Geotechnical Investigation Report - Part of Lot 19, Concession 19, Township of Galway-Cavendish and Harvey, County of Peterborough, Ontario

December 12, 2024

Prepared for:
Jeffrey Homes

Revision 1

Cambium Reference: 17986-002

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Jeffrey Homes (Client) to complete a geotechnical investigation in support of the proposed residential subdivision at 168 County Road 49, in the County of Peterborough, Ontario (Site), illustrated in Figure 1. It is understood that the development is to include a total of 25 estate lots in Phase I, and the remainder of the lots in Phase II.

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 47 ha, which are predominantly undeveloped with mostly grasses and coniferous and deciduous trees, with the exception of a single dwelling and associated structures in the southwestern corner of the property bordering County Road 49. The property is legally known as Part of Lot 19, Concession 19, Township of Galway-Cavendish and Harvey, County of Peterborough. The proposed development includes the construction of 25 estate lots in the southern half of the parcel for Phase I, with the remainder in the northern half of the parcel for Phase II, with accesses off of County Road 49 and Moon Line North. The Site is bordered by existing houses on Ellwood Crescent, to the south, mixed farmland and bush to the north, mixed bush and residential land to the east on Moon Line Road North, and County Road 49 to the west. The Site is generally flat to rolling, with a local high that runs along the north in the northwest area, and slight decline to the southeast.

At the time of writing this report, the actual finished floor elevations (FFE) were not provided. Due to the localized high points, it is assumed that some cut and fill will be completed at the 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 is currently based on the provided proposed concept plan created by D.G. Biddle & Associates Ltd., titled “DP-1” and last revised December 3, 2024.

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 25th to October 27th, 2023 to assess subsurface conditions. 14 boreholes, identified as BH101-23 through BH114-23, were advanced in the relative locations shown on Figure 1. All boreholes were terminated at depths ranging from 2.44 m below existing grade (mbeg) to 4.98 mbeg, in native soil or presumed bedrock. 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.

Four boreholes, BH101-23, BH108-23, BH109-23, and BH113-23 were completed as monitoring wells to assess groundwater conditions over time and complete 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 geodetic COSINE monument (0011960U3306), located along the fence line on the west side of County Road 36, approximately 1.4 km northeast of the

intersection of County Road 49 and County Road 36. The monument has an elevation of 277.33 m above sea level (masl) based on the COSINE Station Report. 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 six (6) 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 were very consistent across the entire site. Silt and sand topsoil was present at surface in all boreholes. Soft to stiff clayey silt soils were encountered below the topsoil in BH101-23 and BH102-23. Compact to very dense gravelly silty sand till was encountered below the clayey silt soil in BH101-23 and BH102-23 and below the topsoil in all other boreholes, extending to termination depth in all boreholes. 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 75 mm to 250 mm in thickness, with an average thickness of approximately 150 mm.

4.2 Clayey Silt

Brown clayey silt, with some sand and trace gravel, and occasional cobbles, was encountered immediately below the topsoil in boreholes BH101-23 and BH102-23. Trace amounts of organics were found within the clayey silt soil in BH102-23. The clayey silt material extended to depths 0.70 mbeg and 1.45 mbeg, respectively. The clayey silt soil was generally found to be drier than the plastic limit (DTPL) at the time of investigation. SPT blow counts within the clayey silt provide evidence of generally soft to stiff relative consistencies.

Laboratory particle size distribution analysis was completed on one (1) sample of the clayey silt material, taken from the boreholes and depths described in Embedded Table 1, with full results provided in Appendix B.

Embedded Table 1 Particle Size Distribution Analysis – Clayey Silt

Borehole	Depth (mbeg)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH102-23 SS2	0.8 – 1.4	Clayey Silt, some Sand	7	16	50	27	22.3

4.3 Till

Brown to light brown to grey till soil with a relatively even mixture of sand, gravel, and silt, with some cobbles and trace to some clay, was encountered immediately below the topsoil in all boreholes, except BH101-23 and BH102-23, where it was encountered immediately below the clayey silt soils. The till extended to termination depth in all boreholes. The till was generally found to be moist at the time of investigation, with BH101-23 exhibiting moist-to-wet to wet soils and BH104-23 exhibiting moist-to-wet soils beginning at 2.3 mbeg. SPT blow counts within the till provide evidence of generally compact to very dense relative densities throughout the entire soil column.

Laboratory particle size distribution analysis was completed on five (5) samples of the till material, taken from the boreholes and depths described in Embedded Table 2, with full results provided in Appendix B.

Embedded Table 2 Particle Size Distribution Analysis - Till

Borehole	Depth (mbeg)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH101-23 SS4	2.3 – 2.9	Silty Gravel and Sand	34	34	25	7	7.5
BH105-23 SS3	1.5 – 2.1	Sandy Silty Gravel some Clay	39	28	23	10	6.2
BH108-23 SS3	1.5 – 2.1	Gravelly Silty Sand	32	41	20	7	3.6
BH109-23 SS4	2.3 – 2.9	Gravelly Silty Sand	33	35	23	9	5.5
BH112-23 SS3	1.5 – 2.1	Sandy Silty Gravel some Clay	34	29	26	11	6.8

4.4 Bedrock

Presumed bedrock was encountered at depths of 3.12 mbeg, 2.44 mbeg, 3.35 mbeg, and 3.66 mbeg, in boreholes BH101-23, BH102-23, BH111-23, and BH114-23, respectively. All other boreholes were terminated in native soils at depths from 4.60 mbeg to 4.98 mbeg. It should be noted that bedrock coring was not performed during drilling activities and practical auger refusal can sometimes occur within cobbles and boulders and may not necessarily be representative of the upper surface of the bedrock.

4.5 Groundwater

All boreholes except BH101-23, BH104-23, and BH113-23, did not encounter any sign of groundwater, including no water on completion of drilling, no evidence of wet or saturated soils, and no evidence of grey soils within the soil column.

Wet soils were first encountered, in BH101-23, at a depth of 2.29 mbeg, all other boreholes were dry upon completion. Water levels measured upon completion of drilling were only found in BH101-23, at a depth of 2.44 mbeg. No sloughing occurred during the investigation.

Groundwater levels were measured in two of the four monitoring wells, BH101-23 and BH113-23, on November 10, 2023, at depths of 0.44 mbeg and 3.94 mbeg, respectively. The monitoring wells at BH108-23 and BH109-23 were found to be dry on November 10, 2023.

Grey soils indicating the long-term presence of the water table were only encountered in boreholes BH101-23 and BH104-23, at depths of 2.20 mbeg and 4.57 mbeg, respectively.

A summary of the first encounter of groundwater in soils, measured water levels as well as water level on completion, and the depth to grey soils is provided in Embedded Table 3.

