

Geotechnical Design Report for Building Permit Application CHEO 1Door4care Parking Garage

Client Name: EllisDon Date: September 21, 2023 File: 36182

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TABLE OF CONTENTS

1.	INTRO	TRODUCTION1						
2.	BACKGROUND1							
3.	UNDE	DERSTANDING OF SUBSURFACE CONDITIONS						
4.	FOUNDATION DESIGN RECOMMENDATIONS							
	4.1	Foundation Excavation and Temporary Dewatering5	;					
	4.2	Site Preparation	;					
	4.3	Protection of Expansive Shale	,					
	4.4	Engineered Fill Pad for Building Footprint 8	;					
	4.5	Grade Raises and Controlled Fill	;					
	4.6	Foundation Design	;					
	4.7	Frost Depth 9)					
	4.8	Slab-On-Grade and Raft Foundations10)					
	4.9	Backfill to Structures and Lateral Earth Pressure10)					
	4.10	Site Seismic Classification11						
	4.11	Cement Type12) -					
	4.12	Site Servicing)					
	4.13	Pavement Structures14	ŀ					
5.	CLOS	URE15	,					

STATEMENT OF LIMITATIONS AND CONDITIONS

IN-TEXT TABLES

Table 3.1: Approximate Depth and Elevation of Bedrock	2
Table 3.2: Groundwater Level Readings at the Site	3
Table 4.1: Foundation Design Options	8
Table 4.2: Recommended Geotechnical Resistances at ULS and SLS	9
Table 4.3: Lateral Earth Pressure Coefficients	.11

APPENDICES

APPENDIX A

- Borehole Location Plan (from GHD's) Report
- Record of Boreholes and Laboratory Test Results



1. INTRODUCTION

Thurber Engineering Ltd. (Thurber) has been retained by EllisDon to provide geotechnical input to the design of foundations for the proposed parking structure at the Children's Hospital for Eastern Ontario (CHEO) Campus.

Geo-environmental (chemical) aspects of the project including disposal excess soil/groundwater off site, consequences of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources, are outside our terms of reference for this project and are not addressed herein.

This report has been issued based on a review of the geotechnical investigations conducted by Infrastructure Ontario's engineer (GHD). The soil conditions may vary between and beyond the borehole locations, and accordingly geotechnical inspection during construction is important to assess any variation of subsurface conditions and to provide additional recommendations if necessitated by such variations.

The use of this report is contingent to ED obtaining a reliance letter from the owner (Infrastructure Ontario) for all the subsurface investigation report(s) provided by the owner and that the reliance letter will include Thurber in conjunction with ED.

It should be noted that Thurber accepts no responsibility for the accuracy and quality of the factual information presented by others.

It is a condition of this report that Thurber's performance of its professional services is subject to the attached Statement of Limitations and Conditions.

2. BACKGROUND

Geotechnical investigations were conducted at the Site by GHD (Infrastructure Ontario's Consultant), the results of which were presented in a report titled "1Door4Care: CHEO Integrated Treatment Centre – Geotechnical Investigation Report (Parking Garage)" dated October 25, 2022.

The geotechnical investigations took place in two stages between January 12, 2021 and July 19, 2022. The scope of geotechnical investigation included advancing a total of 23 boreholes and 6 monitoring wells and geophysical survey using Ground Penetration Radar (GPR).



3. UNDERSTANDING OF SUBSURFACE CONDITIONS

A plan showing the location of the proposed structure at the site as well as the location of the boreholes and monitoring wells advanced at the site has been included in Appendix B. The record of borehole sheets along with the laboratory test results have been included in Appendix B.

The inferred subsurface conditions outlined in this report, have been inferred based on the record of boreholes presented in the above GHD's report.

In general, the subsurface conditions at the site consisted of asphalt over non-cohesive fill (predominantly gravelly sand/gravel/sandy gravel/silty sand to sand and gravel) which is in turn underlain by non-cohesive native soil (predominantly compact to dense gravelly sand/sand/silty sand/sand and gravel/sand and silt) over shale bedrock. The thickness of the fill at the site varied between 0.3 m and 0.8 m. The silty native soil extended to depths ranging from 0.6 m to 1.2 m below existing ground surface, and shale bedrock was encountered or inferred at depths ranging from 0.4 m to 1.2 m below existing ground surface.

Due to the method of investigation and the presence of highly weathered shale below native soil, the top of the bedrock profile cannot be accurately determined. However, the estimated depths to the highly weathered shale bedrock surface as well as estimated elevation of the competent shale bedrock from augering and coring or auger refusal at the location of each borehole at the site have been presented in the following table:

Borehole	Estimated	Estimated
Identification	Depth/Elevation of	Elevation of
Number	Bedrock Surface	Competent
	(mbgs/m)	Bedrock Surface
		(m)
BH1-21	0.9 / 80.5	3.2 / 78.2*
BH2-21	1.1 / 80.2	2.8 / 78.6*
MW3-21	0.6 / 80.8	4.6 / 76.8
BH4-21	0.8 / 81.5	2.8 / 79.5*
MW5-21	0.4 / 81.4	-
MW6-21	1.2 / 80.9	3.5 / 78.7
BH7-21	0.8 / 81.5	2.5 / 79.7*
MW8-21	0.9 / 81.3	2.2 / 80.0*
B1-21	1.0 / 81.0	1.0 / 81.3*

Table 3.1: Approximate Depth and Elevation of Bedrock



Borehole Identification Number	Estimated Depth/Elevation of Bedrock Surface (mbgs/m)	Estimated Elevation of Competent Bedrock Surface (m)
B2-21	0.9 / 80.5	-
B3-21	1.2 / 80.9	-
MW9-22	0.8 / 81.2	2.6 / 79.4
BH10-22	0.7 / 81.5	1.2 / 80.9*
BH11-22	0.9 / 81.3	2.5 / 79.6
BH12-22	1.1 / 81.0	1.8 / 80.2*
BH13-22	1.0 / 81.2	1.9 / 80.2
BH14-22	0.7 / 81.5	1.2 / 81.0*
BH15-22	0.6 / 81.5	1.1 / 81.1*
BH16-22	0.9 / 81.2	1.2 / 80.9*
BH17-22	1.0 / 81.1	1.1 / 81.0*
BH18-22	0.8 / 81.3	1.4 / 80.7
BH19-22	0.9 / 80.2	-
MW20-22	1.0 / 80.2	1.6 / 79.6*

* Estimated Elevation due to Auger Refusal

The groundwater level measurements in the wells are summarized below:

Table 5.2. Groundwater Level Readings at the Site					
Borobolo	Ground Surface	Depth to	Groundwater	Main Screened	
Borenoie	Elev. (m)	Water (m)	Elev. (m)	Deposit	
		2.7	78.7		
MW3-21	81.37	2.5	78.9	Weathered Shale	
		2.6	78.8		
MW5-21	81.83	Dry	Dry	Gravelly Sand FILL/Weathered Shale	
		3.0	79.2		
M\\//6-21	82.17	3.0	79.2	Shala	
111110 21		3.1	79.1	Silale	
		3.0	79.2		
		2.0	80.2	Shale	

Table 3.2: Groundwater Level Readings at the Site



Borehole	Ground Surface Elev. (m)	Depth to Water (m)	Groundwater Elev. (m)	Main Screened Deposit
MW8-21	82.2	2.1	80.1	
		1.7	80.5	
		1.7	80.5	

The groundwater level will be subject to seasonal fluctuations and precipitation events and should be expected to be higher during wet seasons. Perched water may be present at higher levels within the existing fills and/or directly above the bedrock surface.



4. FOUNDATION DESIGN RECOMMENDATIONS

The discussions and preliminary design recommendations presented in this report are based on the information provided to us and on the factual data obtained as part of the investigations completed by GHD. These preliminary recommendations are subject to changes and modifications subject to completion of a supplemental geotechnical investigation (to be carried out during execution).

It is understood that the proposed structure includes an 8-storey building with no below-grade levels. The average top of ground elevation within the proposed building footprint is about Elev. 82.1 m, based on boreholes MH6-21, B2-21, MW9-22, and BH11-22 to BH18-22. The final grades of the lowest level of the proposed structure will be at about Elev. 82.8 m, and the structure will be supported on spread/square footings founded at about Elev. 81.0 m (where bedrock was found at the site).

The reference geotechnical report indicated that bedrock at the site is Shale of Georgian Bay formation which is the dominant bedrock formation in the Greater Toronto Area (GTA). However, a review of bedrock geology maps for Ottawa (MAP 1508A published by Geological Survey of Canada) indicates that the site is located at the border of Carlsbad and Billings Shale formations.

Although the Georgian Bay Shale formation presents some long-term swelling potential associated with changes in salinity, changes in groundwater regime, changes in in-situ stresses, etc., the Carlsbad and Billings Shale formations of Ottawa have not shown such behavior. However, the shale from the Billings Formation (which is likely to be encountered at the site, and to be confirmed as part of the supplemental investigation during the execution) is susceptible to heaving if allowed to weather in the presence of oxygen and moisture. The general mechanism is that oxidation of pyrite within the shale produces sulfuric acid, which in turn reacts with calcite in the shale to form gypsum crystals, which occupy a larger volume than the original materials. A by-product of this chain of reactions also tends to increase sulphate levels which can attack buried concrete structures.

4.1 Foundation Excavation and Temporary Dewatering

It is anticipated that the finished floor of the building will be at about Elev. 82.7 m and that the excavations will be extended to about Elev. 81.0 m. In general, the open-cut excavations will extend through non-cohesive fill (predominantly gravelly sand/gravel/sandy gravel/silty sand to sand and gravel), non-cohesive native soil (predominantly compact to dense gravelly



sand/sand/silty sand/sand and gravel/sand and silt) and shale bedrock. Groundwater is expected to be at or below the base of excavation.

Use of a hydraulic excavator should be suitable for trench excavation within the overburden soils. Provision should be made for handling and removal of asphalt and possible obstructions (i.e., cobbles and boulders) within the fill/soils.

All temporary excavations must be carried out in accordance with the current Occupational Health and Safety Act (OHSA) of Ontario and local regulations. Provided that the excavations are adequately dewatered, the overburden soils are classified as Type 3 above the groundwater level in accordance with the OHSA. Accordingly, excavations in the overburden above the groundwater level can be inclined at 1H:1V, or flatter.

Soil must not be stockpiled beside the excavation within a horizontal distance from the excavation wall equal to the depth of excavation.

Depending on the final elevation of the footings, bedrock removal may be necessary. It will be possible to remove the upper highly weathered portion of shale, to about 0.5 to 1.0 m depth using large hydraulic excavating equipment. Further shale bedrock removal could be accomplished using mechanical methods (such as hoe ramming); however, it is unlikely that removal of competent shale would be necessary for excavations with their base at or above Elev. 81.0 m.

Provided that the base of excavation is kept at or above Elev. 81.0 m, groundwater seepage into the excavation is expected to be handled by filtered sumps and drains.

4.2 Site Preparation

The existing fill and loose native soils founded at the site are not suitable for the support of foundations, floor slabs, engineered fill and/or controlled fill. These unsuitable in-situ materials, along with all existing foundations, floor slabs and utilities associated with the current site development, will need to be removed from beneath proposed foundations and slabs and from within the influence zone of the foundations and slabs. The influence zone includes the area beneath an imaginary line extending downward and outward from the edges of the proposed foundations/slabs at a 45 degrees angle down to undisturbed native soil or bedrock.



4.3 **Protection of Expansive Shale**

The shale bedrock at this site has the potential to swell following exposure to oxygen. The general mechanism is considered to be that pyrite (FeS2) which is present at low concentrations in the shale, is weathered in the combined presence of oxygen and water to form sulphuric acid.

That sulphuric acid then reacts with calcite, which is also present within the shale either as an integral part of the rock or as filling within fractures, to form gypsum. The gypsum crystals tend to form within existing fractures and to be volumetrically larger than the materials that formed them, thus resulting in heaving.

For the above reactions to occur there must be both water and oxygen available. An increase in the ground temperature, such as due to the heat from the parking vehicle, heated areas, etc., is also considered to promote the above reactions.

It is also possible for the products of the above reactions to attack the concrete (i.e., sulphate attack).

To help prevent expansion of the shale and/or reaction with the concrete, the shale must be protected from exposure to oxygen both in the long term as well as temporarily during construction adjacent to the existing building.

The shale bedrock subgrade, when exposed during construction, should be covered as soon as practical (within 12 hours) following the first exposure with a lean concrete layer at least 100 millimetres thick.

Construction planning should ensure the shale is not left exposed and uncovered overnight. Where shale is exposed on the sides of the excavation, the mud slab (with sulphate resistant cement) or shotcrete should be placed such that the concrete covers the shale to at least 100 millimetres above the top of rock level.

Previous excavations or trenches within the proposed construction area should be re-excavated down to shale bedrock and approximately 150 millimetres of the previously exposed shale removed prior to the placement of the concrete skim coat.



4.4 Engineered Fill Pad for Building Footprint

The engineered fill, where and if required, should consist of Ontario Provincial Standard Specification (OPSS) Granular A or Granular B Type II placed in a maximum 300 mm thick loose lifts and compacted to 100 percent of the material's standard Proctor maximum dry density (SPMDD). The top of the engineered fill should be at least 1.0 m wider than foundations at the underside of the footing. Where engineered fill is placed to support the structure footings, its thickness should not be less than 1.0 m unless the engineered fill is placed on bedrock, in which case a lower thickness would be acceptable for the engineered fill.

4.5 Grade Raises and Controlled Fill

The placement of controlled fill for paved areas (parking lots and access roads) may be required at the site. The above geotechnical recommendations for engineered fill apply to the placement of controlled fill as well, except that the controlled fill should be compacted to at least 95 percent of SPMDD. However, the upper 300 mm of controlled fill must be compacted to 100 percent of SPMDD. The placement of the controlled fill should be monitored by geotechnical personnel on a regular basis.

4.6 Foundation Design

The following options are considered feasible for support of the building structure:

Foundation Options	Advantages	Disadvantages
Spread/Square Footings on Competent Bedrock	Allows for relatively high geotechnical bearing capacities at ULS and SLS	May require deeper excavations and lower founding elevations
Spread/Square Footings on at least 0.2 m thick engineered fill on Weathered Bedrock	Allows shallower excavations	Will provide moderate geotechnical resistances at ULS and SLS

Table 4.1: Foundation Design Options

The following Table may be used for the design of shallow foundations bearing on a maximum 1 m thick engineered fill pad over weathered shale or directly supported on competent bedrock:



Founding Stratum	Footing Size (m)/Type	Factored Geotechnical Resistance at ULS (kPa)	Geotechnical Resistance at SLS (kPa) for 20 mm of Settlement
	2 m wide strip	600	500
	3 m wide strip	650	480
Engineered Fill Pad	4 m wide strip	700	400
over Weathered Shale	2 m Square	850	800
	3 m Square	880	550
	4 m Square	900	400
	2 m wide strip	1,100	1,100
	3 m wide strip	1,200	1,100
Compotent Shale	4 m wide strip	1,300	1,200
Competent Shale	2 m Square	1 000	1,500
	3 m Square	1,600	1,200
	4 m Square		1,000

Table 4.2: Recommended Geotechnical Resistances at ULS and SLS

The resistance values provided above are for vertical, concentric loads. Where eccentric or inclined loads are applied, the resistance values used in the design must be reduced accordingly.

The sliding resistance of a cast-in-place footing on bedrock or engineered fill may be computed using the unfactored friction coefficient of 0.7 or 0.55, respectively.

Due to potential swelling of Billings Shale, the final prepared bedrock surface shall be covered by shotcrete or lean concrete within 12 hours of exposure.

Where previous excavations or trenches are present within about 1 m from the closest edge of each proposed foundation or within the footprint of the slab-on-grade, those utilities (including their bedding and backfill) should be fully removed (abandoned) and backfilled with lean concrete (to the top of the adjacent shale bedrock) after removal of about 150 millimetres of the previously exposed shale (the shale which was exposed during construction of the existing trenches).

4.7 Frost Depth

The design frost depth in Ottawa is 1.8 m below the ground surface. The base of all footings should be founded at a minimum depth of 1.8 m, both vertically and horizontally or be provided



with an equivalent thickness of insulation such as expanded polystyrene (EPS) for frost protection. Typically, 25 mm of EPS can be considered equivalent to 300 mm of earth cover for frost protection.

Perimeter footings and interior footings within 1.5 m of perimeter walls of heated structures should be protected by a minimum soil cover of 1.5 m or equivalent insulations. For interior foundations with a horizontal distance greater than 1.5 m from the perimeter of a heated building, frost protection is not required.

4.8 Slab-On-Grade and Raft Foundations

A conventional slab-on-grade is suitable for this project after completion of the site preparation and protection of the swelling shale as described in previous sections. The design of slabs-ongrade may be based on a modulus of subgrade reaction of 25 MPa/m, based on a loaded area of 0.3 m by 0.3 m. A layer of free draining granular material such as OPSS Granular A at least 200 mm thick compacted to 100% of SPMDD should be placed below the floor slab to create a level construction pad and to provide drainage and support. Any bulk fill required to raise the grade to the underside of the Granular A should consist of OPSS Granular B Type II.

Perimeter drains and under slab drains are not required in areas where the Finished Floor Elevation is at least 200 mm above the exterior grades and surface water is directed away from the building.

In building areas that include below grade structures (e.g., elevator pits), the walls and floors should be designed as water-tight and to resist hydrostatic pressures unless perimeter and under slab drainage is provided. The decision on whether to provide drainage for the below grade structures should consider factors such as the quality and quantity of water that will be removed from the site and the need to prevent the underlying shale bedrock from drying out which could lead to heave.

4.9 Backfill to Structures and Lateral Earth Pressure

Backfilling the structures should be conducted with free draining non frost susceptible granular material such as OPSS Granular A or Granular B Type I, II or III conforming to the requirements of OPSS.MUNI 1010. Small vibratory compaction equipment should be used within about 0.5 m of the wall to minimize compaction induced stresses. Compaction of the backfill materials should be conducted as per OPSS.MUNI 501.



Lateral earth pressures acting on the structure may be assumed to be triangular and to be governed by the characteristics of the backfill. For a fully drained condition, the pressures should be computed in accordance with the CHBDC but generally are given by the expression:

$$P_{h}(d) = K^{*}(\gamma d + q)$$

where: $P_h(d)$ = lateral earth pressure at depth d (kPa);

K = static earth pressure coefficient (see table);

 γ = unit weight of retained soil (kN/m³), adjusted for groundwater level;

- d = depth below top of fill where pressure is computed (m); and
- q = value of any surcharge (kPa).

A compaction surcharge should be applied in the design. The magnitude of the lateral pressure representing the compaction surcharge should be 12 kPa at the top of fill which linearly decreases to zero at a depth of 1.7 m (for OPSS Granular B Type I) or at a depth of 2.0 m (for OPSS Granular A or Granular B Type II).

Earth pressure coefficients for backfill to the structure walls are dependent on properties of the granular fill used as the backfill. Typical earth pressure coefficients are shown in the table below, assuming the ground surface behind the wall is flat.

Loading Condition	OPSS Granular A or Granular B Type II Φ = 35°, γ = 22.0 kN/m ³	OPSS Granular B Type I or Type III Φ = 32°, γ = 21.0 kN/m ³
Active, Ka	0.27	0.31
At-Rest, K _o	0.43	0.47
Passive, K _p	3.7	3.3

Table 4.3: Lateral Earth Pressure Coefficients

4.10 Site Seismic Classification

Based on the results of the MASW survey conducted in the vicinity of the proposed structure, described in a report by GHD titled "1Door4Care: CHEO Integrated Treatment Centre – Geotechnical Investigation Report (1Door4Care)" dated October 25, 2022, the average shear wave velocity at the site is greater than 760 m/s, and less than 1500 m/s, therefore, a Site Class B



designation should be used in the design of the proposed structure provided that the thickness of soil between underside of the foundations and the top of bedrock does not exceed 3 m.

4.11 Cement Type

The results of corrosivity assessment of the in-situ soil and/or bedrock samples have been included in GHD's report. The test results indicate that the in-situ soil/bedrock have a negligible to severe (predominantly negligible with the exception of one bedrock sample) potential for sulphate attack as per CSA A23.1.

However, the foundations of the building will be found on at least 200 mm thick engineered fill (as per Section 4.6 and Table 4.1 of this report) and the exterior retaining walls will be backfilled with OPSS Granular A or Granular B Type II. Design of the foundations and below grade walls of the proposed structure may consider CSA Type MS or MH cements provided that the imported materials to be in direct contact with concrete are tested for sulphate content to verify that the above-stated recommendations for the cement type remain valid. Where the foundations and/or exterior walls are poured directly in contact with shale, consideration should be given to the use of CSA Type MS or HS cements.

4.12 Site Servicing

Bedding requirements for the sewers and watermains are summarized as follows:

- Where the subgrade consists of native soil, a bedding thickness of 150 mm can be used in accordance with City of Ottawa Standard Detail Drawing, S6, S7 and W17; or
- Where the subgrade consists of bedrock, the bedding thickness should be increased to 300 mm in accordance with City of Ottawa Standard Detail Drawing S6, S7, and W17 to reduce the potential for point loads from a potentially irregular bedrock surface.

In all cases the bedding material and pipe cover (to at least 300 mm above the top of pipe) should consist of Granular A (S.P. F-3147) that is compacted using suitable vibratory compaction equipment in accordance with S.P. D-029.

The lateral clearance from the outside edge of the pipe to the trench wall should be a minimum of 450 mm for a pipe diameter less than or equal to 900 mm. For pipes with a diameter larger than 900 mm, the minimum lateral clearance should be increased to 500 mm.



The use of clear crushed stone as a bedding layer should not be permitted since fine particles of the overlying backfill soils could potentially migrate into the voids in the clear crushed stone and cause settlement of the pipe and/or the road surface.

Trench backfill above the pipe cover/embedment material should conform to City of Ottawa specification S.P. F-2120 and/or OPSD 802.030 to 803.034 whichever is governing. Backfill should consist of approved excavated material, such as heterogeneous fill (provided that it is fee of organic matter and other deleterious materials), or native inorganic overburden that has a suitable moisture content for compaction.

As noted previously, the shale bedrock at this site is potentially expansive following exposure to oxygen. Due to the risk for expansion, the excavated shale bedrock is not recommended for reuse as trench backfill. The excavated shale, as well as any fill that contains organic and/or deleterious materials, should be transferred off-site in accordance with the Soil Characterization Report prepared for this project, which is provided under separate cover.

If imported fill is required to make up the balance of trench backfill, it should consist of compactable and inorganic earth borrow (OPSS.MUNI 206/212) or Select Subgrade Material (OSSS.MUNI 1010).

All trench backfill, including re-used soils and imported fill, should be compacted in accordance with City S.P. D-029. If the trench backfill material is too wet to achieve the required compaction requirements, it should be stockpiled and allowed to dry, or wasted and replaced with more suitable fill.

The trench backfill above the bedrock surface and within the frost zone (i.e., between the pavement subgrade level and 1.8 m depth, or the bedrock surface, whichever is shallower) should match the soil exposed on the trench walls for frost heave compatibility. This will require some separation of materials upon excavation. Qualified geotechnical personnel should approve the backfill materials for frost compatibility and review the requirements for frost tapers at the time of construction based on the soils exposed in the trench walls. Watermains with less than 2.4 m of cover should be insulated in accordance with City of Ottawa Standard Detail Drawing W22.

Backfilling operations during cold weather must avoid frozen lumps of material, snow, and ice; otherwise, settlement should be expected.

Seepage barriers should be constructed at periodic intervals along the trench to reduce the potential for groundwater level lowering in the surrounding area due to the "French drain" effect on the granular bedding and surround. Otherwise, long-term groundwater level lowering could



result in heaving of the shale beneath the new service pipes or adjacent structures. Seepage barriers also act as cut-offs to prevent migration of contaminants along the relatively permeable backfill in the trenches, as well as a mitigation method during construction to limit groundwater inflow along the trench.

It is important that the seepage barriers extend from trench wall to trench wall and that they fully penetrate the granular surround materials to the trench bottom. The seepage barriers should be at least 1.5 m long. Construction of the seepage barriers should be in accordance with the City of Ottawa's Standard Detail Drawing No. S8. Seepage barriers should be placed at a maximum spacing of 75 m along the trench and on either side of crossing roadways to limit hydraulic connections with intersecting services.

4.13 Pavement Structures

References should be made to the GHD's Geotechnical Investigation Report (Parking Garage) for design and construction of Pavement structures at the site.



5. CLOSURE

This report was issued before any final design or construction details had been prepared or issued. Therefore, differences may exist between the report recommendations and the final design, the project specifications, or conditions during construction. In such instances, Thurber Engineering Ltd. should be contacted immediately to address these differences. Designers and contractors undertaking or bidding the work should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for design and construction, and make their own interpretation of the data as it may affect their proposed scope of work, cost, schedules, safety, and equipment capabilities.

We trust this information meets your present needs. If you have any questions, please contact the undersigned at your convenience.



Review Engineer

Date: September 21, 2023 File: 36182



STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

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5. INTERPRETATION OF THE REPORT

- a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.
- b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.
- c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.
- d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpretations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.



APPENDIX A

Borehole Location Plan (from GHD's) Report Record of Boreholes and Laboratory Test Results



Data Sources: SURVEY BY J.D. BARNES LIMITED, DECEMBER 19, 2019. (UTM18-NAD83). CHEO, 1DOORFOR4CARE (1D4C), SITE PLAN - PHASE 1A, Solic. No: 2111095, Date: 02/20/22. Image ©2022 Google (Imagery Date 6/8/2018).



