Hydrogeological Assessment – 42 and 52 Mill Street, Norwood, Ontario (Rev 1.)

September 3, 2025

Prepared for:
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1.0 Introduction

CAP Norwood Developments Inc. (Client) retained Cambium Inc. (Cambium) to complete a hydrogeological assessment of 52 Mill Street in Norwood, Ontario (the Site). It is understood that the Client intends on developing 643 residential lots and associated infrastructure on the Site.

A hydrogeological assessment was completed in support proposed residential development of the Site, and the results were outlined in the document "*Hydrogeological Assessment – 52 Mill Street, Norwood,* Ontario" dated January 5, 2024, (Cambium, 2024).

The hydrogeological assessment was peer reviewed by Stantec Consulting Ltd. (Stantec). Stantec's comments were outlined in a document entitled "*Hydrogeological Study – 42 & 52 Mill Street, Norwood, Ontario, Upper Mill Pond Subdivision (County File Nos. 15T-240001 and 15OP-240001)*" dated July 22, 2024.

This report is intended to form an updated hydrogeological assessment, incorporating data and information presented in Cambium's January 5, 2024, hydrogeological assessment in addition to new data collected in order to address Stantec's July 22, 2024, peer review comments (Stantec, 2024). Cambium has also completed two geotechnical investigations (Cambium, 2022a) (Cambium, 2023a), a soil characterization report (Cambium, 2023b), an Environmental Impact Study (EIS) (Cambium, 2023), and a Phase I Environmental Site Assessment (ESA) (Cambium, 2022b). These reports were provided to the Client under separate covers and are referenced herein as appropriate.

1.1 Site Description and Proposed Development

The Site is irregularly shaped, consisting of approximately 35.4 ha (87 acres) within Lot 18, Concession 9 of Asphodel Township (Appendix A). The Site is designated as a Rural Zone (RU). The Site is bound by Mill Street and properties zoned as Residential 1 (R1) Zone and Residential 2 (R2) Zone to the southwest through southeast, Asphodel 10th Line and a property zoned as Rural Residential (RR) Zone to the northeast, and a CN railway line to the northwest.

The Site is currently developed for agricultural use and contains a single family dwelling, a barn and storage sheds. The single family dwelling is provided water from a private supply well (see Section 3.5), and wastewater servicing (presumably) by an on-site treatment system.

It is understood that the proposed development will include mixed density residential land use with 643 units, a stormwater management pond, and associated infrastructure including, but not limited to, roads, sidewalks, and greenspace. Water and wastewater services are expected to be provided by the Township of Asphodel-Norwood (Township). All existing structures and dwellings (including the associated water supply well and on-site wastewater treatment system) will be removed prior to development of the Site.

A proposed development is attached in Appendix A, the regional location of the Site is included in Figure 1, and a Site map is included in Figure 2.

2.0 Methodology

This section outlines the methodology followed to complete the hydrogeological assessment.

2.1 Background Information Review

A review of available relevant background information was undertaken for this study, which included the following resources:

- Chapman, L.J. and Putnam, D.F., 2007. Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release – Data 228. Scale: 1:50,000.
- Ontario Geological Survey, 1991. Bedrock Geology of Ontario; Ontario Geological Survey. Scale: 1:250,000.
- Ontario Geological Survey, 2010. Surficial Geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release – Data 128-REV. Scale: 1:50,000.
- Source Protection Area Mapping provided by the Ministry of Environment, Conservation and Parks (MECP)
- Water Well Information System provided by the MECP

2.2 Borehole and Test Pit Investigation

A borehole investigation and test pit investigation were conducted on April 20, 21, 26, and 27, 2022. On November 8, 2024, a secondary subsurface investigation was completed to address comments from Stantec stating that additional monitoring wells are required to satisfactorily characterize groundwater conditions at the Site.

A total of 21 boreholes, designated BH101-22 through BH117-22 and BH201-24 through BH204-24, and 24 test pits, designated TP118-22 through TP141-22, were advanced at the Site for geotechnical and hydrogeological purposes. The boreholes were advanced to depths between 2.0 to 7.1 mbgs, while the test pits were advanced to depths between 1.5 and 3.6 mbgs. Most boreholes and test pits were found to be dry upon completion, with 19 of the 21 boreholes being terminated on presumed bedrock.

As part of the 2022 and 2024 investigations, eight monitoring wells were installed (BH104-22, BH105-22, BH112-22, BH115-22, and BH201-24 through BH204-24) to maximum screen depths between 2.5 and 4.6 mbgs. The location of all boreholes and test pits are shown on Figure 2.

Drilling and sampling for the 2022 and 2024 boreholes were completed using a track-mounted drill rig, under the supervision of a Cambium technician. The boreholes were advanced to their terminated 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 (SS) sampler 305 mm into the soil using a 63.5 kg drop hammer falling 750 mm, as per ASTM D1586 procedures. The SPT N values are used in this report to assess consistency of cohesive soils and relative density of non-cohesive materials. Soil samples were collected at 0.75 m intervals from 0 meters below ground surface (mbgs) to 5.03 mbgs.

The 2022 test pits were generally excavated to a predetermined depth of 3 mbgs or until refusal using a Cambium sourced backhoe, under the supervision of a Cambium technician. Dynamic Probe Penetration Test (DPT) values were recorded for the sampled intervals as the number of blows required to drive a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm. The DPT values are used in this report to assess consistency of cohesive soils and relative density of non-cohesive materials. Borehole and test pit logs are provided in Appendix B.

The encountered soil units were logged in the field using visual and tactile methods, and samples were placed in labelled plastic bags for transport, future reference, possible laboratory testing, and storage. Open test pits were checked for groundwater and general stability prior to backfilling. All test pits were backfilled to as close to pre-existing conditions as possible.

Borehole and test pit locations were surveyed in the field using a Sokkia RTK unit. Elevations were measured in relation to the top nut of the fire hydrant located at the intersection of King Street and Mill Street. Geodetic elevation of the fire hydrant was provided by Jewel Engineering to be 206.05 meters above sea level (masl). The ground surface at the location of

each borehole and test pit has been measured relative to this elevation, with an accuracy of 0.01m.

2.3 Physical Soil Testing

Physical laboratory testing, including eight particle size distribution analyses (LS-702, 705), was completed on selected soil samples in 2022 to confirm textural classification. Results are presented in Appendix C and are discussed in Section 3.3.5.

2.4 Hydrogeological Field Tasks

2.4.1 Water Level Measurements

Manual water level measurements were made in April and May of 2022. In March 2024 pressure transducers were installed in BH104-22, BH105-22, BH112-22 and BH115-22 and additional manual water levels were collected. Site visits were made in May and September 2024 to download the equipment, collect manual water level measurements, and check the status of the transducers. On November 15 and 18, 2024 pressure transducers were also installed in newly constructed wells BH201-24, BH202-24, BH203-24 and BH204-24. Note the logger in well BH104-22 was removed from BH104-22 and installed in BH204-24, as BH104-22 was found to be consistently dry. On February 10 and June 23, 2025 Cambium staff made site visits to download the equipment and check the status of the transducers.

Manual and continuous water level measurement data is discussed in Section 4.1.

The pressure transducers will remain installed in the monitoring wells to continuously collect water level data (in order to satisfy Stantec’s Comment #1).

2.4.2 Single Well Hydraulic Tests

Cambium staff visited the Site on May 4, 2022, to complete Single Well Hydraulic Tests (SWHTs) on monitoring wells BH105-22, BH112-22, and BH115-22. No SWHT could be conducted on BH104-22 as the well was found to be dry. Cambium staff visited the again on November 18, 2024, to complete SWHTs on monitoring wells BH201-24 through BH204-24.

On November 18, 2024, tests could only be conducted on BH201-24 and BH202-24 as BH203-24 and BH204-24 were found to be dry.

The SWHTs were completed by inducing an instantaneous change in groundwater head in the well and monitoring water level recovery. Water level recovery was monitored using an automated water level logging device and validated with manual measurements. The hydraulic conductivity of water bearing units screened in each well were estimated using the software Aquifer Test Pro for the 2022 SWHTs, and AQTESOLV for the 2024 SWHTs. The results of the 2022 and 2024 SWHTs are attached in Appendix D and are discussed further in Section 4.2.

2.4.3 Groundwater Sampling

Cambium collected two groundwater samples from monitoring wells BH105-22 and BH115-22 on May 4, 2022, and collected one groundwater sample from BH201-24 on November 18, 2024. The sample was submitted to SGS laboratory in Lakefield, ON. SGS is accredited by the Canadian Association for Laboratory Accreditation Inc. The sample was stored at a temperature between 0°C and 10°C prior to and during transport. Analytical results from the sample were compared against the Provincial Water Quality Objectives (PWQO) (MOE, 1994). The Certificates of Analysis are attached in Appendix E and the results are discussed further in Section 4.3.

2.4.4 Water Well Surveys

Three water well surveys were conducted for residences near the Site. The first survey was conducted on April 18, 2022, where well surveys were mailed to 19 neighbouring properties requesting information on their private supply well (if one exists) on their property. Cambium did not receive any responses to the April 18 letter mailing campaign, so a follow up mailing campaign was completed on May 19, 2022. During the May 19, 2022, campaign 21 neighbouring properties were contacted, including the 19 properties contacted during the April 18 campaign and two additional properties (2450 and 2319 Asphodel 10th Line).

As part of the 2024 peer review, Stantec commented that private properties identified as being intercepted by the projected dewatering zone of influence (as discussed in Section 5.5) should

be subject to a door-to-door well survey and not simply a letter mailing campaign. To address this comment, Cambium conducted a door-to-door well survey for residences adjacent to the Site on November 18 and 22, 2024, visiting 22 residential properties adjacent the Site. In-person interviews were conducted at two residences (26 Mill Street and 11 Barber Line), where the homeowners were home at the time of the well survey and were willing to participate. When contact was not made in person with homeowners, a letter and questionnaire was left in the mailbox of the residence, with contact information of Cambium personnel if they were interested in participating. Details pertaining to the residences contacted as part of the letter mailing campaigns and door-to-door well surveys and responses received are outlined in Section 4.4. Detailed results of the 2022 and 2024 well surveys are included in Appendix F.

In addition to the well survey, Cambium staff also located and measured the water level and depth of the existing supply well that services the existing dwelling on-site on May 5, 2022. All equipment used in the private supply well investigation was decontaminated prior to usage. Details of the existing supply well on-site are discussed in Section 3.5.

3.0 Geological and Hydrogeological Setting

3.1 Topography and Drainage

Based on topographic mapping by the Ministry of Natural Resources and Forestry (MNRF) (Appendix A), the Site is gently sloping, ranging in elevation from 213 masl in the most eastern corner to 205 masl in the most western corner of the Site. The ground surface of the Site generally slopes downward to the west / northwest towards the Ouse River, though portions of the eastern part of the Site may slope downward to the east towards a tributary of the Ouse River. There are no mapped wetlands or waterbodies on the Site. Drainage on the Site is assumed to follow topography to the west / northwest towards the Ouse River, or potentially to the east towards the tributary of the Ouse River.

3.2 Physiographic Region

The Site is located in the Dummer Moraines physiographic region, between Georgian Bay Fringe to the north and the Peterborough Drumlin fields to the south (Chapman & Putnam, 1984). The Dummer Moraines are an area of rough stony land bordering the Canadian Shield. The region contains glacial moraines, a drumlinized till plain, and sporadic eskers and or exposed bedrock.

3.3 Overburden Geology

Subsurface conditions at the Site generally consist of layer of loose to compact silt topsoil underlain by moist silty sand, which extends to a depth of 0.3 to 2.1 mbgs at locations BH101-22, BH102-22, BH105-22 to BH113-22, BH115-22 to BH117-22, TP118-22 to TP122-22, TP126-21 to TP130-22, TP132-22 to TP141-22, BH202-24, and BH203-24. Moist silty sand, extended to 3.6 mbgs at TP121-22, and to 4.11 mbgs at BH201-24. In test pits and boreholes BH102-22, BH103-22, BH107-22, BH110-22, BH112-22, and BH117-22, loose, moist to wet, silt dominant soils were found underlying the silty sand soil, extending to depths of 1.4 to 2.9 mbgs. Moist to saturated, gravel and sand dominant soils were found to extend from the base of the aforementioned soils to the termination depth of all test pits and boreholes (with the termination depths in the boreholes ranging from 2.0 to 7.1 mbgs and the termination depths in

the test pits ranging from 1.5 – 3.6 mbgs) except BH107-22, TP121-22, TP137-22, and TP138-22. The gravel and sand was found to have a dense to very dense relative density.

The individual soil units are described in detail below and shown on the borehole and test pit logs provided in Appendix B.

3.3.1 Topsoil

All test pits and boreholes encountered a silt topsoil with trace sand at surface. The topsoil contains some to frequent rootlets and varying amounts of gravel and cobble. The topsoil ranged in thickness from 0.15 to 0.30 m in all locations, except boreholes BH104-22 and BH204-24, which had a topsoil thickness of 0.60 and 0.69 m respectively.

3.3.2 Silty Sand

Silty sand and, silt and sand with trace to some clay and gravel was encountered immediately below topsoil or below relatively thin layers of silt in all locations except BH107-22, BH111-22, BH114-22, BH115-22, TP124-22, TP125-22, and TP131-22 and extended to depths ranging from 0.3 mbgs to termination depth within these locations. The SPT and DPT blow counts provide evidence that the silty sand ranged from a loose to dense relative density.

3.3.3 Silt

Silt dominant soils with variable amounts of clay and sand were encountered in boreholes BH102-22, BH103-22, BH105-22 through BH108-22, BH110-22, BH112-22, BH113-22, BH115-22, BH117-22, and TP121-22. These soils were generally found within 3 m of surface, except in BH107-22 where it extends to bedrock at a depth of 4.4 mbgs. The silt soils were encountered immediately below topsoil or as interbedded horizons within the silty sand units. The SPT and DPT blow counts provide evidence of a loose relative density.

3.3.4 Sand and Gravel

Gravel and sand dominant soils with variable amounts of silt and trace amounts of clay were encountered generally at the base of or throughout boreholes BH102-22, BH110-22 through BH117-22, and BH201-24 through BH204-24, and within all test pits except TP121-22, TP137-

22 and TP138-22. The gravel and sand soils were also present as interbedded layers within the sandy silt at depths less than 2.0 mbgs in boreholes BH101-22, BH104-22, and BH117-22. The SPT and DPT blow counts provide evidence that the gravel and sand had a range of dense to very dense relative density.

3.3.5 Grain Size Results

Physical laboratory testing was completed for a total of eight selected soil samples in 2022 to confirm textural classification of the native soils. The soil samples collected ranged from silt with some clay and trace sand to gravelly sand with some silt. Five of the samples had wide particle size distributions, containing significant portions of gravel, sand, and silt and clay, suggesting that these samples may have come from a glacial till.

Laboratory particle size distribution analyses were completed on eight (8) samples of the native soil taken from the boreholes and depths shown in Table 1, and details of the grain size analysis are presented in Appendix C.

Table 1 Particle Size Distribution

Borehole	Depth (mbgs)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH102-22 SS4	2.3 – 2.7	Silt some Clay trace Sand	0	3	86	11
BH104-22 SS3	1.5 – 2.0	Sand and Silt some Clay some Gravel	10	42	35	13
BH105-22 SS3	1.5 – 2.0	Sandy Silt	0	28	72	
BH107-22 SS3	1.5 – 2.0	Sandy Silt	0	28	72	
BH109-22 SS3	1.5 – 2.0	Gravelly Sand and Silt	21	40	39	
BH111-22 SS2	0.8 – 1.2	Gravelly Silty Sand trace Clay	27	44	24	5
BH115-22 SS3	1.5 – 2.0	Gravelly Silty Sand	34	46	20	
BH117-22 SS3	1.5 – 2.0	Gravelly Sand some Silt	20	65	15	

3.3.6 Comparison to Published Literature

According to Miscellaneous Release – Data 128 from the Ontario Geological Survey (OGS) (2010) the predominant surficial soils at the Site are composed of coarse-grained glaciolacustrine deposits described as sand and gravel with minor silt and clay components.

These sediments are interpreted as being deposited in a foreshore or basin depositional environment. The western corner of the Site has sediments described as glaciofluvial deposits composed of primarily gravel and deposited in a fluvial river environment.

The results of the subsurface investigation are generally congruent with the OGS mapping of the area. In the field, soils were primarily logged as silty sand, silt, and gravel and sand, while laboratory results indicate that the collect soil samples consisted of silt or sandy silt soils with relatively narrow ground size distributions, or gravelly sand or sand and silt with relatively wide grain size distributions. The relatively well-sorted silty and sandy soils generally align with the with OGS mapping which shows coarse-grained glaciolacustrine deposits present throughout most of the Site, albeit with the subsurface investigation having finer grained silt-dominated soils with some sand component as opposed to just sand and gravel dominated soils as per the OGS mapping. The likely presence of glacial till at the Site is also not surprising, as surficial till is mapped by the OGS a few hundred meters to the south and east of the Site. The interbedded sand and gravel layers described in Section 3.3.4, as well as the gravelly sand soil sample at BH117-22, may be indicative of sporadic coarse-grained glaciofluvial deposits, which are mapped by OGS to be on the Site and are described as gravelly.

3.4 Bedrock Geology

Bedrock drilling was not conducted at the Site; however, auger refusal was encountered in 19 of the 21 total boreholes drilled on the Site and excavator refusal was encountered in 7 of the 24 total test pits. Where encountered, auger refusal in the boreholes occurred at depths ranging between 2.0 and 7.1 mbgs, with an average refusal depth of 4.0 mbgs, while excavator refusal occurred at depths between 1.5 to 3.3 mbgs. In all cases, auger/excavator refusal was inferred to be on bedrock. BH101-22 and BH103-22 represent the only two boreholes where auger refusal was not encountered, which both extending to depths of 5.0 mbgs. The 17 of 24 test pits that did not encounter refusal were generally terminated in overburden at a depth of 3.0 mbgs.

According to Miscellaneous Release – Data 219 from the Ontario Geological Survey (2007), the bedrock of the area consists of Middle Ordovician rocks of the Bobcaygeon Formation, which is part of the Simcoe Group. The Bobcaygeon Formation is described as limestone with

shale partings and interbeds of varying thickness and frequency. The formation is generally 60 to 75 m thick.

3.5 Water Well Records

Cambium accessed the MECP Water Well Information System (WWIS) to review water well records within 500 m of the Site. There were 40 water well records, installed between the years 1952 and 2023, found within approximately 500 m of the Site (Figure 3; Appendix G).

A summary of the information outlined in the well records is provided below:

- Well use information indicated that 22 wells were used for water supply, 9 well records for observation wells or test holes, 1 well was unfinished, 3 wells were abandoned, and 5 wells were of unknown use.
- 16 wells were installed in overburden to depths ranging from 4.6 to 12.8 mbgs with a mean of 9.2 mbgs.
- 24 wells were installed in bedrock to depths ranging from 6.4 to 51.8 mbgs with a mean of 23.3 mbgs.
- Overburden was most reported as sand or gravel, with some records reporting layers of clay.
- Bedrock was described as limestone or shale, with one well encountering granite.
- Depth to water found for the overburden wells ranged from 3.4 to 12.8 mbgs with a mean of 9.1 mbgs.
- Depth to water found for the bedrock wells ranged 5.8 to 51.8 mbgs with a mean of 18.6 mbgs.
- Static water levels in the overburden wells ranged from 2.0 to 10.0 mbgs, with a mean of 5.3 mbgs.
- Static water levels in the bedrock wells ranged from 3.0 to 29.0 mbgs, with a mean of 8.4 mbgs.

- Recommended pumping rates are only available for two overburden wells, both of which had a recommended pumping rate of 23.0 L/min.
- Recommended pumping rates in the bedrock wells ranged from 0 to 364 L/min, with a mean of 42 L/min.

The depths, static water levels, and pumping rates for the bedrock wells and overburden wells are shown in Table 2.

Table 2 Summary of Surrounding Water Well Record Information

Well Type		Depth (mbgs)	Water First Found (mbgs)	Static Water Level (mbgs)	Recommended Pumping Rate (L/min)
Bedrock Count = 24	Minimum	6.4	5.8	3.0	364
	Maximum	51.8	51.8	29.0	0
	Geomean	23.3	18.6	8.4	42
Overburden Count = 16	Minimum	4.6	3.4	2.0	23.0
	Maximum	12.8	12.8	10.0	23.0
	Geomean	9.2	9.1	5.3	23.0

"NA" denotes no information available

Three water well records were plotted within the Site boundaries (5115821, 7110601 and 7416384).

Well record 5115821 reported the deepest bedrock contact of the four records plotted on-site (at 26.8 mbgs). This record is likely not installed within the property boundaries (or near the Site) as per the sketch provided in the record. The sketch indicates this record was installed north of Highway 7.

Well record 7110601 is presumably for the on-site supply well. Cambium staff located the on-site supply well during a site visit May 5, 2022. The depth of the well was measured to be 43.60 mbgs and a water level 6.31 mbgs. The location of the existing well is outlined on Figure 2. No other supply wells were observed on-site by Cambium staff. Any wells not intended for use on the Site should be decommissioned according to O.Reg. 903.

Well record 7416384 did not have any information but was received by the MECP in April of 2022. This well record was likely for one (or multiple) of the wells installed on-site in 2022 as part of the geotechnical investigation.

3.6 Vulnerable and Regulated Areas

The Site is situated within Otonabee – Peterborough Source Protection Area as per the Ministry of the Environment, Conservation and Parks Source Water Protection Information Atlas (SPIA) (MECP, 2024).

As per the MECP Source Water Protection Information Atlas (SPIA), the Site is located within the following areas:

- Highly Vulnerable Aquifer (HVA)
- Significant Groundwater Recharge Area (SGRA) with a vulnerability score of 6
- Wellhead Protection Areas B and C (WHPA-B/C)
- Intake Protection Zone 3 (IPZ-3)

The HVA covers the entirety of the Site, the SGRA covers the majority of the central and eastern portions of the Site. The WHPAs B and C fall just within the western boundary of the Site, while the IPZ-3 occupies a small area on the eastern boundary of the Site.

As per the MNRF Natural Heritage System database, the Site does not have any Areas of Environmental Significance or Areas of Natural and Scientific Interests (ANSI) or wetlands mapped at the Site (MNRF, 2024).

The Site area does not fall under regulated areas as per Otonabee Conservation and O. Reg. 41/24. However, as Cambium understands, the Otonabee Region Conservation Authority (ORCA) has issued a Restricted Land Use Notice (Otonabee Region Conservation Authority, 2023) for the proposed development (as per Part IV the Clean Water Act, 2006, Section 59 (2) (a)). The Restricted Land Use Notice indicates that there is no prohibition or risk management plan required for the proposed development.

The Restricted Land Use Notice also states the following:

This Notice does not reflect an assessment of significant drinking water threats where the Risk Management Official is not responsible for implementing the Trent Source Protection Plan policy, including sewage and stormwater related activities, low or moderate drinking water threats or Transport Pathways.

The SPIA, MNRF, and ORCA mapping are included in Appendix A, along with a copy of the Restricted Land Use Notice. Source water protection policies, in relation to the proposed development, are further discussed in Section 8.0.

3.7 Hydrogeological Conditions

Overburden on-site was recorded to extend up to 7.1 mbgs (as per the test-pit and drilling program) and was overlying bedrock. Overburden sediments consisted of varying portions of silty sand, silt and, sand and gravel. An aquifer exists within the overburden deposits (as described by the water level monitoring program discussed in Section 4.1). The overburden aquifer is considered to be an unconfined system. The depth to the overburden aquifer varies throughout the year. In addition, the extent of the overburden aquifer system varies throughout the year (since some wells record the presence of groundwater only some times of the year). To assess high groundwater conditions within the, a composite groundwater flow map (Figure 2) was prepared using the 2025 springtime high water measured from each well between March 16 and April 29, 2025 (see Section 4.1 for more details). Based on the groundwater contours, groundwater flow throughout the Site is interpreted to be generally westward/northwest towards the Ouse River.

As per the MECP WWIS water well records, there is also a bedrock aquifer (or aquifers) in the area of the Site. Monitoring wells were not installed in the bedrock as part of this assessment. Further, the connectivity of the overburden and bedrock aquifer (or aquifers) is not known. Presumably, the direction of groundwater flow within the bedrock aquifer is similar to the overburden aquifer. It is anticipated that most of the construction excavations will be advanced within the overburden. However, some bedrock excavations are anticipated. It is expected that dewatering will be required during construction of the proposed development.

A construction dewatering assessment (based upon assumed conditions) is outlined in Section 5.0. Construction dewatering on-site is considered to be feasible (including disposal of discharge water) without significantly influencing local groundwater users, surface water systems, or sensitive source water protection areas (as detailed in subsequent sections of this report).

4.0 Results

4.1 Water Level Monitoring

As described in Section 2.4.1, pressure transducer level loggers have been recording water levels in BH105-22, BH112-22, and BH115-22 since March of 2024, while pressure transducer level loggers having been recording water levels in BH201-24 through BH204-24 since November of 2024. A pressure transducer level logger was initially installed in BH104-24 in March of 2024, but was redeployed in BH204-24 in November of 2024 due to consistently dry conditions in the well. Manual water level measurements have been made in the on-site wells periodically between April 27, 2022 and June 23, 2025. Manual water level measurements and continuous water level measurements from the pressure transducer level loggers are summarized in Appendix H.

Based on the manual and logger water level measurements, the water levels measured from all the wells ranged in depth from -0.25 to >4.57 mbgs and from ≤199.27 to 211.08 masl during the measurement events (with the '>' symbol reflecting the fact that some wells were dry during the monitoring events, and therefore the water table position below these wells was unknown but can be concluded to have been below the bottom elevation of the wells).

Well BH104-22, near the southwest corner of the Site has been consistently dry during its period of record.

Water levels on the eastern side of the Site have ranged from >2.79 to -0.19 mbgs (<206.49 to 209.47 masl) at BH112-22 and, >2.68 to -0.25 mbgs (<208.16 to 211.08 masl) at BH115-22. During the 2024 and 2025 monitoring periods, the water levels in both wells increased in the early spring, reaching annual water level maximums in March/April and generally decreased in the late spring and summer. The water level in BH112-22 was below the logger from late July 2024 to mid March 2025. The water level in BH115-22 was below the logger from late July 2024 to mid December 2024, then observed as being frozen from the end of January until March of 2025. The water levels in BH112-22 and BH115-22 reached their highest recorded water levels on April 5, 2025 and March 16, 2025, respectively.

For BH105-22 near the southwestern corner of the Site, water levels have ranged between 2.12 and 3.19 mbgs (199.27 to 200.33 masl). The water level in BH105-22 increased in March and April of 2024 to reach a peak high water level for the year on May 1, 2024, after which the well's water level steadily declined until December 3, 2024, when the well had its lowest recorded water level. From December 3, 2024 the water level in the well gradually increased until April 7, 2025, when the well had its highest recorded water level, after which water levels have exhibited a decreasing trend into June 2025.

Water levels for BH201-24 to BH204-24, near the center of the Site, are only available from November 15, 2024 to June 22, 2025. The water levels of BH201-24, BH202-24, BH203-24, and BH204-24 ranged as follows:

- from 0.08 to 3.02 mbgs (207.48 to 210.42 masl) at BH201-24,
- from 2.27 to 3.57 mbgs (206.19 to 207.49 masl) at BH202-24,
- from 3.02 to >4.57 mbgs (<200.77 to 202.32 masl) at BH203-24,
- from 0.37 to >2.66 mbgs (<206.30 to 208.59 masl) at BH204-24.

The water levels in BH201-24 and BH202-24 generally increased from November 15, 2024 to each well's maximum water level on April 5 and April 29, 2025, respectively, except for some water level declines in the winter. The water levels for BH203-25 and BH204-25 were dry / below each well's logger until mid to late March 2025, after which the water levels increased to reach each well's maximum water levels on April 21 and April 5, 2025, respectively. After the maximum water level was reached in each of BH201-25 to BH204-25 in April 2025, the water level in each well had an overall decreasing trend in May and June 2025.

To asses high groundwater conditions a composite groundwater flow map (Figure 2) was prepared using the 2025 springtime high water measured from each well between March 16 and April 29, 2025. A composite groundwater elevation map was prepared since each well recorded high groundwater conditions on different dates between March 16 and April 29, 2025. Based on the groundwater contours, groundwater flow throughout the Site is interpreted to be generally westward/northwest towards the Ouse River.

Pressure transducers are currently recording water level data in seven of the eight monitoring wells on-site (all wells except BH104-22). The water level monitoring outlined herein should be considered as part of the design of LID re-infiltration features that aim to re-infiltrate runoff post-development.

4.2 Single Well Hydraulic Tests

Single well hydraulic tests were completed on wells BH105-22, BH112-22, and BH115-22 on May 5, 2022, and on wells BH201-24 and BH202-24 on November 18, 2024. SWHTs could not be completed on BH104-22, BH203-22, and BH204-22, as these wells were dry when visited for testing. The 2022 results were analyzed using the software AquiferTest Pro, while the 2024 results were analyzed using the software AQTESOLV. All tests were analyzed using the Hvorslev interpretation method. Results of hydraulic conductivity tests are presented below in Table 3 and analytical data is included in Appendix D.

The estimated hydraulic conductivity ranged between 5.95×10^{-6} m/s and 3.23×10^{-8} with a weighted mean of 1.51×10^{-6} m/s (the average hydraulic conductivity was weighted as some wells had more SWHT replicates than others). The hydraulic conductivity results are consistent with the typical published values for the tested soil types including sand, silty sand, silt, and silty/sandy glacial till. (Freeze & Cherry, 1979). The results from the 2024 testing are comparable to the results from the 2022 testing.

Table 3 Results of Estimated Hydraulic Conductivity as per SWHT

Monitoring Well	Test Number	Hydraulic Conductivity (m/s)	Tested Soil Type
BH104-22	N/A(1)	N/A(1)	-Sand and Silt, some Clay, some Gravel
BH105-22	1	1.61×10^{-6}	-Sandy Silt, trace Clay -Sand and Silt, some gravel
	2	2.79×10^{-6}	
	3	3.00×10^{-6}	
	4	3.50×10^{-6}	
BH112-22	1	7.35×10^{-8}	-Silty Sand -Silt, some Sand, some Clay -Gravelly Sand, some Silt, trace Clay
	2	7.32×10^{-8}	
	3	4.88×10^{-8}	
BH115-22	1	5.95×10^{-6}	-Gravelly Sand, some Silt
	2	2.64×10^{-6}	
	3	3.25×10^{-6}	
	4	2.17×10^{-6}	
BH201-24	1	1.21×10^{-6}	-Silty Sand, some Gravel, Cobbles (Till)
BH202-24	1	3.23×10^{-8}	-Sand, some Silt -Silty Sand, some Gravel, Cobbles -Gravelly Silt and Sand, Cobbles, (Till) -Sand and Silt, some Gravel, trace Clay, Cobbles
BH203-24	N/A(1)	N/A(1)	-Sand, trace Silt -Gravelly Sand, trace Silt -Sand, trace Gravel, trace Silt, Cobbles -Gravelly Silt and Sand, trace Clay (Till)
BH204-24	N/A(1)	N/A(1)	-Silty Sand -Silty Sand and Gravel

(1) No SWHTs could be completed on *BH104-22, BH203-24, and BH204-24, as these wells were consistently found to be dry.*

4.3 Groundwater Quality

Unfiltered groundwater samples were collected from BH105-22 and BH115-22 on May 4, 2022, while an unfiltered sample was collected from BH201-24 on November 18, 2024. The groundwater samples were collected and submitted for total and dissolved metals and inorganic chemistry analysis to compare to the Provincial Water Quality Objectives (PWQO). Parameters that exceeded PWQO criteria are tabulated in Table 4. The Certificate of Analyses for the water quality samples are included in Appendix E.

Table 4 Groundwater Samples Exceeding PWQO

Parameter	Units	PWQO Criteria	BH105-22	BH115-22	BH201-24
total aluminum	mg/L	0.075	**9.52**	**72.4**	**0.0090**
dissolved aluminum	mg/L	0.075	**0.241**	**0.187**	**0.089**
total arsenic	mg/L	0.005	0.0019	0.0009	**0.009**
total cobalt	mg/L	0.0009	**0.00543**	**0.00164**	**0.0197**
total copper	mg/L	0.005 (1)	**0.0109**	0.0042	**0.050**
total iron	mg/L	0.3	**6.89**	**2.82**	**43.2**
dissolved iron	mg/L	0.3	**0.235**	**0.177**	**0.124**
total lead	mg/L	0.005 (2)	**0.00883**	0.00244	**0.0330**
total nickel	mg/L	0.0025	**0.0093**	**0.0030**	**0.0353**
total phosphorus	mg/L	0.03 (3)	**0.326**	**0.132**	**3.50**
dissolved phosphorus	mg/L	0.03 (3)	**0.018**	0.020	0.010
total silver	mg/L	0.0001	0.00012	<0.00005	**0.00016**
total thallium	mg/L	0.0003	0.000232	0.000089	**0.000615**
total uranium	mg/L	0.005	0.000705	0.000293	**0.0285**
total vanadium	mg/L	0.006	**0.0145**	0.00492	**0.0611**
total zinc	mg/L	0.02	**0.026**	0.014	**0.104**
total zirconium	mg/L	0.004	**0.007**	0.004	<0.002
4AAP-Phenolics	mg/L	0.001	N/A(4)	N/A(4)	**0.002**

Bolded values indicate and exceedances of PWQO.

1. *Based off the total and dissolved hardness values BH201-24 (2,440 and 249 mg/L as $CaCO_3$ respectively) being greater than >20 mg/L*
2. *Based off the total and dissolved hardness values BH201-24 (2,440 and 249 mg/L as $CaCO_3$ respectively) being greater than >80 mg/L*
3. *PWQO criteria to avoid excessive plant growth in rivers and streams*
4. *4AAP-Phenolics were not tested for in BH105-22 and BH115-22.*

As shown in Table 4, there were exceedances for a variety of total metal concentrations, total and dissolved phosphorous, dissolved aluminum, dissolved iron, and 4AAP-Phenolics between the three samples.

Cambium notes the samples were unfiltered and, as such, total suspended solid (TSS) concentrations were elevated, ranging from 1,630 to 3,260 mg/L. The suspended sediments were introduced into the samples by nature of the sampling methodology (i.e., non-filtered samples and mechanical disruption of sediments from the inertial lift foot valve). The elevated TSS concentrations are expected to have contributed to the relatively elevated total metal concentrations, which is corroborated by the dissolved metal concentrations being generally considerably lower than their total metal counterparts. Regardless, even if the discharge water

was filtered there would be expected to be parameter exceedances of PWQO, as at least one PWQO exceedance was observed for dissolved phosphorous, aluminum, and iron and 4AAP-Phenolics in the groundwater samples collected on-site. Therefore, Cambium recommends that the discharge water from any dewatering activities be re-infiltrated wholly on-site to avoid the discharge water from running off overland into a surface water body.

4.4 Well Survey Results

As mentioned in Section 2.4.4, letter mailing campaigns were carried out on April 18 and May 19, 2022, while a door-to-door water well survey was conducted on November 18 and November 26, 2024. The letter mailing campaign included and included properties adjacent the Site, including all those in the potential ZOI of the construction dewatering.

A total of 19 and 21 residences were contacted during the April 18 and May 19, 2022 (respectively) letter mailing campaigns respectively. A total of 22 residences were visited as part of the door-to-door well surveys in November 2024.

There were no respondents to the April 18, 2022, letter mailing campaign and one respondent to the May 19, 2022, letter mailing campaign. There were two respondents to the door-to-door well surveys conducted in November 2024. All respondents completed a well questionnaire, with the respondents to the door-to-door well survey having completed a verbal questionnaire with Cambium personnel. The lists of the residences contacted during in well survey is provided in Appendix F, along with copies of the well questionnaires. A summary of the details provided by the three total respondents are provided below:

- 90 Mill Street – contacted through the letter mailing campaign on May 19, 2022. This property is serviced by municipal water and wastewater and does not have a well or septic system, as indicated by the property owner.
- 26 Mill Street – contacted during the door-to-door well survey on November 18, 2024. This property is serviced by municipal water and wastewater and does not have a well or septic system, as indicated by the property owner.
- 11 Barber Lane – contacted during the door-to-door well survey on November 26, 2024. The homeowner reports that their well is actively used for water supply. The well is

presumed to be a bored well that is approximately 1 to 1.2 m in diameter and approximately 7.6 m in depth, however the homeowner declined to have their well inspected. The homeowner reports that the water was slightly hard, and that the water was treated with a water softener. The homeowner did not report any other water quality or quantity issues with the past use of the well. It was assumed that the supply well was located east of the dwelling, as indicated by the owner.

A discussion of the well survey results in respect to the potential impacts of construction dewatering is provided in Section 5.5.

5.0 Preliminary Dewatering Requirements

It is expected that open-cut excavations will be advanced to build the proposed development. It is likely that the excavations will extend into the groundwater table in some areas. Therefore, groundwater control (construction dewatering) will be required to lower groundwater levels below the floor of the excavations to ensure dry working conditions exist.

The requirements for construction dewatering depend on the Site's soil and groundwater conditions including soil type, soil permeability or hydraulic conductivity, local groundwater levels, and the design of the proposed works, such as the foundation/basement elevation or pipe invert level, as well as the size of proposed structure/elevation.

5.1 Construction Excavation Details for Dewatering Calculations

The proposed development will include 643 residential units. It is assumed that these units will have associated basements. Details regarding basements were not available at the time this document was prepared. However, Cambium understands the Client intends on maintaining the finished floor of the basements above the water table. As such, dewatering estimates for basement excavations are not included herein (but will be reviewed at a later date when the elevation of the finished floors are known and provided).

The proposed development will be provided water and wastewater servicing from the Township. Details pertaining to the construction of underground infrastructure were not finalized at the time this document was prepared. Construction dewatering estimates were based upon assumed depths and footprints of these excavations (during construction).

Water and wastewater infrastructure are assumed to be built within trench excavations with dimensions of 50 m long by 2 m wide by 3 m deep. To facilitate safe working conditions, the groundwater will be drawdown to 1.0 m below the base of the linear infrastructure trenches (i.e. groundwater is to be lowered to 4.0 mbgs for the linear infrastructure trenches).

The open-cut excavation/trenches will cut through native soils that predominantly consist of silty sand, silt, and sand and gravel. The water level during construction dewatering was

assumed to be 0.00 mbgs, based on the shallowest groundwater level measured through manual measurements or logger measurements being above ground surface.

It was assumed that the trench would be advanced within overburden. The hydraulic conductivity of overburden soils was assumed to range from 3.23 x 10^{-8} m/s to 5.95 x 10^{-6} m/s. with a weighted mean of 1.51 x 10^{-6} m/s. The hydraulic conductivity rates were used to provide a range of construction dewatering estimates.

The equations presented in Section 5.2 assume that an excavation fully penetrates the aquifer. Regarding the depth to the base of the aquifer, there are no overburden units below the depth of dewatering that are clearly less permeable than the overburden soils within the depth of dewatering, precluding the use of an interface of two overburden units from representing the aquifer base. During Cambium's geotechnical investigations (Cambium, 2022a) (Cambium, 2023a) (Cambium, 2024c), auger refusal was encountered in 19 of the 21 boreholes drilled, with refusal occurring at depths from 2.0 to 7.1 mbgs. However, given the wide range of bedrock depths and the fact that bedrock drilling was not conducted to determine the properties of the bedrock, it is not clear if the overburden/bedrock interface would be appropriate for defining an aquifer base in terms of the dewatering calculations. Given that there is no clear base to the surficial aquifer on-site, the base of the aquifer, for the purposes of the dewatering calculations, is assumed to be the target drawdown depth for the linear infrastructure trenches (i.e., 4.0 mbgs) plus half the distance between the target drawdown depth and the initial static water level (0.00 mbgs). Using this assumption, the base of the aquifer is assumed to be 6.00 mbgs. This is considered a reasonable assumption as vertical hydraulic conductivities are often an order of magnitude lower than horizontal hydraulic conductivities (Freeze & Cherry, 1979), and water contributions to an excavation from depths deeper than the target drawdown depth plus 50% the distance between the target drawdown depth and the water table are assumed to be negligible.

Construction dewatering calculation parameters for the linear infrastructure trenches are described below and summarized in Table 5.

