

Geotechnical Investigation Proposed Residential Development Quinn's Pointe Phases 6 - 8

3882 Barnsdale Road
Ottawa, Ontario

Prepared for Minto Communities

Report PG6197-1 Revision 2 dated May 26, 2026

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1.0 Introduction

Paterson Group (Paterson) was commissioned by Minto Communities to conduct a geotechnical investigation for the proposed residential development to be located at 3882 Barnsdale Road in the City of Ottawa (reference should be made 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 for the design of the proposed development including construction considerations which may affect the design.

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

2.0 Proposed Development

Based on the available conceptual plans, it is understood that the proposed residential developments will consist of single dwelling and townhouse-style residential units with associated garages and driveways, in addition to condominium residential units.

The woodlot located within the Industrial and Logistics lands have been identified as a good candidate for conveyance as an urban natural feature through a future planning process. As such, this report has assumed the potential future conveyance of the woodlot throughout the report.

Local roadways, parklands, stormwater management facilities and landscaped areas are also anticipated as part of the proposed development at the subject site. It is expected the proposed development will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current investigation was carried out between April 11 and 18, 2022, and October 6 and 8, 2022. During that time, a total of 18 boreholes were advanced to a maximum depth of 13.6 m below ground surface.

Previous investigations, consisting of boreholes and test pits, were carried out by Paterson at the subject site, as part of the Barrhaven South Urban Expansion Area – Community Design Plan, in 2015. The borehole locations were distributed in a manner to provide general coverage of the subject site taking into consideration previous geotechnical investigations, site features and underground utilities. The test hole locations are presented on Drawing PG6197-1 – Test Hole Location Plan included in Appendix 2.

The current boreholes were completed using a track mounted drill rig operated by a two-person crew. Fieldworks were conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer from the geotechnical division. The testing procedure consisted of augering to the required depths and at the selected locations sampling the overburden.

Sampling and In Situ Testing

Soil samples were collected from the auger flights (AU) and using a 50 mm diameter split-spoon (SS) sampler. All samples were initially classified on site and subsequently placed in sealed plastic bags and transported to our laboratory for further examination and classification. The depths at which the auger and split spoon 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.

The overburden thickness was evaluated by a dynamic cone penetration test (DCPT) completed at boreholes BH 9-22, BH 10-22 and BH 18-22. The DCPT consists of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

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

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

Groundwater

Monitoring wells were installed in all the boreholes during the current investigation to permit monitoring of groundwater levels subsequent to the completion of the drilling program. Typical monitoring well construction details are described below:

- 1.5 m of slotted 50 mm diameter PVC screen at the base of the boreholes.
- 50 mm diameter PVC riser pipe from the top of the screen to the ground surface.
- No. 3 silica sand backfill within annular space around screen.
- 300 mm thick bentonite hole plug directly above PVC slotted screen.
- Clean backfill from top of bentonite plug to the ground surface.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific well construction details.

Groundwater observations are discussed in Subsection 4.3 and presented in the Soil Profile and Test Data sheets in Appendix 1.

Long-Term Groundwater Level Monitoring

All drilled monitoring wells and existing monitoring wells which were found to be functioning (BH 8-15, BH 14-15, BH 18-15) were equipped with Van Essen Instrument TD-Diver water level dataloggers to continuously monitor fluctuations in groundwater levels. The dataloggers were programmed to continuously measure and record groundwater levels at a minimum rate of one (1) reading every twelve (12) hours.

In addition to the continuous datalogger measurements, manual water level measurements were periodically taken throughout the groundwater monitoring program using an electronic water level meter. The groundwater monitoring results are presented in Figure 2 to Figure 18 - Monitoring Well Water Elevations sheets in Appendix 2.

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 GPS and referenced to a geodetic datum. Reference should be made to Drawing PG6197-1 - 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. A total of nine (9) grain size distribution analysis were completed on selected soil samples from the current investigation. The results for the laboratory tests completed during the current and previous investigations are presented in Subsection 4.2 and on Grain Size Distribution Results Sheets in Appendix 1.

Moisture content testing was also conducted on all soil samples, the results were shown in Soil Profile and Data Sheets in Appendix 1. 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.

3.4 Analytical Testing

Two (2) soil samples (BH 9-22/SS3 and BH 16-22/SS3) 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.

Adjacent to each borehole location, two (2) 83 mm holes, approximately 1.5 m away each other, were excavated using a Riverside/Bucket auger to a depth of 0.3 to 0.5 and 0.5 to 0.7 m below 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 the testing are further discussed in Subsection 4.4.

3.6 Hydraulic Conductivity (Slug) Testing

Hydraulic conductivity (slug) testing was conducted at select monitoring well locations to assist in confirming anticipated groundwater flow rates within the subsoils 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 isotropic 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 aquifer. The assumption regarding screen length and well diameter is considered to be met based on a screen length of 1.5 m and a diameter of 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 and the data from the test. 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

Currently, the subject site consists of undeveloped and agricultural lands that are divided by mature trees. The ground surface at the subject site is generally flat and has a gentle slope from north to south, from an approximate geodetic elevation of 107 m to 99 m. The northern portion of the site consists of a densely wooded area in the center and sparsely grassed area with some small trees. A densely treed area is also observed within the central west portion of the site, followed by an existing storm pond located within the southwest corner. Another treed area is found to be located in the central east portion of the site.

Fill piles up to 2 m high consisting of boulders and various material have been placed within portions of the site along the northern and eastern property limits. The site is bordered to the west by Borrisokane Road followed by Highway 416, to the north and east by future residential developments, and to the south by Barnsdale Road followed by an agricultural field.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile encountered at the majority of the test hole locations consists of topsoil underlain by compact to very dense silty sand becoming silty sand to sandy silt with depth. It was noted that the silty sand/sandy silt contained gravel, cobbles and boulders at several test hole locations. A layer of stiff to very stiff brown silty clay with sand was encountered within the silty sand/sandy silt deposit at some test hole locations.

The silty clay layer was observed to be present within the northwest corner and central east portion of the site. The silty clay deposit was encountered underlying the topsoil and/or the brown silty sand deposit at depths ranging between 0.3 to 3.3 m with an approximate thickness of 0.4 to 3 m.

DCPT refusal was encountered at the location of BH 9-22, BH 10-22 and BH 18-22 at depths 10.8, 15.7 and 18.0 m below existing ground surface, respectively. Auger refusal on inferred boulders was reported in BH 14-22 at a depth of 5.8 m below existing ground surface.

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

Bedrock

Based on available geological mapping, the bedrock throughout the subject site consists of dolomite of the Oxford Formation with an overburden drift thickness of 15 to 25 m.

Grain Size Distribution and Hydrometer Testing

A total of nine (9) and eighteen (18) samples were submitted for grain size distribution analysis/hydrometer testing from the current and previous investigations, respectively. The results are summarized in Table 1 below.

Table 1 – Summary of Grain Size Distribution Analysis							
Borehole	Sample	Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Classification
Current Investigation (PG6197)							
BH 1-22	SS9	6.1-6.7	0.0	34.4	63.1	2.5	Silty Sand/Sandy Silt
BH 5-22	SS7	4.6-5.2	0.0	48.3	49.7	2.0	Silty Sand/Sandy Silt
BH 8-22	SS8	5.3-5.9	0.0	73.0	23.0	4.0	Silty Sand
BH 10-22	SS9	6.1-6.7	0.0	74.8	21.2	4.0	Silty Sand
BH 13-22	SS10	7.6-8.2	0.2	77.3	19.5	3.0	Silty Sand
BH 15-22	SS16	11.4-12.0	0.0	52.6	45.4	2.0	Silty Sand
BH 16-22	SS12	8.4-9.0	0.0	37.9	61.1	1.0	Silty sand/Sandy silt
BH 17-22	SS12	9.1-9.7	0.0	87.0	11.0	2.0	Silty Sand
BH 18-22	SS13	9.1-9.7	0.0	88.3	7.2	4.5	Silty Sand
Previous Investigations (PG3607, PH1893, G9114)							
Borehole	Sample	Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Classification
BH 2-15	SS7	6.1-6.7	0.0	86.1	13.9		Silty Sand
BH 9-15	SS8	5.3-5.9	0.0	89.9	10.1		Silty Sand
BH 14-15	SS11	7.6-8.2	0.0	90.7	9.3		Silty Sand
BH 18-15	SS11, SS13	7.6-8.2 9.2-9.8	0.0	24.9	75.1		Silty Sand/Sandy Silt
BH 19-15	SS12	8.4-9.0	0.0	19.6	80.4		Silty Sand/Sandy Silt
BH 25-15	SS6	3.8-4.4	0.0	46.0	54.0		Silty Sand/Sandy Silt
BH 26-15	SS7, SS8	4.6-5.2 5.3-5.9	0.0	25.6	74.4		Silty Sand/Sandy Silt
TP 7-15	G2	2.6	16.3	79.5	4.2		Silty Sand w/ gravel

Table 1 – Summary of Grain Size Distribution Analysis							
Borehole	Sample	Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Classification
TP 35-15	G2	2.0	0.0	90.5	9.5		Silty Sand
TP 55-15	G2	2.2	0.0	88.4	11.6		Silty Sand
TP 3-11	G7	3.8	0.0	41.0	59.0		Silty Sand/Sandy Silt
TP 5-11	G11	3.4	0.0	98.3	1.7		Sand
TP 4-03	G1	0.8	0.0	91.3	8.7		Sand
TP 4-03	G2	3.2	0.0	88.9	11.1		Sand
TP 7-03	G1	3.0	50.8	48.6	0.6		Granular B Type I
TP 7-03	G2	5.0	0.2	95.2	4.6		Sand
TP 9-03	G2	5.0	0.0	96.0	4.0		Sand
TP 13-03	G2	4.6	2.3	96.3	1.4		Sand

4.3 Groundwater

Groundwater levels were measured in the installed monitoring wells during the current and previous investigations and are summarized in Table 2 below. The manual groundwater water level measurements are also noted on the applicable Soil Profile and Test Data sheet presented in Appendix 1.

Table 2 – Summary of Groundwater Levels					
Borehole	Observation Method	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
			Depth (m)	Elevation (m)	
Current Investigation (PG6197)					
BH 1-22	MW	100.08	2.73	97.35	April 21, 2022
			2.73	97.35	August 9, 2022
			2.42	97.66	July 17, 2024
BH 2-22	MW	100.95	3.92	97.03	April 21, 2022
			4.73	96.22	August 9, 2022
			2.52	98.43	May 2, 2023
			3.99	96.96	July 17, 2024
BH 3-22	MW	99.69	0.22	99.47	April 21, 2022
			2.24	97.45	October 18, 2022
			-0.11	99.80	May 2, 2023
			0.26	99.43	July 17, 2024
BH 4-22	MW	99.42	0.16	99.26	April 21, 2022
			1.24	98.18	October 18, 2022
			-0.05	99.47	May 2, 2023
			0.13	99.29	July 17, 2024
BH5-22	MW	99.81	0.51	99.30	April 21, 2022

Table 2 – Summary of Groundwater Levels					
Borehole	Observation Method	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
			Depth (m)	Elevation (m)	
			1.84	97.97	October 18, 2022
			-0.04	99.85	May 2, 2023
			0.95	98.86	July 17, 2024
			2.27	97.72	April 21, 2022
BH 6-22	MW	99.99	3.21	96.78	October 18, 2022
			0.94	99.05	May 2, 2023
			2.12	97.87	July 17, 2024
BH 7-22	MW	103.28	7.13	96.15	April 21, 2022
			7.58	95.70	August 9, 2022
			6.13	97.15	May 2, 2023
			7.73	95.55	July 17, 2024
BH 8-22	MW	104.23	5.36	98.87	April 21, 2022
			5.36	98.87	August 9, 2022
			4.29	99.94	May 2, 2023
			4.82	99.41	July 17, 2024
BH 9-22	MW	100.84	1.10	99.74	April 21, 2022
			3.34	97.50	August 9, 2022
			0.31	100.53	May 2, 2023
			Dry	NA	July 17, 2024
BH 10-22	MW	104.84	6.00	98.84	April 21, 2022
			5.76	99.08	August 9, 2022
			5.16	99.68	May 2, 2023
			5.38	99.46	July 17, 2024
BH 11-22	MW	103.15	3.62	99.53	April 21, 2022
			3.68	99.47	August 9, 2022
			3.07	100.08	May 2, 2023
			3.18	99.97	July 17, 2024
BH 12-22	MW	103.32	4.54	98.78	April 21, 2022
			4.41	98.91	August 9, 2022
			3.69	99.63	May 2, 2023
			4.03	99.29	July 17, 2024
BH 13-22	MW	105.03	7.19	97.84	April 21, 2022
			7.28	97.75	August 9, 2022
			6.58	98.45	May 2, 2023
			6.92	98.11	July 17, 2024
BH 14-22	MW	104.43	2.88	101.55	April 21, 2022
			3.35	101.08	August 9, 2022
			2.17	102.26	May 2, 2023
			3.15	101.28	July 17, 2024
BH 15-22	MW	106.79	8.33	98.46	October 18, 2022
			8.45	98.34	July 17, 2024

Table 2 – Summary of Groundwater Levels					
Borehole	Observation Method	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
			Depth (m)	Elevation (m)	
BH 16-22	MW	106.57	9.33	97.24	October 18, 2022
			9.80	96.77	July 17, 2024
BH 17-22	MW	108.73	9.23	99.50	October 18, 2022
			9.37	99.36	July 17, 2024
BH 18-22	MW	110.66	10.43	100.23	October 18, 2022
			10.22	100.44	July 17, 2024
Previous Investigations (PG3607, PH1893, G9114)					
BH 2-15	PZ	104.86	7.17	97.69	December 21, 2015
			6.58	98.28	May 3, 2016
			7.03	97.83	July 28, 2016
BH 3-15	MW	106.93	Dry to 5.27	-	December 21, 2015
					May 3, 2016
					July 28, 2016
BH 4-15	PZ	111.09	Dry to 9.75	-	December 21, 2015
					May 3, 2016
					July 28, 2016
*BH 8-15	MW	106.93	8.24	98.69	December 21, 2015
			7.49	99.44	May 3, 2016
			7.95	98.98	July 28, 2016
			8.60	98.33	April 21, 2022
			8.41	98.52	August 9, 2022
			8.00	98.93	May 2, 2023
			8.19	98.74	July 17, 2024
BH 9-15	MW	106.70	Dry to 2.30	-	December 21, 2015
					May 3, 2016
					July 28, 2016
BH 13-15	PZ	102.74	4.48	98.26	December 21, 2015
			3.64	99.10	May 3, 2016
			4.10	98.64	July 28, 2016
*BH 14-15	MW	103.47	4.52	98.95	December 21, 2015
			3.62	99.85	May 3, 2016
			4.20	99.27	July 28, 2016
			4.43	99.04	April 21, 2022
			4.48	98.99	August 9, 2022

Table 2 – Summary of Groundwater Levels					
Borehole	Observation Method	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
			Depth (m)	Elevation (m)	
			4.07	99.40	
BH 15-15	PZ	103.56	5.35	98.21	December 21, 2015
			7.11	96.45	May 3, 2016
			4.99	98.57	July 28, 2016
BH 16-15	PZ	107.24	Dry to 7.34	-	December 21, 2015
					May 3, 2016
					July 28, 2016
*BH 18-15	MW	101.08	2.12	98.96	December 21, 2015
			0.99	100.09	May 3, 2016
			2.35	98.73	July 28, 2016
			1.53	99.55	April 21, 2022
			2.34	98.74	August 9, 2022
			0.53	100.55	May 2, 2023
BH 19-15	MW	103.99	7.10	96.89	December 21, 2015
			6.25	97.74	May 3, 2016
			6.72	97.27	July 28, 2016
BH 25-15	PZ	99.56	1.01	98.55	December 21, 2015
			1.80	97.76	May 3, 2016
			Damaged	-	July 28, 2016
BH 26-15	MW	100.07	2.58	97.49	December 21, 2015
			1.84	98.23	May 3, 2016
			3.09	96.19	July 28, 2016
BH 33-16	MW	110.04	9.46	100.58	July 28, 2016
			9.46	100.58	July 17, 2024
Notes:					
1. The ground surface elevation at each borehole location was surveyed using a high precision GPS and referenced to a geodetic datum.					
2. MW = Monitoring Well, PZ = Piezometer					

Groundwater Elevation Monitoring Program

A one-year long groundwater monitoring program was undertaken in support of the current *Hydrogeological Existing Conditions Report* prepared by Paterson. The results from the monitoring period are provided in Appendix 1 and should be considered as part of future site grading and servicing designs.

Each monitoring well was equipped with a Van Essen TD-Diver Water Level Datalogger to accurately monitor fluctuations in the water levels. The dataloggers were programmed to continuously measure and record water levels throughout the subject site at a fixed rate of one (1) reading every 12 hours for approximately 12 months.

The monitoring program was undertaken from April 2022 to April 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 Figure 2 to Figure 18 - Monitoring Well Water Elevations sheets in Appendix 2.

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

4.4 Permeameter Testing Results

Permeameter tests were conducted at twenty-four (24) locations to provide the general coverage of the subject site on May 25 to 26, 2022 and October 19 and October 21, 2022. Field saturated hydraulic conductivity (K_{fs}) values and estimated infiltration values are presented in Table 4 below. 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 4 – Summary of Field Saturated Hydraulic Conductivity Values and Infiltration Rates					
Test Completed Adjacent to BH ID	Ground Surface Elevation (m)	Depth of Permeameter Testing (m)	K_{fs} (m/sec)	Infiltration Rate (mm/hr)	Soil Type
BH 1-22	100.08	0.35	6.4×10^{-6}	76	Silty Sand to Sandy Silt
		0.70	3.2×10^{-6}	63	
BH 2-22	100.95	0.36	1.9×10^{-5}	102	Silty Sand to Sandy Silt
		0.62	8.5×10^{-5}	150	
BH 3-22	99.69	0.33	2.1×10^{-6}	56	Silty Sand to Sandy Silt
		0.64	1.1×10^{-6}	47	
BH 4-22	99.42	0.32	1.6×10^{-6}	52	Silty Sand

Table 4 – Summary of Field Saturated Hydraulic Conductivity Values and Infiltration Rates

Test Completed Adjacent to BH ID	Ground Surface Elevation (m)	Depth of Permeameter Testing (m)	K_{fs} (m/sec)	Infiltration Rate (mm/hr)	Soil Type
		0.62	1.6×10^{-6}	52	
BH 5-22	99.81	0.34	6.4×10^{-6}	76	Silty Sand
		0.60	5.3×10^{-6}	72	
BH 6-22	99.99	0.28	6.4×10^{-6}	76	Silty Sand
		0.59	1.1×10^{-5}	88	
BH 7-22	103.28	0.40	6.4×10^{-6}	76	Silty Sand
		0.60	1.1×10^{-7}	30	
BH 8-22	104.23	0.30	1.6×10^{-6}	51	Silty Clay w/ Sand
		0.60	4.3×10^{-6}	68	
BH 9-22	100.84	0.30	8.5×10^{-6}	80	Silty Sand
		0.58	1.2×10^{-5}	90	
BH 10-22	104.84	0.30	4.1×10^{-5}	124	Silty Sand to Sandy Silt
		0.55	3.5×10^{-6}	120	
BH 11-22	103.15	0.32	2.6×10^{-5}	112	Silty Sand
		0.58	2.6×10^{-5}	112	
BH 12-22	103.32	0.33	7.8×10^{-5}	148	Silty Sand
		0.65	3.8×10^{-5}	122	
BH 13-22	105.03	0.30	2.6×10^{-5}	110	Silty Sand
		0.57	2.3×10^{-5}	107	
BH 14-22	104.43	0.37	8.5×10^{-5}	152	Silty Sand
		0.58	1.3×10^{-5}	92	
BH 15-22	106.79	0.30	2.1×10^{-5}	104	Silty Sand
		0.60	1.6×10^{-5}	97	
BH 16-22	106.57	0.30	1.6×10^{-5}	97	Silty Sand
		0.60	3.2×10^{-5}	117	
BH 17-22	108.73	0.30	5.3×10^{-6}	72	Fill
		0.50	2.1×10^{-5}	104	
BH 18-22	110.66	0.30	5.3×10^{-6}	72	Fill
		0.60	1.1×10^{-5}	88	
BH 13-15	102.74	0.29	2.4×10^{-5}	110	Silty Sand
		0.58	1.2×10^{-5}	90	
BH 18-15	101.08	0.30	5.3×10^{-7}	38	Topsoil
		0.58	1.1×10^{-5}	92	Silty Sand
TP 5-15	107.7	0.27	1.2×10^{-5}	90	Silty Sand
		0.56	2.6×10^{-5}	110	
TP 113-15	100	0.26	1.1×10^{-7}	30	Silty Sand w/ clay
		0.56	5.3×10^{-7}	40	

Table 4 – Summary of Field Saturated Hydraulic Conductivity Values and Infiltration Rates

Test Completed Adjacent to BH ID	Ground Surface Elevation (m)	Depth of Permeameter Testing (m)	K_{fs} (m/sec)	Infiltration Rate (mm/hr)	Soil Type
BH 14-15	103.47	0.30	2.1×10^{-5}	104	Silty Sand
		0.60	3.2×10^{-5}	117	
BH 8-15	106.93	0.33	2.4×10^{-5}	108	Silty Sand
		0.47	2.6×10^{-5}	110	

The measured 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 generally range from 1.0×10^{-4} to 1.0×10^{-7} m/sec and 1.0×10^{-7} to 1.0×10^{-10} m/sec, respectively. The range in K_{fs} values is generally due to the variability in composition and consistency of the material encountered.

Based on the field saturated hydraulic conductivity values, the infiltration rates across the site were calculated to range from 30 to 150 mm/hr. The majority of the subject site identified medium to high infiltration rates between 50 and 120 mm/hr, whereas the southwest corner of the site adjacent to the existing pond identified infiltration rates ranging from 30 to 50 mm/hr.

The central east area at BH 7-22 showed a relatively low infiltration rate of 30 mm/hr which can likely be attributed to the dense compaction level of the materials in the soil layer.

A relatively high K_{fs} value at BH 2-22 (150 mm/hr) can likely be attributed to the presence of fill materials deposited in the past. The field saturated hydraulic conductivity values are depicted in Drawing PG6197-4, Preliminary Soil Infiltration Rates in Appendix 2 of this report.

It is important to note that the infiltration rates derived from the K_{fs} values in the table above are unfactored. Prior to use for design purposes, a safety correction factor will need to be applied to the above infiltration rates to account for a number of factors including variations in soil composition and anticipated accumulation of fine-grained material over time.

For use in the design of Low Impact Development measures (LID's), the safety correction factor to be incorporated will be dependent on the size and invert depth of the system relative to the infiltration rates observed up to 1.5 m below the base of the system. It should also be noted that for most LID measures, the bottom of the facility should be separated at least 1 m from the seasonally high groundwater table.

4.5 Hydraulic Conductivity (Slug) Testing Results

Hydraulic conductivity tests were carried out on May 24 and October 18, 2022, at fourteen (14) locations to provide general coverage of the subject site as shown in Table 5 below.

Table 5 – Summary of Hydraulic Conductivity (K) Values.					
Test Hole ID	Ground Surface Elevation (m)	Testing Interval Depth (m)	K (m/sec)	Test Type	Soil Type
BH 1-22	100.08	5.8-7.3	1.79x10 ⁻⁶	Falling Head	Silty Sand to Sandy Silt
			1.76x10 ⁻⁶	Rising Head	
BH 2-22	100.95	5.8-7.3	4.59x10 ⁻⁷	Falling Head	Silty Sand to Sandy Silt
BH 3-22	99.69	4.6-6.1	7.90x10 ⁻⁷	Falling Head	Silty Sand to Sandy Silt
BH 4-22	99.42	4.6-6.1	6.20x10 ⁻⁶	Falling Head	Silty Sand to Sandy Silt
BH 9-22	100.84	5.3-6.8	1.06x10 ⁻⁶	Falling Head	Silty Sand to Sandy Silt
BH 11-22	103.15	4.6-6.1	8.89x10 ⁻⁶	Falling Head	Silty Sand to Sandy Silt
			6.85x10 ⁻⁶	Rising Head	
BH 13-22	105.03	7.6-9.1	1.20x10 ⁻⁵	Falling Head	Silty Sand
			6.48x10 ⁻⁶	Rising Head	
BH 14-22	104.43	4.3-5.8	2.29x10 ⁻⁶	Falling Head	Silty Sand to Sandy Silt
			1.79x10 ⁻⁶	Rising Head	
BH 15-22	106.79	11.3-12.8	1.64x10 ⁻⁵	Falling Head	Silty Sand
			9.74x10 ⁻⁶	Rising Head	
BH 16-22	106.57	10.7-12.2	2.33x10 ⁻⁶	Falling Head	Silty Sand to Sandy Silt
			1.79x10 ⁻⁶	Rising Head	
BH 17-22	108.73	10.7-12.2	4.50x10 ⁻⁶	Falling Head	Silty Sand to Sandy Silt
			2.92x10 ⁻⁶	Rising Head	
BH 18-22	110.66	10.3-11.8	4.63x10 ⁻⁵	Falling Head	Silty Sand to Sandy Silt
			1.95x10 ⁻⁵	Rising Head	
BH 8-15	101.08	7.6-9.1	2.48x10 ⁻⁶	Falling Head	Silty Sand
BH 14-15	103.47	6.1-9.1	1.26x10 ⁻⁶	Falling Head	Silty Sand

Slug testing completed at the monitoring well locations screened in the silty sand/sandy silt identified hydraulic conductivity values ranging from approximately 1x10⁻⁷ to 1x10⁻⁴ m/sec. These values are generally consistent with similar material Paterson has encountered on other sites and typical published values.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered suitable for the proposed development. It is anticipated that conventional shallow foundations would be suitable for low-rise and mid-rise wood framed housing and commercial buildings constructed throughout the subject site. It is anticipated that portions of the development will be occupied by parks, schools, a park and ride area and other municipal facilities, which are all considered suitable to be constructed within the subject site from a geotechnical perspective.

Where clay deposits will remain in place below settlement sensitive structure and infrastructure, grading will be restricted to grade raise limitations to mitigate higher than tolerable settlements of the subsoils and overlying structures and infrastructure. It is anticipated that grade raise restrictions will be limited to localized areas delineated by the test hole coverage identifying the presence of clay deposits and would not be applicable to the entirety of the subject site. If higher than permissible grade raises are required, preloading with or without a surcharge, lightweight fill and/or other measures should be investigated to reduce the risks of unacceptable long-term post construction total and differential settlements.

Municipal services are anticipated within the subject site and will be completed mostly through OHSA Type 2 and Type 3 soils. Where excavations extend below the groundwater level, high groundwater infiltration rates should be anticipated.

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 amounts of organic materials, should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures. Care should be taken not to disturb subgrade soils during site preparation activities.

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

Fill Placement

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

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

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

Site-Generated Fill Preparation and Placement Methodology

Consideration could be given to re-using site-generated soils for fill to build-up the subgrade for structures such as the proposed buildings and subgrade for service trenches. From a geotechnical perspective, site-generated workable soil fill free of organic debris (topsoil, logs, stumps, etc.), inorganic material and/or stones/cobbles larger than 200 mm in their longest dimension meeting the aforementioned conditions are considered suitable for re-use throughout the subject site.

Wet site-generated fill, such as the grey silty clay or grey glacial till soils will be saturated and expected to be difficult to re-use as the high-water contents make compacting impractical without an extensive drying period. Therefore, those soils are not anticipated to be suitable for this purpose.

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

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

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

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

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

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

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

Proof Rolling and Mud Slabs

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

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

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

5.3 Foundation Design

Conventional Shallow Foundation

Conventional shallow spread footings bearing on the undisturbed, compact to dense silty sand or on compacted engineered fill which is placed on undisturbed soil subgrade can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **225 kPa**. A geotechnical resistance factor of 0.5 was applied to the bearing resistance value at ULS.

Where the subgrade is observed to be in a loose state of compactness, it is recommended to be proof-rolled **under dry conditions and above freezing temperatures** by an adequately sized roller making several passes to achieve optimum compaction levels. The compaction program should be reviewed and approved by Paterson field personnel.

Strip footings, up to 3 m wide, and pad footings, up to 5 m wide, bearing on the undisturbed, very stiff silty clay soil subgrade can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **225 kPa**. A geotechnical resistance factor of 0.5 was applied to the bearing resistance value at ULS.

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

Permissible Grade Raise Recommendations for Areas with Clay Deposits

Based on the results of the field investigation, a permissible grade raise restriction of **2.5 m** above the existing and original ground surface may be considered as a preliminary recommendation for grading throughout areas where silty clay has been encountered throughout the subject site. This considers long-term dewatering associated with the proposed site servicing and grading design to an assumed depth of 500 mm below the brown-to-grey interface (i.e., soils above this depth are not considered saturated), up to 80% of the available consolidation estimated by shear strength readings, sustained loading resulting from building foundations yielding contact pressures identified in this section of the report.

Adjustments to the currently identified grade raise restriction are subject to supplemental investigation programs. Localized zones throughout the subject site are anticipated to be able to support higher grade raise restrictions, which will be evaluated during the design phase of the development following supplemental investigation work. Therefore, it should be noted that a re-evaluation of the permissible grade raise recommendations by Paterson is required once details of the proposed development are finalized.

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

Settlement

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

Lateral Support Zone

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to the in-situ bearing medium soils when a plane extending down and out from the bottom edges of the footing, at a minimum of 1.5H:1V, passes only through in situ soil of the same or higher capacity as that of the bearing medium.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Site Designation X_D** for foundations located throughout the subject site, as determined in accordance with Table 4.1.8.4.A of the latest revision of the Ontario Building Code. Based on the current information, including the level of the existing groundwater table, grain size distribution, and compactness of the underlying sand layer, the soils underlying the subject site are not considered 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 Floor Slab Construction

With the removal of all topsoil and deleterious fill within the footprint of the proposed buildings, the existing material, reviewed and approved by Paterson field personnel at the time of construction, will be considered an acceptable subgrade upon which to commence backfilling for floor slab construction.

Where the subgrade consists of silty sand in a loose state of compaction or existing fill a suitably-sized vibratory drum roller should complete several passes over the subgrade surface as a proof-rolling program, reviewed and approved by Paterson at the time of construction. Any poor performing areas under proof rolling or soft areas should be removed and reinstated with an engineered fill, such as OPSS Granular A or Granular B Type II placed in maximum 300 mm thick loose lifts and compacted to a minimum of 98% of the material's SPMDD.

For structures with slab-on-grade construction, the upper 200 mm of sub-floor fill is recommended to consist of OPSS Granular A crushed stone. For structures with basement slab, the upper 200 mm of sub-floor fill may consist of 19 mm clear crushed stone. All backfill material within the footprint of the proposed buildings should be placed in maximum 300 mm thick loose layers and compacted to a minimum of 98% of the materials SPMDD.

All grade raise fill used to raise the subgrade to the underside of the slab-on-grade should be placed in maximum 300 mm thick loose lifts. Soil fill reviewed and approved by Paterson during the construction phase would be advised to be compacted using a suitably sized vibratory sheepsfoot roller. Reference should be made to Section 5.2 of this report for additional information pertaining to slab-on-grade construction.

5.6 Pavement Design

Local roadways and residential driveways are anticipated for this site. The proposed pavement structures for car only parking and driveways, local roadways and access lanes, and arterial roadways with bus traffic are presented in Table 6, Table 7 and Table 8. 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 SPMD using suitable vibratory equipment.

Table 6 – Recommended Pavement Structure – Driveways	
Thickness (mm)	Material Description
50	Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete
150	BASE – OPSS Granular A Crushed Stone
300	SUBBASE – OPSS Granular B Type II
SUBGRADE – Either in-situ soil, or OPSS Granular B Type I or II material over in-situ soil or engineered fill.	

Table 7 – Recommended Pavement Structure – Local Residential Roadways and Heavy Traffic Loading	
Thickness (mm)	Material Description
40	Wear Course – Superpave 12.5 Asphaltic Concrete
50	Wear Course – Superpave 19.0 Asphaltic Concrete
150	BASE – OPSS Granular A Crushed Stone
400	SUBBASE – OPSS Granular B Type II
SUBGRADE – Either in-situ soil, or OPSS Granular B Type I or II material over in-situ soil or engineered fill.	

Table 10 - Recommended Pavement Structure - Arterial Roadways with Bus Traffic	
Thickness (mm)	Material Description
40	Wear Course - Superpave 12.5 Asphaltic Concrete
50	Upper Binder Course - Superpave 19.0 Asphaltic Concrete
50	Lower Binder Course - Superpave 19.0 Asphaltic Concrete
150	BASE - OPSS Granular A Crushed Stone
600	SUBBASE - OPSS Granular B Type II
SUBGRADE - Either in-situ soil, or OPSS Granular B Type I or II material over in-situ soil or engineered fill.	

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 roadways, an Ontario Traffic Category B should be used for design purpose.

Temporary Access Roads, Haul Roads and Construction Traffic

Provisions should be carried for remediating site conditions during the time of construction that would impact the construction of the above-noted design pavement structures (i.e., heavy construction traffic rutting and compromising subgrade soils, placement of subbase layers shortly following periods of spring thaw, snowmelt and rainfall events, over service trenches for utilities and backfill, etc.). These recommendations would be site- and situation specific and only able to be confirmed at the time of construction. It should be noted that the above-noted pavement structures are not intended to support construction traffic without carrying provisions for scarifying contaminated stone (i.e., stone mixed with non-crushed stone soils).

For planning purposes, primary temporary construction access/haul roads may be considered as 500 to 550 mm of a combination of OPSS Granular B Type I or Type II crushed stone and/or blast-rock covered with a minimum 50 to 100 mm thick layer of OPSS Granular B Type II or OPSS Granular A crushed stone (to provide suitable surface for tires) over a subgrade surface reviewed and approved by Paterson field personnel.

Alternatively, consideration may also be given to cow-pathing (i.e., raising the ground surface above the subgrade level) and placing a 300 to 450 mm thick layer of OPSS Granular A or OPSS Granular B Type II crushed stone for handling construction traffic. This appropriate methodology would be determined by the earthwork's contractor during the planning and pre-construction phase.

The above-noted granular structures could be re-used to meet the requirements of the pavement structures provided in the above-noted tables provided provisions are carried to scarify surficial material with high-fines content and replace with clean stone fill provided the remaining granulars are reviewed and approved to be left in place by Paterson personnel prior to placing asphalt.

Temporary access roads that would be later used for permanent conditions should be underlain by a layer of woven geotextile layers to limit pumping of fines into the base and subbase layers during the construction period and reduce the amount of fines that may be pumped into the subbase layers.

Provisions should be carried to suitably compact trench backfill placed over services. Since it is anticipated this material would consist of workable and compactable soils, it is recommended to place this material in maximum 400 mm thick loose lifts compacted using a suitably sized vibratory equipment making several passes under the supervision of Paterson field personnel.

Where trench backfill is placed in a less suitable manner, provisions should be carried to proof-roll (re-compact) the surface using the above-noted compaction equipment and providing a layer of bi-axial geogrid to increase the stiffness of the subgrade soils.

These efforts would be reviewed, approved and advised upon by Paterson field staff during the construction program, however, have been advised herein for provisional and planning purposes.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Basement and Partial Basement Structures

Foundation Drainage

It is recommended that a perimeter foundation drainage system be provided for the proposed structures provided with a basement level. The system should consist of a 100 to 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 19 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structure. The clear stone should be wrapped in a non-woven geotextile. The pipe should have a positive outlet, such as a gravity connection to the storm sewer or sump pump pit. The foundation walls are recommended to be covered with a drainage geocomposite, such as CCW MiraDRAIN 2000 or Delta-Teraxx, connected to the perimeter foundation drainage system.

Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free draining non-frost susceptible granular materials (such as clean sand or OPSS Granular B Type I granular material) or site-generated workable soils placed in maximum 400 mm thick loose lifts and compacted using suitably sized compaction equipment. If consideration is given to backfilling the structures with crushed stone, Paterson should be advised of this during the tendering stage to review and advise on impacts to grade raise restrictions.

Slab-on-Grade Structures

Foundation Drainage

The perimeter foundation drainage system identified for basement structures is considered optional for slab-on-grade structures. Consideration should be given to implementing it below areas supporting hardscaping/settlement sensitive structures (i.e., driveways and pathways) to maintain the service life of these structures. In areas where hard-scaping or pavement structures will abut the building footprint, the system should consist of a 100 to 150 mm diameter perforated corrugated plastic pipe wrapped in a geosock and surrounded by 150 mm of 19 mm clear crushed stone. The clear stone should be wrapped in a non-woven geotextile. The pipe should have a positive outlet, such as a gravity connection to the storm sewer.

The perimeter drainage pipe may be placed against the structure and with the invert placed a minimum of 600 mm below proposed finished grade (i.e., within the subgrade fill and below the crushed stone fill for the hardscaping) and against the building footprint upon Paterson-reviewed and-approved compacted soil backfill to ensure adequate drainage of the overlying granular fill layer is provided from precipitation events and/or spring meltwater.

In this configuration, provided the backfill overlying the pipe consists of crushed stone fill associated with the hardscaping, a composite foundation drainage board will not be required. The installation of the perimeter drainage system should be reviewed by Paterson personnel at the time of construction.

Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free draining non-frost susceptible granular materials (such as clean sand or OPSS Granular B Type I granular material) or site-generated workable soils placed in maximum 400 mm thick loose lifts and compacted using suitably sized compaction equipment. If consideration is given to backfilling the structures with crushed stone, Paterson should be advised of this during the tendering stage to review and advise on impacts to grade raise restrictions.

6.2 Protection of Footings Against Frost Action

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

Other 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 proper structure. These footings should be provided with a minimum 2.1 m thick soil cover (or insulation equivalent).

6.3 Excavation Side Slopes

Excavations can be carried out using conventional excavation techniques and in accordance with the Occupational Health and Safety Act, Regulations for Construction Projects. 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 assumed that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut method.

Unsupported Side Slopes

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be stable in the short term at 1H:1V or flatter. Flatter slopes could be required for deeper excavations or for excavations below the groundwater level. Where such side slopes are not permissible or practical, temporary shoring should be used. The subsoil at this site is considered to be mainly Type 2 and Type 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

The slope cross-sections recommended above are for temporary slopes. 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. Excavation side slopes should also be protected from erosion by surface water and rainfall events by the use of tarpaulins or other means of erosion protection along their footprint in conjunction with dry conditions at the slope toes.

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.

Excavation Base Stability

The base of supported excavations can fail by three (3) general modes:

- Shear failure within the ground caused by inadequate resistance to loads imposed by grade difference inside and outside of the excavation,
- Piping from water seepage through granular soils, and
- Heave of layered soils due to water pressures confined by intervening low permeability soils.

The factor of safety with respect to base heave, FS_b , is:

$$FS_b = N_b s_u / \sigma_z$$

where:

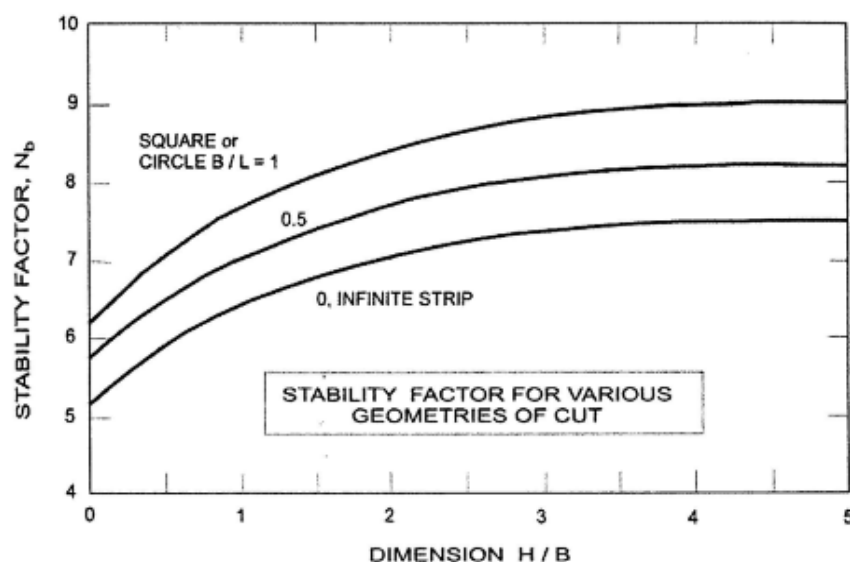
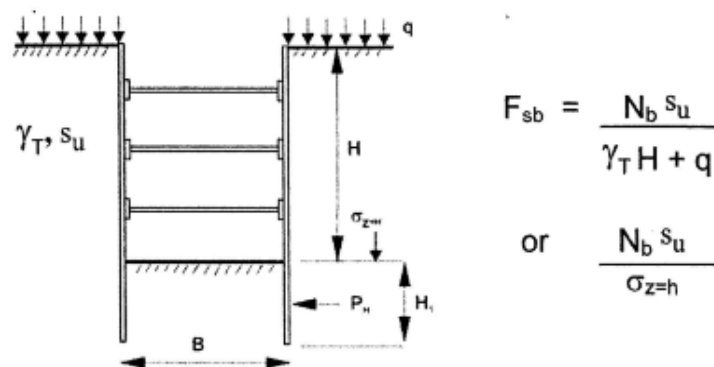
N_b – stability factor dependent upon the geometry of the excavation and given on the figure on the following page.

s_u – undrained shear strength of the soil below the base level.

σ_z – total overburden and surcharge pressures at the bottom of the excavation.

Shear failure of excavation bases is typically rare in granular soils if adequate lateral support is provided. Inadequate dewatering can cause instability in excavations made through granular or layered soils. Therefore, this should be considered by earthworks contractors when planning dewatering and excavation works in clay and non-clayey subsoils.

The potential for base heave in cohesive soils should be determined for stability of flexible retaining systems. As a preliminary precaution, service trench excavations exceeding 4 m in depth should be assessed for excavation base stability during the design phase to verify the suitability of conventional cut-and-cover excavation techniques. It is expected groundwater levels will be managed at all times by the earthworks team to ensure all excavation and backfilling works for site servicing efforts are undertaken in the dry.



6.4 Pipe Bedding and Backfill

Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications and Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa. It should be noted that the following recommendations assume all site servicing works will be undertaken in the dry.

At least 150 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe, should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm.

The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to 99% of the material's standard Proctor maximum dry density. Measures should be taken during the placement of the bedding and cover material to ensure that the material is placed on an approved subgrade material and compacted tight against the vertical sides of the trench.

It should generally be possible to re-use the upper portion of the dry to moist (not wet) overburden material above the cover material if the excavation and filling operations are carried out in dry weather conditions. Any stones greater than 200 mm in their longest dimension should be removed from these materials prior to placement.

Where hard surfaces areas are expected, the backfill material within the frost zone (about 1.5 m below finished grade) should match the soils exposed at the trench walls to reduce potential differential frost heaving. The backfill should be placed in maximum 225 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

Backfilling Within Trench Boxes

When the bedding and cover material is placed within the confines of a trench box and steel plates, it is recommended that the trench box be placed tightly against the outside of the trench walls and remains approximately 300 mm above the obvert level of the service pipe.

The vertical excavation sidewalls within the lower portion of the trench (below the obvert level of the pipe) can be supported using steel plates extended down to the bottom of the trench. The steel plates can be extended below the base of the excavation to prevent basal heave, in conjunction with adequate dewatering measures when located below the groundwater table.

To minimize the potential for disturbance of the bedding and cover material and subsequent settlement of the service pipe during the removal of the steel plates, it is recommended that the bedding layer be re-compacted tightly against the trench sidewalls upon removal/lifting of the steel plate up to the top of the bedding layer and prior to placing the pipe.

This is recommended to mitigate settlement of the pipe that would result from removing the plates without re-compacting the fill that would be left unconfined to the sides of the trench. This procedure would be repeated for the springling and cover layers until the steel plates are removed.

It is generally recommended that this procedure be reviewed by Paterson field personnel at the time of construction.

Clay Seals

To reduce long-term lowering of the groundwater level within the confines of the clay deposit, clay seals should be provided in the service trenches where services are located within the clay layer. The seals should be at least 1.5 m long (in the trench direction) and should extend from trench wall to trench wall. The seals should extend from the frost line and fully penetrate the bedding, sub bedding and cover material.

The clay seals should consist of relatively dry and compactable silty clay placed in maximum 225 mm thick loose layers and compacted using suitably sized vibratory compaction equipment and inspected by Paterson field personnel at the time of placement. The clay seals should be placed at the site boundaries and at strategic locations at no more than 60 m intervals in the service trenches.

The location of the clay seals should be advised by Paterson during the servicing plan review and associated design stage and would be generally advised to be located within and at the boundaries of the clay deposit.

6.5 Groundwater Control

Groundwater Control for Site Servicing and Building Construction

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

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

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

Permit to Take Water

As previously noted, it is understood that the proposed residential development will consist of townhomes and single-family dwellings with paved parking areas, access lanes and local roadways with municipal servicing. While the specifics regarding excavation depth and sizing were unknown at the time of report preparation, it is anticipated that select excavations for the municipal servicing installations may require dewatering.