Notes on Borehole and Test Pit Reports

Soil description :

GHD PS-020.01 - Notes on Borehole and Test Pit Reports - Rev.0 - 07/01/2015

Each subsurface stratum is described using the following terminology. The relative density of granular soils is determined by the Standard Penetration Index ("N" value), while the consistency of clayey sols is measured by the value of undrained shear strength (Cu).

	Classification	(Unified sys	stem)			Terminolo	ogy	
Clay	< 0.002 mm	. ,						
Silt	0.002 to 0.075 mm				81	oo"	4 4 0 0 /	
Sand	0.075 to 4.75 mm	fine	0.075 to 4.25 mm		"tra "sor	ce" ne"	1-10% 10-20%	
Gand	0.075 10 4.75 mm	medium	0.425 to 2.0 mm		adie	ective (silty_sandy)	20-35%	
		coarse	2.0 to 4.75 mm		"and	d"	35-50%	
Gravel	4.75 to 75 mm	fine	4.75 to 19 mm					
Cobbles Boulders	75 to 300 mm >300 mm	course	10 10 10 1111					
Relativ grai	ve density of nular soils	Standa inde	ard penetration ex "N" value		Consi cohe	istency of sive soils	Undraine strengt	d shear h (Cu)
		(BLOV	NS/ft – 300 mm)				(P.S.F)	(kPa)
					Ve	ery soft	<250	<12
V	ery loose		0-4			Soft	250-500	12-25
	Loose		4-10			Firm	500-1000	25-50
C	Compact		10-30			Stiff	1000-2000	50-100
	Dense		30-50		Ve	ery stiff	2000-4000	100-200
Ve	ery dense		>50		I	Hard	>4000	>200
	Rock quality	designatio	'n			STRATIGRAPH	C LEGEND	
"RQE	0" (%) Value		Quality			00	•	
	<25	·	Very poor			00	•••	
	25-50		Poor		Sand	Gravel C	obbles& boulders	Bedrock
	50-75		Fair					Bourook
	75-90		Good					
	>90		Excellent		Silt	Clay	Organic soil	Fill
Samples: Type and Numl The type of sam	ber ple recovered is shown o	n the log by t	the abbreviation listed he	ereafter. The num	bering of samples is	sequential for each t	type of sample.	
SS: Split spoon	. Environmentel compline		ST: S	Shelby tube	arbara)	AG	: Auger	
SSE, GSE, AGE	. Environmental sampling	1	P3. F	riston sample (Ost	GS: Grab sample			
Recovery The recovery, sh	nown as a percentage, is	the ratio of le	ength of the sample obta	ined to the distanc	e the sampler was d	Iriven/pushed into the	e soil	
RQD								
The "Rock Quali the run.	ity Designation" or "RQD"	value, expre	essed as percentage, is t	the ratio of the tota	I length of all core fr	agments of 4 inches	(10 cm) or more to th	ie total length o
IN-SITU TEST	rs:							
N: Standard penetration index R: Refusal to penetration		N _c : Dynamic Cu: Undra Pr: F	cone penetration ind ained shear strength	dex	k: Permeab ABS: Absorption (F	ility Packer test)		
LABORATOR	Y TESTS:							
								O.V.: Organic
I _p : Plasticity inde	ex	H: Hy	drometer analysis	A: Atterberg	g limits	C: Consolidatio	n	vapor
W _I : Liquid limit		GSA:	Grain size analysis	w: Water co	ontent	CS: Swedish fa	Il cone	
Wp: Plastic limit				γ: Unit weig	pht	CHEM: Chemic	al analysis	



Explanation of Terms Used in the Bedrock Core Log

Strength (ISRM)

Terms	Grade	Description	Uncon Compressive S (MPa)	fined Strength (psf)
Extremely Weak Rock	RQ	Indented by thumbnail	0.25-1.0	36-145
Very Weak	R1	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife.	1.0-5.0	145-725
Weak Rock	R2	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.	5.0-25	725-3625
Medium Strong	R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer.	25-50	3625-7250
Strong Rock	R4	Specimen requires more than one blow of geological hammer to fracture it.	50-100	7250-14500
Very strong Rock	R5	Specimen requires many blows of geological hammer to fracture it.	100-250	14500-36250
Extremely Strong Rock	R6	Specimen can only be chipped with geological hammer.	>250	>36250

Bedding (Geological Society Eng. Group Working Party, 1970, Q.J. of Eng. Geol. Vol 3)

Term	Bed Thickness		
Very thickly bedded	>2 m	>6.5 ft.	
Thickly bedded	600 mm-2 m	2.00-6.50 ft.	
Medium bedded	200 mm-600 mm	0.65-2.00 ft.	
Thinly bedded	60 mm-200 mm	0.20-0.65 ft.	
Very thinly bedded	20 mm-60 mm	0.06-0.20 ft.	
Laminated	6 mm-20 mm	0.02-0.06 ft.	
Thinly laminated	<6 mm	<0.02 ft.	

TCR (Total Core Recovery)

Sum of lengths of rock core recovered from a core run, divided by the length of the core rum and expressed as a percentage

SCR (Solid Core Recover)

Sum length of solid full diameter drill core recovered expressed as a percentage of the total length of the core run.



Explanation of Terms Used in the Bedrock Core Log

Weathering (ISRM)

Terms	Grade	Description
Fresh	W1	No visible sign of rock material weathering.
Slightly	W2	Discolouration indicates weathering of rock weathered material and discontinuity surfaces. All the rock material may be discoloured by weathering and may be somewhat weaker than in its fresh condition.
Moderately	W3	Less than half of the rock material is weathered decomposed and/or disintegrated a soil. Fresh or discoloured rock is present either as a corestone.
Highly Weathered	W4	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discoloured rock is present either as a continuous framework or as corestones.
Completely Weathered	W5	All rock material is decomposed and/or disintegrated to a soil. The original mass structure is still largely intact.
Residual Soil	W6	All rock material is converted to soil. The mass structure and material fabric are destroyed There is a large change in volume, but the soil has been significantly transported.

ROD (Rock Quality Designation, after Deere, 1968)

Sum of lengths of pieces of rock core measured along centerline of core equal to or greater than 100 mm from a core run, divided by the length of the core run and expressed as a percentage. Core fractured by drilling is considered intact. RQD normally quoted for N-Size core.

RQD (%)	Rock Quality
90-100	Excellent
75-90	Good
50-75	Fair
25-50	Poor
0-25	Very Poor

(FI) Fracture Index

Expressed as the number of discontinuities per 300 mm (1 ft.) Excluded drill-induced fractures and fragmented zones. Reported as ">>25" if frequency exceeds 25 fractures/0.3 m.

Broken Zone

Zone where core diameter core of very low RQD which may include some drill-induced fractures.

Fragmented Zone

Zone where core is less than full diameter and RQD = 0.

Discontinuity Spacing (ISRM)

Term	Average Spa	acing
Extremely widely spaced	>6 m	>20.00 ft.
Very widely spaced	2 m-6 m	6.50-20.00 ft.
Widely spaced	600 mm-2 m	2.00-6.50 ft.
Moderately spaced	200 mm-600 mm	0.65-2.00 ft.
Closely spaced	60 mm-200 mm	0.20-0.65 ft.
Very closely spaced	20 mm-60 mm	0.06-0.20 ft.
Extremely closely spaced	<20 mm	>0.06 ft.
Note: Excludes drill-induced frac	ctures and fragmented rocl	κ.

Discontinuity Orientation

Discontinuity, fracture, and bedding plane orientations are cited as the acute angle measured with respect to the core axis. Fractures perpendicular to the core axis are at 90 degrees and those parallel to the core axis are at 0 degrees.

	REFEREN	ICE No.	:	11205379-90								ENCL	.OSUI	RE N	o.: _		1	
					BOREHOLE No.:	_		BH1-	21		B	OR	FHO		FF	REE	N	RT
		0	iHD		ELEVATION:		81.	39 m			5	P	age:	_1		<u>1</u>	_	
	CLIENT:		Infra	astructure Ontario (I.0	D.)						LEC	GEND)					
	PROJECT LOCATION	:: N:	Preli Chile Otta	iminary Geotechnica dren's Hospital of Ea wa, Ontario	l Investigation - Proposi stern Ontario Campus -	ed • 40	Parking)1 Smyt	Struc n Roa	ture d,			SS ST	- SP - SH			DN BE		
12/97	DESCRIBE	ED BY:	<u>K.</u> S	challer	CHECKED BY:		S. Sha	hangia	an		⊥⊔ Ţ	RU	- RC - WA		CORI	= /EL		
ate: 2/	DATE (ST	ART):	Janı	uary 15, 2021	DATE (FINISH):	_	Januar	y 15, :	2021									
	NORTHIN	G:	5027	7575.049	EASTING:		449073	3.301										
עווא פגאישאווא טע	Depth	Elevation (m) BGS	Stratigraphy	DESCR SOIL ANI	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Shea Sens W _p W ₁	ar test (sitivity (Water Atterbe "N" Valu /s / 12	Cu) S) conte rg lim Je in30	nt (%) hits (%		Field Lab	
	Feet Metres	81.39		GROUNI	O SURFACE			%			Ν	10 2	20 30 4	40 50	60 7	0 80	90	
ы. эс	0 <u>-</u> 0.13	81.26	\bigotimes	ASPHALT : 125 mi	m	×	GS1		4			0						
GLB Repo	2 - <u>+</u> 2 - <u>+</u> 3 _ <u>+</u> 0.91	80.48		SAND and GRAVE moist, loose to very Gravel : 48%, Sand	EL, trace clay, brown, / dense d : 41%, Clay : 3%, Silt _/	X	SS1	25	5	10-5-4-6	9							
ECH_VUZ	³ <u>-</u> 1.0 4 <u>-</u>	00.40		: 8% Gravel : 39%, Sano : 15%	d : 39%, Clay : 7%, Silt	Д	SS2	88	10	12-30-50/ 100mm	50+	0						
HU_GEUI	$5 - \frac{1}{2}$ $6 - \frac{1}{2}$ $- \frac{1}{2}$			BEDROCK (inferre greyish brown, very	d), shale fragments, y dense	X	SS3	100	4	50/ 100mm	50+	o 		•				
ry File: G	7 2.0					X	SS4	100	4	50/ 75mm	50+	o		•				
PJ LIDIA	9 – 10 – 3.0			auger refusal		M	SS5	100	4	50/ 75mm	50+	0		•				
19.08 - 80.G	+ 3.20 11	78.19		END OF BOREHOL	<u>E:</u>													
9/112053	12 — 13 — 4.0			NOTE : - End of Borehole a	at 3.20 m bgs													
\112053/				 Borehole was bac holeplug and seale bgs donates 'belo 	ckfilled with bentonite ed with cold patch w ground surface'													
112053	16 - 50				-													
0711																		
۲/۱۲	18 — 19 —																	
V8-CHA	20 - 6.0																	
ABASE	21 <u>+</u> 22 -																	
UG DA I	23 - 7.0																	
BACY/L	24																	
EL/LEG	25																	
1 BKUN	²⁰ – 8.0 27 –														+			
GA - 11	28 —																	
SISSAU	29 <u>+</u> 9.0													\square	+			
SIMIS:	30 31														+			
IIE: N://	32 —														+			
L)																		

REFERENCE No.: 112	05379-90							ENCLOSURE No.: 2
	BOREHOLE No.:			BH2-	21		B	ORFHOLE REPORT
GHD	ELEVATION:		81.	36 m				Page: <u>1</u> of <u>1</u>
CLIENT: Infrastructur	e Ontario (I.O.)						LEC	GEND
PROJECT: Preliminary Children's H LOCATION: Ottawa, Ont	Geotechnical Investigation - Propose ospital of Eastern Ontario Campus - ario	ed P 401	arking Smytł	Struct n Roa	ture d,			SS - SPLIT SPOON ST - SHELBY TUBE
DESCRIBED BY: <u>K. Schaller</u>	CHECKED BY:		S. Shal	nangia	an		⊥⊔ Ţ	- WATER LEVEL
DATE (START): <u>January 18,</u>	2021 DATE (FINISH):		Januar	y 18, 2	2021			
법 	1 EASTING:	2	449071	.365				
G WITH GRAPHHW Depth (m) BGS Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) \bigtriangleup Field Sensitivity (S) \Box Lab \bigcirc Water content (%) $\stackrel{\bullet}{\longrightarrow}_{V_{p}} W_{i}$ Atterberg limits (%) $\stackrel{\bullet}{\longrightarrow}$ "N" Value (blows / 12 in30 cm)
Feet Metres 81.36	GROUND SURFACE	\square		%			N	10 20 30 40 50 60 70 80 90
ASPH	ALT : 100 mm		GS1		4			0
2 - 0.61 80.75 SAND 3 - 0.61 80.75 Norst, 1 Grave	and GRAVEL, trace silt, brown, compact I : 42%, Sand : 50%, Clay : 2%, Silt	\mathbb{N}	SS1	71	19	9-7-3-4	10	•
S 1.0 4 - 1.14 80.22 SAND dark b	, some silt, trace clay and gravel, rown, moist, very dense	A	SS2	87	7	10-22-42/ 100mm	50+	
Grave 6 - 2.0 Grave 18% BEDR	I : 15%, Sand : 61%, Clay : 6%, Silt OCK (inferred), shale fragments,	\boxtimes	SS3	83	4	50/ 125mm	50+	
grey, r	noist, very dense	M	SS4	100	4	50/ 75mm	50+	•
9 - 2.77 78.59 auger	refusal	-	SS5	100	9	50/ 25mm	50+	
	OF BOREHOLE :							
NOTE	: of Borebole at 2.77 m bos							
13 – 4.0 - Bore holepi	hole was backfilled with bentonite ug and sealed with cold patch							
67 14	ionates 'below ground surface'							

REFERENCE No.: 11205379-90								ENCLOSU	RE No	.:	3	\$
	BOREHOLE No.:			MW3	-21		B	ORFH	OI F	R	FP()RT
GHD	ELEVATION:		81.	37 m			-	Page:	_1_	of	_2_	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
CLIENT: Infrastructure Ontario (I.	0.)						I FO	GEND				
PROJECT: Preliminary Geotechnica	al Investigation - Propose	ed F	Parking	Struc	ture			SS - SI	PI IT SP	2001	J	
Children's Hospital of Ea LOCATION: Ottawa, Ontario	astern Ontario Campus -	40	1 Smytl	h Roa	d,			ST - SI	HELBY	TUB	E	
DESCRIBED BY: <u>K. Schaller</u>	CHECKED BY:		S. Sha	hangia	an		LLI ▼	RC - R - W	JCK C ATER	ORE LEVE	L	
DATE (START):	DATE (FINISH):		Januar	y 15, :	2021							
NORTHING: 5027638.113	EASTING:		449119	9.449								
Ξω λ			br re	<u>ک</u>	e t	Diauranan	e/ %	Shear test Sensitivity	(Cu) (S)		∆ Fie	ld b
	IPTION OF D BEDROCK	State	pe at umbe	cove CR(%	onter	15 cm/	Valu CR(9	O Water	content erg limit	t (%) s (%)		
Stra 3 H			₽ź	ЪĘ	ĕŏ	RQD(%)	žŌ	• "N" Va (blows / 12	lue ? in30 c	:m)		
Feet Metres 81.37 GROUN	D SURFACE			%			N	10 20 30	40 50 6	50 70	80 90	
ASPHALT : 175 m	m	Х	SS1	100	8	17-22-50/	72	4+		0.3	1 m-	
2 - 0.61 80.76 FILL : SAND/SILTY SAN	D. some gravel, trace	\square	SS2	100	q	42-50/	50+			\vdash		
organics, shale fra	gments, brown,		002	100		75mm			ļ.			
4 BEDROCK (inferre	ed), shale fragments,	\boxtimes	SS3	100	4	50/ 125mm	50+	8			\pm	
5 5	d : 50%, Clay : 14%,	\boxtimes	SS5	100	4	50/	50+	•	•	Bento	onite	
			226	100	1	50/ 100mm	50+				++	
			330	100	4	50/ 75mm	50+			0/4	0/000	- - -
			SS7	83	4	50/	50+			2,7	07202 4 m <u>−</u>	
						150mm				#2 8	and	
		$\overline{\wedge}$	SS8 SS8A	100	17	 50/						
			000/1			50mm				Sci	reen	
		X	SS9	100	5	50/ 50mm	50+				++	
15 - 4.57 76.80	_	×	SS10	100	4	50/	50+			4.5	7 m=	
16 - 5 0 SHALE-BEDROCI	K, laminated, interbeds		RC1	100		50mm 100				4.8	and 8 m−	-
17 – 5.0 highly weathered t	o fresh, weak to											
	, groy											
			RC2	100		78						
											\pm	_
23 - 7.0												
24 –			RC3	98		85						
25									Benic			_
											\mp	_
			RC4	100		03					\pm	
			1.04			30		$\vdash + +$		+	\pm	
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			RC5	83		61					\mp	
			-									

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					ELEVATION:		81.	.37 m					Pag	e: _	2	of	2		
	CLIENT:		Infra	astructure Ontario (I.	0.)						LEC	GEN	<u>ID</u>						
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17/07	DESCRIBE	ED BY:	<u>K.</u> S	challer	CHECKED BY:		S. Sha	hangi	an		⊥⊔ Ţ	RC	-	WA	FER I	JRE LEVE	L		
ate: 2/	DATE (STA	ART):	Janu	uary 14, 2021	DATE (FINISH)	:	Januar	y 15,	2021										
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ע+HAPBH+V	Depth	Elevation (m) BGS	Stratigraphy	DESCR SOIL AN	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Sh Se O w _p V (bl	near te ensitiv Wa Ma Atte "N" lows /	est (C ity (S ater co erbero Value 12 in	u)) ontent g limit	: (%) s (%) :m)	∆ Fi □ La	eld ab	
	Feet Metres	81.37		GROUN	D SURFACE			%			Ν	10	20	30 40	50 6	60 70	80 90)	
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IN SUCAN																			
≝l																			

REFERENCE No.:	11205379-90								ENC	LOSL	IRE I	No.:		4	
GH		BOREHOLE No.:			BH4-	21		B	OR	EH	OL	E I	REF	POF	۲۶
		ELEVATION:		82.	23 m					Page:	_1	_ (of <u>1</u>	_	
CLIENT:Ir	nfrastructure Ontario (I	0.)						LEC	GEN	D					
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DESCRIBED BY: K	. Schaller	CHECKED BY:		S. Sha	nangia	an		LL Ţ	RU	- N	ATE	R LE	VEL		
DATE (START):	anuary 18, 2021	DATE (FINISH):		Januar	y 18, 2	2021									
NORTHING: 5	027621.207	EASTING:		449159	.803		1								
Depth Elevation (m) BGS	DESCF SOIL AN	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	She Ser W _p W ₁ (blo	ear test sitivity Wate Atterb "N" Va ws / 12	: (Cu) (S) r cont berg li lue 2 in3	ent (% mits (⁶	△ □ %)	Field Lab	
Feet Metres 82.23	GROUN	D SURFACE			%			Ν	10	20 30	40 5	0 60	70 80	90	
	FILL : SAND and GRAV brown, moist to we Gravel : 46% Sar	EL, trace clay and silt, et, dense id · 41% Clay · 3% Silt	M	SS1	75		15-27-21-10	48			٩				
	: 10% BEDROCK (inferr		X	SS2	91	7	6-19-34-50/ 50mm	53	0			•			
			М	SS3	90	8	21-50/ 100mm	50+	0						
			×	SS4	100	4	50/ 75mm	50+	0						
			×	SS5	100	5	50/ 75mm	50+	0						
10 - 3.0	auger refusal	/ Le :													
	NOTE :														
	- End of Borenole - Borehole was ba holeplug and seal	at 2.77 m bgs ckfilled with bentonite ed with cold patch													
	- bgs donates 'bel	ow ground surface													
29															

BOREHOLE No: MW5-21 LEVATION: BOREHOLE REPORT CUENT: Infrastructure Ontaino (LO) Page: 1 of 1 CRUENT: Infrastructure Ontaino (LO) Infrastructure Ontaino (LO) Infrastructure Ontaino (LO) PROJECT: Ontaino: Ontaino: Containo: Infrastructure Ontaino (LO) Infrastructure Ontaino (LO) DeSCRIPED BY: K.Schalar CHECKED BY: S.Shahangian IN SS : SPLIT SPOON DATE (START): January 15.2021 DATE (FINISH): January 15.2021 IN CONCONCOLE NORTHNIC G027593.331 EASTING: HU128.777 IN SS # 00 EO 70 89 00 Solu AND BEDROCK Bit SS SS (SR CONC) Bit SS SS (SR CONC) Bit SS SS (SR CONC) Bit SS SS SS (SR CONC) Feed. Metree S1.33 CROUND SURFACE N SS # 00 EO 70 89 00 N SS # 00 EO 70 89 00 In SS # 00 EO 70 89 00 Color Strass CROUND SURFACE N SS SS 100 8 SS SS 100 8 SS SS 100 8 SS SS 100 9 SS SS 10		REFEREN	CE No.	:	11205379-90								ENC	LOS	URE	No.	: _		5	
Page: I df 1 CUENT: Infrastructure Ontario (LO.) Page: I df 1 PROLECT: Endemmary Geolechneid Investgation. Propeed Parting Structure SS SS <t< td=""><td></td><td></td><td>6</td><td></td><td></td><td>BOREHOLE No.:</td><td>_</td><td></td><td>MW5</td><td>-21</td><td></td><td>В</td><td>OF</td><td>۶E۲</td><td>101</td><td>LE</td><td>R</td><td>EP</td><td>OR</td><td>т</td></t<>			6			BOREHOLE No.:	_		MW5	-21		В	OF	۶E۲	101	LE	R	EP	OR	т
CLEINT: Infrastructure Ontario (0.0.) EGEND PROJECT: Preliminary Geological Investigation - Proposed Parking Structure Children's Management Structure Sister SPUT SPOON LOCATION: COLUMN Official Description Sister SPUT SPOON DESCRIPED BY: K. Schaller CHECKED BY: Shahangian DATE (START): January 15, 2021 DATE (FINISH): January 15, 2021 NORTHINC: 5027593.381 EASTINC: 449128.777 G §			9	iHD		ELEVATION:		81.	83 m				<u> </u>	Page	»:	1	of	_1_		
PROLECT: Preliminary Gedechical investigation - Processed Parking Structure Childron's Hopelal of Eastern Onlato Campus - 401 Smyth Road. Structure The Structure Struct		CLIENT:		Infra	astructure Ontario (I.	0.)						LEC	GEN	D						
DESCRIBED BY: K. Schalter CHECKED BY: S. Shahangian WATERLEVEL DATE (START): January 15, 2021 DATE (FINISH): January 15, 2021 WATERLEVEL NORTHING: 5072599, 381 EASTING: 449128.777 Statutory 15, 2021 Materlevel 15, cml Application of the status		PROJECT: LOCATION	l:	Preli Chile Otta	iminary Geotechnica dren's Hospital of Ea wa, Ontario	al Investigation - Propos astern Ontario Campus -	ed - 4(Parking)1 Smyt	<u>Struc</u> h Roa	<u>ture</u> d,		\boxtimes	SS ST	- 5	SPLIT SHEL	F SP .BY		N BE		
DATE (START) January 15. 2021 DATE (FINISH) January 15. 2021 NORTHING: 5027590.381 EASTING: 449128.777 E 502 SOLI AND BEDROCK B	17/07	DESCRIBE	ED BY:	<u>K.</u> S	challer	CHECKED BY:		S. Sha	hangi	an		⊥⊔ ¥	RU	- F - V	VATI	ERL	.EVE	ΞL		
NORTHING: 6027589.381 EASTING: 449128.777 E 500 90.00 0 90.00 0 90.00 <t< td=""><td>ate: 2/7</td><td>DATE (STA</td><td>ART):</td><td>Janu</td><td>uary 15, 2021</td><td>DATE (FINISH)</td><td>:</td><td>Januar</td><td>y 15,</td><td>2021</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	ate: 2/7	DATE (STA	ART):	Janu	uary 15, 2021	DATE (FINISH)	:	Januar	y 15,	2021										
End State Description of solution State State<	Ë	NORTHING	G:	5027	7589.381	EASTING:		449128	3.777											
Freet Metrics 91:33 GROUND SURFACE % N 10:28:39:40:50:00:78:80:00 1 -0.30 81:43	ער אווו פראראראיש אוווא סכ	Depth	Elevation (m) BGS	Stratigraphy	DESCR SOIL ANI	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	She Sei O w _p w (blo	ear tes nsitivit Wate Atter "N" V ows / 2	st (Cu ty (S) er cor rberg /alue 12 in) ntent limits 30 ci	(%) s (%) m)	∆ Fi □ La	ield ab	
1 0.10 81/3 ASPHAL : 100 mm CS1 7 - - 0.01 81/3 2 0.40 81/3 SNN and GRAVEL, some sill, trace lay, brown, moist, dense SS1 100 8 8-16-20-35 38 Bentonite 3 1.0 GRAVELL SAND, some sill, trace lay, brown, moist, dense SS2 100 3 50 ⁺ - - - 0.031 mm 4 GRAVELL SAND, some sill, trace day, Clay: 3%, Sill SS2 100 3 50 ⁺ - - - 0.031 mm 5 - - - - - 0.01 - 50 ⁺ - - - 0.031 mm 6 1.83 80.00 - SS2 100 3 50 ⁺ - - - Screen - 0.031 mm - - Screen - 1.83 mm - - - Screen - 1.83 mm - - - - - - - - - - - - - - - -		Feet Metres	81.83		GROUN	D SURFACE			%			N	10	20 3	0 40	50 6	0 70	80 90) - M	
2 -0.40 81.43 3 -1.0 4 -1.0 5 -1.0 6 -1.33 6 -1.33 6 -1.33 6 -1.33 7 -2.0 8 -1.00 8 -1.00 8 -1.00 9 -1.33 6 -1.33 8 -1.00 8 -1.00 9 -1.00 9 -2.0 8 -2.0 9 -2.0 9 -2.0 9 -2.0 9 -2.0 9 -2.0 9 -2.0 10 -3.0 11 -2.0 12 -2.0 13 -4.0 14 -2.0 9 -2.0 9 -2.0 14 -2.0 9 -2.0 14 -5.0 17	210	1 - 0.10	81.73 81.53		- ASPHALT : 100 m	EL, some silt, trace	×	GS1		7			0		+	+	0.3	31 m	_	
3 1.0 4 1.0 5 GRAVELLY SAND, some silt, trace clay, brown, moist, dene Gravel : 23%, Sand : 49%, Clay : 89%, Silt 6 1.3 7 2.0 8	д Кер Л	2 - 0.40	81.43		clay, brown, moist, Gravel : 43%, San	, dense d : 41%, Clay : 3%, Silt	7	SS1	100	8	8-18-20-35	38	-9-				 3ent	onite		
5 -	כה_עטב.6L	3 <u>-</u> 1.0 4 <u>-</u>			: 13% FILL : GRAVELLY SAND), some silt, trace clay,		SS2	100	3	50/ 125mm	50+	0				1.0 _#∠ ↓)5 m ⁻ Sariu.	_	
7 2.0 Debugged damp, very damage 8 - - 9 - - 10 3.0 - 11 - - 10 3.0 - 11 - - 12 - - 13 - - 14 - - 15 - - 16 - - 17 - - 18 - - 19 - - 10 - - 13 - - 14 - - 15 - - 16 - - 20 - 6.0 21 - - 22 - - 23 - - 24 - - 25 - - 26 - - 27 - - <		5 6 1.83	80.00		Gravel : 23%, San 20%	d : 49%, Clay : 8%, Silt		SS3	100	5	50/ 100mm	50+	0			•	Sc 1.8	reen 33 m	_	
9	ry FIIE: G	7 - 2.0			grey, damp, very d	lense														
11 - Borehole was dy upon completion 12 - Monitoring well installed at 1.837 m bgs - Borehole was dy on January 28.2021 - Borehole was dy on Pebruary 10.2021 - Borehole was dy on Pebruary 10.20	PU LIDIA	9 – 10 – 3.0			NOTE : - End of Borehole :	<u></u> at 1.83 m bgs														
- Borehole was dry on February 10, 2021 - bgs donates 'below ground surface' - bgs donates 'below ground s	2319 - 9U.G				 Borehole was dry Monitoring well in Borehole was dry 	/ upon completion hstalled at 1.837 m bgs / on January 28, 2021														
$ \begin{array}{c} 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 16 \\ 21 \\ 22 \\ 23 \\ 7.0 \\ 24 \\ 25 \\ 26 \\ 8.0 \\ 27 \\ 28 \\ 29 \\ 9.0 \\ 30 \\ 31 \\ 32 \\ 32 \\ \end{array} $	121 I/8/5CU	13 <u>+</u> 4.0			- Borehole was dry - bgs donates 'belo	/ on February 10, 2021 ow ground surface'														
$ \begin{array}{c} 16 \\ - \\ 5.0 \\ 17 \\ - \\ 18 \\ - \\ 20 \\ - \\ 6.0 \\ 21 \\ - \\ 22 \\ - \\ 23 \\ - \\ 7.0 \\ 24 \\ - \\ 25 \\ - \\ 26 \\ - \\ 8.0 \\ 27 \\ - \\ 28 \\ - \\ 31 \\ - \\ 32 \\ - \\ - \\ 32 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$	23/11Z																	+		
$ \begin{array}{c} 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 22 \\ 23 \\ 7.0 \\ 24 \\ 25 \\ 26 \\ 8.0 \\ 27 \\ 28 \\ 10 \\ 30 \\ 31 \\ 32 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10$		16													-		-	+		
$ \begin{array}{c} 19 \\ 20 \\ -6.0 \\ 21 \\ -1 \\ 22 \\ -1 \\ 22 \\ -1 \\ 23 \\ -7.0 \\ 24 \\ -1 \\ 25 \\ -1 \\ 25 \\ -1 \\ 26 \\ -8.0 \\ 27 \\ -1 \\ 28 \\ -1 \\ 28 \\ -1 \\ 28 \\ -1 \\ 28 \\ -1 \\ 28 \\ -1 \\ 28 \\ -1 \\ 28 \\ -1 \\ 28 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1$	-UZTT/	17													-		-	+	_	
20 - 0.0 $21 - 1 - 22 - 1 - 23 - 7.0$ $22 - 1 - 25 - 1 - 26 - 8.0$ $27 - 1 - 28 - 1 - 29 - 9.0$ $30 - 1 - 9.0$ $31 - 1 - 32 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -$	HR/TI																			
$ \begin{array}{c} 21 \\ 22 \\ -1 \\ 33 \\ -7.0 \\ 24 \\ -1 \\ 25 \\ -1 \\ 26 \\ -8.0 \\ 27 \\ -1 \\ 28 \\ -1 \\ 28 \\ -1 \\ 30 \\ -9.0 \\ 31 \\ -1 \\ 32 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1 \\ -1$		20 - 0.0																		
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		32 —																		

