Geotechnical Engineering

Environmental Engineering

Hydrogeology

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Archaeological Services

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# Geotechnical Investigation

Proposed Warehouse Complex
Borrisokane Road
Ottawa, Ontario

Prepared For

Caivan Greenbank North Inc.

February 10, 2020

Report PG5155-1 Revision 1

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# Appendices

# 1.0 Introduction

Paterson Group (Paterson) was commissioned by Caivan Greenbank North Inc. to conduct a geotechnical investigation for the proposed warehouse complex to be located along Borrisokane Road at the former Costello Pit, in the City of Ottawa, Ontario (refer to Figure 1 - Key Plan in Appendix 2 of this report).

The objectives of the investigation were to:

- ❏ Determine the subsoil and groundwater conditions at this site by means of test holes.
- ❏ Provide geotechnical recommendations for 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.

# 2.0 Proposed Project

Based on the available drawings, it is our understanding that the proposed building will consist of a warehouse building with an office area. It is anticipated that associated paved access lanes, vehicle parking areas and landscaped areas will surround the proposed building.

# 3.0 Method of Investigation

## 3.1 Field Investigation

### Field Program

The field program for the investigation was conducted in November 2019 and January 2020. The field program consisted of advancing a total of 7 boreholes to a maximum depth of 31 m below existing ground surface and 21 test pits completed by a hydraulic shovel. 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 locations of the test holes are shown on Drawing PG5155-1 - Test Hole Location Plan included in Appendix 2.

The boreholes were completed with a track-mounted auger drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of our personnel under the direction of a senior engineer. The test hole procedure consisted of augering to the required depths at the selected locations, and sampling and testing the overburden.

### Sampling and In Situ Testing

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

A 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 overburden thickness was evaluated by a dynamic cone penetration test (DCPT) at 5 borehole locations. The DCPT consists of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

The subsurface conditions observed in the test holes were recorded in detail in the field. The soil profiles are presented on 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 month after issuance of this report. They will then be discarded unless we are directed otherwise.

## 3.2 Field Survey

The test hole locations were selected by Paterson personnel in a manner to provide general coverage of the proposed development, taking into consideration site features.

The borehole locations and ground surface elevations were surveyed by JD Barnes and the ground surface elevations are referenced to a geodetic datum. The test hole locations are presented on Drawing PG5155-1 - 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.

# 4.0 Observations

## 4.1 Surface Conditions

The subject site was formerly being used as part of a sand extraction operation. Various fill piles, excavated areas, gravel roads, as well as scattered construction debris are located across the site. Also, the ground surface elevation across the majority of the site is well above the ground surface elevation of the adjacent properties.

The site is bordered to the north by a future development lands, to the south by undeveloped land, to the west by Borrisokane Road and to the east by a future residential development.

## 4.2 Subsurface Profile

**Overburden**

Generally, the subsurface profile encountered at the test hole locations consists of a 1 to 9 m deep fill layer overlying a deep deposit of brown silty sand, an intermittent layer of silty clay and/or brown sand with varying amounts of gravel, cobbles and boulders. Stiff to very stiff brown to grey silty clay was encountered below the silty sand layer and/or fill layer at BH 11-19 to BH 14-19 and BH 16-19.

BH 14-19 was extended to a 31 m depth and extended through a 9 m deep fill layer over a stiff silty clay followed by a compact to dense sand deposit and a 7 m deep stiff silty clay layer over a sandy silt to sand to silt layer over a very dense glacial till deposit from 27 to below 31 m depth.

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

**Bedrock**

Based on available geological mapping, dolomite of the Oxford formation is present in this area with an overburden drift thickness ranging between 15 to 25 m.

## 4.3 Groundwater

Groundwater levels were measured in the standpipes at the borehole locations on November 29, 2019. The measured groundwater level (GWL) readings are presented in Table 1 below. It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater level could vary at the time of construction.

**Table 1 - Summary of Groundwater Levels**

| Borehole Number | Ground Surface Elev. (m) | Measured Groundwater Level | | Recording Date |
|---|---|---|---|---|
| | | Depth (m) | Elevation (m) | |
| BH 9-19 | 104.25 | 4.01 | 100.24 | November 29, 2019 |
| BH 10-19 | 104.36 | Blocked | - | November 29, 2019 |
| BH 11-19 | 104.17 | 3.90 | 100.27 | November 29, 2019 |
| BH 12-19 | 105.09 | Blocked | - | November 29, 2019 |
| BH 13-19 | 105.43 | Blocked | - | November 29, 2019 |
| BH 14-19 | 104.42 | Blocked | - | November 29, 2019 |
| BH 15-19 | 105.02 | - | - | November 29, 2019 |
| BH 16-19 | 105.31 | 6.02 | 99.29 | November 29, 2019 |
| BH 17-19 | 105.30 | 6.73 | 98.57 | November 29, 2019 |
| BH 18-19 | 103.24 | 4.03 | 99.21 | November 29, 2019 |
| BH 19-19 | 104.14 | 3.69 | 100.45 | November 29, 2019 |
| BH 20-19 | 100.24 | 3.83 | 96.41 | November 29, 2019 |

# 5.0 Discussion

## 5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is adequate for the proposed building. It is expected that the proposed building will be founded by shallow conventional footings placed over an undisturbed, compact silty sand bearing surface or an engineered fill pad placed over an approved fill subgrade.

To adequately distribute the foundation loads in areas where the existing fill is encountered below the building footprint, a woven geotextile liner, such as Terratrack 200 or equivalent, should be placed 600 mm below design underside of footing level and extend at least 2 m horizontally beyond the footing face. A biaxial geogrid, such as Terrafix TBX2500 or equivalent, should be placed over the woven geotextile liner. A minimum 600 mm thick pad, consisting of a Granular B Type II, compacted to 98% of its SPMDD should be placed up to design underside of footing level. Prior to placement of the abovenoted engineered fill pad, it is recommended that a proof-rolling program be completed by a vibratory roller making several passes and approved by Paterson personnel over the sub-excavated area below the proposed footings.

For areas where a fill layer is encountered below the granular layer for the floor slab, it is recommended to sub-excavate 500 mm below the underside of floor slab granulars and place a woven geotextile liner, such as Terratrack 200W or equivalent, and a biaxial geogrid, such as Terrafix TBX2500 or equivalent. It is recommended that a proof-rolling program be completed by a vibratory roller making several passes and approved by Paterson personnel prior to placement of the geotextile liner and biaxial geogrid. Any poor performing areas should be removed and reinstated with a select subgrade fill compacted to 98% of its SPMDD under dry and above freezing temperatures.

The proof-rolling program should also be completed across paved areas to ensure that any poor performing soils are removed prior to pavement structure placement.

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

## 5.2 Site Grading and Preparation

### Stripping Depth

Topsoil and any fill, containing significant amounts of deleterious or organic materials, should be stripped from under the proposed building, paved areas, pipe bedding and other settlement sensitive structures.

### Fill Placement

Fill used for grading beneath the building footprint, unless otherwise specified, should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II or select subgrade fill. The fill 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 heavy vibratory compaction equipment. Fill placed beneath the building area should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil can be used as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. The site-generated silty sand material may be used to build up the subgrade level for areas to be paved. This material, under dry and above freezing conditions, should be placed in maximum 300 mm lifts and compacted to a minimum density of 95% of its SPMDD.

Boulders larger than 300 mm in their longest dimensions should be removed from the sand fill prior to being reused.

## 5.3 Foundation Design

Strip footings, up to 3 m wide, and pad footings, up to 5 m wide, placed over an engineered granular fill pad as described in Subsection 5.1 over an approved fill or directly over an undisturbed, stiff silty clay or compact silty sand bearing surface can be designed using a bearing resistance value at Serviceability Limit State (SLS) of **100 kPa** and a factored bearing resistance values at Ultimate Limit States (ULS) of **200 kPa**, incorporating a geotechnical resistance factor of 0.5.

An undisturbed soil 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 the placement of concrete for footings.

### Settlement

Footings designed using the bearing resistance value at SLS provided herein 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. Adequate lateral support is provided to a stiff silty clay, compact silty sand or approved fill bearing medium when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V (or flatter) passes only through in situ soil or engineered fill.

### Permissible Grade Raise Restriction

Due to the presence of a silty clay layer, a permissible grade raise recommendation of 104.0 m (geodetic elevation) is required for settlement sensitive structures.

## 5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Site Class D** for the shallow foundations considered at this site. Based on the current information, including the level of groundwater table and compactness of the underlying sand layer, the soil underlying the subject site is 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 Slab-on-Grade Construction

With the removal of all topsoil and fill, containing deleterious or organic materials, within the footprint of the proposed building, the native soil and/or approved fill pad will be considered to be an acceptable subgrade surface on which to commence backfilling for the floor slab. The upper 300 mm of sub-slab fill should consist of an OPSS Granular A crushed stone. All backfill material within the footprint of the proposed building should be placed in maximum 300 mm thick loose lifts and compacted to at least 98% of its SPMDD.

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

## 5.6 Pavement Structure

### Pavement Structures

Car only parking areas, heavy truck parking areas and access lanes are anticipated at this site. The proposed pavement structures are presented in Tables 2 and 3.

**Table 2 - Recommended Pavement Structure - 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 Access Lanes and Heavy Truck Parking Areas**

| 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 |
| SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill | |

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with an 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 98% of the material's SPMDD using suitable vibratory equipment.

# 6.0 Design and Construction Precautions

## 6.1 Foundation Drainage and Backfill

### Foundation Drainage

A perimeter foundation drainage system is recommended for the proposed building. A perimeter drainage system is an effective way to limit frost heave issues with sidewalks or wheelchair ramps adjacent to the proposed building. The system should consist of a 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 10 mm clear crushed stone, placed around the exterior perimeter of the structure at least 1 m below finished grade to permit 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 required to be insulated against the deleterious effects of frost action. A minimum of 1.5 m of soil cover should be provided for adequate frost protection of heated structures.

Exterior unheated footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of the heated 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 side slopes of excavations at the site should be either cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is expected that sufficient room will be available for the excavation to be undertaken by open-cut methods.

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be excavated at 1H:1V or shallower. The shallower slope is required for excavation below groundwater level.

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.

A trench box is recommended to protect personnel working in trenches with steep or vertical sides. Services are expected to be installed by "cut and cover" methods and excavations should not remain 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.

At least 150 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes. 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.

It should generally be possible to re-use the site materials above the cover material if the 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) and above the cover material should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 225 mm thick loose lifts and compacted to a minimum of 95% of the material standard Proctor maximum dry density.

## 6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavations should be controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations. 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.

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) Category 3 may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum of 4 to 5 months should be allowed for completion of the PTTW Category 3 application package and issuance of the permit by the MECP.

For typical ground or surface water volumes being pumped during the construction phase, between 50,000 to 400,000 L/day, it's 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 mostly 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, tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

The trench excavations should be carried out in a manner to avoid the introduction of frozen materials, snow or ice into the trenches.

# 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:

- ❑ Observation of all bearing surfaces prior to the placement of concrete.
- ❑ Review ground improvement program from a geotechnical perspective.
- ❑ 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 request, following the completion of a satisfactory materials testing and observation program by the geotechnical consultant.

# 8.0 Statement of Limitations

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

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

The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on 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 Caivan Greenbank North Inc. or their agents is not authorized without review by Paterson for the applicability of our recommendations to the altered use of the report.

**Paterson Group Inc.**

David J. Gilbert, P.Eng.

# APPENDIX 1

**SOIL PROFILE AND TEST DATA SHEETS**

**SYMBOLS AND TERMS**

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH 9-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 14

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 104.25 |
| | | AU | 1 | | | | |
| **FILL:** Brown silty clay with sand and gravel, trace asphalt and organics | | SS | 2 | 79 | 29 | 1 | 103.25 |
| | | SS | 3 | 50 | 65 | 2 | 102.25 |
| | | SS | 4 | 46 | 7 | | |
| 2.97 | | | | | | 3 | 101.25 |
| **FILL:** Brown sand with gravel, trace clay | | SS | 5 | 17 | 5 | | |
| | | SS | 6 | 25 | 5 | 4 | 100.25 |
| 4.50 | | | | | | | |
| | | SS | 7 | 38 | 3 | 5 | 99.25 |
| **FILL:** Brown silty clay, some sand, gravel, trace organics | | SS | 8 | 75 | 5 | | |
| | | SS | 9 | 58 | 9 | 6 | 98.25 |
| 6.70 | | | | | | | |
| End of Borehole | | | | | | | |
| (GWL @ 4.01m - Nov. 29, 219) | | | | | | | |

**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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

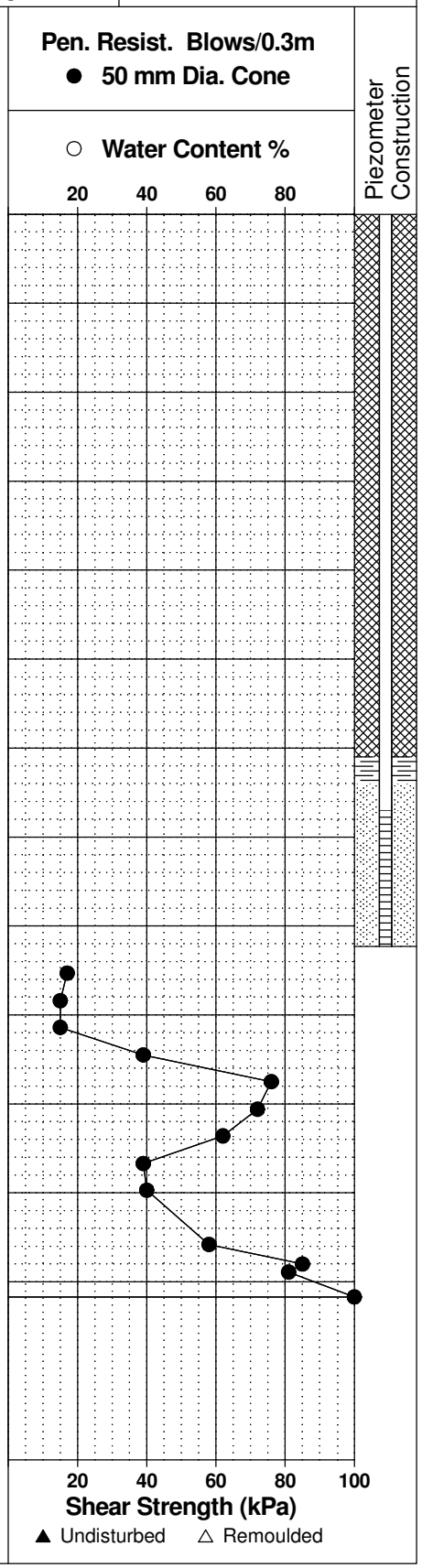
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH10-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 13