Embedded Table 3 Groundwater Depth and Elevation

Location	Surface Elevation (masl)	First Encounter of Groundwater (mbeg) / Elev (masl)	Water Level on Completion (mbeg) / Elev (masl)	Grey Soils Below Depth (mbeg) / Elev (masl)	Measured Water Level Nov. 10, 2023 (mbeg) / Elev (masl)
BH101-23	292.72	2.29 / 290.43	2.44 / 290.28	2.20 / 290.52	0.33 / 292.39
BH104-23	292.26	Dry	Dry	4.57 / 287.69	-
BH108-23	287.88	Dry	Dry	-	Dry
BH109-23	290.31	Dry	Dry	-	Dry
BH113-23	301.62	Dry	Dry	-	3.85 / 297.77

Note: All boreholes not shown in Embedded Table 3 did not encounter any sign of groundwater, including grey soils.

The measured water level in borehole BH101-23 could be a result of localized perched groundwater due to coarser seams or lenses within the finer cohesive clayey silt material or seasonal water from the surface trapped within the clayey silt. It is noted that groundwater levels vary seasonally and in response to climatic activity.

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

Any and 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.

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. Below the groundwater table the dense and very stiff soils should be considered Type 3 soils and may be excavated with side slopes no steeper than 1H: 1V. The native clayey silt soils may be classified as Type 3 soils above the groundwater table in accordance with OHSA. Type 3 soils may be excavated with unsupported side slopes no steeper than 1H:1V. Test excavations should be carried out at the time of construction to assess the soil integrity and water levels to determine any shoring requirements. Excavations into the shallow groundwater encountered at the west end of the site, particularly near BH101-23, should be avoided unless proper dewatering measures are in place, or the grades are raised in this area.

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).

Larger size particles, such as cobbles and boulders may be encountered within the subgrade material. The size and distribution of such obstructions cannot be predicted during a limited investigation, however, should be anticipated.

If bedrock needs to be removed, excavations would likely require a hoe ram and/or blasting depending on the degree of fracturing of the bedrock.

Excavations made into the bedrock can be cut vertically, provided that the rock faces are scaled and maintained to preclude the possibility of spalling. Where this is not possible, in areas where workers and/or equipment must enter the excavation, a protective mesh can be draped over the rock face. Alternatively, a trench box can be used in narrow excavation.

5.4 Dewatering

Assuming that construction of structures is to occur in a dry season, and footings are to be placed above the water table, significant groundwater seepage is not anticipated within the excavation depths for the homes or utilities. The exceptions may be for excavations in the west end of the Site, particularly in the vicinity of BH101-23. Excavations into the shallow groundwater encountered in this area should be avoided unless proper dewatering measures are in place, or the grades are raised in this area, or the water is perched and can be conveniently dewatered. If the high groundwater is encountered in this area and grades are not sufficiently raised, the conditions may preclude the construction of basements in this area. Further dewatering requirements would be discussed in the associated hydrogeological report.

Consideration can be given to digging test excavations prior to construction to observe how quickly the groundwater seeps in the excavations. It would be recommended for the excavations to be completed and backfilled quickly, and for the work to be completed in a traditionally drier season.

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. The clayey silt or other cohesive soils are too fine-grained to provide proper drainage and should not be used as engineered fill. Encountered cobbles and boulders should be stockpiled separately and discarded or used for other construction/landscaping purposes. Some moisture content adjustments may be required depending upon seasonal conditions. 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% 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. 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, or an approved equivalent. The fill should be placed in maximum 200 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.

All engineered fill should be approved by a geotechnical representative at the time of construction.

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 dense to very dense native till soils can be designed for a bearing capacity of 150 kPa at SLS and 225 kPa at ULS. At depths of 2.5 mbeg and below, footings can be designed for a bearing capacity of 150 kPa at SLS and 225 kPa at ULS.

These bearing resistances are for strip footings 0.5 m to 1.0 m wide and spread footings varying from 1 m x 1 m to 2 m x 2 m in size. 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 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. The structures may be founded on approved engineered fill soils overlying native soils subject to approval by Cambium for these areas of raised grades. 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. A minimum thickness of 1.2 m of engineered fill is recommended when it is placed on the loose to compact soils, if any.

Water levels in monitoring wells should be assessed in the spring, under wet conditions, to better understand groundwater at the site. Test excavations may be carried out in the wet season to confirm ground water conditions in the near surface soils.

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

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. Provided the subgrade, under-floor fill and granular base are prepared in accordance with the above recommendations, the preliminary estimate of the Modulus of Subgrade Reaction for the floor slab design is 25 MPa/m.

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. This assumes that basements are constructed above the groundwater table, as construction for basements below the water table, particularly near BH101-23, should be avoided.

Additional groundwater measurements should be taken within the monitoring wells, specifically in the spring, to gather more information on groundwater conditions. Additionally, the FFE should be reviewed to reassess the depths to the water levels and the subdrainage requirements.

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.

The Ko (at rest) value should be used for non-yielding structures, in lieu of Ka.

5.9 Buried Utilities

Trench excavations should generally consider Type 3 soil conditions above the groundwater table which can be excavated with unsupported side slopes no steeper than 1H:1V. Bedding and cover material for any service 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 at least 98 percent of SPMDD. The bedding should consist of at least 150 mm of Granular A. Depending upon invert elevations and success of the contrator's groundwater control methods, a thicker bedding layer (300 mm) may be required at some locations where wet/soft or loose soil conditions are present. If bedding is placed where the subgrade is saturated, the Granular bedding should be replaced with 19 mm diameter crushed clear stone wrapped in geotextile filter (Terrafix 270 R or approved equivalent). The cover material shall be a minimum of 300 mm over the top of pipe and compacted to 95 percent of SPMDD, taking care not to damage the utility pipes during construction. Trench backfill should consist of native, non-organic, non-cohesive till soils from the excavation that are at a moisture content that will allow proper compaction or OPSS SSM or Granular B compacted in lifts up to the road subgrade level, as discussed in Section 5.5.

5.10 Roadway Design Recommendations

The performance of the pavement is dependent upon proper subgrade preparation. All topsoil and organic materials should be removed down to native sand and silt 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 rutting or appreciable deflection is noted should be subexcavated and replaced with suitable fill. The fill should be compacted to at least 98% 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 Embedded Table 4.

Embedded Table 4 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.

150 mm perforated PVC subdrains wrapped with geotextile filter fabric should be installed within the native material below the Granular B subbase layer at the curb line.

