

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

Client Name: EllisDon Date: August 21, 2023

File: 36182



TABLE OF CONTENTS

| 1. | INTRODUCTION | | | | |
|-------|--------------------|--|----|--|--|
| 2. | BAC | KGROUND | 1 | | |
| 3. | UNDI | ERSTANDING OF SUBSURFACE CONDITIONS | 2 | | |
| 4. | FOU | NDATION DESIGN RECOMMENDATIONS | 5 | | |
| | 4.1 | Foundation Excavation and Temporary Dewatering | 5 | | |
| | 4.2 | Site Preparation | 6 | | |
| | 4.3 | Protection of Expansive Shale | 7 | | |
| | 4.4 | Engineered Fill Pad | 7 | | |
| | 4.5 | Foundation Design | 8 | | |
| | 4.6 | Frost Depth | 9 | | |
| | 4.7 | Slab-On-Grade and Raft Foundations | 9 | | |
| | 4.8 | Backfill to Structures and Lateral Earth Pressure | 10 | | |
| | 4.9 | Site Seismic Classification | 11 | | |
| | 4.10 | Cement Type | 11 | | |
| | 4.11 | Site Servicing | 12 | | |
| 5. | CLOS | SURE | 13 | | |
| STAT | TEMEN ⁻ | T OF LIMITATIONS AND CONDITIONS | | | |
| | | IN-TEXT TABLES | | | |
| Table | e 3.1: Ap | pproximate Depth and Elevation of Bedrock | 2 | | |
| | | roundwater Level Readings at the Site | | | |
| | | oundation Design Options | | | |
| | | ecommended Geotechnical Resistances at ULS and SLS | | | |
| rable | 3 4.3: La | ateral 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.

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 included in Appendix A.

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.

2. BACKGROUND

Preliminary 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:

Table 3.1: Approximate Depth and Elevation of Bedrock

| 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* |

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 2 of 14



| 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 3.2: Groundwater Level Readings at the Site

| Borehole | Ground Surface Elev. (m) | Depth to Water (m) | Groundwater Elev. (m) | Main Screened 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 |
| | /IW6-21 82.17 | 3.0 | 79.2 | |
| M\\\/6-21 | | 3.0 | 79.2 | Shale |
| 101000 21 | | 3.1 | 79.1 | Stiale |
| | | 3.0 | 79.2 | |
| | | 2.0 | 80.2 | Shale |

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 3 of 14



| 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.

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 4 of 14



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

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 5 of 14



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 m.

Provided that the base of excavation is kept at or above Elev. 81 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 and floor slabs. These deposits, 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. Grades can be raised using Engineered Fill.

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 6 of 14



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

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

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 7 of 14



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 Foundation Design

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

Table 4.1: Foundation Design Options

| 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 |

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:

Table 4.2: Recommended Geotechnical Resistances at ULS and SLS

| 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 |
| Competent Shale | 4 m wide strip | 1,300 | 1,200 |
| | 2 m Square | 1,600 | 1,500 |
| | 3 m Square | | 1,200 |

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 8 of 14



| Founding Stratum | Footing Size | Factored | Geotechnical Resistance at |
|------------------|--------------|-------------------------|-----------------------------------|
| | (m)/Type | Geotechnical | SLS (kPa) for 20 mm of |
| | | Resistance at ULS (kPa) | Settlement |
| | 4 m Square | | 1,000 |

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).

4.6 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.

4.7 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-on-grade may be based on a modulus of subgrade reaction of 25 MPa/m, based on a loaded area of

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 9 of 14



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.

4.8 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).

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 10 of 14



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/m³ | OPSS Granular B Type I or Type III Φ = 32°, γ = 21.0 kN/m ³ |
|-------------------------|---|--|
| Active, K _a | 0.27 | 0.31 |
| At-Rest, Ko | 0.43 | 0.47 |
| Passive, K _p | 3.7 | 3.3 |

Table 4.3: Lateral Earth Pressure Coefficients

4.9 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.

Based on correspondence with structural engineers it is understood that a Request For Information (RFI) will be sent to IO to identify the governing code (NBC 2015, NBC 2020, OBC 2012, etc.) in design of the structure. Further recommendations along with the anticipated seismic hazard values will be provided once clarifications have been received.

4.10 Cement Type

A moderate potential for sulphate attack was identified for the weathered shale. Therefore, design of the foundations and below grade walls of the proposed structure should consider CSA Type MS or MH cements.

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 11 of 14



4.11 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).

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 12 of 14



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.

5. CLOSURE

This report was issued for the purpose of building permit application only, 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

Client: EllisDon August 21, 2023
File No.: 36182 Page: 13 of 14



Date: August 21, 2023

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.

Nina Warrier, P. Eng. Geotechnical Engineer



Mehdi Mostakhdemi, M.Sc., P. Eng. Review Engineer

File: **36182**

 Client:
 EllisDon
 August 21, 2023

 File No.:
 36182
 Page: 14 of 14



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

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

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.

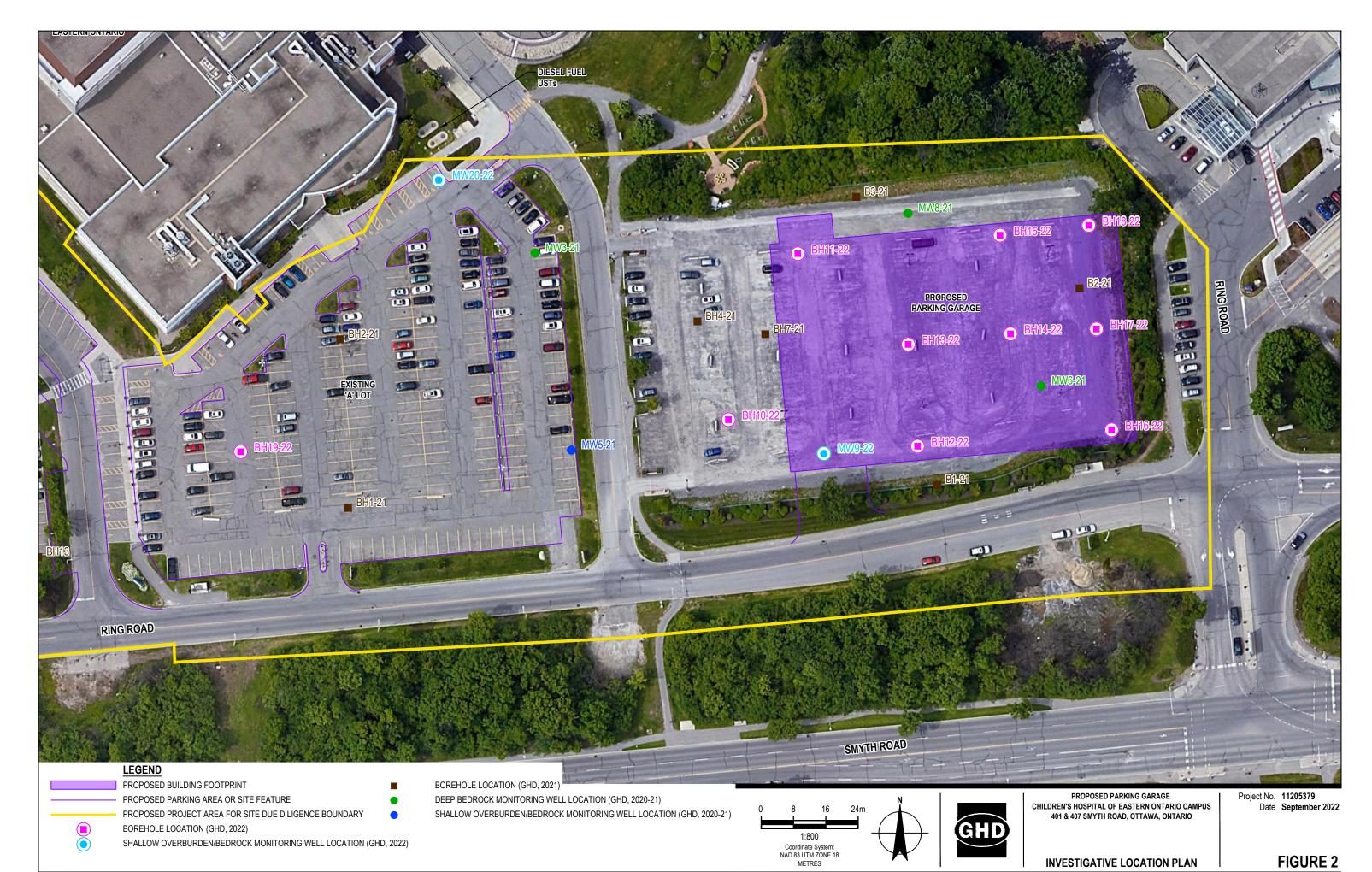
7. INDEPENDENT JUDGEMENTS OF CLIENT

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





Notes on Borehole and Test Pit Reports

Soil description:

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).

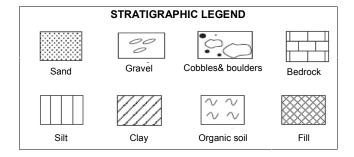
| | Classification (Unified system) | | | |
|-------------------|---------------------------------|--------------------------|---|--|
| Clay | < 0.002 mm | | | |
| Silt | 0.002 to 0.075 mm | | | |
| Sand | 0.075 to 4.75 mm | fine medium coarse | 0.075 to 4.25 mm 0.425 to 2.0 mm 2.0 to 4.75 mm | |
| Gravel Cobbles | 4.75 to 75 mm 75 to 300 mm | fine coarse | 4.75 to 19 mm 19 to 75 mm | |
| Boulders | >300 mm | | | |

| Relative density of granular soils | Standard penetration index "N" value |
|------------------------------------|--------------------------------------|
| | (BLOWS/ft – 300 mm) |
| Very loose | 0-4 |
| Loose | 4-10 |
| Compact | 10-30 |
| Dense | 30-50 |
| Very dense | >50 |

| | Rock quality designation | | |
|---|--------------------------|-----------|--|
| | "RQD" (%) Value | Quality | |
| | <25 | Very poor | |
| ĺ | 25-50 | Poor | |
| | 50-75 | Fair | |
| | 75-90 | Good | |
| | >90 | Excellent | |
| | | | |

| Terminology | , | |
|--------------------------|-----------------|--|
| "trace" "some" | 1-10% 10-20% | |
| adjective (silty, sandy) | 20-35% | |
| "and" | 35-50% | |
| | | |
| | | |
| | | |

| Consistency of cohesive soils | Undrained she strength (Cu | | | | | | | | |
|-------------------------------|-------------------------------|---------|--|--|--|--|--|--|--|
| | (P.S.F) | (kPa) | | | | | | | |
| Very soft | <250 | <12 | | | | | | | |
| Soft | 250-500 | 12-25 | | | | | | | |
| Firm | 500-1000 | 25-50 | | | | | | | |
| Stiff | 1000-2000 | 50-100 | | | | | | | |
| Very stiff | 2000-4000 | 100-200 | | | | | | | |
| Hard | >4000 | >200 | | | | | | | |



CHEM: Chemical analysis

GS: Grab sample

Samples:

Type and Number

The type of sample recovered is shown on the log by the abbreviation listed hereafter. The numbering of samples is sequential for each type of sample.

SS: Split spoon ST: Shelby tube AG: Auger SSE, GSE, AGE: Environmental sampling PS: Piston sample (Osterberg) RC: Rock core

Recovery

The recovery, shown as a percentage, is the ratio of length of the sample obtained to the distance the sampler was driven/pushed into the soil

RQD

The "Rock Quality Designation" or "RQD" value, expressed as percentage, is the ratio of the total length of all core fragments of 4 inches (10 cm) or more to the total length of the run.

IN-SITU TESTS:

N: Standard penetration index N_c : Dynamic cone penetration index k: Permeability R: Refusal to penetration Cu: Undrained shear strength Cu: ABS: Absorption (Packer test) Cu: Pressure meter

LABORATORY TESTS:

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

 $I_p: \mbox{Plasticity index} \qquad H: \mbox{Hydrometer analysis} \qquad A: \mbox{Atterberg limits} \qquad C: \mbox{Consolidation} \qquad \mbox{vapor} \\ W_i: \mbox{Liquid limit} \qquad GSA: \mbox{ Grain size analysis} \qquad w: \mbox{Water content} \qquad CS: \mbox{Swedish fall cone}$

Wp: Plastic limit γ: Unit weight



Explanation of Terms Used in the Bedrock Core Log

Strength (ISRM)

| Terms | Grade | Description | Unconfi Compressive S (MPa) | |
|--------------------------|-------|--|-----------------------------------|-------------|
| 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 | ncing |
|--------------------------|---------------|----------------|
| 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 fractures and fragmented rock.

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.

REFERENCE No.: 11205379-90 ENCLOSURE No.: BH1-21 BOREHOLE No.: BOREHOLE REPORT ELEVATION: 81.39 m Page: 1 of 1 CLIENT: Infrastructure Ontario (I.O.) **LEGEND** Preliminary Geotechnical Investigation - Proposed Parking Structure Children's Hospital of Eastern Ontario Campus - 401 Smyth Road, PROJECT: \boxtimes ss - SPLIT SPOON - SHELBY TUBE Ottawa, Ontario LOCATION: - ROCK CORE DESCRIBED BY: K. Schaller CHECKED BY: S. Shahangian - WATER LEVEL \mathbf{Y} DATE (START): January 15, 2021 DATE (FINISH): January 15, 2021 NORTHING: 5027575.049 **EASTING:** 449073.301 SOIL LOG WITH GRAPH+WELL Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) Moisture Content 'N' Value/ SCR(%) Elevation (m) BGS ☐ Lab Blows per Depth Water content (%) **DESCRIPTION OF** 15 cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 81.39 **GROUND SURFACE** Ν 10 20 30 40 50 60 70 80 90 ASPHALT: 125 mm 0.13 81.26 GS1 4 -- \circ Report: FILL SAND and GRAVEL, trace clay, brown, 25 SS1 2 5 10-5-4-6 9 moist, loose to very dense GHD GEOTECH_V02.GLB 0.91 Gravel: 48%, Sand: 41%, Clay: 3%, Silt 80.48 - 1.0 : 8% SS2 88 10 12-30-50/ 50+ ф Gravel: 39%, Sand: 39%, Clay: 7%, Silt 100mm 15% 5 SS3 50/ BEDROCK (inferred), shale fragments, 100 4 50+ 0 greyish brown, very dense 100mm 2.0 SS4 50/ 100 4 50+ 75mm SS5 100 4 50/ 50+ 75mm 3.0 ---\112053--\11205379\11205379 - 90.GPJ 10 auger refusal 3.20 78.19 11 **END OF BOREHOLE:** 12 NOTE: 13 4.0 - End of Borehole at 3.20 m bgs - Borehole was backfilled with bentonite 14 holeplug and sealed with cold patch - bgs donates 'below ground surface' 15 16 - 5.0 17 18 N:\CA\MISSISSAUGA - 111 BRUNEL\LEGACY\LOG DATABASE\8-CHAR\11 19 6.0 20 21 22 7.0 23 24 25 26 8.0 27 28 29 9.0 30 31 32

| _ | REFEREN | ICE No. | : <u> </u> | 11205379-90 | | | | | | | | FNC | CLOS | URE | No. | : <u> </u> | | 2 | |
|----------------|------------------------------------|----------------------|--------------|---|--|-------------|---------------------|----------------|------------|--------------------|----------------------|---|------|------|--------------|------------|------|-----------|----|
| | | G | LID. | | BOREHOLE No.: | _ | | BH2- | 21 | | В | OF | REH | 10 | LE | R | EP | OI | RT |
| | | | | | ELEVATION: | | 81. | 36 m | | | | | Page | | | | | | |
| r | CLIENT: | | Infra | astructure Ontario (I. | O.) | | | | | | LEC | GEN | ID | | | | | | |
| | PROJECT LOCATION | | Chil | liminary Geotechnica dren's Hospital of Ea awa, Ontario | al Investigation - Propose astern Ontario Campus - | ed 40 | Parking 01 Smyth | Struc i Roa | ture d, | | | SS ST | - S | SHE | T SF LBY | TUE | 3E | | |
| 70/21 | DESCRIBI | ED BY: | K. S | Schaller | CHECKED BY: | _ | S. Sha | nangia | an | | Ā | RC | | | K CO ER I | | | | |
| are: 2/2 | DATE (ST | ART): | Jan | uary 18, 2021 | DATE (FINISH): | _ | Januar | y 18, : | 2021 | | | | | | | | | | |
|] - - | NORTHIN | G: | 502 | 7616.781 | EASTING: | | 449071 | .365 | | | | | | | | | | | |
| WIII GRAPH+W | Depth | Elevation (m) BGS | Stratigraphy | | State Content Moisture Moistur | | | | | | 'N' Value/ SCR(%) | Shear test (Cu) △ Field Sensitivity (S) □ Lab ○ Water content (%) Atterberg limits (%) ■ "N" Value (blows / 12 in30 cm) | | | | | | | |
| | Feet Metres | 81.36 | | GROUN | D SURFACE | | | % | | | N | 10 | 20 3 | 0 40 | 50 6 | 0 70 | 08 0 | 90 | |
| ונ: פר בי | 1 - 0.10 | 81.26 | | ASPHALT : 100 m | m | XX | GS1 | | 4 | | | 0 | | Ŧ | | | | П | |
| oden debo | 2 - 0.61 | 80.75 | | SAND and GRAVE | EL, trace silt, brown, d : 50%, Clay : 2%, Silt | \bigvee | SS1 | 71 | 19 | 9-7-3-4 | 10 | • | | | | | | | |
| GEOLECH_VUZ | 4 - 1.14 | 80.22 | | dark brown, moist. | race clay and gravel, very dense | X | SS2 | 87 | 7 | 10-22-42/ 100mm | 50+ | | - | 1 | | | | | |
| טיים טיים טיים | 5 6 2.0 | | | : 18% BEDROCK (inferre | ed), shale fragments, | \boxtimes | SS3 | 83 | 4 | 50/ 125mm | 50+ | | | | | | | | |
| Library rile. | 7 - 2.3 | | | grey, moist, very d | ense | × | SS4 | 100 | 4 | 50/ 75mm | 50+ | | | | + | | | | |
| 1 | 9 - 2.77 | 78.59 | = | ∖auger refusal | | _ | SS5 | 100 | 9 | 50/ 25mm | 50+ | 0 | | | • | | | Н | |
| 2 | 10 - 3.0 | | | END OF BOREHO | LE: | | | | | 2011111 | | | | + | | | | | |
| 2 | 12 — | | | NOTE: - End of Borehole: | at 2.77 m bgs | | | | | | | | | | | | | | |
| ő | 13 - 4.0 | | | - Borehole was back holeplug and sealed - bgs donates 'belo | ckfilled with bentonite ed with cold patch | | | | | | | | | | | | | | |
| ś | 15 — | | | | | | | | | | | | | | | | | | |
| Ш | 16 — | | | | | | | | | | | | | | | | | | |
| Ш | 18 | | | | | | | | | | | | | | | | | | |
| | 19 + 6.0 | | | | | | | | | | | | | | | | | | |
| ž l | 21 — | | | | | | | | | | | | | | | | | | |
| 5 | 22 + 7.0 | | | | | | | | | | | | | | | | | | |
| 길 | 24 — | | | | | | | | | | | | | | | | | | |
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| 4 | 26 – 8.0 | | | | | | | | | | | | | | | | | | |
| s III | 27 - 28 - | | | | | | | | | | | | | | | | | | |
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| | | | 6 | MU | | ELEVATION: | | 81. | 37 m | | | | | Page: | | | | | | - |
| İ | CLIE | NT: | | Infra | astructure Ontario (I.C | D.) | | | | | I | LEC | GENE | | | | | _ | | |
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| 205379/11205379 - 90.GPJ Library File: GHD_GEOTECH_V02.GLB Report: SOIL LOG WITH GRAPH+WELL Date: 2/26/21 | Depth | | Elevation (m) BGS | Stratigraphy | | PTION OF) BEDROCK | State | Type and Number | Recovery/ TCR(%) | Moisture Content | Blows per 15 cm/ RQD(%) | 'N' Value/ SCR(%) | Sen: | ar test (sitivity (Water of Atterbe | S) conter rg limi | ts (% | | ₄ Fie] Lal | | |
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| Repo | 2 + | 0.30 0.61 | 80.76 | | FILL: | | \mathcal{L} | | | | 150mm | | | | | 7 | | # | | |
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| ت ا | 9 10 - | - 3.0 | | | | | | SS7 | 83 | 4 | 50/ 150mm | 50+ | 0 | | • | | .74 Sar | | | |
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| : | 32 | | | | | | | RC5 | 83 | | 61 | | | | | | Ħ | # | | |
| ŒĹ | | | | KXXM | | | | | 1 - | 1 | 1 | l | 1 1 | 1 1 | 1 I | | 1 I | - 1 | | |

REFERENCE No.: 11205379-90 ENCLOSURE No.: BOREHOLE No.: MW3-21 **BOREHOLE REPORT ELEVATION:** 81.37 m Page: 2 of 2 CLIENT: Infrastructure Ontario (I.O.) **LEGEND** Preliminary Geotechnical Investigation - Proposed Parking Structure Children's Hospital of Eastern Ontario Campus - 401 Smyth Road, PROJECT: \boxtimes ss - SPLIT SPOON ST - SHELBY TUBE LOCATION: Ottawa, Ontario - ROCK CORE 2/26/21 DESCRIBED BY: K. Schaller CHECKED BY: S. Shahangian - WATER LEVEL \mathbf{Y} DATE (START): January 14, 2021 DATE (FINISH): January 15, 2021 NORTHING: 5027638.113 **EASTING:** 449119.449 SOIL LOG WITH GRAPH+WELL Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) Moisture Content 'N' Value/ SCR(%) Elevation (m) BGS ☐ Lab Blows per State Depth Water content (%) **DESCRIPTION OF** 15 cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 81.37 **GROUND SURFACE** Ν 10 20 30 40 50 60 70 80 90 _ 10.06 71.31 10.06 m GHD_GEOTECH_V02.GLB Report: **END OF BOREHOLE:** 34 35 NOTE: - End of Borehole at 10.06 m bgs 36 -11.0 - Borehole was dry upon completion - Rock coring from 4.57 m bgs 37 - 50 mm diameter monitoring well installed at 7.47 m bgs 38 - Groundwater found at 2.69 m bgs on 39 January 28, 2021 12.0 - Groundwater found at 2.49 m bgs on 40 Library File: February 10, 2021 - bgs donates 'below ground surface' 41 42 13.0 ---\112053--\11205379\11205379 - 90.GPJ 43 44 45 14.0 46 47 48 49 -15.0 N:\CA\MISSISSAUGA - 111 BRUNEL\LEGACY\LOG DATABASE\8-CHAR\11-----\1120-50 52 -16.053 54 55 17.0 56 57 58 59 18.0 60 61 62 19.0 63 64 65

