Berkshire Axis Development

Preliminary Geotechnical Investigation
12505 Heart Lake Road
Caledon, Ontario

Project Number
BRM-21011099-B0

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Table of Contents

Tables

Drawings

Appendices

1. Introduction

This report presents the results of a Preliminary Geotechnical Investigation carried out at the site of a proposed commercial/industrial building development at 12505 Heart Lake Road in the Town of Caledon, Ontario. A Phase I Environmental Site Assessment (ESA) was carried out in conjunction with this Preliminary Geotechnical Investigation. Findings of the Phase I ESA are presented under separate cover. The work was authorized by Mr. Leslie Marlowe on behalf of Berkshire Axis Development (the Client).

It is understood that the Client is in the due diligence period for potential acquisition of the subject property.

It is our understanding that the site will be developed with single storey industrial buildings without basement, paved accessways, sewers, and parking areas. No layout plans for the site have been prepared to date.

The purpose of this preliminary study was to determine the subsurface conditions at the site by drilling twelve (12) boreholes evenly located to provide representative coverage of the site. Based on this information, geotechnical engineering guidelines for the design and construction of the development under consideration would be provided. It should be noted that the boreholes were widely spaced for preliminary geotechnical investigation purposes. Once layout plans have been finalized, additional boreholes would be required to confirm subsurface conditions between boreholes for design purposes.

One (1) additional borehole was added to the program to investigate potential for seepage of contaminants into the underlying soils in an area where heavy staining was observed below an aboveground storage tank (AST) during the Phase I ESA site reconnaissance inspection. Findings are included in Section 6.0 of this report.

The comments and recommendations given in this report are based on the assumption that the design concept described will proceed into construction. If changes are made either in the design phase or during construction, this office must be retained to review these modifications. The result of this review may be a modification of our recommendations or the requirement of additional field or laboratory work to check whether the changes are acceptable from a geotechnical viewpoint.

2. Procedure

Drilling and sampling operations, carried out from June 1st to 3rd, 2021, were completed by a combination of auger and split-spoon techniques with drilling equipment owned and operated by a specialist contractor. Twelve (12) geotechnical boreholes, designated as Boreholes 1 to 12, and one (1) environmental borehole designated as Borehole 13, were drilled for this investigation. The boreholes were advanced to depths of approximately 2.3 to 8.1 m below ground surface (mbgs) and spaced to provide representative coverage of the site.

Monitoring wells were installed in three (3) boreholes (Boreholes 2, 9 and 12). The geotechnical boreholes/monitoring wells are listed in Table 1 and the approximate locations of all boreholes/monitoring wells are shown on the attached Borehole Location Plan (Drawing No. 1).

Table 1: List of boreholes and monitoring wells

Borehole	Type*	Coordinates		Date of Completion	Termination Depth (mbgs)
		UTM Easting (m)	UTM Northing (m)		
BH 1	G	595083.59	4846412.70	June 3, 2021	7.9
BH 2	GW	595197.37	4846535.23	June 3, 2021	8.1
BH 3	G	595339.72	4846712.24	June 3, 2021	8.1
BH 4	G	595517.03	4846819.73	June 3, 2021	8.1
BH 5	G	595191.53	4846302.68	June 3, 2021	8.1
BH 6	G	595394.12	4846382.49	June 1, 2021	8.1
BH 7	G	595502.48	4846587.20	June 2, 2021	8.1
BH 8	G	595626.06	4846728.47	June 2, 2021	8.1
BH 9	GW	595342.11	4846152.75	June 1, 2021	8.1
BH 10	G	595421.55	4846245.73	June 1, 2021	8.1
BH 11	G	595534.14	4846392.92	June 1, 2021	8.1
BH 12	GW	595687.11	4846630.51	June 2, 2021	8.1
*Geotechnical (G), Monitoring Well (GW)					

A representative of EXP Services Inc. (EXP) was present throughout the fieldwork to monitor and direct the drill operations, and to record borehole information. Representative samples of the subsurface soils were recovered at regular intervals using conventional 50 mm O.D. split spoon sampling equipment driven in accordance with Standard Penetration Test procedures (ASTM D1586). All split spoon samples were returned to EXP's Brampton laboratory for testing which included moisture content and unit weight determinations on selected samples. Water levels were monitored in the open boreholes prior to backfilling and in monitoring wells installed in Boreholes 2, 9 and 12.

The borehole locations were established in the field by EXP personnel. Elevations were measured using a Sokkia GCS3 Global Navigation Satellite System (GNSS) receiver based on information derived from the TopNET Live Network Service Global Positioning System (GPS).

3. Site Description

The project site occupies an area of about 29.48 hectares (~72.8 acres) in the Town of Caledon, Ontario. Based on available aerial photography, the property consists of mainly farmland. A homestead and several farm buildings and silos are clustered in the southwest quadrant of the property. The property is irregular in shape and is located on the east side of Heart Lake Road, with frontage centred approximately 1.6 km north of Mayfield Road.

4. Subsurface Conditions

The detailed soil profiles encountered in each borehole and the results of moisture content and unit weight determinations are indicated on the attached borehole logs. It should be noted that the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change.

The "Notes on Sample Description" preceding the borehole logs form an integral part of and should be read in conjunction with this report.

In general, the boreholes indicate that the subsurface soils consist of the following layers:

- Topsoil
- Clayey Silt Till (Upper Layer)
- Sandy Silt Till
- Silty Sand
- Silty Clay Till
- Silty Sand Till
- Clayey Silt Till (Lower Layer)

Following is a brief description of the soil conditions encountered during the investigation.

Topsoil

Surface cover comprises topsoil ranging in thickness from approximately 150 to 400 mm at all borehole locations except for Borehole 6. However, the boreholes were advanced primarily in cultivated fields. As such, topsoil thicknesses up to approximately 600 mm associated with typical ploughed fields should be anticipated.

It should be noted that topsoil measurements were carried out at the borehole locations only and could differ at other locations on the site. If required, a more detailed test pit program should be carried out to more accurately quantify the amount of topsoil to be removed for construction purposes.

Clayey Silt Till (Upper Layer)

A clayey silt till deposit underlies the topsoil in Boreholes 1, 2 and 8. The upper clayey silt till was encountered from 0.15 to 0.25 mbgs and extended from 0.7 to 1.1 mbgs, corresponding to Elevation 268.8 to 275.0 m above sea level (mASL). The observed thickness of upper clayey silt till varied from 0.7 m to 1.1 m.

The upper clayey silt till contains trace sand and trace gravel and is typically brown in colour. A wet silty sand seam was noted within the upper clayey silt till at approximately 0.9 m depth (~Elevation 270.8 mASL) in Borehole 1.

The SPT 'N' values recorded in the upper clayey silt till deposit varied from 5 to 8, indicating a consistency of firm to stiff. Moisture contents of the upper clayey silt till were recorded between approximately 12 and 26 percent.

Sandy Silt Till

A sandy silt till deposit was intersected below topsoil in Boreholes 3 to 5, 7 and 9 to 12. It was encountered below the upper clayey silt till in Boreholes 1, 2 and 8. The sandy silt till deposit was encountered at surface in Borehole 6. In Borehole 7 the sandy silt till deposit was encountered again below the silty clay till deposit.

The sandy silt till layer was encountered from ground surface to 1.1 mbgs and extended from 2.1 to 7.0 mbgs (corresponding to Elevations 262.6 to 275.5 mASL). The observed thickness of the sandy silt till layer varied from 1.1 m to 5.6 m.

The sandy silt till contains trace clay, trace gravel and occasional cobble fragments. A wet silty sand was noted within the sandy silt till at approximately 2.3 m depth (~Elevation 269.9 mASL) in Borehole 5. The sandy silt till is brown in colour except for Boreholes 5 where the deposit becomes grey at 4.6 mbgs (~Elevation 267.6 mASL).

The SPT 'N' values recorded in the sandy silt till deposit varied from 4 to 53, indicating a loose to very dense degree of compactness. Measured moisture content of the sandy silt till generally ranges from approximately 8 to 24 percent.

Silty Sand

A 1.1 m thick layer of silty sand was encountered below the sandy silt till layer in Borehole 4. The silty sand layer was encountered from 2.9 mbgs and extended to 4.0 mbgs (corresponding to Elevations 263.2 to 264.3 mASL).

The silty sand contains trace clay and is brown in colour. An SPT 'N' value of 23 was recorded in the silty sand, indicating a compact degree of compactness. A moisture content of 23 percent was measured for this layer.

Silty Clay Till

A 1.6 m thick layer of silty clay till was encountered below the sandy silt till layer in Borehole 7. The silty clay till was encountered from 4.0 mbgs and extended to 5.6 mbgs (corresponding to Elevations 264.0 to 265.6 mASL).

The silty clay till contains trace clay, trace gravel and is grey in colour. A SPT 'N' value of 24 was recorded in the silty clay till, indicating a very stiff consistency. A moisture content of 13 percent was measured for this layer.

Silty Sand Till

A silty sand till deposit was intersected below lower clayey silt till in Borehole 9 and below sandy silt till in Borehole 11. Borehole 9 was terminated in this deposit at depth of 8.1 m (~Elevation 265.5 mASL).

The silty sand till layer was encountered from 2.9 to 7.0 mbgs and extended from 5.6 to 8.1 mbgs (corresponding to Elevations 264.4 to 267.1 mASL). The observed thickness of the upper silty sand till layer varied from 1.1 m to 2.7 m.

The silty sand till contains trace clay and trace gravel. The encountered silty sand till is grey in colour in Borehole 9 and brown in colour in Borehole11.

The SPT 'N' values recorded in the silty sand till deposit varied from 23 to 41, indicating a compact to dense degree of compactness. Measured moisture content of the silty sand till ranges from approximately 9 to 12 percent.

Clayey Silt Till (Lower Layer)

A clayey silt till deposit was intersected below sandy silt till in Boreholes 1 to 3, 5 to 10 and 12. It was encountered below silty sand in Borehole 4 and below silty sand till in Borehole 11.

The lower clayey silt till was encountered from 2.1 to 7.0 mbgs and extended from 7.0 to 8.1 mbgs (corresponding to Elevations 259.2 to 272.8 mASL). It should be noted that with the exception of Borehole 9, all other boreholes were terminated in this deposit.

The observed thickness of lower clayey silt till varied from 1.1 m to 6.0 m.

The lower clayey silt till contains trace sand, trace gravel and occasional cobble fragments. This lower clayey silt till layer is typically brown in colour near the top of the layer and becomes grey with depth.

The SPT 'N' values recorded in the lower clayey silt till deposit varied from 13 to more than 50 per 150 mm, indicating a consistency of stiff to hard. Moisture contents of the lower clayey silt till were recorded between approximately 9 and 14 percent.

Groundwater Conditions

Groundwater conditions were assessed in the open boreholes and in the monitoring wells installed in Boreholes 2, 9 and 12 during the course of the fieldwork.

Short term groundwater levels are recorded on the attached borehole logs. Upon completion of drilling, free water was observed in Boreholes 1 to 3, 5, and 8 to 12 at depths of approximately 1.2 to 7.3 m below existing grades. The remaining boreholes were dry upon completion of augering.

Subsequently, groundwater levels in the monitoring wells installed in Boreholes 2, 9 and 12 were measured and recorded, with the results summarized in the following Table 2.

Table 2: Groundwater Level Readings

Borehole No.	Elapsed Time	Water Level – Depth below grade (m)	Elevation (m)
2	After 22 Days	1.39	273.56
9	After 24 Days	1.12	272.55
12	After 23 Days	0.73	267.79

According to the short-term observations indicated in Table 2, groundwater level had varied between 267.8 to 273.6 mASL.

The groundwater elevations reflect the conditions at the time of the investigation. Groundwater elevations are subject to seasonal fluctuations.

The monitoring wells were installed in general accordance with the Ontario Water Resources Act-R.R.O. 1990, Regulation 903 – Amended to O. Reg. 128/03 by CSD, by a licensed well contractor. When the use of the monitoring wells is no longer required, they must be decommissioned in accordance with the procedure outlined in the Ontario Water Resources Act – R.R.O. 1990, Regulation 903 – Amended to O. Reg. 128/03.

5. Geotechnical Assessment

5.1 Site Grading

It is our understanding that the final site grades have not been established at the time of this investigation. However, based on surface elevations at the borehole locations, relief of approximately 8 m exists over the site. As such, it is anticipated that some regrading (cut and fill operations) will be carried out at the site. The following procedures are recommended for the construction of fill sections for pavement and building areas at the site, where required.

- All vegetation, topsoil, organic or deleterious materials, existing fill and former building foundations etc. should be removed from beneath the proposed building and pavement areas.

- The exposed subgrade surface should be proofrolled with a heavy vibratory roller and examined by qualified geotechnical personnel. Any soft areas detected during the proofrolling process should be subexcavated.

- The area can then be brought up to the final subgrade level with approved on-site or imported material placed in lifts not exceeding 200 mm and compacted to the following requirements:

    I. Within the building areas - minimum of 98 percent standard Proctor maximum dry density (SPMDD) for slab-on-grade support. If foundations are to be placed on engineered fill, the fill should be compacted to 100% SPMDD.

    II. Pavement areas - minimum of 95 percent SPMDD to within 600 mm of final subgrade level and 98 percent SPMDD for the upper 600 mm.

    III. General backfill including trench backfill and backfill adjacent to foundation walls - minimum of 98 percent SPMDD.

- All backfilling and compaction operations should be monitored on a full-time basis by qualified geotechnical personnel to approve material, evaluate placement operations and confirm the specified degree of compaction is achieved uniformly throughout the fill.

- Where free-draining backfill is required, or in confined areas, imported granular material conforming to OPSS Granular ‘B’ is recommended.

5.2 Foundation Considerations

Based on the results of the investigation, conditions suitable for support of the proposed structures were available at all borehole locations. The proposed structures can be supported on conventional spread and strip footings or augered piers founded at depths of

0.7 to 1.4 m (~Elevation 266.2 to 274.8 mASL) below topsoil on the undisturbed native sandy silt till. The footings can be designed for a geotechnical reaction at Serviceability Limit States (SLS) of 150 kPa and factored geotechnical resistance of 225 kPa at Ultimate Limit States (ULS), subject to geotechnical inspection during construction. It should be noted that there may be weaker zones in the till deposit. Should the soil be found to be weaker and unable to support the recommended geotechnical resistances, local deeper excavation will be required in order for the footings to bear on competent soils.

Typically, the piers can be cleaned by the augers. The final cleaning of the bases can then be auger cleaned by mixing the loose materials at the base of the piers with 0.3 to 0.5 m thick concrete. The mixture should then be removed. During the installation of piers, a temporary steel liner will have to be installed to prevent the caving of the drilled hole and to seal off any water which may be perched in the water bearing seams above the founding levels. A positive head of concrete inside the liner with respect to any exterior groundwater levels must be maintained during withdrawal of the liner. A 150 mm slump concrete is recommended for use to prevent the concrete from having a honeycombed structure and to avoid bridging in the liner upon its withdrawal.

The following Table 3 shows the highest elevations at the borehole locations where the afore mentioned bearing values in the native soils can be applied.