	REFEREN	ICE No.	:	11205379-90								ENCLOSURE No.:6	
					BOREHOLE No.:			MW6	-21		В		
		9	äHD		ELEVATION:		82.	17 m			2	Page: <u>1</u> of <u>2</u>	
	CLIENT:		Infra	astructure Ontario (I.0	O.)						LE	EGEND	
	PROJECT LOCATION	::	Prel Chil Otta	liminary Geotechnica dren's Hospital of Ea awa, Ontario	l Investigation - Propos stern Ontario Campus	ed - 40	Parking)1 Smyt	<u>Struc</u> h Roa	ture d,		\boxtimes	SS - SPLIT SPOON ST - SHELBY TUBE	
12/97	DESCRIB	ED BY:	<u>K.</u> S	Schaller	CHECKED BY:		S. Sha	hangi	an		LL ▼	I RC - ROCK CORE - WATER LEVEL	
ate: 2/2	DATE (ST	ART):	Jan	uary 12, 2021	DATE (FINISH)	:	Januar	y 13,	2021				
	NORTHIN	G:	502	7605.404	EASTING:		449244	1.983					
WIIH GKAPH+W	Depth	Elevation (m) BGS	Stratigraphy	DESCR SOIL ANI	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) △ Field Sensitivity (S) □ Lab ○ Water content (%) W _p M Atterberg limits (%) ● "N" Value (blows / 12 in30 cm)	
	Feet Metres	82.17		GROUNI	D SURFACE			%			N	10 20 30 40 50 60 70 80 90	-
Keport: SC	1 - 0.35	81.82		GRAVEL : 350 mm		\mathbb{N}	SS1	87	14	10-30-18-8	48	6 0 • 0.31 m	X
	3 - 1.0	01.00		organics, grey/brow NATIVE : MI-GRAVELLY SA	vn, moist, dense	X	SS2	100	10	4-11-27-45	38		
GEOLECH	4 - 1.22 - 1 5 - 1 5 - 1	00.95		brown, moist, dens Gravel : 32%, Sand : 16%	d : 45%, Clay : 7%, Silt	X	SS3	100	9	35-20-50/ 75mm	100		
IE: GHD	6 2.0 7			BEDROCK (inferre grey, moist, very de	ed), shale fragments, ense	×	SS4	100	4	50/ 75mm	50+	+ O Bentonite	
LIDIALY FI	8 - <u>-</u> 9 - <u>-</u>					×	SS5	100	3	50/ 100mm	50+	+ 0 •	
- 90.67J	10 <u>+</u> 3.0 + 11 <u>+</u>					X	SS6 SS7	100 100	4	50/ 100mm	50+ 50+	+ ○ • 2/10/2021 ¥	
112053/9	12 - 3.51	78.66		SHALE-BEDROCK of limestone/siltsto	K, laminated, interbeds ne (hard layers),	I	RC1	58		50/ 50mm 50		3.66 m	
11205379				moderately strong,	grey		RC2	93		24		#2 Sand	
112053	15 — 16 — - 5.0												
	17 — 18 — 1						RC3	95		54			
-CHAR/11-	$19 - \frac{1}{20} - 6.0$						1105	30				Screen	
ABASE/8-	$21 - \frac{1}{2}$												
	23 - 7.0						RC4	97		55			
LEGACY	24 — 25 —											7.47 m—	
BRUNEL	26 <u>-</u> 8.0					$\left \right $						7.78 m	
111 - Ac	27						DOS	100		50			
SUSSAUC	29 - 9.0						RU5	100		52		Bentonite Seal	
N:/CA/MIS	31 <u>-</u>												
LI6:	32 —						RC6	100		71			

	REFERENCE No	.:11205379-90								ENC	LOS	URE	No.:		6	
			BOREHOLE No.:	_		MW6	-21		B	OR	2EF	10	LE	RE	PO	RT
		AHD	ELEVATION:		82.	17 m			-		Page		2	of _	2	
	CLIENT:	Infrastructure Ontario (I	.0.)						LEC	GEN	D					
	PROJECT:	Preliminary Geotechnic Children's Hospital of E Ottawa, Ontario	al Investigation - Propos astern Ontario Campus ·	ed • 40	Parking)1 Smyt	Struc h Roa	<u>ture</u> d,		\boxtimes	SS ST	- \$ - \$	SPLI SHEL	T SPC _BY T	DON UBE		
6/21	DESCRIBED BY:	K. Schaller	CHECKED BY:	_	S. Sha	hangia	an		⊥∐ ▼	RC	- F - \	ROC NAT	K COI ER LE	RE EVEL	_	
te: 2/2	DATE (START):	January 12, 2021	DATE (FINISH)	_	Januar	y 13, 2	2021		-							
ELL Da	NORTHING:	5027605.404	EASTING:		449244	1.983										
JG WITH GRAPH+W	Depth Elevation (m) BGS	Stratigraphy SOIL AN	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	She Ser O W _p W ₁	ear te nsitivi Wat Atte "N" \ wws /	st (Cu ty (S) er cou rberg /alue 12 in	i) htent (^o limits -30 cm	%) [%)	∆ Fielc □ Lab	1
	Feet Metres 82.17	GROUN	ID SURFACE			%			Ν	10	20 3	0 40	50 60	70 8	80 90	
54СҮLOG DATABASE18-CHAR\11\1120\112053-\112053-\11205379\11205379+90.GPU ∟IDrary FIIE : GHU_GEOTECH_V0Z/GLB Керогт : SUII	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	END OF BOREHC NOTE : - End of Borehole - Borehole was dr - Rock coring from - Monitoring well i - Groundwater fou January 28, 2021 - Groundwater fou February 10, 202 ⁻ - bgs donates 'bel	ALE : at 10.06 m bgs y upon completion h 3.51 m bgs installed at 7.47 m bgs ind at 2.97 m bgs on and at 3.09 m bgs on ow ground surface'												m	
CA/MISSISSAUGA - 111 BRUNELILE	$58 - \frac{1}{-1}$ $59 - \frac{1}{-1}$ $60 - \frac{1}{-1}$ $61 - \frac{1}{-1}$ $62 - \frac{1}{-1}$ $63 - \frac{1}{-1}$ $64 - \frac{1}{-1}$ $65 - \frac{1}{-1}$															
Í,		<u> </u>														

	REFEREN	ICE No.	:	11205379-90								ENC	CLOS	URE	No.	:		7
		6			BOREHOLE No.	: _		BH7-	21		В	OF	۶E۲	10	LE	R	EPC	ORT
		6	iHD		Elevation:		82.	<u>.22 m</u>			-	•	Page	:	1	of	_1_	
	CLIENT:		Infra	astructure Ontario (I.	0.)						LEC	GEN	D					
	PROJECT LOCATION	: N:	Prel Chile Otta	iminary Geotechnica dren's Hospital of Ea wa, Ontario	l Investigation - Propos stern Ontario Campus	ed - 40	Parking)1 Smyt	Struc h Roa	ture d,		\boxtimes	SS ST	- 9	SPLI ⁻ SHEL	T SP _BY		N E	
17/07	DESCRIBE	ED BY:	<u>K.</u> S	schaller	CHECKED BY:		S. Sha	hangia	an		⊥⊔ Ţ	RC	- F - V	VAT	ERL	.EVE	EL	
ale: 2/.	DATE (ST	ART):	Janu	uary 19, 2021	DATE (FINISH)): _	Januar	y 19, :	2021									
	NORTHIN	G:	502	7618.043	EASTING:		449176	6.612				1						
ערווח פרארח+ייי	Depth	Elevation (m) BGS	Stratigraphy	DESCR SOIL ANI	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Sh Se O W _p W (blo	ear tes nsitivit Wate Atter / "N" \ ows / 2	st (Cu y (S) er cor rberg /alue 12 in	i) ntent limits -30 ci	(%) s (%) m)	∆ Fie □ La	∍ld b
	Feet Metres	82.22		GROUN	D SURFACE			%			N	10	20 3	0 40	50 6	0 70	80 90	_
Keport: 0				FILL : SILTY SAND and (moist, very dense	GRAVEL, brown,		SS1	54	6	28-35-17-10	52	0			•			_
	$\begin{array}{c} -1 \\ -2 \\ -2 \\ -2 \\ -2 \\ -2 \\ -2 \\ -2 \\$	81.46		BEDROCK (inferre grey, moist, very de	ed), shale fragments, ense	- X	SS2	100	7	15-40-50/ 125mm	50+	0			•			_
C ECE	4 — - 5 — - -					X	SS3	100	4	45-50/ 75mm	50+			_	•			-
	6 — - 2.0 7 — 2.0					×	SS4	100	4	50/ 125mm	50+	0			•			
LIDIALY LI	8 <u>-</u> 2.52 9 <u>-</u>	79.70		\auger refusal	/		SS5	100	3	50/ 75mm	50+	0			•			
GLJ GLJ	10 3.0			END OF BOREHOL	<u>.E :</u>													_
01 8 - RU.				NOTE : - End of Borehole a	at 2.52 m bgs													_
21 3/ 1/2/12				- Borenole was bac holeplug and seale - bgs donates 'belo	ed with cold patch w ground surface'									-				_
	14													_				_
-SCU21														-				_
ZUUZ	17 <u>-</u> 5.0													+			++	_
	18 —																++	_
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REFERENCE No.:	11205379-90								ENCLOSUR	E No.: _		8				
		BOREHOLE No.:			MW8	-21		В	OREHO		REPO	ORT				
GHI	<u>لو</u>	ELEVATION:		82.	20 m			Page: <u>1</u> of <u>1</u>								
CLIENT: In	frastructure Ontario (I.	D.)						LEC	GEND							
PROJECT: Pr	reliminary Geotechnica	cal Investigation - Proposed Parking Structure						SS - SPLIT SPOON								
LOCATION: Of	hildren's Hospital of Ea ttawa, Ontario	stern Ontario Campus -	40	1 Smyt	n Roa	d,		ST - SHELBY TUBE								
DESCRIBED BY: <u>K</u> .	Schaller	CHECKED BY:		S. Sha	hangia	an		Ţ	- WAT		L /EL					
	anuary 18, 2021	DATE (FINISH):		Januar	y 18, :	2021										
NORTHING: 50)27647.908	EASTING:		44921 <i>°</i>	1.832											
Depth Depth Elevation (m) BGS Stratigraphy	DESCR SOIL ANI	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (C Sensitivity (S O Water co W _p W ₁ Atterberg • "N" Value (blows / 12 in	u)) ontent (% g limits (% 30 cm)	△ Fi □ La) 6)	eld ab				
Feet Metres 82.20	GROUN	D SURFACE			%			Ν	10 20 30 40	50 60 7	0 80 90)				
	ASPHALT : 50 mm	·/		GS1		5				0	.31 m-					
	SANDY GRAVEL, Gravel : 61%, Sand	brown, moist, loose d : 33%, Clay : 2%, Silt	M	SS1	100	7	3-4-2-3	6		Ber	ntonite					
	BEDROCK (inferre reddish brown/grey	d), shale fragments, v, wet, very dense	X	SS2	100	18	23-50/ 150mm	50+			.22 m=	_				
			X	SS3	100	8	50/ 100mm	50+	0	• #2	Sand					
	auger refusal	ʃ	×	SS4	100	4	50/ 75mm	50+	0	• _2 _2	.14 m2 .22 m ²	ਸ ਸ				
	END OF BOREHOI	<u>.E :</u>										_				
	NOTE :											\neg				
	- End of Borehole a - Borehole was dry	at 2.22 m bgs upon completion										_				
	- Monitoring well in - Groundwater four	stalled at 2.14 m bgs nd at 2.03 m bgs on														
	- Groundwater four	nd at 2.09 m bgs on														
	- bgs donates 'belo	w ground surface'														
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26 <u>-</u> 8.0																
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REFERENCE No.:	11205379-90								ENC	LOS	URE	No.:		9		
		BOREHOLE No.:	_		B1-2	21		BOREHOLE REPORT								
GHD	ELEVATION:		82.	29 m			Page: <u>1</u> of <u>1</u>									
CLIENT:Infr	astructure Ontario (I.O	.)						<u>LE</u>	GEN	D						
PROJECT: Pre Chi LOCATION: Otta	liminary Geotechnical Idren's Hospital of Eas awa, Ontario	cal Investigation - Proposed Parking Structure Eastern Ontario Campus - 401 Smyth Road,							SS - SPLIT SPOON							
DESCRIBED BY: K.S	Schaller	CHECKED BY: <u>S. Shahangian</u> ▼ - WATER LEVEL														
	nuary 18, 2021	DATE (FINISH):	_	Januar	y 18, 2	2021										
NORTHING: 502	27580.742	EASTING:		449219	9.213											
Depth Depth Elevation (m) BGS Stratigraphy	DESCRI SOIL AND	PTION OF BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Sh Se ○ w _p v (bl	ear tes nsitivit Wate J Atter /, "N" V ows / 1	st (Cu) y (S) ber con berg l ′alue l2 in:) tent (' imits 30 cm	∠ ⊏ %) (%)	∆ Field] Lab		
Feet Metres 82.29	GROUND	SURFACE			%			Ν	10	20 30	0 40 5	50 60	70 80	90		
	FILL : SILTY SAND and G brown, moist, loose	RAVEL, greyish	\mathbb{A}	SS1	62	2	7-3-2-3	5	•							
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	SAND and GRAVEL clay, brown, moist, v Gravel : 39%, Sand	., some silt, trace /ery dense : 39%, Clay : 7%, Silt	X	SS2	89	10	9-24-50/ 125mm	50+				•				
	BEDROCK, shale fr red/grey, moist, very auger refusal	agments, brownish v dense														
	END OF BOREHOLE														r	
	NOTE : - End of Borehole at	1.04 m bgs													i	
	- Borehole was dry u - bgs donates 'below	upon completion v ground surface'														
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28 —									╞┼		+		+		ſ	
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	REFEREN	ICE No.	·	11205379-90								ENC	LOSU	IRE N	lo.:		10			
					BOREHOLE No.:	_		B2-2	21		BOREHOLE REPORT									
		6	ind		ELEVATION:		82.	18 m			-	F	Page:	_1	_ 0	f <u>1</u>	-			
	CLIENT:		Infra	astructure Ontario (I.	0.)						LE	GENI	<u>)</u>							
	PROJECT	:: N:	Preli Chile Otta	iminary Geotechnica dren's Hospital of Ea wa, Ontario	I Investigation - Proposi Istern Ontario Campus -		SS - SPLIT SPOON													
26/21	DESCRIB	ED BY:	<u>K.</u> S	challer	CHECKED BY:	III KU - KOCK COKE ▼ - WATER LEVEL														
Date: 2	DATE (ST	ART):	Janu	uary 18, 2021	DATE (FINISH):	-	Januar	y 18, :	2021											
VELL	NORTHIN	G:	5027	7629.392	EASTING:		449254	1.399	1	1	1	1								
JG WITH GRAPH+V	Depth Elevation (m) BGS MU TIOS Stratigraphy			DESCR SOIL ANI	IDLION OL Content e State Content e State Content e Content							She Sen W _p W ₁	Shear test (Cu) \triangle Field Sensitivity (S) \Box Lab \bigcirc Water content (%) $\underset{W_{p}, W_{i}}{\longrightarrow}$ Atterberg limits (%) \bullet "N" Value (blows / 12 in -30 cm)							
	Feet Metres	82.18		GROUN	D SURFACE			%			N	10	20 30	40 50	0 60	70 80 9	0			
Report: S(FILL : SILTY SAND and (moist, dense	GRAVEL, brown,		SS1	71	4	13-17-24-9	41	0		•						
_V02.GLB		81.27		BEDROCK, shale	fragments, grey, very	\mathbb{N}	SS2	100	10	4-10-28-34	38	0								
SEOTECH	4 <u>-</u> 5 <u>-</u> 1.52	80.66				X	SS3		9	22-50/ 150mm	50+									
S GHD G	6 2.0 7			END OF BOREHOL	<u>.E :</u>															
ibrary File	8 8 			 End of Borehole a Borehole was dry bgs donates 'below 	at 1.52 m bgs upon completion w ground surface'															
GPJ L																				
	11 — <u>[</u> 																			
5379\112(13 - 4.0																			
53\1120	14 — 15 — 																			
20\1120	16 — — 5.0 17 —																			
1112																				
3-CHAR/1	19 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -																			
TABASE\	21 — 22 —																			
LOG DA	23 - 7.0																			
LEGACY	24 — 25 —																			
BRUNEL	26 8.0																			
iA - 111 E	27 — <u>-</u> 28 — <u>-</u>																			
SISSAUG	29 + 9.0																			
:\CA\MIS	30 <u>-</u> 																			
File: N:	32 —																			

_	REFEREN	ICE No.	:	11205379-90	ENCLOSURE No.:														
		6			BOREHOLE No.:			B3-2	21		BOREHOLE REPORT								
GHD					ELEVATION:		82.	.27 m					Page:	_1	_	of _1	_	VI	
	CLIENT:		Infra	structure Ontario (I.	0.)						<u>LEC</u>	GEN	D						
	PROJECT	:: N:	Preli Chile Otta	iminary Geotechnica dren's Hospital of Ea wa, Ontario	al Investigation - Proposed Parking Structure astern Ontario Campus - 401 Smyth Road,							SS - SPLIT SPOON							
26/21	DESCRIBE	ED BY:	<u>K.</u> S	challer	CHECKED BY:		III RC - ROCK CORE ▼ - WATER LEVEL												
ate: 2/	DATE (ST	ART):			DATE (FINISH)	: _													
	NORTHIN	G:	5027	7652.016	EASTING:		449199	9.133			-								
Depth BE Revation Depth MITH GRAPH+W (m) BGS (m) BGS (IPTION OF D BEDROCK								t (Cu) r (S) er cont perg li alue 2 in3	(Cu) △ Field (S) □ Lab content (%) erg limits (%) ue in 30 cm)							
	Feet Metres	82.27		GROUN	D SURFACE			%			N	10	20 30	40 5	50 60	70 80	90		
Report: SU		91.66		FILL : SILTY SAND with moist, loose	gravel, greyish brown,	X	SS1	62	15	6-6-2-2	8	•							
V02.GLB	3 1.0	01.00		Sand, some gravel grey, moist, stiff	/ l, silt and clay, reddish		SS2	100	13	4-5-9-25	14								
EO IECH	4 1.22 1.37 5	81.05 80.90		BEDROCK (inferre greyish brown, ver	ed), shale fragments, y dense	X	SS3	100	7	50/ 150mm	50+	0			•				
e: GHD_0	6 <u>-</u> - 2.0 7 <u>-</u>			END OF BOREHO	<u>E:</u>														
Library Fil	8 - <u>-</u> 9 - <u>-</u>			 End of Borehole a Borehole was dry bgs donates 'below 	at 1.37 m bgs upon completion w ground surface'														
90.GPJ	10 3.0			0	0														
205379 - 9																			
205379/11	13 <u>-</u> 4.0																		
2053\112																			
1120\11																			
R\11\	18 <u>-</u> 19 <u>-</u>																		
SE/8-CHA	20 <u>-</u> 6.0 21 <u>-</u>																		
DATABAS	22																		
ACYLOG	23 <u>-</u> 7.0 24 <u>-</u>																		
NEL/LEG/	25																		
111 BRU	27 - 8.0																		
SAUGA -	28 — — 29 — _												+			+			
MISSIS	30 - 9.0													+					
N:/CA/	31													+		+			
Ë	JZ																		
,	REFEREN	ICE No.	:	11205379								ENCLOSI	JRE N	o.:					
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					BOREHOLE No.:	_		MW9	-22		B	OREH	OL	E REPO	DRT				
					ELEVATION:		82	.0 m				Page	_1	of <u>1</u>					
	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary	Geote	chnica	al Investigat	ion	LEGEN	<u>ID</u>						
2	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							🖂 ss	- S	PLIT SPOOI	N				
: 1/9/:	DRILLING	RIG:	Trac	k Drill Rig	DRILLING MET	НО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	I ST I RC	- S - R	HELBY TUB OCK CORE	E				
L Date	DESCRIBE	ED BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	r			Ţ	- V	ATER LEVE	EL				
H+WEL	DATE (ST	ART):	19 J	uly 2022	DATE (FINISH):	_	19 July	2022											
GRAP	NORTHIN	G:	5027	7588.5 m	EASTING:		44919	l.1 m		1	1	1							
9 SOIL LOG WITH	Depth	Elevation (m)	Stratigraphy	DESCR SOIL AN	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear tes Sensitivity O Wate W _p M Atter • "N" Va (blows / 1	t (Cu) / (S) er conter perg lim alue 2 in30	△ Fie □ Lal nt (%) iits (%) cm)	ld D				
120537	Feet Metres	82.0		GROUN	D SURFACE				%			10 20 30	40 50	60 70 80 90					
eport: 1		81.8		GM-SAND and GF	RAVEL, grey/brown,	\mathbb{N}	SS1	62	6	9-8-10-4	18			0.2 m					
5.GLB R	2 + 0.8 3 - 10	81.2		NATIVE : SM-SILTY SAND ; grey/brown_moist	and GRAVEL,	\mathbb{N}	SS2	83	3	2-11-27-50	38	0							
ECH_V0	4			SHALE-BEDROC	K, weathered, light									_bentonite_					
<u>_GEOT</u>	5 																		
79 GHI	7 - 2.0													2.1 m_					
112053	8 - 2.6	79.4																	
File:	9 - 30			SHALE-BEDROC	K, highly to moderately ately bedded, weak to		RC1	90		13									
Library				moderately strong	, grey/black														
GPJ.	12 —																		
DITION	13 4.0						RC2	100		40									
GE AD	14													screen					
GARA																			
RKING																			
79 - PA	18 -						RC3	07		65									
112053	19							51		00				5.8 m_					
BASE/	20 - 0.0													sand					
DATA	21																		
SH/LOG	23 - 7.0						BC4	02		67			hor						
79\TEC	24 –						RC4	93		07									
112053	25	74.0																	
S\662\	26 - 7.9 = 8.0	74.2		END OF BOREHO	<u>LE :</u>									7.9 m					
OJECI	27			NOTE :											_				
ITO/PR	29 -			 End of Borehole Rock coring from 	at 7.85 m bgs 2.59 m bgs														
ORON	30 + 9.0			 Monitoring well in bgs donates 'below 	nstalled at 5.79 m bgs ow ground surface'								\mp	+++	-				
N:\CA\T	31 - [_				
File:	32 —														-				

