640 Compass Street
(Part 1 on 4R-35191,
Block 140 on 4M-1544)

Servicing and Stormwater Management Report

November 4, 2024

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Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
1	Servicing and SWM	WJ/SB	24.11.04	DT	24.11.04	SG	24.11.04

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1 Introduction

Richcraft Homes Ltd. (Richcraft) has commissioned Stantec Consulting Ltd. (Stantec) to prepare the following Servicing and Stormwater Management Report in support of the Site Plan Application for 640 Compass Street, (Part 1 on 4R-35191, Block 140 on 4M-1544) within TrailsEdge West Phase 2 Subdivision (known as Block 135 in the previously approved Trails Edge West servicing brief). The subject site is within the City of Ottawa, bound by Brian Coburn Boulevard to the North, Part 2 of Block 140 to the east, Axis Way to the South, and Compass Street to the West (refer to Figure 1.1 below).

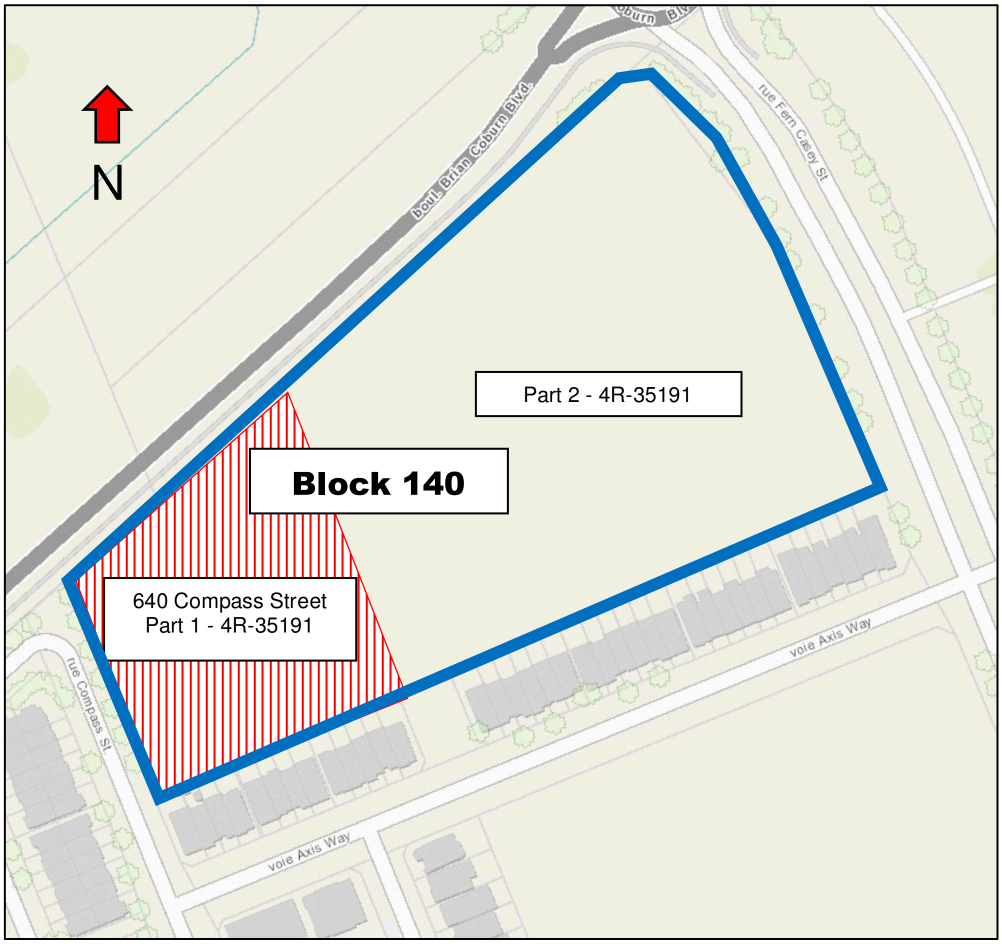


Figure 1.1 Key Map of Trails Edge West Block 140 Including 640 Compass

The 640 Compass Street property is currently zoned DR (Development Reserve) and occupies 0.96 ha of land. The site is currently undeveloped. The proposed development consists of sixty-six (66) two-bedroom terrace flat units as shown in the site plan included in **Appendix E**.

Servicing and stormwater management constraints for the entire block were identified as part of the previously approved *Design Brief for the Trails Edge West* subdivision (DSEL, 2015) as well as within the *Stormwater Management Report for the Trails Edge West Subdivision* (JFSA, 2015). Preliminary servicing and stormwater management analysis for the 640 Compass site was further detailed using the approved subdivision servicing as a base as part of an internal memo titled *Block 140 – Trails Edge West – Civil Servicing* Constraints (DSEL, 2022). Findings from the three noted reports are referenced throughout this report.

1.1 Objective

This site servicing and stormwater management (SWM) report has been prepared to present an internal servicing scheme that is free of conflicts, uses existing/approved infrastructure, and meets all design criteria as identified in background documents and City of Ottawa design guidelines.

2 Reference Documents

The following documents were referenced in the preparation of this report:

- City of Ottawa Sewer Design Guidelines, 2nd Edition, City of Ottawa, October 2012.
- City of Ottawa Design Guidelines – Water Distribution, 1st Edition, Infrastructure Services Department, City of Ottawa, July 2010.
- Technical Bulletin ISDTB-2014-02 Revision to Ottawa Design Guidelines – Water, City of Ottawa, May 2014.
- Technical Bulletin PIEDTB-2016-01 Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, September 2016.
- Technical Bulletin ISTB-2018-01 Revision to Ottawa Design Guidelines – Sewer, City of Ottawa, March 2018.
- Technical Bulletin ISTB-2018-02 Revision to Ottawa Design Guidelines – Water Distribution, City of Ottawa, March 2018.
- Memorandum: Block 140 – Trails Edge West – Civil Servicing Constraints, DSEL, July 2022.
- Design Brief for the Trails Edge West – Richcraft Group of Companies, DSEL, Revision 3, January 26, 2015.
- Stormwater Management Report for the Trails Edge Subdivision, JFSA, Updated January 2015.

3 Potable Water Servicing

3.1 Background

The proposed development is located within Zone 2E of the City of Ottawa’s water distribution system. This zone is fed by the Forest Ridge Pump Station. The site will be fed by a 200 mm diameter watermain on Compass Street.

3.2 Proposed Watermain Sizing and Layout

3.2.1 Connections to Existing Infrastructure

The proposed watermain alignment and sizing for the development is demonstrated on **Drawing SSP-1**. A 200 mm diameter watermain is proposed to follow the alignment of the private roads within the subject property with two connections to the existing 200 mm diameter watermain on Compass Street at the entrance to the 640 Compass site.

Figure 3.1 shows the location of the two (2) connection points to the existing watermain.

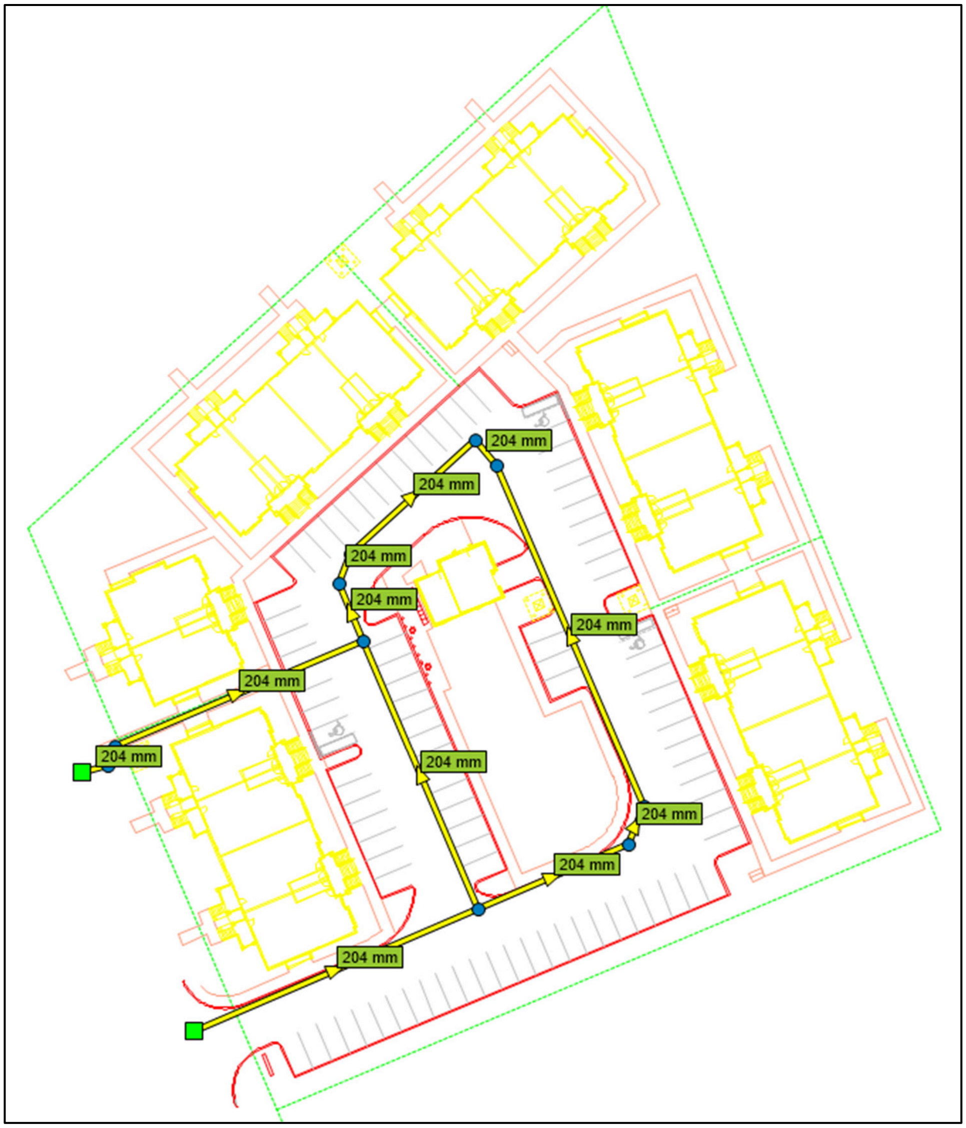


Figure 3.1 Proposed Watermain Layout and Pipe Diameters (mm)

3.2.2 Ground Elevations

Proposed ground elevations throughout the 640 Compass site range from approximately 87.66 m to 87.88m at nodes in the watermain network.

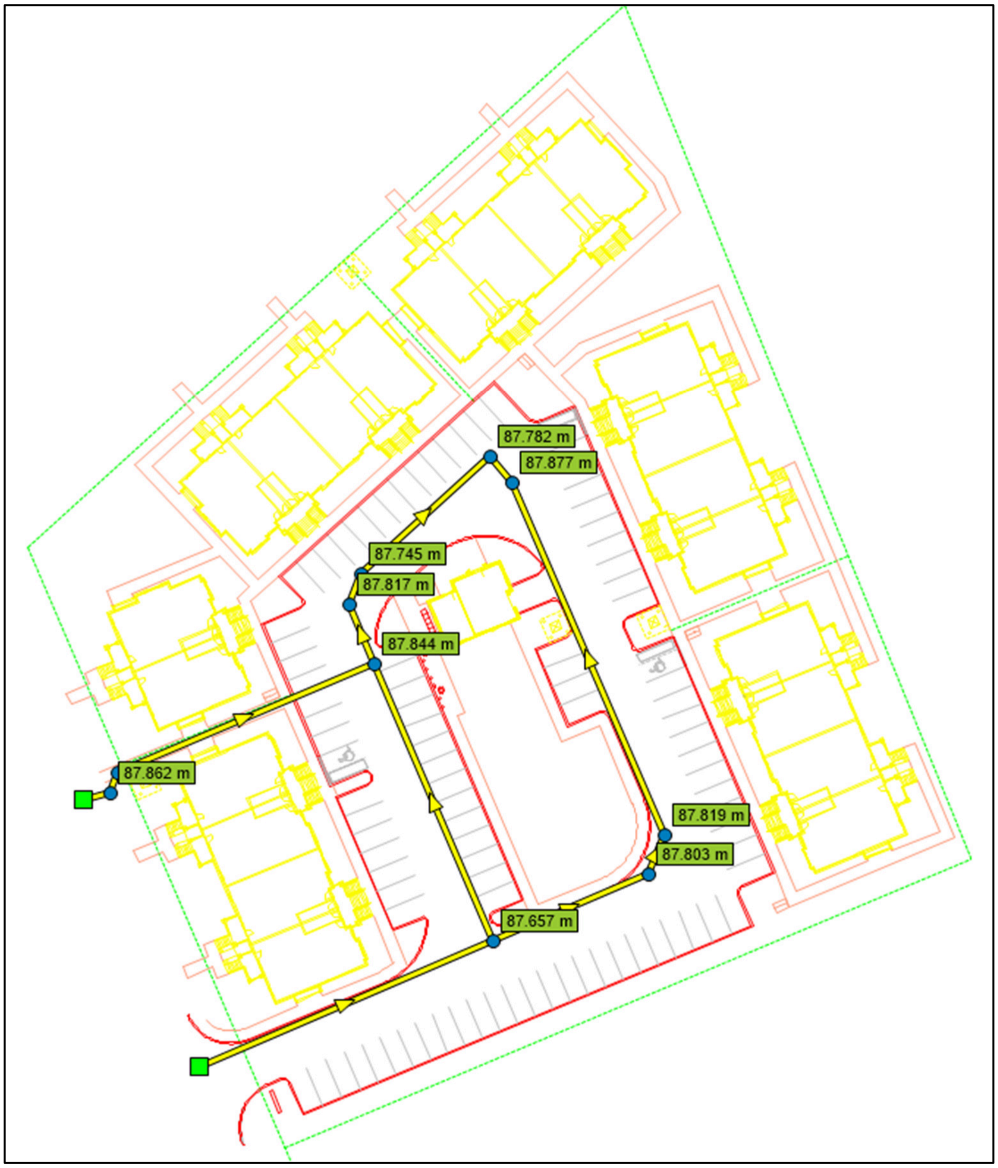


Figure 3.2 Ground Elevations (m) at Nodes

3.2.3 Domestic Water Demands

640 Compass contains a total of sixty-six (66) two-bedroom terrace flat units, with an estimated total population of 178 persons. Refer to **Appendix A.1** for detailed domestic water demand calculations.

Water demands for the development were estimated using the City of Ottawa's Water Distribution Design Guidelines. For residential developments, the average day (AVDY) per capita water demand is 280 L/cap/d. For maximum day (MXDY) demand, AVDY was multiplied by a factor of 2.5 and for peak hour (PKHR) demand, MXDY was multiplied by a factor of 2.2. The calculated residential water consumption is represented in Table 3.1.

Table 3.1 Residential Water Demands for 640 Compass

Unit Type	Units	Persons/Unit	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Two-bedroom Terrace Flats	66	2.7	178	0.58	1.44	3.18

3.3 Level of Service

3.3.1 Allowable Pressures

The City of Ottawa Water Distribution Design Guidelines state that the desired range of system pressures under normal demand conditions (i.e., basic day, maximum day, and peak hour) should be in the range of 350 to 552 kPa (50 to 80 psi) and no less than 275 kPa (40 psi) at the ground elevation on the streets (i.e., at hydrant level). The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way is 552 kPa (80 psi). As per the Ontario Building Code (OBC) & Guide for Plumbing, if pressures greater than 552 kPa (80 psi) are anticipated, pressure relief measures are required. The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi). Under emergency fire flow conditions, the minimum pressure objective in the distribution system is 138 kPa (20 psi).

3.3.2 Fire Flow Demands

Fire flow calculations were completed using the Fire Underwriters Survey (FUS) methodology. Refer to **Appendix A.2** for detailed FUS calculations. The results of the fire flow calculations are summarized in Table 3.2.

Table 3.2 Fire Flow Calculations Using FUS Methodology

Unit Type	Description	Required Fire Flow (L/min)	Required Fire Flow (L/s)
Two-bedroom Terrace Flats	Two-storey building with twelve terrace units (worst case exposures: Block 5)	11,000	183

3.4 Hydraulic Analysis

Hydraulic modeling using PCSWMM was built by Stantec using the following boundary conditions as provided by City of Ottawa staff:

1. Boundary condition at the Compass Street watermain adjacent to the asphalt sidewalk between building Block 1 and Block 2.
2. Boundary condition at the Compass Street watermain across from the western entrance to the 640 Compass site.
3. Boundary condition at the Axis Way stub street through Block 139 located to the South of the 640 Compass site.

The boundary conditions used for the hydraulic analysis are summarized in Table 3.3.

Table 3.3 Boundary Condtions for Connection Points for 640 Compass

Location	Max. HGL (AVDY), Head (m)	PKHR, Head (m)	MXDY+FF (183 L/s), Head (m)
1 – Compass Street (b/w building Block 1 and Block 2)	130.6	126.7	120.0
2 – Compass Street (western entrance to Block 140)	130.6	126.7	121.2
3 – Axis Way Stub Street (Block 139)	130.6	126.7	125.9

The anticipated pressures in this development were assessed to meet minimum servicing requirements (average day and peak hour demands). A fire flow analysis was also performed under maximum day conditions. Detailed results are shown in **Appendix A3**.

3.4.1 Model Development

New watermains were added to the hydraulic model to simulate the proposed distribution system. Hazen-Williams coefficients (“C-Factors”) were applied to the new watermain in accordance with the City of Ottawa’s Water Distribution Design Guidelines (Table 3.4).

Table 3.4 C-Factors Applied Based on Watermain Diameter

Nominal Pipe Diameter (mm)	C-Factor
150	100
200 to 250	110
300 to 600	120
Over 600	130

3.4.1.1 Average Day & Peak Hour

The hydraulic model results show that the maximum pressures (AVDY condition) are anticipated to be approximately 419-421 kPa (60.7-61.1 psi) within the 640 Compass site. Minimum pressures during PKHR conditions are anticipated to be approximately 380-383 kPa (55.2-55.5 psi) for the site. These pressures lie within acceptable operating conditions, and no pressure reducing valves (PRVs) are required for the site.

Figure 3.3 and Figure 3.4 below identify the minimum and maximum pressure results for the simulation, respectively.

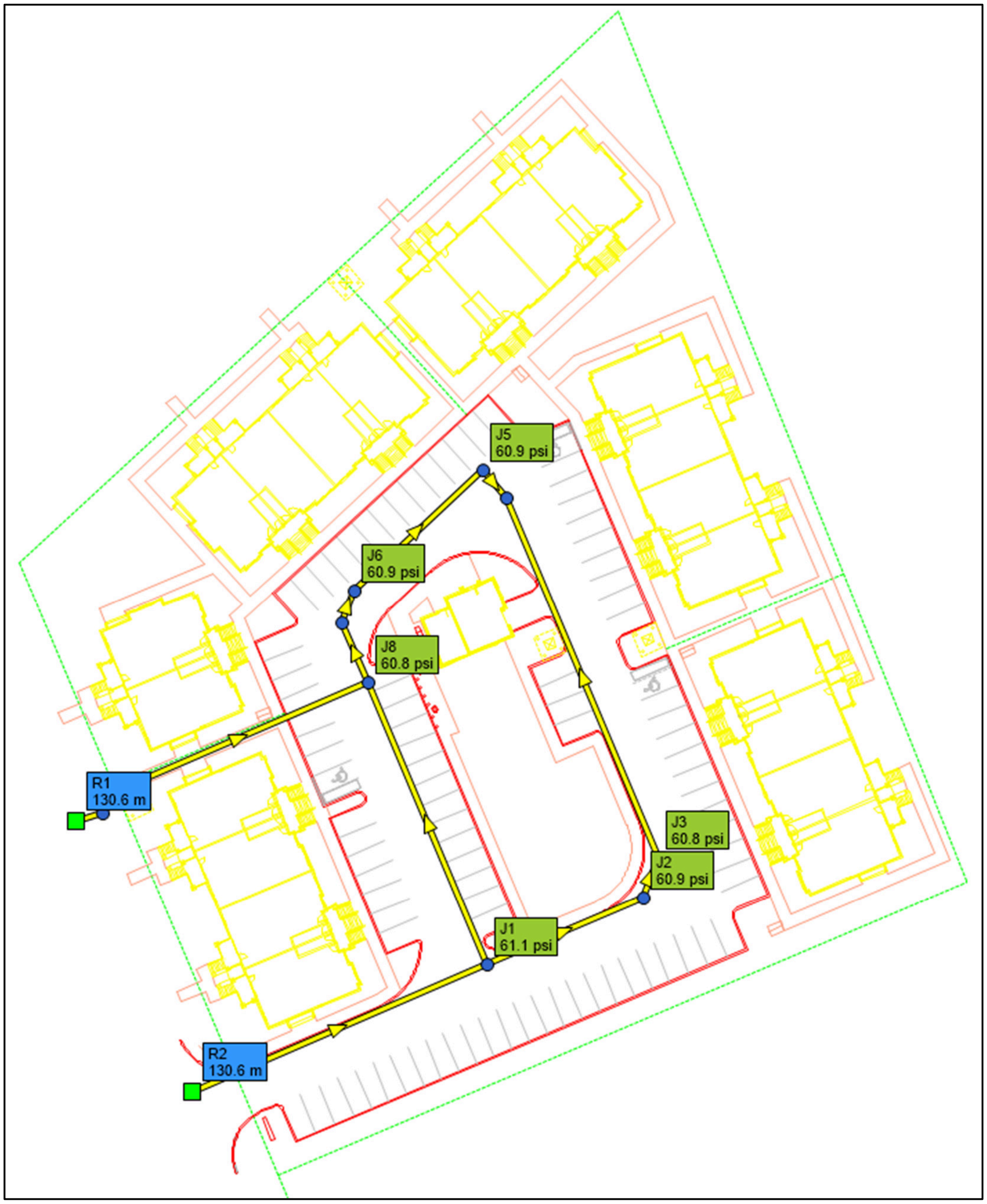


Figure 3.3 Maximum Pressures (psi) During AVDY Conditions

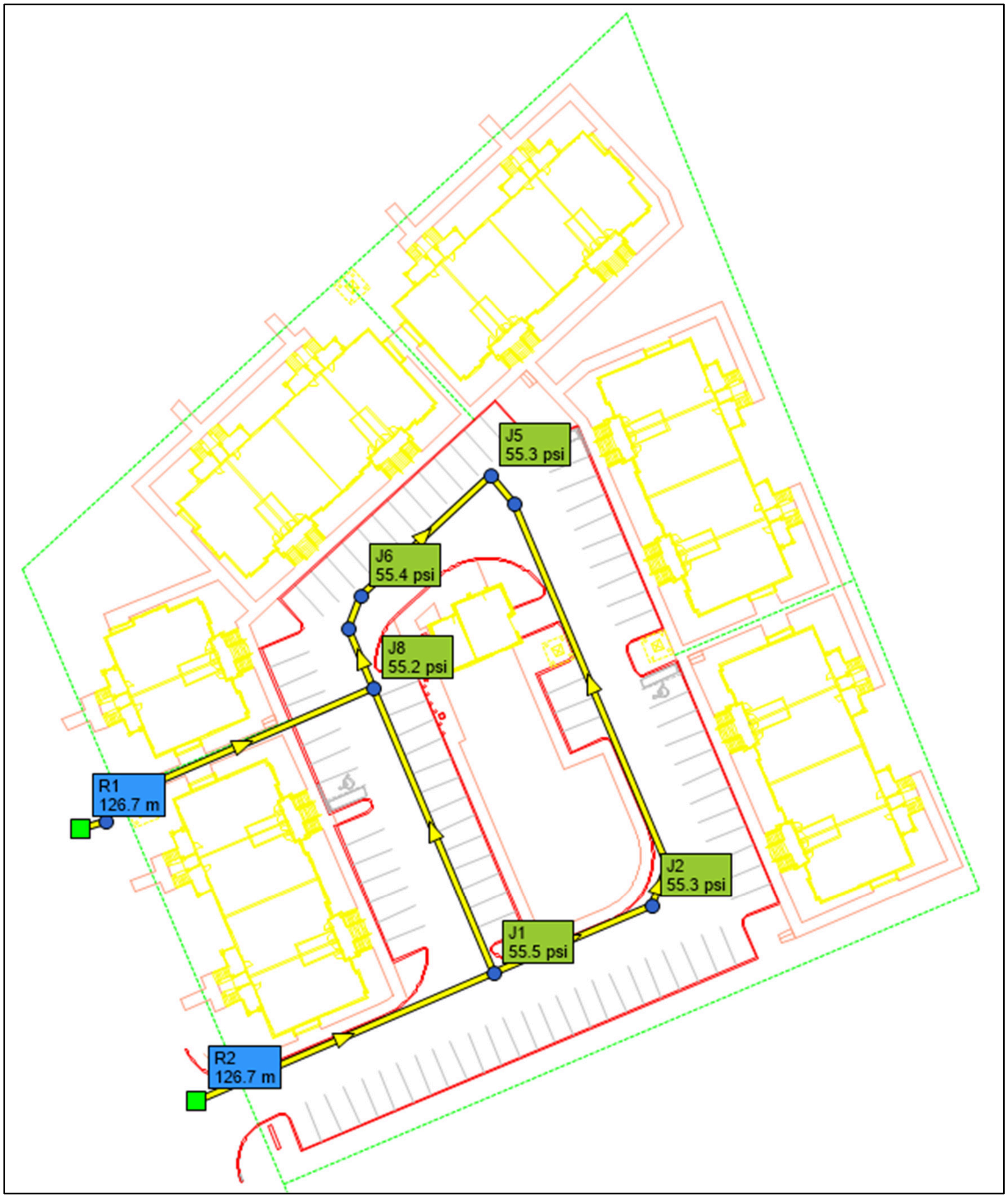


Figure 3.4 Minimum Pressures (psi) During PKHR Conditions

3.4.1.2 Maximum Day Plus Fire flow

An analysis was carried out using the hydraulic model to determine if the proposed development, under maximum day demands, can achieve an additional fire flow of 11,000 L/min (183 L/s) while maintaining a residual pressure of 138 kPa (20 psi). This was accomplished using a steady-state maximum day demand scenario along with the automated fire flow simulation feature of PCSWMM. The available flows are shown in Figure 3.5.

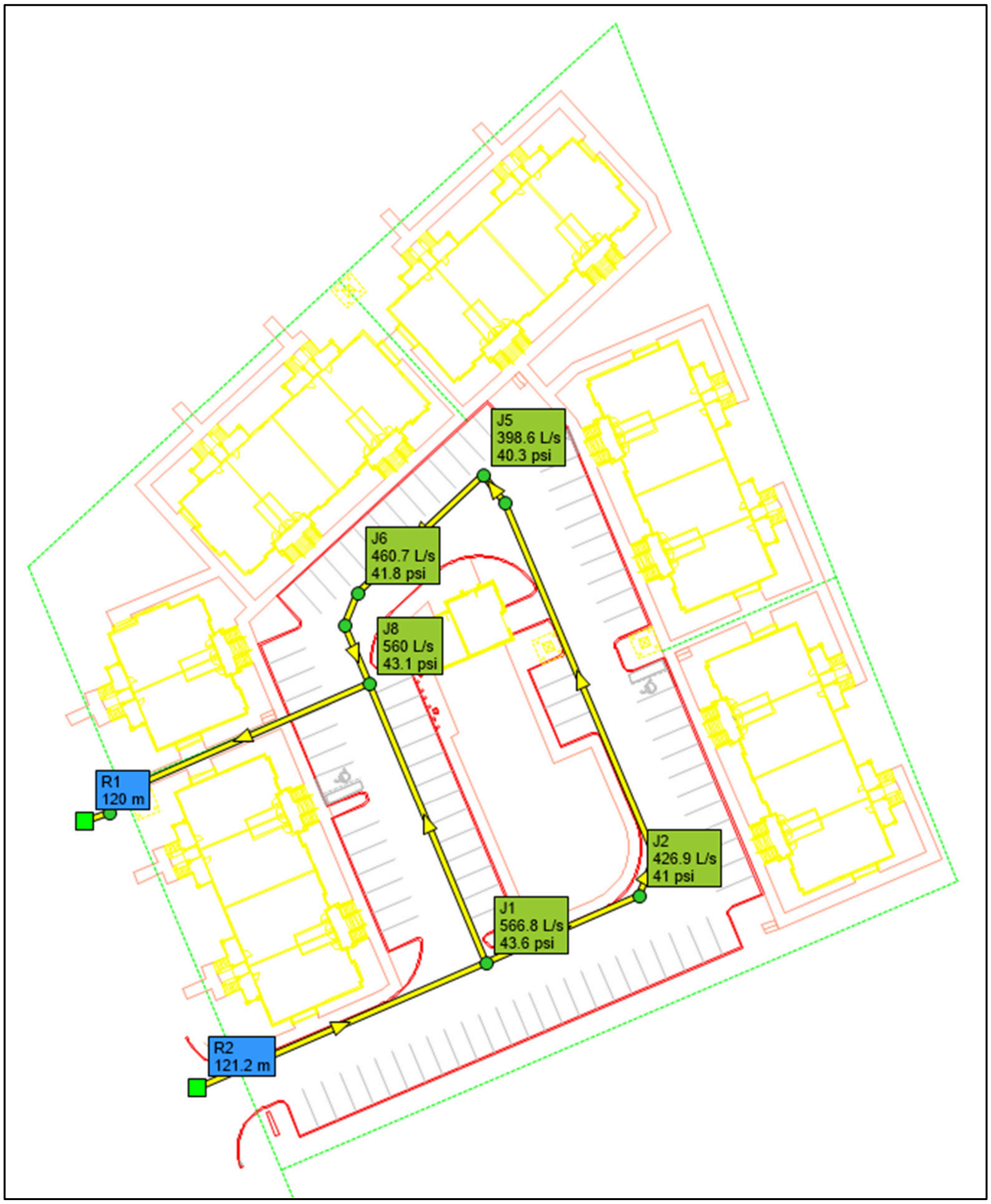


Figure 3.5 Available Fire Flows (L/s) During MXDY Conditions

Using the proposed pipe layout and sizing, a fire flow of 11,000 L/min (183 L/s) can be achieved while maintaining at least 20 psi residual pressure at all locations in the development.

