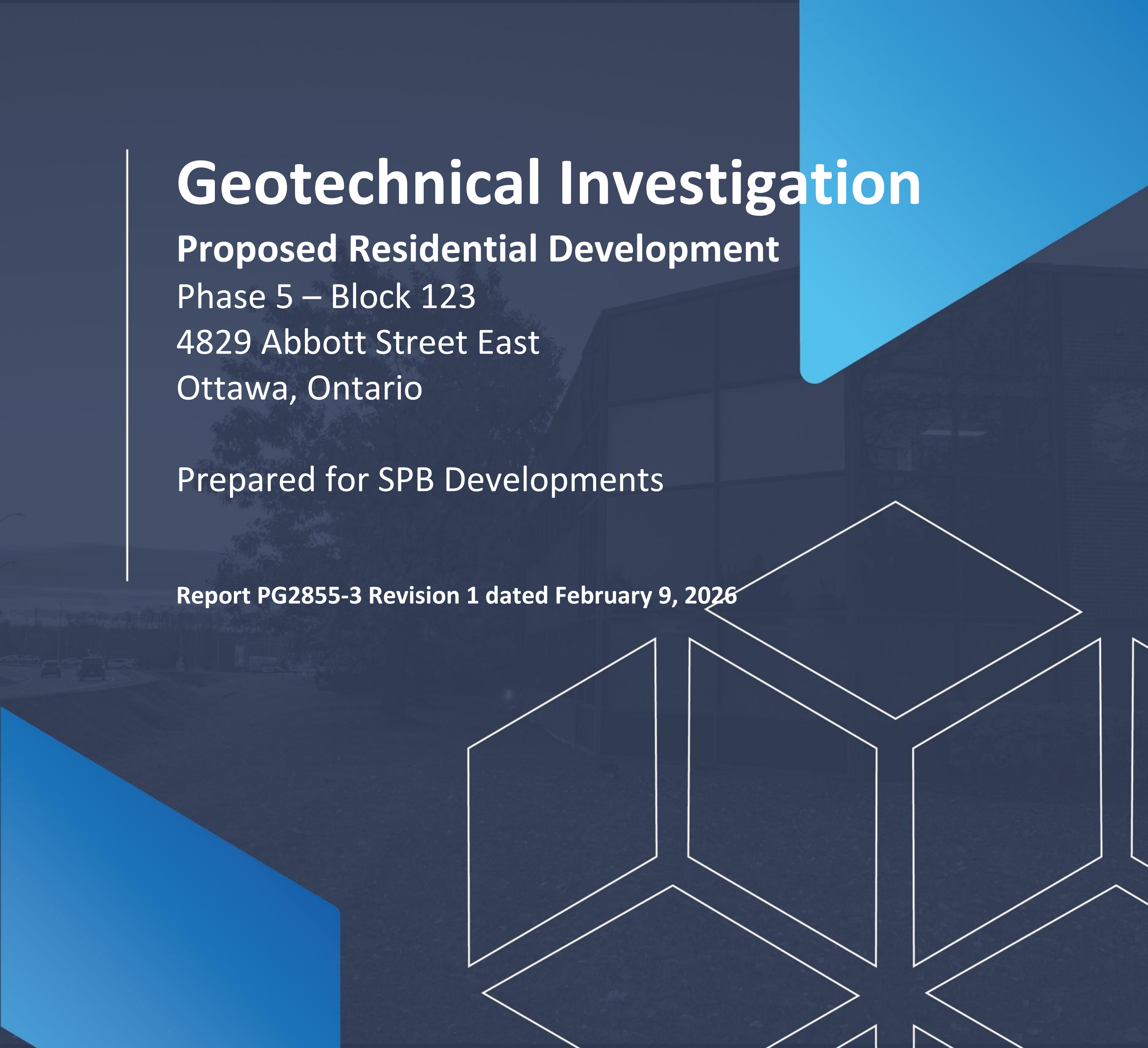


Geotechnical Investigation

Proposed Residential Development

Phase 5 – Block 123
4829 Abbott Street East
Ottawa, Ontario

Prepared for SPB Developments

Report PG2855-3 Revision 1 dated February 9, 2026

Table of Contents

Appendices

Appendix 1	Soil Profile and Test Data Sheets Symbols and Terms Unidimensional Consolidation Testing Sheets Atterberg Limits Testing Results
Appendix 2	Figure 1 – Key Plan Drawing PG2855-9 – Test Hole Location Plan
Appendix 3	PG2855-MEMO.20 Revision 10 dated November 8, 2022 PG2855-MEMO.21 dated November 8, 2022

1.0 Introduction

Paterson Group (Paterson) was commissioned by SPB Developments to conduct a geotechnical investigation for the proposed residential development (Block 123) to be located within Phase 5 of the subject development at 4829 Abbott Street East in the City of Ottawa (refer to Figure 1 - Key Plan presented in Appendix 2).

The objectives of the geotechnical investigation were to:

- ☐ Determine the subsurface soil and groundwater conditions based on test hole information completed within the subject site.

- ☐ Provide geotechnical recommendations pertaining to the design of the proposed residential block including construction considerations which may affect the design. These recommendations include but are not limited to foundation design and pavement design and will address OBC Part 4 requirements.

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

Investigating the presence or potential presence of contamination on the proposed development was not part of the scope of work. Therefore, the present report does not address environmental issues.

2.0 Proposed Development

Based on the available conceptual plan, it is understood that the proposed development will consist of five low to mid-rise, multi-unit residential buildings.

It is further understood that the remainder of the site will generally be occupied by parking areas, access lanes, and landscaped areas. It is also expected that the subject site will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for our investigation was carried out on August 13 and 14, 2014. At that time, two (2) boreholes, extending to a maximum depth of 9.8 m below the existing ground surface, and two (2) test pits, extending to a depth of 4.0 m below the existing ground surface, were completed within the subject block. The test hole locations were placed in a manner to provide general coverage of the subject site taking into account site accessibility issues. The test holes hole locations are presented on Drawing PG2855-9 – Test Hole Location Plan included in Appendix 2.

The boreholes were advanced using a track-mounted auger drill rig operated by a two-person crew, and test pits were excavated using a backhoe. All fieldwork was conducted under the full-time supervision of our personnel under the direction of a senior engineer from our geotechnical department. The drilling and excavating procedures consisted of advancing each test hole to the required depths at the selected locations and sampling the overburden.

Sampling and In Situ Testing

Soil samples were collected from the boreholes using a 50 mm diameter split-spoon (SS) sampler, using 73 mm diameter thin walled (TW) Shelby tubes in conjunction with a piston sampler, or from the auger flights, and grab samples were collected from the open test holes during test pitting operations. Soil samples were recovered along the sidewalls of the test pits by hand during excavation. The depths at which the auger, split spoon, Shelby tube, and grab samples were recovered from the test holes are shown as AU, SS, TW, and G, respectively, on the Soil Profile and Test Data sheets in Appendix 1.

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

Undrained shear strength testing was carried out at regular depth intervals in cohesive soils.

All soil samples were classified on site, placed in sealed plastic bags, and were transported to our laboratory for visual inspection.

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

Groundwater

Flexible standpipes were installed in the boreholes to monitor the groundwater level subsequent to the completion of the sampling program. Groundwater infiltration was observed within the sidewalls of the test pits at the time of excavation. The groundwater observations are discussed in Subsection 4.3 and presented in the Soil Profile and Test Data sheets presented in Appendix 1.

3.2 Field Survey

The test hole locations were laid out by Paterson personnel. The locations of the test holes are presented in Drawing PG2855-7 – Test Hole Location Plan in Appendix 2. The ground surface elevations at the test hole locations were provided by Fairhall, Moffat, and Woodland Ltd and are referenced to a geodetic datum.

3.3 Laboratory Testing

The soil samples recovered from the field investigation were examined in our laboratory. Three (3) Shelby tube samples were submitted for unidimensional consolidation. One (1) sample was submitted for Atterberg limit testing. In addition, one (1) sample was submitted for Atterberg limit testing from a previous investigation completed for neighboring properties on a selected sample in close proximity to the subject site.

The results of the consolidation and Atterberg testing are presented on the Unidimensional Consolidation Test Results and Atterberg Limits sheets presented in Appendix 1 and are further discussed in Sections 4 and 5.

4.0 Observations

4.1 Surface Conditions

Currently, the subject block consists of a fill pile, placed as part of a previously completed settlement surcharge monitoring program. Block 123 is bordered to the northwest by Phase 5 of the subject development, to the northeast by the Carp River, to the southeast by Abbott Street, and to the southwest by Cranesbill Road and residential housing. The Metric Homes site office is located at the southern border of Block 123.

The original ground surface across the subject site is relatively flat and slopes gradually downward to the Carp River to the northeast. The current ground surface across the subject site (the top of the fill pile) is relatively flat, slopes gradually downward to the northwest, and is approximately 2 m above the grade of Abbott Street to the southeast.

4.2 Subsurface Profile

Overburden

At the time of the geotechnical investigations, the soil conditions encountered at the test hole locations generally consisted of a cultivated topsoil/organic layer followed by an undisturbed loose silty sand layer.

The above-noted layers were underlain by an undisturbed, very stiff to firm, brown silty clay deposit followed by firm to soft, grey silty clay extending to a maximum depth of 9.8 m below the existing ground surface.

Practical refusal to DCPT was noted at depths between 27.3 and 34.1 m at boreholes located within Phase 5 but outside the current block. Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific details of the soil profiles encountered at each test hole location.

Existing borehole information within the subject site is presented in Appendix 1. The borehole locations are detailed in Drawing PG2855-9 – Test Hole Location Plan in Appendix 2. It should be noted that the low shear strength values noted at several sampling intervals were determined at the time of the original investigations to be caused by sampling disturbance and are not considered representative of the in-situ soil conditions.

Bedrock

Based on available geological mapping, the bedrock in this area mostly consists of interbedded limestone and dolomite of the Gull River formation with an overburden drift thickness of 25 to 35 m depth.

Atterberg Limits Testing

Atterberg limits testing, as well as associated moisture content testing, was completed on the recovered soil sample at select borehole locations. The results of the Atterberg limits test are presented in Table 1 and on the Atterberg Limits Results sheet in Appendix 1.

Table 1 – Atterberg Limits Results

Sample	Depth (m)	LL (%)	PL (%)	PI (%)	w (%)	Classification
BH 3A	4.16	37	22	15	53.1	CL
BH8 TW5	4.88	37	30	7	50.6	ML

Notes: LL: Liquid Limit; PL: Plastic Limit; PI: Plasticity Index; w: water content;
ML: Inorganic Silt of Low Plasticity, CL: Inorganic Clay of Low Plasticity

4.3 Groundwater

Groundwater levels (GWLs) were measured in the standpipes installed in the boreholes and groundwater infiltration levels were noted at the test pit locations at the time of excavation and the results are summarized in Table 2.

Table 2 – Summary of Groundwater Levels

Borehole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
		Depth (m)	Elevation (m)	
BH 7	95.56	1.80	93.76	August 14, 2014
BH 8	95.45	2.30	93.15	August 21, 2014
TP 1*	95.27	3.90	91.37	August 14, 2014
TP 2*	94.91	0.80	94.11	

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

It should be noted that flexible piezometers can become damaged during backfilling of the borehole, which can lead to lower or higher than normal groundwater level readings. Long-term groundwater levels can also be estimated based on the observed colouring, moisture levels, and consistency of the recovered soil samples. Based on these observations, the long-term groundwater level is expected to be between **2.0 to 3.0 m** depth below the original ground surface elevation.

Groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.

The groundwater level readings are presented in the Soil Profile and Test Data sheets in Appendix 1.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is adequate for the proposed residential development.

Permissible grade raise restriction areas were previously recommended for the proposed development based on our in situ shear vane results and consolidation testing results. As a result of our permissible grade raise recommendations and design finished grading information, a settlement surcharge monitoring program was completed across Block 123. The location of the settlement plate within Block 123 is presented in Drawing PG2855-9 – Test Hole Location Plan in Appendix 2. The results of our settlement monitoring data to date are presented in Figure 2 in Appendix 2.

Due to the successful completion of the above-noted surcharge program within Block 123, **no permissible grade raise restrictions** are required for the proposed development at the subject site.

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

5.2 Site Grading and Preparation

Stripping Depth

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

Where loose or disturbed native material is encountered at subgrade level, a proof-rolling program should be implemented, consisting of compacting the loose material with several passes of a vibratory drum roller under dry conditions and above freezing temperatures, and under the observation of Paterson. Any poor performing areas noted during the proof-rolling operation should be removed and replaced with an approved fill.

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 material for areas where engineered fill with thicknesses up to 0.5 m are required. For areas where engineered fill thicknesses of greater than 0.5 m are required below footing level, it is recommended to build the subgrade level up with a workable, brown silty clay placed in maximum 300 mm loose lifts and compacted using a sheepsfoot roller making several lifts under dry conditions, in above freezing temperatures and periodically inspected by the geotechnical consultant.

The compacted silty clay fill should be capped with a minimum 0.5 m thick granular pad, consisting of Granular A or Granular B Type II, compacted to a minimum 98% of its standard Proctor maximum dry density (SPMDD) and placed in maximum 300 mm loose lifts. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the buildings should be compacted to at least 98% of its SPMDD.

Non-specified existing fill along with site-excavated soil can be used as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. Site excavated, stiff brown silty clay under dry conditions and approved by the geotechnical consultant at the time of placement can be used to build up the subgrade level for areas to be paved. The stiff, brown silty clay should be placed in maximum 300 mm loose lifts and compacted using a sheepsfoot roller to a minimum density of 95% of its 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.

5.3 Foundation Design

It is anticipated that the proposed structures can be founded over conventional shallow footings placed on an approved engineered pad (detailed in Subsection 5.2) over an undisturbed, compact silty sand or an undisturbed, firm to stiff silty clay bearing surface. In areas where finished grade is slightly above the existing ground surface, engineered fill will be required to build up the subgrade level below the underside of footing.

Bearing Resistance Value

Using continuously applied loads, footings for the proposed buildings can be designed using the bearing resistance values presented in Table 2 on the following page.

Table 3 – Bearing Resistance Value

Bearing Surface	Bearing Resistance Value at SLS (kPa)	Factored Bearing Resistance Value at ULS (kPa)
Compact Silty Sand	60	125
Firm Grey Silty Clay	60	125
Stiff Brown Silty Clay	100	180
Engineered Fill	100	180

Note: Strip footings, up to 3 m wide, and pad footings, up to 4 m wide, paced over a silty clay bearing surface can be designed using the above noted bearing resistance values.

The bearing resistance values are provided on the assumption that the footings will be placed on undisturbed soil bearing surfaces. An undisturbed soil bearing surface consists of one from which all topsoil and deleterious materials, such as loose, frozen, or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of concrete for footings.

The bearing resistance value given for footings at SLS will be subjected to potential post construction total and differential settlements of 25 and 20 mm, respectively.

Lateral Support

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

Settlement/Grade Raise

Undrained shear strength testing was completed using a vane apparatus at each borehole location. In addition to the shear strength testing, undisturbed silty clay samples were collected using 73 mm diameter thin walled (TW) Shelby tube in conjunction with a piston sampler.

The Shelby tube sample was sealed at both ends and transported to our laboratory for unidimensional consolidation testing.

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

Generally, the potential long-term settlement is evaluated based on the compressibility characteristics of the silty clay. These characteristics are estimated in the laboratory by conducting unidimensional consolidation tests on undisturbed soil samples collected using Shelby tubes in conjunction with a piston sampler. Three (3) site specific consolidation tests were conducted. The results of the consolidation test are presented in Table 4 and in Appendix 1.

The values for C_{cr} and C_c are the recompression and compression indices, respectively. These soil parameters are a measure of the compressibility due to stress increases below and above the preconsolidation pressures. The higher values for the C_c, as compared to the C_{cr}, illustrate the increased settlement potential above, as compared to below, the preconsolidation pressure.

Table 4 – Summary of Consolidation Testing Results

Borehole	Sample	Depth (m)	p'_c	p'_o	C_{cr}	C_c	Q
BH 6	TW 5	5.00	91	53	0.016	0.835	P
BH 7	TW 5	4.98	75	70	0.015	0.471	P
BH 8	TW 5	5.03	92	65	0.030	0.589	A

* - Q – Quality Assessment of Sample – G: Good A: Acceptable P: Likely Disturbed

The values of p'_c, p'_o, C_{cr} and C_c are determined using standard engineering testing procedures and are estimates only. Natural variations within the soil deposit will affect the results. The p'_o parameter is directly influenced by the groundwater level. Groundwater levels were measured during the site investigation. Groundwater levels vary seasonally which has an impact on the available preconsolidation.

Lowering the groundwater level increases the p'_o and therefore reduces the available preconsolidation.

Unacceptable settlements could be induced by a significant lowering of the groundwater level. The p'_o values for the consolidation tests during the investigation are based on the long-term groundwater level being at 0.5 m below the existing groundwater table.

The groundwater level is based on the colour and undrained shear strength profile of the silty clay.

The potential post construction total and differential settlements are dependent on the position of the long-term groundwater level when buildings are situated over deposits of compressible silty clay. Efforts can be made to reduce the impacts of the proposed development on the long-term groundwater level by placing clay dykes in the service trenches, reducing the sizes of paved areas, leaving green spaces to allow for groundwater recharge or limiting planting of trees to areas away from the buildings. However, it is not economically possible to control the groundwater level.

