PATERSON GROUP

Geotechnical Investigation

Proposed Residential Development

50 Flavescent Lane
Ottawa, Ontario

Prepared for Urbandale Corporation

Report PG8045-1 dated July 10, 2026

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1.0 Introduction

Paterson Group (Paterson) was commissioned by Urbandale Corporation to conduct a geotechnical investigation for the proposed residential development to be located at 50 Flavescent Lane in the City of Ottawa, Ontario (refer to Figure 1 - Key Plan 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 test holes.

☐ Provide geotechnical recommendations pertaining to the design of the proposed development including construction considerations which may affect the design.

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

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

2.0 Proposed Development

Based on the available drawings, it is understood that the proposed development will generally consist of back-to-back and stacked townhouses with basements or of slab-on-grade construction.

At finished grades, the proposed buildings will generally be surrounded by asphalt-paved access lanes, parking areas, and walkways with landscaped margins. It is also understood that the proposed development is to be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current geotechnical investigation was carried out on June 10, 2026 and consisted of advancing a total of 3 boreholes to a maximum depth of 6.7 m below the existing ground surface. A previous geotechnical investigation was carried out by Paterson in the vicinity of the subject site in April, 2024, and consisted of advancing 2 boreholes to a maximum depth of 6.6 m.

Additional geotechnical investigations were carried out in proximity to the subject site by others in February 2012 and August 2019 and consisted of advancing 3 boreholes to a maximum depth of 8.2 m.

The boreholes completed by Paterson as part of the current investigation were placed in a manner to provide general coverage of the subject site taking into consideration underground utilities, site features, and previous test hole locations. The test hole locations are shown on Drawing PG8045-1 – Test Hole Location Plan included in Appendix 2.

The boreholes were completed using a track-mounted drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The testing procedure consisted of advancing the boreholes to the required depth at the selected locations, and sampling and testing the overburden.

Sampling and In-Situ Testing

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

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

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

The thickness of the overburden was evaluated during the course of the investigation by completing a dynamic cone penetration test (DCPT) at borehole BH 2-26. A DCPT was also completed at borehole BH 18-24 during the 2024 investigation by Paterson. The DCPT consists of driving a steel drill rod, equipped with a 50 mm diameter cone at its tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

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

Groundwater

Monitoring wells were installed in all boreholes to permit groundwater level monitoring subsequent to completion of the field program. The groundwater level readings were obtained after a suitable stabilization period subsequent to the completion of the field investigation. Flexible polyethylene standpipes were installed in boreholes BH 18-24, BH 19-24 by Paterson and at borehole BH 12-10 by others during the previous investigations.

3.2 Field Survey

The test hole locations and ground surface elevation at each test hole location were surveyed by Paterson during the current investigation using a handheld GPS and referenced to a geodetic datum. The location of the test holes and ground surface elevation at each test hole location are presented on Drawing PG8045-1 – Test Hole Location Plan in Appendix 2.

3.3 Laboratory Review

The soil samples recovered from the test holes were examined in our laboratory to review the results of the field logging. Additionally, 2 silty clay sample were submitted for Atterberg Limits testing, 2 soil samples were submitted for hydrometer and grain size distribution analysis, and 1 soil sample was submitted for shrinkage limit testing. Further, 1 silty clay sample was submitted for Atterberg Limits testing and 1 soil sample was submitted for hydrometer and grain size distribution analysis during the previous investigation by Paterson.

Moisture content testing was also completed on all soil samples recovered by Paterson and are summarized on the Soil Profile and Test Data sheets included in Appendix 1. All test results are included in Appendix 1 and further discussed in Subsection 4.2 of the current report.

3.4 Analytical Testing

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

4.0 Observations

4.1 Surface Conditions

The subject site is currently vacant and grass covered, consisting primarily of former agricultural lands. However, based on historical aerial photographs of the subject site, the site appears to have been stripped of topsoil between 2014 and 2015, and stockpiled fill material was observed throughout the site, referenced should be made to Figures 2 and 3 in Appendix 2. By 2019, the fill material appears to have generally been removed from the property, reference should be made to Figure 4 in Appendix 2.

The ground surface across the subject is generally flat and at grade with the surrounding properties at geodetic elevation of 91.5 to 92.0 m. The site is bordered to the east, south and west by vacant land associated with future residential development and by Earl Armstrong Road to the north.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile encountered at the subject site consists of fill material underlain by silty clay and glacial till. Fill material was encountered at the existing ground surface at boreholes BH 1-26 through BH 3-26 and extended to an approximate depth of 0.7 m below existing grade. The fill was noted to consist of brown silty clay with sand, crushed stone, and organics.

A hard to very stiff brown silty clay was encountered below the fill material at all test holes completed during the current investigation, and either at ground surface or underlying the topsoil during the historic investigations. The clay deposit was observed to transition to a firm to very stiff grey silty clay at approximate depths of 2.9 to 3.7 m below the existing ground surface.

A layer of loose to very loose brown silty sand to sandy silt with clay was encountered within the clay deposit at all boreholes with the exception of boreholes BH 1-26, BH 2-26 and BH 09-7 at depths varying from 1.0 to 1.8 m below the existing ground surface. Where encountered, the silty sand to sandy silt layer extended to approximate depths of 2.2 to 3.2 and was underlain by the aforementioned clay deposit.

At borehole BH 12-12, the silty sand to sandy silt layer was underlain by a layer of firm grey clayey silt which extended to a depth of 4.6 m below the existing ground surface.

A glacial till deposit was encountered underlying the silty clay deposit at boreholes BH 1-26, BH 3-26, and BH 12-10, at approximate depths of 5.3, 6.6 and 5.6 m below the existing ground surface, respectively. The glacial till deposit was generally observed to consist of a loose to very dense grey silty sand to sandy silt with gravel, cobbles and boulders. Practical refusal to augering was encountered at an approximate depth of 6.4 m at borehole BH 12-10.

Practical refusal to the DCPT was encountered in boreholes BH 2-26 and BH 18-24 at approximate depths of 11.7 and 10.6 m, respectively.

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

Bedrock

Based on available geological mapping, the bedrock in the area of the subject site generally consists of interbedded sandstone and dolomite of the March Formation. The overburden drift thickness is estimated to be between 10 to 15 m below the existing ground surface.

Atterberg Limit Tests

A total of 2 samples were submitted for Atterberg Limits testing during the current investigation. An additional Atterberg Limits test was completed during the previous investigation by Paterson. The results are summarized in Table 1 below.

Table 2 – Summary of Atterberg Limits Results

Test hole	Sample	Depth (m)	LL (%)	PL (%)	PI (%)	Classification
BH 1-26	SS5	3.35	57	20	37	CH
BH 3-26	SS4	2.59	33	14	19	CL
BH 18-24	SS4	2.59	31	15	16	CL

Notes: LL: Liquid Limit; PL: Plastic Limit; PI: Plasticity Index; CH: Inorganic Clays of High Plasticity; CL: Clays of Low Plasticity

Grain Size Distribution and Hydrometer Testing

The results of the grain size distribution and hydrometer tests completed during the current and historic investigations are summarized in Table 2 on the following page and are presented in Appendix 1.

Table 2 – Summary of Grain Size Distribution Analysis

Test Hole	Sample	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 1-26	SS4	0.0	10.9	32.1	57.0
BH 2-26	SS5	0.0	26.2	52.8	21.0
BH 19-24	SS4	0.0	16.8	45.2	38.0

Shrinkage Test

The shrinkage limit of the tested silty clay sample from BH 3-26 was found to be 13.70%. Further, the shrinkage ratios were found to be 1.98.

4.3 Groundwater

Groundwater levels were measured within the monitoring wells on June 17, 2026. Groundwater level measurements taken during the previous investigations are also presented in Table 3.

Table 3 – Summary of Groundwater Levels

Test Hole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Dated Recorded
		Depth (m)	Elevation (m)	
BH 1-26*	91.60	1.71	89.89	June 17, 2026
BH 2-26*	91.93	2.59	89.34	June 17, 2026
BH 3-26*	91.66	2.93	88.73	June 17, 2026
BH 18-24	91.96	0.35	93.01	April 18, 2024
BH 19-24	91.62	0.18	91.04	April 18, 2024
BH 12-10	92.32	2.40	89.92	March 13, 2012

Notes:
- Ground surface elevations at test hole locations are referenced to a geodetic datum.
- '*' Denotes monitoring well

Average groundwater levels were found to range from approximately **1.5 to 3.0 m** below the ground surface at the time of the current geotechnical investigation. It should be noted that groundwater levels are subject to seasonal fluctuations, therefore, the groundwater levels could vary at the time of construction.

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

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is suitable for the proposed residential development. It is recommended that the proposed residential buildings be founded on conventional spread footings placed on an undisturbed, hard to stiff brown silty clay, compact silty sand to sandy silt or engineered fill placed over the undisturbed hard to stiff silty clay or undisturbed compact silty sand to sandy silt.

Due to the presence of a silty clay deposit, the subject site will be subjected to permissible grade raise restrictions.

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

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing organic or deleterious materials, should be stripped from under the proposed buildings and other settlement sensitive structures.

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. This 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 propose buildings should be compacted to a minimum 98% of the Standard Proctor Maximum Dry Density (SPMDD).

Non-specified existing fill, along with site-excavated soil, can be used as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If this material is to be used to build up the subgrade level for areas to be paved, it should be compacted in thin lifts to at least 95% of the material’s SPMDD.

Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls unless a composite drainage blanket connected to a perimeter drainage system is provided.

5.3 Foundation Design

Bearing Resistance Values

Strip footings, up to 3 m wide, and pad footings, up to 5 m wide, placed on an undisturbed, hard to stiff silty clay, or on engineered fill placed directly over the undisturbed hard to stiff silty clay bearing surface, can be designed using a bearing resistance value at serviceability limit states (SLS) of **100 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **150 kPa**. A geotechnical resistance factor of 0.5 was incorporated in calculating the bearing resistance values at ULS.

Footings placed on an undisturbed, compact silty sand to sandy silt or on engineered fill placed directly over the undisturbed silty sand to sandy silt, can be designed using a bearing resistance value at serviceability limit states (SLS) of **100 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **150 kPa**. A geotechnical resistance factor of 0.5 was incorporated in calculating the bearing resistance values at ULS.

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

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

Permissible Grade Raise Recommendations

Due to the presence of the silty clay deposit at the site, a permissible grade raise restriction of **2.5 m** is recommended.

If a higher permissible grade raise is required, preloading with or without surcharge, lightweight fill and/or other measures should be investigated to reduce the risks of unacceptable long-term post construction and differential settlements.

Lateral Support

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

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class X_D** for the foundations at the subject site. The soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest revision of the Ontario Building Code (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 fill, containing significant amounts of deleterious or organic materials, the native soil and/or approved fill is considered to be an acceptable subgrade surface on which to commence backfilling for floor slab construction.

For structures with slab-on-grade construction, it is recommended that the upper 200 mm of sub-slab fill consist of OPSS Granular A crushed stone. For structures with basement slabs, it is recommended that the upper 300 mm of sub-floor fill consists of 19 mm clear crush stone.

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

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

5.6 Pavement Design

For preliminary design purposes, the following pavement structures, presented in Tables 4 and 5, are recommended for car parking areas and access lanes.

Table 4 – Recommended Asphalt Pavement Structure – Car Only Parking Areas

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

Table 5 – Recommended Asphalt Pavement Structure – Local roadways

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

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project. If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material.

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

Pavement Structure Drainage

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

Where silty clay is anticipated at subgrade level, consideration should be given to installing subdrains during the pavement construction as per City of Ottawa standards. The subdrain inverts should be approximately 300 mm below subgrade level. The subgrade surface should be crowned to promote water flow to drainage lines.

