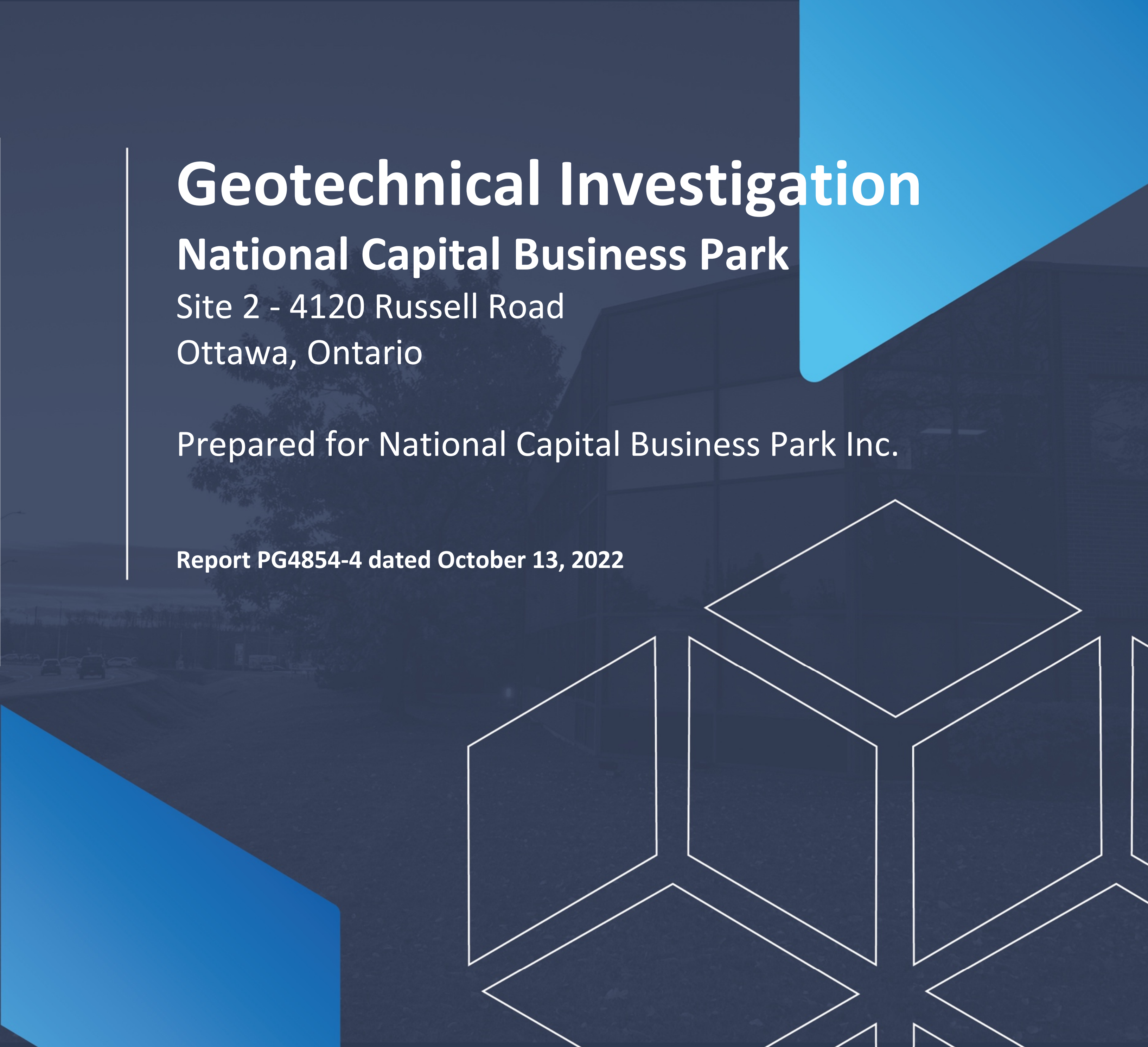

Geotechnical Investigation

National Capital Business Park

Site 2 - 4120 Russell Road
Ottawa, Ontario

Prepared for National Capital Business Park Inc.

Report PG4854-4 dated October 13, 2022

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1.0 Introduction

Paterson Group (Paterson) was commissioned by the National Capital Business Park Inc. to conduct a geotechnical investigation for the proposed National Capital Business Park – Site 2 to be located at 4120 Russell Road in the City of Ottawa (refer to Figure 1 - Key Plan in Appendix 2 of this report for the general site location).

The objectives of the geotechnical investigation were to:

☐ Determine the subsoil and groundwater conditions at this site by means of boreholes.

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

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

2.0 Proposed Development

Based on the available drawings, the proposed development at the subject site will consist of 2 commercial slab-on-grade structures, Buildings D1 and D2, with approximate footprints of 9,700 and 7,800 m^2, respectively. The proposed buildings will be surrounded by asphalt paved access lanes and parking areas with landscaped margins.

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

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The current geotechnical investigation was carried out between October 3 to 5, 2022, and consisted of a total of 10 test pits (TP 1-22 through TP 14-22) advanced to a maximum depth of 3.2 m below the existing grade. A previous geotechnical investigation also included 3 boreholes at this site (boreholes BH 14, BH 15 and BH 16) which were advanced to a maximum depth of 8.2 m. The test hole locations were distributed in a manner to provide general coverage of the subject site, taking into consideration underground services and available access. The approximate locations of the boreholes are shown on Drawing PG4854-12 - Test Hole Location Plan included in Appendix 2.

The test pits were completed using a hydraulic shovel and backfilled with the excavated soil upon completion. The boreholes were drilled 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.

Sampling and In Situ Testing

Soil samples were recovered from the sidewalls of the test pits. All soil samples were visually inspected and classified on site. The soil samples were placed in sealed plastic bags and transported to our laboratory for further examination and classification. The depths at which the soil samples were recovered from the test pits are shown as G on the Soil Profile and Test Data sheets present in Appendix 1.

Soils samples were recovered from the boreholes using two different techniques, namely, sampled directly from the auger flights (AU) or collected using a 50 mm diameter split-spoon (SS) sampler. All samples were visually inspected and initially classified on site. The auger and split-spoon samples were placed in sealed plastic bags and transported to our laboratory for further examination and classification. The depths at which the auger and split spoon samples were recovered from the boreholes are shown as AU and SS, respectively, on the Soil Profile and Test Data sheets presented in Appendix 1.

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, using a vane apparatus, was carried out at regular intervals of depth in cohesive soils.

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

Open hole groundwater levels were recorded in the test pits. Additionally, monitoring wells were installed in boreholes BH 14 and BH 15, and standpipe piezometer was installed in borehole BH 16.

3.2 Field Survey

The test hole locations were selected by Paterson to provide general coverage of the proposed development taking into consideration the existing site features and underground utilities.

The test hole locations, and the ground surface elevation at each test hole location, were surveyed by Paterson using a GPS unit with respect to a geodetic datum. The locations of the test pits and ground surface elevation at each test pit location are presented on Drawing PG4854-12 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Review

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. All samples from the current investigation will be stored in the laboratory for 1 month after this report is completed. They will then be discarded unless we are otherwise directed.

3.4 Analytical Testing

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

4.0 Observations

4.1 Surface Conditions

The subject site is currently a vacant grassed area. The site is bordered by Last Mile Drive to the north and west, Site 1 to the east, and a stormwater management pond to the south. The existing ground surface across the site is generally level at approximate geodetic elevation 78 to 79 m, but slopes downward moderately to geodetic elevation 72 m towards Site 1, near the eastern boundary of the site.

4.2 Subsurface Profile

Fill

Generally, the subsurface profile at the subject site consists of topsoil and/or fill overlying a silty clay deposit at approximate depths of 0.2 to 1.5 m below the existing ground surface. Where encountered, the fill was generally observed to consist of silty clay to silty sand with varying amounts of gravel.

Underlying the topsoil and/or fill, a hard to very stiff, brown silty clay deposit was encountered. At borehole BH 14, the silty clay was observed to become firm and grey below an approximate depth of 5.3 m.

An approximate 0.1 to 0.6 m thickness of glacial till was encountered underlying the silty clay, where penetrated within boreholes BH 15 and BH 16 at depths of 5.6 and 3.8 m, respectively.

Practical refusal to augering was encountered in boreholes BH 15 and BH 16 at depths of 6.3 and 3.9 m, respectively.

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

Bedrock

Based on available geological mapping, bedrock in the area of the subject site consists of shale of the Carlsbad Formation, with drift thicknesses ranging from 3 to 5 m on the western portion of the site, and 5 to 10 m on the eastern portion of the site.

4.3 Groundwater

Groundwater levels were measured in the monitoring wells and standpipe piezometer on September 18 and 27, 2019, respectively. The measured groundwater levels are presented in Table 1 below:

Table 1 - Summary of Groundwater Level Readings

Test Hole Number	Ground Surface Elevation (m)	Groundwater Level (m)	Groundwater Elevation (m)	Recording Date
BH 14*	79.45	5.47	73.98	Sept. 18, 2019
BH 15*	79.23	1.36	-	Sept. 18, 2019
BH 16	78.64	Dry	-	Sept. 27, 2019

Note:
-*Denotes borehole instrumented with a 51 mm diameter monitoring well.
- Ground surface elevations at borehole locations were surveyed by Paterson and are referenced to a geodetic datum.

Further, groundwater was not observed in the test pits, which were excavated to a maximum depth of 3.2 m below the existing ground surface.

The long-term groundwater level can also be estimated based on the observed colour, moisture content and consistency of the recovered samples. Based on the test pit data and the soil profile from the previous boreholes in the area, the long-term groundwater level is expected at approximate depths of 5 to 6 m below the existing ground surface.

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

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is suitable for the proposed development. It is recommended that foundation support for the proposed building consist of conventional spread footings bearing on the undisturbed, hard to very stiff silty clay.

Due to the presence of the silty clay layer, a permissible grade restriction is required for the proposed development. The permissible grade raise recommendations are further discussed in Section 5.3.

A slope stability analysis has also been completed for the slope at the eastern boundary of the site. This is discussed further in Section 6.9.

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

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing organics, should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures.

Fill Placement

Engineered fill placed for grading beneath the proposed buildings, where required, should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the buildings and paved areas should be compacted to at least 98% of the material’s 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. This material 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.

Site excavated soils are not suitable for use as backfill against foundation walls due to the frost heave potential of the site excavated soils below settlement sensitive areas, such as concrete sidewalks and exterior concrete entrance areas.

