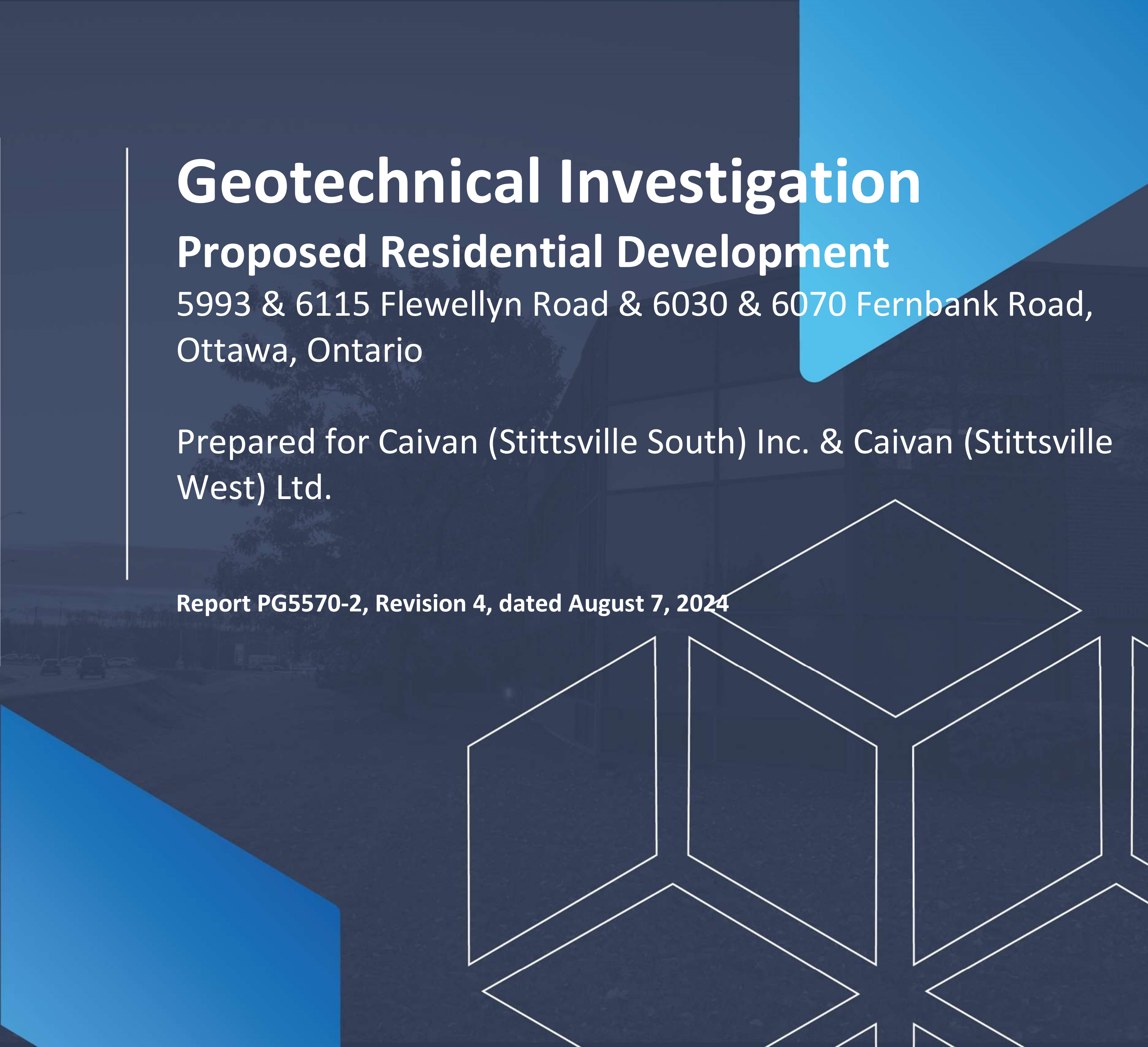


Geotechnical Investigation

Proposed Residential Development

5993 & 6115 Flewellyn Road & 6030 & 6070 Fernbank Road,
Ottawa, Ontario

Prepared for Caivan (Stittsville South) Inc. & Caivan (Stittsville West) Ltd.

Report PG5570-2, Revision 4, dated August 7, 2024

Table of Contents

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Caivan Communities to conduct a geotechnical investigation for the proposed residential development to be located at 5993 & 6115 Flewellyn Road and 6030 & 6070 Fernbank Road in the City of Ottawa (refer to Figure 1 - Key Plan in Appendix 2 of this report).

The objective of the geotechnical investigation was to:

- ☐ Determine the subsoil and groundwater conditions at this site by means of test holes.
- ☐ Provide geotechnical recommendations pertaining to 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 the presence or potential presence of contamination on the subject property was not part of the scope of work of the present investigation. Therefore, the present report does not address environmental issues.

2.0 Proposed Development

Based on available drawings, it is understood that the proposed development will consist of a series of low-rise single and townhouse style residential dwellings with associated driveways, local roadways and landscaped areas.

It is further anticipated that the site will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the geotechnical investigation was carried out between December 14, 2021 and January 10, 2022. At that time, a total of thirty-eight (38) boreholes were advanced to a maximum depth of 10.2 m below the existing ground surface. A supplemental field program was carried out by Paterson at the subject site from September 28 to 30, 2022 and consisted of advancing 7 boreholes and 1 hand auger hole to maximum depths of 9.1 and 0.7 m, respectively. The test holes were distributed in a manner to provide general coverage of the subject site taking into consideration site features.

A previous geotechnical investigation was also completed by Paterson between November 20 and December 10, 2020 for 6070 & 6115 Flewellyn Road. At that time, 18 test pits were excavated to a maximum depth of 3.4 m below ground surface using a hydraulic shovel excavator. The test hole locations are shown on Drawing PG5570-1 - Test Hole Location Plan included in Appendix 2.

The test holes were completed using a low clearance drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The drilling procedure consisted of drilling to the required depth at the selected location and sampling the overburden.

Sampling and In Situ Testing

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

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

Rock core samples were recovered from boreholes BH1-22 to BH5-22, BH1-21, BH2-21, BH3-21, BH22A-21, BH24-21, BH33-21 and BH34-21 drilled during the investigations using a core barrel and diamond drilling techniques. The bedrock samples were classified on site, placed in hard cardboard core boxes and transported to Paterson's laboratory. The depths at which rock core samples were recovered from the boreholes are presented as RC on the Soil Profile and Test Data sheets in Appendix 1.

The recovery value and a Rock Quality Designation (RQD) value were calculated for each drilled section of bedrock and are presented on the borehole logs. The recovery value is the length of the bedrock sample recovered over the length of the drilled section. The RQD value is the total length of intact rock pieces longer than 100 mm over the length of the core run. The values indicate the bedrock quality.

Soil samples from the test pits from the previous investigation were recovered from the side walls of the open excavation and all soil samples were initially classified on site. All samples were placed in sealed plastic bags and transported to our laboratory for further examination and classification. The depths at which the grab samples were recovered from the test pits are shown as "G" on the Soil Profile and Test Data sheets in Appendix 1.

Subsurface conditions observed in the test pits were recorded in detail in the field. Reference should be made to the Soil Profile and Test Data sheets presented in Appendix 1 for specific details of the soil profile encountered at the test pits locations.

Groundwater

Monitoring wells were installed in all boreholes during the September 2022 investigation and outfitted with data loggers to permit monitoring of the groundwater level subsequent to the completion of sampling program. Additionally, data loggers were outfitted in the monitoring wells installed at boreholes BH1-21 to BH3-21, BH22A-21, BH24-21 and BH33-21.

The remaining boreholes were fitted with flexible piezometers to allow groundwater level monitoring. Further, the depth at which groundwater infiltration was encountered through the sidewalls of the test pits were recorded prior to the completion of excavation as noted in the field. The groundwater observations are discussed in Subsection 4.3 and presented in the Soil Profile and Test Data sheets in Appendix 1.

3.2 Field Survey

The test hole locations and ground surface elevation at each test hole location were surveyed by Paterson using a high precision handheld GPS and referenced to a geodetic datum. Reference should be made to Drawing PG5570-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. All samples will be stored in the laboratory for a period of one (1) month after issuance of this report. They will then be discarded unless we are otherwise directed.

A total of 12 grain size distribution tests were completed on selected soil samples. The results are presented in Subsection 4.2 and on Grain Size Distribution Results sheets presented in Appendix 1.

3.4 Analytical Testing

Four (4) soil samples were submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The 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 Subsection 6.7.

3.5 Permeameter Testing

In-situ permeameter testing was conducted using a Pask (Constant Head Well) Permeameter to confirm infiltration rates of the surficial soils at the subject site. At each location, two (2) 83 mm holes, located approximately 1.5 m away each other, were excavated using a Riverside/Bucket auger to approximate depths ranging from 0.3 to 0.6 m below the existing ground surface. All soils from the auger flights were visually inspected and initially classified on-site. The permeameter reservoir was filled with water and inverted into the hole, ensuring that it was relatively vertical and rested on the bottom of the hole. As the water infiltrated into the soil, the water level of the reservoir was monitored at various time intervals until the rate of fall reached equilibrium, known as *“quasi steady state”* flow rate. Quasi steady state flow can be considered to have been obtained after measuring 3 to 5 consecutive rate of fall readings with identical values. The values for the steady state rate of fall were recorded for each location. The results of testing are further discussed in Subsection 4.4.

3.6 Hydraulic Conductivity (Slug) Testing

Hydraulic conductivity (slug) testing was conducted at each monitoring well location with the exception of borehole BH1A-22. The testing was completed to assist in confirming anticipated groundwater flow rates within the subsoils and within the bedrock at the subject site. The test data was analyzed as per the method set out by Hvorslev (1951). Assumptions inherent in the Hvorslev method include a homogeneous and istropic aquifer of infinite extent with zero-storage assumption, and a screen length significantly greater than the monitoring well diameter. The assumption regarding aquifer storage is considered to be appropriate for groundwater inflow through the overburden and bedrock aquifers. The assumption regarding screen length and well diameter is considered to be met based on a screen length generally ranging from 1.5 to 3 m and a diameter ranging from 0.03 to 0.05 m.

While the idealized assumptions regarding aquifer extent, homogeneity, and isotropy are not strictly met in this case (or in any real-world situation), it has been our experience that the Hvorslev method produces effective point estimates of hydraulic conductivity in conditions similar to those encountered at the subject site.

The Horslev analysis is based on the line of best fit through the field data (hydraulic head recovery vs. time), plotted on a semi-logarithmic scale. In cases where the initial hydraulic head displacement is known with relative certainty, such as in this case where a physical slug has been introduced, the line of best fit is considered to pass through the origin. The semi-log drawdown vs. time plots for rising and falling head at each borehole locations are presented in Appendix 1.

The results of testing and hydrogeological recommendations are further discussed in Subsections 4.5

4.0 Observations

4.1 Surface Conditions

The subject site generally consists of undeveloped, vacant land. An existing garage/storage building is located on the 6115 Flewellyn Road property. The property parcel of 5993 Flewellyn Road is cleared of trees and vegetation, where the property parcels comprising 6070 & 6115 Flewellyn Road are heavily treed with mature growth.

The site gradually slopes downward from the northwest to the southeast. The site also gradually slopes downward from the northeast and southwest to the central portion of the site, resulting in a shallow valley striking northwest - southeast. The subject site is bordered to the south by Flewellyn Road, to the west by residential dwellings, to the north by a residential development, and to the east by agricultural land and residential dwellings.

4.2 Subsurface Profile

Generally, the soil profile at the test hole locations consists of topsoil overlying a loose to compact, brown silty sand to sandy silt deposit, followed by compact to dense glacial till, underlain by bedrock. The glacial till deposit was generally observed to consist of compact to dense brown silty sand with gravel, cobbles and trace clay. A thin veneer of stiff, brown silty clay with some sand was observed in boreholes BH23-21 and BH26-21. The silty clay veneer was observed to extend to a maximum depth of 1.1 m below the existing ground surface.

Bedrock

Bedrock was cored in 11 boreholes to a maximum depth of 8.3 m below the bedrock surface, with an average RQD value ranging from 57 to 100%. This is indicative of a fair to excellent quality bedrock within the footprint of the proposed building. Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for the details of the soil profile encountered at borehole location.

Based on available geological mapping, the bedrock in this area consists of Paleozoic limestone of the Bobcaygeon Formation and an overburden drift thickness of 3 to 10 m depth.

Grain Size Distribution Testing

Grain size distribution testing (sieve analysis) was also completed on 12 selected soil sample. The results of the grain size analysis are summarized in Table 1 on the following page and presented on the Grain-size Distribution and Hydrometer Testing Results sheets in Appendix 1.

Table 1 - Summary of Grain Size Distribution Analysis

Test Hole Number	Sample	Gravel (%)	Sand (%)	Fines (%)	
				Silt (%)	Clay (%)
BH1-22	SS2	18.3	47.9	31.2	2.5
BH3-22	SS4	0.0	7.5	87.0	5.5
BH4-22	SS4	19.4	23.3	53.8	3.5
BH5-22	SS3	3.3	25.1	65.6	6.0
BH4-21	SS2 + SS3	6.5	24.2	69.3	
BH11-21	SS3	14.4	50.1	35.5	
BH14-21	SS2 + SS3	25.9	48.9	25.2	
BH19-21	SS2 + SS3	0.1	13.8	86.1	
BH24-21	SS2 + SS3	4.9	46.3	48.8	
BH35-21	SS4 + SS5	61.0	25.5	13.5	
BH37-21	SS3	0.0	64.2	35.8	
BH38-21	SS3 + SS4	0.0	21.0	79.0	

Permeameter Testing Results

A total of 24 permeameter tests were conducted at 12 locations to provide general coverage of the subject site. Preparation and testing of this investigation are in accordance with the Canadian Standards Association (CSA) B65-12-Annex E. Field saturated hydraulic conductivity (K_{fs}) values and estimated infiltration values are presented in Table 2 on the following page.

Field saturated hydraulic conductivity values were determined using the Engineering Technologies Canada (ETC) Ltd. Reference tables provided in the most recent ETC Past Permeameter User Guide dated July 2018. Infiltration rates have been determined based on approximate relationships provided by the Ontario Ministry of Municipal Affairs and Housing - Supplementary Guidelines to the Ontario Building Code, 1997 - SG-6 - Percolation Time and Soil Descriptions.

Table 2 - Summary of Field Saturated Hydraulic Conductivity Values and Infiltration Rates

Permeameter Test Location	Ground Surface Elevation (m)	Depth of Permeameter Testing (m)	K_{fs} (m/sec)	Unfactored Infiltration Rate (mm/hr)	Soil Type
BH1-21	104.29	0.35	$2.1x10^{-6}$	56	Silty Sand
		0.60	$1.9x10^{-6}$	56	
BH2-21	107.19	0.30	$6.4x10^{-6}$	76	Silty Sand
		0.60	$5.3x10^{-7}$	39	
BH7-21	107.04	0.30	$1.1x10^{-6}$	47	Silty Sand
		0.60	$1.6x10^{-6}$	52	
BH11-21	104.98	0.30	$2.7x10^{-6}$	60	Silty Sand
		0.60	$1.6x10^{-6}$	52	Silty Sand to Sandy Silt
BH15-21	103.08	0.35	$2.1x10^{-7}$	31	Silty Sand to Sandy Silt
		0.55	$\leq 8.1x10^{-9}$	≤13	
BH17-21	104.42	0.30	$5.9x10^{-6}$	74	Silty Sand to Sandy Silt
		0.60	$4.1x10^{-6}$	67	
BH22-21	102.98	0.30	$1.1x10^{-6}$	47	Silty Sand
		0.60	$1.6x10^{-6}$	52	
BH23-21	102.38	0.30	$5.3x10^{-7}$	39	Silty Clay with Sand
		0.65	$\leq 8.1x10^{-9}$	≤13	
BH26-21	103.04	0.30	$1.1x10^{-7}$	26	Silty Clay with Sand
		0.60	$1.1x10^{-7}$	26	
BH29-21	102.31	0.30	$5.3x10^{-7}$	39	Silty Sand to Sandy Silt
		0.60	$2.7x10^{-7}$	33	
BH31-21	103.43	0.30	$1.1x10^{-6}$	47	Silty Sand to Sandy Silt
		0.60	$1.4x10^{-7}$	27	
BH37-21	103.54	0.30	$5.3x10^{-6}$	72	Silty Sand to Sandy Silt
		0.60	$5.9x10^{-6}$	74	

Note: Infiltration rates above do not include a safety correction factor.

The measured field saturated hydraulic conductivity (K_{fs}) values within the test holes are consistent with similar material Paterson has encountered on other sites and typical published values for silty sand, sandy silt and silty clay which typically range from $1x10^{-4}$ to $1x10^{-6}$, $1x10^{-6}$ to $1x10^{-8}$, $1x10^{-7}$ to $1x10^{-9}$ m/sec, respectively. The range in K_{fs} values is generally due to the variability in composition and consistency of the material encountered. It is important to note that the infiltration rates derived from the K_{fs} values in the table above are unfactored, and that a factor of safety will need to be applied prior to being considered for design purposes.

Hydraulic Conductivity Values

Hydraulic conductivity (slug testing) values were recorded at each monitoring well location. The results are presented in Table 3 below.

Table 3 - Summary hydraulic conductivity values

Test Hole ID	Ground Surface Elevation (m)	Screened Interval (m)	K (m/sec)	Test Type	Soil Type/Bedrock
BH1-22	107.31	7.5 - 9.0	$1.2x10^{-5}$	Falling Head	Bedrock
			$1.5x10^{-5}$	Falling Head	
			$1.6x10^{-5}$	Falling Head	
			$1.9x10^{-5}$	Rising Head	
			$1.5x10^{-5}$	Rising Head	
BH2-22	103.58	7.5 - 9.0	$8.9x10^{-6}$	Falling Head	Bedrock
			$9.1x10^{-6}$	Rising Head	
BH3-22	102.25	7.5 - 9.0	$6.0x10^{-5}$	Falling Head	Bedrock
			$6.6x10^{-5}$	Rising Head	
BH3A-22	102.25	1.7 - 3.2	$4.2x10^{-6}$	Falling Head	Silty Sand to Sandy Silt & Glacial Till
			$4.8x10^{-6}$	Rising Head	
BH4-22	105.71	7.5 - 9.0	$8.7x10^{-7}$	Falling Head	Bedrock
			$9.1x10^{-7}$	Rising Head	
BH5-22	105.70	7.5 - 9.0	$1.2x10^{-5}$	Falling Head	Bedrock
			$2.0x10^{-5}$	Falling Head	
			$1.4x10^{-5}$	Rising Head	Bedrock
			$1.5x10^{-5}$	Rising Head	
HA1-22	106.78	0.4 – 0.7	$2.2x10^{-5}$	Falling Head	Silty Sand
			$8.8x10^{-6}$	Rising Head	
BH1-21	104.29	2.8 - 5.8	$1.4x10^{-4}$	Falling Head	Bedrock
			$1.1x10^{-4}$	Rising Head	
BH2-21	107.19	2.6 - 5.6	$4.0x10^{-5}$	Falling Head	Bedrock
			$4.0x10^{-5}$	Falling Head	
			$3.9x10^{-5}$	Rising Head	
			$4.1x10^{-5}$	Rising Head	
BH3-21	108.41	2.7 - 5.7	$3.0x10^{-6}$	Falling Head	Bedrock
BH22A-21	102.98	7.2 - 10.2	$4.3x10^{-7}$	Falling Head	Bedrock
BH24-21	103.07	4.9 - 7.9	$6.0x10^{-5}$	Falling Head	Bedrock
			$7.3x10^{-5}$	Falling Head	
			$5.8x10^{-5}$	Rising Head	
			$5.7x10^{-5}$	Rising Head	
BH33-21	104.70	3.3 - 6.3	$1.6x10^{-4}$	Rising Head	Bedrock

Slug testing completed at the monitoring wells screened primarily in the silty sand to sandy silty layer (BH 3A-22, HA1-22) identified hydraulic conductivity values ranging from approximately 4.2x10^{-6} to 2.2x10^{-5} m/sec. These values are generally consistent with similar material Paterson has encountered on other sites and typical published values for silty sand to sandy silt, which typically range from 1x10^{-5} to 1x10^{-7} m/sec and is dependent on the ratio of sand to silt within the material.

The slug testing completed at the monitoring wells screened in bedrock identified hydraulic conductivity values ranging from approximately 4.3x10^{-7} to 1.6x10^{-4} m/sec. These values are generally consistent to with similar material Paterson has encountered on other sites and typical published values for limestone bedrock, which typically range from 1x10^{-5} to 1x10^{-10} m/sec and is dependent on the quality of the bedrock at a given location.

4.3 Groundwater

The groundwater levels were manually recorded within the monitoring wells and piezometers installed at each borehole. Data loggers were installed in all monitoring wells to record seasonal fluctuations and precipitation collected within the upper portion of the subsurface profile across the site. Where encountered, groundwater infiltration through the sidewalls of the test pits were recorded. The recorded groundwater levels are presented in Table 2 below, and are further noted on the Soil Profile and Test Data sheets in Appendix 1. The groundwater data recorded at the subject site to date is presented on Figures 2 to 13: Monitoring Well Water Elevations in Appendix 2.

Table 2 - Measured Groundwater Levels

Test Hole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Dated Recorded
		Depth (m)	Elevation (m)	
BH1-22	107.31	1.33	105.99	October 11, 2022
		1.35	105.97	October 28, 2022
		0.83	106.48	April 4, 2023
		1.35	105.96	May 31, 2023
BH1A-22	107.31	1.44	105.87	October 11, 2022
		1.43	105.88	October 28, 2022
		0.94	106.38	April 4, 2023
		1.46	105.86	May 31, 2023
BH2-22	103.58	1.52	102.06	October 11, 2022
		1.52	102.06	October 28, 2022
		0.59	102.99	April 4, 2023
		1.31	102.27	May 31, 2023

Table 2 - Measured Groundwater Levels

Test Hole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Dated Recorded
		Depth (m)	Elevation (m)	
BH3-22	102.25	0.84	101.42	October 11, 2022
		0.61	101.64	October 28, 2022
		0.11	102.15	April 4, 2023
		0.93	101.32	May 31, 2023
BH3A-22	102.25	0.81	101.44	October 11, 2022
		0.40	101.85	October 28, 2022
		0.00	102.25	April 4, 2023
		0.99	101.26	May 31, 2023
BH4-22	105.71	3.62	102.10	October 11, 2022
		3.65	102.07	October 28, 2022
		3.08	102.64	April 4, 2023
		3.48	102.23	May 31, 2023
BH5-22	105.70	1.62	104.09	October 11, 2022
		1.64	104.06	October 28, 2022
		0.90	104.80	April 4, 2023
		1.56	104.14	May 31, 2023
HA1-22	106.78	0.31	106.48	October 11, 2022
		0.28	106.51	October 28, 2022
		0.14	106.64	April 4, 2023
		0.29	106.49	May 31, 2023
BH1-21*	104.29	1.22	103.07	January 11, 2022
		1.12	103.17	October 11, 2022
		1.01	103.28	October 28, 2022
		0.09	104.21	April 4, 2023
		0.97	103.33	May 31, 2023
BH2-21*	107.19	0.82	106.37	January 11, 2022
		1.16	106.03	October 11, 2022
		0.95	106.25	October 28, 2022
		0.33	106.87	April 4, 2023
		0.87	106.32	May 31, 2023
BH3-21*	108.41	0.89	107.52	January 11, 2022
		0.90	107.51	October 11, 2022
		0.92	107.49	October 28, 2022
		0.52	107.89	April 4, 2023
		0.84	107.57	May 31, 2023
BH4-21	108.95	1.23	107.72	January 11, 2022
BH5-21	108.38	Dry	N/A	January 11, 2022
BH6-21	106.32	Dry	N/A	January 11, 2022
BH7-21	107.04	1.09	105.95	January 11, 2022
BH8-21	105.91	Dry	N/A	January 11, 2022

Table 2 - Measured Groundwater Levels

Test Hole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Dated Recorded
		Depth (m)	Elevation (m)	
BH9-21	104.62	Blocked	N/A	January 11, 2022
BH10-21	105.70	2.83	102.87	January 11, 2022
BH11-21	104.98	1.32	103.42	January 11, 2022
BH12-21	104.05	1.58	102.73	January 11, 2022
BH13-21	103.54	1.44	101.96	January 11, 2022
BH14-21	103.28	1.37	101.91	January 11, 2022
BH15-21	103.08	0.92	102.16	January 11, 2022
BH16-21	104.19	1.32	102.87	January 11, 2022
BH17-21	104.42	1.25	103.17	January 11, 2022
BH18-21	105.06	1.40	103.66	January 11, 2022
BH19-21	101.85	1.04	100.81	January 11, 2022
BH20-21	102.25	1.71	100.54	January 11, 2022
BH21-21	102.92	Blocked	N/A	January 11, 2022
BH22A-21*	102.98	2.49	100.49	January 11, 2022
		2.61	100.37	October 11, 2022
		1.77	101.21	April 4, 2023
		2.72	100.26	May 31, 2023
BH23-21	102.38	Blocked	N/A	January 11, 2022
BH24-21*	103.07	0.67	102.40	January 11, 2022
		0.60	102.47	October 11, 2022
		0.46	102.61	October 28, 2022
		-0.03	103.10	April 4, 2023
		0.74	102.34	May 31, 2023
BH25-21	102.73	0.71	102.02	January 11, 2022
BH26-21	103.04	0.78	102.26	January 11, 2022
BH27-21	102.71	0.84	101.87	January 11, 2022
BH28-21	101.85	1.79	100.06	January 11, 2022
BH29-21	102.31	Blocked	N/A	January 11, 2022
BH30-21	102.44	1.62	100.82	January 11, 2022
BH31-21	103.43	1.27	102.16	January 11, 2022
BH32-21	103.74	1.62	102.12	January 11, 2022
BH33-21*	104.70	1.84	102.86	January 11, 2022
		2.12	102.58	October 11, 2022
		1.98	102.72	October 28, 2022
		1.20	103.51	April 4, 2023
		2.22	102.49	May 31, 2023
BH34-21	102.65	Blocked	N/A	January 11, 2022
BH35-21	105.03	1.22	103.81	January 11, 2022
BH36-21	102.79	0.62	102.17	January 11, 2022
BH37-21	103.54	1.52	102.02	January 11, 2022

Table 2 - Measured Groundwater Levels

Test Hole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Dated Recorded
		Depth (m)	Elevation (m)	
BH38-21	103.62	1.94	101.68	January 11, 2022
TP-1	105.94	Dry	-	November 20, 2020
TP-2	105.06	Dry	-	November 20, 2020
TP-3	102.10	Dry	-	November 20, 2020
TP-4	108.49	Dry	-	November 20, 2020
TP-5	108.36	1.28	107.08	November 20, 2020
TP-6	107.91	1.70	106.21	November 20, 2020
TP-7	106.31	2.24	104.07	November 20, 2020
TP-8	105.48	Dry	-	November 20, 2020
TP-9	104.47	Dry	-	November 20, 2020
TP-10	103.62	0.51	103.11	December 10, 2020
TP-11	103.01	0.89	102.12	December 10, 2020
TP-12	103.21	1.82	101.39	December 10, 2020
TP-13	104.30	0.61	103.69	December 10, 2020
TP-14	105.60	Dry	-	December 10, 2020
TP-15	106.80	2.28	104.52	December 10, 2020
TP-16	104.62	2.33	102.29	December 10, 2020
TP-17	103.90	1.78	102.53	December 10, 2020
TP-18	103.42	Dry	-	December 10, 2020

Notes:
-The ground surface elevation at each test hole location was surveyed using a handheld GPS and referenced to a geodetic datum
-* Denotes groundwater monitoring well

It should be noted that groundwater levels could be influenced by surface water infiltrating the backfilled boreholes. The long-term groundwater levels can also be estimated based on the observed colour, moisture content and consistency of the recovered samples.

In addition to manual water level measurements, a groundwater monitoring program was carried out at the subject site. The groundwater monitoring program provides an overview of the variations in the monitoring well water levels based upon seasonal fluctuations. The monitoring wells were equipped with a submersible datalogger (TD-Diver, VanEssen Instruments) to accurately monitor fluctuations in the water levels. The datalogger was programmed to continuously measure and record water levels at a fixed rate of one (1) reading every 24 hours.

The monitoring program was undertaken from October, 2022 to May 2023. 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 monitoring data is presented in Figures 2 to 13 in Appendix 2.

Upon review of the datalogger readings and manual measurements, the groundwater readings measured within the monitoring wells and the piezometers across the subject site varied from an elevation of 100.26 m to a maximum elevation of 108.1 m, generally decreasing with the topography of the site. Based on our analysis of the measured groundwater levels and the data logger groundwater readings, seasonal groundwater in piezometers and the monitoring wells varied between 0.6 to 2.8 m below ground surface and 0.0 to 3.7 m, respectively.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered satisfactory for the proposed development. It is expected that the proposed residential buildings will be founded on conventional style footings placed on a loose to compact silty sand to sandy silt, compact to dense glacial till, and/or bedrock bearing surface.

It is anticipated that bedrock removal may be required in localized areas across the site for building construction and service installation. All contractors should be prepared for bedrock removal within the subject site.

As the stiff, brown, silty clay layer was only encountered in two borehole locations and was only observed to a shallow depth. A 2 m permissible grade raise restriction is recommended for settlement sensitive structures placed over the silty clay deposit.

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

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing significant organic materials, or construction debris/remnants should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures.

Existing foundations and other construction debris should be entirely removed from within the building perimeters. Under paved areas, existing construction debris should be excavated to a minimum of 1 m below final grade.

Bedrock Removal

Bedrock removal can be accomplished by hoe ramming where only small quantity of the bedrock needs to be removed. Sound bedrock may be removed by line drilling and 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 proximity of the blasting operations should be completed 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/claims related to the blasting operations.
As a general guideline, peak particle velocities (measured at the structures) should not exceed 25 mm/s during the blasting program to reduce the risks of damage to the existing structures.

The blasting operations should be planned and conducted under the supervision of a licensed professional engineer who is also an experienced blasting consultant.

Excavation side slopes in sound bedrock can be excavated almost vertical side walls. A minimum 1 m horizontal ledge, should remain between the overburden excavation and the bedrock surface. The ledge will provide an area to allow for potential sloughing or a stable base for the overburden shoring system.

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 equipments could be a source of vibrations: piling rig, hoe ram, compactor, dozer, crane, truck traffic, etc. The construction of the shoring system using soldier piles or sheet piling will require the use of these equipments. Vibrations, whether it is caused by blasting operations or by construction operations, could be the cause of the source of detrimental vibrations on the adjoining 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 several old or sensitive buildings are encountered in the vicinity of the subject site, considerations should be given to lowering these guidelines.

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 building.

Fill Placement

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

To in-fill existing channels/ditches below building areas, roadways or other settlement sensitive structures, it is recommended to place Granular A, Granular B Type I or II, well graded blast rock (maximum 200 mm diameter) or select subgrade material. The backfill material should be placed under dry conditions, in above freezing temperatures and approved by the geotechnical consultant. The backfill should be placed in maximum 300 mm loose lifts and compacted to 98% of its SPMDD.

Non-specified existing fill along with site-excavated soil could be placed as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in lifts with a maximum thickness of 300 mm and compacted by the tracks of the spreading equipment to minimize voids. Non-specified existing fill and site-excavated soils are not suitable for placement as backfill against foundation walls, unless used in conjunction with a geocomposite drainage membrane, such as Miradrain G100N or Delta Drain 6000.

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. This material should be used structurally only to build up the subgrade for pavements. Where the fill is open-graded, a blinding layer of finer granular fill and/or a woven geotextile may be required to prevent adjacent finer materials from migrating into the voids, with associated loss of ground and settlements. This can be assessed at the time of construction.

5.3 Foundation Design

Bearing Resistance Values (Conventional Shallow Foundation)

Bearing resistance values are provided in Table 3, on the following page, for footings placed on an undisturbed silty sand, glacial till or clean bedrock bearing surface.

Table 3 - Bearing Resistance Values

Bearing Surface	Factored Bearing Resistance Value at ULS (kPa)	Bearing Resistance Value at SLS or Allowable Bearing Pressure (kPa)
Loose to Compact Silty Sand to Sandy Silt	250	150
Compact to Dense Glacial Till	250	150
Engineered Fill (Granular A or Granular B Type II)	250	150
Clean Surface Sounded Bedrock	1000	-

Note: A geotechnical resistance factor of 0.5 was applied to the bearing resistance values at ULS.

An undisturbed soil bearing surface consists of a surface from which all organic materials 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.

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 designed using the bearing resistance values at SLS provided in Table 1 will be subjected to potential post construction total and differential settlements of 25 and 20 mm, respectively. Footings placed on clean, surface sounded bedrock will be subjected to negligible 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 an undisturbed soil bearing surface above the groundwater table when a plane extending horizontally and vertically from the bottom edge of the footing at a minimum of 1.5H:1V, passing 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 a minimum of 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 heavily fractured, weathered bedrock bearing medium 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 to decrease the soil bearing resistance value by 25% for the footings placed on soil bearing media to reduce the potential long-term total and differential settlements.

Also, at the soil/bedrock and bedrock/soil transitions, it is recommended 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. 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.

5.4 Design for Earthquakes

The subject site can be taken as seismic site response **Class C** as defined in Table 4.1.8.4.A of the Ontario Building Code (OBC) 2012 for foundations considered at this site. A higher seismic class may be applicable, such as Class A or B, provided the footings are within 3 m of the bedrock surface.

However, this would need to be confirmed by performing a seismic shear wave velocity test at the subject site. The soils underlying the site are not susceptible to liquefaction. Reference should be made to the latest revision of the Ontario Building Code for a full discussion of the earthquake design requirements.

5.5 Basement Slab

With the removal of all topsoil and deleterious fill, such as those containing organic materials, within the footprint of the proposed buildings, the native soil surface will be considered to be an acceptable subgrade on which to commence backfilling for floor slab construction. Provision should be made for proof rolling the soil subgrade using heavy vibratory compaction equipment prior to placing any fill.

Any soft areas should be removed and backfilled with appropriate backfill material prior to placing any fill. OPSS Granular A or Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab. All backfill material within the footprint of the proposed building(s) should be placed in maximum 300 mm thick loose layers and compacted to a minimum of 98% of the SPMDD.

5.6 Basement Wall

There are several combinations of backfill materials and retained soils that could be applicable for the basement walls of the subject structure. However, the conditions can be well-represented by assuming the retained soil consists of a material with an angle of internal friction of 30 degrees and a bulk (drained) unit weight of 20 kN/m3.However, undrained conditions are anticipated (i.e. below the groundwater level). Therefore, the applicable effective (undrained) unit weight of the retained soil can be taken as 13 kN/m3, where applicable. A hydrostatic pressure should be added to the total static earth pressure when using the effective unit weight.

However, if a full drainage system is being implemented and approved by Paterson at the time of construction, hydrostatic pressure can be omitted in the structural design.

Lateral Earth Pressures

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

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

An additional pressure having a magnitude equal to $K_o \cdot q$ and acting on the entire height of the wall should be added to the above diagram for any surcharge loading, q (kPa), that may be placed at ground surface adjacent to the wall. The surcharge pressure will only be applicable for static analyses and should not be used in conjunction with the seismic loading case. Actual earth pressures could be higher than the “at-rest” case if care is not exercised during the compaction of the backfill materials to maintain a minimum separation of 0.3 m from the walls with the compaction equipment.

Seismic Earth Pressures

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

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

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

The peak ground acceleration, (a_{max}), for the site area is 0.30 g according to OBC 2012. Note that the vertical seismic coefficient is assumed to be zero.

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

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

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

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

The earth forces calculated are unfactored. For the ULS case, the earth loads should be factored as live loads, as per OBC 2012.

5.7 Pavement Design

Car only parking areas, access and heavy traffic access areas are expected at this site. The subgrade material is anticipated to consist of silty sand to sandy silt, glacial till, compacted engineered fill or bedrock. The proposed pavement structures are presented in Tables 4,5 and 6.

Table 4 – Recommended Pavement Structure – Car Only Parking Areas

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

Table 5 – Recommended Pavement Structure – Local and Collector Roadways Without Bus Traffic

Thickness (mm)	Material Description
40	**Wear Course** – HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Wear Course** – HL-8 or Superpave 19 Asphaltic Concrete
150	**BASE** – OPSS Granular A Crushed Stone
450	**SUBBASE** – OPSS Granular B Type II
Subgrade – Either fill, in-situ soil, or OPSS Granular B Type I or II material placed over in-situ soil, or bedrock.	

Table 6 – Recommended Pavement Structure – Roadways with Bus Traffic

Thickness (mm)	Material Description
40	**Wear Course** – HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Upper Binder Course** – HL-8 or Superpave 19 Asphaltic Concrete
50	**Lower Binder Course** – HL-8 or Superpave 19 Asphaltic Concrete
150	**BASE** – OPSS Granular A Crushed Stone
600	**SUBBASE** – OPSS Granular B Type II
Subgrade – Either fill, in-situ soil, or OPSS Granular B Type I or II material placed over in-situ soil, or bedrock.	

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

For residential driveways and car only parking areas, an Ontario Traffic Category A will be used. For local and collector roadways, an Ontario Traffic Category B should be used for design purposes. For roadways with bus traffic, an Ontario Traffic Category D should be used for design purposes.

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 I or 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.

If bedrock is encountered at the subgrade level, the total thickness of the pavement granular materials (base and subbase) could be reduced to 300 mm. The upper 300 mm of the bedrock surface should be reviewed and approved by Paterson prior to placing the base and subbase materials. Care should be exercised to ensure that the bedrock subgrade does not have depressions that will trap water.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage

A perimeter foundation drainage system is recommended to be provided for the proposed structures. The system should consist of a 100 to 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 10 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structure. The pipe should have a positive outlet, such as a gravity connection to the storm sewer.

Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free-draining, non-frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a drainage geocomposite, such as Delta Drain 6000, connected to the perimeter foundation drainage system. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose. A waterproofing system should be provided to the elevator pits (pit bottom and walls).

6.2 Protection of Footings Against Frost Action

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

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

Frost Susceptibility of Bedrock

When bedrock is encountered above the proposed founding depth and soil frost cover is less than 1.5 m, the frost susceptibility of the bedrock should be determined. This can be accomplished as follows:

- ❒ Drill supplemental coreholes within the bedrock in the vicinity of the foundations and assess the frost susceptibility.

- ❒ Examine service trench profiles extending in the bedrock in the vicinity of the foundations to determine if weathering is extensive.

If the bedrock is considered to be **non-frost susceptible**, the footings can be poured directly on the bedrock without any further frost protective measures.

If the bedrock is considered to be **frost susceptible**, the following measures should be implemented for frost protection:

- ❒ Option A – Sub-excavate the weathered bedrock to sound bedrock or to the required frost cover depth. Pour footings at the lower level.

- ❒ Option B – Use insulation to protect footings. It is preferable to pour footings on the insulation overlying weathered bedrock. However, due to potential undulating of the bedrock surface, consideration may have to be given to adopting an insulation detail that allows the footing to be poured directly on the weathered bedrock.

6.3 Excavation Side Slopes

The side slopes of excavations in the overburden materials should be either cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is 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). Where space restrictions exist, or to reduce the trench width, the excavation can be carried out within the confines of a fully braced steel trench box.

Unsupported Side Slopes

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsoil at this site is considered to be mainly a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

In bedrock, almost vertical side slopes can be used provided that all loose rock and blocks with unfavourable weak planes are removed or stabilized.

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

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

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

6.4 Pipe Bedding and Backfill

The pipe bedding for sewer and water pipes should consist of at least 150 mm of OPSS Granular A material for areas over a soil subgrade. However, the bedding thickness should be increased to 300 mm for areas over a bedrock subgrade, if encountered. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of its SPMDD. The bedding material should extend at a minimum to the spring line of the pipe.

The cover material, which should consist of OPSS Granular A crushed stone, should extend from the spring line of the pipe to a minimum of 300 mm above the obvert of the pipe. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of its SPMDD.

Generally, it should be possible to re-use the moist (not wet) silty sand to sandy silt and glacial till above the cover material if the excavation and filling operations are carried out in dry weather conditions. Wet sub-excavated soil 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. All stones greater than 300 mm in their greatest dimension should be removed prior to reuse of site-generated glacial till.

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) should consist of 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 98% of the SPMDD.

6.5 Groundwater Control

Groundwater Control for Building Construction

Based on our observations, it is anticipated that groundwater infiltration into the excavations should be 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

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

For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

6.6 Winter Construction

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

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

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters 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 in the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

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

7.0 Recommendations

A materials testing and observation services program is a requirement for the provided foundation design data to be applicable. The following aspects of the program should be performed by the geotechnical consultant:

- ❒ Observation of all bearing surfaces prior to the placement of concrete.
- ❒ Sampling and testing of the concrete and fill materials used.
- ❒ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❒ Observation of all subgrades prior to backfilling.
- ❒ Field density tests to determine the level of compaction achieved.
- ❒ Sampling and testing of the bituminous concrete including mix design reviews.

All excess soils generated by construction activities should be handled as per *Ontario Regulation 406/19: On-Site and Excess Soil Management.*

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

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 Caivan Communities 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.

Kevin A. Pickard, P.Eng.

LICENSED PROFESSIONAL ENGINEER
August 7, 2024
D. J. GILBERT
100116130
PROVINCE OF ONTARIO

David J. Gilbert, P.Eng.

Michael Killam, P.Eng.

Report Distribution:

- ☐ Caivan Communities (Digital copy)
- ☐ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

GRAIN SIZE DISTRIBUTION RESULTS

ANALYTICAL TESTING RESULTS

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
5993, 6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

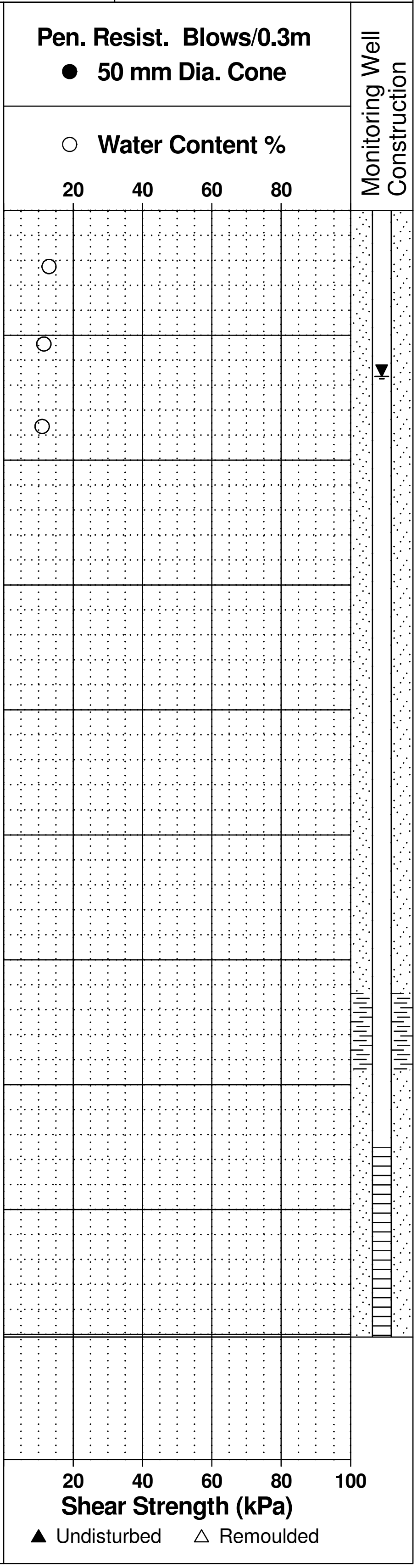
BORINGS BY CME-55 Low Clearance Drill

DATE September 28, 2022

FILE NO. **PG5570**

HOLE NO. **BH 1-22**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	107.31
TOPSOIL 0.30							
Loose to compact, brown **SILTY SAND,** trace gravel 0.60		AU	1				
		SS	2	45	17	1	106.31
GLACIAL TILL: Compact to dense, brown silty sand to sandy silt with gravel, cobbles and boulders		SS	3	14	65		
2.34						2	105.31
		RC	1	100	89		
						3	104.31
		RC	2	100	100		
						4	103.31
						5	102.31
		RC	3	100	100		
BEDROCK: Excellent quality, grey limestone interbedded with dolostone							
						6	101.31
		RC	4	98	98		
						7	100.31
						8	99.31
		RC	5	100	100		
9.02						9	98.31
End of Borehole (GWL @ 1.33m - Oct. 11, 2022)							



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
5993, 6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

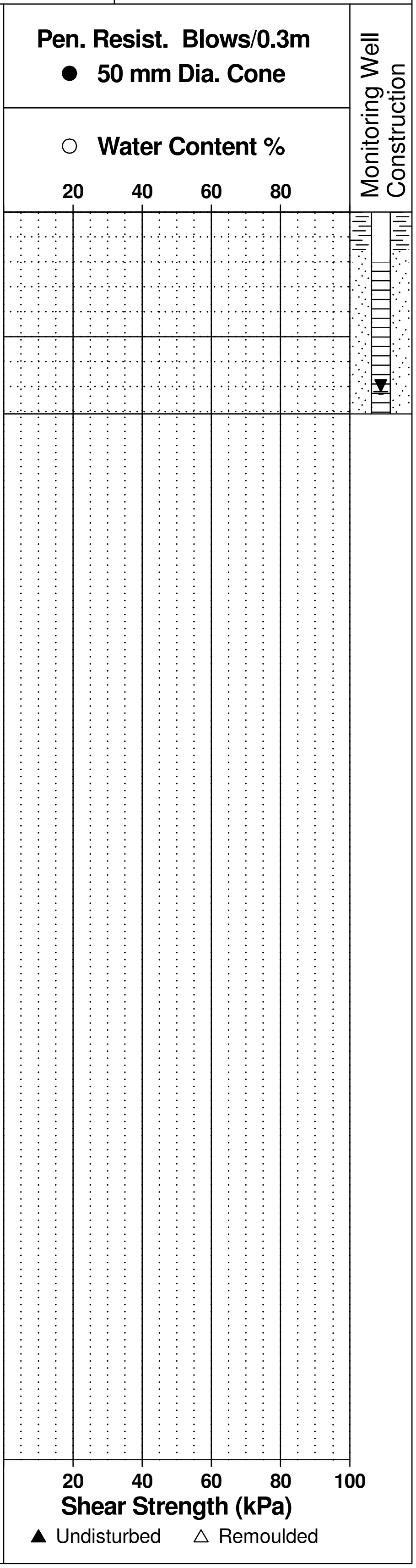
BORINGS BY CME-55 Low Clearance Drill

DATE September 28, 2022

FILE NO. PG5570

HOLE NO. BH 1A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	107.31
OVERBURDEN						1	106.31
1.62							
End of Borehole Practical refusal to augering at 1.62m depth (GWL @ 1.44m - Oct. 11, 2022)							



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
5993, 6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

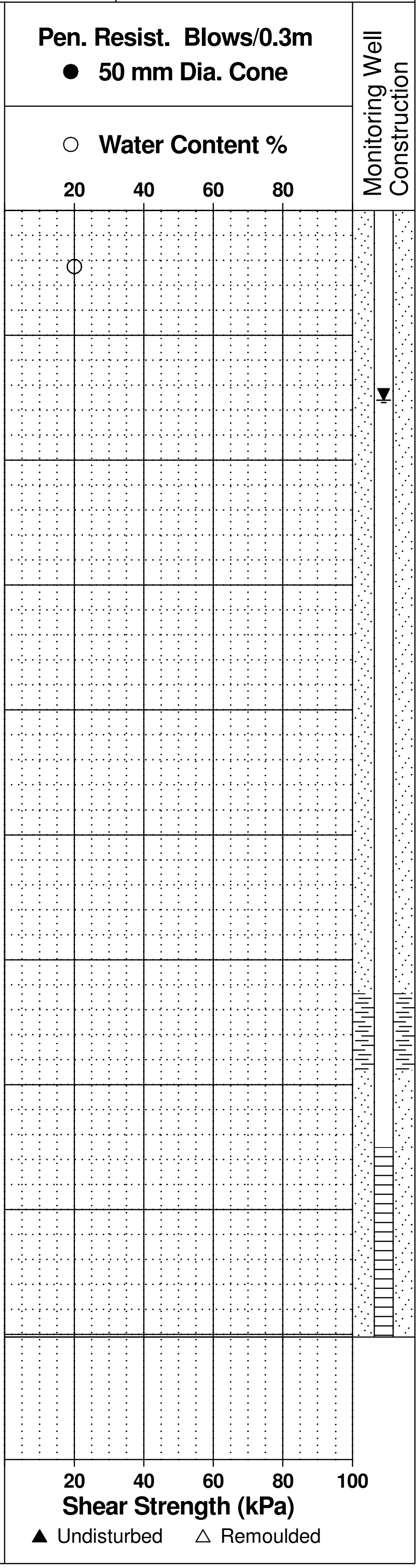
BORINGS BY CME-55 Low Clearance Drill

DATE September 28, 2022

FILE NO. **PG5570**

HOLE NO. **BH 2-22**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD		
GROUND SURFACE						0	103.58
TOPSOIL 0.30							
Compact, brown **SILTY SAND to SANDY SILT,** trace clay and gravel 0.76		AU	1				
		RC	1	100	77	1	102.58
		RC	2	100	97	2	101.58
						3	100.58
BEDROCK: Good to excellent quality, grey limestone interbedded with dolostone		RC	3	100	100	4	99.58
		RC	4	100	100	5	98.58
						6	97.58
		RC	5	100	97	7	96.58
		RC	6	100	100	8	95.58
9.02						9	94.58
End of Borehole (GWL @ 1.52m - Oct. 11, 2022)							



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
5993, 6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

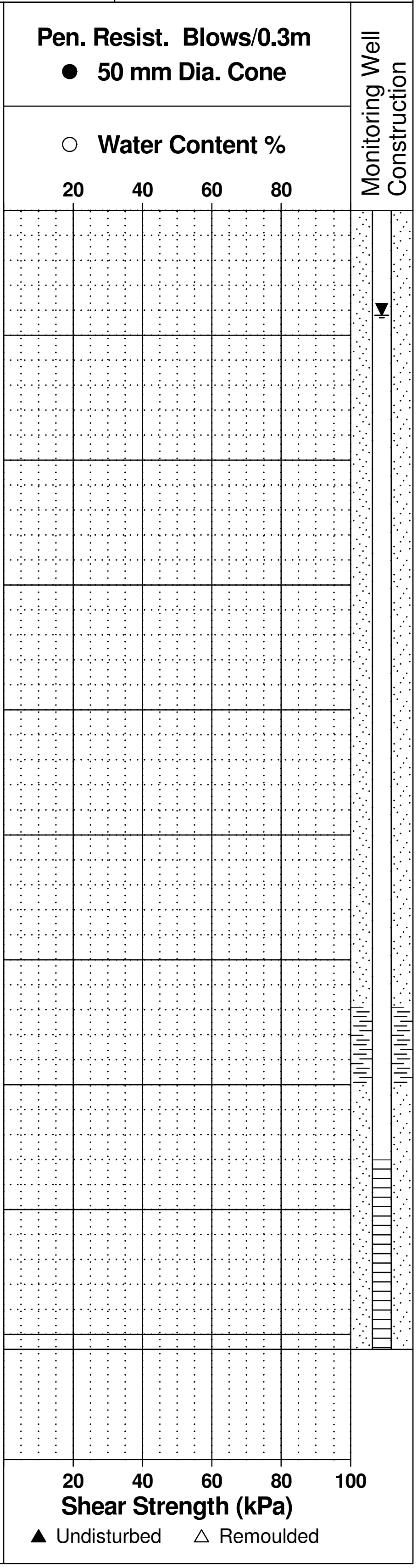
DATE September 29, 2022

FILE NO. **PG5570**

HOLE NO. **BH 3-22**

SOIL DESCRIPTION	STRATA PLOT (depth, m)	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
TOPSOIL	0.28				
Compact, brown **SILTY SAND to SANDY SILT**		AU	1		
		SS	2	58	19
	2.21	SS	3	58	17
GLACIAL TILL: Grey silty sand to sandy silt with gravel, cobbles and boulders, trace clay		SS	4	67	3
	3.43	SS	5	67	50+
BEDROCK: Excellent quality, grey limestone interbedded with doloston		RC	1	100	96
		RC	2	100	98
		RC	3	100	100
	9.12	RC	4	100	100
End of Borehole					
(GWL @ 0.84m - Oct. 11, 2022)					

DEPTH (m)	ELEV. (m)
0	102.25
1	101.25
2	100.25
3	99.25
4	98.25
5	97.25
6	96.25
7	95.25
8	94.25
9	93.25



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
5993, 6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE September 29, 2022

FILE NO. PG5570

HOLE NO. BH 3A-22

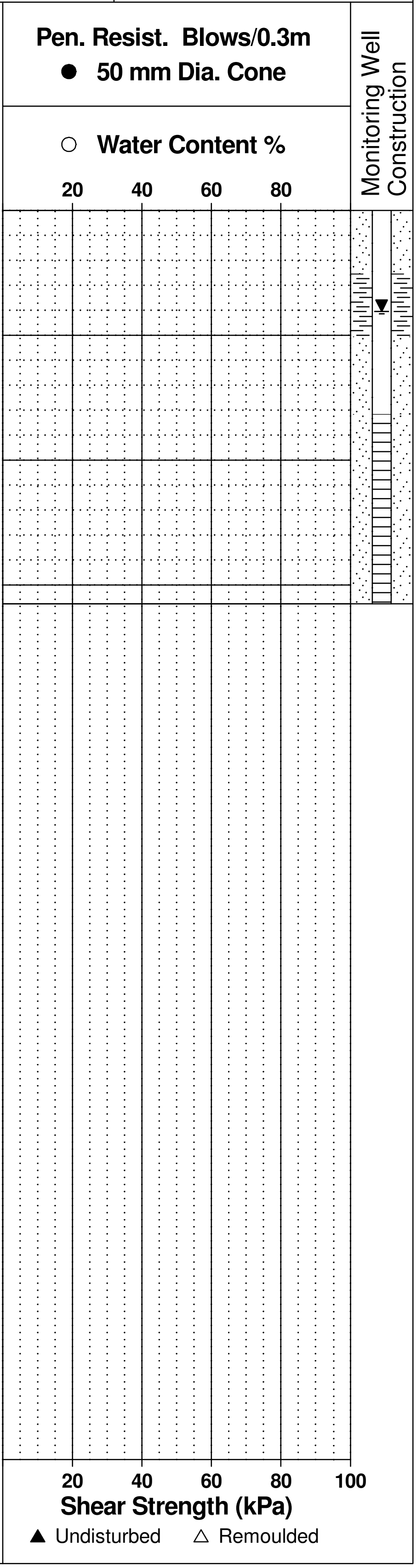
SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD
GROUND SURFACE					
TOPSOIL 0.28					
Compact, brown **SILTY SAND to SANDY SILT** 2.20		AU	1		
GLACIAL TILL: Grey silty sand to sandy silt with gravel, cobbles and boulders, trace clay 3.15					

End of Borehole

Practical refusal to augering at 3.15m depth.

(GWL @ 0.81m - Oct. 11, 2022)

DEPTH (m)	ELEV. (m)
0	102.25
1	101.25
2	100.25
3	99.25



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
5993, 6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

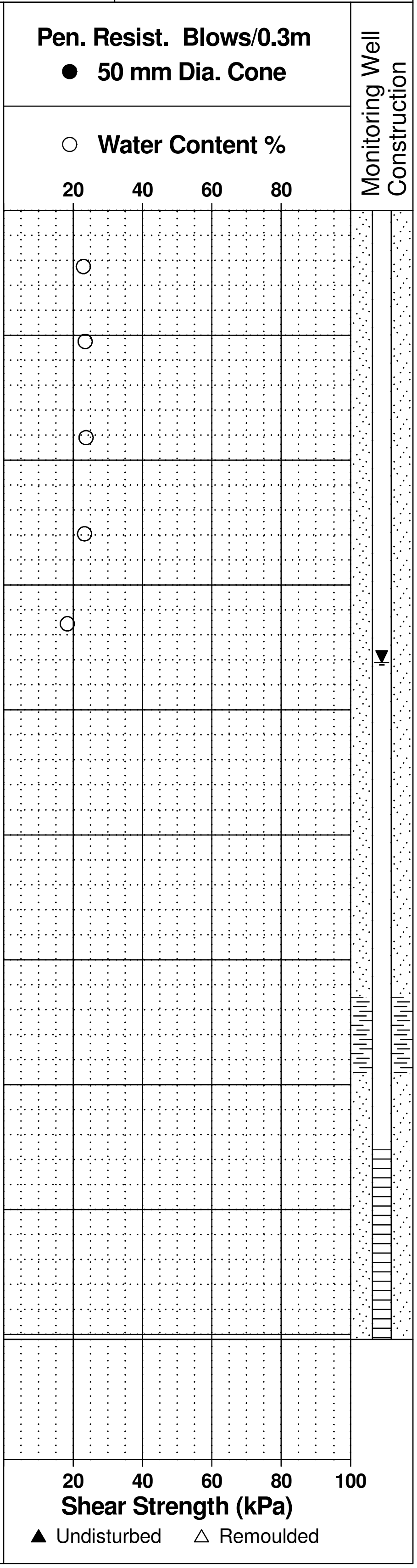
DATE September 29, 2022

FILE NO. PG5570

HOLE NO. BH 4-22

SOIL DESCRIPTION	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE				
TOPSOIL 0.28				
Compact, brown **SILTY SAND to SANDY SILT**	AU	1		
	SS	2	75	22
2.21	SS	3	75	21
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders, trace clay	SS	4	67	17
- grey by 3.0m depth 3.61	SS	5	57	45
	RC	1	100	84
	RC	2	100	98
BEDROCK: Good to excellent quality, grey limestone interbedded with dolostone	RC	3	100	100
9.04	RC	4	100	100
End of Borehole				
(GWL @ 3.62m - Oct. 11, 2022)				

DEPTH (m)	ELEV. (m)
0	105.71
1	104.71
2	103.71
3	102.71
4	101.71
5	100.71
6	99.71
7	98.71
8	97.71
9	96.71



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
5993, 6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE September 30, 2022

FILE NO. **PG5570**

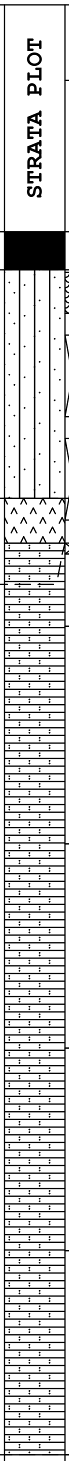
HOLE NO. **BH 5-22**

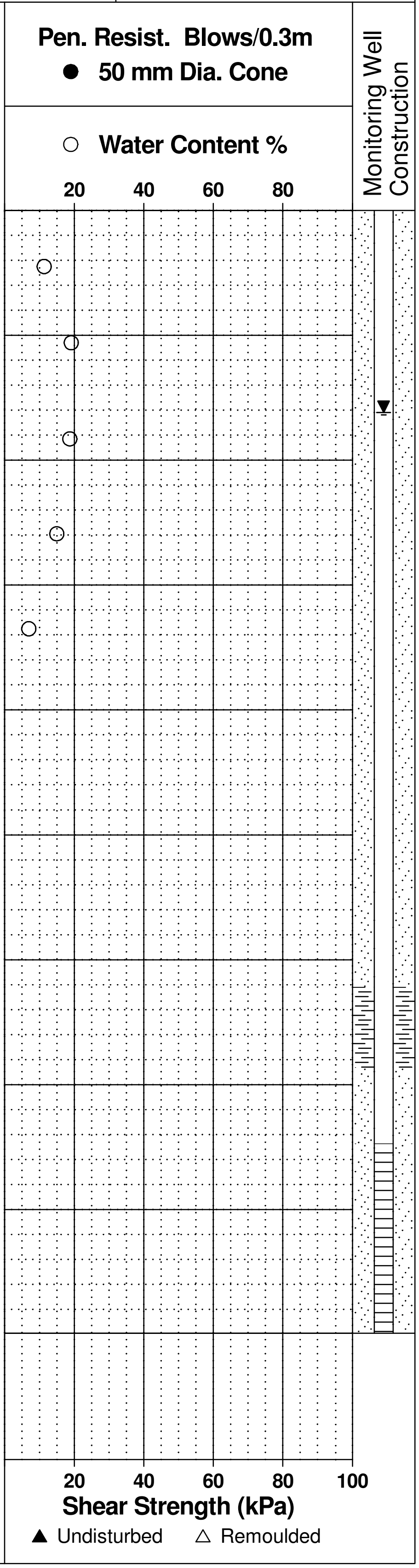
SOIL DESCRIPTION	Depth to base (m)	TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
TOPSOIL	0.28				
Compact, brown **SILTY SAND to SANDY SILT**	1.96	AU	1		
		SS	2	79	21
		SS	3	71	29
GLACIAL TILL: Compact to dense, brown silty sand to sandy silt, trace gravel	2.29	SS	4	100	50+
BEDROCK: Excellent quality, grey limestone interbedded with dolostone	8.99	RC	1	100	100
		RC	2	100	100
		RC	3	100	100
		RC	4	100	100
		RC	5	100	100

End of Borehole

(GWL @ 1.62m - Oct. 11, 2022)

DEPTH (m)	ELEV. (m)
0	105.70
1	104.70
2	103.70
3	102.70
4	101.70
5	100.70
6	99.70
7	98.70
8	97.70





patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
5993, 6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Hand Auger

DATE September 28, 2022

FILE NO. PG5570

HOLE NO. HA 1-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % 20 40 60 80	Monitoring Well Construction
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD				
GROUND SURFACE						0	106.78		
TOPSOIL 0.30									
Brown **SILTY SAND,** trace gravel 0.69									
End of Hand Auger Hole (GWL @ 0.31m - Oct. 11, 2022)									

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

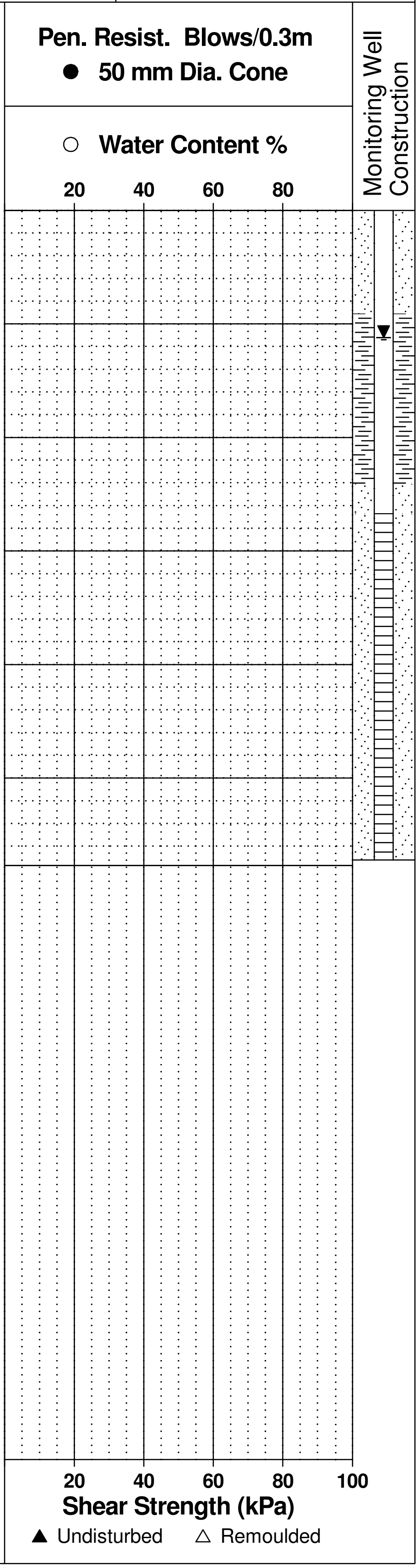
BORINGS BY Track-Mount Power Auger

DATE December 14, 2021

FILE NO. PG5570

HOLE NO. BH 1-21

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	104.29
TOPSOIL 0.43						
Very loose, brown **SILTY SAND**	AU	1				
- some clay by 0.6m depth	SS	2	8	1	1	103.29
1.52						
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders, trace clay	SS	3	25	23		
2.19	SS	4	100	50+	2	102.29
	RC	1	100	57		
BEDROCK: Fair to excellent quality, grey limestone interbedded with dolostone					3	101.29
	RC	2	100	68		
- 20mm thick mud seam at 3.4m depth					4	100.29
- 12mm thick mud at 3.7m depth						
	RC	3	100	98	5	99.29
5.77						
End of Borehole						
(GWL @ 1.22m - Jan. 11, 2022)						



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 14, 2021

FILE NO. PG5570

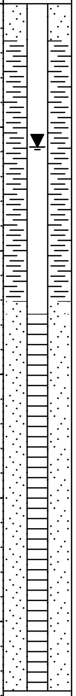
HOLE NO. BH 2-21

SOIL DESCRIPTION	Strata depth (m)	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	107.19
Mulch	0.10						
TOPSOIL	0.51						
Compact, brown **SILTY SAND**	0.91	AU	1				
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders		SS	2	75	12	1	106.19
		SS	3	75	50		
	2.21	SS	4	0	50+	2	105.19
BEDROCK: Good to excellent quality, grey limestone - 12mm thick mud seam at 4.1m depth		RC	1	100	80		
		RC	2	100	100	3	104.19
						4	103.19
		RC	3	100	95	5	102.19
End of Borehole	5.61						

(GWL @ 0.82m - Jan. 11, 2022)

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

Monitoring Well Construction



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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 15, 2021

FILE NO. **PG5570**

HOLE NO. **BH 3-21**

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	108.41
Mulch 0.08						
TOPSOIL 0.43	AU	1				
Loose, brown **SILTY SAND** 0.63						
Loose to compact, brown **SILTY SAND to SANDY SILT**	SS	2	50	10	1	107.41
1.55	SS	3	0	50+		
BEDROCK: Good to excellent, grey limestone interbedded with dolostone	RC	1	100	100	2	106.41
	RC	2	100	72	3	105.41
- 30mm thick mud seam at 4.3m depth					4	104.41
	RC	3	100	100	5	103.41
5.72						
End of Borehole						
(GWL @ 0.89m - Jan. 11, 2022)						

STRATA PLOT

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Monitoring Well Construction

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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 15, 2021

FILE NO. PG5570

HOLE NO. BH 4-21

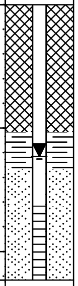
SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	108.95
Mulch 0.10							
TOPSOIL 0.30		AU	1				
Compact, brown **SILTY SAND,** trace shells 0.60							
		SS	2	50	12	1	107.95
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders 2.23		SS	3	42	21	2	106.95
End of Borehole Practical refusal to augering at 2.23m depth (GWL @ 1.23m - Jan. 11, 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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 15, 2021

FILE NO. **PG5570**

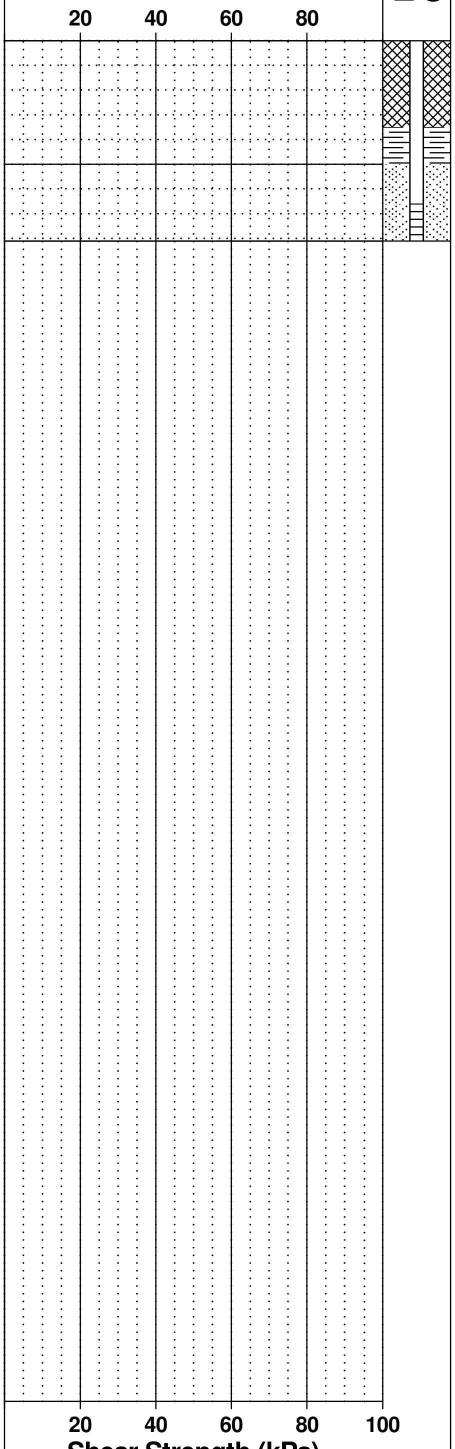
HOLE NO. **BH 5-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	108.38
TOPSOIL 0.36							
Loose, brown **SILTY SAND** 1.22		AU	1				
		SS	2		4	1	107.38
GLACIAL TILL: Dense, grey silty sand with gravel, cobbles and boulders 1.62		SS	3	0	50+		
End of Borehole Practical refusal to augering at 1.62m depth (BH dry - January 11, 2022)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**

○ **Water Content %**

Piezometer Construction



Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

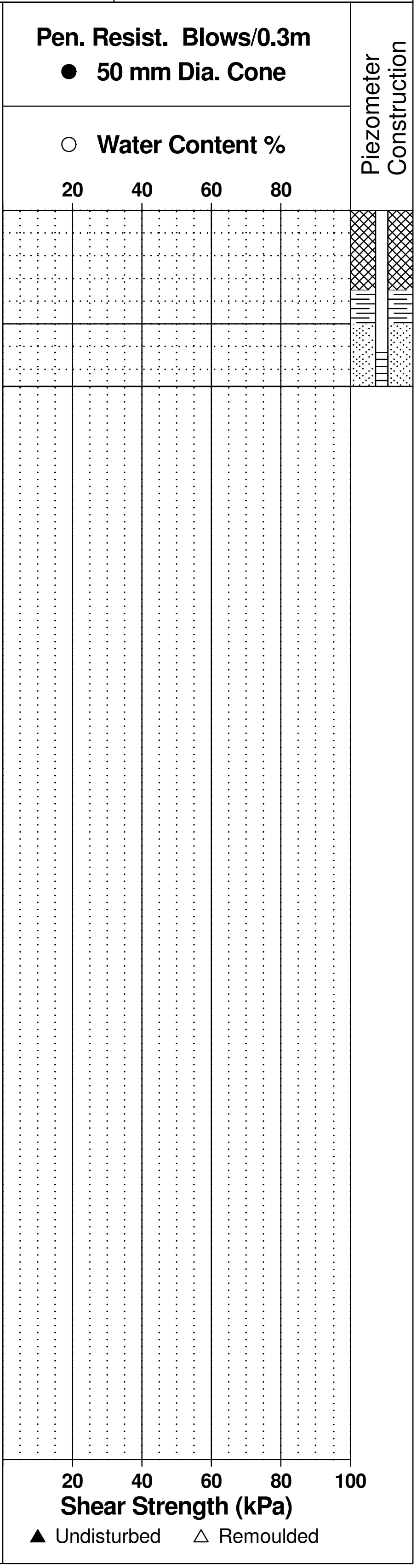
BORINGS BY Track-Mount Power Auger

DATE December 15, 2021

FILE NO. PG5570

HOLE NO. BH 6-21

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							0	106.32
TOPSOIL	0.41							
Loose, brown **SILTY SAND,** trace clay	0.60		AU	1				
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders	1.55		SS	2	83	17	1	105.32
End of Borehole Practical refusal to augering at 1.55m depth (BH dry - January 11, 2022)								



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 15, 2021

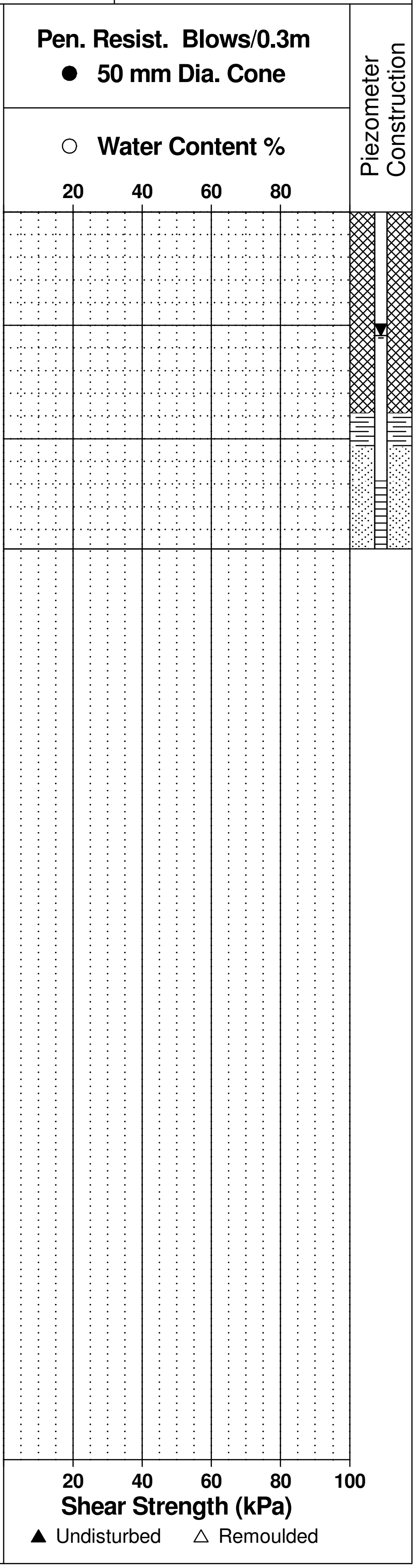
FILE NO. **PG5570**

HOLE NO. **BH 7-21**

SOIL DESCRIPTION		SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Mulch	0.10	AU	1			0	107.04
TOPSOIL	0.41						
Loose, brown **SILTY SAND**	0.60						
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders		SS	2	100	19	1	106.04
		SS	3	67	44	2	105.04
		SS	4		52		
	2.97						
End of Borehole							

Practical refusal to augering at 2.97m depth

(GWL @ 1.09m - Jan. 11, 2022)



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 15, 2021

FILE NO. PG5570

HOLE NO. BH 8-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % 20 40 60 80	Piezometer Construction
GROUND SURFACE									
Mulch 0.05		AU	1			0	105.91		
TOPSOIL 0.38									
Loose, brown **SILTY SAND** 0.60									
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders		SS	2	67	20	1	104.91		
1.60		SS	3	0	50+				
End of Borehole Practical refusal to augering at 1.60m depth (BH dry - January 11, 2022)									

