Geotechnical Investigation Report

74 Edwards Drive Subdivision, Keene, Ontario

February 27, 2025

Prepared for:
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Cambium Reference: 15831-003

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Yvette Johnston (Client) c/o RFA Planning Consultant Inc. to complete a geotechnical investigation in support of the proposed residential subdivision at 74 Edwards Drive, in Keene, Ontario (Site), illustrated in Figure 1. It is understood that the development is to include a total of 26 residential lots.

The purpose of the field work and testing was to obtain information on the general subsurface soil and groundwater conditions at the site by means of a limited number of boreholes and laboratory tests. Based on an interpretation of the data available for this site, this report provides engineering comments, recommendations, and parameters for the geotechnical design aspects of the project, including selected construction considerations which could influence design decisions. It should be noted that this report addresses only the geotechnical (physical) aspects of the subsurface conditions at the site.

This report provides the results of the geotechnical exploration and testing and should be read in conjunction with the “Standard Limitations” in Section 7.0 which forms an integral part of this document. The reader’s attention is specifically drawn to this information, as it is essential for the proper use and interpretation of this report. The data, interpretations and recommendations contained in this report pertain to a specific project as described in the report and are not applicable to any other project or site location. If the project is modified in concept, location, or elevation, or if the project is not initiated within eighteen months of the date of the report, Cambium should be given an opportunity to confirm that the recommendations in this report are still valid.

2.0 Site Description

The Site covers an area of approximately 13 ha that is currently undeveloped and well vegetated with a mixture of coniferous and deciduous trees, shrubs and grasses. The parkland Block 1 has some existing wetland area. The property is legally known as Part of Lots 13 and 14, Concession 7, Township of Otonabee-South Monaghan, County of Peterborough. The proposed development includes the construction of 26 residential lots and two parkland blocks which are approximately 6 ha in total area. The Site is bordered by existing houses on Pinecrest Avenue, to the east, and mixed farmland and bush to the south, west, and north, with Edwards Drive coming off the north. The vacant land generally slopes from south to north, with a steeper slope from east to west in the eastern portion of the proposed residential development, immediately west of the large parkland Block 1 that is generally flat.

At the time of writing this report, the actual finished floor elevations (FFE) were not provided. It is assumed that the proposed FFE will be approximately the same elevation as the existing grades on Site.

The geotechnical investigation was required to confirm the existing subsurface soil and groundwater conditions present at the Site and to prepare geotechnical design and construction recommendations for the proposed residential development. A borehole location plan is included as Figure 2 of this report.

This report presents the methodology and findings of the geotechnical investigation at the Site and addresses requirements and constraints for the design and construction of the residential development.

3.0 Methodology

3.1 Borehole Investigation

A borehole investigation was conducted at the site on October 19th to October 20th, 2023 to assess subsurface conditions. Ten (10) boreholes, identified as BH101-23 through BH110-23, were advanced in the relative locations shown on Figure 1. All boreholes were terminated at depths ranging from 5.0 m below existing grade (mbeg) to 6.6 mbeg, with the exception of borehole BH103-23 that terminated at a depth of 1.0 mbeg due to refusal on large boulders in that area. Termination depths vary based on predetermined depths for individual boreholes and auger and SPT refusal in some locations.

Drilling and sampling were completed using a track-mounted drill rig operating under the supervision of a Cambium technician. The boreholes were advanced to the sampling depths by means of continuous flight solid stem augers with 50 mm O.D. split spoon samplers. Standard Penetration Test (SPT) N values were recorded for the sampled intervals as the number of blows required to drive a split spoon sampler 305 mm into the soil, using a 63.5 kg drop hammer falling 750 mm, as per ASTM D1586 procedures. The SPT N values are used in this report to assess consistency of cohesive soils and relative density of non-cohesive materials.

Three (3) boreholes, BH101-23, BH107-23, and BH109-23 were completed as monitoring wells to assess groundwater conditions over time and complete potential groundwater testing for other associated studies.

The encountered soil units were logged in the field using visual and tactile methods, and samples were placed in labelled plastic bags for transport, future reference, possible laboratory testing, and storage. Open boreholes were checked for groundwater and general stability prior to backfilling. All boreholes not equipped as monitoring wells were backfilled and sealed in accordance with Ontario Regulation (O.Reg.) 903.

Borehole locations were surveyed in the field using a Sokkia RTK unit. Elevations were measured in relation to a Standard Iron Bar (SIB) property boundary marker, located along the

south property line, as shown on Figure 2. The SIB has an elevation of 216.69 m above sea level (masl). The ground surface at the location of each borehole was measured relative to this elevation, with an accuracy of 0.01 m.

The prepared borehole logs are provided in Appendix A. Site soil and groundwater conditions and our geotechnical recommendations are presented in the following sections of this report.

3.2 Laboratory Testing

Physical laboratory testing, including seven (7) particle size distribution analyses (LS-702,705), was completed on selected soil samples to confirm textural classification and to assess geotechnical parameters. Moisture content testing (LS-701) was completed on all retrieved soil samples. Results are presented in Appendix B and are discussed in subsequent sections of this report.

4.0 Subsurface Conditions

The subsurface conditions are fairly consistent throughout, comprising a surficial layer of topsoil which generally overlies a thin layer of silt or sand soil. Compact to very dense glacial till soils underlie the aforementioned soils to the borehole termination depths, with the exception of borehole BH103-23 which terminated due to auger refusal on a presumed boulder in the sand. A cohesive clay and silt layer was encountered above the till material in boreholes BH105-23 and BH109-23. The individual soil units for each street are described in detail below and shown on the borehole logs provided in Appendix A.

Assessments of organic matter content or other topsoil quality tests were beyond the scope of this study.

4.1 Topsoil

Brown silt and sand topsoil was encountered in all boreholes, ranging from 100 mm to 405 mm in thickness, with an average thickness of approximately 195 mm.

4.2 Silt

A brown silt layer with some sand, trace to some gravel and clay, and trace to some organics (rootlets and/or wood fibres), was encountered immediately below the topsoil in boreholes BH101-23, BH109-23 and BH110-23. The silt extended to depths ranging between 0.6 mbeg and 1.5 mbeg. The silt was found to be dry to moist at the time of the investigation with natural moisture content varying from 7% to 11% based on laboratory testing. The relative density of the silt was very loose to compact based on SPT N values ranging from 3 to 19.

4.3 Sand / Silty Sand

A brown sand to silty sand layer was encountered immediately below the topsoil in boreholes BH102-23, BH103-23,BH104-23, BH105-23 and BH107-23. The sand contained some silt and some gravel, and the silty sand contained some clay. Generally, this layer extended to depths ranging from 0.6 mbeg to 1.1 mbeg, with the exception of borehole BH104-23 which encountered another silty sand layer at a depth of 4.9 mbeg and extended to the borehole

termination depth of 6.6 mbeg. The sand was found to be dry to moist at the time of the investigation with natural moisture content values ranging from 2% to 8% based on laboratory testing. The silty sand at the bottom of borehole BH104-23 was found to be moist to wet at the time of the investigation with a natural moisture content value of 19%. The relative density of the near-surface sand to silty sand material was loose to compact based on SPT N values ranging from 7 to 21. The silty sand at the bottom of borehole BH104-23 was dense with SPT N values of 48 and 49.

Laboratory particle size distribution analyses were completed on three (3) samples of the sand to silty sand material, taken from the boreholes and depths described in Table 1. The soil samples and analyses results are based on the Unified Soil Classification System (USCS) scale, with full results provided in Appendix B.

Table 1 Particle Size Distribution Analysis – Sand, and Silty Sand

Borehole	Depth (mbeg)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH102-23 SS 2A	0.6 – 1.1	Sand, some gravel, some silt, trace clay	15	69	11	5	3.6
BH104-23 SS7	6.1 – 6.6	Silty Sand, trace clay	0	62	32	6	18.7
BH107-23 SS 1B	0.1 – 0.6	Silty Sand, some clay, trace gravel	8	43	34	15	7.9

4.4 Clay and Silt

A light brown to grey clay and silt layer was encountered in boreholes BH105-23 and BH109-23 at depths 0.6 mbegs and 1.4 mbeg and were 1.5 m and 1.2 m in thickness respectively. The clay and silt contained some sand and trace gravel, and some organics in borehole BH105-23 from a depth of 1.4 mbeg to 2.1 mbeg. The cohesive layer was drier than plastic limit (DTPL) to wetter than plastic limit (WTPL) at the time of the investigation, with natural moisture content values ranging from 13% to 44% based on laboratory testing. The consistency of the clay and silt material encountered was very soft to stiff based on SPT N values ranging from 2 to 11.

Laboratory particle size distribution analysis was completed on one (1) sample of the clay and silt material, taken from the borehole and depth described in Table 2. The soil sample and analysis results are based on the Unified Soil Classification System (USCS) scale, with full results provided in Appendix B.