Fill used for grading beneath the base and subbase layers of paved areas should consist, unless otherwise specified, of clean imported granular fill, such as OPSS Granular A, Granular B Type II or select subgrade material. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the paved areas should be compacted to at least 95% of its SPMDD.

5.3 Foundation Design

Pad footings, up to 6 m wide, and strip footings up to 3 m wide, placed on an undisturbed, hard to very stiff silty clay can be designed using a bearing resistance value at serviceability limit states (SLS) of **200 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **350 kPa**. A geotechnical resistance factor of 0.5 was applied to the above noted bearing resistance value at ULS.

An undisturbed soil bearing surface consists of 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 designed using the bearing resistance values at SLS given 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 soil bearing medium when a plane extending down and out from the bottom edges of the footing, at a minimum of 1.5H:1V, passes only through soil of the same or higher capacity as that of the bearing medium.

Permissible Grade Raise Recommendation

Consideration must also be given to potential settlements which could occur due to the presence of the silty clay deposit and the combined loads from the proposed footings, any groundwater lowering effects, and grade raise fill. The foundation loads to be considered for the settlement case are the continuously applied loads which consist of the unfactored dead loads and the portion of the unfactored live load that is considered to be continuously applied. For buildings, a minimum value of 50% of the live load is often recommended by Paterson. A post-development groundwater lowering of 0.5 m was assumed.

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

If higher than permissible grade raises are required, preloading with or without a surcharge, lightweight fill, and/or other measures should be investigated to reduce 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 C**. The soils underlying the proposed foundations are not susceptible to liquefaction. Reference should be made to the latest revision of the 2012 Ontario Building Code for a full discussion of the earthquake design requirements.

5.5 Slab on Grade Construction

With the removal of all topsoil and deleterious materials, within the footprints of the proposed buildings, the native silty clay will be considered to be an acceptable subgrade surface on which to commence backfilling for the floor slab. The upper 200 mm of sub-slab fill should consist of an OPSS Granular A crushed stone. All backfill material within the footprints of the proposed buildings should be placed in maximum 300 mm thick loose lifts and compacted to at least 98% of its SPMDD.

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

5.6 Pavement Design

Car only parking areas, access lanes and heavy truck parking/loading areas are anticipated at this site. For the proposed surface parking areas, the pavement structures provided in Tables 2 and 3 are recommended.

Table 2 - Recommended Pavement Structure - Car Only Parking Areas

Thickness (mm)	Material Description
50	**Wear Course -** HL-3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill	

Table 3 - Recommended Pavement Structure
Access Lanes and Heavy Truck Parking Areas

Thickness (mm)	Material Description
40	**Wear Course** - 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 - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill	

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

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material's SPMDD using suitable vibratory equipment.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

A perimeter foundation drainage system is considered optional for the proposed structures at the subject site, as it would help minimize frost heave of paved and landscaped areas in the vicinities of the proposed buildings. Where utilized, 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, placed at the footing level around the exterior perimeter of the structures. The pipe should have a positive outlet, such as a gravity connection to the catch basins or running drainage ditches.

Backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials, such as clean sand or OPSS Granular B Type I granular material. 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.

6.2 Protection of Footings Against Frost Action

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

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

6.3 Excavation Side Slopes

The 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. 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 cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. Excavations below the groundwater level should be cut back at a maximum slope of 1.5H:1V.

The subsoil at this site is considered to be mainly a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

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

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

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

6.4 Pipe Bedding and Backfill

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

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

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.

6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. The contractor should be prepared to direct water away from all subgrades, regardless of the source, to prevent disturbance to the founding medium.

Groundwater Control for Building Construction

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

For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Persons as stipulated under O.Reg. 63/16.

If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

Impacts to Neighbouring Properties

As the proposed building will be a slab-on-grade structure, it is not anticipated that it will be founded below the long-term groundwater level. As a result, long-term groundwater lowering is not anticipated, and therefore no adverse effects are expected to neighbouring properties.

Further, as the proposed slab-on-grade structures will be setback from the site limits, no impacts to the neighbouring properties are anticipated as a result of excavation at the subject site.

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 (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 slightly to moderately aggressive corrosive environment.

6.8 Slope Stability Analysis

The slope conditions were reviewed by Paterson field personnel on-site during the recent geotechnical investigation. Two (2) slope cross-sections at the eastern boundary of the site were studied as the worst-case scenarios for the subject site. The cross-section locations are presented on Drawing PG4854-12 - Test Hole Location Plan, attached in Appendix 2.

The existing slope located at the southern boundary of the site has an approximate height of 7 to 8 m with an incline of 4H:1V to 5H:1V. The slope was observed to be grass covered with occasional bushes and trees. A watercourse is not present at the base of this slope, and no evidence of erosion was noted along the slope.

An analysis was carried out to determine the slope stability under proposed conditions.

Slope Stability Analysis

The slope stability analysis was modeled in SLIDE, a computer program which permits a two-dimensional slope stability analysis calculating several methods including the Bishop's method, which is a widely accepted slope analysis method. The program calculates a factor of safety, which represents the ratio of the forces resisting failure to forces favoring failure. Theoretically, a factor of safety of 1.0 represents a condition where the slope is stable.

However, due to intrinsic limitations of the calculation methods and the variability of the subsurface soil and groundwater conditions, a factor of safety greater than 1.0 is generally required for the failure risk to be considered acceptable. A minimum factor of safety of 1.5 is generally recommended for conditions where the slope failure would comprise permanent structures. An analysis considering seismic loading was also completed. A horizontal acceleration of 0.16g was considered for the section for the seismic loading condition. A factor of safety of 1.1 is considered to be satisfactory for stability analyses including seismic loading.

As noted above, 2 slope cross-sections (Sections A-A and B-B) were studied as the worst case scenarios. It should be noted that details of the slope height and slope angle at the cross-section location under proposed conditions are based on the available grading plan for the proposed development.

Analysis Results and Recommendations

The static analysis results for slope Sections A-A and B-B are presented on Figures 2 and 4, respectively, in Appendix 2. Based on the results, the factor of safety for the slope is greater than 1.5 for the proposed conditions under static analysis. Further, the results of the analyses with seismic loading for slope Sections A-A and B-B are presented on Figures 3 and 5, respectively, in Appendix 2. The results indicate that the factor of safety for the slope is greater than 1.1 for the proposed conditions under seismic analysis.

Accordingly, a stable slope allowance is not required for the slope at the eastern boundary of the site. Further, as there is no watercourse at the base of this slope, toe erosion and erosion access allowance are not applicable to this slope. Therefore, no hazard lands are required for the subject slope.

It is recommended that the existing vegetation and mature trees not be removed from the slope faces as the presence of the vegetation reduces surficial erosion activities. If the existing vegetation needs to be removed along the slope faces, it is recommended that a 100 to 150 mm of topsoil mixed with a hardy seed, or an erosion control blanket be placed across the exposed slope face.

7.0 Recommendations

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

- Review of the grading plan, from a geotechnical perspective.
- Observation of all bearing surfaces prior to the placement of concrete.
- Sampling and testing of the concrete and fill materials.
- 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.

All excess soils, with the exception of engineered crushed stone fill, generated by construction activities that will be transported on-site or off-site should be handled as per *Ontario Regulation 406/19: On-Site and Excess Soil Management*.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon request, following the completion of a satisfactory material testing and observation program by Paterson

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 National Capital Business Park Inc., or their agents, is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

Paterson Group Inc.

LICENSED PROFESSIONAL ENGINEER
Oct. 13, 2022
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Scott Dennis
PROVINCE OF ONTARIO

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Scott S. Dennis, P.Eng.

Report Distribution:

☐ National Capital Business Park (e-mail copy)
☐ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ANALYTICAL TESTING RESULTS

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

FILE NO. PG4854

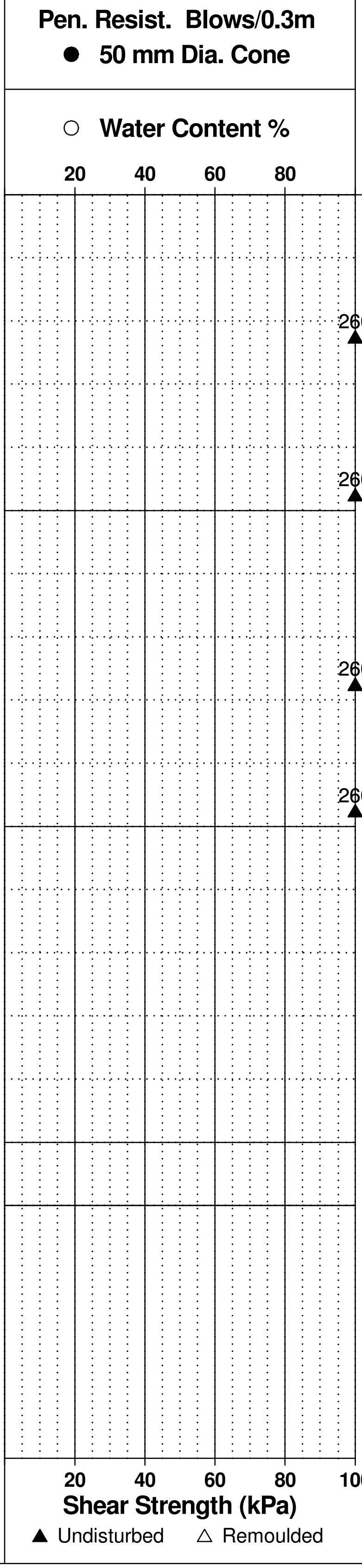
REMARKS

HOLE NO. TP 1-22

BORINGS BY Excavator

DATE October 3, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	78.41
		G	1				
						1	77.41
		G	2				
Hard, brown **SILTY CLAY**							
						2	76.41
3.00						3	75.41
GLACIAL TILL: Hard, brown silty clay with sand, gravel, cobbles and boulders		G	3				
3.20							
End of Test Pit (TP dry upon completion)							



Piezometer Construction

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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

