PATERSON GROUP

Geotechnical Investigation

Proposed Residential Development

1825 Ramsay Concession 11A
Mississippi Mills, Ontario

Prepared for Menzie Almonte 2 Inc (c/o Regional Group)

Report PG5860-1 Revision 3 dated July 25, 2024

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1.0 Introduction

Paterson Group (Paterson) was commissioned by Menzie Almonte 2 Inc (c/o Regional Group) to prepare a geotechnical investigation report for the proposed residential development to be located at 1825 Ramsey Concession 11A, in the Village of Mississippi Mills, Ontario (refer to Figure 1 - Key Plan presented in Appendix 2).

The objective of the geotechnical investigation was to:

- determine the subsoil and groundwater conditions at the site by means of test holes
- provide geotechnical recommendations for the design of the proposed development including construction considerations which may affect its design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

2.0 Proposed Development

Based on the available conceptual drawings, it is understood that the proposed development will consist of residential dwellings with driveways, local roadways, walkways and landscaped areas. It is further understood that a stormwater management pond and a park are to be located within the southwestern portion of the subject site. It is expected that the proposed development will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current geotechnical investigation was carried out on April 2 and 3, 2024. The program consisted of seven (7) boreholes and three (3) hand augered test holes advanced down to a maximum depth of 3.5 m below ground surface A previous geotechnical investigation programs were completed on June 11, 2021 and November 24, 2021, consisted of excavating a total of seven (7) test pits and fifteen (15) hand augered test holes down to a maximum depth of 3.3 m below ground surface. The test pit locations were distributed in a manner to provide general coverage of the subject site and taking into consideration underground utilities and site features. The test hole locations are shown on Drawing PG5860-1 - Test Hole Location Plan attached.

The boreholes were advanced using a CME-55 Power Auger rig and operated by a two-person crew. The drilling procedure consisted of augering to the required depths at the selected locations, and sampling and testing the overburden.

The test pits were completed using an excavator and backfilled with the excavated soil upon completion. The test pit procedures consisted of excavating to the required depth at the selected location and sampling the overburden. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer.

Sampling and In Situ Testing

The soil samples were recovered from the auger flights and using a 50 mm diameter split-spoon sampler. The samples were initially classified on site, placed in sealed plastic bags and transported to our laboratory. The depths at which the auger and split-spoon samples were recovered from the boreholes are shown as AU and SS, respectively, on the Soil Profile and Test Data sheets in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples. The SPT results are recorded as “N” values on the Soil Profile and Test Data sheets. The “N” value is the number of blows required to drive the split-spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

The soil samples from the test pits were recovered from the side walls of the open excavation. The samples were initially classified on site, placed in sealed plastic bags and transported to our laboratory.

The depths at which the auger and grab samples were recovered from the test pits are shown as AU, and G respectively, on the Soil Profile and Test Data sheets in Appendix 1.

Undrained shear strength testing was carried out in cohesive soils using a field vane apparatus.

The subsurface conditions observed in the test pits were recorded in detail in the field. The soil profiles are logged on the Soil Profile and Test Data sheets in Appendix 1 of this report.

Groundwater

Monitoring wells were installed in HA1-24, HA2-24, HA3-24, BH4-24, BH5-24 and BH7-24 test holes during the current investigation to permit monitoring of groundwater levels subsequent to the completion of the drilling program. Typical monitoring well construction details are described below:

- 0.3 m of slotted 50 mm diameter PVC screen at the base of the boreholes HA2-24, HA3-24, BH4-24, BH5-24 and BH7-24.
- 1.5 m of slotted 50 mm diameter PVC screen at the base of the borehole HA1-24.
- 50 mm diameter PVC riser pipe from the top of the screen to the ground surface was installed in BH4-24, BH5-24 and BH7-24.
- 32 mm diameter PVC riser pipe from the top of the screen to the ground surface was installed in HA1-24, HA2-24 and HA3-24.
- No. 3 silica sand backfill within annular space around screen.
- 300 mm thick bentonite hole plug directly above PVC slotted screen.
- Clean backfill from top of bentonite plug to the ground surface.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific well construction details.

The groundwater observations are discussed in subsection 4.3 and presented in the Soil Profile and Test Data Sheets in Appendix 1

Water Level Monitoring

All monitoring wells (HA1-24, HA2-24, HA3-24, BH4-24 and BH5-24) excluding BH7-24 were equipped with Van Essen Instruments TD-Diver water level dataloggers to continuously monitor fluctuations in water levels. The dataloggers were programmed to continuously measure and record groundwater levels at a minimum rate of one (1) reading every twelve (24) hours.

In addition to the continuous datalogger measurements, manual water level measurements were taken during the installation and decommission of the dataloggers using an electronic water level meter. The groundwater monitoring results are presented in Figure 2 to Figure 6 – Groundwater Monitoring Charts in Appendix 2.

3.2 Field Survey

The test hole locations were selected by Paterson to provide general coverage of the subject site. The test hole locations and ground surface elevation at each test hole location were surveyed by Paterson using a high precision, handheld GPS and referenced to a geodetic datum. The location of the boreholes is presented on Drawing PG5860-1 Revision 4- Test Hole Location Plan in Appendix 2.

3.3 Laboratory Review

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. All test results are included in Appendix 1 and further discussed in Subsection 4.2 of the current report.

3.4 Analytical Testing

One (1) soil sample was submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures by others. The sample was submitted to determine the concentration of sulphate and chloride, the resistivity, and the pH of the samples. The results are discussed further in Subsection 6.7.

4.0 Observations

4.1 Surface Conditions

The site is currently undeveloped, and grass covered. The ground surface across the subject site is relatively flat and approximately 1.5 m lower than the neighbouring roadway. The site was observed to be sparsely vegetated with brush and small adolescent trees. It is worth noting that extremely soft ground conditions were encountered at ground surface within the western portion of the site due to the presence of a peat layer.

The site is bound by a residential subdivision and a storm water pond to the south, a single house and associated landscaped areas to the east, and by similar land to the north and west.

4.2 Subsurface Profile

Overburden

The subsurface profile encountered at the test hole locations varies from west to the eastern portion of the site. Shallow bedrock overlain by glacial till and topsoil with high organics was encountered along the east portion of the site. On the other hand, the subsurface profile at the western portion consists of Peat, topsoil, and marl underlain by silty clay, and glacial till or bedrock.

Peat and Marl

Peat consisting of soft highly organic soils and marl deposits were encountered at in the western portion of the site. Marl consists of soft, light-coloured (white to pale gray or) mud-like sediment typically deposited in freshwater marine environment by algae. The thickness of peat and marl varies between 0.25 to 1.3 m thick.

Topsoil

Generally, the topsoil was observed to be 0.2 to 0.45 m thick overlying silty clay, glacial till and/or bedrock.

Silty Clay

A firm to very stiff brown silty clay deposit was encountered at an approximate depth ranging from 0.2 to 1.2 m transitioning to grey at approx. 1.2 to 1.45 m at the western portion of the site and in BH2-24, BH3-24, and BH4-24 at the site's eastern side.

Glacial Till

A glacial till layer was encountered at an approximate depth ranging from 0.2 to 1.7 m overlying the shallow bedrock. The glacial till consists of compact to very dense silty clay to silty sand with gravel, cobbles, rock fragments, and boulders.

Bedrock

Based on available geological mapping, the local bedrock consists of limestone and dolomite of the Gull River formation with an anticipated overburden thickness of 1 to 3 m depth. Practical refusal on bedrock was encountered in all test holes at approximate depths ranging between 0.4 and 3.5 m. Reference should be made to the Soil Profile and Test Data sheets in the attachments for specific details of the soil profiles encountered at each test hole location.

4.3 Groundwater

Manual Groundwater water level measurements were measured periodically collected from the monitoring well installations during the current field investigations and are summarized in Table 1 below. The manual water level measurements are also noted on the applicable Soil Profile and Test Data sheet presented in Appendix 1.

Table 1 – Summary of Groundwater Levels

Borehole	Observation Method	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
			Depth (m)	Elevation (m)	
HA1-24	Monitoring Well	138.22	0.24	137.98	April 9, 2024
			0.42	137.80	July 8, 2024
HA2-24	Monitoring Well	138.39	0.99	137.40	April 9, 2024
			0.0	138.39	July 8, 2024
HA3-24	Monitoring Well	138.51	1.2	137.31	April 9, 2024
			0.0	138.51	July 8, 2024
BH4-24	Monitoring Well	138.94	0.1	138.93	April 9, 2024
			0.0	138.94	July 8, 2024
BH5-24	Monitoring Well	138.94	0.19	138.75	April 9, 2024
			0.2	138.74	July 8, 2024
BH7-24	Monitoring Well	139.60	0.06	139.54	April 9, 2024

Notes:
1. The ground surface elevation at each borehole location was surveyed using a high precision GPS and referenced to a geodetic datum.
2. Groundwater reading at BH7-24 was not recorded during July 8, 2024, site visit.

Water Elevation Monitoring Program

In addition to manual water level measurements, a water elevation monitoring program was carried out across the subject site. The water elevation monitoring program provides an overview of the variations in the monitoring well water elevations throughout the monitoring period. Each monitoring well was equipped with a Van Essen TD-Diver Water Level Datalogger to accurately monitor fluctuations in the water levels. The dataloggers were programmed to continuously measure and record water levels throughout the subject site at a fixed rate of one (1) reading every 24 hours for approximately 3 months.

The monitoring program was undertaken from April 2024 to July 2024. The monitoring data was compared with Environment and Natural Resources Canada precipitation data from the Ottawa International Airport over the same timeframe as part of the monitoring program. The monitoring data is presented in Figure 2 to Figure 6 - Monitoring Well Water Elevations sheets in Appendix 2.

Monitoring Results

The data presented in Figure 2 through Figure 6 shows the seasonal high water table was near the surface during the monitoring program. The water levels throughout the site ranged between 0 to 1 m bgs (137.37 to 139.00m asl) during the monitoring program. It is important to note that groundwater level readings could be influenced by perched water condition. The long-term groundwater table can also be estimated based on the observed colour and consistency of the recovered soil samples. Based on these observations, it is estimated that the long-term groundwater level can be expected between 1.5 to 2.0 m below ground surface.

It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered acceptable for the future phase of the proposed residential development. However, due to the presence of a peat/marl layer and shallow groundwater within the southwest portion of the site, additional site preparation recommendations are required.

Due to the presence of a sensitive silty clay layer, the western portion of the site will be subjected to grade raise restrictions. The recommended permissible grade raise restriction is presented in Drawing PG5860-2 Revision 3 – Permissible Grade Raise Plan in Appendix 2. If a higher permissible grade raise is required, preloading with or without surcharge, lightweight fill and/or other measures should be investigated to reduce the risks of unacceptable long-term post construction and differential settlements.

Depending on depth of services and building foundations, bedrock removal may be required.

The above and other considerations are further discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing significant amounts of organics, should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures.

The peat and marl layers encountered within the site should be removed from under any settlement sensitive structures.

Fill Placement

Fill used for grading beneath the building footprints, unless otherwise specified, should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The fill should be tested and approved prior to delivery to the site.

It should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the building area should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil can be used as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. The reuse of marl and peat is not recommended; however, it is expected that the peat can be mixed with topsoil material and reused for landscaped areas.

If approved site excavated fill is to be used to build up the subgrade level for areas to be paved, they should be compacted in thin lifts to a minimum density of 95% of their respective SPMDD. Non specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls unless a composite drainage blanket connected to a perimeter drainage system is provided.

Bedrock Removal

Should bedrock removal be required, hoe ramming is an option where the bedrock is weathered and/or where only small quantities of bedrock need to be removed. Where large quantities of bedrock need to be removed, line drilling and controlled blasting may be required. The blasting operations should be planned and completed under the guidance of a professional engineer with experience in blasting operations.

