PATERSON GROUP

memorandum

re: **Groundwater Monitoring Program Summary**
Re-zoning and Site Plan Control Application
5360 Bank Street – Ottawa

to: **Percy Pyper (1997) Ltd** – Brent Pyper – info@greelysand.com
date: September 15, 2026
file: PH4841-MEMO.01.REV.01

Further to your request and authorization, Paterson Group (Paterson) has conducted a Groundwater Monitoring Program (GMP) in support of the proposed Re-zoning and Site Plan Control Application to be located at the aforementioned site.

1.0 Background Information

A field investigation was carried out by Paterson on March 17, 2026 at the subject site. During that time, a total of five (5) boreholes were extended to a maximum depth of 6.4 m below ground surface (bgs). At that time, all of the boreholes were equipped with monitoring well installations (BH 1-26, BH 2-26, BH 3-26, BH 4-26 and BH 5-26). Those 5 monitoring wells were utilized for the current groundwater monitoring program. The monitoring wells were distributed in a manner to provide general coverage of the proposed development, taking into consideration underground utilities and site features.

Hydrogeological Pre-consultation

A Hydrogeological Pre-consultation occurred with City of Ottawa (City) staff on February 26, 2026. During the Hydrogeological Pre-consultation and the following email discussions, it was determined that the City would accept a scoped GMP. Both the length of the monitoring program and the proposed monitoring well locations were approved by the City.

Field Survey

The monitoring well locations, and ground surface elevations at each monitoring well location were surveyed by Paterson using a handheld GPS unit and referenced to a geodetic datum. The location and ground surface elevation at each monitoring well location is presented on Drawing PG7831-1 – Test Hole Location Plan attached to the current memorandum.

Subsurface Profile

The subsurface profile at the monitoring well locations included in the current groundwater monitoring program generally consisted of fill or topsoil followed by till consisting of a brown silty sand with gravel and cobbles. In BH 1-26, BH 2-26 and BH 5-26 a brown silty sand layer with trace gravel or trace clay was noted to lie between the fill or topsoil layer and the till layer. Details of the subsurface profile at the monitoring wells included in current groundwater monitoring program can be found in the Soil Profile and Test Data Sheets attached to the current report.

Monitoring Well Installation

Each of the monitoring wells was constructed with 1.5 m of slotted 51 mm diameter PVC screen at the base of the aforementioned monitoring well with 51 mm diameter PVC riser pipe extending from the top of the screen to ground surface. The 51 mm diameter PVC riser extended to ground surface and was either capped with a flush mount cover or extended above the ground surface and covered with a protective steel monitoring well casing.

2.0 Groundwater Monitoring Program

On March 19, 2026 BH 1-26, BH 2-26, BH 3-26, BH 4-26 and BH 5-26 were equipped with a Van Essen Instrument Mini-Diver Water Level Logger to accurately monitor fluctuations in the groundwater levels. In addition, a Van Essen Instruments Baro-Diver was installed in BH 5-26 to monitor changes in atmospheric pressure. The Mini-Divers were programmed to continuously measure and record groundwater levels throughout the subject site at a rate of 1 reading every 24 hours.

The results of the groundwater fluctuations and correlated precipitation events for each monitoring well location between March 19, 2026, and September 4, 2026 have been summarized in Figure 1 through Figure 5 attached to the current report.

3.0 Groundwater Monitoring Results

The data presented in Figure 1 through Figure 5 illustrate the collected groundwater elevations between March 19, 2026 and September 4, 2026. The groundwater readings measured within the monitoring wells across the subject site varied from a minimum elevation of 104.80 m asl to a maximum average elevation of 107.07 m asl. The low and high groundwater elevation measurements at each monitoring well location are summarized in Table 1 below.

Based on our analysis of the datalogger readings, seasonal groundwater fluctuations can be observed at each monitoring well location with a difference in elevation between the low and high readings ranging from 0.3 to 1.24 m. The low groundwater level across the site was noted to be at an average elevation of 105.29 m asl throughout the monitoring period. The high groundwater table across the site during this monitoring period was found to be at an average elevation of 106.1 m asl.

Table 1: Groundwater Monitoring Summary

Well ID	Ground Surface Elevation (m asl)	Low Groundwater Elevation (m asl)	High Groundwater Elevation (m asl)	Difference in Groundwater Elevation (m asl)
BH 1-26	109.08	105.84	106.37	0.53
BH 2-26	109.72	105.13	105.43	0.30
BH 3-26	108.16	104.85	105.88	1.03
BH 4-26	107.99	104.80	105.74	0.94
BH 5-26	107.37	105.83	107.07	1.24
Average		105.29	106.10	0.81

We trust that this information satisfies your requirements.

Best Regards,

Paterson Group Inc.