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 104.36 |
| **FILL:** Brown silty sand with gravel | | AU | | 1 | | | |
| | | SS | 2 | 50 | 20 | 1 | 103.36 |
| 1.45 | | | | | | | |
| **FILL:** Brown sand, some gravel, trace clay, asphalt and cobbles | | SS | 3 | 58 | 27 | 2 | 102.36 |
| | | SS | 4 | 46 | 13 | | |
| | | SS | 5 | 58 | 18 | 3 | 101.36 |
| | | SS | 6 | 29 | 14 | 4 | 100.36 |
| 4.50 | | | | | | | |
| **FILL:** Brown silty clay, some sand and gravel, trace asphalt and organics | | SS | 7 | 33 | 5 | 5 | 99.36 |
| | | SS | 8 | 42 | 19 | | |
| | | SS | 9 | 50 | 5 | 6 | 98.36 |
| | | SS | 10 | 38 | 5 | 7 | 97.36 |
| | | SS | 11 | 58 | 11 | 8 | 96.36 |
| 8.23 | | | | | | | |
| Dynamic Cone Penetration Test commenced at 8.23m depth. | | | | | | 9 | 95.36 |
| | | | | | | 10 | 94.36 |
| | | | | | | 11 | 93.36 |
| 12.17 | | | | | | 12 | 92.36 |
| End of Borehole<br>Practical DCPT refusal at 12.17m depth<br><br>(Piezometer dry/blocked at 4.58m depth - Nov. 29, 2019) | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

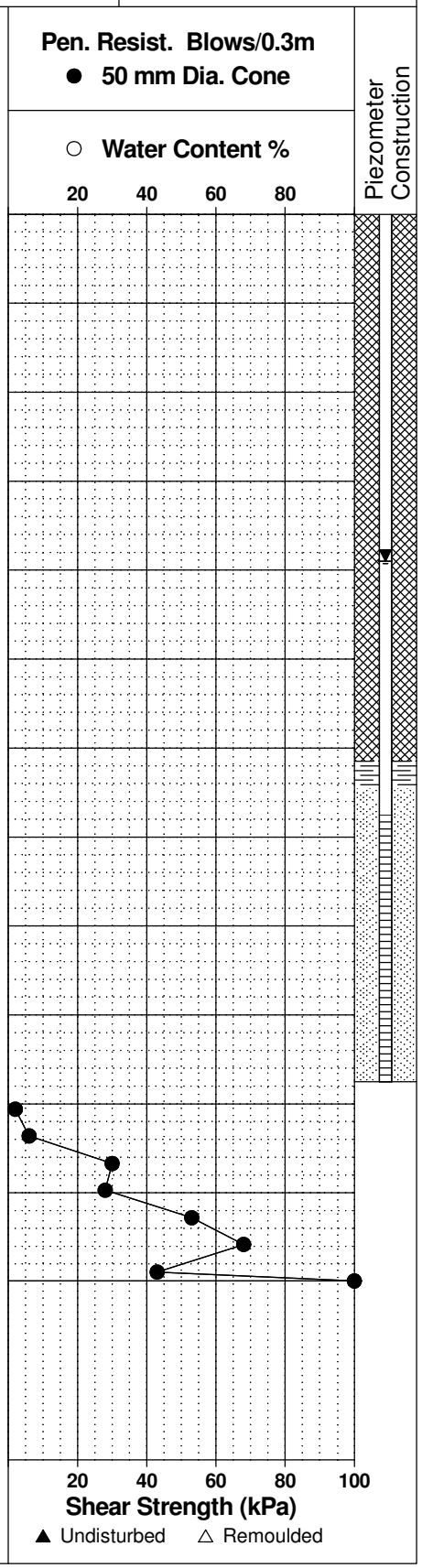
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH11-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 14

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 104.17 |
| **FILL:** Brown sand with gravel and cobbles, trace clay and organics | | AU | 1 | | | | |
| 0.69 | | | | | | | |
| **FILL:** Brown silty clay, some sand, gravel and organics | | SS | 2 | 54 | 31 | 1 | 103.17 |
| 1.45 | | | | | | | |
| **FILL:** Brown sand, some gravel, trace clay, gravel, organics and asphalt | | SS | 3 | 46 | 14 | 2 | 102.17 |
| | | SS | 4 | 29 | 13 | | |
| 2.97 | | | | | | 3 | 101.17 |
| | | SS | 5 | 29 | 7 | | |
| | | SS | 6 | 62 | 8 | 4 | 100.17 |
| **FILL:** Brown silty clay, some sand and gravel, trace organics and asphalt | | SS | 7 | 33 | 10 | 5 | 99.17 |
| | | SS | 8 | 58 | 11 | | |
| 6.01 | | | | | | 6 | 98.17 |
| | | SS | 9 | 42 | 12 | | |
| **FILL:** Brown silty sand, some clay and gravel, trace asphalt and construction debris | | SS | 10 | 0 | 10 | 7 | 97.17 |
| | | SS | 11 | 8 | 12 | 8 | 96.17 |
| 8.30 | | | | | | | |
| | | SS | 12 | 71 | 4 | 9 | 95.17 |
| Brown **SILTY CLAY to SILTY SAND,** some gravel, trace organics | | SS | 13 | 75 | 2 | | |
| 9.75 | | | | | | 10 | 94.17 |
| Dyanmic Cone Penetration Test commenced at 9.75m depth. | | | | | | 11 | 93.17 |
| 11.99 | | | | | | | |
| End of Borehole | | | | | | | |
| Practical DCPT refusal at 11.99m depth. | | | | | | | |
| (GWL @ 3.90m - Nov. 29, 219) | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

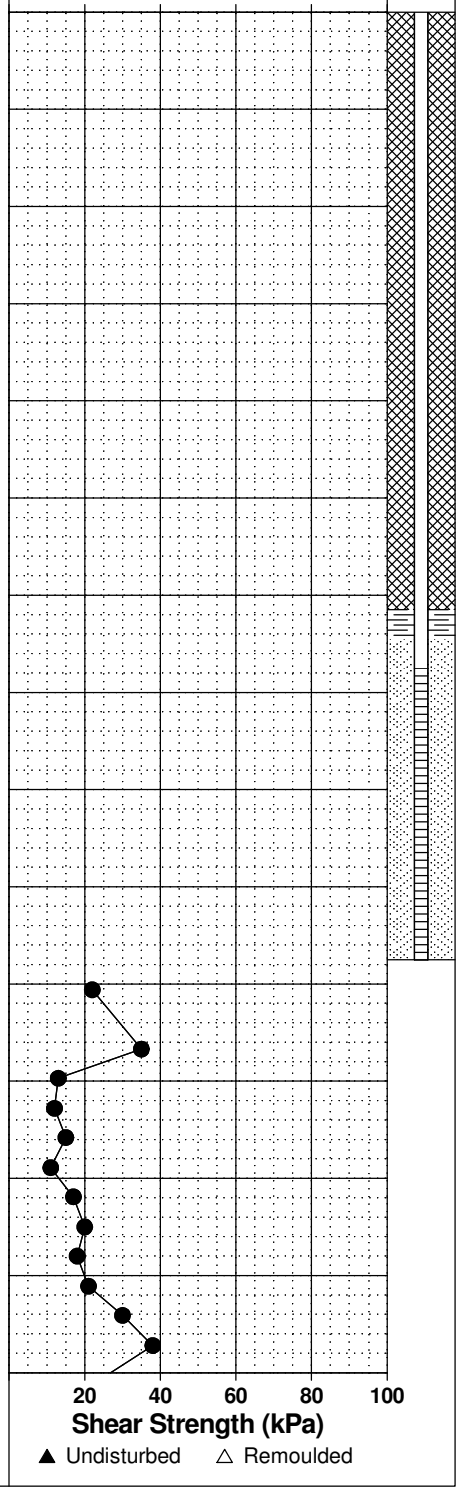
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH12-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 14

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 105.09 |
| **FILL:** Brown sand, trace gravel and organics | | AU | 1 | | | | |
| 0.69 | | | | | | 1 | 104.09 |
| **FILL:** Brown silty clay, some sand and gravel, trace organics and asphalt | | SS | 2 | 46 | 7 | | |
| | | SS | 3 | 12 | 13 | 2 | 103.09 |
| 2.21 | | SS | 4 | 21 | 20 | | |
| | | SS | 5 | 79 | 14 | 3 | 102.09 |
| **FILL:** Brown sand with gravel, trace clay and organics | | SS | 6 | 88 | 31 | 4 | 101.09 |
| | | SS | 7 | 33 | 36 | | |
| 5.26 | | SS | 8 | 83 | 7 | 5 | 100.09 |
| **FILL:** Brown silty clay, some to trace sand and gravel | | SS | 9 | 100 | 2 | 6 | 99.09 |
| - grey by 6.0m depth | | SS | 10 | 100 | 2 | 7 | 98.09 |
| - brown/black by 6.8m depth | | SS | 11 | 100 | 2 | 8 | 97.09 |
| 8.31 | | | | | | | |
| Grey **SILTY CLAY,** trace sand | | SS | 12 | 92 | 13 | 9 | 96.09 |
| 9.07 | | | | | | | |
| Loose, brown **SAND** | | SS | 13 | 62 | 4 | 10 | 95.09 |
| 9.75 | | | | | | | |
| Dynamic Cone Penetration Test commenced at 9.75m depth. | | | | | | 11 | 94.09 |
| | | | | | | 12 | 93.09 |
| | | | | | | 13 | 92.09 |
| | | | | | | 14 | 91.09 |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

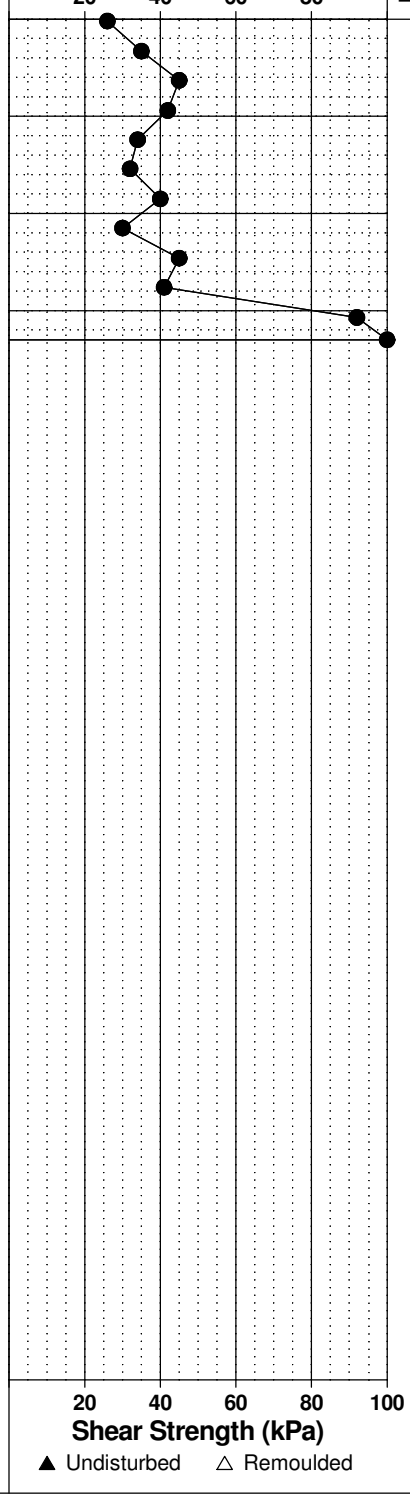
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH12-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 14

| 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** | | | | | | 14 | 91.09 | | |
| | | | | | | 15 | 90.09 | | |
| | | | | | | 16 | 89.09 | | |
| | | | | | | 17 | 88.09 | | |
| 17.30 | | | | | | | | | |
| End of Borehole | | | | | | | | | |
| Practical DCPT refusal at 17.30m depth. | | | | | | | | | |
| (Piezometer dry/blocked at 2.84m depth - Nov. 29, 2019) | | | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH13-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 15

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 105.43 |
| | | AU | 1 | | | | |
| | | SS | 2 | 42 | 24 | 1 | 104.43 |
| | | SS | 3 | 54 | 15 | 2 | 103.43 |
| **FILL:** Brown and, some gravel, trace clay, organics and asphalt | | SS | 4 | 75 | 22 | 3 | 102.43 |
| | | SS | 5 | 75 | 48 | | |
| | | SS | 6 | 54 | 33 | 4 | 101.43 |
| | | SS | 7 | 29 | 16 | 5 | 100.43 |
| 5.26 | | | | | | | |
| Brown/black **SILTY CLAY,** trace sand | | SS | 8 | 100 | 2 | 6 | 99.43 |
| | | SS | 9 | 100 | 2 | | |
| 6.70 | | | | | | | |
| End of Borehole | | | | | | | |
| (Piezometer dry/blocked at 5.04m depth - Nov. 29, 2019) | | | | | | | |

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

20 40 60 80

Piezometer Construction

20 40 60 80 100

**Shear Strength (kPa)**

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH14-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 January 15

| 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 | 104.42 | | |
| **FILL:** Brown sand, some gravel, some to trace clay | | AU | 1 | | | | | | |
| 1.45 | | SS | 2 | 58 | 50 | 1 | 103.42 | | |
| | | SS | 3 | 96 | 13 | 2 | 102.42 | | |
| | | SS | 4 | 54 | 6 | | | | |
| **FILL:** Brown silty clay with sand and gravel, trace organics | | SS | 5 | 42 | 4 | 3 | 101.42 | | |
| | | SS | 6 | 54 | 4 | 4 | 100.42 | | |
| | | SS | 7 | 46 | 2 | 5 | 99.42 | | |
| 6.02 | | SS | 8 | 25 | 3 | 6 | 98.42 | | |
| **FILL:** Brown sand with clay, some gravel, trace organics | | SS | 9 | 50 | 15 | | | | |
| 7.54 | | SS | 10 | 0 | 13 | 7 | 97.42 | | |
| **FILL:** Brown silty clay with sand, some gravel and organics | | SS | 11 | 54 | 15 | 8 | 96.42 | | |
| 8.41 | | SS | 12 | 25 | 7 | 9 | 95.42 | | |
| **FILL:** Brown sand with gravel | | SS | 13 | 21 | 8 | | | | |
| 9.07 | | SS | 14 | | 13 | 10 | 94.42 | | |
| Brown **SILTY CLAY** with sand, trace gravel | | SS | 15 | 654 | 14 | 11 | 93.42 | | |
| 10.59 | | SS | 16 | 79 | 37 | | | | |
| Compact to dense, brown **SAND** | | SS | 17 | 62 | 40 | 12 | 92.42 | | |
| - some silt by 12.1m depth | | SS | 18 | 71 | 42 | 13 | 91.42 | | |
| - trace clay by 13.6m depth | | | | | | 14 | 90.42 | | |