Prior to considering blasting operations, the blasting effects on the existing services, buildings and other structures should be addressed. A pre-blast or pre-construction survey of the existing structures located in proximity of the blasting operations should be conducted prior to commencing construction.

The extent of the survey should be determined by the blasting consultant and sufficient to respond to any inquiries/claims related to the blasting operations. The blasting operations should be planned and conducted under the supervision of a licensed professional engineer who is also an experienced blasting consultant.

Vibration Considerations

Construction operations could be the cause of vibrations, and possibly, sources of nuisance to the community. Therefore, means to reduce the vibration levels as much as possible should be incorporated in the construction operations to maintain a cooperative environment with the residents.

The following construction equipment could be the source of vibrations: hoe ram, compactor, dozer, crane, truck traffic, etc. Vibrations, whether caused by blasting operations or by construction operations, could be the cause or the source of detrimental vibrations on the nearby buildings and structures. Therefore, it is recommended that all vibrations be limited.

Two parameters determine the permissible vibrations, the maximum peak particle velocity and the frequency. For low frequency vibrations, the maximum allowable peak particle velocity is less than that for high frequency vibrations. As a guideline, the peak particle velocity should be less than 15 mm/s between frequencies of 4 to 12 Hz, and 50 mm/s above a frequency of 40 Hz (interpolate between 12 and 40 Hz). These guidelines are for current construction standards. These guidelines are above perceptible human level and, in some cases, could be very disturbing to some people, therefore, a pre-construction survey is recommended to minimize the risks of claims during or following the construction of the proposed building.

5.3 Foundation Design

Based on the subsurface profile encountered, it is expected that footings for the proposed buildings can be founded on either an undisturbed, firm grey silty clay, compact brown glacial till or bedrock bearing surface. Also, footings can be founded on an engineered pad over an approved undisturbed firm grey silty clay, compact brown glacial till, or clean surface sounded bedrock surface.

Bearing Capacity of Conventional Footings

Footings placed on an undisturbed firm, grey silty clay layer or on an engineered pad over undisturbed native soil approved by Paterson at the time of construction, can be designed using a bearing resistance value at serviceability limit states (SLS) of **60 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **125 kPa**.

Footings placed on an undisturbed, compact, brown glacial till bearing surface can be designed using a bearing resistance value at SLS of **150 kPa** and a factored bearing resistance value at ULS of **225 kPa**.

An undisturbed soil bearing surface consists of one from which all topsoil, peat, marl, and deleterious materials, such as loose, frozen or disturbed soil, have been removed, in the dry, prior to the placement of concrete for footings.

Footings placed on a clean, surface sounded bedrock bearing surface can be designed using a bearing resistance value at ULS of **500 kPa**.

A clean surface sounded bedrock bearing surface consists of one from which all loose materials have been removed, and has no near surface seams, voids, fissures or open joints which can be detected from surface sounding with a rock hammer.

A geotechnical resistance factor of 0.5 was applied to the reported bearing resistance values at ULS.

Footings placed on a soil bearing surface and designed using the bearing resistance values at SLS given above will be subjected to potential post construction total and differential settlements of 25 and 20 mm, respectively. Footings placed on a clean surface sounded bedrock bearing surface will be subjected to negligible post construction settlements.

Bedrock/Soil Transition

Where a building is founded partly on bedrock and partly on soil, it is recommended to decrease the soil bearing resistance value by 25% for the footings placed on soil bearing media to reduce the potential long-term total and differential settlements. Also, at the soil/bedrock and bedrock/soil transitions, it is recommended that the upper 0.5 m of the bedrock be removed for a minimum length of 2 m (on the bedrock side) and replaced with nominally compacted OPSS Granular A or Granular B Type II material. The width of the sub-excavation should be at least the proposed footing width plus 0.5 m. Steel reinforcement, extending at least 3 m on both sides of the 2 m long transition, should be placed in the top part of the footings and foundation walls.

Zero Entry Lean Concrete Trenches

Alternatively, a zero-entry, vertical trench can be excavated below the USF down to the bedrock layer and infilled with lean concrete mix (Minimum 15 MPa, 28 day strength). The trench should have near vertical side walls and extend a minimum of 300 mm beyond each face of the footings. The bedrock at the bottom of the excavation should be reviewed by Paterson at the time of construction.

The bearing resistance values used for footings placed over engineered fill or concrete in-filled trenches can be taken as the values provided previously in this report.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels.

Adequate lateral support is provided to native soil, above the groundwater table, when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V passes only through in situ soil or engineered granular fill, as described above. In sound unfractured bedrock, a 1H:6V slope may be used.

Permissible Grade Raise Recommendations

The permissible grade raise recommendations are summarized on Drawing PG5860-2 Revision 3 - Permissible Grade Raise Plan in Appendix 2. Where the grade raise cannot be accommodated with soil fill, the following options could be used alone or in combination.

Option 1 - Use of Lightweight Fill

Lightweight fill (LWF) can be used, consisting of EPS (expanded polystyrene) Type 12 or 15 blocks or other lightweight materials which allow for raising the grade without adding a significant load to the underlying soils. However, these materials are expensive and, in the case of the EPS, are more difficult to use under the groundwater level, as they are buoyant, and must be protected against potential hydrocarbon spills. Use lightweight fill within the interior of the garage and porch areas to reduce the fill-related loads.

Option 2 - Preloading or Surcharging

It is possible to preload or surcharge the proposed site in localized areas provided sufficient time is available to achieve the desired settlements based on theoretical values from the settlement analysis. If this option is considered, a monitoring program using settlement plates and electronic piezometers will have to be implemented. This program will determine the amount of settlement in the preloaded or surcharged areas. Obviously, preloading to proposed finished grades will allow for consolidation of the underlying clays over a longer time period. Surcharging the site with additional fill above the proposed finished grade will add additional load to the underlying clays accelerating the consolidation process and allowing for accelerated settlements. Once the desired settlements are achieved, the site can be unloaded and the fill can be used elsewhere on site.

5.4 Floor Slab Construction

With the removal of all topsoil, peat, marl, and deleterious fill within the footprints of the proposed buildings, the native soil or bedrock surface approved by Paterson will be considered an acceptable subgrade upon which to commence backfilling for floor slab construction.

Any soft areas should be removed and backfilled with appropriate backfill material. OPSS Granular B Types I or II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab (outside the zones of influence of the footings). It is recommended that the upper 200 mm of sub-floor fill consists of 19 mm clear crushed stone.

5.5 Design for Earthquakes

The site class for seismic site response can be taken as **Class C** for the shallow footings founded on glacial till or bedrock and **Class D** for shallow footings founded on the silty clay deposit of the subject site. Reference should be made to the latest revision of the 2012 Ontario Building Code for a full discussion of the earthquake design requirements.

5.6 Pavement Design

For design purposes, the pavement structure presented in the following tables could be used for the design of driveways and local residential roadways:

Table 1 - Recommended Pavement Structure – Driveways

Thickness (mm)	Material Description
50	**Wear Course** - HL-3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE – Either fill, in situ soils or OPSS Granular B Type I or II material placed over in situ soil or fill	

Table 2 - Recommended Pavement Structure – Local Roadways

Thickness (mm)	Material Description
40	**Wear Course -** HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Binder Course -** HL-8 or Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
400	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type I or II material.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

Pavement Structure Drainage

The pavement structure performance is largely dependent on the contact zone between the subgrade material and the base stone in a dry condition. Failure to provide adequate drainage under conditions of heavy wheel loading can result in the fine subgrade soil being pumped into the voids in the stone subbase, thereby reducing load carrying capacity.

Due to the impervious nature of the subgrade and fill materials and transitions between various pavement structures, consideration should be provided to installing subdrains during the pavement construction. At transition zones between various pavement structures, subdrains should be installed longitudinally to drain any potential water trapped in the granular layers. The subdrains at catch basins should extend in four orthogonal directions and longitudinally when placed along a curb.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage

It is recommended that a perimeter foundation drainage system be provided for the proposed structures. The system should consist of a 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 10 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structure. The pipe should have a positive outlet, such as a gravity connection to the storm sewer or direct the collected water to the building sump pit, which should be connected to the storm sewer.

Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free draining non frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless a composite drainage system (such as System Platon or Miradrain) is used. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should be used for this purpose.

6.2 Protection Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effects of frost action. A minimum of 1.5 m of soil cover alone, or a minimum of 0.6 m of soil cover, in conjunction with foundation insulation, should be provided in this regard.

Exterior unheated footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of the structure proper and require additional protection, such as soil cover of 2.1 m or a combination of soil cover and foundation insulation.

6.3 Excavation Side Slopes

The side slopes of excavations in the soil and fill overburden materials should be either cut back to acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. The excavation side

slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter.
The flatter slope is required for excavation below groundwater level. The subsoil at this site is considered to be mainly Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides. Slopes in excess of 3 m in height should be periodically inspected by Paterson in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by "cut and cover" methods and excavations will not be left open for extended periods of time.

6.4 Pipe Bedding and Backfill

A minimum of 150 mm of OPSS Granular A should be placed for pipe bedding for sewer and water pipes for a soil subgrade. The bedding should be increased to 300 mm for areas where the subgrade consists of bedrock. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe should consist of OPSS Granular A. The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to a minimum of 95% of the SPMDD.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

6.5 Groundwater Control

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

The rate of flow of groundwater into the excavation through the overburden soil should be moderate to high for expected founding levels and the conditions within the southwest portion of this site. It is anticipated that pumping from open sumps to overland flow will be sufficient to control the groundwater influx through the sides of the excavations.

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MECP.

For groundwater or surface water volumes being pumped during the construction phase (between 50,000 to 400,000 L/day), it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site mostly consist of frost susceptible materials. In presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

The trench excavations should be carried out in a manner to avoid the introduction of frozen materials, snow or ice into the trenches. As well, pavement construction is difficult during winter. The subgrade consists of frost susceptible soils which will experience total and differential frost heaving as the work takes place. Also, the introduction of frost, snow or ice into the pavement materials, which is difficult to avoid, could adversely affect the performance of the pavement structure.

6.7 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (normal cement) would be appropriate for this site.

The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a moderate slightly aggressive corrosive environment.

7.0 Recommendations

It is a requirement for the foundation design data provided herein to be applicable that the following material testing and observation program be performed by the geotechnical consultant.

- ❑ Review of the grading plan from a geotechnical perspective.
- ❑ Observation of all bearing surfaces prior to the placement of concrete.
- ❑ Sampling and testing of the concrete and fill materials.
- ❑ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❑ Observation of all subgrades prior to backfilling.
- ❑ Field density tests to ensure that the specified level of compaction has been achieved.
- ❑ Sampling and testing of the bituminous concrete including mix design reviews.

All excess soils, with the exception of engineered crushed stone fill, generated by construction activities that will be transported on-site or off-site should be handled as per *Ontario Regulation 406/19: On-Site and Excess Soil Management.*

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon the completion of a satisfactory inspection program by the geotechnical consultant.

8.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. We request permission to review our recommendations when the drawings and specifications are completed.

A geotechnical investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test hole locations, we request immediate notification to permit reassessment of our recommendations.

The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on our undertaking the work. The latter should evaluate the factual information provided in this report and determine the suitability and completeness for their intended construction schedule and methods. Additional testing may be required for their purposes.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Menzie Almonte 2 Inc (c/o Regional Group) or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

Balaji Nirmala, M.Eng.

David J. Gilbert, P.Eng.

