Geotechnical Investigation

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Proposed Riverside South Catholic Elementary School
Brian Good Avenue and Solarium Avenue,
Ottawa, Ontario

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Executive Summary

EXP Services Inc. (EXP) is pleased to present the results of the geotechnical investigation completed for the Proposed New Riverside South Catholic Elementary School to be located in the northwest corner of the Brian Good Avenue and Solarium Avenue intersection in Ottawa, Ontario (Figure 1). The terms and conditions of this assignment were outlined in EXP Services Inc. (EXP) proposal number: OTT-22002013-A0 dated May 4, 2022

The proposed school building will be a single-story structure with no basement located in the southeast corner of the school property. The footprint of the proposed building will be 4630 m^2. The proposed school development will also include portables, a sports field, play structure area, paved parking lots and access roads with access from Solarium Avenue. The proposed development will be serviced by municipal services. The design elevation of the finished floor for the proposed school building will be 92.65 m.

The test hole (borehole and test pit) fieldwork was undertaken in two (2) stages. The first stage was completed between July 14 and July 19,2022 and consists of sixteen (16) boreholes (Borehole Nos. 1 to 16) advanced to termination/auger refusal depths ranging from 4.6 m to 13.4 m below the existing ground surface. The second stage was completed between August 8 and August 10,2022 and consists of nineteen (19) test pits (Test Pit Nos. 1 to 19) extending to termination depths ranging from 1.8 m to 2.4 m below existing grade. The fieldwork was supervised on a full-time basis by a representative from EXP.

The borehole information indicates the subsurface conditions consist of a surficial fill underlain by a topsoil/organic layer contacted at depths of 0.2 m to 1.5 m (Elevation 92.3 m to Elevation 90.2 m) and ranging in thickness between 100 mm and 700 mm. The fill and topsoil are underlain by silty sand to sandy silt to clayey silt to silty clay to clay. Glacial till was contacted at 3.6 to 8.7 m depths (Elevation 88.2 m to Elevation 82.8 m). Auger refusal was met in Borehole Nos. 1 and 12 at 11.7 m and 13.4 m depths (Elevation 79.9 m to Elevation 78.1 m) respectively on inferred cobbles, boulders or bedrock. The groundwater level ranges from 2.8 m to 4.8 depths below existing grade (Elevation 89.0 m to Elevation 86.7 m).

Based on a review of the borehole information and Table 4.1.8.4.A of the 2012 Ontario Building Code (OBC) as amended May 2, 2019, the site classification for seismic response is Class D. A higher (better) seismic site classification may be assigned to this site if a shear wave velocity sounding survey is conducted at the site. Based on a review of the borehole information, the subsurface soils are not considered to be susceptible to liquefaction during a seismic event.

From a geotechnical perspective, the maximum permissible site grade raise is considered to be 1.5 m.

The design finished floor elevation of the proposed school building is Elevation 92.65 m. Based on a review of the borehole information, it is considered feasible to support the proposed building by spread and strip footings. It is our understanding that the design elevation of the underside of the footings will be Elevation 91.0 m. Based on a review of the boreholes located within the footprint of the proposed school building, the footings, at the design underside of footing elevation of Elevation 91.0 m, would be founded on the native sandy clayey silt, sandy silty clay and silty clay at Borehole Nos. 1, 2,7 to 9 and 11 and on the existing fill in the remaining boreholes; Borehole Nos. 3 to 6 and 10. The topsoil (surficial and buried) and the existing fill are not suitable to support the footings and would have to be excavated, removed and replaced with an engineered fill pad. Therefore, the footings for the proposed school building founded at Elevation 91.0 m should be founded on the undisturbed native sandy clayey silt, sandy silty clay and silty clay at Borehole Nos. 1,2, 7 to 9 and 11 and on a minimum 600 mm thick engineered fill pad constructed on top of the undisturbed native soil in the remaining boreholes; Borehole Nos. 3 to 6 and 10.

Square spread footings having a maximum width and length of 3.0 m and strip footings having a maximum width of 1.5 m founded at Elevation 91.0 m on the undisturbed native sandy clayey silt, sandy silty clay and silty clay and on a minimum 600 mm thick properly prepared engineered fill pad, constructed in accordance with the procedure in the attached geotechnical report, may be designed for a bearing capacity at serviceability limit state (SLS) of 100 kPa and factored geotechnical resistance at ultimate limit state (ULS) of 150 kPa. The factored geotechnical resistance value at ULS includes a resistance factor of 0.5. The total and differential settlements of well designed and constructed footings placed in accordance with the above recommendations are expected to be less than 25 mm and 19 mm respectively. The SLS and factored ULS values are valid provided the site grade raise to a maximum of 1.5 m is respected.

The floor slab for the proposed building may be designed and constructed as a slab-on-grade placed on a 200 mm thick 19 mm sized clear stone bed placed on a minimum 300 mm thick engineered fill pad set on the approved native subgrade constructed in accordance with Section 9 of the attached geotechnical report.

It is recommended that a perimeter drainage system should be provided around the proposed school building. Based on the design finished floor elevation of Elevation 92.65 m and the groundwater level at Elevation 89.0 m to Elevation 86.7 m, an underfloor drainage system is not required for the proposed school building.

Excavations for the construction of footings and the installation of underground services are anticipated to extend to a maximum depth of 3.0 m below the existing grade and are anticipated to extend through the fill, topsoil (organic) surficial and buried layers and into the native silty clay/clayey silt and silty sand/sandy silt and are anticipated to be at or above the groundwater level.

Excavations maybe undertaken by conventional heavy equipment capable of removing debris within the fill and cobbles and boulders within the fill.

Open cut excavation within the subsurface soils should comply with the most recent Occupational Health and Safety Act (OHSA), Ontario Regulations 213/91 (August 1, 1991). Based on the definitions contained in OHSA, the subsurface soils at the site are classified as Type 3 soil and as such the excavation sidewalls must be cut back at 1H:1V from the bottom of the excavation. Below the groundwater table, the excavation side slopes are expected to slough and will eventually stabilize at a slope of 2H:1V to 3H:1V.

If side slopes noted above for the construction of the proposed building cannot be achieved due to space restrictions on site, such as the proximity of open cut excavations to the property limits or existing infrastructure, the excavation for the new building construction would have to be undertaken within the confines of an engineered support system (shoring system). If space restrictions prevent open cut excavations, the underground services may be installed within the confines of a prefabricated support system (trench box) which is designed and installed in accordance with the above-noted regulations.

Excavations that terminate within the native silty clay/clayey silt or within the sandy silt/silty sand above the groundwater table are not expected to experience a base-heave type failure. Open cut excavations which extend below the groundwater level within the silty sand/sandy silt are susceptible to instability of the base of the excavation in the form of piping or heave. Should the excavations extend below the groundwater table, EXP should be contacted prior to the start of excavation to provide comments and recommendations to minimize instability of the excavation base.

Seepage of the surface and subsurface water into the excavations is anticipated. However, it should be possible to collect any water entering the excavations in perimeter ditches and to remove it by pumping from sumps. In areas of high infiltration or in areas where more permeable soil layers may exist, a higher seepage rate should be anticipated and will require high-capacity pumps to keep the excavation dry.

It is anticipated that the majority of the material required for backfilling purposes in the interior and exterior of the proposed building and for trench backfill would have to be imported and should preferably conform to Ontario Provincial Standard Specification (OPSS) 1010 Granular B Type II and OPSS 1010 Select Subgrade Material (SSM) specifications.

Pavement structure for light duty traffic areas should consist of 65 mm thick asphaltic concrete, 150 mm thick OPSS Granular A base and 450 mm thick OPSS Granular B Type II subbase. Pavement structure for heavy duty traffic areas should consist of 110 mm thick asphaltic concrete, 150 mm thick OPSS Granular A base and 600 mm thick OPSS Granular B Type II subbase.

The above and other related considerations are discussed in greater detail in the main body of the attached geotechnical report.

1. Introduction

EXP Services Inc. (EXP) is pleased to present the results of the geotechnical investigation completed for the Proposed New Riverside South Catholic Elementary School to be located in the northwest corner of the Brian Good Avenue and Solarium Avenue intersection in Ottawa, Ontario (Figure 1). The terms and conditions of this assignment were outlined in EXP Services Inc. (EXP) proposal number: OTT-22002013-A0 dated May 4, 2022

The proposed school building will be a single-story structure with no basement located in the southeast corner of the school property. The footprint of the proposed building will be 4630 m^2. The proposed school development will also include portables, a sports field, play structure area, paved parking lots and access roads with access from Solarium Avenue. The proposed development will be serviced by municipal services. The design elevation of the finished floor for the proposed school building will be 92.65 m.

A Phase One Environmental Site Assessment (ESA) of the site was also carried out by EXP and the results of the assessment are documented in a separate report dated June 10,2022.

The geotechnical investigation was undertaken to:

a) Establish the subsurface soil and groundwater conditions at 35 test holes located at the site (sixteen (16) boreholes and nineteen (19) test pits),

b) Classify the site for seismic site response in accordance with the requirements of the 2012 Ontario Building Code (as amended May 2, 2019) and assess the potential for liquefaction of the subsurface soils during a seismic event,

c) Comment on grade-raise restrictions and provide site grading requirements,

d) Make recommendations regarding the most suitable type of foundations, founding depth and bearing pressure at serviceability limit state (SLS) and factored geotechnical resistance at ultimate limit state (ULS) of the founding strata and comment on the anticipated total and differential settlements of the recommended foundation type,

e) Provide comment regarding slab-on-grade construction and the requirement for perimeter and underfloor drainage systems,

f) Comment on excavation conditions and de-watering requirements during construction,

g) Provide pipe bedding requirements for underground services,

h) Discuss backfilling requirements and suitability of on-site soils for backfilling purposes,

i) Recommend pavement structure thicknesses for access roads and parking lots,

j) Comment on the corrosion potential of subsurface soils to buried concrete and metal structures/members; and

k) Provide comment regarding restrictions to tree planting.

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

2. Site Description

The site is located in the northwest corner of the Solarium Avenue and Brian Good Avenue intersection. The site is roughly rectangular in shape with an area of approximately 2.74 hectares. It is bounded to the north by vacant land (a future city park under construction), to the west by a residential development, to the east by Brian Good Avenue and a residential development beyond (under construction) and to the south by Solarium Avenue.

The site is currently a vacant property with stockpiles of fill soil.

The topography of the site is generally flat (excluding the soil stockpiles) based on the ground surface elevations at the test holes ranging from Elevation 92.86 m to Elevation 91.06 m.

3. Geology of the Site

3.1 Surficial Geology Map

The surficial geology was reviewed via the Google Earth applications published by the Ontario Ministry of Energy, Northern Development and Mines available via www.mndm.gov.on.ca/en/mines-and-minerals/applications/ogsearth/surficial-geology, last modified on May 23, 2017. The map indicates the Site is underlain by fine glaciomarine deposits consisting of silt and clay with minor sand and gravel. Coarse-textured glaciomarine deposits consisting of sand, gravel and minor silt and clay are noted to be near the site. The fine glaciomarine deposits is underlain by a stone-poor, sandy silt to silty sand-textured glacial till deposit. The surficial deposits are shown in Image 1 below.

Image 1 – Surficial Geology

3.2 Bedrock Geology Map

The bedrock geology map (Map 1508A – Generalized Bedrock Geology, Ottawa-Hull, Ontario and Quebec, Geological Survey of Canada, printed by the Surveys and Mapping Branch, 1979) indicates the site is underlain by sandstone, dolostone or minor shale of the Beekmantown Group within the Oxford formation. The bedrock geology is show in Image 2 below.

Image 2 – Bedrock Geology

4. Procedure

The test hole (borehole and test pit) fieldwork was undertaken in two (2) stages. The first stage was completed between July 14 and July 19,2022 and consists of sixteen (16) boreholes (Borehole Nos. 1 to 16) advanced to termination/auger refusal depths ranging from 4.6 m to 13.4 m below the existing ground surface. The second stage was completed between August 8 and August 10,2022 and consists of nineteen (19) test pits (Test Pit Nos. 1 to 19) extending to termination depths ranging from 1.8 m to 2.4 m below existing grade. The fieldwork was supervised on a full-time basis by a representative from EXP.

The locations and the geodetic elevations of the test holes were established on site by EXP and are shown on the Test Hole Location Plan, Figure 2.

The borehole and test pit locations were cleared of private and public underground services, prior to the start of drilling and excavating operations.

The boreholes were drilled using a CME-75 track mounted drill rig equipped with continuous flight hollow stem augers and soil sampling capabilities. Borehole No. 1 was advanced from 4.6 m depth to the auger refusal depth of 11.7 m under a column of water and using drilling mud. Standard penetration tests (SPTs) were performed in all the boreholes at depth intervals of 0.75 m to 1.5 m with soil samples retrieved by the split-barrel sampler. Relatively undisturbed Shelby tube samples of the clayey soil were retrieved from selected depths in some of the boreholes. The undrained shear strength of the clayey soil was measured by conducting a penetrometer test on selected recovered soil samples and in-situ shear vane tests at selected depth intervals. The subsurface soil conditions in each borehole were logged with each soil sample placed in a labelled plastic bag.

Nineteen (19) mm diameter standpipes and thirty-two (32) mm diameter monitoring wells with slotted section were installed in selected boreholes for long-term monitoring of the groundwater levels. The standpipes and monitoring wells were installed in accordance with EXP standard practice and the installation configuration is documented on the respective borehole log. The boreholes were backfilled upon completion of drilling.

Test pits were carried out with an excavator. Soil samples (grab samples) of the different soil types exposed in the test pits were retrieved and the soil conditions from the test pits were logged, with each soil sample placed in a labeled plastic bag. Groundwater level observations were made in each test pit. The test pits were backfilled upon completion of excavating.

On completion of the fieldwork, the soil samples were transported to the EXP laboratory in Ottawa. The soil samples were visually examined in the laboratory by a geotechnical engineer. All soil samples were classified in accordance with the Unified Soil Classification System (USCS) and the modified Burmeister System (as per the 2006 Fourth Edition Canadian Foundation Engineering Manual (CFEM)).

The geotechnical engineer also assigned the laboratory testing program which is summarized in Table I.

Table I: Summary of Laboratory Testing Program

Type of Test	Number of Tests Completed
Soil Samples	
Moisture Content Determination	160
Unit Weight Determination	33
Grain Size Analysis	14
Atterberg Limit Determination	10
One Dimensional Consolidation Test	2
Corrosion Analysis (pH, sulphate, chloride and resistivity)	3

5. Subsurface Conditions and Groundwater Levels

A detailed description of the subsurface conditions and groundwater levels from the boreholes and test pits are given on the attached Borehole and Test Pit Logs, Figures 3 to 37. The borehole and test pit logs and related information depict subsurface conditions only at the specific locations and times indicated. Subsurface conditions and water levels at other locations may differ from conditions at the locations where sampling was conducted. The passage of time also may result in changes in the conditions interpreted to exist at the locations where sampling was conducted.

Boreholes were drilled and test pits were excavated to provide representation of subsurface conditions as part of a geotechnical exploration program and are not intended to provide evidence of potential environmental conditions.

It should be noted that the soil boundaries indicated on the borehole and test pit logs are inferred from non-continuous sampling and observations during drilling operations. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. The "Notes on Sample Descriptions" preceding the borehole and test pit logs form an integral part of this report and should be read in conjunction with this report.

A review of the borehole and test pit logs indicates the following subsurface conditions with depth and groundwater level measurements.

5.1 Fill

Fill was contacted surficially in all test holes. The fill extends to depths of 0.2 m to 1.8 m (Elevation 92.3 m to Elevation 89.9 m) and ranges from sand and gravel to silty clay. The fill contains cobbles, boulders and debris (such as a metal wire in Borehole No. 6 and metal debris in Test Pit No. 6). The fill material is in a very loose to loose state as indicated by the standard penetration test (SPT) N-values of 1 to 8. The moisture content and unit weight of the fill ranges from 15 percent to 35 percent and 17.5 kN/m^3 to 20.8 kN/m^3 respectively.

The results from the grain-size analysis conducted on two (2) samples of the fill are summarized in Table II. The grain-size distribution curves are shown in Figures 38 and 39.

Table II: Summary of Results from Grain-Size Analysis - Fill Samples

Borehole No. (BH)– Sample No. (SS)	Depth (m)	Grain-Size Analysis (%)			
		Gravel	Sand	Fines (Silt and Clay)	Soil Classification (USCS)
BH 7-SS1	0-0.6	3	58	39	Silty Sand (SM)
BH 10-SS1	0-0.6	1	60	39	Silty Sand (SM)

Based on a review of the results from the grain size analysis, the fill may be classified as a silty sand (SM) in accordance with the Unified Soil Classification System (USCS).

5.2 Buried Topsoil/Organic Soil

A topsoil and organic soil layer was contacted beneath the fill at depths of 0.2 m to 1.5 m (Elevation 92.3 m to Elevation 90.2 m) in Borehole No. 16 and in all of the test pits with the exception Test Pit Nos. 9 and 19. The buried organic soil ranges in thickness between 100 mm and 700 mm. In Test Pit Nos. 4 and 13, the buried topsoil layer is underlain by a further fill layer.

5.3 Silty Sand to Sandy Silt

A native sandy silt to silty sand with varying amounts of clay was contacted beneath the fill and buried organic soil in Borehole Nos. 4 and 12 and in Test Pit Nos. 2, 8 to 12, 17 and 19. The silty sand to sandy silt extends to depths ranging from 1.2 m to 3.0 m (Elevation 91.1 m to Elevation 88.6 m). The SPT N-values of the silty sand to sandy silt range from zero (hammer weight) to 7

indicating the soil is in a very loose to loose state. The natural moisture content and unit weight of the silty sand to sandy silt ranges from 13 percent to 50 percent and 17.9 kN/m^3 to 18.3/m^3 respectively.

Results from the grain-size analysis and Atterberg limit determination conducted on two (2) samples of the silty sand to sandy silt are summarized in Table III and grain-size distribution curves are shown in Figures 40 and 41.

Table III: Summary of Results from Grain-Size Analysis and Atterberg Limit Determination – Silty Sand/Sandy Silt Samples

Borehole No. (BH) – Sample No. (SS)	Depth (m)	Grain-Size Analysis (%)				Atterberg Limits (%)				Soil Classification (USCS)
		Gravel	Sand	Silt	Clay	Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index	
BH4-SS3	1.5-2.1	0	46	28	26	20	--	--	N.P.	Sandy Silt (ML)
BH4-SS4	2.3-2.9	0	50	33	17	21	--	--	N.P.	Sandy Silt (ML)

N.P = Non-Plastic

Based on a review of the results of the grain-size analysis, the tested soil may be classified as sandy silt (ML) to in accordance with the USCS.

5.4 Clayey Silt to Silty Clay to Clay

A clayey silt to silty clay to clay, with a varying amount of sand, was contacted below the fill, buried organic soil and silty sand to sandy silt in all the test holes with the exception of Test Pit Nos. 17 and 19. The clayey silt to silty clay to clay extends to depths of 1.4 m to 7.2 m (Elevation 90.7 m to Elevation 84.3 m). The silty clay in Borehole No. 11 is interrupted by a clayey sandy silt layer contacted at a 1.4 m depth (Elevation 90.3 m) and extends to a 2.2 m depth (Elevation 89.5 m). The clayey silt to silty clay to clay has a consistency of very soft to stiff as indicated by the SPT N-values which range from zero (hammer weight) to 13. The undrained shear strength of the clayey silt to silty clay to clay silty clay ranges from 38 kPa to 144 kPa indicating a firm to very stiff consistency. The natural moisture content and unit weight of the clayey silt to silty clay to clay ranges from 19 percent to 63 percent and 15.8 kN/m^3 to 21.9 kN/m^{3}respectively.

The results from the grain-size analysis and Atterberg limits determination of eight (8) samples of the clayey silt to silty clay to clay are summarized in Table IV. The grain-size distribution curves are shown in Figures 42 to 49.

Table IV Summary of Results from Grain-Size Analysis and Atterberg Limit Determination – Silt Clay/Clayey Silt Samples										
Borehole No. (BH) – Sample No. (SS)	Depth (m)	Grain-Size Analysis (%)				Atterberg Limits (%)				Soil Classification (USCS)
		Gravel	Sand	Silt	Clay	Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index	
BH 1-SS2	0.8-1.4	0	41	33	26	29	29	18	11	Sandy Clayey Silt of Low Plasticity (CL)
BH2-SS7	4.6-5.2	0	3	54	43	39	38	20	18	Silty Clay of Low Plasticity (CL)
BH3-SS2	0.8-1.4	2	30	47	21	28	28	16	13	Sandy Clayey Silt of Low Plasticity (CL)
BH4-ST8	6.1-6.7	0	2	49	49	51	46	21	26	Silty Clay of Low Plasticity (CL)
BH6-SS4	2.3-2.9	0	2	41	57	43	58	25	33	Clay of High Plasticity (CH)
BH7-ST5	3.0-3.6	0	0	42	58	63	56	24	32	Clay of High Plasticity (CH)
BH8-SS6	3.8-4.4	0	23	51	26	36	24	15	9	Clayey Silt with Sand of Low Plasticity (CL)
BH10- SS6	3.8-4.4	0	2	65	33	40	35	20	15	Clayey Silt of Low Plasticity (CL)

Based on a review of the laboratory test results, the soil may be classified as a ranging from a clayey silt of low plasticity (CL) to a silty clay of low plasticity (CL) to a clay of high plasticity (CH) in accordance with the USCS.

One-dimensional consolidation tests were conducted on two (2) samples of the silty clay. The soil parameters derived from the consolidation test results are summarized in Table V and the consolidation test result report is shown in Appendix A.

