Geotechnical Investigation Report – 33 Mill Street South, Port Hope, Ontario

2020-01-06

Prepared for:
Valenova Holdings

Reference No.: 10238-001

CAMBIUM INC.
866.217.7900
cambium-inc.com

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1.0 INTRODUCTION

Cambium Inc. (Cambium) was retained by Valenova Holdings (Client) to complete a geotechnical investigation in support of the design and construction of proposed micro-brewery building located at 33 Mill Street South, Port Hope, Ontario (Site).

The Site is located at the northeast corner of the intersection of Mill Street South and Dorset Street in Port Hope, Ontario. The purpose of the geotechnical investigation was to obtain information about the subsurface conditions by means of a number of boreholes and based on the findings provide recommendations pertaining to the geotechnical design of the proposed 1-storey wood-frame building. 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 proposed structure and facilities.

2.0 METHODOLOGY

2.1 Borehole Investigation

Cambium completed a geotechnical investigation at the Site on December 12, 2019. A total of Six (6) boreholes, designated as BH101-19 through BH106-19, were advanced into the subsurface at predetermined locations throughout the Site. All of the boreholes were advanced to augur refusal due to bedrock at depths ranged from 1.0 metres below ground surface (mbgs) to 3.9 mbgs. The location of the boreholes was obtained from a handheld GPS unit and the elevation of the boreholes was surveyed relative to a temporary Bench Mark (BM). The temporary BM is recognized as the catch basin on Mill Street from topographic survey. The elevation of the catch basin has a geodetic elevation of 79.80 masl according to the topographic survey provided by the client. A Site Plan, including borehole locations and benchmark is appended as Figure 1 of this report.

Drilling and sampling was completed using a truck-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 or hollow 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. Soil samples were collected at approximately 0.75 m intervals in the upper 3.0 m depth and in 1.5 m intervals below 3.0 m depth. 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 were backfilled and sealed in accordance with Ontario Regulation (O.Reg.) 903, as amended, and the property was reinstated to pre-existing conditions.

Borehole logs are provided in Appendix A. 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. Moisture content testing was completed on all soil samples. Testing results are presented in Appendix B and are discussed in Section 3.0.

3.0 SUBSURFACE CONDITIONS

The detailed soil profiles encountered in the boreholes are indicated on the attached borehole logs in Appendix A. It should be noted that the conditions indicated on the borehole logs are for specific locations only, and may vary between and beyond the borehole locations.

The subsurface conditions at the Site generally consist of a layer of gravelly sand or gravel and sand of varying thickness, overlying silty sands, or silt and sand, which in turn overlie the bedrock.

3.1 Topsoil

Topsoil was noticed on BH106-19 only, with a thickness of 200 mm.

3.2 Gravelly Sand or Gravel and Sand (Fill)

Fill, having a thickness of between 1.0 m (BH101-19) and 1.4 m (BH105-19), was encountered at all borehole locations. The composition of the fill material can be generally described as gravel and sand or gravelly sand with some silt and trace clay. Standard Penetration Tests (SPT) carried out in the fill material encountered in all boreholes gave N values ranging from 3 to over 50 blows per 0.3 metres of penetration, which varies very loose to very dense of relative density.

Laboratory particle size distribution analyses were completed for two (2) samples of the fill, taken from the boreholes and depths provided in Table 1 in order to identify the soil texture. The testing results are provided in Appendix B and are summarized in Table 1 based on the Unified Soil Classification System (USCS).

Table 1 Particle Size Distribution Analysis – Fill

BH	Depth (mbgs)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH101-19-SS1	0.2 – 0.8	Gravelly Sand some Silt trace Clay	32	49	16	3	4.1
BH103-19-SS2	0.8 – 1.2	Gravel and Sand some Silt trace Clay	40	38	15	7	7.0

3.3 Silty Sand

The silty sand was found to directly underlie the sand and gravel in BH105-19. The silty sand was observed in brown of color. Silty sands contained ranges from some gravel and trace clay.

The silty sands were found to be dry to moist at the time of investigations. SPT N values provided evidence of a very loose to compact relative density within the silty sands.

A laboratory particle size distribution analysis was completed for one (1) sample of the silty sand material. The analysis results, based on the Unified Soil Classification System (USCS) scale, are summarized above in Table 2, with full results provided in Appendix B.

