PATERSON GROUP

Geotechnical Investigation

Proposed Residential Development

Wateridge Village, Blocks 22 & 23 – Codd's Road
Ottawa, Ontario

Prepared for Mattamy Homes

Report PG7793-1 dated December 12, 2025

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Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Mattamy Homes to prepare a Geotechnical Investigation Report for Blocks 22 and 23 of the Wateridge Village residential development, along Codd's Road 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 Report are to:

- ❑ Determine the subsoil and groundwater conditions at this site by means of existing 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 consist of back-to-back and stacked townhouses with basements or slabs-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

Previous geotechnical field programs for the overall Wateridge Village development were completed by this firm between October 2022 and December 2023. During the previous investigations, a total of 34 boreholes and 2 test pits were advanced within, or in proximity to, the subject site to maximum depths of 6.7 and 3.5 m, respectively.

Additionally, Paterson reviewed the stability of the slope located to the north of the subject site between October 2022 and June 2025. A total of 11 hand augered holes were advanced along the slope to a maximum depth of 0.5 m.

A previous geotechnical investigation was carried out by others to the north of the subject site, at the toe of the aforementioned slope, in August 2013, and consisted of advancing 1 borehole and 8 test pits to maximum depths of 12.2 and 3.7 m, respectively.

The location of the test holes, and ground surface elevation at each test hole location, are presented on Drawing PG7793-1 – Test Hole Location Plan included in Appendix 2.

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

Sampling and In-Situ Testing

Soil samples were recovered from the boreholes using a 50 mm diameter split-spoon (SS) sampler or the auger flights (AU). Soil samples were also recovered from the sidewalls of the test pits (G). All soil samples were visually inspected and classified on site, placed in sealed plastic bags, and transported to the laboratory for further review. The depths at which the auger, split-spoon, and grab samples were recovered from the test holes are shown as AU, SS, and G, respectively, on the Soil Profile and Test Data sheets in Appendix 1.

A Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples and 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 thickness of the overburden was evaluated during the course of the investigation by completing a dynamic cone penetration test (DCPT) at borehole BH 21-22. 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

During the previous investigations, monitoring wells were installed in boreholes BH1-23, BH2-23, and BH4-23 to BH6-23, and flexible standpipe piezometers were installed in all other boreholes, with the exception of borehole BH3-23, to permit monitoring of the groundwater levels subsequent to the completion of the sampling program. The groundwater level readings were obtained after a suitable stabilization period subsequent to the completion of the field investigation.

A groundwater monitoring program was completed as part of previous investigation. Data loggers were installed at monitoring wells located at boreholes BH2-23, BH4-23 and BH5-23 as part of previous investigations and groundwater levels were monitored between April 2023 and May 2024. The groundwater observations are discussed in Section 4.4 and presented in the Soil Profile and Test Data sheets in Appendix 1 of this report.

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 ground surface elevation at each test hole location were surveyed by Paterson 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 PG7793-1 – 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. Moisture content testing was also completed on select soil samples and are summarized on the Soil Profile and Test Data sheets included in Appendix 1.

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 during the historic investigation. 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 generally grass covered and densely treed. However, asphalt roadways associated with the former development are located throughout the site. The site is bordered to the north by a large slope, and to the east, south and west by the Wateridge residential development.

The subject site was part of the lots acquired by the Department of National Defense in the 1890's and used as a military base known as CFB Rockcliffe until the early 2010's. The majority of the site was occupied by Department of National Defence facilities and car parking areas, in addition to some landscaped areas. By 1999, all structures at the subject site were demolished. Historical aerial photographs of the subject site and its surroundings are provided in Figures 2, 3, and 4 - Aerial Photographs, in Appendix 2.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile encountered at the subject site consists of topsoil, asphaltic concrete and/or fill, underlain by silty sand and glacial till.

Fill material was encountered at ground surface or underlying the asphaltic concrete or topsoil at all test holes, with the exception of borehole BH15-22, test pit TP 7 and the hand augered holes completed along the slope to the north of the site. The fill material was generally observed to consist of brown silty sand with gravel, crushed stone and trace clay, organics, topsoil and construction debris. The fill extended to depths of 0.1 to 3.2 m below the existing ground surface.

An approximate 30 to 80 mm thickness of asphaltic concrete was encountered at ground surface of boreholes BH4-23 to BH6-23, BH3-22, BH4-22, BH14-22, BH18-22, BH23-22, BH26-22, BH53-22, and BH62-22.

A layer of loose to compact, brown to grey silty sand to sandy silt with trace gravel was generally encountered underlying the fill material and extended to maximum depths of 1.5 to 6.0 m.

The glacial till layer deposit, encountered in localized areas across the site, was noted to consist of a compact to very dense brown to grey, silty sand to sandy silt with gravel cobbles and boulders.

Practical refusal augering was encountered at approximate depths ranging from 1.1 to 6.6 m below the existing ground surface. Practical refusal to excavation on the bedrock surface was encountered at approximate depths of 1.3 and 3.5 m at test pits TP6-23 and TP7-23, respectively. Practical refusal to the DCPT was encountered in borehole BH21-22 at an approximate depth of 8.4 m.

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

Bedrock

Based on available geological mapping, the bedrock in the area of the subject site generally consists of Shale of the Rockliffe Formation. The overburden drift thickness is estimated to be between 0 to 10 m depth.

4.3 Groundwater

Groundwater levels were manually measured in the installed piezometers and monitoring wells on November 18, 2022; March 24, 2023; April 20, 2023; May 30, 2023; and September 20, 2023. Additionally, data loggers were installed in monitoring wells at boreholes BH1-23, BH4-23 and BH5-23 to record seasonal fluctuations and precipitation collected within the upper portion of the subsurface profile across the site.

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

Table 1 – Summary of Groundwater Levels

Borehole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
		Depth (m)	Elevation (m)	
BH 1-23	89.02	Dry	NA	September 20, 2023
		Dry	NA	May 30, 2023
		1.57	87.45	April 20, 2023
BH 2-23	84.89	1.94	82.95	September 20, 2023
		1.82	83.07	April 20, 2023
BH 4-23	88.23	2.23	86.01	September 20, 2023
		2.53	85.70	May 30, 2023
		1.30	86.93	April 20, 2023
BH 5-23	87.65	Dry	NA	September 20, 2023
		1.84	85.81	May 30, 2023
		Dry	NA	April 20, 2023
BH 6-23	90.99	Dry	NA	September 20, 2023
		Dry	NA	May 30, 2023
		Dry	NA	April 20, 2023
BH 3-22	88.44	0.56	87.88	November 18, 2022
BH 4-22	89.20	Dry	NA	November 18, 2022
BH 5-22	89.30	Dry	NA	November 18, 2022
BH 8-22	88.82	0.54	88.28	March 24, 2023
		Dry	NA	November 18, 2022
BH 9-22	90.68	Dry	NA	November 18, 2022
BH 10-22	89.53	Dry	NA	November 18, 2022
		Dry	NA	March 24, 2023
BH 11-22	84.89	1.24	83.65	March 24, 2023
		2.12	82.77	November 18, 2022
BH 12-22	85.38	2.62	82.76	November 18, 2022
BH 13-22	84.92	Dry	NA	November 18, 2022
BH 14-22	84.4	Dry	NA	November 18, 2022
BH 16-22	87.86	Dry	NA	November 18, 2022
BH 17-22	88.75	Dry	NA	November 18, 2022
BH 18-22	91.05	Dry	NA	November 18, 2022
BH 19-22	91.06	Dry	NA	November 18, 2022
BH 20-22	86.55	0.71	85.84	November 18, 2022

Table 1 – Summary of Groundwater Levels

Borehole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
		Depth (m)	Elevation (m)	
BH 21-22	86.35	3.05	83.3	November 18, 2022
		2.76	83.59	March 24, 2023
BH 22-22	87.59	Dry	NA	November 18, 2022
BH 23-22	87.88	Dry	NA	November 18, 2022
BH 24-22	88.34	Dry	NA	November 18, 2022
BH 25-22	89.17	Dry	NA	November 18, 2022
BH 26-22	87.96	Dry	NA	November 18, 2022
BH 28-22	88.17	Dry	NA	November 18, 2022
BH 29-22	83.17	1.9	81.27	November 18, 2022
BH 53-22	87.5	2.97	84.53	March 24, 2023
		3.45	84.05	November 18, 2022
BH 62-22	85.57	2.9	82.67	November 18, 2022

Note: The ground surface elevation at each borehole location was surveyed using a handheld GPS using a geodetic datum.

In addition to manual water level measurements, a groundwater monitoring program was carried out at boreholes BH1-23, BH4-23 and BH5-23 as part of the previous investigations. The groundwater monitoring program provides an overview of the variations of the monitoring well water levels based on seasonal fluctuations.

The monitoring wells were equipped with submersible dataloggers (TD-Diver, VanEssen Instruments) to accurately monitor fluctuations in the water levels. Dataloggers were programmed to continuously measure and record water levels at a fixed rate of 1 reading every 24 hours for approximately 13 months.

The monitoring program was undertaken from April 2023 to May 2024. The monitoring data was compared with Environment and Natural Resources Canada precipitation data from the Ottawa International Airport over the same timeframe as part of the monitoring program. The groundwater monitoring results are presented in Appendix 1

Groundwater levels can also be estimated based on the observed colour and consistency of the recovered soil samples. Based on the groundwater monitoring

program and these observations, the groundwater table can be expected at an approximate depth of **1.5 to 3.0 m** below the existing ground surface.

It should be noted that surface water can be perched within the open holes which may be interpreted as shallow groundwater in some of the borehole locations. The recorded groundwater levels are also provided on the applicable Soil Profile and Test Data sheets presented in Appendix 1.

It should also 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, compact silty sand to sandy silt, compact to very dense glacial till, or engineered fill placed over compact to dense silty sand or compact to very dense glacial till bearing surfaces.

As a silty clay deposit was not encountered within the subject site, permissible grade raise restrictions and tree planting restrictions are not required.

It is anticipated that some bedrock removal and the removal of large boulders will be required for building construction and servicing installation. Therefore, the contractor should be prepared for bedrock removal and the presence of large boulders within the subject site.

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.

If encountered, existing foundation walls and other construction debris should be entirely removed from within the building perimeters. Under paved areas, existing construction remnants, such as foundation walls, should be excavated to a minimum of 1 m below final grade.

Bedrock Removal

Bedrock removal may be required at the subject site and can be accomplished by hoe ramming where the bedrock is weathered, and/or where only small quantities need to be removed. Sound bedrock may be removed by line drilling in conjunction with controlled blasting and/or hoe ramming.

Prior to considering blasting operations, the blasting effects on the existing services, buildings, and other structures should be addressed. A pre-blast or pre-

construction survey of the existing structures located in the proximity of the blasting operations should be carried out prior to commencing site activities.

The extent of the survey should be determined by the blasting consultant and should be sufficient to respond to any inquiries or claims related to the blasting operations. The blasting operations must be planned and conducted under the supervision of a licensed professional engineer who is also an experienced blasting consultant.

Vibration Considerations

Construction operations are also the cause of vibrations, and possibly, sources of nuisance to the community. Therefore, means to reduce the vibration levels should be incorporated in the construction operations to maintain, as much as possible, a cooperative environment with the residents.

The following construction equipment could be a source of vibrations: piling rig, hoe ram, compactor, dozer, crane, truck traffic, etc. Vibrations, whether caused by blasting operations or by construction operations, could be the cause of the source of detrimental vibrations on the nearby buildings and structures. Therefore, it is recommended that all vibrations be limited.

Two parameters are used to determine the permissible vibrations, namely, the maximum peak particle velocity and the frequency. For low frequency vibrations, the maximum allowable peak particle velocity is less than that for high frequency vibrations. As a guideline, the peak particle velocity should be less than 15 mm/s between frequencies of 4 to 12 Hz, and 50 mm/s above a frequency of 40 Hz (interpolate between 12 and 40 Hz).

It should be noted that these guidelines are for today's construction standards. Considering that these guidelines are above perceptible human level and, in some cases, could be very disturbing to some people, it is recommended that a pre-construction survey be completed to minimize the risks of claims during or following the construction of the proposed buildings.

Fill Placement

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

equipment. Fill placed beneath the 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.

If excavated rock is to be used as fill, it should be suitably fragmented to produce a well-graded material with a maximum particle size of 300 mm. Where this fill material is open-graded, a woven geotextile may be required to prevent adjacent finer materials from migrating into the voids, with associated loss of ground and settlements. Site-generated blast rock fill should be compacted using a suitably sized smooth drum vibratory roller when considered for placement. This can be assessed at the time of construction.

Under winter conditions, if snow and ice is present within the blast rock fill below future basement slabs, then settlement of the fill should be expected and support of a future basement slab and/or temporary supports for slab pours will be negatively impacted and could undergo settlement during spring and summer time conditions. The geotechnical consultant should complete periodic inspections during fill placement to ensure that snow and ice quantities are minimized.

5.3 Foundation Design

Bearing Resistance Values

Footings placed on an undisturbed, compact to dense silty sand to sandy silt or compact to dense glacial till, or on engineered fill placed directly over the undisturbed compact to dense silty sand to sandy silt or compact to dense glacial till bearing surfaces, can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **225 kPa**. A geotechnical resistance factor of 0.5 was incorporated in calculating the bearing resistance values at ULS.

Where the silty sand subgrade is observed to be in a loose state of compaction, proof-rolling under dry conditions and above freezing temperatures should be

completed by an adequately sized vibratory drum roller making several passes to achieve optimum compaction levels. The compaction program should be reviewed and approved by the geotechnical consultant.

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.

Footings supported directly on clean, surface-sounded bedrock, or on lean concrete which is placed directly over clean, surface sounded bedrock, can be designed using a factored bearing resistance value at ultimate limit states (ULS) of **500 kPa**. A geotechnical resistance factor of 0.5 was applied to the bearing resistance value at ULS.

A clean, surface-sounded bedrock bearing surface should be free of loose materials, and have no near surface seams, voids, fissures or open joints which can be detected from surface sounding with a rock hammer.

Footings supported directly on clean, surface sounded bedrock and design for the bearing resistance values provided above will be subject to negligible post-construction total and differential settlements.

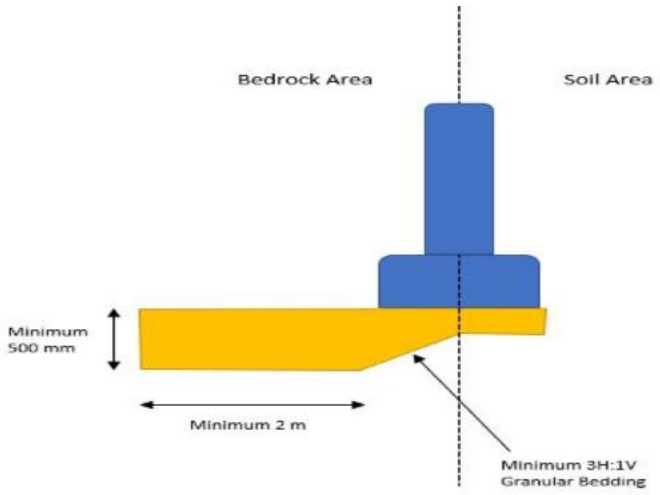
Lateral Support

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.

Adequate lateral support is provided to a sound bedrock bearing medium when a plane extending down and out from the bottom edge of the footing at 1H:6V (or flatter) passes only through sound bedrock or a material of the same or higher capacity as the bedrock, such as concrete. A soil bearing medium or a heavily fractured, weathered bedrock will require a lateral support zone of 1H:1V (or flatter).

Bedrock/Soil Transition

Where a building is founded partly on bedrock and partly on soil, it is recommended at the soil/bedrock and bedrock/soil transitions that the upper 0.5 m of the bedrock be removed for a minimum length of 2 m (on the bedrock side) and replaced with nominally compacted OPSS Granular A or Granular B Type II material, see below. The width of the sub-excavation should be at least the proposed footing width plus 0.5 m. Steel reinforcement, extending at least 3 m on both sides of the 2 m long transition, should be placed in the top part of the footings and foundation walls.



Bedrock/Soil Transition Treatment

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class X_C** 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. Where the subgrade consists of the existing fill, a vibratory drum roller should complete several passes over the subgrade surface as a proof-rolling program. Any poor performing areas should be removed and reinstated with an engineered fill, such as OPSS Granular B Type II.

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 crushed 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 2 and 3, are recommended for car parking areas and access lanes.

Table 2 – 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 – Either fill, in situ soils or OPSS Granular B Type I or II material placed over in situ soil or bedrock.	

Table 3 – 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 – Either fill, in situ soils or OPSS Granular B Type I or II material placed over in situ soil or bedrock.	

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 permitter 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, or to the sump pit where sump pumps are proposed at the residential dwellings.

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.

A minimum of 150 mm of OPSS Granular A should be placed for bedding for sewer or water pipes when placed on a soil or weathered bedrock subgrade. If the bedding is placed on clean, surface sounded bedrock, the thickness of the bedding should be increased to 300 mm for sewer pipes. 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 95% of the 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.

6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavation should be low to moderate 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), provided 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 5 to 6 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 moderate to slightly aggressive corrosive environment.

6.8 Slope Stability Assessment

Slope Condition Review

The existing slope conditions were reviewed by Paterson field personnel as part of the geotechnical investigation on October 13, 2022, and June 20, 2025. Five (5) slope cross-sections were studied as the worst-case scenarios. The cross-section locations are presented on Drawing PG7793-1 – Test Hole Location Plan in Appendix 2.

The existing slope conditions along the northern boundaries of the site are detailed below. The ground surface across the subject site varies, but generally slopes downward to the north, from approximate geodetic elevations of 87.0 to 55.1 m.

The ground surface slopes downward towards the Sir George Etienne-Cartier Parkway to the north of the subject site at an approximate 2H:1V to 15H:1V profile and is generally heavily vegetated with brush and some trees. Additional signs of erosion consisted of exposed tree roots, fallen trees, over-steepening and under-cutting of the bank at bends in the creek alignment.

Stable Slope Allowance

The slope stability analysis was modelled 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 subsoil and groundwater conditions, a factor of safety greater than one is usually required to ascertain that the risks of failure are acceptable. A minimum factor of safety of 1.5 is generally recommended for conditions where the failure of the slope would endanger permanent structures. Subsoil conditions at the cross-sections were inferred based on nearby test holes. For conservative modelling of the groundwater conditions in our analysis, the ground was considered to be fully saturated, exiting at the toe of the slope, and across the creek section.

Static Loading Analysis

The results for the existing static conditions are shown in Figures 5A to 8A and 18A in Appendix 2. The results indicate the factor of safety for all the sections was found to be greater than 1.5. Based on the results, there will be no stable slope allowance setback required for this site.

Seismic Loading Analysis

An analysis considering seismic loading and the groundwater at ground surface was also completed. A horizontal acceleration of 0.16g was considered for all slopes. A factor of safety of 1.1 is considered to be satisfactory for stability analyses including seismic loading.The results of the analyses including seismic loading are shown in Figures 5B to 8B and 18B in Appendix 2. The results indicate a slope with a factor of safety greater than 1.1 at all sections. Based on these results, the slopes are considered to be stable under seismic loading.

Toe Erosion Allowance

Due to the presence of bedrock at the toe of the slope, and the absence of an active water course along the bottom of the slope, no toe erosion setback is considered to be required for the subject slope.

Erosion Access Allowance

As neither a stable slope nor toe erosion allowance is required, an erosion access allowance is not considered to be required for future repair of the slope.

Limit of Hazard Lands

In accordance with the above, a limit of hazard lands setback from the top of slope is not required for the proposed development at this site.

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 Mattamy Homes, 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.

Scott S. Dennis, P.Eng.

Kevin A. Pickard, P.Eng.

Report Distribution:

- ❑ Mattamy Homes (email copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

SOIL PROFILE AND TEST DATA SHEETS BY OTHERS

ANALYTICAL TESTING RESULTS

GROUNDWATER MONITORING RESULTS

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Development - Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger **DATE** April 12, 2023

FILE NO. PG6331

HOLE NO. BH 1-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	89.02
FILL: Brown silty sand with crushed stone, trace organics		AU	1				
0.69							
Loose, brown **SILTY SAND,** some gravel		SS	2	33	5	1	88.02
1.45							
GLACIAL TILL: Dense, dark brown silty sand with gravel, cobbles and boulders		SS	3	75	50+	2	87.02
2.23							
End of Borehole							
Practical refusal to augering at 2.23m depth.							
(GWL @ 1.57m - April 20, 2023)							

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

20 40 60 80

Monitoring Well Construction

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

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SOIL PROFILE AND TEST DATA

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Prop. Development - Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

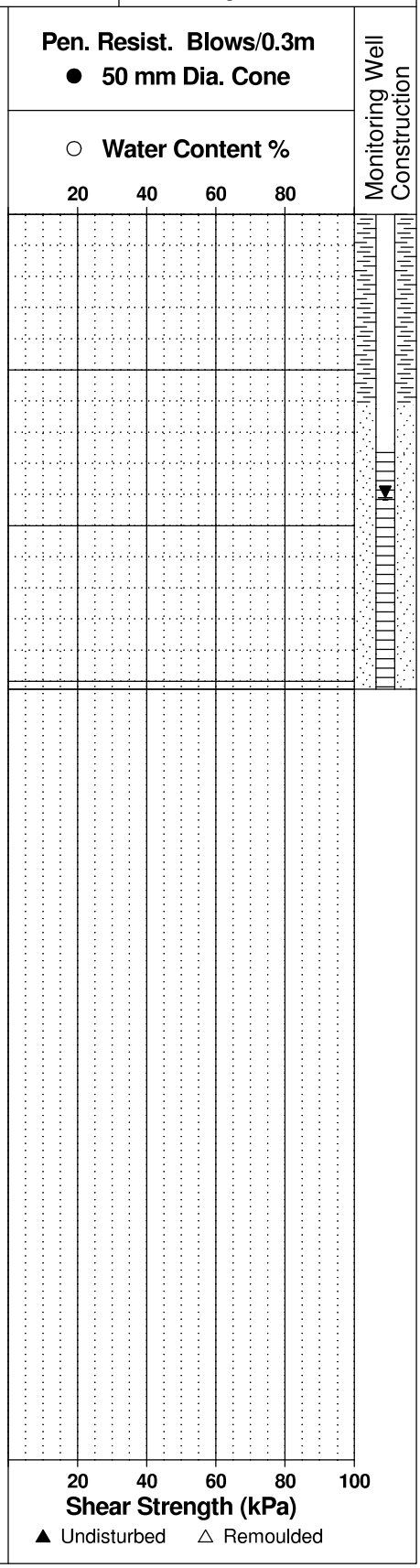
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** April 12, 2023

FILE NO. PG6331

HOLE NO. BH 2-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	84.89
FILL: Brown silty sand with gravel and crushed stone, trace organics		AU	1				
0.69							
		SS	2	58	18	1	83.89
FILL: Brown silty sand with gravel and crushed stone, cobbles, trace clay		SS	3	58	41	2	82.89
- some rock fragments by 2.0m depth		SS	4	75	31		
3.05						3	81.89
End of Borehole							
Practical refusal to augering at 3.05m depth.							
(GWL @ 1.82m - April 20, 2023)							



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Prop. Development - Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

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REMARKS

BORINGS BY Track-Mount Power Auger **DATE** April 12, 2023

FILE NO. PG6331

HOLE NO. BH 3-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE						0	89.37		
FILL: Brown silty sand, trace to some gravel and organics		AU	1						
0.69									
Compact, brown **SILTY SAND,** trace to some gravel		SS	2	75	14	1	88.37		
1.45									
GLACIAL TILL: Very dense, brown silty sand, some gravel		SS	3	88	32				
1.93									
End of Borehole									
Practical refusal to augering at 1.93m depth.									

