



Englobe

Soils Materials Environment

Crombie REIT

**Proposed New Building
5150 Innes Rd,
Ottawa, Ontario**

Geotechnical Investigation Report

Date: September 12, 2017

Ref. N°: 033-B-0017787-1-GE-R-0001-00



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5150 Innes Rd,
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Geotechnical Investigation | 033-B-0017787-1-GE-R-0001-00



Prepared by:

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Senior Geotechnical Engineer

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Test results mentioned herein are only valid for the sample(s) stated in this report.

Englobe's subcontractors who may have accomplished work either on site or in laboratory are duly qualified as stated in our Quality Manual's procurement procedure. Should you require any further information, please contact your Project Manager."

Crombie REIT
610 East River Road, Suite 200,
New Glasgow, NS B2H 3S2
Attention: Mr. Dwayne Cameron

REVISION AND PUBLICATION REGISTER		
Revision N°	Date	Modification And/Or Publication Details
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1 electronic copy	Crombie REIT., Attention: Mr. Dwayne Cameron

INTRODUCTION

Englobe Corp. (Englobe) was retained by Crombie REIT to carry out a geotechnical investigation for the construction of new building located at the north east corner of the parking lot at the 5150 Innes, Ottawa, Ontario. The work was authorized by Crombie REIT by a copy of our proposal signed by the client on July 22, 2017.

The purpose of the investigation was to determine the subsurface soil and groundwater conditions at the site and, based on that information, prepare this engineering report with geotechnical recommendations pertaining to foundation design, concrete slabs-on-grade floor, excavations, dewatering, site servicing and pavement design.

1 **GENERAL INFORMATION**

The project involves the proposed construction of a one storey new building with no basement located on the parking lot at the 5150 Innes, Ottawa, Ontario. The proposed building will be located in the north east portion of the existing parking lot.

2 INVESTIGATION PROCEDURE

2.1 FIELD PROGRAM

The fieldwork for this investigation was carried out on August 23rd, 2017 and involved the drilling of two (2) boreholes (BH-01-17 and BH-02-17). The boreholes were advanced to depths of 8.22 m and 6.10 m respectively at the locations shown on the appended Site Plan. The boreholes were advanced with a CME truck-mounted drill rig equipped with continuous flight solid stem augers, supplied and operated by Grenville Drilling.

Local utility companies were contacted prior to the start of drilling activities in order to demarcate public and private underground utilities near the boring locations.

Soil samples were recovered from the boreholes at regular depth intervals using a 50 mm outside diameter split spoon sampler in accordance with the Standard Penetration Test (SPT) procedure.

An *in situ* vane shear test was completed in the cohesive soil in Borehole BH-01-17 to a depth of 8.22 m. A dynamic penetration test was also done at borehole BH-01-17 in order to verify and confirm the depth of the refusal. This dynamic penetration test ended at 28.96 meters without refusal.

The SPT N-values and results of vane shear testing are plotted on the borehole logs.

The borehole locations and ground surface elevations were surveyed by Englobe. The boreholes were located relative to existing site features and property lines, and the ground surface elevations are referred to an arbitrary elevation of 100.00, representing the surface of the asphalt.

2.2 LABORATORY TESTING

All soil samples secured during this investigation were returned to Englobe's laboratory for visual examination, and index testing. The geotechnical laboratory testing program consisted of natural moisture content tests on all recovered samples and six (6) Atterberg limits tests on selected soil samples.

The soil samples secured during this investigation were returned to our laboratory for visual examination as well as moisture content determinations. The moisture content test results are plotted on the borehole logs. The geotechnical laboratory testing also included, six (6) Atterberg Limits tests with results plotted on the borehole logs in Appendix 3 and summarized in Section 3.1.2.

The soil samples will be stored for a period of three (3) months from the date of sampling. After this time, they will be discarded unless prior arrangements have been made for longer storage.

3 SUMMARIZED CONDITIONS

3.1 SUBSURFACE SOIL CONDITIONS

The subsurface stratigraphy at the borehole locations generally comprises pavement structure and fill underlain by native deposits of clay. Descriptions of the various soil deposits encountered are provided in the following subsections with the subsoil details given on the borehole logs in Appendix 2.

3.1.1 Pavement Structure and Fill

The pavement structure was encountered in both Boreholes and comprises 80 mm of asphaltic concrete, over a thin layer of granular backfill, this fill overlies about 500 mm thick layer of a gravelly sand with some silt material.

Four (4) soil samples of the fill contacted between 0.08 and 0.61 m depths was submitted for chemical analysis. The results are included in Appendix 4 of this report.

At the time of fieldwork, the fill was moist. SPT N-values varying from 10 to 34 blows per 300 mm penetration of a split spoon sampler indicate that the fill in the Boreholes has a compact to dense relative density.

3.1.2 Silty Clay

Silty clay was encountered beneath the fill at both borehole locations. The clay stratum has a thickness of more than 8.22 m at BH-01-17. Based on the vane shear test done on THB-01-17, the clay generally has a very stiff consistency on the first 2 m and gradually becomes firm at 4 m depth.

Six (6) Atterberg Limits tests were completed on samples of the cohesive silty clay and the results are summarized in Table 1. Based on the results of the Atterberg Limits testing, the clayey silt has a high degree of plasticity. Based on results of *in situ* vane shear testing the cohesive silty clay has a high sensitivity.

Table 1: Atterberg Limits Test Results

Borehole number and sample number	Depth (m)	Moisture content (%)	Liquid limit (%)	Plastic limit (%)	Plasticity index	Liquidity index	Class (uscs)
BH-01-17, SS-3	1.52-2.13	40.0	76	28	48	0.3	CH
BH-01-17, SS-5	3.05-3.66	63.7	78	26	52	0.7	CH
BH-01-17, SS-7	4.57-5.18	84.2	83	28	55	1.0	CH
BH-02-17, SS-4	2.29-3.90	48.9	77	26	51	0.6	CH
BH-02-17, SS-6	3.81-4.42	66.4	78	26	52	0.8	CH
BH-02-17, SS-8	5.49-6.10	76.7	76	26	50	1.0	CH

3.1.3 Groundwater

Groundwater seepage was not observed during drilling operations. However, based on laboratory moisture content data, the geotechnical design groundwater level has been estimated to be within 2 m of the ground surface. Groundwater levels can be expected to fluctuate significantly seasonally and following precipitation events.

4 DISCUSSION AND RECOMMENDATIONS

It is understood that a new restaurant building of approximately 175 m² will be constructed in the north-east portion of the subject site. A drive-thru is also proposed for the restaurant.

The property currently comprises an operating Sobeys and LCBO in the west portion of the site and a CIBC in the south-east portion of the site. The remainder of the site is occupied by surface parking, or is landscaped. The following paragraphs include geotechnical recommendations regarding construction of the new restaurant, excavations and dewatering, site servicing and pavement design.

4.1 PROPOSED RESTAURANT

4.1.1 Foundation Design

For the purpose of this engineering report footings for the proposed building have been assumed to be 1.8 m below grade. Boreholes BH-01-17 and BH-02-17 were advanced in the vicinity of the new restaurant and soil conditions comprise pavement structure overlying native very stiff to firm silty clay. The native mineral soils should be suitable to support the loads on conventional footings.

The footings, floor slab, and any fill material including the pavement structure, and utility trench backfill encountered during the removal of the existing structure are not considered suitable to remain below the proposed building footprint and must be subexcavated. The exposed subgrade should be inspected by a geotechnical engineer and any loose or unstable areas noted during the inspection should be removed. Once the deleterious fill has been removed exposing native very stiff to stiff grey silty clay throughout, filling and foundation construction can commence.

Where required, grades below the building foundations and the floor slab should be raised using structural fill placed in 300 mm thick lifts and compacted to 100% standard Proctor maximum dry density (SPMDD). Imported granular materials meeting the gradation limits for OPSS 1010 Granular 'B' should be used to raise grades below the footings.

Full time inspection by experienced geotechnical personnel must be carried out during fill placement and compaction to examine and approve potential sources of fill material, and to carefully monitor the placement and verify the compaction by insitu density testing.

Footings founded on the very stiff to stiff native silty clay or approved structural fill may be designed for a factored geotechnical bearing resistance at Ultimate Limit States (ULS) of 150 kPa and a soil bearing resistance for 25 mm of settlement at Serviceability Limit States (SLS) of 100 kPa.

All exterior footings and those exposed to freezing should be provided with 1.8 m of soil cover to provide protection from freezing. If construction extends into the winter months, all founding soil must be protected from freezing during construction.

A Site Classification 'F' should be used for earthquake load and effects in accordance with Table 4.1.8.4.A of the Ontario Building Code (2012).

Foundation wall backfill should comprise imported sand and gravel placed in 300 mm thick lifts and be compacted to 95% SPMDD. The contacted native mineral soils are not considered suitable for reuse as foundation wall backfill due to the high moisture content and blocky lumpy texture of the silt material. The backfill should be brought up evenly on both sides of walls not designed to resist lateral earth pressure.

4.1.2 Concrete Slab-on-Grade Floor

The floor slab for the proposed building may be constructed using conventional concrete slab-on-grade techniques following removal of the existing pavement structure and any existing fill. The subgrade soils should be approved by a geotechnical engineer. Where required grades should be raised using imported sand or sand and gravel material (ideally, OPSS 1010 Granular 'B') placed in 300 mm thick lifts and compacted to 100% SPMDD. Any structural fill placed below interior footings should also be compacted to 100% SPMDD.

A minimum 150 mm thick layer of Granular 'A' material compacted to 100% SPMDD should be provided directly beneath the slab for levelling and support purposes. No special underfloor drains are required provided the exterior grades are lower than the floor slab and positively sloped away from the building.

4.2 EXCAVATIONS AND DEWATERING

Temporary excavations to conventional depths at this site must comply with the Ontario Occupational Health and Safety Act and Regulations for Construction Projects. The contacted fill would be classified as Type 3 soils and temporary side slopes must be cut at an inclination of 1 horizontal to 1 vertical or less from the base of the excavation (exclusive of groundwater effects).

The contacted cohesive clay deposits underlying the fill would be classified as Type 2 soil and temporary side slopes may be cut near vertical in the bottom 1.20 m and must be trimmed back at about 1 horizontal to 1 vertical above this level.

If seepage occurs through the side slopes of the trench, the temporary side slopes must be cut back at a minimum gradient of 3 horizontal to 1 vertical from the base of the excavation.

Where space limitations (from utility poles, existing underground services, above ground structures, property limits, etc.) do not permit overburden cut slopes at inclinations specified above, a steeper cut slope can be employed if trench liner boxes (prefabricated support system) are used to protect workers. Some movement/slumping of the fill adjacent to the

trench box has to be expected if this option is used. The cohesive clay soils will generally remain vertical for short time periods.

4.3 SITE SERVICING

It is understood that the new building will be provided with services including watermain, sanitary and storm. It is anticipated that the invert levels for the watermain, storm and sanitary connections will be at conventional depths, some 2 to 3 m below finished grade. We refer the reader to Section 4.2, Excavations and Dewatering for recommendations for excavation slopes and dewatering requirements.

Prior to the installation of the new service lines, the pipe subgrade should be inspected by a geotechnical engineer. Any loose or soft zones noted during the inspection must be subexcavated and replaced with well-compacted granular material such as OPSS Granular 'A'. No bearing problems are anticipated for flexible or rigid pipes founded very stiff to stiff native clay or well compacted granular material.

Pipe bedding for water and sewer services should be conventional Class 'B' pipe bedding comprising a minimum 150 mm thick layer of OPSS Granular 'A' aggregate below the pipe invert. The bedding course may be thickened if portions of the subgrade become unduly wet during excavation. Granular 'A' type aggregate should be provided around the pipe to at least 300 mm above the pipe. The bedding aggregate should be compacted to a minimum 95% standard Proctor maximum dry density SPMDD.

Water and sewer lines installed outside of heated areas should be provided with a minimum 1.8 m of soil cover, or equivalent insulation, for frost protection.

The trench backfill should be placed in lifts with a maximum thickness of 300 mm and compacted to minimum 95% SPMDD. Inorganic, debris-free, non-impacted fill may be suitable for reuse on-site following approval by a geotechnical engineer. It is recommended that the native soils be used as backfill in the trenches to prevent problems with differential frost heaving of imported subgrade materials. Non-conventional compaction equipment, such as a hoe-pack, may be necessary.

If necessary, compensation for wet trench backfill conditions can be made with additional Granular 'B' in the pavement structure. It should be noted, however, that the wet backfill material must be compacted to at least 90% SPMDD or post-construction settlements could occur.

Backfilling operations should follow closely after excavations so that only a minimal length of trench is exposed while still allowing for efficient placement of pipe.

If construction extends into the winter months, then the backfilling operations should be planned so that exposure of the backfill material to frost is kept to a minimum and to ensure that frozen material is not used as backfill.

Frequent inspection and compaction testing by experienced geotechnical personnel should be carried out to examine and approve backfill materials, and to verify that the specified degree of compaction has been achieved.

4.4 PAVEMENT STRUCTURE

It is understood that asphalt parking and drive thru is proposed to the west of the new building. Any existing fill material encountered during the removal of the existing structures are not considered suitable to remain below the proposed parking lot and should be subexcavated.