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

In the event that an EASR is required to facilitate dewatering of the proposed development, a minimum of three to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan, to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. Should a Permit to Take Water be required, a minimum of five to six months should be allotted for completion of the permit, due to the minimum review period imposed by the MECP.

Long-term Groundwater Control

Given the sandy nature of the local subsoils, provided recommendations such as clay seals for clay areas are followed during the design and construction stages, it is not anticipated the proposed development will negatively impact the groundwater table surrounding the area of the subject site and associated structures and infrastructure from a geotechnical perspective.

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/pile caps/grade beams are protected with sufficient soil cover to prevent freezing at founding level.

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

The trench excavations should be carried out in a manner that will avoid the introduction of frozen materials into the trenches. Also, pavement construction is difficult during winter. The subgrade consists of frost susceptible soils which will experience total and differential frost heaving as the work takes place. In addition, the introduction of frost, snow or ice into the pavement materials, which is difficult to avoid, could adversely affect the performance of the pavement structure. 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 moderate to slightly aggressive environment.

7.0 Recommendations

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

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

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

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

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

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

8.0 Statement of Limitations

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

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

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

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

Paterson Group Inc.



Faisal I. Abou-Seido, P.Eng.



Drew Petahtegoose, P.Eng.

Report Distribution:

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

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

GRAIN SIZE ANALYSIS AND HYDROMETER TEST RESULTS

ANALYTICAL TESTING RESULTS

HYDRAULIC CONDUCTIVITY (SLUG) TESTING RESULTS

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development - 3882 Barnsdale Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 11, 2022

FILE NO.
PG6197

HOLE NO.
BH 1-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.23		SS	1	38	6	0	100.08				
Loose to compact, brown SILTY SAND to SANDY SILT			SS	2	42	5	1	99.08				
			SS	3	50	11	2	98.08				
	2.44		SS	4	67	30						
Dense, brown SILTY SAND to SANDY SILT			SS	5	83	32	3	97.08				
			SS	6	87	50+	4	96.08				
	3.96		SS	7	100	50+	5	95.08				
Dense to very dense, brown SILTY SAND to SANDY SILT			SS	8	67	33	6	94.08				
			SS	9	83	50+						
	6.86		SS	10	83	12	7	93.08				
Compact, grey SILTY SAND to SANDY SILT	7.47											
End of Borehole												
(GWL @ 2.73m - April 21, 2022)												
(GWL @ 2.73m - August 9, 2022)												
								20 40 60 80 100				
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

DATUM	Geodetic
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REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 11, 2022

FILE NO.
PG6197

HOLE NO.
BH 2-22

[illegible]

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development - 3882 Barnsdale Road
Ottawa, Ontario

DATUM Geodetic

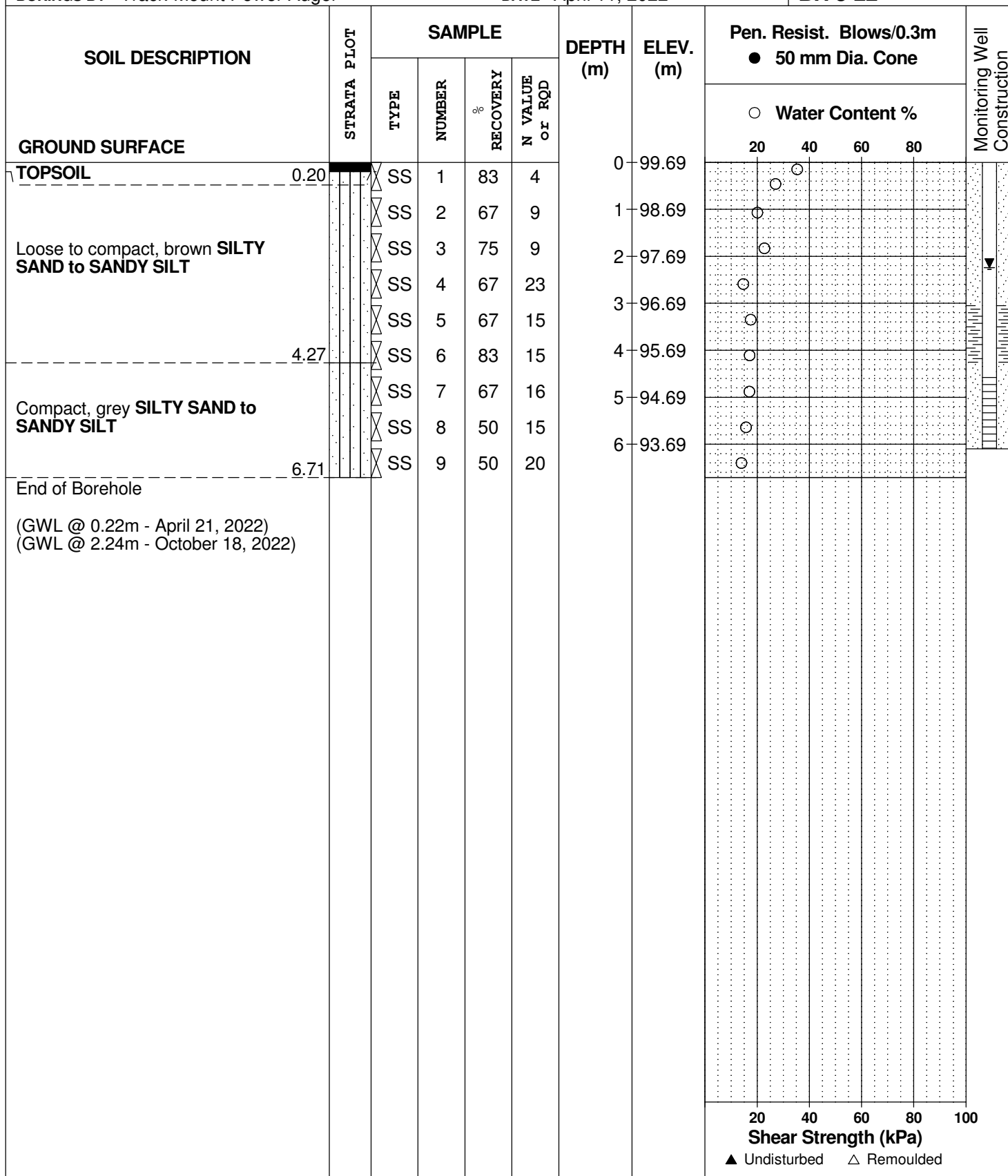
REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 11, 2022

FILE NO.
PG6197

HOLE NO.
BH 3-22



DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 12, 2022

FILE NO.
PG6197

HOLE NO.
BH 4-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.20	SS	1	83	4	0	99.42					
Compact, brown SILTY SAND	1.45	SS	2	83	26	1	98.42					
Dense, brown SILTY SAND to SANDY SILT	2.44	SS	3	100	43	2	97.42					
Dense to very dense, grey SILTY SAND to SANDY SILT		SS	4	83	26	3	96.42					
		SS	5	100	49	4	95.42					
		SS	6	73	50+	5	94.42					
		SS	7	100	61	6	93.42					
		SS	8	91	50+							
		SS	9	80	50+							
End of Borehole	6.71											
(GWL @ 0.16m - April 21, 2022)												
(GWL @ 1.24m - October 18, 2022)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development - 3882 Barnsdale Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 12, 2022

FILE NO.
PG6197

HOLE NO.
BH 5-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL 0.23		SS	1	25	5	0	99.81	○				
Loose, reddish brown SILTY SAND 1.45		SS	2	67	7	1	98.81	○				
Loose, brown SILTY SAND to SANDY SILT 2.44		SS	3	50	5	2	97.81	○				
Loose, grey SILTY SAND to SANDY SILT		SS	4	67	9	3	96.81	○				
		SS	5	67	9	4	95.81	○				
		SS	6	83	7	5	94.81	○				
		SS	7	100	5	6	93.81	○				
		SS	8	83	4			○				
6.71		SS	9	100	6			○				
End of Borehole												
(GWL @ 0.51m - April 21, 2022) (GWL @ 1.84m - October 18, 2022)												

DATUM	Geodetic
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REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 12, 2022

FILE NO.
PG6197

HOLE NO.
BH 6-22

[illegible]

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

**Proposed Development - 3882 Barnsdale Road
Ottawa, Ontario**

DATUM	Geodetic
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REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 13, 2022

FILE NO.
PG6197

HOLE NO.
BH 7-22

[illegible]

DATUM	Geodetic
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REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 13, 2022

FILE NO.
PG6197

HOLE NO.
BH 8-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL	0.30		SS	1	17	4	0	104.23					
Very stiff, brown SILTY CLAY, some sand	1.22		SS	2	50	7	1	103.23					
Compact, brown SILTY SAND	1.52		SS	3	75	18	2	102.23					
Compact to dense, light brown SILTY SAND			SS	4	100	21	3	101.23					
			SS	5	100	30	4	100.23					
			SS	6	100	31	5	99.23					
			SS	7	100	31	6	98.23					
			SS	8	100	24							
			SS	9	100	30							
Compact, brown SILTY SAND	6.86		SS	10	100	18	7	97.23					
End of Borehole	7.47												
(GWL @ 5.36m - April 21, 2022) (GWL @ 5.36m - August 9, 2022)													

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

DATUM Geodetic

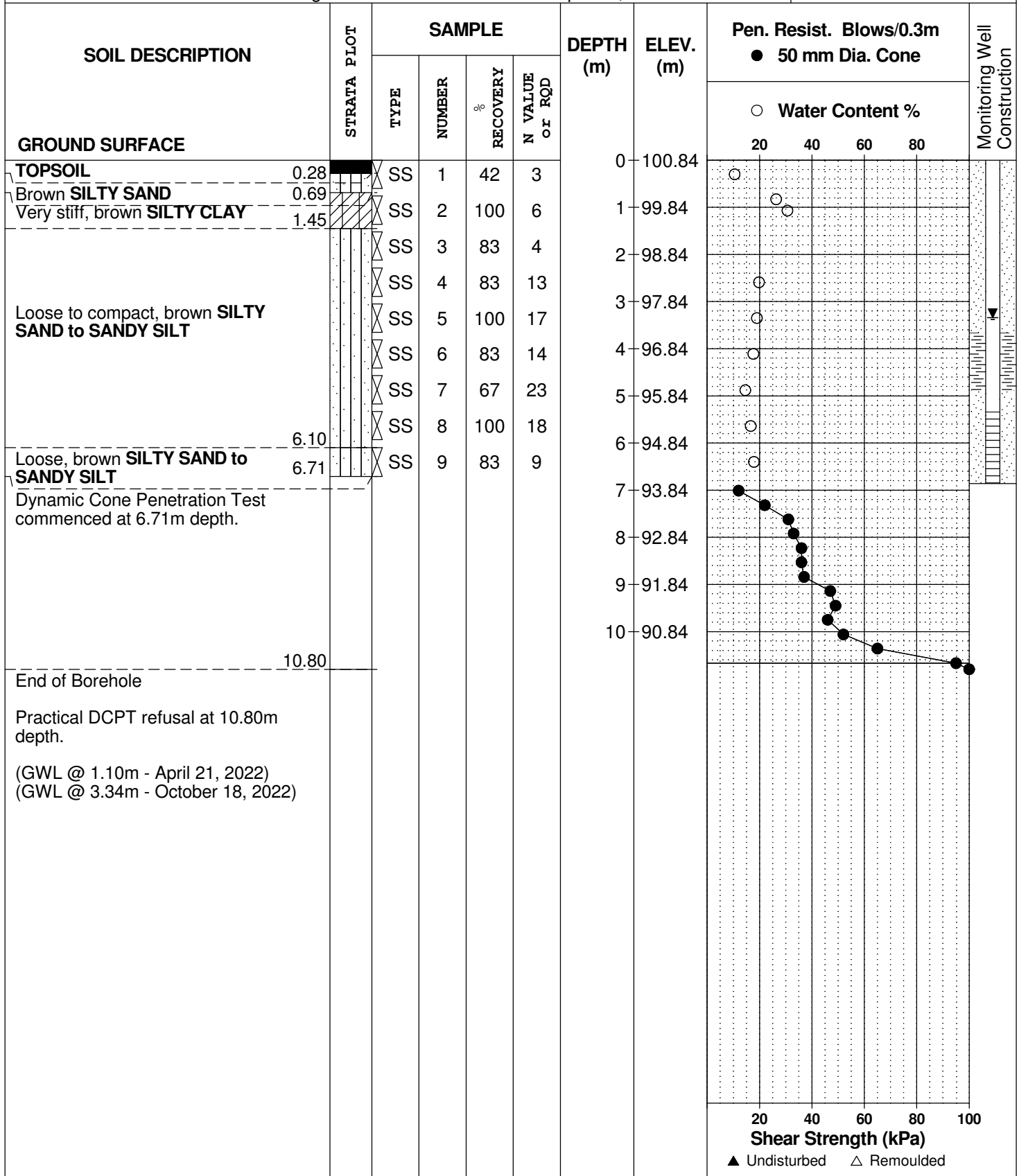
REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 13, 2022

FILE NO.
PG6197

HOLE NO.
BH 9-22



DATUM Geodetic

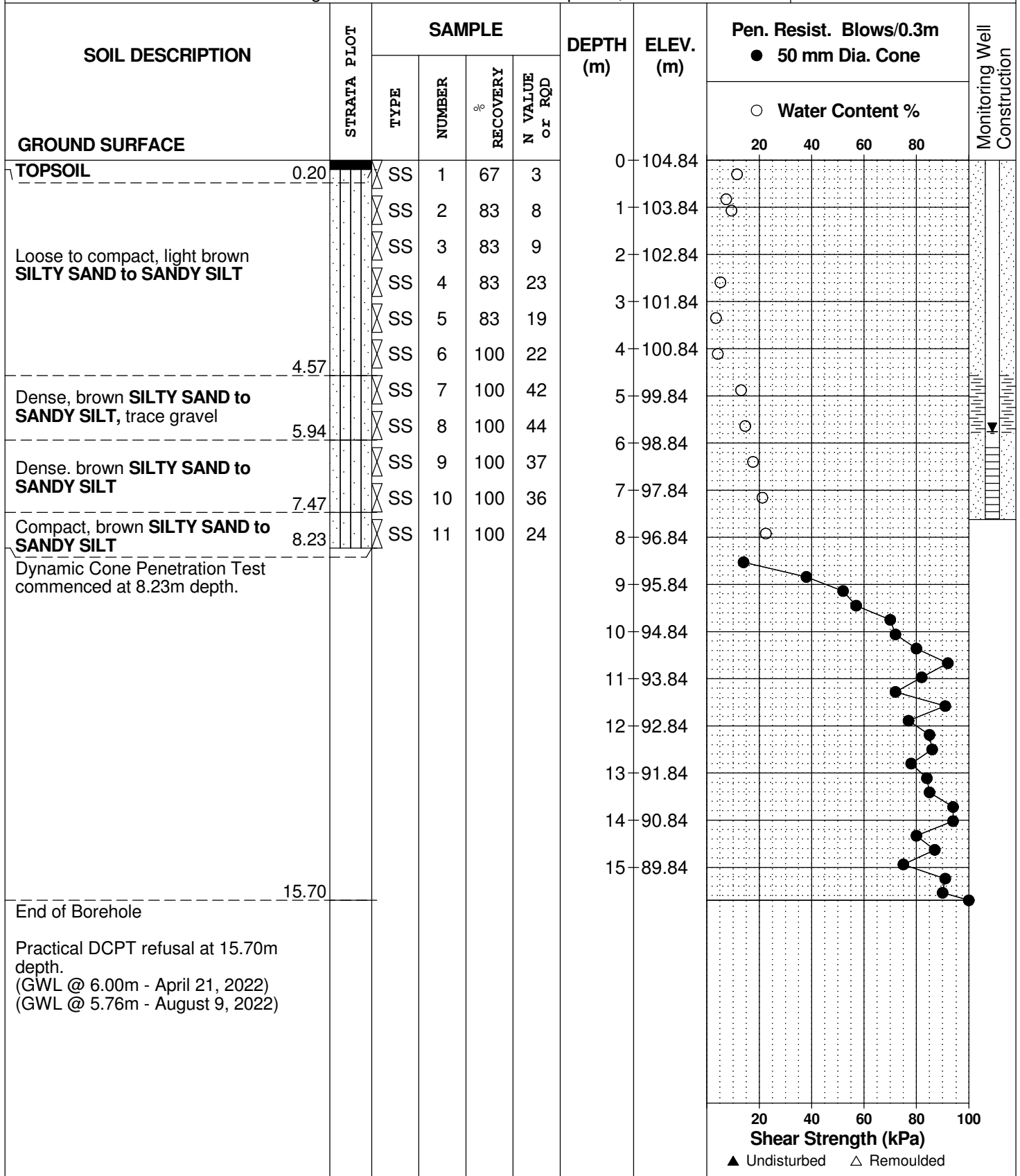
REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 14, 2022

FILE NO.
PG6197

HOLE NO.
BH10-22



SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL	0.18		SS	1	50	5	0	103.15					
Loose to very dense, light brown SILTY SAND			SS	2	83	15	1	102.15					
			SS	3	100	25	2	101.15					
			SS	4	100	28	3	100.15					
			SS	5	83	27	4	99.15					
			SS	6	100	40	5	98.15					
			SS	7	100	50+	6	97.15					
Compact, brown SILTY SAND to SANDY SILT	5.30		SS	8	100	26							
	6.71		SS	9	100	25							
End of Borehole													
(GWL @ 3.62m - April 21, 2022)													
(GWL @ 3.68m - August 9, 2022)													

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Proposed Development - 3882 Barnsdale Road
Ottawa, Ontario**

DATUM	Geodetic
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REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 18, 2022

FILE NO.
PG6197

HOLE NO.
BH12-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL	0.15		SS	1	83	5	0	103.32					
Loose to compact, light brown SILTY SAND			SS	2	83	6	1	102.32					
			SS	3	100	15	2	101.32					
			SS	4	100	20							
			SS	5	100	30	3	100.32					
			SS	6	83	26	4	99.32					
			SS	7	92	22	5	98.32					
			SS	8	100	26							
			SS	9	100	22	6	97.32					
			SS										
End of Borehole	6.86												
(GWL @ 4.54m - April 21, 2022) (GWL @ 4.41m - August 9, 2022)													

DATUM	Geodetic
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REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 18, 2022

FILE NO.
PG6197

HOLE NO.
BH13-22

[illegible]

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Development - 3882 Barnsdale Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE April 18, 2022

FILE NO.
PG6197

HOLE NO.
BH14-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL	0.18		SS	1	75	8	0	104.43					
Loose to dense, brown SILTY SAND			SS	2	92	12	1	103.43					
			SS	3	83	18	2	102.43					
			SS	4	83	31	3	101.43					
			SS	5	75	40	4	100.43					
Very dense, brown SILTY SAND to SANDY SILT	3.73		SS	6	100	50+	4	100.43					
- trace gravel by 5.7m depth	5.82		SS	7	88	50+	5	99.43					
			SS	8	93	50+							
End of Borehole													
Practical refusal on inferred boulder at 5.82m depth.													
(GWL @ 2.88m - April 21, 2022)													
(GWL @ 3.35m - August 9, 2022)													

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE October 6, 2022

FILE NO.
PG6197

HOLE NO.
BH15-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.08		AU	1		0	106.79					
Compact, reddish brown SILTY SAND, trace gravel	0.69		SS	2	100	26	1	105.79				
Hard, brown SILTY CLAY	1.07		SS	3	100	50+	2	104.79				
Very dense, brown SILTY SAND to SANDY SILT			SS	4	100	50+	3	103.79				
			SS	5	92	50+	4	102.79				
			SS	6	100	50+	4	102.79				
- some gravel by 3.6m depth			SS	7	94	50+	5	101.79				
	4.50		SS	8	83	50+	6	100.79				
			SS	9	100	50+	7	99.79				
			SS	10	100	50+	8	98.79				
			SS	11	67	50	9	97.79				
			SS	12	92	38	10	96.79				
			SS	13	92	28	11	95.79				
			SS	14	100	39	12	94.79				
	11.43		SS	15	88	31						
Compact, brown SILTY SAND	12.24		SS	16	92	25						
Dense, brown SILT	12.55		SS	17	92	35						
Dense, grey SILTY SAND to SANDY SILT	12.80											
End of Borehole												
(GWL @ 8.33m - October 18, 2022)												
								Shear Strength (kPa)				
								20	40	60	80	100
								▲ Undisturbed △ Remoulded				

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE October 6, 2022

FILE NO.
PG6197

HOLE NO.
BH16-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
FILL: Brown silty sand with organics, trace gravel	0.08	AU	1			0	106.57	○				
Compact, reddish brown to light brown SILTY SAND		SS	2	100	10	1	105.57	○				
		SS	3	100	11	2	104.57	○				
		SS	4	67	8			○				
		SS	5	67	11	3	103.57	○				
Compact, brown SILTY SAND to SANDY SILT	3.45 3.66	SS	6	83	40	4	102.57	○	○			
Dense to compact, light brown SILTY SAND		SS	7	83	41	5	101.57	○				
		SS	8	92	36	6	100.57	○	○			
		SS	9	67	27			○				
		SS	10	92	10	7	99.57	○	○			
Loose to compact, brown SILTY SAND to SANDY SILT		SS	11	92	21	8	98.57	○				
		SS	12	67	8			○				
		SS	13	75	6	9	97.57	○	○			
		SS	14	75	4	10	96.57	○				
		SS	15	67	9	11	95.57	○				
		SS	16	92	4	12	94.57	○				
		SS	17	83	13			○				
End of Borehole	12.80											
(GWL @ 9.33m - October 18, 2022)												

DATUM	Geodetic
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REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE October 6, 2022

FILE NO.
PG6197

HOLE NO.
BH17-22

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DATUM Geodetic

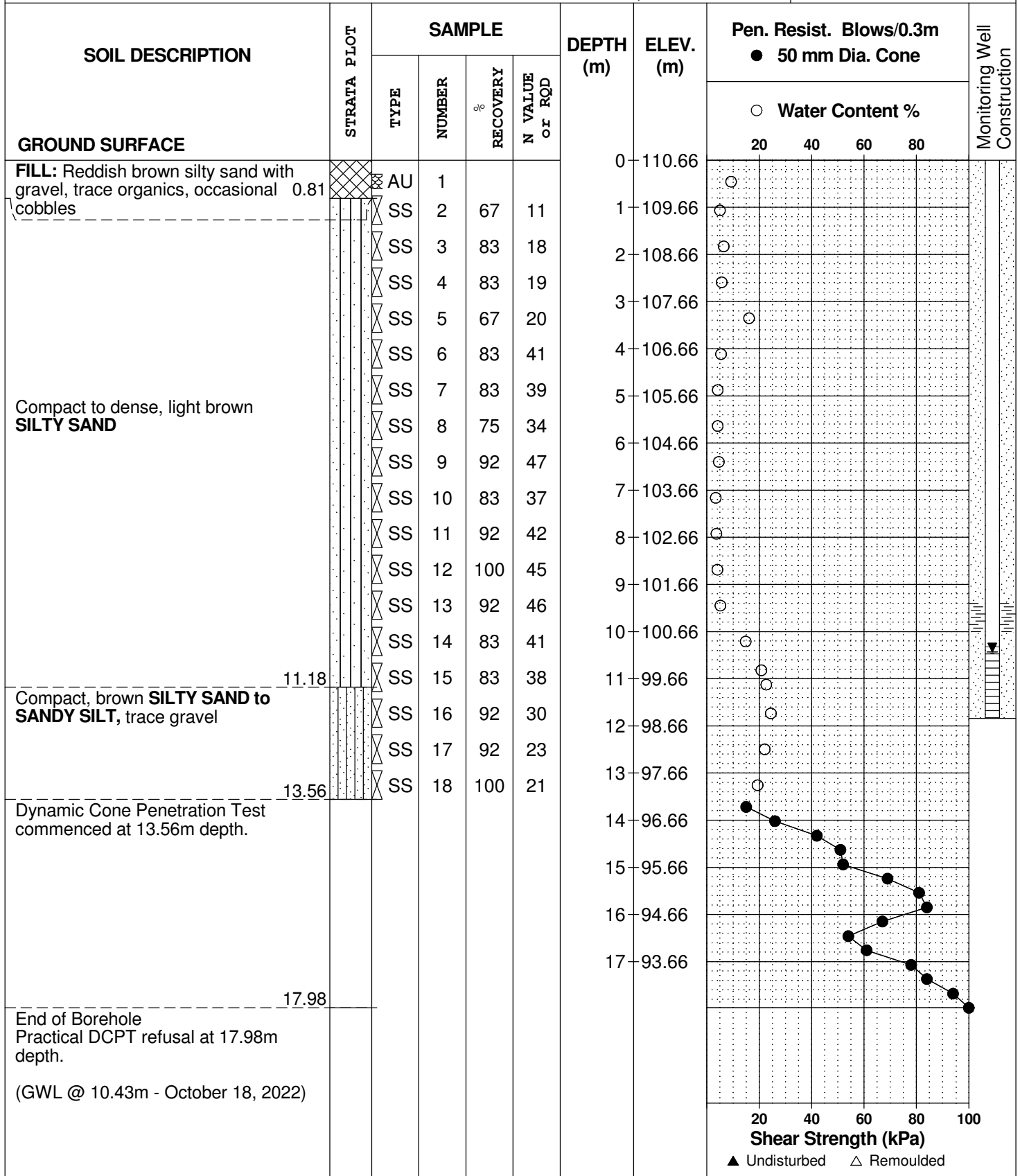
REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE October 7, 2022

FILE NO.
PG6197

HOLE NO.
BH18-22



[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH 2-15

BORINGS BY CME 75 Power Auger

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Compact, brown SILTY SAND with gravel and cobbles - rootlets in upper 100mm		AU	1			0	104.86					
		SS	2	79	10	1	103.86					
		SS	3	63	16	2	102.86					
	2.29											
Soft to firm, grey SILTY CLAY with sand and gravel		SS	4	100	3							
		SS	5	100	2	3	101.86					
	4.88											
Very dense, grey SILTY SAND with gravel, cobbles, boulders and clay		SS	6	50	56	5	99.86					
		SS	7	67	50	6	98.86					
	6.30											
Dense, grey SILTY SAND		SS	8	67	48	7	97.86					
		SS	9	58	39	8	96.86					
		SS	10	83	36							
		SS	11		35	9	95.86					
	9.75											
End of Borehole												
GWL@ 7.17m - Dec. 21, 2015												
GWL@ 6.58m - May 3, 2016												
GWL@ 7.03m - July 28, 2016												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

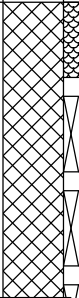
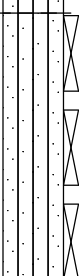
FILE NO.
PG3607

REMARKS

HOLE NO.
BH 3-15

BORINGS BY CME 75 Power Auger

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
FILL: Brown silty sand with gravel, cobbles and boulders, trace clay - rootlets in upper 200mm		AU	1			0	109.77						
		SS	2	75	25	1	108.77						
		SS	3	67	45	2	107.77						
	2.39												
Loose to very dense, brown SILTY SAND with gravel and cobbles		SS	4	100	11								
		SS	5	100	7	3	106.77						
		SS	6	100	38	4	105.77						
		SS	7	100	33	5	104.77						
		SS	8	75	53								
		SS	9	79	42	6	103.77						
		SS	10	100	57	7	102.77						
			7.60										
		SS	11	100	57	8	101.77						
		SS	12	92	51								
Very dense, grey SILTY SAND		SS	13	96	57	9	100.77						
End of Borehole	9.75												
BH dry to 5.27m depth - Dec. 21, 2015 May 3, 2016 July 28, 2016													
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **BH 4-15**

DATE December 2, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. **PG3607**

REMARKS

HOLE NO. **BH 5-15**

BORINGS BY CME 75 Power Auger

DATE December 10, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
FILL: Grey silty sand with clay, gravel and wood		SS	1	42	13	0	108.75					
		SS	2	25	21	1	107.75					
		SS	3	33	5	2	106.75					
		SS	4	42	4	3	105.75					
		SS	5	42	3	4	104.75					
		SS	6	42	3	5	103.75					
		SS	7	17	5	6	102.75					
		SS	8	25	37	7	101.75					
		SS	9	0	50+	8	100.75					
		SS	10	58	9	9	99.75					
		SS	11	0	1							
End of Borehole	9.14											
(BH dry to 9.14m depth - July 28, 2016)												
								</				

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH 6-15

BORINGS BY CME 75 Power Auger

DATE December 3, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Dense to very dense, grey-brown SILTY SAND with gravel, cobbles and boulders		AU	1			0	102.59					
		SS	2	75	31	1	101.59					
		SS	3	100	50+	2	100.59					
Compact to dense, grey-brown SILTY SAND		SS	4	83	27	3	99.59					
		SS	5	58	27	4	98.59					
		SS	6	67	26	5	97.59					
		SS	7	71	31	6	96.59					
		SS	8	67	30	7	95.59					
		SS	9	63	30	8	94.59					
		SS	10	75	25	9	93.59					
		SS	11	100	19							
		SS	12	100	15							
		SS	13	100	15							
End of Borehole												
(BH dry to 4.40m depth - July 28, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **BH 7-15**

BORINGS BY CME 75 Power Auger

DATE December 10, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH 8-15

BORINGS BY CME 75 Power Auger

DATE December 7, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE							0	106.93					
Compact to loose, brown SILTY SAND with gravel and cobbles - rootlets in upper 100mm - with boulders by 1.5m depth		AU	1										
		SS	2	58	12	1	105.93						
		SS	3	46	16	2	104.93						
		SS	4	58	8	3	103.93						
Grey SILTY CLAY with sand, gravel and cobbles		SS	5	92	7	4	102.93						
		SS	6	100	2	5	101.93						
		SS	7	100	6	6	100.93						
		SS	8	100	5	7	100.93						
Compact to dense, grey SILTY SAND with gravel, cobbles and boulders		SS	9	92	18	8	99.93						
		SS	10	75	46	9	98.93						
		SS	11	75	41								
		SS	12	83	49								
End of Borehole							9	97.93					
GWL @ 8.24 m - Dec, 2015 GWL @ 7.49 m - May 3, 2016 GWL @ 7.95 m - July 28, 2016 GWL @ 8.60 m - April 21, 2022 GWL @ 8.41 m - August 9, 2022													
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **BH 9-15**

DATE December 7, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH10-15

BORINGS BY CME 75 Power Auger

DATE December 4, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
FILL: Brown silty sand with gravel, cobbles and boulders - rootlets in upper 200mm - some clay by 1.5m depth		AU	1			0	110.71					
		SS	2	79	11	1	109.71					
		SS	3	42	4	2	108.71					
		SS	4	50	7							
	3.05					3	107.71					
Loose to dense, grey-brown SILTY SAND , some gravel, cobbles and boulders		SS	5	75	8							
		SS	6	79	72	4	106.71					
		SS	7	67	41	5	105.71					
		SS	8	71	28							
	5.64					6	104.71					
Compact, grey SILTY SAND		SS	9	75	26							
		SS	10	75	17	7	103.71					
		SS	11	79	26	8	102.71					
		SS	12	71	25							
	9.14					9	101.71					
Very dense, grey SILTY SAND with gravel, cobbles and boulders	9.75	SS	13	67	50							
End of Borehole												
(BH dry to 9.38m depth - July 28, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **BH11-15**

DATE December 3, 2015

[illegible]

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH12-15

BORINGS BY CME 75 Power Auger

DATE December 2, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Dense to very dense, brown SILTY SAND with gravel, cobbles and boulders - rootlets in upper 100mm		AU	1			0	105.26					
		SS	2	88	42	1	104.26					
		SS	3	33	50+							
		SS	4	67	50+	2	103.26					
		SS	5	83	58	3	102.26					
		SS	6	100	31	4	101.26					
		SS	7	75	47	5	100.26					
Dense, brown SILTY SAND		SS	8	92	30	6	99.26					
		SS	9	79	31							
		SS	10	75	35	7	98.26					
- grey by 7.6m depth		SS	11	92	34	8	97.26					
		SS	12	100	32							
		SS	13	88	37	9	96.26					
End of Borehole												
(BH dry to 7.79m depth - July 28, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH13-15

BORINGS BY CME 75 Power Auger

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Compact, brown SILTY SAND with gravel, cobbles and boulders - rootlets in upper 100mm ----- 1.52 												

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH14-15

BORINGS BY CME 75 Power Auger

DATE December 7, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Compact, brown SILTY SAND with gravel and cobbles in upper 0.8m depth - rootlets in upper 100mm - grey by 3m depth		AU	1			0	103.47					
		SS	2	75	10	1	102.47					
		SS	3	75	11	2	101.47					
		SS	4	71	21							
		SS	5	71	16	3	100.47					
		SS	6	67	22	4	99.47					
		SS	7	75	21	5	98.47					
		SS	8	100	12							
		SS	9	100	12	6	97.47					
		SS	10	100	6	7	96.47					
		SS	11	100	16	8	95.47					
		SS	12	71	10							
		SS	13	63	11	9	94.47					
End of Borehole	9.75											
GWL @ 4.52 m - Dec 21, 2015) GWL @ 3.62 m - May 3, 2015) GWL @ 4.20 m - July 28, 2016 GWL @ 4.43 m - April 21, 2022) GWL @ 4.48 m - August 9, 2022)												
								20	40	60	80	100
								Shear Strength (kPa)				▲ Undisturbed △ Remoulded

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH15-15

BORINGS BY CME 75 Power Auger

DATE December 2, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Loose to compact, brown SILTY SAND - rootlets in upper 100mm - grey by 5.3m depth - running sand encountered at 6.8m depth - loose by 8.4m depth		AU	1			0	103.56					
		SS	2	100	5	1	102.56					
		SS	3	92	10	2	101.56					
		SS	4	100	8	3	100.56					
		SS	5	75	11	4	99.56					
		SS	6	79	21	5	98.56					
		SS	7	67	14	6	97.56					
		SS	8	100	18	7	96.56					
		SS	9	100	19	8	95.56					
		SS	10	100	18	9	94.56					
		SS	11	100	16							
		SS	12	100	8							
		SS	13	100	6							
End of Borehole	9.75											
GWL@ 5.35m - Dec. 21, 2015 GWL@ 7.11m - May 3, 2016 GWL@ 4.99m - July 28, 2016												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH16-15

BORINGS BY CME 75 Power Auger

DATE December 2, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Loose to dense, brown SILTY SAND with gravel, cobbles and boulders - rootlets in upper 100mm		AU	1			0	107.24					
		SS	2	50	5	1	106.24					
		SS	3	79	17	2	105.24					
		SS	4	67	18	3	104.24					
		SS	5	79	28	4	103.24					
		SS	6	67	32	4	103.24					
4.58		SS	7	63	30	5	102.24					
Compact, brown SILTY SAND - trace gravel and cobbles from 6.9 to 8.8m depth - grey by 7.6m depth		SS	8	96	36	6	101.24					
		SS	9	100	34	7	100.24					
		SS	10	79	17	7	100.24					
		SS	11	100	13	8	99.24					
		SS	12	88	19	9	98.24					
		SS	13	79	31	9	98.24					
		9.75										
End of Borehole												
BH dry to 7.34m depth - Dec. 21, 2015 May 3, 2016 July 28, 2016												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **BH17-15**

DATE December 4, 2015

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DATUM Geodetic elevations interpolated from City of Ottawa basemap.

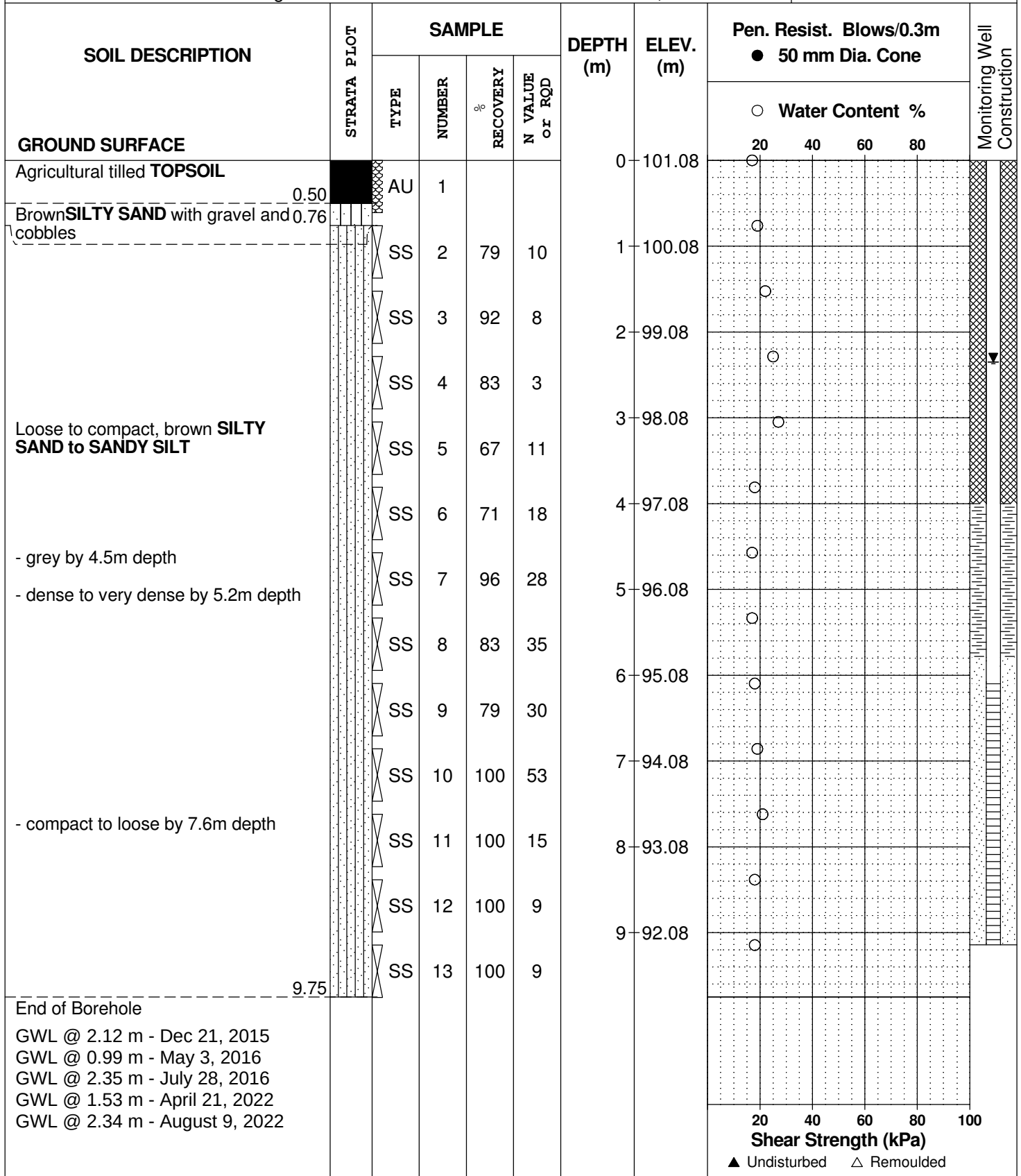
FILE NO.
PG3607

REMARKS

HOLE NO.
BH18-15

BORINGS BY CME 75 Power Auger

DATE December 8, 2015



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH19-15

BORINGS BY CME 75 Power Auger

DATE December 18, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Agricultural tilled TOPSOIL	0.50	AU	1			0	103.99					
Dense, brown SILTY SAND with gravel, cobbles and boulders	2.29	SS	2	67	38	1	102.99					
		SS	3	4	42	2	101.99					
Compact to dense, grey-brown SILTY SAND to SANDY SILT	9.75	SS	4	75	18	3	100.99					
		SS	5	71	30	4	99.99					
		SS	6	67	23	5	98.99					
		SS	7	75	23	6	97.99					
		SS	8	71	26	7	96.99					
		SS	9	83	34	8	95.99					
		SS	10	100	20	9	94.99					
		SS	11	100	21							
		SS	12	100	42							
		SS	13	100	11							
End of Borehole												
GWL@ 7.10m - Dec. 21, 2015												
GWL@ 6.25m - May 3, 2016												
GWL@ 6.72m - July 28, 2016												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH20-15

BORINGS BY CME 75 Power Auger

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL Compact, brown SILTY SAND with gravel, cobbles and boulders, trace clay	0.10	AU	1			0	107.88					
	1.02	SS	2	88	12	1	106.88					
		SS	3	71	14	2	105.88					
		SS	4	83	15	3	104.88					
		SS	5	75	19	4	103.88					
Compact to dense, brown SILTY SAND with gravel and cobbles		SS	6	67	19	5	102.88					
- with boulders by 5.3m depth		SS	7	71	28	6	101.88					
		SS	8	75	49	7	100.88					
		SS	9	71	39	8	99.88					
		SS	10	71	34	9	98.88					
		SS	11	75	37							
		SS	12	75	34							
		SS	13	88	46							
End of Borehole	9.75											
(BH dry to 7.60m depth - July 28, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

GROUND SURFACE

TOPSOIL

Compact, brown **SILTY SAND** with
gravel, cobbles and boulders, trace
clay

Compact to dense, brown **SILTY
SAND** with gravel and cobbles

- with boulders by 5.3m depth

End of Borehole

(BH dry to 7.60m depth - July 28,
2016)

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH21-15

BORINGS BY CME 75 Power Auger

DATE December 9, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Very loose, brown SILTY SAND with gravel, cobbles and boulders - compact to dense by 2.3m depth - grey-brown by 3.8m depth		AU	1			0	102.47					
		SS	2	54	3	1	101.47					
		SS	3	50	3	2	100.47					
		SS	4	67	14	3	99.47					
		SS	5	13	28	4	98.47					
		SS	6	79	12	5	97.47					
		SS	7	79	25	6	96.47					
		SS	8	92	21	7	95.47					
		SS	9	63	19	8	94.47					
		SS	10	29	33	9	93.47					
		SS	11	58	12							
		SS	12	79	31							
		SS	13	75	13							
9.75		End of Borehole										
		(GWL @ 6.73m-July 28, 2016)										
							20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded					

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH22-15

BORINGS BY CME 75 Power Auger

DATE November 27, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
FILL: Brown clayey silt with sand and gravel		AU	1			0	101.71					
- rootlets in upper 200mm	0.70											
Compact to loose, brown SILTY SAND with gravel and cobbles		SS	2	100	25	1	100.71					
		SS	3	100	7	2	99.71					
		SS	4	100	15	3	98.71					
		SS	5	88	28	4	97.71					
		SS	6	100	29	5	96.71					
		SS	7	100	39	6	95.71					
		SS	8	79	40	7	94.71					
		SS	9	96	40	8	93.71					
		SS	10	100	38	9	92.71					
		SS	11	100	18							
		SS	12	100	26							
		SS	13	100	10							
		End of Borehole	9.75									
(BH dry to 6.15m depth - July 28, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH23-15

BORINGS BY CME 75 Power Auger

DATE December 9, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	98.90					
FILL: Brown clayey sand with silt		AU	1									
0.60												
Compact, brown SILTY SAND		SS	2	100	15	1	97.90					
		SS	3	75	20	2	96.90					
		SS	4	75	21	3	95.90					
		SS	5	75	25	4	94.90					
		SS	6	75	20	5	93.90					
		SS	7	75	12	6	92.90					
		SS	8	75	30	7	91.90					
		SS	9	100	25	8	90.90					
6.70												
Compact, grey SILTY SAND with gravel, cobbles and boulders		SS	10	50	30	9	89.90					
		SS	11	75	23	10						
		SS	12	50	30	11						
		SS	13	75	23	12						
9.75												
End of Borehole												
(GWL @ 3.56m-July 28, 2016)												