Table 5 Summary of Construction Dewatering Calculation Parameters

Excavation	Length (m)	Width (m)	Groundwater Depth (mbgs)	Estimated Excavation Depth (mbgs)	Target Water Depth (mbgs)	Aquifer Base Depth (mbgs)	Drawdown Depth (m)
Linear Infrastructure	50	2	0.00	3.0	4.0	6.00	4.00

5.2 Estimated Construction Dewatering Rates

A modified Dupuit-Forchheimer equation was used to estimate the dewatering rate required for the proposed linear infrastructure trenches (Powers, Corwin, Schmall, & Kaeck, 2007):

$$Q = \frac{\pi K(H^2 - h^2)}{\ln(R_0/r_s)} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right]$$

$Where$:

$Q = dewatering\ rate\ (m^3/s)$

$K = hydraulic\ conductivity\ (m/s)$

$H = initial\ hydraulic\ head\ in\ aquifer\ (m)$

$h = target\ hydraulic\ head\ (initial\ hydraulic\ head - target\ drawdown)\ (m)$

$s = target\ drawdown\ (m)$

$r_s = equivalent\ single\ well\ radius = width\ of\ trench/2\ (m)$

$R = zone\ of\ influence\ from\ edge\ of\ trench\ walls\ (m) = 3000 * s * \sqrt{K}$

$R_0 = distance\ to\ radial\ source\ (from\ excavation\ center)\ (m) = R + r_s$

$x = length\ of\ trench\ (m)$

$L = distance\ to\ line\ source\ (from\ excavation\ center) = R_0/2\ (m)$

A summary of calculated construction dewatering rates for the apartment basement excavation and linear infrastructure trenches is provided in Table 6. Detailed calculations are provided in Appendix I.

Table 6 Calculated Construction Dewatering Rates

Excavation Type		Hydraulic Conductivity (K)	Zone of Influence (R)	Dewatering Rate (Q)		Dewatering Rate (Q) with Safety Factor of 2
		(m/s)	(m)	(m^3/day)	(L/day)	(L/day)
Linear Infrastructure Trenches	Minimum	3.23×10^{-8}	2.2	3.07	3,070	6,140
	Maximum	5.95×10^{-6}	29.3	69.5	69,500	139,000
	Geometric Mean	1.51×10^{-6}	14.8	31.3	31,300	62,600

The maximum estimated steady-state dewatering rate for the linear infrastructure trenches is 69,500 L/day. It is noted that the above equation is designed to represent steady-state pumping conditions. In general, at the beginning of the pumping, the pumping rate required to lower the water levels to acceptable levels may be greater than the rate estimated for steady-state conditions as incoming water replaces the volume of excavated soils and adjacent soils are drained. To account for this and other sources of uncertainty, a safety factor of 2 was applied and the maximum estimated dewatering rate for infrastructure trenches (before direct precipitation is accounted for) is 139,000 L/day.

To account for direct precipitation onto the excavations, a 20 mm daily rainfall has been considered based on the City of Toronto Wet Weather Flow Management Guidelines (2006). The total precipitation volume is given by the following formula:

Total Runoff Volume (V) per day = Excavation Area x Rainfall Intensity

Given a footprint of the 100 m^2 footprint of the linear infrastructure trenches, it is possible for an additional 2,000 L/day to accumulate therein. Accordingly, the maximum peak short-term dewatering rate during the construction of the linear infrastructure trenches is 141,000 L/day.

5.3 Basement Operational Dewatering (Long-term)

Given that the Client intends on constructing the basement above the position of the high water table, long-term operational dewatering is not anticipated at this time. Details pertaining to the elevation of the finished floors of the structures will be reviewed at a later date.

5.4 Assessment of Required Regulatory Permits or Registration

Any construction dewatering or other water taking in Ontario is governed by the Ontario Water Resources Act (OWRA; Ontario Regulation 387/04 and/or Ontario Regulation 63/16) and/or the Environmental Protection Act (Registrations under Part II.2).

Where construction dewatering is required in amounts in excess of 50,000 L/day, registration through the Environmental Activity and Sector Registry (EASR) is required. For long-term dewatering in amounts in excess of 379,000 L/day, a Permit to Take Water (PTTW) must be obtained.

The maximum short-term dewatering estimate for the linear infrastructure trenches is 141,000 L/day (including a factor of safety of 2 and a 20 mm rainfall event). Based on this calculation, construction dewatering activities should be registered in the EASR.

5.5 Zone of Influence

The dewatering calculations include estimates of the horizontal distance away from the walls of the excavations where the influence of water withdrawal will be negligible (i.e., the length to zero drawdown or zone of influence (Appendix I)).

The length to zero drawdown for the short-term construction dewatering for the linear infrastructure trenches ranged from approximately 2.2 to 29.3 m from the edge of the trenches. The area included within the length to zero drawdown from the respective excavations / drainage system is the zone of influence (ZOI). It is important to note that the ZOI outlined herein is a conservative approximation based upon assumed construction conditions. The ZOI will need to be revised once finalized development plans (specifically the sewer invert elevations) are available for review.

As shown on Figure 4, the maximum off-site extent of the ZOI for the linear infrastructure trenches was mapped by creating a polygon that extended 29.3 m away from the outer edges of road right-of-ways and service easements that are located closest to the border of the Site. ZOI polygons, relative to road right-of-ways and service easements, were generated because these areas are where linear infrastructure is likely to be installed. As seen in Figure 4, the outer extent of ZOI for the construction dewatering is generally confined within the Site

boundaries but extends off-site in certain locations and intercepts some neighbouring properties. The properties captured within the ZOI are listed below:

- 2441 Asphodel 10th Line wholly undeveloped
- 2413 Asphodel 10th Line (undeveloped area)
- 2370 Asphodel 10th Line
- 2366 Asphodel 10th Line
- 36 Mill Street
- 67 Mill Street
- 84 King Street
- 89 King Streer
- 11 Barber Lane
- CN railway line northwest of the proposed development

Cambium notes that the Township of Asphodel-Norwood indicated that the properties on Mill St. (and King Street) between Queen Street and 108 Mill Street are provided water by municipal services.

The edge of the 11 Barber Lane property is within the ZOI, the results of the well survey indicated the water supply well for the residence is near the house on the property and is outside of the ZOI. It is noted that the ZOI extent is an approximation and assumes the worst-case scenario with available information. The ZOI in this assessment was assigned to the edge of road right-of-ways and service easements which are adjacent the boundary of Site, which is considered a conservative (worst case) scenario. Well BH104-22 is located in the southern portion of the Site, nearest to 11 Barber lane. Well BH104-22 has been dry during every water level measurement event on-site. As such, there is not expected to be significant groundwater concerns in the area of well BH104-22.

The remaining properties intercepted by the ZOI are 2370, 2366, 2413 and 2441 Asphodel 10th Line.

The dwellings at 2370 and 2366 Asphodel 10th Line which are likely to have water provided from a private water supply well. The owners of these properties did not participate in the well survey despite, both properties being contacted multiple times. A discussion of the well survey results of properties with and near the ZOI of the construction dewatering are discussed in Section 9.2.

There is a dwelling located at 2413 Asphodel 10th Line. The owners did not respond to any of the well survey contact attempts. It is noted that the ZOI does not extend onto this property a significant degree, and is well away from any on-site structures. As such, the potential for influences to the well which services the dwelling at 2413 Asphodel 10th Line is considered low.

There is property at 2441 Asphodel 10th Line which, to Cambium's knowledge, has not yet been developed. Regardless, the ZOI is not interpreted to extend onto this property a significant degree.

There are two MECP well records that have been identified within the ZOI. The first is well record 7110601 which is for the water supply well at 52 Mill Street; this well will be decommissioned prior to the construction of the subdivision (see Section 1.1). The second is well record 7294205 which is mapped on the property for 2370 Asphodel 10th Line; this well is installed in limestone to 30.48 m deep and is unlikely to be adversely affected by the short-term dewatering activities on-site.

The ZOI for the construction dewatering intercepts the CN railway tracks which border the Site to the northwest. The ZOI does not intercept adjacent surface water features. Therefore, nearby surface water features are not anticipated to be influenced during the construction and operation of the proposed development.

The ZOI outlined in Figure 4 was only an approximation at the time this document was prepared. Construction dewatering rates and the ZOI should be reviewed and updated at a later date when development plans have been finalized.

Once the ZOI has been confirmed appropriate monitoring and mitigation plans should be developed and applied as needed (i.e., land settlement monitoring and/or supply well monitoring). Potential monitoring and mitigation measures are outlined in Section 9.0.

6.0 Preliminary Discharge Plan

The purpose of the preliminary discharge plan is to provide recommendations for dewatering to be implemented by the Contractor during construction activities related to the installation of linear infrastructure at the Site. The information outlined herein should be updated at a later date once finalized construction and design information is available for review.

In addition to the recommendations of this plan, the Contractor should also have an Emergency Management Plan and Spill Prevention Plan, to ensure the protection of groundwater during excavations from potential contaminant releases during equipment use and refueling, by providing specific spill control and clean up/response measures in the vicinity of the excavations. Additionally, contingency plans should be prepared for disposal in the event that the water does not meet the discharge requirements, either in terms of quantity or quality.

It should be noted that the following sections are based on assumption that the dewatered groundwater will be discharged overland and will reinfiltrate into the ground before running off-site. Once the discharge method is finalized, the appropriate measures described below should be followed.

6.1 Discharge Method

The method of dewatering may vary depending on soils encountered during excavation and the height of the groundwater table above the excavation floor. In high permeability sediments, a wellpoint or eductor system may be required. In low permeability sediments sump pumps may be sufficient to maintain dry conditions in the excavation. The dewatering contractor should choose a dewatering method based on conditions found on-site.

Water discharged from the construction excavation should be directed onto a geotextile liner that will prevent erosion to the soil below it. Water should be directed over an appropriate geotextile liner to one or more ponds, which will allow water to settle and reinfiltrate instead of flowing off-site.

Re-infiltrating construction dewatering discharge water back into the subsurface for disposal is not considered to be a significant issue of concern because the groundwater being withdrawn from the subsurface on-site will be returned back to on-site aquifer systems (via a currently unspecified re-infiltration method).

6.2 Discharge Location

Cambium recommends that water withdrawn from excavations be discharged to the ground surface, and that every effort be made to re-infiltrate the dewatering discharge water on-site before it flows off-site.

Once known, the confirmed discharge location (or locations) should be depicted on the Site map to verify its suitability to handle the discharge and ensure it can easily be accessed for and flow measurements.

6.3 Discharge Water Quality and Treatment

The discharge water will not be required to meet the PWQO criteria as long as it wholly reinfiltrates into the ground and does not flow over land off-site. However, the discharge water must be visually inspected to ensure that there is no visible hydrocarbon film or sheen present. If a film or sheen is observed, water taking must cease until the source is identified and rectified by incorporating treatment or by arranging to have the water removed from the Site by a licensed waste hauler.

6.4 Excavation Stabilization, Erosion, and Sediment Control

The proposed open-cut excavations will cut through native soils which predominantly consist of silty sand, silt, and sand and gravel, with some of the soil resembling a glacial till matrix. Temporary excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA), Ontario Regulation 213/91 (as amended). For practical purposes, as the overburden soils to be excavated are below the prevailing groundwater table, the soils at the Site can be considered Type 4 soils. As such, excavation side slopes should be no steeper than 3H:1V or be suitably shored. Minimum support system

requirements (shoring) for steeper excavations are stipulated in Sections 235 through 238 of the Occupational Health and Safety Act (OHSA), Construction Projects, Part III.

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).

Settlement of surrounding soils may occur due to the overburden texture. Cambium recommends that the excavations should be inspected on a daily basis by a qualified person to determine shoring/stabilization requirements and to assess any potential soil settlement concerns, provided the excavation were kept open.

6.4.1 Erosion Control

Dewatered groundwater discharge is not permitted to erode the surrounding land surfaces. Should the dewatering system not function as intended, erosion and sedimentation measures such as silt fencing, straw bale barriers, sedimentation pools, etc., should be installed as required to allow fines to settle out of discharge water and for filtration purposes.

Runoff water directed into the construction excavations may erode the areas immediately adjacent to the construction excavations (which subsequently introduces sediments into the discharge water). It is recommended that runoff is diverted around construction excavations whenever possible. Such practices will reduce the volume of water required to be removed through construction dewatering.

6.4.2 Sediment Control

Groundwater should be discharged to ground surface and allowed to re-infiltrate wholly within the Site boundaries. As such, filtration to specifically reduce the TSS concentration is not considered necessary. Should the disposal location of discharge water change, then filtration of discharge water should be considered.

6.5 Discharge Monitoring

The Contractor should monitor groundwater extraction and discharge rates as a cumulative whole across the site on a daily basis and kept on file (and reported to the MECP as per applicable regulations).

Discharge water must be visually monitored regularly to ensure that the water is infiltrating wholly on-site. Should the discharge water be observed to flow off-site, then dewatering operations should cease immediately and mitigation measures put in place.

Should a visible sheen be observed in the water (or any other indication of contamination), dewatering must be stopped immediately. Additional treatment methods or alternative disposal methods will be required before dewatering can continue. Walk-arounds of the discharge area should also be performed regularly to ensure that the discharge water is not running off as overland flow outside of the Site boundary.

It is important to note that the ZOI outlined herein is a conservative approximation based upon assumed construction conditions. The ZOI will need to be revised once finalized development plans (specifically pertaining to the sewer invert elevations) are available for review. Once the ZOI is confirmed, one more attempt should be made to contact the owners of the properties located adjacent the Site to inspect their supply well (should their wells be considered at risk of influence from the proposed development). A monitoring program should developed for those wells considered at risk from the proposed development. The monitoring program should include the following:

- Pre-development samples should be collected from those supply wells of willing participants to establish baseline water quality conditions.
- Groundwater quality samples during and after construction from those supply wells of willing participants and compared to pre-development water quality.
- A water level monitoring program should put in place prior to, during, and after development.

The details of the monitoring program should be reviewed and confirmed at a later date.

In addition to the above, the risk of influence to infrastructure (and other structures) within the revised ZOI should be assessed at a later date. A land settlement monitoring program should be developed and applied on an as-needed basis. Further discussion of ground settlement/subsidence is provided in Section 9.4.

7.0 Water Balance Assessment

A water balance assessment was completed to determine the potential change in groundwater recharge that could occur due to the proposed development. The need for a water balance assessment and a discussion of Low-Impact Development (LID) measures was raised as part of Stantec's (2024) peer review. Generally, any property can be categorized into three broad types of areas: paved, roof, and landscape/vegetated. Currently, the Site consists of a single family dwelling, a barn, a storage sheds, a silo, and farmed/landscaped areas. Post-development, the paved and roofed areas will be increased, which will reduce the amount of permeable area at the Site. This has the potential to impact the amount of water that infiltrates into the ground, which is otherwise available to replenish natural groundwater and surface water systems, which must be considered as part of the development process.

To compare the difference in infiltration that may result from the proposed development, a water balance calculation was completed to determine the amount of surplus water that is currently generated at the Site. Site characteristics such as surficial soil type, topography, and the amount of pervious and impervious areas were then used to estimate the volume of water infiltrating at the Site. Calculations were completed for both pre- and post-development scenarios, so that a comparison could be made to identify potential changes in infiltration as well as mitigation measures which could be employed to reduce development impacts.

A breakdown of the pre- and post-development plans as roofed, paved, and landscaped/vegetated areas is presented in Table 7. As lot-scale details are not available in the post-development plan (Appendix A), all residential lots were assumed to be 50% roofed, 40% landscaped, and 10% paved. Detailed discussion of each component completed for the water balance assessment is provided in the following subsections.

Table 7 Pre- and Post-Development Statistics

Type of Land Coverage	Pre-Developments Areas (m^2)	Post Development Areas (m^2)
Building Roof Area	846	98,280
Paved Area	1,235	80,985
Landscape/Vegetated Area	356,849	175,735
Total (m^2)	**355,000**	**355,000**

7.1 Water Budget and Total Water Surplus

Based on the Thornthwaite and Mather method (1957), the water balance is an accounting of water in the hydrologic cycle. Precipitation (P) falls as rain and snow. It can run off towards lakes and streams (R), infiltrate to the groundwater table (I), or evaporate from the ground or be used for transpiration by vegetation (ET). When long-term average values of P, R, I, and ET are used, there is minimal or no net change to groundwater storage (ΔS).

The annual water budget can be expressed as:

$$P = R + I + ET + \Delta S$$

Where:

P = Precipitation (mm/yr)

R = Run-off (mm/yr)

I = Infiltration (mm/yr)

ET = Evapotranspiration (mm/yr)

ΔS = Change in soil water storage (mm/yr)

Total water surplus is defined as the difference between precipitation and evapotranspiration. It is the amount of water per m^2 area that can either infiltrate into on-site soils or be directed off-site as runoff. An assumption for the calculation of water surplus is that changes in soil water storage are negligible over the course of a year. It is also assumed that the catchment area for the water balance described above is completely contained within Site boundaries (i.e. the model does not account for catchment areas that extend off-site).

An annual water budget for the Site was calculated using the thirty-year climate normal data (1981-2010) provided by Environment Canada for the Peterborough Trent U weather station (Climate ID 6166455), located approximately 26 km west (Environment Canada, 2022). A detailed table outlining the calculations is provided in Appendix J. In summary, the average annual precipitation and evapotranspiration at the Site are estimated to be 882 mm/yr and 524 mm/yr, respectively. Therefore, the water surplus of the Site is estimated to be 358 mm/yr.

7.2 Annual Infiltration and Runoff

To determine the amount of water infiltrated into on-site soils annually, the total volume of water available is multiplied by an infiltration factor (IF). The total volume of water available is obtained by multiplying the water surplus value determined from the water balance described above by the total permeable landscape area at the Site. The infiltration factor, which ranges from 0 to 1, is estimated based on topography, soils, and cover as per the Stormwater Management Planning and Design Manual (Ministry of the Environment, 2003). As outlined in Table 8, the infiltration factor at the Site was assigned a value of 0.55.

Table 8 Infiltration Factor

Category	Infiltration Factor
Topography	Rolling = 0.2
Soils	Silty Sand to sandy silt = 0.25
Cover	Cultivated land = 0.1
Infiltration Factor	**0.55**

The annual volume of water that infiltrates at the site is calculated as follows:

$$I\ (m^3/yr) = Water\ Surplus\ (m/yr) * Total\ landscape\ area(m^2/yr) * Infiltration\ Factor$$

The annual infiltration at the Site is expected to vary based on a number of factors (i.e. actual precipitation, variation in soil composition, soil compaction, etc.).

The annual runoff that occurs at the Site varies between permeable and impermeable surfaces. On permeable landscape surfaces, the runoff is calculated as the difference between total precipitation and annual infiltration. On impermeable surfaces where there is no infiltration, the runoff is calculated as 90% of precipitation, with the remaining 10% of precipitation lost directly to evaporation.

Annual infiltration and runoff volumes were calculated for the Site for both pre- and post-development scenarios. A summary of the calculations for each scenario is provided in the following subsections. Additional details of the calculations are provided in Appendix J.

7.3 Pre-Development Water Balance

The water balance for existing conditions at the Site is summarized in Table 9. The pre-development infiltration rate and runoff rate were calculated to be approximately 69,490 and 58,507 m³/yr, respectively.

Table 9 Pre-Development Water Balance

Land Use		Area (m²)	Precipitation (m³)	Evapo-transpiration (m³)	Infiltration (m³)	Run-off (m³)
Impervious Areas	Paved Area	1,235	1,089	109	-	981
	Roof Area	846	746	75	-	671
Pervious Areas	Landscape Area	352,919	311,275	184,930	69,490	56,855
Total		355,000	313,110	185,113	69,490	58,507

Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.

7.4 Post-Development Water Balance

The post-development water balance at the Site is summarized in Table 10. The post-development infiltration rate and runoff rate were calculated to be 34,602 and 170,611 m³/yr, respectively.

Table 10 Post-Development Water Balance

Land Use		Area (m²)	Precipitation (m³)	Evapo-transpiration (m³)	Infiltration (m³)	Run-off (m³)
Impervious Areas	Paved Area	80,985	71,429	7,143	-	64,286
	Roof Area	98,280	86,683	8,668	-	78,015
Pervious Areas	Landscape Area	175,735	154,998	92,085	34,602	28,311
Total		355,000	313,110	107,896	34,602	170,611

Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.

7.5 Water Balance Comparison

A comparison of water balances for the pre-development and post-development scenarios is summarized in Table 11. There is a net infiltration deficit of approximately 34,888 m³/yr,

compared to the pre-development infiltration. The run-off rate upon development of the Site is projected to increase by 112,104 m³/yr.

Table 11 Water Balance Comparison

	Precipitation (m³)	Evapotranspiration (m³)	Infiltration (m³)	Run-off (m³)
Pre-Development	313,110	185,113	69,490	58,507
Post-Development	313,110	107,896	34,602	170,611
Change in Volume	-	-77,217	-34,888	112,104
Change in %	-	-42	-50	192

7.6 Required Infiltration from Roof Runoff

To compensate for the post-development infiltration deficit, a portion of roof run-off water can be captured and directed towards infiltration features. As the infiltration deficit is 34,888 m³/yr and as total roof run-off is projected to increase by 77,343 m^3/yr, the percentage of roof run-off that is required to be redirected to maintain pre-development infiltration volumes is 45%. These details are summarized in Table 12.

Table 12 Requirement of Infiltration from Roof Runoff

Volume of Pre-Development Infiltration (m³/yr)	**69,490**
Volume of Post-Development Infiltration (m³/yr)	**34,602**
Deficit from Pre to Post Development Infiltration (m³/yr)	**34,888**
% of Roof Runoff required to match the pre-development infiltration	**45**

7.7 Water Balance Assessment Summary

Based on the calculations detailed in the preceding subsections, a summary of the water balance assessment is as follows:

- Impervious post-development area (roof and pavement) is projected to increase by approximately 177,184 m^2 when compared to pre-development conditions.

- Without implementing any mitigation measures, it is estimated that the reduction of pervious surfaces at the Site will create a net deficit in infiltration of approximately 34,888 m^3/yr.
- To regain the lost volume of water infiltrated, a diversion of approximately 45% of roof run-off would be required to maintain pre-development water balance conditions (assuming 100% of diverted water is infiltrated).

7.8 Discussions on LID Measures

Low Impact Development (LID) practices are important for the proposed development. To protect the aquifer, it is important to maintain the natural hydrologic cycle as much as possible because decrease in infiltration causes reduction in groundwater recharge and soil moisture replenishment and can also lead to reductions in stream baseflows that are needed to sustain aquatic life.

In general, there are two primary types of LIDs. The first promotes the infiltration of stormwater run-off close to the source and are preferred when hydrogeological and physical conditions are optimal and allow for their emplacement. The second type of LID captures and slowly releases stormwater to the groundwater system through a process of storage and filtration.

Infiltration targets at the Site may be achieved through LIDs and incorporation of a variety of stormwater management techniques including reduced lot grading, roof downspout disconnection, roof leaders discharging to ponding areas or soak away pits, infiltration trenches, and grassed swales.

It is noted that a minimum vertical separation of 1.0 m is generally required between the maximum groundwater elevation and the bottom invert elevation of any proposed LID measure. The water level measurement information outlined herein should be referenced as part of the stormwater management/LID design for the proposed development.

8.0 Source Water Protection

The Site located in the community of Norwood which is located in the Otonabee-Peterborough Source Protection Area (O-P SPA) which is part of the Trent Conservation Coalition Source Protection Region. More specifically, the Site is located within the vulnerable areas listed below which are identified under the Clean Water Act, 2006, and shown Trent Assessment Report maps and the MECP on-line Source Protection Information Atlas (MECP, 2024a).

- Highly Vulnerable Aquifer
- Significant Recharge Area
- Intake Protection Zone 3 for the Hastings Municipal Surface Water System
- Wellhead Protection Areas B and C for the Norwood Municipal Drinking Water System

Trent Source Protection Plan (TSPP) contains policies to manage activity that poses a significant drinking water threat (SDWT) to the quality and quantity of municipal, residential drinking water sources. SDWTs are possible in the Wellhead Protection Areas. There are no water quantity policies that apply within the O-P SPA therefore, only SDWTs that apply to water quality are considered herein. For more information on potential SDWTs associated with the proposed development, see Section 8.4.1.

8.1 Highly Vulnerable Aquifer

The Site is wholly located within a Highly Vulnerable Aquifer (HVA). The TSPP defines a HVA as “An aquifer that is susceptible to contamination from the surface. The depth and type of subsurface material over the aquifer affect its vulnerability”. In Ontario, an HVA is defined as having an Intrinsic Susceptibility Index of less than 30. In general, an HVA will consist of granular materials (e.g., sand and/or gravel) or fractured rock that has a high permeability and is near the surface of the ground.

8.2 Significant Groundwater Recharge Area

The Site is partially located within a Significant Groundwater Recharge Area (SGRA). The TSPP defines a SGRA as “An area within which it is desirable to regulate or monitor drinking

water threats that may affect the recharge of an aquifer". SGRAs are characterized by porous soils, such as sand or gravel, which allow water to seep easily into the ground and flow to an aquifer.

While the proposed development may increase the impervious area on the Site, resulting in decreased infiltration to the subsurface and/or reduced groundwater recharge, impacts can be mitigated through by Low Impact Development (LID) measures that promote the recharge of runoff (preferably sourced from roof surfaces).

8.3 Intake Protection Zone 3

An IPZ encompasses the area that contributes water to the surface water source of a municipal drinking water system. Human activity in an IPZ can impact the quality and/or quantity of a downstream municipal drinking water source by releasing contaminants (i.e. spill or leak) that can be transported in runoff to a municipal intake. IPZs are based on distance from, and travel time to, a municipal drinking water intake and take into consideration the time required for a water treatment plan operator to respond to an event. An IPZ-3 encompasses all contributing watercourses upstream of the IPZ-2 and includes adjacent lands up to Conservation Authority Regulation or 120m from the high water mark, whichever is greater. The IPZ-2 is a secondary protection area that extends downstream from the IPZ-3 to the IPZ-1 and is the area within which flows can reach the municipal intake within two (2) hours. The IPZ-1 is the primary protection area for the municipal intake and is delineated based on defined setbacks from the municipal intake

The Site is partially located within the Intake Protection Zone (IPZ-3) for the Hastings Municipal Surface Water System.

8.4 Wellhead Protection Areas B and C

A Wellhead Protection Area (WHPA) encompasses the areas around a municipal wellhead that contributes groundwater to the source of a municipal drinking water system. Human activity in a WHPA can impact the quality and/or quantity of a municipal drinking water source if it releases contaminants that can enter the groundwater and flow to a municipal wellhead.

The Trent Assessment Report identifies that the Norwood Municipal Drinking Water System has 4 municipal wells.

A small portion of the site is located within the WHPAs B and C for the Norwood Municipal Drinking Water System as shown on the site plan presented in Appendix A. The WHPA-B encompasses the area within which groundwater can reach the municipal wellhead within 2 years or less (excludes 100m radius around the wellhead (WHPA-A). The WHPA-C encompasses the area within which groundwater can reach the municipal wellhead within 2 to 5 years. WHPAs are based on groundwater movement, which is influenced by the slope of the land, well depth well, sediment type, etc. and are often irregularly shaped.

The proposed SWM pond and the rear portion of some residential lots are located within these WHPAs where activity can pose a SDWT.

8.4.1 Drinking Water Threats

There are 22 activities that can pose a drinking water threat under the Clean Water Act, 2006, most of which are not anticipated to be associated with the proposed development. The Technical Rules developed under the Clean Water Act, 2006, set out prescribed circumstances for SDWTs which can only occur in the identified WHPAs

The 2017 Technical Rules are currently in effect locally. In 2021, the MECP published updated Technical Rules that will come into effect upon MECP approval of a proposed updated TSPP which aligns with the updated Technical Rules. Potential SDWTs that may be initiated in WHPAs A and B; activity outside of these WHPAs will not be a SDWT.

Potential SDWTs

1. *The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.*

   This SDWT includes sanitary sewers and storm water management facilities which will be subject to the Township's Environmental Compliance Approval (ECA) for the Stormwater Management System and Municipal Sewage Collection System, or, may be subject to a separate ECA.

2. *The handling and storage of fuel.*

   While this SDWT is not anticipated to be a permanent activity associated with the proposed development, it may be present during construction. As a temporary activity, the TSPP would not apply. Regardless, it is recommended that best management practices be taken to prevent and contain potential spills/leaks from entering groundwater.

3. *The handling and storage of dense non-aqueous phase liquid.*

   These are liquids that are heavier than water and are often found in lubricants, degreasers etc. While this SDWT is not anticipated to be a permanent activity associated with the proposed development, it may be present during construction. As a temporary activity, the TSPP would not apply. Regardless, it is recommended that best management practices be taken to prevent and contain potential spills/leaks from entering groundwater.

4. *The application of road salt.*

   This activity would not be a SDWT under the 2017 Technical Rules and is not likely to be under the 2021 Technical Rules. If it were a SDWT, the Township would be required to adhere to their Salt Management Plan when applying on roads, sidewalks and pedestrian paths that they maintain.

8.4.2 Transport Pathway Considerations

A transport pathway (TP) is a condition of land created by human activity that increases the vulnerability of a raw water supply for a municipal residential drinking water system. A TP can impact the rate or quantity of water flowing to a municipal wellhead or intake pipe.

Consideration was given to the proposed SWM pond and excavation associated with proposed residential development in the WHPAs that could impact the rate or quantity of water entering the groundwater. No permanent TPs are anticipated to be created by the proposed development.

Based on correspondence with the Client, the SWM pond will be within the WHPA-B and will be lined to prevent infiltration. During construction, measures can be employed to mitigate potential risks of excavations for the pond and residential development include: diverting runoff

around excavations; ensuring chemicals used on the Site during construction are handled and stored outside the WHPAs (at least 100m from the area of excavation); post signage to raise awareness that the works are being undertaken in the WHPA for the Norwood Municipal Drinking Water System; and, on-site staff can be trained in spill response, reporting and the use of readily available spill response kits. These measures will serve to prevent and contain potential groundwater contamination. The installation of linear infrastructure within the WHPA will be minimal based on the site plans provide in Appendix A and will be undertaken pursuant to the applicable ECA.

Cambium strongly recommends that the Client work with the Township when developing best management practices to mitigate any potential adverse effects.

Finally, where a TP may be created, the Township is required to comply with reporting requirements of Subsections 27(3)(4) of Ontario Regulation 287/07:

> (3) If a person applies to a municipality for approval of a proposal to engage in an activity in a wellhead protection area or a surface water intake protection zone that may result in the creation of a new transport pathway or the modification of an existing transport pathway, the municipality shall give the source protection authority and the source protection committee notice of the proposal and shall include a description of the proposal, the identity of the person responsible for the proposal and a description of the approvals the person requires to engage in the proposed activity.
>
> (4) If a municipality gives a notice described in subsection (3), the municipality shall give a copy of the notice to the person responsible for the proposal.

This reporting will initiate a review process to confirm if a TP will be created, identify mitigation measures, and ensure the TSPP is updated, as may apply.

9.0 Assessment of Potential Impacts

It is understood that the Site development will include mixed density residential land use with 643 units, a stormwater management pond, and associated infrastructure including, but not limited to, roads, sidewalks, and greenspace. The potential impacts of such a development are discussed below.

9.1 Natural Features

The Site does not contain any wetlands, watercourses, ANSI areas, or regulated areas (as per O.Reg. 41/24). Therefore, no negative impacts to natural features are expected from the proposed development. Regardless, Cambium recommends using best management practices to avoid overland flow of any contaminants to the natural environment in surrounding areas.

9.2 Water Supply Wells

Water and wastewater services south of the proposed development on Mill Street and King Street are provided by the Township. The moderately low hydraulic conductivities of the soils in the eastern portion of the Site and the fact that water supply wells tend to be relatively deep in this area suggests that there will be likely be little to no effects of the dewatering on nearby private supply wells, particularly considering the short-term nature of the dewatering. As such, dewatering activities associated with the proposed development are not expected to impact the water supply of surrounding water supply wells.

As mentioned in Section 5.5 and 6.5, the need to enact a monitoring program of adjacent supply wells should be confirmed at a later date, once the ZOI and construction dewatering rates have been confirmed. Should an adjacent supply well fall within the ZOI (or be considered at risk of influence from the proposed development), then pre-development conditions of the supply well should be established (i.e., groundwater quality and water level fluctuations) and a monitoring program during and after construction should be established.

9.3 Source Protection

Post-development, surface water runoff at the Site is expected to be directed west towards the Site's SWM facility, while groundwater is generally expected to also flow off-site to the west/northwest. As discussed in Section 8.0, the Site is located within areas designated as sensitive surface water and groundwater receptors, including an HVA, SGRA, IPZ-3 and a WHPA-B/C. The proposed development is not expected to significantly impair these areas provided that best management practices are employed during construction of the proposed development. Cambium strongly recommends that the Client work with the Township to develop best-management practices.

The water balancing information indicates that there is sufficient roof runoff available for re-infiltration to offset the projected infiltration deficit (upon development of the Site.). Further discussion of these areas is outlined in Section 8.0.

9.4 Ground Settlement/Subsidence

Under certain conditions, dewatering activities can cause ground settlement or subsidence. The ground settlement/subsidence results from the increase in effective stresses caused by the lowering of ground water level and subsequent decrease in pore pressure.

The ZOI outlined herein is a conservative approximation based upon assumed construction conditions. The ZOI will need to be revised once finalized development plans (specifically pertaining to the sewer invert elevations) are available for review. Once the ZOI is confirmed, the risk of influence to infrastructure (and other structures) should be re-assessed at a later date. A land settlement monitoring program should be developed and applied on an as-needed basis.

10.0 Conclusions and Recommendations

Cambium was retained by CAP Norwood Developments Inc. to complete an updated hydrogeological assessment of the property located at 42 and 52 Mill Street, Norwood, Ontario. The updated hydrogeological assessment is in response to peer review comments by Stantec submitted on July 22, 2024 (Stantec, 2024), which in turn was a review of Cambium's original hydrogeological assessment for the Site submitted on January 5, 2024 (Cambium, 2024).

The Site is situated within Otonabee – Peterborough Source Protection Area. As per the MNRF Natural Heritage System database, the Site does not contain any ANSI or wetlands. The Site is not within an ORCA regulated area. The Site is fully within an HVA and mostly within an SGRA with small portions of the Site being in an IPZ-3 and WHPA-B/C.

The water levels measured from all wells ranged in depth from -0.25 to >4.57 mbgs and from and from ≤199.27 to 211.08 within the overburden aquifer. Groundwater flow was generally interpreted to be west/northwest.

The estimated hydraulic conductivity ranged between 3.23×10^{-8} and 5.95×10^{-6} m/s. The results are consistent with typical published typical values for the sand, silty sand, silt, and silty/sandy glacial till soils encountered at the Site.

A door-to-door well survey of 22 properties surrounding the Site was conducted on November 18 and 26, 2024 to augment the letter mailing well survey campaigns carried out on April 18 and May 19, 2022. Between the 2022 and 2024 well surveys, three residents responded, with two of the three respondents being provided water from the municipality.

As the proposed development will include the installment of linear infrastructure that will require construction excavations extending to depths below the water table, short-term construction dewatering will be required. The peak estimated short-term dewatering rate for the construction excavation was estimated at 141,000 L/day, which includes a safety factor of 2 and direct precipitation from a 20 mm rainfall event. As this estimate is above 50,000 L/day, an EASR registration is recommended. As the Client intends on constructing the basements above the water table, no long-term dewatering should be required.

There were several parameter exceedances of PWQO from water quality samples collected from BH105-22, BH115-22, and BH201-24, even after filtration. Therefore, the discharge water from the dewatering of the linear infrastructure trenches should be wholly re-infiltrated on-site, such that no off-site overland flow occurs. Cambium has proposed a preliminary discharge plan herein that should be followed during the dewatering.

The maximum ZOI from the edges of the linear infrastructure trenches was estimated at 29.3 m. The need to establish existing conditions and complete on-going monitoring off-site supply wells (water quality and water level fluctuations) should be reviewed at a later date once construction dewatering rates (and the ZOI) are confirmed. Further, upon revision of the ZOI, the need for a land settlement monitoring program should be reviewed within the ZOI.

The conceptual water balance indicates that there will be an infiltration deficit of about 34,888 m^3/yr for post-development conditions as compared to pre-development conditions. To fully compensate the post-development infiltration deficit, about 45% of roof-runoff would need to infiltrate the ground through various LID measures. The infiltration deficit can be fully compensated if appropriate LID measures are implemented (e.g., roof downspout disconnection, bioswales, infiltration trenches etc.).

As the Site contains no wetlands, watercourses, or natural vulnerable areas, no impacts from the development on natural features are expected. So long as LID measures are used to maintain the pre-development infiltration rate, and as long as best management practices are used to reduce surface contamination at the Site, no adverse impacts to the HVA, SGRA, IPZ-3 or WHPA-B/C are anticipated. Cambium strongly recommends that the Client work with the Township to develop best-management practices.

11.0 Closing

We trust that the information in this submission meets your current requirements. If you have any questions regarding the contents of this report, please contact the undersigned.

Respectfully submitted,

Cambium Inc.

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2025-09-03

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13.0 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.

Reliance on Materials and Information

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

Facts, conditions, information and circumstances may vary with time and locations and Cambium's work is based on a review of such matters as they existed at the particular time and location indicated in its reports. No assurance is made by Cambium that the facts, conditions, information, circumstances or any underlying assumptions made by Cambium in connection with the work performed will not change after the work is completed and a report is submitted. If any such changes occur or additional information is obtained, Cambium should be advised and requested to consider if the changes or additional information affect its findings or results.

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.

Reliance

Cambium's services, work and reports may be relied on by the client and its corporate directors and officers, employees, and professional advisors. Cambium is not responsible for the use of its work or reports by any other party, or for the reliance on, or for any decision which is made by any party using the services or work performed by or a report prepared by Cambium without Cambium's express written consent. Any party that relies on services or work performed by Cambium or a report prepared by Cambium without Cambium's express written consent, does so at its own risk. No report of Cambium may be disclosed or referred to in any public document without Cambium's express prior written consent. Cambium specifically disclaims any liability or responsibility to any such party for any loss, damage, expense, fine, penalty or other such thing which may arise or result from the use of any information, recommendation or other matter arising from the services, work or reports provided by Cambium.

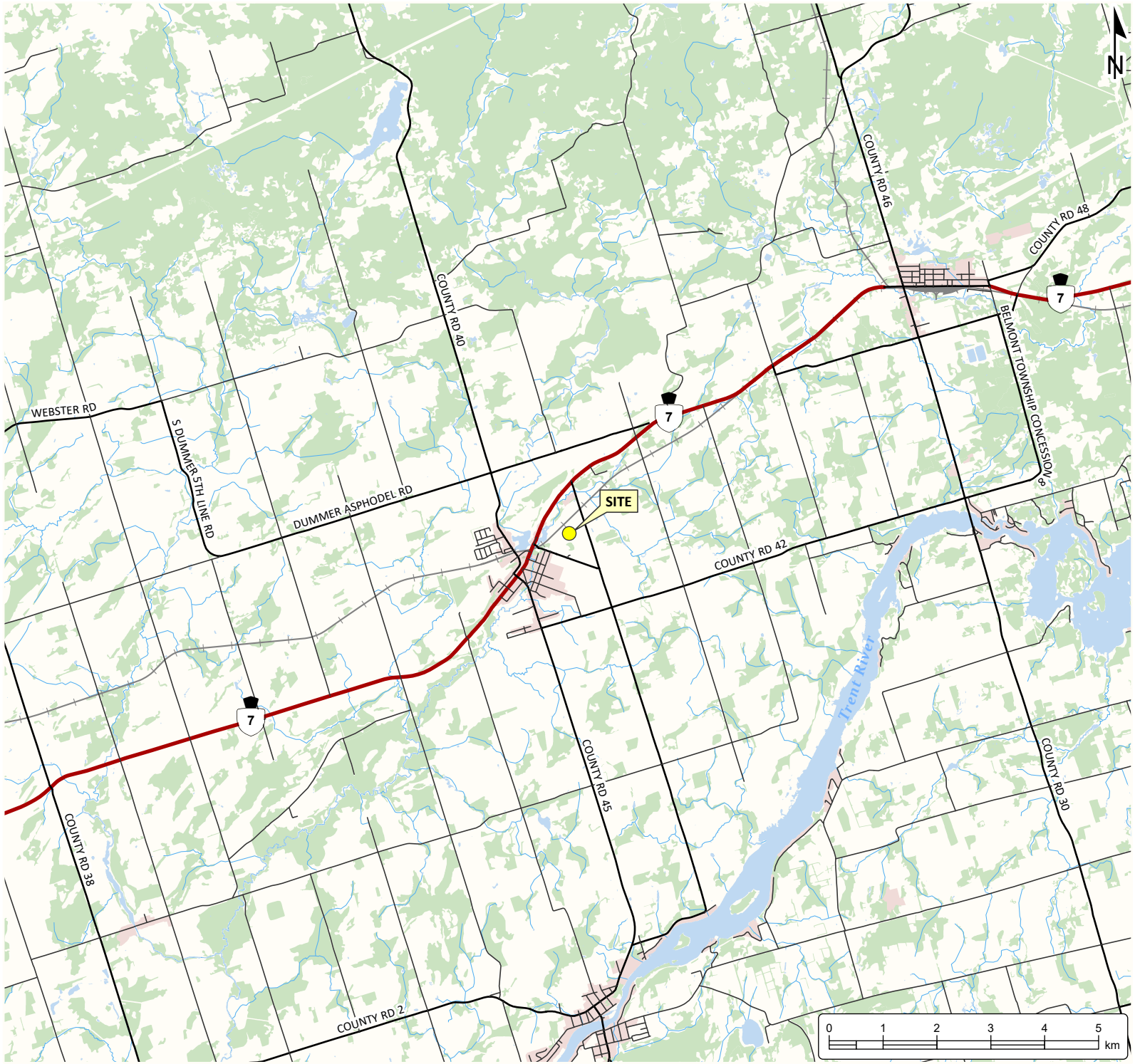
Limitation of Liability

Potential liability to the client arising out of the report is limited to the amount of Cambium's professional liability insurance coverage. Cambium shall only be liable for direct damages to the extent caused by Cambium's negligence and/or breach of contract. Cambium shall not be liable for consequential damages.