Report Distribution:

- ❑ Menzie Almonte 2 Inc (c/o Regional Group) (email copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ANALYTICAL TESTING RESULTS

PATERSON GROUP
9 Auriga Drive
Ottawa, Ontario
K2E 7T9
TEL: (613) 226-7381

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329073.795 **NORTHING:** 5010884.638 **ELEVATION:** 138.22
DATUM: Geodetic
REMARKS:
BORINGS BY: Hand Auger **DATE:** April 3, 2024

FILE NO. PG5860
HOLE NO. HA 1-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
Ground Surface						0	138.22
PEAT		G	1				
0.35							
MARL		G	2			1	137.22
1.00							
GLACIAL TILL: Firm grey silty clay, trace sand and gravel		G	3			2	136.22
						3	135.22
3.50							
End of Hand Auger							
Practical refusal to hand augering at 3.5 m depth							
(GWL at 1.31 m - July 8, 2024)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

PIEZOMETER CONSTRUCTION

PATERSON GROUP
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K2E 7T9
TEL: (613) 226-7381

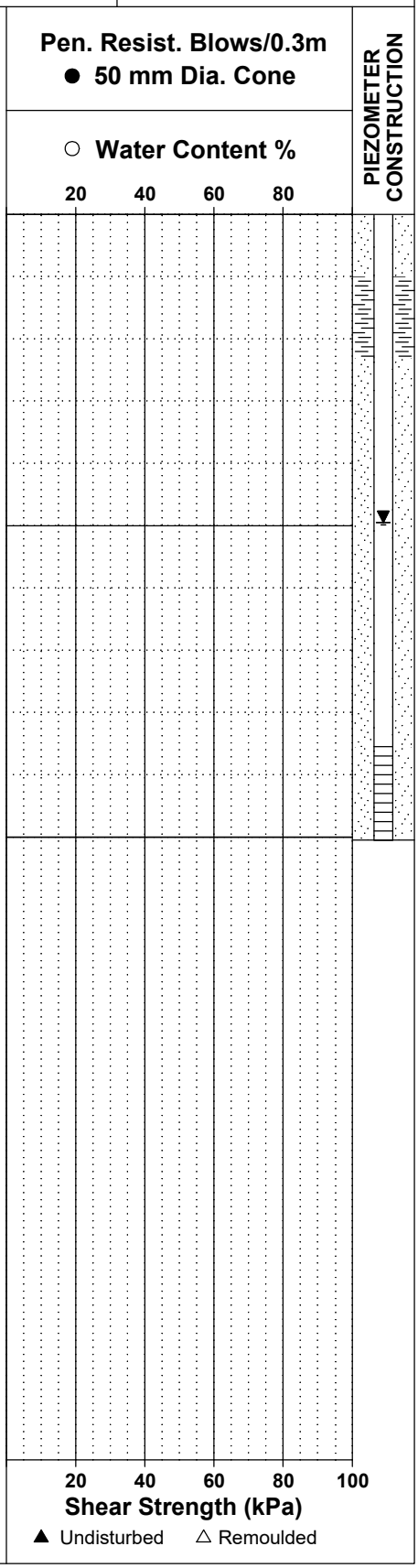
SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329136.169 **NORTHING:** 5010950.849 **ELEVATION:** 138.39
DATUM: Geodetic
REMARKS:
BORINGS BY: Hand Auger **DATE:** April 3, 2024

FILE NO. PG5860
HOLE NO. HA 2-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
Ground Surface						0	138.39
PEAT							
0.30		G	1				
MARL							
		G	2			1	137.39
1.20							
Firm grey **SILTY CLAY**		G	3				
2.00		G	4			2	136.39
End of Hand Auger							
Practical refusal to hand augering at 2.0 m depth							
(GWL at 0.99 m - July 8, 2024)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329101.611 **NORTHING:** 5011044.112 **ELEVATION:** 138.51
DATUM: Geodetic
REMARKS:
BORINGS BY: Hand Auger **DATE:** April 3, 2024

FILE NO. PG5860
HOLE NO. HA 3-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
Ground Surface						0	138.51
PEAT		G	1				
0.80						1	137.51
Firm brown **SILTY CLAY** to **CLAYEY SILT**		G	2				
- Stiff by 1.4 m depth							
1.70						2	136.51
GLACIAL TILL: Stiff grey silty clay, trace gravel		G	3				
3.00						3	135.51
End of Hand Auger							
Practical refusal to hand augering at 3.0 m depth							
(GWL at 1.01 m - July 8, 2024)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %
20 40 60 80

PIEZOMETER CONSTRUCTION

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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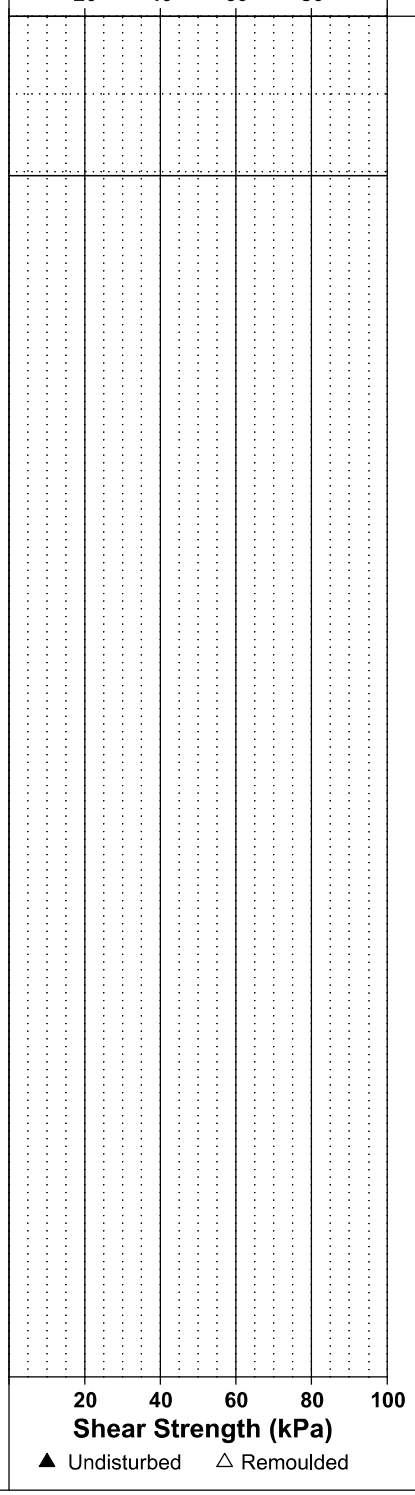
SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329331.768 **NORTHING:** 5011139.119 **ELEVATION:** 140.3
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** April 2, 2024

FILE NO. PG5860
HOLE NO. BH 1-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	PIEZOMETER CONSTRUCTION
Ground Surface									
TOPSOIL and organics						0	140.30		
0.41									
End of Borehole Practical refusal to augering at 0.41 m depth									



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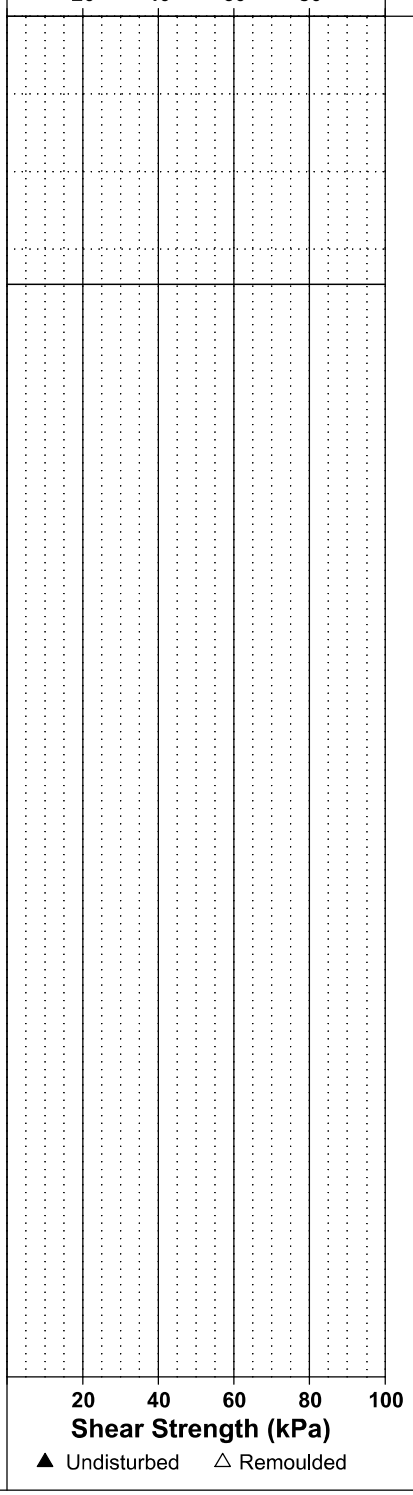
SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329240.717 NORTHING: 5011170.15 ELEVATION: 139.45
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill DATE: April 2, 2024

FILE NO. PG5860
HOLE NO. BH 2-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	PIEZOMETER CONSTRUCTION
Ground Surface						0	139.45		
TOPSOIL and organics									
0.20									
Stiff brown **SILTY CLAY**, trace to some gravel		AU	1						
0.69									
End of Borehole Practical refusal to augering at 0.69 m depth									



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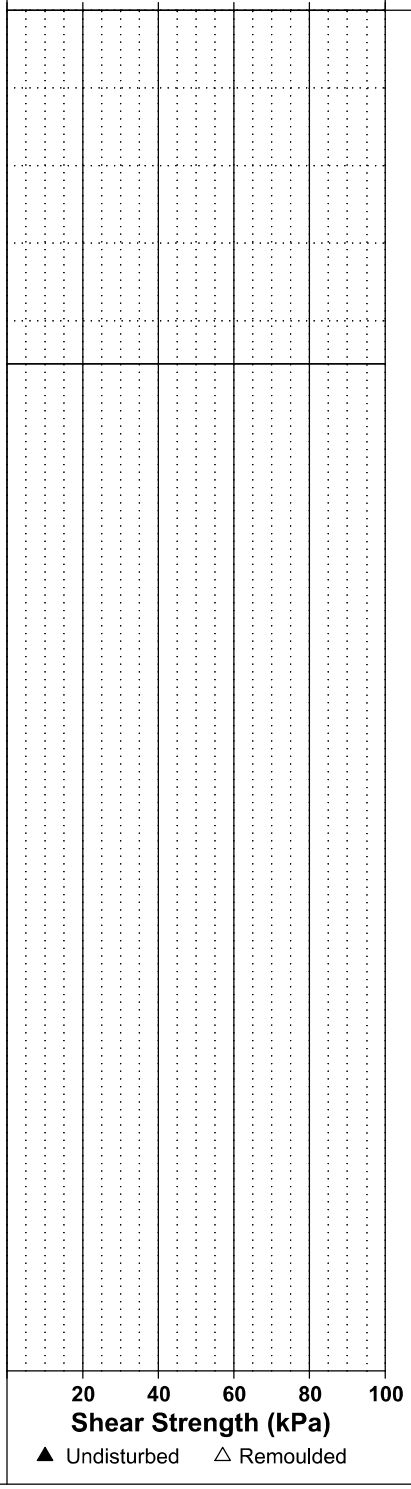
SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329236.833 **NORTHING:** 5011172.994 **ELEVATION:** 139.44
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** April 2, 2024

FILE NO. PG5860
HOLE NO. BH 3-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	PIEZOMETER CONSTRUCTION
Ground Surface						0	139.44		
TOPSOIL and organics									
0.20									
Stiff brown **SILTY CLAY**, trace of some gravel									
0.69									
GLACIAL TILL: Very dense brown silty clay with gravel, cobbles and boulders		SS	1	33	+50				
0.91									
End of Borehole									
Practical refusal to augering at 0.91 m depth									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329238.779 **NORTHING:** 5011122.692 **ELEVATION:** 138.94
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** April 2, 2024