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

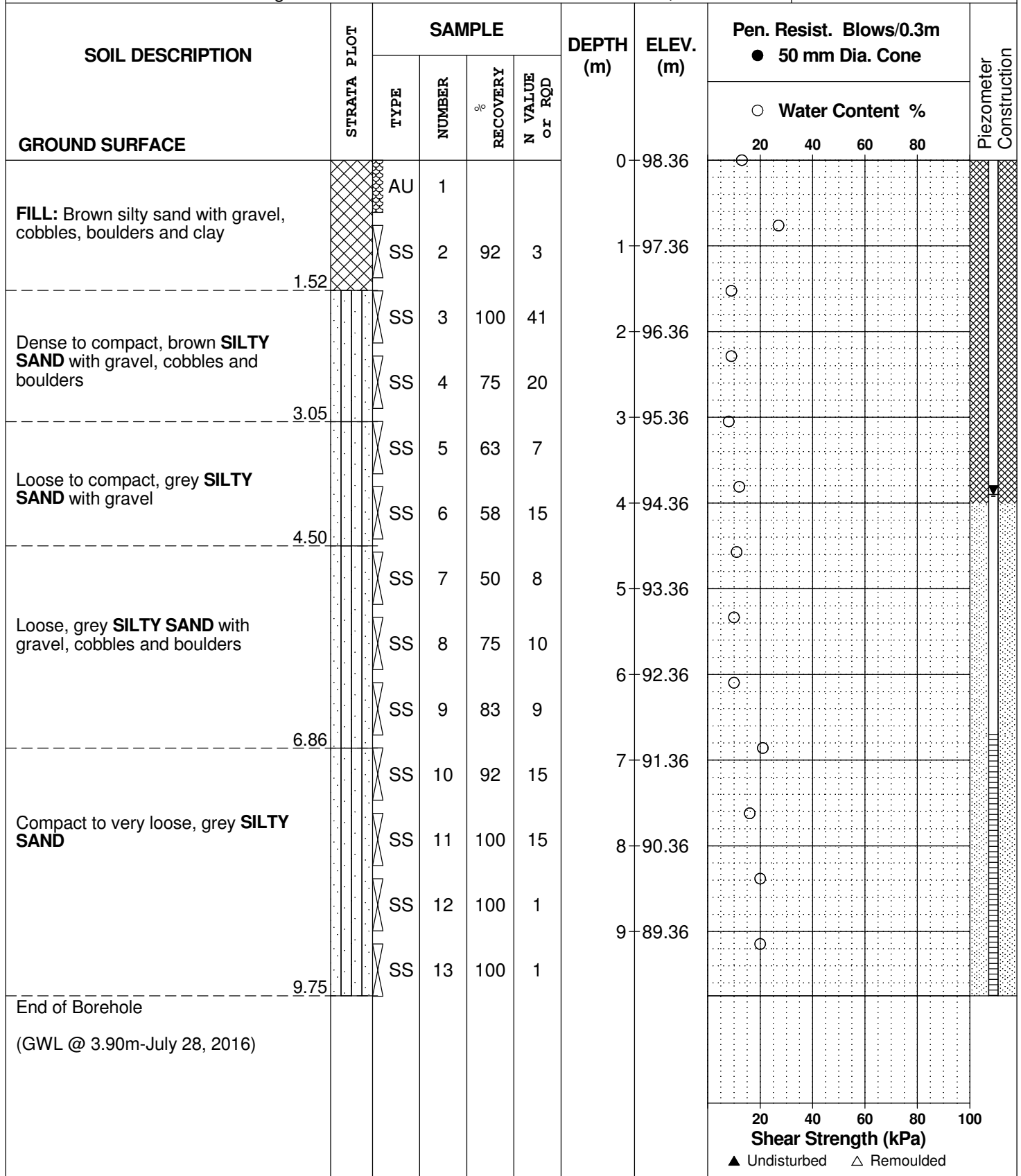
FILE NO.
PG3607

REMARKS

HOLE NO.
BH24-15

BORINGS BY CME 75 Power Auger

DATE November 27, 2015



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH25-15

BORINGS BY CME 75 Power Auger

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.30					0	99.56					
Brown SILTY SAND with gravel	0.76	AU	1									
Loose to compact, brown SILTY SAND to SANDY SILT - grey by 1.5m depth		SS	2	75	5	1	98.56					
		SS	3	71	16	2	97.56					
		SS	4	67	26	3	96.56					
		SS	5	88	27	4	95.56					
		SS	6	79	15	5	94.56					
		SS	7	67	15	6	93.56					
		SS	8	75	24	7	92.56					
		SS	9	71	30	8	91.56					
		SS	10	75	18	9	90.56					
		SS	11	63	19							
		SS	12	79	51							
		SS	13	88	52							
End of Borehole	9.75											
GWL@ 1.01m - Dec. 21, 2015 GWL@ 1.80m - May 3, 2016 PZ Damaged - July 28, 2016												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

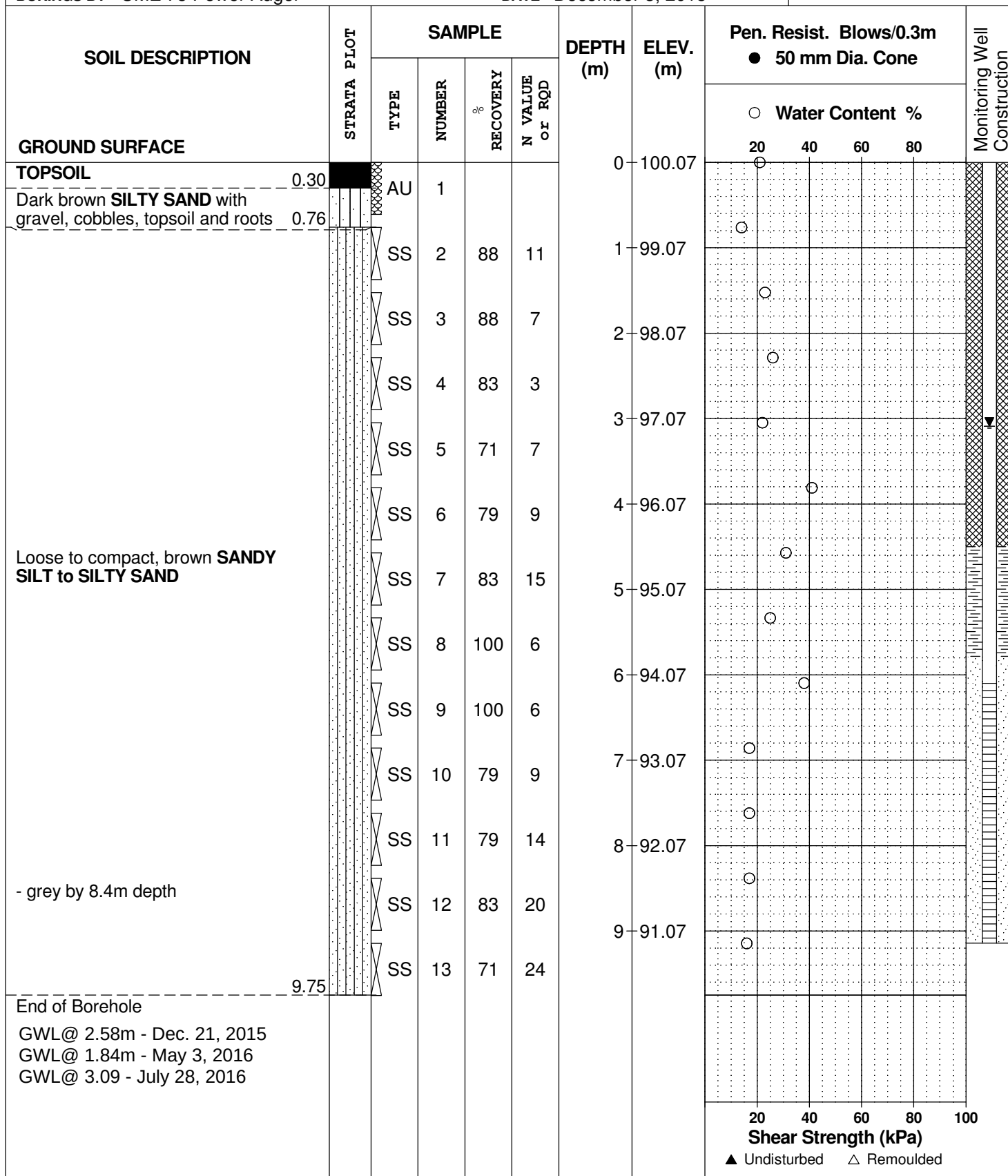
FILE NO.
PG3607

REMARKS

HOLE NO.
BH26-15

BORINGS BY CME 75 Power Auger

DATE December 8, 2015



DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH27-15

BORINGS BY CME 75 Power Auger

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.30	AU	1			0	101.30					
Loose, brown SILTY SAND with gravel, cobbles and boulders	1.50	SS	2	100	4	1	100.30					
Loose to compact, brown SILTY SAND to SANDY SILT - dense to very dense and grey by 5.2m depth		SS	3	100	5	2	99.30					
		SS	4	83	9	3	98.30					
		SS	5	71	16	4	97.30					
		SS	6	67	20	5	96.30					
		SS	7	71	19	6	95.30					
		SS	8	75	55	7	94.30					
		SS	9	100	40	8	93.30					
		SS	10	88	32	9	92.30					
		SS	11	100	50							
		SS	12	83	53							
		SS	13	100	51							
End of Borehole	9.75											
(GWL @ 4.96m-Jul 28, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **BH28-15**

DATE December 1, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS Moved 4m west of BH 28-15

HOLE NO. **BH28A-15**

BORINGS BY CME 75 Power Auger

DATE December 1, 2015

[illegible]

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. **PG3607**

REMARKS

HOLE NO. **BH29-15**

BORINGS BY CME 75 Power Auger

DATE December 9, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.30	AU	1			0	102.14					
Loose to dense, brown SILTY SAND with gravel, cobbles and boulders		SS	2	92	9	1	101.14					
		SS	3	75	17	2	100.14					
		SS	4	71	35	3	99.14					
		SS	5	79	38	4	98.14					
		SS	6	75	33	5	97.14					
		SS	7	83	36	6	96.14					
		SS	8	91	50+	7	95.14					
		SS	9	58	26	8	94.14					
		SS	10	67	64	9	93.14					
		SS	11	63	30							
		SS	12	54	19							
		SS	13	83	2							
	- compact to loose by 8.3m depth											
End of Borehole	9.75											
(GWL @ 6.37m-July 28, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH30-15

BORINGS BY CME 75 Power Auger

DATE November 27, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Brown SILTY SAND , trace gravel and organics	0.76	AU	1			0	99.45					
Very dense to compact, brown SILTY SAND with gravel, cobbles and boulders		SS	2	58	81	1	98.45					
		SS	3	63	55	2	97.45					
		SS	4	79	27	3	96.45					
		SS	5	67	25	4	95.45					
		SS	6	67	29	5	94.45					
		SS	7	71	25	6	93.45					
		SS	8	75	28	7	92.45					
Compact, grey SILTY SAND to SANDY SILT	5.33	SS	9	63	10	8	91.45					
		SS	10	75	21	9	90.45					
		SS	11	71	16	10	89.45					
		SS	12	100	28	11	88.45					
		SS	13	100	21	12	87.45					
- trace gravel to 8.4m depth												
End of Borehole	9.75											
(GWL @ 4.41m-July 28, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH31-16

BORINGS BY CME 55 Power Auger

DATE July 20, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
Compact, brown SANDY SILT , some gravel, trace cobbles, rootlets	1.12	△	SS	1	79	17	0	108.99					
		△	SS	2	75	11	1	107.99					
Compact, brown SILTY SAND , some gravel		△	SS	3	79	13	2	106.99					
		△	SS	4	71	11	3	105.99					
		△	SS	5	92	21	4	104.99					
	3.80	△	SS	6	58	34	5	103.99					
Compact to dense, brown SAND with gravel, some silt and cobbles - some boulders by 6.4m depth		△	SS	7	47	50+	6	102.99					
		△	SS	8	83	82	7	101.99					
		△	SS	9	50	41	8	100.99					
		△	SS	10	62	57	9	99.99					
		△	SS	11	83	46	10	98.99					
		△	SS	12	50	22	11	97.99					
							12	96.99					
							13	95.99					
							14	94.99					
							15	93.99					
						16	92.99						
	16.76												
End of Borehole													
(GWL @ 13.02m-July 28, 2016)													
									20	40	60	80	100
									Shear Strength (kPa)				
									▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **BH32-16**

DATE July 20, 2016

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH33-16

BORINGS BY CME 55 Power Auger

DATE July 19, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	110.04					
Compact to very dense, brown SILTY SAND with gravel, cobbles and boulders - grey by 0.8m depth		SS	1	46	27							
		SS	2	58	18	1	109.04					
		SS	3	67	60	2	108.04					
		SS	4	75	41							
		SS	5	79	35	3	107.04					
Dense, brown SANDY SILT						4	106.04					
Dense, brown SAND , trace to some silt		SS	6	71	29	5	105.04					
		SS	7	71	34	6	104.04					
		SS	8	62	32	8	102.04					
		SS	9	71	30	9	101.04					
		SS	10	83	15	11	99.04					
Compact, brown to grey SILT with sand						12	98.04					
End of Borehole												
(GWL @ 9.46m-July 28, 2016)												
								Shear Strength (kPa)				
								20	40	60	80	100
								▲ Undisturbed △ Remoulded				

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. **PG3607**

REMARKS

HOLE NO. **BH34-16**

BORINGS BY CME 55 Power Auger

DATE July 19, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
Compact, brown SANDY SILT with gravel, some cobbles, rootlets	0.71	SS	1	50	27	0	107.46					
Dense, brown SILTY SAND , some gravel and cobbles	1.52	SS	2	71	31	1	106.46					
Dense to very dense, brown SAND , trace silt and gravel		SS	3	58	36	2	105.46					
		SS	4	58	30	3	104.46					
		SS	5	67	70	4	103.46					
		SS	6	58	56	5	102.46					
		SS	7	67	67	6	101.46					
		SS	8	62	36	7	100.46					
		SS	9	58	41	8	99.46					
		SS	10	67	33	9	98.46					
		SS	11	83	23	10	97.46					
		SS	12	100	23	11	96.46					
- compact by 11.7m depth	11.73					12	95.46					
End of Borehole (GWL @ 11.40m-July 28, 2016)						13	94.46					
						14	93.46					
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **BH35-16**

DATE July 21, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
Brown SILTY SAND , trace gravel, organics and rootlets	0.76					0	105.41						
Very dense to compact, brown SILTY SAND with gravel, cobbles and boulders	5.33					1	104.41						
						2	103.41						
						3	102.41						
						4	101.41						
						5	100.41						
Compact, grey SILTY SAND to SANDY SILT - trace gravel to 8.4m depth	9.14					6	99.41						
						7	98.41						
						8	97.41						
						9	96.41						
Dense to compact, brown SILT , some sand	12.80	SS	1	71	46	10	95.41						
		SS	2	62	35	11	94.41						
		SS	3	46	26	12	93.41						
End of Borehole (GWL @ 9.36m-July 28, 2016)													
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
BH36-16

BORINGS BY CME 55 Power Auger

DATE July 21, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
FILL: Brown silty sand with gravel, 0.30 some cobbles and boulders		SS	1	40	50+	0	109.08					
FILL: Brown silt with sand and gravel, some cobbles and boulders		SS	2	50	63	1	108.08					
		SS	3	64	50+							
		SS	4	79	50+	2	107.08					
	2.90	SS	5	79	37	3	106.08					
Dense to very dense, brown SILT with sand, trace gravel		SS	6	83	34	4	105.08					
		SS	7	67	61	5	104.08					
		SS	8	50	64	6	103.08					
		SS	9	62	44	7	102.08					
		SS	10	75	50	8	101.08					
		SS	11	58	52	9	100.08					
		SS	12	50	10	10	99.08					
		SS	13	50	10	11	98.08					
13.70					12	97.08						
Compact, brown fine to medium SAND		SS	14	50	10	13	96.08					
						14	95.08					
						15	94.08					
	16.76					16	93.08					
End of Borehole												
(GWL @ 12.95m-July 28, 2016)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. TP 1-15

DATE December 2, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

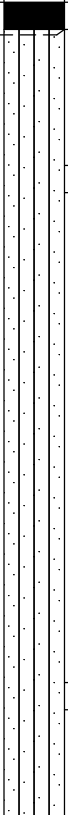
FILE NO.
PG3607

REMARKS

HOLE NO.
TP 2-15

BORINGS BY Backhoe

DATE December 2, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	106.80					
TOPSOIL	0.10											
Compact, brown SILTY SAND		G	1			1	105.80					
		G	2			2	104.80					
End of Test Pit	3.00					3	103.80					
(TP dry upon completion)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 4-15**

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY % ○	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	107.00						
Loose, brown to grey SILTY SAND with gravel, cobbles and boulders - rootlets in upper 150mm		G	1			1	106.00						
End of Test Pit (TP dry upon completion)		G	2			3	104.00						

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 5-15**

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	107.70						
Loose to compact, brown to grey SILTY SAND with gravel, cobbles and boulders - rootlets in upper 200mm		G	1			1	106.70						
		G	2			2	105.70						
								</					

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 6-15**

BORINGS BY Backhoe

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	111.30					
FILL: Grey silty clay with sand, gravel, cobbles and boulders - rootlets in upper 100mm		G	1									
0.80												
Compact, grey SILTY SAND		G	2			1	110.30					
						2	109.30					
3.00						3	108.30					
End of Test Pit (TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 7-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
FILL: Grey-brown silty sand with gravel, cobbles and boulders - rootlets in upper 100mm		G	1			0	111.90						
						1	110.90						
						2	109.90						
Very dense, brown SILTY SAND , trace gravel		G	2										
End of Test Pit (TP dry upon completion)						3	108.90						

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 8-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	109.30						
Dense, brown SILTY SAND			1			1	108.30						
End of Test Pit (TP dry upon completion)	3.00		2			3	106.30						
Shear Strength (kPa)													
▲ Undisturbed △ Remoulded													

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 9-15**

DATE December 2, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.20					0	108.40					
Brown SILTY SAND, trace cobbles		G	1			1	107.40					
						2	106.40					
End of Test Pit (TP dry upon completion)	3.00	G	2			3	105.40					

Shear Strength (kPa)
 ▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 10-15**

DATE December 2, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 11-15**

BORINGS BY Backhoe

DATE December 2, 2015

[illegible]

SOIL PROFILE AND TEST DATA

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. TP 12-15

BORINGS BY Backhoe

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	105.40						
Loose, brown SILTY SAND with gravel, cobbles and boulders		G	1			1	104.40						
1.20													
Compact, grey SILTY SAND		G	2			2	103.40						
3.00													
End of Test Pit (TP dry upon completion)						3	102.40						
							</						

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 13-15

BORINGS BY Backhoe

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	106.60						
Compact, brown SILTY SAND with gravel, cobbles and boulders - grey by 0.4m depth													
						1	105.60						

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. TP 14-15

BORINGS BY Backhoe

DATE November 30, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 15-15**

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	109.40						
FILL: Grey-brown silty clay with sand, gravel, cobbles, boulders and debris - rootlets in upper 200mm		G	1			1	108.40						
						2							
						3							
						4							
						5							
						6							
						7							
						8							
						9							
						10							
End of Test Pit (TP dry upon completion)						3	106.40						

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 16-15**

BORINGS BY Backhoe

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL						0	108.50						
	0.40												
		G	1										
Compact, brown SILTY SAND , trace organics													
- grey by 0.9m depth						1	107.50						
		G	2										
						2	106.50						
						</							

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 17-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	110.50						
FILL: Brown silty sand with gravel and cobbles, some boulders - rootlets in upper 150mm		G	1			1	109.50						
						2							
						3							
						4							
						5							
						6							
						7							
						8							
						9							
						10							
End of Test Pit (TP dry upon completion)		G	2			3	107.50						

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 18-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	107.40						
Dense to very dense, brown SILTY SAND , some gravel and cobbles, trace to some boulders - rootlets in upper 100mm		G	1			1	106.40						
						2	105.40						
						3	104.40						
						4							
						5							
						6							
						7							
						8							
						9							
						10							
End of Test Pit (TP dry upon completion)						3	104.40						

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 19-15

BORINGS BY Backhoe

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	104.40						
Compact to very dense, brown SILTY SAND with gravel, some cobbles and boulders			1										
			2										

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 20-15**

DATE December 2, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL						0	101.90					
----- 0.20												
Loose, dark brown SILTY SAND , some gravel		G	1									
----- 0.70												
Stiff, light grey SILTY CLAY , some cobbles and boulders		G	2			1	100.90					
----- 1.50												
Very dense, light grey SILTY SAND with gravel, cobbles and boulders		G	3			2	99.90					
----- 3.00												
End of Test Pit						3	98.90					
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 21-15

BORINGS BY Backhoe

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL	0.15					0	104.50						
Very stiff, brown CLAYEY SILT		G	1										
	1.80					1	103.50						
Dense to compact, brown SILTY SAND with clay		G	2										
	3.10					2	102.50						
End of Test Pit (TP dry upon completion)													
						3	101.50						
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 22-15**

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	104.40						
Loose, brown SILTY SAND with roots		G	1			1	103.40						
Very stiff, grey CLAYEY SILT		G	2			2	102.40						
End of Test Pit (Open hole GWL @ 1.6m depth)						3	101.40						

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 23-15**

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	107.00						
Compact, brown SILTY SAND - grey by 0.8m depth		G	1			1	106.00						
						2	105.00						
						3	104.00						
End of Test Pit (TP dry upon completion)	3.00												
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. TP 24-15

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	107.40					
FILL: Grey silty clay with sand, gravel, cobbles and boulders 0.80 Compact, brown SILTY SAND - grey by 2.0m depth 3.00 End of Test Pit (TP dry upon completion)		G	1									
		G	2			1	106.40					
		G	3			2	105.40					
						3	104.40					

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. TP 25-15

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	106.80						
Compact, brown SILTY SAND - grey by 0.8m depth		G	1			1	105.80						
						2	104.80						
						3	103.80						
						4							
						5							
						6							
						7							
						8							
						9							
						10							
End of Test Pit (TP dry upon completion)						3	103.80						
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 26-15**

DATE November 30, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 27-15**

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	109.90						
Compact, brown SILTY SAND with gravel, cobbles and boulders - grey by 0.8m depth													

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 28-15

BORINGS BY Backhoe

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	110.70					
FILL: Brown silty sand with gravel, some cobbles and boulders - rootlets in upper 150mm		G	1									
	1.05					1	109.70					
Compact, brown SILTY SAND , some gravel		G	2									
	3.00											
End of Test Pit (TP dry upon completion)						3	107.70					
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

HOLE NO. **TP 29-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
FILL: Dark brown silty sand with gravel and cobbles, trace boulders - rootlets in upper 100mm 0.70		G	1			0	106.20					
Dense, brown SILTY SAND , some gravel 2.00		G	2			1	105.20					
Dense, brown SILTY SAND with gravel, cobbles and boulders 3.00						2	104.20					
End of Test Pit (TP dry upon completion)						3	103.20					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 30-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	106.50						
Very dense, brown SILTY SAND with gravel, cobbles and boulders													
End of Test Pit (TP dry upon completion)	3.00					3	103.50						
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 31-15**

BORINGS BY Backhoe

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	105.50					
Very dense, brown SILTY SAND with gravel, cobbles and oversized boulders - rootlets in upper 100mm		G	1			1	104.50					
		G	2			2	103.50					
End of Test Pit (TP dry upon completion)	3.00					3	102.50					
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 32-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	103.50						
Dense to very dense, brown SILTY SAND with gravel, cobbles and boulders		G	1			1	102.50						
		G	2			2	101.50						
End of Test Pit	3.00					3	100.50						
(Open hole GWL @ 0.8m depth)													

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 33-15

BORINGS BY Backhoe

DATE December 2, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	103.00						
Very dense, light brown SILTY SAND , some gravel, cobbles and boulders - rootlets in upper 200mm		G	1			1	102.00						
						2	101.00						
Compact, brown SILTY SAND , trace gravel		G	2			2.80							
End of Test Pit						3.00							
(TP dry upon completion)						3	100.00						
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 34-15

BORINGS BY Backhoe

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	103.70					
Loose, brown SILTY SAND with roots - grey by 0.5m depth		G	1									
						1	102.70					
		G	2			2	101.70					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 35-15**

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	103.90					
Loose to compact, brown SILTY SAND , trace gravel and rootlets - grey by 0.8m depth		G	1			1	102.90					
		G	2			2	101.90					
						3	100.90					
End of Test Pit (TP dry upon completion)	3.00											

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 36-15

BORINGS BY Backhoe

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	104.00						
Loose to compact, brown SILTY SAND , trace gravel and roots - grey by 0.7m depth													
						1	103.00						

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 37-15**

DATE November 23, 2015

[illegible]

SOIL PROFILE AND TEST DATA

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

HOLE NO. **TP 38-15**

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	104.40						
Loose to compact, brown SILTY SAND , trace to some gravel, cobbles and roots - grey by 0.9m depth			1										
			2			2	102.40						

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 39-15

BORINGS BY Backhoe

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	105.20						
Loose to compact, brown SILTY SAND - grey by 0.8m depth		G	1			1	104.20						
		G	2			2	103.20						
End of Test Pit (TP dry upon completion)	3.00					3	102.20						
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 40-15**

DATE November 23, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 41-15**

BORINGS BY Backhoe

DATE November 30, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. TP 42-15

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	107.90						
Compact, brown SILTY SAND with gravel, cobbles and boulders - grey by 0.7m depth		G	1			1	106.90						
		G	2			2	105.90						
End of Test Pit (TP dry upon completion)	3.10					3	104.90						
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 43-15**

BORINGS BY Backhoe

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	110.20					
FILL: Compact, brown silty sand with gravel, cobbles and boulders - rootlets in upper 150mm 0.80		G	1									
Compact, brown SILTY SAND 3.00		G	2									
End of Test Pit (TP dry upon completion)						3	107.20					
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 44-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
FILL: Dark brown, silty sand with gravel, cobbles and boulders - rootlets in upper 100mm		G	1			0	107.80					
0.60												
Very dense, brown SILTY SAND with gravel, cobbles and boulders		G	2			1	106.80					
2												
3.00												
End of Test Pit (TP dry upon completion)						3	104.80					

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

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 45-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	104.60					
FILL: Brown silty sand with gravel, cobbles and boulders - rootlets in upper 100mm	0.70	G	1									
Dense to very dense, brown SILTY SAND with gravel, cobbles and boulders						1	103.60					
						2	102.60					
		G	2									
End of Test Pit (TP dry upon completion)	3.00					3	101.60					

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 46-15**

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	105.40						
Very dense, brown SILTY SAND with gravel, cobbles and boulders						1	104.40						
						2	103.40						
End of Test Pit (TP dry upon completion)	3.00					3	102.40						

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 47-15**

BORINGS BY Backhoe

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	106.00					
Dense to very dense, brown SILTY SAND with gravel, cobbles and occasional large boulders - rootlets in upper 100mm												
End of Test Pit (TP dry upon completion)	3.00					3	103.00					

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 48-15**

DATE December 2, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	104.80						
Very dense, light brown SILTY SAND with gravel, cobbles and boulders - rootlets in upper 150mm		G	1			1	103.80						
2.00						2	102.80						
Compact, brown SILTY SAND , trace gravel		G	2										
3.00						3	101.80						
End of Test Pit (TP dry upon completion)													
		</											

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 49-15**

BORINGS BY Backhoe

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	103.00					
Loose compact, brown SILTY SAND with roots in upper 300mm - grey by 1.3m depth		G	1			1	102.00					
						2	101.00					
		G	2									
End of Test Pit (TP dry upon completion)	3.00					3	100.00					

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 50-15**

DATE November 23, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 51-15**

BORINGS BY Backhoe

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	103.00						
TOPSOIL													
	0.20												
Loose to compact, brown SILTY SAND , trace gravel and cobbles		G	1										
- grey by 0.5m depth													
	1.30					1	102.00						
Compact, grey SILTY SAND		G	2			2	101.00						
	3.00					3	100.00						
End of Test Pit													
(TP dry upon completion)													

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 52-15**

BORINGS BY Backhoe

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	103.10					
Loose to compact, brown SILTY SAND , some roots in upper 100mm - grey by 0.5m depth		G	1			1	102.10					
		G	2			2	101.10					
						3	100.10					
End of Test Pit (TP dry upon completion)												

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

FILE NO. **PG3607**

HOLE NO. **TP 53-15**

DATE November 23, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	103.20						
Loose, brown SILTY SAND , trace gravel and cobbles. Roots in upper 400mm		G	1										
		G	2										
End of Test Pit (TP dry upon completion)	3.00					3	100.20						
								20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 54-15**

BORINGS BY Backhoe

DATE November 23, 2015

[illegible]

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	105.30						
Compact, brown SILTY SAND - rootlets in upper 100mm - grey by 0.9m depth		G	1			1	104.30						
						2							
						3							
						4							
						5							
						6							
		G	2			7	103.30						
						8							
						9							
						10							
						11							
						12							
End of Test Pit (TP dry upon completion)	3.00						3	102.30					
								20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 56-15**

DATE November 30, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	106.50						
Compact, brown SILTY SAND - rootlets in upper 200mm - grey by 1.1m depth		G	1			1	105.50						
		G	2			2	104.50						
End of Test Pit (TP dry upon completion)						3	103.50						

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. TP 57-15

BORINGS BY Backhoe

DATE November 24, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.15		G	1		0	109.00					
Brown SILTY SAND - with gravel, cobbles and boulders from 1.0 to 1.3m depth - grey by 1.3m depth			G	2		1	108.00					
			G	3								
End of Test Pit	3.00					3	106.00					
(TP dry upon completion)												

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 58-15**

DATE November 24, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.15					0	107.60					
Red-brown to grey SILTY SAND with gravel, cobbles and boulders		G	1									
		G	2									
		G	3									
		G	4									
	1.20					1	106.60					
Grey SILTY SAND		G	5									
	3.00					2	105.60					
Grey SILTY SAND with gravel, cobbles and boulders	3.20											
End of Test Pit						3	104.60					
(TP dry upon completion)												

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 59-15**

BORINGS BY Backhoe

DATE November 24, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL	0.05					0	106.20						
Brown SILTY SAND with gravel, cobbles and boulders - grey by 0.5m depth		G	1										
		G	2										
						1	105.20						
						2	104.20						
		G	3										
End of Test Pit	3.00					3	103.20						
(TP dry upon completion)													

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 60-15**

BORINGS BY Backhoe

DATE November 24, 2015

[illegible]

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 61-15

BORINGS BY Backhoe

DATE November 24, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	104.90						
Very dense, grey-brown SILTY SAND with gravel, cobbles and boulders						1	103.90						
						2	102.90						
End of Test Pit (TP dry upon completion)	2.20												
								Shear Strength (kPa)					
								20	40	60	80	100	
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 62-15**

BORINGS BY Backhoe

DATE November 20, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 63-15**

BORINGS BY Backhoe

DATE November 20, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	101.60						
TOPSOIL	0.15												
Brown SILTY SAND , some clay		G	1										
		G	2										
End of Test Pit	3.00					3	98.60						
(TP dry upon completion)													

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 64-15**

DATE November 20, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 65-15**

BORINGS BY Backhoe

DATE November 20, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 66-15**

BORINGS BY Backhoe

DATE December 2, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	105.00					
TOPSOIL		G	1									
Compact, brown SILTY SAND						1	104.00					
						2	103.00					
End of Test Pit (TP dry upon completion)		G	2			3	102.00					

Shear Strength (kPa)
 ▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 67-15**

DATE November 20, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction		
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %						
								20	40	60	80			
GROUND SURFACE						0	110.60							
Compact, brown SILTY SAND with gravel		G	1											
- grey by 2.3m depth		G	2											
End of Test Pit	3.00					3	107.60							
(TP dry upon completion)														
												</		

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 68-15**

BORINGS BY Backhoe

DATE November 20, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 69-15**

BORINGS BY Backhoe

DATE November 24, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. TP 70-15

BORINGS BY Backhoe

DATE November 24, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 71-15**

DATE November 24, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	103.10						
Dense, grey-brown SILTY SAND with gravel, cobbles and boulders		G	1										
		G	2										
						1	102.10						

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 72-15**

DATE November 24, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 73-15**

DATE November 24, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction		
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %						
								20	40	60	80			
GROUND SURFACE						0	102.10							
Dark brown to grey-brown SILTY SAND with gravel, cobbles and boulders, trace clay						1	101.10							
		G	1											
		G	2											
						2	100.10							
		G	3											
End of Test Pit (TP dry upon completion)						3	99.10							

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. TP 74-15

BORINGS BY Backhoe

DATE November 24, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 75-15**

DATE November 24, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 76-15**

DATE November 24, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	97.90						
Dense, brown SILTY SAND with gravel, cobbles and boulders													
End of Test Pit (TP dry upon completion)	1.00					1	96.90						

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. TP 77-15

DATE November 24, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	98.40						
Grey SILTY SAND with gravel, cobbles and boulders						1	97.40						
		G	1										
						2	96.40						
		G	2										
					3	95.40							
	G	3											
End of Test Pit (TP dry upon completion)	3.00					3	95.40						
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 78-15

BORINGS BY Backhoe

DATE November 20, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.15					0	100.80					
Brown SILTY SAND - grey by 0.8m depth		G	1									
		G	2			1	99.80					
CLAYEY SILT	1.60											
		G	3			2	98.80					
		G	4									
	3.00					3	97.80					
End of Test Pit (TP dry upon completion)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 79-15

BORINGS BY Backhoe

DATE November 20, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	100.80					
TOPSOIL												
	0.35											
		G	1			1	99.80					
Very stiff, brown SILTY CLAY						2	98.80					
		G	2									
	3.00					3	97.80					
End of Borehole (TP dry upon completion)												
					</							

Very stiff, brown **SILTY CLAY**



DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 80-15

BORINGS BY Backhoe

DATE November 20, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.20					0	101.10					
Loose to compact, orange-brown SILTY SAND - grey by 0.8m depth		G	1									
		G	2			1	100.10					
						2	99.10					
	2.50											
SILTY CLAY		G	3									
	3.00											
End of Test Pit (TP dry upon completion)						3	98.10					
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 81-15**

BORINGS BY Backhoe

DATE November 20, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	101.80					
TOPSOIL												
Brown SILTY SAND		G	1			1	100.80					
Very stiff, brown SILTY CLAY						2	99.80					
End of Test Pit (TP dry upon completion)						3	98.80					

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 82-15

BORINGS BY Backhoe

DATE November 20, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	102.50					
Brown SILTY SAND - rootlets in upper 100mm - grey by 0.5m depth		G	1									
		G	2			1	101.50					
	1.55											
Stiff to very stiff, brown SILTY CLAY		G	3			2	100.50					
	3.00					3	99.50					
End of Test Pit (TP dry upon completion)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 83-15**

DATE November 20, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 84-15**

DATE November 20, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	108.00					
TOPSOIL												
0.30												
SILTY SAND with gravel		G	1									
0.60												
		G	2			1	107.00					
		G	3									
SILTY SAND		G	4									
- trace clay by 1.2m depth						2	106.00					
3.00						3	105.00					
End of Test Pit												
(TP dry upon completion)												

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 85-15**

DATE November 19, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.15		G	1		0	106.20					
Grey-brown SILTY SAND with gravel, cobbles and boulders			G	2		1	105.20					
			G	3		2	104.20					
End of Test Pit	2.90											
(TP dry upon completion)												

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 86-15**

DATE November 19, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.15					0	103.00					
Brown SILTY SAND , some gravel and cobbles		G	1									
	0.90					1	102.00					
Grey SILTY SAND		G	2									
						2	101.00					
		G	3									
	3.10					3	100.00					
End of Test Pit (TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 87-15**

DATE November 19, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 88-15**

BORINGS BY Backhoe

DATE November 19, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 89-15**

DATE November 19, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 90-15**

DATE November 19, 2015

[illegible]

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 91-15

BORINGS BY Backhoe

DATE November 19, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	100.60						
Brown to grey SILTY SAND with gravel, cobbles and boulders													
3.00													
End of Test Pit (TP dry upon completion)						3	97.60						

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 92-15**

DATE November 19, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction		
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %						
								20	40	60	80			
GROUND SURFACE						0	98.20							
Brown SILTY SAND with gravel, cobbles and boulders - grey by 1.0m depth						1	97.20							
						2	96.20							
					3	95.20								
End of Test Pit (TP dry upon completion)	3.00													
Shear Strength (kPa)														
▲ Undisturbed △ Remoulded														

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP 93-15**

BORINGS BY Backhoe

DATE November 19, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	98.60						
FILL: Brown silty sand with gravel, cobbles and boulders, trace clay	0.25												
TOPSOIL		G	1			1	97.60						
Grey SILTY SAND, trace clay	1.20	G	2										
Grey SILTY SAND with gravel, cobbles and boulders, trace clay	1.90	G	3			2	96.60						
End of Test Pit (TP dry upon completion)	2.60												
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 94-15**

DATE November 17, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 95-15**

DATE November 17, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction		
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %						
								20	40	60	80			
GROUND SURFACE														
TOPSOIL	0.25					0	99.90							
Loose, brown SILTY SAND - grey by 0.8m depth		G	1			1	98.90							
		G	2											
		G	3											
		G	4											
						2	97.90							
End of Test Pit	2.70													
(Open hole GWL @ 1.6m depth)														

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 96-15**

DATE November 17, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.12					0	100.00					
Loose, brown SILTY SAND -grey by 0.8m depth												
						1	99.00					

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO.
PG3607

REMARKS

HOLE NO.
TP 97-15

BORINGS BY Backhoe

DATE November 17, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	100.20					
TOPSOIL	0.23											
Loose to compact, brown SILTY SAND , trace clay and gravel - grey by 1.1m depth		G	1									
		G	2									
		G	3									
End of Test Pit (TP dry upon completion)	3.00					3	97.20					
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Barrhaven South Urban Expansion Ottawa, Ontario

FILE NO. PG3607

HOLE NO. **TP 98-15**

DATE November 17, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	100.60						
TOPSOIL	0.25												
Compact, brown to grey-brown SILTY SAND, trace clay and gravel		G	1										
		G	2			1	99.60						
		G	3			2	98.60						
End of Test Pit	2.90												
(TP dry upon completion)													
							20	40	60	80	100		
							Shear Strength (kPa)						
							▲ Undisturbed △ Remoulded						

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP 99-15**

DATE November 17, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	101.50						
TOPSOIL	0.20												
Loose to compact, brown SILTY SAND , trace clay and gravel - grey by 0.8m depth		G	1										
		G	2			1	100.50						
						2	99.50						
		G	3										
End of Test Pit	3.00					3	98.50						
(TP dry upon completion)													

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Barrhaven South Urban Expansion Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP100-15**

BORINGS BY Backhoe

DATE November 17, 2015

[illegible]

SOIL PROFILE AND TEST DATA

FILE NO. PG3607

HOLE NO. **TP101-15**

DATE November 17, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP102-15**

DATE November 17, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP103-15**

BORINGS BY Backhoe

DATE November 17, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP104-15**

DATE November 18, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone					Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL						0	102.60						
----- 0.20													
Brown SILTY SAND , trace gravel, cobbles and boulders		G	1										
----- 0.65													
		G	2			1	101.60						
Grey SILTY SAND						2	100.60						
----- 3.00													
End of Test Pit		G	3			3	99.60						
(TP dry upon completion)													

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP105-15**

BORINGS BY Backhoe

DATE November 19, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL						0	103.60					
----- 0.23												
Loose, brown SILTY SAND , some gravel, cobbles and boulders		G	1									
----- 1.20						1	102.60					
Grey SILTY SAND												
----- 2.20						2	101.60					
Loose grey SILTY SAND , some gravel, cobbles and boulders		G	2									
----- 2.70												
End of Test Pit												
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.20					0	104.50					
Dark brown to grey SILTY SAND with gravel, cobbles and boulders		G	1									
		G	2			1	103.50					
		G	3			2	102.50					
Grey SILTY SAND	2.50											
End of Test Pit (TP dry upon completion)	3.10					3	101.50					
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP107-15**

DATE November 19, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY % N VALUE or RQD	○ Water Content %								
					20			40	60	80			
GROUND SURFACE						0	103.20						
Brown to grey SILTY SAND with gravel, cobbles and boulders		G	1										
		G	2										
		G	3			1	102.20						
End of Test Pit (TP dry upon completion)	3.00					3	100.20						
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP108-15**

DATE November 19, 2015

[illegible]

SOIL PROFILE AND TEST DATA

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP109-15**

BORINGS BY Backhoe

DATE November 19, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.10					0	99.00					
Brown to grey SILTY SAND with gravel, cobbles and boulders, trace clay												
		G	1									
		G	2									
						1	98.00					
										</		

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP110-15**

BORINGS BY Backhoe

DATE November 19, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP111-15**

BORINGS BY Backhoe

DATE November 17, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	99.50						
TOPSOIL	0.20												
Compact, brown SILTY SAND - grey by 1.2m depth		G	1										
		G	2			1	98.50						
		G	3			2	97.50						
End of Test Pit	2.60												
(Open hole GWL @ 1.5m depth)													
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP112-15**

BORINGS BY Backhoe

DATE November 18, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL	0.23					0	99.60					
Loose to compact, brown SILTY SAND - grey by 1.4m depth		G	1			1	98.60					✓
		G	2			2	97.60					
		G	3									
End of Test Pit	2.90											
(Open hole GWL @ 1.5m depth)												

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

HOLE NO. TP113-15

DATE November 18, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP114-15**

BORINGS BY Backhoe

DATE November 18, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction		
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %						
								20	40	60	80			
GROUND SURFACE						0	100.00							
TOPSOIL	0.25													
Loose to compact, grey-brown SILTY SAND - grey by 1.2m depth		G	1			1	99.00						V	
		G	2			2	98.00							
End of Test Pit (Open hole GWL @ 1.5m depth)	3.00	G	3			3	97.00							
								20	40	60	80	100	Shear Strength (kPa) ▲ Undisturbed △ Remoulded	

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP115-15**

DATE November 18, 2015

[illegible]

SOIL PROFILE AND TEST DATA

FILE NO. PG3607

HOLE NO. **TP116-15**

DATE November 18, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP117-15**

BORINGS BY Backhoe

DATE November 17, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	101.30					
TOPSOIL	0.17											
Brown SILTY SAND , trace clay - grey by 1.4m depth		G	1									
		G	2			1	100.30					
		G	3									
		G	4			2	99.30					
End of Test Pit (TP dry upon completion)	3.00					3	98.30					
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP118-15**

BORINGS BY Backhoe

DATE November 17, 2015

[illegible]

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP119-15**

BORINGS BY Backhoe

DATE November 17, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0	102.80					
TOPSOIL	0.20	G	1									
Brown SILTY SAND , trace gravel - grey by 1.0m depth		G	2			1	101.80					
		G	3									
						2	100.80					
		G	4									
- boulder noted at 2.5m depth												
End of Test Pit	3.10					3	99.80					
(BH dry upon completion)												

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP120-15**

DATE November 18, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.20					0	104.60					
Loose to compact, brown SILTY SAND , some gravel, cobbles and boulders		G	1									
		G	2			1	103.60					
End of Test Pit	3.00	G	3			2	102.60					
(TP dry upon completion)						3	101.60					
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP121-15**

DATE November 18, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	102.40						
TOPSOIL	0.23												
Loose to compact, brown SILTY SAND with gravel, cobbles and boulders - grey by 0.7m depth		G	1										
		G	2			1	101.40						
End of Test Pit	3.00	G	3			3	99.40						
(TP dry upon completion)													

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP122-15**

BORINGS BY Backhoe

DATE November 18, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
TOPSOIL	0.16					0	102.10						
Loose red-brown SILTY SAND , trace cobbles and gravel	1.20					1	101.10						
Loose, grey SILTY SAND		G	1										
		G	2			2	100.10						
		G	3			3	99.10						
End of Test Pit (TP dry upon completion)	3.00												

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP123-15**

DATE November 18, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

FILE NO. PG3607

HOLE NO. **TP124-15**

DATE November 18, 2015

[illegible]

SOIL PROFILE AND TEST DATA

**Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario**

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. PG3607

REMARKS

HOLE NO. **TP125-15**

BORINGS BY Backhoe

DATE November 18, 2015

[illegible]

SOIL PROFILE AND TEST DATA

Mineral Resource Aggregate Assessment
3882 Barnsdale Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO.

PH1893

HOLE NO.

TP 1-11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL						0						
Loose, grey-brown CLAYEY SANDY SILT		G	1			1						
Dense, grey-brown SANDY SILT/SILT SAND		G	2			2						
End of Test Pit (TP dry upon completion)						6						

SOIL PROFILE AND TEST DATA

Mineral Resource Aggregate Assessment
3882 Barnsdale Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO.

PH1893

HOLE NO.

TP 2-11

[illegible]

SOIL PROFILE AND TEST DATA

Mineral Resource Aggregate Assessment
3882 Barnsdale Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO. **PH1893**

HOLE NO. TP 3-11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.25					0						
Loose to compact, brown to grey SANDY SILT		G	6			1						
						2						
						3						
		G	7			4						
						5						
						6						
End of Test Pit	6.00					6						
(TP dry upon completion)												

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Mineral Resource Aggregate Assessment
3882 Barnsdale Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO. **PH1893**

HOLE NO. TP 4-11

[illegible]

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO.

PH1893

HOLE NO.

TP 5-11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.20											
Compact, red-brown SILTY SAND-GRAVEL with cobbles	0.90	G	10									
						1						
						2						
						3						
Loose to compact, light brown FINE SAND		G	11									
						4						
						5						
						6						
End of Test Pit	6.00											
(TP dry upon completion)												
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Mineral Resource Aggregate Assessment
3882 Barnsdale Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO.

PH1893

HOLE NO.

