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- Environmental Restoration

Proposed Plan of Subdivision
1101 Baxter Road

Conceptual Site Servicing And Stormwater Management Report

1101 BAXTER ROAD

CONCEPTUAL SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared for:

Baxter Regional Inc.
1737 Woodward Drive, 2nd Floor
Ottawa, Ontario
K2C 0P9

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

December 22, 2025

Novatech File: 121019
Ref: R-2025-97

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Engineers, Planners & Landscape Architects

December 22nd, 2025

City of Ottawa
Planning, Development and Building Services Department
110 Laurier Avenue West, 4th Floor
Ottawa, ON K1P 1J1

Attention: **John Bernier, Planner II, Development Review – West Branch**
Julie Candow, Project Manager, Development Review – West Branch

Reference: **1101 Baxter Road**
Conceptual Site Servicing and Stormwater Management Report
Novatech File No.: 121019

The following Conceptual Site Servicing and Stormwater Management Report has been prepared in support of the Draft Plan of Subdivision to facilitate a mixed-use development at 1101 Baxter Road (Subject Site).

This report addresses the approach to site servicing and stormwater management for the Subject Site, which has been developed based on the requirements of the City of Ottawa, Rideau Valley Conservation Authority, and Ministry of Transportation.

Should you have any questions, or require additional information, please contact me.

Yours truly,

NOVATECH

Bassam Bahia, M.Eng., P. Eng.
Director | Land Development

/bs

cc: Evan Garfinkel, Baxter Regional Inc. c/o Regional Group
Greg Winters/Jeffrey Kelly, Novatech

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1.0 INTRODUCTION

1.1 Background

This Conceptual Site Servicing and Stormwater Management Report has been prepared in support of the Draft Plan of Subdivision to facilitate a mixed-use development at 1101 Baxter Road (Subject Site). This report addresses the approach to site servicing and stormwater management for the Subject Site, which is being proposed by Baxter Regional Inc. (Developer).

The Subject Site has an area of 3.13ha and is located along Baxter Road, north of Iris Street, as shown on **Figure 1.1 – Key Plan**. The Subject Site is bound by Baxter Road, followed by Highway 417 and the future Queensview Station to the north; mixed commercial uses to the east; residential uses, followed by Demsey Avenue and Iris Street to the south; and Baxter Road, followed by large format retail uses including the IKEA Ottawa and the Pinecrest Shopping Centre to the west.

The existing land use consists of an office building and an asphalt parking area, as shown on **Figure 1.2 – Existing Conditions Plan**. The Subject Site is currently accessed via four driveways to Baxter Road. The grade of the Subject Site generally slopes from east to west towards Baxter Road.

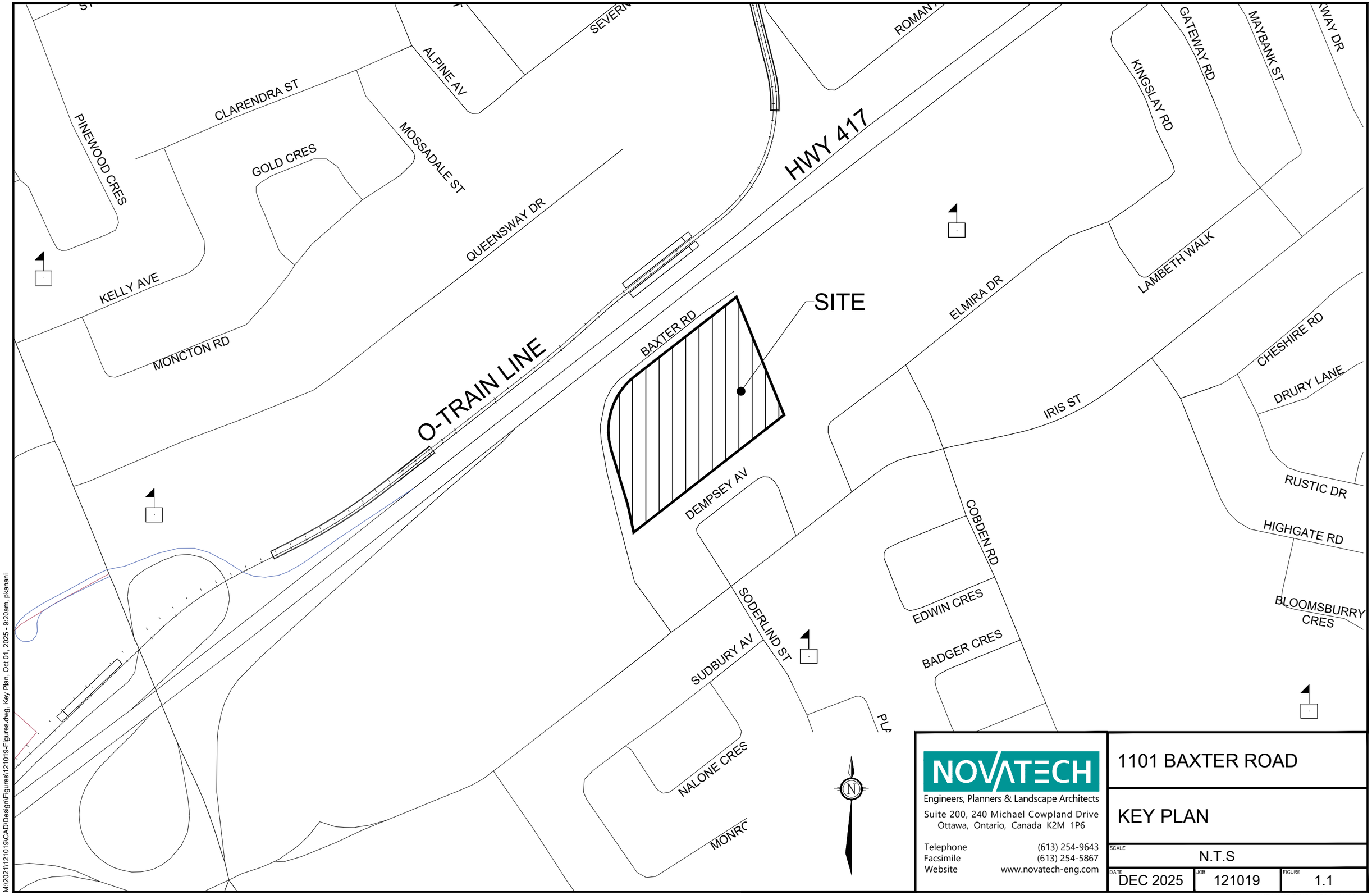
The mixed commercial parcel to the east is currently serviced with private services (i.e. sanitary sewers, storm sewers, and watermain) that outlet to the public services within Baxter Road. The residential properties to the south along Demsey Avenue are currently serviced with public services.

1.2 Development Intent

It is proposed to subdivide the Subject Site into six blocks to facilitate future development of mixed-use buildings ranging from mid to high-rise, a private street, a public park block, a public pathway/servicing block, and a private servicing block.

At this time building footprints/heights and unit counts are all considered conceptual based on the Secondary Planning exercise. Notwithstanding, the residential component is anticipated to consist of approximately 1,400 dwelling units, complemented by limited retail and commercial spaces. Based on the conceptual site plan, it is anticipated that the Subject Site will be accessed via four private accesses from Baxter Road and there will be two to three levels of underground parking. The conceptual site plan is illustrated on **Figure 1.3 – Site Plan**.

Currently, it is anticipated that the development will be phased for constructability and due to the sanitary capacity constraints. Phase 1 will include the construction of the mixed-use blocks (Blocks 1 and 2), the private street block (Street One), the public park block (Block 3), the public pathway/servicing block (Block 4), and the servicing only within the private servicing block (Block 6). Phase 2 will include the construction of the remaining mixed-use block (Block 5) and the remaining construction of the private access/laneway and landscaping associated with the private servicing block (Block 6). **Table 1.1** below provides a breakdown of the land use, phasing, and development potential.



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1101 BAXTER ROAD

KEY PLAN

SCALE: N.T.S

DATE: DEC 2025 | JOB: 121019 | FIGURE: 1.1

HWY 417

EXISTING CITIZEN BUILDING

BAXTER ROAD

ELMIRA DRIVE

IRIS ST

LEGEND

SUBJECT SITE

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1101 BAXTER ROAD

EXISTING CONDITION

SCALE 1:1250 (0 10 20 30 40 50)

DATE DEC 2025 | JOB 121019 | FIGURE 1.2

SHT11X17.DWG - 279mmX432mm

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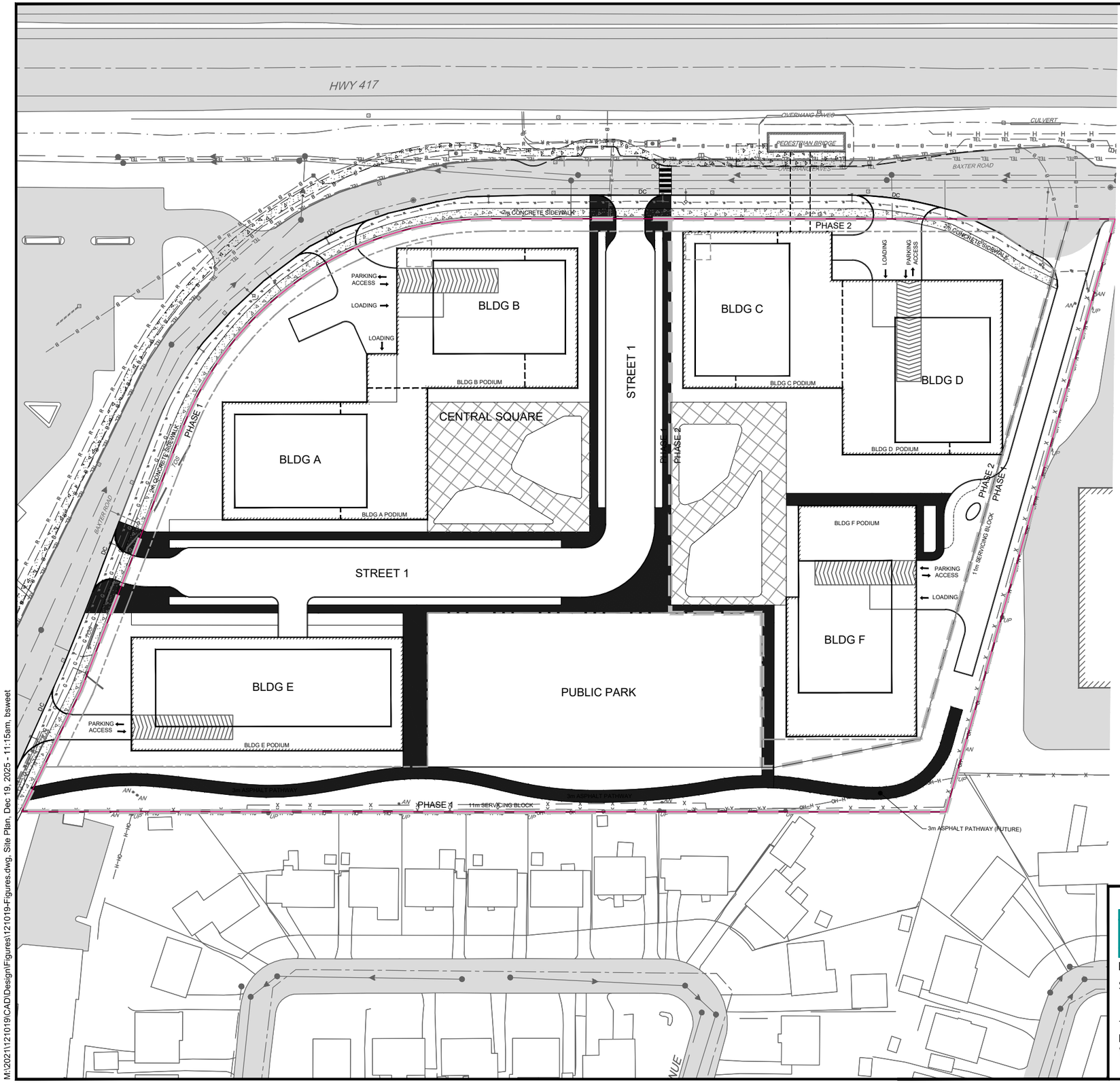

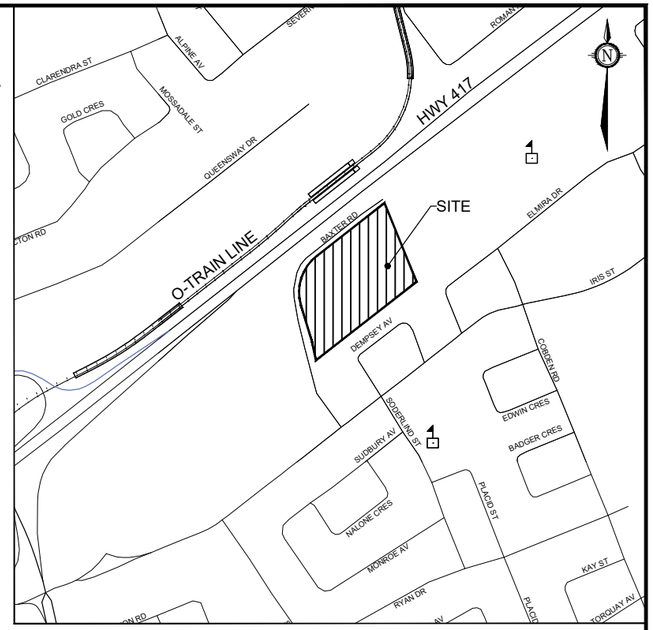

LEGEND

SUBJECT SITE

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1101 BAXTER ROAD

SITE PLAN

SCALE 1 : 1000 (0, 10, 20, 30, 40)

DATE DEC 2025 | JOB 121019 | FIGURE 1.3

SHT11X17.DWG - 279mmX432mm

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Table 1.1: Land Use, Phasing, and Development Potential

Land Use (Phasing)	Draft Plan Block Ref.	Equivalent Unit Count	Gross Area (ha)
Mixed-use Block (Ph 1A)	Blocks 1 and 2	360	1.00
Mixed-use Block (Ph 1B)		320	
Mixed-use Block (Ph 2)	Block 5	768	0.97
Private Street Block (Ph 1A)	Street One	-	0.43
Public Park Block (Ph 1A)	Block 3	-	0.31
Public Pathway/Servicing Block (Ph 1A)	Block 4	-	0.27
Private Servicing Block (Ph 1A/2)	Block 6	-	0.15
Total		**1,448**	**3.13**

The Subject Site is located within the Public Service Area in the City of Ottawa's Official Plan; therefore, the site has been designed with City sanitary collection and water supply systems.

1.3 Report Objective

This report assesses the adequacy of existing services to support the proposed mixed-use development's Draft Plan application. The intent of this Draft Plan application is to subdivide the land and secure adequate servicing capacity for future development.

Separate applications for Site Plan Control and Rezoning will be submitted for each future mixed-use block. This report will be provided to the various agencies for approval and to obtain any applicable approvals.

The City of Ottawa Applicant Study and Plan Identification List along with proof of a pre-consultation meeting is provided in **Appendix A**. In addition, the Ministry of Transportation's land development review correspondence is also provided in said appendix.

The City of Ottawa Servicing Study Guidelines for Development Applications checklist has been completed and is provided in **Appendix B**.

