threads with Report 10     Terrer 4     Terrer 4     Terrer 4     Terrer 4     Terrer 4       Doy of Threads with Report 10     Terrer 4     Terrer 4     Terrer 4     Terrer 4     Terrer 4       Dort 4     Terrer 4     Terrer 4     Terrer 4     Terrer 4     Terrer 4       Sample Mentification and/or Coordinates     Contact: 101 PT     Reputing Coce:     Reputing Coce:       Tris description with appear on the neporty     Terrer 4     Terrer 7     Sample Viet       Tris description with appear on the neporty     Terrer 7     Terrer 7     Sample Viet       Tris description with appear on the neporty     Terrer 7     Terrer 7     Sample Viet       Tris description with appear on the neporty     Terrer 7     Terrer 7     Sample Viet       Tris description with the neporty     Terrer 7     Terrer 7     Sample Viet       Tris description with the neporty     Terrer 7     Terrer 7     Sample Viet       Tris description of the neporty     Tere 7     Terrer 7 <td< td=""><td>For tests that can not so performed according to the service level affected, you will be considered. Indense Filtered (F), Preserved (F) or Filtered and Preserved (FP) betwo</td></td<>	For tests that can not so performed according to the service level affected, you will be considered. Indense Filtered (F), Preserved (F) or Filtered and Preserved (FP) betwo
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Barrel as Report To     Total or as a loss and more obstribution.     Total of the result of	Indeate Filered (F) Preserved (FP) betw Indeate Filered (F) Or Filered and Preserved (FP) betw Indeate Filered (F) Determined Indeate Filered (F) Determine
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11/1     2.4     0.4     1       17/1     2.8     0.4     1       17/1     2.6     0.4     1       17/2     2.6     0.4     1       17/3     2.6     0.4     1       17/3     2.6     0.4     1       17/1     2.6     0.4     0.4       11/1     2.6     0.1     0.1       11/1     2.6     0.1     0.1       11/1     2.6     0.1     0.1       11/1     2.6     0.1     0.1       11/1     2.6     0.1     0.1       11/1     2.6     0.1     0.1       11/1     2.6     0.1     0.1       11/1     2.6     0.1     0.1       11/1     2.6     0.1     0.1       11/1     0.1     0.1     0.1       11/1     0.1     0.1     0.1       11/1     0.1     0.1     0.1       11/1     0.1     0.1     0.1       11/1     0.1     0.1     0.1       11/1     0.1     0.1     0.1       11/1     0.1     0.1     0.1       11/1     0.1     0.1       11/1     0.1     0.1 <td></td>	
H1/f     2.6     L     L       H6/5     2.6     L     L       H1/f     2.6     2.6     L       H1/f     2.6     2.6     L       H1/f     2.6     2.6     2.6       H1/f     2.6     2.6     2.6       L+11/f     2.6     2.6     2.6       Lettl/f     2.6     2.6     2.6       Luei     Special Instructions / Specify Criteria to add on report by clickling on the drop-down list below     Frozan       Luei     Special Instructions / Specify Criteria to add on report by clickling on the drop-down list below     Frozan       Luei     Special Instructions / Specify Criteria to add on report by clickling on the drop-down list below     Frozan	
HE/L     Me     Mn     U       HA/3     26     9.4     0.4       H/1/L     26     7.6     6.4     0.4       H/1/L     27     24     6.4     0.4       H/1/L     24     7.8     6.4     0.4       H/1/L     24     7.8     6.4     0.4       H/1/L     24     7.8     7.4     7.4       L H/1/L     3     5     9.6     1.4       L H/1/L     3     5     9.6     1.4       L H/1/L     3     3     1.4     1.6       L H/1/L     3     5     1.4	
M     M       YO/S     X       Fractions       Packal Instructions / Specify Criteria to add on report by Cricking on the drop-down list below (electronic COC only)       Fraction       Tube       Tube	
HOLS 26 For 26 F	2
t-11/ C A A A A A Frozen tuse) Special instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only) Frozen tuse P add TAME / Cooling	
t use) Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below Frozan (electronic COC only) Trozan Frozan Proceeding (Proceeding Cocoling (Cocoling (Cocoli	
t use) Special Instructions / Specify Criteria to aid on report by dicking on the drop-down list below Frozen (electronic COC only) (Electronic COC only) (Frozen (the Pack TAKe /	
Take 1 Frozen	* SAMPLE CONDITION AS RECEIVED (Jub use only).
Table 1 Cooling 1	SIF Observations
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SHIPMENT RELEASE (clevi use)	FINAL SHIPMENT REGEPTION (lab use ofily)
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HEFEN IC ARK AVE FOR ALS LOCATIONS AND SAMPLING INFORMATION Falue b compared if portions of this form may dotay analysis. Please fills have from LEGIBLY. By the use of this form the user addrownedges and agrees with the Remain and Conditions as specified on the back page by the where - report copy.	COM: CLIENT COPY back page bit the white - report copy.

#### ENCLOSURES

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#### Ref. No. 7171-17-6

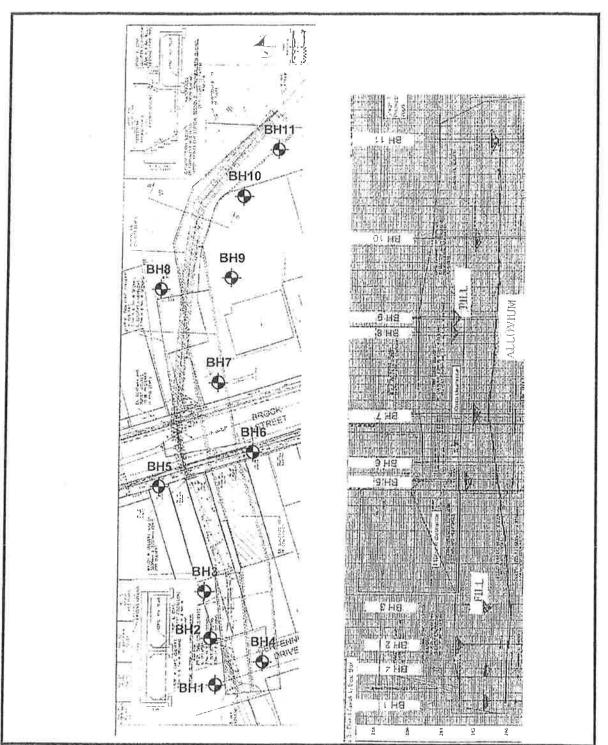
Enclosure 1



# BOREHOLE LOCATION PLAN

Ref. No. 7171-17-6

Enclosure 1A



# SUMMARIZED LONGITUDINAL SECTION

#### Borehole No: 1

Enclosure No : 2

Client : AECOM

**Project : Culvert Reconstruction** 

Location : Brock St./Centennial Dr., Uxbridge, ON

Method : Auger

Diameter : 110 mm

Datum Elevation : Gendetic

Date : August 29, 2017

	SUBSURFACE PROFILE										
Elevation m	Bepth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300nim 20 40 60 80	Cont	isture ent, % 30 50	Remarks
263.01	0	Ground Surface	- K				-			1	
262.26	1-1-1-1	Augered to 0.75 m									50 mm diameter monitoring well
	1				1	SS	34	0			to depth of 6.1 m
	-	FILL			ʻ2	SS	13	0			
	2-	Silty sand, some gravel, brown, moist, compact to desne then very loose			3	SS	2 (				
260,11	3			Ī	2	33		2			
	1.1.1.1.	SILTY SAND Loose, some wood fragments and peat,			4	SS	8	þ			k I
259.01	4	grey, wet							, I		
	11L-				5	SS	19	0		1.00	
	5	SANDY SILT Compact, silt and very fine sand, light			her "runs or anno second						
	 6—	grey, wet			3						
56.46	ļ				6	ss	20	0		1	
	7-	End of Borchole									
	1-1-1										
	8-								11		
		V.A. WOOD	ASS	00	IA	TE	S L	IMITED			Disk :

#### Borehole No: 2

Enclosure No : 3

Client: AECOM

**Project : Culvert Reconstruction** 

Location : Brock St./Centennial Dr., Uxbridge, ON

**Datum Elevation : Geodetic** 

Date : August 29, 2017 SUBSURFACE PROFILE SAMPLE Standard Elevation m Penetration Moisture Remarks Test Content, % Ξ Description Number N-value Symbol Depth blows/300mm Water Type 20 40 60 80 10 30 50 1 1 1 262.81 **Ground Surface** 0-Augered to 0.75 m 50 mm diameter 262.02 monitoring well 1 SS 5 () to depth of 9.1 m FILL 2 SS 3 ( 2-Organic stained sand, some gravel, brown, moist, loose 3 SS 6 259.91 3 7 4  $\mathbf{SS}$ **GRAVELLY SAND** 5 SS 8 Loose, grey, wet to saturated 5 1 6 256.41  $\mathbf{SS}$ 5 0 ĥ L. L. L. SANDY SILT 7 23 SS O  $8 \rightarrow$ loose then compact, silt and very fine sand, light grey, wet 8 31 sand and gravel at the bottom SS 253.21 End of Borehole 10-V.A. WOOD ASSOCIATES LIMITED Disk : Sheet: 1 of 1

