PATERSON GROUP

# Geotechnical Investigation

## Proposed Residential Development

955 Borbridge Avenue
Ottawa, Ontario

Prepared for Richcraft Homes Ltd.

**Report PG7285-1 dated October 18, 2024**

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# Appendices

# 1.0 Introduction

Paterson Group (Paterson) was commissioned by Richcraft Homes Ltd. to conduct a geotechnical investigation for the proposed residential development to be located at 955 Borbridge Avenue in the City of Ottawa (reference should be made to Figure 1 - Key Plan in Appendix 2 of this report for the general site location).

The objectives of the geotechnical investigation were to:

- Determine the subsoil and groundwater conditions at this site by means of boreholes and to;
- 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 for 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 site plan, it is understood that the proposed development will consist of several townhouse blocks and an accessory building, with associated asphalt-paved access lanes and parking areas. An amenity area is also proposed to the south of accessory building.

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 September 20, 2024, and consisted of advancing a total of 4 boreholes to a maximum depth of 5.9 m below existing ground surface. The approximate borehole locations are shown on Drawing PG7285-1 – Test Hole Location Plan included in Appendix 2.

Previous geotechnical investigations on January 31, 2020, August 10, 2022, and April 8, 2022 included test holes at or within the vicinity of the subject site. These test holes consisted of 3 test pits (TP 3-22, TP 10-22, and TP 11-22) and 2 boreholes (BH 2 and BH 20) advanced to a maximum depth of 5.7 m below the existing ground surface.

The borehole locations were distributed in a manner to provide general coverage of the subject site, taking into consideration underground utilities and site features.

The boreholes were completed using a low clearance auger drill rig operated by a two-person crew. The test pits were advanced with an excavator, and backfilled with the excavated soil upon completion. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The testing procedure consisted of augering to the required depths at the selected locations and sampling the overburden.

### Sampling and In Situ Testing

Soil samples were collected from the boreholes using two different techniques, namely, sampled directly from the auger flights (AU) or collected using a 50 mm diameter split spoon (SS) sampler. All samples were visually inspected and initially classified on-site. The auger and split-spoon samples were placed in sealed plastic bags. All samples were transported to our laboratory for further examination and classification. 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 presented 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 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 in Appendix 1 of this report.

**Groundwater**

Flexible standpipe piezometers were installed in all boreholes to permit monitoring of the groundwater levels subsequent to the completion of the sampling program. The groundwater level readings were obtained after a suitable stabilization period subsequent to the completion of the field investigation.

## 3.2 Field Survey

The borehole locations, and ground surface elevation at each borehole location, were surveyed by Paterson using a handheld GPS and referenced to a geodetic datum. The locations of the boreholes, and the ground surface elevation at each borehole location, are presented on Drawing PG7285-1 – 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. The results are discussed in Section 4.2 and are provided in Appendix 1 of this report.

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

## 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 sample. 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 vacant with a gravel and grassed surface. The site is bordered by Borbridge Avenue to the north, Ralph Hennessy Avenue to the east, Rockmelon Street to the south, and vacant land to the west. The ground surface across the subject site is relatively flat at approximate geodetic elevation of 96.0 m.

## 4.2 Subsurface Profile

Generally, the subsurface profile at the borehole locations consists of topsoil or fill underlain by glacial till. The fill was generally observed to consist of a compact, brown silty sand, sandy silt, and/or silty clay with varying amounts of gravel and organics.

The glacial till was encountered underlying the fill at approximate depths of 0.3 to 1.1 m below the existing ground surface. The glacial till was generally observed to consist of compact to very dense, brown silty sand to sandy silt with varying amounts of gravel, cobbles, and boulders.

Practical refusal to augering was encountered at depths ranging from about 3.9 to 5.9 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, bedrock in the area of the subject site consists of sandstone and dolomite of the March formation with an overburden drift thickness of about 5 to 10 m in depth.

## 4.3 Groundwater

Groundwater levels were measured within the installed piezometers at the time of the investigation. The measured groundwater levels noted at that time are presented in Table 1 on next page, and are also presented in Appendix 1.

**Table 1 – Summary of Groundwater Levels**

| Borehole Number | Ground Surface Elevation (m) | Measured Groundwater Level | | Dated Recorded |
|---|---|---|---|---|
| | | Depth (m) | Elevation (m) | |
| BH 1-24 | 96.04 | 3.85 | 92.19 | October 8, 2024 |
| BH 2-24 | 96.65 | 4.43 | 92.22 | |
| BH 3-24 | 96.88 | 5.10 | 91.78 | |
| BH 4-24 | 96.19 | 4.63 | 91.56 | |
| BH 2B-22 | 96.50 | 2.95 | 93.55 | August 17, 2022 |
| BH 20 | 96.34 | 2.30 | 94.04 | Feb 11, 2020 |
| TP 3-22 | 96.47 | DRY | - | April 8, 2022 |
| TP 10-22 | 95.98 | DRY | - | |
| TP 11-22 | 96.26 | 4.9 | 91.36 | |

**Note:** Ground surface elevations at borehole location are 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, the long-term groundwater table can be expected at approximately 3 to 4 m below ground surface.