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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH14-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 January 15

| 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** | | | | | | | | | |
| 14.40 | | SS | 19 | 83 | 30 | 14 | 90.42 | | |
| Grey **SILTY CLAY,** trace sand and gravel | | SS | 20 | 75 | 9 | 15 | 89.42 | | |
| | | SS | 21 | 88 | 3 | 16 | 88.42 | | |
| | | SS | 22 | 96 | 5 | 17 | 87.42 | | |
| | | SS | 23 | 100 | 7 | | | | |
| | | SS | 24 | 100 | 6 | 18 | 86.42 | | |
| | | SS | 25 | 100 | 7 | 19 | 85.42 | | |
| | | SS | 26 | 100 | 6 | 20 | 84.42 | | |
| 21.54 | | SS | 27 | 0 | 50+ | 21 | 83.42 | | |
| Dense to very dense, grey **SANDY SILT** | | SS | 28 | 54 | 48 | 22 | 82.42 | | |
| 23.93 | | | | | | 23 | 81.42 | | |
| Very dense, brown **SAND,** some silt, trace clay and gravel | | SS | 29 | 75 | 54 | 24 | 80.42 | | |
| 25.45 | | | | | | 25 | 79.42 | | |
| Very dense, grey **SILT,** some sand | | SS | 30 | 42 | 51 | 26 | 78.42 | | |
| 26.97 | | | | | | 27 | 77.42 | | |
| **GLACIAL TILL:** Very dense, grey sand, some clay, gravel, cobbles and boulders | | SS | 31 | 50 | 61 | 28 | 76.42 | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

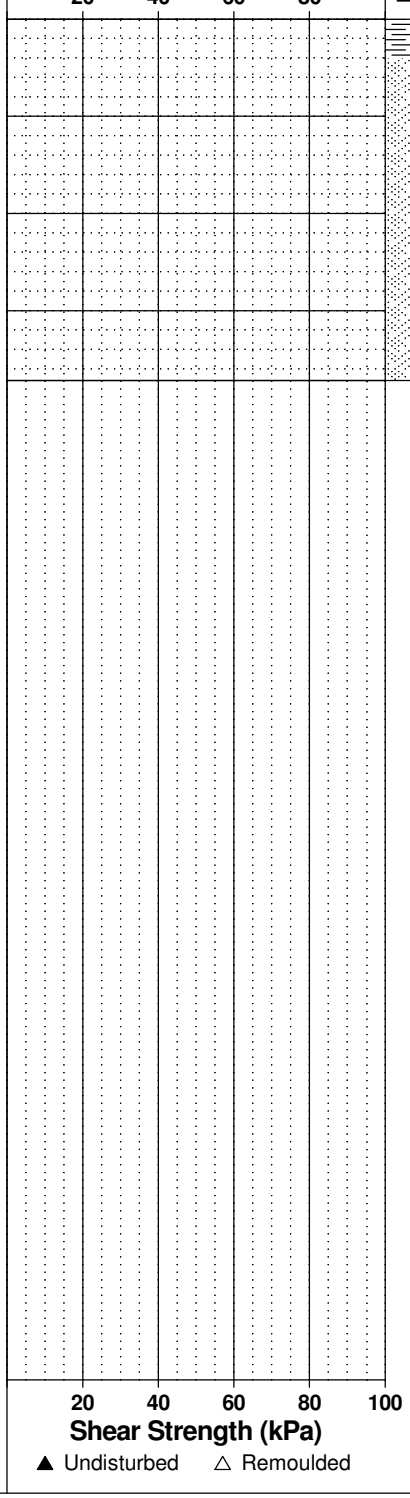
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH14-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 January 15

| 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** | | | | | | | | | |
| | | SS | 32 | 50 | 50+ | 28 | 76.42 | | |
| **GLACIAL TILL:** Very dense, grey sand, some clay, gravel, cobbles and boulders | | RC | 1 | 100 | | 29 | 75.42 | | |
| | | RC | 2 | 27 | | 30 | 74.42 | | |
| 31.72 | | | | | | 31 | 73.42 | | |
| End of Borehole | | | | | | | | | |
| (Piezometer dry/blocked at 2.07m depth - Nov. 29, 2019) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH15-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 15

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) | Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % | Piezometer Construction |
|---|---|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | | | |
| **TOPSOIL** 0.18 | | AU | 1 | | | 0 | 105.02 | | |
| **FILL:** Brown sand, some gravel, trace silty clay | | SS | 2 | 29 | 12 | 1 | 104.02 | | |
| 1.45 | | SS | 3 | 44 | 50+ | 2 | 103.02 | | |
| **FILL:** Brown silty clay, some sand and gravel, trace organcis | | G | 4 | | | 3 | 102.02 | | |
| 2.97 | | SS | 5 | 100 | 11 | 4 | 101.02 | | |
| **FILL:** Brown silty sand, some sand | | SS | 6 | 100 | 2 | 5 | 100.02 | | |
| 4.50 | | SS | 7 | 79 | 40 | 6 | 99.02 | | |
| **FILL:** Brown sand | | SS | 8 | 71 | 31 | | | | |
| - trace gravel by 6.0m depth | | SS | 9 | 67 | 29 | | | | |
| 6.70 | | | | | | | | | |
| End of Borehole | | | | | | | | | |

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

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

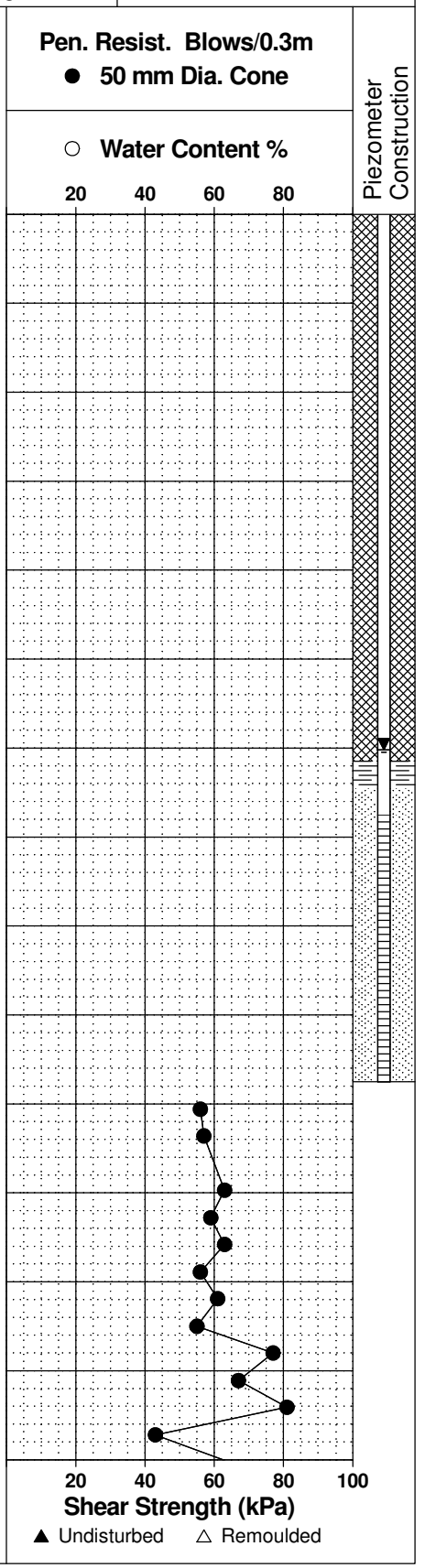
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH16-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 18

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 105.31 |
| **TOPSOIL** 0.15 | | AU | 1 | | | | |
| **FILL:** Brown silty clay with sand and gravel 0.69 | | SS | 2 | 79 | 42 | 1 | 104.31 |
| **FILL:** Brown and, some clay and gravel, trace organics 2.21 | | SS | 3 | 54 | 15 | 2 | 103.31 |
| **FILL:** Brown silty clay with sand, some gravel, trace organics, asphalt 2.97 | | SS | 4 | 71 | 5 | 3 | 102.31 |
| **FILL:** Brown sand, some clay and gravel, trace organics 3.73 | | SS | 5 | 58 | 21 | | |
| **FILL:** Brown silty clay with sand, trace gravel 4.50 | | SS | 6 | 67 | 11 | 4 | 101.31 |
| Brown **SILTY CLAY,** some sand, trace gravel | | SS | 7 | 96 | 14 | 5 | 100.31 |
| 6.02 | | SS | 8 | 100 | 4 | 6 | 99.31 |
| Compact, brown **SAND,** trace silt and gravel | | SS | 9 | 75 | 19 | 7 | 98.31 |
| | | SS | 10 | 71 | 29 | | |
| | | SS | 11 | 67 | 36 | 8 | 97.31 |
| | | SS | 12 | 83 | 20 | 9 | 96.31 |
| 9.75 | | SS | 13 | 0 | 13 | 10 | 95.31 |
| Dynamic Cone Penetration Test commenced at 9.75m depth. | | | | | | 11 | 94.31 |
| | | | | | | 12 | 93.31 |
| | | | | | | 13 | 92.31 |
| | | | | | | 14 | 91.31 |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

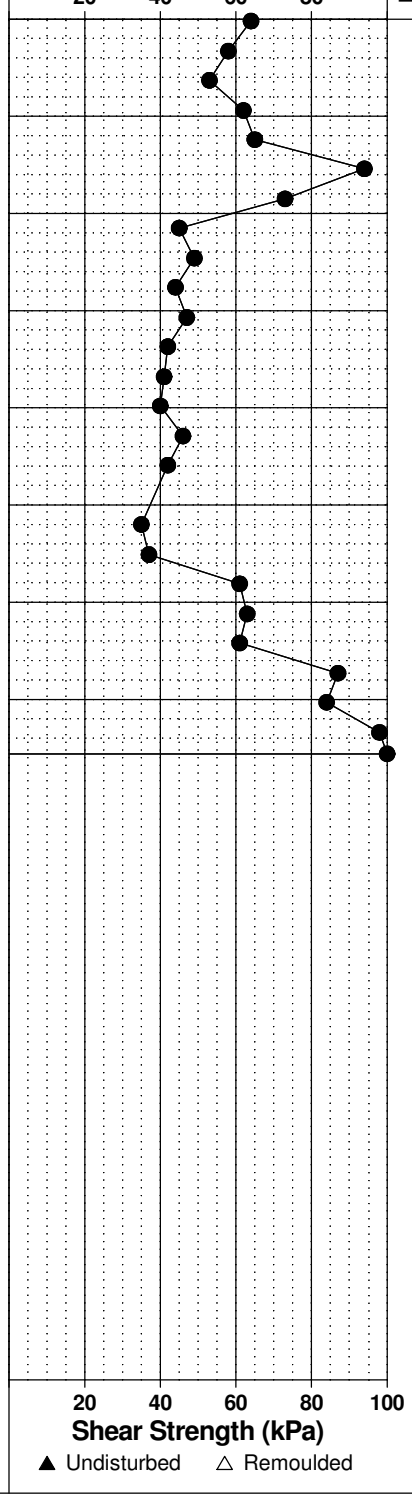
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH16-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 18

| 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** | | | | | | 14 | 91.31 | | |
| | | | | | | 15 | 90.31 | | |
| | | | | | | 16 | 89.31 | | |
| | | | | | | 17 | 88.31 | | |
| | | | | | | 18 | 87.31 | | |
| | | | | | | 19 | 86.31 | | |
| | | | | | | 20 | 85.31 | | |
| | | | | | | 21 | 84.31 | | |
| 21.56 | | | | | | | | | |
| End of Borehole<br><br>Practical DCPT refusal at 21.56m depth.<br><br>(GWL @ 6.02m - Nov. 29, 219) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH17-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 19

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 105.42 |
| **FILL:** Brown silty sand with gravel and cobbles, trace brick and organics | | AU | 1 | | | | |
| 1.07 | | | | | | 1 | 104.42 |
| **FILL:** Brown sand with gravel, trace cobbles | | SS | 2 | 46 | 17 | 2 | 103.42 |
| 2.59 | | | | | | | |
| **FILL:** Brown silty clay, some sand and gravel | | SS | 3 | 96 | 9 | 3 | 102.42 |
| 4.11 | | | | | | 4 | 101.42 |
| | | SS | 4 | 58 | 20 | 5 | 100.42 |
| | | SS | 5 | 67 | 22 | | |
| | | SS | 6 | 50 | 19 | 6 | 99.42 |
| Compact, brown **SAND,** trace gravel | | SS | 7 | 54 | 13 | 7 | 98.42 |
| | | SS | 8 | 67 | 14 | 8 | 97.42 |
| | | SS | 9 | 75 | 4 | 9 | 96.42 |
| | | SS | 10 | 100 | 11 | | |
| 9.75 | | | | | | | |
| End of Borehole | | | | | | | |
| (GWL @ 6.73m - Nov. 29, 219) | | | | | | | |

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

20 40 60 80

Monitoring Well 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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH18-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 19

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 103.89 |
| **FILL:** Brown silty sand, some gravel, trace organics | | AU | 1 | | | 1 | 102.89 |
| 1.45 | | | | | | | |
| **FILL:** Brown silty clay, some sand and gravel, trace organics | | SS | 2 | 54 | 6 | 2 | 101.89 |
| 2.59 | | | | | | | |
| | | SS | 3 | 88 | 11 | 3 | 100.89 |
| Compact to loose, brown **SAND,** trace gravel | | | | | | 4 | 99.89 |
| | | SS | 4 | 58 | 9 | 5 | 98.89 |
| 5.26 | | | | | | | |
| | | SS | 5 | 88 | 12 | 6 | 97.89 |
| | | SS | 6 | 54 | 12 | | |
| Grey **SILTY CLAY,** some sand | | SS | 7 | 48 | 16 | 7 | 96.89 |
| | | SS | 8 | 96 | 1 | 8 | 95.89 |
| | | SS | 9 | 96 | 1 | | |
| 9.07 | | | | | | 9 | 94.89 |
| | | SS | 10 | 96 | 2 | | |
| Very loose, grey **SAND,** trace clay | | SS | 11 | 92 | 2 | 10 | 93.89 |
| 10.67 | | | | | | | |
| End of Borehole | | | | | | | |
| (GWL @ 4.03m - Nov. 29, 219) | | | | | | | |

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

20 40 60 80

Monitoring Well 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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

