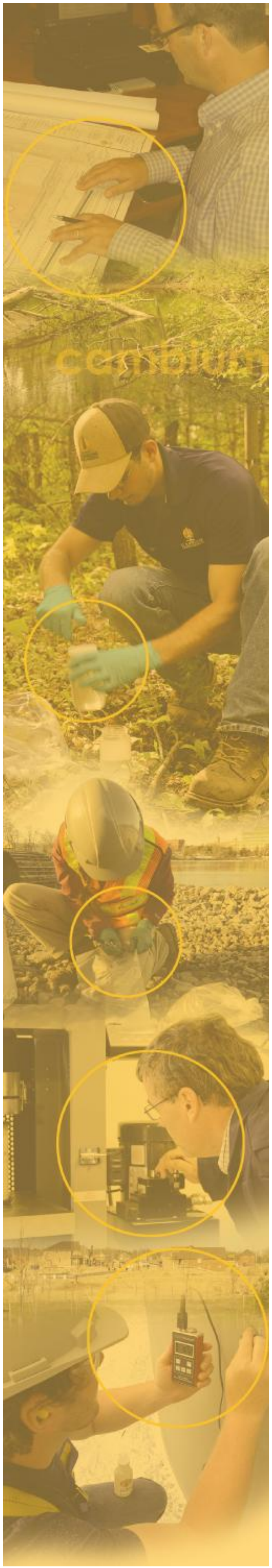

Geotechnical Investigation Report Proposed Subdivision, Gananoque, Ontario

Cambium Reference No.: 7545-001

January 29, 2019

Prepared for: Coombe Custom Homes

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1.0 INTRODUCTION

Cambium Inc. (Cambium) was retained by Coombe Custom Homes (Client) to complete a geotechnical investigation in support of the design and construction of a residential subdivision in Gananoque, Ontario (Site). The Site is located north of MacDonald Drive and on the proposed roadways Wilmer Avenue, Pine Street, and Conner Drive.

The property to be developed is a generally flat and cleared area with some light vegetation cover. A topographically low area is present on the east side of the property. Exposed bedrock is present in the south and northeast corner of the Site.

The geotechnical investigation was required to confirm the subsurface conditions at the Site in order to provide geotechnical design parameters as input into the design and construction of the proposed building lots within the subdivision. A Site Plan showing borehole locations is included as Figure 1 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 buildings, pavement structure, and underground servicing.

2.0 METHODOLOGY

2.1 TEST PIT INVESTIGATION

A test pit investigation was conducted on December 21, 2018 to assess subsurface conditions at the Site. A total of five test pits, designated as TP101-18 through TP105-18, were advanced throughout the Site. The test pits extended to depths ranging from 1.2 m to 3.0 m below ground surface (mbgs). The test pit locations were referenced on-site using survey drawings and on-site stakes. Test pit locations were referenced on site using a handheld GPS device and on site stakes.

Additionally, in each test pit location, dynamic probe penetration tests (DPT), consisting of measuring the number of blows required to advance a 19 mm diameter steel rod into the subgrade soils a distance of 150 mm using an 8 kg hammer falling 750 mm, were completed at each test location to determine the in-situ density and bearing capacity of the soils. The DPT values are used in this report to assess consistency of cohesive soils and relative density of non-cohesive soils. 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 test pits were checked for groundwater and general stability prior to backfilling.

Test pit logs are provided in Appendix A while Site soil and groundwater conditions are described and geotechnical recommendations are discussed in the following sections of this report.

2.2 PHYSICAL LABORATORY TESTING

Physical laboratory testing, including three (3) particle size distribution analyses (LS-702, 705), was completed on selected soil samples to confirm textural classification and to assess geotechnical parameters. Natural moisture content testing (LS-701) was completed on all retrieved soil samples. Results are presented in Appendix B and are discussed in Section 3.0.

3.0 SUBSURFACE CONDITIONS

The subsurface conditions at the Site predominantly consist of various layers of clayey silt to silty clay material dependent on the area of the site being investigated. Additionally, the southern section and northeastern section of the site consisted of exposed bedrock. These soils were encountered throughout the test pit locations with varying termination depths. The test pit locations are shown on Figure 1 and the individual soil units are described in detail below.