REFERENCE No.: 11205379-90 ENCLOSURE No.: BH4-21 BOREHOLE No.: BOREHOLE REPORT ELEVATION: 82.23 m Page: 1 of 1 CLIENT: Infrastructure Ontario (I.O.) **LEGEND** Preliminary Geotechnical Investigation - Proposed Parking Structure Children's Hospital of Eastern Ontario Campus - 401 Smyth Road, PROJECT: \boxtimes ss - SPLIT SPOON ST - SHELBY TUBE Ottawa, Ontario LOCATION: - ROCK CORE DESCRIBED BY: K. Schaller CHECKED BY: S. Shahangian - WATER LEVEL \mathbf{Y} DATE (START): January 18, 2021 DATE (FINISH): January 18, 2021 NORTHING: 5027621.207 **EASTING:** 449159.803 SOIL LOG WITH GRAPH+WELL Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) Moisture Content 'N' Value/ SCR(%) Elevation (m) BGS ☐ Lab Blows per State Depth Water content (%) **DESCRIPTION OF** 15 cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.23 **GROUND SURFACE** % Ν 10 20 30 40 50 60 70 80 90 FILL: SAND and GRAVEL, trace clay and silt, Report: SS1 75 48 15-27-21-10 brown, moist to wet, dense Gravel: 46%, Sand: 41%, Clay: 3%, Silt GHD GEOTECH_V02.GLB 0.76 81.47 10% SS2 91 7 6-19-34-50/ 53 3 BEDROCK (inferred), shale fragments, 1.0 50mm grey, moist, very dense SS3 90 8 21-50/ 50+ 100mm 5 SS4 100 4 50/ 50+ 2.0 75mm SS5 100 5 50/ 50+ 0 75mm 2.77 79.46 auger refusal 3.0 ---\112053--\11205379\11205379 - 90.GPJ 10 **END OF BOREHOLE:** 11 NOTE: 12 - End of Borehole at 2.77 m bgs - Borehole was backfilled with bentonite 13 4.0 holeplug and sealed with cold patch 14 - bgs donates 'below ground surface' 15 16 - 5.0 17 18 N:\CA\MISSISSAUGA - 111 BRUNEL\LEGACY\LOG DATABASE\8-CHAR\11 19 6.0 20 21 22 7.0 23 24 25 26 8.0 27 28 29 9.0 30 31 32

| _ | REFEREN | ICE No. | : | 11205379-90 | | | | | | | | ENC | LOSU | IRE I | No.: | | | 5 | |
|---|--------------|----------------------|--------------|---|--|--------------|--------------------|---------------------|---------------------|-------------------------------|----------------------|---|---|-------------------------------|---------------|--------------------|------------------|-----------|-------------|
| | | | | | BOREHOLE No.: | _ | ı | MW5 | -21 | | В | OR | EH | OL | E | RE | ΞP(| OF | RT. |
| | | 6 | IMD | | ELEVATION: | | 81. | 83 m | | | _ | | Page: | | | | | | ` . |
| İ | CLIENT: | | Infra | astructure Ontario (I. | O.) | | | | | | LEC | GEN | D | | | | | | |
| | PROJECT | : | Prel | iminary Geotechnica | al Investigation - Propose | ed | Parking | Struc | ture | | \boxtimes | SS | | PLIT | SP | NOC | | | |
| | LOCATION | N: | | aren's Hospital of Ea awa, Ontario | astern Ontario Campus - | 40 | Ji Smyti | n Roa | a, | | | | | HELE OCK | | UBE RF | Ē | | |
| 17/07/ | DESCRIBE | ED BY: | <u>K. S</u> | Schaller | CHECKED BY: | _ | S. Sha | hangi | an | | Ā | | | | | EVE | L | | |
| Jare: ∠ | DATE (ST | ART): | Jan | uary 15, 2021 | DATE (FINISH): | _ | Januar | y 15, : | 2021 | | | | | | | | | | |
| , | NORTHIN | G: | 502 | 7589.381 | EASTING: | | 449128 | 3.777 | | Г | 1 | | | | | | | | |
| G WIIH GRAPH+v | Depth | Elevation (m) BGS | Stratigraphy | | RIPTION OF D BEDROCK | State | Type and Number | Recovery/ TCR(%) | Moisture Content | Blows per 15 cm/ RQD(%) | 'N' Value/ SCR(%) | Ser O W _p W _l | ear test nsitivity Wate Atterb "N" Va wws / 12 | (S) r cont erg li | ent (mits | %) (%) | △ Fi □ La | | |
| 3 | Feet Metres | | | | D SURFACE | | | % | | | N | 10 | 20 30 | 40 5 | 0 60 | 70 8 | 30 90 |) | |
| ر ا | 1 - 0.10 | 81.53 | | ASPHALT : 100 m | EL, some silt, trace | X | GS1 | | 7 | | | - | | | | 0.31 | m- | | |
| rep n | 2 - 0.40 | 81.43 | | clay, brown, moist | | \mathbb{I} | SS1 | 100 | 8 | 8-18-20-35 | 38 | 9 | | • | В | ento | nite | | |
| /0Z.GL | 3 = 1.0 | | | : 13% FILL : | | \succeq | SS2 | 100 | 3 | 50/ | 50+ | | | \Rightarrow | | 1.05 | 5 m= | - 85 | 538 55555 |
| ב ב | 4 + | | 臺 | brown, moist, dens |), some silt, trace clay, se | | | | | 125mm | | | | | - | \perp | \perp | | |
| 2 2 | 5 183 | 80.00 | 1 | Gravel : 23%, San : 20% | d : 49%, Clay : 8%, Silt | × | SS3 | 100 | 5 | 50/ 100mm | 50+ | 0 | | $oldsymbol{+}^{oldsymbol{c}}$ | | _Scr -1.83 | | | |
| 2 2 | 7 - 2.0 | 00.00 | | BEDROCK (inferred) grey, damp, very c | ed), shale fragments, lense | | | | | | | | | | | 1.00 | | | |
| II) FIIE | 8 = | | | END OF BOREHO | | | | | | | | | | | | | \forall | | |
| Ligit | 9 = | | | NOTE: | | | | | | | | | | | | | H | | |
| 0.Gr | 10 - 3.0 | | | - End of Borehole - Borehole was dry | upon completion | | | | | | | | | | | | Ħ | | |
| 37/8-2 | 11 — | | | - Borehole was dry | nstalled at 1.837 m bgs y on January 28, 2021 | | | | | | | | | | | | \sharp | | |
| 3071176 | 13 - 4.0 | | | - Borehole was dry - bgs donates 'beld | y on February 10, 2021 ow ground surface' | | | | | | | | | | | | \exists | | |
| 70227 | 14 - | | | | | | | | | | | | | | | | H | | |
| 23-11 | 15 | | | | | | | | | | | | | | | | H | | |
| UZI I.Z. | 16 - 5.0 | | | | | | | | | | | | | | | | Ħ | | |
| -07 LI. | 17 — | | | | | | | | | | | | | | | | \sharp | | |
| | 19 — | | | | | | | | | | | | | | | | \exists | | |
| 7 7 7 | 20 + 6.0 | | | | | | | | | | | | | | | | \exists | | |
| SASE 10 | 21 📜 | | | | | | | | | | | | | | | | \forall | | |
| DAIAE | 22 — | | | | | | | | | | | | | | | | H | | |
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| T GAC | 25 — | | | | | | | | | | | | | | | | \sharp | | |
| ONELIL | 26 - 8.0 | | | | | | | | | | | | | | | | \exists | | |
| ון סקו | 27 - 0.0 | | | | | | | | | | | | | | | | \coprod | | |
| - 45 - 1 | 28 — | | | | | | | | | | | | | | | | \prod | 7 | |
| SISSAL | 29 - 9.0 | | | | | | | | | | | | | | | | $ \downarrow $ | | |
| AWINS | 30 - 31 - 31 | | | | | | | | | | | | | | | | \sharp | \exists | |
|) N N | 32 — | | | | | | | | | | | | \parallel | | | | \sharp | | |

| | REFEREN | CE No. | : | 11205379-90 | | | | | | | | EN | CLOSU | RE No | o.: _ | | 6 | | |
|-----------------|--------------------|----------------------|--------------|--------------------------------------|-------------------------------|-------------------|--------------------|---------------------|---------------------|-------------------------------|----------------------|-----------------------------|---------------------------------------|-----------------------|--------|-------------|--------------|-------|---|
| | | | | | BOREHOLE No.: | | ļ | MW6 | -21 | | В | OF | REHO | OLF | ΞR | ξEF | 20 | R. | Т |
| | | 9 | MD | | ELEVATION: | | 82. | 17 m | | | | • | Page: | | | | | | - |
| İ | CLIENT: | | Infra | astructure Ontario (I. | O.) | | | | | L | LEC | GEN | ND | | | | | | |
| | PROJECT: | | Prel | iminary Geotechnica | al Investigation - Propose | ed I | Parking | Struc | ture | | | | <u></u> | LIT S | POC | N | | | |
| | | | Chil | dren's Hospital of Ea wa, Ontario | astern Ontario Campus - | 40 | 1 Smyt | n Roa | d, | | | ST | - SH | IELBY | / TU | BE | | | |
| 17/07 | DESCRIBE | ED BY: | K. S | Schaller | CHECKED BY: | | S. Sha | hangi | an | | Ţ | RC | | OCK C ATER | | | | | |
| Te: 2/2 | DATE (STA | ART): | Janı | uary 12, 2021 | DATE (FINISH): | _ | Januar | y 13, | 2021 | | | | | | | | | | |
| ∏ | NORTHING | G: | 502 | 7605.404 | EASTING: | | 449244 | 1.983 | | | | | | | | | | | |
| G WILH GRAPH+WE | Depth | Elevation (m) BGS | Stratigraphy | | RIPTION OF D BEDROCK | State | Type and Number | Recovery/ TCR(%) | Moisture Content | Blows per 15 cm/ RQD(%) | 'N' Value/ SCR(%) | Se O W _p V | near test (ensitivity (Water Atterbe | S) (contererg limited | its (% | | Field Lab | | |
| | Feet Metres | 82.17 | | | D SURFACE | | | % | | | N | 10 | 20 30 4 | 10 50 | 60 7 | 08 0 | 90 | 1 | |
|))) | 1 + 0.35 | 81.82 | | GRAVEL : 350 mm | 1 | \bigvee | SS1 | 87 | 14 | 10-30-18-8 | 48 | | 0 | • | 0. | 31 r | m - | M | |
| Керс | 2 - 0.61 | | | FILL : | e gravel, trace | $\langle \rangle$ | | | | | | | | # | | 7 | Ŧ | | |
| JZ.GLE | 3 - 1.0 | | | \organics, grey/brov | wn, moist, dense | | SS2 | 100 | 10 | 4-11-27-45 | 38 | ¢ | , | | | \pm | # | | |
| ٥ ا | 4 - 1.22 | 80.95 | • • | ML-GRAVELLY SA | | $\langle \rangle$ | SS3 | 100 | 9 | 35-20-50/ | 100 | | | | | + | \pm | | |
| SEO E | 5 🛨 | | | Gravel : 32%, San | d : 45%, Clay : 7%, Silt | Δ | 333 | 100 | 9 | 75mm | 100 | Н | | ++ | | \neq | # | | |
| OHD. | 6 - 2.0 | | | | ed), shale fragments, ense | × | SS4 | 100 | 4 | 50/ 75mm | 50+ | 0 | | | -Ben | tonit | ie— | | |
| ry rile | 8 — | | | | | \times | SS5 | 100 | 3 | 50/ | 50+ | 0 | | | | + | + | | |
| LIDra | 9 🛨 📗 | | | | | | | | | 100mm | | | | \blacksquare | | # | Ŧ | | |
| .GP. | 10 - 3.0 | | | | | × | SS6 | 100 | 4 | 50/ | 50+ | 0 | | • | 2 | 10/2 | 2021 | | Ţ |
| 9 - 8/9 | 11 - | 78.66 | V/// | SHALE BEDDOCK | K, laminated, interbeds | × | | 100 | 4 | 100mm 50/ | | 0 | | | | + | t | | |
| 2071. | 12 - 3.51 | | | of limestone/siltsto | one (hard layers), | \parallel | RC1 | 58 | | 50mm 50 | | | | ++ | 3. | 66 r | <u>n</u> – | | |
| 053/9/ | 13 - 4.0 | | | moderately strong, | | ı | D00 | 00 | | | | | | \blacksquare | #2 | San | d | - | |
| 3\112 | 15 — | | | | | ı | RC2 | 93 | | 24 | | | | \parallel | | \pm | # | | |
| CUZ1.17 | 16 - 5.0 | | | | | \parallel | | | | | | | | | | \pm | \pm | | |
| -021 | 17 📑 | | | | | ı | | | | | | | | ++ | | + | + | | |
| | 18 — | | | | | ı | RC3 | 95 | | 54 | | | | \Box | | # | # | - | |
| TAR/ | 19 - 6.0 | | | | | ı | | | | | | | | | s | | n_ | | |
| 1 8-C | 20 + 0.0 | | | | | | | | | | | | | \pm | | \pm | 士 | | |
| ABAS | 22 | | | | | ı | | | | | | \vdash | | \vdash | | + | + | | |
| JG DA | 23 - 7.0 | | | | | ı | 501 | | | | | | | \perp | | \mp | \mp | | |
| ACY IL | 24 | | | | | ı | RC4 | 97 | | 55 | | | | | + | 47 r | | | |
| LILEG | 25 | | | | | ı | | | | | | | | | | San 78 r | ıd⊟ | 100 N | |
| RONE | 26 - 8.0 | | | | | Ħ | | | | | | Н | ++ | + | + | + | + | | |
| | 27 — | | | | | ı | | | | | | | | \Box | | # | Ŧ | | |
| AUGA | 28 — | | | | | | RC5 | 100 | | 52 | | | | \parallel | | # | # | | |
| 22122 | 30 = 9.0 | | | | | | | | | | | | | Bent | tonite | Sea | al | | |
| CAIMI | 31 — | | | | | \parallel | | | | | | \prod | $+\Gamma$ | + | + | + | + | | |
| : | 32 | | | | | | RC6 | 100 | | 71 | | | | Ħ | | \mp | + | | |

REFERENCE No.: 11205379-90 ENCLOSURE No.: MW6-21 BOREHOLE No.: **BOREHOLE REPORT ELEVATION:** 82.17 m Page: 2 of 2 CLIENT: Infrastructure Ontario (I.O.) **LEGEND** Preliminary Geotechnical Investigation - Proposed Parking Structure Children's Hospital of Eastern Ontario Campus - 401 Smyth Road, PROJECT: \boxtimes ss - SPLIT SPOON ST - SHELBY TUBE LOCATION: Ottawa, Ontario - ROCK CORE DESCRIBED BY: K. Schaller CHECKED BY: S. Shahangian - WATER LEVEL \mathbf{Y} DATE (START): January 12, 2021 DATE (FINISH): January 13, 2021 NORTHING: 5027605.404 **EASTING:** 449244.983 SOIL LOG WITH GRAPH+WELL Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) Moisture Content 'N' Value/ SCR(%) Elevation (m) BGS ☐ Lab Blows per Depth State Water content (%) **DESCRIPTION OF** 15 cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.17 **GROUND SURFACE** Ν 10 20 30 40 50 60 70 80 90 _ 10.06 72.11 10.06 m GHD_GEOTECH_V02.GLB Report: **END OF BOREHOLE:** 34 35 NOTE: - End of Borehole at 10.06 m bgs 36 -11.0 - Borehole was dry upon completion - Rock coring from 3.51 m bgs 37 - Monitoring well installed at 7.47 m bgs - Groundwater found at 2.97 m bgs on 38 January 28, 2021 - Groundwater found at 3.09 m bgs on 39 12.0 February 10, 2021 40 - bgs donates 'below ground surface' 41 42 13.0 ---\112053--\11205379\11205379 - 90.GPJ 43 44 45 14.0 46 47 48 49 -15.0 50 N:\CA\MISSISSAUGA - 111 BRUNEL\LEGACY\LOG DATABASE\8-CHAR\11 52 -16.053 54 55 17.0 56 57 58 59 -18.0 60 61 62 19.0 63 64 65

REFERENCE No.: 11205379-90 ENCLOSURE No.: BOREHOLE No.: BH7-21 BOREHOLE REPORT **ELEVATION:** 82.22 m Page: 1 of 1 CLIENT: Infrastructure Ontario (I.O.) **LEGEND** Preliminary Geotechnical Investigation - Proposed Parking Structure Children's Hospital of Eastern Ontario Campus - 401 Smyth Road, PROJECT: \boxtimes ss - SPLIT SPOON - SHELBY TUBE LOCATION: Ottawa, Ontario - ROCK CORE DESCRIBED BY: K. Schaller CHECKED BY: S. Shahangian - WATER LEVEL \mathbf{Y} DATE (START): January 19, 2021 DATE (FINISH): January 19, 2021 NORTHING: 5027618.043 **EASTING:** 449176.612 SOIL LOG WITH GRAPH+WELL Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) Moisture Content 'N' Value/ SCR(%) Elevation (m) BGS ☐ Lab Blows per Depth State Water content (%) **DESCRIPTION OF** 15 cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.22 **GROUND SURFACE** % Ν 10 20 30 40 50 60 70 80 90 FILL: Report: SILTY SAND and GRAVEL, brown, SS1 52 0 54 6 28-35-17-10 moist, very dense GHD GEOTECH_V02.GLB 0.76 81.46 SS2 100 7 15-40-50/ 50+ BEDROCK (inferred), shale fragments, 3 125mm 1.0 grey, moist, very dense SS3 100 45-50/ 4 50+ 5 75mm SS4 100 4 50/ 50+ 0 2.0 125mm SS5 100 3 50/ 50+ 2.52 79.70 auger refusal 75mm **END OF BOREHOLE:** 3.0 ---\112053--\11205379\11205379 - 90.GPJ 10 NOTE: 11 - End of Borehole at 2.52 m bgs 12 - Borehole was backfilled with bentonite holeplug and sealed with cold patch 13 4.0 - bgs donates 'below ground surface' 14 15 16 - 5.0 17 18 N:\CA\MISSISSAUGA - 111 BRUNEL\LEGACY\LOG DATABASE\8-CHAR\11 19 6.0 20 21 22 7.0 23 24 25 26 8.0 27 28 29 9.0 30 31 32

REFERENCE No.: 11205379-90 ENCLOSURE No.: MW8-21 BOREHOLE No.: BOREHOLE REPORT ELEVATION: 82.20 m Page: 1 of 1 CLIENT: Infrastructure Ontario (I.O.) **LEGEND** Preliminary Geotechnical Investigation - Proposed Parking Structure Children's Hospital of Eastern Ontario Campus - 401 Smyth Road, PROJECT: \boxtimes ss - SPLIT SPOON ST - SHELBY TUBE LOCATION: Ottawa, Ontario - ROCK CORE DESCRIBED BY: K. Schaller CHECKED BY: S. Shahangian - WATER LEVEL \mathbf{Y} DATE (START): January 18, 2021 DATE (FINISH): January 18, 2021 NORTHING: 5027647.908 **EASTING:** 449211.832 SOIL LOG WITH GRAPH+WELL Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) Moisture Content 'N' Value/ SCR(%) Elevation (m) BGS ☐ Lab Blows per Depth Water content (%) **DESCRIPTION OF** 15 cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.20 **GROUND SURFACE** Ν 10 20 30 40 50 60 70 80 90 0.05 82.15 ASPHALT: 50 mm GS1 5 --Report: FILL 0.31 SANDY GRAVEL, brown, moist, loose 100 2 SS1 7 3-4-2-3 6 Gravel: 61%, Sand: 33%, Clay: 2%, Silt GHD GEOTECH_V02.GLB Bentonite : 6% 0.86 1.0 81.34 3 BEDROCK (inferred), shale fragments, SS2 23-50/ 100 18 50+ 1.22 m reddish brown/grey, wet, very dense 150mm #2 Sand 5 50/ SS3 100 8 50+ 100mm Screen 2.0 Y 2.14 m 21 SS4 100 4 50/ 50+ 2.22 79.98 auger refusal 2.22 m 75mm **END OF BOREHOLE:** 9 3.0 ---\112053--\11205379\11205379 - 90.GPJ NOTE: 10 - End of Borehole at 2.22 m bgs 11 Borehole was dry upon completionMonitoring well installed at 2.14 m bgs 12 - Groundwater found at 2.03 m bgs on January 28, 2021 13 4.0 - Groundwater found at 2.09 m bgs on February 10, 2021 14 - bgs donates 'below ground surface' 15 16 - 5.0 17 18 N:\CA\MISSISSAUGA - 111 BRUNEL\LEGACY\LOG DATABASE\8-CHAR\11 19 6.0 20 21 22 7.0 23 24 25 26 8.0 27 28 29 9.0 30 31 32

REFERENCE No.: 11205379-90 ENCLOSURE No.: B1-21 BOREHOLE No.: **BOREHOLE REPORT** ELEVATION: _ 82.29 m Page: 1 of 1 CLIENT: Infrastructure Ontario (I.O.) **LEGEND** Preliminary Geotechnical Investigation - Proposed Parking Structure Children's Hospital of Eastern Ontario Campus - 401 Smyth Road, PROJECT: \boxtimes ss - SPLIT SPOON - SHELBY TUBE Ottawa, Ontario LOCATION: - ROCK CORE DESCRIBED BY: K. Schaller CHECKED BY: S. Shahangian - WATER LEVEL \mathbf{Y} DATE (START): January 18, 2021 DATE (FINISH): January 18, 2021 NORTHING: 5027580.742 **EASTING:** 449219.213 SOIL LOG WITH GRAPH+WELL Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) Moisture Content 'N' Value/ SCR(%) Elevation (m) BGS ☐ Lab Blows per State Depth Water content (%) **DESCRIPTION OF** 15 cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.29 **GROUND SURFACE** % Ν 10 20 30 40 50 60 70 80 90 FILL: SILTY SAND and GRAVEL, greyish Report: SS1 5 62 2 7-3-2-3 brown, moist, loose 0.46 81.83 2 NATIVE: GHD_GEOTECH_V02.GLB SAND and GRAVEL, some silt, trace SS2 89 10 9-24-50/ 50+ 81.38 81.25 0.91 1.04 125mm clay, brown, moist, very dense Gravel: 39%, Sand: 39%, Clay: 7%, Silt : 15% 5 BEDROCK, shale fragments, brownish red/grey, moist, very dense auger refusal 2.0 **END OF BOREHOLE:** NOTE: - End of Borehole at 1.04 m bgs 3.0 - Borehole was dry upon completion ---\112053--\11205379\11205379 - 90.GPJ 10 - bgs donates 'below ground surface' 11 12 13 4.0 14 15 16 - 5.0 17 18 N:\CA\MISSISSAUGA - 111 BRUNEL\LEGACY\LOG DATABASE\8-CHAR\11 19 6.0 20 21 22 7.0 23 24 25 26 8.0 27 28 29 9.0 30 31 32

REFERENCE No.: 11205379-90 ENCLOSURE No.: 10 B2-21 BOREHOLE No.: **BOREHOLE REPORT ELEVATION:** 82.18 m Page: 1 of 1 CLIENT: Infrastructure Ontario (I.O.) **LEGEND** Preliminary Geotechnical Investigation - Proposed Parking Structure Children's Hospital of Eastern Ontario Campus - 401 Smyth Road, PROJECT: \boxtimes ss - SPLIT SPOON ST - SHELBY TUBE LOCATION: Ottawa, Ontario - ROCK CORE DESCRIBED BY: K. Schaller CHECKED BY: S. Shahangian - WATER LEVEL \mathbf{Y} DATE (START): January 18, 2021 DATE (FINISH): January 18, 2021 NORTHING: 5027629.392 **EASTING:** 449254.399 SOIL LOG WITH GRAPH+WELL Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) Moisture Content 'N' Value/ SCR(%) Elevation (m) BGS ☐ Lab Blows per Depth State Water content (%) **DESCRIPTION OF** 15 cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.18 **GROUND SURFACE** % Ν 10 20 30 40 50 60 70 80 90 FILL: SILTY SAND and GRAVEL, brown, Report: SS1 71 41 0 13-17-24-9 moist, dense 2 GEOTECH_V02.GLB 100 81.27 SS2 4-10-28-34 3 -991 10 38 BEDROCK, shale fragments, grey, very dense SS3 9 22-50/ 50+ 1.52 80.66 150mm **END OF BOREHOLE:** 2.0 - End of Borehole at 1.52 m bgs - Borehole was dry upon completion - bgs donates 'below ground surface' - 3.0 10 11 12 13 4.0 14 15 16 - 5.0 17 18 N:\CA\MISSISSAUGA - 111 BRUNEL\LEGACY\LOG DATABASE\8-CHAR\11 19 6.0 20 21 22 7.0 23 24 25 26 8.0 27 28 29 9.0 30 31 32