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

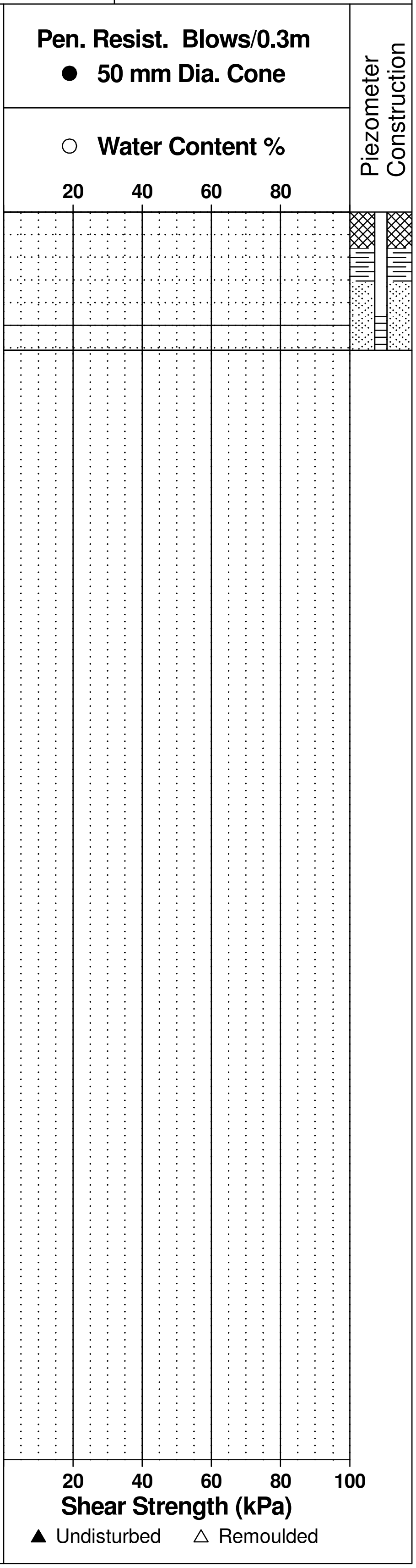
BORINGS BY Track-Mount Power Auger

DATE December 15, 2021

FILE NO. PG5570

HOLE NO. BH 9-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.62
TOPSOIL 0.36							
Loose, brown **SILTY SAND,** trace clay 0.69		AU	1				
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders 1.22		SS	2		50+	1	103.62
End of Borehole Practical refusal to augering at 1.22m depth (Piezometer damaged - Jan. 11, 2022)							



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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 15, 2021

FILE NO. **PG5570**

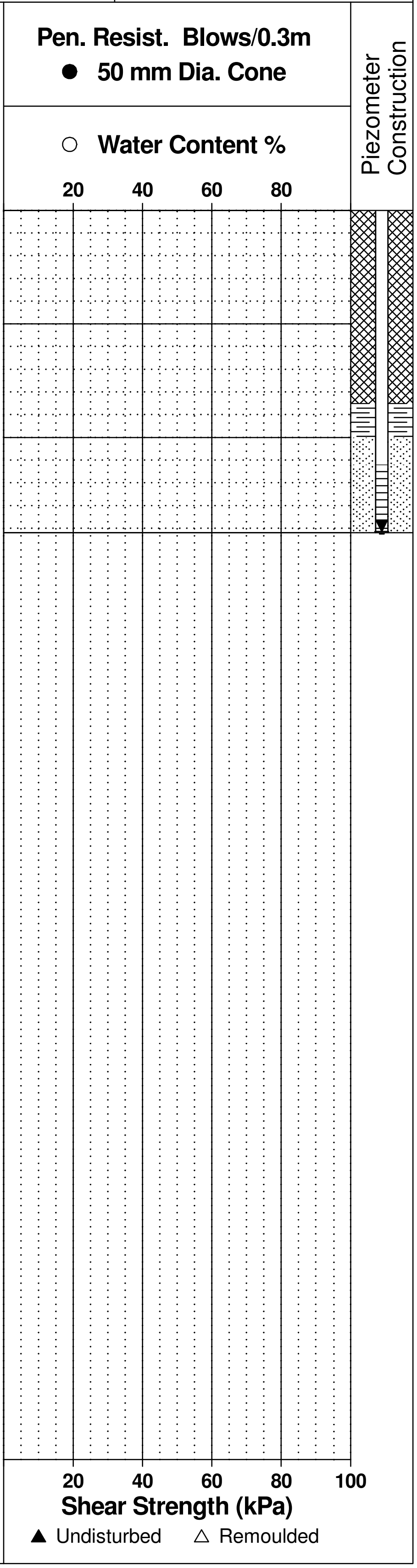
HOLE NO. **BH10-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.70
TOPSOIL 0.36							
Compact, brown **SILTY SAND**		AU	1				
		SS	2	67	23	1	104.70
		SS	3	67	16	2	103.70
2.74		SS	4	64	25		
GLACIAL TILL: Compact to dense, grey silty sand with gravel, cobbles and boulders 2.84							

End of Borehole

Practical refusal to augering at 2.84m depth

(GWL @ 2.83m - Jan. 11, 2022)



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 16, 2021

FILE NO. PG5570

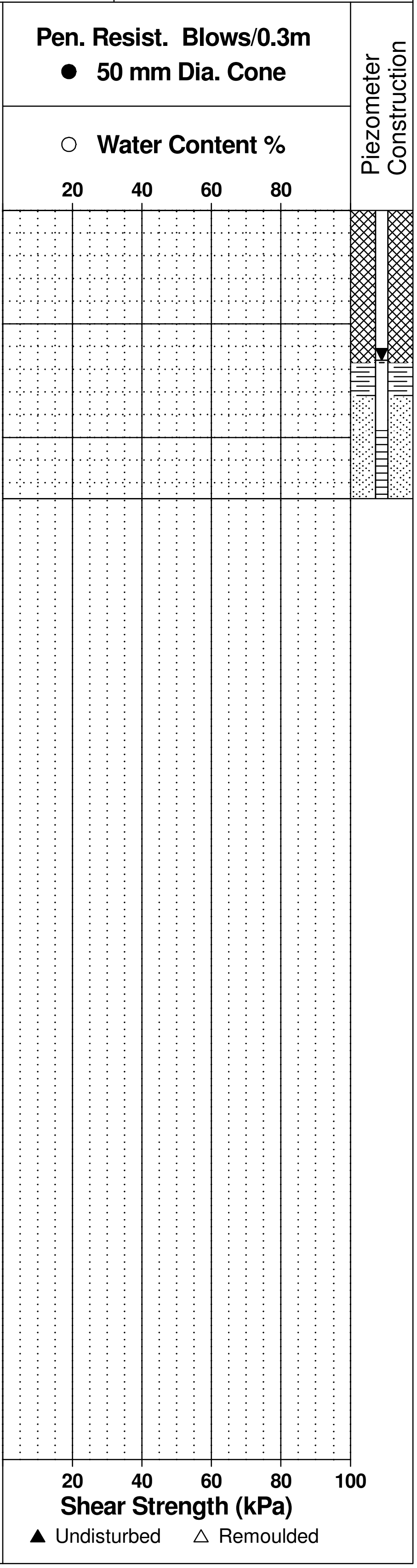
HOLE NO. BH11-21

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	104.98
TOPSOIL 0.33						
Compact, brown **SILTY SAND** 0.66	AU	1				
Compact, brown **SILTY SAND to SANDY SILT** 1.12	SS	2	67	24	1	103.98
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders	SS	3	67	32	2	102.98
2.54	SS	4	80	50+		

End of Borehole

Practical refusal to augering at 2.54m depth

(GWL @ 1.32m - Jan. 11, 2022)



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 16, 2021

FILE NO. PG5570

HOLE NO. BH12-21

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	104.05
TOPSOIL 0.36						
Compact, brown **SILTY SAND** 0.69	AU	1				
Compact, brown **SILTY SAND to SANDY SILT** 1.45	SS	2	67	13	1	103.05
GLACIAL TILL: Dense, brown silty sand with gravel, cobbles and boulders 2.26	SS	3	17	36	2	102.05

End of Borehole

Practical refusal to augering at 2.26m depth

(GWL @ 1.58m - Jan. 11, 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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 16, 2021

FILE NO. PG5570

HOLE NO. BH13-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.54
TOPSOIL 0.36							
		AU	1				
Loose, brown **SILTY SAND to SANDY SILT**		SS	2	25	6	1	102.54
1.60		SS	3	0	50+		
End of Borehole Practical refusal to augering at 1.60m depth (GWL @ 1.44m - Jan. 11, 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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

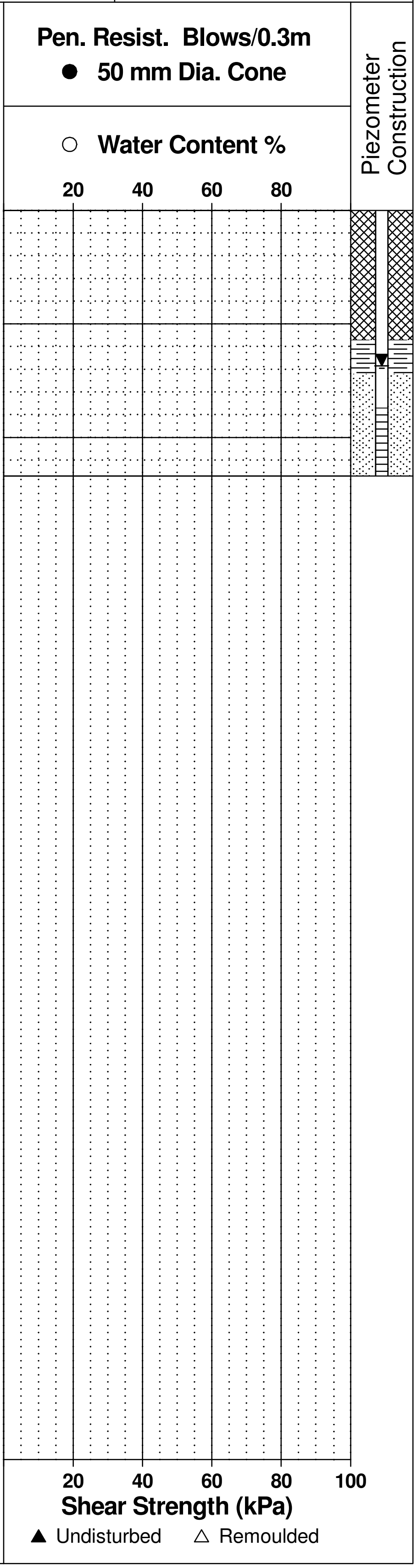
BORINGS BY Track-Mount Power Auger

DATE December 16, 2021

FILE NO. **PG5570**

HOLE NO. **BH14-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD		
GROUND SURFACE							
TOPSOIL 0.36						0	103.28
Loose, brown **SILTY SAND** 0.69		AU	1				
Loose, brown **SILTY SAND to SANDY SILT** 1.45		SS	2	67	6	1	102.28
GLACIAL TILL: Loose to dense, brown silty sand with clay, gravel, cobbles and boulders 2.34		SS	3	25	7	2	101.28
		SS	4	0	50+		
End of Borehole Practical refusal to augering at 2.34m depth (GWL @ 1.37m - Jan. 11, 2022)							



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 16, 2021

FILE NO. PG5570

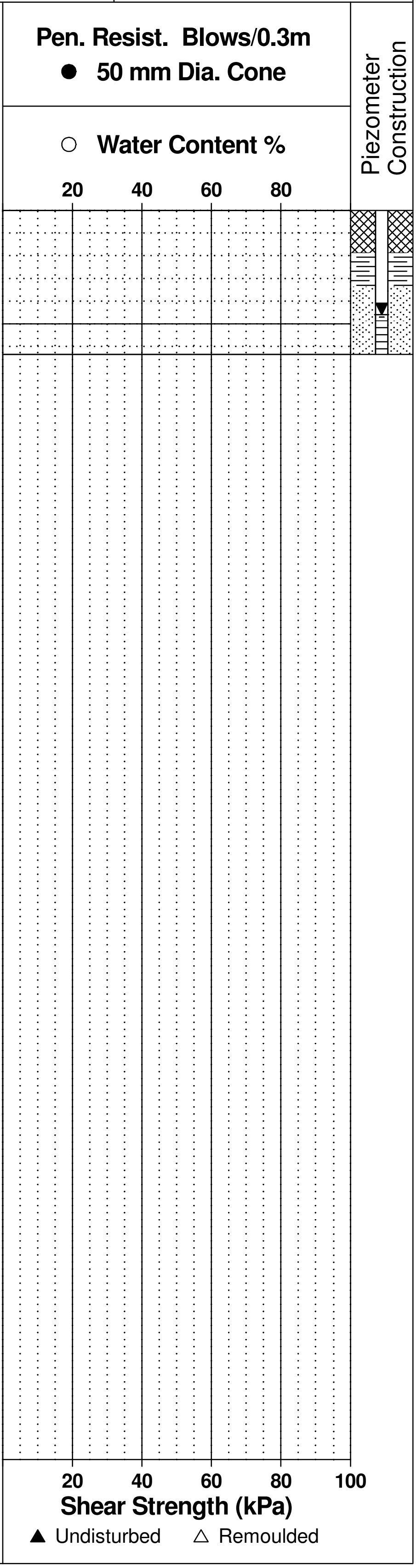
HOLE NO. BH15-21

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	103.08
TOPSOIL 0.30						
Compact, brown **SILTY SAND to SANDY SILT** 0.91	AU	1				
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders 1.27	SS	2	63	19	1	102.08

End of Borehole

Practical refusal to augering at 1.27m depth

(GWL @ 0.92m - Jan. 11, 2022)



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 16, 2021

FILE NO. PG5570

HOLE NO. BH16-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content % (20 40 60 80)	Piezometer Construction
GROUND SURFACE						0	104.19		
TOPSOIL 0.25									
Compact, brown **SILTY SAND,** trace gravel 0.69		AU	1						
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders 1.50		SS	2		22	1	103.19		
End of Borehole									
Practical refusal to augering at 1.50m depth									
(GWL @ 1.32m - Jan. 11, 2022)									

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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 16, 2021

FILE NO. PG5570

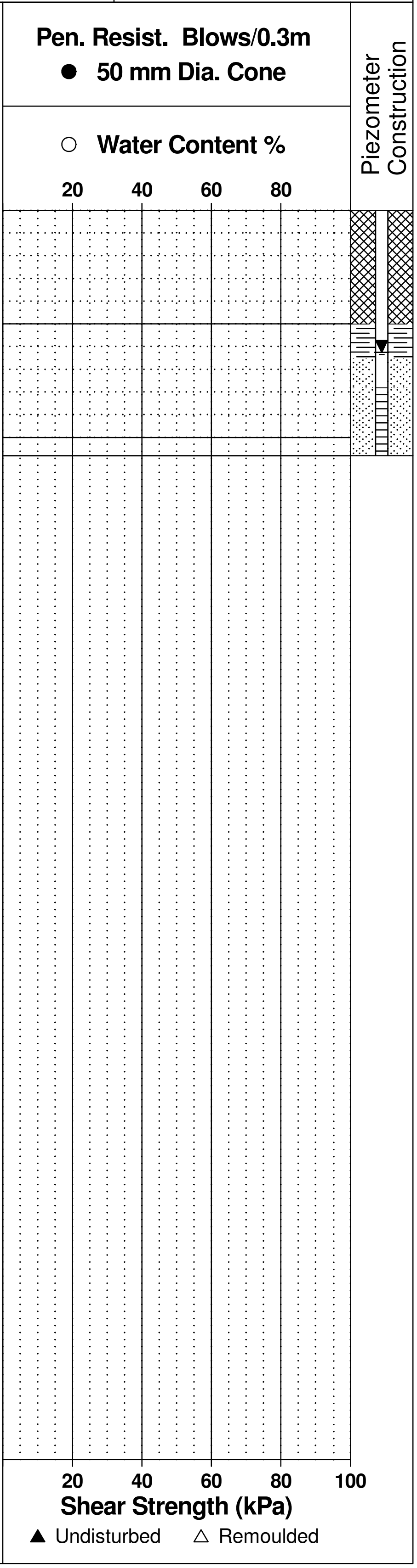
HOLE NO. BH17-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.42
TOPSOIL 0.28							
Loose, brown **SILTY SAND to SANDY SILT**		AU	1				
		SS	2	75	5	1	103.42
1.98		SS	3	91	11	2	102.42
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders 2.16							

End of Borehole

Practical refusal to augering at 2.16m depth

(GWL @ 1.25m - Jan. 11, 2022)



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

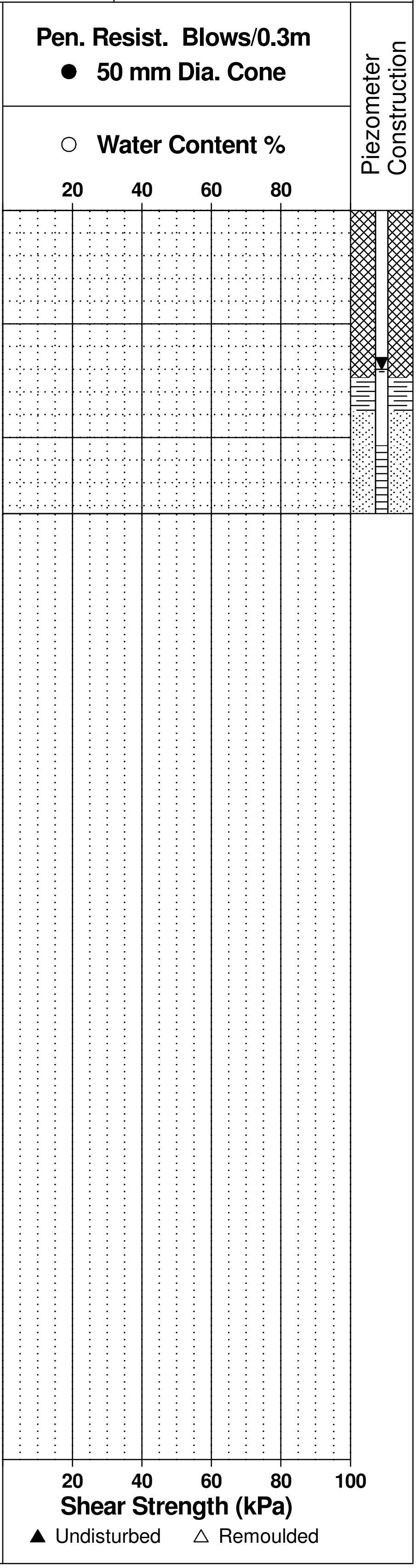
BORINGS BY Track-Mount Power Auger

DATE December 16, 2021

FILE NO. PG5570

HOLE NO. BH18-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.06
TOPSOIL 0.30							
Compact, brown **SILTY SAND to SANDY SILT**		AU	1				
		SS	2	75	10	1	104.06
		SS	3	100	19	2	103.06
- grey by 2.0m depth 2.67		SS	4		50+		
End of Borehole Practical refusal to augering at 2.67m depth (GWL @ 1.40m - Jan. 11, 2022)							



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 16, 2021

FILE NO. PG5570

HOLE NO. BH19-21

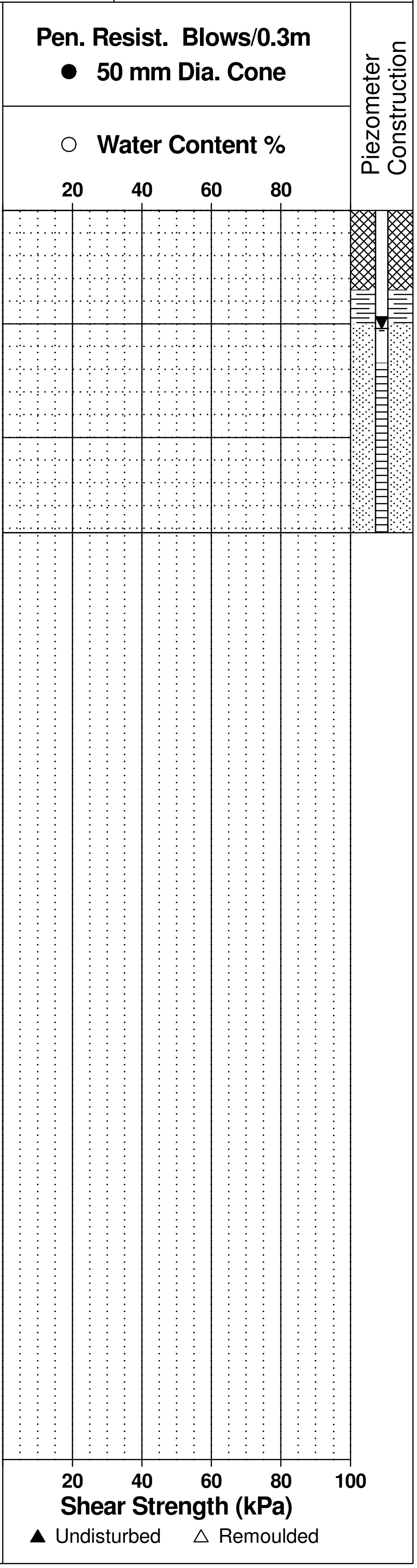
SOIL DESCRIPTION		SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
TOPSOIL	0.20	AU	1		
Compact, brown **SILTY SAND to SANDY SILT**	1.73	SS	2	50	12
Loose, brown **SILTY SAND,** some clay	2.59	SS	3	75	8
GLACIAL TILL: Compact, grey silty sand with gravel, cobbles and boulders	2.84	SS	4	100	12

DEPTH (m)	ELEV. (m)
0	101.85
1	100.85
2	99.85

End of Borehole

Practical refusal to augering at 2.84m depth

(GWL @ 1.04m - Jan. 11, 2022)



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 17, 2021

FILE NO. **PG5570**

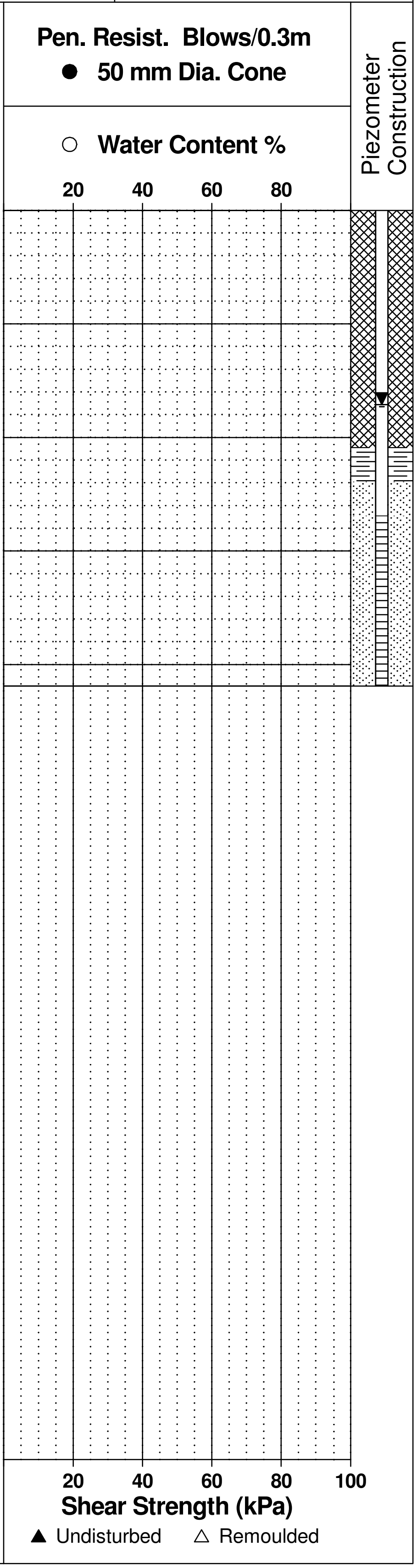
HOLE NO. **BH20-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	102.25
TOPSOIL 0.23							
		AU	1				
Compact to loose, brown **SILTY SAND to SANDY SILT**		SS	2	58	11	1	101.25
		SS	3	42	7		
2.44						2	100.25
Interlayered grey **SANDY SILT** and grey **SILTY CLAY**		SS	4	75	3		
3.20						3	99.25
GLACIAL TILL: Compact, grey silty sand with gravel, cobbles and boulders		SS	5	67	23		
4.19		SS	6		50+	4	98.25

End of Borehole

Practical refusal to augering at 4.19m depth

(GWL @ 1.71m - Jan. 11, 2022)



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

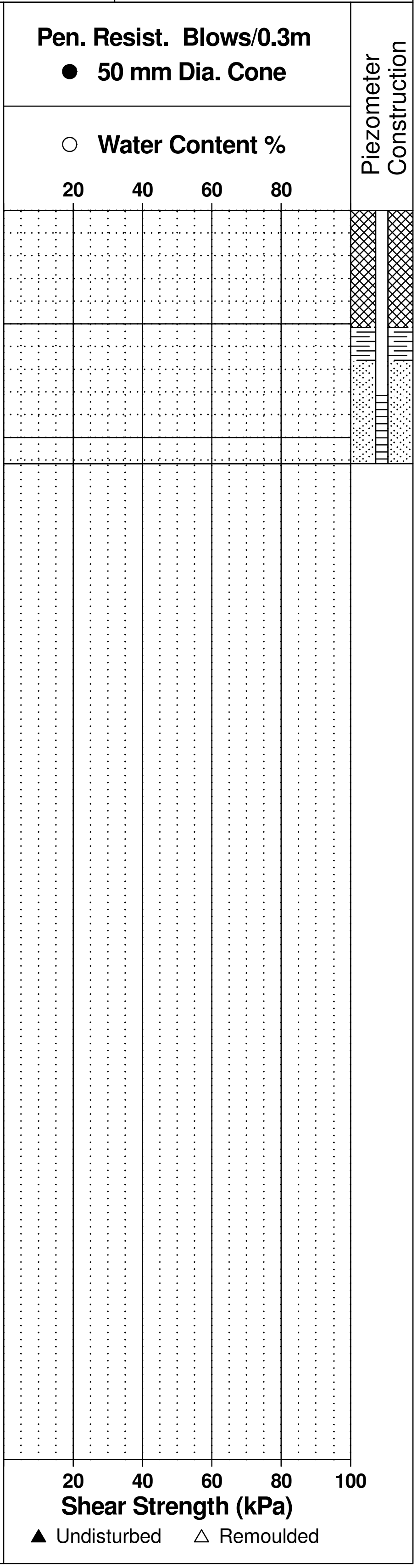
BORINGS BY Track-Mount Power Auger

DATE December 17, 2021

FILE NO. PG5570

HOLE NO. BH21-21

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	102.92
TOPSOIL 0.25						
Loose, brown **SILTY SAND to SANDY SILT**	AU	1				
1.07	SS	2	42	36	1	101.92
GLACIAL TILL: Dense, brown silty sand with gravel, cobbles and boulders	SS	3	50	71	2	100.92
2.23						
End of Borehole Practical refusal to augering at 2.23m depth (Piezometer damaged - Jan. 11, 2022)						



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 20, 2021

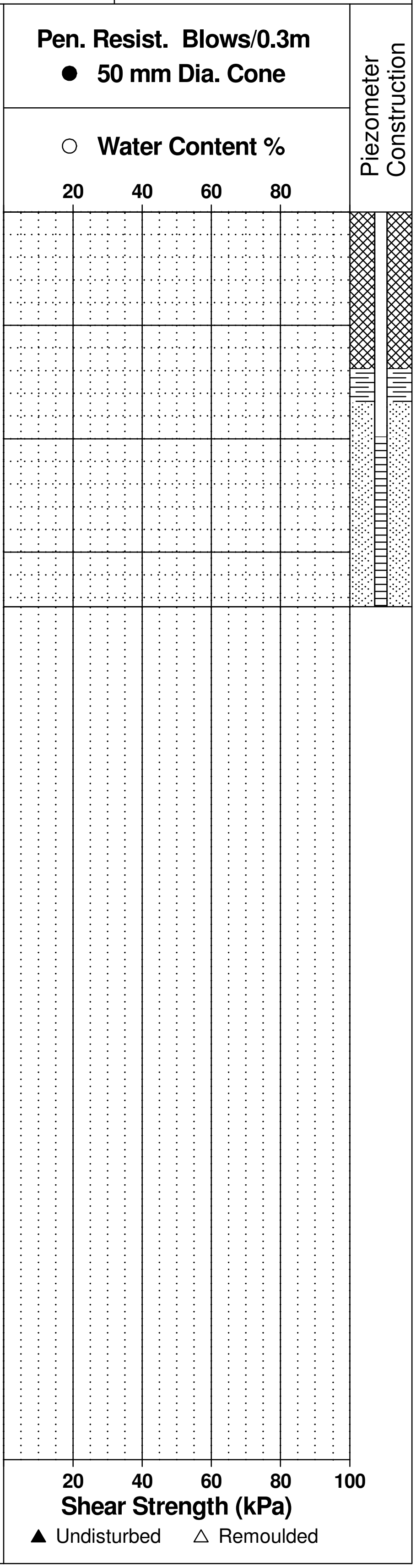
FILE NO. PG5570

HOLE NO. BH22-21

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	102.98
TOPSOIL 0.20						
Loose, brown **SILTY SAND,** trace gravel 0.69	AU	1				
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders	SS	2	100	22	1	101.98
	SS	3	92	29	2	100.98
	SS	4	83	46	3	99.98
3.48	SS	5	50	50+		

End of Borehole

Practical refusal to augering at 3.48m depth.



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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE January 10, 2022

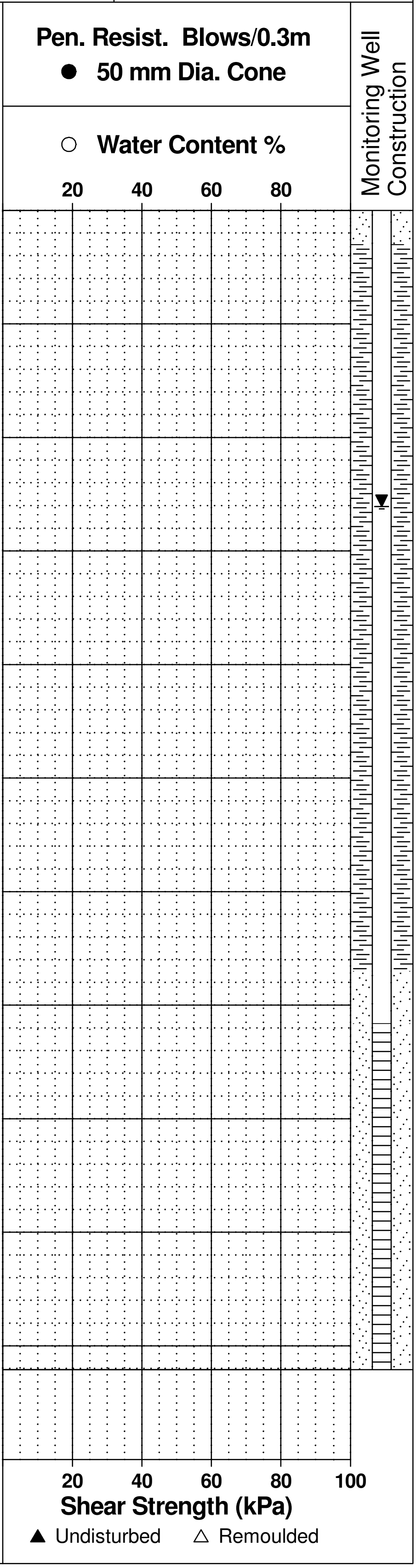
FILE NO. PG5570

HOLE NO. BH22A-21

SOIL DESCRIPTION	
GROUND SURFACE	
TOPSOIL	0.20
Loose, brown **SILTY SAND,** trace gravel	0.69
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders	5.97
BEDROCK: Excellent quality, grey dolostone interbedded with grey limestone	10.21
End of Borehole	
(GWL @ 2.49m - Jan. 11, 2022)	

SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
AU	1		
SS	2	100	22
SS	3	92	29
SS	4	83	46
SS	5	50	50+
RC	1	77	
RC	2	14	
RC	3	100	94
RC	4	100	100
RC	5	100	100

DEPTH (m)	ELEV. (m)
0	102.98
1	101.98
2	100.98
3	99.98
4	98.98
5	97.98
6	96.98
7	95.98
8	94.98
9	93.98
10	92.98



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 20, 2021

FILE NO. PG5570

HOLE NO. BH23-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	102.38		
TOPSOIL 0.28	■								
Stiff, brown **SILTY CLAY,** some sand 1.12	▨	AU	1						
		SS	2	25	32	1	101.38		
GLACIAL TILL: Dense, brown silty sand with gravel, cobbles and boulders, trace clay 1.83		SS	3	55					
End of Borehole Practical refusal to augering at 1.83m depth (Piezometer damaged - Jan. 11, 2022)									

Pen. Resist. / Water Content % scale: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 20, 2021

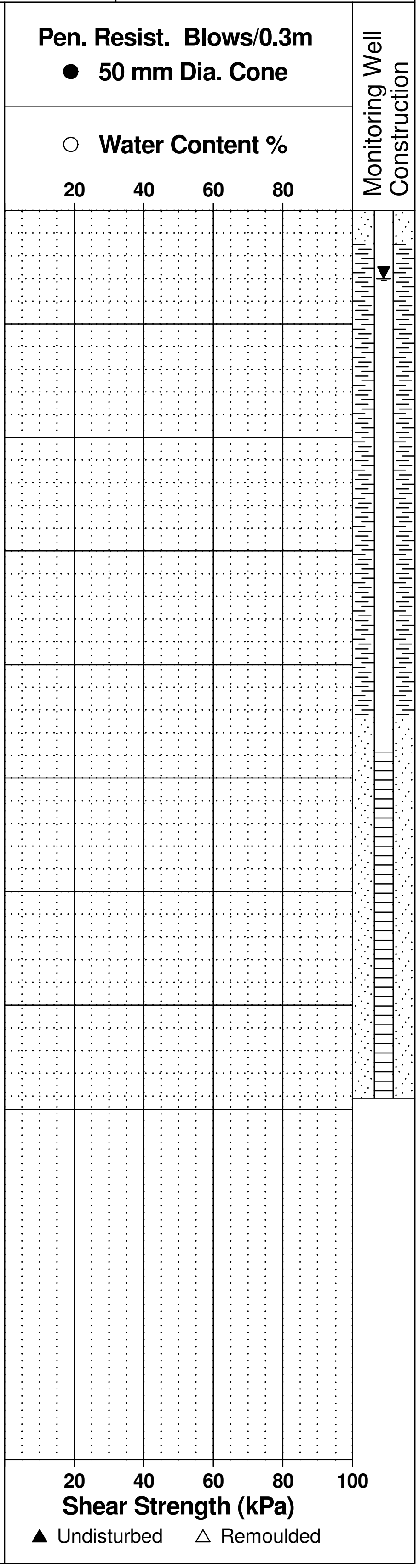
FILE NO. **PG5570**

HOLE NO. **BH24-21**

SOIL DESCRIPTION	Depth to base (m)
GROUND SURFACE	
TOPSOIL	0.30
Loose to dense, brown **SILTY SAND to SANDY SILT**	1.83
GLACIAL TILL: Dense, brown silty sand with gravel, cobbles and boulders - boulders cored from 2.46 to 4.42m depth	4.42
BEDROCK: Good to excellent quality, grey limestone interbedded with dolostone - 15mm thick mud seam at 5.25m depth	7.92
End of Borehole (GWL @ 0.67m - Jan. 11, 2022)	

SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
AU	1		
SS	2	58	8
SS	3	75	32
SS	4	50	50+
RC	1	100	
RC	2	19	
RC	3	100	81
RC	4	100	100
RC	5	100	100

DEPTH (m)	ELEV. (m)
0	103.07
1	102.07
2	101.07
3	100.07
4	99.07
5	98.07
6	97.07
7	96.07



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

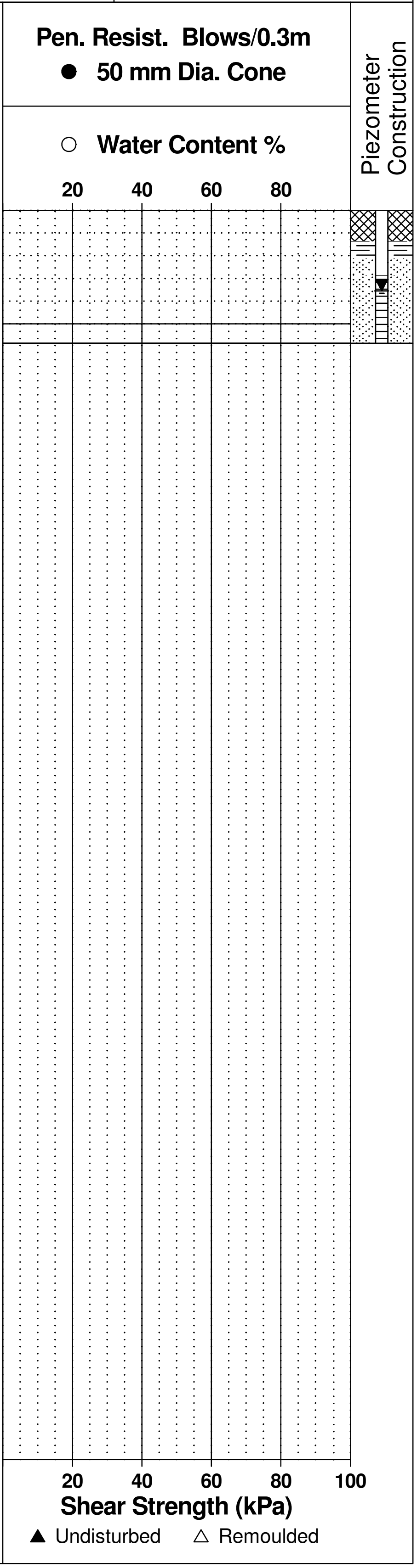
BORINGS BY Track-Mount Power Auger

DATE December 21, 2021

FILE NO. **PG5570**

HOLE NO. **BH25-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	102.73
TOPSOIL 0.25							
Loose, brown **SILTY SAND,** trace clay and gravel 1.17		AU	1				
		SS	2	71	50+	1	101.73
End of Borehole Practical refusal to augering at 1.17m depth (GWL @ 0.71m - Jan. 11, 2022)							