Method : Auger

Diameter : 110 mm

## Borehole No : 3

Enclosure No : 4

Client : AECOM

Project : Culvert Reconstruction

Location : Brock St./Centennial Dr., Uxbridge, ON

Method : Auger

Diameter : 110 mm

**Datum Elevation : Geodetic** 

Date : August 30, 2017

		SUBSURFACE PROFILE			S	AMPL	Æ			
Elevation m	Depth In	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm 20 40 60 80	Moisture Content, %	Remarks
262.72	0_1	Ground Surface	1			1				-
261.97		Augered to 0.75 m								50 mm diameter monitoring well
	1.1.1	FILL			1	SS	3 (	D -	•	- to depth of 9.1 m
		Well graded sand, some gravel, brown, moist, wet at the bottom, very loose then			2	SS	6	0		
259,82		loose			3	SS	6	þ	•	
- ar c g trad	3		9 0 0 0		4	SS	5 (	þ		
	1-1-1-1	GRAVELLY SAND	۹ . •							•
		Loose to compact, grey, wet to saturated	9 . 9 .		5	SS	15	Ø	•	
257.22	5		, , , , , , , , , , , , , , , , , , ,							
	6-				6	SS	3 (			
	7-	SANDY SILT		1				4 1 1		
	L. L. L.	Loose then compact, silt and very fine sand, light grey, wet to saturated		-		00		x		
254.22	8-				7	SS	18	0		-
4	9-	SAND AND GRAVEL	۹. ٩,		•					-
253.12	1	Dense, grey, saturated	9 i 1		8	<b>5</b> S	44	0		
	10-	End of Borchole						2 2 4 - N		-

#### Borehole No : 4

Enclosure No : 5

Client : AECOM

**Project : Culvert Reconstruction** 

Location : Brock St./Centennial Dr., Uxbridge, ON

Method : Auger

Diameter : 110 mm

Datum Elevation : Geodetic

Date : August 30, 2017

		SUBSURFACE PROFILE			s	АМРІ	ĿE			
Blevation m	Deptie et.	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm 20 40 60 80	Moisture Content, %	Remarks
263.04	- 0-	Ground Surface					1			
262.29		Augered to 0.75 m								50 mm diameter
	1-				, <b>1</b>	\$8	<u>5</u> (	) C		monitoring well to depth of 6.1 m
	2-	FILL Gravelly sand, clear stone at 1.5 m, moist			2	SS	10	>		
260.14		then wet to saturated, loose to very loose			3	SS	1 (			
259,44	3	<b>PEAT</b> Very loose, wet			4	SS	4	x T		
258.24	4 1 1 1	GRAVELLY SAND Loose, some topsoil and organics, grey, saturated	••• •••							
	5 1 1 1 1	SANDY SILT Compact, silt and very fine sand, light grey, wet			5	SS	8			
256.49	6	g.cj, i.c.			6	SS	10 (	o Í		
	7	End of Borehole								
	8-									
(*		V.A. WOOD A	ISSC	)С.	IA	TES	S LI	MITED		Disk : Sheet : 1 of 1

## Borehole No: 5

3

Enclosure No : 6

Client : AECOM

Project : Culvert Reconstruction

Location : Brock St/Centennial Dr., Uxbridge, ON

Method : Auger

Diameter : 110 mm

Datum Elevation : Geodetic

Date : August 29, 2017

E       Description       E       Penetration       Moisture Content, % Image: Content, %			SUBSURFACE PROFILE			SÆ	MPL	E			
264.99       1       S0 num diamo muitoring w         2       FILL       1       SS       16         2       Silty sand, some gravel, occasional seams of silty clay, brown, moist, compact then loose to very loose       3       SS       3         261.74       4       5       SILTY SAND       5       SS       1         260.24       5       SILTY SAND       5       SS       1         260.24       6       SS       5       0       1         260.24       6       SS       5       0       1         260.24       7       5       SS       1       0       1         258.74       7       7       SS       12       0       0         258.74       7       5       SS       10       0       0       0         258.74       7       5       S       10       0       0       0       0         256.14       5       5       12       0       0       0       0       0         256.14       5       5       10       0       0       0       0       0       0       0         256.14       5	Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Test blows/300mm	Content, %	Remarks
264.99     1     Silly sand, some gravel, occasional seams of silly clay, brown, moist, compact then loose to very house     1     SS     16     1     1     SS     1     1     1     SS     1     1     1     1     SS     1     1     1     1     SS     1	265.74	0-	Ground Surface						1 K	<u> </u>	
1       1       SS       16       16       bepth of 9.         2       FILL       5       Silty sand, some gravel, occasional seams of silty clay, brown, moist, compact then loose to very loose       3       SS	264.99	-	Augered to 0.75 m								50 mm diameter monitoring well
2-     FILL       Sitty sand, some gravel, occasional seams of sitty clay, brown, moist, compact then laose to very loose     3       3-     SILTY SAND       261.74     4       4     85       3     S       5     SILTY SAND       Very loose, grey, saturated       5     SS       260.24       6       5       SILTY SAND AND PEAT       Loose, seams of silty sand and peat, wet       258.74       7       SANDY SILT       7       8       SANDY SILT       7       8       8       8       8       8       8       8       8       8       8		1-				1	SS	16	0	•	to depth of 9.1 m
2     FILL       Sity sand, some gravel, occasional seams of sity clay, brown, moist, compact then loose to very loose     3       3     SS       3     SS       4     SS       5     SILTY SAND       5     SS       6     SS       5     SILTY SAND AND PEAT       Loose, seams of silty sand and peat, wet       258,74       7       8       SANDY SILT       7       8       8       8       8       8       8       8       8       8       8       8       8		]									
261.74     4     SS     3       260.24     5     SILTY SAND       260.24     5     SS     1       5     SS     1       260.24     5     SILTY SAND AND PEAT       260.24     5     SILTY SAND AND PEAT       258.74     7     6       5     SS     1       6     SS     5       258.74     7       7     SANDY SILT       7     SS       9-     Some scams of clay       9-     Some scams of clay       9-     Some scams of clay		2-	FILL			2	55	8	þ		17 17 18
261.74     4     SS     3       260.24     5     SILTY SAND       260.24     5     SS     1       5     SS     1       260.24     5     SILTY SAND AND PEAT       260.24     5     SILTY SAND AND PEAT       258.74     7     6       5     SS     1       6     SS     5       258.74     7       7     SANDY SILT       7     SS       9-     Some scams of clay       9-     Some scams of clay       9-     Some scams of clay		11	Silty sand, some gravel, occasional seams			3	SS	3 (	5		
261.74     4     SS     3       260.24     5     SILTY SAND       260.24     5     SS     1       5     SS     1       260.24     5     SILTY SAND AND PEAT       260.24     5     SILTY SAND AND PEAT       258.74     7     6       5     SS     1       6     SS     5       258.74     7       7     SANDY SILT       7     SS       9-     Some scams of clay       9-     Some scams of clay       9-     Some scams of clay		1	of silty clay, brown, moist, compact then		Ī						
3     SILTY SAND       5     SS       260.24       6       5       6       SILTY SAND AND PEAT       Loose, seams of silty sand and peat, wet       6       SANDY SILT       7       SANDY SILT       Compact, silt and very fine sand, light grey, wet       9       256.14         8         8		1	·			4	SS	3 (	2		
260.24     5     SS     1       5     SS     1       260.24     5     SS     1       6     SILTY SAND AND PEAT     6     SS     5       Loose, seams of silty sand and peat, wet     6     SS     5       258.74     7     SANDY SILT     7     SS     1       8     SS     20     1     1	261.74	-									
260.24     5     Very loose, grey, saturated       260.24     6     SILTY SAND AND PEAT Loose, seams of silty sand and peat, wet       258.74     7       8     5       9     Sandry SiLT       7     55       12       9     Some scams of clay       8     58       256.14     End of Borehole		4									
260.24     5     Very loose, grey, saturated       260.24     6     SILTY SAND AND PEAT Loose, seams of sitty sand and peat, wet       258.74     7       7     SANDY SILT       7     SS       8     SS       256.14     Some seams of clay       8     SS       256.14     End of Borehole		1	SILTY SAND			5	SS	1(	Ŋ		
258.74     6     SS     5       7     SANDY SILT     6     SS     5       8     SS     10     10       256.14     End of Borehole     8     SS     20		5-	Very loose, grey, saturated								
258.74     7     Loose, seams of silty sand and peat, wet     0     33     3       258.74     7     SANDY SILT     7     SS     12       N     Compact, silt and very fine sand, light grey, wet     8     SS     20       256.14     End of Borehole     8     SS     20	260.24	-14		(XXXX) (4.4.4.5)		1					
258.74     7     Loose, seams of silty sand and peat, wet     0     33     3       258.74     7     SANDY SILT     7     SS     12       N     Compact, silt and very fine sand, light grey, wet     8     SS     20       256.14     End of Borehole     8     SS     20		6-		4.4.4.4 1.4.4.4 1.4.4.4 4.4.4.4.4 4.4.4.4.4 4.4.4.4.4 4.4.4.4.4 4.4.4.4.4.4 4.					LAN DO		
SANDY SILT     7     SS     12       N     Compact, silt and very fine sand, light grey, wet     8     SS     20       256.14     Some seams of clay     8     SS     20		-				6	SS	5 (	Ď		
256.14 SANDY SILT Compact, silt and very fine sand, light grey, wei End of Borehole	258.74	1		1.1.1.1 1.1.1.1 1.1.1.1 1.1.1.1							-
256.14 Compact, silt and very fine sand, light grey, wet 5 End of Borehole 8 SS 20		11				365					
256.14     Compact, silt and very fine sand. light grey, wet       9     some seams of clay       8     SS       20		11	SANDY SILT			7	SS	12	0	•	
256.14 grey, wet 5 Some seams of clay 8 SS 20	1		Compact, silt and very fine sand, light								
End of Borehole	1	111									
End of Borehole	1	9-									
	256.14				-	8	SS	20	U.		
		10-	End of Borehole			5.0			ence a sub-		