REFERENCE No.: 11205379-90 ENCLOSURE No.: BOREHOLE No.: B3-21 **BOREHOLE REPORT** ELEVATION: 82.27 m Page: 1 of 1 Infrastructure Ontario (I.O.) CLIENT: _ **LEGEND** Preliminary Geotechnical Investigation - Proposed Parking Structure Children's Hospital of Eastern Ontario Campus - 401 Smyth Road, PROJECT: \boxtimes ss - SPLIT SPOON - SHELBY TUBE LOCATION: Ottawa, Ontario - ROCK CORE CHECKED BY: _ DESCRIBED BY: K. Schaller - WATER LEVEL ¥ DATE (FINISH): DATE (START): 5027652.016 NORTHING: EASTING: 449199.133 Report: SOIL LOG WITH GRAPH+WELL Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Recovery/ TCR(%) Moisture Content Type and Number 'N' Value/ SCR(%) Elevation (m) BGS ☐ Lab Blows per Water content (%) **DESCRIPTION OF** vvaler content (%)
Atterberg limits (%)
"N" Value 15 cm/ SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.27 **GROUND SURFACE** Ν 10 20 30 40 50 60 70 80 90 FILL: SILTY SAND with gravel, greyish brown, SS1 62 15 6-6-2-2 8 moist, loose 0.61 81.66 trace to some clay GHD_GEOTECH_V02.GLB Sand, some gravel, silt and clay, reddish SS2 3 100 ٠ 1.0 13 4-5-9-25 14 grey, moist, stiff 81.05 SS3 BEDROCK (inferred), shale fragments, 100 7 50/ 50+ 0 1.37 150mm \greyish brown, very dense **END OF BOREHOLE:** - 2.0 NOTE: - End of Borehole at 1.37 m bgs - Borehole was dry upon completion - bgs donates 'below ground surface' **—** 3.0 ---\112053--\11205379\11205379 - 90.GPJ 10 -11 12 -13 **├** 4.0 14 15 16 -- 5.0 17 18 N:\CA\MISSISSAUGA - 111 BRUNEL\LEGACY\LOG DATABASE\8-CHAR\11-19 6.0 20 21 22 7.0 23 -24 25 26 8.0 27 28 29 9.0 30 31 32

| | REFEREN | CE No. | : | 11205379 | | | | | | | | | ENCLO | SUR | RE No | .: | | 9 | |
|--|--|------------------|--------------|---------------------------------|--|---|-----------|--------------------|---------------------|---------------------|------------------------------|----------------------|---|--------------------------------|-------------------------|-------|--|---------------------|--------|
| | | Į | | | BOREHOLE No | .: . | | l | MW9 | -22 | | В | ORE | HC |)LE | RI | ΞP(| OR | λT. |
| | | ì | | | ELEVATION: _ | | | 82 | .0 m | | | | | | 1_ | | | | |
| | CLIENT: | Infrast | ructur | e Ontario (I.O.) | PROJECT: _ | Pre | elin | ninary (| Geote | chnica | al Investigat | ion | LEG | END |) | | | | |
| 72 | LOCATION | 1 : | 401 | Smyth Road, Ottaw | a, Ontario | | | | | | | | | SS | - SP | LIT S | POC | N | |
| 1/9/2 | DRILLING | RIG: _ | Trac | ck Drill Rig | DRILLING ME | TH | 0[| D: <u>203</u> | mm C | D Ho | llow Stem A | <u>uger</u> s | | | | ELBY | | | |
| ∟ Date | DESCRIBE | ED BY: | <u>D. A</u> | sh | CHECKED BY | ': _ | | A. Kha | ndeka | ır | | | ▼ | | | ATER | | | |
| 1+WEL | DATE (STA | ART): | 19 J | uly 2022 | DATE (FINISH | l): | _ | 19 July | 2022 | ! | | | | | | | | | |
| GRAPH | NORTHING | 3 : | 5027 | 7588.5 m | EASTING: | | | 449191 | .1 m | | | | | | | | | | |
| 9 SOIL LOG WITH (| Depth | Elevation (m) | Stratigraphy | | RIPTION OF D BEDROCK | 0+0+0 | State | Type and Number | Recovery/ TCR(%) | Moisture Content | Blows per 15cm/ RQD(%) | 'N' Value/ SCR(%) | Shear Sensit O W W _p W _l A | ivity (\$ /ater o tterbe | S) Écontent rg limit | s (%) | △ Fi | | |
| 20537 | Feet Metres | 82.0 | | | D SURFACE | | | | | % | | | 10 20 | 30 4 | 0 50 6 | | |) N e | /I V / |
| Report: 11 | 1 - 0.3 | 81.8 | | ∖moist, compact | RAVEL, grey/brown, | $/\!$ | \bigvee | SS1 | 62 | 6 | 9-8-10-4 | 18 | 0 | | | 0.2 | 2 m | | |
| V05.GLB F | 3 - 1.0 | 81.2 | | | compact to dense | $\sqrt{\ \ }$ | | SS2 | 83 | 3 | 2-11-27-50 | 38 | 0 | • | | bento | nite | | |
| File: N.XCATORONTOIPROJECTS1662/11205379/TECHILOG DATABASE/11205379 - PARKING GARAGE ADDITION.GPJ Library File: N.XCATORONTOIPROJECTS1662/11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22 | 10 3.0 11 2.0 10 3.0 11 1 12 1 13 4.0 14 1 15 1 16 5.0 17 1 18 1 19 6.0 21 2 22 2 23 7.0 | 79.4 | | SHALE-BEDROC brown SHALE-BEDROC | K, weathered, light K, highly to moderately ately bedded, weak to | | | RC1 RC2 RC3 | 90 100 97 | | 13 40 65 | | | | | | and the manual state of the sta | | |
| File: N:\CA\TORONTO\PROJECTS\662\11205379\T. | 24 — 7.9 25 — 7.9 26 — 8.0 27 — 28 — 29 — 29 — 30 — 31 — 31 — 32 — 32 — 32 — 32 — 32 — 32 | 74.2 | | | at 7.85 m bgs | | | | | | | | | | | 7.9 | 9 m- | | |

| RE | FEREN | ICE No. | .: | 11205379 | | | | | | | | ENCI | LOSU | RE No | D.: _ | | 10 |
|-----------|--------------------------------|------------------|--------------|---|--|----------|--------------------|---------------------|---------------------|------------------------------|----------------------|----------|--|--------------------------|--------|--------------|----------|
| | | | GHE | | BOREHOLE N ELEVATION: | | | | | | В | | | OLE | | | |
| CL | IENT: | Infras | tructur | e Ontario (I.O.) | PROJECT: | Preli | minary (| Geote | chnic | al Investigat | tion | LE | GEN | <u>D</u> | | | |
| LO | CATIO | N: | 401 | Smyth Road, Ottaw | a, Ontario | | | | | | | | SS | - SI | PLIT : | SPOC | NC |
| DR | RILLING | RIG: _ | Trac | k Drill Rig | DRILLING N | IETHC | D: 203 | mm C | DD Ho | llow Stem A | Augers | | ST RC | | | Y TU CORI | |
| | | | | sh | | | | | | | | Ā | | | ATE | R LEV | /EL |
| DA | TE (ST | ART): | 12 J | uly 2022 | DATE (FINIS | SH): _ | 12 July | 2022 | 2 | | | | | | | | |
| NC | PRTHIN | G: | | 7596.9 m | EASTING: | | 449167 | | | | 1 | Sho | ar test | (Cu) | | ΔF | iold |
| d | Depth | Elevation (m) | Stratigraphy | | RIPTION OF D BEDROCK | State | Type and Number | Recovery/ TCR(%) | Moisture Content | Blows per 15cm/ RQD(%) | 'N' Value/ SCR(%) | Sen: | sitivity Water Atterb "N" Val | (S) conter erg lim | ts (%) | | |
| Feet 0 | Metres | 82.1 | | GROUN | D SURFACE | | | | % | | | 10 | 20 30 | 40 50 | 60 70 | 80 9 | 0 |
| - | <u>-</u> - | | | GM-SAND and GF trace clay, brown, | | 1 | | | | | | | | | | | |
| 1 — | _ | | | Gravel : 43%, San Clay : 3% | id : 43%, Silt : 11%, | ΙX | SS1 | 83 | 3 | 16-13-12-4 | 25 | 0 | • | | | | |
| 2 - | - 0.5 - 0.6 | 81.5 | | | | /\ | | | | | | | | | | | |
| - | 0.7 | 81.4 | | NATIVE : SM-SILTY SAND | and GRAVEL, trace | Л | SS2 | 87 | 6 | 7-38-50/ | 88/ | | | | | | |
| 3 — | _ 1.0 | | | | K, weathered, light | <u> </u> | 332 | | | 75mm | 75mm | | | | | | |
| - | _ | | | brown | | | | | | | | | | | | | |
| 4 - | 1.2 | 80.9 | | Borehole terminat | ed due to spoon and | | | | | | | | | | | | |
| 5 — | 1.5 | | | END OF BOREHO | <u>LE :</u> | | | | | | | | | | | | |
| = | <u>-</u> | | | NOTE: | at 4 00 mg lang | | | | | | | | | | | | |
| 6 — | - | | | End of Borehole Borehole was dry bos donates 'believe | at 1.22 m bgs y upon completion ow ground surface' | | | | | | | | | | | | |
| 7 - | — 2.0 - | | | - bgs donates bei | ow ground surface | | | | | | | | | | | | |
| - | - - | | | | | | | | | | | | | | | | |
| 8 — | - - 2.5 | | | | | | | | | | | | | | | | |
| 9 — | - - | | | | | | | | | | | | | | | | |
| 9 - | - | | | | | | | | | | | | | | | | |
| 10 — | 3.0 | | | | | | | | | | | | | | | | |
| - | _ | | | | | | | | | | | | | | | | |
| 11 — | - - 3.5 | | | | | | | | | | | | | | | | |
| 12 — | - - | | | | | | | | | | | \vdash | | | + | + | \dashv |
| - | ŧ. | | | | | | | | | | | \vdash | | | + | + | _ |
| 13 — | 4.0 | | | | | | | | | | | | | | + | + | \dashv |
| 14 — | - | | | | | | | | | | | \vdash | | | + | + | \dashv |
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| 15 — | - 4.5 - | | | | | | | | | | | | | + | + | | |
| - | <u>-</u> - | | | | | | | | | | | | | | | | \perp |
| 16 — | + | | | | | | | | | | | | | | | | |

REFERENCE No .: 11205379 ENCLOSURE No.: BOREHOLE No.: BH11-22 BOREHOLE REPORT **ELEVATION:** 82.1 m Page: 1 of 1 PROJECT: Preliminary Geotechnical Investigation CLIENT: Infrastructure Ontario (I.O.) **LEGEND** 401 Smyth Road, Ottawa, Ontario LOCATION: \boxtimes ss - SPLIT SPOON ST - SHELBY TUBE DRILLING METHOD: 203mm OD Hollow Stem Augers DRILLING RIG: Track Drill Rig - ROCK CORE DESCRIBED BY: D. Ash CHECKED BY: A. Khandekar - WATER LEVEL ¥ 11205379 SOIL LOG WITH GRAPH+WELL DATE (START): ___18 July 2022 DATE (FINISH): 18 July 2022 NORTHING: 5027638.0 m **EASTING:** 449184.6 m Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) 'N' Value/ SCR(%) Elevation (m) Moisture ☐ Lab Content Blows per Water content (%) **DESCRIPTION OF** 15cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.1 **GROUND SURFACE** % 10 20 30 40 50 60 70 80 90 FILL: Report: GW-GM-SANDY GRAVEL, trace silt, SS1 67 2 19-17-11-3 28 trace clay, brown, moist, compact 2 0.6 81.5 Gravel: 52%, Sand: 37%, Silt: 8%, Clay 81.3 SS2 62 9 3-6-11-14 17 NATIVE: SM-ML-SAND and SILT, trace clay, SS3 100 50/ 50+ 75mm grey/brown, moist, compact 5 SHALE-BEDROCK, weathered, light SS4 50/ 50+ 100 brown 2.0 50mm 11205379 GHD auger refusal 2.5 79.6 SHALE-BEDROCK, moderately bedded, 9 moderately weathered, medium strong, RC1 78 36 - 3.0 10 grey/black 11 12 N./CA\TORONTO\PROJECTS\662\11205379\TECH\LOG DATABASE\11205379 - PARKING GARAGE ADDITION.GPJ 13 -- 4.0 RC2 100 60 14 15 16 5.0 17 18 RC3 100 50 19 - 6.0 20 21 22 23 - 7.0 RC4 100 55 24 25 8:8 74.2 27 **END OF BOREHOLE:** 28 29 - End of Borehole at 7.98 m bgs 9.0 - Borehole was dry upon completion 30 - bgs donates 'below ground surface' 31

32

34 35 10.0

| REFERENCE No.: | 11205379 | - | | | | | | | ENCL | .OSUF | RE No | o.: _ | | 12 |
|-------------------------|--|---|-------------------------|--------------------|---------------------|--------|-----------------------------|----------------------|---------------------------------------|--|-------------------|-------|--------------|--------|
| Ø | HD | BOREHOLE No. ELEVATION: | | | | | | В | | EH(age: | | | | |
| CLIENT: Infrasti | ructure Ontario (I.O.) | PROJECT: _F | Preli | minary (| Geote | chnica | al Investiga | ation | LE | GENI | <u> </u> | | | |
| LOCATION: | 401 Smyth Road, Ottaw | <i>y</i> a, Ontario | | | | | | | | SS | | | SPO | |
| DRILLING RIG: _ | Track Drill Rig | DRILLING MET | ГНО | D: 203 | mm C | D Ho | llow Stem | Augers | | ST RC | | | SY TU COR | |
| DESCRIBED BY: | D. Ash | CHECKED BY: | _ | A. Kha | ndeka | r | | | Ā | | | | R LE | |
| DATE (START): | 12 July 2022 | DATE (FINISH) |): _ | 12 July | 2022 | | | | | | | | | |
| NORTHING: | 5027590.3 m | EASTING: | | 449214 | l.3 m | | | | | | | | | |
| Depth Elevation (m) | SOIL AN | RIPTION OF D BEDROCK | State | Type and Number | Recovery/ TCR(%) | | Blows pe 15cm/ RQD(%) | 'N' Value/ SCR(%) | Sens W _p W _l | ar test (sitivity (Water Atterbe "N" Valu vs / 12 | S) contererg limi | cm) | □ l | |
| Feet Metres 82.1 | GROUN | ID SURFACE | + | | | % | | | 10 2 | 20 30 4 | 10 50 | 60 7 | 0 80 9 | 00 |
| 1 0.5 | GM-GRAVEL, sor clay, brown, moist | ne sand and silt, trace , compact nd : 14%, Clay & Silt : | \bigvee | SS1 | 46 | 3 | 13-25-5-5 | 30 | 0 | • | | | | |
| 3 - 1.0 | NATIVE : SM-ML-SAND and brown, moist, very | d SILT, trace clay, dense | $\overline{\mathbb{R}}$ | SS2 | 100 | 5 | 15-39-40-5 75mm | 0/ 79 | 0 | | | | | |
| 4 — 1.1 81.0 5 — 1.5 | SHALE-BEDROC brown | K, weathered, light | | SS3 | 100 | - | 50/ 0mm | 50/ 0mm | | | | | | |
| 6 — 1.8 80.2 = 2.0 7 — | auger refusal | ed due to spoon and | | | | | | | | | | | | |
| 8 – 2.5 | NOTE: - End of Borehole - Borehole was dr - bgs donates 'bel | at 1.83 m bgs | | | | | | | | | | | | |
| 9 3.0 | | | | | | | | | | | | | | |
| - 3.5 | | | | | | | | | | | | | | |
| 3 - 4.0 | | | | | | | | | | | | | | |
| 14 4.5 | | | | | | | | | | | | | | |
| 15 — | | | | | | | | | | | | | | |

REFERENCE No.: 11205379 ENCLOSURE No.: BOREHOLE No.: BH13-22 BOREHOLE REPORT **ELEVATION:** 82.2 m Page: 1 of 1 PROJECT: Preliminary Geotechnical Investigation CLIENT: Infrastructure Ontario (I.O.) **LEGEND** 401 Smyth Road, Ottawa, Ontario LOCATION: \boxtimes ss - SPLIT SPOON 1/9/22 ST - SHELBY TUBE Track Drill Rig DRILLING RIG: DRILLING METHOD: 203mm OD Hollow Stem Augers - ROCK CORE DESCRIBED BY: L. McCann/S. Wallis CHECKED BY: A. Khandekar - WATER LEVEL Ţ 11205379 SOIL LOG WITH GRAPH+WELL DATE (START): 4 July 2022 DATE (FINISH): 4 July 2022 NORTHING: 5027615.5 m **EASTING:** 449212.0 m Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) Elevation (m) Value/ Moisture 'N' Value SCR(%) ☐ Lab Blows per Content Depth Water content (%) **DESCRIPTION OF** 15cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.2 **GROUND SURFACE** % 10 20 30 40 50 60 70 80 90 82.1 0.1 ASPHALT: 75 mm Library File: 11205379 GHD_GEOTECH_V05.GLB Report: SS1 100 FILL 10-13-10-5 23 GW-GM-SANDY GRAVEL. light 2 brown/grey, dry, compact 0.9 1.8 81.3 81.2 NATIVE: SS2 2-2-11-15 13 71 SP-GP-SAND and GRAVEL, trace clay, brown, moist, compact SHALE-BEDROCK, weathered, grey 5 RC1 82 0 80.2 2:8 SHALE-BEDROCK, moderately to highly weathered, thinly bedded, highly to moderately fractured, grey, weak RC2 10 95 3.0 10 11 occasional clay and shale layers N.)CA\TORONTO\PROJECTS\662\11205379\TECH\LOG DATABASE\11205379 - PARKING GARAGE ADDITION.GPJ 12 13 4.0 RC3 100 37 14 15 16 - 5.0 occasional clay and shale layers 17 18 19 RC4 100 43 6.0 20 21 6.6 75.5 22 **END OF BOREHOLE:** 7.0 23 NOTE: 24 - End of Borehole at 2.37 m bgs 25 - Borehole was dry upon completion - Rock coring from 1.32 m bgs 26 - bgs donates 'below ground surface' 8.0 27 28 29 9.0 30 31 32

| | | GHE | | BOREHOLE N ELEVATION: | | | | | | В | _ | EHO age: _ | | | EPO |
|-------------|---------------|--------------|---|---------------------------------------|-----------------------|----------|-------|---------------------|------------------------------|----------------------|-------------|--|-----------------|-----------|--------------------|
| CLIENT: | Infras | tructur | e Ontario (I.O.) | PROJECT: | Preli | minary (| Geote | chnica | al Investigat | ion | LEC | SEND | | | |
| LOCATION | l: | 401 | Smyth Road, Ottaw | a, Ontario | | | | | | | \boxtimes | | - SPI | LIT S | POON |
| | | | ck Drill Rig | | IETHC | D: 203 | mm C | D Ho | llow Stem A | ugers | | ST | | | / TUBE |
| DESCRIBE | D BY: | D. A | sh | CHECKED E | 3Y: _ | A. Kha | ndeka | ır | | | Щ ¥ | RC | | | LEVEL |
| DATE (STA | ART): | 12 J | uly 2022 | DATE (FINIS | SH): _ | 12 July | 2022 | ! | | | | | | | |
| NORTHING | 3: | 5027 | 7618.1 m | EASTING: | | 449237 | 7.3 m | | | | | | | | |
| Depth | Elevation (m) | Stratigraphy | DESCR | IPTION OF D BEDROCK | State | 1 | | Moisture Content | Blows per 15cm/ RQD(%) | 'N' Value/ SCR(%) | Sensi | test (Cutivity (S) Vater co tterberg | ntent limits | s (%) | △ Field □ Lab |
| Feet Metres | 82.2 | | | D SURFACE | | | | % | | | ` | 30 40 | | | 80 90 |
| | | | FILL : GW-GM-SANDY (| GRAVEL, trace silt, | | | | | | | | | | | |
| 1 - 0.5 | | | trace clay, brown, | | $\bigg \bigg $ | SS1 | 58 | 2 | 11-25-16-6 | 41 | 0 | • | | | |
| 2 - 0.6 | 81.6 81.5 | | | | | | | | | | | | + | \forall | +++ |
| - 0.7 | 01.0 | | SP-GP-SAND and trace clay, brown, | GRAVEL, trace silt, moist, very dense | $/ \parallel \rangle$ | | | | | | | | | \vdash | ++ |
| 3 1.0 | | | | K, weathered, light | _ \ | SS2 | 100 | 5 | 7-35-48-42 | 83 | 0 | | | \vdash | |
| 4 - 1.2 | 81.0 | | <u> </u> | | / \ | | | | | | | | | \vdash | |
| - | | | auger refusal | ed due to spoon and | | | | | | | | | | | |
| 5 _ 1.5 | | | END OF BOREHO | <u>LE :</u> | | | | | | | | | | | |
| + | | | NOTE: - End of Borehole | at 1 22 m h ga | | | | | | | | | | | |
| 6 | | | - Borehole was dry - bgs donates 'beld | upon completion | | | | | | | | | | | |
| 7 - 2.0 | | | bgo donates bett | ow ground surface | | | | | | | | | | | |
| · | | | | | | | | | | | | | | | |
| 8 - 2.5 | | | | | | | | | | | | | | | |
| + 2.0 | | | | | | | | | | | | | | \vdash | ++ |
| 9 — | | | | | | | | | | | | + | | + | + |
| 10 - 3.0 | | | | | | | | | | | | + | | \vdash | |
| ` | | | | | | | | | | | | $\perp \downarrow$ | | \perp | \coprod |
| 11 - | | | | | | | | | | | | | | | |
| - 3.5 | | | | | | | | | | | | | | | |
| 12 — | | | | | | | | | | | | | | \top | |
| + | | | | | | | | | | | | + | | \top | |
| 13 4.0 | | | | | | | | | | | | ++ | + | + | ++ |
| 14 — | | | | | | | | | | | | + | | + | ++ |
| | | | | | | | | | | | | + | | \vdash | + |
| 15 — 4.5 | | | | | | | | | | | | $\perp \downarrow$ | | \dashv | $\perp \perp \mid$ |
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| | | Ç | GHE | | BOREHOLE No. ELEVATION: | | | | | | В | ORI | | OLE | | | |
|------------|----------------|------------------|--------------|--|-------------------------------|----------------|--------------------|---------------------|---------------------|------------------------------|----------------------|--|----------|--------------------------|--------------------|--------------|---|
| CLI | ENT: _ | Infrast | ructur | e Ontario (I.O.) | PROJECT: _F | reli | minary (| Geote | chnic | al Investigat | ion | LEC | GENI | <u> </u> | | | |
| LO | CATION | l: | 401 | Smyth Road, Ottaw | a, Ontario | | | | | | | \boxtimes | | | | SPO | |
| DR | ILLING | RIG: _ | Trac | k Drill Rig | DRILLING MET | ΉΟ | D: 203 | mm C | D Ho | llow Stem A | ugers | | ST RC | | | SY TU COR | |
| DE | SCRIBE | D BY: | <u>D. A</u> | sh | CHECKED BY: | _ | A. Kha | ndeka | ır | | | Ţ | | | | R LE\ | |
| DA | TE (STA | ART): | 12 J | uly 2022 | DATE (FINISH |): _ | 12 July | 2022 | | | | | | | | | |
| NO | RTHING | 3 : | 5027 | 7642.6 m | EASTING: | | 449234 | 1.7 m | | | | | | | | | |
| Denth | 2 | Elevation (m) | Stratigraphy | | LIPTION OF D BEDROCK | State | Type and Number | Recovery/ TCR(%) | Moisture Content | Blows per 15cm/ RQD(%) | 'N' Value/ SCR(%) | Sens O N W _p W _l | N" Valu | S) conten erg limi | | △ F □ L | |
| Feet 0 | Metres | 82.1 | | | D SURFACE | 1 | | | % | | | 10 2 | 0 30 4 | 40 50 | 60 70 | 80 9 | 0 |
| - | _ | | | | RAVEL, trace silt, trace | $\backslash /$ | | | | | | | | | | | |
| 1 - | - | | | clay, brown, moist, Gravel : 40%, San Clay : 3% | dense d : 47%, Silt : 10%, | IX | SS1 | 62 | 3 | 16-18-13-5 | 31 | 0 | • | | | | |
| 2 | - 0.5 - 0.6 | 81.5 | | • | | /\ | | | | | | | | | | | |
| _ | - 0.0 | 01.0 | | SHALE-BEDROCK brown | K, weathered, light | $\backslash /$ | | | | | | | | | | | |
| 3 — | | | | | | ΙX | SS2 | 100 | 6 | 20-25-50/ 125mm | 75/ 125mn | | | | | | |
| - | - 1.0 - 1.1 | 81.1 | = | Rorehole terminate | ed due to spoon and | _/ \ | | | | | | | | | | | |
| 4 - | _ | | | auger refusal | ou due to spoon and | | | | | | | | | | | | |
| - | | | | END OF BOREHO | LE: | | | | | | | | | | | | |
| 5 — | - 1.5 - | | | NOTE: | -1.4.07 m. h.m. | | | | | | | | | | | | Ц |
| _ | _ | | | End of Borehole Borehole was dry bgs donates 'beld | upon completion | | | | | | | | | | | | |
| 6 | - | | | - bgs donates beit | ow ground surface | | | | | | | | | | | | |
| 7 | — 2.0 - | | | | | | | | | | | | | | | | |
| . | _ | | | | | | | | | | | | | | | | |
| 8 — | - 0.5 | | | | | | | | | | | | | | | | |
| _ | - 2.5 - | | | | | | | | | | | | | | | | |
| 9 — | _ | | | | | | | | | | | | | | | | |
| - | - 3.0 | | | | | | | | | | | | | | | | |
| 10 — | - 0.0 | | | | | | | | | | | | | | | | |
| 11 — | _ | | | | | | | | | | | | | | \prod | | |
| | - - 3.5 | | | | | | | | | | | | | | | | H |
| 12 — | _ | | | | | | | | | | | | | + | + | + | H |
| - | _ | | | | | | | | | | | | | + | | - | |
| 13 — | - 4.0 | | | | | | | | | | | | | | $\perp \downarrow$ | | |
| - | _ | | | | | | | | | | | | | | | | |
| 14 — | _ | | | | | | | | | | | | | | | | |
| <u>,</u> † | - - 4.5 | | | | | | | | | | | | | | | | |
| 15 — | _ | | | | | | | | | | | | | | | | |
| | | | 1 | | | - 1 | I | 1 | 1 | ĺ | 1 | 1 | | 1 | 1 1 | | 1 |