Table V Consolidation Test Results - Silty Clay Samples								
Borehole No.	Sample No. (Sample Depth), m	Natural Unit Weight (kN/m^3)	σ_p'	σ_{vo}'	C_c	C_r	e_o	OCR
BH4	ST8 (6.1-6.7)	16.9	240	89	0.867	0.0183	1.416	2.7
BH7	ST5(3.0-3.6)	15.8	270	54	0.741	0.0149	1.779	5.0

NOTES:

σ_p'	- Apparent preconsolidation pressure (kPa)	σ_{vo}'	- Calculated existing vertical effective stress (kPa)
C_c	- Compression index	C_r	- Recompression index
e_o	- Initial void ratio	OCR	- Overconsolidation ratio

5.5 Silty Sand

In Borehole No. 12, a silty sand was encountered underlying the clayey silt to silty clay at a 7.2 m depth (Elevation 84.3 m) and extending to an 8.7 m depth (Elevation 82.8). The SPT N-value of 3 indicates the silty sand is in a very loose state.

5.6 Glacial Till

The silty sand in Borehole No. 12 and the clayey silt to silty clay to clay in Borehole Nos. 1, 2, 5, 6 and 9 to 12 are underlain by a glacial till contacted at 3.6 m to 8.7 m depths (Elevation 88.2 m to Elevation 82.8 m). The glacial till contains varying amounts of gravel, sand, silt and clay as well as cobbles and boulders. Based on the SPT N-values of 6 to 64 the glacial till is in a loose to very dense state. High N-values for low sampler penetration, such as 50 for 50 mm of sampler penetration were recorded and may be a result of the sampler resting on a cobble or boulder within the glacial till. In Borehole No. 1 a low SPT N-value of 2 was recorded at sampler number 8 (SS8; 6.1 m to 6.7m depths) . This low SPT N-value may be a result of disturbance to the glacial till at this sample depth by advancing the borehole below a 4.6 m depth under a column of water and by using drilling mud. Therefore, the low SPT N-value of 2 at SS8 is not considered to be representative of the actual state of the glacial till. The natural moisture content of the glacial till ranges from 6 percent to 39 percent.

The results from the grain-size analysis conducted on two (2) samples of the glacial are summarized in Table VI. The grain-size distribution curves are shown in Figures 50 and 51.

Table VI Summary of Results from Grain-Size Analysis – Glacial Till Samples

Borehole No. (BH) – Sample No. (SS)	Depth (m)	Grain-Size Analysis (%)				Soil Classification (USCS)
		Gravel	Sand	Silt	Clay	
BH5-SS6	3.8-4.4	10	46	30	14	Silty Sand (SM)
BH9-SS7	4.6-5.2	8	55	28	9	Silty Sand (SM)

Based on a review of the laboratory test results, the glacial till may be classified as a silty sand (SM) in accordance with the USCS. The glacial till contains cobbles and boulders.

5.7 Inferred Boulders or Bedrock

Auger refusal was met in Borehole Nos. 1 and 12 at 11.7 m and 13.4 m depths (Elevation 79.9 m to 78.1 m) respectively. Auger refusal may have occurred on inferred cobbles, boulders or bedrock.

5.8 Groundwater Level Measurements

A summary of the groundwater level measurements taken in the boreholes equipped with standpipes and monitoring wells on August 22,2022 is shown in Table VII.

Table VII: Summary of Groundwater Level Measurements

Borehole No. (BH)	Ground Surface Elevation (m)	Elapsed Time in Days from Date of Installation	Depth Below Ground Surface (Elevation), m
BH-01	91.60	38 days	3.8 (87.8)
BH-04	91.57	34 days	4.2 (87.4)
BH-07	91.63	38 days	3.0 (88.6)
BH-09	91.76	39 days	2.8 (89.0)
BH-11	91.67	39 days	3.6 (88.1)
BH-12	91.52	39 days	4.8 (86.7)

The groundwater level ranges from 2.8 to 4.8 m depths (Elevation 89.0 m to Elevation 86.7 m).

All test pits remained dry during and upon completion of the excavation operation. The groundwater level was not contacted in all of the test pits excavated to 1.8 m to 2.4 m depths (Elevation 91.1 m to Elevation 88.9 m).

The groundwater levels were determined in the boreholes and test pits at the time and under the condition stated in this report. Note that fluctuations in the level of groundwater may occur due to a seasonal variation such as precipitation, snowmelt, rainfall activities, and other factors not evident at the time of measurement and therefore may be at a higher level during wet weather periods.

6. Site Classification for Seismic Site Response and Liquefaction Potential of Soils

6.1 Site Classification for Seismic Site Response

Based on a review of the borehole information and Table 4.1.8.4.A of the 2012 Ontario Building Code (OBC) as amended May 2, 2019, the site classification for seismic response is Class D. A higher (better) seismic site classification may be assigned to this site if a shear wave velocity sounding survey is conducted at the site.

6.2 Liquefaction Potential of Soils

Based on a review of the borehole information, the subsurface soils are not considered to be susceptible to liquefaction during a seismic event.

7. Grade Raise Restrictions

The design elevation for the floor slab of the proposed school building is Elevation 92.65 m. The ground surface elevations at the boreholes (including Borehole No. 12) located with the footprint of the proposed building range from Elevation 91.77 m to Elevation 91.48 m. Therefore, the site grade raise within the proposed building footprint will range from 0.9 m to 1.2 m.

The ground surface elevation of the boreholes and test pits located outside or beyond the proposed building footprint range from Elevation 92.86 m to Elevation 91.06 m. Based on the assumption that the final design grades in the remaining portion of the site beyond the proposed school building will be slightly below the design finished floor elevation of the proposed school building, the anticipated maximum site grade raise outside of the proposed building footprint will be approximately 1.5 m.

Based on a review of the test hole (boreholes and test pits) information, a maximum grade raise at the site of 1.5 m is considered to be acceptable from a geotechnical perspective. However, should the design grade raise exceed 1.5 m, EXP should be contacted to review the acceptability of the proposed new grade raise and to provide updated bearing pressure at serviceability limit state (SLS) and factored geotechnical resistance at ultimate limit state (ULS) for the building foundations.

8. Site Grading

The **stockpiles of soil fill** currently present on-site should be removed and disposed off-site. For budgeting purposes, the contractor should assume that all existing fill, surficial and buried topsoil (organic) layers and organic stained soils within the footprints of the proposed building, portable(s), play structure, sports field, parking lots and access roads would require removal and replacement with well-compacted fill as indicated below.

Site grading within the **proposed building footprint** should consist of the removal of all existing fill, surficial and buried topsoil (organic) layers and organic stained soils down to the native undisturbed material. The native subgrade should be examined by a geotechnician. Any loose/soft areas identified during the subgrade examination should be excavated, removed and replaced with Ontario Provincial Standard Specification (OPSS) Granular B Type II material compacted to 98 percent standard Proctor maximum dry density (SPMDD). Once the subgrade has been approved, the grades may be raised to the design underside footing and floor slab elevation by the construction of an engineered fill pad constructed in accordance with Section 9 of this report.

Site grading within the **proposed portable area** should consist of the removal of all existing fill, surficial and buried topsoil (organic) layers and organic stained soils down to the native undisturbed material. The native subgrade should be examined by a geotechnician. Any loose/soft areas identified during the subgrade examination should be excavated, removed and replaced with Ontario Provincial Standard Specification (OPSS) Granular B Type II material compacted to 98 percent standard Proctor maximum dry density (SPMDD). Once the subgrade has been approved, the grades may be raised to the design subgrade level by the construction of an engineered fill pad constructed in accordance with the procedure in Section 9 of this report.

Site grading within the **proposed play structure area** should consist of the removal of all existing fill, surficial and buried topsoil (organic) layers and organic stained soils down to the native undisturbed material. The native subgrade should be proofrolled in the full-time presence of a geotechnician. Any loose/soft areas identified during the proofrolling process should be excavated, removed and replaced with Ontario Provincial Standard Specification (OPSS) Granular B Type II material compacted to 95 percent standard Proctor maximum dry density (SPMDD). Once the subgrade has been approved, the grades may be raised to the design subgrade level by the placement of engineered fill as discussed in Section 9 of this report. The engineered fill should be compacted to a minimum 95 percent SPMDD.

Site grading within the **proposed sports field, parking lot and access road areas** should consist of the removal of all existing fill, surficial and buried topsoil (organic) layers and organic stained soils down to the native undisturbed material. The native subgrade should be proofrolled in the presence of a geotechnician. Any loose/soft areas identified during the proofrolling process should be excavated, removed and replaced with Ontario Provincial Standard Specification (OPSS) Granular B Type II or OPSS Select Subgrade Material (SSM) compacted to 95 percent standard Proctor maximum dry density (SPMDD). Alternatively, portions of the excavated and removed existing fill that is free of debris, cobbles, boulders and topsoil (organic soils), may be reused to raise the site grades to the design subgrade level. The suitability of re-using the existing fill to raise the grades will have to be further assessed at time of construction by examining the fill material and conducting additional tests on the material.

9. Foundation Considerations

The design finished floor elevation of the proposed school building is Elevation 92.65 m. Based on a review of the borehole information, it is considered feasible to support the proposed building by spread and strip footings. It is our understanding that the design elevation of the underside of the footings will be Elevation 91.0 m. Based on a review of the boreholes located within the footprint of the proposed school building, the footings, at the design underside of footing elevation of Elevation 91.0 m, would be founded on the native sandy clayey silt, sandy silty clay and silty clay at Borehole Nos. 1, 2, 7 to 9 and 11 and on the existing fill in the remaining boreholes; Borehole Nos. 3 to 6 and 10. The topsoil (surficial and buried) and the existing fill are not suitable to support the footings and would have to be excavated, removed and replaced with an engineered fill pad. Therefore, the footings for the proposed school building, founded at Elevation 91.0 m, should be founded on the undisturbed native sandy clayey silt, sandy silty clay and silty clay at Borehole Nos. 1,2, 7 to 9 and 11 and on a minimum 600 mm thick engineered fill pad constructed on top of the undisturbed native soil in the remaining boreholes; Borehole Nos. 3 to 6 and 10.

Square spread footings having a maximum width and length of 3.0 m and strip footings having a maximum width of 1.5 m founded at Elevation 91.0 m on the undisturbed native sandy clayey silt, sandy silty clay and silty clay and on a minimum 600 mm thick properly prepared engineered fill pad, constructed in accordance with the procedure in the paragraph below, may be designed for a bearing capacity at serviceability limit state (SLS) of 100 kPa and factored geotechnical resistance at ultimate limit state (ULS) of 150 kPa. The factored geotechnical resistance value at ULS includes a resistance factor of 0.5. The total and differential settlements of well designed and constructed footings placed in accordance with the above recommendations are expected to be less than 25 mm and 19 mm respectively. The SLS and factored ULS values are valid provided the site grade raise to a maximum of 1.5 m is respected.

If the founding depth for the proposed footings will be at a lower elevation than Elevation 91.0 m, EXP should be contacted to provide updated SLS and factored ULS values for the footings.

The construction of the engineered fill pad should consist of the removal of all existing fill, surficial and buried topsoil (organic) layers and organic stained soils down to the native undisturbed silt and clay material. The native subgrade should be examined by a geotechnician. Any loose/soft areas identified during the subgrade examination should be excavated, removed and replaced with Ontario Provincial Standard Specification (OPSS) Granular B Type II material compacted to 98 percent standard Proctor maximum dry density (SPMDD). Once the subgrade has been approved, the grades may be raised to the design underside footing and floor slab elevation by the construction of an engineered fill pad. The excavation for the removal of fill and topsoil layers should extend to a sufficient distance beyond the limits of the proposed structure to accommodate a 1.0 m wide horizontal bench of engineered fill that extends beyond the perimeter of the proposed building on all sides, which should thereafter be sloped at an inclination of 1H to 1V down to the approved subgrade. The engineered fill should consist of OPSS Granular B Type II material that is placed in 300 mm thick lifts and each lift compacted to 100 percent SPMDD. The placement and compaction of the engineered fill can in this way be undertaken to the founding level of the footings. From the footing level to the underside of the floor slab, each lift of the Granular B Type II material should be compacted to 98 percent of SPMDD. The engineered fill should be placed under the full-time supervision of a geotechnician working under the direction of a geotechnical engineer. In-place density tests should be undertaken on each lift of the engineered fill to ensure that it is properly compacted prior to placement of subsequent lift.

For footings founded directly on the native sandy clayey silt, sandy silty clay and silty clay and to prevent disturbance to the subgrade, the footing beds should be protected by covering the subgrade with a 50 mm thick concrete mud slab following examination and approval of the founding soil subgrade.

Since the native clay and silt subgrade are susceptible to disturbance due to the effects of weather and construction traffic, it is recommended that in the engineered fill pad areas, the approved native subgrade be covered within the same day of approval with at least one lift of the OPSS Granular B Type II engineered fill material.

All the footing beds should be examined by a geotechnical engineer to ensure that the founding surfaces are capable of supporting the design bearing pressure and that the footing beds have been properly prepared.

A minimum of 1.5 m of earth cover should be provided to the footings to protect them from damage due to frost penetration. The frost cover should be increased to 2.1 m for unheated structures if snow will not be removed from their vicinity. If snow will be removed from the vicinity of the unheated structures, the frost cover should be increased to 2.4 m. Rigid insulation thermally

equivalent to the required soil cover may be used instead of the soil cover. Alternatively, a combination of rigid insulation and soil cover may be used to achieve the required frost protection for the footings.

The recommended factored geotechnical resistance at ULS and bearing pressure at SLS have been calculated by EXP from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of underground conditions becomes available. For example, more specific information is available with respect to conditions between boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field monitoring provided by an experienced geotechnical engineer to validate the information for use during the construction stage.

10. Floor Slab and Drainage Requirements

The floor slab for the proposed building may be designed and constructed as a slab-on-grade placed on a 200 mm thick 19 mm sized clear stone bed placed on a minimum 300 mm thick engineered fill pad set on the approved native subgrade constructed in accordance with Section 9 of this report. The clear stone would minimize the capillary rise of moisture from the sub-soil to the floor slab. Alternatively, the floor slab may be cast on a 200 mm thick bed of OPSS Granular A overlain by a vapour barrier. Adequate saw cuts should be provided in the floor slabs to control cracking.

It is recommended that a perimeter drainage system should be provided around the proposed school building. Based on the design finished floor elevation of Elevation 92.65 m and the groundwater level at Elevation 89.0 m to Elevation 86.7 m, an underfloor drainage system is not required for the proposed school building.

The floor slab should be set at a minimum of 150 mm higher than the surrounding final exterior grade.

The final exterior grade surrounding the proposed building should be sloped away from the proposed building to prevent ponding of surface water close to the exterior walls of the proposed building.

11. Excavation and De-Watering Requirements

11.1 Excess Soil Management

Ontario Regulation 406/19 specifies protocols that are required for the management and disposal of excess soils. As set forth in the regulation, specific analytical testing protocols need to be implemented and followed based on the volume of soil to be managed and the requirements of the receiving site. The testing protocols are specific as to whether the soils are stockpiled or in situ. In either scenario, the testing protocols are far more onerous than have been historically carried out as part of standard industry practices. These decisions should be factored in and accounted for prior to the initiation of the project-defined scope of work. EXP would be pleased to assist with the implementation of a soil management and testing program that would satisfy the requirements of Ontario Regulation 406/19.

11.2 Excavation

Excavations for the construction of footings and the installation of underground services are anticipated to extend to a maximum depth of 3.0 m below the existing grade and is anticipated to extend through the fill, topsoil (organic) surficial and buried layers and into the native silty clay/clayey silt and silty sand/sandy silt and are anticipated to be at or above the groundwater level.

Excavations maybe undertaken by conventional heavy equipment capable of removing debris within the fill and cobbles and boulders within the fill.

Open cut excavation within the subsurface soils should comply with the most recent Occupational Health and Safety Act (OHSA), Ontario Regulations 213/91 (August 1, 1991). Based on the definitions contained in OHSA, the subsurface soils at the site are classified as Type 3 soil and as such the excavation sidewalls must be cut back at 1H:1V from the bottom of the excavation. Below the groundwater table, the excavation side slopes are expected to slough and will eventually stabilize at a slope of 2H:1V to 3H:1V.

If side slopes noted above for the construction of the proposed building cannot be achieved due to space restrictions on site, such as the proximity of open cut excavations to the property limits or existing infrastructure, the excavation for the new building construction would have to be undertaken within the confines of an engineered support system (shoring system). If space restrictions prevent open cut excavations, the underground services may be installed within the confines of a prefabricated support system (trench box) which is designed and installed in accordance with the above-noted regulations.

The need for a shoring system, the most appropriate type of shoring system and the design and installation of the shoring system should be determined by the contractors bidding on this project. The design of the shoring system should be undertaken by a professional engineer experienced in shoring design and the installation of the shoring system should be undertaken by a contractor experienced in the installation of shoring systems. The shoring system should be designed and installed in accordance with latest edition of Ontario Regulation 213/91 under the OHSA and the 2006 Fourth Edition of the Canadian Foundation Engineering Manual (CFEM). The shoring system as well as adjacent settlement sensitive structures (buildings) and infrastructure should be monitored for movement (deflection) on a periodic basis during construction operations.

Excavations that terminate within the native silty clay/clayey silt or within the sandy silt/silty sand above the groundwater table are not expected to experience a base-heave type failure. Open cut excavations which extend below the groundwater level within the silty sand/sandy silt are susceptible to instability of the base of the excavation in the form of piping or heave. Should the excavations extend below the groundwater table, EXP should be contacted prior to the start of excavation to provide comments and recommendations to minimize instability of the excavation base.

The native clay and silt subgrades are susceptible to disturbance due to movement of construction equipment and personnel on its surface. It is therefore recommended that the excavation at the site should be undertaken by construction equipment that does not travel on the excavated surface, such as a gradall or mechanical shovel.

Many geologic materials deteriorate rapidly upon exposure to meteorological elements. Unless otherwise specifically indicated in this report, walls and floors of excavations must be protected from moisture, desiccation, and frost action throughout the course of construction.

11.3 De-Watering Requirements

Seepage of the surface and subsurface water into the excavations is anticipated. However, it should be possible to collect any water entering the excavations in perimeter ditches and to remove it by pumping from sumps. In areas of high infiltration or in areas where more permeable soil layers may exist, a higher seepage rate should be anticipated and will require high-capacity pumps to keep the excavation dry.

For construction dewatering, an Environmental Activity and Sector Registry (EASR) approval may be obtained for water takings greater than 50 m^3 and less than 400 m^3 per day. If more than 400 m^3 per day of groundwater are generated for dewatering purposes, then a Category 3 Permit to Take Water (PTTW) must be obtained from the Ministry of the Environment, Conservation and Parks (MECP). A Category 3 PTTW would require a complete hydrogeological assessment and would take at least 90 days for the MECP to process once the application is submitted.

Although this investigation has estimated the groundwater levels at the time of the fieldwork, and commented on dewatering and general construction problems, conditions may be present which are difficult to establish from standard boring and excavating techniques and which may affect the type and nature of dewatering procedures used by the contractor in practice. These conditions include local and seasonal fluctuations in the groundwater table, erratic changes in the soil profile, thin layers of soil with large or small permeabilities compared with the soil mass, etc. Only carefully controlled tests using pumped wells and observation wells will yield the quantitative data on groundwater volumes and pressures that are necessary to adequately engineer construction dewatering systems.

12. Pipe Bedding Requirements

The depth at which municipal services will be installed is anticipated to be a maximum of 3.0 m depth below grade. Based on this, the subgrade for the underground service pipes is expected to be either clayey silt/silty clay or sandy silt/silty sand.

The bedding for the underground services including material specifications, thickness of cover material and compaction requirements conform to municipal requirements and/or Ontario Provincial Standard Specification and Drawings (OPSS and OPSD).

It is recommended that the pipe bedding be 300 mm thick and consist of OPSS Granular A. The bedding material should be placed along the sides and on top of the pipe to provide a minimum cover of 300 mm. The bedding should be compacted to at least 98 percent of the SPMDD.

The bedding thickness may be further increased in areas where the subgrade becomes disturbed. Trench base stabilization techniques, such as the removal of loose/soft material, placement of additional sub-bedding, consisting of Ontario Provincial Standard Specification (OPSS) Granular B Type II completely wrapped in a non-woven geotextile, may be used if trench base disturbance becomes a problem in wet or soft/loose areas.

To minimize settlement of the pavement structure over services trenches, the trench backfill material within the frost zone, to 1.8 m depth below final grade, should match the existing material along the trench walls to minimize differential frost heaving of the subgrade soil, provided this material is compactible. Otherwise, frost tapers may be required.

If the backfill in the service trenches will consist of granular fill, clay seals should be installed in the service trenches at select intervals (spacing) as per City of Ottawa Drawing No. S8. The seals should be 1 m wide, extend over the entire trench width and from the bottom of the trench to the underside of the pavement structure. The clay should be compacted to 95 percent SPMDD. The purpose of the clay seals is to prevent the permanent lowering of the groundwater level.

The municipal services should be installed in short open trench sections that are excavated and backfilled the same day.

13. Backfilling Requirements and Suitability of On-Site Soils for Backfilling Purposes

The on-site soils to be excavated are fill, surficial and buried topsoil (organic soil), silty clay/clayey silt/clay and silty sand/sandy silt. Portions of the existing fill (free of debris, topsoil (organic soil), cobbles and boulders) and native soils (free of cobbles and boulders) from above the groundwater table may be re-used as fill material to raise the grades at the site to the design subgrade level in areas of the proposed play structure, sports field, parking lots, access roads and landscaped areas, provided that their moisture content remains within +/- 2 percent of the optimum value as established by ASTM Method D698-12e1. These soils are susceptible to moisture absorption due to precipitation and therefore should be protected from the elements if stockpiled on site. The suitability of re-using these soils should be assessed during early stages of construction. The native soils below the groundwater table are expected to be too wet for adequate compaction and should be discarded. They may, however, be used for general grading purposes in the landscape areas if left in the sun to dry or mixed with drier material. The existing topsoil (surficial and buried)/organic soil are not considered suitable for use as backfill material.