2.0 REFERENCES AND SUPPORTING DOCUMENTS

2.1 Guidelines and Supporting Studies

The following guidelines and supporting documents were utilized in the preparation of this report:

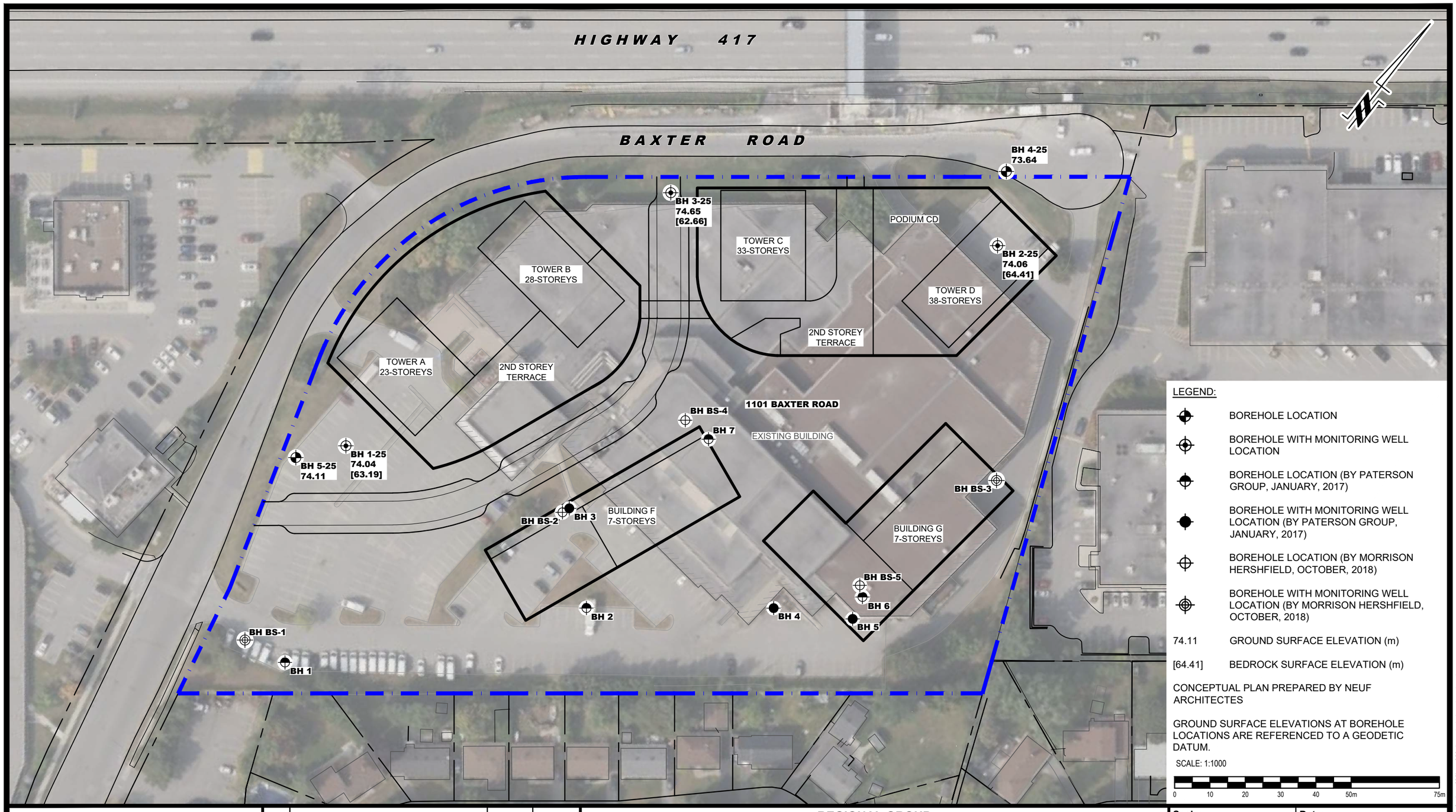
- **City of Ottawa – Official Plan** (OP)
  City of Ottawa, adopted by Council 2024.
- **City of Ottawa – Infrastructure Master Plan** (2024 IMP)
  City of Ottawa, June 2024.
- **City of Ottawa Sewer Design Guidelines** (OSDG)
  City of Ottawa, October 2012.
- **Revisions to OSDG** (ISTBs-2016-01, 2018-01, 2018-03, & 2019-02)
  City of Ottawa, September 2016, March 2018, and July 2019.
- **City of Ottawa Water Distribution Guidelines** (OWDG)
  City of Ottawa, October 2012.
- **Revisions to OWDG** (ISTBs-2010-01, 2014-02, 2018-02, 2018-04, & 2021-03)
  City of Ottawa, December 2010, May 2014, March 2018, June 2018, and August 2021.
- **City of Ottawa Stormwater Management Facility Design Guidelines** (OSWMFDG)
  City of Ottawa, Draft October 2012
- **Stormwater Management Guidelines for the Pinecrest Creek/Westboro Area** (Pinecrest Creek/Westboro Area SWM Guidelines)
  J.F. Sabourin and Associates Inc., October 2012.
- **Design Guidelines for Sewage Works & Drinking Water System** (MECP Guidelines)
  Ontario's Ministry of the Environment, 2008.
- **Stormwater Management Planning & Design Manual** (MECP SWM Guidelines)
  Ontario's Ministry of the Environment, March 2003.
- **Highway Corridor Management Manual** (MTO HCM Manual)
  Ontario's Ministry of Transportation, April 2022.

2.2 Geotechnical Investigation

Paterson Group Inc. (Paterson) conducted a geotechnical investigation (**Appendix F**) in support of the proposed residential development:

Geotechnical Investigation – Proposed Development 1101 Baxter Road, Ottawa, Ontario; Report No. PG7639-1 (revision 1), Paterson Group Inc., September 26, 2025.

Based on the geotechnical study, it is not anticipated that there will be any significant geotechnical concerns with respect to servicing and developing the Subject Site. The test hole locations are provided as **Figure 2.1**. A summary of the geotechnical report findings is provided in **Table 2.1** below.



LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION (BY PATERSON GROUP, JANUARY, 2017)
- BOREHOLE WITH MONITORING WELL LOCATION (BY PATERSON GROUP, JANUARY, 2017)
- BOREHOLE LOCATION (BY MORRISON HERSHFIELD, OCTOBER, 2018)
- BOREHOLE WITH MONITORING WELL LOCATION (BY MORRISON HERSHFIELD, OCTOBER, 2018)

74.11 GROUND SURFACE ELEVATION (m)

[64.41] BEDROCK SURFACE ELEVATION (m)

CONCEPTUAL PLAN PREPARED BY NEUF ARCHITECTES

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

SCALE: 1:1000

0 10 20 30 40 50m 75m

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

NO.	REVISIONS	DATE	INITIAL

REGIONAL GROUP
GEOTECHNICAL INVESTIGATION
PROPOSED DEVELOPMENT
1101 BAXTER ROAD
OTTAWA, ONTARIO

Title:
TEST HOLE LOCATION PLAN

Scale: 1:1000	Date: 09/2025
Drawn by: ZS	Report No.: PG7639-1
Checked by: OM	Dwg. No.: PG7639-1
Approved by: SD	Revision No.:

p:\autocad drawings\geotechnical\pg76xx\pg7639\pg7639-1-test hole location plan.dwg

11x17

FIGURE 2.1

Table 2.1: Summary of Geotechnical Servicing and Grading Considerations

Parameter	Summary
Subsurface Profile	Silty sand, alternating layers of silty sand/silty clay, glacial till
OHSA Soil Type	Type 2 and 3
Bedrock	Grey limestone at approximate depths of 9.7m to 12m below the existing ground surface
Groundwater	Long-term groundwater table can be expected at approximate depths of 3m to 5m below the existing ground surface
Grade Raise Restriction	A permissible grade raise restriction of 1.2m is recommended for finished grading at the site
Pipe Bedding / Backfill	Pipe Bedding 150 mm Granular A Pipe Cover 300 mm Granular A or sand Backfill Native Material
Pavement Structure (Private Roads)	40mm Wear Course (SuperPave 12.5) 50mm Binder Course (SuperPave 19.0) 150mm Base (Granular A) 300mm Subbase (Granular B Type II)
Landscape Consideration	TBD during the detailed design stage

3.0 SERVICING AND GRADING

3.1 Baxter Road

In order to service the Subject Site, the following will be required along Baxter Road:

- Connections to the existing storm sewer.
- Connections to the existing sanitary sewer.
- Connections to the existing watermain and extension/looping of the existing dead-end watermain.

Refer to the Conceptual General Plan of Services (Drawing 121019-GP) for an illustration of the conceptual servicing scheme.

3.2 General Servicing

The Subject Site will be serviced using storm, sanitary, and water. The storm drainage/stormwater management, sanitary, and water servicing strategies are discussed in further detail in the following sections.

In order to minimize connections to the existing public services within Baxter Road, the mixed-use buildings will be interconnected with shared underground parking which will contain internal underground stormwater tanks (for on-site quantity control and landscape irrigation) and associated mechanical piping, a sanitary sewage collection system, and a water supply system. The building roof drains and the private street area drains will be directed to the underground stormwater tanks.

The public park will have public services extended within the public pathway/servicing block, and the private servicing block (with an easement provided in favour of the City). The extension/looping of the existing dead-end watermain on Baxter Road will also be routed within the aforementioned blocks before running parallel (with sufficient clearance) to the existing watermain within Baxter Road and connecting to Iris Street.

Refer to the Conceptual General Plan of Services (Drawing 121019-GP) for further information.

3.3 General Grading

The proposed grading within the Subject Site will direct overland flows to Baxter Road to match pre-development conditions.

The proposed grading will tie into the original ground elevations along the perimeter of the Subject Site.

Refer to the Conceptual Grading Plan (Drawing 121019-GR) for an illustration of the conceptual grading and drainage scheme.

4.0 STORM SEWER SYSTEM AND STORMWATER MANAGEMENT

The Subject Site is located within the Ottawa River West Subwatershed and is tributary to Pinecrest Creek, which falls under the jurisdiction of the Rideau Valley Conservation Authority (RVCA). Drainage is directed to a pipe which crosses Highway 417.

4.1 Stormwater Management Criteria

The following stormwater management criteria has been developed based on the criteria in the OSDG and SWM Guidelines for the Pinecrest Creek/Westboro Area. Excerpts from the Pinecrest Creek / Westboro Area SWM Guidelines can be found in **Appendix C**.

4.1.1 Ottawa Sewer Design Guidelines

Minor System (Storm Sewers)

- Storm sewers are to be designed using the Rational Method for a 2-year return period.

Major System (Overland Flow)

- There is to be no surface ponding of stormwater during a 2-year event;
- Ensure that ponding is confined within the parking areas and easement at a maximum depth of 0.35m for both static ponding and dynamic flow;
- Overland flows are to be confined within the private drive aisles or defined drainage easements for all storms up to and including the 100-year event;
- Storm runoff will be conveyed overland along defined major system flow routes;
- Maximum depth of flow (static + dynamic) on local roads shall not touch any part of the building envelope and must remain below the lowest building opening during the stress test event; and,
- The product of the 100-year flow depth (m) on street and flow velocity (m/s) shall not exceed 0.60.

Best Management Practices

- Implement lot level and conveyance Best Management Practices (BMPs) to promote infiltration and treatment of storm runoff.

Quantity Control

- Stormwater quantity control is to meet the criteria shown in Section 8.3.7.3 of the OSDG, based on the current use.
    - The allowable release rate is to be calculated using the Rational Method with the following parameters:
        - Rainfall intensity based on a 2-year storm event with an assumed time-of-concentration (Tc) of 20 minutes (I = 52.03 mm/hr).
        - Runoff coefficient (C) of 0.50 or the actual existing C value of 0.90, whichever is less.
- Allowable release rate (for all storms up-to and including the 100-year event):

$Q_{allowable}$ = (2.78) x (3.13 ha) x (0.50) x (52.03) mm/hr
= 226.4 L/s

4.1.2 SWM Requirements: Pinecrest Creek/Westboro Area SWM Guidelines

The stormwater management requirements, as per the Pinecrest Creek/Westboro Area SWM Guidelines are as follows:

Runoff Volume Reduction

- A minimum on-site retention of the 10mm design storm (4-hour Chicago) and 300mm of amended topsoil within landscape areas. Any assumptions for non-viability of infiltration measures must be substantiated.

Water Quality

- On-site removal of 80% of TSS, which is inherent due to the on-site retention in landscape areas and detention of the 25mm storm event.

Flood Flow Management (Quantity Control)

- The more stringent of the following criteria:
    - Requirements of OSDG or local sewers (226.4 L/s); or
    - 100-year discharge from the site is to not exceed 33.5 L/s/ha (104.9 L/s).

4.1.3 Ministry of Transportation HCM Manual Criteria

Quantity Control

- Post-development flows to the highway drainage system must not exceed pre-development levels. Given the restrictive quantity control criteria listed in Section 4.1.1 and the Subject Site's substantial impervious area as discussed in Section 4.2, this requirement will be inherently met.

4.2 Pre-Development Conditions

Refer to **Figure 1.2 – Existing Conditions Plan** for an illustration of the pre-development conditions. Under existing conditions, the Subject Site is highly impervious has a C value close to 0.90 and outlets to Baxter Road.

4.3 Allowable Release Rates

The allowable release rates for the proposed development of the Subject Site have been developed based on select criteria from the Pinecrest Creek/Westboro Area SWM Guidelines and the OSDG as follows:

Retention / Infiltration

The retention requirements from in the Pinecrest/Westboro SWM Guidelines (retain the first 10mm of rainfall) will be achieved through amended topsoil and on-site irrigation. Amended topsoil will allow for more infiltration of the pervious areas in the direct runoff and uncontrolled areas of the site. The on-site storage tank for quantity control will provide adequate storage volume to account for the 10mm storm event runoff that is not able to be infiltrated by the topsoil. This portion of the tank will remain to be use for landscape irrigation onsite.

Water Quality

Water quality control, per the Pinecrest Creek/Westboro Area SWM Guidelines will be provided through the retention of the 10mm storm event.

HWY 417

EXISTING CITIZEN BUILDING

BAXTER ROAD

ELMIRA DRIVE

IRIS ST

LEGEND

SUBJECT SITE

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Website www.novatech-eng.com

1101 BAXTER ROAD

EXISTING CONDITION

SCALE 1:1250 (0 10 20 30 40 50)

DATE DEC 2025 | JOB 121019 | FIGURE 1.2

SHT11X17.DWG - 279mmX432mm

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Water Quantity
The water quantity control will be provided in accordance with the Pinecrest Creek/Westboro Area SWM Guidelines Post-development peak flows will be controlled to 33.5 L/s/ha or 104.9 L/s for the 3.13 ha site.

4.4 Proposed Storm Drainage System

Storm servicing for the Subject Site will be provided using a dual drainage system: Runoff from frequent events will be conveyed by storm sewers (minor system), while runoff from larger storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system). Baxter Road will be the outlet for both the minor and major systems.

- Refer to the Conceptual General Plan of Services (Drawing 121019-GP) for an illustration of the proposed storm sewers.
- Refer to the Conceptual Storm Drainage Plan (Drawing 121019-STM) for the catchment areas used in the design of the storm drainage system.

4.4.1 Storm Sewers (Minor System)

The proposed storm sewers will be designed using the Rational Method during the detailed design stage. The on-site storm sewers will be sized to convey an uncontrolled peak flow corresponding to a 2-year return period. The criteria used to size the storm sewers are summarized in **Table 4.1**.

Table 4.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2-year Return Period
Storm Sewer Design	Rational Method/Modeling
IDF Rainfall Data	OSDG
Initial Time of Concentration (T_c)	10 minutes
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

The proposed storm drainage systems include the following:

- Zurn area drains located within the site to convey runoff from building rooftops, private street, and landscaped areas to the underground storage tank.
- Approximately 15m of storm sewers within the site to convey controlled runoff from the underground storage tank to the existing 375mm storm sewer within Baxter Road.
- Approximately 194m of storm sewer to collect and convey uncontrolled runoff from the public park to the existing 375mm storm sewer within Baxter Road.

4.4.2 Underground Storage (Quantity Control)

Underground storage will be provided to meet the stormwater quality and quantity control criteria (allowable release rates), specified in **Section 4.3**. Storage will be provided within the underground parking lot using two underground storage tanks. These tanks will be interconnected and pumped

to existing MHST-25501 to control outflows from the storage tanks to the previously specified allowable release rates.

4.4.3 Grading & Overland Flow (Major System)

The site will be graded to provide an engineered overland flow route (major system) for large infrequent storms or in the event that the storm sewer / stormwater management system becomes obstructed. Major system flows will be directed to Baxter Road.

Refer to the Conceptual Grading Plan (Drawing 121019-GR) for the proposed general grading of the Subject Site.

4.4.4 Best Management Practices and Low Impact Development

The proposed development will implement stormwater management BMPs and low-impact development (LID) techniques to mitigate the reduction in infiltration and groundwater recharge resulting from the proposed development, and to meet the criteria from the Pinecrest/Westboro SWM Guidelines. Proposed LID measures include the following:

- Amended topsoil or equivalent (300mm depth) in landscaped areas to promote the retention of storm runoff and increase evapotranspiration; and,
- Underground storage provided with underground storage tanks.
- Reuse of runoff for landscape irrigation in the lower portion of the underground storage tanks.

The selection of BMPs and LIDs will be reviewed during detailed design stage.

4.5 Proposed Stormwater Management Strategy

4.5.1 Stormwater Quality Control

As per the Pinecrest Creek/Westboro Area SWM Guidelines, stormwater quality control for the Subject Site is to be provided by retention of the 10mm storm event.

4.5.2 Stormwater Quantity Control

The following provides an overview of the proposed stormwater management strategy for controlled and uncontrolled areas:

- *Areas C-11, C-14, C-16 and C-19 – Direct Runoff*

  These subcatchments represents the frontage and easement areas that flow uncontrolled to the Baxter Road.

- *Areas C-08, C-17 and C-18 – Uncontrolled*

  These subcatchments represent areas within the park and easement that are captured by the easement storm sewer system. Storm runoff will be collected by catchbasins and conveyed to the Baxter Road.

- *Areas C-01 to C-0, C-09 to C-10, C-12 to C-13 and C-15 – Controlled*

  These subcatchments represent the onsite areas that will be controlled by the underground storage tanks. The tanks will be pumped above the 10mm runoff volume generated by the overall development so that the 100-year storm event meets the allowable release rate.

Amended Topsoil

All the landscaped areas on the Subject Site will have 300mm of amended topsoil or equivalent to promote the retention of storm runoff. The amended soil is assumed to have a 0.25 void ratio as per the MOE SWM Manual. The assumed storage volume provided within the amended topsoil is 563m^3, calculated as follows:

Total pervious area:	7,501m^2
Depth of amended soils:	300mm amended topsoil; or 100mm of topsoil underlaid by 200mm of coarse sand
Assumed void ratio:	0.25

Total storage provided in amended soils = 7,501 m^2 x 0.30 m x 0.25
= 563 m^3

Underground Storage Tanks

The underground storage tanks will provide quantity control storage for the Subject Site. The controlled drainage areas will connect to the underground storage tanks. There will be two storage tanks with a maximum depth of 2.5m. One tank has an area of 281m^2 and the other has an area of 419m^2 for a total area of 700m^2. The total storage provided by the underground storage tanks is 1,045m^3 based on the layout presented on the Conceptual General Plan of Services (Drawing 121019-GP).

4.6 Hydrologic & Hydraulic Modeling

The OSDG requires hydrologic modeling for all dual drainage systems. The performance of the proposed storm drainage system was evaluated using a conceptual PCSWMM model. The model includes the subcatchments, storm sewer from in the easement, and conceptual storage nodes to determine the required storage volumes.

PCSWMM model schematics and model output are provided in **Appendix C**.

4.6.1 Design Storms

The model was run using the 3-hour Chicago and 12-hour SCS storm distributions for the 2-year, 5-year, and 100-year events. The 4-hour Chicago storm distribution was used for the 10mm and 25mm events (water quality events). The model was also stress tested using the 100-year (+20%) event.