However, 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 suitable for the proposed development. It is recommended that the proposed structures be founded on conventional spread footings bearing on the undisturbed, compact to very dense glacial till.

As a silty clay deposit was not encountered at this site, the proposed development is not subject to a permissible grade raise restriction or geotechnical tree planting setbacks.

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

## 5.2 Site Grading and Preparation

### Stripping Depth

Topsoil and deleterious fill, such as those containing significant organic materials, should be stripped from under any buildings and other settlement sensitive structures. The existing fill material, free of organic materials, should be reviewed by Paterson personnel at the time of construction to determine if the existing fill can be left in place below paved areas.

### Fill Placement

Fill used for grading beneath the building areas 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 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 proposed building areas 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 and beneath exterior parking areas where settlement of the ground surface is of minor concern. In landscaped areas, these materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If these materials are 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.

## 5.3 Foundation Design

### Bearing Resistance Values

Footings supported on the undisturbed, compact to very dense glacial till 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**. A geotechnical resistance factor of 0.5 was applied to the above noted bearing resistance value at ULS.

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

Footings placed on an undisturbed, compact to very dense glacial till bearing surface and designed using the bearing resistance values at SLS provided above will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

### 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. Above the groundwater level, adequate lateral support is provided to the in-situ bearing medium soils 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.

## 5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class C** for the foundations considered at this site. Soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest revision of the Ontario Building Code (OBC) 2012 for a full discussion of the earthquake design requirements.

## 5.5 Floor Slab Construction

With the removal of all topsoil and fill, containing significant amounts of deleterious or organic materials, the undisturbed, compact to very dense glacial till is considered to be an acceptable subgrade surface on which to commence backfilling for floor slab construction.

Any soft areas should be removed and backfilled with appropriate backfill material prior to placing any fill. OPSS Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab.

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

All backfill material within the footprint of the proposed buildings should be placed in maximum 300 mm thick loose layers and compacted to a minimum of 98% of the SPMDD.

## 5.6 Pavement Design

For design purposes, the pavement structures presented in Tables 2 and 3 below are recommended for the design of the driveways, car parking areas, and local roadways.

**Table 2 - Recommended Pavement Structure – Driveways & 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 |
| **SUBGRADE** - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill. | |

**Table 3 - Recommended Pavement Structure – Local Roadways**

| Thickness (mm) | Material Description |
|---|---|
| 40 | **Wear Course** – Superpave 12.5 Asphaltic Concrete |
| 50 | **Binder Course** – Superpave 19.0 Asphaltic Concrete |
| 150 | **BASE** - OPSS Granular A Crushed Stone |
| 450 | **SUBBASE** - OPSS Granular B Type II |
| **SUBGRADE** - OPSS Granular B Type I or II material placed over in situ soil or engineered 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 II material.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material's SPMDD using suitable vibratory equipment.

# 6.0 Design and Construction Precautions

## 6.1 Foundation Backfill

### Foundation Drainage

A perimeter foundation drainage system is recommended for each proposed structure with below-grade space. The system should consist of a 100 to 150 mm diameter, geotextile-wrapped, perforated and corrugated plastic pipe which is 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 structure. The pipe should have a positive outlet, such as a gravity connection 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 used in conjunction with a drainage geocomposite, such as Delta Drain 6000, connected to the perimeter foundation drainage system. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

## 6.2 Protection of Footings Against Frost Action

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

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

## 6.3 Excavation Side Slopes

The temporary excavation side slopes anticipated should either be excavated to acceptable slopes or retained by shoring systems from the beginning of the excavation until the structure is backfilled. It is expected that sufficient room will be available for the greater part of the excavation to be undertake by open-cut methods (i.e. 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 subsurface soil 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 maintain safe working distance 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.

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

Bedding and backfill materials should be in accordance with the most recent material specifications and standard detail drawings from the department of public works and services, infrastructure services branch of the City of Ottawa.

A minimum of 150 mm of OPSS Granular A should be placed for bedding for sewer or water pipes when placed on a soil subgrade. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to a minimum of 300 mm above the obvert of the pipe, should consist of OPSS Granular A (concrete or PSM PVC pipes) or sand (concrete pipe). The bedding and cover materials should be placed in maximum 225 mm thick lifts and compacted to 98% of the SPMDD.

It should generally be possible to re-use the moist (not wet) site-generated fill above the cover material if the excavation and filling operations are carried out in dry weather conditions.