It is anticipated that the majority of the material required for backfilling purposes in the interior and exterior of the proposed building and for trench backfill would have to be imported and should preferably conform to the following specifications:

- Engineered fill under footings for the proposed school building and for the portables - OPSS 1010 Granular B Type II placed in 300 mm thick lifts and each lift compacted to 100 percent SPMDD,
- Engineered fill under the floor slab of the proposed school building - OPSS 1010 Granular B Type II placed in 300 mm thick lifts and each lift compacted to 98 percent SPMDD,
- Backfill material for footing trenches and against foundation walls located outside the proposed school building – OPSS 1010 Granular B Type II placed in 300 mm thick lifts and each lift compacted to 95 percent SPMDD,
- Trench backfill and subgrade fill should consist of OPSS 1010 Granular B Type II for the play structure and OPSS 1010 Select Subgrade Material (SSM) for the sports field, parking lot and access roads, placed in 300 mm thick lifts and each lift compacted to 95 percent SPMDD; and
- Fill for landscaped areas should be clean fill free of debris, topsoil (organic soil), cobbles and boulders placed in 300 mm thick lifts and each lift compacted to 92 percent SPMDD.

14. Access Roads and Parking Lots

The subgrade for the pavement structures is anticipated to consist of the native silts and clays, OPSS Granular B Type II material, OPSS Select Subgrade material (SSM) and approved on-site material. Pavement structure thicknesses required for the access roads and parking lots set on the anticipated approved subgrade materials were computed and are shown in Table VIII. The pavement structures assume a functional design life of 15 to 20 years. The proposed functional design life represents the number of years to the first rehabilitation, assuming regular maintenance is carried out.

Table VIII: Recommended Pavement Structure Thicknesses

Pavement Layer	Compaction Requirements	Computed Pavement Structures	
		Light Duty Traffic (Cars Only)	Heavy Duty Traffic (Buses and Trucks)
Asphaltic Concrete	92 percent to 97 percent MRD	65 mm HL3/SP12.5 mm/ Cat. B (PG 58-34)	50 mm HL3/SP12.5 Cat. B (PG 58-34) 60 mm HL8/SP 19 Cat. B (PG 58-34)
OPSS 1010 Granular A Base (crushed limestone)	100% percent SPMDD	150 mm	150 mm
OPSS 1010 Granular B Type II Sub-base	100% percent SPMDD	450 mm	600 mm

Notes:

1. SPMDD denotes standard Proctor maximum dry density, ASTM, D-698-12e2.
2. MRD denotes Maximum Relative Density, ASTM D2041.
3. The upper 300 mm of the subgrade fill must be compacted to 98% SPMDD.
4. The approved subgrade should be covered with a woven geotextile prior to placement of granular sub-base of the pavement structure.

The foregoing design assumes that construction is carried out during dry periods and that the subgrade is stable under the load of construction equipment. If construction is carried out during wet weather and, heaving or rolling of the subgrade is experienced, additional thickness of granular material may be required in addition to the woven geotextile indicated in Table VIII.

Additional comments on the construction of the parking lots and access roads are as follows:

1. As part of the subgrade preparation, the areas of the proposed parking area and access roads should be stripped of all existing fill, surficial and buried topsoil (organic) layers and organic stained soils down to the native undisturbed soil. The subgrade should be properly shaped, crowned, then proofrolled in the full-time presence of a representative of this office. Any soft or spongy subgrade areas detected should be sub excavated and properly replaced with suitable approved backfill compacted to 95 percent SPMDD (ASTM D698-12e2).
2. The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure that uniform subgrade moisture and density conditions are achieved. The need for adequate drainage cannot be over-emphasized. Subdrains should be installed on both sides of the access road(s). Subdrains must be installed in the proposed parking area at low points and should be continuous between catchbasins to intercept excess surface and subsurface moisture and to prevent subgrade softening. This will ensure no water collects in the granular course, which could result in pavement failure during the spring thaw. The location and extent of subdrains required within the paved areas should be reviewed by this office in conjunction with the proposed site grading.
3. To minimize the problems of differential movement between the pavement and catchbasins/manhole due to frost action, the backfill around the structures should consist of free-draining granular preferably conforming to OPSS

Granular B Type II material. Weep holes should be provided in the catchbasins/manholes to facilitate drainage of any water that may accumulate in the granular fill.

4. The most severe loading conditions on light-duty pavement areas and the subgrade may occur during construction. Consequently, special provisions such as restricted lanes, half-loads during paving, temporary construction roadways, etc., may be required, especially if construction is carried out during unfavorable weather.
5. The finished pavement surface should be free of depressions and should be sloped (preferably at a minimum cross fall of 2 percent) to provide effective surface drainage towards catch basins. Surface water should not be allowed to pond adjacent to the outside edges of paved areas.
6. Relatively weaker subgrade may develop over service trenches at subgrade level. These areas may require the use of thicker/coarser sub-base material and the use of a geotextile at the subgrade level. If this is the case, it is recommended that additional 150 mm thick granular sub-base, OPSS Granular B Type II, should be provided in these areas, in addition to the use of a geotextile at the subgrade level.
7. The granular materials used for pavement construction should conform to Ontario Provincial Standard Specifications (OPSS 1010) for Granular A and Granular B Type II and should be compacted to 100 percent of the SPMDD.

The asphaltic concrete used, and its placement should meet OPSS 1150 or 1151 requirements. It should be compacted from 92 percent to 97 percent of the MRD (ASTM D2041). Asphalt placement should be in accordance with OPSS 310 and OPSS 313.

It is recommended that EXP be retained to review the final pavement structure design and drainage plans prior to construction to ensure they are consistent with the recommendations of this report.

15. Corrosion Potential

Chemical tests limited to pH, sulphate, chloride and resistivity were undertaken on three (3) soil samples. A summary of the results is shown in Table IX. The laboratory certificate of analysis is shown in Appendix B.

Table IX: Corrosion Test Results on Soil Samples

Borehole – Sample No.	Depth (m)	Soil Type	pH	Sulphate (%)	Chloride (%)	Resistivity (ohm-cm)
BH 1 SS3	1.5 – 2.1	Silty Clay	7.72	0.0059	0.0009	6410
BH 3 SS5	3.0 – 3.5	Sandy Clayey Silt	8.24	0.0048	0.0006	5350
BH 8 SS7	4.6-5.0	Clayey Silt	8.23	0.0136	0.0004	3880

The results indicate the soils have a negligible sulphate attack on subsurface concrete. The concrete should be designed in accordance with CSA A.23.1-14.

The results of the resistivity tests indicate that tested soils are mildly corrosive to bare steel as per the National Association of Corrosion Engineers (NACE). Appropriate measures should be taken to protect the buried bare steel from corrosion.

16. Tree Planting Restrictions

Based on the results of the Atterberg limits of the clayey soils and comparison of the results with the City of Ottawa 2005 Clay Soils Policy and 2017 Tree Planting in Sensitive Marine Clay Soils Guidelines (2017 Tree Planting Guidelines), the clayey soils at this site are considered to have a low/medium potential for soil volume change. Therefore, the requirements for tree planting should be in accordance with the 2017 City of Ottawa Tree Planting Guidelines.

A landscape architect should be consulted to ensure the tree planting restrictions and setbacks from the proposed school development at the site are in accordance with the applicable City of Ottawa guidelines.

17. Additional Comments

All earthwork activities from subgrade preparation to placement and compaction of engineered fill, fill in service trenches, placement and compaction of granular materials and asphaltic concrete, should be inspected by qualified geotechnicians to ensure that construction proceeds according to the project specifications.

All the footing beds should be examined by a geotechnical engineer to ensure that the founding surfaces are capable of supporting the design bearing pressure and that the footing beds have been properly prepared.

18. General Comments

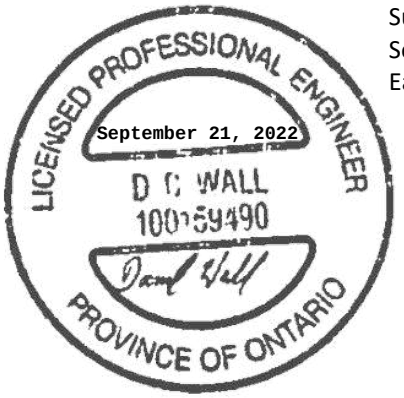
The comments given in this report are intended only for the guidance of design engineers. The number of test holes (boreholes and test pits) required to determine the localized underground conditions between test holes affecting construction costs, techniques, sequencing, equipment, scheduling, etc.,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

The information contained in this report is not intended to reflect on environmental aspects of the soils. Should specific information be required, including for example, the presence of pollutants, contaminants or other hazards in the soil, additional testing may be required.

We trust that the information contained in this report will be satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

Sincerely

Daniel Wall, M. Eng., P.Eng.
Geotechnical Engineer
Earth & Environment



Susan M. Potyondy, P.Eng.
Senior Project Manager
Earth & Environment

Figures

0 150m 300m 600m

HORIZONTAL 1:15,000

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DESIGN	IT/DW
DRAWN	AS
DATE	AUGUST 2022
FILE NO	OTT-22012013-A0

PROJECT NAME: PROPOSED NEW RIVERSIDE SOUTH CATHOLIC ELEMENTARY SCHOOL

PROJECT LOCATION: BRIAN GOOD AVENUE AND SOLARIUM AVENUE, OTTAWA, ON

SITE LOCATION PLAN

SCALE 1:15,000

SKETCH NO FIG 1

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LEGEND

- PROPERTY LINE
- SCHOOL BUILDING SITE PLAN
- **BH-1** (91.60m) — PROPOSED BOREHOLE NO. & LOCATION (GROUND SURFACE ELEVATION)
- **TP-1** (91.07m) — PROPOSED TEST PIT NO. & LOCATION (GROUND SURFACE ELEVATION)

NOTES:

1. THE BOUNDARIES AND SOIL TYPES HAVE BEEN ESTABLISHED ONLY AT BOREHOLE AND TEST PIT LOCATIONS. BETWEEN BOREHOLES AND TEST PITS THEY ARE ASSUMED AND MAY BE SUBJECT TO CONSIDERABLE ERROR.
2. SOIL SAMPLES WILL BE RETAINED IN STORAGE FOR THREE MONTHS AND THEN DESTROYED UNLESS THE CLIENT ADVISES THAT AN EXTENDED TIME PERIOD IS REQUIRED.
3. BOREHOLE AND TEST PIT ELEVATIONS SHOULD NOT BE USED TO DESIGN BUILDING(S) OR FLOOR SLABS OR PARKING LOT(S) GRADES.
4. TOPSOIL QUANTITIES SHOULD NOT BE ESTABLISHED FROM THE INFORMATION AT THE BOREHOLE AND TEST PIT LOCATIONS.
5. THIS DRAWING FORMS PART OF THE REPORT PROJECT NUMBER AS REFERENCED AND SHOULD BE USED ONLY IN CONJUNCTION WITH THIS REPORT.
6. BASE PLAN OBTAINED FROM DRAWING NO. A100–A DATED JULY 4, 2022 (REVISION 3) PREPARED BY PYE & RICHARDS – TEMPRANO & YOUNG ARCHITECTS INC.

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HORIZONTAL 1:1000

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DESIGN	IT/DW
DRAWN	AS
DATE	AUGUST 2022
FILE NO	OTT–22012013–A0

PROJECT NAME: PROPOSED NEW RIVERSIDE SOUTH CATHOLIC ELEMENTARY SCHOOL
PROJECT LOCATION: BRIAN GOOD AVENUE AND SOLARIUM AVENUE, OTTAWA, ON

TEST HOLE LOCATION PLAN

SCALE 1:1,000
SKETCH NO FIG 2

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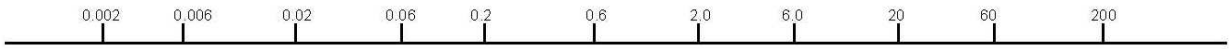
Notes On Sample Descriptions

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

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

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

UNIFIED SOIL CLASSIFICATION

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

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

Log of Borehole BH-01

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Date Drilled: 'July 15, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Figure No. 3

Split Spoon Sample ⊠ | Auger Sample ▮▯ | SPT (N) Value ○ | Dynamic Cone Test —— | Shelby Tube ■ | Shear Strength by Vane Test + S

Combustible Vapour Reading □ | Natural Moisture Content × | Atterberg Limits |—○—| | Undrained Triaxial at % Strain at Failure ⊕ | Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Silty clay, with topsoil inclusions and rootlets, brown, moist, (very loose)	91.6	0
		SANDY CLAYEY SILT Low plasticity, brown, moist, (firm)	91.1	
		SILTY CLAY Brown, wet, (very stiff)	90.2	1
		With silty sand seams and gravel below 2.6 m depth.		2
				3
		GLACIAL TILL Silty sand with gravel, cobbles and boulders, grey, moist, (very loose to dense)	88.0	
		Borehole advanced from 4.6 m to auger refusal at an 11.7 m depth under a column of water and using drilling mud.	87.8	4
				5
				6
				7
				8

Standard Penetration Test N Value: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES	Natural Unit Wt. kN/m³
SS1	
SS2	
SS3	17.7
SS4	17.4
SS5	
SS6	
SS7	
SS8	
SS9	

2 | 5 | 3 144 kPa | 3 110 kPa s=3.8 | 1 | 19 | 39 | 2 | 34

Continued Next Page

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	6.1	Open
August 22, 2022	3.8	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-01

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Figure No. 3

Page. 2 of 2

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		GLACIAL TILL Silty sand with gravel, cobbles and boulders, grey, moist, (very loose to dense) *(continued)*	83.6	8				
				9	39		SS10	
				10				
				11	48 then 50/50 mm		SS11	
		Auger Refusal at 11.7 m Depth	79.9					

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	6.1	Open
August 22, 2022	3.8	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-02

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Date Drilled: 'July 19, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Figure No. 4

Page. 1 of 1

Split Spoon Sample ⊠ | Auger Sample ▮▯ | SPT (N) Value ○ | Dynamic Cone Test ——— | Shelby Tube ■ | Shear Strength by Vane Test +S

Combustible Vapour Reading □ | Natural Moisture Content × | Atterberg Limits |—○—| | Undrained Triaxial at % Strain at Failure ⊕ | Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Clayey silt with sand, topsoil inclusions and rootlets, brown, moist, (very loose)	91.54	0
		SILTY CLAY Trace sand, brown, moist, (stiff to very stiff)	90.7	1
			89.3	2
		SILTY CLAY Trace sand, low plasticity, grey, wet, (firm to very stiff)		3
				4
				5
		GLACIAL TILL Silty sand, with gravel, cobbles and boulders, grey, moist, (very dense)	86.0	
			85.6	
		Borehole Terminated at 5.9 m Depth		

Standard Penetration Test N Value (20 40 60 80) / Shear Strength (50 100 150 200 kPa)

2 — 144 kPa — 8 — >120 kPa — 2 — 115 kPa, s=6.0 — 2 — 101 kPa, s=4.7 — 2 — 62 kPa, s=6.5 — 1 — 48 kPa, s=6.7 — 64

Combustible Vapour Reading (ppm) (250 500 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (20 40 60)

SAMPLES	Natural Unit Wt. kN/m³
SS1	
SS2	19.2
SS3	
SS4	17.4
SS5	
SS6	
SS7	
SS8	

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	3.0	Open

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-03

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Date Drilled: 'July 19, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Figure No. 5

Page. 1 of 1

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)

Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Clayey silt, with sand and rootlets, grey, moist, (loose)	91.59	0	4		SS1	
		SANDY CLAYEY SILT Low plasticity, brown to grey, moist, (very stiff)	90.5	1	4		SS2	
				2	4		SS3	
					>120 kPa			
					2		SS4	17.4
				3	>120 kPa			
					2		SS5	17.1
			87.8		>120 kPa			
		SILTY CLAY Grey to dark grey, wet, (firm to stiff)		4			ST6	
					96 kPa s=6.7			
				5	5		SS7	
					62 kPa s=5.2			
					3		SS8	
			85.4	6	48 kPa s=5.0			
		Borehole Terminated at 6.2 m Depth						

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	3.0	5.3

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole BH-04

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Date Drilled: 'July 19, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Figure No. 6

Page. 1 of 1

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits —○—
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sandy silty clay, with rootlets, brown to grey, moist, (very loose)	91.57	0	3		SS1	
				1	1		SS2	17.5
		SANDY SILT With shell fragments, brown, wet, (very loose to loose)	90.4	2	5		SS3	18.3
					Hammer Weight		SS4	
			88.6	3	2		SS5	
		CLAYEY SILT With silty sand seams, grey, wet, (stiff)			53 kPa s=4.4			
				4	2		SS6	
			87.37		62 kPa s=4.3			
		SILTY CLAY Low plasticity, grey, wet, (stiff)	87.1	5	1		SS7	
					82 kPa s=4.3			
				6			ST8	16.9
					62 kPa s=6.5			
		Borehole Terminated at 7.0 m Depth	84.6	7				

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	2.4	6.1
August 22, 2022	4.2	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-05

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 7

Page. 1 of 1

Date Drilled: 'July 14, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)

Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand with roots, rootlets and topsoil inclusions, brown, moist, (loose)	91.73	0	8		SS1	
				1	8		SS2	19.0
		SILTY CLAY Brown to grey, moist, (very stiff)	90.3	2	4		SS3	
					>120 kPa		SS4	17.7
				3	106 kPa s=6.3 2		SS5	
		GLACIAL TILL Silty sand with gravel, cobbles and boulders, grey, wet, (loose to dense)	88.1	4	48		SS6	
				5	6		SS7	
			85.8		7		SS8	
		Borehole Terminated at 5.9 m Depth						

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	3.4	Open

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole BH-06

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Date Drilled: 'July 18, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Figure No. 8

Page. 1 of 1

Split Spoon Sample ⊠ | Auger Sample ▮▯ | SPT (N) Value ○ | Dynamic Cone Test —— | Shelby Tube ■ | Shear Strength by Vane Test +S

Combustible Vapour Reading □ | Natural Moisture Content × | Atterberg Limits |—○—| | Undrained Triaxial at % Strain at Failure ⊕ | Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand, trace to some clay, with roots and rootlets, brown, moist, (very loose to loose)	91.68	0	3		SS1	
		Metal wire fragment at 1.3 m depth		1	8		SS2	20.8
			89.9		4		SS3	20.1
		CLAY High plasticity, brown to grey, moist, (very stiff)		2	>120 kPa; 4; >120 kPa		SS4	
			87.9	3	2; 115 kPa; s-4.8		SS5	
		GLACIAL TILL Silty sand with gravel, cobbles and boulders, grey, wet, (compact to very dense)		4	55		SS6	
				5	32		SS7	
			85.8		22		SS8	
		Borehole Terminated at 5.9 m Depth						

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	Open

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-07

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 9

Page. 1 of 1

Date Drilled: 'July 15, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)

Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand, trace to some clay, with roots and rootlets, brown, moist, (loose)	91.63	0	7		SS1	
		SANDY SILTY CLAY With silt partings, brown, moist, (soft to stiff)	90.7	1	11		SS2	19.2
				2	2		SS3	
		SILTY CLAY High plasticity, grey, wet, (firm to very stiff)	89.4	2	2		SS4	17.1
				3	120 kPa; 91 kPa; s=6.3		ST5	15.8
			88.63	3	86 kPa; s=4.8			
				4	2		SS6	
				4	72 kPa; s-6.0			
				5	2		SS7	
				5	53 kPa; s=5.5			
				6	2		SS8	
				6	48 kPa; s=5.0			
			85.5					
		Borehole Terminated at 6.1 m Depth						

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A 19 mm diameter standpipe installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	Open
August 22, 2022	3.0	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-08

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 10

Page. 1 of 1

Date Drilled: 'July 15, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○⊣
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sandy silt, with gravel. trace clay and rootlets, brown, moist, (very loose)	91.48	0	2		SS1	
			90.7					
		SILTY CLAY Trace sand, with silt partings, brown, moist, (soft to stiff)		1	8		SS2	18.2
				2	2		SS3	
			89.3					
		SILTY CLAY With silty sand seams, grey, wet, (stiff)			Hammer Weight		SS4	
			88.5	3	62 kPa, s=7.4			
		CLAYEY SILT With sand and shell fragments, low plasticity, grey, wet, (firm to very stiff)			2		SS5	
					>120 kPa			
				4	2		SS6	
					48 kPa, s=6.7			
					2		SS7	
				5	67 kPa, s=5.6			
			86.0		5		SS8	
		SILTY CLAY Grey, moist, (very stiff)			101 kPa, s=3.5			
			85.4	6				
		Borehole Terminated at 6.1 m Depth						

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS		
Date	Water Level (m)	Hole Open To (m)
Upon Completion	1.5	Open

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole BH-09

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 11

Page. 1 of 1

Date Drilled: 'July 14, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)
Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty clay with sand, rootlets and topsoil inclusions, brown, moist, (loose)	91.76 / 91.5	0	8		SS1	18.3
		SILTY CLAY With sand seams, brown, moist, (stiff to very stiff)		1	9; 144 kPa		SS2	
				2	3; >120 kPa		SS3	17.1
					2; 96 kPa; s=5.7		SS4	
		SILTY CLAY Grey, wet, (very soft)	88.9 / 88.96	3	2		SS5	
		GLACIAL TILL Silty sand with gravel, cobbles and boulders, grey, wet, (loose to compact)	88.2	4	15		SS6	
				5	6		SS7	
					17		SS8	
		Borehole Terminated at 5.9 m Depth	85.9					

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. A 19 mm diameter standpipe installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	3.7	Open
August 22, 2022	2.8	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-10

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 12

Page. 1 of 1

Date Drilled: 'July 14, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)

Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand, with clay pockets, gravel, roots, rootlets, topsoil pockets, brown, moist, (very loose to loose)	91.77	0	3		SS1	
				1	9		SS2	20.4
		SILTY CLAY Brown, moist, (very stiff) Silty sand seam at 1.5 m depth	90.3	2	4; >120 kPa		SS3	
					2; 115 kPa, s=6.0		SS4	17.9
			88.1	3	3		SS5	
		CLAYEY SILT Low plasticity, grey, wet, (stiff)		4	3; 72 kPa, s=7.5		SS6	
		GLACIAL TILL Silty sand with gravel, cobbles and boulders, grey, wet, (compact to dense)	87.1	5	17		SS7	
			85.9		48		SS8	
		Borehole Terminated at 5.9 m Depth						