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 each proposed structure which has below-grade space. The system should consist of a 150 mm diameter perforated and corrugated plastic pipe, surrounded on all sides by 150 mm of 19 mm clear crushed stone, which is placed at the footing level around the exterior perimeter of the structure. The pipe should have positive outlet, such as a gravity connection to the storm sewer.

Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free draining non frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a drainage geocomposite, such as Delta Drain 6000, connected to the perimeter foundation drainage system.

6.2 Protection of Footings Against Frost Action

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

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

6.3 Excavation Side Slopes

The side slopes of excavations in the 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. For the proposed development, it is anticipated 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 in the overburden soils, above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. A flatter slope is required for excavation below groundwater level, such as 3H:1V. The subsurface soil at this site is considered to be mainly Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box is used 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.

The pipe bedding for sewer and water pipes should consist of at least 150 mm of OPSS Granular A material. Where the bedding is located on the grey silty clay, the thickness of the bedding material should be increased to 300 mm. The bedding should extend to the spring line of the pipe. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material’s standard Proctor maximum dry density.

Cover material, from the spring line to a minimum of 300 mm above the obvert of the pipe, should consist of OPSS Granular A (concrete or PSM PVC pipes) or sand (concrete pipe). The bedding and cover materials should be placed in maximum 225 mm thick lifts and compacted to a minimum of 99% of its SPMDD.

It should generally be possible to re-use the site generated fill materials (moist, not wet) above the cover material if excavation and filling operations are carried out in dry and non-freezing weather conditions. The wet silty clay should be given a sufficient drying period to decrease its moisture content to an acceptable level to make compaction possible prior to being re-used.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) and above the cover material should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD. All cobbles larger than 200 mm in their longest direction should be segregated from re-use as trench backfill.

Clay Seals

To reduce long-term lowering of the groundwater at this site, clay seals should be provided within the service trenches excavated through the silty clay deposit. The seals should be at least 1.5 m long (in the trench direction) and should extend from trench wall to trench wall. 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 maximum 225 mm thick loose layers and compacted to a minimum of 95% of the 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 excavated through the silty clay deposit.

6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavation should be low and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

Permit to Take Water

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.

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

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

6.7 Corrosion Potential and Sulphate

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

6.8 Landscaping Considerations

Tree Planting Restrictions

Based on the subsurface profile at the test hole locations, a low to medium sensitivity clay soil was encountered throughout the site. Based on our Atterberg limits test results, the modified plasticity index does not exceed 40% in these areas. The following tree planting setbacks are 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 must be satisfied 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 m^3 of available soil volume while a medium tree must be provided with a minimum of 30 m^3 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).

Swimming Pools, Hot Tubs, Decks and Additions

The in-situ soils are considered to be acceptable for in-ground swimming pools. Above ground swimming pools must be placed at least 5 m away from the residence foundation and neighboring foundations. Otherwise, pool construction is considered routine, and can be constructed in accordance with the manufacturer`s requirements.

Additional grading around the hot tub should not exceed permissible grade raises. Otherwise, hot tub construction is considered routine, and can be constructed in accordance with the manufacturer’s specifications.

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

7.0 Recommendations

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

☐ Observation of all bearing surfaces prior to the placement of concrete.

☐ Sampling and testing of the concrete and fill materials.

☐ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.

☐ Observation of all subgrades prior to backfilling.

☐ Field density tests to determine the level of compaction achieved.

☐ Sampling and testing of the bituminous concrete including mix design reviews.

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

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

8.0 Statement of Limitations

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

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

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

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Urbandale Corporation, or their agents, is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

Paterson Group Inc.

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Report Distribution:

☐ Urbandale Construction (email copy)
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APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

RECORD OF BOREHOLE SHEETS BY OTHERS

ATTERBERG LIMITS TESTING RESULTS

GRAIN SIZE DISTRIBUTION ANALYSIS

SHRINKAGE TESTING RESULTS

ANALYTICAL TESTING RESULTS

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

50 Flavescent Land, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 369641.78 **NORTHING:** 5015596.52 **ELEVATION:** 91.60

PROJECT: Riverside South Town Centre Phase 7A

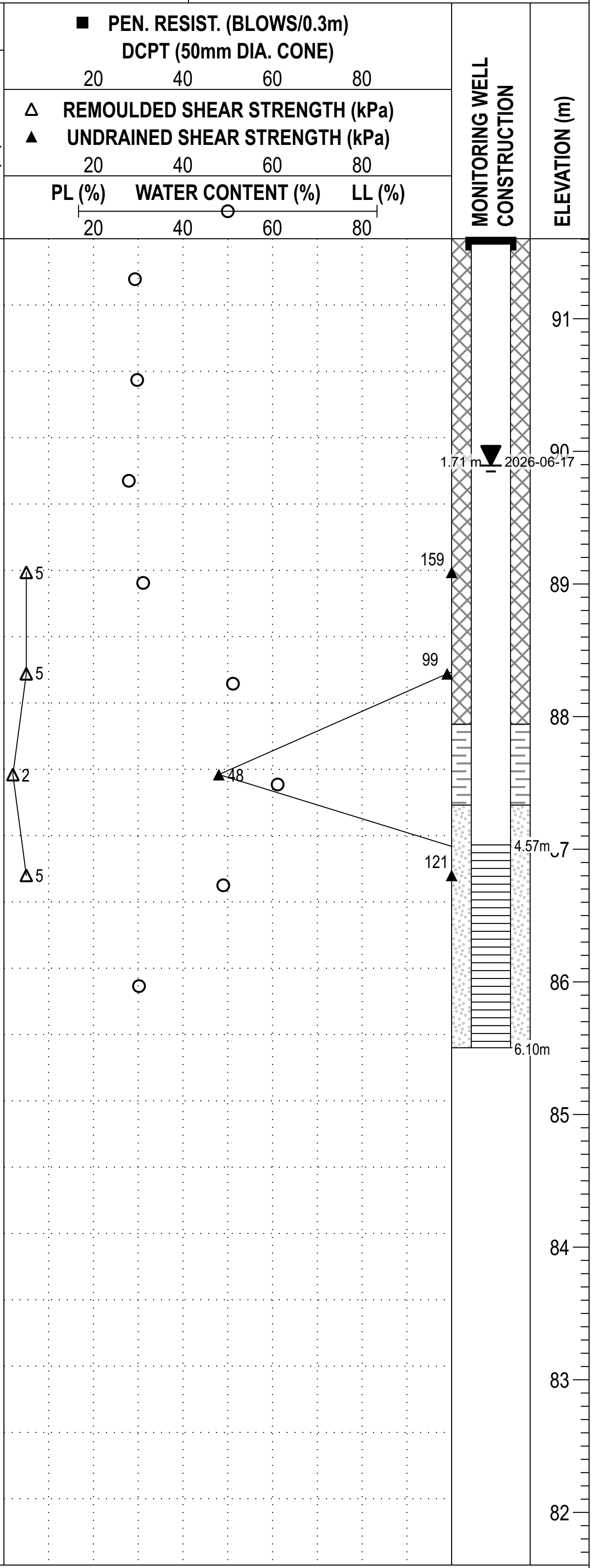
ADVANCED BY: Track Mounted Drill Rig

REMARKS: Datum: NAD1983 (Canada) Geoid: HT2-2010 **DATE:** June 10, 2026

FILE NO. : PG8045

HOLE NO. : BH 1-26

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)
GROUND SURFACE						
FILL: Brown silty clay, some organics, trace cruhsed stone			AU 1			29
0.69m [90.91m]						
Very stiff, brown **SILTY CLAY**, with sand		1	SS 2	100	3-2-2-3 4	30
		2	SS 3	100	2-2-1-2 3	28
			SS 4	100	P	31
2.97m [88.63m]		3				
Stiff to very stiff, grey **SILTY CLAY**			SS 5	100	P	51
		4	SS 6	100	P	61
		5	SS 7	100	P	49
5.26m [86.34m]						
GLACIAL TILL: Grey silty clay, with gravel, cobbles and boulders			SS 8	100	3-2-2-1 4	30
5.94m [85.66m]		6				
GLACIAL TILL: Grey silty sand, with gravel, cobbles and boulders			SS 9	75	23-29-22-25 51	
6.71m [84.89m]						
End of Borehole		7				
(GWL at 1.71 m depth - June 17, 2026)		8				
		9				
		10				



PATERSON GROUP

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

50 Flavescent Land, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 369636.74 **NORTHING:** 5015655.60 **ELEVATION:** 91.93