Any organics exposed in the subgrade should also be subexcavated. Any material required to raise grades beneath the new pavement structure should comprise imported sand and gravel similar to OPSS Granular 'B'. The subgrade fill should be placed in 300 mm thick lifts and compacted to 95% SPMDD.

The fill deposits may remain in place in the subgrade below the new pavement structure provided that the subgrade is thoroughly proof-rolled and inspected by a geotechnical engineer and any potential settlements accepted by the owner.

The finished subgrade should be approved by a geotechnical engineer. Any unstable areas noted during the inspection should be subexcavated and replaced with well compacted subgrade fill.

The following pavement component thicknesses are recommended based on the proposed pavement usage and frost susceptibility and strength of the subgrade soils;

Table 2: Pavement Component Thicknesses

Pavement component	Thickness (mm)
Asphaltic Concrete	70
Granular 'A' Base Course	250
Granular 'B' Subbase Course	500

Samples of both the Granular 'A' and Granular 'B' aggregates should be checked for conformance to OPSS 1010 prior to utilization on site and during construction. The Granular 'B' subbase and Granular 'A' base courses must be compacted to 100% SPMDD, as verified by *in situ* density testing. The asphaltic concrete paving materials should conform to the requirements of OPSS 1150.

The asphalt should be placed and compacted in accordance with OPSS 310. The recommended Performance Graded Asphalt Cement (PG-AC) designation for the asphaltic concrete is 58-28.

5 STATEMENT OF LIMITATIONS

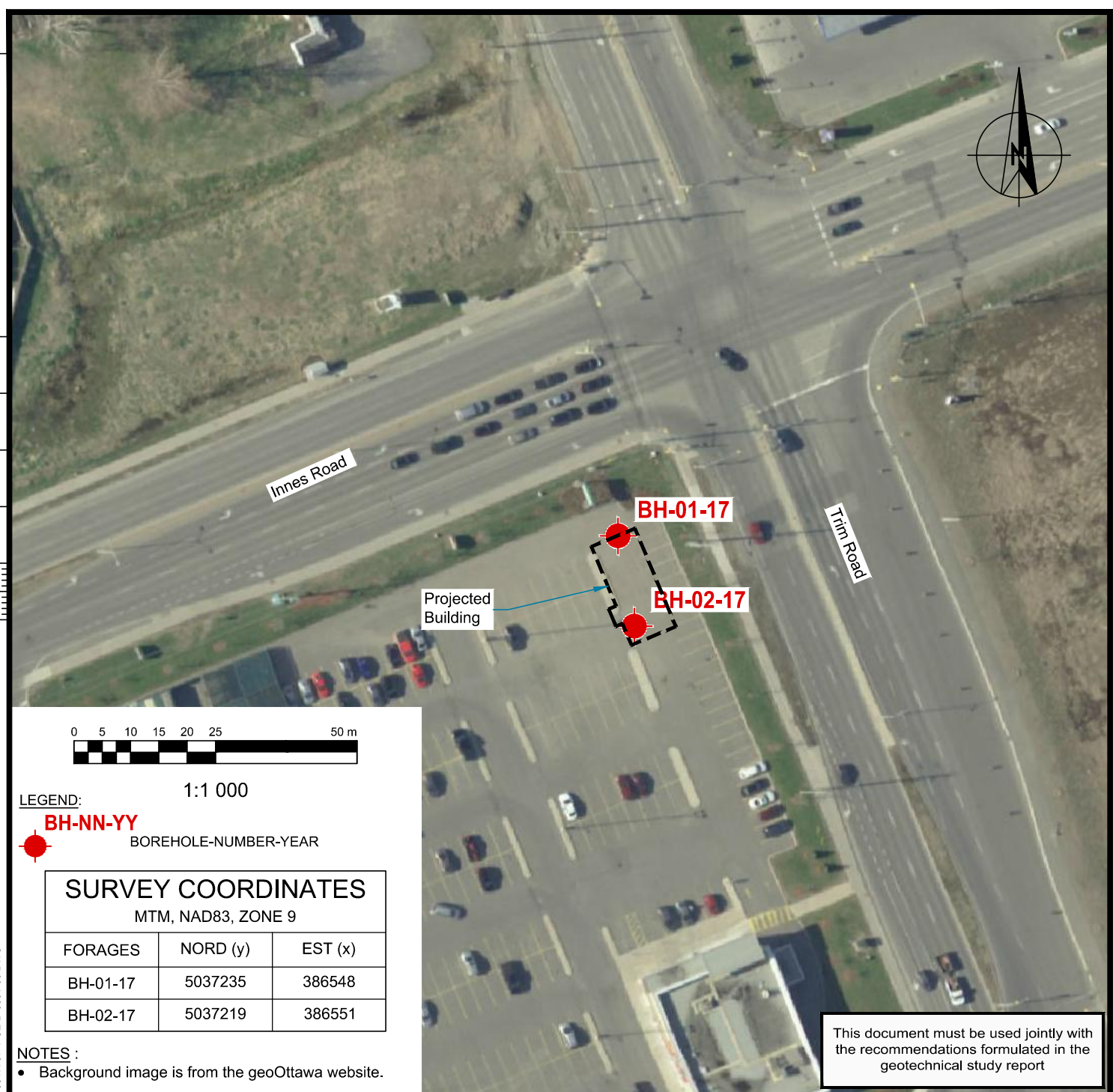
The geotechnical recommendations provided in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known at the time of report preparation, we recommend that we be retained during the final design stage to verify that the geotechnical recommendations have been correctly interpreted in the design. Also, if any further clarification and/or elaboration are needed concerning the geotechnical aspects of the project, Englobe should be contacted. We recommend that we be retained during construction to confirm that the subsurface conditions do not deviate materially from those encountered in the test holes and to ensure that our recommendations are properly understood.

The geotechnical recommendations provided in this report are intended for the use of the owner and its retained designer. They are not intended as specifications or instructions to contractors. Any use which a contractor makes of this report, or decisions made based on it, are the responsibility of the contractor. The contractor must also accept the responsibility for means and methods of construction, seek additional information if required, and draw their own conclusions as to how the subsurface conditions may affect their work. Englobe accepts no responsibility and denies any liability whatsoever for any damages arising from improper or unauthorized use of the report or parts thereof.

It is important to note that the geotechnical investigation involves a limited sampling of the site gathered at specific test hole locations and the conclusions in this report are based on this information gathered. The subsurface geotechnical, hydrogeological, environmental and geologic conditions between and beyond the test holes will differ from those encountered at the test holes. Also such conditions are not uniform and can vary over time. Should subsurface conditions be encountered which differ materially from those indicated at the test holes, we request that we be notified in order to assess the additional information and determine whether or not changes should be made as a result of the conditions.

Appendix 1 Drawings

10 cm
5
4
3
2
1
0



1:1 000

LEGEND:
BH-NN-YY
BOREHOLE-NUMBER-YEAR

SURVEY COORDINATES
MTM, NAD83, ZONE 9

FORAGES	NORD (y)	EST (x)
BH-01-17	5037235	386548
BH-02-17	5037219	386551

NOTES :
• Background image is from the geoOttawa website.

This document must be used jointly with the recommendations formulated in the geotechnical study report

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Client
Crombie REIT

Project
Geotechnical investigation

5150 Innes Rd, Ottawa, ON

Title
Borehole Locations

Englobe Corp.
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Suite 100
Gatineau, Quebec
J8Y 6T5
819-778-3143



Discipline: Geotechnical		Prepared by: S. Séguin	Verified by: C. Perez
Scale: 1:1 000		Drawn by: R. Frenette	Approved by: C. Perez
Date: 06/09/2017		Figure n°: 1 of 1	
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Appendix 2 Borehole Logs

The following sounding logs summarize soils and rock geotechnical properties as well as ground water conditions, as collected during field work and/or obtained from laboratory tests. This note explains the different symbols and abbreviations used in these logs.

STRATIGRAPHIC UNITS

Elevation/Depth:	Reference to the geodesic elevation of the soil or to a bench mark of arbitrary elevation, at the location of the sounding. Depth of the different geological boundaries as measured from ground surface. On the left, the scale is in meters while on the right, it is in feet.
Description of the stratigraphic units:	Every geological formation is detailed. The proportion of the different elements of the soil, defined according to the size of the particles, is given following the classification hereafter. The relative compactness of cohesionless soils is defined by the "N" index of the Standard Penetration Test. The consistency of cohesive soils is defined by their shear resistance.

SYMBOLS

TOP SOIL		SAND		COBBLE	
BACKFILL		SILT		BOULDER	
GRAVEL		CLAY		ROCK	

WATER LEVEL

This column shows the ground water level, as measured at a given time during the geotechnical investigation. The details of the installation (type and depth) are also illustrated in this column.

SAMPLES

Type and number: Each sample is labelled in accordance with the number of this column and the given notation refers to samples types.

Sub-sample: When a sample contains two or more different stratigraphic units, it is sometimes necessary to separate it and create sub-samples. This column allows for the identification of the latter and the association to *in situ* or laboratory measurements to these sub-samples.

Condition: The position, length and condition of each sample are shown in this column. The symbol shows the condition of the sample, following the legend given on the sounding log.

Size: This column indicates the split spoon sampler size.

"N" index
The standard penetration index shown in this column is expressed with the letter "N". This index is obtained with the Standard Penetration Test. It corresponds to the number of blows required to drive the last 300mm of the split spoon, using a 622 Newton hammer falling freely from a height of 762mm (ASTM D-1586). For a 610mm long split spoon, the "N" index is obtained by adding the number of blows required for the driving of the 2nd and 3rd 150mm of the split spoon. Refusal (R) indicates a number of blows greater than 100. A set of numbers such as 28-30-50/60mm indicates that the number of blows required to drive the 1st and 2nd 150mm of the split spoon are respectively 28 and 30. Moreover, it indicates that 50 blows were necessary to get a penetration of 60mm, whereupon the test was suspended.

RQD index: Rock Quality Designation index: This index is defined as the ratio between the total length of all rock cores of 100mm and more in length over the total length of the core run. The RQD index is an indirect measurement of the number of "natural" fractures and of the amount of the alteration in a rock mass.

TESTS

Results: This column shows, for the corresponding depth, the results of tests carried out in the field or in the laboratory (shear strength, dynamic penetration, Atterberg limits with the cone, etc.). For more information, please refer to the legend in the upper part of the sounding log. However, an abbreviation indicating the type of analysis performed is shown next to the sample tested.

Graph: This graph shows the undrained shear strength resistance of cohesive soils, as measured *in situ* or in the laboratory (NQ 2501-200). It is also used to present the Dynamic Cone Penetration Test (NQ 2501-145) results.
Moreover, this graph is used for the representation of the water content and Atterberg limits test results.

Classification

Particle size (mm)

Clay	< 0.002
Clay and silt (undifferentiated)	< 0.08
Sand	0.08 to 5
Gravel	5 to 80
Cobble	80 to 300
Boulder	> 300

Descriptive terminology

Proportion (%)

"Traces" (tr.)	1 to 10
"Some" (s.)	10 to 20
Adjective (ex.: sandy, silty)	20 to 35
"And" (ex.: sand and gravel)	35 to 50

Compactness of cohesionless soils

Standard Penetration Test index ("N" value), ASTM D-1586 (blows for a 300mm penetration)

Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	> 50

Consistency of cohesive soils

Undrained shear strength (kPa)

Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200

Plasticity of cohesive soils

Liquid limit (%)

Low	< 30
Medium	30 to 50
High	> 50

Sensitivity of cohesive soils

$S_t = (C_u/C_{ur})$

Low	$S_t < 2$
Medium	$2 < S_t < 4$
High	$4 < S_t < 8$
Extra-sensitive	$8 < S_t < 16$
Quick (sensitive) clay	$S_t > 16$

Classification of rock

RQD (%)

Very poor quality	< 25
Poor quality	25 to 50
Fair quality	50 to 75
Good quality	75 to 90
Excellent quality	90 to 100



Client :

Crombie Reit

BOREHOLE REPORT

File n°: B-0017787-1
Borehole n°: BH-01-17
Date: From 2017-08-23 to 2017-08-23

Project: Geotechnical Investigation

Location: 5150 Innes Rd, Ottawa, ON

Coordinates (m): North 5037235,0 (Y)
East 386548,0 (X)
MTM, NAD83
ZONE 9 Elevation 0,00 (Z)
Bedrock: m End depth: 28,96 m

Sample condition

Intact Remoulded Lost Core

Organoleptic soil examination:

Visual aspect: Non-existent(N); Disseminated(D); Soaked(S)
Odor: Non-existent(N); Light(L); Medium(M); Persistent(P)

Sample type

SS Split Spoon
TM Thin wall Tube
PS Piston Tube
RC Rock core
AS Auger
MA Bulk sample
TU Transparent tube
PW Englobe Mega-Sampler
FG Frozen ground

Tests

L Consistency Limits
W_L Liquid Limit (%)
W_P Plastic Limit (%)
I_P Plasticity Index (%)
I_L Liquidity Index
W Natural Water Content (%)
GS Grain Size Analysis
S Hydrometer analysis
R Refusal
VBS Methylene Blue Value
WR Weight of Rods
O.M. Organic Matter (%)
K Permeability (cm/s)
UW Unit Weight (kN/m³)
A Absorption (l/min. m)
U Uniaxial Compressive strength (MPa)
RQD Rock Quality Designation (%)
CA Chemical Analysis
P_L Limit Pressure (kPa)
E_m Pressuremeter Modulus (MPa)
E_r Modulus of subgrade reaction (MPa)
SP_o Segregation Potential (mm²/H °C)