Table 2 Particle Size Distribution Analysis – Silty Sand

BH	Depth (mbgs)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH105-19-SS3	1.5 – 2.0	Silty Sand some Gravel trace Clay	11	64	21	4	5.1

3.4 Bedrock

Limestone bedrock was encountered in all boreholes. The inferred top of bedrock level varies from Elev. 76.8 m to 79.7 m as summarized in Table 3. Bedrock was not proven by coring. It is noted that variations in the bedrock surface should be expected. It is often difficult to distinguish where bedrock/till complex ends and bedrock begins, particularly where the bedrock surface is weathered. As such, the inferred bedrock surface level should be considered accurate up to ±1.0 m.

Table 3 Approximate Depth and Elevation of Bedrock Surface

Borehole	Approximate Depth of Limestone Bedrock Surface (mbgs)	Approximate Elevation of Limestone Bedrock Surface (masl)
BH101-19	1.0	79.40
BH102-19	1.3	79.20
BH103-19	1.4	79.25
BH104-19	1.4	79.19
BH105-19	3.9	76.82
BH106-19	1.1	79.70

3.5 Groundwater

All boreholes were dry upon completion to the point of bedrock refusal. The groundwater table appears to be at a depth of greater than 3.9 m below existing grades. It should be noted that 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 borehole information and are intended to assist the 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.

4.1 General Site Preparation

All topsoil, organics and deleterious material should be removed from below the building areas prior to construction. For site grading, in areas of cut or minor fill where the proof roll and/ or inspection has identified unsuitable subgrade conditions, whether too soft or too wet, material is to be removed and replaced with an approved OPSS 1010 Granular ‘B’ Type I compacted material, under guidance of Cambium Staff.

4.2 Excavations

Temporary excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA). The soils at this site would generally be classified as Type 3 soils in accordance with OHSA, with unsupported side slopes no steeper than 1H:1V to the bottom of the excavation. 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 excavations or if wet conditions are encountered, the side slopes should be flattened as required to maintain safe working conditions or excavation sidewalls must be fully supported (shored).

4.3 Dewatering

Excavations for conventional footings will likely not extend below the groundwater table and groundwater seepage will likely not be encountered. Groundwater seepage should be

controllable with filtered sumps and pumps and a permit to take water (PTTW) will not be required.

4.4 Frost Penetration

Based on the Ontario Provincial Standard Drawing (OPSD) 3090.101, the typical frost penetration depth for the proposed structure is expected to be approximately 1.2 mbgs. Footings for the proposed structure should be situated at or below this depth for frost penetration or should be protected. If construction is carried out during the winter months, all footing locations where excavated soils become exposed to potential frost penetration should be poured within the day to prevent potential future settlements. If the footings cannot be poured within the same day the soils are excavated, the surface should be covered with thermal insulation equivalent to 1.2 m of soil cover to prevent potential freezing of the frost susceptible soils at the Site.

It is assumed that any pavement structure thickness will be less than 1.2 m; therefore, grading and drainage are important for good pavement performance and life expectancy. Any utilities should be located below this depth or be appropriately insulated.

4.5 Foundation Design

It is understood that the proposed micro-brewery will be a heated one-storey wood structure with no basement. The proposed building can be supported by conventional shallow strip or spread footings bearing on native soils or bedrock below all existing fill or loose soils. Conventional spread and strip footings foundations on the native soils or bedrock at minimum depth of 1.2 mbgs may be designed using a factored geotechnical resistance at Ultimate Limit States (ULS) of 225 kPa and a geotechnical resistance at Serviceability Limit States (SLS) of 150 kPa (assuming 25 mm total and 19 mm differential of settlement). Perimeter foundation drainage is not considered necessary for this site, provided that the floor slab level is above the finished exterior ground surface level.

4.6 Floor Slabs

The floor slabs for the proposed structures may be constructed using conventional concrete poured slab techniques, following removal of any loose soil or deleterious soils and preparation of the subgrade as outlined in previous sections. To create a stable working surface, to distribute loadings, and for drainage purposes, the floor slabs should be constructed on a minimum of 200 mm of OPSS 1010 Granular A compacted to 98% of SPMDD. The modulus of subgrade reaction appropriate for design of the floor slab on proof-rolled native soil may be using 20 MPa/m.

Underfloor drainage is not considered necessary provided that the floor slab level is above the finished exterior ground surface.