Table 3: Highest Elevation at Borehole Locations Where Recommended Geotechnical Reaction/Resistance Can Be Applied

Borehole No.	Existing Grade Elevation (m)	Founding Material	Spread and Strip Footing/Augered Pier SLS 150 kPa / ULS 225 kPa ~ Elevation (Depth Below Existing Grade (m))
1	271.7	Sandy Silt Till	270.6 (1.1)
2	274.95	Sandy Silt Till	274.3 (0.7)
3	271.75	Sandy Silt Till	270.4 (1.4)
4	267.24	Sandy Silt Till	266.2 (1.0)
5	272.20	Sandy Silt Till	270.8 (1.4)
6	273.82	Sandy Silt Till	272.8 (1.0)
7	269.64	Sandy Silt Till	268.6 (1.0)

Table 3 (continued): Highest Elevation at Borehole Locations Where Recommended Geotechnical Reaction/Resistance Can Be Applied

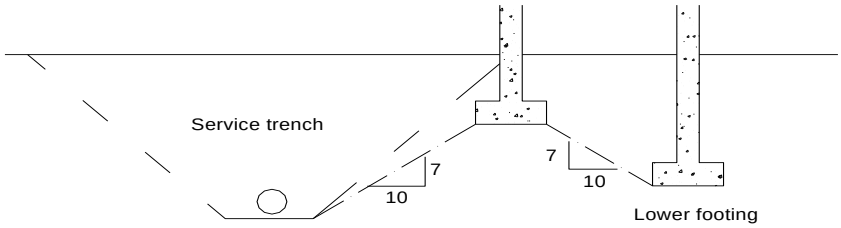
Borehole No.	Existing Grade Elevation (m)	Founding Material	Spread and Strip Footing/Augered Pier SLS 150 kPa / ULS 225 kPa ~ Elevation (Depth Below Existing Grade (m))
8	269.47	Sandy Silt Till	268.5 (1.0)
9	273.67	Sandy Silt Till	272.7 (1.0)
10	275.50	Sandy Silt Till	274.8 (0.7)
11	269.98	Sandy Silt Till	268.6 (1.4)
12	268.52	Sandy Silt Till	267.1 (1.4)

Alternatively, the structures can be supported at nominal depths on engineered fill placed on prepared subgrade and designed for geotechnical reaction of 150 kPa at SLS and factored geotechnical resistance of 225 kPa at ULS. General guidelines and requirements for foundation support on engineered fill are shown on Appendix A.

The engineered fill construction should be monitored on a full-time basis by geotechnical personnel from EXP to examine and approve fill materials, to evaluate placement operations, and to verify that the specified degree of compaction is being achieved uniformly throughout the fill.

5.3 Foundations General

Footings/ piers at different elevations should be located such that higher footings/ piers are set below a line drawn up at 10 Horizontal to 7 Vertical from the near edge of the lower footing/ pier. This concept should also be applied to excavations for new foundations in relation to existing footings or underground services. This concept is illustrated in the following sketch.



FOOTINGS NEAR SERVICE TRENCHES OR AT DIFFERENT ELEVATIONS

All footings/ piers exposed to freezing conditions must be provided with a minimum of 1.2 m of earth cover or equivalent insulation for frost protection, depending on the final grade requirements.

Provided that the soil is not disturbed due to groundwater, precipitation, traffic, etc., and the aforementioned geotechnical reactions/resistances are not exceeded, then total and differential settlements should be small and within the normally tolerated limits of 25 mm and 19 mm, respectively.

The recommended bearing capacities have been calculated by EXP from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of underground conditions becomes available. For example, it should be appreciated that modifications to bearing levels may be required if unforeseen subsoil conditions are revealed after the excavation is exposed to full view or if final design decisions differ from those assumed in this report. For this reason, this office should be retained to review final foundation drawings and to provide field inspections during the construction stage.

5.4 Floor Slabs and Permanent Drainage

The native soil encountered in the boreholes appears generally suitable for floor slab support. For normal slab-on-grade construction, all topsoil, existing fill, former building foundations and other deleterious material should be removed from the entire underfloor area. Following site grading the exposed subgrade surface should then be thoroughly proof-rolled with a heavy vibratory roller. Any soft spots detected should be sub-excavated and replaced with compactible fill in the manner described in Section 5.6 - "Backfill Considerations" section of this report. The site can then be filled to the required grades as outlined in Section 5.1 – “Site Grading”.

A Modulus of Subgrade Reaction k_s of 27 MN/m^3 (170 kcf) may be applied to subgrade prepared in accordance with the foregoing procedures for design purposes.

A 200 mm layer of 19 mm clear stone should be placed between the prepared subgrade and the floor slab to serve as a moisture barrier. Also, within any unheated areas and entrances to buildings, Styrofoam insulation should be provided below the floor slab and against the foundation walls to protect against frost heave.

Based on the soil and groundwater conditions at the site, underfloor drains will not be required. Perimeter drains are not required if the floor slabs of the buildings are set at least 200 mm above the existing exterior grade.

Around the perimeters of the buildings the ground surface should be sloped on a positive grade away from the structures to promote surface water run-off and reduce groundwater infiltration adjacent to the foundations.

5.5 Excavations and Groundwater Control

All excavation must be carried out in accordance with the most recent Occupational Health and Safety Act. The sandy silt till, silty clay till, silty sand till and clayey silt till are classified as Type 2 soils. The saturated silty sand material is classified as Type 4 soils.

Where loose/soft materials are encountered locally, or within zones of persistent seepage at depth, it may be necessary to flatten the side slopes.

It should be noted that the presence of cobbles and boulders in glacial till deposits may influence the progress of excavation. Consequently, provisions should be made in the contract documents to cover any delays caused by these obstructions.

Some seepage of free water from more pervious seams and layers within the native soils should be anticipated during construction. However, it should be possible to control and remove any such seepage by pumping from temporary sumps and ditches and/or oversized excavations.

5.6 Backfill Considerations

Backfill used to satisfy underfloor slab requirements, in footings and service trenches, etc., should be compactible fill, i.e., inorganic soil with its moisture content close to its optimum moisture content determined in the standard Proctor maximum dry density test. For ease of compaction and quality control in confined areas, sand fill such as Ontario Provincial Standard Specifications (OPSS) 1010 Granular 'B' is recommended. The backfill should be placed in lifts not more than 200 mm thick in the loose state, each lift being compacted to at least 98 percent SPMDD under the floor slab and 95 percent SPMDD elsewhere, before subsequent lifts are placed. The degree of compaction achieved in the field should be checked by in-place density tests.

The majority of excavated material will likely consist of the sandy silt till. The excavated native soils may be reused as engineered fill or general backfill where the required compaction efforts can be achieved. Any organic or excessively wet or otherwise deleterious material should not be used for backfill purposes. Any shortfall of suitable on-site excavated material can be made up with imported granular material, OPSS Granular 'B' or equivalent.

In general, the overburden soils are not free draining and therefore should not be used where this characteristic is required, or in confined areas. Imported granular material conforming to OPSS Granular 'B' would also be suitable for these purposes.

5.7 Earthquake Considerations

The recommendations for the geotechnical aspects to determine the earthquake loading for design using the OBC 2012 are presented below.

5.7.1 Subsoil Conditions

The subsoil and groundwater information at this site have been examined in relation to Section 4.1.8.4 of the OBC 2012. The subsoils generally consist of sandy silt till, silty sand, silty clay till, silty sand till and clayey silt till. It is anticipated that the floor slabs of the proposed structures will be founded on compact to very dense sandy silt till.

5.7.2 Depth of Boreholes

Table 4.1.8.4.A. Site Classification for Seismic Site Response in OBC 2012 indicated that to determine the site classification, the average properties in the top 30 m (below the lowest basement level) are to be used. The deepest borehole advanced at this site was at about 8.1 m depth. Therefore, the site classification recommendation would be based on the available information as well as our interpretation of conditions below the boreholes based on our knowledge of the soil conditions in the area. The assumed undrained shear strength for the cohesive soils to 30 m depth will be greater than 100 kPa. The assumed N-values for the granular soil to 30 m depth will have an average value between 15 and 50.

5.7.3 Site Classification

Based on the above assumptions and currently available information, the Site Class for the proposed buildings is “D” as per Table 4.1.8.4.A, Site Classification for Seismic Site Response, OBC 2012.

5.8 Retaining Walls

Based on the relief over the site as evidenced by the borehole collar elevations, retaining walls and loading dock walls may be required. Backfill behind the retaining walls should consist of free-draining granular material. Filter cloth should be placed between the retaining wall and the granular backfill material. A perimeter tile drain or weep holes should also be provided in the structure to prevent hydrostatic pressure build-up.

The lateral earth pressure acting on the retaining or loading dock walls may be calculated from the following equation:

$$p = k(\gamma h + q)$$

where:

- p = the pressure in kPa acting against any retaining wall at depth, h, below the ground surface;
- k = the earth pressure coefficient;
- γ = the bulk unit weight of the retained free draining granular backfill;
- h = the depth in m below the ground surface at which the pressure, p, is to be computed; and

q = the value of any adjacent surcharge in kPa which may be acting close to the wall.

The foregoing expression assumes an effective perimeter tile drain system will be incorporated to prevent the build-up of hydrostatic pressure behind the retaining wall. To minimize infiltration of surface water behind exterior retaining walls, the upper 600 mm of backfill should comprise compacted relatively impervious material.

For design purposes, the following physical properties of the on-site native soils can be used:

Coefficient of Lateral Earth Pressures: $K_a = 0.3$; $K_p = 3.0$

Unit Weight: $\gamma = 23$ kN/m³

5.9 Parking Areas and Internal Access Roads

The recommended pavement structures provided in Table 4 are based upon an estimate of the subgrade soil properties determined from visual examination and textural classification of the soil samples. A functional design life of 8 to 10 years has been used to establish the pavement recommendations. This represents the number of years to the first rehabilitation, assuming regular maintenance is carried out. Other thickness combinations can be used provided the Granular Base Equivalency (GBE) is maintained and any minimum component thickness specified by the Town of Caledon is met.

Table 4: Recommended Pavement Structure Thickness

Pavement Layer	Compaction Requirements	Light-Duty Parking (Cars)	Heavy Duty Traffic (Trucks) Shipping Docks and Access Road
Asphaltic Concrete (OPSS 310)	Minimum 92 % MRD**	40 mm HL3 65 mm HL8	40 mm HL3 110 mm HL8
19 mm Crusher Run Limestone	100% SPMDD*	150 mm	150 mm
50 mm Crusher Run Limestone	100% SPMDD*	300 mm	450 mm

* Denotes standard Proctor maximum dry density, ASTM-D698
** Denotes Maximum Relative density, MTO LS-264

The subgrade must be compacted to 98 percent SPMDD for at least the upper 600 mm.

The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure uniform subgrade moisture and density conditions are achieved. In addition, the need for adequate drainage cannot be over-emphasized. The finished

pavement surface should be free of depressions and should be sloped to provide effective surface drainage toward catch basins. Subdrains should be installed to intercept excess subsurface moisture and to prevent subgrade softening. This is particularly important in heavy-duty pavement areas.

Additional comments on the construction of parking areas and access roadways are as follows:

1. As part of the subgrade preparation, proposed parking areas and access roadways should be stripped of topsoil and other obvious objectionable material. Fill required to raise the grade to design elevations should conform to backfill requirements outlined in previous sections of this report. The subgrade should be proof-rolled in the full-time presence of qualified geotechnical personnel. Soft or spongy subgrade areas should be sub-excavated and properly replaced with suitable approved backfill compacted to 98 percent SPMDD. The final subgrade surface should then be properly shaped and crowned.

2. Assuming that satisfactory cross-falls have been provided for subdrainage, subdrains extending from and between catch basins may be satisfactory. Further, subdrains should also be installed along the perimeter of pavement areas as well as around landscaped areas and temporary snow storage areas.

3. The most severe loading conditions on light-duty pavement areas and the subgrade may occur during construction. Consequently, special provisions such as restricted access lanes, half-loads during paving, etc., may be required, especially if construction is carried out during unfavorable weather.

4. To minimize the problems of differential movement between the pavement and catchbasins/manholes due to frost action, the backfill around the structures should consist of free-draining granular.

5. To prevent water ponding at the lower pavement areas of loading docks, it is recommended that catchbasins be provided to drain the surface run-offs.

6. Chemical Testing

6.1 Chemical Testing Program

The scope of work for this project included chemical testing of soil from the boreholes to assist in selection of disposal options for excess soils that may be generated through construction. Accordingly, seven (7) soil samples including one (1) duplicate from the boreholes were submitted for bulk chemical testing. The samples were analyzed for minimum sampling requirements outlined in O. Reg. 406/19 for metals, hydride-forming metals, electrical conductivity (EC), sodium adsorption ratio (SAR), benzene, toluene, ethyl benzene and xylene (collectively 'BTEX') and petroleum hydrocarbons (PHC) in accordance with the Ministry of the Environment, Conservation and Parks (MECP) document "Rules For Excess Soil Management And Excess Soil Quality Standards" covered under O.Reg.406/19. One (1) of the samples from the boreholes was also tested for Sulphate to assess potential for sulphate attack on subsurface concrete.

In addition, three (3) selected soil samples were subjected to the modified Synthetic Precipitation Leaching Procedure ('mSPLP') analysis for metals covered under O.Reg.406/19.

Further, during the Phase I ESA site reconnaissance inspection carried out in conjunction with the Preliminary Geotechnical investigation, heavy staining was observed below an aboveground storage tank (AST) in the barn immediately east of the homestead on the property. An additional borehole designated Borehole 13 was advanced through the floor to investigate potential seepage of contaminants into the underlying soils. Two (2) samples from this borehole were submitted for bulk chemical testing for Volatile Organic Compounds (VOC) and PHC.

As of January 1, 2021, the originally planned testing program represents the testing most commonly required by private receiving sites requiring fill for site grading purposes.

The soil samples were submitted to an independent laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA). Sample location and analytical data are summarized in the following Table 5. The results of the chemical testing (Certificates of Analysis) are compiled in Appendix B attached.

Table 5: Summary of Soil Samples Submitted for Laboratory Analysis

Sample ID	Location	Depth (m)	Material Matrix	Analytical Parameters
BH1 SS1	Borehole 1	0.0 to 0.6	Topsoil/Clayey Silt Till	Metals, EC, SAR, BTEX, PHC, mSPLP (Metals)
BH3 SS2	Borehole 3	0.8 to 1.2	Native Sandy Silt Till	Metals, EC, SAR, BTEX, PHC
BH6 SS3	Borehole 6	1.6 to 1.9	Native Sandy Silt Till	Metals, EC, SAR, BTEX, PHC, Sulphate
BH6 SS33	Duplicate of BH6 SS3	1.6 to 1.9	Native Sandy Silt Till	Metals, EC, SAR, BTEX, PHC
BH8 SS2	Borehole 8	0.8 to 1.2	Fill	Metals, EC, SAR, BTEX, PHC, mSPLP (Metals)
BH9 SS1	Borehole 9	0.0 to 0.6	Topsoil/Native Sandy Silt Till	Metals, EC, SAR, BTEX, PHC
BH11 SS3	Borehole 11	1.6 to 1.9	Native Sandy Silt Till	Metals, EC, SAR, BTEX, PHC, mSPLP (Metals)
BH13 SS1	Borehole 13	0.2 to 0.7	Fill	VOC, PHC
BH13 SS2	Borehole 13	0.8 to 1.3	Fill	VOC, PHC

Test results were compared to the applicable tables in the MECP document “Soil Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” – April 15, 2011 in accordance with O.Reg.153/04 as amended and the “Rules For Excess Soil Management And Excess Soil Quality Standards” in accordance with O.Reg.406/19.

Comparison with the MECP “Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act”

Comparison with criteria in Table 2 of the MECP Standards was selected as being most appropriate for soil samples recovered from the boreholes. The selection of Table 2 was based on the following Site conditions:

- The subject property has not been identified as a sensitive site.
- The subject property and surrounding properties are located in an area which is rural; there may still be properties in the surrounding area which utilize local groundwater for potable purposes.
- Full depth restoration of contamination (if encountered) is assumed.