3.1 TOPSOIL

Surficial topsoil was encountered in TP104-18 on the east side of the Site. The topsoil was approximately 50 mm thick and contained organic matter and consisted of loose silty clay. The majority of the site has been stripped of topsoil for the proposed construction.

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

3.2 CLAYEY SILT TO SILTY CLAY

Where near surface bedrock was not encountered, varying layers of clayey silt to silty clay material were encountered. The test pits were advanced to depths of 1.2 to 3.0 mbgs, with TP105-18 terminating on limestone bedrock. TP102-18 encountered refusal at 1.2 m depth which is anticipated to be a result of encountering a large boulder. The clayey silt to clay and silt material encountered was grey to brown in colour and ranged from drier than plastic limit (DTPL) to wetter than plastic limit (WTPL). Based on DPT values generally ranging from 8 to 25 blows per 305 mm of penetration, the silty clay and clay has an estimated relative consistency of firm to stiff. Based on laboratory analysis the moisture content ranged from 22.5% to 39.9%.

Laboratory particle size distribution analyses were completed on three (3) samples of the overburden material. The analytical results are shown on the borehole logs, included in Appendix A., and are summarized in Table 1 based on the Unified Soil Classification System (USCS).

Table 1 Particle Size Distribution Results – Overburden

Test Pit	Depth (m)	Soil	% Gravel	% Sand	% Silt	% Clay
TP101-18, GB1	0.6	Clayey Silt	0	2	63	35
TP103-18, GB3	1.8	Silty Clay	0	2	23	75
TP104-18, GB4	2.4	Clay and Silt	0	3	37	60

3.3 BEDROCK

Bedrock was encountered in two of the test pits, TP101-18 and TP105-18 at depths of 2.7 mbgs and 2.9 mbgs, respectively. The bedrock was unable to be fractured with the toothed-bucket excavator indicating a competent and sound bedrock in those locations. Minor seams and fractures were noted in the bedrock. The bedrock is expected to vary in quality across the Site as the bedrock elevation changes. Exposed bedrock is visible at the south and northeast ends of the Site.

3.4 GROUNDWATER

Groundwater was encountered in the form of water inflow at the base of test pits overlying bedrock. Minor sloughing due to water inflow was observed in test pits TP101-18 and TP105-18. All remaining test pits were dry and no sloughing of the sidewalls occurred.

It is expected that the groundwater table in this area is at a depth beyond the scope for this project. It is to be noted the infiltration in the test pits overlying the bedrock is expected as a result of perched water atop the tight bedrock. It should be noted that soil moisture and groundwater levels at the Site may fluctuate seasonally and in response to climatic events.

4.0 GEOTECHNICAL CONSIDERATIONS

The following recommendations are based on the test pit 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 test pit 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.

4.1 SITE PREPARATION

Any existing topsoil or soils identified with organic content at the Site should be excavated and removed from beneath any areas of the Site to be developed.

We understand that the residential units are to include basements where shallow bedrock is not present; as such excavations will extend to depths not exceeding 3.0 mbgs and can expect the subgrade material to consist of competent clayey silt to silty clay soils above the existing groundwater table. In areas where shallow bedrock is encountered, the residential buildings may be founded directly on the clean bedrock surface.

The near surface clay to silty clay 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.

4.2 EXCAVATIONS

Temporary excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA). The generally compact or stiff native clay and silty clay soils above the groundwater table may be classified as Type 3 soils in accordance with OHSA, with side slopes cut with no steeper than 1H:1V.. Below the groundwater table if encountered, these soils may be classified as Type4 soils, with unsupported side slopes no steeper than 3H:1V. Shallow, temporary excavations into the bedrock at the site can have vertical side slopes.

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).

The upper 0.3 m of bedrock at the site can likely be removed by a large excavator. Any deeper excavations would require a hoe ram and/or blasting.

4.3 DEWATERING

Across a majority of the Site, groundwater was encountered at various depths withinstances of perched surface water atop the bedrock. Based on these observations minimal groundwater seepage is expected during residential foundation construction with increased presence likely during the installation of underground services into bedrock or in the topographically low area at the east end of the property. Groundwater seepage should be manageable with filtered sumps and pumps and a Permit to Take Water (PTTW) from the Ministry of the Environment and Climate Change (MOECC) will not be required. It is noted that the elevation of the groundwater table will vary due to seasonal conditions and in response to heavy precipitation events but is expected to be below proposed foundation depths.