4.7 Seismic Site Classification

The structures should be designed to withstand forces caused by seismic activity in accordance with the Ontario Building Code (OBC). In order to determine a site classification, it was assumed that soils as encountered in the samples retrieved in the boreholes would remain continuous minimum depth of 30 m below the bottom of any foundations. In addition, average ‘N60’ values for soils were assumed for the site. Based on these assumptions, in combination with the known local geological conditions, the site class for the proposed building is “C” as per Table 4.1.8.4.A, Site Classification for Seismic Site Response, OBC 2012. These earthquake/seismic design parameters should be reviewed in detail by the structural engineer and incorporated into the design as required.

4.8 Backfill and Compaction

Excavated non-organic fill and native sand and silt 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 on seasonal conditions. Geotechnical inspections and testing of engineered fill are required to confirm acceptable quality.

Engineered fill for foundations should consist of free-draining granular material meeting the specifications of OPSS 1010 Granular B or an approved equivalent, and should be placed in maximum 200 mm thick lifts compacted to a minimum of 100 percent Standard Proctor maximum dry density (SPMDD) as confirmed by nuclear densometer testing. Foundation wall backfill should consist of imported free-draining granular material meeting the specifications for OPSS Granular B, or an approved equivalent, compacted to 98 percent SPMDD, taking care to keep heavy compaction equipment from damaging the walls.

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

4.9 Buried Utilities

Trench excavations should generally consider Type 3 soil conditions which require side slopes no steeper than 1H:1V to the bottom of the excavation. The bedding and cover material for any buried utilities should consist of OPSS 1010 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 98% of SPMDD, taking care not to damage the utility pipes during compaction.

If wet or saturated conditions exist within any utility excavation, consideration should be given to using 19 mm diameter crushed clear stone wrapped in a geotextile filter fabric as pipe bedding.

4.10 Preliminary 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% of SPMDD. The subgrade should be compacted, proof rolled, and inspected by a Geotechnical Engineer. Any areas where rutting

or appreciable deflection is noted should be sub excavated and replaced with suitable fill. The fill should be compacted to at least 98% of SPMDD.

The recommended minimum pavement structure design has been developed for two (2) traffic loading scenario; light duty and heavy duty. The heavy-duty design is appropriate for areas where heavy trucks and maintenance vehicles are anticipated to drive while the light duty design is appropriate for areas where no heavy traffic is anticipated. The recommended minimum pavement structure is provided in Table 4.

Table 4 Recommended Minimum Pavement Structure

Pavement Layer	Compaction Requirements	Heavy Duty access road	Light Duty (parking lot)
Surface Course Asphalt	OPSS 310	40 mm HL3 or HL4	40 mm HL3 or HL4
Binder Course Asphalt	OPSS 310	90 mm HL8 (2 lifts)	50 mm HL8
Granular Base	100% SPMDD (ASTM-D698)	150 mm OPSS 1010 Granular A	150 mm OPSS 1010 Granular A
Granular Subbase	98% SPMDD (ASTM-D698)	300 mm OPSS 1010 Granular B	250 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. 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.

4.11 Design Review and Inspections

Cambium should be contacted to review the design drawings, prior to tendering or commencing construction, to ensure that all pertinent geotechnical-related factors have been addressed.

Further 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.

5.0 CLOSING

Please note that this report is 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 905-725-6280.

Cambium Inc.

Zhaochang Luo, M.Eng., P.Eng.
Project Manager – Geotechnical

Stuart Baird, M.Eng., P.Eng.
General Manager - Geotechnical

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Qualifications and Limitations

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A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the