TP 6-11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL						0						
Loose, red-brown SILTY SAND-GRAVEL with cobbles		G	12									
Loose, grey-brown SAND with gravel and shells		G	13			1						
Loose, grey-brown FINE SAND , some silt		G	14			2						
						3						
						4						
Compact to dense, grey-brown SANDY SILT/SILTY SAND		G	15			5						
						6						
End of Test Pit (TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Mineral Resource Aggregate Assessment
3882 Barnsdale Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO.

PH1893

HOLE NO.

TP 7-11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL	0.31					0						
Compact, red-brown FINE SAND	1.10	G	16			1						
Very stiff, grey-brown CLAYEY SILT	2.50	G	17			2						
Compact to dense, grey-brown SANDY SILT/SILTY SAND	6.00	G	18			3						
End of Test Pit (TP dry upon completion)						4						
						5						
						6						
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO.

PH1893

HOLE NO.

TP 8-11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL												
Loose, dark brown SILTY SAND with gravel and cobbles	0.40 0.80	G	19									
						1						
						2						
						3						
Loose, grey-brown FINE SAND		G	20			4						
						5						
End of Test Pit	5.80											
(TP dry upon completion)												

SOIL PROFILE AND TEST DATA

Mineral Resource Aggregate Assessment
3882 Barnsdale Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO.

PH1893

HOLE NO.

TP 9-11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL	0.30					0						
Dense, dark brown to brown SAND-GRAVEL , some silt, cobbles and boulders		G	21			1						
						2						
						3						
						4						
						5						
						6						
						7						
						8						
						9						
						10						
End of Test Pit (TP dry upon completion)	3.70											
								20	40	60	80	100
								Shear Strength (kPa)				
								▲ Undisturbed △ Remoulded				

SOIL PROFILE AND TEST DATA

Mineral Resource Aggregate Assessment
3882 Barnsdale Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO.

PH1893

HOLE NO.

TP10-11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL						0						
Loose, red-brown SILTY SAND-GRAVEL with cobbles		G	22									
Compact, light brown SILTY SAND		G	23			1						
Dense, grey-brown SANDY SILT		G	24									
Compact, light brown FINE SAND		G	25			2						
Dense, grey-brown SILTY SAND , some gravel, cobbles and boulders		G	26			3						
End of Test Pit (TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Mineral Resource Aggregate Assessment
3882 Barnsdale Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Hydraulic Shovel

DATE 16 December 2011

FILE NO.

PH1893

HOLE NO.

TP11-11

[illegible]

SOIL PROFILE AND TEST DATA

**Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario**

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 23, 03

FILE NO.

G9114

HOLE NO.

TP 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE												
TOPSOIL	0.20					0						
Stiff, grey SILTY CLAY		G	1			1						
						2						
						3						
GLACIAL TILL: Grey silty sand with gravel		G	2			4						
						5						
						6						
End of Test Pit	4.57											
(Open hole GWL @ 2.1m depth)												

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 23, 03

FILE NO.

G9114

HOLE NO.

TP 2

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.18											
GLACIAL TILL: Dense, grey silty sand and gravel with cobbles		G	1			1						
						2						
End of Test Pit	2.90											
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

**Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario**

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 23, 03

FILE NO.

G9114

HOLE NO.

TP 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction			
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %							
								20	40	60	80				
GROUND SURFACE															
TOPSOIL	0.15					0									
Brown SILTY SAND, some gravel	0.46														
Light brown fine SAND		G	1			1									
		G	2			2									
End of Test Pit	5.94														
(TP dry upon completion)															

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 23, 03

FILE NO.

G9114

HOLE NO.

TP 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.15											
Brown SILTY SAND, some gravel	0.60											
Light brown fine SAND		G	1			1						
						2						
						3						
		G	2			4						
						5						
End of Test Pit	5.94											
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 23, 03

FILE NO.

G9114

HOLE NO.

TP 5

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.15											
SAND-GRAVEL	[Pattern]	G	1			1						
						2						
						3						
Brown fine to medium SAND	[Pattern]	G	2			4						
						5						
						6						
End of Test Pit	5.94											
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 23, 03

FILE NO.

G9114

HOLE NO.

TP 6

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.15											
Red SAND, occasional gravel	0.76	G	1			1						
						2						
						3						
Brown fine SAND						4						
						5						
End of Test Pit	5.79											
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 29, 03

FILE NO.

G9114

HOLE NO.

TP 7

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.15											
Red SAND, some gravel						1						
	1.22											
SAND-GRAVEL						2						
						3						
	3.35											
Fine SAND						4						
						5						
	5.18											
Grey SILTY CLAY	5.49											
End of Test Pit												
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 29, 03

FILE NO.

G9114

HOLE NO.

TP 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.20											
Red SAND with gravel		G	1			1						
	1.83					2						
						3						
						4						
Light brown fine SAND						5						
						6						
						7						
End of Test Pit	7.01	G	2									
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 29, 03

FILE NO.

G9114

HOLE NO.

TP 9

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.15											
Reddish brown SAND-GRAVEL	1.22	G	1			1						
						2						
						3						
Light brown fine SAND						4						
						5						
	5.49	G	2									
Grey SILT	6.10	G	3			6						
End of Test Pit (TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 29, 03

FILE NO.

G9114

HOLE NO.

TP10

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.20											
Reddish brown SAND-GRAVEL						1						
	2.13	G	1			2						
Fine to medium SAND						3						
	3.96	G	2									
End of Test Pit												
(Open hole GWL @ 2.1m depth)												

DATUM

FILE NO.

G9114

REMARKS

HOLE NO.

TP11

BORINGS BY Backhoe

DATE Oct 29, 03

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
TOPSOIL	0.15					0						
Red SILTY SAND-GRAVEL	1.22					1						
GLACIAL TILL: Silty sand and gravel, some clay	3.96	G	1			2						
End of Test Pit (TP dry upon completion)						3						

20406080100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

DATUM

FILE NO.

G9114

REMARKS

HOLE NO.

TP12

BORINGS BY Backhoe

DATE Oct 29, 03

[illegible]

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 29, 03

FILE NO.

G9114

HOLE NO.

TP13

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.15											
Red SILTY SAND-GRAVEL	1.22	G	1			1						
						2						
						3						
						4						
Light brown fine to medium SAND		G	2			5						
						6						
End of Test Pit	6.70											
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 29, 03

FILE NO.

G9114

HOLE NO.

TP14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.15											
SAND-GRAVEL		G	1			1						
	2											
	3											
End of Test Pit	3.35											
Refusal to excavation @ 3.35m depth												
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 29, 03

FILE NO.

G9114

HOLE NO.

TP15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.15											
GLACIAL TILL: Very dense silty sand-gravel, some clay		G	1			1						
						2						
End of Test Pit	2.74											
Refusal to excavation @ 2.74m depth												
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Aggregate Resource Investigation
Greenbank Road/Cedarview Road
Ottawa (Nepean), Ontario

DATUM

REMARKS

BORINGS BY Backhoe

DATE Oct 29, 03

FILE NO.

G9114

HOLE NO.

TP16

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
								20	40	60	80	
GROUND SURFACE						0						
TOPSOIL	0.15											
SILTY CLAY	0.60											
GLACIAL TILL: Very dense silty sand-gravel with clay		G	1			1						
	2											
End of Test Pit	2.74											
(TP dry upon completion)												

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

The standard terminology to describe the 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 = $(D_{30})^2 / (D_{10} \times D_{60})$
Cu	-	Uniformity coefficient = D_{60} / D_{10}

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

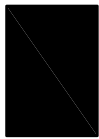
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidation ratio = p'_c / p'_o
Void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

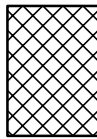
STRATA PLOT



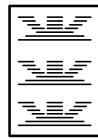
Topsoil



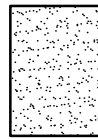
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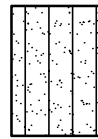
Fill



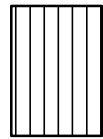
Peat



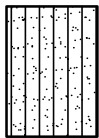
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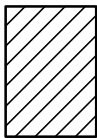
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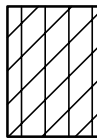
Silt



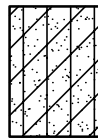
Sandy Silt



Clay



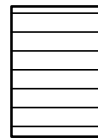
Silty Clay



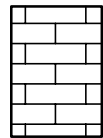
Clayey Silty Sand



Glacial Till



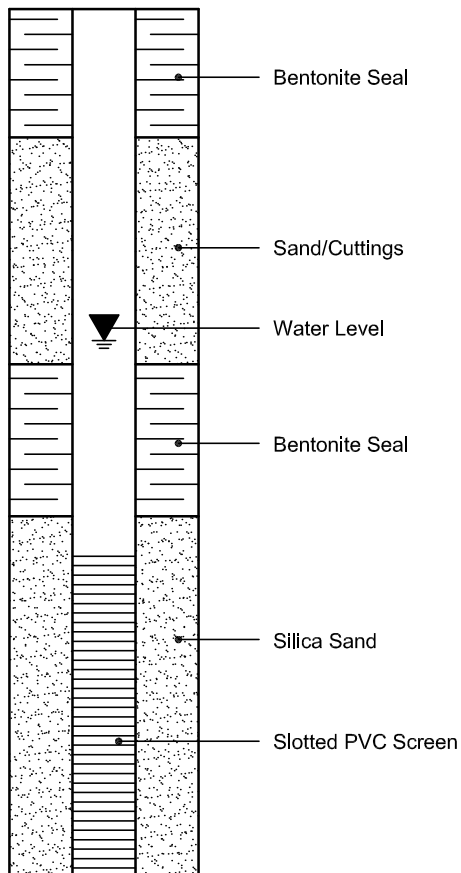
Shale



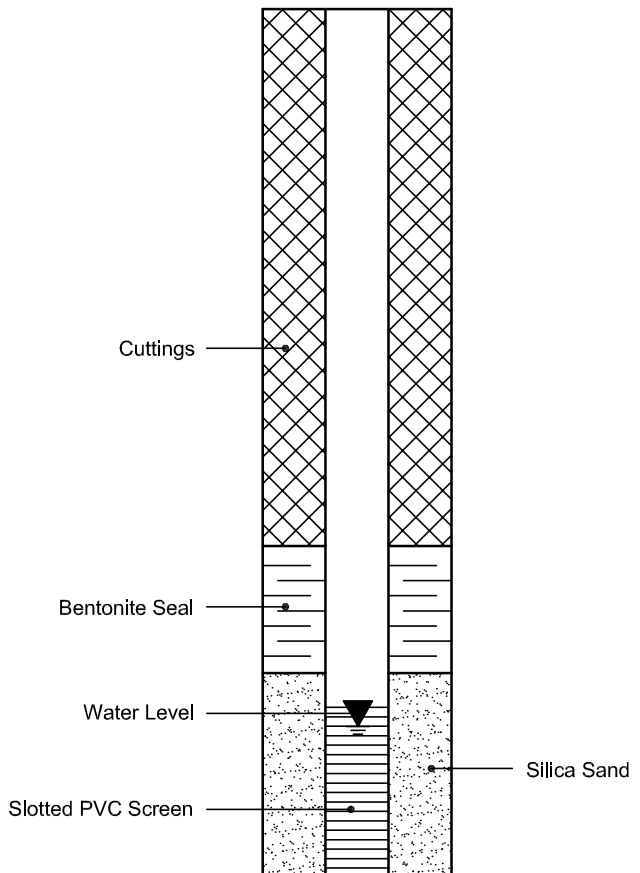
Bedrock

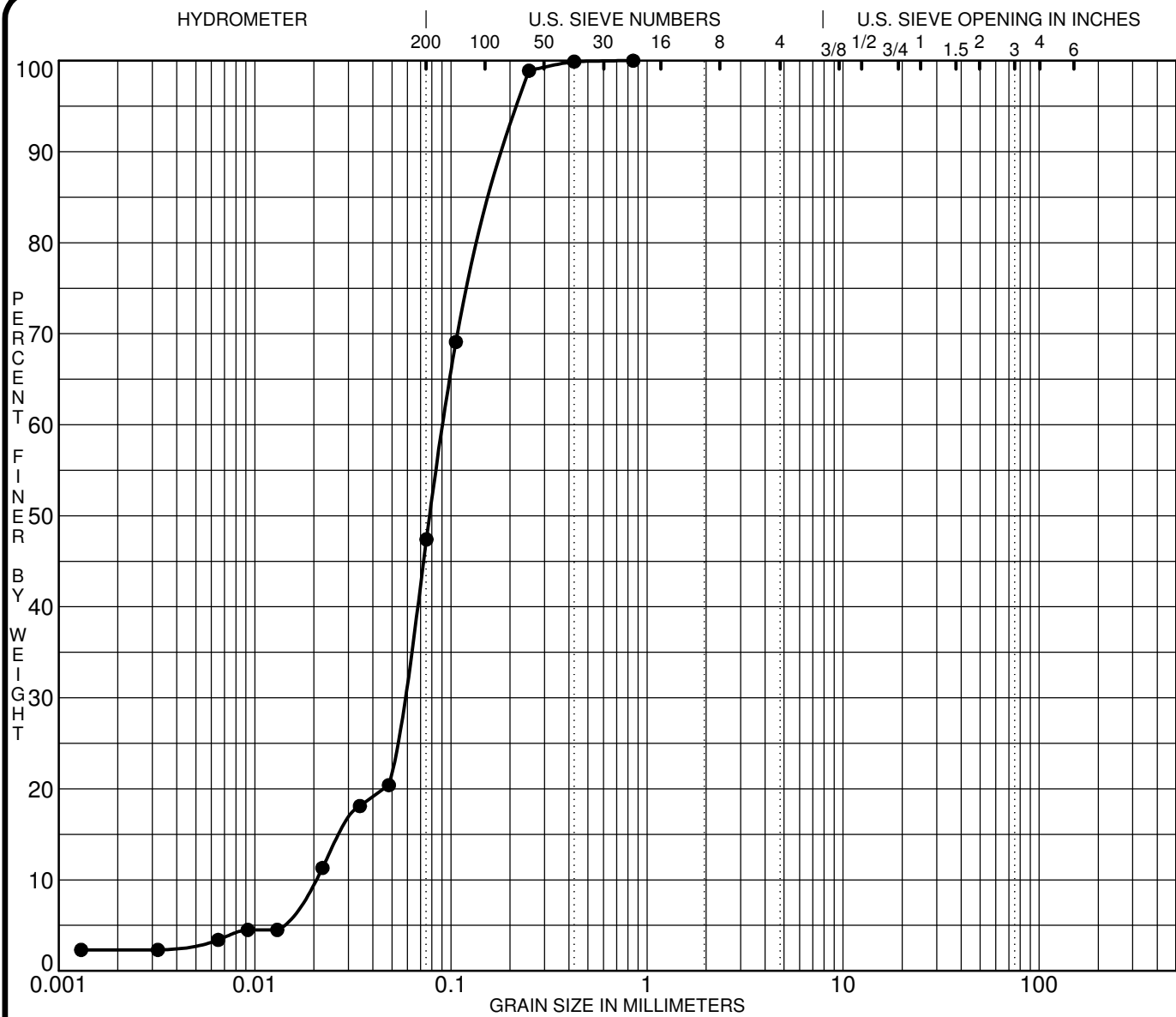
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION





SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH15-22	SS16	SILTY SAND				20.3				1.74	4.6
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH15-22	SS16	0.85	0.09	0.056	0.0200	0.0	52.6	45.4	2.0		
☒												
▲												
★												

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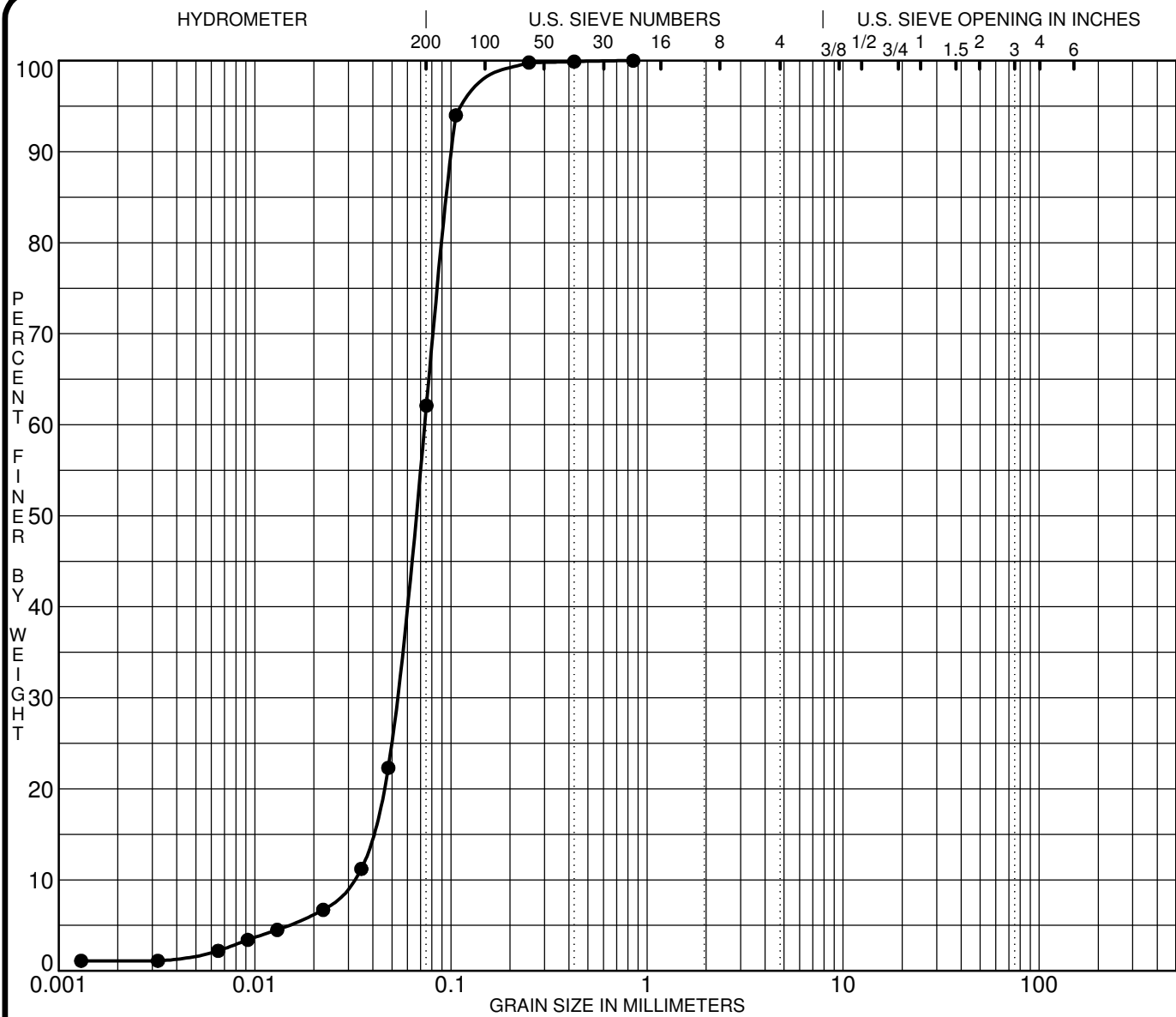
FILE NO. PG6197

DATE 6 Oct 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
●	BH16-22	SS12	SILTY SAND/SANDY SILT				24.7				1.20	2.4
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH16-22	SS12	0.85	0.07	0.052	0.0310	0.0	37.9	61.1	1.0		
☒												
▲												
★												

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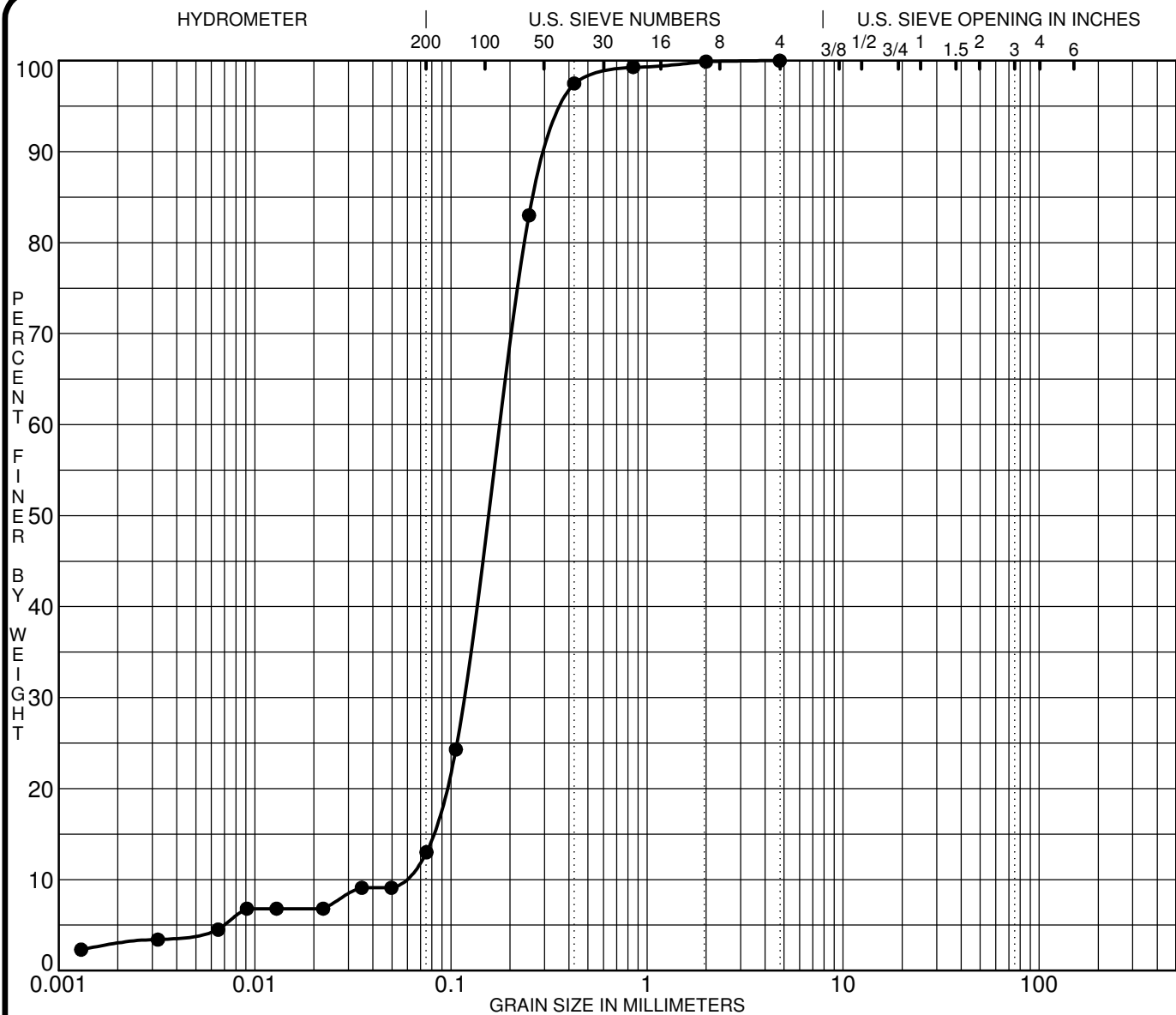
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DATE 6 Oct 22

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9 Auriga Drive, Ottawa, Ontario K2E 7T9

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

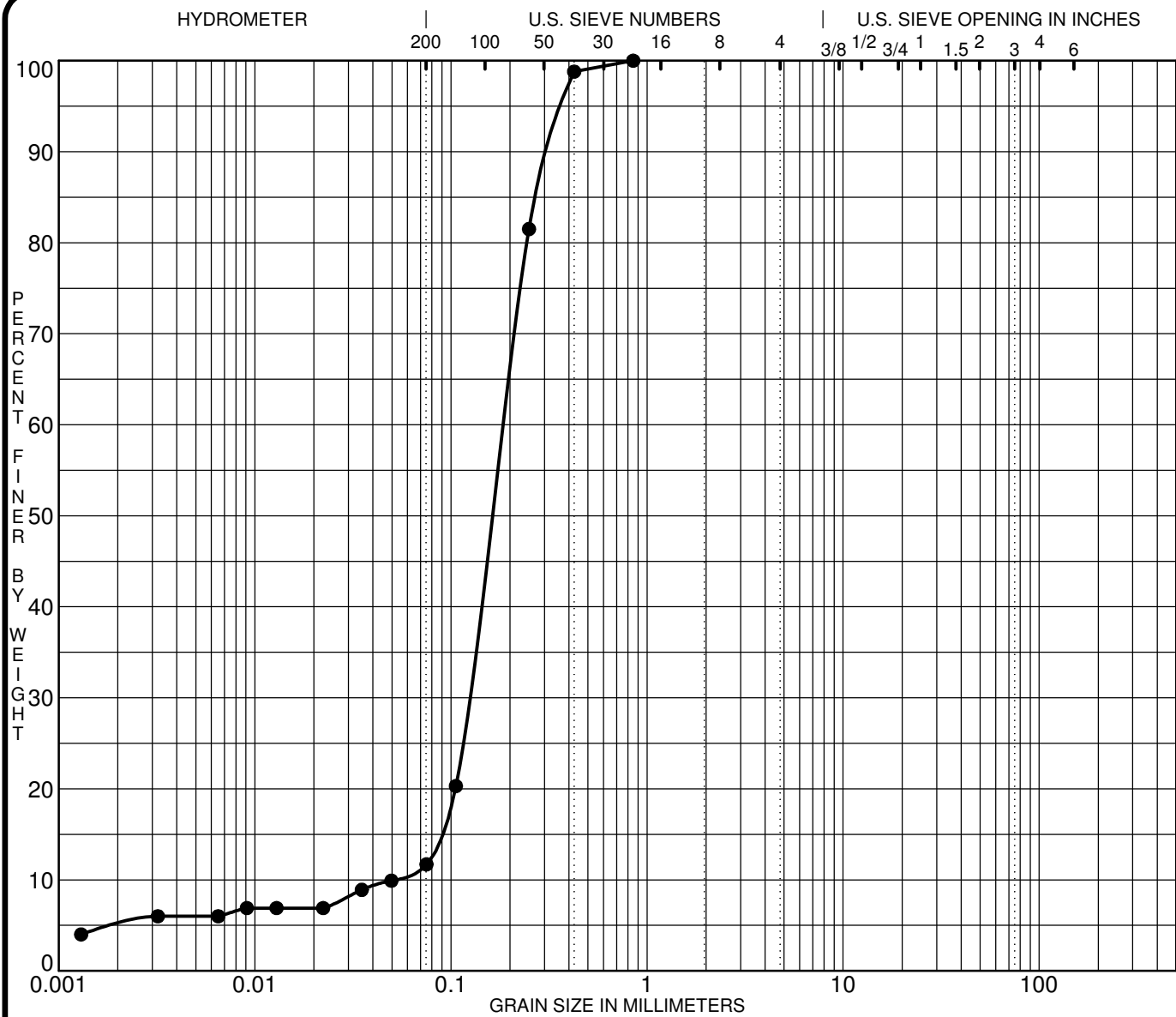
Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH17-22	SS12	SILTY SAND				21.9				1.36	3.3
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH17-22	SS12	4.75	0.18	0.115	0.0547	0.0	87.0	11.0	2.0		
☒												
▲												
★												

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FILE NO. PG6197
 DATE 6 Oct 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
●	BH18-22	SS13	SILTY SAND				6.2				1.57	3.6
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH18-22	SS13	0.85	0.18	0.121	0.0508	0.0	88.3	7.2	4.5		
☒												
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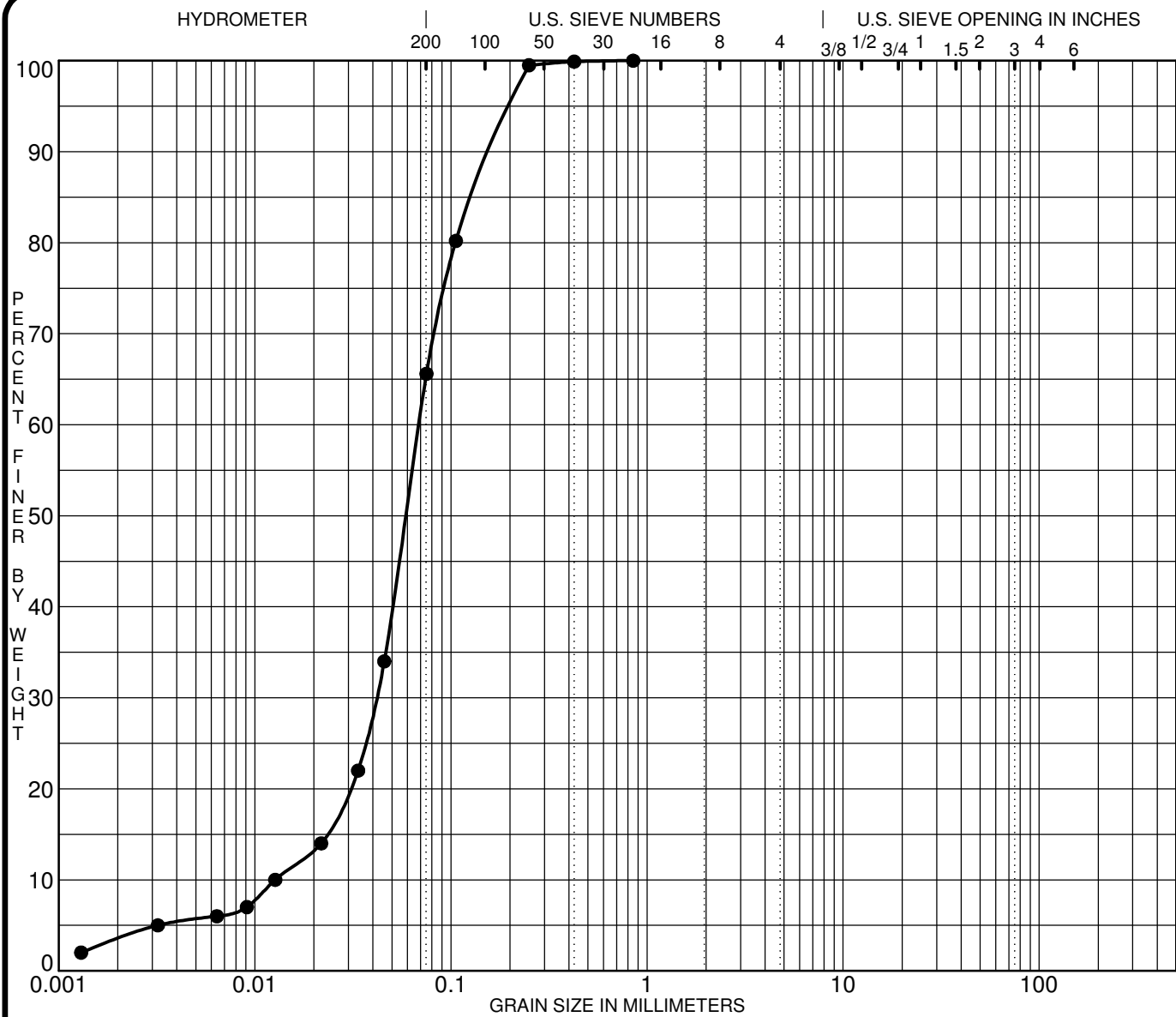
FILE NO. PG6197

DATE 7 Oct 22

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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 1-22	SS9	SILTY SAND/SANDY SILT				15.1				1.95	5.4
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH 1-22	SS9	0.85	0.07	0.041	0.0127	0.0	34.4	63.1	2.5		
☒												
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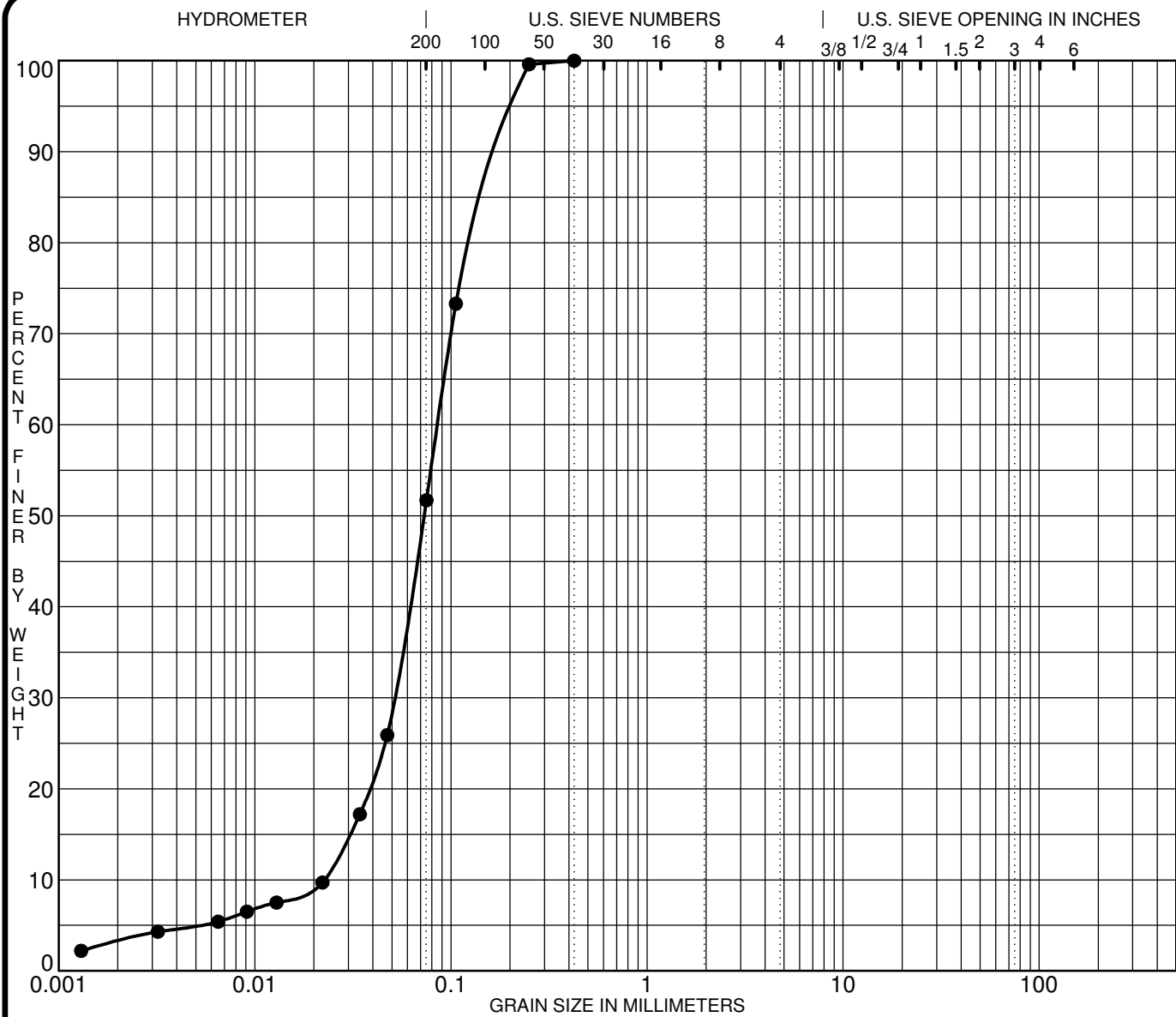
FILE NO. PG6197

DATE 11 Apr 22

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH 5-22	SS7	SILTY SAND/SANDY SILT				21.1				1.34	3.8
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH 5-22	SS7	0.43	0.09	0.051	0.0225	0.0	48.3	49.7	2.0		
☒												
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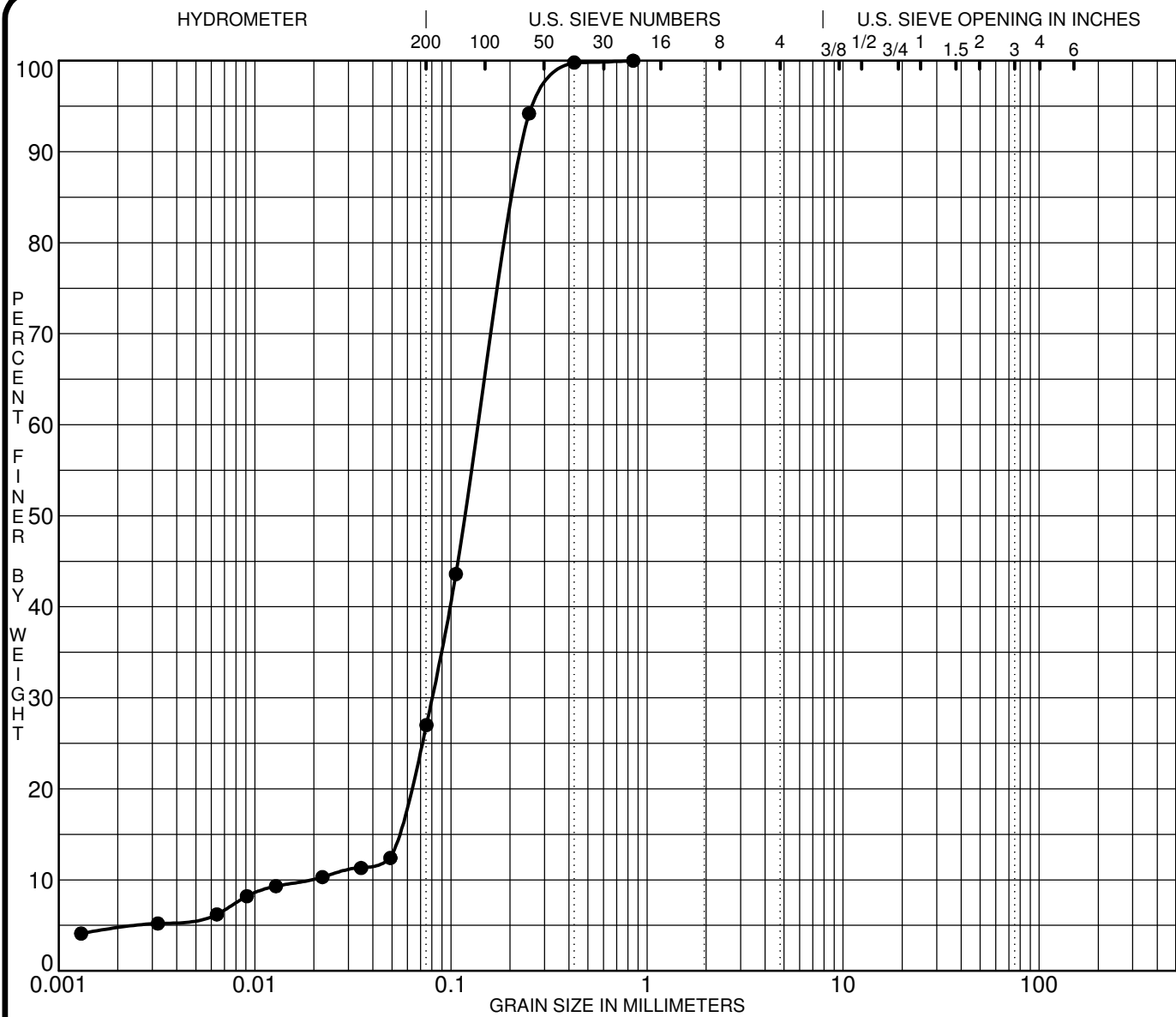
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DATE 12 Apr 22

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH 8-22	SS8	Silty Sand				20.3				2.43	7.5
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH 8-22	SS8	0.85	0.14	0.080	0.0188	0.0	73.0	23.0	4.0		
☒												
▲												
★												

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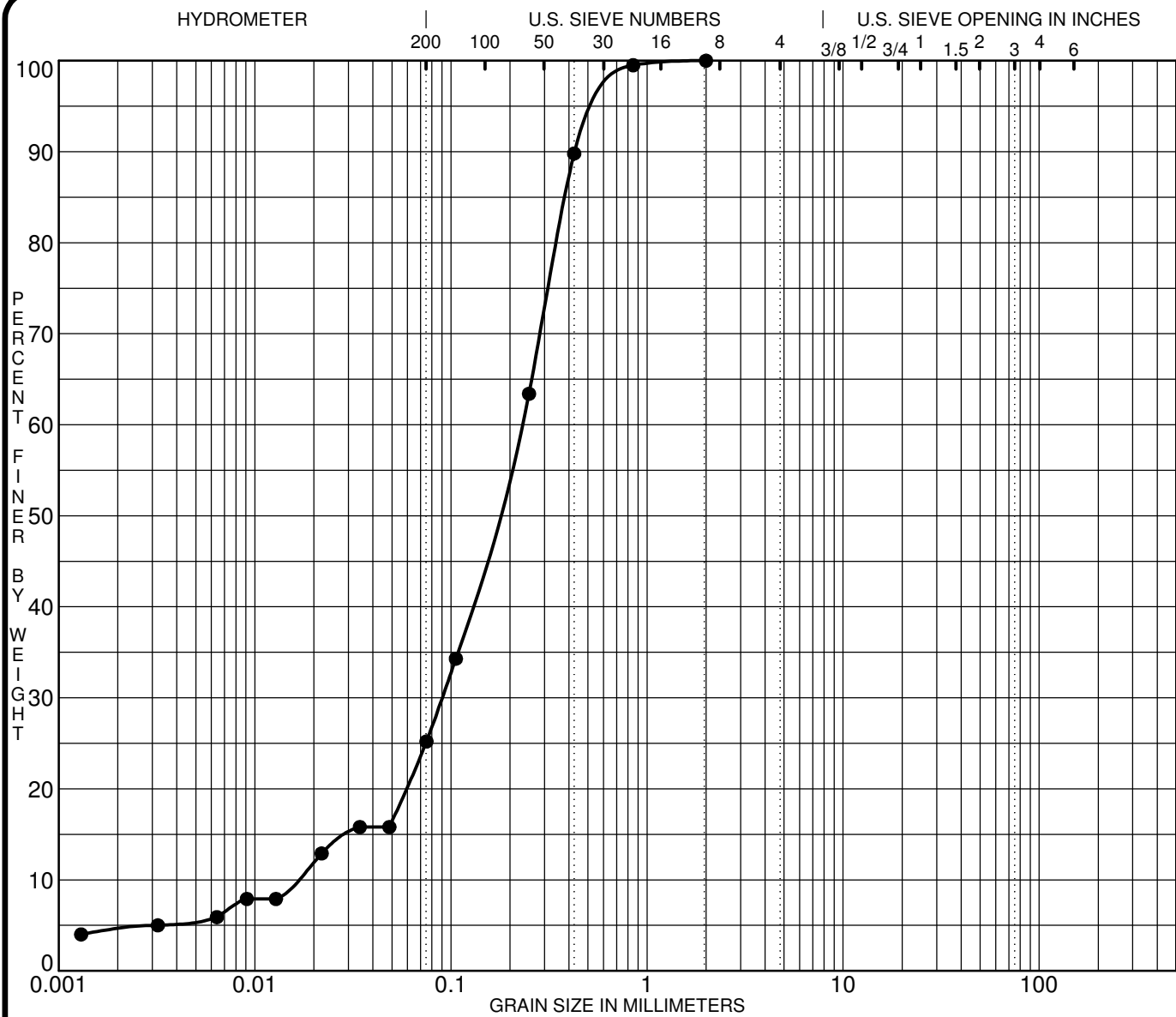
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DATE 13 Apr 22

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GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH10-22	SS9	Silty Sand				14.0				2.23	14.1
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH10-22	SS9	2.00	0.23	0.090	0.0160	0.0	74.8	21.2	4.0		
☒												
▲												
★												