4.4 BACKFILL AND COMPACTION

Excavated non-organic, native overburden clayey silt to silty clay soils from the site may be appropriate for use as fill below grading and parking areas, provided that the actual or adjusted moisture content at the time of construction is within a range that permits compaction to required densities. Some moisture content adjustments may be required depending upon seasonal conditions. Geotechnical inspections and testing of engineered fill are required to confirm acceptable quality.

The exposed bedrock on site is suitable for use as engineered fill if adequately crushed. The engineered fill must be adequately prepared using an on-site crusher to produce a 3” minus crushed limestone material for reuse as Granular ‘B’ as road subbase or for preparing building foundation pads.

Any engineered fill for foundations should be placed in maximum 200 mm thick lifts and should be compacted to a minimum of 100% of standard Proctor maximum dry density (SPMDD). If engineered fill is being placed for general site backfill and grading then compaction to 98% is applicable. If engineered fill being placed consists of crushed shot rock then adequate compaction will need to be confirmed through a proof roll inspection after compaction has been completed with a large vibratory sheep’s foot roller in maximum 300 mm thick lifts. 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 when placed atop native fine grained soils.

Foundation wall backfill should consist of imported, free-draining granular fill, as native site soils are too fine-grained to provide adequate drainage. If a drainage layer membrane is used against the foundation then free-draining granular fill material will not be required and the native site soils will be sufficient. Backfill should be placed in lifts appropriate to the type of compaction equipment used, and compacted to 98% of SPMDD in areas that will be impacted by vehicles and heavy equipment.

Placement of engineered fill should be verified by onsite compaction testing during construction.

4.5 FOUNDATION DESIGN

Assuming that the Site is prepared as outlined above, all building foundations will be founded on bedrock or competent native soils encountered across the entirety of the Site and is adequate to support the structures on conventional strip and spread footings. The bedrock may be designed for an allowable bearing capacity of 900 kPa at ultimate limit state (ULS). The settlement potential on bedrock will be negligible assuming the upper weathered portion of the bedrock is removed and minimal clay seams are identified during this process. Any loose, weathered rock present at footing depth shall be scraped and cleaned to provide a smooth bearing surface for footing placement.

If foundations are to be placed on approved engineered fill or native clay soils extending to bedrock then an allowable bearing capacity of 150 kPa at serviceability limit state (SLS) and 200 kPa at ULS is considered appropriate. Settlement potential at the above-noted SLS loadings is less than 25 mm and differential settlement should be less than 10 mm.

Dowels are to be used to secure potentially unstable surfaces of rock, such as slopes. They are to be anchored in competent rock and extend 300 mm in to the bedrock and 200 mm in to the footing.

Strip footings that transition between any material boundaries, i.e. bedrock to clay soil or engineered fill, will require reinforcing steel bar (rebar) in the footings to mitigate the potential for differential settlement. As such, two 15 M bars are recommended to extend 1.5 m laterally in each direction from the transition point within the footing.

4.5.1 FROST PENETRATION

Based on climate data and design charts, the maximum frost penetration at the Site is estimated at 1.2 m.

Footings for the proposed structures should be situated at or below this depth for frost protection or should be protected. As long as footings are placed on competent bedrock free from weathering and with a clean surface, frost penetration is not expected to be an issue based on the competency of the bedrock in the region. If heavily weathered surface or multiple clay seams are identified frost protection in the form of granular backfill or insulation will be required.

It is assumed that the pavement structure thickness will be less than 1.2 m, so grading and drainage are important for good pavement performance and life expectancy. The construction of any underground services should be located below this depth or be appropriately insulated.

4.6 FLOOR SLABS

Inorganic native soils at the Site are considered not competent to support floor slab loads, therefore floor slabs must also be founded on bedrock or engineered fill, such as Granular 'B', extending to bedrock. To create a stable working surface and to distribute loadings, all slabs-on-grade should be constructed on a minimum of 200 mm of

OPSS 1010 Granular 'A' compacted to 98% of SPMDD with additional engineered fill, such as Granular 'B', placed and compacted to 98% SPMDD to raise grades as required.

