REPORT

Preliminary Geotechnical and Hydrogeological Investigations

Proposed Mixed-Use Development
1 Clair Road East, Guelph, Ontario

Submitted to:

First Capital Asset Management LP
85 Hanna Avenue, Suite 400
Toronto, Ontario
M6K 3S3

Attn: Mr. Albert Ho, Senior Director
Environmental Programs

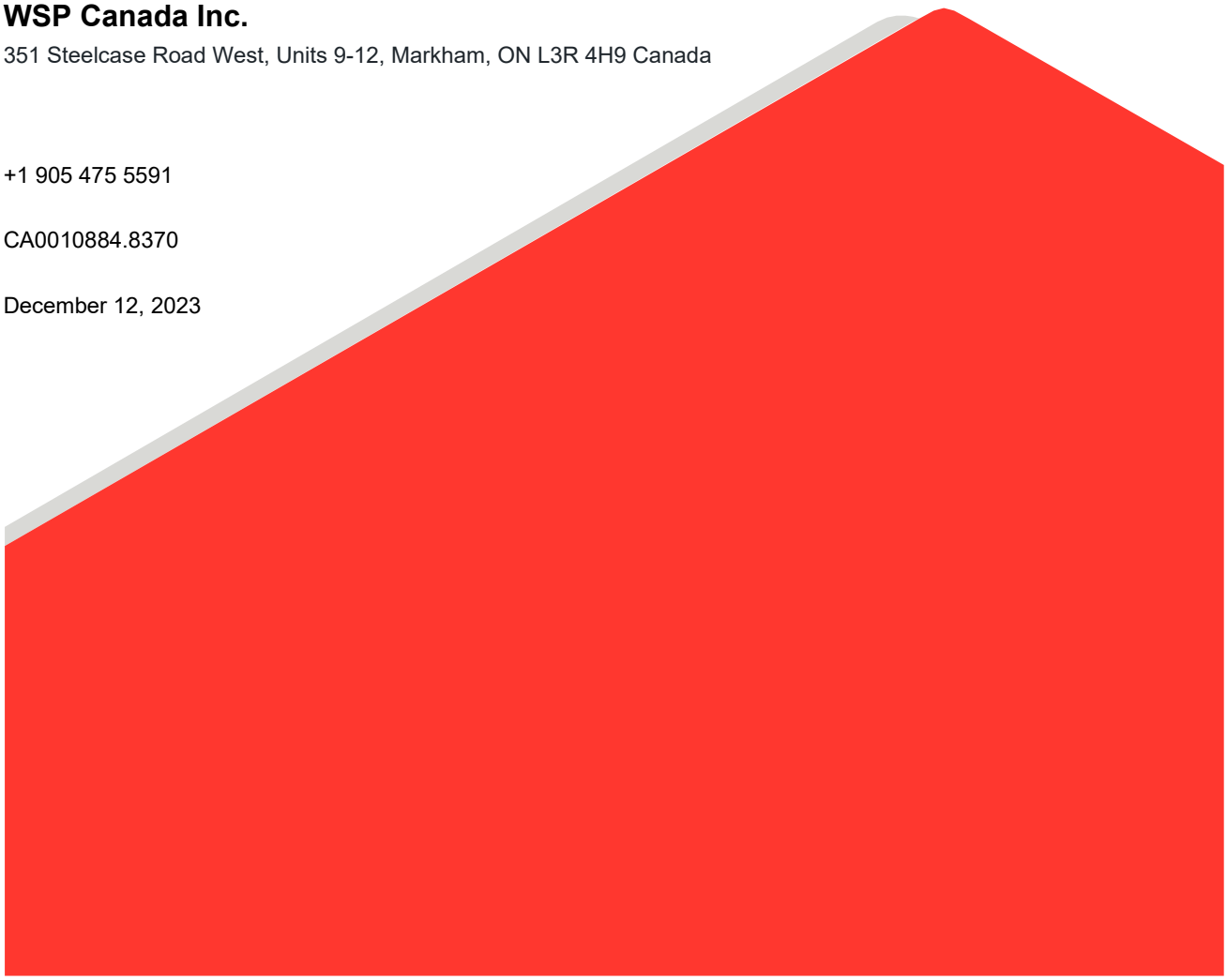
Submitted by:

WSP Canada Inc.
351 Steelcase Road West, Units 9-12, Markham, ON L3R 4H9 Canada

+1 905 475 5591

CA0010884.8370

December 12, 2023



Distribution List

1 e-Copy: First Capital Asset Management LP

1 e-Copy: WSP Canada Inc.

Table of Contents

TABLES

APPENDICES

1.0 INTRODUCTION

WSP Canada Inc., ("WSP") has been retained by First Capital Asset Management LP ("FCAM" or "the Client") to provide geotechnical and hydrogeological consulting services in support of the design for the proposed mixed-use residential/commercial development (the "project") to be located at 1 Clair Road East (the "site") in Guelph, Ontario, at the location shown on the Key Plan, Figure 1 in ***Appendix B***. The terms of reference for the geotechnical and hydrogeological consulting services were included in WSP's proposal No. 2023CA98370 dated August 04, 2023. Authorization to proceed with the investigation was received from FCAM in the form of the signed Authorization to Proceed on August 15, 2023.

The purpose of the field work and testing was to obtain information on the general subsurface soil and groundwater conditions at the site by means of a limited number of boreholes and laboratory tests. Based on an interpretation of the data available for this site, this report provides preliminary engineering comments, recommendations, and parameters for the geotechnical and hydrogeological design aspects of the project, including selected construction considerations which could influence design decisions. It should be noted that this report addresses only the geotechnical and hydrogeological (physical) aspects of the subsurface conditions at the site. The geo-environmental (chemical) aspects, including the consequences of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources, are beyond the terms of reference for this assignment and are not addressed herein. Phase One and Phase Two Environmental Site Assessments were submitted separately.

This preliminary report provides the results of the geotechnical and hydrogeological investigation and testing and should be read in conjunction with the *"Important Information and Limitations of This Report"* in ***Appendix A*** which forms an integral part of this document. The reader's attention is specifically drawn to this information, as it is essential for the proper use and interpretation of this report. The data, interpretations and recommendations contained in this report pertain to a specific project as described in the report and are not applicable to any other project or site location. If the project is modified in concept, location or elevation, or if the project is not initiated within eighteen months of the date of the report, WSP should be given an opportunity to confirm that the recommendations in this report are still valid.

2.0 SITE AND PROJECT DESCRIPTION

The project site is located at the municipal address of 1 Clair Road East in the City of Guelph, Ontario. The site encompasses a land area of approximately 22,071 square metres (m^2) and is currently occupied by several one to two-storey commercial buildings with the remainder of the site used for associated surface parking areas. The west side of the property is bounded by Farley Drive, the south side of the site is bounded by Poppy Drive East, the north side by Clair Road East and the east side by Hawkins Drive. Based on topographic information available for the site, the site terrain generally slopes downward from south to north, with ground surface elevations ranging from about 343 metres above sea level (masl) to 338 masl.

Based on preliminary architectural plans and communication with FCAM, it is understood that the development will consist of the following:

- Building/Tower A – 14 storey residential building with a gross floor area (GFA) of approximately 19,900 m^2
- Building/Tower B1 & B2 – 14 storey and 10 storey residential towers with a 7 storey podium deck. Total GFA of approximately 25,424 m^2
- Building/Tower C – 14 storey residential/commercial building with a GFA of approximately 17,061 m^2
- Building/Tower D - 14 storey residential/commercial building with a GFA of approximately 14,899 m^2

It is understood that the building development will have two levels of underground parking anticipated to extend to approximately 6 m below ground surface. The foundation and elevator shafts are anticipated to extend an additional 1 m to 2 m below the lowest floor elevation (7 m to 8 m below ground surface).

3.0 INVESTIGATION PROCEDURE

3.1 Drilling Program

The combined hydrogeological and geotechnical field investigation for this current assignment was carried out on September 28 to October 4, 2023, during which time five boreholes (designated as BH23-1 to BH23-5) were advanced at the site. The boreholes for the investigation were drilled using a standard truck-mounted drill rig supplied and operated by Altech Drilling of Cambridge, Ontario, subcontracted to WSP.

A summary of the current drilling program is presented below in Table 1. The approximate borehole locations are shown on the Borehole Location Plan, Figure 2 in ***Appendix B***. The results of the subsurface investigation are presented on the Record of Borehole sheets in ***Appendix C*** and the results of geotechnical laboratory testing in ***Appendix D***.

Table 1: Drilling Program

Borehole ID	Ground Surface Elevation (masl)	Borehole Depth (m)	Finished Elevation (masl)	Notes
BH23-1	341.6	15.9	325.7	50-millimetre (mm) diameter monitoring well installed. Screen Interval (7.6 m to 10.7 m) Designated as **BH23-1D**
				Nested 50-millimetre (mm) diameter monitoring well installed. Screen Interval (3.0 m to 6.1 m) Designated as **BH23-1S**
BH23-2	341.8	18.9	322.9	50-mm diameter monitoring well installed Screen Interval (9.1 m to 12.2 m)
BH23-3	340.8	14.3	326.5	50-mm diameter monitoring well installed Screen Interval (6.0 m to 9.1 m)
BH23-4	338.8	14.2	324.6	50-mm diameter monitoring well installed Screen Interval (5.2 m to 8.2 m)
BH23-5	339.8	18.9	320.9	50-mm diameter monitoring well installed Screen Interval (7.6 m to 10.7 m)

masl = metres above sea level.

Standard Penetration Testing (SPT) and sampling were carried out at regular intervals of depth in the geotechnical boreholes using conventional 38-mm internal diameter split spoon sampling equipment driven by an automatic hammer in accordance with the SPT procedures outlined in ASTM International standard D1586: "Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils". The split-spoon samplers used in the investigation limit the maximum particle size that can be sampled and tested to about 40 mm. Therefore, particles or objects that may exist within the soils that are larger than this dimension were not sampled and are not represented in the grain size distributions contained herein. The results of the

field tests (i.e., SPT "N"-values) as presented on the Record of Borehole sheets and in subsequent sections of this report are the values measured directly in the field and are unfactored.

Groundwater conditions were noted in the open boreholes during and upon completion of drilling and monitoring wells were installed in all boreholes (see Table 1, above) following the completion of drilling to allow for subsequent groundwater measurements and hydrogeological testing. The monitoring wells consisted of a 50-mm diameter PVC riser pipe with a slotted screen sealed at a selected depth within the borehole. A sand filter pack surrounded the screen, and above the screen, the borehole and annulus surrounding the riser pipe were backfilled to the surface with bentonite. The well installation details, and groundwater level readings are presented on the Record of Borehole sheets in ***Appendix C***.

The field work for this investigation was observed by members of WSPs technical staff, who located the boreholes in the field, arranged for the clearance of underground utilities, observed the borehole drilling, sampling and in situ testing operations, logged the boreholes as well as examined and took custody of the recovered soil samples. The samples were identified in the field, placed in appropriate containers, labelled, and transported to our Whitby geotechnical laboratory for further visual examination by the project engineer and for laboratory testing.

Index and classification tests, consisting of water content determinations, grain size distribution analyses and Atterberg Limits, were carried out on selected soil samples and the results are presented in ***Appendix D*** and also on the Record of Borehole sheets in ***Appendix C***. In addition, two composite soil samples (from BH23-1 and BH23-4) were collected and submitted for corrosivity testing and the laboratory certificate of analysis for the corrosivity parameters is provided in ***Appendix E***.

The geodetic ground surface elevations at the borehole locations were obtained from the topographic plan provided by FCAM, titled, "*Plan of Block 1, Plan 61M-165, City of Guelph, County of Wellington",* prepared by KRCMAR Surveyors Ltd., Ontario Land Surveyors., dated August 10, 2023, and as such, the elevations given on the Record of Borehole sheets and referred to herein should be considered to be approximate. The borehole locations were referenced to existing prominent site features and plotted on the plan provided in the preparation of Figure 2, Borehole Location Plan. As such, the borehole locations shown on Figure 2 in ***Appendix B*** should also be considered to be approximate.

4.0 SITE GEOLOGY AND STRATIGRAPHY

4.1 Regional Geology

The surficial geology aspects of the general site area are referenced from the following publication:

- Chapman, L.J., and Putnam, D.F., 2007, *"The Physiography of Southern Ontario"*; 4th Edition, Ontario Geological Survey.

Physiographic mapping in the area according to the above-noted reference indicates that the site lies within the physiographic region of southern Ontario known as the Guelph Drumlin Field. The Guelph Drumlin Field is centred on the City of Guelph and includes part of the regional municipalities of Hamilton-Wentworth, Waterloo and Halton and part of Wellington County. This region consists of numerous drumlins but are not closely grouped and the intervening areas consist of fluvial materials. The till in the drumlins is loamy and calcareous and was derived mostly from dolostone of the Amabel Formation. The region is underlain by dolostones of the Amabel and Guelph Formations which dip gently towards the southwest.

The subsurface conditions encountered during the investigation were generally consistent with the physiographic mapping.

4.2 Subsurface Conditions

The detailed subsurface soil and groundwater conditions encountered in the boreholes advanced at the site for this report along with the results of geotechnical laboratory testing are shown on the Record of Borehole sheets in ***Appendix C***. WSPs "*Methods of Soil Classification*", "*Abbreviations and Terms Used on Records of Boreholes and Test Pits*" and "*List of Symbols*" are provided in ***Appendix C*** to assist in the interpretation of the Record of Borehole sheets. The detailed results of geotechnical laboratory testing carried out on selected soil samples are presented in ***Appendix D***.

The Record of Borehole sheets indicate the subsurface conditions in the borehole locations only. The stratigraphic boundaries shown on the borehole records are inferred from non-continuous sampling, observations of drilling progress as well as results of Standard Penetration Tests and, therefore, typically represent transitions between soil types rather than exact planes of geological/stratigraphic change. Subsurface soil conditions will vary between and beyond the borehole locations.

In general, the subsurface conditions encountered in the boreholes consisted of a surficial asphalt layer and up to 2.2 m of fill. Underlying the fill, the native subsurface soils generally consist of variable non-cohesive deposits consisting of sandy silt, silty sand and sand and gravel, non-cohesive till material consisting of silty sand and cohesive till deposits of silty clay.

The subsurface soil and groundwater conditions encountered in the boreholes drilled at the site are described in the following sections.

4.2.1 Asphalt

A surficial asphalt layer, of about 100 mm in thickness, was encountered in all boreholes at ground surface.

4.2.2 Fill

Non-cohesive fill was encountered underlying the surficial asphalt at all of the borehole locations. The fill consisted of silty sand to sand and gravel, which extended to depths ranging from about 0.7 m to 2.2 m below the existing ground surface (bgs) (approximate Elevations 337.3 masl to 340.2 masl).

Standard Penetration Test (SPT) "N"-values measured within the non-cohesive fill ranged from 15 blows per 0.3 m of penetration to 50 blows per 0.1 m of penetration, indicating a compact to very dense degree of compactness. The water content measured on samples of the non-cohesive fill ranged from approximately 1 percent to 9 percent.

4.2.3 Non-Cohesive Deposits

Non-cohesive native deposits of sand and gravel, silty sand and sandy silt were encountered in all the boreholes underlying the near surface fill and interbedded within the till deposits. The non-cohesive deposits were encountered at depths from 0.7 m to 2.2 m bgs (approximate Elevations of 337.3 masl to 340.1 masl) and extended to depths ranging from about 8.7 m to 14.3 m bgs or approximate Elevations of 325.0 m to 330.1 m. Borehole BH23-3 was terminated in the non-cohesive deposits.

SPT "N"-values measured within the sand and gravel, silty sand and sandy silt deposits ranged from 16 blows per 0.3 m of penetration to 50 blows per 0.1 m of penetration, indicating a compact to very dense degree of compactness. The natural water content measured on samples of the sand and gravel, silty sand and sandy silt to silt deposits ranged from approximately 1 percent to 22 percent.

4.2.4 Non-Cohesive Till

Non-cohesive till deposits of silty sand to sandy silt were encountered in all of the boreholes underlying shallower native deposits and interbedded within the deeper non-cohesive deposits and cohesive tills. The non-cohesive till was encountered at depths of about 2.2 m to 5.2 m bgs (approximate Elevations of 334.6 masl to 339.4 masl)

and extended to depths ranging from about 7.2 m to 18.9 m bgs or approximate Elevations of 320.9 masl to 334.4 m. Boreholes BH23-2, BH23-4 and BH23-5 were terminated in the non-cohesive till deposits.

SPT “N”-values measured within the non-cohesive till deposits ranged from 23 blows per 0.3 m of penetration to 50 blows per 0.1 m of penetration, indicating a compact to very dense degree of compactness. The natural water content measured on samples of the non-cohesive till deposits ranged from approximately 2 percent to 13 percent.

4.2.5 Cohesive TILL

A cohesive till deposit consisting of silty clay was encountered in all boreholes, with the exception of borehole BH23-3, interlayered within the native non-cohesive deposits and non-cohesive till. The cohesive till was encountered between depths of about 8.7 m to 14.8 m bgs (approximate Elevations of 325.0 m to 330.1 m) and extended to depths of 13.3 m to 17.1 m bgs or approximate Elevations of 322.7 masl to 325.7 masl. Borehole BH23-1 was terminated in the cohesive till deposit.

SPT “N”-values measured within the cohesive till deposits ranged from of 14 blows to 25 blows per 0.3 m of penetration; indicating a hard consistency. Natural water contents of about 6 percent to 10 percent were measured on samples of the cohesive till deposits.

4.2.6 Geotechnical Laboratory Testing

The results of grain size distribution analyses carried out on samples of the native non-cohesive subsurface materials encountered at the boreholes are provided in **Appendix D**. A summary of the grain size distribution analyses is presented below in **Table 2**.

Table 2: Results of Grain Size Distribution Analysis

Borehole ID	Sample Number	Depth (mbgs)	Soil Classification	Notes
BH23-1	5	3.0 to 3.7	SM	Silty Sand Till
BH23-1	11	9.1 to 9.8	SP	Sand
BH23-2	12	10.7 to 11.3	SP	Gravelly Sand
BH23-2	7	4.6 to 5.2	SM	Silty Sand Till
BH23-4	9	6.1 to 6.7	SM/ML	Silty sand to sandy silt Till

4.2.7 Groundwater Conditions

The groundwater conditions measured in the monitoring wells are shown in detail on the Record of Borehole sheets in ***Appendix C***.

Groundwater levels were measured in the monitoring wells installed in all Boreholes October 12, 2023, October 18, 2023, and October 27, 2023. The recorded depths to the groundwater level are provided below in Table 3. It should be noted that these observations reflect the groundwater conditions encountered/measured at the time of the field investigation (October 2023) and some seasonal and annual fluctuations should be anticipated. It is recommended that additional groundwater level monitoring, during peak high levels, should be obtained during further design.

Table 3: Groundwater Depth and Elevation

Monitoring Well ID	Ground Surface Elevation	October 12, 2023		October 18, 2023		October 27, 2023	
	(masl)	(mbgs)	(mbgs)	(mbgs)	(masl)	(mbgs)	(masl)
BH23-1S	341.6	Dry	-	Dry	-	Dry	-
BH23-1D	341.6	7.90	333.70	8.00	333.60	8.14	333.46
BH23-2	341.8	9.40	332.40	9.20	332.60	9.24	332.56
BH23-3	340.8	7.50	333.30	7.60	333.20	7.62	333.18
BH23-4	338.8	5.70	333.10	5.90	332.90	5.96	332.84
BH23-5	339.8	9.10	330.70	7.90	331.90	7.99	331.81

Notes:
masl = metres above sea level
mbgs = metres below ground surface

The depths to groundwater at the monitoring wells ranged from 5.70 mbgs (BH23-4 on October 12, 2023) to 9.40 mbgs (BH23-2 on October 12, 2023) or from corresponding Elevations of 330.7 masl (BH23-5 on October 12, 2023) to 333.7 masl (BH23-1D on October 12, 2023).

4.2.8 Single-Well Response Testing

Single-well response testing (i.e., rising head testing) was carried out at the monitoring wells installed in Boreholes BH23-1D, BH23-2, BH23-3, BH23-4 and BH23-5 on October 18, 2022. The rising head tests were carried out by rapidly lowering the water levels by purging with a dedicated Waterra footvalve and tubing. The resulting water level recoveries were monitored with an electronic automatic pressure transducer and/or a water level tape. The recovery data were analysed using the AQTESOLV for Windows (1996 – 2007) Version 4.5 software. The Bouwer and Rice (1976) method for unconfined conditions was applied to the rising head test data. Estimates of hydraulic conductivity (K) obtained from the rising head tests are summarized below in Table 4. Summary printouts of the rising head test data and results from AQTESOLV are provided in ***Appendix F***.