Based on the proposed subject property use (proposed industrial development), Industrial/Commercial/ Community (ICC) property use criteria under these Standards were considered to be applicable. In the absence of grain size analyses, the more stringent criteria applicable to coarse grained soil were applied.

All analytical test results for Metals, EC and SAR for soil samples analyzed were within the Table 2 (potable groundwater) ICC property use criteria listed in the MECP Standards.

All analytical test results for BTEX and PHC (F1 – F4) for soil samples analyzed were within the Table 2 (potable groundwater) ICC property use criteria listed in the MECP Standards.

The test results recorded for Samples BH13 SS1 and BH13 SS2 confirm that from an environmental standpoint, contaminants associated with the surficial staining in the barn immediately east of the homestead on the site has not adversely affected the subsurface soil in the area.

Comparison with the MECP "Rules For Excess Soil Management And Excess Soil Quality Standards"

Based on site conditions as described under the comparison with the MECP "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act" section, Table 2.1 (ICC) would be the applicable criteria for comparison under O.Reg.406/19.

All analytical test results for Metals, EC and SAR for soil samples analyzed were within the Table 2.1 (potable groundwater) ICC property use criteria listed in the Rules For Excess Soil Management And Excess Soil Quality Standards.

Due to elevated method detection limits exceeding applicable criteria from Table 2.1 (potable groundwater) ICC property use criteria listed in the Rules For Excess Soil Management And Excess Soil Quality Standards, one or more of the test results for Benzene, Ethylbenzene, Xylenes and PHC (F1 Fraction) in Samples BH1 SS1, BH3 SS2, BH8 SS2 and BH9 SS1 were inconclusive. However, in the opinion of the QP_{ESA} of record for this site, there is no reason to believe that the actual concentrations of these parameters in these samples do not meet the applicable Table 2.1 criteria.

All mSPLP test results met the leachate screening levels covered in Table 2.1 of the MECP Standards under O.Reg.406/19.

Disposal Options

Based on the results of the chemical testing program, from an environmental standpoint, soil represented by the samples analyzed would be considered suitable for reuse on site or for shipment to land based sites being developed for ICC use in a Potable Groundwater condition, subject to approval of receiving site authorities. Given the inconclusive test

results recorded on some samples for Benzene, Ethylbenzene, Xylenes and PHC (F1 Fraction), additional chemical testing may be required to satisfy some receiving site authorities. Physical suitability of the material should be assessed by the receiver for its intended use prior to shipment. Excess soil from the site would also be considered suitable for receipt at MECP registered landfill sites licensed to receive excess soils. However, additional testing for classification under O.Reg.558/00 may be required for shipment to the MECP registered landfill sites.

Potential for Sulphate Attack

One (1) native soil sample, identified as BH6 SS3 was also analyzed for water soluble sulphate. The soluble sulphate content in the sample analyzed was reported as 540 µg/g (<0.054%). Table 3 of the Canadian Standards Association (CSA) A.23.1-09 lists 0.1 % sulphate as the minimum concentration of sulphate in soil that warrants additional requirements for concrete. At the measured concentration, the degree of exposure to sulphate attack is considered to be “negligible” and therefore normal Portland cement (Type 10) can be used in subsurface concrete.

7. General Comments

The information presented in this preliminary report is based on a limited investigation designed to provide information to support an overall assessment of the current geotechnical conditions of the subject property. The conclusions presented in this report reflect site conditions existing at the time of the investigation. Additional boreholes will be required to confirm soil conditions between the widely spaced boreholes drilled for this preliminary report.

EXP should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, EXP will assume no responsibility for interpretation of the recommendations in the report.

The comments given in this report are intended only for the guidance of design engineers. The number of boreholes required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc., would be much greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

More specific information, with respect to the conditions between samples, or the lateral and vertical extent of materials, may become apparent during excavation operations. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent; should this occur, EXP should be contacted to assess the situation, and additional testing and reporting may be required. EXP has qualified personnel to provide assistance in regards to future geotechnical and environmental issues related to this property.

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

EXP Services Inc.

Amin Touhidi, Ph.D., P. Eng.
Senior Engineer
Geotechnical Division

David Dennison, P. Eng.
Senior Project Manager
Geotechnical Division

AT/dd/\\PBRMFSG001\Data_Zeus\2003-Brampton\Projects\Geotechnical Engineering\21000000\21011000\21011099-B0 - Heart Lake Rd 12505, Caledon - Geo\Geotech Report\12505 Heart Lake_Geo Report_July 8_2021.doc

Drawings

Legend

Borehole: ⊕ BH1

Borehole & Monitoring Well: ⊗ BH2

0 50 100 m

Drawing 1

Berkshire Axis Development
Preliminary Geotechnical Investigation
12505 Heart Lake Road, Caledon, Ontario

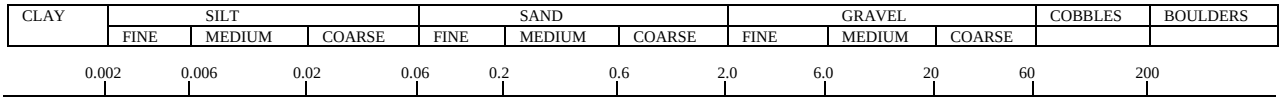
Borehole Locations

exp.

Notes on Sample Descriptions and Soil Types — Drawing 1A

1. All sample descriptions included in this report follow the Canadian Foundations Engineering Manual soil classification system. This system follows the standard proposed by the International Society for Soil Mechanics and Foundation Engineering. Laboratory grain size analyses provided by EXP also follow the same system. Others may use different classification systems; one such system is the Unified Soil Classification. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION



CLAY (PLASTIC) TO SILT (NONPLASTIC)	FINE	MEDIUM	COARSE	FINE	COARSE
	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of

till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

4. Excerpt from “OHSA Regulations for Construction Projects,” Part III, Section 226:

- **Soil Types**

Type 1 Soil

a) is hard, very dense and only able to be penetrated with difficulty by a small sharp object;
b) has a low natural moisture content and a high degree of internal strength;
c) has no signs of water seepage; and
d) can be excavated only by mechanical equipment.

Type 2 Soil

a) is very stiff, dense and can be penetrated with moderate difficulty by a small sharp object;
b) has a low to medium natural moisture content and a medium degree of internal strength; and
c) has a damp appearance after it is excavated.

Type 3 Soil

a) is stiff to firm and compact to loose in consistency or is previously excavated soil;
b) exhibits signs of surface cracking;
c) exhibits signs of water seepage;
d) if it is dry, may run easily into a well-defined conical pile; and
e) has a low degree of internal strength.

Type 4 Soil

a) is soft to very soft and very loose in consistency, very sensitive and upon disturbance is significantly reduced in natural strength;
b) runs easily or flows, unless it is completely supported before excavating procedures;
c) has almost no internal strength;
d) is wet or muddy; and
e) exerts substantial fluid pressure on its supporting system. O. Reg. 213/91, s. 226.

Log of Borehole 1

Project No. BRM-21011099-B0

Drawing No. 2

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 3, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

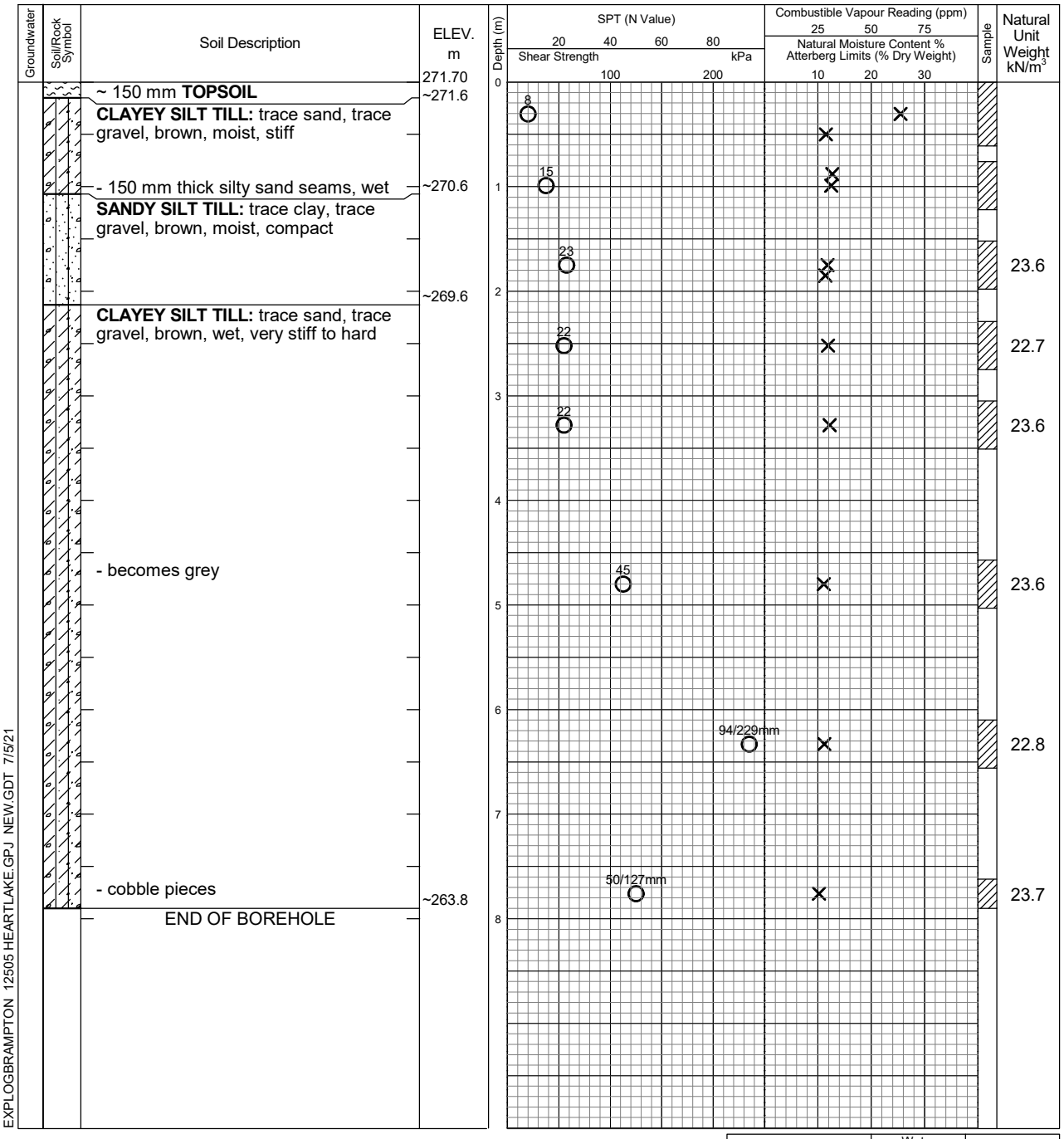
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Date	Water Level (m)	Hole Open to (m)
On completion	1.22	Open

Log of Borehole 2

Project No. BRM-21011099-B0

Drawing No. 3

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 3, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer

Soil Description	ELEV. m	Depth (m)
	274.95	0
~ 150 mm **TOPSOIL**	~274.8	
CLAYEY SILT TILL: trace sand, trace gravel, brown, moist, firm	~274.3	
SANDY SILT TILL: trace clay, trace gravel, brown, moist, compact	~272.8	1
CLAYEY SILT TILL: trace sand, trace gravel, brown, moist, stiff to hard - cobble pieces		2
		3
		4
- becomes grey		5
		6
		7
- becomes wet	~266.9	8
END OF BOREHOLE		

SPT (N Value): 7, 18, 23, 53, 19, 13, 15, 22

Shear Strength (kPa): 20 40 60 80 / 100 200

Combustible Vapour Reading (ppm): 25 50 75

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

Natural Unit Weight kN/m³: 22.3, 22.3, 22.6, 22.6, 23.9, 23.5

Date	Water Level (m)	Hole Open to (m)
On completion	7.32	Well
June 25, 2021	1.39	Well

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 3

Project No. BRM-21011099-B0

Drawing No. 4

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 3, 2021

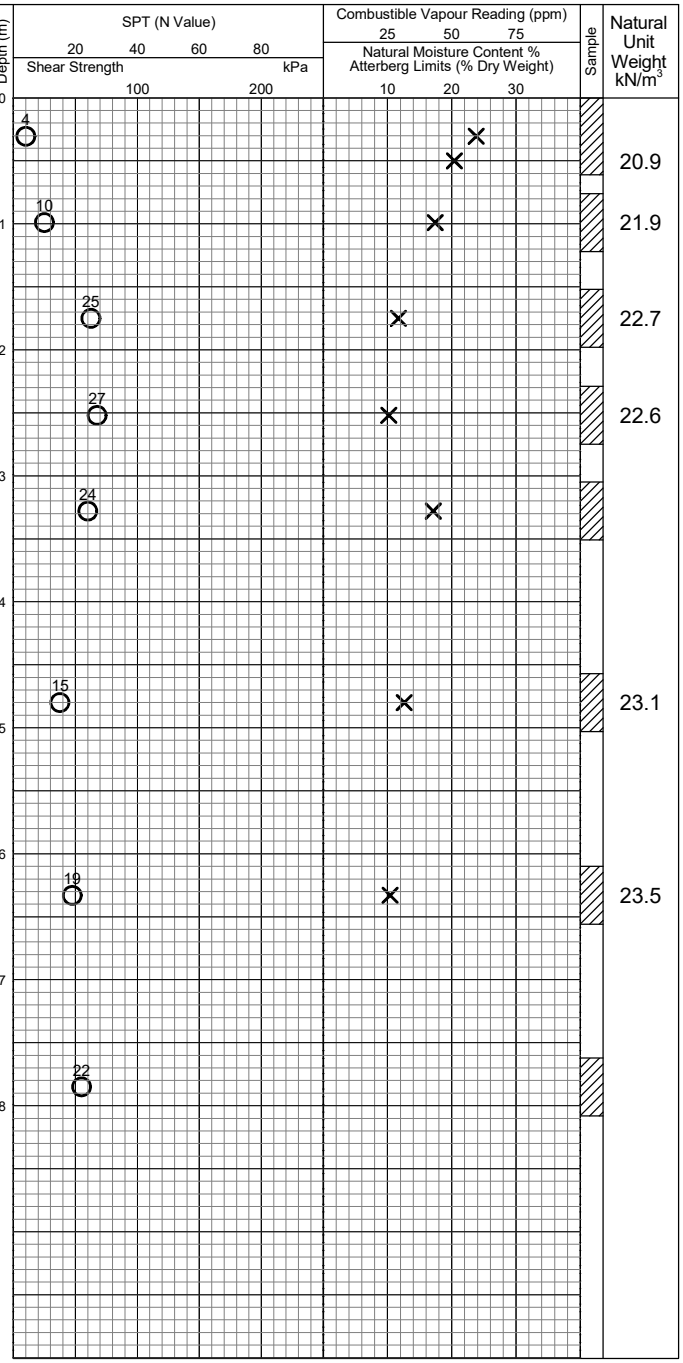
Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit |—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

Soil Description	ELEV. m	Natural Unit Weight kN/m³
~ 250 mm **TOPSOIL**	271.75	
SANDY SILT TILL: trace clay, trace gravel, brown, moist, loose to compact	~271.5	20.9
		21.9
		22.7
		22.6
	~268.9	
CLAYEY SILT TILL: trace sand, trace gravel, brown, moist, very stiff - becomes wet - 150 mm thick silty sand seam		
- becomes grey		23.1
		23.5
	~263.7	
END OF BOREHOLE		