4.7 SUBDRAINAGE

Groundwater was encountered at varying depths with the test pits as perched water atop tight bedrock. It should be noted that groundwater levels are affected by seasonal climatic conditions, as such, groundwater levels are expected to be at higher levels during seasonally wet periods, and the bedrock can potentially block groundwater infiltration during wetter seasons. As such, geotextile wrapped perforated pipe subdrains set in a trench of clear stone and connected to a sump or other frost-free positive outlet are recommended around all perimeter footings, excluding slab-on-grade units.

4.8 BURIED UTILITIES

Trench excavations should generally consider bedrock conditions which can be excavated with unsupported side slopes. If encountered, groundwater should be controllable using filtered sumps and pumps within the excavations.

The bedding and cover material for any services should consist of OPSS 1010-3 Granular 'A' or 'B' Type II, 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% of SPMDD. The cover material shall be a minimum of 300 mm over the top of the pipe and compacted to 95% SPMDD, taking care not to damage the utility pipes during compaction. If groundwater is present during placement of bedding material for utilities then 19 mm clear stone shall be used in place of granular material to ensure adequate compaction under wet conditions.

4.9 LATERAL EARTH PRESSURE

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 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.

4.10 PAVEMENT DESIGN

The performance of the pavement is dependent upon proper subgrade preparation. All topsoil and organic materials should be removed down to native material 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 boulders, 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. It is understood that road design is likely to include the placement of onsite crushed material to a 3" minus specification, which is considered sufficient engineered fill to be compacted as identified above in place of Granular 'B'.

Based on the Site conditions consisting of shallow bedrock that shelfs off towards the northern part of the Site the pavement design has been broken down into two separate designs for standard native soil subgade conditions and shallow bedrock. The recommended pavement structure should meet the Ministry standards for parking and driving areas and should, as a minimum, consist of the pavement layers identified in Table 2.

Table 2 Recommended Minimum Pavement Structure

Pavement Layer	Standard Design	Crushed Rock Subbase Design
Surface Course Asphalt	40 mm HL3 or HL4	40 mm HL3 or HL4
Binder Course Asphalt	50 mm HL8	50 mm HL8
Granular Base	150 mm OPSS 1010 Granular 'A'	150 mm OPSS 1010 Granular 'A'
Granular Subbase	300 mm OPSS 1010 Granular 'B'	Rock Shatter

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.

If shallow bedrock is encountered that does not allow for 300 mm of Granular 'B' material and 150 mm of Granular 'A', the top 300 mm of rock subgrade is to be shattered. This process provides Proper drainage, since trapped water can cause poor pavement performance. To prevent such damage, the top 0.3 m of rock grade shall be "shattered" and the resultant rock fragments are to be left in place to a depth of 0.3 m to provide rock "matting" to hold any granular materials placed.

Due to the transition in subgrade material (i.e. bedrock to clay) in the roadway, a frost taper in the granular base material is required. The Granular 'B' material will be tapered over 15 m from the edge of the bedrock to the full depth of the Granular 'B', resulting in a slope ratio of 50 horizontal to one vertical (50H:1V).

Compaction of the subgrade should be verified by the Engineer prior to placing the granular fill. Granular layers should be placed in 150 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 percent to shed runoff. Abutting pavements should be sawcut to provide clean vertical joints with new pavement areas.

4.11 DESIGN REVIEW AND INSPECTIONS

Cambium should be retained to complete testing and inspections during construction operations to examine and approve subgrade conditions, placement and compaction of fill materials, granular base courses, and asphaltic concrete.

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 testing.

5.0 CLOSING

We trust that the information contained in this report meets your current requirements. If you have questions or comments regarding this document, please do not hesitate to contact the undersigned at (705) 742-7900 ext. 332.

Respectfully submitted,

CAMBIUM INC.