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



HYDROGEOLOGICAL ASSESSMENT

CAP NORWOOD DEVELOPMENTS INC.
52 Mill Street
Norwood, Ontario

LEGEND

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

Notes:
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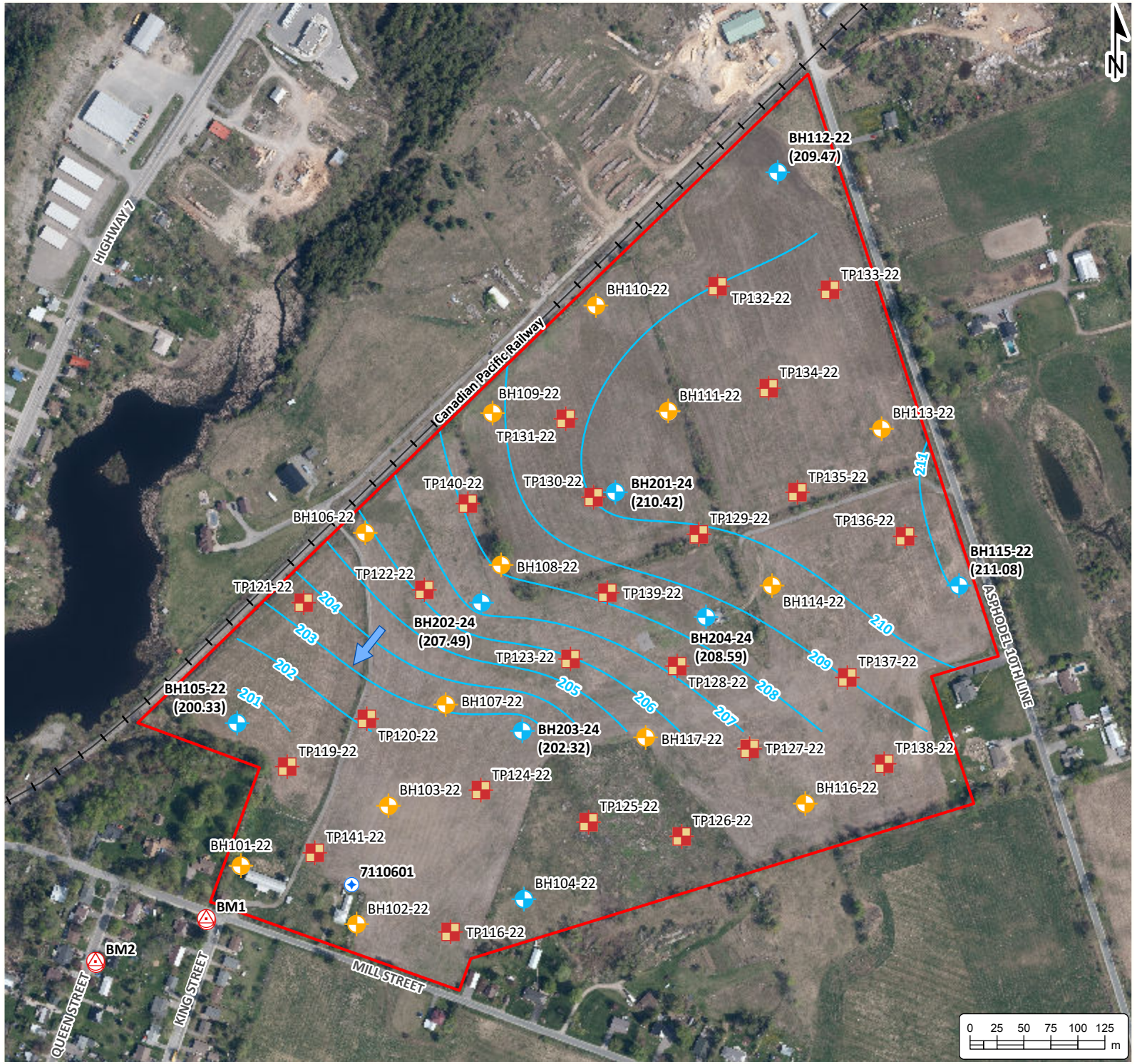
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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.:	14288-007	Date:	July 2025
		Rev.:	
Scale:	1:100,000	Projection:	NAD 1983 UTM Zone 18N
Created by:	LD	Checked by:	CM
Figure:	1		

O:\GIS\MXDs\14200-14299\14288-007 CAP Norwood Dev -MSP- Mill St\2025-02-12 Hydro G 14288-007.aprx



HYDROGEOLOGICAL ASSESSMENT

CAP NORWOOD DEVELOPMENTS INC.
52 Mill Street
Norwood, Ontario

LEGEND

- Benchmark
- Borehole
- Monitoring Well
- Test Pit
- Residential Supply Well
- Railway
- Site (approximate)
- (200.33) Groundwater Elevations Based off Composite High Groundwater Samples From March 16, 2025 to April 20, 2025
- Groundwater Contours Based off Composite High Groundwater Elevations From March 16, 2025 to April 20, 2025
- Groundwater Flow Direction Based off Composite High Groundwater Elevations From March 16, 2025 to April 20, 2025

Notes:
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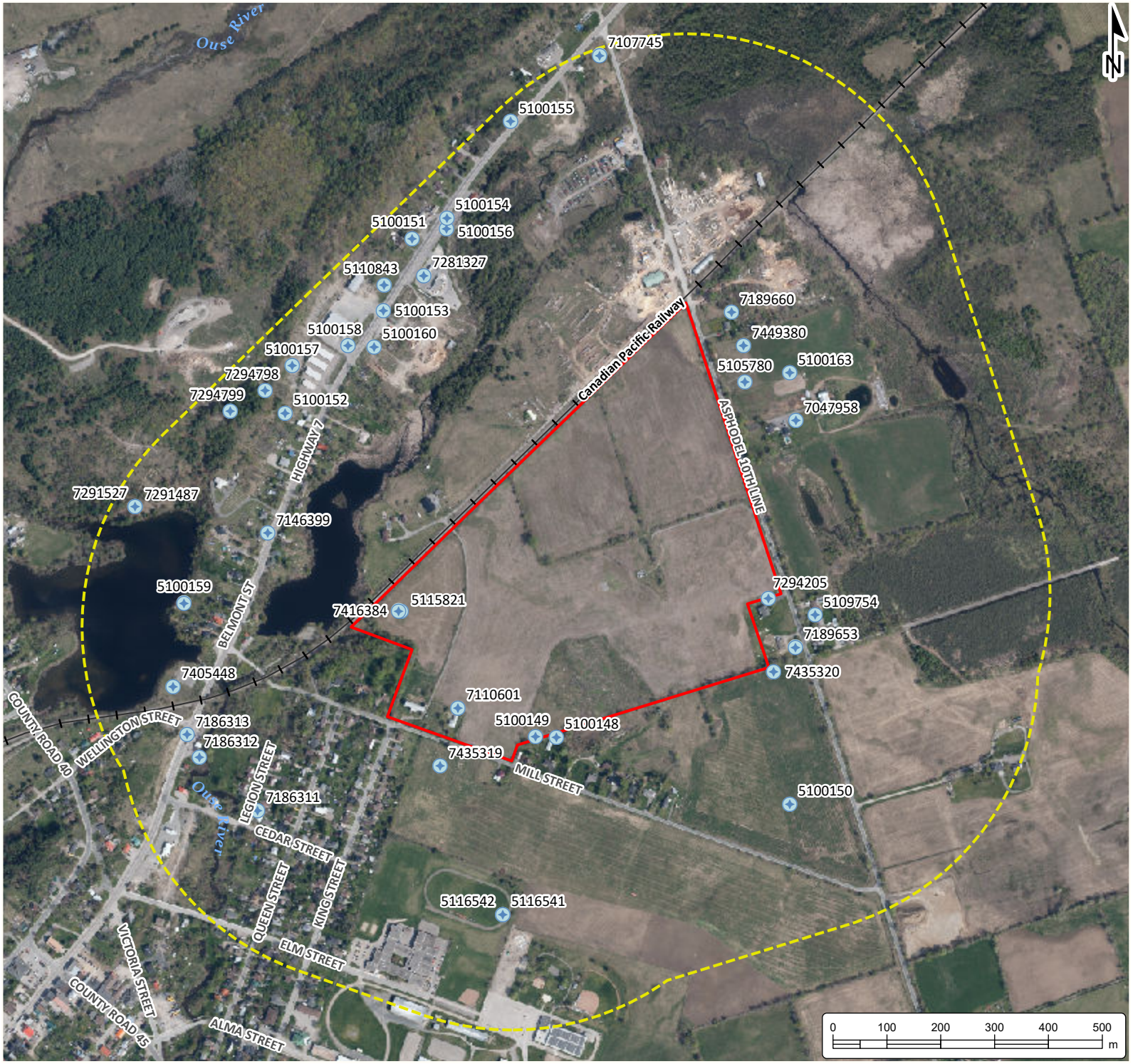
BOREHOLE AND TEST PIT LOCATION PLAN

Project No.:	14288-007	Date:	July 2025
		Rev.:	
Scale:	1:5,000	Projection:	NAD 1983 UTM Zone 18N
Created by:	LD	Checked by:	CM
Figure:	2		

O:\GIS\MXDs\14200-14299\14288-007 CAP Norwood Dev -MSP- Mill St\2025-02-12 Hydro G 14288-007.aprx



HYDROGEOLOGICAL ASSESSMENT

CAP NORWOOD DEVELOPMENTS INC.
52 Mill Street
Norwood, Ontario

LEGEND

- Water Well Record
- Railway
- 500m Study Area
- Site (approximate)

Notes:
- Aerial imagery obtained from the South Central Ontario Orthophotography Project (SCOOP) 2023. Source: Ontario Ministry of Natural Resources and Forestry. © Copyright: 2023 King's Printer of Ontario. All Rights Reserved.
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MECP WELL RECORDS WITHIN 500m

Project No.: 14288-007		Date: July 2025 Rev.:	
Scale: 1:10,000		Projection: NAD 1983 UTM Zone 18N	
Created by: LD	Checked by: CM	Figure: 3	

O:\GIS\MXDs\14200-14299\14288-007 CAP Norwood Dev -MSP- Mill St\2025-02-12 Hydro G 14288-007.aprx

HYDROGEOLOGICAL ASSESSMENT

CAP NORWOOD DEVELOPMENTS INC.
52 Mill Street
Norwood, Ontario

LEGEND

- Water Well Record
- Residential Supply Well
- Railway
- Site (approximate)
- 29.3m Zone Of Influence

Notes:
- Aerial Imagery obtained from the Maxar (WV03) image captured on Sep 30, 2017 as shown in the 2024-03-28 version of the World Imagery map.
- Overlay was obtained from RFA Planning Consultant Inc. Job No. 852. Development Concept for Draft Plan of Subdivision, dated December 22, 2023
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ZONE OF INFLUENCE CONSTRUCTION EXCAVATION

Project No.: 14288-007		Date: July 2025	Rev.:
Scale: 1:5,000		Projection: NAD 1983 UTM Zone 18N	
Created by: LD	Checked by: CM	Figure: 4	

O:\GIS\MXDs\14200-14299\14288-007 CAP Norwood Dev -MSP- Mill St\2025-02-12 Hydro G 14288-007.aprx

Appendix A

Proposed Development Plan and Land Information

DEVELOPMENT SITE PLAN

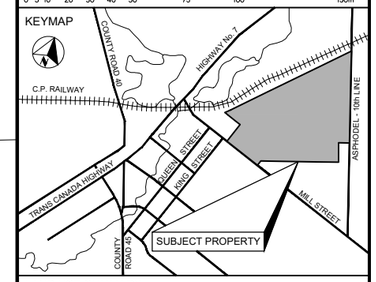
UPPER MILL POND

PART OF BLOCK H, REGISTERED PLAN 6
FORMERLY VILLAGE OF NORWOOD
AND PART OF LOTS 17, 18 AND 19
CONCESSION 9
GEOGRAPHIC TOWNSHIP OF ASPHODEL
TOWNSHIP OF ASPHODEL-NORWOOD
COUNTY OF PETERBOROUGH

SCALE = N.T.S.

0 5 10 20 30 40 50 75 100 150m

KEYMAP



LAND USE SUMMARY

LAND USE	AREA(ha)	AREA%	UNITS	UNITS
12.2m - SINGLE DETACHED LOTS	3.41	9.6	76	
13.7m - SINGLE DETACHED LOTS	3.50	9.9	57	
15.0m - SINGLE DETACHED LOTS	3.79	10.7	66	
6.1m - 2 STOREY TOWNHOUSES (INCLUDING LANES)	3.44	9.7	134	
7.4m - BUNGALOW TOWNHOUSES	2.07	5.8	70	
LOW DENSITY TOTAL - 16.21ha				403
3 STOREY APARTMENT BUILDING WITH COMMERCIAL AT GRADE (SOUTH WEST SIDE) 1842sq.m GFA	1.08	3.0	40	
2 - 12 UNIT, 3 STOREY, STACKED TOWNHOUSE BUILDINGS	0.66	1.9	24	
MEDIUM DENSITY CONDOMINIUM BLOCK 29 - 4 PLEX BUNGALOW UNITS	4.74	13.3	116	
5 - 12 UNIT, 3 STOREY, BUILDINGS	1.21	3.4	60	
MEDIUM DENSITY TOTAL - 7.69ha				240
LANEWAY COMMON ELEMENT FOR TOWNHOUSES	0.82	2.3		
PRIVATE LANE	0.03	0.1		
PARKLAND, WALKWAYS & SERVICE EASEMENTS	1.84	5.2		
STORM WATER POND	1.75	4.9		
20.0m MUNICIPAL ROAD ALLOWANCE = 3607.0m (STREETS A, B, C, D, E, F, G & H)	7.16	20.2		
TOTAL	35.50ha	100.0%		643

LOW DENSITY RESIDENTIAL
403 UNITS/16.21ha. = 24 UNITS/ha (NET)

MEDIUM DENSITY RESIDENTIAL
240 UNITS/7.69ha. = 31 UNITS/ha (NET)

OVERALL NET DENSITY
643 UNITS/23.90ha. = 27 UNITS/ha (NET)

No.	REVISION	DATE	APP'D

DRAWN BY: L.B. | CHECKED BY: R.F.A. | DATE: DEC. 22, 2023 | SCALE: N.T.S.

METRIC NOTE:
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO IMPERIAL BY DIVIDING BY 0.3048.

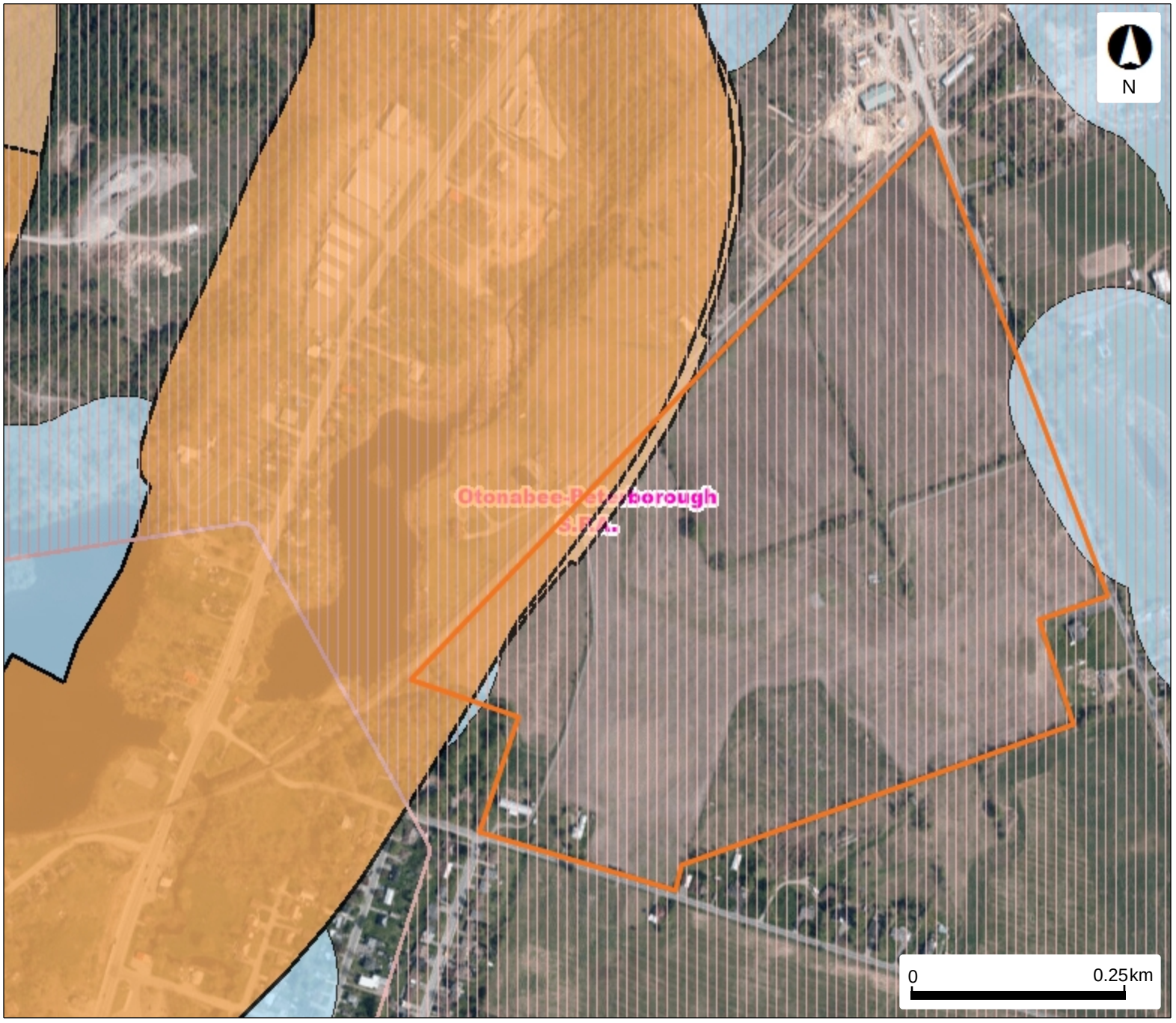
CONTOURS NOTE:
CONTOURS PROVIDED BY CANADIAN LIDAR DATA AND DRAWING AT 5.0m INTERVALS.

DECEMBER 22, 2023

JOB No. 852-DSP

RFA PLANNING CONSULTANT INC
211 Dundas Street East, Suite 202,
Belleville, Ontario, K8N 1E2

MECP SPIA Map - WHPA, IPZ, and HVA (Orange Polygon Denotes Site Boundary)



Legend

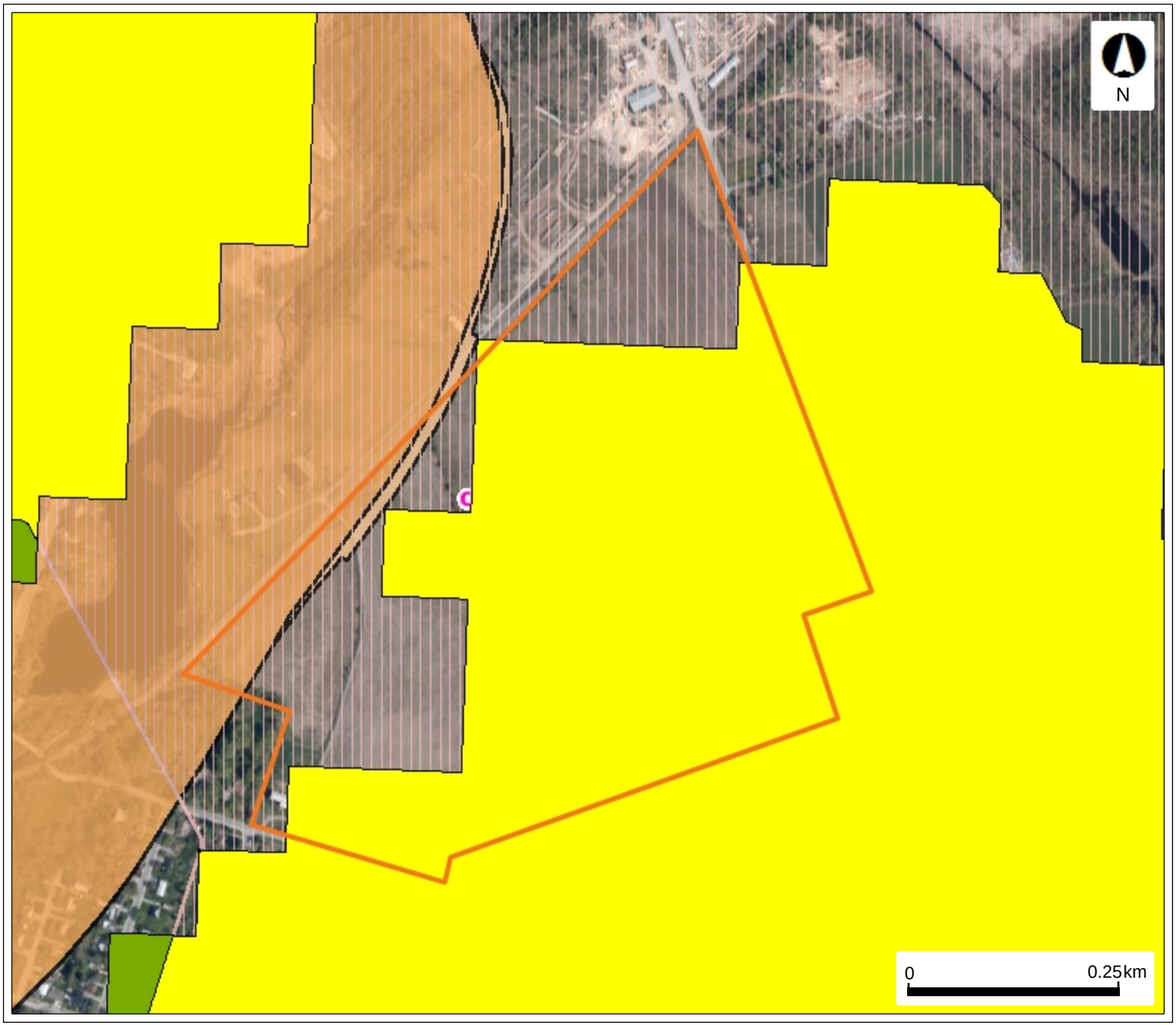
- Issue Contributing Areas
- Highly Vulnerable Aquifers
- WHPA-E
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Intake Protection Zone 1
- Event Based Areas
- Intake Protection Zone 3
- Source Protection Areas

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 12/6/2024
Map Center: 44.38995 N, -77.97081 W

MECP SPIA Map - SGRA and HVA (Orange Polygon Denotes Site Boundary)



Legend

- Significant Groundwater Recharge Area
  - N/A
  - 0
  - 2
  - 4
  - 6
- Issue Contributing Areas
- Highly Vulnerable Aquifers
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Event Based Areas
- Source Protection Areas

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 12/6/2024
Map Center: 44.38989 N, -77.96746 W

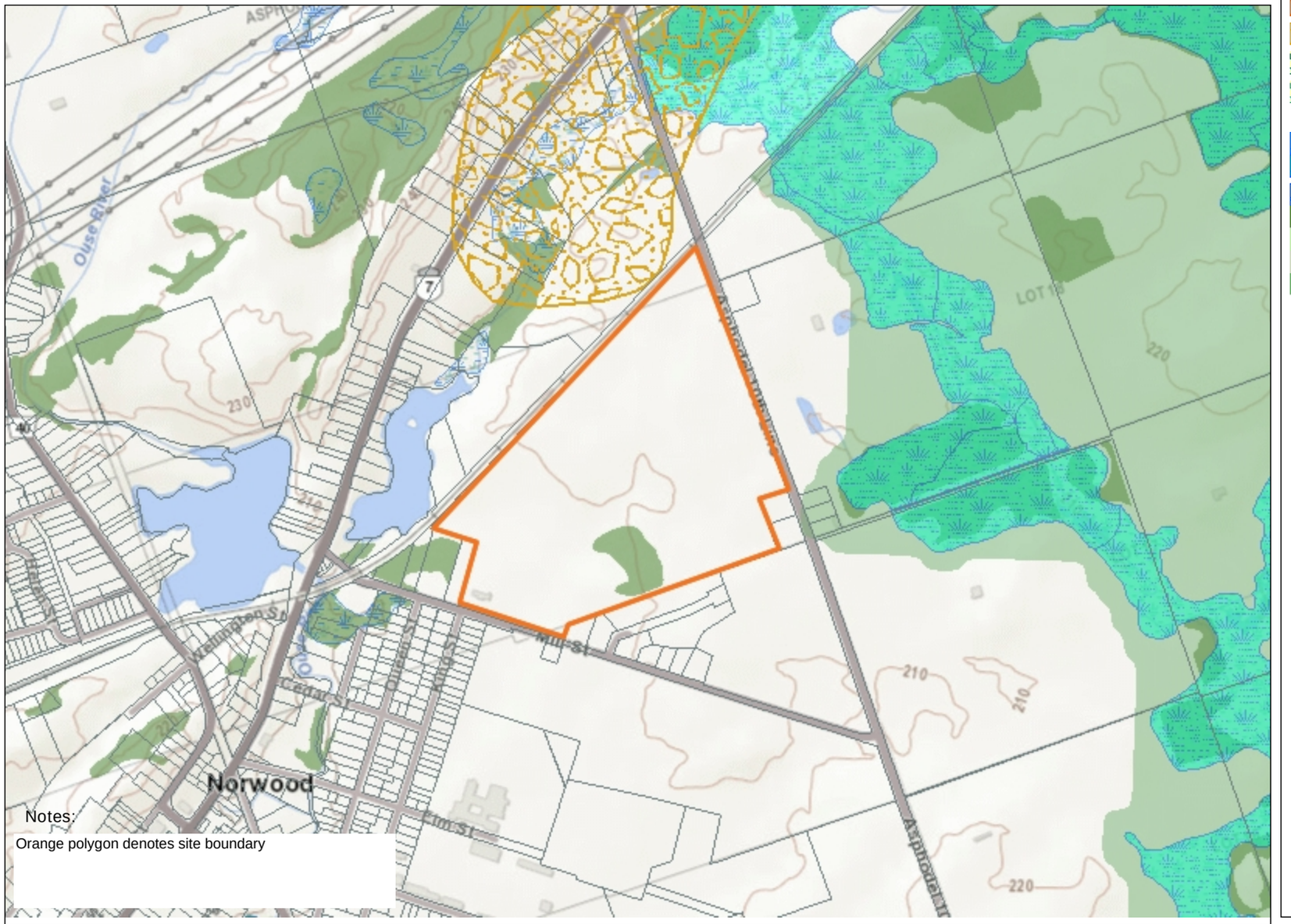
Ontario

Ministry of Natural Resources

Make-a-Map: Natural Heritage Areas

MNRRF Natural Heritage Areas Map

Map created:12/6/2024



Legend

- Assessment Parcel
- ANSI
- Earth Science Provincially Significant/sciences de la terre d'importance provinciale
- Earth Science Regionally Significant/sciences de la terre d'importance régionale
- Life Science Provincially Significant/sciences de la vie d'importance provinciale
- Life Science Regionally Significant/sciences de la vie d'importance régionale
- Evaluated Wetland
- Provincially Significant/considérée d'importance provinciale
- Non-Provincially Significant/non considérée d'importance provinciale
- Unevaluated Wetland
- Woodland
- Conservation Reserve
- Provincial Park
- Natural Heritage System

Notes:

Orange polygon denotes site boundary

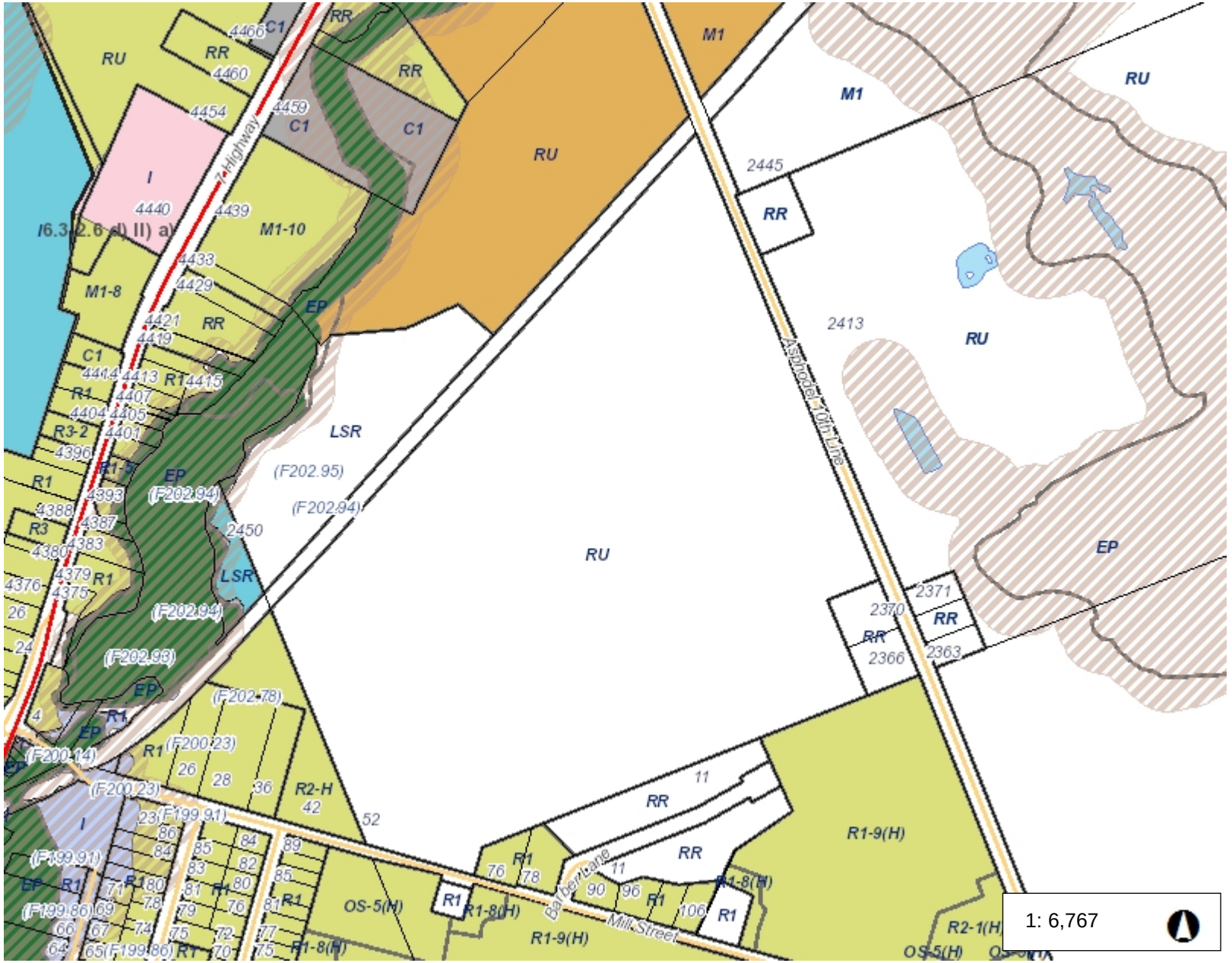
0.7 0 0.33 0.7 Kilometres

Absence of a feature in the map does not mean they do not exist in this area.

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources(OMNR) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

County of Peterborough

County of Peterborough



Legend

Roads < 50,000

- PRIV ; Private; PRIV
- City Arterial
- City Collector and Local
- City Owned Unclassified
- Provincial
- County
- Township
- Water Access Only

Outside Roads < 50,000

- Major Roads
- Local Roads

- First Nations
- Civic Address
- Parcel Fabric
- Parcel First Nations - Canada
- ORCA Dev't Control Area
- AN Flood Fringe Elevation
- AN Zoning Bylaws
- AN Flood Fringe
- Norwood OP Special Section

Norwood OP Landuse

- Commercial
- Environmental Constraint Area
- Extractive Industrial
- Flood Fringe Overlay
- Industrial
- Institutional

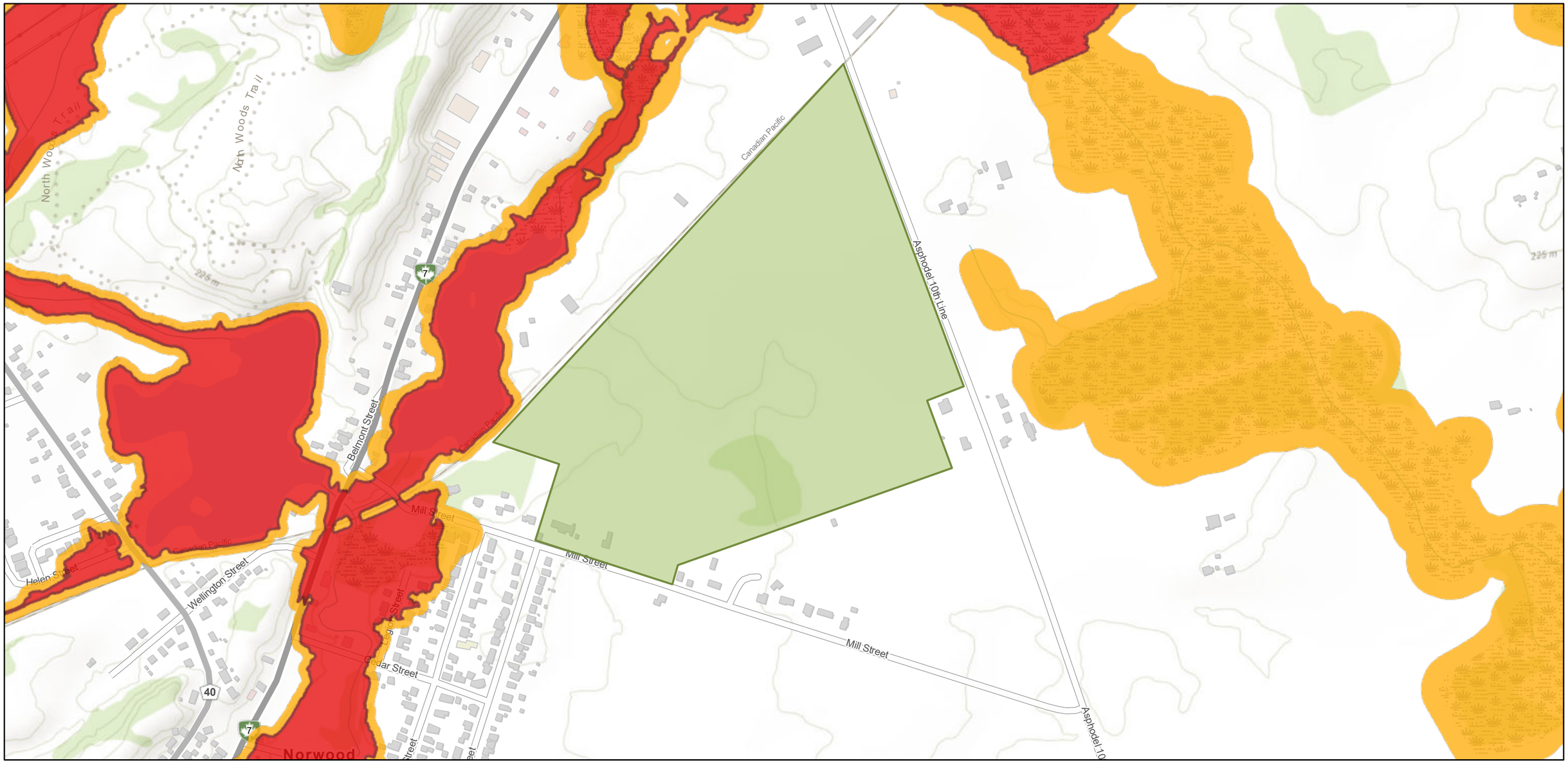
1: 6,767

Notes

ORCA regulated area

North_American_1983_CSRS_UTM_Zone_17N

ORCA Regulated Areas Mapping



12/6/2024, 10:51:18 AM

Regulated Area

Floodplain

1:9,028

0 0.07 0.15 0.3 mi

0 0.1 0.2 0.4 km

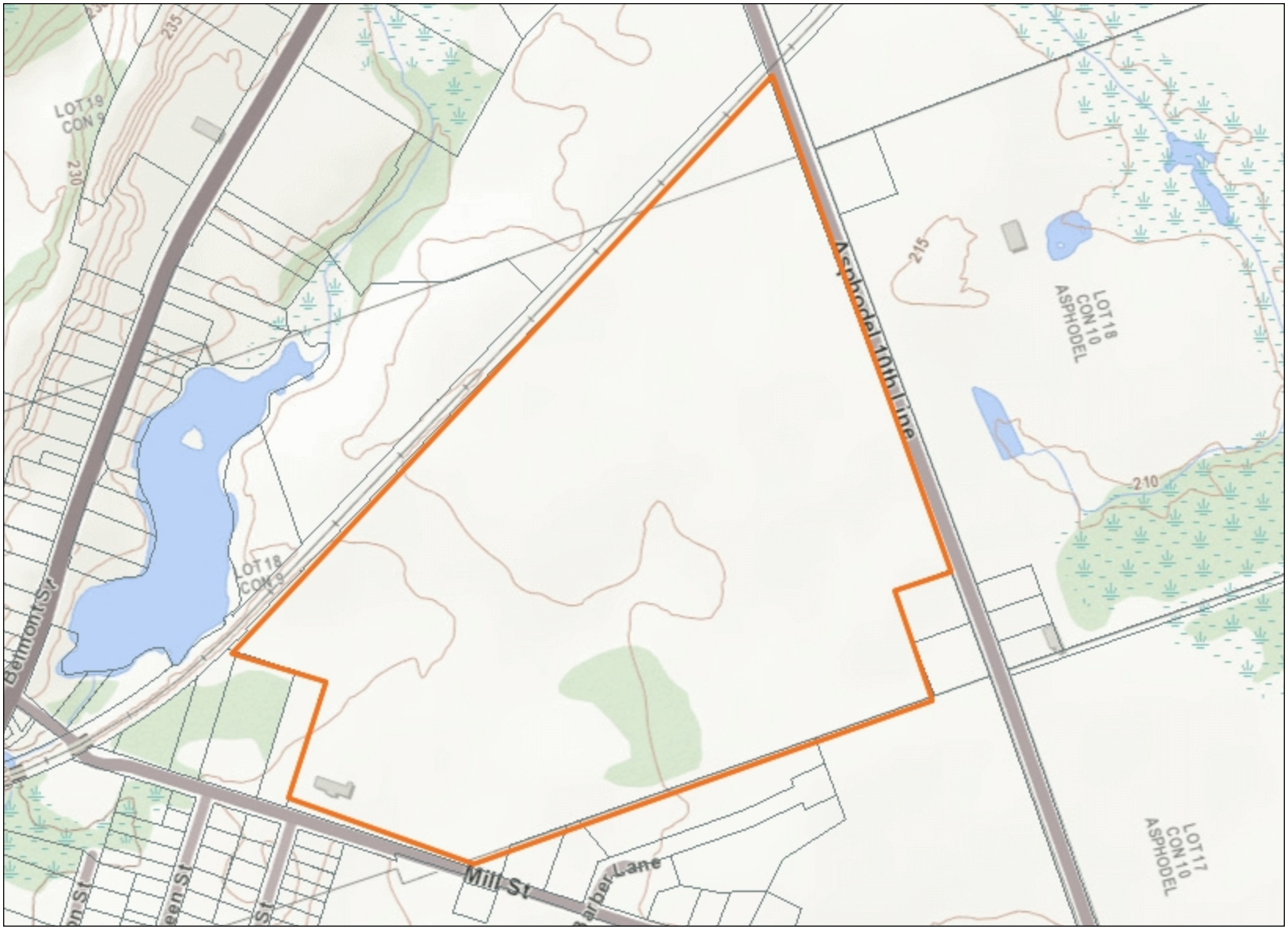
Printed from the Flood Mapping 2022 Web Application
Otonabee Region Conservation Authority

Ontario Ministry of Natural Resources

Make a Topographic Map

MNRF Topographic Map

Notes:
Orange polygon denotes site boundary.