The 3-hour Chicago storm distribution was found to be the critical design storm for both peak flows and storage volumes.

4.6.2 Subcatchment Model Parameters

Hydrologic modeling parameters for each subcatchment were developed based on soil type, existing and proposed land use, and topography.

Runoff Coefficient / Impervious Values

Impervious values were assigned to each subcatchment area shown on the Conceptual Storm Drainage Plan (Drawing 121019-STM). The impervious values correspond to the Runoff Coefficients that will be used in the Rational Method calculations, for the storm sewer design sheet, using the following equation:

$$\% \, imp = \frac{C - 0.2}{0.7}$$

Depression Storage

The following default values for depression storage, per the OSDG, were used for all subcatchments.

- Depression Storage (pervious areas): 4.67mm
- Depression Storage (impervious areas): 1.57mm

Equivalent Width

'Equivalent Width' refers to the width of the subcatchment flow path. This parameter is calculated as described in Section 5.4.5.6 of the OSDG.

Infiltration

Infiltration losses for the subcatchments were modeled using Horton's infiltration equation, which defines the infiltration capacity of the soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses.

The following default values, per the OSDG, were used for the subcatchments.

Horton's Equation:	Initial infiltration rate: f_o = 76.2 mm/hr
$f(t) = f_c + (f_o - f_c)e^{-k(t)}$	Final infiltration rate: f_c = 13.2 mm/hr
	Decay Coefficient: k = 4.14/hr

Refer to subcatchment parameters table provided in **Appendix C.**

Amended Topsoil (LID)

The storage provided by the amended topsoil has been represented in the PCSWMM model using LID controls (infiltration trench). The characteristics for the LID controls only include the thickness of the amended topsoil or equivalent (300mm) and the assumed 0.25 void ratio. The LID controls were applied to only the pervious areas for each subcatchment.

Underground Storage Tanks

The storage requirements for the underground storage tanks are represented in the PCSWMM model as conceptual storage nodes. The storage requirements were estimated as follows:

- The storage requirements for the 10mm retention / water quality event was estimated at a 0.26m depth.
- The total storage required for the 100-year was estimated at a depth 1.49m.

4.6.3 Model Results

The peak flows and required storage volumes from the Subject Site are summarized in **Table 4.2** and **Table 4.3**.

Table 4.2: Peak Flows

Storm Distribution->		**4hr Chicago**	**3hr Chicago**			**12hr SCS**		
Return Period->		**25mm**	**2yr**	**5yr**	**100yr**	**2yr**	**5yr**	**100yr**
Allowable		**104.9**	**104.9**	**104.9**	**104.9**	**104.9**	**104.9**	**104.9**
Post Development	*Controlled*	54.0	54.0	54.0	54.0	54.0	54.0	54.0
	Uncontrolled	11.5	15.9	22.2	37.9	7.8	10.4	24.6
	DR	4.1	5.6	7.6	13.0	2.6	3.5	12.9
	Total	69.6	75.5	83.8	104.9	64.4	67.9	91.5
Difference		*-56.0*	-35.3	-29.4	-21.1	0.0	-40.5	-37.0

Table 4.3: Storage Requirements

Storm Event*	**Provided Storage Volumes**			**Required Storage Volumes**		
	Amended Soils (m^3)	**Storage Tanks (m^3)**	**Total (m^3)**	**Amended Soils (m^3)**	**Storage Tanks (m^3)**	**Total (m^3)**
Water Quality (4-hour Chicago Storm Distribution)						
10mm	563	182 (1)	745	563	181	744
Water Quantity (3-hour Chicago Storm Distribution)						
100-year	563	1,750 (2)	2,313	563	1,045	1,608

[1] Provided volume is located below the pumped volume (0.26m depth)

[2] Provided volume is from the bottom of the tank to the top of the tank (2.5m depth)

The total peak flow will adhere to the allowable release rate for the 100-year storm event. Approximately 1,045m^3 of storage is required within the underground storage tanks for the 100-year storm event.

5.0 SANITARY SEWER SYSTEM

5.1 Existing Sanitary Infrastructure

The sanitary outlet for the Subject Site is an existing 300mm sanitary sewer within Baxter Road. Ultimately, the sanitary flows will outlet to the Pinecrest Creek Collector Sewer located 470m west of the Subject Site.

Pinecrest Creek Collector Sewer
Through the pre-consultation meeting and subsequent correspondence with City staff, capacity constraints have been identified within the Pinecrest Creek Collector Sewer. The 2024 IMP identified two projects, namely the Pinecrest Trunk Flow Reduction and Pinecrest Trunk Sewer Upgrade, to facilitate intensification contemplated within the Pinecrest / Queensview Station. Until such time those projects have advanced, there are wastewater capacity constraints based on the current use and zoning.

The City is planning to implement a flow monitoring program to identify existing extraneous inflow and infiltration (I&I) issues and to establish residual capacity in Spring 2026. Pending the results, further works (projected in 2027) may be required to remove any identified I&I issues.

Refer to pre-consultation meeting feedback form provided in **Appendix A** and email correspondence provided in **Appendix D**.

Allowable Sanitary Flows Under Zoning at time of Development - IP F(1.0)
Due to the capacity constraints, the existing sanitary flows from the Subject Site have been calculated based on the zoning at the time of the latest site plan development, which occurred in the early 1990s. The zoning at that time was IP F (1.) – Light Industrial, pre-amalgamation of the City of Ottawa in 2001. Wastewater collection at the time was established using Regional Municipality of Ottawa-Carleton (RMOC) Guidelines. Below are the existing sanitary flows based on the sanitary sewer design parameters outlined within the *RMOC Environmental Services Design Guidelines (RMOC, 1991)*.

Allowable Sanitary Flows = 3.13 ha x 35,000 L/ha/day x 5.4 (Peaking Factor @ 3.13ha)
= 591,570 L/day
= 6.85 L/sec

For the purposes of determining the allowable sanitary flows for the Subject Site, the extraneous flows from the site area have been excluded in the above calculations. Refer to excerpts from the *RMOC Environmental Services Design Guidelines (RMOC, 1991)* provided in **Appendix D**.

5.2 Proposed Sanitary Infrastructure

Off-site works
The proposed off-site works will require three connections to the existing 300mm sanitary sewer located within Baxter Road. Two connections will be for the mixed-use buildings, and one connection will be for the on-site sanitary sewer to service the public park. The proposed works will require reinstatement of the existing road to match existing conditions or better.

The number of connections and locations will be determined during the detailed design stage. Refer to the Conceptual General Plan of Services (Drawing 121019-GP) for additional details on the proposed off-site works.

On-site works

The mixed-use buildings will be interconnected with an internal sanitary collection system (design by others) in order to convey flows to the existing 300mm sanitary sewer located within Baxter Road.

The proposed on-site works will require approximately 185m of on-site sanitary sewer to service the public park via a servicing block with an easement dedicated to the City, to convey flows to the existing 300mm sanitary sewer located within Baxter Road.

Refer to the Conceptual General Plan of Services (Drawing 121019-GP) for additional details on the proposed on-site works.

5.3 Sanitary Demand and Design Parameters

The sanitary sewer design parameters in **Table 5.1** have been used to calculate the proposed sanitary flows from the Subject Site and in the existing sewer capacity analysis. Unit and population densities and all other design parameters are specified in the OSDG.

Table 5.1: Sanitary Sewer Design Parameters

Design Component	Design Parameter
Population: Apartment	 1.8 people/unit
Residential Flow Rate, Average Daily	280 L/cap/day
Residential Peaking Factor	Harmon Equation (min=2.0, max=4.0) Harmon Correction Factor, k = 0.8
Commercial Flow Rate, Average Daily	28,000 L/ha/day
ICI Peaking Factor	1.0 (or 1.5 if ICI in contributing area is > 20%)
Extraneous Flow Rate	0.33 L/s/ha
Minimum Pipe Size	200 mm
Minimum Velocity[1]	0.6 m/s
Maximum Velocity	3.0 m/s
Minimum Pipe Cover	2.5 m (Unless frost protection provided)

[1]A minimum gradient of 0.65% is required for any initial sewer run with less than 10 residential connections.

Proposed Sanitary Flows

Below are the proposed sanitary flows for the ultimate build-out (Phase 1 and 2) and interim build-out (Phase 1A) scenarios based on the conceptual unit counts. The interim build-out considers the Pinecrest Creek Collector Sewer capacity constraints/allowable sanitary flows under the current zoning.

Ultimate Build-out (Phase 1 and 2)

Proposed Sanitary Flows $_{ULT\ RES}$ = 1,448 units x 1.8 people/unit x 280 L/cap/day x 2.99 PF
= 2,182,078 L/day
= 25.26 L/sec

Proposed Sanitary Flows $_{ULT\ COMM}$ = 0.935 ha x 28,000 L/ha/day x 1.5 PF
= 39,270 L/day
= 0.45 L/sec

Proposed Sanitary Flows $_{ULT\ TOTAL}$ = 25.26 L/sec + 0.45 L/sec
= 25.71 L/sec

Interim Build-out (Phase 1A)

Proposed Sanitary Flows $_{INT\ TOTAL}$ = 360 units x 1.8 people/unit x 280 L/cap/day x 3.34 PF
= 589,176 L/day
= 6.82 L/sec

The Interim Buildout of Phase 1A meets the allowable release rate, to facilitate the early phase of the Draft Plan. Furthermore, as City's Pinecrest Trunk Flow Reduction and Pinecrest Trunk Sewer Upgrade, residual capacity could be made available to accommodate the Ultimate Buildout (Phase 1 and 2)

For the purposes of determining the proposed sanitary flows for the Subject Site, the extraneous flows from the site area have been excluded in the above calculations and the residential peaking factor was calculated using the Harmon Equation.

Existing Sewer Capacity Analysis

Preliminary sanitary sewer design sheets have been prepared for the ultimate and interim buildout scenarios and provided in **Appendix D**. The design sheets confirm that the existing sanitary sewers fronting the Subject Site on Baxter Road have adequate capacity to accommodate the proposed mixed-use development under both the ultimate and interim scenarios.

Refer to the Conceptual Sanitary Drainage Plan (Drawing 121019-SAN) for additional details on the proposed drainage areas.

As part of subsequent correspondence with City staff, it has been noted that to gain additional capacity within the Pinecrest Creek Collector Sewer, the Developer may participate in the flow monitoring/I&I program in order to advance development within the servicing area.

6.0 WATER SUPPLY SYSTEM

6.1 Existing Water Infrastructure

Fronting the Subject Site there is an existing 200mm dead-end watermain within Baxter Road fed by an existing 300mm watermain within Iris Street. Although the Baxter watermain extends into private site that connects into Elmira Drive, the City does not rely on private watermains as part of the public system; therefore, the Baxter watermain is considered a dead-end. Given the foregoing, an extension/looping of the water supply system will be required for redundancy.

6.2 Proposed Water Infrastructure

Off-site works

The proposed off-site works will require three connections to the existing 200mm watermain within Baxter Road for the mixed-use buildings. The proposed off-site works will also require one connection to the existing 200mm watermain within Bater Road (Connection 1), one connection to the existing 300mm watermain within Iris Street (Connection 2), and approximately 155m of off-site watermain within Baxter Road for the extension/looping of the water supply system. The proposed works will require reinstatement of the existing road to match existing conditions or better.

The number of connections and locations will be determined during the detailed design stage. A connection to the existing 200mm watermain on Elmira Drive was contemplated but would require land acquisition by the Developer.

Refer to the Conceptual General Plan of Services (Drawing 121019-GP) for additional details on the proposed off-site works.

On-site works

The mixed-use buildings will be interconnected with an internal water supply system and booster pumps (design by others) fed from the existing 200mm watermain within Bater Road.

The proposed on-site works will require approximately 370m of on-site watermain for the extension/looping of the water supply system. A water service will be provided for the public park from the on-site watermain.

Hydrant locations will be confirmed during the detailed design stage.

Refer to the Conceptual General Plan of Services (Drawing 121019-GP) for additional details on the proposed on-site works.

6.3 Watermain Design Parameters

Boundary conditions were provided by the City based on the OWDG water demand criteria for both the ultimate build-out (Phase 1 and 2) and interim build-out (Phase 1A) scenarios. The boundary conditions considered a looped public 200mm watermain between Connections 1 and 2. It should also be noted that at the time of the boundary condition request the desired domestic demands considered a higher population then what is possible due to the sanitary capacity constraints for the interim build-out scenario. As such, the boundary conditions provided are conservative under the interim build-out scenario. The boundary conditions are included in **Appendix E**.

The domestic demand design parameters, fire demand design scenarios, and system pressure criteria design parameters are outlined in **Table 6.1** below.

Table 6.1: Watermain Design Parameters and Criteria

Domestic Demand Design Parameters	**Design Parameters**
Population: Apartment	 1.8 people/unit
Average Day Residential Demand (AVDY)	280 L/cap/day
Maximum Day Demand (MXDY)	2.5 x Average Day
Peak Hour Demand (PKHR)	5.5 x Average Day
Average Day Commercial Demand (AVDY)	28,000 L/ha/day
Maximum Day Demand (MXDY)	1.5 x Average Day
Peak Hour Demand (PKHR)	2.7 x Average Day
Fire Demand Design	**Design Flows**
Fire Demand (FF)	67-167L/s per FUS
System Pressure Criteria Design Parameters	**Criteria**
Maximum Pressure (AVDY) Condition	< 80 psi occupied areas < 100 psi unoccupied areas
Minimum Pressure (PKHR) Condition	> 40 psi
Minimum Pressure (MXDY + FF) Condition	> 20 psi

The firefighting water demands for the Subject Site has been estimated per OWDG which refers to the Fire Underwriters Survey (CGI, 2020) document, abbreviated as FUS. These calculations will be refined during the detailed design of each building to confirm the assumptions made to support the fire demand and capacity provided by the watermain network. Detailed FUS calculations can be found attached in **Appendix E**.

6.4 System Pressure Modeling and Results

System pressures for the Subject Site for both ultimate and interim build-out scenarios were estimated using simple differential pressure calculations based on an elevation of 74.5m within the site.

Domestic Demand

The water demand summary for the build out of the Subject Site for the basic daily and peak hour demands have been provided in **Table 6.2** below. For detailed results refer to the tables provided in **Appendix E.**

Table 6.2: System Pressure (EPANET)

Condition	Demand (L/s)	Allowable Pressure (psi)	Max/Min Pressure (psi)
Ultimate Build-out			
AVDY	8.75	80 (Max)	57.7
PKHR	47.27	40 (Min)	45.6
Interim Build-out			
AVDY	4.42	80 (Max)	57.7
PKHR	23.81	40 (Min)	46.9

Fire Demand

The proposed Subject Site's buildings will require architectural and engineering input with regards to occupancy, materiality, layout, protected openings, and sprinkle ring, which can only be accomplished at the site plan and building permit stage of each building block as the Subject Site develops.

To achieve the required fire flow, during the detail design stage of initial phase, one can optimize the building design and watermain sizes of the proposed looping extension (using a 200, 250 or 300mm watermain connection between the Baxter Road's dead-end and Iris Road), and allow for multiple hydrants to be drawn from, as opposed to drawing from a single hydrant to meet the required demand.

The available aggregate hydrant flow summary for the build out of the Subject Site using the most conservative building design (protected openings and sprinklered) for the fire flow demands (6,000 L/min for Buildings A/B or Buildings C/D) and maximum day has been provided in **Table 6.3** below.

Table 6.3: Summary of Available Aggregate Hydrant Flow

Condition	Available Aggregate Hydrant Flow @ Connection 1 (L/min)	Min Pressure (psi)
Ultimate Build-out	6,780	20
Interim Build-out	7,260	20

7.0 UTILITIES

The development will be serviced by Hydro Ottawa, Bell Canada, Rogers Communications, and Enbridge Gas Distribution Inc. The works will be coordinated with local utility companies during the detailed design stage.

Streetlighting will be provided within the private road, and will be designed with marker lighting and the City of Ottawa will require future Site Plan Applications to provide a lighting certification letter for a lighting design that results in a maximum allowable lighting spillage of 0.5 FC (5 lux) at the property boundary. In addition, photometric plans will be made available to the City of Ottawa and Ministry of Transportation to ensure it meets their requirements prior to site plan approval of each block.

8.0 EROSION AND SEDIMENT CONTROL AND DEWATERING MEASURES

Temporary erosion and sediment control measures will be implemented during construction in accordance with the *Guidelines on Erosion and Sediment Control for Urban Construction Sites (Government of Ontario, May 1987)*. Erosion and sediment control measures may include:

- Placement of filter fabric under all catch basin and maintenance hatches.
- Silt fence around the area under construction placed as per OPSS 577/OPSD 219.110.
- Light duty straw bale check dam per OPSD 219.180.

The erosion and sediment control measures will need to be installed to the satisfaction of the engineer, the City, the Ontario Ministry of Environment Conservation and Parks (MECP), and the RVCA, prior to construction and will remain in place during construction until vegetation is established. The erosion and sediment control measure will also be subject to regular inspection to ensure that measures are operational.

Refer to the Conceptual Erosion and Sediment Control Plan (Drawing 121019-ESC).

In addition, due to the dewatering activities required during construction of the proposed infrastructure, a Permit-To-Take-Water (PTTW) application or Environmental Activity and Sector Registry (EASR) will be submitted to the MECP. The permit will outline the water taking quantity, and location/quality of the discharge.