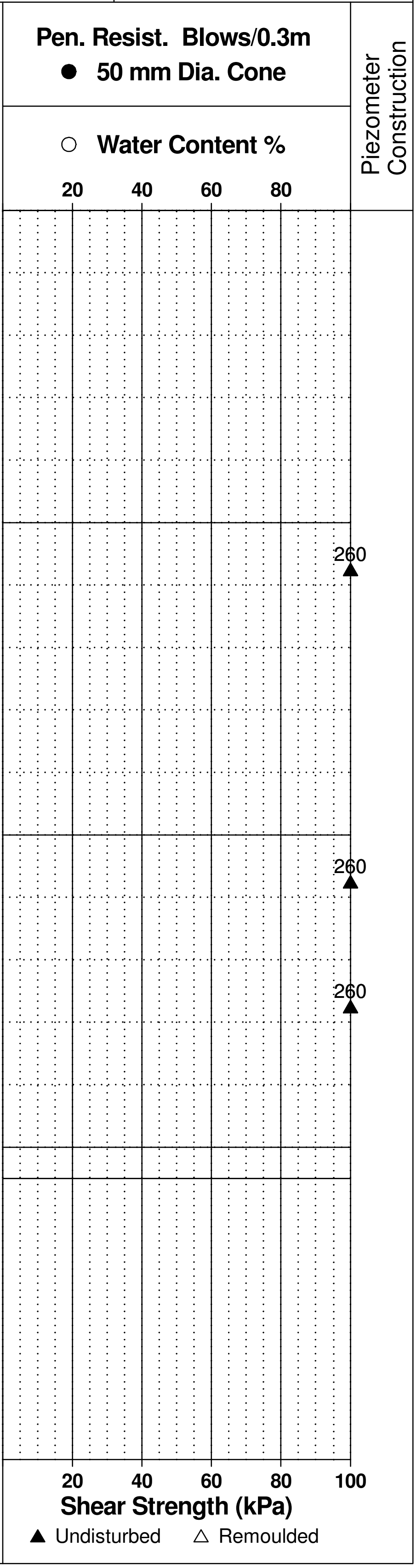
BORINGS BY Excavator

DATE October 3, 2022

FILE NO. PG4854

HOLE NO. TP 2-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	79.09
						1	78.09
		G	1				
Hard, brown **SILTY CLAY,** trace organics							
						2	77.09
		G	2				
2.66							
GLACIAL TILL: Hard, brown silty clay with sand, gravel, cobbles and boulders							
						3	76.09
		G	3				
3.10							
End of Test Pit (TP dry upon completion)							



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

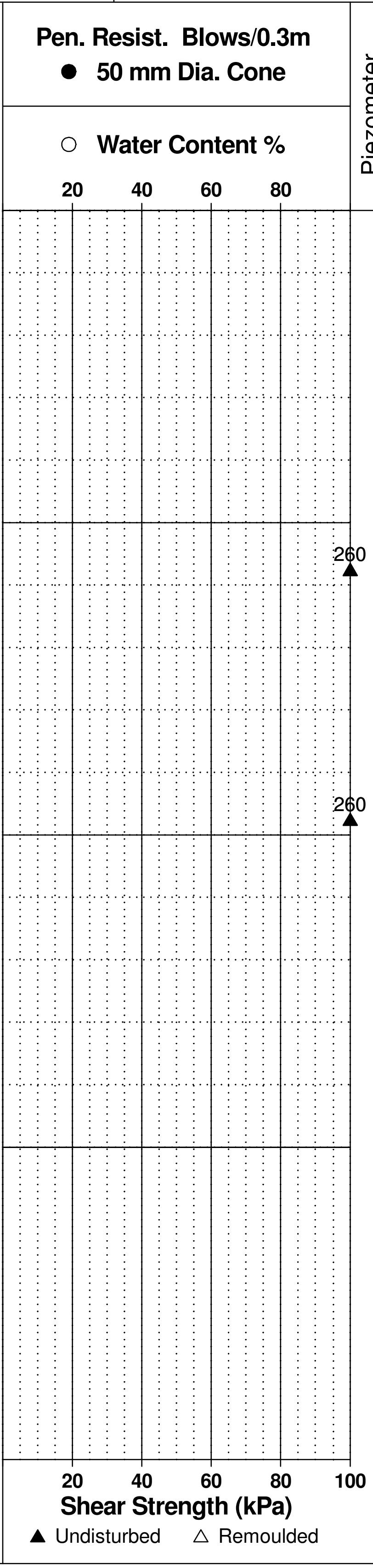
BORINGS BY Excavator

DATE October 3, 2022

FILE NO. PG4854

HOLE NO. TP 3-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	79.79
FILL: Brown silty clay, some crushed stone, gravel, cobbles and blast rock		G	1				
0.90							
Hard, brown **SILTY CLAY**		G	2			1	78.79
						2	77.79
3.00		G	3			3	76.79
End of Test Pit (TP dry upon completion)							



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

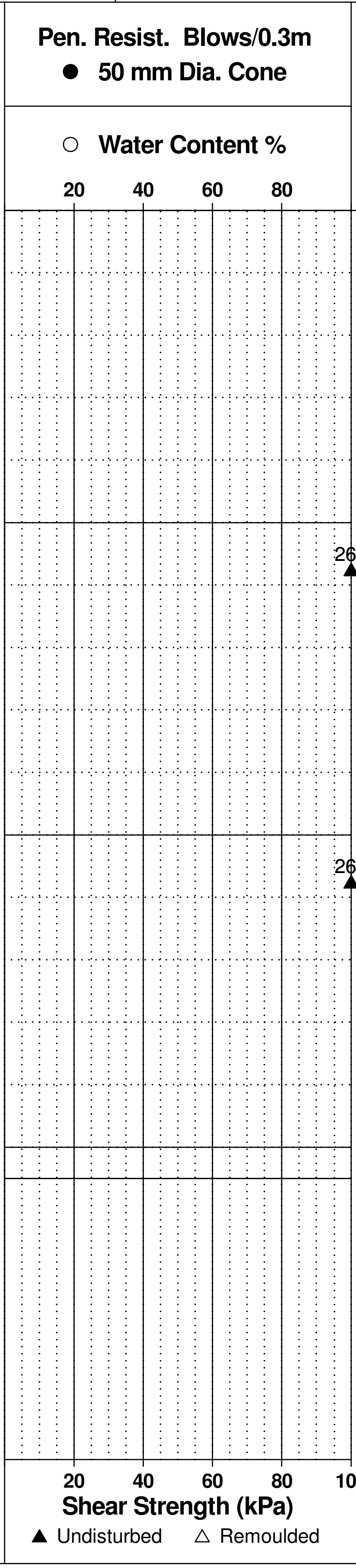
BORINGS BY Excavator

DATE October 3, 2022

FILE NO. PG4854

HOLE NO. TP 4-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	78.48
TOPSOIL (to 0.40)							
						1	77.48
Hard, brown **SILTY CLAY**		G	1				
						2	76.48
						3	75.48
(to 3.10)		G	2				
End of Test Pit (TP dry upon completion)							



Piezometer Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

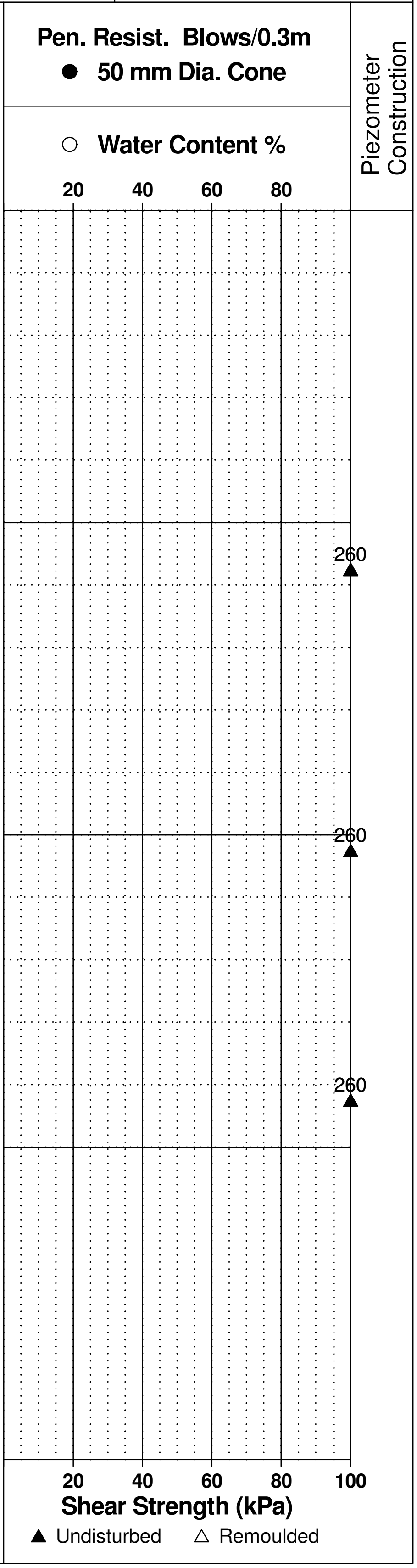
BORINGS BY Excavator

DATE October 3, 2022

FILE NO. **PG4854**

HOLE NO. **TP 5-22**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	78.48
TOPSOIL 0.25							
		G	1			1	77.48
Hard, brown **SILTY CLAY**						2	76.48
3.00		G	2			3	75.48
End of Test Pit (TP dry upon completion)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

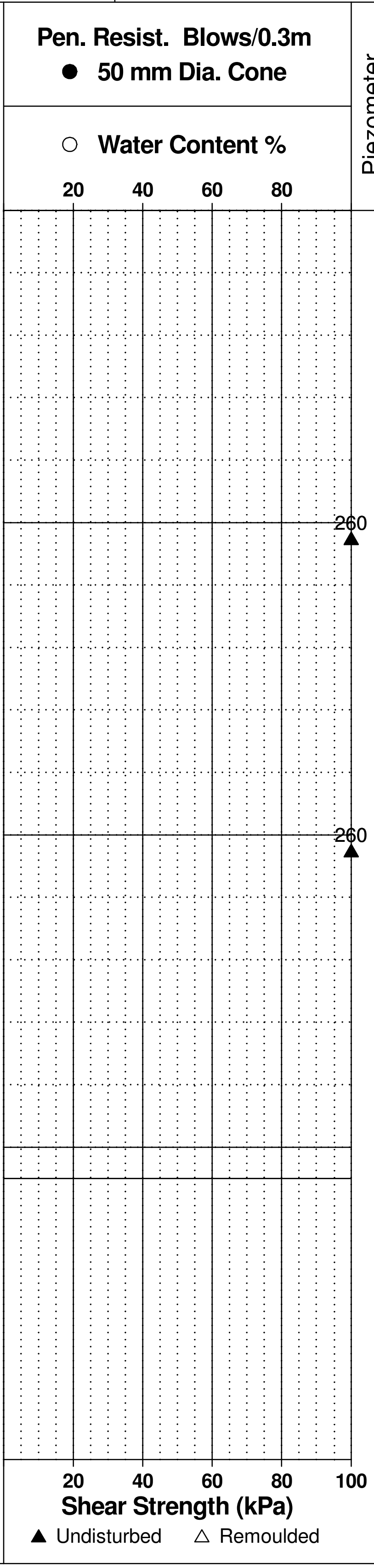
BORINGS BY Excavator

DATE October 3, 2022

FILE NO. PG4854

HOLE NO. TP 6-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Piezometer Construction
GROUND SURFACE						0	78.76	
TOPSOIL	■							
0.55								
Hard, brown **SILTY CLAY**	▨	G	1					
	▨					1	77.76	
	▨	G	2					
	▨					2	76.76	
	▨	G	3					
	▨					3	75.76	
3.10								
End of Test Pit (TP dry upon completion)								



