# Geotechnical Investigation Report – 3210 Albion Road South, Ottawa

October 1, 2025

Prepared for:
EFI Engineering

Cambium Reference: 22599-001

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# 1.0 Introduction

Cambium Inc. (Cambium) was retained by EFI Engineering (Client) to complete a geotechnical investigation in support of the proposed development located at 3210 Albion Road South, Ottawa, Ontario (Site), as shown on the Site Location Map on the attached Figure 1. The terms of reference for the geotechnical consulting services were included in Cambium's Proposal No. 22599-P, dated January 31, 2025.

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. 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, based on the findings of the subsurface investigation program and subsequent analysis. A limited chemical testing program was also completed to assess the potential for corrosion of buried steel elements and sulphate attack against buried concrete elements at the Site.

This report provides the results of the geotechnical investigation and testing program 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 the 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.

## 1.1 Standards and Guidelines

Applicable standards, guidelines and other normative documents utilized in preparing geotechnical engineering recommendations for this report are provided below.

[1] Canadian Foundation Engineering Manual – 5th Edition; Canadian Geotechnical Society; 2023.

[2] Ontario Building Code: 2024 Building Code Compendium – Volume 1, May 29, 2024 – Amalgamating O. Reg. 203/24 with Errata, Supersedes O. Reg. 163/24

## 2.0 Site Description

The Site is located at 3210 Albion Road South in Ottawa, Ontario as shown on the attached Figure 1.

The Site is currently occupied by a building near the frontage of the property along Albion Road South. The building is a single-detached home with a basement level, and was recently renovated to act as office space for the Client. Most of the property is a gravel lot, used as parking and storage. The ground surface at the Site is relatively flat, with elevations ranging from approximately 82 to 83 mASL. A ditch line is located parallel to Albion Road between the road and the Site.

Based on correspondence with the Client, it is understood that the proposed construction consists of a warehouse type building with associated paved parking areas and access lanes. It is assumed that the building will be slab on grade (no basement). It is also assumed that the proposed building will be municipally serviced. At this time, it is understood that the existing building will remain.

Publicly available geological data map the site within a clay plains physiographic region. The site soils are therefore expected to consist of fine-textured glaciomarine deposits or older alluvial deposits, primarily comprised of silt and clay. The local bedrock is mapped as shale, limestone, dolostone and siltstone of the Billings Formation.

# 3.0 Methodology

## 3.1 Borehole Investigation

Cambium completed a borehole investigation at the Site on May 1, 2025, to assess subsurface conditions. Four boreholes, designated BH101-25 to BH104-25, were advanced to a maximum sampled depth of 5.9 meters below ground surface (mbgs). In BH102-25 sampling was carried out to 5.2 mbgs, followed by Dynamic Cone Penetration Testing (DCPT) to a depth of 9.3 mbgs. Table 1 below summarizes notable borehole information.

**Table 1 Borehole Program Summary**

| Borehole | Location | Surface Elevation (mASL) | Borehole Sampling Termination Depth / Elevation (mbgs / mASL) | DCPT (mbgs / mASL) |
|---|---|---|---|---|
| BH101-25 | Proposed Building | 82.59 | 5.2 / 77.39 | -- |
| BH102-25 | Proposed Building | 81.96 | 5.2 / 76.76 | 9.3 / 72.66 |
| BH103-25 | Proposed Building | 82.60 | 5.9 / 76.70 | -- |
| BH104-25 | Property Entrance | 82.82 | 5.2 / 77.62 | -- |

The approximate borehole locations are shown on the Borehole Location Plan, Figure 2, attached. The results of the subsurface investigation are presented on the Borehole Logs provided in Appendix A.

Drilling and sampling were 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 hollow stem augers using conventional 38 mm inside diameter split spoon sampling equipment driven by an automatic hammer in accordance with the SPT procedures outlined in ASTM D1586, “Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils”. 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 soils. Soil samples were collected at regular depth intervals, typically approximately 0.75 m intervals up to a depth of 3.0 mbgs and at 1.5 m intervals thereafter.

Dynamic Cone Penetration Testing (DCPT) was completed below 5.9 mbgs in BH102-25 to further evaluate soil consistency / relative density below the sampled borehole depths. In the DCPT, a 51 mm diameter, 60 degree Apex cone point, attached to the tip of A-size drilling rods, is driven into the ground using the same driving energy as in the SPT method. By recording the number of blows to drive the cone/rod assembly into the soil every 305 mm, a qualitative record of relative density / consistency is obtained. Although the interpretation of the test results may be difficult because no soil samples are obtained through this method, and the penetration resistances are not necessarily equivalent to N values or undrained shear strengths, useful information is gained by the continuity of the results and by the elimination of unbalanced hydrostatic effects which may affect SPT N values.

Shear vane testing was carried out in cohesive soil deposits to assess their consistency, in accordance with ASTM D2573-01, “Standard Test Method for Field Vane Shear Test”.

Groundwater conditions were noted in the open boreholes during and upon completion of drilling. All boreholes were backfilled and sealed in accordance with Ontario Regulation (O.Reg.) 903, as amended.

The field work for this investigation was overseen by members of Cambium’s technical staff, who located the boreholes in the field, arranged for the clearance of underground utilities, supervised the borehole drilling, sampling and in situ testing operations, logged the boreholes and examined and took custody of the recovered soil samples. The samples were identified in the field, placed in appropriate containers, labelled, and transported to our geotechnical laboratory for further visual examination and laboratory testing.

The borehole locations were surveyed by Monument-Urso Surveying Ltd., in conjunction with the site topographic survey. Borehole locations are shown on Figure 2, and the coordinates and ground surface elevations at the borehole locations are provided on the borehole logs in Appendix A.

## 3.2 Laboratory Testing

Following the field investigation program, a laboratory test program was completed for selected soil samples to characterize the site soils. The testing included the following:

- Natural moisture content on all samples (LS 701)
- Sieve and hydrometer analysis on three samples (LS 702)
- Atterberg Limits determination on one sample (LS 703/704)

In addition, one sample was submitted for chemical analysis to determine the corrosion potential of buried steel elements and potential of sulphate attack against buried concrete elements in contact with the site soils.

The laboratory results are summarized in the subsequent report sections. Physical laboratory analysis results and the chemical testing certificates of analysis are attached in Appendix B and Appendix C, respectively.

## 4.0 Subsurface Conditions

The detailed soil profiles encountered during the field investigation 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 can vary between and beyond the borehole locations. The soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones and should not be interpreted as exact planes of geological change. In addition, the descriptions provided on the borehole logs are inferred from a variety of factors, including visual observations of the soil samples retrieved, laboratory testing, measurements prior to and after drilling, and the drilling process itself (such as drilling speed and shaking/grinding of the augers). It should also be noted that soil samples were collected using a 38 mm inside diameter split spoon; as such, particles having nominal diameter greater than 38 mm may not be represented in the collected samples.

Based on the results of the borehole investigation, subsurface conditions at the Site generally consist of granular fill at ground surface, overlying a non-cohesive fill or reworked native material layer of clayey silt in all the boreholes. An organic peat layer was observed below the fill in BH101-25, BH102-25 and BH104-25. The following sections provide a generalized summary of the conditions encountered at the borehole locations; reference should be made to the borehole logs in Appendix A for the conditions encountered at specific borehole locations.

### 4.1 Granular Fill

Granular fill material was encountered at ground surface at all borehole locations. The material consisted predominantly of sand and gravel with varying amounts of silt and trace clay, and extended to depths ranging from 0.2 to 0.6 mbgs.

SPT N values obtained during sampling of this material ranged from 26 to over 50 blows per 305 mm of penetration, indicating a compact to very dense relative density.

The natural moisture content of the granular fill material ranged from 4.7 to 11.0 percent based on laboratory testing.

## 4.2 Reworked Native Fill

A layer of fill inferred to be reworked native soil was encountered below the granular fill layer at all borehole locations. The material was non-cohesive, generally consisting of clayey silt with varying amounts of sand and gravel and extended to depths ranging from 1.1 to 1.5 mbgs.

SPT N values obtained during sampling of this material ranged from 7 to 30 blows per 305 mm of penetration, indicating a loose to dense relative density.

The natural moisture content of the fill material ranged from 6.9 to 22.8 percent based on laboratory testing.

## 4.3 Organic Peat

An organic peat layer was observed in BH101-25, BH102-25, and BH103-25 below the fill materials. The soil is described as fibrous peat, and was dark brown in colour and moist at the time of sampling. Where encountered, the layer thickness is approximately 0.2 to 0.3 m thick, extending to depths ranging from 1.4 to 1.7 mbgs.

The SPT N values obtained traversing this material layer range from 3 to 7 blows per 305 mm of penetration, which indicates a very loose to loose relative density.

The natural moisture content of this material ranged from 34.4 to 187.3 percent based on laboratory testing. It should be noted that full characterization of organic material contents was not included in the current scope of work; however, based on the moisture contents obtained, it is inferred that loss of solid organic materials occurred during the oven-drying process.

## 4.4 Silty Sand

A thin layer of silty sand was encountered below the peat layer in borehole BH104-25, extending to approximately 1.8 mbgs. This material contained some gravel, was wet at the time of sampling and was grey in colour.

One SPT N value was obtained traversing this material of 3 blows per 305 mm of penetration, indicating very loose relative density.

The natural moisture content of this material was 16.2 percent based on laboratory testing.

## 4.5 Silty Clay

A cohesive soil deposit consisting of silty clay was encountered below the peat, fill material and silty sand layers in boreholes BH102-25 and BH104-25 and extended to depths ranging from 2.3 to 3.5 mbgs. The material contained sand, varying from trace to sandy. This material was generally about its plastic limit (w~PL) at the time of sampling and brown to grey in colour.

SPT N values obtained in this material ranged from 2 to 3 blows per 305 mm of penetration. In BH104-25, in-situ shear vane tests yielded shear strengths ranging from 37 to 43 kPa, indicating a firm consistency. A vane test was attempted in BH102-25, but did not shear.

The natural moisture content of this material ranged from 37.0 to 60.4 percent based on laboratory testing.

Particle size distribution analysis was completed on one selected sample of this material and the results are summarized in Table 2.

**Table 2 Particle Size Distribution Results – Silty Clay**

| Sample | Depth (mbgs) | Soil | % Gravel | % Sand | % Silt | % Clay |
|---|---|---|---|---|---|---|
| BH102-25 SS3B | 1.7 – 2.1 | Silty Sandy Clay | 0 | 20 | 27 | 53 |

The percolation rate (T-time) was estimated for the above sample based on the grain size analysis results. The percolation rate for the sample was T > 50 min/cm.