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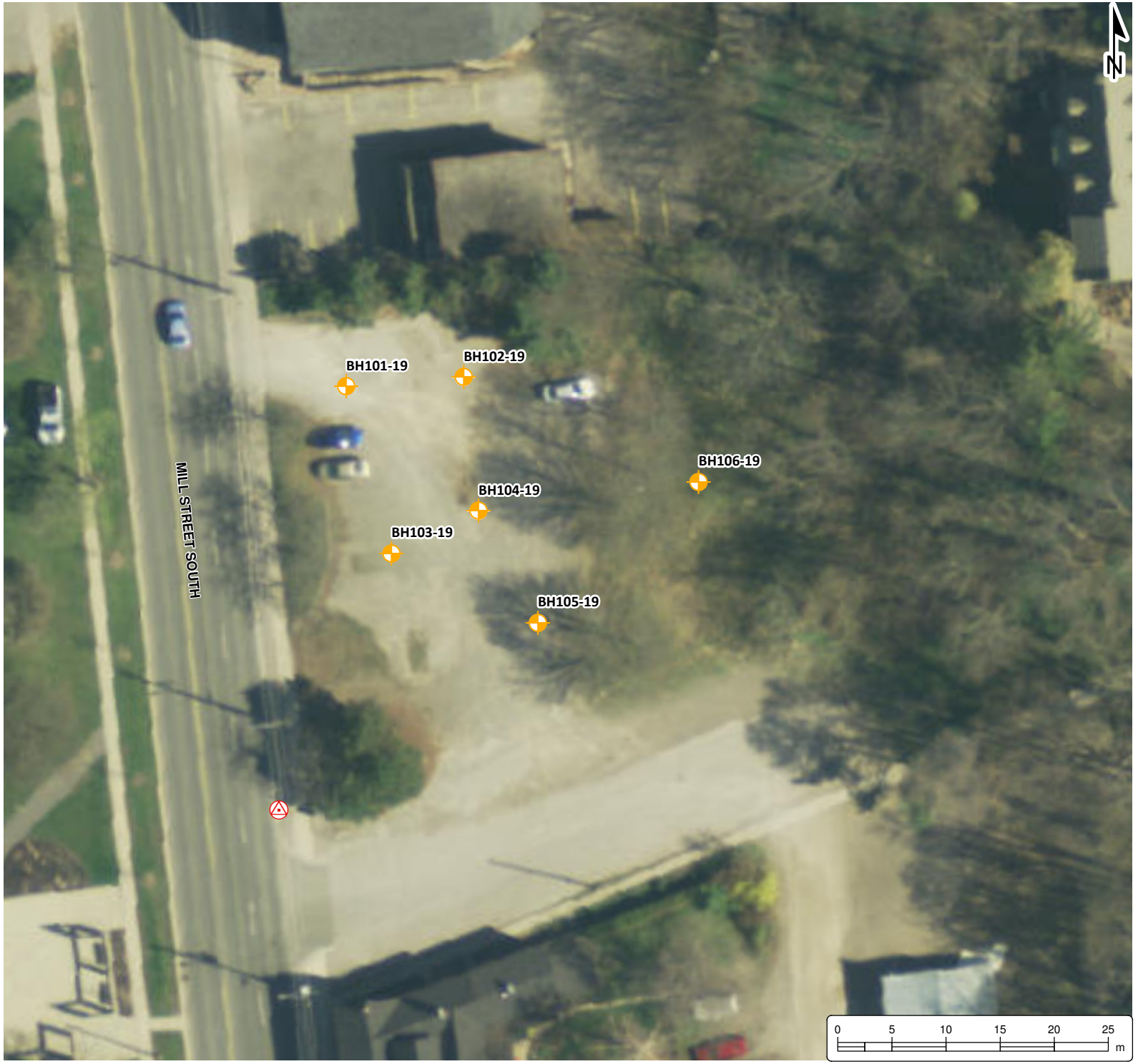
Appended Figures



GEOTECHNICAL INVESTIGATION

VALENOVA HOLDINGS INC.
33 Mill Street South,
Port Hope, Ontario

LEGEND

- Benchmark
- Borehole

Notes:
- Base mapping features are © Queen's Printer of Ontario, 2019 (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.

CAMBIUM
P.O. Box 325, 52 Hunter Street East
Peterborough, Ontario, K9H 1G5
Tel: (705) 742.7900 Fax: (705) 742.7907
www.cambium-inc.com

BOREHOLE LOCATION PLAN

Project No.:	10238-001	Date:	January 2020
		Rev.:	
Scale:	1:500	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	ZL
Figure:	1		

O:\GIS\project_MXDs\10200-10299\10238-001 Valenova Holdings - Geotech - 33 Mill St S, Port Hope\2020-01-08 FIG 1 - Borehole Location Plan.mxd

Appendix A
Borehole Logs

Peterborough
Barrie
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Kingston
T: 866-217-7900
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Log of Borehole: BH101-19

Client:	Valenova Holdings	**Project Name:**	Geotechnical Drilling	**Project No.:**	10238-001
Contractor:	Canadian Environmental Drilling	**Method:**	Solid Stem Auger	**Date Completed:**	Dec. 12, 2019
Location:	33 Mill Street South, Port Hope	**UTM:**	-	**Elevation:**	80.40 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
0		FILL: Grey, gravelly sand, some silt, trace clay, dry to moist, dense								
80			1	SS	100	48				GSA SS1: 32% Gravel 49% Sand 15% Silt 4% Clay
		-Brown, gravelly sandy silt, dry to moist, compact	2	SS	100	50/ 75				
1		Borehole terminated at 1.0 mbgs upon auger refusal on presumed bedrock								
79										
2										
78										
3										
77										