4 Wastewater Servicing

4.1 Background

As indicated in the Trails Edge West – Richcraft Group of Companies Design Brief – Revision 3, (DSEL, January 2015), wastewater from the Trails Edge West Development is conveyed to the existing 600 mm diameter sanitary sewer on Renaud Road via gravity sewer network. Wastewater from the Trails Edge West Development is ultimately conveyed to the Forest Valley Pumping Station.

The DSEL Design Brief identifies MH2A located further east along Axis Way as being used to service the proposed block. As this outlet is not accessible based on the new block configuration, MH15A within Rainrock Crescent / Compass Street has been used as a connection point to sewers within the Trails Edge West subdivision. MH15A contributes to MH16A, which is immediately downstream of the original assumed connection MH2A. The population previously estimated for the original Block 135 was 184 persons.

4.2 Design Criteria

As outlined in the City of Ottawa Sewer Design Guidelines, the following design parameters were used to calculate wastewater flow rates and to size on-site sanitary sewers:

- Minimum full flow velocity – 0.6 m/s
- Maximum full flow velocity – 3.0 m/s
- Manning’s roughness coefficient for all smooth-walled pipes – 0.013
- Single family home persons per unit – 3.4
- Townhouse persons per unit – 2.7
- 2-bedroom apartments persons per unit – 2.1
- Extraneous flow allowance – 0.33 L/s/ha
- Residential average flows – 280 L/cap/day
- Commercial/mixed-use flows – 28,000 L/ha/day
- Maintenance hole spacing – 120 m for pipes under 450 mm diameter, 150 m for pipes 450 mm diameter and larger
- Minimum cover – 2.5 m
- Harmon correction factor – 0.8

In addition, a residential peak factor based on Harmon's Equation was used to determine the peak design flows, per the City of Ottawa Sewer Design Guidelines.

Refer to **Appendix B** for the sanitary sewer design sheet for the proposed site.

4.3 Sanitary Servicing Design

A network of 200mm diameter sanitary sewers are proposed throughout the 640 Compass site to provide gravity sewer services to on-site buildings. Proposed SAN MH 1 is to tie into the existing 200 mm sewer main on Compass Street and serve as the sanitary outlet for the site. Sanitary flows will then be directed southwards from Compass Street to Renaud Road and continue southwest bound to Forest Valley Pumping Station. The proposed sanitary sewers within the 640 Compass site will not convey any upstream sanitary flows from Part 2 of Block 140. The proposed sanitary sewer layout for the subject site is shown in **Drawings SSP-1** and **SA-1**. The sanitary sewer design sheet is included in **Appendix B.1**.

The proposed peak flows from the site are summarized in Table 4.1 below.

Table 4.1 Sanitary Peak Flow at Proposed SAN MH 1

MH ID	Total Area (ha)	Population	Peak Flow (L/s)	Sewer Diameter (mm)
SAN MH 1, 640 Compass contribution	0.96	178	2.4	200

Previously, the entire 3.84ha Block 135 (including the proposed site) was to convey peak flows from an anticipated population of approximately 184. The current site plan anticipates much of the previously considered population will be used within the current 640 Compass site. Extrapolating the current population density to the entire Block 140 area of 3.84ha would result in a population of 712, with resultant peak flows of approximately 8.9L/s. Based on sanitary sewer calculation sheets for Trails Edge West, the most constrained downstream sanitary sewer has an available capacity of approximately 16.7L/s. As such, no downstream capacity concerns are anticipated based on the increase in population density proposed above that originally anticipated in the DSEL Servicing Brief. Background information, including the Trails Edge West sanitary sewer design sheet, is provided in **Appendix B.2**.

5 Stormwater Management and Storm Servicing

The proposed development encompasses approximately 0.96 ha of land with a residential land use containing three-storey terrace flat units. As shown on **Drawing SD-1**, post-development minor system peak flows from the development will be discharged to an existing 1,200 mm diameter storm sewer on Compass Street. Overland flows during major storm events will be directed to Compass Street ultimately discharging to EUC Pond 1, located south of the site. Stormwater quality control (80% TSS removal) is provided by EUC Pond 1, as described in the Stormwater Management Report for the Trails Edge West Subdivision – City of Ottawa, (JFSA, January 2015). Refer to **Appendix C.6** for the storm drainage plan and storm sewer design sheet for the Trails Edge West Subdivision (JFSA, 2015).

In the existing condition, the site sheet drains overland uncontrolled to the east towards Fern Casey Street. The site is currently undeveloped.

5.1 Background

JFSA completed the detailed design of the Trails Edge West Subdivision in January 2015. The design of the storm sewers and EUC Pond 1 in the Trails Edge West site accounted for the future development of the broader Block 140 (then referred to as Block 135).

All of Block 140 was contemplated to be serviced via an existing 1050mm diameter storm sewer stub situated in a future ROW that connects to Axis Way between Compass and Fern Casey. In order to split flows between Part 1 and Part 2 of Block 140, additional services will be required for 640 Compass Street to connect directly to the storm sewer within Compass Street.

The Axis Way sewer that was previously contemplated to receive stormwater flows from Block 140 in its entirety is directed westerly to the sewer within Compass Street at the existing MH17. As such, only the sewer segment between MH15 and MH17 along Rainrock/Compass will need to be assessed to ensure sufficient capacity is available to receive flows from the 640 Compass Street property.

Major and minor system flows are to be ultimately conveyed to EUC Pond 1 for quality and quantity control per Stormwater Management Report for the Trails Edge West Subdivision – City of Ottawa, (JFSA, January 2015).

Additional SWM criteria from this report are listed in the proceeding sections.

5.2 Stormwater Management Design

5.2.1 Design Criteria and Constraints

The design methodology for the SWM component of the development is as follows:

General

- Use of the Modified Rational Method (City of Ottawa).
- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff (City of Ottawa).

Storm Sewer & Inlet Controls

- Proposed site to discharge to the existing 1200 mm diameter storm sewer on Compass Street, (Memorandum: Block 140 – Trails Edge West – Civil Servicing Constraints, DSEL extending the results of the Stormwater Management Report for the Trails Edge West Subdivision, JFSA).
- Minor system discharge rate from the entirety of Block 140 not to exceed 845.8 L/s in the 100-year event (Stormwater Management Report for the Trails Edge West Subdivision – City of Ottawa, JFSA).
- Size storm sewers to convey the 5-year storm event under free-flow conditions using 2012 City of Ottawa I-D-F parameters. (Stormwater Management Report for the Trails Edge West Subdivision – City of Ottawa, JFSA). Note that the minimum requirements for storm sewers have been effectively superseded by revisions and technical bulletins to the City of Ottawa's Sewer Design Guidelines to require free-flow conveyance of the 2-year storm event.

Surface Storage & Overland Flow

- No surface ponding is permitted within the site during the 2-year storm event (City of Ottawa).
- Maximum depth of flow under either static or dynamic conditions shall be less than 0.35m for design storm events (i.e., up to 100-year storm) (City of Ottawa).
- Minimum clearance depth of 0.30m to be provided from spill elevations to building envelopes in proximity of overland flow routes or ponding areas (City of Ottawa).
- Provide adequate emergency overflow conveyance off-site (City of Ottawa).

In keeping with the 2-year inlet restriction criterion, inlet control devices (ICDs) are specified for all street catch basins to limit the inflow to the minor system. Restricted inlet rates to the sewer are necessary to prevent the hydraulic grade line from surcharging storm sewers into basements during major storms. Drawing SD-1 outlines the proposed storm sewer alignment and drainage divides.

5.3 Post-Development Modelling

5.3.1 Allowable Release Rate

The allowable release rate from Block 140 is based on the Stormwater Management Report for the Trails Edge West Subdivision – City of Ottawa, (JFSA, January 2015), and interpolated for the 640 Compass site forming Part 1 of Block 140. The minor and major system target release rates are summarized in Table 5.1 below.

Table 5.1 640 Compass Street Target Release Rates

Block 140 total area per Trails Edge West Subdivision SWM report (ha):	3.65
Block 140 total flow per Trails Edge West Subdivision SWM report (L/s):	845.8
Block 140 per hectare flow per Trails Edge West Subdivision SWM report (L/s/ha):	231.7
640 Compass Street area (ha):	0.95
Target Release Rate (L/s):	**220.1**

1. Block 140 was shown to discharge its minor system to the storm sewer in Block 139 in the Stormwater Management Report for the Trails Edge West Subdivision – City of Ottawa, (JFSA, January 2015). 640 Compass Street is now proposed to outlet to Compass Street and mirrored in the Memorandum: Block 140 – Trails Edge West – Civil Servicing Constraints, (DSEL, July 2022).

5.3.2 Modelling Rationale

The Modified Rational Method was employed to assess the rate of runoff generated during post-development conditions. The post-development release rates for the site have been determined using the criteria above. A time of concentration for the post-development areas (10 minutes) was assigned based on the relatively small site and its proximity to the existing drainage outlet for the site. Surface storage estimates were based on the final grading plan design (see **Drawing GP-1**). Peak flow rates have been calculated using the rational method as follows:

$$\boldsymbol{Q} = \mathbf{2.78}\ (\boldsymbol{C})(\boldsymbol{I})(\boldsymbol{A})$$

Where:
$\boldsymbol{Q} = peak\ flow\ rate, L/s$
$\boldsymbol{C} = site\ runoff\ coefficient$
$\boldsymbol{I} = rainfall\ intensity, mm/hr\ (per\ City\ of\ Ottawa\ IDF\ curves)$
$\boldsymbol{A} = drainage\ area, ha$

5.3.3 Storage Requirements

The site requires quantity control measures to meet the restrictive stormwater release criteria. The use of controlled surface and underground storage within the parking area are proposed to reduce site peak outflow to the allowable target release rates. As per City of Ottawa criteria, no surface ponding is permitted within the site during the 2-year storm event. Refer to **Appendix C** for the 2-year Modified Rational Method calculations which demonstrate that no surface storage is required in the 2-year event except for less than 1.7m^3 of ponding for 10 minutes within the turf section of the amenity area, which is deemed insignificant.

It is proposed to detain stormwater on the surface in parking lot areas using inlet control devices (ICDs) in associated catch basins. Additional runoff in excess of the 100-year storm event that exceeds available on-site storage will be directed overland towards the Compass Street ROW at the southwest boundary of the site. Drainage area C103AA will utilize an underground storage pipe in conjunction with surface ponding.

The Modified Rational Method was employed to determine the peak volume stored in the catch basins and surface storage areas. The site was subdivided into subcatchments (subareas) as defined by the proposed grades and the location, nature, or presence/absence of inlet control devices (ICDs). Each subcatchment was assigned a runoff coefficient based on the proposed finished surface. Further details can be found in **Appendix C**, while **Drawing SD-1** illustrates the proposed subcatchments. The inlet control devices were sized based on the available target release rate from the site during the 2-year storm event. Storage volume and controlled release rates from the on-site catch basins during the 2 and 100-year events are summarized in the table below.

Table 5.2 Peak Surface Volume and Controlled Discharge Summary

Area ID	ICD (Circular Orifice)	2-Year Event			100-Year Event		
		Release Rate (L/s)	$V_{required}$ (m^3)	$V_{available}$ (m^3)	Release Rate (L/s)	$V_{required}$ (m^3)	$V_{available}$ (m^3)
C103A	88 mm	20.3	0.0	39.5	23.8	21.0	39.5
C104A	83 mm	19.9	1.7	33.7	21.2	27.9	33.7
C105A	119 mm	26.1	0.0	22.6	38.5	22.5	22.6
C103AA	112 mm	28.3	0.0	23.4	43.8	23.1	23.4
C103AB	104 mm	19.7	0.0	15.5	28.9	15.5	15.5

5.3.4 Uncontrolled Areas

Due to grading restrictions, three subcatchment areas have been designed without a storage component. The UNC-1 catchment area discharges off-site uncontrolled to the adjacent Compass Street ROW, the UNC-2 catchment area discharges off-site uncontrolled to the adjacent Brian Coburn Boulevard ROW, and the UNC-3 catchment area discharges off-site uncontrolled to Part 2 of Block 140 to the northeast similar to existing conditions. Peak discharges from uncontrolled areas have been considered in the overall SWM plan and have been balanced through overcontrolling the proposed site discharge rates to meet target levels.

Table 5.3 summarizes the 2 and 100-year uncontrolled release rates from the proposed development.

Table 5.3 Peak Uncontrolled 2-Year and 100-Year Release Rates

Storm Return Period	Area ID	Area (ha)	Runoff 'C'	Tc (min)	$Q_{release}$ (L/s)
2-year	UNC-1	0.08	0.56	10	9.6
	UNC-2	0.06	0.44	10	5.6
	UNC-3	0.08	0.40	10	6.8
100-year	UNC-1	0.08	0.70	10	27.8
	UNC-2	0.06	0.55	10	16.4
	UNC-3	0.08	0.50	10	19.9

5.4 Results and Discussion

The following section summarizes the key analysis results. For detailed calculations please refer to the Modified Rational Method sheet in **Appendix B**.

Table 5.4 summarizes the minor system peak discharge rate from the proposed 640 Compass Street for the 5 and 100-year storm events.

Table 5.4 Storm Event Peak Discharge Rates

	2-Year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Controlled Discharge	114.3	156.1
Uncontrolled Sheet Flow	22.0	64.0
Total	**136.4**	**220.1**
Target	**220.1**	

1. Block 140 was shown to discharge its minor system to the storm sewer in Block 139 in the Stormwater Management Report for the Trails Edge West Subdivision – City of Ottawa, (JFSA, January 2015). 640 Compass Street is now proposed to outlet to Compass Street as per the Memorandum: Block 140 – Trails Edge West – Civil Servicing Constraints, (DSEL, July 2022).

The minor system peak flow rate from the proposed 640 Compass Street site is equal to the allowable during all storm events up the 100-year storm event.

Table 5.5 presents the proposed ICDs with their corresponding heads and flows in the 2-year and 100-year storm events.

Table 5.5 2-Year and 100-Year Heads and Flow Rates at ICDs

ICD Schedule						
Catchbasin ID	**Area ID**	**Type**	**2-yr Head (m)**	**2-yr Release Rate (L/s)**	**100-yr Head (m)**	**100-yr Release Rate (L/s)**
103A-1	C103A	88 mm Circular Orifice	1.38	20.3	1.62	20.3
104A-1	C104A	97 mm Circular Orifice	1.85	19.9	1.52	24.6
105A-1	C105A	119 mm Circular Orifice	1.38	26.1	1.64	38.4
103A	C103AA	112 mm Circular Orifice	2.55	28.3	2.71	43.8
103AB-1	C103AB	104 mm Circular Orifice	1.38	19.7	1.58	28.9

1. CB 104A-2 and 104A-3 to be interconnected and controlled by a single ICD at CB 104A-1.

Per Rational Method storm sewer design sheets within the *Stormwater Management Report for the Trails Edge West Subdivision*, the downstream sewer segment within Compass Street between MH15 and MH17 maintains an additional free flow capacity of 462 L/s under the 5-year storm event. In addition, modeling for the subdivision under the 100-year 3-hour Chicago storm event identifies an available free flowing capacity of 320 L/s within the same downstream sewer segment. As the proposed site allowable discharge is 220.1L/s, no deleterious downstream effects on pipe conveyance or HGL are anticipated based on the proposed servicing scheme.

6 Geotechnical Considerations and Grading

6.1 Geotechnical Investigation

A geotechnical investigation report for 640 Compass Street was completed by Paterson Group on October 1, 2024. Field testing consisting of the advancement of four (4) boreholes throughout the subject site was completed on September 9, 2022. Data from a previous investigation carried out by Paterson including a total of five (5) test holes was also taken into consideration. The geotechnical investigation report is included in **Appendix D.1**.

The site is undeveloped and mostly covered in grass. The grade across the site is generally level at an elevation of approximately 87 m. The subsurface profile within the site consists of 0.8 to 1.3m brown silty sand fill with some clay and crushed stone, underlain by a silty clay deposit. This silty clay deposit is generally very stiff to stiff brown silty clay crust within the upper 3 to 4 m below original ground surface. This brown silty clay transitions to a firm, grey silty clay as the depth increases.

Groundwater levels were taken at the four (4) boreholes advanced in 2020. The long-term groundwater table is anticipated to be at a 3 to 4 m depth, subject to seasonal fluctuations.

The site is considered suitable for the proposed development from a geotechnical perspective. Conventional shallow foundations placed on undisturbed stiff to firm silty clay, compacted silty sand to sandy silt, or engineered compacted fill, can be used for the proposed buildings.

A permissible grade raise restriction varies from 0.5m to 1.5 m above original ground surface depending on location within the site. A Permissible Grade Raise Plan is included in **Appendix D.1**. Final grading review is to be provided by Paterson Group to verify that the proposed grading plan meets permissible grade raise requirements.

6.1.1 Proposed Pavement Structure

Tables 6.1 and 6.2 summarize the recommended pavement structures for the development.

Table 6.1 Recommended Pavement Structure for Access Lanes

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 Compacted to Min. 99% SPMDD
450	Subbase – OPSS Granular B Type II Compacted to Min. 99% SPMDD
-	Subgrade – OPSS Granular B Type I or II material placed over in situ soil or engineered fill.

Table 6.2 Recommended Pavement Structure for 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 Compacted to Min. 99% SPMDD
300	Subbase – OPSS Granular B Type II Compacted to Min. 99% SPMDD
-	Subgrade – OPSS Granular B Type II material placed over in situ soil or engineered fill

6.1.2 Sewer/Watermain Installation

The subsurface soils are considered to be Type 2 and 3 according to the Occupational Health and Safety Act and Regulations for Construction Projects. For excavations up to 3 m deep, 1H:1V slopes or shallower are recommended. A shallow slope should be used if the excavation is below the groundwater table. A trench box is required for all steep or vertical side slopes where workers are present.

At least 150mm of OPSS Granular A crushed stone compacted to 95% SPMDD is recommended as bedding for watermains and sewers, up to the springline of the pipes. The base thickness should be increased to 300 mm in the presence of the firm to stiff grey silty clay. OPSS Granular A crushed stone is to be used as cover material at least 300mm above the obvert of the pipes and compacted to a minimum of 95% SPMDD.

If the excavation and filling operations are carried out in dry weather, the moist brown silty clay is expected to be suitable as backfill material (above the cover material). Wet silty clay materials will be difficult to reuse without an extensive drying period. The trench backfill material within the frost zone (about 1.8 m below finished grade) should match the existing soils at the trench walls. Clay seals are recommended at no more than 60 m intervals in the service trenches and at strategic locations to reduce long-term lowering of the groundwater level in the site.

Open sumps and pumps are anticipated to be sufficient in providing groundwater control for relatively shallow excavations due to the impervious nature of the silty clay present throughout the site. A temporary Permit to Take Water (PTTW) from the Ontario Ministry of the Environment, Conservation and Parks (MECP) may be required if more than 400,000 L/day of ground and/or surface water need to be pumped during the construction phase (to be determined by the geotechnical consultant). The review/issuance of the permit may take upwards of 4 months. For typical ground/surface water pumping volumes (50,000 L/day to 400,000 L/day), registration on the Environmental Activity and Sector Registry (EASR) will be required. Two to four weeks should be allotted for the completion of this registration and the preparation of a Water Taking and Discharge Plan by a Qualified Person as required under O.Reg. 63/16.

The founding stratum should be protected from freezing temperatures if winter construction is anticipated. The trench excavations should also be completed in a manner that will avoid the introduction of frozen materials into the trenches.

6.2 Grading Plan

Proposed grading for the site is shown on **Drawing GP-1**. Proposed grading directs most of the overland flows controlled from the proposed development to Compass Street, as per the intent from background studies. A small portion of the site containing mostly landscape area drains uncontrolled towards Brian Coburn Boulevard to the North and Compass Street to the West. Another small section of mainly landscape area drains uncontrolled towards Part 2 of Block 140. It is our understanding that the property owner (Minto) intends to extend the existing ROW (Block 139) along the common property boundary to the east of the proposed site, capturing this uncontrolled runoff and ultimately directing to Axis Way per the Trails Edge subdivision background studies.

The proposed grading has been developed to match the existing road grades along Compass Street to the West and Brian Coburn Boulevard Avenue to the North. The grade raise restriction outlined in the geotechnical investigation report has been generally respected throughout the site, with final review to be provided by the geotechnical consultant.

All grading, in-filling and backfilling works are to be completed as per the geotechnical recommendations made in Paterson's geotechnical investigation report (summarized above in **Section 6.1**).

7 Utilities

Utility infrastructure for Bell, Rogers, Hydro Ottawa, and Enbridge exists within underground plant servicing urbanized rights-of-way adjacent to the subject site. Coordination regarding the exact size, location, and routing of utilities will begin following design circulation.

8 Approvals

The City of Ottawa will review and approve most development applications as they relate to the provision of water supply, wastewater collection and disposal, and stormwater conveyance and treatment under Site Plan Approval processes.

An Environmental Compliance Approval (ECA) is not expected to be required from the Ontario Ministry of the Environment, Conservation and Parks (MECP) for the proposed servicing works within the proposed private block so long as part lot control is not pursued for this development (i.e., as long as the property will be held under single ownership). The Mississippi Valley Conservation Authority (MVCA) will be circulated on this submission.

An MECP Permit to Take Water (PTTW) or registration on the Environmental Activity and Sector Registry (EASR) may be required for the site. The geotechnical consultant shall confirm at the time of application whether a PTTW or EASR registration is required.

No other approval requirements from other regulatory agencies are anticipated.

9 Erosion Control

In order to protect downstream water quality and prevent sediment build up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor.

- Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
- Limit the extent of the exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with geotextiles, geogrid, or synthetic mulches.
- Provide sediment traps and basins during dewatering works.
- Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
- Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

As described in the geotechnical investigation report for the site (see **Appendix D.1**), it is recommended that the observed stockpiling of concrete and rebar be removed during future development. It was noted in the investigation that a Phase II – Environmental Site assessment is not required.

Refer to Drawing EC/DS-1 for the proposed location of silt fences, straw bales, and other erosion control measures.

10 Conclusions and Recommendations

10.1 Potable Water Servicing

The proposed watermain network is capable of achieving the level of service required by the City based on the hydraulic analysis, the following conclusions were made:

- The proposed water distribution system on site is recommended to consist of a 200 mm diameter watermain connecting to the existing 200 mm diameter watermain on Compass Street at two connection points, providing a looped system.
- The proposed watermain network operates below the maximum pressure objective of 552 kPa (80 psi) in both the average day (AVDY) and peak hour (PKHR) conditions, therefore not requiring pressure reducing valves on site.
- Considering maximum day domestic demands with an anticipated fire flow demand of 11,000 L/min (183 L/s), the proposed watermain network is capable of providing sufficient fire flow while maintaining a residual pressure of 138 kPa (20 psi) in all areas within the development.

10.2 Wastewater Servicing

Wastewater from the proposed development will be conveyed to the existing sanitary sewer on Compass Street constructed as part of the Trails Edge West Development. The wastewater is ultimately directed to the Forest Valley Pumping Station off Renaud Road.

A network of 200 mm diameter sanitary sewers are proposed throughout the site. The capacity of the existing sanitary sewers on Compass Street and Renaud Road were verified with the estimated peak wastewater flows from the proposed site and their relative increase from the overall Block 140 discharge estimates made in the Trails Edge West subdivision background reports. The analysis confirmed that there is sufficient capacity within the downstream sanitary sewer system to service the proposed site.

10.3 Stormwater Management and Servicing

The proposed stormwater management plan is in compliance with the requirements outlined in the background documents, the City of Ottawa Sewer Design Guidelines and the Ontario Ministry of the Environment, Conservation and Parks (MECP) Stormwater Management Planning and Design Manual.

Inlet control devices were defined for each subcatchment to restrict inflow rates to the storm sewers to that of the background report design criteria. Major system peak flows from the entire site will be directed to Compass Street, except for small uncontrolled areas to the north and east which will drain to Brian Coburn Boulevard and the undeveloped Part 2 of Block 140 as per existing conditions. Minor system peak flows will be directed to the existing 1200 mm diameter storm sewer on Compass Street. Quantity and quality control (80% TSS removal) of stormwater runoff will be provided at the downstream EUC Pond 1.

10.4 Grading

Proposed grading for the site directs most of the overland flows controlled from the proposed development to Compass Street, as per the intent from servicing studies for the Trails Edge West subdivision. A small portion of the site containing mostly landscape area drains uncontrolled towards existing Brain Coburn Boulevard to the North and Compass Street to the West.

All grading, in-filling, and backfilling works are to be completed as per the geotechnical recommendations made in Paterson's geotechnical investigation report (summarized above in Section 6.1).

10.5 Approvals/Permits

An MECP Environmental Compliance Approval (ECA) may be required for the installation of the proposed storm and sanitary sewers within the private site should part lot control be pursued to sever the property into separate parcels at a later date. A Permit to Take Water or registration on the EASR may be required for dewatering works during sewer/watermain installation, pending confirmation by the geotechnical consultant. The Mississippi Valley Conservation Authority (MVCA) will need to be consulted in order to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.

10.6 Utilities

Utility infrastructure for Bell, Rogers, Hydro Ottawa, and Enbridge exists within underground plant servicing urbanized rights-of-way adjacent to the subject site. Coordination regarding the exact size, location, and routing of utilities will begin following design circulation.

