

Geotechnical Investigation

Proposed Residential Development

Adelaide Street at Menzie Street
Mississippi Mills, Ontario

Prepared for 13165647 Canada Inc.

Report PG6247-1 dated July 19, 2022

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1.0 Introduction

Paterson Group (Paterson) was commissioned by 13165647 Canada Inc. to conduct a geotechnical investigation for the proposed residential development to be located at the southwest corner of Adelaide Street and Menzie Street in the Town of Mississippi Mills, Ontario (refer to Figure 1 - Key Plan in Appendix 2 of this report).

The objectives of the geotechnical investigation were to:

- Determine the subsoil and groundwater conditions at this site by means of test holes.
- Provide geotechnical recommendations pertaining to the design of the proposed development including construction considerations which may affect the 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.

Investigating the presence or potential presence of contamination on the subject property was not part of the scope of work of the present investigation. Therefore, the present report does not address environmental issues.

2.0 Proposed Development

Based on the available drawings, it is understood that the proposed residential development will consist of a series of single- and semi-detached dwellings consisting of either basement or slab-on-grade construction and attached garages.

Associated access lanes, walkways, and landscaped areas are also anticipated as part of the development. 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 May 26 and 27, 2022, and consisted of 16 test pits which were advanced to a maximum depth of 1.1 m below the existing ground surface. The test hole locations were distributed in a manner to provide general coverage of the subject site, taking into consideration underground utilities and site features. The test hole locations are shown on Drawing PG6247-1 - Test Hole Location Plan included in Appendix 2.

The test pits were advanced using a hydraulic shovel excavator. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The test pit procedure consisted of excavating to the required depths at the selected locations and sampling the overburden. The test pits were backfilled with the excavated soils upon completion.

Sampling and In Situ Testing

Soil samples obtained from the test pits were recovered from the sidewalls of the open excavation. The samples were classified on site, placed in sealed plastic bags, and transported to our laboratory. The depths at which the grab samples were recovered from the test pits are shown as G on the Soil Profile and Test Data sheets in Appendix 1.

Undrained shear strength testing, using a test-pitting vane apparatus, was carried out at regular intervals of depth in cohesive soils.

The subsurface conditions observed in the boreholes were recorded in detail in the field. The soil profiles are logged on the Soil Profile and Test Data sheets presented in Appendix 1.

Groundwater

Open hole groundwater infiltration levels were observed and recorded at the time of excavation in test pit locations where groundwater was present. Groundwater level observations are discussed in Section 4.3 and are presented in the Soil Profile and Test Data sheets in Appendix 1 of this report.

Sample Storage

All samples will be stored in the laboratory for a period of one (1) month after issuance of this report. They will then be discarded unless we are otherwise directed.

3.2 Field Survey

The test hole locations were selected by Paterson to provide general coverage of the proposed development taking into consideration the existing site features and underground utilities. The test hole locations and ground surface elevation at each test hole location were surveyed by Paterson using a handheld GPS and referenced to a geodetic datum. The locations of the boreholes and ground surface elevation at each test hole location are presented on Drawing PG6247-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. Soil samples will be stored for a period of one month after this report is completed, unless otherwise directed.

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. The sample was submitted to determine the concentration of sulphate and chloride, the resistivity, and the pH of the samples. The results are presented in Appendix 1 and are discussed further in Section 6.7.

4.0 Observations

4.1 Surface Conditions

The subject site is currently undeveloped and mostly forested. The site is transected by a tree-cleared trail. The site is bordered by ditches along the east and south property boundaries and further by a residential subdivision, a vacant property to the north and residential dwellings to the west, followed by McDermott Street. The ground surface across the site is relatively flat and at grade with the surrounding properties.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile encountered at the test hole locations consisted of a layer of topsoil and/or peat underlain by marl and/or a glacial till deposit. The layer of topsoil and/or peat generally extended to an approximate depth between 0.1 and 0.4 m below ground surface.

The marl was generally encountered directly below the peat layer throughout the north and northeast portions of the subject site. The marl layer extended to approximate depths ranging between 0.4 and 0.8 m below ground surface. At the location of TP12-22 and TP14-22, the marl was further underlain by a glacial till deposit.

Where encountered, the glacial till deposit was observed at depths ranging between approximately 0.1 to 0.7 m below the existing ground surface. The glacial till deposit was observed to consist of brown silty clay and/or sandy silt, and varying amounts of gravel, cobbles, and boulders.

Practical refusal to excavation was encountered at all test holes at approximate depths ranging between 0.3 and 1.1 m below the existing ground surface.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for the details of the soil profile encountered at each test hole location.

Bedrock

Based on available geological mapping, the bedrock in the subject area consists of interbedded limestone and dolomite of the Gull River formation, with an overburden drift thickness of 0 to 2 m depth.

4.3 Groundwater

Groundwater infiltration levels were observed within the test pits during the excavation. The observed groundwater sidewall infiltration levels are presented in Table 1 below and on the Soil Profile and Test Data sheets in Appendix 1.