FILE NO. PG5860
HOLE NO. BH 4-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows / 0.3m ● 50 mm Dia. Cone ○ Water Content %	MONITORING WELL CONSTRUCTION
GROUND SURFACE						0	138.94		
TOPSOIL and organics									
0.23									
Very stiff brown **SILTY CLAY**									
- Intermittent sand seams		SS	1	92	16	1	137.94		
- Grey by 1.45 m depth		SS	2	92	P				
2.21						2	136.94		
GLACIAL TILL: Dense grey silty clay with gravel and sand		SS	3	74	21				
2.87									
End of Borehole									
Practical refusal to augering at 2.87 m depth									
(GWL at 0.56 m - July 8, 2024)									

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329258.901 NORTHING: 5011053.276 ELEVATION: 138.94
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill DATE: April 2, 2024

FILE NO. PG5860
HOLE NO. BH 5-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows / 0.3m ● 50 mm Dia. Cone ○ Water Content %	MONITORING WELL CONSTRUCTION
GROUND SURFACE						0	138.94		
TOPSOIL and organics									
0.25									
GLACIAL TILL: Compact brown silty clay with sand and gravel		AU	1						
		SS	2	67	10	1	137.94		
- Grey by 1.45 m depth		SS	3	54	12	2	136.94		
		SS	4	75	11				
3.00						3	135.94		
End of Borehole									
Practical refusal to augering at 3.0 m depth									
(GWL at 1.02 m - July 8, 2024)									

Pen. Resist. Blows / 0.3m: 20 40 60 80
Water Content %: 20 40 60 80
Shear Strength (kPa): 20 40 60 80 100
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329283.747 **NORTHING:** 5011094.84 **ELEVATION:** 139.26
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** April 2, 2024

FILE NO. PG5860
HOLE NO. BH 6-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	PIEZOMETER CONSTRUCTION
Ground Surface						0	139.26		
TOPSOIL and organics									
0.25									
GLACIAL TILL: Compact brown silty clay with sand and gravel		AU	1						
		SS	2	27	+50	1	138.26		
1.14									
End of Borehole									
Practical refusal to augering at 1.14 m depth									

Pen. Resist. Blows/0.3m: 20 40 60 80
Shear Strength (kPa): 20 40 60 80 100
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

EASTING: 329274.739 **NORTHING:** 5011201.172 **ELEVATION:** 139.60
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** April 2, 2024

FILE NO. PG5860
HOLE NO. BH 7-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows / 0.3m ● 50 mm Dia. Cone ○ Water Content %	MONITORING WELL CONSTRUCTION
GROUND SURFACE						0	139.60		
TOPSOIL and organics									
0.28									
GLACIAL TILL: Compact brown silty sand with some clay and gravel		AU	1						
		SS	2	40	+50				
0.89									
End of Borehole Practical refusal to augering at 0.89 m depth (GWL at 0.06 m - April 9, 2024)									

Pen. Resist. Blows / 0.3m: 20 40 60 80
Water Content %: 20 40 60 80
Shear Strength (kPa): 20 40 60 80 100
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA 1-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	138.56
TOPSOIL/PEAT							
0.35							
Stiff, brown **SILTY CLAY**						1	137.56
1.10							
Stiff to hard, grey **SILTY CLAY** with sand and gravel							
1.60							
End of Hand Auger							
Practical refusal to hand augering at 1.60m depth							
(GWL @ 0.1m depth based on field observations)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)
▲ Undisturbed △ Remoulded

Piezometer Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

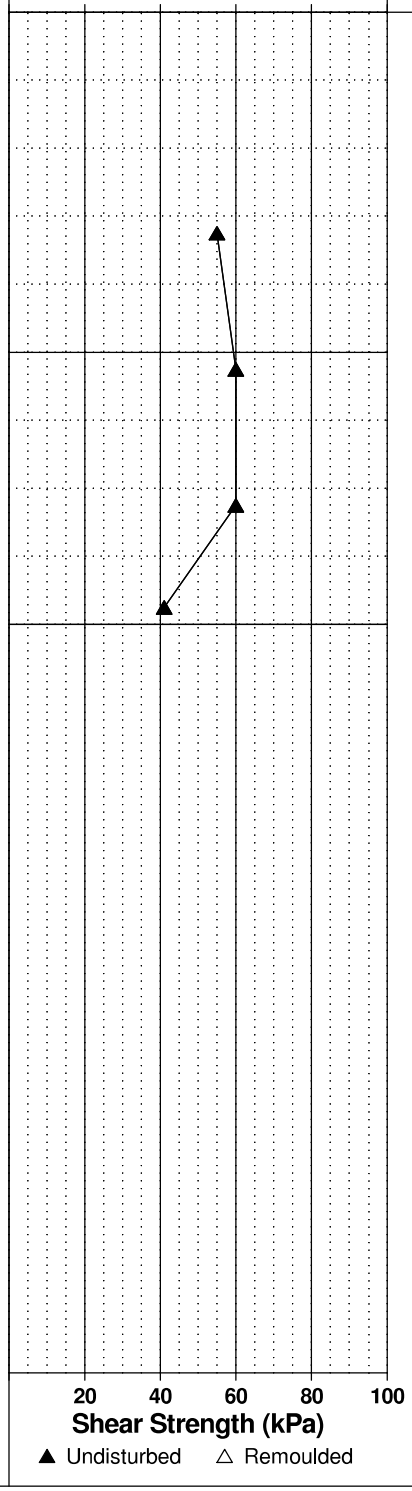
REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA 2-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.40	20 40 60 80	▽
TOPSOIL/PEAT									
0.45									
Stiff to firm, brown **SILTY CLAY**						1	137.40		
- grey by 0.9m depth									
1.80									
End of Hand Auger Hole									
(Water encountered at ground surface)									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA 3-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	138.47
TOPSOIL/PEAT							
0.90						1	137.47
Stiff to firm, grey **SILTY CLAY**							
2.10						2	136.47
End of Hand Auger Hole							
(Water encountered at ground surface)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %
20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

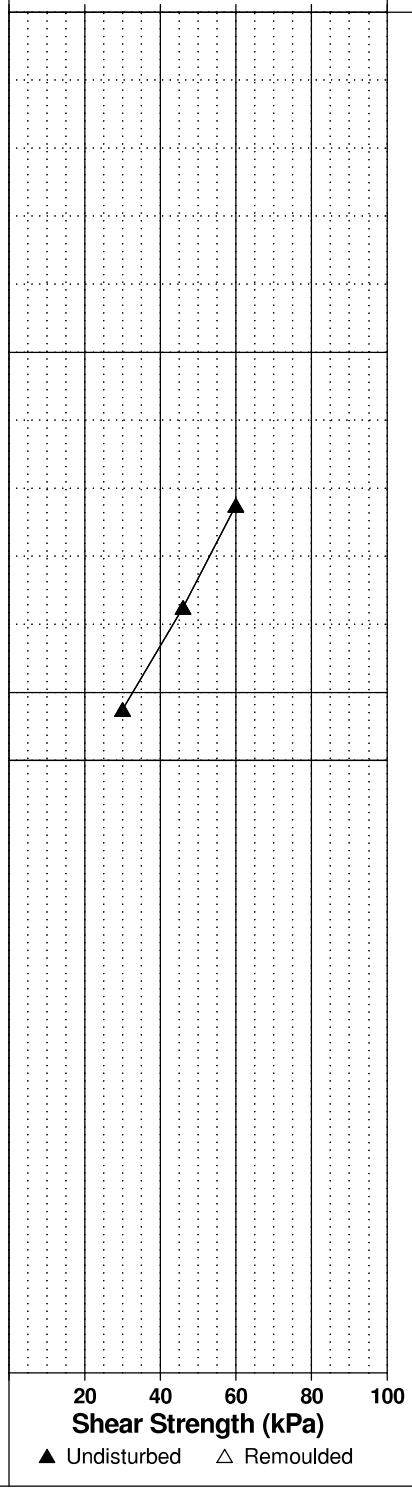
REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA 4-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.37		▽
TOPSOIL/PEAT									
						1	137.37		
1.25									
Stiff to firm, grey **SILTY CLAY**									
						2	136.37		
2.20									
End of Test Pit (Water encountered at ground surface)									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA 5-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.44		▽
TOPSOIL/PEAT									
0.80									
MARL						1	137.44		
1.30									
Firm, grey **SILTY CLAY,** trace sand and gravel									
1.80									
End of Hand Auger Hole									
(Water encountered at ground surface)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %; 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA 6-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	139.12		
TOPSOIL 0.25									
GLACIAL TILL: Hard to very stiff, brown silty clay with sand and gravel - sand content increasing with depth 0.70									
End of Hand Auger Hole (GWL @ 0.5m depth based on field observations)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

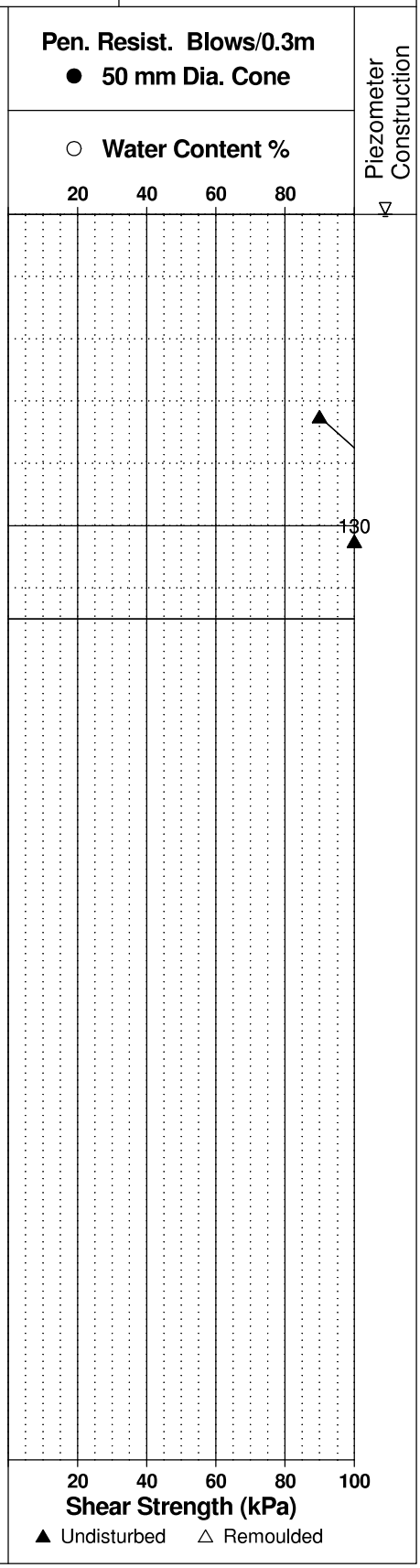
REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA 7-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	138.65
TOPSOIL/PEAT							
0.33							
Stiff to very stiff, brown **SILTY CLAY**							
- sand seam at 0.7m depth						1	137.65
1.30							
End of Hand Auger Hole							
Practical refusal to hand augering at 1.30m depth							
(Water encountered at ground surface)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