Appendices

Appendix A Potable Water Servicing

A.1 Domestic Water Demand Calculations

Trailsedge East Block 140, Ottawa, ON - Domestic Water Demand Estimates

Site Plan provided by M.David Blakely Architect Inc. Rev 7

Project No. 160401759

Densities as per City Guidelines:		
Townhouse Row Units[1]		
Row	2.7	ppu

Type of Unit	No. of Units	Population	Daily Rate of Demand [2] (L/cap/day)	Avg Day Demand		Max Day Demand [3]		Max Hour Demand [3]	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Block 1	12	32	280	6.3	0.11	15.8	0.26	34.7	0.58
Block 2	6	16	280	3.2	0.05	7.9	0.13	17.3	0.29
Block 3	12	32	280	6.3	0.11	15.8	0.26	34.7	0.58
Block 4	12	32	280	6.3	0.11	15.8	0.26	34.7	0.58
Block 5	12	32	280	6.3	0.11	15.8	0.26	34.7	0.58
Block 6	12	32	280	6.3	0.11	15.8	0.26	34.7	0.58
Total Site :	**66**	**178**		**34.7**	**0.58**	**86.6**	**1.44**	**190.6**	**3.18**

Notes:

1 As per Table 4-1 from the City of Ottawa Water Design Guidelines, the persons per unit for Townhouse (row) units is 2.7

2 As per Table 4-2 from the City of Ottawa Water Design Guidelines and Technical Bulletin ISTB-2021-03, the average daily rate of water demand for residential areas: 280 L/cap/day

3 As per Table 4.2 from the City of Ottawa Water Design Guidelines, the water demand criteria used to estimate peak demand rates for residential areas are as follows:

maximum daily demand rate = 2.5 x average day demand rate

maximum hour demand rate = 2.2 x maximum day demand rate

A.2 FUS Calculation Sheets

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401759
Project Name: Trailsedge East Block 140
Date: 11/1/2024
Fire Flow Calculation #: 1
Description: 2-storey residential townhouses c/w basement

Notes: Site Plan provided by M.David Blakely Architect Inc. Rev 7

<table>
<tr><th>Step</th><th>Task</th><th colspan="10">Notes</th><th>Value Used</th><th>Req'd Fire Flow (L/min)</th></tr>
<tr><td>1</td><td>Determine Type of Construction</td><td colspan="10">Type V - Wood Frame / Type IV-D - Mass Timber Construction</td><td>1.5</td><td>-</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Determine Effective Floor Area</td><td colspan="5">Sum of All Floor Areas</td><td colspan="5"></td><td>-</td><td>-</td></tr>
<tr><td>412</td><td>412</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>824</td><td>-</td></tr>
<tr><td>3</td><td>Determine Required Fire Flow</td><td colspan="10">(F = 220 x C x A^{1/2}). Round to nearest 1000 L/min</td><td>-</td><td>9000</td></tr>
<tr><td>4</td><td>Determine Occupancy Charge</td><td colspan="10">Limited Combustible</td><td>-15%</td><td>7650</td></tr>
<tr><td rowspan="4">5</td><td rowspan="4">Determine Sprinkler Reduction</td><td colspan="10">None</td><td>0%</td><td rowspan="4">0</td></tr>
<tr><td colspan="10">Non-Standard Water Supply or N/A</td><td>0%</td></tr>
<tr><td colspan="10">Not Fully Supervised or N/A</td><td>0%</td></tr>
<tr><td colspan="10">% Coverage of Sprinkler System</td><td>0%</td></tr>
<tr><td rowspan="5">6</td><td rowspan="5">Determine Increase for Exposures (Max. 75%)</td><td>Direction</td><td>Exposure Distance (m)</td><td>Exposed Length (m)</td><td>Exposed Height (Stories)</td><td>Length-Height Factor (m x stories)</td><td colspan="2">Construction of Adjacent Wall</td><td colspan="3">Firewall / Sprinklered ?</td><td>-</td><td>-</td></tr>
<tr><td>North</td><td>3.1 to 10</td><td>13</td><td>2</td><td>21-49</td><td colspan="2">Type V</td><td colspan="3">NO</td><td>16%</td><td rowspan="4">2525</td></tr>
<tr><td>East</td><td>> 30</td><td>0</td><td>0</td><td>0-20</td><td colspan="2">Type V</td><td colspan="3">NO</td><td>0%</td></tr>
<tr><td>South</td><td>10.1 to 20</td><td>13</td><td>2</td><td>21-49</td><td colspan="2">Type V</td><td colspan="3">NO</td><td>11%</td></tr>
<tr><td>West</td><td>20.1 to 30</td><td>32</td><td>2</td><td>61-80</td><td colspan="2">Type V</td><td colspan="3">NO</td><td>6%</td></tr>
<tr><td rowspan="4">7</td><td rowspan="4">Determine Final Required Fire Flow</td><td colspan="11">Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min</td><td>10000</td></tr>
<tr><td colspan="11">Total Required Fire Flow in L/s</td><td>166.7</td></tr>
<tr><td colspan="11">Required Duration of Fire Flow (hrs)</td><td>2.00</td></tr>
<tr><td colspan="11">Required Volume of Fire Flow (m³)</td><td>1200</td></tr>
</table>

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401759
Project Name: Trailsedge East Block 140
Date: 11/1/2024
Fire Flow Calculation #: 2
Description: 2-storey residential townhouses c/w basements

Notes: Site Plan provided by M.David Blakely Architect Inc. Rev 7

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction										1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas										-	-
		212	212									424	-
3	Determine Required Fire Flow	(F = 220 x C x $A^{1/2}$). Round to nearest 1000 L/min										-	7000
4	Determine Occupancy Charge	Limited Combustible										-15%	5950
5	Determine Sprinkler Reduction	None										0%	0
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall		Firewall / Sprinklered ?			-	-
		North	3.1 to 10	13	2	21-49	Type V		NO			16%	1607
		East	> 30	16	0	0-20	Type V		NO			0%	
		South	10.1 to 20	13	2	21-49	Type V		NO			11%	
		West	> 30	0	0	0-20	Type V		NO			0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											8000
		Total Required Fire Flow in L/s											133.3
		Required Duration of Fire Flow (hrs)											2.00
		Required Volume of Fire Flow (m^3)											960

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401759
Project Name: Trailsedge East Block 140
Date: 11/1/2024
Fire Flow Calculation #: 3
Description: 2-storey residential townhouses c/w basements

Notes: Site Plan provided by M.David Blakely Architect Inc. Rev 7

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction										1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas										-	-
		412	412									824	-
3	Determine Required Fire Flow	(F = 220 x C x $A^{1/2}$). Round to nearest 1000 L/min										-	9000
4	Determine Occupancy Charge	Limited Combustible										-15%	7650
5	Determine Sprinkler Reduction	None										0%	0
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall		Firewall / Sprinklered ?			-	-
		North	3.1 to 10	13	2	21-49	Type V		NO			16%	2066
		East	> 30	0	0	0-20	Type V		NO			0%	
		South	10.1 to 20	13	2	21-49	Type V		NO			11%	
		West	> 30	0	0	0-20	Type V		NO			0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											10000
		Total Required Fire Flow in L/s											166.7
		Required Duration of Fire Flow (hrs)											2.00
		Required Volume of Fire Flow (m^3)											1200

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401759
Project Name: Trailsedge East Block 140
Date: 11/1/2024
Fire Flow Calculation #: 4
Description: 2-storey residential townhouses c/w basements

Notes: Site Plan provided by M.David Blakely Architect Inc. Rev 7

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction										1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas										-	-
		77	83	103								263	-
3	Determine Required Fire Flow	(F = 220 x C x $A^{1/2}$). Round to nearest 1000 L/min										-	5000
4	Determine Occupancy Charge	Limited Combustible										-15%	4250
5	Determine Sprinkler Reduction	None										0%	0
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall		Firewall / Sprinklered ?			-	-
		North	10.1 to 20	13	2	21-49	Type V		NO			11%	1998
		East	> 30	0	0	0-20	Type V		NO			0%	
		South	3.1 to 10	13	2	21-49	Type V		NO			16%	
		West	0 to 3	0	0	0-20	Type V		NO			20%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											6000
		Total Required Fire Flow in L/s											100.0
		Required Duration of Fire Flow (hrs)											2.00
		Required Volume of Fire Flow (m^3)											720

Stantec

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401759
Project Name: Trailsedge East Block 140
Date: 11/1/2024
Fire Flow Calculation #: 5
Description: 2-storey residential townhouses c/w basements

Notes: Site Plan provided by M.David Blakely Architect Inc. Rev 7

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction										1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas										-	-
		412	412	0								824	-
3	Determine Required Fire Flow	(F = 220 x C x $A^{1/2}$). Round to nearest 1000 L/min										-	9000
4	Determine Occupancy Charge	Limited Combustible										-15%	7650
5	Determine Sprinkler Reduction	None										0%	0
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall		Firewall / Sprinklered ?			-	-
		North	> 30	0	0	0-20	Type V		NO			0%	2907
		East	3.1 to 10	13	2	21-49	Type V		NO			16%	
		South	20.1 to 30	32	2	61-80	Type V		NO			6%	
		West	3.1 to 10	13	2	21-49	Type V		NO			16%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											11000
		Total Required Fire Flow in L/s											183.3
		Required Duration of Fire Flow (hrs)											2.00
		Required Volume of Fire Flow (m^3)											1320

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401759
Project Name: Trailsedge East Block 140
Date: 11/1/2024
Fire Flow Calculation #: 6
Description: 2-storey residential townhouses c/w basements

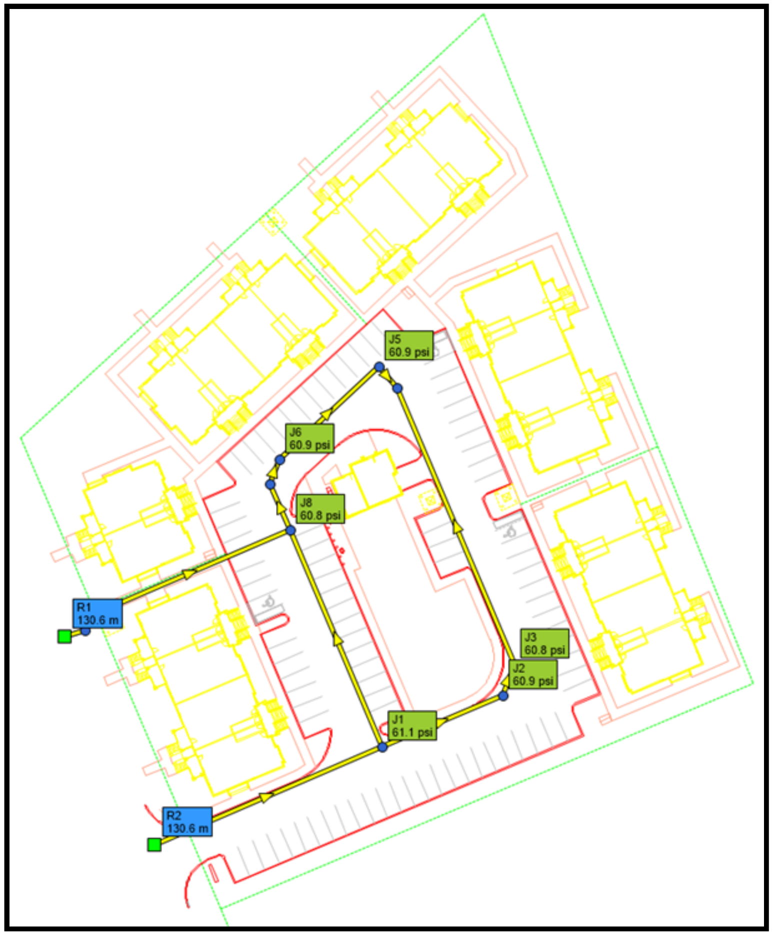
Notes: Site Plan provided by M.David Blakely Architect Inc. Rev 7

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction										1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas										-	-
		77	83	103								263	-
3	Determine Required Fire Flow	(F = 220 x C x $A^{1/2}$). Round to nearest 1000 L/min										-	5000
4	Determine Occupancy Charge	Limited Combustible										-15%	4250
5	Determine Sprinkler Reduction	None										0%	0
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall		Firewall / Sprinklered ?			-	-
		North	> 30	0	0	0-20	Type V		NO			0%	1233
		East	> 30	0	0	0-20	Type V		NO			0%	
		South	10.1 to 20	33	2	61-80	Type V		NO			13%	
		West	3.1 to 10	13	2	21-49	Type V		NO			16%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											5000
		Total Required Fire Flow in L/s											83.3
		Required Duration of Fire Flow (hrs)											1.75
		Required Volume of Fire Flow (m^3)											525

A.3 Watermain Hydraulic Analysis Results

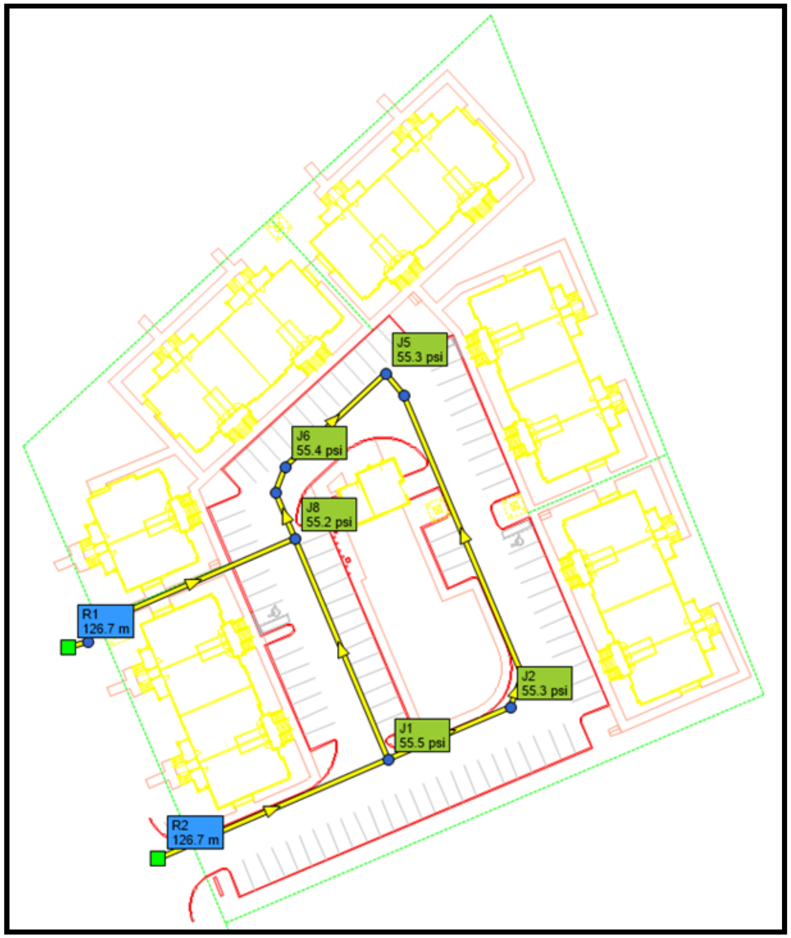
Junction Results - Basic Day

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)	Pressure (psi)2	Pressure (kPa)
J5	0.11	87.78	130.60	42.82	60.89	419.81
J6	0.11	87.75	130.60	42.85	60.93	420.11
J7	0.11	87.82	130.60	42.78	60.83	419.42
J8	0.11	87.84	130.60	42.76	60.80	419.23
J1	0.11	87.66	130.60	42.94	61.06	420.99
J2	0.11	87.80	130.60	42.80	60.86	419.62
J3	0.11	87.82	130.60	42.78	60.83	419.42
J4	0.11	87.88	130.60	42.72	60.75	418.83
J10	0.11	87.86	130.60	42.74	60.77	419.03
J9	0.11	87.91	130.60	42.69	60.70	418.54



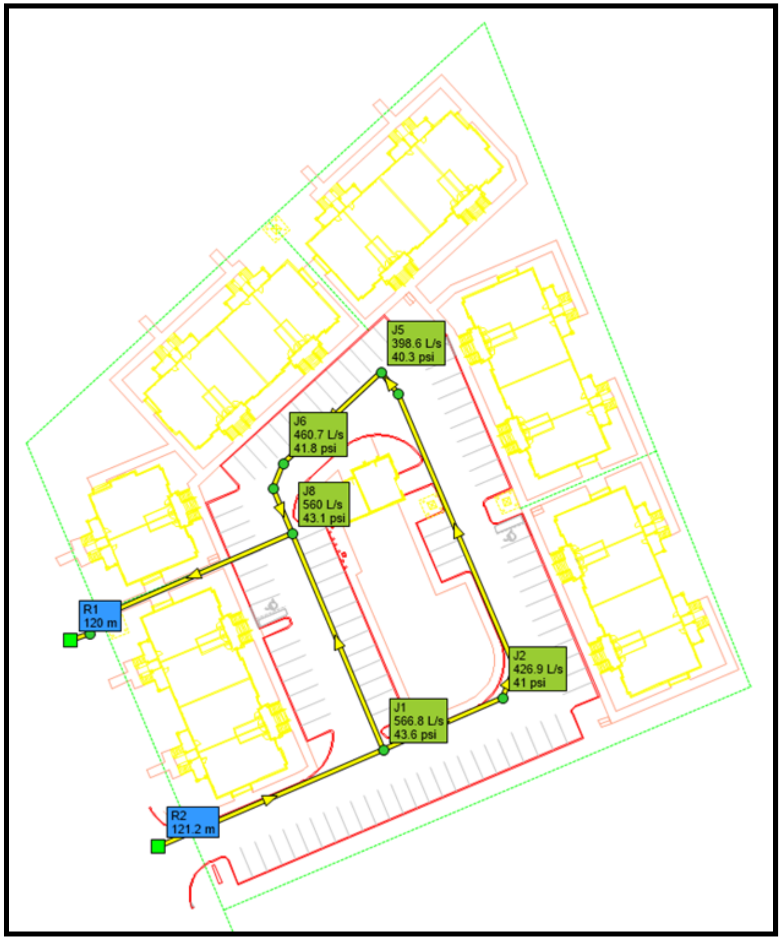
Junction Results - Peak Hour

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)	Pressure (psi)2	Pressure (kPa)
J5	0.58	87.78	126.70	38.92	55.34	381.58
J6	0.58	87.75	126.70	38.95	55.39	381.87
J7	0.58	87.82	126.70	38.88	55.29	381.18
J8	0.58	87.84	126.70	38.85	55.24	380.89
J1	0.58	87.66	126.70	39.04	55.51	382.75
J2	0.58	87.80	126.70	38.89	55.30	381.28
J3	0.58	87.82	126.70	38.88	55.29	381.18
J4	0.58	87.88	126.70	38.82	55.20	380.60
J10	0.58	87.86	126.70	38.84	55.23	380.79
J9	0.58	87.91	126.70	38.79	55.16	380.30



Fire Flow Results - Max Day + 267 L/s

ID	Static Demand (L/s)	Static Pressure (m)	Static Pressure (psi)	Static Pressure (kPa)	Static Head (m)	Fire Flow Demand (L/s)	Residual Pressure (m)	Residual Pressure (psi)	Available Flow (L/s)	Available Pressure (psi)
J5	0.26	32.76	46.58	321.18	120.54	183.30	28.33	40.29	398.59	20
J6	0.26	32.76	46.58	321.18	120.50	183.30	29.39	41.79	460.74	20
J7	0.26	32.68	46.47	320.40	120.49	183.30	29.62	42.12	483.97	20
J8	0.26	32.64	46.41	320.01	120.48	183.30	30.31	43.11	560.04	20
J1	0.26	33.03	46.97	323.83	120.69	183.30	30.63	43.55	566.78	20
J2	0.26	32.84	46.70	321.97	120.65	183.30	28.86	41.04	426.88	20
J3	0.26	32.82	46.67	321.77	120.64	183.30	28.59	40.66	412.60	20
J4	0.26	32.67	46.46	320.30	120.55	183.30	28.13	39.99	392.14	20
J10	0.26	32.18	45.76	315.50	120.04	183.30	31.80	45.22	1337.63	20
J9	0.26	32.16	45.73	315.30	120.07	183.30	31.53	44.84	1034.99	20



Appendix B Wastewater Servicing Calculations

B.1 Sanitary Sewer Design Sheet

SUBDIVISION:

640 Compass Street
Block 140

DATE: 11/1/2024
REVISION: 1
DESIGNED BY: WAJ
CHECKED BY: DCT

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401759

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 l/p/day	MINIMUM VELOCITY	0.60 m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000 l/ha/day	MAXIMUM VELOCITY	3.00 m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 l/ha/day	MANNINGS n	0.013
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 l/ha/day	BEDDING CLASS	B
PERSONS / SINGLE	3.4	INSTITUTIONAL	28,000 l/ha/day	MINIMUM COVER	2.50 m
PERSONS / TOWNHOME	2.7	INFILTRATION	0.33 l/s/Ha	HARMON CORRECTION FACTOR	0.8
PERSONS / APARTMENT	1.8				

LOCATION			RESIDENTIAL AREA AND POPULATION									COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE								
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (ha)	UNITS SINGLE	UNITS TOWN	UNITS APT	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	FLOW (l/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
R6B	6	4	0.32	0	24	0	65	0.32	65	3.63	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.32	0.32	0.1	0.9	65.4	200	PVC	SDR 35	0.65	27.0	**3.22%**	0.85	0.32
R4A	4	3	0.04	0	0	0	0	0.36	65	3.63	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.04	0.36	0.1	0.9	32.5	200	PVC	SDR 35	0.50	23.7	**3.73%**	0.74	0.29
R7A	7	6	0.14	0	12	0	32	0.14	32	3.68	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.14	0.14	0.0	0.4	28.6	200	PVC	SDR 35	0.65	27.0	**1.60%**	0.85	0.26
R6A	6	5	0.13	0	12	0	32	0.26	65	3.63	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.13	0.26	0.1	0.9	34.5	200	PVC	SDR 35	0.50	23.6	**3.60%**	0.74	0.29
R5A	5	3	0.28	0	18	0	49	0.55	113	3.58	1.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.28	0.55	0.2	1.5	53.7	200	PVC	SDR 35	0.50	23.6	**6.33%**	0.74	0.35
R3A	3	2	0.05	0	0	0	0	0.96	178	3.53	2.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.05	0.96	0.3	2.4	31.0	200	PVC	SDR 35	0.50	23.6	**9.96%**	0.74	0.40
	2	1	0.00	0	0	0	0	0.96	178	3.53	2.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.96	0.3	2.4	9.4	200	PVC	SDR 35	0.50	23.6	**9.96%**	0.74	0.40
																												200							

Appendix C Stormwater Management

C.1 Storm Sewer Design Sheet

Stantec

640 Compass Street
Block 140

DATE: 2024-11-04
REVISION: 1
DESIGNED BY: WAJ
CHECKED BY: DCT

STORM SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: **160401759**

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013
MINIMUM COVER: 2.00 m
TIME OF ENTRY 10 min
BEDDING CLASS = B

LOCATION			**DRAINAGE AREA**																									**PIPE SELECTION**											
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETEI (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
C103AA, C103AB	103A	103	0.00	0.33	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.000	0.000	0.224	0.224	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	64.8	43.4	375	375	CIRCULAR	PVC	SDR 35	0.50	116.6	**55.60%**	1.11	0.98	0.74
C103A	103	102	0.00	0.13	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.000	0.000	0.095	0.319	0.000	0.000	0.000	0.000	10.74	74.08	100.45	117.73	172.08	0.0	0.0	88.9	32.5	375	375	CIRCULAR	PVC	SDR 35	0.50	116.6	**76.27%**	1.11	1.08	0.50
																				11.24																			
	106	105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	0.0	33.9	300	300	CIRCULAR	PVC	SDR 35	0.50	68.0	**0.00%**	0.97	0.00	0.00
C105A	105	104	0.00	0.17	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.000	0.000	0.121	0.121	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	35.1	34.5	300	300	CIRCULAR	PVC	SDR 35	0.50	68.0	**51.61%**	0.97	0.83	0.69
C104A	104	102	0.00	0.15	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.000	0.000	0.109	0.231	0.000	0.000	0.000	0.000	10.69	74.25	100.69	118.01	172.49	0.0	0.0	64.5	56.4	375	375	CIRCULAR	PVC	SDR 35	0.50	116.6	**55.31%**	1.11	0.97	0.97
																				11.66																			
	102	101	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.549	0.000	0.000	0.000	0.000	11.66	70.98	96.19	112.71	164.71	0.0	0.0	146.7	28.1	450	450	CIRCULAR	CONCRETE	100-D	0.50	210.3	**69.76%**	1.28	1.21	0.39
	101	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.549	0.000	0.000	0.000	0.000	12.04	69.75	94.50	110.73	161.80	0.0	0.0	144.2	13.5	450	450	CIRCULAR	CONCRETE	100-D	0.50	210.3	**68.54%**	1.28	1.21	0.19
																				12.23									1200	1200									

C.2 Runoff Coefficient/Impervious Calculations

Runoff Coefficient Calculations

Name	Area (m2)	Hard Surface (m2)	Gravel Surface (m2)	Soft Surface (m2)	C
C103A	1297	974	0	323	0.73
C104A	1539	1023	133	383	0.71
C105A	1684	1257	0	427	0.72
C105B	1735	1443	0	292	0.78
C105C	1055	971	0	84	0.84
UNC-1	838	435	0	403	0.56
UNC-2	602	205	0	397	0.44
UNC-3	810	235	0	575	0.40

C.3 2 and 100-Year Modified Rational Method Calculations

Stormwater Management Calculations

File No: **160401759**
Project: **640 Compass Street Block 140**
Date: **04-Nov-24**

SWM Approach:
Post-development flows controlled as per Stormwater Management Report for the
West Subdivision prepared by JFSA dated January 2015.

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table

Catchment Type	Sub-catchment Area ID / Description		Area (ha) "A"	Runoff Coefficient "C"	"A x C"	Overall Runoff Coefficient
Controlled - Tributary	C103AB	Hard	0.101	0.9	0.091	
		Soft	0.009	0.2	0.002	
		Subtotal	0.11		0.0924	0.840
Controlled - Tributary	C103AA	Hard	0.141	0.9	0.127	
		Soft	0.029	0.2	0.006	
		Subtotal	0.17		0.1326	0.780
Controlled - Tributary	C105A	Hard	0.126	0.9	0.114	
		Soft	0.044	0.2	0.009	
		Subtotal	0.17		0.1224	0.720
Controlled - Tributary	C104A	Hard	0.109	0.9	0.098	
		Soft	0.041	0.2	0.008	
		Subtotal	0.15		0.1065	0.710
Controlled - Tributary	C103A	Hard	0.098	0.9	0.089	
		Soft	0.032	0.2	0.006	
		Subtotal	0.13		0.0949	0.730
Uncontrolled - Non-Tributary	UNC-3	Hard	0.023	0.9	0.021	
		Soft	0.057	0.2	0.011	
		Subtotal	0.08		0.032	0.400
Uncontrolled - Non-Tributary	UNC-2	Hard	0.021	0.9	0.019	
		Soft	0.039	0.2	0.008	
		Subtotal	0.06		0.0264	0.440
Uncontrolled - Non-Tributary	UNC-1	Hard	0.041	0.9	0.037	
		Soft	0.039	0.2	0.008	
		Subtotal	0.08		0.0448	0.560
Total			**0.950**		**0.652**	
Overall Runoff Coefficient= C:						**0.69**

Total Roof Areas	**0.000 ha**
Total Tributary Surface Areas (Controlled and Uncontrolled)	**0.730 ha**
Total Tributary Area to Outlet	**0.730 ha**
Total Uncontrolled Areas (Non-Tributary)	**0.220 ha**
Total Site	**0.950 ha**

Stormwater Management Calculations

Project #160401759, 640 Compass Street Block 140
Modified Rational Method Calculations for Storage

2 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a = 732.951
b = 6.199
c = 0.81

t (min)	I (mm/hr)
10	76.81
20	52.03
30	40.04
40	32.86
50	28.04
60	24.56
70	21.91
80	19.83
90	18.14
100	16.75
110	15.57
120	14.56

Project #160401759, 640 Compass Street Block 140
Modified Rational Method Calculations for Storage

100 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a = 1735.688
b = 6.014
c = 0.820

t (min)	I (mm/hr)
10	178.56
20	119.95
30	91.87
40	75.15
50	63.95
60	55.89
70	49.79
80	44.99
90	41.11
100	37.90
110	35.20
120	32.89

5 and 100 YEAR Target Release from the Site

Post-development flows controlled as per Stormwater Management Report for the Trailsedge West Subdivision prepared by JFSA dated January 2015.

