PATERSON GROUP

Geotechnical Investigation

Proposed Residential Development

3265 Jockvale Road
Barrhaven Town Center Stage 2
Ottawa, Ontario

Prepared for Minto Communities

Report PG5636-3 dated November 25, 2025

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Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Minto Communities to undertake a geotechnical investigation for the proposed residential development to be located at 3265 Jockvale Road for Barrhaven Town Center Stage 2 in the City of Ottawa, Ontario (refer to Figure 1 – Key Plan presented in Appendix 2 for the general site location).

The objectives of the geotechnical investigation were to:

- Determine the subsoil and groundwater conditions at this site by means of boreholes, and to
- Provide geotechnical recommendations for the design of the proposed development, including construction considerations which may affect its design.

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

2.0 Proposed Development

Based on the available drawings, it is understood that the proposed residential development will consist of various townhouse types, along with associated roadways, driveways, parking areas, and landscaped areas. In addition, a park is proposed on the west side of the site.

It is also expected that the proposed development will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current geotechnical investigation was carried out between October 20, 2025, and October 23, 2025, and consisted of 14 boreholes advancing to a maximum depth of 6.7 m below the existing ground surface.

In addition, a previous geotechnical investigation was completed by our firm in 2021, which included 9 boreholes advancing to a maximum depth of 6.7 m below the existing ground surface at the subject site. The locations of the test holes are shown on Drawing PG5636-15 – Test Hole Location Plan in Appendix 2.

Boreholes were advanced using a low-clearance track-mounted auger drill rig operated by a two-person crew. The test hole procedure consisted of augering to the required depths at the selected locations and sampling the overburden soils. All fieldwork was conducted under the full-time supervision of our personnel under the direction of a senior engineer from our geotechnical department.

Sampling and In Situ Testing

Soil samples were collected from the boreholes using two different techniques, namely, sampled directly from the auger flights (AU) or collected using a 50 mm diameter split spoon (SS) sampler. Boulders were cored in one borehole (BH 7-25). All samples were visually inspected and initially classified on site. The auger and split-spoon samples were placed in sealed plastic bags, and rock cores (RC) were placed in cardboard boxes.

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

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

Diamond drilling was carried out at the selected borehole location to advance through the boulders for the current investigation or to confirm the bedrock quality in the 2021 investigation. A recovery value and a Rock Quality Designation (RQD) value were calculated for each drilled section of bedrock and are presented as RC on the Soil Profile and Test Data sheets in Appendix 1. The recovery value is the ratio of the bedrock sample length recovered over the drilled section length, in percentage.

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

Groundwater Level Readings

Monitoring wells were installed in boreholes BH 9-25, BH 11-25, and 12A-25, and the remainder of the boreholes were fitted with a flexible polyethylene standpipe, in order to allow for groundwater measurements following completion of the site investigation. The groundwater level readings were obtained after a suitable stabilization period subsequent to the completion of the field investigation. In addition, groundwater observations were recorded in the open hole test pits during the geotechnical investigation.

Typical monitoring well construction details are described below:

- ❑ Up to 3.0 m of slotted 32 or 51 mm diameter PVC screen at the base of the boreholes.
- ❑ 32 or 51 mm diameter PVC riser pipe from the top of the screen to the ground surface.
- ❑ No.3 silica sand backfill within annular space around screen.
- ❑ 300 mm thick bentonite hole plug directly above PVC slotted screen.
- ❑ Clean backfill from top of bentonite plug to the ground surface.

The groundwater observations are discussed in Section 4.3, and the groundwater levels and well construction details are presented on the Soil Profile and Test Data sheets in Appendix 1.

3.2 Field Survey

The test hole locations were selected by Paterson to provide general coverage of the subject site. The test hole locations and ground surface elevation at each test hole location were surveyed by Paterson using a high precision, handheld GPS and referenced to a geodetic datum. The location of the boreholes is presented on Drawing PG5636-15 – Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

The soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. Moisture content testing was completed on all recovered soil samples from the current boreholes. A total of 1 shrinkage test, 4 grain size distribution tests, and 4 Atterberg limits tests were completed on selected soil samples from the investigations.

The results of the testing are presented in Section 4.2 and are provided in Appendix 1.

Sample Storage

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

3.4 Analytical Testing

Two (2) soil samples were submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The samples were submitted to determine the concentration of sulphate and chloride, the resistivity, and the pH of the samples. The results are presented in Appendix 1 and are discussed further in Section 6.7.

4.0 Observations

4.1 Surface Conditions

The subject site consists of undeveloped, primarily vacant land with scattered forested areas. An access road traverses the central portion of the property. The site is bordered by Longfields Drive to the east, Jockvale Road to the west, vacant lands and construction sites to the north, and vacant lands to the south. In addition, a temporary office building and a gravel-surfaced parking area were observed in the northeast corner of the subject site.

The ground surface elevation across the subject site is relatively flat, and slightly sloped upward from east to west, ranging between an approximate geodetic elevation of 92.4 m to 101.0 m. The subject site is relatively at grade with surrounding roadways and properties.

Reference should be made to Drawing PG5636-15 – Test Hole Location Plan included in Appendix 2.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile encountered at the test hole locations consists of either fill or topsoil underlain by a silty clay crust and/or silty sand and/or a glacial till deposit. Where encountered, the existing fill layer was observed to range between 0.4 to 2.2 m in depth.

The surficial layer of topsoil and/or fill was observed to be underlain by an undisturbed, hard to stiff and weathered crust layer of silty clay at BH 1-25, BH 3-25, BH4-25, BH 5-25 of the current investigation and BH 1-21, BH 6-21, BH 7-21 of the 2021 investigation. This crust layer was observed to range between 0.5 and 3.3 m in thickness. The crust layer was observed to be underlain by a layer of unweathered grey silty clay extending up to a depth of 6.5 m below the existing ground surface at BH 7-21.

Glacial till was observed underlying the above-noted deposits at all test hole locations. The glacial till generally consisted of silty sand and/or silty clay with varying amounts of clay. A significant amount of cobbles and boulders is also present throughout the glacial till deposit encountered throughout the subject site.

Practical refusal to augering was encountered at all borehole locations except BH 7-25, BH 8-25, BH 9-25, and BH 12A-25 at approximate depths ranging from 0.6 m to 6.7 m below existing grade, respectively, in the current investigation.

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 borehole location.

Bedrock

Bedrock was cored at BH 1-21 and BH 2-21 to depths of up to 13.6 m and was observed to consist of limestone with interbedded shale in the 2021 investigation. Based on the RQD values, the bedrock core was noted to be in good to excellent condition.

Based on available geological mapping, the subject site is located in an area where the bedrock consists of interbedded sandstone and dolomite of the March formation with a drift thickness between 5 to 15 m.

Grain Size Distribution Testing

The results of the soil samples submitted for grain size analysis from the test holes from the current investigation are summarized in Table 1, on the next page, and are also presented on the grain size distribution testing results sheets in Appendix 1.

Table 1 – Summary of Grain Size Distribution Analysis

Test Hole	Sample Depth	Gravel (%)	Sand (%)	Silt and Clay (%)
BH 3-25	SS6	22.3	50.9	26.8
BH 4-25	SS8	19.5	52.3	28.2
BH 11-25	SS7	22.4	46.5	31.1
BH 12A-25	SS3	41.4	39.9	18.7

Atterberg Limits Testing

Atterberg limits testing, as well as associated moisture content testing, was completed on the recovered silty clay samples at selected locations throughout the subject site. The results are summarized in Table 2 and presented on the Atterberg limits tests sheet in Appendix 1.

Table 2 – Summary of Atterberg Limits Tests

Sample	Depth (m)	Liquid Limit %	Plastic Limit %	Plasticity Index %	Classification
BH 1-25	1.83	70	34	36	MH
BH 4-25	1.83	45	22	23	CL
BH 6-21	2.59	51	29	22	MH
BH 7-21	2.59	72	35	37	MH

Notes: MH: Inorganic Silt of High Plasticity, CL: Inorganic Clay of Low Plasticity

Shrinkage Testing

The shrinkage limit and ratio of the tested soil sample (BH 3-25-SS2) are 20.67 percent and 1.755, respectively. The results are presented on the shrinkage testing sheet in Appendix 1.

4.3 Groundwater

Groundwater levels were measured in the installed piezometers and monitoring well on November 3, 2025, and January 8, 11, and 20, 2021.

The manual groundwater level (GWL) readings are presented in Table 3, in the following, and are shown on the Soil Profile and Test Data sheets in Appendix 1.

The long term groundwater level can also be estimated based on the recovered soil samples, moisture levels, and consistency. It is important to note that groundwater readings at piezometers can be influenced by surface water perched within the borehole backfill material.

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

Table 3 – Summary of Groundwater Levels

Borehole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
		Depth (m)	Elevation (m)	
BH 1-25	94.05	2.69	91.36	November 3, 2025
BH 2A-25	95.01	1.29	93.72	
BH 4-25	93.60	4.20	89.4	
BH 5-25	92.39	1.82	90.57	
BH 5A-25	92.39	3.22	89.17	
BH 6-25	93.44	0.72	92.72	
BH 7-25	96.75	4.70	92.05	
BH 8-25	98.12	5.84	92.28	
BH 9-25*	97.55	6.71	90.84	
BH 11-25*	96.68	Dry	N/A	
BH 12A-25*	98.31	5.12	93.19	
BH 13-25	100.96	2.39	98.57	
BH 14-25	99.74	1.63	98.11	
BH 4-21	97.70	1.52	96.18	January 8, 2021
BH 5-21	100.19	2.29	97.90	
BH 6-21	94.11	3.20	90.91	
BH 7-21	93.10	3.35	89.75	
BH 8-21	95.91	3.05	92.86	
BH 9-21	98.72	Dry	n/a	January 11, 2021
BH 11-21	98.05	4.57	93.48	
BH 12B-21	99.03	3.81	95.22	January 20, 2021
BH 13-21	99.66	4.42	95.24	

Note: The ground surface elevation at each borehole location was surveyed using a handheld GPS using a geodetic datum.
* - A monitoring well has been installed in the borehole.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered suitable for the proposed development. It is expected that the proposed residential dwellings will be founded on conventional spread footings placed on an undisturbed, hard to stiff silty clay, and/or undisturbed, compact silty sand, and/or undisturbed, compact to very dense glacial till deposit.

Furthermore, it is anticipated that cobbles and boulders will be encountered frequently throughout servicing trenches and building excavations. All contractors should be prepared for boulder, including oversized boulders, removal throughout the subject site.

Due to the presence of a silty clay deposit within a portion of the subject site, recommendations have been provided for permissible grade raise restrictions and tree planting setbacks in this area in Sections 5.3 and 6.8, respectively.

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

5.2 Site Grading and Preparation

Stripping Depth

Topsoil, and any deleterious fill, such as those containing organic materials, should be stripped from under any buildings and other settlement sensitive structures. Care should be taken not to disturb adequate bearing soils below the founding level during site preparation activities. Disturbance of the subgrade may result in having to sub- excavate the disturbed material and the placement of additional suitable fill material.

The existing fill, where free of organics and deleterious materials, can be left in place below the proposed floor slab and beyond the lateral support zones for footings. If considered to be left in place as subgrade, it is recommended that the existing fill be proof-rolled under dry conditions and above freezing temperatures by an adequately sized vibratory roller, making several passes to achieve optimum compaction levels. The compaction program should be reviewed and approved by Paterson personnel at the time of construction. In poor performing areas, be removed and reinstated with an approved engineered fill, such as OPSS Granular B Type II.

Fill Placement

Fill placed for grading beneath the building areas should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The imported fill material should be tested and approved prior to delivery. The fill should be placed in maximum 300 mm thick loose lifts and compacted by suitable compaction equipment. Fill placed beneath the building should be compacted to a minimum of 98% of the standard Proctor maximum dry density (SPMDD).

Non-specified existing fill, along with site-excavated soil, could be placed as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in lifts with a maximum thickness of 300 mm and compacted by the tracks of the spreading equipment to minimize voids. If these materials are to be used to build up the subgrade level for areas to be paved, they should be compacted in thin lifts to a minimum density of 95% of the SPMDD.

Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls unless used in conjunction with a composite drainage membrane connected to a perimeter drainage system.

Consideration could be given to re-using site-generated soils for fill to build-up the subgrade for structures such as the proposed buildings and subgrade for service trenches. From a geotechnical perspective, site-generated workable soil fill free of organic debris (topsoil, logs, stumps, etc.), inorganic material and/or stones/cobbles larger than 200 mm in their longest dimension meeting the aforementioned conditions are considered suitable for re-use throughout the subject site. Wet site-generated fill, such as the grey silty clay or grey glacial till soils will be saturated and expected to be difficult to re-use as the high-water contents make compacting impractical without an extensive drying period. Therefore, those soils are not anticipated to be suitable for this purpose.

Prior to considering site-generated soil for the above-noted purposes, Paterson field personnel must review, test (i.e., grain-size and proctor testing), and confirm the fill is in accordance with the above-noted recommendations. Once reviewed and approved by Paterson personnel, care will need to be taken during storage, placement, and compaction of the soil fill to maintain them in an unfrozen state and at a moisture content which is suitable for compaction.

Soils intended for re-use which become frozen and/or have excessive moisture contents will not be considered suitable for re-use at the subject site. Placement of this material during winter months increases the risk of placing frozen material, which is expected to result in future poor-performing areas that will require future repair due to long-term thawing and higher than tolerable amounts of settlement from placing frozen material.

Provided the fill is considered acceptable for placement by Paterson personnel at the time of construction, the approved soil fill may be placed in maximum 300 mm thick loose lifts, compacted using a suitably-sized vibratory sheepsfoot roller to a minimum of 98% of the materials SPMDD, in the dry and above-freezing conditions.

The placement of site-generated fill should be reviewed and approved by Paterson field personnel at the time of construction. Where this fill layer is placed below building footprints, it would be recommended to be capped with a minimum 300 mm thick layer of OPSS Granular A crushed stone compacted to a minimum of 98% of the materials SPMDD.

Consideration may also be given to re-using the site-generated cobbles and boulders exceeding the recommended maximum diameter for re-use. If considered, it is recommended to crush boulders to produce a well-graded crushed stone fill material matching the envelope of an OPSS Granular B Type I or Type II with a maximum particle size of 50 mm.

Testing and approval by Paterson during the crushing stages would be required to verify the adequacy of the material being produced for re-use. If the site-crushed material does not yield sufficiently well-graded material, Paterson may advise to combine the material with sand, OPSS Granular A, or other material to improve the materials gradation. This fill would be advised to be placed in maximum 300 mm thick loose lifts using a suitably-sized smooth-drum compactor and compacted to a minimum of 98% of the materials SMPDD.

Frozen material may not be considered for the above-noted purposes. This process should be reviewed and approved by Paterson field personnel upon completion of each lift and who are experienced in reviewing the placement of soil fill in this manner.