#### Borehole No: 6

Enclosure No : 7

Date : August 29, 2017

Client : AECOM

**Project : Culvert Reconstruction** 

Location : Brock St/Centennial Dr., Uxbridge, ON

Datum Elevation : Geodetic

Method : Auger

Diameter: 110 mm

SUBSURFACE PROFILE SAMPLE Standard Elevation m Penetration Moisture Remarks Test E Content, % Description Number Symbol N-value Depth : Water blows/300mm Type 10 30 50 20 40 60 80 265.41 **Ground Surface** 0 Augered to 0.75 m 50 mm diameter 264.66 monitoring well 1 SS50 FILL to depth of 9.1 m 264.01 Gravelly sand, loose, moist `2 SS37 2 FILL 3 SS 2 ( Seams of sand and silty clay, some wood 3 fragments, dense then very loose, moist SS 4 10 261.41 SANDY SILT 5 SS 8 Loose, some wood fragments, wet 259.91 SAND AND PEAT 6 SS 12 0 Compact, well graded sand and peat, wet 258.41 SANDY SILT 7 SS 7 Compact, silt and very fine sand, light grey, wet 8 SS34 255.81 End of Borehole 10-V.A. WOOD ASSOCIATES LIMITED Disk : Sheet: 1 of 1

#### Borehole No: 7

Enclosure No : 8

Method : Auger Diameter : 110 mm

Client : AECOM

**Project : Culvert Reconstruction** 

Location : Brock St./Centennial Dr., Uxbridge, ON

Datum Elevation : Geodetic

Date : August 28, 2017 SAMPLE SUBSURFACE PROFILE Standard Moisture Penetration 8 Remarks Elevation Test Content, % Depth m Description Number Symbol N-value blows/300mm Water Type 10 30 50 20 40 60 80 265.68 **Ground Surface** 0. Augered to 0.75 m 50 mm diameter 264.93 monitoring well 1  $\mathbf{SS}$ 4 ① to depth of 6.1 m 1 '2 SS 4 ( FILL Sand, some gravel, damp to moist. brown, 3 SS 4 0 loose  $\bigcirc$ 4 SS24 gravelly 261.68 SILTY SAND SS5 0 5 0 Loose, some wood fragments, grey, wet 260.18 **GRAVELLY SAND** ŝ Compact, some silt, organic stained, grey, saturated 6  $\mathbf{SS}$ 13  $\bigcirc$ 259.13 End of Borehole 8 V.A. WOOD ASSOCIATES LIMITED Disk : Sheet : 1 of 1

#### Borehole No: 8

Enclosure No : 9

Client : AECOM

**Project : Culvert Reconstruction** 

Location : Brock St./Centennial Dr., Uxbridge, ON

Method : Auger

Diameter : 110 mm

**Datum Elevation : Geodetic** 

Date : August 26, 2017

		SUBSURFACE PROFILE			S.	AMPI	JE		1			
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm 20 40 60 80	Con	isture tent, <sup>6</sup> 30	%	Remarks
265.81	0-	Ground Surface	1				1					
265.06	1-1-1	Augered to 0.75 m						ļ				50 mm diameter monitoring well
	L L				1	SS	9	0	•		1	to depth of 9.1 m
	2	FILL			2	SS	5 (	D				
		Fine to medium to well graded sand, some gravel, brown, moist, loose to very loose			3	SS	4 (	þ	•	- Frank - San		
ļ	3			-	4	SS	10	0	1			
60.31	4	SILTY SAND Loose, organic stained silty sand, some gravel and peat, grey, wet			5	SS	4 (	5	•			a
	61111				6	SS	7	C				
	7-11-1	SANDY SILT						,	+	ł		
	1-1-1-1-1-1-1-8 1-1-1-1-1-1-1-1-8	fine sand, light grey, wet to saturated			7	SS	19	0	•			
6.21	91-1-1				8	SS	40	õ				
	0	End of Borehole										
		V.A. WOOD A	SSC	)C	IA	TE	S L	IMITED				Disk : Sheet : 1 of 1

## Borehole No: 9

Enclosure No : 10

Client : AECOM

**Project : Culvert Reconstruction** 

Location : Brock St./Centennial Dr., Uxbridge, ON

Method : Auger Diameter : 110 mm

Date : August 25, 2017

Datum Elevation : Geodetic

		SUBSURFACE PROFILE			Sź	AMPI.	E					
Elevation m	Depth m	Description	Symbol	Water	Number	l'ype	N-value	Standard Penetration Test blows/300mm 20 40 60 80	Cu	doist onten 30		Remarks
265.23	0	Ground Surface	1				1					
264.48		Augered to 0.75 m							1	H		50 mm diameter monitoring well
	1.1.1	FILL Seams of gravelly sand, occasional seams of clayey silt, some topsoil and organic			1	SS	5 (	ρ	-0	T		to depth of 9.1 m
	21	stained at the lower section, moist then wet to saturated, loose to very loose			2	SS	10	þ				
	1-1-1-1				3	SS	4 (	Þ.	•			
	3	saturated			4	SS	2 (	D D		•		
260.83	4											
60.03	5	Wood fragments			5	SS	24	0			1	
58.93	6-1	GRAVELLY SAND Compact, saturated	0 0 4 0		6	SS	8					
	7-				0	36	a					
	8	SANDY SILT			7	SS	8	O				
	9-	rootlets observed, light grey, wet to saturated			¥							
55.63	10-	End of Borchole			8	SS	10	0				

25

#### Borehole No: 10

Enclosure No : 11

Client : AECOM

**Project : Culvert Reconstruction** 

Location : Brock St./Centennial Dr., Uxbridge, ON

Method : Auger

Diameter : 110 mm

Datum Elevation : Geodetic

Date : August 26, 2017

SUBSURFACE PROFILE SAMPLE Standard Elevation in Penetration Moisture Remarks Content, % Test Ε Description Number N-value **Depth** r Symbol Water blows/300mm Type 10 30 50 20 40 60 80 264.77 **Ground Surface** Augered to 0.75 m 264.02 50 mm diameter monitoring well FILL O 1-1 SS 18 to depth of 9.1 m Organic stained silty sand, some gravel, seams of topsoil and some organics in places, brown then grey, moist, compact at 2 SS 40 the top, then loose to very loose 2 3 SS 10 some topsoil 4 SS 2 ( 260.47 ÷ GRAVELLY SAND e 5 SS 7 Loose, some silt and scams of clay at the 5-bottom, grey, saturated 6 It grey silt at the bottom SS 258.22 6 4 0 8 8 8 End of Borchole . 10-V.A. WOOD ASSOCIATES LIMITED Disk : Sheet: 1 of 1

### Borehole No: 11

Enclosure No : 12

**Client : AECOM** 

**Project : Culvert Reconstruction** 

Location : Brock St./Centennial Dr., Uxbridge, ON

Method : Auger

Diameter : 110 mm

**Datum Elevation : Geodetic** 

Date : August 25, 2017

		SUBSURFACE PROFILE			S	AMPL	Æ			
Elevation m	Depth as	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm 20 40 60 80	Moisture Content, %	Remarks
264.75	0	Ground Surface	1	1	1			ana ana		
264		Augered to 0.75 m								50 mm diameter monitoring well
	1-]				1	SS	9	p	•	to depth of 9.1 m
	2-	<b>FILL</b> Organic stained silty sand, some gravel,			2	SS	4 (	þ		
	1111	some topsoil and organics in places, brown to grey, moist, loose to very loose			3	\$S	3 (	þ	0	
	3-				4	SS	4 (	þ		
260.75	5	SILTY SAND Loose, organic stained, some gravel and topsoil, grey, wet			5	SS	7	0	•	
	6	SANDY SILT								
257.75		Compact, silt and very fine sand, light grey, wet			6	S5	10	0		
			9 s		•					
	8-	SANDY SILT TILL	а 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 11111		7	SS	6 (	D; ,	0	
	9	Loose to compact, trace fine gravel, light grcy, wet to saturated	9 e 9 e							
255.15		End of Borehole			8	SS	23			
		V.A. WOOD A	ISS	00	CIA	TE	S I	IMITED		Disk : Sheet : 1 of 1