9.0 NEXT STEPS, COORDINATION, AND APPROVALS

The proposed municipal infrastructure may be subject, but not limited to the following approvals:

- MECP PTTW or EASR. Submitted to: MECP. Proponent: Developer.
- Municipal Consent / Utility Circulation for the extension/looping of the existing dead-end watermain. Submitted to: City of Ottawa. Proponent: Developer.
- MECP Environmental Certificate of Approval (ECA) for the storm/sanitary sewers granted as part of the Consolidated Linear Infrastructure programs to facilitate the park services. Submitted to: City of Ottawa. Proponent: Developer.
- MECP Pre-authorized Watermain Alteration and Extension granted as part of City of Ottawa's Drinking Water Works Permit (F-1 Form). Submitted to: City of Ottawa. Proponent: Developer.
- Tree Cutting Permit. Submitted to: City of Ottawa. Proponent: Developer, or its contractor/agent.
- Road Closure and Road Cut Permits. Submitted to: City of Ottawa. Proponent: Developer, or its contractor/agent.

10.0 SUMMARY AND CONCLUSIONS

This report demonstrates that the proposed development can be adequately serviced with storm, sanitary, and water. The report is summarized below:

Storm Sewer System and Stormwater Management:

- The Subject Site will be serviced with:
    - Zurn area drains located within the site to convey runoff from building rooftops, private street, and landscaped areas to the underground storage tank.
    - Approximately 15m of storm sewers within the site to convey controlled runoff from the underground storage tank to the existing 375mm storm sewer within Baxter Road.
    - Approximately 194m of storm sewer to collect and convey uncontrolled runoff from the public park to the existing 375mm storm sewer within Baxter Road.
- Stormwater management will be provided to adhere to the allowable release rates.
- Underground storage will be provided by two interconnected underground storage tanks.
- Amended soils and irrigation of runoff stored within the two underground storage tanks will reduce runoff and provide quality control.

Sanitary Sewer System:

- The sanitary outlet for the Subject Site is an existing 300mm sanitary sewer within Baxter Road. Ultimately, the sanitary flows will outlet to the Pinecrest Creek Collector Sewer located 470m west of the Subject Site.
- Capacity constraints have been identified within the Pinecrest Creek Collector Sewer, and the City is planning to implement a flow monitoring program to identify existing extraneous inflow and infiltration issues and to determine residual capacity. Notwithstanding, based on correspondence with the City, the current site's use and zoning allows for development of Phase 1A (360 units), which can be confirmed during the detailed design stage.
- The proposed off-site works will require three connections to the existing 300mm sanitary sewer located within Baxter Road. Two connections will be for the mixed-use buildings, and one connection for the on-site sanitary sewer to service the public park.
- The mixed-use buildings will be interconnected with an internal sanitary collection system (design by others) in order to convey flows to the existing 300mm sanitary sewer located within Baxter Road.
- The proposed on-site works will require approximately 185m of on-site sanitary sewer to service the public park in order to convey flows to the existing 300mm sanitary sewer located within Baxter Road.
- The existing sanitary sewers fronting the Subject Site on Baxter Road have adequate capacity to accommodate the proposed mixed-use development under both the ultimate and interim scenarios.

- To gain additional capacity within the Pinecrest Creek Collector Sewer, the Developer may participate in the flow monitoring/I&I program in order to advance development within the servicing area.

Water Supply System:

- Fronting the Subject Site there is an existing 200mm dead-end watermain within Baxter Road fed by an existing 300mm watermain within Iris Street.
- The proposed off-site works will require three connections to the existing 200mm watermain within Baxter Road for the mixed-use buildings. The proposed off-site works will also require one connection to the existing 200mm watermain within Bater Road, one connection to the existing 300mm watermain within Iris Street, and approximately 155m of off-site watermain within Baxter Road for the extension/looping of the water supply system.
- The mixed-use buildings will be interconnected with an internal water supply system and booster pumps (design by others).
- The proposed on-site works will require approximately 370m of on-site watermain for the extension/looping of the water supply system.
- The existing watermain network has adequate capacity to meet system pressure for the Subject Site's domestic demands and fire demands; however, the fire demand for the Subject Site will need to be confirmed during the detailed design stage of the initial phase and ultimate buildout.

Erosion and Sediment Control:

- Temporary erosion and sediment control measures will be implemented both prior to commencement and during construction in accordance with the *Guidelines on Erosion and Sediment Control for Urban Construction Sites (Government of Ontario, May 1987)*.

Next Steps, Coordination, and Approvals:

- MECP PTTW or EASR.
- Municipal Consent Circulation for the extension/looping of the existing dead-end watermain.
- MECP Environmental Certificate of Approval (ECA) for the storm/sanitary sewers granted as part of the Consolidated Linear Infrastructure programs.
- MECP Pre-authorized Watermain Alteration and Extension granted as part of City of Ottawa's Drinking Water Works Permit (F-1 Form).
- Tree Cutting Permit.
- Road Closure and Road Cut Permits.

11.0 CLOSURE

This report is respectfully submitted for review and subsequent approval. Please contact the undersigned should you have questions or require additional information.

NOVATECH

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Appendix A
Correspondence

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Proposed Major Zoning By-law Amendment and Subdivision Application – 1101 Baxter Road – PC PC2025-0029

Legend: **R** = Required, the study or plan is required with application submission
A = Advised, the study or plan is advised to evaluate the application or satisfy a condition of approval/draft approval
1 - OPA, **2** - ZBA, **3** - Plan of Subdivision, **4** - Plan of Condominium, **5** - SPC

Core studies required for certain applications all the time (Remaining studies are site specific)

For information and guidance on preparing required studies and plans refer here:

ENGINEERING										
R	**A**	**Study/ Plan Name**	**Description**	**When Required**					**Applicable Study Components & Other Comments**
				1	**2**	**3**	**4**	**5**	
☒	☐	1. Environmental Site Assessment (Phase 1 & Phase 2)	Ensures development only takes place on sites where the environmental conditions are suitable for the proposed use	☒	☒	☒	☒	☒	Record of Site Condition Yes ☐ No ☐
				Study Trigger Details: All cases					
☒	☐	2. Geotechnical Study	Geotechnical design requirements for the subsurface conditions	☒	☒	☒	☒	☒	
				Study Trigger Details: All cases					
☒	☐	3. Grading and Drainage Plan	Grading relationships between connecting (or abutting) properties and surface runoff control	☐	☐	☒	☐	☒	
				Study Trigger Details: All cases					
☐	☐	4. Hydrogeological and Terrain Analysis	A scientific study or evaluation that includes a description of the ground and surface hydrology, geology, terrain, affected landform and its susceptibility	☐	☐	☒	☒	☒	Reasonable Use Study Yes ☐ No ☐ Groundwater Impact Study Yes ☐ No ☐
				Study Trigger Details: When developing on private services or when urban development is in close proximity to existing private serviced development					
☒	☐	5. Noise Control Study	Potential impacts of noise on a development	☒	☒	☒	☒	☒	Vibration Study Yes ☐ No ☐
				Study Trigger Details: See Terms of Reference for full details.					

☐	☐	6. Rail Proximity Study	Development on land adjacent to all Protected Transportation Corridors and facilities shown on Schedule C2 of the Official Plan, to follow rail safety and risk mitigation best practices	☐	☒	☒	☒	☒	Rail Safety Report Yes ☐ No ☐ O-Train Network Proximity Study Yes ☐ No ☐
				Study Trigger Details: Within the Development Zone of Influence for existing and future rapid transit stations and corridors, as shown on Annex 2 of the OP OR on land adjacent to all Protected Transportation Corridors and facilities shown on Schedule C2 of the Official Plan					
☒	☐	7. Site Servicing Study	Provides servicing details based on proposed scale of development with an engineering overview taking into consideration surrounding developments and connections.	☐	☒	☒	☒	☒	Fluvial Geomorphological Report Yes ☐ No ☐ Assessment of Adequacy of Public Services Yes ☐ No ☐ Servicing Options Report Yes ☐ No ☐ Erosion and Sediment Control Plan / Brief Yes ☐ No ☐ Hydraulic Water Main Analysis Yes ☐ No ☐ Stormwater Management Report and Detailed Design Brief Yes ☐ No ☐
				Study Trigger Details: All cases					
☐	☐	8. Slope Stability Study	Assessment of slope stability and measures to provide safe set-back.	☐	☒	☒	☒	☒	Retrogressive Landslide Analysis Yes ☐ No ☐
				Study Trigger Details: Where the potential for Hazard Lands exists on a site.					
☒	☐	9. Transportation Impact Assessment	Identify on and off-site measures to align a development with City transportation objectives.	☐	☒	☒	☒	☒	Roadway Modification Functional Design Yes ☐ No ☐
				Study Trigger Details: If the development generates 60 person-trips or more; or if the development is located in a Location Trigger; or if the development has a Safety Trigger.					

☐	☐	10. Water Budget Assessment	Identify impact of land use changes on the hydrologic cycle and post-development mitigation targets.	☐	☒	☒	☒	☒	
				Study Trigger Details: May be required for site plan control applications for sites with private servicing and / or proximity to hydrogeologically-sensitive areas. Draft plans of subdivision are required to integrate water budget assessments into supporting stormwater management plans and analysis for the study area.					
☐	☐	11. Wellhead Protection Study	Delineate a Wellhead Protection Area (WHPA) and characterize vulnerability for new communal residential drinking water well systems, in accordance with Technical Rules under *Clean Water Act*.	☐	☒	☒	☒	☒	
				Study Trigger Details: Required for all new communal residential drinking water well systems; including new municipal wells, new private communal wells (small water works) that require a Municipal Responsibility Agreement (MRA), expansions or increased water takings from an existing municipal well or existing private communal well and new private communal wells.					

PLANNING									
R	**A**	**Study/Plan Name**	**Description**	**When Required**					**Applicable Study Components & Other Comments**
				1	**2**	**3**	**4**	**5**	
☐	☐	12. Agrology and Soil Capability Study	Confirm or recommend alterations to mapping of agricultural lands in the City.	☒	☐	☐	☐	☐	
				Study Trigger Details: For the expansion of a settlement area or identification of a new settlement area through a comprehensive review; or where it is demonstrated that the land does not meet the requirements for an Agricultural Resource Area.					
☐	☐	13. Archaeological Assessment	Discover any archaeological resources on site, evaluate cultural heritage value and conservation strategies	☒	☒	☒	☒	☒	
				Study Trigger Details: When the land has either: a known archaeological site; or the potential to have archaeological sites; or where the City's Archaeological Resource Potential Mapping Study indicates archaeological potential, outside of the historic core; or upon discovery of any archaeological resource during construction in the City's historic core area.					
☐	☐	14. Building Elevations	Visual of proposed development to understand facing of building including direction of sunlight, height, doors, and windows.	☒	☒	☐	☐	☒	
				Study Trigger Details: Site Plan: for residential buildings with 25 or more residential units; or for residential buildings with less than 25 residential units, if the units are within the Urban area or the High-performance Development Standard threshold in the rural area. Official Plan or Zoning By-law: if staff deem it necessary to determine compliance with OP policies, the Zoning By-law or City of Ottawa Urban Design Guidelines.					

☐	☐	15. Heritage Impact Assessment	Determine impacts of proposed development on cultural heritage resources.	☒	☒	☒	☒	☒	Study Trigger Details: Where development or an application under the Ontario Heritage Act is proposed on, adjacent to, across the street from or within 30 metres of a protected heritage property; or for any development adjacent to the Rideau Canal UNESCO World Heritage Site and its landscaped buffer.	Conservation Plan Yes ☐ No ☐
☐	☐	16. Heritage Act Acknowledgement Report	A submission requirement to demonstrate that the *Ontario Heritage Act* requirements have been satisfied, to ensure that multiple applications are considered currently.	☐	☒	☒	☒	☒	Study Trigger Details: Where the subject property is listed on the Heritage Register and the applicant must submit a Heritage Permit Application (designated heritage property listed on the Heritage Register) or provide notice of intent to demolish or remove a building (non-designated property listed on the Heritage Register).	Heritage Permit Application Yes ☐ No ☐ Notice of Intent to Demolish Yes ☐ No ☐
☐	☐	17. Impact Assessment Study – Mineral Aggregate	Mineral aggregate extraction activities; and to protect known high quality mineral aggregate resources from development and activities that would preclude or hinder their existence (ability to be extracted) or expansion.	☒	☒	☒	☒	☒	Study Trigger Details: New Development within 500 metres of lands within the Bedrock Overlay , or within 300 metres of lands within the Sand and Gravel Resource Area Overlay.	
☐	☐	18. Impact Assessment Study – Mining Hazards	To identify or confirm known mineral deposits or petroleum resources and significant areas of mineral potential. To protect mineral and petroleum resources from development and activities which would preclude or hinder the establishment of new operations or access to the resources.	☒	☒	☒	☒	☒	Study Trigger Details: For all applications in proximity to mining operations.	

☐	☐	19. Impact Assessment Study – Waste Disposal Sites / Former Landfill Sites	To identify or confirm known proximity of existing or former waste disposal sites. To ensure issues of public health, public safety and environmental impact are addressed.	☒	☒	☒	☒	☒	<u>Study Trigger Details</u>: For the establishment of any new Solid Waste Disposal Site or for a footprint expansion of an operating Solid Waste Disposal Site; or development within three kilometers of an operating or non-operating Waste Disposal Site.	
☒	☐	20. Landscape Plan	A plan to demonstrate how the canopy cover, urban design, health, and climate change objectives of Official Plan will be met through tree planting and other site design elements.	☒	☒	☒	☒	☒	<u>Study Trigger Details</u>: Site Plan, Plan of Subdivision, and Plan of Condominium: always required, except where it is demonstrated that the landscape component of a project is not relevant to the review of the application. A high-level conceptual Landscape Plan may be required to support Zoning By-law and Official Plan Amendment applications.	
☐	☐	21. Mature Neighbourhood Streetscape Character Analysis	In the Mature Neighbourhoods a Streetscape Character Analysis is required to determine the applicable zoning requirements.	☐	☒	☐	☐	☐	<u>Study Trigger Details</u>: Zoning By-law amendment application in areas covered by the Mature Neighbourhoods zoning overlay for applications of residential development of four storeys or less located in a R1, R2, R3, or R4 zone.	
☐	☐	22. Minimum Distance Separation	Provincial land use planning tool that determines setback distances between livestock barns, manure storages or anaerobic digesters and surrounding land uses, with the objective of minimizing land use conflicts and nuisance complaints related to odour.	☒	☒	☒	☒	☒	<u>Study Trigger Details</u>: Applications in the Rural Area, outside of a village.	

☒	☐	23. Parking Plan	A tool to assess the sufficiency of on-street parking in plans of subdivision.	☐	☐	☒	☒	☐	Study Trigger Details: For new or revised plans of subdivision with public streets.	
☒	☐	24. Plan of Survey	A Plan of Survey depicts legal boundaries and is a specialized map of a parcel of land and it delineates boundary locations, building locations, physical features and other items of spatial importance.	☒	☒	☒	☒	☒	Study Trigger Details: Required for all *Planning Act* applications.	
☒	☐	25. Plan of Subdivision	Proposed subdivision layout to be used for application approval	☐	☒	☒	☐	☐	Study Trigger Details: Always required with the submission of plan of subdivision application. Only required with a Zoning By-law Amendment application, where such ZBLA is in response to enable a subdivision.	
☐	☐	26. Plan of Condominium	Proposed condominium layout to be used for application approval	☐	☐	☐	☒	☐	Study Trigger Details: With the submission of plan of condominium application.	
☒	☐	27. Planning Rationale	Provides the planning justification in support of the *Planning Act* application and to assist staff and the public in the review of the proposal.	☒	☒	☒	☐	☐	Study Trigger Details: For all Official Plan amendment, Zoning By-law amendment, or plan of subdivision applications.	Integrated Environmental Review Summary Yes ☐ No ☐
☒	☐	28. Preliminary Construction Management Plan	A checklist that shows a development proposal's anticipated impacts to all modes of transportation and all elements in the right of way during construction.	☐	☐	☒	☐	☒	Study Trigger Details: For all Site Plan and plan of subdivision applications.	

☒	☐	29. Public Consultation Strategy	Proposal to reach and collect public input as part of development application.	☒	☒	☒	☒	☒	Study Trigger Details: Official Plan Amendment, Zoning By-law Amendment and Subdivision: Always required. Condominium: Vacant Land only Site Plan: At the discretion of the City's file lead in consultation with the Business and Technical Support Services Manager.	
☒	☐	30. Shadow Analysis	A visual model of how the proposed development will cast its shadow.	☐	☒	☐	☐	☐	Study Trigger Details: When there is an increase in height or massing proposed for a residential, commercial or office use. Two triggers: 1. Inside the Greenbelt: proposed development is over 5 storeys in height (≤15 meters). If a development proposal is 5 storeys or less, but is proposing an increase in height and/or massing and is in close proximity to a shadow sensitive area, a shadow analysis may be requested. 2. Outside the Greenbelt: proposed development is over 3 storeys in height (≤9 meters) and is in close proximity to a shadow sensitive area. Where a proposed development is not in close proximity to a shadow sensitive area (e.g. industrial development) the trigger for a shadow analysis is over 5 storeys in height (≤15 meters).	
☒	☐	31. Site Plan	A Site Plan is a visual drawing that illustrates the proposed development of a site in two dimensions.	☒	☒	☒	☒	☒	Study Trigger Details: Site Plan: All Other applications: where a layout of the	Site Plan Yes ☐ No ☐ Concept Plan Yes ☐ No ☐

				public realm, building massing, heights, densities or massing of the proposal provides changes to the planned context; sites proposing multiple land uses; sites with multiple landowners; sites with two or more buildings, on-site park dedication, and/or a new public or private street(s); sites with proposed changes to connectivity (such as active transportation networks, vehicular circulation or access to transit); sites where the development potential on adjacent properties may be impacted by or could be integrated into the proposed site.	Facility Fit Plan Yes ☐ No ☐
☒	☐	32. Urban Design Brief	Illustrate how a development proposal represents high-quality and context sensitive design that implements policies of the Official Plan, relevant secondary plans, and Council approved plans and guidelines.	☒ ☒ ☒ ☐ ☒ Study Trigger Details: For all Official Plan amendment, Zoning By-law amendment, and plan of subdivision applications. For SPC applications: proposals for residential buildings with 25 or more residential units, or for proposals for residential buildings with less than 25 residential units, if the units are within the Urban area or the High-performance Development Standard threshold in the rural area where OP Policy 11.3 (3) is relevant; for non-residential and mixed-use proposals.	
☐	☐	33. Urban Design Review Panel Report	Demonstrates that a development proposal has attended an Urban Design Review Panel formal review meeting, received, and responded to the associated recommendations, if applicable	☒ ☒ ☒ ☒ ☒ Study Trigger Details: Required for all planning act applications subject to UDRP review, in accordance with the UDRP Panel Terms of Reference.	
☒	☐	34. Wind Analysis	A visual model and a written evaluation of how a proposed development will impact pedestrian-level wind conditions.	☐ ☒ ☐ ☐ ☒ Study Trigger Details: Applications seeking an increase in height and/or massing which is either: a tall building(s), 10 storeys or more or a proposed building that is more than twice the height of	

				adjacent existing buildings and is greater than five storeys in height and is adjacent to existing or planned low rise development, open spaces, water bodies and large public amenity areas.						
☒	☐	35. Zoning Confirmation Report	The purpose of the Zoning Confirmation Report (ZCR) is to identify all zoning compliance issues, if any, at the outset of a planning application.	☐	☒	☐	☐	☒	Study Trigger Details: Required for all SPC and ZBLA applications.	