Date	Water Level (m)	Hole Open to (m)
On completion	6.10	Open

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 4

Project No. BRM-21011099-B0 | Drawing No. 5

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 3, 2021

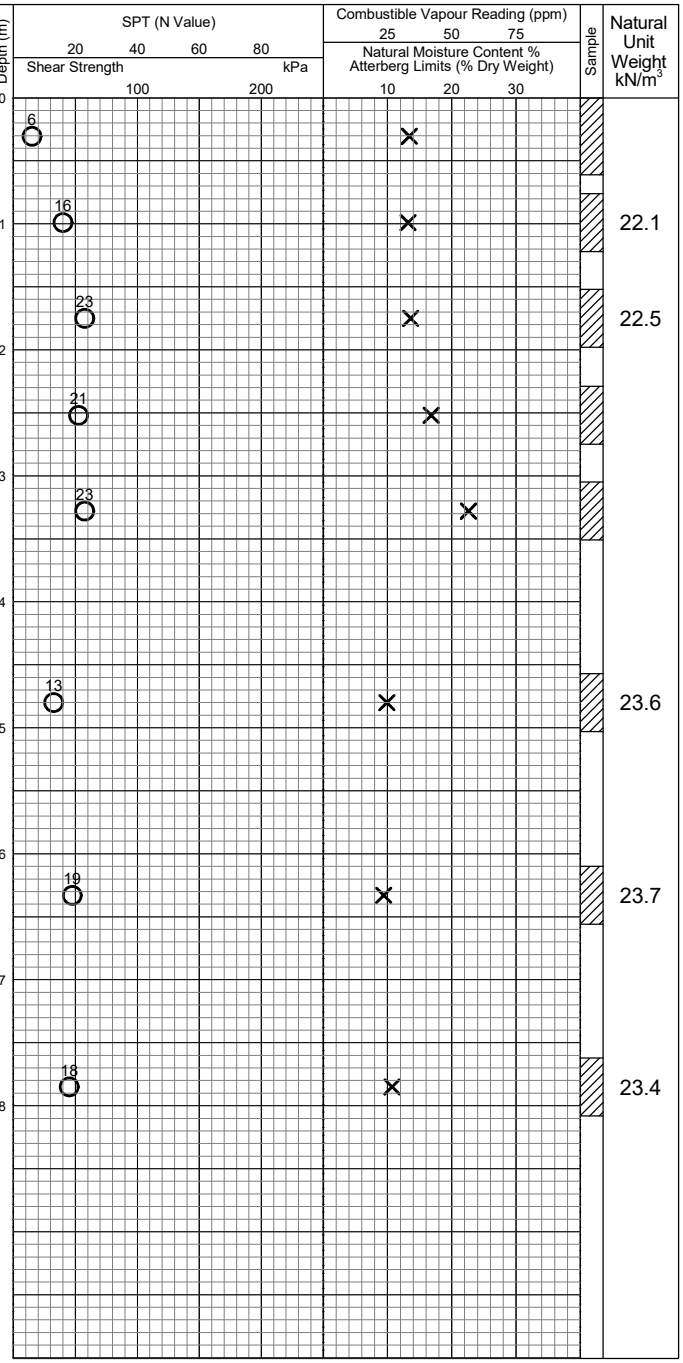
Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

Soil Description	ELEV. m
~ 250 mm **TOPSOIL**	267.24
SANDY SILT TILL: trace clay, trace gravel, brown, moist, loose to compact	~267.0
	~264.3
SILTY SAND: trace clay, brown, wet, compact	
	~263.2
CLAYEY SILT TILL: trace sand, trace gravel, grey, moist, stiff to very stiff	
- cobble pieces	
	~259.2
END OF BOREHOLE	



Date	Water Level (m)	Hole Open to (m)
On completion	Dry	Open

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 5

Project No. BRM-21011099-B0

Drawing No. 6

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 3, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

Combustible Vapour Reading

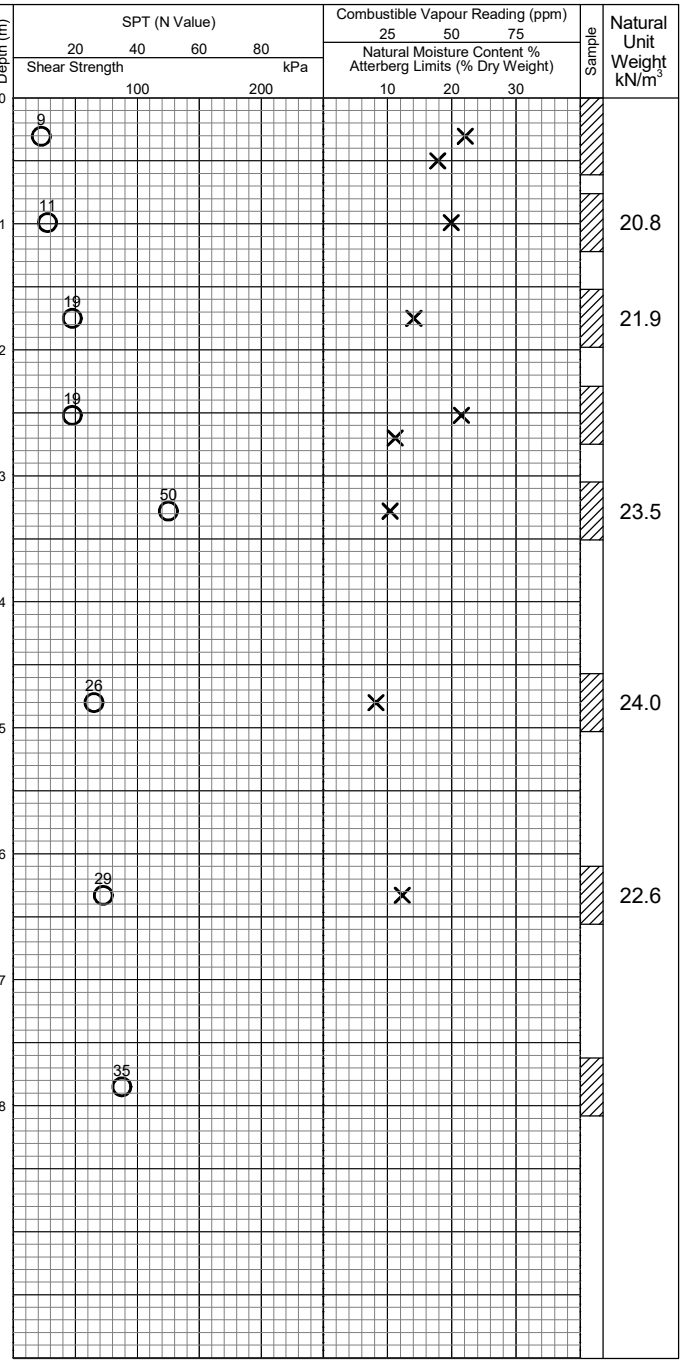
Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer

Soil Description	ELEV. m
~ 400 mm **TOPSOIL**	272.20
	~271.8
SANDY SILT TILL: trace clay, trace gravel, brown, moist, loose to very dense	
- 100 mm thick silty sand seam	
- becomes wet	
- becomes grey	
	~266.6
CLAYEY SILT TILL: trace sand, trace gravel, grey, wet, very stiff to hard	
	~264.1
END OF BOREHOLE	



Date	Water Level (m)	Hole Open to (m)
On completion	1.52	Open

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 6

Project No. BRM-21011099-B0

Drawing No. 7

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 1, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer

Soil Description	ELEV. m	Depth (m)	SPT (N Value) / Shear Strength kPa	Natural Moisture Content % / Atterberg Limits (% Dry Weight)	Natural Unit Weight kN/m³
SANDY SILT TILL: trace clay, trace gravel, brown, moist, compact to dense	273.82	0	17		
		1	15		22.6
		2	12		21.6
- cobble pieces		2	21		22.4
		3	22		23.0
		4			
		5	27		23.1
CLAYEY SILT TILL: trace sand, trace gravel, grey, moist, very stiff	~268.2	6	18		23.3
		7			
		8	26		
END OF BOREHOLE	~265.7				

Date	Water Level (m)	Hole Open to (m)
On completion	Dry	Open

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 7

Project No. BRM-21011099-B0 | Drawing No. 8

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 2, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test ✤ S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

Soil Description	ELEV. m	Depth (m)	SPT (N Value)	Natural Unit Weight kN/m³
~ 250 mm **TOPSOIL**	269.64	0	5	
SANDY SILT TILL: trace clay, trace gravel, brown, moist, loose to very dense	~269.4	1	16	22.5
		2	16	22.1
			15	22.8
		3	53	24.0
	~265.6	4		
SILTY CLAY TILL: trace sand, trace gravel, grey, wet, very stiff		5	24	
	~264.0			
SANDY SILT TILL: trace clay, trace gravel, grey, wet, compact		6	24	23.6
	~262.6	7		
CLAYEY SILT TILL: trace clay, trace gravel, grey, moist, very stiff		8	17	23.3
	~261.6			
END OF BOREHOLE				

SPT (N Value): 20 40 60 80 | Shear Strength: 100 200 kPa

Combustible Vapour Reading (ppm): 25 50 75 | Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

Sample

Date	Water Level (m)	Hole Open to (m)
On completion	Dry	Open

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 8

Project No. BRM-21011099-B0

Drawing No. 9

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 2, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer

Soil Description	ELEV. m	Depth (m)	SPT (N Value)	Natural Unit Weight kN/m³
~ 250 mm **TOPSOIL**	269.47	0	5	
CLAYEY SILT TILL: trace sand, trace gravel, brown, moist, firm	~269.2			
SANDY SILT TILL: trace clay, trace gravel, brown, moist, compact	~268.8	1	15	22.4
		2	20	23.0
			22	
		3	22	22.5
	~265.5	4		
CLAYEY SILT TILL: trace sand, trace gravel, grey, wet, very stiff		5	25	23.6
		6	23	23.6
		7		
		8	30	22.7
	~261.4			
END OF BOREHOLE				

Shear Strength kPa: 100, 200

Combustible Vapour Reading (ppm): 25, 50, 75

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10, 20, 30

Date	Water Level (m)	Hole Open to (m)
On completion	3.05	Open

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 9

Project No. BRM-21011099-B0

Drawing No. 10

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 1, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

Combustible Vapour Reading

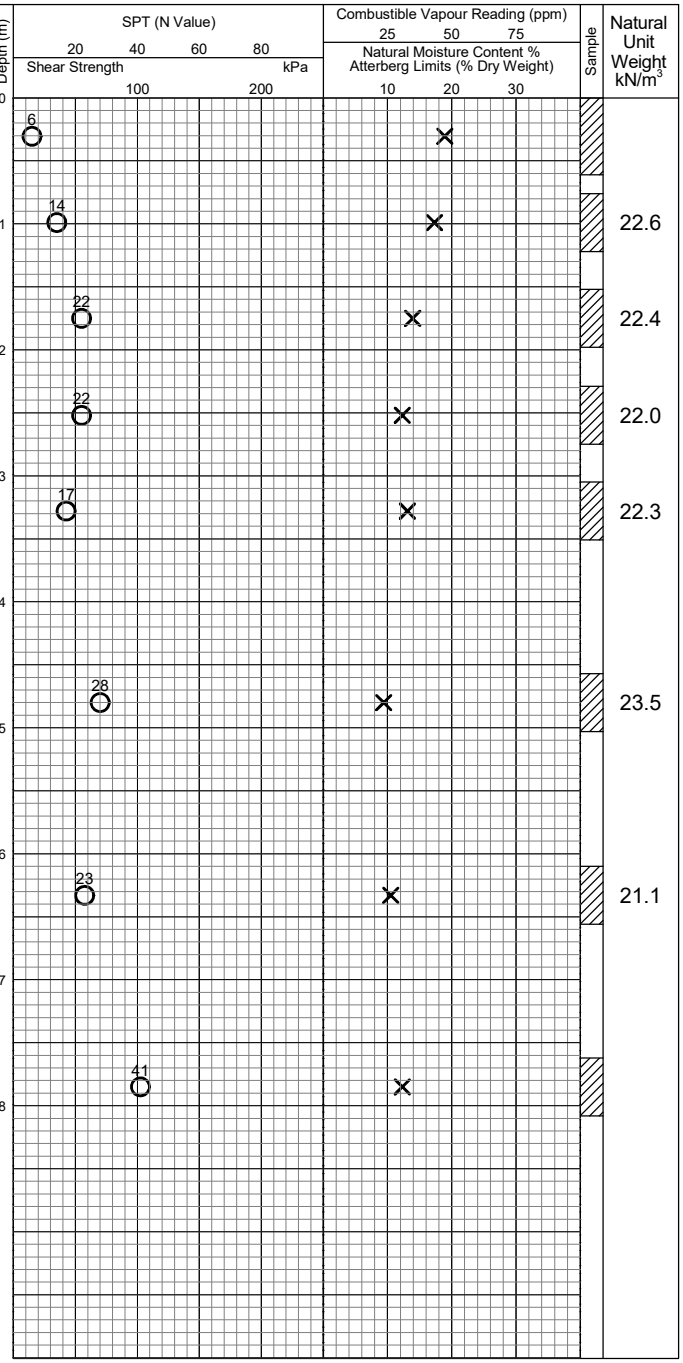
Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer

Soil Description	ELEV. m
~ 250 mm **TOPSOIL**	273.67
	~273.4
SANDY SILT TILL: trace clay, trace gravel, brown, moist, compact	
	~270.4
CLAYEY SILT TILL: trace sand, trace gravel, grey, moist, very stiff	
- becomes wet	
	~266.7
SILTY SAND TILL: trace clay, trace gravel, grey, wet, dense	
	~265.6
END OF BOREHOLE	



Date	Water Level (m)	Hole Open to (m)
On completion	4.88	Well
June 25, 2021	1.12	Well

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 10

Project No. BRM-21011099-B0

Drawing No. 11

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 1, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer

Soil Description	ELEV. m	Depth (m)	Sample	Natural Unit Weight kN/m³
~ 250 mm **TOPSOIL**	275.50			
SANDY SILT TILL: trace clay, trace gravel, brown, moist, loose to compact	~275.3			
- cobble pieces				22.7
				22.8
				22.9
	~271.5			
CLAYEY SILT TILL: trace sand, trace gravel, grey, moist, stiff to very stiff				23.3
				23.5
	~267.4			24.0
END OF BOREHOLE				

SPT (N Value): 20 40 60 80

Shear Strength: 100 200 kPa

Combustible Vapour Reading (ppm): 25 50 75

Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

Date	Water Level (m)	Hole Open to (m)
On completion	3.66	7.01

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 11

Project No. BRM-21011099-B0

Drawing No. 12

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 1, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer

Soil Description	ELEV. m	Depth (m)	Natural Unit Weight kN/m³
~ 250 mm **TOPSOIL**	269.98	0	
SANDY SILT TILL: trace clay, trace gravel, brown, moist, loose to compact	~269.7		
		1	22.3
		2	22.8
			21.8
	~267.1	3	23.4
SILTY SAND TILL: trace clay, trace gravel, brown, moist, compact		4	
- becomes wet		5	
	~264.4	6	23.1
CLAYEY SILT TILL: trace sand, trace gravel, grey, wet, very stiff		7	
	~261.9	8	
END OF BOREHOLE			

SPT (N Value): 4, 12, 18, 19, 23, 25, 27, 29

Shear Strength kPa: 20 40 60 80 / 100 200

Combustible Vapour Reading (ppm): 25 50 75

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

Date	Water Level (m)	Hole Open to (m)
On completion	5.79	6.71

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Log of Borehole 12

Project No. BRM-21011099-B0 | Drawing No. 13

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 2, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)	SPT (N Value) 20 40 60 80 / Shear Strength 100 200 kPa	Combustible Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	Sample	Natural Unit Weight kN/m³
		~ 250 mm **TOPSOIL**	268.52	0	7	×		
		SANDY SILT TILL: trace clay, trace gravel, brown, moist, losoe to very dense	~268.3	1	12	×		
				2	24	×		22.9
		- cobble pieces		2	33	×		
		- becomes wet		3	51	×		22.8
			~264.5	4				
		CLAYEY SILT TILL: trace sand, trace gravel, grey, wet, very stiff to hard		5	31	×		23.9
				6	22	×		22.5
				7				
				8	28	×		22.6
			~260.4					
		END OF BOREHOLE						

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/5/21

Date	Water Level (m)	Hole Open to (m)
On completion	6.10	Well
June 25, 2021	0.73	Well

exp.