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	4.3	Open

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole BH-11

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 13

Page. 1 of 1

Date Drilled: 'July 14, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)

Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand, writh rootlets and brick fragments, brown, moist, (loose)	91.67	0	4		SS1	
		SILTY CLAY Brown, moist, (stiff)	90.8	1	13		SS2	21.9
		CLAYEY SANDY SILT Brown grey, wet, (very loose)	90.3	2	3		SS3	
		SILTY CLAY Brown, moist, (very stiff)	89.5		>120 kPa		SS4	17.9
					6			
				3	>120 kPa		SS5	
			88.0 88.07		2			
		SILTY CLAY Grey, wet, (stiff)			>120 kPa		SS6	
				4	2			
					86 kPa		SS7	
					s=5.1			
			86.4	5	2			
		GLACIAL TILL Silty sand with gravel, cobbles and boulders, grey, wet, (dense)	85.8		33		SS8	
		Borehole Terminated at 5.9 m Depth						

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	4.3	Open
August 22, 2022	3.6	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-12

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Date Drilled: 'July 14, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Figure No. 14

Split Spoon Sample ⊠ | Auger Sample ▮▯ | SPT (N) Value ○ | Dynamic Cone Test —— | Shelby Tube ■ | Shear Strength by Vane Test +S

Combustible Vapour Reading □ | Natural Moisture Content × | Atterberg Limits |—○—| | Undrained Triaxial at % Strain at Failure ⊕ | Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand with gravel, cobbles, boulders and topsoil inclusions, black to brown, moist (loose)	91.52	0	9		SS1	
		SANDY SILT Some clay, brown, moist, (loose)	90.6	1	7		SS2	17.9
				2	4		SS3	
		SILTY CLAY Grey, moist to wet, (stiff to very stiff)	89.3		>120 kPa			
				3	3		SS4	
					2		SS5	17.0
				4	>120 kPa			
					2		SS6	
					>120 kPa			
			86.72	5	58 kPa s=8.0		ST7	
		CLAYEY SILT Grey, wet, (firm)	85.8	6	Hammer Weight		SS8	
				7	38 kPa s=8.0			
		SILTY SAND With gravel, trace clay, grey, wet, (very loose)	84.3	8	3		SS9	

Continued Next Page

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	6.1	Open
August 22, 2022	4.8	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole BH-12

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Figure No. 14

Page. 2 of 2

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		SILTY SAND With gravel, trace clay, grey, wet, (very loose) *(continued)*	83.52	8				
		GLACIAL TILL Silty sand with gravel, cobbles and boulders, grey, wet, (compact to dense)	82.8	9	38		SS10	
		Silty sand heaving up into the augers from 7.6 m to 9.1 m depths		10				
		Difficult augering from 9.8 m to 11.6 m depths		11	45		SS11	
				12	14		SS12	
		Difficult augering from 12.5 m to 13.4 m depths	78.1	13				
		Auger Refusal at 13.4 m Depth						

Standard Penetration Test N Value: 20 40 60 80

Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	6.1	Open
August 22, 2022	4.8	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-13

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 15

Page. 1 of 1

Date Drilled: 'July 19, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)
Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty clay, some sand, with rootlets, grey, moist (very loose)	91.33	0	Hammer Weight		SS1	
			90.6					
		SILTY CLAY Brown to grey, moist, (very stiff)		1	6 144 kPa		SS2	17.4
			89.8					
		CLAYEY SILT Shell fragments, grey, wet, (very stiff)		2	4 120 kPa		SS3	16.9
				3	1		SS4	
					1		SS5	
				4	2		SS6	
			86.7					
		Borehole Terminated at 4.6 m Depth						

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	2.1	Open

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-14

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 16

Page. 1 of 1

Date Drilled: 'July 19, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)

Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sandy silt, with rootlets, brown, moist, (very loose to loose)	91.59	0	4		SS1	
					3		SS2	19.0
			90.5	1				
		SILTY CLAY Brown to grey, moist, (very stiff)			4		SS3	17.7
				2	144 kPa			
					1		SS4	
				3	2		SS5	
				4	2		SS6	
			87.0					
		Borehole Terminated at 4.6 m Depth						

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	2.7	Open

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-15

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 17

Page. 1 of 1

Date Drilled: 'July 19, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sandy silt, with rootlets, brown, moist, (very loose to loose)	91.25	0	3		SS1	
					4		SS2	20.5
		SILTY CLAY Brown, moist, (very soft)	90.2	1				
					2		SS3	17.3
		CLAYEY SANDY SILT Brown, moist, (very loose/very soft)	89.3	2	1		SS4	
			88.4	3	1		SS5	
		SILTY CLAY Grey, wet, (very soft)						
				4	2		SS6	
			86.7					
		Borehole Terminated at 4.6 m Depth						

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	3.0	Open

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Borehole BH-16

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Date Drilled: 'July 19, 2022

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: AN Checked by: DW

Figure No. 18

Page. 1 of 1

Split Spoon Sample ⊠ | Auger Sample ▮▯ | SPT (N) Value ○ | Dynamic Cone Test ——— | Shelby Tube ■ | Shear Strength by Vane Test +S

Combustible Vapour Reading □ | Natural Moisture Content × | Atterberg Limits ⊢○ | Undrained Triaxial at % Strain at Failure ⊕ | Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand, trace clay, with rootlets, dark brown, moist, (loose)	91.23	0	4	×	SS1	
			90.5					
		TOPSOIL ~ 200 mm thick	90.3		4	×	SS2	20.1
		CLAYEY SILT Trace sand, brown, moist, (very soft to soft)		1				
					3	×	SS3	18.3
				2				
					1	×	SS4	
			88.3	3				
		SILTY CLAY Grey to dark grey, wet, (very soft)			1	×	SS5	
				4				
					2	×	SS6	
			86.6					
		Borehole Terminated at 4.6 m Depth						

Standard Penetration Test N Value: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-22012013-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	3.0	Open

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-01

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 19

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits —⊖
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Sandy silt, with gravel, cobbles, topsoil inclusions and rootlets, brown, moist	91.07	0
		TOPSOIL ~ 200 mm thick	90.4	
		SANDY CLAYEY SILT Brown, moist	90.2	1
		SILTY CLAY Brown to grey, moist	89.6	
		Test Pit Terminated at 2.2 m Depth	88.9	2

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES	Natural Unit Wt. kN/m³
GS1	
GS2	

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-02

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 20

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sand silt to silty sand, with rootlets, and cobbles, brown, moist	91.45	0	Shear Strength: 50 100 150 200 kPa	Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60		
		TOPSOIL ~ 400 mm thick	91.1					
		SILTY SAND With rootlets, brown, moist	90.7	1		×	GS1	
		SILTY CLAY With sand, brown, moist	90.0				GS2	
		Test Pit Terminated at 2.1 m Depth	89.4	2		×		

Standard Penetration Test N Value: 20 40 60 80

Combustible Vapour Reading (ppm): 250 500 750

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-03

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 21

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa (20 40 60 80 / 50 100 150 200)	Combustible Vapour Reading (ppm) 250 500 750 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 20 40 60	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sandy silt, with rootlets, brown, moist	91.06	0				
		TOPSOIL ~ 400 mm thick	90.7					
		SANDY CLAYEY SILT Grey, moist	90.3	1		×	GS1	
		SILTY CLAY Brown, moist	89.7				GS2	
		Test Pit Terminated at 2.1 m Depth	89.0	2		×		

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-04

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 22

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Sandy silt, with rootlets, brown, moist	91.41	0
		TOPSOIL ~ 400 mm thick	91.1	
		FILL Sand silt, with gravel, cobbles, boulders, rootlets and wood fragments, brown, moist	90.7	
		TOPSOIL ~ 300 mm thick	90.4	1
		SILTY CLAY With sand, brown, moist	90.1	
		SILTY CLAY Brown, moist	89.7	
		Test Pit Terminated at 2.1 m Depth	89.3	2

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES: GS1, GS2

Natural Unit Wt. kN/m³

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-05

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 23

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Sandy silt to silty sand, with rootlets, cobbles and boulders, brown, moist	91.11	0
		TOPSOIL ~ 200 mm thick	90.2 90.0	
		SILTY CLAY With sand, brown to grey, moist		1
				2
		Test Pit Terminated at 2.2 m Depth	88.9	

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES: GS1, GS2

Natural Unit Wt. kN/m³

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-06

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 24

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sandy silt, brown, moist	91.45	0	20 40 60 80 / 50 100 150 200 kPa	250 500 750 / 20 40 60		
		TOPSOIL ~ 400 mm thick	91.3					
		FILL Sandy silt, with roots, topsoil inclusions and metal debris, brown, moist	90.9					
		SILTY CLAY With sand, brown, moist	90.3	1		×	GS1	
		SILTY SAND With clay, brown, moist	89.7	2		×	GS2	
		Test Pit Terminated at 2.4 m Depth	89.1					

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-07

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 25

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sandy silt, brown, wet	91.61	0	20 40 60 80 / 50 100 150 200 kPa	250 500 750 / 20 40 60		
		TOPSOIL ~ 450 mm thick	91.4					
		FILL Sandy silt with clay, rootlets and wood fragments, brown, moist	90.9	1			GS1	
		SANDY CLAYEY SILT Brown, moist	90.4					
				2				
		Test Pit Terminated at 2.3 m Depth	89.3					

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-08

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 26

Page. 1 of 1

Date Drilled: 'August 08, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—⊖
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand, brown, moist	92.33	0				
			91.6					
		TOPSOIL ~ 100 mm thick	91.5					
		SILTY SAND Brown, moist		1			GS1	
			90.6					
		SILTY CLAY With sand and gravel, grey, moist	90.3	2			GS2	
		Test Pit Terminated at 2.0 m Depth						

Standard Penetration Test N Value: 20 40 60 80
Shear Strength kPa: 50 100 150 200
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-09

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 27

Page. 1 of 1

Date Drilled: 'August 08, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand, with gravel, rootlets and organics, brown, moist	92.01	0	20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60		
			91.3					
		FILL Silty sand and gravel, brown, moist	91.0					
		SILTY SAND With clay, brown, moist		1		×	GS1	
			90.2					
		CLAYEY SILT With sand and gravel, brown grey, moist		2		×	GS2	
			89.6					
		Test Pit Terminated at 2.4 m Depth						

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	1.0	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-10

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 28

Page. 1 of 1

Date Drilled: 'August 08, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Silty sand with gravel, cobbles and rootlets, brown, moist	92.64	0
		TOPSOIL ~ 300 mm thick	92.3	
		SILTY SAND With clay and gravel, brown, moist	92.0	
				1
			91.0	
		CLAYEY SILT With sand and gravel, brown grey, moist	90.7	
		Test Pit Terminated at 1.9 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES: GS1

Natural Unit Wt. kN/m³

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-11

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 29

Page. 1 of 1

Date Drilled: 'August 09, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Sandy silt, brown, wet	91.32	0
		TOPSOIL ~ 300 mm thick	91.0	
		SILTY CLAY Brown, moist	90.7	
				1
		CLAYEY SILT With sand and clay pockets, brown, moist	89.9	
				2
		Test Pit Terminated at 2.3 m Depth	89.0	

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES: GS1 (1), GS2 (2)

Natural Unit Wt. kN/m³

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-12

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 30

Page. 1 of 1

Date Drilled: 'August 09, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sandy silt, brown, wet	91.63	0	20 40 60 80 / 50 100 150 200 kPa	250 500 750 / 20 40 60		
		TOPSOIL ~ 300 mm thick	91.3					
		SANDY SILT With clay, brown, moist	91.0					
				1		×	GS1	
		SANDY CLAYEY SILT Brown, moist	90.4					
				2		×	GS2	
		Test Pit Terminated at 2.2 m Depth	89.4					

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-13

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 31

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—⊖
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Sandy silt, with rootlets, brown, wet	91.59	0
		TOPSOIL ~ 200 mm thick	91.2	
		FILL Sandy silt, with gravel, brown, moist	91.0	
		TOPSOIL ~ 200 mm thick	90.7	
		Brown, moist	90.5	1
		CLAYEY SILT Brown, moist		
		SILTY CLAY Brown, moist	89.9	
		Test Pit Terminated at 2.2 m Depth	89.4	2

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES	Natural Unit Wt. kN/m³
GS1	
GS2	

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-14

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 32

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits —⊖
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Sandy silt, with rootlets, brown, moist	91.09	0	20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60		
		TOPSOIL ~ 400 mm thick	90.8					
		CLAYEY SILT With sand, brown, moist	90.4	1		×	GS1	
		SILTY CLAY Brown, moist	89.7					
			88.9	2		×	GS2	
		Test Pit Terminated at 2.2 m Depth						

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	2.0	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-15

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 33

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Sandy silt to silty sand, with rootlets, brown, moist	91.09	0
		TOPSOIL ~ 400 mm thick Dark brown, moist	90.8	
		SILTY CLAY Brown to reddish brown, moist	90.4	1
			89.1	2
		Test Pit Terminated at 2.0 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES	Natural Unit Wt. kN/m³
GS1	
GS2	

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	1.7	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-16

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 34

Page. 1 of 1

Date Drilled: 'August 10, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Sandy silt to silty sand, with gravel, rootlets and wood fragments, brown, moist	91.75	0
		TOPSOIL ~ 700 mm thick Dark brown, moist	91.3	
		SILTY CLAY With sand and rootlets, brown, moist	90.6	1
		CLAYEY SILT With sand, roots/rootlets and organic pockets, brown, moist	90.0	
		Test Pit Terminated at 2.2 m Depth	89.6	2

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES	Natural Unit Wt. kN/m³
GS1	
GS2	

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-17

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Date Drilled: 'August 09, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Figure No. 35

Page. 1 of 1

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		FILL Sandy silt, with rootlets and organic stains, brown, moist	92.23	0
			90.7	
		TOPSOIL ~ 200 mm thick Dark brown, moist	90.5	
		SILTY SAND With rootlets, brown, moist		1
			89.8	2
		Test Pit Terminated at 2.4 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES: GS1

Natural Unit Wt. kN/m³

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-18

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 36

Page. 1 of 1

Date Drilled: 'August 09, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa (20 40 60 80 / 50 100 150 200)	Combustible Vapour Reading (ppm) 250 500 750 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 20 40 60	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand, with gravel, cobbles, boulders and rootlets, brown, moist	91.87	0				
		TOPSOIL ~ 400 mm thick With rootlets, dark brown, moist	91.6					
		SILTY CLAY Brown, moist	91.2	1		×	GS1	
				2		×	GS2	
		Test Pit Terminated at 2.4 m Depth	89.4					

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

Log of Test Pit TP-19

Project No: OTT-22012013-A0

Project: Proposed New Riverside South Catholic Elementary School

Location: Brian Good Avenue and Solarium Avenue, Ottawa, ON

Figure No. 37

Page. 1 of 1

Date Drilled: 'August 08, 2022

Drill Type: Excavator

Datum: Geodetic Elevation

Logged by: GC Checked by: DW

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits —⊖—
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty sand, with clay, gravel, cobbles and boulders, rootlets, organics and wood fragments, brown, moist	92.86	0	20 40 60 80 / 50 100 150 200 kPa	250 500 750 / 20 40 60		
			91.9	1		×	GS1	
		SANDY SILT With gravel and pockets of silty clay, brown, moist	91.1			×	GS2	
		Test Pit Terminated at 1.8 m Depth						

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Testpit backfilled upon completion of excavation.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-22012013-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	Dry	

CORE DRILLING RECORD

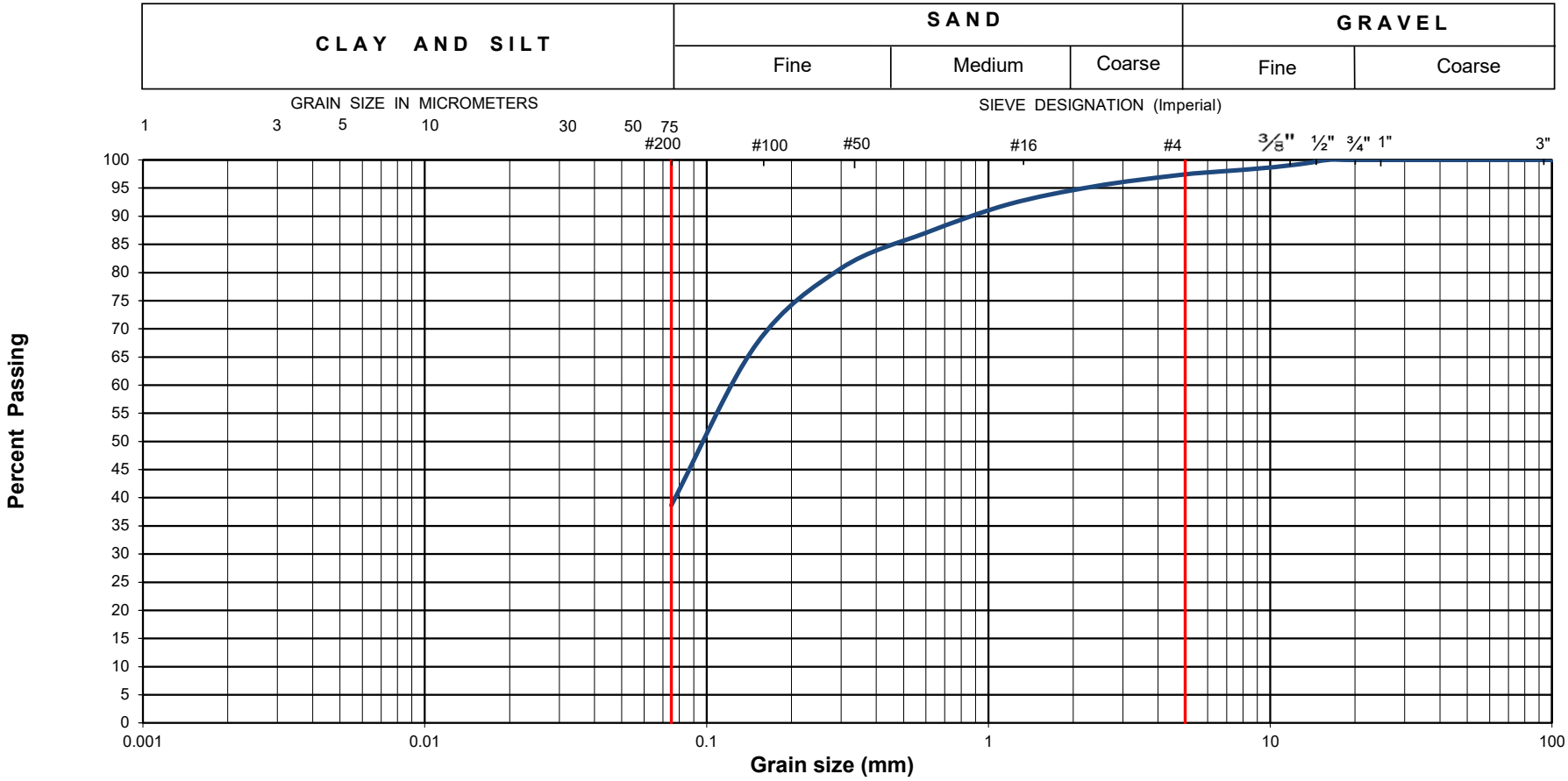
Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT OTT-22012013-A0 LOGS AUGUST 25 2022.GPJ TROW OTTAWA.GDT 8/31/22

EXP Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Grain-Size Distribution Curve
Method of Test For Sieve Analysis of Aggregate
ASTM C-136

Unified Soil Classification System

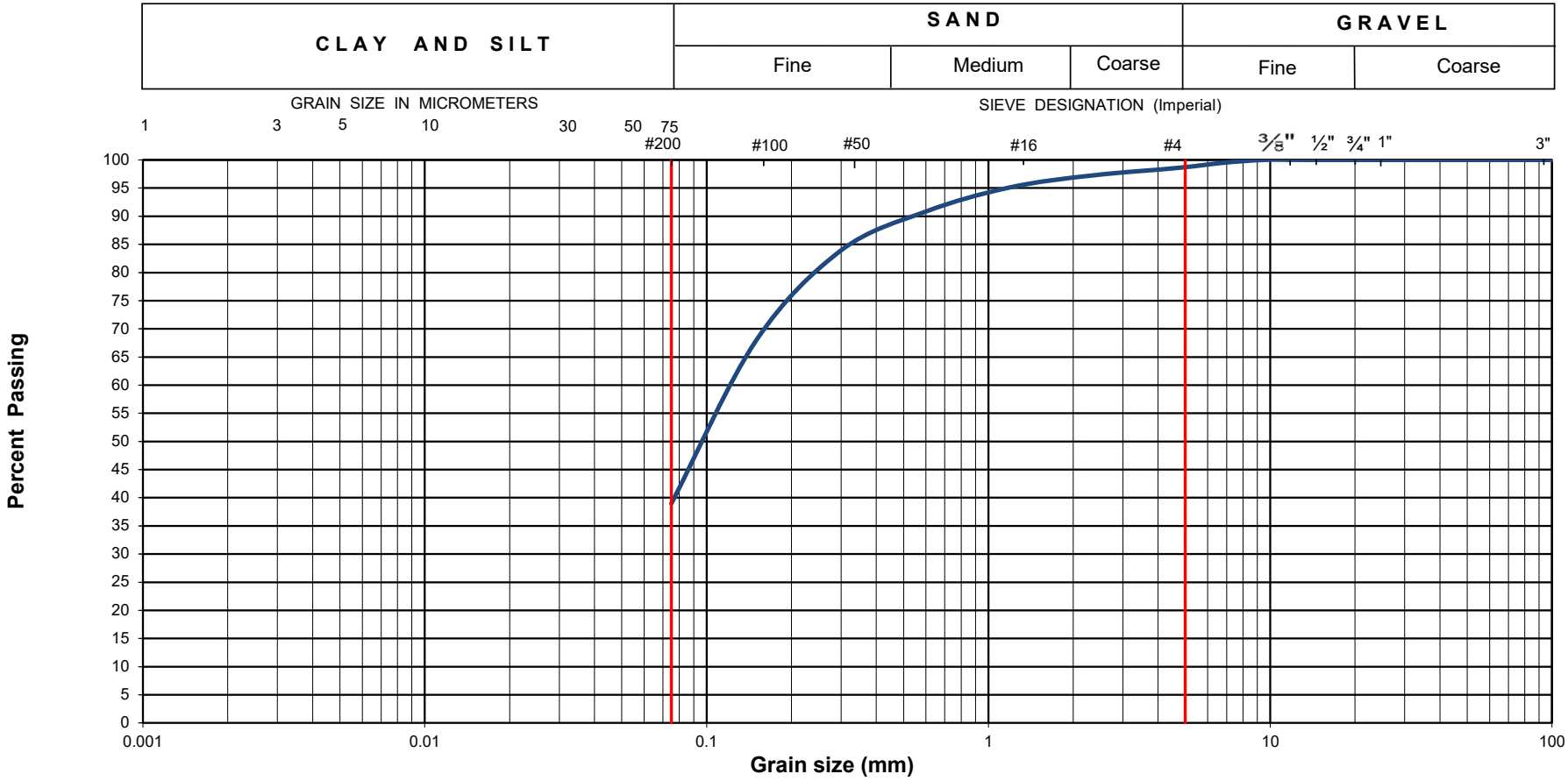


EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa**						
Date Sampled :	**July 15, 2022**	**Borehole No:**	**BH7**		**Sample:**	**SS1**		**Depth (m) :**	**0-0.6**
Sample Composition :		**Gravel (%)**	**3**	**Sand (%)**	**58**	**Silt & Clay (%)**	**39**	**Figure :**	**38**
Sample Description :		**FILL: Silty Sand (SM)**							