Water Level
N Std Penetration test (blows/300mm)
N_C Dyn. Penetration test (blows/300mm) ●
σ'_p Preconsolidation Pressure (kPa)
SCI Soil Corrosivity Index
EDM Deformation Modulus (GPa)
σ'_T Brazilian test (MPa)
Undrained shear strength
C_u Undisturbed (kPa) ▲
C_{ur} Remoulded (kPa) △

DEPTH - ft DEPTH - m		STRATIGRAPHY			WATER LEVEL (m) / DATE	SAMPLES							FIELD AND LABORATORY TESTS				
		ELEVATION - m DEPTH - m	SOIL OR BEDROCK DESCRIPTION	SYMBOLS		TYPE AND NUMBER	SUB-SAMPLE	CONDITION	SIZE	RECOVERY %	Blows/150mm	"N" or RQD	Organo. Exam		RESULTS	NATURAL WATER CONTENT AND LIMITS (%)	
													Odor	Visual		W _p	W _L
<div>20406080100120</div> <div>UNDRAINED SHEAR STRENGTH (kPa) OR DYNAMIC PENETRATION</div> <div>20406080100120</div>																	
		0.00															
1		0.00	Bituminous asphalt.														
		-0.08	Backfill : Gravelly sand, some silt, grey.														
2		0.08															
		-0.61	Native Deposit: Silty clay, traces of silt and gravel, grey.														
3	1	0.61															
		-1.22	Beginning of the scissometer tests on site at 1.22 m.														
4		1.22															
		-1.52	Silty clay, grey, of stiff consistency.														
5		1.52															
6	2																
		-2.29	Silty Clay, grey, moist.														
7		2.29															
8																	
9																	
10	3	-3.05	Silty clay, grey, of soft consistency, moist.														
		3.05															
11																	
		-3.81	Silty clay, grey, of very soft consistency, very wet.														
12		3.81															
13	4																
14																	
15																	
16	5																
17																	
18																	
19																	
20	6	-6.10	End of sampling at a depth of 6,1 m.														
		6.10															
21																	
22																	
23	7																
24																	
25																	
26	8																
27		-8.22	End of the scissometer tests on site at 8.22 m.														
		8.22															
28																	
29																	

Remarks:

Borehole type: Auger

Boring equipment:

Prepared by: S. Séguin, tech.

Approved by: C. Perez, Eng.

2017-09-06

Page: 1 of 3



Client :

Crombie Reit

BOREHOLE REPORT

File n°: **B-0017787-1**
 Borehole n°: **BH-01-17**
 Date: From **2017-08-23** to **2017-08-23**

Project: **Geotechnical Investigation**

Location: **5150 Innes Rd, Ottawa, ON**

Coordinates (m): North 5037235,0 (Y)
 East 386548,0 (X)
MTM, NAD83
ZONE 9 Elevation **0,00 (Z)**
 Bedrock: m End depth: 28,96 m

DEPTH - ft	DEPTH - m	STRATIGRAPHY		SYMBOLS	WATER LEVEL (m) / DATE	SAMPLES								FIELD AND LABORATORY TESTS	
		ELEVATION - m DEPTH - m	SOIL OR BEDROCK DESCRIPTION			TYPE AND NUMBER	SUB-SAMPLE	CONDITION	SIZE	RECOVERY %	Blows/150mm	"N" or RQD	Organo. Exam	RESULTS	NATURAL WATER CONTENT AND LIMITS (%) Wp W WL
30															
31															
32															
33	-10														
34															
35															
36	-11														
37															
38															
39															
40	-12														
41															
42															
43	-13														
44															
45															
46	-14														
47															
48															
49	-15														
50															
51															
52	-16														
53															
54															
55															
56	-17														
57															
58															
59	-18														
60															
61															
62	-19														
63															
64															
65															
66	-20														
67															
68															
69	-21														
70															
71															
72	-22														

Remarks:

Borehole type: **Auger**

Boring equipment:

Prepared by: **S. Séguin, tech.**

Approved by: **C. Perez, Eng.**

2017-09-06

Page: 2 of 3



Client :

Crombie Reit

BOREHOLE REPORT

File n°:

B-0017787-1

Borehole n°:

BH-01-17

Date: From 2017-08-23 to 2017-08-23

Project: Geotechnical Investigaton

Location: 5150 Innes Rd, Ottawa, ON

Coordinates (m): North 5037235,0 (Y)

MTM, NAD83

East 386548,0 (X)

ZONE 9

Elevation

0,00 (Z)

Bedrock:

m End depth: 28,96 m

DEPTH - ft	DEPTH - m	STRATIGRAPHY		SYMBOLS	WATER LEVEL (m) / DATE	SAMPLES							FIELD AND LABORATORY TESTS		
		ELEVATION - m DEPTH - m	SOIL OR BEDROCK DESCRIPTION			TYPE AND NUMBER	SUB-SAMPLE	CONDITION	SIZE	RECOVERY %	Blows/150mm	"N" or RQD	Organo. Exam	RESULTS	NATURAL WATER CONTENT AND LIMITS (%) Wp W WL
74															
75	-23														
76															
77															
78															
79	-24														
80															
81															
82	-25														
83															
84															
85	-26														
86															
87															
88															
89	-27														
90															
91															
92	-28														
93															
94															
95	-29	-28,96 28,96	End of borehole to a depth of 28,97 m.												
96															
97															
98	-30														
99															
100															
101															
102	-31														
103															
104															
105	-32														
106															
107															
108	-33														
109															
110															
111	-34														
112															
113															
114															
115	-35														
116															

Remarks:

Borehole type: Auger

Boring equipment:

Prepared by: S. Séguin, tech.

Approved by: C. Perez, Eng.

2017-09-06

Page: 3 of 3



Client :

Crombie Reit

BOREHOLE REPORT

File n°:

B-0017787-1

Borehole n°:

BH-02-17

Date: From 2017-08-23 to 2017-08-23

Project: Geotechnical Investigation

Location: 5150 Innes Rd, Ottawa, ON

Coordinates (m): North 5037219,0 (Y)

East 386551,0 (X)

Elevation 0,00 (Z)

Bedrock: m End depth: 6,10 m

Sample condition



Intact



Remoulded



Lost



Core

Organoleptic soil examination:

Visual aspect: Non-existent(N); Disseminated(D); Soaked(S)

Odor: Non-existent(N); Light(L); Medium(M); Persistent(P)

Sample type

SS Split Spoon
TM Thin wall Tube
PS Piston Tube
RC Rock core
AS Auger
MA Bulk sample
TU Transparent tube
PW Englobe Mega-Sampler
FG Frozen ground

Tests

L Consistency Limits
W_L Liquid Limit (%)
W_P Plastic Limit (%)
I_P Plasticity Index (%)
I_L Liquidity Index
W Natural Water Content (%)
GS Grain Size Analysis
S Hydrometer analysis
R Refusal
VBS Methylene Blue Value
WR Weight of Rods
O.M. Organic Matter (%)
K Permeability (cm/s)
UW Unit Weight (kN/m³)
A Absorption (l/min. m)
U Uniaxial Compressive strength (MPa)
RQD Rock Quality Designation (%)
CA Chemical Analysis
P_L Limit Pressure (kPa)
E_m Pressurimeter Modulus (MPa)
E_r Modulus of subgrade reaction (MPa)
SP₀ Segregation Potential (mm²/H °C)

Water Level
N Std Penetration test (blows/300mm)
N_C Dyn. Penetration test (blows/300mm) ●
σ_p Preconsolidation Pressure (kPa)
SCI Soil Corrosivity Index
EDM Deformation Modulus (GPa)
σ_T Brazilian test (MPa)
Undrained shear strength
C_u Undisturbed (kPa)
C_{ur} Remoulded (kPa)

Field Laboratory
▲ ■
△ □

R.F.

Vertical Scale = 1 : 75

EQ-09-Ge-66A R.1 04.03.2009

DEPTH - ft DEPTH - m		STRATIGRAPHY			WATER LEVEL (m) / DATE	SAMPLES							FIELD AND LABORATORY TESTS						
		ELEVATION - m DEPTH - m	SOIL OR BEDROCK DESCRIPTION	SYMBOLS		TYPE AND NUMBER	SUB-SAMPLE	CONDITION	SIZE	RECOVERY %	Blows/150mm	"N" or RQD	Organo. Exam		RESULTS	NATURAL WATER CONTENT AND LIMITS (%)			
													Odor	Visual		Wp W WL			
																20 40 60 80 100 120			
															UNDRAINED SHEAR STRENGTH (kPa) OR DYNAMIC PENETRATION				
															20 40 60 80 100 120				
1		0,00	Bituminous asphalt																
2		-0,08	Backfill : Gravelly sand, some silt, grey.		SS-1		X		63	10-25 9-4	34								
3	1	0,08	Native Deposit : Silty clay, traces of sand and gravel.		SS-2		X		54	4-6 9-12	15			W = 25.8					
4		-0,61																	
5		0,61																	
6		-1,52	Silty clay, traces of sand.		SS-3		X		83	5-5 6-7	11			W = 40.4					
7	2	1,52																	
8																			
9																			
10	3	-3,05	Silty clay, grey, of stiff consistency.		SS-4		X		71	4-4 4-4	8			L W = 48.9 WL = 77 Wp = 26					
11		3,05																	
12		-3,81	Silty clay, greenish-grey, of soft consistency, moist.		SS-5		X		100	2-1 1-2	2			W = 51.3					
13	4	3,81																	
14		-4,57	Silty clay, greenish-grey, of soft consistency, moist.		SS-6		X		100	1-1 1-1	2			L W = 66.4 WL = 78 Wp = 26					
15		4,57																	
16	5	-4,57	Silty clay, greenish-grey, of soft consistency, very wet.		SS-7		X		100	0-1 1-1	2			W = 76.0					
17		-5,33																	
18		5,33																	
19	6	-6,10	Silty clay, greenish-grey, of very soft consistency, very wet.		SS-8		X		100	1-1 1-1	2			L W = 76.7 WL = 76 Wp = 26					
20		6,10																	
21			End of borehole to a depth of 6,1 m.																
22																			
23	7																		
24																			
25																			
26	8																		
27																			
28																			
29																			

Remarks:

Borehole type: Auger

Boring equipment:

Prepared by: S. Séguin, tech.

Approved by: C. Perez, Eng.

2017-09-06

Page: 1 of 1

Appendix 3

Geotechnical Laboratory analyses

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation
Location : 5150 Innes Rd, Ottawa, ON

Project # : B-0017787-1
Client ref. :

Report # : 1 **Rev. 0**
Page 1 of 1

Sampling

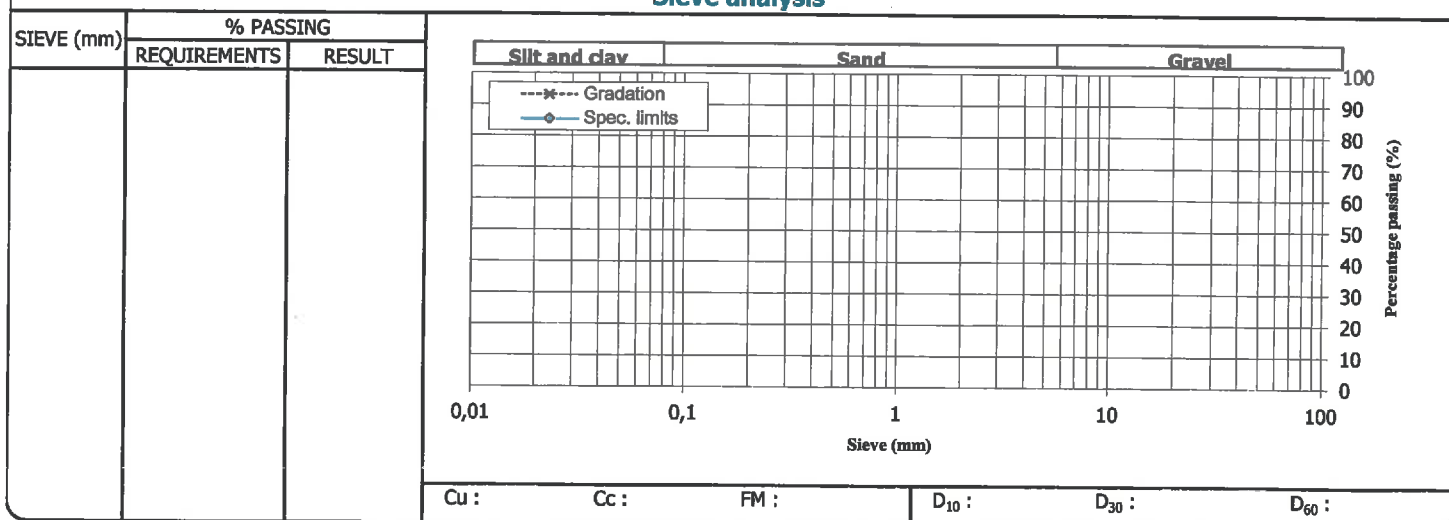
Sampling # : 1
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-01-17, SS-2; 0.61 - 1.22 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Water content (ASTM D2216) (%)

Required

Result

25,3

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-28

Approved by :

Date :