## 4.6 Glacial Till – Silty Sand

A glacial till deposit was encountered in all four boreholes below the peat, silty clay and fill materials. The glacial till extended to the sampling termination depths at the borehole locations, ranging from 5.2 to 5.9 mbgs. This material generally consisted of non-cohesive silty sand, containing clay and gravel. The glacial till was moist to wet at the time of sampling and mostly grey in colour.

SPT N values obtained in the glacial till ranged from 4 to 41 blows per 305 mm of penetration, indicating loose to dense relative density.

The natural moisture content of the glacial till ranged from 7.7 to 16.6 percent based on laboratory testing.

Particle size distribution analysis was completed on two selected sample of this material and the results are summarized in Table 3.

**Table 3 Particle Size Distribution Results – Glacial Till**

| Sample | Depth (mbgs) | Soil | % Gravel | % Sand | % Silt | % Clay |
|---|---|---|---|---|---|---|
| BH101-25 SS3 | 1.5 – 2.1 | Silty Clayey Gravelly Sand | 12 | 40 | 34 | 14 |
| BH103-25 SS3 | 1.5 – 2.1 | Silty Clayey Sand, some Gravel | 10 | 44 | 33 | 13 |

The percolation rate (T-time) was estimated for the above samples based on the grain size analysis results. The percolation rate ranged from T = 30 to T = 35 min/cm.

Atterberg Limits testing was completed on one selected sample of this material. The analysis results are summarized in Table 4 with full results provided in Appendix B.

**Table 4 Atterberg Limits Test Results – Glacial Till – Fines Component**

| Sample | Depth (mbgs) | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | Moisture (%) | Classification |
|---|---|---|---|---|---|---|
| BH103-25 SS4 | 2.3-2.9 | 17.7 | 11.1 | 6.7 | 10.0 | CL-ML (Silty Clay – Clayey Silt) |

## 4.7 Bedrock

Bedrock was not encountered in any of the boreholes advanced by Cambium at the Site. Practical refusal to DCPT was encountered in borehole BH102-25 at a depth of 9.3 mbgs. Refusal may have occurred on the bedrock surface, or on cobbles and boulders in the glacial till deposit.

## 4.8 Groundwater

Groundwater level observations and measurements were carried out at the time of drilling. Borehole side wall instability (caving) depth, groundwater depth and standing water depth were recorded in the open boreholes, if observed. The groundwater observations are summarized in Table 5.

**Table 5 Summary of Groundwater Observations**

| Borehole | Ground Surface Elevation (mASL) | Groundwater in Borehole upon Completion (mbgs / mASL) | Standing Water in Borehole upon Completion (mbgs / mASL) | Caving Depth (mbgs / mASL) |
|---|---|---|---|---|
| BH101-25 | 82.59 | 2.3 / 80.29 | 2.4 / 80.19 | 3.5 / 79.09 |
| BH102-25 | 81.96 | 2.3 / 79.66 | 2.4 / 79.56 | 3.5 / 78.46 |
| BH103-25 | 82.60 | -- | -- | 4.6 / 78.00 |
| BH104-25 | 82.82 | 1.5 / 81.32 | 3.1 / 79.72 | 3.5 / 79.32 |

During the field investigation, Cambium performed a visual search for monitoring wells installed by others from the Phase Two Environmental Site Assessment completed by Paterson Group in 2021. One monitoring well was discovered (BH 2-21). The flush mount well cap was found at approximately 0.4 mbgs, and there are signs that the ground surface at the Site had been elevated with fill material; this indicates that the other monitoring wells could be buried.

On May 1, 2025, the groundwater level in BH 2-21 was measured at approximately 0.61 mbgs. Based on the topographic plan completed by Monument-Urso Surveying, the interpolated ground surface elevation of BH 2-21 is approximately 82.7 mASL. Based on this information, the groundwater level in BH 2-21 has an elevation of approximately 82.1 mASL.

Furthermore, based on the Phase Two Environmental Site Assessment from June 11, 2021, the groundwater elevation on April 12, 2021 was approximately 81.8 mASL at the Site, or 0.9 mbgs.

4.9

## 4.9 Chemical Analysis

One soil sample was submitted for chemical corrosivity analysis to determine corrosion potential of buried steel elements and sulphate attack potential against buried concrete elements. The sample was analyzed for pH, resistivity, chloride, sulphate, sulphide concentration and redox potential. The results are summarized in Table 6, and the Certificates of Analysis provided in Appendix C.

**Table 6 Summary of Chemical Testing Results**

| Sample | Depth (mbgs) | pH | Resistivity (Ω·cm) | Chloride (µg/g) | Sulphate (µg/g) | Sulphide (%) | Redox Potential (mV) |
|---|---|---|---|---|---|---|---|
| BH104-25 | 1.8 – 2.1 | 7.84 | 1870 | 147 | 87 | 0.03 | 196 |

The test results were compared to the ANSI/AWWA corrosivity rating system. Based on the comparison, corrosion potential is considered high. Therefore, corrosion protection measures should be considered for buried steel elements at the Site.

The sulphate and sulphide concentrations indicate that sulphate attack potential against buried concrete elements is low, and Type 10 Portland cement (normal cement) may be used at the Site.

It should be noted that there may be other overriding factors in the assessment of corrosion potential, such as the nature of effluent conveyed, the application of de-icing salts on any access roads and subsequent leaching into the subsoils and stray currents.

# 5.0 Geotechnical Design Considerations

This section of the report provides engineering information on, and recommendations for, the geotechnical design aspects of the project based on our interpretation of the borehole information, the laboratory test data, and our understanding of the project requirements. The information in this portion of the report is provided for planning and for the guidance of the design team. Where comments are made on construction, they are provided only to highlight aspects of construction which could affect the design of the project. Contractors bidding on or undertaking any work at the Site should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction and make their own independent interpretation of the factual data as it affects their proposed construction techniques, schedule, equipment capabilities, costs, sequencing, and the like. Cambium will not assume any responsibility for construction-related decisions made by contractors based on this report. 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 to reassess findings and recommendations as needed.

It is understood that the proposed site development will include a single storey slab-on-grade building, municipally serviced, with associated at-grade parking areas and access lanes.

## 5.1 Site Preparation

Prior to any construction work, any existing unsuitable materials within the building footprint should be removed. This includes soil that is soft, loose, disturbed, frozen or contains excessive amounts of organic or deleterious materials. Vegetation should be stripped from within the building footprint and below any areas to be paved. Excavations should therefore be expected to extend approximately 1.8 to 2.3 mbgs to ensure all organic-rich and soft or unsuitable soils are removed from below building foundation elements.

Given the compactness of the existing fill encountered at ground surface, it may be possible for the existing fill to remain in place below the slab-on-grade. However, the existing fill must be evaluated by Cambium if this approach is considered to ensure the existing material

performance is not impacted by the underlying peat layer. Further discussion is provided in Section 5.7

Any boulders larger than 300 mm diameter in the largest dimension should be removed from below foundation elements. Any resulting voids in the subgrade should be backfilled with properly placed and compacted engineered fill, per the recommendations provided in Section 5.8.

## 5.2 Frost Penetration

Based on OPSD 3090.101, the maximum frost penetration depth below ground surface at the site is estimated to be 1.8 mbgs. Any footings and utilities for both heated and unheated structures should therefore be founded at or below 1.8 mbgs or be provided with a thermal protection equivalent of soil and insulation.

## 5.3 Excavations

All excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA) and O.Reg. 213/91, as amended.

Soils at the site can generally be considered Type 3 soils above the groundwater table, and Type 4 soils below the groundwater table. Unsupported excavations in Type 3 soils must be sloped no steeper than 1 horizontal to 1 vertical (1H:1V), and 3H:1V in Type 4 soils. Where excavation side slopes consist of more than one soil type, the soil shall be classified as the most stringent type of the soil types present. It should be noted that the soil type classifications indicated above are provisional, and subject to change based on field observations of actual conditions at the time of exposure.

Excavation side slopes should be protected from exposure to precipitation and associated ground surface runoff and should be regularly inspected 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).

Material stockpiles should be kept at least at the same distance as the excavation depth from the top edge of the excavation to prevent slope instability.

## 5.4 Dewatering

Groundwater level observations made at the Site during the investigation period are summarized in Section 4.8. The groundwater level during construction could therefore be within 1 m of the existing ground surface. However, it should be noted that water levels can fluctuate seasonally and could be significantly higher in response to precipitation and/or snowmelt.

The native sandy soils at the site should generally be expected to have moderate permeability, and therefore groundwater inflows through these soils could be relatively high. Inflows should be controllable using filtered sumps and pumps; sump pumps should be sized according to the size of the excavations, and additional pumps used as needed to keep the bases of excavations in the dry. The lower permeability fine-grained soils could cause water to perch within the upper fill and peat layers. Therefore, construction should be planned to avoid wetter seasons (e.g. spring) where water levels and inflows are typically at the highest volumes. Excavations should be graded to allow for any groundwater seepage or precipitation to collect at the sump location(s).

It should be noted that water takings in excess of 50,000 L/day (including both groundwater and precipitation runoff/stormwater) are regulated by the Ministry of the Environment, Conservation and Parks (MECP). Certain takings of groundwater and stormwater for construction site dewatering purposes with a combined total of less than 400,000 L/day qualify for self-registration on the MECP's Environmental Activity and Sector Registry (EASR). Registry on the EASR replaces the need to obtain a Permit to Take Water (PTTW) and a Section 53 approval. A Category 3 PTTW is required when proposed water takings exceed 400,000 L/day. An EASR will likely be required and should be completed in advance of construction to avoid delays.

## 5.5 Foundation Design

Based on the anticipated building design, conventional shallow footings placed on undisturbed native soils are expected to be appropriate for the proposed building.

Any footings should be set at a depth greater than the frost penetration depth for the site (1.8 mbgs).

Footings placed directly on an undisturbed compact silty sand bearing surface should be sized using a net reaction at serviceability limit state (SLS) of **75 kPa**, and a factored geotechnical resistance at ultimate limit states (ULS) of **120 kPa**, incorporating a geotechnical resistance factor of 0.5. Footings should be expected to be constructed between 1.8 and 2.3 mbgs, or approximately 80.8 to 79.7 mASL, before the appropriate bearing surface is encountered.

Footings designed using these bearing capacity values assume maximum allowable total and differential settlements of 25 mm and 20 mm, respectively.

In areas where unsuitable, softened or otherwise deleterious materials are encountered at the underside of footing elevation, the unsuitable material must be removed and replaced with engineered fill. Engineered fill should be placed and compacted in accordance with the recommendations provided in Section 5.8.

For areas where footings are stepped, the lowest footings should be constructed first to avoid undermining footings at shallower elevations.