EXP Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Grain-Size Distribution Curve
Method of Test For Sieve Analysis of Aggregate
ASTM C-136

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**					
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa**					
Date Sampled :	**July 14, 2022**	**Borehole No:**	**BH10**	**Sample:**	**SS1**	**Depth (m) :**	**0-0.6**	
Sample Composition :		**Gravel (%)**	**1**	**Sand (%)**	**60**	**Silt & Clay (%)**	**39**	**Figure :** **39**
Sample Description :		**FILL: Silty Sand (SM)**						

EXP Services Inc.
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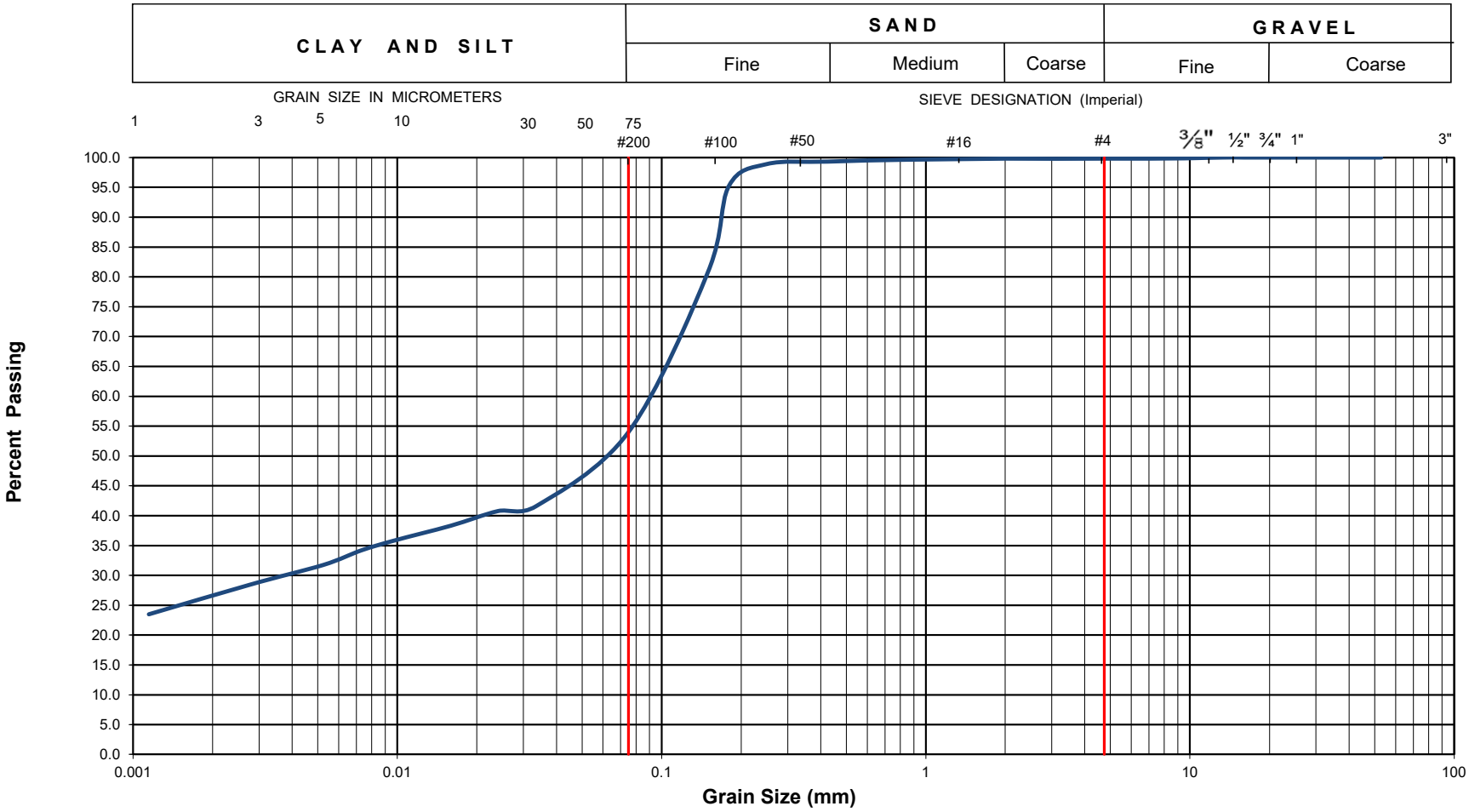
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 19, 2022**	**Borehole No:**	**BH4**		**Sample No.:**	**SS3**		**Depth (m) :**	**1.5-2.1**
Sample Description :		**% Silt and Clay**	**54**	**% Sand**	**46**	**% Gravel**	**0**	**Figure :**	**40**
Sample Description :		**Sandy Silt (ML)**							

EXP Services Inc.
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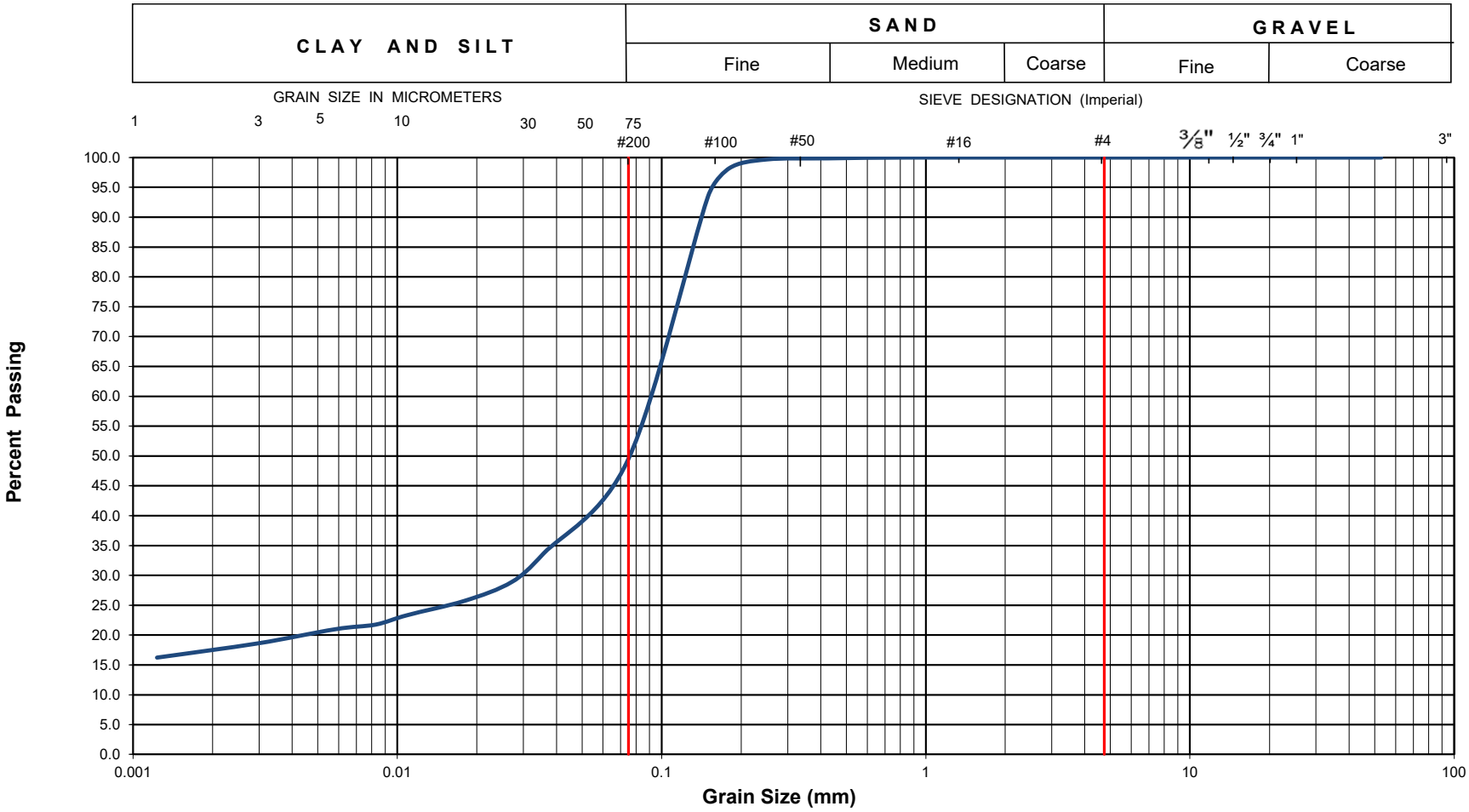
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 19, 2022**	**Borehole No:**	**BH4**	**Sample No.:**	**SS4**	**Depth (m) :**	**2.3-2.9**		
Sample Description :		**% Silt and Clay**	**50**	**% Sand**	**50**	**% Gravel**	**0**	**Figure :**	**41**
Sample Description :		**Sandy Silt (ML)**							

EXP Services Inc.
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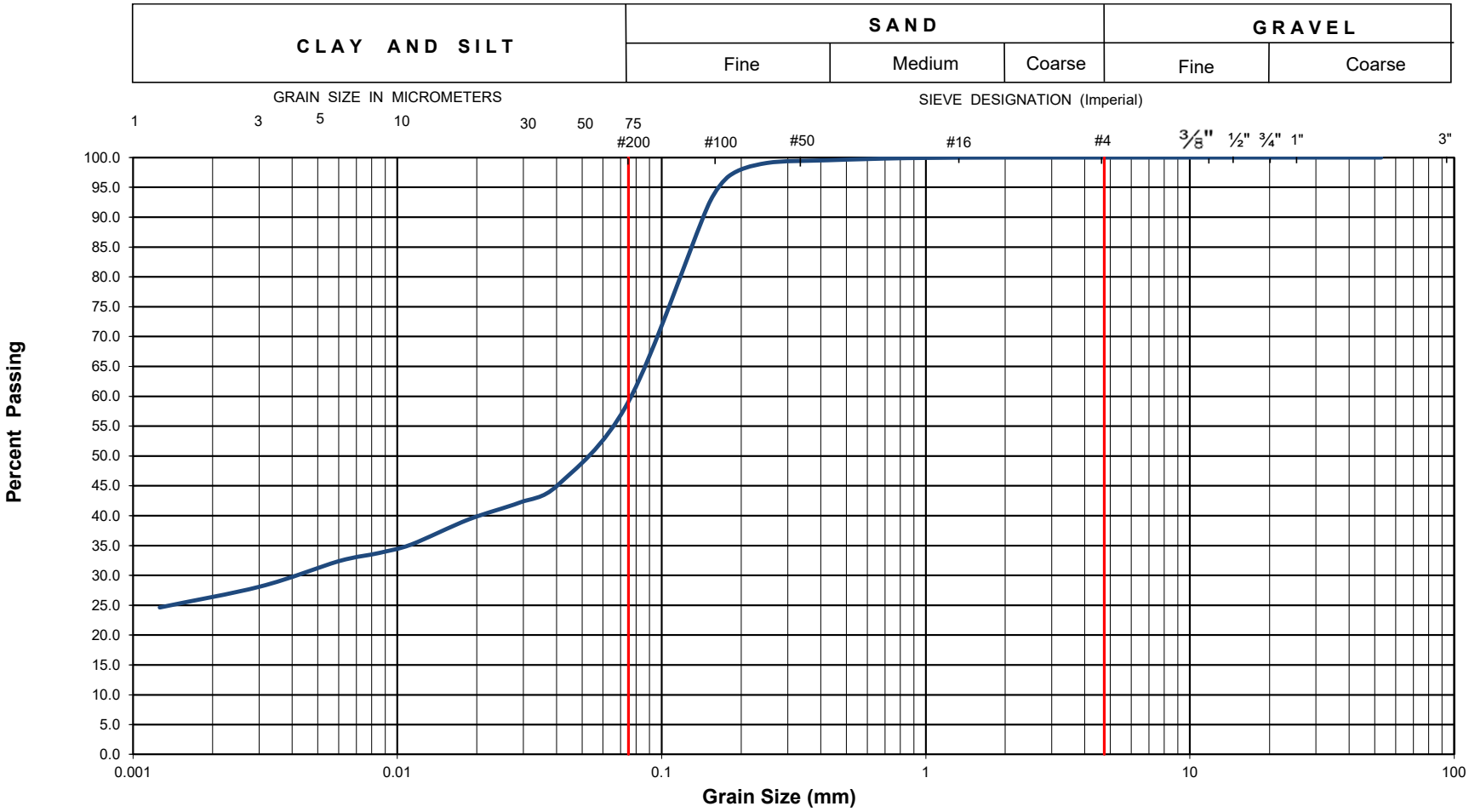
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed Findlay Creek Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 15, 2022**	**Borehole No:**	**BH1**	**Sample No.:**	**SS2**	**Depth (m) :**	**0.8-1.4**		
Sample Description :		**% Silt and Clay**	**59**	**% Sand**	**41**	**% Gravel**	**0**	**Figure :**	**42**
Sample Description :		**Sandy Clayey Silt of Low Plasticity (CL)**							

EXP Services Inc.
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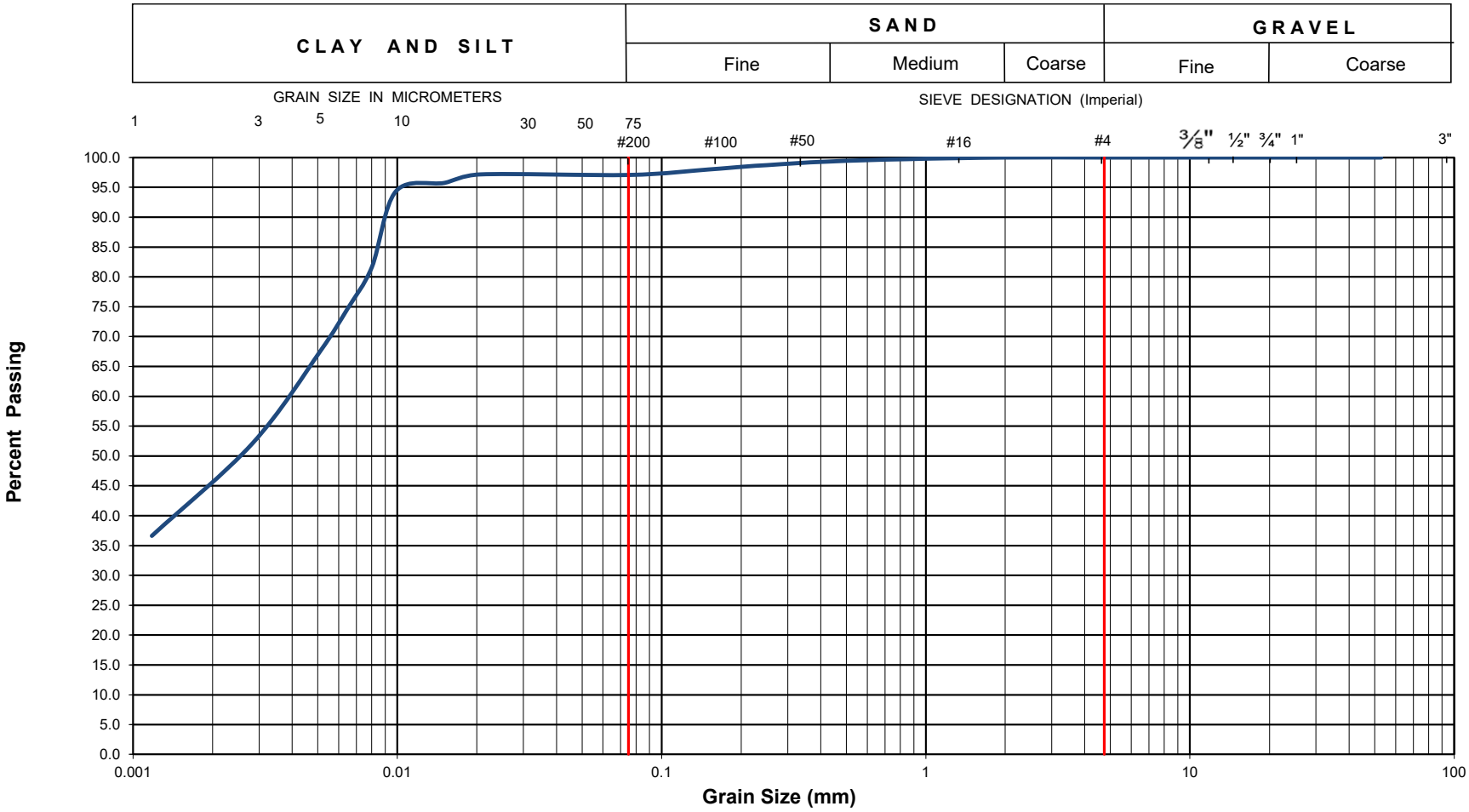
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 18, 2022**	**Borehole No:**	**BH2**		**Sample No.:**	**SS7**		**Depth (m) :**	**4.6-5.2**
Sample Description :		**% Silt and Clay**	**97**	**% Sand**	**3**	**% Gravel**	**0**	**Figure :**	**43**
Sample Description :		**Silty Clay of Low Plasticity (CL)**							

EXP Services Inc.
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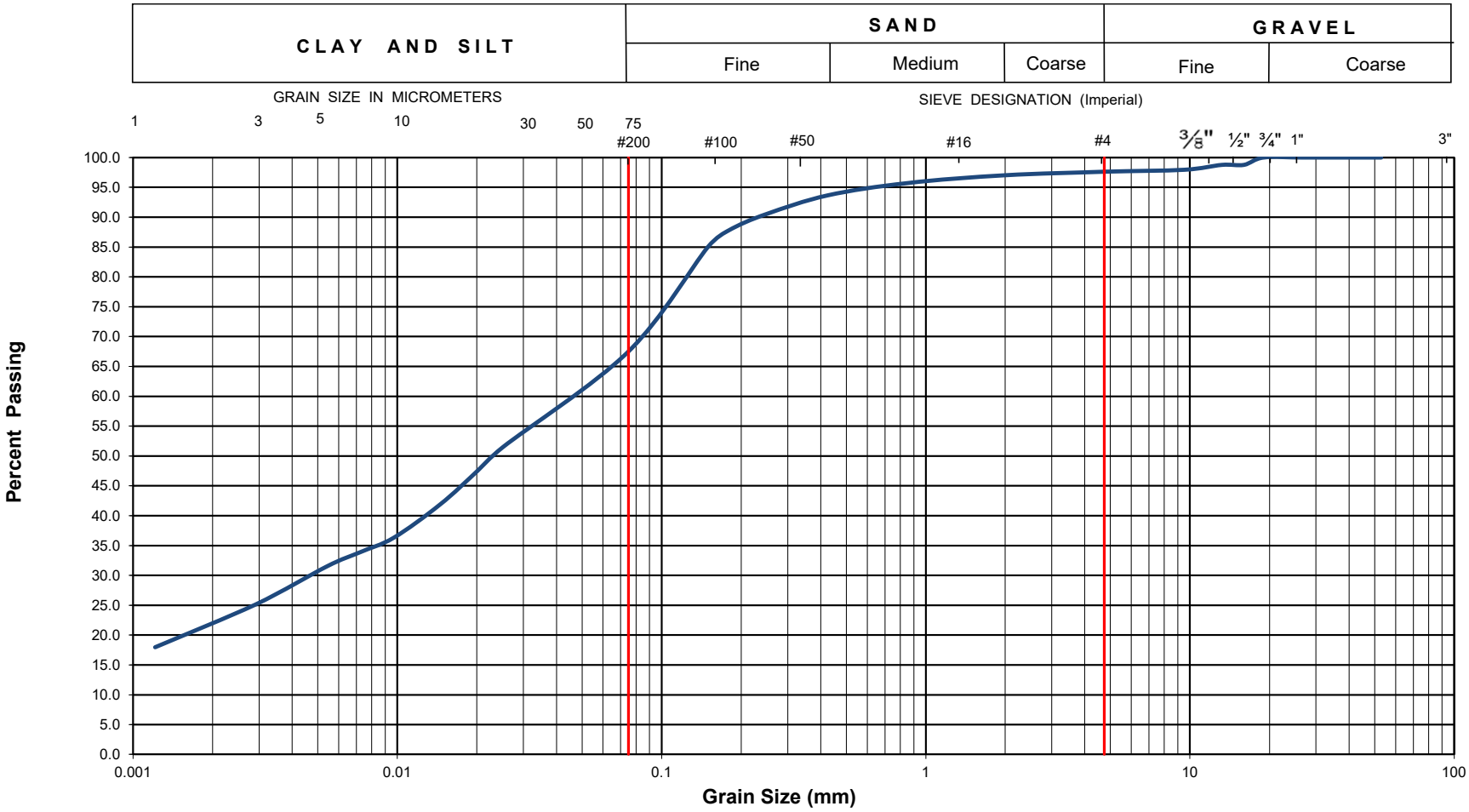
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 19, 2022**	**Borehole No:**	**BH3**		**Sample No.:**	**SS2**		**Depth (m) :**	**0.8-1.4**
Sample Description :		**% Silt and Clay**	**68**	**% Sand**	**30**	**% Gravel**	**2**	**Figure :**	**44**
Sample Description :		**Sandy Clayey Silt of Low Plasticity (CL)**							