Camilo Perez, ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation
Location : 5150 Innes Rd, Ottawa, ON

Project # : B-0017787-1
Client ref. :

Report # : 2 **Rev. 0**
Page 1 of 1

Sampling

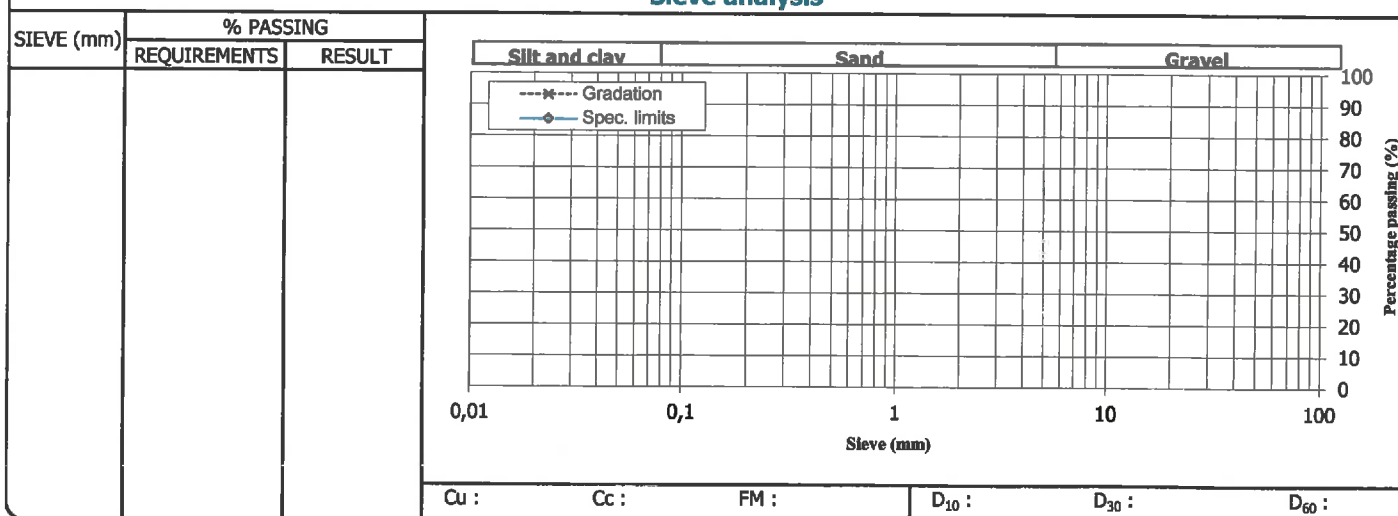
Sampling # : 2
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-01-17, SS-3; 1.52 - 2.13 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Required

Result

Classification (ASTM D 4318)
Liquidity index (ASTM D 4318)
Plasticity index (ASTM D 4318) (%)
Liquid limit (ASTM D 4318) (%)
Plastic limit (ASTM D 4318) (%)
Natural water content (ASTM D 4318) (%)

CH
0,3
48
76
28
40,0

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-30

Approved by :

Date :

Camilo Perez, ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation

Project # : B-0017787-1

Client ref. :

Location : 5150 Innes Rd, Ottawa, ON

Report # : 3 **Rev. 0**
Page 1 of 1

Sampling

Sampling # : 3
Your sampling # :
Material : Clay
Source; location : From borehole

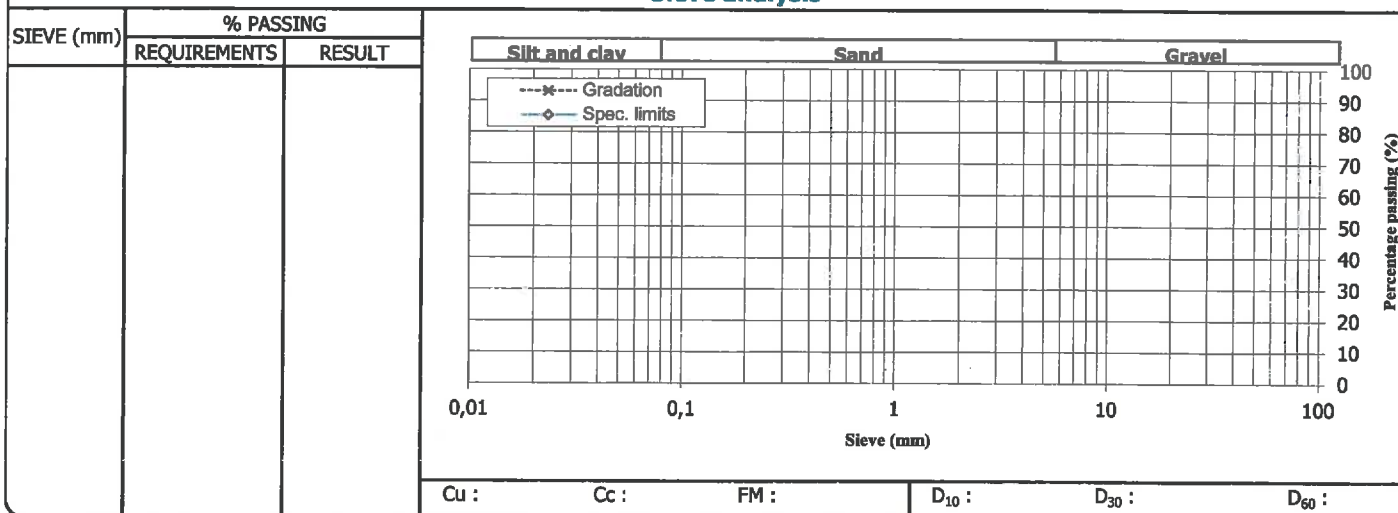
Sampling location : BH-01-17, SS-4; 2.29 - 3.90 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Required

Result

Water content (ASTM D2216) (%)

45,2

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-28

Approved by :

Date :

Camilo Perez, ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation
Location : 5150 Innes Rd, Ottawa, ON

Project # : B-0017787-1
Client ref. :

Report # : 4 **Rev. 0**
Page 1 of 1

Sampling

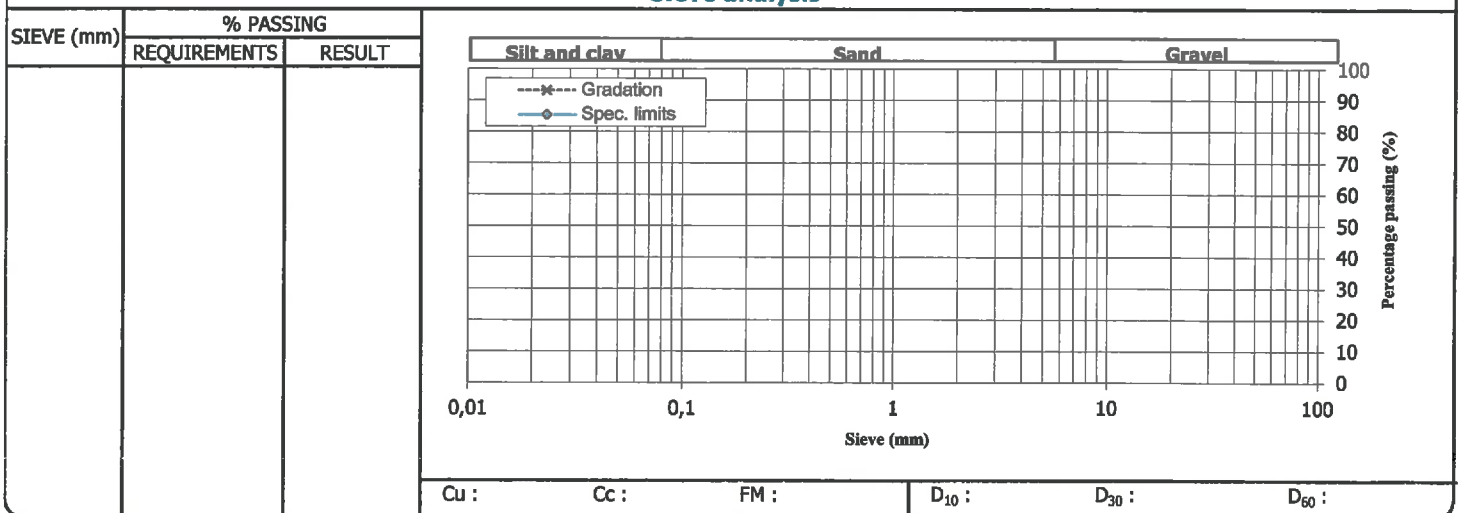
Sampling # : 4
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-01-17, SS-5; 3.05 - 3.66 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Classification (ASTM D 4318)
Liquidly index (ASTM D 4318)
Plasticity index (ASTM D 4318) (%)
Liquid limit (ASTM D 4318) (%)
Plastic limit (ASTM D 4318) (%)
Natural water content (ASTM D 4318) (%)

Required

Result

CH
0,7
52
78
26
63,7

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-30

Approved by :

Date :

Camilo Perez, Ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation
Location : 5150 Innes Rd, Ottawa, ON

Project # : B-0017787-1
Client ref. :

Report # : 5 **Rev. 0**
Page 1 of 1

Sampling

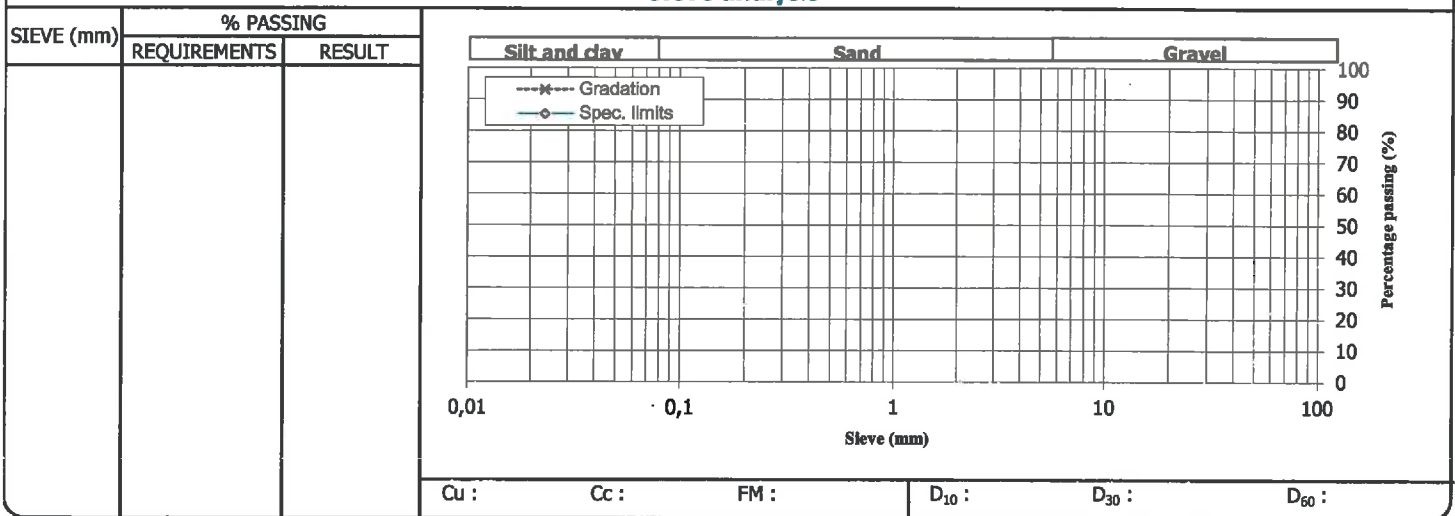
Sampling # : 5
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-01-17, SS-6; 3.81 - 4.42 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Water content (ASTM D2216) (%)

Required

Result

72,2

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-28

Approved by :

Date :

Camilo Perez, ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation

Project # : B-0017787-1
Client ref. :

Location : 5150 Innes Rd, Ottawa, ON

Report # : 6 **Rev. 0**
Page 1 of 1

Sampling

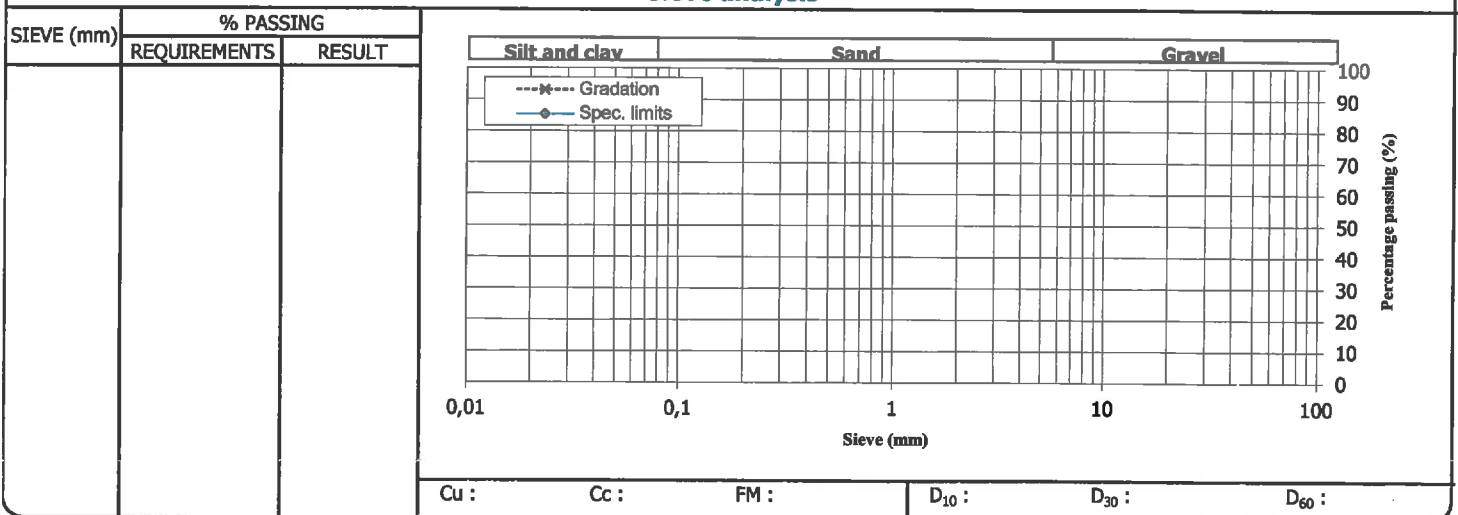
Sampling # : 6
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-01-17, SS-7; 4.57 - 5.18 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Classification (ASTM D 4318)
Liquidity index (ASTM D 4318)
Plasticity index (ASTM D 4318) (%)
Liquid limit (ASTM D 4318) (%)
Plastic limit (ASTM D 4318) (%)
Natural water content (ASTM D 4318) (%)