PROJECT: Riverside South Town Centre Phase 7A

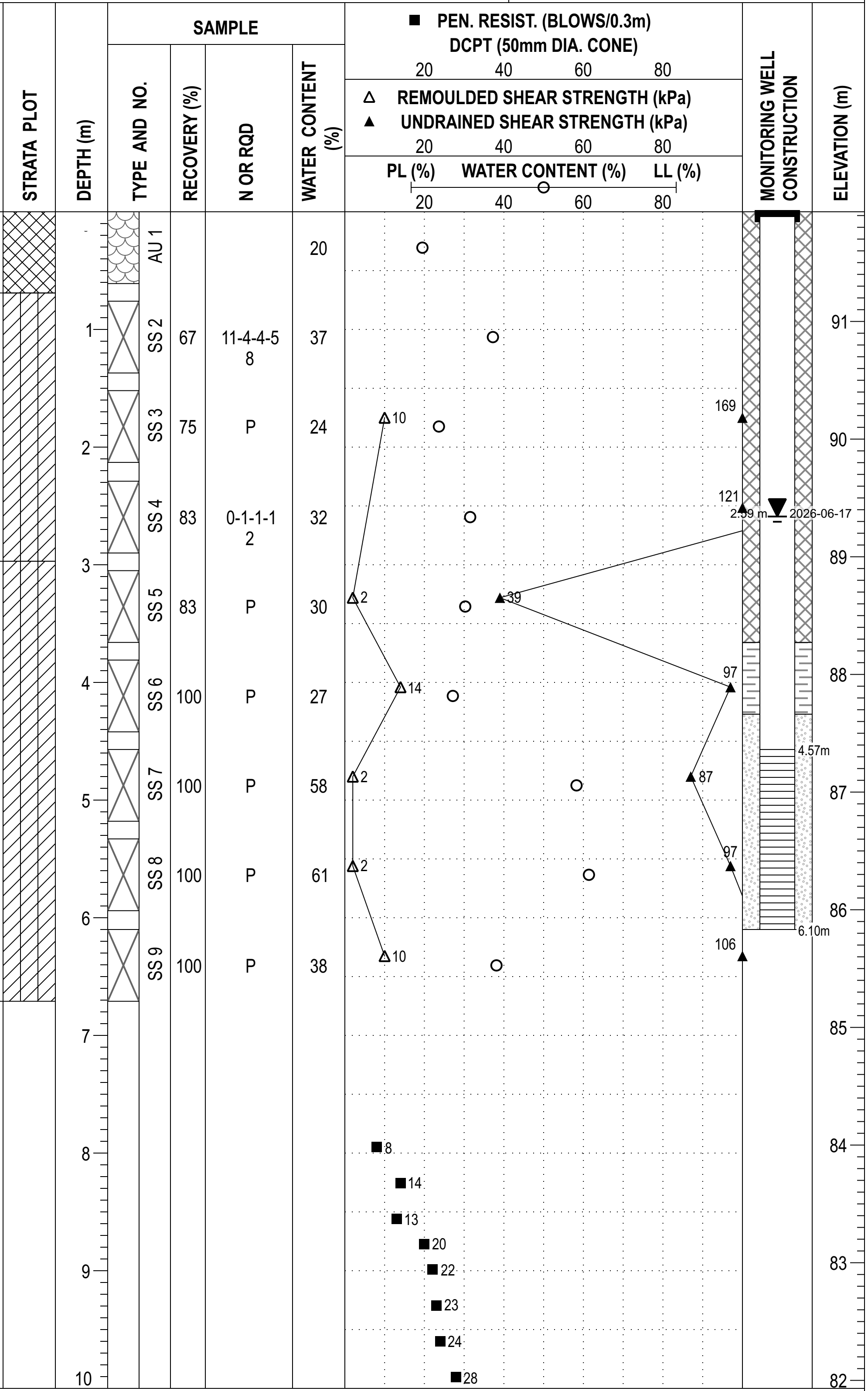
ADVANCED BY: Track Mounted Drill Rig

REMARKS: Datum: NAD1983 (Canada) Geoid: HT2-2010 **DATE:** June 10, 2026

FILE NO. : **PG8045**

HOLE NO. : **BH 2-26**

SAMPLE DESCRIPTION GROUND SURFACE	SAMPLE TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)
FILL: Brown silty clay, with crushed stone	AU 1			20
0.69m [91.24m]				
Very stiff, brown **SILTY CLAY**, with sand	SS 2	67	11-4-4-5 8	37
	SS 3	75	P	24
	SS 4	83	0-1-1-1 2	32
2.97m [88.96m]				
Firm to very stiff, grey **SILTY CLAY**	SS 5	83	P	30
	SS 6	100	P	27
	SS 7	100	P	58
	SS 8	100	P	61
	SS 9	100	P	38
6.71m [85.22m]				
Dynamic Cone Penetration Test commenced at 6.71 m depth DCPT pushed to 7.80 m depth				



DISCLAIMER: THE DATA PRESENTED IN THIS SHEET IS THE PROPERTY OF PATERSON GROUP AND THE CLIENT FOR WHOM IT WAS PRODUCED. THIS SHEET SHOULD BE READ IN CONJUNCTION WITH ITS CORRESPONDING REPORT. PATERSON GROUP IS NOT RESPONSIBLE FOR THE UNAUTHORIZED USE OF THIS DATA.

P:/AutoCAD Drawings/Test Hole Data Files/PG80xx/PG8045/data.sqlite 2026-07-03, 16:41 Paterson_Template MA

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

50 Flavescent Land, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 369636.74 **NORTHING:** 5015655.60 **ELEVATION:** 91.93

PROJECT: Riverside South Town Centre Phase 7A

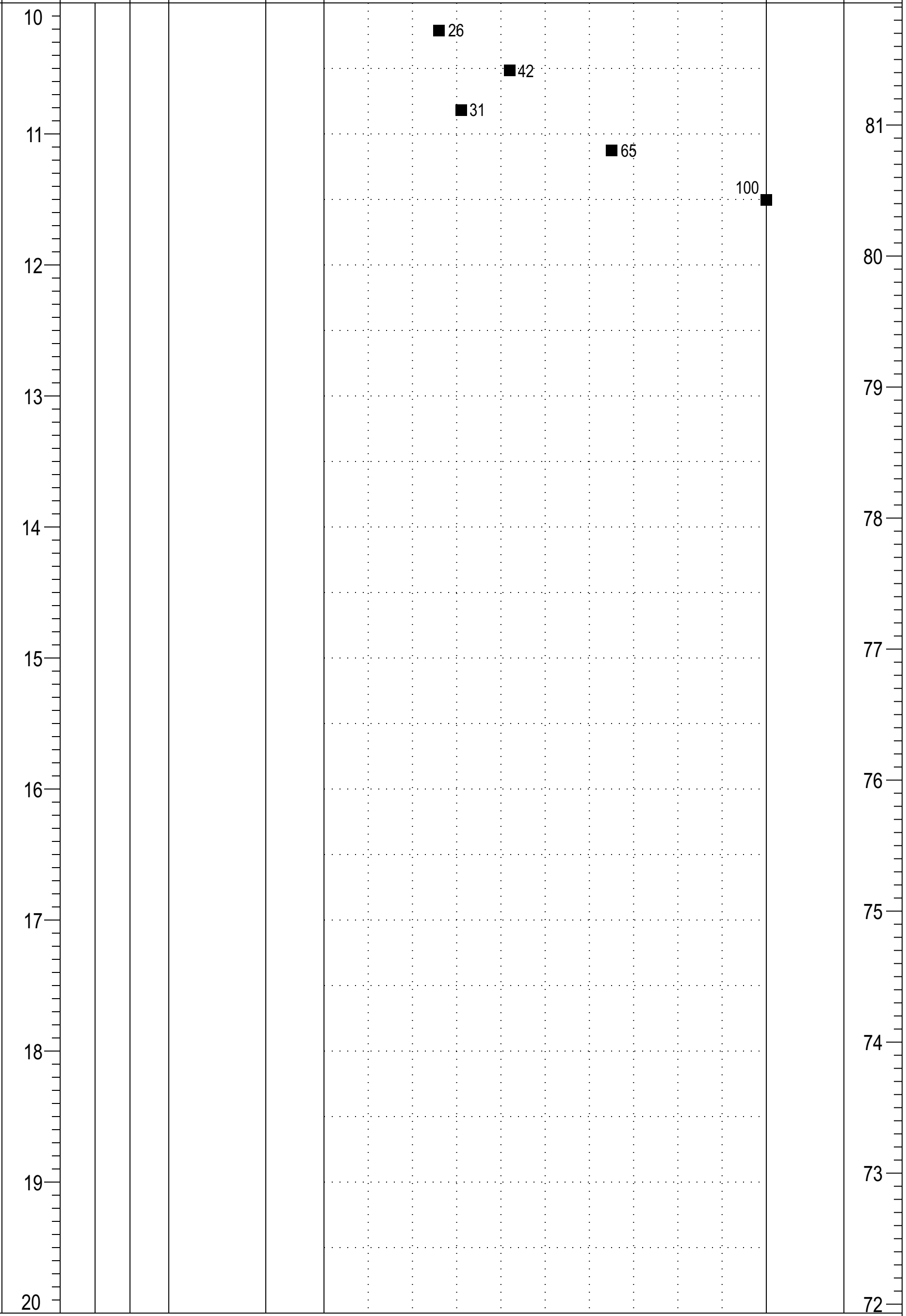
ADVANCED BY: Track Mounted Drill Rig

REMARKS: Datum: NAD1983 (Canada) Geoid: HT2-2010 **DATE:** June 10, 2026

FILE NO. : PG8045

HOLE NO. : BH 2-26

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)
11.58m [80.35m]									
End of Borehole Practical refusal to DCPT at 11.73 m depth (GWL at 2.59 m depth - June 17, 2026)									



SOIL PROFILE AND TEST DATA

Geotechnical Investigation

50 Flavescent Land, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 369587.06 **NORTHING:** 5015686.04 **ELEVATION:** 91.66

PROJECT: Riverside South Town Centre Phase 7A

ADVANCED BY: Track Mounted Drill Rig

REMARKS: Datum: NAD1983 (Canada) Geoid: HT2-2010

DATE: June 10, 2026

FILE NO. : **PG8045**

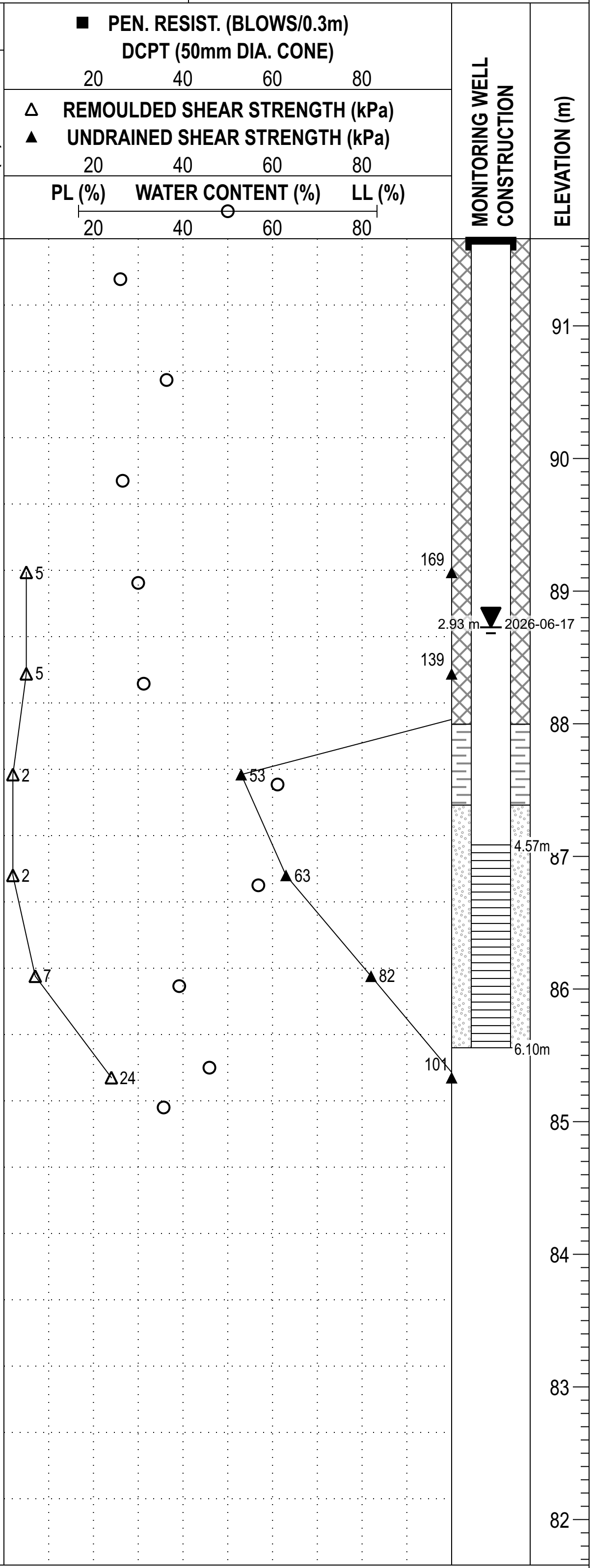
HOLE NO. : **BH 3-26**

SAMPLE DESCRIPTION	Depth / Elevation
GROUND SURFACE	
FILL: Brown silty clay, with sand, some organics, trace crushed stone	0.69m [90.97m]
Hard, brown **SILTY CLAY**, with sand	1.45m [90.21m]
Brown **SILTY SAND** to **SANDY SILT**, with clay	2.21m [89.45m]
Very stiff, brown **SILTY CLAY**, with to some sand	3.51m [88.15m]
Stiff, grey **SILTY CLAY**	6.55m [85.11m]
GLACIAL TILL: Grey silty clay, some to trace sand, trace gravel	6.71m [84.95m]

End of Borehole

(GWL at 2.93 m depth - June 17, 2026)

TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)
AU 1			26
SS 2	92	3-3-5-4 8	36
SS 3		1-2-3-3 5	27
SS 4	100	P	30
SS 5	100	P	31
SS 6	100	P	61
SS 7	100	P	57
SS 8	100	P	39
SS 9	100	0-0-0-3 0	46 36



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation - Prop. Mixed-Use Dev.
Riverside South - Town Center Phase 7A
Ottawa, Ontario

EASTING: 369637.104 **NORTHING:** 5015645.767 **ELEVATION:** 91.96
DATUM: Geodetic
REMARKS:
BORINGS BY: CME 55 Track-Mounted Auger **DATE:** April 8, 2024