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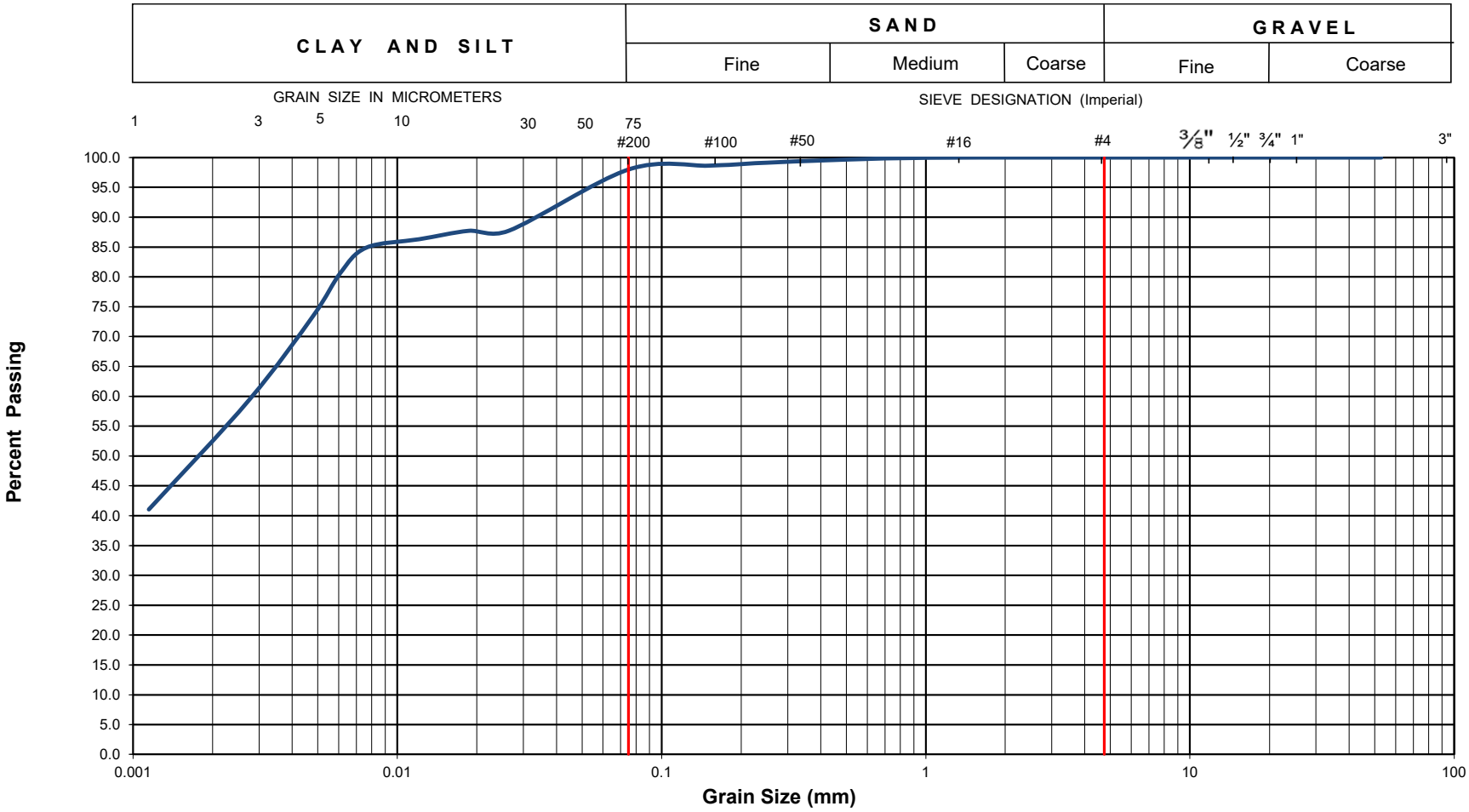
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 19, 2022**	**Borehole No:**	**BH4**		**Sample No.:**	**ST 8**		**Depth (m) :**	**6.1-6.7**
Sample Description :		**% Silt and Clay**	**98**	**% Sand**	**2**	**% Gravel**	**0**	**Figure :**	**45**
Sample Description :		**Silty Clay of Low Plasticity (CL)**							

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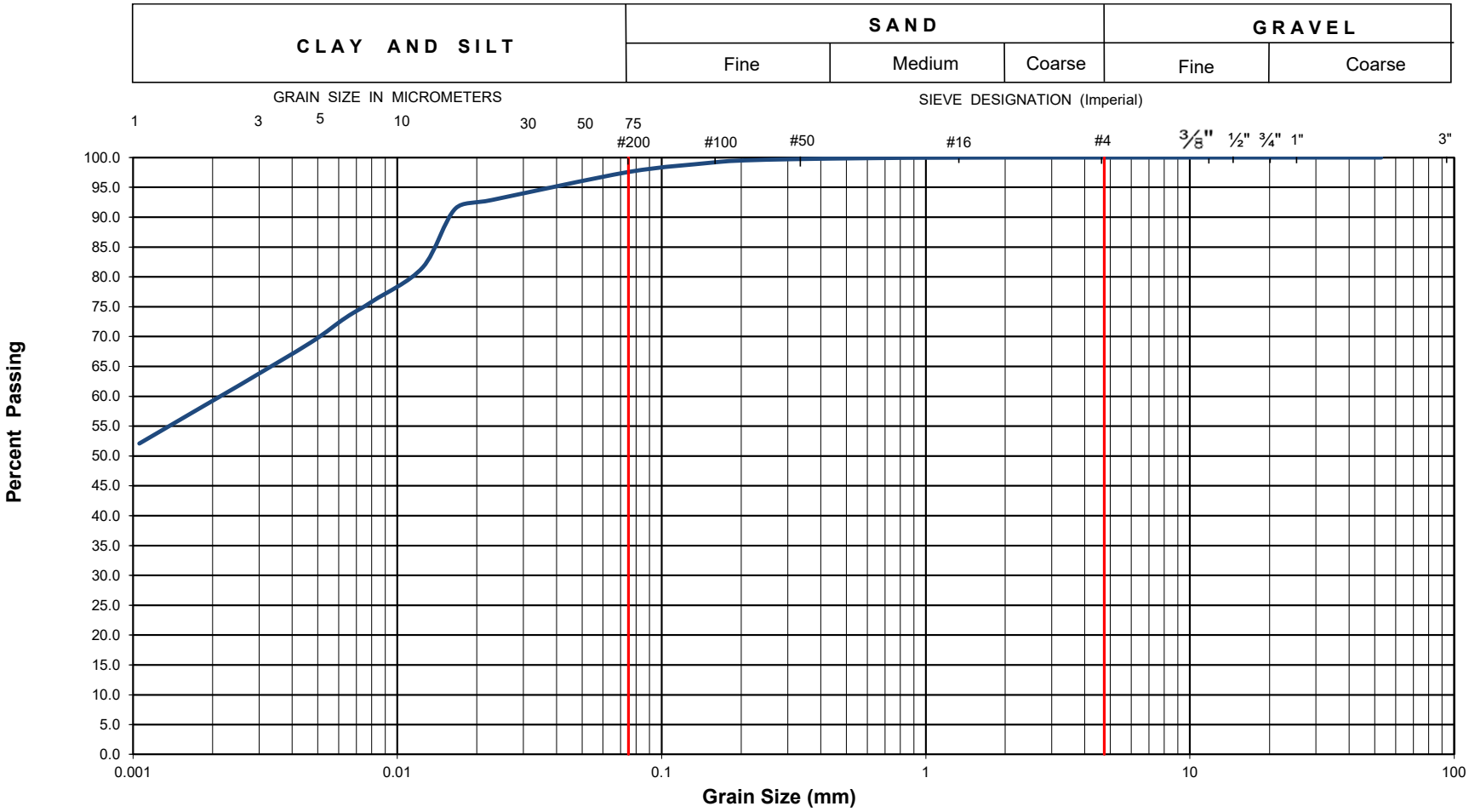
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 18, 2022**	**Borehole No:**	**BH6**		**Sample No.:**	**SS4**		**Depth (m) :**	**2.3-2.9**
Sample Description :		**% Silt and Clay**	**98**	**% Sand**	**2**	**% Gravel**	**0**	**Figure :**	**46**
Sample Description :		**Clay of High Plasticity (CH)**							

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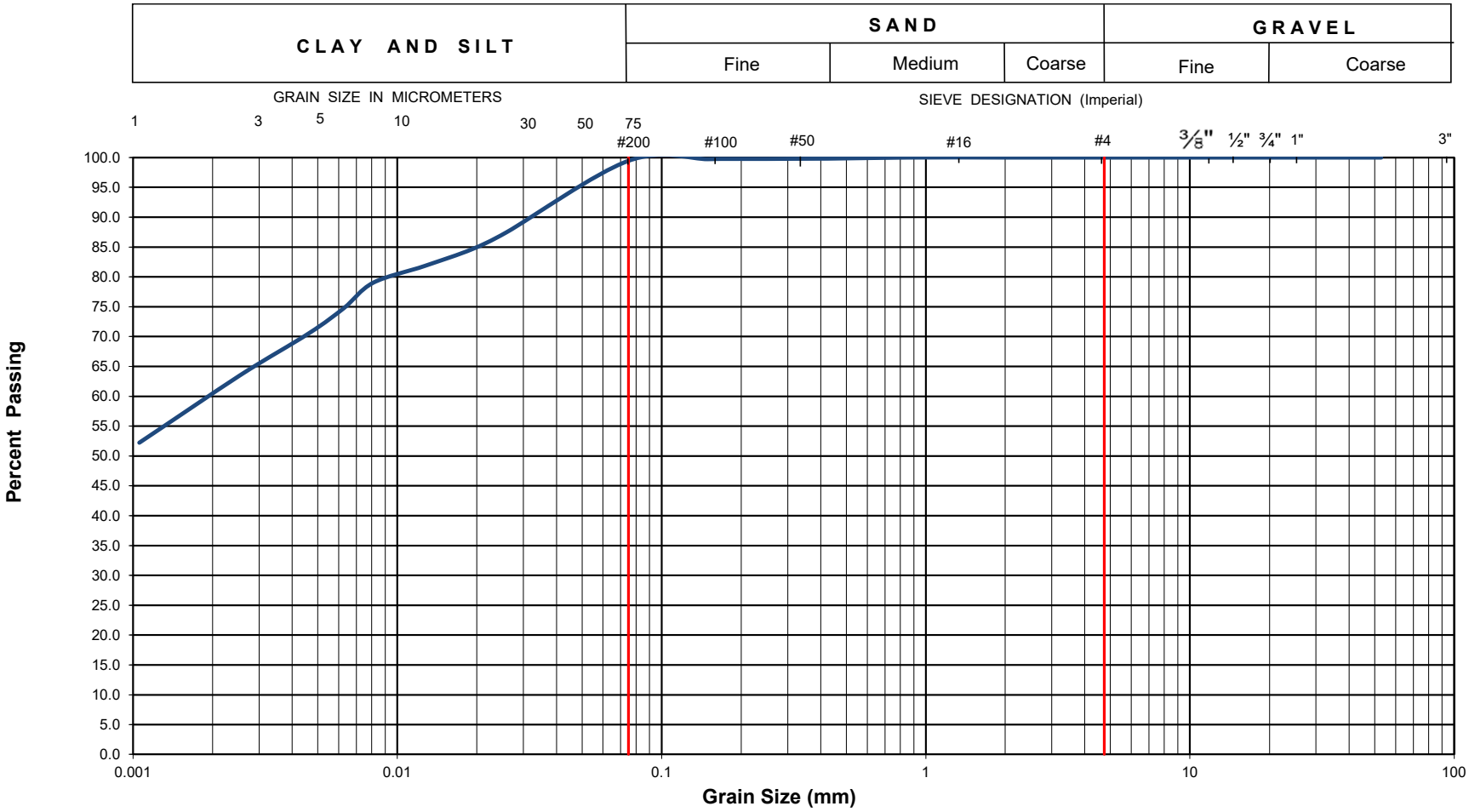
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 15, 2022**	**Borehole No:**	**BH7**		**Sample No.:**	**ST5**		**Depth (m) :**	**3.0-3.6**
Sample Description :		**% Silt and Clay**	**100**	**% Sand**	**0**	**% Gravel**	**0**	**Figure :**	**47**
Sample Description :		**Clay of High Plasticity (CH)**							

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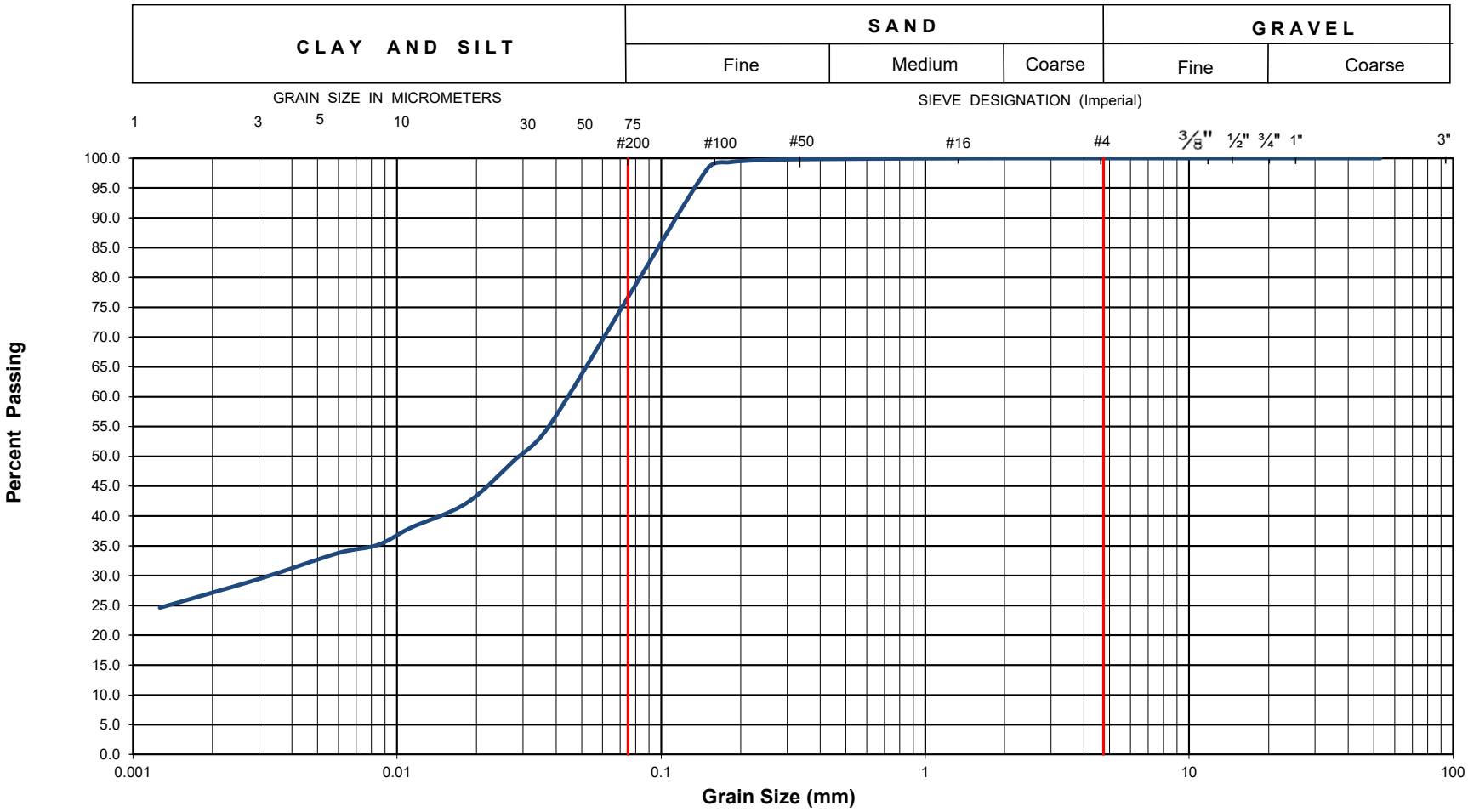
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 14, 2022**	**Borehole No:**	**BH8**	**Sample No.:**	**SS6**	**Depth (m) :**	**3.8-4.4**		
Sample Description :		**% Silt and Clay**	**77**	**% Sand**	**23**	**% Gravel**	**0**	**Figure :**	**48**
Sample Description :		**Clayey Silt with Sand of Low Plasticity (CL)**							

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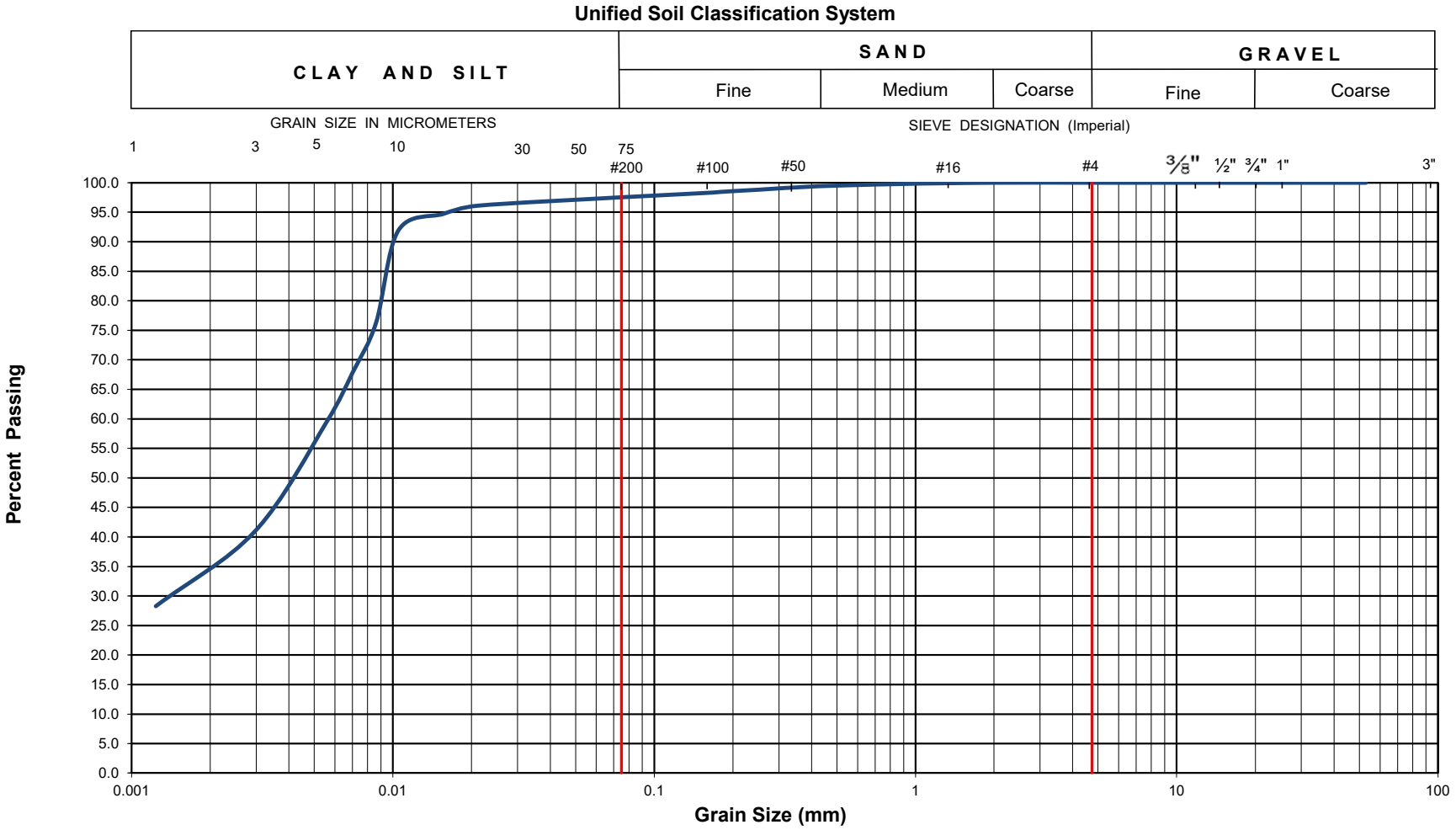
Ottawa, ON K2B 8H6

Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

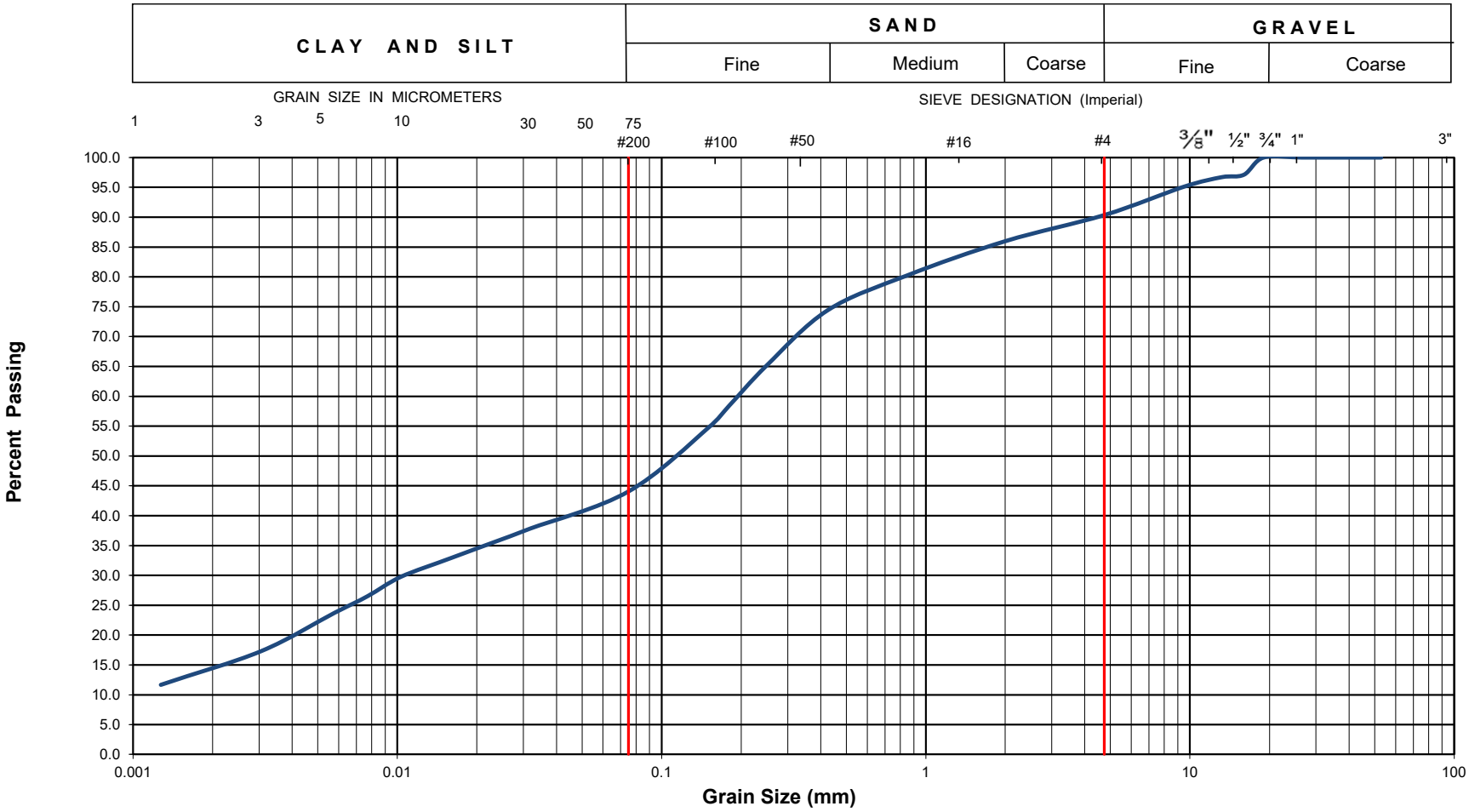


EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 14, 2022**	**Borehole No:**	**BH10**		**Sample No.:**	**SS6**		**Depth (m) :**	**3.8-4.4**
Sample Description :		**% Silt and Clay**	**98**	**% Sand**	**2**	**% Gravel**	**0**	**Figure :**	**49**
Sample Description :		**Clayey Silt of Low Plasticity (CL)**							

EXP Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 14, 2022**	**Borehole No:**	**BH5**		**Sample No.:**	**SS6**		**Depth (m) :**	**3.8-4.4**
Sample Description :		**% Silt and Clay**	**44**	**% Sand**	**46**	**% Gravel**	**10**	**Figure :**	**50**
Sample Description :		**Glacial Till: Silty Sand (SM)**							

EXP Services Inc.
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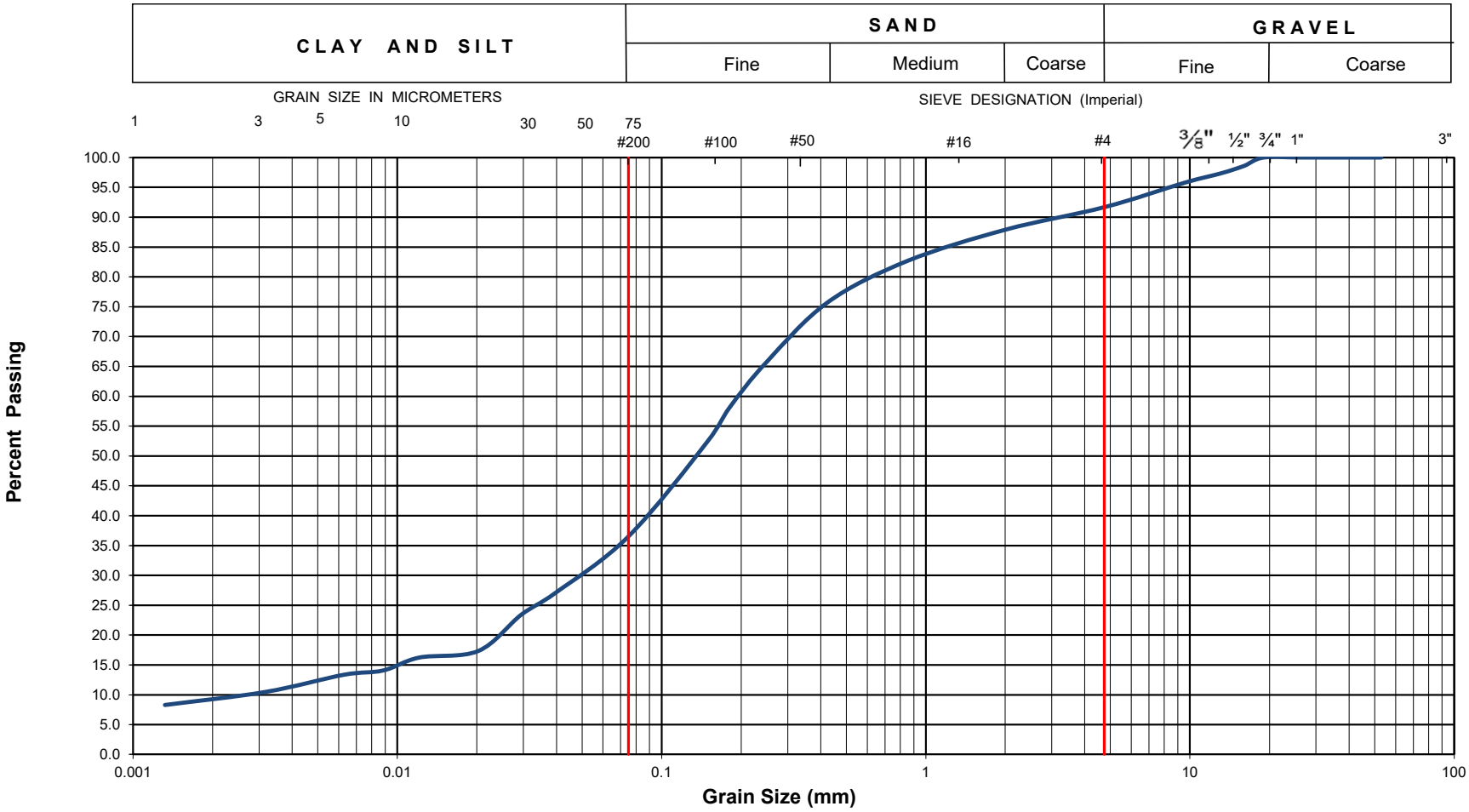
Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422

Unified Soil Classification System



EXP Project No.:	**OTT-22012013-A0**	**Project Name :**	**Proposed New Riverside South Catholic Elementary School**						
Client :	**OCSB**	**Project Location :**	**Brian Good & Solarium Ave, Ottawa, ON**						
Date Sampled :	**July 14, 2022**	**Borehole No:**	**BH9**		**Sample No.:**	**SS7**		**Depth (m) :**	**4.6-5.2**
Sample Description :		**% Silt and Clay**	**37**	**% Sand**	**55**	**% Gravel**	**8**	**Figure :**	**51**
Sample Description :		**Glacial Till: Silty Sand (SM)**							

Appendix A – One-Dimensional Consolidation Test Results Report

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue, Ottawa ON K2C 3G4

August 18, 2022
File: 121623683

Attention: Ismail Taki, M.Eng., P.Eng.
Exp Services Inc
2650 Queensview Drive
Suite 100
Ottawa, Ontario, Canada, K2B 8H6
Tel: 1-613-853-1350
E-mail: ismail.taki@exp.com

Dear Mr. Taki,

Reference: Consolidation Test Results: Proposed OCB School, 4720 Spratt Road, Ottawa, ON, Exp Services Inc., File # OTT-0022012013-A0

This letter presents the results of one-dimensional consolidation test carried out on two shelby tube samples in accordance with ASTM D2435/D2435M – 11(2020). The test results are provided in the attached tables and figures.

Summary of samples tested

Sample ID	Depth (ft)	Date sampled
BH 4 ST8	20-22	July 19, 2022
BH 7 ST5	10-12	July 15, 2022

This letter provides test results only and does not constitute any interpretation or engineering recommendations with respect to material suitability or specification compliance.

We trust the information presented herein meets your present requirements. Should you have any questions or require additional information, please do not hesitate to contact us.

Regards,

Stantec Consulting Ltd.

Ramin Ghassemi Ph.D., P.Eng.
Geotechnical Engineer
Direct: 613 722-4420
Mobile: 437 775-7625
Ramin.ghassemi@stantec.com

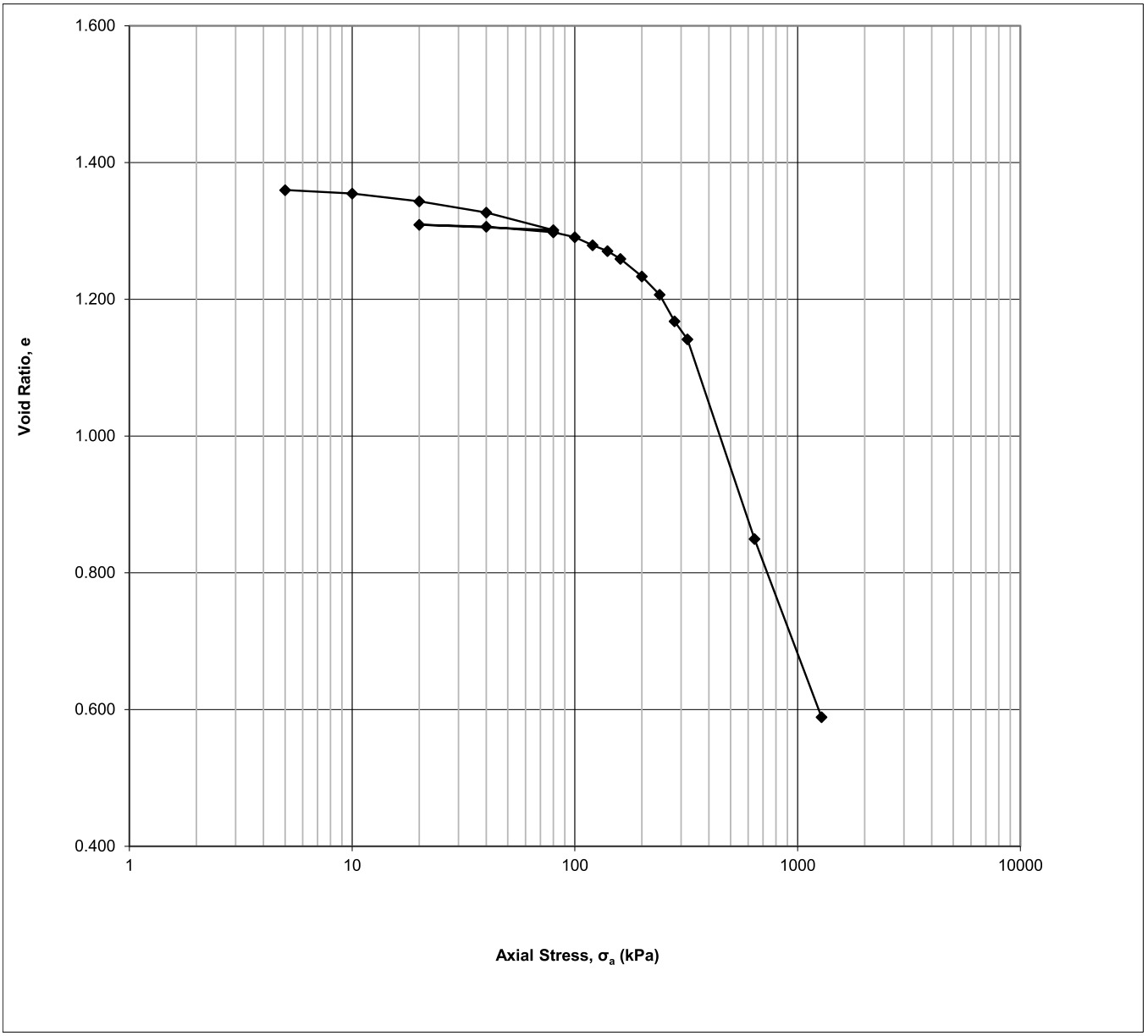
v:\01216\active\laboratory_standing_offers\2022-laboratory standing offers\121623683 exp services inc\two consolidations, exp# 22012013\121623683_let_consolidation_bh4 st8 & bh7 st5_22012013.docx

Stantec

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

ASTM D2435/D2435M - 11(2020)

Project	**Exp, File# OTT-0022012013-A0**
Project No.	**121623683**
Borehole No.	**BH 4**
Sample No.	**ST8**
Sample Depth	**20-22 ft.**



Stantec

Stantec Consulting Ltd.

August 19, 2022 Date: D. Boateng

August 19, 2022 Date: R. Ghassemi

Checked by:

Approved by:

One-Dimensional Consolidation Test using Incremental Loading

ASTM D2435/D2435M - 11(2020)

Specimen Details

Project Name	Exp, File# OTT-0022012013-A0
Project Location	4720 Spratt Road, Ottawa, ON
Borehole	BH 4
Sample No.	ST8
Depth	20-22 ft.
Sample Date	July 19, 2022
Test Number	One
Technician Name	Daniel Boateng

Soil Description & Classification

Lean clay, grey, friable, moist

Specific Gravity of Solids	2.750
Average water content of trimmings %	36.22

Additional Notes (information source, occurence and size of large isolated particles etc.)

1. Loading schedule was provided by the client, 2. Specific gravity of solids was assumed

Initial Specimen Conditions

Height	mm	20.00
Diameter	mm	50.00
Area	mm^2	1963
Volume	mm^3	39270
Mass	g	67.63
Dry Mass	g	44.70
Density	Mg/m^3	1.722
Dry Density	Mg/m^3	1.138
Water Content	%	51.30
Degree of Saturation	%	99.6
Height of Solids	mm	8.28
Initial Void Ratio		1.416

Final Specimen Conditions

Water Content	%	34.05
Final Void Ratio		0.589
Final Height	mm	13.15

Stantec

Stantec Consulting Ltd.

Filename: V:\01216\active\laboratory_standing_offers\2022-Laboratory Standing Offers\121623(Date: August 19, 2022 Checked by: D. Boateng Date: August 19, 2022 Approved by: R. Ghassemi Date: August 19, 2022

One-Dimensional Consolidation Test using Incremental Loading

ASTM D2435/D2435M - 11(2020)

Specimen Details

Project Name	Exp, File# OTT-0022012013-A0
Project Location	4720 Spratt Road, Ottawa, ON
Borehole	BH 4
Sample No.	ST8
Depth	20-22 ft.
Sample Date	July 19, 2022
Test Number	One
Technician Name	Daniel Boateng

Test Procedure

Date Started		July 28, 2022
Date Finished		August 15, 2022
Machine Number		Frame C
Cell Number		C
Ring Number		C
Trimming Procedure		Trimming turntable/Cutting ring
Moisture Condition		Inundated
Axial Stress at Inundation	kPa	5
Water Used		De-aired tap water
Test Method		A
Interpretation Procedure for c_v		2

All Departures from Outlined ASTM D2435/D2435M-11 (2020) Procedure

Calculations

Load Increment	Increment Duration	Axial Stress σ_a	Corrected Deformation ΔH	Specimen Height H	Axial Strain ε_a	Void Ratio e
	min	kPa	mm	mm	%	
Seating	0.0	0	0.0000	20.0000	0.00	1.416
1	1440.0	5	0.4639	19.5361	2.32	1.360
2	1440.0	10	0.5057	19.4943	2.53	1.355
3	1440.0	20	0.6012	19.3988	3.01	1.343
4	1440.0	40	0.7360	19.2640	3.68	1.327
5	1440.0	80	0.9491	19.0509	4.75	1.301
6	1440.0	20	0.8840	19.1160	4.42	1.309
7	1440.0	40	0.9069	19.0931	4.53	1.306
8	1440.0	80	0.9756	19.0244	4.88	1.298
9	1440.0	100	1.0353	18.9647	5.18	1.291
10	1440.0	120	1.1317	18.8683	5.66	1.279
11	1440.0	140	1.2029	18.7971	6.01	1.271
12	1440.0	160	1.2984	18.7016	6.49	1.259
13	1440.0	200	1.5105	18.4895	7.55	1.233
14	1440.0	240	1.7327	18.2673	8.66	1.207
15	1440.0	280	2.0537	17.9463	10.27	1.168
16	1440.0	320	2.2703	17.7297	11.35	1.142
17	1440.0	640	4.6891	15.3109	23.45	0.850
18	1440.0	1280	6.8455	13.1545	34.23	0.589

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Stantec Consulting Ltd.

Filename: V:\01216\active\laboratory_standing_offers\2022-Laboratory Standing Offers
Date: August 19, 2022
Checked by: D. Boateng Date: August 19, 2022
Approved by: R. Ghassemi Date: August 19, 2022

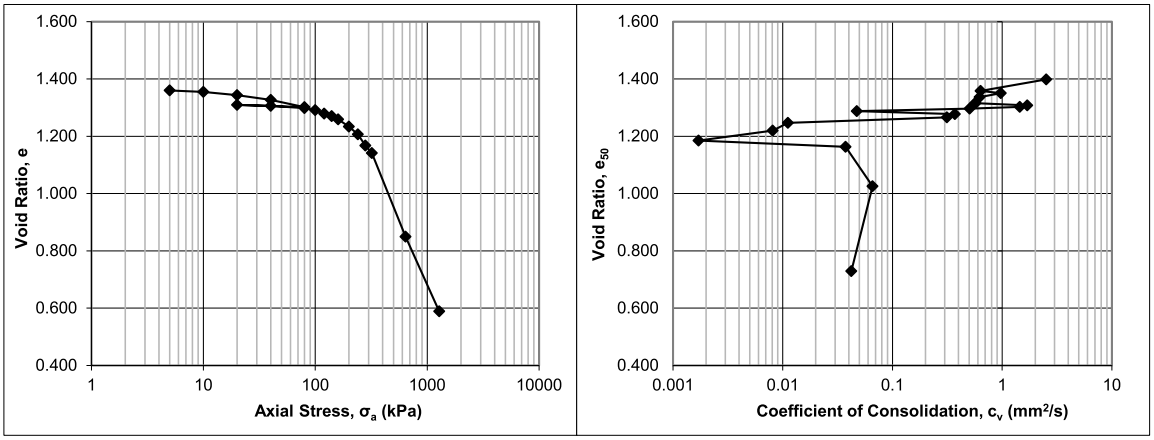
One-Dimensional Consolidation Test using Incremental Loading
ASTM D2435/D2435M - 11(2020)

Specimen Details

Job Ref.	Exp, File# OTT-0022012013-A0
Job Location	4720 Spratt Road, Ottawa, ON
Borehole	BH 4
Sample No.	ST8
Depth	20-22 ft.
Sample Date	July 19, 2022
Test Number	One
Technician Name	Daniel Boateng

Calculations

		Calculated using Interpretation Procedure 2				Interpretation Procedure 1		Interpretation Procedure 2	
Load Increment	Axial Stress $\sigma_{a,\ average}$ kPa	Corrected Deformation ΔH_{50} mm	Specimen Height H_{50} mm	Axial Strain $\varepsilon_{a,50}$ %	Void Ratio e_{50}	Time t_{50} sec	Coeff. Consol. c_v mm^2/s	Time t_{90} sec	Coeff. Consol. c_v mm^2/s
Seating	0								
1	3	0.1437	19.8563	0.72	1.399			33	2.53E+00
2	8	0.4783	19.5217	2.39	1.358			127	6.37E-01
3	15	0.5401	19.4599	2.70	1.351			82	9.74E-01
4	30	0.6539	19.3461	3.27	1.337			128	6.22E-01
5	60	0.8331	19.1669	4.17	1.315			137	5.69E-01
6	50	0.9161	19.0839	4.58	1.305				
7	30	0.8975	19.1025	4.49	1.308			46	1.70E+00
8	60	0.9398	19.0602	4.70	1.302			53	1.45E+00
9	90	0.9916	19.0084	4.96	1.296			152	5.05E-01
10	110	1.0614	18.9386	5.31	1.288			1607	4.73E-02
11	130	1.1452	18.8548	5.73	1.278			203	3.71E-01
12	150	1.2394	18.7606	6.20	1.266			237	3.15E-01
13	180	1.4035	18.5965	7.02	1.246			6579	1.11E-02
14	220	1.6231	18.3769	8.12	1.220			8851	8.09E-03
15	260	1.9108	18.0892	9.55	1.185			40580	1.71E-03
16	300	2.0906	17.9094	10.45	1.163			1816	3.75E-02
17	480	3.2347	16.7653	16.17	1.025			906	6.58E-02
18	960	5.6831	14.3169	28.42	0.729			1032	4.21E-02



Stantec	Project No.: 121623683 Project Name: Exp, File# OTT-0022012013-A0	Photo Log