Required

Result

CH
1,0
55
83
28
84,2

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-29

Approved by :

Date :

Camilo Perez, Ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation
Location : 5150 Innes Rd, Ottawa, ON

Project # : B-0017787-1
Client ref. :

Report # : 7 **Rev. 0**
Page 1 of 1

Sampling

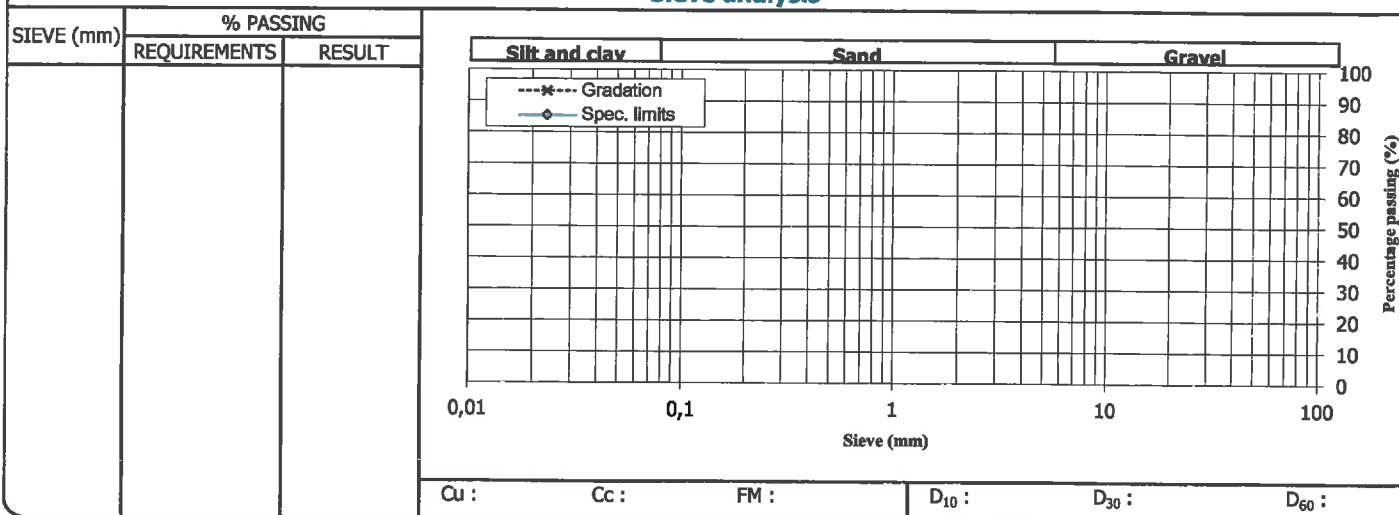
Sampling # : 7
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-01-17, SS-8; 5.49 - 6.10 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Water content (ASTM D2216) (%)

Required

Result

82,7

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-28

Approved by :

Date :

Camilo Perez, ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation

Project # : B-0017787-1

Client ref. :

Location : 5150 Innes Rd, Ottawa, ON

Report # : 8 **Rev. 0**
Page 1 of 1

Sampling

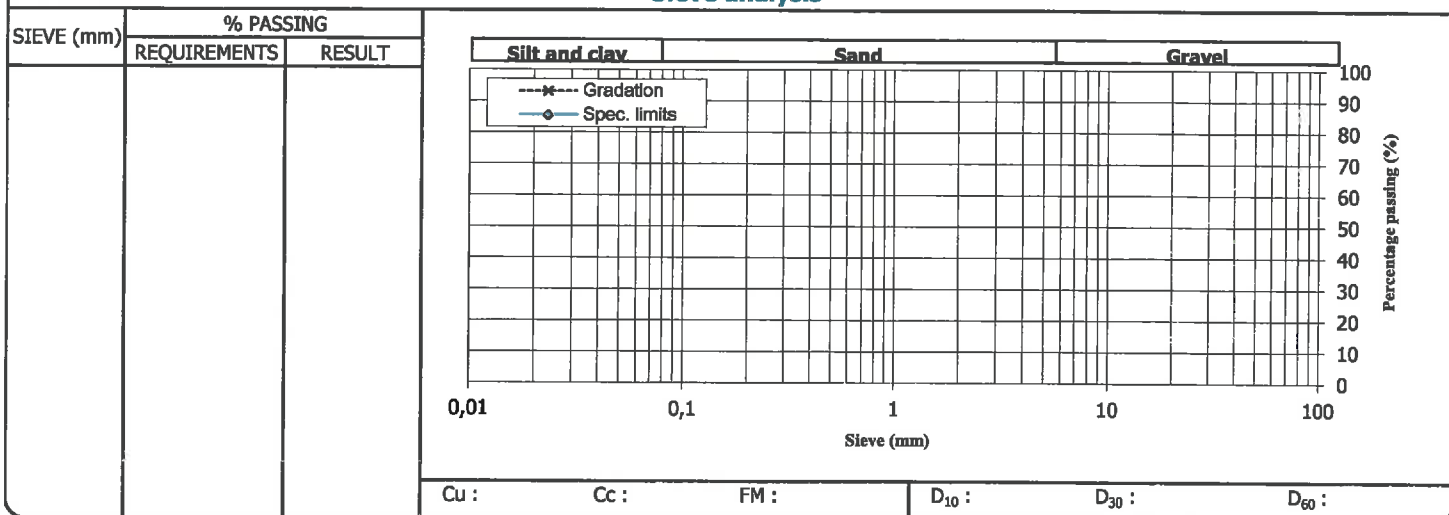
Sampling # : 8
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-02-17, SS-2; 0.61 - 1.22 m

Specification # 1

Reference :
Use :
Callbre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Water content (ASTM D2216) (%)

Required

Result

25,8

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-28

Approved by :

Date :

Camilo Perez, ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation
Location : 5150 Innes Rd, Ottawa, ON

Project # : B-0017787-1
Client ref. :

Report # : 9 **Rev. 0**
Page 1 of 1

Sampling

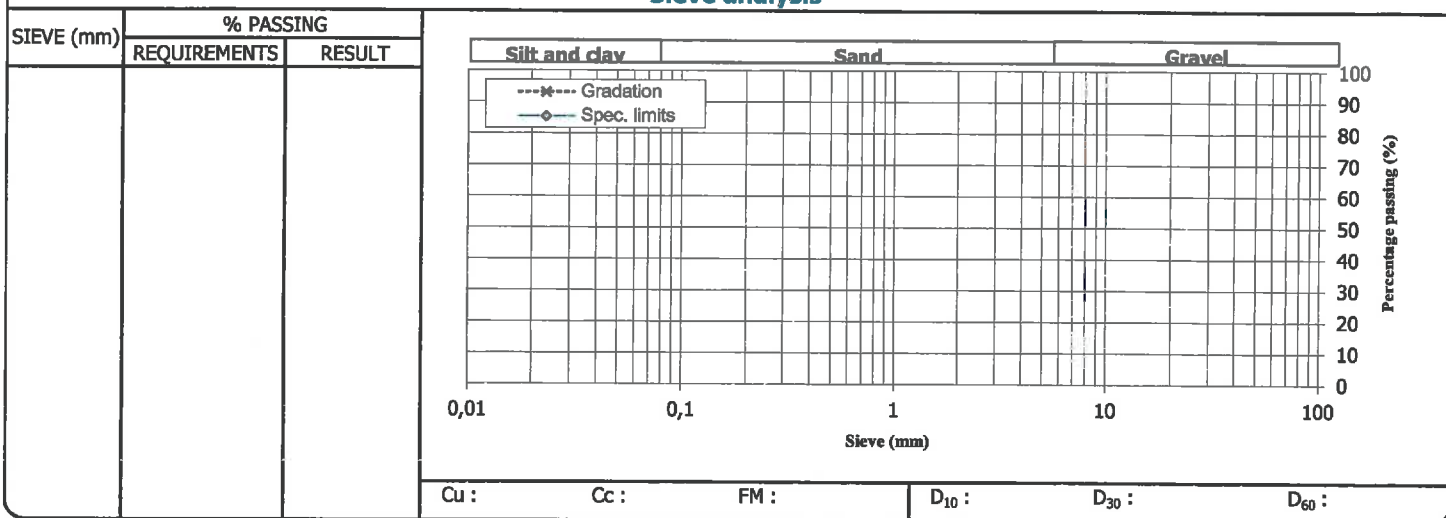
Sampling # : 9
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-02-17, SS-3; 1.52 - 2.13 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Required

Result

Water content (ASTM D2216) (%)

40,4

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-28

Approved by :

Date :

Camilo Perez, ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation

Project # : B-0017787-1
Client ref. :

Location : 5150 Innes Rd, Ottawa, ON

Report # : 10 **Rev. 0**
Page 1 of 1

Sampling

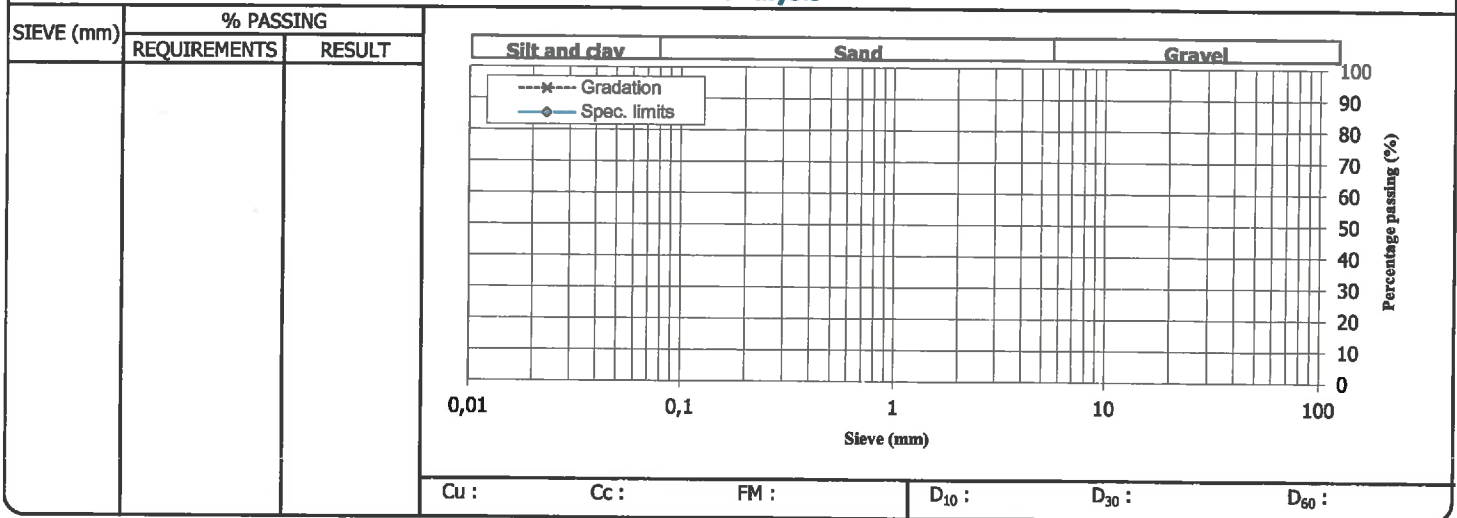
Sampling # : 10
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-02-17, SS-4; 2.29 - 3.90 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : Sand :
Gravel : Silt and clay :

Other testing

Required

Result

Classification (ASTM D 4318)
Liquidity index (ASTM D 4318)
Plasticity Index (ASTM D 4318) (%)
Liquid limit (ASTM D 4318) (%)
Plastic limit (ASTM D 4318) (%)
Natural water content (ASTM D 4318) (%)

CH
0,6
51
77
26
48,9

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-30

Approved by :

Date :

Camilo Perez, ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation

Project # : B-0017787-1
Client ref. :