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

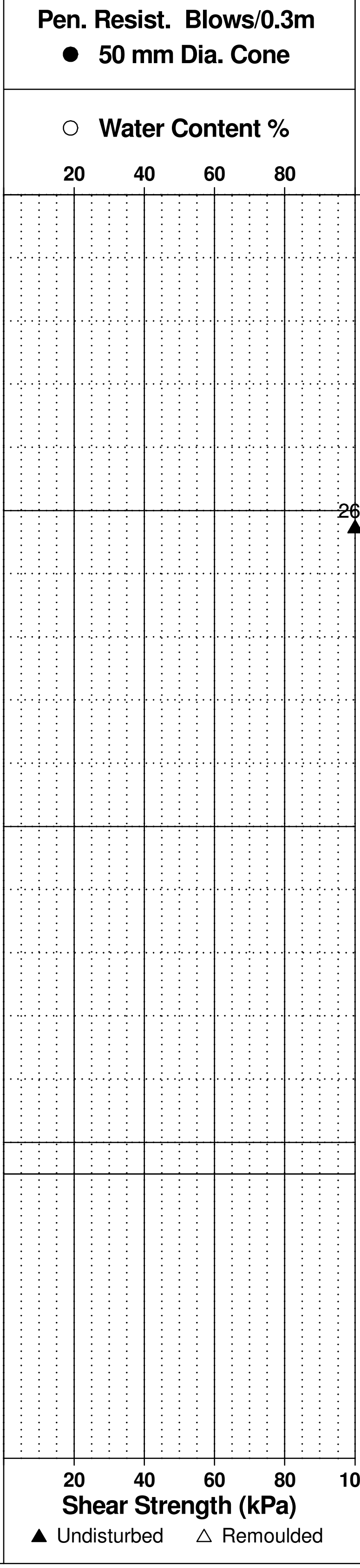
BORINGS BY Excavator

DATE October 3, 2022

FILE NO. PG4854

HOLE NO. TP 7-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Piezometer Construction
GROUND SURFACE						0	78.93	
FILL: Brown silty clay with crushed stone, cobbles, gravel and topsoil	▩	G	1					
0.60								
Hard, brown **SILTY CLAY**	▨	G	2			1	77.93	
						2	76.93	
		G	3					
						3	75.93	
3.10								
End of Test Pit (TP dry upon completion)								



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

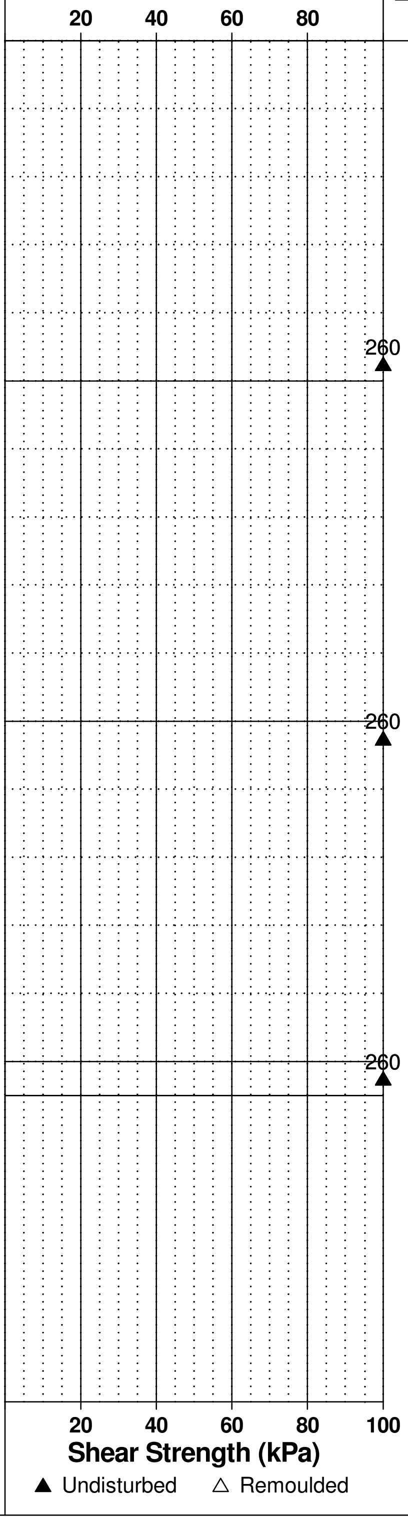
BORINGS BY Excavator

DATE October 5, 2022

FILE NO. PG4854

HOLE NO. TP 8-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	78.26		
FILL: Brown silty clay, trace gravel, organics and topsoil	▨	G	1						
0.40									
Hard, brown **SILTY CLAY**	▨					1	77.26		
		G	2						
						2	76.26		
		G	3						
						3	75.26		
3.10		G	4						
End of Test Pit (TP dry upon completion)									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

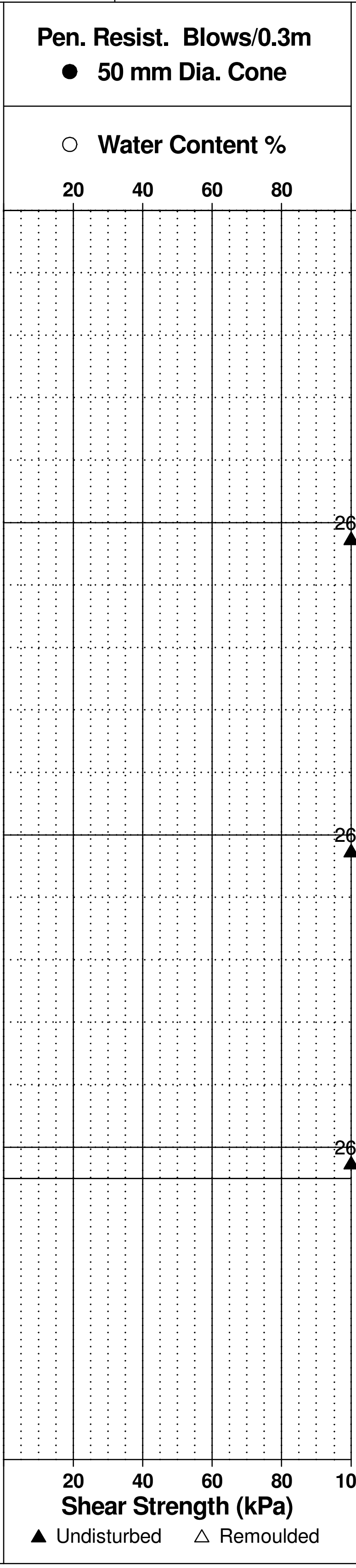
BORINGS BY Excavator

DATE October 5, 2022

FILE NO. PG4854

HOLE NO. TP 9-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Piezometer Construction
GROUND SURFACE						0	78.54	
TOPSOIL	■							
0.30								
Hard, brown **SILTY CLAY**	▨	G	1			1	77.54	
	▨					2	76.54	
	▨					3	75.54	
3.10	▨	G	2					
End of Test Pit (TP dry upon completion)								



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

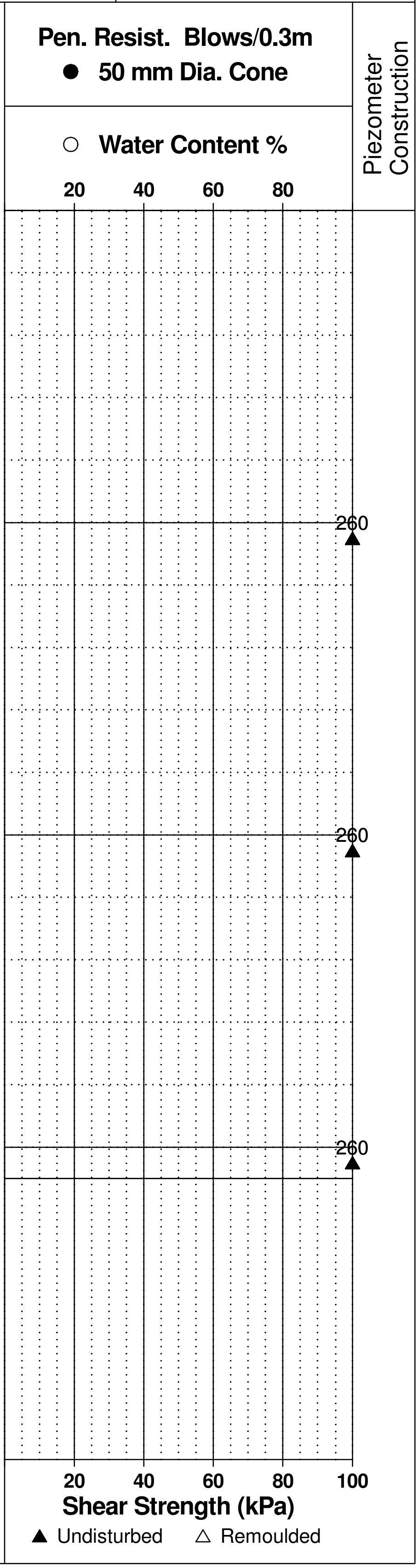
BORINGS BY Excavator

DATE October 5, 2022

FILE NO. PG4854

HOLE NO. TP10-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	78.98
FILL: Brown silty clay with topsoil, crushed stone, some gravel	▩	G	1				
0.60							
						1	77.98
	▨	G	2				
Hard, brown **SILTY CLAY**	▨						
						2	76.98
						3	75.98
3.10	▨	G	3				
End of Test Pit (TP dry upon completion)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