Michael Smit, EIT
Project Coordinator

Stuart Baird, M.Eng., P.Eng.
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Appended Figures

GEOTECHNICAL INVESTIGATION
COOMBE CUSTOM HOMES
Gananoque, Ontario

LEGEND

Test Pit Location

Notes:
- Base mapping features are © Queen's Printer of Ontario, 2017 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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TEST PIT LOCATION PLAN

Project No.: 7545-001	Date: December 2018 Rev.:
Scale: 1:2,000	Projection: NAD 1983 UTM Zone 17N

Created by:	Checked by:	Figure:
SH	KWT	1

O:\GIS\project_MXDs\7500-7599\7545-001 Coombe Custom Homes - Gananoque Subdivision - Geotechnical Investigation\2019-01-07 FIG 1 - Borehole Location Plan.mxd

Appendix A
Test Pit Logs

TEST PIT LOGS

Test Pit Investigation - Wilmer Avenue, Gananoque, Ontario

Cambium Reference No. 7545-001

Date of Investigation: December 21, 2018

Completed by: Michael Smit

Test Pit ID	Depth (mbgs[1])	Material Description	Depth (mbgs)	DPT[2] (Blows/150mm)
TP101-18	0.0 - 0.6	SILTY CLAY: Brown silty clay, trace sand, trace gravel, soft, WTPL	0.00 - 0.15	5
			0.15 - 0.30	10
	0.6 - 1.2	CLAYEY SILT: Brown clayey silt, trace sand, stiff, APL	0.30 - 0.45	-
			0.45 - 0.60	-
	1.2 -2.9	SILTY CLAY: Brown silty clay, very stiff, APL	0.60 - 0.75	11
			0.75 - 0.90	12
	2.9 - 3.0	GRAVELLY SAND: Gravelly sand, some clay	0.90 - 1.05	-
			1.05 - 1.20	-
		Test pit terminated at 3.0 mbgs on bedrock with water inflow at 2.6 mbgs with minor sloughing near the bottom. DPT terminated at 1.2 mbgs due to weather conditions.		
TP102-18	0.0 - 0.6	SILTY CLAY: Brown silty clay, trace gravel, soft, WTPL	0.00 - 0.30	-
			0.30 - 0.45	8
	0.6 - 1.2	SILTY CLAY: Brown silty clay, trace gravel, soft, WTPL	0.45 - 0.60	17
			0.60 - 1.20	-
		Test pit terminated at 1.2 mbgs in silty clay with DPT adanced to 1.7 mbgs. Dry and no sloughing. Refusal likely due to isolated boulder. DPT terminated at 1.5 mbgs due to weather conditions.	1.20 - 1.35	8
			1.35 - 1.50	50
TP103-18	0.0 - 0.6	SILTY CLAY: Brown silty clay, trace gravel, organics present	0.00 - 0.15	8
			0.15 - 0.30	9
	0.6 - 3.0	SILTY CLAY: Brown silty clay, trace sand, some clay, trace gravel, moist, compact	0.30 - 0.60	-
			0.60 - 0.75	12
		Test pit terminated at 3.0 mbgs in silty clay with no sloughing or water inflow present. DPT terminated at 1.2 mbgs due to weather conditions.	0.75 - 0.90	50
TP104-18	0.0 - 0.05	TOPSOIL: 50 mm topsoil		
	0.05 - 0.6	CLAY: Grey clay, soft to firm, APL		
	0.6 - 2.4	CLAY AND SILT: Brown clay and silt, trace sand, very stiff, DTPL		
		Test pit terminated at 2.4 mbgs in clay with no sloughing or water inflow present.		
TP105-18	0.0 - 2.7	SILTY CLAY: Brown silty clay, trace gravel, soft, WTPL		
		Test pit terminated at 2.7 mbgs upon berock refusal.		

Notes:
1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod into the soil with an 8 kg hammer falling 750 mm.