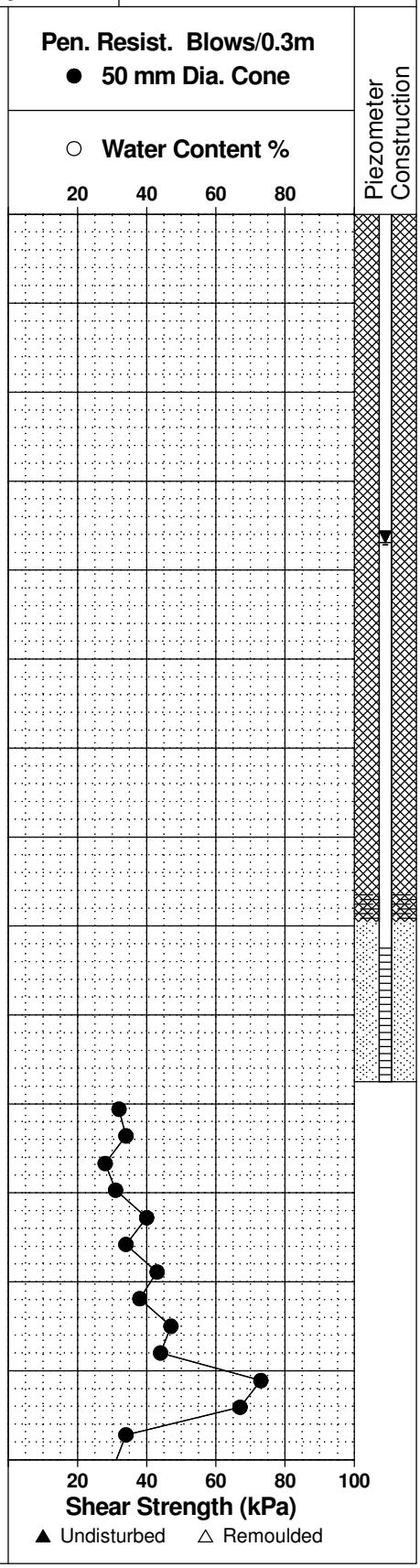
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH19-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 19

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 104.14 |
| **FILL:** Brown silty sand, some gravel, trace organics (0.51) | | AU | 1 | | | | |
| **FILL:** Brown silty clay, some sand and gravel (1.45) | | SS | 2 | 47 | 50+ | 1 | 103.14 |
| **FILL:** Brown sand with silty clay, some gravel, trace organics | | SS | 3 | 50 | 9 | 2 | 102.14 |
| | | SS | 4 | 4 | 7 | 3 | 101.14 |
| | | SS | 5 | 46 | 6 | | |
| | | SS | 6 | 42 | 7 | 4 | 100.14 |
| | | SS | 7 | 21 | 4 | 5 | 99.14 |
| (6.02) | | SS | 8 | 42 | 6 | 6 | 98.14 |
| **FILL:** Brown sand, some organics and gravel (6.78) | | SS | 9 | 88 | 21 | | |
| Loose to compact, brown **SAND,** trace gravel | | SS | 10 | 83 | 4 | 7 | 97.14 |
| | | SS | 11 | 46 | 16 | 8 | 96.14 |
| | | SS | 12 | 38 | 21 | 9 | 95.14 |
| (9.75) | | SS | 13 | 54 | 18 | | |
| Dynamic Cone Penetration Test commenced at 9.75m depth. | | | | | | 10 | 94.14 |
| | | | | | | 11 | 93.14 |
| | | | | | | 12 | 92.14 |
| | | | | | | 13 | 91.14 |
| | | | | | | 14 | 90.14 |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

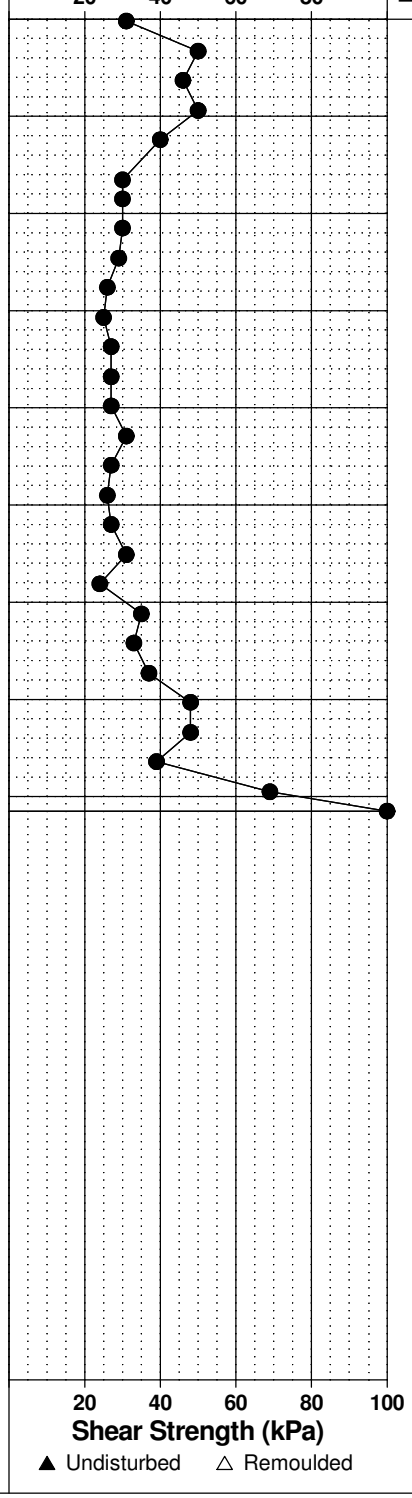
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH19-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 19

| 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 | | | |
| | | | | | | 14 | 90.14 | | |
| | | | | | | 15 | 89.14 | | |
| | | | | | | 16 | 88.14 | | |
| | | | | | | 17 | 87.14 | | |
| | | | | | | 18 | 86.14 | | |
| | | | | | | 19 | 85.14 | | |
| | | | | | | 20 | 84.14 | | |
| | | | | | | 21 | 83.14 | | |
| | | | | | | 22 | 82.14 | | |
| 22.15 | | | | | | | | | |
| End of Borehole<br><br>Practical DCPT refusal at 22.15m depth.<br><br>(GWL @ 3.69m - Nov. 29, 219) | | | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** BH20-19

**BORINGS BY** CME 55 Power Auger **DATE** 2019 November 19

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 103.72 |
| **FILL:** Brown silty sand, trace gravel and organics | | AU | 1 | | | 1 | 102.72 |
| | | SS | 2 | 42 | 12 | 2 | 101.72 |
| 2.59 | | | | | | | |
| | | SS | 3 | 58 | 5 | 3 | 100.72 |
| **FILL:** Brown sand, trace gravel | | SS | 4 | 79 | 7 | 4 | 99.72 |
| | | SS | 5 | 54 | 15 | 5 | 98.72 |
| 6.02 | | | | | | 6 | 97.72 |
| Compact, brown **SAND,** trace gravel and clay seams | | SS | 6 | 58 | 19 | | |
| | | SS | 7 | 54 | 12 | 7 | 96.72 |
| 7.54 | | | | | | | |
| Compact, grey **SILTY SAND** with gravel and clay | | SS | 6 | 50 | 8 | 8 | 95.72 |
| 8.30 | | | | | | | |
| | | SS | 9 | 71 | 2 | 9 | 94.72 |
| Grey-brown **SILTY CLAY,** trace sand | | SS | 10 | 92 | 2 | | |
| | | SS | 11 | 100 | 1 | 10 | 93.72 |
| 10.67 | | | | | | | |
| End of Borehole | | | | | | | |
| (GWL @ 3.83m - Nov. 29, 219) | | | | | | | |

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

20 40 60 80

Monitoring Well 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**
**3713 Borrisokane Road**
**Ottawa, Ontario**

**DATUM** Ground surface elevations provided by J.D. Barnes Limited.

**FILE NO.** PG5016

**REMARKS**

**HOLE NO.** BH 7

**BORINGS BY** CME 55 Power Auger **DATE** 2019 July 23

| 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 % | Monitoring Well Construction |
|---|---|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 103.77 | | |
| **FILL:** Brown silty sand and gravel | | AU | 1 | | | | | | |
| 1.07 | | SS | 2 | 0 | 9 | 1 | 102.77 | | |
| | | SS | 3 | 62 | 13 | 2 | 101.77 | | |
| | | SS | 4 | 62 | 14 | | | | |
| Compact to dense, brown **SILTY SAND** | | SS | 5 | 54 | 22 | 3 | 100.77 | | |
| | | SS | 5 | 96 | 23 | 4 | 99.77 | | |
| | | SS | 7 | 71 | 24 | 5 | 98.77 | | |
| | | SS | 8 | 100 | 27 | 6 | 97.77 | | |
| 6.70 | | SS | 9 | 100 | 38 | | | | |
| End of Borehole | | | | | | | | | |
| (GWL @ 3.66m - July 24, 2019) | | | | | | | | | |

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

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP32

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 102.23 | | |
| **FILL:** Brown sand, some gravel, cobbles, trace clay and organics 0.30 | | G | 1 | | | | | | |
| | | | | | | 1 | 101.23 | | |
| | | | | | | 2 | 100.23 | | |
| Brown **SAND,** some gravel, trace cobbles | | | | | | | | | |
| | | | | | | 3 | 99.23 | | |
| | | G | 2 | | | 4 | 98.23 | | |
| 4.70 | | | | | | | | | |
| Brown **SAND,** some clay, gravel, cobbles and boulders | | G | 3 | | | 5 | 97.23 | | ▽ |
| 5.40 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (GWL at 4.8m depth based on field observations) | | | | | | | | | |

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

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP33

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 103.94 | | |
| **FILL:** Brown sand with gravel, cobbles, trace organics | | G | 1 | | | | | | |
| 0.30 | | | | | | 1 | 102.94 | | |
| **FILL:** Brown sand, trace gravel | | G | 2 | | | | | | |
| 3.30 | | | | | | 2 | 101.94 | | |
| | | | | | | 3 | 100.94 | | |
| Grey **SILTY CLAY,** trace sand | | G | 3 | | | 4 | 99.94 | | |
| 5.00 | | | | | | 5 | 98.94 | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 3.1m 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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP34

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 103.24 | | |
| **FILL:** Brown sand, trace gravel and organics | | G | 1 | | | | | | |
| 0.60 | | | | | | | | | |
| **FILL:** Brown silty clay, some sand, gravel, organics and topsoil | | G | 2 | | | 1 | 102.24 | | |
| 1.05 | | | | | | | | | |
| **FILL:** Brown sand, trace gravel | | G | 3 | | | 2 | 101.24 | | |
| | | | | | | 3 | 100.24 | | |
| 3.60 | | | | | | | | | |
| Loose to compact, brown **SAND** | | G | 4 | | | 4 | 99.24 | | |
| | | | | | | 5 | 98.24 | | |
| 5.20 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 3.15m depth) | | | | | | | | | |

Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP35

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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** | | | | | | | | | |
| **FILL:** Topsoil, trace organics, gravel and sand 0.15 | | G | 1 | | | 0 | 10530.00 | | |
| **FILL:** Brown sand, some gravel and cobbles | | | | | | 1 | 10529.00 | | |
| | | G | 2 | | | 2 | 10528.00 | | |
| 3.10 | | | | | | 3 | 10527.00 | | |
| Loose, brown **SAND** | | | | | | 4 | 10526.00 | | |
| | | G | 3 | | | 5 | 10525.00 | | |
| 6.10 | | | | | | 6 | 10524.00 | | |
| 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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP36

**BORINGS BY** Excavator **DATE** 2019 November 11

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) | Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % | Piezometer Construction |
|---|---|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | | | |
| **TOPSOIL** 0.15 | | G | 1 | | | 0 | 105.10 | | |
| **FILL:** Brown sand, some topsoil, gravel, cobbles | | | | | | 1 | 104.10 | | |
| - some asphalt between 2.4 and 2.7m depth | | G | 2 | | | 2 | 103.10 | | |
| 4.50 | | | | | | 3 | 102.10 | | |
| **GLACIAL TILL:** Loose, brown sand, some gravel, cobbles and clay | | | | | | 4 | 101.10 | | |
| 6.05 | | G | 3 | | | 5 | 100.10 | | |
| End of Test Pit | | | | | | 6 | 99.10 | | |
| (GWL @ 5.95m depth based on field observations) | | | | | | | | | |

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

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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP37

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 105.02 | | |
| **FILL:** Brown sand with topsoil, some gravel 0.15 | | G | 1 | | | | | | |
| **FILL:** Brown sand, some gravel and cobbles, trace asphalt | | | | | | 1 | 104.02 | | |
| 3.10 | | G | 2 | | | 2 | 103.02 | | |
| Loose to compact, brown **SAND** | | | | | | 3 | 102.02 | | |
| | | G | 3 | | | 4 | 101.02 | | |
| 5.00 | | G | 4 | | | 5 | 100.02 | | |
| Stiff, grey **SILTY CLAY,** trace sand 5.70 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP38

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 106.11 | | |
| **FILL:** Brown silty clay, some sand, gravel, organics (0.15) | | G | 1 | | | | | | |
| | | | | | | 1 | 105.11 | | |
| | | G | 2 | | | | | | |
| Fir, brown **SILTY CLAY,** trace sand and gravel | | | | | | 2 | 104.11 | | |
| | | | | | | 3 | 103.11 | | |
| | | | | | | 4 | 102.11 | | |
| | | G | 3 | | | 5 | 101.11 | | |
| (5.50) 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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP39

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 105.29 | | |
| **FILL:** Brown silty clay, some gravel, organics | | G | 1 | | | | | | |
| 0.15 | | | | | | 1 | 104.29 | | |
| | | G | 2 | | | | | | |
| **FILL:** Brown sand, some clay, gravel, construction debris | | | | | | 2 | 103.29 | | |
| | | | | | | 3 | 102.29 | | |
| | | | | | | 4 | 101.29 | | |
| | | G | 3 | | | 5 | 100.29 | | |
| 5.50 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

Pen. Resist. Blows/0.3m: 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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP40

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 106.46 | | |
| **FILL:** Brown sand, some gravel, cobbles (0.15) | | G | 1 | | | | | | |
| **FILL:** Brown sand, some gravel, cobbles, trace brick | | | | | | 1 | 105.46 | | |
| | | | | | | 2 | 104.46 | | |
| | | G | 2 | | | | | | |
| - trace clay by 3.2m depth | | | | | | 3 | 103.46 | | |
| | | | | | | 4 | 102.46 | | |
| | | G | 3 | | | 5 | 101.46 | | |
| (5.20) End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 5.1m 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