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

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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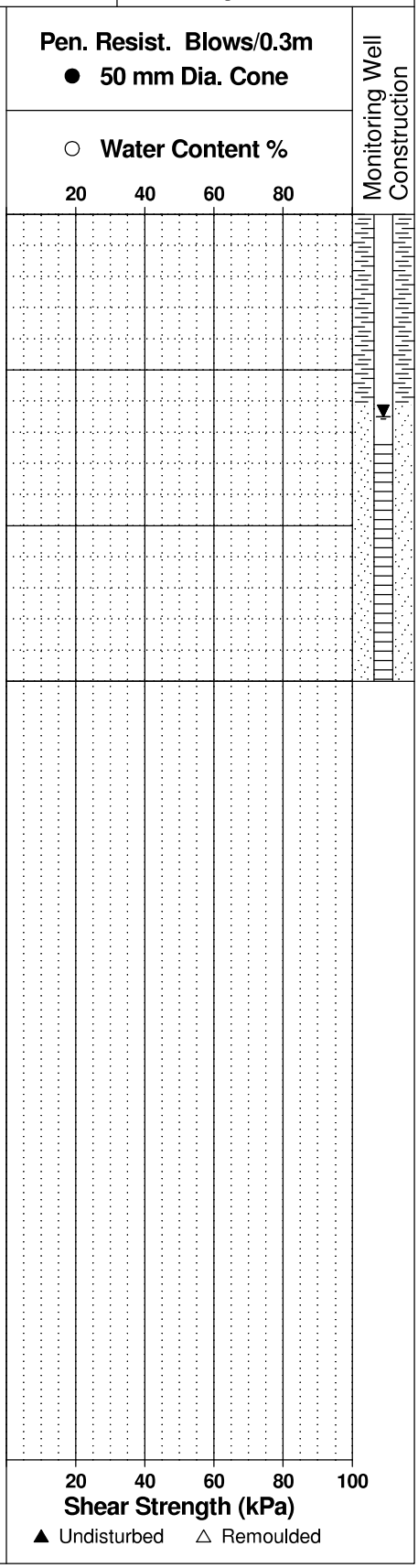
BORINGS BY Track-Mount Power Auger **DATE** April 12, 2023

FILE NO. PG6331

HOLE NO. BH 4-23

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							0	88.23
Asphaltic concrete	0.08							
FILL: Crushed stone with sand	0.15							
FILL: Brown sand, trace gravel	0.69		AU	1				
FILL: Brown silty clay with sand, trace organics	1.37		SS	2	83	7	1	87.23
			SS	3	58	15	2	86.23
Compact, brown **SILTY SAND,** trace to some gravel, occasional cobbles	3.00		SS	4	70	19	3	85.23
End of Borehole								
Practical refusal to augering at 3.00m depth.								
(GWL @ 1.30m - April 20, 2023)								



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BORINGS BY Track-Mount Power Auger **DATE** April 12, 2023

FILE NO. PG6331

HOLE NO. BH 5-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08						0	87.65
FILL: Brown silty sand, trace gravel 0.69		AU	1				
Compact, brown **SILTY SAND,** trace to some gravel		SS	2	58	9	1	86.65
		SS	3	50	13		
2.08						2	85.65
End of Borehole							
Practical refusal to augering at 2.08m depth.							

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

Monitoring Well Construction

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

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BORINGS BY Track-Mount Power Auger **DATE** April 13, 2023

FILE NO. PG6331

HOLE NO. BH 6-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	90.99
Asphaltic concrete 0.08		AU	1				
FILL: Brown silty sand with crushed stone, some gravel		SS	2	46	14	1	89.99
		SS	3	29	27	2	88.99
		SS	4	29	7		
2.97						3	87.99
Loose to compact, brown **SILTY SAND,** trace to some gravel		SS	5	46	4		
3.73							
GLACIAL TILL: Dense to very dense, brown silty sand to sandy silt with gravel, cobbles and boulders		SS	6	50	36	4	86.99
4.47							
End of Borehole							
Practical refusal to augering at 4.47m depth.							
(GBH dry - April 20, 2023)							

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

20 40 60 80

Monitoring Well Construction

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

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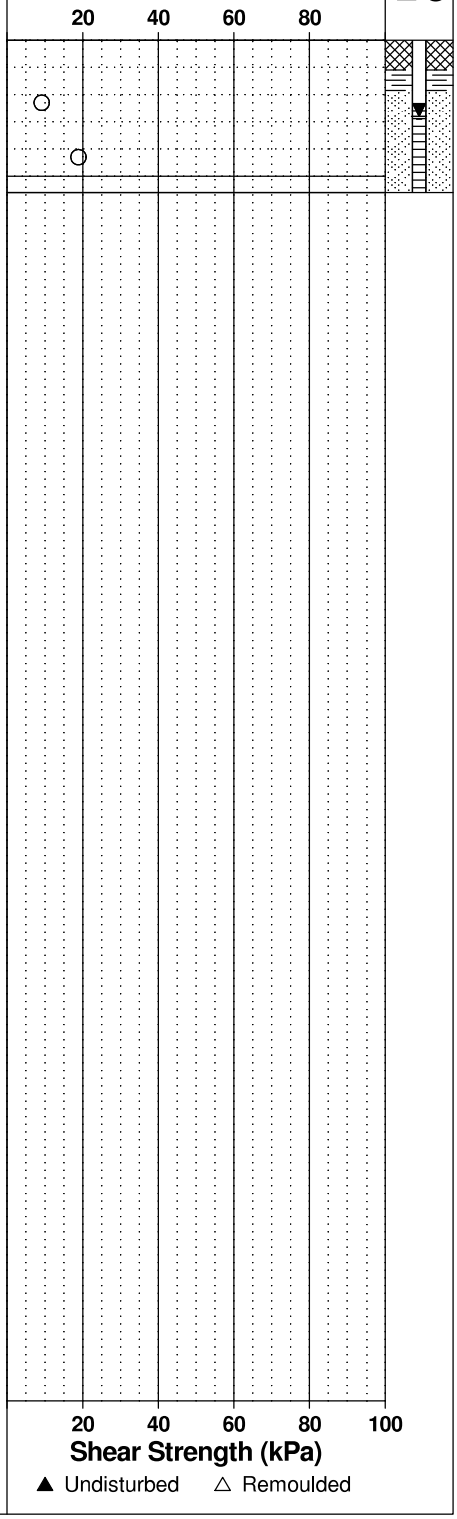
BORINGS BY Track-Mount Power Auger **DATE** October 26, 2022

FILE NO. PG6331

HOLE NO. BH 3-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.03						0	88.44
FILL: Brown silty sand, some gravel and crushed stone		AU	1				
- trace clay by 0.7m depth 1.12		SS	2	63	50+	1	87.44
End of Borehole							
Practical refusal to augering at 1.12m depth.							
(GWL @ 0.56m - Nov. 18, 2022)							

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



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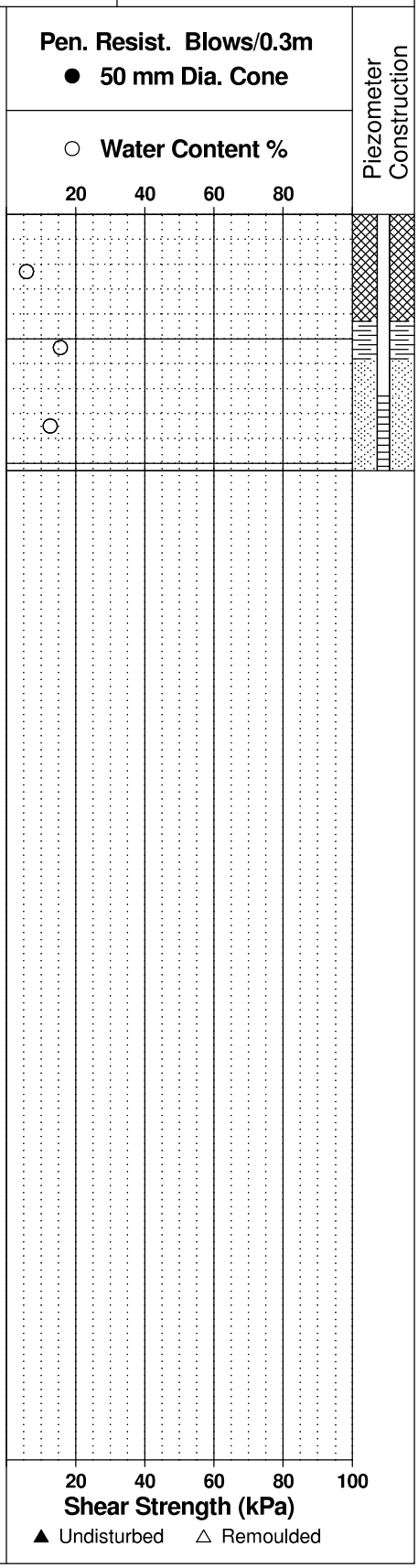
BORINGS BY Track-Mount Power Auger **DATE** October 26, 2022

FILE NO. PG6331

HOLE NO. BH 4-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.03						0	89.20
		AU	1				
FILL: Brown silty sand with gravel and crushed stone		SS	2	63	5	1	88.20
		SS	3	57	50+		
2.06						2	87.20
End of Borehole							
Practical refusal to augering at 2.06m depth.							
(BH dry - November 18, 2022)							



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FILE NO. PG6331

HOLE NO. BH 5-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	89.30
FILL: Brown silty sand with organics		AU	1				
0.10							
Compact, brown **SILTY SAND,** trace gravel		SS	2	71	16	1	88.30
- some rock fragments by 1.5m depth		SS	3	33	50+		
1.80							
End of Borehole							
Practical refusal to augering at 1.80m depth.							
(BH dry - November 18, 2022)							

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

20 40 60 80

Piezometer Construction

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

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Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

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FILE NO. PG6331

HOLE NO. BH 6-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.77
FILL: Brown silty sand with organics (0.13)		AU	1				
FILL: Brown silty sand, some gravel - trace concrete by 0.7m depth		SS	2	21	12	1	87.77
(1.45) Compact, brown **SILTY SAND,** trace gravel (2.21)		SS	3	58	16	2	86.77
GLACIAL TILL: Compact, grey silty sand to sandy silt with gravel, cobbles and boulders (2.74)		SS	4	56	50+		
End of Borehole Practical refusal to augering at 2.74m depth.							

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

Piezometer Construction

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

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Wateridge Village Phases 6, 7 & 8
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REMARKS

BORINGS BY Track-Mount Power Auger **DATE** October 26, 2022

FILE NO. PG6331

HOLE NO. BH 7-22

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							0	88.06
FILL: Brown silty sand with organics, some gravel	0.15		AU	1				
FILL: Brown silty sand, some gravel	0.69							
Compact, light brown **SILTY SAND,** some gravel			SS	2	25	17	1	87.06
			SS	3	67	15		
	2.21						2	86.06
GLACIAL TILL: Compact, grey silty sand to sandy silt with gravel, cobbles and boulders	2.59		SS	4	100	50+		
End of Borehole								
Practical refusal to augering at 2.59m depth.								

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

20 40 60 80

Piezometer Construction

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

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Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

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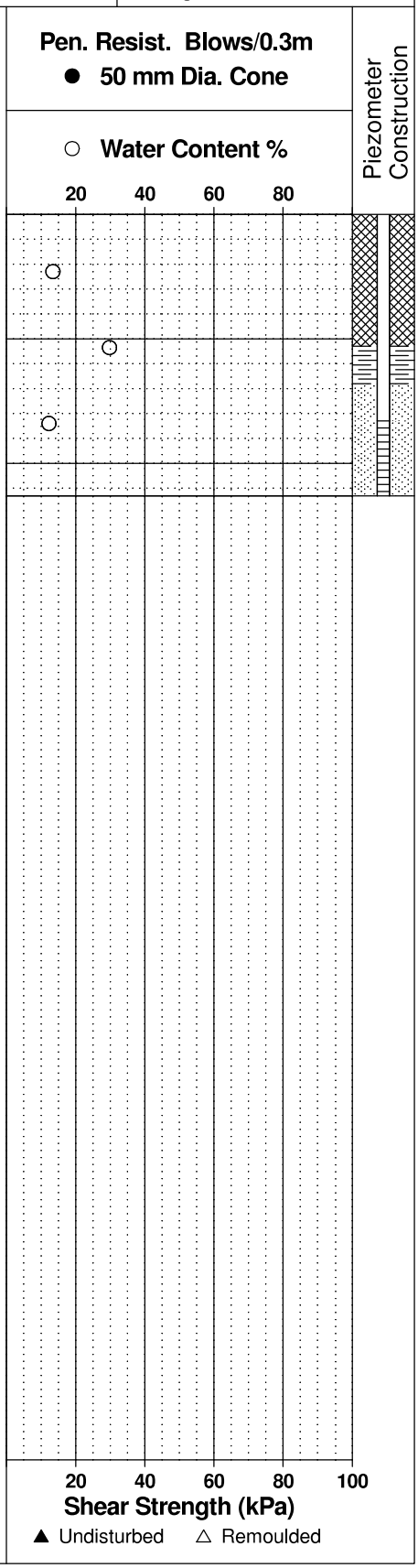
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** October 27, 2022

FILE NO. PG6331

HOLE NO. BH 8-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.82
FILL: Brown silty sand with gravel, crushed stone and organics 0.15							
FILL: Brown silty sand with gravel and crushed stone 0.60		AU	1				
Compact, light brown **SILTY SAND,** some gravel		SS	2	67	10	1	87.82
1.45							
Compact, light brown **SILTY SAND to SANDY SILT,** some gravel		SS	3	77	50+	2	86.82
2.26							
End of Borehole							
Practical refusal to augering at 2.26m depth.							
(BH dry - November 18, 2022)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
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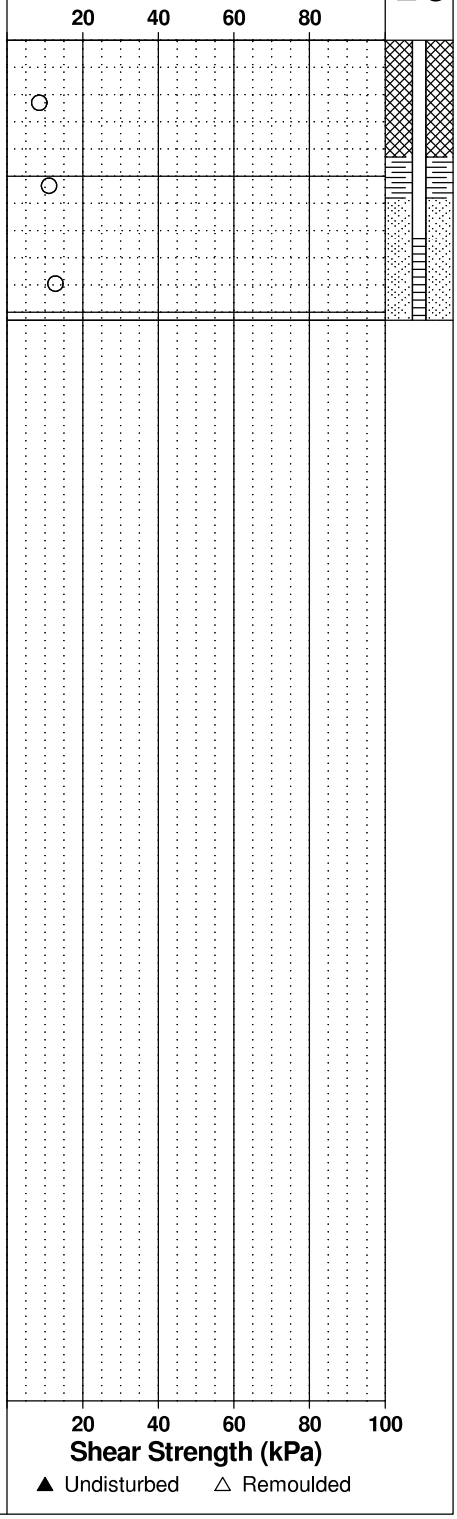
BORINGS BY Track-Mount Power Auger **DATE** October 27, 2022

FILE NO. PG6331

HOLE NO. BH 9-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	90.68
FILL: Brown sitly sand with organics 0.20		AU	1				
FILL: Brown silty sand with gravel and crushed stone 0.69						1	89.68
Compact, brown **SILTY SAND,** some gravel		SS	2	71	18		
2.06		SS	3	67	14	2	88.68
End of Borehole							
Practical refusal to augering at 2.06m depth.							
(BH dry - November 18, 2022)							

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



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SOIL PROFILE AND TEST DATA

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Wateridge Village Phases 6, 7 & 8
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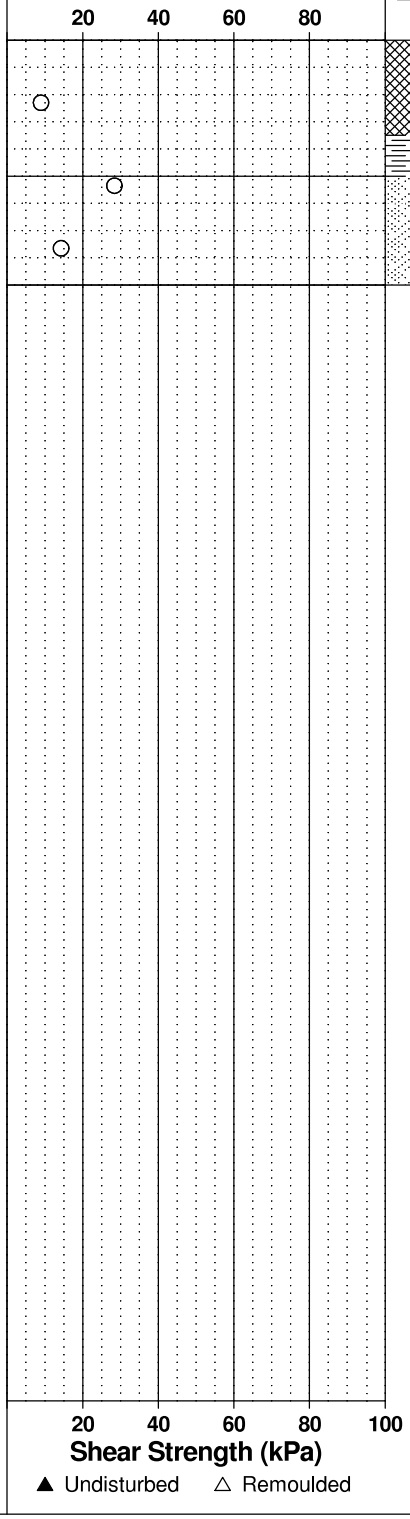
FILE NO. PG6331

HOLE NO. BH10-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	89.53
FILL: Brown silty sand with gravel, organics and topsoil (0.10)		AU	1				
FILL: Brown silty sand with gravel, trace topsoil and organics		SS	2	13	16	1	88.53
- some rock fragments by 1.5m depth		SS	3	100	50+		
1.80							
End of Borehole							
Practical refusal to augering at 1.80m depth.							
(BH dry - November 18, 2022)							

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



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
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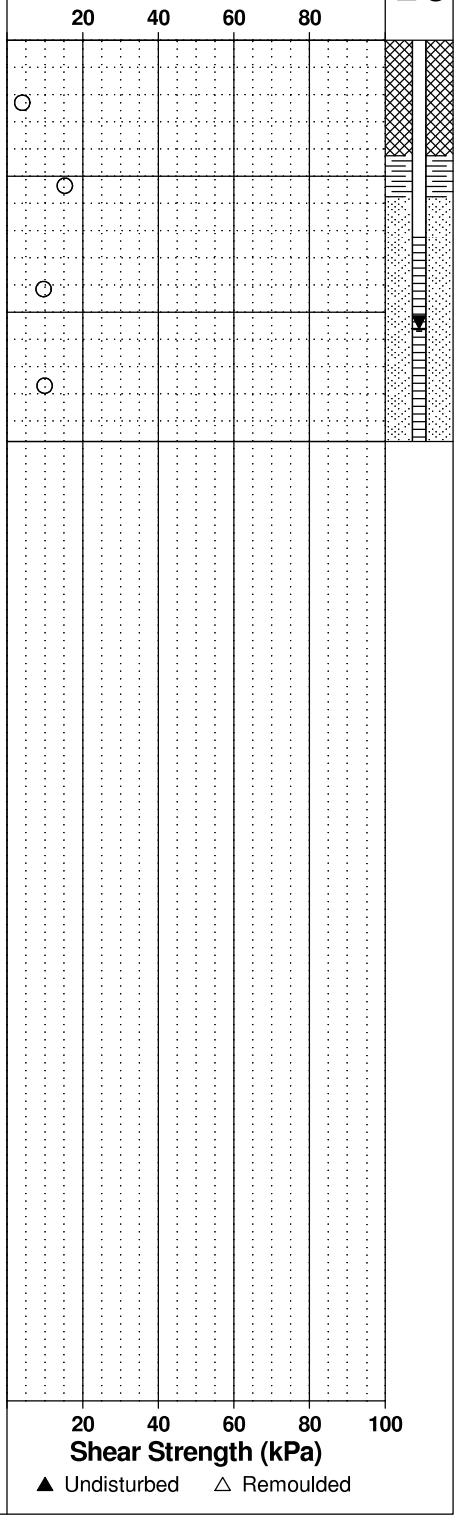
BORINGS BY Track-Mount Power Auger **DATE** October 27, 2022

FILE NO. PG6331

HOLE NO. BH11-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	84.89
FILL: Brown silty sand with gravel and crushed stone		AU	1				
0.69							
		SS	2	42	20	1	83.89
FILL: Brown sitly sand with gravel and crushed stone, occasional cobbles, rock fragments, trace clay		SS	3	42	13	2	82.89
		SS	4	45	15		
2.95							
End of Borehole							
Practical refusal to augering at 2.95m depth.							
(GWL @ 2.12m - Nov. 18, 2022)							