Monitoring Well No.: 1

Project: Culvert Reconstruction

Client: AECOM

Location: Brock Rd./Centennial Dr., Uxbridge, ON

Enclosure: 2A

Datum Elev.: 263.01 m

	SUBSURFACE PROFILE								
<b>Depth</b> Symbol	Description	Depth/Elev.	Number	Type	Blows/ft	Recovery	Standard Penetration Test blows/ft 20 40 60 80	Well Data	Remarks
0	Ground Surface	0				Í.			
	Augered to 0.75 m	263 0.75			\$- -				50 mm diameter PVC pipe
1-3		262.3	1	ss	34		Ø		
	FILL Sith conditions		2	SS	13		\$	x	GWL at Elev.261.61 on 9-15-17 pm
2	Silty sand, some gravel, brown, moist, compact to deshe then very loose								
		2.9	3	SS	2				
3-2000		260.1							
	SILTY SAND Loose, some wood fragments		4	SS	8		3		
4	and peat, grey, wet	4 259							
		200							
5-4	SANDY SILT		5	SS	19		<b>Å</b>		
	Compact, silt and very fine sand, light grey, wet								
-	2	6,55	6	SS	20		0		
7-	End of Borehole	256.5							
8-									
Drilled By	: Geotech Support Services Inc.						ciates Ltd	Hole Si	ze: 110 mm
Drill Meth	od: Auger				carbor	ough	d, Unil 24 , ON	Datum:	Geodetic
Drill Date	: August 29, 2017				M1X	167		Sheet: '	1 of 1

Monitoring Well No.: 2

Project: Culvert Reconstruction

**Client: AECOM** 

Location: Brock St./Centennial Dr., Uxbridge, ON

very fine sand, light grey, wet

9-1

10-

Enclosure: 3A

Datum Elev.: 262.81 m SUBSURFACE PROFILE Standard Depth/Elev Penetration Test Well Data Remarks Recovery Blows/ft Number Symbol Description blows/fl Depth Туре 20 40 60 80 0 Ground Surface 0-262.8 GWL at Elev. 262.66 Augered to 0,75 m 0n 9-15-17 pm 0.7921 262 1 SS 5 50 mm diameter PVC pipe FILL 2 SS 3 Organic stained sand, some gravel, brown, moist, loose 3 SS 6 2.9 259.9 4 SS 7 GRAVELLY SAND 5 SS 8 Loose, grey, wet to saturated 6.4 6 SS 5 256.4 SANDY SILT 7 SS 23 4 8loose then compact, silt and 1

SS 31 sand and gravel at the bottom 8 9.6 253.2 End of Borehole Drilled By: Geotech Support Services Inc. V A Wood Associates Ltd Hole Size: 110 mm 1080 Tapscott Rd, Unit 24 Drill Method: Auger Datum: Geodetic Scarborough, ON M1X 1E7 Drill Date: August 29, 2017 Sheet: 1 of 1

•

Monitoring Well No.: 3

Project: Culvert Reconstruction

Client: AECOM

Location: Brock St./Centennial Dr., Uxbridge, ON

Enclosure: 4A

Datum Elev.: 262.72 m

	SUBSURFACE PROFILE							1	
Depth Svmhol	Description	Depth/Elev	Number	Туре	Blows/ft	Recovery	Standard Penetration Test blows/ft 20 40 60 80	Well Data	Remarks
0-	Ground Surface	0	1		1				
1 TT	Augered to 0.75 m	262.7							GWL at ground surface on 9-15-17
1-7	8	262	1	SS	2		2	Colored Sectors	50 mm diameter PVC pipe
-333	FILL		2	SS	6				
2	Well graded sand, some gravel, brown, moist, wet at the bottom, very loose then loose							None of the local division of the local divi	
-788	bottom, very loose then loose	2.9	3	SS	6		¢		
3-9	3	259.8							
-0			4	SS	5		φ		
	GRAVELLY SAND								
4_•									
2.8	Loose to compact, grey, wet to saturated				_	-			
5-4			5	SS	15		9		
-0	9.	5.5							
		257.2							
6			6	SS	3				
	SANDY SILT								
7-	Loose then compact, silt and very fine sand, light grey, wet to								
	saturated		7	SS	18				
1		8.5							
- 9		254.2							
9-0	SAND AND GRAVEL Dense, grey, saturated								
	Dense, grey, saturated	9.6	8	SS	44		0		
10-	End of Borehole	253.1							
Drilled	By: Geotech Support Services Inc.			VAV	Vood A	Asso	ciates Ltd	Hole Si	ze; 110 mm
Drill M	ethod: Auger			carbor	ough	td, Unit 24 1, ON	Datum:	Geodetic	
Drill Da	ate: August 30, 2017				M1>	< 1Ē7	7	Sheet:	1 of 1

Monitoring Well No.: 4

Project: Culvert Reconstruction

Client: AECOM

Location: Brock St./Centennial Dr., Uxbridge, ON

Enclosure: 5A Datum Elev.: 263.04 m

SUBSURFACE PROFILE Standard Depth/Elev, Remarks Penetration Test Well Data Recovery Blows/ft Number Symbol Description blows/ft Depth Type 20 40 60 80 1. 0 Ground Surface 0 263 50 mm diameter Augered to 0.75 m PVC pipe 0.75 262.3 5 1 SS FILL GWL at Elev.261.36 SS 1 2 on 9-15-17 pm Gravelly sand, clear stone at 1.5 m, moist then wet to saturated, loose to very loose 3 SS 1 2.9 260.1 PEAT SS 4 4 Very loose, wet 3.6 259.4 GRAVELLY SAND Loose, some topsoil and organics, grey, saturated 4.8 SS 8 5 258.2 ¥. SANDY SILT Compact, silt and very fine sand, light grey, wet 6-10 6 SS 6.55 256.5 End of Borehole ŝ, 8-Hole Size: 110 mm Drilled By: Geotech Support Services Inc. V A Wood Associates Ltd 1080 Tapscott Rd, Unit 24 Datum: Geodetic Drill Method: Auger Scarborough, ON M1X 1E7 Sheet: 1 of 1 Drill Date: August 30, 2017

Monitoring Well No.: 5

Project: Culvert Reconstruction

Client: AECOM

Location: Brock St./Centennial Dr., Uxbridge, ON

Enclosure: 6A Datum Elev.: 265.74 m

		SUBSURFACE PROFILE								
Depth	Symbol	Description	Depth/Elev.	Number	Type	Blows/ft	Recovery	Standard Penetration Test blows/ft 20 40 60 80	Well Data	Remarks
0-		Ground Surface	0		1	1				
-		Augered to 0.75 m	265.7							50 mm diameter
			0.75						8 88	PVC pipe
1-			265	1	SS	16		Q		
1				1	1	1				
Ľ	***	FILL		2	SS	8		6		
2-	***	FILL	1 1		1	-		<u> </u>	1 1	
-		Silty sand, some gravel,	1	3	SS	3				
R		occasional seams of silty clay, brown, moist, compact then	1						×.	GWL at Elev.263.0
3-3	***	loose to very loose								on 9-15-17 pm
93	***			4	SS	3	{			
2	***		4							
13	***		261.7							
3	888		1 4							
5 J	***	SILTY SAND Very loose, grey, saturated	1	5	SS	1	- d			
-2	***	· ; ····; ;··; ;··; ···;	5.5						4 6	
14			260.2							
6		SILTY SAND AND PEAT								
		Loose, seams of silty sand and	Ī	6	SS	5	k	5		
-01-02		peat, wet	1				-			
7	11		7 258.7			~				
4			200.1							
1		SANDY SILT		7	SS	12	-			
8-				-	55	12		- <u>+</u>		
4		Compact, silt and very fine sand, light grey, wet								
1		cana, ngrit groy, wet								
9-1										
		some seams of clay	9.6	8	SS	20		¢		
10-		End of Borehole	256.1			x				
10-			1		1			and an observation of the second		
Drill	led By	: Geotech Support Services Inc.			VAV	Vood A	ssoc	lates Ltd	Hole Siz	:e; 110 mm
Dall	04-++	nod: Augar			1080	Tapsc	ott R	d, Unit 24	Dell	0 1 1
	Drill Method: Auger								Datum:	Geodetic
Drill	Date	: August 29, 2017		Scarborough, ON Datum: Geodetic M1X 1E7 Sheet: 1 of 1						

Monitoring Well No.: 7

Project: Culvert Reconstruction

Client: AECOM

Enclosure: 8A

Location: Brock SL/Centennial Dr., Uxbridge, ON

Datum Elev.: 265.68 m

		SUBSURFACE PROFILE					1			
Depth	Symbol	Description	Depth/Elev.	Number	Type	Blows/ft	Recovery	Standard Penetration Test blows/ft 20 40 60 80	Well Data	Remarks
		Ground Surface	0		1		1			
0-		Augered to 0.75 m	265.7							50 mm diameter PVC pipe
1			264.9	1	SS	4		9		
2-		FILL		2	SS	4		5		
-		Sand, some gravel, damp to moist, brown, loose		3	SS	4				
3-		gravelly		4	SS	24				GWL at Elev.262.39 on 9-15-17 pm
4-			4 261.7			X				
- 5-		SILTY SAND Loose, some wood fragments, grey, wet		5	SS	5		¢		
6-		GRAVELLY SAND Compact, some silt, organic	5.5 260.2							
	***	stained, grey, saturated	6.55	6	SS	13		6		
7	XXXX	End of Borehole	259.1							
		y: Geotech Support Services Inc. hod: Auger			1080	Tapso carbo	cott I	ociates Ltd Rd, Unit 24 h, ON		Size: 110 mm : Geodetic
D	rill Dat	e; August 28, 2017				IVE1.		ſ	Sheet:	1 of 1