Block 140 total area per Trailsedge West Subdivision SWM report (ha):	3.65
Block 140 total flow per Trailsedge West Subdivision SWM report (L/s):	845.8
Block 140 per hectare flow per Trailsedge West Subdivision SWM report (L/s/ha):	231.7
640 Compass Street Area (ha):	0.95
Target Release Rate (L/s)	**220.1**

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: C103AB — Controlled - Tributary
Area (ha): 0.11
C: 0.84

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	19.7	19.7	0.0	**0.0**
20	52.03	13.4	13.4	0.0	**0.0**
30	40.04	10.3	10.3	0.0	**0.0**
40	32.86	8.4	8.4	0.0	**0.0**
50	28.04	7.2	7.2	0.0	**0.0**
60	24.56	6.3	6.3	0.0	**0.0**
70	21.91	5.6	5.6	0.0	**0.0**
80	19.83	5.1	5.1	0.0	**0.0**
90	18.14	4.7	4.7	0.0	**0.0**
100	16.75	4.3	4.3	0.0	**0.0**
110	15.57	4.0	4.0	0.0	**0.0**
120	14.56	3.7	3.7	0.0	**0.0**

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 104 mm
Invert Elevation 86.16 m
T/G Elevation 87.54 m
Max Ponding Depth 0.00 m
Downstream W/L 85.09 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	87.54	1.38	19.7	0.0	15.5	OK

Subdrainage Area: C103AA — Controlled - Tributary
Area (ha): 0.17
C: 0.78

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	28.3	28.3	0.0	**0.0**
20	52.03	19.2	19.2	0.0	**0.0**
30	40.04	14.8	14.8	0.0	**0.0**
40	32.86	12.1	12.1	0.0	**0.0**
50	28.04	10.3	10.3	0.0	**0.0**
60	24.56	9.1	9.1	0.0	**0.0**
70	21.91	8.1	8.1	0.0	**0.0**
80	19.83	7.3	7.3	0.0	**0.0**
90	18.14	6.7	6.7	0.0	**0.0**
100	16.75	6.2	6.2	0.0	**0.0**
110	15.57	5.7	5.7	0.0	**0.0**
120	14.56	5.4	5.4	0.0	**0.0**

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 112 mm
Invert Elevation 84.96 m Volume available in CBMH 3.0 m3
T/G Elevation 87.64 m Length of 900mm BOSS 21.1 m
Max Ponding Depth 0.00 m Volume available in 900mm BOSS 13.4 m3
Downstream W/L 85.09 m Total available volume in structures 16.5 m3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	87.64	2.55	28.3	0.0	23.4	OK

Subdrainage Area: C105A — Controlled - Tributary
Area (ha): 0.17
C: 0.72

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	26.1	26.1	0.0	**0.0**
20	52.03	17.7	17.7	0.0	**0.0**
30	40.04	13.6	13.6	0.0	**0.0**
40	32.86	11.2	11.2	0.0	**0.0**
50	28.04	9.5	9.5	0.0	**0.0**
60	24.56	8.4	8.4	0.0	**0.0**

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: C103AB — Controlled - Tributary
Area (ha): 0.11
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	54.6	28.9	25.8	**15.5**
20	119.95	36.7	28.9	7.8	9.4
30	91.87	28.1	28.1	0.0	0.0
40	75.15	23.0	23.0	0.0	0.0
50	63.95	19.6	19.6	0.0	0.0
60	55.89	17.1	17.1	0.0	0.0
70	49.79	15.2	15.2	0.0	0.0
80	44.99	13.8	13.8	0.0	0.0
90	41.11	12.6	12.6	0.0	0.0
100	37.90	11.6	11.6	0.0	0.0
110	35.20	10.8	10.8	0.0	0.0
120	32.89	10.1	10.1	0.0	0.0

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 104 mm
Invert Elevation 86.16 m Volume available in CB 0.50
T/G Elevation 87.54 m
Max Ponding Depth 0.20 m
Downstream W/L 85.09 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	87.74	1.58	28.9	15.5	15.5	OK
					0.05	

Subdrainage Area: C103AA — Controlled - Tributary
Area (ha): 0.17
C: 0.98

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	82.3	43.8	38.5	**23.1**
20	119.95	55.3	43.8	11.4	13.7
30	91.87	42.3	42.3	0.0	0.0
40	75.15	34.6	34.6	0.0	0.0
50	63.95	29.5	29.5	0.0	0.0
60	55.89	25.8	25.8	0.0	0.0
70	49.79	22.9	22.9	0.0	0.0
80	44.99	20.7	20.7	0.0	0.0
90	41.11	18.9	18.9	0.0	0.0
100	37.90	17.5	17.5	0.0	0.0
110	35.20	16.2	16.2	0.0	0.0
120	32.89	15.2	15.2	0.0	0.0

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 112 mm
Invert Elevation 84.96 m Volume available in CBMH 3.0 m3
T/G Elevation 87.64 m Length of 900mm BOSS 21.1 m
Max Ponding Depth 0.16 m Volume available in 900mm BOSS 13.4 m3
Downstream W/L 85.09 m Total available volume in structures 16.5 m3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	87.80	2.71	43.8	23.1	23.4	OK
					0.28	

Subdrainage Area: C105A — Controlled - Tributary
Area (ha): 0.17
C: 0.90

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	75.9	38.5	37.5	**22.5**
20	119.95	51.0	38.5	12.5	15.0
30	91.87	39.1	38.5	0.6	1.1
40	75.15	32.0	32.0	0.0	0.0
50	63.95	27.2	27.2	0.0	0.0
60	55.89	23.8	23.8	0.0	0.0

Stormwater Management Calculations

Project #160401759, 640 Compass Street Block 140
Modified Rational Method Calculations for Storage

70	21.91	7.5	7.5	0.0	**0.0**
80	19.83	6.7	6.7	0.0	**0.0**
90	18.14	6.2	6.2	0.0	**0.0**
100	16.75	5.7	5.7	0.0	**0.0**
110	15.57	5.3	5.3	0.0	**0.0**
120	14.56	5.0	5.0	0.0	**0.0**

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 119 mm
Invert Elevation 86.16 m
T/G Elevation 87.54 m
Max Ponding Depth 0.00 m
Downstream W/L 85.06 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	87.54	1.38	26.1	0.0	22.6	OK

Subdrainage Area: C104A Controlled - Tributary
Area (ha): 0.15
C: 0.71

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	22.7	19.9	2.9	**1.7**
20	52.03	15.4	15.4	0.0	0.0
30	40.04	11.9	11.9	0.0	0.0
40	32.86	9.7	9.7	0.0	0.0
50	28.04	8.3	8.3	0.0	0.0
60	24.56	7.3	7.3	0.0	0.0
70	21.91	6.5	6.5	0.0	0.0
80	19.83	5.9	5.9	0.0	0.0
90	18.14	5.4	5.4	0.0	0.0
100	16.75	5.0	5.0	0.0	0.0
110	15.57	4.6	4.6	0.0	0.0
120	14.56	4.3	4.3	0.0	0.0

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 83 mm
Invert Elevation 85.67 m
T/G Elevation 87.49 m
Max Ponding Depth 0.03 m
Downstream W/L 84.82 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	87.52	1.85	19.9	1.7	33.7	OK

Subdrainage Area: C103A Controlled - Tributary
Area (ha): 0.13
C: 0.73

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	20.3	20.3	0.0	**0.0**
20	52.03	13.7	13.7	0.0	**0.0**
30	40.04	10.6	10.6	0.0	**0.0**
40	32.86	8.7	8.7	0.0	**0.0**
50	28.04	7.4	7.4	0.0	**0.0**
60	24.56	6.5	6.5	0.0	**0.0**
70	21.91	5.8	5.8	0.0	**0.0**
80	19.83	5.2	5.2	0.0	**0.0**
90	18.14	4.8	4.8	0.0	**0.0**
100	16.75	4.4	4.4	0.0	**0.0**
110	15.57	4.1	4.1	0.0	**0.0**
120	14.56	3.8	3.8	0.0	**0.0**

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 88 mm
Invert Elevation 86.09 m
T/G Elevation 87.47 m
Max Ponding Depth 0.00 m
Downstream W/L 84.64 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	87.47	1.38	20.3	0.0	39.5	OK

Subdrainage Area: UNC-3 Uncontrolled - Non-Tributary
Area (ha): 0.08
C: 0.40

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	6.8	6.8		
20	52.03	4.6	4.6		
30	40.04	3.6	3.6		
40	32.86	2.9	2.9		
50	28.04	2.5	2.5		
60	24.56	2.2	2.2		
70	21.91	1.9	1.9		
80	19.83	1.8	1.8		
90	18.14	1.6	1.6		
100	16.75	1.5	1.5		
110	15.57	1.4	1.4		
120	14.56	1.3	1.3		

Subdrainage Area: UNC-2 Uncontrolled - Non-Tributary
Area (ha): 0.06
C: 0.44

Project #160401759, 640 Compass Street Block 140
Modified Rational Method Calculations for Storage

70	49.79	21.2	21.2	0.0	0.0
80	44.99	19.1	19.1	0.0	0.0
90	41.11	17.5	17.5	0.0	0.0
100	37.90	16.1	16.1	0.0	0.0
110	35.20	15.0	15.0	0.0	0.0
120	32.89	14.0	14.0	0.0	0.0

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 119 mm
Invert Elevation 86.16 m Volume available in CB 0.50
T/G Elevation 87.54 m
Max Ponding Depth 0.26 m
Downstream W/L 85.06 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	87.80	1.64	38.5	22.5	22.6	OK
					0.12	

Subdrainage Area: C104A Controlled - Tributary
Area (ha): 0.15
C: 0.89

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	66.1	21.2	44.9	26.9
20	119.95	44.4	21.2	23.2	**27.8**
30	91.87	34.0	21.2	12.8	23.1
40	75.15	27.8	21.2	6.6	15.9
50	63.95	23.7	21.2	2.5	7.4
60	55.89	20.7	20.7	0.0	0.0
70	49.79	18.4	18.4	0.0	0.0
80	44.99	16.7	16.7	0.0	0.0
90	41.11	15.2	15.2	0.0	0.0
100	37.90	14.0	14.0	0.0	0.0
110	35.20	13.0	13.0	0.0	0.0
120	32.89	12.2	12.2	0.0	0.0

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 83 mm
Invert Elevation 85.67 m Volume available in CB's 1.5 m3
T/G Elevation 87.49 m Length of 200mm CB Lead 35.4 m
Max Ponding Depth 0.28 m Volume available in 200mm CB Lead 1.1 m3
Downstream W/L 84.82 m Total available volume in structures 2.6 m3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	87.77	2.10	21.2	27.8	33.7	OK
					5.85	

Subdrainage Area: C103A Controlled - Tributary
Area (ha): 0.13
C: 0.91

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	58.9	23.8	35.1	**21.0**
20	119.95	39.6	23.8	15.7	18.9
30	91.87	30.3	23.8	6.5	11.7
40	75.15	24.8	23.8	1.0	2.3
50	63.95	21.1	21.1	0.0	0.0
60	55.89	18.4	18.4	0.0	0.0
70	49.79	16.4	16.4	0.0	0.0
80	44.99	14.8	14.8	0.0	0.0
90	41.11	13.6	13.6	0.0	0.0
100	37.90	12.5	12.5	0.0	0.0
110	35.20	11.6	11.6	0.0	0.0
120	32.89	10.8	10.8	0.0	0.0

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 88 mm
Invert Elevation 86.09 m Volume available in CB 0.50
T/G Elevation 87.47 m
Max Ponding Depth 0.24 m
Downstream W/L 84.64 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	87.71	1.62	23.8	21.0	39.5	OK
					18.45	

Subdrainage Area: UNC-3 Uncontrolled - Non-Tributary
Area (ha): 0.08
C: 0.50

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	19.9	19.9		
20	119.95	13.3	13.3		
30	91.87	10.2	10.2		
40	75.15	8.4	8.4		
50	63.95	7.1	7.1		
60	55.89	6.2	6.2		
70	49.79	5.5	5.5		
80	44.99	5.0	5.0		
90	41.11	4.6	4.6		
100	37.90	4.2	4.2		
110	35.20	3.9	3.9		
120	32.89	3.7	3.7		

Subdrainage Area: UNC-2 Uncontrolled - Non-Tributary
Area (ha): 0.06
C: 0.55

Stormwater Management Calculations

Project #160401759, 640 Compass Street Block 140
Modified Rational Method Calculations for Storage

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	5.6	5.6		
20	52.03	3.8	3.8		
30	40.04	2.9	2.9		
40	32.86	2.4	2.4		
50	28.04	2.1	2.1		
60	24.56	1.8	1.8		
70	21.91	1.6	1.6		
80	19.83	1.5	1.5		
90	18.14	1.3	1.3		
100	16.75	1.2	1.2		
110	15.57	1.1	1.1		
120	14.56	1.1	1.1		

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.08
C: 0.56

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	9.6	9.6		
20	52.03	6.5	6.5		
30	40.04	5.0	5.0		
40	32.86	4.1	4.1		
50	28.04	3.5	3.5		
60	24.56	3.1	3.1		
70	21.91	2.7	2.7		
80	19.83	2.5	2.5		
90	18.14	2.3	2.3		
100	16.75	2.1	2.1		
110	15.57	1.9	1.9		
120	14.56	1.8	1.8		

SUMMARY TO OUTLET

			Vrequired	Vavailable*	
Tributary Area	0.730	ha			
Total 2yr Flow to Sewer	114.3	L/s	2	135 m^3	Ok
Non-Tributary Area	0.220	ha			
Total 2yr Flow Uncontrolled	22.0	L/s			
Total Area	0.950	ha			
Total 2yr Flow	136.4	L/s			
Target	220.1	L/s			

Project #160401759, 640 Compass Street Block 140
Modified Rational Method Calculations for Storage

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	16.4	16.4		
20	119.95	11.0	11.0		
30	91.87	8.4	8.4		
40	75.15	6.9	6.9		
50	63.95	5.9	5.9		
60	55.89	5.1	5.1		
70	49.79	4.6	4.6		
80	44.99	4.1	4.1		
90	41.11	3.8	3.8		
100	37.90	3.5	3.5		
110	35.20	3.2	3.2		
120	32.89	3.0	3.0		

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.08
C: 0.70

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	27.8	27.8		
20	119.95	18.7	18.7		
30	91.87	14.3	14.3		
40	75.15	11.7	11.7		
50	63.95	10.0	10.0		
60	55.89	8.7	8.7		
70	49.79	7.8	7.8		
80	44.99	7.0	7.0		
90	41.11	6.4	6.4		
100	37.90	5.9	5.9		
110	35.20	5.5	5.5		
120	32.89	5.1	5.1		

SUMMARY TO OUTLET

			Vrequired	Vavailable*	
Tributary Area	0.730	ha			
Total 100yr Flow to Sewer	156.1	L/s	110	135 m^3	Ok
Non-Tributary Area	0.220	ha			
Total 100yr Flow Uncontrolled	64.0	L/s			
Total Area	0.950	ha			
Total 100yr Flow	220.1	L/s			
Target	220.1	L/s			

C.4 Background Report Excerpts

david schaeffer engineering ltd
SMART SUBDIVISIONS™

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MEMORANDUM

July 26, 2022

Richcraft Group of Companies
2280 Street Laurent Boulevard
Ottawa, ON, K1G 4K1

Attention: Alexander Orakwue, M.Eng., E.I.T.

Re: Block 140 – Trails Edge West – Civil Servicing Constraints

The Richcraft Group of Companies (Richcraft) has retained DSEL to prepare a brief summary of the availability of services associated with development of the approximately 3.64ha of property within the Trails Edge West community that is bordered to the north by Brian Coburn Boulevard, the east by Fern Casey Street, the south by Axis Way, and the west by Compass Street (known as 'the site'). Referred to as Block 140 in this memo, the site is shown as Block 135 on Trails Edge west drawings and design sheets. Similarly, Compass Street is shown as Rainrock Crescent.

Refer to the following Trails Edge West subdivision drawings, attached for reference

- Sheet 5 – General Plan, Rev 6, 15-01-26
- Sheet 6 – General Plan, Rev 6, 15-01-26
- Sheet 14 – Sanitary Drainage Plan, Rev 6, 15-01-26
- Sheet 15 – Sanitary Drainage Plan, Rev 6, 15-01-26
- Sheet 17 – Storm Drainage Plan, Rev 6, 15-01-26
- Sheet 18 – Sanitary Drainage Plan, Rev 6, 15-01-26

The 3.64ha mixed use development was contemplated in the servicing studies prepared and submitted in support of the Richcraft – Trails Edge Phase 2 subdivision application. The following studies were referenced in the Trails Edge Phase 2 design brief:

- Design Brief for the Trails Edge West - Richcraft – City of Ottawa, DSEL, dated January 26, 2015 (Design Brief)
- Stormwater Management Report for the Trails Edge West Subdivision – City of Ottawa, JFSA, dated January 2015
  (SWM report)
- Trails Edge Watermain Analysis – Phase 2 – City of Ottawa, WSP, dated December 8, 2014 (Watermain Analysis)

The 3.64ha development is jointly owned by both Richcraft and Minto Communities (Minto). Richcraft currently owns a parcel of the property to the east, flanking and serviced by Fern Casey Street, and a parcel to the west, flanking and serviced by Compass Street. The land between these two properties is owned by Minto and is serviced by Block 136 to Axis Way. See ***Fig 1 - Existing Land Ownership***, attached.

A land swap agreement is underway that would simplify the division of lands, resulting in a single 0.96ha block of land owned by Richcraft in the west and a single 2.68ha block of land owned by Minto to the east. See ***Fig 2 - Proposed Land Swap***, attached.

The 0.96ha portion to be developed by Richcraft is proposed to be developed as a residential area with stacked townhouse dwellings with a paved parking area. An estimated 60 units results in a forecasted population of 162 people. As the services contemplated for Block 136 in the Trails Edge Phase 2 Servicing Report are only positioned to service the Minto lands, additional services will be required on Compass Street to service the new Richcraft parcel.

Stormwater / Drainage

The Trails Edge Phase 2 minor system was sized to capture the 5 year storm event for Block 140 and provides an outlet for the site which ultimately discharges to EUC Pond 1. EUC Pond 1 has been sized to accommodate the subject site and provide water quality control. On site storage is required to detain runoff generated by the 100 year storm and is anticipated to be accommodated via depression/sag storage within parking lots and/or beneath the surface using either oversized storm sewers or modular storage systems. The allowable release rate, and storage volumes will need to be established during the detailed design phase.

A decommissioned ditch inlet catch basin in the Brian Coburn Boulevard right of way connects to MH 15 (2400mm diameter), and a 1200 mm diameter sewer main on Compass Street. The DICB previously conveyed 2,200 L/s under the 5 year storm that is now captured and conveyed within in a separate sewer system along Brian Cobourn Boulevard.

The Trails Edge Phase 2 subdivision has a minor system flow allocation of 845.8 L/s for block 140 (see **Appendix 3**) and servicing was to be via a connection to Axis Street through Block 136. Based on the proposed configuration presented in **Figure 2**, a new storm sewer connection will be required to service the Richcraft lands. The new connection is contemplated to connect to the existing storm sewer on Compass Street at MH 15.

The latest design sheets for the existing storm sewer on Compass Street indicate a residual capacity of 2,662.3 L/s and so the sewer is expected to have sufficient capacity to service the subject site. The restrictive length of sewer is between MH 21 and MH 22 which has a residual capacity of 2,098.6 L/s under original conditions which include the planned drainage from the site.

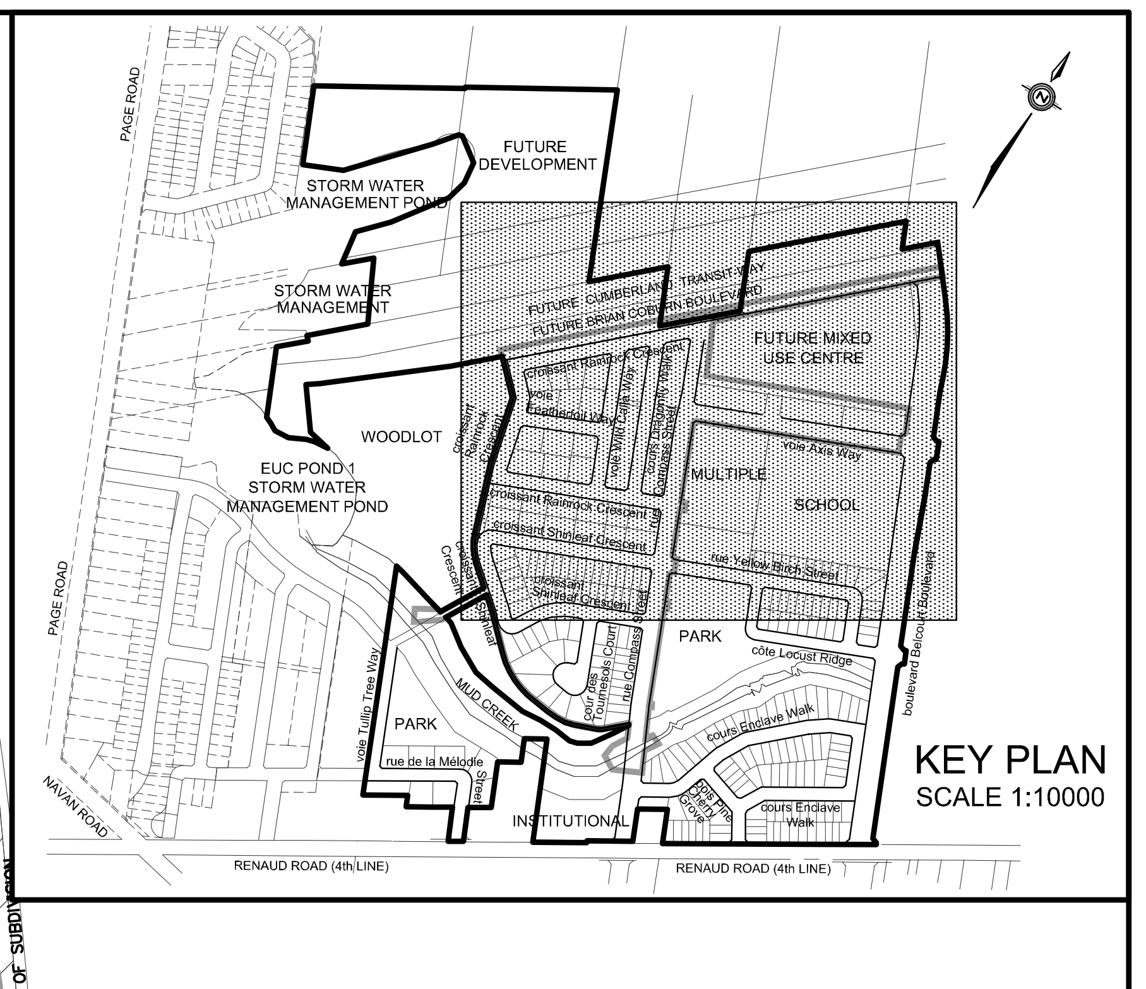
Table 3 of the SWM report shows composite HGL values from the 100 year 3hr Chicago, 100 year 24 hour SCS Type II, and three historical storm events. The max HGL is determined to be 85.137m at MH 15 on Compass Street. Per City guidelines, a 0.3m freeboard will need to be provided between maximum HGL and the underside of footings. This criterion will need to be respected and verified using hydraulic/hydrologic modelling or through a desktop analysis at the detailed design stage.

Wastewater

A sanitary sewer is located within Compass Street, and a service connection can be made at MH 15A. This 1200mm diameter MH is the first in a south bound sewer run that starts with a 200mm diameter sewer. The first run of sewer, 15A-16A, has a residual capacity of 26.79 L/s under original conditions.

Under proposed conditions, sewer run 15A-16A is expected to convey an additional 2.18 L/s from a proposed 200mm diameter service connection to the proposed development. While capacity in this sewer was not allocated to this development, it is not allocated to any other development and exists as excess due to minimum pipe size standards and a need to service the houses along existing Compass Street.

The restrictive lengths of sewer are downstream of MH 19A, these runs reach 88% of capacity under original conditions. The proposed development represents a 1.6% increase to the total flow in these pipes. Therefore, there is anticipated to be capacity for the development’s wastewater flows, even with consideration for the originally allocated population of 184 to still occupy the remainder of the block and be serviced through Block 136.



KEY PLAN
SCALE 1:10000

LEGEND

0.25Ha / 0.75	DRAINAGE AREA IN HECTARES RUN-OFF COEFFICIENT
0.29Ha / 0.65	EXTERNAL DRAINAGE AREA IN HECTARES (BY OTHERS) RUN-OFF COEFFICIENT
⇨	OVERLAND FLOW DIRECTION
⇨	EXTERNAL OVERLAND FLOW DIRECTION
○	STORM MANHOLE
○	STORM MANHOLE IN OTHER PHASES
○	CATCHBASIN MANHOLE
●	RLCBS – ELBOW SECTION (CITY STD. S31) / 'T' SECTION (CITY STD. S30), AS NOTED ON THE DRAWING
□ □□	SINGLE/DOUBLE CATCHBASIN
□ □□ CB'A'	CATCHBASINS WITH INLET CONTROL DEVICE IPEX TEMPEST A (Q max = 19.9 l/s)
□ □□ CB'B'	CATCHBASINS WITH INLET CONTROL DEVICE IPEX TEMPEST B (Q max = 28.4 l/s)
□ □□ CB'C'	CACHBASINS WITH INLET CONTROL DEVICE IPEX TEMPEST C (Q max = 35.5 l/s)
□ □□ CB'D'	CATCHBASINS WITH INLET CONTROL DEVICE IPEX TEMPEST D (Q max = 50.1 l/s)
□ □□ CB'E'	CATCHBASINS WITH INLET CONTROL DEVICE IPEX TEMPEST F (Q max = 69.1 l/s)
▬ ▬ ▬	STORM SEWER TRIBUTARY BOUNDARY
▬ ▬ ▬	EXTERNAL STORM SEWER TRIBUTARY BOUNDARY
▬▬▬	PHASE LINE
----	SINGLE STORM HOUSE CONNECTION
▨	WORKS TO BE COMPLETED BY OTHERS AND OTHER PHASES

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY STANTEC GEOMATICS LIMITED, FILE No. 161611903-111. SURVEY DATED AUGUST 2, 2012.

LEGAL INFORMATION

CALCULATED M-PLAN PROVIDED BY STANTEC GEOMATICS LIMITED, JOB No. 161613137-132, RECEIVED ON OCTOBER 30, 2014.

PRE-SERVICING RE-SUBMISSION 15-01-26

ELEVATION NOTE

ELEVATION = 86.708 m

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM NATIONAL CAPITAL COMMISSION No. 019680227, HAVING AN ELEVATION OF 86.708 m.

No.	BY	DATE	DESCRIPTION	BY
6	Z.L.	15-01-26	PRE-SERVICING RE-SUBMISSION	
5	Z.L.	15-01-15	PRE-SERVICING SUBMISSION	
4	Z.L.	14-10-16	3rd SUBMISSION	
3	Z.L.	14-09-11	2nd SUBMISSION	
2	Z.L.	14-05-16	1st RE-SUBMISSION	
1	Z.L.	12-09-14	1st SUBMISSION	

Ottawa CITY OF OTTAWA

PROJECT No. 12-612

Z. LI
15-01-26

STORM DRAINAGE PLAN

RICHCRAFT
GROUP OF
COMPANIES

TRAILS EDGE WEST

DSEL
david schaeffer engineering ltd
120 Iber Road, Unit 203
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

DRAWN BY: W.L./C.M.	CHECKED BY: K.M.	DRAWING NO.	SHEET NO.
DESIGNED BY: K.M.	CHECKED BY: Z.L.		17
SCALE: 1:1000	DATE: SEPTEMBER 2012		

ATTACHMENT 3

Trails Edge Storm Drainage Design Sheet

STORM SEWER CALCULATION SHEET (RATIONAL METHOD) (INTERIM B CONDITION)

Full block minor
system flow allocation

Manning 0.013 Return Frequency

	LOCATION		AREA (Ha)										FLOW					ICD DATA				DESIGN FLOW	SEWER DATA								
Location	From Node	To Node	R= 0.25	R= 0.40	R= 0.50	R= 0.58	R= 0.65	R= 0.70	R= 0.73	R= 0.76	R= 0.80	R= 0.83	Indiv. 2.78 AC	Accum. 2.78 AC	Time of Conc.	Rainfall Intensity	Peak Flow Q (l/s)	No.	Type	Flow Q (l/s)	Accum. Flow		DIA. (mm) (actual)	DIA. (mm) (nominal)	TYPE	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME OF FLOW (min.)	RATIO Q/Q full
Block 138 (Access)																															
Contribution From Block 135 (Fut. Mixed Used Centre)											3.65		8.12	8.12	10.00	104.19	845.8			845.8	845.8	845.8									
																		RYCB	A	19.9	865.7										
						0.15							0.24	8.36					A	19.9	885.6										
	Cont 2	41				0.28				0.08			0.62	8.98	10.00	104.19	935.6		A	19.9	905.5	935.6	1050	1050	CONC	0.20	43.0	1221	1.41	0.51	0.77
To voie Axis Way , Pipe 41 - 17														8.98	10.51						905.5										
voie Axis Way																															
From Future Phase																	649.0			649.0	649.0	649.0	(Flow from 675mm Orifice in Splitter MH 39 to MH 40 as per JFSA's calculation)								
																			D	50.1	699.1										
																			A	19.9	719.0										
																			C	35.5	754.5										
	39	40								0.32			0.68	0.68	10.00	104.19	719.4		A	19.9	774.4	719.4	1050	1050	CONC	0.11	111.26	906	1.05	1.77	0.79
																		RYCB	A	19.9	794.3										
																			A	19.9	814.2										
																			C	35.5	849.7										
																			B	28.4	878.1										
	40	41								0.32			0.68	1.35	11.77	95.68	778.4		A	19.9	898.0	778.4	1200	1200	CONC	0.10	102.0	1233	1.09	1.56	0.63
Contribution From Block 136 (Access), Cont 2 - 41													8.98		10.51					905.5	1803.5										
																			C	35.5	1839.0										
																			A	19.9	1858.9										
																			D	50.1	1909.0										
	41	17								0.34			0.72	11.05	13.33	89.36	1636.5		A	19.9	1928.9	1636.5	1500	1500	CONC	0.10	114.0	2235	1.26	1.50	0.73
To rue Compass Street, Pipe 17 - 170														11.05	14.83		649.0				1928.9										
cours Dragonfly Walk																															
																			A	19.9	19.9										
																			A	19.9	39.8										
																			B	28.4	68.2										
																			C	35.6	103.7										
	9	10								0.56			1.18	1.18	10.00	104.19	123.3		C	35.5	139.2	123.3	525	525	CONC	0.20	100.5	192	0.89	1.89	0.64
																			C	35.5	174.7										
																			C	35.5	210.2										
																			D	50.1	260.3										
	10	11								0.51			1.08	2.26	11.89	95.19	215.2		D	50.1	310.4	215.2	675	675	CONC	0.15	110.5	326	0.91	2.02	0.66
To croissant Rainrock Crescent, Pipe 11 - 18														2.26	13.91						310.4										
voie Wild Calla Way																															
																			A	19.9	19.9										
																			D	50.1	70.0										
	5	6								0.56			1.18	1.18	10.00	104.19	123.3		D	50.1	120.1	123.3	525	525	CONC	0.20	106.0	192	0.89	1.99	0.64
																			C	35.5	155.6										
																			C	35.5	191.1										
	6	12								0.35			0.74	1.92	11.99	94.74	182.2		C	35.5	226.6	182.2	600	600	CONC	0.20	87.5	275	0.97	1.50	0.66
To croissant Rainrock Crescent, Pipe 12 - 13														1.92	13.49						226.6										
voie Featherfoil Way																															
																			E	69.1	69.1										
																		RYCB	A	19.9	89.0										
																			B	28.4	117.4										
	7	8				0.20				0.41			1.19	1.19	10.00	104.19	123.9		C	35.5	152.9	123.9	450	450	PVC	0.30	83.5	156	0.98	1.42	0.79
To croissant Rainrock Crescent, Pipe 8 - 14														1.19	11.42						152.9										
croissant Rainrock Crescent																															
																			A	19.9	19.9										
																			A	19.9	39.8										
																		RYCB	A	19.9	59.7										
																			A	19.9	79.6										
	1	2				0.03				0.24			0.56	0.56	10.00	104.19	57.9		A	19.9	99.5	57.9	450	450	PVC	0.35	77.5	169	1.06	1.22	0.34
	2	3								0.04			0.08	0.64	11.22	98.17	62.8				99.5	62.8	450	450	PVC	0.40	13.0	180	1.13	0.19	0.35
Contribution From DICB3			0.85										0.59	0.59	10.00	104.19	61.6				61.6	61.6	300	300	PVC	1.00	11.0	97	1.37	0.13	0.64
	3	4				0.21				0.12			0.59	1.82	11.41	97.30	177.4	RYCB	A	19.9	181.0	177.4	600	600	CONC	0.30	38.5	336	1.19	0.54	0.53
																			A	19.9	200.9										
	4	8								0.05			0.11	1.93	11.95	94.92	183.0		B	28.4	229.3	183.0	675	675	CONC	0.20	24.0	376	1.05	0.38	0.49
Contribution From voie Featherfoil Way, Pipe 7 - 8													1.19		11.42					152.9	382.2										
																			A	19.9	402.1										
																			A	19.9	422.0										
	8	14				0.35				0.21			1.01	4.13	12.33	93.31	384.9	RYCB	B	28.4	450.4	384.9	675	675	CONC	0.50	87.0	594	1.66	0.87	0.65
To BLOCK 105 (6m Servicing Corridor), Pipe 14 - 140														4.13	13.20						450.4										