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 21, 2021

FILE NO. PG5570

HOLE NO. BH26-21

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	103.04
TOPSOIL 0.25						
Stiff, brown **SILTY CLAY,** some sand 0.69	AU	1				
GLACIAL TILL: Dense, brown silty sand with gravel, cobbles and boulders, trace clay	SS	2	40	50+	1	102.04
2.16	SS	3	61	33	2	101.04
End of Borehole						

Practical refusal to augering at 2.16m depth

(GWL @ 0.78m - Jan. 11, 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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 21, 2021

FILE NO. PG5570

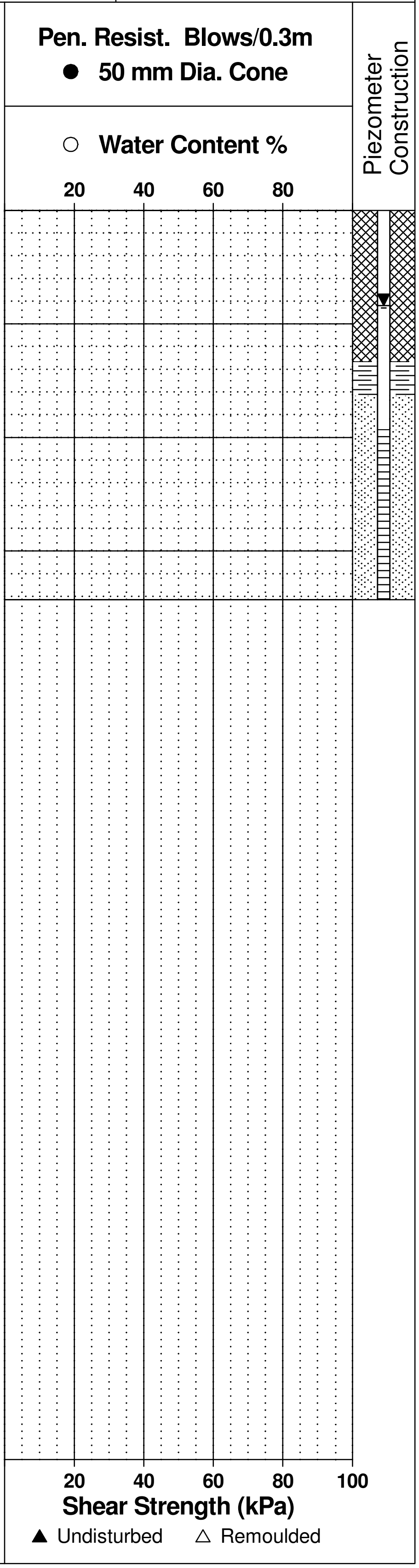
HOLE NO. BH27-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD		
GROUND SURFACE							
TOPSOIL 0.28						0	102.71
Compact to loose, brown **SILTY SAND to SANDY SILT,** trace clay		AU	1				
		SS	2	67	19	1	101.71
		SS	3	83	21	2	100.71
- grey by 2.4m depth		SS	4	50	9		
3.12						3	99.71
GLACIAL TILL: Very loose, grey silty sand with gravel, cobbles and boulders 3.43		SS	5	86	3		

End of Borehole

Practical refusal to augering at 3.43m depth

(GWL @ 0.84m - Jan. 11, 2022)



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 21, 2021

FILE NO. **PG5570**

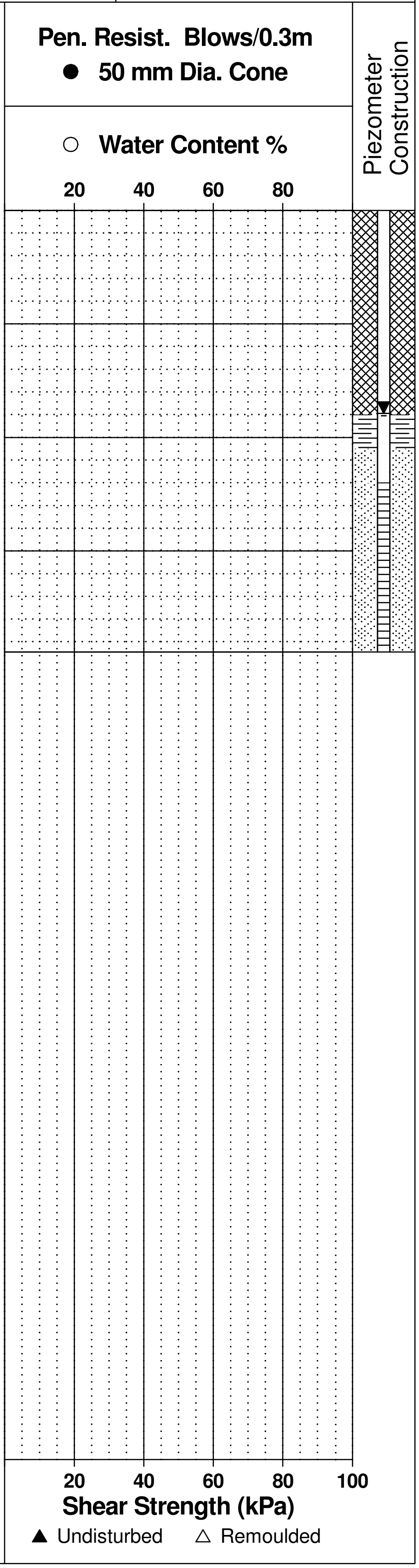
HOLE NO. **BH28-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	101.85
TOPSOIL 0.30							
		AU	1				
Loose, brown **SILTY SAND to SANDY SILT,** trace clay		SS	2	42	7	1	100.85
2.21		SS	3	58	8	2	99.85
Interbedded layers of grey **SILTY SAND** and grey **SILTY CLAY** 2.97		SS	4	100	2		
GLACIAL TILL: Very loose, grey silty sand with clay, gravel and cobbles		SS	5	100	3	3	98.85
3.89		SS	6		50+		

End of Borehole

Practical refusal to augering at 3.89m depth

(GWL @ 1.79m - Jan. 11, 2022)



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 21, 2021

FILE NO. PG5570

HOLE NO. BH29-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	102.31
TOPSOIL 0.28							
		AU	1				
		SS	2	50	9	1	101.31
Loose to very loose, brown **SILTY SAND to SANDY SILT,** trace clay		SS	3	67	8	2	100.31
- grey by 1.9m depth		SS	4	67	4		
- intermittent layers of grey silty clay by 3.0m depth		SS	5	58	2	3	99.31
3.96		SS	6	67			

End of Borehole

Practical refusal to augering at 3.96m depth

(Piezometer damaged - Jan. 11, 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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

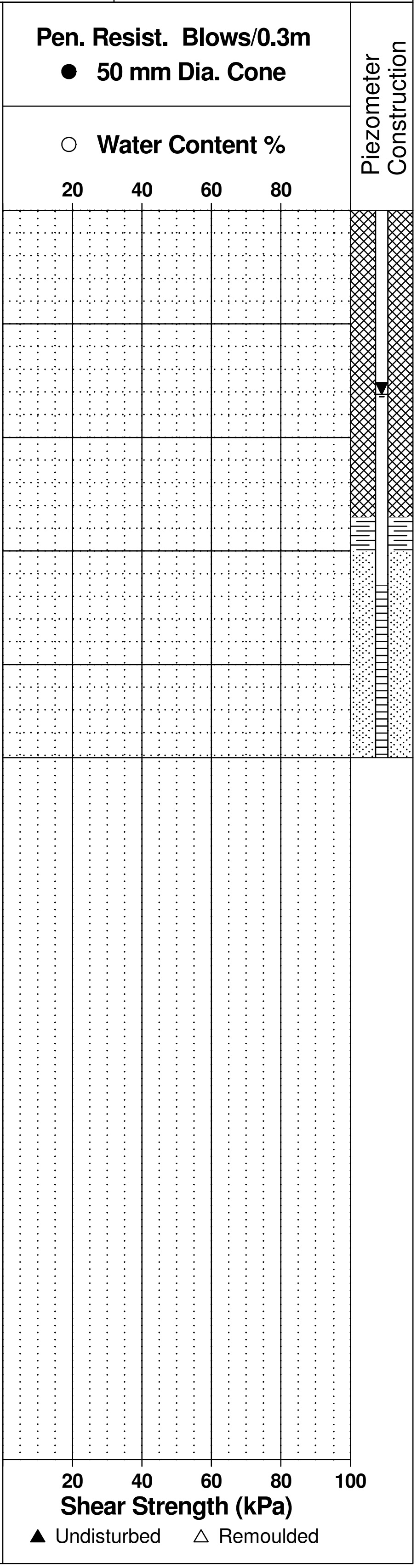
BORINGS BY Track-Mount Power Auger

DATE December 21, 2021

FILE NO. PG5570

HOLE NO. BH30-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	102.44
TOPSOIL 0.25							
		AU	1				
Compact to very loose, brown **SILTY SAND to SANDY SILT,** trace clay		SS	2	50	12	1	101.44
		SS	3	33	10		
- grey by 2.0m depth						2	100.44
		SS	4	92	1		
						3	99.44
3.45		SS	5	83	2		
GLACIAL TILL: Very loose to compact, grey silty sand with gravel, cobbles and boulders, trace clay		SS	6	33	24	4	98.44
4.82		SS	7	50	50+		
End of Borehole Practical refusal to augering at 4.82m depth (GWL @ 1.62m - Jan. 11, 2022)							



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 21, 2021

FILE NO. **PG5570**

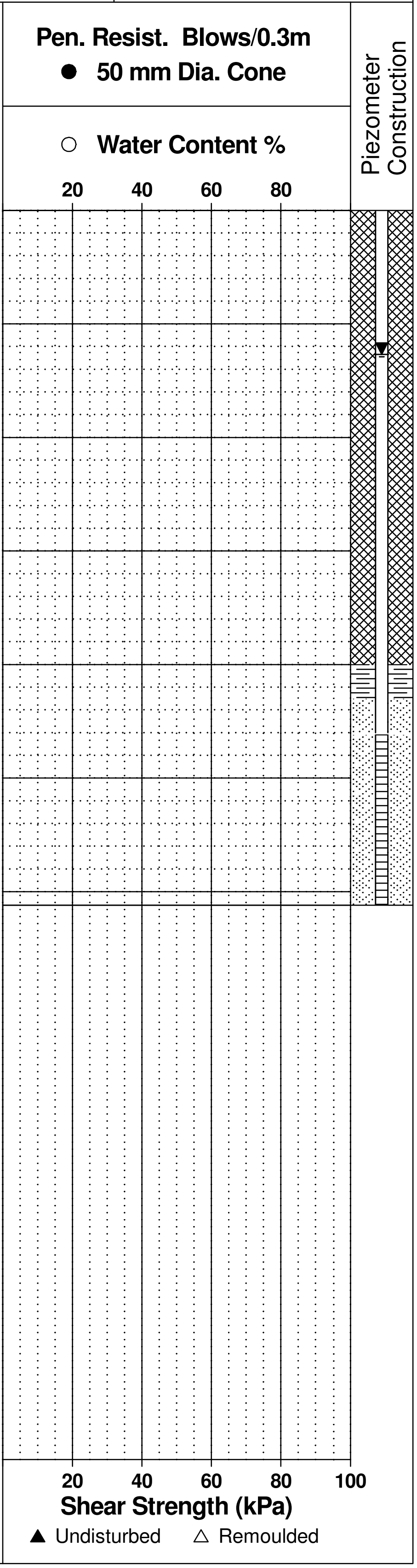
HOLE NO. **BH31-21**

SOIL DESCRIPTION	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	103.43
TOPSOIL 0.36	AU	1				
Compact to loose, brown **SILTY SAND to SANDY SILT,** trace clay	SS	2	50	14	1	102.43
	SS	3	50	22	2	101.43
	SS	4	42	9	3	100.43
- grey by 3.2m depth	SS	5	58	5		
4.72	SS	6	42	12	4	99.43
GLACIAL TILL: Dense, grey silty sand with gravel, cobbles and boulders	SS	7	58	37	5	98.43
	SS	8		58		
6.12	SS	9	0	50+	6	97.43

End of Borehole

Practical refusal to augering at 6.12m depth

(GWL @ 1.27m - Jan. 11, 2022)



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 21, 2021

FILE NO. PG5570

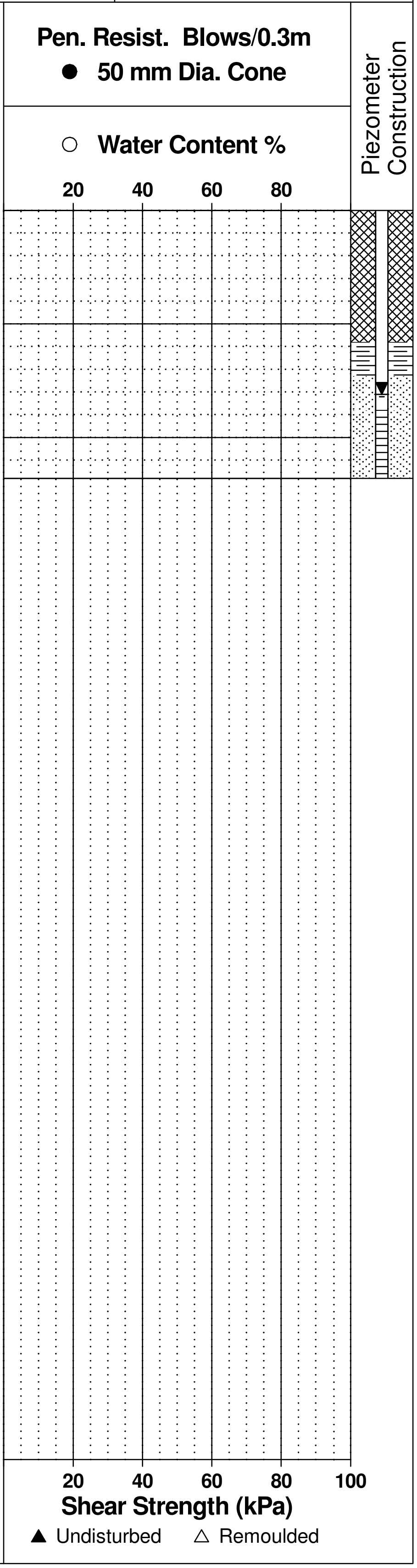
HOLE NO. BH32-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD		
GROUND SURFACE						0	103.74
TOPSOIL 0.15							
Compact to dense, brown **SILTY SAND to SANDY SILT**		AU	1				
		SS	2	67	39	1	102.74
- grey 1.4m depth		SS	3	67	26		
2.21						2	101.74
GLACIAL TILL: Grey silty sand with gravel, cobbles and boulders 2.36		SS	4	50	50+		

End of Borehole

Practical refusal to augering at 2.36m depth

(GWL @ 1.62m - Jan. 11, 2022)



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 22, 2021

FILE NO. **PG5570**

HOLE NO. **BH33-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD
GROUND SURFACE					
Compact, brown **SILTY SAND,** trace clay and organics		AU	1		
		SS	2	50	13
1.45					
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders		SS	3	8	11
		RC	1	30	
2.74					
BEDROCK: Good to excellent quality, grey limestone		RC	2	100	73
- 25mm thick mud seam at 3.7m depth		RC	3	95	85
- 30mm thick mud seam at 3.8m depth		RC	4	100	100
6.27					
End of Borehole					
(GWL @ 1.84m - Jan. 11, 2022)					

DEPTH (m)	ELEV. (m)
0	104.70
1	103.70
2	102.70
3	101.70
4	100.70
5	99.70
6	98.70

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**

○ **Water Content %**

20 40 60 80

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

Monitoring Well Construction

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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE December 22, 2021

FILE NO. **PG5570**

HOLE NO. **BH34-21**

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	102.65
TOPSOIL 0.25						
	SS AU	5 1	17	8		
Compact to loose, brown **SILTY SAND to SANDY SILT**	SS	2	42	10	1	101.65
	SS	3	25	9		
2.21					2	100.65
	SS	4	17	2		
GLACIAL TILL: Very loose to loose, grey silty sand with gravel, cobbles and boulders, trace clay					3	99.65
	RC	1	31			
					4	98.65
	RC	2	100	100	5	97.65
5.21						
BEDROCK: Excellent quality, grey limestone interbedded with dolostone					6	96.65
	RC	3	100	100		
6.61						
End of Borehole						

STRATA PLOT

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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE January 7, 2022

FILE NO. PG5570

HOLE NO. BH35-21

SOIL DESCRIPTION	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	105.03
TOPSOIL 0.28						
	AU	1				
Loose to compact, brown **SILTY SAND to SANDY SILT**	SS	2	50	7	1	104.03
1.68						
	SS	3	50	25	2	103.03
GLACIAL TILL: Compact to very dense, grey silty sand with gravel, cobbles and boulders	SS	4	25	56		
					3	102.03
3.51	SS	5	67	50+		

End of Borehole

Practical refusal to augering at 3.51m depth.

(GWL @ 1.22m - Jan. 11, 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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

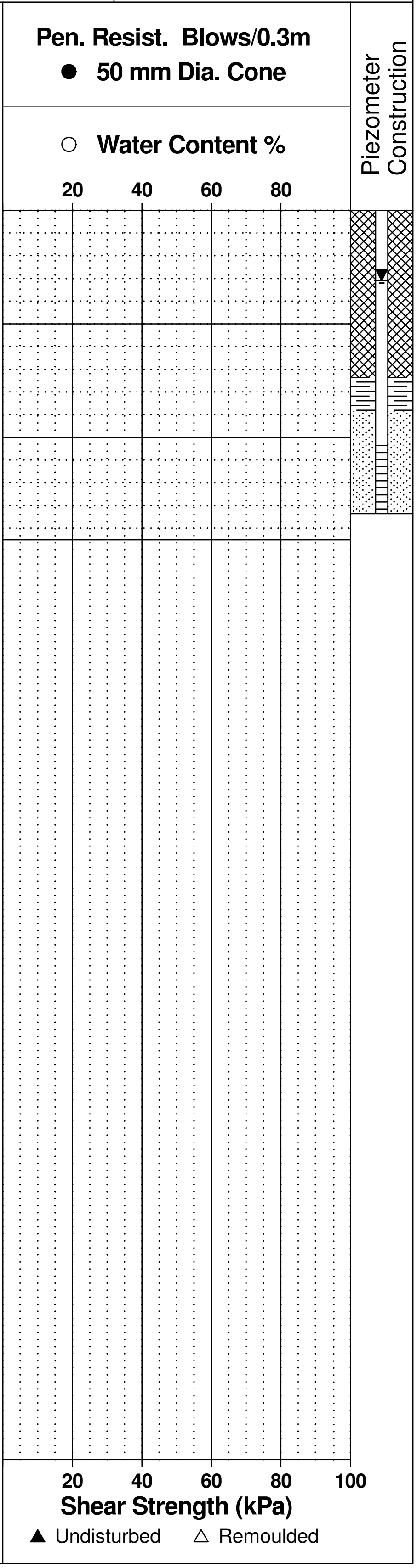
BORINGS BY Track-Mount Power Auger

DATE January 7, 2022

FILE NO. **PG5570**

HOLE NO. **BH36-21**

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	102.79
TOPSOIL 0.30						
Compact, brown **SILTY SAND to SANDY SILT**	AU	1				
	SS	2	42	15	1	101.79
1.45						
GLACIAL TILL: Very dense to compact, brown silty sand with gravel, cobbles and boulders	SS	3	60	50+		
					2	100.79
	SS	4	8	15		
2.90						
End of Borehole Practical refusal to augering at 2.90m depth. (GWL @ 0.62m - Jan. 11, 2022)						



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE January 7, 2022

FILE NO. PG5570

HOLE NO. BH37-21

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	103.54
TOPSOIL 0.36	AU	1				
Compact to dense, brown **SILTY SAND to SANDY SILT**	SS	2	42	22	1	102.54
	SS	3	58	34	2	101.54
2.21						
GLACIAL TILL: Very dense, grey silty sand with gravel, cobbles and boulders 2.67	SS	4	50	50+		

End of Borehole

Practical refusal to augering at 2.67m depth.

(GWL @ 1.52m - Jan. 11, 2022)

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

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

Piezometer Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE January 7, 2022

FILE NO. **PG5570**

HOLE NO. **BH38-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.62
FILL: Crushed stone and gravel 0.15							
		AU	1				
Dense to compact, brown **SILTY SAND to SANDY SILT**		SS	2		32	1	102.62
		SS	3		24		
- grey by 2.0m depth						2	101.62
		SS	4	100	50+		
2.64							
End of Borehole Practical refusal to augering at 2.64m depth. (GWL @ 1.94m - Jan. 11, 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

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

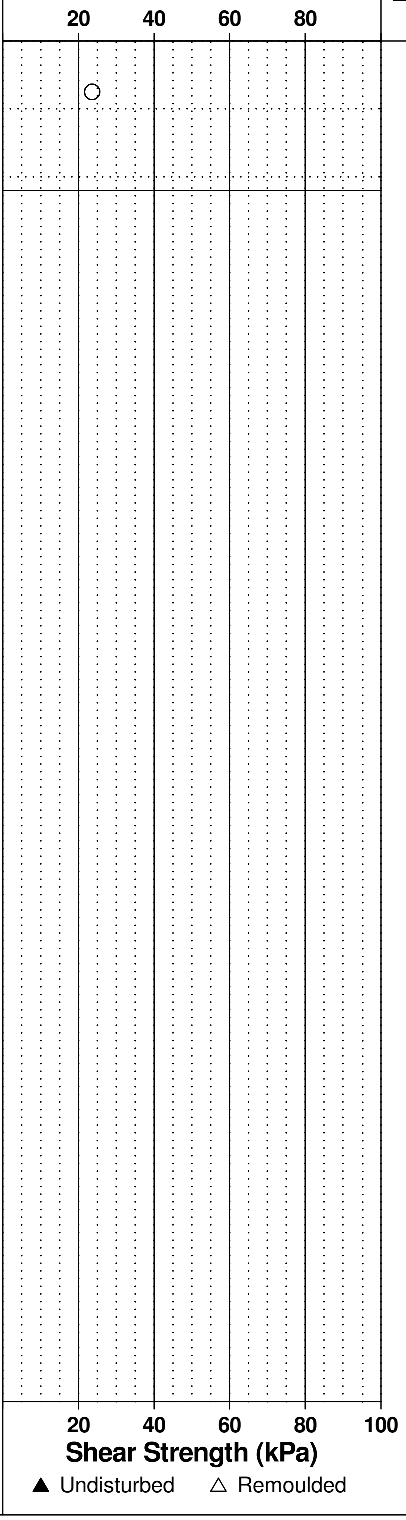
BORINGS BY CME-55 Low Clearance Drill

DATE November 20, 2020

FILE NO. PG5570

HOLE NO. TP 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.15		G	1			0	105.94		
GLACIAL TILL: Brown silty sand with gravel and some clay 0.25		G	2						
BEDROCK Weathered interbedded limestone 0.44		G	3						
End of Test Pit Practical refusal to excavation at 0.44m depth (TP dry upon completion)									



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

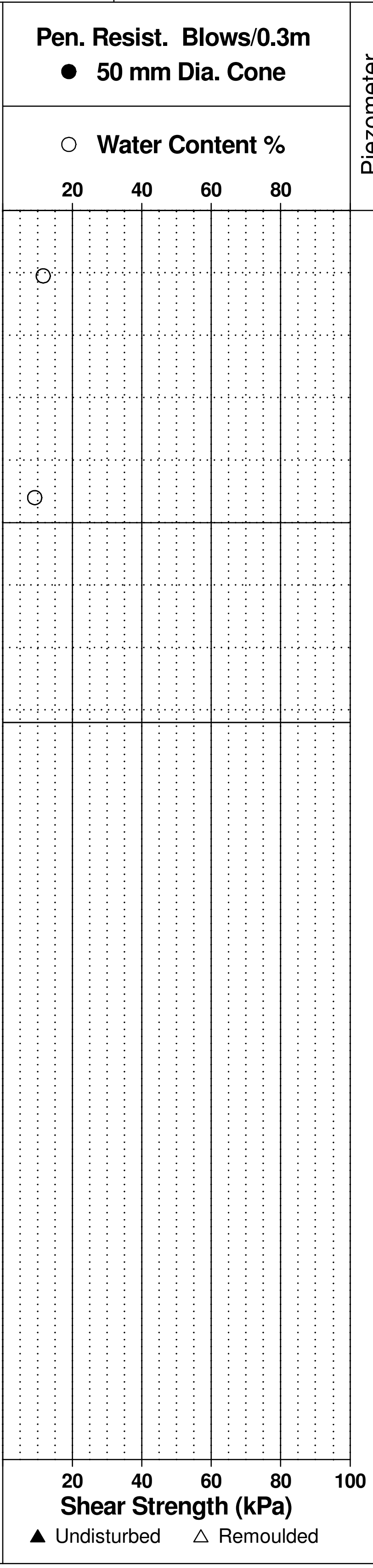
FILE NO. **PG5570**

REMARKS

HOLE NO. **TP 2**

BORINGS BY CME-55 Low Clearance Drill **DATE** November 20, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)	Piezometer Construction
GROUND SURFACE						0	105.06	
TOPSOIL 0.21		G	1					
Brown **SILTY SAND,** trace gravel 0.92		G	2					
						1	104.06	
GLACIAL TILL: Brown silty sand with gravel, cobbles and boulders 1.64		G	3					
End of Test Pit TP terminated on inferred bedrock surface at 1.64m depth (TP dry upon completion)								



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

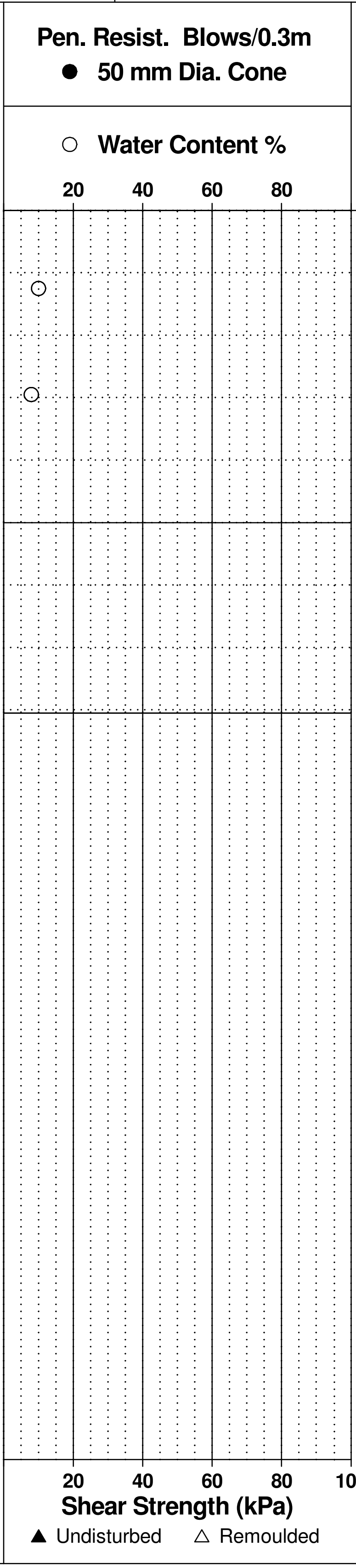
BORINGS BY CME-55 Low Clearance Drill

DATE November 20, 2020

FILE NO. PG5570

HOLE NO. TP 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	102.10
TOPSOIL 0.25		G	1				
Brown **SILTY SAND,** trace sea shells 0.59		G	2				
GLACIAL TILL: Brown silty sand with gravel, cobbles and boulders 1.61		G	3			1	101.10
End of Test Pit TP terminated on inferred bedrock surface at 1.61m depth (TP dry upon completion)							



Piezometer Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE November 20, 2020

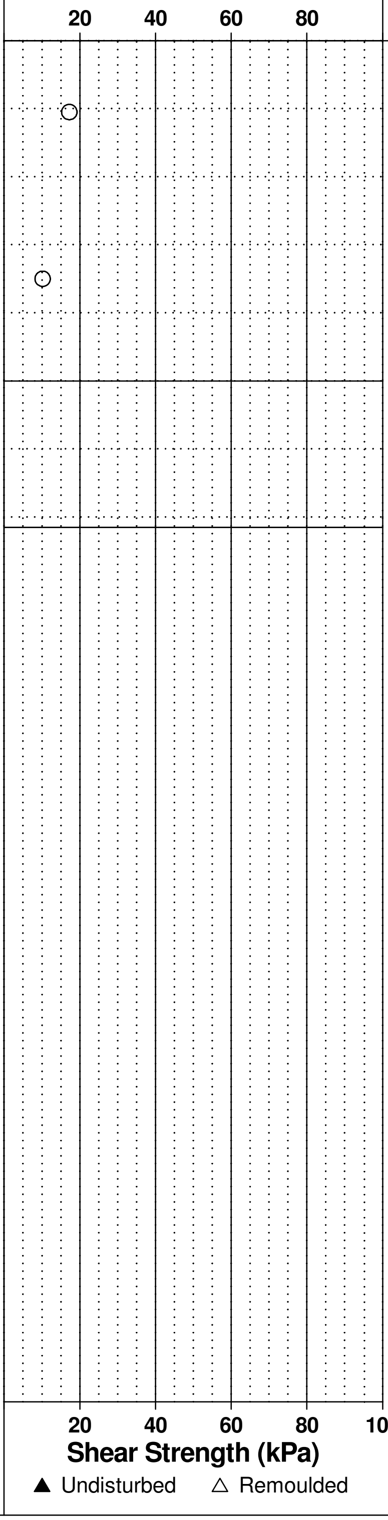
FILE NO. PG5570

HOLE NO. TP 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Piezometer Construction
GROUND SURFACE						0	108.49	
TOPSOIL 0.21		G	1					
Brown **SILTY SAND,** trace gravel, cobble and organics 0.70		G	2					
GLACIAL TILL: Brown silty sand, some gravel, cobble, boulder, trace clay 1.43		G	3			1	107.49	
End of Test Pit Test Pit terminated on bedrock surface at 1.43m depth (TP dry upon completion)								

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**

○ **Water Content %**



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5570

REMARKS

HOLE NO. TP 5

BORINGS BY CME-55 Low Clearance Drill

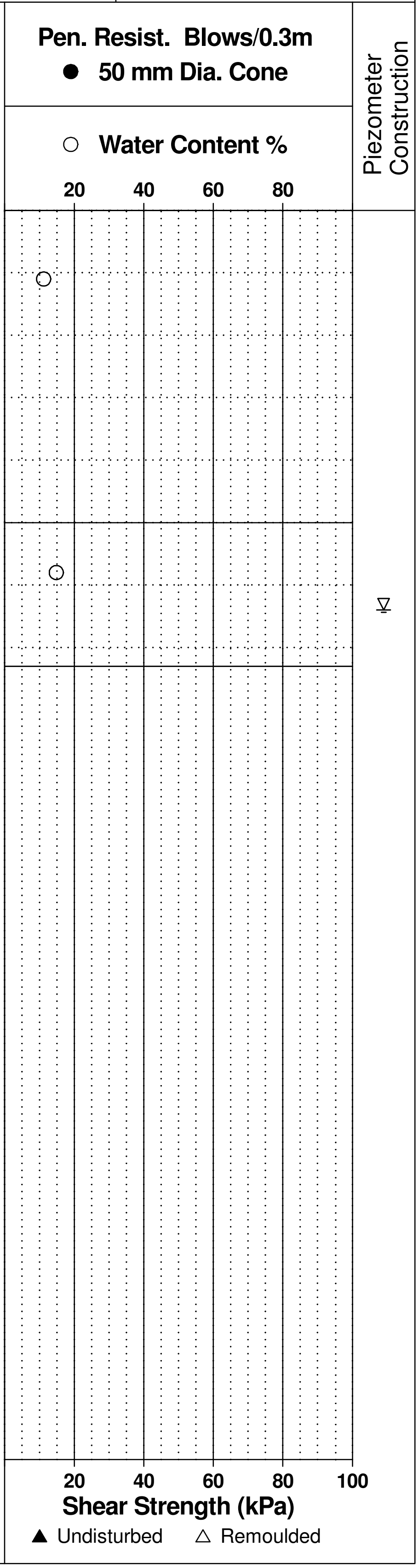
DATE November 20, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	108.36
TOPSOIL 0.22		G	1				
Brown **SILTY SAND** 1.16		G	2			1	107.36
GLACIAL TILL: Brown silty sand, some gravel, cobble, and boulder 1.46		G	3				

End of Test Pit

TP terminated on inferred bedrock surface at 1.46m depth

(Groundwater infiltration at 1.28m - Nov 20, 2020)



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE November 20, 2020

FILE NO. PG5570

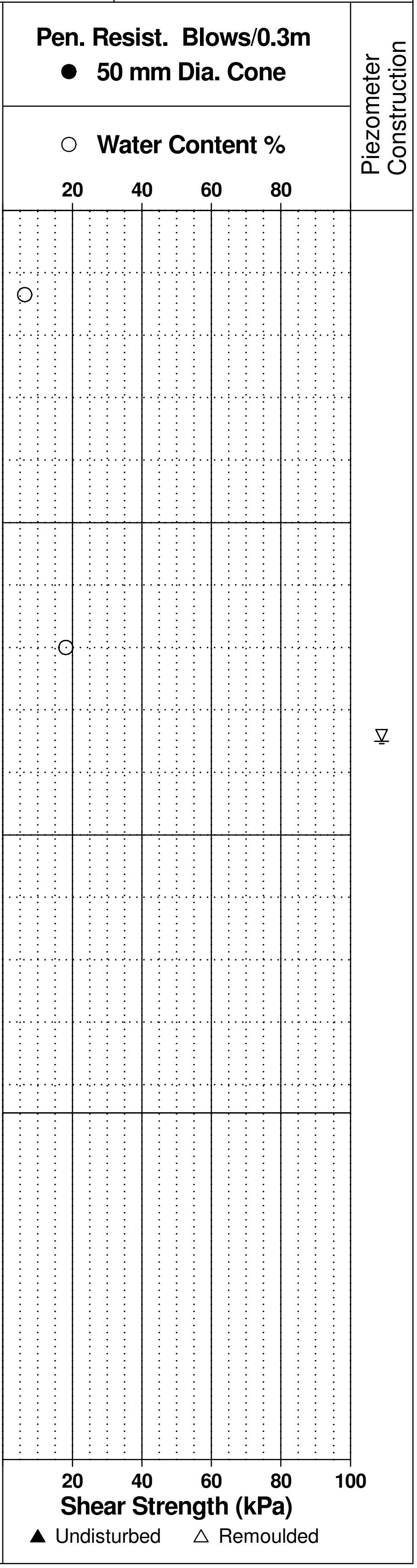
HOLE NO. TP 6

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	107.91
TOPSOIL 0.27		G	1				
Brown **SILTY SAND,** trace cobble, boulders and seashells		G	2			1	106.91
1.70		G	3				
BEDROCK: Weathered interbedded limestone 2.89		G	4			2	105.91

End of Test Pit

TP terminated on inferred bedrock surface at 2.89m depth

(Groundwater infiltration at 1.70m - Nov 20, 2020)



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

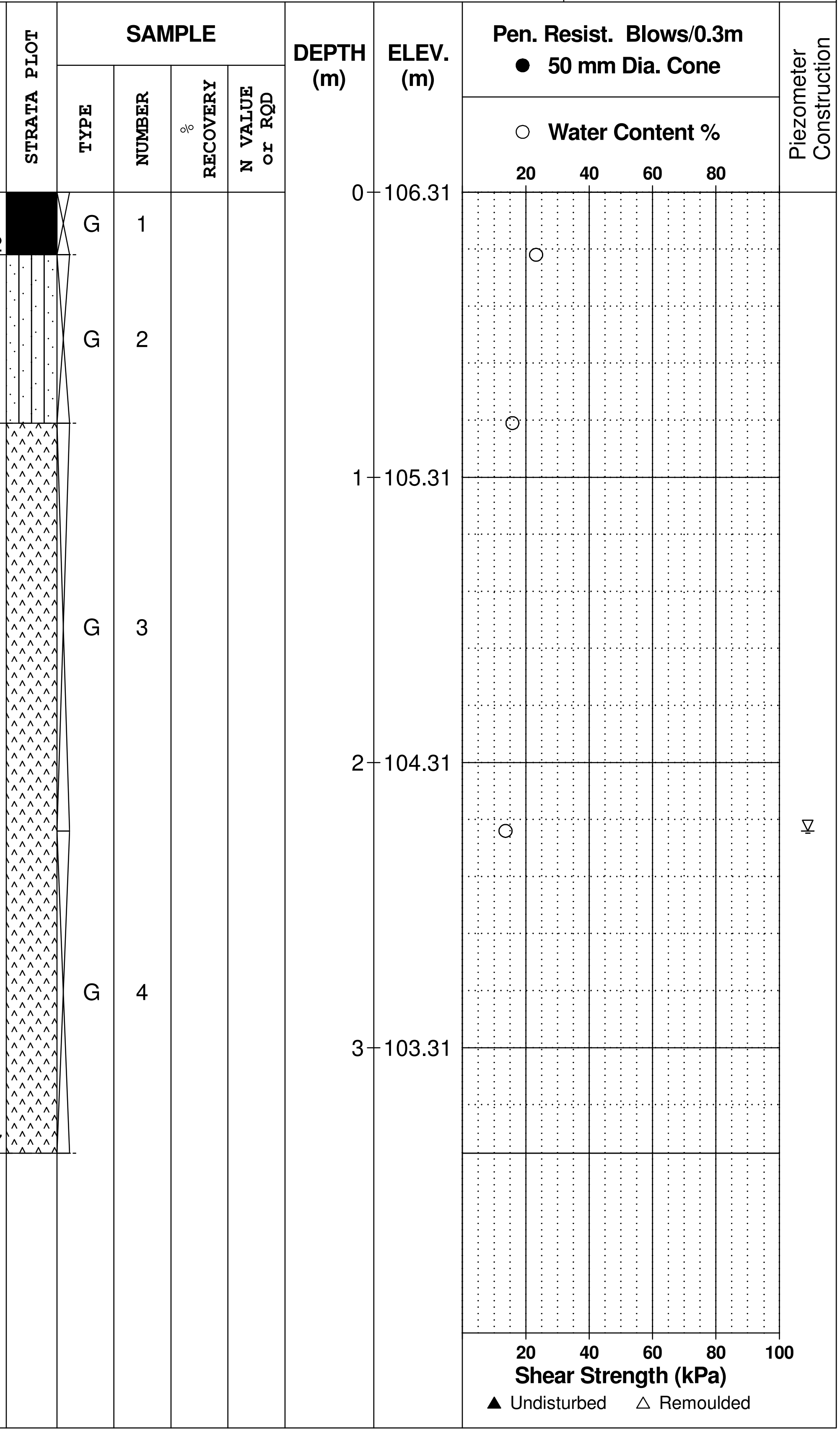
SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic
REMARKS
BORINGS BY CME-55 Low Clearance Drill
DATE November 20, 2020
FILE NO. PG5570
HOLE NO. TP 7