| | | GHE | | BOREHOLE No. | | | | | | В | | EHO | | | PO |
|-----------------|---------------|--------------|---|-------------------------|---------------|----------|-------|---------------------|------------------------------|----------------------|-------------|--|-------------------------------|------------|----------------------|
| CLIENT: | Infrast | tructur | e Ontario (I.O.) | PROJECT: | Preli | minary (| Geote | chnica | al Investigat | ion | LEC | <u>SEND</u> | | | |
| LOCATION | l: | 401 | Smyth Road, Ottaw | —— — a, Ontario | | | | | | | \boxtimes | | - SPI | ₋IT SI | POON |
| | | | ck Drill Rig | | ТНО | D: 203 | mm C | D Ho | llow Stem A | ugers | | ST | - SHE | ELBY | TUBE |
| DESCRIBE | D BY: | D. A | sh | CHECKED BY | : | A. Kha | ndeka | ır | | | | | - RO | | ORE LEVEL |
| DATE (STA | ART): | 12 J | uly 2022 | DATE (FINISH |): _ | 17 Dec | embe | r 202 | 2 | | | | | | |
| NORTHING | 3: | 5027 | 7594.4 m | EASTING: | | 449262 | 2.3 m | | | | | | | | |
| Depth | Elevation (m) | Stratigraphy | DESCR | LIPTION OF D BEDROCK | State | | | Moisture Content | Blows per 15cm/ RQD(%) | 'N' Value/ SCR(%) | Sensi | r test (C tivity (S Vater co Atterbero N" Value s / 12 in |) ´ ontent (g limits | (%) (%) | △ Field □ Lab |
| Feet Metres | 82.1 | | GROUN | D SURFACE | | | | % | | | _ ` | 30 40 | | | 30 90 |
| | | | FILL : SW-SM-SAND and | d GRAVEL, trace silt, | | | | | | | | | | | |
| 1 - 0.5 | | | trace clay, brown, | | | SS1 | 54 | 3 | 2-6-8-6 | 14 | 0 • | | | | |
| 0.7 | 81.4 | | NATIVE: | CDA\/EL 4=====il4 | 7 | | | | | | | | | | |
| 3 - 0.9 - 1.0 | 81.2 | | ∖trace clay, brown, | | / \ | SS2 | 87 | 7 | 2-4-11-14 | 15 | | | | | |
| - 1.0 | | | SHALE-BEDROCH brown | K, weathered, light | $/ \setminus$ | | | | | | | | | | |
| 4 - 1.2 | 80.9 | | | ed due to spoon and | | SS3 | 100 | | 50/ 0mm | 50/ 0mm | | | | | |
| 5 - 1.5 | | | auger refusal | ıe. | | | | | | | | | | | |
| | | | END OF BOREHO | <u>LE .</u> | | | | | | | | | | | H |
| 6 | | | - End of Borehole - Borehole was dry | at 1.22 m bgs | | | | | | | | | | + | $\vdash\vdash\vdash$ |
| 2.0 | | | - bgs donates 'beld | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | |
| _ | | | | | | | | | | | | | | | |
| 8 – 2.5 | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | |
| + | | | | | | | | | | | | $\dashv \uparrow$ | 1 | | |
| 10 - 3.0 | | | | | | | | | | | | + | + | + | |
| + | | | | | | | | | | | | ++ | + | + | |
| 11 — | | | | | | | | | | | | + | + | + | H |
| - 3.5 12 - | | | | | | | | | | | | + | + | + | |
| '- | | | | | | | | | | | | $\perp \downarrow \downarrow$ | $\perp \downarrow \downarrow$ | \perp | |
| 13 - 4.0 | | | | | | | | | | | | $\perp \! \! \perp$ | | \perp | |
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| 14 — | | | | | | | | | | | | | | | |
| 4.5 | | | | | | | | | | | | + | + | \dagger | |
| 15 — | | | | | | | | | | | | + | + | + | |
| - I | | 1 | | | | I | | 1 | | | | | | | 1 |

| _ | REFERENCE No.: 1120537 | 9 | | | | | | | ENCLOS | SURE | No.: | | 17 | |
|--|--|---|-----------|--------------------|---------------------|-------|-----------------------------|----------------------|--------------------------|---|----------------------|---------------|------------------|----|
| | GHD | BOREHOLE No.: ELEVATION: | | | | | | В | ORE Pag | HO l | | | | RT |
| | CLIENT: Infrastructure Ontario (I. | | elii | minary (| Geote | chnic | al Investiga | ation | LEGE | <u>ND</u> | | | | |
| /22 | LOCATION: 401 Smyth Road | | | | | | | | ⊠ s: ⊠ s ⁻ | | | | OON TUBE | |
| te: 1/9 | DRILLING RIG: Track Drill Rig | | | | | | | | ∭ R | C - | ROC | | | |
| ∐ Da | DESCRIBED BY: D. Ash | | | | | | | | Ā | | WAT | ER L | EVEL | - |
| H+WE | DATE (START): 12 July 2022 | DATE (FINISH): | _ | 12 July | 2022 | | | | | | | | | |
| GRAP | NORTHING: 5027619.3 m | EASTING: | | 449258 | 8.6 m | | T | | | | | | | |
| 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22 | Depth Elevation (m) Stratigraphy | | State | Type and Number | Recovery/ TCR(%) | | Blows pe 15cm/ RQD(%) | 'N' Value/ SCR(%) | (SWOID) | ity (S) ater cor erberg Value 12 in | ntent (% limits (| %) %)) | ∆ Field ∃ Lab | |
| 12053 | Feet Metres 82.1 (| GROUND SURFACE | | | | % | | | 10 20 | 30 40 | 50 60 | 70 80 | 90 | |
| 5.GLB Report: 1 | 1 — GW-GM-G trace clay, Gravel : 52 : 2%, | RAVEL with SAND, trace silt, brown, moist, compact %, Sand : 39%, Silt : 7%, Clay | \bigvee | SS1 | 54 | | 4-10-17-17 | 1 27 | • | | | | | |
| File: N.;CAITORONTO!PROJECTS 662/11205379\TECHLUG DATABASE\11205379 - PARKING GARAGE ADDITION.GPJ Library File: 11205379 GHD_GEOTECH_V05.GLB Report: | 2 - 0.7 81.4 NATIVE: SP-GP-SA trace clay, | ND and GRAVEL, trace silt, brown, moist, compact | \bigvee | SS2 | 100 | | 3-8-22-50, 75mm | / 30 | | • | | | | |
| J Library File: 1120 | brown, Borehole to auger refu: 5 — 1.5 END OF Be | erminated due to spoon and sal | | | | | | | | | | | | |
| ARAGE ADDITION.GF | 6 — End of Borehole - bgs dona | orehole at 1.14 m bgs was dry upon completion tes 'below ground surface' | | | | | | | | | | | | |
| 79 - PARKING G | 9 — | | | | | | | | | | | | | |
| 4TABASE\11205 | 10 - 3.0 | | | | | | | | | | | | | |
| 379\TECH\LOG D, | 11 — 3.5 | | | | | | | | | | | | | |
| IECTS\662\11206 | 13 — 4.0 | | | | | | | | | | | | | |
| PROJ | 14 — | | | | | | | | | | | | | |
| RONTC | 15 — 4.5 | | | | | | | | | | | | | |
| :\CA\TO | | | | | | | | | | | | | | |
| File: N | 16 — | | | | | | | | | | | | | |

REFERENCE No .: 11205379 ENCLOSURE No.: BOREHOLE No.: BH18-22 BOREHOLE REPORT **ELEVATION:** 82.1 m Page: 1 of 1 PROJECT: Preliminary Geotechnical Investigation CLIENT: Infrastructure Ontario (I.O.) **LEGEND** 401 Smyth Road, Ottawa, Ontario \boxtimes ss - SPLIT SPOON 1/9/22 ST - SHELBY TUBE DRILLING RIG: Track Drill Rig DRILLING METHOD: 203mm OD Hollow Stem Augers - ROCK CORE DESCRIBED BY: D. Ash CHECKED BY: A. Khandekar - WATER LEVEL Ţ 11205379 SOIL LOG WITH GRAPH+WELL DATE (START): 15 July 2022 DATE (FINISH): 15 July 2022 NORTHING: 5027645.0 m **EASTING:** 449256.7 m Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) 'N' Value/ SCR(%) Elevation (m) Moisture ☐ Lab Blows per Content Water content (%) **DESCRIPTION OF** 15cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 82.1 **GROUND SURFACE** % 10 20 30 40 50 60 70 80 90 FILL: GW-GM-SANDY GRAVEL with sand, SS1 62 9-8-10-4 18 trace silt, trace clay, grey/brown, moist, 0.6 81.5 compact GEOTECH_V05.GLB 8.0 81.3 Gravel: 73%, Sand: 21%, Silt: 5%, Clay SS2 38 83 2-11-27-50 1% 1.0 NATIVE: SP-GP-SAND and GRAVEL, trace silt, 1.4 80.7 trace clay, moist, dense SHALE-BEDROCK RC1 100 0 auger refusal **Library File:** 11205379 GHD 2.0 SHALE-BEDROCK, moderately to highly weathered, thinly bedded, very weak to moderately strong, grey/black 3.0 10 RC2 100 0 11 N.)CA\TORONTO\PROJECTS\662\11205379\TECH\LOG DATABASE\11205379 - PARKING GARAGE ADDITION.GPJ 12 13 4.0 14 15 RC3 100 36 16 - 5.0 17 18 19 6.0 20 RC4 100 51 21 22 23 75.0 24 **END OF BOREHOLE:** 25 - End of Borehole at 7.13 m bgs 26 8.0 - Rock coring from 1.40 m bgs 27 - Borehole was dry upon completion - bgs donates 'below ground surface' 28 29 9.0 30 31 32

| REFERENCE No.: 11205379 | | | | | E | ENCLOSUR | E No.: _ | 19 | |
|--|---|-----------------|--|----------------------------|-----------------------------|---|--|-----------------|----|
| | BOREHOLE No.: | В | H19-22 | | В | OREHO | LE F | REPOF | RT |
| GHD | ELEVATION: | 81.1 | 1 m | | | Page: _ | | | |
| CLIENT: Infrastructure Ontario (I.O.) | PROJECT: Pre | liminary G | eotechnica | al Investiga | ation | LEGEND | | | |
| LOCATION: 401 Smyth Road, Ottaw | a, Ontario | | | | | ⊠ ss | | SPOON | |
| DRILLING RIG: <u>Track Drill Rig</u> | DRILLING METHO | OD: 203m | nm OD Ho | llow Stem | <u>Augers</u> | ⊠ ST ∏ RC | - SHELE - ROCK | BY TUBE CORE | |
| DESCRIBED BY: D. Ash | | | | | | Ā | | R LEVEL | |
| DATE (START): 14 July 2022 | DATE (FINISH): | 14 July 2 | 2022 | | | | | | |
| NORTHING: 5027588.9 m | EASTING: | 449046. | | | | Shoar tost (C | <u> </u> | △ Field | |
| | RIPTION OF D BEDROCK | Type and Number | Recovery/ TCR(%) Moisture Content | Blows pe 15cm/ RQD(% | 'N' Value/ SCR(%) | Shear test (C Sensitivity (S Water co Atterbery "N" Value (blows / 12 in | i) [*] ontent (%) g limits (% | □ Lob | |
| A CDUAL T. 75 mm | D SURFACE | | % | | | 10 20 30 40 | 50 60 7 | 0 80 90 | |
| ASPHALT: 75 mm FILL: SM-GRAVELLY Solday, brown, loose | AND, trace silt, trace | SS1 | 79 | 4-5-3-6 | 8 | • | | | |
| 80.2 NATIVE : SP-GP-SAND and trace clay, brown, Gravel : 31%, San Clay : 7% | d : 46%, Silt : 16%, K, weathered, light | SS2 | 71 | 17-33-50, 125mm | / 83/ 125mn 1 | | | | |
| | at 1.37 m bgs | | | | - | | | | |
| NO - 2.0 - bgs donates 'beld' - bgs donates 'bgs donates 'beld' - bgs donates 'bgs dona | ow ground surface' | | | | - | | | | |
| 8. – 2.5 – 2.5 – 9 – 9 – 9 – 9 – 9 – 9 – 9 – 9 – 9 – | | | | | _ | | | | |
| 10 — 3.0 — 3 | | | | | _ | | | | |
| G 11 - 당 + 3.5 | | | | | | | +++ | | |
| 12 — | | | | | | | | | |
| 13 - 4.0 | | | | | | | + | | |
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REFERENCE No.: 11205379 ENCLOSURE No.: BOREHOLE No.: MW20-22 BOREHOLE REPORT **ELEVATION:** 81.2 m Page: 1 of 1 PROJECT: Preliminary Geotechnical Investigation CLIENT: Infrastructure Ontario (I.O.) **LEGEND** 401 Smyth Road, Ottawa, Ontario \boxtimes ss - SPLIT SPOON **Date:** 1/9/22 ST - SHELBY TUBE DRILLING RIG: Track Drill Rig DRILLING METHOD: 203mm OD Hollow Stem Augers - ROCK CORE DESCRIBED BY: D. Ash CHECKED BY: A. Khandekar - WATER LEVEL Ţ FIIe: N.CAITORONTOIPROJECTS1662/112053791TECHLOG DATABASE1/1205379 - PARKING GARAGE ADDITION. GPJ LIDRAY FIIe: 1/205379 GHD. GEOTECH. V05. GLB Report: 1/205379 SOIL LOG WITH GRAPH+WELL DATE (START): 14 July 2022 DATE (FINISH): 14 July 2022 NORTHING: 5027656.2 m **EASTING:** 449095.7 m Shear test (Cu) Sensitivity (S) △ Field Stratigraphy Type and Number Recovery/ TCR(%) 'N' Value/ SCR(%) Elevation (m) Moisture ☐ Lab Content Blows per Depth Water content (%) **DESCRIPTION OF** 15cm/ Atterberg limits (%) SOIL AND BEDROCK RQD(%) (blows / 12 in.-30 cm) Feet Metres 81.2 **GROUND SURFACE** 10 20 30 40 50 60 70 80 90 ASPHALT: 75 mm 0.1 81.1 02 FILL: SM-GRAVELLY SAND, some silt, trace SS1 58 5 6-10-8-5 18 0 clay, brown, moist, compact bentonite 0.5 Gravel: 36%, Sand: 44%, Silt: 16%, Clay: 4% 0.7 m 8.0 80.5 NATIVE: 3 SP-GP-SAND and GRAVEL, trace silt, 1.0 80.2 trace clay, brown, moist, dense SS2 87 5 8-21-29-27 50 0 1.0 Gravel: 46%, Sand: 41%, Silt: 9%, Clay screer SHALE-BEDROCK, weathered, grey 1.5 SS3 100 50/ 50/ 1.6 79.6 1.6 m Borehole terminated due to spoon and 75mm 75mm auger refusal **END OF BOREHOLE:** 2.0 NOTE: - End of Borehole at 1.60 m bgs - Monitoring well installed at 1.60 m bgs 2.5 - bgs donates 'below ground surface' 9 3.0 3.5 12 13 4.0 14 4.5 15 16 5.0 17 18 5.5 19



| CIIE | ent: | Infrastructure Ontario | | | Lab No.: | G-21-01 | |
|-----------------|-----------------------|---|---------------|-------------------|--------------|------------------|------------------|
| Pro | ject, Site: | Proposed Parking Structure Children's Hospital of Easte 401 Smyth Road, Ottawa, C | rn Ontario C | Campus | Project No.: | 11205379-80 | |
| | Borehole No.: | B1-2 | | | Sample No.: | SS2 | |
| | Depth: | 0.7-1.0 | 0m | | Enclosure: | - | |
| | | | | | | | |
| | 100 90 80 70 | | | | | | 0 10 20 30 |
| sing | 60 | | | | | | 40 |
| Percent Passing | 50 | | | | | | Percent Retained |
| Per | 40 | | | | | | 60 |
| | 30 | | | | | | 70 |
| | 20 | | | | | | 80 |
| | 10 | | | | | | 90 |
| | 0.001 | 0.01 | 0.1 Diam | 1 eter (mm) | | 10 | 100 |
| | | | Diairi | Sand | | Gravel | 7 |
| | | Clay & Silt | Fine | | ım Coarse | Fine Coarse | - |
| | | Particle | e-Size Limits | as per USCS (ASTM | D-2487) | <u> </u> |] |
| | | Soil Description | | Gravel (%) | Sand (%) | Clay & Silt (%) | |
| | S | and and Gravel, some Silt, trace (| Clay | 39 | 39 | 22 | |
| | | Clay-size particles (<0.002 mn | n): | | | 7 % | |
| Rer | narks: | | | | | | |
| Per | formed by: | Z. Ma | athurin | | Date: | February 10, 202 | 1 |
| Ver | ified by: | E. Be | ennett | | Date: | February 17, 202 | 1 |
| | | | | | | | |



| Clie | ent: | | Infra | structu | re Onta | ario | | | | | | | | _Lab | No.: | | G | -21-0° | 1 | | | | |
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| Pro | ject, Site | : | Chile | oosed P dren's H | - Hospita | l of Ea | aste | rn (| Ontari | io Ca | ımpı | ıs | | Pro | ject No. | : | 11 | 2053 | 79-80 |) | | | |
| | • • | | 401 | Smyth | Road, | Ottaw | a, O |)nta | ırio | | | | | | | | | | | | | | |
| | Borehole | No.: | | | | В3 | -21 | | | | | | _ | Sam | ple No.: | | SS | S2 | | | | | |
| | Depth: | | | | | 0.7- | 1.0 | | | | | | | Encl | osure: | | - | | | | | | |
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| | 70 | | | | | | | | | | | | | | | | | | | | | 30 | |
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| sing | 60 | | | | | | | # | | | | + | | | | | | | | | $+\!\!\!+\!\!\!\!+\!\!\!\!+$ | 40 | ained |
| Percent Passing | | | | | | | | | | | | | | | | | | | | | | | Percent Retained |
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| 4 | 40 | | | | | | | | | | | M | | | | | | | | | Ш | 60 | |
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| | | | | Soil Des | scriptio | n | | | | | Grav | vel (% | 6) | | Sand (% | b) | | CI | ay & \$ | Silt (% | %) | | |
| | | Sand | , some | Gravel, | some S | Silt, son | ne C | lay | | | | 19 | | | 50 | | | | 31 | 1 | | | |
| | Sand, some Gravel, some Silt, son Clay-size particles (<0.002) | | | | nm): | | | | | | | | | | | | 14 | % | | | | | |
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| 1101 | ilai No. | | | | | | | | | | | | | | | | | | | | | | |
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| Per | formed b | y: | | | | Z. N | Math | uri | n | | | | | _ | Date: | | | Febr | uary | 10, 2 | :021 | | |
| Ver | ified by: | | | | | E. I | Beni | net | <u>t</u> | | | | | _ | Date: | | | Febr | uary | 17, 2 | :021 | | |
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| Infrastructure Ontario | 4 | | Lab No.: | G-21-01 | | - |
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| Children's Hospital of Ea | astern Ontario | Campus | Project No.: | 11205379-80 | | _ |
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| | | | | Fine Co | arse | |
| Farti | icie-Size Limits | as per USCS (ASTM | D-2467) | | | 7 |
| Soil Description | | Gravel (%) | Sand (%) | Clay & S | ilt (%) | |
| ravel and Sand, trace Silt, trace | e Clay | 48 | 41 | | | |
| | | | | 3 % | <u>,</u> | |
| | | | | | | - |
| Z. N | Mathurin | | Date: | February 1 | 10, 2021 | _ |
| E. | Bennett | | Date: | February 1 | 7, 2021 | - |
| Children's Hospital of Eastern Ontario Cal 401 Smyth Road, Ottawa, Ontario BH1-21 0.1-0.3m Ontario BH1-21 Ontario Ontario Clay & Silt Fine Particle-Size Limits as pa | Proposed Parking Structure Children's Hospital of Eastern Ontario Campus 401 Smyth Road, Ottawa, Ontario BH1-21 0.1-0.3m Clay & Silt Particle-Size Limits as per USCS (ASTM Soil Description Tavel and Sand, trace Silt, trace Clay Z. Mathurin | Proposed Parking Structure Children's Hospital of Eastern Ontario BH1-21 0.1-0.3m Sample No.: Enclosure: Sample No.: Enclosure: Clay & Silt Tine Particle-Size Limits as per USCS (ASTM D-2487) Soil Description Cayel and Sand, trace Silt, trace Clay Z. Mathurin Date: | Proposed Parking Structure | Proposed Parking Structure | | |



| Clie | ent: | Infrastructure Or | | | Lab No.: | G-21-01 | 1 | |
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| | | Proposed Parkin | | | | | | |
| Pro | ject, Site: | Children's Hospi | | | Project N | o.: 112053 | 79-80 | |
| | Danahala Na | | BH2-21 | | Compute No. | .: Grab | | |
| | Borehole No.: | | | | Sample No | .: <u>Glab</u> | | |
| | Depth: | | 0.1-0.3m | | Enclosure: | - | | |
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| | 10 | | | | | | | 90 |
| | | | | | | | | |
| | 0.001 | 0.01 | 0.1 | Diameter (mm) | 1 | 10 | | 100 100 |
| | | | | Diameter (mm) | | | | |
| | | Clay & Silt | | Sand | | Gra | vel | |
| | | Ciay & Siit | | | Medium Coa | rse Fine | Coarse | |
| | | | Particle-Size Li | mits as per USCS (| ASTM D-2487) | | | |
| | | | | | | | | |
| | | Soil Descript | on | Gravel (% | Sand (| .%) Cla | ay & Silt (%) | |
| | Si | and and Gravel, trace \$ | Silt. trace Clav | 42 | 50 | | 8 | |
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| Rer | narks: | | | | | | | |
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| Per | formed by: | | Z. Mathurin | | Date | : <u>Febr</u> | uary 10, 2021 | |
| Ver | ified by: | | E. Bennett | | Date | : Febr | uary 17, 2021 | |
| | | | | | | | | <u></u> |



| Clie | ent: | Infrastructure Ontario | | | Lab No.: | G-21-01 | | |
|-----------------|---------------|--|------------------|-------------------|--------------|------------|----------|------------------------|
| Pro | ject, Site: | Proposed Parking Struc Children's Hospital of E | astern Ontario | Campus | Project No.: | 11205379-8 | 0 | |
| | | 401 Smyth Road, Ottav | | | | | | |
| | Borehole No.: | BH | 12-21 | | Sample No.: | SS1 | | |
| | Depth: | 0.5- | -0.8m | | Enclosure: | _ | | |
| | | | | | | | | |
| | | | | | | | | |
| | 100 | | | | | | | T ° |
| | 90 | | | | | | | 10 |
| | 00 | | | | | | | |
| | 80 | | | | | | | 20 |
| | 70 | | | | | | | 30 |
| sing | 60 | | | | | | | 40 |
| Percent Passing | | | | | | | | 05 09 Percent Retained |
| Percer | 50 | | | | | | | 50 Jercen |
| _ | 40 | | | | | | | 60 |
| | | | | | | | | |
| | 30 | | | | | | | 70 |
| | 20 | | | | | | | 80 |
| | 10 | | | | | | | 90 |
| | • | | | | | | | |
| | 0.001 | 0.01 | 0.1 Diame | eter (mm) | | 10 | | 100 100 |
| | | | | Sand | | Gravel | | |
| | | Clay & Silt | Fine | | | Fine C | Coarse | |
| | | Part | icle-Size Limits | as per USCS (ASTM | D-2487) | | | |
| | | Soil Description | | Gravel (%) | Sand (%) | Clay & | Silt (%) | |
| | Sar | nd, some Silt, some Gravel, tra | ce Clay | 15 | 61 | 2 | 4 | |
| | | Clay-size particles (<0.002 | mm): | | | 6 | % | |
| Rer | narks: | | | | | | | |
| | | | | | | | | |
| Per | formed by: | Z. | Mathurin | | Date: | February | 10, 2021 | |
| Ver | ified by: | E. | Bennett | | Date: | February | 17, 2021 | |
| | | | | | | | | |