To reduce potential long-term liabilities, consideration should be given to accounting for a larger groundwater lowering and to provide means to reduce long-term groundwater lowering (e.g. clay dykes, restriction on planting around the dwellings, etc). Buildings on silty clay deposits increases the likelihood of movements and therefore of cracking.

The use of steel reinforcement in foundations placed at key structural locations will tend to reduce foundation cracking compared to unreinforced foundations.

Settlement Surcharge Monitoring Program

A settlement surcharge monitoring program was completed for Block 123 within Phase 5 of the subject development, where significant permissible grade raise exceedances occur. The surcharge program was initiated in April 2020, following the placement of fill material within Block 123. At that time, three (3) settlement plates (SP6, SP8, and SP9) were installed to permit ongoing monitoring of the surcharge program. The remaining fill material for the surcharge program was placed between May and June 2020. As part of the fill placement, Three (3) additional settlement plates (SP5, SP7, and SP10) were installed to permit ongoing monitoring of the surcharge program.

The surcharge program was completed in October 2022. Based on the results of the surcharge program, total cumulative settlements of up to 293 mm were observed for to SP5 to SP10 over the duration of the Phase 5 settlement surcharge monitoring program.

A revised grading plan review was completed by Paterson for the proposed development following the completion of the surcharge programs.

Based on our review, we have provided lightweight fill recommendations where grade raise exceedances have occurred across the entire subdivision. However, for Block 123 where the settlement surcharge program has been completed, the LWF recommendations can be omitted.

The results of our grading plan review are presented in memorandum report PG2855-MEMO.20 Revision 10 dated November 8, 2022, and PG2855-MEMO.21 dated November 8, 2022, in Appendix 3.

Footings designed using the above-noted bearing resistance values will be subjected to post-construction total and differential settlements of 25 and 20 mm, respectively. A post-development groundwater lowering of 0.5 m was assumed.

5.4 Design for Earthquakes

It is expected that the footings of the proposed residential dwellings will be founded over an engineered fill pad or directly over an undisturbed, silty clay or silty sand bearing surface. Due to the thick silty clay layer observed on the subject site, a seismic site response **Class E** is applicable to the subject site according to the OBC 2024. The soils underlying the site are not susceptible to liquefaction.

5.5 Basement Slab

With the removal of all topsoil and deleterious fill, containing organic matter, within the footprints of the proposed buildings, undisturbed native soil surface will be considered acceptable subgrade on which to commence backfilling for floor slab construction.

Any soft areas should be removed and backfilled with appropriate backfill material. OPSS Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab. It is recommended that the upper 200 mm of sub-slab fill consist of 19 mm clear crushed stone.

5.6 Pavement Structure

For design purposes, the pavement structure presented in the tables on the following page could be used for the design of driveways and paved parking areas, local residential roadways and roadways with bus traffic.

Table 5 – Recommended Pavement Structure – Driveways & Car-Only Parking Areas

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

Table 6 – Recommended Pavement Structure – Local Residential Roadways

Thickness (mm)	Material Description
40	**Wear Course** – HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Binder Course** – HL-8 or Superpave 19.0 Asphaltic Concrete
150	**BASE** – OPSS Granular A Crushed Stone
450	**SUBBASE** – OPSS Granular B Type II
SUBGRADE – Either in situ soil or OPSS Granular B Type I or II material placed over in situ soil.	

Table 7 – Recommended Pavement Structure – Roadways with Bus Traffic

Thickness (mm)	Material Description
40	**Wear Course** – HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Upper Binder Course** – HL-8 or Superpave 19.0 Asphaltic Concrete
50	**Lower Binder Course** – HL-8 or 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 placed over in situ soil.	

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 purposes.

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

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. Weak subgrade conditions may be experienced over service trench fill materials. This may require the use of a geotextile, such as Terratrack 200 or equivalent, thicker subbase, or other measures that can be recommended at the time of construction as part of the field observation program.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable compaction equipment.

Pavement Structure Drainage

Satisfactory performance of the pavement structure is largely dependent on keeping the contact zone between the subgrade material and the base stone in a dry condition. Failure to provide adequate drainage under conditions of heavy wheel loading can result in the fine subgrade soil being pumped into the voids in the stone subbase, thereby reducing its load carrying capacity.

Where silty clay is anticipated at subgrade level, consideration should be given to installing subdrains during the pavement construction. The sub-drain inverts should be approximately 300 mm below subgrade level and run longitudinal along the curblines. The subgrade surface should be crowned to promote water flow to the drainage lines.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage

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

Foundation Backfill

<u>Foundation Walls</u>

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

<u>Sidewalks and Walkways</u>

Backfill material below sidewalk and walkway subgrade areas or other settlement sensitive structures which are not adjacent to the buildings should consist of free draining, non-frost susceptible material. This material should be placed in a maximum of 300 mm thick loose lifts and compacted to at least 98% of its SPMDD under dry and above freezing conditions.

6.2 Protection 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 alone, or a combination of soil cover in conjunction with foundation insulation 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 and Service Trenches

Excavations will be mostly through silty sand and sensitive grey silty clay. Above the groundwater level, for excavations to depths of approximately 3 m, the excavation side slopes should be stable in the short term at 1.5H:1V. Flatter slopes could be required for deeper excavations or for excavation 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 a 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.

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 differences 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.

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. The potential for base heave in cohesive soils should be determined for the stability of flexible retaining systems.

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

$$FS_b = N_b s_u/\sigma_z$$

Where:

- ☐ Nb - stability factor dependent upon the geometry of the excavation and given in Figure 1 on the following page.
- ☐ su - undrained shear strength of the soil below the base level.
- ☐ σz - total overburden and surcharge pressures at the bottom of the excavation.

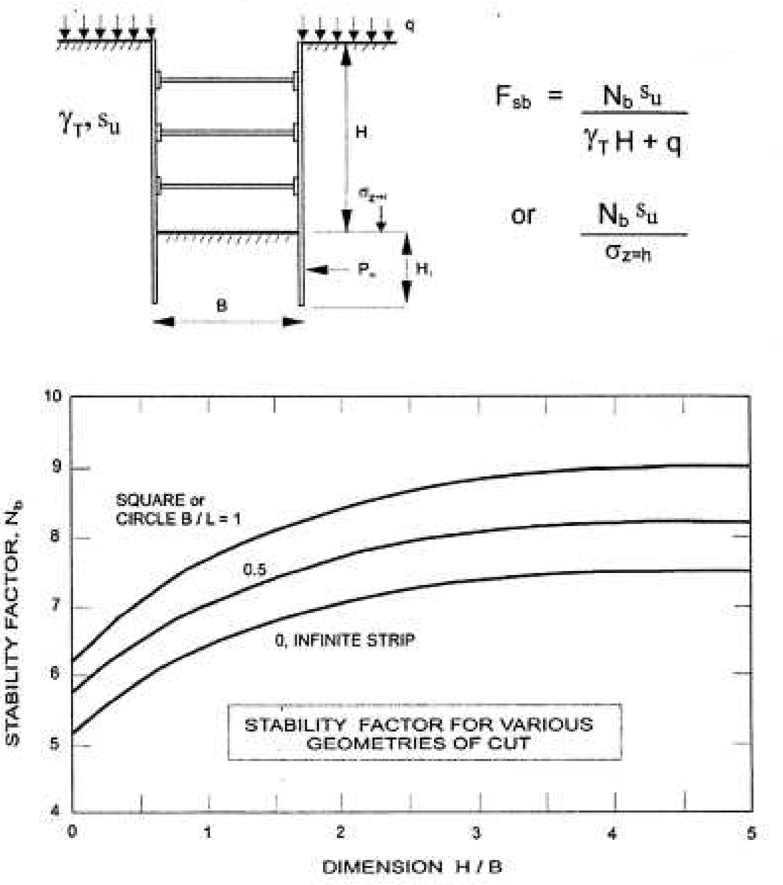


Figure 1 - Stability Factor for Various Geometries of Cut

In the case of soft to firm clays, a factor of safety of 2 is recommended for base stability.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications and Standard Detail Drawings from the City of Ottawa.

The pipe bedding for sewer and water pipes should consist of at least 150 mm of OPSS Granular A material. Where the bedding is located within the firm grey silty clay, the thickness of the bedding material should be increased to a minimum of 300 mm. The material should be placed in a maximum of 300 mm thick lifts and compacted to a minimum of 95% of its SPMDD. The bedding material should extend at least to the spring line of the pipe.

The cover material, which should consist of OPSS Granular A, should extend from the spring line of the pipe to at least 300 mm above the obvert of the pipe. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 95% of its SPMDD.

Generally, it should be possible to re-use the moist (not wet) brown silty clay above the cover material if the excavation and filling operations are carried out in dry weather conditions. Wet silty clay materials will be difficult to re-use, as the high-water contents make compacting impractical without an extensive drying period.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

Clay Seals

To reduce long-term lowering of the groundwater level at this site, clay seals should be provided in the service trenches. 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, subbedding and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in maximum 225 mm thick loose layers and compacted to a minimum of 95% of the SPMDD.

The clay seals should generally be placed at the site boundaries and at strategic locations at no more than 60 m intervals in the service trenches.

Paterson completed a review of the site servicing drawings to review and approve the clay seal locations. Based on our review, the proposed clay seal locations are acceptable from a geotechnical perspective.

6.5 Groundwater Control

Due to the relatively impervious nature of the silty clay materials, it is anticipated that groundwater infiltration into the excavations should be low and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations.

Groundwater Control for Building Construction

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

For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Persons as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application. It is understood that an EASR will be completed for roadway and servicing construction within Phase 5 within the subject site.

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.

6.6 Winter Construction

The subsurface conditions at this site mostly consist of frost susceptible materials. In presence of water and freezing conditions ice could form within the soil mass. Heaving and settlement upon thawing could occur. Precautions should be taken if winter construction is considered for this project. 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, tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

The trench excavations should be constructed in a manner that will avoid the introduction of frozen materials into the trenches. As well, 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.

6.7 Landscaping Considerations

Tree Planting Restrictions

Paterson completed a soils review of the site to determine applicable tree planting setbacks, in accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines) for trees planted within a public right-of-way (ROW). Atterberg limits testing was completed for recovered silty clay samples at selected locations throughout the subject site. The above-noted test results were completed on samples taken at depths between the anticipated underside of footing elevation and a 3.5 m depth below the finished grade. The results of our testing are presented in Table 1 and in Appendix 1.

Based on the results of the Atterberg limit testing mentioned above, the plasticity index was found to be less than 40% in all the tested clay samples. The silty clay across the subject site is considered low to medium sensitivity clay and should not be designated as sensitive marine clays.

Low to Medium Sensitivity Clays

A low to medium sensitivity clay soil was encountered between the anticipated design underside of footing elevations and 3.5 m below finished grade as per City Guidelines for the entire site. Based on our Atterberg limits test results, the modified plasticity index does not exceed 40% across the site. **The following tree planting setback is recommended for the entire subject site due to the presence of low to medium sensitivity clays.**

Large trees (mature height over 14 m) can be planted within these areas provided a tree to foundation setback equal to the full mature height of the tree can be provided (e.g. in a park or other green space). Tree planting setback limits may be reduced to **4.5 m** for small (mature height up to 7.5 m) and medium size trees (mature tree height 7.5 to 14 m), provided that the conditions noted below are met.

- ☐ The underside of footing (USF) is 2.1 m or greater below the lowest finished grade must be satisfied for footings within 10 m from the tree, as measured from the centre of the tree trunk and verified by means of the Grading Plan as indicated procedural changes below.

- ☐ A small tree must be provided with a minimum of 25 m^3 of available soil volume while a medium tree must be provided with a minimum of 30 m^3 of available soil volume, as determined by the Landscape Architect. The developer is to ensure that the soil is generally un-compacted when backfilling in street tree planting locations.

- ☐ The tree species must be small (mature tree height up to 7.5 m) to medium size (mature tree height 7.5 m to 14 m) as confirmed by the Landscape Architect.

- ☐ The foundation walls are to be reinforced at least nominally (minimum of two upper and two lower 15M bars in the foundation wall).

- ☐ Grading surrounding the tree must promote drainage to the tree root zone (in such a manner as not to be detrimental to the tree).

It is well documented in the literature, and is our experience, that fast-growing trees located near buildings founded on cohesive soils that shrink on drying can result in long-term differential settlements of the structures. Tree varieties that have the most pronounced effect on foundations are seen to consist of poplars, willows, and some maples (i.e. Manitoba Maples) and, as such, they should not be considered in the landscaping design.

Swimming Pools

The in-situ soils are considered to be acceptable for swimming pools. Above ground swimming pools must be placed at least 5 m away from the residence foundation and neighbouring foundations. Otherwise, pool construction is considered routine, and can be constructed in accordance with the manufacturer`s requirements.

Above Ground Hot Tubs

Additional grading around the hot tub should not exceed permissible grade raises. Otherwise, hot tub construction is considered routine, and can be constructed in accordance with the manufacturer’s specifications.

Installation of Decks or Additions

Additional grading around proposed deck or addition should not exceed permissible grade raises. Otherwise, standard construction practices are considered acceptable.

7.0 Recommendations

It is recommended that the following be carried out by Paterson once preliminary and/or detailed design of the proposed development have been prepared:

☐ Review detailed grading, servicing, landscaping, and structural plan(s) from a geotechnical perspective, when updates are made available.

☐ Review and inspection of all foundation drainage systems and buildings sump pits.

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:

☐ 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 and follow-up field density tests to determine the level of compaction achieved.

☐ Field density tests to determine the level of compaction achieved.

☐ Sampling and testing of the bituminous concrete including mix design reviews.

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

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

8.0 Statement of Limitations

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

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

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

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than SPB Developments 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.

O.Canton

Owen R. Canton, B.Eng.

LICENSED PROFESSIONAL ENGINEER
Feb. 9, 2026
F. I. ABOU-SEIDO
100156744
PROVINCE OF ONTARIO

Faisal I. Abou-Seido, P.Eng.

Report Distribution:

- ☐ SPB Developments (1 copy)
- ☐ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

UNIDIMENSIONAL CONSOLIDATION TESTING RESULTS

ATTERBERG LIMITS' TESTING RESULTS

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Terry Fox Drive
Ottawa, Ontario

DATUM Ground surface elevations at test hole locations provided by Fairhall, Moffatt and Woodland Ltd.

REMARKS

BORINGS BY CME 55 Power Auger

DATE 13 August 2014

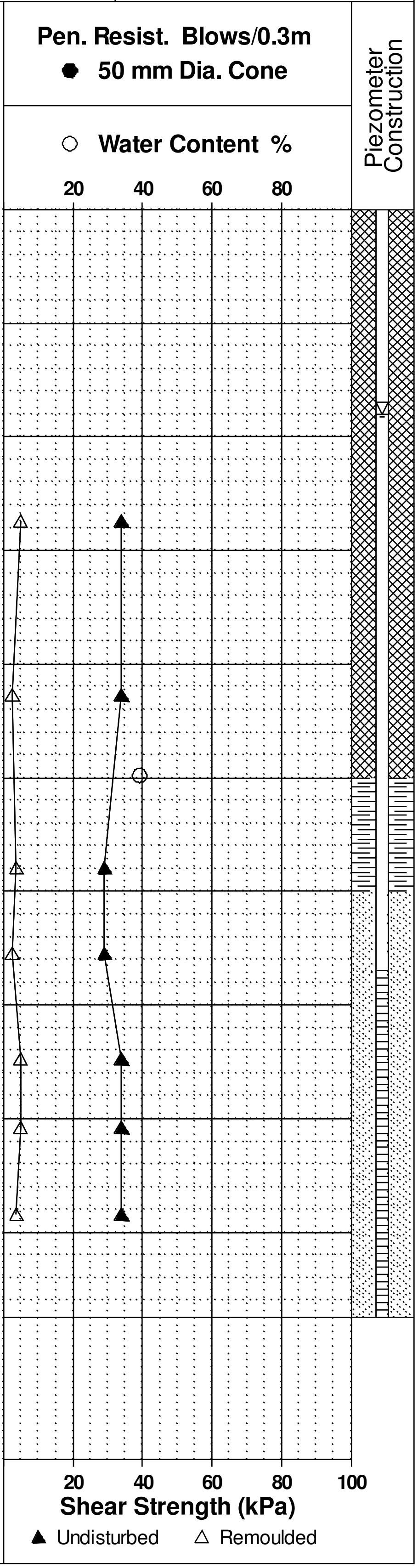
FILE NO. PG2855

HOLE NO. BH 7

SOIL DESCRIPTION	
GROUND SURFACE	
TOPSOIL	0.33
Loose, brown **SILTY SAND,** trace clay	1.83
Grey **CLAYEY SAND** with silt	2.29
Firm, grey **SILTY CLAY**	9.75
End of Borehole (Based on field obs, GWL at 1.8m depth)	

SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
AU	1		
SS	2	75	4
SS	3	83	2
TW	4	96	
TW	5	100	
TW	6	0	

DEPTH (m)	ELEV. (m)
0	95.56
1	94.56
2	93.56
3	92.56
4	91.56
5	90.56
6	89.56
7	88.56
8	87.56
9	86.56



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Terry Fox Drive
Ottawa, Ontario

DATUM Ground surface elevations at test hole locations provided by Fairhall, Moffatt and Woodland Ltd.