Proof Rolling and Mud Slabs

The contractor should take appropriate precautions to avoid disturbing the subgrade and bearing surfaces from construction and worker traffic. Any loose sandy soils or areas where fill is encountered at the design founding elevation (i.e., areas where existing structures exist) within the subgrade level for settlement sensitive structure would be recommended to be proof-rolled under dry conditions and above freezing temperatures by an adequately sized roller, making several passes to achieve optimum compaction levels. The compaction program should be reviewed and approved by Paterson field personnel.

Where structures are advanced and founded below the water table and within compact to dense glacial till soils, in-situ soils at the founding elevation are anticipated to become readily disturbed due to the saturated condition they may be encountered in. To mitigate disturbance by worker traffic, it may be advised that a minimum 75 mm thick mud slab be placed below any footing to prevent the subgrade from becoming disturbed by worker traffic and fluctuating water levels that may be present within the excavation depth at the time of construction. It would be key to maintain dewatered excavations at that time where these types of structures are considered to minimize subgrade disturbance.

Depending on the looseness and degree of saturation at the time of construction, other measures (additional compaction, dewatering, mud-slab, sub-excavation and reinstatement of crushed stone fill) may be recommended to accommodate site conditions at the time of construction. However, these considerations would be evaluated at the time of construction by Paterson on a footing-specific basis.

5.3 Foundation Design

Conventional Shallow Foundations

Strip footings, up to 3 m wide, and pad footings, up to 5 m wide, placed on an undisturbed, hard to stiff silty clay bearing surface can be designed using a bearing resistance value at serviceability limit state **(SLS) of 150 kPa** and a factored bearing resistance value at ultimate limit state **(ULS) of 225 kPa**.

Conventional spread footings placed on an undisturbed, compact silty sand bearing surface can be designed using a bearing resistance value at serviceability limit state **(SLS) of 150 kPa** and a factored bearing resistance value at ultimate limit states **(ULS) of 220 kPa**.

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

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

Footings designed using the bearing resistance values above will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to a deposit of silty clay, silty sand and/or glacial till above the groundwater table when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V passes only through in situ soil of the same or higher capacity as the bearing medium soil.

Permissible Grade Raise

A **permissible grade raise restriction of 3.0 m** is recommended for areas where building foundations are founded over a silty clay deposit in the areas outlined on Drawing PG5636-16 – Permissible Grade Raise Areas in Appendix 2. Footings bearing on a compact to very dense glacial till bearing surface will not be subjected to a permissible grade raise restriction.

If higher than permissible grade raises are required, preloading with or without a surcharge, lightweight fill, and/or other solutions may be recommended by the geotechnical consultant, if required, to mitigate the risks of unacceptable long-term post-construction total and differential settlements.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class X_D**. If a higher seismic site class is required (Class X_C) for the proposed development, a site-specific shear wave velocity test may be completed to accurately determine the applicable seismic site classification for foundation design of the proposed building, as defined in Table 4.1.8.4.A of the Ontario Building Code (OBC) 2024.

Accordingly, the soils underlying the subject site are not susceptible to liquefaction or cycling softening. Reference should be made to the latest version of the OBC 2024 for a full discussion of the earthquake design requirements.

5.5 Basement Slab / Slab-on-Grade Construction

With the removal of all topsoil and deleterious fill, such as material containing a high content of organic materials, the native soil, approved by the geotechnical consultant at the time of excavation, will be considered to be an acceptable subgrade surface on which to commence backfilling for floor slab construction. Any soft areas should be removed and backfilled with appropriate backfill material. OPSS Granular A or OPSS Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab for this purpose.

The existing fill, where free of organics and deleterious materials, can be left in place below the proposed floor slab and beyond the lateral support zones for footings. If considered to be left in place as subgrade, it is recommended that the existing fill be proof-rolled under dry conditions and above freezing temperatures by an adequately sized vibratory roller making several passes to achieve optimum compaction levels. The compaction program should be reviewed and approved by Paterson personnel at the time of construction. In poor performing areas be removed and reinstated with an approved engineered fill, such as OPSS Granular B Type II.

For structures with basement slabs, it is recommended that the upper 200 mm of sub-floor fill consists of 19 mm clear crushed stone. For any structures with slab-on-grade construction, the upper 200 mm of sub-slab fill is recommended to consist of OPSS Granular A crushed stone compacted to a minimum of 98% of the materials SPMDD. A clear crushed stone fill is recommended for backfilling below the floor slab for limited span slab-on-grade areas, such as front porch or garage footprints.

5.6 Basement Wall

Where the soil is to be retained, there are several combinations of backfill materials and retained soils that could be applicable for the basement walls of the subject structure. However, the conditions can be well-represented by assuming the retained soil consists of a material with an angle of internal friction of 30 degrees and a dry unit weight of 20 kN/m^3. The applicable effective unit weight of the retained soil can be estimated as 13 kN/m^3, where applicable. A hydrostatic pressure should be added to the total static earth pressure when calculating the effective unit weight.

Lateral Earth Pressures

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

K_o = at-rest earth pressure coefficient of the applicable retained soil (0.5)
γ = unit weight of fill of the applicable retained soil (kN/m^3)
H = height of the wall (m)

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

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

Seismic Earth Pressures

The total seismic force (P_{AE}) includes both the earth force component (P_o) and the seismic component (ΔP_{AE}).

The seismic earth force (ΔP_{AE}) can be calculated using $0.375 \cdot ac \cdot \gamma \cdot H^2/g$ where:

a_c = $(1.45-a_{max}/g)a_{max}$
γ = unit weight of fill of the applicable retained soil (kN/m^3)
H = height of the wall (m)
g = gravity, 9.81 m/s^2

The peak ground acceleration (a_{max}) for the Ottawa area is 0.362 g according to the OBC 2024. Note that the vertical seismic coefficient is assumed to be zero.

The earth force component (P_o) under seismic conditions can be calculated using:

$P_o = 0.5\ K_o\ \gamma\ H^2$, where $K_o = 0.5$ for the soil conditions noted above.

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

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

The earth forces calculated are unfactored. For the ULS case, the earth loads should be factored as live loads, as per the OBC 2024.

5.7 Pavement Design

For design purposes, the pavement structure presented in the following tables could be used for the design of driveways, local residential streets, and roadways with bus traffic. It should be noted that for residential driveways and car only parking areas, Ontario Traffic Category A is applicable. For local roadways, Ontario Traffic Category B should be used for design purposes.

Table 4 – Recommended Pavement Structure - Driveways

Thickness (mm)	Material Description
50	**Wear Course** – HL-3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** – OPSS Granular A Crushed Stone
300	**SUBBASE** – OPSS Granular B Type II

Notes:
1 - SUBGRADE - Either in situ soils or OPSS Granular B Type I or II material placed over in situ soil
2 - Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this Pavement Structure.

Table 5 – Recommended Pavement Structure – Local Residential Roadways

Thickness (mm)	Material Description
40	**Wear Course** – HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Binder Course** – HL-8 or Superpave 19.0 Asphaltic Concrete
150	**BASE** – OPSS Granular A Crushed Stone
450	**SUBBASE** – OPSS Granular B Type II

Notes:
1 - SUBGRADE - Either in situ soils or OPSS Granular B Type I or II material placed over in situ soil
2 - Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this Pavement Structure.

Table 6 – Recommended Pavement Structure – Arterial Roadways with Bus Traffic

Thickness (mm)	Material Description
40	**Wear Course** - Superpave 12.5 Asphaltic Concrete
50	**Upper Binder Course** - Superpave 19.0 Asphaltic Concrete
50	**Lower Binder Course** - Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
600	**SUBBASE** - OPSS Granular B Type II

Notes:
1 - SUBGRADE - Either in situ soils or OPSS Granular B Type I or II material placed over in situ soil
2 - Minimum Performance Graded (PG) 64-34 asphalt cement should be used for this Pavement Structure.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. Weak subgrade conditions may be experienced over service trench fill materials. This may require the use of a geotextile, thicker subbase or other measures that can be recommended at the time of construction as part of the field observation program.

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for driveways and local roadways and PG 64-34 asphalt cement should be used for roadways with bus traffic. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage

It is recommended that a perimeter foundation drainage system be provided for the structures with basement levels. The system should consist of a 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 19 mm clear crushed stone which is placed at the footing level around the exterior perimeter of the structure. The perimeter drainage pipe should direct water to sump pit(s) located within the lower basement levels or provide a gravity connection to the storm sewer.

The perimeter foundation drainage system is considered optional for slab-on-grade structures. Consideration should be given to implementing it below areas supporting hardscaping/settlement sensitive structures (i.e., driveways and pathways) to maintain the service life of these structures.

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 CCW MiraDRAIN 2000 or Delta Terraxx, 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 and Slabs Against Frost Action

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

Exterior unheated footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of the 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

Unsupported Excavations

The side slopes of excavations in the soil and fill overburden materials should either be 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 greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be excavated at 1H:1V or shallower. The shallower slope is required for excavation below groundwater level. The subsurface soils are considered to be a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

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

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

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications and Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa.

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 native soil above the cover material if the excavation and filling operations are carried out in dry weather conditions. Any stones greater than 200 mm in their longest dimension should be removed from these materials prior to placement.

The backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to reduce potential differential frost heaving. The backfill should be placed in maximum 225 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

Clay Seals

To reduce long-term lowering of the groundwater level at this site, clay seals should be provided in the service trenches. The seals should be at least 1.5 m long and should extend from trench wall to trench wall.

Generally, the seals should extend from the frost line and fully penetrate the bedding, subbedding, and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in a maximum 225 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD. The clay seals should be placed at the site boundaries and at strategic locations at no more than 60 m intervals in the service trenches.

6.5 Groundwater Control

Groundwater Control for Site Servicing and Building Construction

Due to the permeable glacial till deposit encountered below the groundwater table at the subject site, it is anticipated that conventional pumping with open sumps would be insufficient to control groundwater influx through service trenches and deep basement excavations located below the groundwater table.

Therefore, if excavations for the above-noted items are anticipated to be undertaken below the groundwater table and within the permeable sand or glacial till deposits, dewatering from outside the excavations using deep wells, well points, or other means may be required and should be determined by the earthwork's contractors dewatering specialist during the planning and pre-construction stages of the project. Paterson should be advised to assist with the interpretation of existing in-situ soils information during this process. It is nonetheless advised that the site servicing and earthworks contractor retain a dewatering specialist for all excavations planned below the groundwater table throughout the subject site.

Above the groundwater table within sand/glacial till and/or in the silty clay layer, it is anticipated that groundwater infiltration into the excavations should be low to moderate, if encountered, and controllable using open sumps. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

Groundwater Control

Under the current regulations enacted by the Ministry of Environment, Conservation and Parks (MECP), any dewatering in excess of 50,000 L/day requires a registration on the Environmental Activity and Sector Registry (EASR), so long as that dewatering is related to construction. If the dewatering is not related to construction, a Permit to Take Water obtained from the MECP will be required.

In the event that an EASR is required to facilitate dewatering of the proposed development, a minimum of three 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. Should a Permit to Take Water be required, a minimum of five to six months should be allotted for completion of the permit, due to the minimum review period imposed by the MECP.

Impacts on Neighbouring Properties

It is not anticipated that the proposed excavations will extend significantly below the long-term groundwater level. As a result, long-term groundwater lowering is not anticipated, and therefore, no adverse effects are expected to be seen on neighbouring properties.

6.6 Winter Construction

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

The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

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

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

6.7 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (normal cement) would be appropriate for this site. The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a non-aggressive to moderate corrosive environment.

6.8 Landscaping Considerations

Tree Planting Restrictions

In accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines), Paterson completed a soils review of the site to determine applicable tree planting setbacks. Atterberg limits testing was completed for the recovered silty clay samples at selected locations throughout the subject site. The soil samples were recovered from elevations below the anticipated design underside of footing elevation and 3.5 m depth below the anticipated finished grade. The results of our testing are presented in Table 2 in Section 4.2 and in Appendix 1.

Based on the results of our review, the following tree planting setbacks are required within the proposed development, in the areas where silty clay was encountered. The approximate limits of the portion of the site subject to the tree planting setback are shown on Drawing PG5636-17 – Tree Planting Setback Recommendations provided in Appendix 2. Tree planting setbacks are not required for the remainder of the site. The recommended tree planting setbacks should be reviewed by Paterson once the proposed grading plan has been prepared.

Low to Medium Sensitivity Clay Area

A low to medium sensitivity clay soil was encountered between the anticipated design underside of footing elevation and 3.5 m below finished grade as per City of Ottawa Guidelines, in the area outlined in Drawing PG5636-17– Tree Planting Setback Recommendations in Appendix 2. Based on our Atterberg limits test results, the modified plasticity index does not exceed 40% in these areas. The following tree planting setbacks are therefore recommended for the low to medium sensitivity area.

Large trees (mature height over 14 m) can be planted within these areas where a tree to foundation setback equal to the full mature height of the tree can be provided (e.g. in a park or other green space). Tree planting setback limits may be reduced to **4.5 m** for small (mature height up to 7.5 m) and medium size trees (mature tree height 7.5 to 14 m), provided that the conditions noted below are met.

- ❑ The underside of footing (USF) is 2.1 m or greater below the lowest finished grade for footings within 10 m from the tree, as measured from the center of the tree trunk and verified by means of the Grading Plan.
- ❑ A small tree must be provided with a minimum of 25 m3 of available soils volume while a medium tree must be provided with a minimum of 30 m3 of available soil volume, as determined by the Landscape Architect. The developer is to ensure that the soil is generally un-compacted when backfilling in street tree planting locations.
- ❑ The tree species must be small (mature tree height up to 7.5 m) to medium size (mature tree height 7.5 m to 14 m) as confirmed by the Landscape Architect.
- ❑ The foundation walls are to be reinforced at least nominally (minimum of two upper and two lower 15M bars in the foundation wall).
- ❑ Grading surrounding the tree must promote drainage to the tree root zone (in such a manner as not to be detrimental to the tree), as noted on the subdivision Grading Plan.

Aboveground Swimming Pools

The in-situ soils are considered to be acceptable for in-ground swimming pools. Aboveground swimming pools must be placed at least 5 m away from the residence foundation, neighbouring foundations, and any retaining wall structures. Otherwise, pool construction is considered routine and can be constructed in accordance with the manufacturer's recommendations.

Aboveground Hot Tubs

Hot tubs must be placed at least 2 m away from the residence foundation walls. Additional grading around hot tubs should not exceed the permissible grade raises specified in this report. Otherwise, hot tub construction is considered routine and can be constructed in accordance with the manufacturer's specifications.

Decks and Building Additions

Additional grading around proposed decks or additions should not exceed permissible grade raises. Otherwise, standard construction practices are considered acceptable.

7.0 Recommendations

It is recommended that the following be carried out by Paterson once design details of the proposed development have been prepared:

- ❑ Review preliminary and detailed grading, servicing plan(s) from a geotechnical perspective.