| Clie | ent: | _ | | | tructui | | | | | | | | | | | | | Lab | No.: | | _ | G- | 21-0 | 1 | | | | | |
|-----------------|--------------|------|-------|------|----------------|--------|---------|-------|---------------|------|----------|--------|--------|-------|-------|--------|-----|-------|--------|------------|--------|---------------------|------|-------------|--------|-----------|--------------|--------|------------------|
| _ | | | | | sed P | | | | | | 0-4 | - ui - | 0 | | | | | | | _ | | | | | | | | | |
| Pro | ject, Site: | _ | | | en's F myth | | | | | | | ario | Cai | mpu | JS | | | Proj | ect N | lo.: | _ | 11 | 2053 | 379- | 80 | | | | |
| | Borehole No. | | | | | | , | BH4 | | | | | | | | | | Samp | alo Ne | ` · | | SS | 1 | | | | | | |
| | | | | | | | | 0.2-0 | | | | | | | | _ | | | | | _ | | | | | | | | |
| | Depth: | _ | | | | | | 0.2-0 | 0.511 | 1 | | | | | | _ | | Enclo | sure: | | _ | _ | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 100 | | | | | | | | | | | | | | | | П | | | | | | | | - | _ | ₽ | T 0 | |
| | | | | | | | | | | | | | | | | | | | | | | | | / | | | | | |
| | 90 | | | | | | | | | + | | | | | | | | | | | | | | | | \square | | 10 | |
| | 80 | | | | | | | | | | | | | | | | | | | | | Ш | | _ | | | | 20 | |
| | 00 | | | | | | | | | | | | | | | | | | | | | | | | | | | 20 | |
| | 70 | | | | | | | | | + | | | | | | | | | | | | | | | | | | 30 | |
| g | | | | | | | | | | | | | | | | | | | | | | | | | | | | | eq |
| Percent Passing | 60 | | | | | | | | | П | | | | | | \top | | | | | | †† | | | | | | 40 | Percent Retained |
| ent F | 50 | | | | | | | | | | | | | | | Ш | | | | | | Ш | | | | Ш | | 50 | ent F |
| Perc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Perc |
| | 40 | | | | | _ | | | | + | | | | | | + | | | | | | ₩ | | + | | | | 60 | |
| | 30 | | | | | | | | | | | | | | | | | / | | | | | | | | | | 70 | |
| | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | T ′° | |
| | 20 | | | | | | | | | + | | | | | | | | | | | | | | + | | | | 80 | |
| | | | | | | | | _ | | - | _ | | | | | | | | | | | | | | | | | | |
| | 10 | | | | | _ | _ | | | | | | | | | | | | | | | Ш | | | | | | 90 | |
| | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | 100 | 0 |
| | 0.001 | | | | 0.01 | | | | | C |).1 D | Diame | eter (| mm) | | | 1 | | | | | 10 | | | | | 1 | 100 | |
| | | | | | | | | | | Г | | | | | Sa | nd | | | | | | | Gr | avel | | | | | |
| | | | C | Clay | & Silt | | | | | | | Fine | , | | | Me | diu | ım | Coa | arse | | Fine | | | Coa | rse | | | |
| | | | | | | | | Parti | cle-S | Size | Lim | its a | as pe | er US | scs | (AS | TM | D-248 | 37) | | | | | | | | | | |
| | | | | | | — | | | | | | | | | | | | Г | | | \neg | | | | | — | — | \neg | |
| | | | | So | oil Des | script | tion | | | | | | (| Gra | vel (| %) | | | Sand | (%) | | | С | lay 8 | & Silf | t (%) |) | | |
| | | Grav | el an | nd S | Sand, t | race (| Silt, t | trace | : Cla | ay | | | | | 46 | | | | 41 | | | | | | 13 | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | (| 3 % | | | | |
| Rer | narks: | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Per | formed by: | _ | | | | | | Z. N | <i>l</i> lath | nur | in | | | | | | | | Date |) : | _ | | Feb | ruar | y 10 | , 20 | 21 | | |
| Ver | ified by: | _ | | | | | | E. I | Ben | ne | tt | | | | | | | _ | Date |) : | _ | | Feb | ruar | y 17 | , 20 | 21 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| Clie | ent: | Infrastructure Ontario | | | Lab No.: | G-21-01 | | |
|-----------------|---|---|-------------|----------------------------|--------------|--------------|------|------------------|
| Pro | ject, Site: | Proposed Parking Stru Children's Hospital of E | | Campus | Project No.: | 11205379-80 | | |
| | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | 401 Smyth Road, Otta | wa, Ontario | • | | | | |
| | Borehole No.: | MV | V5-21 | | Sample No.: | Grab | | |
| | Depth: | 0.1 | -0.3m | | Enclosure: | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 100 | | | | | | 0 | |
| | | | | | | | | |
| | 90 | | | | | | 10 | |
| | 80 | | | | | | 20 | |
| | 70 | | | | | | | |
| | 70 | | | | | | 30 | |
| ıssing | 60 | | | | | | 40 | tainec |
| Percent Passing | 50 | | | | | | 50 | Percent Retained |
| Perc | | | | | | | | Perc |
| | 40 | | | | | | 60 | |
| | 30 | | | | | | 70 | |
| | | | | | | | | |
| | 20 | | | | | | 80 | |
| | 10 | | | | | | 90 | |
| | | | | | | | | • |
| | 0.001 | 0.01 | 0.1 Diame | eter (mm) | | 10 | 100 | U |
| | | Clay & Silt | | Sand | | Gravel | | |
| | | | Fine | Mediu as per USCS (ASTM | | Fine Coars | se | |
| | | · u | | , | | | | |
| | | Soil Description | | Gravel (%) | Sand (%) | Clay & Silt | (%) | |
| | (| Gravel and Sand, some Silt, trac | ce Clay | 43 | 41 | 16 | | |
| | | Clay-size particles (<0.002 | mm): | | | 3 % | | |
| Rer | narks: | | | | | | | |
| | _ | | | | | | | |
| Per | formed by: | Z. | Mathurin | | Date: | February 10, | 2021 | |
| Ver | ified by: | E | . Bennett | | Date: | February 17, | 2021 | |
| | | | | | | | | |



| Clie | ent: | Infrastructure Ontario | | | Lab No.: | G-21-01 | | |
|-----------------|---------------|--|--------------|-------------------|--------------|-------------|---|---------------------------|
| | | Proposed Parking Stru | | 0 | | | | |
| Pro | ject, Site: | Children's Hospital of E 401 Smyth Road, Otta | | Campus | Project No.: | 11205379-80 | | |
| | | • | | | | 004 | | |
| | Borehole No.: | | N5-21 | - | Sample No.: | SS1 | | |
| | Depth: | 0.5 | 5-0.8m | | Enclosure: | - | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 100 | | | | | | • | - 0 |
| | | | | | | ا | | |
| | 90 | | | | | | | - 10 |
| | | | | | | | | 00 |
| | 80 | | | | | | | - 20 |
| | 70 | | | | | | | - 30 |
| | | | | | | | | |
| sing | 60 | | | | | | | ained 40 |
| Percent Passing | | | | | | | | 95 05 Percent Retained |
| rcent | 50 | | | | | | | - 50 - 50 - |
| Pel | | | | | | | | Pel |
| | 40 | | | | | | | - 60 |
| | | | | | | | | |
| | 30 | | | | | | | - 70 |
| | 20 | | | | | | | - 80 |
| | 20 | | | | | | | - 80 |
| | 10 | | | | | | | - 90 |
| | • | | | | | | | |
| | 0 | | | | | | | 100 |
| | 0.001 | 0.01 | 0.1 Diame | eter (mm) | | 10 | 10 | 00 |
| | | | | Sand | | Gravel | | |
| | | Clay & Silt | Fine | | ım Coarse | | arse | |
| | | Par | | as per USCS (ASTM | | 1 | <u> </u> | |
| | | | | | , | | | |
| | | Soil Description | | Gravel (%) | Sand (%) | Clay & S | ilt (%) | |
| | | Oon Description | | Oraver (70) | Garia (70) | Olay & O | III (70) | |
| | | Gravelly Sand, some Silt, trace | e Clay | 23 | 49 | 28 | | |
| | | Clay-size particles (<0.002 | mm): | | | 8 % | , | \dashv |
| | • | | | | | | | |
| Rer | narks: | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Per | formed by: | | Mathurin | | Date: | February 1 | 0, 2021 | |
| | | | | | | | , | |
| Ver | ified by: | E | . Bennett | | Date: | February 1 | 7, 2021 | _ |
| | | | | | | | | |



| Clie | nt: | Infrastructure Ontario | | | Lab No.: | G-21-01 | | |
|------------------|---------------|---|---------------------|----------------------------|--------------|-------------|---------|------------------|
| Pro _. | ect, Site: | Proposed Parking Stru Children's Hospital of I | Eastern Ontario | Campus | Project No.: | 11205379-80 | | |
| | | 401 Smyth Road, Otta | | | | | | |
| | Borehole No.: | - | W6-21 | | Sample No.: | SS2 | | |
| | Depth: | 3.0 | 8-1.1m | | Enclosure: | - | | |
| | | | | | | | | |
| | | | | | | | | |
| | 100 | | | | | | 0 | |
| | 90 | | | | | | 10 |) |
| | | | | | | | | |
| | 80 | | | | | | 20 |) |
| | 70 | | | | | | 30 |) |
| g. | | | | | | | | eq |
| Passin | 60 | | | | | | 40 | Retain |
| Percent Passing | 50 | | | | | | 50 | Percent Retained |
| Pel | 40 | | | | | | | |
| | 40 | | | | | | 60 |) |
| | 30 | | | | | | 70 |) |
| | 20 | | | | | | 80 |) |
| | | | | | | | | |
| | 10 | | | | | | 90 |) |
| | 0 | | | | | | 10 | 00 |
| | 0.001 | 0.01 | 0.1 Diame | eter (mm) | | 10 | 100 | |
| | | Clay & Silt | | Sand | | Gravel | | |
| | | | Fine | Mediu as per USCS (ASTM | | Fine Coa | rse | |
| | | | | (| | 1 | | ı |
| | | Soil Description | | Gravel (%) | Sand (%) | Clay & Sil | t (%) | |
| | C | Gravelly, Sand, some Silt, trac | e Clay | 32 | 45 | 23 | | |
| | | Clay-size particles (<0.002 | ! mm): | | | 7 % | | |
| Ren | narks: | | | | | | | |
| | | | | | | | | |
| Peri | ormed by: | Z. | . Mathurin | | Date: | February 10 |), 2021 | |
| Veri | fied by: | E | . Bennett | | Date: | February 17 | 7, 2021 | |
| | | | | | | | | |



| Clie | ent: | Infrastructure Onta | | | Lab No.: | G-21-01 | | ı |
|-----------------|---------------|---------------------------|--|--------------------|--------------|--|---------|------------------|
| D | innt Oite | Proposed Parking | | a Campus | Duningt No. | 44005070.00 | | |
| Pro | ject, Site: | 401 Smyth Road, | al of Eastern Ontario Ottawa, Ontario | Campus | Project No.: | 11205379-80 | | |
| | Borehole No.: | • | MW8-21 | | Sample No.: | Grab | | |
| | | | 0.0-0.3m | | Enclosure: | | | |
| | Depth: | | 0.0-0.0111 | | Enclosure. | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 100 | | | | | · · · · · · · · · · · · · · · · · · · | | |
| | | | | | | | | |
| | 90 | | | | | | 10 |) |
| | | | | | | $ \hspace{.06cm} $ | | |
| | 80 | | | | | | 20 | , |
| | 70 | | | | | | 30 |) |
| | | | | | | / | | 70 |
| assinę | 60 | | | | | | 40 | etaine |
| Percent Passing | 50 | | | | | | 50 | Percent Retained |
| Perce | 30 | | | | | | | Perce |
| | 40 | | | | | | 60 |) |
| | | | | | | | | |
| | 30 | | | | | | 70 |) |
| | 20 | | | | | | 80 | , |
| | 20 | | | | | | | , |
| | 10 | | | | | | 90 |) |
| | | | | | | | | |
| | 0.001 | 0.01 | 0.1 | 1 | | 10 | 100 100 | 00 |
| | | | Diam | neter (mm) | | | | |
| | | Clay & Silt | | Sand | | Gravel | | |
| | | | Fine Particle-Size Limits | | | Fine Coars | se | |
| | | | Farticle-Size Lillits | as per 0303 (ASTIV | 1 D-2467) | | | |
| | | Soil Description | on | Gravel (%) | Sand (%) | Clay & Silt | (%) | |
| | | Sandy Gravel, trace Silt, | trace Clay | 61 | 33 | 6 | | |
| | | | | | | 2 % | | |
| _ | | | | | | | | |
| Rer | narks: | | | | | | | |
| | | | | | | | | |
| Per | formed by: | | Z. Mathurin | | Date: | February 10, | 2021 | |
| Ver | ified by: | | E. Bennett | | Date: | February 17, | 2021 | |
| | | | | | | | | |



| Clie | ent: | _ | | Infrastructure | e Ontario | | | Lab No.: | | G-22-03 | | |
|-----------------|-----------|--------------|--|-----------------------|--------------|------------|----------|--------------|------|---------------|----------------|---------|
| Pro | ject, Sit | e: | | Children H | lospital | | | Project No.: | | 11205379 | | |
| | Borehol | e No.: | | BH10-22 0 - 0,61 m | | | | Sample No.: | _ | SS-1 | | |
| | Бериі. | _ | | 0 - 0,0111 | | | | Enclosure. | | - | | |
| | 90 | | | | | | | | | | 0 10 | |
| | 80 | | | | | | | | | | 20 | |
| Percent Passing | 60 | | | | | | | | | | 40 | nt Reta |
| Perc | 40 | | | | | | | | | | 60 | |
| | 20 — | | | | | | | | | | 70 80 90 | |
| | 0.001 | | 0.01 | | 0.1 Diame | eter (mm) | 1 | | 10 | | 100 100 | 0 |
| | | | | | | : | Sand | | Gra | avel | | |
| | | | Clay & Silt | | Fine | | Mediu | | Fine | Coarse | | |
| | | | | Particle-Si | ize Limits a | is per USC | CS (ASTM | D-2487) | | | | |
| | | | Soil Descrip | otion | | Grav | el (%) | Sand (%) | CI | ay & Silt (%) | | |
| | C | Gravel and S | Sand, with Some | | of Clay | 4 | 3 | 43 | | 14 | | |
| | | Clay | Silt-size partic y-size particles (| | n): | | | 3 | | | | |
| Rer | narks: | More int | formation is availa | able upon requ | est. | | | | | | | |
| Per | formed | by: | | J. Lalor | nde) | | | Date: | Aug | gust 15, 2022 | | |
| Ver | ified by | : _ | | booel | <u>/</u> | | | Date: | Aug | gust 24, 2022 | | |



| Clien | t: | | lr | nfrastructur | e Ontario | | | _Lab No.: | | G-22-03 | | |
|-----------------------------|---|------------------|----------------|-----------------------|---------------|-----------|-----------|---------------------------|-------|----------------------------------|---|------------------|
| Proje | ct, Site: | | | Children I | Hospital | | | _Project No.: | | 11205379 | | |
| | orehole N | No.: | | BH11-22 0 - 0,61 r | | | | Sample No.: Enclosure: | | SS-1 - | | |
| Percent Passing 2 2 1 1 8 8 | 0 | Clay | 0.01 | | | eter (mm) | Sand | | 10 Gr | ravel | 0 10 20 30 40 50 60 70 80 | Percent Retained |
| | | Clay | & Silt | | Fine | | Medi | | Fine | Coarse | | |
| | | | | Particle-S | Size Limits a | s per US | SCS (ASTN | 1 D-2487) | | | | |
| | | Sc | oil Descripti | on | | Gra | vel (%) | Sand (%) | C | lay & Silt (%) | | |
| | , | Gravel and Sand | d, with Trace | s of Silt and | Clay | | 52 | 37 | | 11 | | |
| | | | ize particles | | m): | | | | 3 | | | |
| Rema | rks: | More information | on is availabl | e upon requ | uest. | | | | | | | |
| | rmed by | <i>y</i> : | | J. Lalo | ende | | | Date: | | igust 11, 2022 igust 24, 2022 | | |



| Clie | nt: | | | Lab No.: | G-22-03 | | |
|-----------------|--|---|-----------------|------------------|--------------|-------------------------|---------------------------------------|
| Pro | ject, Site: | Children | n Hospital | | Project No.: | 11205379 | |
| | Borehole I | No.: BH12 | -22 | | Sample No.: | SS-1 | |
| | Depth: | 0 - 0,6 | 11 m | | Enclosure: | | |
| Percent Passing | 100 90 80 70 60 50 40 30 20 10 0.001 | 0.01 Clay & Silt | Fine | | | 10 Gravel Fine Coarse | 0 10 20 30 Percent Retained 90 90 100 |
| | | Particl | e-Size Limits a | s per USCS (ASTM | D-2487) | • | |
| | | Soil Description | | Gravel (%) | Sand (%) | Clay & Silt (%) | |
| | G | Gravel, with Some Sand and Silt, Trace | es of Clay | 66 | 14 | 20 | |
| | | Silt-size particles (%) : Clay-size particles (%) (<0.002 | mm): | | | | |
| Rer | narks: | More information is available upon re | equest. | | | | |
| Per | formed by | y: J. La | alonde | | Date: | August 11, 202 | 2 |
| Ver | ified by: | | <u> </u> | | Date: | August 24, 202 | 2 |



| Client: Infrastructure Ontario Project, Site: Children Hospital | | Lab No.: | G-22-03 | | | | | |
|--|--|--|--------------|--------------------|---------------------------|-------------------------|---|--|
| Pro | ject, Site: | Children | Hospital | | Project No.: | 11205379 | | |
| | Borehole No | 0 - 0,61 | | | Sample No.: Enclosure: | SS-1 - | | |
| Percent Passing | 100 90 80 70 60 40 30 20 10 0.001 | 0.01 | 0.1 Diameter | r(mm) 1 Sand Mediu | m Coarse | 10 Gravel Fine Coarse | 0 10 20 30 40 page 24 30 40 40 40 40 40 40 40 40 40 40 40 40 40 | |
| | | Particle | | per USCS (ASTM | | Fine Coarse | | |
| | | Soil Description | | Gravel (%) | Sand (%) | Clay & Silt (| %) | |
| | | Sandy Gravel, with Traces of Silt and | Clay | 66 | 22 | 12 | | |
| | | Silt-size particles (%) : Clay-size particles (%) (<0.002 r | mm): | | | | | |
| Ren | narks: | More information is available upon red | quest. | | | | | |
| Per | formed by: | J. La | londe | | Date: | August 11, 20 |)22 | |
| Ver | ified by: | | 2 | | Date: | August 24, 20 |)22 | |



| Client: | Infrastructure Ontario | Lab No.: | G-22-03 | |
|----------------|--|-----------------|------------------------------------|--|
| Project, Site: | Children Hospital | Project No.: | 11205379 | _ |
| Borehole No.: | BH15-22 | Sample No.: | SS-1 | |
| Depth: | 0 - 0,61 m | Enclosure: | - | _ |
| CI | Clay & Silt Particle-Size Limits a Soil Description Gravel, with Some Silt and Traces of Clay Silt-size particles (%): ay-size particles (%) (<0.002 mm): | | | 00 100 20 30 40 30 30 30 30 30 30 30 30 30 30 30 30 30 |
| Performed by: | J. Lalonde | Date: | August 11, 2022 August 24, 2022 | _ |



| Client: | Infrastructu | ıre Ontario | | Lab No.: | G-22-03 | |
|--|---|-------------|---------------|---------------------------|--|---|
| Project, Site: | : Children | Hospital | | Project No.: | 11205379 | |
| Borehole Depth: | No.: BH16-2 0 - 0,61 | | | Sample No.: Enclosure: | SS-1 - | |
| 100 90 80 70 60 10 10 10 10 10 10 10 10 10 10 10 10 10 | Clay & Silt Particle Soil Description Sand and Gravel, with Traces of Silt an Silt-size particles (%): Clay-size particles (%) (<0.002 n | d Clay | Sand Mediu | | To Gravel Fine Coarse Clay & Silt (% | 10 20 30 40 40 40 40 40 40 40 40 40 40 40 40 40 |
| Performed b | y: J. Lal | onde | | Date: | August 11, 20: | |



| Client: | Infrastructure | e Ontario | _Lab No.: | G-22-03 | _ |
|----------------------|--|-----------|---------------------------|-------------------------------------|--|
| Project, Site: | Children H | ospital | _Project No.: | 11205379 | _ |
| Borehole No.: Depth: | BH17-22 0 - 0,61 m | | Sample No.: Enclosure: | SS-1 - | |
| CI | Clay & Silt Particle-Si Soil Description / Gravel, with Traces of Silt and Cl Silt-size particles (%): ay-size particles (%) (<0.002 mm | n): | ium Coarse | Gravel Fine Coarse Clay & Silt (%) | 0 10 20 30 40 50 60 70 80 90 100 90 90 100 90 90 100 90 90 90 90 90 90 90 90 90 90 90 90 9 |
| Performed by: | J. Ļalor | nde | Date: | August 9, 2022 | _ |
| Verified by: | Social | | _ Date: | August 24, 2022 | _ |



| Client: | Infrastructure Ontario | | Lab No.: | G-22-03 | _ | | | |
|--|---|--|---------------------------|--------------------------------------|---------------------------------------|--|--|--|
| Project, Site: | Children Hospital | | Project No.: | 11205379 | _ | | | |
| Borehole N | No.: BH18-22 0 - 0,61 m | | Sample No.: Enclosure: | SS-1 - | | | | |
| 100 90 80 70 60 40 40 40 0.001 Page 100 100 100 100 100 100 100 100 100 10 | Clay & Silt Particle-Size Limits Soil Description Sandy Gravel, with Traces of Silt and Clay Silt-size particles (%): Clay-size particles (%) (<0.002 mm): | | | 2 3 3 4 4 5 7 7 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | | |
| | Performed by: J. Lalonde Date: August 9, 2022 | | | | | | | |
| Verified by: | | | Date: | August 24, 2022 | - | | | |



| Client: Project, Site: | | Infrastructure Or | ntario | Lab No.: | G-22-03 11205379 | | | |
|---|--------|---|--|---------------------------|-------------------------|--------------------------|--|--|
| | | Children Hosp | ital | Project No.: | | | | |
| Borehole No.: Depth: | | 0,76 - 1,37 m | | Sample No.: Enclosure: | SS-2 - | | | |
| Percent Passing 100 11 11 11 11 11 11 11 11 11 11 11 11 | | 0.01 0.1 Clay & Silt Particle-Size L | Diameter (mm) Sand Fine Mediu imits as per USCS (ASTM | | 10 Gravel Fine Coarse | 0 10 20 30 90 90 100 100 | | |
| | | Particle-Size L | imits as per USCS (ASTM | D-2487) | | | | |
| | | Soil Description | Gravel (%) | Sand (%) | Clay & Silt (%) | | | |
| | Sand | and Gravel, with Some Silt and Traces of C | Clay 31 | 46 | 23 | | | |
| | | Silt-size particles (%) : | | 16 | | | | |
| | | Clay-size particles (%) (<0.002 mm): | | 7 | | | | |
| Rema | rks: | More information is available upon request. | | | | | | |
| Performed by: J. Lalonde Date: August 17, 2022 | | | | | | 2 | | |
| Verifie | ed by: | - Josef | | Date: | August 24, 202 | 2 | | |



| Client: Project, Site: | | Infrastructu | Infrastructure Ontario | | | | | |
|---------------------------|-------------|---|------------------------|----------------|---------------------------|----------------|---|------------------|
| | | Children | Hospital | Project No.: | 11205379 | | | |
| | Borehole No | 0,00 - 0,6 | | | Sample No.: Enclosure: | SS-1 - | | |
| Percent Passing | 100 | 0.01 | 0.1 Diamete | | | 10 | 0 10 20 30 40 40 60 70 80 90 | Percent Retained |
| | | Clay & Silt | Fire | Sand | | Gravel | | |
| | | | Fine -Size Limits as | per USCS (ASTM | | Fine Coarse | \dashv | |
| | | Soil Description | | Gravel (%) | Sand (%) | Clay & Silt (% |) | |
| | Sand | d and Gravel, with Some Silt and Trace | es of Clay | 36 | 44 | 20 | | |
| | | Silt-size particles (%) : Clay-size particles (%) (<0.002 n | nm): | | 16 4 | | | |
| Rem | arks: | More information is available upon rec | quest. | | | | | |
| | ormed by: | J. La | onde | | Date: | August 9, 202 | | |
| Veri | fied by: | | 1 | | Date: | August 24, 202 | 22 | |



| Client: Project, Site: | | Infrastructur | Lab No | .: _ | G-22-03 | | | |
|---------------------------|-----------------|--|-------------------------|---------|----------|-----------|----------|---------------------------|
| | | Children F | Hospital | Project | No.: | 11205379 | | |
| Borehole No.: Depth: | | .: MW20-2 | | Sample | _ | SS-2 | | |
| | Борин. | | | | | | | |
| | 90 | | | | | | | 0 |
| | 70 | | | | | | | 20 30 |
| Percent Passing | 60 | | | | | | | 05 06 Percent Retained |
| Perce | 40 | | | | | | | 90 Pero |
| | 20 | | | | | | | 70 80 |
| | 10 | | | | | | | 90 |
| | 0.001 | 0.01 | 0.1 Diameter (mm) | 1 | | 10 | 10 | |
| | | Clay & Silt | Sai Fine | | parse | Gravel Co | oarse | |
| | | Particle-S | Size Limits as per USCS | | <u> </u> | I | | |
| | | Soil Description | Gravel | %) San | d (%) | Clay & S | Silt (%) | |
| | | Gravel and Sand, Traces of Silt and C | lay 46 | 2 | 11 | 1: | 3 | |
| | | Silt-size particles (%): Clay-size particles (%) (<0.002 m | m): | | 9 | | | |
| Rer | narks: <u>N</u> | More information is available upon requ | iest. | | | | | _ |
| Per | formed by: | J. Lalo | nde | Da | te: | August 9 | 9, 2022 | |
| Ver | ified by: | <u> </u> | <u> </u> | Da | te: | August 2 | 23, 2022 | |