Table 1 – Summary of Groundwater Levels				
Borehole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
		Depth (m)	Elevation (m)	
TP 1-22	138.22	0.50	137.72	May 26, 2022
TP 2-22	138.65	Dry	N/A	
TP 3-22	138.18	Dry	N/A	
TP 4-22	138.57	Dry	N/A	
TP 5-22	138.69	Dry	N/A	
TP 6-22	138.31	Dry	N/A	
TP 7-22	138.00	0.75	137.25	
TP 8-22	137.88	0.70	137.18	
TP 9-22	137.79	0.55	137.24	May 27, 2022
TP 10-22	138.05	Dry	N/A	
TP 11-22	137.91	0.30	137.61	
TP 12-22	137.79	0.30	137.49	
TP 13-22	137.92	0.45	137.47	
TP 14-22	138.03	0.40	137.63	
TP 15-22	137.97	0.40	137.57	
TP 16-22	138.27	Dry	N/A	

Note: The ground surface elevation at each test pit location was surveyed using a handheld GPS and referenced to a geodetic datum.

Long-term groundwater levels 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 table can be expected below the bedrock surface.

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

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered suitable for the proposed residential development. The proposed buildings may be founded on conventional spread footings placed on an undisturbed glacial till, or a clean, surface sounded bedrock bearing surface.

Depending on the founding depth of the proposed buildings, bedrock removal may be required to complete the basement level and/or site servicing works. All contractors should be prepared for oversized boulder and bedrock removal.

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 organic materials, should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures.

Fill Placement

Fill placed for grading beneath the proposed development should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill, where required, 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 buildings and paved areas should consist of OPSS Granular A or Granular B Type II and be compacted to at least 98% of the material's standard Proctor maximum dry density (SPMDD).

Site-excavated soil may be used as general landscaping fill where settlement of the ground surface is of minor concern. The materials should be spread in lifts with a maximum thickness of 300 mm and compacted by the tracks of the spreading equipment to minimize voids. If this material is to be used to build up the subgrade level for areas to be paved, it should be compacted in thin lifts to at least 95% of the material's SPMDD.

Site-generated topsoil, peat and/or marl should be segregated from site-generated fill considered for use to build up subgrade levels. This material is generally considered unsuitable for use where load bearing and/or settlement sensitive structures such as roadways, services and other structures may be considered.

Site-excavated soils are not suitable for use as backfill against foundation walls unless used in conjunction with a composite drainage membrane, such as Miradrain G100N or Delta Drain 6000.

If excavated rock is used as exterior fill, it should be suitably fragmented to produce a well-graded material, similar to a 150 mm minus crushed stone material and approved by the geotechnical consultant. This material should be used structurally only to build up the subgrade for pavements. Where the crushed bedrock is open graded, a blinding layer of finer granular fill and/or a woven geotextile may be required to prevent adjacent finer materials from migrating into the voids, with associated loss of ground and settlements. This can be assessed at the time of construction. Site-generated crushed rock fill should be compacted using a suitably sized smooth drum vibratory roller when considered for placement.

Bedrock Removal

Bedrock removal can be accomplished by hoe ramming where the bedrock is weathered and/or where only small quantities of the bedrock need to be removed. Sound bedrock may be removed by line drilling in conjunction with controlled blasting and/or hoe ramming.

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 the proximity of the blasting operations should be carried out prior to commencing site activities.

The extent of the survey should be determined by the blasting consultant and should be sufficient to respond to any inquiries or claims related to the blasting operations.

As a general guideline, peak particle velocities (measured at the structures) should not exceed 25 mm/s during the blasting program to reduce the risks of damage to the existing surrounding structures. 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 cause 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.

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

Two parameters determine the recommended vibration limit: 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).

These guidelines are for current construction standards. Considering that these guidelines are above perceptible human level and, in some cases, could be very disturbing to some people, it is recommended that a pre-construction survey be completed to minimize the risks of claims during or following the construction of the proposed development.

5.3 Foundation Design

Bearing Resistance Values – Conventional Spread Footings

As noted above, based on the subsurface profile encountered in the test holes, it is recommended that the proposed buildings be founded on conventional spread footings placed on undisturbed compact glacial till, or clean, surface sounded bedrock.

Overburden Bearing Surface

Conventional spread footings placed on an undisturbed, compact glacial till bearing surface can be designed using a bearing resistance value at serviceability limit states (SLS) of **200 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **300 kPa** incorporating a geotechnical resistance factor of 0.5 at SLS.

An undisturbed glacial till bearing surface consists of one from which all topsoil and deleterious materials, such as loose, frozen, or disturbed soil, whether in-situ or not, have been removed, in the dry, prior to placement of concrete footings.

Bedrock Bearing Surface

Footings placed on clean, surface sounded bedrock can be designed using a factored bearing resistance value at ultimate limit states (ULS) of **1,000 kPa**, incorporating a geotechnical resistance factor of 0.5.

A clean, surface-sounded bedrock bearing surface should be free of loose materials and have no near surface seams, voids, fissures, or open joints which can be detected from surface sounding with a rock hammer.

Bearing resistance values for footing design should be confirmed on a per lot basis by the geotechnical consultant at the time of construction.