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 “C” (very dense soil and soft rock) 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

In performing work on behalf of a client, Cambium relies on its client to provide instructions on the scope of its retainer, and, on that basis, Cambium determines the precise nature of the work to be performed. Cambium undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

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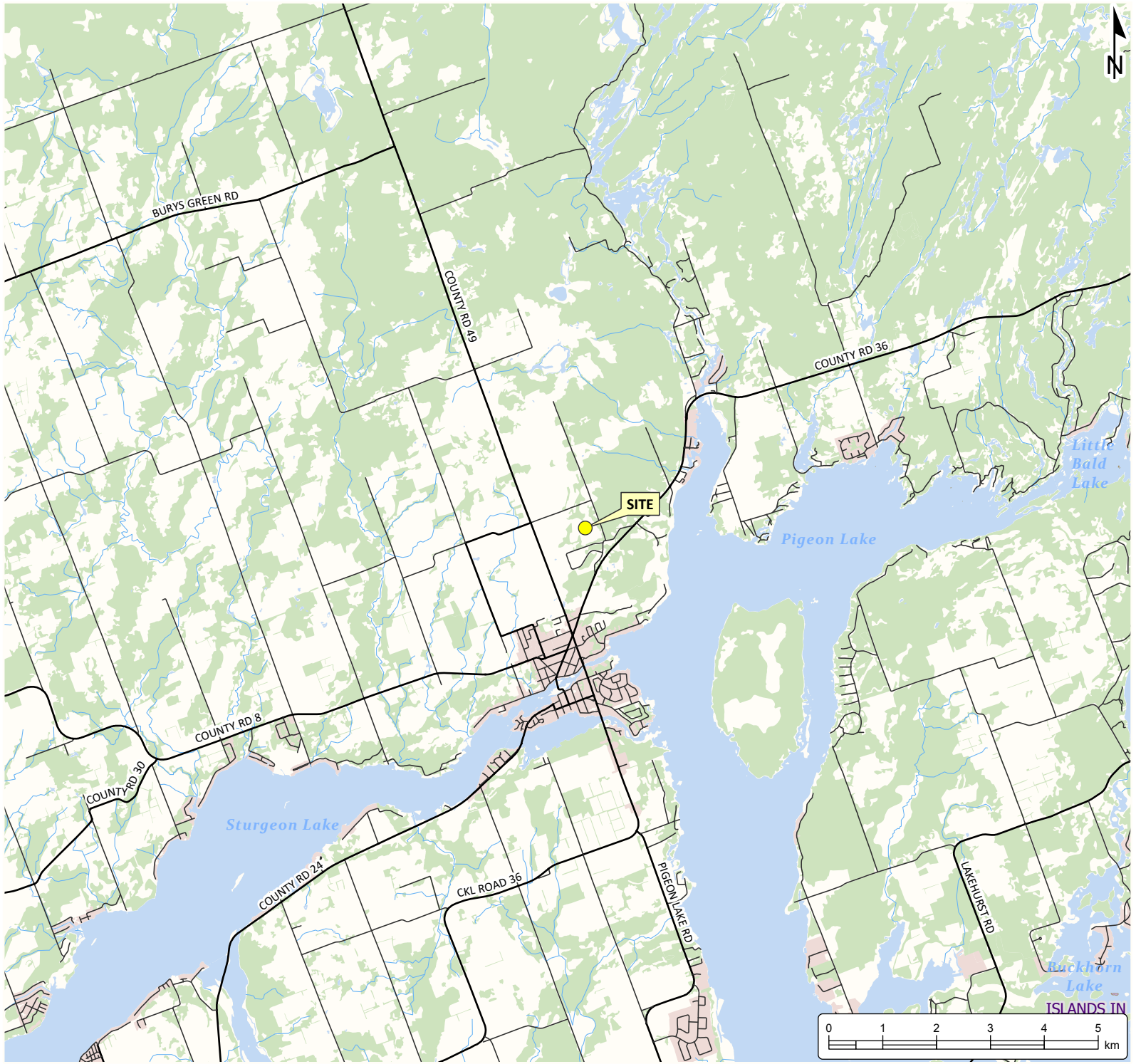
Appended Figures



GEOTECHNICAL INVESTIGATION

JEFFERY HOMES
Part of Lot 19, Concession 19
County of Peterborough, Ontario

LEGEND

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

Notes:
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SITE LOCATION PLAN

Project No.: 17986-002		Date: April 2024	
		Rev.:	
Scale: 1:100,000		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: JM	Figure:	1

O:\GIS\MXDs\17900-17999\17986-002 Jeffery Homes - GEO & HydroG - Pt. Lot 19, Conc. 19 - Bobcaygeon Development\2023-11-15 Geotechnical Investigation.aprx

GEOTECHNICAL INVESTIGATION

JEFFERY HOMES
Part of Lot 19, Concession 19
County of Peterborough, Ontario

LEGEND

- Borehole
- Monitoring Well
- Site (approximate)

Notes:
- Site plan overlay was created by D.G. Biddle and Associates Limited, titled: Proposed Draft Plan, project no. 122169, drawing no. DP-1, dated December 6, 2024.
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BOREHOLE LOCATION PLAN

Project No.:	17986-002	Date:	December 2024
		Rev.:	
Scale:	1:7,500	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	JM
Figure:	2		

O:\GIS\MXDs\17900-17999\17986-002 Jeffery Homes - GEO & HydroG - Pt. Lot 19, Conc. 19 - Bobcaygeon Development\2023-11-15 Geotechnical Investigation.aprx

Appendix A

Borehole Logs

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Log of Borehole: BH101-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 25, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 694675.16 E, 4937141.01 N	**Elevation:**	292.72 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
293 / 0		TOPSOIL: 75mm thick layer of topsoil	1A	SS					Cap	Small cobble throughout
		CLAYEY SILT: Brown, clayey silt, some sand, trace gravel, drier than plastic limit, soft	1B	SS	25	2			Pipe Bentonite Plug	Water level measured at 0.33 mbgs on Nov. 10, 2023
292 / 1		TILL: Light brown, gravelly silty sand, trace clay, moist to wet, compact	2	SS	50	15				
291 / 2			3	SS	42	15			Sand Pack PVC Screen	Groundwater first encountered at 2.29 mbgs Water level upon completion at 2.44 mbgs
290 / 3		TILL: Grey, silty gravel and sand, trace clay, wet, dense	4	SS	70	43				SS4 GSA: 34% gravel 34% sand 25% silt 7% clay
		-becomes very dense	5	SS	100	50/75			Cap	
289 / 4		Borehole terminated at 3.12 mbgs after auger refusal on presumed bedrock or large boulders								Borehole open upon completion
288 / 5										

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH102-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 25, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 694793.84 E, 4937195.17 N	**Elevation:**	295.67 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
296 / 0		TOPSOIL: 75mm thick layer of topsoil								
		CLAYEY SILT: Brown, clayey silt, some sand, trace gravel, trace organics, drier than plastic limit, stiff	1	SS	12	9				Small cobble throughout
295 / 1		-becomes firm	2	SS	50	7				SS2 GSA: 7% gravel 16% sand 50% silt 27% clay
		TILL: Light brown, silty gravel and sand, moist, compact	3	SS	42	13				Borehole open and dry upon completion
294 / 2		-becomes very dense	4	SS	33	50/75				
293 / 3		Borehole terminated at 2.51 mbgs after auger refusal on presumed bedrock or large boulders								
292 / 4										
291 / 5										