Location : 5150 Innes Rd, Ottawa, ON

Report # : 11 **Rev. 0**
Page 1 of 1

Sampling

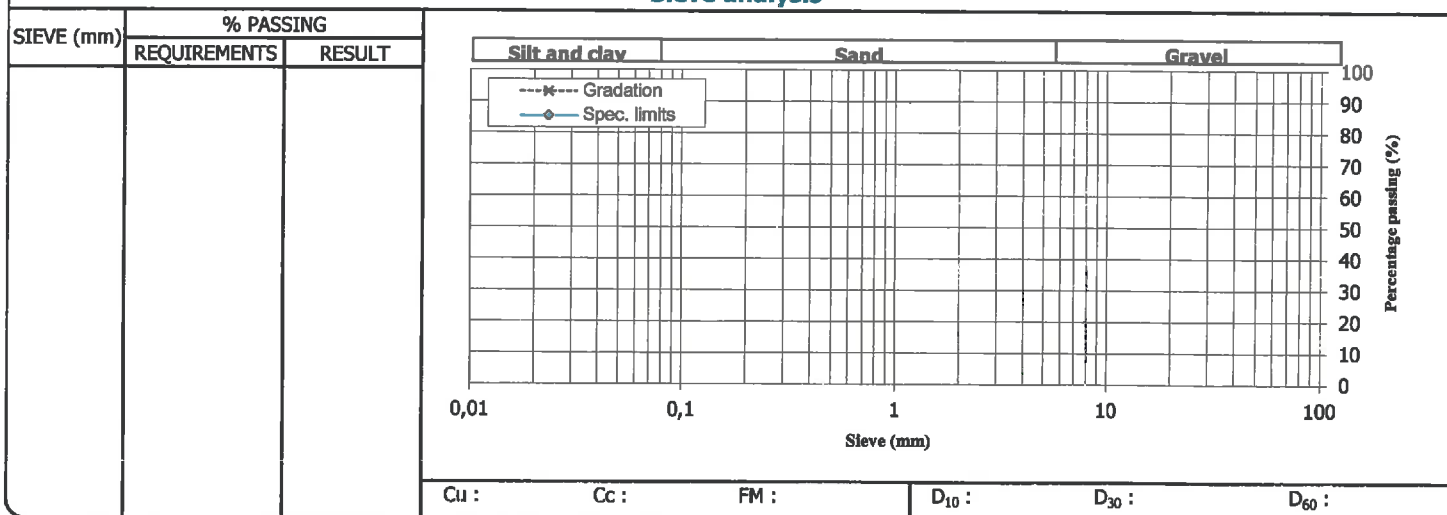
Sampling # : 11
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-02-17, SS-5; 3.05 - 3.66 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Required

Result

Water content (ASTM D2216) (%)

51,3

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-28

Approved by :

Date :

Camilo Perez, Ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation

Project # : B-0017787-1
Client ref. :

Location : 5150 Innes Rd, Ottawa, ON

Report # : 12 **Rev. 0**
Page 1 of 1

Sampling

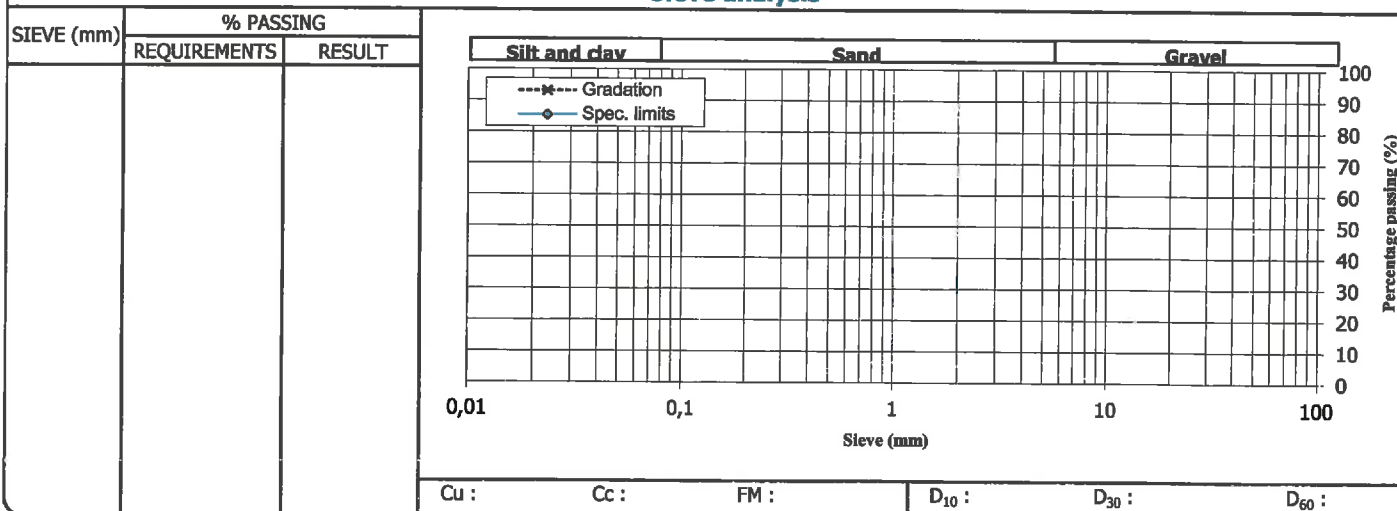
Sampling # : 12
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-02-17, SS-6; 3.81 - 4.42 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Classification (ASTM D 4318)
Liquid limit (ASTM D 4318)
Plasticity Index (ASTM D 4318) (%)
Liquid limit (ASTM D 4318) (%)
Plastic limit (ASTM D 4318) (%)
Natural water content (ASTM D 4318) (%)

Required

Result

CH
0,8
52
78
26
66,4

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-29

Approved by :

Date :

Camilo Perez, ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation

Project # : B-0017787-1
Client ref. :

Location : 5150 Innes Rd, Ottawa, ON

Report # : 13 **Rev. 0**
Page 1 of 1

Sampling

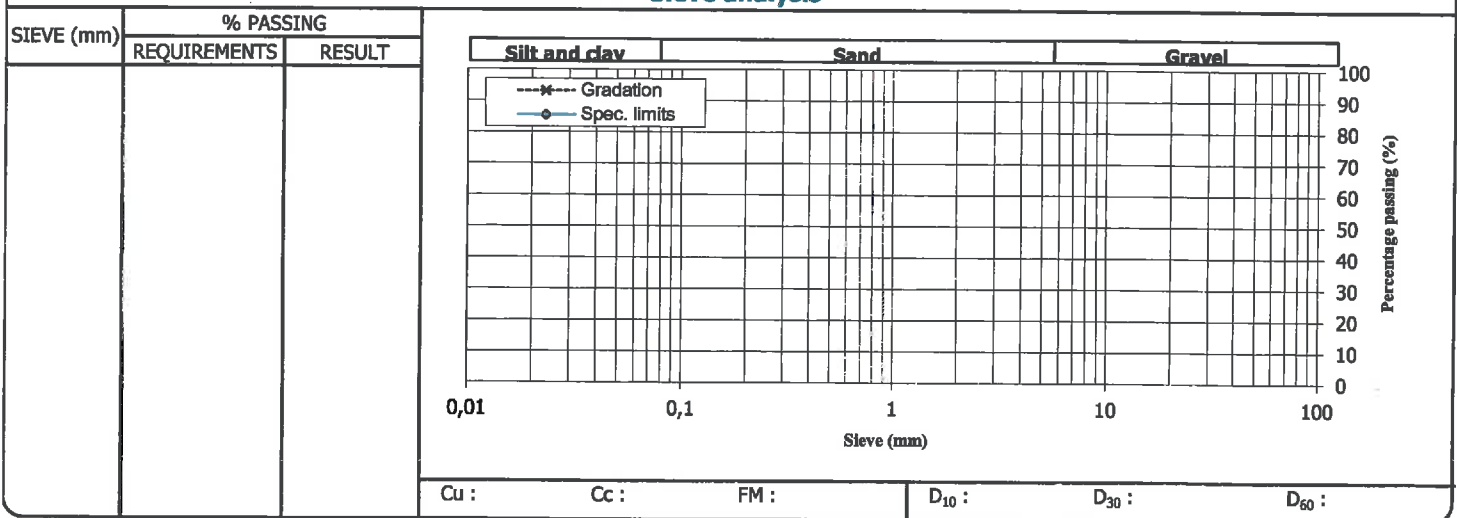
Sampling # : 13
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-02-17, SS-7; 4.57 - 5.18 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Water content (ASTM D2216) (%)

Required

Result

76,0

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-28

Approved by :

Date :

Camilo Perez, Ing.

Client : Crombie REIT
Project : 5150 Innes Rd; Geotechnical Investigation

Project # : B-0017787-1
Client ref. :

Location : 5150 Innes Rd, Ottawa, ON

Report # : 14 **Rev. 0**
Page 1 of 1

Sampling

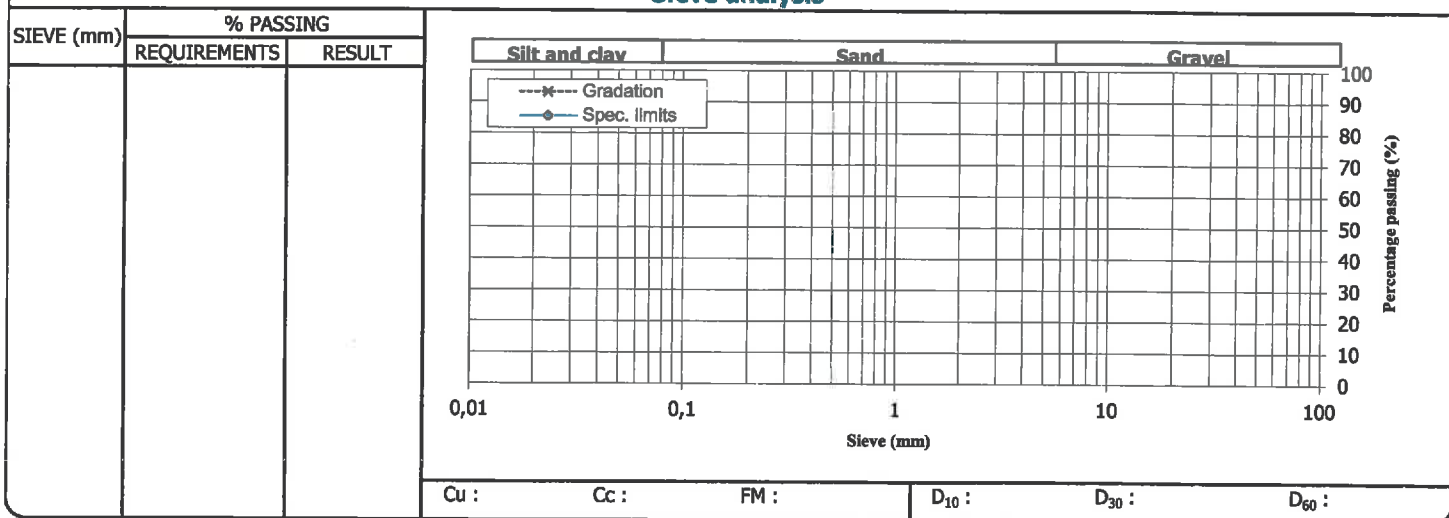
Sampling # : 14
Your sampling # :
Material : Clay
Source; location : From borehole
Sampling location : BH-02-17, SS-8; 5.49 - 6.10 m

Specification # 1

Reference :
Use :
Calibre :
Class :

Sampling date : 2017-08-23
By : Sylvain Séguin, tech.
Date received : 2017-08-25

Sieve analysis



Maximum dry density
kg/m³

Optimum moisture
%

Retained 5 mm
%

Proportions from sieve analysis (%)

Cobble : **Sand :**
Gravel : **Silt and clay :**

Other testing

Classification (ASTM D 4318)
Liquidity Index (ASTM D 4318)
Plasticity index (ASTM D 4318) (%)
Liquid limit (ASTM D 4318) (%)
Plastic limit (ASTM D 4318) (%)
Natural water content (ASTM D 4318) (%)

Required

Result

CH
1,0
50
76
26
76,7

Remarks

RESULTS WITH AN ASTERISK DO NOT MEET REQUIREMENTS.

Prepared by :

Date :

Rock Desjardins, tech.

2017-08-28

Approved by :

Date :

Camilo Perez, Ing.

Appendix 4 Toxicity Characteristic

Client: Englobe Corp. (Gatineau)
900, boulevard de la Carrière, bureau 100
Gatineau, QC
J8Y 6T5
Attention: Mr. Camilo Perez
PO#:
Invoice to: Englobe Corp.

Report Number: 1716228
Date Submitted: 2017-08-25
Date Reported: 2017-09-05
Project: B-00177871-1
COC #: 190748
Temperature: 19

Page 1 of 18

Dear Camilo Perez:**Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).**

Report Comments:

APPROVAL: _____

Long Qu, Organics Supervisor

All analysis is completed in Ottawa, Ontario (unless otherwise indicated).

Eurofins Ottawa is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on our CALA scope of accreditation. It can be found at <http://www.cala.ca/scopes/2602.pdf>.

Eurofins (Ottawa) is certified and accredited for specific parameters by OMAFRA, Ontario Ministry of Agriculture, Food and Rural Affairs (for farm soils). Licensed by Ontario MOE for specific tests in drinking water.

Eurofins (Mississauga) is accredited for specific parameters by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required.