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 a soil bearing medium to reduce the potential for long-term total and differential settlements.

At the soil/bedrock transitions, it is recommended that a minimum depth of 300 mm of bedrock be removed from below the founding elevation for a minimum length of 2.0 m on the bedrock side. This area should be subsequently reinstated with an engineered fill, such as OPSS Granular A or OPSS Granular B Type II crushed stone and compacted to a minimum of 98% of the materials SPMDD. 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.

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 the in-situ bearing medium soils when a plane extending down and out from the bottom edges of the footing, at a minimum of 1.5H:1V, passes only through in situ soil of the same or higher capacity as that of the bearing medium.

Adequate lateral support is provided to sound bedrock bearing medium when a plane extending down and out from the bottom edges of the footing at a minimum of 1H:6V (or flatter) passes only through sound bedrock or a material of the same or higher capacity as the bedrock, such as concrete. A weathered bedrock bearing medium will require a lateral support zone of 1H:1V (or flatter).

Settlement

Footings placed on an undisturbed soil bearing surface and designed using the above noted bearing resistance values at SLS will be subject to potential post-construction total and differential settlements of 25 to 20 mm, respectively.

Footings bearing on an acceptable bedrock bearing surface and designed for the bearing resistance values provided above will be subjected to negligible potential post-construction total and differential settlements.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class C** for foundations constructed at the subject site as deduced from Table 4.1.8.4.A of the 2012 Ontario Building Code (OBC 2012). If a higher seismic site class is required (Class A or B), a site-specific shear wave velocity test may be completed to accurately determine the applicable seismic site classification for foundation design of the proposed buildings.

The soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest revision of the 2012 Ontario Building Code for a full discussion of the earthquake design requirements.

5.5 Basement Slab/ Slab-on-Grade Construction

With the removal of all topsoil, peat, and fill containing significant amounts of deleterious or organic materials, the existing native soil or bedrock approved by the geotechnical consultant at the time of excavation will be considered an acceptable subgrade surface on which to commence backfilling for support of the floor slab.

For structures with basement slabs, it is recommended that the upper 200 mm of subfloor fill for the basement floor slab consists of 19 mm clear crushed stone. For any structure with slab-on-grade construction, the upper 200 mm of sub-slab fill is recommended to consist of OPSS Granular A crushed stone.

Any poor performing areas should be sub-excavated and reinstated using OPSS Granular B Type II. All backfill material within the footprint of the proposed building should consist of OPSS Granular B Type II and should be placed in maximum 300 mm thick loose layers and compacted to at least 98% of its SPMDD.

5.6 Basement Wall

There are several combinations of backfill materials and retained soils that could be applicable for the basement walls of the proposed basement space. However, the conditions can be well-represented by assuming the retained soil consists of a material with an angle of internal friction of 30 degrees and a bulk (drained) unit weight of 20 kN/m³.

Two distinct conditions, static and seismic, must be reviewed for design calculations. The parameters for design calculations for the two conditions are presented below.

Static Earth Pressures

The static horizontal earth pressure (p_o) can be calculated using a triangular earth pressure distribution equal to $K_o \cdot \gamma \cdot H$ where:

- K_o = at-rest earth pressure coefficient of the applicable retained material
- γ = unit weight of fill of the applicable retained soil (kN/m³)
- H = height of the wall (m)

An additional pressure having a magnitude equal to $K_o \cdot q$ and acting on the entire height of the wall should be added to the above diagram for any surcharge loading, q (kPa), that may be placed at ground surface adjacent to the wall. The surcharge pressure will only be applicable for static analyses and should not be used in conjunction with the seismic loading case.

Actual earth pressures could be higher than the “at-rest” case if care is not exercised during the compaction of the backfill materials to maintain a minimum separation of 0.3 m from the walls with the compaction equipment.

Seismic Earth Pressures

The total seismic force (P_{AE}) includes both the earth force component (P_o) and the seismic component (ΔP_{AE}). The seismic earth force (ΔP_{AE}) can be calculated using $0.375 \cdot a_c \cdot \gamma \cdot H^2/g$ where:

$$a_c = (1.45 - a_{max}/g)a_{max}$$

γ = unit weight of fill of the applicable retained soil (kN/m³)

H = height of the wall (m)

g = gravity, 9.81 m/s²

The peak ground acceleration, (a_{max}), for the Ottawa area is 0.22g according to OBC 2012. Note that the vertical seismic coefficient is assumed to be zero.

The earth force component (P_o) under seismic conditions can be calculated using $P_o = 0.5 K_o \gamma H^2$, where $K_o = 0.5$ for the soil conditions noted above.

The total earth force (P_{AE}) is considered to act at a height, h (m), from the base of the wall, where:

$$h = \{P_o \cdot (H/3) + \Delta P_{AE} \cdot (0.6 \cdot H)\} / P_{AE}$$

The earth forces calculated are unfactored. For the ULS case, the earth loads should be factored as live loads, as per OBC 2012.

5.7 Pavement Design

The following design tables may be considered for the design driveways, car-parking areas and local residential roadways throughout the subject site.