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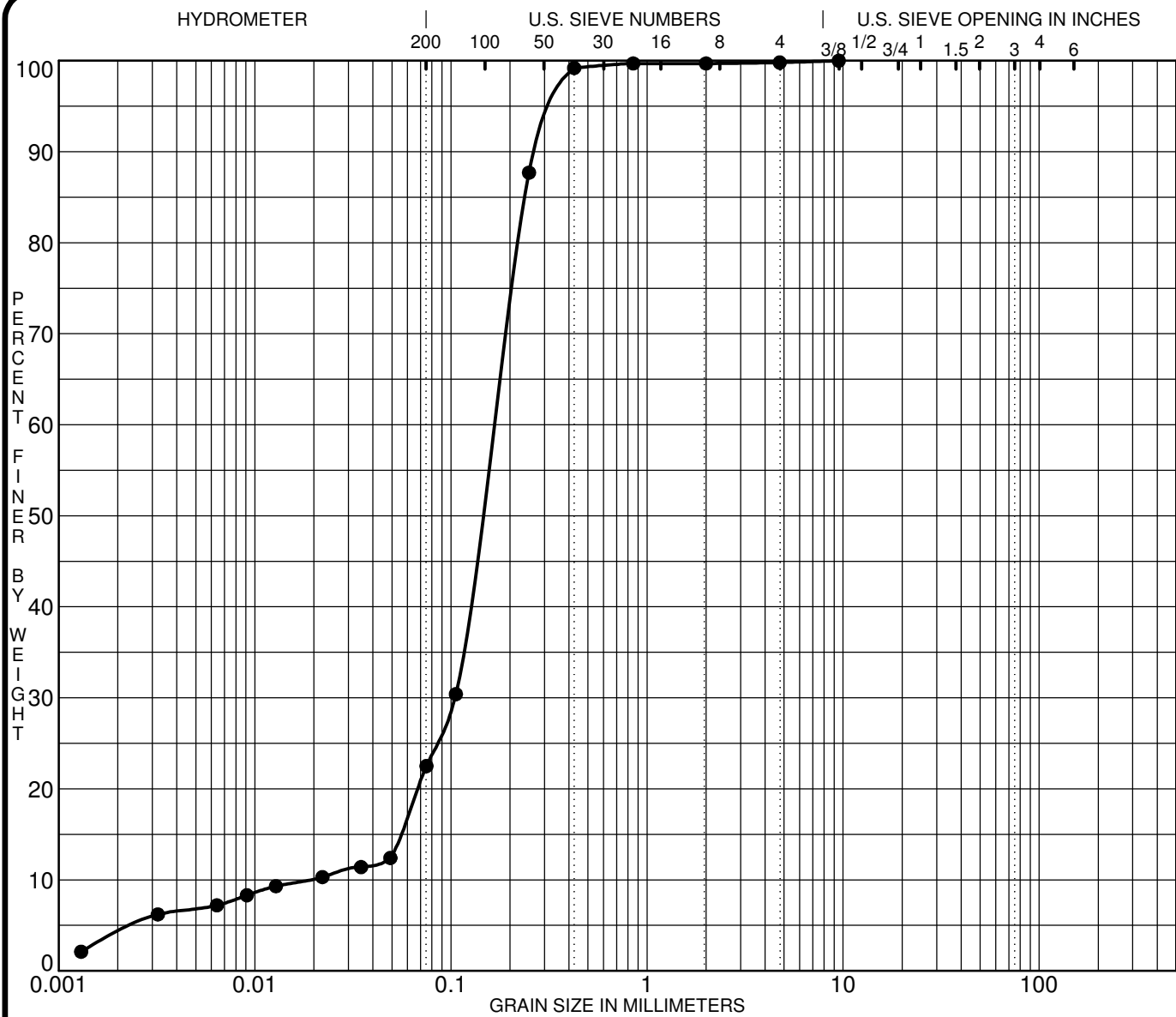
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DATE 14 Apr 22

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH13-22	SS10	SILTY SAND				18.5				3.50	8.8
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH13-22	SS10	9.50	0.17	0.104	0.0188	0.2	77.3	19.5	3.0		
☒												
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Development - 3882 Barnsdale Road

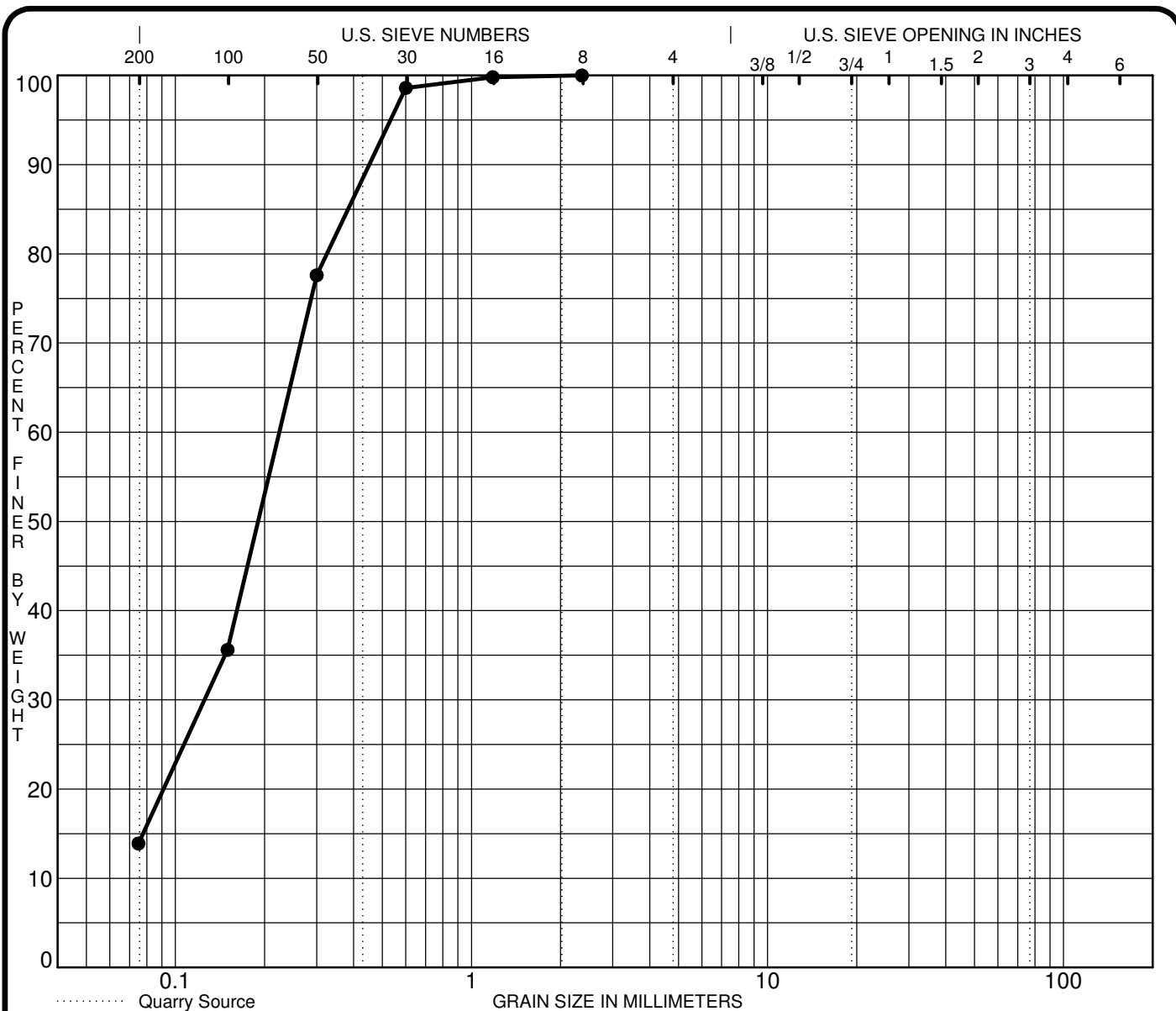
FILE NO. PG6197

DATE 18 Apr 22

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH 2-15	SS 7	(SM) SILTY SAND									
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	BH 2-15	SS 7	2.36	0.22	0.125		0.0	86.1	13.9			
☒												
▲												
★												

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PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

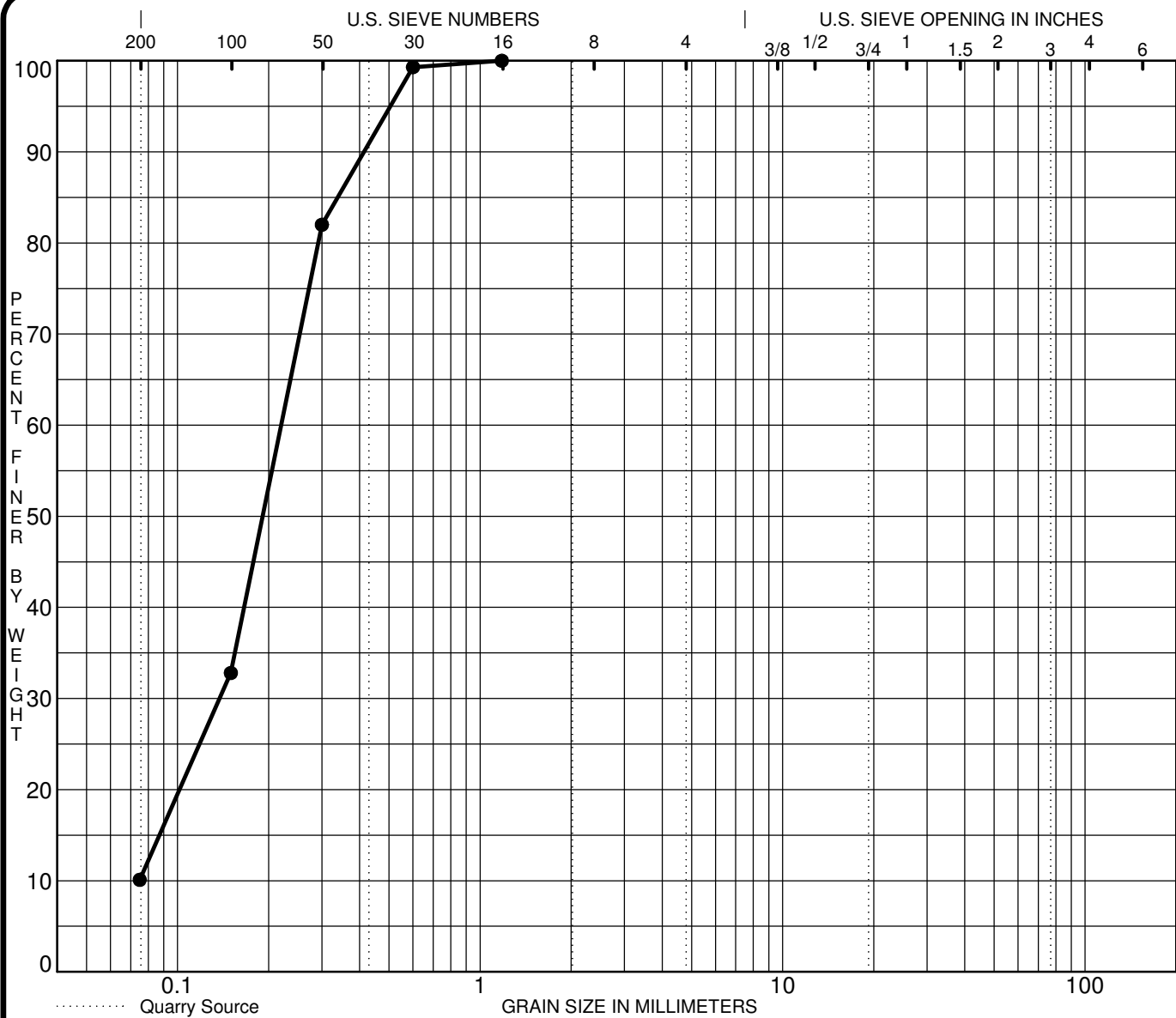
FILE NO. PG3607

DATE 30 Nov 15

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH 9-15	SS 8	(SP-SM) Poorly-graded SAND with silt								1.15	2.9
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	BH 9-15	SS 8	1.18	0.22	0.138		0.0	89.9	10.1			
☒												
▲												
★												

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PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

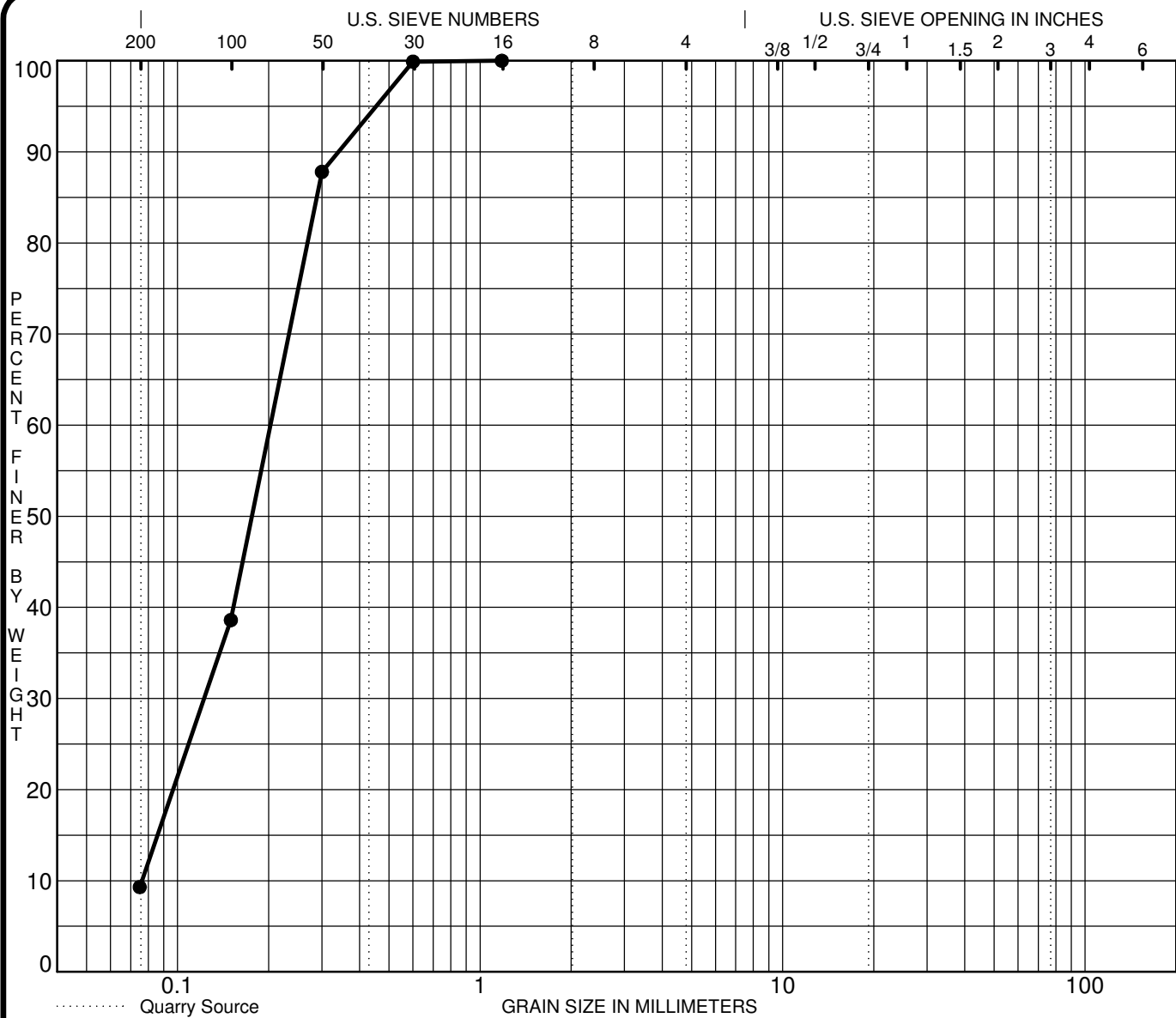
FILE NO. PG3607

DATE 7 Dec 15

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	BH14-15 SS 11	(SP-SM) Poorly-graded SAND with silt								0.97	2.7
☒											
▲											
★											
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	BH14-15 SS 11	1.18	0.20	0.122	0.0763	0.0	90.7	9.3			
☒											
▲											
★											

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PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

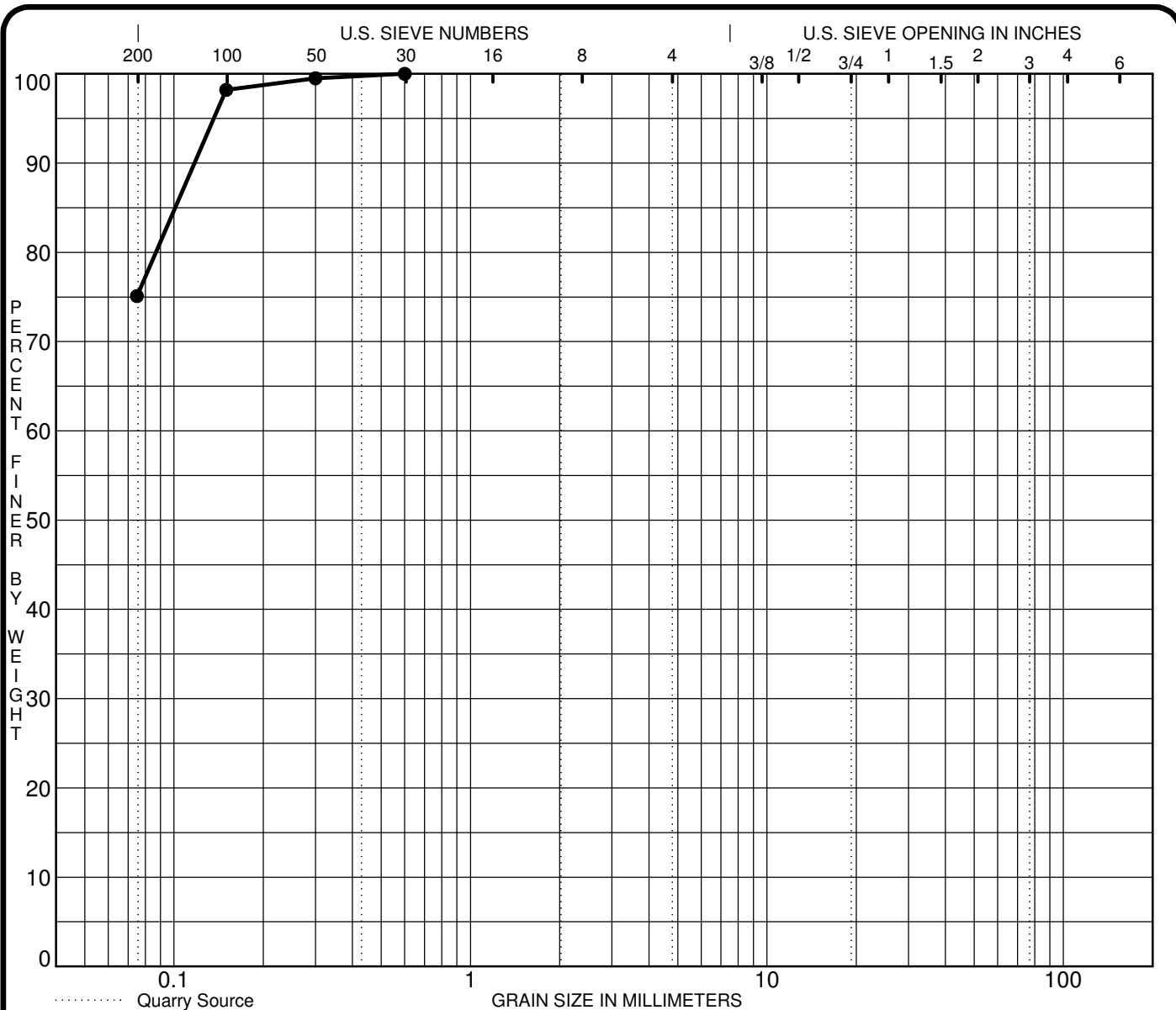
FILE NO. PG3607

DATE 7 Dec 15

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



Specimen Identification	Classification				MC%	LL	PL	PI	Cc	Cu
● BH18-15SS 11&13	(ML) SILT with sand									
☒										
▲										
★										
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● BH18-15SS 11&13	0.60				0.0	24.9	75.1			
☒										
▲										
★										

CLIENT Regional Group of Companies

PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

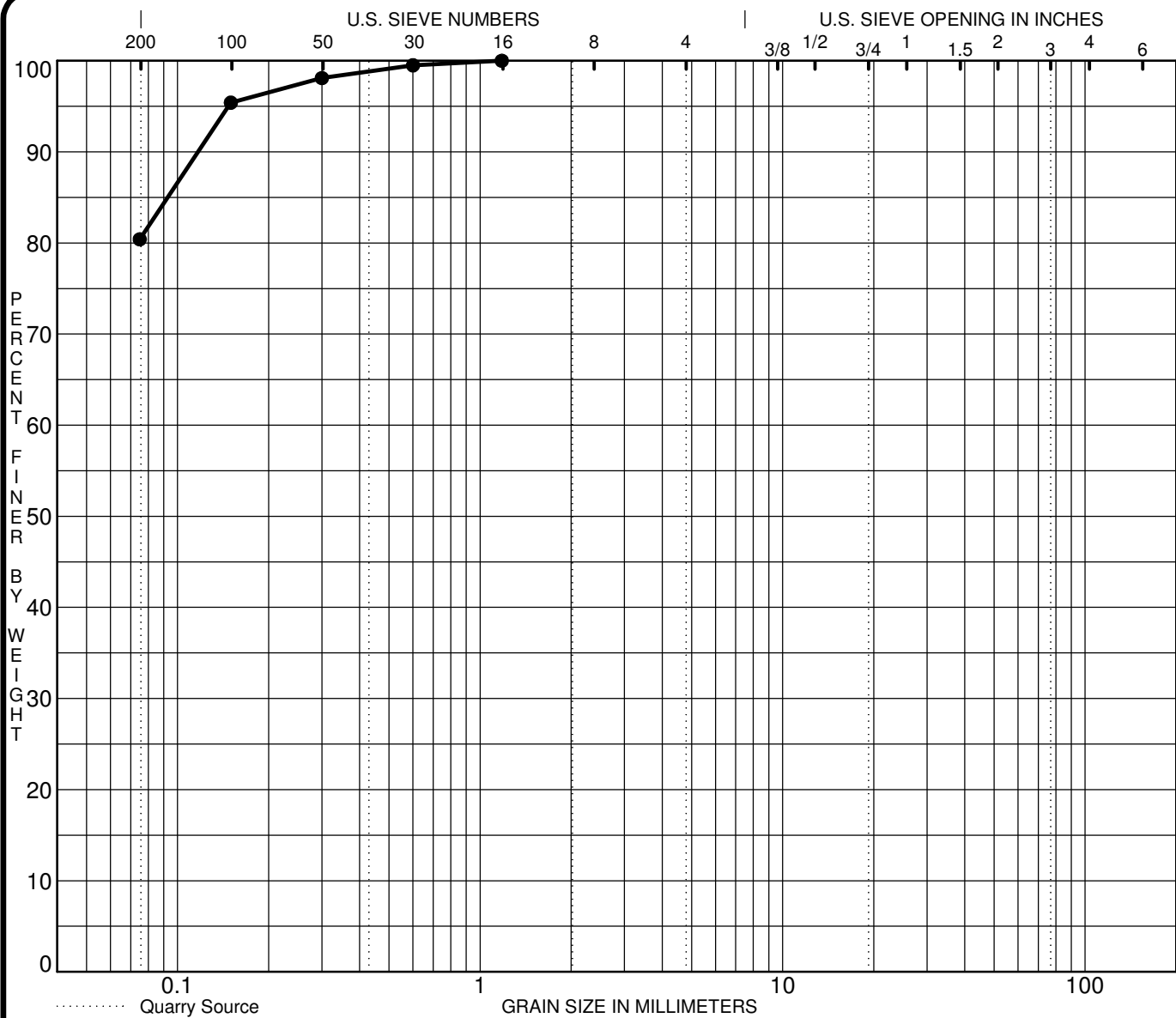
FILE NO. PG3607

DATE 8 Dec 15

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH19-15	SS 12	(ML) SILT with sand									
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	BH19-15	SS 12	1.18				0.0	19.6	80.4			
☒												
▲												
★												

CLIENT Regional Group of Companies

PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

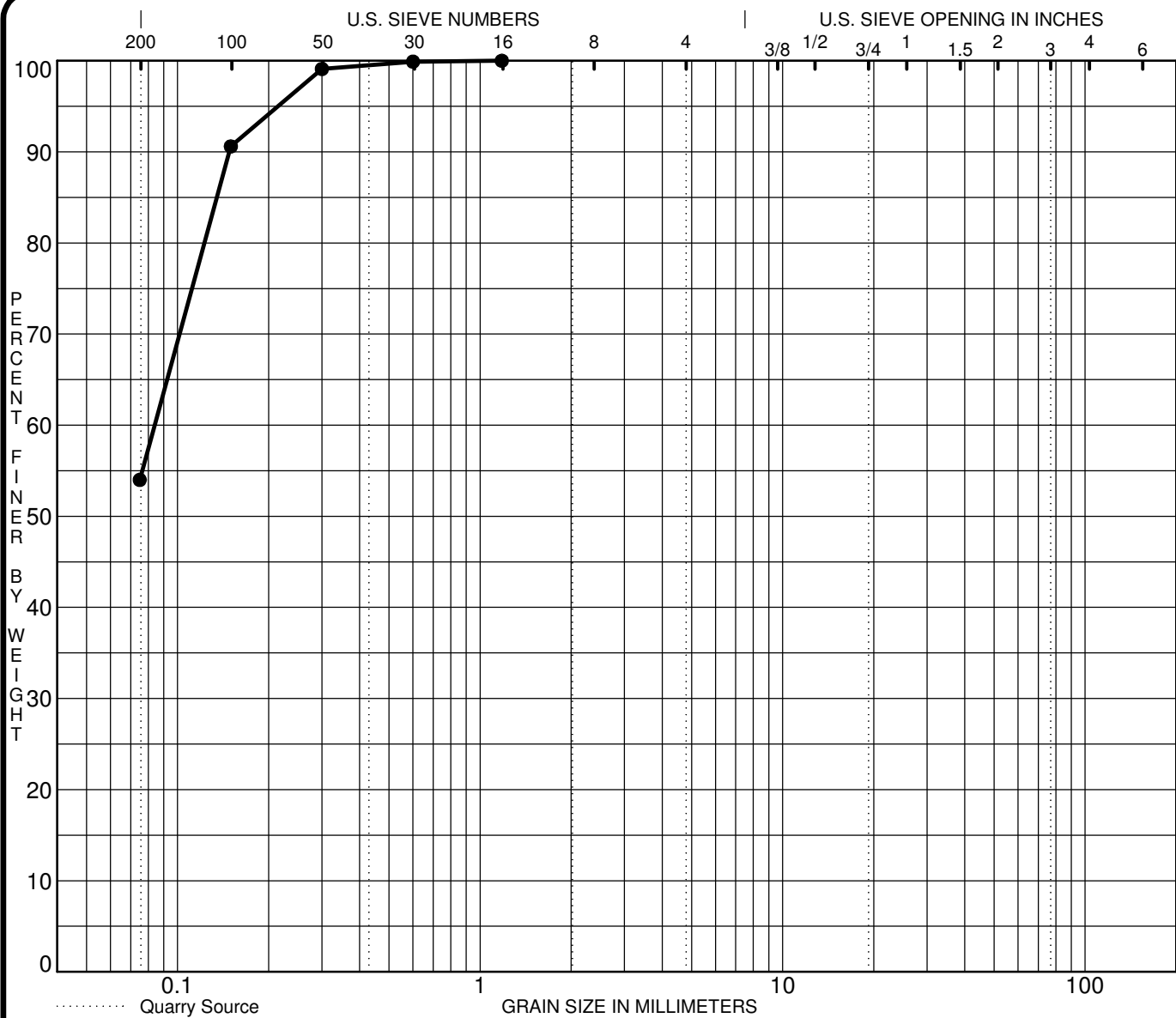
FILE NO. PG3607

DATE 18 Dec 15

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	BH25-15	SS 6	(ML) SANDY SILT									
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	BH25-15	SS 6	1.18	0.08			0.0	46.0	54.0			
☒												
▲												
★												

CLIENT Regional Group of Companies

PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

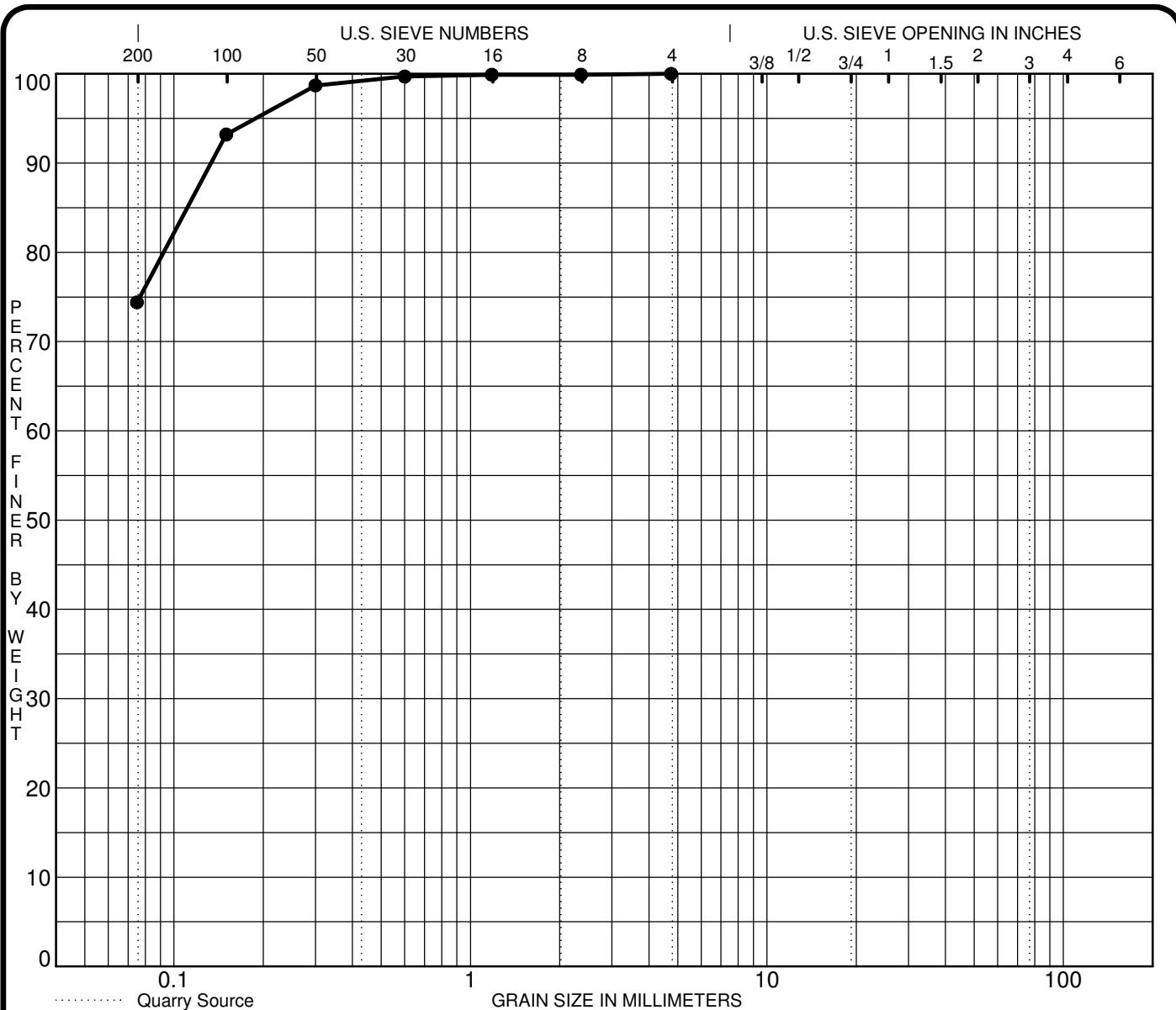
FILE NO. PG3607

DATE 1 Dec 15

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification	Classification				MC%	LL	PL	PI	Cc	Cu
● BH26-15 SS 7&8	(ML) SILT with sand									
☒										
▲										
★										
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● BH26-15 SS 7&8	4.75				0.0	25.6	74.4			
☒										
▲										
★										

CLIENT Regional Group of Companies

PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

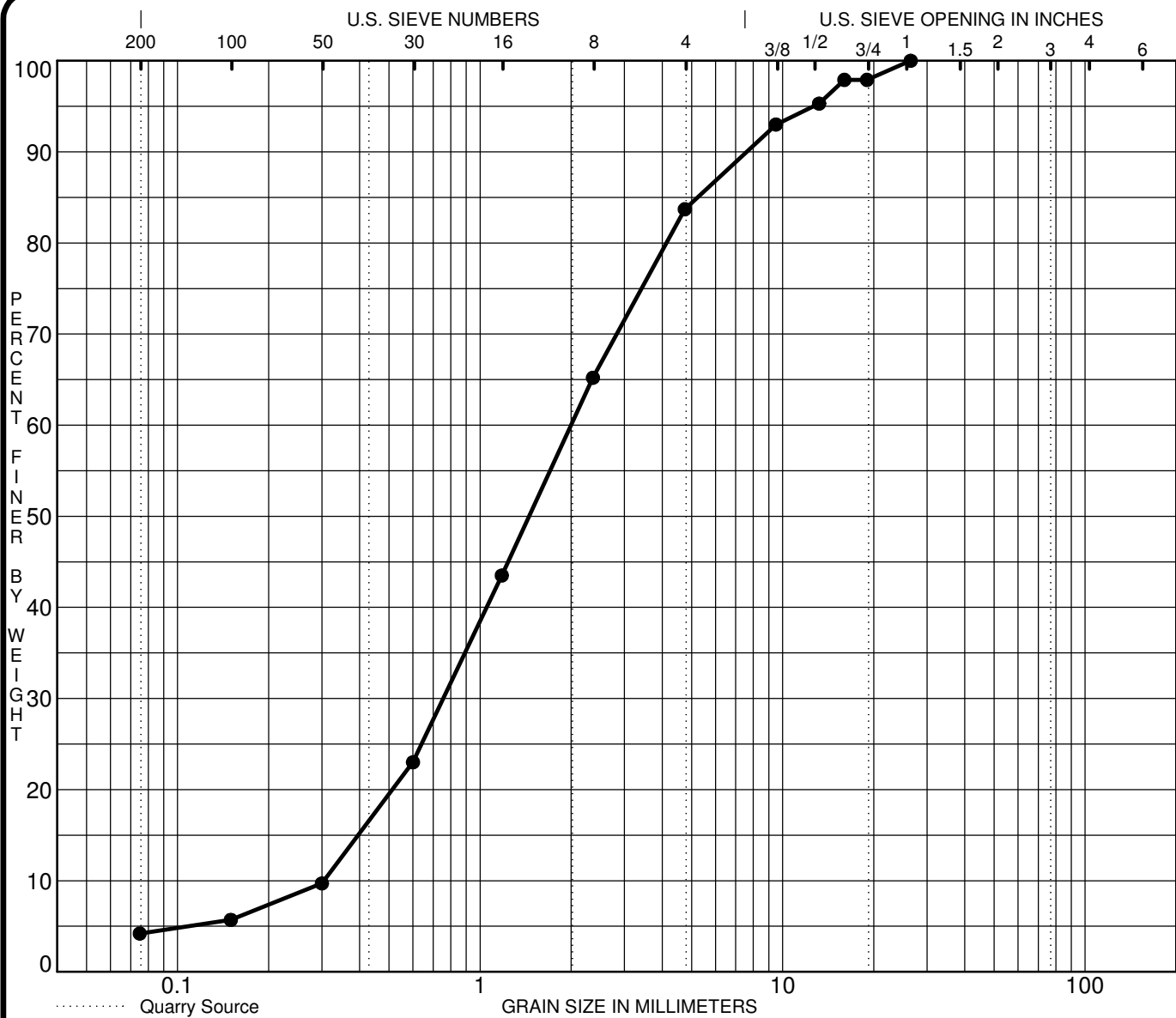
FILE NO. PG3607

DATE 8 Dec 15

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 7-15	G 2	(SP) Poorly-graded SAND with gravel								0.94	6.6
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 7-15	G 2	26.50	2.00	0.756	0.3047	16.3	79.5	4.2			
☒												
▲												
★												

CLIENT Regional Group of Companies

PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

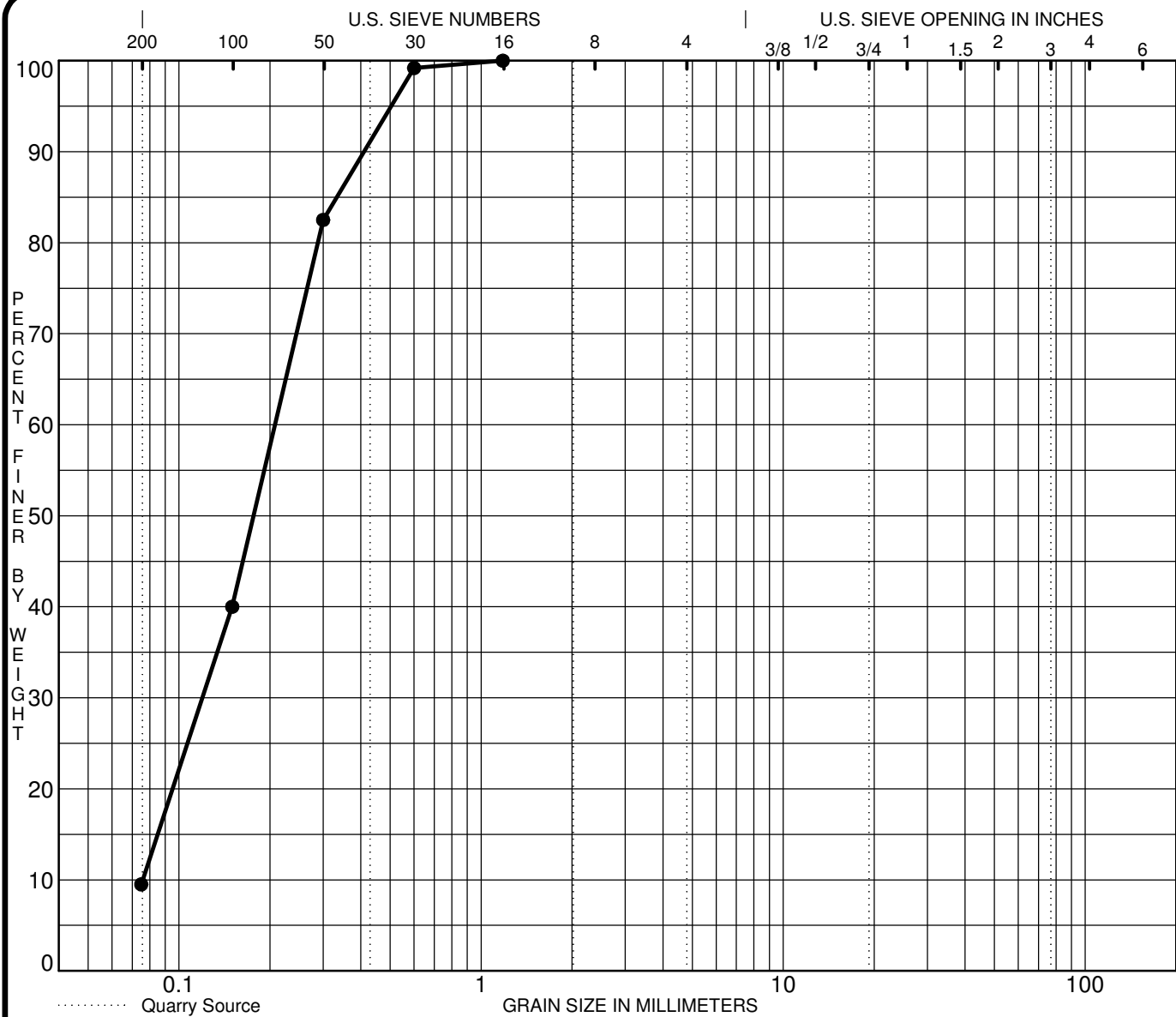
FILE NO. PG3607

DATE 1 Dec 15

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 35-15	G 2	(SP-SM) Poorly-graded SAND with silt								0.91	2.7
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 35-15	G 2	1.18	0.21	0.120	0.0759	0.0	90.5	9.5			
☒												
▲												
★												

CLIENT Regional Group of Companies

PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

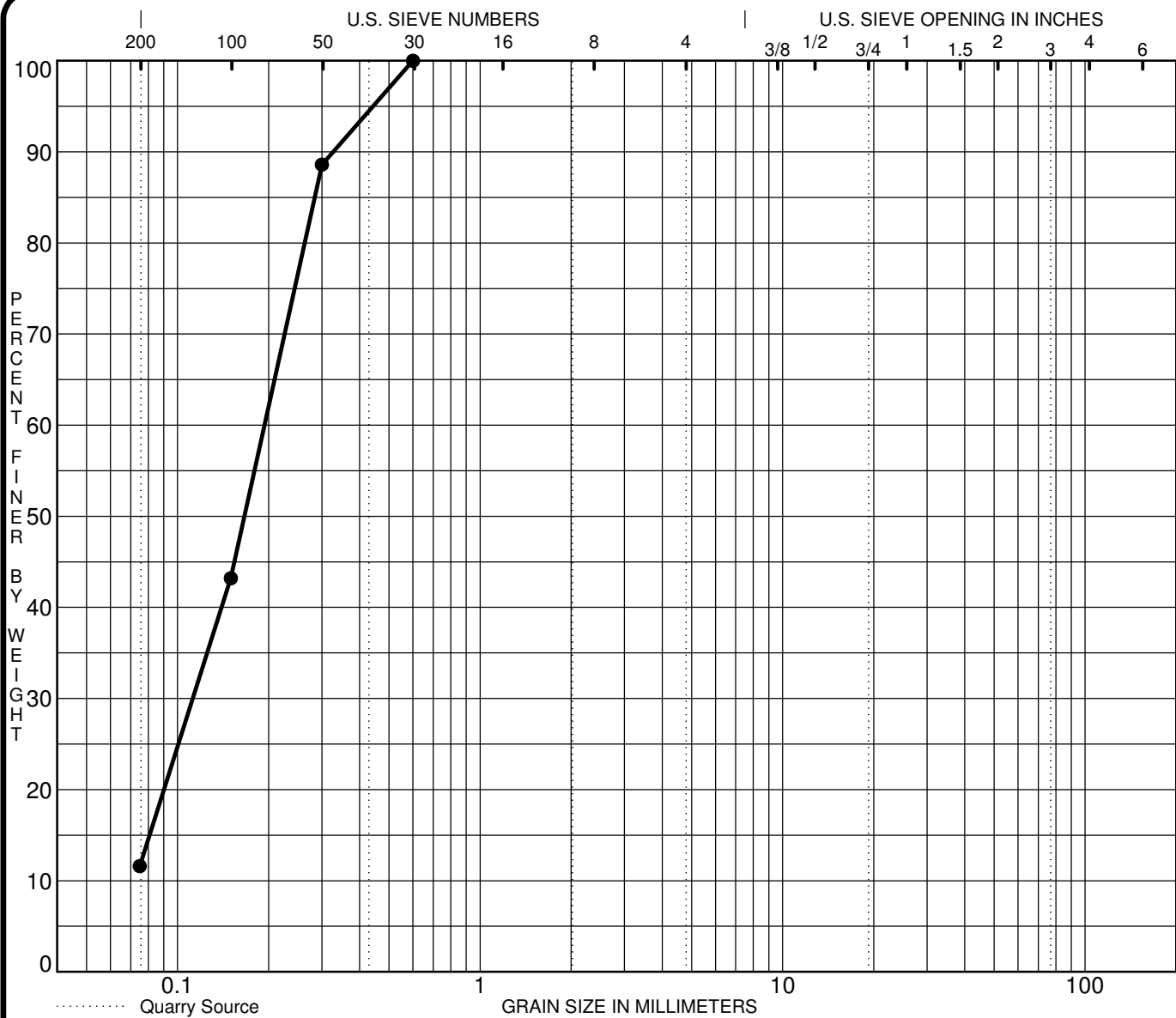
FILE NO. PG3607

DATE 23 Nov 15

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification			Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 55-15	G 2	(SP-SM) Poorly-graded SAND with silt								0.90	2.7
☒												
▲												
★												
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 55-15	G 2	0.60	0.19	0.112		0.0	88.4	11.6			
☒												
▲												
★												

CLIENT Regional Group of Companies

PROJECT Geotechnical Investigation - Barrhaven South

Urban Expansion

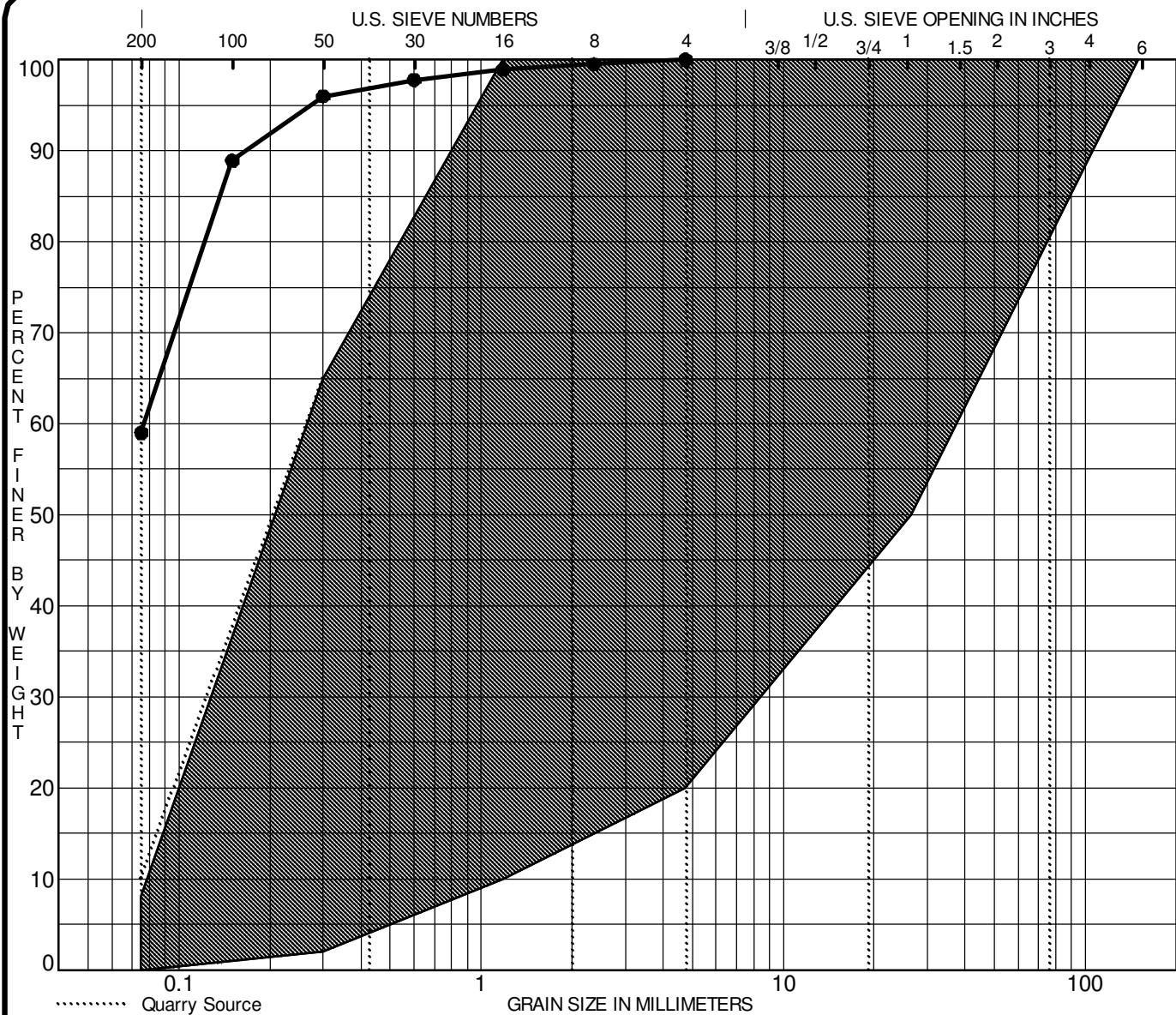
FILE NO. PG3607

DATE 30 Nov 15

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION



Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 3-11 G6	SANDY SILT									
☒											
▲											
★											
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 3-11 G6	4.75	0.08			0.0	41.0	59.0			
☒											
▲											
★											

CLIENT Minto Communities Inc.