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



Piezometer Construction

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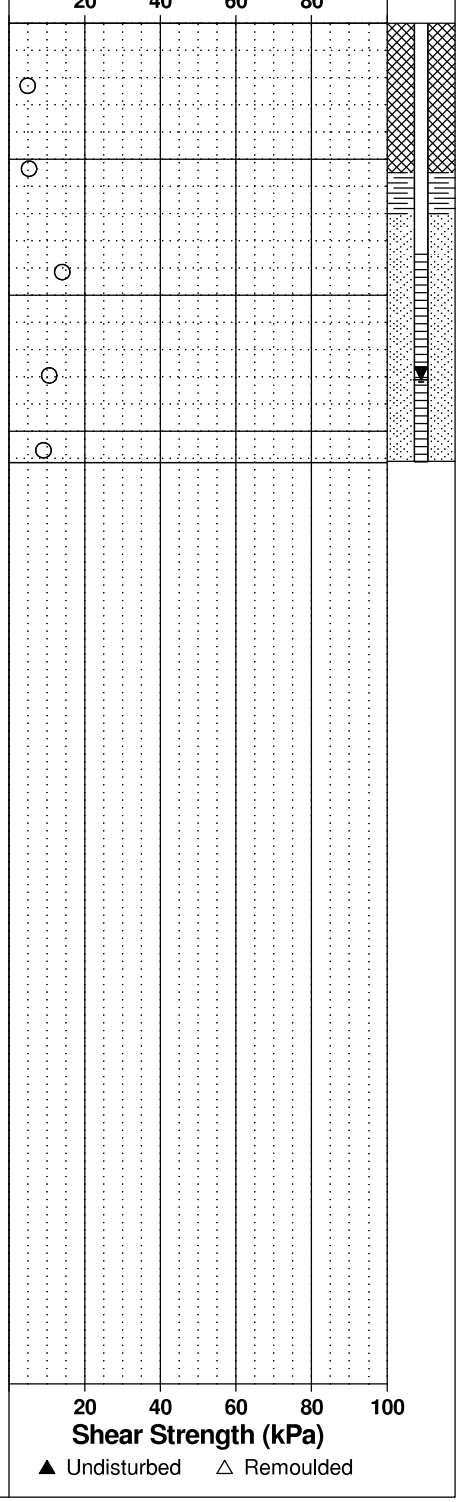
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** October 27, 2022

FILE NO. PG6331

HOLE NO. BH12-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.38
FILL: Brown silty sand with gravel and crushed stone		AU	1				
0.69							
FILL: Brown silty sand with gravel, crushed stone, trace asphalt and concrete		SS	2	62	16	1	84.38
		SS	3	29	19	2	83.38
2.21							
FILL: Brown silty sand with gravel and cobbles, trace clay - some rock fragments by 2.9m depth		SS	4	67	11	3	82.38
3.23		SS	5	75	50+		
End of Borehole Practical refusal to augering at 3.23m depth. (GWL @ 2.62m - Nov. 18, 2022)							



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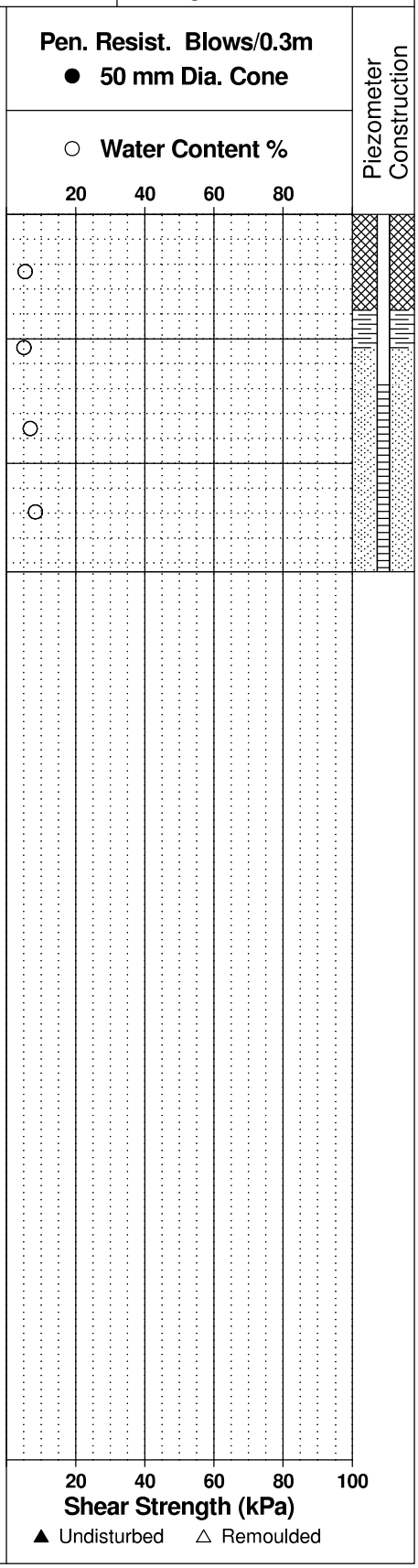
BORINGS BY Track-Mount Power Auger **DATE** October 27, 2022

FILE NO. PG6331

HOLE NO. BH13-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	84.92
TOPSOIL 0.18							
FILL: Brown silty sand with gravel and crushed stone		AU	1				
		SS	2	75	50+	1	83.92
- occasional cobbles and rock fragments by 0.7m depth		SS	3	63	50+		
- trace organics from 1.5m to 2.1m depth		SS	4	75	50+	2	82.92
2.87							
End of Borehole							
Practical refusal to augering at 2.87m depth.							
(BH dry - November 18, 2022)							



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BORINGS BY Track-Mount Power Auger **DATE** October 27, 2022

FILE NO. PG6331

HOLE NO. BH14-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.04						0	84.40
FILL: Brown silty sand with and crushed stone, trace organics and rock fragments		AU	1				
		SS	2	50	18	1	83.40
1.98		SS	3	56	39		
End of Borehole							
Practical refusal to augering at 1.98m depth.							
(BH dry - November 18, 2022)							

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

Piezometer Construction

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

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BORINGS BY Track-Mount Power Auger **DATE** October 27, 2022

FILE NO. PG6331

HOLE NO. BH15-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.14
TOPSOIL 0.10		AU	1				
GLACIAL TILL: Very dense, brown silty sand with gravel, cobbles and boulders		SS	2	100	50+	1	87.14
1.78		SS	3	67	50+		
End of Borehole							
Practical refusal to augering at 1.78m depth.							

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

Piezometer Construction

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

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BORINGS BY Track-Mount Power Auger **DATE** October 27, 2022

FILE NO. PG6331

HOLE NO. BH16-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	87.86
FILL: Brown silty sand with organics 0.10		AU	1				
FILL: Brown silty sand with gravel and crushed stone 0.60		SS	2	63	3	1	86.86
FILL: Brown silty sand with clay, trace organics 1.37		SS	3	50	11		
Compact, Brown **SILTY SAND,** trace gravel		SS	4	71	13	2	85.86
2.97							
GLACIAL TILL: Very dense, brown silty sand to sandy silt with gravel, cobbles and boulders		SS	5	38	50+	3	84.86
4.11		SS	6	0	50+	4	83.86
End of Borehole							
Practical refusal to augering at 4.11m depth.							
(BH dry - November 18, 2022)							

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

Piezometer Construction

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

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BORINGS BY Track-Mount Power Auger **DATE** October 28, 2022

FILE NO. PG6331

HOLE NO. BH17-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.75
FILL: Brown silty sand with gravel, trace organics (0.10)		AU	1				
FILL: Brown silty sand with crushed stone, trace gravel (0.69)							
GLACIAL TILL: Very dense, brown silty sand to sandy silt with gravel and cobbles (1.22)		SS	2	63	50+	1	87.75
End of Borehole							
Practical refusal to augering at 1.22m depth.							
(BH dry - November 18, 2022)							

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

Piezometer Construction

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

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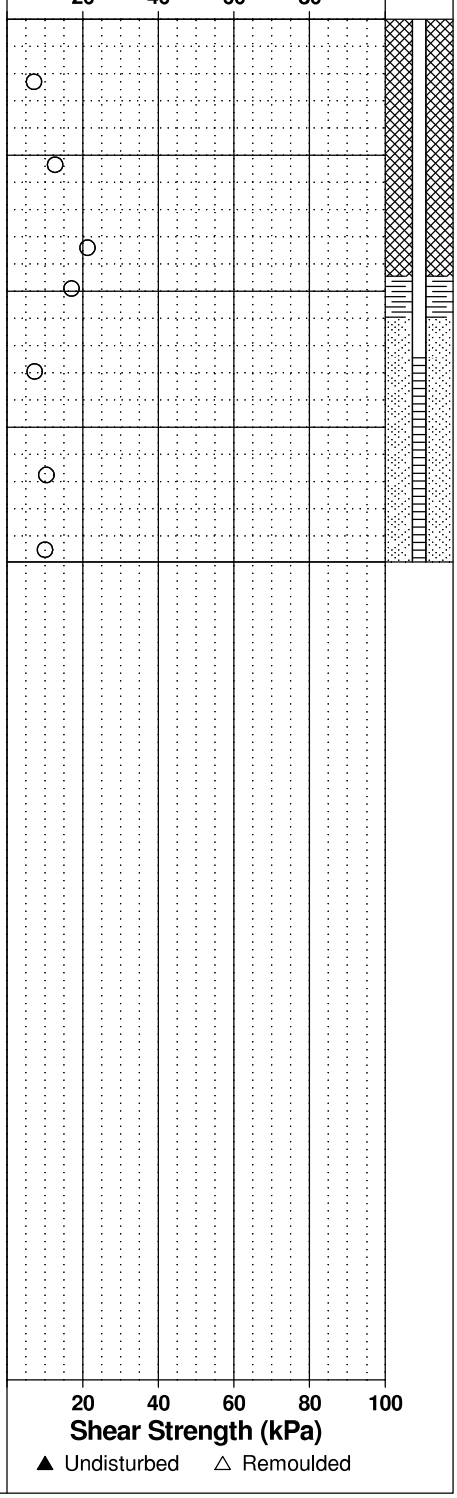
BORINGS BY Track-Mount Power Auger **DATE** October 28, 2022

FILE NO. PG6331

HOLE NO. BH18-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.05						0	91.05
FILL: Brown silty sand with crushed stone and gravel, trace topsoil		AU	1				
		SS	2	21	11	1	90.05
1.65							
Very loose to desen, brown **SILTY SAND,** trace gravel		SS	3	54	3	2	89.05
		SS	4	63	32		
2.97						3	88.05
GLACIAL TILL: Compact to very dense, brown silty sand to sandy silt with gravel, cobbles and boudlers		SS	5	67	19		
3.99		SS	6	71	50+		
End of Borehole							
Practical refusal to augering at 3.99m depth.							
(BH dry - November 18, 2022)							



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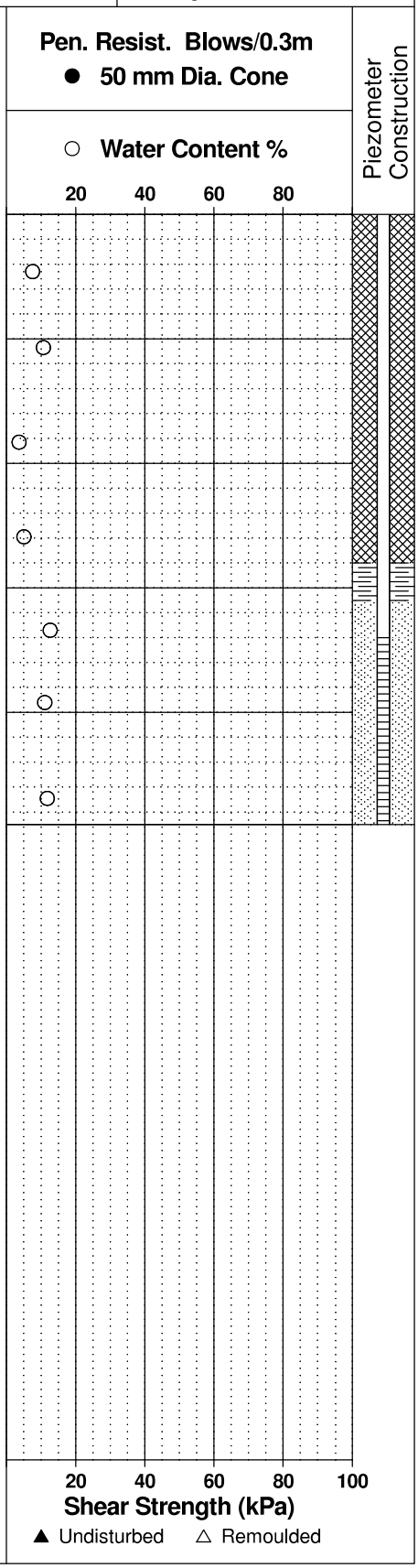
BORINGS BY Track-Mount Power Auger **DATE** October 28, 2022

FILE NO. PG6331

HOLE NO. BH19-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	91.06
FILL: Brown silty sand with organics 0.10		AU	1				
FILL: Brown silty sand with gravel, crushed stone and rock fragments 0.69							
Compact, brown **SILTY SAND to SANDY SILT,** trace gravel		SS	2	67	22	1	90.06
1.45		SS	3	67	41	2	89.06
Dense, brown **SILTY SAND,** trace gravel		SS	4	79	26		
		SS	5	70	44	3	88.06
3.73		SS	6	89	50+	4	87.06
Very dense, grey **SILTY SAND to SANDY SILT**		SS	7	82	50+		
4.90							
End of Borehole							
Practical refusal to augering at 4.90m depth.							
(BH dry - November 18, 2022)							



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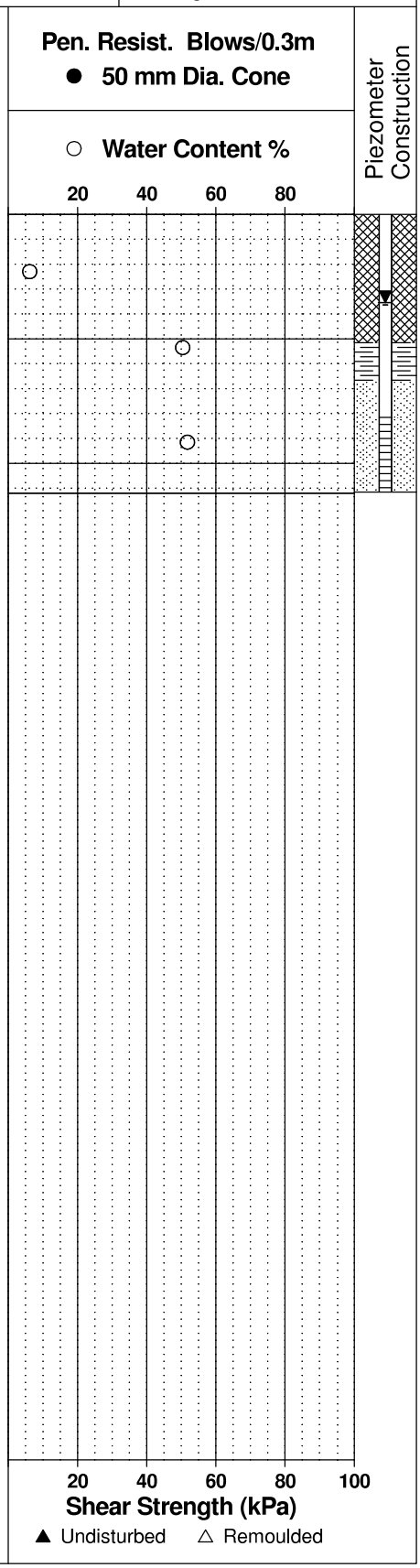
FILE NO. PG6331

HOLE NO. BH20-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	86.55
FILL: Brown silty sand with gravel and crushed stone, trace organics to 0.1m depth		AU	1				
0.69							
Hard, brown **SILTY CLAY**		SS	2	67	9	1	85.55
		SS	3	100	12	2	84.55
2.24							
End of Borehole							
Practical refusal to augering at 2.24m depth.							
(GWL @ 0.71m - Nov. 18, 2022)							



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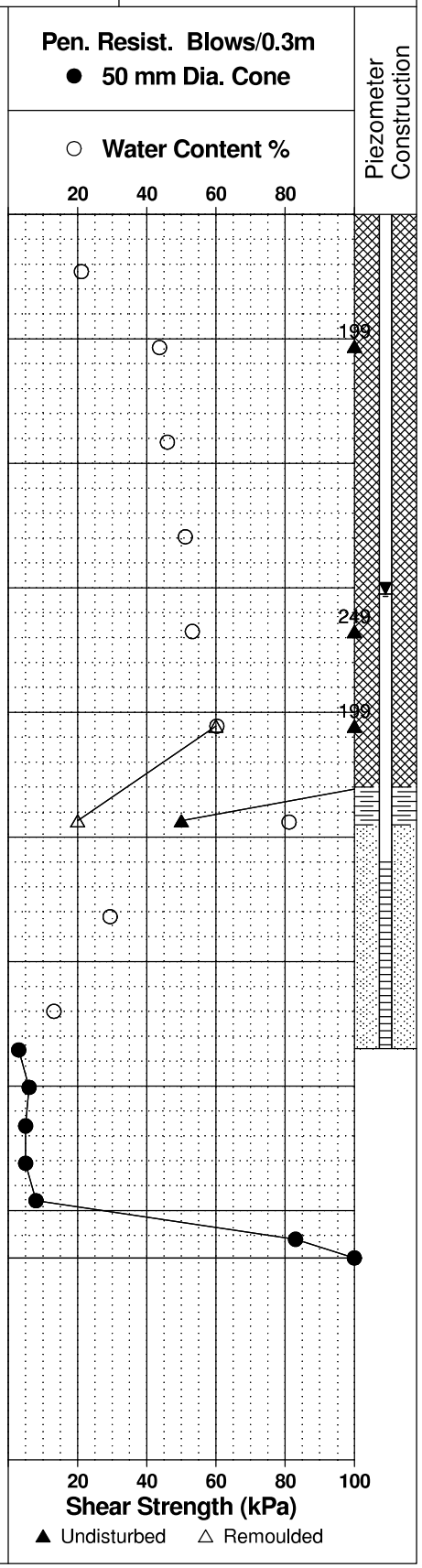
FILE NO. PG6331

HOLE NO. BH21-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	86.35
FILL: Brown silty clay with sand and organics 0.10		AU	1				
FILL: Brown silty clay with sand, trace crushed stone and gravel 0.69		SS	2	100	P	1	85.35
		SS	3	100	13	2	84.35
Hard to very stiff, brown **SILTY CLAY**		SS	4	100	10		
- some sand seams from 0.7 to 1.4m depth		SS	5	100	P	3	83.35
		SS	6	100	P	4	82.35
- stiff and grey by 4.5m depth		SS	7	100	P	5	81.35
5.26							
Compact, grey **SILTY SAND,** trace gravel		SS	8	63	13	6	80.35
6.02							
GLACIAL TILL: Very loose, grey silty sand to sandy silt with clay, trace gravel		SS	9	100	2	7	79.35
6.71							
Dynamic Cone Penetration Test commenced at 6.71m depth.						8	78.35
8.38							
End of Borehole Practical DCPT refusal at 8.38m depth. (GWL @ 3.05m - Nov. 18, 2022)							



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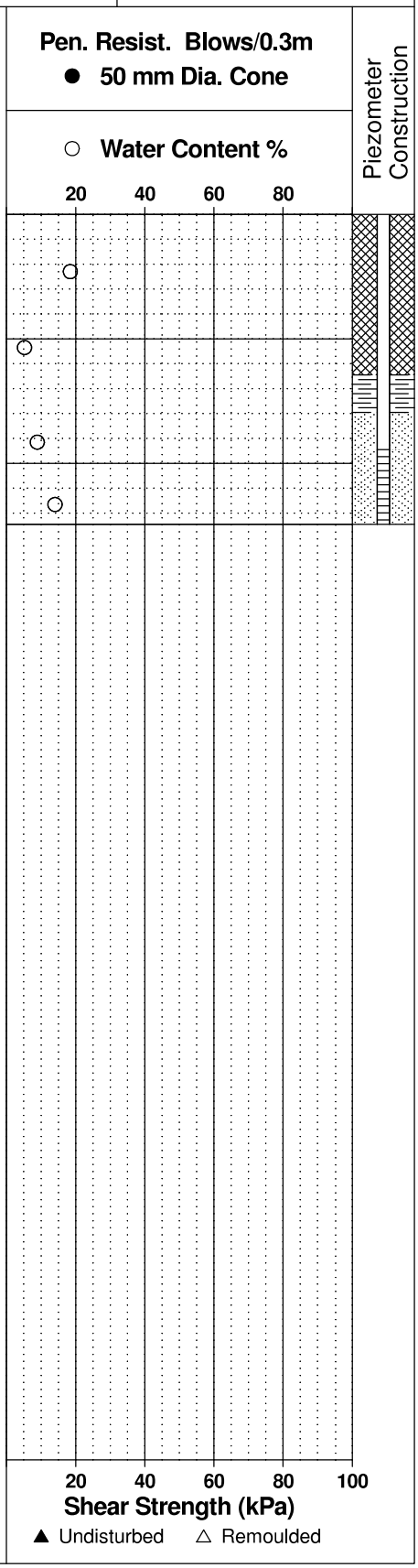
FILE NO. PG6331

HOLE NO. BH22-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	87.59
FILL: Brown silty sand with organics 0.10		AU	1				
FILL: Brown silty sand with gravel, trace concrete 0.69							
Compact, reddish brown **SILTY SAND,** trace gravel		SS	2	0	19	1	86.59
- light brown by 1.4m depth		SS	3	67	20	2	85.59
2.21							
GLACIAL TILL: Very dense, brown to grey silty sand, trace gravel 2.49		SS	4	100	50+		
End of Borehole							
Practical refusal to augering at 2.49m depth.							
(BH dry - November 18, 2022)							



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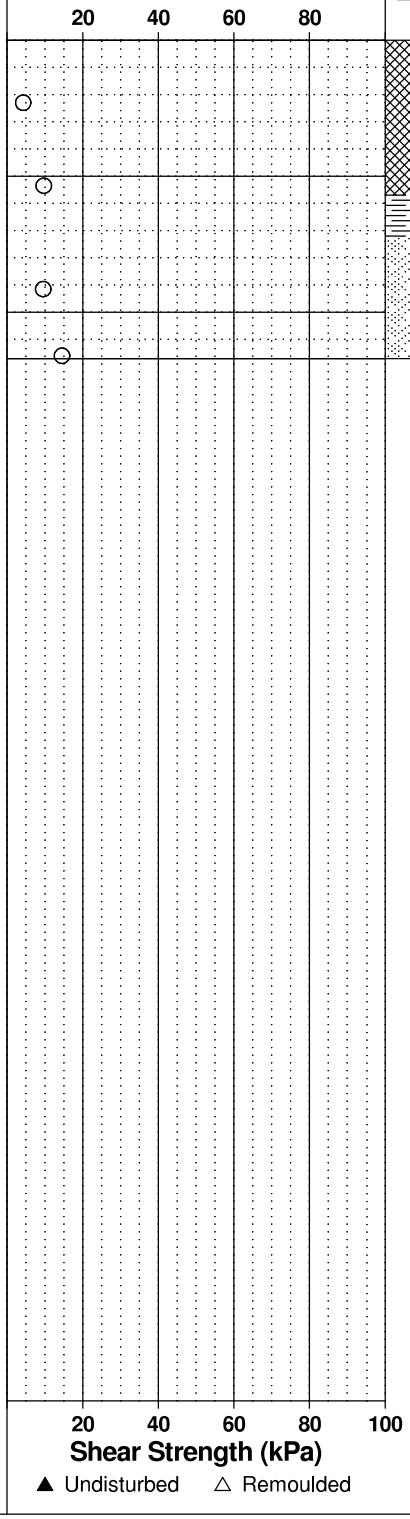
FILE NO. PG6331