Table 2 – Recommended Pavement Structure – Driveways and Car-Only Parking Areas	
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 Crushed Stone
SUBGRADE – Either fill, in-situ soil, or OPSS Granular B Type I or II material placed over in-situ soil.	

Table 3 – Recommended Pavement Structure – Local Residential 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
450	SUBBASE – OPSS Granular B Type II Crushed Stone
SUBGRADE – Either fill, in-situ soil, or OPSS Granular B Type I or II material placed over in-situ soil.	

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

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.

If bedrock is encountered at the subgrade level, the total thickness of the pavement granular materials (base and subbase) could be reduced to 300 mm. The upper 300 mm of the bedrock surface should be reviewed and approved by Paterson prior to placing the base and subbase materials. Care should be exercised to ensure that the bedrock subgrade does not have depressions that will trap the water.

Subgrades for walkways against the building should be sloped to divert water towards the buildings foundation drainage system.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage

If basement units are considered for the future homes, a perimeter foundation drainage system should be provided for the proposed structures. The system should consist of a 150 mm diameter perforated and corrugated plastic pipe, surrounded on all sides by 150 mm of 19 mm clear crushed stone, which is placed at the footing level around the exterior perimeter of the basement walls. The pipe should have a positive outlet, such as a gravity connection to the storm sewer or to a sump pit.

Foundation Backfill

Backfill against the exterior sides of the basement 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 placement as backfill against the foundation walls unless used in conjunction with a composite drainage system, such as Delta Drain 6000 or Miradrain G100N. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should be placed for this purpose.

6.2 Protection of Footings Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effect of frost action. A minimum of 1.5 m thick soil cover, or an equivalent thickness of soil cover and insulation, should be provided in this regard.

Exterior unheated footings, such as those for isolated exterior piers for decks, are more prone to deleterious movement associated with frost action and require additional protection, such as soil cover of 2.1 m, or an equivalent combination of soil cover and foundation insulation.

However, sound bedrock bearing mediums are not considered as frost susceptible, such that footings placed directly on sound bedrock would not require the minimum soil cover, as referenced above, to mitigate the migration of frost.

6.3 Excavation Side Slopes

The side slopes of shallow excavations anticipated at this site should either be cut back at acceptable slopes or be retained by temporary shoring systems from the start of the excavation until the structure is backfilled.

It is assumed that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

Unsupported Excavations

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 a 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 the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

Excavation side slopes around the building excavation should be protected from erosion by surface water and rainfall events and drying during drier weather by the use of secured tarpaulins spanning the length of the side slopes, or other means of erosion protection along their footprint. Efforts should also be made to maintain dry surfaces at the bottom of the excavation footprints and along the bottom of side slopes to prevent disturbance to the toe of the slope. Additional measures may be recommended at the time of construction by the geotechnical consultant.

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

At least 150 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes when placed on soil subgrade. Should bedrock be encountered at the bedding level, the bedding layer should be increased to a minimum thickness of 300 mm.

The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 95% of its SPMDD. 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 or Granular B Type II with a maximum size of 25 mm. The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to 95% of the material's standard Proctor maximum dry density.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finish grade) should match the soils exposed at the trench walls to reduce the potential 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. All cobbles larger than 200 mm in their longest direction should be segregated from re-use as trench backfill.

6.5 Groundwater Control

Groundwater Control for Building Construction

Based on our observations, it is anticipated that groundwater infiltration into the excavations should be low and controllable using open sumps. 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.

Permit to Take Water

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

For typical ground or surface water volumes being pumped during the construction phase, typically 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. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project.

The subsoil conditions at this site consist of frost susceptible materials. In the 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.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost in the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions. Additional information could be provided, if required.

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 low to 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.

- 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.
- Review of the installation of the foundation drainage system.
- Observation of all subgrades prior to backfilling.
- Field density tests to determine the level of compaction achieved.
- Sampling and testing of the bituminous concrete including mix design reviews.

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.

All excess soil must be handled as per *Ontario Regulation 406/19: On-Site and Excess Soil Management*.

8.0 Statement of Limitations

The recommendations provided are in accordance with the present understanding of the project. Paterson requests permission to review the recommendations when the drawings and specifications are completed.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, Paterson requests 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 or 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 13165647 Canada Inc. or their agents is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

Paterson Group Inc.



Drew Petahtegoose, B. Eng.



David J. Gilbert, P.Eng.

Report Distribution:

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APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ANALYTICAL TESTING RESULTS

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic


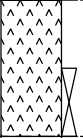
REMARKS

BORINGS BY Excavator

DATE May 26, 2022

FILE NO.
PG6247

HOLE NO.
TP 1-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL		G	1			0	138.22					
GLACIAL TILL: Compact, brown silty clay with sand, trace gravel and cobbles		G	2									
End of Test Pit TP terminated on bedrock surface at 0.50m depth. (Groundwater infiltration at base of test pit)												

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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic

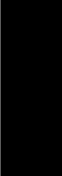

REMARKS

BORINGS BY Excavator

DATE May 26, 2022

FILE NO.
PG6247

HOLE NO.
TP 2-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL		G	1			0	138.65					
0.27 GLACIAL TILL: Compact, brown silty sand to sandy silt with gravel and cobbles 0.40		G	2									
End of Test Pit TP terminated on bedrock surface at 0.40m depth. (TP dry upon completion)												