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

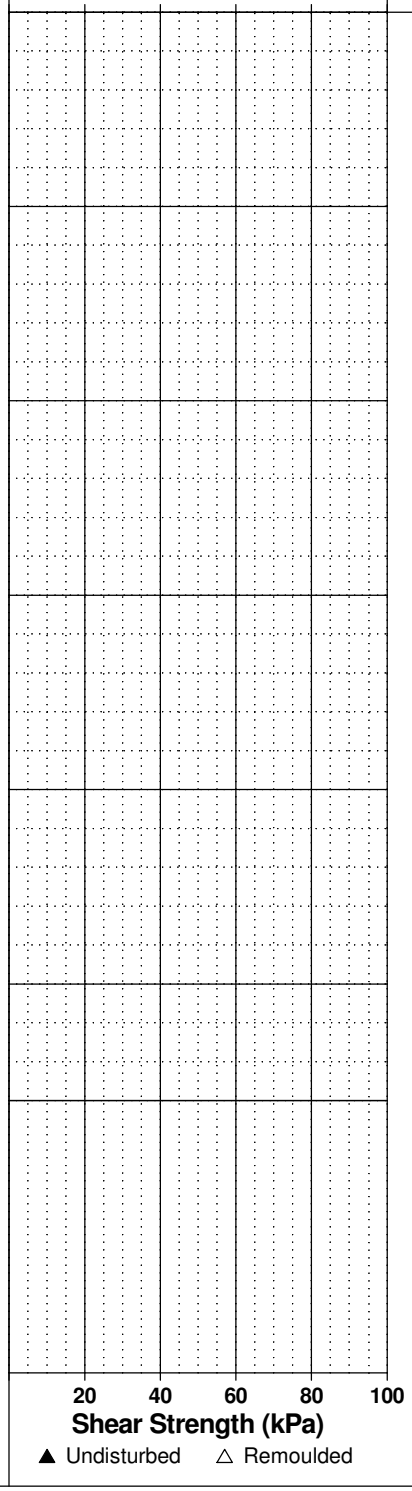
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP41

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 105.10 | | |
| **FILL:** Brown sand, some clay, gravel, cobbles, organics | | G | 1 | | | | | | |
| 0.25 | | | | | | 1 | 104.10 | | |
| **FILL:** Brown silty clay, some gravel, cobbles, trace sand | | | | | | 2 | 103.10 | | |
| | | G | 2 | | | 3 | 102.10 | | |
| 3.60 | | | | | | | | | |
| Compact, brown **SAND,** some gravel | | | | | | 4 | 101.10 | | |
| | | G | 3 | | | 5 | 100.10 | | |
| 5.60 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP42

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 104.51 | | |
| **FILL:** Brown silty clay, some sand, gravel, cobbles, trace organics and construction debris | | G | 1 | | | 1 | 103.51 | | |
| | | G | 2 | | | 2 | 102.51 | | |
| 3.40 | | | | | | 3 | 101.51 | | |
| Stff, brown **SILTY CLAY,** some sand, trace cobbles | | G | 3 | | | 4 | 100.51 | | |
| 5.40 | | | | | | 5 | 99.51 | | |
| End of Test Pit<br><br>(Groundwater infiltration at 5.0m depth) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP43

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 104.67 | | |
| **FILL:** Brown silty clay, some topsoil trace gravel (0.20) | | G | 1 | | | | | | |
| **FILL:** Brown silty clay, some sand, gravel, cobbles, trace construction debris | | G | 2 | | | 1 | 103.67 | | |
| (2.90) | | | | | | 2 | 102.67 | | |
| **FILL:** Gry silty clay, some sand, gravel, cobbles | | G | 3 | | | 3 | 101.67 | | |
| (5.20) | | | | | | 4 | 100.67 | | |
| End of Test Pit | | | | | | 5 | 99.67 | | |
| (Groundwater infiltration at 4.9m depth) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

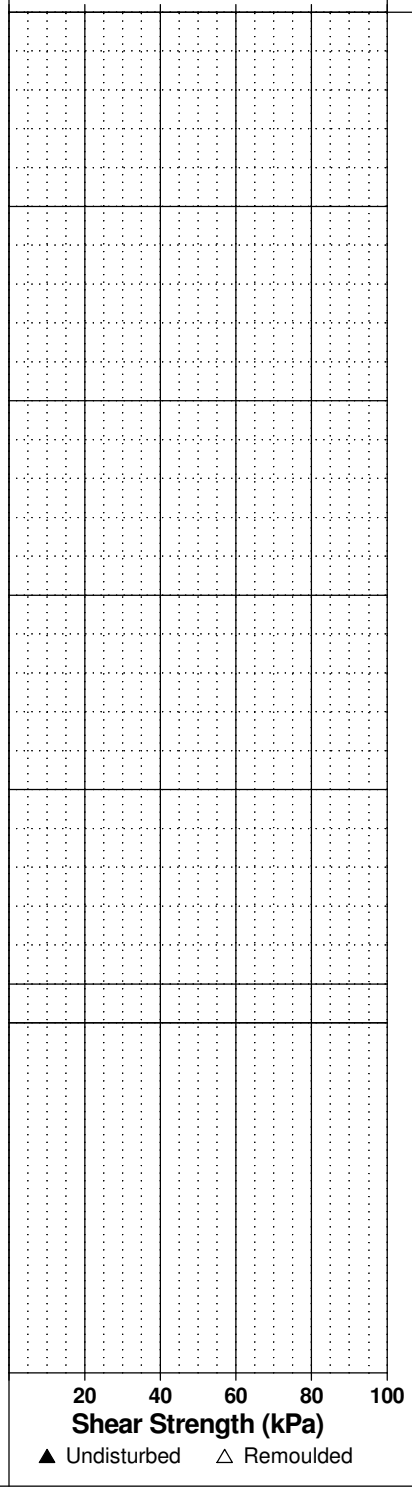
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP44

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 103.85 | | |
| **FILL:** Brown silty clay, some sand, gravel | | G | 1 | | | | | | |
| 0.15 | | | | | | 1 | 102.85 | | |
| **FILL:** Brown sand, some gravel, cobbles, trace construction debris | | G | 2 | | | 2 | 101.85 | | |
| 3.70 | | | | | | 3 | 100.85 | | |
| **FILL:** Brown sand, some gravel, cobbles, trace clay | | G | 3 | | | 4 | 99.85 | | |
| 5.20 | | | | | | 5 | 98.85 | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 4.6m depth) | | | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

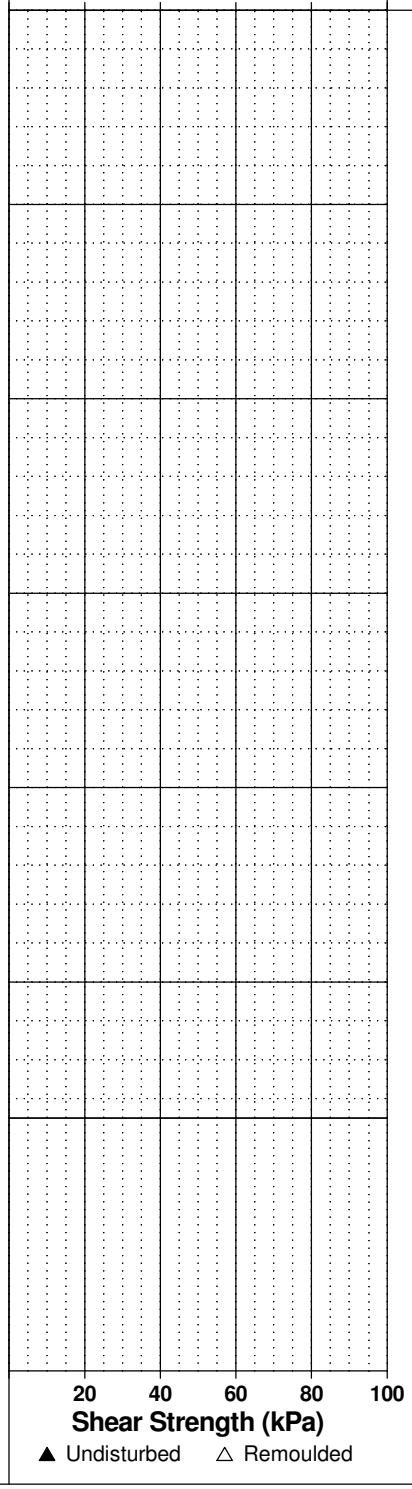
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP45

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 104.14 | | |
| **FILL:** Brown sand, some gravel, cobbles, clay, trace organics | | G | 1 | | | 1 | 103.14 | | |
| | | G | 2 | | | 2 | 102.14 | | |
| | | | | | | 3 | 101.14 | | |
| 3.50 | | | | | | | | | |
| **FILL:** Brown silty clay, some sand, gravel, trace cobbles | | G | 3 | | | 4 | 100.14 | | |
| | | | | | | 5 | 99.14 | | |
| 5.70 | | | | | | | | | |
| End of Test Pit<br>(TP dry upon completion) | | | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP46

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 102.74 | | |
| **FILL:** Brown sand, some gravel, trace organics | | G | 1 | | | 1 | 101.74 | | |
| | | | | | | 2 | 100.74 | | |
| | | G | 2 | | | 3 | 99.74 | | |
| 3.00 | | | | | | | | | |
| Loose, brown **SAND,** trace silt | | | | | | 4 | 98.74 | | |
| | | | | | | 5 | 97.74 | | |
| 5.50 | | G | 3 | | | | | | |
| End of Test Pit<br><br>(GWL @ 5.35m depth based on field observations) | | | | | | | | | |

Pen. Resist. Blows/0.3m: 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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP47

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 101.19 | | |
| **FILL:** Brown sand and gravel | | G | 1 | | | | | | |
| 0.60 | | | | | | 1 | 100.19 | | |
| **FILL:** Grey silty clay, some sand and gravel | | | | | | 2 | 99.19 | | |
| | | G | 2 | | | | | | |
| 3.10 | | | | | | 3 | 98.19 | | |
| Loose, brown **SAND,** trace silt | | | | | | 4 | 97.19 | | |
| | | G | 3 | | | 5 | 96.19 | | |
| 5.45 | | | | | | | | | |
| End of Test Pit<br>(Groundwater infiltration at 5.3m depth) | | | | | | | | | |

Pen. Resist. Blows/0.3m: ○ Water Content % — 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

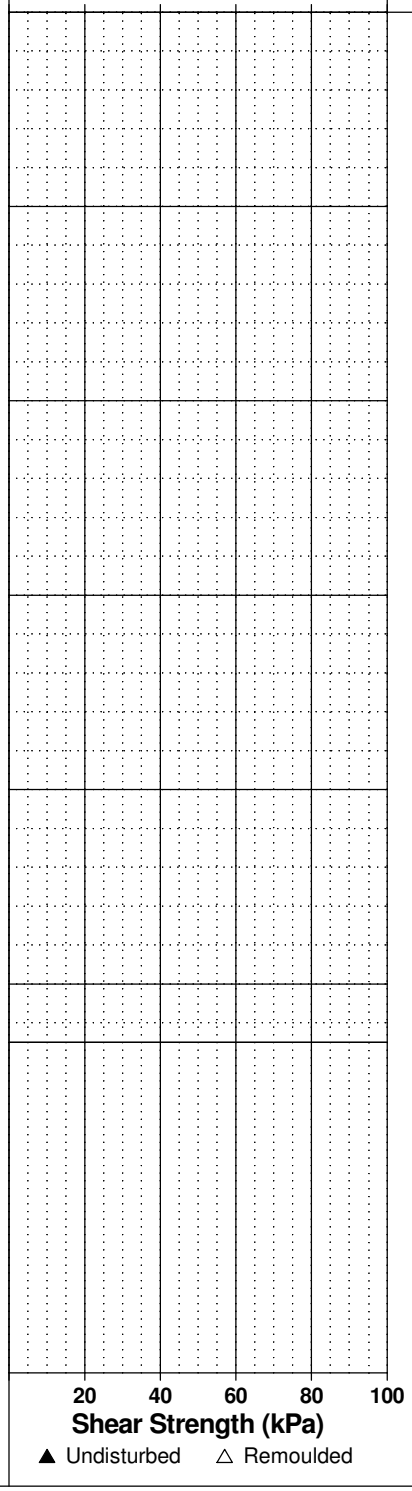
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP48

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 102.61 | | |
| **FILL:** Brown sand with some to trace gravel | | G | 1 | | | 1 | 101.61 | | |
| | | | | | | 2 | 100.61 | | |
| | | G | 2 | | | 3 | 99.61 | | |
| 3.50 | | | | | | 4 | 98.61 | | |
| Loose to dense, brown **SAND** | | G | 3 | | | 5 | 97.61 | | |
| 5.30 | | | | | | | | | |
| End of Test Pit<br>(Groundwater infiltration at 4.9m depth) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP49

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 103.49 | | |
| **FILL:** Brown sand and gravel, some cobbles, trace clay | | G | 1 | | | | | | |
| | | G | 2 | | | 1 | 102.49 | | |
| 1.10 | | | | | | | | | |
| Loose, brown **SAND** | | | | | | 2 | 101.49 | | |
| | | | | | | 3 | 100.49 | | |
| | | | | | | 4 | 99.49 | | |
| | | G | 3 | | | 5 | 98.49 | | |
| 5.30 | | | | | | | | | |
| 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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP50

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 103.62 | | |
| | | G | 1 | | | 1 | 102.62 | | |
| **FILL:** Brown sand and gravel, trace cobbles, organics | | | | | | 2 | 101.62 | | |
| | | | | | | 3 | 100.62 | | |
| 3.95 | | G | 2 | | | 4 | 99.62 | | |
| **FILL:** Brown sandy clay to clayey sand with gravel, some cobbles | | | | | | | | | |
| | | G | 3 | | | 5 | 98.62 | | |
| 5.20 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (GWL @ 4.9m depth based on field observations) | | | | | | | | | |