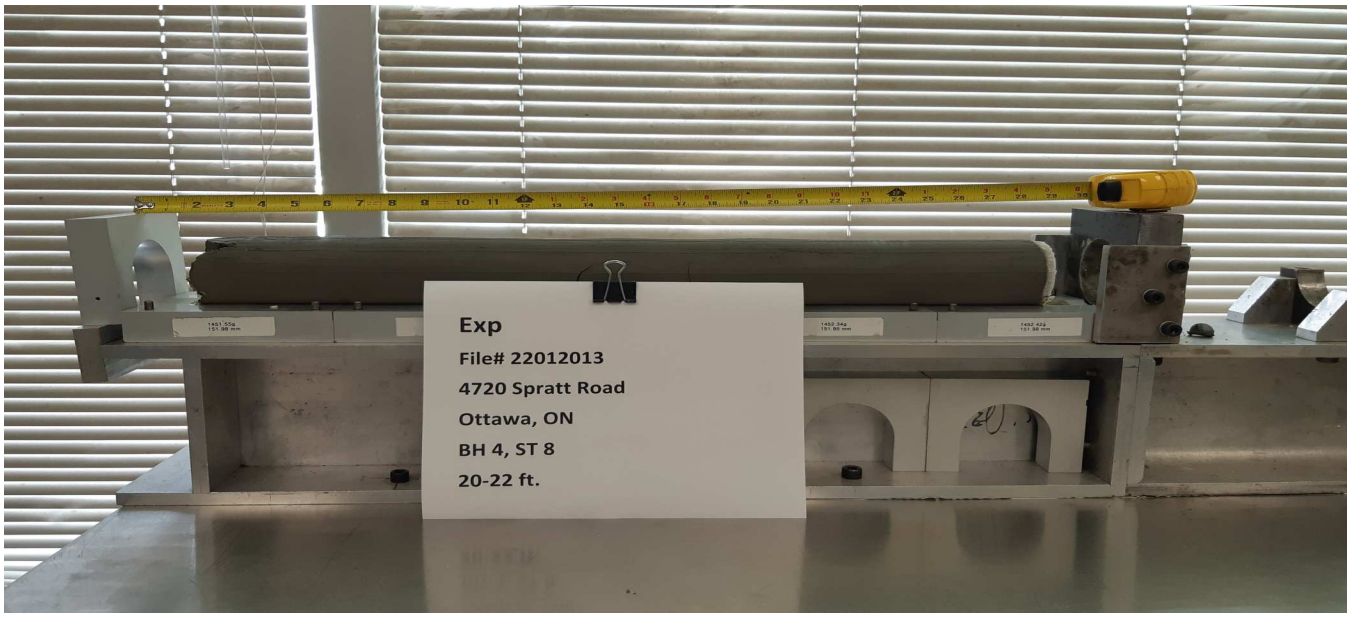


Photo No.: 1	Borehole: BH4 ST8	Depth: 20 – 22 ft

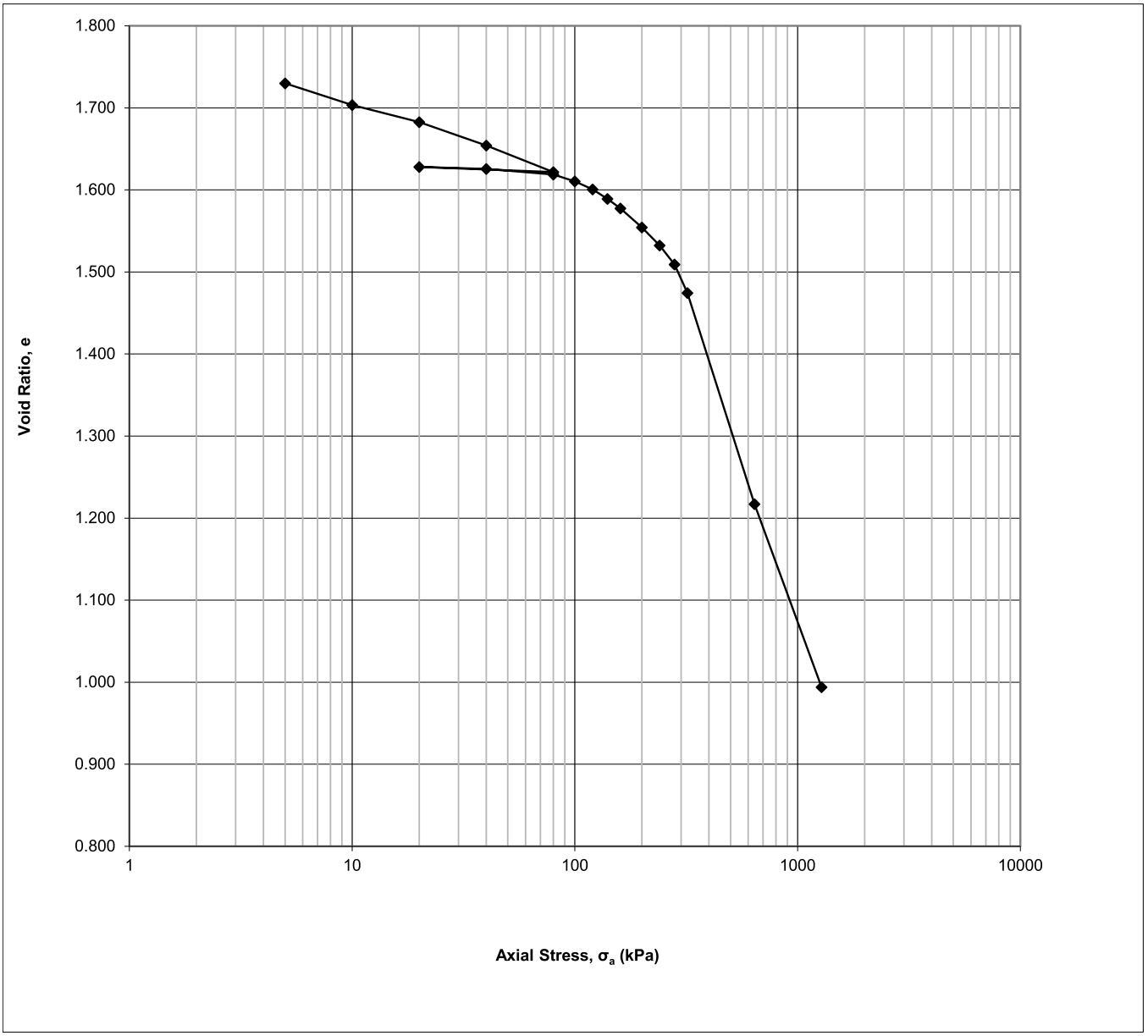
Photo No.: 2	Borehole: BH4 ST8	Depth: 20 – 22 ft

Stantec

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

ASTM D2435/D2435M - 11(2020)

Project	**Exp, File# OTT-0022012013-A0**
Project No.	**121623683**
Borehole No.	**BH 7**
Sample No.	**ST5**
Sample Depth	**10-12 ft.**



Stantec

Stantec Consulting Ltd.

August 19, 2022 Date: D. Boateng

August 19, 2022 Date: R. Ghassemi

Checked by:

Approved by:

One-Dimensional Consolidation Test using Incremental Loading

ASTM D2435/D2435M - 11(2020)

Specimen Details

Project Name	Exp, File# OTT-0022012013-A0
Project Location	4720 Spratt Road, Ottawa, ON
Borehole	BH 7
Sample No.	ST5
Depth	10-12 ft.
Sample Date	July 15, 2022
Test Number	Two
Technician Name	Daniel Boateng

Soil Description & Classification

Fat clay, brown, desiccated, very moist	
Specific Gravity of Solids	2.750
Average water content of trimmings %	59.07
Additional Notes (information source, occurence and size of large isolated particles etc.)	
1. Loading schedule was provided by the client, 2. Specific gravity of solids was assumed	

Initial Specimen Conditions

Height	mm	20.00
Diameter	mm	50.00
Area	mm^2	1963
Volume	mm^3	39270
Mass	g	63.22
Dry Mass	g	38.86
Density	Mg/m^3	1.610
Dry Density	Mg/m^3	0.990
Water Content	%	62.69
Degree of Saturation	%	96.9
Height of Solids	mm	7.20
Initial Void Ratio		1.779

Final Specimen Conditions

Water Content	%	37.34
Final Void Ratio		0.994
Final Height	mm	14.35

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Filename: V:\01216\active\laboratory_standing_offers\2022-Laboratory Standing Offers\121623(Date: August 19, 2022
Checked by: D. Boateng Date: August 19, 2022
Approved by: R. Ghassemi Date: August 19, 2022

One-Dimensional Consolidation Test using Incremental Loading
ASTM D2435/D2435M - 11(2020)

Specimen Details

Project Name	Exp, File# OTT-0022012013-A0
Project Location	4720 Spratt Road, Ottawa, ON
Borehole	BH 7
Sample No.	ST5
Depth	10-12 ft.
Sample Date	July 15, 2022
Test Number	Two
Technician Name	Daniel Boateng

Test Procedure

Date Started		July 28, 2022
Date Finished		August 15, 2022
Machine Number		Frame D
Cell Number		D
Ring Number		D
Trimming Procedure		Trimming turntable/Cutting ring
Moisture Condition		Inundated
Axial Stress at Inundation	kPa	5
Water Used		De-aired tap water
Test Method		A
Interpretation Procedure for c_v		2

All Departures from Outlined ASTM D2435/D2435M-11 (2020) Procedure

Calculations

Load Increment	Increment Duration	Axial Stress σ_a	Corrected Deformation ΔH	Specimen Height H	Axial Strain ε_a	Void Ratio e
	min	kPa	mm	mm	%	
Seating	0.0	0	0.0000	20.0000	0.00	1.779
1	1440.0	5	0.3530	19.6470	1.77	1.730
2	1440.0	10	0.5443	19.4557	2.72	1.703
3	1440.0	20	0.6932	19.3068	3.47	1.683
4	1440.0	40	0.8979	19.1021	4.49	1.654
5	1440.0	80	1.1324	18.8676	5.66	1.622
6	1440.0	20	1.0865	18.9135	5.43	1.628
7	1440.0	40	1.1033	18.8967	5.52	1.626
8	1440.0	80	1.1528	18.8472	5.76	1.619
9	1440.0	100	1.2132	18.7868	6.07	1.610
10	1440.0	120	1.2840	18.7160	6.42	1.601
11	1440.0	140	1.3665	18.6335	6.83	1.589
12	1440.0	160	1.4493	18.5507	7.25	1.578
13	1440.0	200	1.6171	18.3829	8.09	1.554
14	1440.0	240	1.7756	18.2244	8.88	1.532
15	1440.0	280	1.9413	18.0587	9.71	1.509
16	1440.0	320	2.1925	17.8075	10.96	1.474
17	1440.0	640	4.0444	15.9556	20.22	1.217
18	1440.0	1280	5.6486	14.3514	28.24	0.994

Stantec

Stantec Consulting Ltd.

Filename: V:\01216\active\laboratory_standing_offers\2022-Laboratory Standing Offers
Date: August 19, 2022
Checked by: D. Boateng Date: August 19, 2022
Approved by: R. Ghassemi Date: August 19, 2022

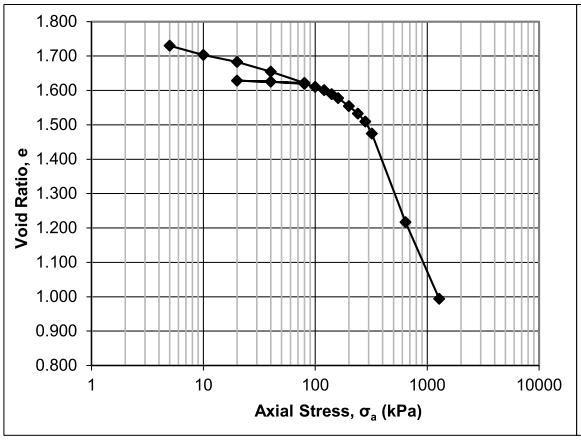
One-Dimensional Consolidation Test using Incremental Loading
ASTM D2435/D2435M - 11(2020)

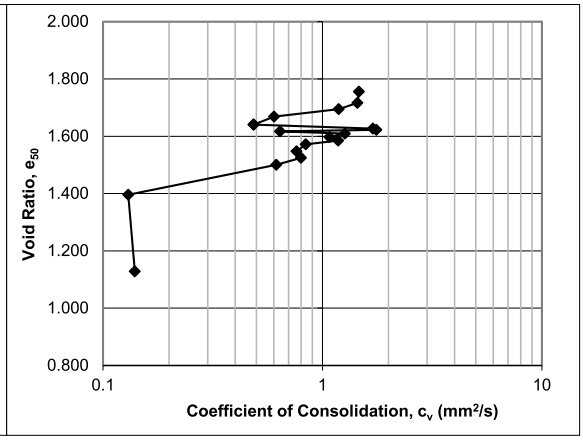
Specimen Details

Job Ref.	Exp, File# OTT-0022012013-A0
Job Location	4720 Spratt Road, Ottawa, ON
Borehole	BH 7
Sample No.	ST5
Depth	10-12 ft.
Sample Date	July 15, 2022
Test Number	Two
Technician Name	Daniel Boateng

Calculations

		Calculated using Interpretation Procedure 2				Interpretation Procedure 1		Interpretation Procedure 2	
Load Increment	Axial Stress $\sigma_{a,\ average}$ kPa	Corrected Deformation ΔH_{50} mm	Specimen Height H_{50} mm	Axial Strain $\varepsilon_{a,50}$ %	Void Ratio e_{50}	Time t_{50} sec	Coeff. Consol. c_v mm^2/s	Time t_{90} sec	Coeff. Consol. c_v mm^2/s
Seating	0								
1	3	0.1677	19.8323	0.84	1.756			57	1.47E+00
2	8	0.4509	19.5491	2.25	1.716			56	1.45E+00
3	15	0.6091	19.3909	3.05	1.694			67	1.19E+00
4	30	0.7961	19.2039	3.98	1.668			130	6.02E-01
5	60	0.9938	19.0062	4.97	1.641			158	4.86E-01
6	50	1.1153	18.8847	5.58	1.624				
7	30	1.0946	18.9054	5.47	1.627			45	1.70E+00
8	60	1.1238	18.8762	5.62	1.623			43	1.76E+00
9	90	1.1619	18.8381	5.81	1.618			117	6.40E-01
10	110	1.2236	18.7764	6.12	1.609			59	1.27E+00
11	130	1.3106	18.6894	6.55	1.597			69	1.08E+00
12	150	1.3951	18.6049	6.98	1.585			62	1.18E+00
13	180	1.4922	18.5078	7.46	1.572			86	8.41E-01
14	220	1.6636	18.3364	8.32	1.548			94	7.62E-01
15	260	1.8287	18.1713	9.14	1.525			88	7.98E-01
16	300	2.0058	17.9942	10.03	1.500			111	6.16E-01
17	480	2.7598	17.2402	13.80	1.396			484	1.30E-01
18	960	4.6835	15.3165	23.42	1.128			356	1.40E-01





Stantec	Project No.: 121623683 Project Name: Exp, File# OTT-0022012013-A0	Photo Log

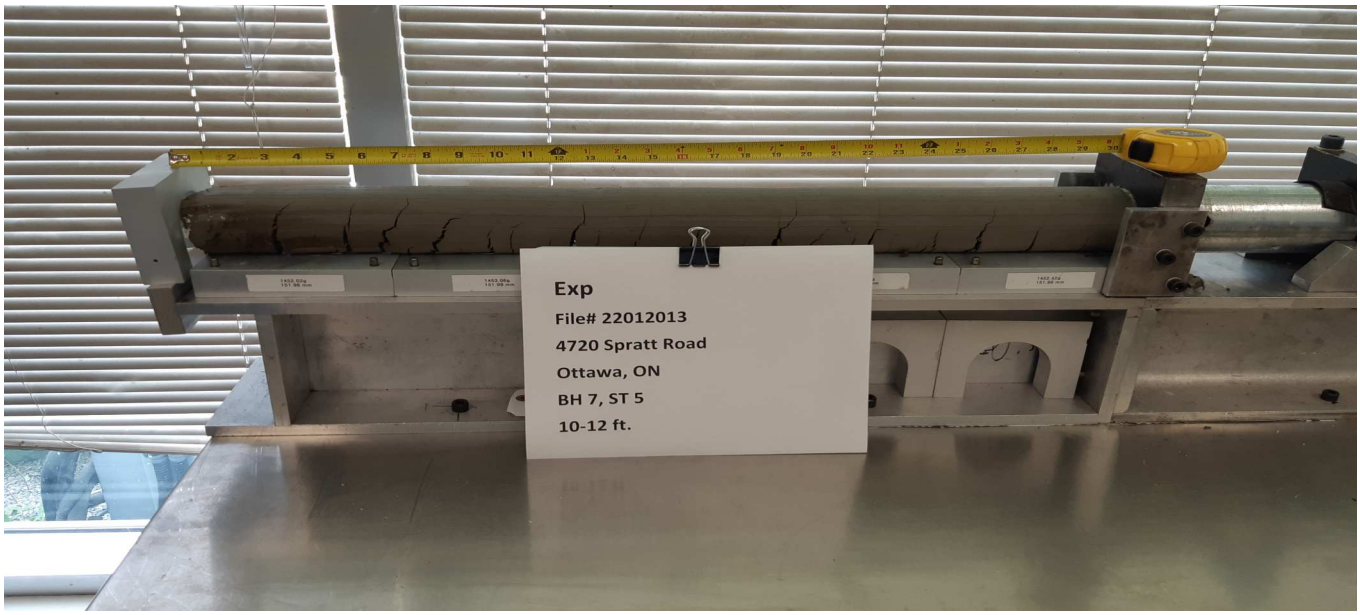


Photo No.: 1	Borehole: BH7 ST5	Depth: 10 – 12 ft

Photo No.: 2	Borehole: BH7 ST5	Depth: 10 – 12 ft

Appendix B – Laboratory Certificate of Analysis Report

AGAT Laboratories

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

CLIENT NAME: **EXP SERVICES INC**
2650 QUEENSVIEW DRIVE, UNIT 100
OTTAWA, ON K2B8H6
(613) 688-1899
ATTENTION TO: **Daniel Wall**
PROJECT: **OTT-22012013-AO**
AGAT WORK ORDER: **22Z929319**
SOIL ANALYSIS REVIEWED BY: **Jacky Zhu, Spectroscopy Technician**
DATE REPORTED: **Aug 11, 2022**
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.*

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: 22Z929319

PROJECT: OTT-22012013-AO

CLIENT NAME: EXP SERVICES INC

ATTENTION TO: Daniel Wall

SAMPLING SITE:4720 Spratt Rd, Ottawa

SAMPLED BY:Exp

Inorganic Chemistry (Soil)

DATE RECEIVED: 2022-08-05 **DATE REPORTED: 2022-08-11**

		SAMPLE DESCRIPTION:		BH 1 SS3 5-7'	BH 3 SS5 10'-11.5'	BH 8 SS7 15'-17.5'
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2022-07-15	2022-07-19	2022-07-14
Parameter	Unit	G / S	RDL	4173084	4173089	4173091
Chloride (2:1)	µg/g		2	9	6	4
Sulphate (2:1)	µg/g		2	59	48	136
pH (2:1)	pH Units		NA	7.72	8.24	8.23
Electrical Conductivity (2:1)	mS/cm		0.005	0.156	0.187	0.258
Resistivity (2:1) (Calculated)	ohm.cm		1	6410	5350	3880

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

4173084-4173091 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:

CHARTERED CHEMIST NIANDONG ZHU ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

AGAT Laboratories

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

Quality Assurance

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 22Z929319

PROJECT: OTT-22012013-AO

ATTENTION TO: Daniel Wall

SAMPLING SITE:4720 Spratt Rd, Ottawa

SAMPLED BY:Exp

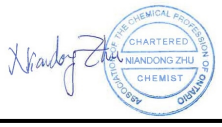
Soil Analysis

RPT Date: Aug 11, 2022			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
Inorganic Chemistry (Soil)															
Chloride (2:1)	4166062		148	148	0.0%	< 2	100%	70%	130%	102%	80%	120%	106%	70%	130%
Sulphate (2:1)	4166062		18	18	0.0%	< 2	107%	70%	130%	102%	80%	120%	106%	70%	130%
pH (2:1)	4175866		7.23	7.43	2.7%	NA	100%	80%	120%						
Electrical Conductivity (2:1)	4176158		0.386	0.362	6.4%	0.014	102%	80%	120%						

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

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

Certified By:



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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 22Z929319

PROJECT: OTT-22012013-AO

ATTENTION TO: Daniel Wall

SAMPLING SITE:4720 Spratt Rd, Ottawa

SAMPLED BY:Exp

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

1 of 5

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 #: 227929319

Cooler Quantity: one bag - NOT in packs

Arrival Temperatures: 23.2 | 23.1 | 23.2

LT 1.2 | 1.3 | 1.2

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: EXP
Contact: Daniel Wall
Address: 2650 Queensview Drive Suite 100
Phone: 613-686-1899 Fax:
Reports to be sent to:
1. Email: Daniel.Wall@exp.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)
☐ Regulation 558
☐ CCME

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

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

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

Turnaround Time (TAT) Required:

Regular TAT (Most Analysis) ☒ 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: OTT-22012013-A0
Site Location: 4720 Spratt Rd, Ottawa
Sampled By: EXP
AGAT ID #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

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	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs, Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: Total PCBs ☐ Aroclor	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	pH	Sulphates	Chlorides	Resistivity				Potentially Hazardous or High Concentration (Y/N)
BH 1 SS3 5-7'	July 15/22	AM/PM	1														✓	✓	✓	✓				
BH 3 SS5 10'-11.5'	July 19/22	AM/PM	1														✓	✓	✓	✓				
BH 8 SS7 15'-17.5'	July 14/22	AM/PM	1														✓	✓	✓	✓				
		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
Ryan DiGiuseppe	Aug 4/22	6:00pm	C. Griffith	AUG 05 2022	08h05
C. Griffith	AUG 05 2022	16h00	M. GRAVIS	Aug 6/22	10:30
	Date	Time		Date	Time

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Date Issued: May 29, 2020

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