REMARKS

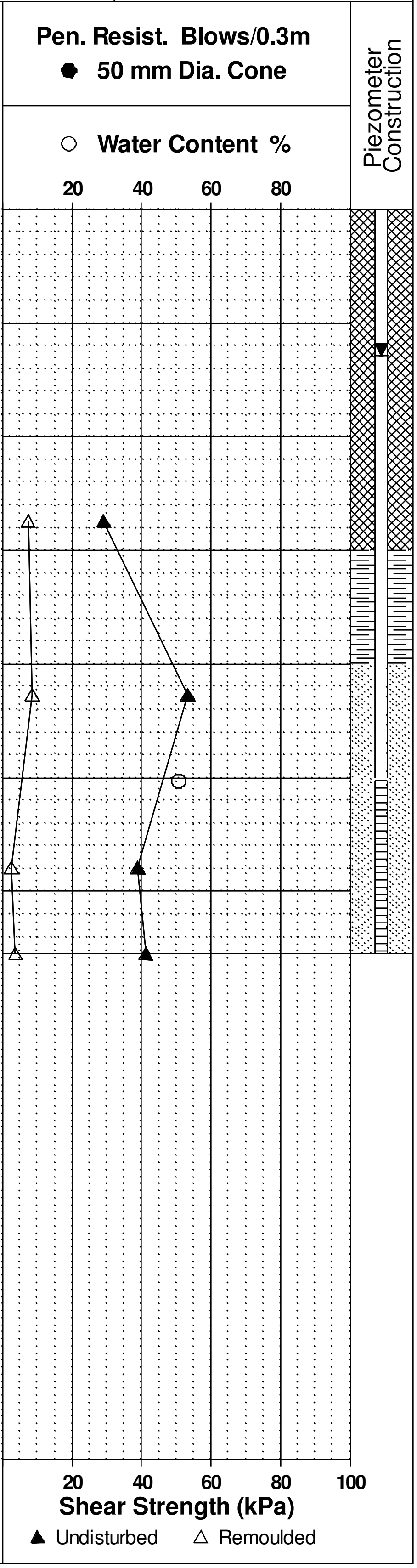
BORINGS BY CME 55 Power Auger

DATE 13 August 2014

FILE NO. PG2855

HOLE NO. BH 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD		
GROUND SURFACE						0	95.45
25mm Topsoil over brown **CLAYEY SILT** 0.40		AU	1				
Loose, brown **SILTY SAND** with clay 1.37		SS	2	12	9	1	94.45
Firm, brown **SILTY CLAY,** trace sand - grey by 2.3m depth		SS	3	0	5	2	93.45
						3	92.45
		TW	4	79			
						4	91.45
		TW	5	100		5	90.45
						6	89.45
6.55							
End of Borehole (GWL @ 1.28m-August 21, 2014)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Terry Fox Drive
Ottawa, Ontario

DATUM Ground surface elevations at test hole locations provided by Fairhall, Moffatt and Woodland Ltd.

REMARKS

BORINGS BY Backhoe

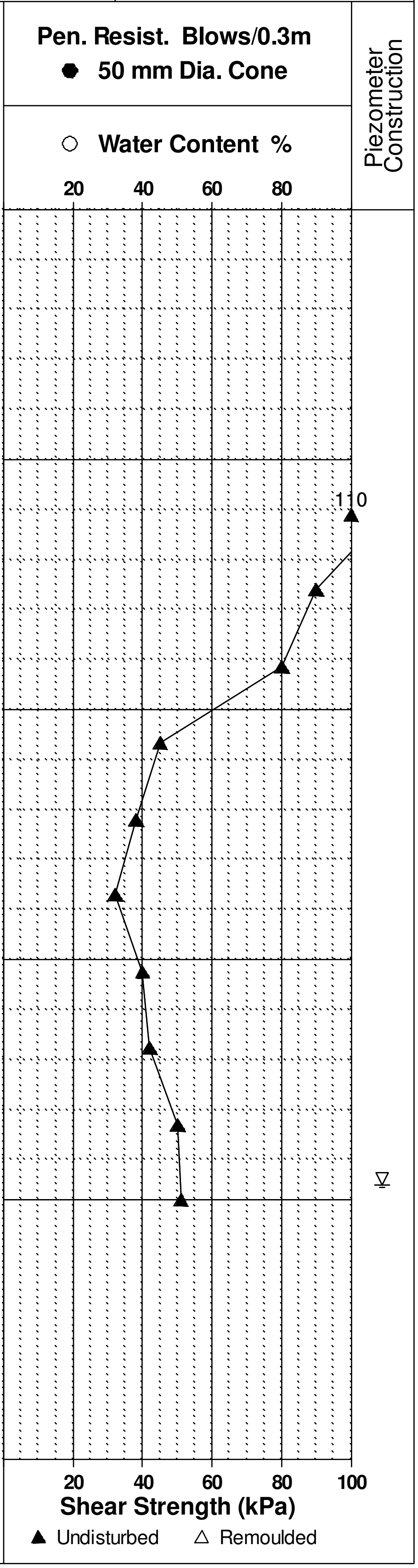
DATE 14 August 2014

FILE NO. PG2855

HOLE NO. TP 1

SOIL DESCRIPTION	Depth to base (m)	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
TOPSOIL	0.30	G	1		
Brown **SILTY SAND** with clay	1.22	G	2		
Very stiff to stiff, brown **SILTY CLAY,** some sand	2.00				
Grey **SILTY SAND** with clay	2.30	G	3		
Firm, grey **SILTY CLAY**	3.96				
End of Test Pit (Groundwater infiltration at 3.9m depth)					

DEPTH (m)	ELEV. (m)
0	95.27
1	94.27
2	93.27
3	92.27



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Terry Fox Drive
Ottawa, Ontario

DATUM Ground surface elevations at test hole locations provided by Fairhall, Moffatt and Woodland Ltd.

REMARKS

BORINGS BY Backhoe

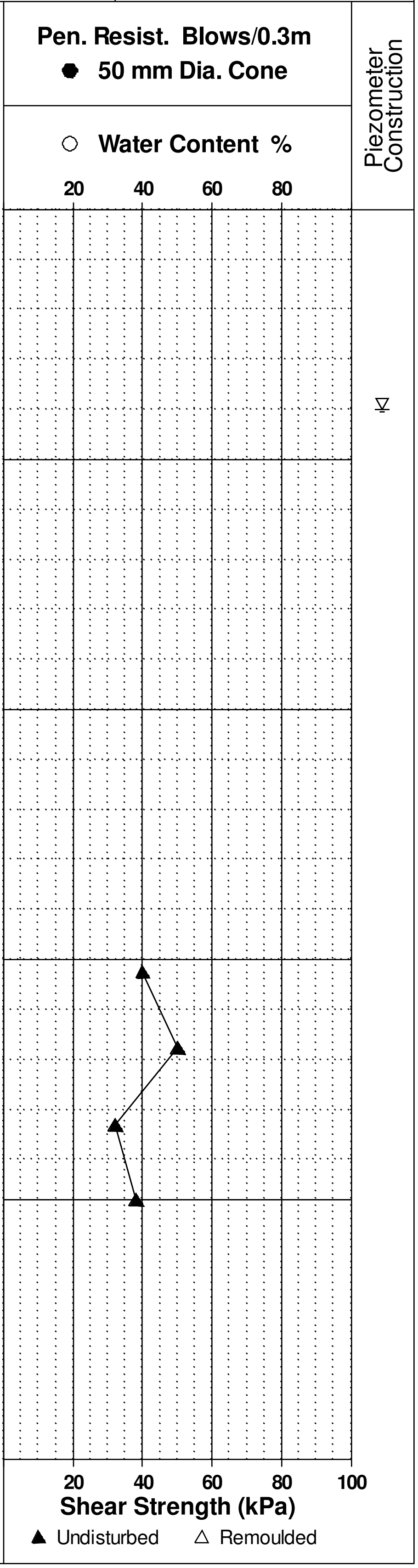
DATE 14 August 2014

FILE NO. **PG2855**

HOLE NO. **TP 2**

SOIL DESCRIPTION	Depth to base (m)	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
TOPSOIL	0.46				
PEAT	0.76	G	1		
Brown **SILTY SAND,** trace clay	3.05	G	2		
		G	3		
Stiff to firm, grey **SILTY CLAY**	3.96				
End of Test Pit (Groundwater infiltration at 0.8m depth)					

DEPTH (m)	ELEV. (m)
0	94.91
1	93.91
2	92.91
3	91.91



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 = $(D30)^2 / (D10 \times D60)$
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)

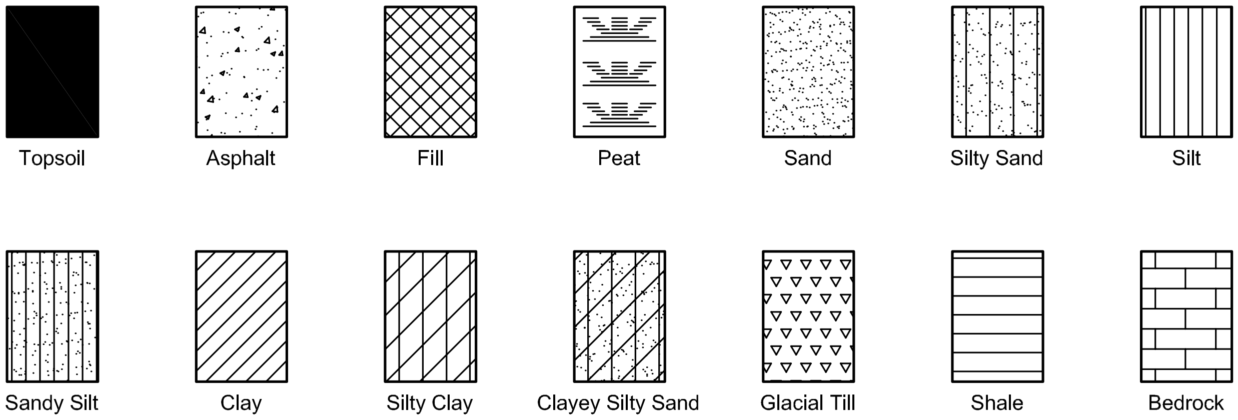
OC Ratio Overconsolidaton ratio = p'_c / p'_o
Void Ratio Initial sample void ratio = volume of voids / volume of solids
Wo - Initial water content (at start of consolidation test)

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.

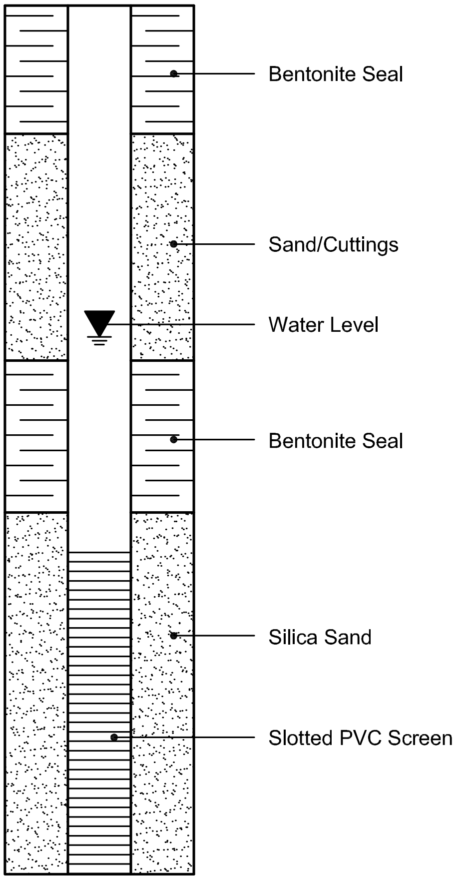
SYMBOLS AND TERMS (continued)

STRATA PLOT

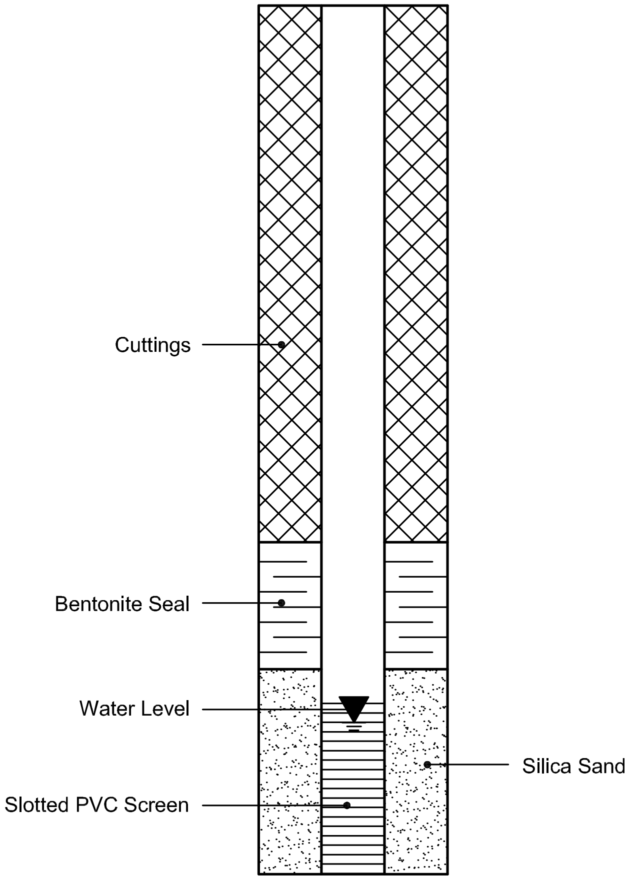


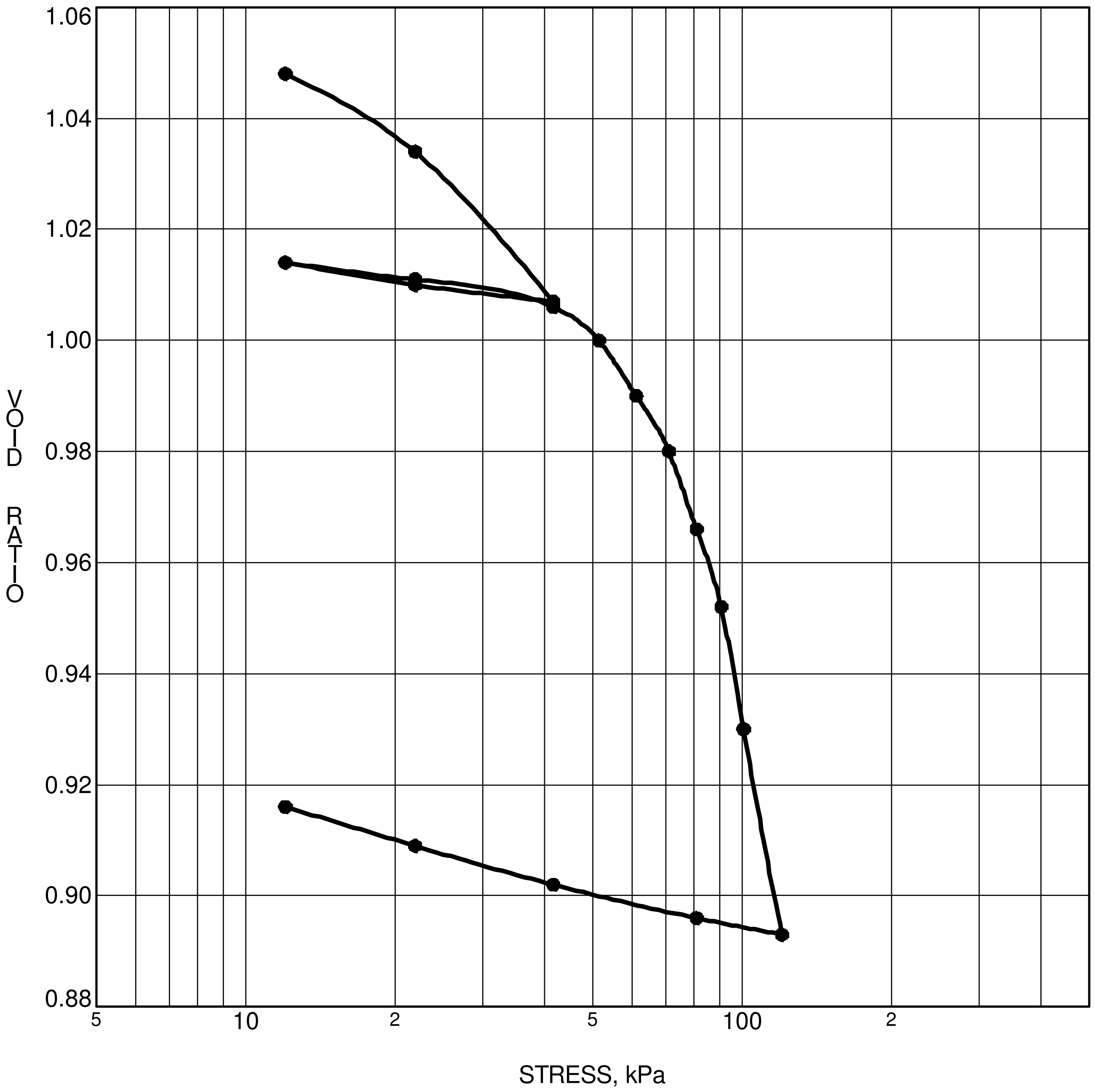
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION





CONSOLIDATION TEST DATA SUMMARY					
Borehole No.	**BH 7**	p'o	**70.8** kPa	Ccr	**0.015**
Sample No.	**TW 5**	p'c	**75** kPa	Cc	**0.471**
Sample Depth	**4.98** m	OC Ratio	**1.1**	Wo	**39.1** %
Sample Elev.	**90.58** m	Void Ratio	**1.076**	Unit Wt.	**18.1** kN/m ^{3}

CLIENT **SPB Developments**

FILE NO. **PG2855**

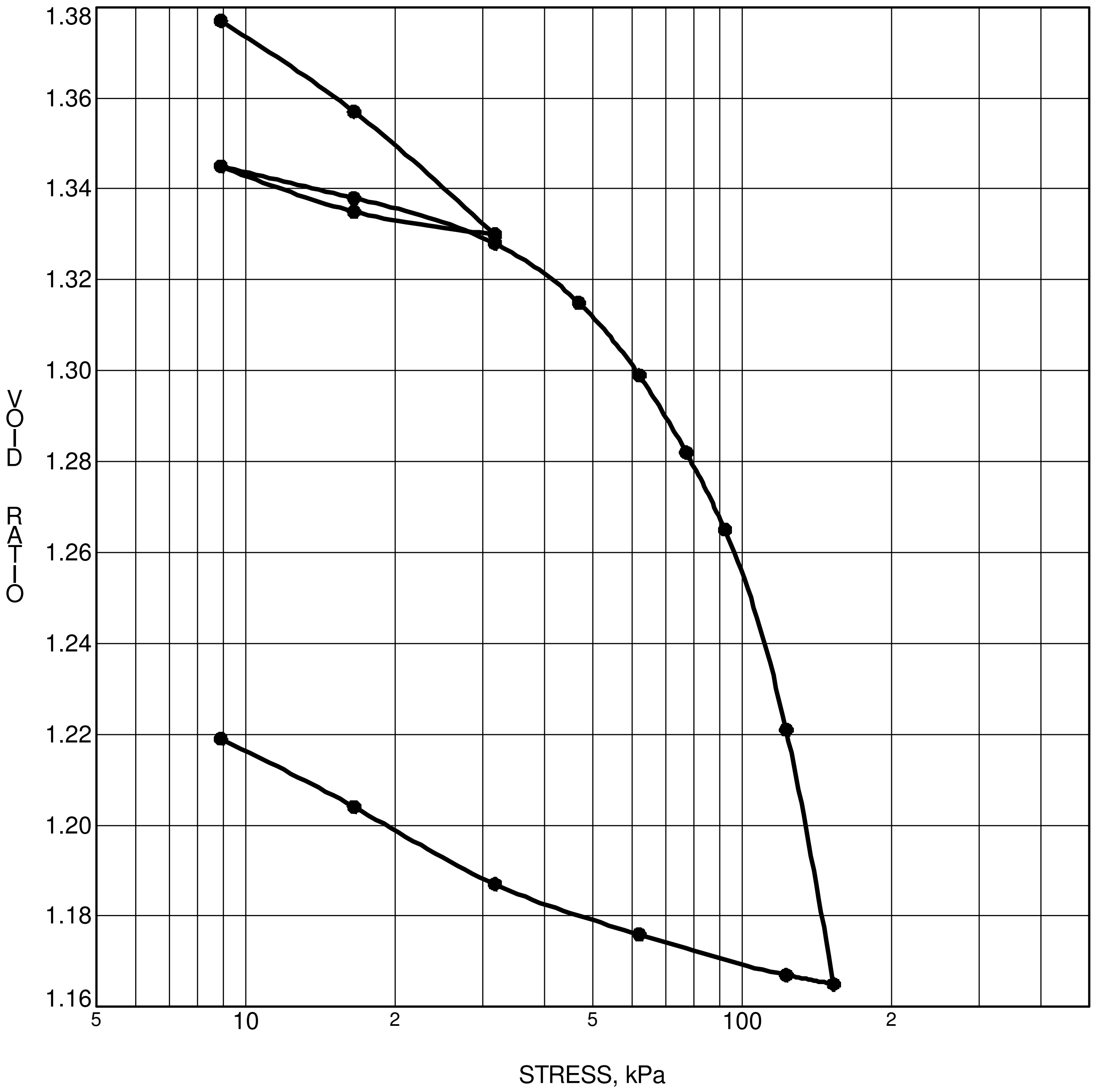
PROJECT **Geotechnical Investigation - Prop. Residential Development - Terry Fox Drive**

DATE **21/08/2014**

patersongroup **Consulting Engineers**

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

CONSOLIDATION TEST



CONSOLIDATION TEST DATA SUMMARY					
Borehole No.	**BH 8**	p'$_o$	**65** kPa	Ccr	**0.030**
Sample No.	**TW 5**	p'$_c$	**92** kPa	Cc	**0.589**
Sample Depth	**5.03** m	OC Ratio	**1.4**	Wo	**50.6** %
Sample Elev.	**90.42** m	Void Ratio	**1.392**	Unit Wt.	**17.0** kN/m ^{3}

CLIENT **SPB Developments**

FILE NO. **PG2855**

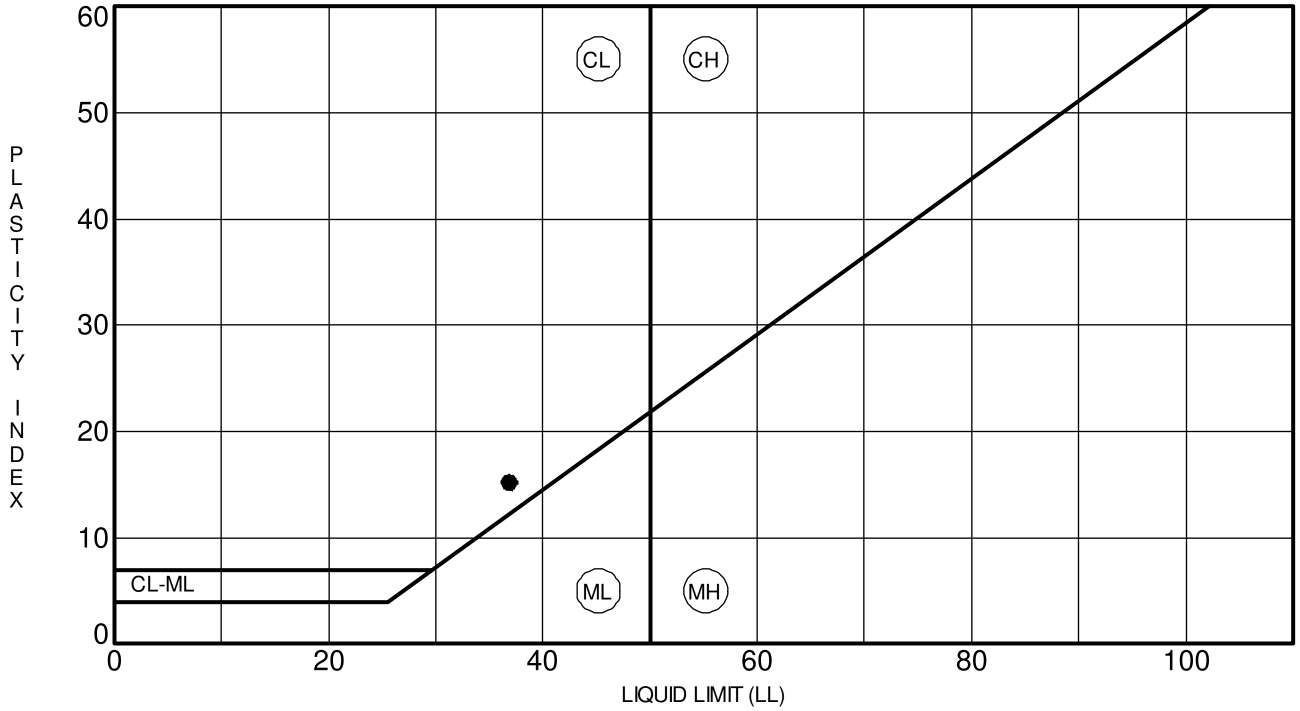
PROJECT **Geotechnical Investigation - Prop. Residential Development - Terry Fox Drive**

DATE **25/08/2014**

patersongroup **Consulting Engineers**

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

CONSOLIDATION TEST



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**BH 3A**	**TW 1**	**37**	**22**	**15**		**Inorganic clays of low plasticity**

CLIENT **SPB Developments**

FILE NO. **PG2855**

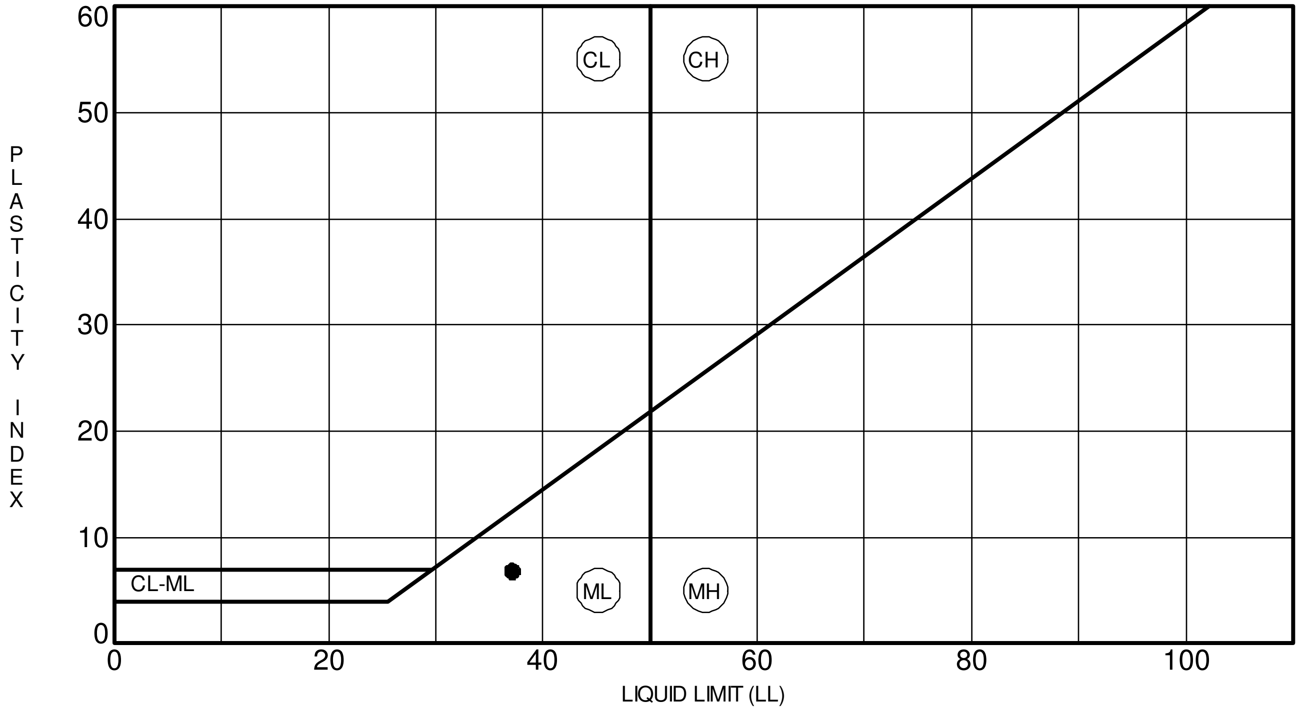
PROJECT **Geotechnical Investigation - Prop. Residential Development - Terry Fox Drive**

DATE **28 Nov 12**

patersongroup **Consulting Engineers**

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

ATTERBERG LIMITS' RESULTS



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**BH 8**	**TW 5**	**37**	**30**	**7**		**ML - Inorganic silt of low plasticity**

CLIENT **SPB Developments**

FILE NO. **PG2855**

PROJECT **Geotechnical Investigation - Prop. Residential Development - Terry Fox Drive**

DATE **13 Aug 14**

patersongroup **Consulting Engineers**

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

ATTERBERG LIMITS' RESULTS

APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG2855-9 – TEST HOLE LOCATION PLAN

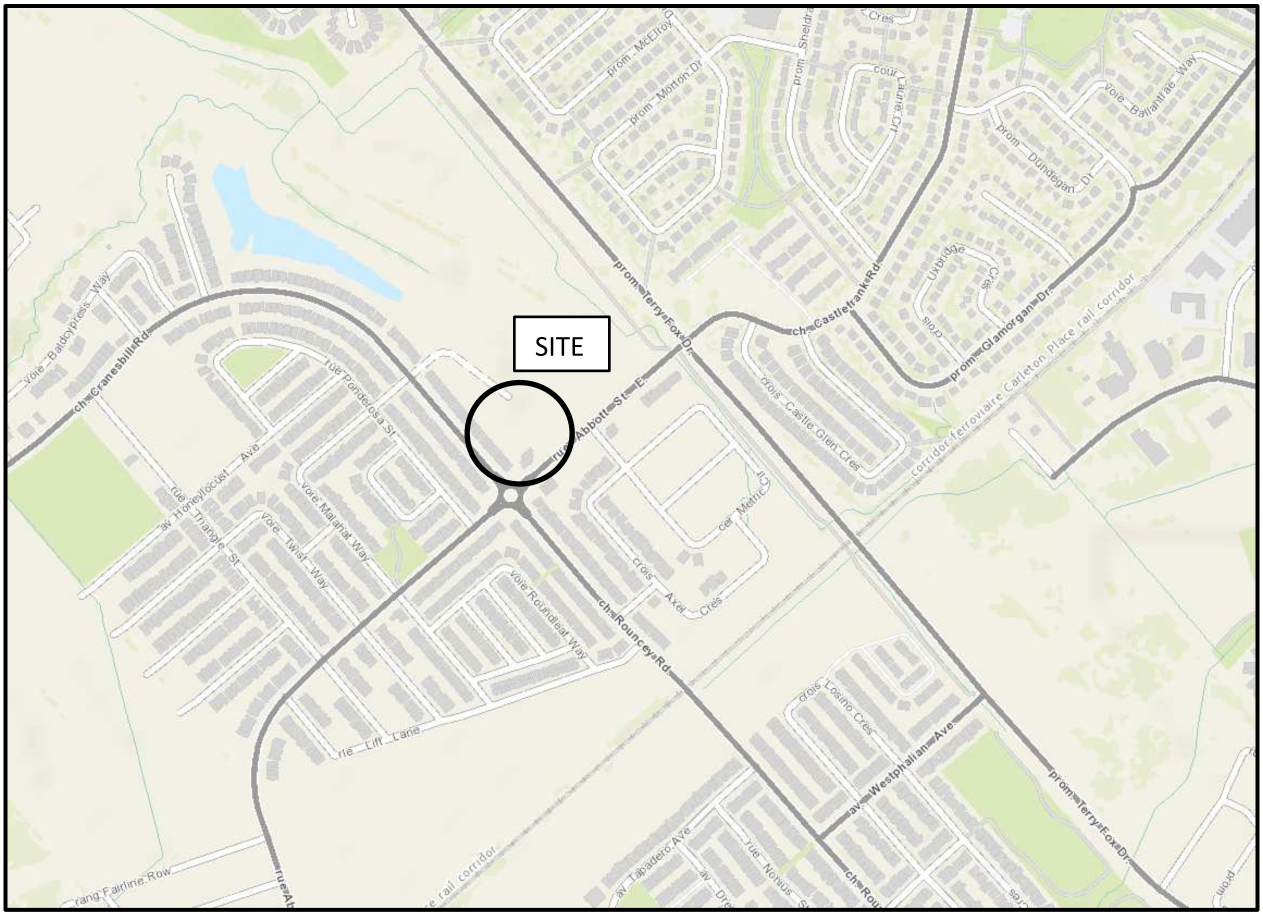
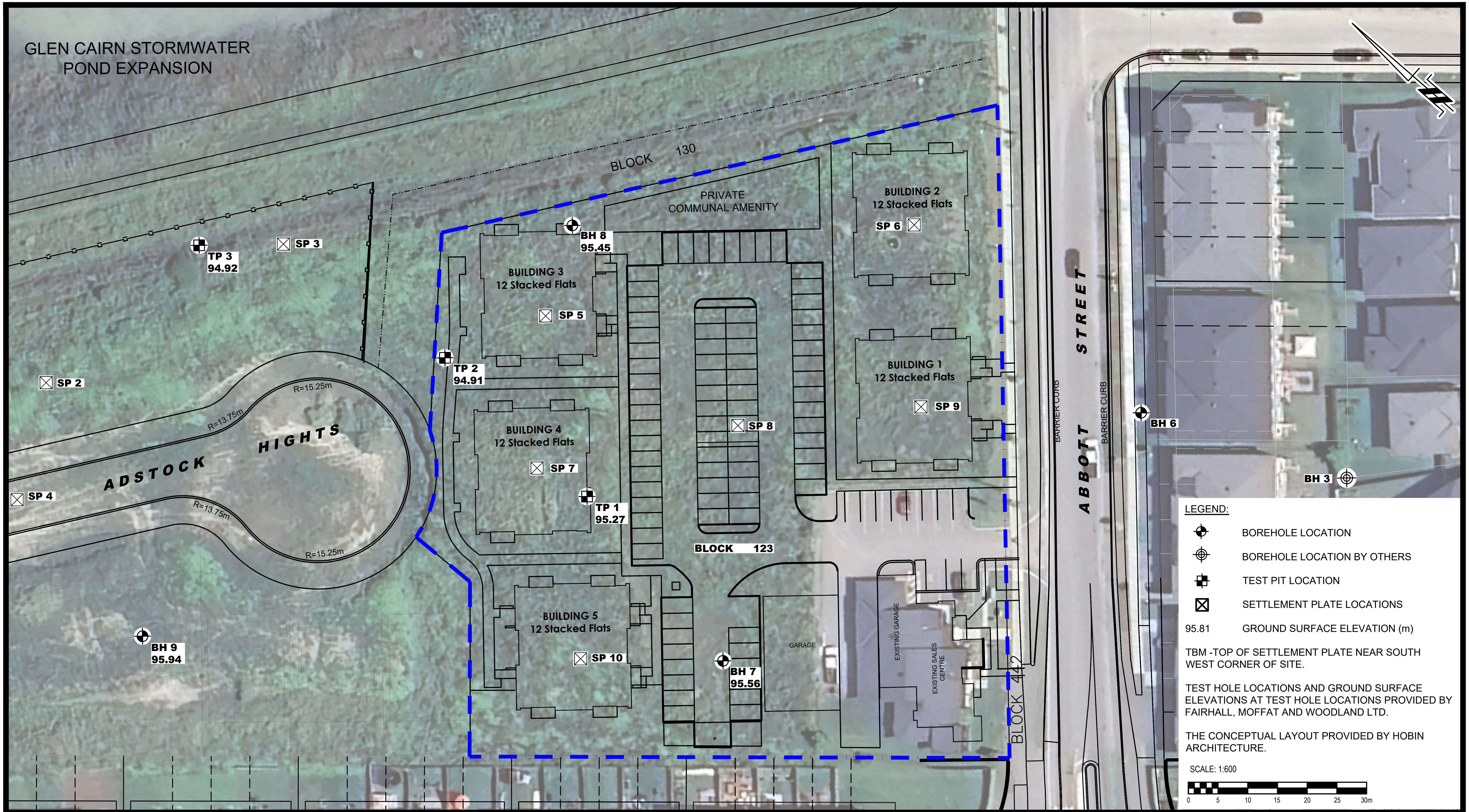