Log of Borehole 13

Project No. BRM-21011099-B0

Drawing No. 14

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 12505 Heartlake Road, Caledon ON

12505 Heartlake Rd, Caledon

Date Drilled: June 4, 2021

Drill Type: Solid Auger Bomb

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)	SPT (N Value) 20 40 60 80 / Shear Strength kPa 100 200	Combustible Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	Sample	Natural Unit Weight kN/m³
		~ 125 mm **CONCRETE SLAB** over ~ 50 mm **GRANULAR BASE** over		0	7			
		FILL: clayey silt, trace sand, trace gravel, red brick fragments, brown to dark brown, moist, no staining, no odour		1	10			
		CLAYEY SILT TILL: fine sand seams, trace gravel, brown, oxidized partings, moist, very stiff, no staining, no odour		2	23			
		END OF BOREHOLE						

Date	Water Level (m)	Hole Open to (m)
On completion	Dry	Open

EXPLOGBRAMPTON 12505 HEARTLAKE.GPJ NEW.GDT 7/7/21

Appendix A:
Engineered Fill Construction Guidelines

Foundations placed on engineered fill comprising native soil from the site - or imported materials - may be designed for an SLS geotechnical reaction of 150 kPa (ULS factored geotechnical resistance of 225 kPa).

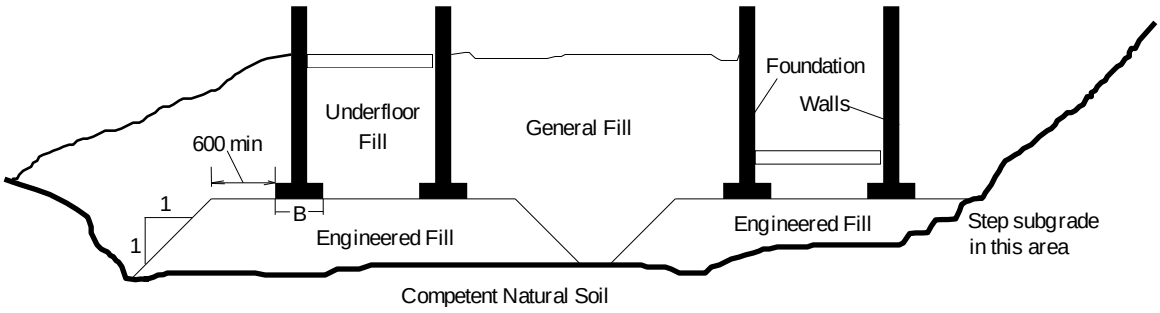
Additional comments with regard to engineered fill are as follows:

- The area must be stripped of all topsoil, existing fill material or other deleterious material and proof-rolled. Soft spots must be dug out. The stripped native subgrade must be examined and approved by a geotechnical engineer prior to placement of fill.

- The approved engineered fill must be placed in loose lifts not exceeding 200 mm and compacted to 100% Standard Proctor dry density throughout. Granular fill is preferred.

- Full time geotechnical inspection during placement of engineered fill is required.

- The fill must be placed such that the specified geometry is achieved as follows:.



Foundations on Engineered Fill (schematic)

- A minimum footing width of 500 mm (20 inches) is suggested. Steel Reinforcement should be as designed by the Structural Engineer.
- All excavations must be done in accordance with the Occupational Health and Safety Regulations of Ontario.

Appendix B:
Certificates of Analyses

Your P.O. #: BRAMPTON GEOTECHNICA
Your Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your C.O.C. #: n/a

Attention: David Dennison

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2021/06/22
Report #: R6687251
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1G2176
Received: 2021/06/14, 13:35

Sample Matrix: Soil
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Hot Water Extractable Boron	7	2021/06/16	2021/06/16	CAM SOP-00408	R153 Ana. Prot. 2011
Free (WAD) Cyanide	4	2021/06/16	2021/06/16	CAM SOP-00457	OMOE E3015 m
Free (WAD) Cyanide	3	2021/06/17	2021/06/17	CAM SOP-00457	OMOE E3015 m
Conductivity	7	2021/06/16	2021/06/16	CAM SOP-00414	OMOE E3530 v1 m
Hexavalent Chromium in Soil by IC (1)	4	2021/06/16	2021/06/16	CAM SOP-00436	EPA 3060/7199 m
Hexavalent Chromium in Soil by IC (1)	3	2021/06/17	2021/06/17	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	3	N/A	2021/06/15	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	4	N/A	2021/06/16	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	6	2021/06/15	2021/06/15	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	1	2021/06/15	2021/06/16	CAM SOP-00316	CCME CWS m
Acid Extractable Metals by ICPMS	7	2021/06/16	2021/06/17	CAM SOP-00447	EPA 6020B m
Total Metals in SPLP Leachate by ICPMS	3	2021/06/21	2021/06/21	CAM SOP-00447	EPA 6020B m
Moisture	7	N/A	2021/06/15	CAM SOP-00445	Carter 2nd ed 51.2 m
Modified SPLP extraction - pH	3	N/A	2021/06/21	CAM SOP-00941	OMOECP LaSB E9003 R3
Modified SPLP extraction - Weight	3	N/A	2021/06/21	CAM SOP-00941	OMOECP LaSB E9003 R3
pH CaCl2 EXTRACT	4	2021/06/16	2021/06/16	CAM SOP-00413	EPA 9045 D m
pH CaCl2 EXTRACT	3	2021/06/17	2021/06/17	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	7	N/A	2021/06/16	CAM SOP-00102	EPA 6010C
Sulphate (20:1 Extract)	1	2021/06/16	2021/06/16	CAM SOP-00464	EPA 375.4 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or

Your P.O. #: BRAMPTON GEOTECHNICA
Your Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your C.O.C. #: n/a

Attention: David Dennison

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2021/06/22
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CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1G2176
Received: 2021/06/14, 13:35

implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Soils are reported on a dry weight basis unless otherwise specified.
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C1G2176
Report Date: 2021/06/22

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

O.REG 406 EXCESS SOIL SPLP METALS (SOIL)

BV Labs ID		PVC935	PVC939	PVC941		
Sampling Date		2021/06/03 14:00	2021/06/02 09:00	2021/06/02 13:00		
COC Number		n/a	n/a	n/a		
	UNITS	**BH1 SS1**	**BH8 SS2**	**BH11 SS3**	**RDL**	**QC Batch**
Metals						
Leachable (SPLP) Antimony (Sb)	ug/L	<0.5	<0.5	<0.5	0.5	7420223
Leachable (SPLP) Arsenic (As)	ug/L	<1	<1	<1	1	7420223
Leachable (SPLP) Barium (Ba)	ug/L	<5	<5	<5	5	7420223
Leachable (SPLP) Beryllium (Be)	ug/L	<0.5	<0.5	<0.5	0.5	7420223
Leachable (SPLP) Boron (B)	ug/L	<10	<10	<10	10	7420223
Leachable (SPLP) Cadmium (Cd)	ug/L	<0.1	<0.1	<0.1	0.1	7420223
Leachable (SPLP) Chromium (Cr)	ug/L	<5	<5	<5	5	7420223
Leachable (SPLP) Cobalt (Co)	ug/L	<0.5	<0.5	<0.5	0.5	7420223
Leachable (SPLP) Copper (Cu)	ug/L	<1	1	<1	1	7420223
Leachable (SPLP) Lead (Pb)	ug/L	<0.5	<0.5	<0.5	0.5	7420223
Leachable (SPLP) Molybdenum (Mo)	ug/L	<1	<1	2	1	7420223
Leachable (SPLP) Nickel (Ni)	ug/L	<1	<1	<1	1	7420223
Leachable (SPLP) Selenium (Se)	ug/L	<2	<2	<2	2	7420223
Leachable (SPLP) Silver (Ag)	ug/L	<0.1	<0.1	<0.1	0.1	7420223
Leachable (SPLP) Thallium (Tl)	ug/L	<0.05	<0.05	<0.05	0.05	7420223
Leachable (SPLP) Uranium (U)	ug/L	<0.1	<0.1	<0.1	0.1	7420223
Leachable (SPLP) Vanadium (V)	ug/L	<1	<1	<1	1	7420223
Leachable (SPLP) Zinc (Zn)	ug/L	<5	<5	<5	5	7420223

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1G2176
Report Date: 2021/06/22

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

O.REG 406 EXCESS SOIL SPLP PREP (SOIL)

BV Labs ID		PVC935	PVC939	PVC941	
Sampling Date		2021/06/03 14:00	2021/06/02 09:00	2021/06/02 13:00	
COC Number		n/a	n/a	n/a	
	UNITS	**BH1 SS1**	**BH8 SS2**	**BH11 SS3**	**QC Batch**
Inorganics					
Dry Weight	g	100	100	100	7419278
Final pH	pH	9.36	9.07	9.35	7419275
QC Batch = Quality Control Batch					

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1G2176
Report Date: 2021/06/22

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

O.REG 153 METALS & INORGANICS PKG (SOIL)

BV Labs ID		PVC935		PVC936		PVC937	PVC938		
Sampling Date		2021/06/03 14:00		2021/06/03 10:00		2021/06/01 15:00	2021/06/01 15:00		
COC Number		n/a		n/a		n/a	n/a		
	UNITS	**BH1 SS1**	**QC Batch**	**BH3 SS2**	**QC Batch**	**BH6 SS3**	**BH6 SS33**	**RDL**	**QC Batch**
Calculated Parameters									
Sodium Adsorption Ratio	N/A	0.26	7406623	0.24 (1)	7406623	0.33	0.36		7406623
Inorganics									
Conductivity	mS/cm	0.19	7410571	0.21	7410571	0.14	0.15	0.002	7410571
Available (CaCl2) pH	pH	7.73	7413200	7.62	7411067	7.69	7.72		7411067
WAD Cyanide (Free)	ug/g	<0.01	7413114	<0.01	7410502	<0.01	<0.01	0.01	7410434
Chromium (VI)	ug/g	<0.18	7413032	<0.18	7410925	<0.18	<0.18	0.18	7410398
Metals									
Hot Water Ext. Boron (B)	ug/g	0.075	7410429	0.085	7410429	0.070	0.087	0.050	7410429
Acid Extractable Antimony (Sb)	ug/g	<0.20	7410387	<0.20	7410387	<0.20	<0.20	0.20	7410387
Acid Extractable Arsenic (As)	ug/g	4.1	7410387	5.6	7410387	4.3	5.2	1.0	7410387
Acid Extractable Barium (Ba)	ug/g	65	7410387	54	7410387	63	67	0.50	7410387
Acid Extractable Beryllium (Be)	ug/g	0.64	7410387	0.66	7410387	0.60	0.62	0.20	7410387
Acid Extractable Boron (B)	ug/g	7.9	7410387	7.2	7410387	8.5	7.9	5.0	7410387
Acid Extractable Cadmium (Cd)	ug/g	<0.10	7410387	<0.10	7410387	<0.10	<0.10	0.10	7410387
Acid Extractable Chromium (Cr)	ug/g	19	7410387	21	7410387	19	22	1.0	7410387
Acid Extractable Cobalt (Co)	ug/g	9.5	7410387	11	7410387	9.7	11	0.10	7410387
Acid Extractable Copper (Cu)	ug/g	28	7410387	35	7410387	30	32	0.50	7410387
Acid Extractable Lead (Pb)	ug/g	12	7410387	10	7410387	8.3	10	1.0	7410387
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	7410387	<0.50	7410387	1.0	0.65	0.50	7410387
Acid Extractable Nickel (Ni)	ug/g	20	7410387	25	7410387	21	24	0.50	7410387
Acid Extractable Selenium (Se)	ug/g	<0.50	7410387	<0.50	7410387	<0.50	<0.50	0.50	7410387
Acid Extractable Silver (Ag)	ug/g	<0.20	7410387	<0.20	7410387	<0.20	<0.20	0.20	7410387
Acid Extractable Thallium (Tl)	ug/g	0.13	7410387	0.14	7410387	0.14	0.16	0.050	7410387
Acid Extractable Uranium (U)	ug/g	0.50	7410387	0.49	7410387	0.48	0.45	0.050	7410387
Acid Extractable Vanadium (V)	ug/g	32	7410387	29	7410387	27	31	5.0	7410387
Acid Extractable Zinc (Zn)	ug/g	44	7410387	59	7410387	51	56	5.0	7410387
Acid Extractable Mercury (Hg)	ug/g	<0.050	7410387	<0.050	7410387	<0.050	<0.050	0.050	7410387

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

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exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

O.REG 153 METALS & INORGANICS PKG (SOIL)

BV Labs ID		PVC939		PVC940		PVC941		
Sampling Date		2021/06/02 09:00		2021/06/01 11:00		2021/06/02 13:00		
COC Number		n/a		n/a		n/a		
	UNITS	**BH8 SS2**	**QC Batch**	**BH9 SS1**	**QC Batch**	**BH11 SS3**	**RDL**	**QC Batch**
Calculated Parameters								
Sodium Adsorption Ratio	N/A	0.28 (1)	7406623	0.27	7406623	0.25 (1)		7406623
Inorganics								
Conductivity	mS/cm	0.15	7410571	0.20	7410571	0.18	0.002	7410571
Available (CaCl2) pH	pH	7.75	7413200	7.35	7411067	7.91		7413200
WAD Cyanide (Free)	ug/g	<0.01	7413114	<0.01	7410434	<0.01	0.01	7413114
Chromium (VI)	ug/g	<0.18	7413032	<0.18	7410398	<0.18	0.18	7413032
Metals								
Hot Water Ext. Boron (B)	ug/g	<0.050	7410429	0.50	7410429	0.063	0.050	7410429
Acid Extractable Antimony (Sb)	ug/g	<0.20	7410387	<0.20	7410387	<0.20	0.20	7410387
Acid Extractable Arsenic (As)	ug/g	4.7	7410387	4.7	7410387	4.3	1.0	7410387
Acid Extractable Barium (Ba)	ug/g	60	7410387	87	7410387	66	0.50	7410387
Acid Extractable Beryllium (Be)	ug/g	0.60	7410387	0.74	7410387	0.56	0.20	7410387
Acid Extractable Boron (B)	ug/g	8.0	7410387	6.1	7410387	8.7	5.0	7410387
Acid Extractable Cadmium (Cd)	ug/g	<0.10	7410387	0.27	7410387	<0.10	0.10	7410387
Acid Extractable Chromium (Cr)	ug/g	19	7410387	22	7410387	18	1.0	7410387
Acid Extractable Cobalt (Co)	ug/g	10	7410387	8.8	7410387	9.4	0.10	7410387
Acid Extractable Copper (Cu)	ug/g	29	7410387	25	7410387	35	0.50	7410387
Acid Extractable Lead (Pb)	ug/g	11	7410387	13	7410387	7.9	1.0	7410387
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	7410387	<0.50	7410387	<0.50	0.50	7410387
Acid Extractable Nickel (Ni)	ug/g	22	7410387	19	7410387	20	0.50	7410387
Acid Extractable Selenium (Se)	ug/g	<0.50	7410387	<0.50	7410387	<0.50	0.50	7410387
Acid Extractable Silver (Ag)	ug/g	<0.20	7410387	<0.20	7410387	<0.20	0.20	7410387
Acid Extractable Thallium (Tl)	ug/g	0.14	7410387	0.15	7410387	0.11	0.050	7410387
Acid Extractable Uranium (U)	ug/g	0.47	7410387	0.61	7410387	0.52	0.050	7410387
Acid Extractable Vanadium (V)	ug/g	27	7410387	34	7410387	26	5.0	7410387
Acid Extractable Zinc (Zn)	ug/g	60	7410387	67	7410387	50	5.0	7410387
Acid Extractable Mercury (Hg)	ug/g	<0.050	7410387	<0.050	7410387	<0.050	0.050	7410387