FILE NO. **PG4958**
HOLE NO. **BH18-24**

SAMPLE DESCRIPTION

Ground Surface

Sample Description	Depth to base (m)
Hard to very stiff, brown **SILTY CLAY** with intermittent silt seams, trace sand - organics at surface	0.97
Loose, brown **SILTY SAND** to **SANDY SILT**, some clay - clay content increases with depth	2.49
Stiff, brown **SILTY CLAY**, some sand, with intermittent silt seams	3.30
Firm to stiff, grey **SILTY CLAY** with intermittent silt seams	6.55
Dynamic Cone Penetration Test commenced at 6.55m depth. The cone was pushed to 7.62m depth.	10.57

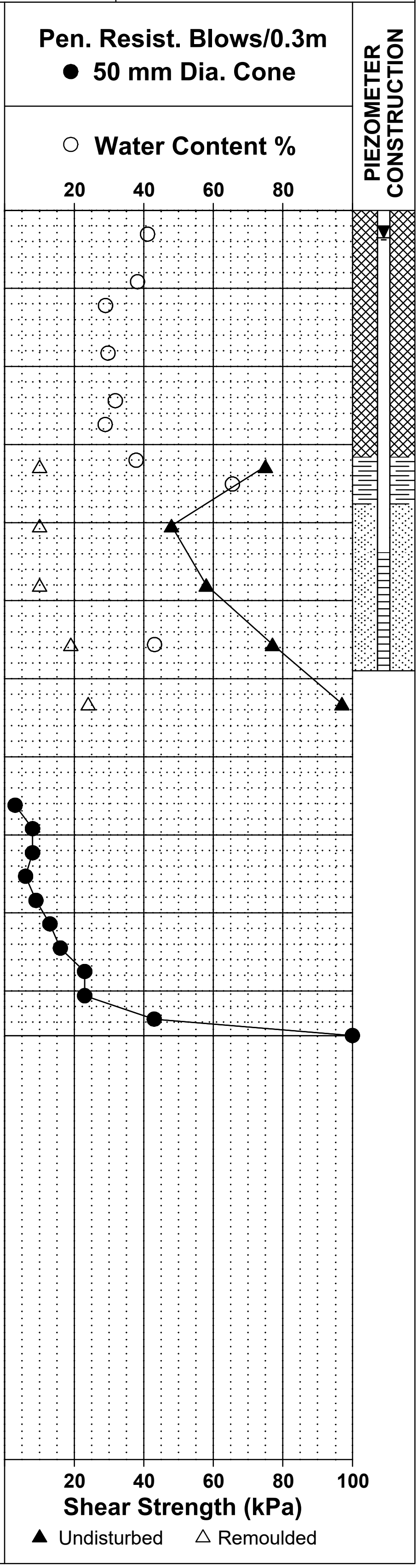
End of Borehole

Practical DCPT refusal at 10.57m depth

(GWL @ 0.35m - April 18, 2024)

TYPE	NUMBER	% RECOVERY	N VALUE or RQD
AU	1		
SS	2	100	7
SS	3	100	5
SS	4	100	4
SS	5	100	P
G	6		

DEPTH (m)	ELEV. (m)
0	91.96
1	90.96
2	89.96
3	88.96
4	87.96
5	86.96
6	85.96
7	84.96
8	83.96
9	82.96
10	81.96



SOIL PROFILE AND TEST DATA

Geotechnical Investigation - Prop. Mixed-Use Dev.
Riverside South - Town Center Phase 7A
Ottawa, Ontario

EASTING: 369510.502 **NORTHING:** 5015631.116 **ELEVATION:** 91.62

DATUM: Geodetic

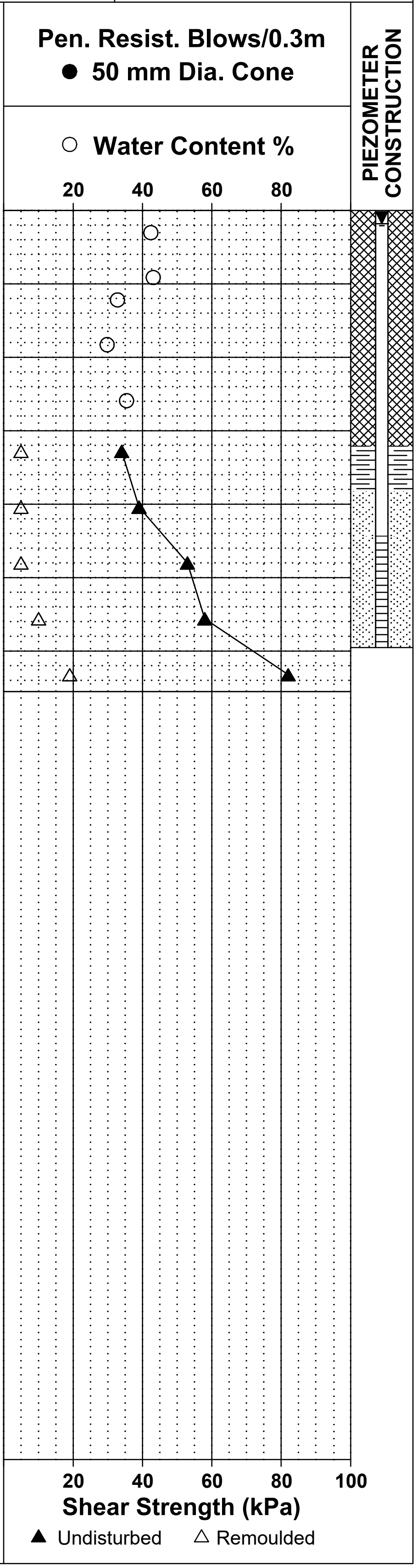
REMARKS:

BORINGS BY: CME 55 Track-Mounted Auger **DATE:** April 8, 2024

FILE NO. PG4958

HOLE NO. BH19-24

SAMPLE DESCRIPTION	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
Ground Surface					0	91.62
Hard to very stiff, brown **SILTY CLAY**, trace sand - organics at surface	AU	1				
1.07	SS	2	100	8	1	90.62
Loose, brown **SILTY SAND** to **SANDY SILT**, some clay - clay content increases with depth	SS	3	100	4	2	89.62
2.21	SS	4	100	3		
2.97					3	88.62
Stiff, brown **SILTY CLAY** to **CLAYEY SILT** with intermittent silt seams and sand					4	87.62
Firm to stiff, grey **SILTY CLAY** with intermittent silt seams					5	86.62
					6	85.62
6.55						
End of Borehole (GWL @ 0.18m - April 18, 2024)						



SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC% - Natural moisture content or water content of sample, %
LL - Liquid Limit, % (water content above which soil behaves as a liquid)
PL - Plastic limit, % (water content above which soil behaves plastically)
PI - Plasticity index, % (difference between LL and PL)

Dxx - Grain size which xx% of the soil, by weight, is of finer grain sizes
These grain size descriptions are not used below 0.075 mm grain size
D10 - Grain size at which 10% of the soil is finer (effective grain size)
D60 - Grain size at which 60% of the soil is finer

Cc - Concavity coefficient = $(D30)^2 / (D10 \times D60)$
Cu - Uniformity coefficient = D60 / D10

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

CONSOLIDATION TEST

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

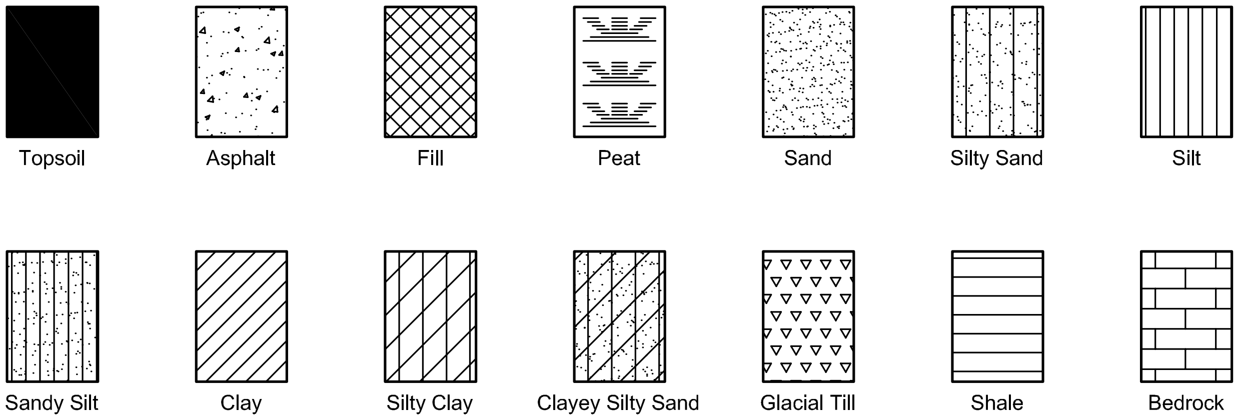
OC Ratio Overconsolidaton ratio = p'_c / p'_o
Void Ratio Initial sample void ratio = volume of voids / volume of solids
Wo - Initial water content (at start of consolidation test)

PERMEABILITY TEST

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

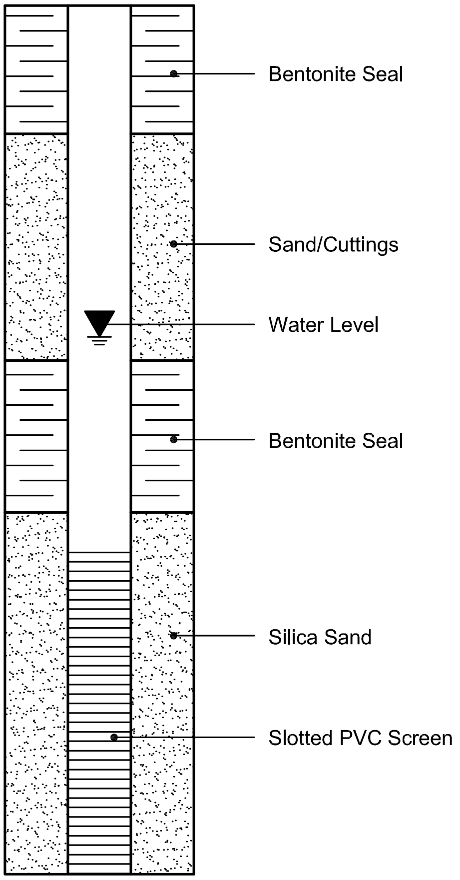
SYMBOLS AND TERMS (continued)

STRATA PLOT

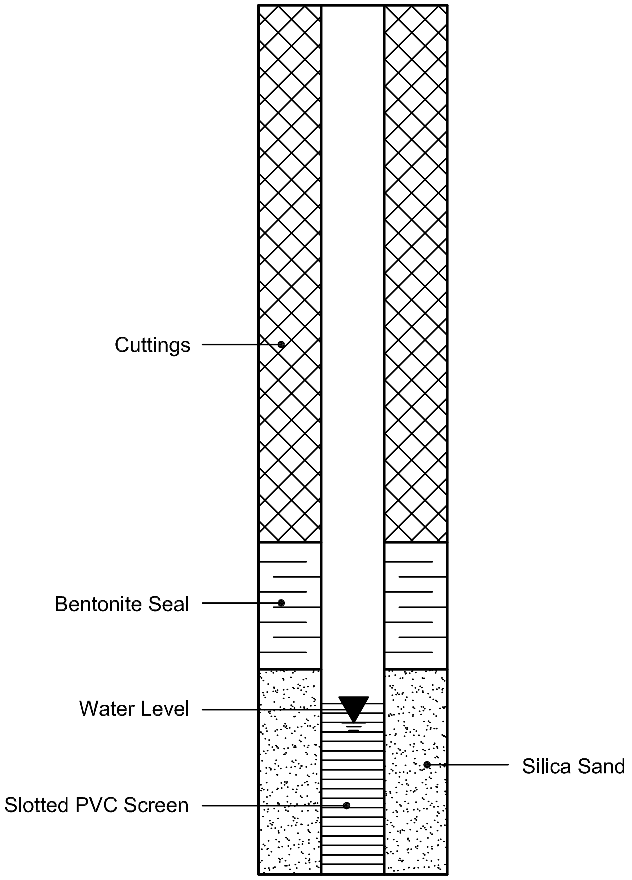


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



PROJECT: 11-1121-0293

RECORD OF BOREHOLE: 12-10

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: February 22, 2012

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

BORING METHOD: Rotary Drill, 200mm Dia. (Hollow Stem)