PROJECT Mineral Resource Aggregate Assessment - 3882

Barnsdale Road

FILE NO. PH1893

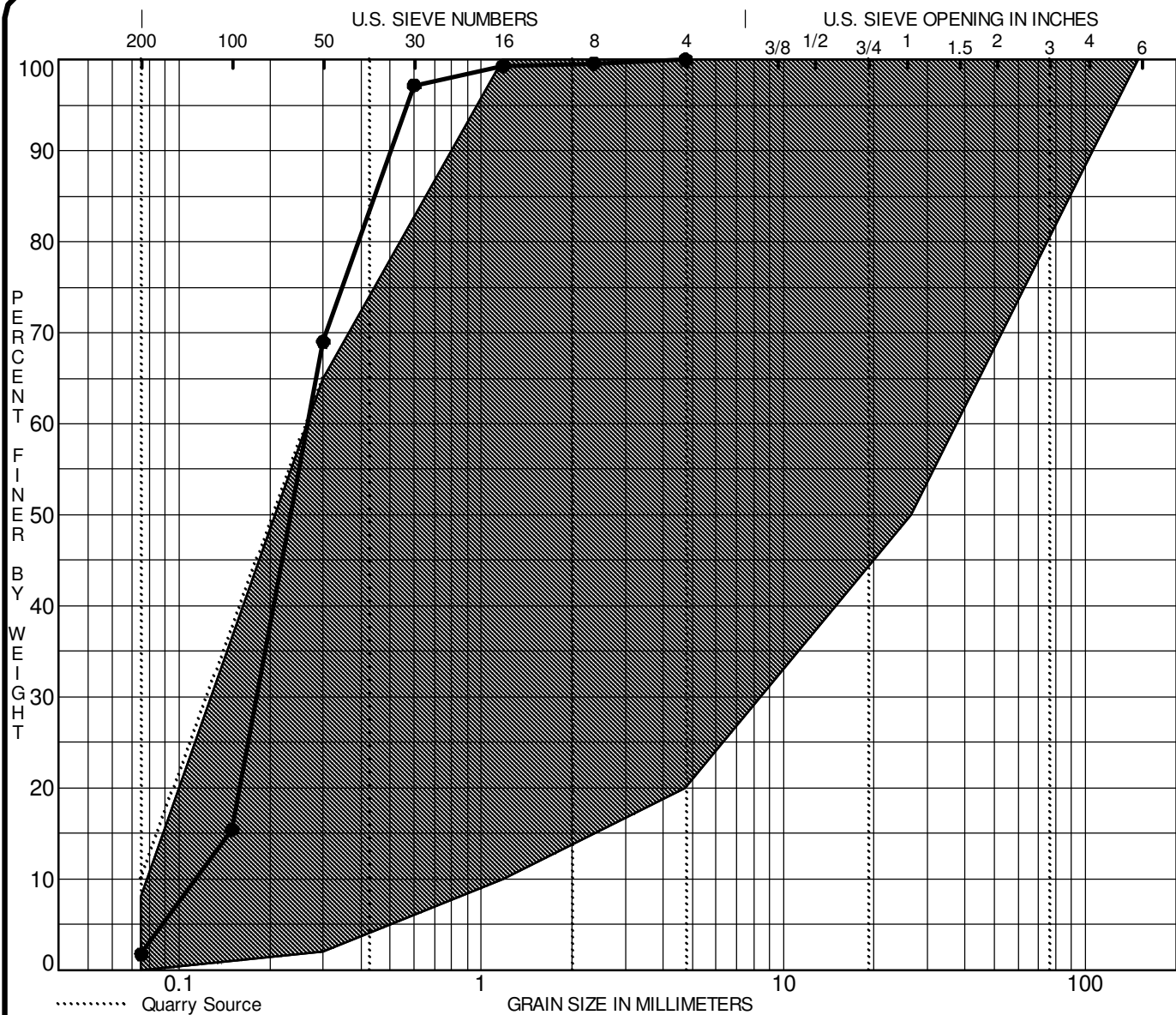
DATE 16 Dec 11

patersongroup

Consulting
Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

**GRAIN SIZE
DISTRIBUTION**



Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 5-11 G11	FINE SAND								1.08	2.3
☒											
▲											
★											
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 5-11 G11	4.75	0.27	0.181	0.1141	0.0	98.3	1.7			
☒											
▲											
★											

CLIENT Minto Communities Inc.

PROJECT Mineral Resource Aggregate Assessment - 3882

Barnsdale Road

FILE NO. PH1893

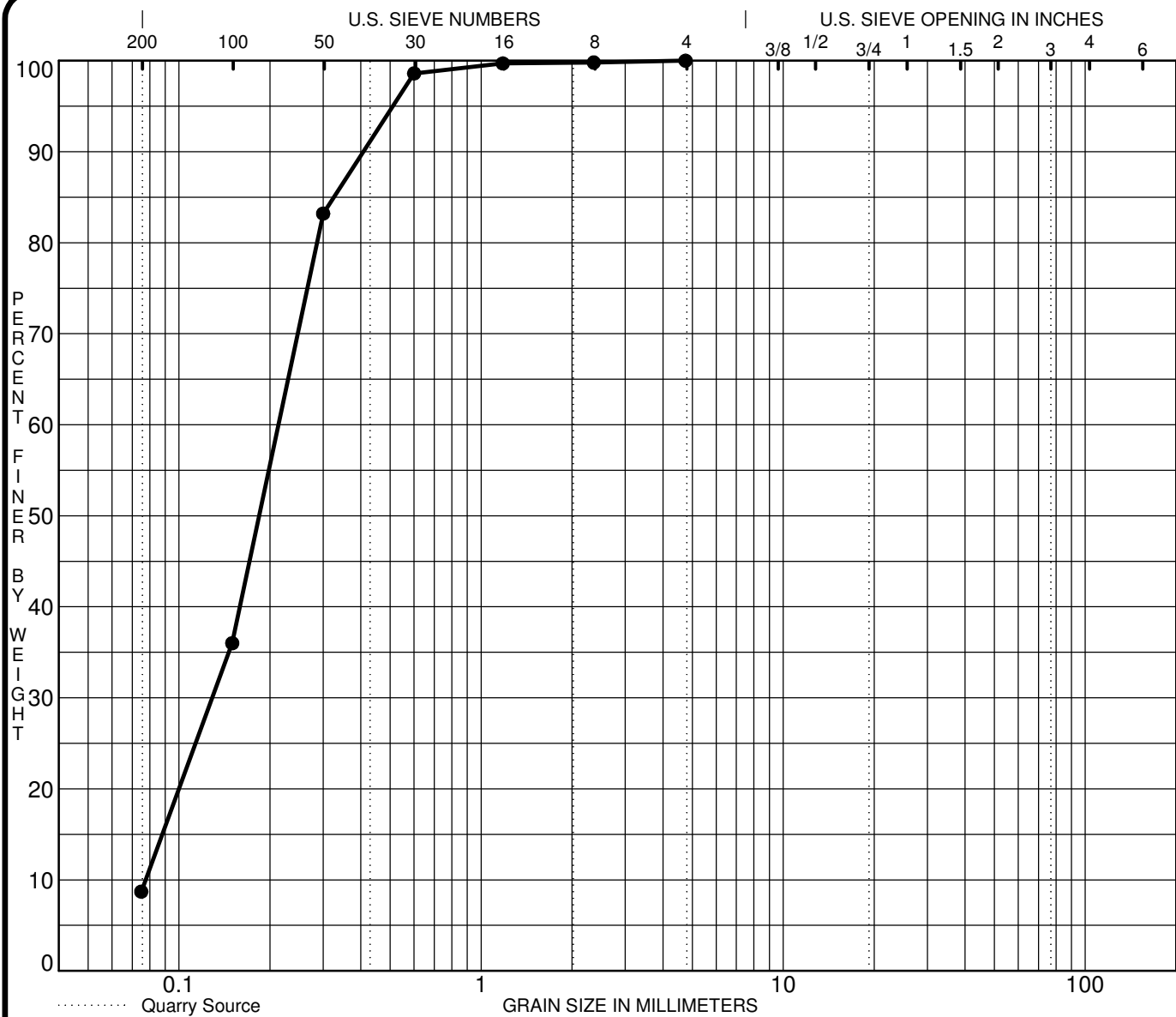
DATE 16 Dec 11

patersongroup

Consulting
Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

**GRAIN SIZE
DISTRIBUTION**



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 4 G 1	SAND								1.00	2.8
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 4 G 1	4.75	0.21	0.129	0.0775	0.0	91.3	8.7			

CLIENT Mr. Dan Paquette

PROJECT Aggregate Resource Investigation - Greenbank

Road/Cedarview Road

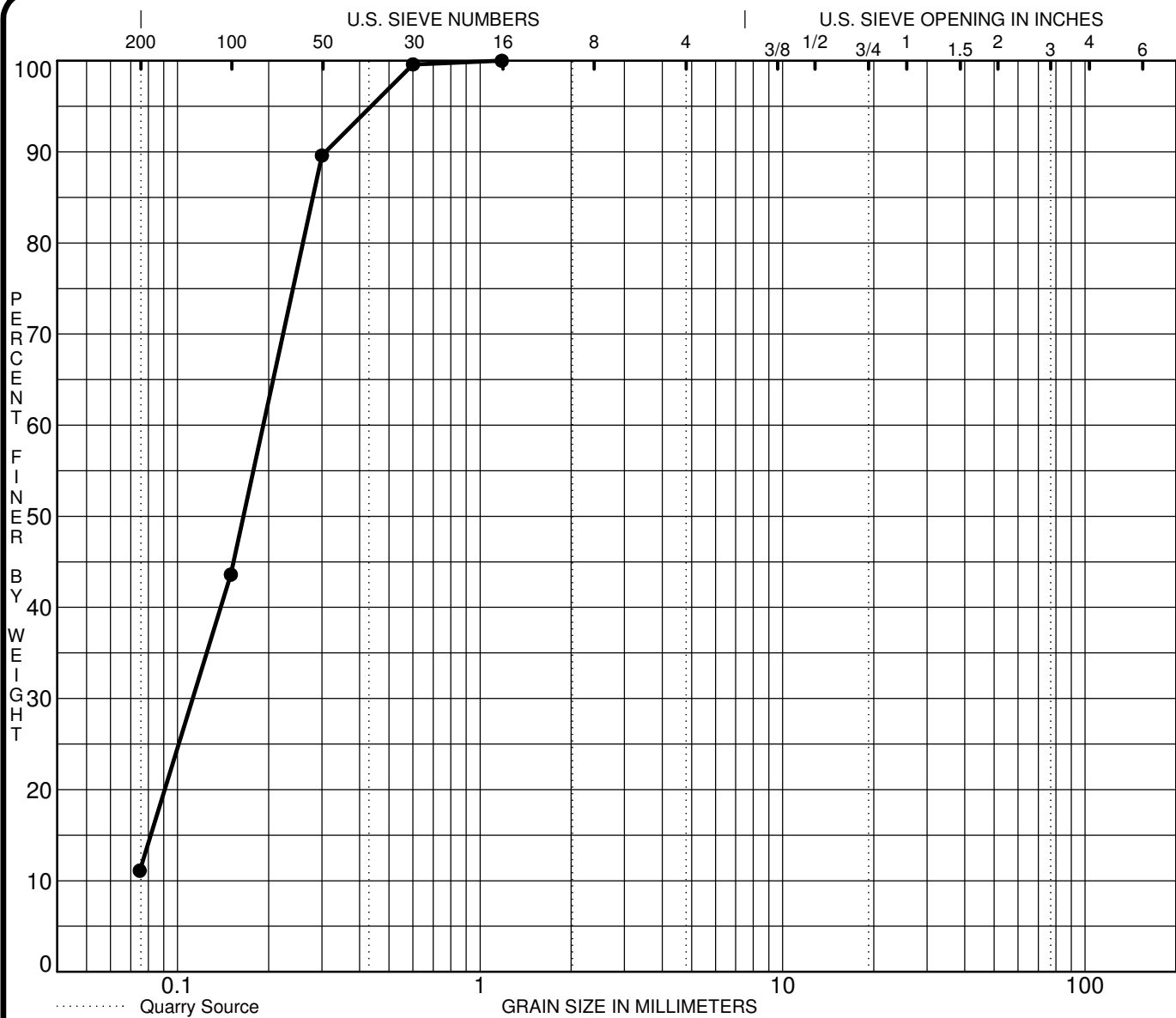
FILE NO. G9114

DATE Oct 23, 03

patersongroup Consulting Engineers

28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 4 G 2	SAND								0.90	2.6
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 4 G 2	1.18	0.19	0.112		0.0	88.9	11.1			

CLIENT Mr. Dan Paquette

PROJECT Aggregate Resource Investigation - Greenbank

Road/Cedarview Road

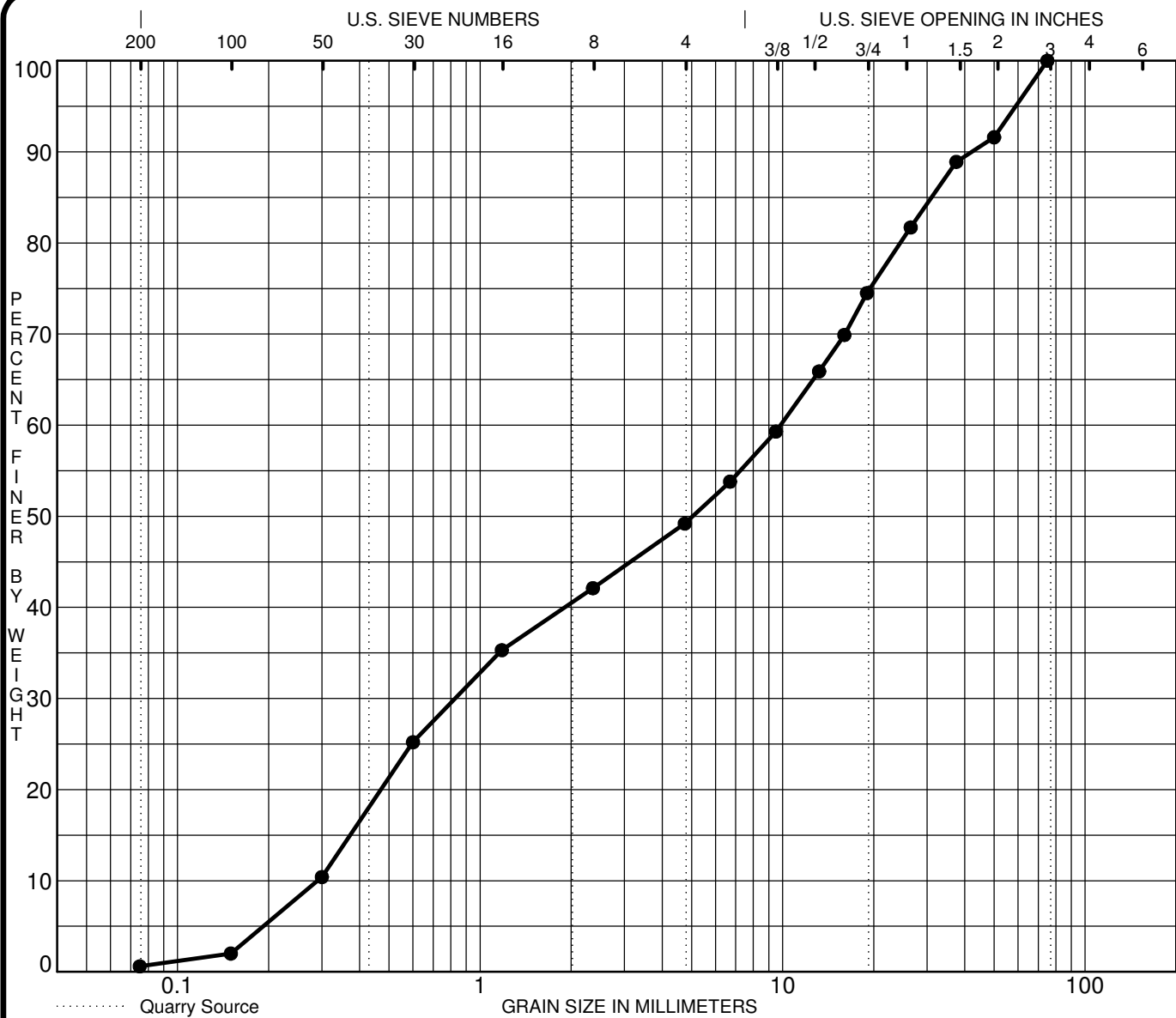
FILE NO. G9114

DATE Oct 23, 03

patersongroup Consulting Engineers

28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 7 G 1	GRANULAR B TYPE I								0.24	33.9
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 7 G 1	75.00	9.84	0.827	0.2903	50.8	48.6	0.6			

CLIENT Mr. Dan Paquette

PROJECT Aggregate Resource Investigation - Greenbank

Road/Cedarview Road

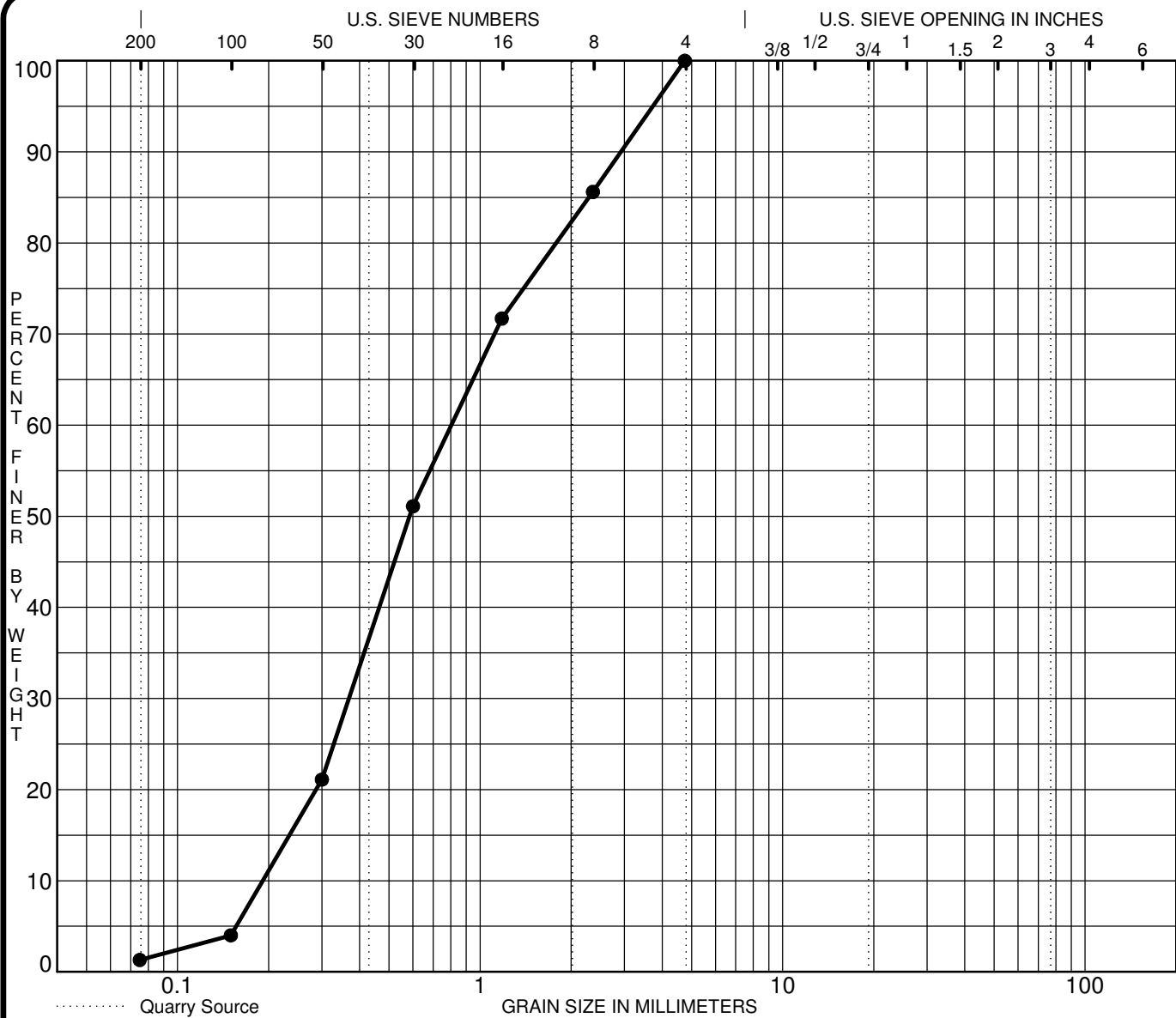
FILE NO. G9114

DATE Oct 29, 03

patersongroup Consulting Engineers

28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 7	G 1	SAND (after screening on 4.75mm)							0.88	4.2
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 7	G 1	4.75	0.80	0.368	0.1913	0.0	98.7	1.3		

CLIENT Mr. Dan Paquette

PROJECT Aggregate Resource Investigation - Greenbank

Road/Cedarview Road

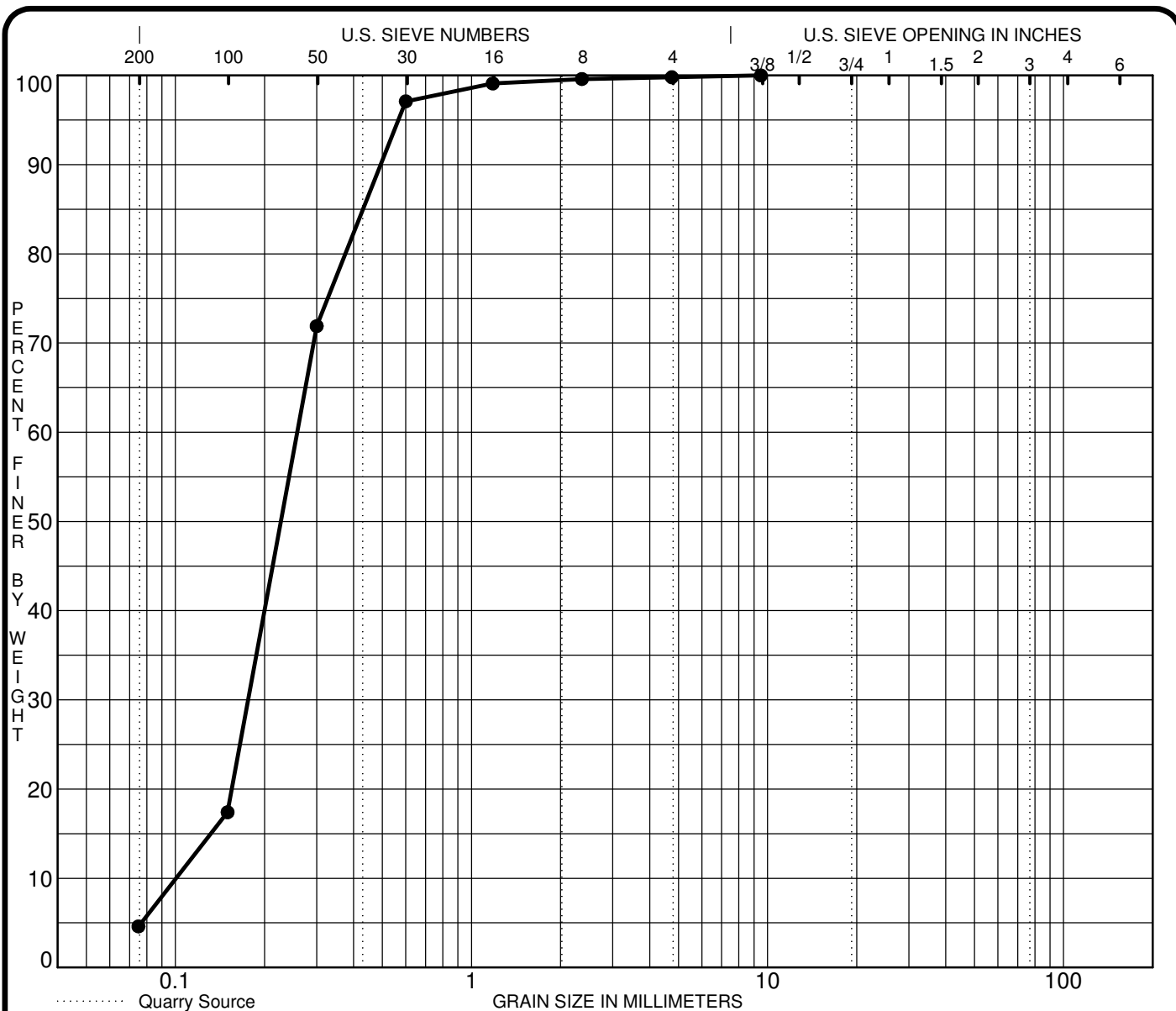
FILE NO. G9114

DATE Oct 29, 03

patersongroup Consulting Engineers

28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 7 G 2	SAND								1.20	2.6
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 7 G 2	9.50	0.26	0.176	0.1005	0.2	95.2	4.6			

CLIENT Mr. Dan Paquette

PROJECT Aggregate Resource Investigation - Greenbank

Road/Cedarview Road

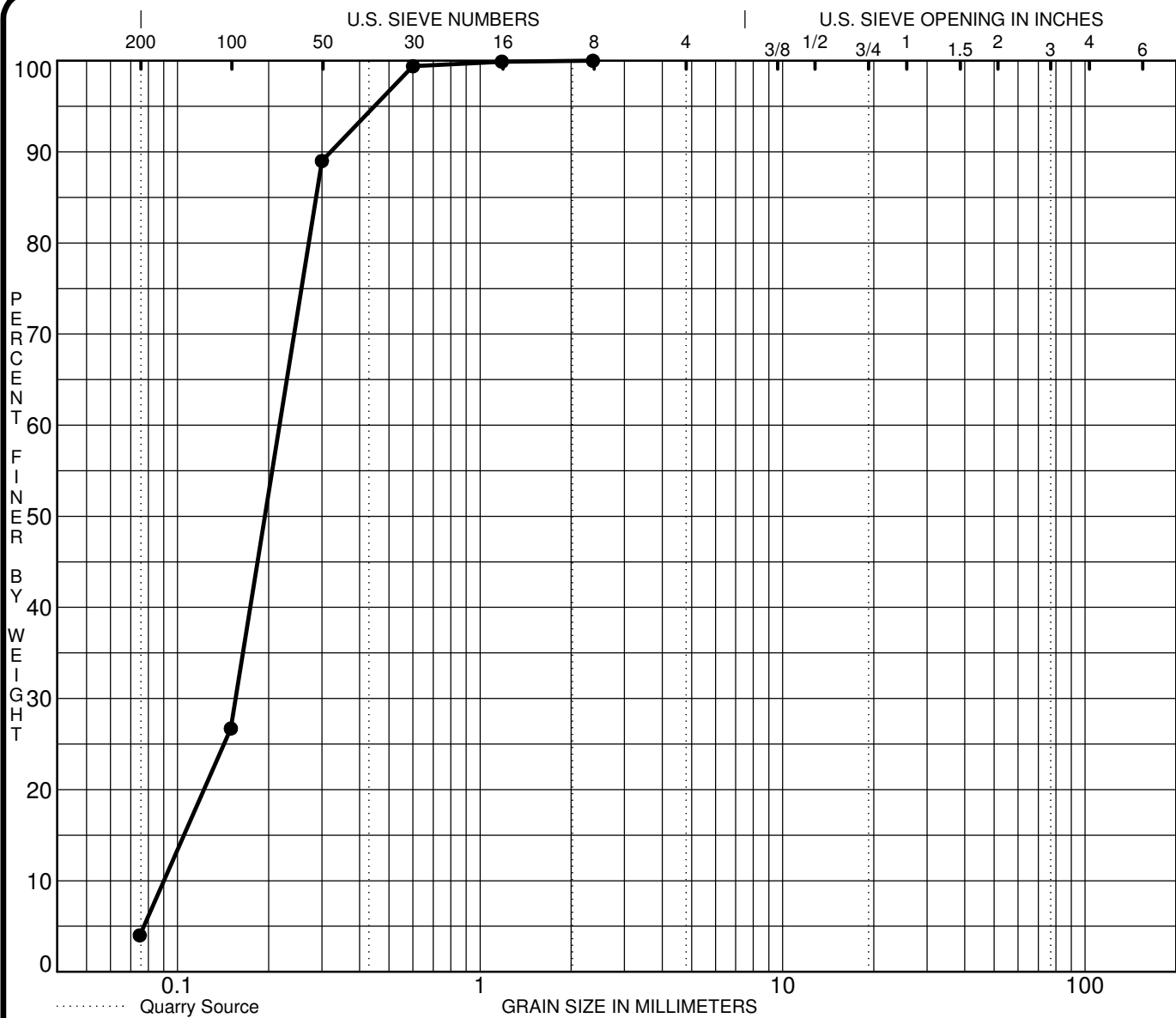
FILE NO. G9114

DATE Oct 29, 03

patersongroup Consulting Engineers

28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP 9 G 2	SAND								1.24	2.4
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP 9 G 2	2.36	0.22	0.156	0.0901	0.0	96.0	4.0			

CLIENT Mr. Dan Paquette

PROJECT Aggregate Resource Investigation - Greenbank

Road/Cedarview Road

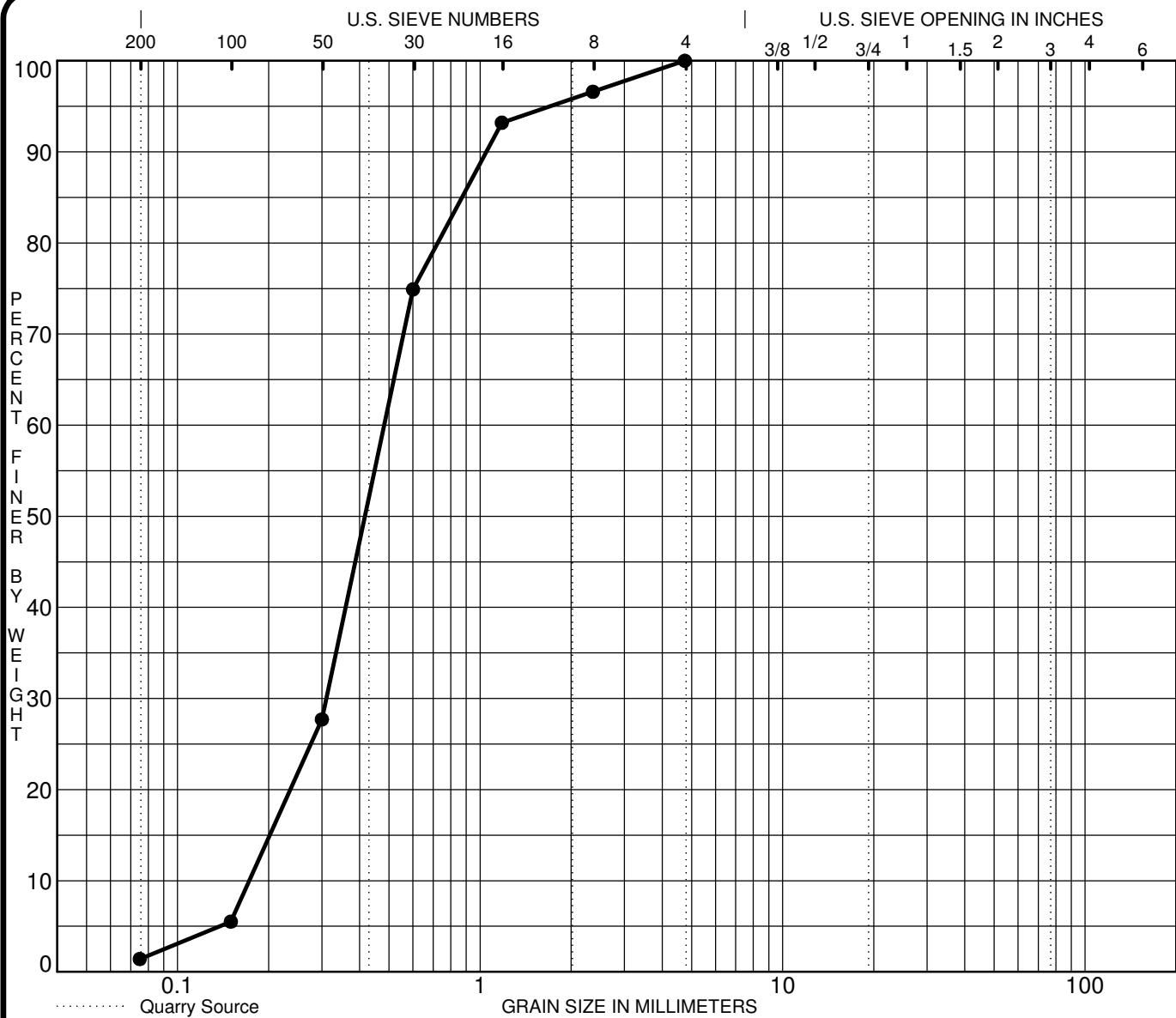
FILE NO. G9114

DATE Oct 29, 03

patersongroup Consulting Engineers

28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION

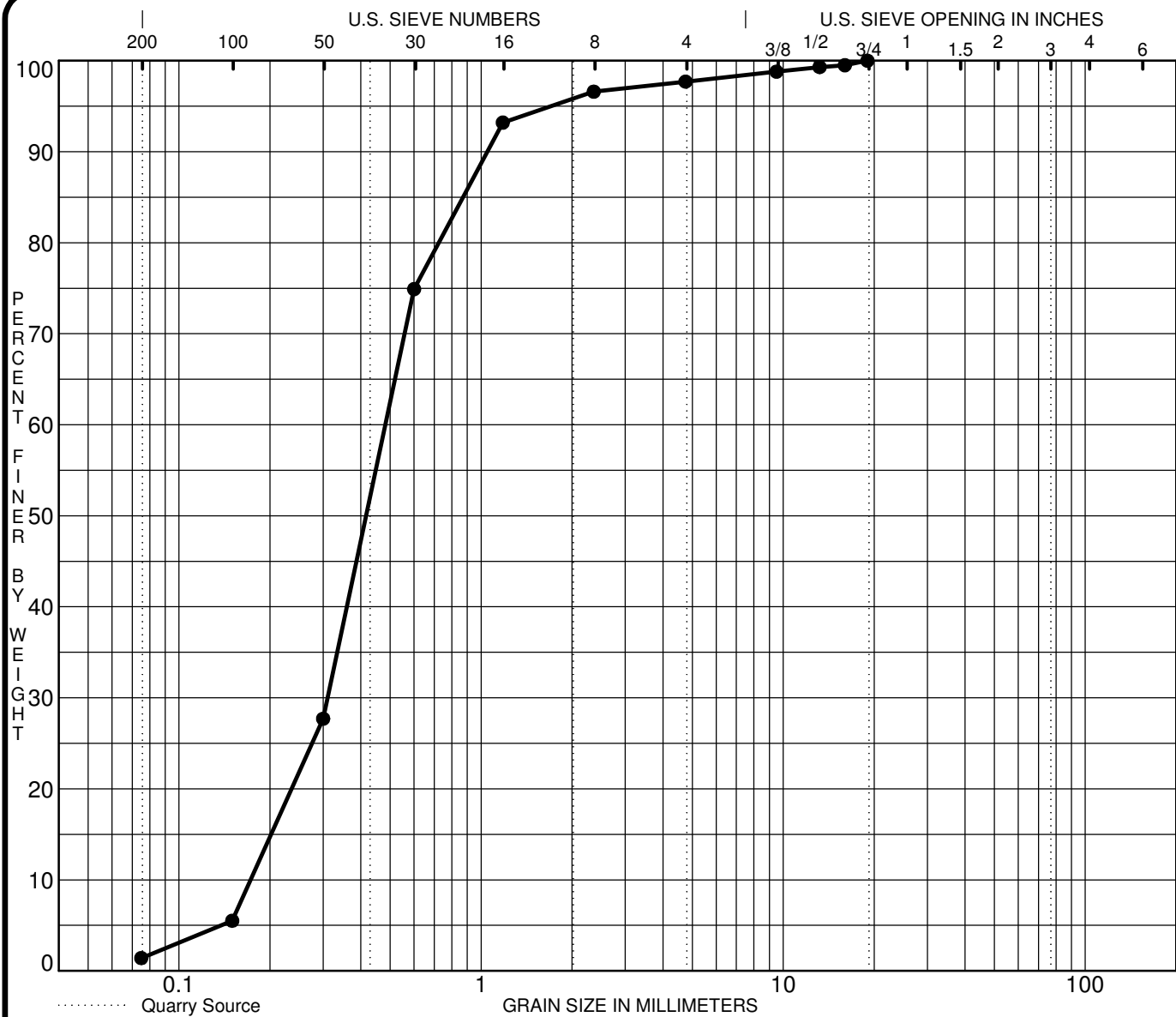


SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP13	G 2	SAND (after screening on 4.75mm)							1.16	2.8
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP13	G 2	4.75	0.48	0.310	0.1726	0.0	98.6	1.4		

CLIENT Mr. Dan Paquette
 PROJECT Aggregate Resource Investigation - Greenbank
Road/Cedarview Road

FILE NO. G9114
 DATE Oct 29, 03



SILT	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

Specimen Identification		Classification				MC%	LL	PL	PI	Cc	Cu
●	TP13 G 2	GRANULAR B TYPE I								1.16	2.8
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
●	TP13 G 2	19.00	0.48	0.310	0.1726	2.3	96.3	1.4			

CLIENT Mr. Dan Paquette

PROJECT Aggregate Resource Investigation - Greenbank

Road/Cedarview Road

FILE NO. G9114

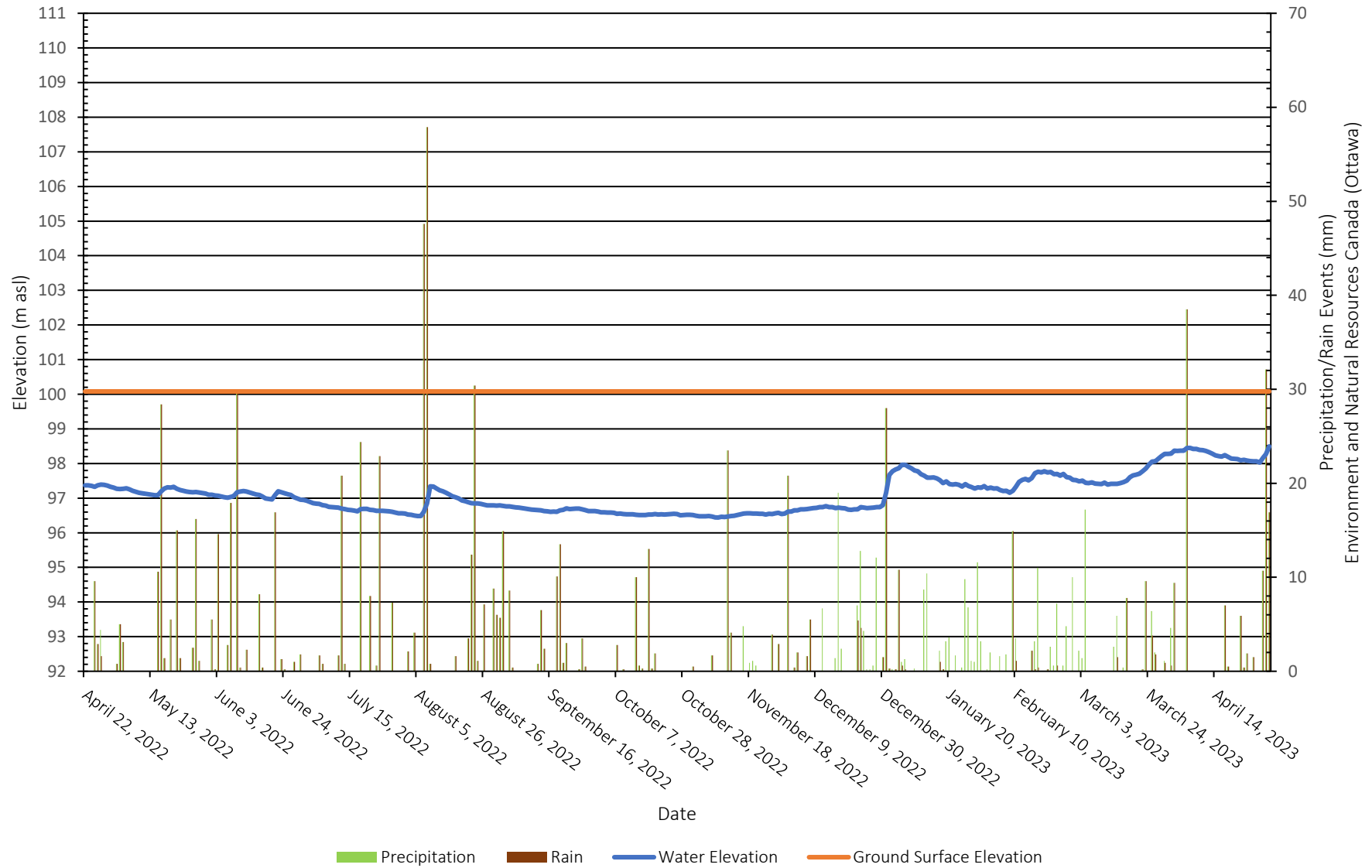
DATE Oct 29, 03

patersongroup Consulting Engineers

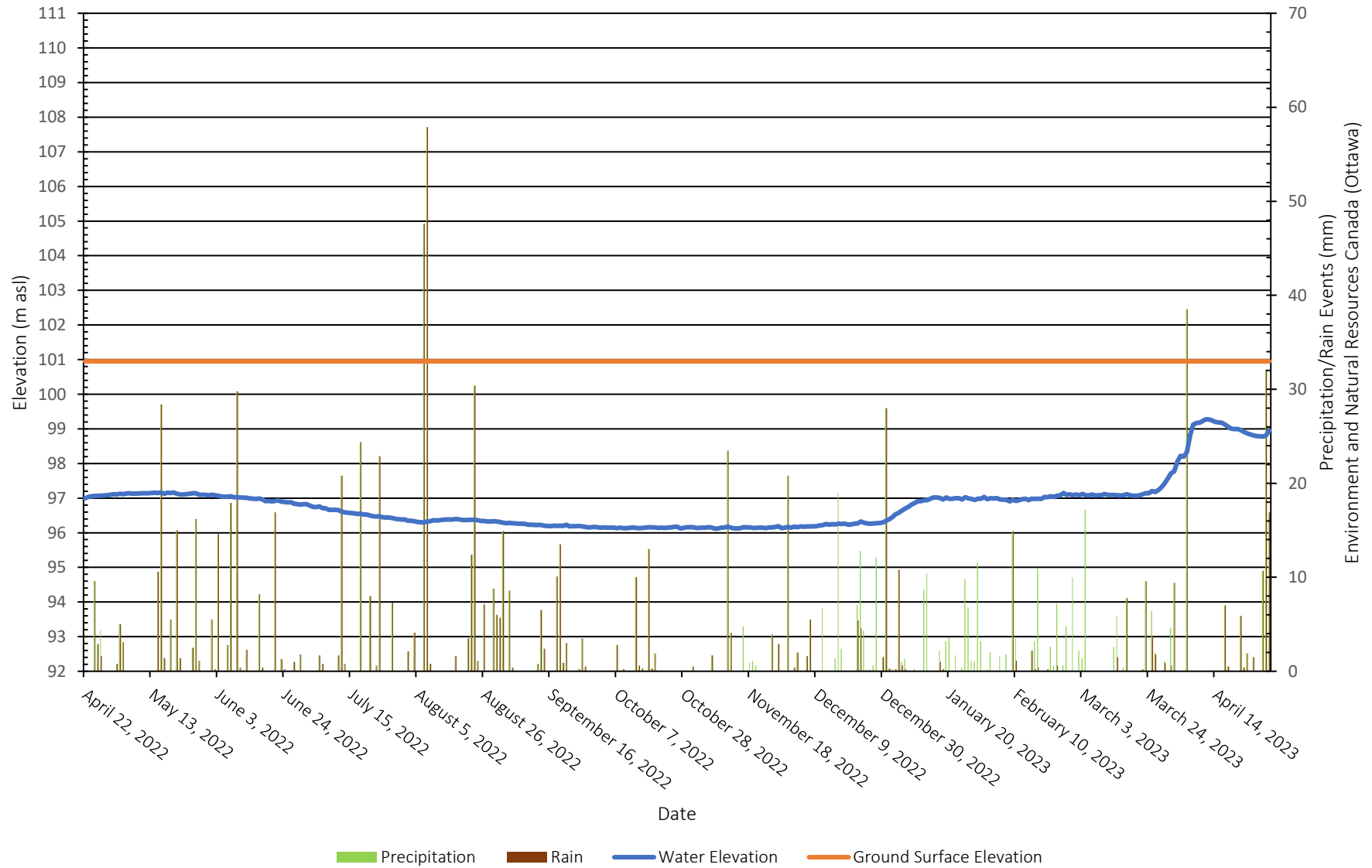
28 Concouse Gate, Unit 1, Ottawa, Ontario K2E 7T7