FILE NO. **PG4854**

REMARKS

HOLE NO. **TP11-22**

BORINGS BY Excavator

DATE September 30, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % 20 40 60 80	Piezometer Construction
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD				
GROUND SURFACE						0	77.58		
TOPSOIL 0.20									
Hard, brown **SILTY CLAY**		G	1						
		G	2			1	76.58		
1.78		G	3						
End of Test Pit (TP dry upon completion)									

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

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

FILE NO. PG4854

REMARKS

HOLE NO. TP12-22

BORINGS BY Excavator

DATE September 30, 2022

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 % 20 40 60 80	Piezometer Construction
GROUND SURFACE						0	77.83		
TOPSOIL 0.17									
Hard, brown **SILTY CLAY**		G	1						
						1	76.83		
		G	2						
2.03		G	3						
						2	75.83		
End of Test Pit									
(TP dry upon completion)									

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

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9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE September 30, 2022

FILE NO. **PG4854**

HOLE NO. **TP13-22**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content % (20 40 60 80)	Piezometer Construction
GROUND SURFACE						0	78.21		
TOPSOIL 0.29	■	G	1						
	▨					1	77.21		
Hard, brown **SILTY CLAY**	▨	G	2						
	▨	G	3			2	76.21		
2.21 End of Test Pit (TP dry upon completion)									

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

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9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed National Capital Business Park - Site 2
4120 Russell Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE September 30, 2022

FILE NO. PG4854

HOLE NO. TP14-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % 20 40 60 80	Piezometer Construction
GROUND SURFACE						0	78.20		
	▨	G	1						
Hard, brown **SILTY CLAY**	▨					1	77.20		
	▨	G	2						
	▨	G	3			2	76.20		
2.20									
End of Test Pit (TP dry upon completion)									

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers
154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Preliminary Geotechnical Investigation
Proposed Commercial / Industrial Complex
4055 and 4120 Russell Road, Ottawa, Ontario

DATUM Ground surface elevations provided Annis, O'Sullivan, Vollebekk Ltd.

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 September 4

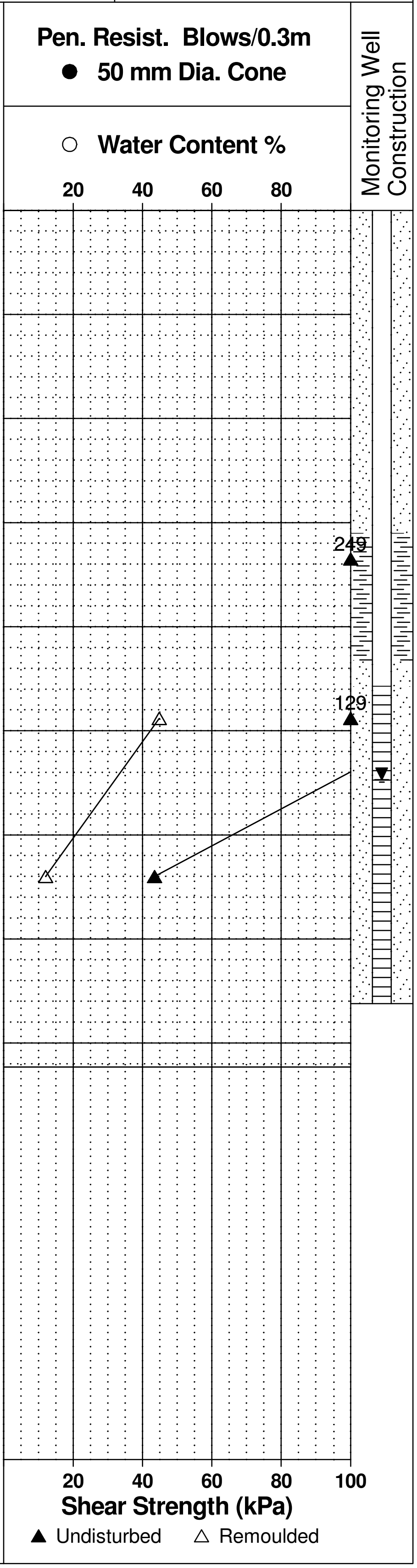
FILE NO. PG4854

HOLE NO. BH14

SOIL DESCRIPTION	Depth to base (m)
GROUND SURFACE	
TOPSOIL	0.20
FILL: Brown silty clay with sand, some gravel	1.52
Hard to very stiff, brown **SILTY CLAY** - stiff to firm and grey by 5.3m depth	7.92
GLACIAL TILL: Grey silty clay with sand, gravel, cobbles and boulders	8.23
End of Borehole (GWL @ 5.47m - Sept. 18, 2019)	

SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
AU	1		
SS	2	12	17
SS	3	96	15
SS	4	100	9
SS	5	100	7
SS	6	100	4
SS	7	100	1
SS	8	100	W
SS	9	100	W
SS	10	100	1
SS	11	10	2

DEPTH (m)	ELEV. (m)
0	79.45
1	78.45
2	77.45
3	76.45
4	75.45
5	74.45
6	73.45
7	72.45
8	71.45



SOIL PROFILE AND TEST DATA

Preliminary Geotechnical Investigation
Proposed Commercial / Industrial Complex
4055 and 4120 Russell Road, Ottawa, Ontario

DATUM Ground surface elevations provided Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PG4854

REMARKS

HOLE NO. BH15

BORINGS BY CME 55 Power Auger

DATE 2019 September 4

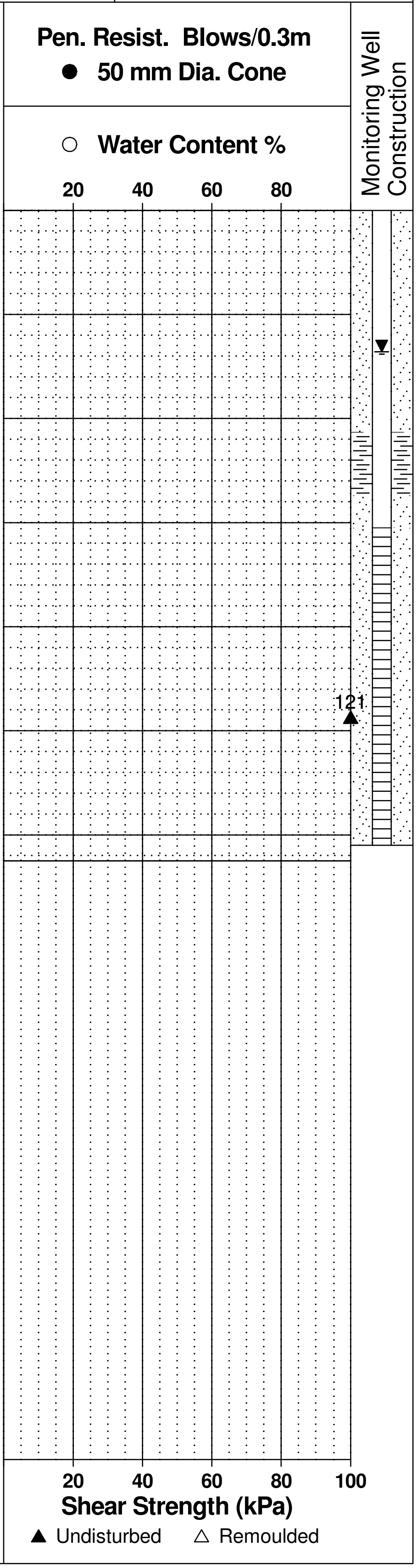
SOIL DESCRIPTION	Depth to base (m)	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
TOPSOIL	0.10				
FILL: Brown silty sand, trace gravel	0.76	SS	1	67	7
Very stiff, brown **SILTY CLAY**		SS	2	75	13
		SS	3	92	11
		SS	4	100	9
		SS	5	100	5
		SS	6	100	4
- grey by 4.8m depth	5.64	SS	7	100	2
GLACIAL TILL: Grey silty sand with gravel, cobbles, boulders	6.25	SS	8	67	50
		SS	9	60	50+

End of Borehole

Practical refusal to augering at 6.25m depth

(GWL @ 1.36m - Sept. 18, 2019)

DEPTH (m)	ELEV. (m)
0	79.23
1	78.23
2	77.23
3	76.23
4	75.23
5	74.23
6	73.23



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Preliminary Geotechnical Investigation
Proposed Commercial / Industrial Complex
4055 and 4120 Russell Road, Ottawa, Ontario

DATUM Ground surface elevations provided Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PG4854

REMARKS

HOLE NO. BH16

BORINGS BY CME 55 Power Auger

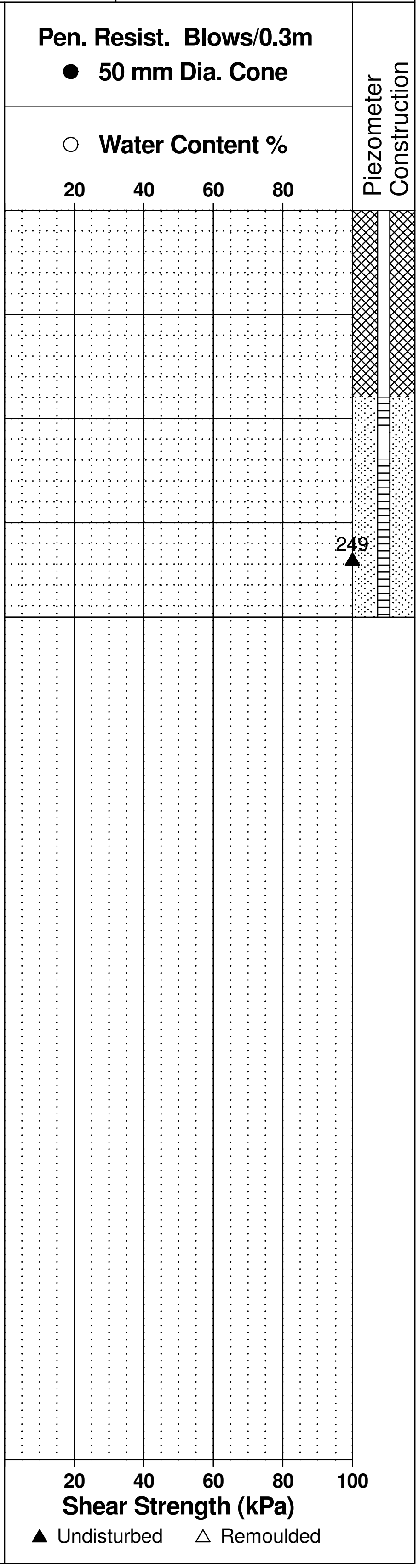
DATE 2019 September 4

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	78.64
TOPSOIL 0.20	AU	1				
Hard, brown **SILTY CLAY,** trace sand	SS	2	88	19	1	77.64
	SS	3	100	15	2	76.64
	SS	4	100	9	3	75.64
3.81 **GLACIAL TILL:** Brown silty sand with ground rock 3.91	SS	5	100	50+		