ENVIRONMENTAL										
R	**A**	**Study / Plan Name**	**Description**	**When Required**					**Applicable Study Components & Other Comments**	
				1	**2**	**3**	**4**	**5**		
☐	☐	36. Community Energy Plan	Includes a community energy analysis, alongside mitigation measures, and other associated information. The community energy analysis refers to the overall assessment process to identify on and off-site measures to align the design of the development with City climate objectives.	☐	☐	☐	☐	☐	NOT IMPLEMENTED & NOT REQUIRED	
☐	☐	37. Energy Modelling Report	The Energy Modeling Report is a Site Plan Control application submission requirement to show how climate change mitigation, and energy objectives will be met through exterior building design elements.	☐	☐	☐	☐	☐	NOT IMPLEMENTED & NOT REQUIRED	
☐	☐	38. Environmental Impact Study	Assessment of environmental impacts of a project and documents the existing natural features, identifies the potential environmental impacts,	☒	☒	☒	☐	☒	Study Trigger Details: Is required when development or site alteration is proposed in or within a	Assessment of Landform Features Yes ☐ No ☐ Integrated Environmental Review Yes ☐ No ☐

			recommends ways to avoid and reduce the negative impacts, and proposes ways to enhance natural features and functions.	specified distance of environmentally designated lands, natural heritage features, the City's Natural Heritage System, or hazardous forest types for wildland fire. The EIS Decision Tool (Appendix 2 of the Environmental Impact Study Guidelines) provides a checklist of the natural heritage features and adjacent areas within which an EIS is required to support development applications under the *Planning Act.*	Protocol for Wildlife Protection during Construction Yes ☐ No ☐ Significant Woodlands Guidelines for Identification, Evaluation, and Impact Assessment Yes ☐ No ☐
☐	☐	39. Environmental Management Plan	A comprehensive environmental planning document that identifies, evaluates, and mitigates the potential impacts of proposed development on the natural environment and its ecological functions at local planning stage.	☒ ☐ ☐ ☐ ☐ Study Trigger Details: Official Plan amendments for local plans (area-specific policy or secondary plan, where: there is significant change in the conditions upon which the original study was based; there are proposed changes to planned infrastructure needed to service a subdivision that would have a significant impact on the infrastructure needs of another subdivision within the EMP study area, or the applicable Class Environmental Assessment approval has expired.	
☐	☐	40. High-performance Development Standard	A collection of voluntary and required standards that raise performance of new building projects to achieve sustainable and resilient design	☐ ☐ ☐ ☐ ☐ NOT IMPLEMENTED & NOT REQUIRED	
☒	☐	41. Tree Conservation Report	Demonstrates how tree cover will be retained and protected on the site, including mature trees, stands of trees, and hedgerows.	☐ ☐ ☒ ☒ ☒ Study Trigger Details: Where there is a tree of 10 centimeters in diameter or greater on the site and/or if there is a tree on an adjacent site that has a Critical Root Zone (CRZ) extending onto the development site.	

File No.: PC2025-0029

March 18, 2025

Evan Garfinkel
Regional Group
Via email: egarfinkel@regionalgroup.com

Subject: Pre-Consultation: Meeting Feedback
Proposed Zoning By-law Amendment and Plan of Subdivision Applications – 1101 Baxter Road

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on February 20, 2025.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☒	**4** ☐	**5** ☐

One (1) indicates that considerable major revisions are required while five (5) suggests that the proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Should you choose, proceed to complete a Phase 2 / Phase 3 Pre-consultation Application Form. Please submit this information together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed is requested with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density it is recommended that a subsequent pre-consultation application be submitted.

4. If the Urban Design Review Panel (UDRP) Report is listed as a required submission material in the Study and Plan Identification List, the applicant must visit the UDRP prior to formally submitting the planning application. The UDRP report is required for the application to be considered complete.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. **OP:** Schedule B2 - Inner Urban Transect, Hub, Evolving Neighbourhood Overlay

2. **Secondary Plan:** Pinecrest and Queensview Stations Secondary Plan - this along with the associated zoning recently approved and is within the appeal period at this time.

3. **Zoning:** Rezoned from Light Industrial to Mixed-Use Centre (**MCXX SYYY4)**

    a. 40, 30, and 10-storey heights - moving from the highway towards the south of the property.

        i. 45 degree angular plane to be demonstrated.

    b. 25-metre tower separations for towers on the same lot

    c. Sideyard setback for tower is 12.5m

    d. Lots greater than 1250 sq m 2% of lot area must be provided as outdoor communal area, can be used towards any amenity area reqs. under the ZB.

4. Section 37 requirements / Community Benefits Charge

    a. The former Section 37 regime has been replaced with a "Community Benefits Charge", By-law No. 2022-307, of 4% of the land value. This charge will be required for ALL buildings that are 5 or more storeys and 10

or more units and will be required at the time of building permit unless the development is subject to an existing registered Section 37 agreement. Questions regarding this change can be directed to Ranbir.Singh@ottawa.ca.

5. Please observe the Urban Desing Guidelines for High-rise Buildings in any future Site Plan Application in determining appropriate lotting.

6. Landscape requirements

    a. A landscape plan is required prior to early servicing.

7. Secondary Plan - Site Specific policies of interest:

    a. a sidewalk shall be required in the right-of-way along the east and south side of Baxter Road

    b. cycling facilities may be required in the right-of-way along the east and south side of Baxter Road, adjacent to 1101 Baxter Road.

    c. new public or private street(s) that demonstrate all of the following:

    d. Improved overall connectivity through the site;

    e. Direct access to Queensview Station;

    f. Prioritized safety for people using active transportation; and

    g. Connections to the broader street network.

    h. Buildings may have their frontage internal provided a number of conditions are met.

    i. Development at the north part of the site may include a pedestrian bridge over Baxter Road to connect directly to the pedestrian bridge over Highway 417 to Queensview Station without an amendment to this Plan.

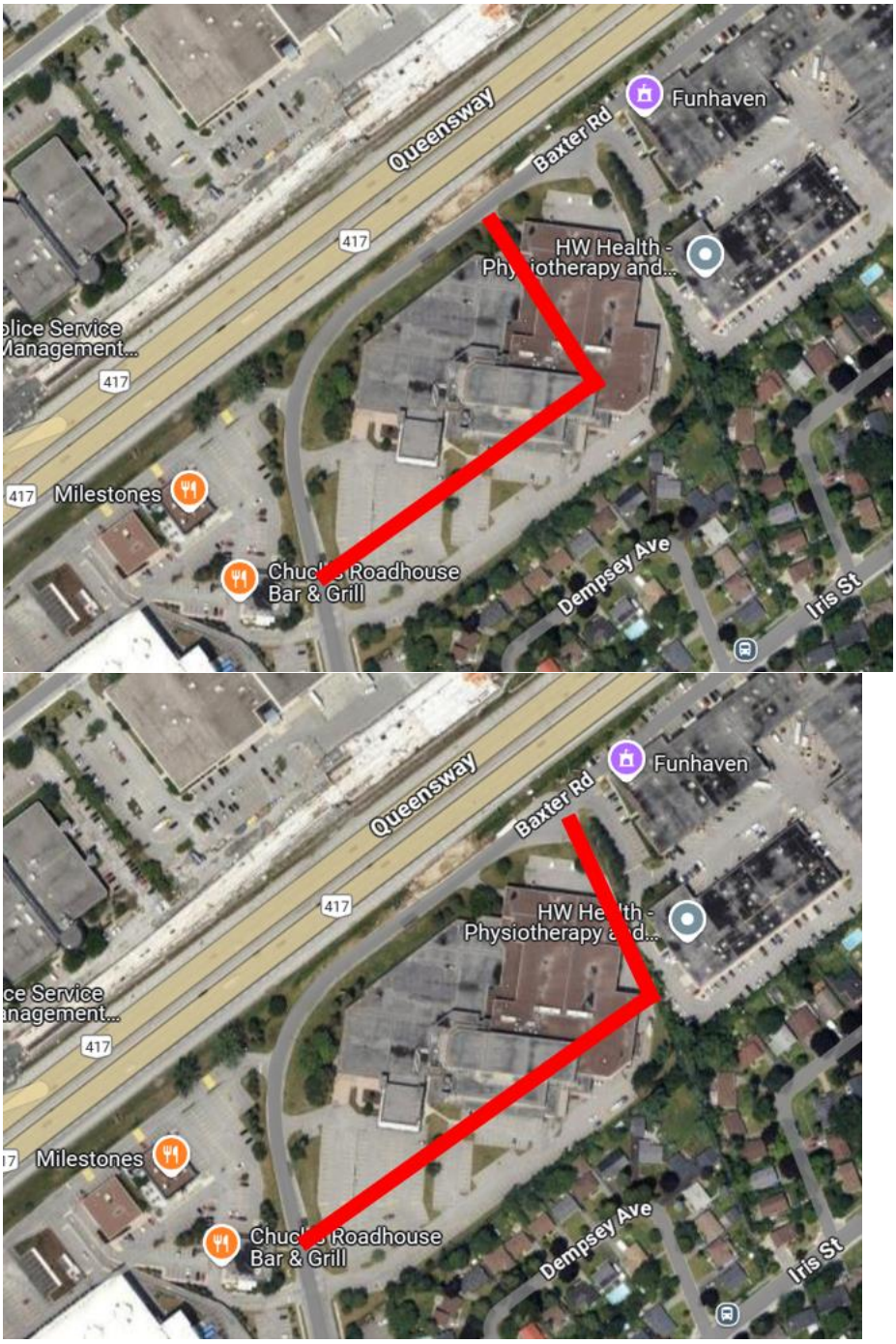
Urban Design

Comments:

8. As part of a formal submission, staff require an Urban Design Brief (Terms of Reference attached), architectural drawings (including a Site Plan and Building Elevations) a Concept Plan (including conceptual massing), a Landscape Plan, and Wind and Shadow Studies. Staff also require a Block Plan illustrating development potential on adjacent sites and detailed angular planes depicting the proposed transition to the low-rise community to the south.

9. The site is located within a Design Priority Area, a visit to the UDRP will be required in advance of the Applicant's formal submission to the City. A UDRP Report will also be required.

10. The proposed public road should break up the large development blocks and either align with the pedestrian bridge for the transit station or the edge of the site to normalize Baxter Road:



11. The location of the park needs to consider future shadow and wind conditions.

12. There may be further opportunities to break-up the larger blocks with POPS and mid-block connections which should be explored as part of a Master Plan.

13. Staff recommend a further pre-consultation once built form details are available.

Engineering

Comments:

14. The Stormwater Management Criteria, for the subject site, is to be based on the following:

    a. Stormwater Management Guidelines for the Pinecrest Creek/Westboro Area, Final Report, dated May 2019, prepared by JFSA. This site drains directly into the Ottawa River Parkway (ORP) pipe and therefore would fall under category 7 in Table 3-1 of the above noted Report.

        i. A minimum on-site retention of the 10mm design storm;

        ii. On-site removal of 80% of TSS; some of which would be accomplished by on-site retention of first 10mm of rainfall;

        iii. 1:100 year discharge from site not to exceed 33.5 L/s/ha

    b. Any storm event greater than the allowable release rate, up to and including the 100-year storm event, must be detained on site.

15. A municipal Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA) will be required for the proposed development for the municipal sanitary sewers and storm sewers. A Ministry contact has been provided below but please work with City staff on the application.

    a. Patrick Lalonde at (613) 521-3450 or Patrick.Lalonde@ontario.ca

16. There are sanitary constraints in the Pinecrest Creek Collector sewer. This will require further discussion with the City's Infrastructure Planning Unit for long term sanitary servicing for the site. Sewer capacity will be evaluated for each development application and if capacity is deemed inadequate for the proposed development, the City may put a development application on hold by imposing development conditions requiring adequate servicing or by adding a holding symbol to applicable zoning until there is sufficient capacity. Please provide conceptual sanitary sewer flows once available.

17. Once the conceptual sanitary sewer flows are received, the City's Infrastructure Planning Unit will determine how much capacity is available in the Pinecrest Creek Collector sewer. Please note that any available sewer capacity for new developments will be considered on a first come, first served basis and will not be reserved until Draft Plan of Subdivision approval or Site Plan approval. As stated below in Section 4.3.4 of the Infrastructure Master Plan, the Draft Plan of Subdivision application may be subject to conditions requiring development phasing, with associated phasing of capacity allocation, to ensure fair and

orderly development that addresses the needs of other developers subject to the same constraints. At draft plan submission, please submit a phasing plan, with associated phasing of projected sanitary flows.

4) Where infrastructure system capacity is limited, and is unable to meet all future development related demands, the available capacity will be allocated in the following order of priority:

a. All developments with Draft Plan of Subdivision Approval, subject to conditions of approval, or Site Plan Approval
b. Zoned land not requiring a Site Plan Control approval
c. Zoned land requiring a Site Plan Control approval
d. Zoned land where the applicant is seeking a Consent to Sever

Any remaining capacity will be allocated at the time of draft approval on a first-come-first-served basis unless an agreement is otherwise reached between all property owners who may potentially benefit. If draft approval for a specific development expires, the associated capacity allocation will also expire.
Draft Plan of Subdivision applications in such areas may be subject to conditions requiring development phasing, with associated phasing of capacity allocation, to ensure fair and orderly development that addresses the needs of other developers subject to the same constraints. Where proposed development exceeds the available capacity, the City may use other measures, such as Holding Zones, that would apply until such time as the available capacity is increased.

18. Until more capacity is gained in the Pinecrest Creek Collector through future servicing studies and subsequent projects, the applicant can look for ways to offset their sanitary flows to the system through extraneous flow inflow and infiltration removal via onsite works (proposed sanitary infrastructure) or offsite works (existing sanitary infrastructure).

19. An existing 300mm diameter sanitary sewer runs along the north side of the subject site and runs west, discharging to the Pinecrest Creek Collector sewer. The applicant must determine if there is sufficient capacity in the 300mm diameter sanitary sewer to support the proposed residential development or if the existing sewer requires upsizing. Please incorporate any phasing plans into these calculations.

20. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

    a. Location of service

b. Type of development

c. The amount of fire flow required (per OBC or FUS).

d. Average daily demand: ___ l/s.

e. Maximum daily demand: ___l/s.

f. Maximum hourly daily demand: ___ l/s.

21. The subject site is currently serviced by a 203mm diameter watermain running along the west and north sides of the site. The public portion of the watermain is a dead end watermain on Baxter Road. To service the proposed residential blocks, a public watermain loop will be required. This can be achieved by the following three options:

    a. Looping the 203mm watermain back along Baxter Road towards Iris Street.

    b. Looping the 203mm watermain by upsizing the 152mm private watermain located behind 1050 Baxter Road and connecting via an existing block to Elmira Drive (with an easement in favour of the City over 1050 Baxter Road).

    c. Looping the 203mm watermain to Elmira Drive through an existing residential parcel fronting Elmira Drive and backing onto 1101 Baxter Road that would be purchased by the owner of 1101 Baxter Road. An easement in favour of the City would be required over any portion of the watermain that was not located within a City right-of-way. The minimum easement width is 6.0m

22. At the time of Site Plan Application for individual blocks: Residential areas serving 50 or more dwellings shall be connected with a minimum of two watermains, separated by an isolation valve, to avoid the creation of a vulnerable service area.

Feel free to contact Julie Candow, Project Manager, for follow-up questions.

Noise

Comments:

23. Noise Impact Studies are required. Feasibility Study required before draft approval and Detailed Study required before registration. Both studies must assess:

    a. Road

b. Rail

c. Stationary (due to the proximity to neighbouring exposed mechanical equipment) or (if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses)

24. Note that the Feasibility Study is not required at the time of application, but is required before draft approval. However, it is highly recommended to submit the Noise Feasibility Study as soon as possible so that noise effects can be avoided or mitigated as part of the subdivision design.

Feel free to contact Josiane Gervais, TPM, for follow-up questions.