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

BV Labs Job #: C1G2176
Report Date: 2021/06/22

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

BV Labs ID		PVC935		PVC936			PVC937		PVC938		
Sampling Date		2021/06/03 14:00		2021/06/03 10:00			2021/06/01 15:00		2021/06/01 15:00		
COC Number		n/a		n/a			n/a		n/a		
	UNITS	**BH1 SS1**	**RDL**	**BH3 SS2**	**RDL**	**QC Batch**	**BH6 SS3**	**RDL**	**BH6 SS33**	**RDL**	**QC Batch**
Inorganics											
Moisture	%	10	1.0	10	1.0	7408568	13	1.0	11	1.0	7408568
BTEX & F1 Hydrocarbons											
Benzene	ug/g	<0.060	0.060	<0.040	0.040	7412190	<0.020	0.020	<0.060	0.060	7409351
Toluene	ug/g	<0.060	0.060	<0.040	0.040	7412190	<0.020	0.020	<0.060	0.060	7409351
Ethylbenzene	ug/g	<0.060	0.060	<0.040	0.040	7412190	<0.020	0.020	<0.060	0.060	7409351
o-Xylene	ug/g	<0.060	0.060	<0.040	0.040	7412190	<0.020	0.020	<0.060	0.060	7409351
p+m-Xylene	ug/g	<0.12	0.12	<0.080	0.080	7412190	<0.040	0.040	<0.12	0.12	7409351
Total Xylenes	ug/g	<1.2	1.2	<0.080	0.080	7412190	<0.040	0.040	<0.12	0.12	7409351
F1 (C6-C10)	ug/g	<30	30	<20	20	7412190	<10	10	<30	30	7409351
F1 (C6-C10) - BTEX	ug/g	<30	30	<20	20	7412190	<10	10	<30	30	7409351
F2-F4 Hydrocarbons											
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	<10	10	7408148	10	10	11	10	7408148
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	<50	50	7408148	<50	50	<50	50	7408148
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	<50	50	7408148	<50	50	<50	50	7408148
Reached Baseline at C50	ug/g	Yes		Yes		7408148	Yes		Yes		7408148
Surrogate Recovery (%)											
1,4-Difluorobenzene	%	102		103		7412190	103		104		7409351
4-Bromofluorobenzene	%	90		87		7412190	95		85		7409351
D10-o-Xylene	%	116		107		7412190	91		111		7409351
D4-1,2-Dichloroethane	%	104		106		7412190	100		102		7409351
o-Terphenyl	%	93		92		7408148	94		94		7408148

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C1G2176
Report Date: 2021/06/22

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

BV Labs ID		PVC939			PVC940			PVC941		
Sampling Date		2021/06/02 09:00			2021/06/01 11:00			2021/06/02 13:00		
COC Number		n/a			n/a			n/a		
	UNITS	**BH8 SS2**	**RDL**	**QC Batch**	**BH9 SS1**	**RDL**	**QC Batch**	**BH11 SS3**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	14	1.0	7408568	16	1.0	7408568	10	1.0	7408568
BTEX & F1 Hydrocarbons										
Benzene	ug/g	<0.040	0.040	7410484	<0.10	0.10	7409351	<0.040	0.040	7410484
Toluene	ug/g	<0.040	0.040	7410484	<0.10	0.10	7409351	<0.040	0.040	7410484
Ethylbenzene	ug/g	<0.040	0.040	7410484	<0.10	0.10	7409351	<0.040	0.040	7410484
o-Xylene	ug/g	<0.040	0.040	7410484	<0.10	0.10	7409351	<0.040	0.040	7410484
p+m-Xylene	ug/g	<0.080	0.080	7410484	<0.20	0.20	7409351	<0.080	0.080	7410484
Total Xylenes	ug/g	<0.080	0.080	7410484	<0.20	0.20	7409351	<0.080	0.080	7410484
F1 (C6-C10)	ug/g	<20	20	7410484	<50	50	7409351	<20	20	7410484
F1 (C6-C10) - BTEX	ug/g	<20	20	7410484	<50	50	7409351	<20	20	7410484
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	7408148	<10	10	7408148	<10	10	7408148
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	7408148	<50	50	7408148	<50	50	7408148
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	7408148	<50	50	7408148	<50	50	7408148
Reached Baseline at C50	ug/g	Yes		7408148	Yes		7408148	Yes		7408148
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	98		7410484	100		7409351	98		7410484
4-Bromofluorobenzene	%	99		7410484	84		7409351	97		7410484
D10-o-Xylene	%	97		7410484	161 (1)		7409351	98		7410484
D4-1,2-Dichloroethane	%	106		7410484	100		7409351	106		7410484
o-Terphenyl	%	91		7408148	91		7408148	92		7408148

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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BV Labs Job #: C1G2176
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Sampler Initials: CG

RESULTS OF ANALYSES OF SOIL

BV Labs ID		PVC937		
Sampling Date		2021/06/01 15:00		
COC Number		n/a		
	UNITS	**BH6 SS3**	**RDL**	**QC Batch**
Inorganics				
Soluble (20:1) Sulphate (SO4)	ug/g	540	20	7411018

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C1G2176
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TEST SUMMARY

BV Labs ID: PVC935
Sample ID: BH1 SS1
Matrix: Soil

Collected: 2021/06/03
Shipped:
Received: 2021/06/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	7410429	2021/06/16	2021/06/16	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	7413114	2021/06/17	2021/06/17	Louise Harding
Conductivity	AT	7410571	2021/06/16	2021/06/16	Khushbu Vijay kumar Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	7413032	2021/06/17	2021/06/17	Violeta Porcila
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7412190	N/A	2021/06/16	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7408148	2021/06/15	2021/06/15	Anna Stuglik Rolland
Acid Extractable Metals by ICPMS	ICP/MS	7410387	2021/06/16	2021/06/17	Daniel Teclu
Total Metals in SPLP Leachate by ICPMS	ICP/MS	7420223	2021/06/21	2021/06/21	Azita Fazaeli
Moisture	BAL	7408568	N/A	2021/06/15	Manpreet Kaur
Modified SPLP extraction - pH	PH	7419275	N/A	2021/06/21	Jared King
Modified SPLP extraction - Weight		7419278	N/A	2021/06/21	Jared King
pH CaCl2 EXTRACT	AT	7413200	2021/06/17	2021/06/17	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	7406623	N/A	2021/06/16	Automated Statchk

BV Labs ID: PVC936
Sample ID: BH3 SS2
Matrix: Soil

Collected: 2021/06/03
Shipped:
Received: 2021/06/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	7410429	2021/06/16	2021/06/16	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	7410502	2021/06/16	2021/06/16	Aditiben Patel
Conductivity	AT	7410571	2021/06/16	2021/06/16	Khushbu Vijay kumar Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	7410925	2021/06/16	2021/06/16	Violeta Porcila
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7412190	N/A	2021/06/16	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7408148	2021/06/15	2021/06/15	Anna Stuglik Rolland
Acid Extractable Metals by ICPMS	ICP/MS	7410387	2021/06/16	2021/06/17	Daniel Teclu
Moisture	BAL	7408568	N/A	2021/06/15	Manpreet Kaur
pH CaCl2 EXTRACT	AT	7411067	2021/06/16	2021/06/16	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7406623	N/A	2021/06/16	Automated Statchk

BV Labs ID: PVC937
Sample ID: BH6 SS3
Matrix: Soil

Collected: 2021/06/01
Shipped:
Received: 2021/06/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	7410429	2021/06/16	2021/06/16	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	7410434	2021/06/16	2021/06/16	Aditiben Patel
Conductivity	AT	7410571	2021/06/16	2021/06/16	Khushbu Vijay kumar Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	7410398	2021/06/16	2021/06/16	Violeta Porcila
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7409351	N/A	2021/06/15	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7408148	2021/06/15	2021/06/15	Anna Stuglik Rolland
Acid Extractable Metals by ICPMS	ICP/MS	7410387	2021/06/16	2021/06/17	Daniel Teclu
Moisture	BAL	7408568	N/A	2021/06/15	Manpreet Kaur

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Sampler Initials: CG

TEST SUMMARY

BV Labs ID: PVC937
Sample ID: BH6 SS3
Matrix: Soil

Collected: 2021/06/01
Shipped:
Received: 2021/06/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	7411067	2021/06/16	2021/06/16	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7406623	N/A	2021/06/16	Automated Statchk
Sulphate (20:1 Extract)	KONE/EC	7411018	2021/06/16	2021/06/16	Avneet Kour Sudan

BV Labs ID: PVC938
Sample ID: BH6 SS33
Matrix: Soil

Collected: 2021/06/01
Shipped:
Received: 2021/06/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	7410429	2021/06/16	2021/06/16	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	7410434	2021/06/16	2021/06/16	Aditiben Patel
Conductivity	AT	7410571	2021/06/16	2021/06/16	Khushbu Vijay kumar Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	7410398	2021/06/16	2021/06/16	Violeta Porcila
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7409351	N/A	2021/06/15	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7408148	2021/06/15	2021/06/15	Anna Stuglik Rolland
Acid Extractable Metals by ICPMS	ICP/MS	7410387	2021/06/16	2021/06/17	Daniel Teclu
Moisture	BAL	7408568	N/A	2021/06/15	Manpreet Kaur
pH CaCl2 EXTRACT	AT	7411067	2021/06/16	2021/06/16	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7406623	N/A	2021/06/16	Automated Statchk

BV Labs ID: PVC939
Sample ID: BH8 SS2
Matrix: Soil

Collected: 2021/06/02
Shipped:
Received: 2021/06/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	7410429	2021/06/16	2021/06/16	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	7413114	2021/06/17	2021/06/17	Louise Harding
Conductivity	AT	7410571	2021/06/16	2021/06/16	Khushbu Vijay kumar Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	7413032	2021/06/17	2021/06/17	Violeta Porcila
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7410484	N/A	2021/06/16	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7408148	2021/06/15	2021/06/15	Anna Stuglik Rolland
Acid Extractable Metals by ICPMS	ICP/MS	7410387	2021/06/16	2021/06/17	Daniel Teclu
Total Metals in SPLP Leachate by ICPMS	ICP/MS	7420223	2021/06/21	2021/06/21	Azita Fazaeli
Moisture	BAL	7408568	N/A	2021/06/15	Manpreet Kaur
Modified SPLP extraction - pH	PH	7419275	N/A	2021/06/21	Jared King
Modified SPLP extraction - Weight		7419278	N/A	2021/06/21	Jared King
pH CaCl2 EXTRACT	AT	7413200	2021/06/17	2021/06/17	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	7406623	N/A	2021/06/16	Automated Statchk

BV Labs Job #: C1G2176
Report Date: 2021/06/22

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

TEST SUMMARY

BV Labs ID: PVC940
Sample ID: BH9 SS1
Matrix: Soil

Collected: 2021/06/01
Shipped:
Received: 2021/06/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	7410429	2021/06/16	2021/06/16	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	7410434	2021/06/16	2021/06/16	Aditiben Patel
Conductivity	AT	7410571	2021/06/16	2021/06/16	Khushbu Vijay kumar Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	7410398	2021/06/16	2021/06/16	Violeta Porcila
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7409351	N/A	2021/06/15	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7408148	2021/06/15	2021/06/15	Anna Stuglik Rolland
Acid Extractable Metals by ICPMS	ICP/MS	7410387	2021/06/16	2021/06/17	Daniel Teclu
Moisture	BAL	7408568	N/A	2021/06/15	Manpreet Kaur
pH CaCl2 EXTRACT	AT	7411067	2021/06/16	2021/06/16	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	7406623	N/A	2021/06/16	Automated Statchk

BV Labs ID: PVC941
Sample ID: BH11 SS3
Matrix: Soil

Collected: 2021/06/02
Shipped:
Received: 2021/06/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	7410429	2021/06/16	2021/06/16	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	7413114	2021/06/17	2021/06/17	Louise Harding
Conductivity	AT	7410571	2021/06/16	2021/06/16	Khushbu Vijay kumar Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	7413032	2021/06/17	2021/06/17	Violeta Porcila
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7410484	N/A	2021/06/16	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7408148	2021/06/15	2021/06/16	Anna Stuglik Rolland
Acid Extractable Metals by ICPMS	ICP/MS	7410387	2021/06/16	2021/06/17	Daniel Teclu
Total Metals in SPLP Leachate by ICPMS	ICP/MS	7420223	2021/06/21	2021/06/21	Azita Fazaeli
Moisture	BAL	7408568	N/A	2021/06/15	Manpreet Kaur
Modified SPLP extraction - pH	PH	7419275	N/A	2021/06/21	Jared King
Modified SPLP extraction - Weight		7419278	N/A	2021/06/21	Jared King
pH CaCl2 EXTRACT	AT	7413200	2021/06/17	2021/06/17	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	7406623	N/A	2021/06/16	Automated Statchk

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Client Project #: BRM-21011099-B0
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Sampler Initials: CG

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	10.7°C

Sample PVC935 [BH1 SS1] : F1 BTEX analysis : Detection limits were adjusted for sample weight .

Sample PVC936 [BH3 SS2] : F1 BTEX analysis : Detection limits were adjusted for sample weight .

Sample PVC938 [BH6 SS33] : F1/BTEX analysis: Detection limits were adjusted for sample weight.

Sample PVC939 [BH8 SS2] : F1/BTEX Analysis: Detection limits were adjusted for sample weight.

Sample PVC940 [BH9 SS1] : F1/BTEX analysis: The recovery of the extraction surrogate compound was above the upper control limit for the soil sample. Visible loss of methanol was observed in this sample. As a result, there is an increased level of uncertainty associated with the values reported for this sample.
Detection limits were adjusted for sample weight.

Sample PVC941 [BH11 SS3] : F1/BTEX Analysis: Detection limits were adjusted for sample weight.

Results relate only to the items tested.