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

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

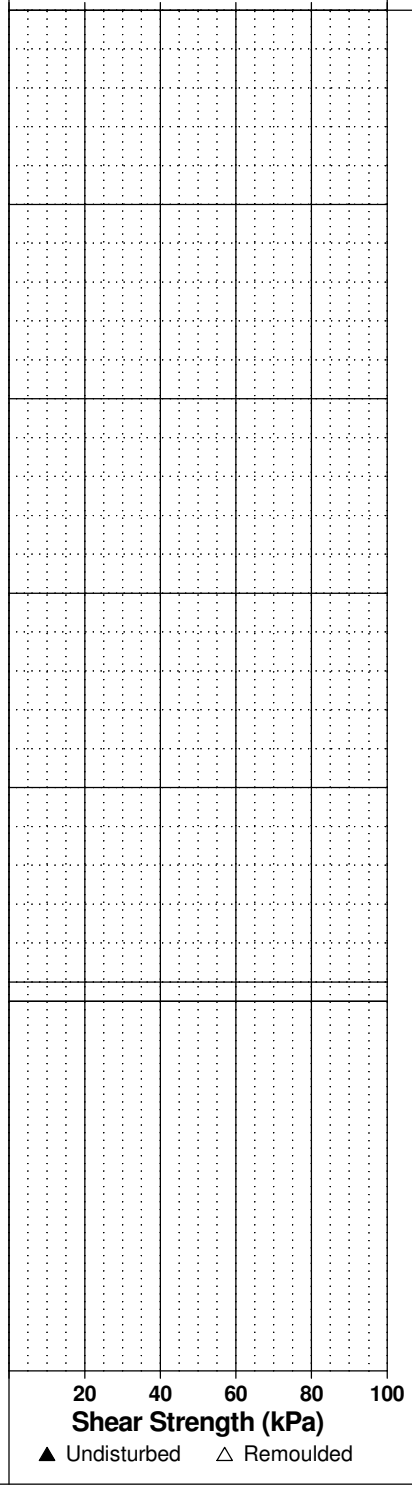
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP51

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 103.92 | | |
| **FILL:** Brown sand, some gravel, cobbles, trace clay (0.20) | | G | 1 | | | | | | |
| | | | | | | 1 | 102.92 | | |
| | | | | | | 2 | 101.92 | | |
| **FILL:** Brown sand, trace gravel | | G | 2 | | | 3 | 100.92 | | |
| | | | | | | 4 | 99.92 | | |
| | | G | 3 | | | 5 | 98.92 | | |
| (5.10) End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 5.0m depth | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

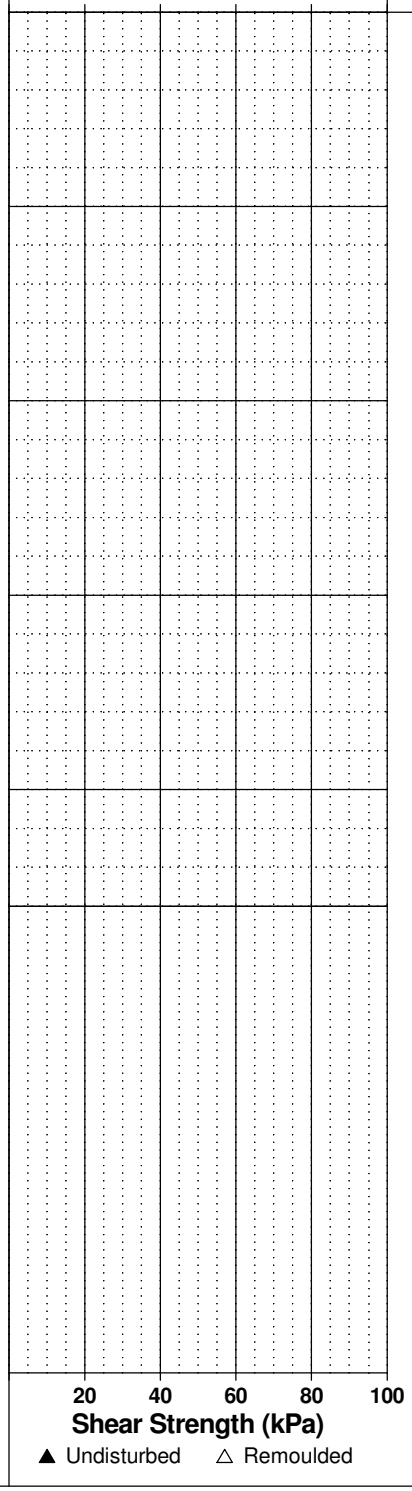
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP52

**BORINGS BY** Excavator **DATE** 2019 November 12

| 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 | 104.04 | | |
| **FILL:** Brown sand, some gravel | | G | 1 | | | | | | |
| 0.40 | | | | | | | | | |
| | | | | | | 1 | 103.04 | | |
| | | | | | | 2 | 102.04 | | |
| **FILL:** Brown sand, some gravel, cobbles, trace clay and organics | | G | 2 | | | 3 | 101.04 | | |
| | | G | 3 | | | 4 | 100.04 | | |
| 4.60 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

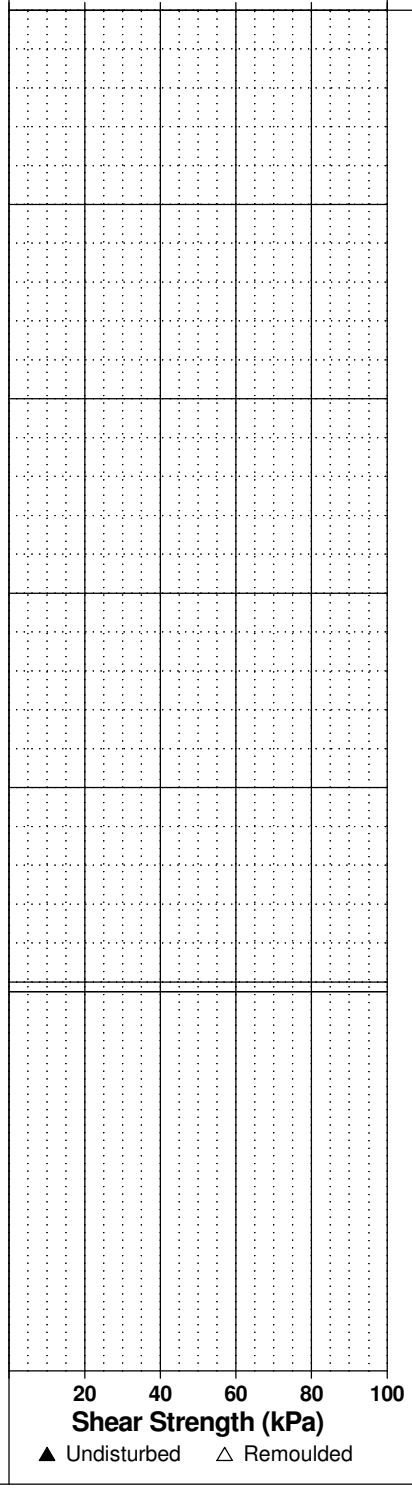
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP53

**BORINGS BY** Excavator **DATE** 2019 November 11

| 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 | 102.16 | | |
| **FILL:** Brown sand and gravel, trace organics (0.25) | | G | 1 | | | | | | |
| | | | | | | 1 | 101.16 | | |
| | | | | | | 2 | 100.16 | | |
| **FILL:** Brown sand, trace gravel | | G | 2 | | | | | | |
| | | | | | | 3 | 99.16 | | |
| | | G | 3 | | | 4 | 98.16 | | |
| (5.05) | | | | | | 5 | 97.16 | | |
| End of Test Pit | | | | | | | | | |
| (GWL @ 4.6m depth based on field observations) | | | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP54

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 102.82 | 20 40 60 80 | |
| Sandy **TOPSOIL** with gravel | | | | | | | | | |
| 0.40 | | | | | | | | | |
| | | | | | | 1 | 101.82 | | |
| | | | | | | 2 | 100.82 | | |
| Loose, light brown **SAND** | | | | | | | | | |
| | | | | | | 3 | 99.82 | | |
| | | | | | | 4 | 98.82 | | ▽ |
| | | | | | | 5 | 97.82 | | |
| 5.20 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 4.3m depth) | | | | | | | | | |

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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP55

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 103.31 | | |
| **FILL:** Sand and gravel with topsoil | | | | | | | | | |
| 0.60 | | | | | | 1 | 102.31 | | |
| Light brown **SAND** | | | | | | 2 | 101.31 | | |
| | | | | | | 3 | 100.31 | | ▽ |
| | | | | | | 4 | 99.31 | | |
| 4.30 | | | | | | | | | |
| End of Test Pit<br><br>(Groundwater infiltration at 3.2m depth) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP56

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 102.41 | 20 40 60 80 | |
| **FILL:** Sand and gravel with topsoil | | | | | | | | | |
| 0.60 | | | | | | 1 | 101.41 | | |
| | | | | | | 2 | 100.41 | | |
| Light brown **SAND** | | | | | | 3 | 99.41 | | |
| | | | | | | 4 | 98.41 | | ▽ |
| | | | | | | 5 | 97.41 | | |
| 5.40 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 4.6m depth) | | | | | | | | 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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP57

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 101.89 | 20 40 60 80 | |
| **FILL:** Gravel with topsoil | | | | | | | | | |
| 0.60 | | | | | | 1 | 100.89 | | |
| | | | | | | 2 | 99.89 | | |
| Loose, light brown **SAND** | | | | | | 3 | 98.89 | | |
| | | | | | | 4 | 97.89 | | ▽ |
| 4.80 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 4.2m depth) | | | | | | | | | |

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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP58

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 102.31 | | |
| **FILL:** Sand and gravel with topsoil | | | | | | | | | |
| 0.70 | | | | | | 1 | 101.31 | | |
| Loose, light brown **SAND** | | | | | | 2 | 100.31 | | ▽ |
| | | | | | | 3 | 99.31 | | |
| 3.60 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 2.6m depth) | | | | | | | | | |

Water Content % scale: 20 40 60 80

Shear Strength (kPa) scale: 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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

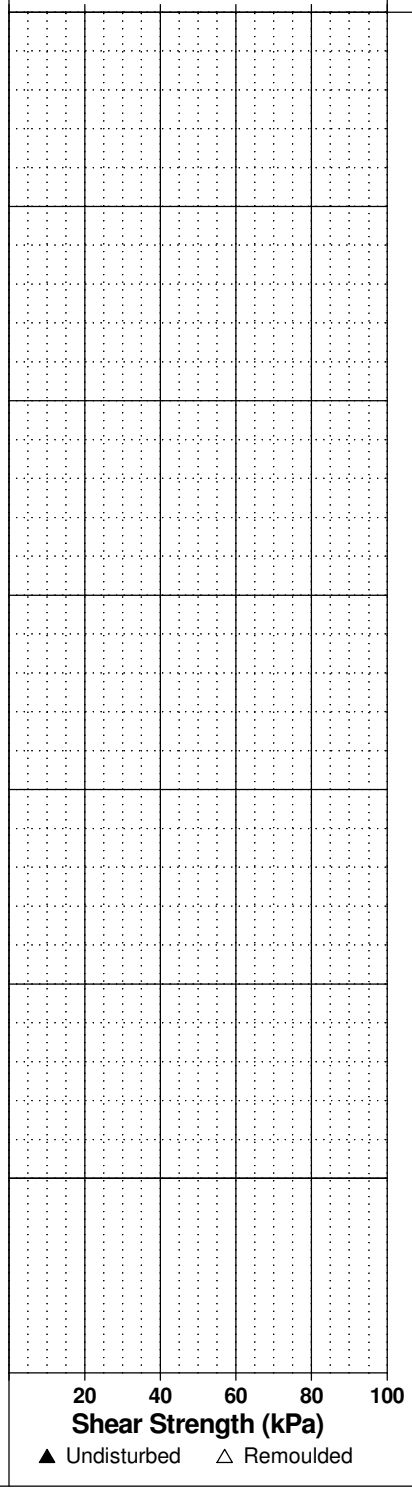
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP59

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 103.81 | | |
| **FILL:** Sand and gravel with topsoil | | G | 1 | | | | | | |
| 0.60 | | G | 2 | | | 1 | 102.81 | | |
| **FILL:** Grey-brown silty sand with dark grey to black clay | | | | | | 2 | 101.81 | | |
| | | | | | | 3 | 100.81 | | |
| | | | | | | 4 | 99.81 | | |
| | | | | | | 5 | 98.81 | | |
| | | | | | | 6 | 97.81 | | |
| 6.90 | | | | | | | | | |



**patersongroup** Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

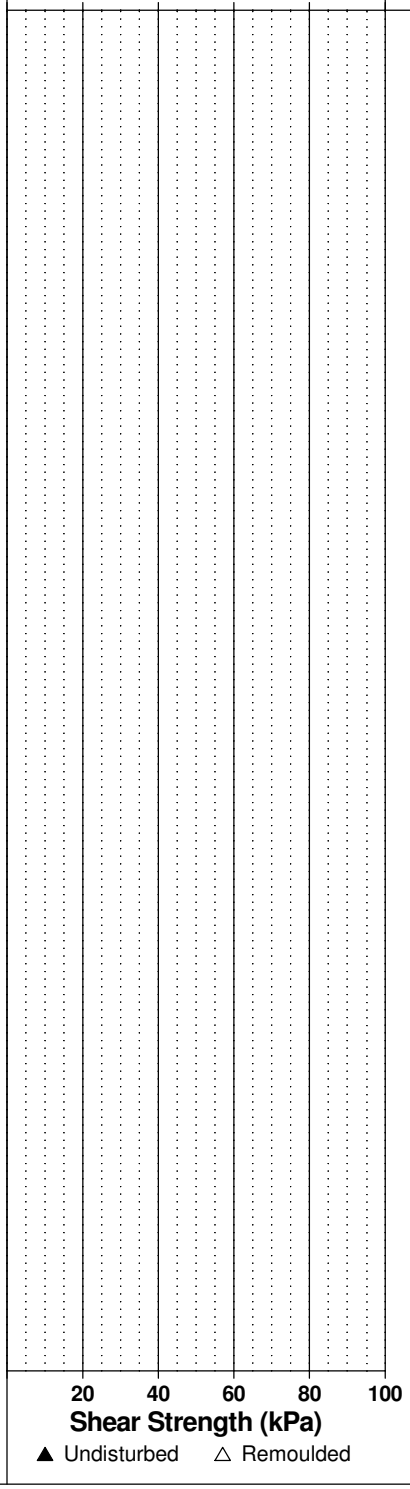
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP59

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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** | | | | | | | | | |
| End of Test Pit<br>(TP dry upon completion) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP60

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 102.04 | 20 40 60 80 | |
| **FILL:** Gravel with topsoil | | | | | | | | | |
| 0.60 | | | | | | 1 | 101.04 | | |
| Compact, light brown **SILTY SAND** with clay | | | | | | 2 | 100.04 | | ▽ |
| | | | | | | 3 | 99.04 | | |
| 4.20 | | | | | | 4 | 98.04 | | |
| End of Test Pit<br>(Groundwater infiltration at 2.8m depth) | | | | | | | | 20 40 60 80 100<br>**Shear Strength (kPa)**<br>▲ Undisturbed △ Remoulded | |