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/sec

Designed: K.M.
Checked: Z.L.
Dwg. Reference: Storm Drainage Plan, Dwg. No. 17 to 20

PROJECT: TRAILS EDGE WEST
LOCATION: City of Ottawa
File Ref: 12-612
Date: January, 2015
Sheet No. 1 of 3

LICENSED PROFESSIONAL ENGINEER
Z. LI
Jan. 26, 2017
PROVINCE OF ONTARIO

STORM SEWER CALCULATION SHEET (RATIONAL METHOD) (INTERIM B CONDITION)

Ottawa

Manning 0.013 Return Frequency

Richcraft lands to
connect to MH 15.
Area = 0.36 ha
R = 0.80

	LOCATION		AREA (Ha)										FLOW					ICD DATA				DESIGN FLOW	SEWER DATA								
Location	From Node	To Node	R= 0.25	R= 0.40	R= 0.50	R= 0.58	R= 0.65	R= 0.70	R= 0.73	R= 0.76	R= 0.80	R= 0.83	Indiv. 2.78 AC	Accum. 2.78 AC	Time of Conc.	Rainfall Intensity	Peak Flow Q (l/s)	No.	Type	Flow Q (l/s)	Accum. Flow		DIA. (mm) (actual)	DIA. (mm) (nominal)	TYPE	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME OF FLOW (min.)	RATIO Q/Q full
Contribution From cours Dragonfly Walk, Pipe 10 - 11													2.26		13.91					310.4	310.4										
																			B	28.4	338.8										
	11	18								0.13			0.27	2.54	13.91	87.25	221.2		D	50.1	388.9	221.2	675	675	CONC	0.15	50.5	326	0.91	0.93	0.68
To rue Compass Street, Pipe 18 - 19														2.54	14.83						388.9										
	11	12								0.14			0.30	0.30	10.00	104.19	30.8					30.8	300	300	PVC	0.40	48.5	61	0.87	0.93	0.50
Contribution From voie Wild Calla Way, Pipe 6 - 12													1.92		13.49					226.6	226.6										
																			A	19.9	246.5										
	12	13								0.24			0.51	2.73	13.49	88.78	242.0		C	35.5	282.0	242.0	600	600	CONC	0.30	61.5	336	1.19	0.86	0.72
																			B	28.4	310.4										
																			B	28.4	338.8										
																			A	19.9	358.7										
	13	14								0.29			0.61	3.34	14.35	85.71	286.1		B	28.4	387.1	286.1	750	750	CONC	0.30	72.5	610	1.38	0.88	0.47
To BLOCK 105 (6m Servicing Corridor), Pipe 14 - 140														3.34	15.23						387.1										
																			A	19.9	19.9										
																			C	35.5	55.4										
	15	17								0.43			0.91	0.91	10.00	104.19	94.7		A	19.9	75.3	94.7	1200	1200	CONC	0.50	107.0	2757	2.44	0.73	0.03
To rue Compass Street, Pipe 17 - 170														0.91	10.73						75.3										
BLOCK 105 (6m Servicing Corridor)																															
Contribution From croissant Rainrock Crescent, Pipe 8 - 14													4.13		13.20					450.4	450.4										
Contribution From croissant Rainrock Crescent, Pipe 13 - 14													3.34		15.23					387.1	837.5										
	14	140								0.01			0.02	7.48	15.23	82.83	619.9				837.5	619.9	900	900	CONC	0.40	5.5	1145	1.80	0.05	0.54
	140	141				0.43				0.10			0.90	8.39	15.28	82.67	693.5	RYCB	B	28.4	865.9	693.5	900	900	CONC	0.40	73.0	1145	1.80	0.68	0.61
	141	24								0.01			0.02	8.41	15.95	80.60	677.8				865.9	677.8	900	900	CONC	0.40	6.5	1145	1.80	0.06	0.59
To croissant Shinleaf Crescent, Pipe 24 - 25														8.41	16.01						865.9										
cour des Tournesols Court																															
	280	28						0.10					0.19	0.19	10.00	104.19	20.3					20.3	375	375	PVC	0.40	16.0	111	1.00	0.27	0.18
	28	29						0.24					0.47	0.66	10.27	102.81	68.0					68.0	375	375	PVC	0.30	17.5	96	0.87	0.34	0.71
																			D	50.1	50.1										
																			D	50.1	100.2										
																		RYCB	A	19.9	120.1										
																		RYCB	B	28.4	148.5										
					0.30								0.42	1.08					A	19.9	168.4										
	29	30			0.39			0.23					0.99	2.07	10.60	101.12	209.2		B	28.4	196.8	209.2	600	600	CONC	0.25	82.0	307	1.09	1.26	0.68
To croissant Shinleaf Crescent, Pipe 30 - 31														2.07	11.86						196.8										
rue Compass Street																															
Contribution From voie Axis Way, Pipe 41 - 17													11.05		14.83		649.0			1928.9	1928.9										
Contribution From croissant Rainrock Crescent, Pipe 15 - 17													0.91		10.73					75.3	2004.2										
																			E	69.1	2073.3										
	17	170								0.24			0.51	12.47	14.83	84.10	1697.3		A	19.9	2093.2	1697.3	1800	1800	CONC	0.10	60.5	3635	1.43	0.71	0.47
																			A	19.9	2113.1										
																			C	35.5	2148.6										
	170	18								0.23			0.49	12.95	15.54	81.85	1709.1		A	19.9	2168.5	1709.1	1800	1800	CONC	0.10	64.5	3635	1.43	0.75	0.47
Contribution from Block 139											0.35		0.78	0.78																	
Contribution from Block 138 (Multiple)											1.23		2.74	3.51	10.00	104.19	366.1			366.1	366.1	366.1	675	675	CONC	0.50	17.0	594	1.66	0.17	0.62
Contribution From croissant Rainrock Crescent, Pipe 11 - 18													2.54		14.83					388.9	2923.5										
																		RYCB	B	28.4	2951.9										
																			A	19.9	2971.8										
	18	19				0.33				0.18			0.91	19.91	16.29	79.60	2234.1		A	19.9	2991.7	2234.1	1950	1950	CONC	0.10	75.0	4500	1.51	0.83	0.50
Contribution From rue Yellow Birch Street, Pipe Plug - 19													9.94		17.31		297.0			1107.6	4099.4										

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/sec

Designed: K.M.
Checked: Z.L.
Dwg. Reference: Storm Drainage Plan, Dwg. No. 17 to 20

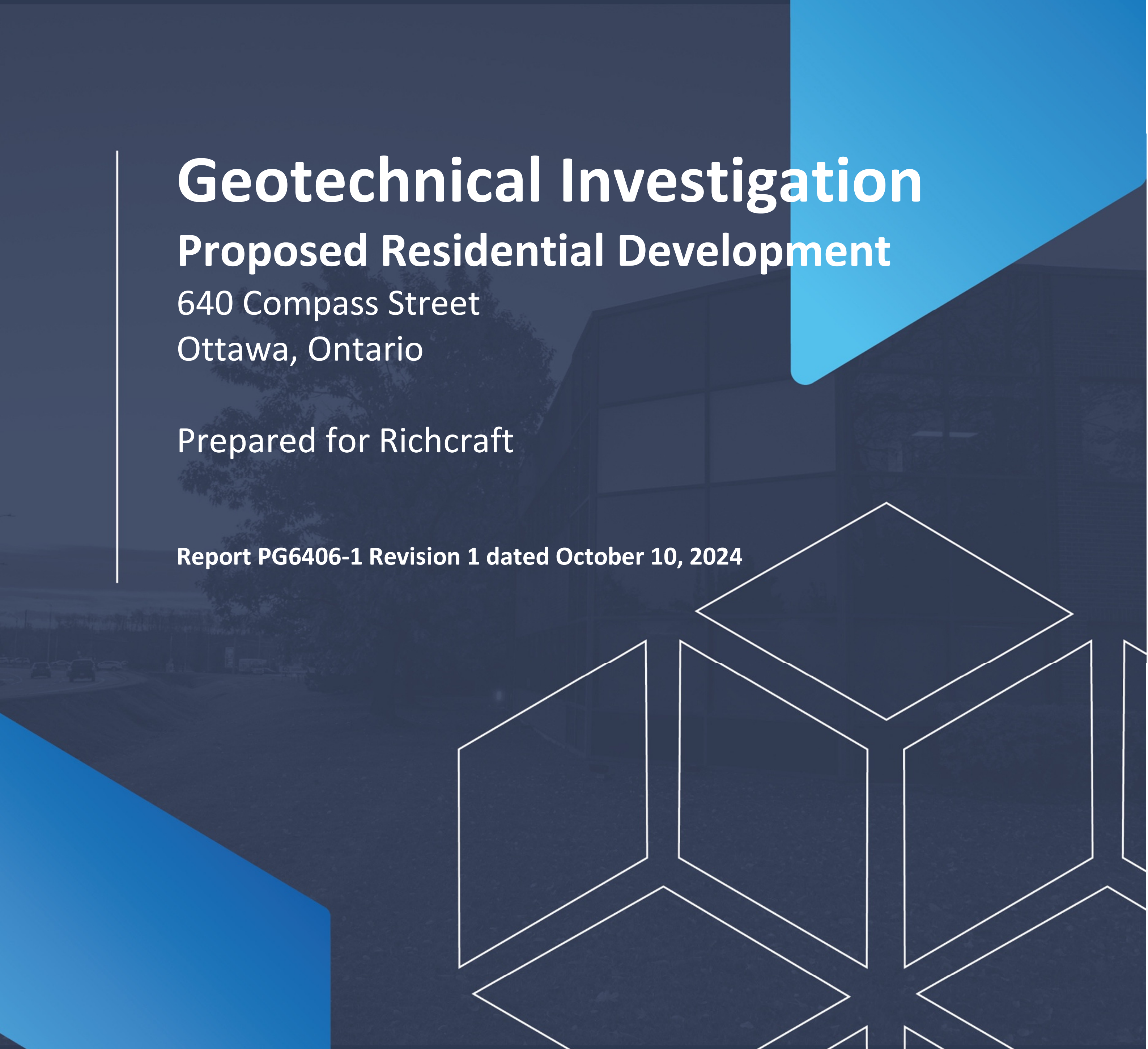
PROJECT: TRAILS EDGE WEST
LOCATION: City of Ottawa
File Ref: 12-612
Date: January, 2015
Sheet No. 2 of 3

LICENSED PROFESSIONAL ENGINEER
Z. LI
Jan 26 2015
PROVINCE OF ONTARIO

Appendix D Geotechnical Information

D.1 Geotechnical Investigation Report

PATERSON GROUP



Geotechnical Investigation

Proposed Residential Development

640 Compass Street
Ottawa, Ontario

Prepared for Richcraft

Report PG6406-1 Revision 1 dated October 10, 2024

Table of Contents

Appendices

Appendix 1	Soil Profiles and Test Data Sheets Symbols and Terms Atterberg Limits Test Results Hydrometer and Grain Size Distribution Test Result Shrinkage Test Result Analytical Test Result
Appendix 2	Figure 1 - Key Plan Drawing PG6406-1 – Test Hole Location Plan Drawing PG6406-2 – Permissible Grade Raise Plan

1.0 Introduction

Paterson Group (Paterson) was commissioned by Richcraft to conduct a geotechnical investigation for the proposed residential development to be located at 640 Compass Street, in the City of Ottawa (refer to Figure 1 - Key Plan in Appendix 2 of this report for the general site location).

The objectives of the geotechnical investigation were to:

- ☐ Determine the subsoil and groundwater conditions at this site by means of test holes.

- ☐ Provide geotechnical recommendations pertaining to the design of the proposed development including construction considerations which may affect the design.

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

2.0 Proposed Development

Based on the available drawings, it is understood that the proposed development will consist of 6 residential townhouse blocks located around the perimeter of the site, with an amenity area in the central portion of the site. At finished grades, the proposed townhouse blocks will be surrounded by landscaped areas, asphalt-paved access lanes and parking areas, and sidewalks. It is also anticipated that the proposed development will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the geotechnical investigation was carried out on September 9, 2022, and consisted of advancing a total of 4 boreholes (BH 1-22 through BH 4-22) to a maximum depth of 6.7 m below ground surface. Previous investigations carried out by Paterson included a total of 5 test holes within the subject site: borehole BH 4-20 in May 2020, borehole BH 10 in August 2011, hand auger hole HA 5-09 in May 2009, and borehole BH 11-08 and test pit TP 11-08 in August 2008.

The test holes undertaken by Paterson as part of the current investigation were placed in a manner to provide general coverage of the subject site taking into consideration underground utilities, site features, and previous test hole locations. The test hole locations are shown on Drawing PG6406-1 - Test Hole Location Plan included in Appendix 2.

The boreholes were completed using a truck-mounted drill rig operated by a two-person crew. The test pit was completed using a backhoe. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The testing procedure consisted of augering or excavating to the required depth at the selected locations, and sampling and testing the overburden.

Sampling and In Situ Testing

Soil samples were recovered using a 50 mm diameter split-spoon sampler or from the auger flights. The split-spoon and auger samples were classified on-site and placed in sealed plastic bags. All samples were transported to our laboratory. The depths at which the split-spoon and auger samples were recovered from the boreholes are shown as SS and AU, 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 in cohesive soils (silty clays) using a field vane apparatus.

The overburden thickness was evaluated by a dynamic cone penetration test (DCPT) completed at boreholes BH 11-08, BH 10, BH 4-20, and BH 4-22. The DCPT consists of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

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

Groundwater

Flexible polyethylene standpipes were installed in all boreholes to allow groundwater level monitoring subsequent to advancing the boreholes. The groundwater level readings were obtained after a suitable stabilization period. The groundwater observations are discussed in Section 4.3 and presented in the Soil Profile and Test Data sheets in Appendix 1.

3.2 Field Survey

The borehole location and ground surface elevation at each borehole location were surveyed by Paterson using a high precision, handheld GPS and referenced to a geodetic datum. The location of the boreholes is presented on Drawing PG6406-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. A total of 4 Atterberg Limits tests, 1 grain size distribution/hydrometer test, and 1 shrinkage test have been performed on the soil samples obtained from the current and previous test holes.

Soil samples from the current investigation will be stored for a period of 1 month after this report is completed, unless we are otherwise directed. Testing results are presented in Appendix 1 and discussed further in Section 4.2.

3.4 Analytical Testing

One (1) soil sample has been submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures, by determining the concentration of sulphate and chloride, the resistivity, and the pH. The results are presented in Appendix 1 and are discussed further in Section 6.7.

4.0 Observations

4.1 Surface Conditions

The site is currently vacant and generally grass-covered, with a relatively level ground surface at an approximate geodetic elevation of 87 to 88 m. The site is bordered to the east by vacant land, to the north by Brian Coburn Boulevard, to the west by Compass Street, and to the south by residential townhouse blocks.

4.2 Subsurface Profile

Overburden

Generally, the soil profile at the test hole locations consists of topsoil and/or fill underlain by silty clay. The fill material was observed at borehole BH 1-22, extending to an approximate depth of 1.3 m below the existing ground surface, and consists of grey to brown, silty sand to silty clay with varying amounts of gravel and organics.

A deep deposit of silty clay was encountered underlying the topsoil and/or fill. The upper portion of the silty clay deposit, extending to approximate depths of 3 to 4 m, was generally brown in colour and very stiff to stiff, becoming grey and firm below these depths.

Practical refusal of the DCPT was encountered at depths ranging from 24.1 to 25.3 m below the existing ground surface.

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

Atterberg Limits Results

The results of the Atterberg Limit tests conducted within the silty clay are presented in Table 1 - Summary of Atterberg Limits Results on the next page, and also in Appendix 1. The tested material was classified as an Inorganic Clay of High Plasticity (CH).

Table 1 - Summary of Atterberg Limits Results (Current Investigation, 2022)

Sample	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Classification
BH 1-22 - SS 4	55.6	81	26	55	CH
BH 3-22 - SS 4	63.9	82	26	56	CH
BH 4-22 - SS 4	54.6	76	25	41	CH
Atterberg Limits Results (Previous Investigation, 2020)					
BH 4-20 – SS 3	39.4	72	31	41	CH
Notes: CH – Inorganic clays of high plasticity					

Grain Size Distribution/Hydrometer Test

One (1) representative soil sample was submitted for grain size distribution analysis, including hydrometer testing. The results are summarized in Table 2 below and are presented on the Grain Size Distribution sheet in Appendix 1.

Table 2 - Summary of Grain Size Distribution Analysis (Current Investigation, 2022)

Sample	Gravel %	Sand %	Fines Content	
			Silt %	Clay %
BH 3-22 - SS 3	0.0	0.4	34.6	65.0

Shrinkage Test

One (1) representative soil sample (BH 1-22, SS3) was submitted for shrinkage test. The shrinkage limit and ratio were found to be 18% and 1.65, respectively.

Bedrock

Based on available geological mapping, the bedrock in the subject area consists of interbedded limestone and shale of the Lindsay Formation with an overburden thickness of 25 to 50 m.

4.3 Groundwater

Groundwater levels for the current investigation were measured on September 22, 2022, in the piezometers installed at the borehole locations. The measured groundwater levels noted at that time are presented in Table 3 below.

Table 3 – Summary of Groundwater Levels (Current Investigation, 2022)

Test Hole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Dated Recorded
		Depth (m)	Elevation (m)	
BH 1-22	87.78	2.43	85.35	September 22, 2022
BH 2-22	86.99	1.83	85.16	
BH 3-22	87.32	1.95	85.37	
BH 4-22	87.17	2.00	85.17	
Groundwater Levels (Previous Investigation, 2020)				
BH 4-20	87.57	4.28	83.29	May 29, 2020
Groundwater Levels (Previous Investigation, 2011)				
BH 10	86.97	2.30	84.37	August 11, 2011
Groundwater Levels (Previous Investigation, 2008)				
BH 11-08	87.14	0.61	86.53	August 28, 2008
TP 11-08	87.14	1.00	86.14	

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

It should be noted that surface water can become trapped within a backfilled borehole, which can lead to higher than typical groundwater level observations. Long-term groundwater levels can also be estimated based on the observed colour and consistency of the recovered soil samples.

Based on these observations, the long-term groundwater table can be expected at an approximate 3 to 4 m depth. It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered suitable for the proposed residential development. It is recommended that the proposed buildings be supported on conventional spread footings placed on the undisturbed, stiff silty clay.

Due to the presence of the silty clay deposit, permissible grade raise restrictions have been provided for this site. The permissible grade raise recommendations are discussed in Subsection 5.3.

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

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing organic materials, should be stripped from under any buildings, paved areas, pipe bedding and other settlement-sensitive structures. Care should be taken not to disturb adequate bearing soils below the founding level during site preparation activities. Disturbance of the subgrade may result in having to sub-excavate the disturbed material and the placement of additional suitable fill material.

Fill Placement

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

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

5.3 Foundation Design

Bearing Resistance Values

Strip footings, up to 3 m wide, and pad footings, up to 5 m wide, placed on an undisturbed, stiff silty clay bearing surface, or engineered fill which is placed directly over an undisturbed, stiff silty clay bearing surface, can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **225 kPa**. A geotechnical resistance factor of 0.5 is applied to the above noted bearing resistance value at ULS.

An undisturbed soil bearing surface consists of a surface from which all topsoil and deleterious materials, such as loose, frozen, or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of concrete for footings.

The bearing resistance value 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 edges of the footing, at a minimum of 1.5H:1V, passes only through in situ soil or engineered fill of the same or higher capacity as that of the bearing medium.

Permissible Grade Raise

Consideration must also 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 buildings, a minimum value of 50% of the live load is often recommended by Paterson. A post-development groundwater lowering of 0.5 m was assumed.

Our permissible grade raise recommendations for the proposed development are presented in Drawing PG6406-2 – Permissible Grade Raise Plan in Appendix 2.

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

5.4 Design for Earthquakes

For foundations constructed at the subject site, the site class for seismic site response can be taken as **Class E**, according to the Ontario Building Code (OBC) 2012. The soils underlying the subject site are not susceptible to liquefaction.

Reference should be made to the latest revision of the OBC 2012 for a full discussion of the earthquake design requirements.

5.5 Slab on Grade Construction

With the removal of all topsoil and deleterious fill within the footprints of the proposed buildings, the native soils or approved engineered fill pad will be considered an acceptable subgrade upon which to commence backfilling for floor slab construction.

Any soft areas should be removed and backfilled with appropriate backfill material. OPSS Granular B Types I or II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slabs (outside the zones of influence of the footings).

For structures with basement slabs, it is recommended that the upper 200 mm of subfloor fill consists of 19 mm clear crushed stone. For any structures with slab-on-grade construction, the upper 200 mm of sub-slab fill is recommended to consist of OPSS Granular A crushed stone.

5.6 Pavement Structure

For design purposes, the pavement structure presented in Tables 4 and 5 can be used for the design of car parking areas and access lanes/heavy truck parking areas.

Table 4 - Recommended Pavement Structure - Car-Only Parking Areas

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

Table 5 - Recommended Pavement Structure – Access Lanes & Local 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 - OPSS Granular B Type I or II material placed over in situ soil or engineered fill	

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.

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project. The pavement granular base and subbase should be placed in a maximum of 300 mm thick lifts and compacted to a minimum of 99% 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.

Due to the low permeability of the subgrade materials consideration should be given to installing subdrains during the pavement construction, as per City of Ottawa standards. The subdrain inverts should be approximately 300 mm below the subgrade level. 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

A perimeter foundation drainage system is recommended for each proposed structure. Each system should consist of a 100 to 150 mm diameter, geotextile-wrapped, perforated and corrugated plastic pipe which is surrounded by 150 mm of 19 mm clear crushed stone and is placed at the footing level around the exterior perimeter of each structure. Each pipe should have a positive outlet, such as a gravity connection to the storm sewer.

Backfill against the exterior sides of the foundation walls should consist of free draining, non-frost susceptible granular materials. The site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill unless a composite drainage system (such as system Miradrain G100N or Delta Drain 6000) connected to a drainage system is provided. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material should otherwise be used for this purpose.

6.2 Protection of Footings Against Frost Action

Perimeter footings of heated structures are recommended to be insulated against the deleterious effects of frost action. A minimum 1.5 m thick soil cover, or an equivalent combination of soil cover and foundation insulation, should be provided in this regard.

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

6.3 Excavation Side Slopes

The side slopes of excavations in the overburdened materials should either be cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is anticipated that sufficient space will be available for the greater part of the excavations to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below the groundwater level.

The subsoil at this site is considered to be mainly a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

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

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

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

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications and Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa.

The pipe bedding for sewer and water pipes placed on a relatively dry, undisturbed subgrade surface 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 bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe, should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm. The bedding and cover materials should be placed in a maximum of 225 mm thick lifts compacted to 99% of the material’s standard Proctor maximum dry density.

It should generally be possible to re-use the upper portion of the dry to moist (not wet) silty clay above the cover material if the excavation and filling operations are carried out in dry weather conditions. Wet silty clay should be given a sufficient drying period to decrease its moisture content to an acceptable level to make compaction possible prior to being reused.

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 reduce potential differential frost heaving. The backfill should be placed in a maximum of 225 mm thick loose lifts and compacted to a minimum of 95% of the material’s SPMDD.

To reduce the 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 and should extend from trench wall to trench wall. Generally, the seals should extend from the frost line and fully penetrate the bedding, sub-bedding and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in a maximum of 225 mm thick loose layers and compacted to a minimum of 95% of the material's SPMDD. The clay seals should be placed at the site boundaries and strategic locations at no more than 60 m intervals in the service trenches.

6.5 Groundwater Control

Based on our observations, it is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. The contractor should be prepared to direct water away from all subgrades, regardless of the source, to prevent disturbance to the founding medium.

Permit to Take Water

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 Person as stipulated under O.Reg. 63/16.

If a project qualifies for a PTTW based on anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at the founding level.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost into the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions.

6.7 Corrosion Potential and Sulphate

The results of analytical testing on the sample, BH 4-22 – SS3, show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (normal cement) would be appropriate for this site. The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a low to slightly aggressive corrosive environment.

6.8 Landscaping Considerations

Tree Planting Setbacks

In general accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines), Paterson completed a soils review of the site to determine applicable tree planting setbacks. Atterberg limits testing and grain size distribution analysis were completed for recovered silty clay samples at selected locations throughout the subject site. The above noted test results were completed between the anticipated underside of footing elevation and a 3.5 m depth below the expected finished grade. The results of our testing are presented in Tables 1 and 2 in Section 4.2 and in Appendix 1.

A medium to high sensitivity clay soil was encountered between the anticipated underside of footing elevations and 3.5 m below anticipated finished grades at the subject site. Based on our Atterberg Limits test results, the plasticity index limit exceeds 40% across the subject site. Therefore, the following tree planting setbacks are recommended for the medium to high-sensitivity areas.

Large trees (mature height over 14 m) can be planted within this area 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). A tree planting setback limit of **7.5 m** is applicable for small (mature tree height up to 7.5 m) and medium size trees (mature tree height 7.5 m to 14 m) provided that the following conditions 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), as noted on the subdivision Grading Plan.

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 per 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 a proposed deck or addition should not exceed permissible grade raises. Otherwise, standard construction practices are considered acceptable.

7.0 Recommendations

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

☐ Review the final grading plan, from a geotechnical perspective.

☐ Observation of all bearing surfaces prior to the placement of concrete.

☐ Sampling and testing of the concrete and fill materials.

☐ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.

☐ Observation of all subgrades prior to backfilling.

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

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

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

All excess soils, with the exception of engineered crushed stone fill, generated by construction activities that will be transported on-site or off-site should be handled as per *Ontario Regulation 406/19: On-Site and Excess Soil Management*.

8.0 Statement of Limitations

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

The soils investigation by others is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations by others, 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 Richcraft, 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.

LICENSED PROFESSIONAL ENGINEER
October 10, 2024
S. S. DENNIS
100519516
PROVINCE OF ONTARIO

Scott Dennis

Otillia McLaughlin B.Eng.

Scott S. Dennis, P.Eng.