End of Borehole

Practical refusal to augering at 3.91m depth

(Piezometer dry - Sept. 27, 2019)



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)

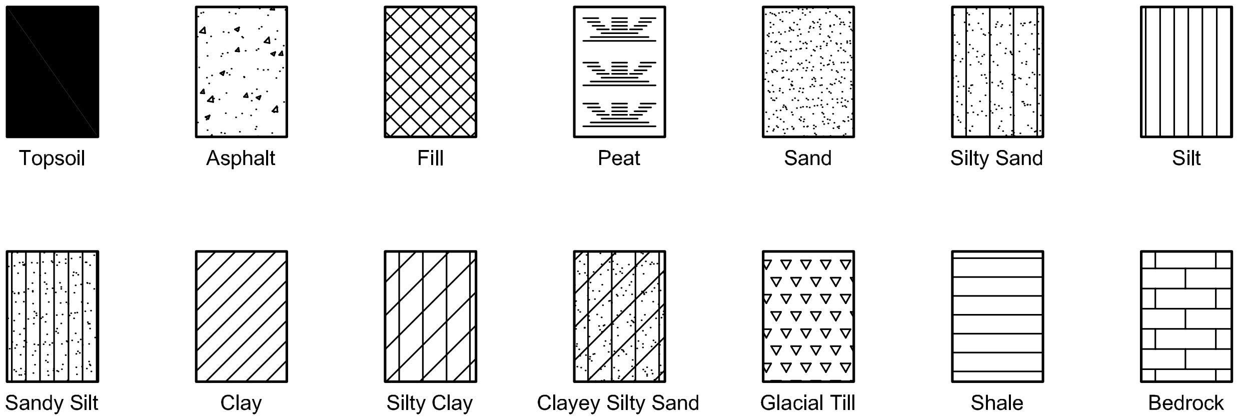
OC Ratio Overconsolidaton ratio = p'_c / p'_o
Void Ratio Initial sample void ratio = volume of voids / volume of solids
Wo - Initial water content (at start of consolidation test)

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.

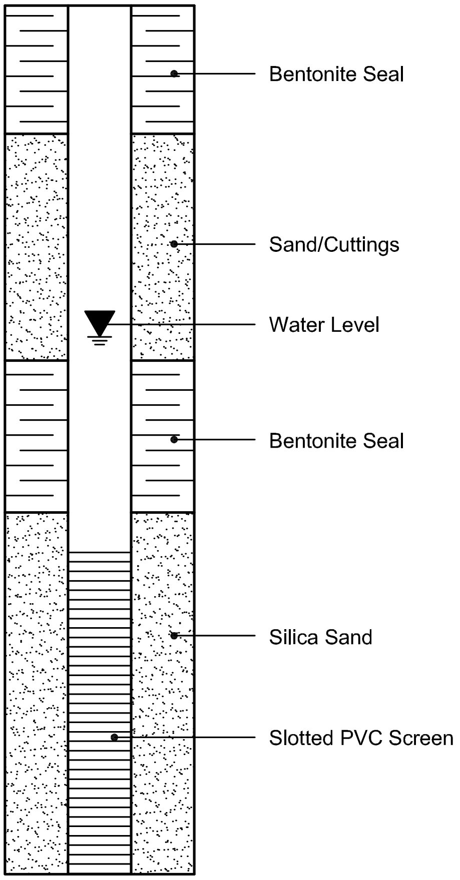
SYMBOLS AND TERMS (continued)

STRATA PLOT

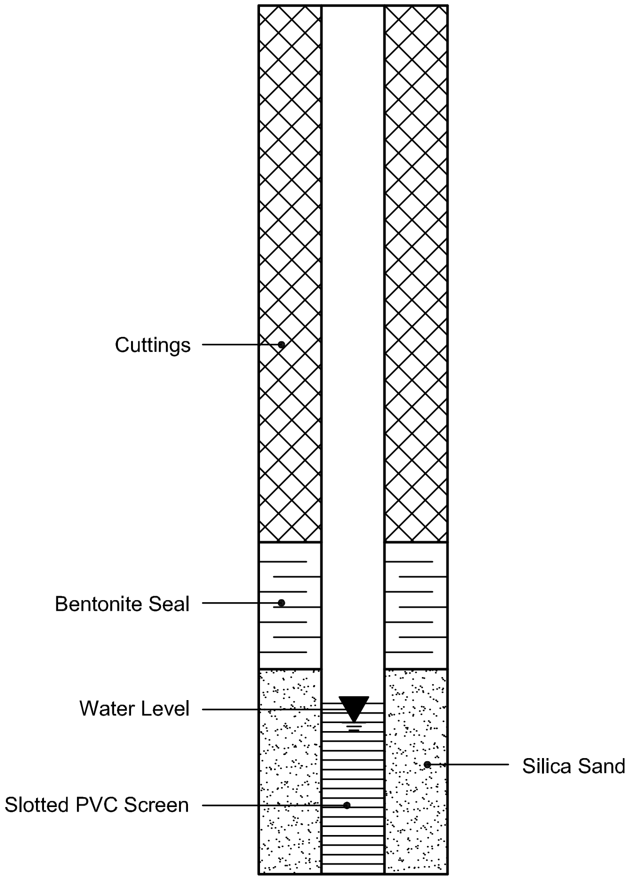


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis

Report Date: 13-Oct-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 5-Oct-2022

Client PO: 55934

Project Description: PG4854

	Client ID:	TP1-22-G2	-	-	-		
	Sample Date:	04-Oct-22 09:00	-	-	-	-	-
	Sample ID:	2241269-01	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	82.8	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	6.85	-	-	-	-	-
Resistivity	0.1 Ohm.m	98.5	-	-	-	-	-
Anions							
Chloride	5 ug/g	<5	-	-	-	-	-
Sulphate	5 ug/g	13	-	-	-	-	-