Erik Ardley, P.Geo

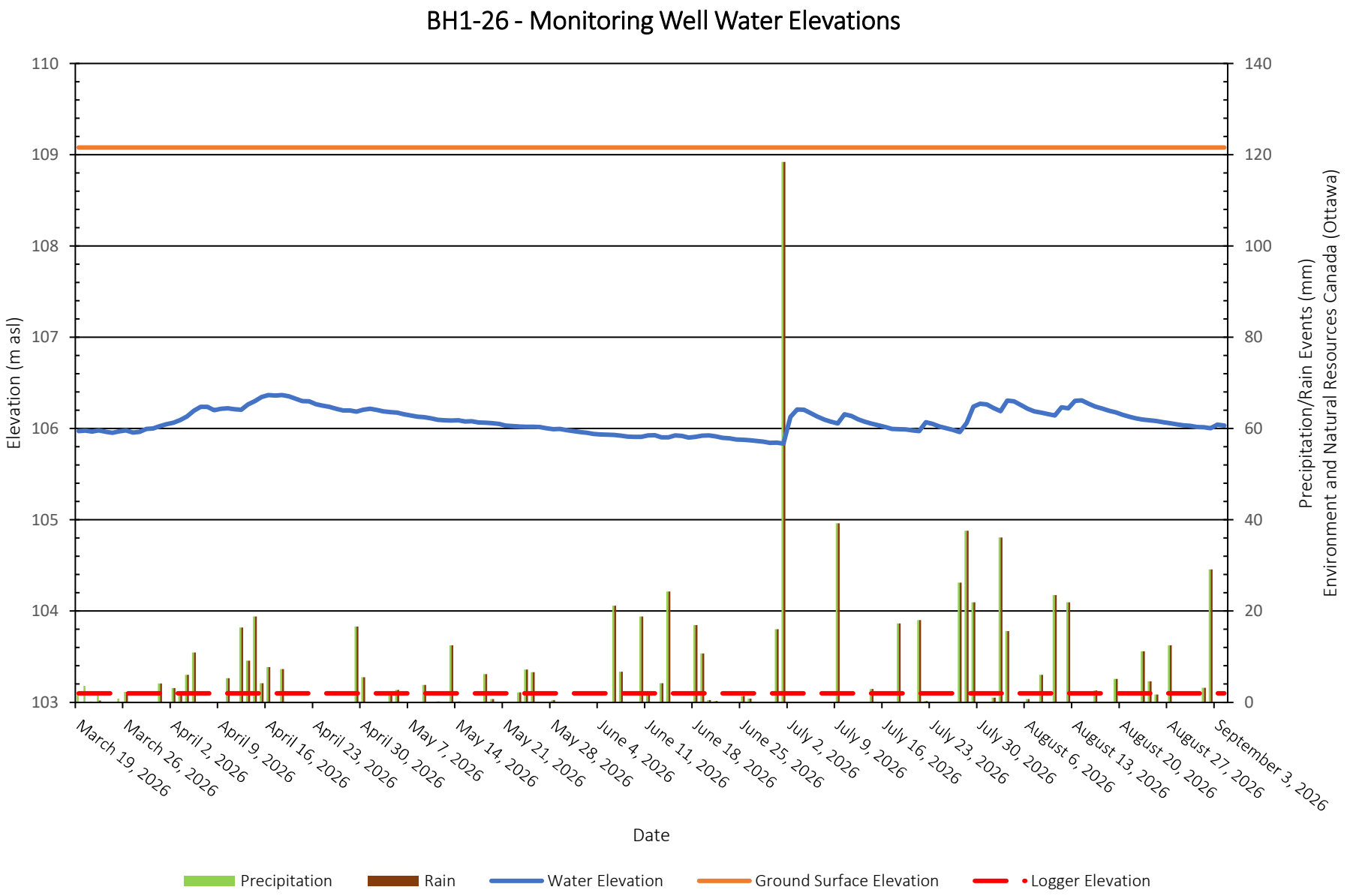


Attachments

- Figure 1 through Figure 5 – Groundwater Monitoring Levels
- Soil Profile and Test Data Sheets
- Drawing PG7831-1 – Test Hole Location Plan