Legend

- Building as Symbol
- Building to Scale
- Airport
- Heliport \ Hospital Heliport
- Seaplane Base
- Ferry Route
- Trail
- Bruce Trail
- Greenbelt Route
- Rideau Trail
- Trans Canada Trail
- Voyageur Trail
- Waterfront Trail
- Railway \ Train Station
- Railway with Bridge
- Railway with Tunnel
- Road (Major → Minor)
- Winter Road
- Road with Bridge
- Road with Tunnel
- Primary, Kings or 400 Series Highway
- Secondary Highway
- Tertiary Highway
- District, County, Regional or Municipal Road
- Toll Highway
- One Way Road
- Road with Permanent Blocked Passage
- Road with Address Ranges
- Hydro Line, Communication Line or Unknown Transmission Line
- Natural Gas Pipeline, Water Pipeline or Unknown Pipeline
- Spot Height
- Index Contour
- Contour
- Wooded Area
- Wetland
- Waterbody
- Waterbody Elevation
- Watercourse
- Falls
- Rapids
- Rapids \ Falls
- Rapids
- Rocks
- Lock Gate
- Dam \ Hydro Wall
- Dam \ Hydro Wall
- Provincial \ State Boundary
- International Boundary
- Upper Tier \ District Municipal Boundary
- Lower Tier \ Single Tier Municipal Boundary
- Lot Line
- Indian Reserve
- Provincial Park
- National Park
- Conservation Reserve
- Military Lands

0 0.3 km

Projection: Web Mercator

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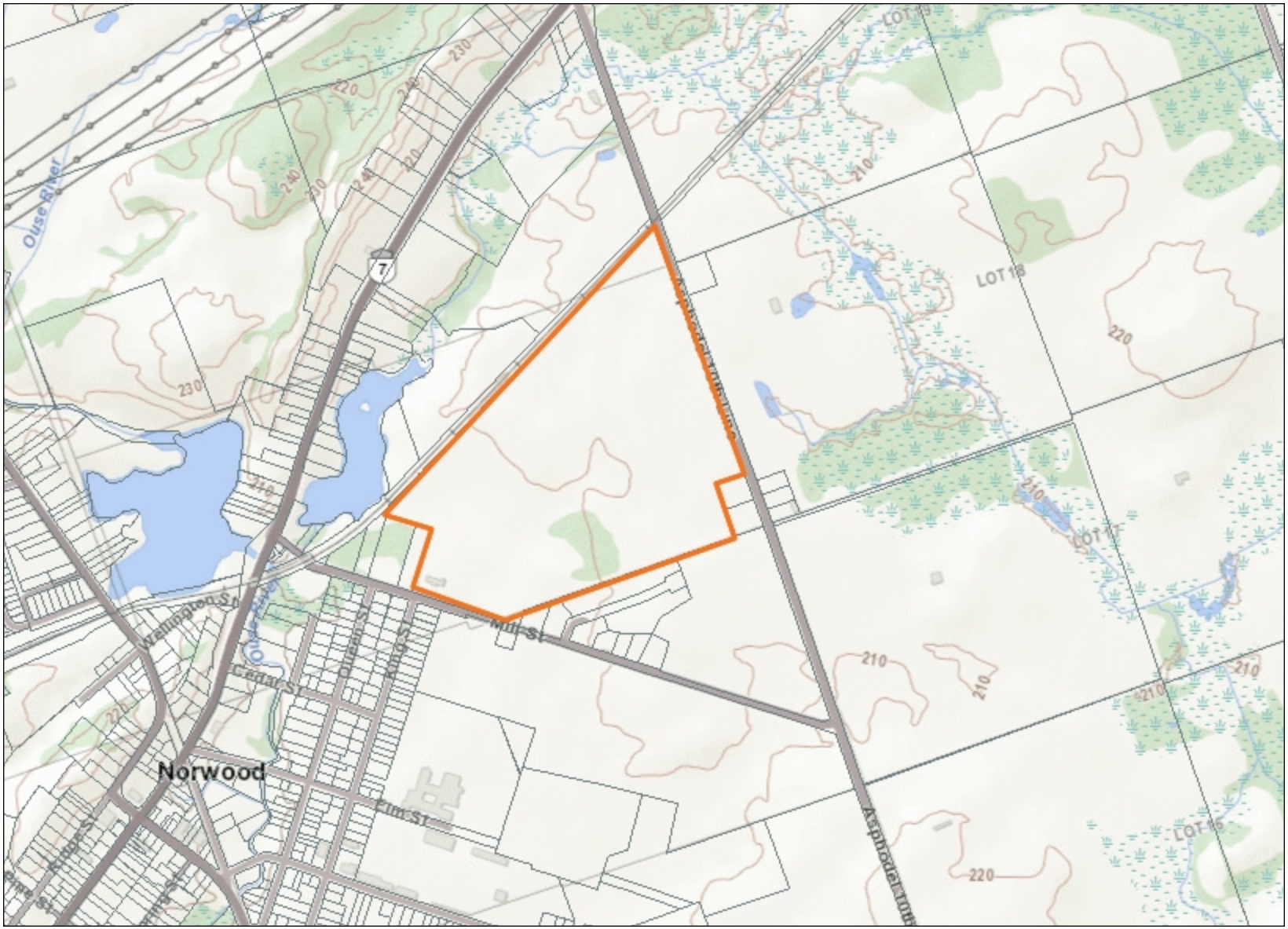
Ontario Ministry of Natural Resources

Make a Topographic Map

MNRF Topographic Map

Notes:
Orange polygon denotes site boundary.



Legend

- Building as Symbol
- Building to Scale
- Airport
- Heliport \ Hospital Heliport
- Seaplane Base
- Ferry Route
- Trail
- Bruce Trail
- Greenbelt Route
- Rideau Trail
- Trans Canada Trail
- Voyageur Trail
- Waterfront Trail
- Railway \ Train Station
- Railway with Bridge
- Railway with Tunnel
- Road (Major → Minor)
- Winter Road
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- Road with Tunnel
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- Secondary Highway
- Tertiary Highway
- District, County, Regional or Municipal Road
- Toll Highway
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- Hydro Line, Communication Line or Unknown Transmission Line
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- Rocks
- Lock Gate
- Dam \ Hydro Wall
- Dam \ Hydro Wall
- Provincial \ State Boundary
- International Boundary
- Upper Tier \ District Municipal Boundary
- Lower Tier \ Single Tier Municipal Boundary
- Lot Line
- Indian Reserve
- Provincial Park
- National Park
- Conservation Reserve
- Military Lands

0 0.7 km

Projection: Web Mercator

DRINKING WATER SOURCE PROTECTION
Act for Clean Water
Otonabee-Peterborough Source Protection Area

Restricted Land Use Notice

To Engage in an Activity in a Vulnerable Area for a Municipal Drinking Water Supply

Issued under Part IV the *Clean Water Act, 2006*, Section 59 (2) (a)

No Prohibition or Risk Management Plan Requirement

Property:	52 Mill Street, Norwood	Notice:	2023-0158-N2a
Municipality:	Township of Asphodel-Norwood	Issued:	December 22, 2023
Roll No.:	150101000315300	Expires:	December 21, 2024
Vulnerable Area:	Wellhead Protection Area for the Norwood Municipal Well System		

This Notice is based on information received as part of an Application received in relation to a:

Plan of Subdivision for a 643-unit low and medium density residential development as per Draft Plan of Subdivision prepared by Gifford, Harris Surveying Ltd and dated December 20, 2023.

1. This Notice confirms that municipal approval of the Plan of Subdivision will not result in an activity being initiated that is a significant drinking water threat which is prohibited under Section 57, Part IV, *Clean Water Act*, *2006*, (*CWA*) or that requires a risk management plan under(Section 58, Part IV, *CWA*);
2. This Notice does not reflect an assessment of significant drinking water threats where the Risk Management Official is not responsible for implementing the Trent Source Protection Plan policy, including sewage and stormwater related activities, low or moderate drinking water threats or Transport Pathways (see reverse for more details);
3. This Notice is not valid for any other approvals which the proposal may require under the *Planning Act*, *1990*, or for any permits that may be required under the *Building Code Act*, *1992*, *Conservation Authorities Act*, *1990*, or other legislative or regulatory requirements; and,
4. Any change to the information submitted under the Application received nullifies this Notice, unless otherwise permitted by the Risk Management Official.

Thank you for your cooperation in protecting our local sources of drinking water.

Otonabee CONSERVATION

Terri Cox
Risk Management Official / Risk Management Inspector
Otonabee Region Conservation Authority
250 Milroy Drive, Peterborough, ON K9H 7M9
705-745-5791 x219 tcox@otonabeeconservation.com

Drinking Water Threats & Transport Pathways

The *Clean Water Act* (*Act*) is part of a multi-barrier approach to protecting drinking water by addressing land-based activities that can negatively impact municipal drinking water sources. It identifies two primary factors that can increase the risks to drinking water sources: Drinking Water Threats and Transport Pathways.

Drinking Water Threat (Threat)

A Threat is a land-based activity that can occur in Vulnerable Areas defined under the *CWA. These include* Intake Protection Zones for a surface water sources and Wellhead Protection Areas for groundwater sources. The *CWA* identifies 22 Threats and prescribes circumstances for Low, Moderate and Significant Threats.

The Trent Source Protection Plan contains policies to address *significant* Threats. The Risk Management Official implements many, not all, of these policies. The Risk Management Inspector enforces policies implemented by the Risk Management Official. There are currently no policies that apply to Low or Moderate Threats.

The Risk Management Official is required to review proposed development in Vulnerable Areas where *significant* Threats may occur. A Restricted Land Use Notice(Notice) is issued if no significant Threats are identified or a risk management plan required by the Trent Source Protection Plan (Section 58, *CWA)* is in place. Notices are not issued if a Threat is prohibited by the Trent Source Protection Plan (Section 57, *CWA*).

Transport Pathways

A Transport Pathway is a condition of land resulting from human activity that increases the vulnerability of the raw water supply of the municipal drinking water system. The creation or modification of a Transport Pathway can negatively impact the quality and quantity of a drinking water source by disturbing the surface above the aquifer and increasing the rate or quantity of flow to the groundwater source which supplies the municipal wells or reducing the amount of time for water to flow to a municipal surface water intake pipe.

Ontario Regulation 287 /07, subsection 27(3) states that if a person applies to a municipality for approval of a proposal to engage in an activity in a WHPA or a surface water IPZ that may result in the creation of a new transport pathway or the modification of an existing transport pathway, the municipality shall notify the source protection authority and the source protection committee of the proposal and include a description of the proposal, identity of the person responsible for the proposal and a description of the approvals the person requires to engage in the proposed activity. Ontario Regulation 287/07, subsection 27(4) requires the municipality to give a copy of the notice to the person responsible for the proposal.

250 Milroy Drive, Peterborough ON K9H 7M9
P: 705-745-5791 F: 705-745-7488
otonabeeca@otonabeeconservation.com
otonabeeconservation.com

Otonabee CONSERVATION

Appendix B

Borehole and Test Pit Logs

CAMBIUM
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH101-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263264.8937 E, 4919157.519 N	**Elevation:**	204.434 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
205 / -1										
204 / 0		TOPSOIL: 150mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A 1B 1C	SS SS SS	85	7				
		SANDY SILT: Brown, sandy silt, trace gravel, moist, loose								
203 / -1		SILTY SAND: Brown, silty sand, some gravel, moist, loose	2	SS	100	11				
		SAND AND SILT: Light brown, sand and silt, some gravel, trace clay, moist to wet, compact								
202 / -2		GRAVELLY SAND: Light brown, gravelly silty sand, some gravel, trace clay, moist, compact	3	SS	100	24				
		SAND AND SILT: Light brown/grey, gravelly sand and silt, trace clay, dry to moist, compact	4	SS	100	29				Borehole open and dry upon completion
201 / -3		-becomes dense	5	SS	100	46				
200 / -4		-becomes moist	6	SS	100	34				Cobbles
199 / -5		Borehole terminated at 5.03 mbgs in gravelly sand and silt								
-6										

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

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Log of Borehole: BH102-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263372.1357 E, 4919103.341 N	**Elevation:**	205.325 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
205 / 0		TOPSOIL: 300mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A	SS	75	4				
			1B	SS						
		SILTY SAND: Brown, silty sand, trace clay, moist, loose	2	SS	80	6				
204 / 1			3A	SS	100	5				Groundwater first encountered at 1.52 mbgs
		SILT: Brown, silt, some clay, trace sand, moist to wet, loose	3B	SS						
203 / 2			4	SS	100	7				SS4 GSA: 0% gravel 3% sand 86% silt 11% clay
202 / 3		GRAVELLY SAND: Brown, gravelly silty sand, trace clay, moist to wet, very dense	5	SS	100	50/50				Water level upon completion at 3.05 mbgs
		Borehole terminated at 3.05 mbgs on presumed bedrock								Borehole open upon completion
201 / 4										
200 / 5										
199 / 6										

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

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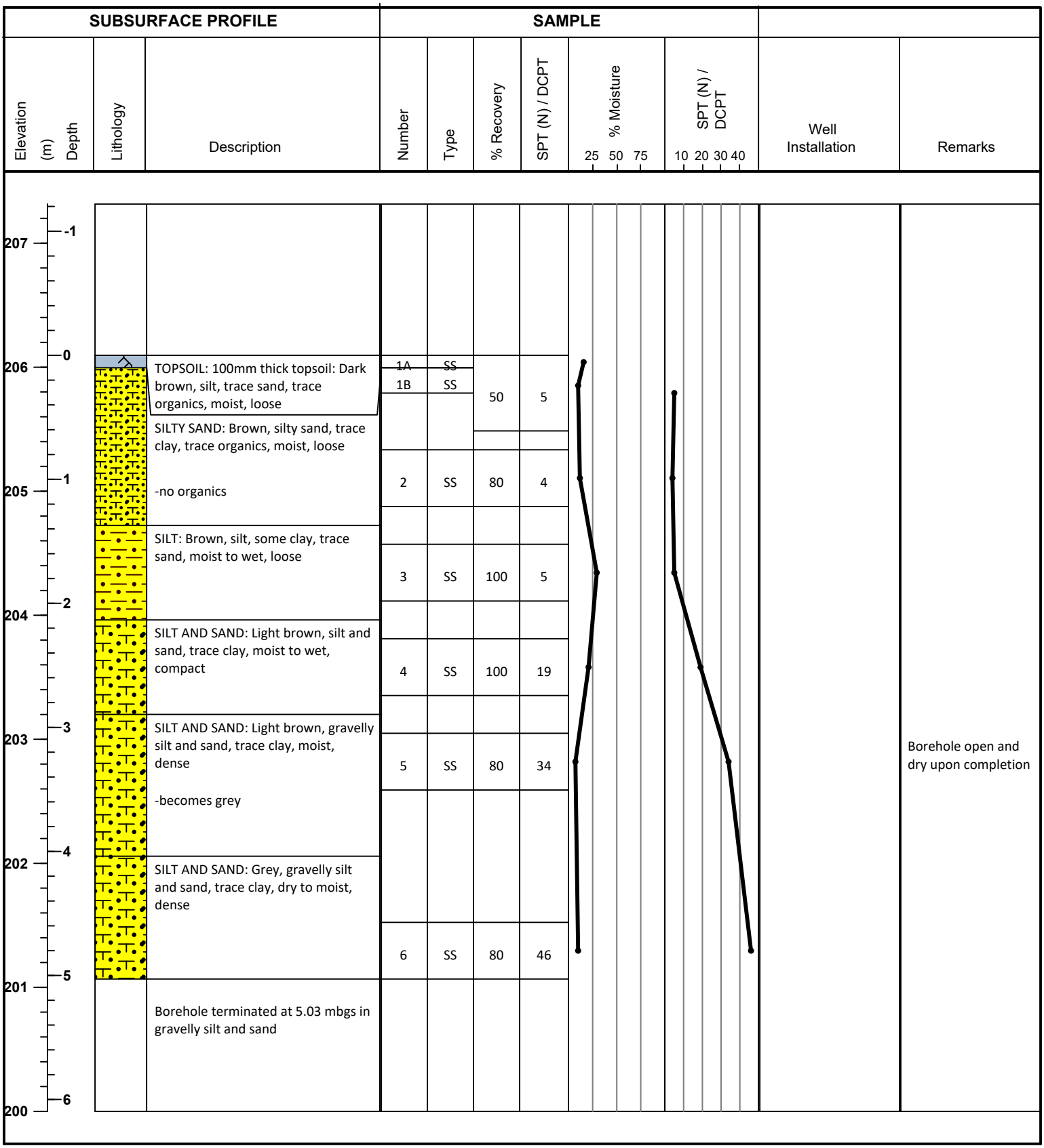
Log of Borehole: BH103-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263401.7241 E, 4919213.468 N	**Elevation:**	206.096 masl



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

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Log of Borehole: BH104-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263527.4327 E, 4919126.817 N	**Elevation:**	208.934 masl

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N) / DCPT	Well Installation	Remarks
209	0	TOPSOIL: 600mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1	SS	50	4	Cap	No water level detected when measured on May 4, 2022
208	1	GRAVELLY SAND: Light brown/grey, gravelly silty sand, trace clay, moist, dense	2	SS	60	43	Pipe, Bentonite Plug	SS3 GSA: 10% gravel 42% sand 35% silt 13%clay
207	2	SAND AND SILT: Grey, sand and silt, some clay, some gravel, moist, compact	3	SS	100	15		
206	3	SAND AND SILT: Grey, gravelly sand and silt, some clay, moist, dense	4	SS	100	46	Sand Pack, PVC Screen	Borehole open and dry upon completion
			5	SS	100	50/100	Cap	
205	4	Borehole terminated at 3.2 mbgs on presumed bedrock						
204	5							
203	6							

% Moisture: 25 50 75
SPT (N) / DCPT: 10 20 30 40

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

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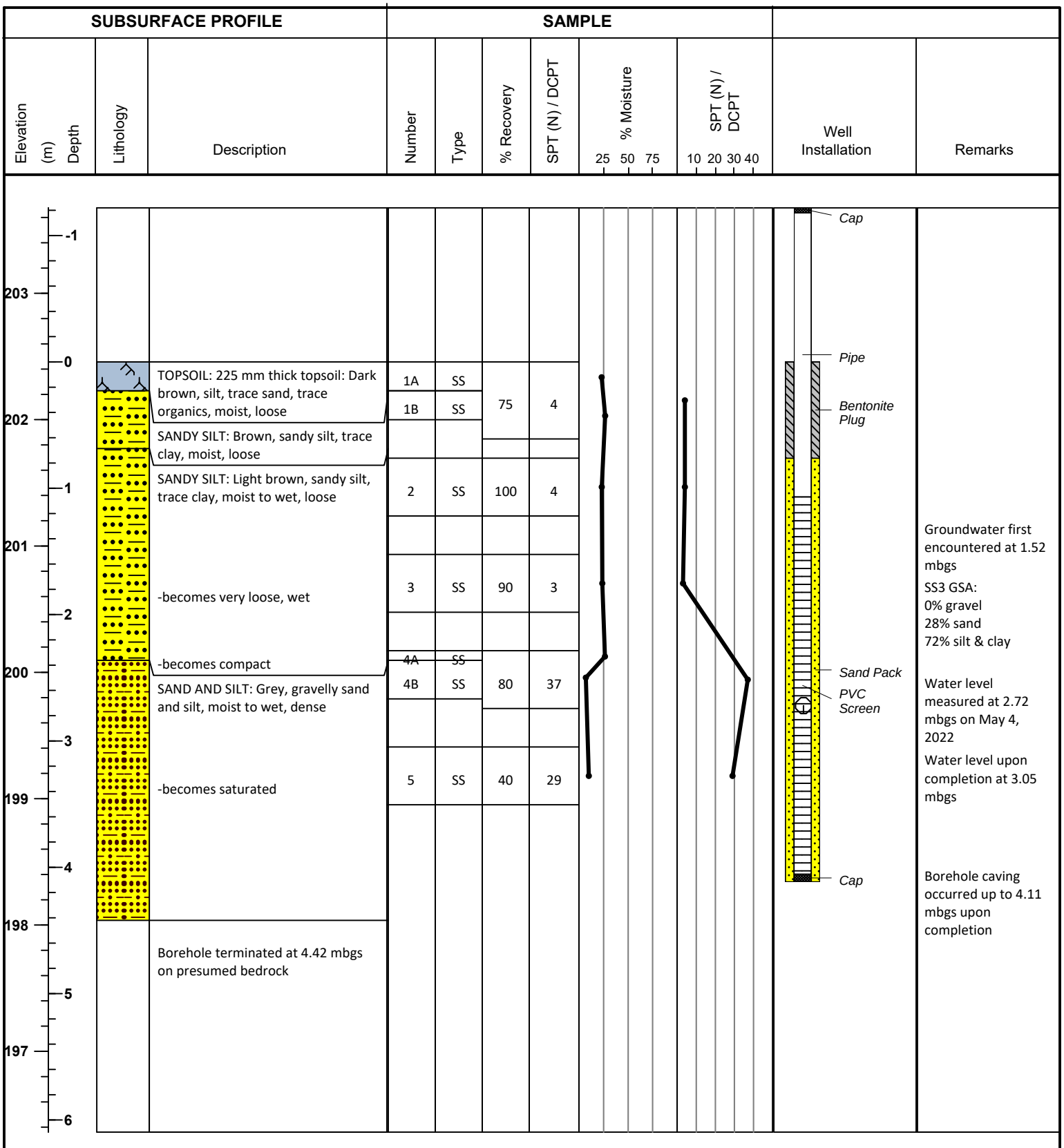
Log of Borehole: BH105-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263261.4148 E, 4919290.377 N	**Elevation:**	202.457 masl



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

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Log of Borehole: BH106-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263380.2677 E, 4919466.901 N	**Elevation:**	208.343 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
208 / 0		TOPSOIL: 300mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A	SS	75	4				
			1B	SS						
		SANDY SILT: Brown, sandy silt, trace clay, moist, loose								
207 / 1		SAND AND SILT: Light brown, gravelly sand and silt, moist, compact	2A	SS	80	16				
			2B	SS						
		-becomes dense	3	SS	80	41				
206 / 2										
		-becomes dry to moist, very dense	4	SS	60	54				
205 / 3										
			5	SS	50	50/425				Borehole open and dry upon completion
204 / 4										
			6	SS	100	50/50				
203 / 5		Borehole terminated at 4.57 mbgs on presumed bedrock								
-6										

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

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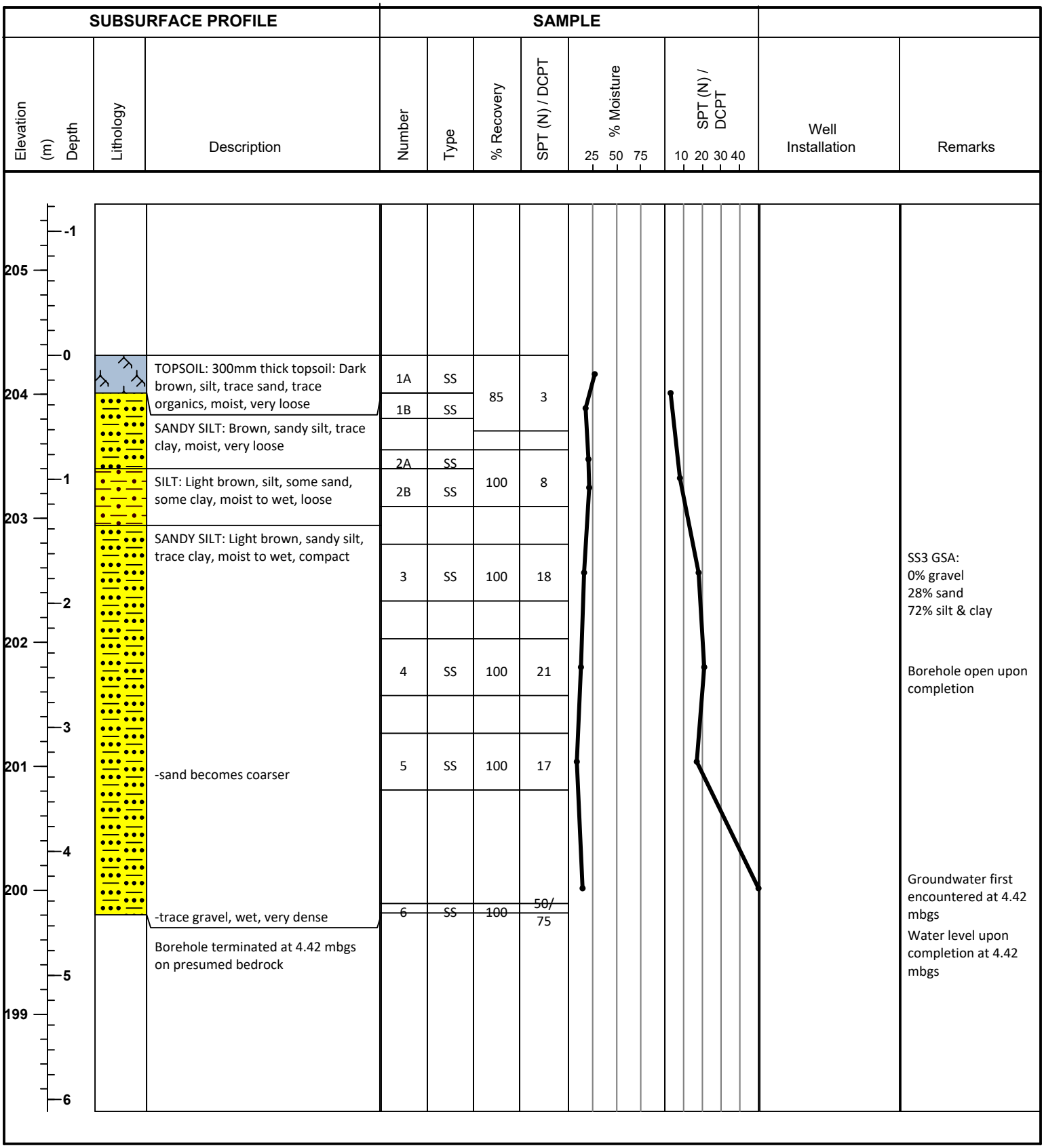
Log of Borehole: BH107-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263454.8087 E, 4919307.502 N	**Elevation:**	204.314 masl



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

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Log of Borehole: BH108-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263506.3392 E, 4919437.261 N	**Elevation:**	210.409 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
211 / -1										
210 / 0		TOPSOIL: 300mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS	75	3				
			1B	SS						
		SANDY SILT: Brown, sandy silt, trace clay, moist, very loose								
209 / 1		SAND AND SILT: Light brown, gravelly sand and silt, trace clay, moist, compact	2	SS	80	20				
										Groundwater first encountered at 1.52 mbgs
208 / 2		-becomes wet	3	SS	80	13				Water level upon completion at 2.13 mbgs
			4	SS	60	14				
207 / 3		-becomes saturated	5	SS	50	13				
206 / 4		-becomes very dense	6	SS	100	50/100				Borehole open upon completion
205 / 5		Borehole terminated at 4.67 mbgs on presumed bedrock								
/ 6										

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

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Log of Borehole: BH109-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263498.4301 E, 4919578.083 N	**Elevation:**	209.636 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
210 / 0		TOPSOIL: 150mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS						
			1B	SS	75	3				
209 / 1		SILTY SAND: Brown, silty sand, trace clay, moist, very loose								
			2A	SS						
		SILT AND SAND: Brown, silt and sand, trace clay, moist to wet, very loose	2B	SS	60	1				
208 / 2		SAND AND SILT: Light brown, gravelly sand and silt, moist, compact	3	SS	100	27				SS3 GSA: 21% gravel 40% sand 39% silt & clay
			4	SS	70	51				
207 / 3		-becomes very dense								
			5	SS	100	60				
206 / 4										
205 / 5			6	SS	100	50/ 275				Borehole open and dry upon completion
		Borehole terminated at 4.88 mbgs on presumed bedrock								
204 / 6										

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

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Log of Borehole: BH110-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263594.2056 E, 4919677.787 N	**Elevation:**	209.735 masl

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N) / DCPT	Well Installation	Remarks
210	0	TOPSOIL: 200mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A	SS	65	4		
			1B	SS				
209	1	SANDY SILT: Brown, sandy silt, trace clay, moist, loose						
		SILTY SAND: Brown, silty sand, trace clay, moist, loose	2A	SS	100	5		
			2B	SS				
		SILT: Brown, silt, some sand, some clay, moist to wet, loose						
208	2		3A	SS	85	13		
		SILTY SAND: Light brown, silty sand, trace clay, trace gravel, moist to wet, compact	3B	SS				
		GRAVELLY SAND: Light brown, gravelly silty sand, trace clay, moist to wet, dense	4	SS	60	36		
207	3							
			5	SS	100	48		
206	4	Borehole terminated at 3.96 mbgs on presumed bedrock						Borehole open and dry upon completion
205	5							
204	6							

% Moisture: 25 50 75
SPT (N) / DCPT: 10 20 30 40

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

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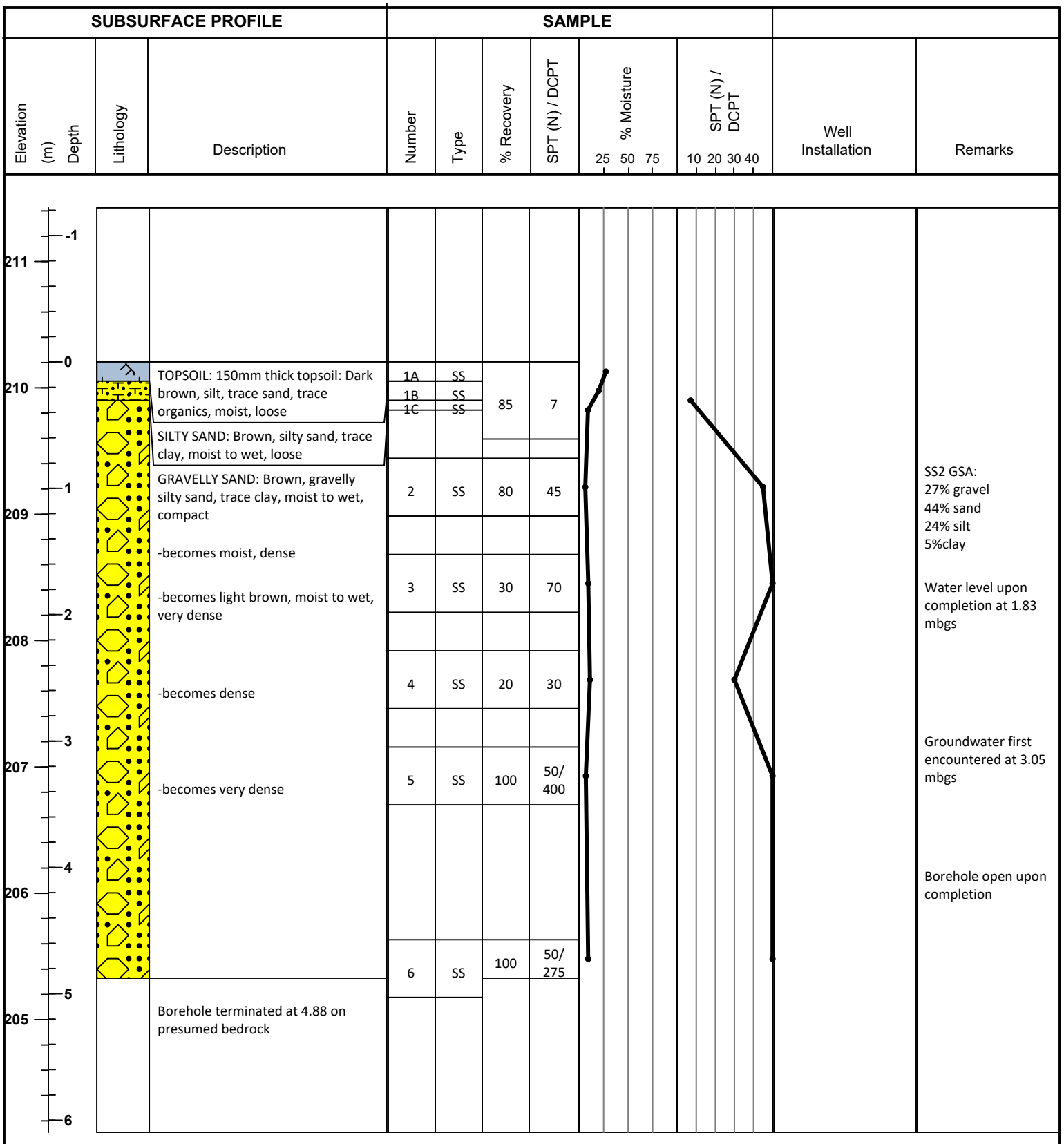
Log of Borehole: BH111-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T263661.3887 E, 4919579.516 N	**Elevation:**	210.205 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
211 / -1										
210 / 0		TOPSOIL: 150mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A 1B 1C	SS SS SS	85	7				
		SILTY SAND: Brown, silty sand, trace clay, moist to wet, loose								
209 / 1		GRAVELLY SAND: Brown, gravelly silty sand, trace clay, moist to wet, compact	2	SS	80	45				SS2 GSA: 27% gravel 44% sand 24% silt 5%clay
		-becomes moist, dense								
208 / 2		-becomes light brown, moist to wet, very dense	3	SS	30	70				Water level upon completion at 1.83 mbgs
		-becomes dense	4	SS	20	30				
207 / 3		-becomes very dense	5	SS	100	50/ 400				Groundwater first encountered at 3.05 mbgs
206 / 4										Borehole open upon completion
205 / 5		Borehole terminated at 4.88 on presumed bedrock	6	SS	100	50/ 275				
/ 6										

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

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Log of Borehole: BH112-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263763.0134 E, 4919801.271 N	**Elevation:**	209.28 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
209 / 0		TOPSOIL: 200mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS	85	3			Cap	Groundwater first encountered at 0.76 mbgs
			1B	SS					Pipe	
		SANDY SILT: Brown, sandy silt, trace clay, moist, very loose							Bentonite Plug	
208 / 1		SILTY SAND: Brown, silty sand, wet, loose	2	SS	100	4				Water level upon completion at 0.76 mbgs
		SILT: Brown, silt, some sand, some clay, wet, loose	3A	SS	50	5				Water level measured at 1.24 mbgs on May 4, 2022
207 / 2		SILTY SAND: Brown, silty sand, trace clay, wet, loose	3B	SS					Sand Pack	
		GRAVELLY SAND: Brown, gravelly silty sand, trace clay, saturated, very dense	4	SS	40	50/ 375			PVC Screen	
206 / 3		Borehole terminated at 2.67 mbgs on presumed bedrock							Cap	Borehole caving occurred up to 2.59 mbgs upon completion
205 / 4										
204 / 5										
/ 6										

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

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Log of Borehole: BH113-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263859.3257 E, 4919563.455 N	**Elevation:**	211.703 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
212 / 0		TOPSOIL: 300mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS	80	3				
			1B	SS						
211 / 1		SANDY SILT: Brown, sandy silt, trace clay, moist, very loose								
		GRAVELLY SAND: Grey, gravelly silty sand, dry to moist, dense	2	SS	50	38				
210 / 2		-becomes very dense	3	SS	70	50/ 400				Borehole open and dry upon completion
		Borehole terminated at 1.98 mbgs on presumed bedrock								
209 / 3										
208 / 4										
207 / 5										
206 / 6										

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

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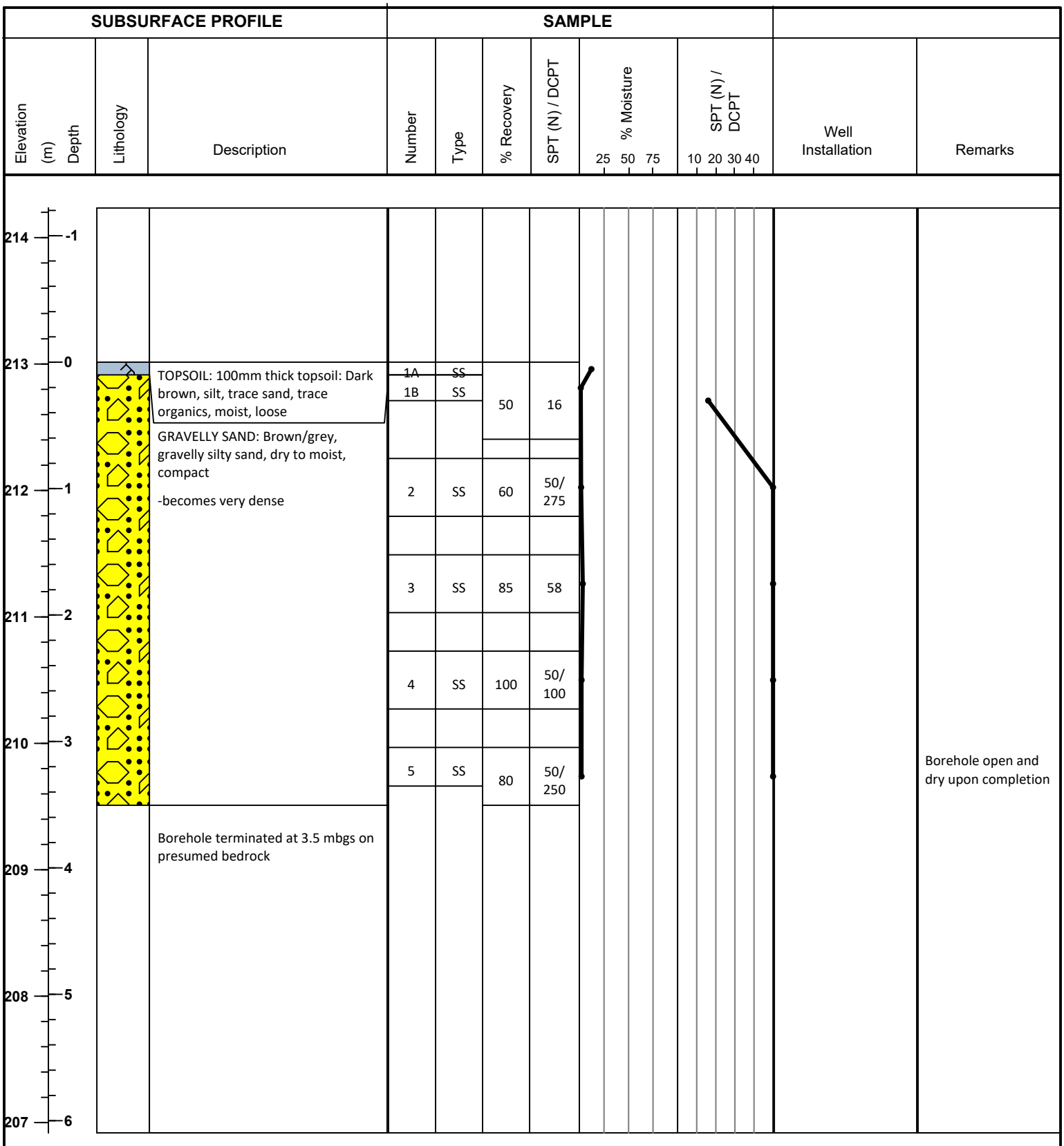
Log of Borehole: BH114-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263757.541 E, 4919417.733 N	**Elevation:**	213.015 masl



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

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Log of Borehole: BH115-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263931.2517 E, 4919417.57 N	**Elevation:**	210.833 masl

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N) / DCPT	Well Installation	Remarks
212	-1						Cap	
211	0	TOPSOIL: 200mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A	SS			Pipe	
			1B	SS	65	4	Bentonite Plug	
		SANDY SILT: Brown, sandy silt, trace clay, trace organics, moist, loose						
210	1	GRAVELLY SAND: Brown, gravelly silty sand, moist, dense	2	SS	50	42		
			3	SS	80	32	Sand Pack	
209	2						PVC Screen	
		-becomes very dense	4	SS	60	50/ 300	Cap	
208	3	Borehole terminated at 2.59 mbgs on presumed bedrock						
207	4							
206	5							
205	6							

% Moisture: 25 50 75

SPT (N) / DCPT: 10 20 30 40

Groundwater first encountered at 1.52 mbgs

SS3 GSA:
34% gravel
46% sand
20% silt & clay

Water level upon completion at 1.68 mbgs

Water level measured at 2.02 mbgs on May 4, 2022

Borehole open upon completion

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

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Log of Borehole: BH116-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263788.3967 E, 4919215.355 N	**Elevation:**	210.406 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
211 / -1										
210 / 0		TOPSOIL: 150mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A 1B	SS SS	60	7				
		SILTY SAND: Brown, silty sand, trace gravel, trace clay, moist, loose -becomes compact	2A 2B	SS SS	67	10				
209 / -1		GRAVELLY SAND: Brown, gravelly sand, some silt, trace clay, moist, dense	3	SS	100	42				
208 / -2		GRAVEL: Grey, gravel, some sand, some silt, dry, very dense	4A 4B	SS SS	50	50/ 275				Borehole open and dry upon completion
		Borehole terminated at 2.59 mbgs on presumed bedrock								
207 / -3										
206 / -4										
205 / -5										
-6										