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP61

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 101.76 | | |
| **FILL:** Grey-brown silty sand with clay, cobbles and construction debris | | G | 1 | | | 1 | 100.76 | | |
| 1.80 | | | | | | 2 | 99.76 | | ▽ |
| Loose, light brown **SAND** | | | | | | 3 | 98.76 | | |
| 3.60 | | | | | | | | | |
| End of Test Pit<br><br>(Groundwater infiltration at 2.3m depth) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

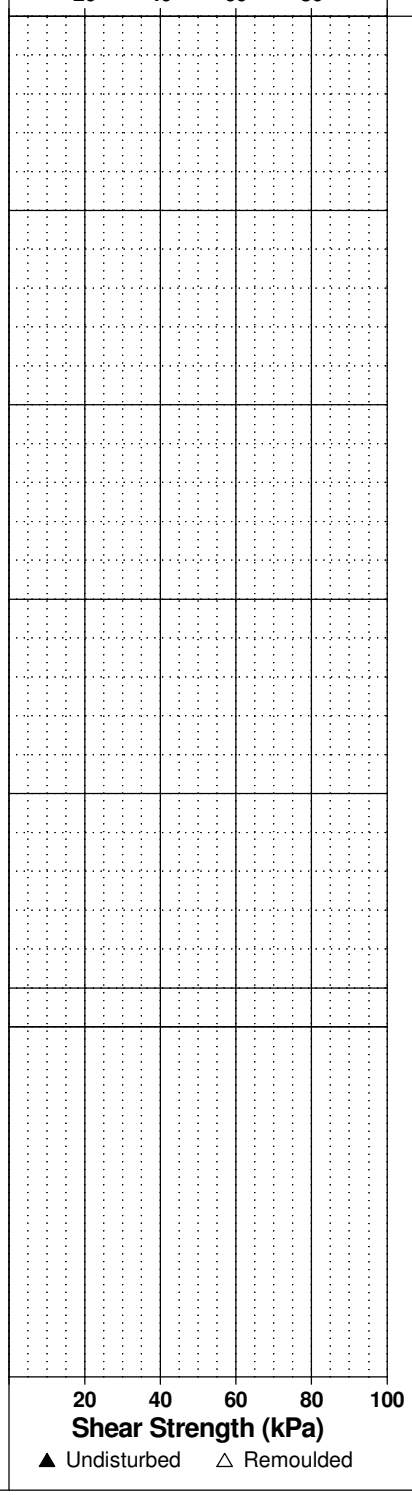
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP62

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 101.34 | | |
| **FILL:** Dark grey to black silty sand with organics | | G | 1 | | | 1 | 100.34 | | |
| | | | | | | 2 | 99.34 | | ▽ |
| Loose, light brown **SAND** | | | | | | 3 | 98.34 | | |
| | | | | | | 4 | 97.34 | | |
| | | | | | | 5 | 96.34 | | |
| 2.10 | | | | | | | | | |
| 5.20 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 2.5m depth) | | | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP63

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 102.13 | | |
| **FILL:** Gravel wtih topsoil | | | | | | | | | |
| 0.30 | | | | | | | | | |
| | | G | 1 | | | 1 | 101.13 | | |
| Loose, brown **SAND** with cobbles | | | | | | 2 | 100.13 | | |
| | | | | | | 3 | 99.13 | | ▽ |
| | | | | | | 4 | 98.13 | | |
| 4.46 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 3.1m 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

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP64

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 103.81 | | |
| **FILL:** Grey-brown silty sand with gravel and cobbles, trace organics and asphalt | | G | 1 | | | 1 | 102.81 | | |
| | | | | | | 2 | 101.81 | | |
| | | | | | | 3 | 100.81 | | |
| | | | | | | 4 | 99.81 | | ▽ |
| | | | | | | 5 | 98.81 | | |
| 5.80 | | | | | | | | | |
| End of Test Pit<br><br>(Groundwater infiltration at 4.2m depth) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP65

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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 | 102.82 | | |
| **FILL:** Gravel with topsoil | | | | | | | | | |
| 0.20 | | | | | | | | | |
| Compact, dark brown **SILTY SAND** with gravel and cobbles | | G | 1 | | | 1 | 101.82 | | |
| | | | | | | 2 | 100.82 | | |
| | | | | | | 3 | 99.82 | | ▽ |
| | | | | | | 4 | 98.82 | | |
| | | | | | | 5 | 97.82 | | |
| 5.40 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 3.2m 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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP66

**BORINGS BY** Excavator **DATE** 2020 January 6

| 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** | | | | | | | | | |
| **FILL:** Gravel with topsoil 0.20 | | | | | | 0 | 103.08 | | |
| Compact, dark brown **SILTY SAND,** some cobbles, trace boulders | | G | 8 | | | 1 | 102.08 | | |
| | | | | | | 2 | 101.08 | | |
| | | | | | | 3 | 100.08 | | |
| 4.20 | | | | | | 4 | 99.08 | | |
| End of Test Pit<br>(Groundwater infiltration at 2.7m depth) | | | | | | | | | |

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

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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP67

**BORINGS BY** Excavator **DATE** 2020 January 8

| 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 | 103.88 | | |
| **FILL:** Gravel and cobbles, trace boulders and crushed stone | | | | | | | | | |
| 1.00 | | | | | | 1 | 102.88 | | |
| **FILL:** Dark brown silty sand with gravel, some cobbles and organics, trace boulders, wood and concrete | | G | 1 | | | 2 | 101.88 | | |
| | | | | | | 3 | 100.88 | | |
| | | | | | | 4 | 99.88 | | |
| | | | | | | 5 | 98.88 | | |
| 5.40 | | | | | | | | | |
| 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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

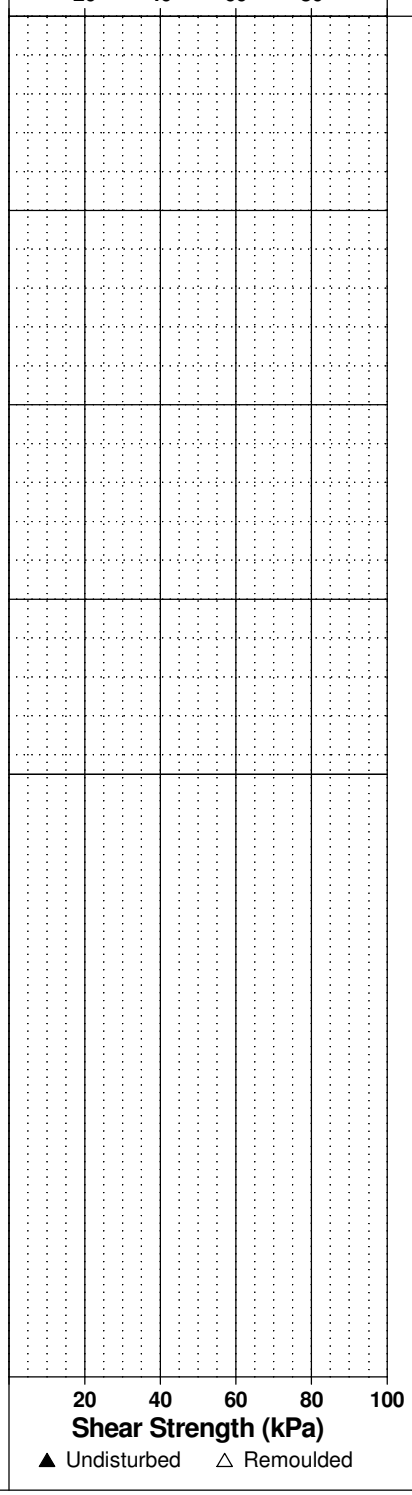
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP68

**BORINGS BY** Excavator **DATE** 2020 January 8

| 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 | 101.76 | | |
| **FILL:** Gravel with topsoil | | | | | | | | | |
| 0.90 | | | | | | 1 | 100.76 | | |
| Loose, light brown **SAND** | | | | | | 2 | 99.76 | | ▽ |
| | | | | | | 3 | 98.76 | | |
| 3.90 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 2.4m depth) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP69

**BORINGS BY** Excavator **DATE** 2020 January 8

| 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 | 102.88 | 20 40 60 80 | |
| **FILL:** Gravel with topsoil | | | | | | | | | |
| 0.60 | | | | | | 1 | 101.88 | | |
| | | | | | | 2 | 100.88 | | |
| Loose, light brown **SAND** | | | | | | 3 | 99.88 | | |
| | | | | | | 4 | 98.88 | | ▽ |
| 5.02 | | | | | | 5 | 97.88 | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 4.2m depth) | | | | | | | | | |

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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

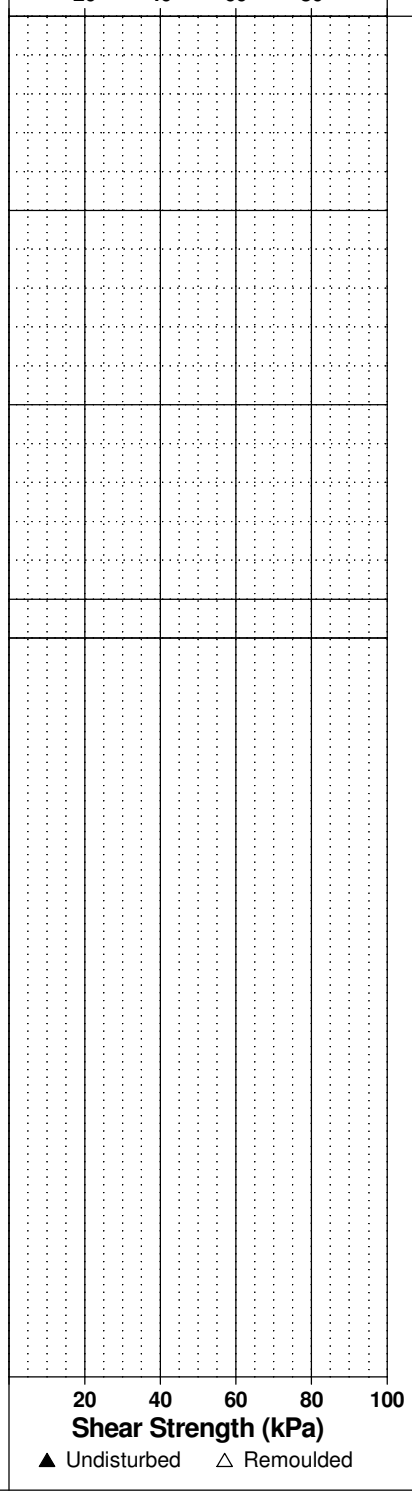
**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP70

**BORINGS BY** Excavator **DATE** 2020 January 8

| 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 | 102.02 | | |
| **FILL:** Gravel with crushed stone and topsoil | | | | | | | | | |
| 0.50 | | | | | | | | | |
| **FILL:** Dark brown silt with gravel, cobbles and construction debris | | | | | | 1 | 101.02 | | |
| 1.60 | | | | | | | | | |
| Loose, light brown **SAND** | | | | | | 2 | 100.02 | | |
| | | | | | | 3 | 99.02 | | |
| 3.20 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 3.2m depth) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Prop. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP71

**BORINGS BY** Excavator **DATE** 2020 January 8

| 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 | 101.32 | | |
| **FILL:** Dark brown silt with organics, gravel, cobbles and construction debris | | | | | | | | | |
| 0.75 | | | | | | | | | |
| Loose, light brown **SAND** | | | | | | | | | |
| 1.02 | | | | | | 1 | 100.32 | | |
| Stiff, grey **SILTY CLAY,** trace organics | | G | 1 | | | 2 | 99.32 | | |
| 2.90 | | | | | | | | | |
| Loose, light brown **SAND** | | | | | | 3 | 98.32 | | ▽ |
| | | | | | | 4 | 97.32 | | |
| 4.60 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 3.4m depth) | | | | | | | | | |

Pen. Resist. Blows/0.3m: 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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP72

**BORINGS BY** Excavator **DATE** 2020 January 8

| 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 | 101.92 | | |
| **FILL:** Dark brown organic silt with gravel, cobbles, trace boulders and constrcution debris | | | | | | 1 | 100.92 | | |
| 1.30 | | | | | | | | | |
| Loose, light brown **SAND** | | | | | | 2 | 99.92 | | |
| 2.30 | | | | | | | | | |
| Stiff, grey **SILTY CLAY,** trace organics | | | | | | 3 | 98.92 | | |
| | | | | | | 4 | 97.92 | | |
| | | | | | | 5 | 96.92 | | |
| 5.90 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

Water Content % scale: 20 40 60 80

Shear Strength (kPa) scale: 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. Residential Development - Borrisokane Rd.**
**Ottawa, Ontario**

**DATUM** Geodetic

**FILE NO.** PG5155

**REMARKS**

**HOLE NO.** TP73

**BORINGS BY** Excavator **DATE** 2020 January 8

| 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 | 102.39 | | |
| **FILL:** Brown silty sand with gravel, cobbles, boulders, trace organics | | | | | | 1 | 101.39 | | |
| | | | | | | 2 | 100.39 | | |
| 2.00 | | | | | | | | | |
| Loose, light brown **SAND** | | | | | | 3 | 99.39 | | ▽ |
| 3.90 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 2.9m depth) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**3713 Borrisokane Road**
**Ottawa, Ontario**

**DATUM** Ground surface elevations provided by J.D. Barnes Limited.

**FILE NO.** PG5016

**REMARKS**

**HOLE NO.** TP10

**BORINGS BY** Excavator **DATE** 2019 July 26

| 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 | 106.58 | | |
| **FILL:** Brown sand with gravel, cobbles and boulders | | G | 1 | | | | | | |
| 0.70 | | | | | | 1 | 105.58 | | |
| **FILL:** Brown silty sand with gravel, trace cobbles and boulders | | G | 2 | | | 2 | 104.58 | | |
| 3.30 | | | | | | 3 | 103.58 | | |
| **FILL:** Brown silty clay, trace sand and gravel | | G | 3 | | | 4 | 102.58 | | |
| 6.20 | | | | | | 5 | 101.58 | | |
| **FILL:** Brown sand, some gravel, trace cobbles and boulders | | G | 4 | | | 6 | 100.58 | | |
| 7.10 | | | | | | 7 | 99.58 | | |
| End of Test Pit<br>(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**
**3713 Borrisokane Road**
**Ottawa, Ontario**