BV Labs Job #: C1G2176
Report Date: 2021/06/22

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
7408148	o-Terphenyl	2021/06/15	101	60 - 130	92	60 - 130	101	%				
7409351	1,4-Difluorobenzene	2021/06/15	94	60 - 140	94	60 - 140	108	%				
7409351	4-Bromofluorobenzene	2021/06/15	103	60 - 140	105	60 - 140	98	%				
7409351	D10-o-Xylene	2021/06/15	99	60 - 140	92	60 - 140	101	%				
7409351	D4-1,2-Dichloroethane	2021/06/15	96	60 - 140	94	60 - 140	107	%				
7410484	1,4-Difluorobenzene	2021/06/16	92	60 - 140	94	60 - 140	97	%				
7410484	4-Bromofluorobenzene	2021/06/16	100	60 - 140	101	60 - 140	97	%				
7410484	D10-o-Xylene	2021/06/16	95	60 - 140	92	60 - 140	91	%				
7410484	D4-1,2-Dichloroethane	2021/06/16	102	60 - 140	100	60 - 140	105	%				
7412190	1,4-Difluorobenzene	2021/06/16	94	60 - 140	97	60 - 140	101	%				
7412190	4-Bromofluorobenzene	2021/06/16	104	60 - 140	102	60 - 140	87	%				
7412190	D10-o-Xylene	2021/06/16	110	60 - 140	104	60 - 140	103	%				
7412190	D4-1,2-Dichloroethane	2021/06/16	100	60 - 140	94	60 - 140	105	%				
7408148	F2 (C10-C16 Hydrocarbons)	2021/06/15	115	50 - 130	104	80 - 120	<10	ug/g	NC	30		
7408148	F3 (C16-C34 Hydrocarbons)	2021/06/15	114	50 - 130	103	80 - 120	<50	ug/g	NC	30		
7408148	F4 (C34-C50 Hydrocarbons)	2021/06/15	115	50 - 130	104	80 - 120	<50	ug/g	15	30		
7408568	Moisture	2021/06/15							2.3	20		
7409351	Benzene	2021/06/15	107	50 - 140	96	50 - 140	<0.020	ug/g	NC	50		
7409351	Ethylbenzene	2021/06/15	125	50 - 140	114	50 - 140	<0.020	ug/g	NC	50		
7409351	F1 (C6-C10) - BTEX	2021/06/15					<10	ug/g	NC	30		
7409351	F1 (C6-C10)	2021/06/15	108	60 - 140	100	80 - 120	<10	ug/g	NC	30		
7409351	o-Xylene	2021/06/15	124	50 - 140	112	50 - 140	<0.020	ug/g	4.3	50		
7409351	p+m-Xylene	2021/06/15	122	50 - 140	111	50 - 140	<0.040	ug/g	8.2	50		
7409351	Toluene	2021/06/15	111	50 - 140	99	50 - 140	<0.020	ug/g	12	50		
7409351	Total Xylenes	2021/06/15					<0.040	ug/g	6.8	50		
7410387	Acid Extractable Antimony (Sb)	2021/06/17	102	75 - 125	103	80 - 120	<0.20	ug/g	NC	30		
7410387	Acid Extractable Arsenic (As)	2021/06/17	91	75 - 125	104	80 - 120	<1.0	ug/g	NC	30		
7410387	Acid Extractable Barium (Ba)	2021/06/17	99	75 - 125	103	80 - 120	<0.50	ug/g	17	30		
7410387	Acid Extractable Beryllium (Be)	2021/06/17	99	75 - 125	98	80 - 120	<0.20	ug/g	NC	30		
7410387	Acid Extractable Boron (B)	2021/06/17	91	75 - 125	96	80 - 120	<5.0	ug/g	NC	30		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
7410387	Acid Extractable Cadmium (Cd)	2021/06/17	97	75 - 125	99	80 - 120	<0.10	ug/g	NC	30		
7410387	Acid Extractable Chromium (Cr)	2021/06/17	NC	75 - 125	100	80 - 120	<1.0	ug/g	3.9	30		
7410387	Acid Extractable Cobalt (Co)	2021/06/17	95	75 - 125	100	80 - 120	<0.10	ug/g	2.6	30		
7410387	Acid Extractable Copper (Cu)	2021/06/17	95	75 - 125	96	80 - 120	<0.50	ug/g	9.6	30		
7410387	Acid Extractable Lead (Pb)	2021/06/17	95	75 - 125	100	80 - 120	<1.0	ug/g	3.5	30		
7410387	Acid Extractable Mercury (Hg)	2021/06/17	82	75 - 125	87	80 - 120	<0.050	ug/g	NC	30		
7410387	Acid Extractable Molybdenum (Mo)	2021/06/17	97	75 - 125	100	80 - 120	<0.50	ug/g	13	30		
7410387	Acid Extractable Nickel (Ni)	2021/06/17	98	75 - 125	103	80 - 120	<0.50	ug/g	2.3	30		
7410387	Acid Extractable Selenium (Se)	2021/06/17	93	75 - 125	100	80 - 120	<0.50	ug/g	NC	30		
7410387	Acid Extractable Silver (Ag)	2021/06/17	93	75 - 125	97	80 - 120	<0.20	ug/g	NC	30		
7410387	Acid Extractable Thallium (Tl)	2021/06/17	96	75 - 125	99	80 - 120	<0.050	ug/g	NC	30		
7410387	Acid Extractable Uranium (U)	2021/06/17	97	75 - 125	99	80 - 120	<0.050	ug/g	9.6	30		
7410387	Acid Extractable Vanadium (V)	2021/06/17	NC	75 - 125	100	80 - 120	<5.0	ug/g	3.7	30		
7410387	Acid Extractable Zinc (Zn)	2021/06/17	89	75 - 125	102	80 - 120	<5.0	ug/g	2.1	30		
7410398	Chromium (VI)	2021/06/16	48 (1)	70 - 130	91	80 - 120	<0.18	ug/g	NC	35		
7410429	Hot Water Ext. Boron (B)	2021/06/16	104	75 - 125	101	75 - 125	<0.050	ug/g	NC	40		
7410434	WAD Cyanide (Free)	2021/06/16	100	75 - 125	98	80 - 120	<0.01	ug/g	NC	35		
7410484	Benzene	2021/06/16	105	50 - 140	101	50 - 140	<0.020	ug/g	NC	50		
7410484	Ethylbenzene	2021/06/16	116	50 - 140	111	50 - 140	<0.020	ug/g	2.0	50		
7410484	F1 (C6-C10) - BTEX	2021/06/16					<10	ug/g	0.47	30		
7410484	F1 (C6-C10)	2021/06/16	76	60 - 140	88	80 - 120	<10	ug/g	0.47	30		
7410484	o-Xylene	2021/06/16	117	50 - 140	110	50 - 140	<0.020	ug/g	5.1	50		
7410484	p+m-Xylene	2021/06/16	113	50 - 140	103	50 - 140	<0.040	ug/g	1.4	50		
7410484	Toluene	2021/06/16	107	50 - 140	100	50 - 140	<0.020	ug/g	NC	50		
7410484	Total Xylenes	2021/06/16					<0.040	ug/g	1.2	50		
7410502	WAD Cyanide (Free)	2021/06/16	97	75 - 125	95	80 - 120	<0.01	ug/g	NC	35		
7410571	Conductivity	2021/06/16			99	90 - 110	<0.002	mS/cm	2.2	10		
7410925	Chromium (VI)	2021/06/16	87	70 - 130	88	80 - 120	<0.18	ug/g	NC	35		
7411018	Soluble (20:1) Sulphate (SO4)	2021/06/16	NC	70 - 130	105	70 - 130	<20	ug/g	0.76	35		
7411067	Available (CaCl2) pH	2021/06/16			100	97 - 103			0.085	N/A		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
7412190	Benzene	2021/06/16	104	50 - 140	99	50 - 140	<0.020	ug/g	NC	50		
7412190	Ethylbenzene	2021/06/16	115	50 - 140	109	50 - 140	<0.020	ug/g	NC	50		
7412190	F1 (C6-C10) - BTEX	2021/06/16					<10	ug/g	NC	30		
7412190	F1 (C6-C10)	2021/06/16	103	60 - 140	93	80 - 120	<10	ug/g	NC	30		
7412190	o-Xylene	2021/06/16	115	50 - 140	106	50 - 140	<0.020	ug/g	NC	50		
7412190	p+m-Xylene	2021/06/16	110	50 - 140	104	50 - 140	<0.040	ug/g	NC	50		
7412190	Toluene	2021/06/16	101	50 - 140	95	50 - 140	<0.020	ug/g	NC	50		
7412190	Total Xylenes	2021/06/16					<0.040	ug/g	NC	50		
7413032	Chromium (VI)	2021/06/17	87	70 - 130	92	80 - 120	<0.18	ug/g	NC	35		
7413114	WAD Cyanide (Free)	2021/06/17	99	75 - 125	96	80 - 120	<0.01	ug/g	NC	35		
7413200	Available (CaCl2) pH	2021/06/17			100	97 - 103			0.43	N/A		
7420223	Leachable (SPLP) Antimony (Sb)	2021/06/21	104	80 - 120	104	80 - 120	<0.5	ug/L	NC	35	<0.5	ug/L
7420223	Leachable (SPLP) Arsenic (As)	2021/06/21	98	80 - 120	99	80 - 120	<1	ug/L	0.38	35	<1	ug/L
7420223	Leachable (SPLP) Barium (Ba)	2021/06/21	98	80 - 120	100	80 - 120	<5	ug/L	NC	35	<5	ug/L
7420223	Leachable (SPLP) Beryllium (Be)	2021/06/21	100	80 - 120	99	80 - 120	<0.5	ug/L	NC	35	<0.5	ug/L
7420223	Leachable (SPLP) Boron (B)	2021/06/21	98	80 - 120	97	80 - 120	<10	ug/L	NC	35	<10	ug/L
7420223	Leachable (SPLP) Cadmium (Cd)	2021/06/21	101	80 - 120	101	80 - 120	<0.1	ug/L			<0.1	ug/L
7420223	Leachable (SPLP) Chromium (Cr)	2021/06/21	94	80 - 120	95	80 - 120	<5	ug/L	NC	35	<5	ug/L
7420223	Leachable (SPLP) Cobalt (Co)	2021/06/21	95	80 - 120	95	80 - 120	<0.5	ug/L	NC	35	<0.5	ug/L
7420223	Leachable (SPLP) Copper (Cu)	2021/06/21	100	80 - 120	99	80 - 120	<1	ug/L	17	35	<1	ug/L
7420223	Leachable (SPLP) Lead (Pb)	2021/06/21	93	80 - 120	93	80 - 120	<0.5	ug/L	NC	35	<0.5	ug/L
7420223	Leachable (SPLP) Molybdenum (Mo)	2021/06/21	99	80 - 120	97	80 - 120	<1	ug/L	NC	35	<1	ug/L
7420223	Leachable (SPLP) Nickel (Ni)	2021/06/21	94	80 - 120	103	80 - 120	<1	ug/L	NC	35	<1	ug/L
7420223	Leachable (SPLP) Selenium (Se)	2021/06/21	104	80 - 120	103	80 - 120	<2	ug/L	NC	35	<2	ug/L
7420223	Leachable (SPLP) Silver (Ag)	2021/06/21	99	80 - 120	98	80 - 120	<0.1	ug/L	NC	35	<0.1	ug/L
7420223	Leachable (SPLP) Thallium (Tl)	2021/06/21	91	80 - 120	93	80 - 120	<0.05	ug/L			<0.05	ug/L
7420223	Leachable (SPLP) Uranium (U)	2021/06/21	99	80 - 120	98	80 - 120	<0.1	ug/L	NC	35	<0.1	ug/L
7420223	Leachable (SPLP) Vanadium (V)	2021/06/21	96	80 - 120	97	80 - 120	<1	ug/L	3.7	35	<1	ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
7420223	Leachable (SPLP) Zinc (Zn)	2021/06/21	100	80 - 120	102	80 - 120	<5	ug/L	NC	35	<5	ug/L

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The matrix spike was reanalyzed to confirm result.

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BV Labs Job #: C1G2176
Report Date: 2021/06/22

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anastassia Hamanov, Scientific Specialist

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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BUREAU VERITAS

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/6

CHAIN OF CUSTODY RECORD

Page _____ of _____

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: EXP Services Inc.	Company Name:	Quotation #: Stream 3	[X] Regular TAT (5-7 days) Most analyses
Contact Name: David Dennison	Contact Name:	P.O. #/ AFE#: Brampton Geotechnical	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 1595 Clark Boulevard	Address:	Project #: BRM-21011099-B0	Rush TAT (Surcharges will be applied)
Brampton, Ont. L6T 4V1		Site Location: 12505 Heart Lake Road	[ ] 1 Day [ ] 2 Days [ ] 3-4 Days
Phone: 905-793-9800 Fax: 905-793-0641	Phone: Fax:	Site #:	
Email: dave.dennison@exp.com	Email:	Site Location Province: Ontario	Date Required:
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY		Sampled By: Calvin Guan	Rush Confirmation #:

Regulation 153	Other Regulations
[X] Table 1 [ ] Res/Park [ ] Med/ Fine	[ ] CCME [ ] Sanitary Sewer Bylaw
[ ] Table 2 [ ] Ind/Comm [ ] Coarse	[ ] MISA [ ] Storm Sewer Bylaw
[ ] Table 3 [ ] Agri/ Other	[ ] PWQO Region
[ ] Table _____	[ ] Other (Specify)
FOR RSC (PLEASE CIRCLE) Y / N	[ ] REG 558 (MIN. 3 DAY TAT REQUIRED)
No	[X] REG 406 Table 1

Include Criteria on Certificate of Analysis: Y / N ✓

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Analysis Requested

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr VI, ICPMS Metals, HWS - B)	SULPHATE	mSPLP METALS							HOLD- DO NOT ANALYZE
1	BH1 SS1	3-Jun-21	2.00 pm	Soil	3		X	X		X				X							
2	BH3 SS2	3-Jun-21	10.00 am	Soil	3		X	X		X											
3	BH6 SS3	1-Jun-21	3.00 pm	Soil	3		X	X		X			X								
4	BH6 SS33	1-Jun-21	3.00 pm	Soil	3		X	X		X											
5	BH8 SS2	2-Jun-21	9.00 am	Soil	3		X	X		X				X							
6	BH9 SS1	1-Jun-21	11.00 am	Soil	3		X	X		X											
7	BH11 SS3	2-Jun-21	1.00 pm	Soil	3		X	X		X				X							
8																					
9																					
10																					

LABORATORY USE ONLY

CUSTODY SEAL Y / (N)		COOLER TEMPERATURES
Present	Intact	
N	N	11/8/13

COOLING MEDIA PRESENT: (Y) / N

COMMENTS

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
			VIDHI BHANSAR	2021/06/14	13:35

14-Jun-21 13:35
Patricia Legette
C1G2176
M2K ENV-1144

Your P.O. #: BRAMPTON GEOTECHNICA
Your Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your C.O.C. #: N/A

Attention: David Dennison

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2021/06/15
Report #: R6676516
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1F6305
Received: 2021/06/08, 14:54

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
1,3-Dichloropropene Sum	1	N/A	2021/06/14		EPA 8260C m
1,3-Dichloropropene Sum	1	N/A	2021/06/15		EPA 8260C m
Petroleum Hydrocarbons F2-F4 in Soil (1)	2	2021/06/10	2021/06/10	CAM SOP-00316	CCME CWS m
Moisture	2	N/A	2021/06/09	CAM SOP-00445	Carter 2nd ed 51.2 m
Volatile Organic Compounds and F1 PHCs	1	N/A	2021/06/13	CAM SOP-00230	EPA 8260C m
Volatile Organic Compounds and F1 PHCs	1	N/A	2021/06/15	CAM SOP-00230	EPA 8260C m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1

Your P.O. #: BRAMPTON GEOTECHNICA
Your Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your C.O.C. #: N/A

Attention: David Dennison

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2021/06/15
Report #: R6676516
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1F6305
Received: 2021/06/08, 14:54
Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799
==========
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C1F6305
Report Date: 2021/06/15