REFE	REN	CE No.	:	11205379								ENC	LOS	URE	No.:		10	
					BOREHOLE No.	: _	I	3H10	-22		B	OF	۶F۲	IOI	F	RF	PΟ	RT
			<u>i</u> HL		ELEVATION:		82	.1 m			5	0.	Page	e: <u>1</u>	_	of _	<u>1</u>	
CLIEN	NT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: _F	Preli	minary	Geote	chnica	al Investigat	ion	L	EGE	ND				
		N:	401	Smyth Road, Ottaw	a, Ontario							\triangleright	ss	-	SPL	IT SF	POON	
	ING	RIG:	Trac	ck Drill Rig	DRILLING MET	ГНС	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers		ST	-	SHE	LBY		<u>:</u>
DESC	RIBE	ED BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır			Ļ	j ru Z	, - -	WA	FER I		L
	(ST	ART):	12 J	luly 2022	DATE (FINISH): _	12 July	2022										
	THIN	G:	502	7596.9 m	EASTING:		449167	7.5 m										
9 SOIL LOG WITH C		Elevation (m)	Stratigraphy	DESCR SOIL AN	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Sh Se ○ w _p v (bl	ear te nsitivil Wat Atte ' ' "N" \ ows / '	st (Cu) er con rberg l /alue 12 in) itent (^r imits 30 cm	(%) (%)	∆ Fielo] Lab	i
Feet Me	etres	82.1		GROUN	D SURFACE				%			10	20 3	0 40 9	50 60	70 8	0 90	
÷				FILL : GM-SAND and GF	RAVEL, some silt.													
				trace clay, brown, Gravel : 43%, San Clay : 3%	moist, compact d : 43%, Silt : 11%,		SS1	83	3	16-13-12-4	25	0	•					-
ECH_V05.	0.5 0.6 0.7	81.5 81.4														-		
 3	1.0			clay, very dense	<pre>// GRAVEL, trace // /, weathered, light</pre>		SS2	87	6	7-38-50/ 75mm	88/ 75mm							
2379 Gt	1.0			brown														
e: 1120	1.2	80.9		Borehole terminate auger refusal	ed due to spoon and													_
rary Fij	1.5			END OF BOREHO	LE :													-
				NOTE : - End of Borehole	at 1.22 m bgs													-
	2.0			 Borehole was dry bgs donates 'below 	/ upon completion ow ground surface'													-
AGE AD																		-
- 8	2.5																	-
79 - PAR																		
	3.0																	-
															$\left \right $			-
	2 5														$\left \right $			-
	3.5																	-
1120537												$\left \right $	+			+		-
13 – 13 – -	4.0											$\left \right $				+		-
												$\left \right $				+		ł
	4.5																	
																_		

_	REFEREN	CE No	.:	11205379								ENCLOSURE No.: 11
		1			BOREHOLE No.:	_	E	3H11	-22		B	OREHOLE REPORT
		ì	5		Elevation:		82	.1 m				Page: <u>1</u> of <u>1</u>
	CLIENT:	Infras	tructur	e Ontario (I.O.)	PROJECT: _P	reli	minary (Geote	chnica	al Investigat	ion	LEGEND
3	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							SS - SPLIT SPOON
19/1	DRILLING	RIG:	Trac	ck Drill Rig	DRILLING MET	НΟ	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	ST - SHELBY TUBE
	DESCRIBE	ED BY:	<u>D</u> . A	Nsh	CHECKED BY:		A. Kha	ndeka	ır			▼ - WATER LEVEL
	DATE (STA	ART):	18 J	luly 2022	DATE (FINISH)	-	18 July	2022				
L L L L L L L L L L L L L L L L L L L	NORTHING	G:	502	7638.0 m	EASTING:	_	449184	l.6 m	1	1	1	
	Depth	Elevation (m)	Stratigraphy	DESCR SOIL AN	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) △ Field Sensitivity (S) □ Lab ○ Water content (%) ↓ Atterberg limits (%) ● "N" Value (blows / 12 in30 cm)
	Feet Metres	82.1		GROUN	D SURFACE				%			10 20 30 40 50 60 70 80 90
	$\begin{array}{c} 1 \\ 2 \\ - \\ 2 \end{array} \begin{array}{c} - \\ - \\ 0.6 \end{array}$	81.5		FILL : GW-GM-SANDY (trace clay, brown, Gravel : 52%, Son	GRAVEL, trace silt, moist, compact	X	SS1	67	2	19-17-11-3	28	
GLD GLD	3 _ 0.9	81.3				╢	SS2	62	9	3-6-11-14	17	
	4			SM-ML-SAND and	SILT, trace clay,		SS3	100		50/ 75mm	50+	
	6 2.0			SHALE-BEDROCI brown	K, weathered, light	X	SS4	100		50/ 50mm	50+	•••••
	8 <u>-</u> 2.5 9 <u>-</u> 10 <u>-</u> 3.0 11 <u>-</u>	79.6		auger refusal SHALE-BEDROCI moderately weathe grey/black	K, moderately bedded, ered, medium strong,		RC1	78		36		
	12						RC2	100		60		
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$						RC3	100		50		
	22 - 7.0 $23 - 7.0$ $24 - 7.0$ $25 - 7.0$ $26 - 8.9$	74.2					RC4	100		55		
	27			END OF BOREHO NOTE : - End of Borehole - Borehole was dry - bgs donates 'belo	LE : at 7.98 m bgs r upon completion ow ground surface'							

	REFEREN	CE NO.	:	11205379								ENC	-050	IRE N	0.:		12
					BOREHOLE No.		E	3H12	-22		B	OR	ΕH	OL	ER	REP	ORT
					ELEVATION:		82	.1 m			_	F	Page:	_1	of		
ſ	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: F	reli	minary (Geote	chnica	al Investigati	ion	LE	GEN	ID			
~	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							\bowtie	SS	- S	PLIT	SPOO	N
1/9/2:	DRILLING	RIG:	Trac	ck Drill Rig	DRILLING MET	ΉО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers		ST	- S	HELE	BY TU	BE
Date:	DESCRIBE	ED BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır			⊔⊔ Ţ	RC	- r - V	VATE	R LE	E /EL
WELL	DATE (ST	ART):	12 J	luly 2022	DATE (FINISH)	:	12 July	2022									
RAPH+	NORTHIN	G:	502	7590.3 m	EASTING:		449214	.3 m									
9 SOIL LOG WITH G	Depth	Elevation (m)	Stratigraphy	DESCR SOIL AN	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	She Sen W _p W ₁	ar test sitivity Wate Atterb "N" Va ws / 12	(Cu) (S) r conte berg lim lue 2 in30	nt (%) nits (% cm)	△ F □ L)	ïeld ab
20537	Feet Metres	82.1		GROUN	D SURFACE				%			10	20 30	40 50	60 7	0 80 9	0
Report: 11				FILL : GM-GRAVEL, son clay, brown, moist,	ne sand and silt, trace compact	\mathbb{N}		10	-	40.05 5 5							
GLBR	1			Gravel : 66%, San 20%	d : 14%, Clay & Silt :	Ŵ	SS1	46	3	13-25-5-5	30			\downarrow			
H_V05	2 - 0.5	04.4												\downarrow			
OTEC	0.7	81.4		NATIVE : SM-ML-SAND and	SILT. trace clav.	7/											
HD_GE	3			brown, moist, very	dense	ľ	SS2	100	5	15-39-40-50/ 75mm	79	0				•	
5379 G	- 1.1	81.0		SHALE-BEDROCH	K, weathered, light	+	000	100		50/	50/						
: 1120	4			brown			553	100		50/ 0mm	0mm						
ary File	5 1.5																
Libra	-																
N.GPJ	6 — 1.8	80.2		Borehole terminate	ed due to spoon and												
DITIDO	2.0 7																
AGE A	/ _ _				<u>LE .</u>												
G GAR	8 - 25			- End of Borehole	at 1.83 m bgs												
ARKIN	- 2.5			- bgs donates 'belo	ow ground surface'												
379 - F	9 —																
N11205																	
ABASE																	
G DAT	11 —																
CH/LO	- 3.5																
379\TE	12 —																
2/11205																	
TS\662	'3 <u>-</u> 4.0												\uparrow	++			
ROJEC	14 —											\vdash	+	++			
NTO/P												\vdash	+	+			
TORO	15 - 4.5											\vdash	+	++			
N:\CA												\square	+	+			
File:																	

_	REFEREN	ICE No.	:	11205379								EN	SLOS	JURI		.:	1	3
					BOREHOLE No.:	_	E	3H13	-22		B	OF	RE	HO	LE	R	EPC	DRT
			HL		ELEVATION:		82	.2 m				•.	Pag	e: _	1	of	_1_	
	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary (Geote	chnica	al Investigat	ion	L	EGE	ND				
N	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							\triangleright	s:	3	- SF	LIT S	SPOOI	N
: 1/9/2	DRILLING	RIG:	Trac	k Drill Rig	DRILLING MET	НО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers		S⁻ קרוק	Г Э.	- SH	IELB,		E
Date	DESCRIB	ED BY:	<u>L. M</u>	cCann/S. Wallis	CHECKED BY:		A. Kha	ndeka	ır			2	<u>r</u>	0	- W	ATER		EL
+WELL	DATE (ST	ART):	4 Ju	ly 2022	DATE (FINISH):		4 July	2022										
GRAPH	NORTHIN	G:	5027	7615.5 m	EASTING:		449212	2.0 m		1								
9 SOIL LOG WITH (Depth	Elevation (m)	Stratigraphy	DESCF SOIL AN	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Sh Se O W _p V (bl	near te ensitiv Wa Ma Atte "N" ows /	est (C ity (S ter co erbero Value 12 in	u)) onteni g limit	t (%) s (%) cm)	∆ Fie □ Lat	ld o
Fe Good	eet Metres	82.2		GROUN	D SURFACE				%			10	20 3	30 40	50 (50 70	80 90	_
∓ 0 ₩ 1	0.1	82.1	\bigotimes	∼ASPHALT : 75 mn FILL :	<u>۱</u>	\mathbb{N}	SS1	100		10-13-10-5	23	+	•	$\left \right $	+	$\left \right $	++	-
8 2	- <u>-</u>			GW-GM-SANDY (GRAVEL, light	μ												_
2.GLB	0.9	81.3 81.2		_ NATIVE :		$\overline{\mathbb{N}}$	SS2	71		2-2-11-15	13							
° ਸ਼ੂਂ 4	[−] 1:0	01.2		SP-GP-SAND and brown, moist, com	GRAVEL, trace clay,								+		-		++	_
5 100				SHALE-BEDROC	K, weathered, grey		RC1	82		0								
9 9 9		80.2			(moderately to highly	╢												_
7 0				weathered, thinly i	bedded, highly to								_		_			
8 1120				moderately nactur	eu, grey, weak		RC2	95		10					_			
	$\frac{1}{4}$																	
11	, e.e 												_		-			_
12				occasional clay an	d shale layers	T												
	3 - 4.0																	_
	↓						RC3	100		37					-			_
BBR 15	5 - [_			
b 9 16	3 - 5.0																	_
	7			occasional clay an	d shale layers													
- 18	3												_	$\left \right $	_			_
11206) <u> </u>						RC4	100		43								
																		_
	6.6	75.5	=			μ							_	$\left \right $	-		++	_
	3 - 7.0			END OF BOREHO	<u>LE :</u>									\square			++	-
24 26/1EC	↓ <u>↓</u>			NOTE : - End of Borehole	at 2.37 m bos									\square				-
25 25	;			- Borehole was dry	upon completion													
26	3 8.0			- bgs donates 'bel	bw ground surface'								-	\square	-			-
27 27																		1
	3 - [
	9.0											7	-	\square		\square	+	-
ATOR ATOR																	\ddagger	
	- 																	

	REFERENCE	E NO.:		11205379								ENCLO	SURE	NO		14	
					BOREHOLE No.	: _		3H14	-22		B	ORE	ноі	E	REP	ORT	
					ELEVATION:		82	.2 m			_	Pa	ge: <u>1</u>		of <u>1</u>	_	
	CLIENT: _lr	nfrasti	ructure	e Ontario (I.O.)	PROJECT: _F	Preli	minary	Geote	chnica	al Investigati	on	LEG	END				
N	LOCATION:		401	Smyth Road, Ottawa	a, Ontario							🖂 s	s -	SPLI	T SPO	ON	
: 1/9/2	DRILLING RI	IG: _	Trac	k Drill Rig	DRILLING MET	ΉО	D: <u>203</u>	mm O	D Ho	llow Stem A	ugers	. ⊠ s	т -	SHE		JBE	
Date:	DESCRIBED	BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır			⊥⊥ ⊓ Ţ	-	WAT	ER LE	VEL	
+WELL	DATE (STAR	RT): _	12 J	uly 2022	DATE (FINISH)): _	12 July	2022									
BRAPH	NORTHING:		5027	7618.1 m	EASTING:		449237	7.3 m			-						
9 SOIL LOG WITH (Depth	Elevation (m)	Stratigraphy	DESCR SOIL ANI	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear Sensiti O W M W _p W At (blows	test (Cu vity (S) ater con terberg ' Value / 12 in) itent (% limits (<u>30 cm</u>]	△ □ %))	Field Lab	
20537	Feet Metres 8	32.2		GROUN	D SURFACE				%			10 20	30 40	50 60	70 80 9	90	
379/TECHILOG DATABASE/11205379 - PARKING GARAGE ADDITION.GPJ LIbrary File: 11205379 GHD_GEOTECH_V05.GLB Report: 112 T	$\begin{array}{c} & & & & & \\ & & & & & \\ 1 & & & & \\ & & & &$	81.6 81.5		FILL : GW-GM-SANDY G trace clay, brown, r Gravel : 66%, Sand 12% NATIVE : SP-GP-SAND and trace clay, brown, r SHALE-BEDROCK brown Borehole terminate auger refusal END OF BOREHOI NOTE : - End of Borehole as dry - bgs donates 'belo	GRAVEL, trace silt, moist, dense d : 22%, Clay & Silt : GRAVEL, trace silt, moist, very dense (, weathered, light ad due to spoon and <u>E :</u> at 1.22 m bgs upon completion ow ground surface'		SS1	58	2	11-25-16-6 7-35-48-42	41 83						
IL: N:\CA\TORONTO\PROJECTS\662\112	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$																

+WELL Date: 1/9/22	CLIENT: LOCATION DRILLING DESCRIBE DATE (ST/	Infrast	ructur		BOREHOLE No.: ELEVATION:	_	E	<u>3H15</u>	-22		B	OR	EHC	DLE	ER	EPC	DRT
+WELL Date: 1/9/22	CLIENT: LOCATION DRILLING DESCRIBE DATE (ST/	Infrast	ructur		ELEVATION:												
+WELL Date: 1/9/22	CLIENT: _ LOCATION DRILLING DESCRIBE DATE (ST/	Infrast N: RIG: _	ructur				82	.1 m				Р	age:	_1_	of	_1_	
+WELL Date: 1/9/22	LOCATION DRILLING DESCRIBE DATE (ST/	I: RIG: _	404	e Ontario (I.O.)	PROJECT: P	reli	minary (Geote	chnica	al Investigat	ion	LE	GEN	<u>)</u>			
+WELL Date: 1/9/2	DRILLING DESCRIBE DATE (ST/	RIG: _	401	Smyth Road, Ottaw	a, Ontario							\boxtimes	SS	- SI	PLIT \$	SPOO	N
+WELL Date	DESCRIBE		Trac	ck Drill Rig	DRILLING MET	НО	D: <u>203</u>	mm O	D Ho	llow Stem A	ugers		ST RC	- SI - R	HELB OCK (Y TUB CORF	E
+WELI	DATE (ST/	ED BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	r			Ţ		- W	ATEF	RLEVE	EL
+ - -		ART):	12 J	luly 2022	DATE (FINISH):	_	12 July	2022									
GRAPH	NORTHIN	G:	5027	7642.6 m	EASTING:		449234	.7 m									
9 SOIL LOG WITH	Depth	Elevation (m)	Stratigraphy	DESCF SOIL AN	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shea Sens W _p W ₁	ar test (sitivity (Water (Atterbe "N" Valu vs / 12	Cu) S) conter rg lim ie in30	nt (%) its (%) cm)	∆ Fie □ Lal	ld ว
50537 P 4	eet Metres	82.1		GROUN	D SURFACE				%			10 2	20 30 4	0 50	60 70	80 90	-
1_V05.GLB Report: 11	- - - - 0.5 - 0.6	81.5		FILL : SM-SAND and GF clay, brown, moist Gravel : 40%, San Clay : 3%	RAVEL, trace silt, trace , dense d : 47%, Silt : 10%,		SS1	62	3	16-18-13-5	31	0	•				_
5379 GHD_GEOTECH	 1.0 1.1	81.1		SHALE-BEDROC brown Borehole terminat	K, weathered, light ed due to spoon and		SS2	100	6	20-25-50/ 125mm	75/ 125mn	0 1					_
brary File: 1120 G A	 1.5			END OF BOREHO NOTE :	<u>LE :</u> at 1.07 m bos												_
DDITION.GPJ L	 2.0			- Borehole was dr - bgs donates 'bel	/ upon completion ow ground surface'												_
(ING GARAGE AI	 2.5																_
1205379 - PARI G																	
C DATABASE/1 11) 3.0																
12 12 12	3.5 2																
CTS/662/112(3 - 4.0																-
DNTO/PROJE	+																-
15 N:\CA\TOK																	-

	REFEREN	CE No.	:	11205379								ENCLOSURE No.: 16
					BOREHOLE No.:	_	E	3H16	-22		B	OREHOLE REPORT
					ELEVATION:		82	.1 m				Page: <u>1</u> of <u>1</u>
ľ	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary (Geote	chnica	al Investigat	ion	LEGEND
N	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							🔀 SS - SPLIT SPOON
7/8/1	DRILLING	RIG:	Trac	ck Drill Rig	DRILLING MET	но	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	
Date:	DESCRIBE	ED BY:	D. A	Ash	CHECKED BY:		A. Kha	ndeka	ır			III RC - ROCK CORE ▼ - WATER LEVEL
VELL	DATE (ST/	ART):	12 J	July 2022	DATE (FINISH)	:	17 Dec	embe	r 202	2		
	NORTHIN	G:	502	7594.4 m	EASTING:		449262	2.3 m				
	Depth	Elevation (m)	Stratigraphy	DESCR SOIL AN	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) \bigtriangleup Field Sensitivity (S) \Box Lab Water content (%) \square_{μ_p} Atterberg limits (%) \square_{μ_p} N" Value (blows / 12 in30 cm)
10007	Feet Metres	82.1		GROUN	D SURFACE				%			10 20 30 40 50 60 70 80 90
ברע_ עטט.טרש הקשטוו.	1	81.4		FILL : SW-SM-SAND an trace clay, brown, Gravel : 44%, San : 2%	d GRAVEL, trace silt, moist, compact d : 45%, Silt : 9%, Clay		SS1	54	3	2-6-8-6	14	
יאס פרוע פרעי	3 0.9 1.0	81.2		SP-GP-SAND and trace clay, brown, SHALE-BEDROCI brown	GRAVEL, trace silt, moist, compact / K, weathered, light		SS2	87	7	2-4-11-14	15	
20211	4 - 1.2	80.9		Borehole terminate auger refusal	ed due to spoon and		SS3	100		50/ 0mm	50/ 0mm	n
ary rite	5 _ 1.5			END OF BOREHO	<u>LE :</u>							
	6 — - - 2.0			NOTE : - End of Borehole - Borehole was dry - bgs donates 'belo	at 1.22 m bgs / upon completion ow ground surface'							
	7 -											
	8 — — 2.5											
	9 —											
	11 3.5											
	12 -											
010/00/01/11	13 - 4.0											
	14 —											
	15 - 4.5											
LIE. N. CA	16 —											

BOREHOLE No.: BH17-22 BOREHOLE RepOR CLIENT: Infrastructure Oriario (L.O.) PROJECT: Product: B2.1 m Product: Produc: P	_		CE NO.	·	11205379								ENGLOSURE NO.:	17	
ELEVATION: B2.1 m Page: 1 of CLENT: Infrastructure Ontario (I.O.) PROJECT: Preliminary Geotechnical Investigation LECEND DOLLING: 015 Smyth Road, Ottawa, Ontario DRULING RIG: Track Drill Rig DRULING RIG: Str. ShELEY TUBE DOLLING: Track Drill Rig DRULING RIG: Track Drill Rig DRULING RIG: Str. ShELEY TUBE DOESCREED BY: DAH CHECKED BY: A.Khandekar WATER LEVEL DATE (START): 12 July 2022 DATE (FINISH): 12 July 2022 DATE (FINISH): 12 July 2022 NORTHING: 50027619.3 m EASTINS: 449258.6 m Str. Shert Ref. (C) Descrete (FINISH): SOIL AND BEDROCK SSI Str. Shert Ref. (C) Descrete (FINISH): 12 July 2022 Descrete (FINISH): Descrete (FINISH): <td></td> <td></td> <td></td> <td></td> <td></td> <td>BOREHOLE No.:</td> <td></td> <td>E</td> <td>3H17</td> <td>-22</td> <td></td> <td>B</td> <td></td> <td>REPO</td> <td>RT</td>						BOREHOLE No.:		E	3H17	-22		B		REPO	RT
CLENT: Infrastructure Ontario (L.O.) PROJECT: Preliminary Geotechnical Investigation LEGEND DORLING RG: Track Drill Rig DRILLING RG: Track Drill Rig DRILLING METHOD. 203mm OD Hollow Stem Augers ST - SPLIT SPOON DESCRIBED BY: D.A.H. OHCKOKE DRIY: A. Khandebar ST - SPLIT SPOON DATE (START) 12.July 2022 DATE (FINSHY) 12.July 2022 - WATER LEVEL NORTHING: 5027619.3 m EASTING: 449258.8 m - WATER LEVEL NORTHING: 5027619.3 m EASTING: 449258.8 m - WATER LEVEL Total Strant: 12.July 2022 DATE (FINSHY) 12.July 202 - WATER LEVEL Total Strant: 12.July 2022 DATE (START) 12.July 202 - WATER LEVEL Total Strant: 12.July 2022 DATE (START) 12.July 202 - WATER LEVEL Total Strant: 12.July 2022 DATE (START) 12.July 202 - WATER LEVEL Total Strant: 12.July 2022 DATE (START) 12.July 202 - WATER LEVEL Total Strant:						ELEVATION:		82	.1 m				Page: <u>1</u> o	f <u>1</u>	
LOCATION: 401 Smyth Road. Ottawa, Ontario SS SPLIT SPOON INDEXCRIPED BY: D.Ash ORILLING RETHOD: 203mm 0D Hollow Stem Augers SS SPLIT SPOON IDDESCRIPED BY: D.Ash CHECKED BY: A.Knandekar WATER LEVEL IDDESCRIPED BY: D.Ash CHECKED BY: A.Knandekar WATER LEVEL IDDESCRIPTION OF SS State Test (OU) OPEN TEST (START) OPEN TEST (START) OPEN TEST (START) IDDESCRIPTION OF SS SS STATE (FINISH): IDDESCRIPTION OF State Test (OU) OPEN TEST (START) IDDESCRIPTION OF SS SS SS STATE (START) OPEN TEST (START) IDDESCRIPTION OF SS SS SS SS OPEN TEST (START) OPEN TEST (START) IDDESCRIPTION OF SS SS SS OPEN TEST (START) OPEN TEST (START) OPEN TEST (START) OPEN TEST (START) IDDESCRIPTION OF SS SS OPEN TEST (START) OPEN TEST (ST		CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary (Geote	chnica	al Investigati	ion	LEGEND		
BRILLING RIG. Track Drill Rig DRILLING METHOD. 203mm OD Hollow Stem Auges ST SHELEY TUBE DESCRIPED BY: D.Ah CHECKED BY: A.Knandekar WATER LEVEL DATE (START): 12.July 2022 DATE (FINISH): 12.July 2022 WATER LEVEL NORTHING: 6027618.3 m EASTING: 449258.8 m Standekar WATER LEVEL SOLL AND BEDROCK B	~	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							🖂 SS - SPLIT	SPOON	
DESCRIBED BY: D. Ash CHECKED BY: A. Khandekar	1/9/2:	DRILLING	RIG:	Trac	ck Drill Rig	DRILLING MET	ΉО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	ST - SHEL		<u>:</u>
DATE (START): 12 July 2022 DATE (FINISH): 12 July 2022 NORTHING: 5027619.3 m EASTING: 449258.6 m Sometoxic, Columnation of the second o	Date:	DESCRIBE	ED BY:	<u>D.</u> A	sh	CHECKED BY:		A. Kha	ndeka	ır			III RC - ROCH ▼ - WATH	ER LEVEL	_
NORTHING: 5027619.3 m EASTING: 449258.6 m 5 7	WELL	DATE (STA	ART):	12 J	luly 2022	DATE (FINISH)	: _	12 July	2022						
Bit Mathematical Stress Sector Stress <t< td=""><td>SRAPH-</td><td>NORTHING</td><td>G:</td><td>502</td><td>7619.3 m</td><td>EASTING:</td><td></td><td>449258</td><td>3.6 m</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	SRAPH-	NORTHING	G:	502	7619.3 m	EASTING:		449258	3.6 m						
Feet Metres 82.1 GROUND SURFACE % 10 20 30 40 50 60 70 60 90 1 - <t< td=""><td>9 SOIL LOG WITH G</td><td>Depth</td><td>Elevation (m)</td><td>Stratigraphy</td><td>DESCR SOIL AN</td><td>RIPTION OF D BEDROCK</td><td>State</td><td>Type and Number</td><td>Recovery/ TCR(%)</td><td>Moisture Content</td><td>Blows per 15cm/ RQD(%)</td><td>'N' Value/ SCR(%)</td><td>Shear test (Cu) Sensitivity (S) Water content (% M_p, W_i Atterberg limits (% "N" Value (blows / 12 in30 cm)</td><td>△ Field □ Lab) 6)</td><td>1</td></t<>	9 SOIL LOG WITH G	Depth	Elevation (m)	Stratigraphy	DESCR SOIL AN	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) Sensitivity (S) Water content (% M _p , W _i Atterberg limits (% "N" Value (blows / 12 in30 cm)	△ Field □ Lab) 6)	1
Image: 1 FILL: FILL: SS1 54 - 4-10-17-11 27 • Image: 1 0.5 0.7 81.4 SS1 54 - 4-10-17-11 27 • Image: 1 0.5 0.7 81.4 SS1 54 - 4-10-17-11 27 • Image: 1 0.5 0.7 81.4 SS1 54 - 4-10-17-11 27 • Image: 1 0.5 Image: 1 1.0 S1.0 SS1 SS2 100 - 3-8-22-50/ 76mm 30 • Image: 1 Image: 1<	205379	Feet Metres	82.1		GROUN	D SURFACE				%			10 20 30 40 50 60	70 80 90	
	N.\CA\TORONTO\PROJECTS\662\11205379\TECH\LOG DATABASE\11205379 - PARKING GARAGE ADDITION.GPJ Library File: 11205379 GHD_GEOTECH_V05.GLB Report: 11205	$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \\ \end{array} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} $	81.4 81.0 81.0		FILL : GW-GM-GRAVEL trace clay, brown, Gravel : 52%, San : 2%, NATIVE : SP-GP-SAND and trace clay, brown, Borehole terminate auger refusal END OF BOREHO NOTE : - End of Borehole - Borehole was dry - bgs donates 'beld	with SAND, trace silt, moist, compact d : 39%, Silt : 7%, Clay		SS1 SS2	54		4-10-17-11 3-8-22-50/ 75mm	27			