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH103-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 25, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 694882.12 E, 4937290.56 N	**Elevation:**	296.18 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
296	0		TOPSOIL: 150mm thick layer of topsoil	1	SS	24	8				Small cobble throughout
			TILL: Light brown, silty gravel and sand, moist, very dense	2	SS	58	54				
295	1			3	SS	75	56				Borehole open and dry upon completion
294	2			4	SS	67	52				
293	3			5	SS	92	68				
292	4			6	SS	100	50/75				
291	5		Borehole terminated at 4.65 mbgs after SPT refusal in silty gravel and sand till								

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Log of Borehole: BH104-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 25, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 695029.52 E, 4937418.20 N	**Elevation:**	292.26 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
293	-1										
292	0		TOPSOIL: 150mm thick layer of topsoil	1	SS	25	6				Small cobble throughout
			TILL: Light brown, sandy silty gravel, some clay, moist, compact								
291	1			2	SS	75	12				Borehole open and dry upon completion
				3	SS	25	11				
290	2		-becomes moist to wet	4	SS	75	19				
289	3		-becomes very dense	5	SS	0	50/150				
288	4		-becomes grey	6	SS	100	50/50				
287	5		Borehole terminated at 4.62 mbgs after SPT refusal in sandy silty gravel till								

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH105-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 25, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 695220.03 E, 4937348.23 N	**Elevation:**	290.23 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
290 / 0		TOPSOIL: 200mm thick layer of topsoil	1A	SS	58	8				
		TILL: Brown, sandy silty gravel, some clay, moist, loose	1B	SS						
289 / 1		-becomes dense	2	SS	25	37				Small cobble throughout
288 / 2			3	SS	75	31				SS3 GSA: 39% gravel 28% sand 23% silt 10% clay
287 / 3		-becomes very dense	4	SS	100	50/ 125				Borehole open and dry upon completion
			5	SS	100	50/ 150				
286 / 4			6	SS	25	50/ 100				
285 / 5		Borehole terminated at 4.67 mbgs after SPT refusal in sandy silty gravel till								

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH106-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 26, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 695333.16 E, 4937462.64 N	**Elevation:**	288.64 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
289	-1										
288	0		TOPSOIL: 200mm thick layer of topsoil	1	SS	33	7				Small cobble throughout
			TILL: Light brown, gravelly silty sand, trace clay, moist, dense	2	SS	42	49				Borehole open and dry upon completion
287	1			3	SS	83	41				
286	2		-becomes very dense	4	SS	67	59				
285	3			5	SS	33	50/75				
284	4			6	SS	80	50/100				
	5		Borehole terminated at 4.82 mbgs after SPT refusal in gravelly silty sand till								

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH107-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 26, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 695513.31 E, 4937433.93 N	**Elevation:**	286.35 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
286 / 0		TOPSOIL: 250mm thick layer of topsoil								
		TILL: Light brown, gravelly silty sand, trace clay, moist, very dense	1	SS	42	6				
			2	SS	96	83				Small cobble throughout
285 / 1			3	SS	50	50/100				Borehole open and dry upon completion
284 / 2			4	SS	100	80				
283 / 3			5	SS	55	50/125				
282 / 4			6	SS	67	50/75				
281 / 5		Borehole terminated at 4.80 mbgs after SPT refusal in gravelly silty sand till								

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH108-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 26, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 695459.31 E, 4937561.77 N	**Elevation:**	287.88 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
288	0		TOPSOIL: 150mm thick layer of topsoil	1A	SS	42	9			Cap	
			TILL: Light brown, gravelly silty sand, trace clay, moist, loose	1B	SS						Small cobble throughout
287	1		-becomes dense	2	SS	67	49			Pipe Bentonite Plug	
286	2		-becomes very dense	3	SS	58	69				SS3 GSA: 32% gravel 41% sand 20% silt 7% clay
				4	SS	0	50/75				Borehole open and dry upon completion
285	3			5	SS	50	50/50			Sand Pack PVC Screen	Monitoring well was found dry on Nov. 10, 2023
284	4										
				6	SS	67	50/150			Cap	
283	5		Borehole terminated at 4.72 mbgs after SPT refusal in gravelly silty sand till								

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH109-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 26, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 695333.74 E, 4937710.50 N	**Elevation:**	290.31 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
291 / -1										
290 / 0		TOPSOIL: 200mm thick layer of topsoil	1A	SS	50	10			Cap	
		TILL: Light brown, gravelly silty sand, trace clay, moist, compact	1B	SS						Small cobble throughout
289 / -1		-becomes dense	2	SS	33	42			Pipe Bentonite Plug	Borehole open and dry upon completion
288 / -2		-becomes very dense	3	SS	75	53				
			4	SS	100	77				SS4 GSA: 33% gravel 35% sand 23% silt 9% clay
287 / -3			5	SS	67	50/150			Sand Pack PVC Screen	Monitoring well was found dry on Nov. 10, 2023
286 / -4			6	SS	100	50/125			Cap	
285 / -5		Borehole terminated at 4.85 mbgs after SPT refusal in gravelly silty sand till								

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH110-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 26, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 695259.48 E, 4937570.87 N	**Elevation:**	290.26 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
290	0		TOPSOIL: 75mm thick layer of topsoil	1A	SS						
			TILL: Light brown, gravelly silty sand, trace clay, moist, loose	1B	SS	46	6				
289	1		-becomes dense	2	SS	33	37				Small cobble throughout
				3	SS	83	35				Borehole open and dry upon completion
288	2		-becomes very dense	4	SS	67	50/ 75				
287	3			5	SS	100	50/ 100				
286	4			6	SS	88	50/ 250				
285	5		Borehole terminated at 4.98 mbgs after SPT refusal in gravelly silty sand till								

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH111-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 27, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 694825.61 E, 4937424.12 N	**Elevation:**	294.96 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
296	-1										
295	0		TOPSOIL: 200mm thick layer of topsoil								
			TILL: Light brown, sandy silty gravel, some clay, moist, loose	1	SS	38	8				Small cobble throughout
294	1		-becomes compact	2	SS	33	18				Borehole open and dry upon completion
				3	SS	12	24				
293	2			4	SS	55	26				
292	3		-becomes very dense	5	SS	0	50/50				
			Borehole terminated at 3.35 mbgs after auger refusal on presumed bedrock or large boulder								
291	4										
290	5										