Project: Culvert Reconstruction

Client: AECOM

Location: Brock St./Centennial Dr., Uxbridge, ON

Enclosure: 9A

Monitoring Well No.: 8

Datum Elev.: 265.81 m

		SUBSURFACE PROFILE			5				1	
Depth	Symbol	Description	Depth/Elev.	Number	Type	Blows/ft	Recovery	Standard Penetration Test blows/tt 20 40 60 80	Well Data	Remarks
0-		Ground Surface	0							
0-		Augered to 0.75 m	265.8							50 mm diameter
	1	Augered to 0.75 m	0.75			0			<u> </u>	PVC pipe
1.3	-3333		265.1	1	SS	ß	-			
1	3888		1.000		30	5		9		GWL at Elev.264.59
					L					on 9-15-17 pm
	2000	FILL		2	SS	5		¢		
2-	*****	Fine to medium to well graded	1		1					
		sand, some gravel, brown,		3	SS	4	1			
	****	moist, loose to very loose								
3-										
	*****			4	SS	1	G		い いち いち しょう	
	****				1		1		當 截	
1	<u> </u>		4				- (			
-		1	261.8							
		SILTY SAND								
-		Loose, organic stained silty		5	SS	4			100	
5-3	XXX -	sand, some gravel and peat, grey, wet	1							
	<u> </u>	gray, wet	5.5							
1			260.3							
6-						1				
				6	SS	7		Ģ.		
-			1 1	- mart	1					
7-		SANDY SILT	1 1						8	
-		Loose then compact to dense,								
1		silt and very fine sand, light								
4		grey, wet to saturated		7	SS	19		Q I		
8-										
1										
1			1							
9-										
1			9,6	8	SS	40		ò		
	1.1.1		256.2	•						
10-		End of Borehole					1		4	
	£	and the second		-					11	
Dr	illed By	: Geotech Support Services Inc.			VAV	Nood A	Asso	ciates Ltd	Hole Si	ze: 110 mm
_					1080	Tapso	ott R	d, Unit 24		
Dr	ni Méth	od: Auger			S	carbor			Datum:	Geodetic
Dri	ill Date	: August 26, 2017				IVI12	< 1E7		Sheet:	1 of 1
-		<b>U</b>								

Monitoring Well No.: 9

Project: Culvert Reconstruction

Client: AECOM

Location: Brock St./Centennial Dr., Uxbridge, ON

Enclosure: 10A

Datum Elev.: 265.23 m

		SUBSURFACE PROFILE			1	1.1				
Depth	Symbol	Description	Depth/Elev.	Number	Type	Blows/ft	Recovery	Standard Penetration Test blows/ft 20 40 60 80	Well Data	Remarks
0-		Ground Surface	0		1		1			
- I	- 1	Augered to 0.75 m	265.2							50 mm diameter
		Augures to one m	0.75						55 55	PVC pipe
	8888	FILL	264.5	1	SS	5		0		
	18888	Seams of gravelly sand,		·		-		1		
1	1000	occasional seams of clayey silt, some topsoil and organic								GWL at Elev.263,55
	****	stained at the lower section,		2	SS	10		$\mathcal{P}$		on 9-15-17 pm
27		moist then wet to saturated,								
		loose to very loose		3	SS	4		\$		
1 3					1		1			
3-					00	2				
-		saturated		4	SS	2	1	8111		
1						×				
4-	****		ë							
1 7	<u> </u>		4.4 260.8					V I I I		
5		Wood fragments	200.8	5	SS	24		5	翦 圓	
5-	8888	Ū.	5,2					$\mathcal{T}$	8	
1	-		260							
1		GRAVELLY SAND							限 図	
6-	9 8	Compact, saturated								
l 3	<b>Q</b>		6.3 258.9	6	SS	8		¢		
4			200.9							
7										
-										
1		SANDY SILT								
				7	SS	8		φ		
-		Loose to compact, silt and very fine sand, rootlets observed,								
1		light grey, wet to saturated								
_										
91									25 10	
			9.6	8	SS	10		Ċ		
-		End of Borehole	255.6							
10-							İ		1	
Dr	illed P	r Gentech Support Services Inc.			17.4.1	Moud	1000	ciates Ltd	Hole Si	ize: 110 mm
	Drilled By; Geotech Support Services Inc.							ld, Unit 24		
Dr	rill Meth	nod: Auger							Datum:	Geodetic
		A		Scarborough, ON Datum: Geodetic M1X 1E7 Sheet: 1 of 1					1.05.1	
Ur	iii Date	e: August 25, 2017				)			Sneet:	

Monitoring Well No.: 10

а.

Project: Culvert Reconstruction

Client: AECOM

Location: Brock St./Centennial Dr., Uxbridge, ON

Enclosure: 11A

Datum Elev.: 264.77 m

SUBSURFACE PROFILE							1				
Depth	Symbol	Description	Depth/Elev.	Number	Type	Blows/ft	Recovery	Standard Penetration Test blows/ft 20 40 60 80	Well Data	Remarks	
0-		Ground Surface	0		1				1	×	
		Augered to 0.75 m	264.8							50 mm diameter	
			0.75		1				251 100	PVC pipe	
	***	FILL Organic stained silty sand,	264	1	SS	18		9		✓ GWL at Elev.262.45 on 9-15-17 pm	
4	***	some gravel, seams of topsoil				[]					
1.1	****	and some organics in places, brown then grey, moist, compact at the top, then loose to very loose some topsoil		2	SS	4			×		
2-	***				1						
1-1	***			3	SS	1					
3	****				1						
J.	****			4	SS	2					
3	***		1		1						
4-	***		4.0								
19777		GRAVELLY SAND	4.3			1 <sup>1</sup>					
		Loose, some silt and seams of clay at the bottom, grey, saturated		5	SS	7					
5-											
1											
6-											
	8 "			6	SS	4					
-	v		6.55		00						
7-		End of Borehole	200.2	3							
i											
-	1							÷			
8-											
7 8											
TT											
9-											
1											
- F											
10-									1		
Dri	lled By	: Geotech Support Services Inc.		V A Wood Associates Ltd					Hole Size: 110 mm		
Drill Method: Auger					1080 Tapscott Rd, Unit 24 Scarborough, ON					Datum: Geodetic	
Dri	ll Date	: August 26, 2017		M1X 1E7				Sheet: 1 of 1			