Client: Englobe Corp. (Gatineau)
900, boulevard de la Carrière, bureau 100
Gatineau, QC
J8Y 6T5
Attention: Mr. Camilo Perez
PO#:
Invoice to: Englobe Corp.

Report Number: 1716228
Date Submitted: 2017-08-25
Date Reported: 2017-09-05
Project: B-00177871-1
COC #: 190748

Group	Analyte	MRL	Units	Guideline	Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
					1316310	1316311	1316312	1316313	
					Soil Reg153	Soil Reg153	Soil Reg153	Soil Reg153	
					2017-08-23	2017-08-23	2017-08-23	2017-08-23	
					TF-01-17 CF-1	TF-01-17 CF-2	TF-02-17 CF-1	TF-02-17 CF-2	
Inorganics	Antimony	1	ug/g	STD 1.3	<1	<1	<1	<1	
	Arsenic	1	ug/g	STD 18	4	3	4	3	
	Barium	1	ug/g	STD 220	350*	192	336*	200	
	Beryllium	1	ug/g	STD 2.5	<1	<1	<1	<1	
	Boron (total)	5	ug/g	STD 36	5	6	8	7	
	Cadmium	0.5	ug/g	STD 1.2	<0.5	<0.5	<0.5	<0.5	
	Chromium Total	1	ug/g	STD 70	10	92*	10	98*	
	Cobalt	1	ug/g	STD 21	4	15	4	19	
	Copper	1	ug/g	STD 92	4	38	4	38	
	Lead	1	ug/g	STD 120	7	8	7	9	
	Molybdenum	1	ug/g	STD 2	1	<1	<1	<1	
	Nickel	1	ug/g	STD 82	9	51	10	56	
	Selenium	1	ug/g	STD 1.5	<1	<1	<1	<1	
	Silver	0.2	ug/g	STD 0.5	<0.2	<0.2	<0.2	<0.2	
	Thallium	1	ug/g	STD 1	<1	<1	<1	<1	
	Uranium	0.5	ug/g	STD 2.5	0.5	1.0	0.5	1.0	
	Vanadium	2	ug/g	STD 86	<2	70	8	72	
	Zinc	2	ug/g	STD 290	12	77	10	84	
Moisture	Moisture-Humidite	0.1	%		1.1	22.8	8.9	22.0	
Petroleum Hydrocarbons	Alpha-androstrane	0	%		80	92	96	90	
	Petroleum Hydrocarbons F1	10	ug/g	STD 25	<10	<10	<10	<10	
	Petroleum Hydrocarbons F2	10	ug/g	STD 10	<10	<10	<10	<10	
	Petroleum Hydrocarbons F3	20	ug/g	STD 240	370*	<20	<20	<20	
	Petroleum Hydrocarbons F4	20	ug/g	STD 120	1520*	<20	<20	<20	
	Petroleum Hydrocarbons F4g	500	ug/g	STD 120	5200*				
Semi-Volatiles	1+2-methylnaphthalene	0.05	ug/g		<0.05	<0.05	<0.05	<0.05	

Guideline = O.Reg 153-T1-All Other Soils * = Guideline Exceedence

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J8Y 6T5
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Invoice to: Englobe Corp.

Report Number: 1716228
Date Submitted: 2017-08-25
Date Reported: 2017-09-05
Project: B-00177871-1
COC #: 190748

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1316310 Soil Reg153 2017-08-23 TF-01-17 CF-1	1316311 Soil Reg153 2017-08-23 TF-01-17 CF-2	1316312 Soil Reg153 2017-08-23 TF-02-17 CF-1	1316313 Soil Reg153 2017-08-23 TF-02-17 CF-2
Group	Analyte	MRL	Units	Guideline					
Semi-Volatiles	Acenaphthene	0.05	ug/g	STD 0.072	<0.05	<0.05	<0.05	<0.05	
	Acenaphthylene	0.05	ug/g	STD 0.093	<0.05	<0.05	<0.05	<0.05	
	Anthracene	0.05	ug/g	STD 0.16	<0.05	<0.05	<0.05	<0.05	
	Benz[a]anthracene	0.05	ug/g	STD 0.36	<0.05	<0.05	<0.05	<0.05	
	Benzo[a]pyrene	0.05	ug/g	STD 0.3	<0.05	<0.05	<0.05	<0.05	
	Benzo[b]fluoranthene	0.05	ug/g	STD 0.47	<0.05	<0.05	<0.05	<0.05	
	Benzo[ghi]perylene	0.05	ug/g	STD 0.68	<0.05	<0.05	<0.05	<0.05	
	Benzo[k]fluoranthene	0.05	ug/g	STD 0.48	<0.05	<0.05	<0.05	<0.05	
	Chrysene	0.05	ug/g	STD 2.8	<0.05	<0.05	<0.05	<0.05	
	Dibenz[a h]anthracene	0.05	ug/g	STD 0.1	<0.05	<0.05	<0.05	<0.05	
	Fluoranthene	0.05	ug/g	STD 0.56	<0.05	<0.05	<0.05	<0.05	
	Fluorene	0.05	ug/g	STD 0.12	<0.05	<0.05	<0.05	<0.05	
	Indeno[1 2 3-cd]pyrene	0.05	ug/g	STD 0.23	<0.05	<0.05	<0.05	<0.05	
	Methlynaphthalene, 1-	0.05	ug/g	STD 0.59	<0.05	<0.05	<0.05	<0.05	
	Methlynaphthalene, 2-	0.05	ug/g	STD 0.59	<0.05	<0.05	<0.05	<0.05	
	Naphthalene	0.05	ug/g	STD 0.09	<0.05	<0.05	<0.05	<0.05	
	Phenanthrene	0.05	ug/g	STD 0.69	<0.05	<0.05	<0.05	<0.05	
	Pyrene	0.05	ug/g	STD 1	<0.05	<0.05	<0.05	<0.05	
VOC Surrogates Rec	1,2-dichloroethane-d4	0	%		110	113	101	110	
	4-bromofluorobenzene	0	%		100	89	92	99	
	Toluene-d8	0	%		95	93	94	94	
VOCs	Acetone	0.50	ug/g	STD 0.5	220*	1.79*	2.97*	<0.50	
	Benzene	0.02	ug/g	STD 0.02	<0.02	<0.02	<0.02	<0.02	
	Bromodichloromethane	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	
	Bromoform	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	
	Bromomethane	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	

Guideline = O.Reg 153-T1-All Other Soils

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Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO
= Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Englobe Corp. (Gatineau)
900, boulevard de la Carrière, bureau 100
Gatineau, QC
J8Y 6T5
Attention: Mr. Camilo Perez
PO#:
Invoice to: Englobe Corp.

Report Number: 1716228
Date Submitted: 2017-08-25
Date Reported: 2017-09-05
Project: B-00177871-1
COC #: 190748

Group	Analyte	MRL	Units	Guideline	Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
					1316310	1316311	1316312	1316313	1316313
					Soil Reg153	Soil Reg153	Soil Reg153	Soil Reg153	Soil Reg153
					2017-08-23	2017-08-23	2017-08-23	2017-08-23	2017-08-23
					TF-01-17 CF-1	TF-01-17 CF-2	TF-02-17 CF-1	TF-02-17 CF-2	TF-02-17 CF-2
VOCs	Carbon Tetrachloride	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chlorobenzene	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chloroform	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dibromochloromethane	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichlorobenzene, 1,2-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichlorobenzene, 1,3-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichlorobenzene, 1,4-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichlorodifluoromethane	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloroethane, 1,1-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloroethane, 1,2-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloroethylene, 1,1-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloroethylene, 1,2-cis-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloroethylene, 1,2-trans-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloropropane, 1,2-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloropropene, 1,3-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloropropylene, 1,3-cis-	0.05	ug/g		<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloropropylene, 1,3-trans-	0.05	ug/g		<0.05	<0.05	<0.05	<0.05	<0.05
	Ethylbenzene	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Ethylene dibromide	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Hexane (n)	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Methyl Ethyl Ketone	0.50	ug/g	STD 0.5	<0.50	<0.50	<0.50	<0.50	<0.50
	Methyl Isobutyl Ketone	0.50	ug/g	STD 0.5	<0.50	<0.50	<0.50	<0.50	<0.50
	Methyl tert-Butyl Ether (MTBE)	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Methylene Chloride	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Styrene	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Tetrachloroethane, 1,1,1,2-	0.05	ug/g	STD 0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Date Submitted: 2017-08-25
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					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1316310 Soil Reg153 2017-08-23 TF-01-17 CF-1	1316311 Soil Reg153 2017-08-23 TF-01-17 CF-2	1316312 Soil Reg153 2017-08-23 TF-02-17 CF-1	1316313 Soil Reg153 2017-08-23 TF-02-17 CF-2
Group	Analyte	MRL	Units	Guideline					
VOCs	Tetrachloroethane, 1,1,2,2-	0.05	ug/g	STD 0.05		<0.05	<0.05	<0.05	<0.05
	Tetrachloroethylene	0.05	ug/g	STD 0.05		<0.05	<0.05	<0.05	<0.05
	Toluene	0.20	ug/g	STD 0.2		<0.20	<0.20	<0.20	<0.20
	Trichloroethane, 1,1,1-	0.05	ug/g	STD 0.05		<0.05	<0.05	<0.05	<0.05
	Trichloroethane, 1,1,2-	0.05	ug/g	STD 0.05		<0.05	<0.05	<0.05	<0.05
	Trichloroethylene	0.05	ug/g	STD 0.05		<0.05	<0.05	<0.05	<0.05
	Trichlorofluoromethane	0.05	ug/g	STD 0.25		<0.05	<0.05	<0.05	<0.05
	Vinyl Chloride	0.02	ug/g	STD 0.02		<0.02	<0.02	<0.02	<0.02
	Xylene Mixture	0.05	ug/g	STD 0.05		<0.05	<0.05	<0.05	<0.05
	Xylene, m/p-	0.05	ug/g			<0.05	<0.05	<0.05	<0.05
	Xylene, o-	0.05	ug/g			<0.05	<0.05	<0.05	<0.05
					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1316314 Soil Reg153 2017-08-23 DUP-1			
Group	Analyte	MRL	Units	Guideline					
Inorganics	Antimony	1	ug/g	STD 1.3		<1			
	Arsenic	1	ug/g	STD 18		3			
	Barium	1	ug/g	STD 220		217			
	Beryllium	1	ug/g	STD 2.5		<1			
	Boron (total)	5	ug/g	STD 36		8			
	Cadmium	0.5	ug/g	STD 1.2		<0.5			
	Chromium Total	1	ug/g	STD 70		11			
	Cobalt	1	ug/g	STD 21		3			

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					1316314 Soil Reg153 2017-08-23 DUP-1
Group	Analyte	MRL	Units	Guideline	
Inorganics	Copper	1	ug/g	STD 92	5
	Lead	1	ug/g	STD 120	6
	Molybdenum	1	ug/g	STD 2	1
	Nickel	1	ug/g	STD 82	9
	Selenium	1	ug/g	STD 1.5	<1
	Silver	0.2	ug/g	STD 0.5	<0.2
	Thallium	1	ug/g	STD 1	<1
	Uranium	0.5	ug/g	STD 2.5	<0.5
	Vanadium	2	ug/g	STD 86	8
	Zinc	2	ug/g	STD 290	15
Moisture	Moisture-Humidite	0.1	%		0.3
Petroleum Hydrocarbons	Alpha-androstrane	0	%		94
	Petroleum Hydrocarbons F1	10	ug/g	STD 25	<10
	Petroleum Hydrocarbons F2	10	ug/g	STD 10	<10
	Petroleum Hydrocarbons F3	20	ug/g	STD 240	270*
	Petroleum Hydrocarbons F4	20	ug/g	STD 120	470*
	Petroleum Hydrocarbons F4g	500	ug/g	STD 120	2900*
Semi-Volatiles	1+2-methylnaphthalene	0.05	ug/g		<0.05
	Acenaphthene	0.05	ug/g	STD 0.072	<0.05
	Acenaphthylene	0.05	ug/g	STD 0.093	<0.05
	Anthracene	0.05	ug/g	STD 0.16	<0.05
	Benz[a]anthracene	0.05	ug/g	STD 0.36	<0.05
	Benzo[a]pyrene	0.05	ug/g	STD 0.3	<0.05
	Benzo[b]fluoranthene	0.05	ug/g	STD 0.47	<0.05
	Benzo[ghi]perylene	0.05	ug/g	STD 0.68	<0.05
	Benzo[k]fluoranthene	0.05	ug/g	STD 0.48	<0.05

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Project: B-00177871-1
COC #: 190748

		Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.			1316314 Soil Reg153 2017-08-23 DUP-1
Group	Analyte	MRL	Units	Guideline	
Semi-Volatiles	Chrysene	0.05	ug/g	STD 2.8	<0.05
	Dibenz[a h]anthracene	0.05	ug/g	STD 0.1	<0.05
	Fluoranthene	0.05	ug/g	STD 0.56	<0.05
	Fluorene	0.05	ug/g	STD 0.12	<0.05
	Indeno[1 2 3-cd]pyrene	0.05	ug/g	STD 0.23	<0.05
	Methlynaphthalene, 1-	0.05	ug/g	STD 0.59	<0.05
	Methlynaphthalene, 2-	0.05	ug/g	STD 0.59	<0.05
	Naphthalene	0.05	ug/g	STD 0.09	<0.05
	Phenanthrene	0.05	ug/g	STD 0.69	<0.05
	Pyrene	0.05	ug/g	STD 1	<0.05
VOC Surrogates Rec	1,2-dichloroethane-d4	0	%		106
	4-bromofluorobenzene	0	%		108
	Toluene-d8	0	%		92
VOCs	Acetone	0.50	ug/g	STD 0.5	<0.50
	Benzene	0.02	ug/g	STD 0.02	<0.02
	Bromodichloromethane	0.05	ug/g	STD 0.05	<0.05
	Bromoform	0.05	ug/g	STD 0.05	<0.05
	Bromomethane	0.05	ug/g	STD 0.05	<0.05
	Carbon Tetrachloride	0.05	ug/g	STD 0.05	<0.05
	Chlorobenzene	0.05	ug/g	STD 0.05	<0.05
	Chloroform	0.05	ug/g	STD 0.05	<0.05
	Dibromochloromethane	0.05	ug/g	STD 0.05	<0.05
	Dichlorobenzene, 1,2-	0.05	ug/g	STD 0.05	<0.05
	Dichlorobenzene, 1,3-	0.05	ug/g	STD 0.05	<0.05
	Dichlorobenzene, 1,4-	0.05	ug/g	STD 0.05	<0.05
	Dichlorodifluoromethane	0.05	ug/g	STD 0.05	<0.05

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= Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Englobe Corp. (Gatineau)
900, boulevard de la Carrière, bureau 100
Gatineau, QC
J8Y 6T5
Attention: Mr. Camilo Perez
PO#:
Invoice to: Englobe Corp.