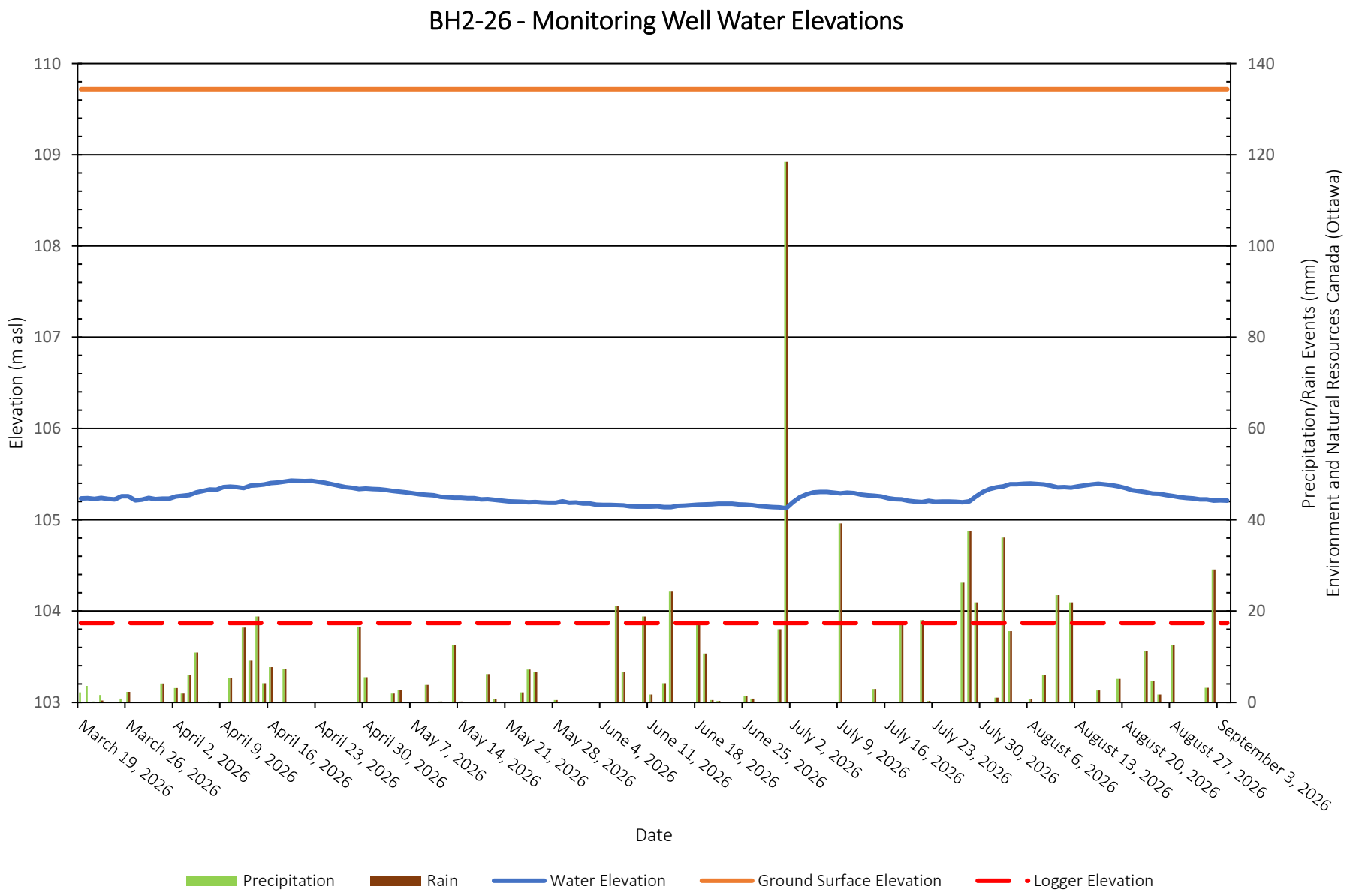
File: PH4841

Greely Sand Gravel
5360 Bank Street, Ottawa, Ontario
Monitoring Well Water Elevations



File: PH4841

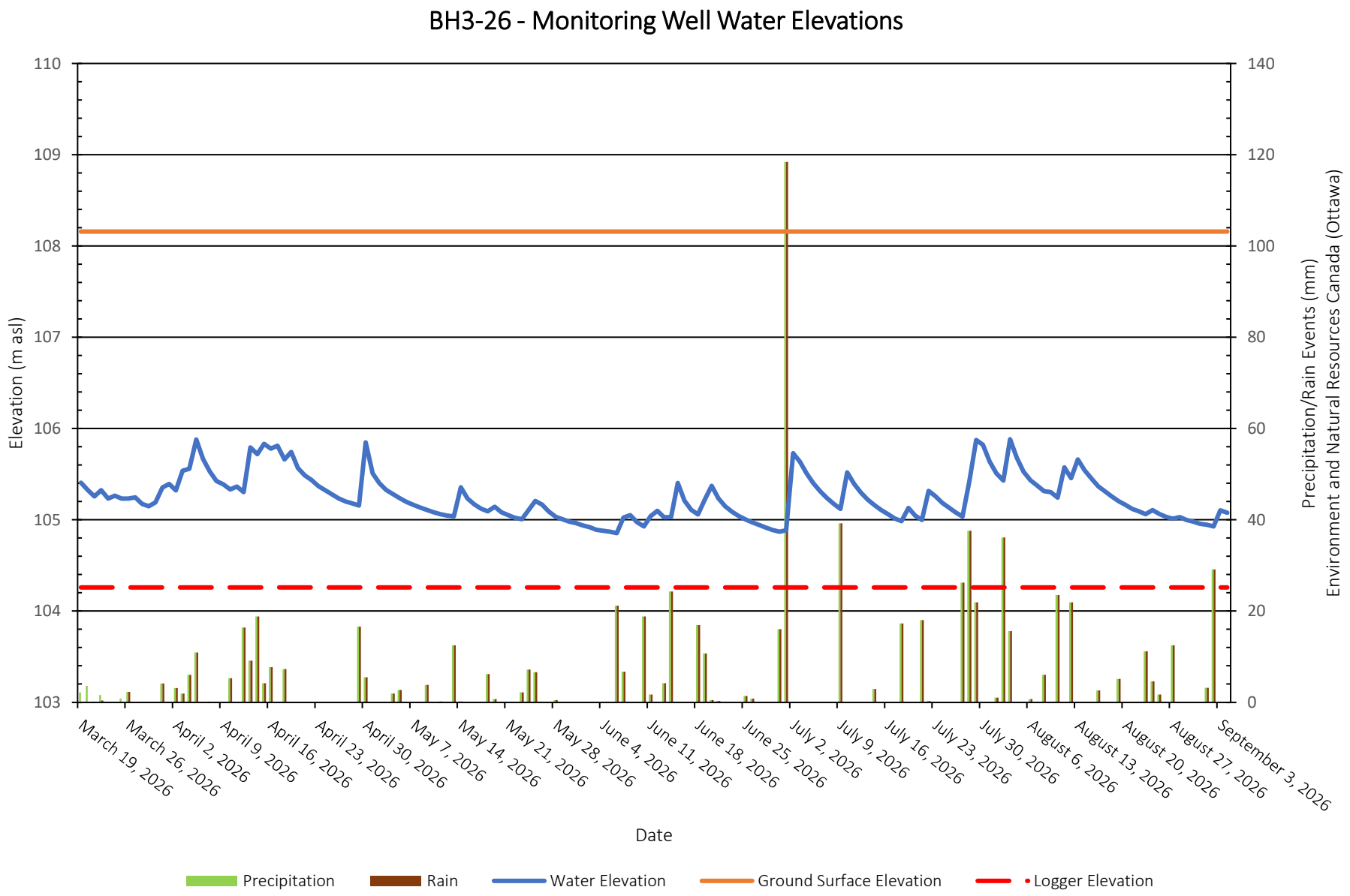
Greely Sand Gravel
5360 Bank Street, Ottawa, Ontario
Monitoring Well Water Elevations