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. All cobbles larger than 200 mm in their longest direction should be segregated from re-use as trench backfill.

## 6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavations should be low to moderate 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.

**Groundwater Control for Building Construction**

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.

**Impacts to Neighbouring Properties**

A silty clay deposit was not encountered at this site, therefore no adverse effects to neighbouring properties are expected as a result of dewatering which may occur during construction and due to foundation drainage.

## 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 (GU – General Use cement) would be appropriate for this site. The chloride content and pH of the sample indicate that they are not a significant factor in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a slightly aggressive to moderate corrosive environment.

## 6.8 Tree Planting Restrictions

As noted above in Section 5.1, a silty clay deposit was not encountered at the subject site. Therefore, tree planting setbacks are not required for the proposed development, from a geotechnical perspective.

# 7.0 Recommendations

A materials testing and observation services program is a requirement for the provided foundation design data to be applicable. The following aspects of the program should be performed by the geotechnical consultant:

- ❑ Review of the finalized Grading Plan and Servicing 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 used.
- ❑ 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 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

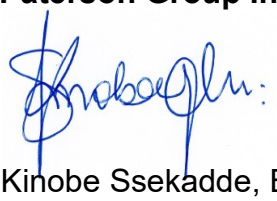
The recommendations provided herein are in accordance with the present understanding of the project. Paterson requests permission to review the recommendations when the drawings and specifications are completed.

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 Richcraft Homes Ltd., 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.**



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**Report Distribution:**

- ❑ Richcraft Homes Ltd. (e-mail Copy)
- ❑ Paterson Group (1 Copy)

# APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ANALYTICAL TESTING RESULTS

# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

955 Borbridge Avenue, Ottawa, Ontario

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 369263.61 **NORTHING:** 5014301.04 **ELEVATION:** 96.04

**PROJECT:** Proposed Development

**BORINGS BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** September 20, 2024

**FILE NO. :** PG7285

**HOLE NO. :** BH 1-24

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N, Nc OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 | REMOULDED SHEAR STRENGTH, Cur (kPa) / PEAK SHEAR STRENGTH, Cu (kPa) 20 40 60 80 | PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | PIEZOMETER CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | 0 | | | | | | | | | 96 |
| **FILL:** Compact, brown silty sand to sandy silt | | | AU 1 | | | | | | | | |
| 0.84m [ 95.20m ] | | | | | | | | | | | |
| **GLACIAL TILL:** Dense to very dense, brown silty sand to sandy silt, with gravel, cobbles and boulders | | 1 | SS 2 | 86 | 11-18-20-50 38 | | | | | | 95 |
| | | 2 | SS 3 | 33 | 5-13-20-16 33 | | | | | | 94 |
| | | | SS 4 | 0 | 18-27-21-20 48 | | | | | | |
| 2.97m [ 93.07m ] | | 3 | | | | | | | | | 93 |
| **GLACIAL TILL:** Very dense, brown silty fine sand with gravel, cobbles and boulders | | | SS 5 | 54 | 8-10-13-20 23 | | | | | | |
| 3.91m [ 92.13m ] | | | SS 6 | 25 | 50-/-/-/ 50/0.1 | | | | | 3.9 m 2024-10-08 | |
| End of Borehole | | 4 | | | | | | | | | 92 |
| Practical refusal to augering at 3.91 m depth | | | | | | | | | | | |
| (GWL at 3.85 m - October 8, 2024) | | 5 | | | | | | | | | 91 |
| | | 6 | | | | | | | | | 90 |
| | | 7 | | | | | | | | | 89 |
| | | 8 | | | | | | | | | |

# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

955 Borbridge Avenue, Ottawa, Ontario

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 369220.51 **NORTHING:** 5014327.98 **ELEVATION:** 96.65

**PROJECT:** Proposed Development

**BORINGS BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** September 20, 2024

**FILE NO. :** PG7285

**HOLE NO. :** BH 2-24

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N, Nc OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / ▵ REMOULDED SHEAR STRENGTH, Cur (kPa) / ▲ PEAK SHEAR STRENGTH, Cu (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | PIEZOMETER CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | |
| **FILL:** Compact, brown silty fine sand to sandy silty, with gravel, cobbles and boulders, trace topsoil | | 0 | AU 1 | | | | | | 96 |
| 0.69m [ 95.96m ] | | | | | | | | | |
| **GLACIAL TILL:** Dense, brown silty sand to sandy silt, with gravel, cobbles and boulders | | 1 | SS 2 | 60 | 11-11-50-/ 61/0.08 | | | | 95 |
| | | 2 | SS 3 | 50 | 16-27-22-19 49 | | | | 94 |
| | | | SS 4 | 75 | 5-17-19-14 36 | | | | 93 |
| 2.97m [ 93.68m ] | | 3 | | | | | | | |
| **GLACIAL TILL:** Dense to compact, brown silty fine sand, with gravel, cobble sand boulders | | | SS 5 | 62 | 6-13-18-20 31 | | | | 92 |
| | | 4 | SS 6 | 62 | 6-10-12-10 22 | | | 4.4 m 2024-10-08 | |
| - Trace clay by 5.03 m depth<br>- Greish by 5.03 m depth | | 5 | SS 7 | 54 | 5-7-10-6 17 | | | | 91 |
| 5.87m [ 90.78m ] | | | SS 8 | 75 | 6-8-11-50 19 | | | | 90 |
| End of Borehole<br><br>Practical refusal to augering at 5.87 m depth<br><br>(GWL at 4.43 m - October 8, 2024) | | 6 | | | | | | | 89 |
| | | 7 | | | | | | | |
| | | 8 | | | | | | | |

# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

955 Borbridge Avenue, Ottawa, Ontario

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 369200.67 **NORTHING:** 5014388.08 **ELEVATION:** 96.88

**PROJECT:** Proposed Development

**BORINGS BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** September 20, 2024

**FILE NO. :** PG7285

**HOLE NO. :** BH 3-24

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N, Nc OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / △ REMOULDED SHEAR STRENGTH, Cur (kPa) ▲ PEAK SHEAR STRENGTH, Cu (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | PIEZOMETER CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | |
| **GLACIAL TILL:** Very dense, brown silty fine sand to sandy silt, with gravel, cobbles and boulders | | 0 | AU 1 | | | | | | 96 |
| | | 1 | SS 2 | 79 | 7-34-27-26 61 | | | | 95 |
| | | 2 | SS 3 | 71 | 10-34-30-23 64 | | | | 94 |
| 2.21m [ 94.67m ] | | | | | | | | | |
| **GLACIAL TILL:** Compact to dense, brown silty fine sand | | 3 | SS 4 | 71 | 6-11-17-16 28 | | | | 93 |
| | | 4 | SS 5 | 58 | 8-13-22-21 35 | | | | 92 |
| 4.50m [ 92.38m ] | | | SS 6 | 75 | 5-8-13-16 21 | | | 5.1 m 2024-10-08 | |
| **GLACIAL TILL:** Compact, grey silty fine sand to sandy silt | | 5 | SS 7 | 67 | 7-8-6-7 14 | | | | 91 |
| 5.23m [ 91.65m ] | | | | | | | | | |
| End of Borehole | | 6 | | | | | | | 90 |
| Practical refusal to augering at 5.23 m depth | | 7 | | | | | | | 89 |
| (GWL at 5.10 m - October 8, 2024) | | 8 | | | | | | | |

# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

955 Borbridge Avenue, Ottawa, Ontario

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 369307.71 **NORTHING:** 5014393.21 **ELEVATION:** 96.19

**PROJECT:** Proposed Development

**BORINGS BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** September 20, 2024

**FILE NO. :** PG7285

**HOLE NO. :** BH 4-24

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N, Nc OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / ∆ REMOULDED SHEAR STRENGTH, Cur (kPa) ▲ PEAK SHEAR STRENGTH, Cu (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | PIEZOMETER CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | 0 | | | | | | | 96 |
| **FILL:** Brown silty clay, trace sand and gravel | | | AU 1 | | | | | | |
| 1.07m [ 95.12m ] | | 1 | SS 2 | 0 | 14-27-25-20 52 | | | | 95 |
| **GLACIAL TILL:** Very dense, brown silty fine sand to sandy silt, with gravel, cobbles and boulders | | | SS 3 | 88 | 13-50-/-/ 50/0.1 | | | | |
| | | 2 | SS 4 | 71 | 6-16-16-9 32 | | | | 94 |
| - Trace clay at 3.05 m depth | | 3 | SS 5 | 96 | 5-5-7-10 12 | | | | 93 |
| | | 4 | SS 6 | 46 | 3-13-18-16 31 | | | | 92 |
| 4.50m [ 91.69m ] | | | | | | | | 4.6 m 2024-10-08 | |
| **GLACIAL TILL:** Loose, grey silty fine to medium sand, trace gravel | | 5 | SS 7 | 42 | 3-3-3-8 6 | | | | 91 |
| 5.26m [ 90.93m ] | | | | | | | | | |
| **GLACIAL TILL:** Very dense, grey silty fine sand, with gravel, occasional cobbles and boulders, trace clay | | | SS 8 | 72 | 2-37-50-/ 87/0.08 | | | | |
| 5.72m [ 90.47m ] | | 6 | | | | | | | 90 |
| End of Borehole | | | | | | | | | |
| Practical refusal to augering at 5.72 m depth | | 7 | | | | | | | 89 |
| (GWL at 4.63 m - October 8, 2024) | | 8 | | | | | | | |

# patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Development - Riverside South Phase 17**
**Ottawa, Ontario**

**DATUM** Geodetic

**REMARKS**

**BORINGS BY** CME-55 Low Clearance Drill **DATE** August 10, 2022

**FILE NO.** PG5131

**HOLE NO.** BH 2-22

| 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 | 96.50 | | |
| **TOPSOIL** 0.33 | | | | | | | | | |
| **GLACIAL TILL:** Brown silty clay with gravel, trace sand 0.69 | | AU | 1 | | | | | | |
| **GLACIAL TILL:** Very dense, brown silty sand with gravel, cobbles and boulders, trace clay 1.47 | | SS | 2 | 100 | 50+ | 1 | 95.50 | | |
| End of Borehole<br><br>Practical refusal to augering at 1.47m depth. | | | | | | | | | |

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

# patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Development - Riverside South Phase 17**
**Ottawa, Ontario**

**DATUM** Geodetic

**REMARKS**

**BORINGS BY** CME-55 Low Clearance Drill **DATE** August 10, 2022

**FILE NO.** PG5131

**HOLE NO.** BH 2A-22

| 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 | 96.50 | | |
| **OVERBURDEN** | | | | | | | | | |
| 0.69 | | | | | | | | | |
| **GLACIAL TILL:** Very dense, brown silty sand with gravel, cobbles and boulders, trace clay | | SS | 1 | 75 | 50+ | 1 | 95.50 | ○ | |
| | | | | | | 2 | 94.50 | | |
| 2.26 | | | | | | | | | |
| End of Borehole<br><br>Practical refusal to augering at 2.26m depth. | | | | | | | | | |

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

9 Auriga Drive, Ottawa, Ontario K2E 7T9

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Development - Riverside South Phase 17**
**Ottawa, Ontario**

**DATUM** Geodetic

**REMARKS**

**BORINGS BY** CME-55 Low Clearance Drill **DATE** August 10, 2022

**FILE NO.** PG5131

**HOLE NO.** BH 2B-22

| 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 | 96.50 | 20 40 60 80 | |
| **OVERBURDEN** | | | | | | 1 | 95.50 | | |
| | | | | | | 2 | 94.50 | | |
| 2.26 | | | | | | | | | |
| **GLACIAL TILL:** Compact to very dense, grey silty clay with sand, gravel, cobbles and boulders | | SS | 1 | 83 | 23 | 3 | 93.50 | | |
| | | SS | 2 | 83 | 18 | | | | |
| | | SS | 3 | 93 | 50+ | 4 | 92.50 | | |
| 4.22 | | | | | | | | | |
| End of Borehole | | | | | | | | | |
| Practical refusal to augering at 4.22m depth. | | | | | | | | | |
| (GWL @ 2.95m - August 17, 2022) | | | | | | | | | |

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

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Riverside South Development - Phase 17**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5131

**REMARKS**

**HOLE NO.** BH20

**BORINGS BY** CME 55 Power Auger **DATE** January 31, 2020

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 96.34 |
| **TOPSOIL** 0.25 | | AU | 1 | | | | |
| **GLACIAL TILL:** Dense, brown sandy silt, trace clay and gravel | | SS | 2 | 92 | 30 | 1 | 95.34 |
| | | SS | 3 | 0 | 50+ | 2 | 94.34 |
| 2.30 | | | | | | | |
| **GLACIAL TILL:** Brown clayey silt, some sand, trace gravel and cobbles | | SS | 4 | 83 | 36 | 3 | 93.34 |
| 3.05 | | | | | | | |
| **GLACIAL TILL:** Dense, brown sandy silt, trace clay, gravel and cobbles | | SS | 5 | 8 | 17 | | |
| 3.80 | | | | | | 4 | 92.34 |
| **GLACIAL TILL:** Compact to very dense, grey silty sand to sandy silt, trace gravel and cobbles | | SS | 6 | 62 | 28 | | |
| | | SS | 7 | 50 | 36 | 5 | 91.34 |
| | | SS | 8 | 50 | 50+ | | |
| 5.74 | | | | | | | |
| End of Borehole | | | | | | | |
| Practical refusal to augering at 5.74m depth | | | | | | | |
| (GWL @ 2.30m - Feb. 11, 2020) | | | | | | | |

**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

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Development - Riverside South Phase 17-1B**
**Ottawa, Ontario**

**DATUM** Geodetic

**REMARKS**

**BORINGS BY** Excavator **DATE** April 8, 2022

**FILE NO.** PG5131

**HOLE NO.** TP 3-22

| 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 | 96.47 | | |
| | | | | | | 1 | 95.47 | | |
| | | | | | | 2 | 94.47 | | |
| Compact, brown **SILTY SAND,** some gravel, cobbles and boulders, trace clay | | | | | | 3 | 93.47 | | |
| | | | | | | 4 | 92.47 | | |
| | | | | | | 5 | 91.47 | | |
| 5.37 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