Report Distribution:

- ☐ Richcraft (e-mail copy)
- ☐ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ATTERBERG LIMITS TEST RESULTS

GRAIN SIZE DISTRIBUTION ANALYSIS RESULT

SHRINKAGE TEST RESULT

ANALYTICAL TEST RESULTS

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Trails Edge West
Block 140 - Ottawa, Ontario

DATUM Geodetic

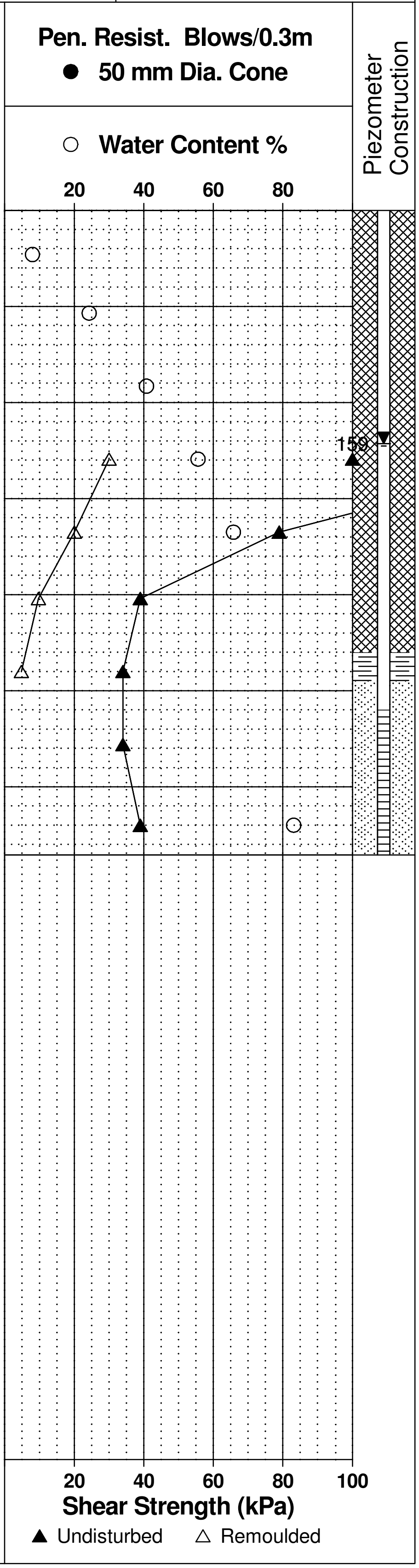
REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** September 9, 2022

FILE NO. PG6406

HOLE NO. BH 1-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD		
GROUND SURFACE						0	87.78
TOPSOIL 0.10							
FILL: Brown silty sand with gravel and crushed stone, some clay, trace organics 0.76		AU	1				
		SS	2	75	10	1	86.78
FILL: Grey-brown silty clay, trace sand, gravel and organics 1.32							
		SS	3	83	8	2	85.78
		SS	4	88	P		
Very stiff to stiff, brown **SILTY CLAY**						3	84.78
		SS	5	83	P		
- firm and grey by 3.7m depth						4	83.78
						5	82.78
						6	81.78
6.71		SS	6	92	P		
End of Borehole (GWL @ 2.43m - Sept. 22, 2022)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Trails Edge West
Block 140 - Ottawa, Ontario

DATUM Geodetic

REMARKS

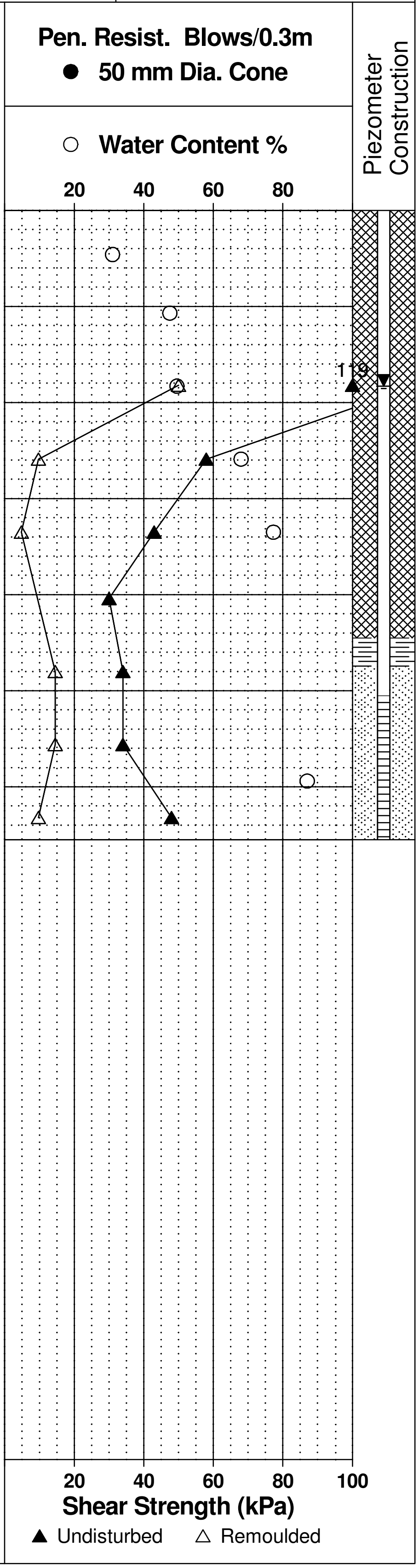
BORINGS BY CME-55 Low Clearance Drill

DATE September 9, 2022

FILE NO. PG6406

HOLE NO. BH 2-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	86.99
TOPSOIL 0.08		AU	1				
		SS	2	83	7	1	85.99
Very stiff to stiff, brown **SILTY CLAY**		SS	3	8	P	2	84.99
- firm and grey by 2.7m depth		SS	4	88	P	3	83.99
		SS	5	88	P	4	82.99
						5	81.99
		G	6			6	80.99
6.55							
End of Borehole (GWL @ 1.83m - Sept. 22, 2022)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Trails Edge West
Block 140 - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE September 9, 2022

FILE NO. **PG6406**

HOLE NO. **BH 3-22**

SOIL DESCRIPTION

GROUND SURFACE

TOPSOIL 0.15

Very stiff to stiff, brown **SILTY CLAY**

- firm and grey by 3.0m depth

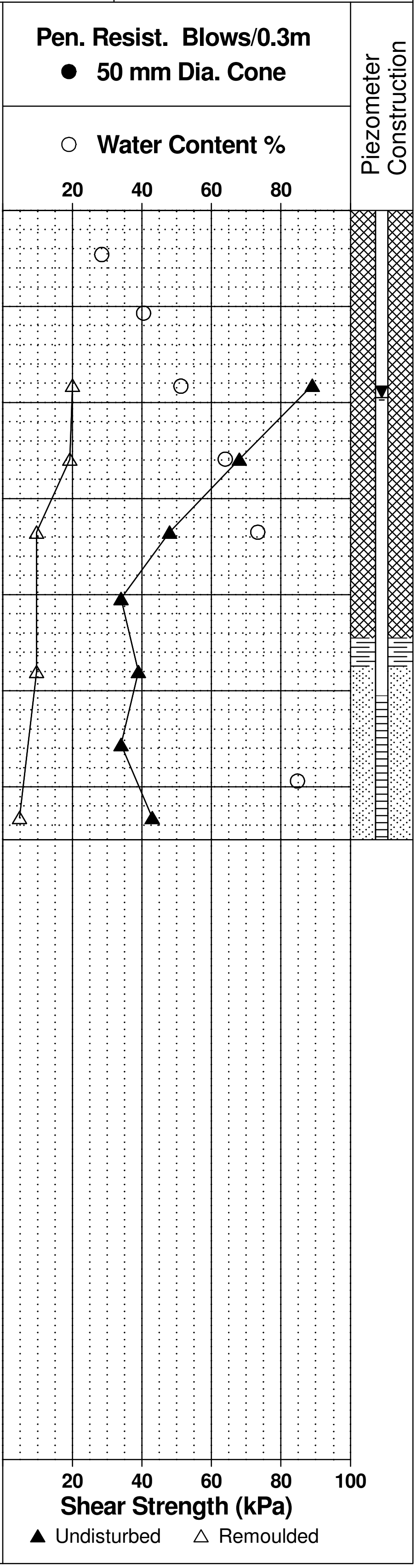
6.55

End of Borehole

(GWL @ 1.95m - Sept. 22, 2022)

SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD
AU	1		
SS	2	83	10
SS	3	88	P
SS	4	83	P
SS	5	83	P
G	6		

DEPTH (m)	ELEV. (m)
0	87.32
1	86.32
2	85.32
3	84.32
4	83.32
5	82.32
6	81.32



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Trails Edge West
Block 140 - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

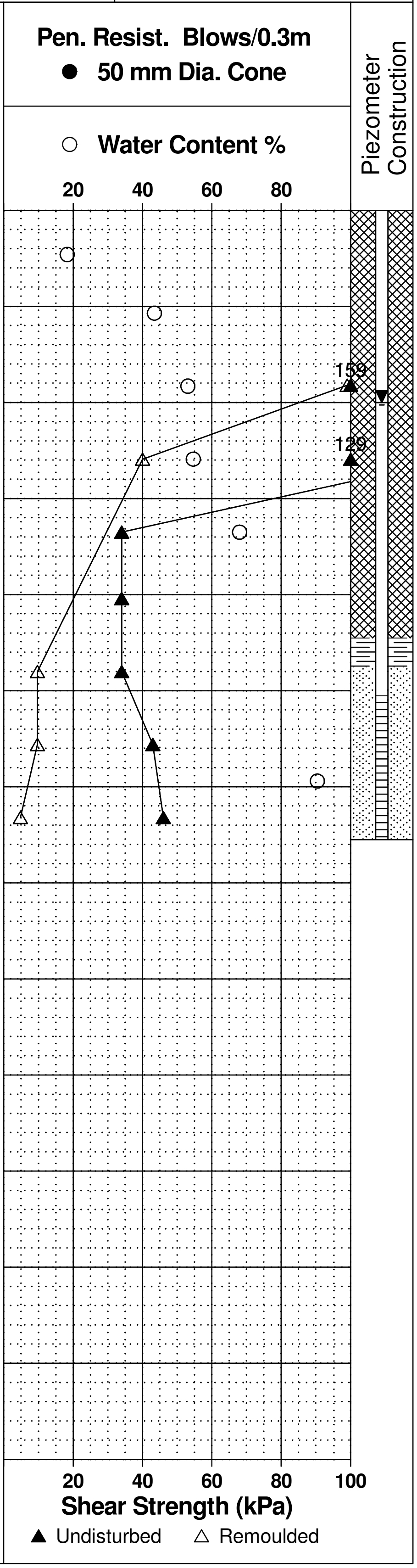
DATE September 9, 2022

FILE NO. **PG6406**

HOLE NO. **BH 4-22**

SOIL DESCRIPTION	TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE				
TOPSOIL 0.20	AU	1		
Very stiff to stiff, brown **SILTY CLAY,** trace sand	SS	2	75	11
	SS	3	92	P
	SS	4	75	P
- firm and grey by 3.0m depth	SS	5	75	P
6.55	G	6		
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed to 20.1m depth.				

DEPTH (m)	ELEV. (m)
0	87.17
1	86.17
2	85.17
3	84.17
4	83.17
5	82.17
6	81.17
7	80.17
8	79.17
9	78.17
10	77.17
11	76.17
12	75.17
13	74.17



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Trails Edge West
Block 140 - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** September 9, 2022

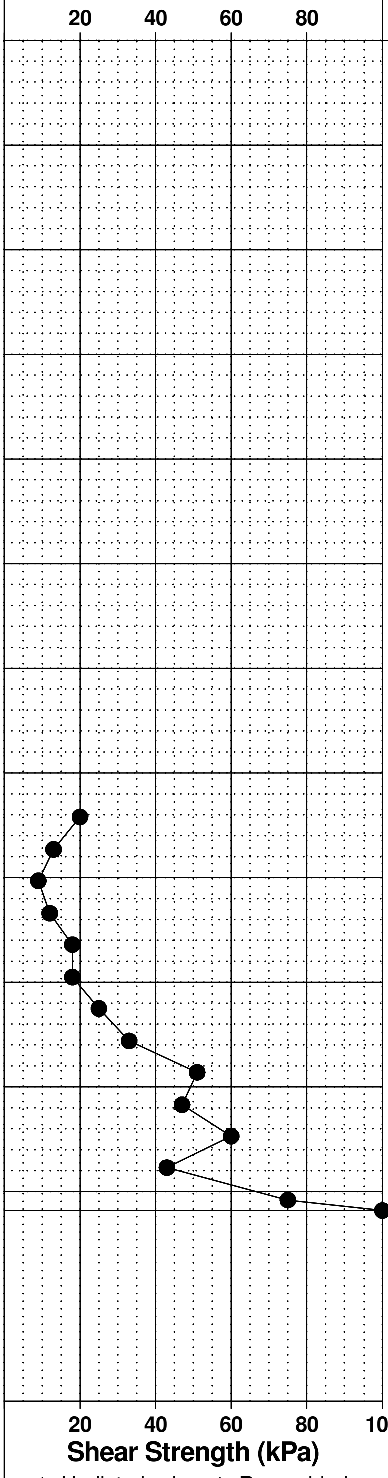
FILE NO. PG6406

HOLE NO. BH 4-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						13	74.17
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed to 20.1m depth.						14	73.17
						15	72.17
						16	71.17
						17	70.17
						18	69.17
						19	68.17
						20	67.17
						21	66.17
						22	65.17
						23	64.17
24.18						24	63.17
End of Borehole Practical DCPT refusal at 24.18m depth (GWL @ 2.00m - Sept. 22, 2022)							

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

○ Water Content %



Shear Strength (kPa)

▲ Undisturbed △ Remoulded

Piezometer Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
Proposed Residential Development - Trail's Edge
Renaud Road, Ottawa, Ontario

DATUM Geodetic

FILE NO. **PG2392**

REMARKS

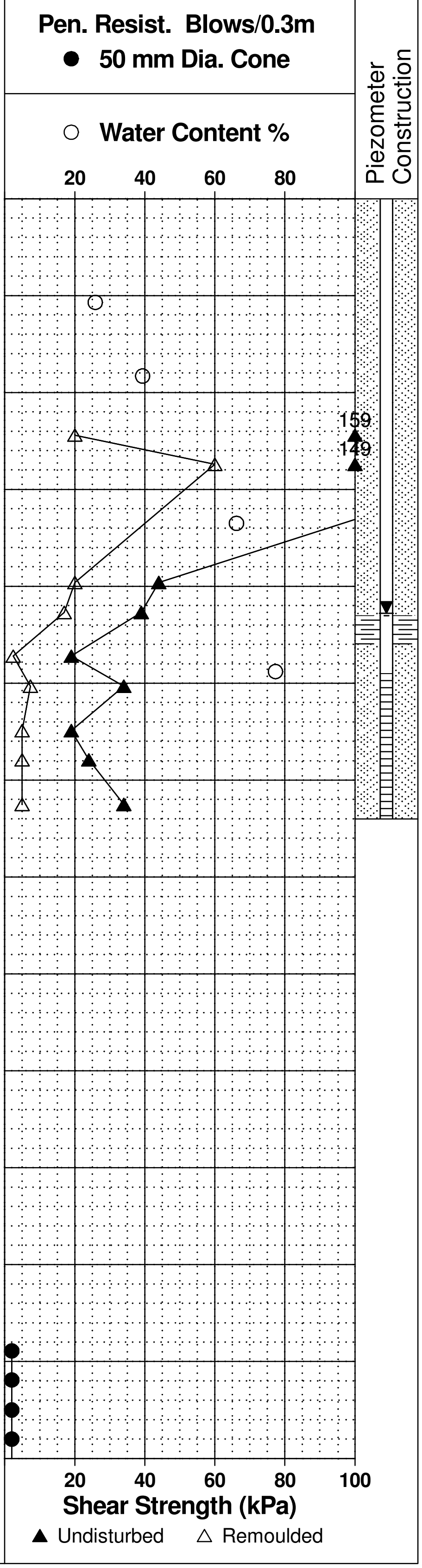
HOLE NO. **BH 4-20**

BORINGS BY Track-Mount Power Auger

DATE May 7, 2020

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD
GROUND SURFACE				
FILL: Brown silty clay, trace organics, gravel and cobbles 0.60	AU	1		
Brown **SILTY CLAY,** trace sand and organics 1.52	SS	2	58	9
Very stiff to stiff, grey-brown **SILTY CLAY** - firm and grey by 3.0m depth 6.40	SS	3	100	7
	SS	4	100	2
Dynamic Cone Penetration Test commenced at 6.40m depth. Cone pushed to 11.3m depth.				

DEPTH (m)	ELEV. (m)
0	87.57
1	86.57
2	85.57
3	84.57
4	83.57
5	82.57
6	81.57
7	80.57
8	79.57
9	78.57
10	77.57
11	76.57
12	75.57
13	74.57



SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
Proposed Residential Development - Trail's Edge
Renaud Road, Ottawa, Ontario

DATUM Geodetic

REMARKS

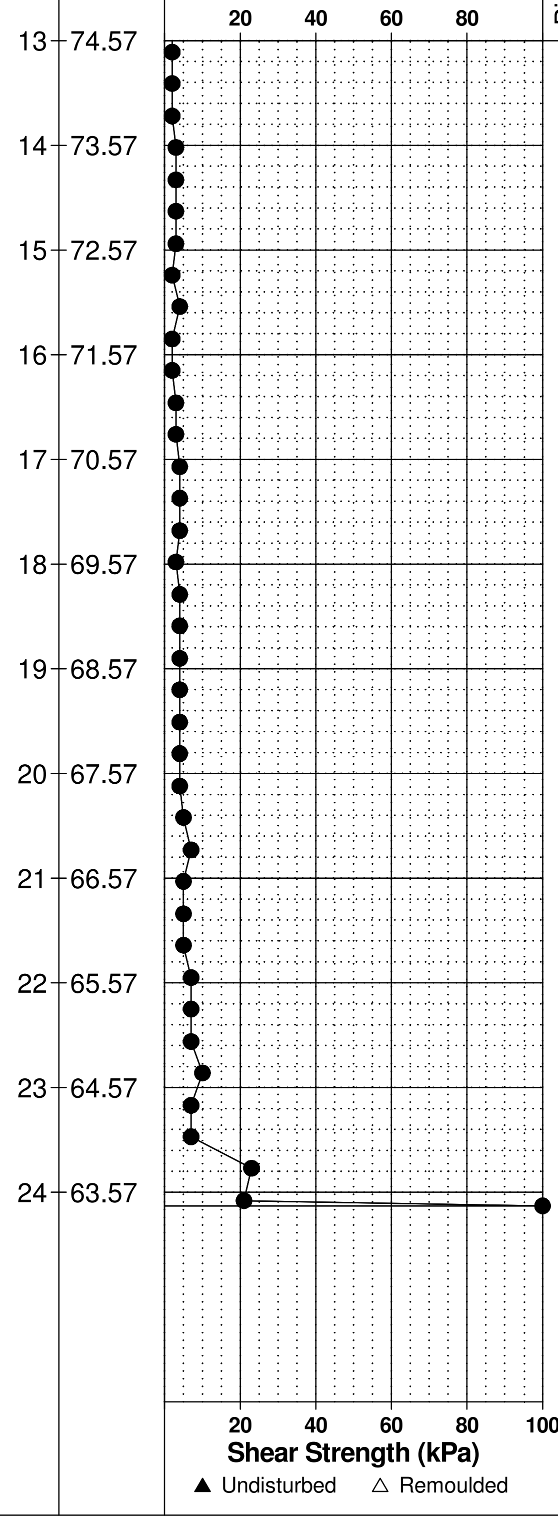
BORINGS BY Track-Mount Power Auger

DATE May 7, 2020

FILE NO. PG2392

HOLE NO. BH 4-20

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	Piezometer Construction
GROUND SURFACE						13	74.57		
						14	73.57		
						15	72.57		
						16	71.57		
						17	70.57		
						18	69.57		
						19	68.57		
						20	67.57		
						21	66.57		
						22	65.57		
						23	64.57		
24.13						24	63.57		
End of Borehole Practical DCPT refusal at 24.13m depth. (GWL @ 4.28m - May 29, 2020)									



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development-Trails Edge Phase 2
Ottawa, Ontario

DATUM Ground surface provided by Annis, O'Sullivan, Vollebekk Limited.

REMARKS

BORINGS BY CME 55 Power Auger

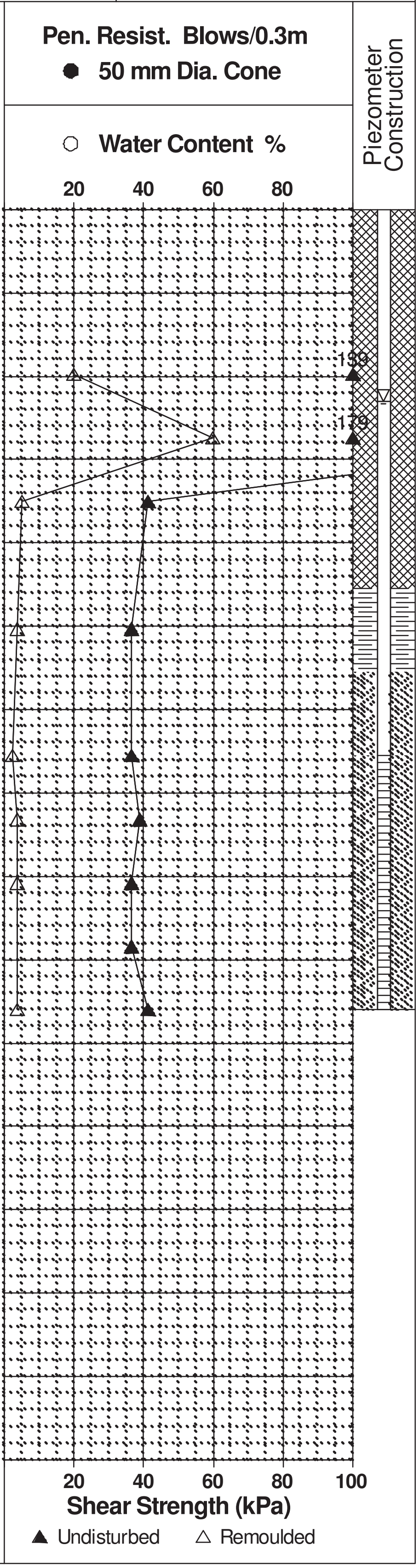
DATE 17 August 2011

FILE NO. PG2392

HOLE NO. BH10

SOIL DESCRIPTION	Depth to base (m)	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE						
TOPSOIL	0.20		AU	1		
Brown **SILTY CLAY** with sand, trace gravel	0.69					
Very stiff to stiff, brown **SILTY CLAY**	3.30		SS	2	92	7
Firm, grey **SILTY CLAY**	9.60		TW TW	2 3		
Dynamic Cone Penetration Test commenced @ 25.27m depth. Cone pushed to 22.7m depth.						

DEPTH (m)	ELEV. (m)
0	86.97
1	85.97
2	84.97
3	83.97
4	82.97
5	81.97
6	80.97
7	79.97
8	78.97
9	77.97
10	76.97
11	75.97
12	74.97
13	73.97
14	72.97
15	71.97



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development-Trails Edge Phase 2
Ottawa, Ontario

DATUM Ground surface provided by Annis, O'Sullivan, Vollebekk Limited.

REMARKS

BORINGS BY CME 55 Power Auger

DATE 17 August 2011

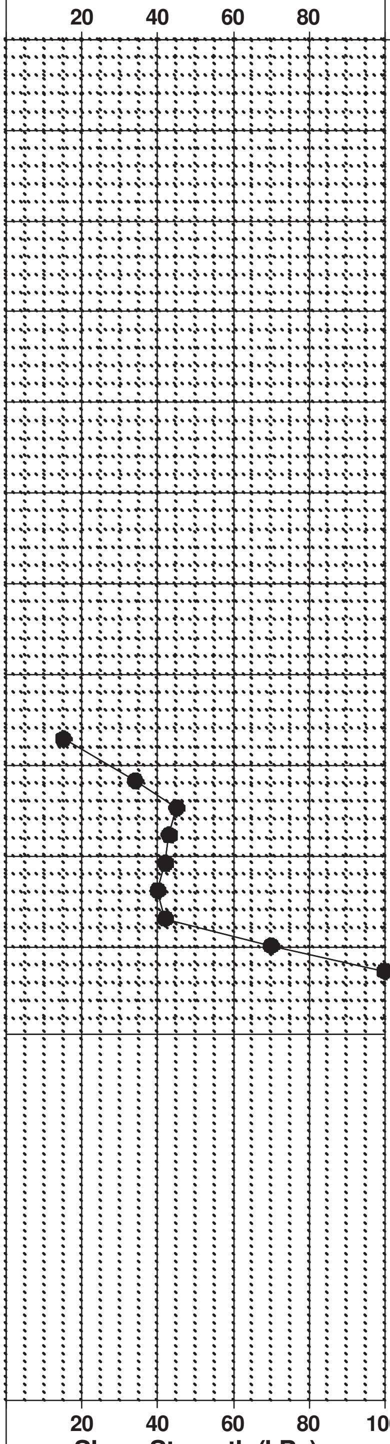
FILE NO. PG2392

HOLE NO. BH10

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Piezometer Construction
GROUND SURFACE								
						15	71.97	
						16	70.97	
						17	69.97	
						18	68.97	
						19	67.97	
						20	66.97	
						21	65.97	
						22	64.97	
						23	63.97	
						24	62.97	
25.27						25	61.97	
End of Borehole Practical cone refusal @ 25.27m depth (GWL @ 2.3m depth based on field observations)								

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

○ Water Content %



Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Residential Development-Renaud Road
Ottawa, Ontario

DATUM

REMARKS

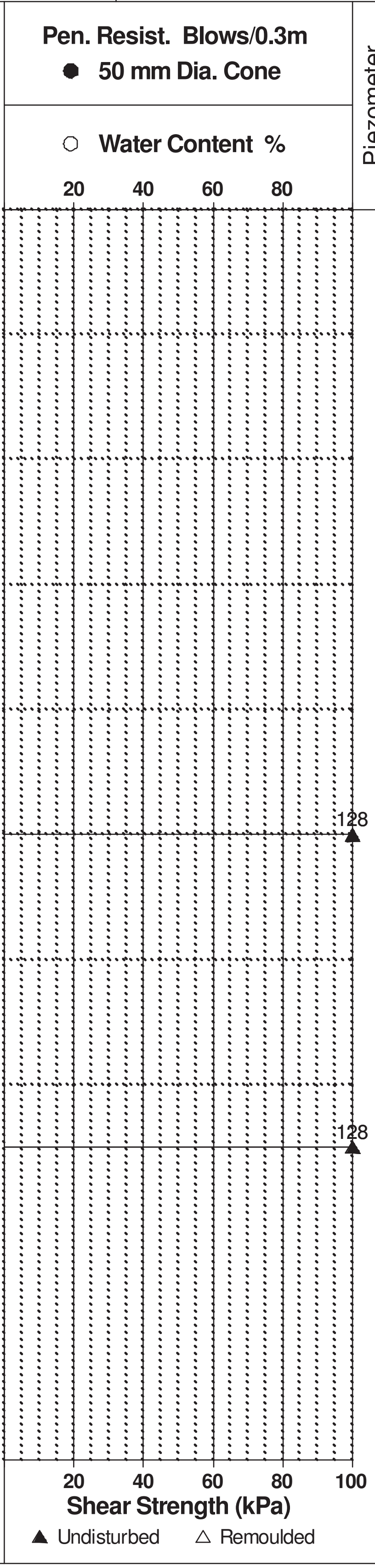
BORINGS BY Hand Auger

DATE 11 May 2009

FILE NO. PG1605

HOLE NO. HA 5-09

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Piezometer Construction
GROUND SURFACE						0		
TOPSOIL 0.30	■							
Very stiff, brown **SILTY CLAY** 1.60	▨					1		
End of Hand Auger Hole								



patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Renaud Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

FILE NO. **PG0861**

REMARKS

HOLE NO. **BH11-08**

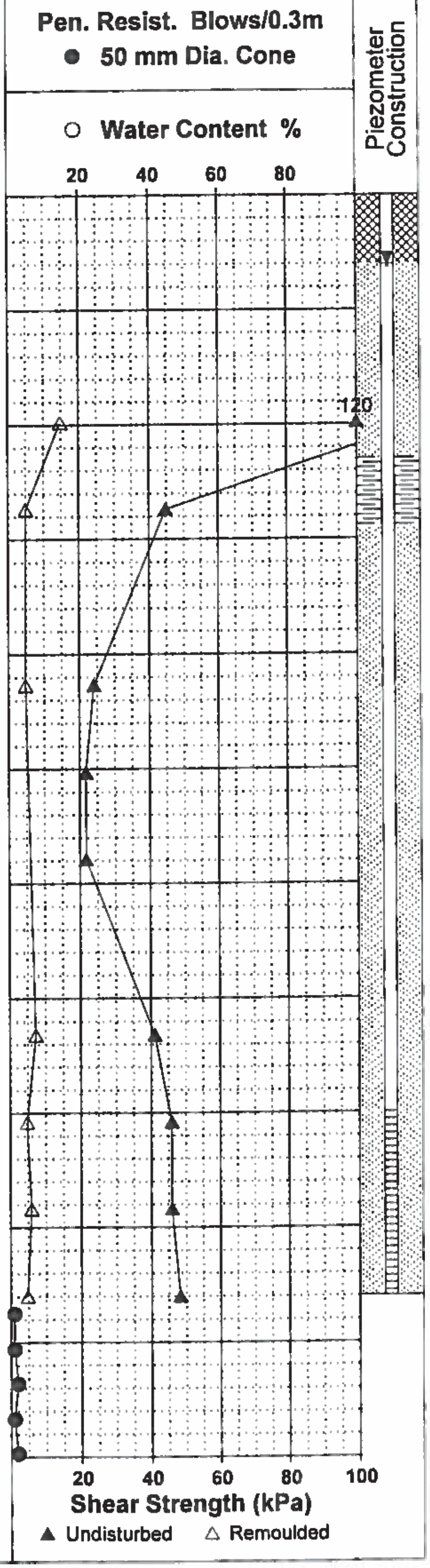
BORINGS BY CME 55 Power Auger

DATE 7 Aug 08

SOIL DESCRIPTION	DEPTH (m)
GROUND SURFACE	
TOPSOIL	0.20
Very stiff to stiff, brown **SILTY CLAY** - firm and grey by 2.9m depth	9.60
Dynamic Cone Penetration Test commenced @ 9.60m depth Inferred **SILTY CLAY**	

SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
SS	1		9
TW	2	88	
TW	3	100	

DEPTH (m)	ELEV. (m)
0	87.14
1	86.14
2	85.14
3	84.14
4	83.14
5	82.14
6	81.14
7	80.14
8	79.14
9	78.14
10	77.14
11	76.14



patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Renaud Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

FILE NO. PG0861

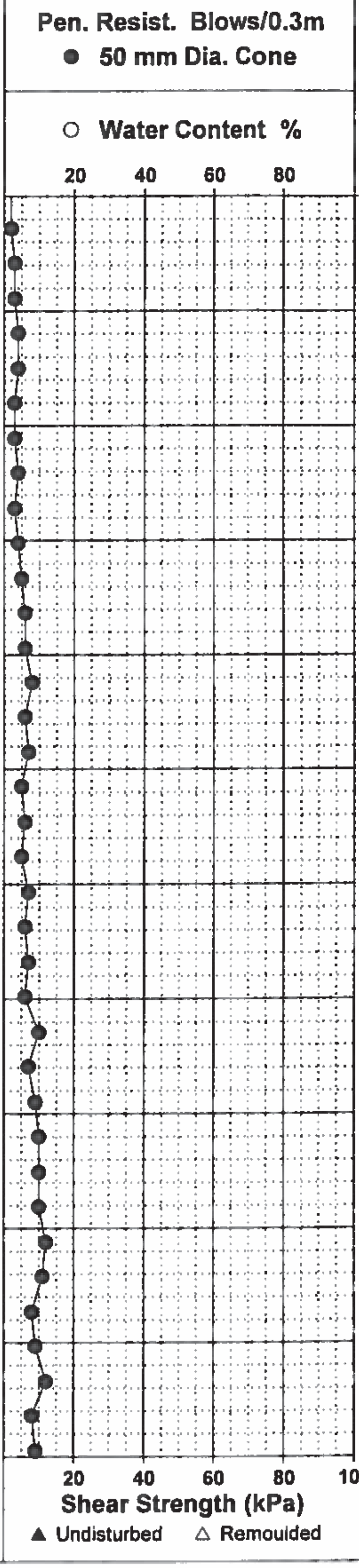
REMARKS

HOLE NO. BH11-08

BORINGS BY CME 55 Power Auger

DATE 7 Aug 08

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
	▨					11	76.14
	▨					12	75.14
	▨					13	74.14
	▨					14	73.14
	▨					15	72.14
Inferred **SILTY CLAY**	▨					16	71.14
	▨					17	70.14
	▨					18	69.14
	▨					19	68.14
	▨					20	67.14
	▨					21	66.14
	▨					22	65.14



Piezometer Construction

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Renaud Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

REMARKS

BORINGS BY CME 55 Power Auger

DATE 7 Aug 08

FILE NO. PG0861

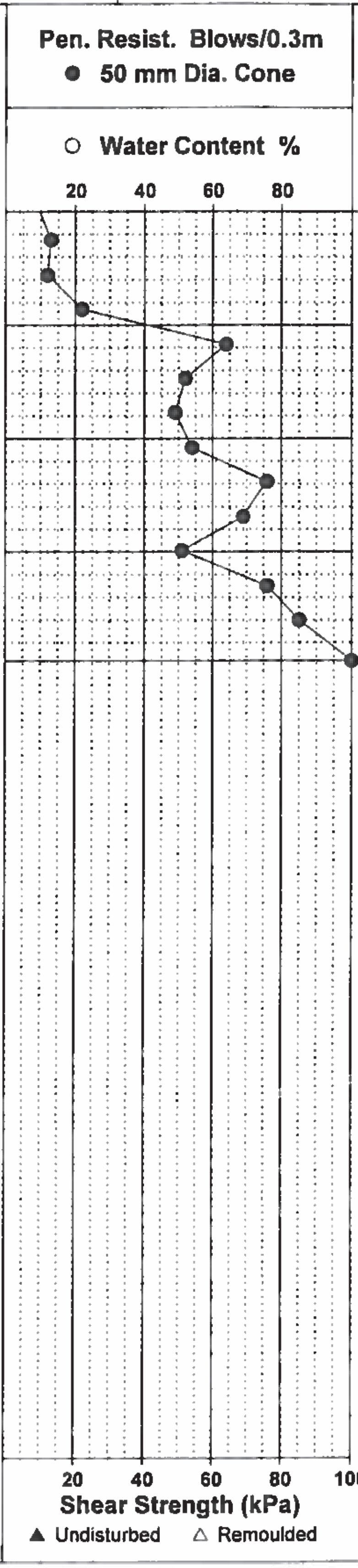
HOLE NO. BH11-08

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Piezometer Construction
GROUND SURFACE						22	65.14	
Inferred **SILTY CLAY** 22.90	▨					23	64.14	
Inferred **GLACIAL TILL**	⁂					24	63.14	
25.96	⁂					25	62.14	

End of Borehole

Practical DCPT refusal @ 25.96m depth

(GWL @ 0.61m-Aug. 28/08)



patersongroup Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Renaud Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

REMARKS

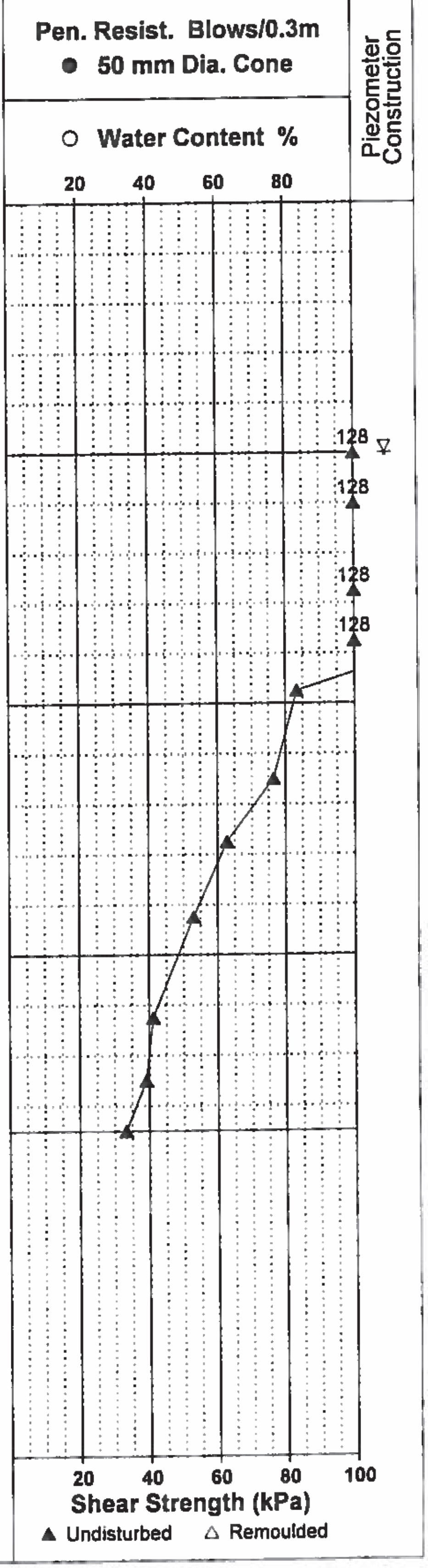
BORINGS BY Hydraulic Shovel

DATE 28 Aug 08

FILE NO. PG0861

HOLE NO. TP11-08

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	87.14
TOPSOIL 0.20	■						
Very stiff to stiff, brown **SILTY CLAY**	▨					1	86.14
						2	85.14
- stiff to firm and grey by 2.9m depth	▨					3	84.14
3.70							
End of Test Pit (GWL @ 1.0m-Aug. 28/08)							



SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC% - Natural moisture content or water content of sample, %
LL - Liquid Limit, % (water content above which soil behaves as a liquid)
PL - Plastic limit, % (water content above which soil behaves plastically)
PI - Plasticity index, % (difference between LL and PL)

Dxx - Grain size which xx% of the soil, by weight, is of finer grain sizes
These grain size descriptions are not used below 0.075 mm grain size
D10 - Grain size at which 10% of the soil is finer (effective grain size)
D60 - Grain size at which 60% of the soil is finer

Cc - Concavity coefficient = $(D30)^2$ / (D10 x D60)
Cu - Uniformity coefficient = D60 / D10

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

CONSOLIDATION TEST

p'_o - Present effective overburden pressure at sample depth
p'_c - Preconsolidation pressure of (maximum past pressure on) sample
Ccr - Recompression index (in effect at pressures below p'_c)
Cc - Compression index (in effect at pressures above p'_c)

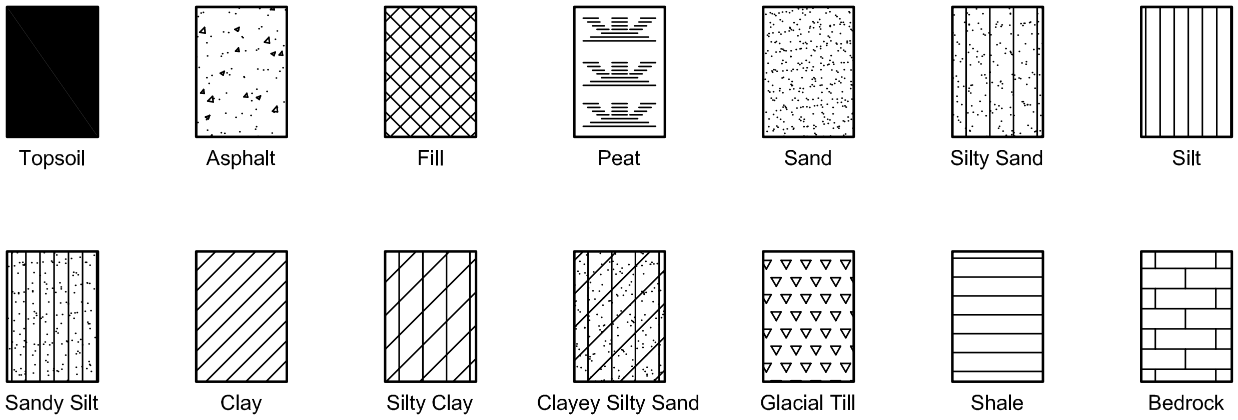
OC Ratio Overconsolidaton ratio = p'_c / p'_o
Void Ratio Initial sample void ratio = volume of voids / volume of solids
Wo - Initial water content (at start of consolidation test)

PERMEABILITY TEST

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

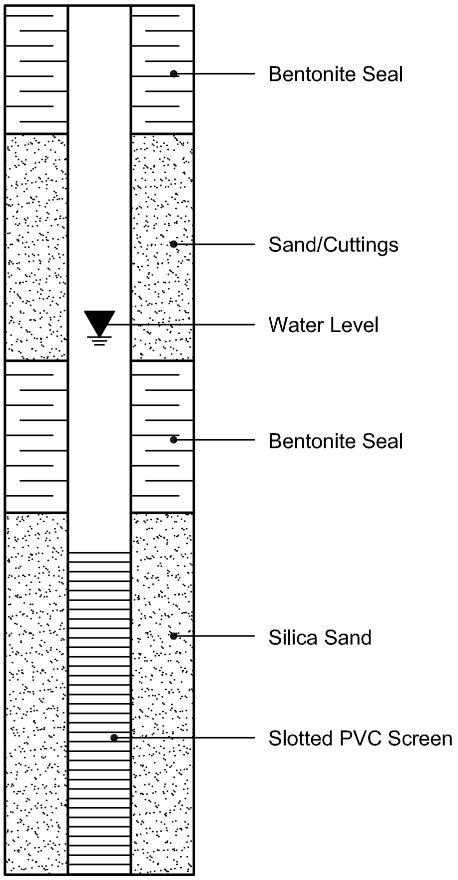
SYMBOLS AND TERMS (continued)

STRATA PLOT

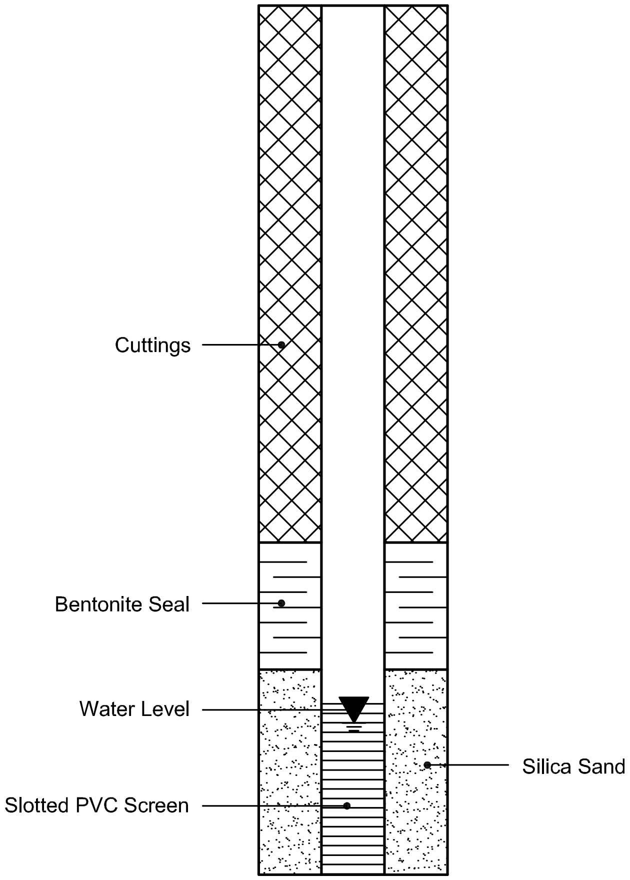


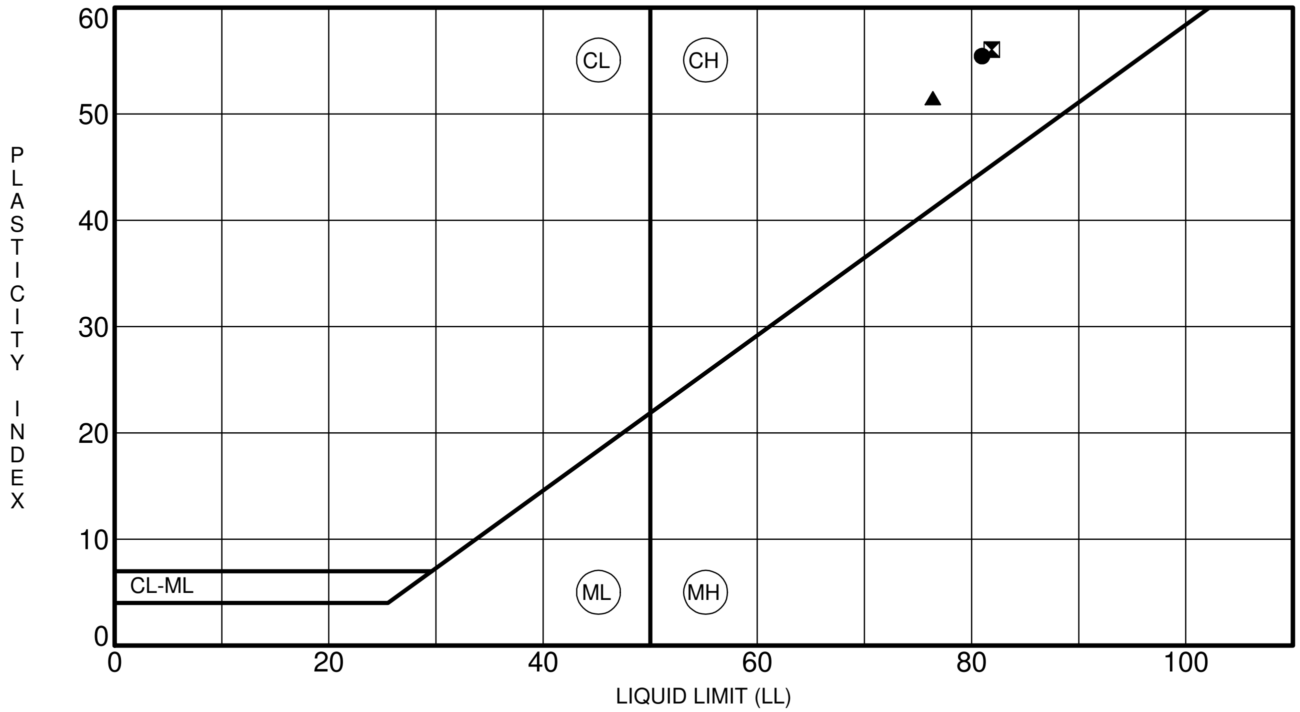
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION





Specimen Identification			LL	PL	PI	Fines	Classification
●	**BH 1-22**	**SS4**	**81**	**26**	**55**		**CH - Inorganic clays of high plasticity**
⧗	**BH 3-22**	**SS4**	**82**	**26**	**56**		**CH - Inorganic clays of high plasticity**
▲	**BH 4-22**	**SS4**	**76**	**25**	**52**		**CH - Inorganic clays of high plasticity**

CLIENT **Richcraft Homes**

PROJECT **Geotechnical Investigation - Prop. Residential Development - Trails Edge West**

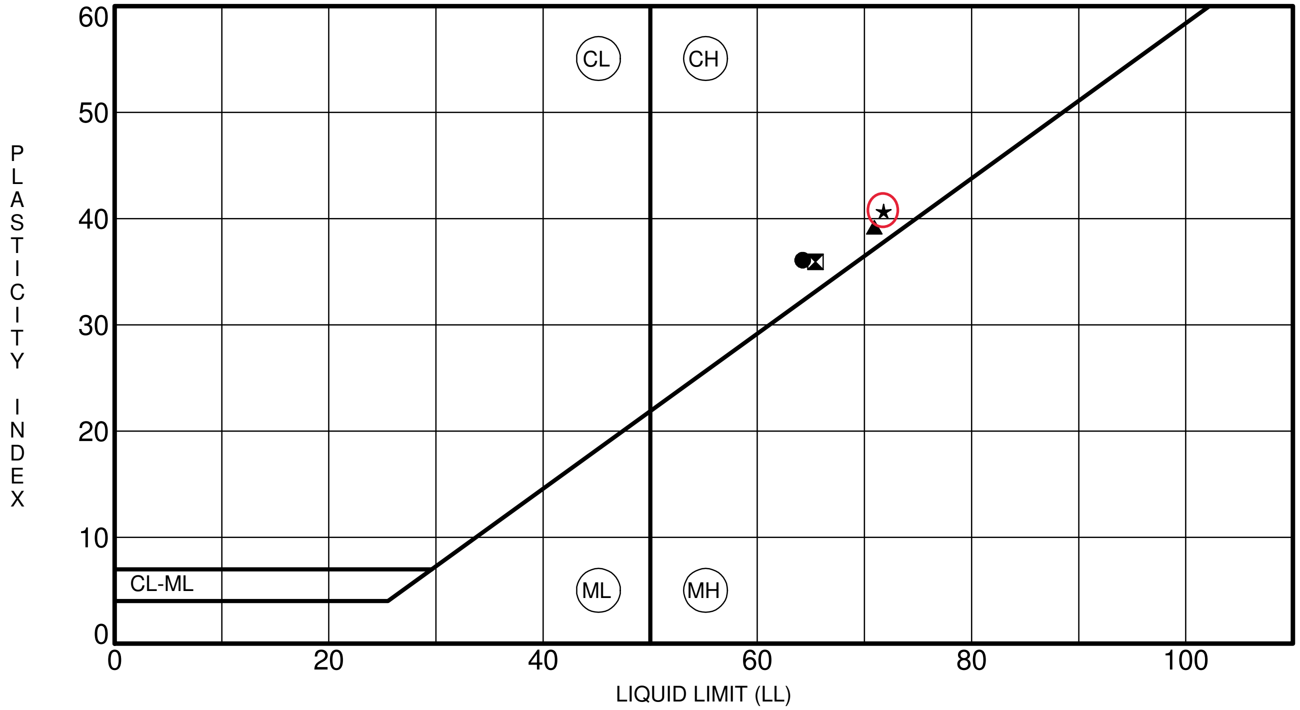
FILE NO. **PG6406**

DATE **9 Sep 22**

patersongroup **Consulting Engineers**

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

ATTERBERG LIMITS' RESULTS



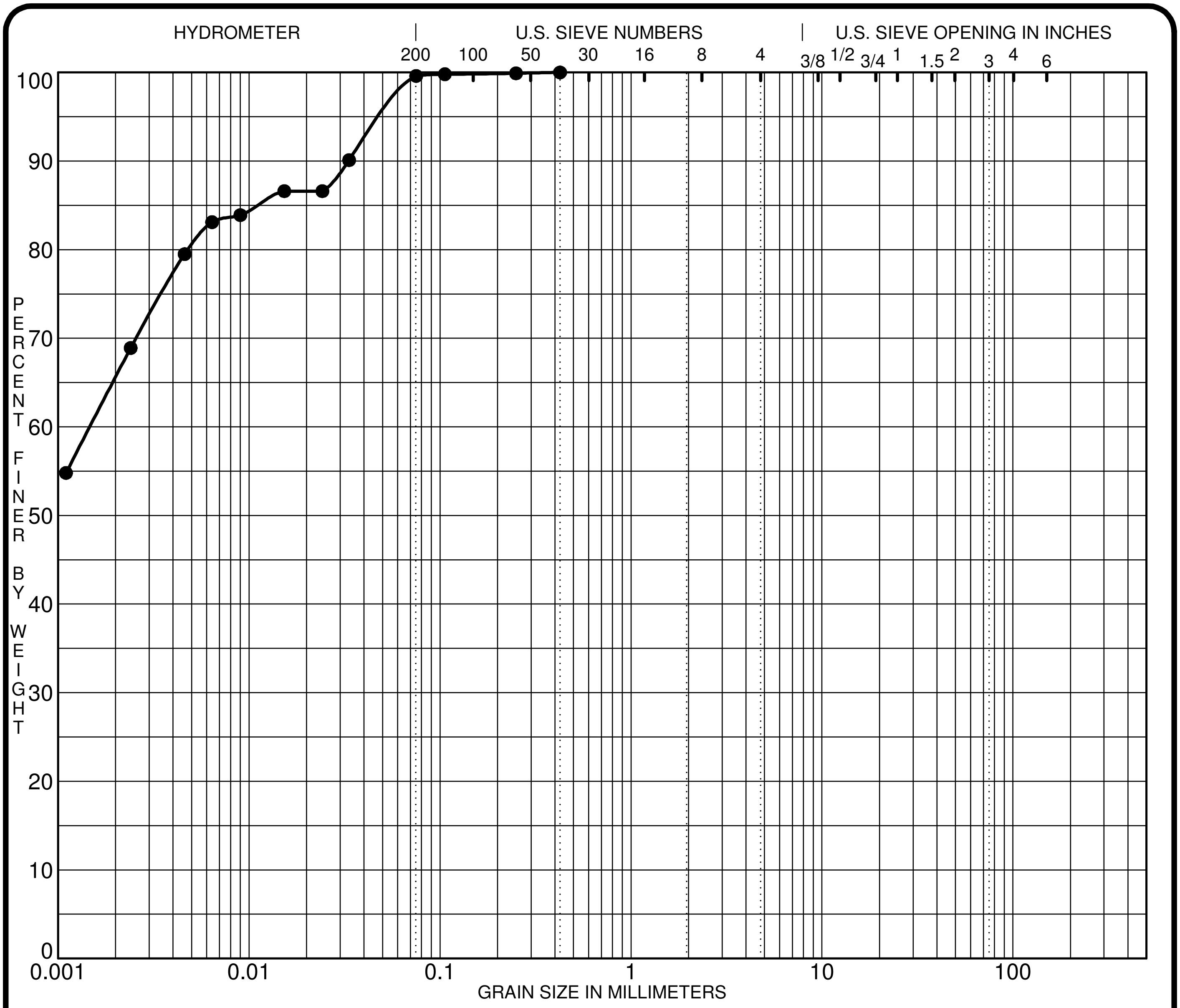
	Specimen Identification		LL	PL	PI	Fines	Classification
●	**BH 1-20**	**SS 3**	**64**	**28**	**36**		**CH - Inorganic clays of high plasticity**
⧗	**BH 2-20**	**SS 3**	**65**	**29**	**36**		**CH - Inorganic clays of high plasticity**
▲	**BH 3-20**	**SS 3**	**71**	**32**	**39**		**CH - Inorganic clays of high plasticity**
★	**BH 4-20**	**SS 3**	**72**	**31**	**41**		**CH - Inorganic clays of high plasticity**

CLIENT **Minto Communities Inc.**
PROJECT **Supplemental Geotechnical Investigation -**
Proposed Residential Development - Trail's Edge

FILE NO. **PG2392**
DATE **7 May 20**

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

ATTERBERG LIMITS' RESULTS



SILT OR CLAY	SAND			GRAVEL		COBBLES
	fine	medium	coarse	fine	coarse	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 3-22**	**SS3**	**CH - Inorganic clays of high plasticity**						
☒									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 3-22**	**SS3**	**0.43**	**0.00**			**0.0**	**0.4**	**99.6**	
☒										
▲										
★										

CLIENT **Richcraft Homes**

FILE NO. **PG6406**

PROJECT **Geotechnical Investigation - Prop. Residential Development - Trails Edge West**

DATE **9 Sep 22**

patersongroup **Consulting Engineers**

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

GRAIN SIZE DISTRIBUTION

patersongroup
consulting engineers

Linear Shrinkage
ASTM D4943-02

CLIENT:	Richcraft	DEPTH	5'-0" to 7'-0"	FILE NO.:	PG6406
PROJECT:	Trails Edge West - Block 140	BH OR TP No:	BH-1 SS3	DATE SAMPLED	9-Sep
LAB No:	38433	TESTED BY:	CP / CS	DATE RECEIVED	13-Sep
SAMPLED BY:	D.R	DATE REPORTED:	27-Sep-22	DATE TESTED	22-Sep

LABORATORY INFORMATION & TEST RESULTS

Moisture	No. of Blows(8)
Tare	5.09
Soil Pat Wet + Tare	61.4
Soil Pat Wet	56.31
Soil Pat Dry + Tare	35.35
Soil Pat Dry	30.26
Moisture	**86.09**

Calibration (Two Trials)	Tin NO.(x21)	
Tin	4.83	4.84
Tin + Grease	5.12	5.12
Glass	48.97	48.97
Tin + Glass + Water	94.46	91.48
Volume	40.37	37.39
Average Volume	**38.88**	

Soil Pat + String	30.27
Soil Pat + Wax + String in Air	31.74
Soil Pat + Wax + String in Water	11.79
Volume Of Pat (Vdx)	19.95

RESULTS:

Shrinkage Limit	**18.07**
Shrinkage Ratio	**1.654**
Volumetric Shrinkage	**112.479**
Linear Shrinkage	**22.213**

REVIEWED BY:	**Curtis Beadow**	**Joe Forsyth, P. Eng.**

Certificate of Analysis

Report Date: 19-Sep-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 13-Sep-2022

Client PO: 55763

Project Description: PG6406

Client ID:		BH4-22 SS3	-	-	-	-	-
Sample Date:		09-Sep-22 09:00	-	-	-		
Sample ID:		2238192-01	-	-	-		
Matrix:		Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	66.8	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.43	-	-	-	-	-
Resistivity	0.1 Ohm.m	54.3	-	-	-	-	-
Anions							
Chloride	5 ug/g	<5	-	-	-	-	-
Sulphate	5 ug/g	67	-	-	-	-	-

APPENDIX 2

FIGURE 1 – KEY PLAN

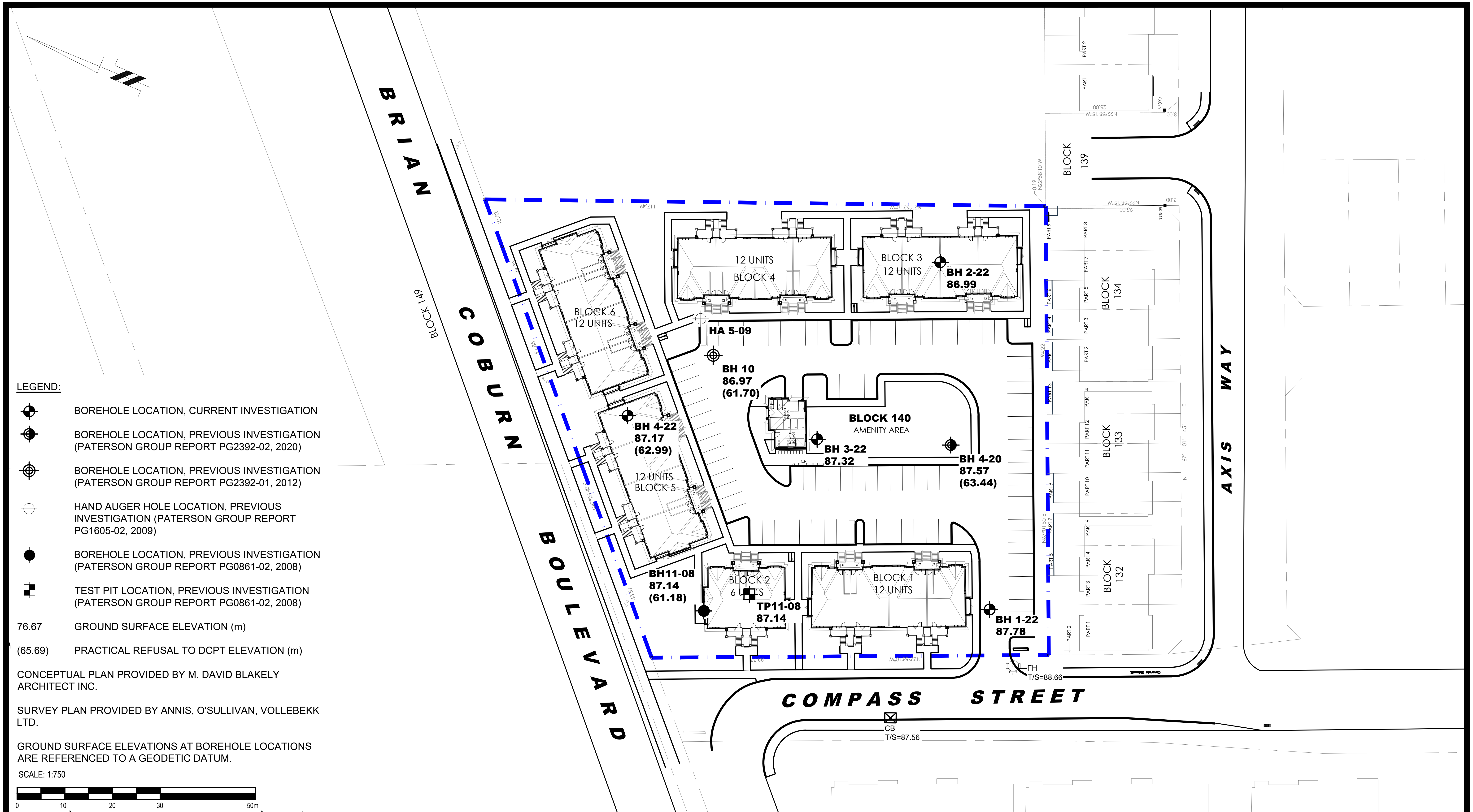
DRAWING PG6406-1 – TEST HOLE LOCATION PLAN

DRAWING PG6406-2 – PERMISSIBLE GRADE RAISE PLAN

FIGURE 1

KEY PLAN

PATERSON GROUP



LEGEND:

⊕	BOREHOLE LOCATION, CURRENT INVESTIGATION
⊕	BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG2392-02, 2020)
⊕	BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG2392-01, 2012)
⊕	HAND AUGER HOLE LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG1605-02, 2009)
●	BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG0861-02, 2008)
▚	TEST PIT LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG0861-02, 2008)
76.67	GROUND SURFACE ELEVATION (m)
(65.69)	PRACTICAL REFUSAL TO DCPT ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY M. DAVID BLAKELY ARCHITECT INC.