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

- ❑ Review and inspection of the installation of the foundation drainage systems.
- ❑ Observation of all bearing surfaces prior to the placement of concrete.
- ❑ Sampling and testing of the concrete and fill materials.
- ❑ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❑ Observation of all subgrades prior to backfilling and follow-up field density tests to determine the level of compaction achieved.
- ❑ Field density tests to determine the level of compaction achieved.
- ❑ Sampling and testing of the bituminous concrete including mix design reviews.

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

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

8.0 Statement of Limitations

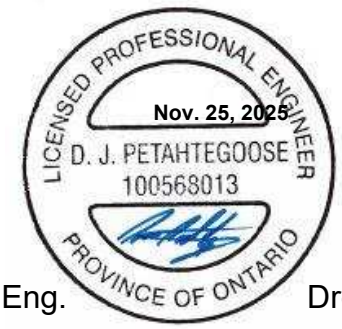
The recommendations provided in this report are in accordance with our present understanding of the project. We request permission to review our recommendations when the drawings and specifications are completed.

A geotechnical investigation of this nature is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test 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 its 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 Minto Communities or their agents is not authorized without review by Paterson Group for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.



Yashar Ziaeimehr, M.A.Sc., P.Eng. Drew Petahtegoose, P.Eng.

Report Distribution:

- ❑ Minto Communities (1 digital copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ATTERBERG LIMIT TESTING RESULTS

GRAIN SIZE TESTING RESULTS

SHRINKAGE TESTING RESULTS

ANALYTICAL TESTING RESULTS

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364808.98 **NORTHING:** 5014462.06 **ELEVATION:** 94.05

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 20, 2025

FILE NO. : PG5636

HOLE NO. : BH 1-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									94
FILL: Brown silty sand with crushed stone			AU 1			12			
			SS 2	76	20-35-35-30 70/0.08	5			
						9			
1.42m [92.63m]		1	SS 3	8	10-9-8-9 17	7			93
Hard, brown **SILTY CLAY**			SS 4	92	4-6-7-7 13	33			
		2	SS 5	92	4-3-3-2 6	35		249 2.69 m 2025-11-03	92
2.95m [91.10m]									
GLACIAL TILL: Compact, brown silty clay with sand, some gravel		3	SS 6	75	P	24			91
3.73m [90.32m]									
GLACIAL TILL: Compact, grey silty sand with clay and gravel		4	SS 7	91	1-5-7-6 12	14			90
4.37m [89.68m]									
End of Borehole		5							89
Practical refusal to augering at 4.37 m depth		6							88
(GWL at 2.69 m depth - November 3, 2025)		7							87
		8							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364816.84 **NORTHING:** 5014513.88 **ELEVATION:** 95.01

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 20, 2025

FILE NO. : PG5636

HOLE NO. : BH 2-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									95
FILL: Brown silty sand with crushed stone			AU 1						
			SS 2	70	33-50-/-/ 50/0.1	17			
- Some clay by 0.7 m depth									
0.94m [94.07m]			SS 3	100	11-41-21-25 62	14			
End of Borehole		1							94
Practical refusal to augering at 0.94 m depth		2							93
		3							92
		4							91
		5							90
		6							89
		7							88
		8							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364657.70 **NORTHING:** 5014399.64 **ELEVATION:** 95.01

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 20, 2025

FILE NO. : PG5636

HOLE NO. : BH 2A-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80	REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80	PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE											95
FILL: Brown silty sand with crushed stone			AU 1								
			SS 2	100	21-45-27-16 72	6					
- Some clay by 0.7 m depth		1	SS 3	89	8-50-/-/ 50/0.08	13					94
1.30m [93.71m]										1.29 m 2025-11-03	
End of Borehole											
Practical refusal to augering at 1.30 m depth		2									93
(GWL at 1.29 m depth - November 3, 2025)		3									92
		4									91
		5									90
		6									89
		7									88
		8									

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364628.51 **NORTHING:** 5014327.09 **ELEVATION:** 95.12

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 21, 2025

FILE NO. : PG5636

HOLE NO. : BH 3-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									95
TOPSOIL: with organics 0.08m [95.04m]			AU 1			15			
Compact, brown **SILTY SAND**, trace clay 0.69m [94.43m]									
Stiff, brown **SILTY CLAY**, trace gravel		1	SS 2	67	2-6-8-31 14	28 24			94
1.45m [93.67m]									
Compact, brown **SILTY SAND**, with gravel		2	SS 3	67	30-14-12-13 26	13			93
- Some clay and cobbles by 2.3 m depth			SS 4	67	11-5-13-7 18	17			
2.97m [92.15m]									
GLACIAL TILL: Loose to compact, brown silty clay with gravel, cobbles and boulders, some sand		3	SS 5	100	4-3-3-3 6	12			92
		4	SS 6	71	1-2-1-1 3	11			91
		5	SS 7	63	3-2-1-1 3	15			90
		6	SS 8	29	3-6-4-4 10	18			89
- Grey by 6.1 m depth			SS 9	58	2-3-5-5 8	11			
6.71m [88.41m]		7							88
End of Borehole									
Practical refusal to augering at 6.71 m depth		8							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364661.57 **NORTHING:** 5014277.17 **ELEVATION:** 93.60

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 21, 2025

FILE NO. : PG5636

HOLE NO. : BH 4-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
TOPSOIL: with organics 0.13m [93.47m]			AU 1			28			93
Hard to stiff, brown **SILTY CLAY**		1	SS 2	100	P	40	249		92
2.21m [91.39m]		2	SS 3	100	3-5-5-5 10	36			
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders, trace clay			SS 4	71	3-8-9-7 17	11			91
3.35m [90.25m]		3	SS 5	75	2-2-7-3 9	12 14			90
GLACIAL TILL: Compact to loose, grey silty sand with gravel, cobbles and boulders, trace clay		4	SS 6	37	2-4-3-4 7	11		4.20 m 2025-11-03	89
		5	SS 7	58	2-4-7-5 11	10			88
6.02m [87.58m]		6	SS 8	58	1-1-2-2 3	10			
GLACIAL TILL: Dense, brown sand with gravel, cobbles and boulders			SS 9	50	10-24-12-12 36	12			87
6.71m [86.89m]		7							
End of Borehole Practical refusal to augering at 6.71 m depth (GWL at 4.20 m depth - November 3, 2025)		8							86

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364781.27 **NORTHING:** 5014362.16 **ELEVATION:** 92.39

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 21, 2025

FILE NO. : PG5636

HOLE NO. : BH 5-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
TOPSOIL: with organics 0.08m [92.31m]									92
Stiff, brown **SILTY CLAY**		1	SS 1	83	1-3-7-6 10	35			
			SS 2	100	3-5-7-6 12	40			91
1.80m [90.59m]			SS 3	100	1-3-17-17 20	35			
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders, some clay		2				15			90
3.00m [89.39m]			SS 4	46	2-8-7-5 15	18			
End of Borehole		3							89
Practical refusal to augering at 3.0 m depth		4							88
(GWL at 1.82 m depth - November 3, 2025)		5							87
		6							86
		7							85
		8						1.82 m - 2025-11-03	

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364782.72 **NORTHING:** 5014369.85 **ELEVATION:** 92.39

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 21, 2025

FILE NO. : PG5636

HOLE NO. : BH 5A-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80	REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80	PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE											
OVERBURDEN											
2.29m [90.10m]											
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders, trace clay			SS 1	21	3-7-8-6 15	11					
- Grey by 3.0 m depth			SS 2	58	4-6-7-4 13	12				3.22 m 2025-11-03	
			SS 3	83	1-2-8-3 10	11					
			SS 4	42	2-20-14-5 34	14					
			SS 5	58	3-13-8-7 21	11					
6.05m [86.34m]											
End of Borehole											
Practical refusal to augering at 6.05 m depth											
(GWL at 3.22 m depth - November 3, 2025)											

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364775.25 **NORTHING:** 5014401.57 **ELEVATION:** 93.44

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 21, 2025

FILE NO. : PG5636

HOLE NO. : BH 6-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
FILL: Coarse granular, crushed stone and blast rock			AU 1			8			
0.46m [92.98m]									
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders		1	SS 2	50	7-8-11-12 19	10		0.72 m 2025-11-03	93
1.55m [91.89m]									92
End of Borehole		2							91
Practical refusal to augering at 1.55 m depth		3							90
(GWL at 0.72 m depth - November 3, 2025)		4							89
		5							88
		6							87
		7							86
		8							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364667.11 **NORTHING:** 5014454.49 **ELEVATION:** 96.75

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 22, 2025

FILE NO. : PG5636

HOLE NO. : BH 7-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
FILL: Coarse granular crushed stone									
0.15m [96.60m]									
FILL: Brown silty sand with gravel, cobbles and crushed stone, some clay									
0.69m [96.06m]									
GLACIAL TILL: Very dense to dense, brown silty sand with gravel, cobbles and boulders		1	AU 1			7			
			SS 2	92	12-18-50-/ 68/0.03	8			
			SS 3	59	50-/-/-/ 50/0.13	2			
		2	RC 1	25					
		3	SS 4	8	12-20-20-14 40	6			
		4	RC 2	91					
		5	RC 3	32					
		6	SS 5		3-3-13-50 16/0.05	14			
6.43m [90.32m]		7							
End of Borehole									
(GWL at 4.70 m depth - November 3, 2025)		8							

4.70 m 2025-11-03

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364518.57 **NORTHING:** 5014379.67 **ELEVATION:** 98.12

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 22, 2025

FILE NO. : PG5636

HOLE NO. : BH 8-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
FILL: Brown silty clay, some gravel, trace sand			AU 1			16			98
0.69m [97.43m]									
GLACIAL TILL: Very dense to compact, brown silty sand with gravel, cobbles and boulders		1	SS 2	82	5-12-50-/ 62/0.13	9			97
			SS 3	87	10-42-50-/ 92/0.08	6			
		2							96
			SS 4	67	16-42-29-31 71	6			
		3							95
			SS 5	67	5-18-29-20 47	8			
		4							94
			SS 6	46	6-30-16-20 46	8			
		5							93
			SS 7	63	6-20-7-11 27	8			
- Trace clay between 5.3 m to 5.9 m depth									
		6	SS 8	100	4-16-15-18 31	8			92
6.58m [91.54m]									
End of Borehole			SS 9	84	4-18-48-50 66/0.03	8			91
(GWL at 5.84 m depth - November 3, 2025)		7							
		8							

5.84 m 2025-11-03

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364544.29 **NORTHING:** 5014341.79 **ELEVATION:** 97.55

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 22, 2025

FILE NO. : PG5636

HOLE NO. : BH 9-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	MONITORING WELL CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
FILL: Brown silty sand with gravel and cobbles			AU 1			12			97
0.69m [96.86m]									
GLACIAL TILL: Very dense to compact, brown silty sand with gravel, cobbles and boulders		1	SS 2	100	5-22-39-39 61	6			96
		2	SS 3	100	6-36-50-/ 86/0.13	6			95
		3	SS 4	79	7-48-20-14 68	8			94
		4	SS 5	100	10-23-22-21 45	9			93
		5	SS 6	100	10-32-22-23 54	7			92
- Trace clay between 4.5 m to 5.2 m depth		6	SS 7	75	12-15-12-16 27	9			91
		7	SS 8	71	12-26-45-45 71	7			90
6.71m [90.84m]		8	SS 9	46	3-18-32-22 50	10			
End of Borehole									
(GWL at 6.71 m depth - November 3, 2025)								5.19m; 6.71 m 2025-11-03	

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364682.64 **NORTHING:** 5014398.59 **ELEVATION:** 97.22

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 21, 2025

FILE NO. : PG5636

HOLE NO. : BH10-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
TOPSOIL: with organics 0.13m [97.09m]		0	AU 1			10			97
Compact to dense, brown **SILTY SAND** with gravel and cobbles									
0.94m [96.28m]			SS 2	29	31-50-/-/ 50/0.03	5			
End of Borehole		1							96
Practical refusal to augering at 0.94 m depth		2							95
		3							94
		4							93
		5							92
		6							91
		7							90
		8							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364666.71 **NORTHING:** 5014395.56 **ELEVATION:** 97.22

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 21, 2025

FILE NO. : PG5636

HOLE NO. : BH10A-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE: TYPE AND NO.	SAMPLE: RECOVERY (%)	SAMPLE: N OR RQD	SAMPLE: WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80	REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80	PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE		0									97
TOPSOIL: with organics 0.13m [97.09m]											
Brown **SILTY SAND** with gravel and cobbles 0.61m [96.61m]											
End of Borehole		1									96
Practical refusal to augering at 0.61 m depth		2									95
		3									94
		4									93
		5									92
		6									91
		7									90
		8									

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364657.70 **NORTHING:** 5014399.64 **ELEVATION:** 97.84

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 21, 2025

FILE NO. : PG5636

HOLE NO. : BH10B-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
TOPSOIL: with organics 0.13m [97.71m]		0	AU 1			8			97
Compact, brown **SILTY SAND** with gravel and cobbles 0.69m [97.15m]									
GLACIAL TILL: Very dense, brown silty sand with gravel, cobbles and boulders		1	SS 2	100	12-29-40-45 69	7			
1.50m [96.34m]									96
End of Borehole		2							
Practical refusal to augering at 1.5 m depth									95
		3							
									94
		4							
									93
		5							
									92
		6							
									91
		7							
									90
		8							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364723.32 **NORTHING:** 5014396.49 **ELEVATION:** 96.68

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 23, 2025

FILE NO. : PG5636

HOLE NO. : BH11-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	MONITORING WELL CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
TOPSOIL: with organics			AU 1			5			
0.13m [96.55m]									
Brown **SILTY SAND**, trace gravel									
0.69m [95.99m]									
GLACIAL TILL: Very dense to compact, brown silty sand with gravel, cobbles and boulders		1	SS 2		50-/-/-/ 50/0.03				96
		2	SS 3	67	7-50-/-/ 50/0.08	6			95
			SS 4	100	50-/-/-/ 50/0.03				94
- Trace clay by 3.0 m depth		3	SS 5	100	5-12-15-14 27	8			93
		4	SS 6	4	9-26-34-31 60	7			
		5	SS 7	100	6-18-21-16 39	8		4.68m	92
- Greyish brown by 5.3 m depth			SS 8	100	8-10-18-21 28	8			91
5.99m [90.69m]		6						6.20m	
End of Borehole									90
Practical refusal to augering at 5.99 m depth		7							
(BH Dry on - November 3, 2025)									89
		8							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364517.59 **NORTHING:** 5014270.68 **ELEVATION:** 98.31