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

| Client: | | | Infrastructure On | rio Lab no.: | G-20-01 | |
|--------------------------|------------------------------|------------|-------------------|--|--------------------------------------|--|
| Project/Site: | CHEO Proposed N | | | king 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 | | |
| | Liquid Limit (LL): | | | Soil Preparation: | | |
| | Test No. 1 | Test No. 2 | Test No. 3 | ☑ Cohesive <425 μm □ | Dry preparation | |
| Number of blows | 30 | 25 | 20 | ☐ Cohesive >425 μm ☑ | Wet preparation | |
| | Water Conte | ent: | | ☐ Non-cohesive | | |
| 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 | | | |
| Mass of water, g | 2.54 | 2.91 | 2.73 | 36.0 | | |
| Tare, g | 21.63 | 21.65 | 21.60 | 34.0 Outent 34.0 32.0 | | |
| Mass of soil, g | 8.22 | 9.24 | 7.93 | Ö | | |
| Water content % | 30.9% | 31.5% | 34.4% | 32.0 | | |
| Plastic Limit (P | L) - Water Cont | ent: | | 20.0 | • | |
| 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 50 | | |
| Mass of soil, g | 5.26 | 5.30 | = | 60 Low plasticity High plastic | ity av | |
| Water content % | 17.7% | 18.5% | | ਜ਼ Inorganic clay | | |
| Average water content % | 18. | 1% | | ± 40 | | |
| Natural Wate | r Content (W ⁿ) |): | = | Inorganic clay Inorganic clay Inorganic clay Inorganic clay Inorganic clay Inorganic clay Inorganic clay Inorganic clay | | |
| Tare no. | G | | | Low compressibility | (MH) and (CH) | |
| Wet soil+tare, g | 445.80 | | | - High irlorg | compressibility ganic silt | |
| Dry soil+tare, g | 393.10 | | | 10 | t | |
| 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 Limit (PL) Plasticity Index (Pl) | Natural Water Content W ⁿ | |
| Water content % | 13.4% | | = | 32 18 14 | 13 | |
| Remarks: | | | | | | |
| | | | | | | |
| Performed by: | | ۸۱: ٦ | ilhaddad | Date: Feb | ruony 12, 2021 | |
| | | All E | Ihaddad | Febi | ruary 12, 2021 | |
| Verified by: E. I | | Bennett | Date: Feb | February 18, 2021 | | |



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

| Client: | Infrastructure Ontario | | | | | Lab no.: | | _ | G-22-03 |
|--|----------------------------|-------------------------|-------------------|---------------------------------|--------------------------------------|--------------------|-------------------|-----------|--------------------------------------|
| Project/Site: | Children Hospita | | | al | | | Project no.: | | 11205379 |
| Borehole no.: | BH13-22 | 2 | Sample no.: | | SS-2 | | Depth: | (| 0,61 - 1,22 m |
| Soil Description: | | | - | | | | _Date sampled: | _ | |
| Apparatus: Liquid limit device no.: Sieve no.: | Hand 015 | 8033031049 B23-04645 | | | Porcelain bowl no.: 1 Spatula no.: 1 | | | | |
| | Liquid Limit | (LL): | | Soil Prepara | tion: | | | | |
| | Test No. 1 | Test No. 2 | Test No. 3 | - | Cohes | ive <425 μι | m | _ [| Dry preparation |
| Number of blows | | | | 1 . | Cohes | ive >425 μι | m | _ \ | Wet preparation |
| | Water Conte | ent: | 1 | 1 - | Non-ce | ohesive | | _ | |
| Tare no. | | | | | | | Results | | |
| Wet soil+tare, g | | | | 2.0 |) | | | | |
| Dry soil+tare, g | | | | 1 | | | | | |
| Mass of water, g | | | | - - - - - - - | | | | | |
| Tare, g | | | | - Itent | | | | | |
| Mass of soil, g | | | | Water Content (%) | | | | | |
| Water content % | | | | Wat | | | | | |
| Plastic Limit (Pl | L) - Water Cont | tent: | | 1 | | | | | |
| Tare no. | | | 1 | | | | | | |
| Wet soil+tare, g | | | 1 | 0.0 | | | | | |
| Dry soil+tare, g | | | 1 | | 15 | 17 | 19 21 Nb Blows | : | 23 25 27 |
| Mass of water, g | | | 1 | | | Soil | Plasticity Chart | ASTM | D2487 |
| Tare, g | | |] | 70 | | | LL 50 | \top | |
| Mass of soil, g | | |] | 60 - | Lean | clay (CL) | Ent | clay (CH | |
| Water content % | | | 1 | 급 50 + | Lean | Gidy (GE) | | + | |
| Average water content % | | | | 7d-7T = Id ×9pu | | | Orga | anic clay | , ОН |
| Natural Wate | r Content (W ⁿ |): | | ioi 30 - | | Orga | anic clay OL | | |
| Tare no. | | |] | Plast | Silty clay | (CL)ML)— | | Elas | stic silt MH |
| Wet soil+tare, g | | | 1 | 20 | | | | Organ | nic silt OH |
| Dry soil+tare, g | | | | 10 | | | Organic silt | + | |
| Mass of water, g | | | | 0 0 | 10 | 20 3 | ML OL 50 | 60 | 70 80 90 100 |
| Tare, g | | |] | | | | Liquid Limit LL | | |
| Mass of soil, g | | |] | Liquid Limit (LL) | | stic Limit (PL) | Plasticity Index | (PI) | Natural Water Content W ⁿ |
| Water content % | | | = | (/ | | () | | | |
| Remarks: | Non-Plastic S | Sample | | | | | | | |
| | | | | | | | | | - |
| Porformed by: | | | alanda | | ı | Date: | | Sonta | mher 13, 2022 |
| Performed by: | | J. L | _atonde | | - | | | - | mber 13, 2022 |
| Verified by: | | CXC | \ | | - ' | Date: | | 3epter | mber 13, 2022 |
| Laboratory Location: | 179 Col | onnade Rd. S | Suite 400, Ottawa | , Ontario | _ | | | | |



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

| Client: | Infrastructure Onta | | | tario | | Lab no.: | G-22-03 | | |
|--------------------------|----------------------------|--------------|------------------|--|--------------------------------------|--|--------------------------------------|--|--|
| Project/Site: | Children Hos | | | 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.: | 803 | 33031049 | Porcelain bowl no.: | 1 | | |
| Liquid limit device no.: | | 1 | Oven no.: | B2 | 23-04645 | Spatula no.: | 1 | | |
| Sieve no.: | 015 | 5690 | Glass plate no.: | | 1 | <u> </u> | | | |
| _ | Liquid Limit (| (LL): | 1 | Soil Prepara | tion: | | | | |
| | Test No. 1 | Test No. 2 | Test No. 3 | Ø | ☑ Cohesive <425 μm ☑ Dry preparation | | | | |
| Number of blows | | | | | Cohesive >42 | 5 μm | Wet preparation | | |
| | Water Conte | ent: | 1 | | Non-cohesive | | | | |
| Tare no. | | | | | | Results | | | |
| Wet soil+tare, g | | | | 2.0 | | | | | |
| Dry soil+tare, g | | | | <u> </u> | | | | | |
| Mass of water, g | | | | (%) | | | | | |
| Tare, g | | | | ntent | | | | | |
| Mass of soil, g | | | | Water Content (%) | | | | | |
| Water content % | | | | Wat | | | | | |
| Plastic Limit (Pl | _) - Water Cont | ent: | | | | | | | |
| Tare no. | | | 1 | | | | | | |
| Wet soil+tare, g | | | - | 0.0 | , | | | | |
| Dry soil+tare, g | | | - | | 15 17 | 19 21 Nb Blows | 23 25 27 | | |
| Mass of water, g | | | - | | S | oil Plasticity Chart AS | 「M D2487 | | |
| Tare, g | | | - | 70 | | LL <mark>5</mark> 0 | | | |
| Mass of soil, g | | | 1 | 60 | Lean clay (CL |) Fat clay | | | |
| Water content % | | | - | 급 50 + | Lean day (cl. | | | | |
| Average water content % | | | 1 | Plasticity Index PI = LL-PL 00 00 00 00 00 00 00 00 00 00 00 00 00 | | Organic o | Clay OH | | |
| Natural Water | r Content (W ⁿ |): | | <u>pu</u> 30 + | | Organic clay OL | | | |
| Tare no. | | | 1 | Plastic | Silty clay (CL) ML | | Elastic silt (MH) | | |
| Wet soil+tare, g | | | - | 20 | | | rganic silt OH | | |
| Dry soil+tare, g | | | - | 10 | | Organic silt | | | |
| Mass of water, g | | | 1 | 0 | 40 20 | 30 40 50 60 | 70 80 90 100 | | |
| Tare, g | | | 1 | | 10 20 | Liquid Limit LL | 70 80 90 100 | | |
| Mass of soil, g | | | 1 | Liquid Limit | | it Plasticity Index (PI | Natural Water Content W ⁿ | | |
| Water content % | | | - | (LL) | (PL) | | | | |
| Remarks: | Non-Plastic S | Sample | ı | 1 | 1 | 1 | .1 | | |
| | | | | | | | | | |
| Performed by: | | | <i>e</i> londe | | Date: | San | tember 13, 2022 | | |
| | | D.C. | V | | _ | | | | |
| Verified by: | | CCC | | | _ Date: | Sep | tember 13, 2022 | | |
| Laboratory Location: | 179 Col | onnade Rd. S | uite 400, Ottawa | ı, Ontario | _ | | | | |



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

| Client: | Infrastructure Ontario | | | | | Lab no.: | | _ | G-22-03 | |
|--|--|--------------|------------------|-------------------------|----------------|---------------|--------------------|----------------|--------------------------------------|--|
| Project/Site: | Children Hospita | | | al | | | Project no.: | | 11205379 | |
| Borehole no.: | MW20-22 | 2 | Sample no.: | | SS-2 | | Depth: | | ,61 - 1,22 m | |
| Soil Description: | | | - | | | | Date sampled: | _ | | |
| Apparatus: Liquid limit device no.: Sieve no.: | Hand Crank Balance no.: 1 Oven no.: 0155690 Glass plate no.: | | | 8033031049 B23-04645 | | | | | 1 1 | |
| | Liquid Limit | (LL): | | Soil Preparat | tion: | | | | | |
| | Test No. 1 | Test No. 2 | Test No. 3 | | Cohesive | <425 µr | n [| _v D | ry preparation | |
| Number of blows | | | | 1 | Cohesive | >425 µr | m [| w | Vet preparation | |
| | Water Conte | ent: | <u> </u> | 1 - | Non-cohe | sive | _ | _ | | |
| Tare no. | | | | | | | Results | | | |
| Wet soil+tare, g | | | | 2.0 |) | | | | | |
| Dry soil+tare, g | | | | 1 | | | | | | |
| Mass of water, g | | | | (% | | | | | | |
| Tare, g | | | | tent (| | | | | | |
| Mass of soil, g | | | | Water Content (%) | | | | | | |
| Water content % | | | | Wate | | | | | | |
| Plastic Limit (Pl | L) - Water Cont | tent: | | 1 | | | | | | |
| Tare no. | | | - | | | | | | | |
| Wet soil+tare, g | | | | 0.0 | | | | | | |
| Dry soil+tare, g | | | | | 15 | 17 | 19 21 Nb Blows | 2 | 23 25 27 | |
| Mass of water, g | | | 1 | | | Soil | Plasticity Chart A | ASTM | D2487 | |
| Tare, g | | | 1 | 70 | | | LL 50 | Т | | |
| Mass of soil, g | | | 1 | 60 | Lean clay | (CL) | Fate | clay (CH) | | |
| Water content % | | | 1 | 글 50 — | Lean day | | | + | | |
| Average water content % | | | | 7d-7T = Id хэри | | | Orgai | nic clay | OH | |
| Natural Wate | r Content (W ⁿ |): | | igi 30 — | | Orga | nic clay OL | | | |
| Tare no. | | | | Plast | Silty clay (CL | (ML)— | , | Elasti | tic silt MH | |
| Wet soil+tare, g | | | | 20 | | | | Organio | ic silt OH | |
| Dry soil+tare, g | | | | 10 | 222333 | | Organic silt | + | | |
| Mass of water, g | | | 1 | 0 | 10 | 20 3 | 0 40 50 | 60 | 70 80 90 100 | |
| Tare, g | | | | | | | Liquid Limit LL | | | |
| Mass of soil, g | | | | Liquid Limit (LL) | Plastic (PL | | Plasticity Index | (PI) | Natural Water Content W ⁿ | |
| Water content % | | | - | (==) | ,,,, | -, | | | | |
| Remarks: | Non-Plastic S | Sample | • | • | | | • | | | |
| | | | | | | | | | | |
| Doufouse at his | | | alamd - | | Dat | e: | | `ort: | ahar 13, 2000 | |
| Performed by: | $\overline{}$ | J. L | .alonde | | - | | S | eptem | nber 13, 2022 | |
| Verified by: | ~ | | 24 | | _ Dat | e: | S | eptem | nber 13, 2022 | |
| Laboratory Location: | 179 Col | onnade Rd. S | uite 400, Ottawa | , Ontario | _ | | | | | |



Moisture Content of Soils (ASTM D 2216)

| Client: | Infrastru | ucture Ontari | io | | Lab No.: | | G-22-03 | |
|----------------------------------|-----------|---------------|----------|-------------------------------|----------|---------|---------|---------|
| Project/Site: | Childre | en's Hospital | 11205379 | | | | | |
| Apparatus Used for Testing | Oven No.: | B23-0 |)4645 | 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: | → JABa | ptiste | | Date: | | July 27 | 7, 2022 | |
| Verified by : | | 3 | Date: | July 27, 2022 August 3, 2022 | | | | |



Moisture Content of Soils (ASTM D 2216)

| Client: | Infrastr | ucture Ontari | io | Lab No.: | | | G-2: | 2-03 |
|----------------------------------|--------------------------|---------------|------------|---------------|-------------------------------|---------|---------|------|
| Project/Site: | Childre | en's Hospital | 1 | | Project No. | : | 1120 | 5379 |
| Apparatus Used for Testing | Oven No.: B23-04645 Scal | | 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: | √ J A Ba | aptiste | | Date: | | Julv 27 | 7, 2022 | |
| Verified by : | | <u>}</u> | | Date: | July 27, 2022 August 3, 2022 | | | |



| Client : | | Infrastructure Ontario Lab No : A- | | | | | | |
|----------------------------------|--------------------|------------------------------------|--------------------|---|----------|--|--|--|
| Project/Site | : | Children Hospital | Project No : | Project No : 11205379 | | | | |
| 2400 | | | | | | | | |
| 2300 • | | | | Zero Air Voids Line | | | | |
| 2200 • | | | | | | | | |
| Dry Density (kg/m³) | | | | | | | | |
| 2000 | | | | | | | | |
| 1900 • | | | | | | | | |
| 1800 | 2.0 | 4.0 6.0 | 8.0 | 10.0 12.0 | 14.0 | | | |
| | | | ontent (%) | | | | | |
| Prepared Sam | ple: Dry | 0 Moist x | | Assumed G _s : | 2.70 | | | |
| ASTM D698 Te | est Method: A | 0 B 0 4.75 mm 9.50 mm | C x 19.0 mm | Type of Hammer: M | lanual | | | |
| Soil Type: Material: | | Crushed Stone | | | | | | |
| Proposed Use: Sample Identifi | | BH11-22 | Max. D | ry Density: 2254 | kg/m³ | | | |
| Sample Location | | In Place | Optimu | ım Moisture: 6.4 | % | | | |
| Sample Date: | phor / r it warne. | | Correc | % Retained on 19.0 mm: 2.8 % Corrected Dry Density: 2254 kg/m | | | | |
| Sampled By: | | D. Ash | Correc | ted Opt. Moist.: 6.4 | <u> </u> | | | |
| Remarks : | | | | | | | | |
| Performed b | y: | J. Lalonde | Date : | September 2, 202 | 22 | | | |
| Verified by : | | loce | Date : | September 6, 202 | 22 | | | |



| Cli | ient : | Ir | nfrastructure Onta | rio | Lab No : A-22-02 | | | | |
|-----------------------------------|--|-----|---------------------|---------------------|-----------------------|---|---|--|--|
| Pr | oject/Site : | | Children Hospital | <u> </u> | Project No : 11205379 | | | | |
| Dry Density (kg/m³) | 2400 2350 2300 2250 2250 2150 2150 2000 1950 | | | | | Zero Air Voids | | | |
| | 0.0 | 2.0 | 4.0 | 6.0 Water Conten | | 10.0 12.0 | 14.0 | | |
| | epared Sample | | 0 Moist 0 B 4.75 mm | x 0 0.50 mm | x 19.0 mm | Assumed G_s : Type of Hammer: | 2.70 Mechanical | | |
| Ma Pro Sa Sa Ag Sa | Soil Type: Crushed Stone Material: Proposed Use: Sample Identification: BH18-22 Sample Location: Aggregate Supplier / Pit Name: In Place Sample Date: Sampled By: D. Ash | | | | Max. I Optim Reta | Ory Density: um Moisture: ained on 19.0 mm: cted Dry Density: cted Opt. Moist.: | 2237 kg/m³ 6.7 % 7.2 % 2265 kg/m³ 6.2 % | | |
| Re | emarks : | | | | | | | | |
| | erformed by | : | J. Lalonde | | Date : | Septembe September | | | |



| Client : | In | frastructure Ontario | Lab No : | A-22-02 | | | | |
|--|--------------|---|-------------------|--------------------------------------|--|--|--|--|
| Project/Site : | | Children Hospital | Project No : | Project No : 11205379 | | | | |
| 2400 | | | | | | | | |
| 2300 | | | | Zero Air Voids Line | | | | |
| 2200 • | | | | | | | | |
| Dry Density (kg/m³) | | | | | | | | |
| 2000 | | | | | | | | |
| 1900 • | | | | | | | | |
| 1800 | 2.0 | 4.0 6.0 | 8.0 10.0 | 0 12.0 14.0 | | | | |
| | | Water Conte | ent (%) | | | | | |
| Prepared Sample: | Dry | 0 Moist x | Ass | sumed G _s : 2.70 | | | | |
| ASTM D698 Test M | lethod: A | 0 B 0 C 4.75 mm 9.50 mm | х Тур | pe of Hammer: Mechanical | | | | |
| Soil Type: Material: | | Crushed Stone | | | | | | |
| Proposed Use: Sample Identification | on: | MW9-22 | Max. Dry I | Density: 2258 kg/m³ | | | | |
| Sample Location: Aggregate Supplier | / Pit Name | In Place | Optimum % Retaine | Moisture: 7.5 % d on 19.0 mm: 10.3 % | | | | |
| Sample Date: | , ricitanio. | | Corrected | Dry Density: 2297 kg/m ³ | | | | |
| Sampled By: | | D. Ash | Corrected | Opt. Moist.: 6.7 % | | | | |
| Remarks : | | | | | | | | |
| Performed by : | | J. Lalonde | Date : | September 7, 2022 | | | | |
| Verified by : | | xel | Date : | September 13, 2022 | | | | |



| Client : | Infrastructure C | Ontario | | | Р | Project N° : 11205379-80 | | | | |
|-----------------------|---------------------------------|------------------------------------|------------------------|---------|------------------------|--------------------------|-----------------------|--------------------|--|--|
| Project : | Proposed Park | ing Structure | | | | Sa | Sample N°: MW3-21 RC1 | | | |
| | Children's Hos 401 Smyth Roa | pital of Eastern ad Ottawa Onta | Ontario Campus ario | 3 | | _ | Depth : 4.8 | | | |
| | | au, Ottawa, Otta | arro | | | — Samp | | nuary 14-15 / 2021 | | |
| | | | | | | | | | | |
| Testing App | paratus Used : | | | Loading | device N° | 1 | | Caliper N°11 | | |
| | | | Technical Data | | | | | View of Specimen | | |
| | | | | | Average | \neg | Bef | ore Test : | | |
| Diameter : | | 63 | 63 | 63 | 63.0 | (mm) | | ZIGO | | |
| Length : | | 117 | 117 | 117 | 117.0 | (mm) | | | | |
| Straightness (0.5mr | m maximum) (S1) : | 0.3 | 0.2 | 0.3 | 0.3 | (mm) | | | | |
| Flatness (25µm ma | ximum) (FP2) : | Ok | Ok | Ok | Ok | | | W3-21 | | |
| Parallelism (0.25 ° r | maximum) (FP2) : | 0.15 | 0.15 | 0.15 | 0.15 | (°) | | | | |
| Mass : | 96 | 5.2 | (g) Volume: | 36 | 6 4 718 | (mm³) | | | | |
| Density: | | 0.2 | _(g) | | _(kg/m³) | () | | | | |
| Moisture Condition | ns : | | Di | | _ (Kg/III) | | | 631 | | |
| Loading Rate (0.5 | 5 to 1.0 MPa / sec) : | | 0. | 6 | (NAD = /= = =) | | Aft | er Test : | | |
| Type of Fracture : | : | | 3 | 3 | _(MPa/sec) | | | | | |
| Test Duration (2-1 | 15 Minutes) : | | 3. | 5 | (minutes) | | | | | |
| Maximum Applied | d Load : | | 251 | .98 | _(minutes) ☑ kN ☐ lbs | | | P d m | | |
| Compressive S | Strength : | | 80 | .8 | _ _(MPa) | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Remarks : | | | | | | | • | | | |
| | | | | | | | | | | |
| Analysed by : | | | Ali Elhaddad | | | _ | Date : | February 8, 2021 | | |
| Verified by : | | | E. Bennett | | | | Date : | February 17, 2021 | | |



| Client : | Infrastructure C | Ontario | | | | Pro | Project N°: 11205379-80 | | | |
|-----------------------|----------------------------------|------------------|------------------------|---------|---|-------------|--------------------------|-------------------|--|--|
| Project : | Proposed Park | ing Structure | | | | | | ° : MW3-21 RC2 | | |
| | Children's Hosp 401 Smyth Roa | oital of Eastern | Ontario Campus ario | | | | Depth : 6.4-6.55m | | | |
| | | ia, Gilawa, Gila | 3110 | | | Samplin | | uary 14-15 / 2021 | | |
| Testing App | paratus Used : | | | Loading | device N° | 1 | C | aliper N°1 | | |
| | | | Technical Data | | | | | View of Specimen | | |
| | | | | | Average | | Befor | e Test : | | |
| Diameter : | | 63 | 63 | 63 | 63.0 | (mm) | | | | |
| Length: | | 74 | 74 | 74 | 74.0 | (mm) | | 21'0" | | |
| Straightness (0.5mm | n maximum) (S1) : | 0.2 | 0.2 | 0.2 | 0.2 | (mm) | | | | |
| Flatness (25µm max | ximum) (FP2) : | Ok | Ok | Ok | Ok | | 1 | MW3-21 | | |
| Parallelism (0.25 ° n | naximum) (FP2) : | 0.1 | 0.1 | 0.1 | 0.15 | (°) | | RCZ- | | |
| Mass : | 6 | 12 | _(g) Volume: _ | 23 | 30676 | (mm³) | | | | |
| Density: | | | 265 | 53 | _ (kg/m³) | | | 21'4" | | |
| Moisture Condition | ns: | | Dr | | | | | | | |
| Loading Rate (0.5 | to 1.0 MPa / sec) : | | 0.0 | 6 | – (MPa/sec) | | Afte | r Test : | | |
| Type of Fracture : | | | 3 | | _(\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | | | | | |
| Test Duration (2-1 | 5 Minutes) : | | 4 | | – (minutes) | | | | | |
| Maximum Applied | Load : | | 335. | .49 | _ ✓ kN □ | Ibs | | | | |
| Compressive S | trength : | | 107 | 7.6 | _(MPa) | | | | | |
| | | | | | | | | 4 | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Remarks : | | | | | | | | | | |
| Analysed by : | | | Ali Elhaddad | | | _ | Date : | February 8, 2021 | | |
| Verified by : | | | E. Bennett | | | | Date : | February 17, 2021 | | |