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

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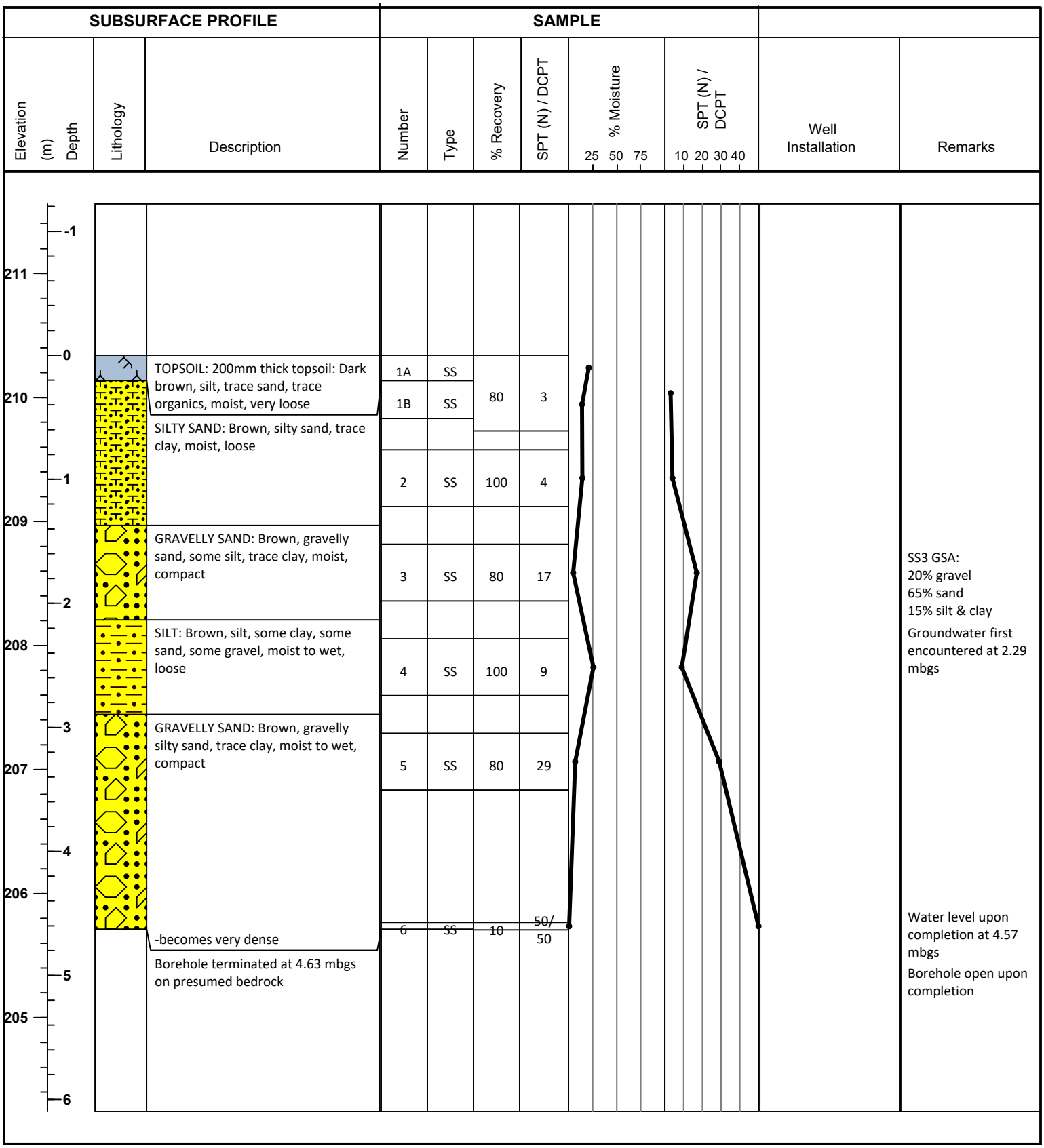
Log of Borehole: BH117-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263640.3596 E, 4919276.71 N	**Elevation:**	210.34 masl



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

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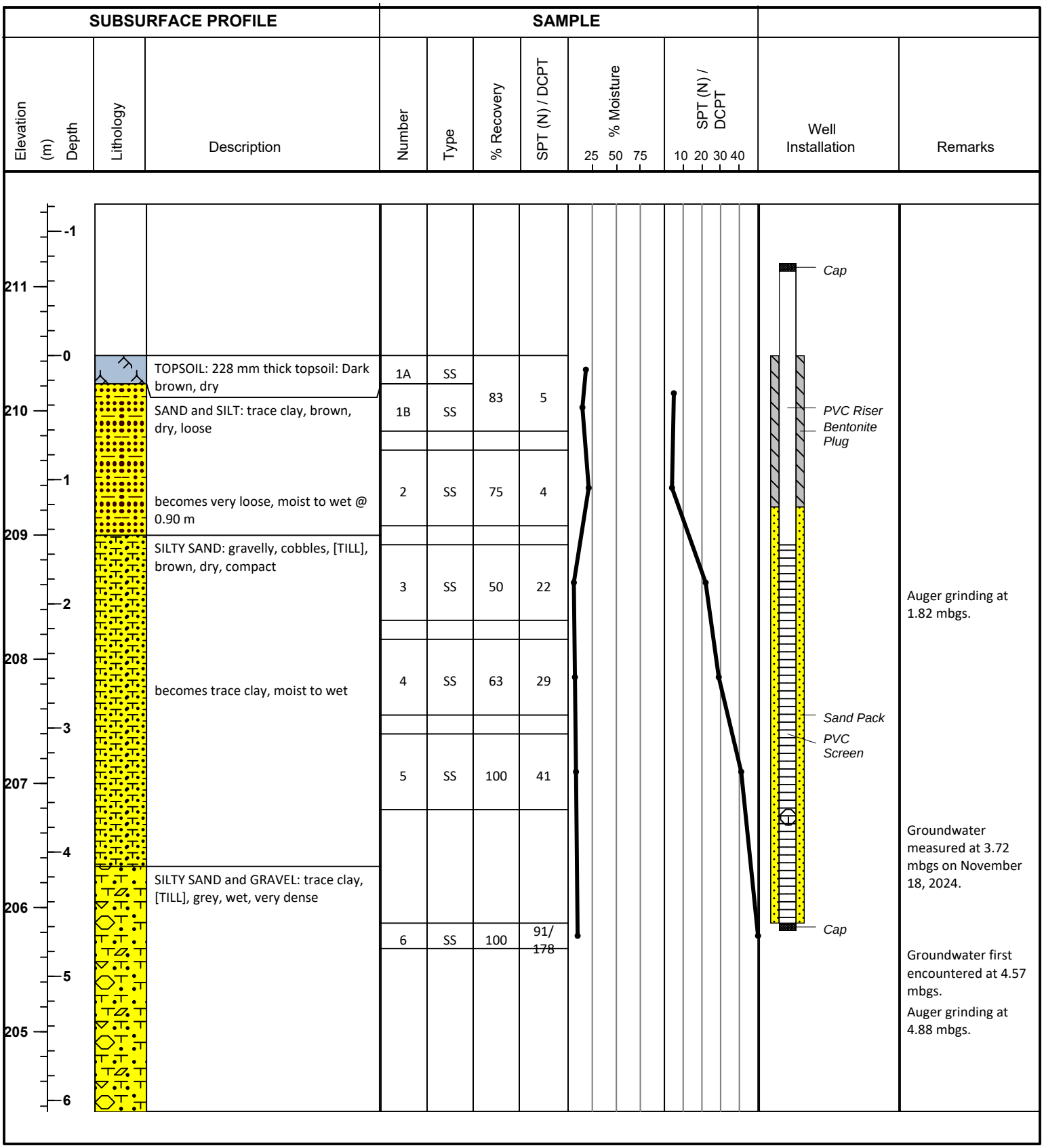
Log of Borehole: BH201-24

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-007
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	November 8, 2024
Location:	42 and 2 Mill Street, Norwood	**UTM:**	18T 263612.29 E, 4919504.45 N	**Elevation:**	210.50 mASL



Logged By: T. Paget **Input By:** T. Paget

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Log of Borehole: BH201-24

Client:	CAP Norwood Dev	***Project Name:***	42 & 52 Mill Street, Norwood	***Project No.:***	14288-007
Contractor:	Canadian Environmental	***Method:***	Solid Stem Auger	***Date Completed:***	November 8, 2024
Location:	42 and 2 Mill Street, Norwood	***UTM:***	18T 263612.29 E, 4919504.45 N	***Elevation:***	210.50 mASL

SUBSURFACE PROFILE			SAMPLE								
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
204										Auger grinding at 6.40 mbgs.
7		Borehole terminated at 7.09 mbgs on presumed bedrock								
203										

Logged By: T. Paget ***Input By:*** T. Paget

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Log of Borehole: BH202-24

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-007
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	November 8, 2024
Location:	42 and 2 Mill Street, Norwood	**UTM:**	18T 263488.05 E, 4919401.91 N	**Elevation:**	209.76 mASL

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N) / DCPT	Well Installation	Remarks
210	-1							
209	0	TOPSOIL: 228 mm thick topsoil: Dark brown, dry	1A	SS			Cap	
		SAND: some silt, light brown, dry, loose	1B	SS	63	5	PVC Riser	
208	1	becomes very loose	2	SS	42	2	Bentonite Plug	
207	2	becomes loose	3	SS	63	6		
		SILTY SAND: some gravel, cobbles, brown, moist to wet, loose	4	SS	50	9		Auger grinding at 2.44 mbgs.
206	3	GRAVELLY SILT AND SAND: cobbles, brown, [TILL], moist, very dense	5	SS	100	76/ 280	Sand Pack PVC Screen	Groundwater measured at 2.94 mbgs on November 18, 2024.
205	4	Sand and Silt: some gravel, trace clay, cobbles, grey, dry, very dense	6	SS	100	98/ 228		Auger grinding at 3.96 mbgs.
204	5	Borehole terminated at 4.95 mbgs on presumed bedrock					Cap	

% Moisture: 25 50 75

SPT (N) / DCPT: 10 20 30 40

Logged By: T. Paget **Input By:** T. Paget

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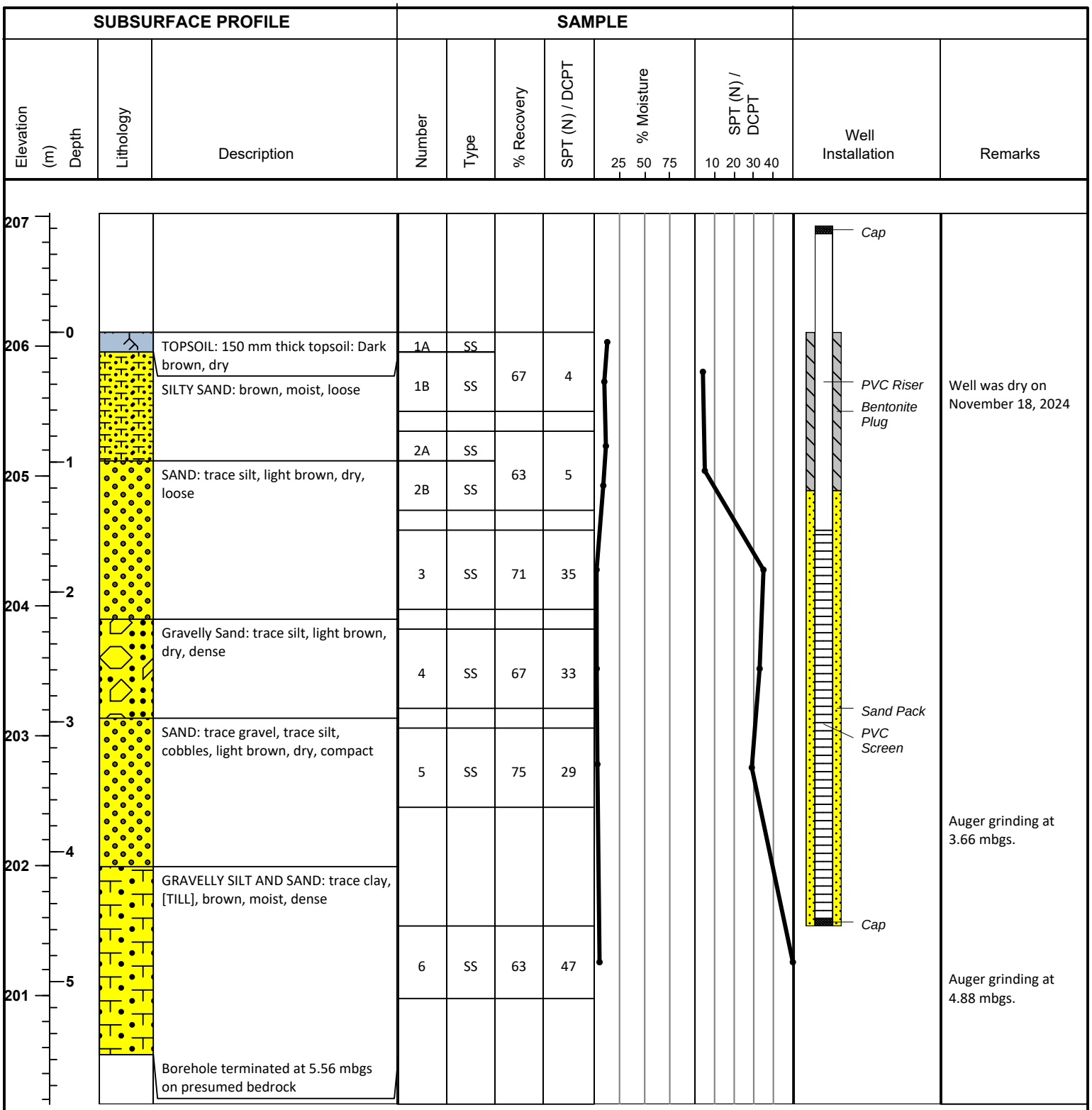
Log of Borehole: BH203-24

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-007
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	November 8, 2024
Location:	42 and 2 Mill Street, Norwood	**UTM:**	18T 263526.2 E, 4919282.54 N	**Elevation:**	206.16 mASL



Logged By: T. Paget **Input By:** T. Paget

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Log of Borehole: BH204-24

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-007
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	November 8, 2024
Location:	42 and 2 Mill Street, Norwood	**UTM:**	18T 263696.36 E, 4917808.56 N	**Elevation:**	208.96 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
210 / 0		TOPSOIL: 686 mm thick topsoil: Dark brown, moist	1A	SS	83	4			Cap	
			1B	SS					PVC Riser	
									Bentonite Plug	Well was dry on November 18, 2024
209 / 1		Silty Sand: brown, dry, loose	2	SS	63	5				
208 / 2		becomes moist, compact	3	SS	63	10			Sand Pack	
		Silty Sand and Gravel: light brown to grey, moist, compact							PVC Screen	Auger grinding at 1.28 mbgs.
207 / 3			4	SS	73	60/ 228			Cap	
		Borehole terminated at 2.69 mbgs on presumed bedrock								Borehole open and dry on completion.
206 / 4										
205 / 5										
204										

Logged By: T. Paget **Input By:** T. Paget

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP118-22	0.15-0.75	GS2		Brown, SILTY SAND, trace clay, moist	0.45	6
	0.75-1.5	GS3		Light brown, GRAVELLY SILTY SAND, trace clay	0.6	8
18T 263459.2299 E	1.5-2.4	GS4		Same as above	0.75	6
4919096.046 N	2.4-3.0	GS5		Same as above	0.9	10
					1.05	17
206.812 masl					1.2	22
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	4
				No groundwater or caving observed upon completion	1.5	12
					1.65	50
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP119-22	0.3-1.2	GS2		Light brown, SILTY SAND, trace clay, moist	0.45	7
	1.2-2.1	GS3		Light brown, GRAVELLY SILTY SAND, moist	0.6	6
18T 263307.8794 E	2.1-3.0	GS4		Same as above	0.75	6
4919249.476 N	3.3			Bedrock	0.9	8
					1.05	9
203.588 masl					1.2	13
				Test pit terminated at 3.3 mbgs on bedrock	1.35	4
				No groundwater or caving observed upon completion	1.5	16
					1.65	22
					1.8	28
					1.95	27
					2.1	35
					2.25	50
					0.15	1
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP120-22	0.15-0.9	GS2		Brown, SILTY SAND, trace clay, moist	0.45	6
	0.9-1.5	GS3		Brown, SILTY SAND, some clay, moist to wet	0.6	7
18T 263381.7756 E	1.5-2.1	GS4		Light brown, SILTY SAND, some gravel, trace clay, moist	0.75	8
4919293.79 E	2.1-3.0	GS5		Light brown, GRAVELLY SILTY SAND, trace clay, moist	0.9	9
					1.05	10
203.488 masl					1.2	8
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	2
				No groundwater or caving observed upon completion	1.5	4
					1.65	11
					1.8	11
					1.95	10
					2.1	28
					2.25	39
					2.4	48

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	1
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP121-22	0.15-0.75	GS2		Brown, SILTY SAND, trace clay, moist	0.45	6
	0.75-1.5	GS3		Brown, SILTY SAND, some clay, moist to wet	0.6	8
18T 263323.0037 E	1.5-2.4	GS4		Light brown/grey, SILTY SAND, some clay, moist	0.75	9
4919401.899 N	2.4-3.0	GS5		Same as above, trace gravel	0.9	10
					1.05	13
203.75 masl					1.2	15
				Test pit terminated at 3.6 mbgs in silty sand	1.35	1
				Groundwater seepage observed at 3.3 mbgs	1.5	3
				Water level observed at 3.6 mbgs upon completion	1.65	4
				Sidewall caving observed at 3.3 mbgs	1.8	5
					1.95	9
					2.1	17
					2.25	30
					2.4	38
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP122-22	0.2-1.2	GS2		Light brown, SILTY SAND, trace clay, moist	0.45	5
	1.2-2.25	GS3		Same as above	0.6	7
18T 263435.1018 E	2.25-3.0	GS4		Light brown, GRAVELLY SILTY SAND, moist	0.75	8
4919413.538 N					0.9	6
					1.05	5
208.78 masl				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.2	5
				No groundwater observed upon completion	1.35	1
				Sidewall caving observed at 0.9 mbgs	1.5	1
					1.65	1
					1.8	1
					1.95	1
					2.1	1
					2.25	1
					2.4	21

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP123-22	0.2-0.6	GS2		Brown, SAND, some silt, some gravel, moist	0.45	8
	0.6-1.5	GS3		Light brown, SAND, some silt, trace gravel, moist	0.6	8
18T 263570.6278 E	1.5-2.4	GS4		Brown, GRAVELLY SAND, some silt, moist	0.75	7
4919349.463 N	2.4-3.0	GS5		Same as above	0.9	5
					1.05	12
209.674 masl					1.2	22
				Test pit terminated at 3.0 mbgs in gravelly sand	1.35	3
				No groundwater or caving observed upon completion	1.5	9
					1.65	11
					1.8	13
					1.95	13
					2.1	17
					2.25	39
					2.4	50
					0.15	3
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	9
TP124-22	0.3-1.2	GS2		Light brown, GRAVELLY SILTY SAND, trace clay, moist	0.45	39
	1.2-2.1	GS3		Same as above	0.6	50
18T 263487.625 E	2.1-3.0	GS4		Same as above	0.75	
4919227.613 N					0.9	
					1.05	
205.446 masl				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.2	
				No groundwater or caving observed upon completion	1.35	4
					1.5	20
					1.65	50
					0.15	1
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	2
TP125-22	0.3-1.2	GS2		Light brown, GRAVELLY SILTY SAND, trace clay, moist	0.45	2
	1.2-2.1	GS3		Same as above	0.6	4
18T 263587.5195 E	2.1-3.0	GS4		Same as above	0.75	11
4919198.145 N					0.9	50
					1.05	
208.502 masl				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.2	
				No groundwater or caving observed upon completion	1.35	9
					1.5	42
					1.65	50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	1
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	2
TP126-22	0.15-0.9	GS2		Brown, SILTY SAND, trace clay, trace organics, moist	0.45	2
	0.9-1.5	GS3		Light brown, SAND, some silt, trace clay, moist	0.6	2
18T 263673.8582 E	1.5-2.4	GS4		Light brown, GRAVELLY SILTY SAND, moist	0.75	3
4919184.81 N	2.4-3.0	GS5		Same as above	0.9	4
					1.05	3
211.056 masl					1.2	4
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	3
				No groundwater or caving observed upon completion	1.5	11
					1.65	29
					1.8	50
					0.15	2
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP127-22	0.15-0.75	GS2		Brown, SILTY SAND, trace clay, trace organics, moist	0.45	6
	0.75-1.65	GS3		Light brown, SAND, some silt, trace clay, moist	0.6	6
18T 263736.9108 E	1.65-2.55	GS4		Light brown, GRAVELLY SILTY SAND, moist	0.75	6
4919266.591 N					0.9	7
					1.05	5
208.81 masl				Test pit terminated at 2.55 mbgs on bedrock	1.2	5
				No groundwater or caving observed upon completion	1.35	8
					1.5	50
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP128-22	0.2-0.9	GS2		Brown, SANDY SILT, trace clay, moist	0.45	5
	0.9-1.5	GS3		Brown, SILTY SAND, trace clay, moist to wet	0.6	6
18T 263669.5935 E	1.5-2.4	GS4		Light brown, GRAVELLY SILTY SAND, moist to wet	0.75	9
4919343.14 N	2.4-3.0	GS5		Same as above	0.9	10
					1.05	12
208.276 masl					1.2	11
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	2
				Groundwater seepage observed at 2.4 mbgs	1.5	4
				Water level observed at 2.55 mbgs upon completion	1.65	5
				Sidewall caving observed at 0.9 mbgs	1.8	12
					1.95	17
					2.1	7
					2.25	15
					2.4	50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	7
TP129-22	0.3-0.9	GS2		Brown, SILTY SAND, trace clay, moist	0.45	8
	0.9-1.5	GS3		Brown, SILT AND SAND, trace clay, moist	0.6	12
18T 263689.7605 E	1.5-2.4	GS4		Light brown, GRAVELLY SILTY SAND, moist to wet	0.75	18
4919465.412 N	2.4-3.0	GS5		Same as above, wet	0.9	14
					1.05	13
210.846 masl					1.2	14
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	5
				Groundwater seepage observed at 2.4 mbgs	1.5	15
				Water level observed at 2.85 mbgs upon completion	1.65	44
				No caving observed upon completion	1.8	50
					0.15	1
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP130-22	0.2-0.9	GS2		Brown, SILTY SAND, trace clay, moist to wet	0.45	7
	0.9-1.8	GS3		Brown, SILTY SAND, some gravel, trace clay, moist to wet	0.6	9
18T 263592.0739 E	1.8-2.4	GS4		Light brown, GRAVELLY SILTY SAND, trace clay, moist to wet	0.75	10
4919499.753 N	2.4-3.0	GS5		Same as above	0.9	12
					1.05	16
210.096 masl					1.2	22
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	4
				Groundwater seepage observed at 1.8 mbgs	1.5	4
				Water level observed at 3.0 mbgs upon completion	1.65	3
				No caving observed upon completion	1.8	4
					1.95	13
					2.1	33
					2.25	50
					0.15	1
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP131-22	0.2-1.2	GS2		Light brown, GRAVELLY SAND, some silt, trace clay, moist to wet	0.45	5
	1.2-2.1	GS3		Same as above	0.6	7
18T 263566.1644 E	2.1-3.0	GS4		Same as above	0.75	9
4919572.217 N					0.9	12
					1.05	50
209.662 masl				Test pit terminated at 3.0 mbgs in gravelly sand	1.2	
				No groundwater or caving observed upon completion	1.35	4
					1.5	50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	1
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP132-22	0.15-0.6	GS2		Brown, SILTY SAND, trace clay, moist	0.45	5
	0.6-1.5	GS3		Brown, SILT AND SAND, trace clay, moist	0.6	6
18T 263707.1165 E	1.5-2.4	GS4		Light brown, GRAVELLY SILTY SAND, moist to wet	0.75	9
4919695.665 N	2.4-3.0	GS5		Same as above, wet	0.9	12
					1.05	12
209.94 masl					1.2	11
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	2
				Groundwater seepage observed at 2.4 mbgs	1.5	5
				Water level observed at 2.85 mbgs upon completion	1.65	7
				No caving observed upon completion	1.8	10
					1.95	18
					2.1	39
					2.25	50
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP133-22	0.3-0.9	GS2		Brown, SILTY SAND, trace clay, moist	0.45	5
	0.9-1.2	GS3		Light brown, GRAVELLY SILTY SAND, wet, trace clay	0.6	10
18T 263811.4872 E	1.2-2.4	GS4		Same as above, moist	0.75	8
4919691.934 N	2.4-3.0	GS5		Same as above	0.9	14
					1.05	10
210.921 masl					1.2	20
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	1
				Groundwater at 1.05 mbgs	1.5	3
				No water level or caving observed upon completion	1.65	8
					1.8	20
					1.95	36
					2.1	50
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP134-22	0.2-1.2	GS2		Light brown, SILTY SAND, trace clay, moist	0.45	6
	1.2-1.8	GS3		Light brown, GRAVELLY SILTY SAND, moist	0.6	8
18T 263754.5517 E	1.8-2.25	GS4		Same as above	0.75	22
4919601.034 E					0.9	50
					1.05	
213.61 masl				Test pit terminated at 2.25 mbgs on bedrock	1.2	8
				No groundwater or caving observed upon completion	1.35	50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	10
TP135-22	0.2-0.6	GS2		Brown, SILTY SAND, trace clay, moist	0.45	8
	0.6-1.2	GS3		Light brown, GRAVELLY SILTY SAND, moist	0.6	6
18T 263781.1848 E	1.2-1.95	GS4		Same as above	0.75	5
4919504.206 N					0.9	50
					1.05	
211.982 masl				Test pit terminated at 1.95 mbgs on bedrock	1.2	7
				No groundwater or caving observed upon completion	1.35	17
					1.5	50
					1.65	
					1.8	
					1.95	
					2.1	
					2.25	
					0.15	1
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP136-22	0.3-0.6	GS2		Brown, SILTY SAND, trace clay, moist	0.45	6
	0.6-1.5	GS3		Brown, GRAVELLY SILTY SAND, moist	0.6	19
18T 263881.0651 E					0.75	50
4919463.612 N					0.9	
				Test pit terminated at 1.5 mbgs on bedrock	1.05	
213.088 masl				No groundwater or caving observed upon completion	1.2	10
					1.35	50
				Large cobbles throughout		
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP137-22	0.3-1.2	GS2		Brown, SILTY SAND, trace clay, moist	0.45	4
	1.2-1.95	GS3		Same as above	0.6	4
18T 263827.6047 E					0.75	5
4919332.42 N					0.9	5
				Test pit terminated at 1.95 mbgs on bedrock	1.05	6
210.368 masl				No groundwater or caving observed upon completion	1.2	6
					1.35	0
					1.5	2
					1.65	50
					1.8	

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
TP138-22 18T 263861.8087 E 4919252.342 N 209.877 masl	0-0.15 0.15-1.05 1.05-1.5	GS1 GS2 GS3		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist Brown, SILTY SAND, trace clay, moist Light brown, SILTY SAND, some clay, moist to wet Test pit terminated at 1.5 mbgs on bedrock No groundwater or water level observed upon completion Sidewall caving observed at 0.6 mbgs	0.15 0.3 0.45 0.6 0.75 0.9 1.05 1.2 1.35	1 3 7 8 15 50 15 50
TP139-22 18T 263604.7646 E 4919410.865 N 209.924 masl	0-0.3 0.3-1.2 1.2-2.1 2.1-3.0	GS1 GS2 GS3 GS4		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist Brown, SILTY SAND, trace clay, moist Light brown, GRAVELLY SILTY SAND, trace clay, moist Same as above Test pit terminated at 3.0 mbgs in gravelly silty sand No groundwater or caving observed upon completion	0.15 0.3 0.45 0.6 0.75 0.9 1.05 1.2 1.35 1.5 1.65 1.8 1.95 2.1	2 5 6 6 7 8 10 11 1 2 3 9 29 50
TP140-22 18T 263475.3943 E 4919493.625 N 209.734 masl	0-0.3 0.3-0.75 0.75-1.5 1.5-2.4 2.4-3.0	GS1 GS2 GS3 GS4 GS5		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist Brown, SILTY SAND, trace clay, moist Light brown, GRAVELLY SAND, trace clay, moist to wet, some silt Same as above, wet Same as above Test pit terminated at 3.0 mbgs in gravelly sand Groundwater seepage observed at 1.95 mbgs Water level observed at 2.85 mbgs upon completion Sidewall caving observed at 0.9 mbgs	0.15 0.3 0.45 0.6 0.75 0.9 1.05 1.2 1.35 1.5 1.65 1.8	2 5 9 9 8 10 16 29 5 10 27 50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	8
TP141-22	0.15-0.75	GS2		Light brown, SILTY SAND, trace clay, moist	0.45	11
	0.75-1.8	GS3		Same as above, some gravel	0.6	12
18T 263333.4648 E	1.8-2.1	GS4		Light brown, GRAVELLY SILTY SAND, moist	0.75	22
4919169.725 N	2.1-3.0	GS5		Same as above	0.9	18
					1.05	22
204.859 masl					1.2	28
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	1
				No groundwater or caving observed upon completion	1.5	2
					1.65	6
					1.8	4
					1.95	9
					2.1	50

Appendix C

Grain Size Analysis

Grain Size Distribution Chart

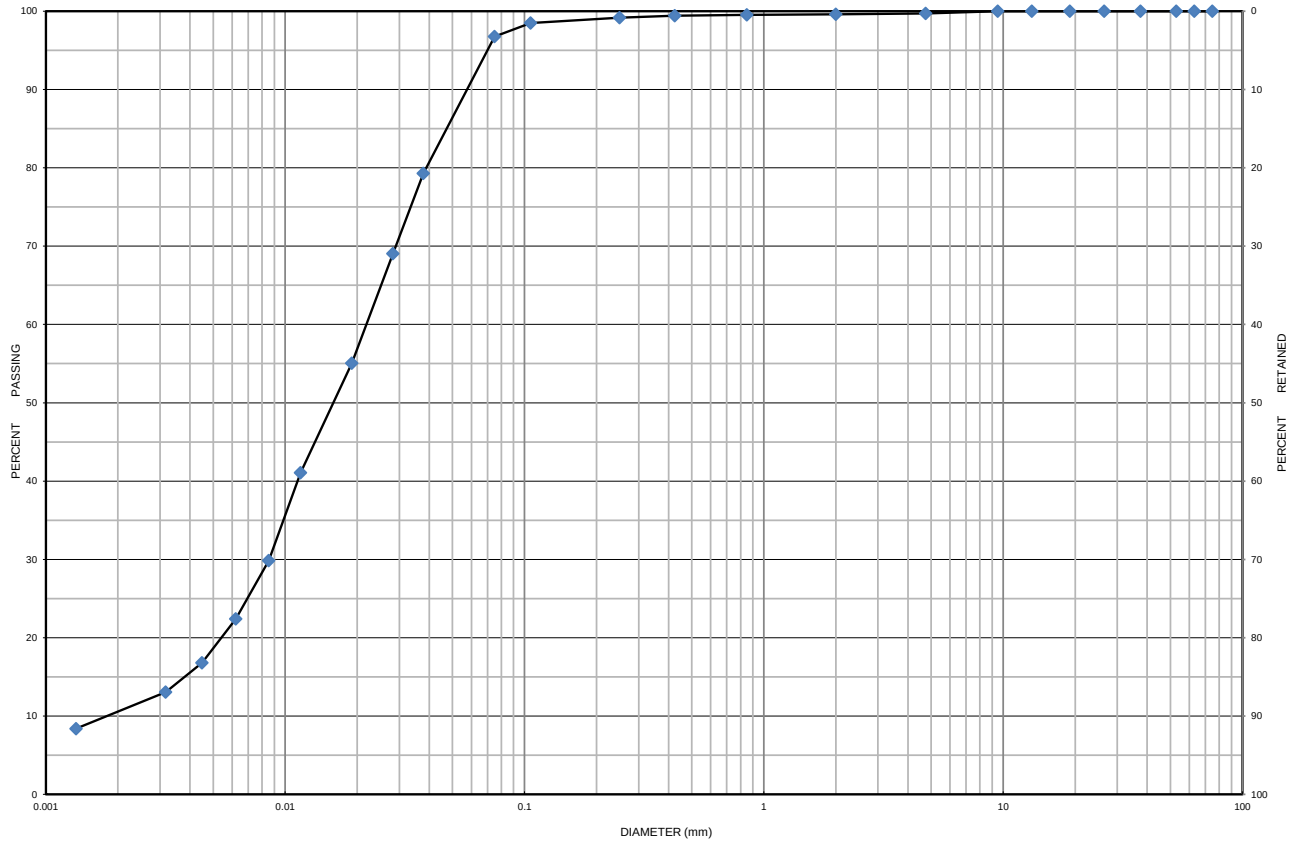
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 102-22 SS 4* **Depth:** *2.3 m to 2.7 m* **Lab Sample No:** *S-22-0740*

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 102-22	SS 4	2.3 m to 2.7 m	0	3	86	11	27.8

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silt some Clay trace Sand	ML	0.0220	0.0087	0.0017	12.94	2.02

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Grain Size Distribution Chart

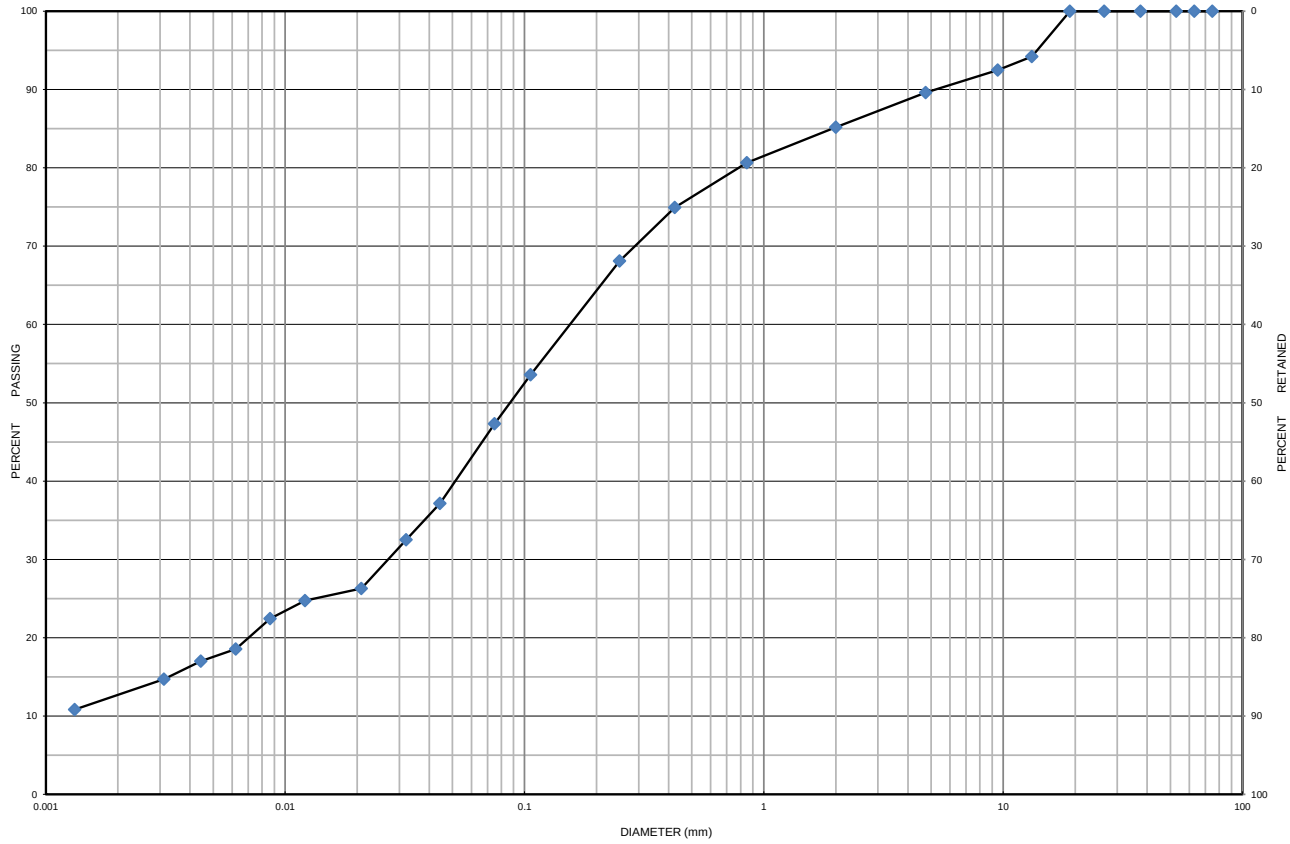
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 104-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0741*

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



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

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 104-22	SS 3	1.5 m to 2 m	10	42	35	13	8.2

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand and Silt some Clay some Gravel	SM	0.160	0.026	-	-	-

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Grain Size Distribution Chart

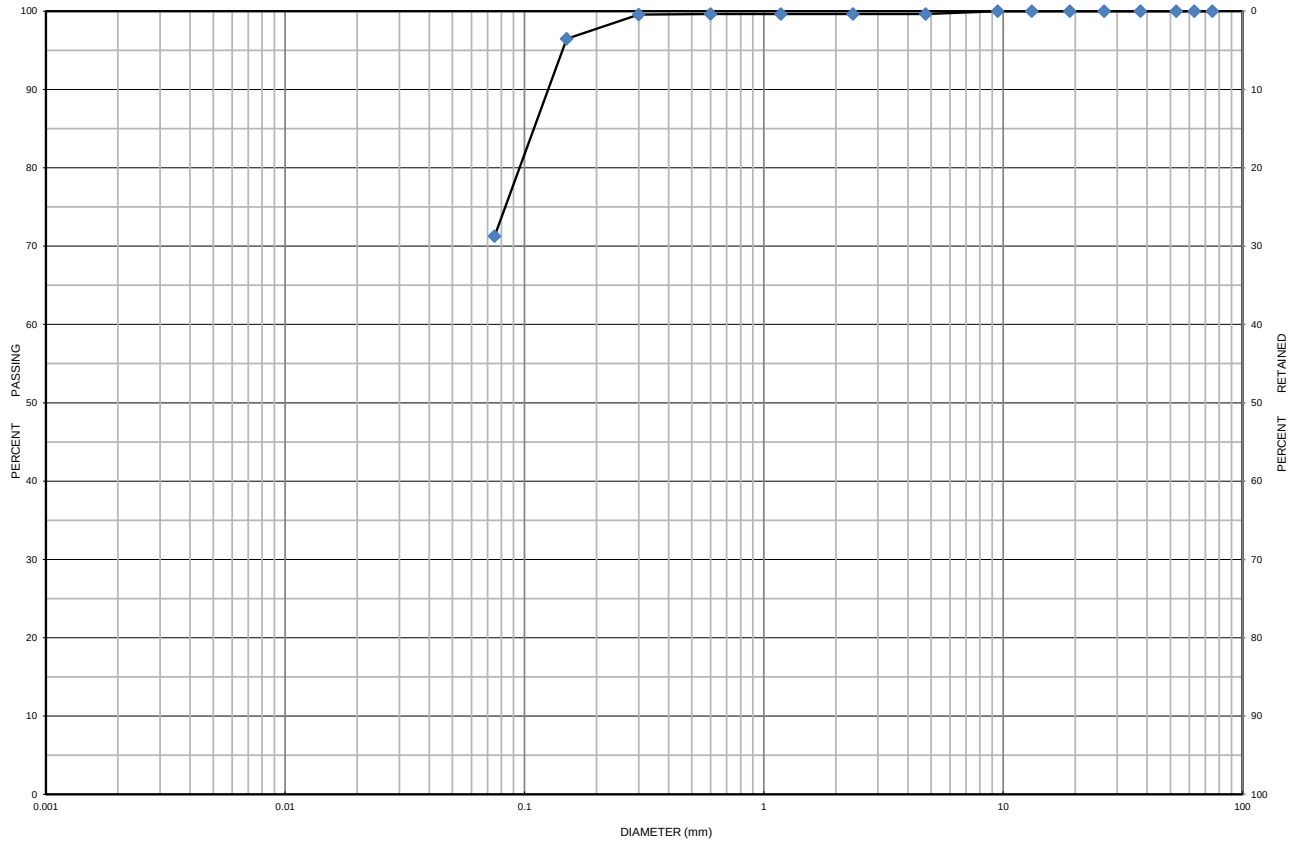
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 105-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0742*

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 105-22	SS 3	1.5 m to 2 m	0	28	72		23.7

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sandy Silt	ML	-	-	-	-	-

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Grain Size Distribution Chart