Appendix B

Physical Laboratory Testing Results

Grain Size Distribution Chart

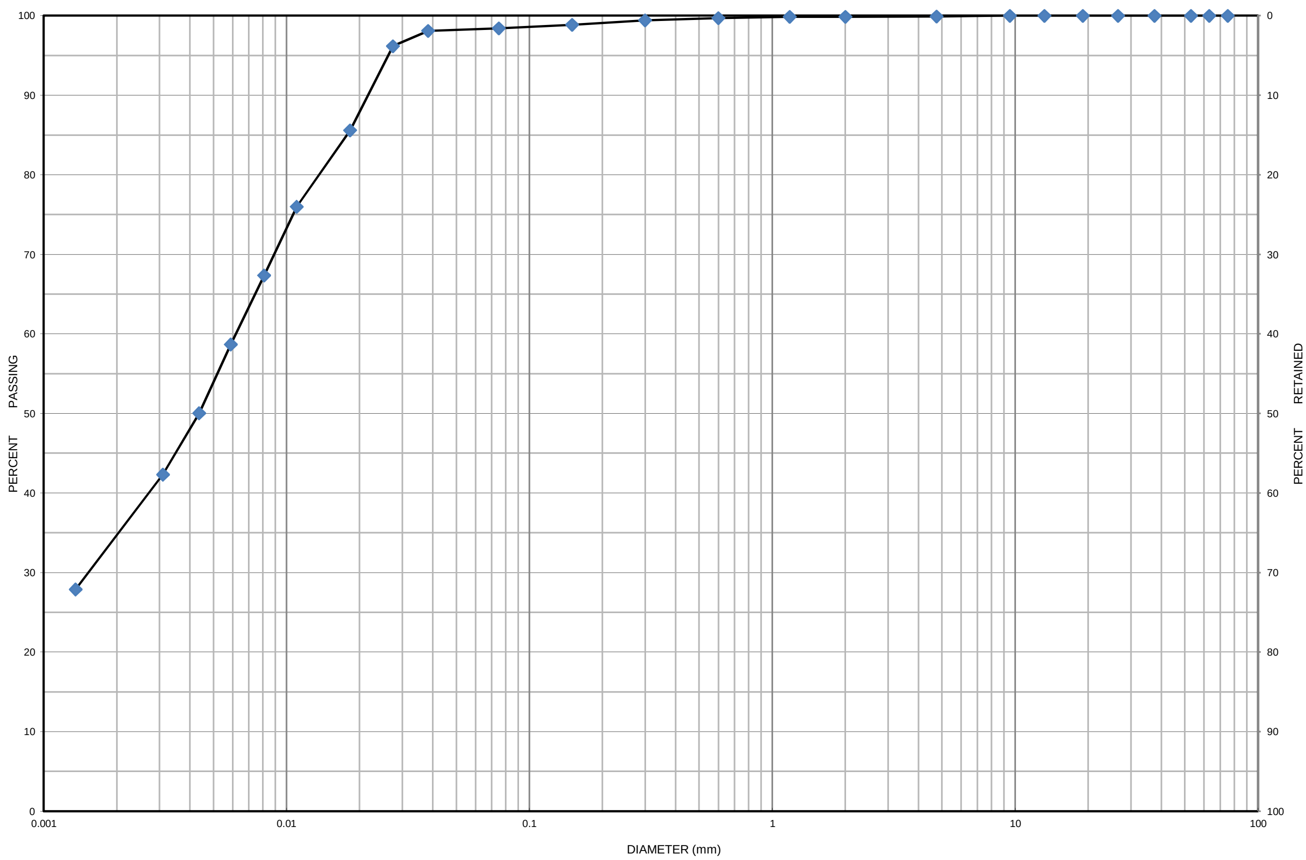
Project Number: *7545-001* **Client:** *Coombe Custom Homes*

Project Name: *Gananoque Subdivision - Geotechnical Investigation*

Sample Date: *December 21, 2018* **Sampled By:** *Michael Smit - Cambium Inc.*

Location: *TP 101-18 GB 1* **Depth:** *0.6 m* **Lab Sample No:** *S-19-0002*

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			

Location	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
TP 101-18	GB 1	0.6 m	0	2	98		25.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Clayey Silt trace Sand	ML	0.0062	0.0016	-	-	-

Issued By: ____________________ *Date Issued:* *January 16, 2019*

(Senior Project Manager)