| Client : | Infrastructure O | Ontario | | | | Project N°: 11205379-80 | | | | |
|-----------------------|----------------------------------|--|------------------------|------------|-----------------------|-------------------------|---|--|--|--|
| Project : | Proposed Parki | ng Structure | | | | Sample | N°: MW3-21 RC3 | | | |
| | Children's Hosp 401 Smyth Roa | oital of Eastern (id. Ottawa. Onta | Ontario Campus ario | | | — Dep | oth: 7.92-8.07m | | | |
| | | | | | | | ate : January 14-15 / 2021 | | | |
| Testing An | paratus Used : | | | L oading (| device N° | 1 | Caliper N°1 | | | |
| reating Ap | <u> </u> | | | | | | | | | |
| | | 7 | Гесhnical Data | | | | View of Specimen | | | |
| | | | | | Average | | Before Test : | | | |
| Diameter : | | 63 | 63 | 63 | 63.0 | (mm) | | | | |
| Length: | | 78 | 78 | 78 | 78.0 | (mm) | T26'0" | | | |
| Straightness (0.5mi | m maximum) (S1) : | 0.3 | 0.2 | 0.3 | 0.3 | (mm) | MW 3 - 21 | | | |
| Flatness (25μm ma | ximum) (FP2) : | Ok | Ok | Ok | Ok | | RC3 | | | |
| Parallelism (0.25 ° ı | maximum) (FP2) : | 0.1 | 0.15 | 0.1 | 0.15 | (°) | | | | |
| Mass : | 65 | 6.6 | _(g) Volume: _ | 24 | 3145 | (mm³) | | | | |
| Density: | | <u> </u> | 270 | | _(kg/m ³) | () | | | | |
| Moisture Conditio | ns : | | Dr | | _ (0 | | 4150 | | | |
| Loading Rate (0.5 | 5 to 1.0 MPa / sec) : | | 0.6 | 6 | (MPa/sec) | | After Test : | | | |
| Type of Fracture : | | | 3 | | _ | | | | | |
| Test Duration (2-1 | 15 Minutes) : | | 3.8 | 5 | _(minutes) | | | | | |
| Maximum Applied | Load : | | 260. | .09 | ☑ kN □ | lbs | | | | |
| Compressive S | Strength : | | 83. | .4 | _(MPa) | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | Marie | | | |
| Remarks : | - | | | | | | | | | |
| Analysed by : | | | Ali Elhaddad | | | Da | ate: February 8, 2021 | | | |
| Verified by : | | | E. Bennett | | | Da | ate: February 17, 2021 | | | |



| Client : | Infrastructure (| Ontario | | | | Project N° : 11205379-80 | | | | |
|-----------------------|---------------------------------|---------------|------------------------|----------|----------------|--------------------------|--------------------------|--|--|--|
| Project : | Proposed Park | ing Structure | | | | Sample N° : MW3-21 RC5 | | | | |
| | Children's Hos 401 Smyth Roa | | Ontario Campus ario | | | Dept | h : 9.63-9.75m | | | |
| | | | | | | Sampling Dat | e : January 14-15 / 2021 | | | |
| Testing App | aratus Used : | | | Loading | device N° | 1 | Caliper N°1_ | | | |
| | | | Technical Data | | | | View of Specimen | | | |
| | | | | | Average | | Before Test: | | | |
| Diameter : | | 63 | 63 | 63 | 63.0 | (mm) | T31' Z4 | | | |
| Length: | | 91 | 91 | 91 | 91.0 | (mm) | | | | |
| Straightness (0.5mm | n maximum) (S1) : | 0.2 | 0.3 | 0.3 | 0.3 | (mm) | MW 3-21 | | | |
| latness (25μm max | kimum) (FP2) : | Ok | Ok | Ok | Ok | | RC5 | | | |
| Parallelism (0.25 ° n | naximum) (FP2) : | 0.15 | 0.15 | 0.15 | 0.15 | (°) | | | | |
| Mass : | 73 | 36.3 | _(g) Volume: | 28 | 33669 | (mm³) | | | | |
| Density: | | | 259 | 96 | (kg/m³) | | | | | |
| Moisture Condition | ns: | | Dr | -у | | | | | | |
| oading Rate (0.5 | to 1.0 MPa / sec) : | | 0. | 6 | | | After Test : | | | |
| ype of Fracture : | | | 3 | . | _(MPa/sec) | | | | | |
| est Duration (2-1 | 5 Minutes) : | | 4 | | _ (minutes) | | | | | |
| /laximum Applied | Load : | | 251 | .57 | _ ` | lbs | | | | |
| Compressive S | trength : | | 80 | .7 | _ _(MPa) | | | | | |
| | | | | | | | 8 | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Remarks : | | | | | | | | | | |
| Analysed by : | | | Ali Elhaddad | | | Dat | re: February 8, 2021 | | | |
| /erified by : | | | E. Bennett | | | — Dat | _ | | | |
| CHILLIA DV . | | | L. DUIIIUUL | | | Dai | I GDIUAIY II, ZUZI | | | |



| Client : | Infrastructure C | Ontario | | | Project N° : 11205379-80 | | | | | |
|---------------------|---|--------------|------------------------|-----------|--------------------------|-----------------------|----------------|--------------------|--|--|
| Project : | Proposed Parki | ng Structure | | | | Sample N°: MW6-21 RC2 | | | | |
| | Children's Hosp <u>401 Smyth Roa</u> | | Ontario Campus ario | | | _ | Depth : 4.75-4 | 4.88m | | |
| | | | | | | Samplin | g Date : Janua | ary 14-15 / 2021 | | |
| Testing Ap | paratus Used : | | | Loading o | device N° | 1 | Ca | liper N°1_ | | |
| | | | Technical Data | | | | | View of Specimen | | |
| | | | T | | Average | | Before | Test: | | |
| Diameter : | | 63 | 63 | 63 | 63.0 | (mm) | | | | |
| Length: | | 86 | 86 | 86 | 86.0 | (mm) | | | | |
| Straightness (0.5m | m maximum) (S1) : | 0.3 | 0.3 | 0.3 | 0.3 | (mm) | | 2130 | | |
| Flatness (25μm ma | aximum) (FP2) : | Ok | Ok | Ok | Ok | | - 11 | MW6-21 | | |
| Parallelism (0.25 ° | maximum) (FP2) : | 0.15 | 0.15 | 0.15 | 0.15 | (°) | - 11 | RC2 | | |
| Mass : | 70: | 2.4 | _(g) Volume: _ | 26 | 8083 | (mm³) | - 11 | | | |
| Density: | | | 262 | 20 | (kg/m³) | | - 11 | 15'7" -16' | | |
| Moisture Conditio | ons : | | Dr | | _(0) | | - 11 | | | |
| Loading Rate (0.5 | 5 to 1.0 MPa / sec) : | | 0.6 | 6 | - | | After | Test: | | |
| Type of Fracture | · | | 3 | | _(MPa/sec) | | | . 4 | | |
| Test Duration (2- | 15 Minutes) : | | 4 | | - _(minutes) | | | | | |
| Maximum Applied | d Load : | | 294 | 5 | ☑ kN □ | lbs | | | | |
| Compressive S | Strength : | | 94. | 5 | _ _(MPa) | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Remarks : | _ | | | | | | | | | |
| Analysed by : | | | Ali Elhaddad | | | | Date : | February 8, 2021 | | |
| Verified by : | | | E. Bennett | | | _ | Date : | February 17, 2021 | | |
| - JI III JU DV . | | | Domicit | | | | Duit . | I ODIGALY II, ZUZI | | |



| Client : | Infrastructure C | Ontario | | | | Project N° : 11205379-80 | | | | |
|------------------------|----------------------------------|---------------|------------------------|---------|----------------|---------------------------|----------------------|--|--|--|
| Project : | Proposed Park | ing Structure | | | | Sample N° : MW6-21 RC4 | | | | |
| | Children's Hosp 401 Smyth Roa | | Ontario Campus ario | | | Depth : 6.65-6.81m | | | | |
| | | | | | | Sampling Date : | January 14-15 / 2021 | | | |
| Tacting Appa | ratua Haad i | | | Looding | device N° | 1 | Caliper N°1_ | | | |
| Testing Appa | ratus Osed . | | | Loading | device in | 1 | Camper N1 | | | |
| | | | Technical Data | | | | View of Specimen | | | |
| | | | | | Average | ٦ | Before Test : | | | |
| Diameter : | | 63 | 63 | 63 | 63.0 | (mm) | | | | |
| Length: | | 82 | 82 | 82 | 82.0 | (mm) | | | | |
| Straightness (0.5mm r | maximum) (S1) : | 0.3 | 0.3 | 0.3 | 0.3 | (mm) | 7 | | | |
| latness (25μm maxin | mum) (FP2) : | Ok | Ok | Ok | Ok | | = 21 | | | |
| Parallelism (0.25 ° ma | aximum) (FP2) : | 0.15 | 0.15 | 0.15 | 0.15 | (°) | MW6-21 | | | |
| Mass : | 67 | 6.1 | _(g) Volume: | 25 | 55614 | (mm³) | | | | |
| Density: | | | 264 | 45 | (kg/m³) | | Tarket 1 | | | |
| Moisture Conditions | : | | Dr | | _(3 / | | | | | |
| oading Rate (0.5 to | o 1.0 MPa / sec) : | | 0. | 6 | _ | | After Test : | | | |
| ype of Fracture : | , | | 3 | | _(MPa/sec) | | | | | |
| est Duration (2-15 | Minutes) : | | 4 | | — (minutes) | | | | | |
| Maximum Applied L | oad : | | 311 | .75 | ✓ kN | lbs | | | | |
| Compressive Str | ength : | | 100 | 0.0 | _(MPa) | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Remarks : | | | | | | | | | | |
| | | | | | | | | | | |
| Analysed by : | | | Ali Elhaddad | | | Date : | February 8, 2021 | | | |
| /erified by : | | | E. Bennett | | | Date : | February 17, 2021 | | | |



| Client : | Infrastructure C | Ontario | | | | Pr | Project N°: 11205379-80 | | | |
|---------------------------|----------------------------------|--------------------------------------|------------------------|-------------|------------|----------------|-------------------------|--------------------|--|--|
| Project : | Proposed Park | ing Structure | | | | Sa | Sample N°: MW6-21 RC5 | | | |
| | Children's Hosp 401 Smyth Roa | pital of Eastern ad. Ottawa. Onta | Ontario Campus ario | 3 | | | Depth: 7. | | | |
| | y | , | | | | — Sampl | | nuary 14-15 / 2021 | | |
| | | | | | | | | - | | |
| Testing Appara | atus Used : | | | Loading | device N° | 1 | | Caliper N°1 | | |
| | | | Technical Data | | | | | View of Specimen | | |
| | | | | | Average | | Ве | fore Test: | | |
| Diameter : | | 63 | 63 | 63 | 63.0 | (mm) | | | | |
| Length: | | 93 | 93 | 93 | 93.0 | (mm) | | 263 | | |
| Straightness (0.5mm m | naximum) (S1) : | 0.3 | 0.3 | 0.3 | 0.3 | (mm) | | | | |
| Flatness (25µm maxim | um) (FP2) : | Ok | Ok | Ok | Ok | | | 441.2/ 1 | | |
| Parallelism (0.25 ° max | | 0.15 | 0.15 | 0.15 | 0.15 | (°) | | MINGS. RCS | | |
| raialielisiii (0.23 iiiax | amum) (FF2). | 0.15 | 0.13 | 0.13 | 0.13 | | | | | |
| Mass: | 77 | 6.4 | _(g) Volume: | 28 | 9904 | (mm³) | | | | |
| Density: | | • | 26 | | _(kg/m³) | | | | | |
| Moisture Conditions : | : | | Di | | _(Kg/III) | | | | | |
| Loading Rate (0.5 to | 1.0 MPa / sec) : | | 0. | 6 | - | | Af | ter Test : | | |
| Type of Fracture : | , | | 4 | | _(MPa/sec) | | | | | |
| | Aircota a) | | | | - | | | | | |
| Test Duration (2-15 N | · | | 5 | | (minutes) | | | | | |
| Maximum Applied Lo | ad: | | 318 | 3.7 ———— | ☑ kN □ | lbs | | | | |
| Compressive Stre | ength: | | 102 | 2.2 | _(MPa) | | | 1 | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Remarks : | | | | | | | • | | | |
| Analysed by : | | | Ali Elhaddad | | | | Date : | February 8, 2021 | | |
| Verified by : | | | E. Bennett | | | _ - | Date : | February 17, 2021 | | |



| Client : | Infrastructure C | | | | | _ | : <u>11205379</u> |
|---------------------------|------------------|---------------|---------------|----------|----------------|----------|--|
| Project : | Children's Hosp | oital | | | | <u> </u> | : <u>MW9-22 r.1</u> : 3,20 - 3,31 m |
| | | | | | | | : |
| Testing Appara | atus Used : | | | Loadin | ng device N°_9 | 9130 | |
| | | ד | echnical Data | | | | View of Specimen |
| | | | | | 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 ma | aximum) (S1) : | 0.4 | 0.4 | 0.4 | 0.4 | (mm) | |
| Flatness (25μm maximu | ım) (FP2) : | Ok | Ok | Ok | Ok | (μm) | |
| Parallelism (0.25 ° maxii | mum) (FP2) : | 0.15 | 0.20 | 0.20 | 0.18 | (°) | After Test: |
| Mass : | 91 | 3.8 | (g) Volume: | 34 | 1893 | _(mm³) | |
| Density: | | | 267 | 73 | _(kg/m³) | | |
| Moisture Conditions : | | | Dr | У | _ | | |
| _oading Rate (0.5 to | 1.0 MPa / sec) : | | 0.5 | 58 | _(MPa/sec) | | |
| Type of Fracture : | | | Multiple I | Fracture | _ | | |
| Test Duration (2-15 M | flinutes) : | | 12 | 3 | _(seconds) | | |
| Maximum Applied Loa | ad : | | 222 | .24 | _(kN) | | |
| Compressive Stre | ngth : | | 71 | .0 | _(MPa) | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Remarks : | | | | | | | |
| | | | | | | | |
| Analysed by : | J. Lalonde | $\overline{}$ | | | | Date | : 8/18/2022 |
| Verified by : | X | xex | | | | Date | :8/25/2022 |



| Client : Project : | Infrastructure (| | | | | _ | °: 11205379 °: MW9-22 r.2 |
|----------------------------------|------------------|-------|---------------|--------|---------------|-------------|------------------------------|
| | | | | | | | h: 4,04 - 4,14 m e: |
| Testing Appara | itus Used : | | | Loadir | ng device N°_ | 9130 | Caliper N° _1 |
| | | 1 | echnical Data | | | | View of Specimen |
| Diameter : | | 63.18 | 63.20 | 63.00 | Average 63.13 | (mm) | Before Test : |
| Length : | | 96.49 | 95.36 | 95.29 | 95.71 | (mm) | |
| Straightness (0.5mm ma | aximum) (S1) : | 0.1 | 0.1 | 0.2 | 0.1 | (mm) | |
| Flatness (25μm maximu | m) (FP2) : | Ok | Ok | Ok | Ok | (μm) | |
| Parallelism (0.25 ° maxir | mum) (FP2) : | 0.05 | 0.10 | 0.10 | 0.08 | (°) | After Test : |
| Mass : | 79 | 98.9 | (g) Volume: | 29 | 9563 | (mm³) | |
| Density : Moisture Conditions : | | | 266 | 67 | _(kg/m³) | | |
| _oading Rate (0.5 to | | | Dr | | - | | |
| Type of Fracture : | | | 0.4 | | _(MPa/sec) | | |
| Test Duration (2-15 M | (linutes) | | Multiple F | | = | | |
| Maximum Applied Loa | · | | 11 | 8 | _(seconds) | | |
| | | | 175. | .67 | _(kN) | | |
| Compressive Strer | ngun : | | 56. | .1 | _(MPa) | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Remarks : | | | | | | | |
| Analysed by : | J. Lalonde | | <u> </u> | | | Date | e: 8/18/2022 |
| Verified by : | | bal |) | | | | |



| Client : | Infrastructure (| Ontario | | | | Project N° | 11205379 |
|-------------------------|------------------|---------|----------------|----------|--------------|---------------|------------------|
| Project : | Children's Hos | pital | | | | Sample N° | BH13-22 r.3 |
| | | | | | | Depth | 3,61 - 3,71 m |
| | | | | | | Sampling Date | : |
| Testing Appar | ratus Used : | | | Loadin | g device N°_ | 9130 | Caliper N° _1 |
| | | 7 | Technical Data | | | | View of Specimen |
| | | | | | Average | | Before Test : |
| Diameter : | | 63.00 | 63.09 | 63.15 | 63.08 | (mm) | 221 |
| Length : | | 100.38 | 100.26 | 100.38 | 100.34 | (mm) | |
| Straightness (0.5mm n | naximum) (S1) : | 0.2 | 0.3 | 0.2 | 0.2 | (mm) | |
| Flatness (25μm maxim | um) (FP2) : | Ok | Ok | Ok | Ok | (μm) | |
| Parallelism (0.25 ° max | kimum) (FP2) : | 0.15 | 0.15 | 0.15 | 0.15 | (°) | After Test : |
| Mass : | 83 | 31.5 | (g) Volume: | 31 | 3579 | (mm³) | |
| Density: | | | 265 | 52 | _(kg/m³) | | |
| Moisture Conditions | : | | Dr | ту | _ | | 37 |
| _oading Rate (0.5 to | 1.0 MPa / sec) : | | 0.3 | 33 | (MPa/sec) | | |
| Type of Fracture : | | | Multiple F | Fracture | | | |
| Test Duration (2-15 | Minutes) : | | 10 | 8 | _(seconds) | | |
| Maximum Applied Lo | oad : | | 112. | .31 | _(kN) | | |
| Compressive Stre | ength: | | 35. | .9 | _(MPa) | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Remarks : | | | | | | | |
| | | | | | | | |
| Analysed by : | J. Latonde | | | | | Date | 8/18/2022 |
| Verified by : | | DOEX | | | | Date | 8/25/2022 |



| Client : | Infrastructure C | | | | | | : 11205379 : MW23-22 r.2 |
|---------------------------|------------------|--------|----------------|--------------|----------------|---------------|-----------------------------|
| - | | | | | | | : 6,93 - 7,03 m |
| | | | | | | Sampling Date | : |
| Testing Appara | tus Used : | | | Loadin | ng device N°_9 | 9130 | Caliper N° _1 |
| | | ו | Technical Data | | | | View of Specimen |
| Diameter | | 62.11 | 62.04 | 63.06 | Average | (mm) | 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 ma | eximum) (S1) : | 0.2 | 0.1 | 0.2 | 0.2 | (mm) | |
| Flatness (25µm maximul | m) (FP2) : | Ok | Ok | Ok | Ok | (μm) | |
| Parallelism (0.25 ° maxir | mum) (FP2) : | 0.10 | 0.15 | 0.15 | 0.13 | (°) | After Test: |
| Mass : | 84 | 5.1 | (g) Volume: | 31 | 3469 | _(mm³) | |
| Density: | | | 269 | 96 | _(kg/m³) | | |
| Moisture Conditions : | | | Dr | у | _ | | |
| Loading Rate (0.5 to 1 | 1.0 MPa / sec) : | | 0.3 | 39 | _(MPa/sec) | | |
| Type of Fracture : | | | Multiple I | - racture | | | |
| Test Duration (2-15 M | linutes) : | | 12 | 1 | (seconds) | | |
| Maximum Applied Loa | ad : | | 146 | .16 | - (kN) | | |
| Compressive Strer | ngth : | | 46 | .8 | - (MPa) | | |
| | | | | | _ ` | | |
| | | | | | | | |
| | | | | | | | |
| Remarks : | | | | | | | |
| | | | | | | | |
| Analysed by : | J. Lalonde | | | | | Date | : 8/18/2022 |
| Verified by : | | Xex | | | | Date | :8/25/2022 |



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

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

| ERSION 1:Excluding Sulphide in Soil analysis |
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Disclaimer:

*Notes

- 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)

Page 1 of 5

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)

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CLIENT NAME: GHD LIMITED

SAMPLING SITE:

Redox Potential 3

Certificate of Analysis

AGAT WORK ORDER: 21Z712939

PROJECT: 11205379-RPT8

ATTENTION TO: Jennifer Balkwill

397

414

NA

SAMPLED BY:

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377

Corrosivity Package

DATE RECEIVED: 2021-02-19 DATE REPORTED: 2021-03-01 11205379-BH4-11205379-MW6- 11205379-BH7-11205379-MW8-SAMPLE DESCRIPTION: 21-SS2-0.7-1.0m 21-SS2-1.1-1.3m 21-SS2-0.7-1.0m 21-SS2-0.7-1.0m SAMPLE TYPE: Soil Soil Soil Soil 2021-01-18 DATE SAMPLED: 2021-01-18 2021-01-13 2021-01-19 2122181 2122183 **Parameter** Unit G/S RDL Date Prepared Date Analyzed 2122180 RDL 2122182 RDL Chloride (2:1) 4 2021-02-24 2021-02-24 440 2 253 4 μg/g 69 562 Sulphate (2:1) 4 2021-02-24 2021-02-24 439 2 395 6 4 195 μg/g pH (2:1) pH Units NA 2021-02-24 2021-02-24 6.35 NA 7.4 7.23 NA 7.95 0.005 0.005 Electrical Conductivity (2:1) mS/cm 0.005 2021-02-24 2021-02-24 1.21 0.936 0.163 1.40 Resistivity (2:1) (Calculated) 2021-02-24 2021-02-24 826 1 1070 6130 1 714 ohm.cm 1 428 Redox Potential 1 m۷ NA 2021-02-23 2021-02-23 NA 389 429 NA 377 446 Redox Potential 2 mV NA 2021-02-23 2021-02-23 NA 394 416 NA 379

2021-02-23

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.

2021-02-23

NA

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

432

NA

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.

m۷

Analysis performed at AGAT Toronto (unless marked by *)

CHARTERED S NYME BASILY OF CHEMIST ASSISTANCE OF CHARTERED S NOW SHEET ASSISTANCE OF CHEMIST ASSISTANCE OF CHARTER S NAM



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Quality Assurance

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 21Z712939

PROJECT: 11205379-RPT8

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

| | | | | Soi | l Ana | alysis | 5 | | | | | | | | |
|-------------------------------|-----------|---------|---|----------|-------------------|---------|--------------------|----------------------|-------|--------------------|--------|----------------|--------------|-----|-------|
| RPT Date: Mar 01, 2021 | | | | DUPLICAT | E | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | KE |
| PARAMETER | Batch | Sample | mple Dup #1 Dup #2 PPD Blank Measured Lim | | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | 1 1 10 | ptable nits | | | |
| | | ld | | | | | Value | Lower | Upper | | | Upper | | | 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.