Monitoring Well No.: 11

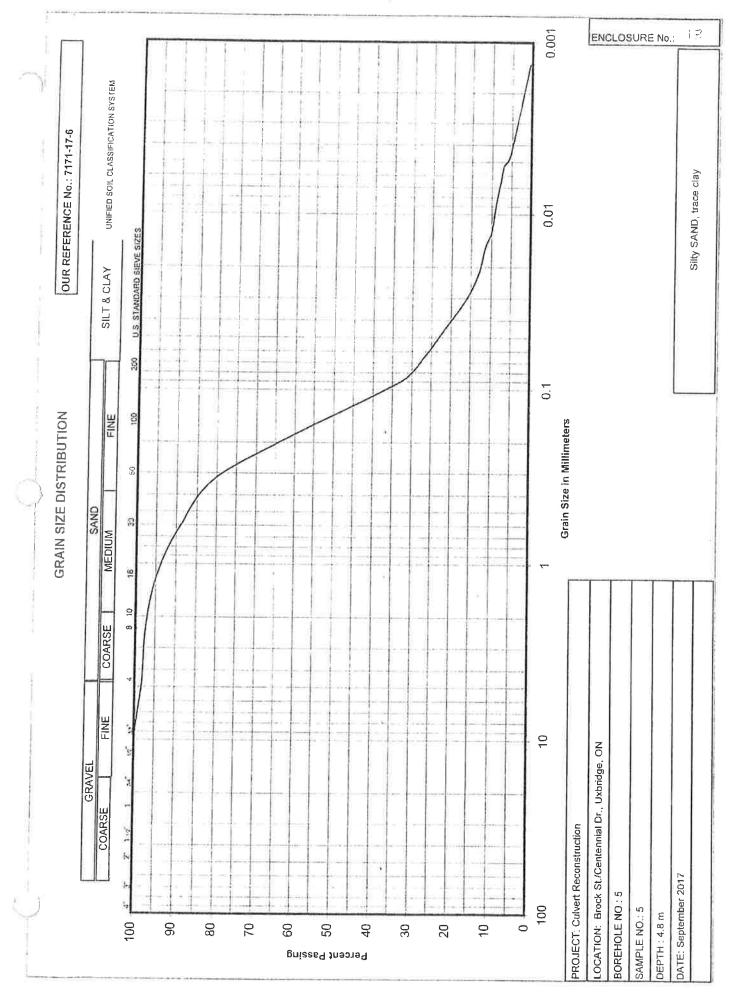
Project: Culvert Reconstruction

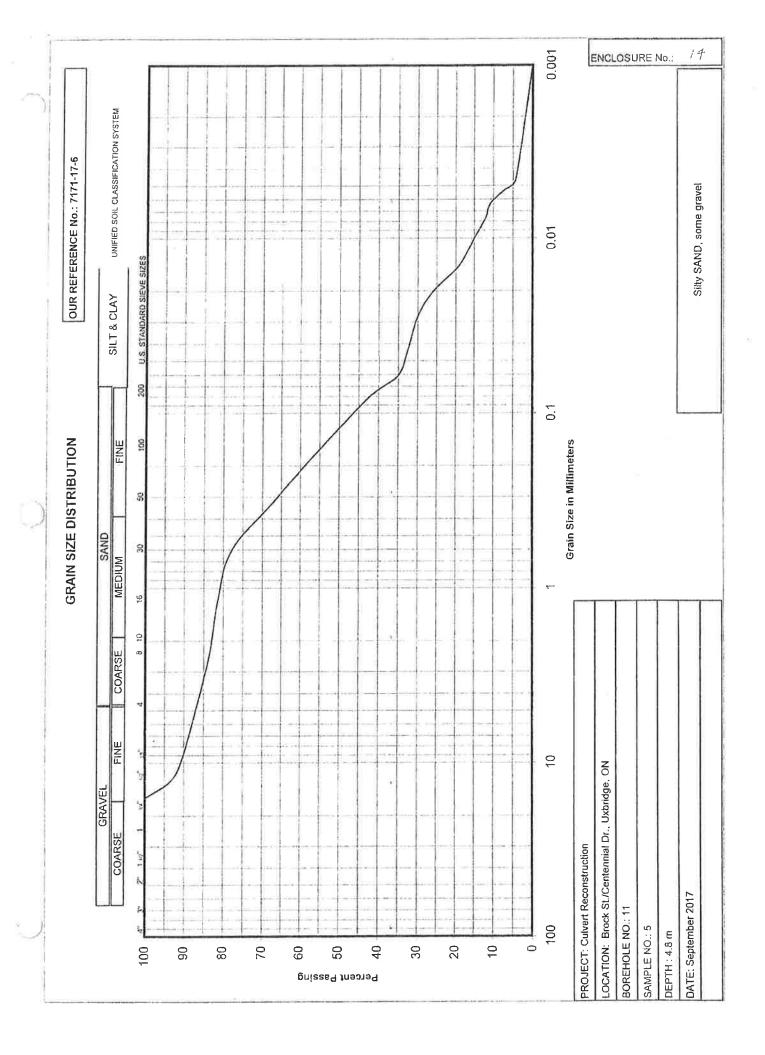
Client: AECOM

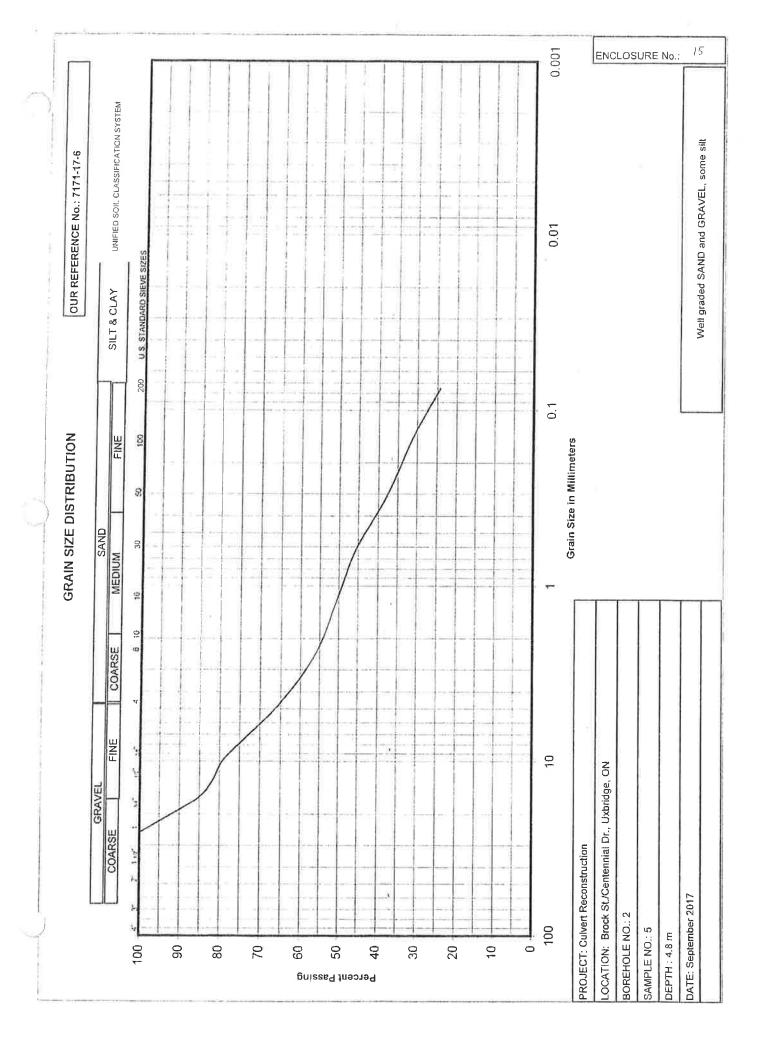
Enclosure: 12A Datum Elev.: 264.75 m

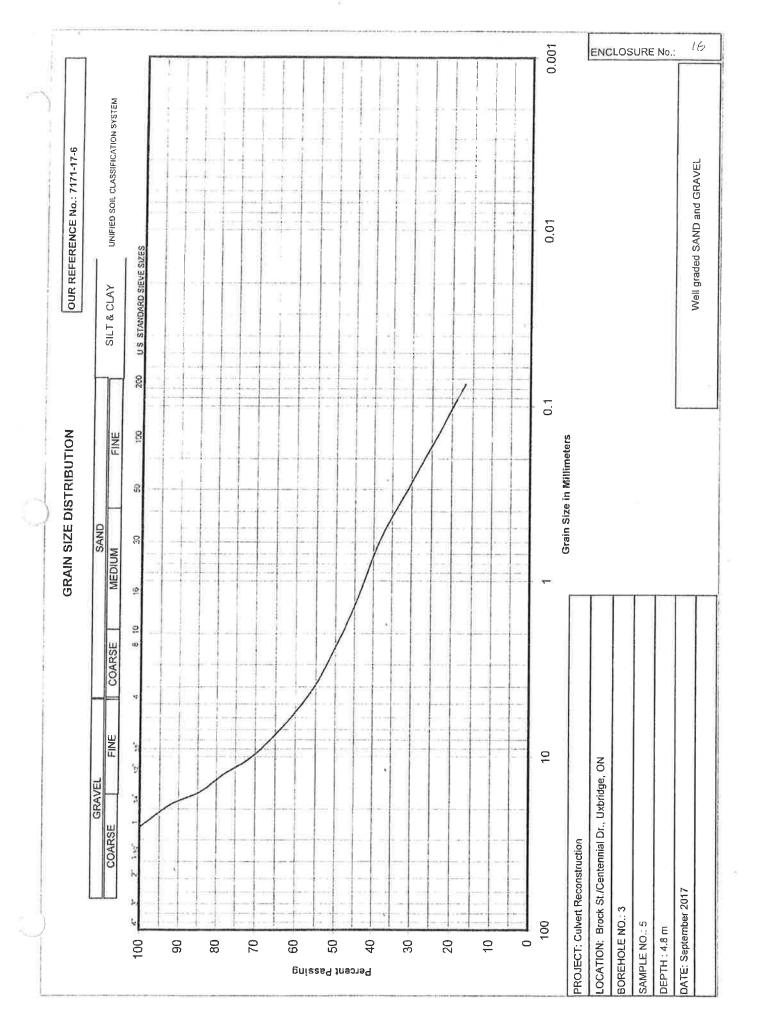
Location: Brock St./Centennial Dr., Uxbridge, ON

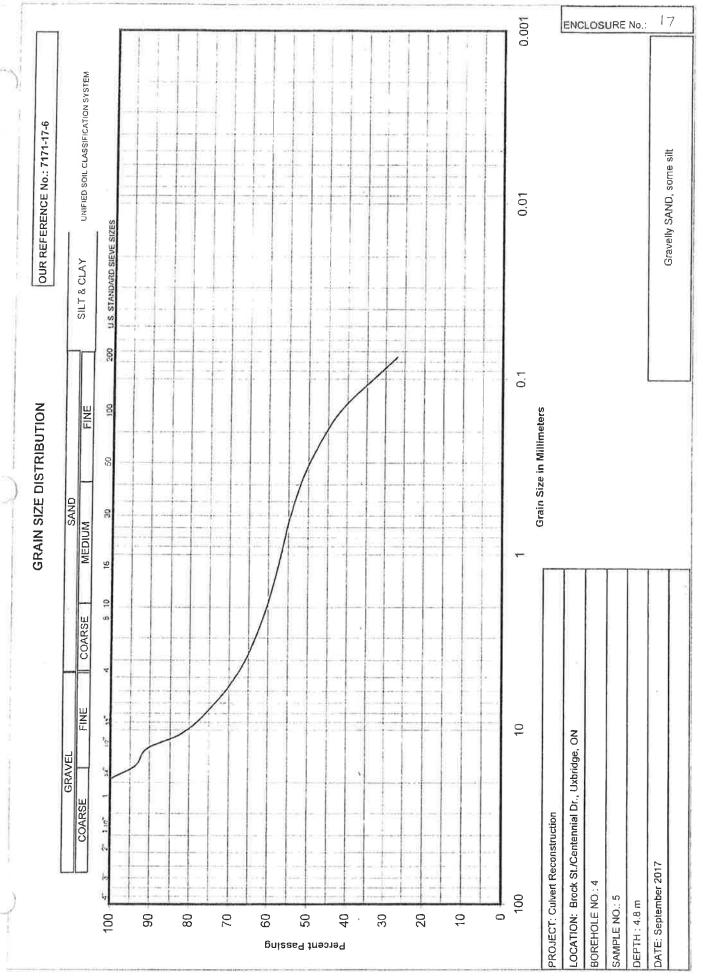
SUBSURFACE PROFILE Standard Depth/Elev Penetration Test Data Remarks Recovery Blows/ft Number blows/ft Symbol Description Depth Type Well 40 60 80 20 1 1 1 0 Ground Surface 0 50 mm diameter 264.8 Augered to 0.75 m PVC pipe 0.75 264 1 SS 9 P FILL SS 2 4 Organic stained silty sand, some gravel, some topsoil and 3 SS 3 organics in places, brown to grey, moist, loose to very loose GWL at Elev.261.64 . 4 SS 4 on 9-15-17 pm 4 260.8 SILTY SAND 5 SS 7 Loose, organic stained, some gravel and topsoil, grey, wet 5.4 259.4 SANDY SILT 6 6 SS 10 φ Compact, silt and very fine sand, light grey, wet 7 257.8 7 6 SS SANDY SILT TILL Loose to compact, trace fine gravel, light grey, wet to saturated 8 SS 23 9.6 255.1 End of Borehole 10-Hole Size: 110 mm Drilled By: Geotech Support Services Inc. V A Wood Associates Ltd 1080 Tapscott Rd, Unit 24 Scarborough, ON M1X 1E7 Datum: Geodetic Drill Method: Auger Sheet: 1 of 1 Drill Date: August 25, 2017