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

DATUM Geodetic

REMARKS

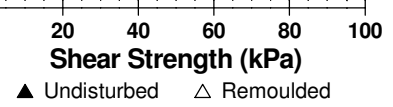
BORINGS BY Excavator

DATE May 26, 2022

FILE NO.
PG6247

HOLE NO.
TP 3-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL	0.20	G	1			0	138.18					
GLACIAL TILL: Compact, brown silty clay with sand, gravel and cobbles	0.70	G	2									
End of Test Pit TP terminated on bedrock surface at 0.70m depth. (TP dry upon completion)												



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE May 26, 2022

FILE NO.
PG6247

HOLE NO.
TP 4-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL		G	1			0	138.57					
GLACIAL TILL: Compact, brown silty sand to sandy silt, some gravel and cobbles		G	2									
End of Test Pit TP terminated on bedrock surface at 0.60m depth. (TP dry upon completion)												

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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic



REMARKS

BORINGS BY Excavator

DATE May 26, 2022

FILE NO.
PG6247

HOLE NO.
TP 5-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE							20	40	60	80		
TOPSOIL		G	1			0	138.69					
0.16 GLACIAL TILL: Compact, brown silty clay with sand, some gravel, cobbles and boulders		G	2									
0.30 End of Test Pit												
TP terminated on bedrock surface at 0.30m depth. (TP dry upon completion)												

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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic


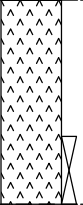
REMARKS

BORINGS BY Excavator

DATE May 26, 2022

FILE NO.
PG6247

HOLE NO.
TP 6-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL		G	1			0	138.31					
GLACIAL TILL: Compact, brown silty clay with sand, trace gravel		G	2									
End of Test Pit TP terminated on bedrock surface at 0.60m depth. (TP dry upon completion)												

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

DATUM Geodetic



REMARKS

BORINGS BY Excavator

DATE May 26, 2022

FILE NO.
PG6247

HOLE NO.
TP 7-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			20	40	60	80		
GROUND SURFACE						0	138.00						
TOPSOIL		G	1										
MARL		G	2										
End of Test Pit													
TP terminated on bedrock surface at 0.80m depth. (Groundwater infiltration at 0.75m depth)													

○ Water Content %
 20 40 60 80
 Shear Strength (kPa)
 ▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE May 26, 2022

FILE NO.
PG6247

HOLE NO.
TP 8-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL & PEAT	[REDACTED]	G	1			0	137.88					
MARL	[REDACTED]	G	2									
End of Test Pit												
TP terminated on bedrock surface at 0.83m depth. (Groundwater infiltration at 0.7m depth)												

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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE May 27, 2022

FILE NO.
PG6247

HOLE NO.
TP 9-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE						0	137.79	20	40	60	80	
PEAT		G	1									
MARL		G	2									∇
End of Test Pit												
TP terminated on bedrock surface at 0.66m depth. (Groundwater infiltration at 0.55m depth)												

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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic

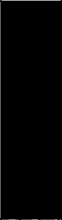

REMARKS

BORINGS BY Excavator

DATE May 27, 2022

FILE NO.
PG6247

HOLE NO.
TP10-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL		G	1			0	138.05					
GLACIAL TILL: Compact, brown silty clay with sand and gravel		G	2									
End of Test Pit TP terminated on bedrock surface at 0.68m depth. (TP dry upon completion)												

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

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE May 27, 2022

FILE NO.
PG6247

HOLE NO.
TP11-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
GROUND SURFACE								20	40	60	80		
PEAT		G	1			0	137.91						
MARL		G	2										∇
End of Test Pit													
TP terminated on bedrock surface at 0.44m depth. (Groundwater infiltration at 0.3m depth)													
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic


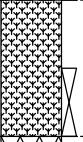
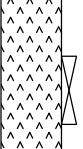
REMARKS

BORINGS BY Excavator

DATE May 27, 2022

FILE NO.
PG6247

HOLE NO.
TP12-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			20	40	60	80		
GROUND SURFACE						0	137.79						
PEAT													
	0.30	G	1										
MARL													
	0.50	G	2										
GLACIAL TILL: Compact, brown silty clay with sand, some gravel and boulders													
	0.74	G	3										
End of Test Pit													
TP terminated on bedrock surface at 0.74m depth. (Groundwater infiltration at 0.3m depth)													



DATUM Geodetic



REMARKS

BORINGS BY Excavator

DATE May 27, 2022

FILE NO.
PG6247

HOLE NO.
TP13-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
PEAT		G	1			0	137.92					
MARL		G	2									
End of Test Pit												
TP terminated on bedrock surface at 0.74m depth. (Groundwater infiltration at 0.45m depth)												