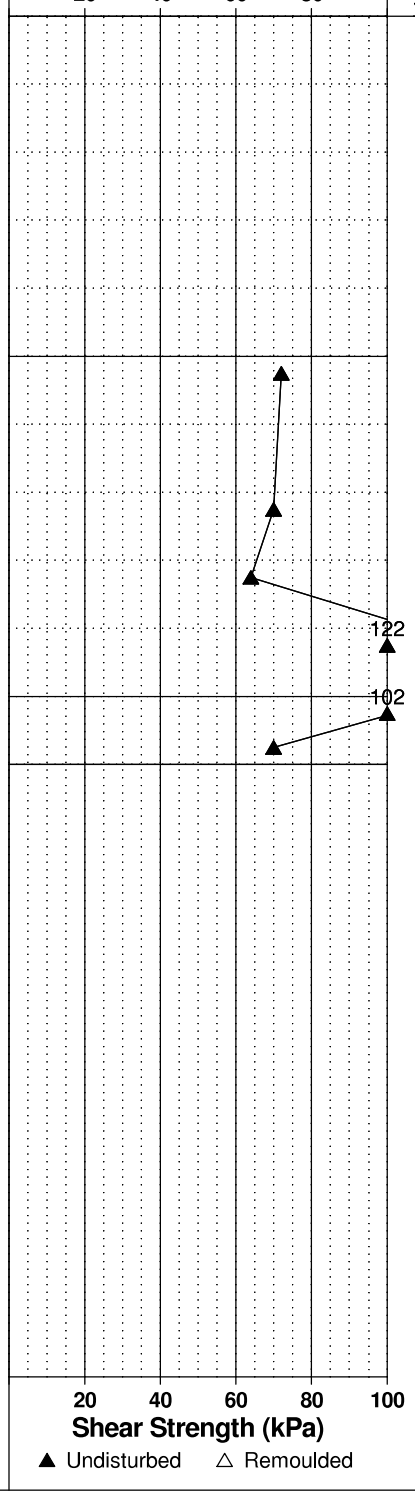
REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA 8-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.65		▽
TOPSOIL/PEAT									
0.60									
Stiff to very stiff, grey **SILTY CLAY**						1	137.65		
- sand seam at 1.5m depth									
2.20						2	136.65		
End of Hand Auger Hole									
(Water encountered at ground surface)									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

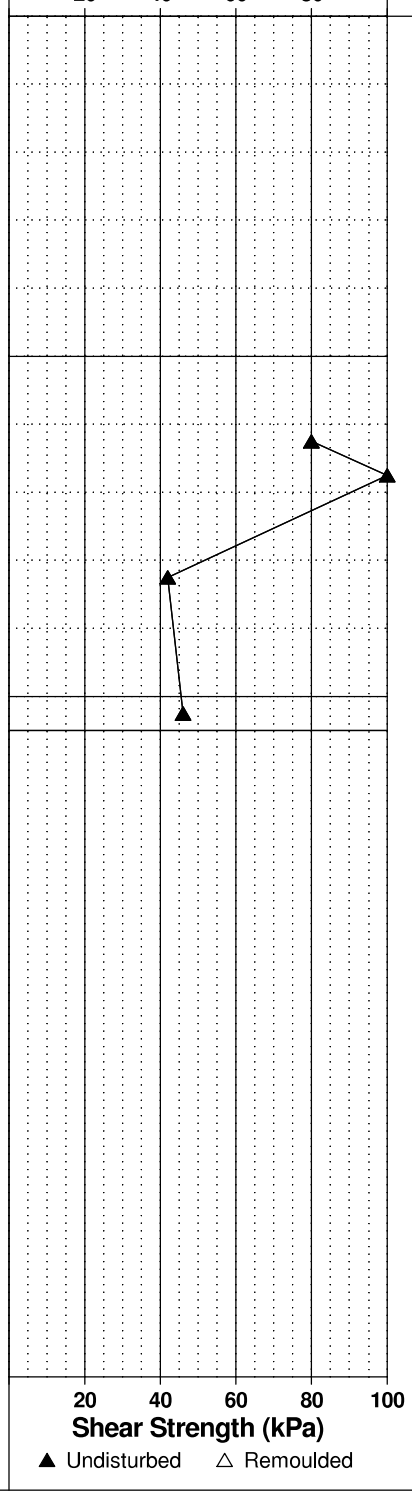
FILE NO. PG5860

HOLE NO. HA 9-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	138.59
TOPSOIL/PEAT							
						1	137.59
1.10							
Stiff to firm, grey **SILTY CLAY**							
- sand seams at 1.2 and 1.9m depth							
2.10						2	136.59
End of Hand Auger Hole							
(Water encountered at ground surface)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

Piezometer Construction



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

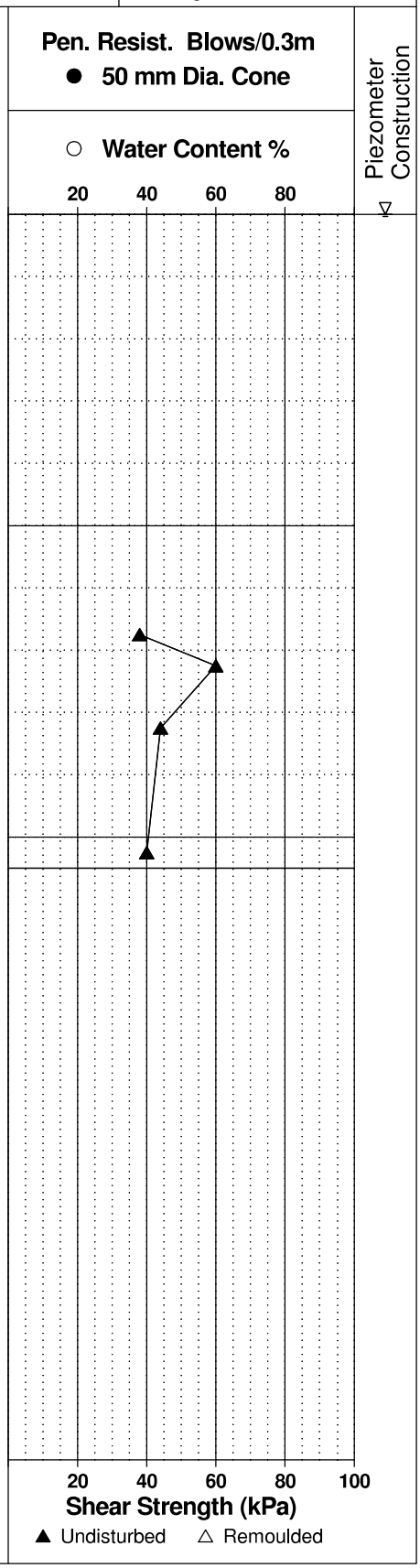
REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA10-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	138.66
PEAT							
0.75							
MARL						1	137.66
1.25							
Firm, grey **SILTY CLAY**							
- some silt seams from 1.4 to 1.7m depth							
2.10						2	136.66
End of Hand Auger Hole							
(Water encountered at ground surface)							



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REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA11-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.56		
PEAT									
0.70									
MARL						1	137.56		
1.20									
Stiff to firm, grey **SILTY CLAY,** trace sand									
1.80									
End of Hand Auger Hole Practical refusal to hand augering at 1.80m depth (Water encountered at ground surface)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %; scale 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100; ▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA12-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.47		
PEAT									
0.70						1	137.47		
MARL									
- trace gravel by 1.2m depth									
1.60									
Soft to firm, grey **SILTY CLAY**									
- some sand, trace by 1.9m depth						2	136.47		
2.10 End of Hand Auger									
(Water encountered at ground surface)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA13-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	138.40
PEAT							
0.65							
MARL						1	137.40
1.30							
Soft to firm, grey **SILTY CLAY**						2	136.40
2.10							
End of Hand Auger Hole							
(Water encountered at ground surface)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

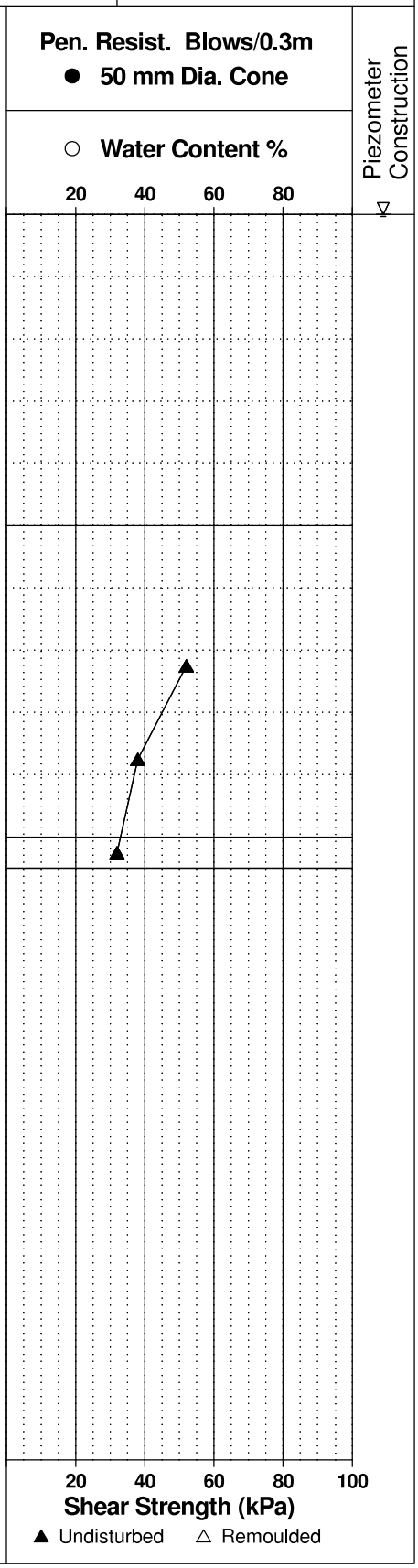
REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA14-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	138.40
PEAT							
0.80						1	137.40
MARL							
1.35							
Stiff to firm, grey **SILTY CLAY**							
- sand seam at 1.4m depth							
2.10						2	136.40
End of Hand Auger Hole							
(Water encountered at ground surface)							



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SOIL PROFILE AND TEST DATA

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Future Phase for Proposed Residential Development
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REMARKS

BORINGS BY Hand Auger **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. HA15-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.37		
PEAT									
0.55									
MARL						1	137.37		
1.30									
Stiff to firm, grey **SILTY CLAY**						2	136.37		
2.10									
End of Hand Auger Hole									
(Water encountered at ground surface)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** June 11, 2021

FILE NO. PG5860

HOLE NO. TP 1-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.54	20 40 60 80	
PEAT		G	1						▽
0.42		G	2						
MARL						1	137.54		
0.75									
		G	3						
Firm, grey **SILTY CLAY**						2	136.54		
2.62									
End of Test Pit TP terminated on bedrock surface at 2.62m depth. (GWL @ 0.3m depth based on field observations)								20 40 60 80 100 **Shear Strength (kPa)** ▲ Undisturbed △ Remoulded	

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Future Phase for Proposed Residential Development
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DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** June 11, 2021

FILE NO. PG5860

HOLE NO. TP 2-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.61		
PEAT		G	1						
0.25									
GLACIAL TILL: Very stiff, brown silty clay with sand, gravel, cobbles and boulders - grey by 0.8m depth						1	137.61		▽
		G	2			2	136.61		
2.15									
End of Test Pit TP terminated on bedrock surface at 2.15m depth. (GWL @ 1.0m depth based on field observations)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
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DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** June 11, 2021

FILE NO. PG5860

HOLE NO. TP 3-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL		G	1			0	138.93		
0.17									
GLACIAL TILL: Very stiff, brown silty clay with sand, gravel, cobbles and boulders						1	137.93		▽
		G	2						
- grey by 2.0m depth						2	136.93		
		G	3						
2.58									
End of Test Pit									
TP terminated on bedrock surface at 2.58m depth.									
(GWL @ 1.7m depth based on field observations)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** June 11, 2021

FILE NO. PG5860

HOLE NO. TP 4-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.97		
TOPSOIL 0.19		G	1						
GLACIAL TILL: Very stiff, brown silty clay with sand, gravel, cobbles and boulders		G	2			1	137.97		▽
- grey by 1.8m depth		G	3			2	136.97		
2.60 End of Test Pit									
TP terminated on bedrock surface at 2.60m depth.									
(GWL @ 1.7m depth based on field observations)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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Future Phase for Proposed Residential Development
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DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** June 11, 2021

FILE NO. PG5860

HOLE NO. TP 5-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.41		
PEAT		G	1						▽
0.42									
MARL		G	2						
0.98						1	137.41		
Firm to soft, grey **SILTY CLAY**		G	3						
						2	136.41		
2.51									
End of Test Pit									
TP terminated on bedrock surface at 2.51m depth.									
(GWL @ 0.3m depth based on field observations)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

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REMARKS

BORINGS BY Excavator **DATE** June 11, 2021

FILE NO. PG5860

HOLE NO. TP 6-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	138.29		
PEAT		G	1						▽
0.37									
		G	2						
Stiff, grey **SILTY CLAY,** trace sand and gravel						1	137.29		
						2	136.29		
2.37									
End of Test Pit TP terminated on bedrock surface at 2.37m depth. (GWL @ 0.35m depth based on field observations)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Future Phase for Proposed Residential Development
1825 Ramsay Concession 11A, Mississippi Mills, Ont.