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

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Development - Riverside South Phase 17-1B**
**Ottawa, Ontario**

**DATUM** Geodetic

**REMARKS**

**BORINGS BY** Excavator **DATE** April 8, 2022

**FILE NO.** PG5131

**HOLE NO.** TP10-22

| 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 | 95.98 | | |
| **TOPSOIL** 0.36 | | | | | | | | | |
| Compact, brown **SILTY SAND** with gravel, cobbles, trace clay | | | | | | 1 | 94.98 | | |
| | | | | | | 2 | 93.98 | | |
| 2.63 | | | | | | | | | |
| Grey **SILTY CLAY** with gravel, cobbles, some sand, boulders | | | | | | 3 | 92.98 | | |
| 3.98 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

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

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Development - Riverside South Phase 17-1B**
**Ottawa, Ontario**

**DATUM** Geodetic

**REMARKS**

**BORINGS BY** Excavator **DATE** April 8, 2022

**FILE NO.** PG5131

**HOLE NO.** TP11-22

| 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 | 96.26 | 20 40 60 80 | |
| **TOPSOIL** 0.40 | | | | | | | | | |
| Compact, brown **SILTY SAND** with gravel, cobbles, some clay, boulders | | | | | | 1 | 95.26 | | |
| | | | | | | 2 | 94.26 | | |
| 3.10 | | | | | | 3 | 93.26 | | |
| Grey **SILTY CLAY** with gravel, cobbles, some sand and boulders | | | | | | 4 | 92.26 | | |
| | | | | | | 5 | 91.26 | | ▽ |
| 5.26 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 4.9m depth) | | | | | | | | | |
| (Low to moderate groundwater infiltration rate was observed) | | | | | | | | | |

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 relative strength of cohesionless soils is the compactness condition, 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. An SPT N value of "P" denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

| Compactness Condition | '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 shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

| 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, $S_t$, is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

| | |
|---|---|
| Low Sensitivity: | $S_t < 2$ |
| Medium Sensitivity: | $2 < S_t < 4$ |
| Sensitive: | $4 < S_t < 8$ |
| Extra Sensitive: | $8 < S_t < 16$ |
| Quick Clay: | $S_t > 16$ |

## 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 NQ or larger size core. However, it can be used on smaller core sizes, such as BQ, 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, generally recovered using a piston sampler |
| G | - | "Grab" sample from test pit or surface materials |
| AU | - | Auger sample or bulk sample |
| WS | - | Wash sample |
| RC | - | Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits. |

## SYMBOLS AND TERMS (continued)

### PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

| | | |
|---|---|---|
| WC% | - | Natural water 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 at which xx% of the soil, by weight, is of finer grain sizes<br>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 x 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

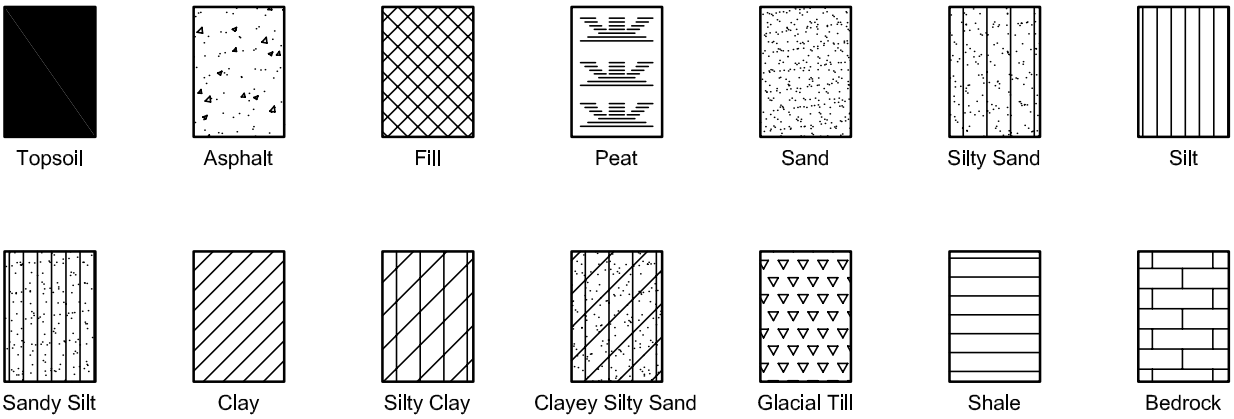
| | | |
|---|---|---|
| $p'_o$ | - | Present effective overburden pressure at sample depth |
| $p'_c$ | - | Preconsolidation pressure of (maximum past pressure on) sample |
| Ccr | - | Recompression index (in effect at pressures below $p'_c$) |
| Cc | - | Compression index (in effect at pressures above $p'_c$) |
| 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. |