FIGURE 1

KEY PLAN

PATERSON
GROUP



LEGEND:

⊕	BOREHOLE LOCATION
⊕	BOREHOLE LOCATION BY OTHERS
▣	TEST PIT LOCATION
☒	SETTLEMENT PLATE LOCATIONS
95.81	GROUND SURFACE ELEVATION (m)

TBM -TOP OF SETTLEMENT PLATE NEAR SOUTH WEST CORNER OF SITE.

TEST HOLE LOCATIONS AND GROUND SURFACE ELEVATIONS AT TEST HOLE LOCATIONS PROVIDED BY FAIRHALL, MOFFAT AND WOODLAND LTD.

THE CONCEPTUAL LAYOUT PROVIDED BY HOBIN ARCHITECTURE.

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

NO.	REVISIONS	DATE	INITIAL

SPB DEVELOPMENTS
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
4829 ABBOTT STREET EAST

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:600	Date: 02/2025
Drawn by: GK	Report No.: PG2855-1
Checked by: YZ	Dwg. No.: PG2855-9
Approved by: OC	Revision No.:

p:\autocad drawings\geotechnical\pg28xx\pg2855\pg2855-9 test hole location plan.dwg

11x17

APPENDIX 3

PG2855-MEMO.20 Revision 10 dated November 8, 2022

PG2855-MEMO.21dated November 8, 2022

PATERSON GROUP

memorandum

re: **Geotechnical Design Summary Details**
Metric Homes – Phases 4 and 5
950 Terry Fox Drive – Ottawa

to: SPB Developments – **Mr. Pierre Bernier** – pierre@metrichomes.com

to: Novatech Engineering – **Mr.Alex McAuley** – a.mcauley@novatech-eng.com

date: November 8, 2022

file: PG2855-MEMO.20 Revision 10

Further to your request and authorization, Paterson Group (Paterson) prepared the current report to provide a geotechnical design summary and grading plan review for the proposed residential development to be located at 950 Terry Fox Drive in the City of Ottawa, Ontario. The following report should be read in conjunction with Paterson Reports PG2855-2 Rev. 6 dated November 8, 2022, PG2855-3 dated November 8, 2022 and PG2855-MEMO.21 dated November 8, 2022.

Relevant design information is presented in Table 1 - Summary of Design Details for the subject blocks and lots. The relevant design information includes the following:

☐ Legal lot/block number
☐ Civic address
☐ Existing grade elevation
☐ Proposed finished grade elevation
☐ Finished floor elevation
☐ Maximum allowable grade raise
☐ Bearing resistance values
☐ Proposed USF elevation
☐ Lightweight fill (LWF) recommendations
☐ Seismic site class

Grading Plan Review

Paterson reviewed the following grading plans prepared by Novatech Engineering (Novatech) regarding the residential development at the aforementioned site:

☐ SPB Developments Inc. (Metric Homes) Subdivision, 950 Terry Fox Drive - Grading Plan - Project No. 110037 - Drawing No. 110037-GR1, Revision 13 dated January 16, 2019.
☐ SPB Developments Inc. (Metric Homes) Subdivision, 950 Terry Fox Drive - Grading Plan - Project No. 110037 - Drawing No. 110037-GR2, Revision 13 dated January 16, 2019.
☐ SPB Developments Inc. (Metric Homes) Subdivision, 950 Terry Fox Drive - Grading Plan - Project No. 110037 - Drawing No. 110037-GR3, Revision 9 dated August 22, 2022.

Based on the grading plans provided, the majority of the lots/blocks were in compliance with our permissible grade raise recommendations and considered acceptable from a geotechnical perspective. However, the finished grades at several lots/blocks have exceeded our permissible grade raise restrictions, which will require either lightweight fill or a successfully completed surcharge program to consider the grading acceptable from a geotechnical perspective. The proposed grades will be considered acceptable provided that a successful settlement surcharge monitoring program is completed at the lots/blocks outlined in the attached Table 1 - Summary of Design Details or lightweight fill (LWF), consisting of a EPS geofoam blocks, placed below the garages, front porches, and/or around the perimeter of the structure as detailed in Table 1 attached. LWF material specifications and cover recommendations are provided in Figure 1 attached to the current report.

Table 1 attached provides a grading summary and lightweight fill (LWF) requirements for the subject buildings based on our grading plan review.

Settlement Surcharge Monitoring Program

A settlement surcharge program was completed within Phase 5 and a portion of Phase 4 within the proposed development. Lightweight fill recommendations for the surcharged lots/blocks have been updated based on the results of the surcharge settlement monitoring program. It should be noted that the surcharge program included the right-of-ways (ROWs) within Phase 5, as well as a portion of Phase 4, therefore lightweight fill (LWF) is not required in the areas. The areas where settlement surcharge programs have been completed are noted in the attached Table 1.

Outdoor Structures

The following is recommended for setbacks regarding outdoor structures:

Swimming Pools

The in-situ soils are considered to be acceptable for in-ground swimming pools. Above ground swimming pools must be placed at least 5 m away from the residence foundation and neighbouring foundations. Otherwise, pool construction is considered routine, and can be constructed in accordance with the manufacturer`s requirements.

Aboveground Hot Tubs

Additional grading around the hot tub should not exceed permissible grade raises. Otherwise, hot tub construction is considered routine, and can be constructed in accordance with the manufacturer’s specifications.

Installation of Decks or Additions

Additional grading around proposed deck or addition should not exceed permissible grade raises. Otherwise, standard construction practices are considered acceptable.

We trust that this information satisfies your immediate requirements.

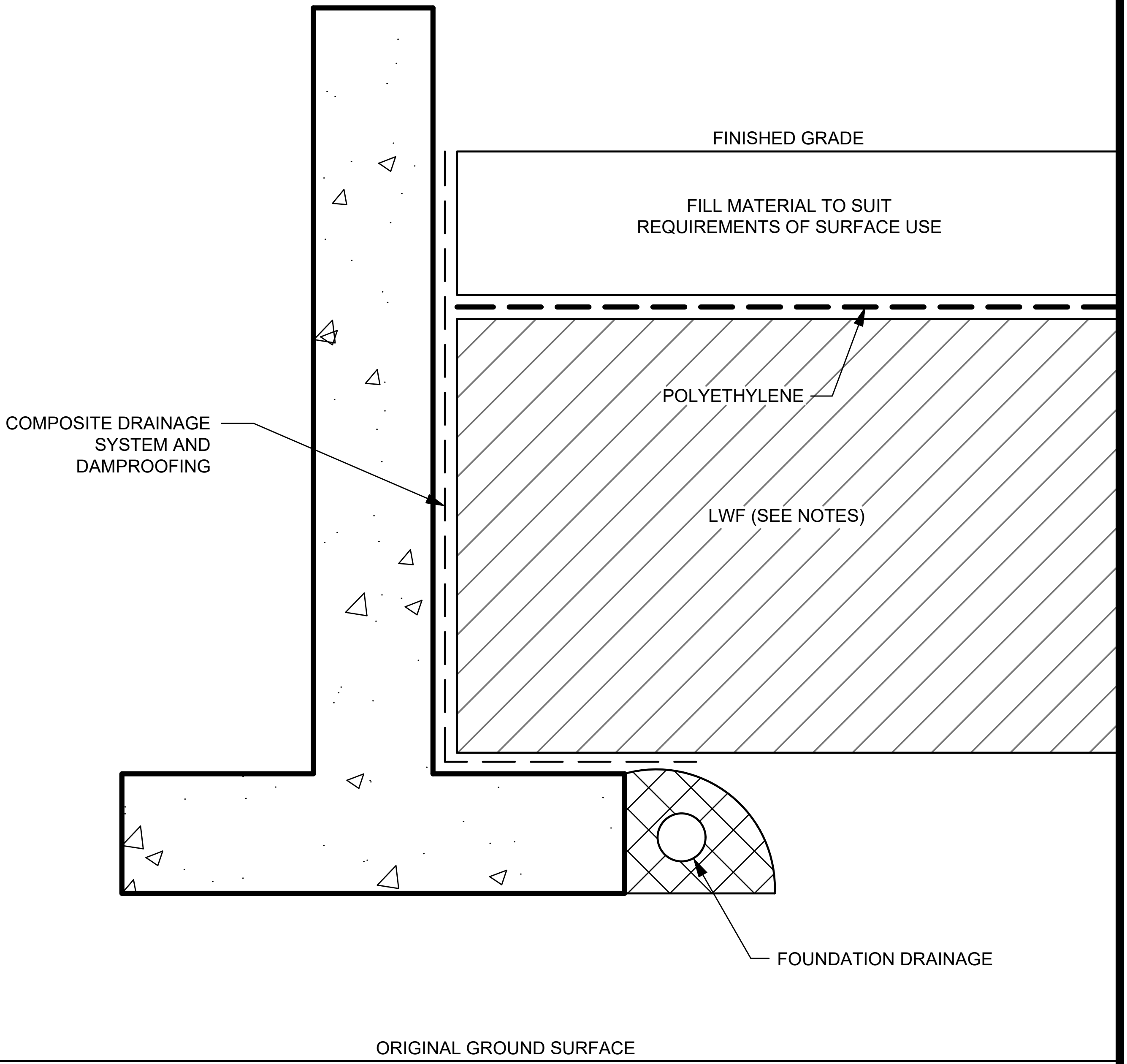
Best Regards,

Paterson Group Inc.

LICENSED PROFESSIONAL ENGINEER
Nov.9-2022
D. J. GILBERT
100116130
PROVINCE OF ONTARIO

O.Canton
Owen Canton, EIT

David J. Gilbert, P. Eng.



NOTES:

1. USE EPS12 BELOW FRONT PORCH
2. USE EPS15 BELOW GARAGE AND DRIVEWAY
   USE EPS12 BELOW LANDSCAPED AREAS
3. MINIMUM GRANULAR THICKNESS OVER LWF SHOULD BE AS FOLLOWS:

FRONT PORCH	150mm OF OPSS GRANULAR A
GARAGE	300mm OF OPSS GRANULAR A
DRIVEWAY	300mm OF OPSS GRANULAR A
LANSCAPED	500mm OF APPROVED BACKFILL SOIL