Logged By: J. Monroy **Input By:** A. Romig

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Log of Borehole: BH102-19

Client:	Valenova Holdings	**Project Name:**	Geotechnical Drilling	**Project No.:**	10238-001
Contractor:	Canadian Environmental Drilling	**Method:**	Solid Stem Auger	**Date Completed:**	Dec. 12, 2019
Location:	33 Mill Street South, Port Hope	**UTM:**	-	**Elevation:**	80.50 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
0 / 80		FILL: Light brown, sand, fine to medium grained, some gravel, trace silt, dry to moist, compact	1	SS	100	18				
		Brown, gravelly silty sand, dry to moist								
1 / 79		-compact	2	SS	79	50/ 50				
2 / 78		Borehole terminated at 1.3 mbgs upon auger refusal on presumed bedrock								
3 / 77										

Logged By: J. Monroy **Input By:** A. Romig

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Log of Borehole: BH103-19

Client:	Valenova Holdings	**Project Name:**	Geotechnical Drilling	**Project No.:**	10238-001
Contractor:	Canadian Environmental Drilling	**Method:**	Solid Stem Auger	**Date Completed:**	Dec. 12, 2019
Location:	33 Mill Street South, Port Hope	**UTM:**	-	**Elevation:**	80.65 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
0 / 80		FILL: Brown, gravel and sand, some silt, dry to moist, compact	1	SS	92	25				
1 / 79		-gravel and sand, some silt, trace clay, compact	2	SS	78	16				GSA SS2: 40% Gravel 38% Sand 16% Silt 6% Clay
2 / 78		Borehole terminated at 1.4 mbgs upon auger refusal on presumed bedrock								
3 / 77										

Logged By: J. Monroy **Input By:** A. Romig

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Log of Borehole: BH104-19

Client:	Valenova Holdings	**Project Name:**	Geotechnical Drilling	**Project No.:**	10238-001
Contractor:	Canadian Environmental Drilling	**Method:**	Solid Stem Auger	**Date Completed:**	Dec. 12, 2019
Location:	33 Mill Street South, Port Hope	**UTM:**	-	**Elevation:**	80.59 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
0		FILL: Grey-brown, gravel and sand, dry to moist, compact								
		-light brown, sand, fine grained, some silt, trace gravel, dry to moist	1	SS	92	22				
80										
		-moist, very loose	2	SS	94	3				
1										
79		Borehole terminated at 1.4 mbgs upon auger refusal on presumed bedrock								
2										
78										
3										
77										

Logged By: J. Monroy **Input By:** A. Romig

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Log of Borehole: BH105-19

Client:	Valenova Holdings	**Project Name:**	Geotechnical Drilling	**Project No.:**	10238-001
Contractor:	Canadian Environmental Drilling	**Method:**	Solid Stem Auger	**Date Completed:**	Dec. 12, 2019
Location:	33 Mill Street South, Port Hope	**UTM:**	-	**Elevation:**	80.72 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
0 / 80		FILL: Brown, gravelly sand, fine to medium grained, trace silt, dry to moist, compact	1	SS	58	23				
1 / 79		-light brown, silty sand, fine grained, some gravel, trace clay, moist to wet, very loose	2	SS	100	11				
			3	SS	89	2				GSA SS3: 11% Gravel 64% Sand 21% Silt 4% Clay
2 / 78		-wet -grey, gravel and sand, wet, loose	4	SS	44	7				
3 / 77		-grey-brown, sand, fine grained, some gravel, trace to some silt, wet, loose	5	SS	94	5				
		Borehole terminated at 3.9 mbgs upon auger refusal on presumed bedrock								

Logged By: J. Monroy **Input By:** A. Romig

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Log of Borehole: BH106-19

Client:	Valenova Holdings	**Project Name:**	Geotechnical Drilling	**Project No.:**	10238-001
Contractor:	Canadian Environmental Drilling	**Method:**	Solid Stem Auger	**Date Completed:**	Dec. 12, 2019
Location:	33 Mill Street South, Port Hope	**UTM:**	-	**Elevation:**	80.80 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
0		TOPSOIL: 200 mm thick								
		FILL: Brown, sand and silt, some gravel, dry to moist, compact	1	SS	58	12				
80			2	SS	100	50/75				Broken gravel in tip of split spoon
1		Borehole terminated at 1.1 mbgs upon auger refusal on presumed bedrock								
79										
2										
78										
3										
77										