Table 4: Single-Well Response Test Summary

Monitoring Well ID	Screened Interval (masl)	Groundwater Condition	Screened Unit	Est. Hydraulic Conductivity (m/s)
BH23-1D	333.98 – 330.9	Unconfined	Sand and Gravel, Sand.	2.8 x 10-5
BH23-2	332.65 – 329.61	Unconfined	Silty Sand Till, Sand	3.5 x 10-5
BH23-3	334.70-331.65	Unconfined	Silty Sand Till, Sand	2.9 x 10-5
BH23-4	333.62-330.57	Unconfined	Silty Sand, Sand	1.7 x 10-5
BH23-5	332.18-329.13	Unconfined	Silty Sand, Sand	1.9 x 10^{-4}

Notes:
masl = metres above sea level
m/s = metres per second

The hydraulic conductivity estimates for the glacial till at BH23-1D, BH23-2, BH23-3, BH23-4 and BH23-5 ranged from 1.9 x 10^{-4} m/s to 3.5 x 10^{-5} m/s. In our experience, the hydraulic conductivity estimates are reasonable for the glacial till soil type at test locations.

4.2.9 Groundwater Quality

Groundwater samples were collected from monitoring well/Borehole BH23-1D on October 18, 2023. The samples were unfiltered and collected using a peristaltic pump, using accepted environmental engineering protocols, and stored on ice in coolers until delivered, under chain-of-custody documentation, to ALS Canada Ltd. Laboratories of Mississauga, Ontario for analysis.

The unfiltered samples were analysed for the list of parameters included in Table 1 – *Limits for Guelph Sanitary Sewers and Combine Sewers Discharge* and Table 2 – *Limits for Storm Sewer Discharge* as outlined in Regional Municipality of Guelph (By-Law (1991) No. 13791), which include various metals, inorganics, general chemistry, oil and grease, carbonaceous biochemical oxygen demand (BOD). The laboratory analytical report is included in Appendix H.

For the groundwater samples collected from monitoring well BH21-1D on October 18, 2023, no exceedances of the Table 1 – *Limits for Sanitary Sewers and Combined Sewers Discharge* and Table 2 – *Limits for Guelph Storm Sewer Discharge* were identified in the samples.

5.0 DISCUSSION AND RECOMMENDATIONS

This section of the report provides engineering information on, and preliminary recommendations for, the geotechnical design aspects of the project based on our interpretation of the borehole information, the laboratory test data and our understanding of the project requirements. The information in this portion of the report is provided for planning and design purposes for the guidance of the design engineers and architects. Where comments are made on construction, they are provided only in order to highlight aspects of construction which could affect the design of the project. Contractors bidding on or undertaking any work at the site should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction, and make their own independent interpretation of the factual data as it affects their proposed construction techniques, schedule, equipment capabilities, costs, sequencing, and the like. WSP will not assume any responsibility for construction-related decisions made by contractors on the basis of this report.

Based on preliminary architectural plans and communication with FCAM, it is understood that the development will consist of the following:

- Building/Tower A – 14 storey residential building with a gross floor area (GFA) of approximately 19,990 m^2
- Building/Tower B1 & B2 – 14 storey and 10 storey residential towers with a 7 storey podium deck. Total GFA of approximately 25,424 m^2
- Building/Tower C – 14 storey residential/commercial building with a GFA of approximately 17,061 m^2
- Building/Tower D - 14 storey residential/commercial building with a GFA of approximately 14,899 m^2

It is understood that the building development will have two levels of underground parking anticipated to extend to approximately 6 m below ground surface. The foundation and elevator shafts are anticipated to extend an additional 1 m to 2 m below the lowest floor elevation. Therefore, the foundation is expected to be set about 7 to 8 below existing grade.

5.1 Geotechnical Recommendations

5.1.1 Foundation Design

Consideration may be given to supporting the proposed building on conventional spread/strip footings founded in the competent, native and undisturbed non-cohesive deposits as indicated below in Table 5.

Table 5: Recommended Highest Founding Depths/Elevations for Shallow Footings

Borehole ID	Proposed Founding Elevation (m)	Proposed Depth Below Existing Grade (m)	Anticipated Founding Materials
BH23-1	334.6	7.0	Very dense sand and gravel
BH23-2	334.8	7.0	Very dense silty sand Till
BH23-3	333.8	7.0	Very dense gravelly sand
BH23-4	331.8	7.0	Compact to Dense sandy and gravel
BH23-5	332.8	7.0	Compact to Dense silty sand Till

All surficial vegetation, topsoil, fill, old foundations, other structures and any deleterious materials should be stripped/removed from the proposed development area. The spread/strip footings bearing on the competent, native and undisturbed deposits, at or below the depths/elevations provided above in Table 3, may be designed using the factored geotechnical resistance at Ultimate Limit States (ULS) values and the geotechnical reaction at Serviceability Limit States (SLS) values for 25 mm total settlement and 19 mm differential settlement provided below in Table 6.

Table 6: Recommended ULS and SLS for Shallow Foundations

Spread or Strip Footing Dimensions	Factored Geotechnical Resistance at ULS (kPa)	Geotechnical Reaction at SLS (for 25 mm of settlement) kPa
1 m x 1 m Spread	350	SLS > ULS
2 m x 2 m Spread	400	
3 m x 3 m Spread	450	300
4 m x 4 m Spread	500	250
5 m x 5 m Spread	600	200
0.5 m Strip footing	250	SLS > ULS
1.0 m Strip footing	300	

All exterior footings and footings in unheated areas should be provided with at least 1.4 m of earth cover after final grading or a thermally equivalent thickness of insulation, in order to address the potential for damage due to frost action.

As the soil bearing resistance and reaction values are related to the actual footing sizes and founding depths, the foundation recommendations must be reviewed by WSP once the building details are finalized. Additionally, the soil resistance and reaction values presented above in Table 6 are calculated under the assumption that the founding elevations are at least 1 m below the finished slab elevation.

If stepped spread footings are constructed at different founding levels, the difference in elevation between individual adjacent footings should not be greater than one half the clear distance between the footings (2H:1V

or gentler). Should this not be possible, WSP should be consulted to provide field inspection to ensure that the footings exceeding the above requirement are stable and the bearing for the upper footing is not compromised. In addition, the lower footings should be constructed first so that if it is necessary to construct the lower footings at a greater depth than anticipated, the elevations of the upper footings can be adjusted accordingly. Stepped strip footings, if required, should be constructed in accordance with the latest edition of the Ontario Building Code (2015 OBC), Section 9.15.3.9.

Our foundation recommendations are subject to a key assumption that no former excavation, former or existing underground utility or structure is within or intercepts the zone of influence of the proposed footings. The zone of influence of the proposed footings can be defined as any line drawn from the underside edge of the footing down and away at a slope of 1 horizontal to 1 vertical. Complete removal of fill and any existing or remaining foundations from previous structures or any underground utilities, if present, or lowering the founding elevation (if appropriate) may be required subject to the inspection by WSP during the time of construction.

The founding materials are susceptible to disturbance by construction activity especially during wet weather or by drying when the founding soils are exposed for extended periods of time in dry weather. Care should be taken to preserve the integrity of the materials as bearing strata. Prior to placing concrete for the footings, the foundation excavations must be inspected by WSP to confirm that the footings are located in a native, undisturbed and competent bearing stratum which has been cleaned of ponded water and loosened or softened material. If the concrete for the footings on the native soil cannot be placed immediately after excavation and inspection (i.e., within 24 hours of excavation and inspection), it is recommended that a working mat of lean concrete be placed in the excavation to protect the integrity of the bearing stratum. The bearing soil and fresh concrete must be protected from freezing during cold weather construction.

5.1.2 Slab-on-Grade Floor

It is anticipated that the basement level will be at an approximate depth of about 6 m for the mixed-use development, and that the floor slab can be designed as a concrete slab-on-grade. The soils at the basement subgrade level will generally consist of dense to very dense silty sand to sandy silt till.

The exposed subgrade should be proof rolled in conjunction with an inspection by WSP. Remedial work should be carried out on any softened, disturbed, wet or poorly performing zones as directed by WSP. Any low areas may then be brought up to within at least 200 mm of the underside of the floor slabs, as required, using Ontario Provincial Standard Specification (OPSS) 1010 Granular ‘B’, Type I material or other approved material, placed in maximum 200-mm thick loose lifts and uniformly compacted to at least 98 per cent of the material’s Standard Proctor Maximum Dry Density (SPMDD).

The final lift of granular fill beneath floor slabs should consist of a minimum thickness of 200 mm of OPSS Granular ‘A’ material, uniformly compacted to at least 100 per cent of the material’s SPMDD, acting as a moisture barrier. Any filling operations should be inspected and tested by WSP. Additional Granular ‘A’ material may be needed to provide adequate pipe bedding and cover, depending on the requirements for an under-slab drainage system (see below).

The floor slabs should be structurally separate from the foundation walls and columns. Sawcut control joints should be provided at regular intervals and along column lines to control shrinkage cracking and to allow for any differential settlement of the floor slabs.

If the basement is designed to be unheated, the subdrain system and granular base soils should not be allowed to freeze, especially around cold air intake ducts. WSP would be pleased to provide thermal insulation input during the design stage, if requested.

5.1.3 Permanent Drainage

At the time of the field investigation during October 2023, the groundwater levels were measured at or below the anticipated finished floor elevation (FFE) of the proposed underground levels (groundwater ranged from 5.7 mbgs to 9.4 mbgs, or Elevations 330.7 masl to 333.7 masl, during fieldwork in October 2023) . As a result, an exterior perimeter drainage system and underfloor drainage should be installed. If a permanent drainage system is not feasible, the building can be constructed with a fully waterproofed basement that is also resistant to hydrostatic pressure (i.e., with a “tanked” basement design). Consideration should be given to waterproofing the lower portions of the elevator shafts/sumps below the basement slab-on-grade to reduce long-term discharge rates.

The extent of drainage measures such as a composite geosynthetic drainage system or equivalent, under slab drainage and sump system should be assessed during the final design stages and WSP can provide geotechnical input as required.

An underfloor drainage system, connected to sumps, should be provided to collect seepage and to limit pore water pressure build-up on the underside of the floor slab. The subfloor drainage system may consist of a network of robust sub-drainpipes conveying collected groundwater to a sump or sumps from which the groundwater can be pumped to a municipal sewer. The drainage system would consist of interconnected perforated pipes (bedded on, and within, free draining granular soils fully wrapped in geotextile fabric) installed around the perimeter of the building and within the building footprint.

Drainage, such as through the use of a composite geosynthetic drainage system or equivalent, should be provided to the exterior walls. The composite drain must withstand the design horizontal earth pressures used for below grade wall design and should be connected to the under-slab drainage system or perimeter drainage system. The drainage system collector pipes should drain to a sump for collection and discharge. The long-term drainage discharge rates are further discussed below in **Section 7.0**. Considerations regarding long-term drainage rates should be re-evaluated as site designs progress and construction plans are developed.

5.1.4 Temporary Excavation and Support

Excavations for the construction of the foundations will extend through the fill and into the variable native deposits described in detail above in ***Section 4.2***. It is anticipated that excavation into the overburden materials can be achieved with conventional hydraulic excavating equipment. Further, excavations should not undermine any existing foundations for adjacent structures or existing infrastructure.

The till deposits at this site are glacially derived and as such should be expected to contain cobble and boulder size materials. The contractor should be made aware of the potential presence of cobble and/or boulder size obstructions within the overburden soils.

It is anticipated that temporary excavations above the groundwater table level will consist of conventional temporary open cuts with side slopes not steeper than 1H:1V for Type 3 soils as classified by the Ontario Health and Safety Act and Regulations for Construction Projects (OHSA). For Type 3 soils, the slope should be from the base of the excavation. If excavations extend below the measured groundwater elevations, adequate dewatering will be required to achieve a Type 3 soil classification. Saturated soils, below the groundwater level would be classified as Type 4 soils and, accordingly, side slope inclinations should not exceed 3H:1V. Where the side slopes consist of more than one soil type, the soil shall be classified as the type with the highest number among the types present. Please note that the soil type classifications indicated above are provisional and are subject to change based on field observations of the actual conditions at the time of exposure.

Depending upon the construction procedures adopted by the contractor, actual groundwater seepage conditions, the success of the contractor’s groundwater control methods and weather conditions at the time of construction, some flattening and/or blanketing of the slopes may be required. Care should be taken to direct

surface runoff away from the open excavations. Stockpiles of excavated materials should be kept at least the same horizontal distance from the top edge of the excavation as the depth to not negatively impact excavation slope stability, subject to confirmation by a geotechnical engineer in the field during construction. Care should also be taken to avoid overloading of any underground services / structures by stockpiles.

Where space is not available for unsupported open cut excavations, some form of temporary shoring will be needed to support the excavations for the proposed building. In general, there are three basic shoring methods that are commonly used in local practice: steel soldier piles and timber lagging, driven interlocking steel sheet piles and continuous concrete (secant pile or diaphragm) walls, each with appropriate lateral support (interior braces and rakers and/or anchored tie backs).

The shoring method(s) selected to support the excavation must take into account the soil stratigraphy, the groundwater conditions, the methods adopted to control groundwater, effects of weather, and the ground movements associated with the shoring system stiffness and their impact on adjacent settlement sensitive structures and utilities. These shoring systems will need to be stiffened with external (i.e., tie-backs) and/or internal (i.e., braces and/or rakers) support systems to limit the size of structural members and reduce lateral ground movements. For all the above systems, some form of lateral support (internal or external) to the wall is required for excavation depths greater than about 3 m to 4 m.

Soldier piles and lagging is suitable where the objective is to maintain an essentially vertical excavation wall and the movements above and behind the wall need only be sufficiently limited that relatively flexible features (such as roadways) will not be adversely affected. As a result, steel soldier piles installed in pre-augered sockets, with timber lagging shoring may be feasible at this site where excavations are adequately dewatered and not located adjacent to any settlement-sensitive utilities or structures within the zone influence of the shoring. We would note that soldier pile and lagging systems do not provide a groundwater cut off and, accordingly, proactive dewatering would be required to lower the groundwater levels to at least 1 m below the excavation base elevation on the exterior of the shoring. The location and elevation of all buried services or structures in the vicinity of the site should be accurately determined prior to design of the appropriate temporary support systems.

Where foundations or settlement-sensitive buried services lie within the zone of influence of the shoring and the shoring deflections need to be strictly limited, secant pile or diaphragm walls would be appropriate due to their stiffer structural characteristics. Continuous concrete walls are also appropriate where groundwater inflow needs to be controlled. The type of support system may consist of either soldier piles and lagging or a secant pile/diaphragm wall subject to review once the final design drawings are available.

Design of the shoring should include an evaluation of base stability, soil squeezing stability and hydraulic uplift stability as defined in the Canadian Foundation Engineering Manual (CFEM, 2006). The shoring system should be designed to account for horizontal/lateral earth loads, surcharge loads, groundwater pressures and the effects of weather as well as the project requirements for controlling ground displacements. Lateral pressures for design of the temporary structures will depend on the temporary structure design and the nature of the lateral support provided. The distribution of lateral pressures on a shoring system depends greatly on the methods used, the stiffness, and the degree of lateral restraint. As such, the distribution of lateral earth pressures for such a system is best left to the ultimate designer of the shoring who can best account for such conditions. It is a common practice for a specialist contractor to design and install the excavation support system.

Although the design of the shoring will be completed by the contractor, the parameters presented below in Table 7 are provided to enable the structural designer to develop a conceptual design and assess the approximate construction costs for the shoring systems.

Table 7: Coefficients of Static Lateral Earth Pressure

Soil Description	Unit Weight	Internal Angle of Friction	Undrained Shear Strength	Coefficient of Earth Pressure1		
	(Ɣ, kN/m3)	(ϕ, degrees)	(kPa)	Active Ka	At Rest Ko	Passive Kp2
Compact to very dense non cohesive fill	18	28	-	0.36	0.53	2.77
Compact to very dense non-cohesive deposits	19	32	-	0.31	0.47	3.25
Compact to very dense non-cohesive till	21	36	-	0.26	0.41	3.85

1) The earth pressure coefficients noted above are based on a horizontal surface adjacent to the excavation. If sloped surfaces are present, the coefficient of earth pressure should be adjusted accordingly.
2) The total passive resistance below the base of the excavation (i.e., adjacent to the temporary protection system) may be calculated based on the values of K_p indicated above but reduced by an appropriate factor that considers the allowable wall movement to account for the fact that a large strain would be required for mobilization of the full passive resistance.
3) For longer-term (drained) analyses, cohesion should be assumed to be zero for all soil types.

5.1.5 Lateral Earth Pressure for Below Grade Walls

The design of the foundation walls for the proposed building should take into account the horizontal soil loads, hydrostatic pressure, as well as surcharge loads that may occur during or after construction. The permanent below-grade wall is considered to be a rigid structure and should be designed to resist at-rest lateral earth pressures calculated as follows:

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

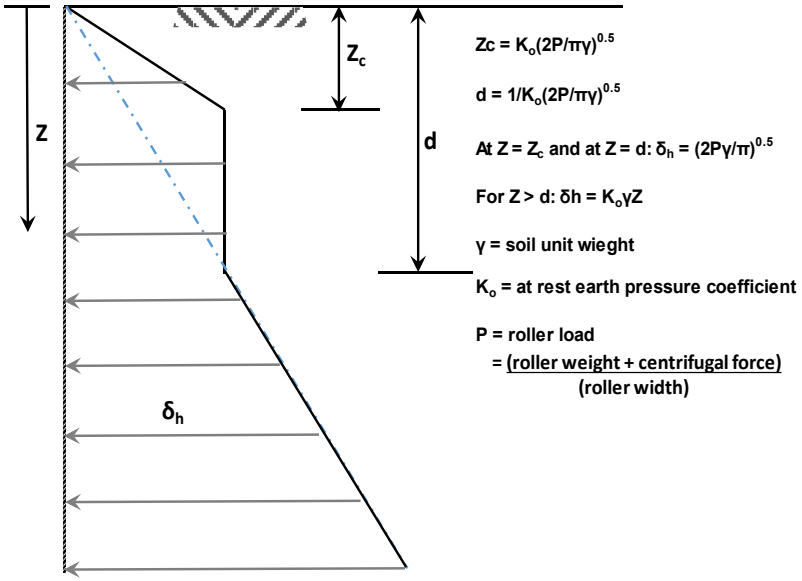
where:

- p = lateral earth pressure acting depth z, kPa
- $K = K_o$ = at rest earth pressure coefficient, use 0.5 for the foundation wall
- γ = unit weight of retained soil/backfill, a value of 21 kN/m^3 may be assumed
- h = depth to point of interest in soil, m
- q = equivalent value of surcharge on the ground surface, kPa

The above expression assumes that the perimeter drainage system prevents the build-up of any hydrostatic pressure behind the wall. Should hydrostatic pressures be considered to build-up behind the walls (such as in the case of a fully waterproofed or “tanked” basement), they must be included in calculating the lateral pressures and other measures to address possible buoyancy and waterproofing may need to be considered. The lateral earth pressures acting on the below-grade walls will depend on the type and method of placement of the backfill materials, the nature of the soils behind the wall, the magnitude of surcharge including construction loadings from equipment or materials, the freedom of lateral movement of the structure, and the drainage conditions behind the walls. Surcharge pressures from any adjacent foundations and/or roads should also be included in the design as indicated.

To account for lateral pressures induced by the compaction effort adjacent to foundation walls, small walk-behind compaction equipment should be used within the zone of influence of the wall, as defined by a line extending upwards and outwards from the base of the wall at an inclination of 1H:2V, and the design lateral

earth pressure distribution should consist of a combined trapezoidal/triangular distribution as depicted below. Typical roller loads are provided for reference.