PATERSON GROUP

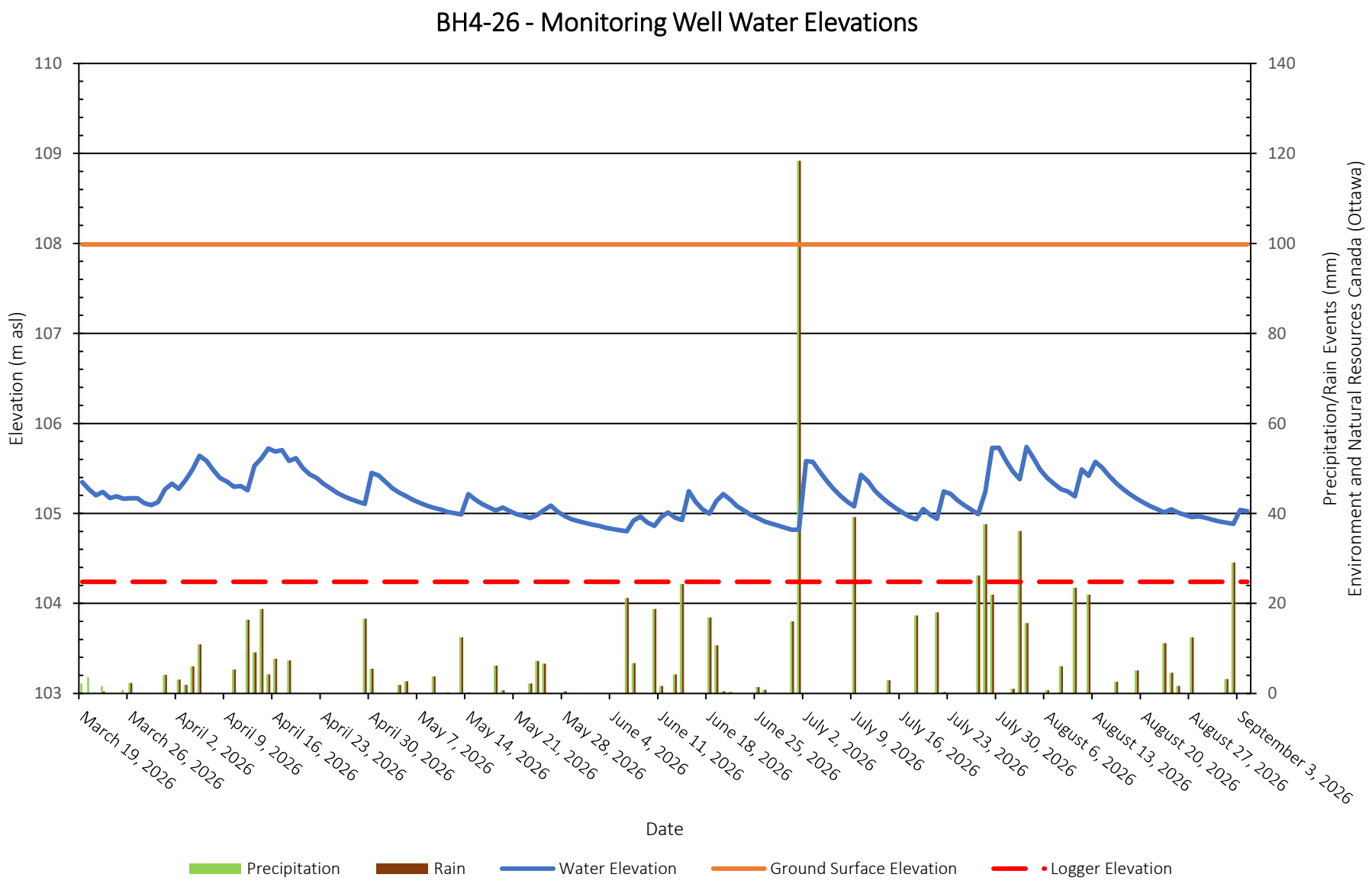
File: PH4841

Greely Sand Gravel
5360 Bank Street, Ottawa, Ontario
Monitoring Well Water Elevations