DESCRIPTION	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m
GROUND SURFACE	92.32			
Dark brown to black silty clay, trace sand and organic matter (TOPSOIL)	0.00			
Very stiff grey brown SILTY CLAY, trace sand (Weathered Crust)	92.09 0.23	1	50 DO	7
Loose to very loose grey brown SILTY SAND to SANDY SILT, some clay, trace gravel	91.12 1.20	2	50 DO	5
		3	50 DO	3
Stiff grey brown to grey SILTY CLAY to CLAYEY SILT, trace sand	89.12 3.20	4	50 DO	1
Stiff grey SILTY CLAY, occasional silt seams	88.66 3.66	5	50 DO	WH
		6	50 DO	WH
Very dense grey SILTY SAND to SANDY SILT, some gravel, trace clay, with cobbles and boulders (GLACIAL TILL)	86.68 5.64	7	50 DO	>50
End of Borehole Auger Refusal	85.92 6.40			

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

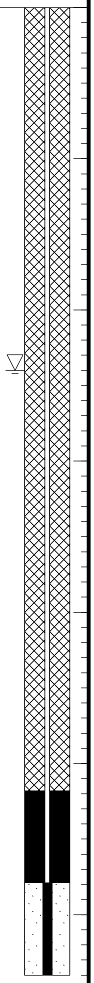
SHEAR STRENGTH Cu, kPa: nat V. + Q - ● rem V. ⊕ U - ○ : 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-6} 10^{-5} 10^{-4} 10^{-3}

WATER CONTENT PERCENT: Wp ⊢ ○W ⊣ Wl : 20 40 60 80

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



WL in Standpipe at Elev. 89.92m on Mar. 13, 2012

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: R.I.
CHECKED: C.K.

PROJECT: 11-1121-0293

RECORD OF BOREHOLE: 12-12

SHEET 1 OF 1

LOCATION: See Site Plan

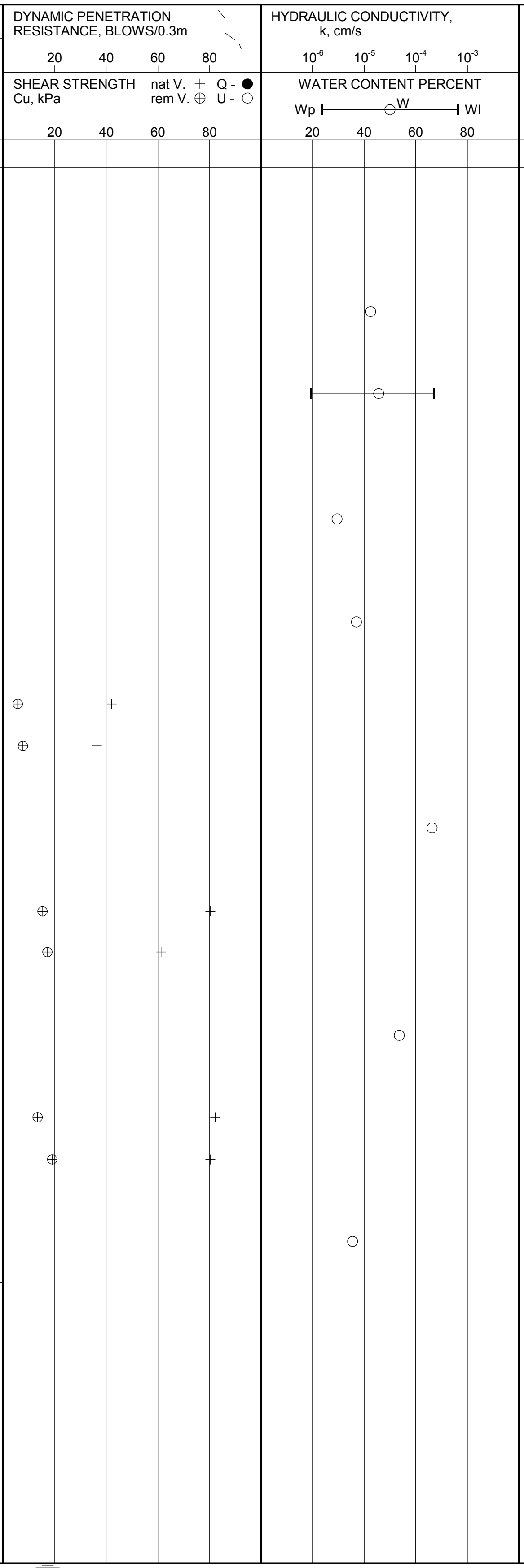
BORING DATE: February 22, 2012

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE	91.90					
0	Rotary Drill 200mm Dia. (Hollow Stem)	Dark brown silty clay, trace sand and organic matter (TOPSOIL)	0.00					
		Very stiff grey brown SILTY CLAY, trace sand (Weathered Crust)	91.52 0.38	1 2	50 DO 50 DO	7 4		
2		Very loose grey brown SILTY SAND to SANDY SILT, trace clay, trace gravel	90.07 1.83	3	50 DO	4		
3		Firm grey CLAYEY SILT, some fine sand seams	88.85 3.05	4	50 DO	WH		
		Stiff grey SILTY CLAY	87.33 4.57	5 6	50 DO 50 DO	PM WH		
		Very stiff to stiff grey SILTY CLAY to CLAYEY SILT, some silt seams	84.28 7.62	7	50 DO	2		Borehole dry upon completion of drilling
		End of Borehole	83.67 8.23					



DEPTH SCALE
1 : 50

Golder Associates

LOGGED: R.I.
CHECKED: C.K.

PROJECT: 09-1121-0120

RECORD OF BOREHOLE: 09-7

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: Aug. 14, 2009

DATUM: Geodetic

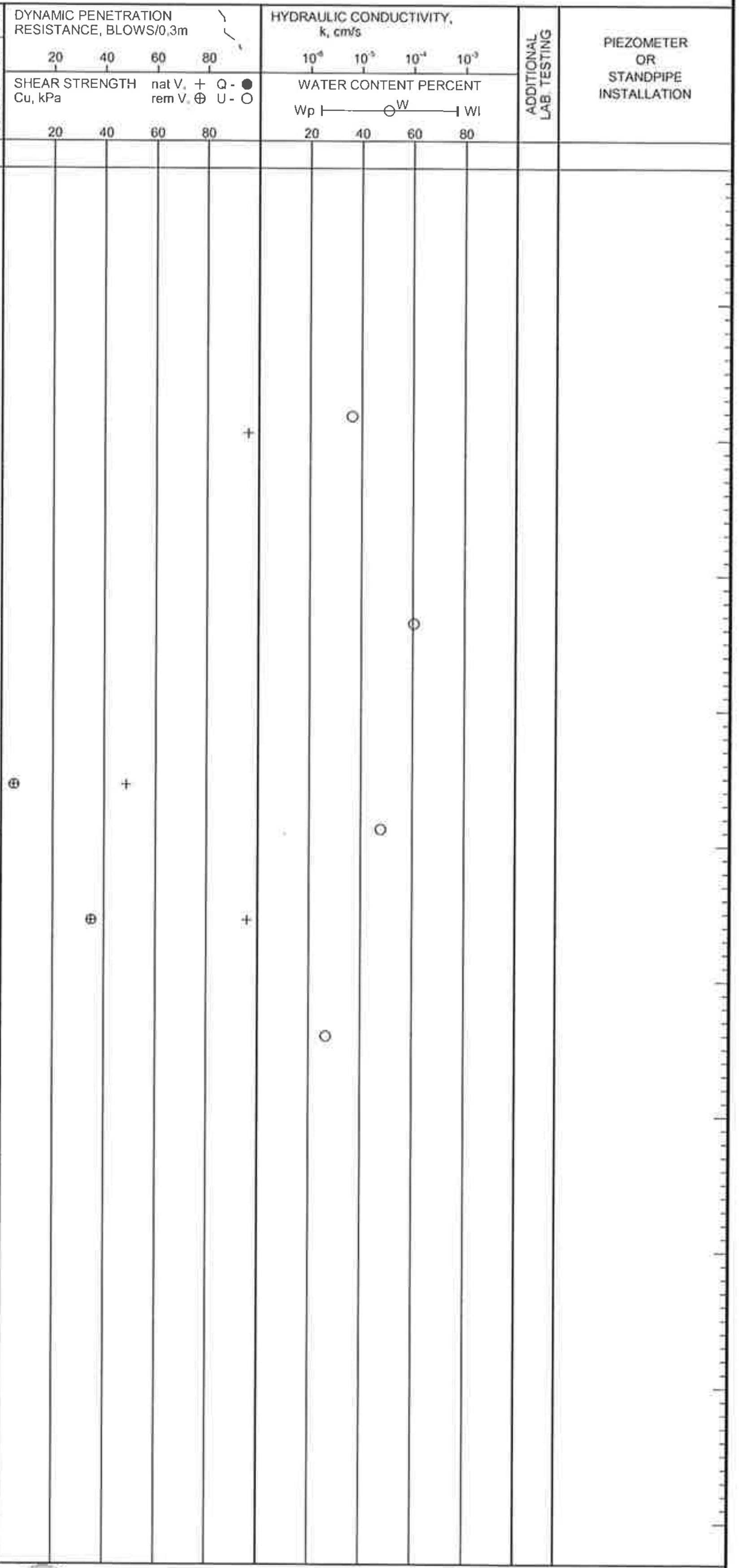
SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

BORING METHOD: Power Auger 200mm Diam. (Hollow Stem)

SOIL PROFILE DESCRIPTION	ELEV. DEPTH (m)
GROUND SURFACE	92.23
Dark brown silty clay, some sand and organic matter (TOPSOIL)	0.00
Stiff grey brown SILTY CLAY, some sand, occasional fine sand seam (Weathered Crust)	0.15
Grey SILTY CLAY, occasional clayey silt seam with depth	89.33 2.90
Stiff grey SILTY CLAY, trace sand	86.59 5.64
End of Borehole	84.91 7.32

SAMPLES NUMBER	TYPE	BLOWS/0.3m
1	50 DO	8
2	50 DO	4
3	50 DO	WH
4	50 DO	WH
5	50 DO	WH
6	50 DO	WH
7	50 DO	4
8	50 DO	5
9	50 DO	5