Transportation

Comments:

25. Follow Traffic Impact Assessment Guidelines:

    a. Note that the TIA Guidelines have been updated, the changes are available on the City's website.

    b. Traffic Impact Assessment is required. Please submit the Scoping/Forecasting report to josiane.gervais@ottawa.ca at your earliest convenience. The applicant is responsible to submit the Scoping Report prior to application and must allow for a 14 day circulation period.

    c. The Strategy Report (including Synchro files) must be submitted with the formal submission to deem complete. The applicant is strongly encouraged to submit the Strategy Report to the TPM prior to formal submission and allow for a 14 day circulation period.

    d. Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)

26. Local roadways are to be designed for a 30km/hr posted speed.

27. Geometric Road Design Drawings (GRDD) will be required with the first submission of underground infrastructure and grading drawings. You are strongly encouraged to submit conceptual GRDD plans as part of the Draft Plan of Subdivision review. These drawings should include such items as, but are not limited to:

    a. Road signage and pavement markings;

    b. Location of depressed curbs and tactile walking surface indicators (TWSI);

c. Traffic calming measures aimed at reducing vehicle speed and enhancing pedestrian safety. Measures may include either vertical or horizontal features, however such measures shall not interfere with stormwater management and overland flow routing. Traffic calming measures shall reference best management practices from the Canadian Guide to Neighbourhood Traffic Calming, published by the Transportation Association of Canada, and/or Ontario Traffic Manual, and/or the City of Ottawa's Traffic Calming Design Guidelines;

d. Intersection control measures at new internal intersections.

28. ROW Protection:

    a. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16.

    b. Corner triangles are required (measure on the property line/ROW protected line; no structure above or below this triangle): **Local road to local**: A 3 metre x 3 metre triangle.

    c. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

29. Site is within 200 m of Queensview LRT station.

30. Ensure sightlines for the two proposed public roadway intersections are adequate.

Feel free to contact Josiane Gervais, Transportation Project Manager, for follow-up questions.

Environment

Comments:

31. No natural features that would trigger an Environmental Impact Study.

32. Bird-Safe Design Guidelines - Please review and incorporate bird safe design elements. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf

33. Please consider if there are features that can be added reduce the urban heat island effect (see OP 10.3.3). For example, this impact can be reduced by

adding large canopy trees, green roofs or vegetation walls, or incorporating building with low heat absorbing materials.

Feel free to contact Matthew Hayley, Environmental Planner, for follow-up questions.

Forestry

Comments:

34. A Tree Conservation Report is required, providing tree information for the existing trees on and adjacent to the site. While no detailed plans have been provided, the TCR should assess the retainability of trees, based on current conditions and anticipated use of the proposed block.
    a. A Tree Permit, issued by the planning forester, will be required for the removal of any protected trees, on or adjacent to the site.
35. A conceptual Landscape Plan is required, showing adequate soil volumes to support tree plantings.
36. Existing trees bordering the residential properties to the South should be prioritized for retention. Existing soil volumes must be preserved and expanded, to ensure that there is sufficient space for existing and new trees.
37. The following Tree Conservation Report (TCR) guidelines have been adapted from the Schedule E of the Tree Protection By-law – for more information on these requirements please contact julian.alvarez-barkham@ottawa.ca
    a. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City.
        i. An approved TCR is a requirement of Site Plan approval.
    b. Any removal of privately-owned trees 10cm or larger in diameter within the urban area, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
    c. The TCR must contain 2 separate plans:
        i. Plan/Map 1 - show existing conditions with tree cover information.
        ii. Plan/Map 2 - show proposed development with tree cover information.
    d. The TCR must list all trees on site, as well as off-site trees if the CRZ (critical root zone) extends into the developed area, by species, diameter, and health condition.
        i. For ease of review, the Planning Forester suggests that all trees be numbered and referenced in an inventory table.
    e. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)

f. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained.
    i. Compensation may be required for the removal of city owned trees.
g. The removal of trees on a property line will require the permission of both property owners.
h. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available on the Tree Protection Specification or by searching Ottawa.ca.
    i. The location of tree protection fencing must be shown on the plan.
    ii. Show the critical root zone of the retained trees.
i. As per the Official Plan §4.8.2, the retention of healthy trees must be prioritized wherever possible. Please seek opportunities for retention of trees that will contribute to the design and function of the site.

38. The following Landscape Plan (LP) guidelines have been adapted from Schedule E of the Tree Protection By-law – for more information on these requirements please contact julian.alvarez-barkham@ottawa.ca

a. Please ensure any retained trees are shown on the LP.
b. Minimum Setbacks
    i. Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
    ii. Maintain 2.5m from curb.
    iii. Coniferous species require a minimum 4.5m setback from curb, sidewalk, or MUP/cycle track/pathway.
    iv. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas.
    v. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.
b. Tree specifications
    i. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
    ii. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage.
c. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and if possible, include watering and warranty as described in the specification.
d. No root barriers, dead-man anchor systems, or planters are permitted.
e. No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)
f. Hard surface planting

i. If there are hard surface plantings, a planting detail must be provided.

ii. Curb style planter design is highly recommended.

iii. No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.

c. Trees are to be planted at grade.

d. Soil Volume - Please demonstrate as per the **Landscape Plan Terms of Reference** that the available soil volumes for new plantings will meet or exceed the following:

Tree Type/Size	Single Tree Soil Volume (m^3)	Multiple Tree Soil Volume (m^3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

i. It is strongly suggested that the proposed species list include a column listing the available soil volume.

e. Sensitive Marine Clay - Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines.

f. The City requests that consideration be given to planting native species wherever there is a high probability of survival to maturity.

g. Efforts shall be made to provide as much future canopy cover as possible at a site level, through tree planting and tree retention. The Landscape Plan shall show/document that the proposed tree planting and retention will contribute to the City's overall canopy cover over time. **Please provide a projection of the future canopy cover for the site to 40 years.**

Feel free to contact Julian Alvarez-Barkham, Forester, for follow-up questions.

Parkland

Comments:

39. Comments forthcoming.

Feel free to contact Louise Cerveny, Parks Planner, for follow-up questions.

Other

40. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design and will be applicable to Site Plan Control and Plan of Subdivision applications.

    a. The HPDS was passed by Council on April 13, 2022, but is not in effect at this time, as Council has referred the 2023 HPDS Update Report back to staff with the direction to bring forward an updated report to Committee at a later date. The timing of an updated report to Committee is unknown at this time, and updates will be shared when they are available.

    b. Please refer to the HPDS information at ottawa.ca/HPDS for more information.

41. Under the Affordable Housing Community Improvement Plan, a Tax Increment Equivalent Grant (TIEG) program was created to incentivize the development of affordable rental units. It provides a yearly fixed grant for 20 years. The grant helps offset the revenue loss housing providers experience when incorporating affordable units in their developments.

    a. To be eligible for the TIEG program you must meet the following criteria:

        i. the greater of five units OR 15 per cent of the total number of units within the development must be made affordable

        ii. provide a minimum of 15 per cent of each unit type in the development as affordable

        iii. enter into an agreement with the city to ensure the units maintain affordable for a minimum period of 20 years at or below the city-wide average market rent for the entire housing stock based on building form and unit type, as defined by the Canada Mortgage and Housing Corporation

        iv. must apply after a formal Site Plan Control submission, or Building Permit submission for projects not requiring Site Plan Control, and prior to Occupancy Permit issuance

    b. Please refer to the TIEG information *at Affordable housing community improvement plan / Plan d'améliorations communautaires pour le logement abordable for more details or contact the TIEG coordinator via email at affordablehousingcip@ottawa.ca.*

Submission Requirements and Fees

1. A Zoning By-law Amendment and Plan of Subdivision.

a. Additional information regarding fees related to planning applications can be found here.

2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,

John Bernier, MCIP, RPP
Planner II

LAND DEVELOPMENT REVIEW CORRESPONDENCE

Correspondence: 1101 Baxter Road; MTO-LD-2025-41K-000755

Brian Hickey (Regional Planner (CMP/SPM))
Tuesday December 9, 2025 10:04 AM

To: Jeff Kelly <j.kelly@novatech-eng.com>
Attachments: 1101 Baxter Road; MTO-LD-2025-41K-000755.msg

Good morning,
Thank you for your submission.
Under the authority of the Public Transportation and Highway Improvement Act (PTHIA), the Ministry, through the issuance of permits, controls all land use within 45 metres of the highway right-of-way and the area within 395 metres of the centre-point of the highway intersection and any intersecting road. All development within the control area is subject to Ministry approvals and it is the responsibility of the landowner to acquire all necessary MTO permits prior to the commencement of any construction and/or alteration. Please note that the subject land is within the Ministry's permit control area as defined by PTHIA. Therefore, Ministry approvals and permits are required prior to the construction and/or alteration of any buildings and/or structures and prior to the issuance of any municipal building permits or approvals as per Section 8. (2) (a) of the *Building Code Act*.
The Ministry will require additional supporting documentation to accompany your Land Development Review submission.
MTO will require a complete site plan, which must include engineered, scalable and stamped drawings that depict all existing and proposed structures or features with all applicable setbacks.
MTO will require a Traffic Impact Study (TIS) to determine the impacts to the provincial highway system and potential mitigation that may be required to address those impacts. (Only a draft was provided)
The MTO will also require a Stormwater Management (SWM) Report. As a general principle, stormwater management plans must conform to the Ministry's requirement that post-development flows to the highway drainage system do not exceed pre-development flows.
In addition, a Photometric plan is needed to demonstrate how the site will be illuminated, ensuring that no light from the site escapes onto the Ministry's ROW.
Please note: All visible signs within 400 m of any limit of a Provincial Highway require a Ministry issued permit.

Once the submission has been completely circulated, reviewed and approved by MTO, you may then proceed to apply for the Building and Land Use permit. (And Location Sign permit if applicable)

Thank you,

Brian Hickey
Corridor Management Planner
Highway Corridor Management
Ministry of Transportation of Ontario

Appendix B
Servicing Report Checklist

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Engineers, Planners & Landscape Architects

Development Servicing Study Checklist

Project Name: 1101 Baxter Road
Project Number: 121019
Date: December 22, 2025

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Executive Summary (for larger reports only).	**NA**		
Date and revision number of the report.	Y	Cover	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y	Fig 1.1, 1.2, 1.3	
Plan showing the site and location of all existing services.	Y	GP	
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	NA		
Summary of Pre-consultation Meetings with City and other approval agencies.	Y	1	
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Y	2	
Statement of objectives and servicing criteria.	Y	1	
Identification of existing and proposed infrastructure available in the immediate area.	Y	4,5,6	
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	NA		
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Y	GR	

Development Servicing Study Checklist

Project Name: 1101 Baxter Road
Project Number: 121019
Date: December 22, 2025

4.1 General Content	**Addressed (Y/N/NA)**	**Section**	**Comments**
Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	NA		
Proposed phasing of the development, if applicable.	NA		
Reference to geotechnical studies and recommendations concerning servicing.	Y	2	
All preliminary and formal site plan submissions should have the following information:			
Metric scale	NA		
North arrow (including construction North)	NA		
Key plan	NA		
Name and contact information of applicant and property owner	NA		
Property limits including bearings and dimensions	NA		
Existing and proposed structures and parking areas	NA		
Easements, road widening and rights-of-way	NA		
Adjacent street names	NA		

4.2 Water	Addressed (Y/N/NA)	Section	Comments
Confirm consistency with Master Servicing Study, if available.	NA		
Availability of public infrastructure to service proposed development.	Y	6	
Identification of system constraints.	Y	6	
Identify boundary conditions.	Y	6	
Confirmation of adequate domestic supply and pressure.	Y	6	
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y	6	
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Y	6	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	Y	6	
Address reliability requirements such as appropriate location of shut-off valves.	Y	GP	
Check on the necessity of a pressure zone boundary modification.	NA		
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y	6	
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y	6, GP	
Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	Y	6	
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	6	
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Y	6	

4.3 Wastewater	**Addressed (Y/N/NA)**	**Section**	**Comments**
Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Y	5	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	NA		
Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	NA		
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	5	
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Y	5	
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N		
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	5	
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	NA		
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	NA		
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	NA		
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	NA		
Special considerations such as contamination, corrosive environment etc.	NA		

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	4	
Analysis of the available capacity in existing public infrastructure.	NA		
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y	STM	
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	4	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Y	4	
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	4	
Set-back from private sewage disposal systems.	NA		
Watercourse and hazard lands setbacks.	NA		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	NA		
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	NA		
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	4	
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Y	4	
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Y	4	
Any proposed diversion of drainage catchment areas from one outlet to another.	NA		
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	Y	4	
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	NA		

4.4 Stormwater	**Addressed (Y/N/NA)**	**Section**	**Comments**
Identification of municipal drains and related approval requirements.	NA		
Description of how the conveyance and storage capacity will be achieved for the development.	Y	4	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y	4	
Inclusion of hydraulic analysis including HGL elevations.	Y	4	
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	8	
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	Y	4	
Identification of fill constrains related to floodplain and geotechnical investigation.	NA		

4.5 Approval and Permit Requirements	Addressed (Y/N/NA)	Section	Comments
Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Y	9	
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	Y	9	
Changes to Municipal Drains.	NA		
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Y	9	

4.6 Conclusion	Addressed (Y/N/NA)	Section	Comments
Clearly stated conclusions and recommendations.	Y	10	
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	NA		
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y	11	

Appendix C
Storm Sewer Design Sheets and Stormwater Management Calculations

Table 3.1: SWM Guidelines for the Pinecrest Creek / Westboro Study Area

	Development Type	Runoff Volume Reduction	Water Quality	Water Quantity	
			TSS Removal	Flood Flow Management	Erosion Control
All Locations					
Residential Development *Not* Requiring Site Plan Control Approval					
1	all soil infiltration rates	Direction/re-direction of downspouts/roof drainage to landscaped areas to minimize runoff. Amended topsoil, or a depth of topsoil up to 300 mm, provides runoff volume reduction benefits and is encouraged as a best practice over all soft landscaped surfaces.	Inherent TSS removal from on-site retention in landscaped areas.	Not applicable	Not applicable
Draining to the Ottawa River					
Commercial/Institutional and Industrial Developments - discharging directly to the Ottawa River					
2	all soil infiltration rates	A minimum on-site retention of the 10 mm design storm; refer to LID references[(i)] for guidance on prudent approach to planning infiltration-based LID best management practices. Assumptions re: non-viability of infiltration measures must be substantiated. A green roof, rain harvesting measures and/or a combination of detention/retention measures[(ii)] could be implemented to provide further runoff volume reduction.	On-site removal of 80% of TSS; some of which would be accomplished by on-site retention of first 10 mm of rainfall.	As per City of Ottawa Sewer Design Guidelines	Not applicable
Residential Development Requiring Site Plan Control Approval - discharging directly to the Ottawa River					
3	all soil infiltration rates	A minimum on-site retention of the 10 mm design storm; refer to LID references[(i)] for guidance on prudent approach to planning infiltration-based LID best management practices. Assumptions re: non-viability of infiltration measures must be substantiated. A green roof, rain harvesting measures and/or a combination of detention/retention measures[(ii)] could be implemented to provide further runoff volume reduction.	On-site removal of 80% of TSS; some of which would be accomplished by on-site retention of first 10 mm of rainfall.	As per City of Ottawa Sewer Design Guidelines	Not applicable
Draining to Pinecrest Creek					
Commercial/Institutional and Industrial Developments - discharging upstream of the Ottawa River Parkway pipe (ORPP) inlet					
4	all soil infiltration rates	A minimum on-site retention of the 10 mm design storm; refer to LID references[(i)] for guidance on prudent approach to planning infiltration-based LID best management practices. Assumptions re: non-viability of infiltration measures must be substantiated. A green roof, rain harvesting measures and/or a combination of detention/retention measures[(ii)] could be implemented to provide further runoff volume reduction.	On-site removal of 80% of TSS; some of which would be accomplished by on-site retention of first 10 mm of rainfall and detention of the 25 mm design storm[(iii)].	The more stringent of the following criteria will govern: i) 1:100 year discharge from site not to exceed 33.5 L/s/ha) or; ii) Requirements of City of Ottawa Sewer Design Guidelines.	Control (detain) the runoff from the 25 mm design storm[(iii)] such that the peak outflow from the site does not exceed 5.8 L/s/ha.

Table 3.1: SWM Guidelines for the Pinecrest Creek / Westboro Study Area

Development Type		Runoff Volume Reduction	Water Quality	Water Quantity	
			TSS Removal	Flood Flow Management	Erosion Control
Commercial/Institutional and Industrial Developments - discharging directly to Ottawa River Parkway pipe (ORPP)					
5	all soil infiltration rates	A minimum on-site retention of the 10 mm design storm; refer to LID references[(i)] for guidance on prudent approach to planning infiltration-based LID best management practices. Assumptions re: non-viability of infiltration measures must be substantiated. A green roof, rain harvesting measures and/or a combination of detention/retention measures[(ii)] could be implemented to provide further runoff volume reduction.	On-site removal of 80% of TSS; some of which would be accomplished by on-site retention of first 10 mm of rainfall.	The more stringent of the following criteria will govern: i) 1:100 year discharge from site not to exceed 33.5 L/s/ha) or; ii) Requirements of City of Ottawa Sewer Design Guidelines.	Not applicable
Residential Development Requiring Site Plan Control Approval - discharging upstream of Ottawa River Parkway pipe (ORPP) inlet					
6	all soil infiltration rates	A minimum on-site retention of the 10 mm design storm; refer to LID references[(i)] for guidance on prudent approach to planning infiltration-based LID best management practices. Assumptions re: non-viability of infiltration measures must be substantiated. A green roof, rain harvesting measures and/or a combination of detention/retention measures[(ii)] could be implemented to provide further runoff volume reduction.	On-site removal of 80% of TSS; some of which would be accomplished by on-site retention of first 10 mm of rainfall and detention of the 25 mm design storms[(iii)].	The more stringent of the following criteria will govern: i) 1:100 year discharge from site not to exceed 33.5 L/s/ha); or ii) Requirements of City of Ottawa Sewer Design Guidelines.	Control (detain) the runoff from the 25 mm design storm[(iii)] such that the peak outflow from the site does not exceed 5.8 L/s/ha.
Residential Development Requiring Site Plan Control Approval - discharging directly to Ottawa River Parkway pipe (ORPP)					
7	all soil infiltration rates	A minimum on-site retention of the 10 mm design storm; refer to LID references[(i)] for guidance on prudent approach to planning infiltration-based LID best management practices. Assumptions re: non-viability of infiltration measures must be substantiated. A green roof, rain harvesting measures and/or a combination of detention/retention measures[(ii)] could be implemented to provide further runoff volume reduction.	On-site removal of 80% of TSS; some of which would be accomplished by on-site retention of first 10 mm of rainfall.	The more stringent of the following criteria will govern: i) 1:100 year discharge from site not to exceed 33.5 L/s/ha); or ii) Requirements of City of Ottawa Sewer Design Guidelines.	Not applicable

Notes:

(i) Re: Infiltration measures: Beyond the targets specified in this table, the planning, design and use of these systems shall be in accordance with the guidance in the Stormwater Management Planning and Design Manual (MOE, 2003); the Low Impact Development Stormwater Management Planning and Design Guide (CVC and TRCA, 2010); the Low Impact Development Stormwater Management Planning and Design Wiki at: wiki.sustainabletechnologies.ca; and Draft No.2 Low Impact Development (LID) Stormwater Management Guidance Manual (MOECC, November 2017) or the final version of this Manual, when available. As noted in the MOECC LID SWM Guidance Manual, a prudent approach to planning infiltration-based LID best management practices on any site involves delineating catchment areas that contain high risk site activities and isolating them by applying non-infiltration-based practices to these areas.