Typical Roller Loads

Roller Type	Weight (kN)	Cent. Force (kN)	Width (mm)	P (kN/m)
1-drum walk-behind	2.3	8.3	560	18.9
2-drum walk-behind	1.6	10.1	560	20.9
2-drum walk-behind	12.1	8.8	760	27.5
2-drum walk-behind	9.2	19.8	750	38.7

To avoid detrimental impacts from frost adhesion and heaving, the excavated areas behind foundation walls for the basement levels or any below grade foundation elements should be backfilled with non-frost susceptible granular material conforming to the requirements for OPSS.MUNI 1010 Granular “B” Type I material. In areas where pavements or other hard surfacing will abut the building, differential frost heaving could occur between the granular fill immediately adjacent to the building and the more frost susceptible native materials which exist beyond the wall backfill. To reduce the severity of this differential heaving, the backfill adjacent to the wall should be placed to form a frost taper. The frost taper should be brought up to pavement subgrade level from 1.2 m below finished exterior grade at a slope of 3 horizontal to 1 vertical, or flatter, away from the wall. The backfill materials should be placed evenly in lifts not exceeding 200 mm in loose thickness. The layers should be uniformly compacted to at least 95 per cent of the material’s SPMDD. Light compaction equipment should be used within 2 m of the wall; otherwise, compaction stresses on the wall may be greater than that imposed by the backfill material. The upper 0.3 m of backfill should consist of clayey material (where appropriate) to provide a relatively low-permeability cap and the exterior grade should also be shaped to slope away from the building.

The lateral earth pressure equation outlined above is given in an unfactored format and will need to be factored for Limit States Design purposes.

5.1.6 Pipe Bedding and Cover

The bedding for the Site servicing pipes should be compatible with the type and class of pipe, the surrounding subsoil and anticipated loading conditions and should be designed in accordance with Ontario Provincial Standard Drawing (OPSD) 802.03 and any applicable City of Guelph standards. Where granular bedding is deemed to be acceptable, it should consist of at least 150 mm of OPSS.MUNI 1010 Granular ‘A’. Depending on groundwater conditions at the time of excavation, a thicker bedding layer may be required at some localized areas in overly wet zones of silty sand, silty sand, sand and silts to facilitate the pipe installations.

Where unavoidable disturbance to the subgrade surface does occur, it may be necessary to place a sub-bedding layer of compacted OPSS.MUNI 1010 Granular 'B' Type II beneath the Granular 'A'. The requirements for additional bedding thicknesses in excess of 150 mm should be determined during construction by the geotechnical engineer.

From the springline to 300 mm above the pipe obvert, sand cover (such as OPSS.MUNI 1002 fine concrete aggregate) may be used. All bedding and cover materials should be placed in maximum 200-mm thick loose lifts and should be uniformly compacted to at least 95 per cent of the material's SPMDD using suitable vibratory compaction equipment.

The use of clear crushed stone as a bedding layer shall not be permitted anywhere on this project since fine particles from the native deposits could potentially migrate into the voids in the clear crushed stone and cause loss of pipe support.

5.1.7 Trench Backfill

The excavated materials from the site will vary and mainly consist of the soil material types as outlined above in **Section 4.2**. The fills and native non-cohesive subsoils above the groundwater table are variable in water content but generally appear to be near their estimated optimum water contents for compaction.

The excavated materials at suitable water contents may be reused as trench backfill, from a geotechnical perspective, provided they are free of significant amounts of topsoil, organics, or other deleterious material, and are placed and compacted as outlined below. However, some difficulty would be expected in achieving adequate compaction during wet weather. The fill materials may be reused as backfill material provided they are inspected and approved during construction by WSP. All topsoil and organic materials, including within the fill, should be wasted. All oversized cobbles and boulders (i.e., greater than 150 mm in size) should also be removed from the backfill.

All trench backfill, from the top of the cover material to 1 m below subgrade elevation, should be placed in maximum 300-mm thick loose lifts and uniformly compacted to at least 95 per cent of the material's SPMDD. From 1 m below subgrade to the subgrade elevation of any areas to be paved, the materials should be placed in maximum 300-mm thick loose lifts and uniformly compacted to at least 98 per cent of their SPMDD.

Alternatively, if placement water contents at the time of construction are too high, or if there is a shortage of suitable in-situ material, then an approved imported granular material which meets the requirements for OPSS Select Subgrade Material (SSM) could be used. It should be placed in loose lift thicknesses not exceeding 300 mm and uniformly compacted to at least 95 per cent or 98 per cent of SPMDD as indicated above. Backfilling operations during cold weather should avoid inclusions of frozen lumps of material, snow and ice.

Normal post-construction settlement of the compacted trench backfill should be anticipated, with the majority of such settlement taking place within about 6 months following the completion of trench backfilling operations. This settlement will be reflected at the ground surface. Placement of the surface course of asphalt should be differed for a period of about 12 months to limit cracking in response to backfill settlement.

5.1.8 Site Classification for Seismic Site Response

Seismic hazard is defined in the 2012 Ontario Building Code (OBC) by uniform hazard spectra (UHS) at spectral coordinates of 0.2 second, 0.5 second, 1.0 second and 2.0 seconds and a probability of exceedance of 2% in 50 years. The OBC method uses a site classification system defined by the average soil/bedrock properties (e.g., shear wave velocity, Standard Penetration Test (SPT) resistance, undrained soil shear strength, etc.) in the 30 m of the soil profile extending below the foundation level. There are 6 site classes from A to F, decreasing in ground stiffness from A, hard rock, to E, soft soil; with site class F used to denote problematic soils (e.g., sites underlain by thick peat deposits and/or liquefiable/collapsible soils). The site class is then used to obtain

acceleration and velocity-based site coefficients F_a and F_v, respectively, used to modify the UHS to account for the effects of site-specific soil conditions in design.

The results of the borehole investigation indicate the average SPT "N"-value below the foundations is generally between 30 to 50 blows per 0.3 m of penetration. Based on these results, **Site Class D** may be used for design. The site classification may be improved by site-specific testing such as multi-channel analysis of surface waves (MASW) testing.

6.0 CORROSIVITY

Two composite soil samples (from BH23-1 and BH23-4) were submitted for corrosivity testing and the laboratory certificate of analysis for the corrosivity parameters is provided in ***Appendix E***. The corrosivity results were compared to the American Water Works Association (AWWA) C-105 (2005) Standard, "Polyethylene Encasement for Ductile-Iron Pipe Systems". Based on the results, the corrosivity potential is considered to be high at the location of BH23-1 tested and buried steel elements installed would therefore require protection from corrosion. The corrosivity potential is considered to be low at location BH23-4 tested. The analytical results for the locations tested generally indicate that the potential for sulphate attack is negligible and that concrete made with Type GU Portland cement should be acceptable for below grade concrete elements. These recommendations are based on a limited number of sample locations and are provided as guidance only; the civil engineer should take the results of the laboratory testing, the potential for corrosion and the ultimate selection of materials into consideration.

7.0 DEWATERING ASSESSMENT

At the time of preparation of this report, the precise finished floor elevation of the proposed basement level was not available. The proposed North (Tower C and D) and South (Tower A and B1/B2) buildings will include a two-level underground basement with the lowest level assumed to be at a depth of about 10 mbgs for the purpose of this report. Based on a ground surface elevation of about 339.8 masl at the North buildings (Tower C and D) and 341.80 masl at the South buildings (Tower A and B1/B2), the top of the basement floor slab is assumed to be at about Elevation 329.3 masl at the North building and 331.3 at the South building for the purposes of this report. It is assumed that footings will extend some 1 m to 1.5 m below the lowest floor elevation. For the purpose of dewatering estimates, the building footprint is assumed to have plan dimensions of about 146.9 m x 44.7 m at the North buildings (Tower C and D) and 146.9m x 84.1 m at the South buildings (Tower A and B1/B2).

Groundwater levels in the monitoring wells at the Site were observed to range from 5.7 mbgs to 9.4 mbgs (or about Elevations 330.7 masl to 333.7 masl) on the dates measured, although seasonal and annual groundwater fluctuations should be expected. The base of excavation for the building foundations is assumed to be about 10 mbgs, which is at least between 0.6 m to 4.3 m below the water table elevations measured during the investigation. Therefore, proactive dewatering during construction is anticipated to be required.

The method of construction dewatering should be solely determined by the Contractor based on their own assessment of the Site-specific conditions, and likely by their specialist dewatering contractor. In any case, the groundwater level should be lowered to a minimum of 1 m below the excavation depths in advance of the excavation reaching the design elevation. Surface water runoff must be directed away from any open excavation.

It is recommended that a licensed, specialist dewatering subcontractor supervise the installation, operation, and decommissioning of any dewatering systems for this project, in accordance with applicable legislation. It is understood that a dewatering plan from a specialist subcontractor has not yet been prepared.

Water takings in excess of 50 m^3/day are regulated by the Ministry of the Environment, Conservation and Parks (MECP). Certain takings of groundwater for construction site dewatering purposes with a combined total less

than 400 m^3/day qualify for self-registration on the MECP's Environmental Activity and Sector Registry (EASR). A Category 3 Permit to Take Water (PTTW) is required where the proposed groundwater taking is greater than 400 m^3/day.

The rate of groundwater inflow to excavations will vary during construction. Initially, higher inflow rates will occur as groundwater is removed from storage within the dewatering zone of influence. With time, rates will decrease toward a steady-state condition. Incidental precipitation into excavations will also need to be managed together with the groundwater contributions.

Based on the hydrogeological conditions encountered at the borehole locations and our preliminary analyses, the steady state groundwater inflow rate into the excavation (within the predominantly glacial till soils encountered at the site) is anticipated to be approximately 574.1 m^3/day at the North Buildings (Tower C and D) and 1006.3 m^3/day at the south buildings (Tower A and B1/B2). Accordingly, the need for a Category 3 PTTW and a supporting Water Taking Report and Discharge Plan should be conservatively anticipated. These findings, together with considerations regarding long-term drainage rates, should be re-evaluated as site designs progress and construction plans are developed.

8.0 MONITORING WELL DECOMMISSIONING

As previously indicated, monitoring wells were installed in all borehole locations to permit monitoring of groundwater levels. Ontario Regulation (O.Reg.) 903 as amended, of the Ontario Water Resources Act, requires that wells be properly abandoned / decommissioned by qualified and licensed personnel. It is recommended that the decommissioning of the wells be carried out as part of the construction activities at the site so that additional water level measurements can be taken leading up to, and immediately prior to, construction and/or so that the wells can be potentially used to evaluate the effectiveness of the dewatering system during construction. If requested, WSP could provide assistance to the owner in arranging for the decommissioning of the wells by a MECP-licensed water well drilling contractor.

9.0 ADDITIONAL CONSIDERATIONS

If higher foundation capacities than those discussed herein are required, deeper bearing elevations could be considered of additional supplementary site investigation and testing, could be carried out to further characterize the subsurface conditions at the site and to refine the design recommendations presented in this report.

During construction, a sufficient degree of foundation inspections, subgrade inspections, and an adequate number of in-situ density tests and materials testing should be carried out to confirm that the conditions exposed are consistent with those encountered in the boreholes, and to monitor conformance to the pertinent project specifications. Concrete testing should be carried out on both the plastic material in the field and of set cylinder samples in a CSA certified laboratory.

The soils at this site are sensitive to disturbance from ponded water, construction traffic and frost. All bearing surfaces must be inspected by WSP prior to filling or concreting to ensure that strata having adequate bearing capacity have been reached and that the bearing surfaces have been properly prepared.

10.0 CLOSURE

We trust that this report provides sufficient geotechnical and hydrogeological engineering information to facilitate the design of this project. If you have any questions regarding the contents of this report or require additional information, please do not hesitate to contact this office.

Signature Page

Yours truly,

WSP Canada Inc.

Alexander Dziedzic P.Eng.
Geotechnical Project Manager

Jay Nash, B.Sc., PMP
Manager – Hydrogeology and Geosciences

Pouya Pishgah, M.Sc., P.Eng.
Principal Geotechnical Engineer

AD/JN/PP/sac

https://wsponlinecan.sharepoint.com/sites/ca-ca00108848370/shared documents/06. deliverables/geotech and hydro-g reports/ca0010884.8370-r-rev0-fcr 1 clair rd e_12dec2023.docx

APPENDIX A

Important Information and Limitations of This Report

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: WSP Canada Inc. (WSP) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to WSP by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. WSP cannot be responsible for use of this report, or portions thereof, unless WSP is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without WSP's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, WSP may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to WSP. The report, all plans, data, drawings and other documents as well as all electronic media prepared by WSP are considered its professional work product and shall remain the copyright property of WSP, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of WSP. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of WSP's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, communications between WSP and the Client, and to any other reports prepared by WSP for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. WSP can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Ground Water Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, WSP does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that WSP interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

Sample Disposal: WSP will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client’s expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

Follow-Up and Construction Services: All details of the design were not known at the time of submission of WSP's report. WSP should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of WSP's report.

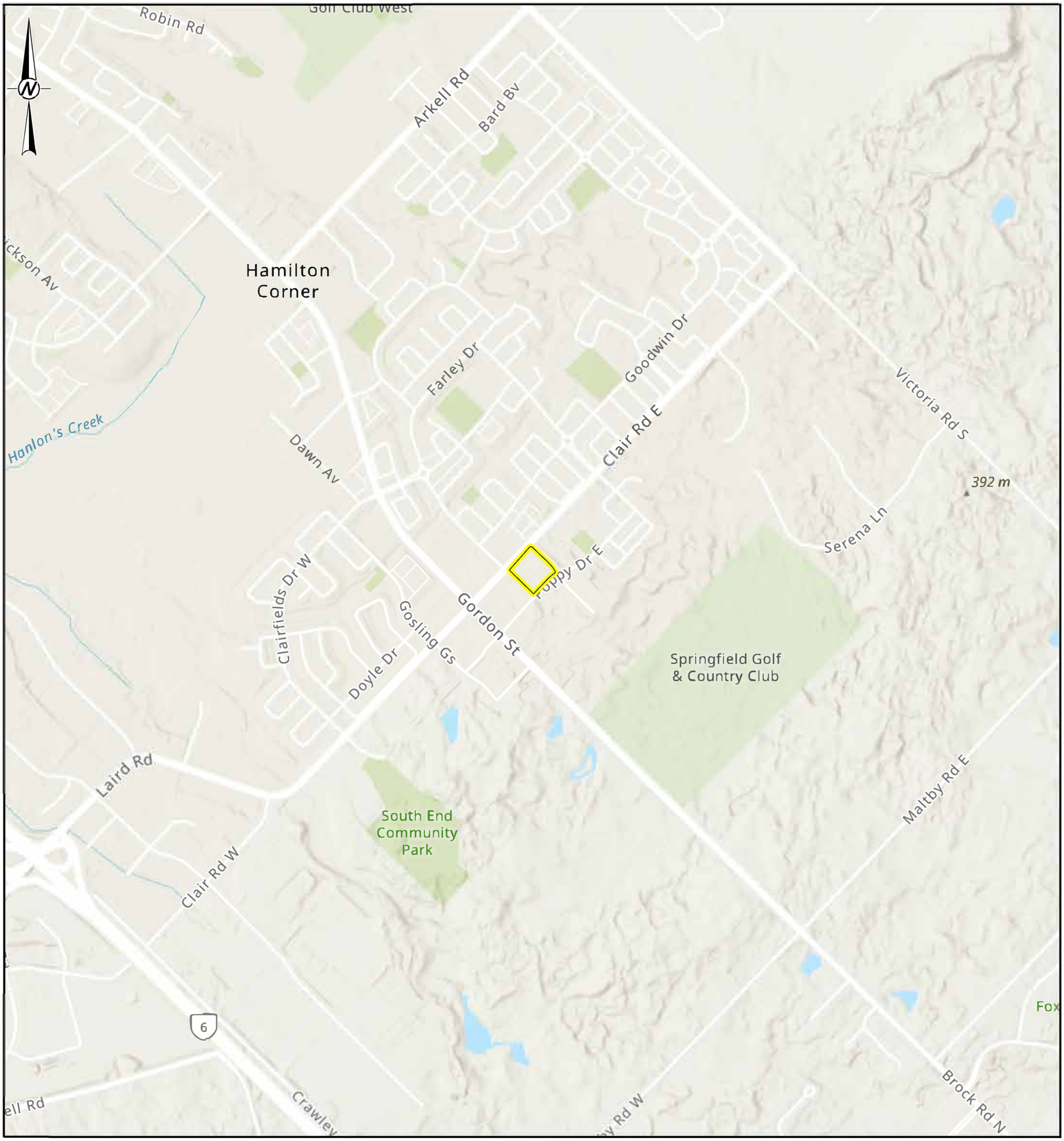
During construction, WSP should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of WSP's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in WSP's report. Adequate field review, observation and testing during construction are necessary for WSP to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, WSP's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

APPENDIX B

Figure 1 - Key Plan

Figure 2 - Borehole Location Plan

Figure 3 – MECP Water Well Records



LEGEND

SITE BOUNDARY

0 250 500 1,000

1:25,000 METRES

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: ESRI, NASA, NGA, USGS, FEMA, ESRI, © OPENSTREETMAP CONTRIBUTORS, HERE, GARMIN, FAO, USGS, EPA, NPS, AAFC, NRCAN, CITY OF GUELPH, PROVINCE OF ONTARIO, ESRI CANADA, ESRI, HERE, GARMIN, SAFEGRAPH, GEOTECHNOLOGIES, INC, METI/ NASA, USGS, EPA, NPS, US CENSUS BUREAU, USDA, NRCAN, PARKS CANADA
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
FIRST CAPITAL MANAGEMENT ASSET LP.

PROJECT
GEOTECHNICAL, HYDROGEOLOGICAL INVESTIGATIONS AND ENVIRONMENTAL SITE ASSESSMENT SERVICES, PROPOSED MIXED-USE DEVELOPMENT, 1 CLAIR ROAD EAST, GUELPH, ONTARIO

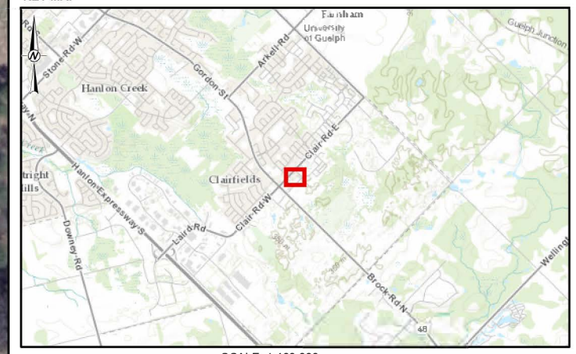
TITLE
KEY PLAN

CONSULTANT
wsp

YYYY-MM-DD	2023-11-03
DESIGNED	----
PREPARED	JT
REVIEWED	AD
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0010884.83700001		A	1

KEY MAP



SCALE: 1:100,000

LEGEND

- BOREHOLE LOCATION
- SITE BOUNDARY

0 12.5 25 50

1:1,000 METRES

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: CITY OF GUELPH, MAXAR, MICROSOFT, CITY OF GUELPH, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
3. COORDINATE SYSTEM: NAD 1983 CSRS UTM ZONE 17N

CLIENT

FIRST CAPITAL MANAGEMENT ASSET LP.

PROJECT

GEOTECHNICAL, HYDROGEOLOGICAL INVESTIGATIONS AND ENVIRONMENTAL SITE ASSESSMENT SERVICES, PROPOSED MIXED-USE DEVELOPMENT, 1 CLAIR ROAD EAST, GUELPH, ONTARIO

TITLE

BOREHOLE LOCATION PLAN

CONSULTANT

wsp

YYYY-MM-DD	2023-11-03
DESIGNED	----
PREPARED	JT
REVIEWED	AD
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0010884.8370	0001	A	2

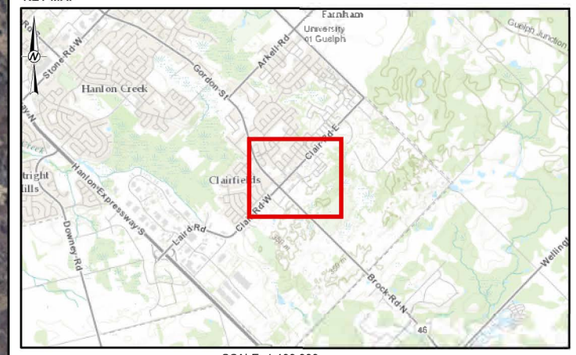
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

20mm

0

PATH: S:\Clients\First_Capital\105_Clair_Rd_E_Guelph_ON\##_PROJ\CA0010884.8370\40_PROJ\50\001_Geotech_Invest\CA0010884_8370_0001_BC-0000.aprx PRINTED ON: AT 8:11:16 AM

KEY MAP



SCALE: 1:100,000

LEGEND

- WELL RECORD
- SITE BOUNDARY
- STUDY AREA (500 METRE RADIUS)

0 50 100 200

1:5,000 METRES

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: CITY OF GUELPH, MAXAR, CITY OF GUELPH, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
3. COORDINATE SYSTEM: NAD 1983 CSRS UTM ZONE 17N

CLIENT
FIRST CAPITAL MANAGEMENT ASSET LP.