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** November 24, 2021

FILE NO. PG5860

HOLE NO. TP 7-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	138.41
PEAT		G	1				
0.55							
		G	2				
MARL						1	137.41
1.30							
		G	3				
Soft, grey **SILTY CLAY**						2	136.41
2.90							
GLACIAL TILL: Very stiff, grey silty clay with sand and gravel						3	135.41
3.30							
End of Test Pit							
(Groundwater infiltration at 0.1m depth)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their "sensitivity". The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called "mechanical breaks") are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2 / (D10 \times D60)$
Cu	-	Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$
Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay
(more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

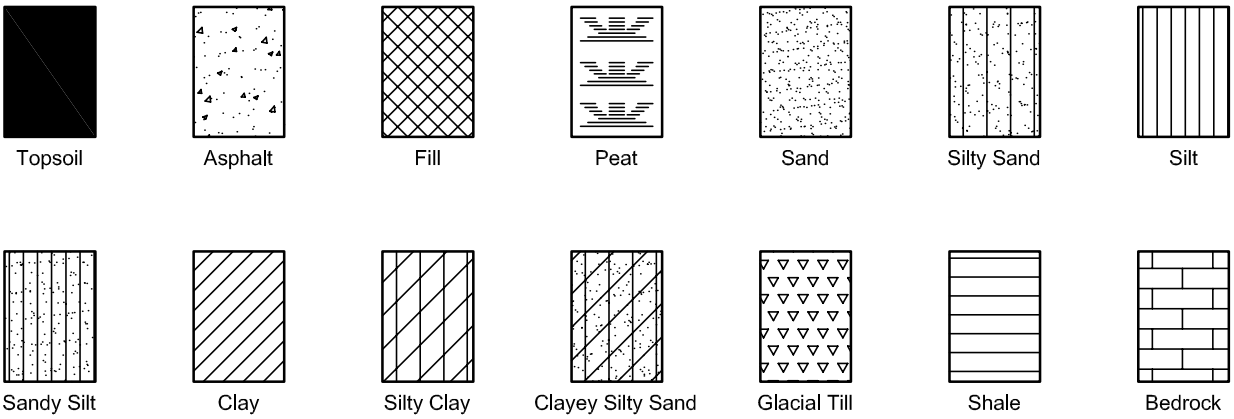
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

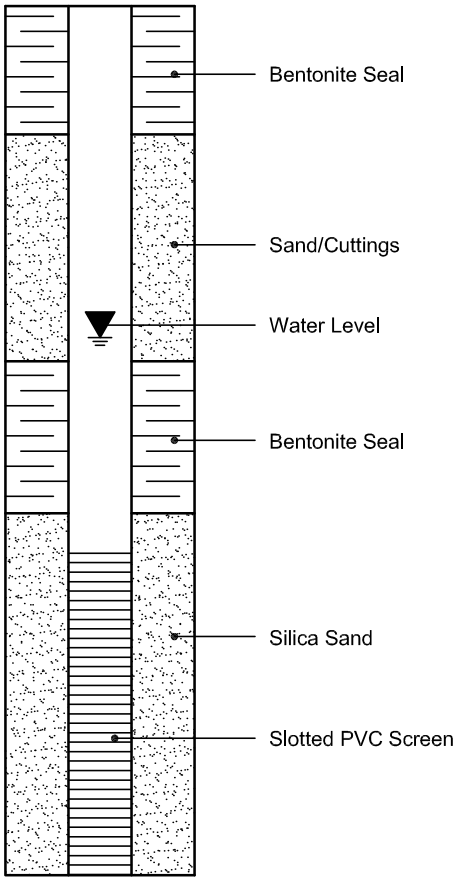
SYMBOLS AND TERMS (continued)

STRATA PLOT

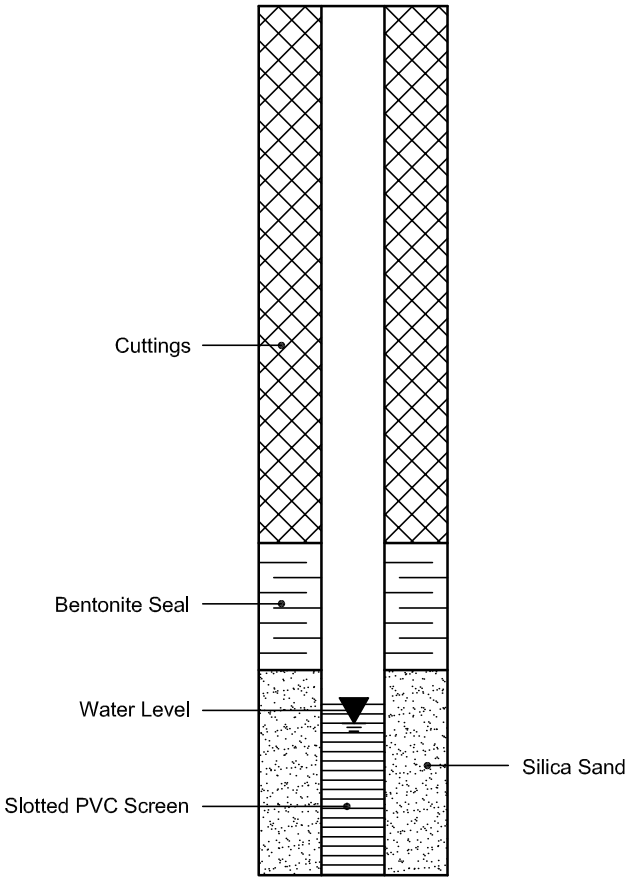


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis

Report Date: 21-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 15-Jun-2021

Client PO: 32278

Project Description: PG5860

	Client ID:	TP6-21 G2	-	-	-
	Sample Date:	11-Jun-21 09:00	-	-	-
	Sample ID:	2125235-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	77.7	-	-	-
General Inorganics					
pH	0.05 pH Units	7.53	-	-	-
Resistivity	0.10 Ohm.m	57.2	-	-	-
Anions					
Chloride	5 ug/g dry	14	-	-	-
Sulphate	5 ug/g dry	52	-	-	-