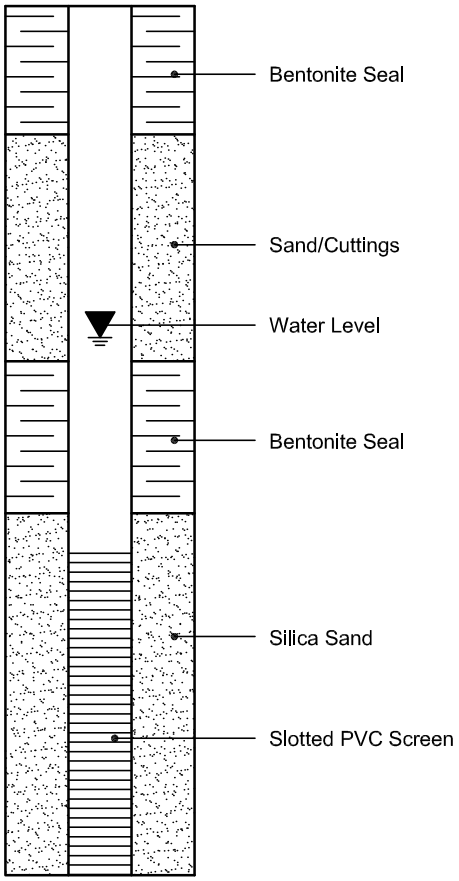
# SYMBOLS AND TERMS (continued)

## STRATA PLOT

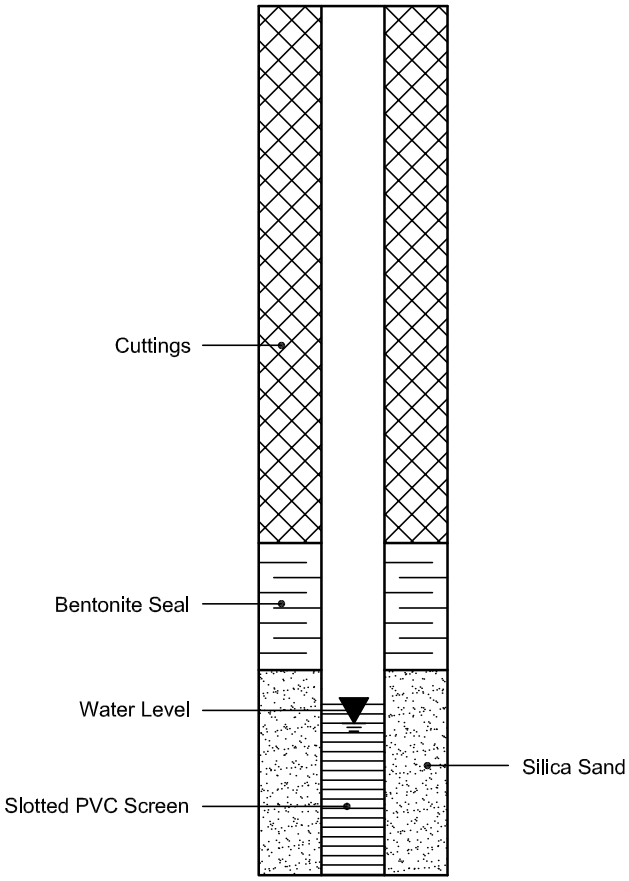



## MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION




PIEZOMETER CONSTRUCTION



Certificate of Analysis

Report Date: 30-Sep-2024

**Client:** **Paterson Group Consulting Engineers (Ottawa)**

Order Date: 24-Sep-2024

**Client PO: 61357**

**Project Description: PG7285**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Client ID:** | BH2-24 SS3 | - | - | - | | |
| | **Sample Date:** | 23-Sep-24 09:00 | - | - | - | - | - |
| | **Sample ID:** | 2439235-01 | - | - | - | | |
| | **Matrix:** | Soil | - | - | - | | |
| | **MDL/Units** | | | | | | |
| **Physical Characteristics** | | | | | | | |
| % Solids | 0.1 % by Wt. | 93.0 | - | - | - | - | - |
| **General Inorganics** | | | | | | | |
| pH | 0.05 pH Units | 7.88 | - | - | - | - | - |
| Resistivity | 0.1 Ohm.m | 81.2 | - | - | - | - | - |
| **Anions** | | | | | | | |
| Chloride | 10 ug/g | <10 | - | - | - | - | - |
| Sulphate | 10 ug/g | <10 | - | - | - | - | - |