PROJECT
GEOTECHNICAL, HYDROGEOLOGICAL INVESTIGATIONS AND ENVIRONMENTAL SITE ASSESSMENT SERVICES, PROPOSED MIXED-USE DEVELOPMENT, 1 CLAIR ROAD EAST, GUELPH, ONTARIO

TITLE
MECP WATER WELL RECORDS

CONSULTANT

wsp

YYYY-MM-DD	2023-11-08
DESIGNED	----
PREPARED	JT
REVIEWED	LB
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0010884.8370	0001	A	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

PATH: K:\Dlients\First_Capital\105_Clair Rd_E, Guelph_DW\99_PRO\CA0010884_8370\40_PRO\50\001 Geotech_Invest\CA0010884_8370-0001-RPT-0009.aprx PRINTED ON: AT 2:25:42 PM

APPENDIX C

Method of Soil Classification

Symbols and Terms Used on Records of Boreholes and Test Pits

List of Symbols

Record of Borehole Sheets Boreholes -1 to -5

METHOD OF SOIL CLASSIFICATION

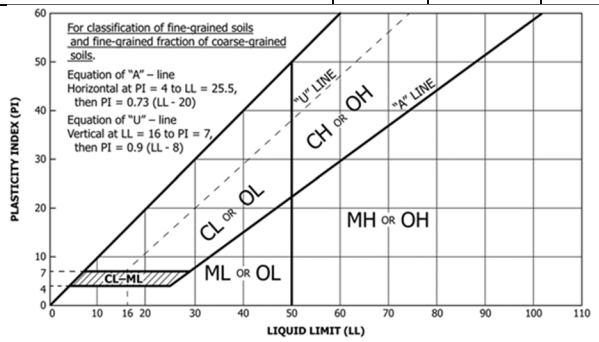
The WSP Canada Soil Classification[1] System is based on the Unified Soil Classification System (USCS) (after ASTM D2487)

Organic or Inorganic	Soil Group	Type of Soil		Gradation or Plasticity	$Cu = \frac{D_{60}}{D_{10}}$		$Cc = \frac{(D_{30})^2}{D_{10} x D_{60}}$	Organic Content [6,9]	USCS Group Symbol [3,5,7]	Primary Group Name [2]
INORGANIC (Organic Content <30% by mass)	COARSE-GRAINED SOILS (>50% by mass is larger than 0.075 mm)	GRAVELS (>50% by mass of coarse fraction is larger than 4.75 mm)	Clean Gravels with <5% fines [3] (by mass)	Well Graded	≥4	(and)	≥1 to ≤3	≤30%	GW	Well-graded GRAVEL [4,6]
				Poorly Graded	<4	(and/or)	<1 or >3		GP	Poorly graded GRAVEL [4,6]
			Gravels with >12% fines [3] (by mass)	Below A Line	n/a				GM	SILTY GRAVEL [4,6]
				Above A Line	n/a				GC	CLAYEY GRAVEL [4,5,6]
		SANDS (≥50% by mass of coarse fraction is smaller than 4.75 mm)	Clean Sands with <5% fines [7] (by mass)	Well Graded	≥6	(and)	≥1 to ≤3		SW	Well-graded SAND [6,8]
				Poorly Graded	<6	(and/or)	<1 or >3		SP	Poorly graded SAND [6,8]
			Sands with >12% fines [7] (by mass)	Below A Line	n/a				SM	SILTY SAND [6,8]
				Above A Line	n/a				SC	CLAYEY SAND [5,6,8]

Organic or Inorganic	Soil Group	Type of Soil	Laboratory Tests	Field Indicators					Organic Content [B,H]	USCS Group Symbol [A]	Primary Group Name [A]
				Dilatancy	Dry Strength	Shine Test	Thread Diameter (mm)	Toughness (of 3 mm thread)			
INORGANIC (Organic Content <30% by mass)	FINE-GRAINED SOILS (≥50% by mass is smaller than 0.075 mm)	SILTS (Nonplastic or PI and LL plot **below A-Line** on Plasticity Chart below) [C]	Liquid Limit <50 [D]	Rapid	None to Low	Dull to None	3 to >6	Low/can't roll 3 mm	<15%	ML	SILT [H]
				None to Slow	Low to Medium	Dull to Slight	3 to 6	Low	15% to 30%	OL	ORGANIC SILT
			Liquid Limit ≥50 [D]	None to V.Slow	Low to Medium	Slight	3 to 6	Low to Medium	<15%	MH	ELASTIC SILT[H]
				None	Medium to High	Dull to Slight	1 to 3	Low to Medium	15% to <30%	OH	ORGANIC SILT
		CLAYS (PI and LL plot **above A-Line** on Plasticity Chart below) [A]	Liquid Limit <50 [D]	None to Medium Slow	Medium to High	Slight to Shiny	1 to 3	Medium	<15%	CL	LEAN CLAY [A,E,F,G,H]
				None to V.Slow	Medium to High	Slight to Shiny	1 to 3	Medium	15% to <30%	OL	ORGANIC CLAY [E,F,G]
			Liquid Limit ≥50 [D]	None	High to V.High	Shiny	<1	High	<15%	CH	FAT CLAY [E,F,G,H]
				None	High	Shiny	<1 to 1	High	15% to <30%	OH	ORGANIC CLAY [E,F,G]
HIGHLY ORGANIC SOILS (Organic Content >30% by mass)		Peat and mineral soil mixtures	Relatively lightweight, possibly spongy. Some water may squeeze from sample. Some shrinkage may occur on air drying. Sand fraction may be visible. Low to high dilatancy. Thread weak near plastic limit. Low to medium dry strength.						30% to <75%	PT	SILTY PEAT, SANDY PEAT
		Predominantly peat, may contain some mineral soil, fibrous or amorphous peat	Lightweight, spongy. Much water squeezes from sample. Shrinks considerably on air drying (i.e., very high water content). Plant structure identiable to altered.						75% to 100%		PEAT

Coarse-Grained Soil Note(s):

1. Based on the material passing the 75 mm sieve.
2. If field sample contains or drilling observations indicate cobbles or boulders or both, add, "with cobbles" or "with cobbles and boulders". Include notes on the depth(s) encountered, and sizes if possible.
3. Gravels with 5% to 12% fines require dual symbols:
   (GW-GM) Well-graded GRAVEL with silt,
   (GW-GC) Well-graded GRAVEL with clay,
   (GP-GM) Poorly graded GRAVEL with silt,
   (GP-GC) Poorly graded GRAVEL with clay.
4. If soil contains ≥15% sand, add "with sand" to Group Name.
5. If fines classify as CL-ML, use dual symbol (GC-GM) or (SC-SM) for Group Symbol.
6. If the soil has an organic content (OC) 15%≤OC<30% the prefix "Organic" should be added before the Group Name. If the soil has an organic content 3%≤OC<15% add "with organic fines" to Group Name. If the soil contains >0% to ≤3% organics, the descriptor "trace organics" may be added.
7. Sands with 5% to 12% fines require dual symbols:
   (SW-SM) Well-graded SAND with silt,
   (SW-SC) Well-graded SAND with clay,
   (SP-SM) Poorly graded SAND with silt,
   (SP-SC) Poorly graded SAND with clay.
8. If soil contains ≥15% gravel, add "with gravel" to Group Name.



Fine-Grained Soil Note(s):

- **A.** If Atterberg limits plot above the A-line but in the 'hatched' area on the plasticity chart, soil is a (CL-ML) SILTY CLAY.
- **B.** If the soil contains >0% to ≤3% organics, the descriptor "trace organics" may be added.
- **C.** If fine-grained materials are nonplastic (i.e., a plastic limit (PL) cannot be measured), soil is a (ML) SILT.
- **D.** If soil has a liquid limit (LL) >30% to <50%, the term 'medium plasticity' may be included in the description, but the Group Name/Symbol is not changed.
- **E.** If soil contains 15% to <30% +No.200, add "with sand" or "with gravel".
- **F.** If soil contains ≥30% +No.200 mainly sand, add "Sandy" to Group Name.
- **G.** If soil contains ≥30% +No.200 mainly gravel, add "Gravelly" to Group Name.
- **H.** If the soil has an organic content (OC) 3%≤OC<15% add "with organic fines" to Group Name.

ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES AND TEST PITS

PARTICLE SIZES OF CONSTITUENTS

Soil Constituent	Particle Size Description	Millimetres	Inches (US Std. Sieve Size)
BOULDERS	Not Applicable	>300	>12
COBBLES	Not Applicable	75 to 300	3 to 12
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425	(10) to (4) (40) to (10) (200) to (40)
SILT/CLAY	Classified by plasticity	<0.075	< (200)

GRADATIONAL COMPONENT TERMS

% (by mass)	Term
≤ 5	Use “trace”
> 5 to ≤ 12	Use “few”
> 12 to <30	Use “little”
≥ 30 to <50	Use “some”
≥ 50	Use “mostly”

PENETRATION RESISTANCE

Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split-spoon sampler for a distance of 300 mm (12 in.). Values reported are as recorded in the field and are uncorrected.

Cone Penetration Test (CPT)

An electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm^2 pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (q_t), porewater pressure (u) and sleeve frictions are recorded electronically at 25 mm penetration intervals.

Dynamic Cone Penetration Resistance (DCPT); Nd:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

PH: Sampler advanced by hydraulic pressure
PM: Sampler advanced by manual pressure
WH: Sampler advanced by static weight of hammer
WR: Sampler advanced by weight of sampler and rod

SAMPLES

AS	Auger sample
BS	Block sample
CS	Chunk sample
DD	Diamond Drilling
DO or DP	Seamless open ended, driven, pushed tube sampler, or geoprobe macro-core – note size
DS	Denison type sample
FS	Foil Sample
GS	Grab Sample
MC	Modified California Samples – note sample diameter and hammer weight
MS	Modified Shelby (for frozen soil)
RC	Rock core
SC	Soil core
SS	Split-spoon sampler (50 mm OD); larger sizes use MC
ST	Slotted tube
TO	Thin-walled, open – note size (Shelby tube)
TP	Thin-walled, piston – note size (Shelby tube)
WS	Wash sample

SOIL TESTS

w	water content
PL , w_p	plastic limit
LL , w_L	liquid limit
C	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test[1]
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement[1]
D_R	relative density (specific gravity, Gs)
DS	direct shear test
GS	specific gravity
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO_4	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V (FV)	field vane (LV-laboratory vane test)
γ	unit weight

1. Tests anisotropically consolidated prior to shear are shown as CAD, CAU.

NON-COHESIVE (COHESIONLESS) SOILS

Compactness[2]

Term	SPT ‘N’ (blows/0.3m)[1]
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	>50

1. SPT ‘N’ in general accordance with ASTM D1586, uncorrected for the effects of overburden pressure.
2. Definition of compactness terms are based on SPT ‘N’ ranges as provided in Terzaghi, Peck and Mesri (1996). Many factors affect the recorded SPT ‘N’ value, including hammer efficiency (which may be greater than 60% in automatic trip hammers), overburden pressure, groundwater conditions, and grainsize. As such, the recorded SPT ‘N’ value(s) should be considered only an approximate guide to the soil compactness. These factors need to be considered when evaluating the results, and the stated compactness terms should not be relied upon for design or construction.

Field Moisture Condition

Term	Description
Dry	Soil flows freely through fingers.
Moist	Soils are darker than in the dry condition and may feel cool.
Wet	As moist, but with free water forming on hands when handled.

COHESIVE SOILS

Consistency

Term	Undrained Shear Strength (kPa)	SPT ‘N’[1,2] (blows/0.3m)
Very Soft	<12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	>200	>30

1. SPT ‘N’ in general accordance with ASTM D1586, uncorrected for overburden pressure effects; approximate only.
2. SPT ‘N’ values should be considered ONLY an approximate guide to consistency; for sensitive clays (e.g., Champlain Sea clays), the N-value approximation for consistency terms does NOT apply. Rely on direct measurement of undrained shear strength or other manual observations.

Water Content

Term	Description
w < PL	Material is estimated to be drier than the Plastic Limit.
w ~ PL	Material is estimated to be close to the Plastic Limit.
w > PL	Material is estimated to be wetter than the Plastic Limit.

LIST OF SYMBOLS

Unless otherwise stated, the symbols employed in the report are as follows:

I. GENERAL

π	3.1416
ln x	natural logarithm of x
$\log_{10}$	x or log x, logarithm of x to base 10
g	acceleration due to gravity
t	time

II. STRESS AND STRAIN

γ	shear strain
Δ	change in, e.g. in stress: $\Delta\sigma$
ε	linear strain
ε_v	volumetric strain
η	coefficient of viscosity
υ	Poisson's ratio
σ	total stress
σ'	effective stress ($\sigma' = \sigma - u$)
σ'_{vo}	initial effective overburden stress
$\sigma_1, \sigma_2, \sigma_3$	principal stress (major, intermediate, minor)
σ_{oct}	mean stress or octahedral stress $= (\sigma_1 + \sigma_2 + \sigma_3)/3$
τ	shear stress
u	porewater pressure
E	modulus of deformation
G	shear modulus of deformation
K	bulk modulus of compressibility

III. SOIL PROPERTIES

(a) Index Properties

$\rho(\gamma)$	bulk density (bulk unit weight)*
$\rho_d(\gamma_d)$	dry density (dry unit weight)
$\rho_w(\gamma_w)$	density (unit weight) of water
$\rho_s(\gamma_s)$	density (unit weight) of solid particles
γ'	unit weight of submerged soil ($\gamma' = \gamma - \gamma_w$)
D_R	relative density (specific gravity) of solid particles ($D_R = \rho_s / \rho_w$) (formerly G_s)
e	void ratio
n	porosity
S	degree of saturation

* Density symbol is ρ. Unit weight symbol is γ where $\gamma = \rho g$ (i.e. mass density multiplied by acceleration due to gravity)

(a) Index Properties (continued)

w	water content
w_l or LL	liquid limit
w_p or PL	plastic limit
I_p or PI	plasticity index = $(w_l - w_p)$
NP	nonplastic
w_s	shrinkage limit
I_L	liquidity index = $(w - w_p) / I_p$
I_C	consistency index = $(w_l - w) / I_p$
e_{max}	void ratio in loosest state
e_{min}	void ratio in densest state
I_D	density index = $(e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density)

(b) Hydraulic Properties

h	hydraulic head or potential
q	rate of flow
v	velocity of flow
i	hydraulic gradient
k	hydraulic conductivity (coefficient of permeability)
j	seepage force per unit volume

(c) Consolidation (one-dimensional)

C_c	compression index (normally consolidated range)
C_r	recompression index (over-consolidated range)
C_s	swelling index
C_α	secondary compression index
m_v	coefficient of volume change
c_v	coefficient of consolidation (vertical direction)
c_h	coefficient of consolidation (horizontal direction)
T_v	time factor (vertical direction)
U	degree of consolidation
σ'_p	pre-consolidation stress
OCR	over-consolidation ratio = σ'_p / σ'_{vo}

(d) Shear Strength

τ_p, τ_r	peak and residual shear strength
ϕ'	effective angle of internal friction
δ	angle of interface friction
μ	coefficient of friction = tan δ
c′	effective cohesion
c_u, s_u	undrained shear strength ($\phi = 0$ analysis)
p	mean total stress $(\sigma_1 + \sigma_3)/2$
p′	mean effective stress $(\sigma'_1 + \sigma'_3)/2$
q	$(\sigma_1 - \sigma_3)/2$ or $(\sigma'_1 - \sigma'_3)/2$
q_u	compressive strength $(\sigma_1 - \sigma_3)$
S_t	sensitivity

Notes: 1 $\tau = c' + \sigma' \tan \phi'$

2 shear strength = (compressive strength)/2

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-1

SHEET 1 OF 2

LOCATION: See Borehole Location Plan

BORING DATE: September 28, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected	HYDRAULIC CONDUCTIVITY, k, cm/s	WATER CONTENT PERCENT Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		341.60									23-1S 23-1D
0	Diedrich D-120 Trak Mount 200 mm O.D. Hollow Stem Auger	ASPHALT (100 mm)		0.00									
		FILL - (SP) gravelly SAND, some fines; brown; non-cohesive, moist, compact		0.10	1	SS	24	ND					
				340.84									
1		FILL - (SM) SILTY SAND, some gravel to gravelly; brown; non-cohesive, moist, compact		0.76	2	SS	29	ND					
				340.15									
		(SP/GP) SAND and GRAVEL, trace fines; brown; non-cohesive, moist, dense - cobbles/boulders		1.45	3	SS	49	ND					
2				339.39									
		(SM) SILTY SAND, some gravel to gravelly; brown (TILL); non-cohesive, moist, compact to very dense		2.21	4	SS	26	ND					
3					5	SS	43	ND				M	
4					6	SS	45	ND					
5					7	SS	58	ND					
					8	SS	49	ND					
6					9	SS	40	ND					
7				334.41									
		(SP/GP) SAND and GRAVEL, trace fines; brown; non-cohesive, moist, very dense - cobbles		7.19	10	SS	74	ND					Oct.18, 2023 Oct.27, 2023
8				332.91									
		(SP) SAND, some gravel to gravelly, some fines; brown; non-cohesive, , wet, compact to dense		8.69									
9					11	SS	20	ND				MH	
10		*CONTINUED NEXT PAGE*											

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

DEPTH SCALE

1 : 50

LOGGED: AD

CHECKED: AD

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-1

SHEET 2 OF 2

LOCATION: See Borehole Location Plan

BORING DATE: September 28, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---								23-1S 23-1D
10	Diedrich D-120 Trak Mount; 200 mm O.D. Hollow Stem Auger	(SP) SAND, some gravel to gravelly, some fines; brown; non-cohesive, , wet, compact to dense								
11					12	SS	16	ND		
12										
13					13	SS	30	ND		
				328.34						
		(ML) SILT, trace sand; brown, slight plasticity; non-cohesive, wet, compact		13.26						
14					14	SS	28	ND		
				326.82						
		(CL) SILTY CLAY, some sand, some gravel: brown (TILL); cohesive, w~PL, very stiff		14.78						
15					15	SS	16	ND		
				325.75						
16		END OF BOREHOLE		15.85						
17		NOTES:								
18		1. A 50 mm Dia. monitoring well (BH23-1S) was installed in the borehole upon completion of drilling. Screened from 3.0 m to 6.1 m below ground surface.								
19		2. A 50 mm Dia. monitoring well (BH23-1D) was installed in the borehole upon completion of drilling. Screened from 7.6 m to 10.7 m below ground surface.								
20		3. Groundwater level measured in BH23-1S as follows:								

Date	Depth (m)	Elev. (m)
12-Oct-23	Dry	-
18-Oct-23	Dry	-
27-Oct-23	Dry	-

4. Groundwater level measured in BH23-1D as follows:

Date	Depth (m)	Elev. (m)
12-Oct-23	7.9	333.7
18-Oct-23	8.0	333.6
27-Oct-23	8.1	333.5

DEPTH SCALE

1 : 50

LOGGED: AD

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-2

SHEET 1 OF 3

LOCATION: See Borehole Location Plan

BORING DATE: October 2, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		341.80						
0		ASPHALT (100 mm)		0.00						
		FILL - (SP/GP) SAND and GRAVEL, trace fines; brown; non-cohesive, moist, dense to very dense		0.10	1	SS	35	ND		Concrete 50 mm Dia Monitoring Well
1		- trace brick fragments			2	SS	49	ND		
					3	SS	50/0.07	ND		
2				339.59						
		(SP/GP) SAND and GRAVEL, trace to some fines; brown; non-cohesive, moist, compact to very dense		2.21	4	SS	30	ND		
3		- Cobbles								
					5	SS	52	ND		
4					6	SS	44	ND		Bentonite
				337.30						
		(SM) SILTY SAND, some gravel to gravelly; brown (TILL); non-cohesive, moist, dense to very dense		4.50	7	SS	32	ND	MH	
5					8	SS	50/0.13	ND		
6					9	SS	52	ND		
7										
8					10	SS	67	ND		
9										Sand
					11	SS	54	ND		Oct. 27, 2023 Screen
10		CONTINUED NEXT PAGE								