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 23, 2025

FILE NO. : PG5636

HOLE NO. : BH12-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
TOPSOIL: with organics, trace gravel		0	AU 1			16			98
0.28m [98.03m]									
GLACIAL TILL: Very dense, brown silty sand with gravel, cobbles and boulders		1	SS 2	100	6-24-50-/ 74/0.13	7			97
1.27m [97.04m]									
End of Borehole		2							96
Practical refusal to augering at 1.27 m depth		3							95
		4							94
		5							93
		6							92
		7							91
		8							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364515.55 **NORTHING:** 5014267.66 **ELEVATION:** 98.31

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 23, 2025

FILE NO. : PG5636

HOLE NO. : BH12A-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	MONITORING WELL CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
OVERBURDEN: Refer BH 12-25 for soil profile									
1.52m [96.79m]									
GLACIAL TILL: Very dense to compact, brown silty sand with gravel, cobbles and boulders			SS 1	86	9-50-50-/ 100/0.05	7			
			SS 2	100	9-20-39-50 59/0.05	7			
			RC 1	73					
			RC 2	19					
			SS 3	58	11-15-22-19 37	13			
			SS 4	25	16-14-13-14 27	9			
			SS 5	21	3-15-25-12 40	9			
6.71m [91.60m]									
End of Borehole									
(GWL at 5.12 m depth - November 3, 2025)								5.12 m 5.02m 2025-11-03 6.54m	

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364452.65 **NORTHING:** 5014268.33 **ELEVATION:** 100.96

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 23, 2025

FILE NO. : PG5636

HOLE NO. : BH13-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
TOPSOIL: with organics 0.30m [100.66m]									
FILL: Brown silty clay, trace gravel 0.69m [100.27m]			AU 1			20			
FILL: Compact, brown silty sand with gravel and cobbles, trace organics and clay 1.68m [99.28m]		1	SS 2	54	5-13-17-14 30	20			100
			SS 3	95	4-13-33-50 46/0.08	13			
GLACIAL TILL: Dense to very dense, brown silty sand with gravel, cobbles and boulders 2.69m [98.27m]		2	SS 4	63	20-50-/-/ 50/0.05	8 5		2.39 m - 2025-11-03	99
End of Borehole Practical refusal to augering at 2.69 m depth (GWL at 2.39 m depth - November 3, 2025)		3							98
		4							97
		5							96
		6							95
		7							94
		8							93

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

3265 Jockvale Road - Barrhaven Town Centre Stage 2, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 364495.54 **NORTHING:** 5014224.42 **ELEVATION:** 99.74

PROJECT: Proposed Residential Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: October 23, 2025

FILE NO. : PG5636

HOLE NO. : BH14-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
TOPSOIL: with organics 0.15m [99.59m]									
FILL: Loose, Brown silty sand with gravel 0.30m [99.44m]									
GLACIAL TILL: Compact to very dense, brown silty sand with gravel, cobbles and boulders		1	SS 1	75	2-2-4-6 6	10			99
			SS 2	75	5-26-43-44 69	6			
			SS 3	33	11-50-/-/ 50/0.08	5		1.63 m 2025-11-03	98
1.98m [97.76m]		2							
End of Borehole									97
Practical refusal to augering at 1.98 m depth		3							
(GWL at 1.63 m depth - November 3, 2025)		4							96
		5							95
		6							94
		7							93
		8							92

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Mixed-Use Commercial and Residential Development
3265 Jockvale Road - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 6

FILE NO. PG5636

HOLE NO. BH 1-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	96.25
TOPSOIL 0.20		AU	1				
Very stiff brown **SILTY CLAY**		SS	2	96	7	1	95.25
2.13		SS	3	86	6	2	94.25
GLACIAL TILL: Compact to dense brown silty clay with sand, gravel, cobbles and boulders		SS	4	54	11	3	93.25
		SS	5	38	32		
		SS	6	20	+50	4	92.25
- Grey by 4.5 m depth		SS	7	21	19	5	91.25
		SS	8	21	38		
		SS	9	50	+50	6	90.25
		SS	10	33	37	7	89.25
		SS	11	75	28		
		SS	12	0	+50	8	88.25
9.58		SS	13	100	+50	9	87.25
BEDROCK: Good quality limestone with interbedded shale		RC	1	100	80	10	86.25
- Good quality seam of shale from 10.52 m depth to 12.67 m depth		RC	2	98	73	11	85.25
						12	84.25
- Excellent quality limestone with interbedded shale by 12.6 m depth		RC	3	100	98	13	83.25
13.59							
End of Borehole							
(GWL based on site observations at 5.18 m depth - Jan 6, 2021)							

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

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Mixed-Use Commercial and Residential Development
3265 Jockvale Road - Ottawa, Ontario

DATUM Geodetic

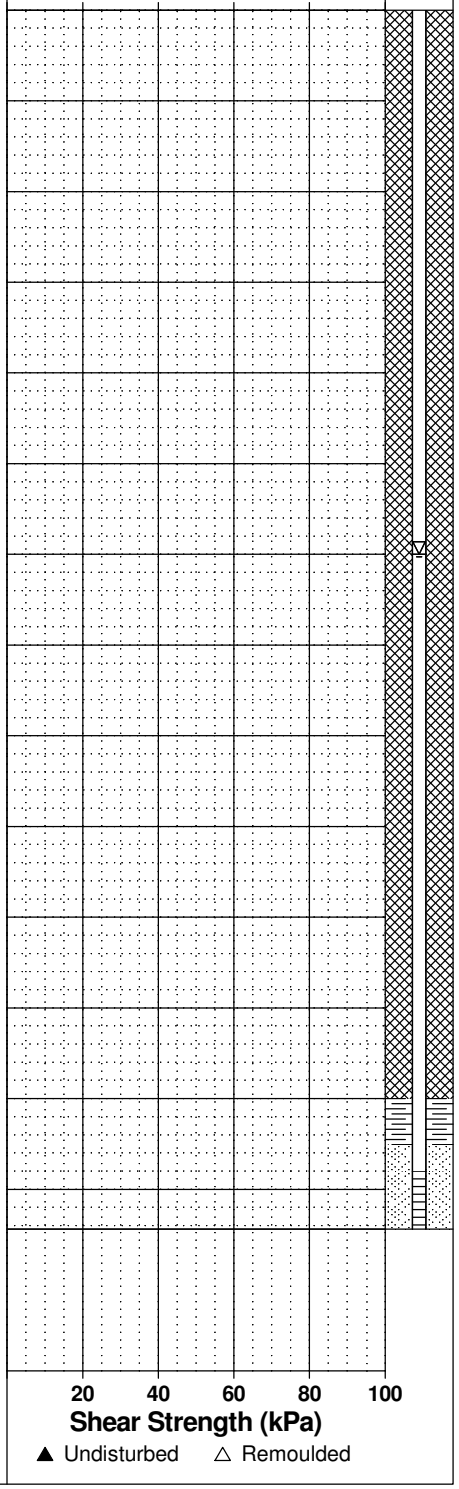
FILE NO. PG5636

REMARKS

HOLE NO. BH 2-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 7

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	102.53
FILL: Brown silty clay with gravel and cobbles		AU	1				
		G	2			1	101.53
		SS	3	73	+50		
2.29						2	100.53
		SS	4	81	+50		
GLACIAL TILL: Compact to very dense brown silty sand with gravel, cobbles and boulders		SS	5	86	+50	3	99.53
- Grey by 4.0 m depth						4	98.53
- Increasing gravel content with depth		SS	6	78	+50		
						5	97.53
		SS	7	67	65	6	96.53
						7	95.53
		SS	8	17	19	8	94.53
						9	93.53
		SS	9	74	+50		
						10	92.53
		SS	10	38	67	11	91.53
12.29						12	90.53
BEDROCK: Good quality limestone with interbedded shale		SS	11	100	+50		
		RC	1	93	84	13	89.53
13.44							
End of Borehole							
(GWL based on site observations at 6.0 m depth - Jan 7, 2021)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Mixed-Use Commercial and Residential Development
3265 Jockvale Road - Ottawa, Ontario

DATUM Geodetic

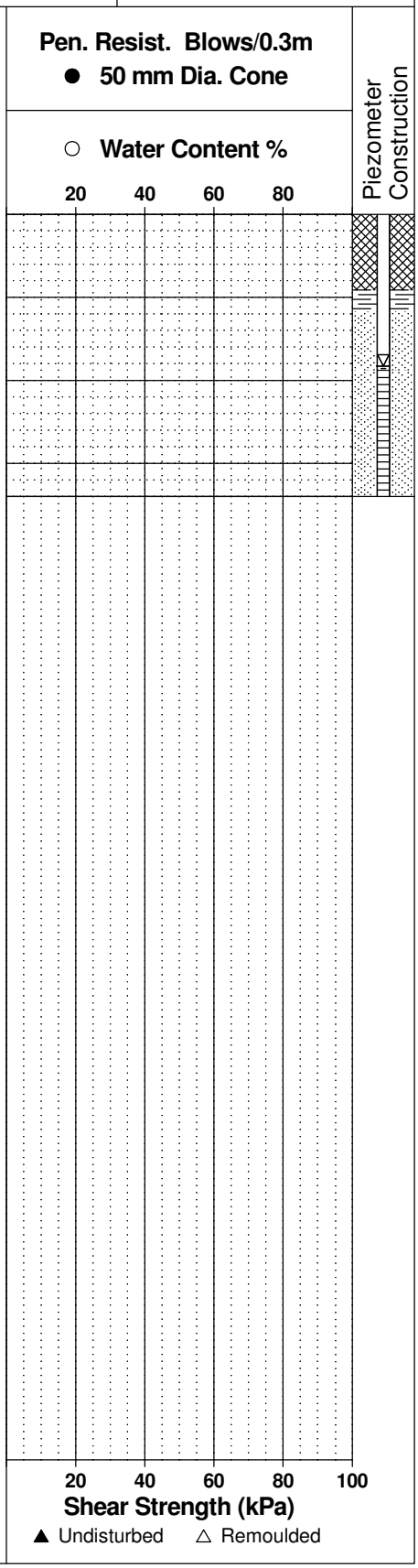
FILE NO. PG5636

REMARKS

HOLE NO. BH 3-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	102.03
FILL: Brown silty sand some gravel		AU	1				
0.61						1	101.03
GLACIAL TILL: Brown clayey silty sand some gravel and cobbles		SS	2	71	+50		
		SS	3	50	+50	2	100.03
- Grey by 3.2 m depth		SS	4	29	41		
						3	99.03
3.40		SS	5	60	+50		
End of Borehole							
Practical refusal to augering at 3.40 m depth							
(GWL based on site observations at 1.83 m depth - Jan 8, 2021)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Mixed-Use Commercial and Residential Development
3265 Jockvale Road - Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5636

REMARKS

HOLE NO. BH 4-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	97.70
TOPSOIL 0.23		AU	1				
FILL: Clayey sand with gravel and organics		SS	2	67	7	1	96.70
1.37							
GLACIAL TILL: Compact to dense brown clayey silty sand with gravel, cobbles and boulders		SS	3	46	7	2	95.70
		SS	4	0	+50		
		SS	5	75	21	3	94.70
		SS	6	71	13	4	93.70
		SS	7	45	20		
5.21						5	92.70
End of Borehole							
Practical refusal to augering at 5.21 m depth							
(GWL based on site observations at 1.52 m depth - Jan 8, 2021)							

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

20 40 60 80

Piezometer Construction

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

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Mixed-Use Commercial and Residential Development
3265 Jockvale Road - Ottawa, Ontario

DATUM Geodetic

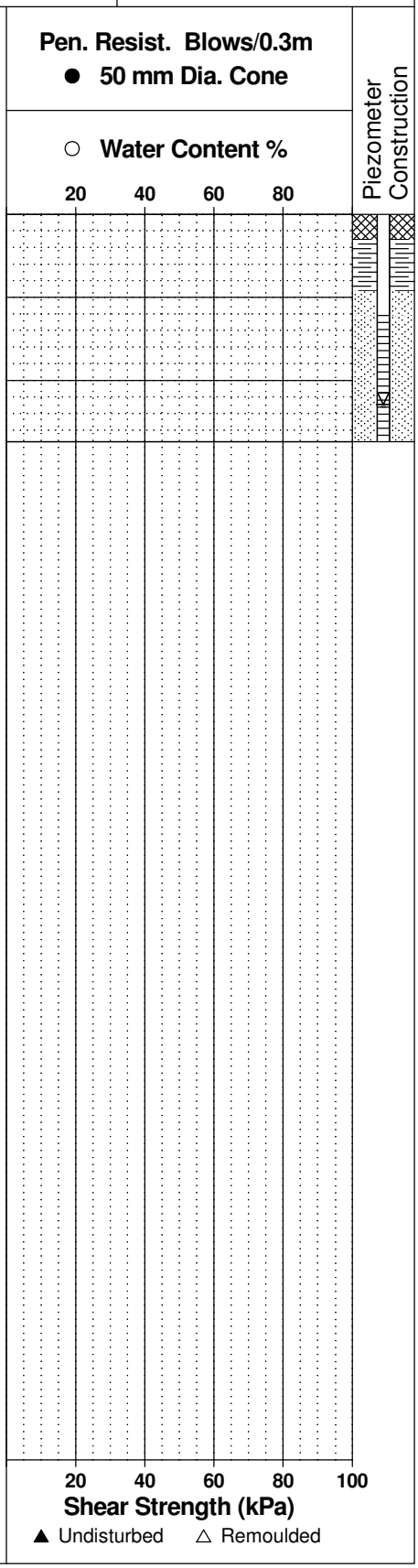
FILE NO. PG5636

REMARKS

HOLE NO. BH 5-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
FILL: Brown silty sand, organics, gravel and scrap metal 0.38		AU	1			0	100.19
GLACIAL TILL: Very dense brown silty sand, with gravel, cobbles and boulders, some clay		SS	2	63	51	1	99.19
		SS	3	96	52	2	98.19
2.74		SS	4	91	+50		
End of Borehole							
Practical refusal to augering @ 2.74 m depth							
(GWL based on site observations at 2.29 m depth - Jan 5, 2021)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Mixed-Use Commercial and Residential Development
3265 Jockvale Road - Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5636

REMARKS

HOLE NO. BH 6-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	94.11
Very stiff brown **SILTY CLAY** some organics		AU	1				
		SS	2	83	10	1	93.11
		SS	3	100	7	2	92.11
2.29							
GLACIAL TILL: Compact grey clayey silty sand, with gravel, cobbles and boulders		SS	4	100	5		
		SS	5	44	+50	3	91.11
		SS	6	72	13	4	90.11
		SS	7	13	15	5	89.11
		SS	8	58	16		
6.10						6	88.11
End of Borehole							
(GWL based on site observations at 3.20 m depth - Jan 8, 2021)							

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

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Mixed-Use Commercial and Residential Development
3265 Jockvale Road - Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5636