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH112-23

Client: Jeffrey Homes
Project Name: GEO - 168 County Road 49, Bobcaygeon
Project No.: 17986-002
Contractor: Landshark
Method: Hollow Stem Auger
Date Completed: October 27, 2023
Location: 168 County Road 49, Bobcaygeon
UTM: 17T 694713.62 E, 4937533.65 N
Elevation: 304.44 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
305 / 0		TOPSOIL: 150mm thick layer of topsoil	1A	SS						
304 / 1		TILL: Light brown, sandy silty gravel, some clay, moist, compact	1B	SS	75	11				
		-becomes dense	2	SS	67	49				Small cobble throughout
303 / 2			3	SS	83	41				SS3 GSA: 34% gravel 29% sand 26% silt 11% clay
302 / 3		-becomes very dense	4	SS	0	50/225				Borehole open and dry upon completion
			5	SS	100	50/75				
301 / 4										
300 / 5			6	SS	67	50/75				
299		Borehole terminated at 4.80 mbgs after SPT refusal in sandy silty gravel till								

Logged By: J. Riseling
Input By: J. Riseling

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Log of Borehole: BH113-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 27, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 694578.13 E, 4937436.09 N	**Elevation:**	301.62 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
302 / 0		TOPSOIL: 150mm thick layer of topsoil	1A	SS					Cap	
		TILL: Light brown, sandy silty gravel, some clay, moist, loose	1B	SS	33	7				
301 / 1		-becomes compact	2	SS	36	23			Pipe Bentonite Plug	Small cobble throughout Borehole open and dry upon completion
300 / 2			3	SS	50	22				
299 / 3		-becomes very dense	4	SS	33	50/225				
			5	SS	0	50/100			Sand Pack PVC Screen	Water level measured at 3.85 mbgs on Nov. 10, 2023
298 / 4										
297 / 5		Borehole terminated at 4.60 mbgs after SPT refusal in sandy silty gravel till	6	SS	100	50/25			Cap	

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH114-23

Client:	Jeffrey Homes	**Project Name:**	GEO - 168 County Road 49, Bobcaygeon	**Project No.:**	17986-002
Contractor:	Landshark	**Method:**	Hollow Stem Auger	**Date Completed:**	October 27, 2023
Location:	168 County Road 49, Bobcaygeon	**UTM:**	17T 694694.37 E, 4937341.31 N	**Elevation:**	297.54 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
298 / 0		TOPSOIL: 200mm thick layer of topsoil	1	SS	33	4				Small cobble throughout
		TILL: Light brown, sandy silty gravel, some clay, moist, loose								
297 / 1		-becomes compact	2	SS	50	21				Borehole open and dry upon completion
296 / 2		-becomes dense	3	SS	21	32				
295 / 3		-becomes very dense	4	SS	20	50/125				
			5	SS	0	50/50				
294 / 4		Borehole terminated at 3.66 mbgs after auger refusal on presumed bedrock or large boulder								
293 / 5										

Logged By: J. Riseling **Input By:** J. Riseling

Appendix B

Soil Laboratory Testing Results

Grain Size Distribution Chart

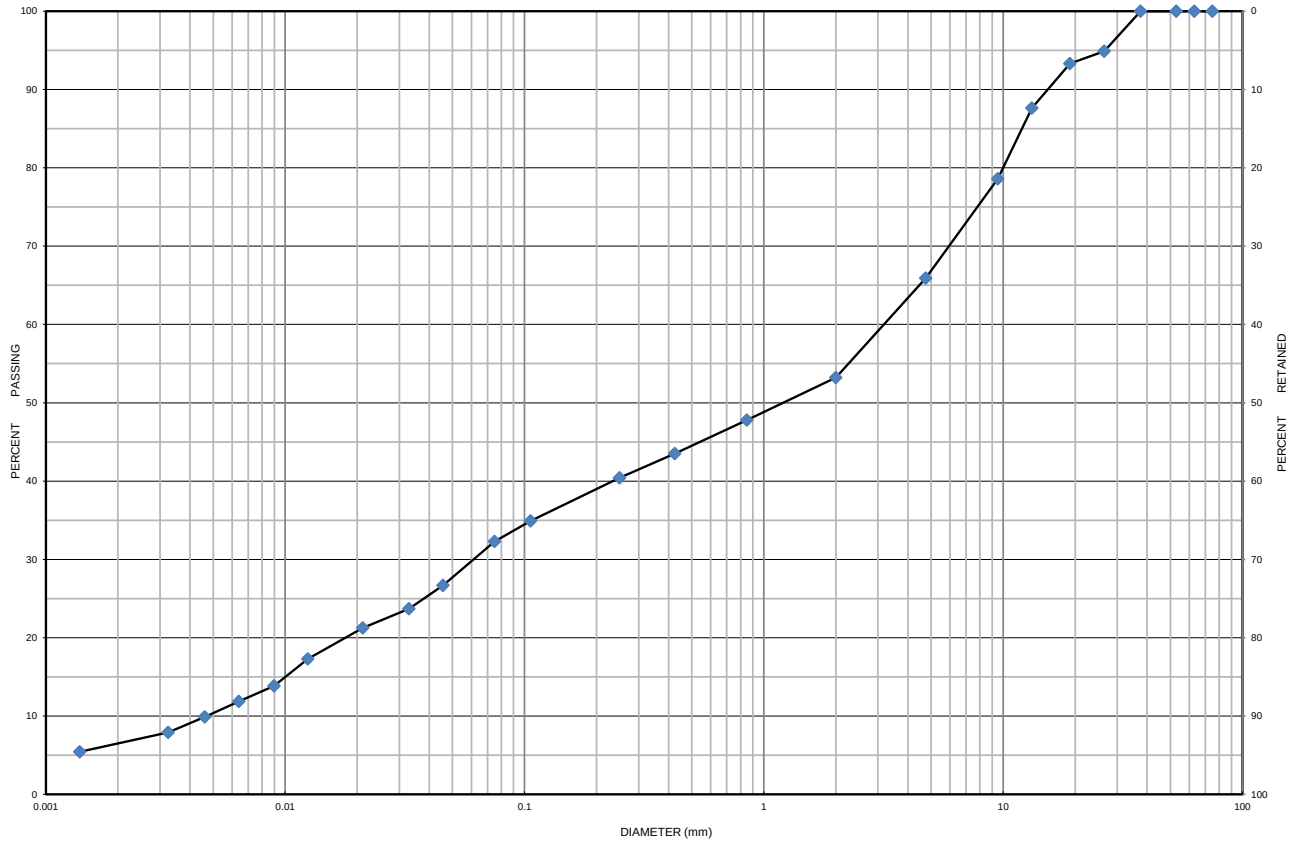
Project Number: *17986-002* **Client:** *Jeffery Homes*

Project Name: *Pt. Lot 19, Conc. 19 - Bobcaygeon Development*

Sample Date: *October 25-27, 2023* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 101-23 SS 4* **Depth:** *2.3 m to 2.9 m* **Lab Sample No:** *S-23-1845*

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 4	2.3 m to 2.9 m	34	34	25	7	7.5

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Gravel and Sand trace Clay	SM	3.2500	0.0610	0.0047	691.49	0.24