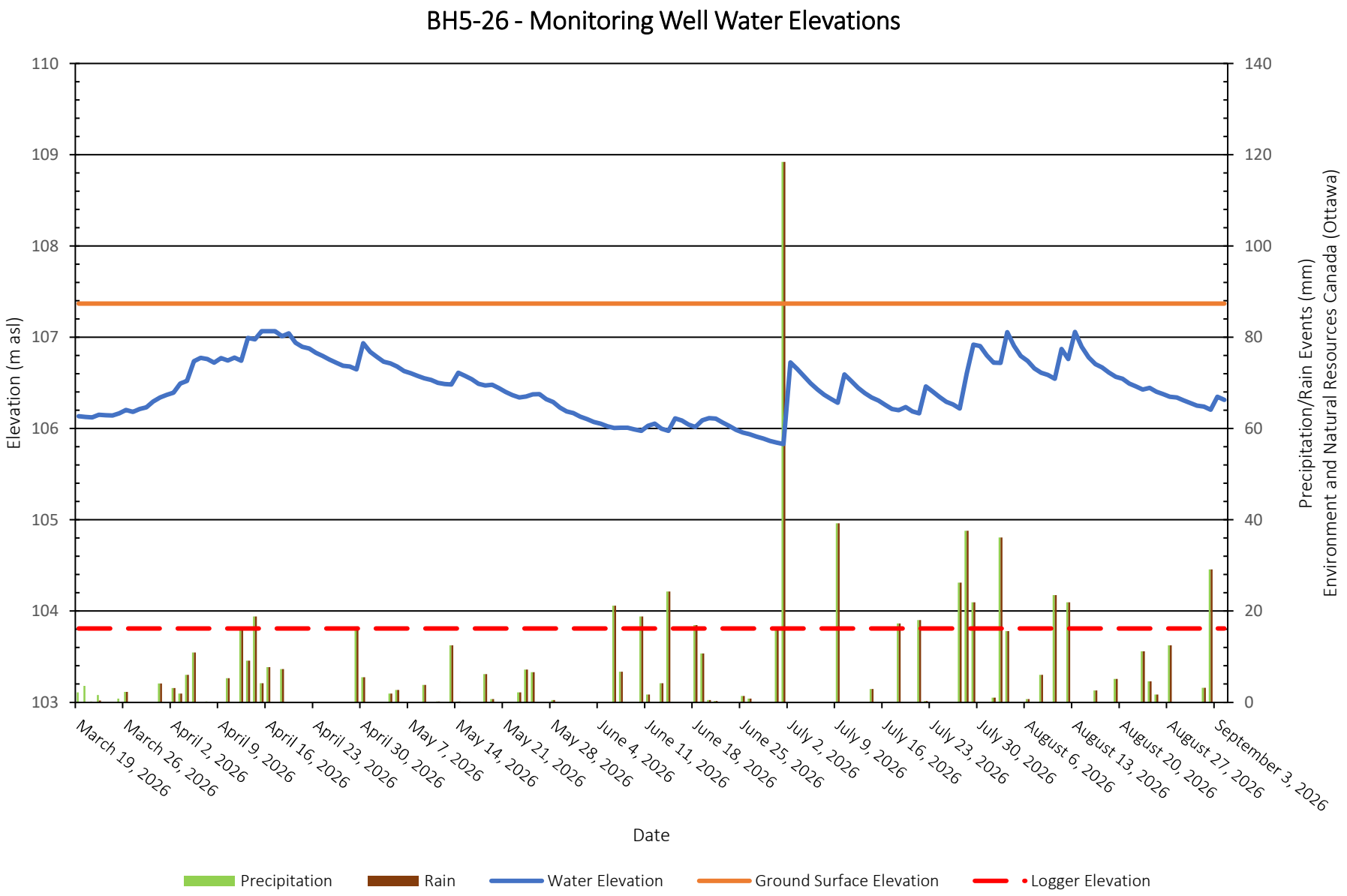
File: PH4841

Greely Sand Gravel
5360 Bank Street, Ottawa, Ontario
Monitoring Well Water Elevations



File: PH4841

Greely Sand Gravel
5360 Bank Street, Ottawa, Ontario
Monitoring Well Water Elevations



SOIL PROFILE AND TEST DATA

Geotechnical Investigation

5360 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 377088.44 **NORTHING:** 5016470.60 **ELEVATION:** 109.08

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS: Datum: NAD1983 (Canada) Geoid: HT2-2010 **DATE:** March 17, 2026