(ii) Retention is to hold or retain stormwater on a more permanent basis such as for infiltration to the surrounding soils. Detention is the temporary storage or detaining of stormwater for eventual release to the downstream system.

(iii) 25 mm 4-hour Chicago design storm

1101 Baxter Road (121019)
Post-Development Model Parameters

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Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Flow Path Length (m)	Equivalent Width (m)	Average Slope (%)
C-01	0.188	0.90	100.0%	0%	27	69	1.0%
C-02	0.163	0.90	100.0%	0%	29	56	2.0%
C-03	0.312	0.90	100.0%	0%	29	109	1.0%
C-04	0.098	0.90	100.0%	0%	37	26	2.0%
C-05	0.318	0.90	100.0%	0%	42	76	1.0%
C-06	0.368	0.90	100.0%	0%	42	88	2.0%
C-07	0.176	0.90	100.0%	0%	31	57	1.0%
C-08	0.358	0.44	34.3%	0%	37	97	2.0%
C-09	0.189	0.90	100.0%	0%	41	46	2.0%
C-10	0.010	0.90	100.0%	0%	16	6	2.0%
C-11	0.052	0.49	41.4%	0%	12	43	2.0%
C-12	0.121	0.90	100.0%	0%	18	66	2.0%
C-13	0.038	0.90	100.0%	0%	26	15	2.0%
C-14	0.061	0.29	12.9%	0%	3	193	2.0%
C-15	0.030	0.90	100.0%	0%	14	21	2.0%
C-16	0.059	0.50	42.9%	0%	15	40	2.0%
C-17	0.266	0.52	45.7%	0%	40	66	2.0%
C-18	0.182	0.36	22.9%	0%	19	97	2.0%
C-19	0.141	0.34	20.0%	0%	87	16	2.0%
TOTAL:	**3.130**	**0.73**	**76.0%**				

1101 Baxter Road (121019)
Water Quality

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10mm Infiltration Volume

Subcatchment ID	Draiange Area (ha)	10mm Runoff Depth (mm)	10mm Volume (m3)
C-01	0.188	8.55	16.1
C-02	0.163	8.56	14.0
C-03	0.312	8.55	26.7
C-04	0.098	8.55	8.4
C-05	0.318	8.54	27.2
C-06	0.368	8.55	31.5
C-07	0.176	8.55	15.0
C-08	0.358	0.28	1.0
C-09	0.189	8.55	16.2
C-10	0.01	8.54	0.9
C-11	0.052	1.43	0.7
C-12	0.121	8.55	10.3
C-13	0.038	8.55	3.2
C-14	0.061	0.14	0.1
C-15	0.03	8.54	2.6
C-16	0.059	1.54	0.9
C-17	0.266	1.79	4.8
C-18	0.182	0.46	0.8
C-19	0.141	0.34	0.5
		TOTAL	**180.7**

1101 Baxter Road (121019)
Water Quality

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Amended Topsoil Areas

Subcatchment ID	Draiange Area (ha)	Percent Impervious (%)	Pervious Area (m^2)	LID Area (m^2)
C-01	0.188	100.0%	0	0
C-02	0.163	100.0%	0	0
C-03	0.312	100.0%	0	0
C-04	0.098	100.0%	0	0
C-05	0.318	100.0%	0	0
C-06	0.368	100.0%	0	0
C-07	0.176	100.0%	0	0
C-08	0.358	34.3%	2,352	2,352
C-09	0.189	100.0%	0	0
C-10	0.01	100.0%	0	0
C-11	0.052	41.4%	305	305
C-12	0.121	100.0%	0	0
C-13	0.038	100.0%	0	0
C-14	0.061	12.9%	531	531
C-15	0.03	100.0%	0	0
C-16	0.059	42.9%	337	337
C-17	0.266	45.7%	1,444	1,444
C-18	0.182	22.9%	1,403	1,403
C-19	0.141	20.0%	1,128	1,128
			TOTAL	**7,501**

Depth of Topsoil	300	mm
Void ratio	0.25	
Volume	**563**	**m^3**

1101 Baxter Road (121019)

Design Storm Time Series Data

Chicago Design Storms

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C5mm-4.stm		C25mm-4.stm		C2-3.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0.00	0:00	0	0:00	0
0:10	0.60	0:10	1.51	0:10	2.81
0:20	0.70	0:20	1.75	0:20	3.5
0:30	0.83	0:30	2.07	0:30	4.69
0:40	1.03	0:40	2.58	0:40	7.3
0:50	1.38	0:50	3.46	0:50	18.21
1:00	2.15	1:00	5.39	1:00	76.81
1:10	5.37	1:10	13.44	1:10	24.08
1:20	22.67	1:20	56.67	1:20	12.36
1:30	7.11	1:30	17.77	1:30	8.32
1:40	3.65	1:40	9.12	1:40	6.3
1:50	2.46	1:50	6.14	1:50	5.09
2:00	1.86	2:00	4.65	2:00	4.29
2:10	1.50	2:10	3.76	2:10	3.72
2:20	1.27	2:20	3.17	2:20	3.29
2:30	1.10	2:30	2.74	2:30	2.95
2:40	0.97	2:40	2.43	2:40	2.68
2:50	0.87	2:50	2.18	2:50	2.46
3:00	0.79	3:00	1.98	3:00	2.28
3:10	0.73	3:10	1.81		
3:20	0.67	3:20	1.68		
3:30	0.63	3:30	1.56		
3:40	0.59	3:40	1.47		
3:50	0.55	3:50	1.38		
4:00	0.52	4:00	1.31		

1101 Baxter Road (121019)

Design Storm Time Series Data

Chicago Design Storms

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C5-3.stm		C100-3.stm		C100-3+20%.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0	0:00	0	0:00	0
0:10	3.68	0:10	6.05	0:10	6:14
0:20	4.58	0:20	7.54	0:20	9.05
0:30	6.15	0:30	10.16	0:30	12.19
0:40	9.61	0:40	15.97	0:40	19.16
0:50	24.17	0:50	40.65	0:50	48.78
1:00	104.19	1:00	178.56	1:00	214.27
1:10	32.04	1:10	54.05	1:10	64.86
1:20	16.34	1:20	27.32	1:20	32.78
1:30	10.96	1:30	18.24	1:30	21.89
1:40	8.29	1:40	13.74	1:40	16.49
1:50	6.69	1:50	11.06	1:50	13.27
2:00	5.63	2:00	9.29	2:00	11.15
2:10	4.87	2:10	8.02	2:10	9.62
2:20	4.3	2:20	7.08	2:20	8.5
2:30	3.86	2:30	6.35	2:30	7.62
2:40	3.51	2:40	5.76	2:40	6.91
2:50	3.22	2:50	5.28	2:50	6.34
3:00	2.98	3:00	4.88	3:00	5.86

1101 Baxter Road (121019)

Design Storm Time Series Data

SCS Design Storms

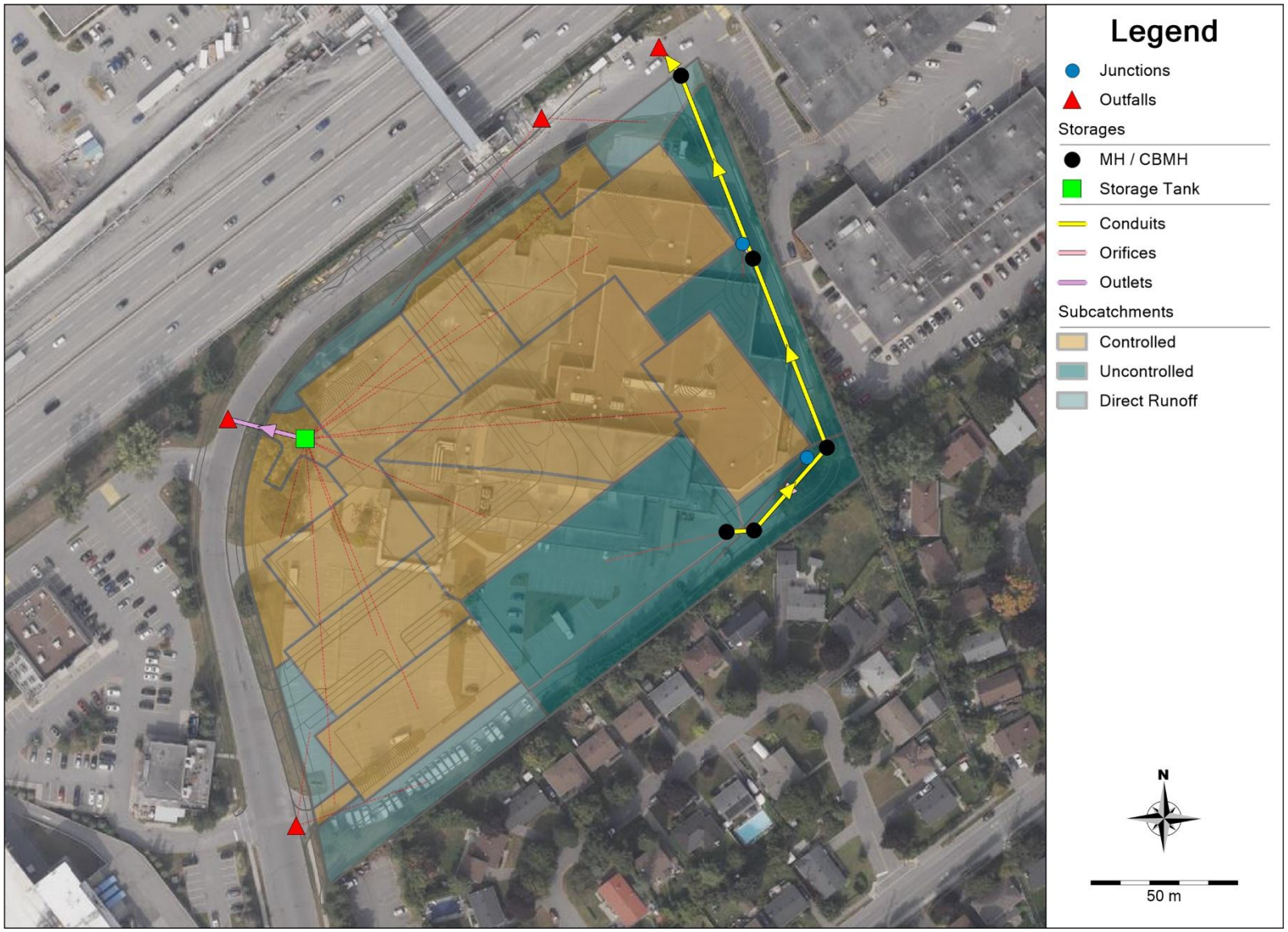
NOVATECH
Engineers, Planners & Landscape Architects

S2-12.stm		S5-12.stm		S100-12.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0.00	0:00	0	0:00	0
0:30	1.27	0:30	1.69	0:30	2.82
1:00	0.59	1:00	0.79	1:00	1.31
1:30	1.10	1:30	1.46	1:30	2.44
2:00	1.10	2:00	1.46	2:00	2.44
2:30	1.44	2:30	1.91	2:30	3.19
3:00	1.27	3:00	1.69	3:00	2.82
3:30	1.69	3:30	2.25	3:30	3.76
4:00	1.69	4:00	2.25	4:00	3.76
4:30	2.29	4:30	3.03	4:30	5.07
5:00	2.88	5:00	3.82	5:00	6.39
5:30	4.57	5:30	6.07	5:30	10.14
6:00	36.24	6:00	48.08	6:00	80.38
6:30	9.23	6:30	12.25	6:30	20.47
7:00	4.06	7:00	5.39	7:00	9.01
7:30	2.71	7:30	3.59	7:30	6.01
8:00	2.37	8:00	3.15	8:00	5.26
8:30	1.86	8:30	2.47	8:30	4.13
9:00	1.95	9:00	2.58	9:00	4.32
9:30	1.27	9:30	1.69	9:30	2.82
10:00	1.02	10:00	1.35	10:00	2.25
10:30	1.44	10:30	1.91	10:30	3.19
11:00	0.93	11:00	1.24	11:00	2.07
11:30	0.85	11:30	1.12	11:30	1.88
12:00	0.85	12:00	1.12	12:00	1.88

1101 Baxter Road (121019)
PCSWMM Model Schematics

NOVATECH
Engineers, Planners & Landscape Architects

Overall Model Schematic



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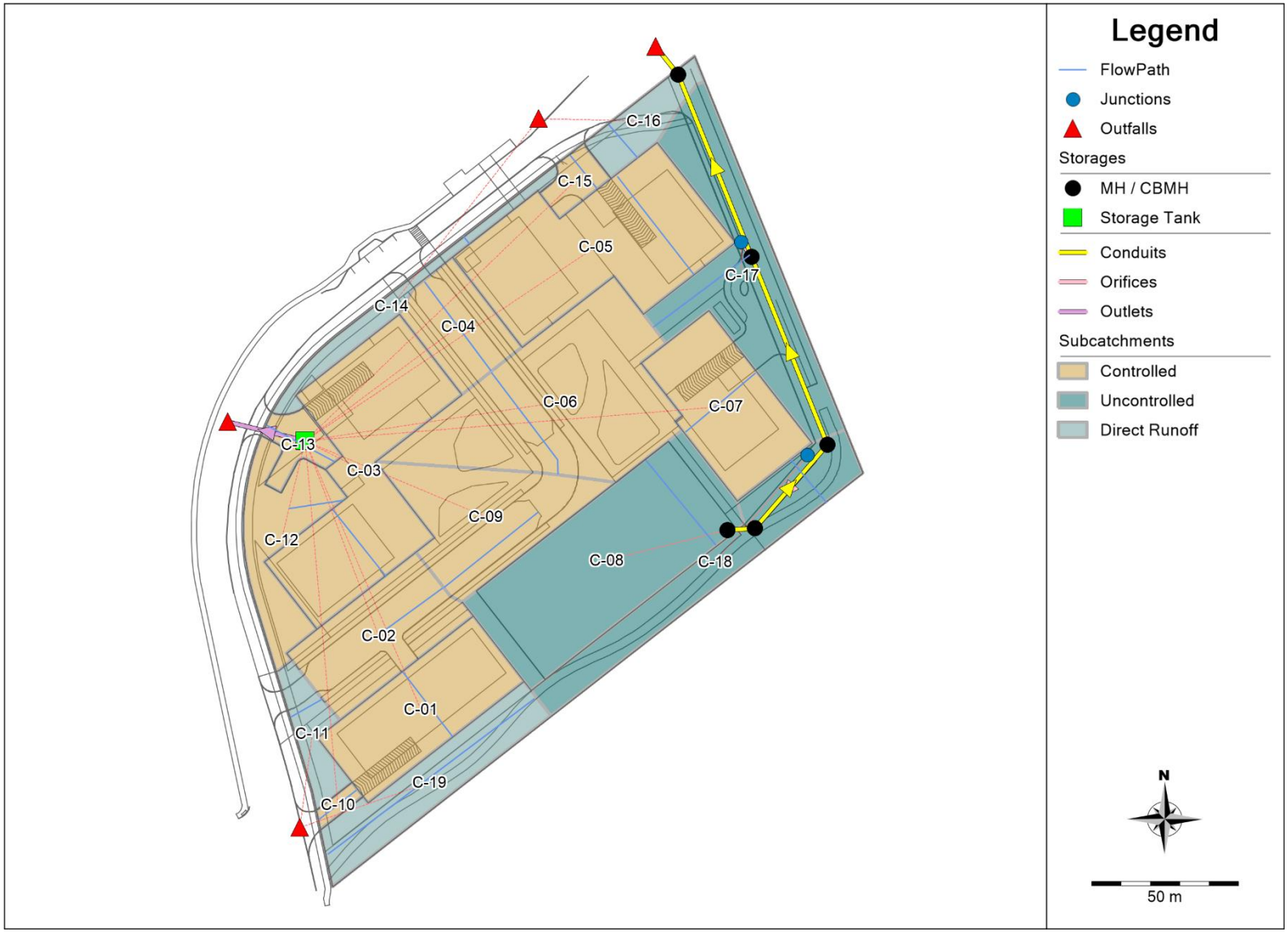
1101 Baxter Road (121019)
PCSWMM Model Schematics