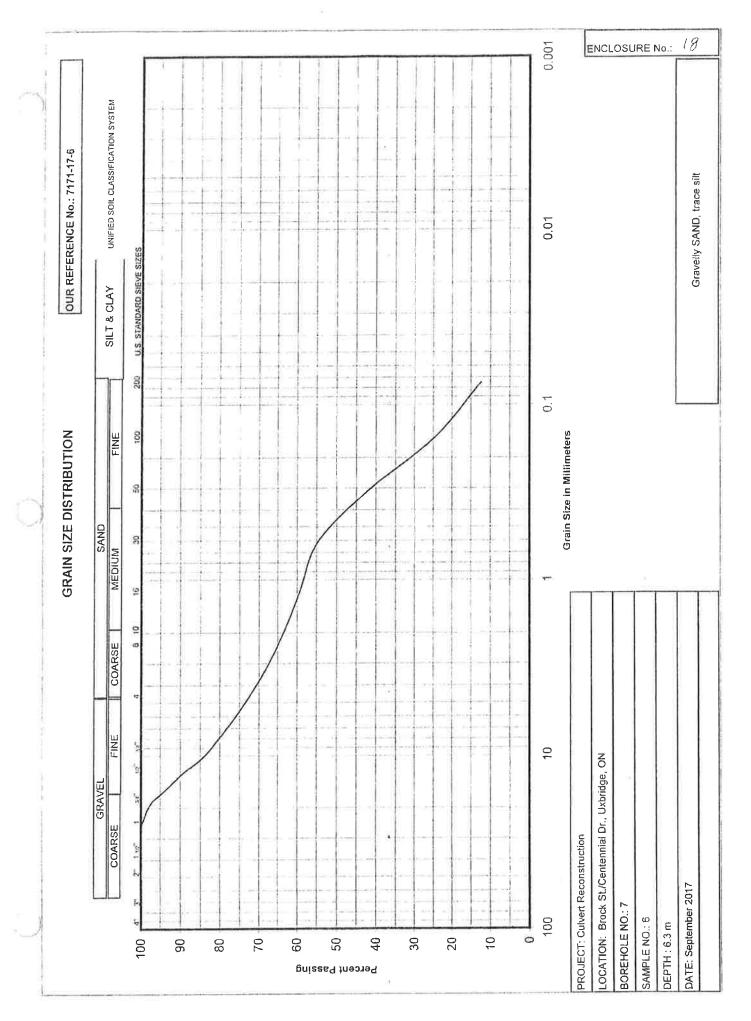


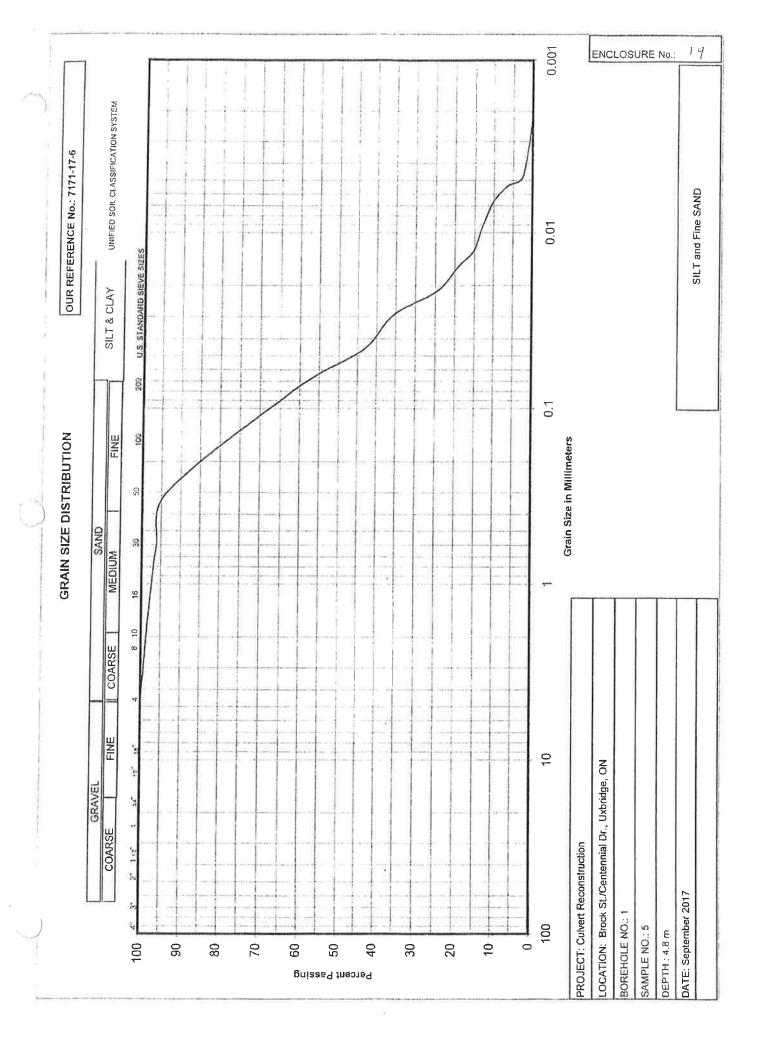


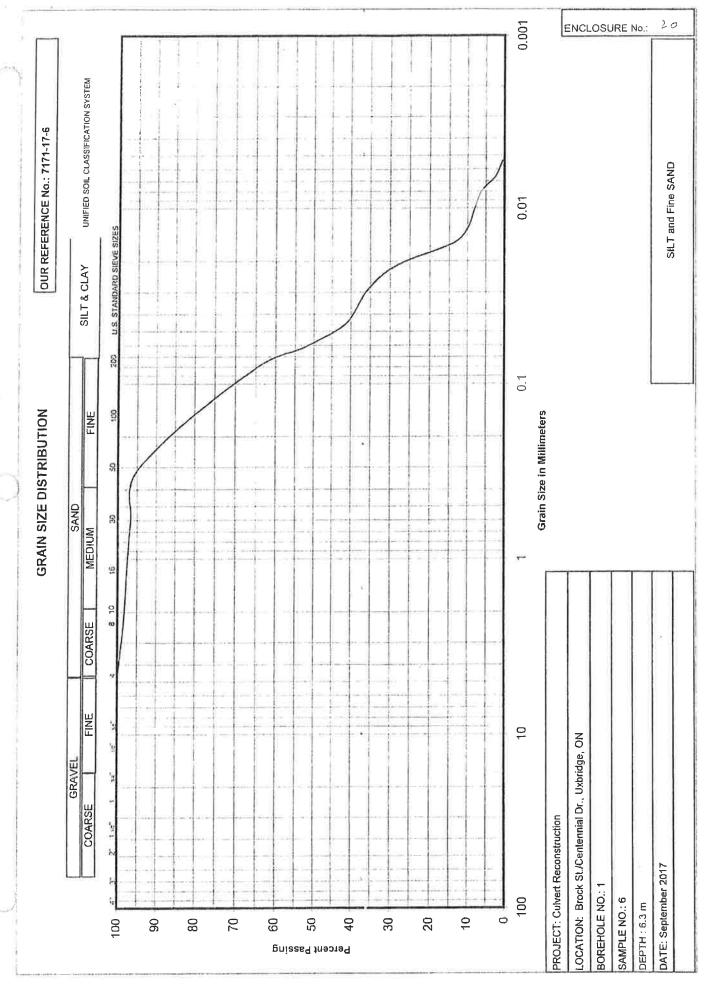


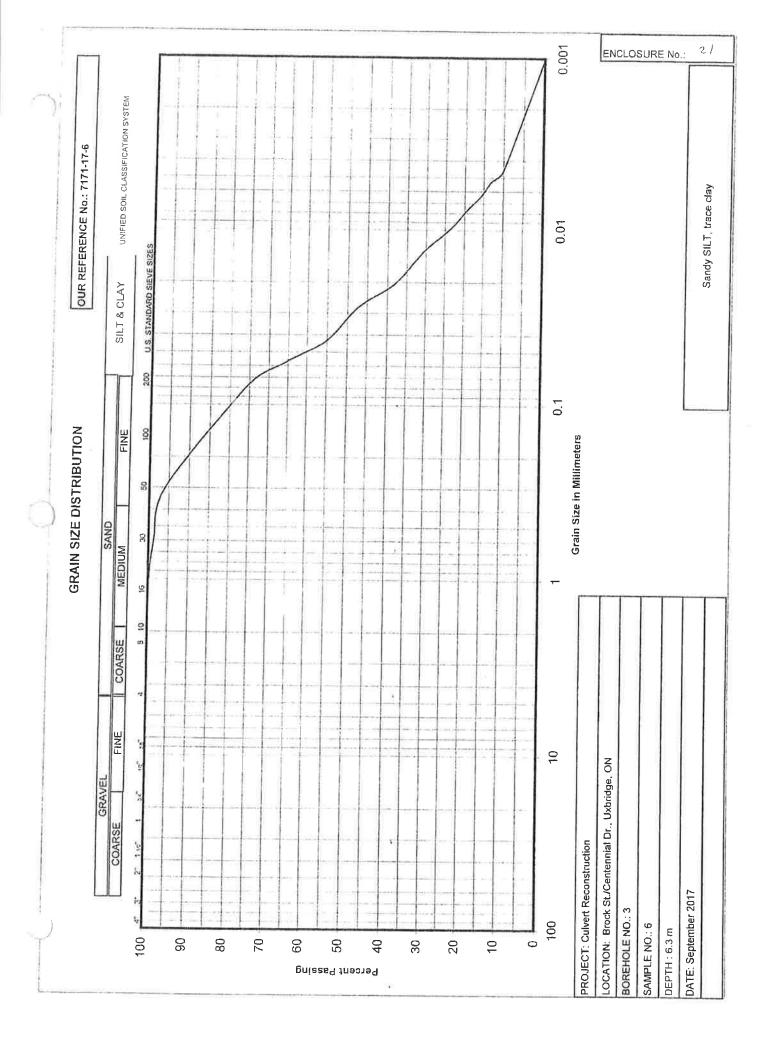