Diedrich D-120 Trak Mount
200 mm O.D. Hollow Stem Auger

DEPTH SCALE
1 : 50

LOGGED: AD
CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-2

SHEET 2 OF 3

LOCATION: See Borehole Location Plan

BORING DATE: October 2, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---								
10	Diedrich D-120 Trak Mount; 200 mm O.D. Hollow Stem Auger			331.59						
		(SP) gravelly SAND, trace fines; brown; non-cohesive, wet, compact to dense		10.21						
11					12	SS	45	ND		MH	Screen
12					13	SS	23	ND			
13				328.54						
		(ML) Sandy SILT, trace gravel, slight plasticity; grey (TILL); non-cohesive, moist, compact		13.26						
14					14	SS	14	ND			
15					15	SS	16	ND			Bentonite
16				325.49						
		(SM/ML) SILTY SAND, some gravel to gravelly; grey (TILL); non-cohesive, moist, dense to very dense		16.31						
17					16	SS	46	ND		
18					17	SS	73/0.28	ND		
				322.90						
19		END OF BOREHOLE		18.90						
20		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 50

LOGGED: AD

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-2

SHEET 3 OF 3

LOCATION: See Borehole Location Plan

BORING DATE: October 2, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*								
		NOTE: 1. Groundwater level measured in monitoring well as follows: Date Depth (m) Elev. (m) 12-Oct-23 9.4 332.4 18-Oct-23 9.2 332.6 27-Oct-23 9.2 332.6								
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

DEPTH SCALE

1 : 50

LOGGED: AD

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-3

SHEET 1 OF 2

LOCATION: See Borehole Location Plan

BORING DATE: September 29, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		340.80						
0		ASPHALT (100 mm)		0.00						
		FILL - (SP/GP) SAND and GRAVEL, some fines; brown; non-cohesive, moist, very dense		0.10 / 340.07	1	SS	58	ND		Concrete 50 mm Dia Monitoring Well
1		(ML) Sandy SILT; brown, oxidation stains; non-cohesive, moist, compact		0.73 / 339.35	2	SS	22	ND		
		(SP/GP) SAND and GRAVEL, some fines; brown; non-cohesive, moist, very dense - cobbles/boulders		1.45 / 337.83	3	SS	52	ND		
2					4	SS	81/0.28	ND		
3	Diedrich D-120 Trak Mount 200 mm O.D. Hollow Stem Auger	(SM) SILTY SAND, some gravel to gravelly; brown (TILL); non-cohesive, moist, dense to very dense		2.97	5	SS	55	ND		Bentonite
4					6	SS	60	ND		
5					7	SS	55	ND		
					8	SS	43	ND		Sand
6					9	SS	47	ND		
7		(SP) gravelly SAND, trace fines; brown; non-cohesive, wet, dense to very dense		7.01 / 333.79						
					10	SS	89/0.28	ND		Screen Oct. 27, 2023
8										
9					11A			ND		
				331.15		SS	50			Bentonite
		(ML) Sandy SILT; brown; non-cohesive, wet, very dense		9.65	11B			ND		
10		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 50

LOGGED: AD

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-3

SHEET 2 OF 2

LOCATION: See Borehole Location Plan

BORING DATE: September 29, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---								
10	Diedrich D-120 Trak Mount, 200 mm O.D. Hollow Stem Auger	(ML) Sandy SILT; brown; non-cohesive, wet, very dense						ND		
					12	SS	50/0.13	ND		
11				329.07						
		(SP) gravelly SAND; brown; non-cohesive, wet, dense		11.73						Bentonite
12										
					13	SS	40	ND		
13										
					14	SS	41	ND		
14				326.47						
		END OF BOREHOLE		14.33						
15		NOTE:								
		1. Groundwater level measured in monitoring well as follows:								
		Date / Depth (m) / Elev. (m): 12-Oct-23 / 7.5 / 333.3; 18-Oct-23 / 7.6 / 333.2; 27-Oct-23 / 7.6 / 333.2								
16										
17										
18										
19										
20										

DEPTH SCALE

1 : 50

LOGGED: AD

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-4

SHEET 1 OF 2

LOCATION: See Borehole Location Plan

BORING DATE: October 4, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		338.80							
0		ASPHALT (100 mm)		0.00							
		FILL - (SP/GP) SAND and GRAVEL, trace fines; brown; non-cohesive, moist, compact to dense		0.10	1	SS	20	ND			Concrete 50 mm Dia Monitoring Well
1					2	SS	30	ND			
				337.35							
		(SM/GP) SILTY SAND and GRAVEL; brown; non-cohesive, moist, very dense		1.45	3	SS	51	ND			
2		- cobbles/boulders			4	SS	75	ND			Bentonite
3					5	SS	63	ND			
				335.07							
		(SM/ML) SILTY SAND to Sandy SILT, some gravel to gravelly; brown (TILL); non-cohesive, moist to wet, dense to very dense		3.73	6	SS	57	ND			
4					7	SS	64	ND			Sand
5					8	SS	50/0.10	ND			
6		- Becomes wet at a depth of about 5.8 m									Oct. 27, 2023
					9	SS	38	ND		MH	
7				331.64							Screen
		(SP/GP) SAND and GRAVEL; brown; non-cohesive, wet, compact to dense		7.16							
8					10	SS	30	ND			
				330.11							
		(CL) Sandy SILTY CLAY, some gravel: brown (TILL); cohesive, w~PL, very stiff		8.69							
9					11	SS	25	ND			Bentonite
10											
		CONTINUED NEXT PAGE									

Diedrich D-120 Trak Mount
200 mm O.D. Hollow Stem Auger

DEPTH SCALE
1 : 50

LOGGED: AD
CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-4

SHEET 2 OF 2

LOCATION: See Borehole Location Plan

BORING DATE: October 4, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---								
10	Diedrich D-120 Trak Mount, 200 mm O.D. Hollow Stem Auger			328.59						
		(ML) Sandy SILT, some gravel; grey (TILL); non-cohesive, moist, very dense		10.21						
					12	SS	89/ 0.25	ND		
11				327.17						
		(CL) Sandy SILTY CLAY, some gravel: grey (TILL); cohesive, w~PL, very stiff		11.63						Bentonite
12										
					13	SS	22	ND		
13				325.54						
		(SM/ML) SILTY SAND to Sandy SILT, some gravel; grey (TILL); non-cohesive, moist, very dense		13.26						
					14	SS	92/ 0.28	ND		
14				324.63						
		END OF BOREHOLE		14.17						
15		NOTE:								
		1. Groundwater level measured in monitoring well as follows:								
		Date / Depth (m) / Elev. (m) 12-Oct-23 / 5.7 / 333.1 18-Oct-23 / 5.9 / 332.9 27-Oct-23 / 6.0 / 332.8								
16										
17										
18										
19										
20										

DEPTH SCALE

1 : 50

LOGGED: AD

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-5

SHEET 1 OF 3

LOCATION: See Borehole Location Plan

BORING DATE: October 3, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		339.80						
		ASPHALT (100 mm)		0.00						
		FILL - (SP/GP) SAND and GRAVEL, some fines; brown; non-cohesive, moist, dense		0.10	1	SS	47	ND		Concrete 50 mm Dia Monitoring Well
1					2	SS	44	ND		
				338.35						
		(SM/GP) SILTY SAND and GRAVEL; brown; non-cohesive, moist, compact to dense		1.45	3	SS	18	ND		
2					4	SS	33	ND		
3					5	SS	29	ND		
										Bentonite
4					6	SS	40	ND		
					7	SS	32	ND		
5				334.62						
		(SM) SILTY SAND, some gravel to gravelly; brown (TILL); non-cohesive, moist, compact to very dense		5.18	8	SS	28	ND		
6					9	SS	34	ND		
7										Sand
8					10	SS	30	ND		Oct. 27, 2023
										Screen
9					11	SS	50	ND		
10		*CONTINUED NEXT PAGE*								

Diedrich D-120 Trak Mount
200 mm O.D. Hollow Stem Auger

DEPTH SCALE
1 : 50

LOGGED: AD
CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-5

SHEET 2 OF 3

LOCATION: See Borehole Location Plan

BORING DATE: October 3, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*								
	Diedrich D-120 Trak Mount 200 mm O.D. Hollow Stem Auger	(SP) SAND, some gravel to gravelly, trace fines; brown; non-cohesive, wet, compact		329.59 10.21						Screen
11					12	SS	28	ND		
12										
					13	SS	29	ND		
13										
14					14	SS	24	ND		Bentonite
		(CL) Sandy SILTY CLAY, some gravel: grey (TILL); cohesive, w~PL, very stiff		325.02 14.78						
15					15	SS	17	ND		
16										
					16A			ND		
17		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist to wet, compact to dense		322.73 17.07		SS	25			
					16B			ND		
18								ND		
					17	SS	41	ND		
19		END OF BOREHOLE		320.90 18.90						
20		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 50

LOGGED: AD

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

PROJECT: CA0010884.8370

RECORD OF BOREHOLE: BH23-5

SHEET 3 OF 3

LOCATION: See Borehole Location Plan

BORING DATE: October 3, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrich D120

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ *ND = Not Detected* 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ *ND = Not Detected* 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*								
		NOTE: 1. Groundwater level measured in monitoring well as follows: Date Depth (m) Elev. (m) 12-Oct-23 9.1 330.7 18-Oct-23 7.9 331.9 27-Oct-23 8.0 331.8								
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

DEPTH SCALE

1 : 50

LOGGED: AD

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\105_CLAIR_RD_E_GUELPH_ON\02_DATA\GINT\105_CLAIR_RD_E_GUELPH_ON-GEOTECH.GPJ GAL-MIS.GDT 12/12/23

APPENDIX D

Results of Geotechnical Laboratory Testing

PARTICLE SIZE DISTRIBUTION

MTO LS-702

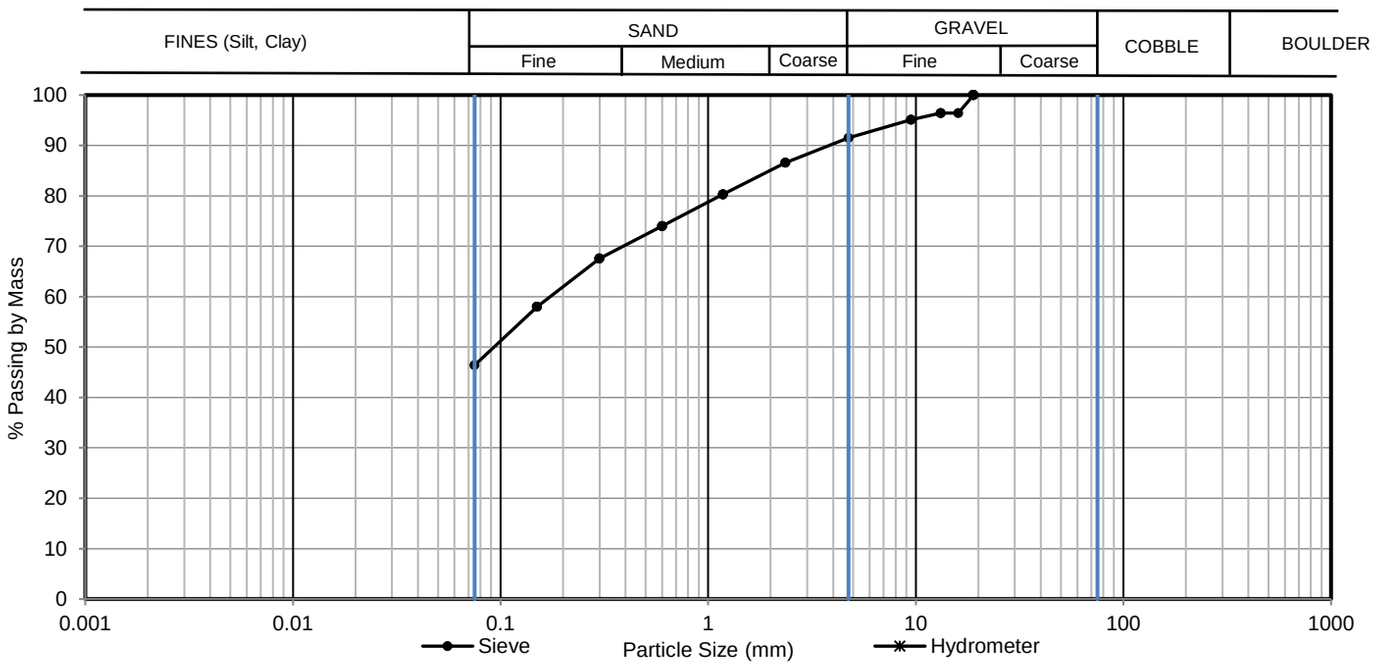
Test Request # CA0010884.8370_1
Client: FCAM
Project Name: Pergola Commons
Source:
Soil Description: (SM) SILTY SAND, some gravel (TILL)

Project Number: CA0010884.8370
Project Location: 105 Clair Road East, Guelph ON
Sample Location: BH 23-1
Sample No.: 5
Type: SS
Depth (m): 3.0 - 3.7

Specimen Reference: NA
Specimen Depth: NA
Date of Test: 23 Oct 2023
Specimen Description: NA

Grain Size Distribution (%)

FINES (Silt, Clay)	SAND			GRAVEL		COBBLE	BOULDER
	Fine	Medium	Coarse	Fine	Coarse		
46.4		45.1		8.5			



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
3/4"	19	100.0		
	16	96.4		
0.530"	13.2	96.4		
3/8"	9.5	95.1		
#4	4.75	91.5		
#8	2.36	86.6		
#16	1.18	80.3		
#30	0.6	74.0		
#50	0.3	67.6		
#100	0.15	58.0		
#200	0.075	46.4		
			0.005 mm	
			0.002 mm	
			D60	0.17
			D30	
			D10	
			Cu	
			Cc	

Notes:

Disclaimer:

The laboratory testing services reported herein have been performed in accordance with the terms of a contract with WSP's client, and with the recognized standards indicated in this report, or local industry practice. This laboratory testing services report is for the sole use of WSP's client, relates only to the sample(s) tested and does not represent any (actual or implied) interpretation or opinion regarding specification compliance or materials suitability for any specific purpose.

Tested by: JTimms **Date:** 23 Oct 2023

Checked by: JTimms **Date:** 02 Nov 2023

Reviewed by: JTaylor **Date:** 07 Nov 2023

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
Canada
[+1] 905-723-2727

PARTICLE SIZE DISTRIBUTION

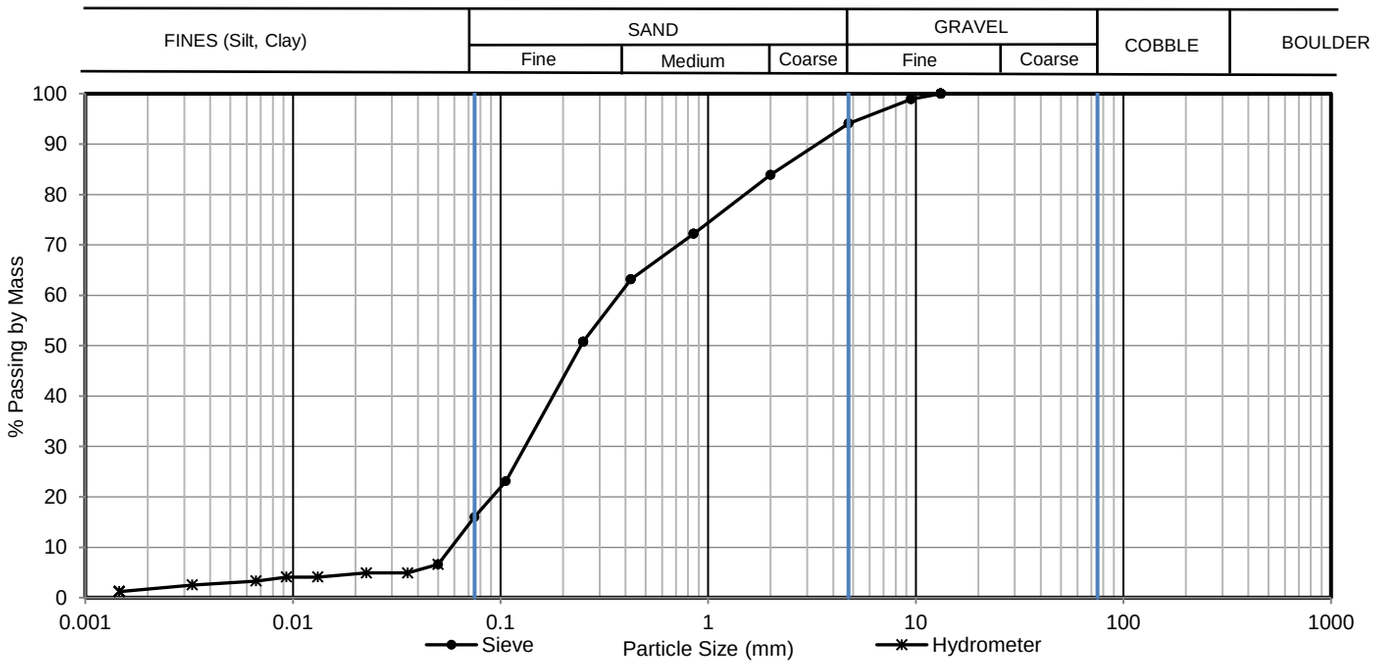
MTO LS-702

Test Request # CA0010884.8370_1
Client: FCAM
Project Name: Pergola Commons
Source:
Soil Description: (SP) SAND, some fines

Project Number: CA0010884.8370
Project Location: 105 Clair Road East, Guelph ON
Sample Location: BH 23-1
Sample No.: 11
Type: SS
Depth (m): 9.1 - 9.8

Specimen Reference: NA
Specimen Depth: NA
Specimen Description: NA
Date of Test: 24 Oct 2023

Grain Size Distribution (%) 16.0 78.1 5.9



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
0.530"	13.2	100.0	0.0500	6.6
3/8"	9.5	98.9	0.0357	4.9
#4	4.75	94.1	0.0226	4.9
#10	2	83.9	0.0132	4.1
#20	0.85	72.2	0.0093	4.1
#40	0.425	63.2	0.0066	3.3
#60	0.25	50.8	0.0033	2.5
#140	0.106	23.1	0.0015	1.2
#200	0.075	16.0		
			0.005 mm	2.98
			0.002 mm	1.71
			D60	0.37
			D30	0.13
			D10	0.06
			Cu	6.00
			Cc	1.00

Notes:

Disclaimer:

The laboratory testing services reported herein have been performed in accordance with the terms of a contract with WSP's client, and with the recognized standards indicated in this report, or local industry practice. This laboratory testing services report is for the sole use of WSP's client, relates only to the sample(s) tested and does not represent any (actual or implied) interpretation or opinion regarding specification compliance or materials suitability for any specific purpose.