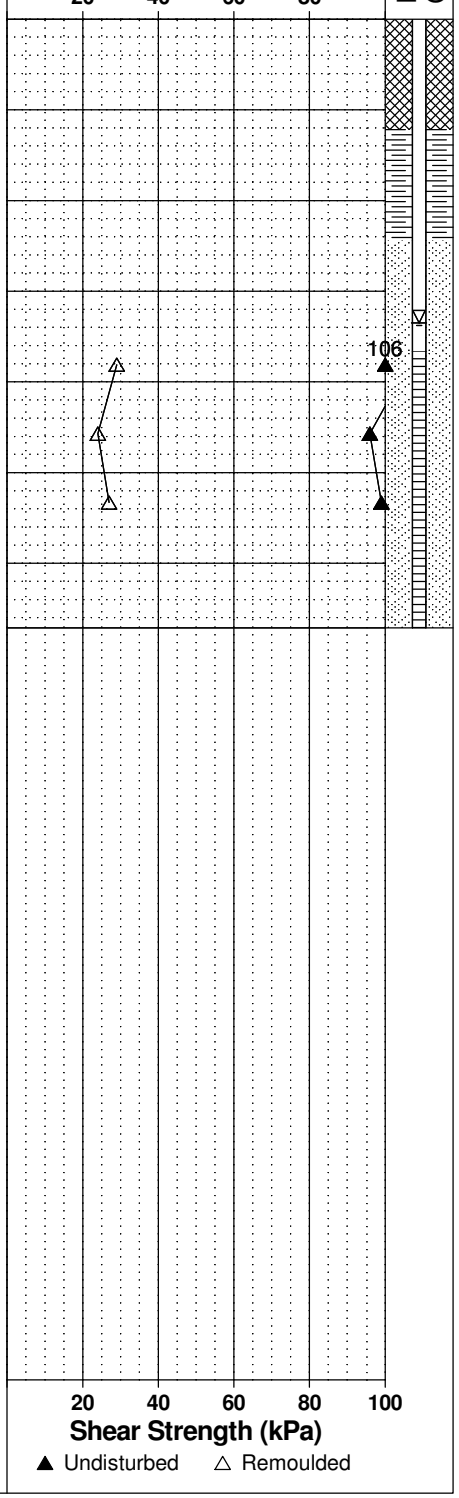
REMARKS

HOLE NO. BH 7-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	93.10
TOPSOIL 0.20		AU	1				
Very stiff brown **SILTY CLAY**		SS	2	75	12	1	92.10
		SS	3	100	10	2	91.10
		SS	4	100	8	3	90.10
		SS	5	100	4		
- Grey and stiff by 3.6 m depth						4	89.10
						5	88.10
						6	87.10
6.55		SS	6	100	7		
GLACIAL TILL: Grey silty clay with sand gravel, cobbles and boulders 6.71							
End of Borehole							
(GWL based on site observations at 3.35 m depth - Jan 8, 2021)							

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



Piezometer Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Mixed-Use Commercial and Residential Development
3265 Jockvale Road - Ottawa, Ontario

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FILE NO. PG5636

REMARKS

HOLE NO. BH 8-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.08		AU	1			0	95.91
GLACIAL TILL: Compact to very dense brown silty sand some clay, gravel, cobbles and boulders		SS	2	58	22	1	94.91
		SS	3	38	29	2	93.91
		SS	4	100	+50		
3.15		SS	5	0	+50	3	92.91
End of Borehole							
Practical refusal to augering at 3.15 m depth							
(GWL based on site observations at 3.05 m depth - Jan 8, 2021)							

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

20 40 60 80

Piezometer Construction

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

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Mixed-Use Commercial and Residential Development
3265 Jockvale Road - Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5636

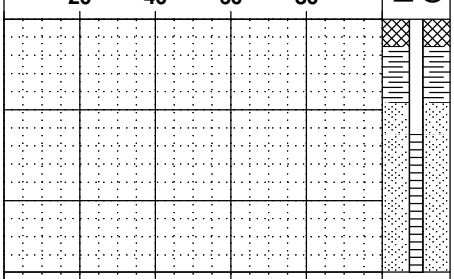
REMARKS

HOLE NO. BH 9-21

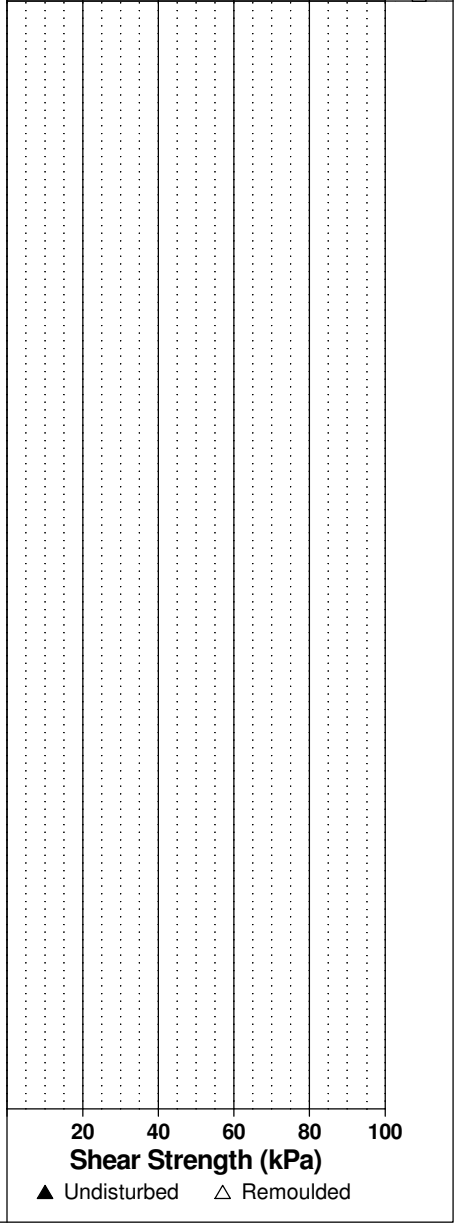
BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	98.72
FILL: Brown silty sand some gravel and crushed stone		AU	1				
0.76						1	97.72
GLACIAL TILL: Compact to very dense brown silty sand with gravel cobbles and boulders, some clay		SS	2	71	58		
		SS	3	76	+50	2	96.72
2.79		SS	4	100	94		
End of Borehole							
Practical refusal to augering at 2.79 m depth							
(Based on site observations borehole was dry upon completion)							

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



Piezometer Construction



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
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DATUM Geodetic

FILE NO. PG5636

REMARKS

HOLE NO. BH11-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 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 0.13		AU	1			0	98.05		
GLACIAL TILL: Compact to very dense brown silty clay with sand, gravel, cobbles and boulders		SS	2	75	41	1	97.05		
		SS	3	80	+50				
		SS	4	50	+50	2	96.05		
		SS	5	54	37	3	95.05		
		SS	6	63	39	4	94.05		
		SS	7	54	37	5	93.05		
- Moisture increased in recovered samples by 4.9 m depth		SS	8	67	40	6	92.05		
- Becoming grey by 6.4 m depth		SS	9	75	+50				
6.68									
End of Borehole									
Practical refusal to augering at 6.68 m depth									
(GWL based on site observations at 4.57 m depth - Jan 11, 2021)									

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
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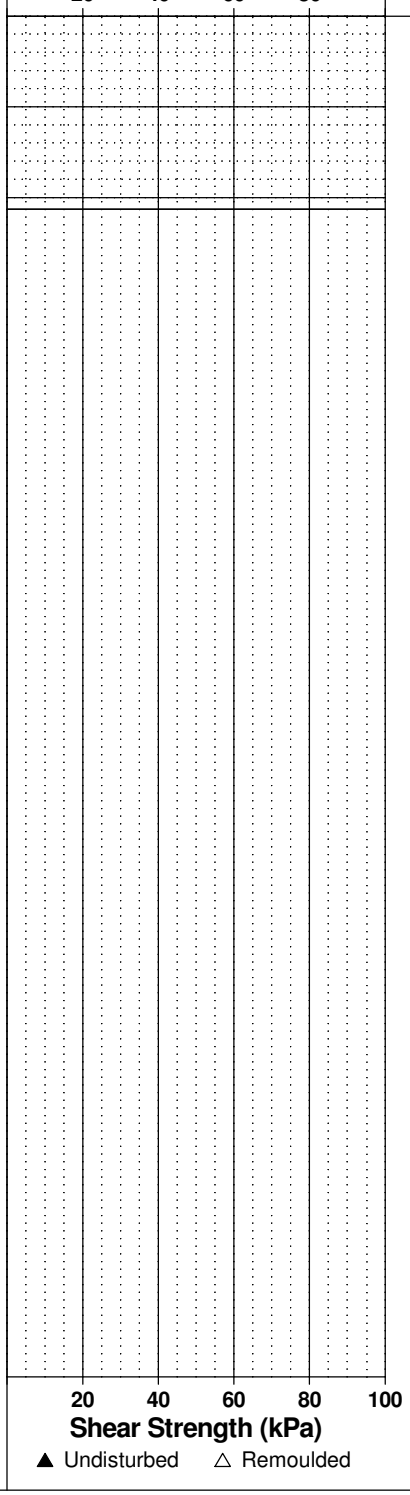
FILE NO. PG5636

REMARKS

HOLE NO. BH12A-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 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									
TOPSOIL 0.23		AU	1			0	99.40		
GLACIAL TILL: Compact to very dense brown silty sand with gravel, cobbles and boulders, trace clay		SS	2	79	28	1	98.40		
2.13		SS	3	63	63	2	97.40		
End of Borehole									
Mechanical fault with drilling equipment required this test hole to be terminated at a depth of 2.13 m.									



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SOIL PROFILE AND TEST DATA

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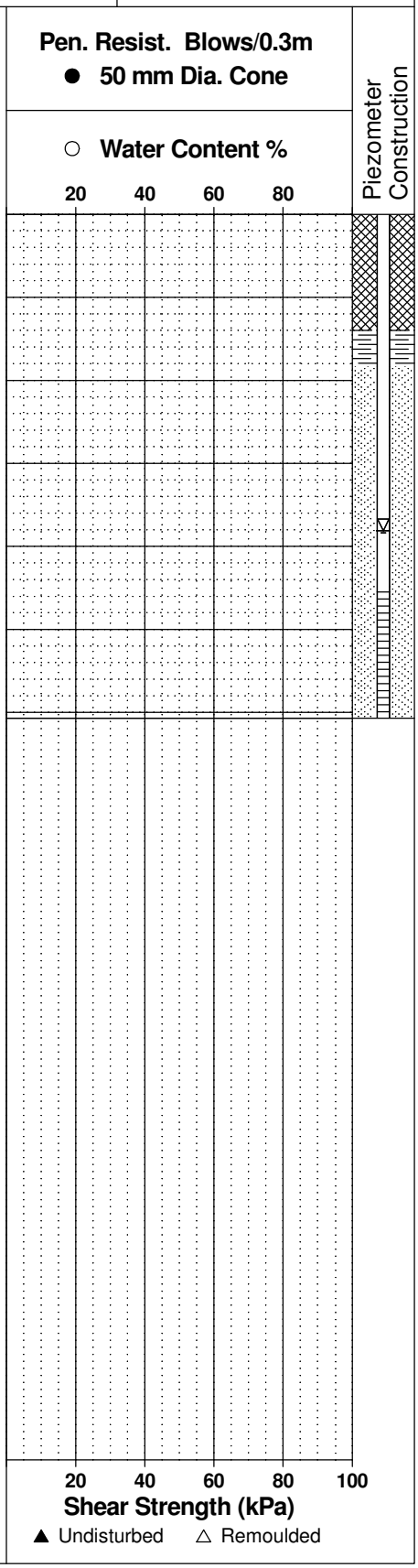
FILE NO. PG5636

REMARKS

HOLE NO. BH12B-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 20

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	99.03
TOPSOIL 0.18		AU	1				
		SS	2	67	25	1	98.03
GLACIAL TILL: Compact to dense brown silty sand with gravel, cobbles and boulders		SS	3	63	39	2	97.03
		SS	4	75	34		
		SS	5	71	34	3	96.03
		SS	6	8	57	4	95.03
- Increasing in clay content by 4.6 m depth		SS	7	46	23	5	94.03
6.07		SS	8	42	45	6	93.03
End of Borehole							
Practical refusal to augering at 6.07m depth							
(GWL based on site observations at 3.81 m depth - Jan 21, 2021)							



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SOIL PROFILE AND TEST DATA

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FILE NO. PG5636

REMARKS

HOLE NO. BH13-21

BORINGS BY CME-55 Low Clearance Drill **DATE** 2021 January 20

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 0.20		AU	1			0	99.66		
		SS	2	58	32	1	98.66		
GLACIAL TILL: Compact brown silty sand with gravel, cobbles and boulders		SS	3	63	48	2	97.66		
		SS	4	88	42				
		SS	5	17	+50	3	96.66		
		SS	6	21	+50	4	95.66		
4.72		SS	7	0	+50				
End of Borehole									
Practical refusal to augering at 4.72m depth									
(GWL based on site observations at 4.42 m depth - Jan 21, 2021)									

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

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

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

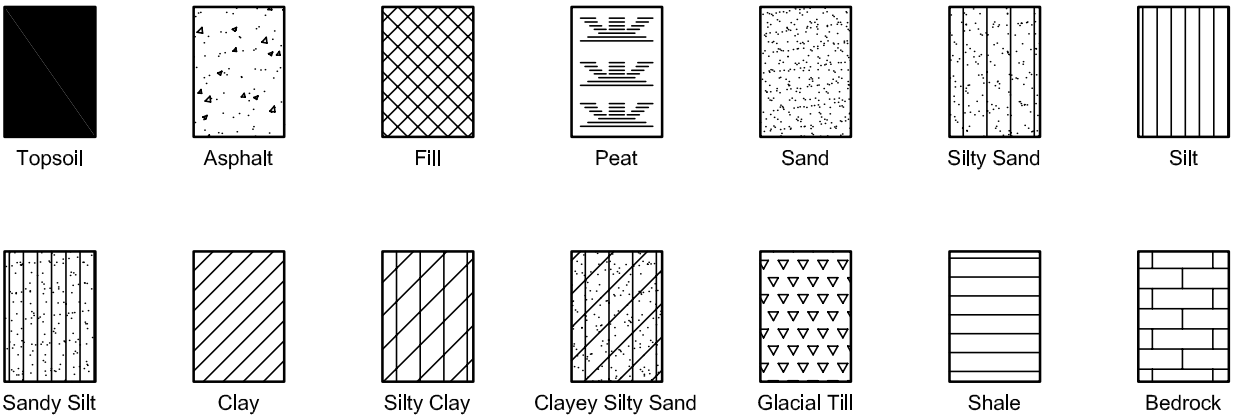
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void 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.