FILE NO. : PG7831

HOLE NO. : BH 1-26

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									109
FILL: Brown silty sand with gravel, trace organics, cobbles and clay		1	AU 1						
			SS 2	58	20-14-16-13 30				108
		2	SS 3	58	6-7-10-8 17				
2.21m [106.87m]									107
Compact to loose, brown **SILTY SAND** trace clay			SS 4	75	3-5-5-5 10				
		3	SS 5	67	3-4-3-6 7				106
		4	SS 6	58	4-7-7-8 14				105
		5	SS 7	83	3-4-5-6 9				104
5.26m [103.82m]									
GLACIAL TILL: Very dense, brown silty fine sand with gravel, cobbles and boulders		6	SS 8	64	23-24-48-50 72/0.1				103
6.43m [102.65m]			SS 9	92	15-28-50-/ 78/0.03				
End of Borehole		7							102
		8							

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

P:/AutoCAD Drawings/Test Hole Data Files/PG78xx/PG7831/data.sqlite 2026-03-31, 08:45 Paterson_Template AE

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

5360 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 377171.43 **NORTHING:** 5016452.47 **ELEVATION:** 109.72

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS: Datum: NAD1983 (Canada) Geoid: HT2-2010 **DATE:** March 17, 2026

FILE NO. : PG7831

HOLE NO. : BH 2-26

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
FILL: Brown silty sand with gravel			AU 1						109
0.69m [109.03m]									
Compact to very dense, brown **SILTY SAND**		1	SS 2	67	5-4-6-8 10				108
			SS 3	71	5-32-50-/ 82/0.05				
1.98m [107.74m]		2							
GLACIAL TILL: Very dense, brown silty fine sand with gravel, cobbles and boulders			SS 4	100	40-50-/-/ 50/None				107
		3	SS 5	36	50-/-/-/ 50/None				
			SS 6	61	21-50-/-/ 50/0.1				106
		4	SS 7	95	50-/-/-/ 50/0.08				105
		5	SS 8	66	20-50-/-/ 50/0.08				104
		6	SS 9	76	30-50-/-/ 50/0.05				103
6.30m [103.42m]									
End of Borehole		7							102
		8							

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

P:/AutoCAD Drawings/Test Hole Data Files/PG78xx/PG7831/data.sqlite 2026-03-31, 08:45 Paterson_Template AE

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

5360 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 377272.25 **NORTHING:** 5016441.87 **ELEVATION:** 108.16

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS: Datum: NAD1983 (Canada) Geoid: HT2-2010 **DATE:** March 17, 2026

FILE NO. : PG7831

HOLE NO. : BH 3-26

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
FILL: Brown silty sand with gravel, trace organics			AU 1						108
		1	SS 2	50	3-3-2-2 5				107
1.45m [106.71m]			SS 3	95	50-/-/-/ 50/0.08				
GLACIAL TILL: Very dense, brown silty fine sand with gravel, cobbles and boulders		2	SS 4	91	28-50-/-/ 50/0.13				106
		3	SS 5	85	35-50-/-/ 50/0.03				105
4.19m [103.97m]		4	SS 6	73	26-50-/-/ 50/0.13				104
End of Borehole		5							103
		6							102
		7							101
		8							

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

P:/AutoCAD Drawings/Test Hole Data Files/PG78xx/PG7831/data.sqlite 2026-03-31, 08:45 Paterson_Template AE

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

5360 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 377281.20 **NORTHING:** 5016436.81 **ELEVATION:** 107.99

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS: Datum: NAD1983 (Canada) Geoid: HT2-2010 **DATE:** March 17, 2026

FILE NO. : PG7831

HOLE NO. : BH 4-26

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
FILL: Brown silty sand with gravel, trace organics			AU 1						
		1	SS 2	29	7-8-8-6 16				107
1.45m [106.54m]			SS 3	63	50-/-/-/ 50/0.08				
GLACIAL TILL: Very dense, brown silty sand with gravel and cobbles		2							106
			SS 4	65	6-6-29-50 35/0.1				
		3	SS 5	66	15-50-/-/ 50/0.08				105
3.81m [104.18m]			SS 6		50-/-/-/ 50/0				
End of Borehole		4							104
		5							103
		6							102
		7							101
		8							100

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

P:/AutoCAD Drawings/Test Hole Data Files/PG78xx/PG7831/data.sqlite 2026-03-31, 08:45 Paterson_Template AE

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

5360 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 377386.92 **NORTHING:** 5016556.63 **ELEVATION:** 107.37

PROJECT: Proposed Development **FILE NO. :** PG7831

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS: Datum: NAD1983 (Canada) Geoid: HT2-2010 **DATE:** March 17, 2026 **HOLE NO. :** BH 5-26

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80	REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80	PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE											
TOPSOIL: trace organics 0.10m [107.27m]											107
Loose to compact, brown **SILTY SAND**, trace gravel 0.69m [106.68m]											
GLACIAL TILL: Very dense, brown silty fine sand with gravel, cobbles and boulders		1	AU 1								
			SS 2	83	9-25-21-25 46						106
		2	SS 3	635	20-34-33-30 67						
			SS 4	54	6-50-/-/ 50/0.13						105
		3	SS 5	51	50-/-/-/ 50/0.1						
3.66m [103.71m]											104
End of Borehole		4									
Practical refusal to augering at 3.66 m depth											103
		5									
											102
		6									
											101
		7									
											100
		8									