Logged By: J. Monroy **Input By:** A. Romig

Appendix B

Physical Laboratory Testing Results

Grain Size Distribution Chart

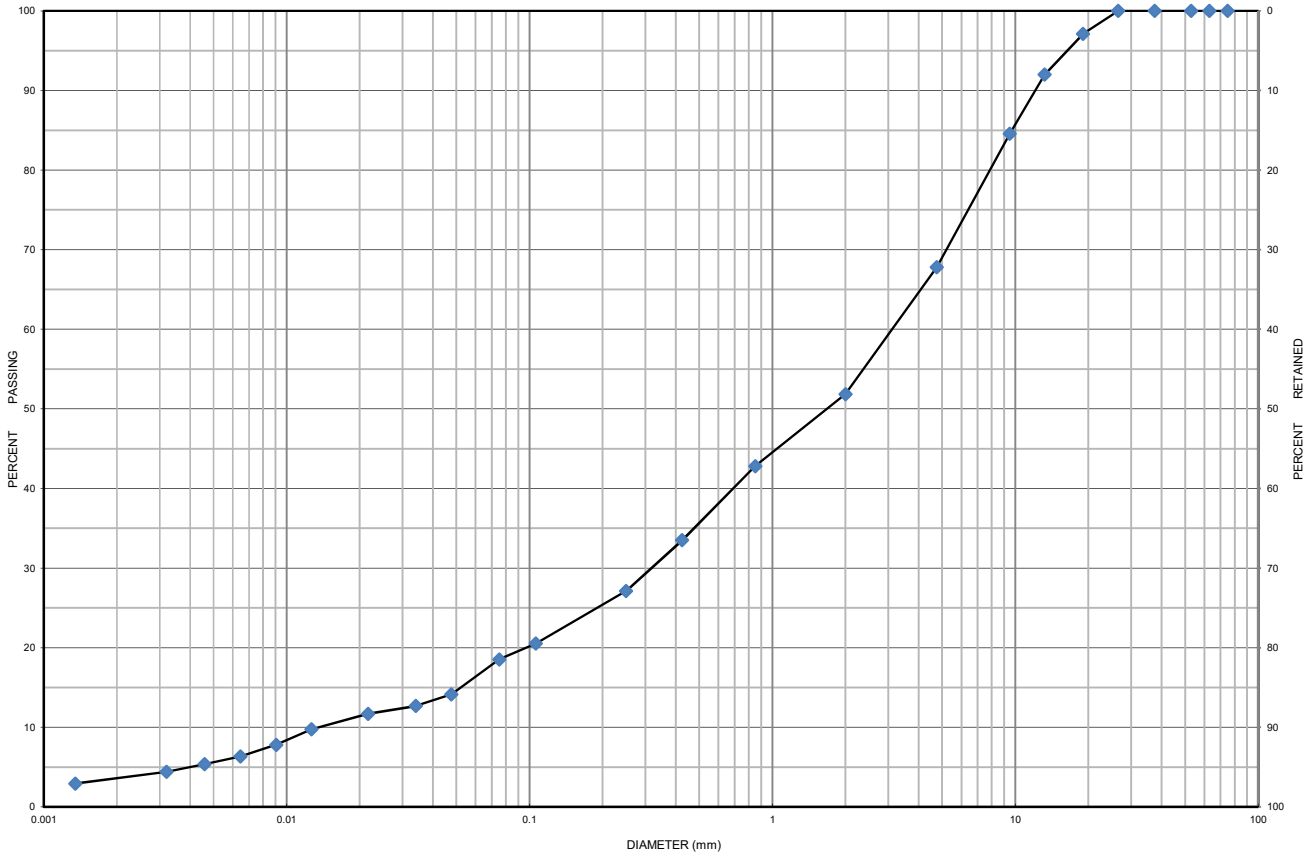
Project Number: *10238-001* **Client:** *Valenova Holdings Inc.*

Project Name: *Geotechnical - 33 Mill St. South, Port Hope*

Sample Date: *December 12, 2019* **Sampled By:** *Juan Monroy - Cambium Inc.*

Location: *B H101-19 SS 1* **Depth:** *0.2 m to 0.8 m* **Lab Sample No:** *S-19-1092*