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE				
TOPSOIL (to 0.22)	G	1		
Brown **SILTY SAND,** trace clay (0.22 – 0.81)	G	2		
GLACIAL TILL: Brown silty sand with gravel, cobbles and boulders (0.81 – 3.37)	G G	3 4		
End of Test Pit (3.37)				

DEPTH (m)	ELEV. (m)
0	106.31
1	105.31
2	104.31
3	103.31



End of Test Pit

TP terminated on inferred bedrock surface at 3.37m depth

(Groundwater infiltration at 2.24m - Nov 20, 2020)

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

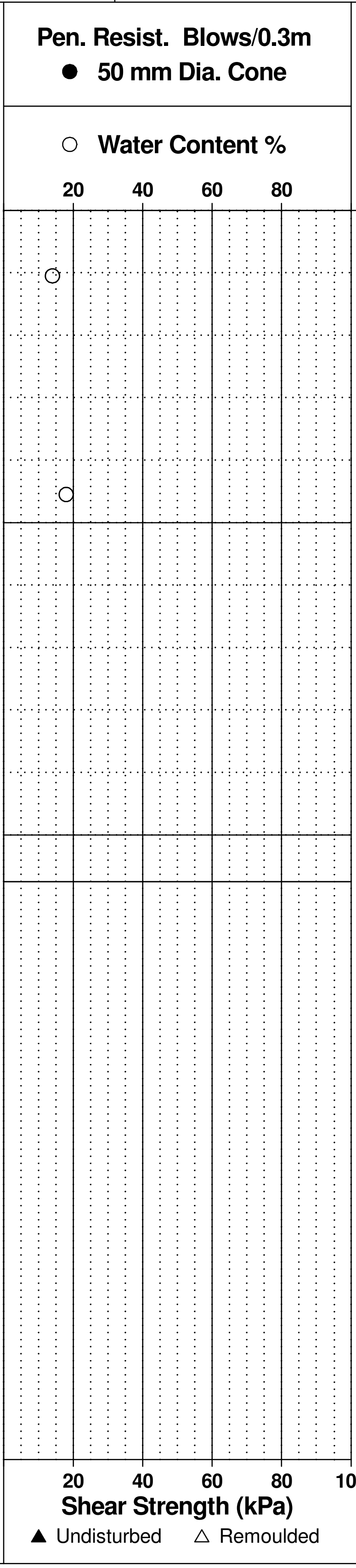
BORINGS BY CME-55 Low Clearance Drill

DATE November 20, 2020

FILE NO. PG5570

HOLE NO. TP 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.48
TOPSOIL 0.21		G	1				
Brown **SILTY SAND,** trace clay and organics - increasing in silt content with depth 2.15		G G	2 3			1 2	104.48 103.48
End of Test Pit TP terminated on inferred bedrock surface at 2.15m depth (TP dry upon completion)							



Piezometer Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

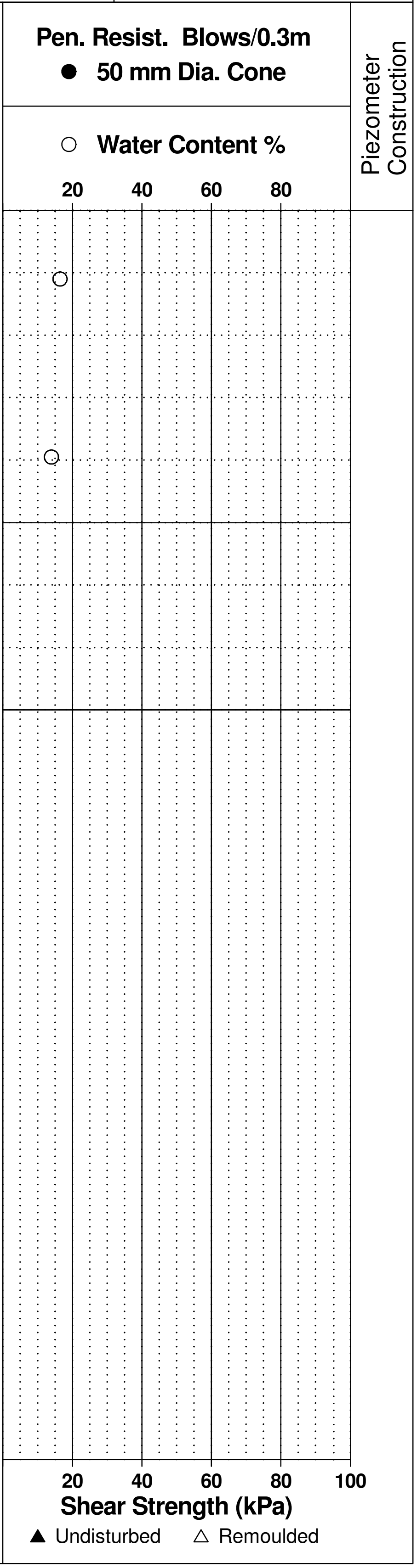
BORINGS BY CME-55 Low Clearance Drill

DATE November 20, 2020

FILE NO. PG5570

HOLE NO. TP 9

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.47
TOPSOIL 0.22		G	1				
Brown **SILTY SAND,** trace organics 0.79		G	2				
GLACIAL TILL: Brown silty sand trace gravel, cobbles, and boulders 1.60		G	3			1	103.47
End of Test Pit TP terminated on inferred bedrock surface at 1.60m depth (TP dry upon completion)							



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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE December 10, 2020

FILE NO. PG5570

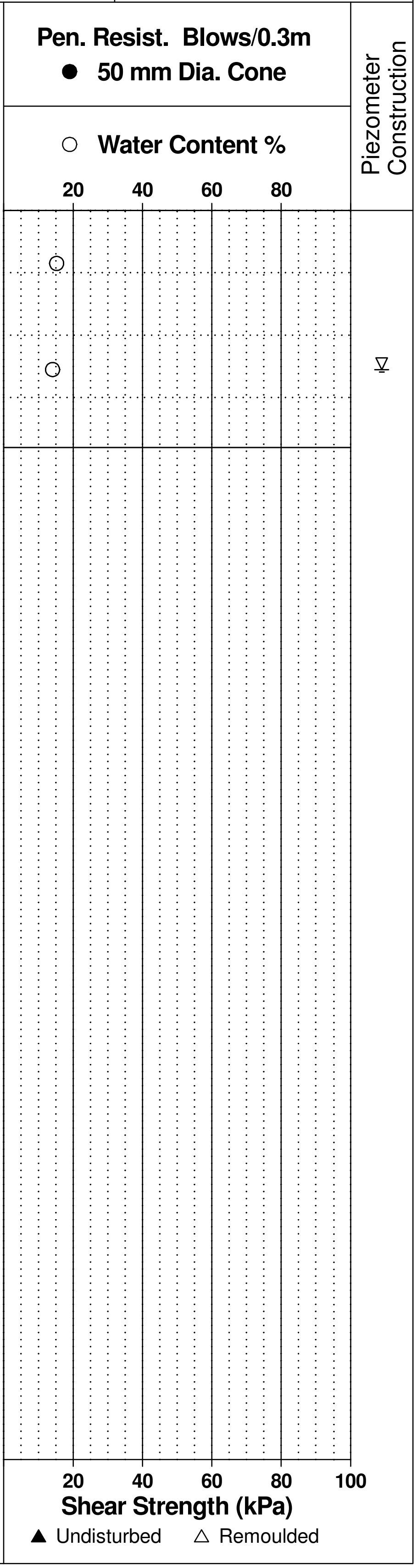
HOLE NO. TP 10

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.62
TOPSOIL 0.17	■	G	1				
Brown **SILTY SAND,** trace gravel and cobbles 0.51		G	2				
GLACIAL TILL: Brown silty sand, with gravel, trace cobble and boulders 0.76		G	3				

End of Test Pit

TP terminated on inferred bedrock surface at 0.76m depth

(Groundwater infiltration at 0.51m - Dec 10, 2020)



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

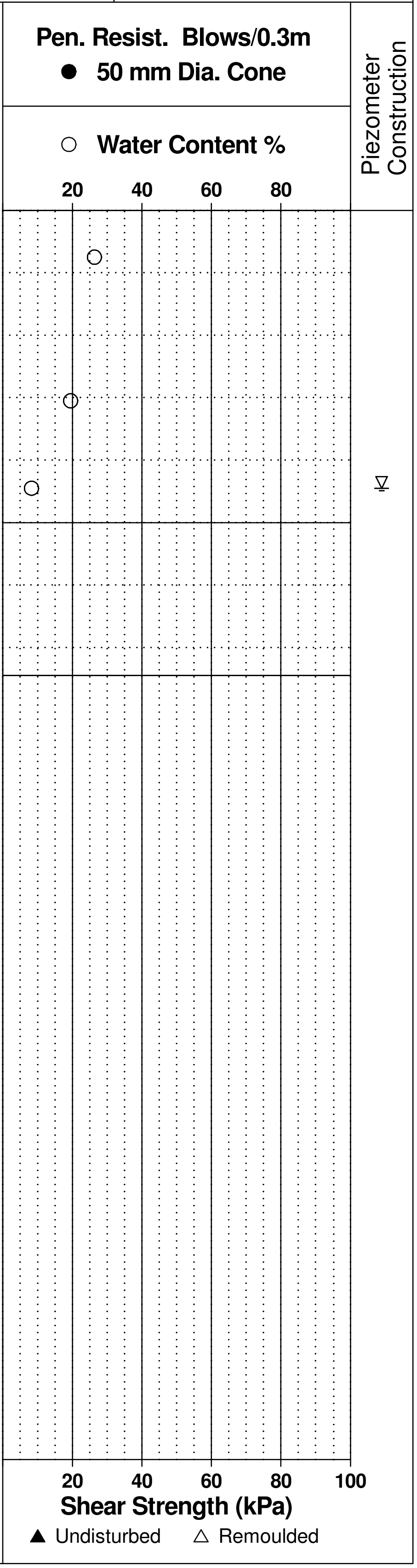
BORINGS BY CME-55 Low Clearance Drill

DATE December 10, 2020

FILE NO. PG5570

HOLE NO. TP 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.01
TOPSOIL 0.15		G	1				
Brown **SILTY SAND,** trace gravel		G	2				
0.89		G	3				
GLACIAL TILL: Brown silty sand, with gravel, cobbles, and boulders		G	1			1	102.01
1.49							
End of Test Pit TP terminated on inferred bedrock surface at 1.49m depth (Groundwater infiltration at 0.89m - Dec 10, 2020)							



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

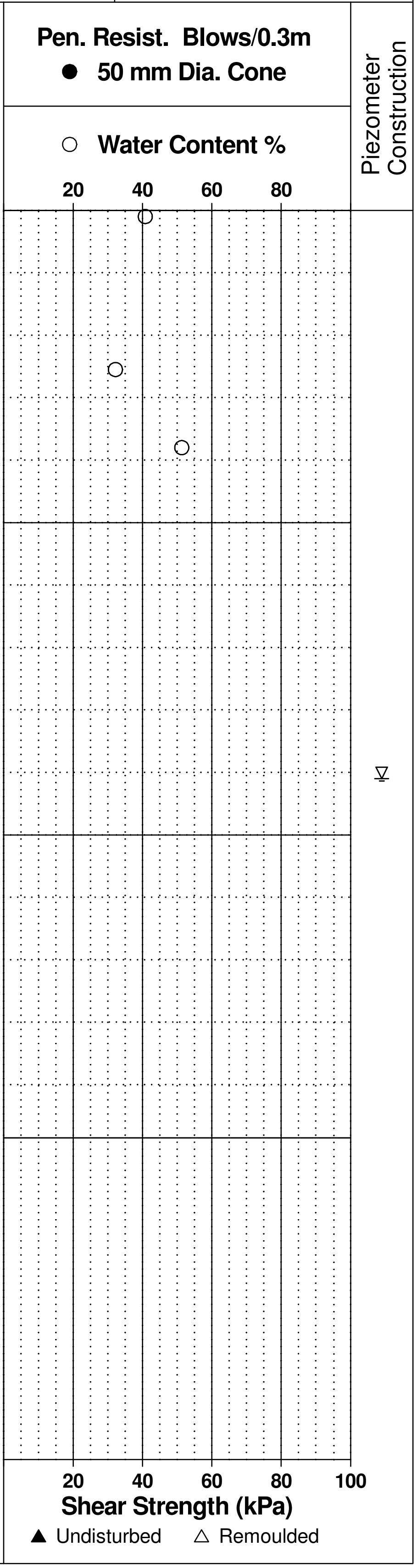
BORINGS BY CME-55 Low Clearance Drill

DATE December 10, 2020

FILE NO. PG5570

HOLE NO. TP 12

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	103.21
TOPSOIL 0.02	G	1				
Brown **SILTY SAND,** trace gravel 0.51	G	2				
Organic silt with **PEAT** fibers 0.76	G	3				
GLACIAL TILL: Brown silty sand with gravel, cobbles and boulders	G	4			1	102.21
					2	101.21
2.97						
End of Test Pit TP terminated on inferred bedrock surface at 2.97m depth (Groundwater infiltration at 1.82m - Dec 10, 2020)						



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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE December 10, 2020

FILE NO. PG5570

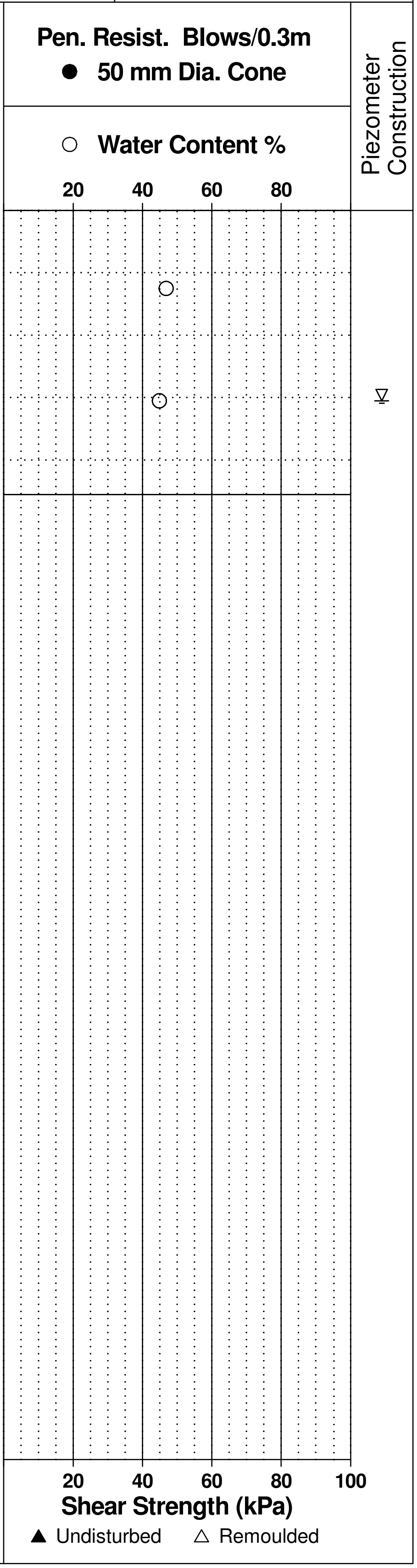
HOLE NO. TP 13

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.30
TOPSOIL 0.25		G	1				
Brown **SILTY SAND,** trace organics 0.61		G	2				
GLACIAL TILL: Brown silty sand with gravel, cobbles and boulders 0.91		G	3				

End of Test Pit

TP terminated on inferred bedrock surface at 0.91m depth

(Groundwater infiltration at 0.61m - Dec 10, 2020)



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

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

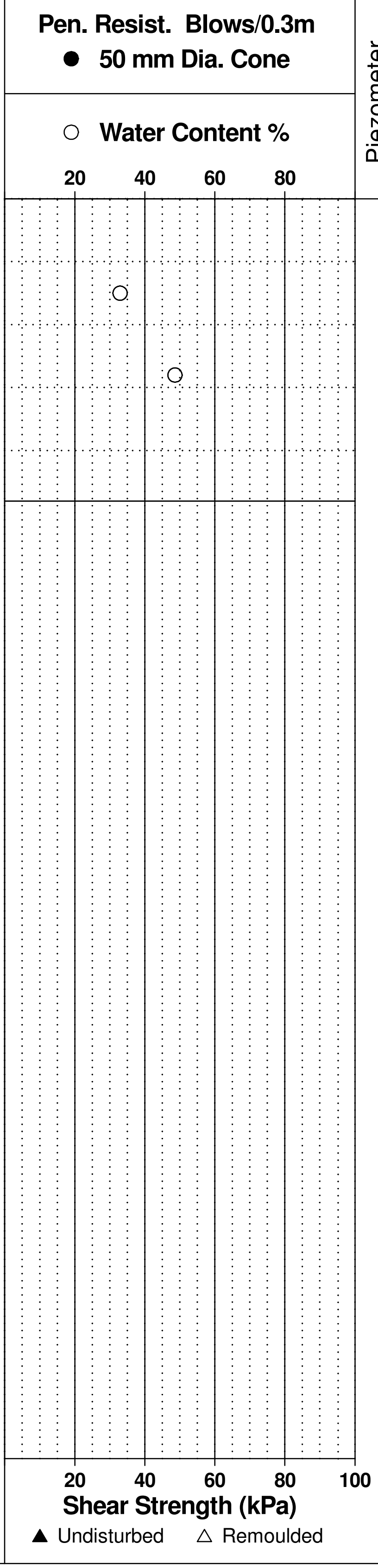
BORINGS BY CME-55 Low Clearance Drill

DATE December 10, 2020

FILE NO. PG5570

HOLE NO. TP 14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.60
TOPSOIL 0.30			1				
Brown **SILTY SAND** 0.56			2				
GLACIAL TILL: Brown silty sand with gravel, cobbles, and boulders. 0.97			3				
End of Test Pit Practical refusal to excavation at 0.94m depth (TP dry upon completion)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE December 10, 2020

FILE NO. PG5570

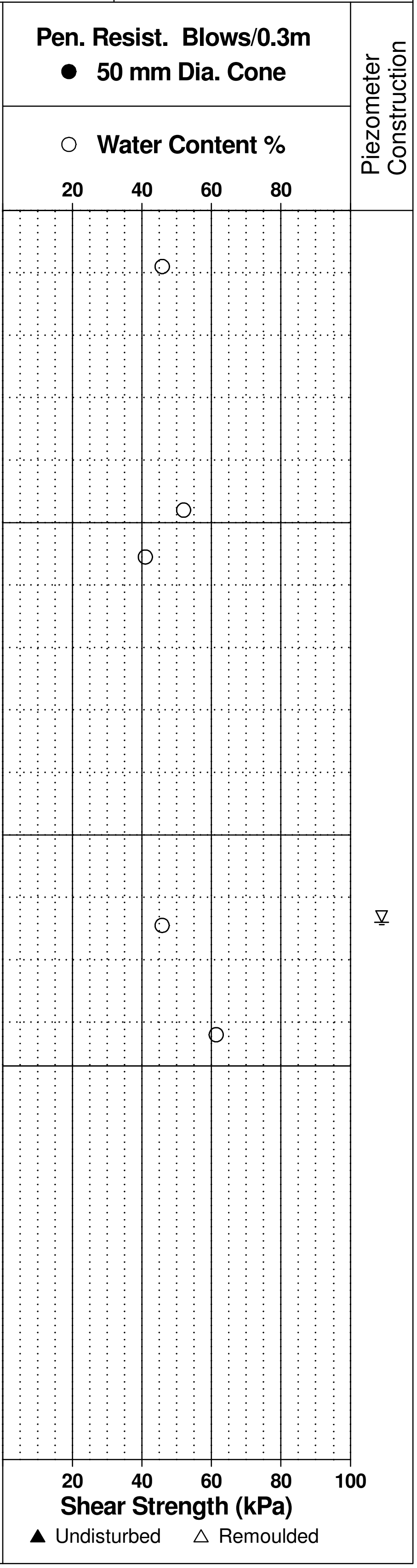
HOLE NO. TP 15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Piezometer Construction
GROUND SURFACE						0	106.80	
TOPSOIL 0.18		G	1					
Brown **SILTY SAND**		G	2					
		G	3			1	105.80	
		G	4					
						2	104.80	⊻
2.64		G	5					
GLACIAL TILL: Grey silty sand with gravel, cobbles and boulders 2.74		G	6					

End of Test Pit

TP terminated on inferred bedrock surface at 2.74m depth

(Groundwater infiltration at 2.28m - Dec 10, 2020)



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5570

REMARKS

HOLE NO. TP 16

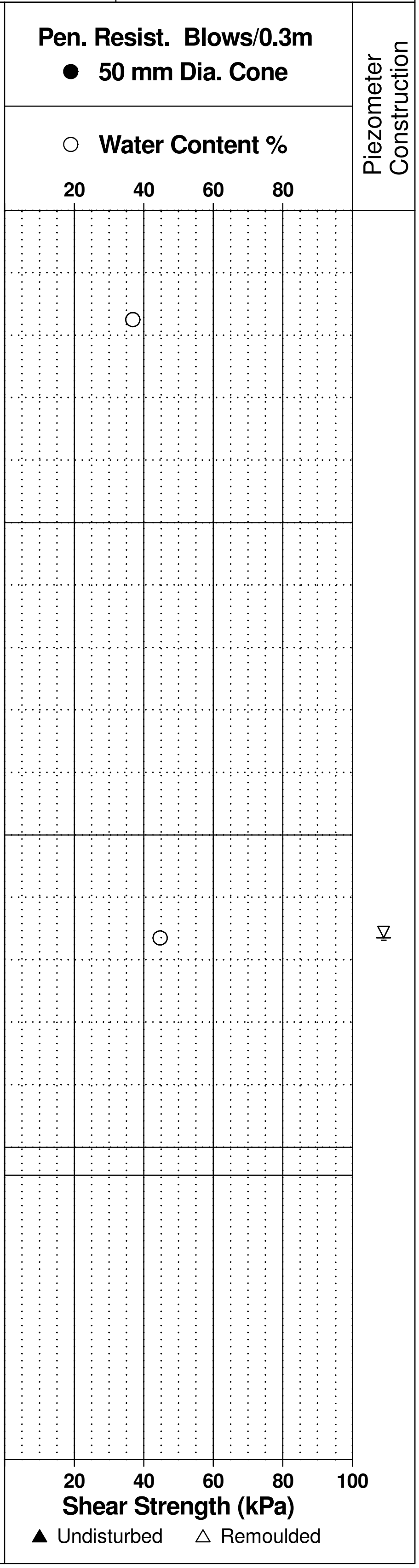
BORINGS BY CME-55 Low Clearance Drill

DATE December 10, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.62
TOPSOIL 0.35		G	1				
Brown **SILTY SAND,** trace gravel 2.34		G	2			1	103.62
						2	102.62
GLACIAL TILL: Grey silty sand with gravel, cobbles and boulders. 3.09		G	3			3	101.62
End of Test Pit							

TP terminated on inferred bedrock surface at 3.09m depth

(Groundwater infiltration at 2.33m - Dec 10, 2020)



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

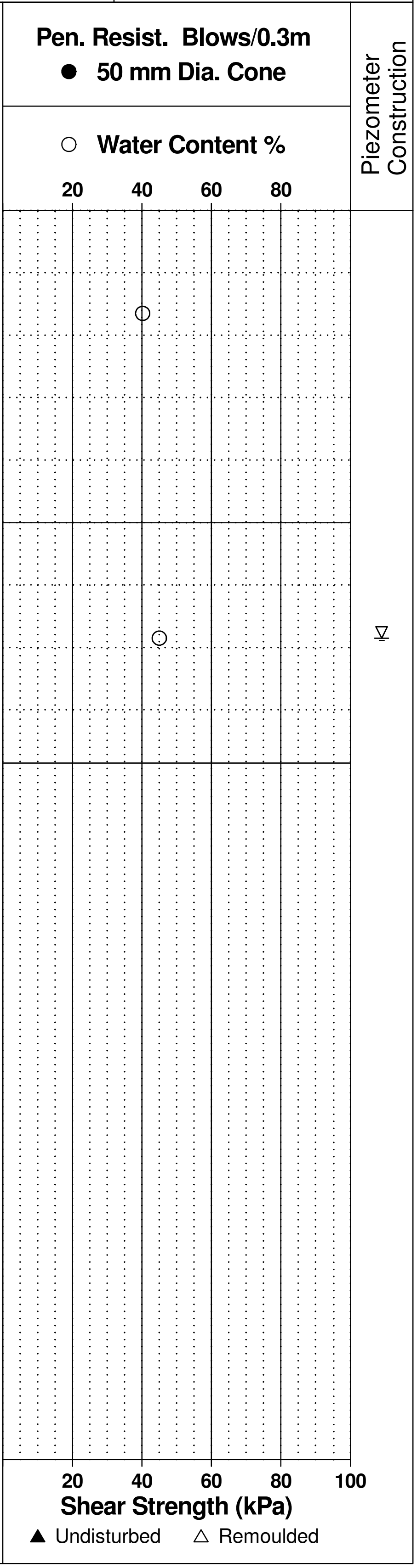
BORINGS BY CME-55 Low Clearance Drill

DATE December 10, 2020

FILE NO. PG5570

HOLE NO. TP 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.90
TOPSOIL 0.33		G	1				
Brown **SILTY SAND,** trace gravel 1.37		G	2			1	102.90
GLACIAL TILL: Brown silty sand, with gravel cobbles and boulders 1.78		G	3				
End of Test Pit TP terminated on inferred bedrock surface at 1.78m depth (Groundwater infiltration at 1.37m - Dec 10, 2020)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6070 and 6115 Flewellyn Road
Ottawa, Ontario

DATUM Geodetic

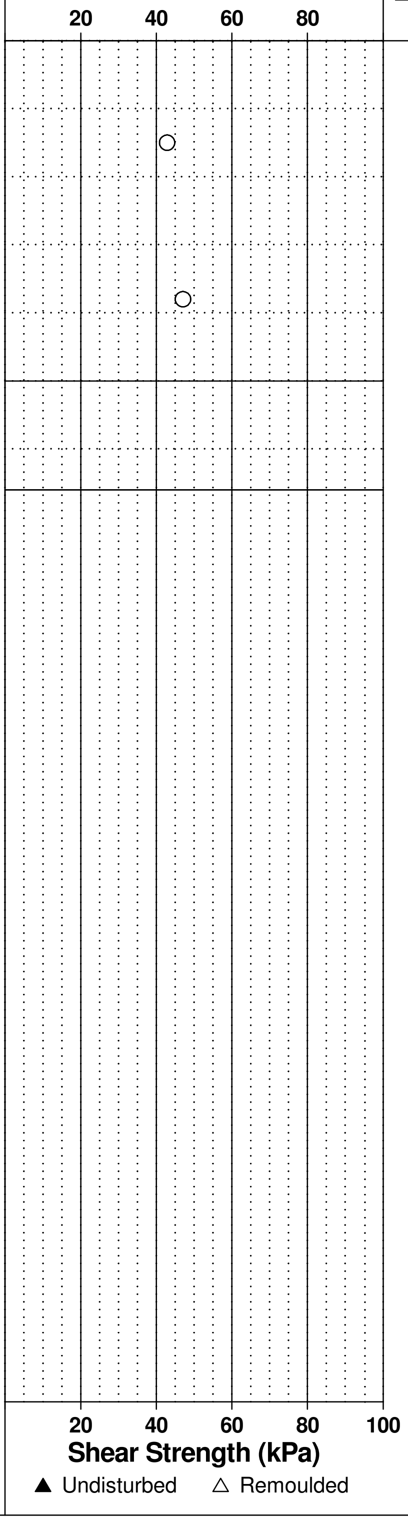
REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** December 10, 2020

FILE NO. PG5570

HOLE NO. TP 18

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	103.42		
TOPSOIL 0.30		G	1						
Brown **SILTY SAND,** some gravel		G	2						
1.32		G	3			1	102.42		
End of Test Pit TP terminated on inferred bedrock surface at 1.32m depth (TP dry upon completion)									



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 relative strength of cohesionless soils is the compactness condition, 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. An SPT N value of “P” denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

Compactness Condition	‘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 shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

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, S_t, is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

Low Sensitivity: $S_t < 2$
Medium Sensitivity: $2 < S_t < 4$
Sensitive: $4 < S_t < 8$
Extra Sensitive: $8 < S_t < 16$
Quick Clay: $S_t > 16$

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 NQ or larger size core. However, it can be used on smaller core sizes, such as BQ, 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, generally recovered using a piston sampler
G - "Grab" sample from test pit or surface materials
AU - Auger sample or bulk sample
WS - Wash sample
RC - Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

WC% - Natural water 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 at 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)

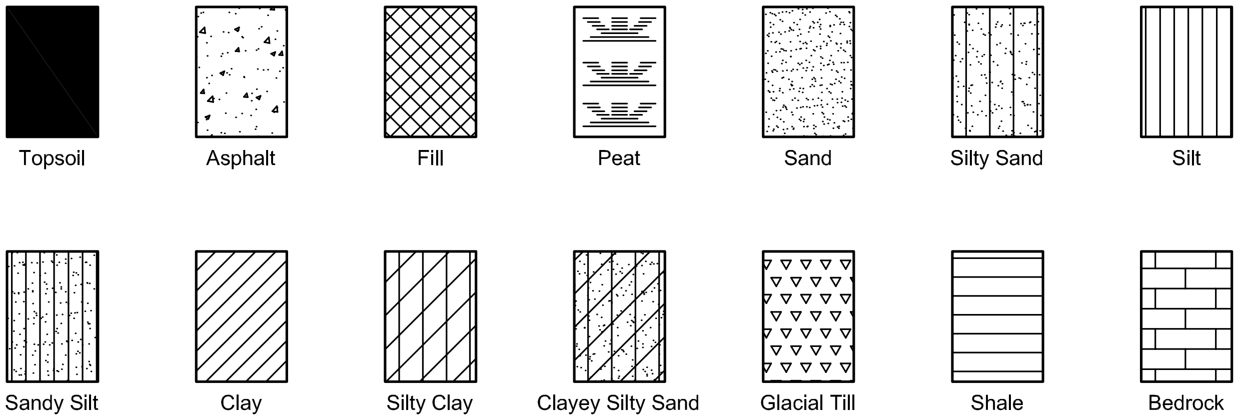
OC Ratio Overconsolidaton ratio = p'_c / p'_o
Void Ratio Initial sample void ratio = volume of voids / volume of solids
Wo - Initial water content (at start of consolidation test)

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.