Table 2 Particle Size Distribution Analysis – Clay and Silt

Borehole	Depth (mbeg)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH109-23 SS3	1.5 – 2.0	Clay and Silt, some sand	0	15	42	43	26.0

4.5 Glacial Till

Subsurface soils at the Site predominantly consist of glacial till soils with either a sandy silt or gravelly sand texture, containing various amounts of clay, gravel, silt, cobbles, and boulders. The glacial till was encountered in all boreholes underlying either the topsoil, silt, clay and silt, or sand soils described above and extended to the borehole termination depths, except borehole BH103-23 which terminated due to auger refusal on a presumed boulder in the sand and borehole BH104-23 which terminated in the dense silty sand. The glacial till was light brown to grey in colour and was generally found to be dry to moist at the time of the investigation, with BH104-23, BH105-23 and BH110-23 exhibiting wet soils beginning at 6.2 mbeg, 4.0 mbeg and 3.1 mbeg respectively. Moisture content values of the glacial till ranged from 4% to 14% based on laboratory testing. SPT N values ranging between 11 and greater than 50 blows per 305 mm of penetration, provide evidence of compact to very dense relative densities throughout the entire soil column.

A 0.5 m thick light brown silt and sand layer with trace clay and trace gravel was interbedded within the glacial till matrix in borehole BH106-23 at a depth of 1.6 mbeg. The silt and sand was moist at the time of the investigation, with a dense relative density.

Laboratory particle size distribution analyses were completed on three (3) samples of the till and silt and sand material, taken from the boreholes and depths described in Table 3. The soil

samples and analyses results are based on the Unified Soil Classification System (USCS) scale, with full results provided in Appendix B.

Table 3 Particle Size Distribution Analysis – Glacial Till and Silt and Sand

Borehole	Depth (mbeg)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH101-23 SS6	4.6 – 5.0	Sandy Silt, some Clay, some Gravel	11	34	37	18	6.5
BH106-23 SS3B	1.6 – 2.0	Silt and Sand, trace Clay, trace Gravel	4	41	47	8	8.9
BH110-23 SS4	2.3 – 2.9	Gravelly Sand, some Silt, trace Clay	33	45	15	7	4.6

4.6 Bedrock

Bedrock was not encountered within the investigation depths. All boreholes were terminated in native soil.

4.7 Groundwater

Only borehole BH104-23, BH105-23 and BH110-23 encountered groundwater seepage upon drilling completion, prior to backfilling, at depths between 3.1 mbeg and 5.2 mbeg. Six boreholes, BH102-23, BH104-23, BH105-23, BH106-23, BH108-23 and BH109-23 encountered caving (sloughing) at depths between 4.5 mbeg and 6.0 mbeg.

Boreholes BH101-23, BH107-23, and BH109-23 were outfitted as monitoring wells to measure the static groundwater levels after drilling completion. A summary of the water levels at these locations where groundwater seepage was first observed and where monitoring wells were installed is provided in Table 4.

Table 4 Groundwater Depth and Elevation

Location	Surface Elevation (masl)	First Encounter of Groundwater (mbeg) / Elev (masl)	Water Level on Completion (mbeg) / Elev (masl)	Measured Water Level Nov. 10, 2023 (mbeg) / Elev (masl)
BH101-23	230.79	-	Dry	2.67 / 228.12
BH104-23	235.30	6.20 / 229.10	5.20 / 230.10	-
BH105-23	231.39	4.00 / 227.39	4.30 / 227.09	-
BH107-23	232.10	-	Dry	5.83 / 226.27
BH109-23	217.80	-	Dry	5.49 / 212.31
BH110-23	221.10	3.10 / 218.00	3.10 / 218.00	-

*Note: All boreholes not shown in **Error! Reference source not found.** did not encounter any sign of groundwater.*

Based on the above observations, the groundwater table seems to vary between elevation 228.10 masl in the northwest to 212.30 masl in the southeast, suggesting groundwater flow from northwest to southeast towards the wetland area at the east portion of the Site. There is potential for localized perched groundwater trapped in seams or lenses of courses material within the glacial till matrix, within the high elevations, and would not be indicative of a saturated soil mass. It is recommended that additional groundwater level measurements be taken at the monitoring wells during the changing seasons to understand the seasonal variation in the groundwater table at the Site. Groundwater levels may fluctuate seasonally and with large precipitation events.

5.0 Geotechnical Design Considerations

The following recommendations are based on borehole information and are intended to assist designers. Recommendations should not be construed as providing instructions to contractors, who should form their own opinions about site conditions. It is possible that subsurface conditions beyond the borehole locations may vary from those observed. If significant variations are found before or during construction, Cambium should be contacted so that we can reassess our findings, if necessary.

5.1 Site Preparation

All vegetation and organic soils, including topsoil, should be removed from beneath the proposed homes, roadways and utilities. The exposed subgrade should be proof-rolled and inspected by qualified geotechnical engineering personnel prior to the placement of any fill or bedding material. Any loose/soft soils identified at the time of proof-rolling that are unable to be uniformly compacted should be sub-excavated and removed. The excavations created through the removal of these materials should be backfilled with approved engineered fill consistent with the recommendations provided below.

The near surface soils can be very unstable if they are wet or saturated. Such conditions are common in the spring and late fall. Under these conditions, temporary use of granular fill, and possible reinforcing geotextiles, may be required to prevent severe rutting on construction access routes.

If significant regrading is to occur, Cambium should be notified to reassess the groundwater and subgrade conditions, footing elevations, and geotechnical considerations/recommendations provided below.

5.2 Frost Penetration

Based on climate data and design charts, the frost penetration depth below the pavement at the site is estimated at 1.5 m.

It is assumed that the pavement structure thickness will be less than 1.5 m, so grading and drainage are important for good pavement performance and life expectancy.

Any services/utilities should be located below this depth or be appropriately insulated.

5.3 Excavations

All excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA). The generally compact to very dense native till may be classified as Type 2 soils above the groundwater table in accordance with OHSA. Type 2 soils may be excavated with unsupported side slopes no steeper than 1H:1V within 1.2 m of the base of the excavation while the very soft to stiff clay and silt (cohesive) material may be classified as Type 3 soils, with unsupported side slopes no steeper than 1H:1V. Below the groundwater table the dense to very dense till soils should be considered Type 3 soils.

Where the side slopes consist of more than one soil type, the soil shall be classified as the type with the highest number among the soils present. Please note that the soil type classifications indicated above are provisional and are subject to change based on field observations of the actual conditions at the time of exposure. However, depending upon the construction procedures adopted by the contractor, actual groundwater seepage conditions, the success of the contractor's groundwater control methods and weather conditions at the time of construction, some flattening and/or blanketing of the slopes may be required. Care should be taken to direct surface runoff away from the open excavations. Stockpiles of excavated materials should be kept at least at the same distance as the excavation depth from the top edge of the excavation to prevent slope instability. Care should also be taken to avoid overloading of any existing underground services/structures by stockpiles.

Excavation side slopes should be protected from exposure to precipitation and associated ground surface runoff and should be inspected regularly for signs of instability. If localized instability is noted during excavation or if wet conditions are encountered, the side slopes should be flattened as required to maintain safe working conditions or the excavation sidewalls must be fully supported (shored).

5.4 Dewatering

The depth of the groundwater table at the Sites varies between 2.7 mbeg and 5.5 mbeg (228.10 masl to 212.30 masl). Assuming that construction of structures is to occur in a dry season, and there are no significant grade changes (cuts), footings are to be placed above the water table and significant groundwater seepage is not anticipated within the excavation depths for the homes or utilities. Any seepage within the excavation depths should be controllable with filtered sumps and pumps and a Permit to Take Water (PTTW) or registry in the Environmental Activity and Sector Registry (EASR) for the Ministry of the Environment, Conservation and Parks (MECP) will not be required.

It should be noted that the groundwater table is influenced by seasonal fluctuations and major precipitation events.

5.5 Backfill and Compaction

Excavated topsoil from the Site is not appropriate for use as fill below grading, roadways and parking areas. Excavated native till and imported fill, not containing organics or any other deleterious material, may be appropriate for use as engineered fill, provided that the actual or adjusted moisture content at the time of construction is within a range that permits compaction to required densities. Full time monitoring of the acceptability of the subgrade soils in fill areas and compaction testing during placement of engineered fill by Cambium should be completed to ensure appropriate materials are used and that compaction requirements are met. Some moisture content adjustments may be required depending upon seasonal conditions. Any clay and silt, as identified in boreholes BH105-23 and BH109-23, is not appropriate for reuse as backfill. Geotechnical inspections and testing of engineered fill are required to confirm acceptable quality.

Any engineered fill below foundations should be placed in lifts appropriate to the type of compaction equipment used on site and be compacted to a minimum of 100 percent of standard Proctor maximum dry density (SPMDD), as confirmed by nuclear densometer testing. If native soils from the site are not used as engineered fill, imported material for engineered fill

should consist of clean, non-organic soils, free of chemical contamination or deleterious material. The moisture content of the engineered fill will need to be close enough to optimum at the time of placement to allow for adequate compaction. Consideration could be given to using a material meeting the specifications of OPSS 1010 Granular B or an approved equivalent. If conditions are wet at the time of construction, compaction of granular fill may not be possible, and 19 mm diameter crushed clear stone wrapped in a geotextile filter fabric (Terrafix 270R or equivalent) should be used in place of engineered fill. Staged or stepped excavation and placement of the geotextile and clear stone may help limit the requirement for a PTTW or registry in the Environmental Activity and Sector Registry for the MOECP.