# APPENDIX 2

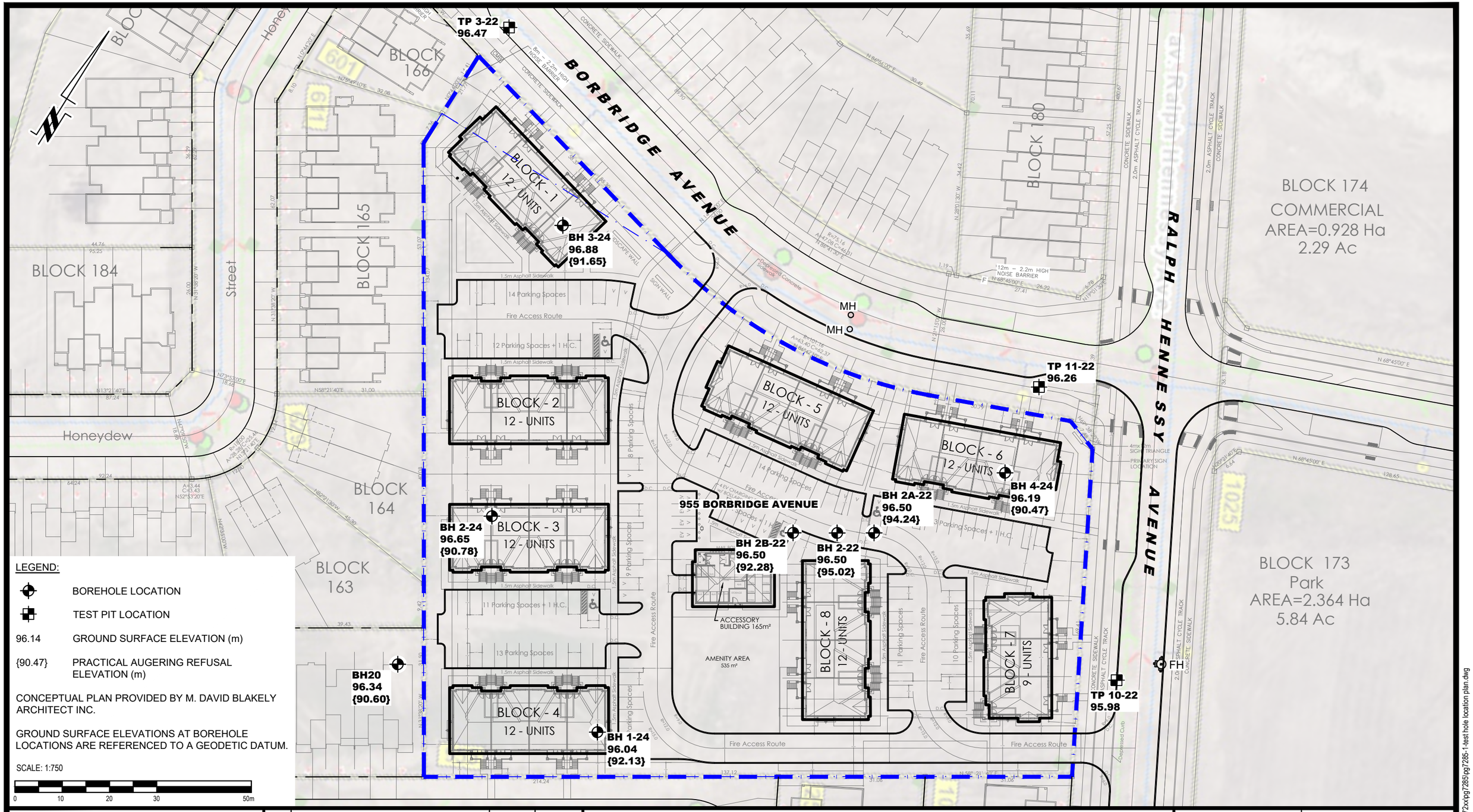
FIGURE 1 - KEY PLAN

DRAWING PG7285-1 - TEST HOLE LOCATION PLAN


# FIGURE 1

## KEY PLAN

PATERSON GROUP




LEGEND:

- BOREHOLE LOCATION
- TEST PIT LOCATION
- 96.14 GROUND SURFACE ELEVATION (m)
- {90.47} PRACTICAL AUGERING REFUSAL ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY M. DAVID BLAKELY ARCHITECT INC.

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:750

0 10 20 30 50m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |

RICHCRAFT HOMES LTD.
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
955 BORBRIDGE AVENUE
OTTAWA, ONTARIO

Title:

# TEST HOLE LOCATION PLAN

| | |
|---|---|
| Scale: 1:750 | Date: 10/2024 |
| Drawn by: YA | Report No.: PG7285-1 |
| Checked by: KS | Dwg. No.: PG7285-1 |
| Approved by: SD | Revision No.: |

11x17

p:\autocad drawings\geotechnical\pg72xx\pg7285\pg7285-1-test hole location plan.dwg