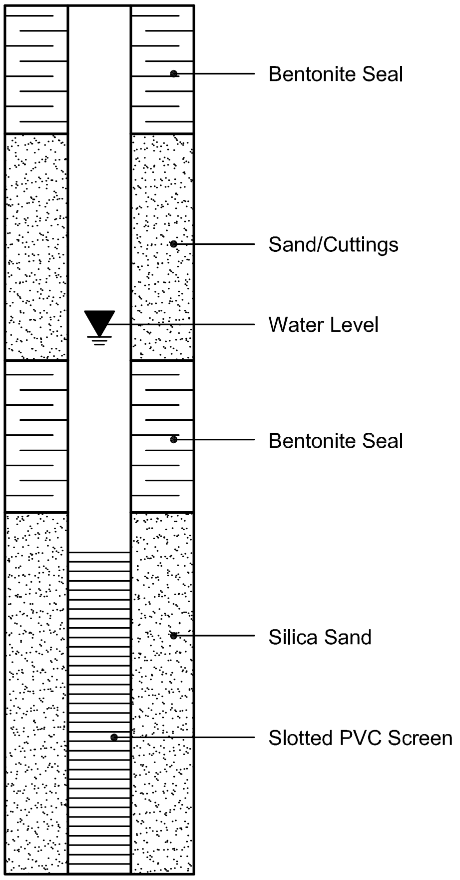
SYMBOLS AND TERMS (continued)

STRATA PLOT

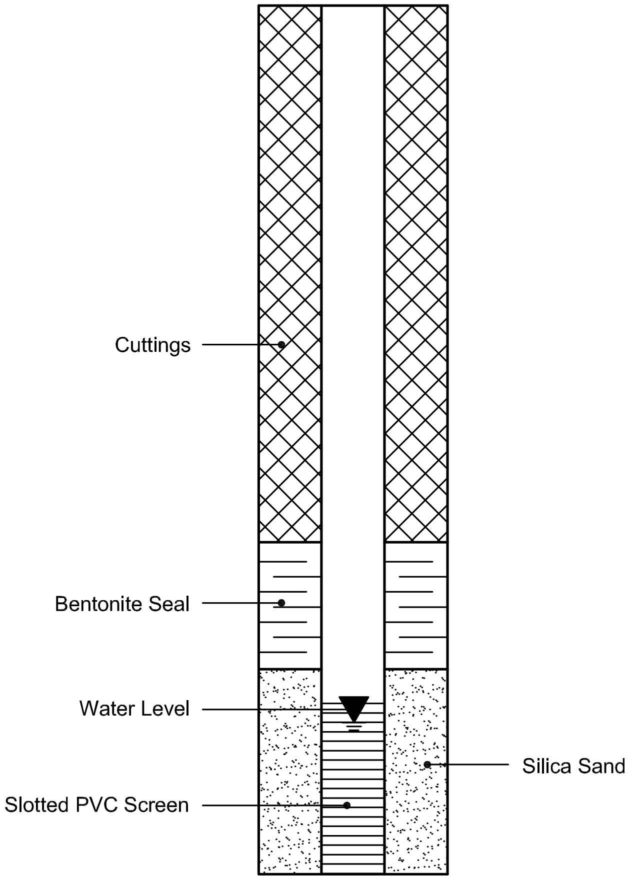


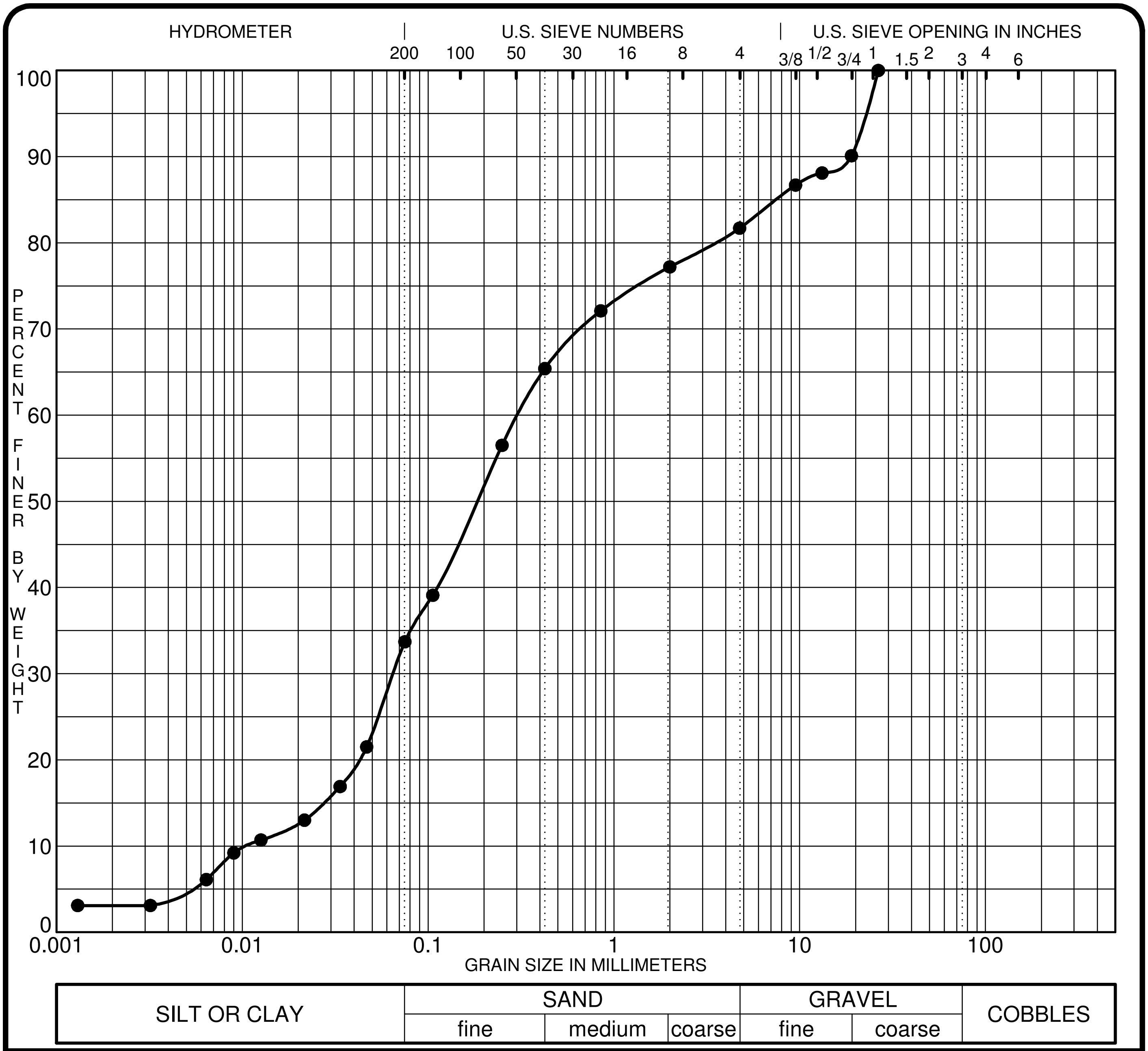
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION





	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 1-22**	**SS2**	**Glacial Till**					**1.27**	**28.6**
⊠									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 1-22**	**SS2**	**26.50**	**0.31**	**0.065**	**0.0108**	**18.3**	**48.0**	**31.2**	**2.5**
⊠										
▲										
★										

CLIENT **Caivan Communities**

FILE NO. **PG5570**

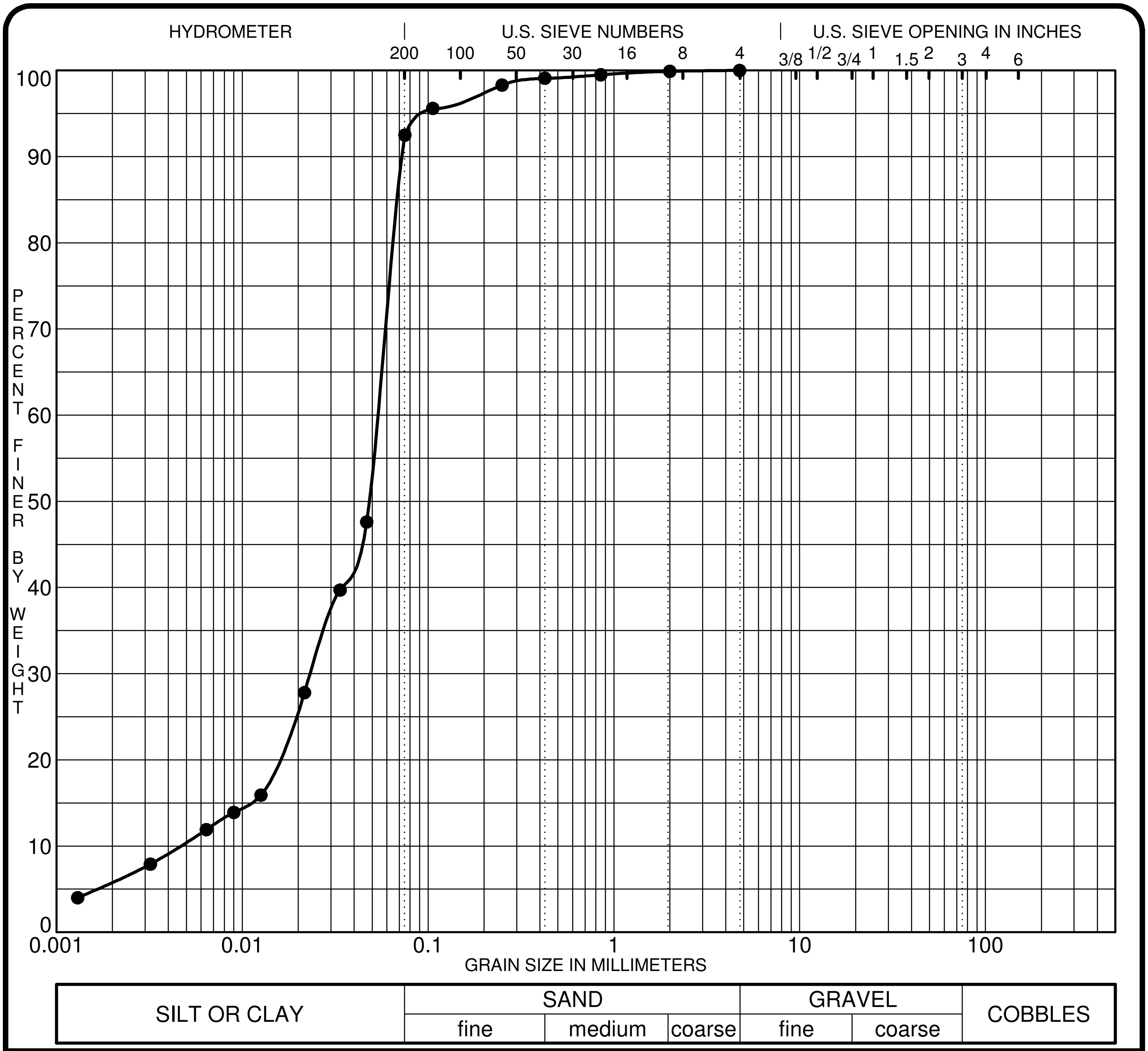
PROJECT **Geotechnical Investigation - 5993, 6070 and 6115 Flewellyn Road**

DATE **28 Sep 22**

patersongroup **Consulting Engineers**

9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION



	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 3-22**	**SS4**	**Glacial Till**					**2.24**	**11.6**
⌧									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 3-22**	**SS4**	**4.75**	**0.05**	**0.023**	**0.0046**	**0.0**	**7.5**	**87.0**	**5.5**
⌧										
▲										
★										

CLIENT **Caivan Communities**

FILE NO. **PG5570**

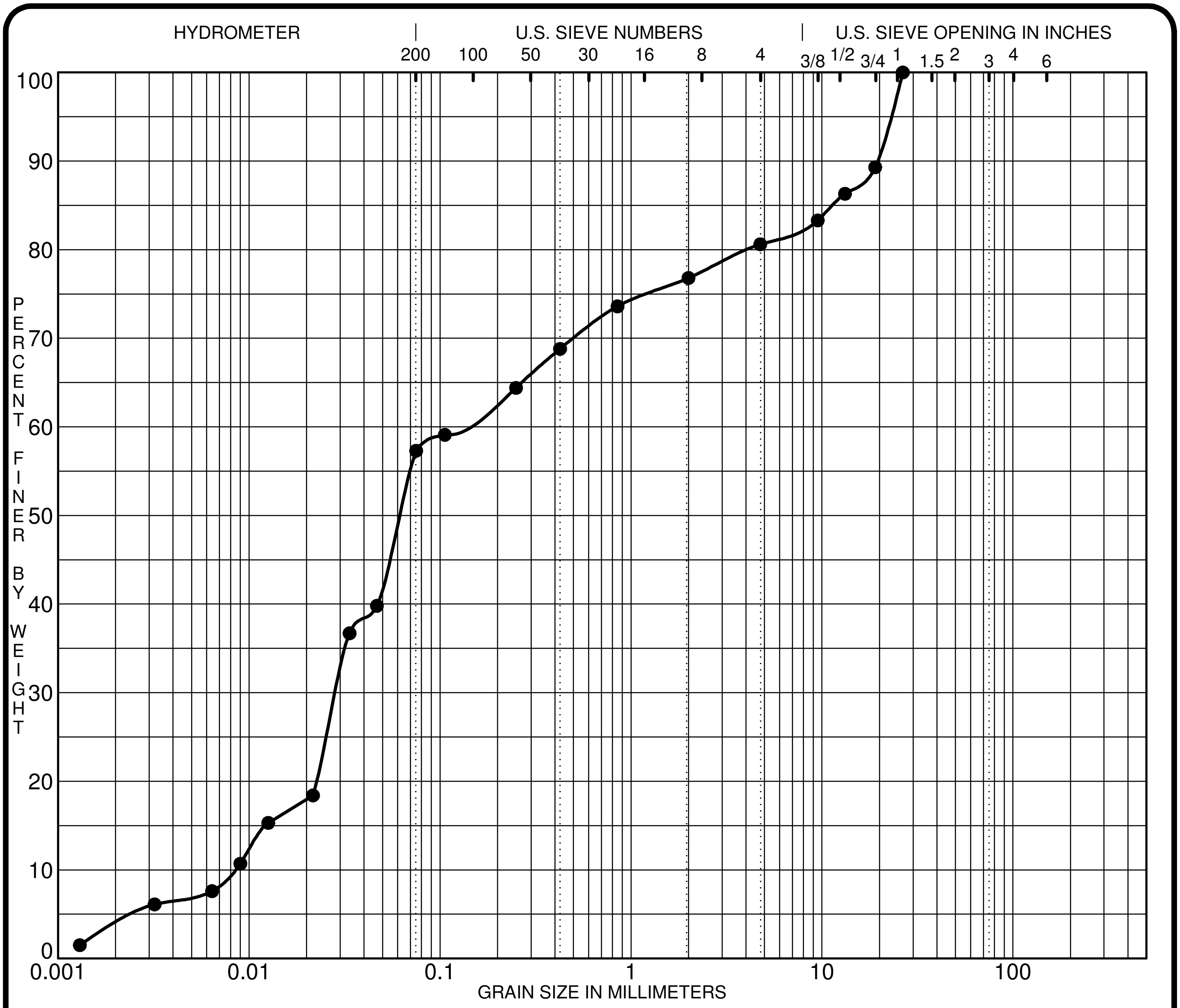
PROJECT **Geotechnical Investigation - 5993, 6070 and 6115 Flewellyn Road**

DATE **29 Sep 22**

patersongroup **Consulting Engineers**

9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 4-22**	**SS4**	**Glacial Till**					**0.80**	**14.7**
☒									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 4-22**	**SS4**	**26.50**	**0.12**	**0.029**	**0.0083**	**19.4**	**23.3**	**53.8**	**3.5**
☒										
▲										
★										

CLIENT **Caivan Communities**

FILE NO. **PG5570**

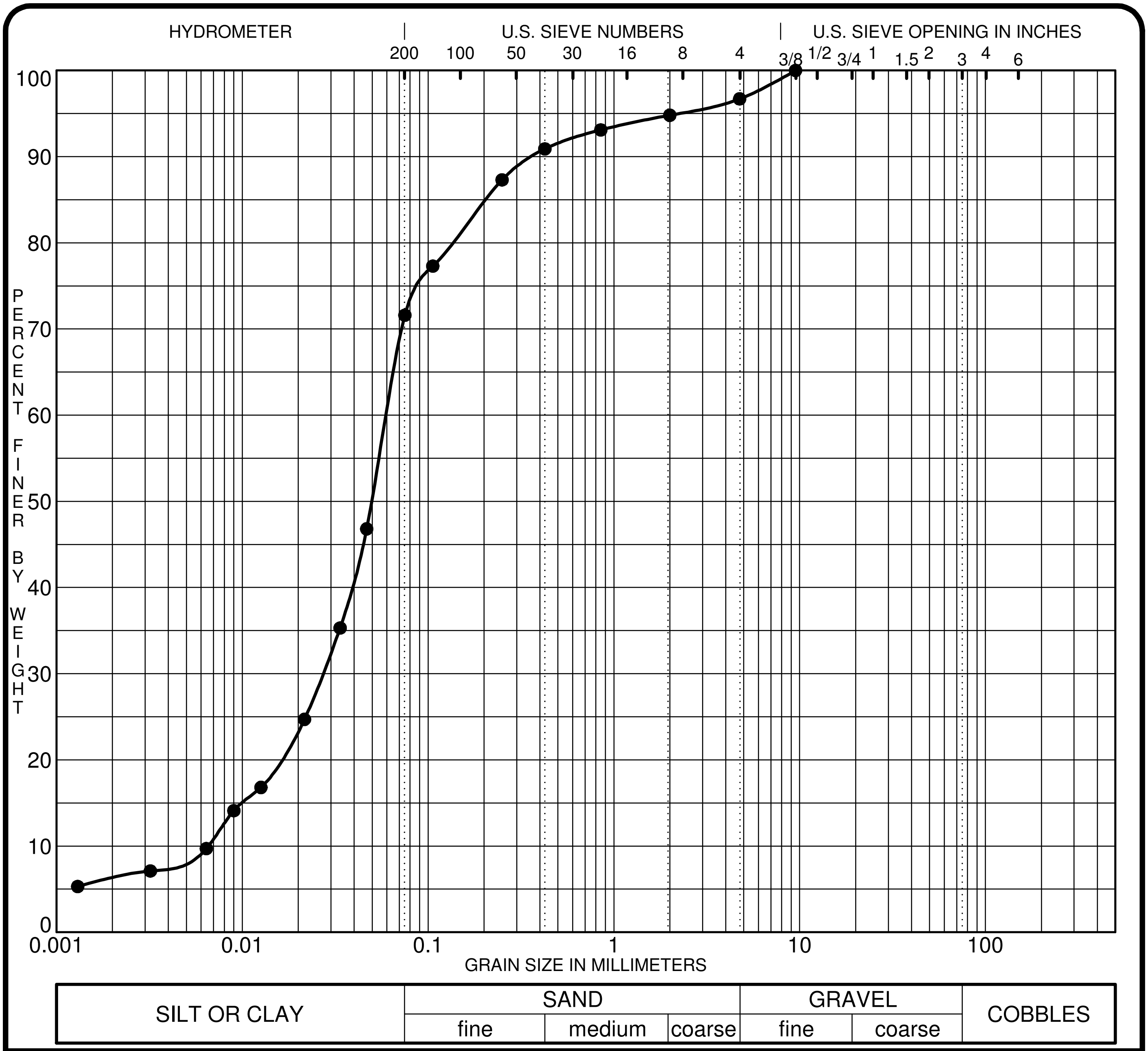
PROJECT **Geotechnical Investigation - 5993, 6070 and 6115 Flewellyn Road**

DATE **29 Sep 22**

patersongroup **Consulting Engineers**

9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION



	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 5-22**	**SS3**	**Silty Sand/Sandy Silt**					**1.84**	**9.2**
⊠									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 5-22**	**SS3**	**9.50**	**0.06**	**0.027**	**0.0066**	**3.3**	**25.1**	**65.6**	**6.0**
⊠										
▲										
★										

CLIENT **Caivan Communities**

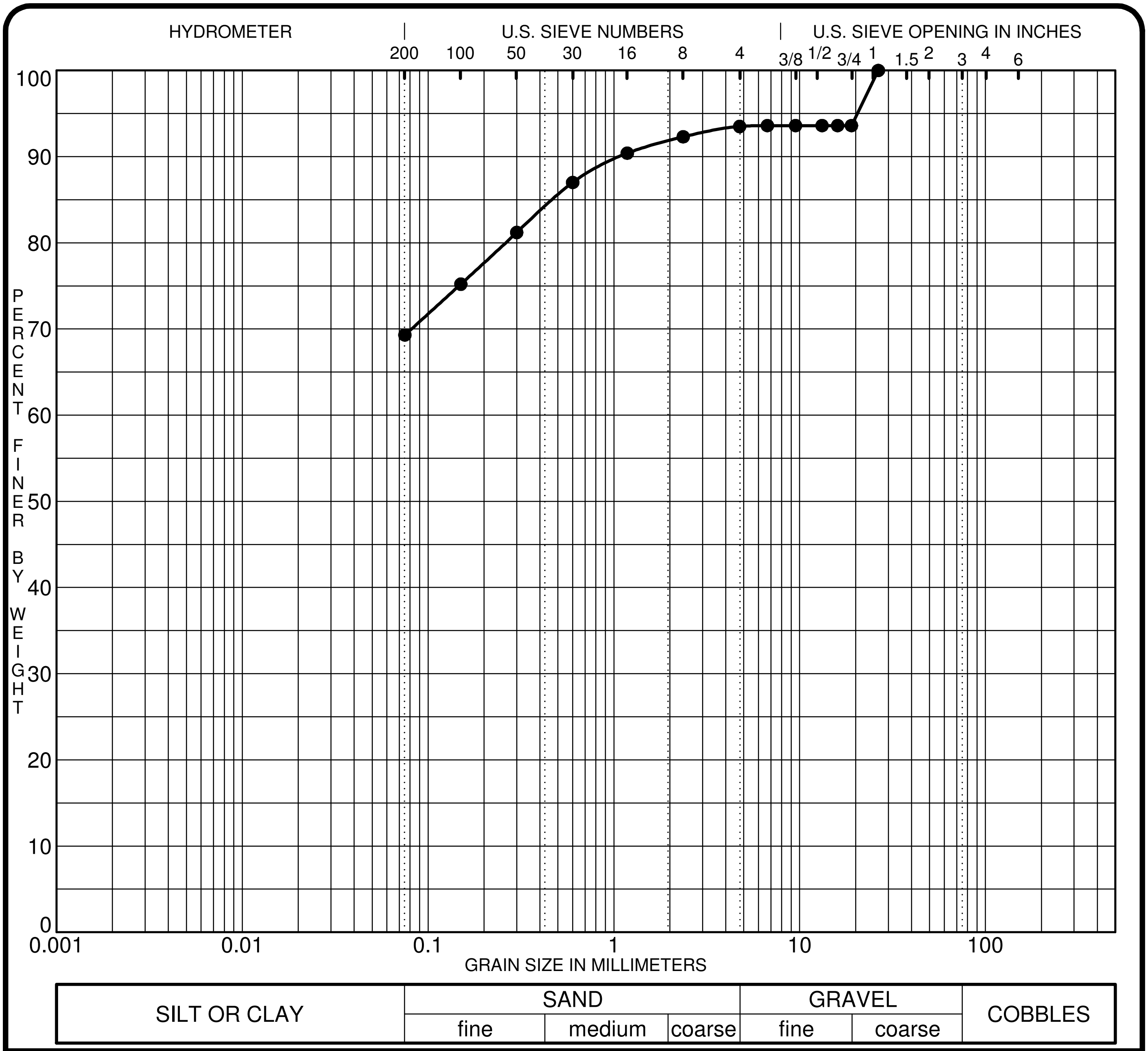
PROJECT **Geotechnical Investigation - 5993, 6070 and 6115**
Flewellyn Road

FILE NO. **PG5570**

DATE **30 Sep 22**

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

GRAIN SIZE DISTRIBUTION



	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 4-21 SS2+SS3**	**GLACIAL TILL**					**0.40**	**2.5**
⌧								
▲								
★								

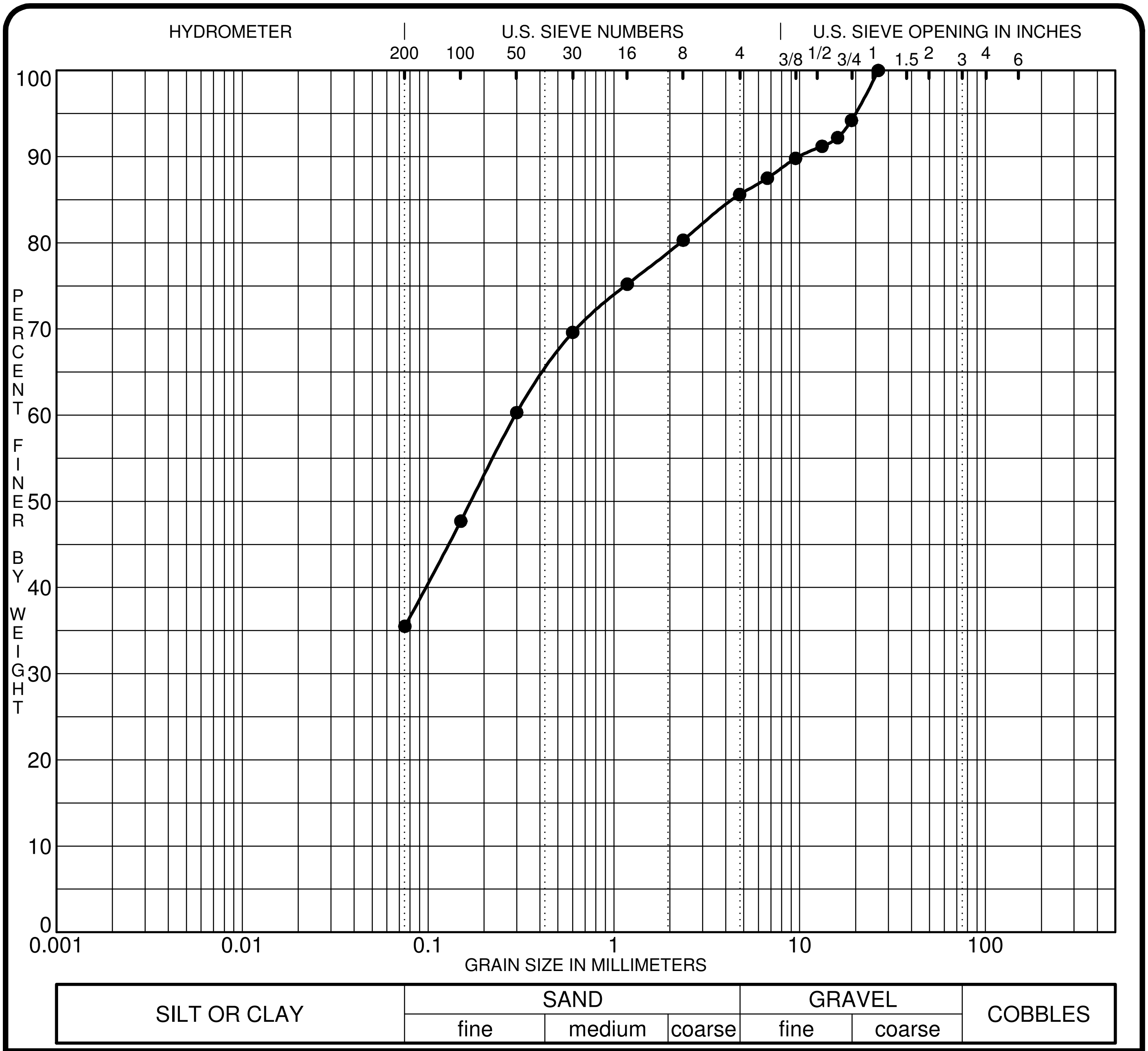
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 4-21 SS2+SS3**	**26.50**				**6.5**	**24.2**	**69.3**	
⌧									
▲									
★									

CLIENT	**Caivan Communities**	FILE NO.	**PG5570**
PROJECT	**Geotechnical Investigation - 5993, 6070 and 6115 Flewellyn Road, Ottawa, On.**	DATE	**15 Dec 21**

patersongroup **Consulting Engineers**

9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION



Specimen Identification			Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH11-21**	**SS3**	**GLACIAL TILL**					**0.87**	**24.2**
☒									
▲									
★									

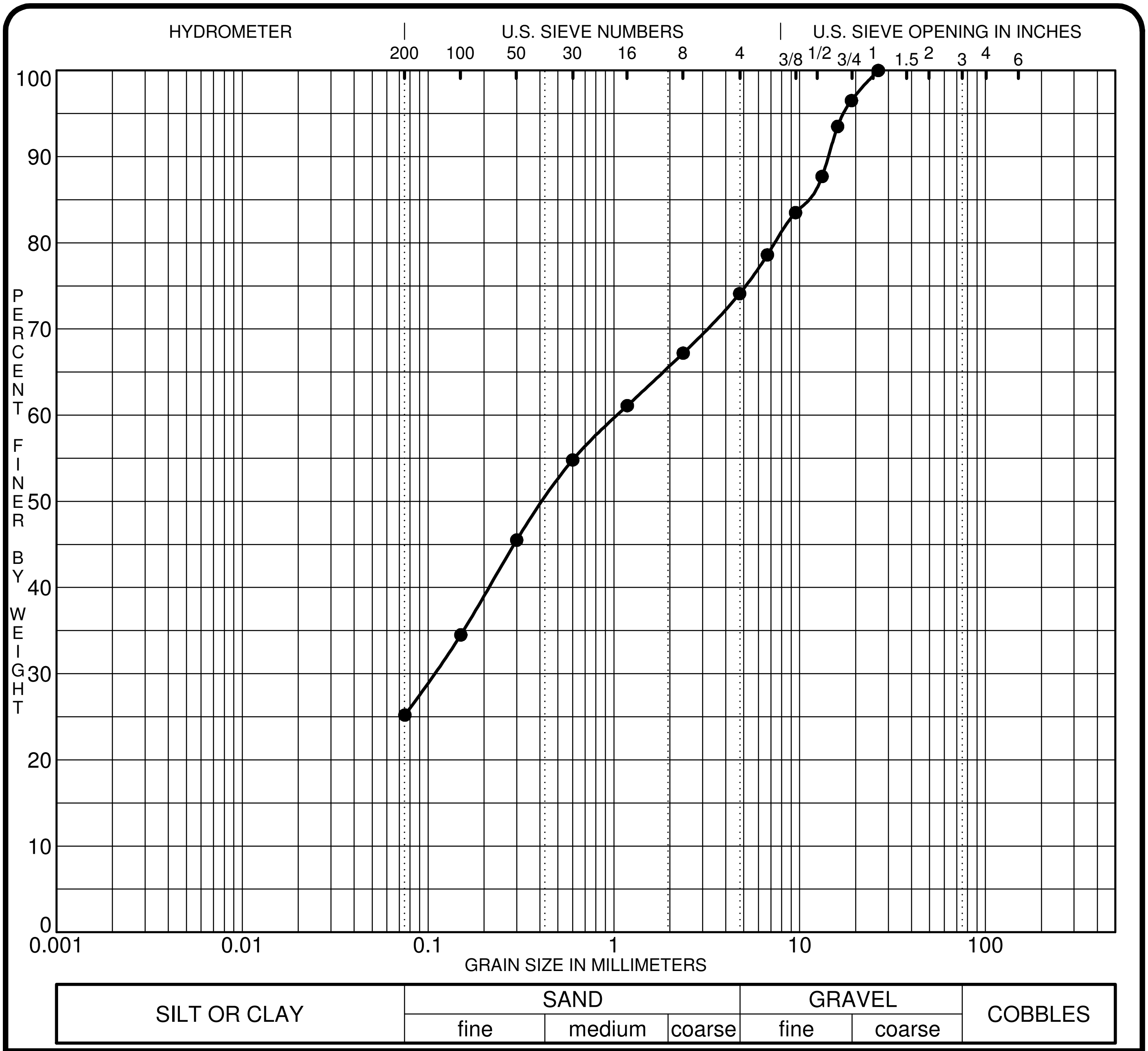
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH11-21**	**SS3**	**26.50**	**0.30**			**14.4**	**50.1**	**35.5**	
☒										
▲										
★										

CLIENT **Caivan Communities**
PROJECT **Geotechnical Investigation - 5993, 6070 and 6115**
Flewellyn Road, Ottawa, On.

FILE NO. **PG5570**
DATE **16 Dec 21**

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

GRAIN SIZE DISTRIBUTION



	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH14-21SS2+SS3**	**GLACIAL TILL**					**0.70**	**76.7**
⊠								
▲								
★								

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH14-21SS2+SS3**	**26.50**	**1.05**	**0.107**		**25.9**	**48.9**	**25.2**	
⊠									
▲									
★									

CLIENT **Caivan Communities**

FILE NO. **PG5570**

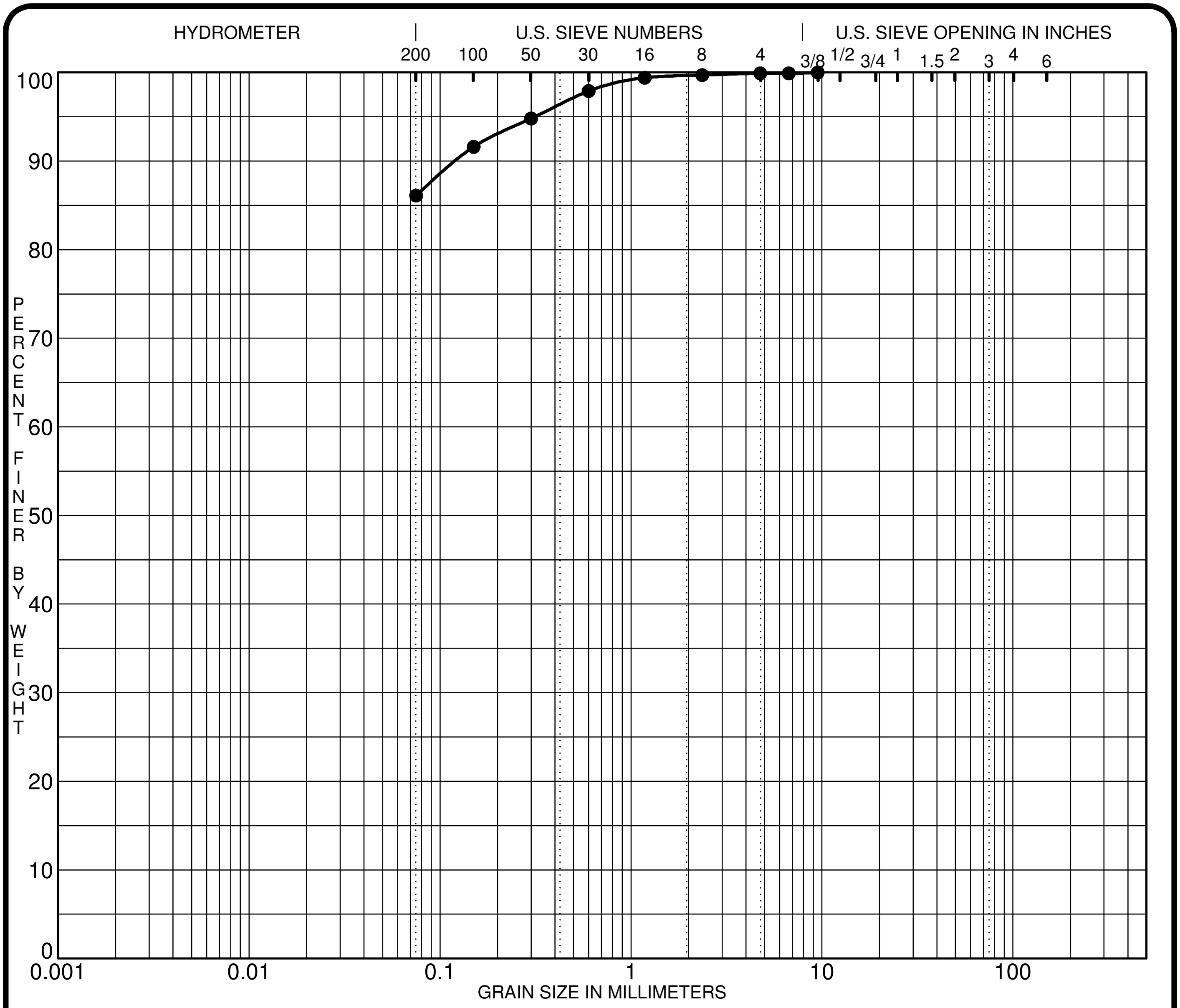
PROJECT **Geotechnical Investigation - 5993, 6070 and 6115**
Flewellyn Road, Ottawa, On.

DATE **16 Dec 21**

patersongroup **Consulting Engineers**

9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH19-21SS2+SS3**	**SILTY SAND/SANDY SILT**					**0.83**	**1.2**
☒								
▲								
★								

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH19-21SS2+SS3**	**9.50**				**0.1**	**13.8**	**86.1**	
☒									
▲									
★									

CLIENT **Caivan Communities**

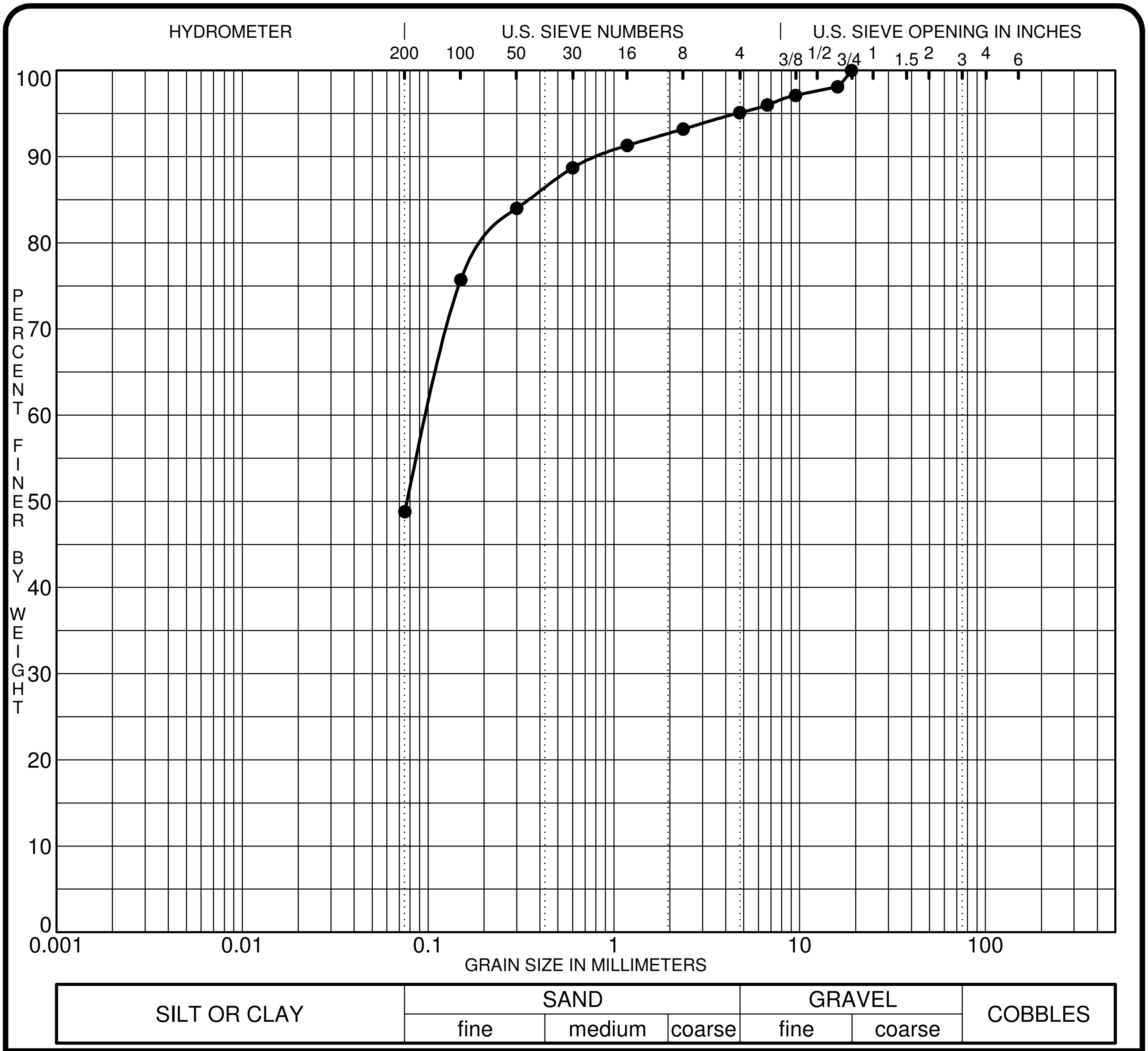
FILE NO. **PG5570**

PROJECT **Geotechnical Investigation - 5993, 6070 and 6115**
Flewellyn Road, Ottawa, On.