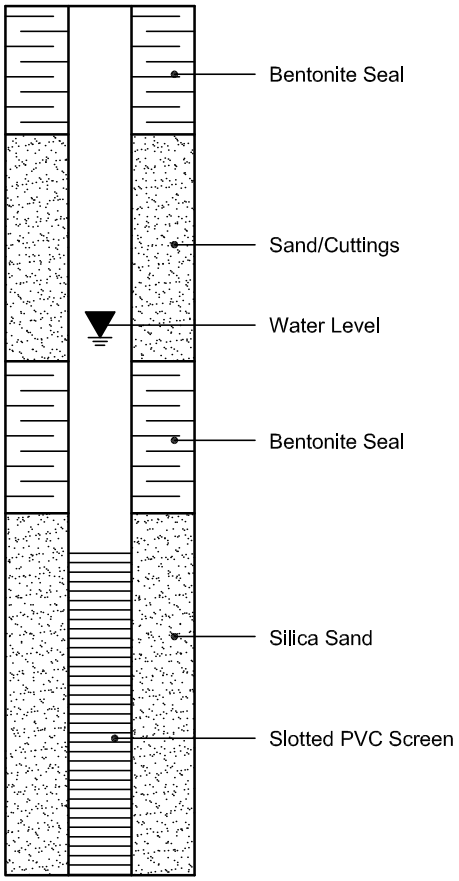
SYMBOLS AND TERMS (continued)

STRATA PLOT

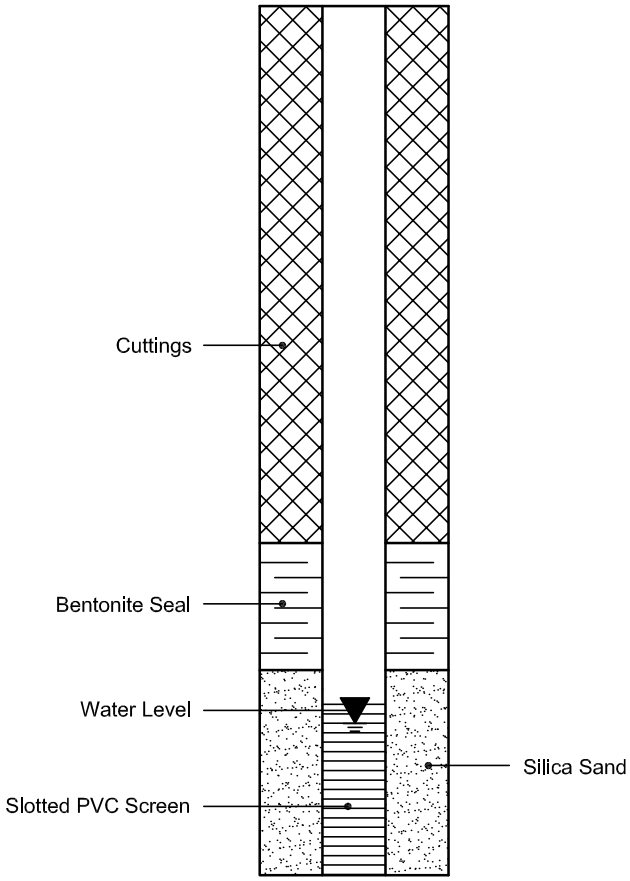


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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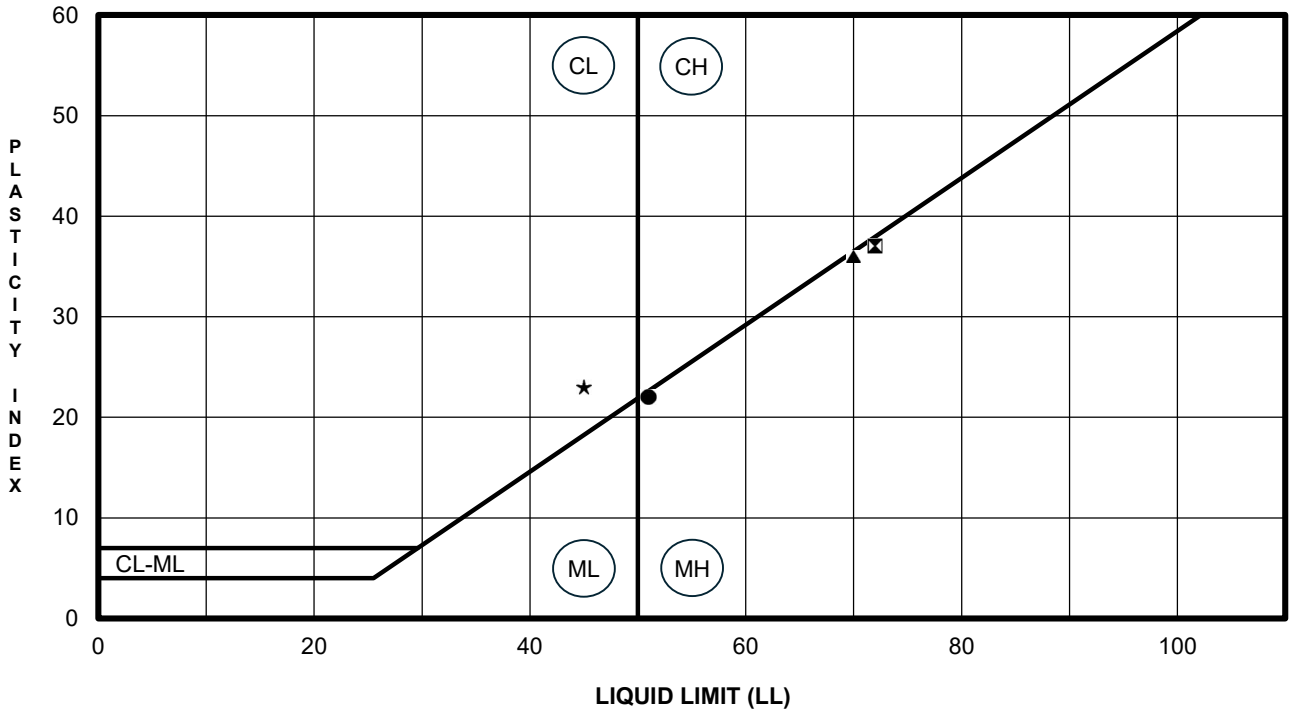
ATTERBERG LIMITS' RESULTS



Specimen Identificacation			LL	PL	PI	Fines	Classification
●	BH 6-21	SS4	51	29	22	97.1	MH - Inorganic silts of high plasticity
⊠	BH 7-21	SS4	72	35	37	87.3	MH - Inorganic silts of high plasticity
▲	BH 1-25	SS4	70	34	36		MH - Inorganic silts of high plasticity
★	BH 4-25	SS3	45	22	23		CL - Inorganic clays of low plasticity

CLIENT	Minto Communities Inc.	FILE NO.	PG5636
PROJECT	Geotechnical Investigation	DATE	23-Oct-25
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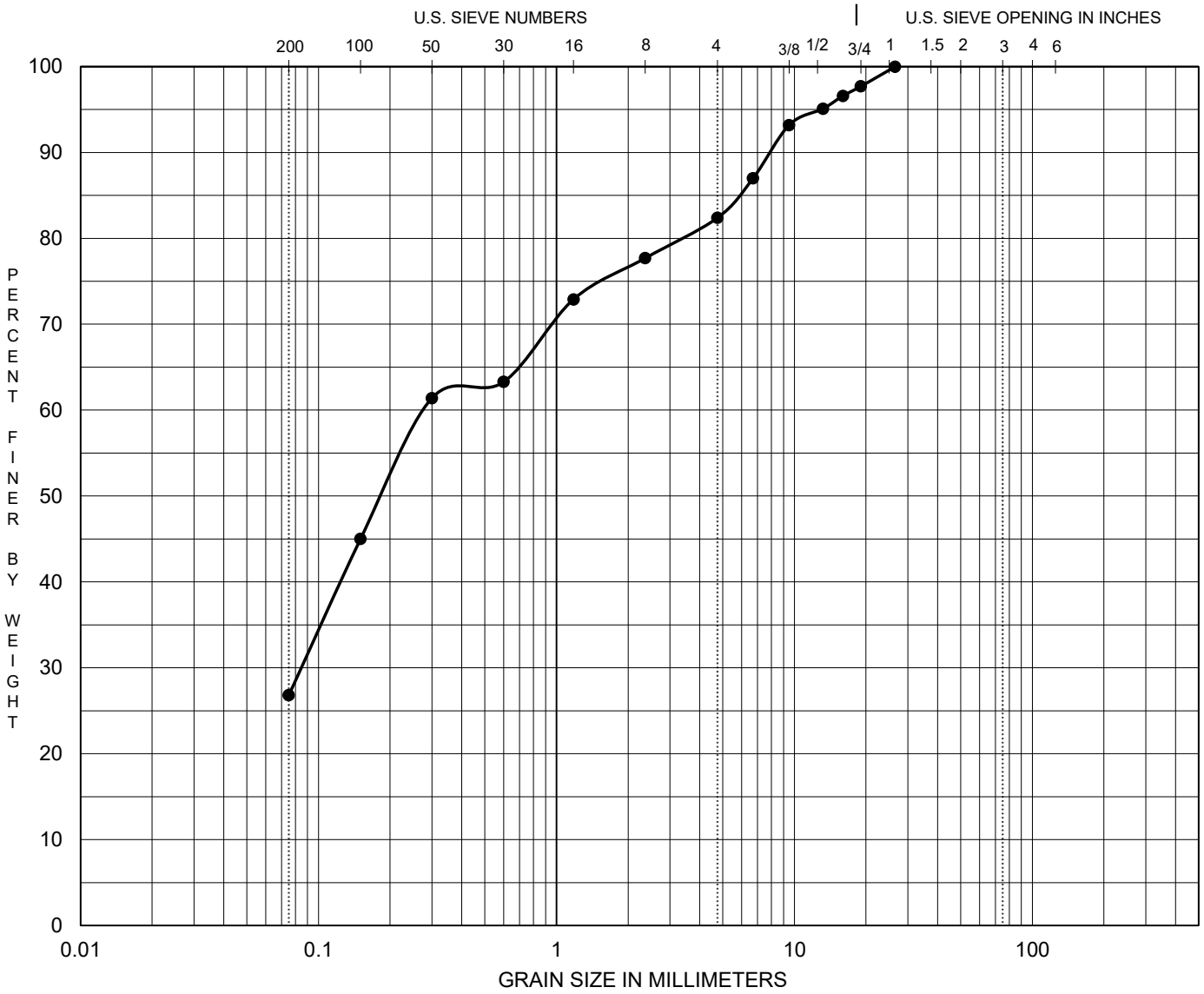
GRAIN SIZE DISTRIBUTION



SILT AND CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 3-25**	**SS6**		**11.0**				**2.01**	**28.0**
☒									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 3-25**	**SS6**	**26.5**	**0.28**	**0.075**	**0.01**	**22.3**	**50.9**	**26.8**	
☒										
▲										
★										

CLIENT	**Minto Communities Inc.**	**FILE NO.**	**PG5636**
PROJECT	**Geotechnical Investigation**	**DATE**	**2025-OCT-29**
	Proposed Residential Development		

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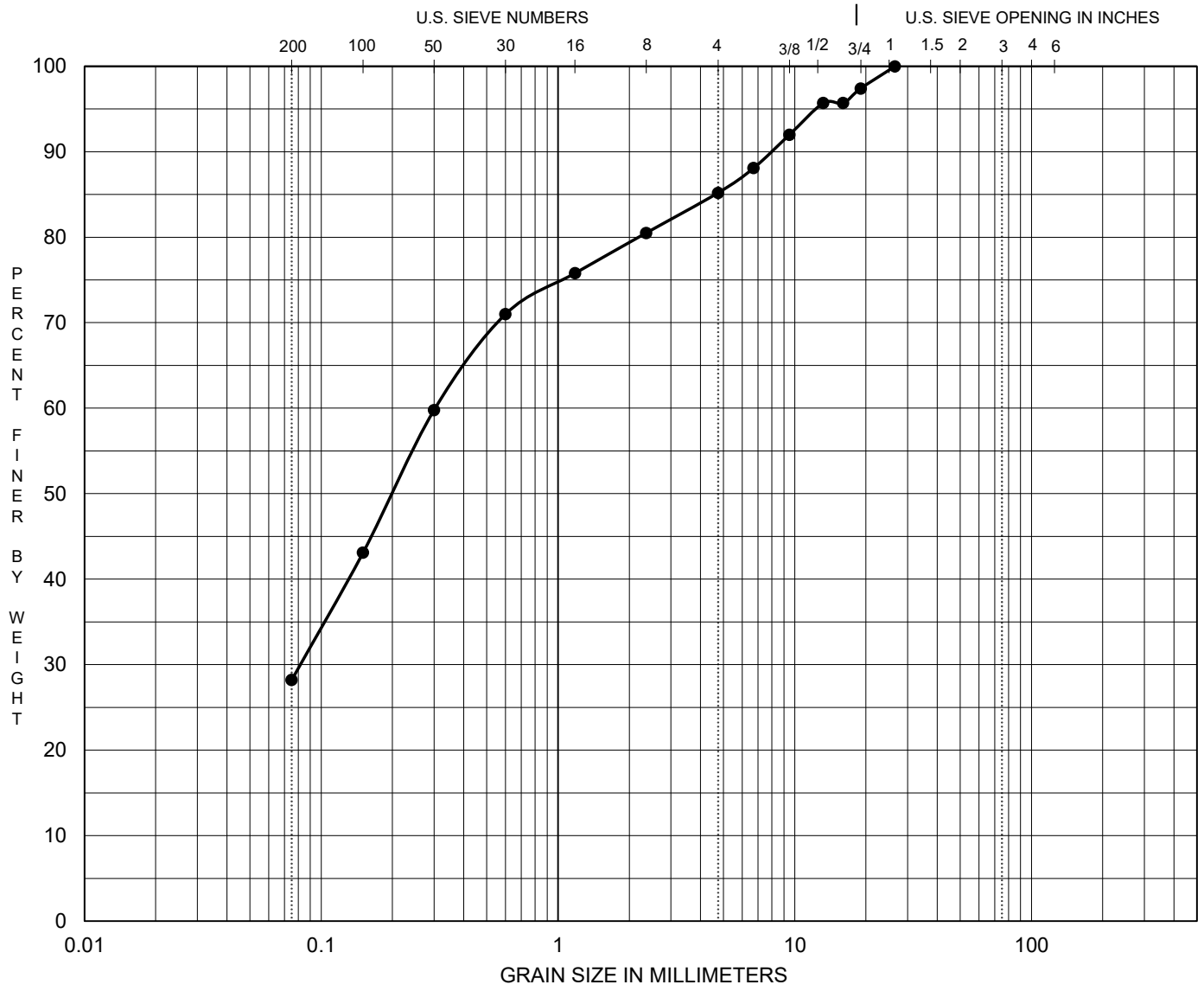
GRAIN SIZE DISTRIBUTION