Foundation wall and any buried utility backfill material should consist of free-draining imported granular material. Most of the native site soils are too fine-grained to provide proper drainage, and as such this should be accomplished using well graded Granular B Type 1 material complying with OPSS 1010. The fill should be placed in maximum 300 mm thick lifts and compacted to a minimum of 98 percent of Standard Proctor Maximum Dry Density (SPMDD).

The backfill material, if any, in the upper 300 mm below the pavement subgrade elevation should be compacted to 100 percent of SPMDD in all areas.

5.6 Foundation Design

Assuming the stie is prepared as outlined above, the native sub-soils are competent to support the proposed structures with basements on conventional strip and spread footings. It is assumed exterior footings will be placed at a minimum of 1.5 m below final adjacent grade for frost protection and placed on undisturbed native glacial till soils at depth or approved engineered fill. Footings situated at a minimum depth of 1.5 m below the final grade, founded on undisturbed compact to very dense native till soils or stiff to very stiff cohesive material can be designed for a bearing capacity of 150 kPa at SLS and 225 kPa at ULS. The very soft to soft clay and silt material is not competent to support the strip and spread footings and should be subexcavated if encountered.

In areas where the grade will be raised, in accordance with Section 5.5, the existing material will need to be removed to depths up to a minimum of 0.5 mbeg, and the non-organic portions

recompacted prior to placing fill. Specification regarding adequate subgrade depth for area of grade raises may be provided upon review of the site grading plan. The subgrade soils should be leveled, proof-rolled and inspected by a geotechnical engineer prior to placement of the fill material. Any soft loose areas identified would need to be subexcavated and replaced with compacted engineered fill as discussed in Section 5.5.

In addition, the structures may be founded on approved engineered fill soils overlying native soils subject to the approval by Cambium. A minimum thickness of 1.2 m of engineered fill is recommended where it is placed on very loose to loose to very soft to soft soils, if any. Structures founded on approved, compacted engineered fill soils may be designed for an allowable bearing capacity of 100 kPa SLS and 150 kPa ULS when the fill is placed on loose to compact native soils, and 150 kPa SLS and 225 kPa ULS when the fill is placed on dense to very dense native soils.

Water levels in monitoring wells should be assessed in the spring, under wet conditions, to better understand groundwater at the site.

Settlement potential at the noted SLS loadings is less than 25 mm and differential settlement should be less than 10 mm.

The quality of the subgrade shall be inspected by Cambium during construction, prior to constructing the footings and placing engineered fill, to confirm bearing capacity estimates and suitability of any engineered fill.

5.6.1 Floor Slabs

Inorganic native till soils or engineered fill are considered competent to support floor slab loads. Subgrade soils should be leveled, proof-rolled and inspected by a geotechnical engineer. Any soft loose areas identified would need to be subexcavated and replaced with compacted engineered fill as discussed in Section 5.5. Given the anticipated subgrade conditions, to create a stable working surface and to distribute loadings, shallow floor slabs should be constructed on a minimum of 200 mm of OPSS Granular A, compacted as outlined

in Section 5.5, and basement slabs should be constructed on a minimum of 300 mm Granular A or clear stone completely wrapped in geotextile.

5.7 Subdrainage

The average groundwater table at the Site is designed to be below the proposed footing elevations, however assuming the proposed structures are to have basements, perimeter subdrains are recommended, given that groundwater conditions on the site may vary seasonally, with the potential for higher groundwater at times. Geotextile wrapped perforated pipe subdrains set in a trench of clear stone and connected to a sump or other appropriate frost-free outlets are recommended around the perimeter footings. If clear stone is placed below the floor slab the clear stone should be hydraulically connected to the exterior subdrains; the inverts of which should be a minimum of 150 mm below the underside of the basement slab.

5.8 Lateral Earth Pressures

Lateral earth pressure coefficients (K) for foundation and retaining wall design are provided below. It is assumed that potential lateral loads will result from cohesionless, frictional materials, such as well-drained granular backfill.

Ko (at rest)	0.42
Ka (active)	0.27
Kp (passive)	3.7

The following formula may be used to calculate active lateral thrust (Pa) on yielding retaining structures;

$$Pa = (H/2)(Ka)(\gamma H + 2q)$$

where,

H = Height of retaining structure (m)

γ = unit weight of retained soil (kN/m^3)

q = surcharge (kPa)

A unit weight of 22 kN/m^3 should be assumed for compacted granular backfill loadings.

5.9 Buried Utilities

Trench excavations should generally consider Type 3 soil conditions above the groundwater table which can be excavated with unsupported side slope no steeper than 1H:1V. Bedding and cover material for any services should consist of OPSS 1010-3 Granular A or B Type ll, placed in accordance with pertinent Ontario Provincial Standard Drawings (OPSD 802.013). The bedding and cover material shall be placed in maximum 200 mm thick lifts and should be compacted to at least 98 percent of SPMDD. The cover material shall be a minimum of 300 mm over the top of pipe and compacted to 95 percent SPMDD, taking care not to damage the utility pipes during construction.

5.10 Roadway Design Recommendations

The performance of the pavement is dependent upon proper subgrade preparation. All topsoil and organic materials should be removed from the Site and backfilled with approved engineered fill or native material, compacted to 98 percent SPMDD. The subgrade should be proof rolled and inspected by a Geotechnical Engineer. Any areas where rutting or appreciable deflection is noted should be subexcavated and replaced with suitable fill. The fill should be compacted to at least 98 percent SPMDD.

To completely protect against damage due to frost heaving, excavations would have to be made to the maximum frost penetration depth and backfilled with free-draining granular material. In order to reduce costs an alternative pavement structure design is proposed. It should be noted that while the designs presented will provide adequate support for the intended use, some minor frost heaving could persist, resulting in minor degradation and minimal annual maintenance.

The recommended pavement structure design for the proposed internal roads has been developed based on a subgrade with moderate amounts frost susceptible fines. The pavement structure assumes all roads will be low volume residential roadways. The recommended minimum pavement structure is provided in Table 5.

Table 5 Recommended Minimum Pavement Structure

Pavement Layer	Residential Roads (Local)
Surface Course Asphalt	40 mm HL4
Binder Course Asphalt	50 mm HL8
Granular Base	150 mm OPSS 1010 Granular A
Granular Subbase	350 mm OPSS 1010 Granular B

Material and thickness substitutions must be approved by the Design Engineer.

The thickness of the subbase layer could be increased at the discretion of the Engineer, to accommodate site conditions at the time of construction, including soft or weak subgrade soil replacement.

Compaction of the subgrade should be verified by the Engineer prior to placing the granular fill. Granular layers should be placed in 200 mm maximum loose lifts and compacted to at least 98 percent of SPMDD (ASTM D698) standard. The granular materials specified should conform to OPSS standards, as confirmed by appropriate materials testing.

The final asphalt surface should be sloped at a minimum of 2% to shed runoff. Any abutting pavements should be saw cut to provide clean vertical joints with new pavement areas.

5.11 Seismic Site Classification

For the purpose of seismic design, geotechnical information shall be used to determine the “Site Class”. The average properties in the top 30 m (below the lowest founding level) are to be used. The site classification recommendation would be based on the available information as well as our interpretation of conditions below the boreholes based on our knowledge of the soil conditions in the area. In accordance with Table 4.1.8.4.A of the OBC (2012), it is recommended that Site Class “D” (stiff soil) be applied for structural at the Site. It may be possible, though not assured, to upgrade the seismic site class for the proposed development through the implementation of Shear Wave Velocity testing.

5.12 Design Review and Inspections

Test excavations should be advanced throughout the Site, prior to construction, to compare findings to those observed in this report. Should soil or groundwater conditions change drastically from this report, a qualified geotechnical engineer should be consulted.

Testing and inspections should be carried out during construction operations to examine and approve subgrade conditions, placement and compaction of fill materials, and dewatering requirements. Concrete used during construction should also be tested for slump, air entrainment and compressive strength.

We should be contacted to review and approve design drawings, prior to tendering or commencing construction, to ensure that all pertinent geotechnical-related factors have been addressed. It is important that onsite geotechnical supervision be provided at this site for excavation and backfill procedures, deleterious soil removal, subgrade inspections and compaction and concrete testing.

6.0 Closing

Please note that this work program and report are governed by the attached Qualifications and Limitations. If you have questions or comments regarding this document, please do not hesitate to contact the undersigned at (705) 742-7900.

Respectfully submitted,

Cambium Inc.

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7.0 Standard Limitations

Limited Warranty

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The findings and results presented in reports prepared by Cambium are based on the materials and information provided by the client to Cambium and on the facts, conditions and circumstances encountered by Cambium during the performance of the work requested by the client. In formulating its findings and results into a report, Cambium assumes that the information and materials provided by the client or obtained by Cambium from the client or otherwise are factual, accurate and represent a true depiction of the circumstances that exist. Cambium relies on its client to inform Cambium if there are changes to any such information and materials. Cambium does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Cambium will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from Cambium during the provision of services, work or reports.