CHEMIST OF CHEMIST OF

Certified By:



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

Method Summary

CLIENT NAME: GHD LIMITED AGAT WORK ORDER: 21Z712939
PROJECT: 11205379-RPT8 ATTENTION TO: Jennifer Balkwill

SAMPLING SITE: SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|--------------------------------|--------------|---|---------------------------|
| Soil Analysis | · | · | |
| 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 |



5835 Coopers Avenue Mississauga, Ontario L1Z 1Y2 Ph: 905.712.5100 Fax: 905.712.5122 webearth.agatlabs.com

| Laboratory | Use | Only |
|------------|-----|------|
| | 21 | -7 |

| Work Order #: | 21 | 王子 | 129 | 39 | 7 |
|---------------|----|----|-----|----|---|
| | | | | | _ |

| Cooler Quantity: | ana b | 20,-1 | Sip |
|----------------------|-------|-------|------|
| Arrival Temperatures | | 19.61 | 182 |
| LTUCE Pack | 40 | 4-61 | 4.8 |
| Custody Seal Intact: | □Yes | □No | □N/A |

| Chain of Cu | istody Record | If this is a l | Orlnking Water | sample, plea | se use Drinl | ding Water Chain o | of Custody Form (pote | able water | consum | ed by huma | ns) | | _ / ^ | rrival Te | mpera | | 10g | 0 16 | 5.0 | 4.0 |) |
|---------------------------------|---------------------------------------|-----------------|------------------|--------------------|------------------|------------------------------------|-------------------------|--------------------------|------------|------------------------|-------------------------|---------|---------------------------------|---|---------------------------------------|------------------------------------|-------------|----------------|------------|-----------------|----|
| Report Informa | ation: GHD Limited | | | | Reg (Please | gulatory Requ | uirements: | | | | | | | ustody s | - / | | □Yes | | □No | | N/ |
| | lennifer Balkwill | | | | _ | gulation 153/04 | Excess Soils F | R406 | Sev | ver Use | | | Turnaround Time (TAT) Required: | | | | | | Ξ | | |
| Address: | 455 Phillip St Unit 100A | , Waterloo, ON | , N2L 3X2 | | | · · | _ | | | | Storm | 1 | | | | | | | | | |
| | | | | | | ole <u>Indicate One</u> Ind/Com | Table Indicate O | ne | | Region | | | Re | gular | TAT (| Most An | alyses) | 5 to 7 | Business | s Days | |
| Phone: | 519-340-4286 | Fax: | | | | Res/Park | Regulation 55 | 58 | ☐ Pro | v. Water Ç | uality | | Ru | sh TA | T (Ruch S | Surcharg | (es Apply) | | | | |
| Penarts to be sent to: | ennifer.balkwill@ghd.com | I ax | | | | Agriculture | | - 4 | | ectives (P | | | | | | | | | | | |
| 1. Email: | emmer.baikwinieghd.com | | | | | exture (Check One) Coarse | ССМЕ | | Oth | er | | | | | Busine ays | SS | Day | lusiness /s | 1 1 | lext Busi ay | ne |
| 2. Email: | | | | | - 11 - | Fine | | | | Indicate One | | | - | | • | Requi | red (Rush | Surcharge | es May Ar | pply): | |
| Duralis at Informa | | | | | le | this submissi | on for a | D | onort | Guldeli | 20 05 | | | | | | | | | | |
| Project Informa | | | | | | cord of Site Co | | | | te of A | | | | === | | | | notification | | | |
| - | 11205379-RPT8 | | | | - | |] No | Е | | | N | | | *T/ | AT is ex | clusive | e of week | ends and s | tatutory l | holidays | |
| Site Location: Sampled By: | | | | | | 1 103 | | | 1 103 | |] 4 | | | | me Da | y' ana | tysis, pież | ise contac | t your A | GAT CPI | / |
| AGAT ID #: | | PO: _7352 | 22893 | | | | | 7 8 | 0. | Reg 153 | | | 0, R 55 | | Reg 406 | | | | | | |
| 71971715 | Please note: If quotation number is r | | | analysis. | | ple Matrix Le | gend | CrVI, DOC | | | 9 | - | 4. | PCB. | 98 | | | | | | 1 |
| Invoice Informa | ation: | R | II To Same: Ye | os 🕖 No 🗆 | B GW | Biota Ground Water | | Hg, Cr | | | ON I | | Disposal Characterization TCLP. | LI VOCS LI ABNS LI B(a)PLI PCBS S SPLP Rainwater Leach | Pack | 4 | | | | | I |
| Company: | | D | ii io odilic. To | ,5 Eq. 110 L | 0 | Oil | | T S | | □HWSB | □ Yes | | zaticı | ate l | zation Pa | BIEX, FI-r4 | | | | | 1 |
| Contact: | | | | | P | Paint | | Meta | | | | Aroclor | cteri | ABNs | eriza | <u> </u> | 4 | | | | 1 |
| Address: | | | | | S | Soil | | ed - | Soil | Hg.I | | D Arc | Chara | 2 2 3 | aracteriz | | | | | | 1 |
| Email: | | | | | SD SW | Sediment Surface Water | | Filte | Inorganics | □ crvl, □ | = | | sal (| SPLP | Cha : | Aera R | | | | | 1 |
| | | | | | J | | | Field Filtered - Metals, | So | s - 🗆 Cr F1-F4 I | 74 | PCBs | Sis | Soil 1 | Soils Ch | EC/SAR | . Col | | | | ı |
| Sample | Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | | nments/ Instructions | Y/N | Metals | Metals - [BTEX, F1 | Analyze r4G ir required | Total P | VOC | Excess (| Excess Soils Characterization Peckage | pH, ICPMS Metals, Salt - EC/SAR | Corrosivity | | | | |
| | | | AN PN | 1 | | | | | | | | | | | | | | | | | 1 |
| 11205379- BH4-21 | - SS2 - 0.7-1.0m | 2021-01-18 | AN PN | 1 | Soil | Corrosivity | | | | | | | | | | | | | | | |
| | | | AN PN | 1 | | | | | | | | 1.0 | | 7 | | | | | | | |
| 11205379- MW6-21 | - SS2 - 0.7-1.0m | 2021-01-13 | AN PN | 1 | Soil | Corrosivity | | | | | П | | | | | | | | | | |
| 11205379- BH7-21 | - SS2 - 0.7-1.0m | 2021-01-19 | AN PN | 1 | Soil | Corrosivity | | | | | | | | | | | | | | | |
| 11205379- MW8-21 | - SS2 - 1.1-1.3m | 2021-01-18 | AN PN | 1 | Soil | Corrosivity | | | | | | | | | | | | | | | |
| | | | AN PN | | | | | | | | П | | | | | | | | | | T |
| | | | AN PN | | | | | | | | | | | | | | | | | | T |
| | | | AA PA | | | | | | | | \top | | | | | | | | | | Ť |
| | | | AN PN | | | | | | | | | | | | | | | | | | + |
| | | | AN PN | | | | | | | | | | | _ | | | | | | | t |
| Samples Relinquished By (Print | Name and Side | | PN | / Time | | Samples Received Dur | Print Natus and Sign): | | | | | LDate | T. | Tire | 2 | | | | | _ | 1 |
| | / ^ | | | | | (80 | Thol | eth | (A) | (1) | 16 | 0360 | 119 | | 37 | w | | | | | |
| Samples Relinquished By (Print | Name and Dign (At) | 427 | 1/2119 | To | nov | Samples Bergand Ru | Print Month and Right | R | 7 | 4 | eh | 20 | 6 | Tim | 0 | 2 | Ma | Page | of | | |
| County Ballion Labor By Charles | -47/ OL. | W L | | 1 | | 3//1 | 101100 | CV | W | | en | 40 | 101 | Toro | 11, | 0 | 116 | IN | | | _ |



CERTIFICATE OF ANALYSIS

Page Work Order : WT2214174

Client : GHD Limited Laboratory : Waterloo - Environmental

Contact **Account Manager** : Rick Hawthorne : Rick Hawthorne Address Address

: 455 Phillip Street : 60 Northland Road, Unit 1 Waterloo ON Canada N2L 3X2

Waterloo ON Canada N2V 2B8 Telephone

: 1 of 5

: +1 519 886 6910 **Date Samples Received** : 11205379-100 : 14-Sep-2022 10:30

: 735-004287 **Date Analysis** : 15-Sep-2022

Commenced

C-O-C number Issue Date : 16-Sep-2022 16:35 Sampler : CLIENT

: ----: 11205379-100-SSOW 735-004287 Quote number

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

Telephone

Project

РО

Site

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 Kinnenhuck | Team Leader - Inorganics | Inorganics Waterloo Ontario |

 Page
 : 2 of 5

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



General Comments

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 for analysis.

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

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 |

>: greater than.

<: less than.

 Page
 : 3 of 5

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



Analytical Results

WT2214174-001

Sub-Matrix: SoilClient sample ID: 11205379- BH16-SS2(Matrix: Soil/Solid)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.CI | 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: SoilClient sample ID: 11205379- BH20-SS2(Matrix: Soil/Solid)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) | | 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.CI | 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: SoilClient sample ID: 11205379- MW17-SS1(Matrix: Soil/Solid)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) | | 231 FR5 | 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.CI | 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.

 Page
 : 4 of 5

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



Analytical Results

WT2214174-004

Sub-Matrix: Soil Client sample ID: 11205379- MW18-SS3 (Matrix: Soil/Solid) 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.CI | 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: SoilClient sample ID: 11205379- BH11-22-SS2(Matrix: Soil/Solid)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) | | 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: SoilClient sample ID: 11205379- BH16-22-SS2(Matrix: Soil/Solid)Client sampling date / time: 14-Sep-2022

| Analyte | CAS Number | Result | LOR | Unit | Method | Prep Date | Analysis | QCLot |
|-------------------------------------|------------|---------|------|----------|----------|-------------|-------------|--------|
| Analyte | CAS Number | rtesan | LON | Onn | Wichiod | 7 Tep Bate | Date | QOLO |
| Physical Tests | | | | | | | Date | |
| 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.

 Page
 : 5 of 5

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



Analytical Results

WT2214174-007

Sub-Matrix: SoilClient sample ID: 11205379- BH17-22-SS2(Matrix: Soil/Solid)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) | | 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.CI | 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 Client sample ID: 11205379- MW09-22 (Matrix: Soil/Solid) 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) | | 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 Issue Date : 735-004287 : 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 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.

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

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No 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

 Page
 : 3 of 11

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



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 Evaluation: × = Holding time exceedance; √ = Within Holding Time

| Matrix: Soli/Solid | | | | | LV | aluation. * - | Holding time exce | euanice , • | - vviti iii i | Holding Til |
|--|---------|---------------|-------------|---------------|------------|---------------|-------------------|-------------|---------------|-------------|
| Analyte Group | Method | Sampling Date | Ext | traction / Pr | reparation | | | Analys | is | |
| Container / Client Sample ID(s) | | | Preparation | Holding | g Times | Eval | Analysis Date | Holding | Times | Eval |
| | | | Date | Rec | Actual | | | Rec | Actual | |
| Leachable Anions & Nutrients : Water Extractable Chloride by IC | | | | | | | | | | |
| Glass soil jar/Teflon lined cap | | | | | | | | | | |
| 11205379- BH11-22-SS2 | E236.CI | 14-Sep-2022 | 16-Sep-2022 | 30 | 3 days | ✓ | 16-Sep-2022 | 28 days | 0 days | ✓ |
| | | | | days | | | | | | |
| Leachable Anions & Nutrients : Water Extractable Chloride by IC | | | | | | | | | | |
| Glass soil jar/Teflon lined cap | F000 01 | 44.0 0000 | 40.0 | | | , | 40.0 | 00.1 | | |
| 11205379- BH16-22-SS2 | E236.CI | 14-Sep-2022 | 16-Sep-2022 | 30 | 3 days | ✓ | 16-Sep-2022 | 28 days | 0 days | ✓ |
| | | | | days | | | | | | |
| Leachable Anions & Nutrients : Water Extractable Chloride by IC | | | | | | | | | | |
| Glass soil jar/Teflon lined cap 11205379- BH16-SS2 | E236.CI | 14-Sep-2022 | 16-Sep-2022 | 00 | 3 days | ✓ | 16-Sep-2022 | 28 days | 0 days | 1 |
| 11203379- BH 10-332 | E230.CI | 14-3ep-2022 | 10-Sep-2022 | 30 days | 3 uays | • | 10-Sep-2022 | 20 uays | 0 days | • |
| | | | | uays | | | | | | |
| Leachable Anions & Nutrients : Water Extractable Chloride by IC Glass soil jar/Teflon lined cap | | | | | | | | | | |
| 11205379- BH17-22-SS2 | E236.CI | 14-Sep-2022 | 16-Sep-2022 | 30 | 3 days | ✓ | 16-Sep-2022 | 28 days | 0 days | 1 |
| 11200010- B1111-22 002 | | oop 2022 | 10 00p 2022 | days | o dayo | | 10 00p 2022 | 20 days | dayo | |
| Leachable Anions & Nutrients : Water Extractable Chloride by 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 | ✓ |
| | | | • | days | | | | | | |
| Leachable Anions & Nutrients : Water Extractable Chloride by 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 | ✓ |
| | | | | days | | | | | | |
| Leachable Anions & Nutrients : Water Extractable Chloride by IC | | | | | | | | 1 | | |
| Glass soil jar/Teflon lined cap | | | | | | | | | | |
| 11205379- MW17-SS1 | E236.CI | 14-Sep-2022 | 16-Sep-2022 | 30 | 3 days | ✓ | 16-Sep-2022 | 28 days | 0 days | ✓ |
| | | | | days | | | | | | |

 Page
 : 4 of 11

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



Matrix: Soil/Solid

| Evaluation: | - Holding tim | e exceedance : | / - | Within Holding Time | |
|-------------|---------------|----------------|-----|---------------------|--|
| | | | | | |

| /latrix: Soil/Solid | | | | | E\ | /aluation: × = | Holding time exce | edance; v | = vvitnin | Holding |
|--|----------|---------------|-------------|---------------|-----------|----------------|-------------------|-----------|-----------|---------|
| Analyte Group | Method | Sampling Date | Ex | traction / Pr | eparation | | | Analys | is | |
| Container / Client Sample ID(s) | | | Preparation | Holding | g Times | Eval | Analysis Date | Holding | Times | Eval |
| | | | Date | Rec | Actual | | | Rec | Actual | |
| eachable Anions & Nutrients : Water Extractable Chloride by IC | | | | | | | | | | |
| Glass soil jar/Teflon lined cap | | | | | | | | | | |
| 11205379- MW18-SS3 | E236.CI | 14-Sep-2022 | 16-Sep-2022 | 30 | 3 days | ✓ | 16-Sep-2022 | 28 days | 0 days | ✓ |
| | | | | days | | | | | | |
| eachable 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 | ✓ |
| | | | | 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 | ✓ |
| | | | | 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 | ✓ | 16-Sep-2022 | 28 days | 0 days | ✓ |
| | | | | 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 | ✓ |
| | | | | 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 | ✓ |
| | | | | 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 : WT2214174 Work Order Client : GHD Limited : 11205379-100 Project



| Matrix: Soil/Solid | _ | | | | Ev | /aluation: 🗴 = | Holding time exce | edance ; 🔻 | / = Withir | Holding Tim |
|--|---------|---------------|-------------|---------------|-----------|----------------|-------------------|------------|------------|-------------|
| Analyte Group | Method | Sampling Date | Ext | traction / Pr | eparation | | | Analys | is | |
| Container / Client Sample ID(s) | | | Preparation | Holding | Times | Eval | Analysis Date | | Times | Eval |
| | | | Date | Rec | Actual | | | Rec | Actual | |
| 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 | ✓ |
| | | | | | | | | | | |
| Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level) | | | | | | | | | I | |
| Glass soil jar/Teflon lined cap | E100-L | 14-Sep-2022 | 16 Can 2022 | | | | 16 Con 2022 | 20 days | O days | _ |
| 11205379- BH16-22-SS2 | E100-L | 14-3ep-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- BH16-SS2 | E100-L | 14-Sep-2022 | 16-Sep-2022 | | | | 16-Sep-2022 | 30 days | 2 days | ✓ |
| 11200010 21110 002 | 2.00 2 | 33p 2022 | .0 000 2022 | | | | .0 000 2022 | oo aayo | | |
| 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 | ✓ |
| | | | · | | | | · | | | |
| 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 | ✓ |
| | | | | | | | | | | |
| Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level) | | | | | | | | | | |
| Glass soil jar/Teflon lined cap | | | | | | | | | | |
| 11205379- MW09-22 | 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 | F400 I | 44.0 0000 | 40.0 | | | | 40.0 | 00.1 | | , |
| 11205379- MW17-SS1 | 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- MW18-SS3 | E100-L | 14-Sep-2022 | 16-Sep-2022 | | | | 16-Sep-2022 | 30 days | 2 days | ✓ |
| 1 1200019- IVIVV 10-000 | E 100-L | 14-36p-2022 | 10-3ep-2022 | | | | 10-3ep-2022 | 50 days | ∠ uays | • |
| Physical Tarta Maister Contact by Contact | | | | | | | | | | |
| Physical Tests : Moisture Content by Gravimetry Glass soil jar/Teflon lined cap | | | | | | | I | | | |
| 11205379- BH11-22-SS2 | E144 | 14-Sep-2022 | | | | | 15-Sep-2022 | | | |
| | | | | | | | | | | |
| | 1 | 1 | | 1 | | | 1 | T. | | |

 Page
 : 6 of 11

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



Matrix: Soil/Solid Evaluation: × = Holding time exceedance; ✓ = Within Holding Time

| attix. John John | | | | | | aldation. | riolding time exceed | , addition | *************************************** | riolaling |
|---|--------|---------------|--------------------------|---------|---------|-----------|----------------------|------------|---|-----------|
| Analyte Group | Method | Sampling Date | Extraction / Preparation | | | | Analysis | | | |
| Container / Client Sample ID(s) | | | Preparation | Holding | 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 | | | |
| 11203379- 0010-332 | L144 | 14-0ep-2022 | | | | | 13-3ep-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 | | | | | | | I | | 1 1 | |
| 11205379- BH20-SS2 | E144 | 14-Sep-2022 | | | | | 15-Sep-2022 | | | |
| 1,200010 21,20 002 | | | | | | | | | | |
| 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 | | | | | | | T | I | | |
| Glass soil jar/Teflon lined cap 11205379- MW17-SS1 | E144 | 14-Sep-2022 | | | | | 15-Sep-2022 | | | |
| 11250013 WWW 77 001 | | 11 Gop 2022 | | | | | 10 GSP 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 | 1 days | 1 |
| 11200079- DH11-22-002 | L125 | 14-3ep-2022 | 13-3ер-2022 | | | | 13-3ep-2022 | days | Tuays | • |
| 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 | 1 days | ✓ |
| | | | | | | | | days | | |

 Page
 : 7 of 11

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



Matrix: Soil/Solid

| Evaluation: 🗴 = | Holding time exceedance ; ✓ = Within Holding Time |
|-----------------|---|
| | |

| atilix. Soli/Solid | | | | | LV | aluation. •• – | riolaing time exce | oddiioo , | | |
|--|--------|---------------|--------------------------|---------------|--------|----------------|--------------------|-----------|--------|----------|
| Analyte Group | Method | Sampling Date | Extraction / Preparation | | | | Analysis | | | |
| Container / Client Sample ID(s) | | | Preparation | Holding 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 | | | | | | | | | | |
| Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received Glass soil jar/Teflon lined cap | | | | | | | | | | |
| | E108A | 14-Sep-2022 | 15-Sep-2022 | | | | 15-Sep-2022 | 30 days | 1 days | √ |

 Page
 : 8 of 11

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



Matrix: Soil/Solid Evaluation: ▼ = Holding time exceedance; ✓ = Within Holding Time

| | | | | | · carcacation in | ribiding time excer | - uu , | | riolaling in |
|--------|---------------------|--|--|---|--|---|--|---|--|
| Method | Sampling Date | Ext | raction / Pr | eparation | | | Analys | is | |
| | | Preparation Date | Holding Rec | g Times Actual | Eval | Analysis Date | Holding Rec | Times Actual | Eval |
| | | | | | | | | | |
| E108A | 14-Sep-2022 | 15-Sep-2022 | | | | 15-Sep-2022 | 30 days | 1 days | ✓ |
| | | | | | | | | | |
| E108A | 14-Sep-2022 | 15-Sep-2022 | | | | 15-Sep-2022 | 30 days | 1 days | 1 |
| | | | | | | | | | |
| E108A | 14-Sep-2022 | 15-Sep-2022 | | | | 15-Sep-2022 | 30 days | 1 days | 4 |
| | | | | | | | | | |
| E108A | 14-Sep-2022 | 15-Sep-2022 | | | | 15-Sep-2022 | 30 days | 1 days | ✓ |
| | | | 1 | | | | | | |
| E108A | 14-Sep-2022 | 15-Sep-2022 | | | | 15-Sep-2022 | 30 days | 1 days | 1 |
| | E108A E108A E108A | E108A 14-Sep-2022 E108A 14-Sep-2022 E108A 14-Sep-2022 E108A 14-Sep-2022 | Preparation Date E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 | Preparation Date Holding Rec E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 | Method Sampling Date Extraction / Preparation Preparation Date Holding Times Rec Actual E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 | Method Sampling Date Extraction / Preparation Preparation Date Holding Times Rec Actual E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 | Method Sampling Date Extraction / Preparation Preparation Holding Times Rec Eval Analysis Date E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 | Method Sampling Date Extraction / Preparation Preparation Analysis Date Rec Analysis Date Analysis Date Rec Holding Times Rec E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 30 days E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 30 days E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 30 days E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 30 days | Method Sampling Date Extraction / Preparation Preparation Preparation Rec Actual Eval Analysis Date Rec Actual Analysis Date Rec Actual Holding Times Rec Actual E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 30 days 1 days E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 30 days 1 days E108A 14-Sep-2022 15-Sep-2022 15-Sep-2022 30 days 1 days |

Legend & Qualifier Definitions

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

Page : 9 of 11 Work Order · WT2214174 Client : GHD Limited Project : 11205379-100



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

E236.SO4

 Page
 : 10 of 11

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



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").

| Method / Lab | Matrix | Method Reference | Method Descriptions |
|--|--|---|--|
| 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. |
| 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 ± 5°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. |
| 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. |
| 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. |
| 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. |
| 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. |
| 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. |
| Method / Lab | Matrix | Method Reference | Method Descriptions |
| EP108 Waterloo - | 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. |
| | E100-L Waterloo - Environmental E108A Waterloo - Environmental E125 Waterloo - Environmental E144 Waterloo - Environmental E236.Cl Waterloo - Environmental E236.SO4 Waterloo - Environmental E236.SO4 Waterloo - Environmental EC100R Waterloo - Environmental EC100R Waterloo - Environmental EC100R Waterloo - Environmental EC100R | E100-L Soil/Solid Waterloo - Environmental E108A Soil/Solid Waterloo - Environmental E125 Soil/Solid Waterloo - Environmental E144 Soil/Solid Waterloo - Environmental E236.Cl Soil/Solid Waterloo - Environmental E236.SO4 Soil/Solid Waterloo - Environmental E236.SO4 Soil/Solid Waterloo - Environmental EC100R Soil/Solid Waterloo - Environmental EC100R Soil/Solid Waterloo - Environmental EC100R Soil/Solid Waterloo - Environmental Method / Lab Matrix EP108 Soil/Solid | E100-L Soil/Solid CSSS Ch. 15 (mod)/APHA 2510 (mod) |

 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 |
| pH | | | | 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

Client : GHD Limited
Contact : Rick Hawthorne

:455 Phillip Street

Waterloo ON Canada N2L 3X2

Telephone : ---

Address

Project : 11205379-100 PO : 735-004287

C-O-C number : ----

Sampler : CLIENT

Site :----

Quote number : 11205379-100-SSOW 735-004287

No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 4

Laboratory : Waterloo - Environmental

Account Manager : Rick Hawthorne

Address : 60 Northland Road, Unit 1

Waterloo, Ontario Canada N2V 2B8

Telephone : +1 519 886 6910

Date Samples Received : 14-Sep-2022 10:30

Date Analysis Commenced : 15-Sep-2022

Issue Date : 16-Sep-2022 16:35

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).

Laboratory Dunlicate (DLIP) Report

| Sub-Matrix: Soil/Solid | | | | | | Laboratory Duplicate (DOP) 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 8 | Nutrients (QC Lot: 648 | 3052) | | | | | | | | | | | |
| 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 8 | Nutrients (QC Lot: 648 | 3053) | | | | | | | | | | | |
| 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 | ub-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: 64805 | | | | | | | | | | | | | | |
| sulfate, soluble ion content | 14808-79-8 | E236.SO4 | 20 | mg/kg | 5000 mg/kg | 100 | 70.0 | 130 | | | | | | |
| Leachable Anions & Nutrients (QCLot: 64805 | 3) | | | | | | | | | | | | | |
| chloride, soluble ion content | 16887-00-6 | E236.CI | 5 | mg/kg | 5000 mg/kg | 101 | 80.0 | 120 | | | | | | |
| | | | | | | | | | | | | | | |

 Page
 : 4 of 4

 Work Order
 : WT2214174

 Client
 : GHD Limited

 Project
 : 11205379-100



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 Anion | s & Nutrients (QCLot: 6 | 348052) | | | | | | | | | | |
| | RM | sulfate, soluble ion content | 14808-79-8 | E236.SO4 | 217 mg/kg | 98.5 | 60.0 | 140 | | | | |
| Leachable Anion | s & Nutrients (QCLot: 6 | 348053) | | | | | | | | | | |
| | RM | chloride, soluble ion content | 16887-00-6 | E236.CI | 673 mg/kg | 94.1 | 70.0 | 130 | | | | |

Chain of Custody (COC) / Analytical Request Form

Page

| مح | خ |
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| 22 - | |
| umber: , | ₽ |
| COCN | Page |

REFER TO BACK-PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION
Fallure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.