Tested by: MKMarren **Date:** 24 Oct 2023

Checked by: JTimms **Date:** 02 Nov 2023

Reviewed by: JTaylor **Date:** 07 Nov 2023

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
Canada
[+1] 905-723-2727

PARTICLE SIZE DISTRIBUTION

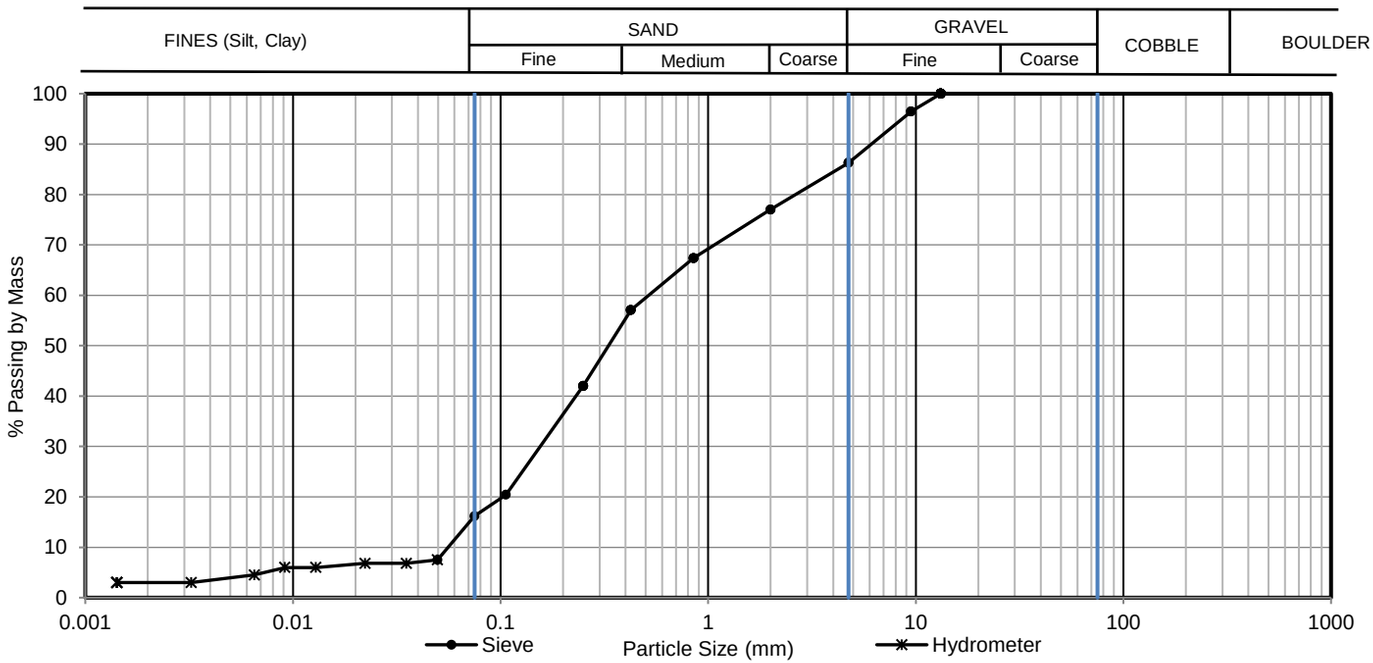
MTO LS-702

Test Request # CA0010884.8370_1
Client: FCAM
Project Name: Pergola Commons
Source:
Soil Description: (SP) gravelly SAND

Project Number: CA0010884.8370
Project Location: 105 Clair Road East, Guelph ON
Sample Location: BH 23-2
Sample No.: 12
Type: SS
Depth (m): 10.7 - 11.3

Specimen Reference: NA
Specimen Depth: NA
Specimen Description: NA
Date of Test: 24 Oct 2023

Grain Size Distribution (%) 16.2 70.1 13.7



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
0.530"	13.2	100.0	0.0497	7.5
3/8"	9.5	96.5	0.0352	6.8
#4	4.75	86.3	0.0223	6.8
#10	2	77.0	0.0129	6.0
#20	0.85	67.4	0.0092	6.0
#40	0.425	57.1	0.0065	4.5
#60	0.25	42.0	0.0032	3.0
#140	0.106	20.4	0.0014	3.0
#200	0.075	16.2		
			0.005 mm	3.93
			0.002 mm	3.00
			D60	0.52
			D30	0.16
			D10	0.06
			Cu	9.00
			Cc	1.00

Notes:

Disclaimer:

The laboratory testing services reported herein have been performed in accordance with the terms of a contract with WSP's client, and with the recognized standards indicated in this report, or local industry practice. This laboratory testing services report is for the sole use of WSP's client, relates only to the sample(s) tested and does not represent any (actual or implied) interpretation or opinion regarding specification compliance or materials suitability for any specific purpose.

Tested by: MKMarren **Date:** 24 Oct 2023

Checked by: JTimms **Date:** 09 Nov 2023

Reviewed by: **Date:**

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
Canada
[+1] 905-723-2727

PARTICLE SIZE DISTRIBUTION

MTO LS-702

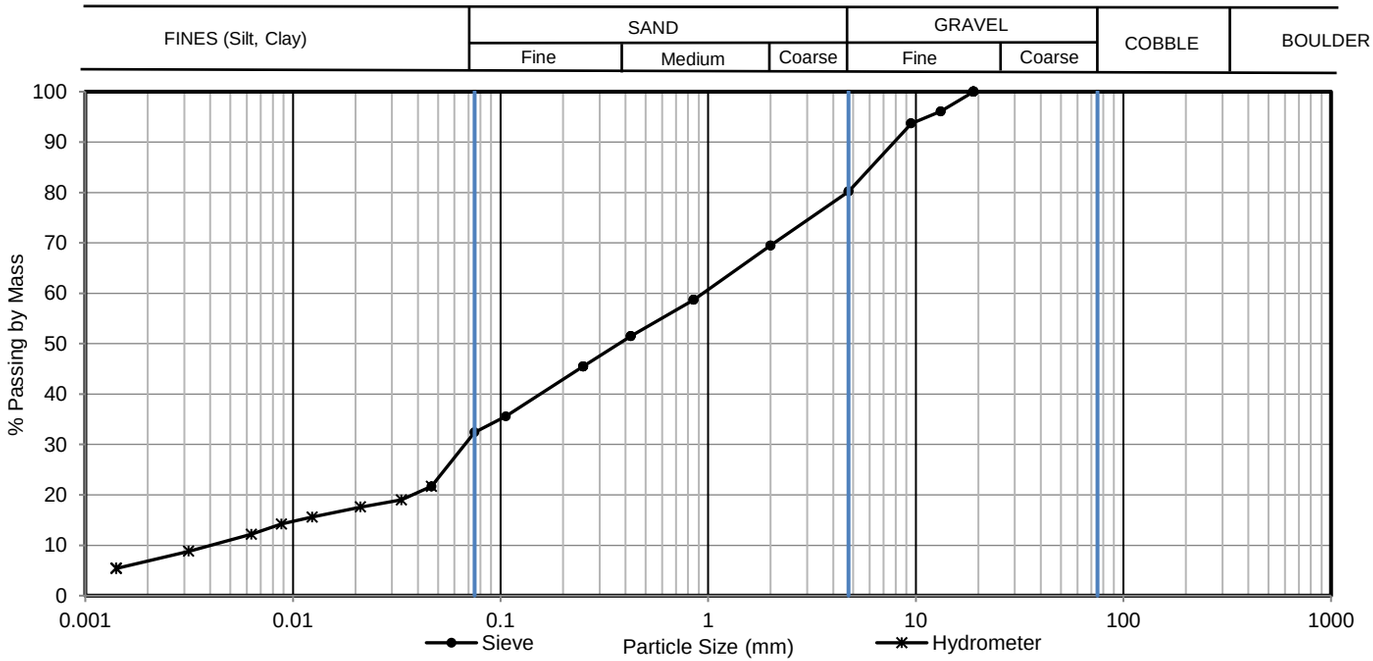
Test Request # CA0010884.8370_1
Client: FCAM
Project Name: Pergola Commons
Source:
Soil Description: (SM) SILTY SAND, some gravel to gravelly TILL

Project Number: CA0010884.8370
Project Location: 105 Clair Rd E
Sample Location: BH 23-2
Sample No.: 7
Type: SS
Depth (m): 4.6 - 5.2

Specimen Reference: NA
Specimen Depth: NA
Specimen Description: NA
Date of Test: 24 Oct 2023

Grain Size Distribution (%)

FINES (Silt, Clay)	SAND			GRAVEL		COBBLE	BOULDER
	Fine	Medium	Coarse	Fine	Coarse		
32.4	47.8			19.8			



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
3/4"	19	100.0	0.0465	21.7
0.530"	13.2	96.1	0.0333	19.0
3/8"	9.5	93.7	0.0212	17.6
#4	4.75	80.2	0.0124	15.6
#10	2	69.5	0.0088	14.2
#20	0.85	58.7	0.0063	12.2
#40	0.425	51.5	0.0032	8.8
#60	0.25	45.5	0.0014	5.4
#140	0.106	35.6		
#200	0.075	32.4		
			0.005 mm	11.06
			0.002 mm	6.88
			D60	0.94
			D30	0.07
			D10	0.00
			Cu	230.00
			Cc	1.00

Notes:

Disclaimer:

The laboratory testing services reported herein have been performed in accordance with the terms of a contract with WSP's client, and with the recognized standards indicated in this report, or local industry practice. This laboratory testing services report is for the sole use of WSP's client, relates only to the sample(s) tested and does not represent any (actual or implied) interpretation or opinion regarding specification compliance or materials suitability for any specific purpose.

Tested by: MKMarren **Date:** 24 Oct 2023

Checked by: JTimms **Date:** 02 Nov 2023

Reviewed by: JTaylor **Date:** 07 Nov 2023

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
Canada
[+1] 905-723-2727

PARTICLE SIZE DISTRIBUTION

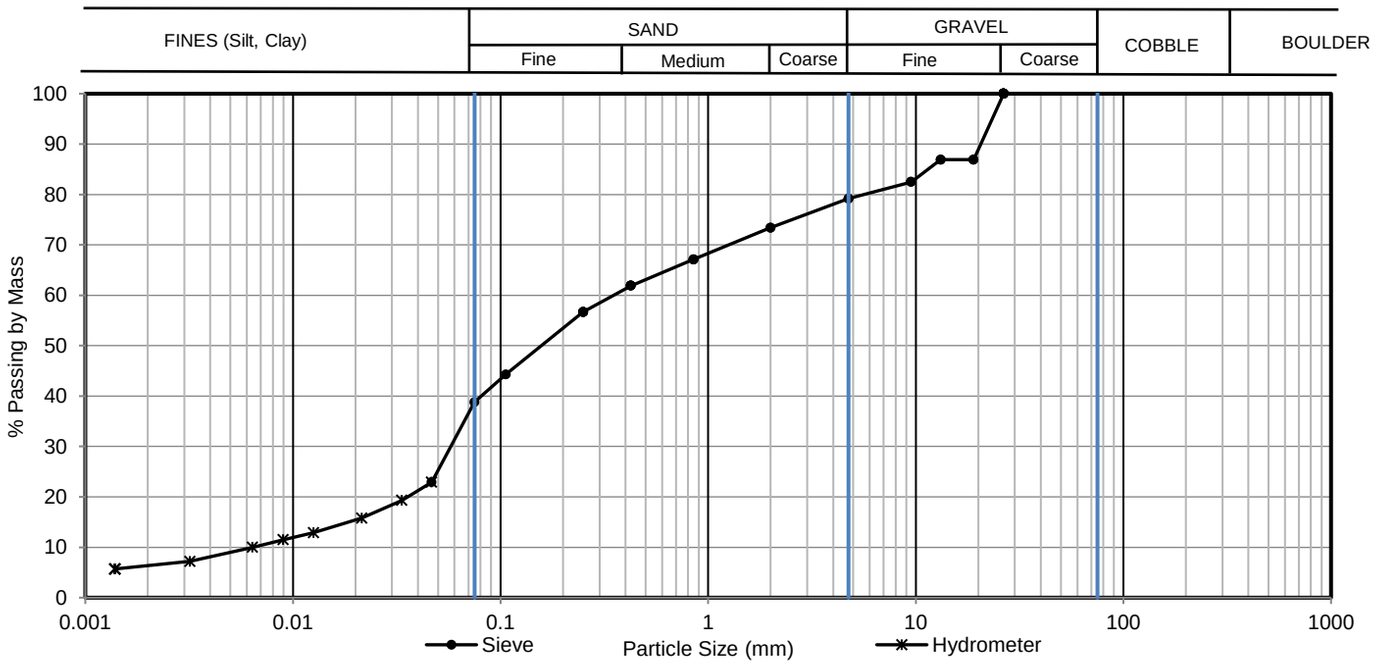
MTO LS-702

Test Request # CA0010884.8370_1
Client: FCAM
Project Name: Pergola Commons
Source:
Soil Description: (SM/ML) SILTY SAND to sandy SILT TILL

Project Number: CA0010884.8370
Project Location:
Sample Location: BH 23-4
Sample No.: 9
Type: SS
Depth (m): 6.1 - 6.7

Specimen Reference: NA
Specimen Depth: NA
Specimen Description: NA
Date of Test: 24 Oct 2023

Grain Size Distribution (%) 38.8 40.4 20.8



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
1.06"	26.5	100.0	0.0466	22.9
3/4"	19	86.9	0.0335	19.3
0.530"	13.2	86.9	0.0215	15.8
3/8"	9.5	82.5	0.0126	12.9
#4	4.75	79.2	0.0090	11.5
#10	2	73.4	0.0064	10.0
#20	0.85	67.1	0.0032	7.2
#40	0.425	61.9	0.0014	5.7
#60	0.25	56.7		
#140	0.106	44.3		
#200	0.075	38.8		
			0.005 mm	9.01
			0.002 mm	6.36
			D60	0.35
			D30	0.06
			D10	0.01
			Cu	55.00
			Cc	2.00

Notes:

Disclaimer:

The laboratory testing services reported herein have been performed in accordance with the terms of a contract with WSP's client, and with the recognized standards indicated in this report, or local industry practice. This laboratory testing services report is for the sole use of WSP's client, relates only to the sample(s) tested and does not represent any (actual or implied) interpretation or opinion regarding specification compliance or materials suitability for any specific purpose.

Tested by: MKMarren **Date:** 24 Oct 2023

Checked by: JTimms **Date:** 02 Nov 2023

Reviewed by: JTaylor **Date:** 07 Nov 2023

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
Canada
[+1] 905-723-2727

APPENDIX E

Corrosivity Results

AGAT Laboratories

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

CLIENT NAME: WSP CANADA INC.
351 STEELCASE ROAD WEST, UNITS 9-12
MARKHAM, ON L3R4H9
(905) 475-0065
ATTENTION TO: Alexander Dziedzic
PROJECT: CA0010884.8370 (1000)
AGAT WORK ORDER: 23T088487
SOIL ANALYSIS REVIEWED BY: Sukhwinder Randhawa, Inorganic Team Lead
DATE REPORTED: Nov 10, 2023
PAGES (INCLUDING COVER): 5
VERSION*: 1

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

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 23T088487

PROJECT: CA0010884.8370 (1000)

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Alexander Dziedzic

SAMPLING SITE:85 Clair Rd E, Guelph, ON

SAMPLED BY:Alexander Dziedzic

Corrosivity Package

DATE RECEIVED: 2023-11-02

DATE REPORTED: 2023-11-10

SAMPLE DESCRIPTION:				**BH23-1 Sa 5,6,7**	**BH23-4 Sa 7,8,9**
SAMPLE TYPE:				**Soil**	**Soil**
DATE SAMPLED:				**2023-10-31 12:00**	**2023-10-31 12:00**
Parameter	**Unit**	**G / S**	**RDL**	**5421856**	**5421864**
Chloride (2:1)	µg/g		2	149	12
Sulphate (2:1)	µg/g		2	13	5
pH (2:1)	pH Units		NA	9.51	8.89
Electrical Conductivity (2:1)	mS/cm		0.005	0.490	0.128
Resistivity (2:1) (Calculated)	ohm.cm		1	2040	7810
Redox Potential 1	mV		NA	399	362
Redox Potential 2	mV		NA	400	371
Redox Potential 3	mV		NA	396	373

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

5421856-5421864 EC, pH, Chloride and Sulphate were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil). Resistivity is a calculated parameter.
Redox potential measured on as received sample. Due to the potential for rapid change in sample equilibrium chemistry with exposure to oxidative/reduction conditions laboratory results may differ from field measured results.
Redox potential measurement in soil is quite variable and non reproducible due in part, to the general heterogeneity of a given soil. It is also related to the introduction of increased oxygen into the sample after extraction. The interpretation of soil redox potential should be considered in terms of its general range rather than as an absolute measurement.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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

Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 23T088487

PROJECT: CA0010884.8370 (1000)

ATTENTION TO: Alexander Dziedzic

SAMPLING SITE:85 Clair Rd E, Guelph, ON

SAMPLED BY:Alexander Dziedzic

Soil Analysis

RPT Date: Nov 10, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Corrosivity Package															
Chloride (2:1)	5404727		19	19	0.0%	< 2	101%	70%	130%	102%	80%	120%	98%	70%	130%
Sulphate (2:1)	5404727		33	32	3.1%	< 2	101%	70%	130%	103%	80%	120%	98%	70%	130%
pH (2:1)	5426774		8.35	8.26	1.1%	NA	101%	80%	120%						
Electrical Conductivity (2:1)	5426774		0.105	0.114	8.2%	< 0.005	103%	80%	120%						
Redox Potential 1	5421856					NA	100%	90%	110%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Certified By:

AGAT Laboratories

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

Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 23T088487

PROJECT: CA0010884.8370 (1000)

ATTENTION TO: Alexander Dziedzic

SAMPLING SITE:85 Clair Rd E, Guelph, ON

SAMPLED BY:Alexander Dziedzic

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Chloride (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Resistivity (2:1) (Calculated)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION
Redox Potential 1	INOR-93-6066	modified from G200-20, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 2	INOR-93-6066	modified from G200-20, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 3	INOR-93-6066	modified from G200-20, SM 2580 B	REDOX POTENTIAL ELECTRODE

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 23T088487

Cooler Quantity: 1 cooler

Arrival Temperatures: 8.4 | 7.9

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: loose ice

Report Information:

Company: WSP Canada Inc.

Contact: Alexander Dziedzic

Address: 351 Steelcase road West
Units 9-12, Markham ON, L3R 4H9

Phone: 905 243 4784 Fax:

Reports to be sent to:

1. Email: alexander.dziedzic@wsp.com
2. Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table ___ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Excess Soils R406
Table ___ *Indicate One*
Sample from APEC?
☐ Yes
☐ No
☐ Stockpile ☐ In-situ

☐ Regulation 558
☐ Sewer Use
☐ Sanitary ☐ Storm
Region
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
Indicate One

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
***TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: CA0010884.8370 (1000)

Site Location: 85 Clair Rd E, Guelph, ON

Sampled By: Alexander Dziedzic

AGAT Quote #: PO:

Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a Record of Site Condition? ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company: First Capital Asset Managment LP

Contact: Albert Ho

Address: 85 Hanna Avenue, Suite 400, Toronto, ON M6K 3S3

Email: Purpose: Pergola Commons Corrosivity Testing

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y / N)	O. Reg 153: Metals & Inorganics, Inc. EC/SAR	Metals - ICPMS, ☐ CrVI, ☐ Hg, ☐ HWSB	BTEX, F1-F4 PHCs Analyze F4G if required ☐ Yes ☐ No	PAHs	PCBs	VOC	Landfill Disposal Characterization TCLP: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	Corrosivity + Sulphate	Potentially Hazardous or High Concentration (Y/N)
BH23-1 Sa 5,6,7	Oct 31	12:00 AM/PM	1	S													☑	
BH23-4 Sa 7,8,9	Oct 31	12:00 AM/PM	1	S													☑	
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																

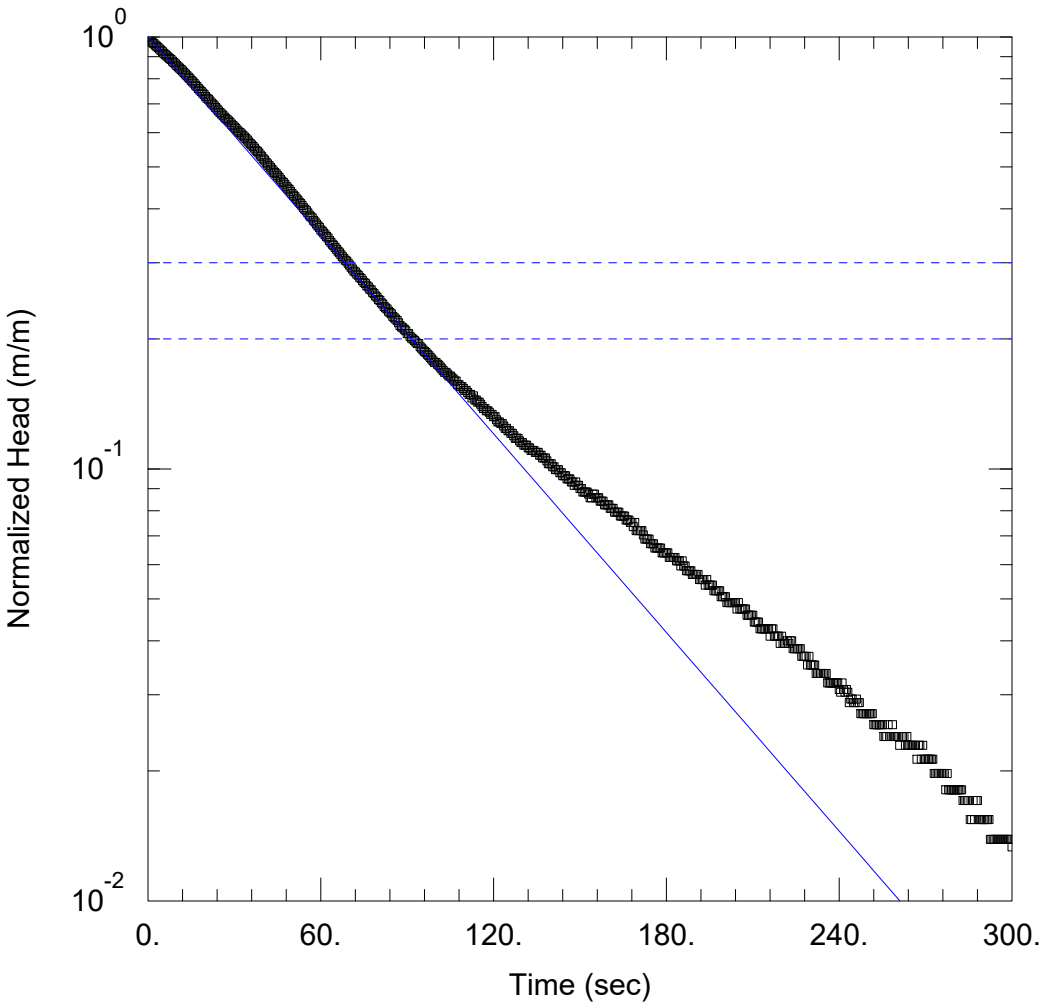
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Alexander Dziedzic, AD	Oct 31	5:00	Aniqa Tahir	Nov 9 2023	2:14pm

Page 1 of 1

Nº:

APPENDIX F

The Single-Well Response Testing AQTESOLV



WELL TEST ANALYSIS

Data Set: C:\...\23-1D.aqt
Date: 11/30/23 Time: 16:01:44

PROJECT INFORMATION

Company: WSP
Client: First Capital Asset Management
Project: CA0010884
Location: 105 Clair Road East, Guelph, O
Test Well: 23-1D
Test Date: 10/18/2023

AQUIFER DATA

Saturated Thickness: 2.62 m Anisotropy Ratio (Kz/Kr): 1.