_	REFEREN	ICE No.	:	11205379								ENC	LOS	URE	No.:		18	
					BOREHOLE No.:	_	E	3H18	-22		B	OR	FF	IOI	FF		ORT	
			<u>eli</u>		ELEVATION:		82	.1 m					Page	: <u>1</u>	0	f <u>1</u>		
	CLIENT:	Infrast	tructur	e Ontario (I.O.)	PROJECT: P	reli	minary (Geote	chnica	al Investigati	ion	LE	EGE	ND				
	LOCATIO	N:	401	Smyth Road, Ottaw	a, Ontario							\boxtimes	ss	-	SPLIT	SPOO	N	
1/9/22	DRILLING	RIG:	Trac	k Drill Rig	DRILLING METI	ю	D: 203	mm C	D Ho	llow Stem A	ugers		ST	-	SHEL	BY TU	BE	
Date:	DESCRIBI	ED BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır				RC	; -	ROCH	CORI	E /EL	
VELL	DATE (ST	ART):	15 J	uly 2022	DATE (FINISH):		15 July	2022				-	•					
RAPH+/	NORTHIN	G:	5027	7645.0 m	EASTING:		449256	6.7 m										
9 SOIL LOG WITH G	Depth	Elevation (m)	Stratigraphy	DESCR SOIL AN	IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	She Ser O W _p W ₁	ear tes sitivit Wate Atter "N" V	st (Cu) y (S) er con rberg l /alue 12 in:	tent (% imits (% 30 cm)	△ F □ L) ()	ield ab	
20537	Feet Metres	82.1		GROUN	D SURFACE				%			10	20 3	0 40 5	50 60 7	0 80 9	0	
port: 112	1 			FILL : GW-GM-SANDY (trace silt_trace cla	GRAVEL with sand,	M	SS1	62		9-8-10-4	18		•					
GLB Re	2 - 0.6 = 0.8	81.5 81.3		compact Gravel : 73%, San	d : 21%, Silt : 5%, Clay∬	\mathbb{N}	552	83		2-11-27-50	38						_	
CH_V05.				: 1% NATIVE : SP-GP-SAND and	GRAVEL trace silt	μ	002	00		2-11-27-50	00			-				
GEOTE	5 - 1.4	80.7		trace clay, moist, c	lense		RC1	100		0								
379 GHD	7 <u>-</u> 2.0			auger refusal SHALE-BEDROCI	K, moderately to highly												_	
112053	8			moderately strong	grey/black													
rary File							RC2	100		0								
-J Libi			իկկկ															
TION.GI	13 - 4.0																	
GE ADD	14 -																_	
G GARA	15 — 16 — 16 —						RC3	100		36							_	
PARKIN	17 – 																	
05379 -	18 — 19 —																_	
ASE/112	20 6.0																_	
DATAB/	21 —						RC4	100		51							_	
H/LOG	22 - 7.0																	
VTECH	24 — 7.1 24 —	75.0				┦┸												
205379	25 —			END OF BOREHO														
362/11:	26 - 8.0			- End of Borehole	at 7.13 m bgs													
ECTS	27 -			 Rock coring from Borehole was dry 	upon completion													
PROJE	28			- bgs donates 'belo	ow ground surface'									\mp				
NTO/	29																	
\TORC	30 -														\square		_	
N:\CA	31 —																\neg	
File:	32 -																	

	REFEREN	CE No.	:	11205379								ENCLO	SURE	No.:		19
					BOREHOLE No.:	: _		BH19	-22		B	ORE	ноі	EF	REP	ORT
			HI		ELEVATION:		81	.1 m				Pag	ge: <u>1</u>	0	f <u>1</u>	
ľ	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary	Geote	chnica	al Investigat	ion	LEG	END			
~	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							⊠ s	s -	SPLIT	SPOO	N
1/9/2	DRILLING	RIG:	Trac	ck Drill Rig	DRILLING MET	ΉО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	⊠ s	т -	SHEL		BE
Date:	DESCRIBE	ED BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır			⊥⊥ N Ţ	-	WATE		/EL
+WELL	DATE (STA	ART):	14 J	luly 2022	DATE (FINISH)	: _	14 July	/ 2022								
GRAPH	NORTHING	G:	502	7588.9 m	EASTING:		449046	6.7 m		1						
9 SOIL LOG WITH 0	Depth	Elevation (m)	Stratigraphy	DESCR SOIL AN	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear t Sensitiv O Wa W _p W ₁ Att (blows)	est (Cu) vity (S) ater con terberg I ' Value / 12 in:	tent (% imits (% 30 cm)	△ F □ L) ;;)	ïeld ab
20537	Feet Metres	81.1		GROUN	D SURFACE				%			10 20	30 40 5	50 60 7	0 80 9	0
H_V05.GLB Report: 112	0.1 1	81.0		ASPHALT : 75 mm FILL : SM-GRAVELLY S, clay, brown, loose	n AND, trace silt, trace		SS1	79		4-5-3-6	8	•				
y File: 11205379 GHD_GEOTEC	3 - 0.9 - 1.0 4 - 1.4 5 1.5	80.4 80.2 79.7		NATIVE : SP-GP-SAND and trace clay, brown, Gravel : 31%, San Clay : 7% SHALE-BEDROCI brown to grey/blac	GRAVEL, some silt, moist, very dense d : 46%, Silt : 16%, <, weathered, light k LE :		SS2	71		17-33-50/ 125mm	83/ 125mn	1				
ARAGE ADDITION.GPJ Librar	6 7 			NOTE : - End of Borehole - Borehole was dry - bgs donates 'belo	at 1.37 m bgs / upon completion ow ground surface'											
05379 - PARKING G	8 - 2.5 - 2.5 9															
DATABASE/11:																
379/TECH/LOG																
32/11205																
ECTS/6	- 4.0															
\PROJE	14 —															
RONTO	15 - 4.5															
CA/TO																
File: N	16 —															

	REFERENCE	E No.: _	11205379	<u> </u>							ENCLOSURE N	lo.:	20
				BOREHOLE No.:	_	Ν	/W20	-22		B	OREHOL	E REP	ORT
				ELEVATION:		81	.2 m				Page: 1	of	-
	CLIENT: In	nfrastruc	ture Ontario (I.O.)	PROJECT: P	reli	minary (Geote	chnica	al Investigat	ion	LEGEND		
2	LOCATION:	40	01 Smyth Road, Ottav	va, Ontario							🛛 ss - s	SPLIT SPO	ON
: 1/9/2	DRILLING RI	G: <u> </u>	rack Drill Rig	DRILLING MET	HO	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	ST -S	SHELBY TU ROCK COR	JBE E
L Date	DESCRIBED	BY: <u>D</u>	. Ash	CHECKED BY:		A. Kha	ndeka	ır			¥ - V	VATER LE	√EL
H+WEL	DATE (STAR	RT): <u>1</u> 4	4 July 2022	_ DATE (FINISH):	_	14 July	2022						
GRAPI	NORTHING:	50	027656.2 m	EASTING:		449095	5.7 m	r		1			
9 SOIL LOG WITH	Depth	Elevation (m) Strationanhy	DESCR SOIL AN	RIPTION OF ID BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) Sensitivity (S) Water conte M _p W ₁ Atterberg lin • "N" Value (blows / 12 in30	△ F □ L ent (%) nits (%) 0 cm)	-ield .ab
20537	Feet Metres 8	31.2	GROUN	ND SURFACE				%			10 20 30 40 50	60 70 80 9)0
AltorontoproJects(66211265379TechLoG DATABASE(1205379 - PARKING GARAGE ADDITION.GPJ LIbrary File: 11205379 GHD_GEOTECH_V05.GLB Report: 112055	Feet Metres 8 0 - 0.1 8 1 - - 0.5 2 2 - 0.5 2 - - 0.5 2 - 0.8 8 3 - 1.0 8 8 4 - 1.0 8 1.0 8 4 - 1.0 7 6 - 7 6 - 2.0 7 - 7 6 - 7 6 - 2.0 7 - 1.6 7 7 6 - - 2.0 7 - 1.6 7 9 - - 3.0 - 1.1 1.6 7 10 - 3.0 - - 1.0 1.1 <td< td=""><td>90.5 90.2 79.6</td><td>ASPHALT : 75 mi FILL : SM-GRAVELLY S clay, brown, mois' Gravel : 36%, Sar Clay : 4% NATIVE : SP-GP-SAND and trace clay, brown, Gravel : 46%, Sar : 4% SHALE-BEDROC Borehole terminat auger refusal END OF BOREHO NOTE : - End of Borehole - Monitoring well i - bgs donates 'bel</td><td>AD SURFACE m SAND, some silt, trace t, compact nd : 44%, Silt : 16%, d GRAVEL, trace silt, moist, dense nd : 41%, Silt : 9%, Clay K, weathered, grey ted due to spoon and DLE : at 1.60 m bgs nstalled at 1.60 m bgs low ground surface'</td><td></td><td>SS1 SS2 SS3</td><td>58 87 100</td><td><u>5</u> 5 </td><td>6-10-8-5 8-21-29-27 50/ 75mm</td><td>18 50 50/ 75mm</td><td></td><td>0 60 70 80 9</td><td></td></td<>	90.5 90.2 79.6	ASPHALT : 75 mi FILL : SM-GRAVELLY S clay, brown, mois' Gravel : 36%, Sar Clay : 4% NATIVE : SP-GP-SAND and trace clay, brown, Gravel : 46%, Sar : 4% SHALE-BEDROC Borehole terminat auger refusal END OF BOREHO NOTE : - End of Borehole - Monitoring well i - bgs donates 'bel	AD SURFACE m SAND, some silt, trace t, compact nd : 44%, Silt : 16%, d GRAVEL, trace silt, moist, dense nd : 41%, Silt : 9%, Clay K, weathered, grey ted due to spoon and DLE : at 1.60 m bgs nstalled at 1.60 m bgs low ground surface'		SS1 SS2 SS3	58 87 100	<u>5</u> 5 	6-10-8-5 8-21-29-27 50/ 75mm	18 50 50/ 75mm		0 60 70 80 9	
File: N:	19												



Clie	Client: Project, Site:	Infrastructure Ontario		Lab No.:	G-21-01				
Proj	ect, Site:	Proposed Parking Structure Children's Hospital of Eastern Onta 401 Smyth Road, Ottawa, Ontario	rio Campus	_ _Project No.:	11205379-80				
	Borehole No.:	B1-21		Sample No.:	SS2				
	Depth:	0.7-1.0m		Enclosure:					
	100					0			
	90					10			
	80 -					20			
	70								
5	70								
Passin	60					Ketai 04			
rcent I	50					50 DE			
Pe	40					Be			
	30					60			
						70			
	20					80			
	10					90			
	0.001	0.01 0.1	Diameter (mm)		10	100			
		Clay & Silt	Sand		Gravel				
		Particle-Size L	nits as per USCS (AST	1 D-2487)					
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)				
	s	and and Gravel, some Silt, trace Clay	39	39	22				
		Clay-size particles (<0.002 mm):		I	7 %				
Ren	narks:								
Perf	ormed by:	Z. Mathurin		Date:	February 10, 2021				
Veri	fied by:	E. Bennett		Date:	February 17, 2021				



Clie	Client: Project, Site:	Infrastructure Ontario		Lab No.:	G-21-01	
Pro	ject, Site:	Proposed Parking Structure Children's Hospital of Eastern Onta 401 Smyth Road, Ottawa, Ontario	rio Campus	Project No.:	11205379-80	
	Borehole No.:	B3-21		Sample No.:	SS2	
	Depth:	0.7-1.0		Enclosure:	-	
Percent Passing	100 90 80 70 60 50 40 30 20 10					0 10 20 30 40 50 50 50 60 70 80 80
	0.001	0.01 0.1 Di	ameter (mm)		10	100 100
			Sand		Gravel	
		Clay & Silt	ine Mediu	um Coarse	Fine Coarse	-
		Particle-Size Limit	s as per USCS (ASTM	I D-2487)		
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)	
	San	ld, some Gravel, some Silt, some Clay	19	50	31	
		Clay-size particles (<0.002 mm):			14 %	
Ren	narks:					
Per	formed by:	Z. Mathurin		Date:	February 10, 202	21
Veri	ified by:	E. Bennett		Date:	February 17, 202	21



Clie	Client: Project, Site:	Infrastructure	Ontario		Lab No.:	G-21-01	
Pro	ject, Site:	Proposed Par Children's Ho 401 Smyth Ro	king Structure spital of Eastern Ontario oad, Ottawa, Ontario	o Campus	Project No.:	11205379-80	
	Borehole N	o.:	BH1-21		Sample No.:	Grab	
	Depth:		0.1-0.3m		Enclosure:	_	
	100						•••• 0
	90					1 1	10
	80						20
	70						30
ssing	60						tained 40
ent Pa	50						but Ke
Perce	50						Berce 00
	40						60
	30						70
	30						
	20						80
	10						90
	0.001	0.01	0.1 Dian	neter (mm)		10	100 <u>100</u>
		Clav & Silt		Sand		Gravel	
		,	Fin Particle-Size Limits	as per USCS (ASTM	ım Coarse I D-2487)	Fine Coarse	•
		Soil Desci	ription	Gravel (%)	Sand (%)	Clay & Silt (%	%)
		Gravel and Sand, trac	ce Silt, trace Clay	48	41	11	
						3 %	
Rei	narks: -						
Per	formed by:	·	Z. Mathurin		Date:	February 10, 2	2021
Ver	ified by:		E. Bennett		Date:	February 17, 2	2021



Clie	ent:	Infrastructure Ontario		Lab No.:	G-21-01					
Pro	ject, Site:	Proposed Parking Structure Children's Hospital of Easte 401 Smyth Road, Ottawa, 0	e ern Ontario Campus Ontario	Project No.:	11205379-80					
	Borehole No	.: BH2-21		Sample No.:	Grab					
	Depth:	0.1-0.3r	n	Enclosure:	-					
	100					● 				
	90					10				
	80					20				
	70					30				
	70									
assinç	60					40 ketaine				
cent F	50					50 E				
Per	10					Per la				
	40 30 20					60				
						70				
						80				
	10					90				
	0.001	0.01	0.1	1	10	100 <u>100</u>				
			Diameter (mm)	- 4	2 and					
		Clay & Silt	Fine	Medium Coarse	Fine Coarse					
		Particle-	Size Limits as per USCS	(ASTM D-2487)						
		Soil Description	Gravel	%) Sand (%)	Clay & Silt (%)				
		Sand and Gravel, trace Silt, trace Cla	ay 42	50	8					
					2 %					
Rei	marks:									
Ber	formed bur	7 1.4-4	ourio	Data	Echruczy 40, 00)21				
Per	ionnea by:	2. Mat								
Ver	ified by:	E. Ber	nnett	Date:	February 17, 2021					



Cli	Client: Project, Site:	Infrastructure Ontario			Lab No.:	G-21-01				
Pro	oject, Site:	Proposed Parking Structur Children's Hospital of Eas 401 Smyth Road, Ottawa,	re tern Ontario Ontario	Campus	Project No.:	11205379-80				
	Borehole No.:	BH2-2	21		Sample No.:	SS1				
	Depth:	0.5-0.8	ßm		Enclosure:	-				
	100						••••			
	90						10			
	80						20			
	70						30			
sing	60						40 III			
t Pas							t Reta			
ercen	50						50 U			
<u>م</u>	40						60 L			
	30						70			
	20						80			
	10						90			
	0 001	0.01	0.1	1		10				
	0.001	0.01	Diame	ter (mm)		10				
		Clay & Silt	Fine	Sand	im Coarse	Gravel	<u> </u>			
		Particle	-Size Limits a	s per USCS (ASTM	D-2487)		·			
		Soil Description		Gravel (%)	Sand (%)	Clay & Silt (%)			
	S	and, some Silt, some Gravel, trace	Clay	15	61	24				
		Clay-size particles (<0.002 mm	ı):			6 %				
Re	marks:									
Pe	formed by:	Z. Ma	thurin		Date: February 10, 2021					
Ve	ified by:	E. Be	ennett		Date:	Date: February 17, 2021				



Clie	Client: Project, Site:	Infrastructure	e Ontario		Lab No.:	G-21-01	
Pro	ject, Site:	Proposed Pa Children's Ho 401 Smyth R	rking Structure ospital of Eastern Ontario oad, Ottawa, Ontario	o Campus	Project No.:	11205379-80	
	Borehole N	o.:	BH4-21		Sample No.:	SS1	
	Depth:		0.2-0.5m		Enclosure:	-	
	100					· · · · · · · · · · · · · · · · · · ·	••••
	90						10
	30						10
	80						20
	70						30
_	10						σ
assing	60						etaine 40
ent P	50						50 B
Perc							Perc Perc
	40						60
	30						70
	20						80
	10						90
	-						
	0.001	0.01	0.1 Dian	neter (mm)		10	100 <u>100</u>
		Clay & Silt		Sand		Gravel	
			Fin Particle-Size Limits	as per USCS (ASTM	um Coarse I D-2487)	Fine Coars	e
		Soil Desc	ription	Gravel (%)	Sand (%)	Clay & Silt (%)
		Gravel and Sand, tra	ice Silt, trace Clay	46	41	13	
						3 %	
Rer	narks:						
Per	formed by	:	Z. Mathurin		Date:	February 10,	2021
Ver	ified by:		E. Bennett		Date:	February 17,	2021



Clie	Client: Project, Site:	Infrastructure Ontario		Lab No.:	G-21-01			
Pro	ject, Site:	Proposed Parking Structure Children's Hospital of Eastern (401 Smyth Road, Ottawa, Onta	ntario Campus io	- Project No.:	11205379-80			
	Borehole No.:	MW5-21		Sample No.:	Grab			
	Depth:	0.1-0.3m		Enclosure:	-			
	100					0		
	90					10		
	80					20		
	70					30		
ssing	60			/		40 tained		
nt Pa	50					ut Kei		
Perce	50					50 Berce		
	40					60		
	20							
	30					70		
						80		
	10							
	10					90		
	0.001	0.01 0	1		10	100 <u>100</u>		
			Diameter (mm)					
		Clay & Silt	Sand	um Coorco	Gravel			
		Particle-Size	imits as per USCS (ASTM	/I D-2487)				
				I				
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)			
	G	ravel and Sand, some Silt, trace Clay	43	41	16			
		Clay-size particles (<0.002 mm):			3 %			
		· · · · /						
Ren	narks:							
Per	formed by:	Z. Mathuri		Date: February 10, 2021				
Ver	fied by:	E. Bennet		Date: February 17, 2021				



Clie	Client: Project, Site:	Infrastructure Ontario		Lab No.:	G-21-01	
Pro	ject, Site:	Proposed Parking Structure Children's Hospital of Eastern Onta 401 Smyth Road, Ottawa, Ontario	rio Campus	Project No.:	11205379-80	
	Borehole No.:	MW5-21		Sample No.:	SS1	
	Depth:	0.5-0.8m		Enclosure:	-	
	·					
	100				· · · · · · · · · · · · · · · · · · ·	••••••••••••••••••••••••••••••••••••••
	90					10
	80					20
	_					
	70					30
ssing	60					40 stained
ent Pa	50					ant Re
Perce	50					Berce 02
	40					60
	30					70
	20					80
	10					90
	0.001	0.01 0.1	iameter (mm)		10	100 <u>100</u>
			Sand		Gravel	
		Cidy & Silt	Fine Mediu	um Coarse	Fine Coarse	_
		Falticle-Size Lini		1 D-2487)		
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)	
	(Gravelly Sand, some Silt, trace Clay	23	49	28	
		Clay-size particles (<0.002 mm):			8 %	
Rer	narks:					
Per	formed by:	Z. Mathurin		Date:	February 10, 202	21
Ver	ified by:	E. Bennett		Date:	February 17, 202	21



Clie	Client: Project, Site:	Infrastructure Ontario		Lab No.:	G-21-01	
Pro	ject, Site:	Proposed Parking Structure Children's Hospital of Eastern Ont 401 Smyth Road, Ottawa, Ontario	ario Campus	Project No.:	11205379-80	
	Borehole No.:	MW6-21		Sample No.:	SS2	
	Depth:	0.8-1.1m		Enclosure:	-	
	100					
	90					10
	80					20
	70					30
bu	60					l do u
Passi	60					Retai
ercent	50					50 tu
Pe	40					– – 60
	40					
	30					70
	20					80
	10					90
	0 001		1		10	100
	0.001		Diameter (mm)			7
		Clay & Silt	Sand Fine Mediu	um Coarse	Gravel	
		Particle-Size Lim	its as per USCS (ASTN	1 D-2487)		
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)	
	(Gravelly, Sand, some Silt, trace Clay	32	45	23	
		Clay-size particles (<0.002 mm):			7 %	
Rei	narks:					
Per	formed by:	Z. Mathurin		Date:	February 10, 202	1
Ver	ified by:	E. Bennett		Date:	February 17, 202	1



Clie	Client: Project, Site:	Infrastructure Ontario		Lab No.:	G-21-01				
Pro	ject, Site:	Proposed Parking Structure Children's Hospital of Easte 401 Smyth Road, Ottawa, 0	e ern Ontario Campus Ontario	Project No.:	11205379-80				
	Borehole No.:	MW8-21		Sample No.:	Grab				
	Depth:	0.0-0.3n	ו	Enclosure:	-				
	90					0			
	80					20			
Percent Passing	70 60 50 40 30 20					30 40 50 50 60 60 70 80			
	10					90			
	0.001	0.01	0.1 Diameter (mm)	1	10	100 100			
			Sand		Gravel				
		Particle-	Fine Mee Size Limits as per USCS (AS ⁻	dium Coarse	Fine Coarse				
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)				
		Sandy Gravel, trace Silt, trace Clay	61	33	6				
					2 %				
Rei	narks:								
Per	formed by:	Z. Math	nurin	Date:	February 10, 202	21			
Ver	ified by:	E. Ben	nett	Date: February 17, 2021					