HOLE NO. BH23-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	87.88
Asphaltic concrete 0.05							
FILL: Brown silty sand, trace gravel 0.69		AU	1				
FILL: Reddish brown silty sand, trace clay and gravel 1.45		SS	2	71	10	1	86.88
Compact, light brown **SILTY SAND**		SS	3	83	19		
- very dense and brown to grey by 2.2m depth 2.34		SS	4	100	50+	2	85.88
End of Borehole							
Practical refusal to augering at 2.34m depth.							
(BH dry - November 18, 2022)							

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



Piezometer Construction

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BORINGS BY Track-Mount Power Auger **DATE** October 31, 2022

FILE NO. PG6331

HOLE NO. BH24-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.34
FILL: Brown silty sand with organics		AU	1				
0.10							
FILL: Brown silty sand, trace gravel and concrete							
0.69		SS	2	79	5	1	87.34
FILL: Brown silty sand, some gravel, trace organics		SS	3	58	5	2	86.34
2.21							
FILL: Brown to grey silty sand with rock fragments		SS	4	36	50+		
2.82							
End of Borehole							
Practical refusal to augering at 2.82m depth.							
(BH dry - November 18, 2022)							

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

20 40 60 80

Piezometer Construction

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

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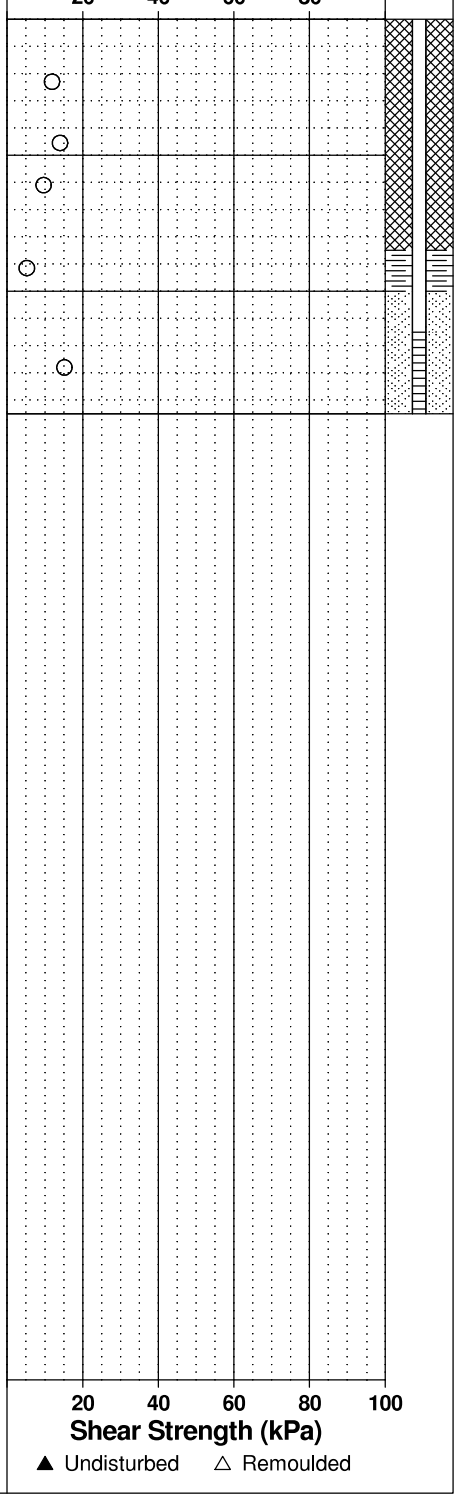
FILE NO. PG6331

HOLE NO. BH25-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	89.17
FILL: Brown silty sand with organics, trace rock (0.10)		AU	1				
FILL: Brown silty sand with gravel, trace brick fragments (1.24)		SS	2	63	6	1	88.17
Loose to compact, reddish brown to light brown **SILTY SAND** (2.21)		SS	3	83	30	2	87.17
GLACIAL TILL: Compact, brown silty sand to sandy silt with gravel, cobbles and boulders - grey by 2.7m depth (2.90)		SS	4	71	30		
End of Borehole							

Practical refusal to augering at 2.90m depth.

(BH dry - November 18, 2022)



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BORINGS BY Track-Mount Power Auger **DATE** October 31, 2022

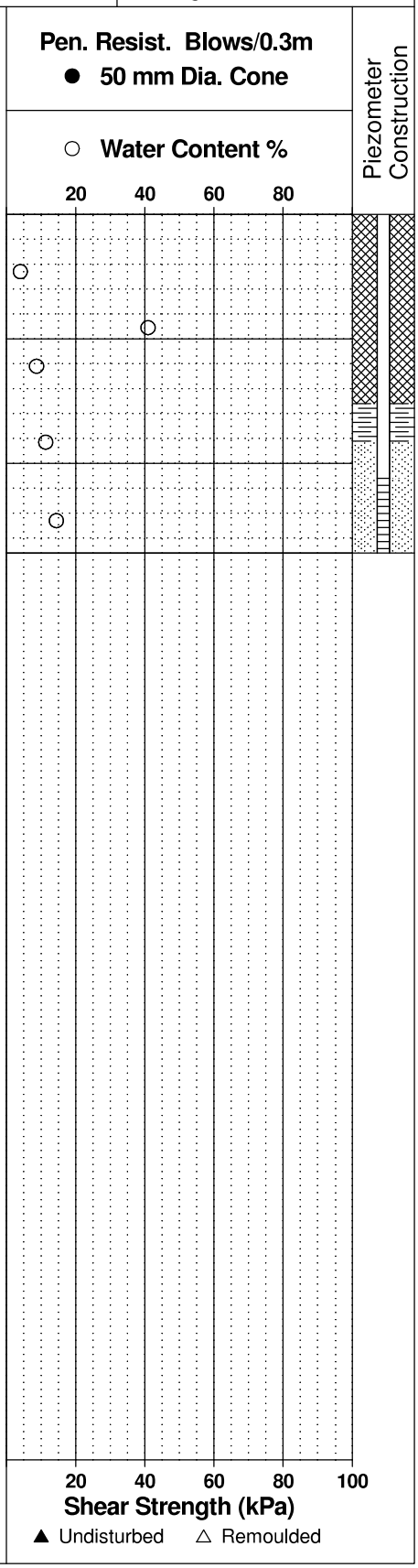
FILE NO. PG6331

HOLE NO. BH26-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08						0	87.96
FILL: Brown silty sand, trace gravel 0.69		AU	1				
FILL: Brown silty clay with sand, trace organics 1.07		SS	2	67	14	1	86.96
Compact, brown **SILTY SAND,** some gravel		SS	3	67	17	2	85.96
2.36							
Compact, grey **SILTY SAND to SANDY SILT,** trace gravel 2.72		SS	4	69	50+		
End of Borehole							

Practical refusal to augering at 2.72m depth.

(BH dry - November 18, 2022)



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BORINGS BY Track-Mount Power Auger **DATE** October 31, 2022

FILE NO. PG6331

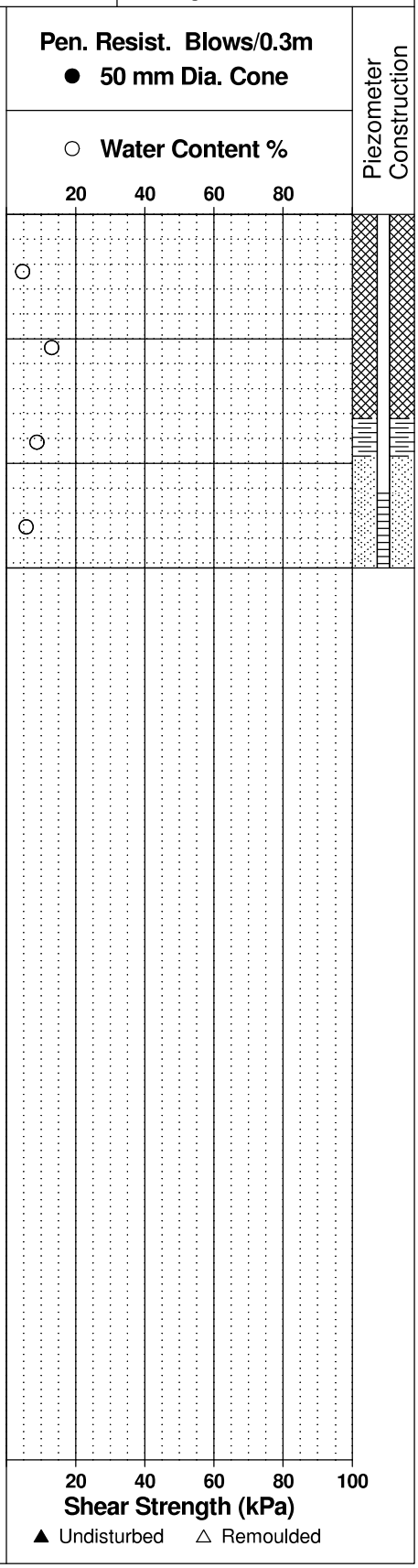
HOLE NO. BH28-22

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							0	88.17
FILL: Brown silty sand with crushed stone	0.13		AU	1				
- trace gravel by 0.7m depth	0.69							
FILL: Brown silty sand with crushed stone, trace gravel			SS	2	54	7	1	87.17
FILL: Brown silty sand, trace gravel and organics	1.45							
TOPSOIL	1.68		SS	3	100	20		
Compact to very dense, grey **SILTY SAND,** some gravel			SS	4	82	50+	2	86.17
	2.84							

End of Borehole

Practical refusal to augering at 2.84m depth.

(BH dry - November 18, 2022)



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BORINGS BY Track-Mount Power Auger **DATE** November 1, 2022

FILE NO. PG6331

HOLE NO. BH29-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	83.17
TOPSOIL 0.20							
FILL: Brown silty clay, some sand, trace gravel and topsoil		AU	1				
1.12		SS	2	88	4	1	82.17
Hard to very stiff, brown **SILTY CLAY**		SS	3	100	P	2	81.17
2.44		SS	4	100	P		
GLACIAL TILL: Loose, brown silty sand to sandy silt with clay, some gravel, cobbles		SS	5	58	5	3	80.17
3.73		SS	6	38	6	4	79.17
GLACIAL TILL: Loose, grey silty sand, some gravel 4.50							
GLACIAL TILL: Compact, grey silty sand to sandy silt, some to trace clay and gravel		SS	7	100	6	5	78.17
		SS	8	100	21		
6.02						6	77.17
GLACIAL TILL: Very dense, dark grey silty sand to sandy silt with gravel, cobbles and boulders, trace clay 6.60		SS	9	100	50+		
End of Borehole							

Practical refusal to augering at 6.60m depth.

(GWL @ 1.90m - Nov. 18, 2022)

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

20 40 60 80

Piezometer Construction

249

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

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

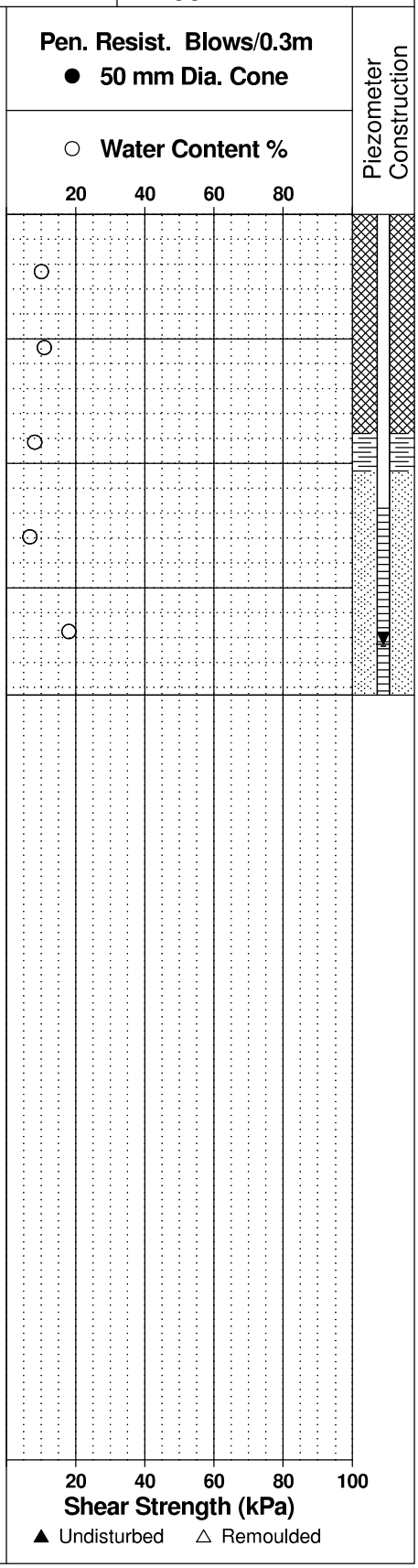
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** November 7, 2022

FILE NO. PG6331

HOLE NO. BH53-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.05						0	87.50
FILL: Brown silty sand with crushed stone 0.69		AU	1				
FILL: Brown silty sand, trace clay and gravel 1.45		SS	2	58	13	1	86.50
Compact to dense, reddish brown **SILTY SAND,** some gravel		SS	3	58	25	2	85.50
		SS	4	63	35		
2.97						3	84.50
Compact, grey **SILTY SAND** with gravel		SS	5	50	19		
3.86		SS	6	0	50+		
End of Borehole							
Practical refusal to augering at 3.86m depth.							
(GWL @ 3.45m - Nov. 18, 2022)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

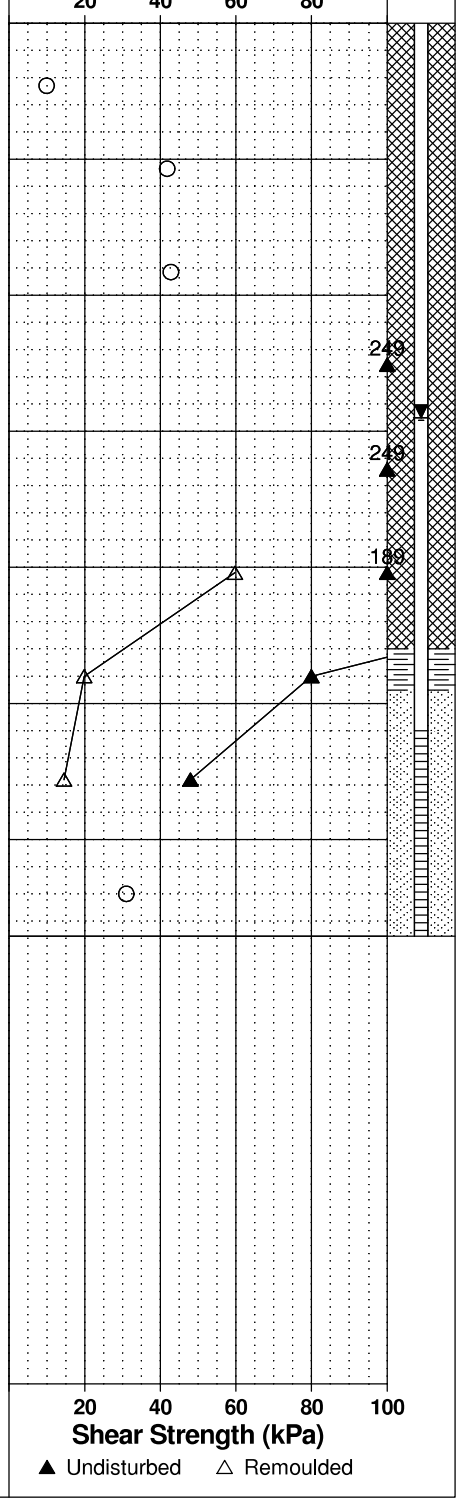
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** November 9, 2022

FILE NO. PG6331

HOLE NO. BH62-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.57
Asphaltic concrete 0.05							
FILL: Brown silty sand with crushed stone 0.69		AU	1				
		SS	2	75	11	1	84.57
		SS	3	100	15	2	83.57
Hard to very stiff, brown **SILTY CLAY**						3	82.57
4.40						4	81.57
Stiff to firm, grey **SILTY CLAY**						5	80.57
6.02						6	79.57
GLACIAL TILL: Compact, grey silty sand to sandy silt, some gravel, trace clay 6.71		SS	4	42	6		
End of Borehole							
(GWL @ 2.90m - Nov. 18, 2022)							



SOIL PROFILE AND TEST DATA

GEOTECHNICAL INVESTIGATION

Wateridge Village Phases 6, 7, 8, Ottawa, Ontario

DATUM: Geodetic **EASTING:** 372492.468 **NORTHING:** 5035465.044 **ELEVATION:** 83.4 m

PROJECT: Proposed Residential Development

BORINGS BY: Excavator

REMARKS:

DATE: December 21, 2023

FILE NO. PG6331

HOLE NO. TP 6-23

SAMPLE DESCRIPTION	STRATA PLOT	Sample No.	SAMPLE % RECOVERY	N VALUE or RQD	WATER CONTENT %	DEPTH (m)	Remoulded Shear Strength (kPa) 0 50 100	Peak Shear Strength (kPa) 0 50 100	Pen. Resist. Blows/0.3m (50 mm Dia. Cone) 0 50 100	Piezometer Construction
Ground Surface EL 83.4 m										
FILL: Brown silty sand with topsoil, organics and crushed stones		G 1				0				
0.9 m EL 82.5 m		G 2								
Stiff to hard, brown **SILTY CLAY**, some sand, trace gravel		G 3				1		(150) (260)		
1.3 m EL 82.1 m										
End of Test Pit Practical refusal to excavation on bedrock at 1.30 m depth (Some groundwater infiltration at the bottom of test pit)						2				
						3				
						4				
						5				
						6				

SOIL PROFILE AND TEST DATA

GEOTECHNICAL INVESTIGATION

Wateridge Village Phases 6, 7, 8, Ottawa, Ontario

DATUM: Geodetic **EASTING:** 372434.606 **NORTHING:** 5035465.938 **ELEVATION:** 82.35 m

PROJECT: Proposed Residential Development

BORINGS BY: Excavator

REMARKS:

DATE: December 21, 2023

FILE NO. PG6331

HOLE NO. TP 7-23

SAMPLE DESCRIPTION	STRATA PLOT	Sample No.	SAMPLE % RECOVERY	N VALUE or RQD	WATER CONTENT %	DEPTH (m)	Remoulded Shear Strength (kPa) 0 50 100	Peak Shear Strength (kPa) 0 50 100	Pen. Resist. Blows/0.3m (50 mm Dia. Cone) 0 50 100	Piezometer Construction
Ground Surface EL 82.35 m										
TOPSOIL 0.4 m EL 81.95 m						0				
Hard, grey **SILTY CLAY**, trace gravel		G 1				1		(260)		
- occasional cobbles by 1.7 m depth						1		(260)		
		G 2				2				
3.5 m EL 78.85 m						3				
End of Test Pit						4				
Practical refusal to excavation on bedrock at 3.50 m depth						5				
(Some groundwater infiltration at 3.0 m depth upon completion)						6				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

Wateridge Village – Phases 6 and 7, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 372423.64 **NORTHING:** 5035669.29 **ELEVATION:** 59.40

PROJECT: Proposed Residential Development

ADVANCED BY: Hand Auger

REMARKS:

DATE: June 20, 2025

FILE NO. : PG6331

HOLE NO. : HA 7-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE: TYPE AND NO.	SAMPLE: RECOVERY (%)	SAMPLE: N OR RQD	SAMPLE: WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / △ REMOULDED SHEAR STRENGTH (kPa) / ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
Brown **SILTY SAND** with gravel									
0.20m [59.20m]									
End of Hand Auger Hole Practical refusal to hand augering at 0.20 m depth on bedrock		1							59

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

Wateridge Village – Phases 6 and 7, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 372435.52 **NORTHING:** 5035554.61 **ELEVATION:** 80.63

PROJECT: Proposed Residential Development

ADVANCED BY: Hand Auger

REMARKS:

DATE: June 20, 2025

FILE NO. : PG6331

HOLE NO. : HA 8-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE: TYPE AND NO.	SAMPLE: RECOVERY (%)	SAMPLE: N OR RQD	SAMPLE: WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / △ REMOULDED SHEAR STRENGTH (kPa) / ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
Brown **SILTY SAND** with gravel									
0.15m [80.48m]									
End of Hand Auger Hole Practical refusal to hand augering at 0.15 m depth on bedrock		1							80

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

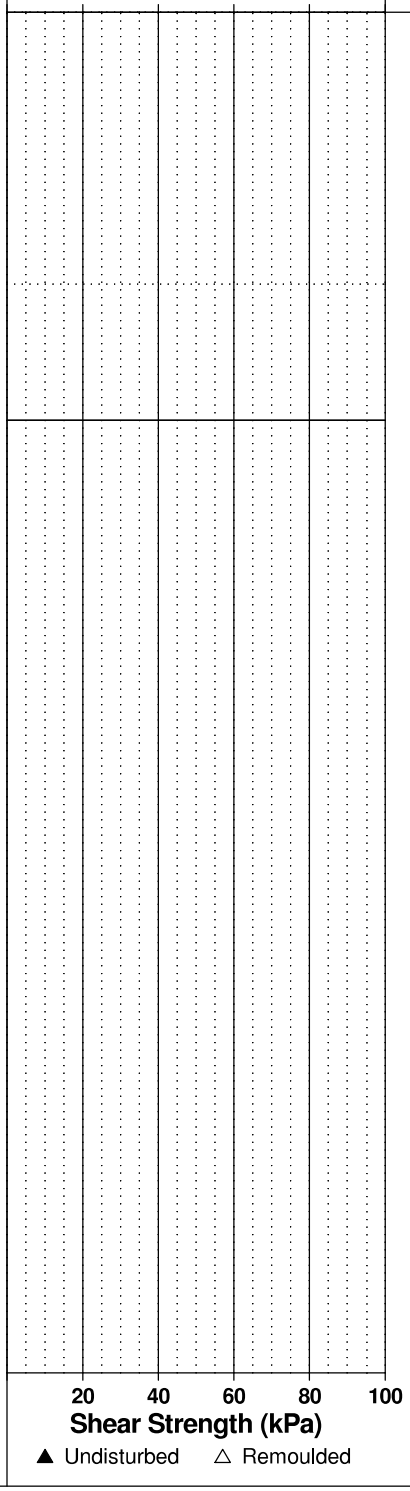
REMARKS

BORINGS BY Hand Auger DATE October 14, 2022

FILE NO. PG6331

HOLE NO. HA 4-22

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	78.33		
Dark brown **SILTY SAND** with organics and gravel - with rock fragments by 0.15m depth		AU	1						
0.30									
End of Hand Auger Hole Practical refusal to hand augering on inferred bedrock at 0.30m depth.									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger **DATE** October 14, 2022

FILE NO. PG6331

HOLE NO. HA 5-22

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	85.93	20 40 60 80	
Brown **SILTY SAND** with gravel and rock fragments									
0.46									
End of Hand Auger Hole Practical refusal to hand augering on inferred bedrock at 0.46m depth.									