4. PLACEMENT OF LWF SHOULD BE ON A LEVELED SURFACE (SAND CAN BE USED TO PROVIDE AN ADEQUATE LEVELLING SURFACE).

patersongroup
consulting engineers

EPS BLOCK INSTALLATION AROUND RESIDENTIAL BUILDINGS

Drawing No.: FIGURE 1
Scale: N.T.S.
Drawn: MPG
Approved: DJG

Table 1 - Summary of Design Details

PG2855 - Metric Homes - 950 Terry Fox Drive - Phase 3 & 5

Lot/Block No.	Street	Original GS Front (m)	Proposed GS Front (m)	Original GS Rear (m)	Proposed GS Rear (m)	Finished Floor Elevation	Bearing Resistance Value - SLS (kPa)	Underside of Footing (USF) Elevation	Permissible Grade Raise Front (m)	Permissible Grade Raise Rear (m)	Exceeding Permissible Grade Raise Front (m)	Exceeding Permissible Grade Raise Rear (m)	Surcharge Program	Minimum Thickness LWF in Garage and Front Porch or Slab-on-Grade (m)	Minimum Thickness LWF extending 2.4 m Beyond the building face or property line (m)	Seismic Site Class
1	261 Metric Circle	95.27	98.85	95.15	98.45	99.35	100	96.40	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
2	263 Metric Circle	95.46	98.60	95.26	98.45	99.35	100	96.40	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
3	265 Metric Circle	95.49	98.65	95.48	98.50	99.35	100	96.40	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
4	267 Metric Circle	95.64	98.65	95.15	98.50	99.35	100	96.40	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
5	269 Metric Circle	95.52	98.85	95.31	98.45	99.35	100	96.40	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
6	271 Metric Circle	95.52	98.85	95.58	98.45	99.35	100	96.40	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
7	273 Metric Circle	95.75	98.80	95.52	98.40	99.30	100	96.35	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
8	275 Metric Circle	95.78	98.75	95.78	98.35	99.25	100	96.30	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
9	277 Metric Circle	95.86	98.70	95.93	98.40	99.20	100	96.25	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
10	279 Metric Circle	96.07	98.65	95.93	98.45	99.15	100	96.20	N/A	N/A	no	no	completed	Not Required	Not Required	Class E
11	51 Axel Cresent	96.26	98.35	96.26	98.35	99.15	100	96.20	2.1	2.1	0.19	0.19	no	1.50	0.3 m thick LWF along Front, 0.3 m thick LWF along Rear and Sides	Class E
12	53 Axel Cresent	96.68	98.60	96.56	98.40	99.20	60	96.25	2.1	2.1	no	no	no	Not Required	Not Required	Class E
13	55 Axel Cresent	96.68	98.75	96.66	98.35	99.35	100	96.40	2.1	2.1	0.17	no	no	1.50	0.3 m thick LWF along Front	Class E
14	57 Axel Cresent	97.01	98.85	96.83	98.65	99.40	60	96.45	2.1	2.1	no	no	no	Not Required	Not Required	Class E
15	59 Axel Cresent	97.16	98.80	97.08	99.00	99.50	60	96.55	2.1	2.1	no	no	no	Not Required	Not Required	Class E
16	61 Axel Cresent	97.16	98.87	97.08	99.07	99.57	60	96.62	2.1	2.1	no	no	no	Not Required	Not Required	Class E
17	63 Axel Cresent	97.06	99.08	98.64	99.08	99.58	60	96.63	2.1	2.1	no	no	no	Not Required	Not Required	Class E
18	65 Axel Cresent	97.06	98.88	98.32	99.08	99.58	60	96.63	2.1	2.1	no	no	no	Not Required	Not Required	Class E
19	67 Axel Cresent	97.95	98.93	98.31	99.13	99.63	60	96.68	2.1	2.1	no	no	no	Not Required	Not Required	Class E
20	69 Axel Cresent	97.73	98.93	97.79	99.13	99.63	60	96.68	2.1	2.1	no	no	no	Not Required	Not Required	Class E
21	71 Axel Cresent	97.73	98.95	97.79	99.15	99.65	60	96.70	2.1	2.1	no	no	no	Not Required	Not Required	Class E
22	73 Axel Cresent	97.80	99.05	98.68	99.25	99.75	60	96.80	2.1	2.1	no	no	no	Not Required	Not Required	Class E
23	75 Axel Cresent	97.83	99.20	98.85	99.40	99.90	60	96.95	2.1	2.1	no	no	no	Not Required	Not Required	Class E
24	77 Axel Cresent	97.93	99.20	98.85	99.40	99.90	60	96.95	2.1	2.1	no	no	no	Not Required	Not Required	Class E
25	79 Axel Cresent	97.94	99.25	98.23	99.45	99.95	60	97.00	2.1	2.1	no	no	no	Not Required	Not Required	Class E
26	81 Axel Cresent	97.94	99.25	98.23	99.45	99.95	60	97.00	2.1	2.1	no	no	no	Not Required	Not Required	Class E
27	85 Axel Cresent	98.17	99.05	99.01	99.45	99.95	60	97.00	2.1	2.1	no	no	no	Not Required	Not Required	Class E
28	87 Axel Cresent	98.17	99.25	98.54	99.45	99.95	60	97.00	2.1	2.1	no	no	no	Not Required	Not Required	Class E
29	89 Axel Cresent	98.19	99.30	98.37	99.50	100.00	60	97.05	2.1	2.1	no	no	no	Not Required	Not Required	Class E
30	91 Axel Cresent	98.25	99.35	98.37	99.55	100.05	60	97.10	2.1	2.1	no	no	no	Not Required	Not Required	Class E
31	93 Axel Cresent	98.17	99.40	98.30	99.40	100.10	60	97.15	2.1	2.1	no	no	no	Not Required	Not Required	Class E
32	95 Axel Cresent	98.17	99.45	98.30	99.25	99.95	60	97.00	2.1	2.1	no	no	no	Not Required	Not Required	Class E
33	97 Axel Cresent	98.06	99.45	98.26	99.05	99.95	60	97.00	2.1	2.1	no	no	no	Not Required	Not Required	Class E
34	99 Axel Cresent	98.06	99.35	97.89	99.15	100.05	60	97.10	2.1	2.1	no	no	no	Not Required	Not Required	Class E
35	101 Axel Cresent	97.62	99.15	97.89	99.15	100.05	60	97.10	2.1	2.1	no	no	no	Not Required	Not Required	Class E
36	103 Axel Cresent	97.62	99.10	97.60	99.15	100.00	60	97.05	2.1	2.1	no	no	no	Not Required	Not Required	Class E
37	105 Axel Cresent	97.32	99.05	97.55	99.10	99.95	60	97.00	2.1	2.1	no	no	no	Not Required	Not Required	Class E
38	107 Axel Cresent	97.32	99.00	97.55	99.05	99.90	60	96.95	2.1	2.1	no	no	no	Not Required	Not Required	Class E
39	109 Axel Cresent	97.01	99.00	97.29	99.00	99.90	100	96.95	2.1	2.1	0.09	no	no	1.00	0.3 m thick LWF along Front	Class E
40	111 Axel Cresent	97.01	98.95	97.01	99.15	99.85	100	96.90	2.1	2.1	0.04	0.24	no	1.00	0.3 m thick LWF along Rear and Sides	Class E
41	113 Axel Cresent	96.93	98.90	97.19	99.10	99.80	100	96.85	2.1	2.1	0.07	0.01	no	1.00	Not Required	Class E
42	115 Axel Cresent	96.93	98.85	97.19	99.05	99.75	100	96.80	2.1	2.1	0.02	no	no	Not Required	Not Required	Class E
43	120 Axel Cresent	96.46	98.65	96.46	98.90	99.70	100	96.75	2.1	2.1	0.39	0.64	completed	1.50	0.9 m thick LWF along Front, 1.1 m thick LWF along Rear and Sides	Class E
44	122 Axel Cresent	96.28	98.65	96.46	98.90	99.65	100	96.70	2.1	2.1	0.57	0.64	completed	1.50	1.1 m thick LWF along Front, 1.1 m thick LWF along Rear and Sides	Class E
45	124 Axel Cresent	96.28	98.75	96.73	98.95	99.65	100	96.70	2.1	2.1	0.67	0.42	completed	1.50	1.2 m thick LWF along Front, 0.9 m thick LWF along Rear and Sides	Class E
46	126 Axel Cresent	96.55	98.75	96.73	98.95	99.60	100	96.65	2.1	2.1	0.30	0.32	completed	1.50	0.3 m thick LWF along Front, 0.3 m thick LWF along Rear and Sides	Class E
47	108 Axel Cresent	96.73	99.00	96.90	99.00	99.90	100	96.95	2.1	2.1	0.47	0.30	no	1.50	0.5 m thick LWF along Front, 0.3 m thick LWF along Rear and Sides	Class E
48	106 Axel Cresent	96.93	99.00	96.90	99.00	99.90	100	96.95	2.1	2.1	0.17	0.20	no	1.50	0.3 m thick LWF along Front, 0.3 m thick LWF along Rear and Sides	Class E
49	104 Axel Cresent	97.34	99.10	97.22	98.90	99.95	100	97.00	2.1	2.1	no	no	no	Not Required	Not Required	Class E
50	102 Axel Cresent	97.34	99.15	97.39	98.95	100.00	100	97.05	2.1	2.1	no	no	no	Not Required	Not Required	Class E
51	100 Axel Cresent	97.78	99.25	97.69	99.05	100.05	60	97.10	2.1	2.1	no	no	no	Not Required	Not Required	Class E
52	98 Axel Cresent	97.78	99.25	97.69	98.85	100.05	60	97.10	2.1	2.1	no	no	no	Not Required	Not Required	Class E
53	96 Axel Cresent	97.94	99.25	97.86	99.05	99.95	60	97.00	2.1	2.1	no	no	no	Not Required	Not Required	Class E
54	86 Axel Cresent	97.90	99.10	97.51	98.90	99.80	60	96.85	2.1	2.1	no	no	no	Not Required	Not Required	Class E
55	84 Axel Cresent	97.90	98.95	97.51	98.95	99.85	60	96.90	2.1	2.1	no	no	no	Not Required	Not Required	Class E
56	82 Axel Cresent	97.94	99.10	97.53	98.90	99.80	60	96.85	2.1	2.1	no	no	no	Not Required	Not Required	Class E
57	80 Axel Cresent	97.94	99.05	97.63	98.85	99.75	60	96.80	2.1	2.1	no	no	no	Not Required	Not Required	Class E
58	78 Axel Cresent	97.87	99.05	97.50	98.85	99.75	60	96.80	2.1	2.1	no	no	no	Not Required	Not Required	Class E
59	76 Axel Cresent	97.87	99.00	97.50	98.80	99.70	60	96.75	2.1	2.1	no	no	no	Not Required	Not Required	Class E
60	74 Axel Cresent	97.72	99.00	97.55	98.80	99.70	60	96.75	2.1	2.1	no	no	no	Not Required	Not Required	Class E

Table 1 - Summary of Design Details

PG2855 - Metric Homes - 950 Terry Fox Drive - Phase 3 & 5

Lot/Block No.	Street	Original GS Front (m)	Proposed GS Front (m)	Original GS Rear (m)	Proposed GS Rear (m)	Finished Floor Elevation	Bearing Resistance Value - SLS (kPa)	Underside of Footing (USF) Elevation	Permissible Grade Raise Front (m)	Permissible Grade Raise Rear (m)	Exceeding Permissible Grade Raise Front (m)	Exceeding Permissible Grade Raise Rear (m)	Surcharge Program	Minimum Thickness LWF in Garage and Front Porch or Slab-on-Grade (m)	Minimum Thickness LWF extending 2.4 m Beyond the building face or property line (m)	Seismic Site Class
61	72 Axel Cresent	97.72	99.00	97.55	98.80	99.70	60	96.75	2.1	2.1	no	no	no	Not Required	Not Required	Class E
62	70 Axel Cresent	97.61	98.95	97.46	98.75	99.65	60	96.70	2.1	2.1	no	no	no	Not Required	Not Required	Class E
63	68 Axel Cresent	97.61	98.90	97.46	98.70	99.60	60	96.65	2.1	2.1	no	no	no	Not Required	Not Required	Class E
64	66 Axel Cresent	97.05	98.90	97.12	98.70	99.60	60	96.65	2.1	2.1	no	no	no	Not Required	Not Required	Class E
65	64 Axel Cresent	97.05	98.85	97.03	98.85	99.55	60	96.60	2.1	2.1	no	no	no	Not Required	Not Required	Class E
66	201 Metric Circle	96.35	98.55	97.03	98.75	99.25	100	96.30	2.1	2.1	0.30	no	no	1.50	0.3 thick LWF along Front	Class E
67	203 Metric Circle	96.58	98.55	96.92	98.75	99.25	100	96.30	2.1	2.1	0.07	no	no	1.00	Not Required	Class E
68	205 Metric Circle	96.97	98.55	97.09	98.75	99.25	60	96.30	2.1	2.1	no	no	no	Not Required	Not Required	Class E
69	207 Metric Circle	96.97	98.55	97.09	98.75	99.25	60	96.30	2.1	2.1	no	no	no	Not Required	Not Required	Class E
70	209 Metric Circle	97.19	98.60	97.26	98.80	99.30	60	96.35	2.1	2.1	no	no	no	Not Required	Not Required	Class E
71	211 Metric Circle	97.19	98.60	97.26	98.80	99.30	60	96.35	2.1	2.1	no	no	no	Not Required	Not Required	Class E
72	213 Metric Circle	97.18	98.65	97.41	98.85	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
73	215 Metric Circle	97.18	98.65	97.41	98.85	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
74	217 Metric Circle	97.14	98.65	97.49	98.85	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
75	219 Metric Circle	97.14	98.70	97.49	98.90	99.40	60	96.45	2.1	2.1	no	no	no	Not Required	Not Required	Class E
76	221 Metric Circle	96.97	98.85	97.05	99.05	99.55	60	96.60	2.1	2.1	no	no	no	Not Required	Not Required	Class E
77	223 Metric Circle	96.97	98.85	97.05	99.05	99.55	60	96.60	2.1	2.1	no	no	no	Not Required	Not Required	Class E
78	225 Metric Circle	96.97	98.85	97.03	99.05	99.55	60	96.60	2.1	2.1	no	no	no	Not Required	Not Required	Class E
79	216 Metric Circle	96.96	98.65	96.77	98.85	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
80	214 Metric Circle	97.04	98.45	96.77	98.85	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
81	212 Metric Circle	97.02	98.45	96.88	98.85	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
82	210 Metric Circle	97.02	98.40	96.88	98.80	99.30	60	96.35	2.1	2.1	no	no	no	Not Required	Not Required	Class E
83	21 Bolt Terrace	96.30	98.65	96.58	98.65	99.35	100	96.40	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
84	23 Bolt Terrace	96.30	98.70	96.36	98.90	99.40	100	96.45	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
85	25 Bolt Terrace	96.12	98.85	96.20	99.05	99.55	100	96.60	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
86	27 Bolt Terrace	96.34	98.85	96.07	99.05	99.55	100	96.60	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
87	29 Bolt Terrace	96.35	98.80	96.07	99.00	99.50	100	96.55	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
88	248 Metric Circle	95.42	98.90	95.89	99.00	99.60	100	96.65	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
89	246 Metric Circle	95.42	98.90	95.89	99.00	99.60	100	96.65	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
90	244 Metric Circle	95.58	98.80	95.08	99.00	99.65	100	96.70	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
91	242 Metric Circle	95.58	98.80	95.08	99.00	99.70	100	96.75	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
92	234 Metric Circle	95.55	98.75	96.01	99.00	99.65	100	96.70	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
93	232 Metric Circle	95.77	98.90	96.01	99.10	99.60	100	96.65	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
94	230 Metric Circle	96.06	98.85	96.21	99.05	99.55	100	96.60	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
95	228 Metric Circle	96.46	98.85	96.25	98.85	99.55	100	96.60	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
96	226 Metric Circle	96.46	98.80	96.61	98.65	99.50	100	96.55	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
97	206 Metric Circle	96.96	98.55	96.41	98.75	99.25	100	96.30	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
98	204 Metric Circle	97.07	98.75	96.41	98.75	99.25	100	96.30	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
99	202 Metric Circle	96.51	98.75	96.13	98.75	99.25	100	96.30	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
100	200 Metric Circle	96.13	98.55	96.04	98.75	99.25	100	96.30	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
101	270 Metric Circle	96.04	98.75	96.16	98.75	99.35	100	96.40	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
102	268 Metric Circle	96.01	98.80	96.16	98.80	99.35	100	96.40	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
103	266 Metric Circle	95.89	98.85	96.12	98.85	99.35	100	96.40	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
104	264 Metric Circle	95.78	98.65	96.13	98.85	99.35	100	96.40	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
105	262 Metric Circle	95.68	98.60	95.72	98.80	99.35	100	96.40	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
106	258 Metric Circle	95.49	98.55	95.67	98.75	99.45	100	96.50	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
107	256 Metric Circle	95.55	98.55	95.67	98.75	99.45	100	96.50	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
108	254 Metric Circle	95.55	98.75	95.70	98.75	99.45	100	96.50	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
109	252 Metric Circle	95.62	98.80	95.70	99.00	99.50	100	96.55	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
110	28 Bolt Terrace	95.89	99.00	95.83	98.80	99.50	100	96.55	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
111	26 Bolt Terrace	96.26	98.75	96.48	98.75	99.45	100	96.50	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
112	24 Bolt Terrace	96.15	98.95	96.48	98.80	99.45	100	96.50	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
113	22 Bolt Terrace	96.15	98.70	96.37	98.80	99.40	100	96.45	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
114	20 Bolt Terrace	96.29	98.65	96.37	98.85	99.35	100	96.40	N/A	N/A	no	no	Completed	Not Required	Not Required	Class E
Block 115 A	4788 Abbott Street	95.57	97.90	95.61	98.38	99.00	100	96.05	2.1	2.1	0.63	1.07	no	1.50	1.3 m thick LWF along Front, 0.8 m thick LWF along Rear and West Side	Class E
Block 115 B	4786 Abbott Street	95.57	97.90	95.61	98.38	99.00	100	96.05	2.1	2.1	0.63	1.07	no	1.50	0.8 m thick LWF along Front, 1.2 m thick LWF along Rear	Class E
Block 115 C	4784 Abbott Street	95.47	97.90	95.45	98.38	99.00	100	96.05	2.1	2.1	0.73	1.23	no	1.50	0.9 m thick LWF along Front, 1.4 m thick LWF along Rear	Class E
Block 115 D	4782 Abbott Street	95.47	97.90	95.45	98.38	99.00	100	96.05	2.1	2.1	0.73	1.23	no	1.50	0.9 m thick LWF along Front, 1.4 m thick LWF along Rear and East Side	Class E
Block 116 A	4796 Abbott Street	95.79	98.20	95.89	98.40	99.10	100	96.15	2.1	2.1	0.61	0.71	no	1.50	0.8 m thick LWF along Front, 0.9 m thick LWF along Rear and West Side	Class E
Block 116 B	4794 Abbott Street	95.79	98.20	95.89	98.40	99.10	100	96.15	2.1	2.1	0.61	0.71	no	1.50	0.8 m thick LWF along Front, 0.9 m thick LWF along Rear	Class E
Block 116 C	4792 Abbott Street	95.57	98.20	95.61	98.40	99.10	100	96.15	2.1	2.1	0.93	1.09	no	1.50	1.1 m thick LWF along Front, 1.3 m thick LWF along Rear	Class E
Block 116 D	4790 Abbott Street	95.57	98.20	95.61	98.40	99.10	100	96.15	2.1	2.1	0.93	1.09	no	1.50	1.1 m thick LWF along Front, 1.3 m thick LWF along Rear and East Side	Class E
Block 117 A	4802 Abbott Street	95.71	98.15	95.89	98.35	99.05	100	96.10	2.1	2.1	0.64	0.66	no	1.50	0.8 m thick LWF along Front, 0.9 m thick LWF along Rear and West Side	Class E
Block 117 B	4800 Abbott Street	95.71	98.15	95.89	98.35	99.05	100	96.10	2.1	2.1	0.64	0.66	no	1.50	0.8 m thick LWF along Front, 0.9 m thick LWF along Rear	Class E
Block 117 C	4798 Abbott Street	95.79	98.15	95.89	98.35	99.05	100	96.10	2.1	2.1	0.56	0.66	no	1.50	0.8 m thick LWF along Front, 0.9 m thick LWF along Rear and East Side	Class E