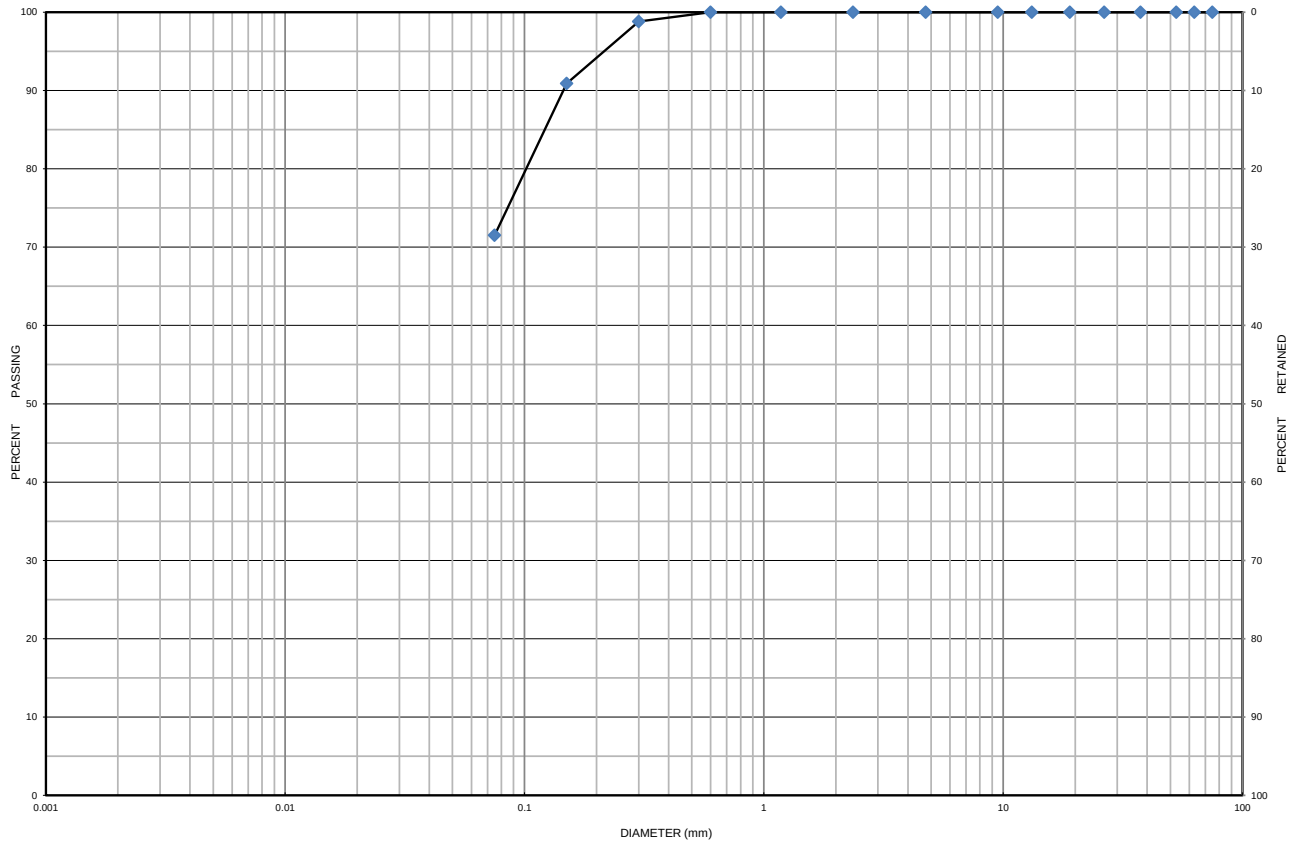
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 107-22 SS 3* **Depth:** **Lab Sample No:** *S-22-0743*

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



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

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 107-22	SS 3		0	28	72		16.1

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sandy Silt	ML	-	-	-	-	-

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Grain Size Distribution Chart

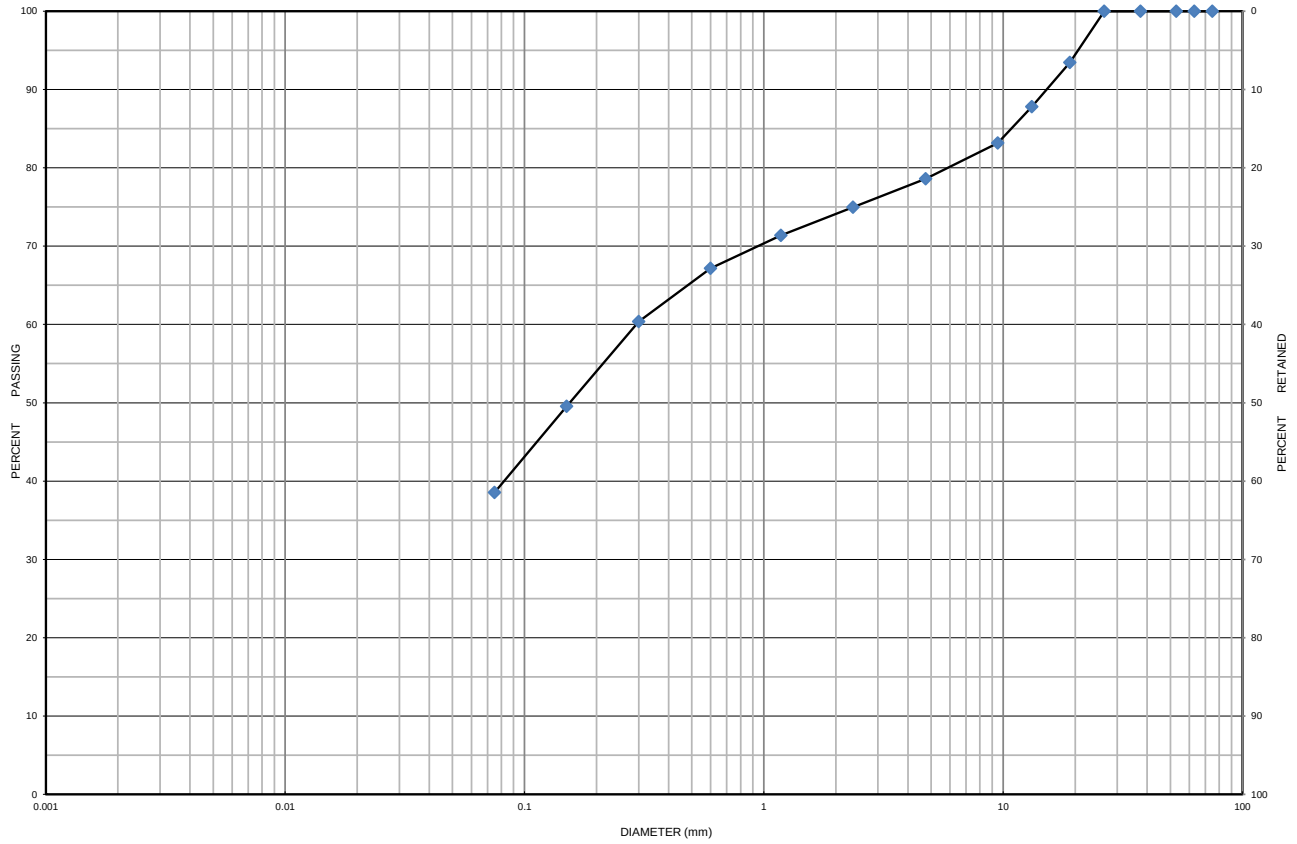
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 109-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0744*

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 109-22	SS 3	1.5 m to 2 m	21	40	39		8.2

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Sand and Silt	SM	0.300	-	-	-	-

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Grain Size Distribution Chart

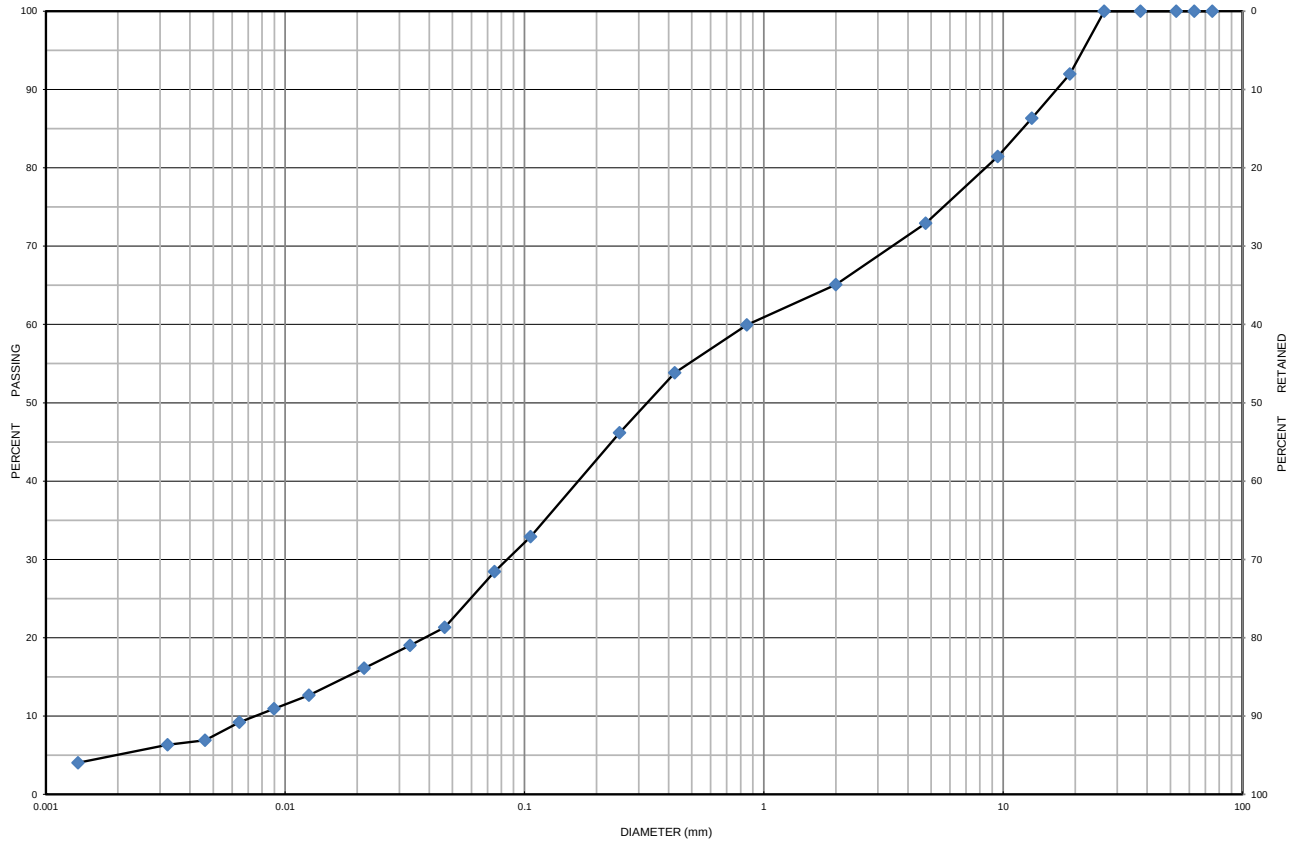
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 111-22 SS 2* **Depth:** *0.8 m to 1.2 m* **Lab Sample No:** *S-22-0747*

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 111-22	SS 2	0.8 m to 1.2 m	27	44	24	5	6.3

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Silty Sand trace Clay	SM	0.8800	0.0860	0.0075	117.33	1.12

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Grain Size Distribution Chart

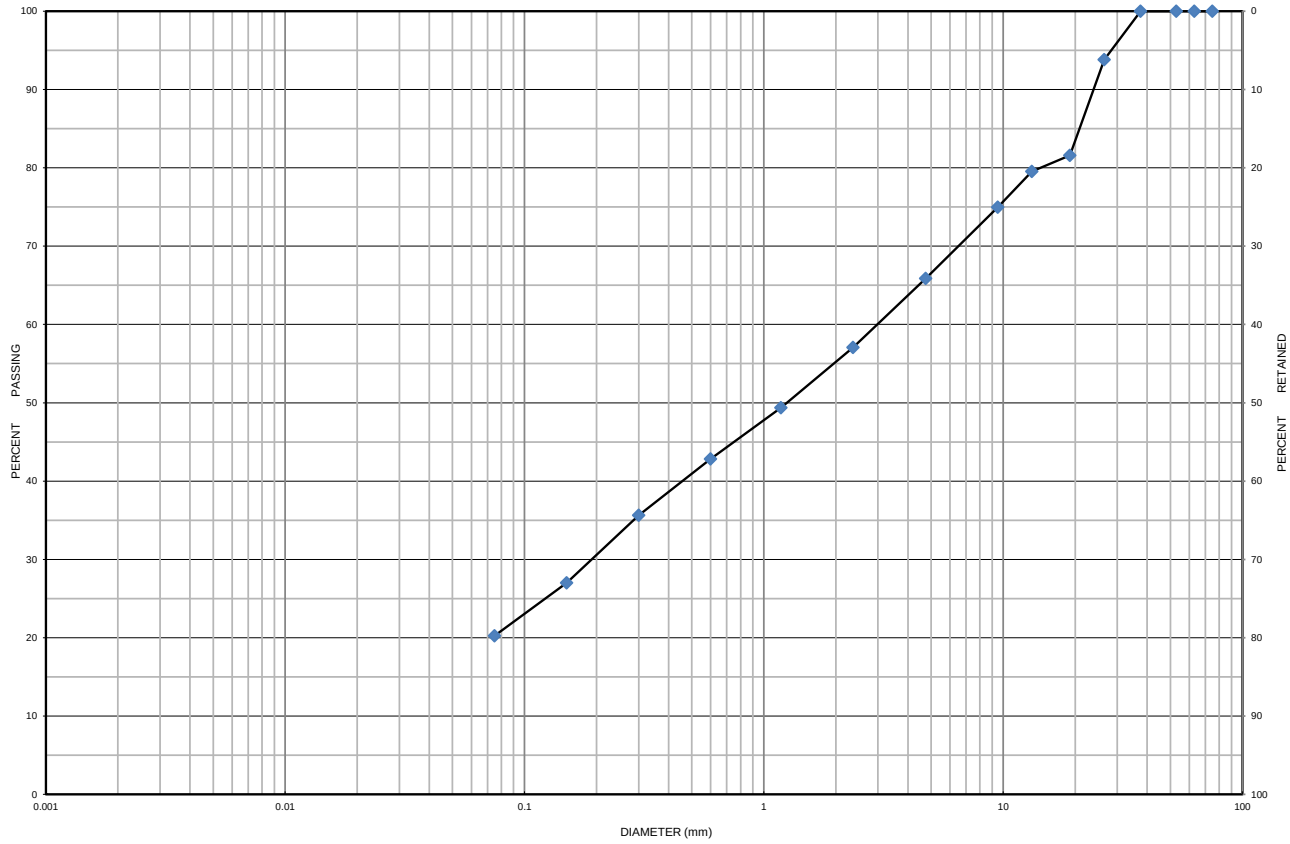
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 115-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0745*

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 115-22	SS 3	1.5 m to 2 m	34	46	20		6.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Silty Sand	SM	3.000	0.190	-	-	-

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Grain Size Distribution Chart

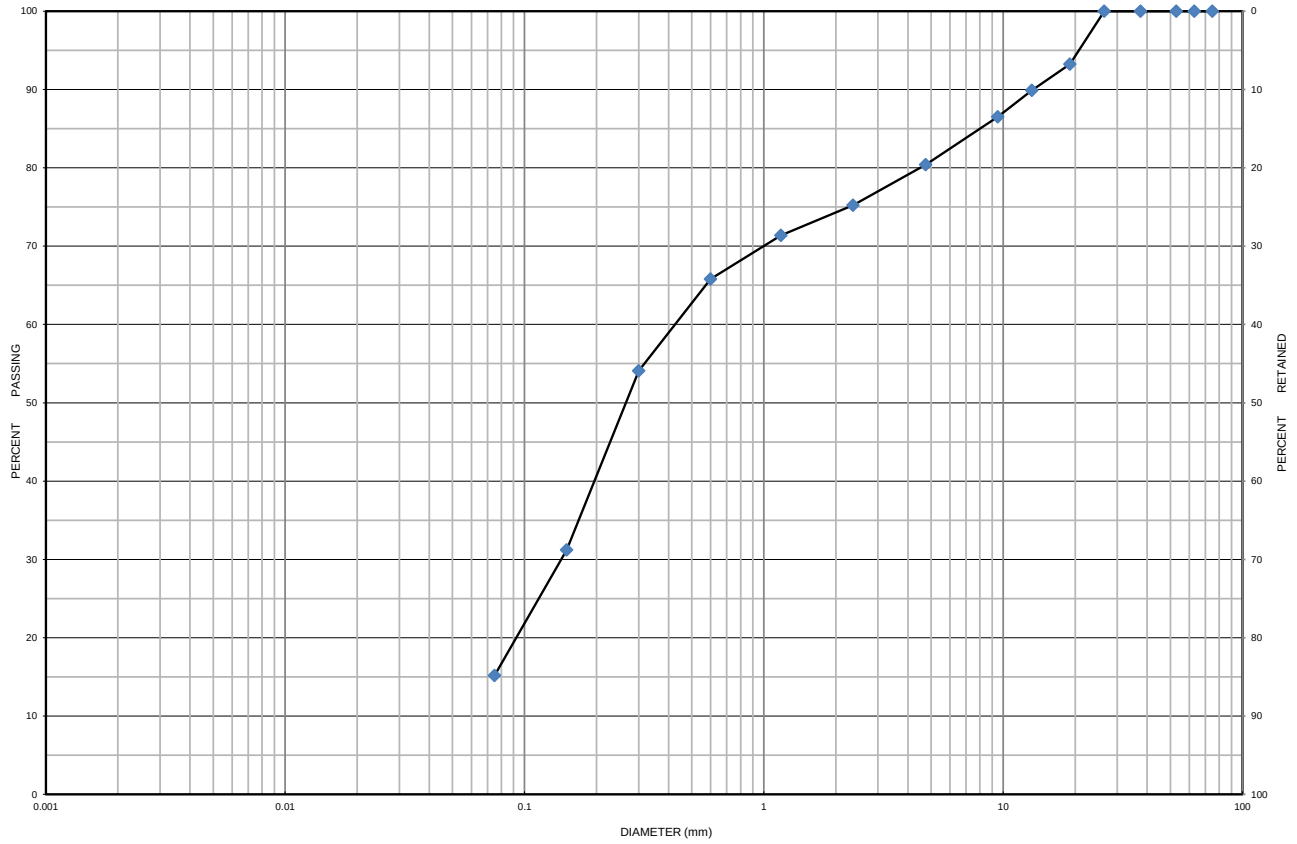
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 117-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0746*

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 117-22	SS 3	1.5 m to 2 m	20	65	15		4.7

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Sand some Silt	SM	0.420	0.150	-	-	-

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Appendix D

Single Well Hydraulic Test Results

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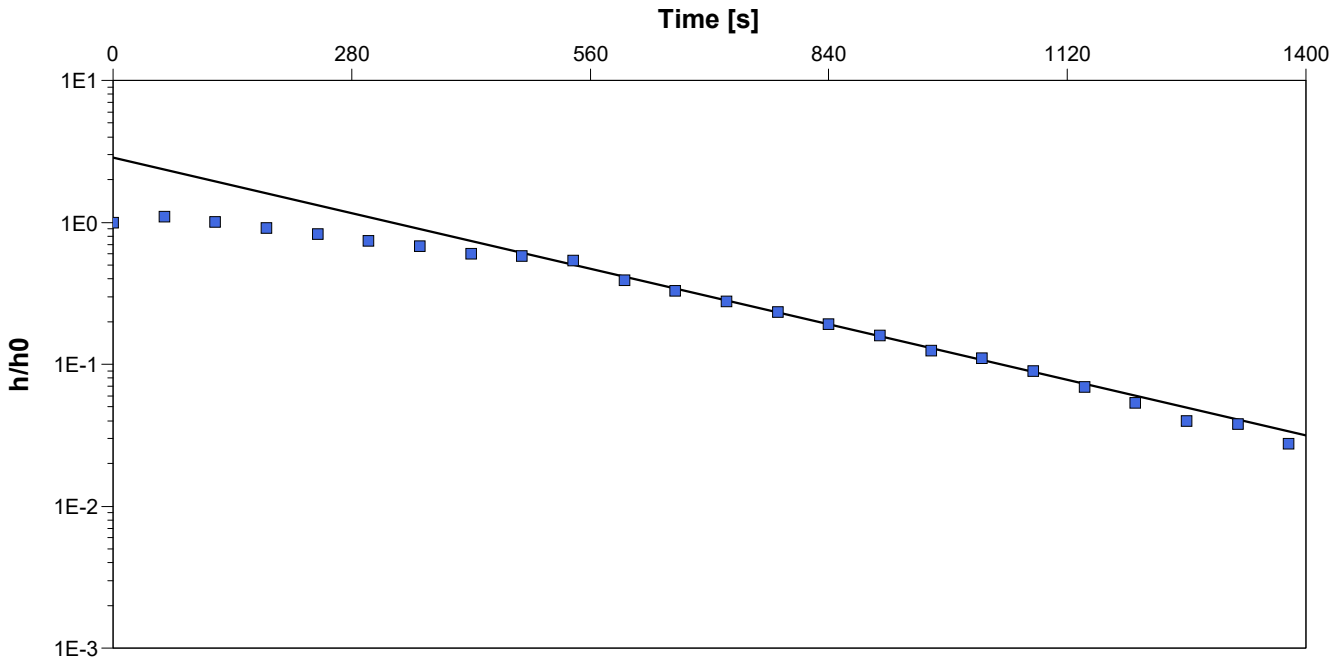
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW105-22 - Slug Test 1	Test Well: MW105-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW105-22 - Slug Test 1	Analysis Date: 6/16/2022
Aquifer Thickness: 1.70 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW105-22	1.61×10^{-6}	

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K9H1E5

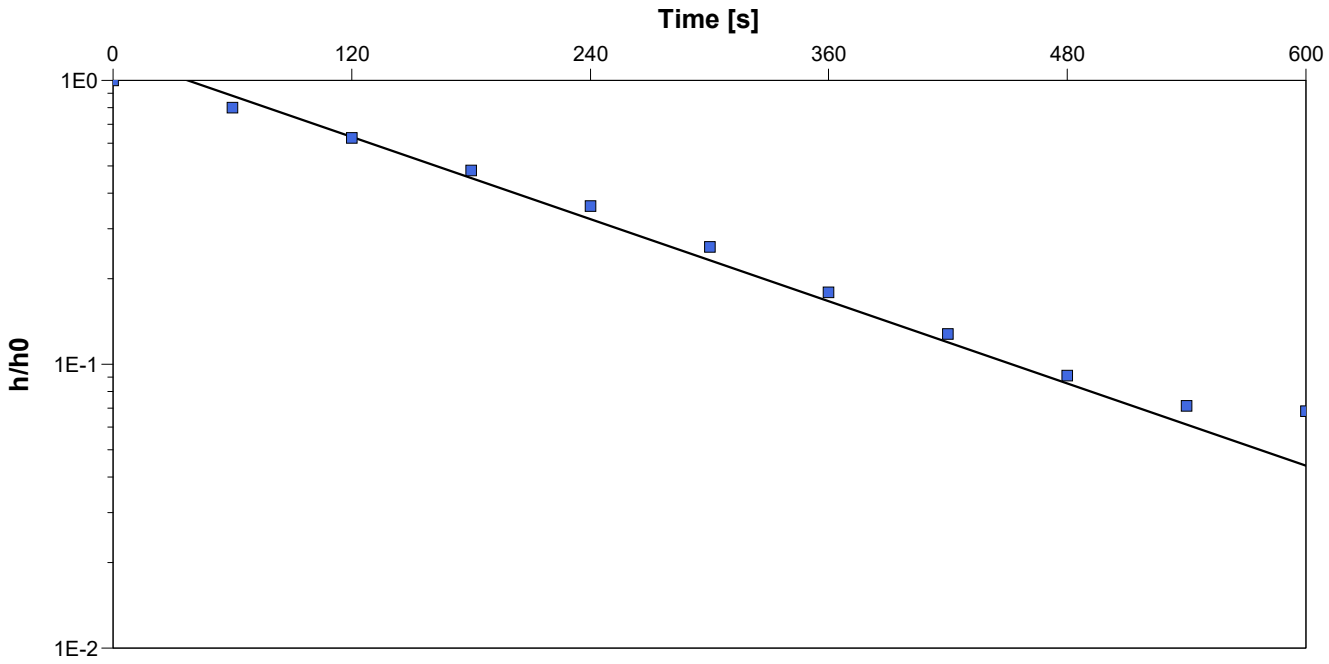
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW105-22 - Slug Test 2	Test Well: MW105-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW105-22 - Slug Test 2	Analysis Date: 6/16/2022
Aquifer Thickness: 1.70 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW105-22	2.79×10^{-6}	

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K9H1E5

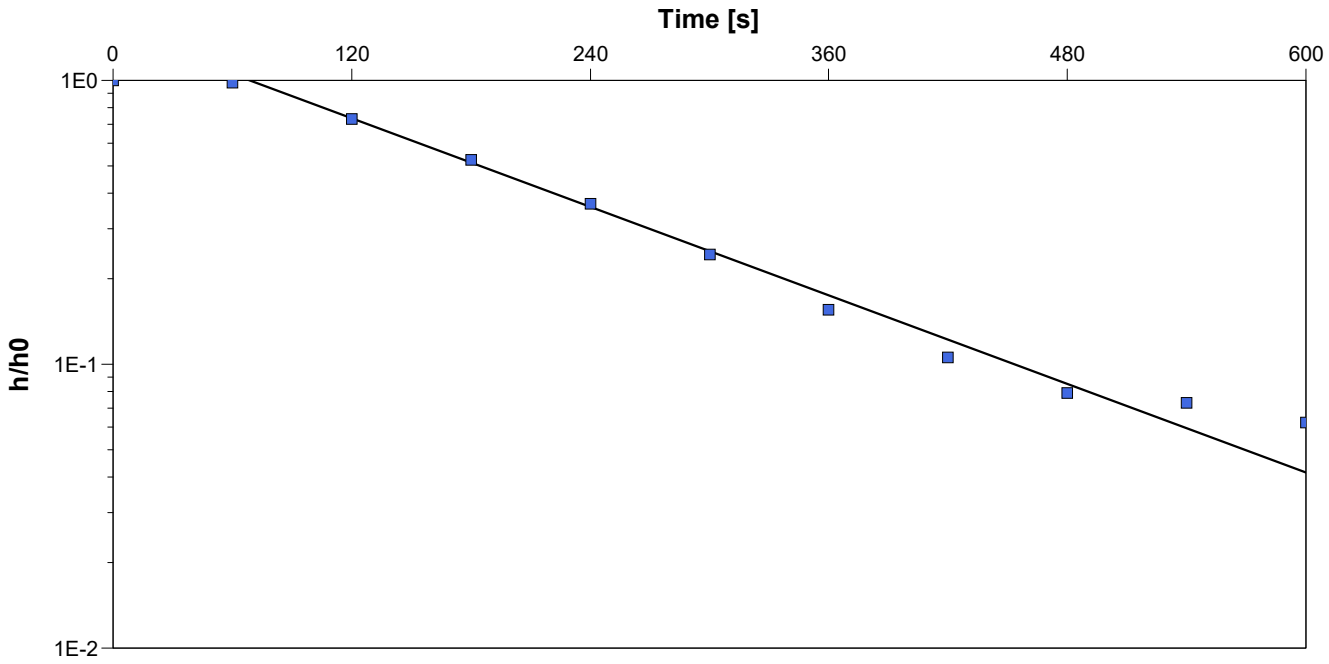
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW105-22 - Slug Test 3	Test Well: MW105-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW105-22 - Slug Test 3	Analysis Date: 6/16/2022
Aquifer Thickness: 1.70 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW105-22	3.00×10^{-6}	

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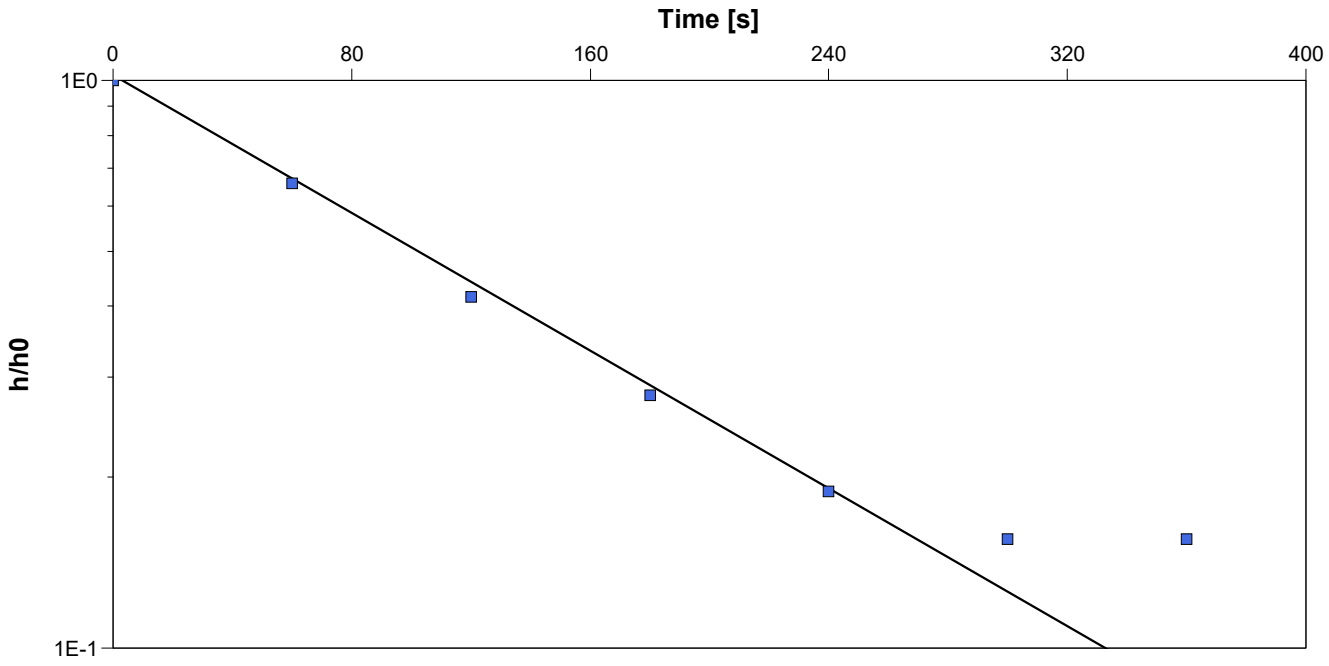
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW105-22 - Slug Test 4	Test Well: MW105-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW105-22 - Slug Test 4	Analysis Date: 6/16/2022
Aquifer Thickness: 1.70 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW105-22	3.50×10^{-6}	

194 Sophia St.
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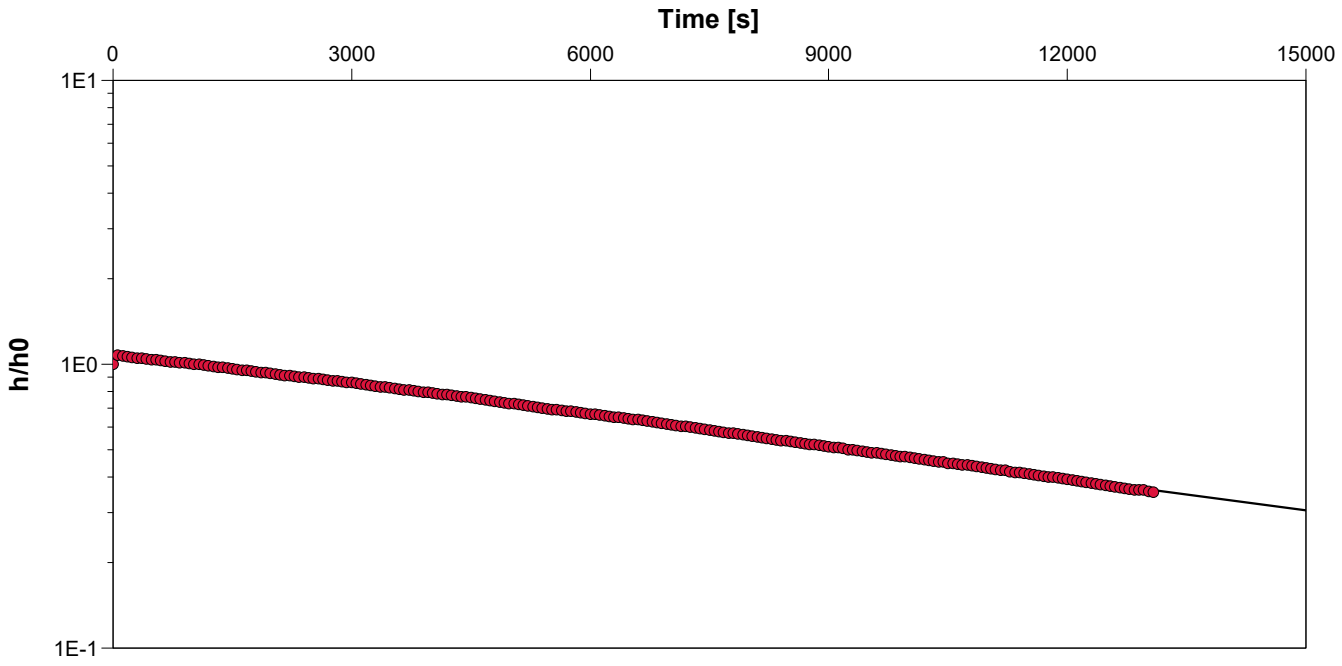
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW112-22 - Slug Test 1	Test Well: MW112-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW112-22 - Slug Test 1	Analysis Date: 6/16/2022
Aquifer Thickness: 1.43 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW112-22	7.35×10^{-8}	

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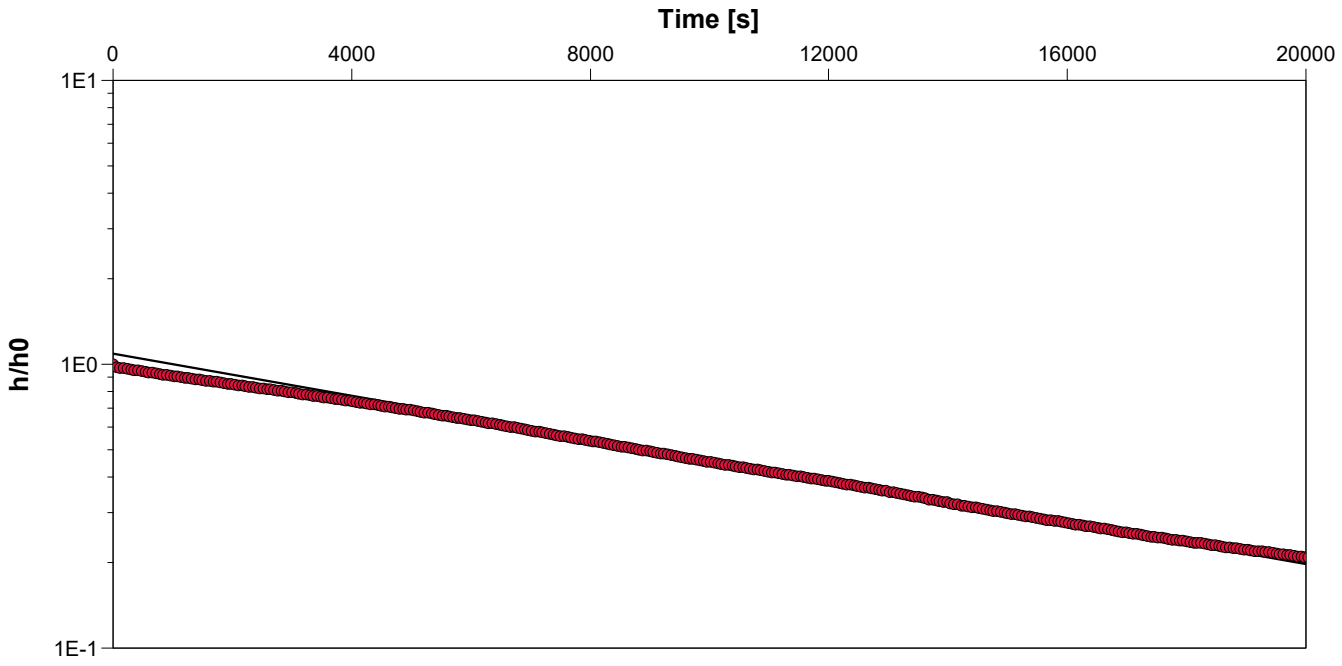
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW112-22 - Slug Test 2	Test Well: MW112-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW112-22 - Slug Test 2	Analysis Date: 6/16/2022
Aquifer Thickness: 1.43 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW112-22	7.32×10^{-8}	

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Peterborough, ON
K9H1E5

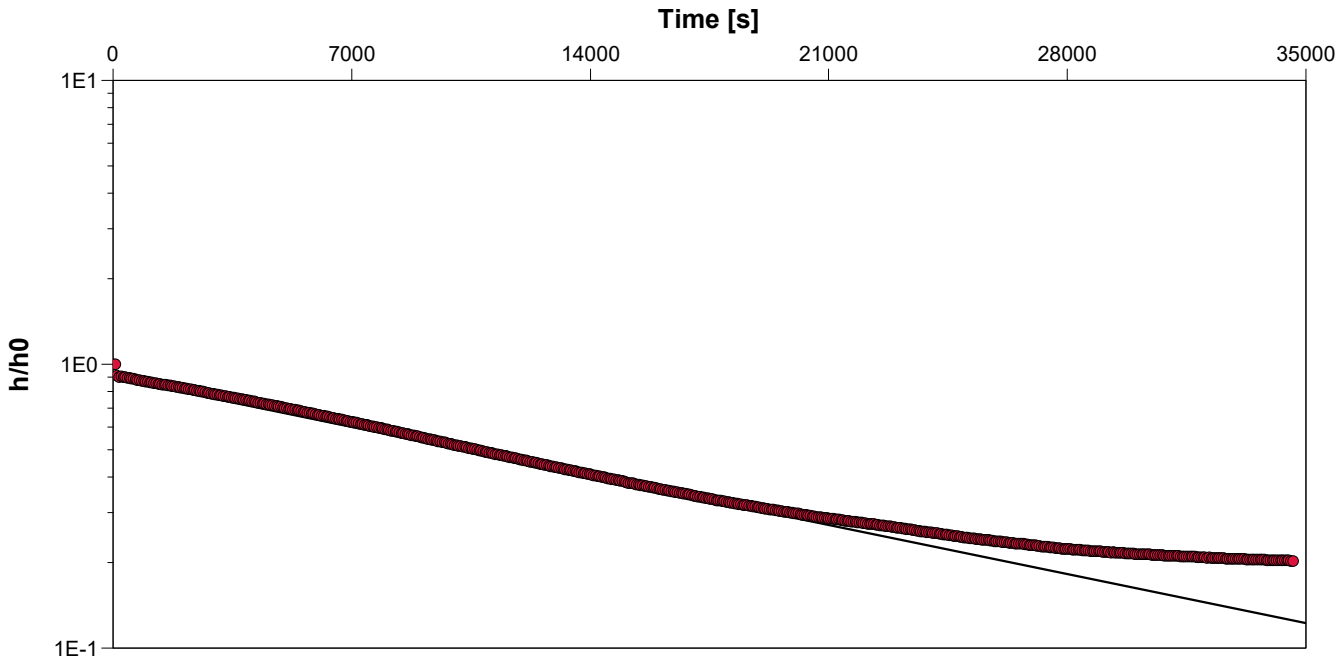
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW112-22 - Slug Test 3	Test Well: MW112-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW112-22 - Slug Test 3	Analysis Date: 6/16/2022
Aquifer Thickness: 1.43 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW112-22	4.88×10^{-8}	

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Peterborough, ON
K9H1E5

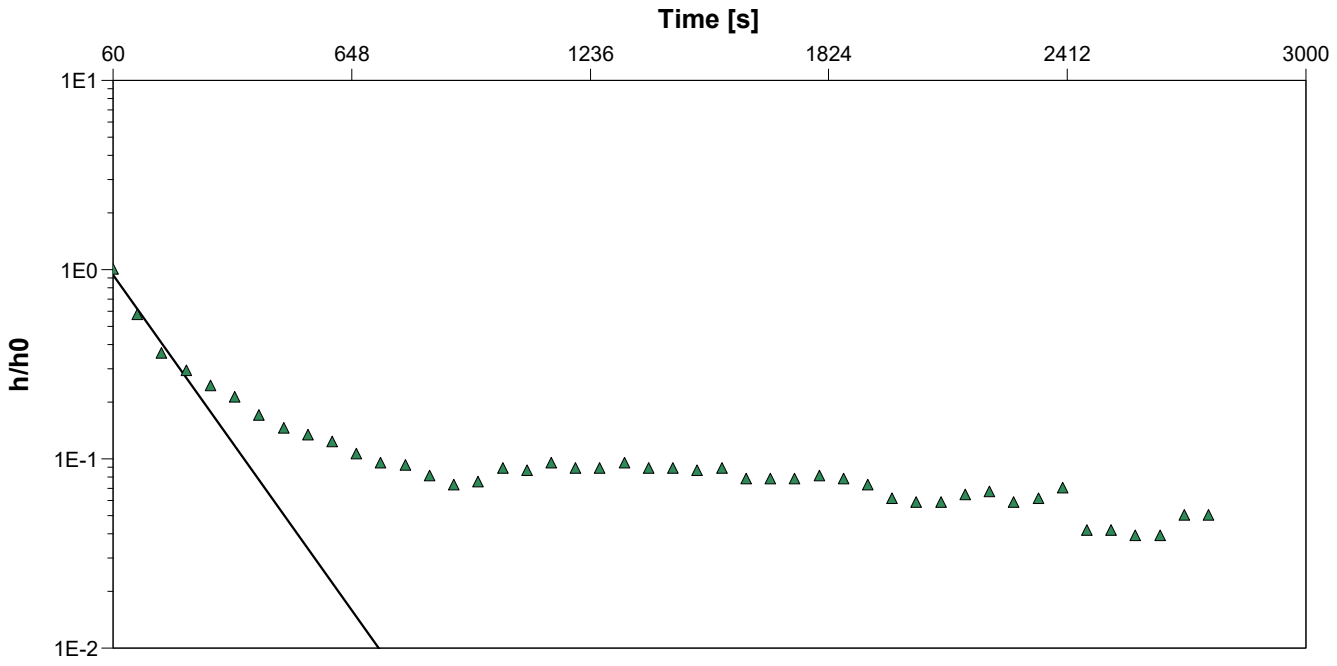
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW115-22 - Slug Test 1	Test Well: MW115-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW115-22 - Slug Test 1	Analysis Date: 6/16/2022
Aquifer Thickness: 0.57 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW115-22	5.95×10^{-6}	