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

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

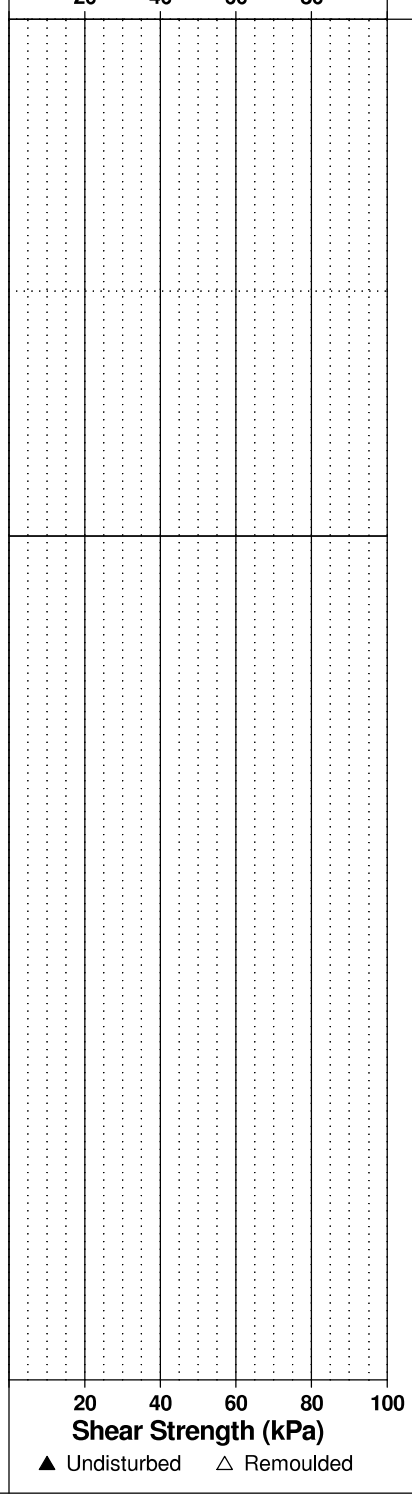
REMARKS

BORINGS BY Hand Auger DATE October 13, 2022

FILE NO. PG6331

HOLE NO. HA 6-22

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	59.47		
TOPSOIL		G	1						
0.25									
Brown **SILTY SAND** with gravel and rock fragments									
0.38									
End of Hand Auger Hole Practical refusal to hand augering on inferred bedrock at 0.38m depth.									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger **DATE** October 12, 2022

FILE NO. PG6331

HOLE NO. HA 7-22

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	84.36		
Dark brown **SILTY SAND** with organics		G	1						
0.41									
End of Hand Auger Hole Practical refusal to hand augering on inferred bedrock at 0.41m depth.									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger

DATE October 13, 2022

FILE NO. PG6331

HOLE NO. HA 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	56.58		
TOPSOIL		G	1						
0.20									
Brown **SILTY CLAY** with sand, gravel and rock fragments		G	2						
0.38									
End of Hand Auger Hole Practical refusal to hand augering on inferred bedrock at 0.38m depth.									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

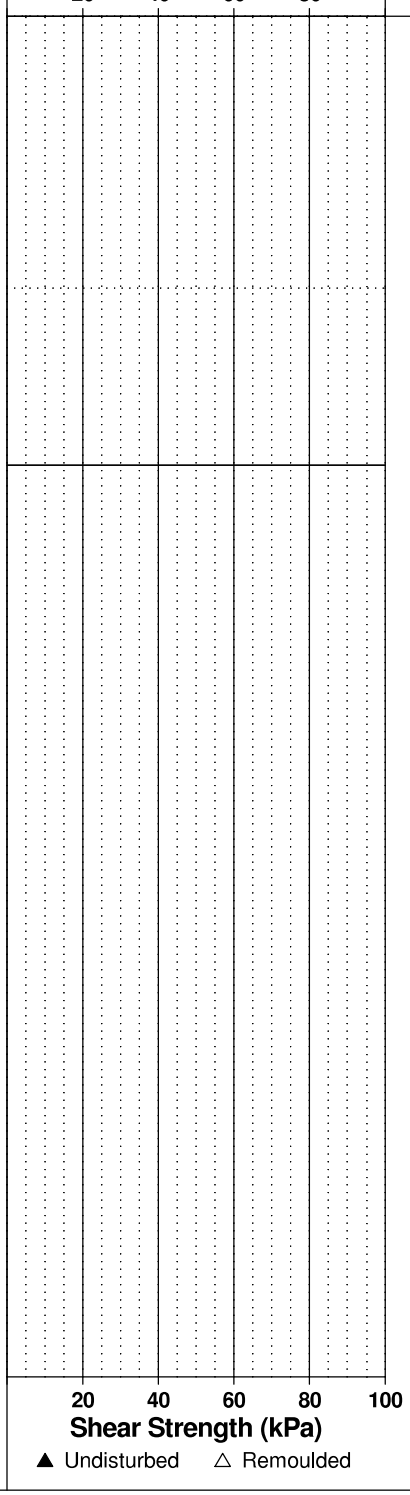
REMARKS

BORINGS BY Hand Auger DATE October 12, 2022

FILE NO. PG6331

HOLE NO. HA 9-22

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	86.76		
TOPSOIL		G	1						
0.28									
Brown **SILTY SAND** with gravel									
0.33									
End of Hand Auger Hole Practical refusal to hand augering on inferred bedrock at 0.33m depth.									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

REMARKS

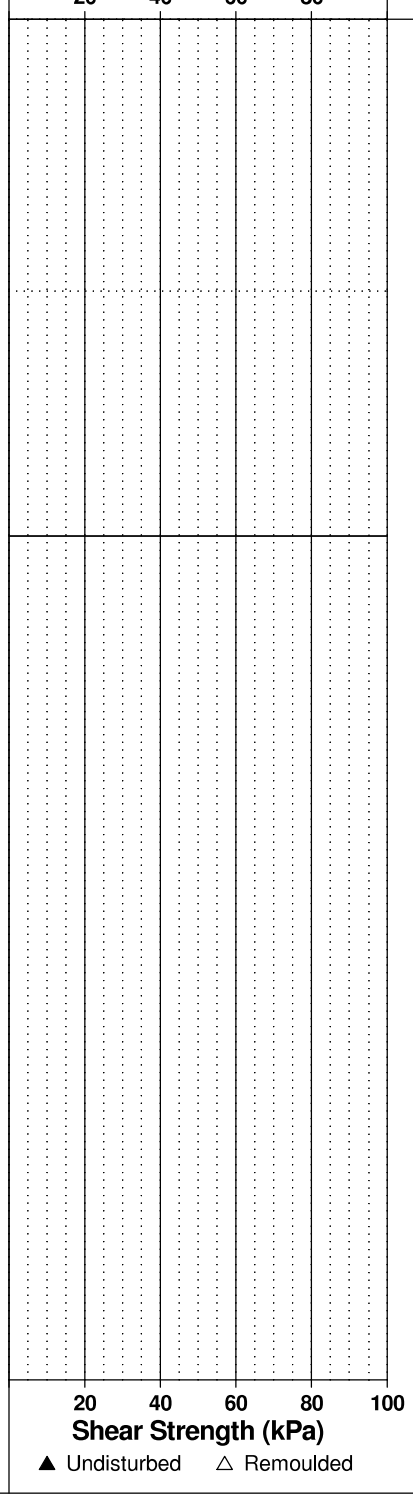
BORINGS BY Hand Auger

DATE October 13, 2022

FILE NO. PG6331

HOLE NO. HA10-22

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	57.95		
TOPSOIL		G	1						
0.23									
Brown **SILTY SAND** with gravel and rock fragments									
0.38									
End of Hand Auger Hole Practical refusal to hand augering on inferred bedrock at 0.38m depth.									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger

DATE October 12, 2022

FILE NO. PG6331

HOLE NO. HA11-22

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	86.86		
TOPSOIL									
0.15									
Brown SILTY CLAY		G	1						
0.30									
End of Hand Auger Hole									
Practical refusal to hand augering on inferred bedrock at 0.30m depth.									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Wateridge Village Phases 6, 7 & 8
Ottawa, Ontario

DATUM Geodetic

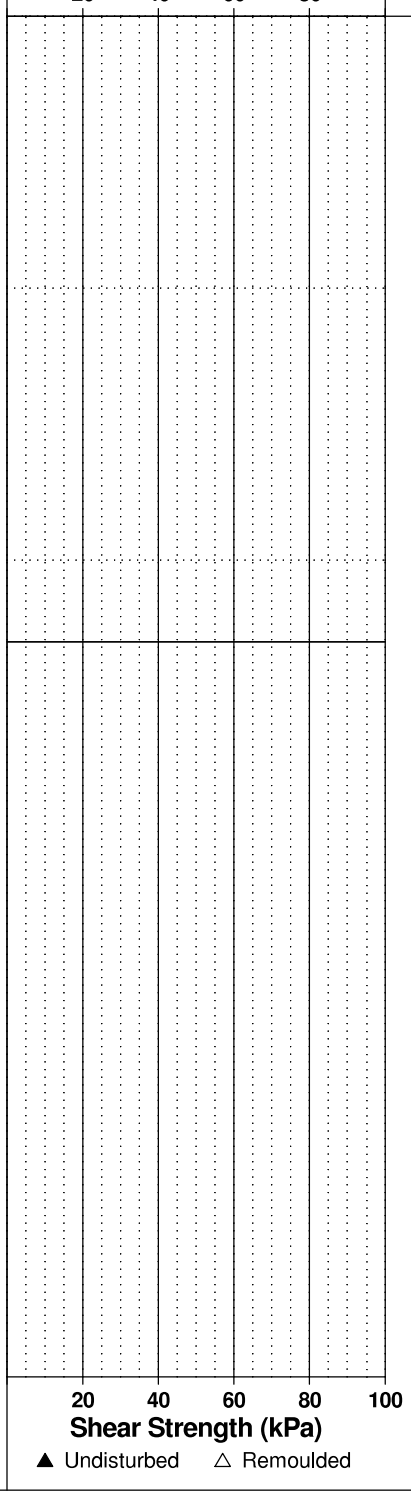
REMARKS

BORINGS BY Hand Auger **DATE** October 13, 2022

FILE NO. PG6331

HOLE NO. HA12-22

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	55.82		
TOPSOIL		G	1						
0.25									
Brown **SILTY CLAY** with sand, gravel and rock fragments		G	2						
0.46									
End of Hand Auger Hole Practical refusal to hand augering on inferred bedrock at 0.46m depth.									



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

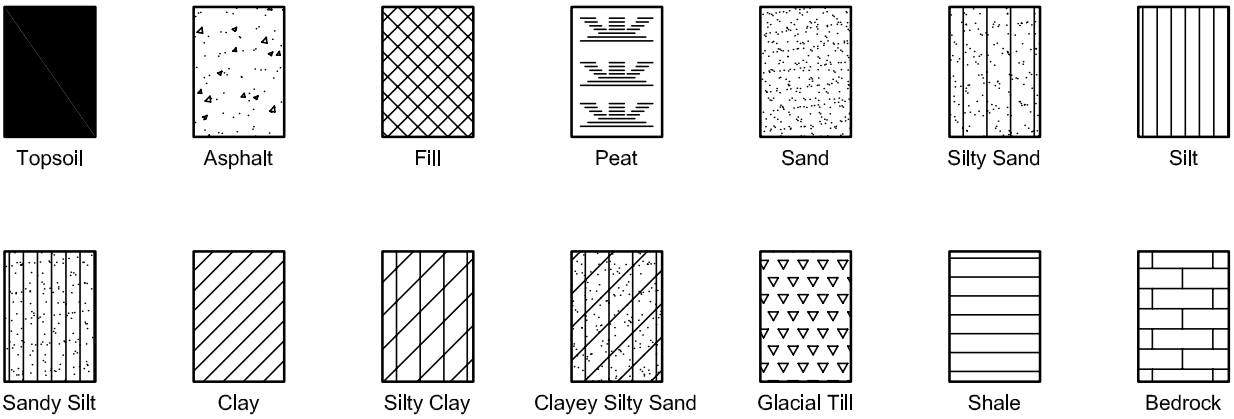
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

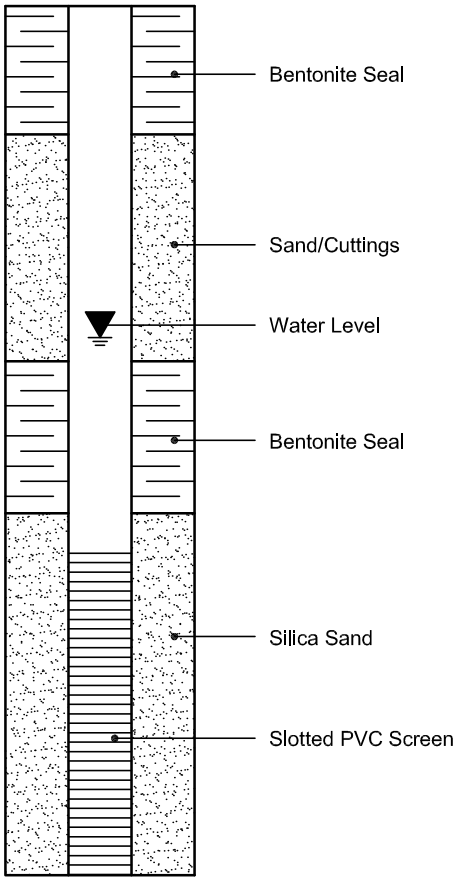
SYMBOLS AND TERMS (continued)

STRATA PLOT

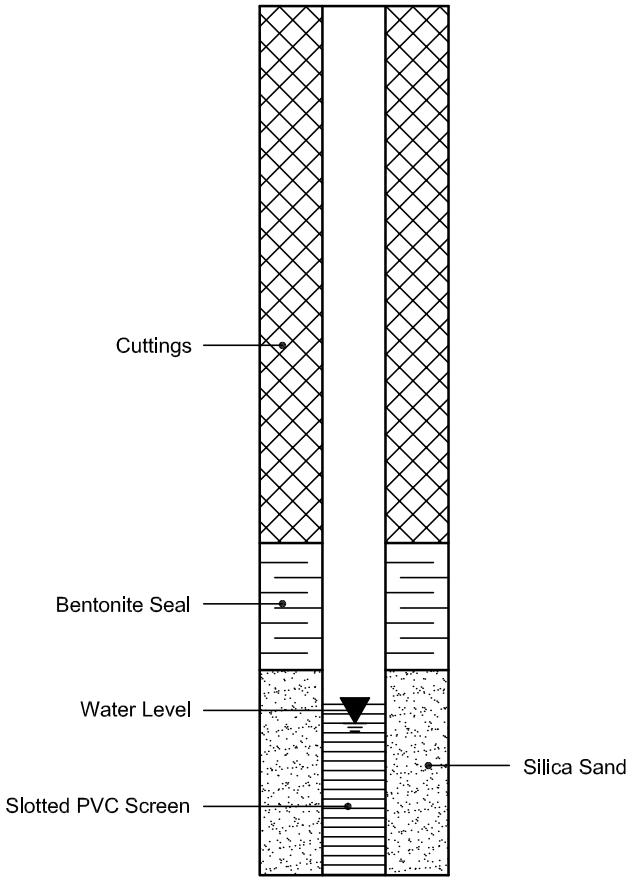


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



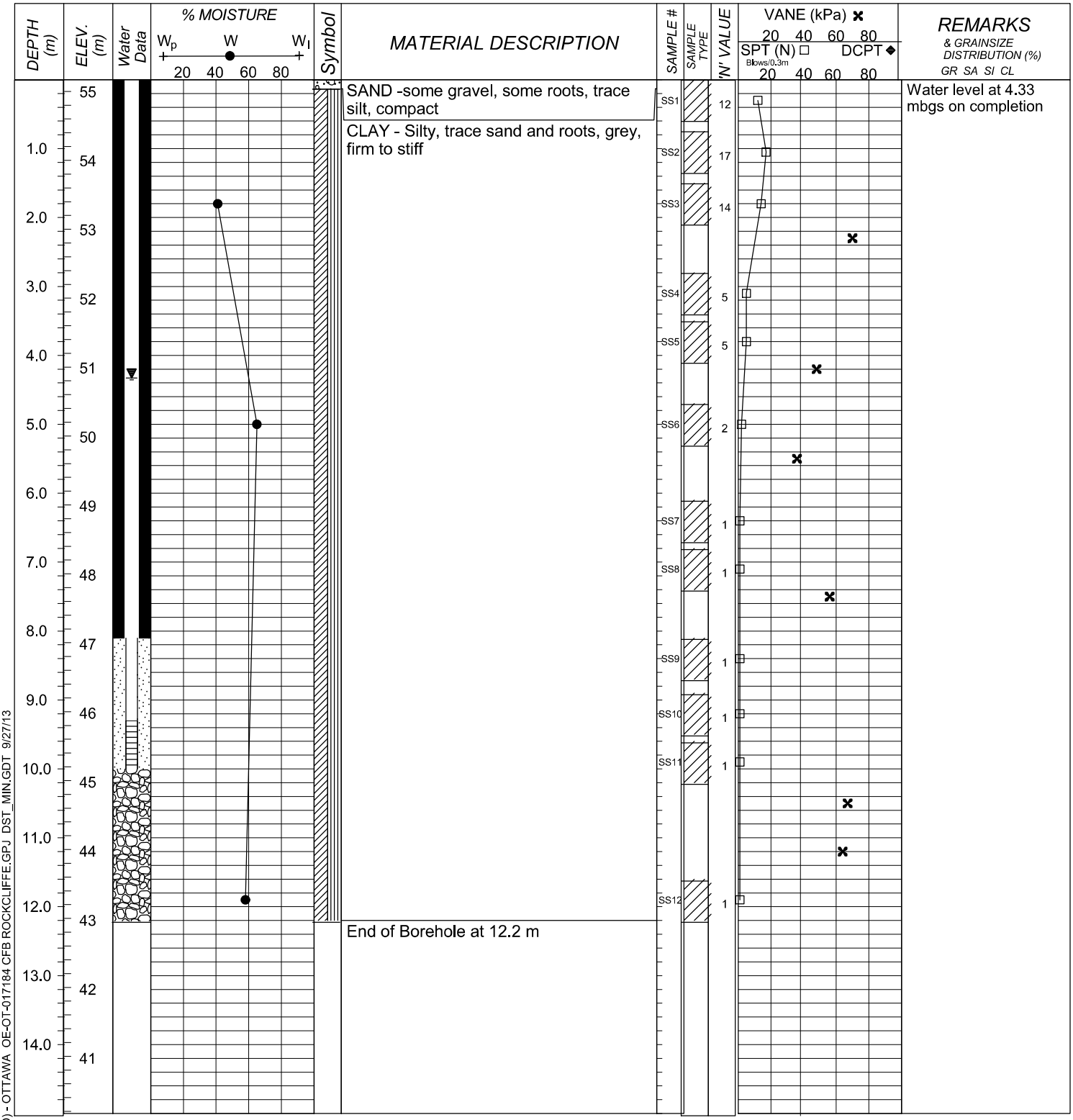
PIEZOMETER CONSTRUCTION



LOG OF BOREHOLE BH13-15

DST REF. No.: **OE-OT-017184**
CLIENT: **Canada Lands Company (CLC)**
PROJECT: **Stormwater Management Plan**
LOCATION: **Former CFB Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **55.17 metres**

Drilling Data
METHOD: **Hollow Stem Auger**
DIAMETER: **80 mm ID**
DATE: **August 26, 2013**
COORDINATES: **5034106.6** m N, **450485.3** m E



DST consulting engineers

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Web: www.dstgroup.com

SAMPLE TYPE LEGEND

Auger Sample
Split Spoon Sample
Bulk Sample
Rock Core
Hiller Peat Sampler
70mm Thin Wall Tube
Bentonite
Sand

ENCLOSURE 6

BOREHOLE (STANDARD) - OTTAWA OE-OT-017184 CFB ROCKCLIFFE.GPJ DST_MIN.GDT 9/27/13

LOG OF TESTPIT TP13-18

DST REF. No.: **OE-OT-017184**
CLIENT: **Canada Lands Company (CLC)**
PROJECT: **Stormwater Management Plan**
LOCATION: **Former CFB Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **58.57 metres**

Testpit Data
METHOD: **Excavator**
DATE: **8/21/2013**
COORDINATES: **5034065.5** m N, **450361.1** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE W_p W W_l (20 40 60 80)	Symbol	MATERIAL DESCRIPTION	DEPTH(m)	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ (20 40 60 80) / CPT (kPa) ◆ (300 600 900 1200)	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0					ORGANICS - Grass and Roots					
0.2					FILL - SAND & GRAVEL - some boulders, bricks and asphalt					
0.4										
0.6	58				End of Testpit at 0.6 m					
0.8										
1.0						1				
1.2										
1.4										
1.6	57									
1.8										
2.0						2				
2.2										
2.4										
2.6	56									
2.8										
3.0						3				
3.2										
3.4										
3.6	55									
3.8										
4.0						4				
4.2										
4.4										
4.6	54									
4.8										

TESTPIT (STANDARD) - OTTAWA OE-OT-017184 CFB ROCKCLIFFE.GPJ DST_MIN.GDT 10/17/13

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SAMPLE TYPE LEGEND

Bulk Sample

ENCLOSURE 18

LOG OF TESTPIT TP13-19

DST REF. No.: **OE-OT-017184**
CLIENT: **Canada Lands Company (CLC)**
PROJECT: **Stormwater Management Plan**
LOCATION: **Former CFB Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **59.01 metres**