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

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE May 27, 2022

FILE NO.
PG6247

HOLE NO.
TP14-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
GROUND SURFACE								20	40	60	80		
PEAT		G	1			0	138.03						
MARL		G	2			0.40							▽
GLACIAL TILL: Compact, brown silty sand with clay, gravel and boulders		G	3			0.70							
End of Test Pit						1.05	1	137.03					
TP terminated on bedrock surface at 1.05m depth. (Groundwater infiltration at 0.4m depth)													
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE May 27, 2022

FILE NO.
PG6247

HOLE NO.
TP15-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL	[REDACTED]	G	1			0	137.97					
GLACIAL TILL: Compact, brown silty clay with sand and boulders	[REDACTED]	G	2			0.40						∇
End of Test Pit TP terminated on bedrock surface at 0.74m depth. (Groundwater infiltration at 0.4m depth)	[REDACTED]					0.74						
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Prop. Residential Development - Adelaide at Menzie St.
 Mississippi Mills (Almonte), Ontario

DATUM Geodetic

REMARKS

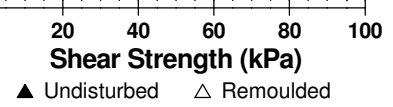
BORINGS BY Excavator

DATE May 27, 2022

FILE NO.
PG6247

HOLE NO.
TP16-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE						0	138.27	20	40	60	80	
TOPSOIL		G	1									
GLACIAL TILL: Compact, brown silty clay with sand and gravel		G	2									
End of Test Pit TP terminated on bedrock surface at 0.70m depth. (TP dry upon completion)												



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 = $(D_{30})^2 / (D_{10} \times D_{60})$
Cu	-	Uniformity coefficient = D_{60} / D_{10}

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		Overconsolidation 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.
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SYMBOLS AND TERMS (continued)

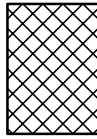
STRATA PLOT



Topsoil



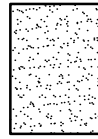
Asphalt



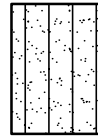
Fill



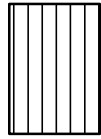
Peat



Sand



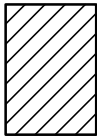
Silty Sand



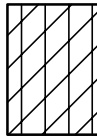
Silt



Sandy Silt



Clay



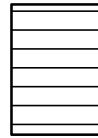
Silty Clay



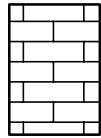
Clayey Silty Sand



Glacial Till



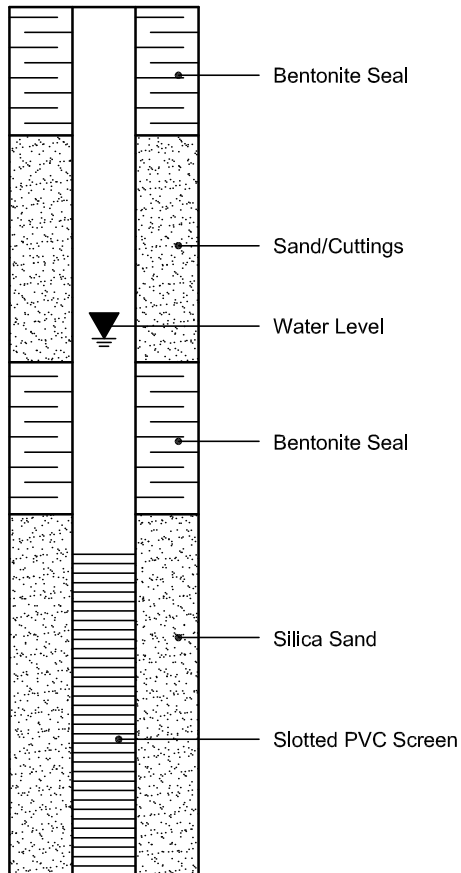
Shale



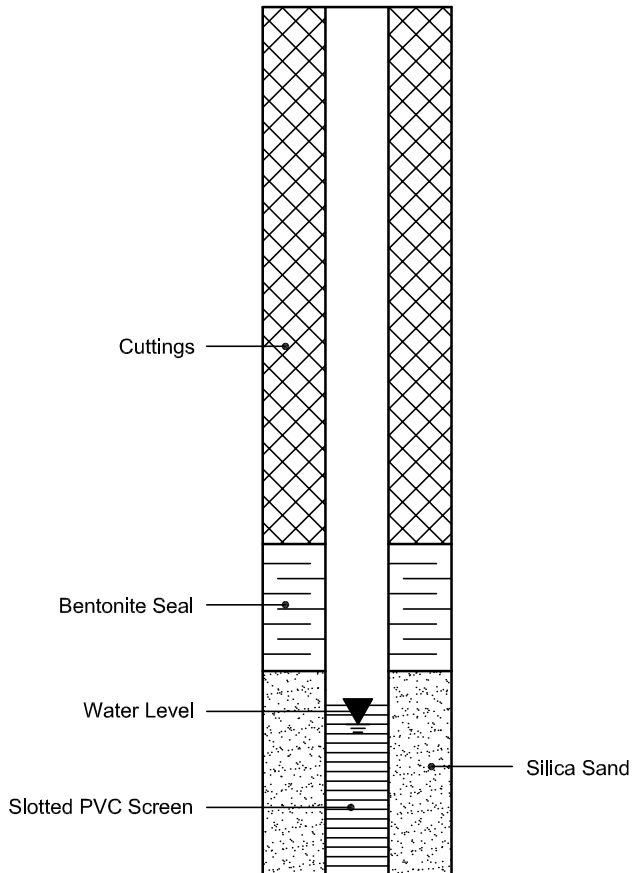
Bedrock

MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis

Report Date: 09-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 31-May-2022