## 5.6 Seismic Site Classification

The site class for seismic site response can be taken as **Class D**. The soils at the Site are not considered susceptible to seismic liquefaction. Reference should be made to Section 4.1.8.4 – Site Properties of the most recent revision of the OBC [2] for seismic design requirements and discussion.

## 5.7 Slabs-On-Grade

Inorganic native soils at the Site are considered competent to support floor slab loads. 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 percent of standard Proctor maximum dry density (SPMDD).

For areas below the proposed slab-on-grade, outside of the excavation areas for building footings or utilities, consideration could be given to assessing the existing fill material to remain in place. The feasibility of this approach would be contingent on an assessment to determine whether the organic soil layer impacts the performance of the overlying existing fill. Any existing material remaining in place must be reviewed and approved by Cambium prior to placement of additional fill for grading below the slab. Cambium should be consulted during design and construction to coordinate on-site testing of the existing fill to evaluate its performance and determine appropriate next steps.

## 5.8 Backfill and Compaction

All existing organic and non-organic fill, native materials containing organics, and any loose or otherwise unsuitable soils shall be removed down to a competent base prior to placement of any backfill material. Backfill areas must be approved by a qualified geotechnical engineer prior to placement of any new fill, to ensure the suitability of subgrade conditions.

Foundation wall and any buried utility backfill material should consist of free-draining imported granular material. 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.

Excavated materials with a high silt content, as encountered throughout the boreholes advanced by Cambium at the Site, will not be suitable for re-use as backfill for foundation walls or retaining walls. As such, it is recommended that allowances be made to import appropriate fill material to the Site for backfill applications. Geotechnical testing of the material proposed

for import to the Site will be required to confirm suitability and compaction parameters for various backfill applications (e.g., Proctor testing to confirm optimum moisture content, grain size analysis to confirm material composition). Typically, backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 98% of the material's SPMDD. Backfill adjacent to the structural elements (e.g., foundation walls) should be compacted to 95% of SPMDD, taking care not to damage the adjacent structures. The backfill material in the upper 300 mm below pavement subgrade elevation should be compacted to 100% of SPMDD in all areas.

### 5.8.1 Engineered Fill

The following is recommended for the construction of engineered fill:

I. Remove any and all existing vegetation, surficial topsoil / organics, organic fills or fills and any loose/disturbed soils to a competent subgrade for a suitable envelope.

II. The area of the engineered fill should extend horizontally 1 m beyond the outside edge of the foundations then extend downward at an imaginary 1H:1V slope to the competent approved native soil. The exposed edges of the engineered fill should be sloped at a maximum of 3H:1V to avoid weakening of the engineered fill edges due to slope movement. If fill is required adjacent to sloped banks (i.e., slope steeper than 3H:1V), the fill shall be placed in stepped planes to avoid a plane weakness.

III. The subgrade or base of the engineered fill area must be approved by Cambium prior to placement of any new fill, to ensure suitability of the subgrade condition.

IV. Place approved OPSS 1010.MUNI SSM or Granular 'B' Type I material at a moisture content at or near optimum moisture in suitable maximum 200 mm thick lifts, compacted to 100% of SPMDD. If tested and approved 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. Any frost penetration into the fill material must be removed prior to placement of subsequent lifts of fill and reviewed by Cambium.

V. The engineered fill should be placed at least 600 mm above the elevation of the proposed underside of footing.

VI. Due to the potential negative effects of differential settlement between engineered fill and the native soils, footings should only be placed on either native soils or engineered fill and not a combination. Reinforcing steel bars should be included and placed within the footings and the top of the foundation walls. All tie reinforcing steel bars should be included and placed within the top of the foundation walls. All tie reinforcing steel bars should have at least 600 mm of overlap. The actual steel reinforcement design should be confirmed / designed by the project structural engineer.

VII. Full time testing and inspection of the engineered fill will be required for it to be used as a founding material, as outlined in Section 4.2.2.2 of the Ontario Building Code [2].

The final surface of the engineered fill should be protected as necessary from construction traffic, ponded water and freezing, and should be sloped to provide positive drainage for surface water during and following the construction period. During periods of freezing weather, additional soil cover should be placed above final subgrade to provide frost protection.

If engineered fill is placed over dissimilar material such as silty or clayey soils, it may be necessary to separate the engineered fill from the finer-grained soils and prevent long-term fine particle migration into the engineered fill. A non-woven geotextile, such as Terrafix 360R or an approved equivalent, should be used for this purpose. The exposed subgrades below engineered fill should be verified onsite by geotechnical personnel prior to backfilling to ensure subgrade suitability and that appropriate treatments are applied as needed.

Additional recommendations for backfilling of buried utilities are provided in Section 5.10.

## 5.9 Lateral Earth Pressure

Lateral earth pressure coefficients (K) and soil mechanical parameters for the encountered stratigraphy are shown in Table 7 below and may be used for the preliminary design of temporary and permanent structures at the Site, if required.

**Table 7 Lateral Earth Pressure Coefficients**

| Soil | Bulk Unit Weight $\gamma$ (kN/m$^3$) | Internal Friction Angle $\varphi$ (°) | Earth Pressure Coefficients (Rankine) | | |
|---|---|---|---|---|---|
| | | | Active $K_a$ (-) | Passive $K_p$ (-) | At-rest $K_0$ (-) |
| Non-Cohesive Soils *Loose* | 18.0 | 28 | 0.36 | 2.77 | 0.53 |
| Cohesive Soils *Firm* | 16.5 | 28 | 0.34 | 2.94 | 0.53 |
| Non-Cohesive Soils *Compact* | 19.0 | 30 | 0.33 | 3.00 | 0.50 |
| Granular A, Granular B Type I/II *(Placed and compacted according to recommendations provided in this report)* | 21 | 32 | 0.31 | 3.21 | 0.47 |

The coefficients provided in Table 7 assume that the surface of the granular backfill is horizontal against any proposed retaining wall, and the wall is vertical and smooth. It is noted that use of the active earth pressure coefficient for design purposes assumes that any proposed retaining structures will be free to deform/experience sufficient displacement throughout their lifespan.

## 5.10 Buried Utilities

Cambium should be retained to review the site servicing plan to confirm the following recommendations.

### 5.10.1 Frost Protection for Underground Services

It is recommended to place water services at a minimum depth of 300 mm below the frost penetration depth, with the top of the pipe located at 2.1 mbgs or lower as dictated by municipal service requirements. If a minimum of 2.1 m of soil cover cannot be provided, then the pipe should be insulated using a suitable rigid polystyrene insulation (DOW Styrofoam HI40, or equivalent) or a pre-insulated pipe should be installed. The thickness of insulation will depend on the depth of available soil cover; Cambium can provide additional recommendations if required.

### 5.10.2 Subgrade Preparation

Excavation and dewatering recommendations are provided in Sections 5.3 and 5.4. The subgrades are generally expected to consist of silty sand and silty clay. To limit migration of fine particles into pipe bedding, non-woven geotextile such as Terrafix 270R or an approved equivalent should be used as a separator between subgrade and pipe bedding materials. The geotextile should be placed immediately following excavation, followed as soon as possible by pipe bedding.

Care should be taken to limit construction traffic directly on the subgrade.

### 5.10.3 Pipe Bedding and Cover Materials

Bedding and cover material for any services should conform to Ontario Provincial Standard Drawings (OPSD) 802.010 and 802.013 (flexible pipes) and OPSD 802.031 to 802.033 (rigid pipes). The pipe bedding should consist of 200 mm of OPSS.MUNI 1010 Granular A wrapped by a geotextile (Terrafix 270R or an approved equivalent). The bedding and cover material shall be placed in maximum 200 mm thick lifts and should be compacted to at least 95 percent SPMDD. The cover material shall extend a minimum of 300 mm above the top of the pipe and be compacted to a minimum of 95 percent of SPMDD, taking care not to damage the utility pipes during compaction. It should be noted that excessive vibrations from compaction equipment could soften the subgrade, so low vibration methods should be used wherever possible. The use of clear stone as pipe bedding and cover material should not be permitted.

### 5.10.4 Pipe Backfill

Above the pipe cover material, the pipe can be backfilled by using imported granular fill material such as OPSS.MUNI 1010 Granular B Type I. An alternative select subgrade material (SSM) may be used as well, provided that the material is approved by Cambium prior to use. The re-using of excavated organic free native soils is likely not feasible due to the high moisture content and material composition. In any case, backfill should be free of organic, frozen or otherwise deleterious materials, and should match as closely as reasonably possible the composition of the materials in the trench walls to limit differential movement. The soils should be placed in maximum 300 mm thick lifts compacted to 95 percent of SPMDD.

## 5.11 Pavement Design

The performance of pavement is dependent upon provision of a properly prepared and well-drained subgrade. All topsoil and organic materials should be removed down to native material and backfilled with approved engineered fill or native material, compacted to minimum 95 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. Fill placed below the pavement structure should be compacted to at least 98 percent of SPMDD.

The recommended minimum pavement structure design has been developed for two traffic loading scenarios; light duty and heavy duty. The heavy-duty design is appropriate for areas where truck/bus/emergency vehicle traffic is anticipated, such as access and emergency lanes, while the light duty design is appropriate for areas where no heavy vehicles are anticipated, such as parking areas. The recommended minimum pavement structure is provided in Table 8.

**Table 8 Recommended Minimum Pavement Structure**

| Pavement Layer | Light Duty | Heavy Duty |
|---|---|---|
| Surface Course Asphalt | 50 mm HL3 or HL4 | 40 mm HL3 or HL4 |
| Binder Course Asphalt | -- | 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 | 400 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.

In areas where additional subgrade support is required and/or sub-excavation is not feasible, either due to high groundwater or soft soils, consideration should be given to placing a non-woven geotextile and geogrid subgrade reinforcement prior to placing the pavement structure. The non-woven geotextile should consist of Terrafix 270R, followed by a geogrid consisting of Terrafix TBX11, or approved equivalents. The geosynthetics should be provided with minimum 300 mm overlap between adjacent sheets and installed according to the manufacturer's instructions.

To maintain a relatively dry subgrade condition and prevent subgrade softening, subdrains are recommended to be installed. These should consist of 150 mm diameter perforated, corrugated plastic pipe, surrounded by 150 mm of 19 mm clear crushed stone with pipe inverts placed 300 mm below the top of subgrade. The subdrains should connect to a positive outlet such as a catch basin or storm sewer.

Transitions between differing pavement structures should be provided with minimum slopes of 10H:1V to limit differential movement due to frost heave.

Compaction of the subgrade should be verified by the Engineer prior to placing the granular fill. Pavement granular materials should be placed in 150 mm maximum loose lifts and compacted

to at least 100 percent of SPMDD. 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.

## 5.12 Design Review and Inspections

Testing and inspections should be carried out during construction operations to examine and approve subgrade conditions, fill material, compaction of pipe bedding, trench backfill, granular base courses, and asphalt concrete.