194 Sophia St.
Peterborough, ON
K9H1E5

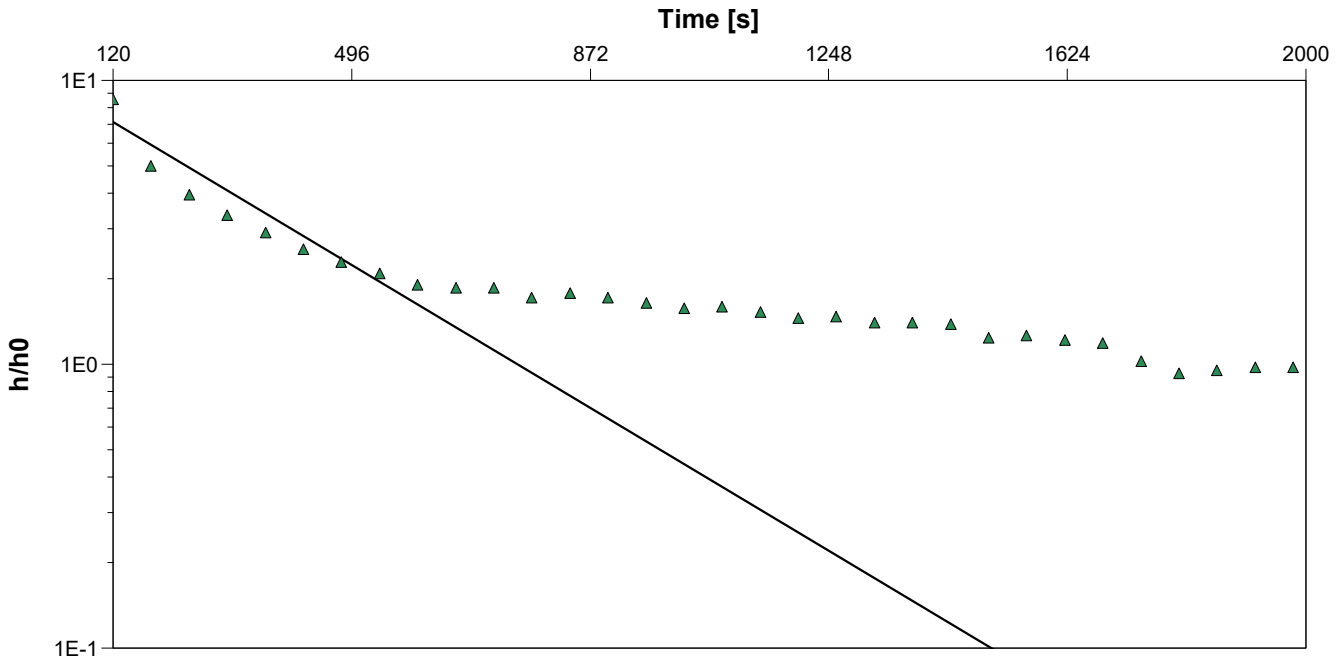
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW115-22 - Slug Test 2	Test Well: MW115-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW115-22 - Slug Test 2	Analysis Date: 6/16/2022
Aquifer Thickness: 0.57 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW115-22	2.64×10^{-6}	

194 Sophia St.
Peterborough, ON
K9H1E5

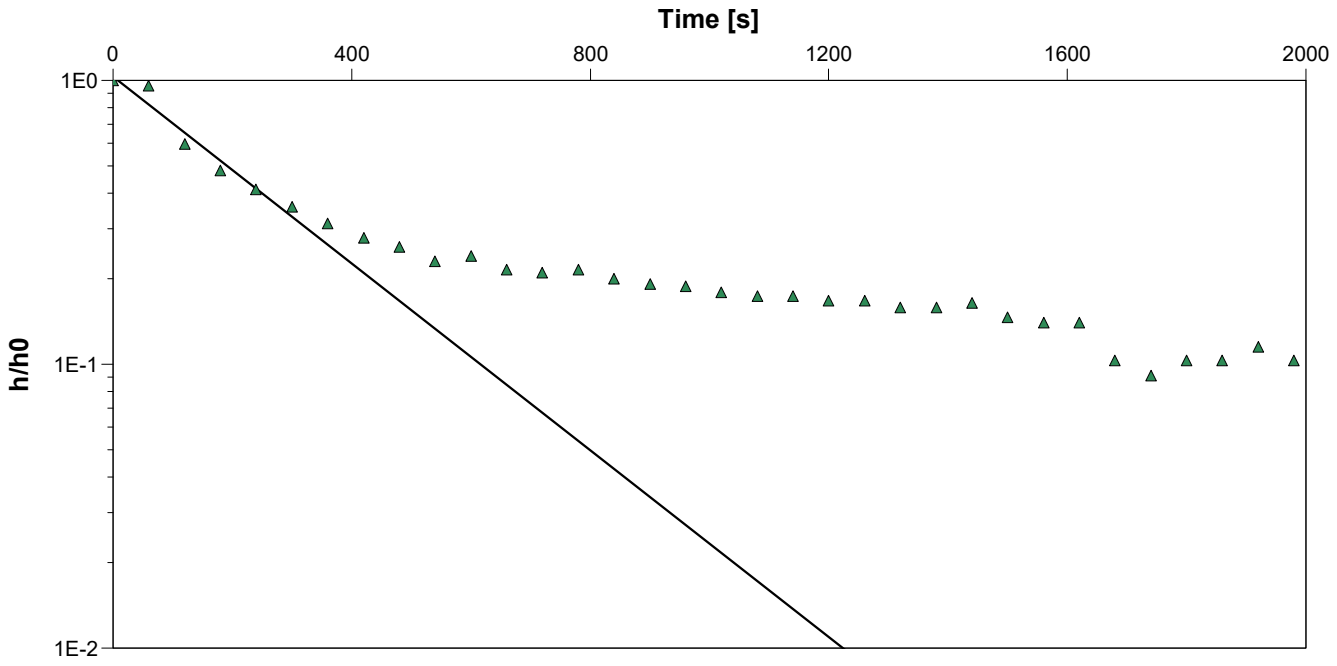
Slug Test Analysis Report

Project: Hydrogeological Assessment

Number: 14288-003

Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW115-22 - Slug Test 3	Test Well: MW115-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW115-22 - Slug Test 3	Analysis Date: 6/16/2022
Aquifer Thickness: 0.57 m		

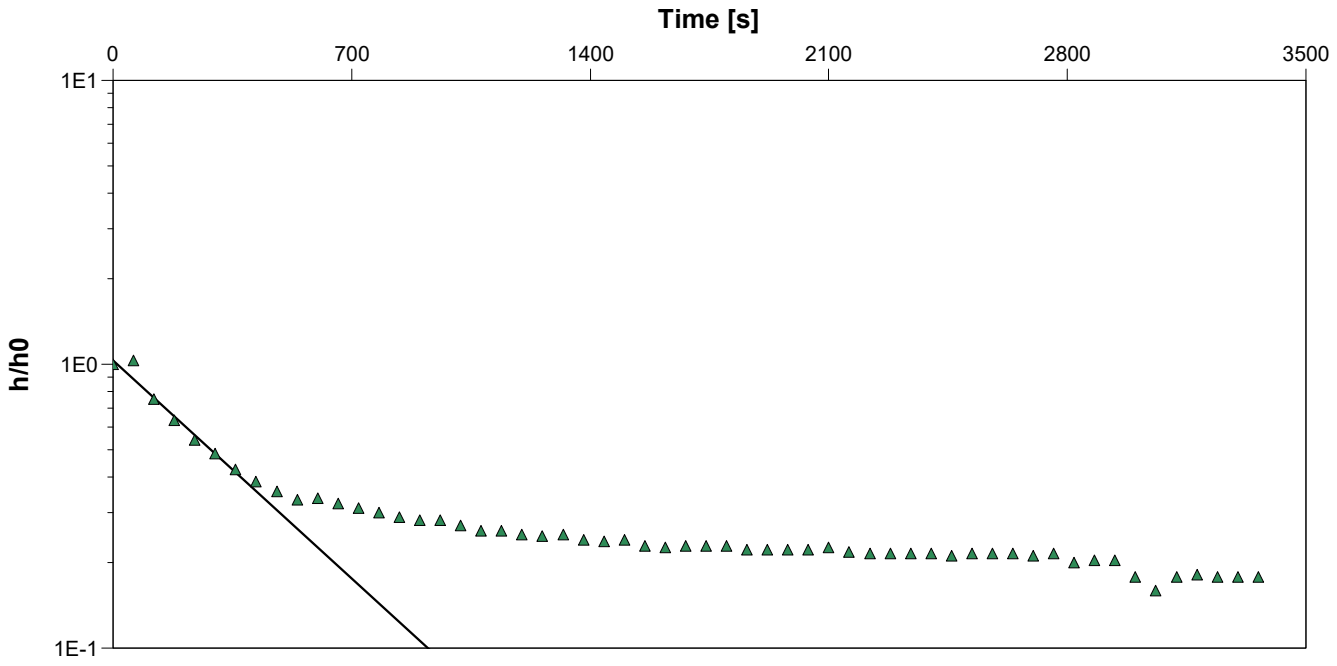


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW115-22	3.25×10^{-6}	

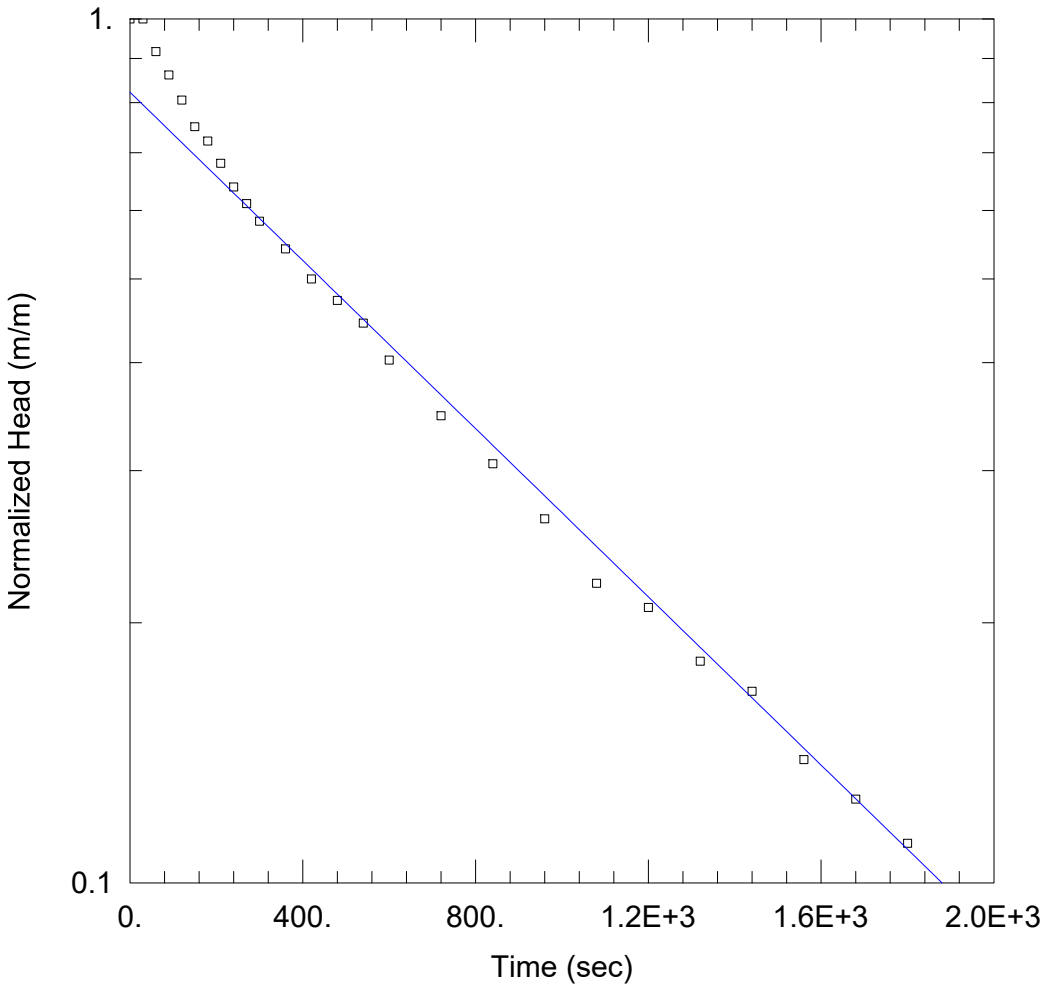
194 Sophia St. Peterborough, ON K9H1E5	**Slug Test Analysis Report** Project: Hydrogeological Assessment Number: 14288-003 Client: CAP Norwood Development

Location: 52 Mill Street, Norwood	Slug Test: MW115-22 - Slug Test 4	Test Well: MW115-22
Test Conducted by: J. Munro		Test Date: 5/4/2022
Analysis Performed by: N. Heikoop	MW115-22 - Slug Test 4	Analysis Date: 6/16/2022
Aquifer Thickness: 0.57 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW115-22	2.17×10^{-6}	



BH201-24 BAIL TEST

Data Set: C:\Users\Ben.Didemus\Documents\Mill St Norwood\BH201-24 Bail Test.aqt
Date: 11/18/24 Time: 11:12:14

PROJECT INFORMATION

Company: Cambium
Client: CAP Norwood Developments Inc.
Project: 14288-007
Location: Mill Street, Norwood, Ontario
Test Well: BH201-24
Test Date: November 18, 2024

AQUIFER DATA

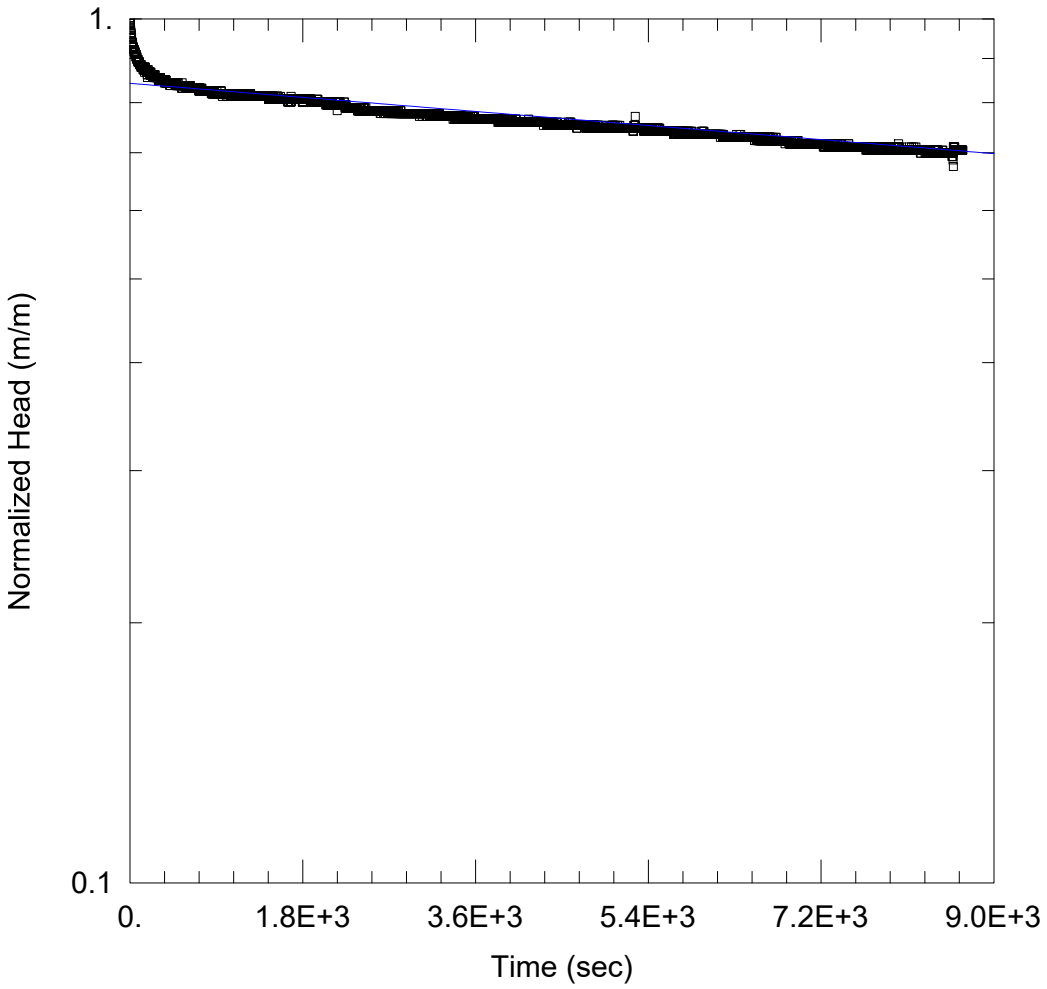
Saturated Thickness: 1.582 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH201-24)

Initial Displacement: 0.36 m
Total Well Penetration Depth: 1.582 m
Casing Radius: 0.0254 m
Static Water Column Height: 1.582 m
Screen Length: 1.582 m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 1.211E-6 m/sec
y0 = 0.2961 m



BH202-24 BAIL TEST

Data Set: C:\Users\Ben.Didemus\Documents\Mill St Norwood\BH202-24 Bail Test.aqt
Date: 11/18/24 Time: 11:21:37

PROJECT INFORMATION

Company: Cambium
Client: CAP Norwood Developments Inc.
Project: 14288-007
Location: Mill Street, Norwood, Ontario
Test Well: BH202-24
Test Date: November 18, 2024

AQUIFER DATA

Saturated Thickness: 1.102 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH202-24 Bail Test)

Initial Displacement: 0.4982 m
Total Well Penetration Depth: 1.102 m
Casing Radius: 0.0254 m
Static Water Column Height: 1.102 m
Screen Length: 1.102 m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 3.23E-8 m/sec
y0 = 0.4196 m

Appendix E

Laboratory Certificates of Analysis

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

Project : 14258-003

11-May-2022

Cambium Inc.
Attn : Cameron MacDougall

194 Sofia Street
Peterborough, ON
K9H 1E3, Canada

Phone: 705-742-7900
Fax:705-742-7907

Date Rec. : 04 May 2022
LR Report: **CA17977-MAY22**
Reference: 14288-003, Cameron MacDougall

Copy: Final # 1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	6: MW105-22	7: MW115-22
Sample Date & Time					04-May-22 13:45	04-May-22 14:30
Temp Upon Receipt [°C]	***	***	***	***	***	***
TSS [mg/L]	05-May-22	16:19	06-May-22	13:48	2020	3260
Cl [mg/L]	10-May-22	16:39	11-May-22	13:59	9	18
NH3+NH4 [as N mg/L]	04-May-22	22:31	05-May-22	10:36	< 0.1	< 0.1
NO2 [as N mg/L]	10-May-22	11:44	11-May-22	10:08	< 0.03	0.06
NO3 [as N mg/L]	10-May-22	11:44	11-May-22	10:08	18.9	23.4
NO2+NO3 [as N mg/L]	10-May-22	11:44	11-May-22	10:08	18.9	23.5
Al (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.241	0.187
Al (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	9.52	3.56
Sb (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	< 0.0009	< 0.0009
Sb (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	< 0.0009	< 0.0009
As (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	< 0.0002	< 0.0002
As (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.0019	0.0009
Ba (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.0251	0.0291
Ba (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.122	0.0724
Be (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.000015	0.000021
Be (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.000449	0.000161
B (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.018	0.035
B (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.030	0.017
Bi (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	< 0.00001	< 0.00001
Bi (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00004	0.00002
Cd (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	< 0.000003	< 0.000003
Cd (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.000046	0.000030
Ca (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	125	128
Ca (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	242	172
Cr (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.0111	0.00400

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

Project : 14258-003

LR Report : **CA17977-MAY22**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	6: MW105-22	7: MW115-22
Cr (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00067	0.00050
Co (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.000489	0.000285
Co (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00543	0.00164
Cu (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.0014	0.0011
Cu (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.0109	0.0042
Fe (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.235	0.177
Fe (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	6.89	2.82
Pb (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00042	0.00032
Pb (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00883	0.00244
Li (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.0006	0.0008
Li (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.0083	0.0034
Mg (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	4.78	3.53
Mg (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	8.40	4.57
Mn (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.107	0.05963
Mn (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.897	0.137
Mo (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00013	0.00018
Mo (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00055	0.00027
Ni (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.0007	0.0006
Ni (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.0093	0.0030
P (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.018	0.020
P (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.326	0.132
K (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	1.29	1.02
K (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	4.80	2.12
Se (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	< 0.00004	0.00009
Se (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00009	0.00007
Si (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	4.33	4.22
Si (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	23.2	12.9
Ag (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	< 0.00005	< 0.00005
Ag (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00012	< 0.00005
Na (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	5.72	3.11
Na (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	5.88	3.12
Sr (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.305	0.282
Sr (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.473	0.360
Tl (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.000021	0.000016
Tl (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.000232	0.000089
Sn (diss) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00026	0.00048
Sn (tot) [mg/L]	09-May-22	18:57	11-May-22	16:01	0.00180	0.00146
Ti (diss) [mg/L]	09-May-22	18:57	11-May-22	16:02	0.0107	0.00870
Ti (tot) [mg/L]	09-May-22	18:57	11-May-22	16:02	0.510	0.171
U (diss) [mg/L]	09-May-22	18:57	11-May-22	16:02	0.000439	0.000234
U (tot) [mg/L]	09-May-22	18:57	11-May-22	16:02	0.000705	0.000293
V (diss) [mg/L]	09-May-22	18:57	11-May-22	16:02	0.00073	0.00052

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

Project : 14258-003

LR Report : **CA17977-MAY22**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	6: MW105-22	7: MW115-22
V (tot) [mg/L]	09-May-22	18:57	11-May-22	16:02	0.0145	0.00492
Zn (diss) [mg/L]	09-May-22	18:57	11-May-22	16:02	< 0.002	< 0.002
Zn (tot) [mg/L]	09-May-22	18:57	11-May-22	16:02	0.026	0.014
Zr (diss) [mg/L]	09-May-22	18:57	11-May-22	16:02	< 0.002	< 0.002
Zr (tot) [mg/L]	09-May-22	18:57	11-May-22	16:02	0.007	0.004

Note: Unionized ammonia calculated using lab results for pH and temperature.

Temperature of Sample upon Receipt: 11 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: N/A

Jill Campbell

Jill Campbell, B.Sc.,GISAS
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002897279

FINAL REPORT

CA15178-NOV24 R1

14288-007, Norwood, ON

Prepared for

Cambium Inc.

FINAL REPORT

CA15178-NOV24 R1

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Cambium Inc.	Project Specialist	Jill Campbell, B.Sc.,GISAS
		Laboratory	SGS Canada Inc.
Address	194 Sophia Street Peterborough, ON K9H 1E5. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Ben Didemus	Telephone	2165
Telephone	705-742-7900	Facsimile	705-652-6365
Facsimile		Email	jill.campbell@sgs.com
Email	ben.didemus@cambium-inc.com; ESdat_CA+Cambium@ESda	SGS Reference	CA15178-NOV24
Project	14288-007, Norwood, ON	Received	11/18/2024
Order Number		Approved	11/22/2024
Samples	Ground Water (1)	Report Number	CA15178-NOV24 R1
		Date Reported	11/22/2024

COMMENTS

ODWS - Ontario Drinking Water Standards
MAC/IMAC - Maximum / Interim Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
* Exceeds ODWS limit
** No ODWS limit

Temperature of Sample upon Receipt: 14 degrees C
Cooling Agent Present:yes
Custody Seal Present:yes

Chain of Custody Number:034860

SIGNATORIES

Jill Campbell, B.Sc.,GISAS

TABLE OF CONTENTS

FINAL REPORT

CA15178-NOV24 R1

Client: Cambium Inc.
Project: 14288-007, Norwood, ON
Project Manager: Ben Didemus
Samplers: Jenacy Samways

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	5
Sample Name	BH101-24
Sample Matrix	Ground Water
Sample Date	18/11/2024

Parameter	Units	RL	L1	Result
General Chemistry				
Dissolved Oxygen	mg/L	1		8.8
Total Suspended Solids	mg/L	2		1630
Alkalinity	mg/L as CaCO3	2		906
Turbidity	NTU	0.10		1100
Ammonia+Ammonium (N)	as N mg/L	0.1		0.1
Temperature @ pH	°C	0		21.0
Unionized Ammonia	mg/L as N	0.001	0.02	0.002
Hydrogen Sulphide	mg/L	0.02		< 0.02
Metals and Inorganics				
Sulphide	mg/L	0.02		< 0.02
Hardness	mg/L as CaCO3	0.05		2440
Hardness (dissolved)	mg/L as CaCO3	0.05		249
Aluminum (0.2µm)	mg/L	0.001	0.075	0.003
Silver (total)	mg/L	0.00005	0.0001	0.00016
Silver (dissolved)	mg/L	0.00005		< 0.00005
Aluminum (total)	mg/L	0.001		37.0
Aluminum (dissolved)	mg/L	0.001	0.075	0.089
Arsenic (total)	mg/L	0.0002	0.005	0.0090
Arsenic (dissolved)	mg/L	0.0002		0.0005
Barium (total)	mg/L	0.00008		0.794
Barium (dissolved)	mg/L	0.00008		0.106
Beryllium (total)	mg/L	0.000007	1.1	0.00199

FINAL REPORT

CA15178-NOV24 R1

Client: Cambium Inc.
Project: 14288-007, Norwood, ON
Project Manager: Ben Didemus
Samplers: Jenacy Samways

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	5
Sample Name	BH101-24
Sample Matrix	Ground Water
Sample Date	18/11/2024

Metals and Inorganics (continued)

Parameter	Units	RL	L1	Result
Beryllium (dissolved)	mg/L	0.000007		< 0.000007
Boron (total)	mg/L	0.002	0.2	0.042
Boron (dissolved)	mg/L	0.002		0.019
Bismuth (total)	mg/L	0.00001		0.00021
Bismuth (dissolved)	mg/L	0.00001		< 0.00001
Calcium (total)	mg/L	0.01		924
Calcium (dissolved)	mg/L	0.01		87.5
Cadmium (total)	mg/L	0.000003	0.0005	0.000263
Cadmium (dissolved)	mg/L	0.000003		0.000004
Cobalt (total)	mg/L	0.000004	0.0009	0.0197
Cobalt (dissolved)	mg/L	0.000004		0.000488
Chromium (total)	mg/L	0.00008	0.1	0.0455
Chromium (dissolved)	mg/L	0.00008		0.00013
Copper (total)	mg/L	0.001	0.005	0.050
Copper (dissolved)	mg/L	0.001		< 0.001
Iron (total)	mg/L	0.007	0.3	43.2
Iron (dissolved)	mg/L	0.007		0.124
Potassium (total)	mg/L	0.009		11.4
Potassium (dissolved)	mg/L	0.009		2.12
Magnesium (total)	mg/L	0.001		31.3
Magnesium (dissolved)	mg/L	0.001		7.39
Manganese (total)	mg/L	0.00001		1.60

FINAL REPORT

CA15178-NOV24 R1

Client: Cambium Inc.
Project: 14288-007, Norwood, ON
Project Manager: Ben Didemus
Samplers: Jenacy Samways

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	5
Sample Name	BH101-24
Sample Matrix	Ground Water
Sample Date	18/11/2024

Metals and Inorganics (continued)

Parameter	Units	RL	L1	Result
Manganese (dissolved)	mg/L	0.00001		0.0266
Molybdenum (total)	mg/L	0.0004	0.04	0.0038
Molybdenum (dissolved)	mg/L	0.0004		0.0068
Sodium (total)	mg/L	0.01		38.2
Sodium (dissolved)	mg/L	0.01		37.5
Nickel (total)	mg/L	0.0001	0.025	0.0353
Nickel (dissolved)	mg/L	0.0001		0.0014
Phosphorus (total)	mg/L	0.003	0.01	3.50
Phosphorus (dissolved)	mg/L	0.003		0.010
Lead (total)	mg/L	0.00009	0.025	0.0330
Lead (dissolved)	mg/L	0.00009		< 0.00009
Antimony (total)	mg/L	0.0009	0.02	< 0.0009
Antimony (dissolved)	mg/L	0.0009		< 0.0009
Selenium (total)	mg/L	0.00004	0.1	0.00081
Selenium (dissolved)	mg/L	0.00004		0.00034
Silicon (total)	mg/L	0.02		73.0
Silicon (dissolved)	mg/L	0.02		8.42
Tin (total)	mg/L	0.00006		0.00050
Tin (dissolved)	mg/L	0.00006		0.00030
Strontium (total)	mg/L	0.00008		1.45
Strontium (dissolved)	mg/L	0.00008		0.247
Titanium (total)	mg/L	0.0001		1.80

FINAL REPORT

CA15178-NOV24 R1

Client: Cambium Inc.
Project: 14288-007, Norwood, ON
Project Manager: Ben Didemus
Samplers: Jenacy Samways

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	5
Sample Name	BH101-24
Sample Matrix	Ground Water
Sample Date	18/11/2024

Metals and Inorganics (continued)

Parameter	Units	RL	L1	Result
Titanium (dissolved)	mg/L	0.0001		0.0059
Thallium (total)	mg/L	0.000005	0.0003	0.000615
Thallium (dissolved)	mg/L	0.000005		0.000035
Uranium (total)	mg/L	0.000002	0.005	0.0285
Uranium (dissolved)	mg/L	0.000002		0.0126
Vanadium (total)	mg/L	0.00001	0.006	0.0611
Vanadium (dissolved)	mg/L	0.00001		0.00106
Lithium (total)	mg/L	0.0001		0.0418
Lithium (dissolved)	mg/L	0.0001		0.0051
Zirconium (total)	mg/L	0.002	0.004	< 0.002
Zirconium (dissolved)	mg/L	0.002		< 0.002
Zinc (total)	mg/L	0.002	0.02	0.104
Zinc (dissolved)	mg/L	0.002		< 0.002

FINAL REPORT

CA15178-NOV24 R1

Client: Cambium Inc.
Project: 14288-007, Norwood, ON
Project Manager: Ben Didemus
Samplers: Jenacy Samways

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	5
Sample Name	BH101-24
Sample Matrix	Ground Water
Sample Date	18/11/2024

Parameter	Units	RL	L1	Result
Other (ORP)				
pH	No unit	0.05	8.6	7.49
Cyanide (free)	mg/L	0.005	0.005	< 0.005
Chromium VI	µg/L	0.2	1	0.2
Mercury (dissolved)	mg/L	0.00001	0.0002	< 0.00001
Phenols				
4AAP-Phenolics	mg/L	0.001	0.001	0.002

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1
BH101-24				
Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.089	0.075
Arsenic	SM 3030/EPA 200.8	mg/L	0.0090	0.005
Cobalt	SM 3030/EPA 200.8	mg/L	0.0197	0.0009
Copper	SM 3030/EPA 200.8	mg/L	0.050	0.005
Iron	SM 3030/EPA 200.8	mg/L	43.2	0.3
Lead	SM 3030/EPA 200.8	mg/L	0.0330	0.025
Nickel	SM 3030/EPA 200.8	mg/L	0.0353	0.025
Phosphorus	SM 3030/EPA 200.8	mg/L	3.50	0.01
Silver	SM 3030/EPA 200.8	mg/L	0.00016	0.0001
Thallium	SM 3030/EPA 200.8	mg/L	0.000615	0.0003
Uranium	SM 3030/EPA 200.8	mg/L	0.0285	0.005
Vanadium	SM 3030/EPA 200.8	mg/L	0.0611	0.006
Zinc	SM 3030/EPA 200.8	mg/L	0.104	0.02
4AAP-Phenolics	SM 5530B-D	mg/L	0.002	0.001

QC SUMMARY

Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0389-NOV24	mg/L as CaCO3	2	< 2	8	20	94	80	120	NA		

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0183-NOV24	as N mg/L	0.1	<0.1	ND	10	100	90	110	93	75	125

Cyanide by SFA

Method: SM4500 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (free)	SKA0177-NOV24	mg/L	0.005	<0.005	1	10	90	80	120	103	75	125

FINAL REPORT

QC SUMMARY

Hexavalent Chromium by SFA

Method: EPA218.6/EPA3060A | Internal ref.: ME-CA-[ENVISKA-LAK-AN-012

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chromium VI	SKA0179-NOV24	ug/L	0.2	<0.2	ND	20	99	80	120	94	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (dissolved)	EHG0047-NOV24	mg/L	0.00001	< 0.00001	ND	20	100	80	120	84	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0218-NOV24	mg/L	0.00005	<0.00005	12	20	102	90	110	80	70	130
Aluminum (total)	EMS0218-NOV24	mg/L	0.001	<0.001	1	20	99	90	110	112	70	130
Arsenic (total)	EMS0218-NOV24	mg/L	0.0002	<0.0002	16	20	101	90	110	102	70	130
Barium (total)	EMS0218-NOV24	mg/L	0.00008	<0.00008	1	20	109	90	110	106	70	130
Beryllium (total)	EMS0218-NOV24	mg/L	0.000007	<0.000007	ND	20	105	90	110	101	70	130
Boron (total)	EMS0218-NOV24	mg/L	0.002	<0.002	19	20	105	90	110	101	70	130
Bismuth (total)	EMS0218-NOV24	mg/L	0.00001	1e-005	1	20	104	90	110	93	70	130
Calcium (total)	EMS0218-NOV24	mg/L	0.01	<0.01	1	20	106	90	110	107	70	130
Cadmium (total)	EMS0218-NOV24	mg/L	0.000003	<0.000003	8	20	102	90	110	101	70	130
Cobalt (total)	EMS0218-NOV24	mg/L	0.000004	<0.000004	1	20	100	90	110	100	70	130
Chromium (total)	EMS0218-NOV24	mg/L	0.00008	<0.00008	3	20	100	90	110	110	70	130
Copper (total)	EMS0218-NOV24	mg/L	0.001	<0.001	1	20	103	90	110	101	70	130
Iron (total)	EMS0218-NOV24	mg/L	0.007	<0.007	0	20	109	90	110	100	70	130
Potassium (total)	EMS0218-NOV24	mg/L	0.009	<0.009	4	20	105	90	110	111	70	130
Lithium (total)	EMS0218-NOV24	mg/L	0.0001	<0.0001	5	20	103	90	110	95	70	130
Magnesium (total)	EMS0218-NOV24	mg/L	0.001	<0.001	1	20	106	90	110	98	70	130
Manganese (total)	EMS0218-NOV24	mg/L	0.00001	<0.00001	2	20	102	90	110	101	70	130
Molybdenum (total)	EMS0218-NOV24	mg/L	0.0004	<0.0004	3	20	105	90	110	95	70	130
Sodium (total)	EMS0218-NOV24	mg/L	0.01	<0.01	0	20	107	90	110	101	70	130
Nickel (total)	EMS0218-NOV24	mg/L	0.0001	<0.0001	ND	20	101	90	110	99	70	130

FINAL REPORT

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Lead (total)	EMS0218-NOV24	mg/L	0.00009	<0.00009	1	20	106	90	110	101	70	130
Phosphorus (total)	EMS0218-NOV24	mg/L	0.003	<0.003	2	20	103	90	110	NV	70	130
Antimony (total)	EMS0218-NOV24	mg/L	0.0009	<0.0009	ND	20	109	90	110	83	70	130
Selenium (total)	EMS0218-NOV24	mg/L	0.00004	<0.00004	3	20	106	90	110	96	70	130
Silicon (total)	EMS0218-NOV24	mg/L	0.02	<0.02	0	20	104	90	110	NV	70	130
Tin (total)	EMS0218-NOV24	mg/L	0.00006	<0.00006	ND	20	101	90	110	NV	70	130
Strontium (total)	EMS0218-NOV24	mg/L	0.00008	<0.00008	0	20	102	90	110	98	70	130
Titanium (total)	EMS0218-NOV24	mg/L	0.0001	<0.0001	1	20	104	90	110	NV	70	130
Thallium (total)	EMS0218-NOV24	mg/L	0.000005	<0.000005	1	20	103	90	110	85	70	130
Uranium (total)	EMS0218-NOV24	mg/L	0.000002	<0.000002	8	20	108	90	110	102	70	130
Vanadium (total)	EMS0218-NOV24	mg/L	0.00001	<0.00001	9	20	103	90	110	97	70	130
Zinc (total)	EMS0218-NOV24	mg/L	0.002	<0.002	2	20	102	90	110	98	70	130
Zirconium (total)	EMS0218-NOV24	mg/L	0.002	<0.002	ND	20	96	90	110	NV	70	130
Aluminum (0.2µm)	EMS0223-NOV24	mg/L	0.001	<0.001	3	20	110	90	110	109	70	130

FINAL REPORT

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0389-NOV24	No unit	0.05	NA	0		99			NA		

Phenols by SFA

Method: SM 5530B-D I Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0182-NOV24	mg/L	0.001	<0.001	4	10	101	80	120	90	75	125

Sulphide by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0207-NOV24	mg/L	0.02	<0.02	ND	20	100	80	120	NA	75	125

FINAL REPORT

QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0387-NOV24	mg/L	2	< 2	0	10	96	90	110	NA		

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0382-NOV24	NTU	0.10	< 0.10	0	10	99	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.
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This report supersedes all previous versions.

-- End of Analytical Report --

Docusign Envelope ID: 70AC3802-E981-4694-A14C-E5056DCE8090

Request for Laboratory Services and CHAIN OF CUSTODY

No: 034860

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Page 1 of 1

Laboratory Information Section - Lab use only

Received By: IC Clydesdale
Received Date: NOV 18 2024 (mm/dd/yy)
Received Time: 15 : 20 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☐ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: ICE
Temperature Upon Receipt (°C): 14x3
LAB LIMS #: CA15178-NOV24

REPORT INFORMATION	INVOICE INFORMATION
Company: Cambium Inc.	☐ (same as Report Information)
Contact: Ben Didemus	Company: Cambium Inc.
Address: 194 Sophia St, Peterborough, ON	Contact: Cameron MacDougall
Phone: 705-768-0835	Address: 194 Sophia St., Peterborough, ON
Fax:	Phone: 705-957-0137
Email: ben.didemus@cambium-inc.com	Email: cameron.macdougall@cambium-inc.com

Quotation #: 2024 1078
Project #: 14288-007
P.O. #:
Site Location/ID: Norwood ON

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____ Appx. _____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☑ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
☐ ODWS Not Reportable *See note

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☑ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS–soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: ☐	Other: ☐	Other: ☐	Other: ☐	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg General ☐ Extended ☐	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	BH101-24	11/18/2024	11:40	13	GW	N												✗ PWQO	✓ Dissolved metals	✓ Quote 2024 1078					
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Please analyze for all parameters on quote, as well as dissolved and total metals for all metals listed on quote.

Observations/Comments/Special Instructions: * Please also analyze dissolved metals (and total)

Sampled By (NAME): Jenacy Samways
Signature: Jenacy Samways
Date: 11 / 18 / 24 (mm/dd/yy)

Relinquished by (NAME): Jenacy Samways
Signature: Jenacy Samways
Date: 11 / 18 / 24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.7
Date of Issue: 07 JUNE 2023

Appendix F

Water Well Survey Letter and Questionnaire

Residential survey contact addresses

#	Address	City	Province	Postal Code	Contacted in April 2022	Contacted in May 2022	Contacted in November 2024
24	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
26	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
28	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
36	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
67	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
76	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
78	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
90	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
96	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
102	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
106	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
112	Mill St	Norwood	Ontario	K0L 2V0	X	X	X
11	Barber Lane	Norwood	Ontario	K0L 2V0			X
2363	Asphodel 10th Line	Norwood	Ontario	K0L 2V0	X	X	X
2366	Asphodel 10th Line	Norwood	Ontario	K0L 2V0	X	X	X
2367	Asphodel 10th Line	Norwood	Ontario	K0L 2V0	X	X	X
2370	Asphodel 10th Line	Norwood	Ontario	K0L 2V0	X	X	X
2371	Asphodel 10th Line	Norwood	Ontario	K0L 2V0	X	X	X
2413	Asphodel 10th Line	Norwood	Ontario	K0L 2V0	X	X	X
2447	Asphodel 10th Line	Norwood	Ontario	K0L 2V0	X	X	X
2450	Asphodel 10th Line	Norwood	Ontario	K0L 2V0		X	X
2319	Asphodel 10th Line	Norwood	Ontario	K0L 2V0		X	X

CAMBIUM

Environmental

Geotechnical

Building Sciences

Construction Quality Verification

Telephone
(866) 217.7900
(705) 742.7900

Facsimile
(705) 742.7907

Website
cambium-inc.com

Mailing Address
P.O. Box 325,
Peterborough, Ontario
Canada, K9J 6Z3

Locations
Peterborough
Kingston
Barrie
Oshawa
Calgary

Laboratory
Peterborough

Professional Engineers Ontario

APGO

May 2022

Cambium Reference: 14288-003

Dear property owner,

Cambium Inc. is completing a hydrogeological assessment of the property at 52 Mill Street, Norwood in support of potential residential development of that site. As part of the assessment, we are taking inventory of private groundwater users located adjacent to the work area. The purpose of the inventory is to identify nearby water supply wells that may be sensitive to the development.