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Site Assessments

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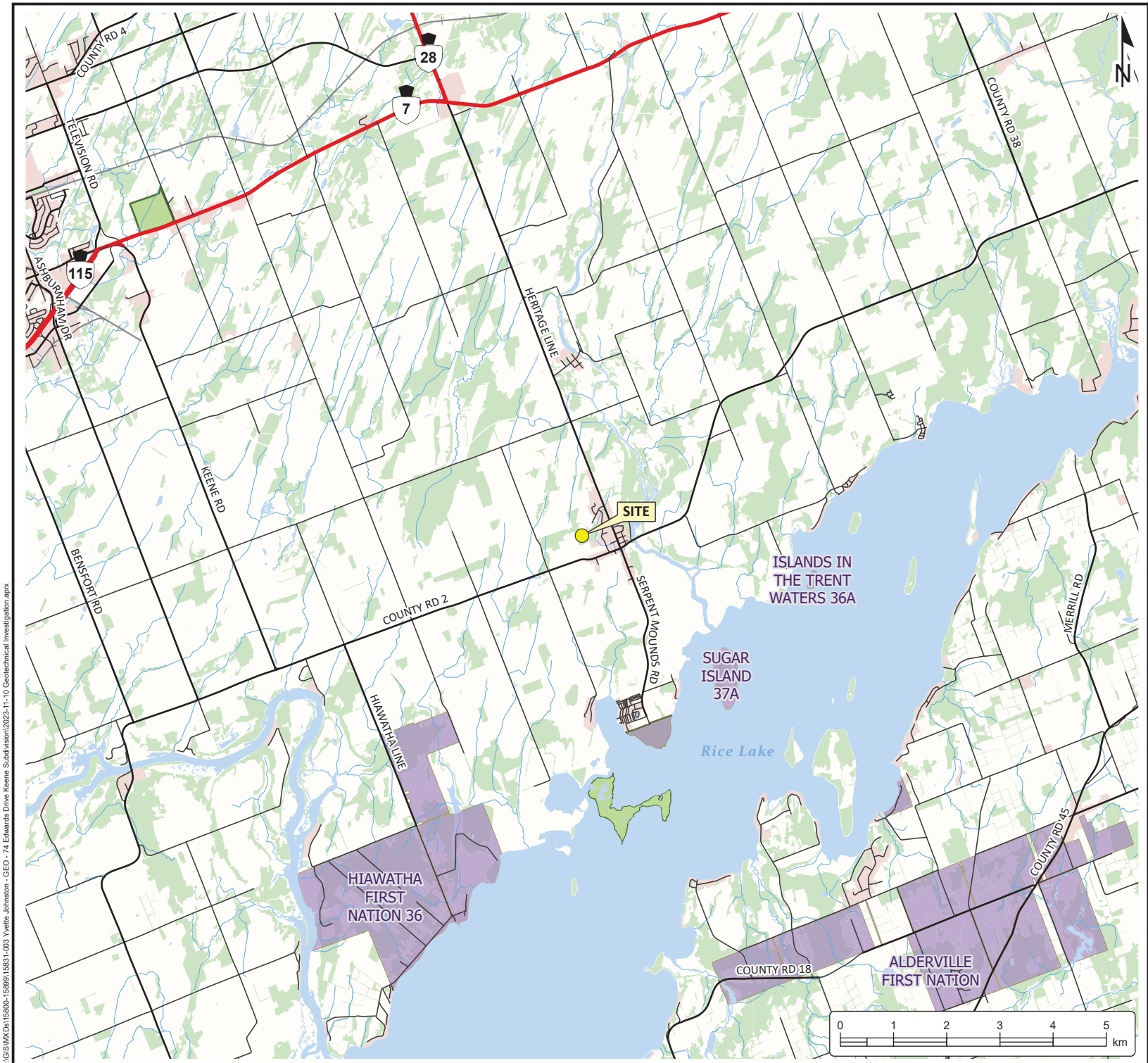
Appended Figures



GEOTECHNICAL INVESTIGATION

YVETTE JOHNSTON
74 Edwards Drive
Keene, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- First Nations Reserve
- Provincial Park
- Water Area
- Wooded Area
- Built Up Area

Notes:
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- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
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SITE LOCATION PLAN

Project No.: 15831-003		Date: November 2023	Rev.:
Scale: 1:100,000		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: JM	Figure: 1	

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GEOTECHNICAL INVESTIGATION

YVETTE JOHNSTON
74 Edwards Drive
Keene, Ontario

LEGEND

- Benchmark
- Borehole
- Monitoring Well
- Site (approximate)

Notes:
- overlay was created by RFA Planning Consultant Inc. Job no. 867, dated March 3, 2023, titled: Concept Sketch
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Benchmarks:
BM-SIB - Iron bar property boundary marker with an elevation of 216.689 (masl)

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BOREHOLE LOCATION PLAN

Project No.: 15831-003		Date: November 2023	Rev.:
Scale: 1:2,500		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: JM	Figure: 2	

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Appendix A

Borehole Logs

Barrie
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Log of Borehole: BH101-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 20, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T 725789.47 m E, 4902833.4 m N
Elevation: 230.79 masl

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
230 / 0		TOPSOIL: 125 mm thick	1A							
		SILT: Brown, silt, some sand, trace to some gravel, trace to some organics (rootlets and wood fibres), dry to moist, loose	1B	SS	70	19				
230 / 1		-becomes compact	2	SS	0	15			Bentonite Plug; Pipe	
		TILL: Light brown, gravelly sand, some silt, trace to some clay, dry to moist, compact	3	SS	100	11				
229 / 2		-becomes dense	4	SS	100	49				
228 / 3		-becomes compact	5	SS	60	23			Sand Pack; PVC Screen	Groundwater level was measured at 2.67 mbeg (228.12 masl) on November 3, 2023
227 / 4		TILL: Light browmn, sandy silt, some clay, some gravel, dry to moist, very dense	6	SS	100	50				SS6 GSA: 11% Sand 34% Gravel 37% Silt 18% Clay
226 / 5									Cap	
225 / 6		-becomes light grey	7	SS	100	50				
224 / 7		Borehole terminated at 6.5 mbeg in sandy silt till								Borehole was open and dry upon drilling completion

Logged By: T. Paget
Input By: J. Monroy

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Log of Borehole: BH102-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 19, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T 725892.84 m E, 4902843.70 m N
Elevation: 238.12 masl

Elevation (m)	Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
238	0		TOPSOIL: 150 mm thick	1B							
			SAND: Brown, sand, some gravel, some silt, dry to moist, loose	1B	SS	75	7				
			-becomes compact	2A	SS	100	21				SS2A GSA: 15% Gravel 69% Sand 11% Silt 5% Clay
237	1		TILL: Brown, sandy silt, some gravel, some clay, dry to moist, compact	2B							
				3	SS	90	25				
236	2		-becomes moist and dense	4	SS	100	45				
235	3		-becomes very dense	5	SS	100	50				
234	4			6	SS	100	50				Auger grinding at 4.5 mbeg on presumed cobble
233	5		Borehole terminated at 5.0 mbeg due to auger refusal on presumed boulder	7	SS	100	50				Borehole caved to 4.5 mbeg and was dry upon drilling completion
232	6										
231	7										

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Input By: J. Monroy

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Log of Borehole: BH103-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 19, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T 725948.21 m E, 4902878.82 m N
Elevation: 239.61 masl

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
0 / 239		TOPSOIL: 200 mm thick	1A							
		SAND: Brown, sand, some silt, trace to some gravel, dry to moist, compact	1B	SS	85	13				
1 / 238			2	SS	60	50				
		Borehole terminated at 1.0 mbeg due to auger refusal on presumed boulder								Borehole open and dry upon drilling completion
2 / 237										
3 / 236										
4 / 235										
5 / 234										
6 / 233										
7										

Logged By: T. Paget
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Log of Borehole: BH104-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 20, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T 725961.54 m E, 4902825.67 m N
Elevation: 235.30 masl

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
235 / 0		TOPSOIL: 150 mm thick	1A							
		SAND: Brown, sand, some silt, some gravel, trace organics, dry to moist, loose	1B	SS	100	7				
1		TILL: Light brown, gravelly sand, some silt, trace clay, dry to moist, dense	2	SS	85	50				
234		TILL: Light brown, sandy silt, some clay, some gravel, dry to moist, compact	3	SS	100	16				Cobbles encountered at approximate depth of 1.5 mbeg
2			4	SS	100	25				
233			5	SS	100	47				
3		-becomes dense	6A	SS	95	48				
232			6B	SS						
4										
231		SILTY SAND: Light brown, silty sand, medium grained, trace clay, moist, dense								Borehole caved to 5.5 mbegs with groundwater at 5.2 mbeg upon drilling completion
5										
230										
6		-becomes wet	7	SS	100	49				SS7 GSA: 0% Gravel 62% Sand 32% Silt 6% Clay
229										
7		Borehole terminated at 6.6 mbeg in silty sand								
228										

Logged By: T. Paget
Input By: J. Monroy

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Log of Borehole: BH105-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 19, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T 725866.92 m E, 4902713.24 m N
Elevation: 231.39 masl