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
B H101-19	SS 1	0.2 m to 0.8 m	32	49	19		4.1

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Sand some Silt trace Clay	SM	3.100	0.310	0.015	206.67	2.07

Issued By: _____ *Date Issued:* *December 19, 2019*

(Senior Project Manager)

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6

Grain Size Distribution Chart

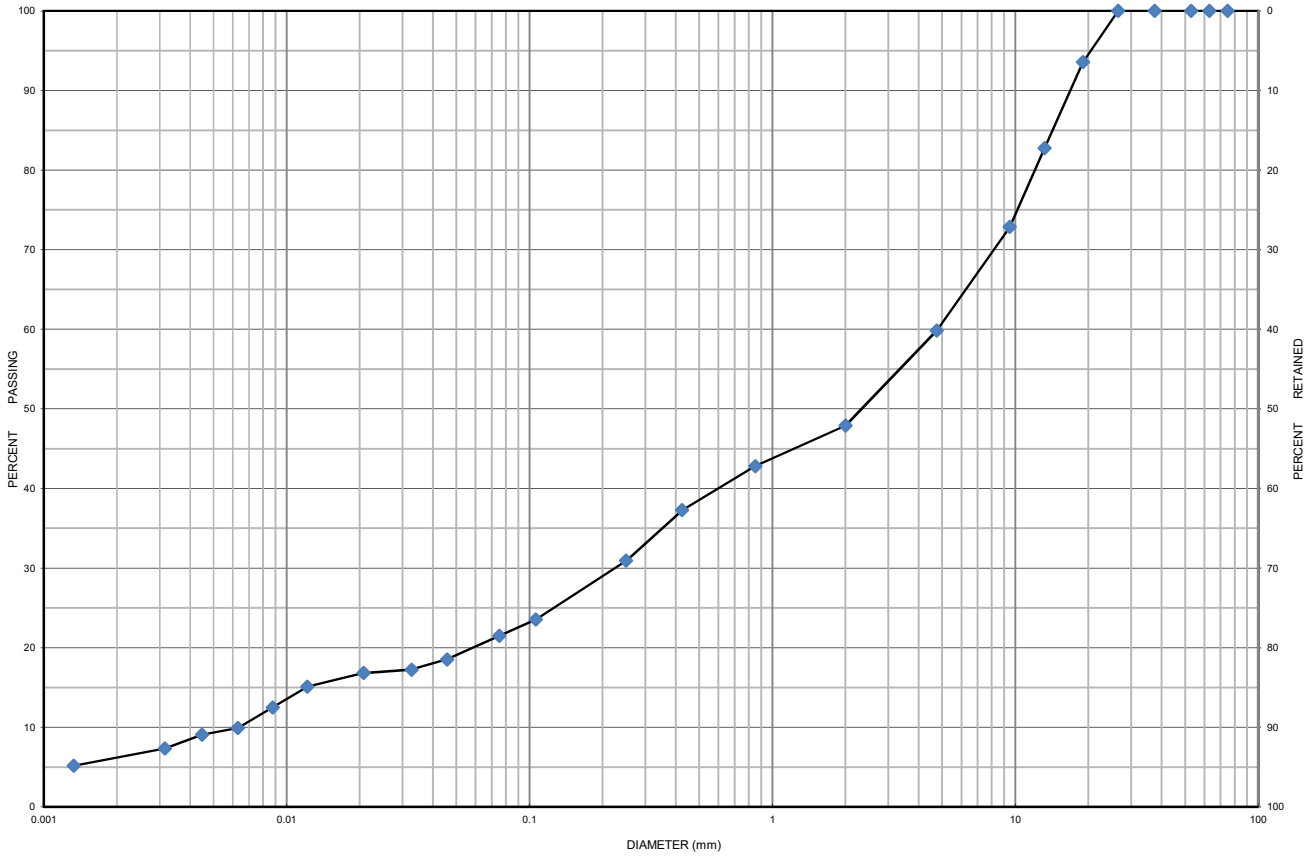
Project Number: *10238-001* **Client:** *Valenova Holdings Inc.*

Project Name: *Geotechnical - 33 Mill St. South, Port Hope*

Sample Date: *December 12, 2019* **Sampled By:** *Juan Monroy - Cambium Inc.*

Location: *B H103-19 SS 2* **Depth:** *0.8 m to 1.2 m* **Lab Sample No:** *S-19-1093*

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
B H103-19	SS 2	0.8 m to 1.2 m	40	38	22		7.0