DEPTH SCALE

1 : 50

Golder Associates

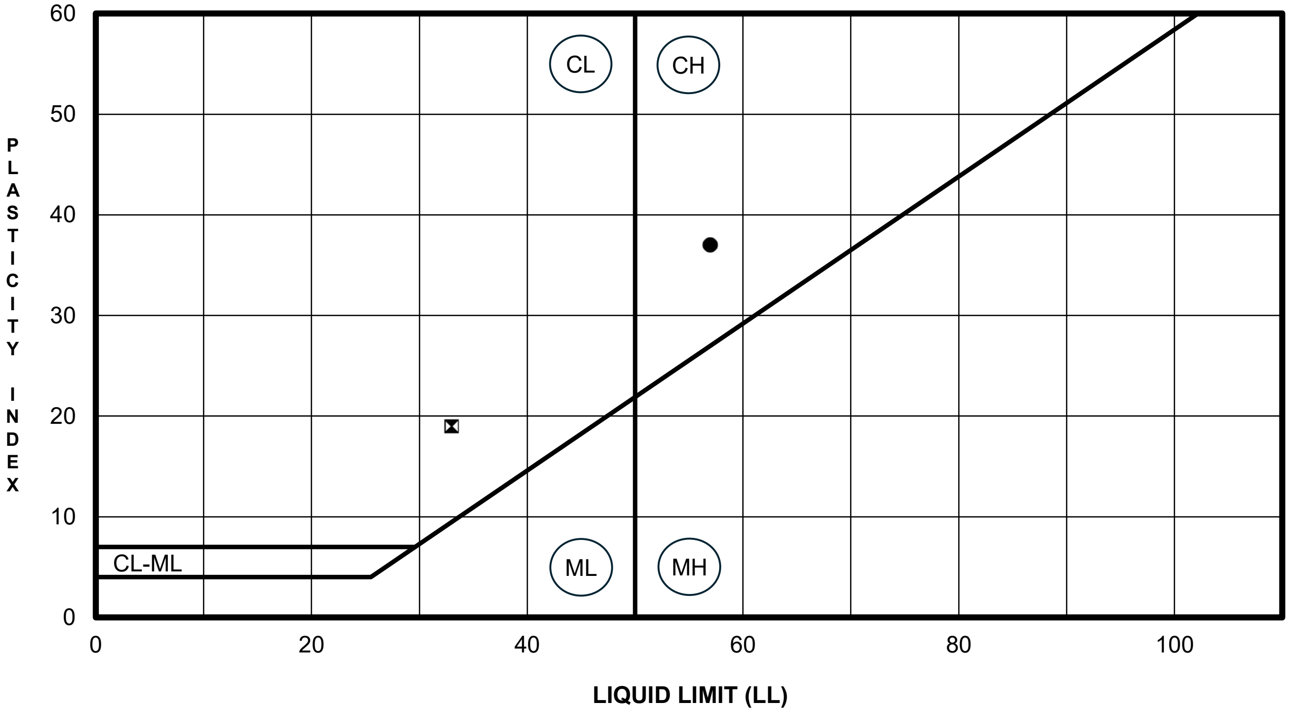
LOGGED: J.C.

CHECKED: SK

PATERSON GROUP

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

ATTERBERG LIMITS' RESULTS



	Specimen Identificacation		LL	PL	PI	Fines	Classification
●	**BH 1-26**	**SS5**	**57**	**20**	**37**		**CH - Inorganic clays of high plasticity**
⧗	**BH 3-26**	**SS4**	**33**	**14**	**19**		**CL - Inorganic clays of low plasticity**
▲							
★							
⊙							
✥							
○							
△							
⊗							
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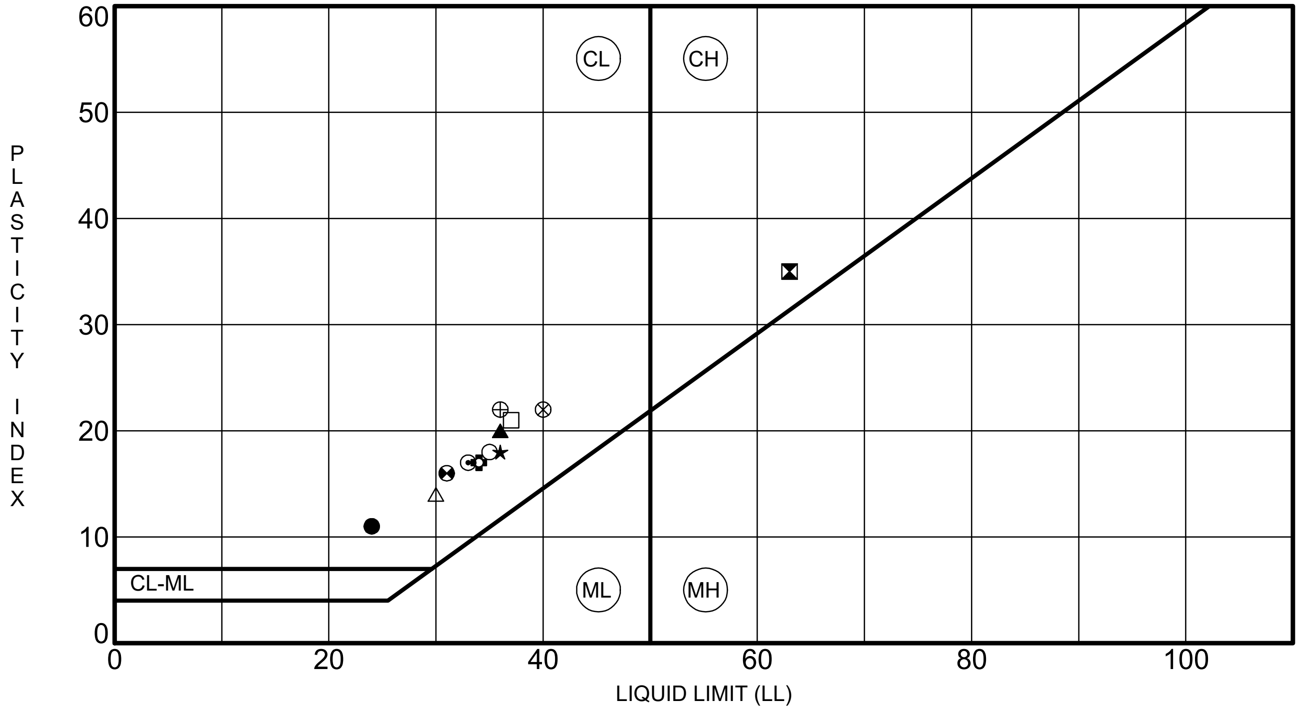
CLIENT Urbandale Construction

FILE NO. PG8045

PROJECT Geotechnical Investigation - Riverside South Town Centre Phase 7A - 50 Flacescent Land, Ottawa, Ontario

DATE 8-Jul-26



Specimen Identification			LL	PL	PI	Fines	Classification
●	**BH 1-24**	**SS 4**	**24**	**13**	**11**		**CL - Inorganic clays of low plasticity**
⧗	**BH 3-24**	**SS 4**	**63**	**28**	**35**	**93.9**	**CH - Inorganic clays of high plasticity CH**
▲	**BH 4-24**	**SS 4**	**36**	**16**	**20**		**CL - Inorganic clays of low plasticity**
★	**BH 5-24**	**SS 3**	**36**	**18**	**18**	**72.0**	**CL - Inorganic clays of low plasticity CL**
⊙	**BH 6-24**	**SS 4**	**33**	**16**	**17**	**69.4**	**CL - Inorganic clays of low plasticity CL**
✿	**BH 7-24**	**SS 3**	**34**	**17**	**17**		**CL - Inorganic clays of low plasticity**
○	**BH 8-24**	**SS 4**	**35**	**17**	**18**	**74.6**	**CL - Inorganic clays of low plasticity CL**
△	**BH11-24**	**SS 4**	**30**	**16**	**14**		**CL - Inorganic clays of low plasticity**
⊗	**BH14-24**	**SS 3**	**40**	**18**	**22**	**63.7**	**CL - Inorganic clays of low plasticity CL**
⊕	**BH15-24**	**SS 3**	**36**	**14**	**22**		**CL - Inorganic clays of low plasticity**
□	**BH17-24**	**SS 4**	**37**	**16**	**21**	**82.5**	**CL - Inorganic clays of low plasticity CL**
☢	**BH18-24**	**SS 4**	**31**	**15**	**16**		**CL - Inorganic clays of low plasticity**

CLIENT **Riverside South Limited Partnership**

FILE NO. **PG4958**

PROJECT **Geotechnical Investigation - Prop. Mixed-Use Dev.**
- Riverside South - Town Center Phase 7A

DATE **8 Apr 24**

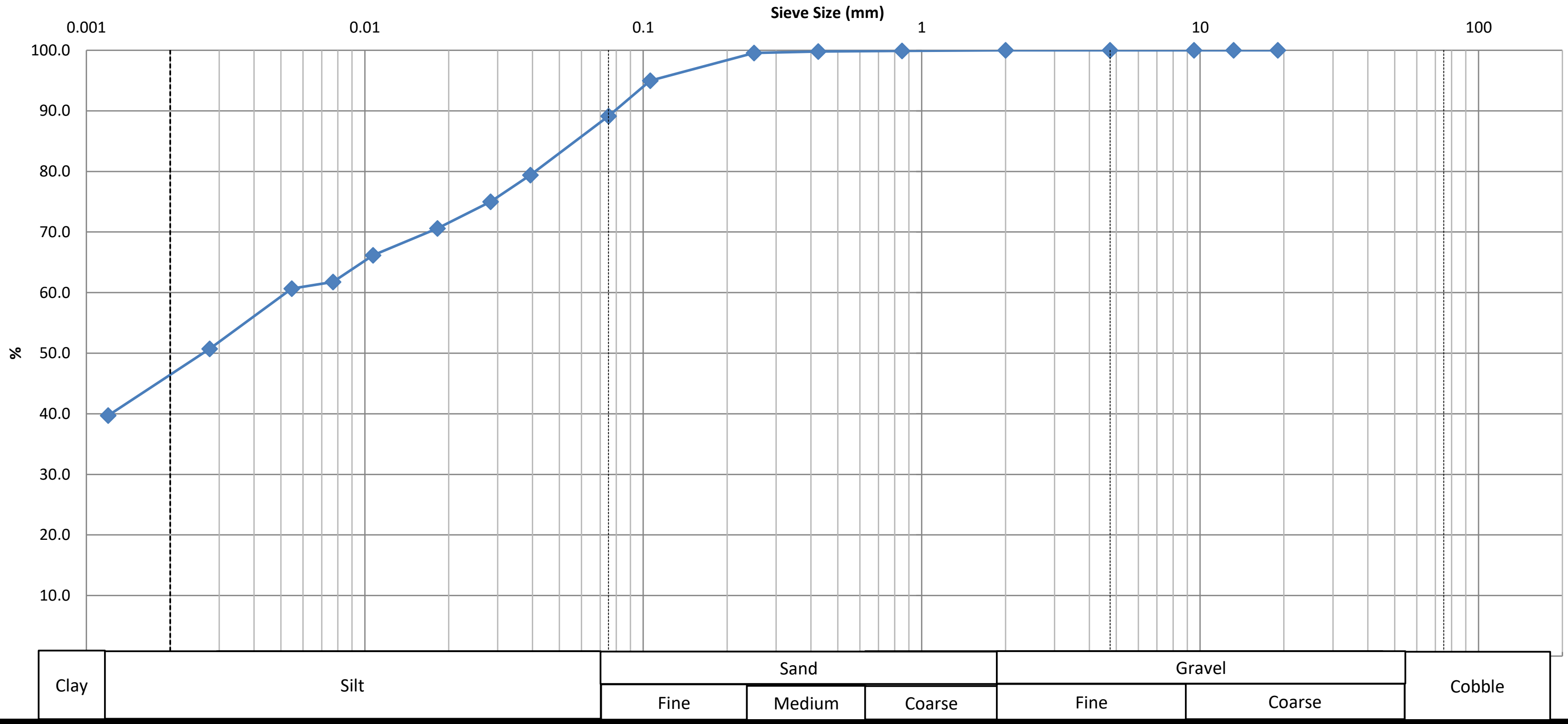
patersongroup **Consulting Engineers**
9 Auriga Drive, Ottawa, Ontario K2E 7T9