Cambium 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 the site for excavation procedures, fill placement, and compaction 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,

DS

**Cambium Inc.**

LICENSED PROFESSIONAL ENGINEER
N. F. S. CHRISTIE
100200855
PROVINCE OF ONTARIO

**Signed by:**
61E8638C183444F...

2025-10-01

Nathan Christie, P.Eng.
Senior Project Manager – Geotechnical

*NC/rg*

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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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When preparing reports, Cambium considers applicable legislation, regulations, governmental guidelines and policies to the extent they are within its knowledge, but Cambium is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, governmental guidelines and policies is for information only and is not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Site Assessments

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 extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

Only conditions at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site chosen for study by the client, or any other matter not specifically addressed in a report prepared by Cambium, are beyond the scope of the work performed by Cambium and such matters have not been investigated or addressed.

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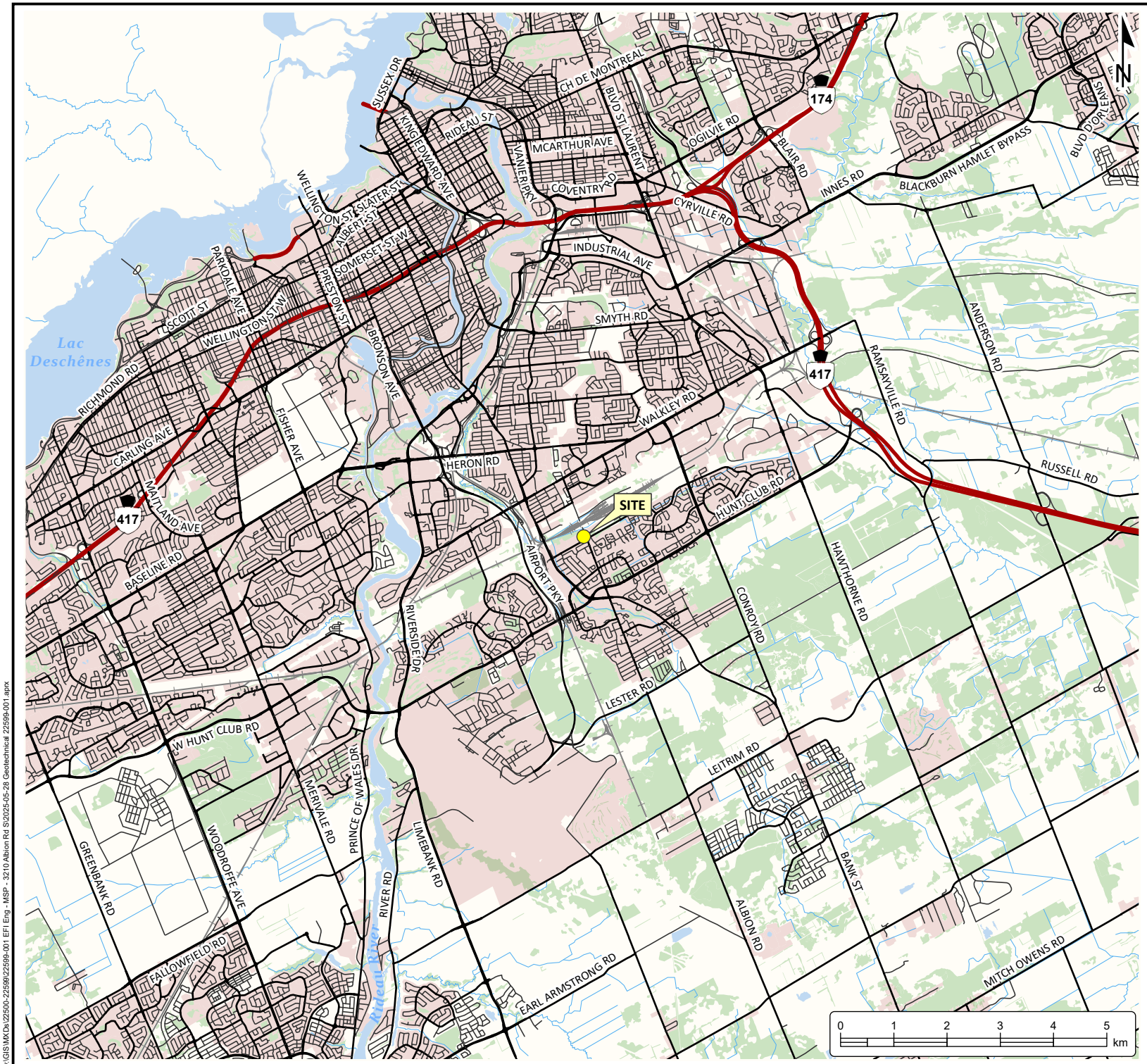
Personal Liability

The client expressly agrees that Cambium employees shall have no personal liability to the client with respect to a claim, whether in contract, tort and/or other cause of action in law. Furthermore, the client agrees that it will bring no proceedings nor take any action in any court of law against Cambium employees in their personal capacity.

# Appended Figures




# GEOTECHNICAL INVESTIGATION

EFI ENGINEERING
3210 Albion Road South
Ottawa, Ontario

**LEGEND**

- Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Water Area
- Wooded Area
- Built Up Area

**Notes:**
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- 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
194 Sophia Street
Peterborough, Ontario, K9H 1E5
Tel: (705) 742.7900 Fax: (705) 742.7907
www.cambium-inc.com

## SITE LOCATION PLAN

| Project No.: | Date: |
|---|---|
| 22599-001 | May 2025 |
| Scale: 1:100,000 | Projection: NAD 1983 UTM Zone 18N |
| Created by: LD | Checked by: NC |
| Figure: 1 | |

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# GEOTECHNICAL INVESTIGATION

EFI ENGINEERING
3210 Albion Road South
Ottawa, Ontario

**LEGEND**

- Borehole
- Site (approximate)

**Notes:**
- AerialImagery\GEO_Imagery_Data_Service_2023to2027:
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- 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
194 Sophia Street
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## BOREHOLE LOCATION PLAN

| Project No.: | Date: |
|---|---|
| 22599-001 | May 2025 |
| Scale: 1:1,000 | Projection: NAD 1983 UTM Zone 18N |
| Created by: LD | Checked by: NC |
| Figure: 2 | |

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# Appendix A

# Borehole Logs

CAMBIUM

**Client:** EFI Engineering
**Contractor:** Downing Drilling
**Project No.:** 22599-001
**Location:** 3210 Albion Rd S, Ottawa

**Project Name:** 3210 Albion Rd S
**Method:** Truck Mounted Hollow Stem Auger
**Elevation:** 82.59 mASL
**UTM:** 18T **N:** 5023606.25 **E:** 449096.53

**Log of Borehole:** BH101-25
Page: 1 of 1
**Date Completed:** May 1, 2025

| Elevation (m) | Depth | Description | Elevation / Depth | Number | Type | % Recovery | SPT (N) | Atterberg Limits (%) LL PL PI / % Moisture (25 50 75) | Shear Strength Cu, kPa (nat V. rem V.) (20 40 60 80) / SPT (N) (20 40 60 80) | Well Installation | Log Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 82.6 | 0 | **(GW) GRAVEL and SAND:** some silt; brown; moist, compact [FILL] | 82.39 / 0.20 | 1A | SS | 71 | 36 | 5% | 36 | | |
| | | | | 1B | SS | | | 4.2% | | | |
| 82.1 | 0.5 | **(SM) SILTY SAND and GRAVEL:** trace clay; dark brown; moist, compact [FILL] | 81.98 / 0.61 | | | | | | | | |
| | | **(ML) sandy CLAYEY SILT:** black; moist, loose [FILL] | 81.52 / 1.07 | 2A | SS | 79 | 8 | 22.5% | 8 | | |
| 81.6 | 1 | **(PT) PEAT:** fibrous; black; wet, loose | 81.22 / 1.37 | 2B | SS | | | | 187.3% | | |
| 81.1 | 1.5 | **(SM) gravelly SILTY SAND:** with clay; brown to grey; wet to moist, loose to compact [TILL] | | 3 | SS | 71 | 5 | 16.6% | 5 | | |
| 80.6 | 2 | | | | | | | | | | |
| 80.1 | 2.5 | | | 4 | SS | 79 | 24 | 9.6% | 24 | | |
| 79.6 | 3 | | | | | | | | | | |
| 79.1 | 3.5 | | | 5 | SS | 100 | 12 | 7.7% | 12 | | |
| 78.6 | 4 | | | | | | | | | | |
| 78.1 | 4.5 | | | 6 | SS | 79 | 8 | 9.8% | 8 | | |
| 77.6 | 5 | | 77.41 | 7 | SS | 67 | 5 | 9.9% | 5 | | |
| 77.1 | 5.5 | Borehole terminated @ 5.2 mbgs due to target depth achieved. | 5.18 | | | | | | | | Borehole terminated at 5.2 mbgs due to target depth achieved. Borehole caved to 3.5 mbgs upon completion. First groundwater encountered at 2.3 mbgs. Standing water encountered at 2.4 mbgs upon completion. |
| 76.6 | 6 | | | | | | | | | | |
| 76.1 | 6.5 | | | | | | | | | | |
| 75.6 | 7 | | | | | | | | | | |
| 75.1 | | | | | | | | | | | |

GRAINSIZE DISTRIBUTION

| SAMPLE | GRAVEL | SAND | SILT | CLAY |
|---|---|---|---|---|
| 03 | 12 | 40 | 34 | 14 |

**Logged By:** RR
**Input By:** MA

CAMBIUM

**Client:** EFI Engineering
**Contractor:** Downing Drilling
**Project No.:** 22599-001
**Location:** 3210 Albion Rd S, Ottawa

**Project Name:** 3210 Albion Rd S
**Method:** Truck Mounted Hollow Stem Auger
**Elevation:** 81.96 mASL
**UTM:** 18T **N:** 5023634.97 **E:** 449105.90