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Grain Size Distribution Chart

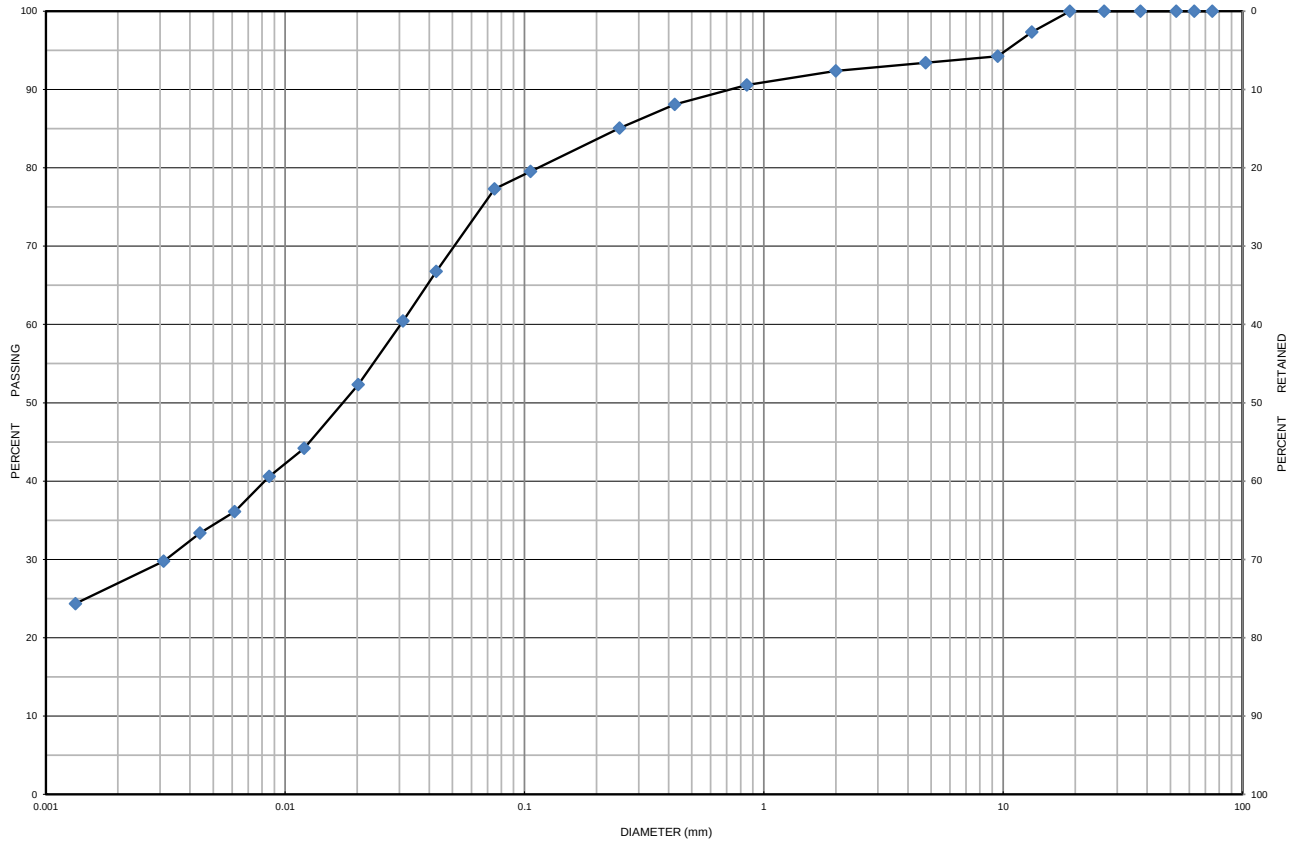
Project Number: *17986-002* **Client:** *Jeffery Homes*

Project Name: *Pt. Lot 19, Conc. 19 - Bobcaygeon Development*

Sample Date: *October 25-27, 2023* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 102-23 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-23-1846*

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 2	0.8 m to 1.4 m	7	16	50	27	22.3

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Clayey Silt some Sand trace Gravel	ML	0.0300	0.0032	-	-	-

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Grain Size Distribution Chart

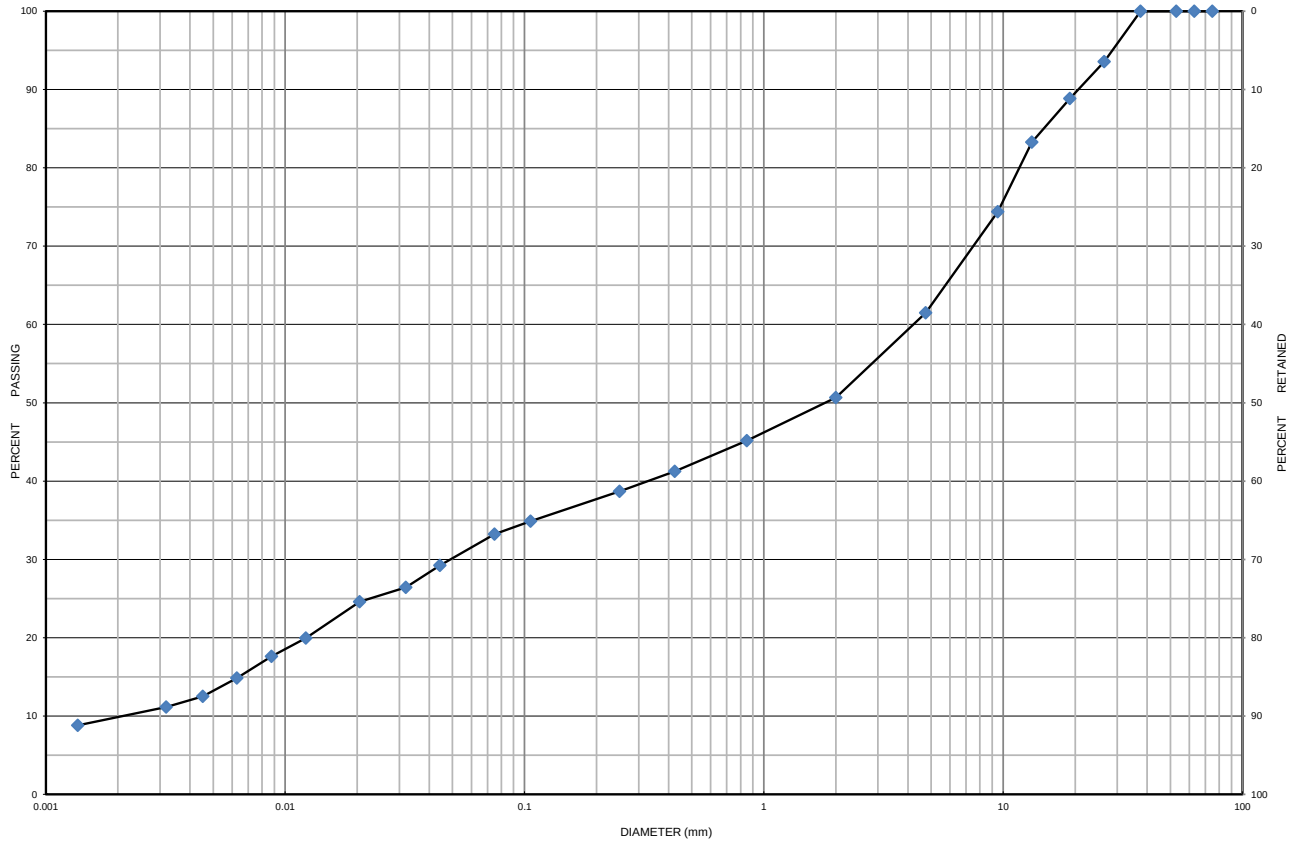
Project Number: *17986-002* **Client:** *Jeffery Homes*