DATE **16 Dec 21**

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

GRAIN SIZE DISTRIBUTION



	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH24-21SS3+SS4**	**GLACIAL TILL**					**1.10**	**3.5**
☒								
▲								
★								

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH24-21SS3+SS4**	**19.00**	**0.10**			**4.9**	**46.3**	**48.8**	
☒									
▲									
★									

CLIENT **Caivan Communities**

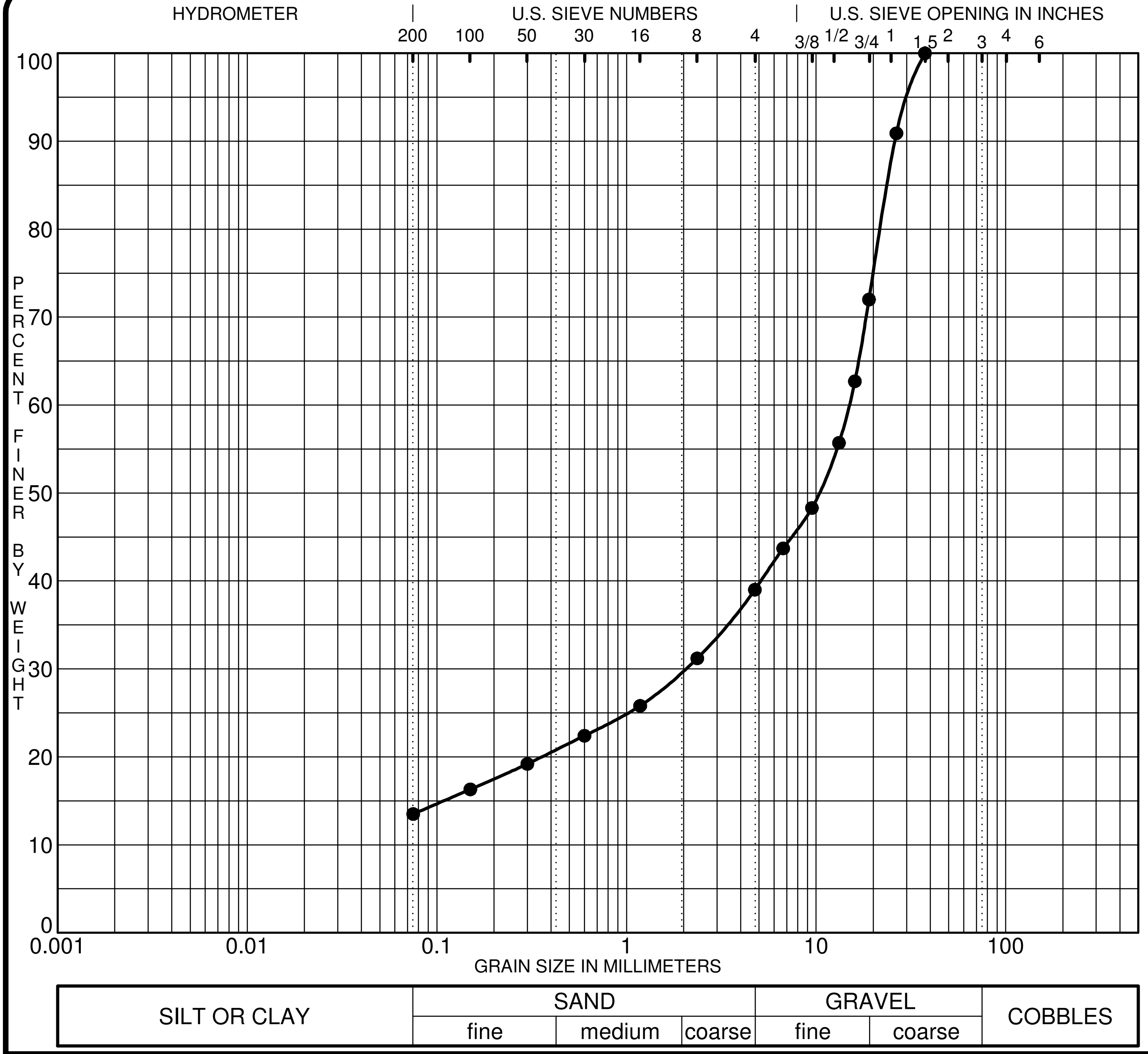
FILE NO. **PG5570**

PROJECT **Geotechnical Investigation - 5993, 6070 and 6115**
Flewellyn Road, Ottawa, On.

DATE **20 Dec 21**

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

GRAIN SIZE DISTRIBUTION



	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH35-21SS4+SS5**	**GLACIAL TILL**					**17.82**	**1100**
⊠								
▲								
★								

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH35-21SS4+SS5**	**37.50**	**14.86**	**2.023**		**61.0**	**25.5**	**13.5**	
⊠									
▲									
★									

CLIENT **Caivan Communities**

PROJECT **Geotechnical Investigation - 5993, 6070 and 6115**
Flewellyn Road, Ottawa, On.

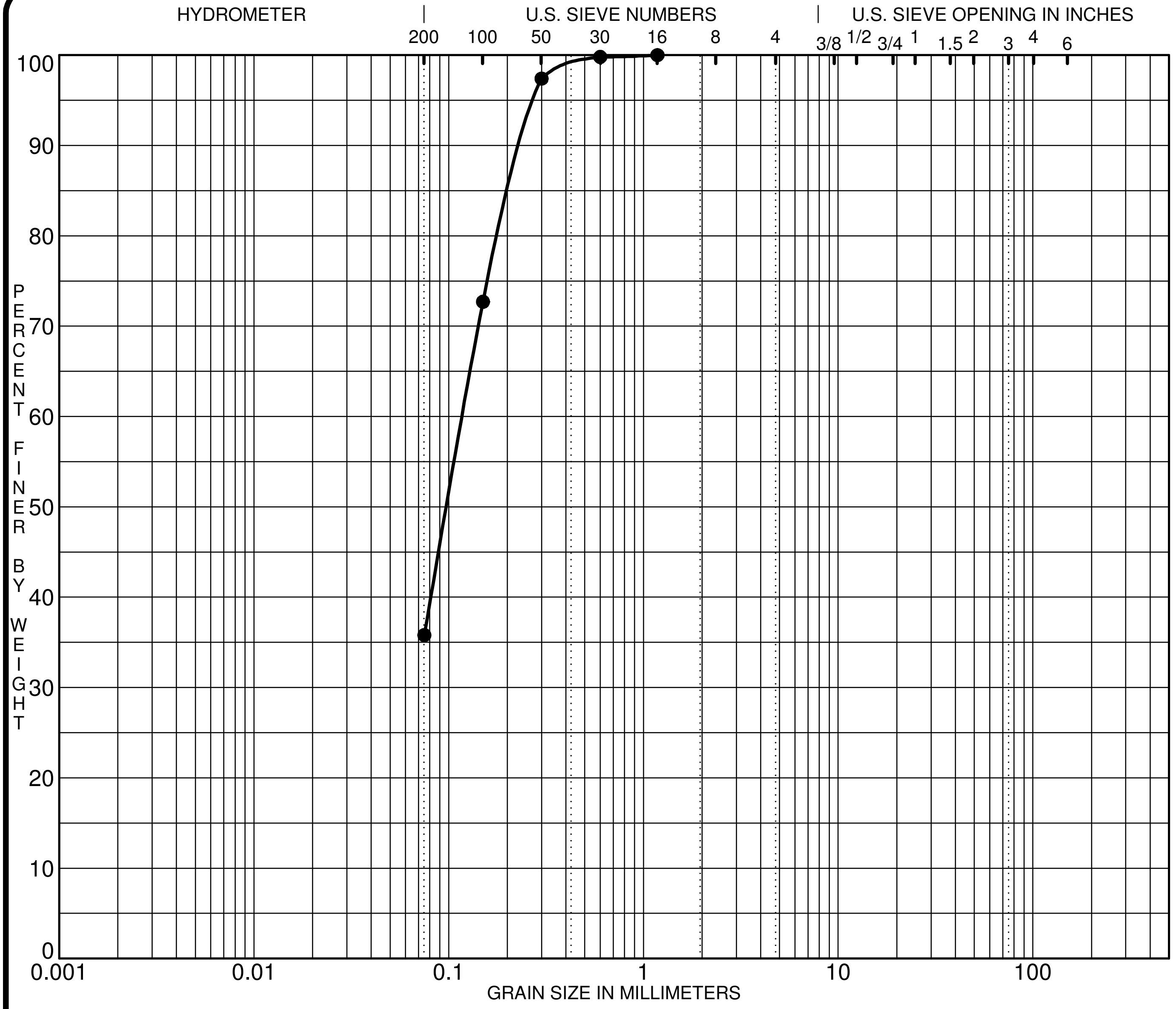
FILE NO. **PG5570**

DATE **7 Jan 22**

patersongroup **Consulting Engineers**

9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH37-21**	**SS3**	**SILTY SAND/SANDY SILT**					**0.65**	**2.4**
☒									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH37-21**	**SS3**	**1.18**	**0.12**			**0.0**	**64.2**	**35.8**	
☒										
▲										
★										

CLIENT **Caivan Communities**

PROJECT **Geotechnical Investigation - 5993, 6070 and 6115**
Flewellyn Road, Ottawa, On.

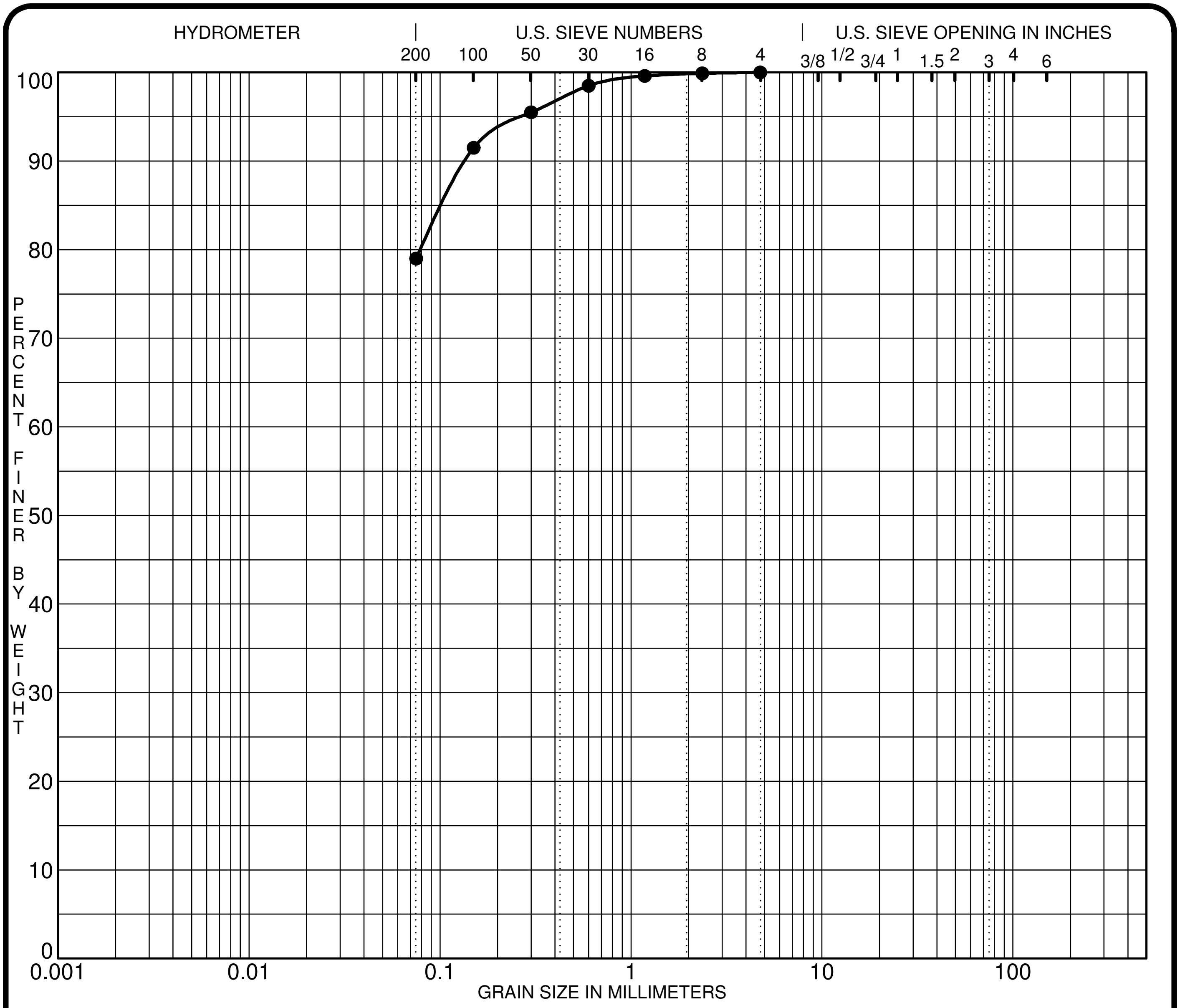
FILE NO. **PG5570**

DATE **7 Jan 22**

patersongroup **Consulting Engineers**

9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH38-21SS3+SS4**	**SILTY SAND/SANDY SILT**					**0.56**	**1.8**
☒								
▲								
★								

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH38-21SS3+SS4**	**4.75**				**0.0**	**21.0**	**79.0**	
☒									
▲									
★									

CLIENT **Caivan Communities**

FILE NO. **PG5570**

PROJECT **Geotechnical Investigation - 5993, 6070 and 6115**
Flewellyn Road, Ottawa, On.

DATE **7 Jan 22**

patersongroup **Consulting Engineers**

9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION

Certificate of Analysis

Report Date: 27-Nov-2020

Client: Paterson Group Consulting Engineers

Order Date: 20-Nov-2020

Client PO: 31285

Project Description: PG5570

	Client ID:	TP4-GR3	-	-	-
	Sample Date:	20-Nov-20 13:00	-	-	-
	Sample ID:	2047663-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	89.0	-	-	-
General Inorganics					
pH	0.05 pH Units	7.60	-	-	-
Resistivity	0.10 Ohm.m	93.8	-	-	-
Anions					
Chloride	5 ug/g dry	<5	-	-	-
Sulphate	5 ug/g dry	<5	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 31363

Report Date: 17-Dec-2020

Order Date: 14-Dec-2020

Project Description: PG5570

	Client ID:	TPF-G2	-	-	-
	Sample Date:	11-Dec-20 15:30	-	-	-
	Sample ID:	2051099-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	82.7	-	-	-
General Inorganics					
pH	0.05 pH Units	7.33	-	-	-
Resistivity	0.10 Ohm.m	101	-	-	-
Anions					
Chloride	5 ug/g dry	<5	-	-	-
Sulphate	5 ug/g dry	<5	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 33505

Report Date: 22-Dec-2021

Order Date: 17-Dec-2021

Project Description: PG5570

	Client ID:	BH17-21 SS3	-	-	-
	Sample Date:	16-Dec-21 09:00	-	-	-
	Sample ID:	2151599-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	81.9	-	-	-
General Inorganics					
pH	0.05 pH Units	7.73	-	-	-
Resistivity	0.10 Ohm.m	48.9	-	-	-
Anions					
Chloride	5 ug/g dry	34	-	-	-
Sulphate	5 ug/g dry	24	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 33585

Report Date: 04-Jan-2022

Order Date: 23-Dec-2021

Project Description: PG5570

	Client ID:	BH34-21 SS3	-	-	-
	Sample Date:	22-Dec-21 09:00	-	-	-
	Sample ID:	2152465-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	84.6	-	-	-
General Inorganics					
pH	0.05 pH Units	7.75	-	-	-
Resistivity	0.10 Ohm.m	81.3	-	-	-
Anions					
Chloride	5 ug/g dry	12	-	-	-
Sulphate	5 ug/g dry	9	-	-	-

APPENDIX 2

FIGURE 1 - KEY PLAN

FIGURES 2 – 13 MONITORING WELL WATER ELEVATIONS

DRAWING PG5570-1 - TEST HOLE LOCATION PLAN

DRAWING PG5570-2 - BEDROCK CONTOUR PLAN

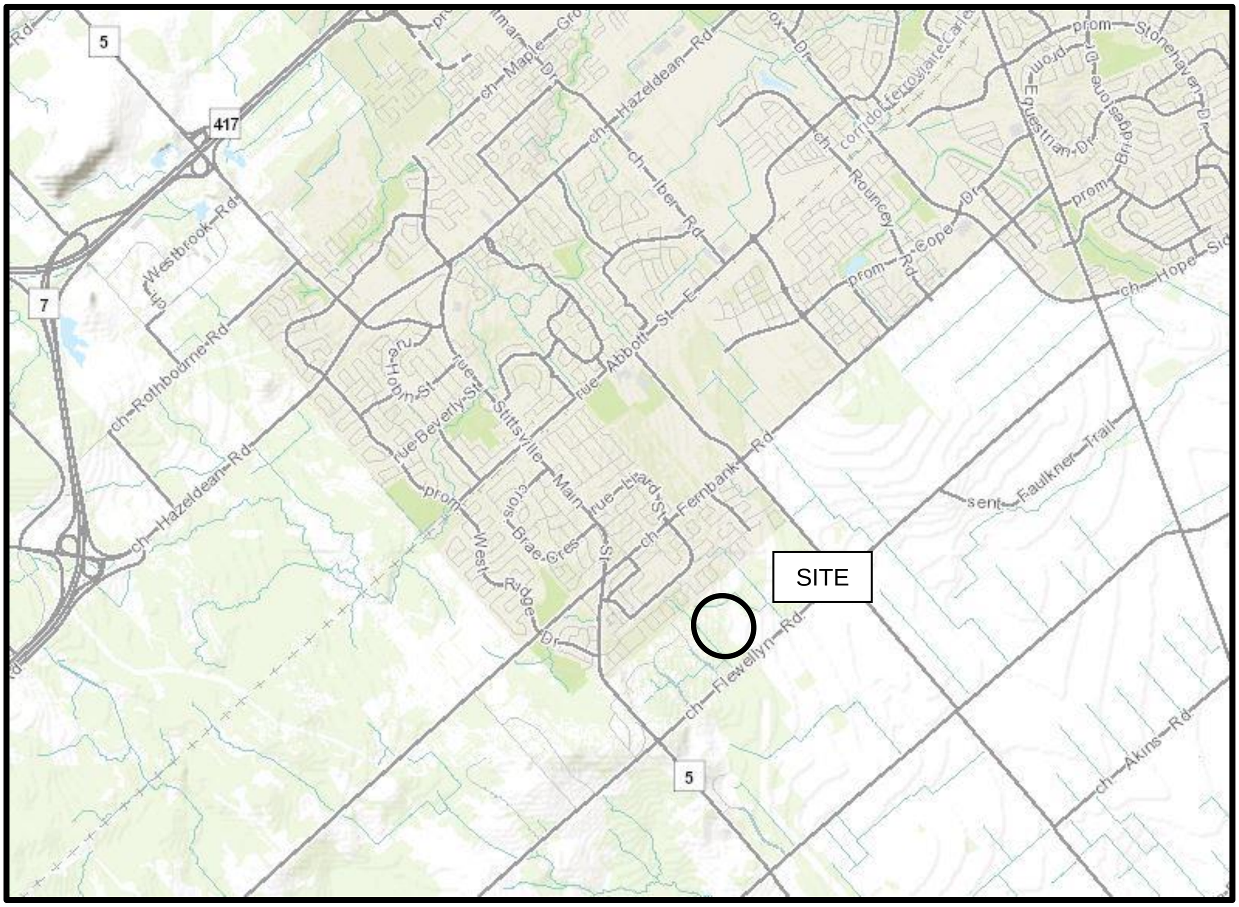


FIGURE 1

KEY PLAN

PATERSON
GROUP

Figure 2: BH1-21 - Monitoring Well Water Elevations

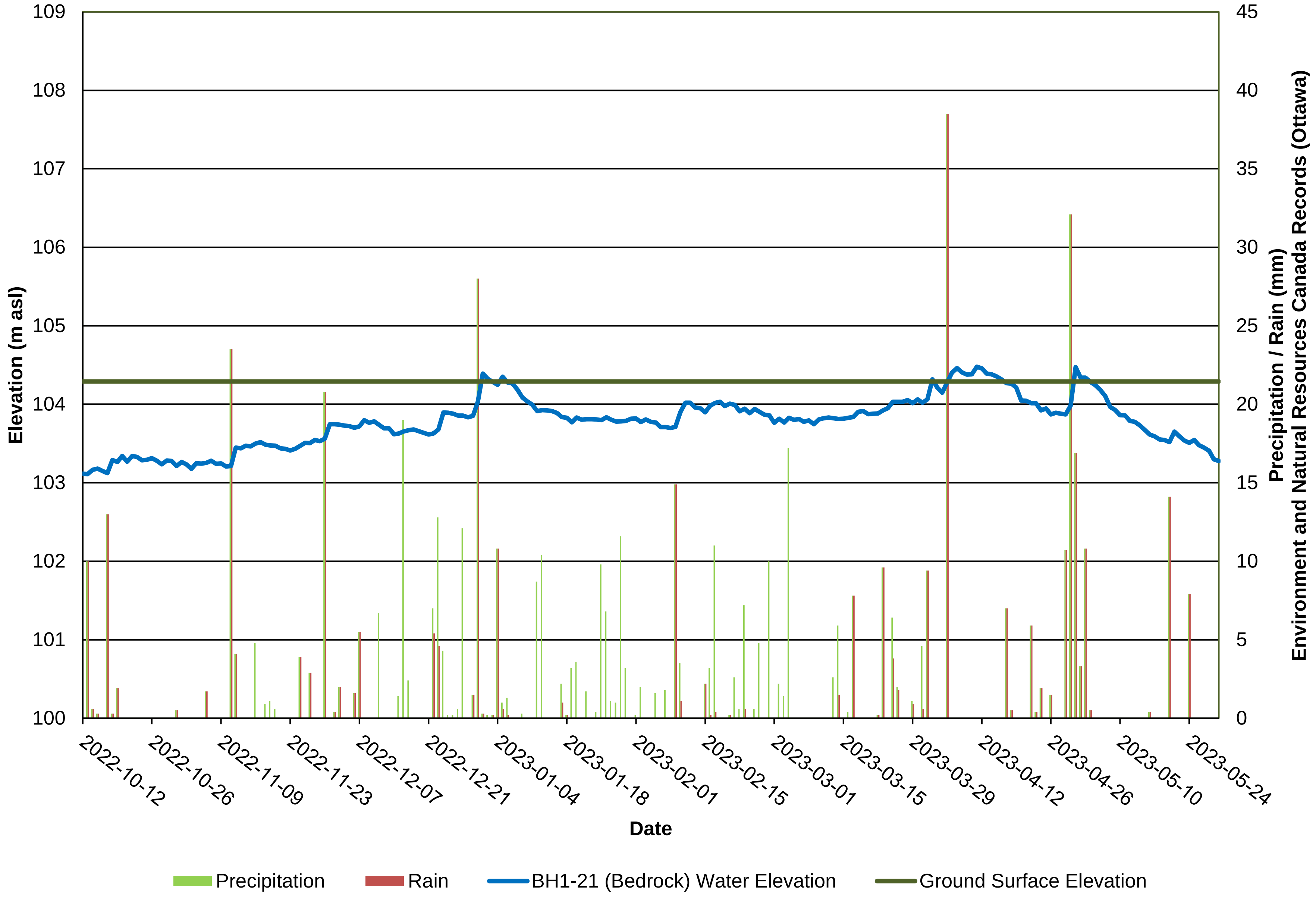


Figure 3: BH2-21 - Monitoring Well Water Elevations

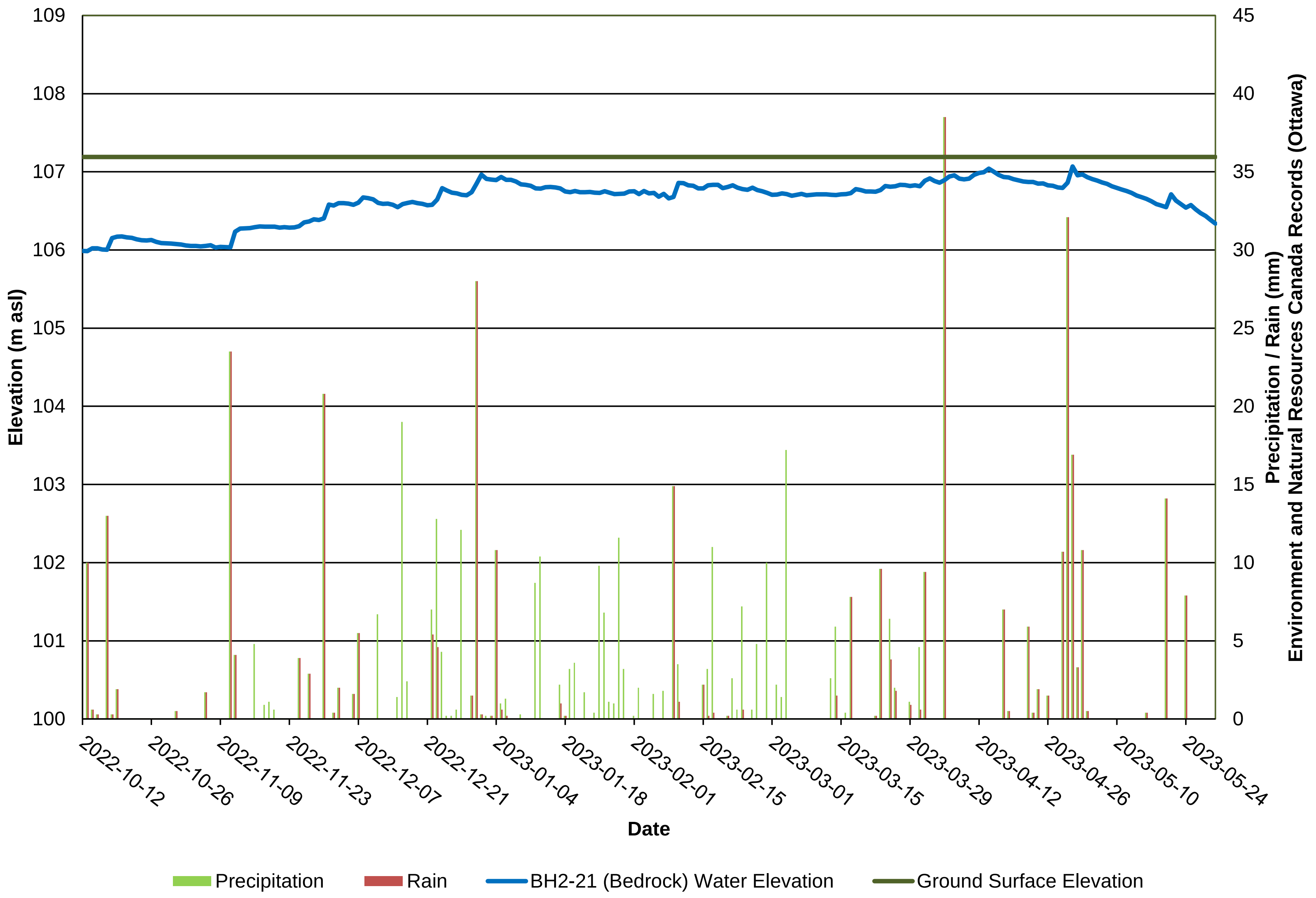


Figure 4: BH3-21 - Monitoring Well Water Elevations

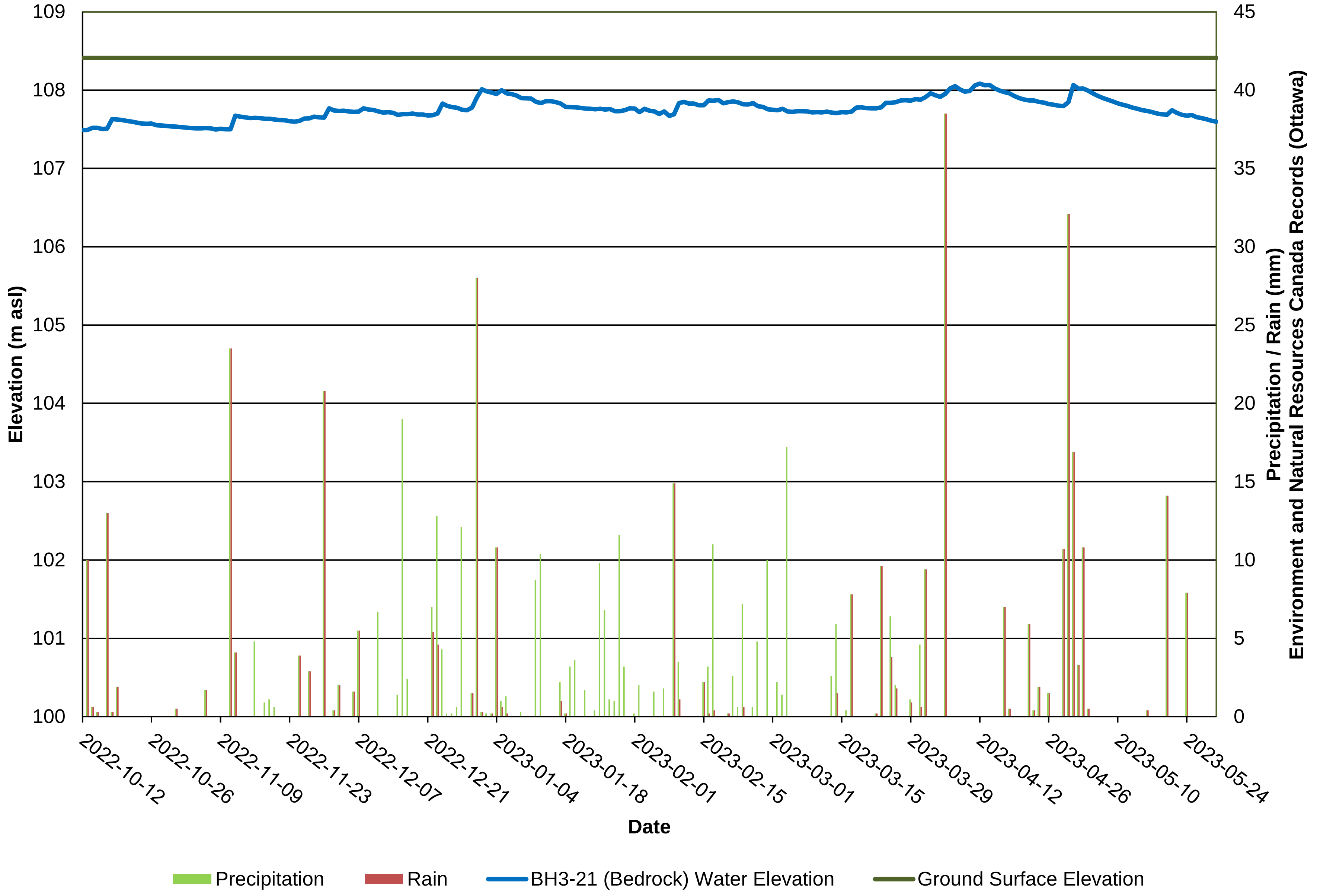
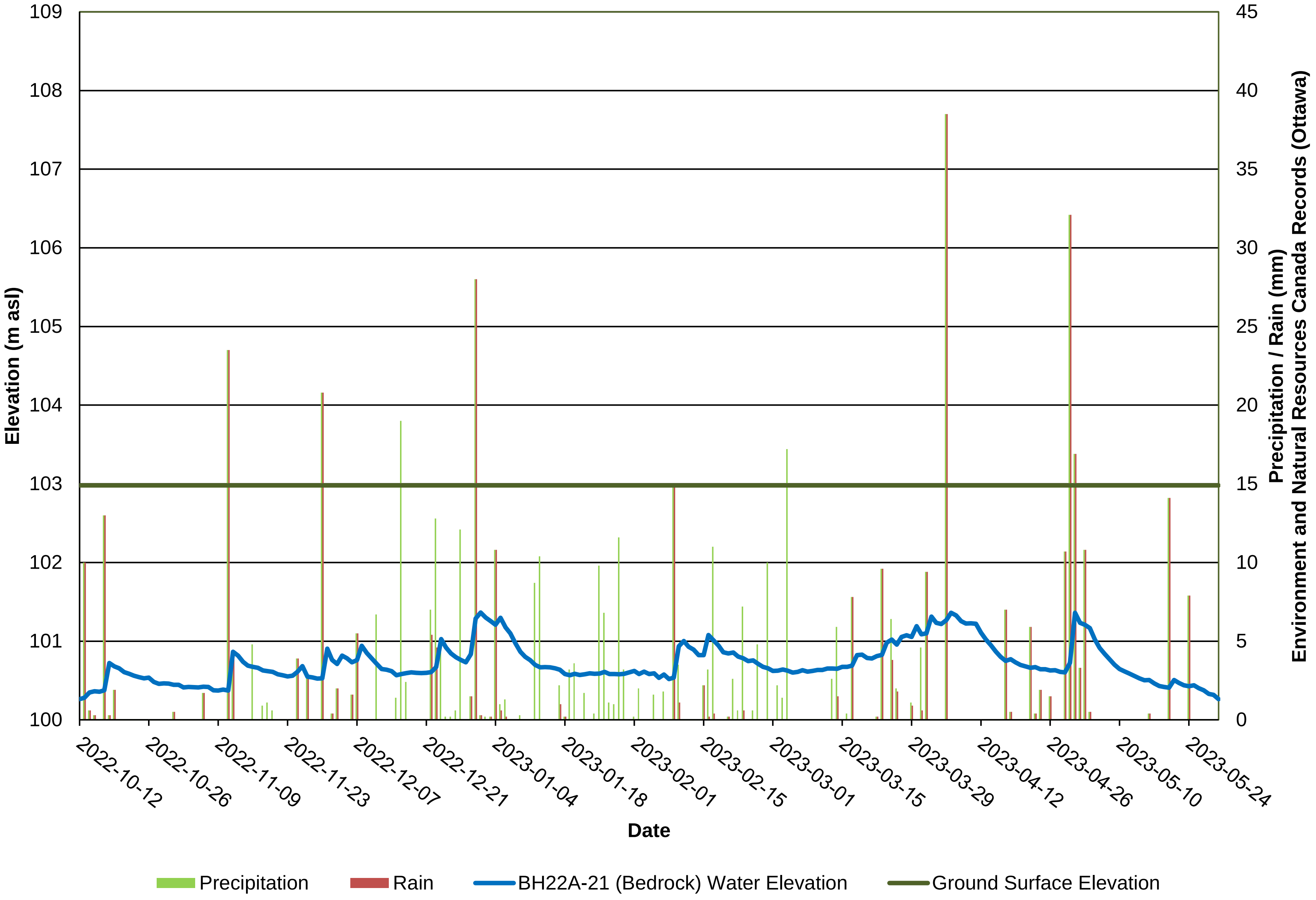