Testpit Data
METHOD: **Excavator**
DATE: **8/21/2013**
COORDINATES: **5034020.7** m N, **450410.7** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE W_p W W_l (20 40 60 80)	Symbol	MATERIAL DESCRIPTION	DEPTH(m)	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ (20 40 60 80) / CPT (kPa) ◆ (300 600 900 1200)	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0					ORGANICS - Grass and Roots					
0.2					FILL - SAND & GRAVEL - trace roots, boulders					
0.4										
0.6					- asphalt and concrete					
0.8										
1.0	58				- concrete with pipe	1				
1.2										
1.4										
1.6					- concrete, asphalt and bricks					
1.8										
2.0	57					2				
2.2					FILL - SAND - some silt, trace gravel					
2.4										
2.6										
2.8					- steel					
3.0	56				End of Testpit at 3.0 m	3				
3.2										
3.4										
3.6										
3.8										
4.0	55					4				
4.2										
4.4										
4.6										
4.8										

TESTPIT (STANDARD) - OTTAWA OE-OT-017184 CFB ROCKCLIFFE.GPJ DST_MIN.GDT 10/17/13

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SAMPLE TYPE LEGEND

Bulk Sample

ENCLOSURE 19

LOG OF TESTPIT TP13-20

DST REF. No.: **OE-OT-017184**
CLIENT: **Canada Lands Company (CLC)**
PROJECT: **Stormwater Management Plan**
LOCATION: **Former CFB Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **57.6 metres**

Testpit Data
METHOD: **Excavator**
DATE: **8/21/2013**
COORDINATES: **5034038.8** m N, **450438.6** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE W_p W W_l (20 40 60 80)	Symbol	MATERIAL DESCRIPTION	DEPTH(m)	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80 / CPT (kPa) ◆ 300 600 900 1200	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0					ORGANICS - Grass and Roots					
0.2					FILL - SAND & GRAVEL - trace roots, boulders, brown					
0.4										
0.6	57				FILL - SAND - some silt, trace gravel and clay					
0.8										
1.0						1				
1.2					- white powder					
1.4										
1.6	56				- steel, white powder					
1.8					CLAY - Silty					
2.0						2				
2.2										
2.4										
2.6	55									
2.8										
3.0					End of Testpit at 3.0 m	3				
3.2										
3.4										
3.6	54									
3.8										
4.0						4				
4.2										
4.4										
4.6	53									
4.8										

TESTPIT (STANDARD) - OTTAWA OE-OT-017184 CFB ROCKCLIFFE.GPJ DST_MIN.GDT 10/17/13

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SAMPLE TYPE LEGEND

Bulk Sample

ENCLOSURE 20

LOG OF TESTPIT TP13-21

DST REF. No.: **OE-OT-017184**
CLIENT: **Canada Lands Company (CLC)**
PROJECT: **Stormwater Management Plan**
LOCATION: **Former CFB Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **56.63 metres**

Testpit Data
METHOD: **Excavator**
DATE: **8/21/2013**
COORDINATES: **5034051.5** m N, **450458.5** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE W_p W W_l (20 40 60 80)	Symbol	MATERIAL DESCRIPTION	DEPTH(m)	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ (20 40 60 80) / CPT (kPa) ◆ (300 600 900 1200)	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0					ORGANICS - Grass and Topsoil					
0.2					FILL - SAND & GRAVEL - trace roots, brown					
0.4					FILL - SAND - trace silt, light brown					
0.6	56				SILT - Sandy, some gravel, brown					
0.8										
1.0						1				
1.2					CLAY - Silty					
1.4										
1.6	55									
1.8										
2.0						2				
2.2										
2.4					End of Testpit at 2.4 m					
2.6	54									
2.8										
3.0						3				
3.2										
3.4										
3.6	53									
3.8										
4.0						4				
4.2										
4.4										
4.6	52									
4.8										

TESTPIT (STANDARD) - OTTAWA OE-OT-017184 CFB ROCKCLIFFE.GPJ DST_MIN.GDT 10/17/13

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SAMPLE TYPE LEGEND

Bulk Sample

ENCLOSURE 21

LOG OF TESTPIT TP13-22

DST REF. No.: **OE-OT-017184**
CLIENT: **Canada Lands Company (CLC)**
PROJECT: **Stormwater Management Plan**
LOCATION: **Former CFB Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **55.97 metres**

Testpit Data
METHOD: **Excavator**
DATE: **8/21/2013**
COORDINATES: **5034067.9** m N, **450482.5** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE W_p W W_l (20 40 60 80)	Symbol	MATERIAL DESCRIPTION	DEPTH(m)	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80 / CPT (kPa) ◆ 300 600 900 1200	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0					ORGANICS - Grass and Topsoil					
0.2					FILL - SAND & GRAVEL - some cobbles, and asphalt					
0.4										
0.6										
0.8										
1.0	55				CONCRETE - 200 mm	1				
1.2					Two pipes inside concrete box					
1.4										
1.6										
1.8										
2.0	54				End of Testpit at 2.0 m	2				
2.2										
2.4										
2.6										
2.8										
3.0	53					3				
3.2										
3.4										
3.6										
3.8										
4.0	52					4				
4.2										
4.4										
4.6										
4.8										
	51									

TESTPIT (STANDARD) - OTTAWA OE-OT-017184 CFB ROCKCLIFFE.GPJ DST_MIN.GDT 10/17/13

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SAMPLE TYPE LEGEND

Bulk Sample

ENCLOSURE 22

LOG OF TESTPIT TP13-23

DST REF. No.: **OE-OT-017184**
CLIENT: **Canada Lands Company (CLC)**
PROJECT: **Stormwater Management Plan**
LOCATION: **Former CFB Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **56.4 metres**

Testpit Data
METHOD: **Excavator**
DATE: **8/21/2013**
COORDINATES: **5034089.7** m N, **450525** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE W_p W W_l (20 40 60 80)	Symbol	MATERIAL DESCRIPTION	DEPTH(m)	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80 / CPT (kPa) ◆ 300 600 900 1200	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0					ORGANICS - Grass and Topsoil					
0.2					FILL - SAND & GRAVEL - trace roots, light brown					
0.4	56									
0.6					ASPHALT - 220 mm					
0.8					FILL - SAND & GRAVEL - light grey					
1.0					ASPHALT - 102 mm	1				
1.2					FILL - SAND & GRAVEL - brown					
1.4	55				CONCRETE - 102 mm					
1.6					FILL - SAND - some gravel and silt, trace clay, brown					
1.8										
2.0						2				
2.2					PEAT - black					
2.4	54				CLAY - Silty					
2.6										
2.8										
3.0						3				
3.2										
3.4	53									
3.6					End of Testpit at 3.65 m					
3.8										
4.0						4				
4.2										
4.4	52									
4.6										
4.8										

TESTPIT (STANDARD) - OTTAWA OE-OT-017184 CFB ROCKCLIFFE.GPJ DST_MIN.GDT 10/17/13

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SAMPLE TYPE LEGEND

Bulk Sample

ENCLOSURE 23

LOG OF TESTPIT TP13-24

DST REF. No.: **OE-OT-017184**
CLIENT: **Canada Lands Company (CLC)**
PROJECT: **Stormwater Management Plan**
LOCATION: **Former CFB Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **56.99 metres**

Testpit Data
METHOD: **Excavator**
DATE: **8/21/2013**
COORDINATES: **5034100.1** m N, **450532.7** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE W_p W W_l (20 40 60 80)	Symbol	MATERIAL DESCRIPTION	DEPTH(m)	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ (20 40 60 80) / CPT (kPa) ◆ (300 600 900 1200)	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0					ORGANICS - Grass and Topsoil					
0.2					FILL - SAND & GRAVEL - with concrete, asphalt, brick, rebar and boulders					
0.4										
0.6										
0.8										
1.0	56					1				
1.2										
1.4										
1.6										
1.8					End of Testpit at 1.8 m					
2.0	55					2				
2.2										
2.4										
2.6										
2.8										
3.0	54					3				
3.2										
3.4										
3.6										
3.8										
4.0	53					4				
4.2										
4.4										
4.6										
4.8										

TESTPIT (STANDARD) - OTTAWA OE-OT-017184 CFB ROCKCLIFFE.GPJ DST_MIN.GDT 10/17/13

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SAMPLE TYPE LEGEND

Bulk Sample

ENCLOSURE 24

LOG OF TESTPIT TP13-25

DST REF. No.: **OE-OT-017184**
CLIENT: **Canada Lands Company (CLC)**
PROJECT: **Stormwater Management Plan**
LOCATION: **Former CFB Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **56.99 metres**

Testpit Data
METHOD: **Excavator**
DATE: **8/21/2013**
COORDINATES: **5034106.6** m N, **450509.9** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE W_p W W_l (20 40 60 80)	Symbol	MATERIAL DESCRIPTION	DEPTH(m)	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ (20 40 60 80) / CPT (kPa) ◆ (300 600 900 1200)	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0					ORGANICS - Grass and Topsoil					
0.2					FILL - SAND & GRAVEL - with concrete, asphalt, brick, rebar and boulders					
0.4										
0.6										
0.8										
1.0	56					1				
1.2										
1.4										
1.6										
1.8					End of Testpit at 1.8 m					
2.0	55					2				
2.2										
2.4										
2.6										
2.8										
3.0	54					3				
3.2										
3.4										
3.6										
3.8										
4.0	53					4				
4.2										
4.4										
4.6										
4.8										

TESTPIT (STANDARD) - OTTAWA OE-OT-017184 CFB ROCKCLIFFE.GPJ DST_MIN.GDT 10/17/13

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SAMPLE TYPE LEGEND

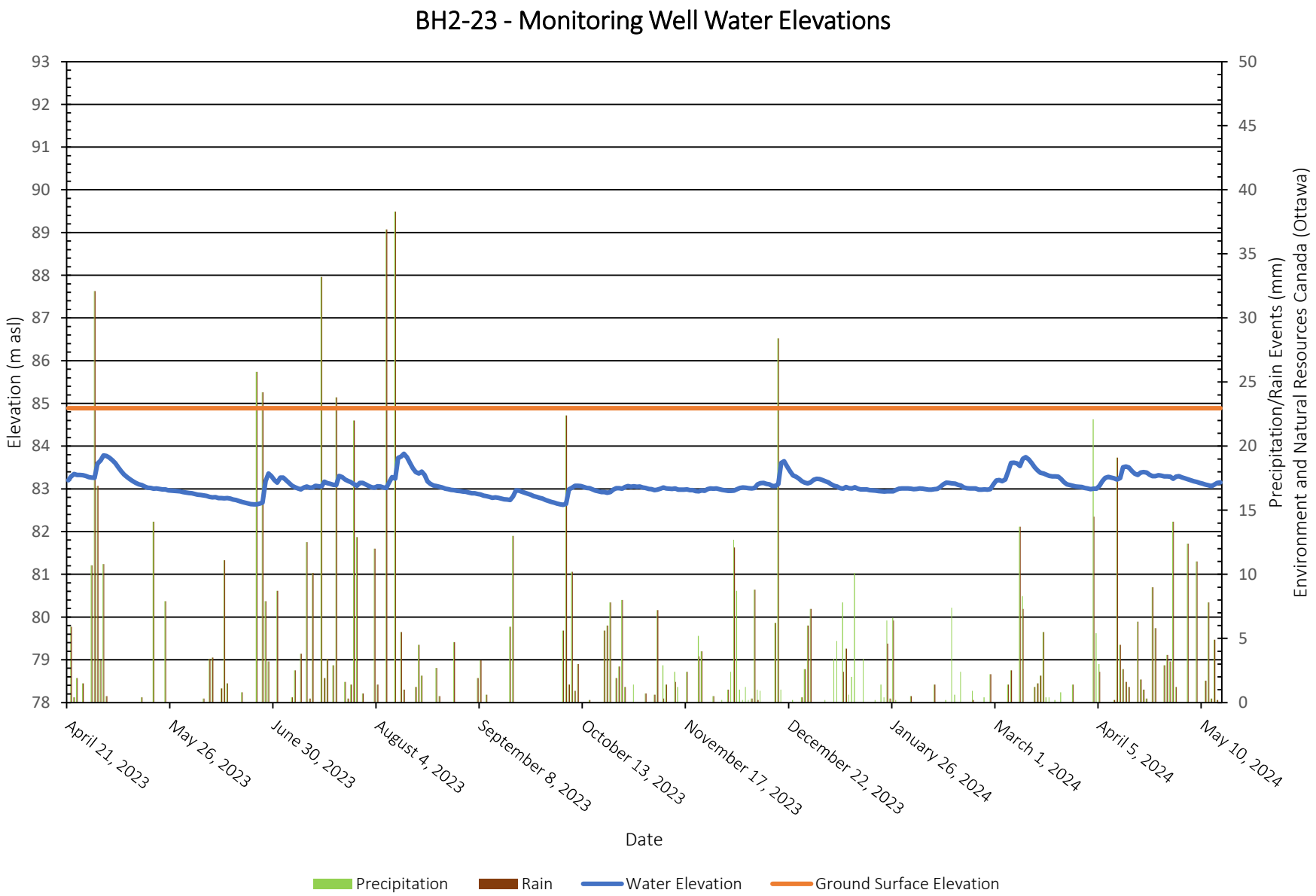
Bulk Sample

ENCLOSURE 25

	Client ID:	BH19-22-SS3	-	-	-	-	-
	Sample Date:	28-Oct-22 09:00	-	-	-	-	-
	Sample ID:	2245388-01	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	96.2	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.24	-	-	-	-	-
Resistivity	0.1 Ohm.m	212	-	-	-	-	-
Anions							
Chloride	5 ug/g	<5	-	-	-	-	-
Sulphate	5 ug/g	<5	-	-	-	-	-

File: PG6331

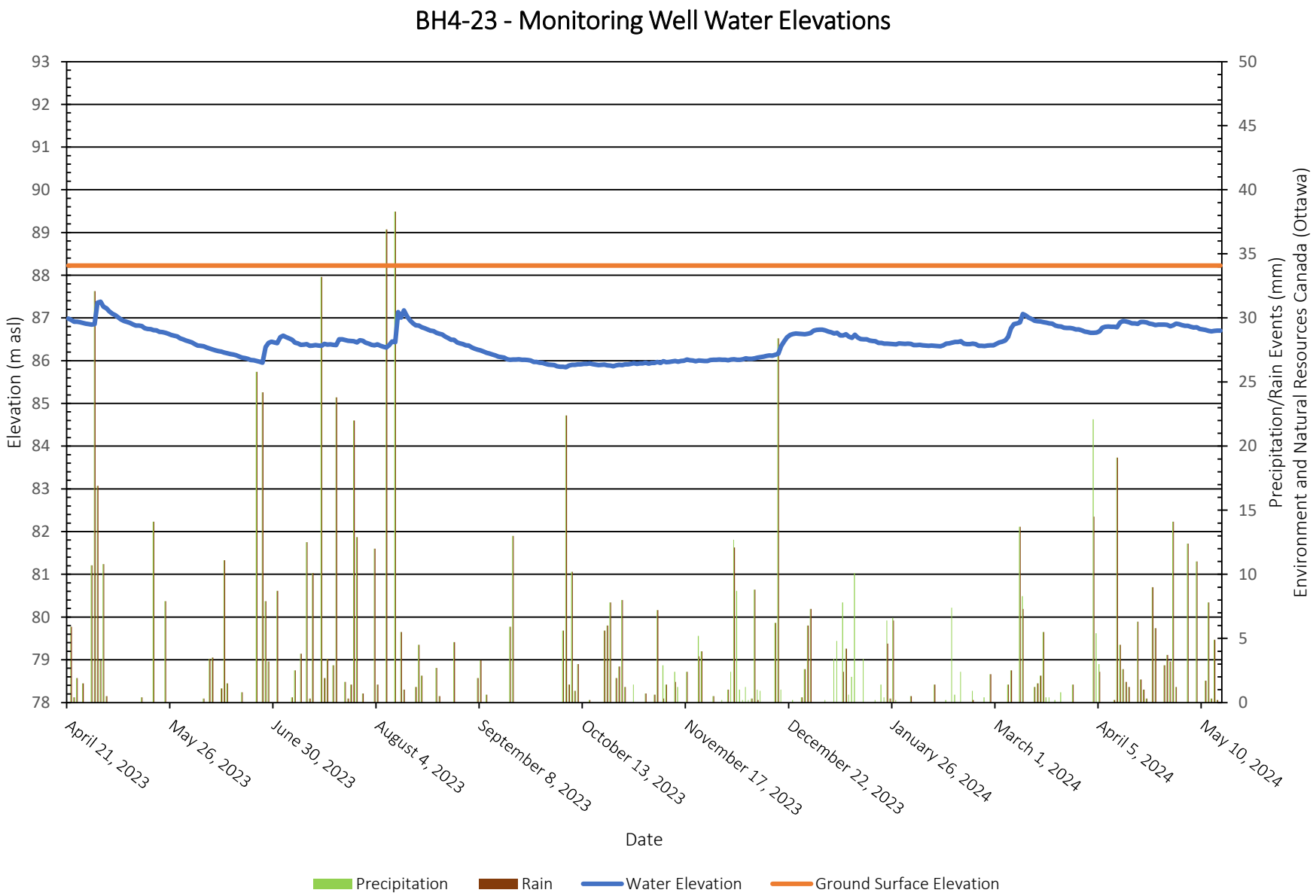
Canada Lands Company c/o IBI Group
Wateridge Village Phases 6,7 and 8
Monitoring Well Water Elevations



PATERSON GROUP

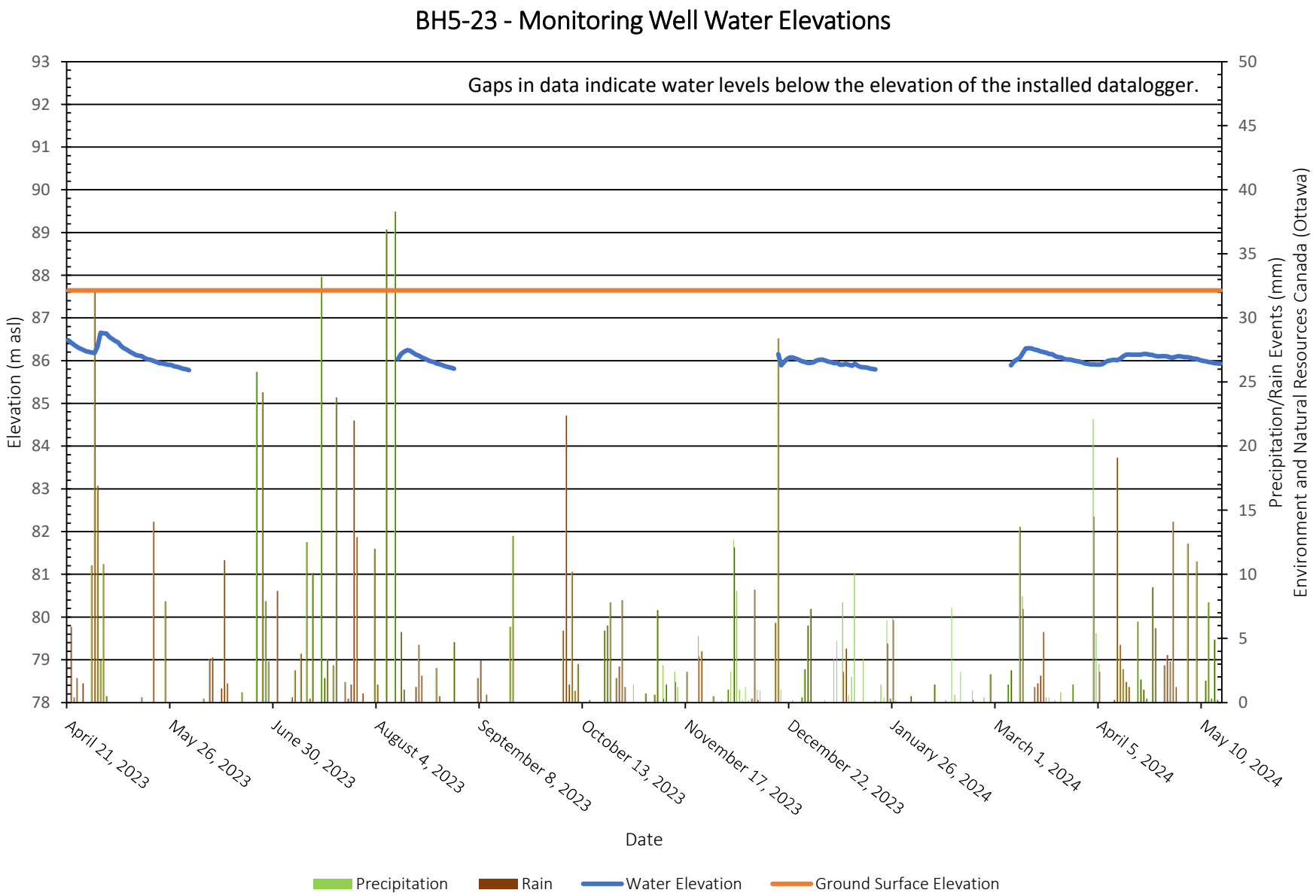
File: PG6331

Canada Lands Company c/o IBI Group
Wateridge Village Phases 6,7 and 8
Monitoring Well Water Elevations



PATERSON GROUP

Canada Lands Company c/o IBI Group
Wateridge Village Phases 6,7 and 8
Monitoring Well Water Elevations