Project Name: *Pt. Lot 19, Conc. 19 - Bobcaygeon Development*

Sample Date: *October 25-27, 2023* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 105-23 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-23-1847*

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 105-23	SS 3	1.5 m to 2.1 m	39	28	23	10	6.2

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sandy Silty Gravel some Clay	SM	4.200	0.050	0.002	2100.00	0.30

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Grain Size Distribution Chart

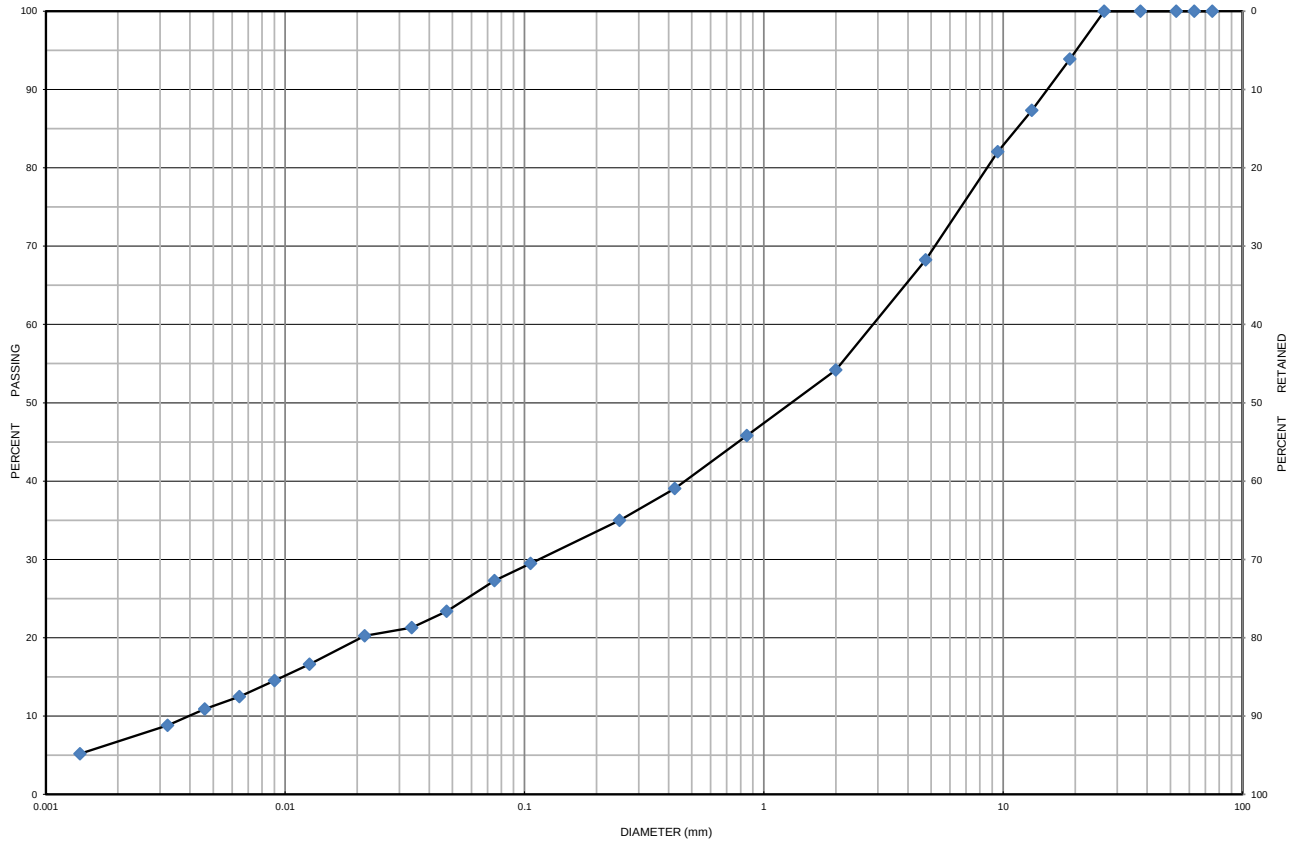
Project Number: *17986-002* **Client:** *Jeffery Homes*

Project Name: *Pt. Lot 19, Conc. 19 - Bobcaygeon Development*

Sample Date: *October 25-27, 2023* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 108-23 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-23-1848*

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 108-23	SS 3	1.5 m to 2.1 m	32	41	20	7	3.6

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Silty Sand trace Clay	SM	2.800	0.120	0.004	700.00	1.29

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Grain Size Distribution Chart