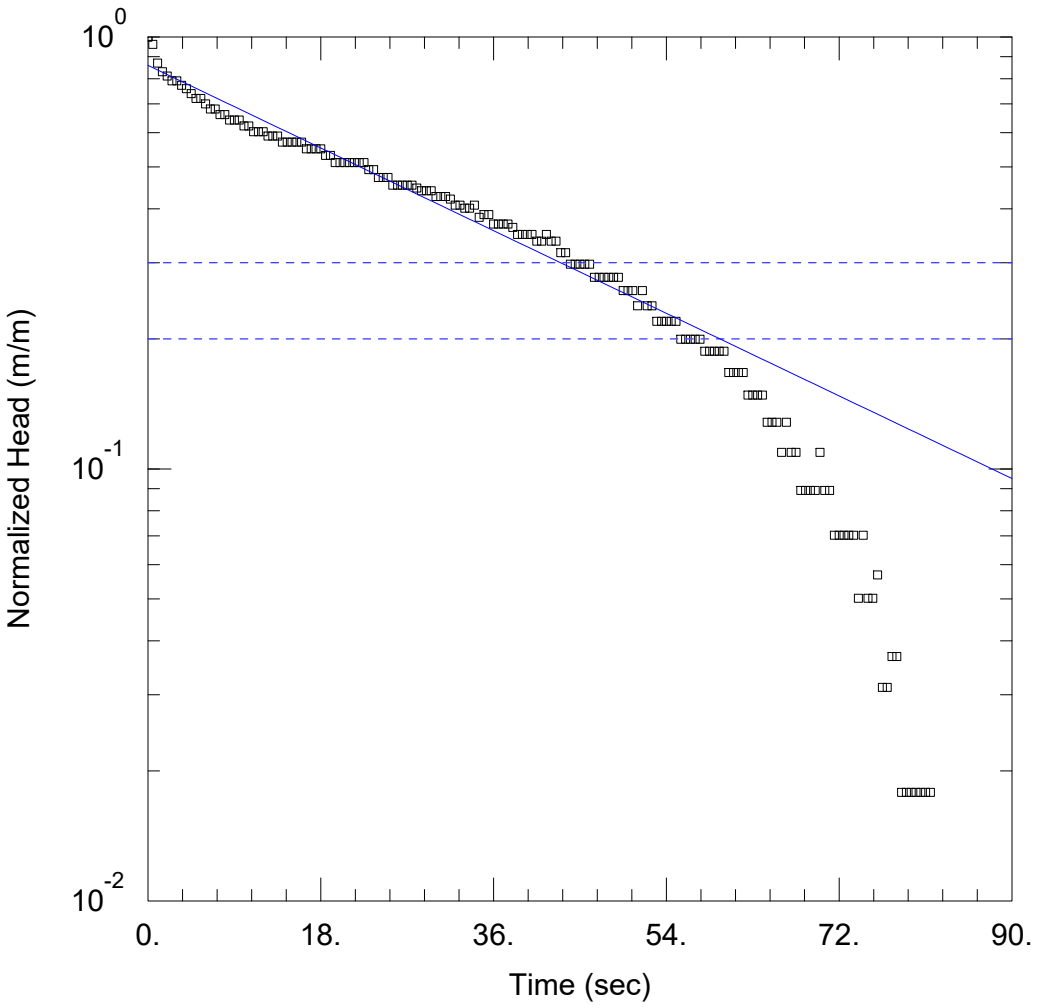
WELL DATA (23-1D)

Initial Displacement: 1.095 m
Total Well Penetration Depth: 2.62 m
Casing Radius: 0.025 m
Static Water Column Height: 2.62 m
Screen Length: 2.62 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 2.841E-5 m/sec y0 = 1.098 m



WELL TEST ANALYSIS

Data Set: C:\...\23-2.aqt
Date: 11/30/23 Time: 16:02:58

PROJECT INFORMATION

Company: WSP
Client: First Capital Asset Management
Project: CA0010884
Location: 105 Clair Road East, Guelph, O
Test Well: 23-2
Test Date: 10/18/2023

AQUIFER DATA

Saturated Thickness: 3.04 m Anisotropy Ratio (Kz/Kr): 1.

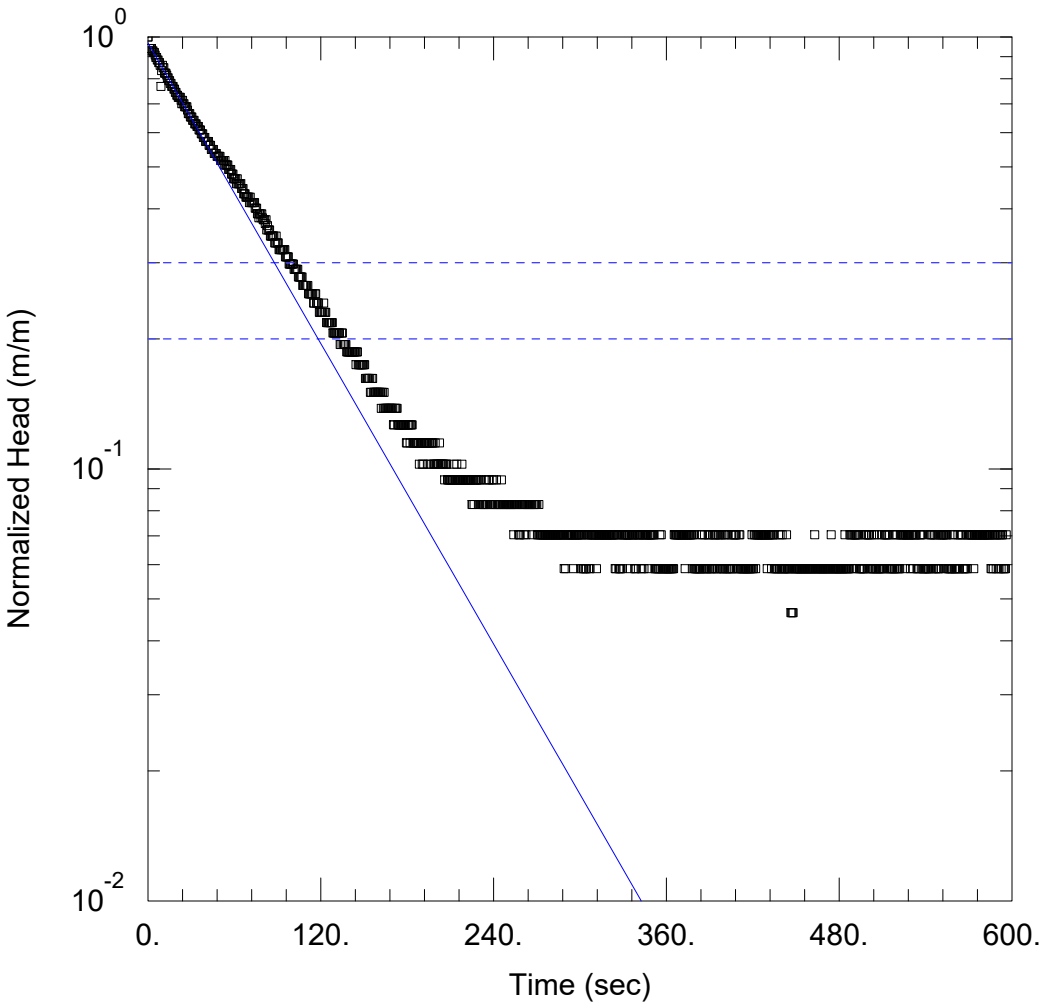
WELL DATA (23-2)

Initial Displacement: 0.0897 m
Total Well Penetration Depth: 3.04 m
Casing Radius: 0.025 m
Static Water Column Height: 3.04 m
Screen Length: 3.04 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 3.571E-5 m/sec y0 = 0.07708 m



WELL TEST ANALYSIS

Data Set: C:\...\23-3.aqt
Date: 11/30/23 Time: 16:03:35

PROJECT INFORMATION

Company: WSP
Client: First Capital Asset Management
Project: CA0010884
Location: 105 Clair Road East, Guelph, O
Test Well: 23-3
Test Date: 10/18/2023

AQUIFER DATA

Saturated Thickness: 1.59 m Anisotropy Ratio (Kz/Kr): 1.

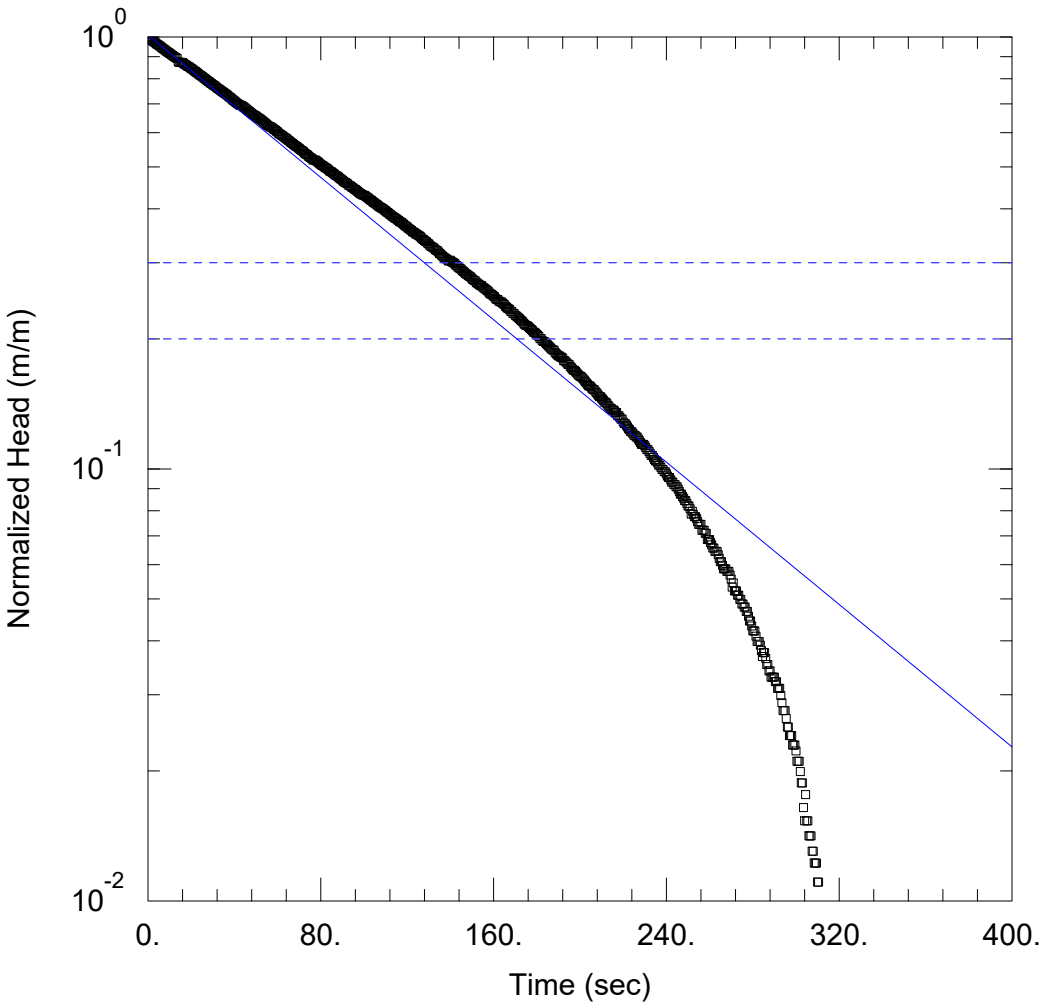
WELL DATA (23-3)

Initial Displacement: 0.1463 m
Total Well Penetration Depth: 1.59 m
Casing Radius: 0.025 m
Static Water Column Height: 1.59 m
Screen Length: 1.59 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 2.922E-5 m/sec y0 = 0.1417 m



WELL TEST ANALYSIS

Data Set: C:\...\23-4.aqt
Date: 11/30/23 Time: 16:03:59

PROJECT INFORMATION

Company: WSP
Client: First Capital Asset Management
Project: CA0010884
Location: 105 Clair Road East, Guelph, O
Test Well: 23-4
Test Date: 10/18/2023

AQUIFER DATA

Saturated Thickness: 2.31 m Anisotropy Ratio (Kz/Kr): 1.

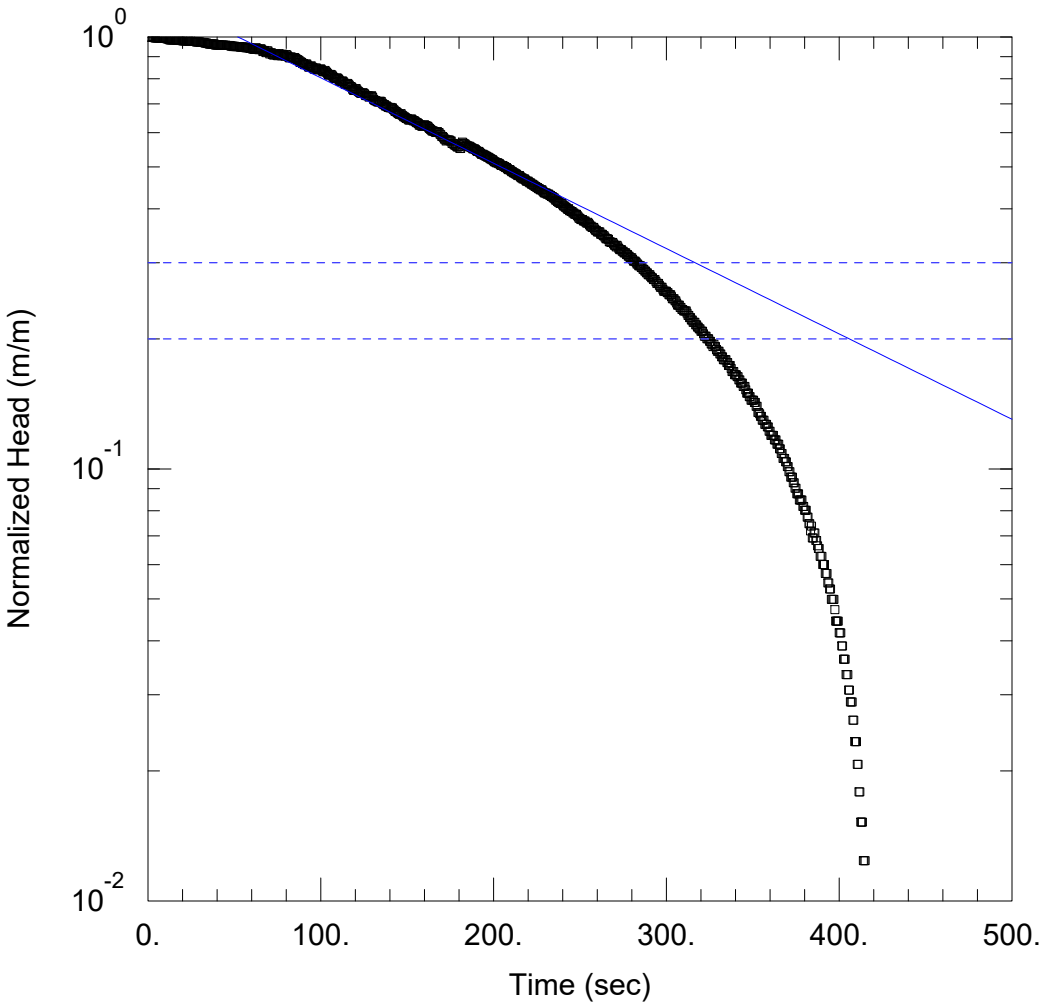
WELL DATA (23-4)

Initial Displacement: 1.52 m
Total Well Penetration Depth: 2.31 m
Casing Radius: 0.025 m
Static Water Column Height: 2.31 m
Screen Length: 2.31 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.655E-5 m/sec y0 = 1.535 m



WELL TEST ANALYSIS

Data Set: C:\...\23-5.aqt
Date: 11/30/23 Time: 16:04:18

PROJECT INFORMATION

Company: WSP
Client: First Capital Asset Management
Project: CA0010884
Location: 105 Clair Road East, Guelph, O
Test Well: 23-5
Test Date: 10/18/2023

AQUIFER DATA

Saturated Thickness: 2.78 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (23-5)

Initial Displacement: 0.6373 m
Total Well Penetration Depth: 2.78 m
Casing Radius: 0.025 m
Static Water Column Height: 2.78 m
Screen Length: 2.78 m
Well Radius: 1. m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001887 m/sec y0 = 0.8074 m

APPENDIX G

Groundwater Quality Results

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WT2333881**	Page	: 1 of 7
Client	: **WSP Canada Inc.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Lisseth Benavente	Account Manager	: Gayle Braun
Address	: 6925 Century Ave Suite #100 Mississauga ON Canada L5N 7K2	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: CA0010884/PHASE: 200	Date Samples Received	: 19-Oct-2023 09:00
PO	: ----	Date Analysis Commenced	: 19-Oct-2023
C-O-C number	: 20-1084021	Issue Date	: 25-Oct-2023 16:29
Sampler	: RAMIN N.		
Site	: 85 CLAIR RD E, GUELPH, ON		
Quote number	: WSP MSA Pricing		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Organics, Waterloo, Ontario
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Jon Fisher	Production Manager, Environmental	Metals, Waterloo, Ontario
Zeba Patel		Microbiology, Waterloo, Ontario