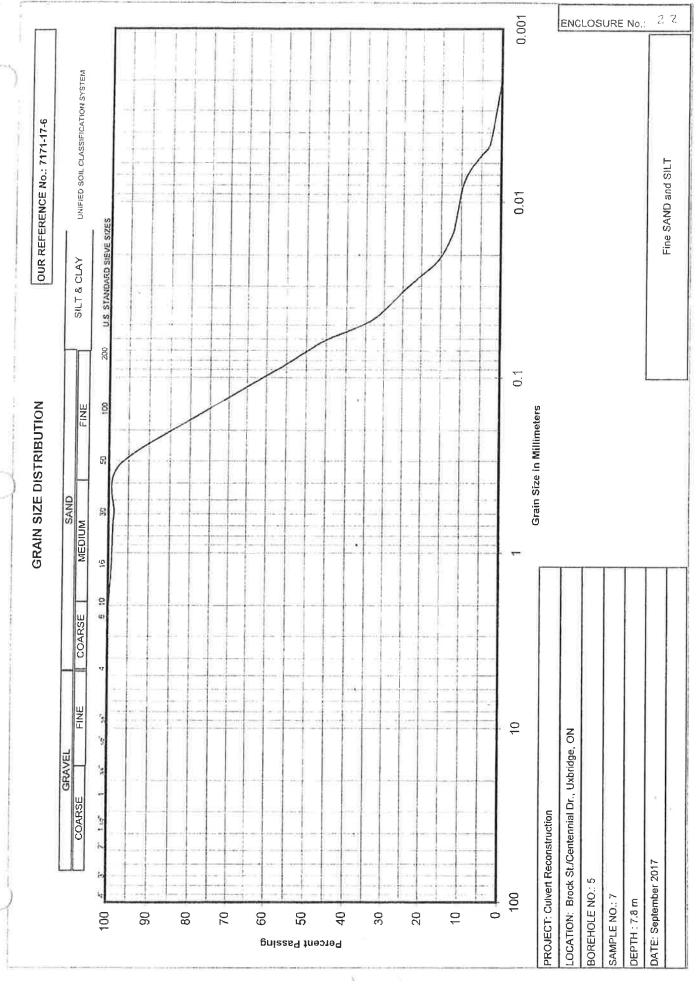




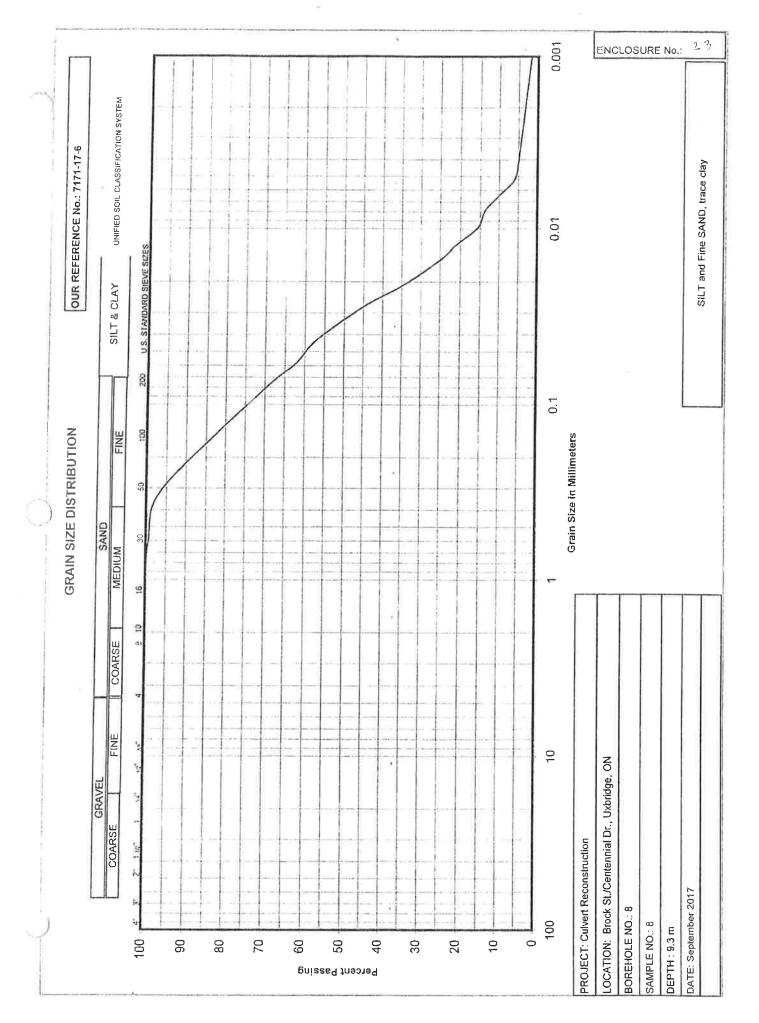




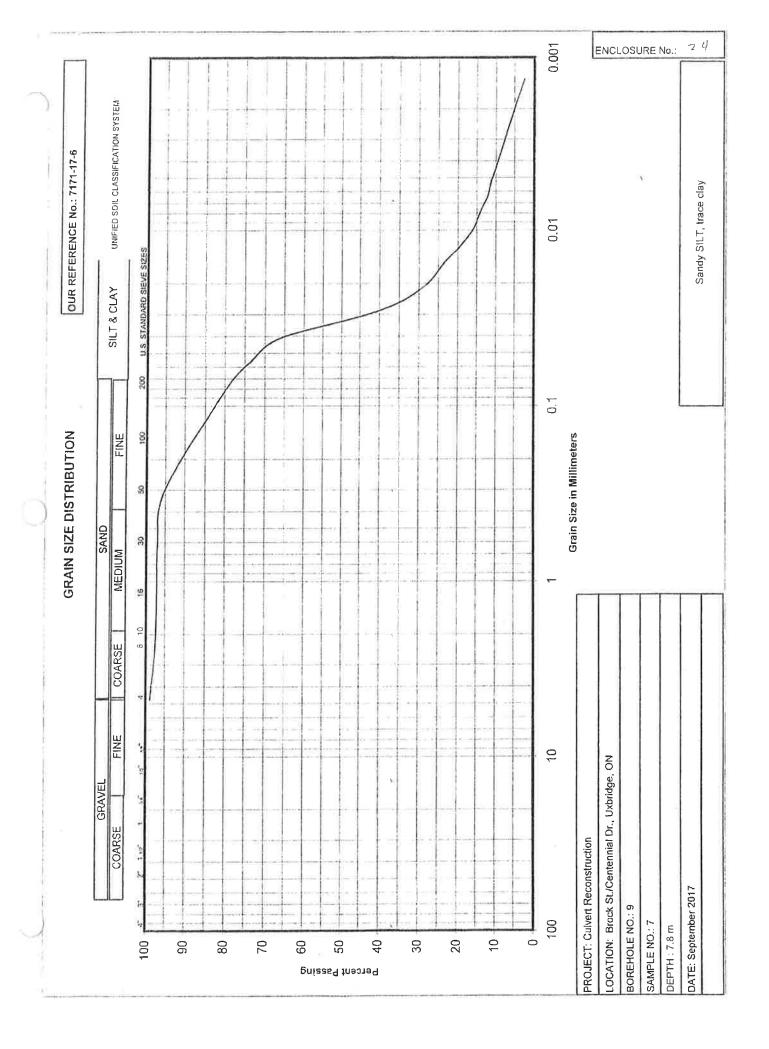




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