**Log of Borehole:** BH102-25
Page: 1 of 2
**Date Completed:** May 1, 2025

| SUBSURFACE PROFILE | | | | SAMPLE | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Elevation (m) / Depth | Lithology | Description | Elevation / Depth | Number | Type | % Recovery | SPT (N) | Atterberg Limits (%) LL PL PI; % Moisture 25 50 75 | Shear Strength Cu, kPa (nat V., rem V.); SPT (N) 20 40 60 80 | Well Installation | Log Notes |
| 82 / 0 | | **(SW) gravelly SAND:** some silt; brown; moist, very dense [FILL] | 81.78 / 0.18 | 1A | SS | 63 | 57 | 4.7% | 57 | | |
| 81.5 / 0.5 | | **(SW) gravelly SAND and CLAYEY SILT:** dark brown; moist, very dense to dense [FILL] | | 1B | SS | | | 10.2% | | | |
| 81 / 1 | | | | 2 | SS | 13 | 30 | 6.9% | 30 | | |
| 80.5 / 1.5 | | | 80.44 / 1.52 | 3A | SS | 92 | 3 | | 170.5% | | |
| | | **(PT) PEAT:** fibrous; dark brown; wet, loose | 80.23 / 1.73 | 3B | SS | | | 37% | 3 | | |
| 80 / 2 | | **(CL) sandy SILTY CLAY:** grey; w~PL, soft | 79.67 / 2.29 | | | | | | | | Shear Vane refusal at 2.1 mbgs; could not penetrate underlying soil layer. |
| 79.5 / 2.5 | | **(SM) gravelly SILTY SAND:** with clay; dark grey; wet to moist, loose to compact [TILL] | | 4 | SS | 63 | 8 | 12.1% | 8 | | |
| 79 / 3 | | | | 5 | SS | 71 | 10 | 10.6% | 10 | | |
| 78.5 / 3.5 | | | | | | | | | | | |
| 78 / 4 | | | | 6 | SS | 58 | 4 | 9.9% | 4 | | |
| 77.5 / 4.5 | | | | 7 | SS | 42 | 9 | 9.5% | 9 | | |
| 77 / 5 | | | 76.78 / 5.18 | | | | | | | | |
| 76.5 / 5.5 | | | | 8 | DCPT | | 7 | | 7 | | |
| | | | | 9 | DCPT | | 16 | | 16 | | |
| 76 / 6 | | | | 10 | DCPT | | 14 | | 14 | | |
| | | | | 11 | DCPT | | 21 | | 21 | | |
| 75.5 / 6.5 | | | | 12 | DCPT | | 18 | | 18 | | |
| | | | | 13 | DCPT | | 26 | | 26 | | |
| 75 / 7 | | | | 14 | DCPT | | 25 | | 25 | | |
| 74.5 | | | | | | | | | | | |

GRAINSIZE DISTRIBUTION

| SAMPLE | GRAVEL | SAND | SILT | CLAY |
|---|---|---|---|---|
| 3B | | 20 | 27 | 53 |

**Logged By:** RR
**Input By:** MA

CAMBIUM

**Client:** EFI Engineering
**Contractor:** Downing Drilling
**Project No.:** 22599-001
**Location:** 3210 Albion Rd S, Ottawa

**Project Name:** 3210 Albion Rd S
**Method:** Truck Mounted Hollow Stem Auger
**Elevation:** 81.96 mASL
**UTM:** 18T **N:** 5023634.97 **E:** 449105.90

**Log of Borehole:** BH102-25
Page: 2 of 2
**Date Completed:** May 1, 2025

| SUBSURFACE PROFILE | | | SAMPLE | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elevation (m) / Depth | Lithology | Description (Elevation / Depth) | Number | Type | % Recovery | SPT (N) | Atterberg Limits (%) LL PL PI; 25 50 75; % Moisture 25 50 75 | Shear Strength Cu, kPa (nat V., rem V.); 20 40 60 80; SPT (N) 20 40 60 80 | Well Installation | Log Notes |
| 74.5 / 7.5 | | | 15 | DCPT | | 23 | | 23 | | Borehole sampling terminated at 5.2 mbgs due to target depth achieved. DCPT refusal at 9.3 mbgs. Borehole caved to 3.5 mbgs upon completion. First groundwater encountered at 2.3 mbgs. Standing water encountered at 2.4 mbgs upon completion. |
| 74 / 8 | | | 16 | DCPT | | 25 | | 25 | | |
| | | | 17 | DCPT | | 40 | | 40 | | |
| 73.5 / 8.5 | | | 18 | DCPT | | 42 | | 42 | | |
| | | | 19 | DCPT | | 60 | | 60 | | |
| 73 / 9 | | | 20 | DCPT | | 84 | | 84 | | |
| | | | 21 | DCPT | | 100 /8" | | 100 | | |
| 72.5 / 9.5 | | | | | | | | | | |
| 72 / 10 | | | | | | | | | | |
| 71.5 / 10.5 | | | | | | | | | | |
| 71 / 11 | | | | | | | | | | |
| 70.5 / 11.5 | | | | | | | | | | |
| 70 / 12 | | | | | | | | | | |
| 69.5 / 12.5 | | | | | | | | | | |
| 69 / 13 | | | | | | | | | | |
| 68.5 / 13.5 | | | | | | | | | | |
| 68 / 14 | | | | | | | | | | |
| 67.5 / 14.5 | | | | | | | | | | |
| 67 | | | | | | | | | | |

GRAINSIZE DISTRIBUTION

| SAMPLE | GRAVEL | SAND | SILT | CLAY |
|---|---|---|---|---|
| 3B | | 20 | 27 | 53 |

**Logged By:** RR **Input By:** MA

CAMBIUM

**Client:** EFI Engineering
**Contractor:** Downing Drilling
**Project No.:** 22599-001
**Location:** 3210 Albion Rd S, Ottawa

**Project Name:** 3210 Albion Rd S
**Method:** Truck Mounted Hollow Stem Auger
**Elevation:** 82.60 mASL
**UTM:** 18T **N:** 5023622.95 **E:** 449128.71

**Log of Borehole:** BH103-25
Page: 1 of 1
**Date Completed:** May 1, 2025

| Elevation (m) | Depth | Description | Number | Type | % Recovery | SPT (N) | Atterberg Limits (%) / % Moisture | Shear Strength Cu, kPa / SPT (N) | Well Installation | Log Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 82.6 | 0 | **(SW) gravelly SAND and SILT:** dark brown; moist, compact [FILL] | 1 | SS | 88 | 26 | 11% | 26 | | |
| 82.1 | 0.5 | 81.99 | | | | | | | | |
| | | **(ML) sandy CLAYEY SILT:** trace gravel; black to dark brown, organics present; moist, compact [FILL] 0.61 | | | | | | | | |
| 81.6 | 1 | | 2 | SS | 79 | 12 | 20.5% | 12 | | |
| 81.1 | 1.5 | 81.08 | | | | | | | | |
| | | **(SM) gravelly SILTY SAND:** with clay; brown to dark grey; moist, loose to compact [TILL] 1.52 | 3 | SS | 100 | 24 | 9.6% | 24 | | |
| 80.6 | 2 | | | | | | | | | |
| 80.1 | 2.5 | | 4 | SS | 83 | 10 | 6.7 / 17.7 / 11.1 / 10% | 10 | | |
| 79.6 | 3 | | | | | | | | | |
| 79.1 | 3.5 | | 5 | SS | 50 | 8 | 8.7% | 8 | | |
| 78.6 | 4 | | | | | | | | | |
| | | | 6 | SS | 75 | 6 | 9.4% | 6 | | |
| 78.1 | 4.5 | | | | | | | | | |
| 77.6 | 5 | | 7 | SS | 25 | 11 | 8.5% | 11 | | |
| 77.1 | 5.5 | - occasional cobbles, dense | 8 | SS | 50 | 41 | 10.6% | 41 | | Borehole terminated at 5.9 mbgs due to target depth achieved. Borehole caved to 4.6 mbgs upon completion. No ground water or standing water encountered. |
| 76.6 | 6 | 76.66 | | | | | | | | |
| | | Borehole terminated @ 5.9 mbgs due to target depth achieved. 5.94 | | | | | | | | |
| 76.1 | 6.5 | | | | | | | | | |
| 75.6 | 7 | | | | | | | | | |
| 75.1 | | | | | | | | | | |

| GRAINSIZE DISTRIBUTION | SAMPLE | GRAVEL | SAND | SILT | CLAY |
|---|---|---|---|---|---|
| | 03 | 10 | 44 | 33 | 13 |

**Logged By:** RR
**Input By:** MA

CAMBIUM

**Client:** EFI Engineering
**Contractor:** Downing Drilling
**Project No.:** 22599-001
**Location:** 3210 Albion Rd S, Ottawa

**Project Name:** 3210 Albion Rd S
**Method:** Truck Mounted Hollow Stem Auger
**Elevation:** 82.82 mASL
**UTM:** 18T **N:** 5023655.83 **E:** 449132.92

**Log of Borehole:** BH104-25
Page: 1 of 1
**Date Completed:** May 1, 2025

| Elevation (m) | Depth | Description | Elevation / Depth | Number | Type | % Recovery | SPT (N) | Atterberg Limits (%) LL PL PI / % Moisture (25 50 75) | Shear Strength Cu, kPa (nat V., rem V.) / SPT (N) (20 40 60 80) | Well Installation | Log Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 82.8 | 0 | **(SW) gravelly SAND:** some silt, occasional cobble; brown to dark brown; moist, very dense [FILL] | 82.21 | 1 | SS | 79 | 51 | 6.7% | 51 | | |
| 82.3 | 0.5 | **(ML) sandy CLAYEY SILT:** contains organics; dark grey; moist, loose [FILL] | 0.61 / 81.60 | 2A | SS | 83 | 7 | 22.8% | 7 | | |
| 81.8 | 1 | **(PT) PEAT:** fibrous; black; wet, loose | 1.22 / 81.30 | 2B | SS | | | 34.4% | | | |
| 81.3 | 1.5 | **(SM) SILTY SAND:** some gravel; grey; wet, very loose | 1.52 / 80.99 | 3A | SS | 83 | 3 | 16.2% | 3 | | |
| 80.8 | 2 | **(CL) sandy SILTY CLAY:** grey, w~PL, firm | 1.83 | 3B | SS | | | 43.8% | | | Environmental sample collected: BH104-25_1.8-2.1, tested for corrosivity, sulfides and redox potential |
| 80.3 | 2.5 | | | 4 | FV | | | | 6 / 43 | | |
| 79.8 | 3 | | | 5 | FV | | | | 7 / 37 | | |
| 79.3 | 3.5 | | 79.31 | 6A | SS | 100 | 2 | 60.4% | 2 | | |
| 78.8 | 4 | **(SM) gravelly SILTY SAND:** with clay; grey; moist, loose to compact [TILL] | 3.51 | 6B | SS | | | 8.6% | | | |
| 78.3 | 4.5 | | | 7 | SS | 58 | 4 | 11.1% | 4 | | Borehole terminated at 5.2 mbgs due to target depth achieved. Borehole caved to 3.5 mbgs upon completion. First groundwater encountered at 1.5 mbgs. Standing water encountered at 3.0 mbgs upon completion. |
| 77.8 | 5 | | 77.64 | 8 | SS | 50 | 14 | 10.1% | 14 | | |
| 77.3 | 5.5 | Borehole terminated @ 5.2 mbgs due to target depth achieved. | 5.18 | | | | | | | | |
| 76.8 | 6 | | | | | | | | | | |
| 76.3 | 6.5 | | | | | | | | | | |
| 75.8 | 7 | | | | | | | | | | |
| 75.3 | | | | | | | | | | | |