GRAIN SIZE DISTRIBUTION

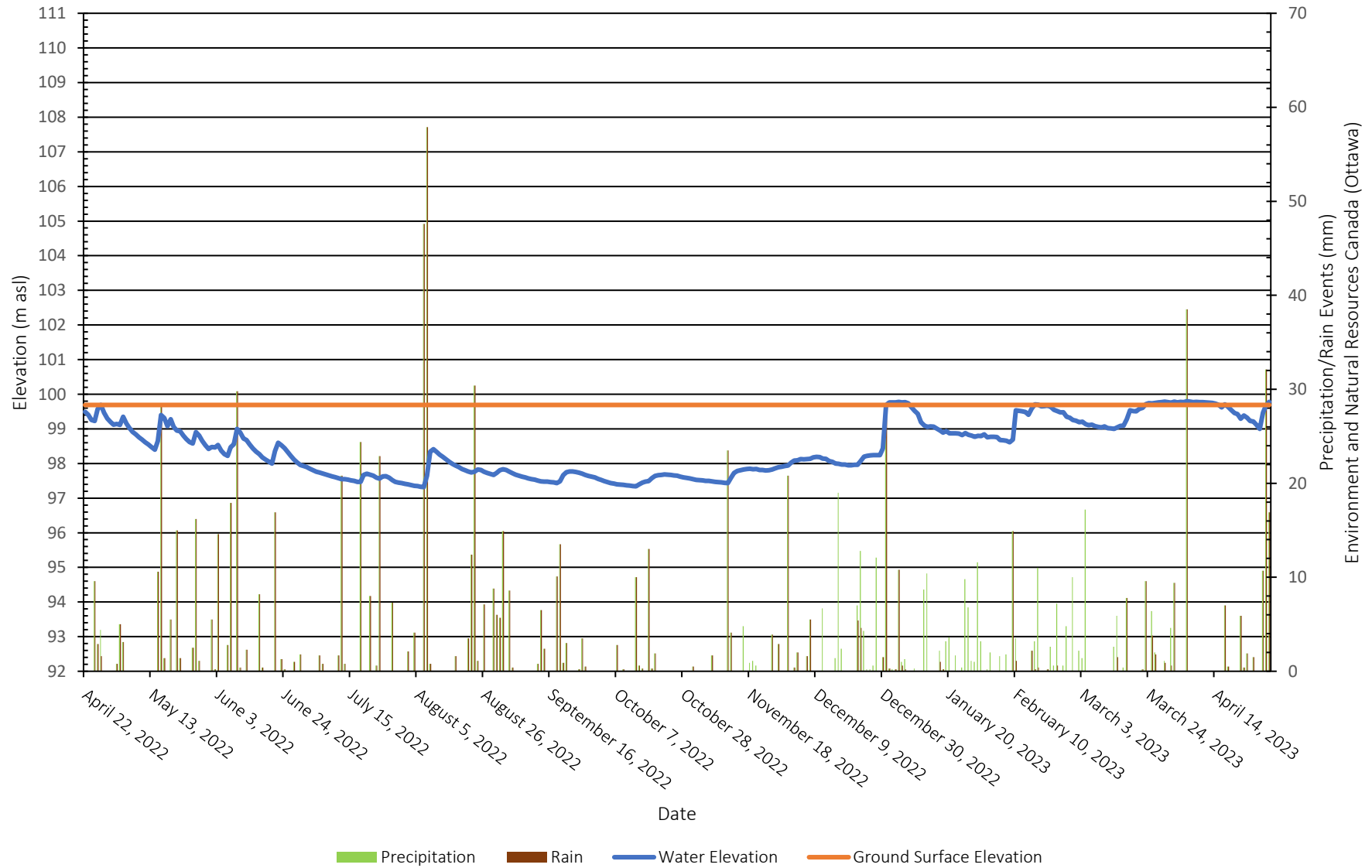
BH1-22 - Monitoring Well Water Elevations



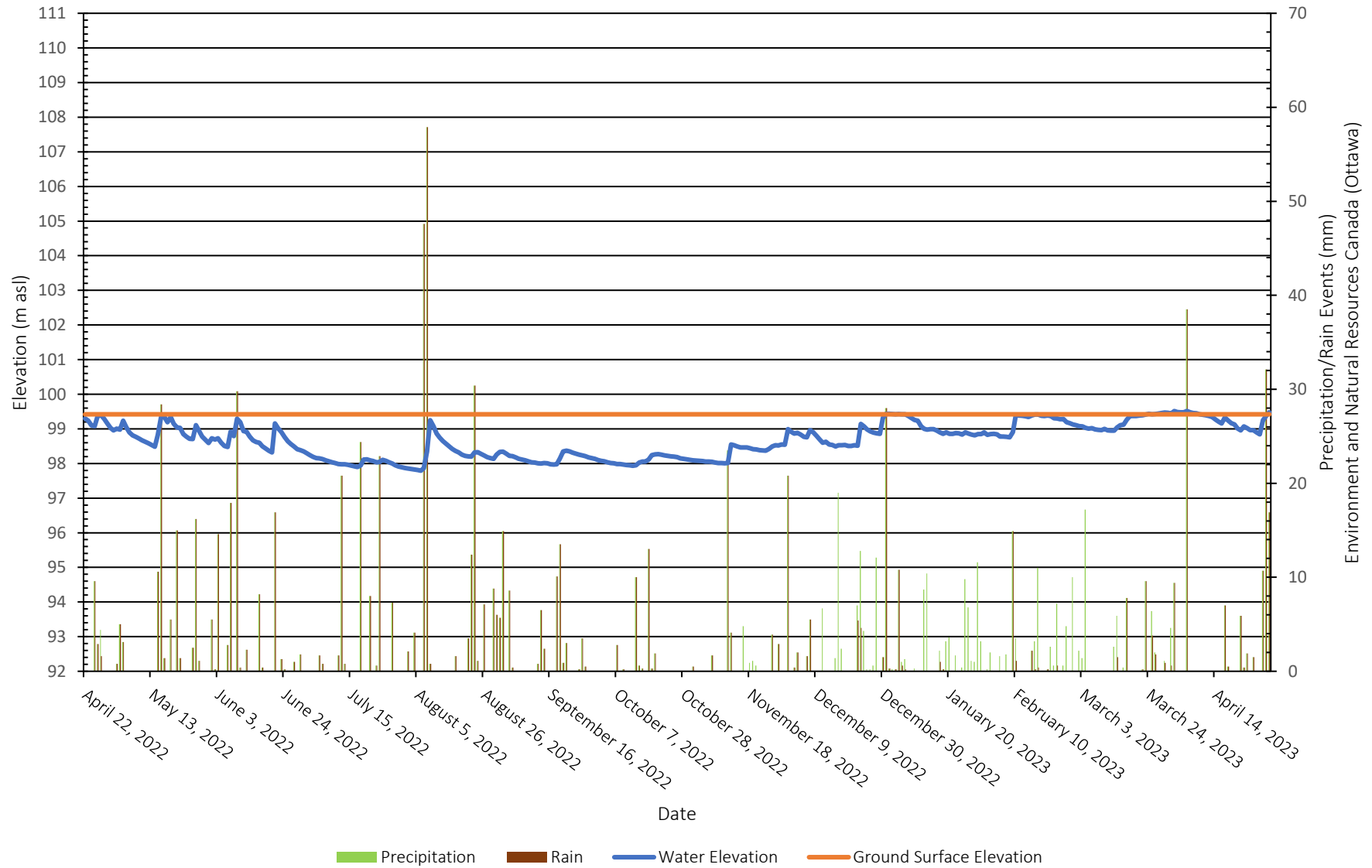
BH2-22 - Monitoring Well Water Elevations



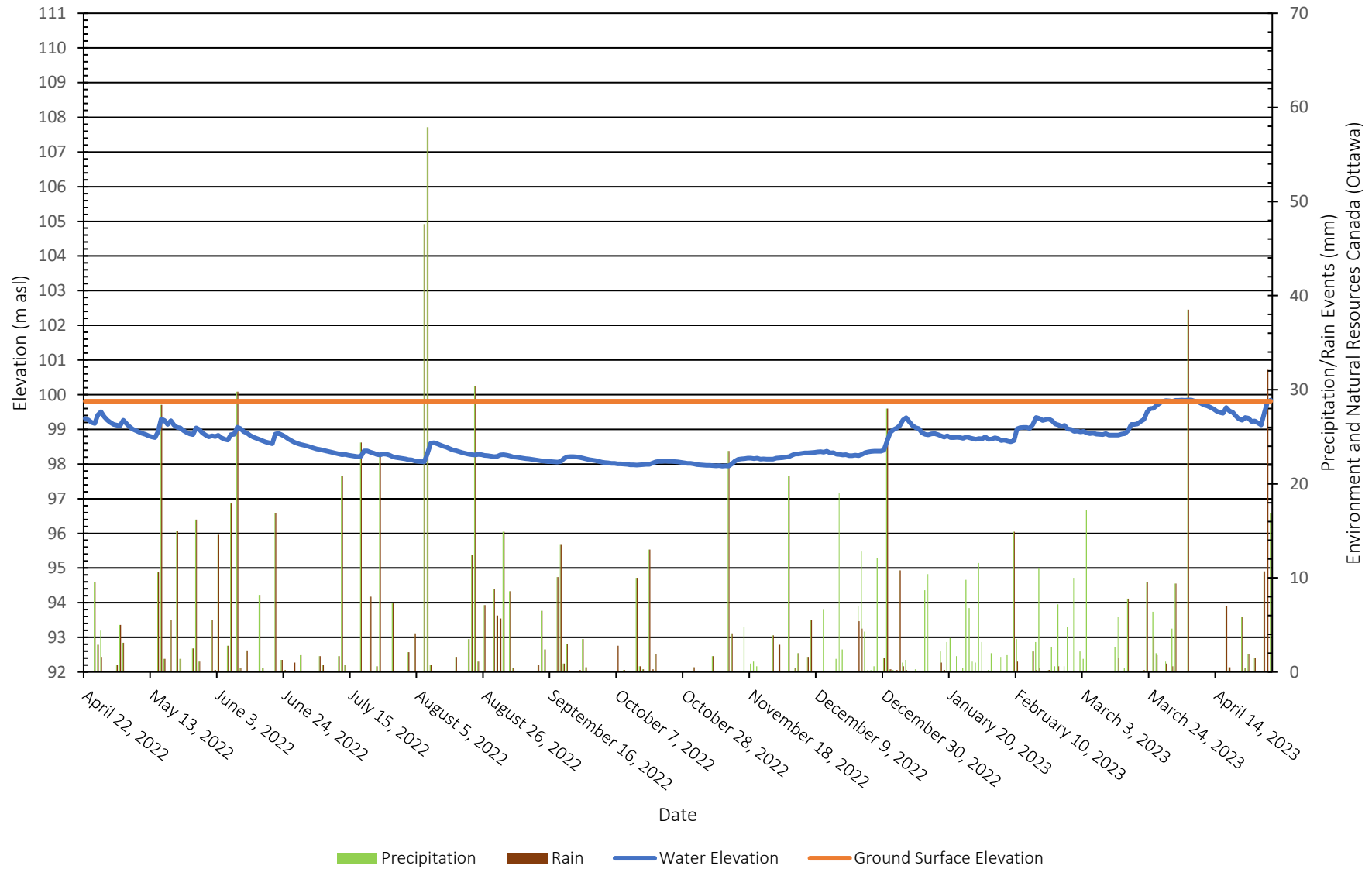
BH3-22 - Monitoring Well Water Elevations



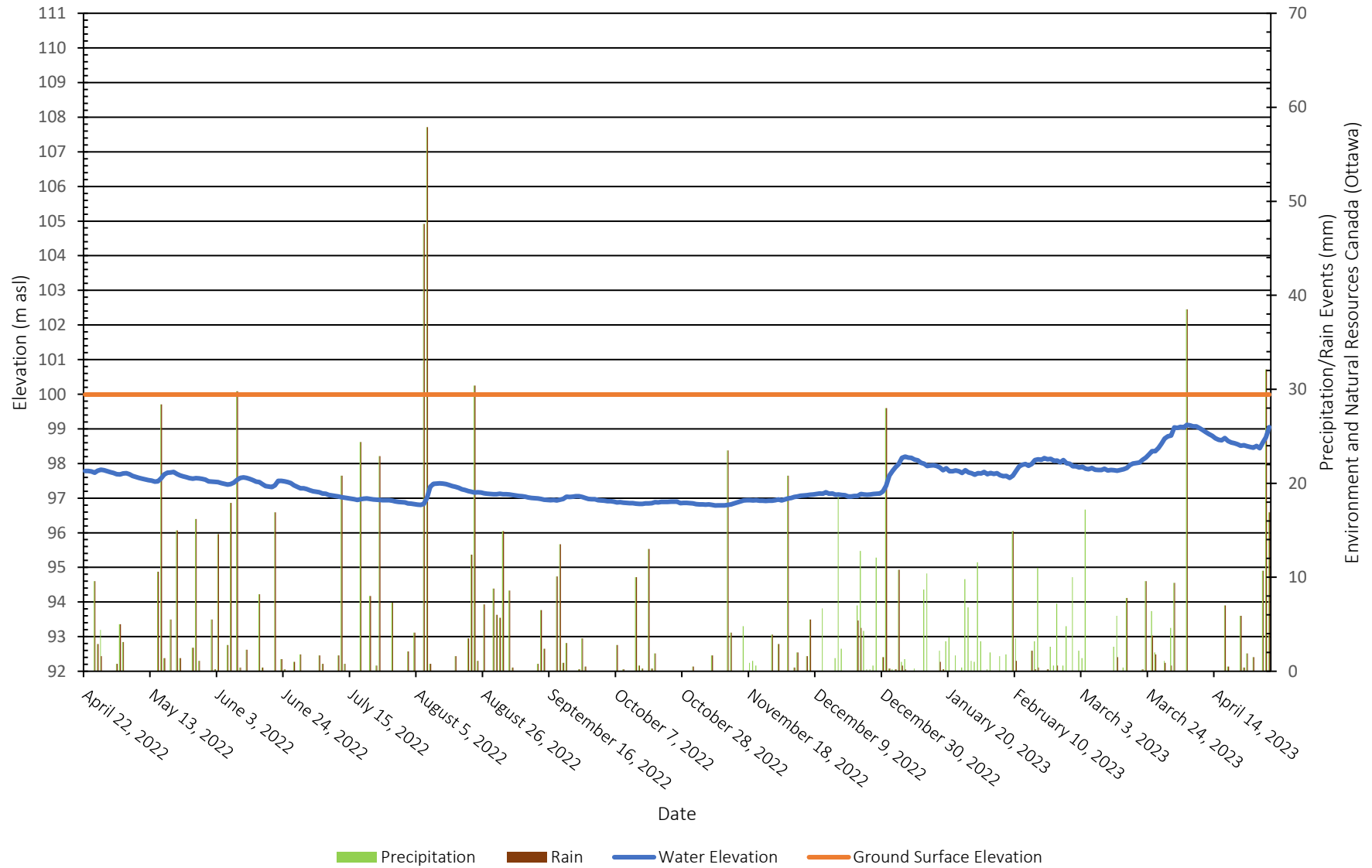
BH4-22 - Monitoring Well Water Elevations



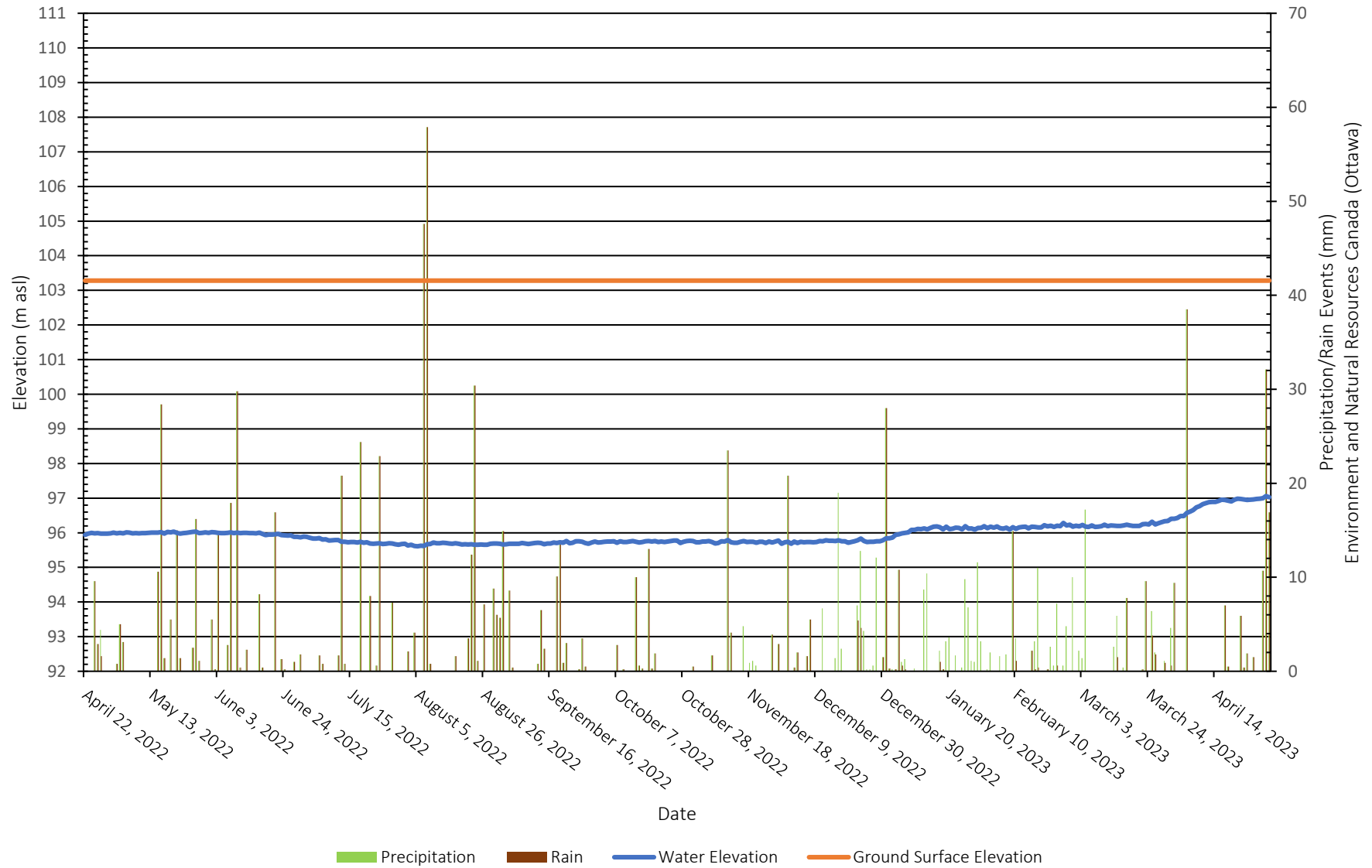
BH5-22 - Monitoring Well Water Elevations



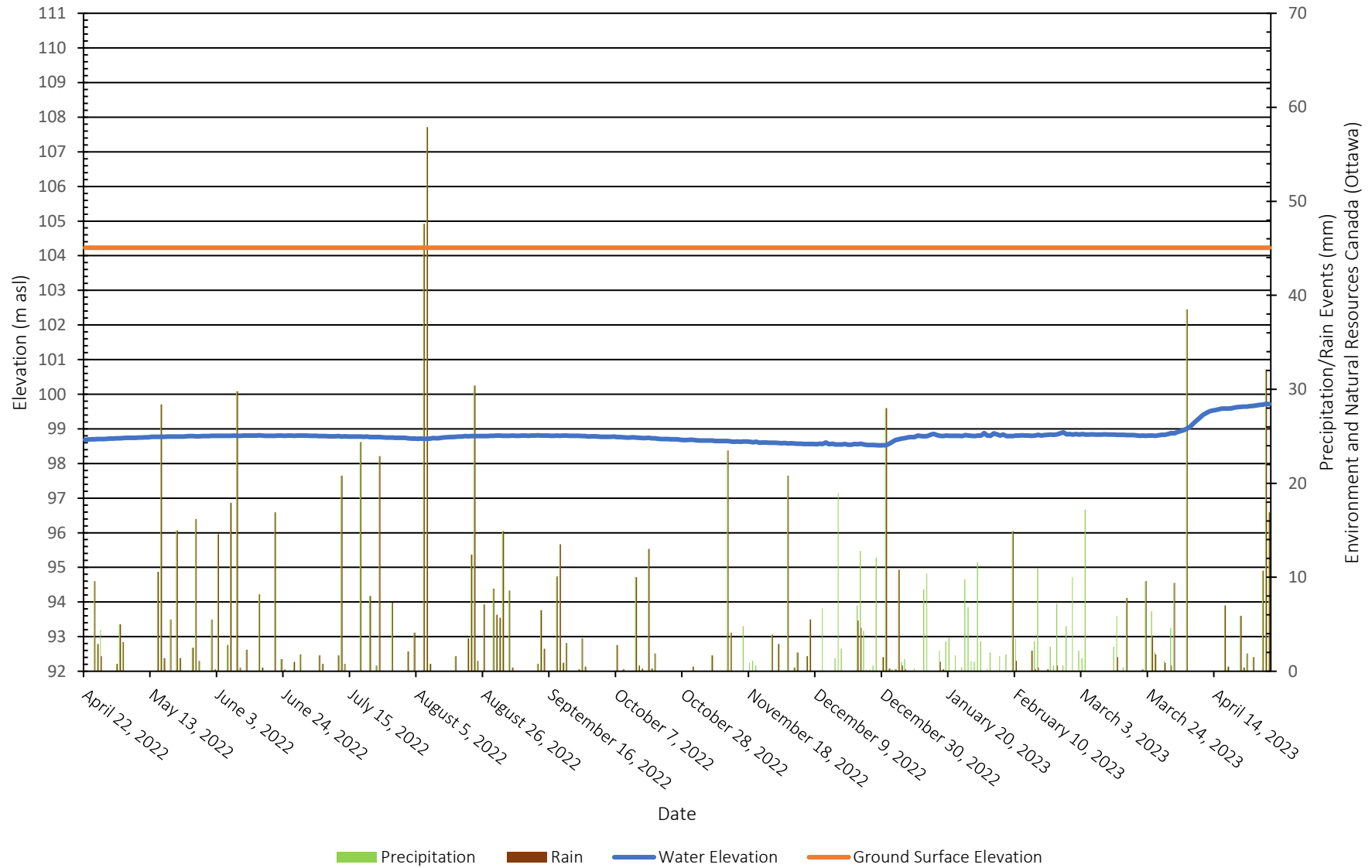
BH6-22 - Monitoring Well Water Elevations



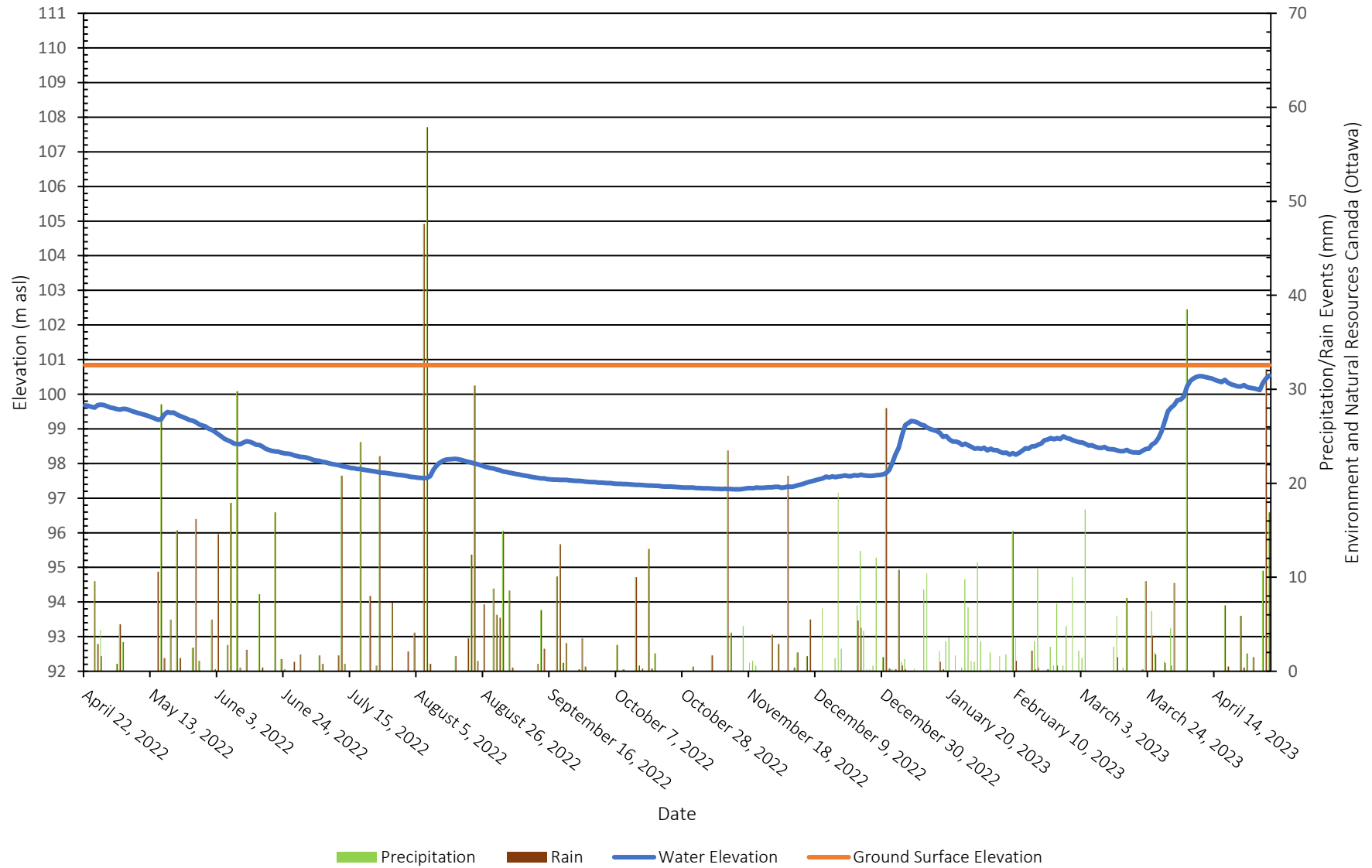
BH7-22 - Monitoring Well Water Elevations



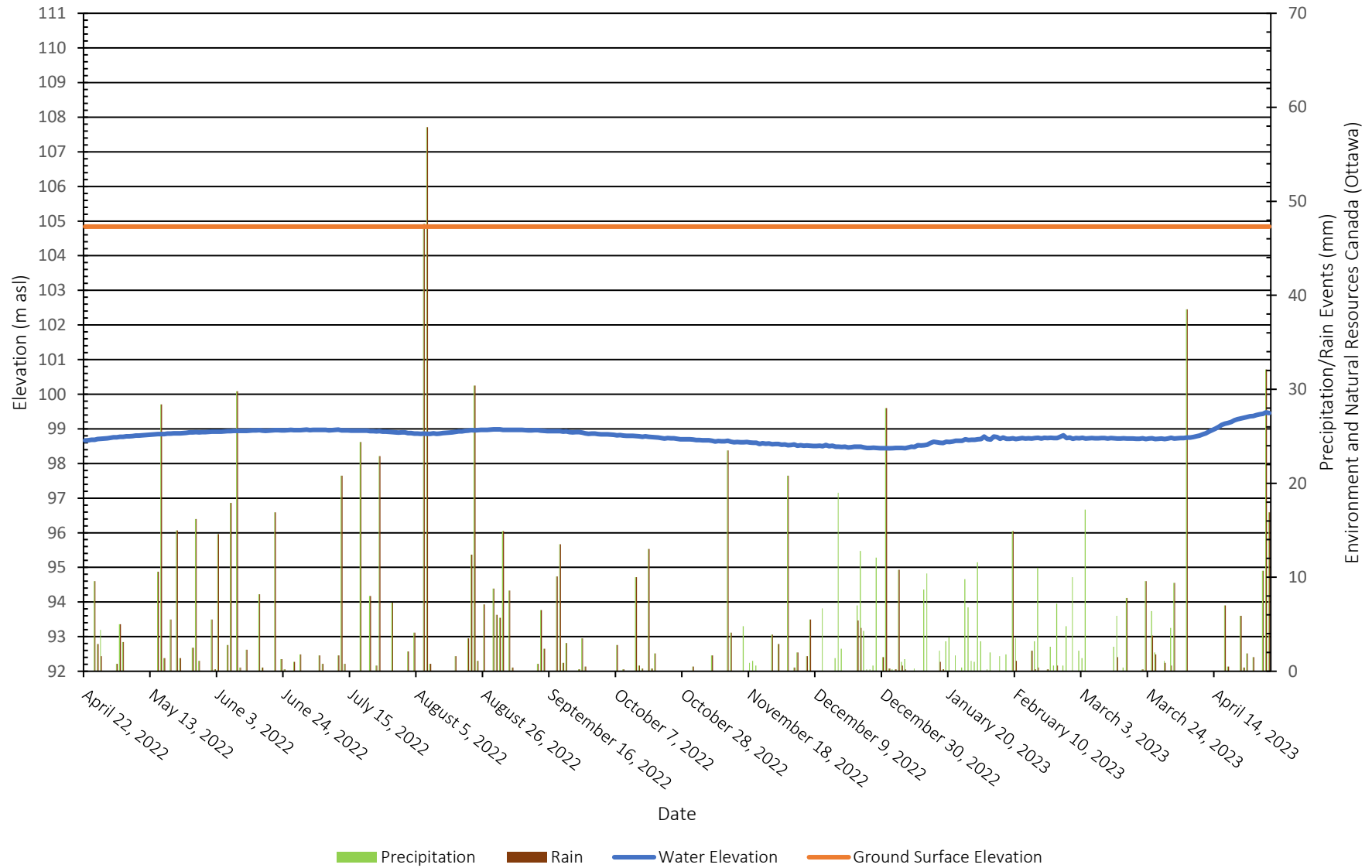
BH8-22 - Monitoring Well Water Elevations



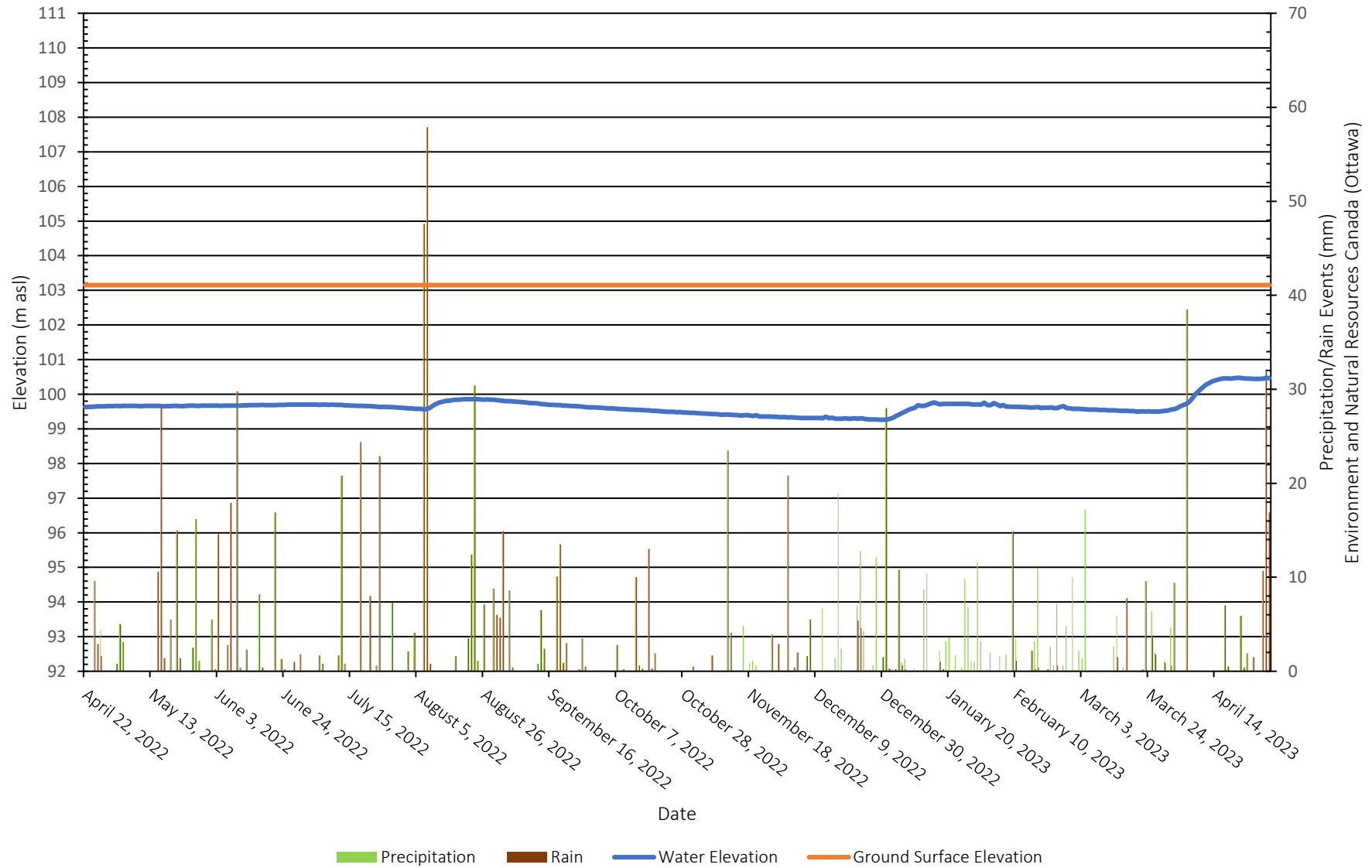
BH9-22 - Monitoring Well Water Elevations



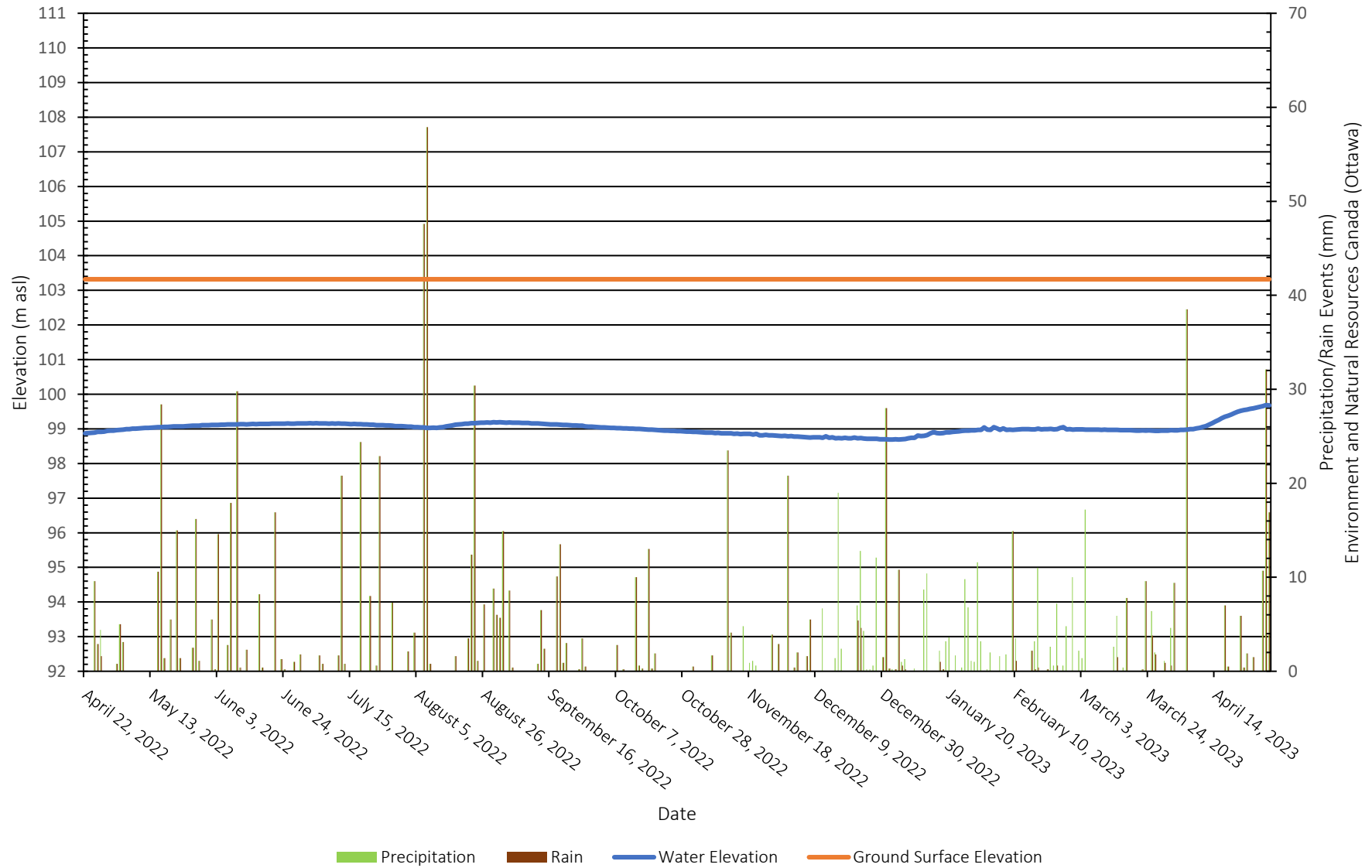
BH10-22 - Monitoring Well Water Elevations



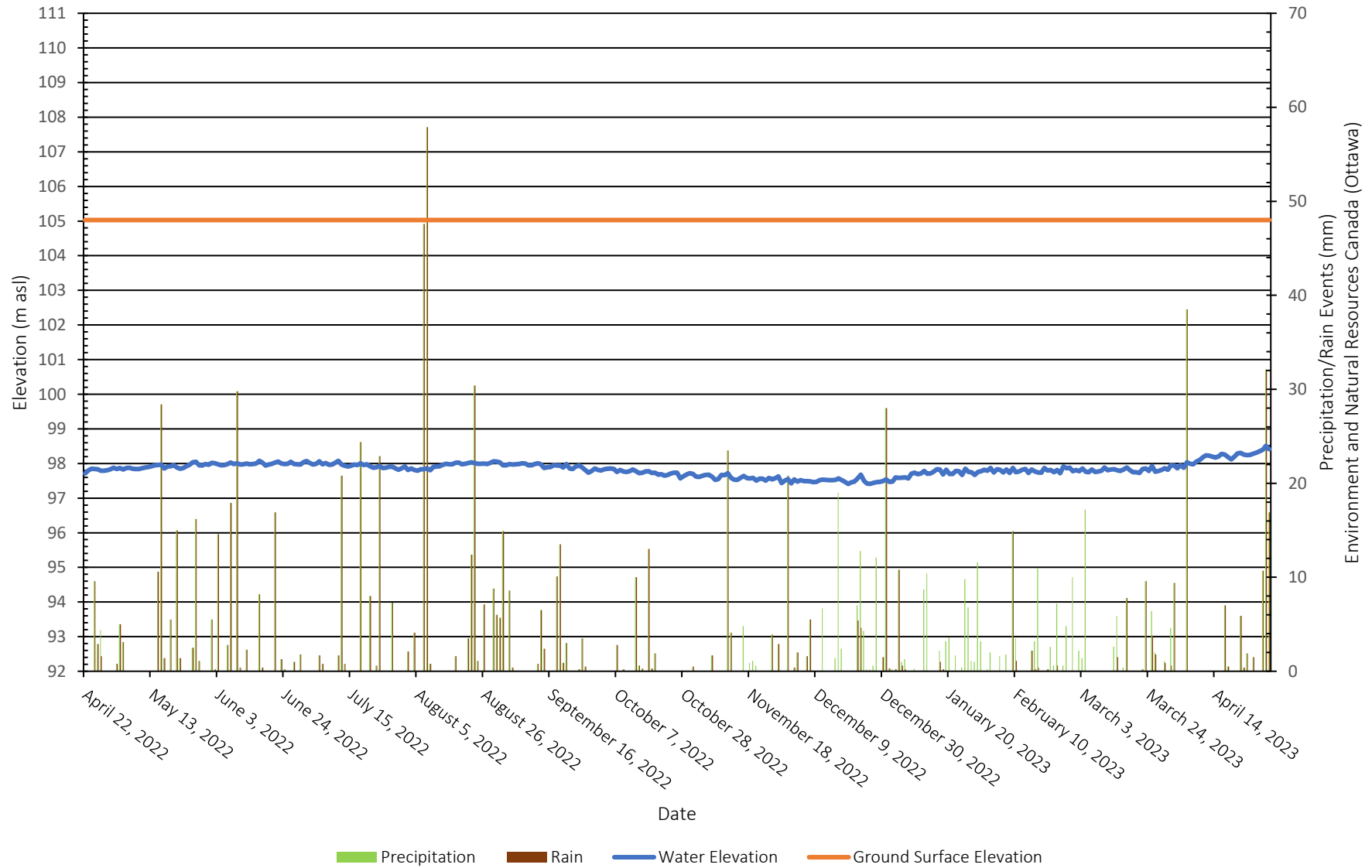
BH11-22 - Monitoring Well Water Elevations