Client PO:

Project Description: PG6247

Client ID:	TP6-22-G2	-	-	-
Sample Date:	26-May-22 09:00	-	-	-
Sample ID:	2223297-01	-	-	-
MDL/Units	Soil	-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	84.9	-	-	-
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General Inorganics

pH	0.05 pH Units	7.42	-	-	-
Resistivity	0.10 Ohm.m	61.9	-	-	-

Anions

Chloride	5 ug/g dry	<5	-	-	-
Sulphate	5 ug/g dry	<5	-	-	-

APPENDIX 2

FIGURE 1 – KEY PLAN

DRAWING PG6247-1 – TEST HOLE LOCATION PLAN

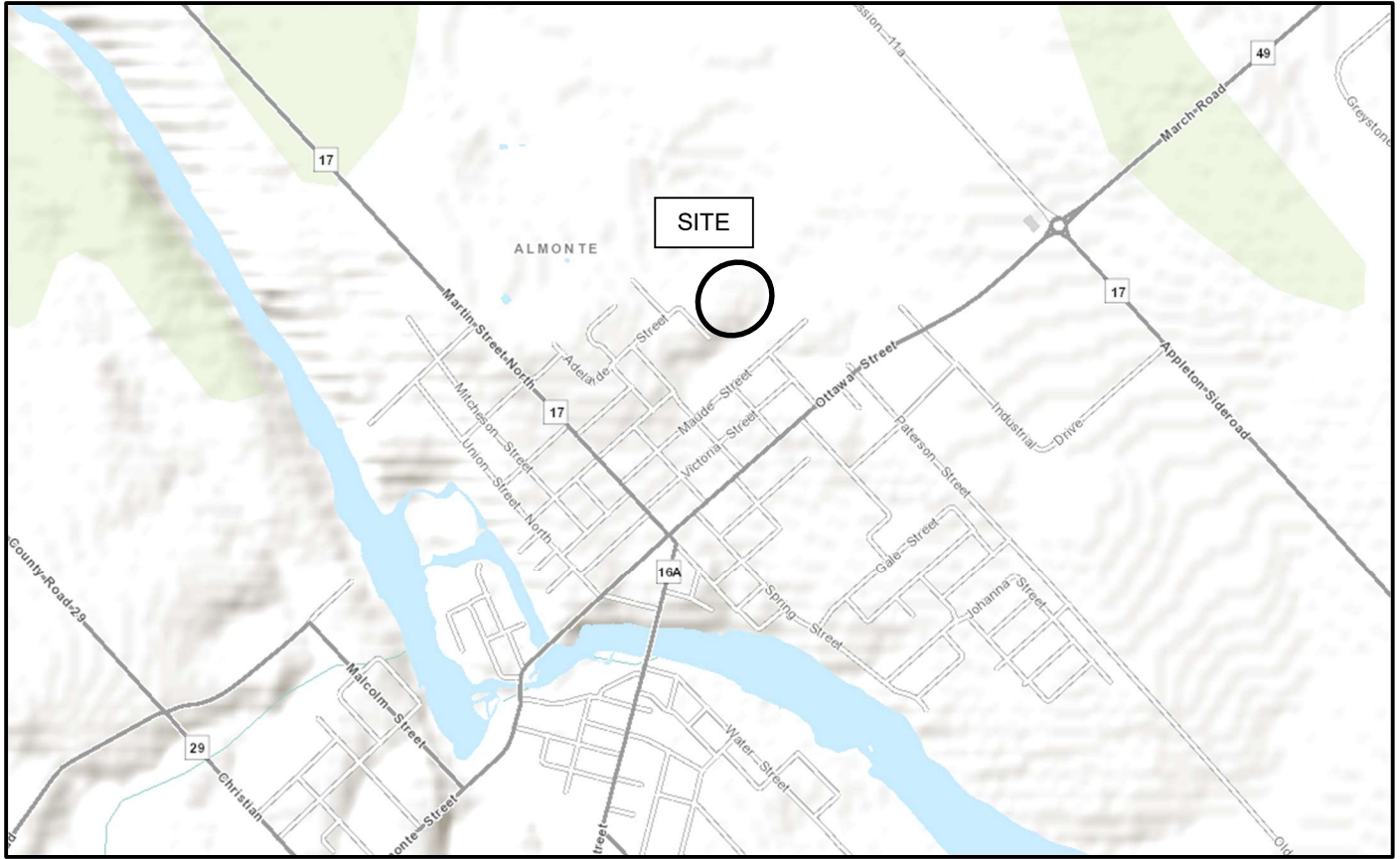
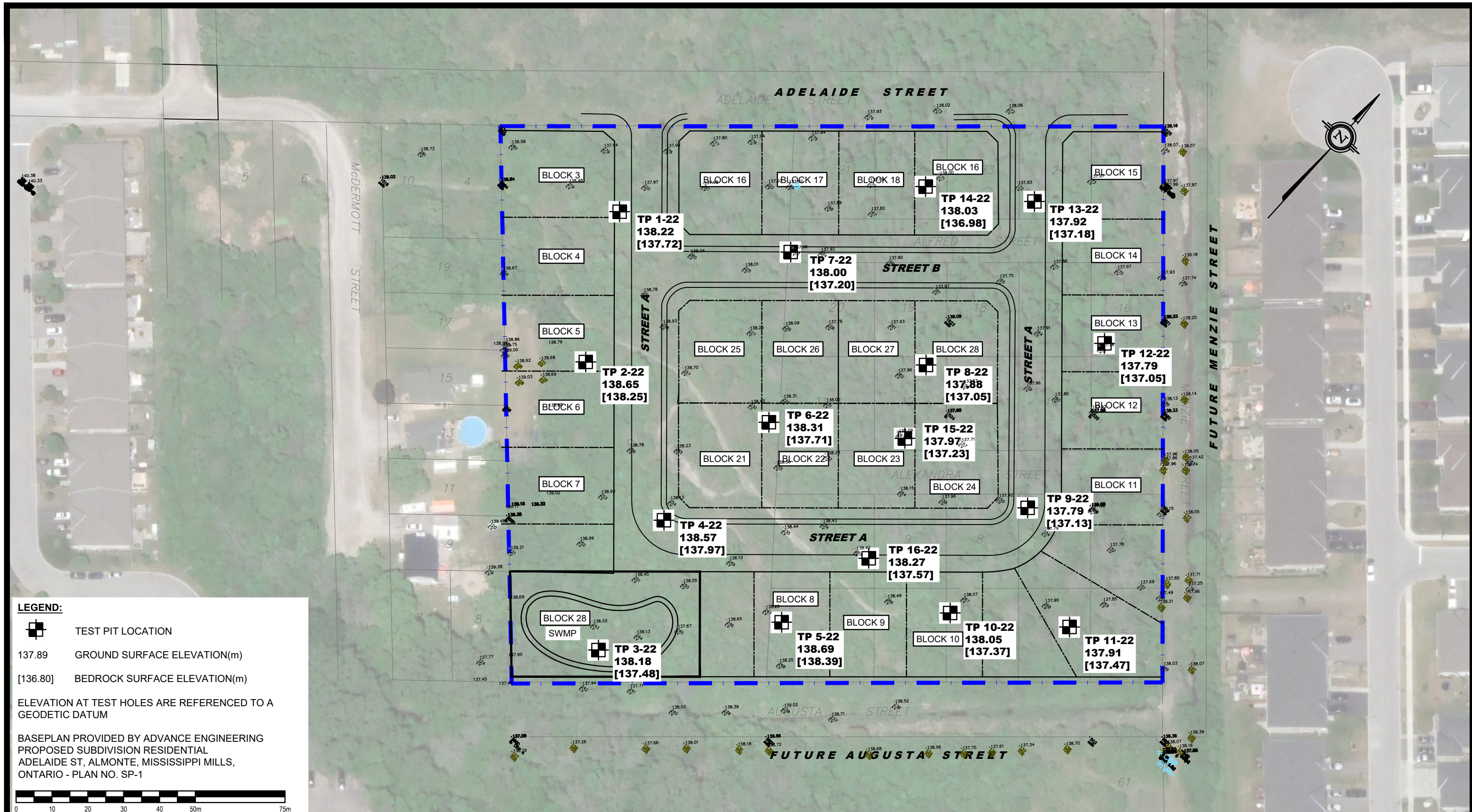