SILT AND CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 4-25**	**SS8**		**10.0**				**28**	**2.0**
☒									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 4-25**	**SS8**	**26.5**	**0.3**	**0.08**	**0.01**	**19.5**	**52.3**	**28.2**	
☒										
▲										
★										

CLIENT Minto Communities Inc. **FILE NO.** PG5636

PROJECT Geotechnical Investigation **DATE** 2025-OCT-29

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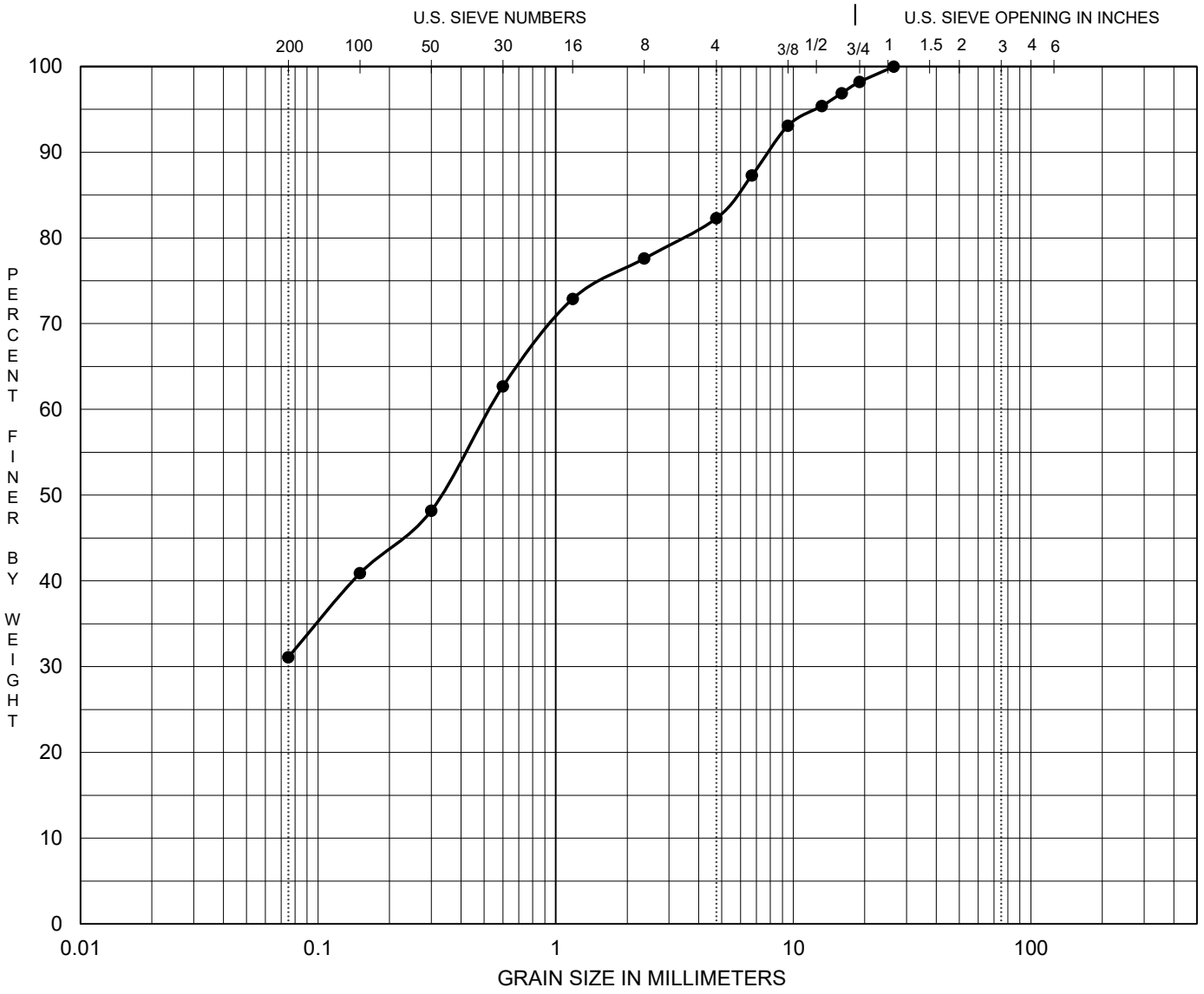
GRAIN SIZE DISTRIBUTION



SILT AND CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 11-25 SS7**		**8.0**				**0.96**	**51.0**
☒								
▲								
★								

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 11-25 SS7**	**26.5**	**0.51**	**0.07**	**0.01**	**22.4**	**46.5**	**31.1**	
☒									
▲									
★									

CLIENT	**Minto Communities Inc.**	**FILE NO.**	**PG5636**
PROJECT	**Geotechnical Investigation**	**DATE**	**2025-OCT-29**
	Proposed Residential Development		

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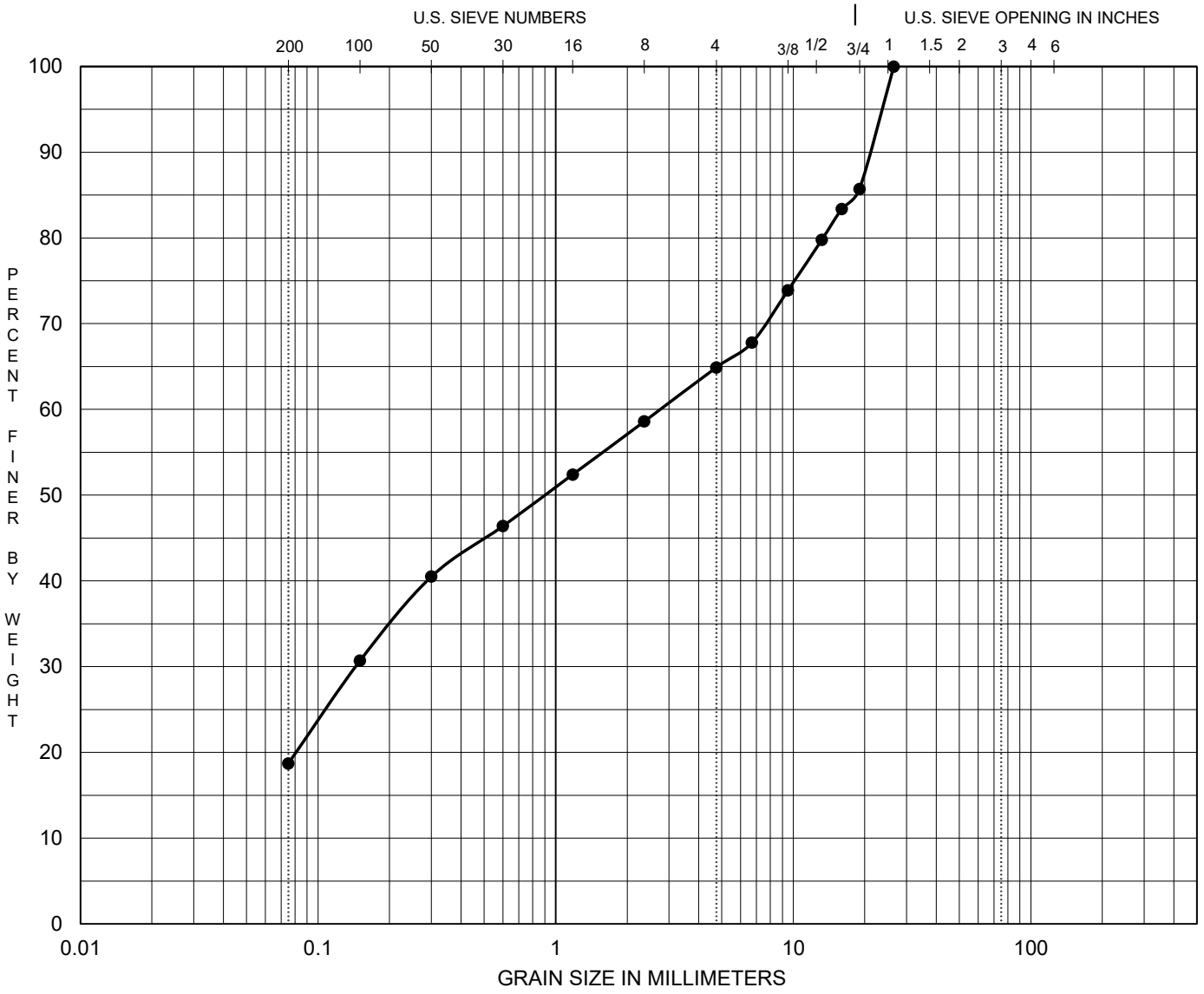
GRAIN SIZE DISTRIBUTION



SILT AND CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 12A-25**	**SS3**		**13.0**				**0.19**	**50.0**
☒									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 12A-25**	**SS3**	**26.5**	**2.7**	**0.16**	**0.05**	**41.4**	**39.9**	**18.7**	
☒										
▲										
★										

CLIENT	**Minto Communities Inc.**	**FILE NO.**	**PG5636**
PROJECT	**Geotechnical Investigation**	**DATE**	**2025-OCT-29**
	Proposed Residential Development		

PATERSON GROUP

Linear Shrinkage
ASTM D4943-02

CLIENT:	Minto	DEPTH	2'6" - 4'6"	FILE NO.:	PG5636
PROJECT:	Chapman Mills and Greenbank Rd.	BH OR TO No:	BH3-25 SS2	DATE SAMPLED	23-Oct-25
LAB No:	64086	TESTED BY:	AG	DATE RECEIVED	29-Oct-25
SAMPLED BY:	Max R.	DATE REPORTED:	05-Nov-25	DATE TESTED	29-Oct-25

LABORATORY INFORMATION & TEST RESULTS

Moisture		**Calibration (Two Trials)**		
Tare	5.24	Tin	4.84	4.84
Soil Pat Wet + Tare	65.02	Tin + Grease	5.25	5.25
Soil Pat Wet	59.78	Glass	43.23	43.22
Soil Pat Dry + Tare	41.54	Tin + Glass + Water	85.15	85.14
Soil Pat Dry	36.3	Volume	36.67	36.67
Moisture	**64.70**	**Average Volume**	**36.67**	

Soil Pat + String	36.72
Soil Pat + Wax + String in Air	43.62
Soil Pat + Wax + String in Water	15.18
Volume Of Pat	28.44

RESULTS:

Shrinkage Limit	**20.67**
Shrinkage Ratio	**1.755**
Volumetric Shrinkage	**77.259**
Linear Shrinkage	**17.370**

REVIEWED BY:	**Curtis Beadow**	**Joe Forsyth, P. Eng.**
		

Certificate of Analysis

Report Date: 30-Oct-2025

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

Order Date: 24-Oct-2025

Client PO: 65320

Project Description: PG5636

	Client ID:	BH3-25-SS3-5'-7'	-	-	-		
	Sample Date:	21-Oct-25 09:00	-	-	-	-	-
	Sample ID:	2543521-01	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	89.4	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.61	-	-	-	-	-
Resistivity	0.1 Ohm.m	85.3	-	-	-	-	-
Anions							
Chloride	10 ug/g	<10	-	-	-	-	-
Sulphate	10 ug/g	<10	-	-	-	-	-

Certificate of Analysis

Report Date: 04-Nov-2025

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

Order Date: 29-Oct-2025

Client PO: 64352

Project Description: PG5636

	Client ID:	BH5-25-SS3-5'-7'	-	-	-		
	Sample Date:	21-Oct-25 09:00	-	-	-	-	-
	Sample ID:	2544305-01	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	70.8	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.31	-	-	-	-	-
Resistivity	0.1 Ohm.m	124	-	-	-	-	-
Anions							
Chloride	10 ug/g	<10	-	-	-	-	-
Sulphate	10 ug/g	<10	-	-	-	-	-