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

**Logged By:** RR
**Input By:** MA

# Appendix B

# Soil Laboratory Testing Results

# Grain Size Distribution Chart

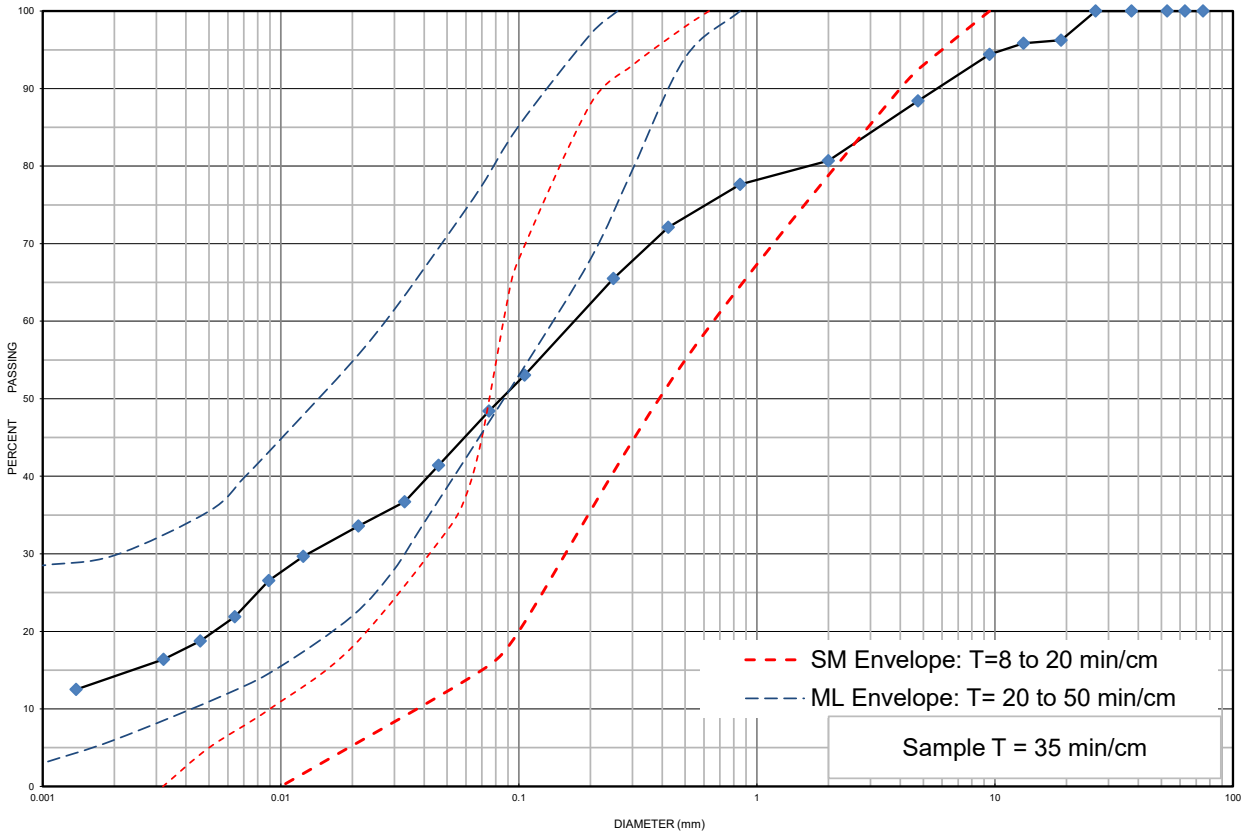
**Project Number:** *22599-001* **Client:** *EFI Engineering*

**Project Name:** *3210 Albion Rd S*

**Sample Date:** *May 1, 2025* **Sampled By:** *Rory Ryan - Cambium Inc.*

**Location:** *BH 101-25 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-25-0723*

| 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 101-25 | SS 3 | 1.5 m to 2.1 m | 12 | 40 | 34 | 14 | 16.6 |

| Description | Classification | $D_{60}$ | $D_{30}$ | $D_{10}$ | $C_u$ | $C_c$ |
|---|---|---|---|---|---|---|
| Silty Clayey Gravelly Sand | SM | 0.165 | 0.014 | - | - | - |

Additional information availabe upon request

*Issued By:* _____ *Date Issued:* *May 28, 2025*

(Senior Project Manager)

**Cambium Inc. (Laboratory)**
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

# Grain Size Distribution Chart

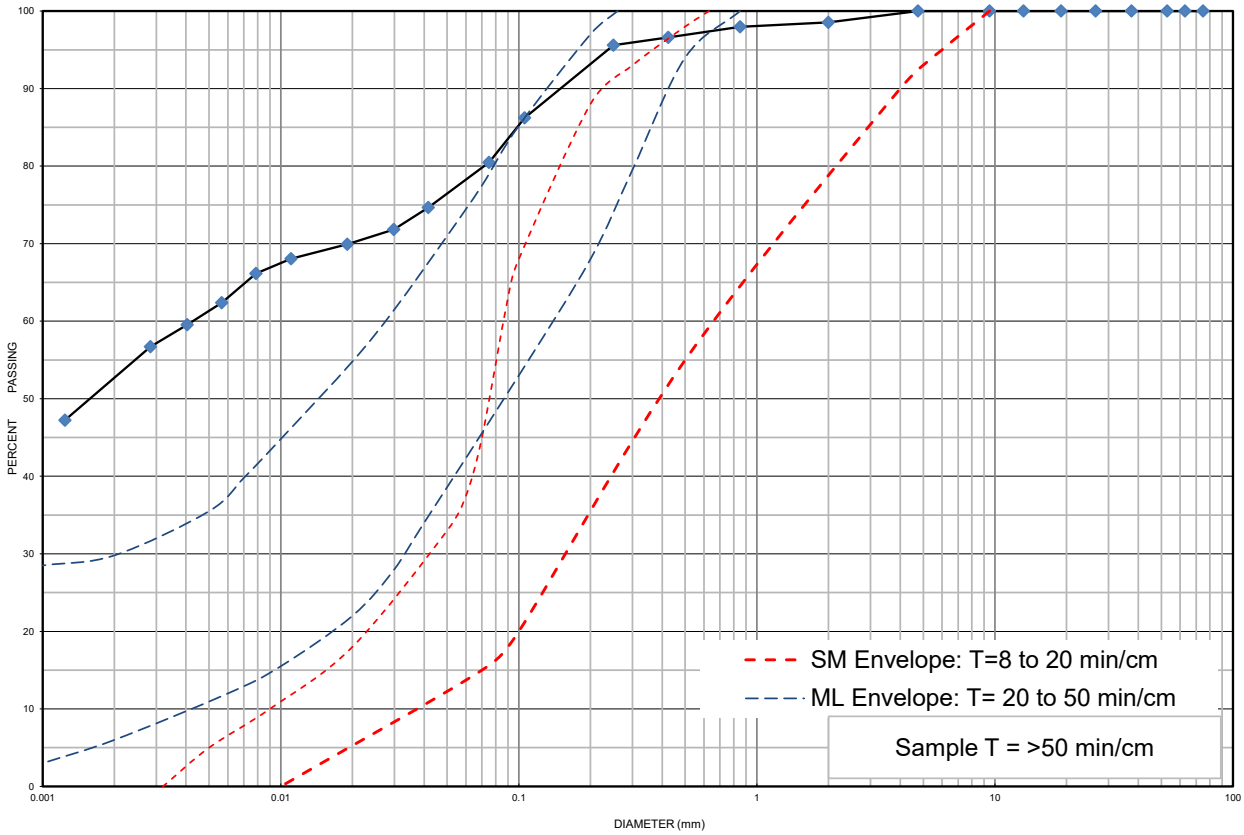
**Project Number:** *22599-001* **Client:** *EFI Engineering*

**Project Name:** *3210 Albion Rd S*

**Sample Date:** *May 1, 2025* **Sampled By:** *Rory Ryan - Cambium Inc.*

**Location:** *BH 102-25 SS 3B* **Depth:** *1.7 m to 2.1 m* **Lab Sample No:** *S-25-0724*

| 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 102-25 | SS 3B | 1.7 m to 2.1 m | 0 | 20 | 27 | 53 | 37.0 |

| Description | Classification | $D_{60}$ | $D_{30}$ | $D_{10}$ | $C_u$ | $C_c$ |
|---|---|---|---|---|---|---|
| Silty Sandy Clay | CL | 0.0043 | - | - | - | - |

Additional information availabe upon request

*Issued By:* _____ *Date Issued:* *May 28, 2025*

(Senior Project Manager)

**Cambium Inc. (Laboratory)**
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

# Grain Size Distribution Chart

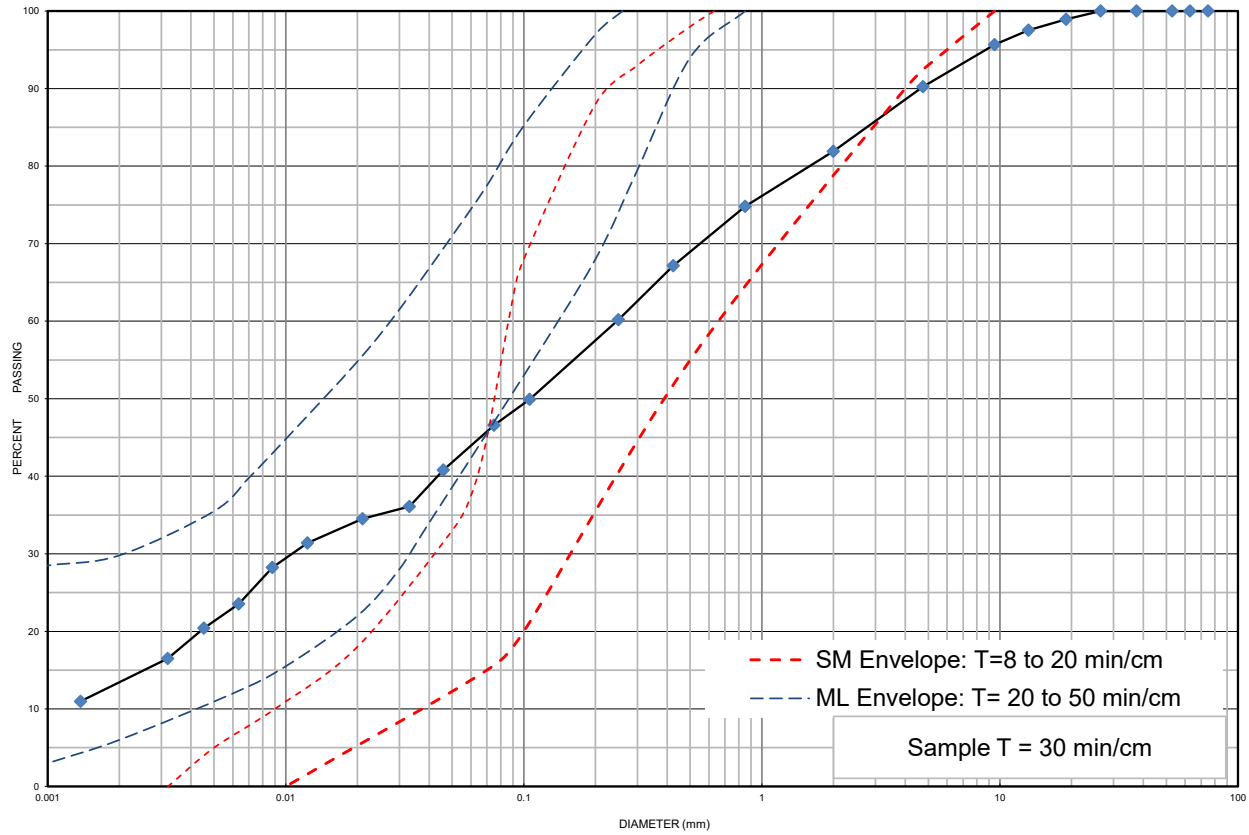
**Project Number:** *22599-001* **Client:** *EFI Engineering*