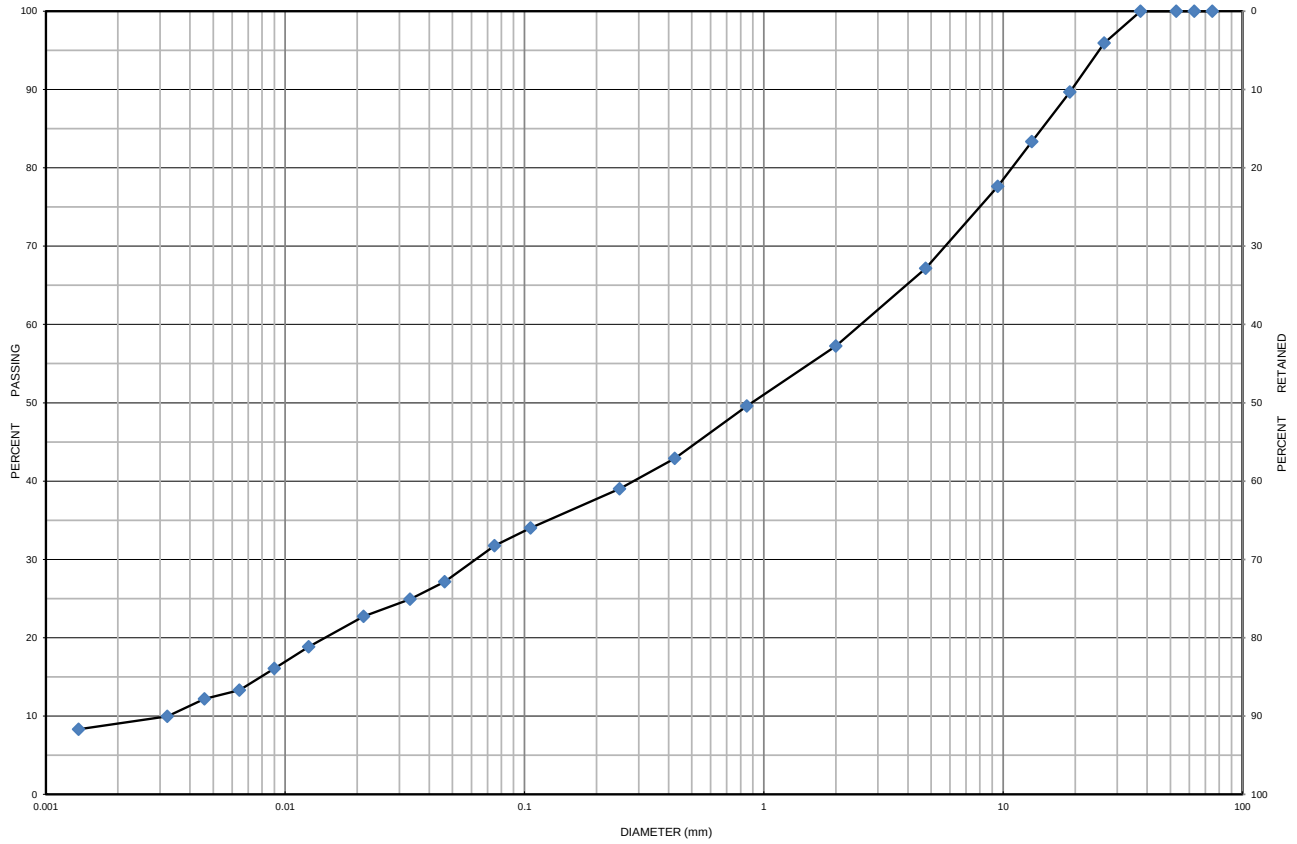
Project Number: *17986-002* **Client:** *Jeffery Homes*

Project Name: *Pt. Lot 19, Conc. 19 - Bobcaygeon Development*

Sample Date: *October 25-27, 2023* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 109-23 SS 4* **Depth:** *2.3 m to 2.9 m* **Lab Sample No:** *S-23-1849*

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 4	2.3 m to 2.9 m	33	35	23	9	5.5

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Silty Sand trace Clay	SM	2.6000	0.0620	0.0031	838.71	0.48

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Grain Size Distribution Chart

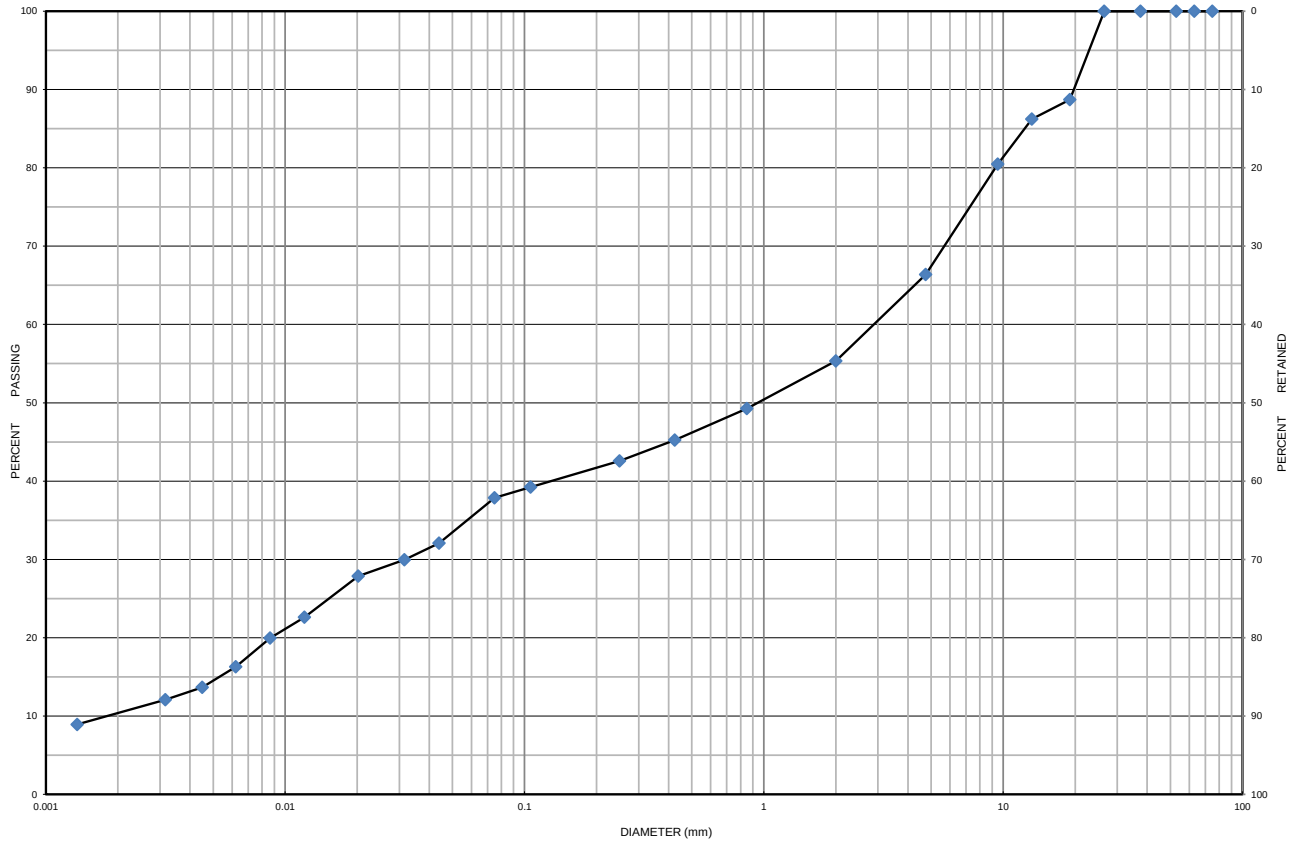
Project Number: *17986-002* **Client:** *Jeffery Homes*

Project Name: *Pt. Lot 19, Conc. 19 - Bobcaygeon Development*

Sample Date: *October 25-27, 2023* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 112-23 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-23-1850*

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 112-23	SS 3	1.5 m to 2.1 m	34	29	26	11	6.8

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sandy Silty Gravel some Clay	SM	2.9500	0.0330	0.0019	1552.63	0.19

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