APPENDIX 2

FIGURE 1 – KEY PLAN

DRAWING PG5636-15 – TEST HOLE LOCATION PLAN

DRAWING PG5636-16 – PERMISSIBLE GRADE RAISE PLAN

DRAWING PG5636-17 – TREE PLANTING SETBACK PLAN

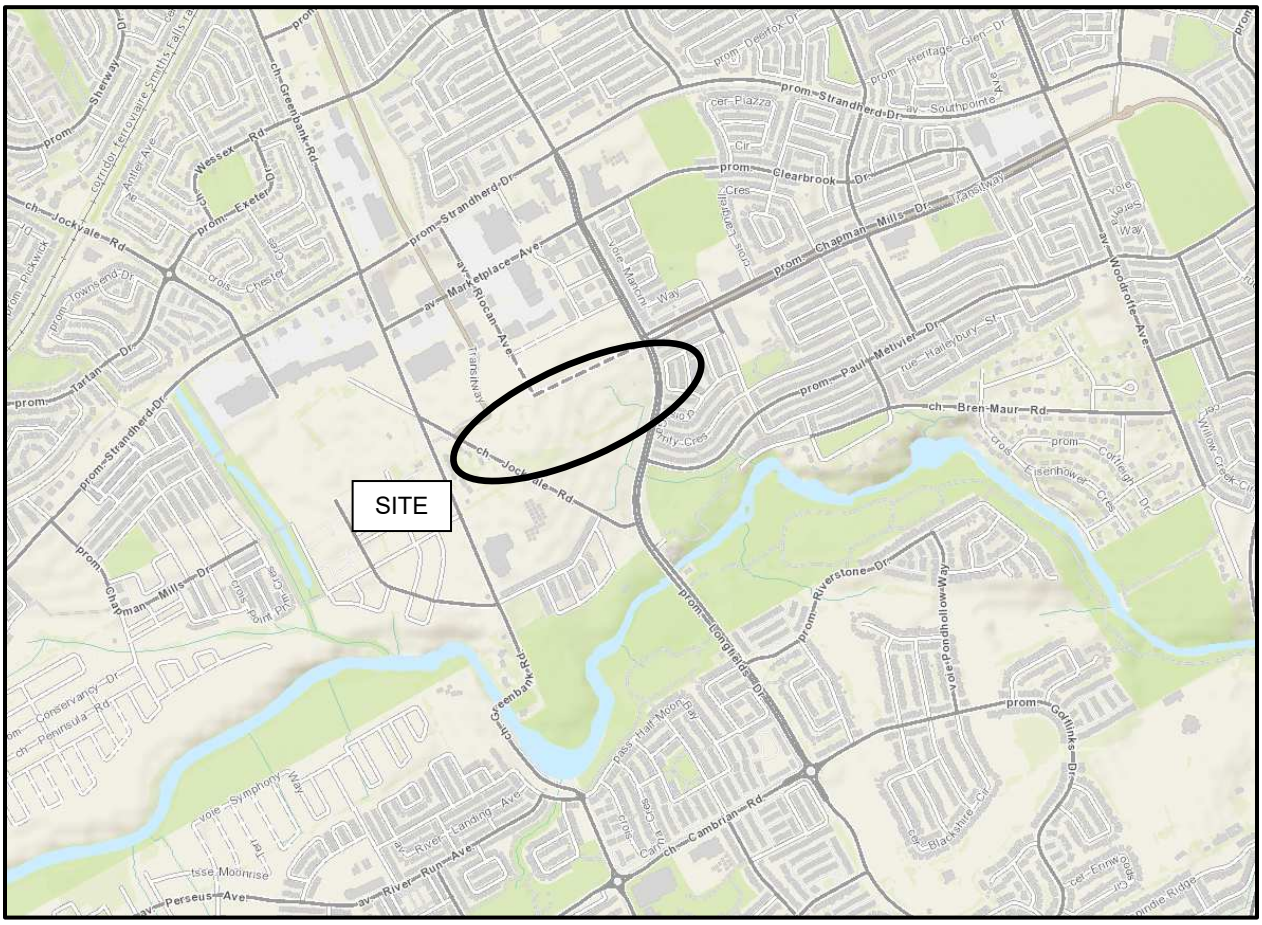
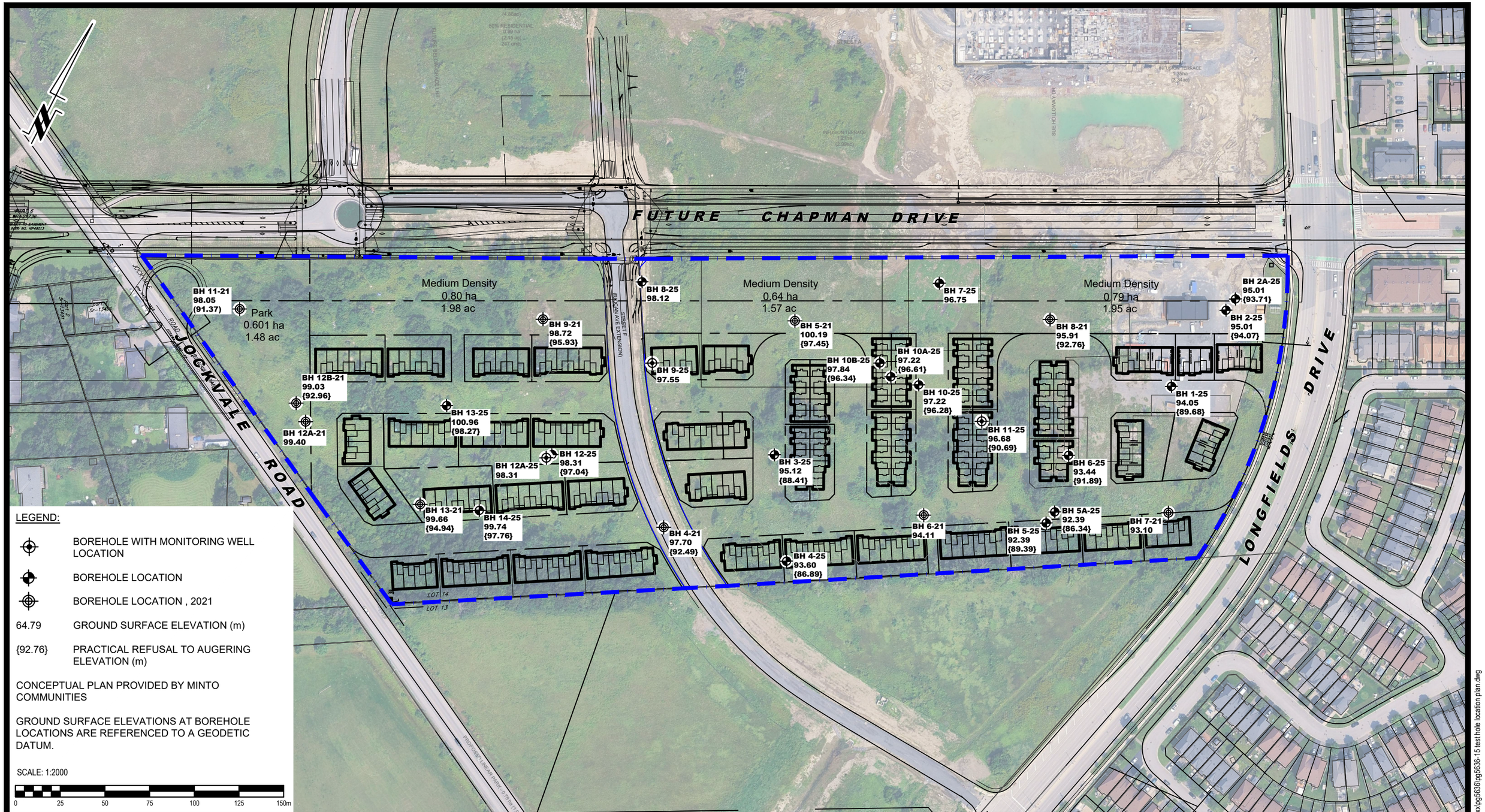


FIGURE 1

KEY PLAN

PATERSON GROUP



LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- BOREHOLE LOCATION , 2021
- 64.79 GROUND SURFACE ELEVATION (m)
- {92.76} PRACTICAL REFUSAL TO AUGERING ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY MINTO COMMUNITIES

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

SCALE: 1:2000

0 25 50 75 100 125 150m

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

NO.	REVISIONS	DATE	INITIAL

MINTO COMMUNITIES

GEOTECHNICAL INVESTIGATION

PROPOSED RESIDENTIAL DEVELOPMENT

OTTAWA, 3265 JOCKVALE ROAD - BARRHAVEN TOWN CENTRE STAGE 2 ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:2000	Date: 11/2025
Drawn by: GK	Report No.: PG5636-3
Checked by: YZ	Dwg. No.: PG5636-15
Approved by: DP	Revision No.:

11x17

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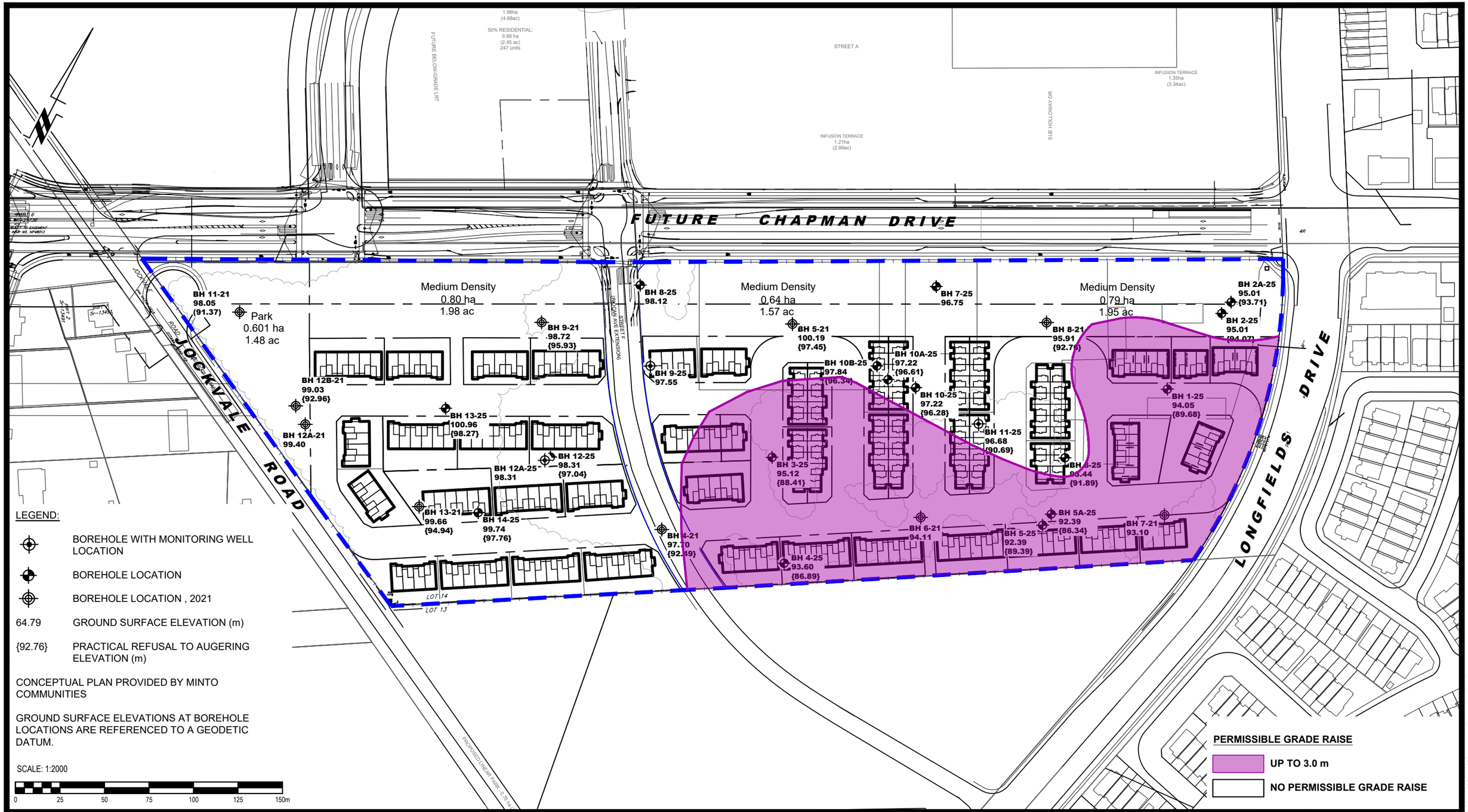

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- BOREHOLE LOCATION , 2021
- 64.79 GROUND SURFACE ELEVATION (m)
- {92.76} PRACTICAL REFUSAL TO AUGERING ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY MINTO COMMUNITIES

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

SCALE: 1:2000

0 25 50 75 100 125 150m

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TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

MINTO COMMUNITIES
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
OTTAWA, 3265 JOCKVALE ROAD - BARRHAVEN TOWN CENTRE STAGE 2 ONTARIO

Title:
PERMISSIBLE GRADE RAISE PLAN

Scale: 1:2000	Date: 11/2025
Drawn by: GK	Report No.: PG5636-3
Checked by: YZ	Dwg. No.: PG5636-16
Approved by: DP	Revision No.:

11x17

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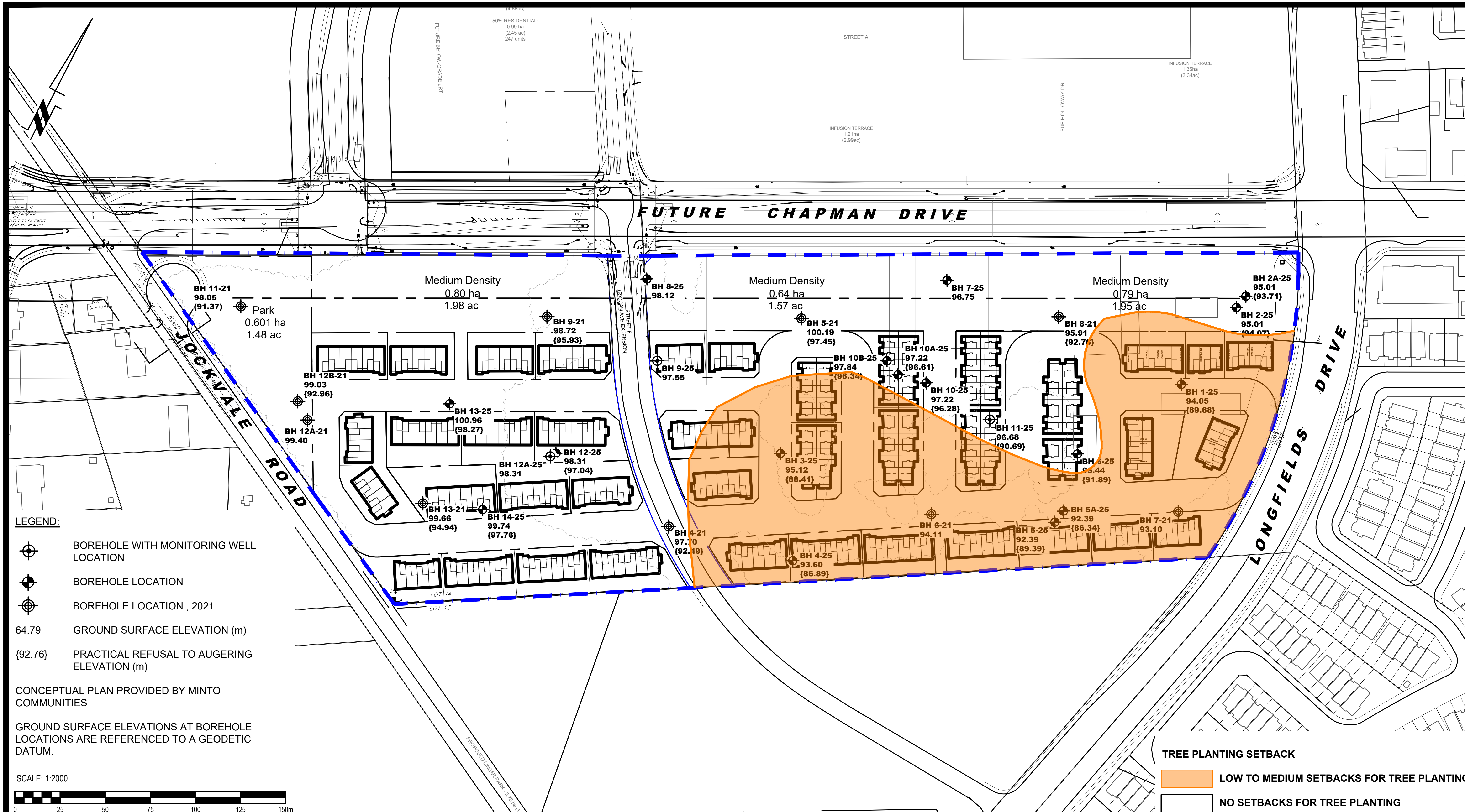

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- BOREHOLE LOCATION , 2021

64.79 GROUND SURFACE ELEVATION (m)

{92.76} PRACTICAL REFUSAL TO AUGERING ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY MINTO COMMUNITIES

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

SCALE: 1:2000

0 25 50 75 100 125 150m

TREE PLANTING SETBACK

- LOW TO MEDIUM SETBACKS FOR TREE PLANTING
- NO SETBACKS FOR TREE PLANTING

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

NO.	REVISIONS	DATE	INITIAL

MINTO COMMUNITIES
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
OTTAWA, 3265 JOCKVALE ROAD - BARRHAVEN TOWN CENTRE STAGE 2 ONTARIO

Title:

TREE PLANTING SETBACK PLAN

Scale: 1:2000	Date: 11/2025
Drawn by: GK	Report No.: PG5636-3
Checked by: YZ	Dwg. No.: PG5636-17
Approved by: DP	Revision No.:

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