Elevation (m) / Depth	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
231 / 0	TOPSOIL: 200 mm thick	1A							
	SAND: Brown, sand, some gravel, dry to moist, loose	1B	SS	50	9				
230 / 1	CLAY AND SILT: Light brown, clay and silt, some sand, trace gravel, DTPL, stiff	2	SS	40	11				
	CLAY AND SILT: Light brown to light grey, clay and silt, some sand, trace gravel, some organics, WTPL, soft	3	SS	80	3				
229 / 2	TILL: Light brown to light grey, sandy silt, some gravel, some clay, dry to moist, compact	4	SS	100	19				
228 / 3	-becomes very dense	5	SS	100	50				Auger grinding from 3.0 mbeg to 4.5 mbeg on presumed cobbles
227 / 4	TILL: Light brown to light grey, gravelly sand, some silt, trace clay, wet, very dense	6	SS	100	50				
226 / 5									Borehole caved to 5.6 mbeg with groundwater at 4.3 mbeg upon drilling completion
225 / 6	-becomes grey	7	SS	100	50				
7	Borehole terminated at 6.5 mbeg in gravelly sand till								

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Input By: J. Monroy

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Log of Borehole: BH106-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 19, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T 725920.11 m E, 4902718.95 m N
Elevation: 232.84 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
232 / 0		TOPSOIL: 200 mm thick	1A							
		TILL: Light brown, sandy silt, some gravel, some clay, dry to moist, dense	1B	SS	60	37				
232 / 1		-becomes compact	2	SS	100	22				Auger grinding from 0.8 mbeg to 1.5 mbeg on presumed cobbles
		-becomes dense	3A							
231 / 2		SILT AND SAND: Light brown, silt and sand, trace clay, trace gravel, moist, dense	3B	SS	100	43				SS3B GSA: 4% Gravel 41% Sand 47% Silt 8% Clay
		TILL: Light brown, gravelly sand, some silt, trace clay, moist, dense	4	SS	95	41				Cobbles encountered again at approximate depth of 2.3 mbeg
230 / 3		-becomes very dense	5	SS	95	50				
229 / 4		TILL: Light brown, sandy silt, some gravel, some clay, dry to moist, very dense	6	SS	100	50				Cobbles encountered again at approximate depth of 4.6 mbeg
228 / 5										
227 / 6			7	SS	85	50				Borehole caved to 5.5 mbeg and was dry upon drilling completion
226 / 7		Borehole terminated at 6.3 mbeg in sandy silt till								

Logged By: T. Paget
Input By: J. Monroy

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Log of Borehole: BH107-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 20, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T 725964.66 m E, 4902765.49 m N
Elevation: 232.10 masl

Elevation (m)	Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
232	0		TOPSOIL: 100 mm thick	1A							
			SILTY SAND: Orangey brown, silty sand, some clay, trace gravel, some organics, dry to moist, compact	1B	SS	75	11				SS1B GSA: 8% Gravel 43% Sand 34% Silt 15% Clay
			TILL: Light brown, gravelly sand, some silt, trace clay, dry to moist, dense	2	SS	100	42				
231	1									Bentonite Plug	
			-becomes compact	3	SS	100	23			Pipe	
230	2										
			TILL: Light brown, sandy silt, some gravel, some clay, moist to wet, compact	4	SS	100	24				Cobbles encountered at approximate depth of 2.3 mbeg
229	3		-becomes dense	5	SS	100	43				Borehole was open and dry upon drilling completion
228	4									Sand Pack	
			-becomes very dense	6	SS	100	50			PVC Screen	Auger grinding at 4.5 mbeg on presumed cobble
227	5		-becomes grey								
226	6			7	SS	90	50			Cap	Groundwater level was measured at 5.83 mbeg (226.27 masl) on November 3, 2023
			Borehole terminated at 6.5 mbeg in sandy silt till								
225	7										

Logged By: T. Paget
Input By: J. Monroy

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Log of Borehole: BH108-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 19, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T 725909.67 m E, 4902613.13 m N
Elevation: 228.34 masl

Elevation (m)	Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
228	0		TOPSOIL: 305 mm thick	1A	SS	15	22				
				1B							
	1		TILL: Light brown, sandy silt, some gravel, trace to some clay, dry to moist, compact	2	SS	70	44				
			-becomes dense								
227											
	2		-becomes compact	3	SS	90	27				Auger grinding at 1.5 mbeg on presumed cobble
226			-becomes very dense	4	SS	55	50				
	3										
225				5	SS	100	50				
	4		TILL: Light brown, gravelly sand, some silt, trace clay, moist to wet, very dense								
224				6	SS	100	50				Cobbles encountered again at approximate depth of 4.6 mbeg
	5										
223											
	6			7	SS	100	50				
222			Borehole terminated at 6.2 mbeg in gravelly sand till								Borehole caved to 5.8 mbeg and was dry upon drilling completion
	7										

Logged By: T. Paget
Input By: J. Monroy

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Log of Borehole: BH109-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 20, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T 725997.69 m E, 4902607.50 m N
Elevation: 217.80 masl

Elevation (m)	Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
217	0		TOPSOIL: 100 mm thick	1A							
			SILT: Brown, silt, some sand, some clay, trace organics, dry to moist, very loose to loose	1B	SS	65	4				
	1			2	SS	75	3				
216	2		CLAY AND SILT: Brown, clay and silt, some sand, DTPL, very soft to soft	3	SS	100	2				
			-becomes WTPL and firm	4A	SS	100	30				
215			TILL: Grey, clay and silt, some sand, some gravel, WTPL, very stiff	4B							
	3		TILL: Grey, sandy silt, some gravel, trace to some clay, dry to moist, dense	5A	SS	50	34				
				5B							
214	4										
213	5		-becomes very dense	6	SS	100	50				
212	6			7	SS	75	50				
211	7		Borehole terminated at 6.3 mbeg in sandy silt till								

Bentonite Plug
Pipe
Sand Pack
PVC Screen
Cap

SS3 GSA:
0% Gravel
15% Sand
42% Silt
43% Clay

Groundwater level was measured at 5.49 mbeg (212.31 masl) on November 3, 2023

Borehole caved to 6.0 mbeg and was dry upon drilling completion

Logged By: T. Paget
Input By: J. Monroy

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Log of Borehole: BH110-23

Client: Yvette Johnston
Project Name: Geo - 74 Edwards Drive, Keene
Project No.: 15831-003
Contractor: ACE Drilling
Method: Solid Stem Auger
Date Completed: October 19, 2023
Location: 74 Edwards Drive, Keene
UTM: 17 T725989.25 m E, 4902645.13 m N
Elevation: 221.10 masl

Elevation (m)	Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
221	0		TOPSOIL: 405 mm thick	1A	SS	100	7				
			SILT: Light brown, silt, some sand, trace gravel, dry to moist, loose	1B							
			TILL: Light brown, sandy silt, some gravel, trace to some clay, dry to moist, compact	2A							
220	1			2B	SS	100	21				
				3	SS	75	12				Auger grinding at 1.5 mbeg on presumed cobble
219	2										Cobbles encountered again at approximate depth of 2.3 mbeg
			TILL: Light brown, gravelly sand, some silt, trace clay, moist to wet, compact	4	SS	65	23				SS4 GSA: 33% Gravel 45% Sand 15% Silt 7% Clay
218	3		-becomes wet and dense	5	SS	60	39				
217	4										
			-becomes light brown to grey, and very dense	6	SS	80	50				Cobbles encountered again at approximate depth of 4.6 mbeg
216	5										
215	6			7	SS	100	50				
			Borehole terminated at 6.3 mbeg in gravelly sand till								
214	7										

Logged By: T. Paget
Input By: J. Monroy

Appendix B

Soil Laboratory Testing Results

Grain Size Distribution Chart

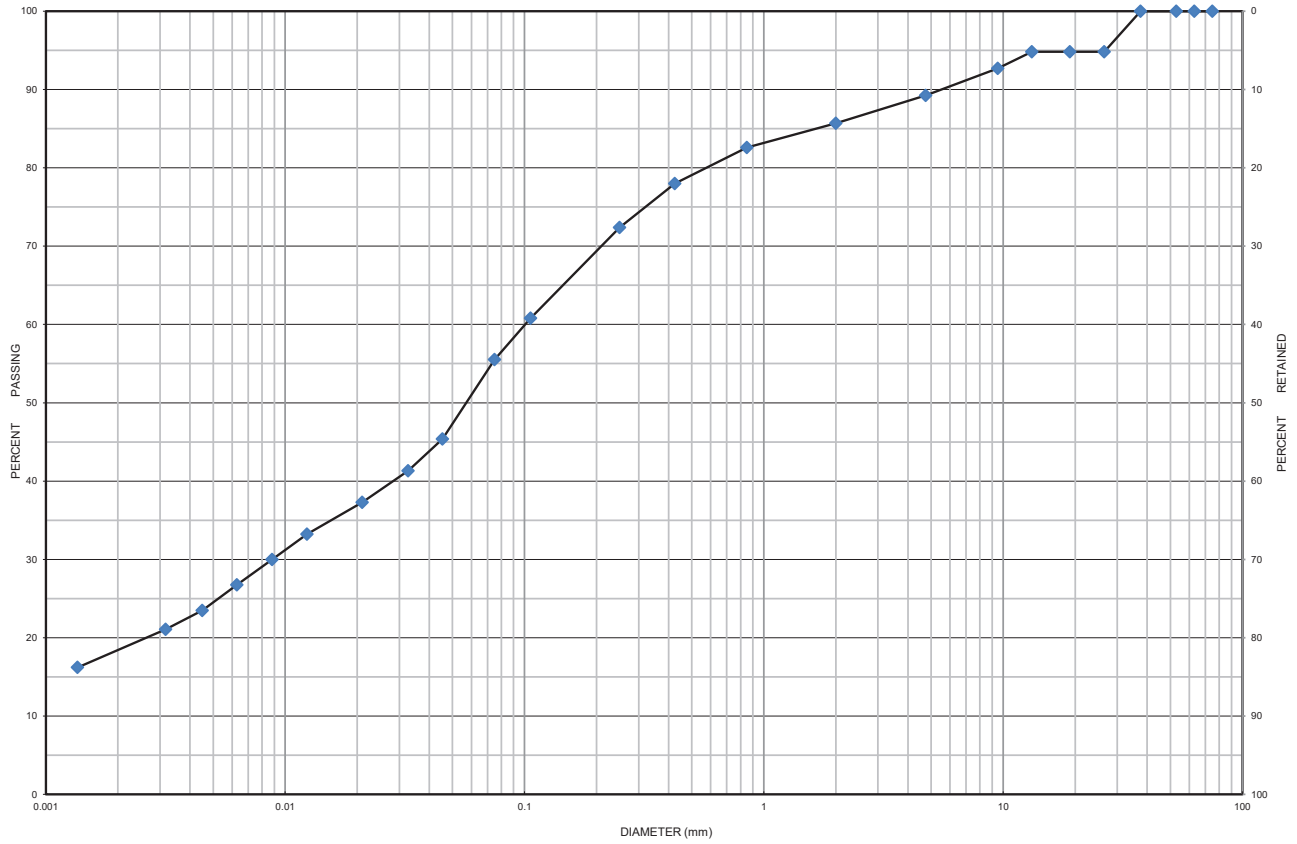
Project Number: *15831-003* **Client:** *Yvette Johnston*