Clie	ent:							Infra	astri	uct	ure	e 0	ntar	io						La	bl	No.:						(G-2	2-0	3				
Pro	ject,	Site:						С	hild	ren	h H	os	oital							_Pr	oje	ctl	No.	.:	_			1	120)537	79				
	Bore	hole No.:							BH	10-	22								_	Sa	mp	le N	lo.:		_				SS	S-1					
	Dept	h:							0 - 0	0,61	1 m	1							-	En	clo	sure	e:		-					-					
Percent Passing	100 - 90 - 80 - 70 - 50 - 30 - 20 - 10 -																										/	/						0 10 20 30 40 50 60 70 80 90	Percent Retained
	0.00	01	-	•	0	.01						0.	1 Di	ame	ter (r	nm)			1							1	0						100	100 0)
	Г										-						Sa	nd										Grav	/el			7			
				Cla	ay 8	Silt							F	ine				N	/ledi	um		Co	ars	e		Fir	ne		C	Coar	se				
	L								Part	icle	-Si	ze l	Limit	s a	s pe	r U	SCS	(A	STN	1 D-2	487)													
				s	Soil	Des	crip	tion							(Gra	vel	(%)		s	and	(%))				Cla	у&	Silt	t (%)			
		Gravel and Sand, with Some Silt and Traces of Cl									Clay	'			43					43	3						1	4							
	-		Clay	Silt- -size	siz pa	e par	ticle s (%	es (% 6) (<	%): :	02 I	mm	ו):			11																				
_			-		_		•							_																_		_		_	
Rei	More information is available upon request.																																		
Per	formed by:J. Lalonde)							Date: August 15, 2022																	
Ver	ified	ried by: J. Lalonde																	I	Dat	e:		-		A	ugı	ust 2	24,	202	22					



Client:	: Infrastructure Onta											Onta	irio						La	b N	o.:			_	G-22-03							_			
Project, S	Site:							(Child	dre	n ŀ	los	pita	l						_Pro	oje	ct N	lo.:		_			1	120	537	79			_	
Boreh Depth	nole N n:	lo.:							Bł 0 -	-111 0,6	-22 61 r	2 m							-	Sar End	mpl ⁱ	e N ure	o.: :		-				SS	6-1 -				_	
100 90 80 70 60 50 40 30 20 10 0.00	1	Grave	e info	CI CI CI Silt	lay So and stio	0.01 8. Si il Do , wit ze p artic	lit escri h Tra partic cles avail	iptio aces (%)	Par n (%) :: (<0.(rticl	le-S		Limi	Diamo	eter (mm)	Sa Scs Scs	Ind N (%)		um 1 D-24		Coa	arse (%)			1	0	Grav	/el y & 1	coars					Percent Retained
																															_				
Performe	formed by: J. Lalonde									e							_	D	ate	:		_		A	ugı	ust ′	11,	202	2		_				
Verified I	rmed by: J. Lalonde													Date: August 24, 2022									_												



Clie	nt:				Inf	rastru	ıctu	ire	Ontario					La	b No	.:			G-2	2-03	1	
Proj	ect, Site:				(Childr	ren	Ho	spital					_Pr	oject	No.:			1120)537	9	 _
	Borehole No. Depth:	:				BH1 0 - 0	12-2),61	22 m					_	Sa En	mple closui	No.: re:			S	S-1 -		 _
Percent Passing	100 90 80 70 60 50 40 30 20 10 0 0.001 Grav	vel, with \$	Clay Somo	0.01 0.01	criptio and Si ticles (%) (Parti n (<0.00			0.1 Diam Fin e Limits Clay		mm)	San CS (////////////////////////////////////	d Med ASTI	ium M D-2		oarse	10	Gra	ay &	Coars Silt	••• ••• ••• ••• ••• ••• ••• ••• ••• ••	D 10 20 30 40 50 50 50 60 70 80 90 100
Rem	Remarks: More information is available upon request.																			 		
Perf	erformed by:														Da	te:		Aug	gust	11, 2	2022	_
Veri	fied by:	d by: Date: August 24, 2022										 _										



Clie	nt:	_				Int	frastr	uctu	ıre	Onta	irio				Li	ab N	lo.:		_			G-2	2-03	3			
Pro	ect, Site	: _					Child	ren	Ho	ospita	l				_P	roje	ct N	o.:			1	120)537	9			
	Borehole Depth:	No.:					BH 0 - (14-2 0,61	22 m					_	Sa Er	ampl nclos	e No sure:) .:	_			SS	S-1 -				
Percent Passing	100 90 80 90 70 60 50 90 40 90 30 90 20 90 10 90 0 0.001	Sandy	Grav		0.01		Part		-Siz	0.1 C	Diamet	ter (m	San CS (rel ('	d Med ASTI		2487	Coa) and	rse (%)		10	Gra	vel c ay &	Coars	-•••		- 0 - 10 - 20 - 30 - 40 - 50 - 60 - 70 - 80 - 90 - 100	0 Percent Retained
		Cla	iy-siz	e p	article	s (%)	(<0.0	02 n	nm)):																	
Ren	narks:	More in	nform	atic	on is av	ailable	e upor	n rec	que	st.																<u> </u>	
Per	ormed b	y:					J.	Lal	on (de						0	Date	:	_		Aug	ust ′	11, 2	2022	2		
Ver	fied by: Date: August 24, 2022																										



Cli	ent:							Infr	asti	ruct	tur	e C	Onta	ario)						La	bľ	No.			_				G-2	22-0)3				
Pro	oject,	, Site:						C	Chilo	lrer	n H	los	pita	al							_Pro	oje	ect	No.	.:	-			1	120)53	79				
	Bore	ehole No.:							Bŀ	115	-22	2									Sa	mp	le N	lo.:						S	S-1					
	Dep	oth:							0 -	0,6	1 n	n									En	clo	sure	e :		_					-					
	100 -								1 1				1											1				1			-•	┍─₱	┍┍┥	•	- 0	
	90 -																																		- 10	
	80 -																										Ι								- 20	
	70 -									1																Ϊ									- 30	ъ
Passing	60 -			+						+							-								/								+		- 40	Retaine
ercent	50 -			+						+														/									+		- 50	ercent
	40 -									_																									- 60	
	30 -																																\parallel		- 70	
	20 -																																		- 80	
	20												-	~	\square																				00	
	10 -		-	•	+	┿┥╸		-	-																								Ħ		- 90	
	0 - 0.0	001				0.01						0	0.1	Dian	nete	r (mi	m)			1							1	0						10	- 100 00	0
																		Sa	nd										Gra	vel						
				CI	ay	& SIII			Pa	rticl	e-S	Size	Lin	Fir nits	ne as	per	US	cs	M (As	ledi STI	ium VI D-2	487	Co 7)	ars	e		Fi	ne		(Соа	rse	_			
	l																																			
				;	Soi	il De:	scrip	otio	n							G	rav	/el ((%))		S	and	I (%	5)				Cla	ay &	Sil	t (%	»)			
		Sand a	nd Gr	avel,	wit	th So	me	Silt a	and	Tra	ces	s of	Cla	ау			4	40					4	7						1	13					
			Clav	Silt	-siz e pa	ze pa artic	articl	les (%) (%) : <0.0	002	mi	m):													1	0										
			,		-			, (,			1																					
Re	mark	ά s: <u>Μα</u>	ore inf	orma	tio	n is a	ivaila	able	upo	n re	equ	iest	t.																							
Pe	Performed by: J. Lalonde															_	I	Dat	e:		-		A	۱ug	ust	11,	202	22								
Ve	rified	l by:	y: Date: August 24, 2022																																	



Clie	ent:								In	fras	truc	ctur	re	On	tario)						Lab) N	o.:						G	-22	-03	i			_
Pro	ject	, Site:	:							Chi	ldre	en H	Ю	spi	tal							Pro	jec	t N	lo.:					11	205	5379	9			_
	Bor	ehole	No.:							В	3H10	6-22	2									San	nple	e No	o.:						SS	-1				_
	Dep	oth:		_						0	- 0,	61 ı	m									Enc	losi	ure:							-	·				_
	100																												_		•	•	-••	┝╋	∩ °	
	90																												-				+		- 1(0
	80																											/					+		- 20	0
5	70	-																									/						+		- 30	0 7
nt Passin	60																																+		- 40	nt Retaine
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	30																					/													7'	0
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						So	oil	Desc	riptio	on							G	rav	el ('	%)			Sa	nd	(%))			C	Clay	& S	Silt ((%)			
			Sand	and	Gra	ave	el, v	vith T	races	s of S	Silt	and	IC	lay				4	4					45							11					
				Clay	Sil siz/	t-s :e p	ize par	e part ticles	icles s (%)	(%) (<0	: .002	2 m	m)):												9 2										_
Rei	narl	(S:	Mor	e inf	orm	atio	on	is ava	ailable	e up	on r	equ	ues	st.		·																				
																																				-
Per	Performed by: J. Lalonde													_	D	ate	:		_		Αι	Igu	st 1	1, 2	202	2		-								
Ver	ified	l by:				~	2	\leq	k		X	2	Date: August 24, 2022									_														



Cli	ent:		-						Infr	rast	ruc	tur	e C	Dnt	ario)						Lat	o N	lo.:						G	-22	-03				-
Pro	ject,	, Site:	_						C	Chilo	drei	n H	los	spit	al							Pro	ojeo	ct N	lo.:					11	205	379	Э			-
	Bor	ehole No	o.:							Bł	H17	-22	2									San	nple	e No	D.:						SS-	·1				
	Dep	oth:	-							0 -	0,6	1 n	n									Enc	los	ure							-					-
Percent Passing	100 - 90 - 80 - 70 - 50 - 30 - 20 - 10 -																																		0 - 10 - 20 - 30 - 40 - 50 - 60 - 70 - 80 - 90	Percent Retained
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					s	Soi	Des	scrij	ptio	n							G	irav	/el	(%)			Sa	and	(%)				C	lay	& S	Silt (%)			
			Sandy	Gra	avel	, w	ith T	race	es of	f Silt	t and	d C	Clay	/				ł	52					39							9					
				S	ilt-	siz	e pa	rtic	les ((%)	:															7	-									
			Cla	ay-s	ize	ра	rtic	es ((%) (<0.(002	mr	m):													2										
Re	mark	(s: <u>)</u>	More in	nfori	mat	ion	ı is a	vaila	able	upo	on re	equ	iest	t.																						- -
Pe	forn	ned by:	_	,	_			\		J	نہا .ا	alo	nd	е								_	D)ate):				A	ugu	st 9	9, 20)22	!		-
Ve	ified	l by:		($\overline{\langle}$	~		k	\geq	2	5	}										-	D	Date):				Au	igus	st 2	4, 2	022	2		-



Cli	ent:		_						Infr	rastr	uct	ure	e 0	ntari	0					_L	ab N	lo.:					C	G-22	2-03				
Pro	ject	, Site:	_						C	Child	lrer	ι H	osp	oital						_P	roje	ct N	lo.:				11	1205	5379	9			
	Bor	ehole No).:							BH	118-	-22							_	S	ampl	e No	o.:					SS	-1				
	Dep	oth:	_							0 -	0,6 ⁻	1 m	1						_	E	nclos	sure						-					
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					s	Soil	l Des	scrij	ptio	n						Gı	rave	əl (%	6)		Si	and	(%)			C	Clay	/& \$	Silt ((%)			
		:	Sandy	Gra	ivel	, w	ith T	race	es of	f Silt	anc	I CI	lay				7	3				21						6					
				S	ilt-	siz	e pa	rtic	les ((%) :														5									
			Cla	ıy-si	ize	ра	rticl	les ((%) (<0.0	02	mn	n):									1											
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Pei	forn	ned by:			/					J	. Lą	lor	nde	,	Date: August 9, 2022																		
Vei	ifiec	l by:	_		$\langle $	\geq	\leq		0	00	2	Ł					Date: August 24, 2022																



Clie	ent:							Inf	rast	ruc	tur	e C	Dnt	aric)						Lab	N	o.:						G	-22	-03				_
Pro	ject, S	ite:						(Chil	drei	n F	los	spit	al							Pro	jec	t N	o.:					112	205	379	}			-
	Boreho	ole No.:							Bl	H19)-22	2									Sam	nple	e No) .:					:	SS-	2				_
	Depth:	:							0,76	- 1	,37	' m									Enc	losı	ure:							-					-
Percent Passing	100 90 80 70 60 50 40 30 20 10 0.001					0.01							.1			r (mn	n)			1							10							- 0 - 10 - 20 - 30 - 40 - 50 - 60 - 70 - 80 - 90 - 10	000
				Cla	ay 8	& Silt	:								_		;	San	d	al !						_		Gr	avel			_]		
									Ра	rticl	e-S	Size	Lin	nits	as	per	USC	CS (AST	αiu ΓM I	m D-24	87)	Joa	rse		-	ine				arse	• 			
				ę	Soi	l Des	scrij	ptio	n							Gı	rav	el ('	%)			Sa	nd	(%)				с	lay	& S	ilt (%)			Ī
	Sand and Gravel, with Some						Silt	and	Tra	ces	s of	Cl	ay			3	81					46							23						
			Clay	Silt- -size	-siz e pa	e pa articl	irtic les (les (%)	(%) (<0.(: 002	mr	m):													16 7										
Rer	narks:	Mor	e info	ormat	tior	n is a	ivaila	able	upc	on re	equ	iest	t.																						-
Per	Performed by: J. Lalonde							е								-	D	ate	:				Au	gus	st 1	7, 2	022	2		_					
Verified by: Date:										Au	gus	st 24	4, 2	022	2		_																		



Client:				Infrastructu	ire Ontario			Lab No.:	G-	22-03					
Project,	, Site:			Children	Hospital			Project No.:	112	205379					
Bore Dep	ehole No.: oth:			MW20- 0,00 - 0,6	22 61 m			Sample No.: Enclosure:		SS-1 -					
100 - 90 - 80 - 70 - Buissiud 60 - 40 - 30 - 20 - 10 - 0.0			0.01	Particle	0.1 Diam	eter (mm)	1 Sand Media SCS (ASTM vel (%)	um Coarse D-2487)	10 Clay 4	Coarse	0 10 20 30 40 50 60 70 80 90 100	0 Percent Retained			
		Silt-	size partio	cles (%) :	- ,			16							
		Clay-size	particles	(%) (<0.002 n	nm):			4							
Remark	ks: Mor	e informat	tion is avai	lable upon rec	quest.										
Perform	ned by:		\frown	J. La	onde			Date:	Augus	st 9, 2022					
Verified	l by:		\geq	bæ	<u> </u>			Date:	Date: August 24, 2022						



Client:		_						Inf	rast	ruc	ctur	re (Onta	ario	1						Lab	No	o.:						G-	22-	03				
Project,	Site:	_						(Chil	dre	n ł	Hos	spita	al							Proj	jec	t N	o.:					112	205	379	I			
Borel Depti	hole No. h:	.: _							M\ 0,61	W2	0-2 ,22	2 2 m							_		Sam Encl	iple osu	No ire:	.:					ç	SS-2	2				
100	• •			Cla		0.01			Pa	rtic			D.1	Diam	neter as p	(mm			d		n D-248			rse		F	10	Gr			arse			0 - 10 - 20 - 30 - 40 - 50 - 60 - 70 - 80 - 90 - 10 - 00	00 (((((((((((((((((((
l r				s	Soil	Des	scrip	otio	n						Γ	Gra	ave	el (%	%)			Sar	nd (%)				с	lay a	& S	ilt (9	%)			Ī
	(Grave	l an S ay-s	id S ilt-:	siz pa	d, Tr e pa rticl	rticles (s of les (%) (Silt (%)	and : 002	d C	Gravel (%) Sand (%) Clay & Sitt (%) Clay 46 41 13 9 9 4 4																							
Remarks	s: <u>N</u>	lore ir	nforr	mat	ion	is a	vaila	able	upc	on r	eqı	les	t.							Dete: August 0, 2022															
Perform Verified	ed by: by:	-		(<	\sim			X				e						Date: August 9, 2022 Date: August 23, 2022																



Liquid Limit, Plastic Limit and Plasticity Index of Soils (ASTM D4318)

Client:			nfrastructure Or	tario	Lab no.:	G-20-01
Project/Site:		CHEO P	roposed New Pa	rking Garage	Project no.:	11205379-80
Borehole no.:	BH3		Sample no.:	SS2	Depth:	0.6-1.2m
Soil description:					Date sampled:	18-Jan-21
Apparatus:	Hand	Crank	Balance no.:	1	Porcelain bowl no.:	1
Liquid limit device no.:		1	Oven no.:	1	Spatula no.:	1
Sieve no.:		1	Glass plate no.:	1		
r	Liquid Limit (LL):		Soil Preparation:		
	Test No. 1	Test No. 2	Test No. 3	☑ Cohesive <4	25 μm 🛛	Dry preparation
Number of blows	30	25	20	Cohesive >4	25 μm ☑	Wet preparation
	Water Conte	nt:	1	Non-cohesiv	/e	
Tare no.	S39	S11	S32		Results	
Wet soil+tare, g	32.39	33.80	32.26	38.0		
Dry soil+tare, g	29.85	30.89	29.53	36.0		
Mass of water, g	2.54	2.91	2.73	(%)		
Tare, g	21.63	21.65	21.60	te 34.0		
Mass of soil, g	8.22	9.24	7.93			
Water content %	30.9%	31.5%	34.4%	32.0 × 32.0		
Plastic Limit (Pl	L) - Water Cont	ent:		30.0		
Tare no.	S37	S18		30.0		
Wet soil+tare, g	28.17	28.51		28.0		
Dry soil+tare, g	27.24	27.53		15 17	19 21 23 25 27 Nb Blows	29 31 33 35
Mass of water, g	0.93	0.98			Soil Plasticity Chart	
Tare, g	21.98	22.23		70	LL 5D	
Mass of soil, g	5.26	5.30		60 Low plasticity	High plastic	sity lav
Water content %	17.7%	18.5%				
Average water content %	18.	1%		ä 40		
Natural Wate	r Content (W ⁿ)	:		면 	CL.	
Tare no.	G				bilty	(MH) and (CH)
Wet soil+tare, g	445.80			20	High infor - Inpr	i compressibility ganic silt nanic clav
Dry soil+tare, g	393.10				- Medium co norganic si	mpressibility It
Mass of water, g	52.70			0 10 20) 30 40 50 60	70 80 90 100
Tare, g	0.00				Liquid Limit LL	
Mass of soil, g	393.10			Liquid Limit (LL) Plastic Limi	it (PL) Plasticity Index (PI)	Natural Water Content W ⁿ
Water content %	13.4%			32 18	14	13
Remarks:						
Performed by:		Ali E	lhaddad	Date:	Feb	ruary 12, 2021
Verified by:		E.I	Bennett	Date:	Feb	ruary 18, 2021



Liquid Limit, Plastic Limit and Plasticity Index of Soils (ASTM D4318)

Client:			Infrastructure On	tario		Lab no.:	G-22-03
Project/Site:			Children Hospi	tal		Project no.:	11205379
Borehole no.:	BH13-22		Sample no.:		SS-2	Depth:	0,61 - 1,22 m
Soil Description:						Date sampled:	
Apparatus:	Hand	Crank	Balance no.:	8033	3031049	Porcelain bowl no.:	1
Liquid limit device no.:		1	Oven no.:	B23	3-04645	Spatula no.:	1
Sieve no.:	015	5690	Glass plate no.:		1	-	
	Liquid Limit	(LL):	•	Soil Preparati	on:		
	Test No. 1	Test No. 2	Test No. 3		Cohesive <425 µr	n 🗸	Dry preparation
Number of blows					Cohesive >425 µr	n 🗆	Wet preparation
	Water Conte	ent:			Non-cohesive		
Tare no.						Results	
Wet soil+tare, g				2.0			
Dry soil+tare, g							
Mass of water, g				(%)			
Tare, g				ntent			
Mass of soil, g				er Co			
Water content %				Wat			
Plastic Limit (Pl	L) - Water Cont	ent:					
Tare no.							
Wet soil+tare, g				0.0			
Dry soil+tare, g					15 17	19 21 Nb Blows	23 25 27
Mass of water, g					Soil	Plasticity Chart ASTI	M D2487
Tare, g				70		LL 50	
Mass of soil, g				60 —	Lean clay (CL)	Ent alov	
Water content %				ы 50 —			
Average water content %				ä 40 –		Organic cla	ay OH)
Natural Wate	r Content (W ⁿ):			Orga	anic clay OL	
Tare no.				is blastic	Ity clay (CL (ML)	T EI	astic silt MH
Wet soil+tare, g				20		Org	anic silt OH
Dry soil+tare, g				10		Organic silt	
Mass of water, g					10 20 3		70 80 90 100
Tare, g						Liquid Limit LL	
Mass of soil, g			1	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Natural Water Content W ⁿ
Water content %					. ,		
Remarks:	Non-Plastic S	Sample		-			
Performed by:	\frown	<u> </u>	atanda		Date:	Sont	amber 13, 2022
. chomed by		J. L				<u>Gepte</u>	
Verified by:	\rightarrow	<u>va</u>	<u> </u>		Date:	Septe	ember 13, 2022
Laboratory Location:	179 Col	onnade Rd. S	uite 400, Ottawa	, Ontario			



Liquid Limit, Plastic Limit and Plasticity Index of Soils (ASTM D4318)

Client:			Infrastructure On	tario		Lab no.:	G-22-03
Project/Site:			Children Hospi	ital		Project no.:	11205379
Borehole no.:	BH19-22		Sample no.:		SS-2	Depth:	0,76 - 1,37 m
Soil Description:						Date sampled:	
Apparatus:	Hand	Crank	Balance no.:	8033	3031049	Porcelain bowl no.:	1
Liquid limit device no.:		1	Oven no.:	B23	3-04645	Spatula no.:	1
Sieve no.:	015	5690	Glass plate no.:		1		
	Liquid Limit	(LL):		Soil Preparati	on:		
	Test No. 1	Test No. 2	Test No. 3		Cohesive <425 µr	n 🗸	Dry preparation
Number of blows					Cohesive >425 µr	n 🗆	Wet preparation
	Water Conte	ent:			Non-cohesive		
Tare no.						Results	
Wet soil+tare, g				2.0			
Dry soil+tare, g							
Mass of water, g				(%)			
Tare, g				ntent			
Mass of soil, g				er Co			
Water content %				Wat			
Plastic Limit (Pl	L) - Water Cont	ent:		-			
Tare no.							
Wet soil+tare, g				0.0			
Dry soil+tare, g					15 17	19 21 Nb Blows	23 25 27
Mass of water, g					Soil	Plasticity Chart AST	M D2487
Tare, g				70		LL 50	
Mass of soil, g				60 -	Lean clay (c)	Eat clay	
Water content %				ы т 50 —			
Average water content %				ä 40 –		Organic cla	ay OH)
Natural Wate	r Content (W ⁿ):			Orga	nic clay OL	
Tare no.				Si Si	Ity clay (CL (ML)-	T EI	astic silt (MH)
Wet soil+tare, g				20		Org	anic silt OH
Dry soil+tare, g				10		Organic silt	
Mass of water, g				0	10 20 3		70 80 90 100
Tare, g				-		Liquid Limit LL	
Mass of soil, g				Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Natural Water Content W ⁿ
Water content %					. ,		
Remarks:	Non-Plastic S	Sample		-			
Performed by	\frown		alonde		Date:	Sent	ember 13, 2022
Vorified by:	$\overline{\langle}$		∇		Data	Cont	amber 13, 2022
vernied by:	$\overline{}$	<u>S</u>	5		Date:	5ept6	5111JEI 13, 2U22
Laboratory Location:	179 Col	onnade Rd. S	uite 400, Ottawa	, Ontario			


Liquid Limit, Plastic Limit and Plasticity Index of Soils (ASTM D4318)

Client:			Infrastructure On	tario		Lab no.:	G-22-03	
Project/Site:			Children Hospi	tal		Project no.:	11205379	
Borehole no.:	MW20-22	2	Sample no.:		SS-2	Depth:	0,61 - 1,22 m	
Soil Description:						Date sampled:		
Apparatus:	Hand	Crank	Balance no.:	8033	3031049	Porcelain bowl no.:	1	
Liquid limit device no.:		1	Oven no.:	B23	-04645	Spatula no.:	1	
Sieve no.:	015	5690	Glass plate no.:		1			
	Liquid Limit	(LL):	-	Soil Preparati	on:			
	Test No. 1	Test No. 2	Test No. 3		Cohesive <425 µr	n 🖉	Dry preparation	
Number of blows					Cohesive >425 µr	n 🗆	Wet preparation	
	Water Conte	ent:			Non-cohesive			
Tare no.						Results		
Wet soil+tare, g				2.0				
Dry soil+tare, g								
Mass of water, g				(%)				
Tare, g				ntent (
Mass of soil, g				er Co				
Water content %				Wat				
Plastic Limit (Pl	L) - Water Cont	ent:		1				
Tare no.								
Wet soil+tare, g				0.0	ļ			
Dry soil+tare, g					15 17	19 21 Nb Blows	23 25 27	
Mass of water, g			-		Soil	Plasticity Chart AST	M D2487	
Tare, g				70		LL 50		
Mass of soil, g				60 -	Lean clay (C)	Eat alou (
Water content %				Ч 		Fat day		
Average water content %				≝ ₩ 40		Organic cla	ау он	
Natural Wate	r Content (W ⁿ):			Orga	Inic clay OL		
Tare no.				lis Plastic	ty clay (CL) (ML)	7 Eli	astic silt MH	
Wet soil+tare, g				20		Org.	anic silt OH	
Dry soil+tare, g			1	10		Organic silt		
Mass of water, g				0	10 20 3		70 80 90 100	
Tare, g					10 20 0	Liquid Limit LL		
Mass of soil, g			1	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Natural Water Content W ⁿ	
Water content %								
Remarks:	Non-Plastic S	Sample	·	·		·		
Performed by		<u> </u>	alomie		Date:	Sente	ember 13, 2022	
Varified by:			<u> </u>		Data		ambor 12, 2022	
vermed by:	$-\epsilon$	100	5		Date:	Septe	emper 13, 2022	
Laboratory Location:	179 Col	onnade Rd. S	uite 400, Ottawa	, Ontario				