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravel and Sand some Silt trace Clay	SM	4.800	0.230	0.007	738.46	1.70

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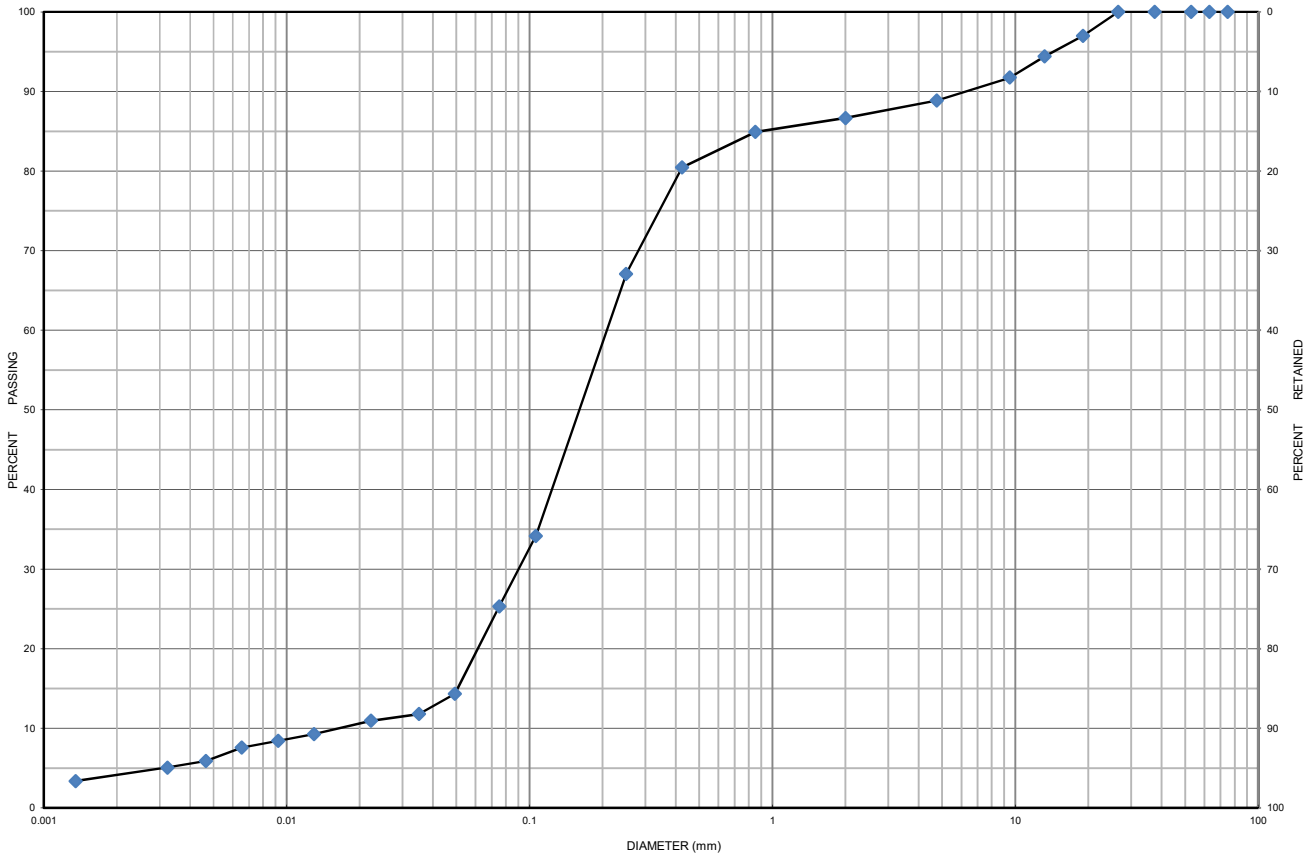
Grain Size Distribution Chart

Project Number:	*10238-001*	**Client:**	*Valenova Holdings Inc.*		
Project Name:	*Geotechnical - 33 Mill St. South, Port Hope*				
Sample Date:	*December 12, 2019*	**Sampled By:**	*Juan Monroy - Cambium Inc.*		
Location:	*B H105-19 SS 3*	**Depth:**	*1.5 m to 2 m*	**Lab Sample No:**	*S-19-1094*

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
B H105-19	SS 3	1.5 m to 2 m	11	64	25		14.6

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Sand some Gravel trace Clay	SM	0.210	0.090	0.018	11.67	2.14

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866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6