Project Name: *74 Edwards Drive, Keene Subdivision ON*

Sample Date: *October 19 & 20, 2023* **Sampled By:** *Tim Paget - Cambium Inc.*

Location: *BH 101-23 SS 6* **Depth:** *4.6 m to 5 m* **Lab Sample No:** *S-23-1772*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 101-23	SS 6	4.6 m to 5 m	11	34	37	18	6.5

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sandy Silt some Clay some Gravel	ML	0.100	0.009	-	-	-

Additional information available upon request

Issued By: _____ *Date Issued:* *November 3, 2023*

(Senior Project Manager)

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Grain Size Distribution Chart

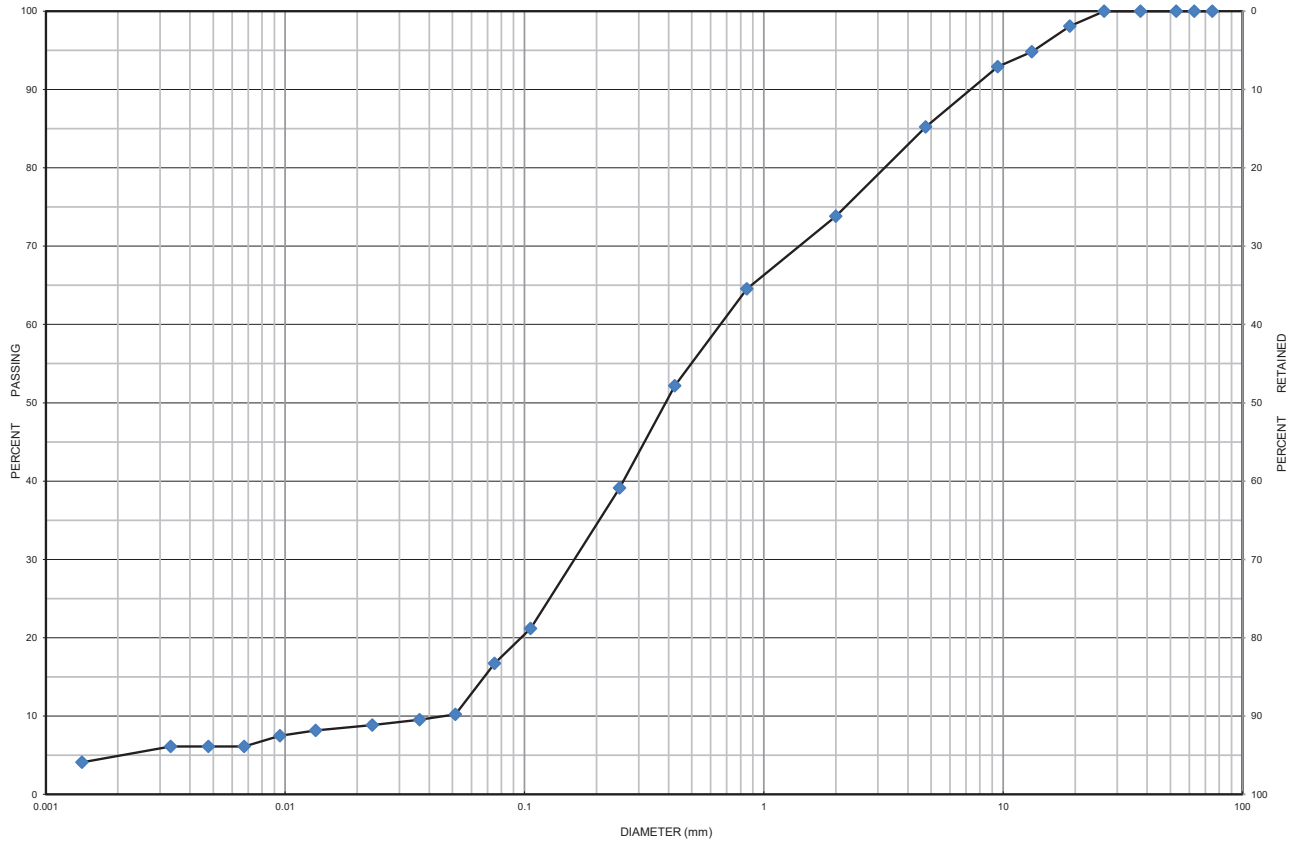
Project Number: *15831-003* **Client:** *Yvette Johnston*

Project Name: *74 Edwards Drive, Keene Subdivision ON*

Sample Date: *October 19 & 20, 2023* **Sampled By:** *Tim Paget - Cambium Inc.*

Location: *BH 102-23 SS 2A* **Depth:** *0.6 m to 1.1 m* **Lab Sample No:** *S-23-1773*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 102-23	SS 2A	0.6 m to 1.1 m	15	69	11	5	3.6

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand some Gravel some Silt trace Clay	SM	0.660	0.165	0.043	15.35	0.96

Additional information available upon request

Issued By: _____ *Date Issued:* *November 3, 2023*

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Grain Size Distribution Chart

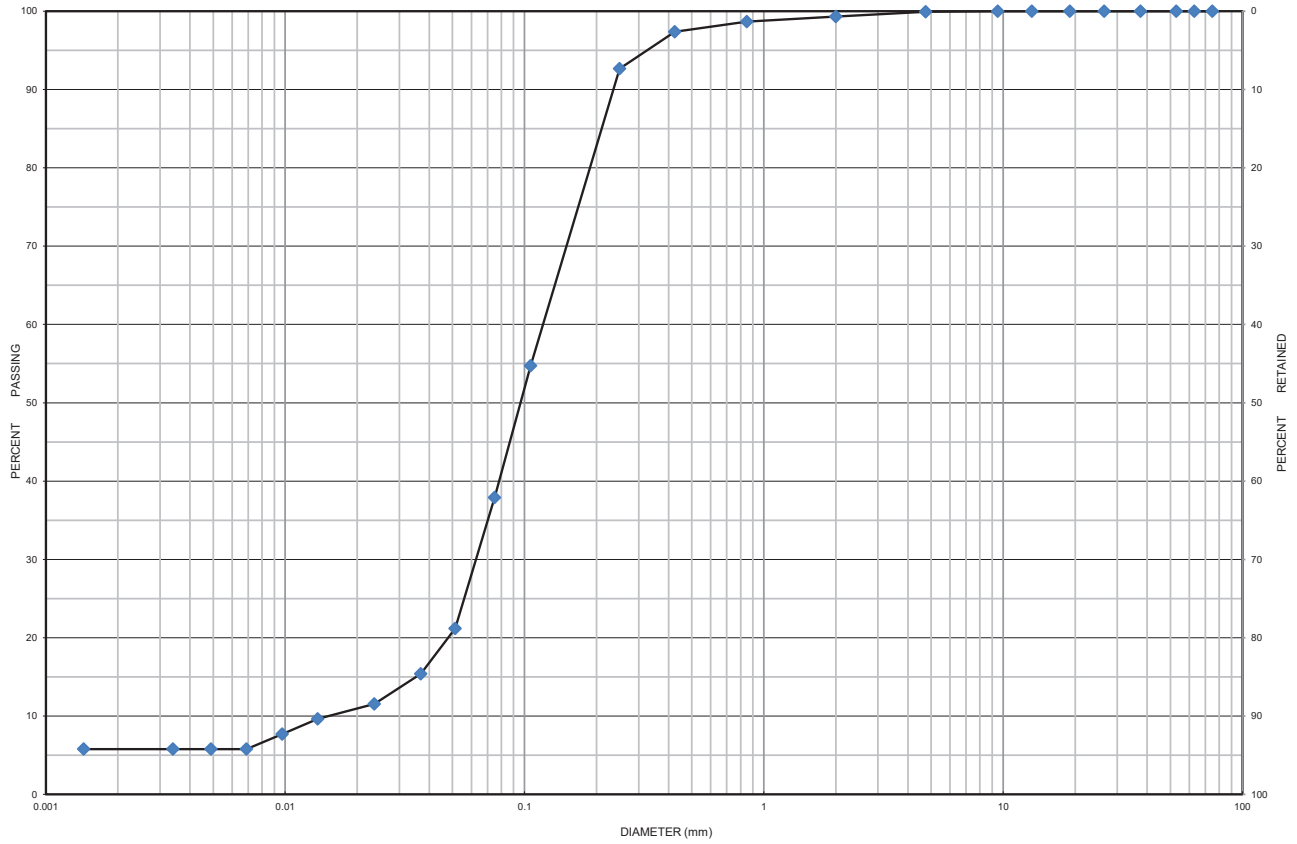
Project Number: *15831-003* **Client:** *Yvette Johnston*