APPENDIX 2

FIGURE 1 – KEY PLAN

FIGURE 2 TO 6 – GROUNDWATER MONITORING CHARTS

DRAWING PG5860-1 – TEST HOLE LOCATION PLAN

DRAWING PG5860-2 – PERMISSIBLE GRADE RAISE PLAN

FIGURE 1

KEY PLAN

PATERSON GROUP

Figure 2 - HA1-24 - Monitoring Well Water Elevations

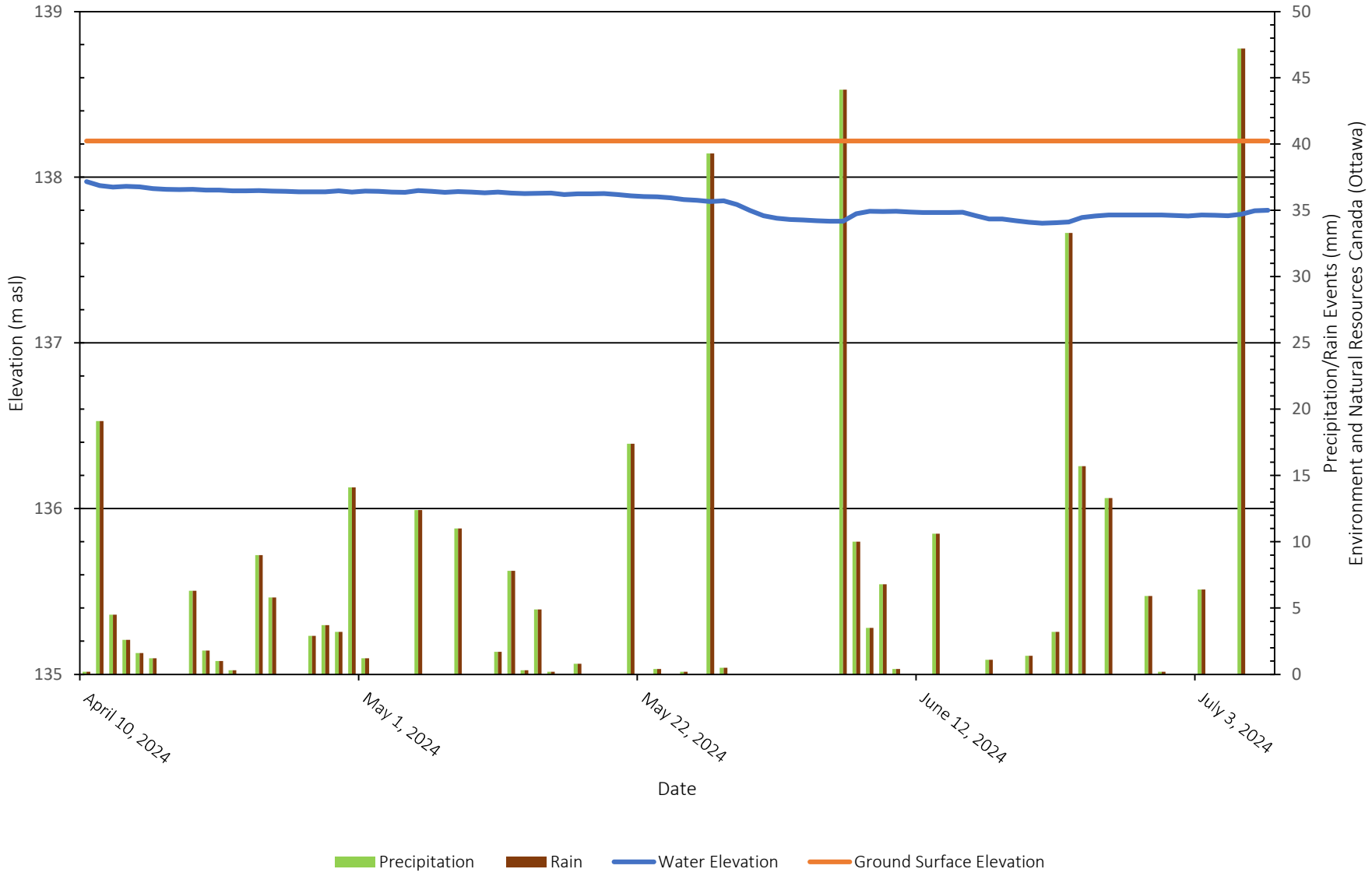


Figure 3: HA2-24 - Monitoring Well Water Elevations

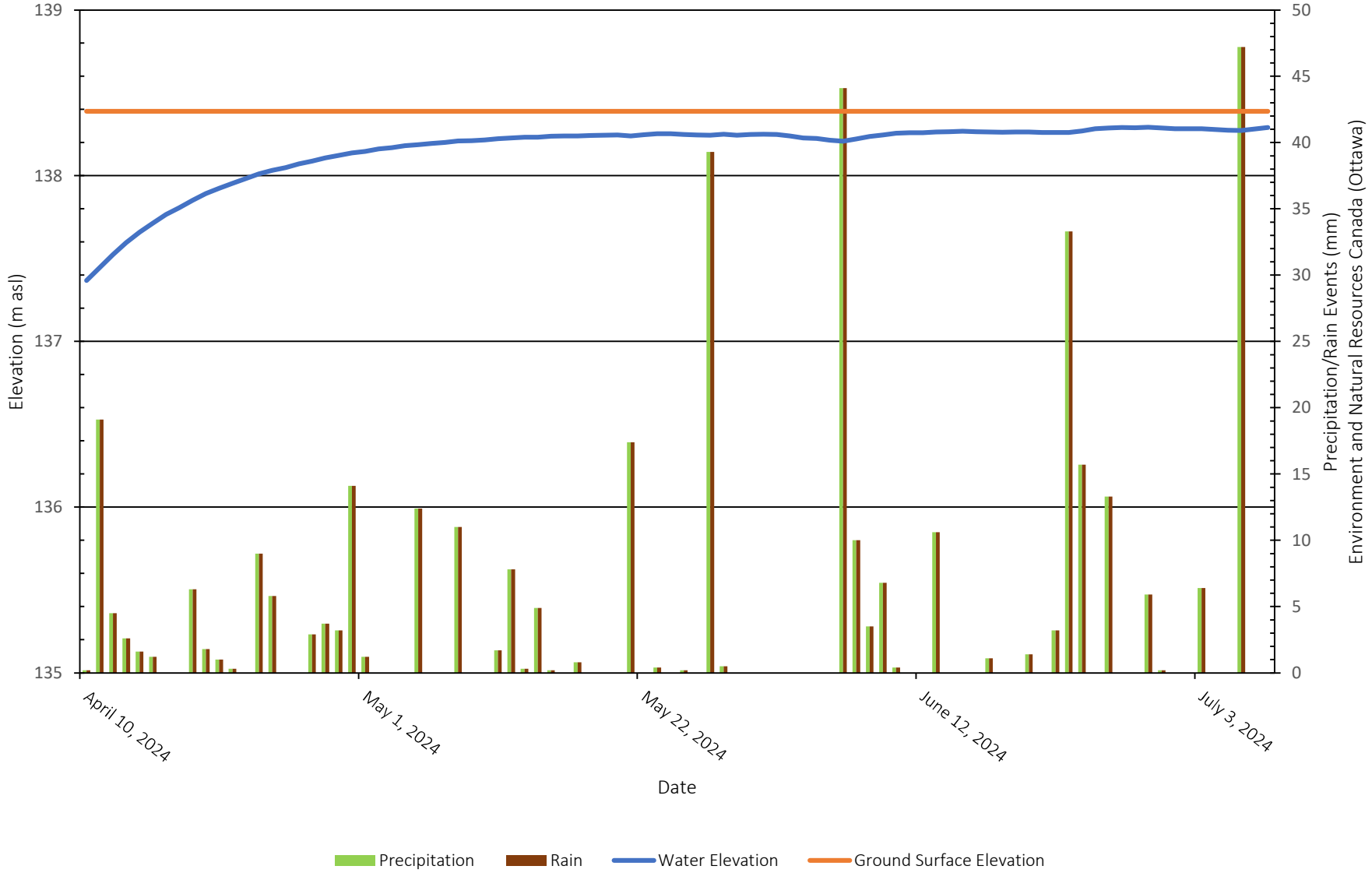


Figure 4: HA3-24 - Monitoring Well Water Elevations

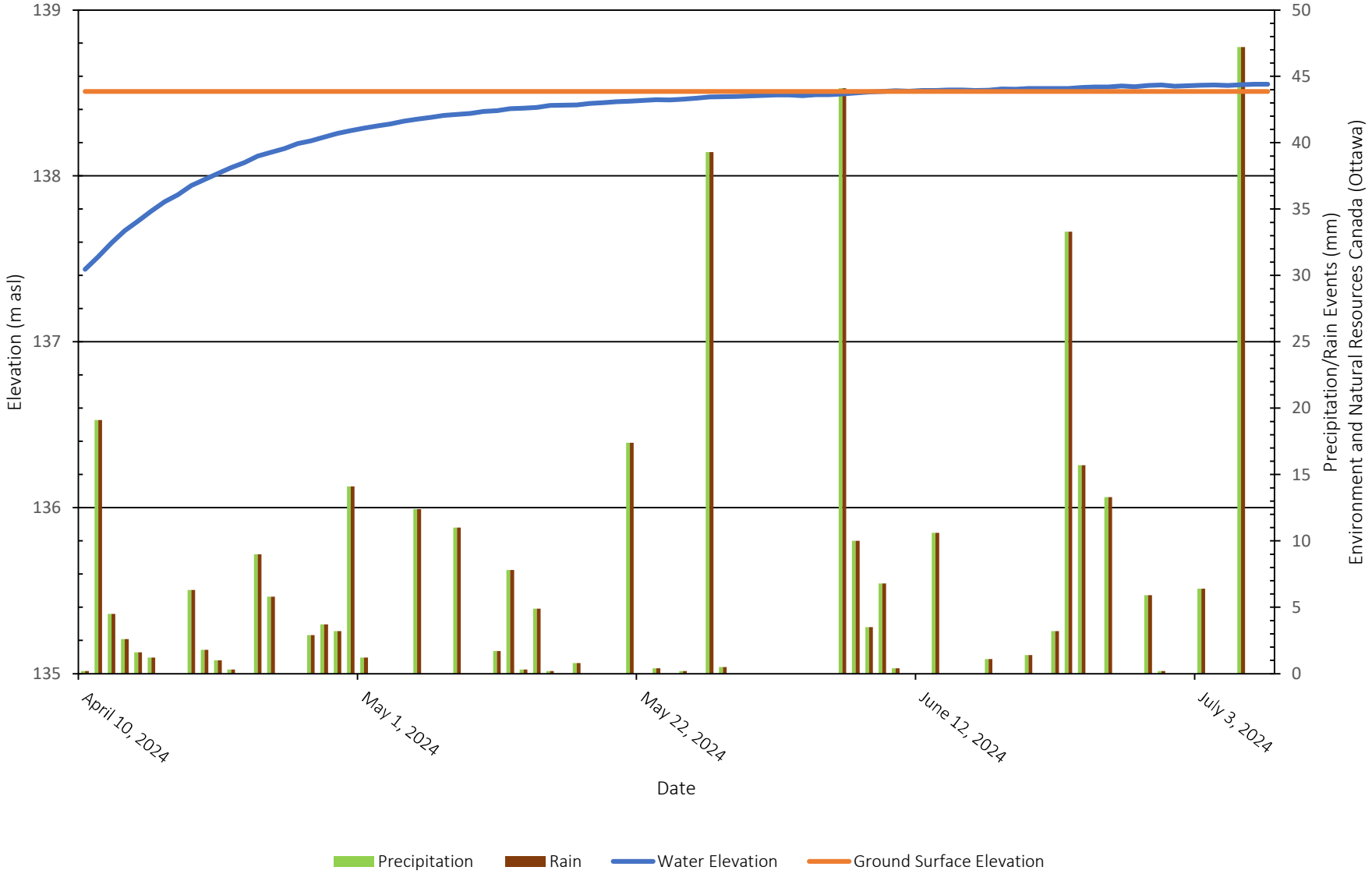


Figure 5: BH4-24 - Monitoring Well Water Elevations

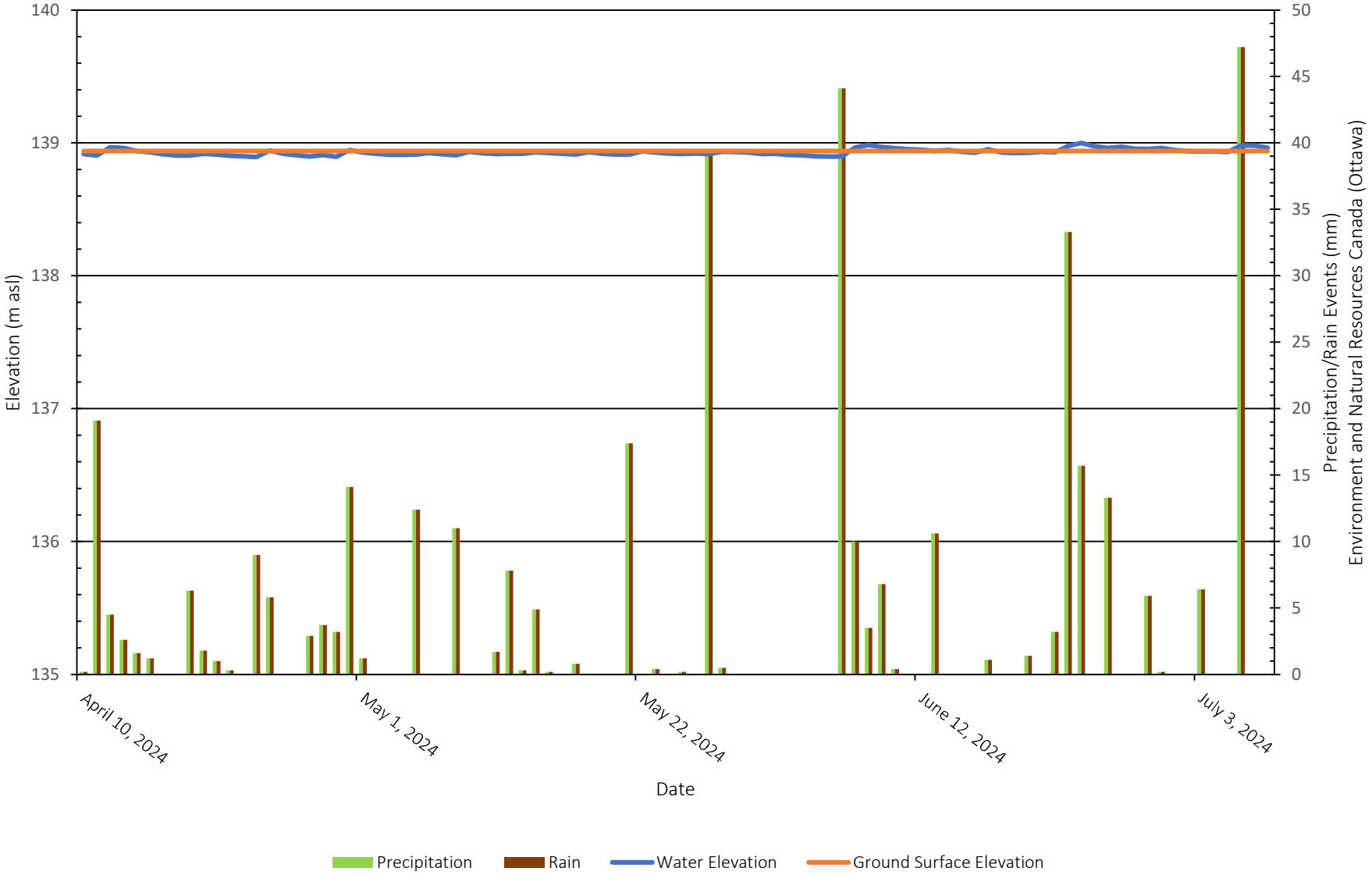
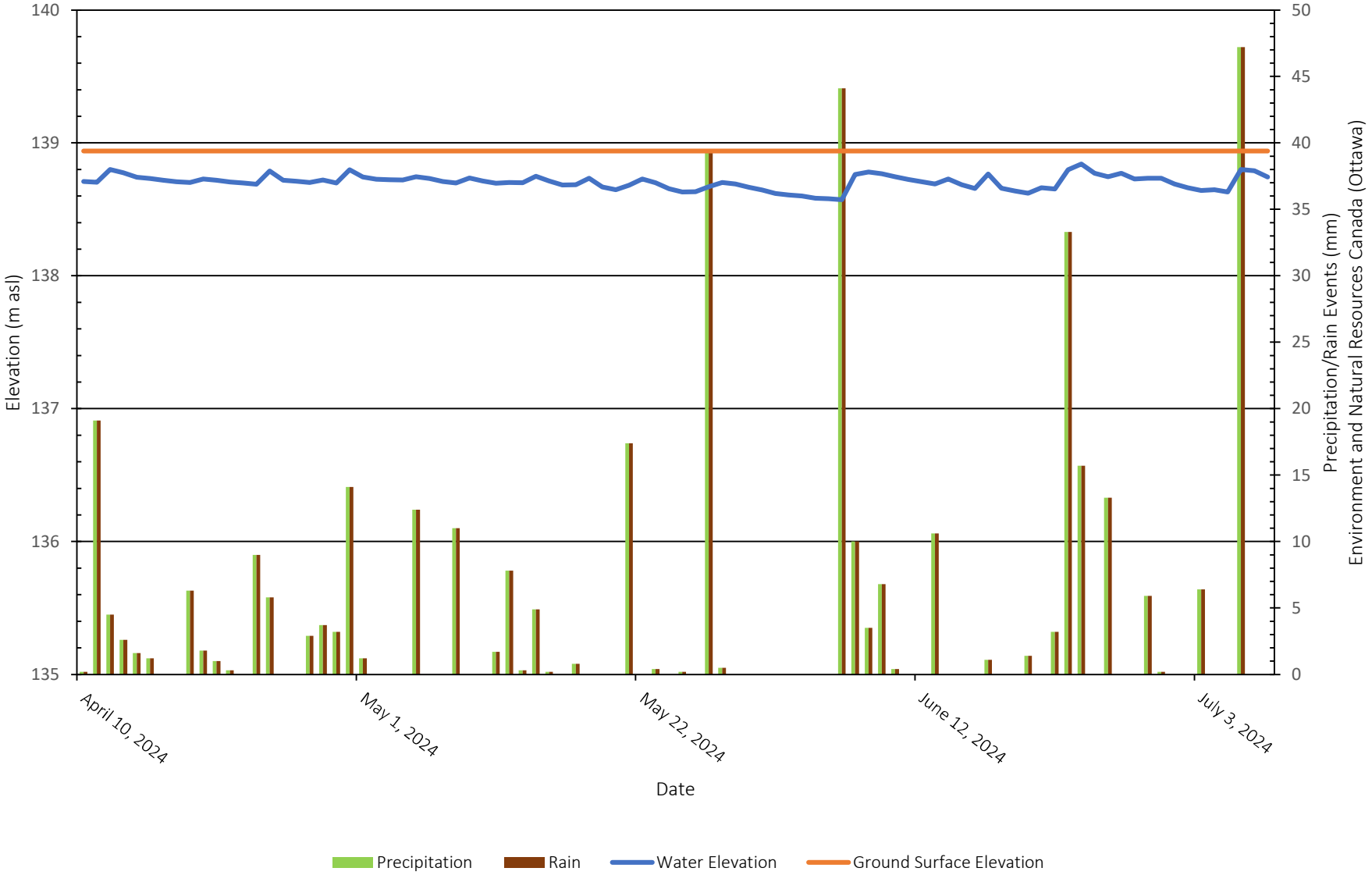
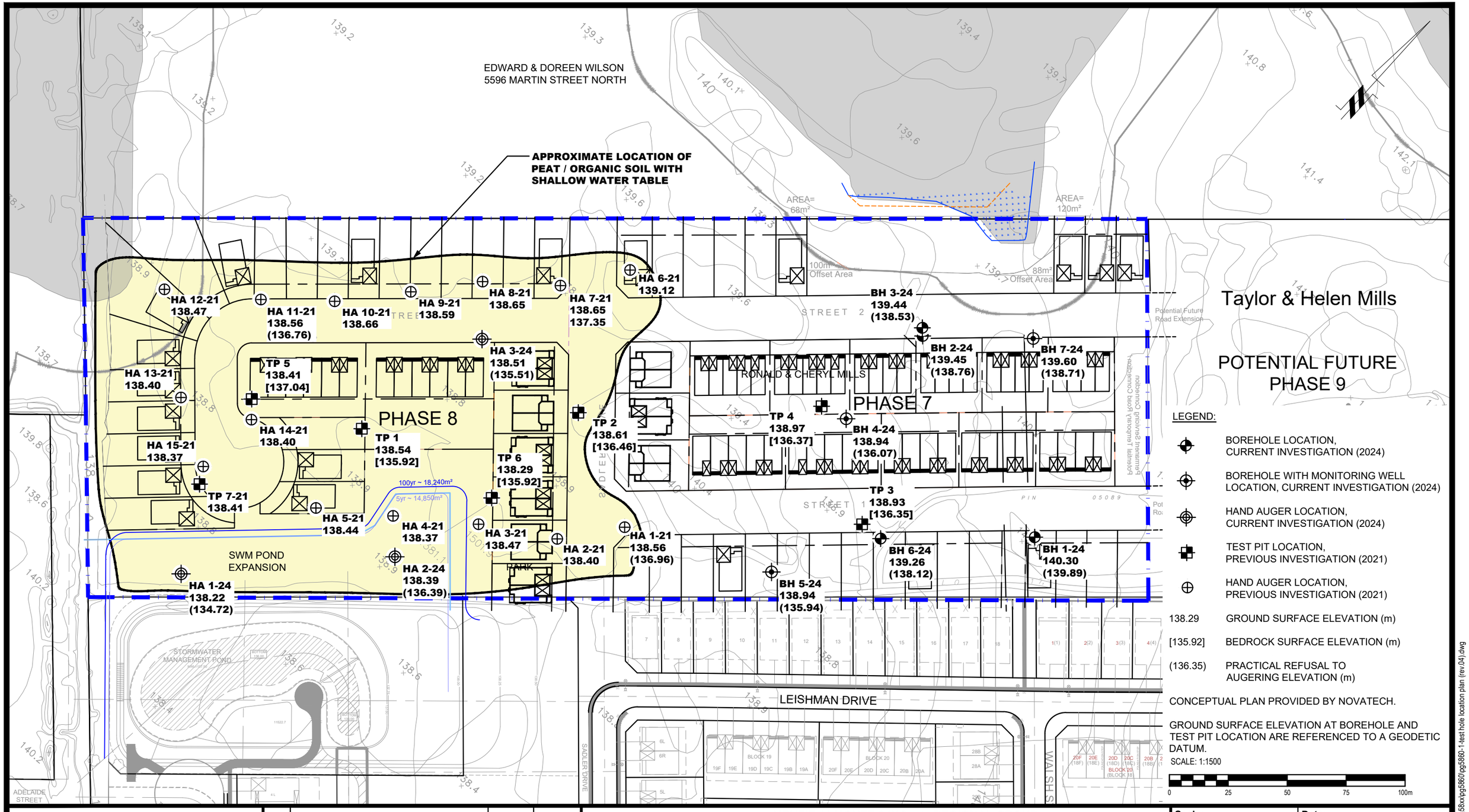


Figure 6: BH5-24 - Monitoring Well Water Elevations





Taylor & Helen Mills

POTENTIAL FUTURE PHASE 9

LEGEND:

- BOREHOLE LOCATION, CURRENT INVESTIGATION (2024)
- BOREHOLE WITH MONITORING WELL LOCATION, CURRENT INVESTIGATION (2024)
- HAND AUGER LOCATION, CURRENT INVESTIGATION (2024)
- TEST PIT LOCATION, PREVIOUS INVESTIGATION (2021)
- HAND AUGER LOCATION, PREVIOUS INVESTIGATION (2021)

138.29 GROUND SURFACE ELEVATION (m)

[135.92] BEDROCK SURFACE ELEVATION (m)

(136.35) PRACTICAL REFUSAL TO AUGERING ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY NOVATECH.

GROUND SURFACE ELEVATION AT BOREHOLE AND TEST PIT LOCATION ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:1500

0 25 50 75 100m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7S9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
4	ADDED 2024 BOREHOLE AND HAND AUGER LOCATIONS	11/07/2024	BN
3	UPDATED TO NEW CONCEPTUAL PLAN	07/02/2023	GA
2	UPDATED TO NEW CONCEPTUAL PLAN	12/01/2023	ZM
1	HA 1-21 - HA 15-21 & TP 7-21 ADDED TO PLAN	11/01/2021	MS

MENZIE ALMONTE 2 INC. c/o REGIONAL GROUP

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
1825 RAMSAY CONCESSION 11A

TOWNSHIP OF MISSISSIPPI MILLS, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1500	Date: 06/2021
Drawn by: YA	Report No.: PG5860-REP.01
Checked by: BN	Dwg. No.: PG5860-1
Approved by: DJG	Revision No.: 4

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EDWARD & DOREEN WILSON
5596 MARTIN STREET NORTH

PHASE 8

PHASE 7