Report Number: 1716228
Date Submitted: 2017-08-25
Date Reported: 2017-09-05
Project: B-00177871-1
COC #: 190748

		Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.			1316314 Soil Reg153 2017-08-23 DUP-1
Group	Analyte	MRL	Units	Guideline	
VOCs	Dichloroethane, 1,1-	0.05	ug/g	STD 0.05	<0.05
	Dichloroethane, 1,2-	0.05	ug/g	STD 0.05	<0.05
	Dichloroethylene, 1,1-	0.05	ug/g	STD 0.05	<0.05
	Dichloroethylene, 1,2-cis-	0.05	ug/g	STD 0.05	<0.05
	Dichloroethylene, 1,2-trans-	0.05	ug/g	STD 0.05	<0.05
	Dichloropropane, 1,2-	0.05	ug/g	STD 0.05	<0.05
	Dichloropropene, 1,3-	0.05	ug/g	STD 0.05	<0.05
	Dichloropropylene, 1,3-cis-	0.05	ug/g		<0.05
	Dichloropropylene, 1,3-trans-	0.05	ug/g		<0.05
	Ethylbenzene	0.05	ug/g	STD 0.05	<0.05
	Ethylene dibromide	0.05	ug/g	STD 0.05	<0.05
	Hexane (n)	0.05	ug/g	STD 0.05	<0.05
	Methyl Ethyl Ketone	0.50	ug/g	STD 0.5	<0.50
	Methyl Isobutyl Ketone	0.50	ug/g	STD 0.5	<0.50
	Methyl tert-Butyl Ether (MTBE)	0.05	ug/g	STD 0.05	<0.05
	Methylene Chloride	0.05	ug/g	STD 0.05	<0.05
	Styrene	0.05	ug/g	STD 0.05	<0.05
	Tetrachloroethane, 1,1,1,2-	0.05	ug/g	STD 0.05	<0.05
	Tetrachloroethane, 1,1,2,2-	0.05	ug/g	STD 0.05	<0.05
	Tetrachloroethylene	0.05	ug/g	STD 0.05	<0.05
	Toluene	0.20	ug/g	STD 0.2	<0.20
	Trichloroethane, 1,1,1-	0.05	ug/g	STD 0.05	<0.05
	Trichloroethane, 1,1,2-	0.05	ug/g	STD 0.05	<0.05
	Trichloroethylene	0.05	ug/g	STD 0.05	<0.05
	Trichlorofluoromethane	0.05	ug/g	STD 0.25	<0.05
	Vinyl Chloride	0.02	ug/g	STD 0.02	<0.02

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				Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	
Group	Analyte	MRL	Units	Guideline	
VOCs	Xylene Mixture	0.05	ug/g	STD 0.05	1316314 Soil Reg153 2017-08-23 DUP-1
	Xylene, m/p-	0.05	ug/g		<0.05
	Xylene, o-	0.05	ug/g		<0.05

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 290004 Analysis/Extraction Date 2017-08-30 Instrument GC/FID			
Method CCME		Analyst TJB	
Petroleum Hydrocarbons F1	<10 ug/g	94	80-120
Method V 8260B		Analyst TJB	
Dichloropropene, 1,3-			
Acetone	<0.50 ug/g	114	60-130
Methyl Ethyl Ketone	<0.50 ug/g	108	60-130
Methyl Isobutyl Ketone			60-130
Methyl tert-Butyl Ether (MTBE)	<0.05 ug/g	109	60-130
Run No 332414 Analysis/Extraction Date 2017-08-30 Instrument			
Method P 8270		Analyst JLD	
Methylnaphthalene, 1-	<0.05 ug/g	71	50-140
Methylnaphthalene, 2-	<0.05 ug/g	73	50-140
Acenaphthene	<0.05 ug/g	68	50-140
Acenaphthylene	<0.05 ug/g	63	50-140

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Anthracene	<0.05 ug/g	73	50-140
Benz[a]anthracene	<0.05 ug/g	83	50-140
Benzo[a]pyrene	<0.05 ug/g	81	50-140
Benzo[b]fluoranthene	<0.05 ug/g	124	50-140
Benzo[ghi]perylene	<0.05 ug/g	83	50-140
Benzo[k]fluoranthene	<0.05 ug/g	89	50-140
Chrysene	<0.05 ug/g	81	50-140
Dibenz[a h]anthracene	<0.05 ug/g	83	50-140
Fluoranthene	<0.05 ug/g	81	50-140
Fluorene	<0.05 ug/g	69	50-140
Indeno[1 2 3-cd]pyrene	<0.05 ug/g	89	50-140
Naphthalene	<0.05 ug/g	67	50-140
Phenanthrene	<0.05 ug/g	79	50-140
Pyrene	<0.05 ug/g	80	50-140
Run No 332416 Analysis/Extraction Date 2017-08-29 Instrument			
Method P 8270 Analyst JLD			
1+2-methylnaphthalene	<0.05 ug/g		
Run No 332422 Analysis/Extraction Date 2017-08-28 Instrument GC/MS			

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Method V 8260B		Analyst TJB	
Tetrachloroethane, 1,1,1,2-	<0.05 ug/g	114	60-130
Trichloroethane, 1,1,1-	<0.05 ug/g	91	60-130
Tetrachloroethane, 1,1,2,2-	<0.05 ug/g	95	60-130
Trichloroethane, 1,1,2-	<0.05 ug/g	91	60-130
Dichloroethane, 1,1-	<0.05 ug/g	93	60-130
Dichloroethylene, 1,1-	<0.05 ug/g	107	60-130
Dichlorobenzene, 1,2-	<0.05 ug/g	113	60-130
Dichloroethane, 1,2-	<0.05 ug/g	85	60-130
Dichloropropane, 1,2-	<0.05 ug/g	106	60-130
Dichlorobenzene, 1,3-	<0.05 ug/g	107	60-130
Dichlorobenzene, 1,4-	<0.05 ug/g	101	60-130
Benzene	<0.02 ug/g	92	60-130
Bromodichloromethane	<0.05 ug/g	101	60-130
Bromoform	<0.05 ug/g	92	60-130
Bromomethane	<0.05 ug/g	107	60-130
Dichloroethylene, 1,2-cis-	<0.05 ug/g	86	60-130
Dichloropropene, 1,3-cis-	<0.05 ug/g	104	60-130

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Analyte	Blank	QC % Rec	QC Limits
Carbon Tetrachloride	<0.05 ug/g	95	60-130
Chloroform	<0.05 ug/g	101	60-130
Dibromochloromethane	<0.05 ug/g	98	60-130
Dichlorodifluoromethane	<0.05 ug/g	75	60-130
Methylene Chloride	<0.05 ug/g	106	60-130
Ethylbenzene	<0.05 ug/g	104	60-130
Ethylene dibromide	<0.05 ug/g	91	60-130
Hexane (n)	<0.05 ug/g	91	60-130
m/p-xylene	<0.05 ug/g	106	60-130
Chlorobenzene	<0.05 ug/g	102	60-130
o-xylene	<0.05 ug/g	102	60-130
Styrene	<0.05 ug/g	95	60-130
Dichloroethylene, 1,2-trans-	<0.05 ug/g	107	60-130
Dichloropropene, 1,3-trans-	<0.05 ug/g	97	60-130
Tetrachloroethylene	<0.05 ug/g	102	60-130
Toluene	<0.20 ug/g	107	60-130
Trichloroethylene	<0.05 ug/g	105	60-130
Trichlorofluoromethane	<0.05 ug/g	91	60-130

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Vinyl Chloride	<0.02 ug/g	86	60-130
Run No 332424 Analysis/Extraction Date 2017-08-30 Instrument GC/MS Method V 8260B Analyst TJB			
Xylene Mixture			
Run No 332441 Analysis/Extraction Date 2017-08-30 Instrument GC/FID Method CCME Analyst JLD			
Petroleum Hydrocarbons F4g	<500 ug/g	90	80-120
Run No 332450 Analysis/Extraction Date 2017-08-30 Instrument Oven Method C SM2540B Analyst JLD			
Moisture-Humidite		100	80-120
Method CCME Analyst JLD			
Petroleum Hydrocarbons F2	<10 ug/g	116	80-120
Petroleum Hydrocarbons F3	<20 ug/g	116	80-120
Petroleum Hydrocarbons F4	<20 ug/g	116	80-120
Run No 332468 Analysis/Extraction Date 2017-08-30 Instrument Method EPA 200.8 Analyst H_D			
Silver	<0.2 ug/g	105	70-130
Arsenic	<1 ug/g	98	70-130
Boron (total)	<5 ug/g	108	70-130

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Barium	<1 ug/g	96	70-130
Beryllium	<1 ug/g	108	70-130
Cadmium	<0.5 ug/g	105	70-130
Cobalt	<1 ug/g	107	70-130
Chromium Total	<1 ug/g	108	70-130
Copper	<1 ug/g	110	70-130
Molybdenum	<1 ug/g	105	70-130
Nickel	<1 ug/g	110	70-130
Lead	<1 ug/g	101	70-130
Antimony	<1 ug/g	107	70-130
Selenium	<1 ug/g	99	70-130
Thallium	<1 ug/g	104	70-130
Uranium	<0.5 ug/g	111	70-130
Vanadium	<2 ug/g	105	70-130
Zinc	<2 ug/g	112	70-130
Run No 332571 Analysis/Extraction Date 2017-08-31 Instrument			
Method EPA 200.8 Analyst H_D			
Boron (total)	<5 ug/g	90	70-130

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Vanadium	<2 ug/g	81	70-130
Run No 332681 Analysis/Extraction Date 2017-09-05 Instrument			
Method EPA 200.8 Analyst H. D			
Chromium Total	<1 ug/g	112	70-130

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Sample Comment Summary

Sample ID: 1316310 TF-01-17 CF-1 The result for F4 (C34-C50) gravimetric must be substituted if it is greater than the result for F4 (C34-C50). Metals spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte. Metals duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the MRL. Sample interference on Cr and caused Cr spk to fail. Sample result was verified by reran and redigested 3 times.

Sample ID: 1316314 DUP-1 The result for F4 (C34-C50) gravimetric must be substituted if it is greater than the result for F4 (C34-C50).

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Petroleum Hydrocarbons - CCME Checklist

Samples were analysed by Eurofins Ottawa Method AMCCME2, "Petroleum Hydrocarbons in Water and Soil, CCME/TPH" or Eurofins Mississauga Method 11-09-SP-2322, "Petroleum Hydrocarbons in Water and Soil, CCME/TPH". These methods comply with the reference method for the CCME CWS PHC and are validated for use in the laboratory. Eurofins Ottawa is accredited by CALA (ISO 17025) for all CCME F1-F4 fractions as listed in this report. Eurofins Mississauga is accredited by SCC (ISO 17025) for all CCME F1-F4 fractions as listed in this report. Data for QC samples (blank, duplicate, spike) are available on request

Holding/Analysis Times	Yes/No	If NO, then reasons
All fractions analyzed within recommended hold times/analysis times?	Yes	
F1		
nC6 and nC10 response factors within 30% of toluene	Yes	
BTEX was subtracted from F1 fraction	Yes	
If YES, was F1-BTEX (C6-C10) reported	Yes	
F2		
nC10, nC16 and nC34 response factors within 10% of their average (F2-F4)	Yes	
Linearity within 15% (F2-F4)	Yes	
Napthalene was subtracted from F2 fraction		
If YES was F2-Napthalene reported		
F3		
PAH (selected compounds) subtracted from F3 fraction		
If YES was F3-PAH reported		
F4		
C50 response factor within 70% of nC10+nC16+nC34 average	Yes	
Chromatogram descended to baseline by retention time of C50	No	
if NO was F4 (C34-C50) gravimetric reported	Yes	

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