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

P:/AutoCAD Drawings/Test Hole Data Files/PG78xx/PG7831/data.sqlite 2026-03-31, 08:45 Paterson_Template AE

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2$ / (D10 x D60)
Cu	-	Uniformity coefficient = D60 / D10

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

CONSOLIDATION TEST

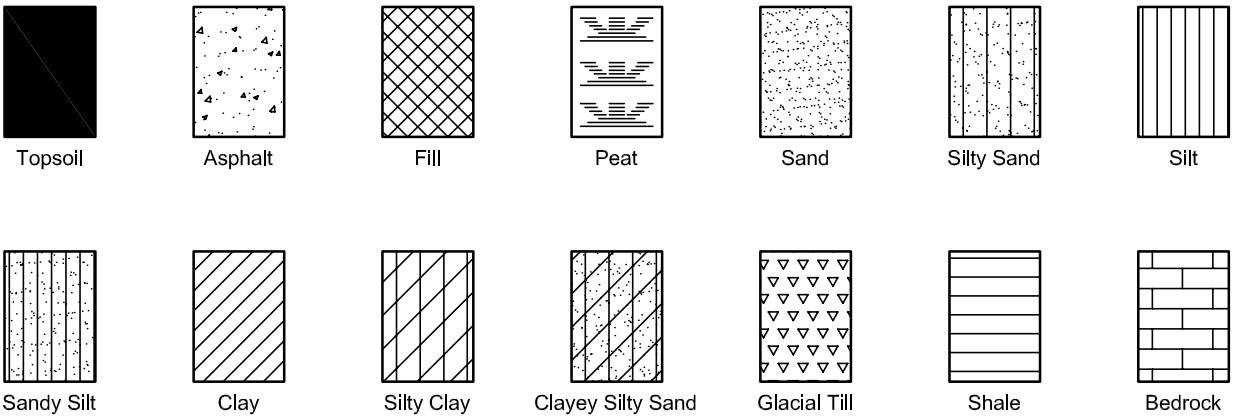
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

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

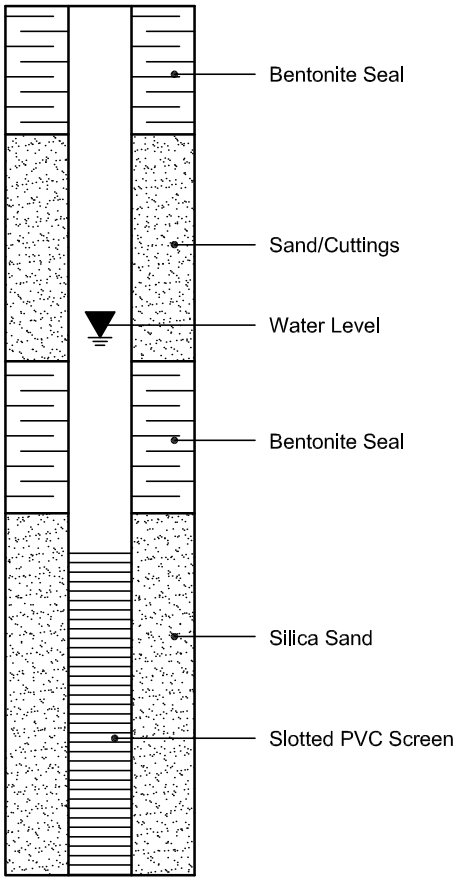
SYMBOLS AND TERMS (continued)