Project Name: *74 Edwards Drive, Keene Subdivision ON*

Sample Date: *October 19 & 20, 2023* **Sampled By:** *Tim Paget - Cambium Inc.*

Location: *BH 104-23 SS 7* **Depth:** *6.1 m to 6.6 m* **Lab Sample No:** *S-23-1774*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 104-23	SS 7	6.1 m to 6.6 m	0	62	32	6	18.7

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Sand trace Clay	SM	0.125	0.064	0.015	8.33	2.18

Additional information available upon request

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Grain Size Distribution Chart

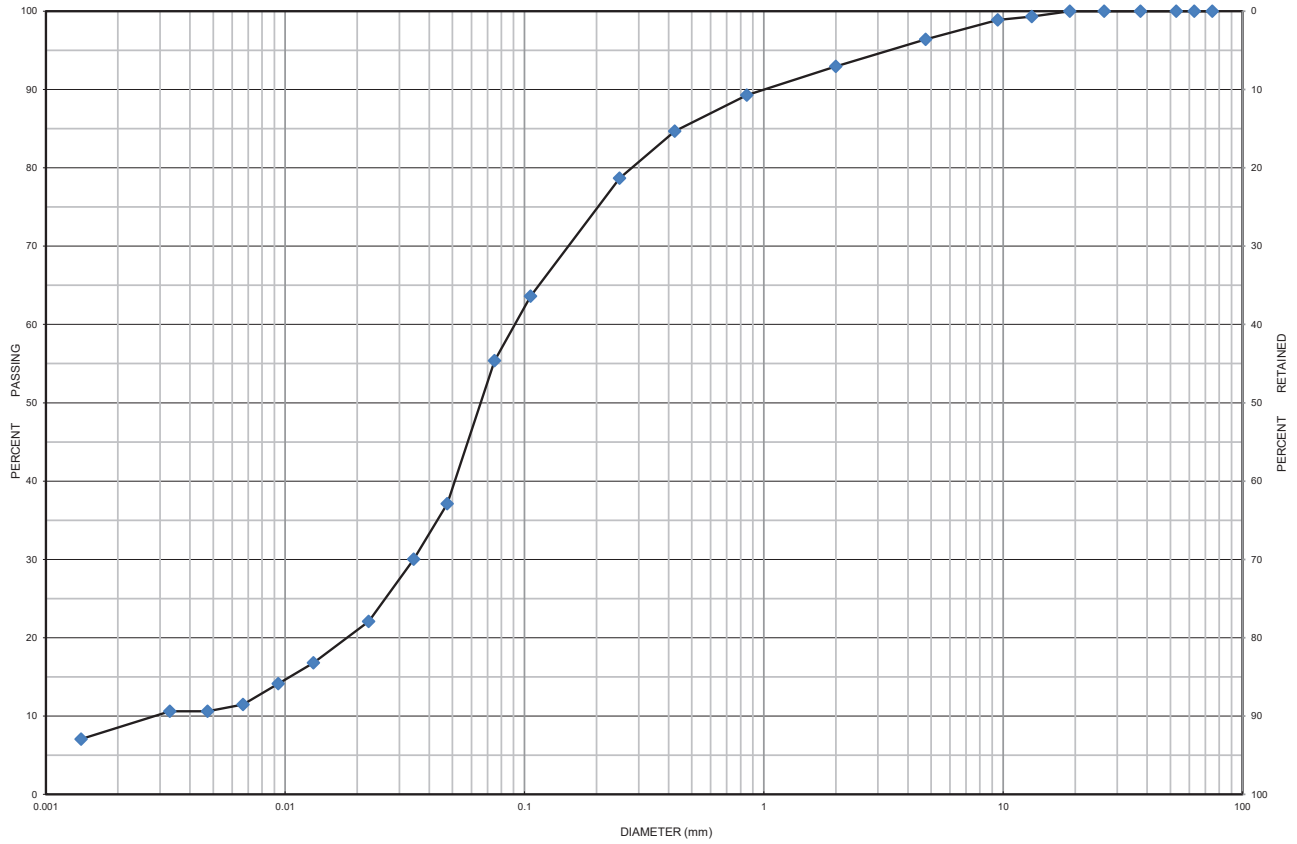
Project Number: *15831-003* **Client:** *Yvette Johnston*

Project Name: *74 Edwards Drive, Keene Subdivision ON*

Sample Date: *October 19 & 2023* **Sampled By:** *Tim Paget - Cambium Inc.*

Location: *BH 106-23 SS 3B* **Depth:** *1.6 m to 2 m* **Lab Sample No:** *S-23-1775*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 106-23	SS 3B	1.6 m to 2 m	4	41	47	8	8.9

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silt and Sand trace Clay trace Gravel	ML	0.0900	0.0350	0.0028	32.14	4.86

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Grain Size Distribution Chart

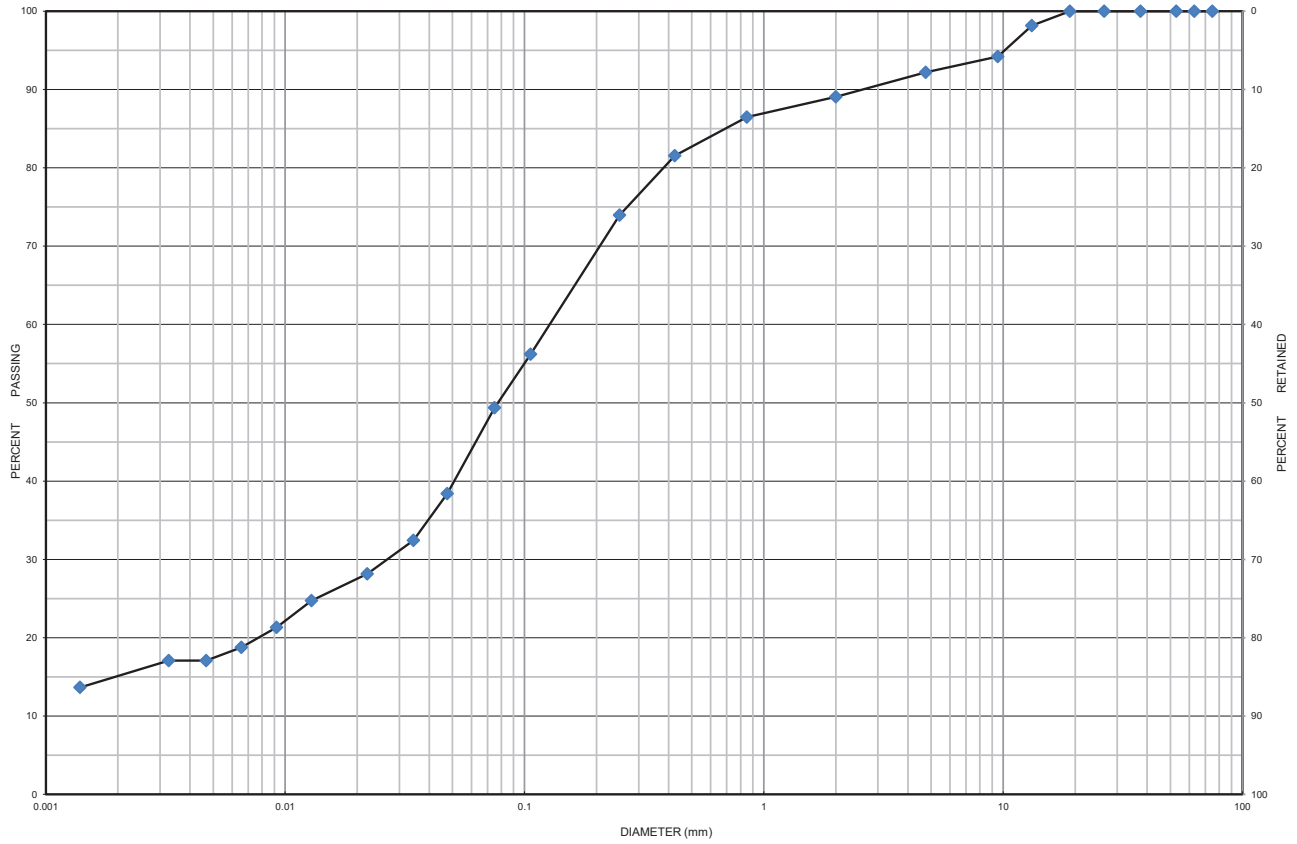
Project Number: *15831-003* **Client:** *Yvette Johnston*