**DATUM** Ground surface elevations provided by J.D. Barnes Limited.

**FILE NO.** PG5016

**REMARKS**

**HOLE NO.** TP11

**BORINGS BY** Excavator **DATE** 2019 July 26

| 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 | 105.18 | | |
| **FILL:** Brown sand with gravel, trace cobbles and boulders | | G | 1 | | | | | | |
| 0.60 | | | | | | 1 | 104.18 | | |
| **FILL:** Brown sand with gravel | | G | 2 | | | 2 | 103.18 | | |
| | | | | | | 3 | 102.18 | | |
| 4.40 | | G | 3 | | | 4 | 101.18 | | |
| Brown **SAND,** some gravel | | | | | | 5 | 100.18 | | |
| | | | | | | 6 | 99.18 | | |
| 6.30 | | G | 4 | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

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

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

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**3713 Borrisokane Road**
**Ottawa, Ontario**

**DATUM** Ground surface elevations provided by J.D. Barnes Limited.

**FILE NO.** PG5016

**REMARKS**

**HOLE NO.** TP12

**BORINGS BY** Excavator **DATE** 2019 July 26

| 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 | 103.85 | | |
| | | G | 1 | | | 1 | 102.85 | | |
| Brown **SAND** some gravel, trace to some cobbles and boulders | | | | | | 2 | 101.85 | | |
| | | G | 2 | | | 3 | 100.85 | | |
| | | | | | | 4 | 99.85 | | |
| 5.00 | | | | | | | | | |
| **GLACIAL TILL:** Brown clayey silt with sand and gravel 5.20 | | G | 3 | | | 5 | 98.85 | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 4.7m 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

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**3713 Borrisokane Road**
**Ottawa, Ontario**

**DATUM** Ground surface elevations provided by J.D. Barnes Limited.

**FILE NO.** PG5016

**REMARKS**

**HOLE NO.** TP13

**BORINGS BY** Excavator **DATE** 2019 July 26

| 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 | 104.50 | | |
| **FILL:** Dark brown to brown sand with gravel, some cobbles and boulders | | G | 1 | | | 1 | 103.50 | | |
| | | G | 2 | | | 2 | 102.50 | | |
| | | G | 3 | | | 3 | 101.50 | | |
| | | | | | | 4 | 100.50 | | |
| 4.80 | | | | | | | | | |
| Brown **SAND,** trace gravel | | G | 4 | | | 5 | 99.50 | | |
| 5.60 | | | | | | | | | |
| End of Test Pit<br><br>(Groundwater infiltration at 4.8m depth) | | | | | | | | | |

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**
**3713 Borrisokane Road**
**Ottawa, Ontario**

**DATUM** Ground surface elevations provided by J.D. Barnes Limited.

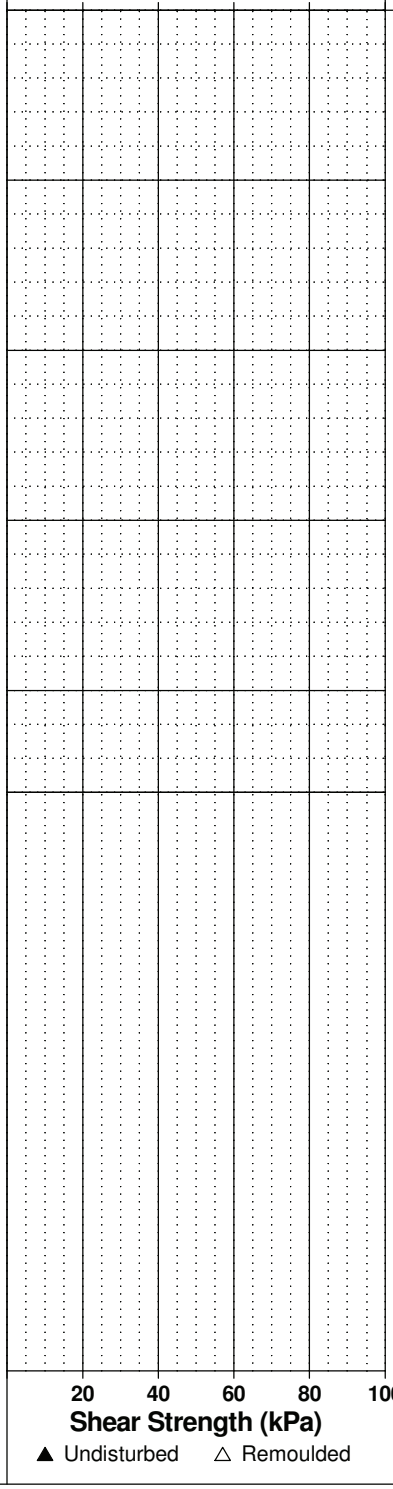
**FILE NO.** PG5016

**REMARKS**

**HOLE NO.** TP14

**BORINGS BY** Excavator **DATE** 2019 July 26

| 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 | 100.63 | | |
| **FILL:** Brown sand | | G | 1 | | | | | | |
| 0.50 | | | | | | 1 | 99.63 | | |
| **FILL:** Brown silty sand, some clay and gravel, trace cobbles and boulders | | G | 2 | | | | | | |
| 1.60 | | | | | | 2 | 98.63 | | |
| Brown **SAND,** trace gravel | | G | 3 | | | | | | |
| 2.80 | | | | | | 3 | 97.63 | | |
| | | G | 4 | | | | | | |
| Grey **SILTY CLAY** | | | | | | 4 | 96.63 | | |
| 4.60 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Groundwater infiltration at 1.8m depth) | | | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**3713 Borrisokane Road**
**Ottawa, Ontario**

**DATUM** Ground surface elevations provided by J.D. Barnes Limited.

**FILE NO.** PG5016

**REMARKS**

**HOLE NO.** TP26

**BORINGS BY** Excavator **DATE** 2019 September 18

| 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 | 105.54 | | |
| **FILL:** Brown silty sand with clay, trace organics and cobbles | | G | 1 | | | 1 | 104.54 | | |
| | | | | | | 2 | 103.54 | | |
| | | | | | | 3 | 102.54 | | |
| 4.09 | | | | | | 4 | 101.54 | | |
| **FILL:** Brown silty clay with concrete and boulders | | G | 2 | | | 5 | 100.54 | | |
| | | | | | | 6 | 99.54 | | |
| | | | | | | 7 | 98.54 | | |
| 7.67 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

# 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<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

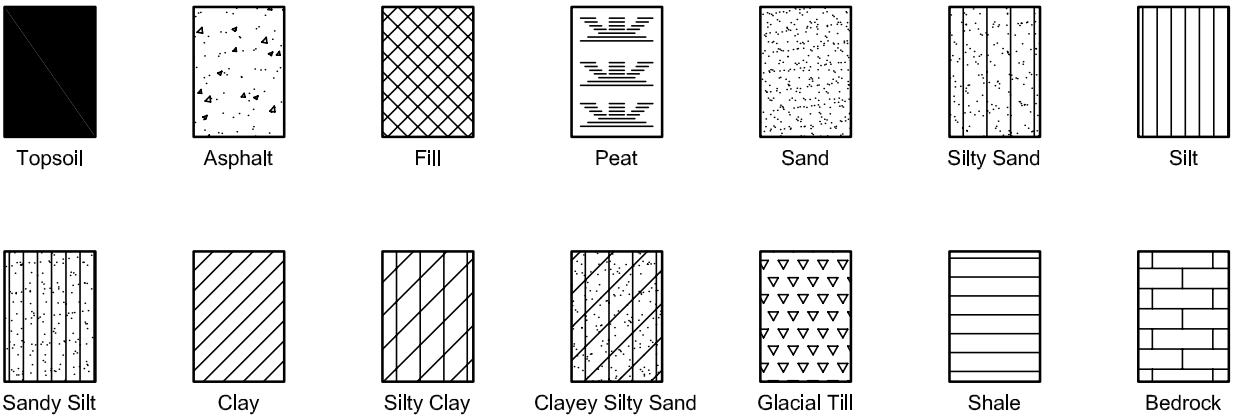
| | | |
|---|---|---|
| $p'_o$ | - | Present effective overburden pressure at sample depth |
| $p'_c$ | - | Preconsolidation pressure of (maximum past pressure on) sample |
| Ccr | - | Recompression index (in effect at pressures below $p'_c$) |
| Cc | - | Compression index (in effect at pressures above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

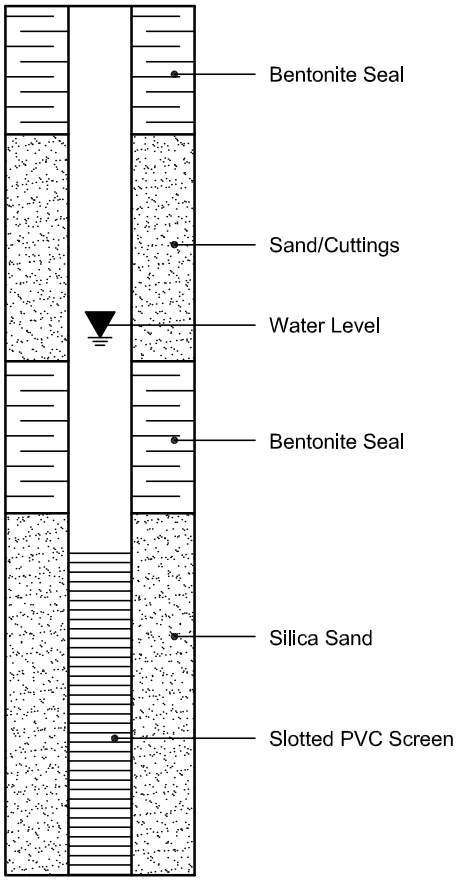
# SYMBOLS AND TERMS (continued)

## STRATA PLOT

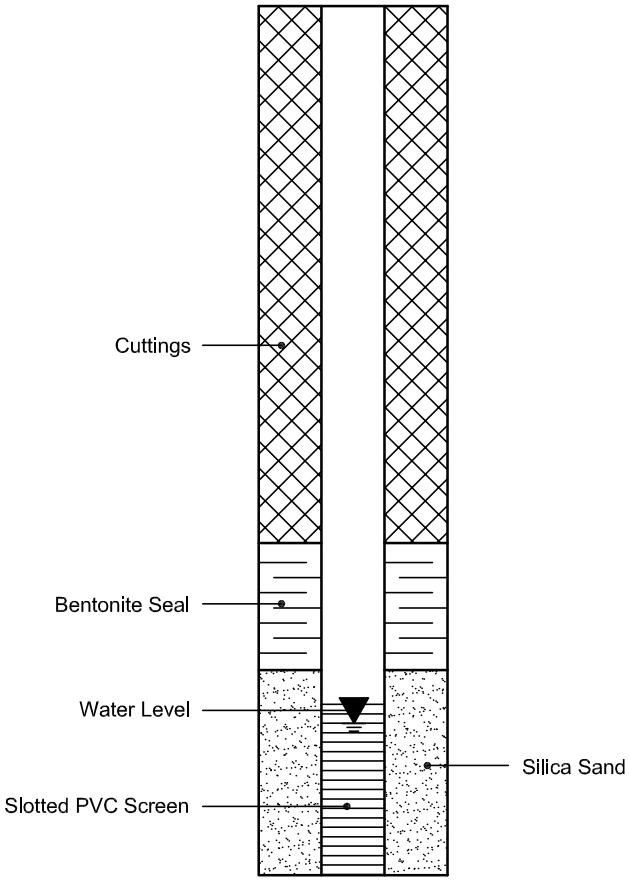



## MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION




PIEZOMETER CONSTRUCTION



# APPENDIX 2

**FIGURE 1 - KEY PLAN**

**DRAWING PG5155-1 - TEST HOLE LOCATION PLAN**


FIGURE 1

KEY PLAN

TP 34
103.24
BH 6
103.89
(100.09)
BH 18-19
103.89
TP 35
105.30
BH 17-19
105.42
TP 58
102.31
TP 27
105.62
TP 10
106.58
TP 26
105.54
TP 25
106.40
TP 14
100.63
TP 12
103.85
BH
20-19
103.72
TP 24
106.36
BH 8
100.95
TP 63
102.13
TP 46
102.74
TP 36
105.10
TP 40
106.46
TP 38
106.11
TP 62
101.34
TP 47
101.12
BH 12-19
105.09
(87.79)
TP 7
106.70
TP 71
101.32
TP 72
101.92
BH 13-19
105.43
BH 16-19
105.31
(83.75)
TP 23
105.53
TP 22
106.64
TP 70
101.76
TP 61
101.76
TP 60
102.04
TP 33
103.94
TP 37
105.02
TP 11
105.18
TP 73
102.39
BH 15-19
105.02
TP 66
103.08
TP 69
102.02
TP 48
102.61
TP 57
101.89
TP 58
102.31
TP 48
102.61
TP 65
102.82
TP 64
103.81
TP 59
103.81
BH19-19
104.14
(81.99)
TP 25
106.40
TP 39
105.29
TP 42
104.51
TP 49
103.49
TP 32
102.23
TP 68
102.88
TP 50
103.62
BH14-19
104.42
TP 43
104.67
TP 9
104.06
TP 56
103.31
TP 67
103.88
TP 45
104.14
TP 55
102.41
BH 7
103.77
(100.11)
BH 7
103.80
TP 52
104.04
BH 11-19
104.17
(92.18)
BH 9-19
104.25
BH 10-19
104.36
(92.19)
TP 41
105.10
TP 53
102.16
TP 44
103.85
TP 54
102.82
TP 51
103.92
*97.90
*98.65
*98.72
*100.02
*100.83
*101.16
*101.42
*102.06

LEGEND:

- BOREHOLE LOCATION
- TEST PIT LOCATION (2020)
- BOREHOLE WITH MONITORING WELL LOCATION
- TEST PIT LOCATION (PREVIOUS INVESTIGATION (JULY-NOVEMBER, 2019)

104.14 GROUND SURFACE ELEVATION (m)

(92.19) PRACTICAL REFUSAL TO AUGERING / DCPT ELEVATION (m)

ALL GROUND SURFACE ELEVATIONS ARE REFERENCED TO A GEODETIC ELEVATION (NAD83 ZONE 18N)

SCALE: 1:1500

0 25 50 75 100m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| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
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| | | | |
| | | | |

CAIVAN GREENBANK NORTH INC.

GEOTECHNICAL INVESTIGATION
3713-BORRISOKANE-PROPOSED COMMERCIAL DEVELOPMENT
OTTAWA, ONTARIO

Title:

# TEST HOLE LOCATION PLAN

| | |
|---|---|
| Scale: 1:1500 | Date: 02/2020 |
| Drawn by: RCG | Report No.: PG5155-1 |
| Checked by: DJG | **PG5155-1** |
| Approved by: DJG | Revision No.: |

p:\autocad drawings\geotechnical\pg51xx\pg5155\pg5155- 1 corrected holes.dwg