Cambium Inc. (Laboratory)
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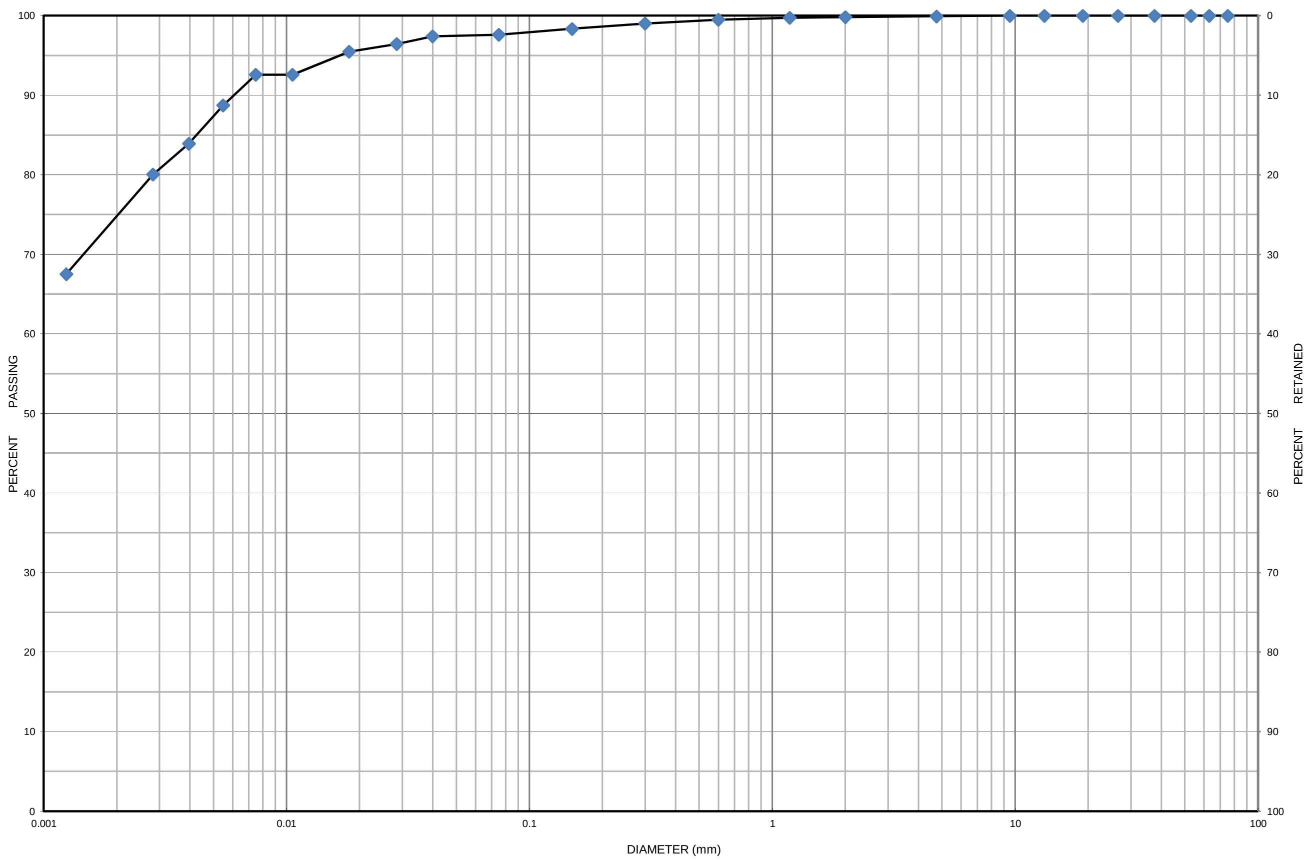
Grain Size Distribution Chart

Project Number: *7545-001* **Client:** *Coombe Custom Homes*
Project Name: *Gananoque Subdivision - Geotechnical Investigation*
Sample Date: *December 21, 2018* **Sampled By:** *Michael Smit - Cambium Inc.*
Location: *TP 103-18 GS 3* **Depth:** *1.8 m* **Lab Sample No:** *S-18-0003*

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			

Location	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
TP 103-18	GS 3	1.8 m	0	2	98		22.5

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Clay trace Sand	CL-CH	-	-	-	-	-

Issued By: [signature] (Senior Project Manager) *Date Issued:* *January 16, 2019*