ATTERBERG LIMITS' RESULTS

PATERSON GROUP

SIEVE ANALYSIS
ASTM C136

CLIENT:	Urbandale Construction	DEPTH:	7'6" - 9'6"	FILE NO:	PG8045
CONTRACT NO.:		BH OR TP No.:	BH1-26 / SS4	LAB NO:	67167
PROJECT:	50 Flavescent Lane			DATE RECEIVED:	18-Jun-26
				DATE TESTED:	18-Jun-26
DATE SAMPLED:	18-Jun-26			DATE REPORTED:	8-Jul-26
SAMPLED BY:	-			TESTED BY:	D.J



Identification	Soil Classification				MC(%)	LL	PL	PI	Cc	Cu
					43.1					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)	Clay (%)	
					0.0	10.9		32.1	57.0	

Comments:

REVIEWED BY:

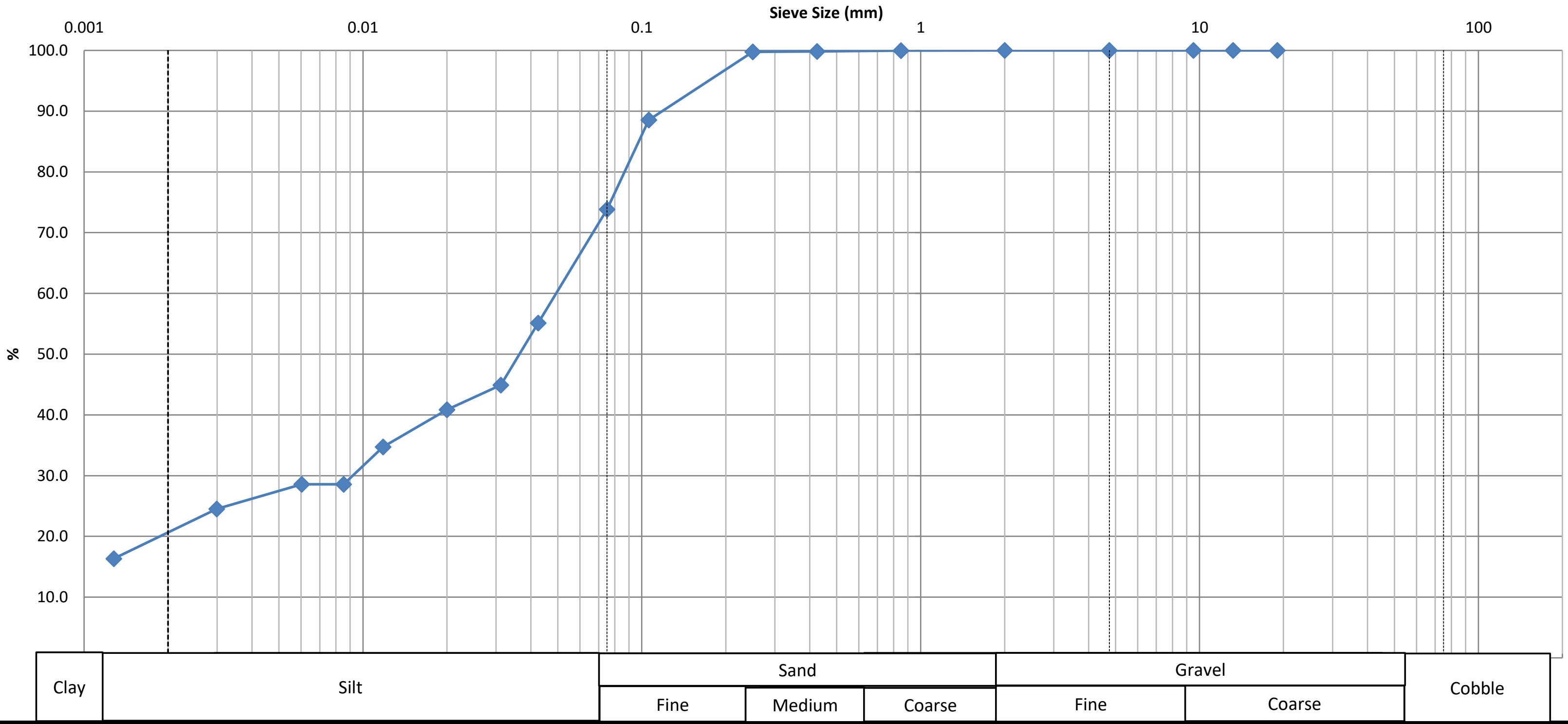
Curtis Beadow

Joe Forsyth, P. Eng.

PATERSON GROUP

SIEVE ANALYSIS
ASTM C136

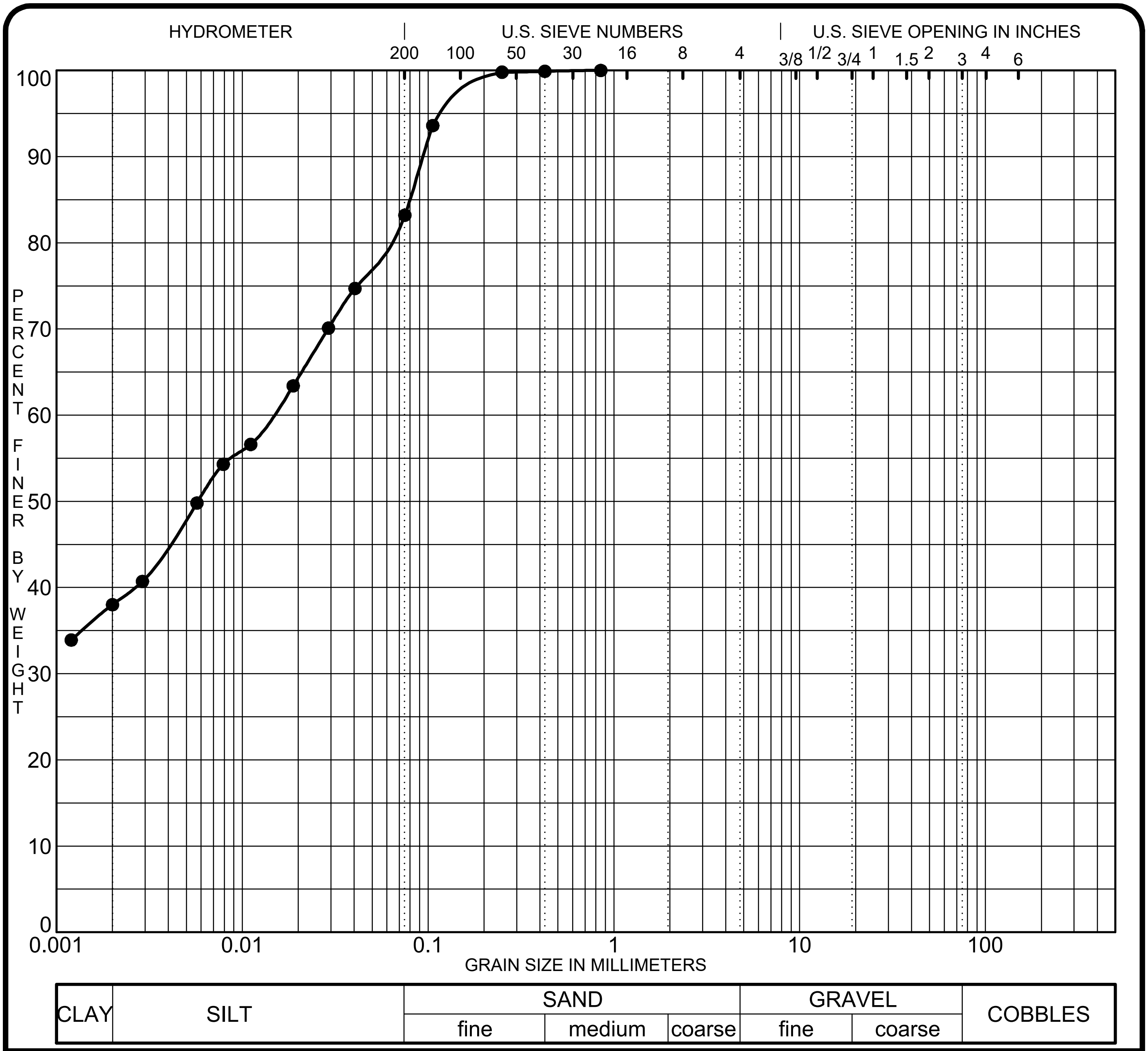
CLIENT:	Urbandale Construction	DEPTH:	10' - 12'	FILE NO:	PG8045
CONTRACT NO.:		BH OR TP No.:	BH2-26 / SS5	LAB NO:	67169
PROJECT:	50 Flavescent Lane			DATE RECEIVED:	18-Jun-26
				DATE TESTED:	18-Jun-26
DATE SAMPLED:	18-Jun-26			DATE REPORTED:	8-Jul-26
SAMPLED BY:	-			TESTED BY:	D.J



Identification	**Soil Classification**					**MC(%)**	**LL**	**PL**	**PI**	**Cc**	**Cu**
						28.4					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					0.0	26.2		52.8		21.0	

Comments:

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



	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH19-24**	**SS 4**		**41.7**					
☒									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH19-24**	**SS 4**	**0.85**	**0.01**			**0.0**	**16.8**	**45.2**	**38.0**
☒										
▲										
★										

CLIENT **Riverside South Limited Partnership**

PROJECT **Geotechnical Investigation - Prop. Mixed-Use Dev. - Riverside South - Town Center Phase 7A**

FILE NO. **PG4958**

DATE **8 Apr 24**

patersongroup **Consulting Engineers**

9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION

Certificate of Analysis

Report Date: 18-Jun-2026

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

Order Date: 15-Jun-2026

Client PO: 66190

Project Description: PG8045

	Client ID:	BH2-26-SS3	-	-	-	-	-
	Sample Date:	10-Jun-26 09:00	-	-	-	-	-
	Sample ID:	2625106-01	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	78.4	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.59	-	-	-	-	-
Resistivity	0.1 Ohm.m	53.7	-	-	-	-	-
Anions							
Chloride	10 ug/g	<10	-	-	-	-	-
Sulphate	10 ug/g	47	-	-	-	-	-