SURVEY PLAN PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

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

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7S9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED CONCEPTUAL PLAN	09/10/2024	OM

RICHCRAFT

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
640 COMPASS STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:750	Date: 09/2022
Drawn by: GK	Report No.: PG6406-1
Checked by: SK	Dwg. No.: PG6406-1
Approved by: SD	Revision No.: 1

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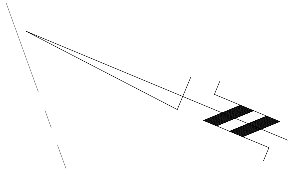
11x17



LEGEND:

⊕ BOREHOLE LOCATION, CURRENT INVESTIGATION

⊕ BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG2392-02, 2020)

⊕ BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG2392-01, 2012)

⊕ HAND AUGER HOLE LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG1605-02, 2009)

● BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG0861-02, 2008)

▚ TEST PIT LOCATION, PREVIOUS INVESTIGATION (PATERSON GROUP REPORT PG0861-02, 2008)

76.67	GROUND SURFACE ELEVATION (m)
(65.69)	PRACTICAL REFUSAL TO DCPT ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY M. DAVID BLAKELY ARCHITECT INC.

SURVEY PLAN PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

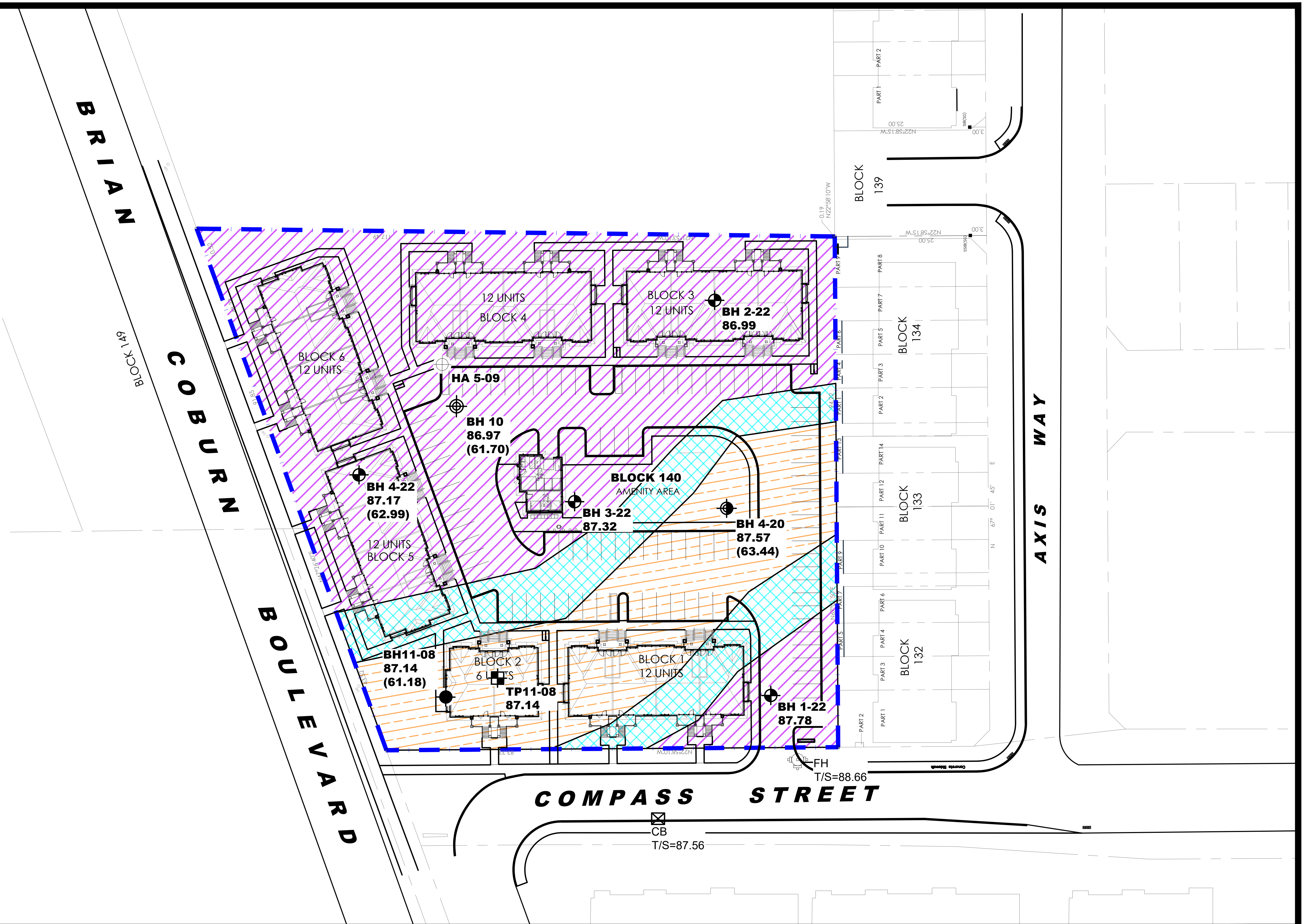
GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

PERMISSIBLE GRADE RAISE

▨	**UP TO 0.5 m**
▨	**UP TO 1.0 m**
▨	**UP TO 1.5 m**

SCALE: 1:750

0 10 20 30 50m



PATERSON GROUP

9 AURIGA DRIVE
OTTAWA, ON
K2E 7S9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED CONCEPTUAL PLAN	09/10/2024	OM

RICHCRAFT

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
640 COMPASS STREET

OTTAWA, ONTARIO

Title:

PERMISSIBLE GRADE RAISE PLAN

Scale: 1:750
Date: 09/2022
Drawn by: GK
Report No.: PG6406-1
Checked by: SK
Dwg. No.: PG6406-2
Approved by: SD
Revision No.: 1

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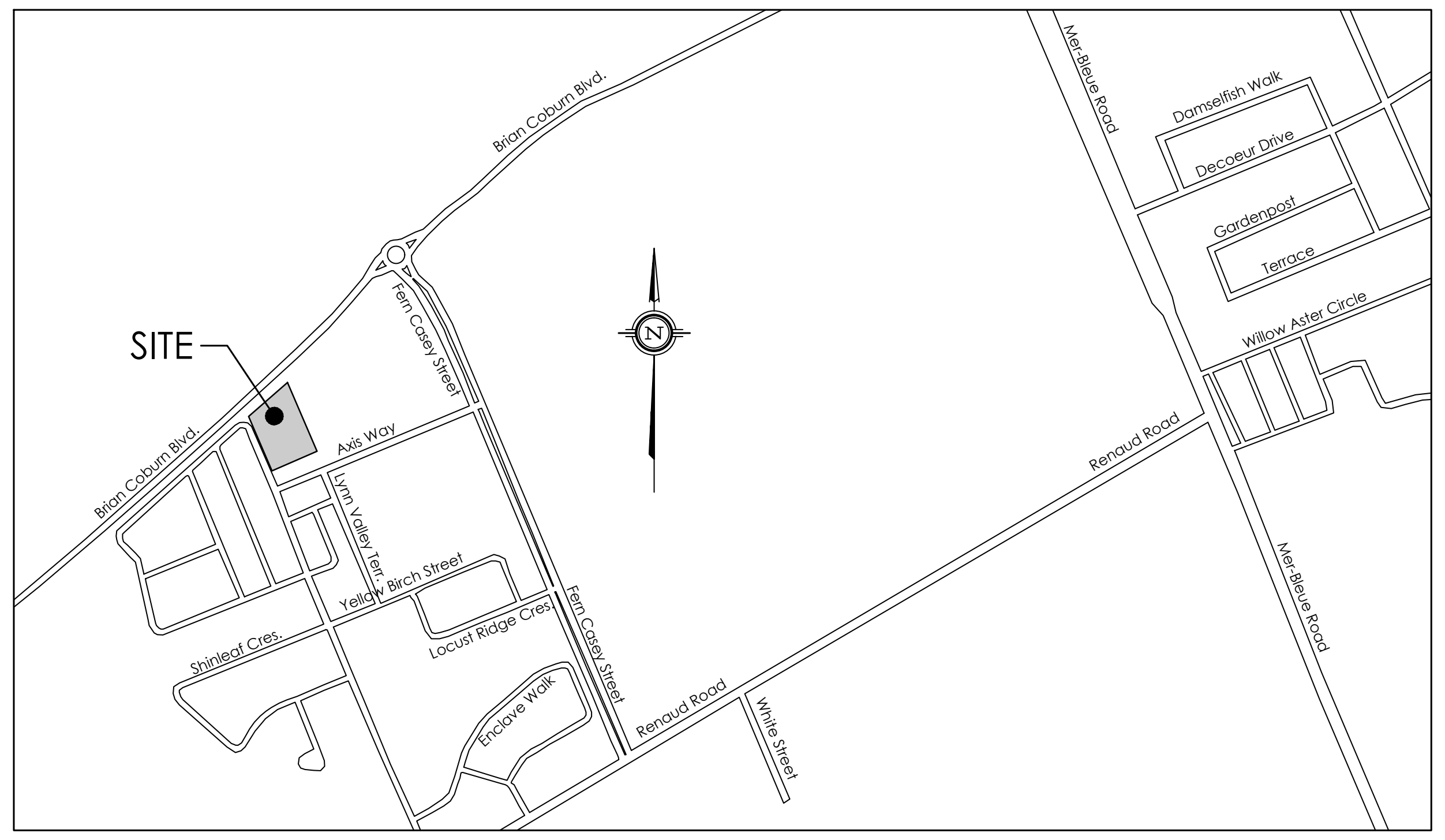
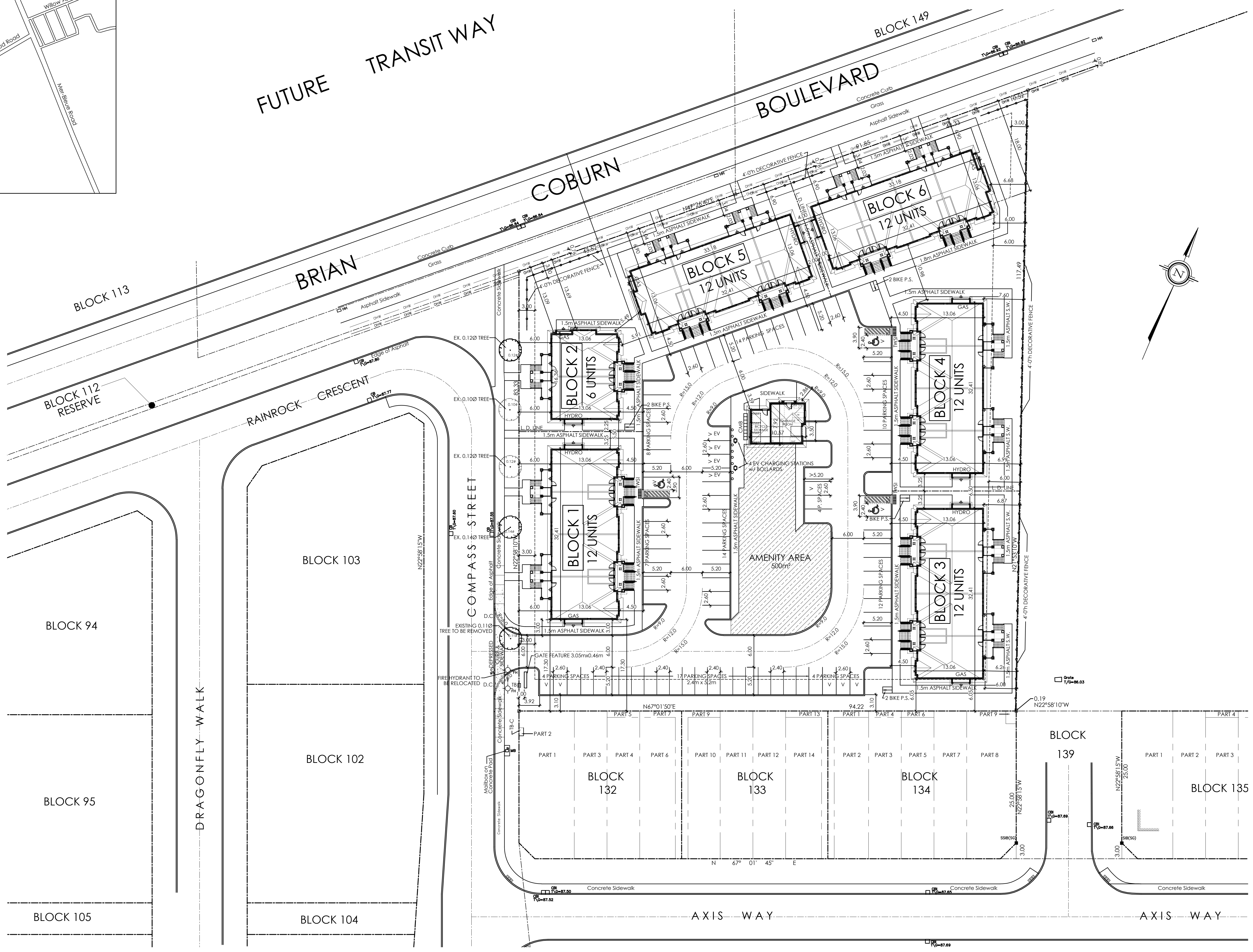
11x17

Appendix E Proposed Site Plan



KEY PLAN
NOT TO SCALE



SITE INFORMATION :

PROPOSED ZONING : R4Z [____] - PERMITTED USES : - PLANNED UNIT DEVELOPMENT (SECTION 131)
- STACKED DWELLING
- BACK / BACK TOWNHOMES

SITE AREA : 9,559.35 m²
TOTAL BUILDING AREA : 2,259.4 m²

PROPOSED ZONING:	R4Z[____]	PROVIDED:
LOT AREA (MIN.):	1,400.0 m²	9,559.35 m² (.95 ha)
LOT WIDTH (MIN.):	18.0 m	COMPASS STREET 83.33 m
FRONT YARD (MIN.) :	3.0 m	6.00 m
CORNER SIDE YARD (MIN.) :	3.0 m	6.90 m
INTERIOR SIDE YARD (MIN.) :	6.0 m	6.05 m
REAR YARD (MIN.) :	6.0 m	6.00 m
BUILDING SPACING :		
BETWEEN BUILDING & PRIVATE WAY	1.8 m	2.79 m
BETWEEN BUILDINGS	1.2 m	4.00 m
MINIMUM LANDSCAPED AREA :	30.0%	45.6 % (5,197.7m²)
BUILDING HEIGHT (STACKED TERRACE UNITS) (MAX.):	15.0 m	9.5 m
PORCH STAIR TO LOT LINE (SECTION 65)	0.60 m	n/a

TOTAL AMENITY AREA REQUIRED :
- STACKED DWELLING 6.0m² x 66 = 396.0 m²
COMMUNAL AMENITY AREA REQ'D. (MIN.):
50% of 396 m² = 198.0 m²

- PRIVATE AMENITY AREA -
(BALCONIES & PATIOS) 6.5m² x 66 = 429.0 m²
- COMMUNAL AMENITY AREA - 500.0 m²
TOTAL AMENITY AREA PROVIDED : 929.0 m²

ACCESSORY BUILDING	SECTION 131	PROVIDED:
BUILDING HEIGHT (MAX.):	4.5 m	4.02 m
FLOOR AREA (MAX.) :	200.0 m²	77.50 m²

TERRACE FLATS PARKING :
PARKING REQUIRED : 1.2 Spaces / (66) d.u. + 0.2 / (66) d.u. (Visitor) = 80 + 14 = 94 Spaces
PARKING PROVIDED : 80 Spaces + 14 Visitor Spaces = 94 Spaces

2.6m x 5.2m Spaces =	63 Spaces
2.4m x 5.2m Spaces =	17 Spaces (18%)
2.6m x 5.2m Visitor Spaces =	7 Spaces
2.6m x 5.2m E.V. Visitor Spaces =	4 Spaces
3.9m x 5.2m H.C. Visitor Spaces =	3 Spaces
	94 Spaces

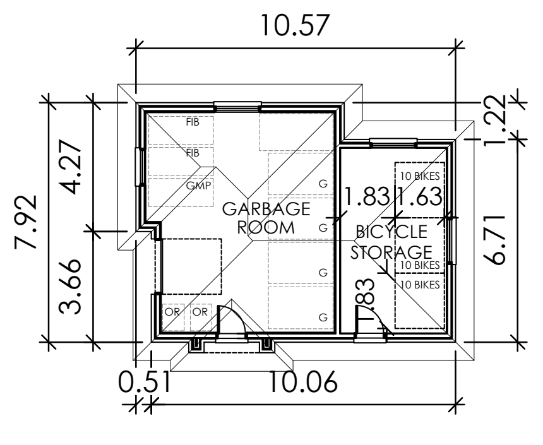
BICYCLE PARKING REQUIRED : 72 (0.5 / (66) d.u.) = 33 Spaces
BICYCLE PARKING PROVIDED : 30 Interior Spaces + 8 Exterior Spaces = 38 Spaces

TERRACE FLATS :

BLOCK No. :		BUILDING AREA:	GROSS FLOOR AREA:	No. UNITS:
BLOCK 1 =	TERRACE FLATS	412.0 m²	1,240.0 m²	12 UNITS
BLOCK 2 =	TERRACE FLATS	212.0 m²	630.0 m²	6 UNITS
BLOCK 3 =	TERRACE FLATS	412.0 m²	1,240.0 m²	12 UNITS
BLOCK 4 =	TERRACE FLATS	412.0 m²	1,240.0 m²	12 UNITS
BLOCK 5 =	TERRACE FLATS	415.0 m²	1,250.0 m²	12 UNITS
BLOCK 6 =	TERRACE FLATS	415.0 m²	1,250.0 m²	12 UNITS
BICYCLE / GARBAGE =		77.5 m²		
TOTAL =		2,355.5 m²	6,850.0 m²	66 UNITS

SNOW STORAGE : SNOW STORAGE WILL BE OFF SITE.

NOTE:
SITE PLAN TO BE READ IN CONJUNCTION WITH :
- SITE SERVICING PLAN PREPARED BY __________.
- LANDSCAPING PLAN PREPARED BY __________.
- BOUNDARIES DERIVED FROM : PLAN OF SURVEY OF PART OF BLOCK 140 REGISTERED PLAN 4M-1544 PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.



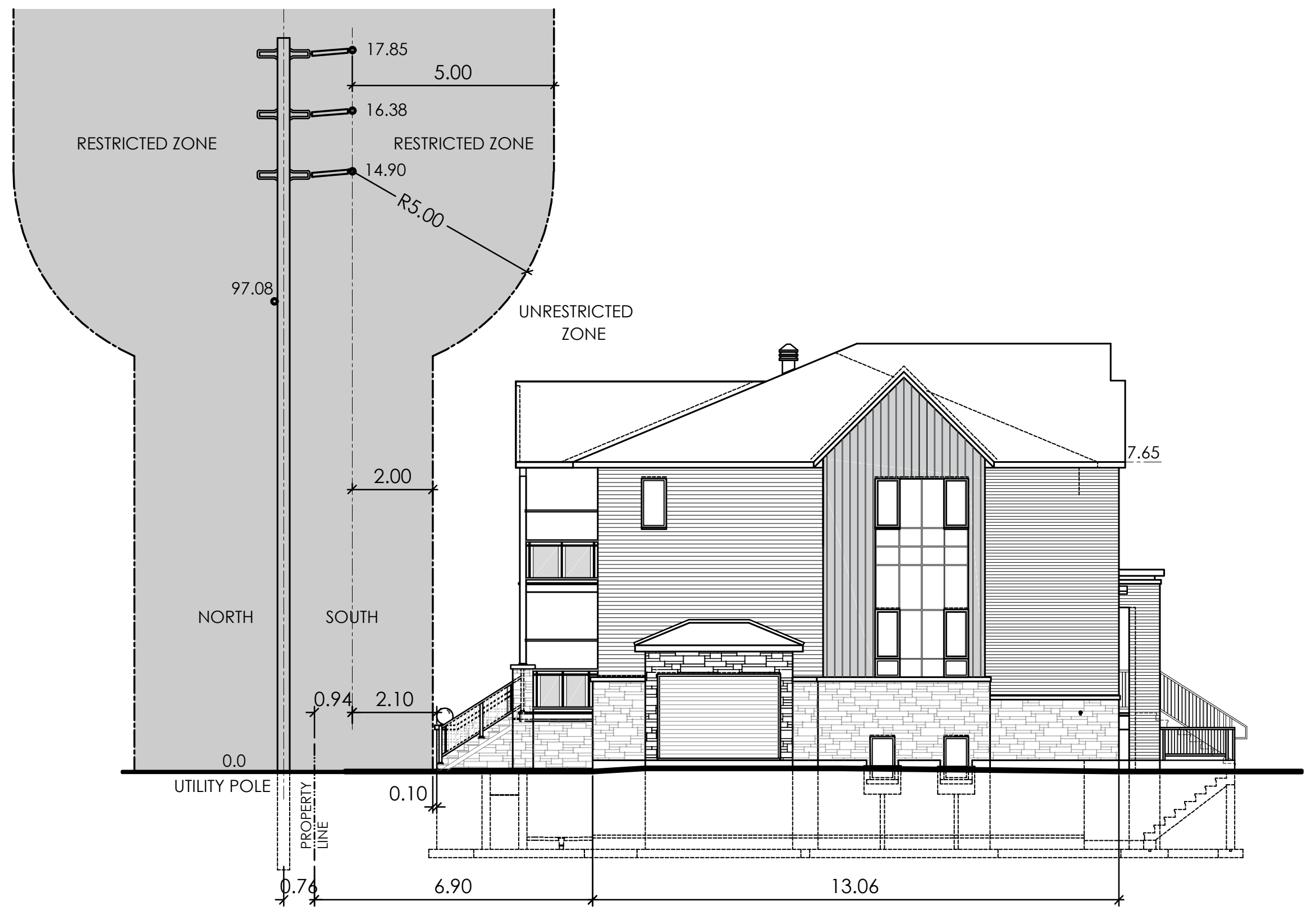
ACCESSORY BUILDING - 77.5m²
30 BICYCLE PARKING SPACES

GARBAGE ROOM:	(Minimum Required)
GARBAGE -	4 - 4 cu.yd. Bins
FIBRE -	2 - 2 cu.yd. Bins
GMP -	1 - 2 cu.yd. Bin
ORGANICS -	2 - 240L Carts

BICYCLE STORAGE ROOM:
3 STACKED RACKS 10 / RACK = 30 BIKES

LEGEND:

D.C.	- DEPRESSED CURB
⊕	- WALL MOUNT LIGHT FIXTURE
L. D. LINE	- LIMITING DISTANCE LINE
▨	- TACTILE WALKING SURFACE INDICATORS (TWSI)
1.50 1.80	- EXTERIOR BIKE PARKING SPACE



1 SP-1 HYDRO CLEARANCE SKETCH
BLOCK 5 - WEST SIDE ELEVATION SCALE 1:200
NOTE: HEIGHTS OF HYDRO WIRES TO BE CONFIRMED FOR BLOCK 140.

SCALE 0 5 10 20 50 75 100

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Ottawa, Ontario K2E 6Z9
Phone (613) 226-8811 Fax (613) 226-7942

GENERAL NOTES:
1. THE CONTRACTOR IS RESPONSIBLE FOR CHECKING AND VERIFYING ALL DIMENSIONS, ANY DISCREPANCY MUST BE REPORTED TO M. DAVID BLAKELY ARCHITECT INC.
2. ALL WORK AND MATERIALS TO BE IN COMPLIANCE WITH ALL CODES, REGULATIONS, AND BY-LAWS.
3. ADDITIONAL DRAWINGS MAY BE ISSUED FOR CLARIFICATION TO ASSIST THE PROPER EXECUTION OF WORK. SUCH DRAWINGS WILL HAVE THE SAME MEANING AND INTENT AS IF THEY WERE INCLUDED WITH THE PLANS IN CONTRACT DOCUMENTS.
4. DO NOT SCALE DRAWINGS.
5. THIS DRAWING SHALL NOT BE USED FOR PERMIT OR CONSTRUCTION UNLESS THE DRAWING BEARS THE ARCHITECT'S SEAL AND SIGNATURE.
6. THIS REPRODUCTION SHALL NOT BE ALTERED

CONSTRUCTION NORTH

SEAL

No.	DATE	DESCRIPTION	INIT.
10.	03/10/24	REVISED SIDEWALK WIDTHS	SM
9.	24/09/24	REVISED BLOCKS 3&4, SIDEWALKS	SM
8.	19/09/24	REVISED HYDRO CLEARANCE SKETCH	SM
7.	20/08/24	REVISED BLOCKS 1,2, 5 & 6	SM
6.	04/06/24	REVISED LAYOUT	SM
5.	29/05/24	REVISED LAYOUT	SM
4.	08/04/24	REVISED UNIT TYPES & LAYOUT	SM
3.	11/03/24	REVISED UNIT TYPES & LAYOUT	SM
2.	28/02/24	REVISED BLOCK LAYOUT	SM
1.	15/03/22	FOR REVIEW	SM

REVISIONS

No.	DATE	DESCRIPTION	INIT.
20.			
19.			
18.			
17.			
16.			
15.			
14.			
13.			
12.	29/10/24	REV. DEPRESSED CURB/FENCE & TWSI's	SM
11.	09/10/24	REV. AS PER EX. TREES ON COMPASS	SM

REVISIONS

PROJECT
66 UNIT
TERRACE FLATS
640 COMPASS STREET - BLOCK 140
OTTAWA, ONT.

CLIENT
RICHCRAFT

DRAWING TITLE
SITE PLAN

DATE	SCALE	SHEET No.
MAR., 2022.	1:500	SP-1
DRAWN BY: SBM	CHECKED MDB	