RONALD & CHERYL MILLS

SWM POND EXPANSION

STORMWATER MANAGEMENT POND

PARK

LEISHMAN DRIVE

STREET 1

STREET 2

SADLER DRIVE

ADELAIDE STREET

WALSH ST

Poter Road

100yr ~ 18,240m²

5yr ~ 14,850m²

AREA= 68m²

AREA= 120m²

100m² Offset Area

88m² Offset Area

HA 12-21 138.47

HA 11-21 138.56 (136.76)

HA 10-21 138.66

HA 9-21 138.59

HA 8-21 138.65

HA 7-21 138.65 137.35

HA 6-21 139.12

HA 13-21 138.40

TP 5 138.41 [137.04]

HA 3-24 138.51 (135.51)

HA 14-21 138.40

HA 15-21 138.37

TP 1 138.54 [135.92]

TP 6 138.29 [135.92]

TP 2 138.61 [136.46]

TP 4 138.97 [136.37]

BH 3-24 139.44 (138.53)

BH 2-24 139.45 (136.76)

BH 7-24 139.60 (138.71)

BH 4-24 138.94 (136.07)

TP 3 138.93 [136.35]

TP 7-21 138.41

HA 5-21 138.44

HA 4-21 138.37

HA 3-21 138.47

HA 2-21 138.40

HA 1-21 138.56 (136.96)

HA 2-24 138.39 (136.39)

BH 6-24 139.26 (138.12)

BH 1-24 140.30 (139.89)

HA 1-24 138.22 (134.72)

BH 5-24 138.94 (135.94)

PERMISSIBLE GRADE RAISE:

- NO PERMISSIBLE GRADE RAISE RESTRICTION
- UP TO 0.8 m
- UP TO 1.0 m
- UP TO 1.3 m
- UP TO 2.5 m

LEGEND:

- BOREHOLE LOCATION, CURRENT INVESTIGATION (2024)
- BOREHOLE WITH MONITORING WELL LOCATION, CURRENT INVESTIGATION (2024)
- HAND AUGER LOCATION, CURRENT INVESTIGATION (2024)
- TEST PIT LOCATION, PREVIOUS INVESTIGATION (2021)
- HAND AUGER LOCATION, PREVIOUS INVESTIGATION (2021)

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SCALE: 1:1500

0 25 50 75 100m

PATERSON GROUP
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OTTAWA, ON
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TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
3	ADDED 2024 BOREHOLE AND HAND AUGER LOCATIONS	11/07/2024	BN
2	UPDATED TO NEW CONCEPTUAL PLAN	07/02/2023	GA
1	UPDATED TO NEW CONCEPTUAL PLAN	21/09/2022	ZM

MENZIE ALMONTE 2 INC. c/o REGIONAL GROUP
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
1825 RAMSAY CONCESSION 11A
TOWNSHIP OF MISSISSIPPI MILLS, ONTARIO

Title:

PERMISSIBLE GRADE RAISE PLAN

Scale: 1:1500	Date: 01/2022
Drawn by: YA	Report No.: PG5860-REP.01
Checked by: BN	Dwg. No.: PG5860-2
Approved by: DJG	Revision No.: 3

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