FIGURE 1

KEY PLAN

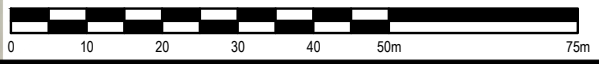


LEGEND:

-  TEST PIT LOCATION
- 137.89 GROUND SURFACE ELEVATION(m)
- [136.80] BEDROCK SURFACE ELEVATION(m)

ELEVATION AT TEST HOLES ARE REFERENCED TO A GEODETIC DATUM

BASEPLAN PROVIDED BY ADVANCE ENGINEERING
 PROPOSED SUBDIVISION RESIDENTIAL
 ADELAIDE ST, ALMONTE, MISSISSIPPI MILLS,
 ONTARIO - PLAN NO. SP-1



patersongroup
 consulting engineers

154 Colonnade Road South
 Ottawa, Ontario K2E 7J5
 Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

13165647 CANADA INC.
GEOTECHNICAL INVESTIGATION - PROPOSED RESIDENTIAL DEVELOPMENT
ADELAIDE STREET AT MENZIE STREET – MISSISSIPPI MILLS

ALMONTE, ONTARIO

TEST HOLE LOCATION PLAN

Scale:	1:1000	Date:	06/2022
Drawn by:	RCG	Report No.:	PG6247-1
Checked by:	DP	Dwg. No.:	PG6247-1
Approved by:	DJG	Revision No.:	