Project Name: *74 Edwards Drive, Keene Subdivision ON*

Sample Date: *October 19 & 20, 2023* **Sampled By:** *Tim Paget - Cambium Inc.*

Location: *BH 107-23 SS 1B* **Depth:** *0.1 m to 0.6 m* **Lab Sample No:** *S-23-1776*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 107-23	SS 1B	0.1 m to 0.6 m	8	43	34	15	7.9

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Sand some Clay trace Gravel	SM	0.140	0.026	-	-	-

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Grain Size Distribution Chart

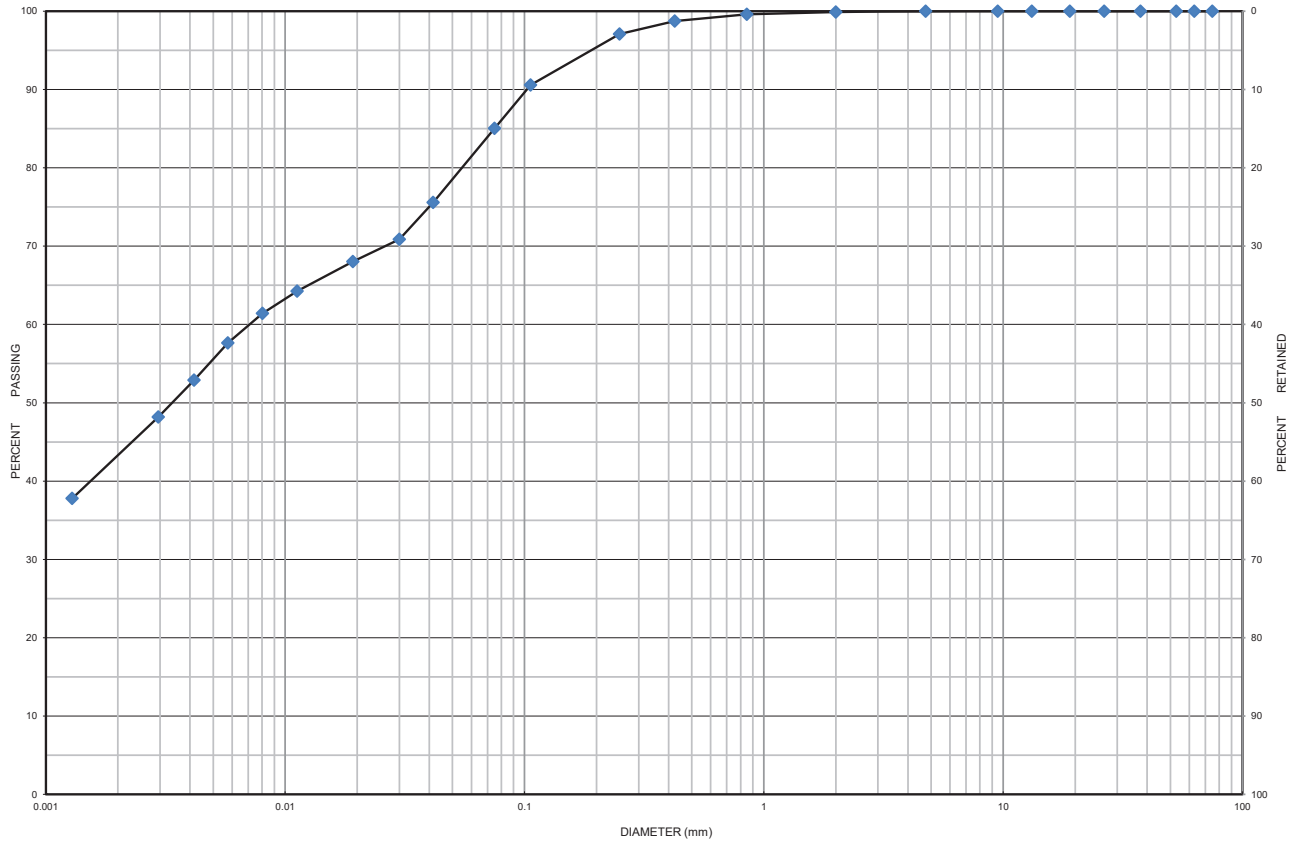
Project Number: *15831-003* **Client:** *Yvette Johnston*

Project Name: *74 Edwards Drive, Keene Subdivision ON*

Sample Date: *October 19 & 20, 2023* **Sampled By:** *Tim Paget - Cambium Inc.*

Location: *BH 109-23 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-23-1777*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 109-23	SS 3	1.5 m to 2 m	0	15	42	43	26.0

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Clay and Silt some Sand	CL	0.007	-	-	-	-

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Grain Size Distribution Chart

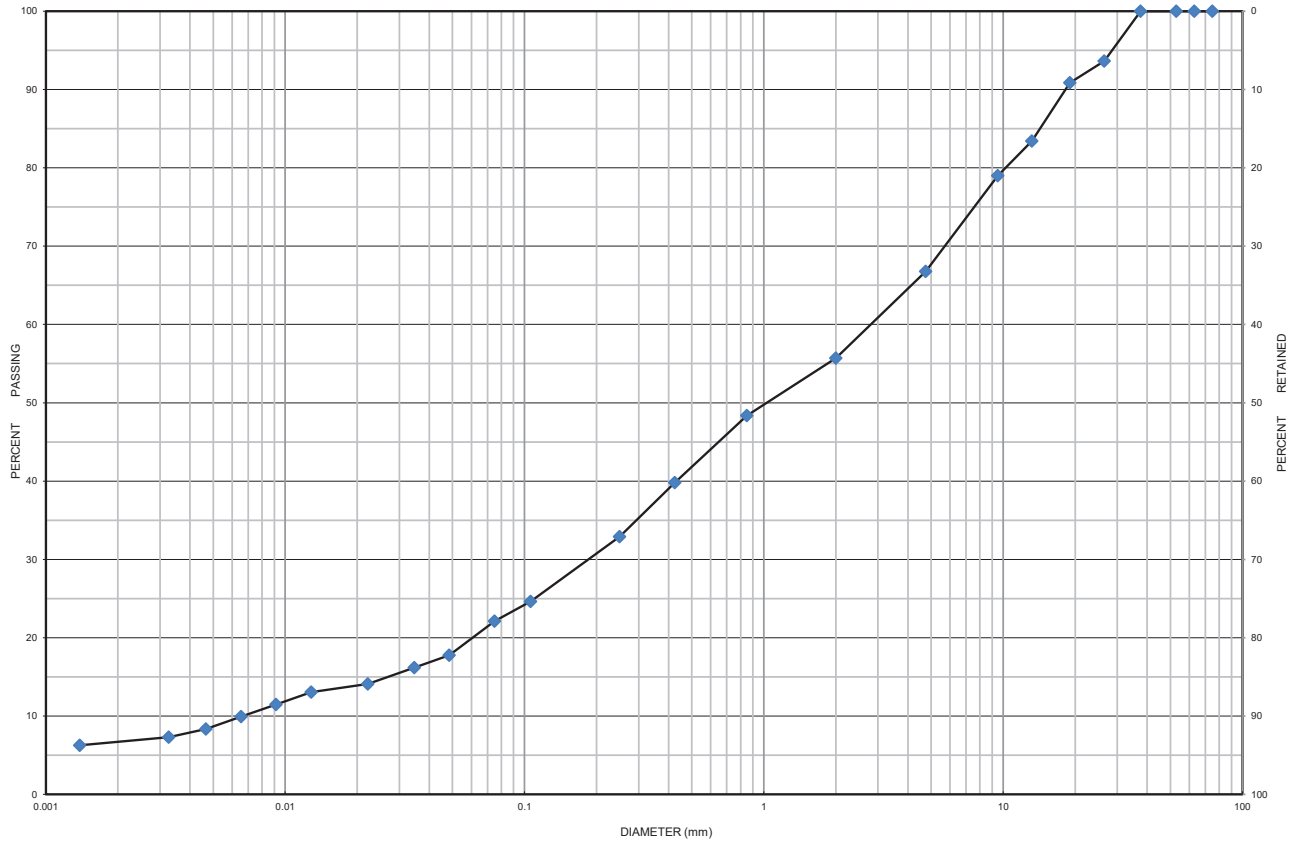
Project Number: *15831-003* **Client:** *Yvette Johnston*

Project Name: *74 Edwards Drive, Keene Subdivision ON*

Sample Date: *October 19 & 20, 2023* **Sampled By:** *Tim Paget - Cambium Inc.*

Location: *BH 110-23 SS 4* **Depth:** *2.3 m to 2.9 m* **Lab Sample No:** *S-23-1778*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 110-23	SS 4	2.3 m to 2.9 m	33	45	15	7	4.6

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Sand some Silt trace Clay	SM	2.7500	0.1800	0.0069	398.55	1.71

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