Moisture Content of Soils (ASTM D 2216)

Client:	Infrastru	ucture Ontar	io		Lab No.:		G-2	2-03
Project/Site:	Childro	en's Hospita	I		Project No.	:	11205379	
Apparatus Used for Testing	Oven No.:	B23-(04645	Scale No.:	80330	31049		
BH No.:					BH10-22	BH10-22	BH11-22	BH11-22
Sample No.:					SS1	SS2	SS1	SS2
Depth:					0,0-2,0	2,0-3,3	0,0-2,0	2,0-4,0
Container no.					32	25	28	4
Mass of container + wet soil (g)					70.50	70.00	75.70	72.80
Mass of container + dry soil (g)					68.90	66.80	74.40	68.10
Mass of container (g)					14.80	14.60	14.70	14.80
Mass of dry soil (g)					54.1	52.2	59.7	53.3
Mass of water (g)					1.6	3.2	1.3	4.7
Moisture content (%)					3.0	6.1	2.2	8.8
BH No.:	BH12-22	BH12-22	BH14-22	BH14-22	BH15-22	BH15-22	BH16-22	BH16-22
Sample No.:	SS1	SS2	SS1	SS2	SS1	SS2	SS1	SS2
Depth:	0,0-2,0	2,0-4,0	0,0-2,0	2,0-4,0	0,0-2,0	2,0-3,5	0.0-2,0	2,0-4,0
Container no.	42	15	14	35	18	9	13	23
Mass of container + wet soil (g)	83.70	74.40	79.40	74.00	61.00	62.70	78.90	58.40
Mass of container + dry soil (g)	81.60	71.80	77.90	71.10	59.50	60.20	77.00	55.40
Mass of container (g)	14.60	14.80	14.80	15.10	15.00	14.70	14.80	15.10
Mass of dry soil (g)	67.0	57.0	63.1	56.0	44.5	45.5	62.2	40.3
Mass of water (g)	2.1	2.6	1.5	2.9	1.5	2.5	1.9	3.0
Moisture content (%)	3.1	4.6	2.4	5.2	3.4	5.5	3.1	7.4
Remarks:								
Performed By:		antiste		Date:		luly 2	7 2022	
Verified by :				Date:		August	3, 2022	



Moisture Content of Soils (ASTM D 2216)

Client:	Infrastru	ucture Ontar	io		Lab No.:	G-22-03
Project/Site:	Childro	en's Hospital	I		Project No.:	11205379
Apparatus Used for Testing	Oven No.:	Oven No.: B23-04645		Scale No.:	8033031049)
MW No.:	BH9-22	BH9-22				
Sample No.:	SS1	SS2				
Depth:	0,0-2,0	2,5-4,5				
Container no.	9	32				
Mass of container + wet soil (g)	59.30	55.60				
Mass of container + dry soil (g)	56.90	54.30				
Mass of container (g)	14.70	14.90				
Mass of dry soil (g)	42.2	39.4				
Mass of water (g)	2.4	1.3				
Moisture content (%)	5.7	3.3				
MW No.:	BH14	BH20-22	BH20-22			
Sample No.:	SS3B	SS1	SS2			
Depth:	2,4-5,1	0,5-2,5	2,5-4,5			
Container no.	23	16	28			
Mass of container + wet soil (g)	54.30	48.50	58.60			
Mass of container + dry soil (g)	52.60	47.00	56.40			
Mass of container (g)	15.00	14.90	14.90			
Mass of dry soil (g)	37.6	32.1	41.5			
Mass of water (g)	1.7	1.5	2.2			
Moisture content (%)	4.5	4.7	5.3			
Remarks:						
Performed By:	Performed By: J A Baptiste					July 27, 2022
Verified by :	bae	<u> X</u>		Date:	A	ugust 3, 2022

GHD

Standard Proctor Test (ASTM D698)

Client :	Iı	frastructure Ontario		Lab No :	A-22-02
Project/Site	e:	Children Hospital	Pro	oject No :	11205379
2400 -					
2300 •				Zero A	Air Voids Line
2200 . (س ا					
Density (kg					
2000 •					
1900 •					
1800 • 0.	0 2.0	4.0 Wa	6.0 8.0 ater Content (%)	10.0	12.0 14.0
Prepared Sa ASTM D698	mple: Dry Test Method: A	0 Moist 0 B 4.75 mm 9.50	x 0 C x 0 mm 19.0 mr	Assumed G	B _s : 2.70 mmer: Manual
Soil Type: Material:		Crushed Sto	one		
Sample Iden Sample Loca Aggregate S	ee. tification: ation: upplier / Pit Name:	BH11-22 In Place	2	Max. Dry Density: Optimum Moistur % Retained on 19	e: <u>2254 kg/m³</u> e. <u>6.4 %</u> 9.0 mm: <u>2.8 %</u>
Sample Date Sampled By:		D. Ash		Corrected Dry De Corrected Opt. Mo	nsity: 2254 kg/m ³ oist.: 6.4 %
Remarks :					
Performed	by:	J. Lalonde		Date : So	eptember 2, 2022
Verified by	··	bæl		Date : Se	eptember 6, 2022

GHD

Standard Proctor Test (ASTM D698)



Standard Proctor Test (ASTM D698)









Client : Project :	Infrastructure Ontario Proposed Parking Structure Children's Hospital of Eastern Ontario Campus 401 Smyth Road, Ottawa, Ontario						Project N° : <u>11205379-80</u> Sample N° : <u>MW3-21 RC2</u> Depth : <u>6.4-6.55m</u> Sampling Date : <u>January 14-15 / 2021</u>		
Testing Appara	<u>tus Used :</u>			1		Caliper Nº1			
		-	Technical Data			View of Specimen			
Diameter :		63	63	63	Average 63.0	(mm)	В	efore Test :	
Length :		74	74	74	74.0	(mm)		21:0"	
Straightness (0.5mm ma	aximum) (S1) :	0.2	0.2	0.2	0.2	(mm)			
Flatness (25µm maximu	ım) (FP2) :	Ok	Ok	Ok	Ok	_		MW3-21	
Parallelism (0.25 ° maxi	mum) (FP2) :	0.1	0.1	0.1	0.15	(°)		RCZ	
Mass : Density : Moisture Conditions :	6′	12	_(g) Volume: 	23 53 ry	90676 _ (kg/m ³)	(mm ³)		DI'Y'	
Loading Rate (0.5 to ²	1.0 MPa / sec) :		0.	6	(MPa/sec)		A	fter Test :	
Type of Fracture :			3	3	_(\\\\ a/300)				
Test Duration (2-15 M	linutes) :		4	ŀ	(minutes)				
Maximum Applied Loa	ad :		335	.49	☑ kN	lbs			
Compressive Stre	ngth :		107	7.6	(MPa)			A CEL	
								4	
Remarks :									
Analysed by :			Ali Elhaddad				Date :	February 8, 2021	
Verified by :			E. Bennett			_	Date :	February 17, 2021	



Client :	Infrastructure C	Intario				Proj	ect N° :	11205379-80
Project :	Proposed Parki	ng Structure	Ontonia Commun			Sam	ple N° : [MW3-21 RC3
	401 Smyth Roa	id, Ottawa, Onta	ario			Depth : <u>7.92-8.07m</u>		
						Sampling	g Date : <u>.</u>	January 14-15 / 2021
Testing Appara	tus Used :			Loading	device N°	1		Caliper Nº1
			Technical Data			View of Specimen		
Diameter :		63	63	63	Average	(mm)	E	Before Test :
Length :		78	78	78	78.0	(mm)		T26' 0'
Straightness (0.5mm ma	aximum) (S1) :	0.3	0.2	0.3	0.3	(mm)		MLJZ
Flatness (25µm maximu	ım) (FP2) :	Ok	Ok	Ok	Ok			RC3
Parallelism (0.25 ° maxi	mum) (FP2) :	0.1	0.15	0.1	0.15	(°)		1
Mass :	65	6.6	(g) Volume:	24	3145	(mm ³)		
Density :			27	00	(kg/m ³)			
Moisture Conditions :			Di	ry	_(0)			100
Loading Rate (0.5 to 1	1.0 MPa / sec) :		0.	6	(MPa/sec)		/	After Test :
Type of Fracture :			3	3	_(\\\\ 0/000)			
Test Duration (2-15 M	linutes) :		3.	5	- (minutes)			
Maximum Applied Loa	ad :		260	.09	_ `	lbs		1100 27
Compressive Stre	ngth :		83	.4	(MPa)			
								· · · · ·
Remarks :								
Analysed by :			Ali Elhaddad			_	Date :	February 8, 2021
Verified by :			E. Bennett				Date :	February 17, 2021



Client : Project :	Infrastructure O Proposed Parki Children's Hosp 401 Smyth Roa	ontario ng Structure bital of Eastern (d. Ottawa. Onta	Ontario Campus ario			_ Project N _ Sample N _ Depth Sampling Date	° : <u>11205379-80</u> ° : <u>MW3-21 RC5</u> n : <u>9.63-9.75m</u> e : January 14-15 / <u>2021</u>
Testing Appara	tus Used :			Loading o	levice Nº	1	Caliper Nº1
		٢	Fechnical Data		View of Specimen		
					Average	_	Before Test :
Diameter :		63	63	63	63.0	(mm)	J 31-20
Length :		91	91	91	91.0	(mm)	
Straightness (0.5mm ma	aximum) (S1) :	0.2	0.3	0.3	0.3	(mm)	MW 3-21
Flatness (25µm maximu	m) (FP2) :	Ok	Ok	Ok	Ok	_	RC5
Parallelism (0.25 ° maxir	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)	
Mass :	73	6.3	(g) Volume:	28	3669	_(mm ³)	
Density :			259	96	_(kg/m ³)		
Moisture Conditions :			Dr	У			
Loading Rate (0.5 to 1	.0 MPa / sec) :		0.	6	(MPa/sec)		After Test :
Type of Fracture :			3		-		
Test Duration (2-15 M	inutes) :		4		(minutes)		
Maximum Applied Loa	ıd :		251	.57	☑ kN 🔲 I	bs	· A CAR AN
Compressive Strer	ngth :		80	.7	(MPa)		
Remarks :							
Analysed by :			Ali Elhaddad			Date	e: February 8, 2021
Verified by :			E. Bennett			_ Date	E February 17, 2021



Client :	Infrastructure C	Intario				Proj	ject Nº : <u>1</u>	1205379-80	
Project :	Proposed Parki	ng Structure	Ontario Campus			Sam	ple N° : <u>N</u>	1W6-21 RC2	
	401 Smyth Roa	d, Ottawa, Onta	ario			_	Depth : <u>4.75-4.88m</u>		
						Sampling	g Date : J	anuary 14-15 / 2021	
Testing Appara	itus Used :			1		Caliper Nº1			
			Fechnical Data			View of Specimen			
Diamotor :		63	63	63	Average		В	efore Test :	
		00	05	00	00.0				
Length :		86	86	86	86.0	(mm)			
Straightness (0.5mm m	aximum) (S1) :	0.3	0.3	0.3	0.3	(mm)		×13.01	
Flatness (25µm maximu	ım) (FP2) :	Ok	Ok	Ok	Ok			MW6-21	
Parallelism (0.25 ° maxi	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)		RC2	
Mass :	70	24	(a) Volume:	26	8083	(mm ³)			
Density :			_(g) 101011101 261		(kq/m^3)	()		15'7" -16'	
Moisture Conditions :			D	ry	_(,				
Loading Rate (0.5 to	1.0 MPa / sec) :		0.	6			Α	fter Test :	
Type of Fracture :				3					
Test Duration (2-15 M	linutes) :		4	1	- (minutes)				
Maximum Applied Loa	ad :		294	4.5	_ (lbs			
Compressive Stre	ngth :		94	5	(MPa)			TO ALLO	
Remarks :									
Analysed by :			Ali Elhaddad			_	Date : _	February 8, 2021	
Verified by :			E. Bennett				Date : _	February 17, 2021	



Client :	Infrastructure C	Intario				Proje	ect N° : 11205379-80		
Project :	Proposed Parki	ng Structure				Samp	Sample N° : MW6-21 RC4		
	Children's Hosp 401 Smvth Roa	oital of Eastern (d. Ottawa <u>, Onta</u>	Ontario Campus Irio	,		C	Depth : 6.65-6.81m		
						Sampling	Sampling Date : January 14-15 / 2021		
Testing Appara	tus Used :			Loading c	levice Nº	1	Caliper Nº1		
		1	echnical Data				View of Specimen		
					Average		Before Test :		
Diameter :		63	63	63	63.0	(mm)			
Length :		82	82	82	82.0	(mm)	alor a la l		
Straightness (0.5mm ma	aximum) (S1) :	0.3	0.3	0.3	0.3	(mm)			
Flatness (25µm maximu	m) (FP2) :	Ok	Ok	Ok	Ok		- 70'1		
Parallelism (0.25 ° maxir	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)	MW6-21		
Mass :	67	6.1	(g) Volume:	25	5614	_(mm ³)			
Density :			264	45	_(kg/m ³)		22' 4"		
Moisture Conditions :			Dr	ГУ	_				
Loading Rate (0.5 to 1	1.0 MPa / sec) :		0.	6	(MPa/sec)		After Test :		
Type of Fracture :			3	\$	_				
Test Duration (2-15 M	inutes) :		4	ŀ	(minutes)				
Maximum Applied Loa	ad :		311	.75	☑ kN 🔲 I	bs			
Compressive Strer	ngth :		100).0	(MPa)				
Remarks :									
Analysed by :			Ali Elhaddad				Date : February 8, 2021		
Verified by :			E. Bennett			_	Date : February 17, 2021		



Client :	Infrastructure C	Intario				Proje	ect N°:	11205379-80
Project :	Proposed Parki	ng Structure	Ontonio Oc			Samp	ole N° :	MW6-21 RC5
	401 Smyth Roa	nd, Ottawa, Onta	Ontario Campus ario	5		Depth : 7.98-8.10m		
						Sampling	Date :	January 14-15 / 2021
Testing Appara	tus Used :			Loading o	levice Nº	1		Caliper Nº1
	Technical Data							View of Specimen
.					Average	٦, 、		Before Test :
Diameter :		63	63	63	63.0	(mm) —		
Length :		93	93	93	93.0	(mm)		26'2
Straightness (0.5mm m	aximum) (S1) :	0.3	0.3	0.3	0.3	(mm)		
Flatness (25µm maximu	ım) (FP2) :	Ok	Ok	Ok	Ok			MW6-1
Parallelism (0.25 ° maxi	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)		RCS
Mass :	77	6.4	(a) Volume:	28	9904	(mm ³)		
Density :			26	78	(kg/m ³)	_, ,		
Moisture Conditions :			Di	ry				
Loading Rate (0.5 to	1.0 MPa / sec) :		0.	6	- (MPa/sec)			After Test :
Type of Fracture :				ł	_ ()			
Test Duration (2-15 M	linutes) :		5	5	(minutes)			
Maximum Applied Loa	ad :		318	3.7	✓ kN	lbs		
Compressive Stre	ngth :		102	2.2	(MPa)			
								A Star
								Contract of the
Remarks :								
Analysed by :			Ali Elhaddad			_	Date :	February 8, 2021
Verified by :			E. Bennett			_	Date :	February 17, 2021

Client :	Infrastructure C	Ontario				Project N ^o	: 11205379
Project :	Children's Hosp	pital				Sample N ^o	: MW9-22 r.1
						Depth	: 3,20 - 3,31 m
						Sampling Date	:
Testing Appar	ratus Used :			Loadin	g device N°_9	9130	Caliper N°_1
		-	Fechnical Data				View of Specimen
			1		Average	7	Before Test :
Diameter :		63.09	63.09	63.21	63.13	(mm)	
Length :		109.59	108.25	109.84	109.23	(mm)	
Straightness (0.5mm n	naximum) (S1) :	0.4	0.4	0.4	0.4	(mm)	
Flatness (25µm maxim	um) (FP2) :	Ok	Ok	Ok	Ok	(μm)	
Parallelism (0.25 ° max	kimum) (FP2) :	0.15	0.20	0.20	0.18	(°)	After Test :
Mass :	91	3.8	_(g) Volume:	34	1893	(mm ³)	
Density :			267	73	(kg/m ³)		
Moisture Conditions	:		Dr	У	_		The second s
Loading Rate (0.5 to	o 1.0 MPa / sec) :		0.5	58	(MPa/sec)		
Type of Fracture :			Multiple F	Fracture	_		
Test Duration (2-15	Minutes) :		12	3	(seconds)		
Maximum Applied Lo	oad :		222.	.24	_ _(kN)		
Compressive Stre	ength :		71.	.0	_(MPa)		
Remarks :							
Analysed by :	J. Lalonde	\frown				Date	8/18/2022
Verified by :	X	<u>ref</u>				Date	: 8/25/2022

Client :	Infrastructure C	Ontario				Project N ^o	: 11205379	
Project :	Children's Hosp	pital				Sample N ^o	: MW9-22 r.2	
						Depth	: 4,04 - 4,14 m	
						Sampling Date	:	
Testing Appara	atus Used :			Loadin	g device N°_	9130	Caliper Nº _1	
			Technical Data				View of Specimen	
			1		Average		Before Test :	
Diameter :		63.18	63.20	63.00	63.13	(mm)		
Length :		96.49	95.36	95.29	95.71	(mm)		
Straightness (0.5mm m	aximum) (S1) :	0.1	0.1	0.2	0.1	(mm)		
Flatness (25µm maximu	ım) (FP2) :	Ok	Ok	Ok	Ok	(μm)		
Parallelism (0.25 ° maxi	imum) (FP2) :	0.05	0.10	0.10	0.08	(°)	After Test :	
Mass :	79	8.9	_(g) Volume: _	29	9563	(mm ³)		
Density :			266	57	(kg/m ³)			
Moisture Conditions			Dry	y	_		A Distance	
Loading Rate (0.5 to	1.0 MPa / sec) :		0.4	8	(MPa/sec)			
Type of Fracture :			Multiple F	racture	_			
Test Duration (2-15 N	/linutes) :		118	8	(seconds)			
Maximum Applied Lo	ad :		175.	67	_(kN)			
Compressive Stre	ngth :		56.	1	_(MPa)			
Remarks :								
Analysed by :	J. Lalonde	$\overline{}$	<u> </u>			Date	: 8/18/2022	
Verified by :	\rightarrow	bae	<u> </u>			Date	: 8/25/2022	
				Lamuam / 0004				

Client :	Infrastructure C	Ontario				Project N ^o	: 11205379	
Project :	Children's Hosp	pital				Sample N ^o	: BH13-22 r.3	
						Depth	: <u>3,61 - 3,71 m</u>	
						Sampling Date	:	
Testing Appara	ntus Used :			Loadir	ng device N°_	9130	Caliper Nº_1	
			Technical Data				View of Specimen	
					Average	7	Before Test :	
Diameter :		63.00	63.09	63.15	63.08	(mm)		
Length :		100.38	100.26	100.38	100.34	(mm)	C. I.	
Straightness (0.5mm ma	aximum) (S1) :	0.2	0.3	0.2	0.2	(mm)		
Flatness (25µm maximu	m) (FP2) :	Ok	Ok	Ok	Ok	(μm)		
Parallelism (0.25 ° maxi	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)	After Test :	
Mass :	83	1.5	_(g) Volume: _	31	3579	_(mm ³)		
Density :			265	52	_(kg/m ³)			
Moisture Conditions :			Dr	у	_		and the	
Loading Rate (0.5 to	1.0 MPa / sec) :		0.3	3	(MPa/sec)			
Type of Fracture :			Multiple F	Fracture	_			
Test Duration (2-15 M	linutes) :		10	8	(seconds)			
Maximum Applied Lo	ad :		112.	31	_(kN)			
Compressive Stre	ngth :		35.	9	_(MPa)			
Remarks :								
Analysed by :	J. Latonde					Date	: 8/18/2022	
Verified by :		<u>oæ</u> j				Date	: 8/25/2022	

Client :	Infrastructure	Ontario				Project N°	: 11205379
Project :	Children's Ho	spital				Sample N ^o :	: MW23-22 r.2
						Depth :	: <u>6,93 - 7,03 m</u>
						Sampling Date	:
Testing Appara	atus Used :			Loadin	g device N°_9	9130	Caliper N ^o _1
			Technical Data				View of Specimen
			1		Average	7	Before Test :
Diameter :		63.11	63.04	63.06	63.07	(mm)	
Length :		100.32	100.27	100.42	100.34	(mm)	
Straightness (0.5mm m	aximum) (S1) :	0.2	0.1	0.2	0.2	(mm)	
Flatness (25µm maximu	um) (FP2) :	Ok	Ok	Ok	Ok	(μm)	
Parallelism (0.25 ° maxi	imum) (FP2) :	0.10	0.15	0.15	0.13	(°)	After Test :
Mass :	8	45.1	_(g) Volume: _	31	3469	_(mm ³)	
Density :			269	96	_(kg/m ³)		
Moisture Conditions :	:		Dr	y			
Loading Rate (0.5 to	1.0 MPa / sec) :	:	0.3	9	(MPa/sec)		
Type of Fracture :			Multiple F	racture	_		
Test Duration (2-15 N	/linutes) :		12	1	(seconds)		
Maximum Applied Lo	oad :		146.	16	_(kN)		
Compressive Stre	ngth :		46.	8	_(MPa)		
Remarks :							
Analysed by :	J. Lalonde	<u>_</u>				Date	8/18/2022
Verified by :	$ \geq) $	bael				Date :	8/25/2022
		\bigcirc		Lanuar (0004			



CLIENT NAME: GHD LIMITED 455 Phillip St WATERLOO, ON N2V1C2 (519) 884-0510 ATTENTION TO: Jennifer Balkwill PROJECT: 11205379-RPT8 AGAT WORK ORDER: 21Z712939 SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer DATE REPORTED: Mar 01, 2021 PAGES (INCLUDING COVER): 5 VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

<u>*Notes</u> VERSION 1:Excluding Sulphide in Soil analysis

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may
 incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of
 merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines
 contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories (V1)

Iember of: Association of Professional Engineers and Geoscientists of Alberta	
(APEGA)	
Western Enviro-Agricultural Laboratory Association (WEALA)	

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Page 1 of 5



Certificate of Analysis

AGAT WORK ORDER: 21Z712939 PROJECT: 11205379-RPT8 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

ATTENTION TO: Jennifer Balkwill

SAMPLED BY:

Corrosivity Package

DATE RECEIVED: 2021-02-19	9						ſ	DATE REPORTE	D: 2021-03-0	01	
						11205379-BH4-		11205379-MW6-	11205379-BH7-		11205379-MW8-
		SAMPLE DESCRIPTION				21-SS2-0.7-1.0m		21-SS2-0.7-1.0m	21-SS2-0.7-1.0m		21-SS2-1.1-1.3m
					SAMPLE TYPE:	Soil		Soil	Soil		Soil
					DATE SAMPLED:	2021-01-18		2021-01-13	2021-01-19		2021-01-18
Parameter	Unit	G/S	RDL	Date Prepared	Date Analyzed	2122180	RDL	2122181	2122182	RDL	2122183
Chloride (2:1)	µg/g		4	2021-02-24	2021-02-24	440	2	253	69	4	562
Sulphate (2:1)	µg/g		4	2021-02-24	2021-02-24	439	2	395	6	4	195
pH (2:1)	pH Units		NA	2021-02-24	2021-02-24	6.35	NA	7.4	7.23	NA	7.95
Electrical Conductivity (2:1)	mS/cm		0.005	2021-02-24	2021-02-24	1.21	0.005	0.936	0.163	0.005	1.40
Resistivity (2:1) (Calculated)	ohm.cm		1	2021-02-24	2021-02-24	826	1	1070	6130	1	714
Redox Potential 1	mV		NA	2021-02-23	2021-02-23	428	NA	389	429	NA	377
Redox Potential 2	mV		NA	2021-02-23	2021-02-23	446	NA	394	416	NA	379
Redox Potential 3	mV		NA	2021-02-23	2021-02-23	432	NA	397	414	NA	377

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2122180-2122183 EC, pH, Chloride and Sulphate were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil). Resistivity is a calculated parameter.

Redox potential measured on as received sample. Due to the potential for rapid change in sample equilibrium chemistry with exposure to oxidative/reduction conditions laboratory results may differ from field measured results.

Redox potential measurement in soil is quite variable and non reproducible due in part, to the general heterogeneity of a given soil. It is also related to the introduction of increased oxygen into the sample after extraction. The interpretation of soil redox potential should be considered in terms of its general range rather than as an absolute measurement.

Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)



Certified By:



5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11205379-RPT8

SAMPLING SITE:

AGAT WORK ORDER: 21Z712939 ATTENTION TO: Jennifer Balkwill

SAMPLED BY:

Soil Analysis

						-									
RPT Date: Mar 01, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acceptable Limits		Recoverv	Acceptable Limits		Recovery	Acceptable Limits	
		Ia					value	Lower	Upper		Lower	Upper		Lower	Upper
Corrosivity Package															
Chloride (2:1)	2129123		42	42	0.0%	< 2	93%	70%	130%	102%	80%	120%	104%	70%	130%
Sulphate (2:1)	2129123		3	3	NA	< 2	100%	70%	130%	107%	80%	120%	106%	70%	130%
pH (2:1)	2122180 2	2122180	6.35	6.38	0.5%	NA	100%	90%	110%						
Electrical Conductivity (2:1)	2122180 2	2122180	1.21	1.40	14.6%	< 0.005	105%	80%	120%						
Redox Potential 1	1						100%	90%	110%						

Comments: NA signifies Not Applicable.