APPENDIX 2

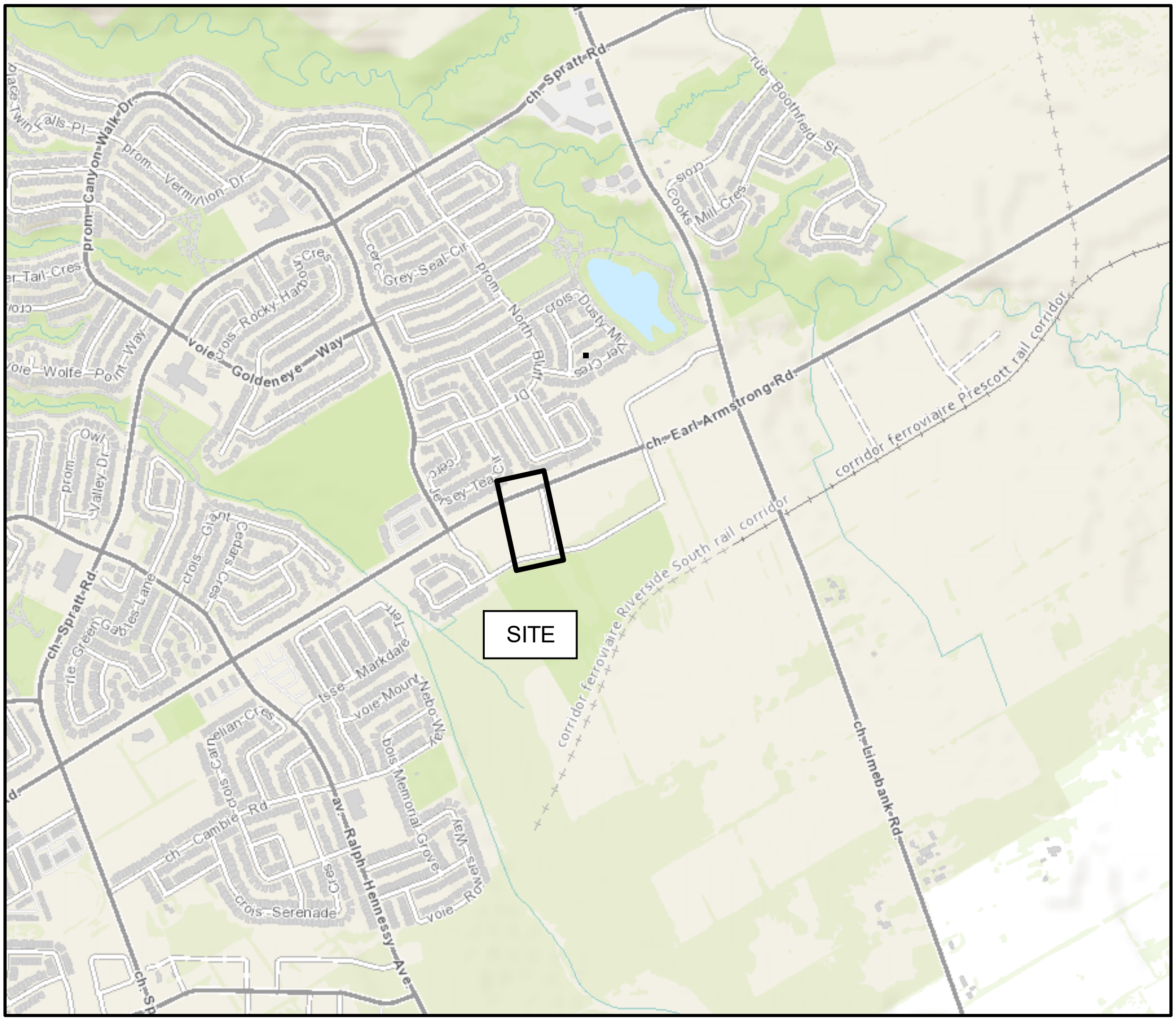


FIGURE 1

KEY PLAN

FIGURE 2

AERIAL PHOTOGRAPH - 2014

PATERSON GROUP

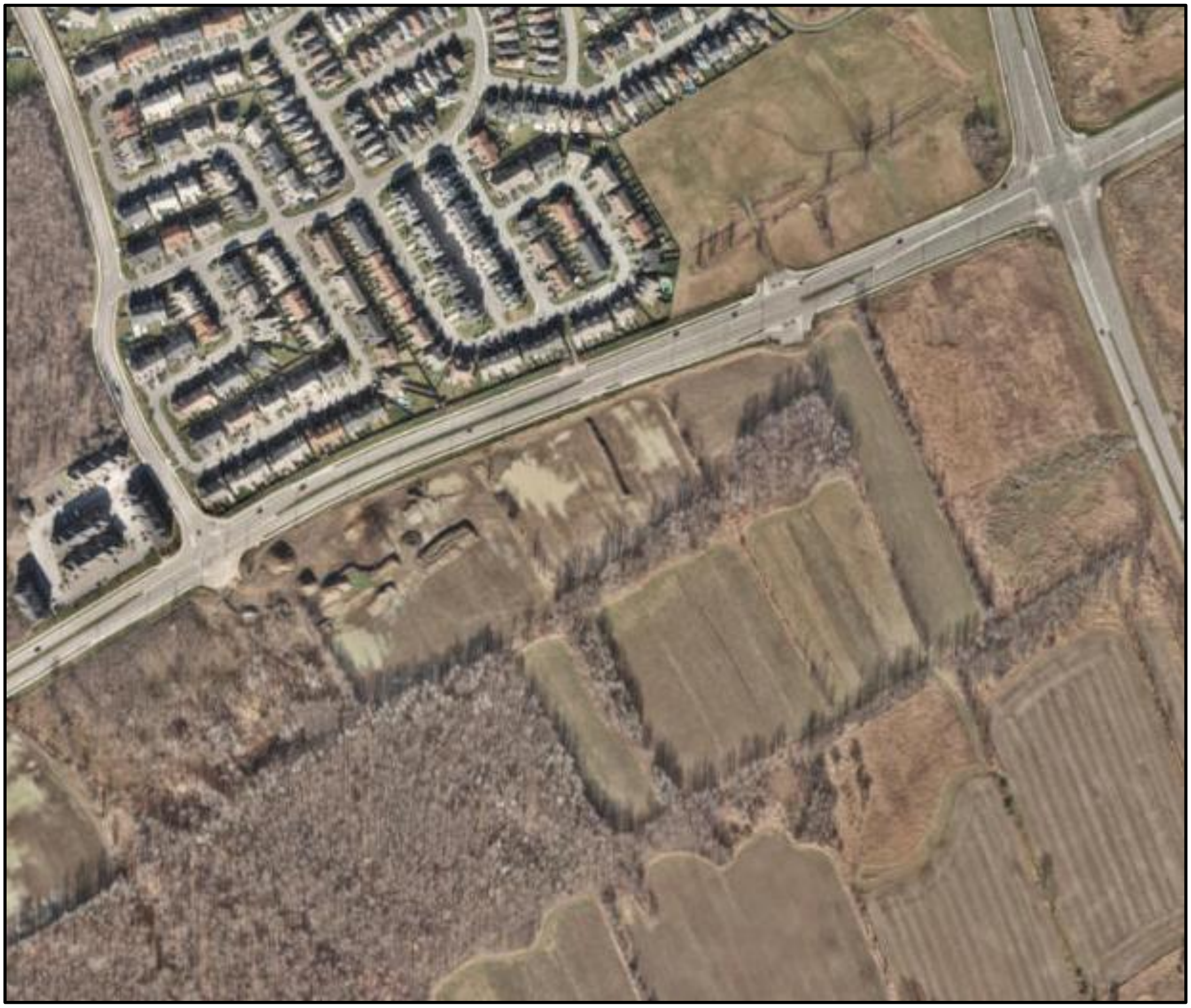
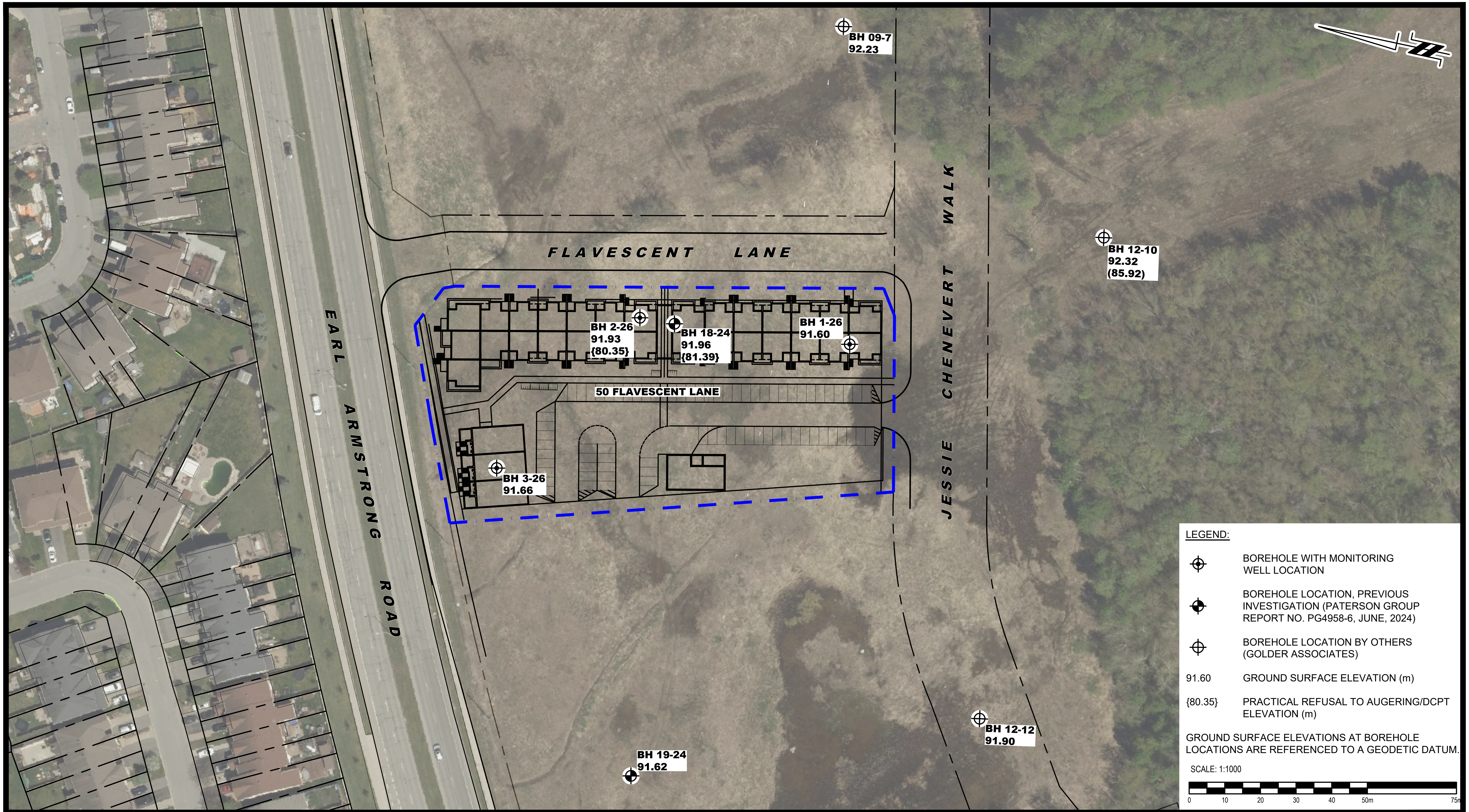


FIGURE 3

AERIAL PHOTOGRAPH - 2015

FIGURE 4

AERIAL PHOTOGRAPH - 2019



LEGEND:

⌖	BOREHOLE WITH MONITORING WELL LOCATION
●	BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT NO. PG4958-6, JUNE, 2024)
⌖	BOREHOLE LOCATION BY OTHERS (GOLDER ASSOCIATES)
91.60	GROUND SURFACE ELEVATION (m)
{80.35}	PRACTICAL REFUSAL TO AUGERING/DCPT ELEVATION (m)

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

SCALE: 1:1000

0 10 20 30 40 50m 75m

PATERSON GROUP

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

NO.	REVISIONS	DD/MM/YYYY	INITIAL

URBANDALE CORPORATION
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
50 FLAVESCENT LANE

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1000	Date: 07/2026
Drawn by: ZS	Report No.: PG8045-1
Checked by: MA	Dwg. No.: PG8045-1
Approved by: KP	Revision No.:

p:\autocad drawings\geotechnical\pg80xx\pg8045\pg8045-1-test hole location plan.dwg

11x17