Figure 5: BH22A-21 - Monitoring Well Water Elevations



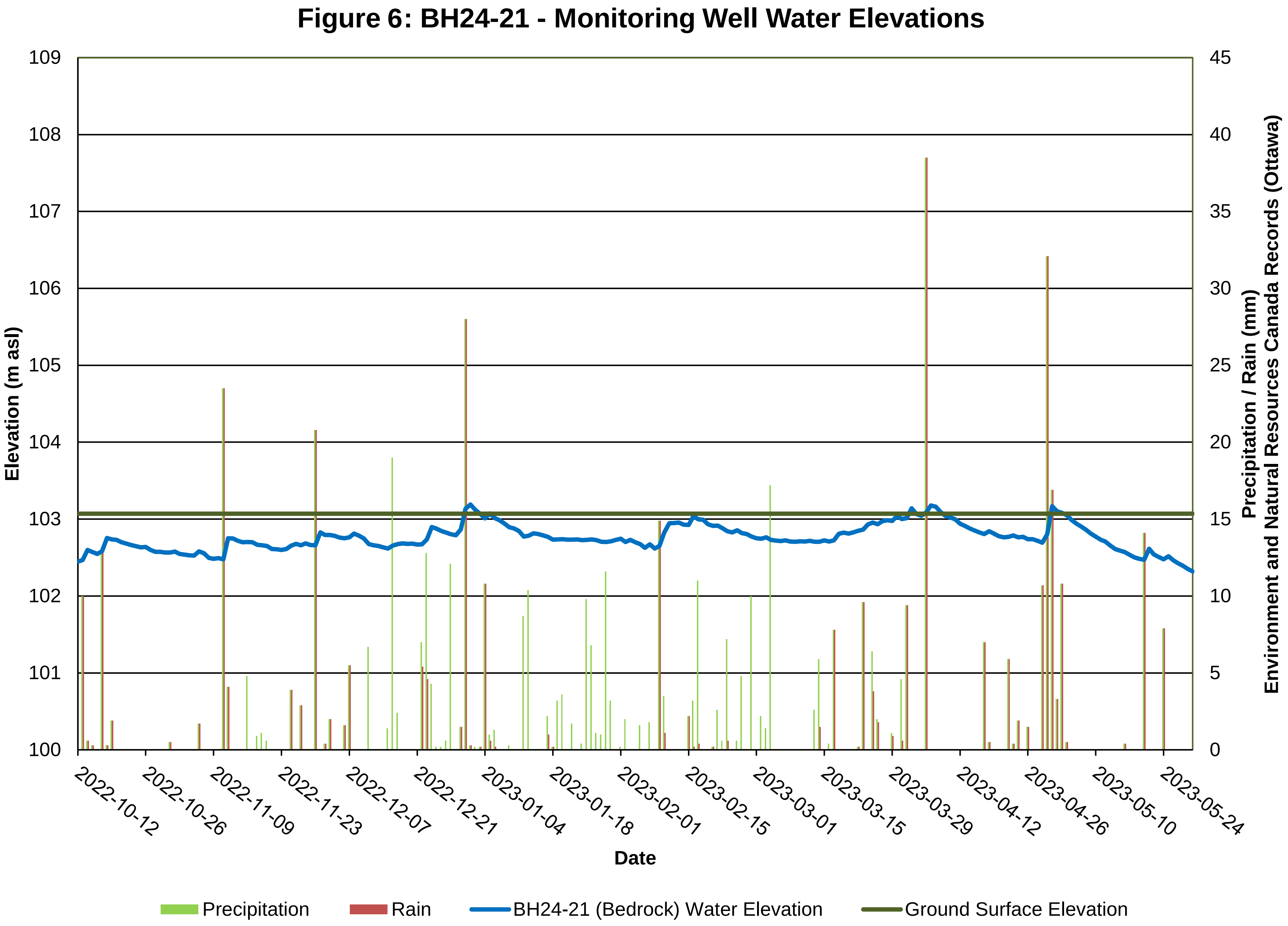


Figure 6: BH24-21 - Monitoring Well Water Elevations

Figure 7: BH33-21 - Monitoring Well Water Elevations

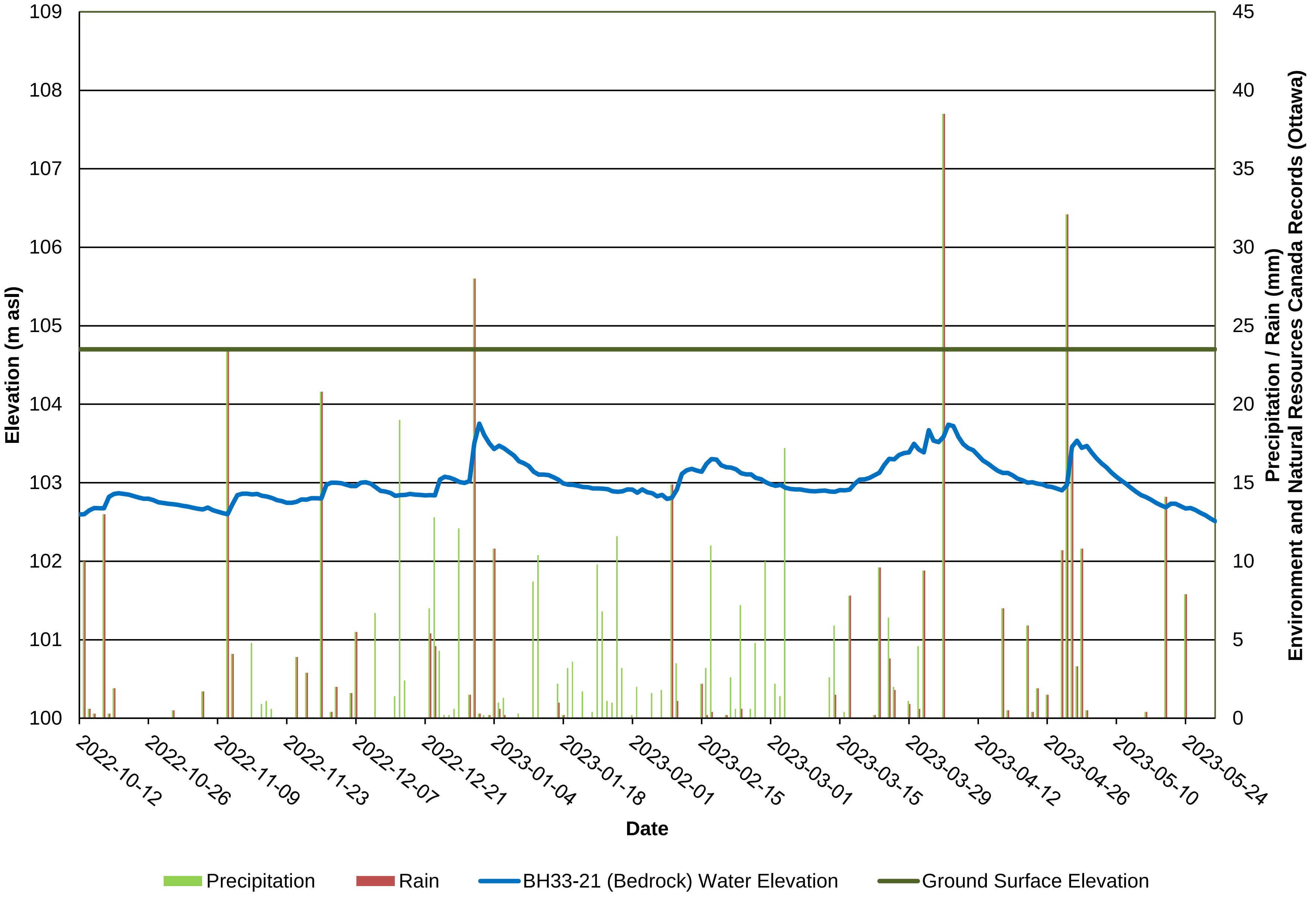


Figure 8: BH1-22 & BH1A-22 - Monitoring Well Water Elevations

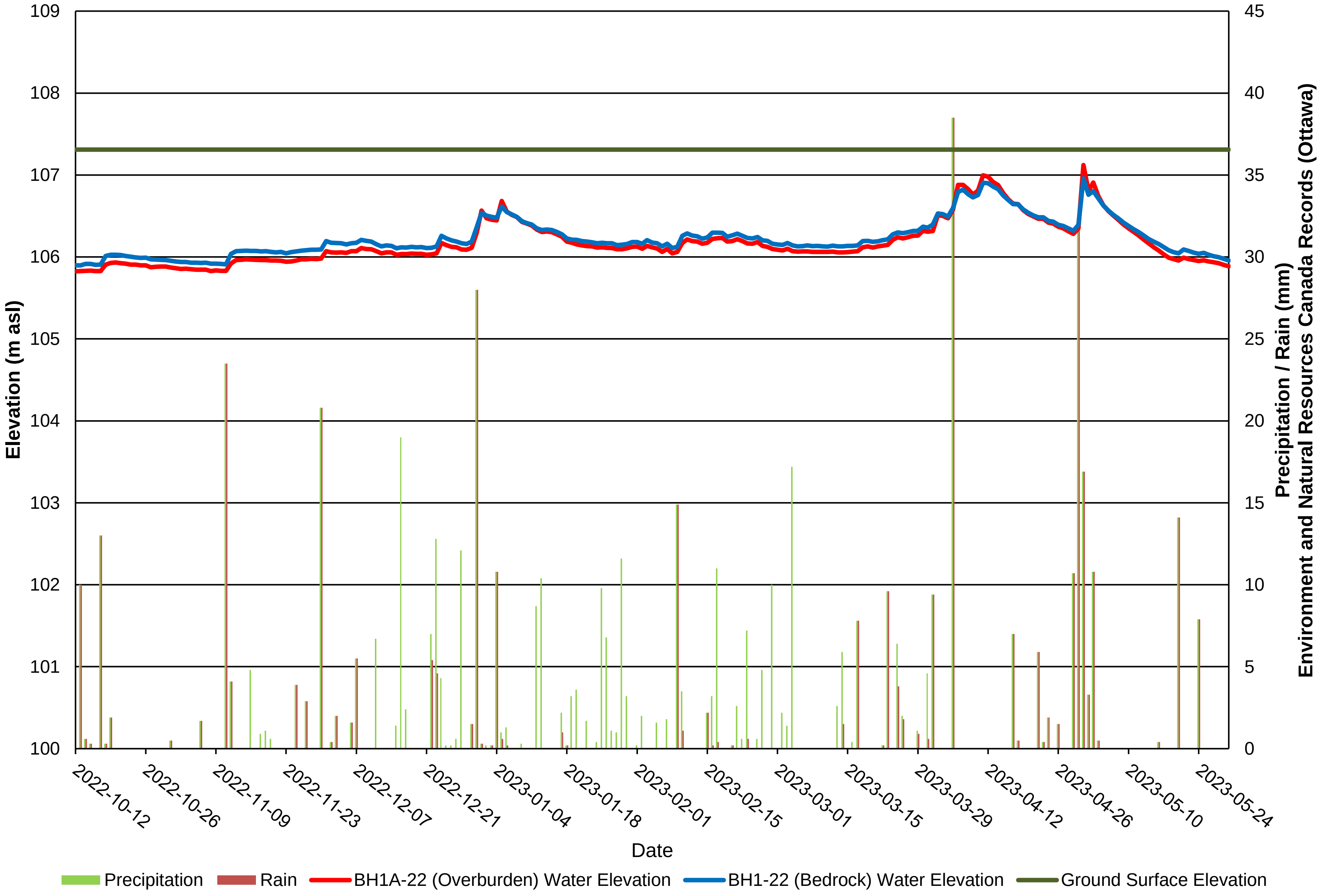


Figure 9: BH2-22 - Monitoring Well Water Elevations

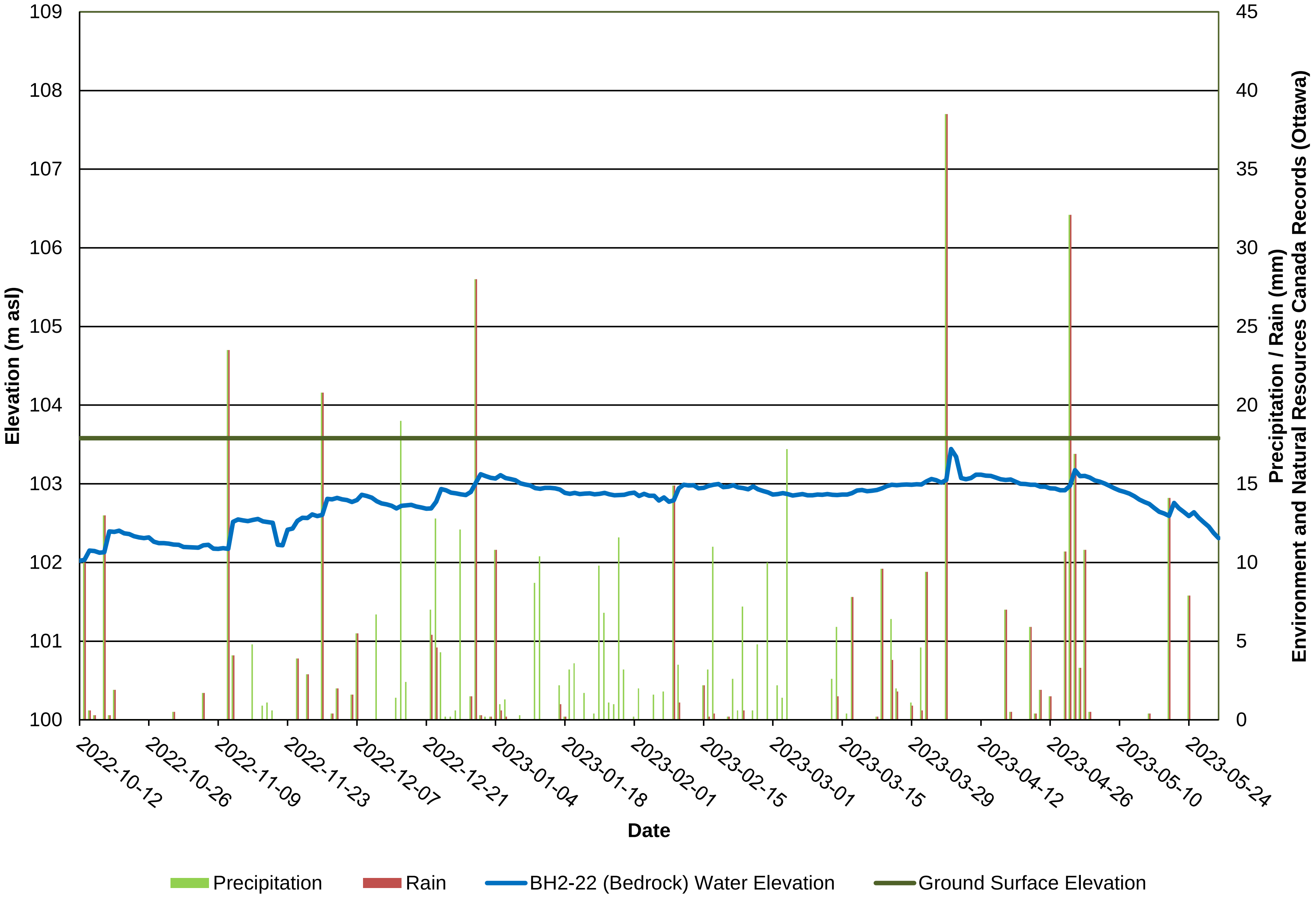


Figure 10: BH3-22 & BH3A-22 - Monitoring Well Water Elevations

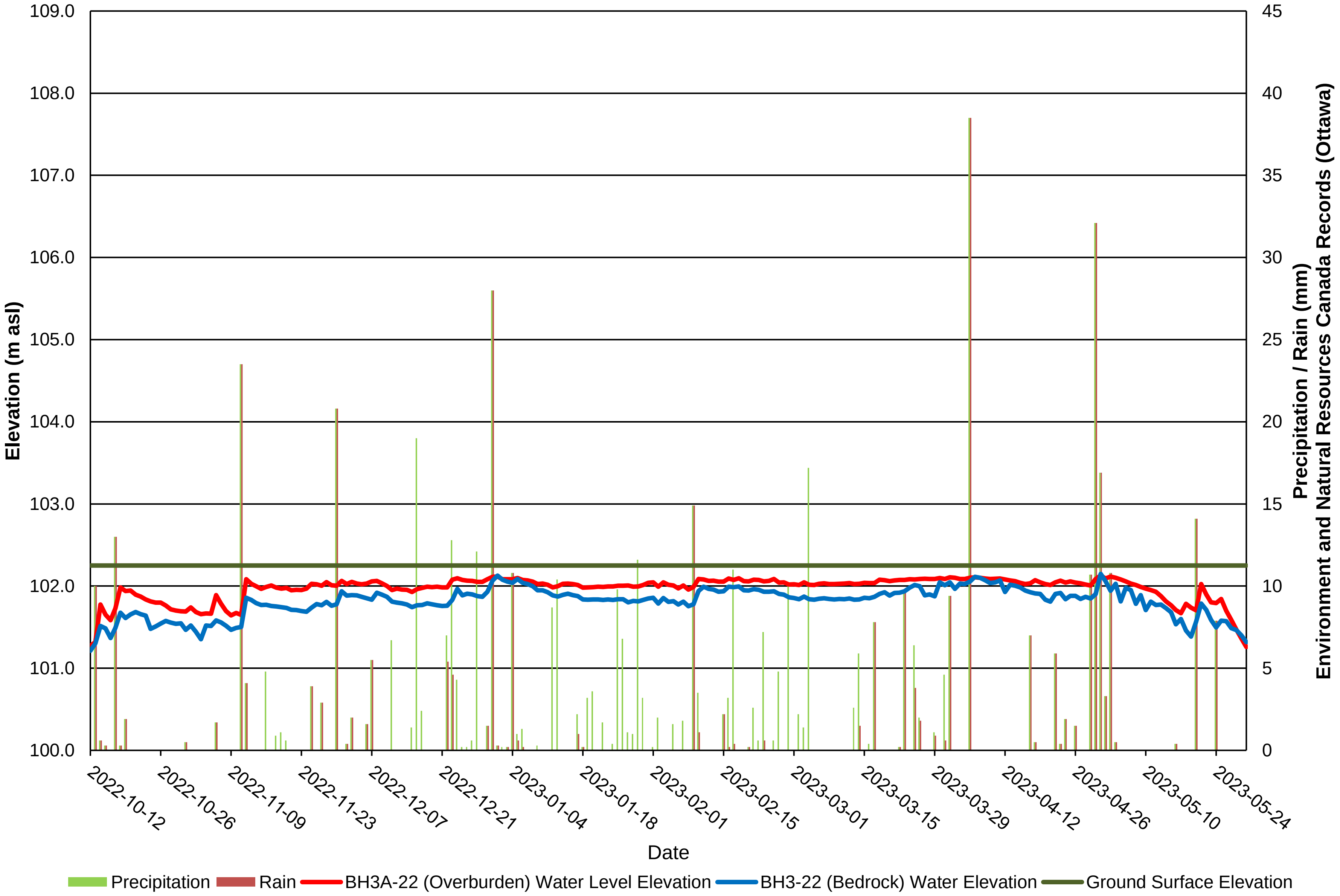


Figure 11: BH4-22 - Monitoring Well Water Elevations

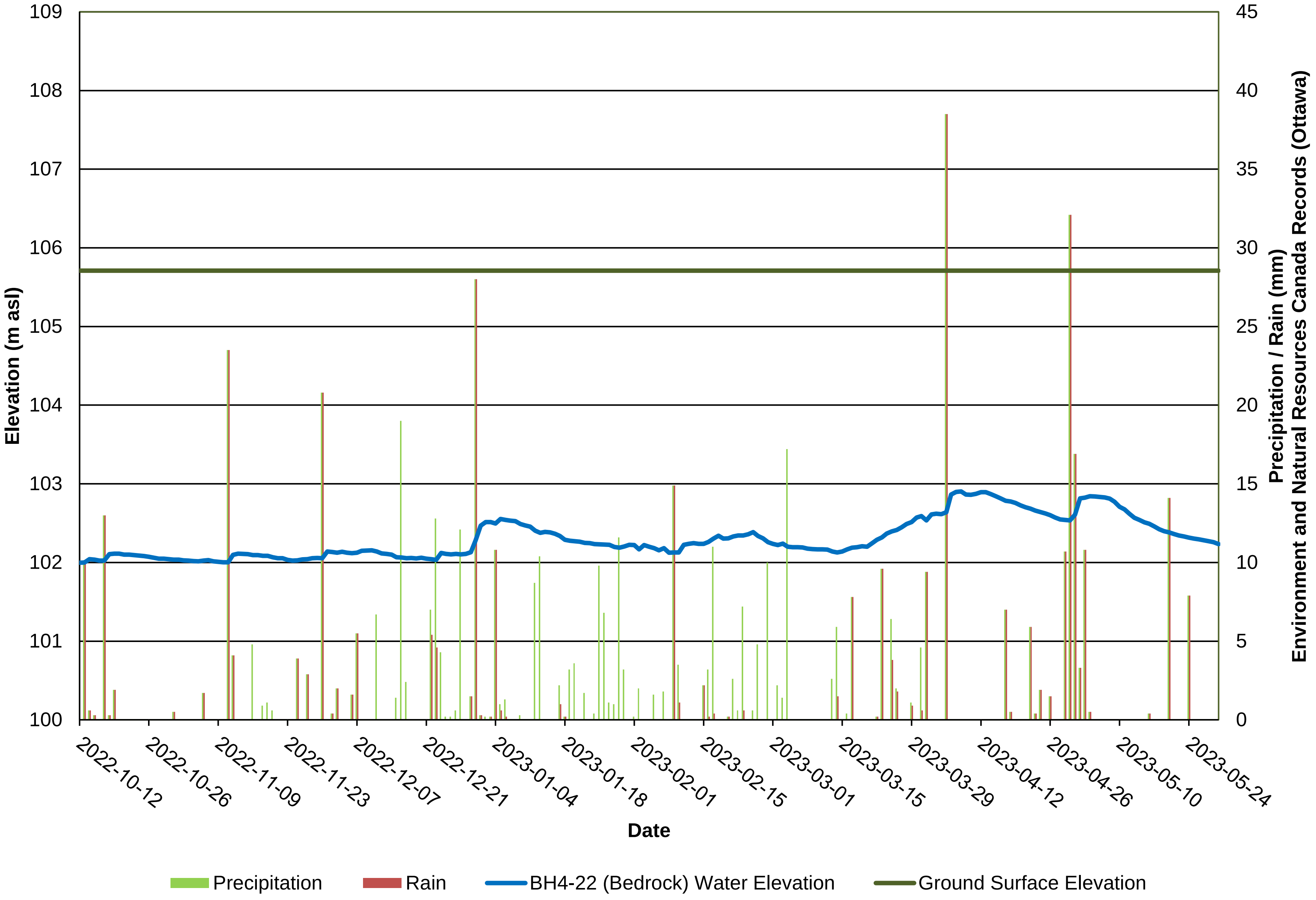


Figure 12: BH5-22 - Monitoring Well Water Elevations

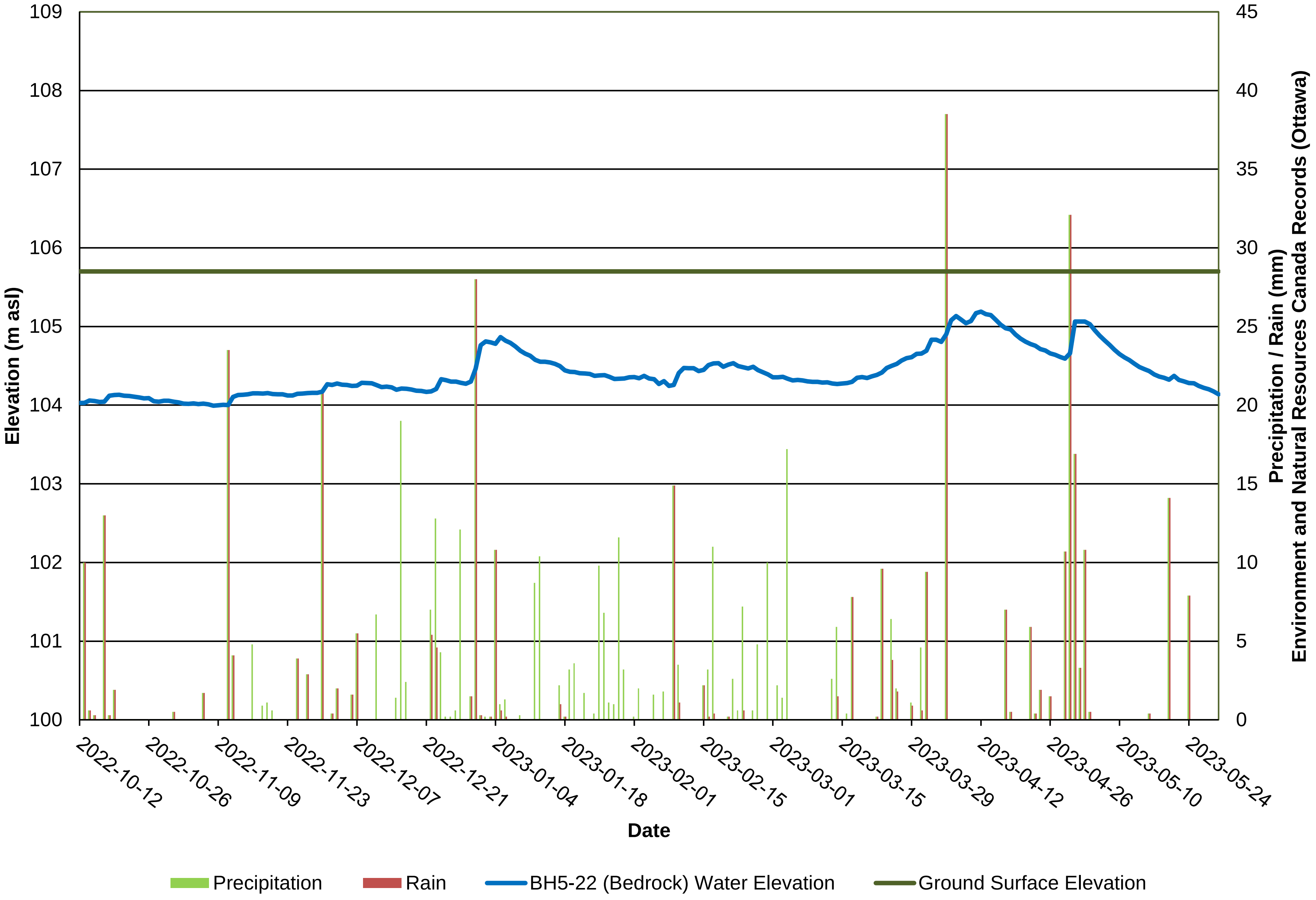
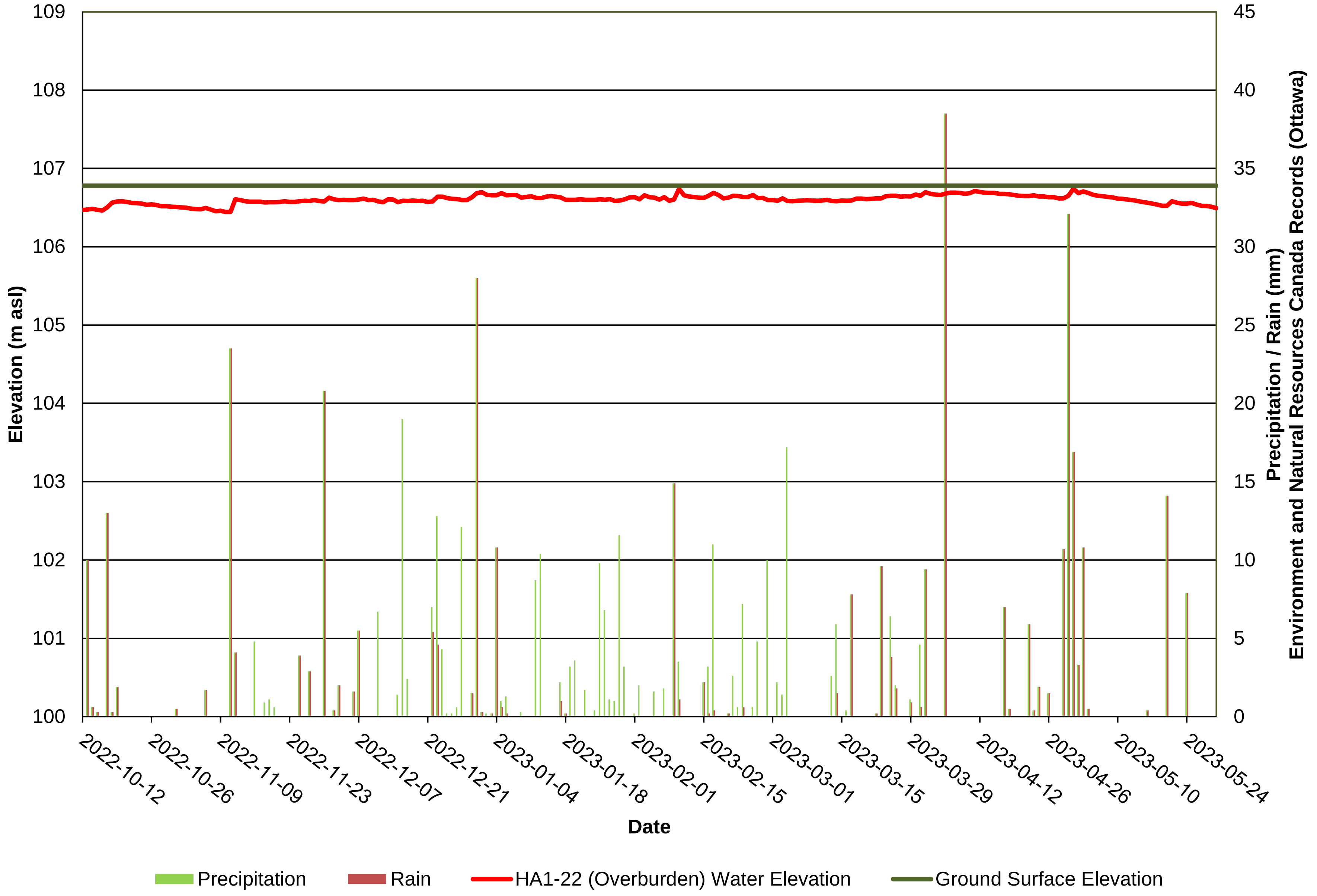
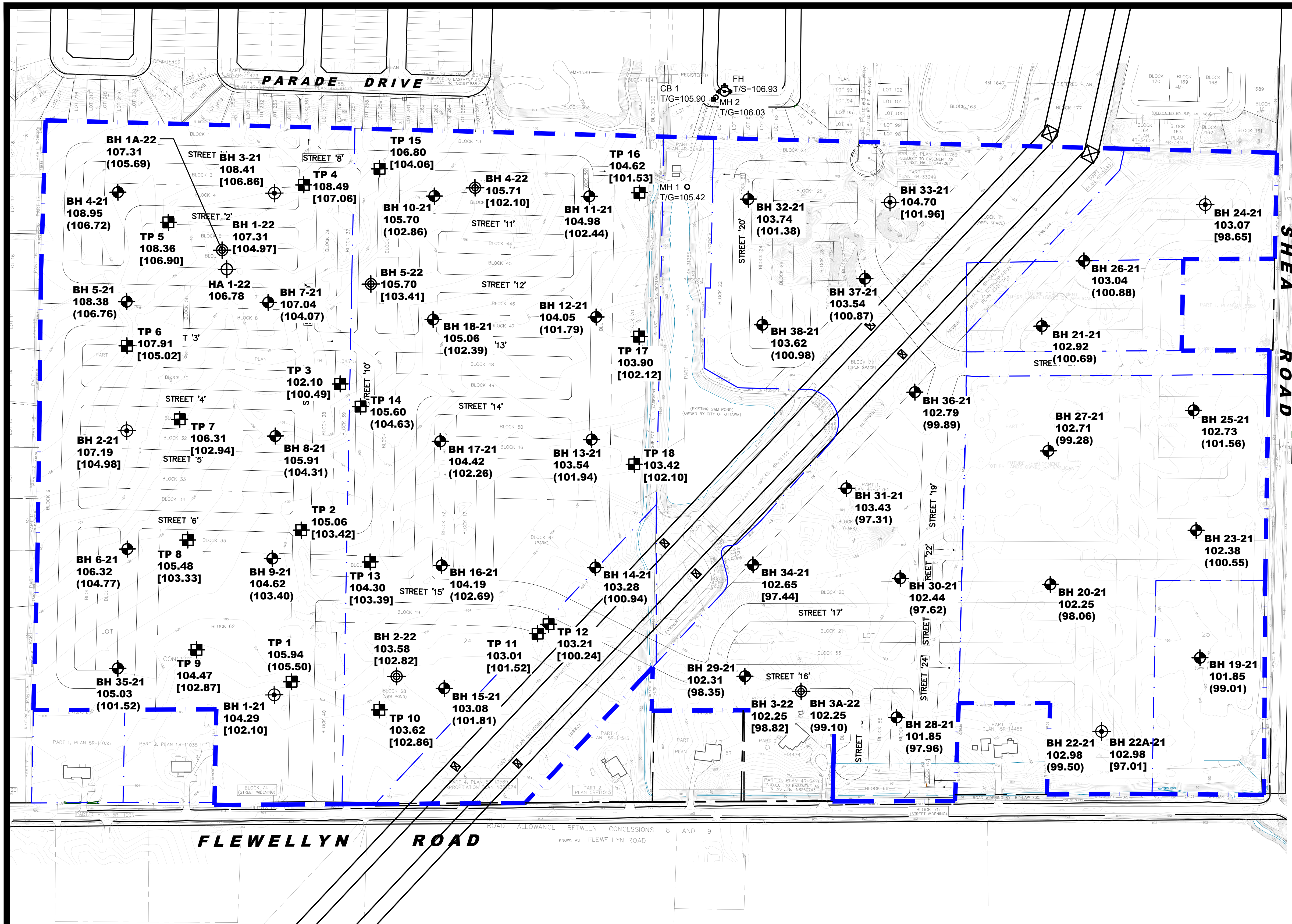


Figure 13: HA1-22 - Monitoring Well Water Elevations





LEGEND:

⊕	HAND AUGER LOCATION (CURRENT INVESTIGATION)
◎	BOREHOLE WITH MONITORING WELL LOCATION (CURRENT INVESTIGATION)
●	BOREHOLE WITH PIEZOMETER LOCATION (PATERSON GROUP REPORT; PG5570-2, JAN 20, 2022)
⊕	BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP REPORT; PG5570-2, JAN 20, 2022)
■	TEST PIT LOCATION\ (PATERSON GROUP REPORT; PG5570-1, JAN 3, 2021)
104.29	GROUND SURFACE ELEVATION (m)
[102.10]	BEDROCK SURFACE ELEVATION (m)
(102.39)	PRACTICAL REFUSAL TO AUGERING / EXCAVATION ELEVATION (m)

BASE PLAN PREPARED BY J.D. BARNES LIMITED.

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

SCALE: 1:4000

0 50 100 150 200 250m

PATERSON GROUP

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

NO.	REVISIONS	DATE	INITIAL
6	UPDATED TO NEW CONCEPTUAL PLAN	03/07/2024	KP
5	UPDATED TO NEW CONCEPTUAL PLAN	28/08/2023	KP
4	UPDATED CLIENT'S NAME AND SITE ADDRESS	12/06/2023	KP
3	UPDATED SITE BOUNDARY	13/02/2023	KP
2	BH 1-22 - BH 5-22 & HA1-22 ADDED TO PLAN	10/03/2022	KP

CAIVAN (STITTSVILLE SOUTH) INC. & CAIVAN (STITTSVILLE WEST) LTD.

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
OTTAWA, 5993 & 6115 FLEWELLYN ROAD & 6030 & 6070 FERNBANK ROAD ONTARIO

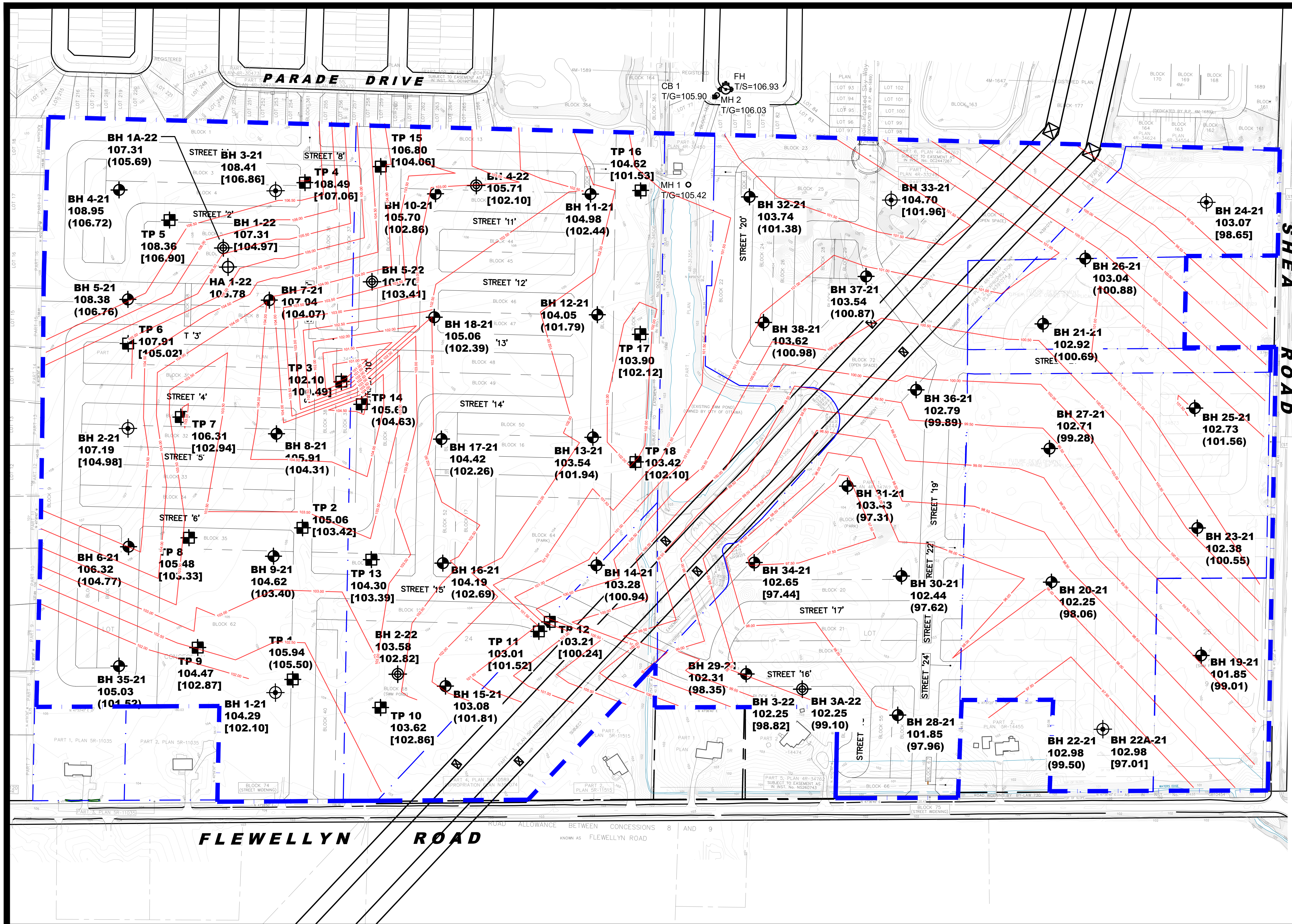
Title:

TEST HOLE LOCATION PLAN

Scale: 1:4000
Date: 01/2022
Drawn by: YA
Report No.: PG5570-2, REVISION 4
Checked by: KP
Dwg. No.: PG5570-1
Approved by: DJG
Revision No.: 6

p:\autocad drawings\geotechnical\pg55xx\pg5570\pg5570-1 thlp (rev.06) r.dwg

11x17



LEGEND:

⌖	HAND AUGER LOCATION (CURRENT INVESTIGATION)
⊕	BOREHOLE WITH MONITORING WELL LOCATION (CURRENT INVESTIGATION)
⊕	BOREHOLE WITH PIEZOMETER LOCATION (PATERSON GROUP REPORT; PG5570-2, JAN 20, 2022)
⊕	BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP REPORT; PG5570-2, JAN 20, 2022)
■	TEST PIT LOCATION\ (PATERSON GROUP REPORT; PG5570-1, JAN 3, 2021)
97.50 ——	BEDROCK CONTOUR (m)
104.29	GROUND SURFACE ELEVATION (m)
[102.10]	BEDROCK SURFACE ELEVATION (m)
(102.39)	PRACTICAL REFUSAL TO AUGERING / EXCAVATION ELEVATION (m)

BASE PLAN PREPARED BY J.D. BARNES LIMITED.

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

SCALE: 1:4000

0 50 100 150 200 250m

PATERSON GROUP

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

NO.	REVISIONS	DATE	INITIAL
6	UPDATED TO NEW CONCEPTUAL PLAN	03/07/2024	KP
5	UPDATED TO NEW CONCEPTUAL PLAN	28/08/2023	KP
4	UPDATED CLIENT'S NAME AND SITE ADDRESS	12/06/2023	KP
3	UPDATED SITE BOUNDARY	13/02/2023	KP
2	BH 1-22 - BH 5-22 & HA1-22 ADDED TO PLAN	10/03/2022	KP

CAIVAN (STITTSVILLE SOUTH) INC. & CAIVAN (STITTSVILLE WEST) LTD.
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
OTTAWA, 5993 & 6115 FLEWELLYN ROAD & 6030 & 6070 FERNBANK ROAD ONTARIO

Title:

BEDROCK CONTOUR PLAN

Scale: 1:4000
Date: 01/2022
Drawn by: YA
Report No.: PG5570-2, REVISION 4
Checked by: KP
Dwg. No.: PG5570-2
Approved by: DJG
Revision No.: 6

p:\autocad drawings\geotechnical\pg55xx\pg5570\pg5570-1 thlp (rev.06) r.dwg

11x17