If a supply well is located on your property, we are requesting that you please review and complete the attached questionnaire. Complete as much information as possible and scan the document (or take a photograph) and email to michelle.rea@cambium-inc.com. Please note, Cambium Inc. may contact you at a later date to request permission to monitor the water level in your well in the future.

You are not obligated to complete this form and participation on your part is voluntary. If you choose to provide a response to this letter, please do so before May 30, 2022.

If you have any questions regarding this assessment, please contact Michelle Rea at 1-705-957-3558.

Thank you. Best regards,

Cambium Inc.

Cameron MacDougall, P.Geo.
Project Manager

CJM

Attached: Water Well Survey Questionnaire

CAMBIUM INC.
BASELINE ASSESSMENT OF RESIDENTIAL WATER SUPPLY

Resident/Owner: _____ Info. Provided By: _____

Address: _____

_____

Phone: Home _____ Work _____

Email Address: _____

Part I: Well Construction Details

Location of Well: _____

_____

Well Record Number (i.e., tag on well) _____

Record Available?: _____ (attach copy) Construction Date: _____

Well Depth (m): _____ Diameter (cm): _____

Casing Length (m): _____ Diameter (cm): _____

Screen Installed? _____ Depth to Water From Ground Surface (m) _____

Details (slot size, diameter, length, depth) _____

_____

_____

Depth to Bedrock: _____ Bedrock Type: _____

Part II: Pump Installation Details

Pump Type (submersible, centifugal, jet, etc.): _____

Manufacturer/Model No.: _____ Power: _____

Design Pumping Rate (units): _____ Design Head (m): _____

Setting Depth (m): _____ Discharge Line (materials, diameter): _____

Pitless Adaptor (type, depth) : _____

Storage Details (pressure or holding tanks, filters or other treatment, operating pressures, etc.):

_____

_____

_____

CAMBIUM INC.
BASELINE ASSESSMENT OF RESIDENTIAL WATER SUPPLY

Part III: Groundwater Usage

What is groundwater used for (specify for each well)?

Water quantity (problems, amounts)

Water Discharge (septic system, settling ponds, other surface water, age, location, etc.)

Water Quality Tested ?: _____ (attach results if available)

Water quality (odour, taste, colour, hardness)

Diagram:

CAMBIUM

Environmental

Geotechnical

Building Sciences

Construction Quality Verification

Telephone
(866) 217.7900
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Facsimile
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Website
cambium-inc.com

Mailing Address
P.O. Box 325,
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Canada, K9J 6Z3

Locations
Peterborough
Kingston
Barrie
Oshawa

Laboratory
Peterborough

November 1, 2024 (Cambium Project Number: 14288-007)

Dear property owner,

Cambium Inc. is completing a water well survey of properties adjacent to a proposed residential development on Mill Street in Norwood, Ontario. The Site is located between Mill Street and Asphodel 10th Line.

As part of the survey, we are taking inventory of existing private groundwater users in the area of the proposed development. Cambium may request permission to investigate your well at a later date (should your well be safe and accessible to inspect). The well investigation will include an onsite interview (or phone call) with you and a water level/depth measurement of your well. Cambium Inc. may also request your permission to collect a raw (untreated) groundwater sample from your well.

If a private supply well is located on your property, and you would like to participate in the survey, please contact Ben Didemus by email at ben.didemus@cambium-inc.com or by telephone at 1-705-768-0835. Data collected from your well will be provided to you. Also, please see the attached water well questionnaire and complete as much information as possible. All of the information requested in the questionnaire is not necessarily required. Once complete please scan the document (or take a photograph) and email to the above referenced address, or mail back to us using the pre-paid postage envelope. Please respond by December 2, 2024.

Please note: You are not obligated to respond to this letter and participation on your part is voluntary. However, participation is encouraged. If you have any questions regarding this letter, please contact Ben Didemus at 1-705-768-0835.

Thank you.

Best regards,

Cambium Inc.

Cameron MacDougall, P.Geo.
Project Manager

BD/CJM
Attached: Water Well Survey Questionnaire

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Professional Engineers Ontario

APGO

CAMBIUM QUALIFICATIONS AND 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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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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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.

CAMBIUM INC.
BASELINE ASSESSMENT OF RESIDENTIAL WATER SUPPLY

Resident/Owner: Ryan + Julie Hughes Info. Provided By: Abby Hughes (daughter)

Address: 26 Mill St

Phone: Home 705-957-4526 Work 705-868-4863

Email Address: abbyhughes03@gmail.com

Part I: Well Construction Details

Location of Well: N/A, on town water

Well Record Number (i.e., tag on well) _____

Record Available?: _____ (attach copy) Construction Date: _____

Well Depth (m): _____ Diameter (cm): _____

Casing Length (m): _____ Diameter (cm): _____

Screen Installed? _____ Depth to Water From Ground Surface (m) _____

Details (slot size, diameter, length, depth) _____

Depth to Bedrock: _____ Bedrock Type: _____

Part II: Pump Installation Details

Pump Type (submersible, centifugal, jet, etc.): _____

Manufacturer/Model No.: _____ Power: _____

Design Pumping Rate (units): _____ Design Head (m): _____

Setting Depth (m): _____ Discharge Line (materials, diameter): _____

Pitless Adaptor (type, depth) : _____

Storage Details (pressure or holding tanks, filters or other treatment, operating pressures, etc.):

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BASELINE ASSESSMENT OF RESIDENTIAL WATER SUPPLY

Part III: Groundwater Usage

What is groundwater used for (specify for each well)?

Water quantity (problems, amounts)

Water Discharge (septic system, settling ponds, other surface water, age, location, etc.)

Water Quality Tested ?: _____ (attach results if available)

Water quality (odour, taste, colour, hardness)

Diagram:

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BASELINE ASSESSMENT OF RESIDENTIAL WATER SUPPLY

Resident/Owner: Dean Barber Info. Provided By: Dean Barber

Address: 11 Barber Lane, Norwood, ON

Phone: Home 705-639-5486 Work _____

Email Address: ddb1951@gmail.com

Part I: Well Construction Details

Location of Well: Behind house

Well Record Number (i.e., tag on well) No tag

Record Available?: No (attach copy) Construction Date: 1971

Well Depth (m): ~25' Diameter (cm): 4 - 3.5 ft

Casing Length (m): _____ Diameter (cm): _____

Screen Installed? _____ Depth to Water From Ground Surface (m) ~12'

Details (slot size, diameter, length, depth) Declined taking a water level/well measurements

Depth to Bedrock: Unknown Bedrock Type: Unknown

Part II: Pump Installation Details

Pump Type (submersible, centifugal, jet, etc.): No pump

Manufacturer/Model No.: _____ Power: _____

Design Pumping Rate (units): _____ Design Head (m): _____

Setting Depth (m): _____ Discharge Line (materials, diameter): _____

Pitless Adaptor (type, depth) : _____

Storage Details (pressure or holding tanks, filters or other treatment, operating pressures, etc.):

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BASELINE ASSESSMENT OF RESIDENTIAL WATER SUPPLY

Part III: Groundwater Usage

What is groundwater used for (specify for each well)?

Residential use

Water quantity (problems, amounts)

Not in 35 years

Water Discharge (septic system, settling ponds, other surface water, age, location, etc.)

Septic tank, tile bed

Water Quality Tested ?: Not in many years (attach results if available)

Water quality (odour, taste, colour, hardness)

Little hard, uses a softener, no other treatment systems

Diagram:

Appendix G

MECP Well Record Summary

Water Well Records Summary Report

Produced by Cambium Inc. using MOECP Water Well Information System (WWIS)

All units in meters unless otherwise specified

Well ID: 5100148 **Easting:** 263546 **UTM Zone** 18
Construction Date: 1959-12-03 **Northing:** 4919090 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	12.2	**Water Kind**	FRESH	**Pump Rate (LPM):**	0
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	0
Water First Found:	9.8	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	5 : 0
Static Level:	6				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	7.92
	CLAY		
2	LIMESTONE	7.92	12.19
	LIMESTONE		

Well ID: 5100149 **Easting:** 263511 **UTM Zone** 18
Construction Date: 1959-11-16 **Northing:** 4919096 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	30.5	**Water Kind**		**Pump Rate (LPM):**	
Well Diameter (cm):	15.24	**Final Status**	Abandoned-Su	**Recommended Pump Rate:**	
Water First Found:		**Primary Water Use:**		**Pumping Duration (h:m):**	
Static Level:					

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	7.92
2	LIMESTONE	7.92	30.48

Well ID: 5100150 **Easting:** 263977 **UTM Zone** 18
Construction Date: 1964-10-19 **Northing:** 4918949 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	34.8	**Water Kind**		**Pump Rate (LPM):**	
Well Diameter (cm):	15.24	**Final Status**	Abandoned-Su	**Recommended Pump Rate:**	
Water First Found:		**Primary Water Use:**		**Pumping Duration (h:m):**	
Static Level:					

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	3.35
2	SHALE	3.35	3.96
3	LIMESTONE	3.96	34.75

Well ID: 5100151 **Easting:** 263282 **UTM Zone** 18
Construction Date: 1952-05-19 **Northing:** 4920013 **Positional Accuracy:** unknown UTM

Well Depth:	11.0	**Water Kind**	FRESH	**Pump Rate (LPM):**	0
Well Diameter (cm):	12.70	**Final Status**	Water Supply	**Recommended Pump Rate:**	
Water First Found:	10.7	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	24 : 0
Static Level:	8				

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0.00	10.97

Well ID: 5100152 **Easting:** 263040 **UTM Zone** 18
Construction Date: 1952-09-19 **Northing:** 4919685 **Positional Accuracy:** unknown UTM

Well Depth:	12.2	**Water Kind**	FRESH	**Pump Rate (LPM):**	23
Well Diameter (cm):	12.70	**Final Status**	Water Supply	**Recommended Pump Rate:**	
Water First Found:	10.7	**Primary Water Use:**	Public	**Pumping Duration (h:m):**	3 : 0
Static Level:	3				

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0.00	10.67
2	GRAVEL	10.67	12.19

Well ID: 5100153 **Easting:** 263222 **UTM Zone** 18
Construction Date: 1954-12-28 **Northing:** 4919869 **Positional Accuracy:** unknown UTM

Well Depth:	12.8	**Water Kind**	FRESH	**Pump Rate (LPM):**	23
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	
Water First Found:	12.8	**Primary Water Use:**	Commerical	**Pumping Duration (h:m):**	2 : 0
Static Level:	10				

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.30
2	MEDIUM SAND	0.30	11.58
3	CLAY	11.58	12.80

Well ID: 5100154 **Easting:** 263344 **UTM Zone** 18
Construction Date: 1955-11-14 **Northing:** 4920056 **Positional Accuracy:** unknown UTM

Well Depth:	6.4	**Water Kind**	FRESH	**Pump Rate (LPM):**	14
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	
Water First Found:	5.8	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	0 : 45
Static Level:	3				

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0.00	3.66
2	LIMESTONE	3.66	6.40

Well ID: 5100156 **Easting:** 263343 **UTM Zone** 18
Construction Date: 1959-06-02 **Northing:** 4920026 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	16.5	**Water Kind**	FRESH	**Pump Rate (LPM):**	27
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	
Water First Found:	15.2	**Primary Water Use:**	Commerical	**Pumping Duration (h:m):**	3 : 0
Static Level:	10				

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.91
2	GRAVEL	0.91	10.67
3	MEDIUM SAND	10.67	11.89
4	LIMESTONE	11.89	16.46

Well ID: 5100157 **Easting:** 263053 **UTM Zone** 18
Construction Date: 1960-06-06 **Northing:** 4919765 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	51.8	**Water Kind**	SALTY	**Pump Rate (LPM):**	23
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	23
Water First Found:	51.8	**Primary Water Use:**	Commerical	**Pumping Duration (h:m):**	1 : 0
Static Level:	29				

Layer:	Driller's Description:	Top:	Bottom:

1	MEDIUM SAND	0.00	13.41
2	LIMESTONE	13.41	51.82

Well ID: 5100158
Construction Date: 1966-01-03
Easting: 263159
Northing: 4919796
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 12.2
Well Diameter (cm): 15.24
Water First Found: 11.6
Static Level: 8
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	1.22
2	MEDIUM SAND	1.22	10.97
3	LIMESTONE	10.97	12.19

Well ID: 5100159
Construction Date: 1967-02-14
Easting: 262857
Northing: 4919335
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 7.9
Well Diameter (cm): 15.24
Water First Found: 7.6
Static Level: 2
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 2 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.30
2	CLAY	0.30	7.62
3	GRAVEL	7.62	7.92

Well ID: 5100160
Construction Date: 1967-08-29
Easting: 263210
Northing: 4919815
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 11.0
Well Diameter (cm):
Water First Found: 10.7
Static Level: 8
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 0 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	PREVIOUSLY DUG	0.00	4.88
	PREVIOUSLY DUG		
2	MEDIUM SAND	4.88	10.97
	MEDIUM SAND		

Well ID: 5100163
Construction Date: 1966-09-06
Easting: 263981
Northing: 4919757
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 18.3
Well Diameter (cm): 15.24
Water First Found: 10.7
Static Level: 6
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 5
Recommended Pump Rate: 5
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0.00	5.18
2	LIMESTONE	5.18	16.76
3	GRANITE	16.76	18.29

Well ID: 5105780
Construction Date: 1972-01-19
Easting: 263900
Northing: 4919742
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 19.8
Well Diameter (cm): 15.24
Water First Found:
Static Level:
Water Kind
Final Status Unfinished
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	1.22
2	HARDPAN	1.22	2.13
3	LIMESTONE	2.13	19.81

Well ID: 5109119
Construction Date: 1978-08-16
Easting: 263080
Northing: 4920072
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 12.2
Well Diameter (cm): 15.24
Water First Found: 12.2
Static Level: 9
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 45
Recommended Pump Rate: 45
Pumping Duration (h:m): 3 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0.00	10.97
2	LIMESTONE	10.97	12.19

Well ID: 5109754
Construction Date: 1980-06-02
Easting: 264030
Northing: 4919322
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 21.3
Well Diameter (cm): 15.24
Water First Found: 19.8
Static Level: 5
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): :

Layer:	Driller's Description:	Top:	Bottom:
1	PREVIOUSLY DUG	0.00	3.66
2	LIMESTONE	3.66	21.34

Well ID: 5110843
Construction Date: 1983-09-28
Easting: 263230
Northing: 4919922
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 12.2
Well Diameter (cm): 15.24
Water First Found: 11.9
Static Level: 9
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Commerical
Pump Rate (LPM): 45
Recommended Pump Rate: 36
Pumping Duration (h:m): 10 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0.00	11.28
2	LIMESTONE	11.28	12.19

Well ID: 5111528
Construction Date: 1985-11-01
Easting: 263075
Northing: 4919905
UTM Zone 18
Positional Accuracy: unknown UTM

Well Depth: 25.6
Well Diameter (cm): 15.24
Water First Found: 22.9
Static Level: 5
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 5
Recommended Pump Rate: 5
Pumping Duration (h:m): 3 :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.61
2	SAND	0.61	9.14

3	LIMESTONE	9.14	25.60

Well ID: 5115821
Construction Date: 1992-05-05
Easting: 263264
Northing: 4919324
UTM Zone 18
Positional Accuracy: unknown UTM

Well Depth: 27.1
Well Diameter (cm): 15.24
Water First Found: 26.5
Static Level: 23
Water Kind FRESH
Final Status Test Hole
Primary Water Use: Commerical
Pump Rate (LPM): 364
Recommended Pump Rate: ###
Pumping Duration (h:m): 11 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	FILL	0.00	7.62
2	GRAVEL	7.62	13.72
3	GRAVEL	13.72	26.52
4	GRAVEL	26.52	26.82
5	SHALE	26.82	27.13

Well ID: 5116541
Construction Date: 1994-03-08
Easting: 263451
Northing: 4918748
UTM Zone 18
Positional Accuracy: unknown UTM

Well Depth: 11.0
Well Diameter (cm): 20.32
Water First Found: 3.3
Static Level: 3
Water Kind FRESH
Final Status Abandoned-Su
Primary Water Use: Municipal
Pump Rate (LPM): 227
Recommended Pump Rate:
Pumping Duration (h:m): 24 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	FINE SAND	0.00	2.44
	FINE SAND		
2	GRAVEL	2.44	3.66
	GRAVEL		
3	COARSE GRAVEL	3.66	9.75
	COARSE GRAVEL		
4	GRAVEL	9.75	10.97
	GRAVEL		

Well ID: 5116542
Construction Date: 1994-03-08
Easting: 263451
Northing: 4918748
UTM Zone 18
Positional Accuracy: unknown UTM

Well Depth: 10.7
Well Diameter (cm): 5.08
Water First Found:
Static Level: 3
Water Kind
Final Status Observation W
Primary Water Use: Not Used
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m): :

Layer:	Driller's Description:	Top:	Bottom:
1	FINE SAND	0.00	1.22
2	BOULDERS	1.22	5.79
3	GRAVEL	5.79	7.32
4	GRAVEL	7.32	7.92
5	GRAVEL	7.92	9.45
6	GRAVEL	9.45	10.67

Well ID: 5116818
Construction Date: 1995-02-15
Easting: 263075
Northing: 4919905
UTM Zone 18
Positional Accuracy: unknown UTM

Well Depth: 22.0
Well Diameter (cm): 15.24
Water First Found: 12.2
Static Level: 8
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 27
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.30
2	CLAY	0.30	9.14
3	SHALE	9.14	9.45
4	LIMESTONE	9.45	21.95

Well ID: 7047958
Construction Date: 2007-08-09
Easting: 263996
Northing: 4919669
UTM Zone 18
Positional Accuracy: margin of error : 10 - 30 m

Well Depth: 25.9
Well Diameter (cm): 15.88
Water First Found: 24.7
Static Level: 6
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.15
	TOPSOIL		
2	SAND	0.15	1.22
	SAND		
3	CLAY	1.22	7.92
	CLAY		
4	SHALE	7.92	9.14
	SHALE		
5	LIMESTONE	9.14	25.91
	LIMESTONE		

Well ID: 7110601
Construction Date: 2008-08-28
Easting: 263366
Northing: 4919140
UTM Zone 18
Positional Accuracy: margin of error : 10 - 30 m

Well Depth: 42.7
Well Diameter (cm): 15.88
Water First Found: 18.3
Static Level: 7
Water Kind Untested
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0.00	5.49
2	LIMESTONE	5.49	42.67

Well ID: 7146399
Construction Date: 2010-06-10
Easting: 263010
Northing: 4919464
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth:
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7186311
Construction Date: 2012-09-04
Easting: 262998
Northing: 4918956
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 4.6
Well Diameter (cm): 3.45
Water First Found:
Static Level:
Water Kind
Final Status Observation W
Primary Water Use: Monitoring an
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	FILL	0.00	0.61
2	SAND	0.61	2.44
3	SAND	2.44	4.57

Well ID: 7186312
Construction Date: 2012-09-04
Easting: 262886
Northing: 4919051
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 4.6
Well Diameter (cm): 3.45
Water First Found:
Static Level:
Water Kind
Final Status Observation W
Primary Water Use: Monitoring an
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0.00	1.50
2	FILL	1.50	3.10
3	SAND	3.10	4.57

Well ID: 7186313
Construction Date: 2012-09-04
Easting: 262855
Northing: 4919091
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 4.6
Well Diameter (cm): 3.45
Water First Found:
Static Level:
Water Kind
Final Status Test Hole
Primary Water Use: Monitoring an
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0.00	1.50
2	FILL	1.50	3.10
3	SAND	3.10	4.57

Well ID: 7189653
Construction Date: 2012-10-16
Easting: 263990
Northing: 4919241
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 30.5
Well Diameter (cm): 15.88
Water First Found: 27.4
Static Level: 4
Water Kind Untested
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 16
Recommended Pump Rate: 16
Pumping Duration (h:m): 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0.00	3.05
2	LIMESTONE	3.05	30.48

Well ID: 7189660
Construction Date: 2012-10-16
Easting: 263875
Northing: 4919869
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 18.3
Well Diameter (cm): 15.88
Water First Found: 12.2
Static Level: 4
Water Kind Untested
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 16
Recommended Pump Rate: 16
Pumping Duration (h:m): 1 :

Layer:	Driller's Description:	Top:	Bottom:

1	SAND	0.00	8.53
2	LIMESTONE	8.53	18.29

Well ID: 7281327
Construction Date: 2017-02-17
Easting: 263300
Northing: 4919946
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 10.7
Well Diameter (cm): 5.08
Water First Found: 7.6
Static Level:
Water Kind Untested
Final Status Monitoring an
Primary Water Use: Test Hole
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0.00	0.61
2	SAND	0.61	10.67

Well ID: 7294205
Construction Date: 2017-09-06
Easting: 263944
Northing: 4919330
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 30.5
Well Diameter (cm): 15.88
Water First Found: 26.8
Static Level: 5
Water Kind Untested
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 16
Recommended Pump Rate: 16
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	3.66
2	LIMESTONE	3.66	30.48

Well ID: 7294797
Construction Date: 2017-09-15
Easting: 263042
Northing: 4919872
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 26.5
Well Diameter (cm): 5.08
Water First Found:
Static Level:
Water Kind
Final Status Test Hole
Primary Water Use: Test Hole
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0.00	1.22
2	BOULDERS	1.22	22.86
3	SHALE	22.86	25.30
4	LIMESTONE	25.30	26.52

Well ID: 7294798
Construction Date: 2017-09-15
Easting: 263010
Northing: 4919733
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth:
Well Diameter (cm): 5.08
Water First Found:
Static Level:
Water Kind
Final Status Observation W
Primary Water Use: Test Hole
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0.00	
2	SHALE		
3	LIMESTONE		

Well ID: 7294799
Construction Date: 2017-09-15
Easting: 262944
Northing: 4919693
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth:
Well Diameter (cm): 5.08
Water First Found:
Static Level:
Water Kind
Final Status Observation W
Primary Water Use: Test Hole
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0.00	
2	SHALE		
3	LIMESTONE		

Well ID: 7405448
Construction Date: 2021-12-10
Easting: 262834
Northing: 4919170
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth:
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7416384
Construction Date: 2022-04-27
Easting: 263257
Northing: 4919307
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth:
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7435319
Construction Date: 2022-11-21
Easting: 263330
Northing: 4919031
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth:
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7435320
Construction Date: 2022-11-21
Easting: 263949
Northing: 4919198
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth:
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7449380
Construction Date: 2023-06-08

Easting: 263893
Northing: 4919814

UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 15.2
Well Diameter (cm): 15.88
Water First Found: 15.2
Static Level: 4

Water Kind Untested
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 32
Recommended Pump Rate: 32
Pumping Duration (h:m): 2 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.30
	TOPSOIL		
2	CLAY	0.30	10.06
	CLAY		
3	LIMESTONE	10.06	15.24
	LIMESTONE		

Appendix H

Water Level Summary

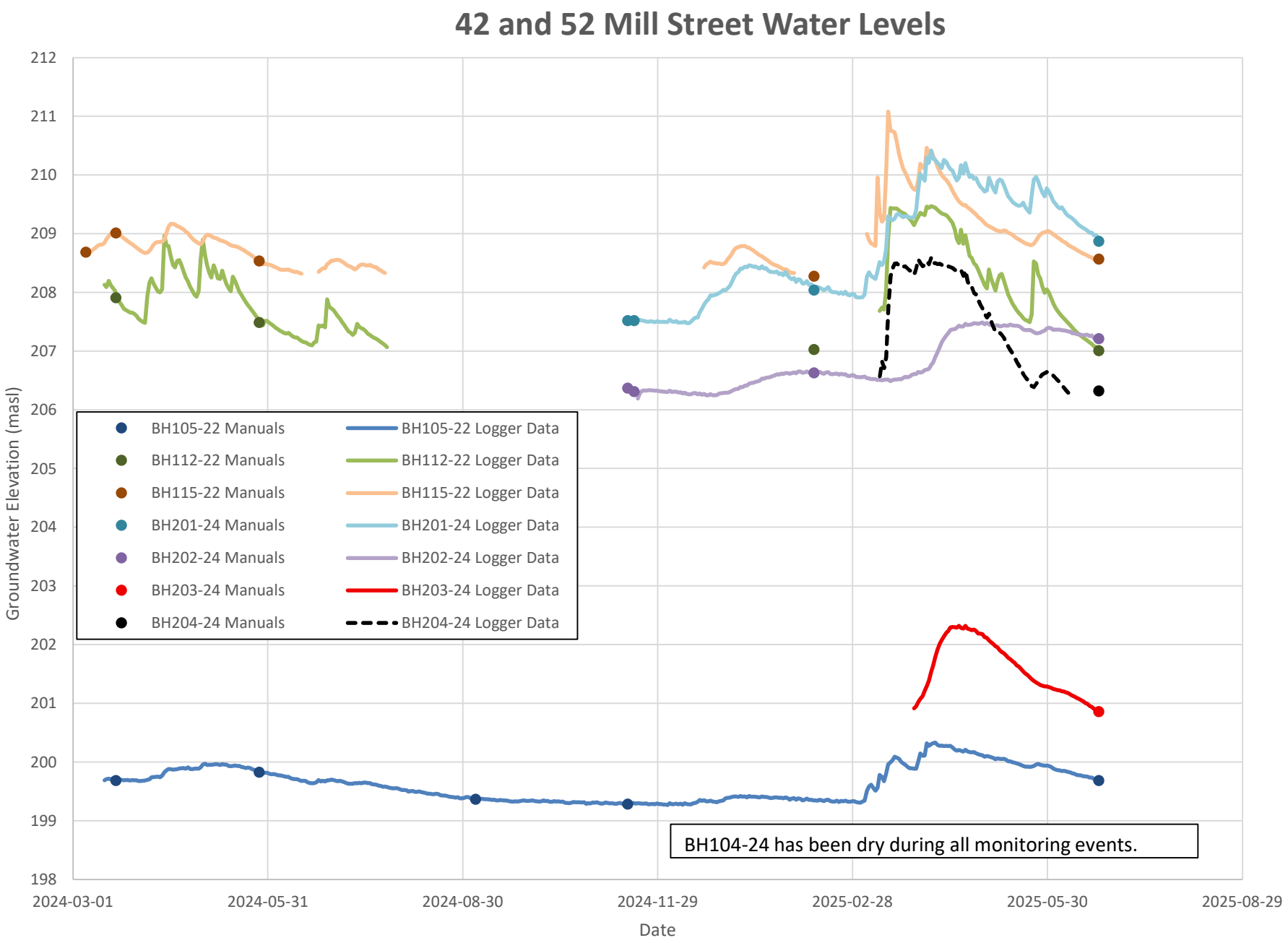
Appendix H - Water Levels at 42 and 52 Mill Street, Norwood

Date	Well	BH104-22	BH105-22	BH112-22	BH115-22	BH201-24	BH202-24	BH203-24	BH204-24
	Top of Pipe Elevation (masl)	210.06	203.70[1]	210.42[1]	212.09	211.24	210.49	206.16	209.72
	Ground Surface Elevation (masl)	208.93	202.46	209.28	210.83	210.50	209.76	205.34	208.96
	Stick-up (m)	1.13	1.24	1.14	1.25	0.74	0.73	0.82	0.76
27-Apr-2022	Groundwater Elevation (masl)	Dry (<205.85)	199.78	208.40	208.93	-	-	-	-
	Water Level (mbgs)	Dry (>3.08)	2.68	0.88	1.91	-	-	-	-
4-May-2022	Groundwater Elevation (masl)	Dry (<205.85)	199.74	208.04	208.82	-	-	-	-
	Water Level (mbgs)	Dry (>3.08)	2.72	1.24	2.02	-	-	-	-
7-Mar-2024	Groundwater Elevation (masl)	Dry (<205.85)	N/A[3]	N/A[3]	208.66	-	-	-	-
	Water Level (mbgs)	Dry (>3.08)	N/A[3]	N/A[3]	2.18	-	-	-	-
21-Mar-2024	Groundwater Elevation (masl)	Dry (<205.85)	199.69	207.91	208.99	-	-	-	-
	Water Level (mbgs)	Dry (>3.08)	2.77	1.37	1.85	-	-	-	-
27-May-2024	Groundwater Elevation (masl)	Dry (<205.85)	199.83	207.49	208.51	-	-	-	-
	Water Level (mbgs)	Dry (>3.08)	2.63	1.79	2.33	-	-	-	-
5-Sep-2024	Groundwater Elevation (masl)	Dry (<205.85)	199.37	Dry (<206.49)	Dry (<208.16)	-	-	-	-
	Water Level (mbgs)	Dry (>3.08)	3.09	Dry (>2.79)	Dry (>2.68)	-	-	-	-
15-Nov-2024	Groundwater Elevation (masl)	Dry (<205.85)	199.29	Dry (<206.49)	Dry (<208.16)	207.52	206.37	Dry (<200.77)	Dry (<206.3)
	Water Level (mbgs)	Dry (>3.08)	3.17	Dry (>2.79)	Dry (>2.68)	2.98	3.39	Dry (>4.57)	Dry (>2.66)
18-Nov-2024	Groundwater Elevation (masl)	-	-	-	-	207.52	206.31	Dry (<200.77)	Dry (<206.3)
	Water Level (mbgs)	-	-	-	-	2.98	3.45	Dry (>4.57)	Dry (>2.66)
10-Feb-2025	Groundwater Elevation (masl)	Dry (<205.85)	Unknown[2]	207.03	208.25	208.04	206.63	Dry (<200.77)	Dry (<206.3)
	Water Level (mbgs)	Dry (>3.08)	Unknown[2]	2.25	2.59	2.46	3.13	Dry (>4.57)	Dry (>2.66)
23-Jun-2025	Groundwater Elevation (masl)	Dry (<205.85)	199.69	207.01	208.57	208.87	207.21	200.86	206.32
	Water Level (mbgs)	Dry (>3.08)	2.77	2.27	2.27	1.63	2.55	4.48	2.64

[1] BH105-22 and BH112-22 were damaged between May 4, 2022, and March 7, 2024. The casing of these wells was fixed and the tops of casings were surveyed on March 15, 2025. Therefore, water elevations after March 15, 2025, were calculated in reference to the 2024 survey for this Site, as opposed to the 2022 survey.

[2] A water level could not be measured from BH105-22 on February 10, 2025, because the cap could not be removed due to the cap being connected to a wire holding the well's pressure transducer in place and due to the water in the well being frozen and preventing the wire from moving.

[3] Water elevations could not be calculated from BH105-22 and BH112-22 on March 7, 2024 as the casing on both wells was damaged.



Appendix I

Dewatering Calculations

DEWATERING CALCULATIONS

Modified Dupuit-Forchheimer Equation: unconfined flow into a linear excavation.
Calculations assume no flow boundary at aquifer base

Excavation Area		Initial Depth to Groundwater	Target Depth to Groundwater	Depth to Base of Aquifer*	Unit Length of Trench (a)	Width of Trench (b)	Hydraulic Conductivity (K)	Drawdown (s)	R	r_w = b/2	R_o	$\ln(R_o/r_w)$	L = R_o/2	H	h = H-s	Q_{ends}	Q_{trench}	Q_{total}		
		mbgs	mbgs	mbgs	m	m	m/s	m	m	m	m	-	m	m	m	m^3/s	m^3/s	m^3/s	L/s	L/d
Elongated Trench @ 50 m Increments	Minimum K	0.00	4.00	6.00	50	2	3.23E-08	4.00	2.16	1.00	3.16	1.15	1.58	6.00	2.00	0.000003	0.000033	**0.000036**	**0.036**	**3,073**
	Maximum K	0.00	4.00	6.00	50	2	5.95E-06	4.00	29.27	1.00	30.27	3.41	15.14	6.00	2.00	0.000175	0.000629	**0.000804**	**0.80**	**69,499**
	Geometric mean K	0.00	4.00	6.00	50	2	1.51E-06	4.00	14.75	1.00	15.75	2.76	7.87	6.00	2.00	0.000055	0.000307	**0.000362**	**0.36**	**31,272**

s = target drawdown (initial - target depth to groundwater) (m)
R_o = radius of influence of construction dewatering/pumping, from center of excavation (m)
L = distance to line source (m)
r_s = equivalent single well radius (m)
H = Initial hydraulic head in aquifer (m)
h = hydraulic head at radius of well (m)
Q = construction dewatering rate (m^3/s)
*For base of aquifer, use target depth to groundwater plus 50% of target drawdown (s), unless specific geological conditions dictate otherwise.
For practical use, R is presented as zone of influence for reporting purposes, with the distance defined from edge of excavation.

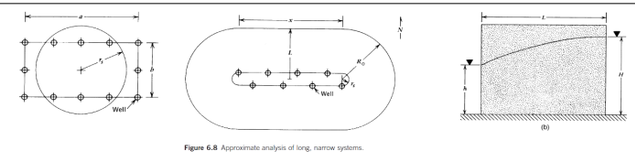


Figure 6.8 Approximate analysis of long, narrow systems.

Source: Powers, J. Patrick, et al. "Construction dewatering and groundwater control." (2007)

$$Q = \frac{\pi K(H^2 - h^2)}{\ln R_0/r_s} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right] \quad (6.10b)$$

x = unit length of trench

R = 3000*s*sqrt(K)
Source: Kyrieleis, W. and Sichardt, W. "Grundwasserabsenkung bei Fundierungsarbeiten" Springer, Berlin, 1930

R_o = R, if R >> r_s ***(R >> rs when R/r$_s$ > 100)***
else, R_o = R + r_s

Source: Cashman and Preene. "Groundwater Lowering in Construction." (2013)

Appendix J

Water Balance Calculations

Water Balance Calculations

42 and 52 Mill Street, Norwood, Ontario

THORNTHWAITE-TYPE MONTHLY WATER-BALANCE MODEL

modified from Dingman 2015: Box 6-8 (pg 299) using ET model of Hamon (1963)

		Input Data				Computed Values							
											Surplus	358	mm/yr
Weather Station Location:	**PETERBOROUGH TRENT U**					**Latitude:**	**44.4**	**degree**					
Solar Declination (degree)	-20.6	-12.6	-1.5	10.0	19.0	23.1	21.0	13.4	2.6	-9.0	-18.5	-23.0	
DayLength (hr)*	9.1	10.3	11.8	13.3	14.6	15.3	14.9	13.8	12.3	10.8	9.5	8.7	
Available Water Storage Capacity	0.14	m/m	**Root Depth**	500	mm	**SOILmax**	70.0	mm					

MONTHLY WATER BALANCE DATA

Temperatures in C, water-balance terms in mm.

Month:	J	F	M	A	M	J	J	A	S	O	N	D	Year
TEMPERATURE (T)	-8.4	-6.5	-1.3	6.3	12.8	18.0	20.7	19.4	15.0	8.4	2.4	-4.0	
PRECIPITATION (P)	57.3	48.8	56.5	66.4	88.7	83.0	73.6	87.0	92.4	77.0	85.5	66.0	882
RAIN	22.4	23.1	34.0	60.9	88.7	83.0	73.6	87.0	92.4	75.7	73.3	35.0	749
SNOW	35	26	23	6	0	0	0	0	0	1	12	31	133
MELT FACTOR (F)	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.40	0.00	
PACK	73	99	121	0	0	0	0	0	0	0	7	38	
MELT	0	0	0	127	0	0	0	0	0	1	5	0	133
INPUT (W)	22	23	34	188	89	83	74	87	92	77	78	35	882
POTENTIAL ET (PET)	0	0	0	41	70	97	115	98	65	39	22	0	548
NET INPUT (ΔW)	22	23	34	147	19	-14	-41	-11	27	38	56	35	
SOIL MOISTURE (SOIL)	70	70	70	70	70	57	32	27	54	70	70	70	
ΔSOIL	0	0	0	0	0	-13	-26	-5	27	16	0	0	0
ET	0	0	0	41	70	96	99	92	65	39	22	0	524
SURPLUS=W-ET-ΔSOIL	22	23	34	147	19	0	0	0	0	22	56	35	358

Notes:

Precipitation, Rain, Temperature, and Latitude are inputted parameters

SOILmax = available water storage capacity * root depth

m = month

D = Day length (hrs) $=2*\cos^{-1}(-\tan(\text{Latitude})*\tan(\text{Declination}))/0.2618$ [calculation is in radians]

$SNOW_m = P_m - RAIN_m$

$F_m = 0$ if $T_m <= 0^oC$; $F_m = 0.167*T_m$ if $0^oC<T_m<6^oC$; $F_m = 1$ if $T_m>=6^oC$

$PACK_m = (1-F_m)*(SNOW_m+PACK_{m-1})$

$MELT = F_m*(SNOW_m+PACK_{m-1})$

$W_m = RAIN_m+MELT_m$.

PET = 0 if $T_m<0$; otherwise $PET = 2.98*0.611*\exp(17.3*T_m/(T_m+237))/(T_m+237.2)*$Number of days in month [Hamon ET model (1963)]

$\Delta W_m = W_m - PET_m$

$SOIL = \min\{[\Delta W_m+SOIL_{m-1}], SOILmax\}$, if $\Delta Wm>0$; otherwise $SOIL = SOIL_{m-1}* \exp(\Delta W/SOILmax)$

$\Delta SOIL = SOIL_{m-1}-SOIL_m$

ET = PET if W_m > PET; otherwise, $ET=W_m-\Delta SOIL$

Pre- and Post-Development Water Balance Calculations
42 and 52 Mill Street, Norwood, Ontario

1 Climate Information

Precipitation	882	mm/yr
Actual Evapotranspiration	524	mm/yr
Water Surplus	358	mm/yr

2 Infiltration Rates

Table 2 Approach - Infiltration factors

Topography: Flat and Hilly Land	0.2
Soil Type: Sandy Silt / Silty Sand to Clayey Silt / Silty Clay	0.25
Cover: Cultivated land	0.1
Total Infiltration Factor	**0.55**

Infiltration (Water Surplus * Infiltration Factor)	**197**	mm/yr
Run-off (Water Surplus - Infiltration)	**161**	mm/yr

Table 3 Approach - Typical Recharge Rates

Coarse Sand and Gravel	>250	mm/yr
Fine to medium sand	200-250	mm/yr
Silty sand to sandy silt	150-200	mm/yr
Silt	125-150	mm/yr
Clayey Silt	100- 125	mm/yr
Clay	<100	mm/yr

Site development area is underlain predominantly silty sand to sandy silt with localized deposits of silty clay.

Based on the above, the recharge rate is typically	150-200	mm/yr

3 Pre-Development Property Statistics	**ha**	**m^2**
Total Paved Area	0.12	1,235
Total Roof Area	0.08	846
Total Landscape Area	35.29	352,919
Total	**35.50**	**355,000**

4 Post-Development Property Statistics	**ha**	**m^2**
Total Paved Area	8.10	80,985
Total Roof Area	9.83	98,280
Total Landscape Area	17.57	175,735
Total	**35.50**	**355,000**

Pre- and Post-Development Water Balance Calculations

42 and 52 Mill Street, Norwood, Ontario

5 Pre-Development Water Balance

Land Use		Area (m^2)	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Impervious Areas	Paved Area	1,235	1,089	109	-	981
	Roof Area	846	746	75	-	671
Pervious Areas	Landscape Area	352,919	311,275	184,930	69,490	56,855
	Totals	355,000	313,110	185,113	69,490	58,507
Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.						

6 Post-Development Water Balance

Land Use		Area (m^2)	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Impervious Areas	Paved Area	80,985	71,429	7,143	-	64,286
	Roof Area	98,280	86,683	8,668	-	78,015
Pervious Areas	Landscape Area	175,735	154,998	92,085	34,602	28,311
	Totals	355,000	313,110	107,896	34,602	170,611
Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.						

7 Comparision of Pre- and Post -Development

	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Pre-Development	313,110	185,113	69,490	58,507
Post-Development	313,110	107,896	34,602	170,611
Change in Volume	-	- 77,217	- 34,888	112,104
Change in %	-	- 42	- 50	192

8 Requirement for Infiltration of Roof Run-off

Volume of Pre-Development Infiltration (m^3/yr)	69,490
Volume of Post-Development Infiltration (m^3/yr)	34,602
Deficit from Pre to Post Development Infiltration (m^3/yr)	34,888
Percentage of Roof Runoff required to match the pre-development infiltration (%)	45