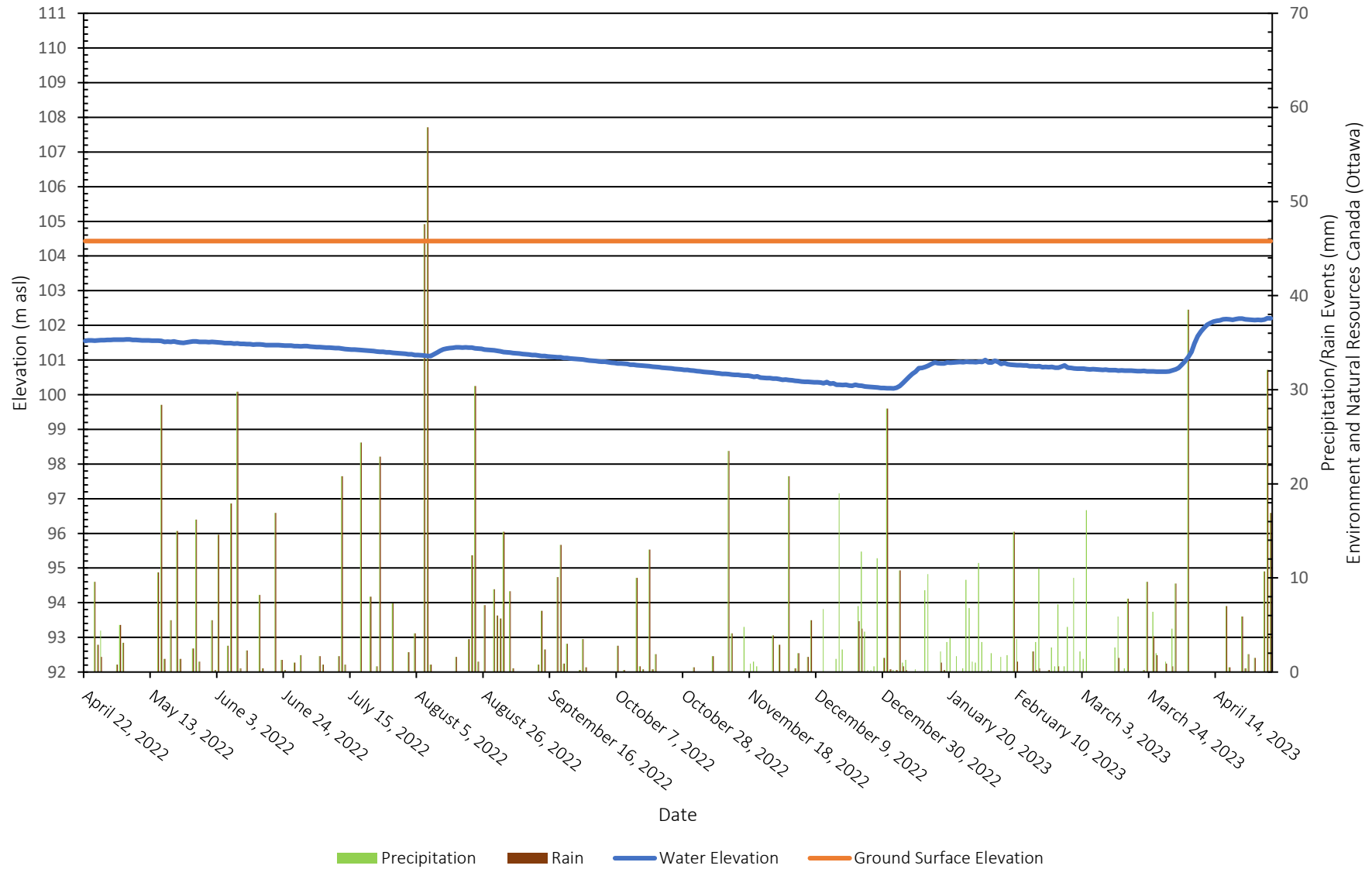
BH12-22 - Monitoring Well Water Elevations



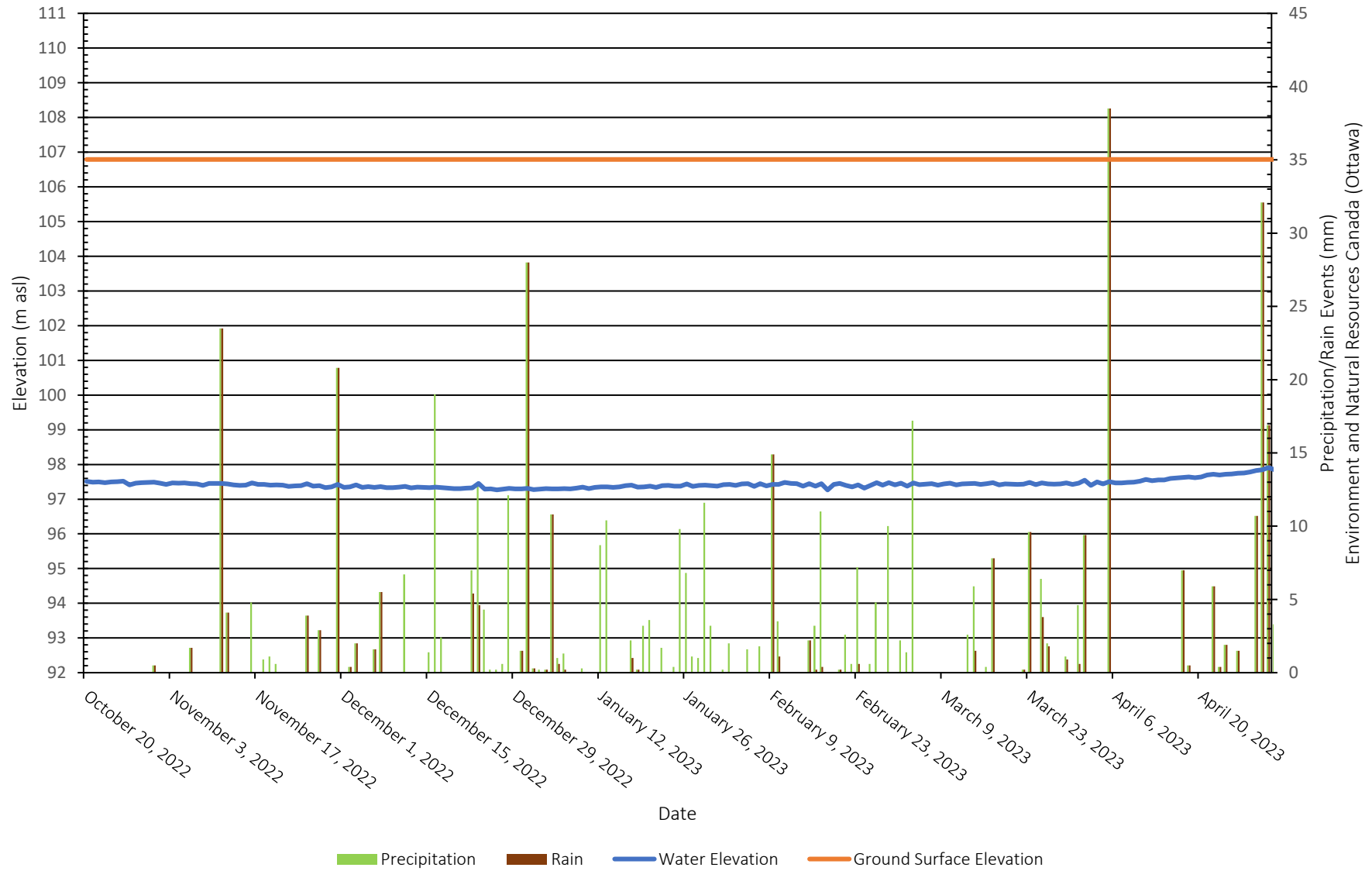
BH13-22 - Monitoring Well Water Elevations



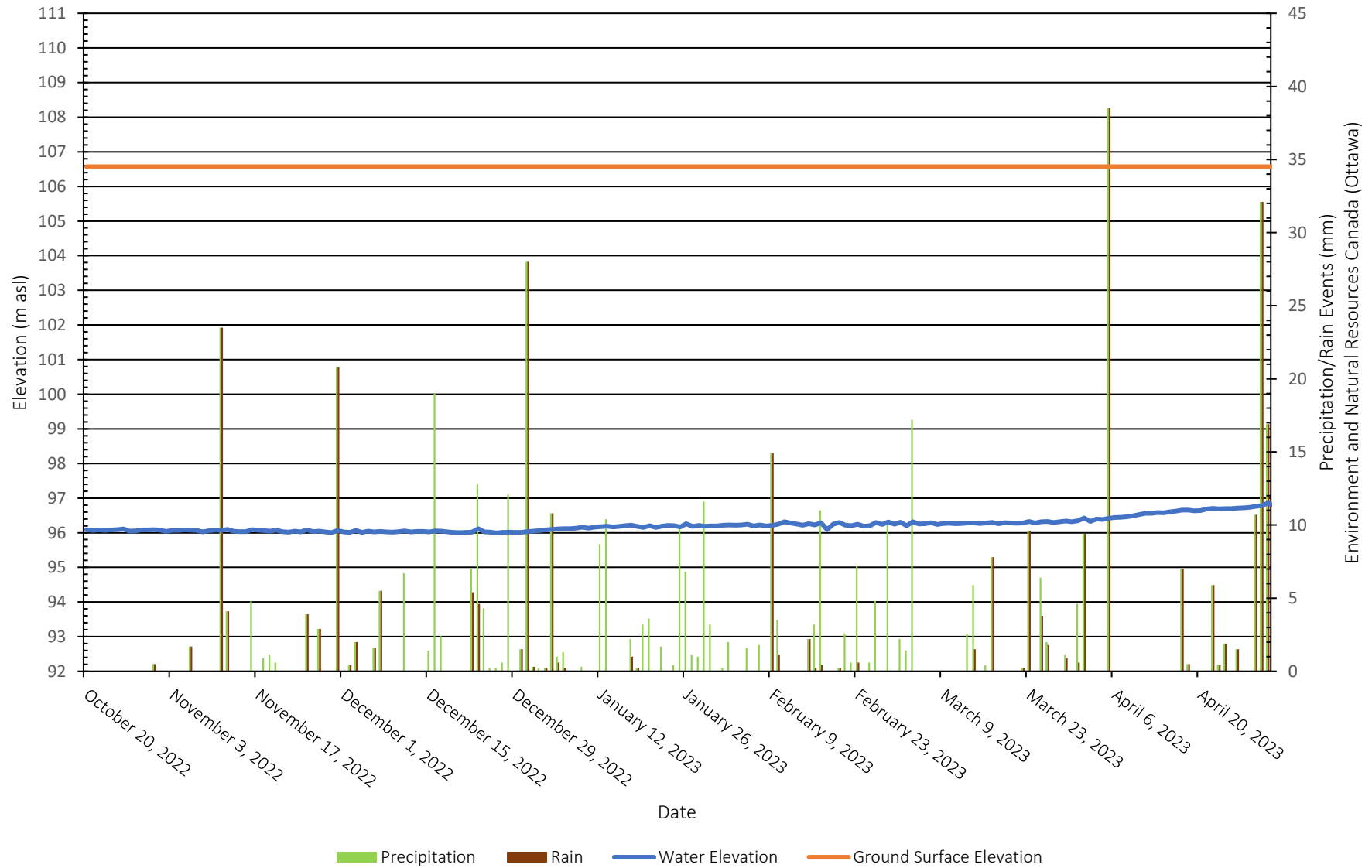
BH14-22 - Monitoring Well Water Elevations



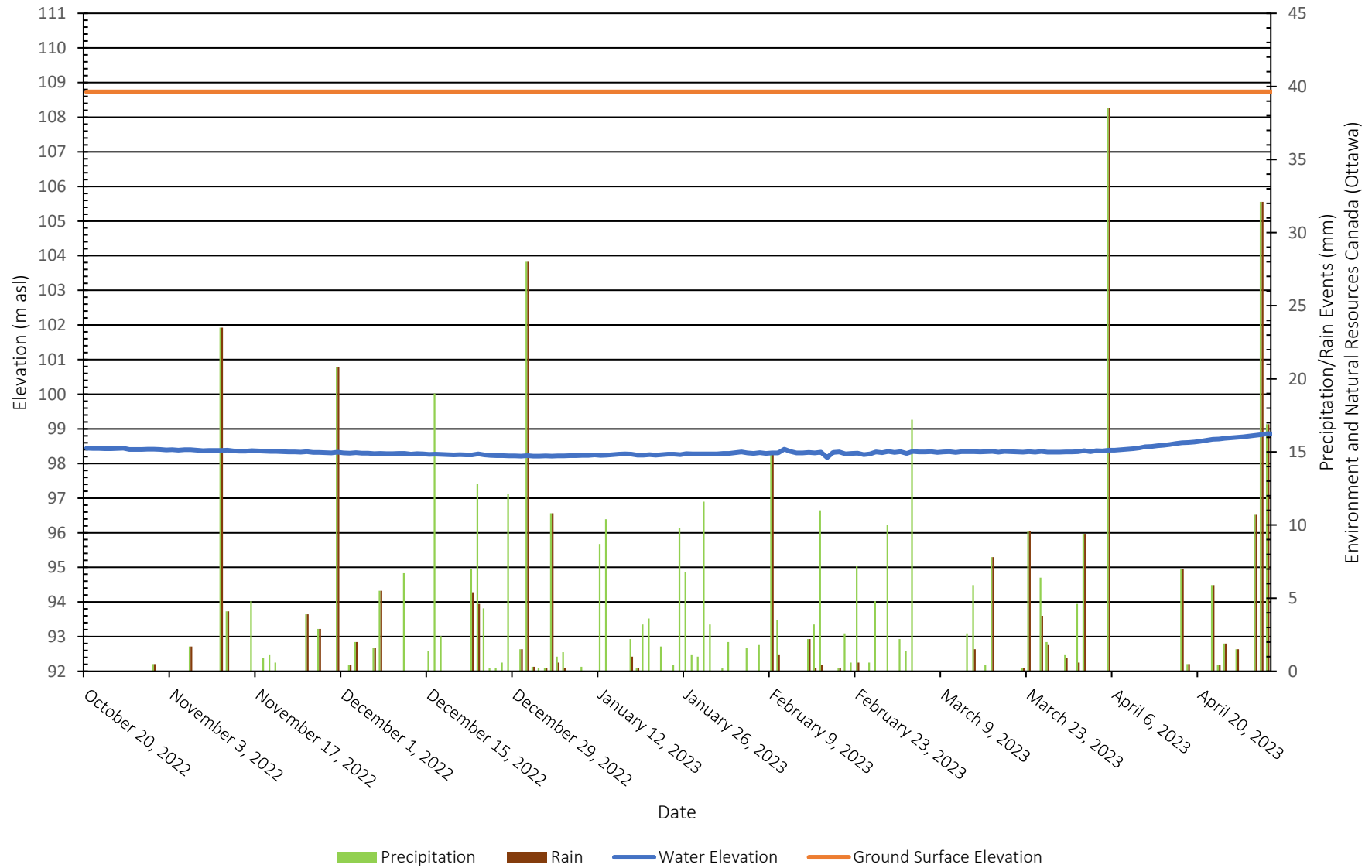
BH15-22 - Monitoring Well Water Elevations



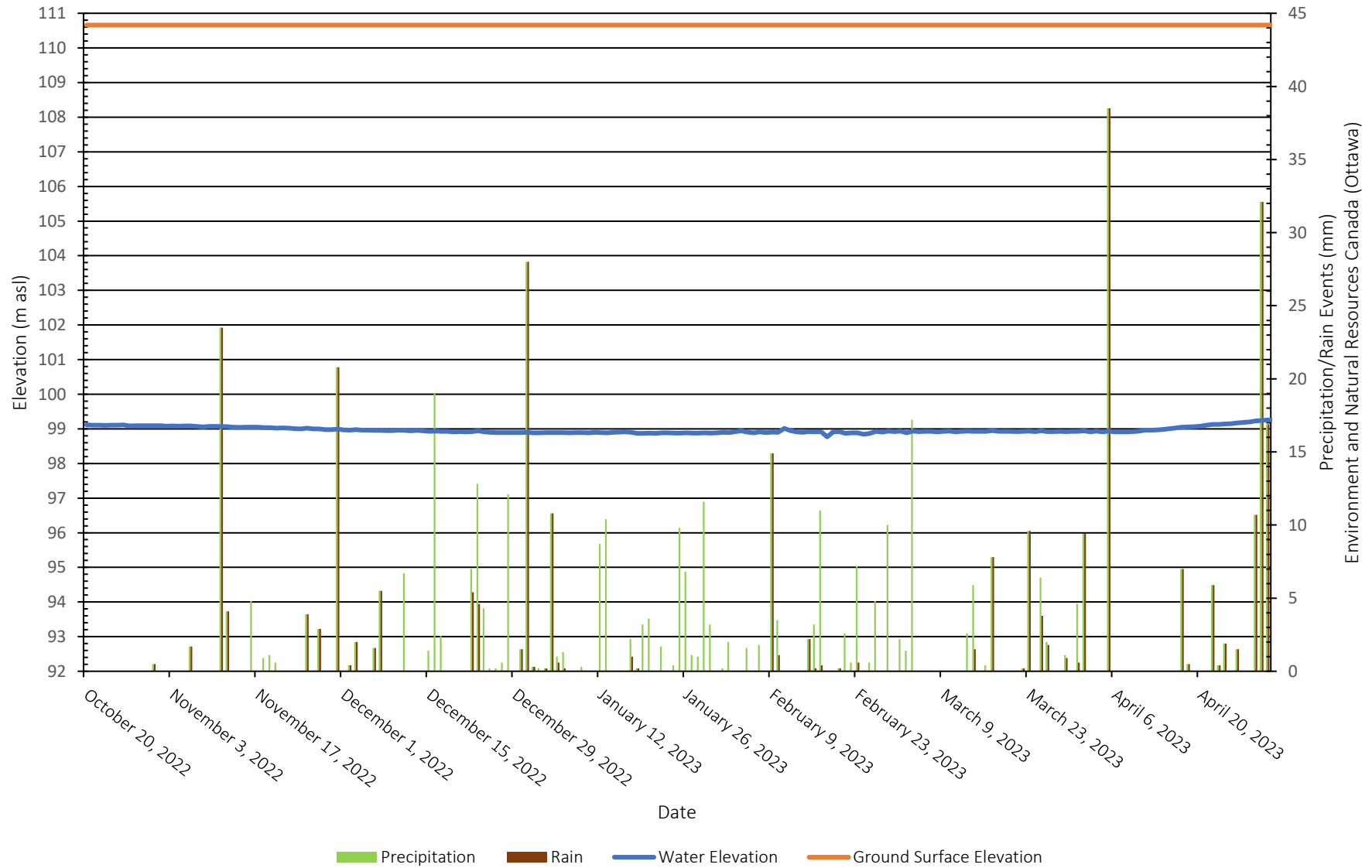
BH16-22 - Monitoring Well Water Elevations



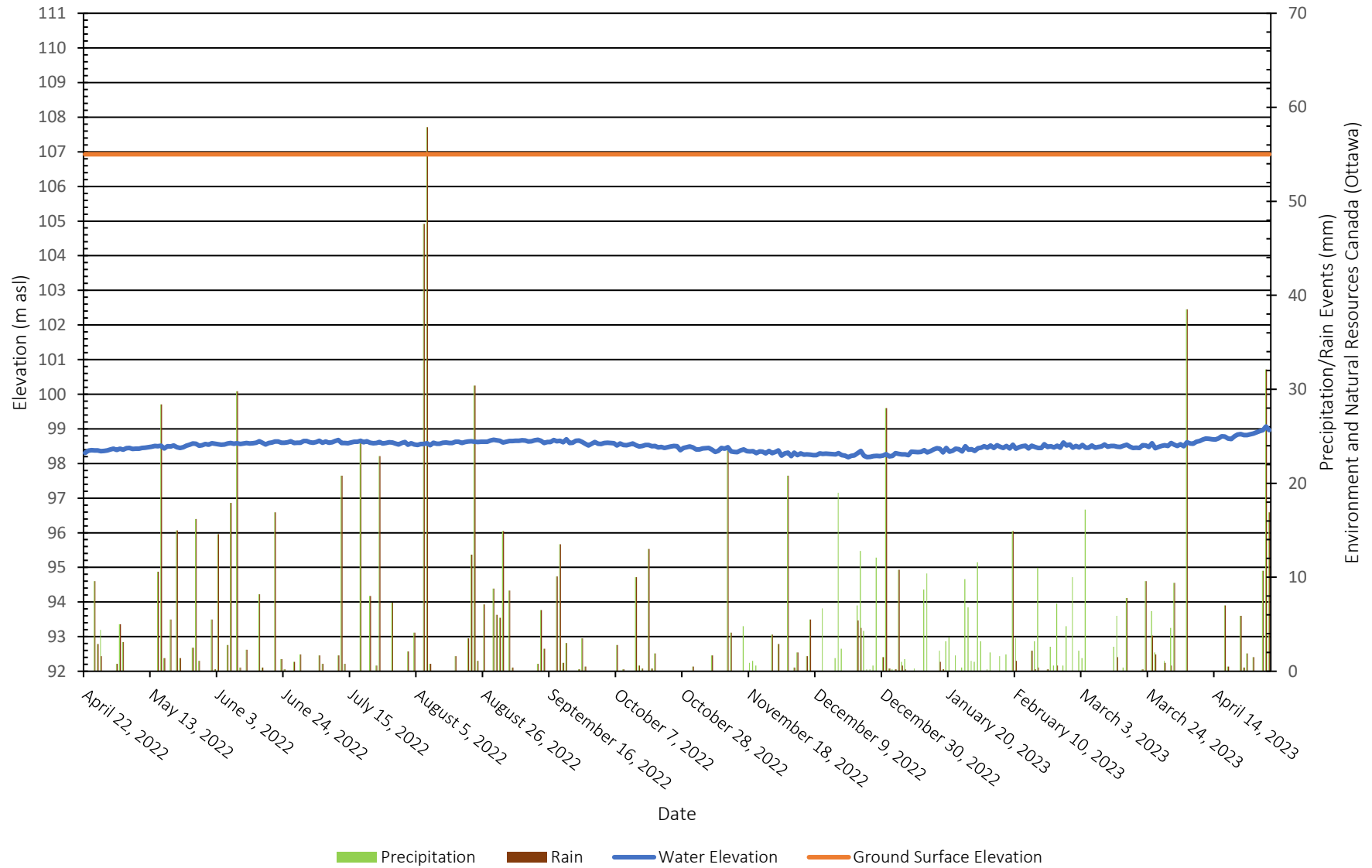
BH17-22 - Monitoring Well Water Elevations



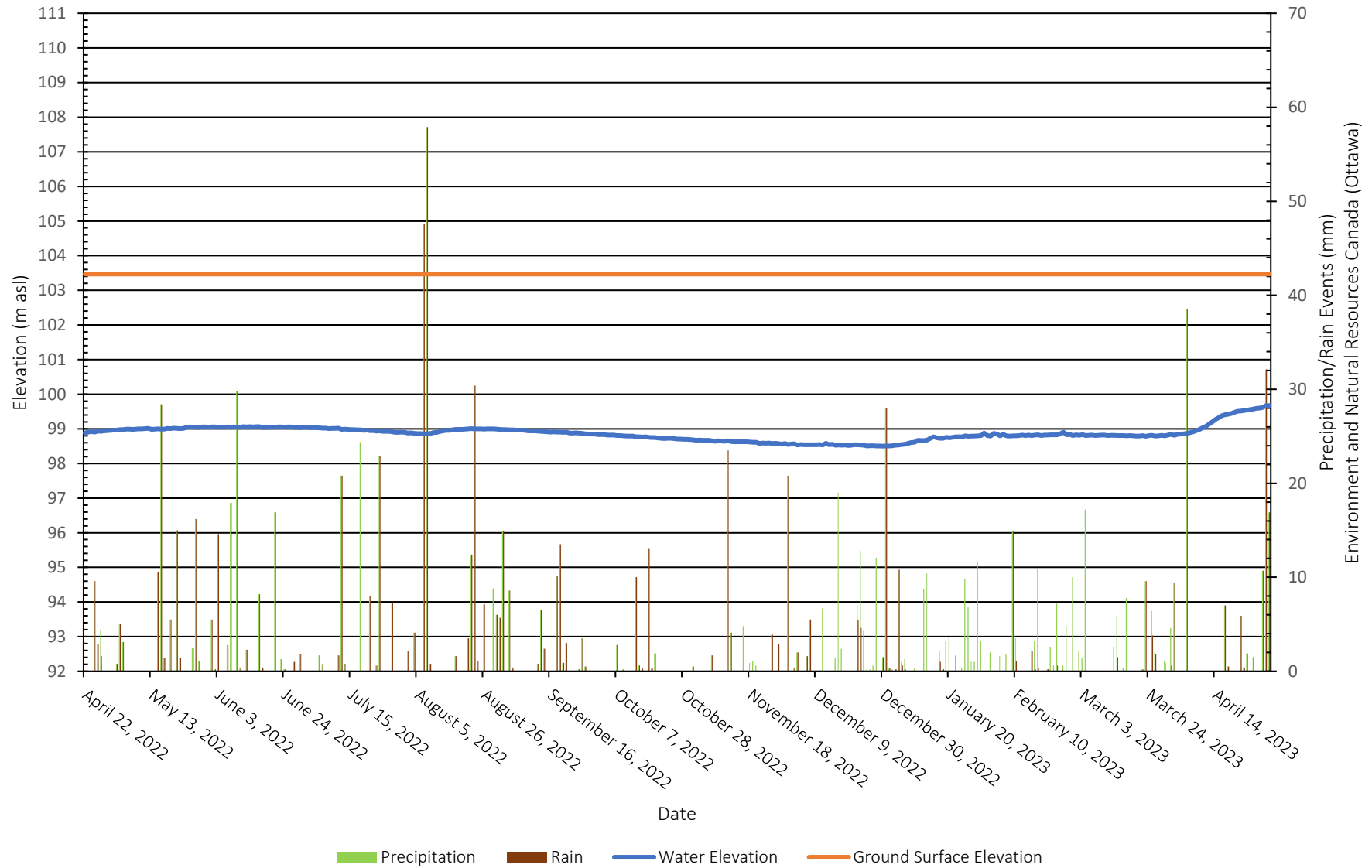
BH18-22 - Monitoring Well Water Elevations



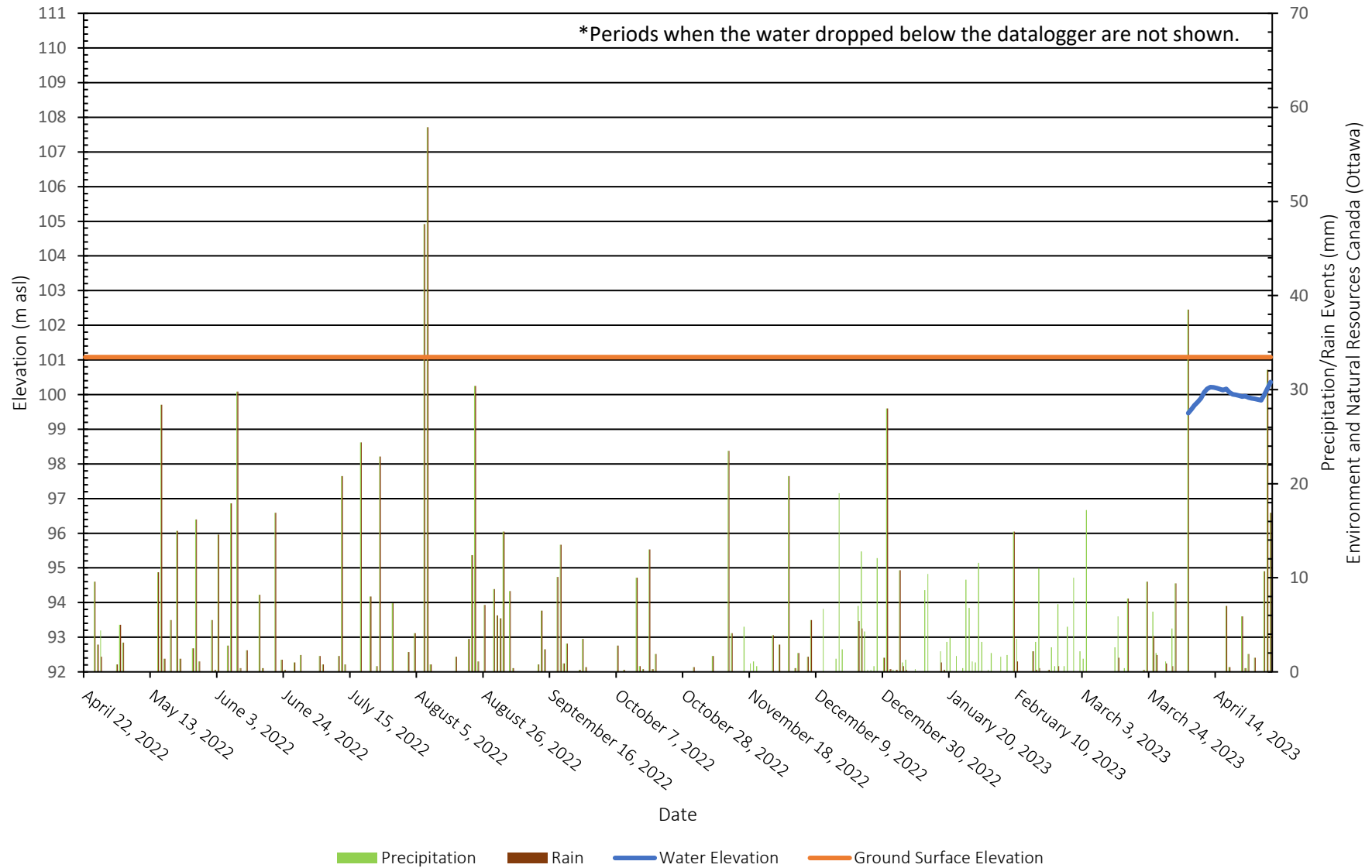
BH8-15 - Monitoring Well Water Elevations



BH14-15 - Monitoring Well Water Elevations



BH18-15 - Monitoring Well Water Elevations



Certificate of Analysis

Report Date: 22-Apr-2022

Client: Paterson Group Consulting Engineers

Order Date: 19-Apr-2022

Client PO: 27372

Project Description: PG6197

Client ID:	BH9-22 SS3	-	-	-
Sample Date:	19-Apr-22 09:00	-	-	-
Sample ID:	2217196-01	-	-	-
MDL/Units	Soil	-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	82.6	-	-	-
----------	--------------	------	---	---	---

General Inorganics

pH	0.05 pH Units	6.26	-	-	-
Resistivity	0.10 Ohm.m	173	-	-	-

Anions

Chloride	5 ug/g dry	<5	-	-	-
Sulphate	5 ug/g dry	<5	-	-	-

Certificate of Analysis

Report Date: 17-Oct-2022

Client: Paterson Group Consulting Engineers

Order Date: 11-Oct-2022

Client PO: 55962

Project Description: PG6197

Client ID:	BH16-22, SS3	-	-	-	-
Sample Date:	06-Oct-22 09:00	-	-	-	-
Sample ID:	2242189-01	-	-	-	-
Matrix:	Soil	-	-	-	-
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	95.8	-	-	-	-
----------	--------------	------	---	---	---	---

General Inorganics

pH	0.05 pH Units	7.47	-	-	-	-
Resistivity	0.1 Ohm.m	427	-	-	-	-

Anions

Chloride	5 ug/g	<5	-	-	-	-
Sulphate	5 ug/g	<5	-	-	-	-

APPENDIX 2

FIGURE 1 – KEY PLAN

DRAWING PG6197-1 – TEST HOLE LOCATION PLAN

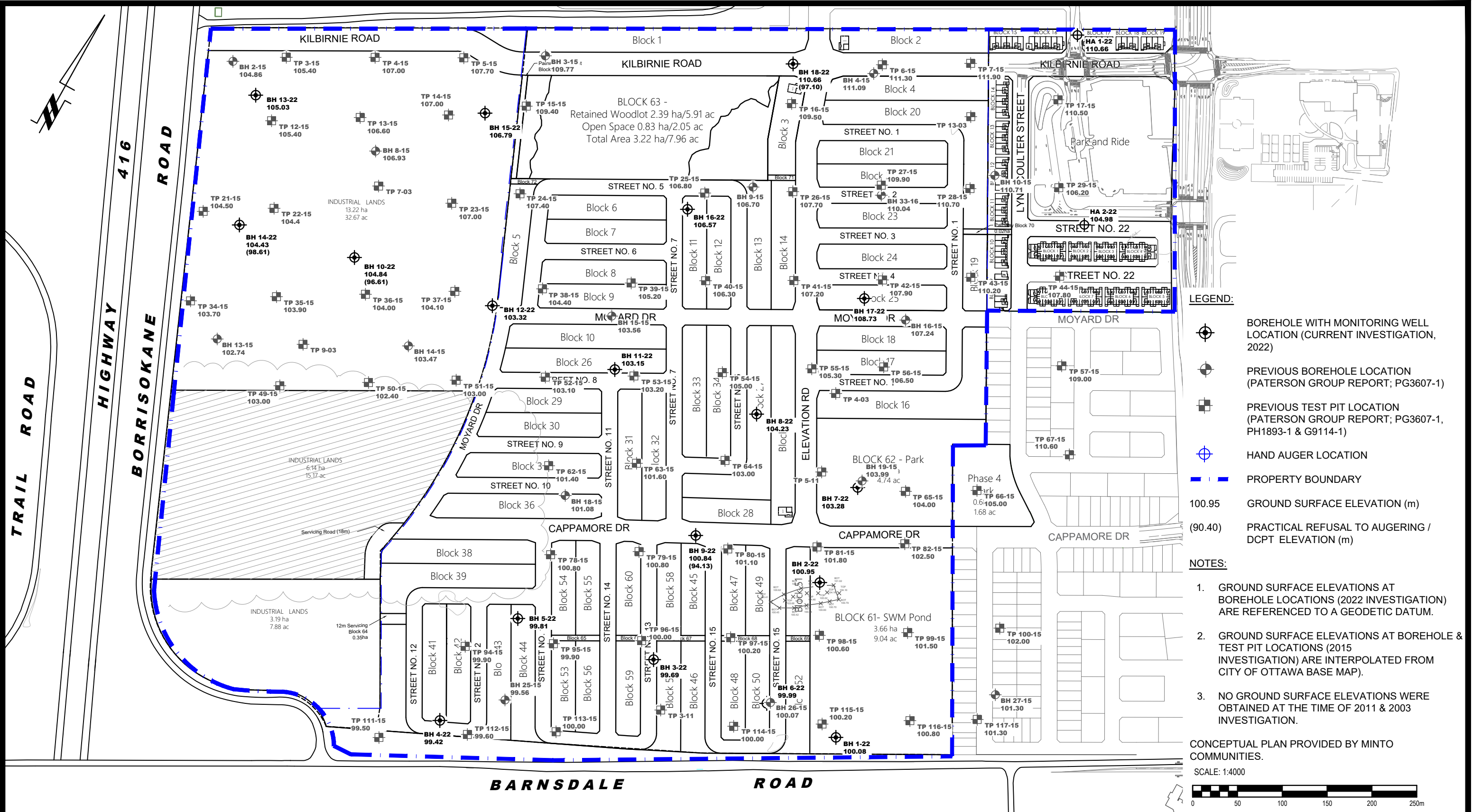
DRAWING PG6197-2 – PERMISSIBLE GRADE RAISE PLAN

DRAWING PG6197-3 – BATHYMETRIC CONTOUR PLAN



FIGURE 1

KEY PLAN



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

4	UPDATED CONCEPTUAL PLAN	26/05/2026	DP
3	UPDATED CONCEPTUAL PLAN	01/10/2024	DP
2	UPDATED CONCEPTUAL PLAN	12/07/2024	CE
1	HA 1-22 & HA 2-22 ADDED TO PLAN	31/10/2022	SK
NO.	REVISIONS	DD/MM/YYYY	INITIAL

MINTO COMMUNITIES
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT – BARRHAVEN SOUTH PHASE 3 – S1 AREA
3882 BARNSDALE ROAD
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:4000

Drawn by: GK

Checked by: DP

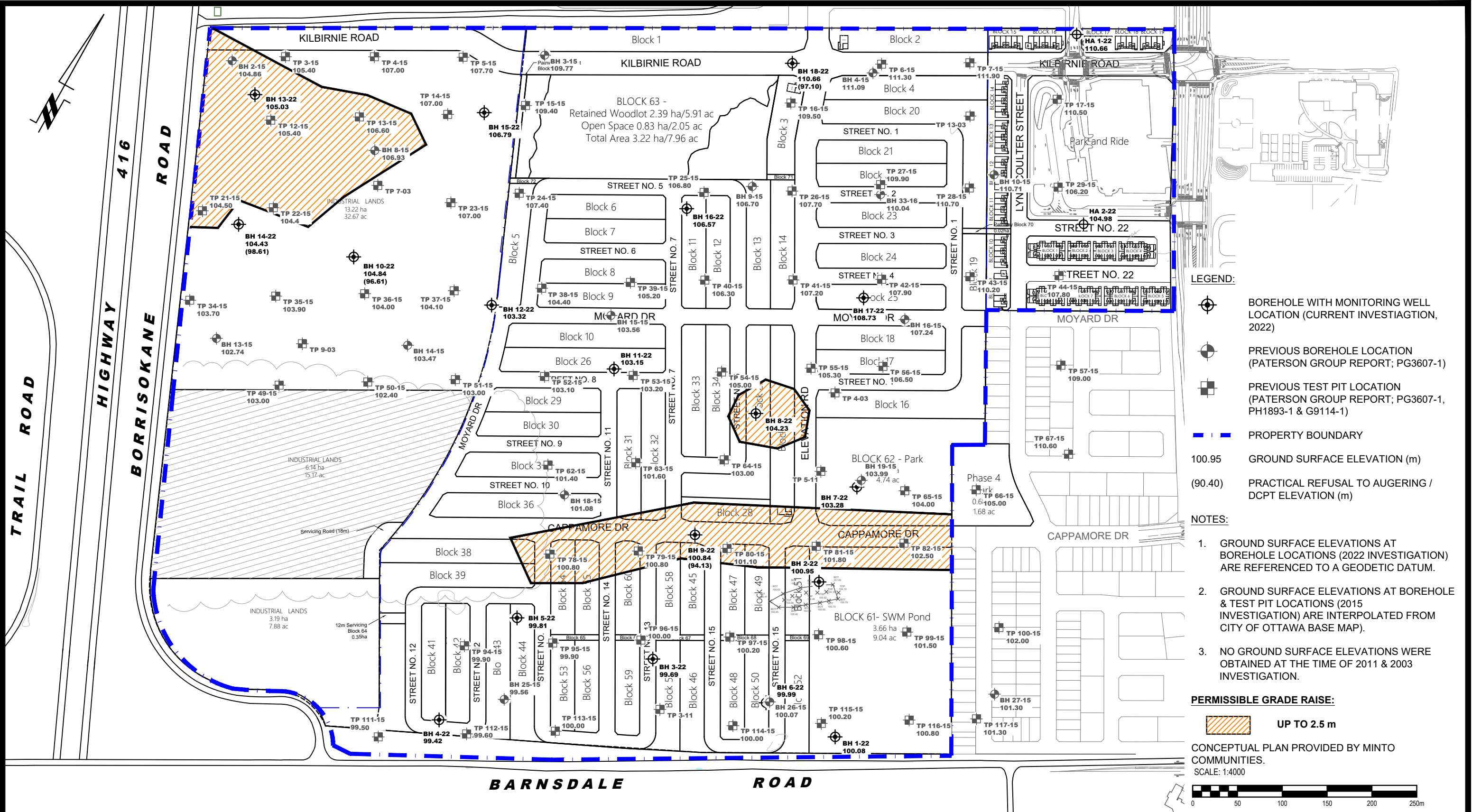
Approved by: DJG

Date: 10/2022

Report No.: PG6197-REP.01

Dwg. No.: PG6197-1

Revision No.: 4



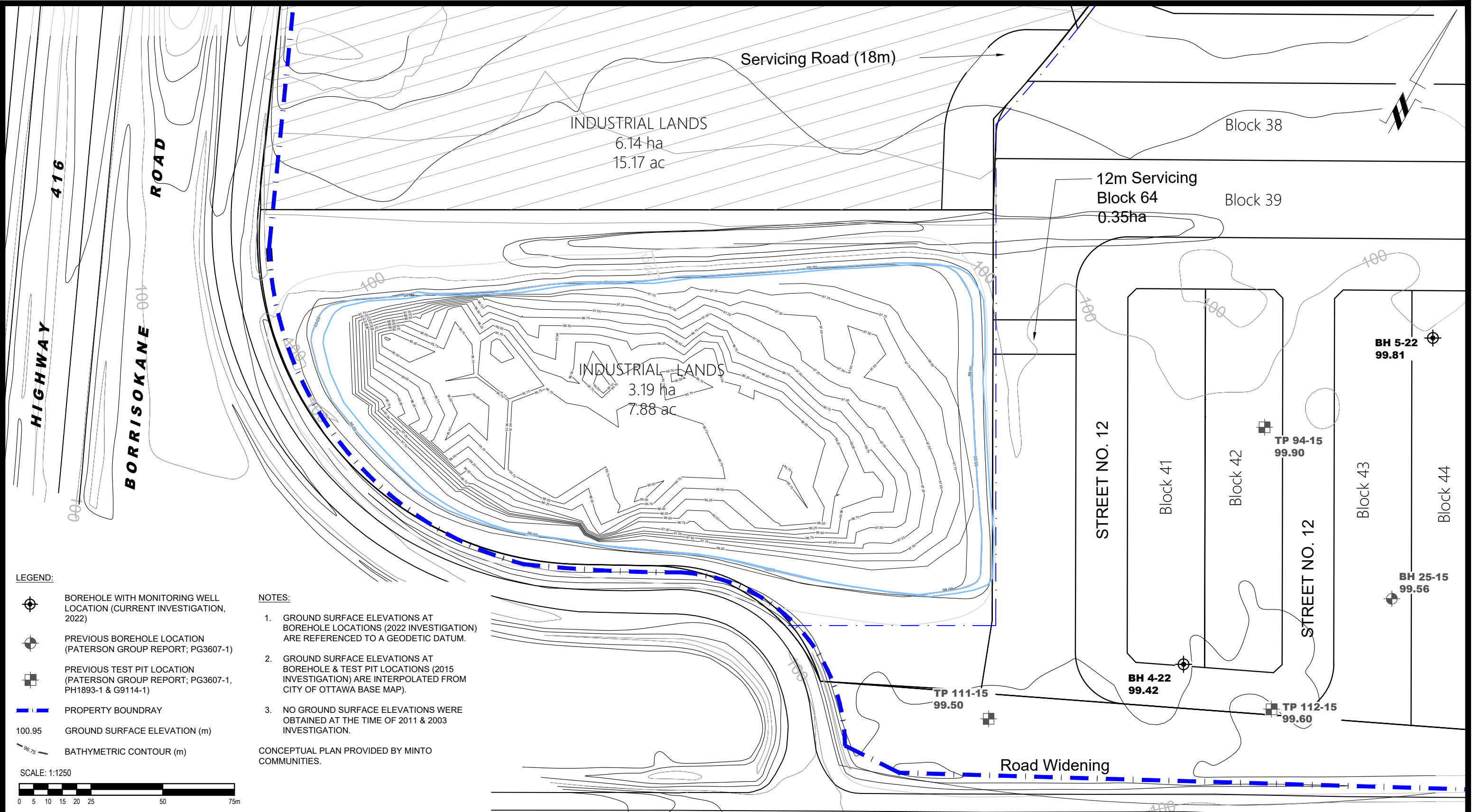
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

3	UPDATED CONCEPTUAL PLAN	26/05/2026	DP
2	UPDATED CONCEPTUAL PLAN	01/10/2024	DP
1	UPDATED CONCEPTUAL PLAN	12/07/2024	CE
NO.	REVISIONS	DD/MM/YYYY	INITIAL

MINTO COMMUNITIES
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT – BARRHAVEN SOUTH PHASE 3 – S1 AREA
3882 BARNSDALE ROAD
OTTAWA, ONTARIO

Title:
PERMISSIBLE GRADE RAISE PLAN

Scale:	1:4000	Date:	10/2022
Drawn by:	GK	Report No.:	PG6197-REP.01
Checked by:	DP	Dwg. No.:	PG6197-2
Approved by:	DJG	Revision No.:	3



LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION (CURRENT INVESTIGATION, 2022)
- PREVIOUS BOREHOLE LOCATION (PATERSON GROUP REPORT; PG3607-1)
- PREVIOUS TEST PIT LOCATION (PATERSON GROUP REPORT; PG3607-1, PH1893-1 & G9114-1)
- PROPERTY BOUNDARY
- 100.95 GROUND SURFACE ELEVATION (m)
- 96.75 BATHYMETRIC CONTOUR (m)



NOTES:

- GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS (2022 INVESTIGATION) ARE REFERENCED TO A GEODETIC DATUM.
- GROUND SURFACE ELEVATIONS AT BOREHOLE & TEST PIT LOCATIONS (2015 INVESTIGATION) ARE INTERPOLATED FROM CITY OF OTTAWA BASE MAP.
- NO GROUND SURFACE ELEVATIONS WERE OBTAINED AT THE TIME OF 2011 & 2003 INVESTIGATION.

CONCEPTUAL PLAN PROVIDED BY MINTO COMMUNITIES.



PATERSON GROUP

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

NO.	REVISIONS	DD/MM/YYYY	INITIAL
2	UPDATED CONCEPTUAL PLAN	26/05/2026	DP
1	UPDATED CONCEPTUAL PLAN	12/07/2024	CE

MINTO COMMUNITIES

GEOTECHNICAL AND HYDROLOGICAL INVESTIGATION
PROPOSED DEVELOPMENT - BARRHAVEN SOUTH EXPANSION
3882 BARNSDALE ROAD

OTTAWA, ONTARIO

Title:

BATHYMETRIC CONTOUR PLAN

Scale:	1:1250	Date:	10/2022
Drawn by:	GK	Report No.:	PG6197-REP.01
Checked by:	DP	Dwg. No.:	PG6197-3
Approved by:	DJG	Revision No.:	2