APPENDIX 2

FIGURE 1 - KEY PLAN

FIGURES 2 TO 5 – SLOPE STABILITY ANALYSIS CROSS-SECTIONS

DRAWING PG4854-12 - TEST HOLE LOCATION PLAN

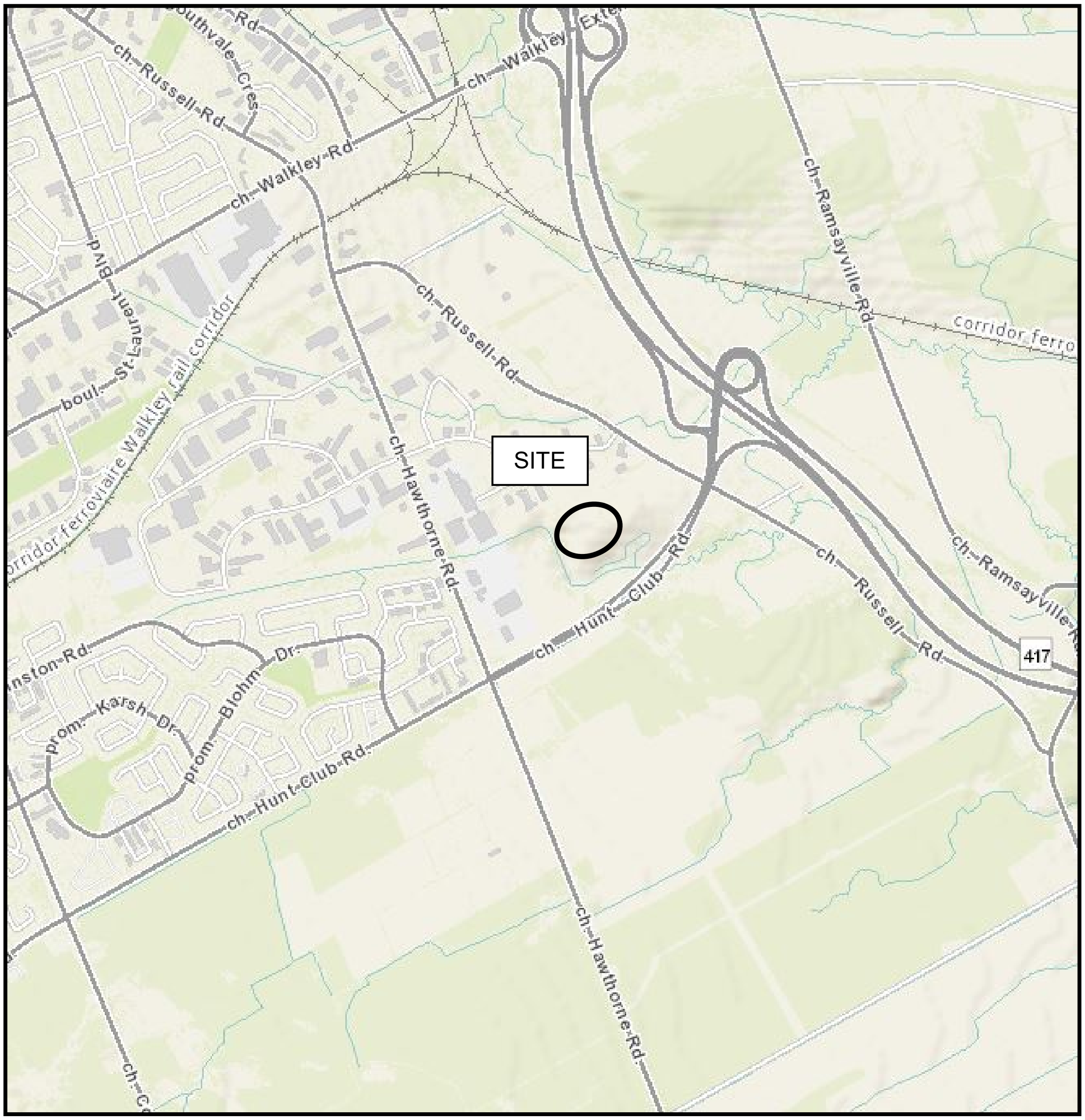


FIGURE 1

KEY PLAN

PATERSON
GROUP

Figure 2 - Section A - Static Analysis

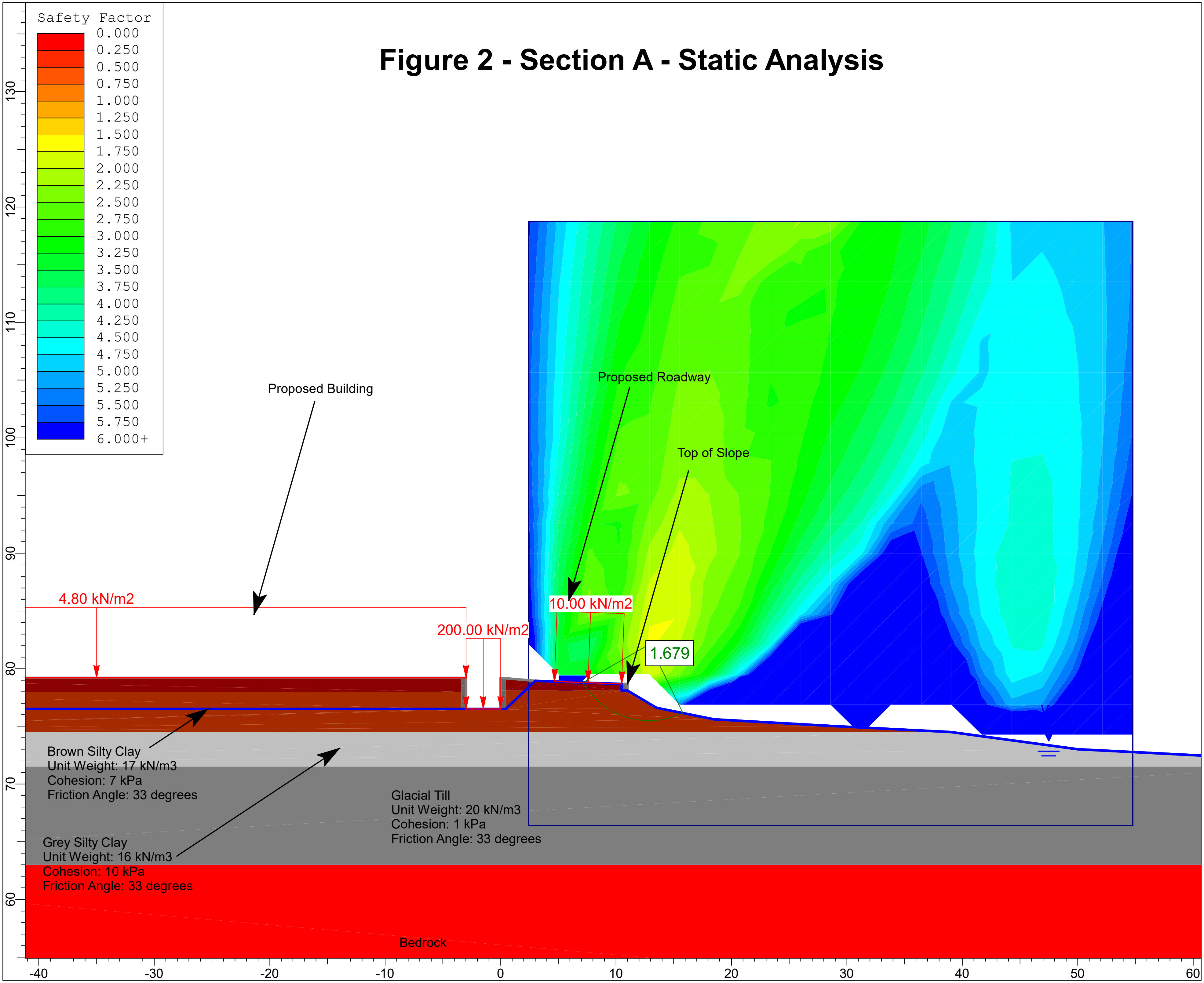


Figure 3 - Section A - Seismic Analysis

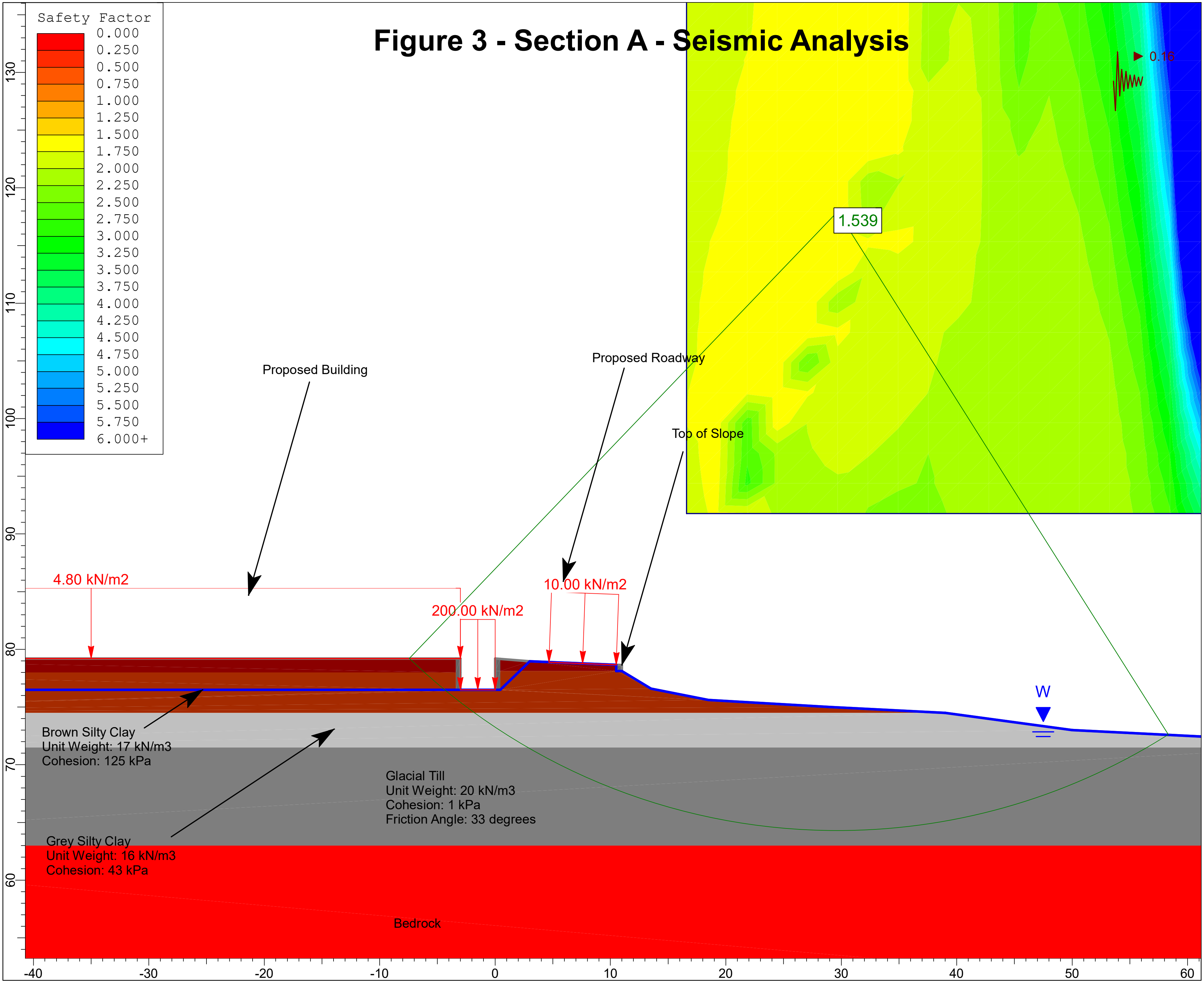


Figure 4 - Section B - Static Analysis

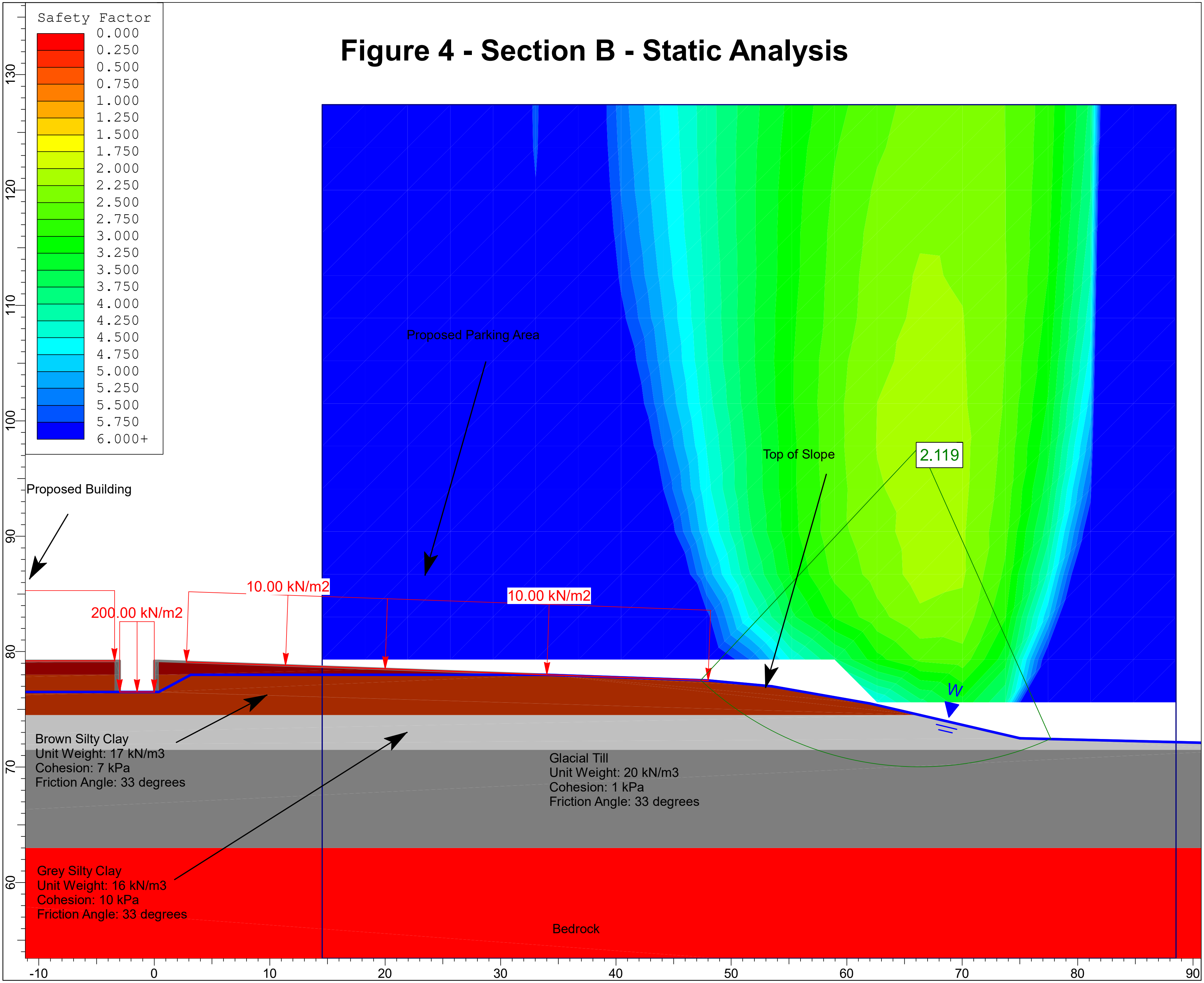
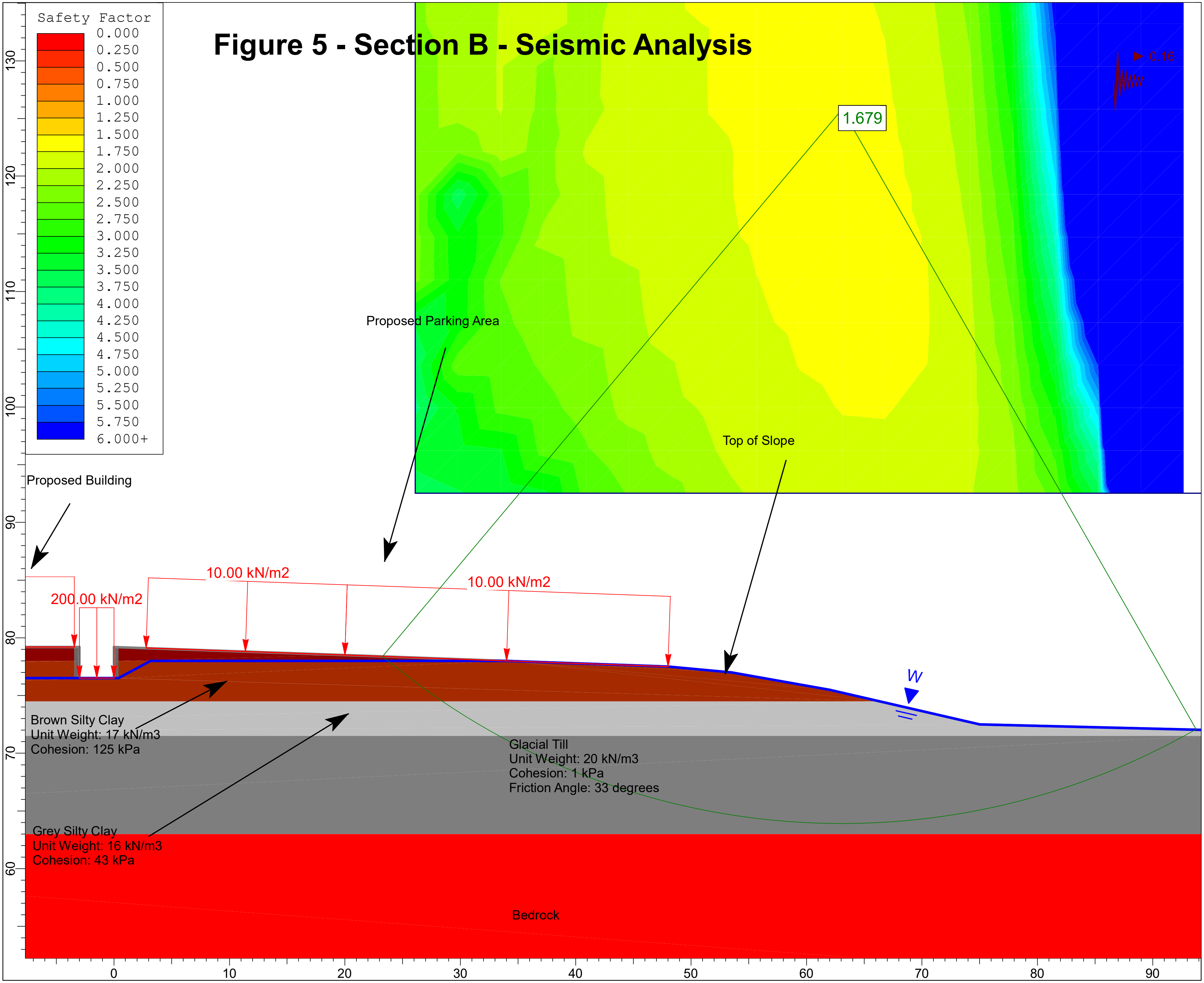
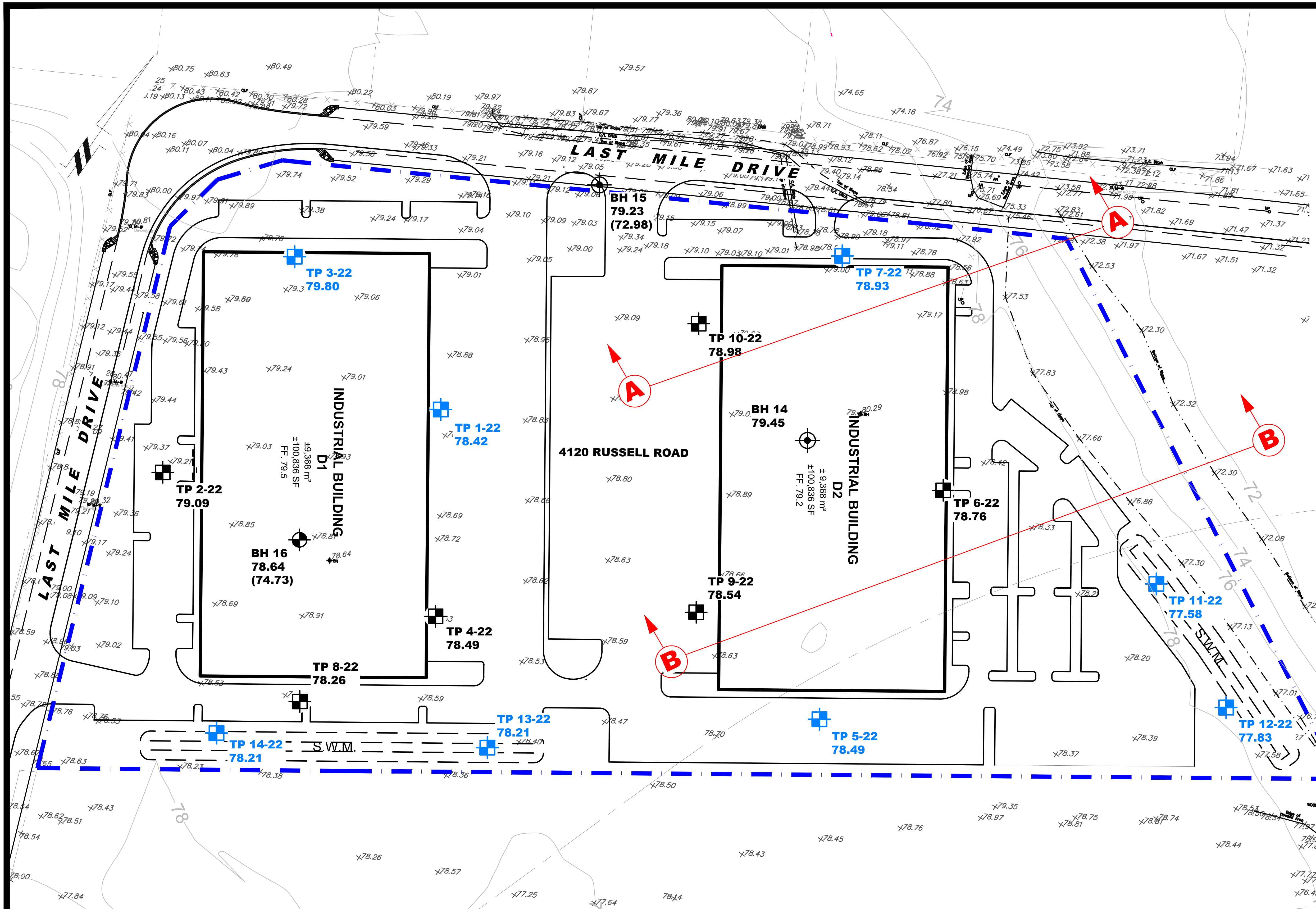


Figure 5 - Section B - Seismic Analysis





LEGEND:

■	TEST PIT LOCATION (CURRENT INVESTIGATION)
■	TEST PIT LOCATION (PATERSON GROUP REPORT; PH4612,2022)
⊕	BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PG4854,10/2019)
⊕	BOREHOLE WITH MONITORING WELL LOCATION , PREVIOUS INVESTIGATION (PG4854,10/2019)
B — B	SLOPE STABILITY CROSS SECTION
77.58	GROUND SURFACE ELEVATION (m)
(72.98)	PRACTICAL REFUSAL TO AUGERING / DCPT ELEVATION (m)
×	CONCEPTUAL PLAN PROVIDED BY L.R.L ENGINEERING

GROUND SURFACE ELEVATIONS AT TEST HOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:1250

0 5 10 15 20 25 50 75m

PATERSON GROUP

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NO.	REVISIONS	DATE	INITIAL

NATIONAL CAPITAL BUSINESS PARK INC.
GEOTECHNICAL INVESTIGATION
PROPOSED NATIONAL CAPITAL BUSINESS PARK - SITE 2
4120 RUSSELL ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1250	Date: 10/2022
Drawn by: JM	Report No.: PG4854-1
Checked by: SD	Dwg. No.: PG4854-12
Approved by: SD	Revision No.:

11x17

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