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Qualifiers

Qualifier	Description
BODL	Limit of Reporting for BOD was increased to account for the largest volume of sample tested.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	BH23-1D	----	----	----	----	----	----
				Sampling date/time	19-Oct-2023 00:00	----	----	----	----	----	----
				Sub-Matrix	Water	----	----	----	----	----	----
					WT2333881-001	--------	--------	--------	--------	--------	--------
Physical Tests											
pH	----	E108/WT	pH units		7.93	----	----	----	----	----	----
Solids, total suspended [TSS]	----	E160/WT	mg/L		9.3	----	----	----	----	----	----
Anions and Nutrients											
Chloride	16887-00-6	E235.Cl/WT	mg/L		526 DLDS	----	----	----	----	----	----
Fluoride	16984-48-8	E235.F/WT	mg/L		<0.100 DLDS	----	----	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/WT	mg/L		0.313	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/WT	mg/L		0.0095	----	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WT	mg/L		54.8 DLDS	----	----	----	----	----	----
Cyanides											
Cyanide, strong acid dissociable (Total)	----	E333/WT	mg/L		<0.0020	----	----	----	----	----	----
Microbiological Tests											
Coliforms, thermotolerant [fecal]	----	E012.FC/WT	CFU/100 mL		5	----	----	----	----	----	----
Total Metals											
Aluminum, total	7429-90-5	E420/WT	mg/L		0.139	----	----	----	----	----	----
Antimony, total	7440-36-0	E420/WT	mg/L		<0.00010	----	----	----	----	----	----
Arsenic, total	7440-38-2	E420/WT	mg/L		0.00024	----	----	----	----	----	----
Bismuth, total	7440-69-9	E420/WT	mg/L		<0.000050	----	----	----	----	----	----
Cadmium, total	7440-43-9	E420/WT	mg/L		0.0000271	----	----	----	----	----	----
Chromium, total	7440-47-3	E420/WT	mg/L		<0.00050	----	----	----	----	----	----
Cobalt, total	7440-48-4	E420/WT	mg/L		0.00050	----	----	----	----	----	----
Copper, total	7440-50-8	E420/WT	mg/L		0.00141	----	----	----	----	----	----
Iron, total	7439-89-6	E420/WT	mg/L		0.184	----	----	----	----	----	----
Lead, total	7439-92-1	E420/WT	mg/L		0.000412	----	----	----	----	----	----
Manganese, total	7439-96-5	E420/WT	mg/L		0.0558	----	----	----	----	----	----
Mercury, total	7439-97-6	E508/WT	mg/L		<0.0000050	----	----	----	----	----	----
Molybdenum, total	7439-98-7	E420/WT	mg/L		0.00239	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	BH23-1D	----	----	----	----	----	----
				Sampling date/time	19-Oct-2023 00:00	----	----	----	----	----	----
				Sub-Matrix	Water	----	----	----	----	----	----
				WT2333881-001	--------	--------	--------	--------	--------	--------	
Total Metals											
Nickel, total	7440-02-0	E420/WT	mg/L	0.00188	----	----	----	----	----	----	
Selenium, total	7782-49-2	E420/WT	mg/L	0.000242	----	----	----	----	----	----	
Silver, total	7440-22-4	E420/WT	mg/L	<0.000010	----	----	----	----	----	----	
Tin, total	7440-31-5	E420/WT	mg/L	0.00097	----	----	----	----	----	----	
Titanium, total	7440-32-6	E420/WT	mg/L	0.00274	----	----	----	----	----	----	
Vanadium, total	7440-62-2	E420/WT	mg/L	<0.00050	----	----	----	----	----	----	
Zinc, total	7440-66-6	E420/WT	mg/L	0.0083	----	----	----	----	----	----	
Aggregate Organics											
Carbonaceous biochemical oxygen demand [CBOD]	----	E555/WT	mg/L	<3.0 BODL	----	----	----	----	----	----	
Oil & grease (gravimetric)	----	E567/WT	mg/L	<5.0	----	----	----	----	----	----	
Oil & grease, animal/vegetable (gravimetric)	----	EC567A.SG/WT	mg/L	<5.0	----	----	----	----	----	----	
Oil & grease, mineral (gravimetric)	----	E567SG/WT	mg/L	<5.0	----	----	----	----	----	----	
Phenols, total (4AAP)	----	E562/WT	mg/L	<0.0010	----	----	----	----	----	----	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

Summary of Guideline Limits

Analyte	CAS Number	Unit	GUESUB SAN	GUESUB STM					
Physical Tests									
pH	----	pH units	**5.5 - 9.5 pH units**	**6 - 9 pH units**					
Solids, total suspended [TSS]	----	mg/L	**350 mg/L**	**15 mg/L**					
Anions and Nutrients									
Chloride	16887-00-6	mg/L	**1500 mg/L**	**--**					
Fluoride	16984-48-8	mg/L	**10 mg/L**	**--**					
Kjeldahl nitrogen, total [TKN]	----	mg/L	**100 mg/L**	**--**					
Phosphorus, total	7723-14-0	mg/L	**10 mg/L**	**--**					
Sulfate (as SO4)	14808-79-8	mg/L	**1500 mg/L**	**--**					
Cyanides									
Cyanide, strong acid dissociable (Total)	----	mg/L	**2 mg/L**	**--**					
Microbiological Tests									
Coliforms, thermotolerant [fecal]	----	CFU/100mL	**--**	**200 CFU/100mL**					
Total Metals									
Aluminum, total	7429-90-5	mg/L	**50 mg/L**	**--**					
Antimony, total	7440-36-0	mg/L	**5 mg/L**	**--**					
Arsenic, total	7440-38-2	mg/L	**1 mg/L**	**--**					
Bismuth, total	7440-69-9	mg/L	**5 mg/L**	**--**					
Cadmium, total	7440-43-9	mg/L	**1 mg/L**	**0.001 mg/L**					
Chromium, total	7440-47-3	mg/L	**5 mg/L**	**0.2 mg/L**					
Cobalt, total	7440-48-4	mg/L	**5 mg/L**	**--**					
Copper, total	7440-50-8	mg/L	**3 mg/L**	**0.01 mg/L**					
Iron, total	7439-89-6	mg/L	**50 mg/L**	**--**					
Lead, total	7439-92-1	mg/L	**5 mg/L**	**0.05 mg/L**					
Manganese, total	7439-96-5	mg/L	**5 mg/L**	**--**					
Mercury, total	7439-97-6	mg/L	**0.1 mg/L**	**0.001 mg/L**					
Molybdenum, total	7439-98-7	mg/L	**5 mg/L**	**--**					
Nickel, total	7440-02-0	mg/L	**3 mg/L**	**0.05 mg/L**					
Selenium, total	7782-49-2	mg/L	**5 mg/L**	**--**					
Silver, total	7440-22-4	mg/L	**5 mg/L**	**--**					
Tin, total	7440-31-5	mg/L	**5 mg/L**	**--**					
Titanium, total	7440-32-6	mg/L	**5 mg/L**	**--**					
Vanadium, total	7440-62-2	mg/L	**5 mg/L**	**--**					
Zinc, total	7440-66-6	mg/L	**3 mg/L**	**0.05 mg/L**					
Aggregate Organics									
Carbonaceous biochemical oxygen demand [CBOD]	----	mg/L	**300 mg/L**	**15 mg/L**					

Analyte	CAS Number	Unit	GUESUB SAN	GUESUB STM					
Aggregate Organics - Continued									
Oil & grease (gravimetric)	----	mg/L	--	--					
Oil & grease, animal/vegetable (gravimetric)	----	mg/L	**100 mg/L**	--					
Oil & grease, mineral (gravimetric)	----	mg/L	**15 mg/L**	--					
Phenols, total (4AAP)	----	mg/L	**1 mg/L**	--					

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

Key:

GUESUB	Ontario Guelph Sanitary and Storm Sewer By-Law 15202 (1996)
SAN	Ontario City of Guelph Sanitary Sewer Use By-Law 15202
STM	Ontario City of Guelph Storm Sewer Use By-Law 15202

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2333881**	Page	: 1 of 9
Client	: **WSP Canada Inc.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Lisseth Benavente	Account Manager	: Gayle Braun
Address	: 6925 Century Ave Suite #100 Mississauga ON Canada L5N 7K2	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: CA0010884/PHASE: 200	Date Samples Received	: 19-Oct-2023 09:00
PO	: ----	Issue Date	: 25-Oct-2023 16:33
C-O-C number	: 20-1084021		
Sampler	: RAMIN N.		
Site	: 85 CLAIR RD E, GUELPH, ON		
Quote number	: WSP MSA Pricing		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT-4d]										
BH23-1D	E555	19-Oct-2023	----	----	----		19-Oct-2023	4 days	0 days	✓
Aggregate Organics : Mineral Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
BH23-1D	E567SG	19-Oct-2023	19-Oct-2023	28 days	1 days	✓	23-Oct-2023	40 days	4 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
BH23-1D	E567	19-Oct-2023	19-Oct-2023	28 days	1 days	✓	23-Oct-2023	40 days	4 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) [ON MECP]										
BH23-1D	E562	19-Oct-2023	20-Oct-2023	28 days	1 days	✓	20-Oct-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP]										
BH23-1D	E235.Cl	19-Oct-2023	23-Oct-2023	28 days	5 days	✓	24-Oct-2023	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP]										
BH23-1D	E235.F	19-Oct-2023	23-Oct-2023	28 days	5 days	✓	24-Oct-2023	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP]										
BH23-1D	E235.SO4	19-Oct-2023	23-Oct-2023	28 days	5 days	✓	24-Oct-2023	28 days	5 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) [ON MECP]										
BH23-1D	E318	19-Oct-2023	23-Oct-2023	28 days	4 days	✓	24-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) [ON MECP]										
BH23-1D	E372-U	19-Oct-2023	22-Oct-2023	28 days	4 days	✓	23-Oct-2023	28 days	5 days	✓
Cyanides : Total Cyanide										
HDPE - total (sodium hydroxide)										
BH23-1D	E333	19-Oct-2023	24-Oct-2023	14 days	6 days	✓	24-Oct-2023	14 days	6 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) [ON MECP]										
BH23-1D	E012.FC	19-Oct-2023	----	----	----		20-Oct-2023	48 hrs	34 hrs	✓
Physical Tests : pH by Meter										
HDPE [ON MECP]										
BH23-1D	E108	19-Oct-2023	23-Oct-2023	14 days	5 days	✓	23-Oct-2023	14 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE [ON MECP]										
BH23-1D	E160	19-Oct-2023	----	----	----		23-Oct-2023	7 days	4 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) [ON MECP]										
BH23-1D	E508	19-Oct-2023	20-Oct-2023	28 days	1 days	✓	20-Oct-2023	28 days	1 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
BH23-1D	E420	19-Oct-2023	19-Oct-2023	180 days	1 days	✓	20-Oct-2023	180 days	1 days	✓

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1194478	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1200240	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	1200237	1	4	25.0	5.0	✓
pH by Meter	E108	1200232	1	8	12.5	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1196136	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1200241	1	4	25.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1196479	0	2	0.0	5.0	✗
Total Cyanide	E333	1203730	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1196134	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	1196080	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1195791	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1196135	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1199957	1	18	5.5	4.7	✓
Laboratory Control Samples (LCS)							
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1194478	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1200240	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	1200237	1	4	25.0	5.0	✓
Mineral Oil & Grease by Gravimetry	E567SG	1194383	1	7	14.2	5.0	✓
Oil & Grease by Gravimetry	E567	1194382	1	16	6.2	5.0	✓
pH by Meter	E108	1200232	1	8	12.5	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1196136	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1200241	1	4	25.0	5.0	✓
Total Cyanide	E333	1203730	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1196134	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	1196080	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1195791	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1196135	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1199957	1	18	5.5	4.7	✓
Method Blanks (MB)							
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1194478	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1200240	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	1200237	1	4	25.0	5.0	✓
Mineral Oil & Grease by Gravimetry	E567SG	1194383	1	7	14.2	5.0	✓
Oil & Grease by Gravimetry	E567	1194382	1	16	6.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1196136	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Sulfate in Water by IC	E235.SO4	1200241	1	4	25.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1196479	1	2	50.0	5.0	✓
Total Cyanide	E333	1203730	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1196134	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	1196080	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1195791	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1196135	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1199957	1	18	5.5	4.7	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	1200240	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	1200237	1	4	25.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1196136	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1200241	1	4	25.0	5.0	✓
Total Cyanide	E333	1203730	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1196134	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	1196080	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1195791	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1196135	1	20	5.0	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Waterloo	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ±0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Waterloo	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Waterloo	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Waterloo	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Total Cyanide	E333 ALS Environmental - Waterloo	Water	ISO 14403 (mod)	Total or Strong Acid Dissociable (SAD) Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line UV digestion followed by colourmetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Waterloo	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Waterloo	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 ALS Environmental - Waterloo	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555 ALS Environmental - Waterloo	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Nitrification inhibitor is added to samples to prevent nitrogenous compounds from consuming oxygen resulting in only carbonaceous oxygen demand being reported by this method. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Phenols (4AAP) in Water by Colorimetry	E562 ALS Environmental - Waterloo	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K3Fe(CN)6) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
Oil & Grease by Gravimetry	E567 ALS Environmental - Waterloo	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane and the extract is evaporated to dryness. The residue is then weighed to determine Oil and Grease.
Mineral Oil & Grease by Gravimetry	E567SG ALS Environmental - Waterloo	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane, followed by silica gel treatment after which the extract is evaporated to dryness. The residue is then weighed to determine Mineral Oil and Grease.
Animal & Vegetable Oil & Grease by Gravimetry	EC567A.SG ALS Environmental - Waterloo	Water	APHA 5520 (mod)	Animal & vegetable oil and grease is calculated as follows: Oil & Grease (gravimetric) minus Mineral Oil & Grease (gravimetric)

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in water	EP318 ALS Environmental - Waterloo	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Waterloo	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Oil & Grease Extraction for Gravimetry	EP567 ALS Environmental - Waterloo	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane by liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **WT2333881**	Page	: 1 of 10
Client	: WSP Canada Inc.	Laboratory	: ALS Environmental - Waterloo
Contact	: Lisseth Benavente	Account Manager	: Gayle Braun
Address	: 6925 Century Ave Suite #100 Mississauga ON Canada L5N 7K2	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	:	Telephone	: +1 519 886 6910
Project	: CA0010884/PHASE: 200	Date Samples Received	: 19-Oct-2023 09:00
PO	: ----	Date Analysis Commenced	: 19-Oct-2023
C-O-C number	: 20-1084021	Issue Date	: 25-Oct-2023 16:33
Sampler	: RAMIN N. ----		
Site	: 85 CLAIR RD E, GUELPH, ON		
Quote number	: WSP MSA Pricing		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

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

Signatories	*Position*	*Laboratory Department*
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Waterloo Organics, Waterloo, Ontario
Jon Fisher	Production Manager, Environmental	Waterloo Inorganics, Waterloo, Ontario
Jon Fisher	Production Manager, Environmental	Waterloo Metals, Waterloo, Ontario
Zeba Patel		Waterloo Microbiology, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1199957)											
WT2333881-001	BH23-1D	Solids, total suspended [TSS]	----	E160	3.0	mg/L	9.3	9.1	0.2	Diff <2x LOR	----
Physical Tests (QC Lot: 1200232)											
WT2333869-001	Anonymous	pH	----	E108	0.10	pH units	8.15	8.12	0.369%	4%	----
Anions and Nutrients (QC Lot: 1196134)											
WT2333338-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.500	mg/L	1.92	2.09	0.171	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1196135)											
WT2333525-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.422	0.426	1.05%	20%	----
Anions and Nutrients (QC Lot: 1200237)											
WT2333869-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.076	0.079	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1200240)											
WT2333869-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	48.3	49.3	2.00%	20%	----
Anions and Nutrients (QC Lot: 1200241)											
WT2333869-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	48.7	49.4	1.52%	20%	----
Total Metals (QC Lot: 1195791)											
HA2300873-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0252	0.0252	0.00006	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00020	0.00020	0.000007	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.0226	0.0224	0.912%	20%	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.120	0.118	0.865%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000212	0.000211	0.000001	Diff <2x LOR	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00348	0.00354	1.96%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000130	0.000133	0.000002	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1195791) - continued											
HA2300873-001	Anonymous	Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.168	0.168	0.593%	20%	----
Total Metals (QC Lot: 1196080)											
WT2333760-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000500	mg/L	3.47 µg/L	0.00372	6.95%	20%	----
Aggregate Organics (QC Lot: 1194478)											
WT2333885-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2.0	mg/L	2.0	2.1	0.0%	30%	----
Aggregate Organics (QC Lot: 1196136)											
WT2333533-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1199957)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1196134)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1196135)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1200237)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1200240)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1200241)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Cyanides (QCLot: 1203730)						
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1196479)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Total Metals (QCLot: 1195791)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1195791) - continued						
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Total Metals (QCLot: 1196080)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 1194382)						
Oil & grease (gravimetric)	----	E567	5	mg/L	<5.0	----
Aggregate Organics (QCLot: 1194383)						
Oil & grease, mineral (gravimetric)	----	E567SG	5	mg/L	<5.0	----
Aggregate Organics (QCLot: 1194478)						
Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 1196136)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1199957)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	89.2	85.0	115	----
Physical Tests (QCLot: 1200232)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 1196134)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1196135)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.393 mg/L	95.6	80.0	120	----
Anions and Nutrients (QCLot: 1200237)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1200240)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1200241)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Cyanides (QCLot: 1203730)									
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	0.25 mg/L	99.9	80.0	120	----
Total Metals (QCLot: 1195791)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	98.7	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	96.1	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	102	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	97.3	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	98.4	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.0125 mg/L	99.0	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.0125 mg/L	99.7	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.0125 mg/L	97.9	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	97.1	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	99.5	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.0125 mg/L	99.4	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.0125 mg/L	95.3	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	98.6	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	96.6	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1195791) - continued									
Silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	88.8	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	92.6	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.0125 mg/L	95.0	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	101	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	98.4	80.0	120	----
Total Metals (QCLot: 1196080)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	99.5	80.0	120	----
Aggregate Organics (QCLot: 1194382)									
Oil & grease (gravimetric)	----	E567	5	mg/L	200 mg/L	94.0	70.0	130	----
Aggregate Organics (QCLot: 1194383)									
Oil & grease, mineral (gravimetric)	----	E567SG	5	mg/L	100 mg/L	89.0	70.0	130	----
Aggregate Organics (QCLot: 1194478)									
Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2	mg/L	198 mg/L	106	85.0	115	----
Aggregate Organics (QCLot: 1196136)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	105	85.0	115	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1196134)										
WT2333338-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	28.2 mg/L	2.5 mg/L	113	70.0	130	----
Anions and Nutrients (QCLot: 1196135)										
WT2333525-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.1 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1200237)										
WT2333869-001	Anonymous	Fluoride	16984-48-8	E235.F	0.964 mg/L	1 mg/L	96.4	75.0	125	----
Anions and Nutrients (QCLot: 1200240)										
WT2333869-001	Anonymous	Chloride	16887-00-6	E235.Cl	99.5 mg/L	100 mg/L	99.5	75.0	125	----
Anions and Nutrients (QCLot: 1200241)										
WT2333869-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	101 mg/L	100 mg/L	101	75.0	125	----
Cyanides (QCLot: 1203730)										
WT2333422-004	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333		----		75.0	125	----
Total Metals (QCLot: 1195791)										
HA2300873-002	Anonymous	Aluminum, total	7429-90-5	E420	0.0866 mg/L	0.1 mg/L	86.6	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0481 mg/L	0.05 mg/L	96.2	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0508 mg/L	0.05 mg/L	102	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0471 mg/L	0.05 mg/L	94.2	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00493 mg/L	0.005 mg/L	98.6	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0129 mg/L	0.0125 mg/L	103	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0121 mg/L	0.0125 mg/L	96.8	70.0	130	----
		Copper, total	7440-50-8	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		Iron, total	7439-89-6	E420	0.051 mg/L	0.05 mg/L	101	70.0	130	----
		Lead, total	7439-92-1	E420	0.0242 mg/L	0.025 mg/L	96.8	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0126 mg/L	0.0125 mg/L	101	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0120 mg/L	0.0125 mg/L	95.9	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0239 mg/L	0.025 mg/L	95.7	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0488 mg/L	0.05 mg/L	97.5	70.0	130	----
		Silver, total	7440-22-4	E420	0.00438 mg/L	0.005 mg/L	87.7	70.0	130	----
		Tin, total	7440-31-5	E420	0.0233 mg/L	0.025 mg/L	93.1	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0118 mg/L	0.0125 mg/L	94.8	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0247 mg/L	0.025 mg/L	98.6	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1195791) - continued										
HA2300873-002	Anonymous	Zinc, total	7440-66-6	E420	ND mg/L	0.025 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1196080)										
WT2333760-002	Anonymous	Mercury, total	7439-97-6	E508	ND mg/L	0.001 mg/L	ND	70.0	130	----
Aggregate Organics (QCLot: 1196136)										
WT2333533-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0210 mg/L	0.02 mg/L	105	75.0	125	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 1084021

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division Waterloo
Work Order Reference
WT2333881

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Request
Company:	WSP E&I Canada Limited	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surcharges a
Contact:	Lisseth Benavente	Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcha
Phone:	905-568-2929	☐ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcha
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcha
Street:	2900 Argentia Rd #15	Email 1 or Fax lisseth.benavente@wsp.com	☐ 1 day [E] if received by 3pm M-F - 100% rush surcha
City/Province:	Mississauga ON	Email 2	☐ Same day [E2] if received by 10am M-S - 200% rush sur may apply to rush requests on weekends, statutory holiday
Postal Code:	L5N 7X9	Email 3	Date and Time Required for all E&P TATs:
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients	For all tests with rush TATs request
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Ana
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	CA0010884 / phase: 200	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:	85 clair Rd E, Guelph, ON	Location:	
ALS Lab Work Order # (ALS use only):	WT2333881	ALS Contact: Cayle Braun	Sampler: Ramin Niknam

ALS Sample # (ALS use only)	Sample Identification and/Or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Guelph Sewer, Sanitary-Storm use Package	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	BH23-1D	18-10-23	3:00 PM	GW	9	✓			

Indicate Filtered (F), Preserved (P) or

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Compare to Guelph sewer sanitary - storm By law
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☑ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				-0.6			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: Ramin Niknam	Date: oct 18, 2023	Time: 7:45 P.M	Received by:	Date:	Time:	Received by: AP	Date: 19 Oct 23	Time: 9:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

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

OCCC - 447 CC-487 SF
B-151 MM-442 N-342

wsp.com