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

BV Labs ID		PTX320	PTX321			PTX321		
Sampling Date		2021/06/04 10:00	2021/06/04 10:00			2021/06/04 10:00		
COC Number		N/A	N/A			N/A		
	UNITS	**BH13 SS1**	**BH13 SS2**	**RDL**	**QC Batch**	**BH13 SS2 Lab-Dup**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	17	15	1.0	7398583	15	1.0	7398583
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	0.050	7394864			
Volatile Organics								
Acetone (2-Propanone)	ug/g	<0.50	<0.50	0.50	7400223			
Benzene	ug/g	<0.020	<0.020	0.020	7400223			
Bromodichloromethane	ug/g	<0.050	<0.050	0.050	7400223			
Bromoform	ug/g	<0.050	<0.050	0.050	7400223			
Bromomethane	ug/g	<0.050	<0.050	0.050	7400223			
Carbon Tetrachloride	ug/g	<0.050	<0.050	0.050	7400223			
Chlorobenzene	ug/g	<0.050	<0.050	0.050	7400223			
Chloroform	ug/g	<0.050	<0.050	0.050	7400223			
Dibromochloromethane	ug/g	<0.050	<0.050	0.050	7400223			
1,2-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	7400223			
1,3-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	7400223			
1,4-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	7400223			
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	<0.050	0.050	7400223			
1,1-Dichloroethane	ug/g	<0.050	<0.050	0.050	7400223			
1,2-Dichloroethane	ug/g	<0.050	<0.050	0.050	7400223			
1,1-Dichloroethylene	ug/g	<0.050	<0.050	0.050	7400223			
cis-1,2-Dichloroethylene	ug/g	<0.050	<0.050	0.050	7400223			
trans-1,2-Dichloroethylene	ug/g	<0.050	<0.050	0.050	7400223			
1,2-Dichloropropane	ug/g	<0.050	<0.050	0.050	7400223			
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	0.030	7400223			
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	0.040	7400223			
Ethylbenzene	ug/g	<0.020	<0.020	0.020	7400223			
Ethylene Dibromide	ug/g	<0.050	<0.050	0.050	7400223			
Hexane	ug/g	<0.050	<0.050	0.050	7400223			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: C1F6305
Report Date: 2021/06/15

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

BV Labs ID		PTX320	PTX321			PTX321		
Sampling Date		2021/06/04 10:00	2021/06/04 10:00			2021/06/04 10:00		
COC Number		N/A	N/A			N/A		
	UNITS	**BH13 SS1**	**BH13 SS2**	**RDL**	**QC Batch**	**BH13 SS2 Lab-Dup**	**RDL**	**QC Batch**
Methylene Chloride(Dichloromethane)	ug/g	<0.050	<0.050	0.050	7400223			
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	<0.50	0.50	7400223			
Methyl Isobutyl Ketone	ug/g	<0.50	<0.50	0.50	7400223			
Methyl t-butyl ether (MTBE)	ug/g	<0.050	<0.050	0.050	7400223			
Styrene	ug/g	<0.050	<0.050	0.050	7400223			
1,1,1,2-Tetrachloroethane	ug/g	<0.050	<0.050	0.050	7400223			
1,1,2,2-Tetrachloroethane	ug/g	<0.050	<0.050	0.050	7400223			
Tetrachloroethylene	ug/g	<0.050	<0.050	0.050	7400223			
Toluene	ug/g	<0.020	<0.020	0.020	7400223			
1,1,1-Trichloroethane	ug/g	<0.050	<0.050	0.050	7400223			
1,1,2-Trichloroethane	ug/g	<0.050	<0.050	0.050	7400223			
Trichloroethylene	ug/g	0.061	<0.050	0.050	7400223			
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	<0.050	0.050	7400223			
Vinyl Chloride	ug/g	<0.020	<0.020	0.020	7400223			
p+m-Xylene	ug/g	<0.020	<0.020	0.020	7400223			
o-Xylene	ug/g	<0.020	<0.020	0.020	7400223			
Total Xylenes	ug/g	<0.020	<0.020	0.020	7400223			
F1 (C6-C10)	ug/g	<10	<10	10	7400223			
F1 (C6-C10) - BTEX	ug/g	<10	<10	10	7400223			
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	10	7400453			
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	50	7400453			
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	50	7400453			
Reached Baseline at C50	ug/g	Yes	Yes		7400453			
Surrogate Recovery (%)								
o-Terphenyl	%	87	88		7400453			
4-Bromofluorobenzene	%	93	121		7400223			
D10-o-Xylene	%	91	93		7400223			
D4-1,2-Dichloroethane	%	97	113		7400223			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: C1F6305
Report Date: 2021/06/15

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

BV Labs ID		PTX320	PTX321			PTX321		
Sampling Date		2021/06/04 10:00	2021/06/04 10:00			2021/06/04 10:00		
COC Number		N/A	N/A			N/A		
	UNITS	**BH13 SS1**	**BH13 SS2**	**RDL**	**QC Batch**	**BH13 SS2 Lab-Dup**	**RDL**	**QC Batch**
D8-Toluene	%	103	94		7400223			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: C1F6305
Report Date: 2021/06/15

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

TEST SUMMARY

BV Labs ID: PTX320
Sample ID: BH13 SS1
Matrix: Soil

Collected: 2021/06/04
Shipped:
Received: 2021/06/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	7394864	N/A	2021/06/14	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7400453	2021/06/10	2021/06/10	Ravinder Gaidhu
Moisture	BAL	7398583	N/A	2021/06/09	Gurpreet Kaur (ONT)
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7400223	N/A	2021/06/13	Rebecca McClean

BV Labs ID: PTX321
Sample ID: BH13 SS2
Matrix: Soil

Collected: 2021/06/04
Shipped:
Received: 2021/06/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	7394864	N/A	2021/06/15	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7400453	2021/06/10	2021/06/10	Ravinder Gaidhu
Moisture	BAL	7398583	N/A	2021/06/09	Gurpreet Kaur (ONT)
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7400223	N/A	2021/06/15	Rebecca McClean

BV Labs ID: PTX321 Dup
Sample ID: BH13 SS2
Matrix: Soil

Collected: 2021/06/04
Shipped:
Received: 2021/06/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	7398583	N/A	2021/06/09	Gurpreet Kaur (ONT)

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BV Labs Job #: C1F6305
Report Date: 2021/06/15

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.3°C

Results relate only to the items tested.

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BV Labs Job #: C1F6305
Report Date: 2021/06/15

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7400223	4-Bromofluorobenzene	2021/06/12	96	60 - 140	96	60 - 140	92	%		
7400223	D10-o-Xylene	2021/06/12	80	60 - 130	98	60 - 130	82	%		
7400223	D4-1,2-Dichloroethane	2021/06/12	98	60 - 140	101	60 - 140	101	%		
7400223	D8-Toluene	2021/06/12	105	60 - 140	103	60 - 140	101	%		
7400453	o-Terphenyl	2021/06/10	91	60 - 130	86	60 - 130	89	%		
7398583	Moisture	2021/06/09							1.4	20
7400223	1,1,1,2-Tetrachloroethane	2021/06/12	100	60 - 140	112	60 - 130	<0.050	ug/g	NC	50
7400223	1,1,1-Trichloroethane	2021/06/12	95	60 - 140	107	60 - 130	<0.050	ug/g	NC	50
7400223	1,1,2,2-Tetrachloroethane	2021/06/12	100	60 - 140	113	60 - 130	<0.050	ug/g	NC	50
7400223	1,1,2-Trichloroethane	2021/06/12	100	60 - 140	114	60 - 130	<0.050	ug/g	NC	50
7400223	1,1-Dichloroethane	2021/06/12	98	60 - 140	111	60 - 130	<0.050	ug/g	NC	50
7400223	1,1-Dichloroethylene	2021/06/12	94	60 - 140	105	60 - 130	<0.050	ug/g	NC	50
7400223	1,2-Dichlorobenzene	2021/06/12	100	60 - 140	109	60 - 130	<0.050	ug/g	NC	50
7400223	1,2-Dichloroethane	2021/06/12	91	60 - 140	105	60 - 130	<0.050	ug/g	NC	50
7400223	1,2-Dichloropropane	2021/06/12	102	60 - 140	116	60 - 130	<0.050	ug/g	NC	50
7400223	1,3-Dichlorobenzene	2021/06/12	102	60 - 140	110	60 - 130	<0.050	ug/g	NC	50
7400223	1,4-Dichlorobenzene	2021/06/12	123	60 - 140	133 (1)	60 - 130	<0.050	ug/g	NC	50
7400223	Acetone (2-Propanone)	2021/06/12	92	60 - 140	106	60 - 140	<0.50	ug/g	NC	50
7400223	Benzene	2021/06/12	97	60 - 140	109	60 - 130	<0.020	ug/g	NC	50
7400223	Bromodichloromethane	2021/06/12	97	60 - 140	110	60 - 130	<0.050	ug/g	NC	50
7400223	Bromoform	2021/06/12	97	60 - 140	110	60 - 130	<0.050	ug/g	NC	50
7400223	Bromomethane	2021/06/12	95	60 - 140	109	60 - 140	<0.050	ug/g	NC	50
7400223	Carbon Tetrachloride	2021/06/12	90	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
7400223	Chlorobenzene	2021/06/12	98	60 - 140	108	60 - 130	<0.050	ug/g	NC	50
7400223	Chloroform	2021/06/12	96	60 - 140	109	60 - 130	<0.050	ug/g	NC	50
7400223	cis-1,2-Dichloroethylene	2021/06/12	100	60 - 140	113	60 - 130	<0.050	ug/g	NC	50
7400223	cis-1,3-Dichloropropene	2021/06/12	88	60 - 140	102	60 - 130	<0.030	ug/g	NC	50
7400223	Dibromochloromethane	2021/06/12	97	60 - 140	109	60 - 130	<0.050	ug/g	NC	50
7400223	Dichlorodifluoromethane (FREON 12)	2021/06/12	87	60 - 140	100	60 - 140	<0.050	ug/g	NC	50
7400223	Ethylbenzene	2021/06/12	91	60 - 140	99	60 - 130	<0.020	ug/g	NC	50

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7400223	Ethylene Dibromide	2021/06/12	99	60 - 140	112	60 - 130	<0.050	ug/g	NC	50
7400223	F1 (C6-C10) - BTEX	2021/06/12					<10	ug/g	NC	30
7400223	F1 (C6-C10)	2021/06/12	91	60 - 140	94	80 - 120	<10	ug/g	NC	30
7400223	Hexane	2021/06/12	99	60 - 140	111	60 - 130	<0.050	ug/g	NC	50
7400223	Methyl Ethyl Ketone (2-Butanone)	2021/06/12	103	60 - 140	119	60 - 140	<0.50	ug/g	NC	50
7400223	Methyl Isobutyl Ketone	2021/06/12	93	60 - 140	108	60 - 130	<0.50	ug/g	NC	50
7400223	Methyl t-butyl ether (MTBE)	2021/06/12	89	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
7400223	Methylene Chloride(Dichloromethane)	2021/06/12	101	60 - 140	115	60 - 130	<0.050	ug/g	NC	50
7400223	o-Xylene	2021/06/12	91	60 - 140	100	60 - 130	<0.020	ug/g	NC	50
7400223	p+m-Xylene	2021/06/12	93	60 - 140	101	60 - 130	<0.020	ug/g	NC	50
7400223	Styrene	2021/06/12	102	60 - 140	112	60 - 130	<0.050	ug/g	NC	50
7400223	Tetrachloroethylene	2021/06/12	95	60 - 140	103	60 - 130	<0.050	ug/g	NC	50
7400223	Toluene	2021/06/12	94	60 - 140	103	60 - 130	<0.020	ug/g	NC	50
7400223	Total Xylenes	2021/06/12					<0.020	ug/g	NC	50
7400223	trans-1,2-Dichloroethylene	2021/06/12	101	60 - 140	112	60 - 130	<0.050	ug/g	NC	50
7400223	trans-1,3-Dichloropropene	2021/06/12	96	60 - 140	111	60 - 130	<0.040	ug/g	NC	50
7400223	Trichloroethylene	2021/06/12	103	60 - 140	115	60 - 130	<0.050	ug/g	NC	50
7400223	Trichlorofluoromethane (FREON 11)	2021/06/12	89	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
7400223	Vinyl Chloride	2021/06/12	104	60 - 140	118	60 - 130	<0.020	ug/g	NC	50
7400453	F2 (C10-C16 Hydrocarbons)	2021/06/10	97	50 - 130	91	80 - 120	<10	ug/g	NC	30
7400453	F3 (C16-C34 Hydrocarbons)	2021/06/10	99	50 - 130	93	80 - 120	<50	ug/g	NC	30
7400453	F4 (C34-C50 Hydrocarbons)	2021/06/10	101	50 - 130	94	80 - 120	<50	ug/g	NC	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) The recovery was above the upper control limit. This may represent a high bias in some results for this specific analyte. For results that were not detected (ND), this potential bias has no impact.

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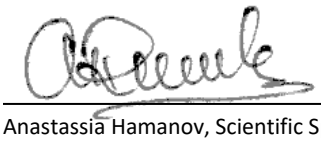
BV Labs Job #: C1F6305
Report Date: 2021/06/15

exp Services Inc
Client Project #: BRM-21011099-B0
Site Location: 12505 HEART LAKE ROAD
Your P.O. #: BRAMPTON GEOTECHNICA
Sampler Initials: CG

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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BUREAU VERITAS

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/6

CHAIN OF CUSTODY RECORD

Page _____ of _____

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: EXP Services Inc.	Company Name:	Quotation #: Stream 3	[X] Regular TAT (5-7 days) Most analyses
Contact Name: David Dennison	Contact Name:	P.O. #/ AFE#: Brampton Geotechnical	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 1595 Clark Boulevard	Address:	Project #: BRM-21011099-B0	Rush TAT (Surcharges will be applied)
Brampton, Ont. L6T 4V1		Site Location: 12505 Heart Lake Road	[ ] 1 Day [ ] 2 Days [ ] 3-4 Days
Phone: 905-793-9800 Fax: 905-793-0641	Phone: Fax:	Site #:	Date Required:
Email: dave.dennison@exp.com	Email:	Site Location Province: Ontario	Rush Confirmation #:
		Sampled By: Calvin Guan	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153	Other Regulations
[X] Table 1 [ ] Res/Park [ ] Med/ Fine	[ ] CCME [ ] Sanitary Sewer Bylaw
[ ] Table 2 [ ] Ind/Comm [ ] Coarse	[ ] MISA [ ] Storm Sewer Bylaw
[ ] Table 3 [ ] Agri/ Other	[ ] PWQO Region
[ ] Table _____	[ ] Other (Specify)
FOR RSC (PLEASE CIRCLE) Y / N	[ ] REG 558 (MIN. 3 DAY TAT REQUIRED)
No	[ ] REG 406 Table

Include Criteria on Certificate of Analysis: Y / N ✓

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Analysis Requested

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr VI, ICPMS Metals, HWS - B)	SULPHATE	mSPLP METALS	HOLD- DO NOT ANALYZE
1	BH13 SS1	4-Jun-21	10.00 am	Soil	2			X	X						
2	BH13 SS2	4-Jun-21	10.00 am	Soil	2			X	X						
3															
4															
5															
6															
7															
8															
9															
10															

LABORATORY USE ONLY

CUSTODY SEAL Y / N		COOLER TEMPERATURES
Present	Intact	
N	N	31314

COOLING MEDIA PRESENT: (Y) / N

COMMENTS

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
				08-Jun-21	14:57

08-Jun-21 14:54
Patricia Legette
C1F6305

KSE ENV 1261