PATERSON GROUP

APPENDIX 2

FIGURE 1 – KEY PLAN

FIGURE 2 – AERIAL PHOTOGRAPH 1999

FIGURE 3 – AERIAL PHOTOGRAPH 1991

FIGURE 4 – AERIAL PHOTOGRAPH 1965

FIGURES 5A TO 8A, 18A, 5B TO 8B, 18B – SLOPE STABILITY CROSS SECTIONS

DRAWING PG7793-1 – TEST HOLE LOCATION PLAN

FIGURE 1

KEY PLAN

PATERSON GROUP

FIGURE 2

AERIAL PHOTOGRAPH - 1999

PATERSON GROUP

FIGURE 3

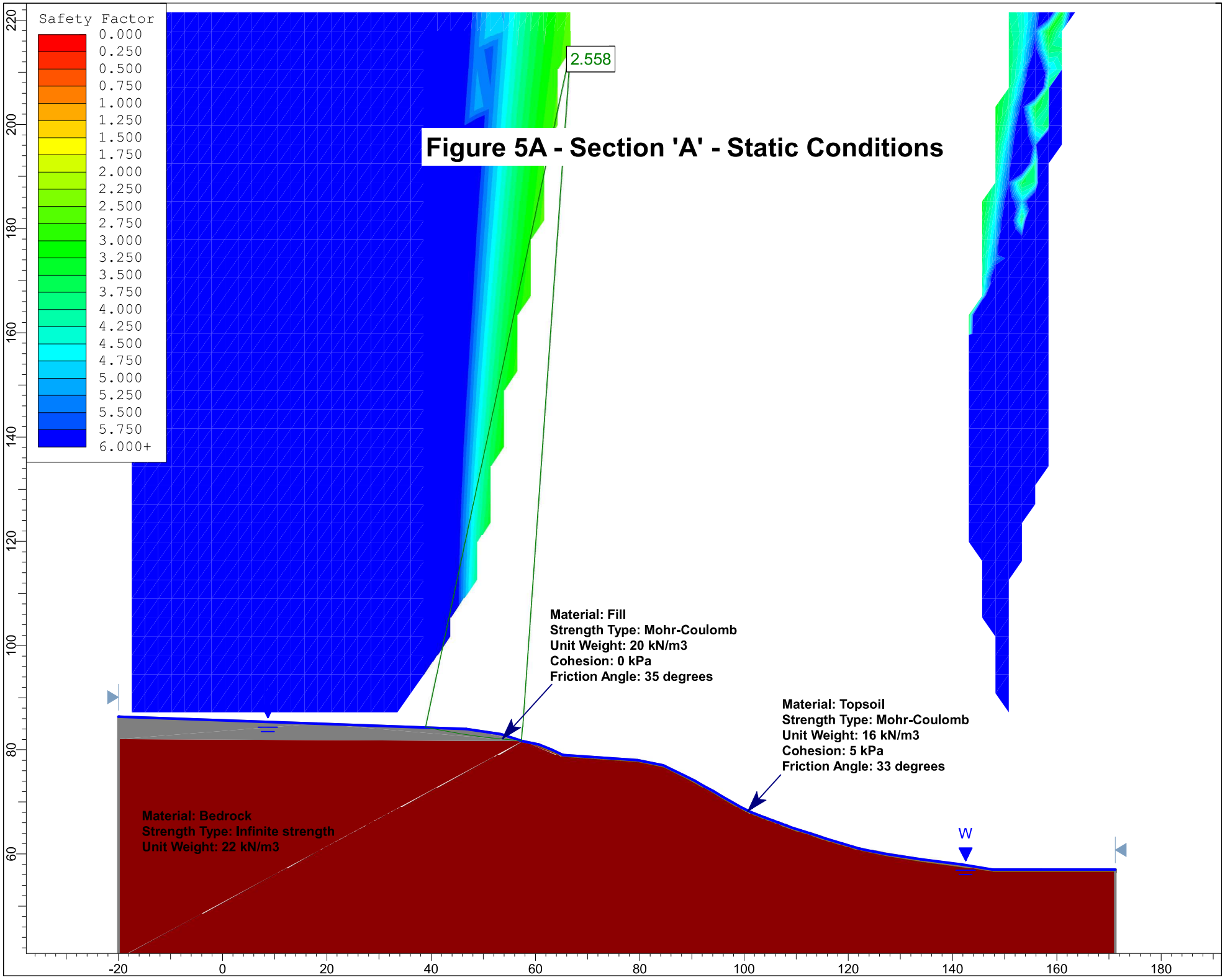
AERIAL PHOTOGRAPH - 1991

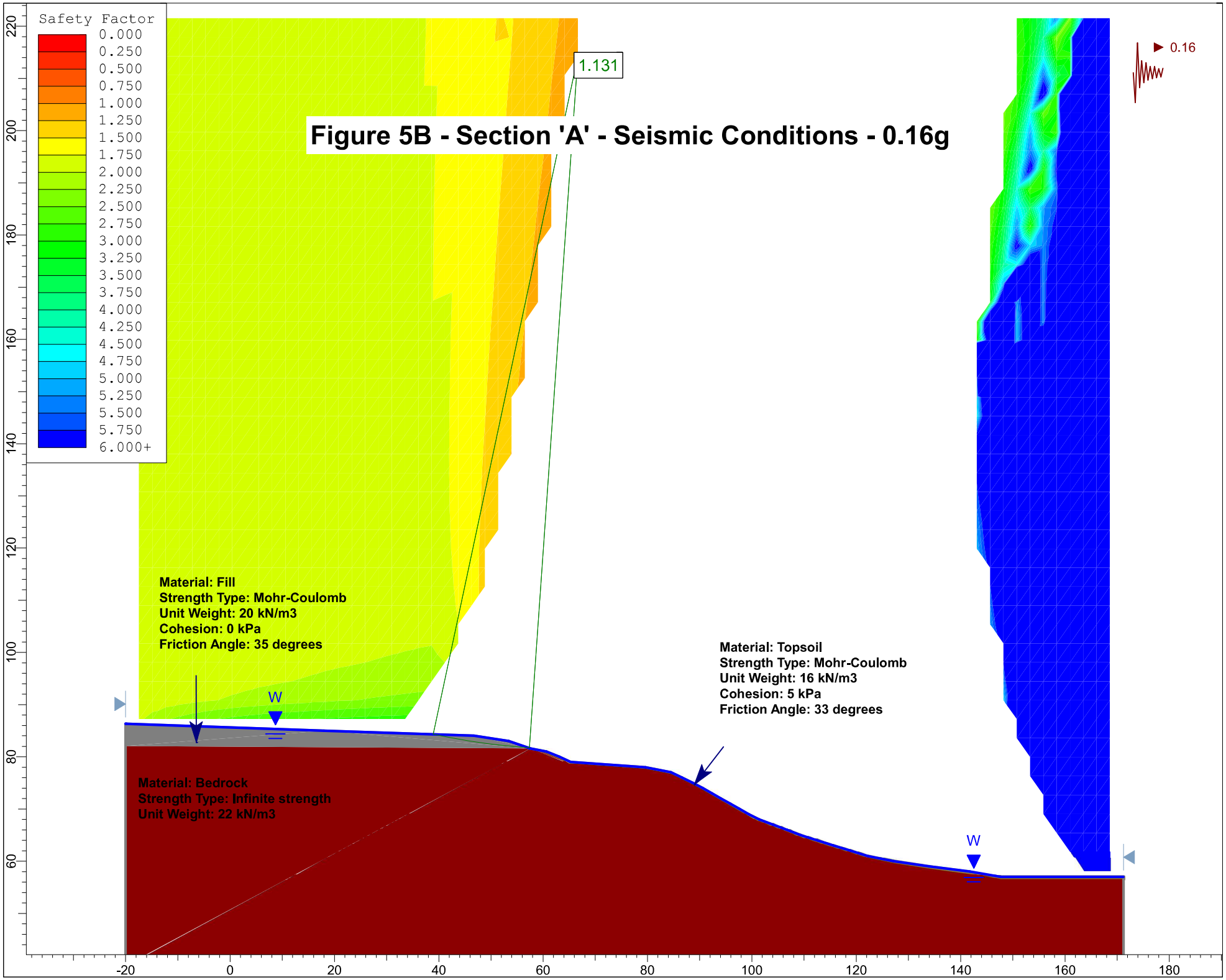
PATERSON GROUP

FIGURE 4

AERIAL PHOTOGRAPH - 1965

PATERSON GROUP


Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
2.558
Figure 5A - Section 'A' - Static Conditions
Material: Fill
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
Material: Topsoil
Strength Type: Mohr-Coulomb
Unit Weight: 16 kN/m3
Cohesion: 5 kPa
Friction Angle: 33 degrees
Material: Bedrock
Strength Type: Infinite strength
Unit Weight: 22 kN/m3
W
220
200
180
160
140
120
100
80
60
-20
0
20
40
60
80
100
120
140
160
180


Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
1.131
0.16
Figure 5B - Section 'A' - Seismic Conditions - 0.16g
Material: Fill
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
Material: Topsoil
Strength Type: Mohr-Coulomb
Unit Weight: 16 kN/m3
Cohesion: 5 kPa
Friction Angle: 33 degrees
Material: Bedrock
Strength Type: Infinite strength
Unit Weight: 22 kN/m3
W
W
220
200
180
160
140
120
100
80
60
-20
0
20
40
60
80
100
120
140
160
180

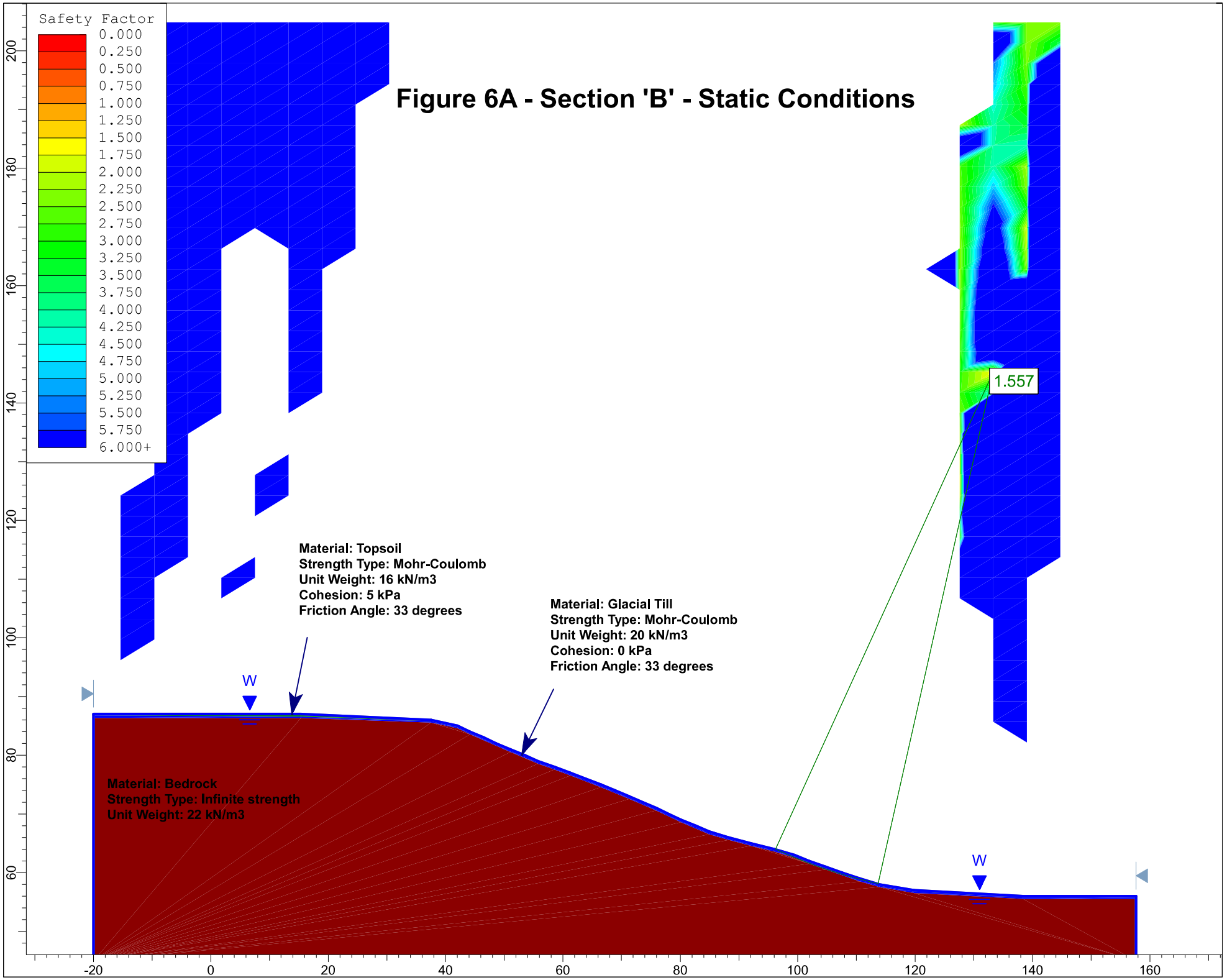


Figure 6A - Section 'B' - Static Conditions
Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
1.557
Material: Topsoil
Strength Type: Mohr-Coulomb
Unit Weight: 16 kN/m3
Cohesion: 5 kPa
Friction Angle: 33 degrees
Material: Glacial Till
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 33 degrees
Material: Bedrock
Strength Type: Infinite strength
Unit Weight: 22 kN/m3
W
W
200
180
160
140
120
100
80
60
-20
0
20
40
60
80
100
120
140
160

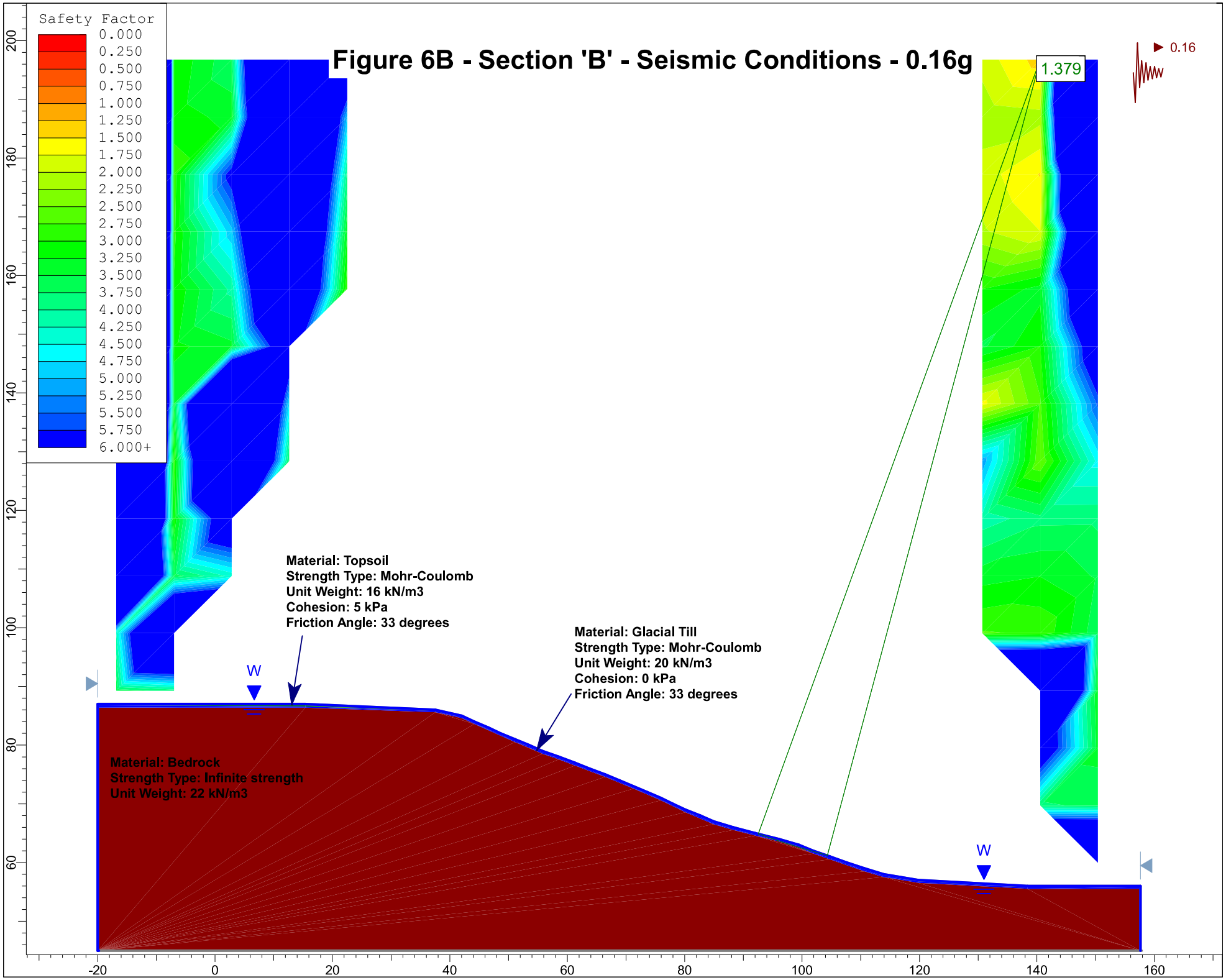
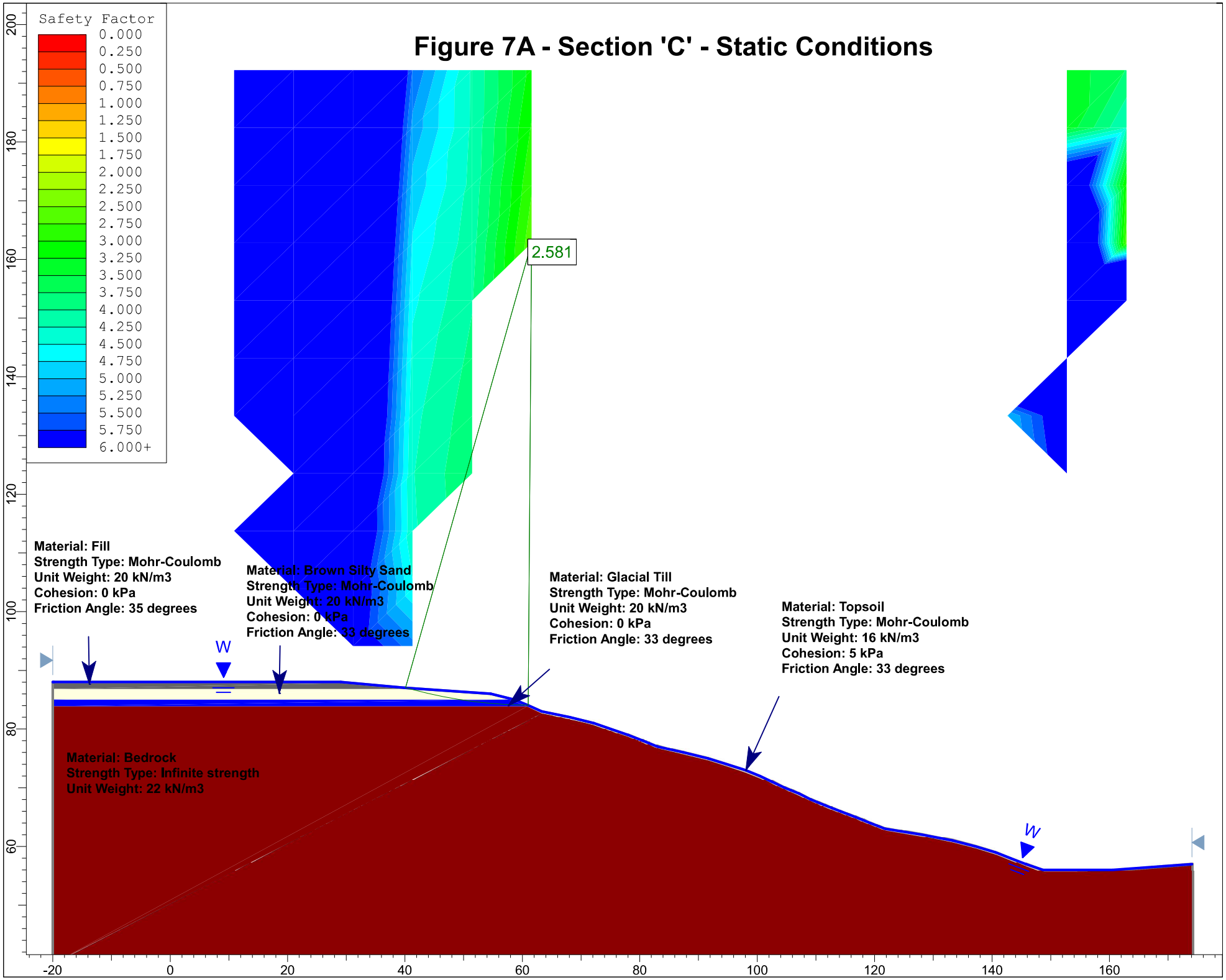


Figure 6B - Section 'B' - Seismic Conditions - 0.16g
Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
1.379
0.16
Material: Topsoil
Strength Type: Mohr-Coulomb
Unit Weight: 16 kN/m3
Cohesion: 5 kPa
Friction Angle: 33 degrees
Material: Glacial Till
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 33 degrees
Material: Bedrock
Strength Type: Infinite strength
Unit Weight: 22 kN/m3
W
W
200
180
160
140
120
100
80
60
-20
0
20
40
60
80
100
120
140
160