Table 1 - Summary of Design Details

PG2855 - Metric Homes - 950 Terry Fox Drive - Phase 3 & 5

Lot/Block No.	Street	Original GS Front (m)	Proposed GS Front (m)	Original GS Rear (m)	Proposed GS Rear (m)	Finished Floor Elevation	Bearing Resistance Value - SLS (kPa)	Underside of Footing (USF) Elevation	Permissible Grade Raise Front (m)	Permissible Grade Raise Rear (m)	Exceeding Permissible Grade Raise Front (m)	Exceeding Permissible Grade Raise Rear (m)	Surcharge Program	Minimum Thickness LWF in Garage and Front Porch or Slab-on-Grade (m)	Minimum Thickness LWF extending 2.4 m Beyond the building face or property line (m)	Seismic Site Class
Block 118 A	4816 Abbott Street	96.13	98.05	96.26	98.35	99.15	100	96.20	2.1	2.1	0.02	0.19	no	1.00	0.3 m thick LWF along Front, 0.4 m thick LWF along Rear and West Side	Class E
Block 118 B	4814 Abbott Street	96.13	98.05	96.26	98.35	99.15	100	96.20	2.1	2.1	0.02	0.19	no	1.00	0.3 m thick LWF along Front, 0.4 m thick LWF along Rear	Class E
Block 118 C	4812 Abbott Street	96.13	98.05	96.26	98.35	99.15	100	96.20	2.1	2.1	0.02	0.19	no	1.00	0.3 m thick LWF along Front, 0.4 m thick LWF along Rear	Class E
Block 118 D	4810 Abbott Street	95.76	98.05	96.26	98.35	99.15	100	96.20	2.1	2.1	0.49	0.29	no	1.50	0.7 m thick LWF along Front, 0.5 m thick LWF along Rear	Class E
Block 118 E	4808 Abbott Street	95.76	98.05	96.24	98.35	99.15	100	96.20	2.1	2.1	0.49	0.31	no	1.50	0.7 m thick LWF along Front, 0.5 m thick LWF along Rear and East Side	Class E
Block 119 A	4824 Abbott Street	96.77	98.35	96.78	98.45	99.25	60	96.30	2.1	2.1	no	no	no	Not Required	Not Required	Class E
Block 119 B	4822 Abbott Street	96.77	98.35	96.78	98.45	99.25	60	96.30	2.1	2.1	no	no	no	Not Required	Not Required	Class E
Block 119 C	4820 Abbott Street	96.13	98.35	96.66	98.45	99.25	100	96.30	2.1	2.1	0.32	no	no	1.50	0.5 m thick LWF along Front	Class E
Block 119 D	4818 Abbott Street	96.13	98.35	96.26	98.45	99.25	100	96.30	2.1	2.1	0.32	0.29	no	1.50	0.5 m thick LWF along Front, 0.5 m thick LWF along Rear and East Side	Class E
Block 120 A	4832 Abbott Street	97.09	98.45	97.11	98.55	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
Block 120 B	4830 Abbott Street	97.09	98.45	97.11	98.55	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
Block 120 C	4828 Abbott Street	96.77	98.45	96.78	98.55	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
Block 120 D	4826 Abbott Street	96.77	98.45	96.78	98.55	99.35	60	96.40	2.1	2.1	no	no	no	Not Required	Not Required	Class E
Block 121 A	4840 Abbott Street	97.79	98.55	97.62	98.65	99.45	60	96.50	2.1	2.1	no	no	no	Not Required	Not Required	Class E
Block 121 B	4838 Abbott Street	97.79	98.55	97.30	98.65	99.45	60	96.50	2.1	2.1	no	no	no	Not Required	Not Required	Class E
Block 121 C	4836 Abbott Street	97.09	98.55	97.30	98.65	99.45	60	96.50	2.1	2.1	no	no	no	Not Required	Not Required	Class E
Block 121 D	4834 Abbott Street	97.09	98.55	97.11	98.65	99.45	60	96.50	2.1	2.1	no	no	no	Not Required	Not Required	Class E
1	Adstock Heights	95.69	97.95	94.93	96.55	98.76	100	95.81	1.7	1.7	0.56	no	no	Not Required	Not Required	Class E
2	Adstock Heights	95.95	97.86	95.50	97.75	98.76	100	95.81	1.7	1.7	0.21	0.55	no	1.50	0.4 m thick LWF along Front, 0.8 m thick LWF along Rear and Sides	Class E
3	Adstock Heights	95.95	97.76	95.50	97.56	98.76	100	95.81	1.7	1.7	0.11	0.36	no	1.00	0.3 m thick LWF along Front, 0.6 m thick LWF along Rear and Sides	Class E
4	Adstock Heights	95.95	97.86	96.01	97.81	98.76	100	95.81	1.5	1.5	0.41	0.30	Completed	Not Required	Not Required	Class E
5	Adstock Heights	95.50	97.86	95.00	97.81	98.76	100	95.81	1.5	1.5	0.86	1.31	Completed	Not Required	Not Required	Class E
6	Adstock Heights	96.30	97.86	96.50	97.86	98.76	100	95.81	1.5	1.5	0.06	no	Completed	Not Required	Not Required	Class E
7	Adstock Heights	95.82	97.86	95.00	97.86	98.76	100	95.81	1.5	1.5	0.54	1.36	Completed	Not Required	Not Required	Class E
8	Adstock Heights	95.00	95.00	95.00	97.86	98.76	100	95.81	1.5	1.5	no	1.36	Completed	Not Required	Not Required	Class E
9	Adstock Heights	94.82	97.66	95.00	97.76	98.76	100	95.81	1.5	1.5	1.34	1.26	Completed	Not Required	Not Required	Class E
10	Adstock Heights	94.85	97.66	95.00	97.86	98.76	100	95.81	1.5	1.5	1.31	1.36	Completed	Not Required	Not Required	Class E
11	Adstock Heights	96.50	97.70	97.70	98.05	98.76	60	95.81	1.7	1.7	no	no	no	Not Required	Not Required	Class E
12	Adstock Heights	96.50	97.70	96.72	98.05	98.76	60	95.81	1.7	1.7	no	no	no	Not Required	Not Required	Class E
13	Adstock Heights	96.50	97.70	96.72	97.85	98.76	60	95.81	1.7	1.7	no	no	no	Not Required	Not Required	Class E
14	Adstock Heights	96.00	97.86	96.27	98.11	98.76	100	95.81	1.7	1.7	0.16	0.14	no	1.50	0.4 m thick LWF along Front, 0.4 m thick LWF along Rear and Sides	Class E
15	Adstock Heights	95.40	97.86	96.27	98.11	98.76	100	95.81	1.7	1.7	0.76	0.14	no	1.50	1.0 m thick LWF along Front and Sides, 0.4 m thick LWF along Rear	Class E
16	Adstock Heights	95.40	97.86	96.37	98.01	98.76	100	95.81	1.7	1.7	0.76	no	no	1.50	1.0 m thick LWF along Front and Sides	Class E
17	Adstock Heights	96.00	97.86	96.50	97.96	98.76	100	95.81	1.7	1.7	0.16	no	no	1.50	0.4 m thick LWF along Front and Sides	Class E
* Block 123 A	Abbott Street	95.61	98.69	96.66	98.69	100.25	100	96.50	1.7	1.7	1.88	0.83	Completed	Not Required	Not Required	Class E
* Block 123 B	Abbott Street	94.95	98.54	95.26	98.05	100.20	100	96.45	1.5	1.5	2.69	1.89	Completed	Not Required	Not Required	Class E
* Block 123 C	Abbott Street	95.13	98.49	95.17	98.49	100.15	100	96.40	1.5	1.5	2.46	2.42	Completed	Not Required	Not Required	Class E
* Block 123 D	Abbott Street	95.87	98.34	95.73	98.34	100.15	100	96.40	1.7	1.7	1.17	1.31	Completed	Not Required	Not Required	Class E
* Block 123 E	Abbott Street	96.10	98.49	95.96	98.00	100.15	100	96.40	1.7	1.7	0.99	0.64	Completed	Not Required	Not Required	Class E

Proposed grade raise information was based on the following grading plans prepared by Novatech:

- SPB Developments Inc. (Metric Homes) Subdivision, 950 Terry Fox Drive -Grading Plan - Project No. 110037 - Drawing No. 110037-GR1 - Revision 13 dated January 16, 2019, Drawing No. 110037-GP2 - Revison 13 dated January 16, 2019 and Drawing No 110037-GP3 - Revision 9 dated August 22, 2022.
- Bearing Resistance Values to be confirmed in the field by the Geotechnical Consultant at the time of Construction.
- * Denotes the following items inferred for Block 123 for presentation purposes:
- The individual buildings for Block 123 were identified as Unit A, B, C, D and E starting at the northwest corner of Block 123 in a clockwise direction.
- Front of Block 123 A faces East, Front of Building 123 B faces North, Front of Building 123 C faces West, Front of Building 123 D faces south and Front of Building 123 E faces South
- Where blast rock is used to build the subgrade, an increased LWF thickness was assigned to accommodate the additional loading by the blast rock (Lots 43, 44 and 45)
- Where not enough space is available along the sides of the foundation walls for LWF, the LWF should be extended horizontally a maximum of 2.4 m or to the property line.

PATERSON GROUP

memorandum

re: **Completion of Settlement Surcharge Monitoring Program**
Metric Homes – Phases 4 and 5
950 Terry Fox Drive – Ottawa

to: SPB Developments – **Mr. Pierre Bernier** – pierre@metrichomes.com

to: Novatech Engineering – **Mr.Alex McAuley** – a.mcauley@novatech-eng.com

date: November 8, 2022

file: PG2855-MEMO.21

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a completion summary of the settlement surcharge monitoring programs conducted within Phases 4 and 5 of the proposed residential development to be located at 950 Terry Fox Drive in the City of Ottawa, Ontario. The following report should be read in conjunction with Paterson Reports PG2855-2 Rev. 6 dated November 8, 2022, PG2855-3 dated November 8, 2022 and PG2855-MEMO.20 Revision 10 dated November 8, 2022.

Background

As a result of our permissible grade raise recommendations and proposed finished grading information, settlement surcharge monitoring programs were initiated in an areas where finished grades had exceeded our original permissible grade raise recommendations within Phases 4 and 5 of the proposed development.

Paterson reviewed the following plans prepared by Novatech Engineering (Novatech) regarding the completion of the surcharge programs at the aforementioned site:

- ❑ SPB Developments Inc. (Metric Homes) Subdivision, 950 Terry Fox Drive - Grading Plan - Project No. 110037 - Drawing No. 110037-GR1, Revision 13 dated January 16, 2019.
- ❑ SPB Developments Inc. (Metric Homes) Subdivision, 950 Terry Fox Drive - Grading Plan - Project No. 110037 - Drawing No. 110037-GR2, Revision 13 dated January 16, 2019.
- ❑ SPB Developments Inc. (Metric Homes) Subdivision, 950 Terry Fox Drive - Grading Plan - Project No. 110037 - Drawing No. 110037-GR3, Revision 9 dated August 22, 2022.
- ❑ SPB Developments Inc. (Metric Homes) Subdivision, 950 Terry Fox Drive – 2017 Surcharge and Earthworks Program - Project No. 110037 - Drawing No. 110037-S&E, Revision 2 dated January 11, 2018.

Paterson reviewed the following topographic survey plan prepared by ASL Agrodrain Limited (ASL) regarding the completion of the surcharge programs at the aforementioned site:

- ❑ Trailview PH5 Surcharge with Ortho – June 16, 2020.

Settlement Surcharge Monitoring Programs

Phase 4

A settlement surcharge monitoring program was completed for Lots 1-10, 43-46, and 83-114 within Phase 4 of the subject development, where significant permissible grade raise exceedances occur.

The Phase 4 surcharge program was initiated in August 2016, following the placement of fill material within a portion of the lots. At that time, four (4) settlement plates (SP7 to SP10) were installed to permit ongoing monitoring of the surcharge program. Additional fill material was placed around SP7 to SP10 between November 2016 and May 2017. The remaining fill material for the surcharge program was placed between August and September 2017. As part of the fill placement, an additional eight (8) settlement plates (SP11 to SP18) were installed to permit ongoing monitoring of the remainder of the surcharge program. It should be noted that settlement plates SP7 and SP8 were reinstalled as SP16 and SP18, respectively, between November 26 and December 29, 2017.

A portion of the surcharge program, represented by settlement plates SP9 and SP10, was completed in March 2020, to permit the construction of adjacent roadways and servicing. The remainder of the surcharge program was completed in October 2022. Based on the results of the surcharge program, total cumulative settlements of up to 630 mm were observed for SP9 to SP18 over the duration of the Phase 4 settlement surcharge monitoring program.

The results of the surcharge program are presented in Figure 3 – Settlement Monitoring Program – Phase 4, attached to the current memorandum. The surcharge pile areas and settlement plate locations are presented in Drawing PG2855-4 – Settlement Plate Location Plan attached to the current memorandum.

Phase 5

A settlement surcharge monitoring program was completed for Lots 1-10 and Block 123 within Phase 5 of the subject development, where significant permissible grade raise exceedances occur.

The Phase 5 surcharge program was initiated in April 2020, following the placement of fill material within Block 123. At that time, three (3) settlement plates (SP6, SP8 and SP9) were installed to permit ongoing monitoring of the surcharge program. The remaining fill material for the surcharge program was placed between May and June 2020. As part of the fill placement, an additional seven (7) settlement plates (SP1 to SP5, SP7 and SP10) were installed to permit ongoing monitoring of the surcharge program.

The Phase 5 surcharge program was completed in October 2022. Based on the results of the surcharge program, total cumulative settlements of up to 293 mm were observed for to SP1 to SP10 over the duration of the Phase 5 settlement surcharge monitoring program.

The results of the surcharge program are presented in Figure 4 – Settlement Monitoring Program – Phase 5, attached to the current memorandum. The surcharge pile areas and settlement plate locations are presented in Drawing PG2855-6 – Settlement Plate Location Plan attached to the current memorandum.

Geotechnical Review

Based on Paterson's review of the monitoring results, the settlement surcharge programs are considered to be complete from a geotechnical perspective. Therefore, the permissible grade raise restriction is not applicable for the surcharged areas and lightweight fill will is not required.

A revised grading plan review was completed by Paterson for the proposed development following the completion of the surcharge programs. The results of our grading plan review are presented in the aforementioned memorandum PG2855-MEMO.20 Revision 10 dated November 8, 2022.

We trust that this information satisfies your immediate requirements.

Best Regards,

Paterson Group Inc.

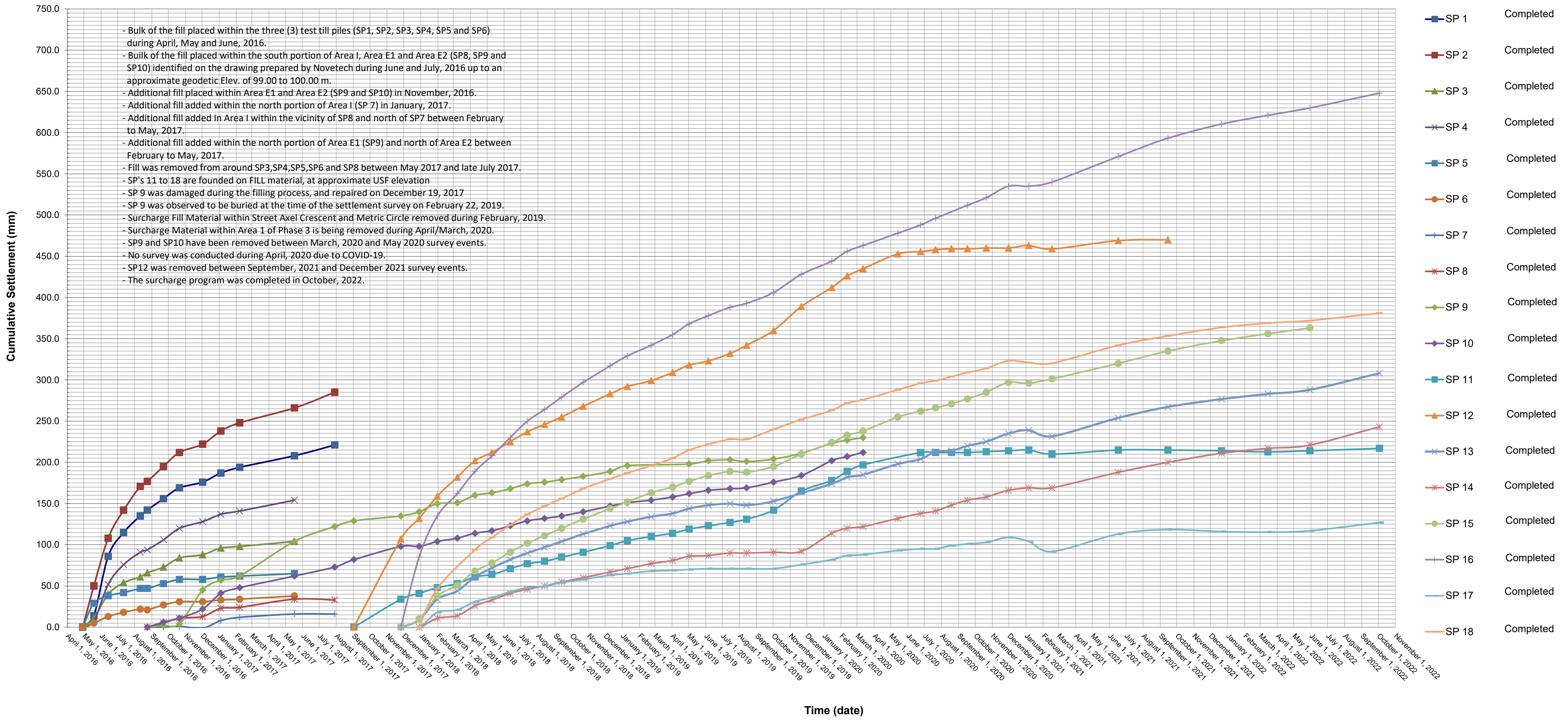
O.Canton

Owen Canton, EIT

LICENSED PROFESSIONAL ENGINEER
Nov.9-2022
D. J. GILBERT
100116130
PROVINCE OF ONTARIO

David J. Gilbert, P. Eng.