**Project Name:** *3210 Albion Rd S*

**Sample Date:** *May 1, 2025* **Sampled By:** *Rory Ryan - Cambium Inc.*

**Location:** *BH 103-25 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-25-0725*

| 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 103-25 | SS 3 | 1.5 m to 2.1 m | 10 | 44 | 33 | 13 | 9.6 |

| Description | Classification | $D_{60}$ | $D_{30}$ | $D_{10}$ | $C_u$ | $C_c$ |
|---|---|---|---|---|---|---|
| Silty Clayey Sand some Gravel | SM | 0.255 | 0.012 | - | - | - |

Additional information availabe upon request

*Issued By:* _____ *Date Issued:* *May 28, 2025*

(Senior Project Manager)

**Cambium Inc. (Laboratory)**
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

# Plasticity Chart

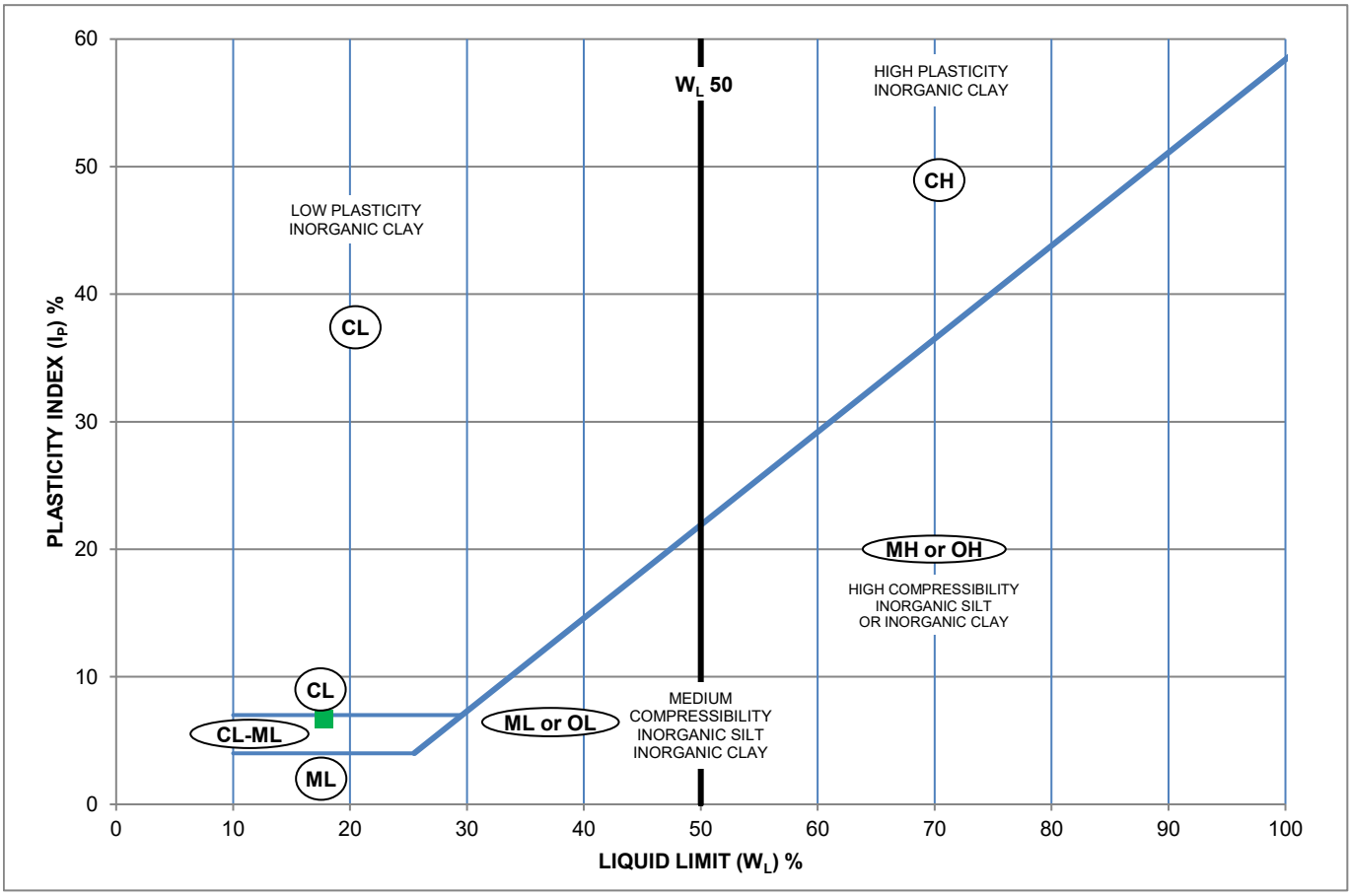
**Project Number:** *22599-001* **Client:** *EFI Engineering*

**Project Name:** *3210 Albion Rd S*

**Sampled By:** *Rory Ryan - Cambium Inc.* **Sample Date:** *May 1, 2025*

**Hole No.:** *BH 103-25 SS 4* **Depth:** *2.3 m to 2.9 m* **Lab Sample No:** *S-25-0726*

| Low Plasticity | High Plasticity |
|---|---|




| Symbol | Borehole | Sample | Depth | Description |
|---|---|---|---|---|
| ■ | BH 103-25 | SS 4 | 2.3 m to 2.9 m | CL-ML |

| Liquid Limit (%) | Plastic Limit | Plasticity Index (%) |
|---|---|---|
| ***17.7*** | ***11.1*** | ***6.7*** |

Additional information available upon request

*Issued By:* _____ *Date Issued:* *May 13, 2025*

(Senior Project Manager)

**Cambium Inc. (Laboratory)**
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

# Appendix C

# Laboratory Certificate of Analysis

PARACEL LABORATORIES LTD.

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300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

# Certificate of Analysis

**Cambium Inc. (Ottawa)**
102-343 Preston Street
Ottawa, ON K7K 7G3
Attn: Nathan Christie

Client PO:
Project: 22599-001
Custody: 75259

Report Date: 7-May-2025
Order Date: 1-May-2025

**Order #: 2518438**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|---|---|
| 2518438-01 | BH104-25_1.8-2.1 |

Approved By:

Mark Foto

Mark Foto, M.Sc.
Laboratory Director

PARACEL LABORATORIES LTD.

**Order #: 2518438**

Certificate of Analysis

Report Date: 07-May-2025

**Client:** **Cambium Inc. (Ottawa)**

Order Date: 1-May-2025

**Client PO:**

**Project Description: 22599-001**

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| Anions | EPA 300.1 - IC, water extraction | 6-May-25 | 6-May-25 |
| pH, soil | EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext. | 2-May-25 | 2-May-25 |
| Resistivity | EPA 120.1 - probe, water extraction | 5-May-25 | 5-May-25 |
| Solids, % | CWS Tier 1 - Gravimetric | 5-May-25 | 6-May-25 |

PARACEL LABORATORIES LTD.

**Order #: 2518438**

Certificate of Analysis

Report Date: 07-May-2025

**Client:** **Cambium Inc. (Ottawa)**

Order Date: 1-May-2025

**Client PO:**

**Project Description: 22599-001**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Client ID:** | BH104-25_1.8-2.1 | - | - | - | | |
| | **Sample Date:** | 01-May-25 10:00 | - | - | - | - | - |
| | **Sample ID:** | 2518438-01 | - | - | - | | |
| | **Matrix:** | Soil | - | - | - | | |
| | **MDL/Units** | | | | | | |
| **Physical Characteristics** | | | | | | | |
| % Solids | 0.1 % by Wt. | 64.9 | - | - | - | - | - |
| **General Inorganics** | | | | | | | |
| pH | 0.05 pH Units | 7.84 | - | - | - | - | - |
| Resistivity | 0.1 Ohm.m | 18.7 | - | - | - | - | - |
| **Anions** | | | | | | | |
| Chloride | 10 ug/g | 147 | - | - | - | - | - |
| Sulphate | 10 ug/g | 87 | - | - | - | - | - |

PARACEL LABORATORIES LTD.

**Order #: 2518438**

Certificate of Analysis

Report Date: 07-May-2025

**Client:** **Cambium Inc. (Ottawa)**

Order Date: 1-May-2025

**Client PO:**

**Project Description: 22599-001**

## Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|
| **Anions** | | | | | | | | |
| Chloride | ND | 10 | ug/g | | | | | |
| Sulphate | ND | 10 | ug/g | | | | | |
| **General Inorganics** | | | | | | | | |
| Resistivity | ND | 0.1 | Ohm.m | | | | | |

PARACEL LABORATORIES LTD.

**Order #: 2518438**

Certificate of Analysis

Report Date: 07-May-2025

**Client:** **Cambium Inc. (Ottawa)**

Order Date: 1-May-2025

**Client PO:**

**Project Description: 22599-001**

## Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Anions** | | | | | | | | | |
| Chloride | 33.4 | 10 | ug/g | 27.1 | | | 20.6 | 35 | |
| Sulphate | 56.7 | 10 | ug/g | 47.8 | | | 17.1 | 35 | |
| **General Inorganics** | | | | | | | | | |
| pH | 7.87 | 0.05 | pH Units | 7.90 | | | 0.4 | 2.3 | |
| Resistivity | 59.6 | 0.1 | Ohm.m | 60.2 | | | 1.1 | 20 | |
| **Physical Characteristics** | | | | | | | | | |
| % Solids | 87.6 | 0.1 | % by Wt. | 87.6 | | | 0.0 | 25 | |

PARACEL LABORATORIES LTD.