Figure 7A - Section 'C' - Static Conditions



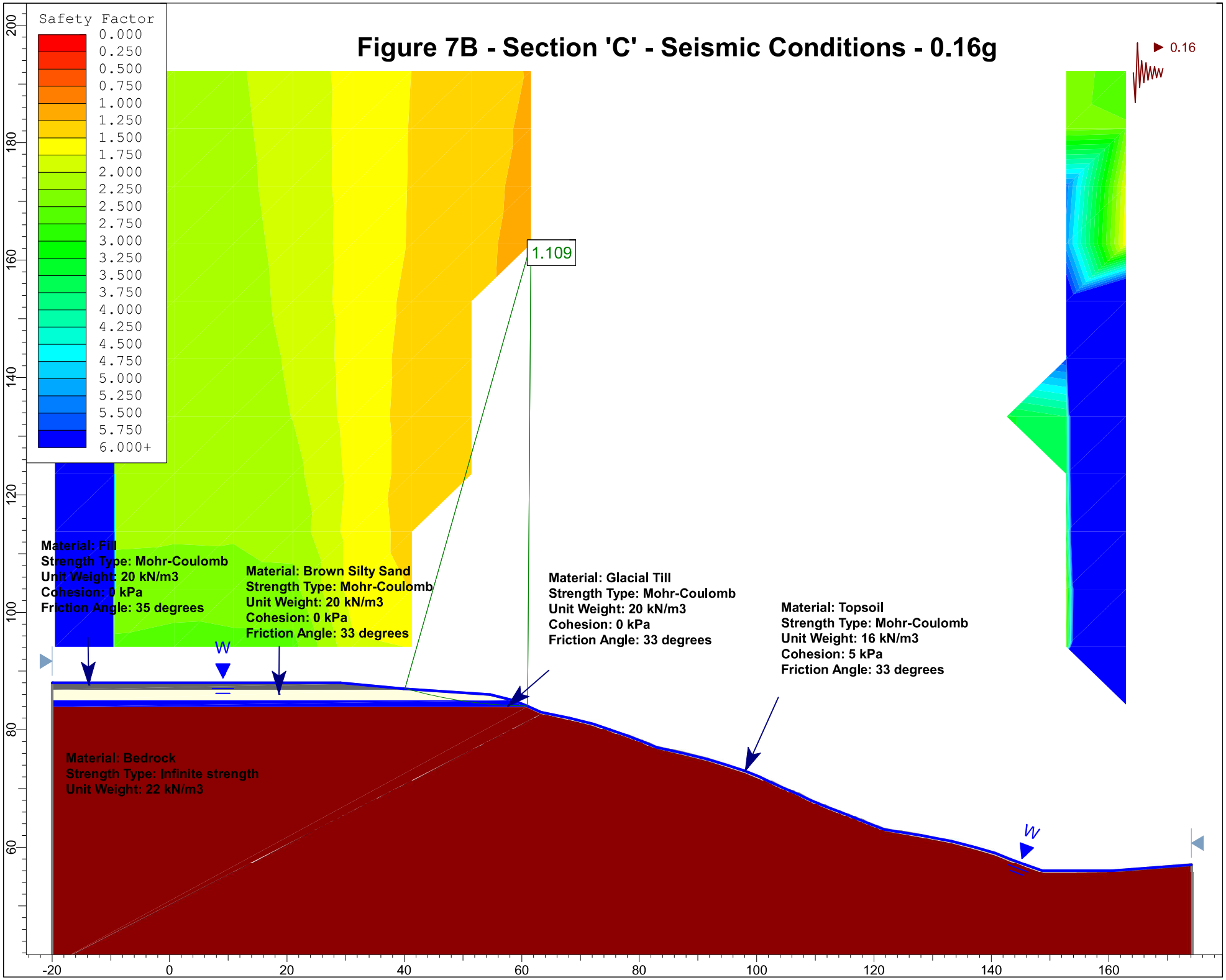
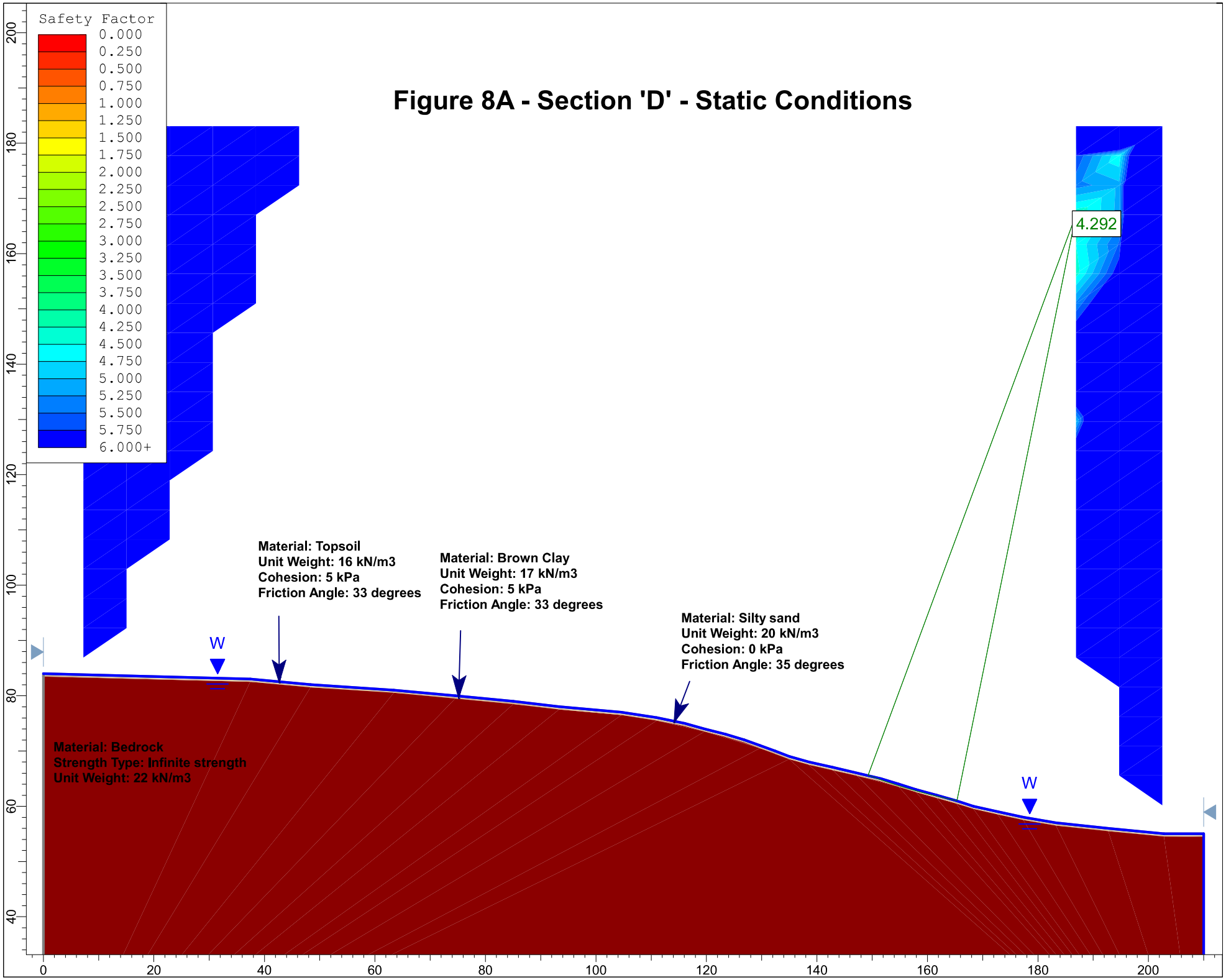


Figure 7B - Section 'C' - Seismic Conditions - 0.16g
Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
0.16
1.109
Material: Fill
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
Material: Brown Silty Sand
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 33 degrees
Material: Glacial Till
Strength Type: Mohr-Coulomb
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 33 degrees
Material: Topsoil
Strength Type: Mohr-Coulomb
Unit Weight: 16 kN/m3
Cohesion: 5 kPa
Friction Angle: 33 degrees
Material: Bedrock
Strength Type: Infinite strength
Unit Weight: 22 kN/m3
W
W
200
180
160
140
120
100
80
60
-20
0
20
40
60
80
100
120
140
160


Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
Figure 8A - Section 'D' - Static Conditions
4.292
Material: Topsoil
Unit Weight: 16 kN/m3
Cohesion: 5 kPa
Friction Angle: 33 degrees
Material: Brown Clay
Unit Weight: 17 kN/m3
Cohesion: 5 kPa
Friction Angle: 33 degrees
Material: Silty sand
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
W
W
Material: Bedrock
Strength Type: Infinite strength
Unit Weight: 22 kN/m3
0
20
40
60
80
100
120
140
160
180
200
40
60
80
100
120
140
160
180
200

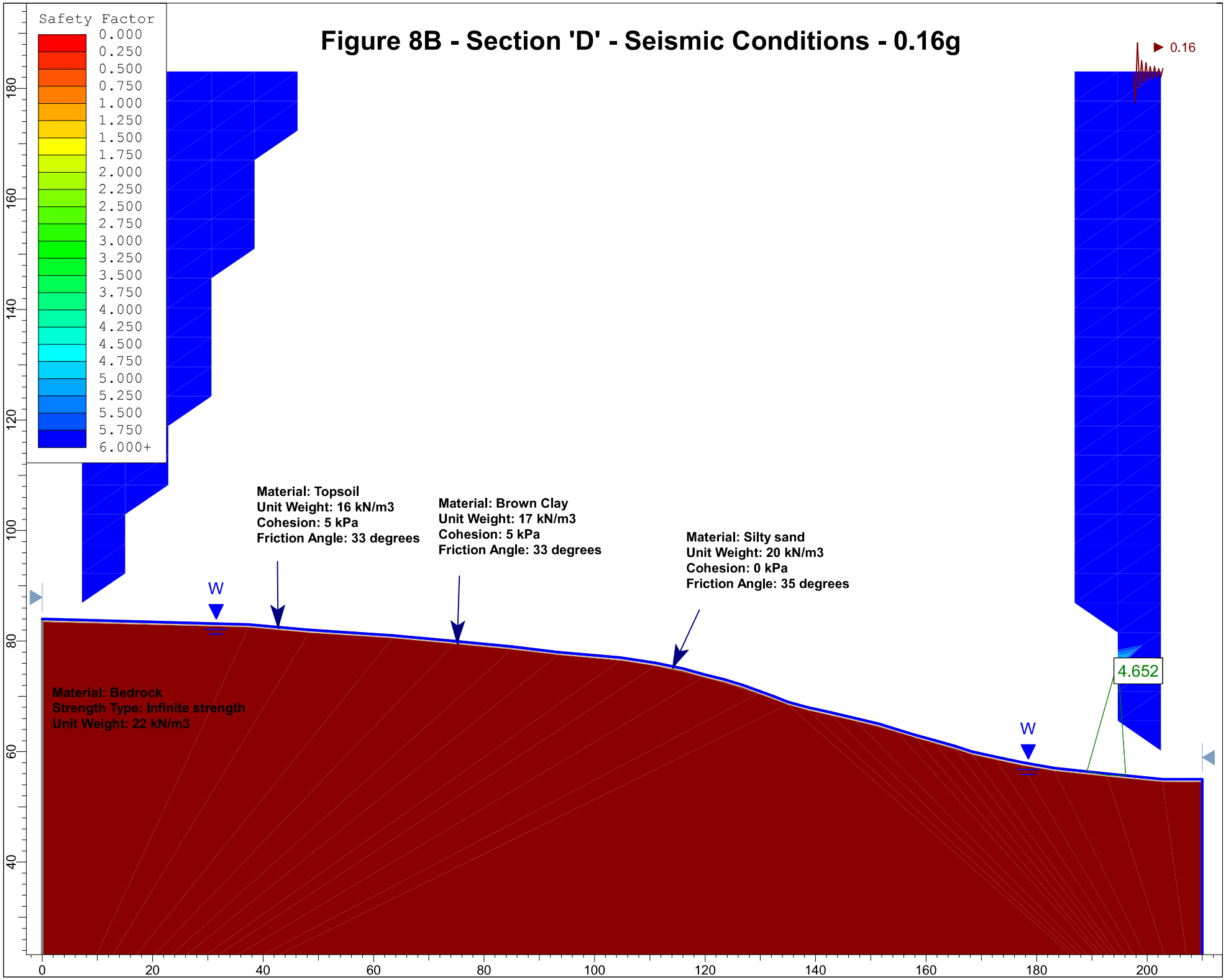
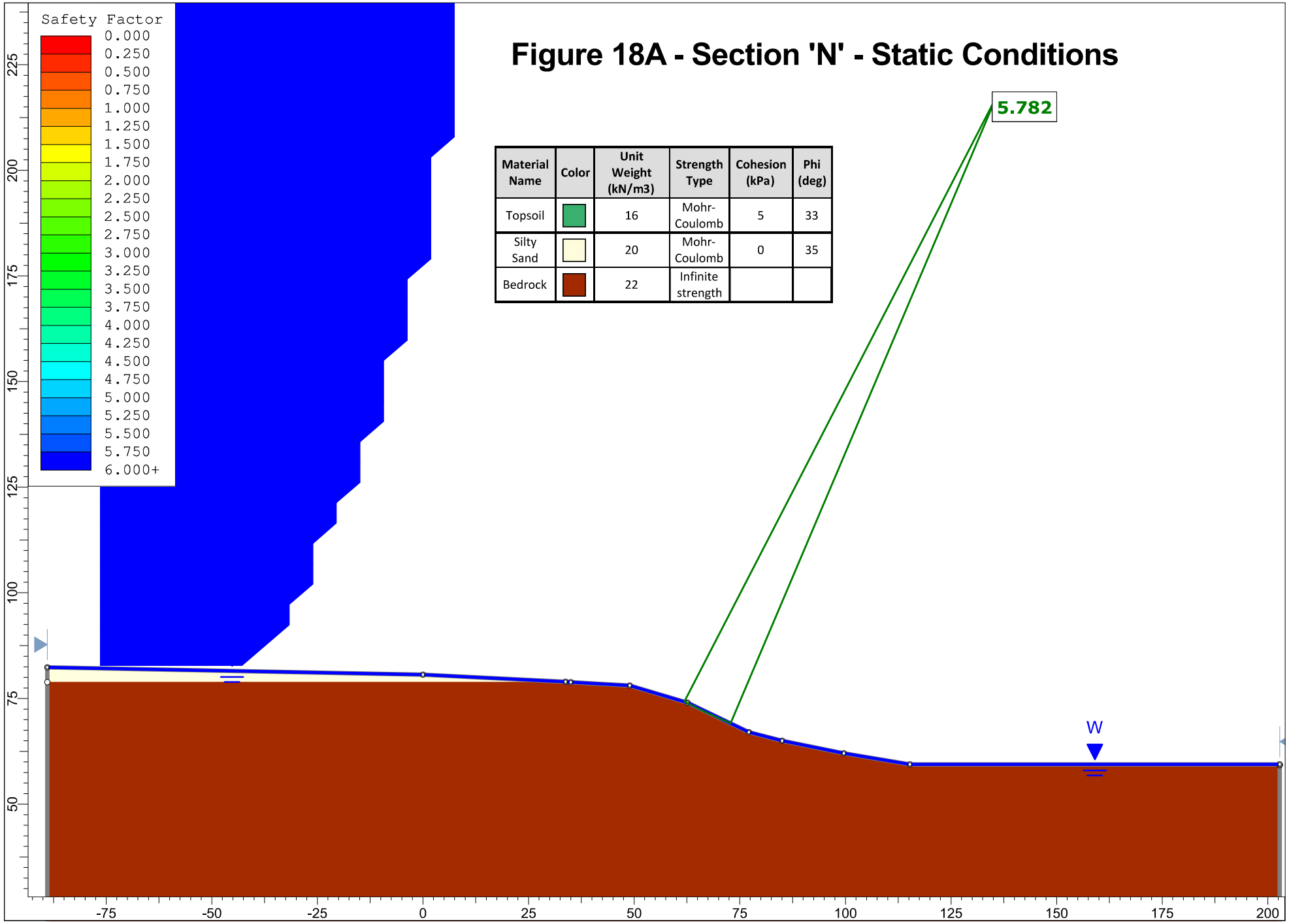


Figure 8B - Section 'D' - Seismic Conditions - 0.16g
Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
0.16
Material: Topsoil
Unit Weight: 16 kN/m3
Cohesion: 5 kPa
Friction Angle: 33 degrees
Material: Brown Clay
Unit Weight: 17 kN/m3
Cohesion: 5 kPa
Friction Angle: 33 degrees
Material: Silty sand
Unit Weight: 20 kN/m3
Cohesion: 0 kPa
Friction Angle: 35 degrees
W
W
Material: Bedrock
Strength Type: Infinite strength
Unit Weight: 22 kN/m3
4.652
0
20
40
60
80
100
120
140
160
180
200
40
60
80
100
120
140
160
180

Figure 18A - Section 'N' - Static Conditions



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)
Topsoil		16	Mohr-Coulomb	5	33
Silty Sand		20	Mohr-Coulomb	0	35
Bedrock		22	Infinite strength		

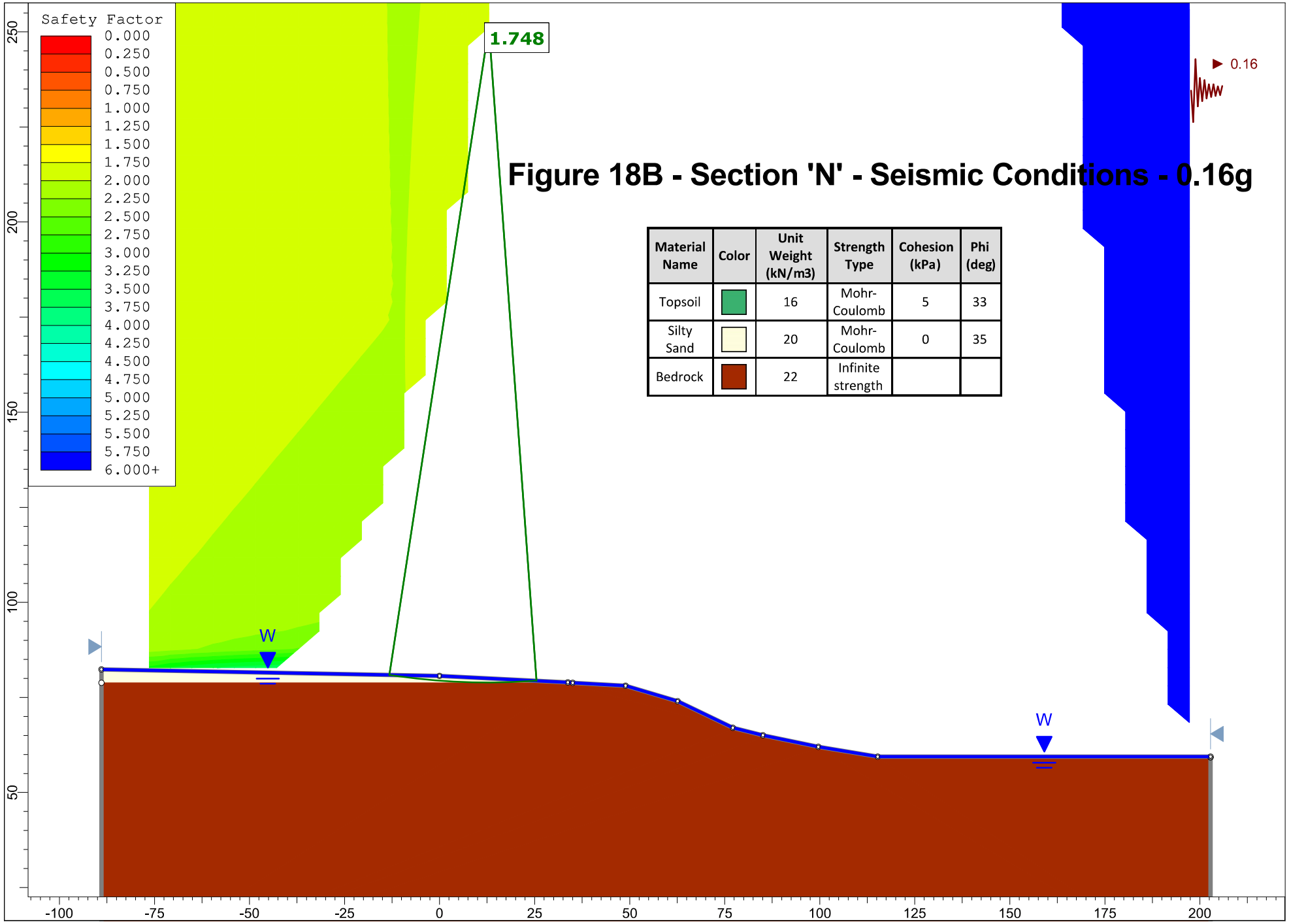
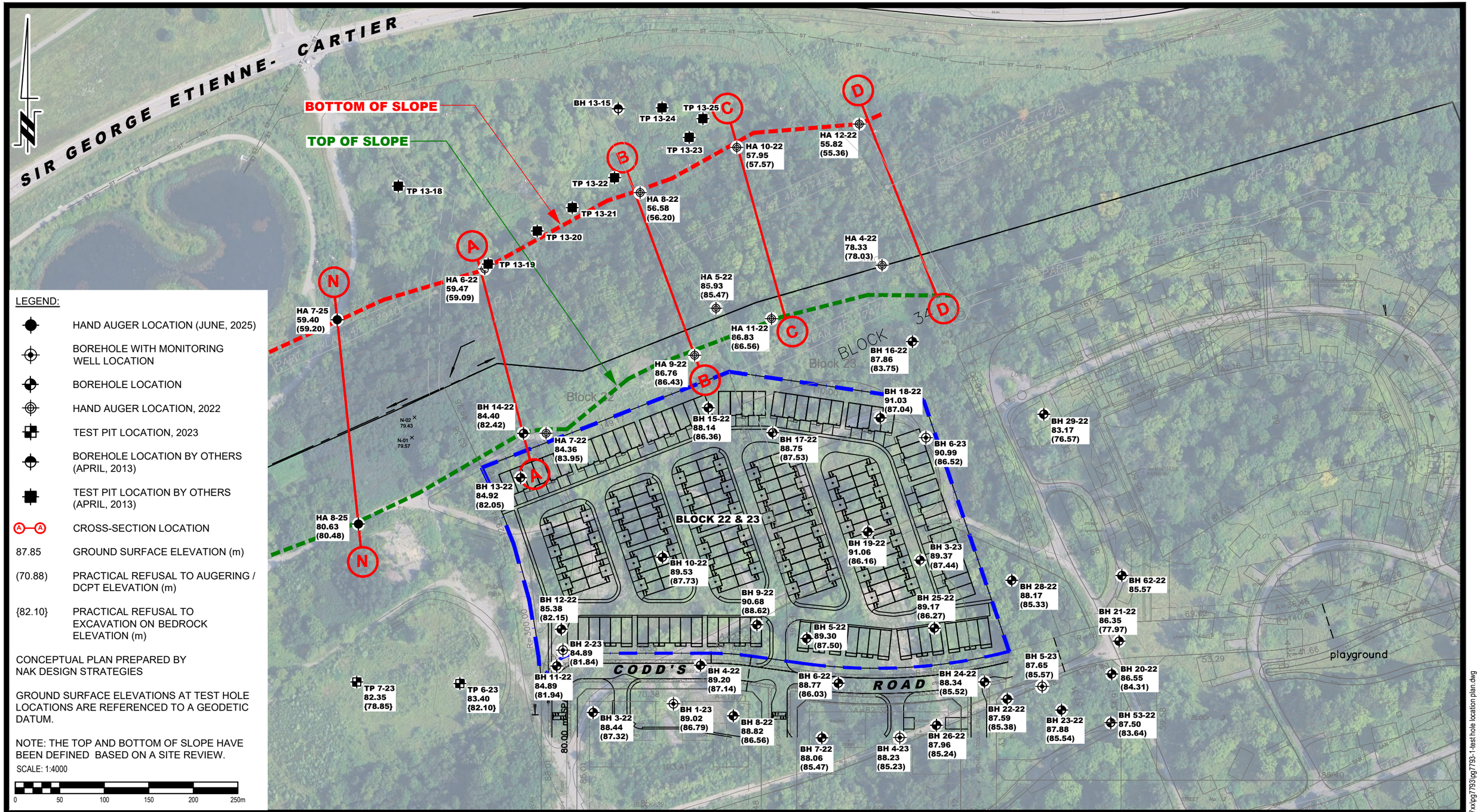


Figure 18B - Section 'N' - Seismic Conditions - 0.16g

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)
Topsoil		16	Mohr-Coulomb	5	33
Silty Sand		20	Mohr-Coulomb	0	35
Bedrock		22	Infinite strength		



LEGEND:

- HAND AUGER LOCATION (JUNE, 2025)
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- HAND AUGER LOCATION, 2022
- TEST PIT LOCATION, 2023
- BOREHOLE LOCATION BY OTHERS (APRIL, 2013)
- TEST PIT LOCATION BY OTHERS (APRIL, 2013)
- A—A CROSS-SECTION LOCATION
- 87.85 GROUND SURFACE ELEVATION (m)
- (70.88) PRACTICAL REFUSAL TO AUGERING / DCPT ELEVATION (m)
- {82.10} PRACTICAL REFUSAL TO EXCAVATION ON BEDROCK ELEVATION (m)

CONCEPTUAL PLAN PREPARED BY
NAK DESIGN STRATEGIES

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

NOTE: THE TOP AND BOTTOM OF SLOPE HAVE BEEN DEFINED BASED ON A SITE REVIEW.

SCALE: 1:4000

0 50 100 150 200 250m

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NO.	REVISIONS	DATE	INITIAL

MATTAMY HOMES
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
WATERIDGE VILLAGE, BLOCK 22 & 23 - CODD'S ROAD
OTTAWA, ONTARIO

Title:
TEST HOLE LOCATION PLAN

Scale: 1:2000	Date: 12/2025
Drawn by: YA	Report No.: PG7793-1
Checked by: KS	Dwg. No.: PG7793-1
Approved by: KP	Revision No.:

p:\autocad drawings\geotechnical\pg77xx\pg7793\pg7793-1-test hole location plan.dwg

11x17