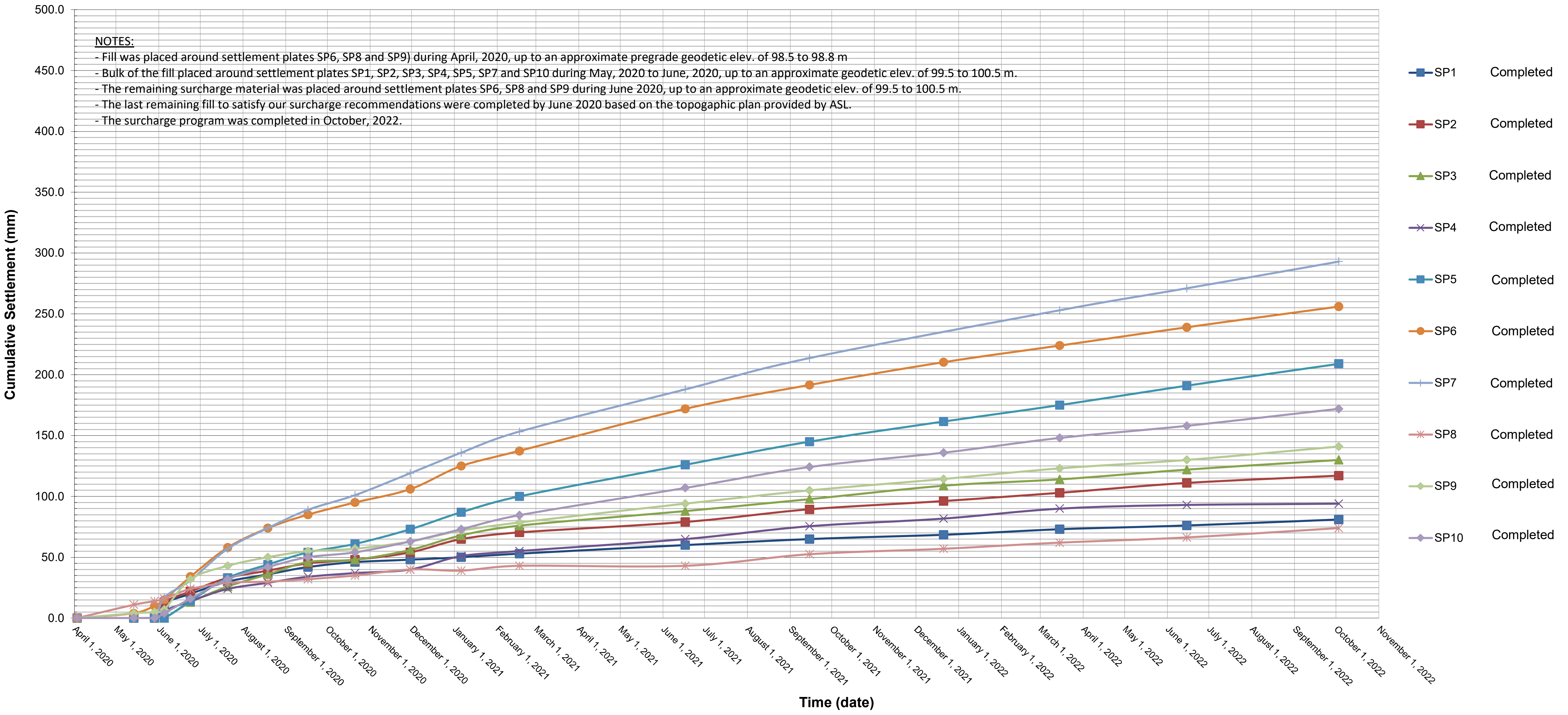
Figure 3 - Surcharge Monitoring Program - Phase 3 and 4
Metric Lands - Proposed Residential Development - Terry Fox Drive



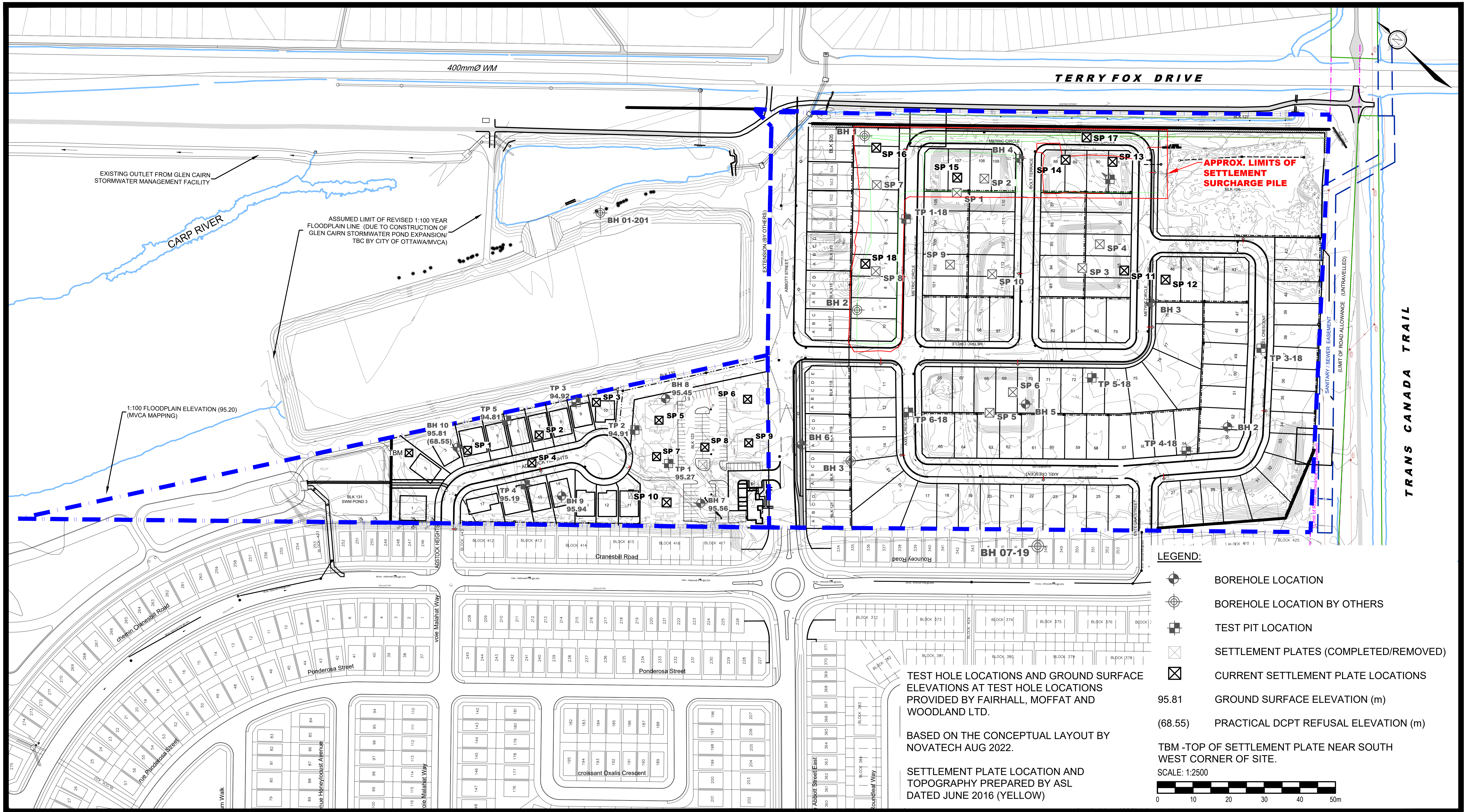
- Bulk of the fill placed within the three (3) test till piles (SP1, SP2, SP3, SP4, SP5 and SP6) during April, May and June, 2016.
- Builk of the fill placed within the south portion of Area I, Area E1 and Area E2 (SP8, SP9 and SP10) identified on the drawing prepared by Novetech during June and July, 2016 up to an approximate geodetic Elev. of 99.00 to 100.00 m.
- Additional fill placed within Area E1 and Area E2 (SP9 and SP10) in November, 2016.
- Additional fill added within the north portion of Area I (SP 7) in January, 2017.
- Additional fill added In Area I within the vicinity of SP8 and north of SP7 between February to May, 2017.
- Additional fill added within the north portion of Area E1 (SP9) and north of Area E2 between February to May, 2017.
- Fill was removed from around SP3,SP4,SP5,SP6 and SP8 between May 2017 and late July 2017.
- SP's 11 to 18 are founded on FILL material, at approximate USF elevation
- SP 9 was damaged during the filling process, and repaired on December 19, 2017
- SP 9 was observed to be buried at the time of the settlement survey on February 22, 2019.
- Surcharge Fill Material within Street Axel Crescent and Metric Circle removed during February, 2019.
- Surcharge Material within Area 1 of Phase 3 is being removed during April/March, 2020.
- SP9 and SP10 have been removed between March, 2020 and May 2020 survey events.
- No survey was conducted during April, 2020 due to COVID-19.
- SP12 was removed between September, 2021 and December 2021 survey events.
- The surcharge program was completed in October, 2022.

PATERSON GROUP

Figure 4 - Surcharge Monitoring Program - Phase 5
Metric Lands - Proposed Residential Development - Terry Fox Drive



NOTES:
- Fill was placed around settlement plates SP6, SP8 and SP9) during April, 2020, up to an approximate pregrade geodetic elev. of 98.5 to 98.8 m
- Bulk of the fill placed around settlement plates SP1, SP2, SP3, SP4, SP5, SP7 and SP10 during May, 2020 to June, 2020, up to an approximate geodetic elev. of 99.5 to 100.5 m.
- The remaining surcharge material was placed around settlement plates SP6, SP8 and SP9 during June 2020, up to an approximate geodetic elev. of 99.5 to 100.5 m.
- The last remaining fill to satisfy our surcharge recommendations were completed by June 2020 based on the topographic plan provided by ASL.
- The surcharge program was completed in October, 2022.



TEST HOLE LOCATIONS AND GROUND SURFACE ELEVATIONS AT TEST HOLE LOCATIONS PROVIDED BY FAIRHALL, MOFFAT AND WOODLAND LTD.

BASED ON THE CONCEPTUAL LAYOUT BY NOVATECH AUG 2022.

SETTLEMENT PLATE LOCATION AND TOPOGRAPHY PREPARED BY ASL DATED JUNE 2016 (YELLOW)

LEGEND:

⊕	BOREHOLE LOCATION
⊕	BOREHOLE LOCATION BY OTHERS
▪	TEST PIT LOCATION
☒	SETTLEMENT PLATES (COMPLETED/REMOVED)
☒	CURRENT SETTLEMENT PLATE LOCATIONS
95.81	GROUND SURFACE ELEVATION (m)
(68.55)	PRACTICAL DCPT REFUSAL ELEVATION (m)

TBM -TOP OF SETTLEMENT PLATE NEAR SOUTH WEST CORNER OF SITE.

SCALE: 1:2500

0 10 20 30 40 50m

PATERSON GROUP

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

NO.	REVISIONS	DATE	INITIAL
5	BASE PLAN UPDATED	15/11/2022	OC
4	REVISED LIMITS OF SETTLEMENT SURCHARGE PROGRAM	29/07/2020	RG
3	SURCHARGE TOPO (ASL) ADDED TO PLAN	24/05/2018	NC
2	NEW SETTLEMENT PLATES ADDED TO PLAN	09/01/2018	DJG
1	BASE PLAN UPDATED	14/06/2017	DJG

SPB DEVELOPMENTS

GEOTECHNICAL INVESTIGATION
PROP. RESIDENTIAL DEVELOPMENT - 950 TERRY FOX DRIVE

OTTAWA, ONTARIO

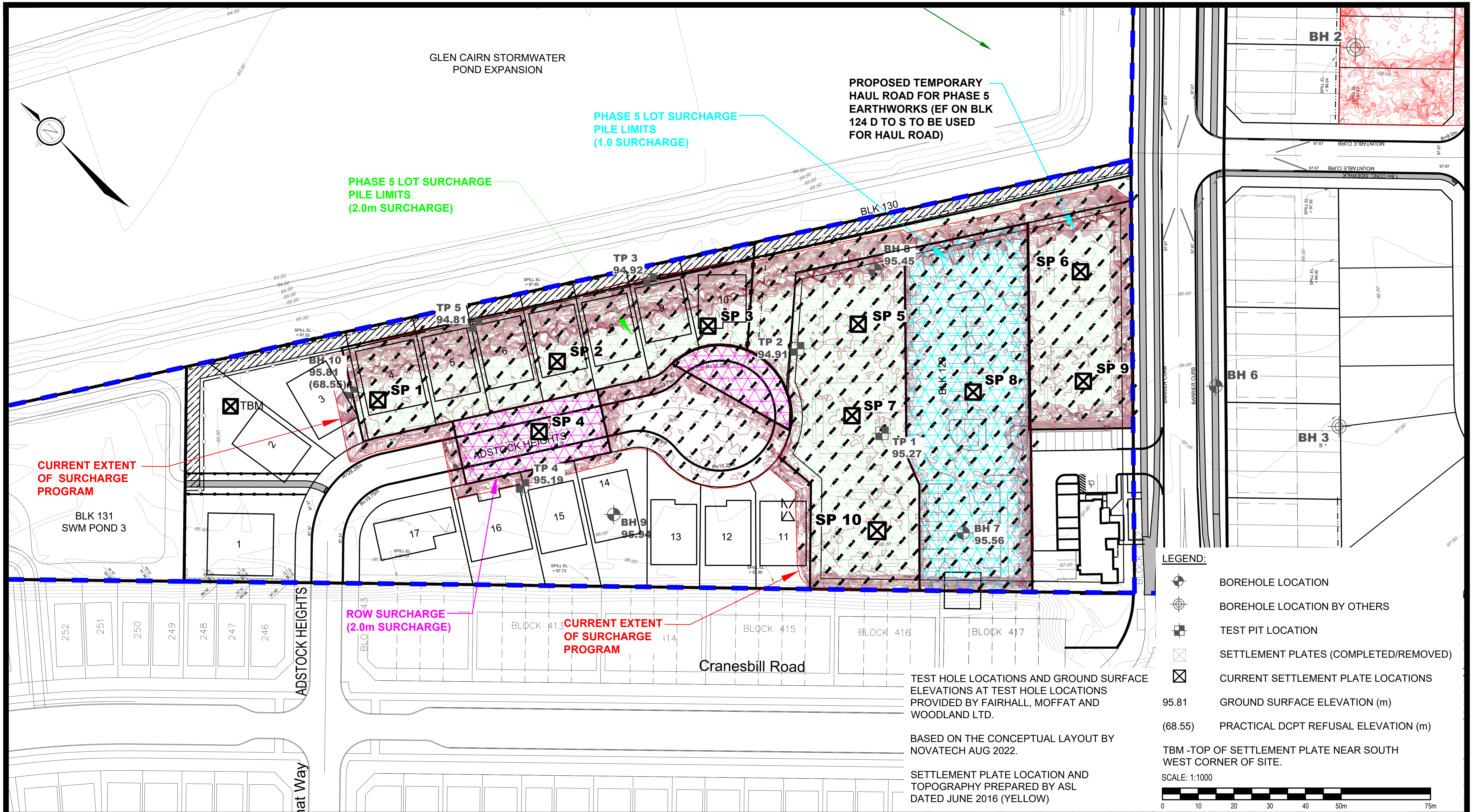
Title:

SETTLEMENT PLATE LOCATION PLAN

Scale: 1:2500
Drawn by: RCG
Checked by: OC
Approved by: DJG
Date: 06/2017
Report No.: PG2855-2
Dwg. No.: PG2855-4
Revision No.: 5

p:\autocad drawings\geotechnical\pg28xx\pg2855\nov 2022\pg2855-4-spl plan (rev.05).dwg

11x17



LEGEND:

⊕ BOREHOLE LOCATION

⊕ BOREHOLE LOCATION BY OTHERS

▩ TEST PIT LOCATION

☒ SETTLEMENT PLATES (COMPLETED/REMOVED)

☒ CURRENT SETTLEMENT PLATE LOCATIONS

95.81 GROUND SURFACE ELEVATION (m)

(68.55) PRACTICAL DCPT REFUSAL ELEVATION (m)

TBM -TOP OF SETTLEMENT PLATE NEAR SOUTH WEST CORNER OF SITE.

SCALE: 1:1000

0 10 20 30 40 50m 75m

TEST HOLE LOCATIONS AND GROUND SURFACE ELEVATIONS AT TEST HOLE LOCATIONS PROVIDED BY FAIRHALL, MOFFAT AND WOODLAND LTD.

BASED ON THE CONCEPTUAL LAYOUT BY NOVATECH AUG 2022.

SETTLEMENT PLATE LOCATION AND TOPOGRAPHY PREPARED BY ASL DATED JUNE 2016 (YELLOW)

PATERSON GROUP

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

NO.	REVISIONS	DATE	INITIAL
1	BASE PLAN UPDATED	15/11/2022	OC

SPB DEVELOPMENTS

GEOTECHNICAL INVESTIGATION
PROP. RESIDENTIAL DEVELOPMENT - 950 TERRY FOX DRIVE - PHASE 5
OTTAWA, ONTARIO

Title:

SETTLEMENT PLATE LOCATION PLAN

Scale: 1:1000
Date: 06/2017
Drawn by: RCG
Report No.: PG2855-2
Checked by: OC
Dwg. No.: PG2855-6
Approved by: DJG
Revision No.: 1

p:\autocad drawings\geotechnical\pg28xx\pg2855\nov 2022\pg2855-4-spl plan (rev.05).dwg

11x17