Grain Size Distribution Chart

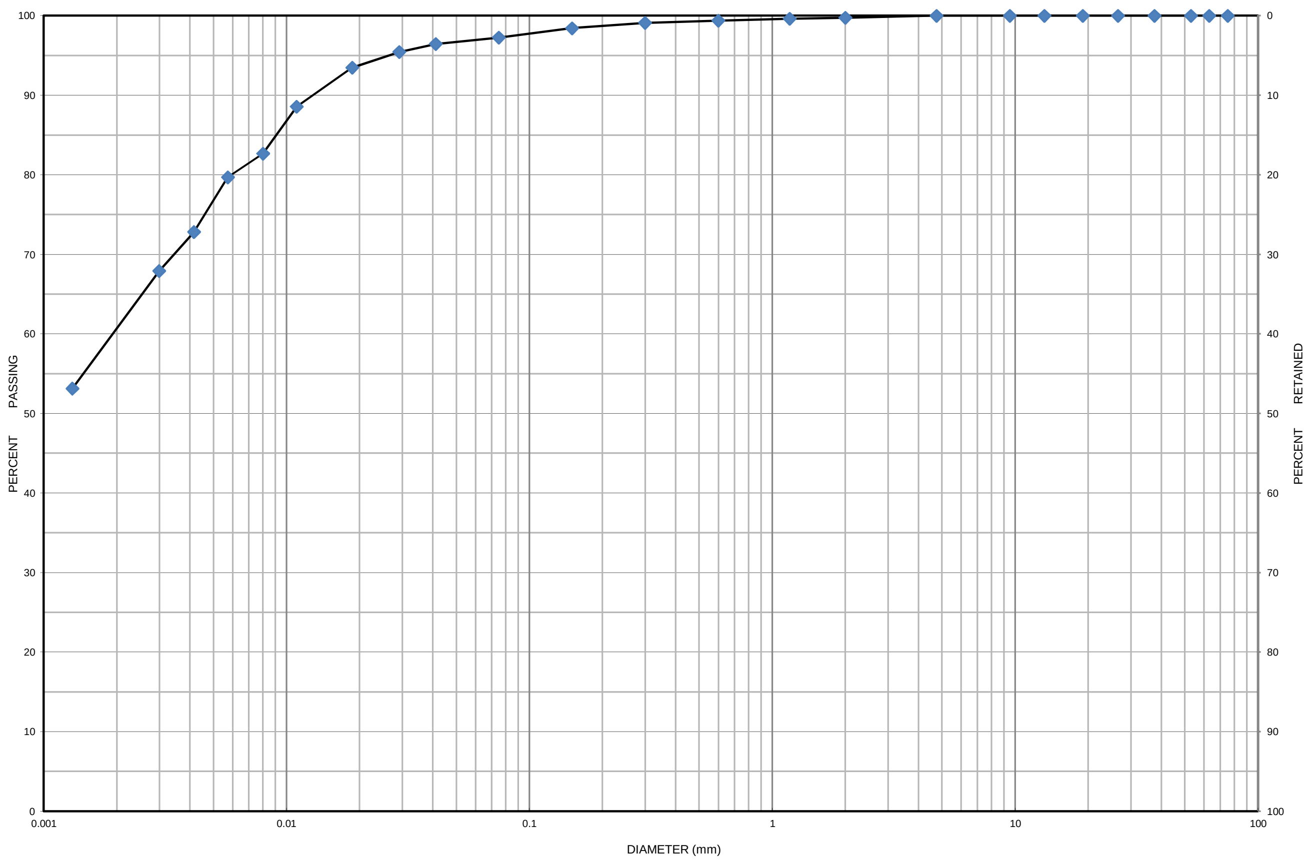
Project Number: *7545-001* **Client:** *Coombe Custom Homes*

Project Name: *Gananoque Subdivision - Geotechnical Investigation*

Sample Date: *December 21, 2018* **Sampled By:** *Michael Smit - Cambium Inc.*

Location: *TP 104-18 GS 4* **Depth:** *2.4 m* **Lab Sample No:** *S-18-0004*

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			

Location	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
TP 104-18	GS 4	2.4 m	0	3	97		28.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Clay and Silt trace Sand	CL-ML	0.0019	-	-	-	-

Issued By: (Senior Project Manager) *Date Issued:* *January 16, 2019*

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