**Order #: 2518438**

Certificate of Analysis

Report Date: 07-May-2025

**Client:** **Cambium Inc. (Ottawa)**

Order Date: 1-May-2025

**Client PO:**

**Project Description: 22599-001**

## Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Anions** | | | | | | | | | |
| Chloride | 140 | 10 | ug/g | 27.1 | 113 | 82-118 | | | |
| Sulphate | 153 | 10 | ug/g | 47.8 | 106 | 80-120 | | | |

PARACEL LABORATORIES LTD.

**Order #: 2518438**

Certificate of Analysis

Report Date: 07-May-2025

**Client:** **Cambium Inc. (Ottawa)**

Order Date: 1-May-2025

**Client PO:**

**Project Description: 22599-001**

**Qualifier Notes:**

**Sample Data Revisions:**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unlesss otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

PARACEL LABORATORIES LTD

**Paracel ID: 2518438**

| Paracel Order Number (Lab Use Only) | Chain Of Custody (Lab Use Only) |
|---|---|
| 2518438 | № 75259 |

| | |
|---|---|
| Client Name: Nathan Christie Cambium Inc | Project Ref: 22599-001 |
| Contact Name: Nathan Christie | Quote #: |
| Address: 343 Preston St, Ottawa, ON 11th Floor | PO #: |
| Telephone: 613-808-4182 | E-mail: nathan.christie James.sullivan @ cambium-inc.com |

Page 1 of 1

**Turnaround Time**

☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular

Date Required: _____

☐ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☐ Table ___
For RSC: ☐ Yes ☐ No

**Other Regulation**

☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun: ___
☐ Other:

**Matrix Type:** S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

**Required Analysis**

| | Sample ID/Location Name | Matrix | Air Volume | # of Containers | Sample Taken Date | Sample Taken Time | Corrosivity | Sulphides | Redox Potential | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BH104-25_1.8-2.1 | S | | 3 | May 1, 2025 | 10:00 | X | X | X | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |

Comments:

Method of Delivery: WALK-IN

| | | | |
|---|---|---|---|
| Relinquished By (Sign): | Received at Depot: | Received at Lab: LTJ | Verified By: LTJ |
| Relinquished By (Print): Roly Ryan | Date/Time: | Date/Time: 01/05/25; 14:34 | Date/Time: 01/05/25; 16:41 |
| Date/Time: May 1, 2025 2:26 | Temperature: °C | Temperature: 17.9 °C | pH Verified: ☐ By: |

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# Subcontracted Analysis

**Cambium Inc. (Ottawa)**
102-343 Preston Street
Ottawa, ON K7K 7G3
Attn: Nathan Christie

| | |
|---|---|
| Paracel Report No. | **2518438** |
| Client Project(s): | **22599-001** |
| Client PO: | |
| Reference: | **SO Cambium - ENV** |
| CoC Number: | **75259** |

| | |
|---|---|
| Order Date: | 01-May-25 |
| Report Date: | 7-May-25 |

Sample(s) from this project were subcontracted for the listed parameters. A copy of the subcontractor's report is attached

| Paracel ID | Client ID | Analysis |
|---|---|---|
| 2518438-01 | BH104-25_1.8-2.1 | Redox potential, soil<br>Sulphide, solid |

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

09-May-2025

**Paracel Laboratories**
Attn : Dale Robertson

300-2319 St.Laurent Blvd.
Ottawa, ON
K1G 4K6, Canada

Phone: 613-731-9577
Fax:613-731-9064

**Date Rec. :** 07 May 2025
**LR Report:** **CA13407-MAY25**
**Reference:** Project#: 2518438

**Copy:** #1

# CERTIFICATE OF ANALYSIS
## Final Report

| Sample ID | Sample Date & Time | Sulphide ($Na_2CO_3$) % |
|---|---|---|
| 1: Analysis Start Date | | 09-May-25 |
| 2: Analysis Start Time | | 10:16 |
| 3: Analysis Completed Date | | 09-May-25 |
| 4: Analysis Completed Time | | 11:37 |
| 5: RL | | 0.01 |
| 6: BH104-25_1.8-2.1 | 01-May-25 10:00 | 0.03 |

RL - SGS Reporting Limit

*Kimberley Didsbury*
*Project Specialist,*
*Environment, Health & Safety*

OnLine LIMS

0004107019

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**LR Report :** **CA13407-MAY25**

# Quality Control Report

| Inorganic Analysis | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | Reporting Limit | Unit | Method Blank | Duplicate | | | | LCS / Spike Blank | | | Matrix Spike / Reference Material | | |
| | | | | Result 1 | Result 2 | RPD | Acceptance Criteria | Spike Recovery (%) | Recovery Limits (%) | | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | | % | | Low | High | | Low | High |
| *Carbon/Sulphur - QCBatchID: ECS0034-MAY25* | | | | | | | | | | | | | |
| Sulphide (Na2CO3) | 0.01 | % | < 0.01 | | | | | | | | | | |

OnLine LIMS

0004107019

**TESTMARK Laboratories Ltd.**
*Committed to Quality and Service*

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| Client: | Dale Robertson | Work Order Number: | 575478 |
| Company: | Paracel Laboratories Ltd. - Ottawa | PO #: | |
| Address: | 300-2319 St. Laurent Blvd.<br>Ottawa, ON, K1G 4J8 | Regulation:<br>Project #: | Information not provided<br>2518438 |
| Phone/Fax: | (613) 731-9577 / (613) 731-9064 | DWS #: | |
| Email: | drobertson@paracellabs.com | Sampled By: | |
| Date Order Received: | 5/7/2025 | Analysis Started: | 5/12/2025 |
| Arrival Temperature: | 20.3 C | Analysis Completed: | 5/12/2025 |

## WORK ORDER SUMMARY

ANALYSES WERE PERFORMED ON THE FOLLOWING SAMPLES. THE RESULTS RELATE ONLY TO THE ITEMS TESTED.

| Sample Description | Lab ID | Matrix | Type | Comments | Date Collected | Time Collected |
|---|---|---|---|---|---|---|
| BH104-25_1.8-2.1 | 2137214 | Soil | None | | 5/1/2025 | 10:00 AM |

## METHODS AND INSTRUMENTATION

THE FOLLOWING METHODS WERE USED FOR YOUR SAMPLE(S):

| Method | Lab | Description | Reference |
|---|---|---|---|
| RedOx - Soil (T06) | Mississauga | Determination of RedOx Potential of Soil | Modified from APHA-2580B |

## REPORT COMMENTS

**Non-Testmark container received 05/07/25 JM**
**Sample for Redox Potential received past hold time, proceed with analysis as per client note 05/07/25 JM**

This report has been approved by:

Aline de Chevigny
Production Coordinator CET



6820 Kitimat Road Unit 4, Mississauga, ON, L5N 5M3
Phone: (905) 821-1112 Fax: (905) 821-2095 Web: www.testmark.ca

**TESTMARK Laboratories Ltd.**
*Committed to Quality and Service*

# CERTIFICATE OF ANALYSIS

Paracel Laboratories Ltd. - Ottawa

Work Order Number: 575478

## WORK ORDER RESULTS

| Sample Description | BH104 - 25 _ 1.8 - 2.1 | | |
|---|---|---|---|
| Sample Date | 5/1/2025 10:00 AM | | |
| Lab ID | 2137214 | | |
| **General Chemistry** | **Result** | **MDL** | **Units** |
| RedOx (vs. S.H.E.) | 196<br>[195] | N/A | mV |

## LEGEND

Dates: Dates are formatted as mm/dd/year throughout this report.

MDL: Method detection limit or minimum reporting limit.

[ ]: Results for laboratory replicates are shown in square brackets immediately below the associated sample result for ease of comparison.

Organic Soil Analysis: Data reported for organic analysis in soils samples are corrected for moisture content.

Quality Control: All associated Quality Control data is available on request.

Field Data: Reports containing Field Parameters represent data that has been collected and provided by the client. Testmark is not responsible for the validity of this data which may be used in subsequent calculations.

Sample Condition Deviations: A noted sample condition deviation may affect the validity of the result. Results apply to the sample(s) as received.

Reproduction of Report: Report shall not be reproduced, except in full, without the approval of Testmark Laboratories Ltd.

ICPMS Dustfall Insoluble: The ICPMS Dustfall Insoluble Portion method analyzes only the particulate matter from the Dustfall Sampler which is retained on the analysis filter during the Dustfall method.

Regulation Comparisons: Disclaimer: Please note that regulation criteria are provided for comparative purposes, however the onus on ensuring the validity of this comparison rests with the client.



6820 Kitimat Road Unit 4, Mississauga, ON, L5N 5M3
Phone: (905) 821-1112 Fax: (905) 821-2095 Web: www.testmark.ca

PARACEL LABORATORIES LTD

**Paracel ID: 2518438**

| Paracel Order Number (Lab Use Only) | Chain Of Custody (Lab Use Only) |
|---|---|
| 2518438 | № 75259 |

Client Name: Nathan Christie Cambium Inc
Contact Name: Nathan Christie
Address: 343 Preston St, Ottawa, ON 11th Floor
Telephone: 613-808-4182

Project Ref: 22599-001
Quote #:
PO #:
E-mail: nathan.christie@cambium-inc.com; James.Sullivan@cambium-inc.com

Page 1 of 1

Turnaround Time
☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Date Required:

☐ REG 153/04 ☐ REG 406/19

Table 1 ☐ Res/Park ☐ Med/Fine
Table 2 ☐ Ind/Comm ☐ Coarse
Table 3 ☐ Agri/Other
Table ___
For RSC: ☐ Yes ☐ No

Other Regulation
☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun:
☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

| | Sample ID/Location Name | Matrix | Air Volume | # of Containers | Sample Taken Date | Sample Taken Time | Required Analysis: Corrosivity | Sulphides | Redox Potential |
|---|---|---|---|---|---|---|---|---|---|
| 1 | BH104-25_1.8-2.1 | S | | 3 | May 1, 2025 | 10:00 | X | X | X |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |

Comments:

Method of Delivery: WALK-IN

| | | | |
|---|---|---|---|
| Relinquished By (Sign): | Received at Depot: | Received at Lab: LTJ | Verified By: LTJ |
| Relinquished By (Print): Roly Ryan | Date/Time: | Date/Time: 01/05/25; 14:34 | Date/Time: 01/05/25; 16:41 |
| Date/Time: May 1, 2025 2:26 | Temperature: °C | Temperature: 17.9 °C | pH Verified: ☐ By: |