STRATA PLOT

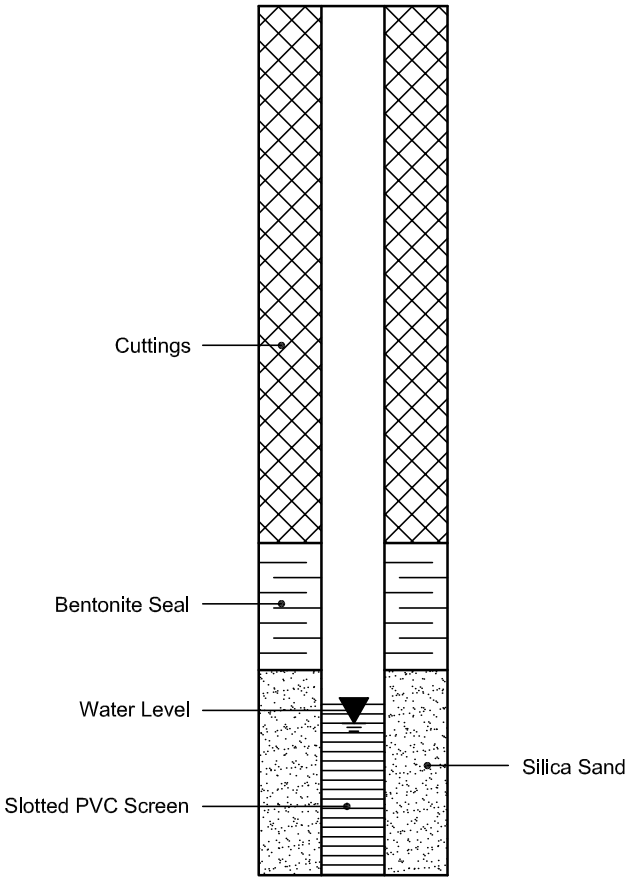


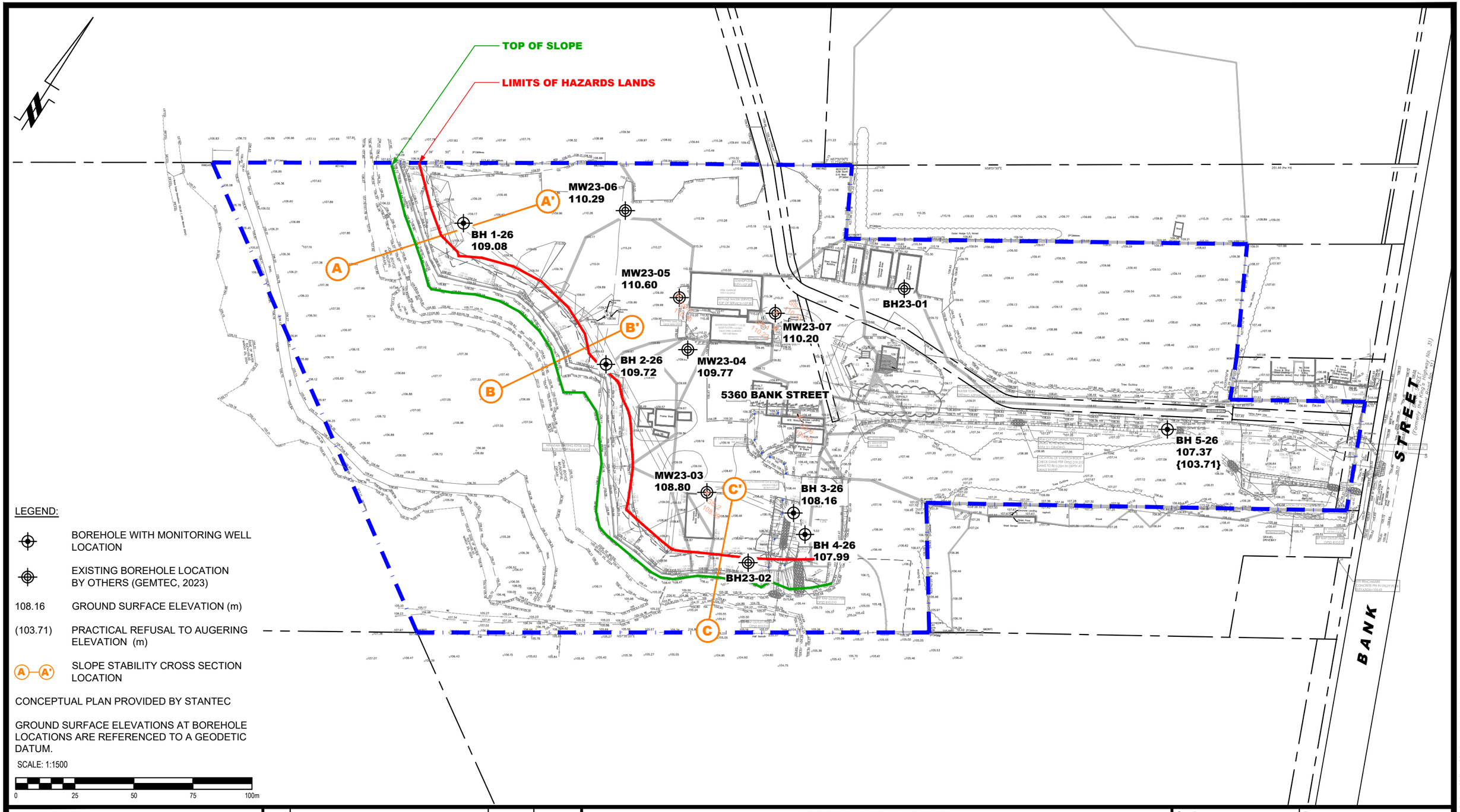
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION





LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- EXISTING BOREHOLE LOCATION BY OTHERS (GEMTEC, 2023)
- 108.16 GROUND SURFACE ELEVATION (m)
- (103.71) PRACTICAL REFUSAL TO AUGERING ELEVATION (m)
- A—A' SLOPE STABILITY CROSS SECTION LOCATION

CONCEPTUAL PLAN PROVIDED BY STANTEC

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

SCALE: 1:1500

0 25 50 75 100m

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

NO.	REVISIONS	DATE	INITIAL

GREELY SAND & GRAVEL
GEOTECHNICAL INVESTIGATION
PROPOSED DEVELOPMENT
5360 BANK STREET
OTTAWA, ONTARIO

Title: TEST HOLE LOPCATION PLAN

Scale: 1:1500	Date: 03/2026
Drawn by: GK	Report No.: PG7831-1
Checked by: ZA	Dwg. No.: PG7831-1
Approved by: SD	Revision No.:

p:\autocad drawings\geotechnical\pg78xx\pg7831\pg7831-1 test hole location plan.dwg

11x17