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.





AGAT QUALITY ASSURANCE REPORT (V1)

Page 3 of 5

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.



5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11205379-RPT8

AGAT WORK ORDER: 21Z712939

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE.		SAWFLED DT.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis		I	
Chloride (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Electrical Conductivity (2:1)	INOR-93-6036	modified from MSA PART 3, CH 14 and SM 2510 B	EC METER
Resistivity (2:1) (Calculated)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION
Redox Potential 1	INOR-93-6066	modified G200-09, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 2	INOR-93-6066	modified G200-09, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 3	INOR-93-6066	modified G200-09, SM 2580 B	REDOX POTENTIAL ELECTRODE

hain of Custody Reco	rd If this is a l	Orinking Water s	ample, plea	se use Drink	lng Water Chain of (ustody Form (po	table water o	onsum	ed by h	umans)			Arr	ival Ter	nperatu	ires: Réle	18	014	5.0	4.8	2
Report Information: Company: GHD Limited Contact: Jennifer Balkwill Address: 455 Phillip St Unit 10 Phone: 519-340-4286	Dort Information: pany: GHD Limited act: Jennifer Balkwill ess: 455 Phillip St Unit 100A, Waterloo, ON, N2L 3X2				sulatory Requi check all applicable boxes) gulation 153/04 ble	rements:	R406	Sev S	ver Us anitary Regio v. Wat	e 7 🗌 S 201 er Qual	torm - ity		Cu: No Tur Reg Rus	stody S tes: naro gular sh TA1	und 1 TAT (M	ict: fime lost Analy	(TAT) (s Apply)	Requii	□No ed: Busines:	s Days	
Reports to be sent to: 1. Email: 2. Email:	om			Soil Te	exture (Check One) Coarse Fine	_ ссме	[Obj	ective er Indicat	s (PWQ	O)	_	1	3 E Da	Busines lys R Date F	s Require	2 B Day ed (Rush	usiness s Surcharg	Es May A	lext Bus)ay .pply):	ines
Project Information: Project: 11205379-RPT8 Site Location:				Red -	this submission cord of Site Con	for a ditlon? NO	Re Cer	eport tifica Yes	Gulo ate o	deline f Ana D	on Iysis No		F	*7A For 'Sau	Please T is exc me Day'	provic lusive analy	de prior n of weeke vsls, plea	otification ands and a	for rush tatutory ot your A	TAT holidays	S MI
Please note: If quotation numb Invoice Information: Company: Contact: Address: Email:	er is not provided, ellent will	be billed full price for a	s ⊠ No □	B GW O P S SD SW	Biota Ground Water Oil Paint Soil Sediment Surface Water	211Q	ield Filtered - Metals, Hg, CrVI, D	& Inorganics	CrVI, 🗆 Hg, 🗆 HWSB	1-F4 PHCs F4G if required TYEs TNo	Be T Arochar		Disposal Characterization ICLP: Ma⊨⊡ VDCs □ ABNs □ BrahP □ PCB	Soils SPLP Rainwater Leach	Soils Characterization Package MS Metals, BTEX, F1-F4	C/SAR	rosivity				Concentration (
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comm Special In	ents/ structions	Y/N	Metals	Metals	BTEX, F Analyze	PAHS Total D	VOC	Landfill TC2 P. D	Excess	Excess pH, ICP	Salt - E(Cor				
11205379- BH4-21 – SS2 - 0.7-1.0m	2021-01-18	PM AM PM AM	1	Soil	Corrosivity									_							
.1205379- MW6-21 - SS2 - 0.7-1.0m 1205379- BH7-21 - SS2 - 0.7-1.0m 11205379- MW8-21 - SS2 - 1.1-1.3m	2021-01-13 2021-01-19 2021-01-18	AM PM AM PM AM PM	1 1 1	Soil Soil Soil	Corrosivity Corrosivity Corrosivity																+
		AM PM AM PM AM FM											- + 1								
splas Ralinquished By (Print Name and Sign)	<u>م</u>		Time		Samples Received By (Print	t Natura and Sign)	left	Ð	C	-S	51 [3-()	9	Time	, Sh	<u>റ</u>)		Page	of		



CERTIFICATE OF ANALYSIS

Work Order	: WT2214174	Page	÷ 1 of 5
Client	: GHD Limited	Laboratory	: Waterloo - Environmental
Contact	: Rick Hawthorne	Account Manager	: Rick Hawthorne
Address	: 455 Phillip Street Waterloo ON Canada N2L 3X2	Address	60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	:	Telephone	: +1 519 886 6910
Project	: 11205379-100	Date Samples Received	: 14-Sep-2022 10:30
PO	: 735-004287	Date Analysis Commenced	: 15-Sep-2022
C-O-C number	:	Issue Date	: 16-Sep-2022 16:35
Sampler	: CLIENT		•
Site	:		
Quote number	11205379-100-SSOW 735-004287		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Greg Pokocky	Supervisor - Inorganic	Inorganics, Waterloo, Ontario
Joseph Scharbach		Centralized Prep, Waterloo, Ontario
Walt Kippenhuck	Team Leader - Inorganics	Inorganics, Waterloo, Ontario



General Comments

for analysis.

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance. Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances LOR: Limit of Reporting (detection limit).

Unit	Description
%	percent
µS/cm	Microsiemens per centimetre
mg/kg	milligrams per kilogram
mV	millivolts
ohm cm	ohm centimetre (resistivity)
pH units	pH units

>: greater than.

<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
FR5	As per applicable reference method(s), soil:water ratio for Fixed Ratio Leach was modified to 1:5 due to high soil organic content



Analytical Results

WT2214174-001

Sub-Matrix:Soil

(Matrix: Soil/Solid)

Client sample ID: 11205379- BH16-SS2 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		2650 FR5,	10.0	μS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		10.4	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		436	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		8.26	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		380	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	1300	5.0	mg/kg	E236.Cl	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	498	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

WT2214174-002

Sub-Matrix:Soil (Matrix: Soil/Solid) Client sample ID: 11205379- BH20-SS2 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis	QCLot
							Date	
Physical Tests								
conductivity (1:2 leachate)		422 FR5,	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		10.1	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		419	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		7.78	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		2370	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	19.6	5.0	mg/kg	E236.Cl	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	173	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

WT2214174-003 Sub-Matrix:**Soil**

(Matrix: Soil/Solid)

Client sample ID: 11205379- MW17-SS1 Client sampling date / time: 14-Sep-2022

Analyte CAS Number Result LOR Unit Method Prep Date	Analysis	QCLot
	Date	
Physical Tests		
conductivity (1:2 leachate) 231 ^{FB5} 10.0 µS/cm E100-L 16-Sep-2022	16-Sep-2022	648051
moisture <0.25 0.25 % E144 -	15-Sep-2022	648057
oxidation-reduction potential [ORP] 419 0.10 mV E125 15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq) 8.26 0.10 pH units E108A 15-Sep-2022	15-Sep-2022	648054
resistivity 4330 100 ohm.cm EC100R -	16-Sep-2022	-
Leachable Anions & Nutrients		
chloride, soluble ion content 16887-00-6 8.6 5.0 mg/kg E236.Cl 16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content 14808-79-8 54 20 mg/kg E236.SO4 16-Sep-2022	16-Sep-2022	648052

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

WT2214174-004

Sub-Matrix:Soil (Matrix: Soil/Solid) Client sample ID: 11205379- MW18-SS3 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		1310 FR5,	10.0	μS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		8.45	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		398	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		8.16	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		760	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	734	5.0	mg/kg	E236.Cl	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	215	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

WT2214174-005

Sub-Matrix:Soil

(Matrix:	Soil/Solid)
----------	-------------

Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis	QCLot
							Date	
Physical Tests								
conductivity (1:2 leachate)		2540 FR5,	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		6.72	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		393	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		7.28	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		390	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	1420	5.0	mg/kg	E236.CI	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	219	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

WT2214174-006

Sub Matrix Sail	
Sub-Matrix.Soli	

(Matrix: Soil/Solid)

Client sample ID: 11205379- BH16-22-SS2

Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		430 FR5,	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		6.03	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		354	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		7.85	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		2320	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	83.2	5.0	mg/kg	E236.CI	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	116	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

WT2214174-007

Sub-Matrix:Soil

(Matrix: Soil/Solid)

Client sample ID: 11205379- BH17-22-SS2 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis	QCLot
							Date	
Physical Tests								
conductivity (1:2 leachate)		622 FR5,	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		7.97	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		350	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		7.47	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		1610	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	609	5.0	mg/kg	E236.Cl	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	94	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

WT2214174-008

Sub-Matrix:Soil

(Matrix: Soil/Solid)

Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis	QCLot
							Date	
Physical Tests								
conductivity (1:2 leachate)		5560 FR5.	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		6.16	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		371	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		6.81	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		180	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	611	5.0	mg/kg	E236.CI	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	6500	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

Please refer to the General Comments section for an explanation of any qualifiers detected.



QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: WT2214174	Page	: 1 of 11
Client	: GHD Limited	Laboratory	: Waterloo - Environmental
Contact	: Rick Hawthorne	Account Manager	: Rick Hawthorne
Address	: 455 Phillip Street	Address	: 60 Northland Road, Unit 1
	Waterloo ON Canada N2L 3X2		Waterloo, Ontario Canada N2V 2B8
Telephone	:	Telephone	: +1 519 886 6910
Project	: 11205379-100	Date Samples Received	: 14-Sep-2022 10:30
PO	: 735-004287	Issue Date	: 16-Sep-2022 16:35
C-O-C number	:		
Sampler	: CLIENT		
Site	:		
Quote number	: 11205379-100-SSOW 735-004287		
No. of samples received	:8		
No. of samples analysed	:8		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summarizes.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers Outliers : Quality Control Samples

- <u>No</u> Method Blank value outliers occur.
- <u>No</u> Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- <u>No</u> Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

• No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

• No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

• No Quality Control Sample Frequency Outliers occur.

RIGHT SOLUTIONS | RIGHT PARTNER



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: Soil/Solid					Ev	aluation: × =	Holding time exce	edance ; ง	= Withir	Holding Tim
Analyte Group	Method	Sampling Date	Ext	Extraction / Preparation				Analys		
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Leachable Anions & Nutrients : Water Extractable Chloride b	ly IC									
Glass soil jar/Teflon lined cap										
11205379- BH11-22-SS2	E236.CI	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Chloride b	y IC									
Glass soil jar/Teflon lined cap										
11205379- BH16-22-SS2	E236.CI	14-Sep-2022	16-Sep-2022	30	3 days	✓	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Chloride b	y IC									
Glass soil jar/Teflon lined cap										
11205379- BH16-SS2	E236.CI	14-Sep-2022	16-Sep-2022	30	3 days	✓	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Chloride b	y IC									
Glass soil jar/Teflon lined cap										
11205379- BH17-22-SS2	E236.CI	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Chloride b	y IC									
Glass soil jar/Teflon lined cap										
11205379- BH20-SS2	E236.CI	14-Sep-2022	16-Sep-2022	30	3 days	✓	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Chloride b	y IC									
Glass soil jar/Teflon lined cap										
11205379- MW09-22	E236.CI	14-Sep-2022	16-Sep-2022	30	3 days	✓	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Chloride b	y IC									
Glass soil jar/Teflon lined cap										
11205379- MW17-SS1	E236.Cl	14-Sep-2022	16-Sep-2022	30	3 days	✓	16-Sep-2022	28 days	0 days	1
				davs						

Page	: 4 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	11205379-100



Matrix: Soil/Solid					Ev	aluation: × =	- Holding time exce	edance ; 🔹	= Within	Holding Time
Analyte Group	Method	Sampling Date	Ex	traction / Pi	reparation			Analysis		
Container / Client Sample ID(s)			Preparation	Holdin	q Times	Eval	Analysis Date	Holding	a Times	Eval
			Date	Rec	Actual			Rec	Actual	
Leachable Anions & Nutrients : Water Extractable Chloride by IC										
Glass soil jar/Teflon lined cap										
11205379- MW18-SS3	E236.Cl	14-Sep-2022	16-Sep-2022	30	3 days	✓	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- BH11-22-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	✓	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- BH16-22-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	~	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- BH16-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- BH17-22-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	~	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- BH20-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	✓	16-Sep-2022	28 days	0 days	1
				days						
Leachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- MW09-22	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	~	16-Sep-2022	28 days	0 days	~
				days						
Leachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- MW17-SS1	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	~	16-Sep-2022	28 days	0 days	~
				days						
Leachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- MW18-SS3	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	✓	16-Sep-2022	28 days	0 days	✓
				days						

Page	: 5 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	11205379-100



Matrix: Soil/Solid					Ev	aluation: × =	Holding time exce	edance ; 🔹	= Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	traction / Pi	reparation			Analysis		
Container / Client Sample ID(s)			Preparation Date	Holdin Rec	g Times Actual	Eval	Analysis Date	Holding Rec	g Times Actual	Eval
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- BH11-22-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	v
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- BH16-22-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	1
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)								1		
Glass soil jar/Teflon lined cap 11205379- BH16-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	¥
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- BH17-22-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	4
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- BH20-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	V
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)					11					
Glass soil jar/Teflon lined cap 11205379- MW09-22	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	4
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- MW17-SS1	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	1
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- MW18-SS3	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	¥
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 11205379- BH11-22-SS2	E144	14-Sep-2022					15-Sep-2022			

Page	: 6 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	11205379-100



Matrix: Soil/Solid					Ev	aluation: × =	Holding time excee	edance ; •	= Within	Holding Time
Analyte Group	Method	Sampling Date	Ex	Extraction / Preparation				Analys		
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
11205379- BH16-22-SS2	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
11205379- BH16-SS2	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
11205379- BH17-22-SS2	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
11205379- BH20-SS2	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
11205379- MW09-22	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
11205379- MW17-SS1	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
11205379- MW18-SS3	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap										
11205379- BH11-22-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	~
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap										
11205379- BH16-22-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	~

Page	: 7 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	· 11205379-100



Matrix: Soil/Solid					Ev	aluation: × =	Holding time exce	edance ; 🗸	<pre>/ = Within</pre>	Holding Time
Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding	Times	Eval
			Date	Rec	Actual			Rec	Actual	
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap										
11205379- BH16-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180	1 days	✓
								days		
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap										
11205379- BH17-22-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180	1 days	✓
								days		
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap										
11205379- BH20-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180	1 days	✓
								days		
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap										
11205379- MW09-22	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180	1 days	✓
								days		
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap										
11205379- MW17-SS1	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180	1 days	✓
								days		
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap										
11205379- MW18-SS3	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180	1 days	✓
								days		
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap										
11205379- BH11-22-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	✓
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap										
11205379- BH16-22-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	✓
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap										
11205379- BH16-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	1

Page	: 8 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	11205379-100



Matrix: Soil/Solid					Ev	valuation: × =	Holding time exce	edance ; •	= Within	Holding Time
Analyte Group	Method	Sampling Date	Ex	Extraction / Preparation						
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap 11205379- BH17-22-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	1
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap										
11205379- BH20-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	~
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap										
11205379- MW09-22	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	~
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap										
11205379- MW17-SS1	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	~
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	1									
11205370- MW18-SS3	F108A	14-Sep-2022	15-Sen-2022				15-Sep-2022	30 days	1 days	1
	LIVON	.1 000 2022	10-000-2022				10-000-2022	JU GUYS	1 44 9 5	·
	2					5	2			

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: Soil/Solid	Evaluation: \star = QC frequency outside specification; \star = QC frequency within specification.								
Quality Control Sample Type			C	ount		Frequency (%)			
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation		
Laboratory Duplicates (DUP)									
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	648051	1	8	12.5	5.0	✓		
Moisture Content by Gravimetry	E144	648057	1	8	12.5	5.0	✓		
ORP by Electrode	E125	648056	1	8	12.5	5.0	✓		
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	648054	1	8	12.5	5.0	✓		
Water Extractable Chloride by IC	E236.CI	648053	1	8	12.5	5.0	✓		
Water Extractable Sulfate by IC	E236.SO4	648052	1	8	12.5	5.0	✓		
Laboratory Control Samples (LCS)									
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	648051	2	8	25.0	10.0	✓		
Moisture Content by Gravimetry	E144	648057	1	8	12.5	5.0	✓		
ORP by Electrode	E125	648056	1	8	12.5	5.0	✓		
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	648054	1	8	12.5	5.0	✓		
Water Extractable Chloride by IC	E236.CI	648053	2	8	25.0	10.0	✓		
Water Extractable Sulfate by IC	E236.SO4	648052	2	8	25.0	10.0	✓		
Method Blanks (MB)									
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	648051	1	8	12.5	5.0	✓		
Moisture Content by Gravimetry	E144	648057	1	8	12.5	5.0	✓		
Water Extractable Chloride by IC	E236.CI	648053	1	8	12.5	5.0	✓		
Water Extractable Sulfate by IC	E236.SO4	648052	1	8	12.5	5.0	✓		


Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L Waterloo - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Conductance is measured in the fluid that is observed in the upper layer.
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A Waterloo - Environmental	Soil/Solid	MOEE E3137A	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally $20 \pm 5^{\circ}$ C) and is carried out in accordance with procedures described in the Analytical Protocol (prescriptive method). A minimum 10g portion of the sample, as received, 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 by centrifuging, settling, or decanting and then analyzed using a pH meter and electrode.
ORP by Electrode	E125 Waterloo - Environmental	Soil/Solid	APHA 2580 (mod)	Oxidation Redution Potential (ORP) is reported as the oxidation-reduction potential of the platinum metal-reference electrode employed in the analysis, measured in mV.
Moisture Content by Gravimetry	E144 Waterloo - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Water Extractable Chloride by IC	E236.Cl Waterloo - Environmental	Soil/Solid	EPA 300.1	Inorganic anions are analyzed by Ion Chromatography with conductivity and /or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Water Extractable Sulfate by IC	E236.SO4 Waterloo - Environmental	Soil/Solid	EPA 300.1	Inorganic anions are analyzed by Ion Chromatography with conductivity and /or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Resistivity Calculation for Soil Using E100-L	EC100R Waterloo - Environmental	Soil/Solid	APHA 2510 B	Soil Resistivity (calculated) is determined as the inverse of the conductivity of a 2:1 water:soil leachate (dry weight). This method is intended as a rapid approximation for Soil Resistivity. Where high accuracy results are required, direct measurement of Soil Resistivity by the Wenner Four-Electrode Method (ASTM G57) is recommended.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Waterloo - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.

Page	: 11 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	: 11205379-100



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil : 0.01CaCl2 - As Received for	EP108A	Soil/Solid	MOEE E3137A	A minimum 10g portion of the sample, as received, is extracted with 20mL of 0.01M
рН				calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is
	Waterloo -			separated from the soil by centrifuging, settling or decanting and then analyzed using a
	Environmental			pH meter and electrode.
Preparation of ORP by Electrode	EP125	Soil/Solid	APHA 2580 (mod)	Field-moist sample is extracted in a 1:2 ratio with DI water and then analyzed by ORP
				meter.
	Waterloo -			
	Environmental			
Anions Leach 1:10 Soil:Water (Dry)	EP236	Soil/Solid	EPA 300.1	5 grams of dried soil is mixed with 50 grams of distilled water for a minimum of 30
				minutes. The extract is filtered and analyzed by ion chromatography.
	Waterloo -			
	Environmental			
Distillation for Acid Volatile Sulfide in Soil	EP396-L	Soil/Solid	APHA 4500S2J	Acid Volatile Sulfide is determined by colourimetric measurement on a sediment sample
				that has been treated with hydrochloric acid within a purge and trap system, where the
	Waterloo -			evolved hydrogen sulfide gas is carried into a basic solution by argon gas for analysis.
	Environmental			



QUALITY CONTROL REPORT

Work Order	WT2214174	Page	: 1 of 4
Client	: GHD Limited	Laboratory	: Waterloo - Environmental
Contact	Rick Hawthorne	Account Manager	: Rick Hawthorne
Address	: 455 Phillip Street Waterloo ON Canada N2L 3X2	Address	∺60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	:	Telephone	:+1 519 886 6910
Project	: 11205379-100	Date Samples Received	: 14-Sep-2022 10:30
PO	: 735-004287	Date Analysis Commenced	: 15-Sep-2022
C-O-C number	:	Issue Date	16-Sep-2022 16:35
Sampler	: CLIENT		
Site	:		
Quote number	: 11205379-100-SSOW 735-004287		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Greg Pokocky	Supervisor - Inorganic	Waterloo Inorganics, Waterloo, Ontario
Joseph Scharbach		Waterloo Centralized Prep, Waterloo, Ontario
Walt Kippenhuck	Team Leader - Inorganics	Waterloo Inorganics, Waterloo, Ontario

Page	: 2 of 4
Work Order	: WT2214174
Client	: GHD Limited
Project	· 11205379-100



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include 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 (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Soil/Solid				Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC	Lot: 648051)										
WT2214174-006	11205379- BH16-22-SS2	conductivity (1:2 leachate)		E100-L	10.0	μS/cm	430	438	1.84%	20%	
Physical Tests (QC	Lot: 648054)										
WT2214174-008	11205379- MW09-22	pH (1:2 soil:CaCl2-aq)		E108A	0.10	pH units	6.81	6.82	0.147%	5%	
Physical Tests (QC	Lot: 648056)										
WT2214174-007	11205379- BH17-22-SS2	oxidation-reduction potential [ORP]		E125	0.10	mV	350	430	20.5%	25%	
Physical Tests (QC	Lot: 648057)										
WT2214174-008	11205379- MW09-22	moisture		E144	0.25	%	6.16	6.68	8.05%	20%	
Leachable Anions & Nutrients (QC Lot: 648052)											
WT2214174-006	11205379- BH16-22-SS2	sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	116	118	1	Diff <2x LOR	
Leachable Anions & Nutrients (QC Lot: 648053)											
WT2214174-006	11205379- BH16-22-SS2	chloride, soluble ion content	16887-00-6	E236.CI	5.0	mg/kg	83.2	83.3	0.136%	30%	

Page	: 3 of 4
Work Order	: WT2214174
Client	: GHD Limited
Project	: 11205379-100



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier	
Physical Tests (QCLot: 648051)							
conductivity (1:2 leachate)		E100-L	5	µS/cm	<5.00		
Physical Tests (QCLot: 648057)							
moisture		E144	0.25	%	<0.25		
Leachable Anions & Nutrients (QCLot: 648052)							
sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	<20		
Leachable Anions & Nutrients (QCLot: 648053)							
chloride, soluble ion content	16887-00-6	E236.CI	5	mg/kg	<5.0		

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Soil/Solid					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery	' Limits (%)	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 648051)									
conductivity (1:2 leachate)		E100-L	5	μS/cm	1409 µS/cm	98.8	90.0	110	
Physical Tests (QCLot: 648054)									
pH (1:2 soil:CaCl2-aq)		E108A		pH units	7 pH units	100	98.0	102	
Physical Tests (QCLot: 648057)									
moisture		E144	0.25	%	50 %	101	90.0	110	
Leachable Anions & Nutrients (QCLot: 648052)									
sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	5000 mg/kg	100	70.0	130	
Leachable Anions & Nutrients (QCLot: 648053)									
chloride, soluble ion content	16887-00-6	E236.Cl	5	mg/kg	5000 mg/kg	101	80.0	120	



Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery L	imits (%)	
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (C	CLot: 648051)								
	RM	conductivity (1:2 leachate)		E100-L	3239 µS/cm	100	70.0	130	
Physical Tests (C	CLot: 648056)								
	RM	oxidation-reduction potential [ORP]		E125	475 mV	102	80.0	120	
Leachable Anions	s & Nutrients (QCLot: 6	48052)							
	RM	sulfate, soluble ion content	14808-79-8	E236.SO4	217 mg/kg	98.5	60.0	140	
Leachable Anions & Nutrients (QCLot: 648053)									
	RM	chloride, soluble ion content	16887-00-6	E236.CI	673 mg/kg	94.1	70.0	130	

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Free: 1 800 668 9878	Recipients			- provide details below if box checked		ighd.com			ecipients	AAIL 🗆 MAIL 🗍 FAX	a		d Fields (client use)	PO#	Routing Code:			Sampler:	Time Sample Type											ing from drop-down below	Ö	Su	<u>8</u>			I RECEPTION (ALS USE ONLY)	
Canada Toll I	Reports / F	Select Report Format:	Merge QC/QCI Reports with COA	Compare Results to Criteria on Report	Select Distribution:	Email 1 or Fax jennifer.balkwill@	Email 2	Email 3	Invoice R	Select Invoice Distribution: 🔲 EM	Email 1 or Fax	Email 2	Oil and Gas Require	AFE/Cost Center:	Major/Minor Code:	Requisitioner:	Location:	ALS Contact:	Date				40.40							Limits for result evaluation by selection	(Excel COC only)					Parelised hu	NGCONTRACT NJ
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N www.alsglobal.com	Contact and company na	y: GHD Limited	Jennifer Balkwill	519-340-4286	Company address below will	455 Phillip Street, Unit 100	vince: Waterloo, Ontario	ode: N2L 3X2	To Same as Report To	Copy of Invoice with Repor	k:		Project Info	:ount #/ Quote #:	11205379-100	E: 735-003472-1		b Work Order # (ALS use only):	nple # Sample antv) (This d	11205379 ~ RH/M	11205379 × R LI 20	11205379 - ML/1	111205379 - M- M- /	11205379 ~ R LL 11.	11205379 - RH 16	11205379 - BH 17	11205379 - MWO			intine Water (DW) Semulae ¹ (ali		les taken from a Regulated DW Syst		es lor runan consumption, use r	LI YES LI NO SHIPMENT DELEA		
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