NOVATECH
Engineers, Planners & Landscape Architects

Subcatchments and Flow Paths



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1101 Baxter Road (121019)
PCSWMM Model Schematics

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Junctions and Outfalls

Date: 2025-12-22
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1101 Baxter Road (121019)
PCSWMM Model Schematics

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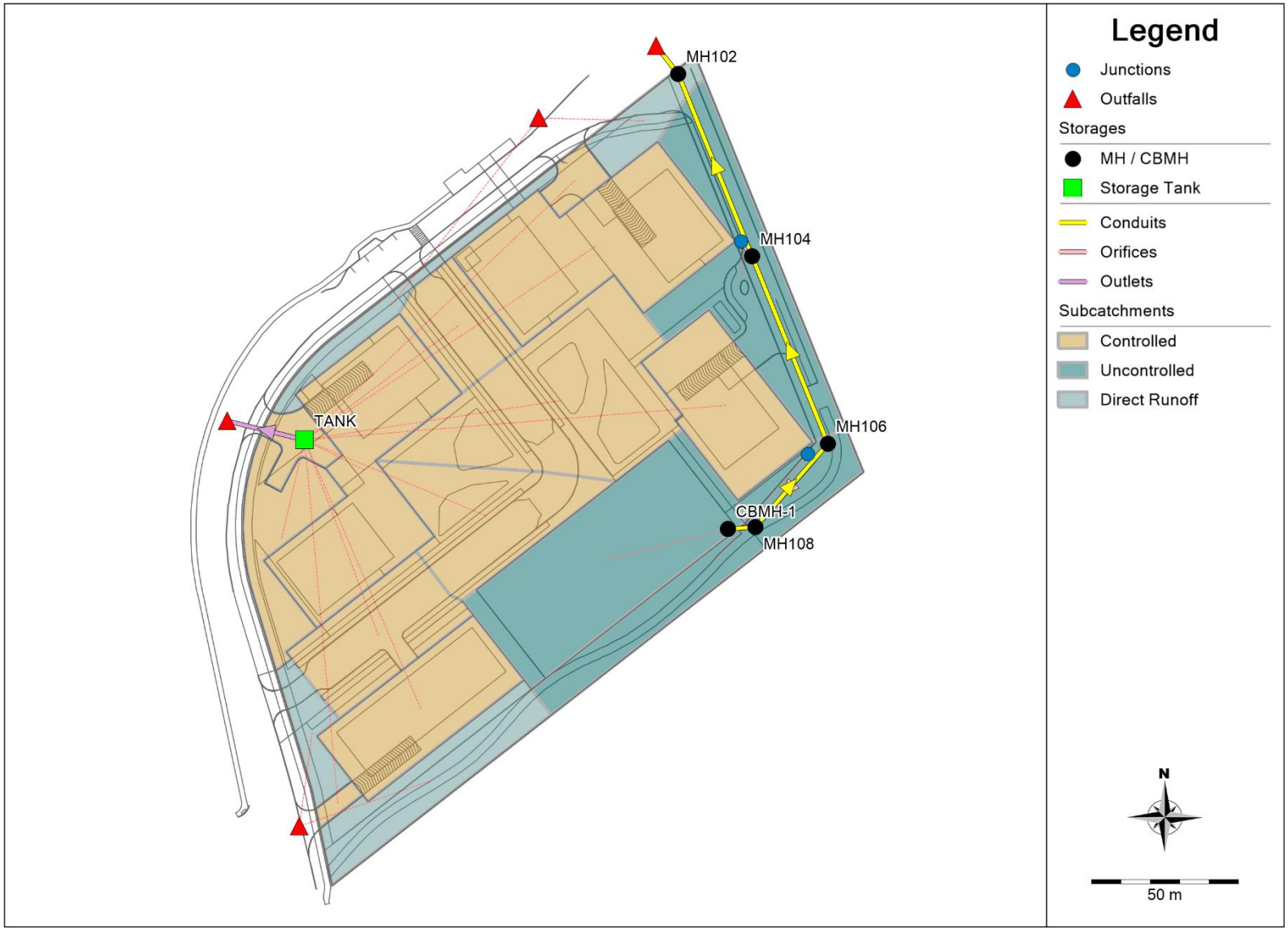
Engineers, Planners & Landscape Architects

Storage Nodes



Date: 2025-12-22
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1101 Baxter Road (121019)
PCSWMM Model Results - 4-hour 10mm Chicago Storm Event

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 19
Number of nodes 12
Number of links 10
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	XX-C10mm-4hr	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
C-01	0.19	68.55	100.00	1.0000	Raingage1	TANK
C-02	0.16	55.78	100.00	2.0000	Raingage1	TANK
C-03	0.31	109.34	100.00	1.0000	Raingage1	TANK
C-04	0.10	26.29	100.00	2.0000	Raingage1	TANK
C-05	0.32	75.97	100.00	1.0000	Raingage1	TANK
C-06	0.37	88.08	100.00	2.0000	Raingage1	TANK
C-07	0.18	57.35	100.00	1.0000	Raingage1	TANK
C-08	0.36	97.28	9.55	2.0000	Raingage1	CBMH-1
C-09	0.19	46.20	100.00	2.0000	Raingage1	TANK
C-10	0.01	6.34	100.00	2.0000	Raingage1	TANK
C-11	0.05	43.13	40.94	2.0000	Raingage1	DR-E
C-12	0.12	66.01	100.00	2.0000	Raingage1	TANK
C-13	0.04	14.64	100.00	2.0000	Raingage1	TANK
C-14	0.06	192.53	12.36	2.0000	Raingage1	DR-N
C-15	0.03	21.22	100.00	2.0000	Raingage1	TANK
C-16	0.06	39.88	42.48	2.0000	Raingage1	DR-N
C-17	0.27	65.77	46.10	2.0000	Raingage1	CB15-16-17
C-18	0.18	97.18	23.51	2.0000	Raingage1	RYCB-2
C-19	0.14	16.12	19.91	2.0000	Raingage1	DR-E

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
C-08	AmmendedTopsoil	1	2352.00	10.00	65.70	0.00	100.00
C-11	AmmendedTopsoil	1	305.00	10.00	58.65	0.00	100.00
C-14	AmmendedTopsoil	1	531.00	10.00	87.05	0.00	100.00
C-16	AmmendedTopsoil	1	337.00	10.00	57.12	0.00	100.00
C-17	AmmendedTopsoil	1	1444.00	10.00	54.29	0.00	100.00
C-18	AmmendedTopsoil	1	1403.00	10.00	77.09	0.00	100.00
C-19	AmmendedTopsoil	1	1128.00	10.00	80.00	0.00	100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB15-16-17	JUNCTION	72.70	1.43	0.0	
RYCB-2	JUNCTION	74.39	1.20	0.0	
DR-E	OUTFALL	74.20	0.00	0.0	
DR-N	OUTFALL	73.70	0.00	0.0	
MH100	OUTFALL	71.12	0.30	0.0	
MHST-25501	OUTFALL	70.78	0.00	0.0	
CBMH-1	STORAGE	71.81	3.68	0.0	
MH102	STORAGE	71.16	2.74	0.0	
MH104	STORAGE	71.39	2.81	0.0	
MH106	STORAGE	71.61	4.17	0.0	

1101 Baxter Road (121019)
PCSWMM Model Results - 4-hour 10mm Chicago Storm Event

MH108	STORAGE	71.75	4.16	0.0
TANK	STORAGE	70.90	2.90	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
CBMH1-MH108	CBMH-1	MH108	CONDUIT	9.4	0.3192	0.0130
MH102-MH100	MH102	MH100	CONDUIT	12.2	0.3279	0.0130
MH104-MH102	MH104	MH102	CONDUIT	66.5	0.3008	0.0130
MH106-MH104	MH106	MH104	CONDUIT	68.6	0.3061	0.0130
MH108-MH106	MH108	MH106	CONDUIT	37.4	0.2941	0.0130
OCB15	CB15-16-17	MH104	ORIFICE			
OCB16	CB15-16-17	MH104	ORIFICE			
OCB17	CB15-16-17	MH104	ORIFICE			
ORYCB-2	RYCB-2	MH108	ORIFICE			
Pump	TANK	MHST-25501	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
CBMH1-MH108	CIRCULAR	0.30	0.07	0.07	0.30	1	54.63
MH102-MH100	CIRCULAR	0.30	0.07	0.07	0.30	1	55.37
MH104-MH102	CIRCULAR	0.30	0.07	0.07	0.30	1	53.03
MH106-MH104	CIRCULAR	0.30	0.07	0.07	0.30	1	53.51
MH108-MH106	CIRCULAR	0.30	0.07	0.07	0.30	1	52.45

****
Analysis Options
****
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 10/21/2025 00:00:00
Ending Date 10/23/2025 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.001500 m

********** Runoff Quantity Continuity **********	Volume hectare-m	Depth mm
Total Precipitation	0.031	10.000
Evaporation Loss	0.000	0.000
Infiltration Loss	0.003	0.847
Surface Runoff	0.018	5.776
Final Storage	0.011	3.457
Continuity Error (%)	-0.801	

********** Flow Routing Continuity **********	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.018	0.181
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.001	0.009

1101 Baxter Road (121019)
PCSWMM Model Results - 4-hour 10mm Chicago Storm Event

```
  Flooding Loss ............          0.000          0.000
  Evaporation Loss .........          0.000          0.000
  Exfiltration Loss ........          0.000          0.000
  Initial Stored Volume ....          0.000          0.000
  Final Stored Volume ......          0.017          0.172
  Continuity Error (%) .....          0.000


  ***************************
  Time-Step Critical Elements
  ***************************
  None


  *********************************
  Highest Flow Instability Indexes
  *********************************
  All links are stable.


  *********************************
  Most Frequent Nonconverging Nodes
  *********************************
  Convergence obtained at all time steps.


  ************************
  Routing Time Step Summary
  ************************
  Minimum Time Step           :     1.50 sec
  Average Time Step           :     2.00 sec
  Maximum Time Step           :     2.00 sec
  % of Time in Steady State   :     0.00
  Average Iterations per Step :     2.00
  % of Steps Not Converging   :     0.00
  Time Step Frequencies       :
      2.000 -  1.516 sec      :   100.00 %
      1.516 -  1.149 sec      :     0.00 %
      1.149 -  0.871 sec      :     0.00 %
      0.871 -  0.660 sec      :     0.00 %
      0.660 -  0.500 sec      :     0.00 %
```

```
  ***************************
  Subcatchment Runoff Summary
  ***************************

  ------------------------------------------------------------------------------------------------------------------------
-------------
                         Total      Total      Total      Total     Imperv       Perv      Total      Total
Peak  Runoff
                        Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff     Runoff
Runoff   Coeff
  Subcatchment             mm         mm         mm         mm         mm         mm         mm   10^6 ltr
LPS
  ------------------------------------------------------------------------------------------------------------------------
-------------
  C-01                  10.00       0.00       0.00       0.00       8.55       0.00       8.55       0.02
11.42   0.855
  C-02                  10.00       0.00       0.00       0.00       8.56       0.00       8.56       0.01
10.09   0.856
  C-03                  10.00       0.00       0.00       0.00       8.55       0.00       8.55       0.03
18.87   0.855
  C-04                  10.00       0.00       0.00       0.00       8.55       0.00       8.55       0.01
5.97   0.855
  C-05                  10.00       0.00       0.00       0.00       8.54       0.00       8.54       0.03
18.22   0.854
  C-06                  10.00       0.00       0.00       0.00       8.55       0.00       8.55       0.03
22.18   0.855
  C-07                  10.00       0.00       0.00       0.00       8.55       0.00       8.55       0.02
10.56   0.855
  C-08                  10.00       0.00       0.00       3.10       0.28       0.00       0.28       0.00
0.74   0.028
  C-09                  10.00       0.00       0.00       0.00       8.55       0.00       8.55       0.02
11.42   0.855
  C-10                  10.00       0.00       0.00       0.00       8.54       0.00       8.54       0.00
0.63   0.854
  C-11                  10.00       0.00       0.00       2.44       1.43       0.00       1.43       0.00
0.55   0.143
  C-12                  10.00       0.00       0.00       0.00       8.55       0.00       8.55       0.01
7.59   0.855
  C-13                  10.00       0.00       0.00       0.00       8.55       0.00       8.55       0.00
2.37   0.855
  C-14                  10.00       0.00       0.00       1.14       0.14       0.00       0.14       0.00
```

1101 Baxter Road (121019)
PCSWMM Model Results - 4-hour 10mm Chicago Storm Event

C-15	10.00	0.00	0.00	0.00	8.54	0.00	8.54	0.00	1.89	0.854
C-16	10.00	0.00	0.00	2.47	1.54	0.00	1.54	0.00	0.68	0.154
C-17	10.00	0.00	0.00	2.46	1.79	0.00	1.79	0.00	3.53	0.179
C-18	10.00	0.00	0.00	1.75	0.46	0.00	0.46	0.00	0.62	0.046
C-19	10.00	0.00	0.00	1.60	0.34	0.00	0.34	0.00	0.35	0.034

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
C-08	AmmendedTopsoil	10.00	0.00	0.00	0.00	0.00	0.00	10.00	-0.00
C-11	AmmendedTopsoil	10.00	0.00	0.00	0.00	0.00	0.00	10.00	-0.00
C-14	AmmendedTopsoil	10.00	0.00	0.00	0.00	0.00	0.00	10.00	-0.00
C-16	AmmendedTopsoil	10.00	0.00	0.00	0.00	0.00	0.00	10.00	-0.00
C-17	AmmendedTopsoil	10.00	0.00	0.00	0.00	0.00	0.00	10.00	-0.00
C-18	AmmendedTopsoil	10.00	0.00	0.00	0.00	0.00	0.00	10.00	-0.00
C-19	AmmendedTopsoil	10.00	0.00	0.00	0.00	0.00	0.00	10.00	-0.00

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB15-16-17	JUNCTION	0.00	0.05	72.75	0 01:30	0.05
RYCB-2	JUNCTION	0.00	0.02	74.41	0 01:30	0.02
DR-E	OUTFALL	0.00	0.00	74.20	0 00:00	0.00
DR-N	OUTFALL	0.00	0.00	73.70	0 00:00	0.00
MH100	OUTFALL	0.00	0.06	71.18	0 01:32	0.06
MHST-25501	OUTFALL	0.00	0.00	70.78	0 00:00	0.00
CBMH-1	STORAGE	0.00	0.03	71.84	0 01:30	0.03
MH102	STORAGE	0.00	0.06	71.22	0 01:32	0.06
MH104	STORAGE	0.00	0.06	71.45	0 01:32	0.06
MH106	STORAGE	0.00	0.03	71.64	0 01:32	0.03
MH108	STORAGE	0.00	0.04	71.79	0 01:30	0.04
TANK	STORAGE	0.24	0.25	71.15	2 00:00	0.25

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB15-16-17	JUNCTION	3.53	3.53	0 01:30	0.00477	0.00477	-0.000
RYCB-2	JUNCTION	0.62	0.62	0 01:30	0.000829	0.000829	0.003
DR-E	OUTFALL	0.91	0.91	0 01:25	0.00122	0.00122	0.000
DR-N	OUTFALL	0.74	0.74	0 01:25	0.000993	0.000993	0.000
MH100	OUTFALL	0.00	4.16	0 01:32	0	0.00659	0.000
MHST-25501	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CBMH-1	STORAGE	0.74	0.74	0 01:25	0.000992	0.000992	-0.008
MH102	STORAGE	0.00	4.17	0 01:32	0	0.00659	-0.001
MH104	STORAGE	0.00	4.69	0 01:30	0	0.00659	0.065
MH106	STORAGE	0.00	1.32	0 01:30	0	0.00182	-0.053

1101 Baxter Road (121019)
PCSWMM Model Results - 4-hour 10mm Chicago Storm Event

MH108	STORAGE	0.00	1.36	0	01:30	0	0.00182	-0.029
TANK	STORAGE	121.21	121.21	0	01:30	0.172	0.172	0.011

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
CBMH-1	0.000	0.0	0.0	0.0	0.000	0.7	0 01:30	0.74
MH102	0.000	0.1	0.0	0.0	0.000	2.2	0 01:32	4.16
MH104	0.000	0.1	0.0	0.0	0.000	2.1	0 01:32	4.17
MH106	0.000	0.0	0.0	0.0	0.000	0.8	0 01:32	1.27
MH108	0.000	0.0	0.0	0.0	0.000	0.9	0 01:30	1.32
TANK	0.165	9.4	0.0	0.0	0.172	9.8	2 00:00	0.00

****
Outfall Loading Summary
****

	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
DR-E	4.39	0.15	0.91	0.001
DR-N	3.62	0.14	0.74	0.001
MH100	6.85	0.55	4.16	0.007
MHST-25501	0.00	0.00	0.00	0.000
System	3.72	0.84	5.36	0.009

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
CBMH1-MH108	CONDUIT	0.74	0 01:30	0.30	0.01	0.08
MH102-MH100	CONDUIT	4.16	0 01:32	0.43	0.08	0.20
MH104-MH102	CONDUIT	4.17	0 01:32	0.48	0.08	0.18
MH106-MH104	CONDUIT	1.27	0 01:32	0.22	0.02	0.14
MH108-MH106	CONDUIT	1.32	0 01:30	0.34	0.03	0.10
OCB15	ORIFICE	0.00	0 00:00			0.00
OCB16	ORIFICE	3.52	0 01:30			0.26
OCB17	ORIFICE	0.00	0 00:00			0.00
ORYCB-2	ORIFICE	0.62	0 01:30			0.08
Pump	DUMMY	0.00	0 00:00			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

1101 Baxter Road (121019)
PCSWMM Model Results - 4-hour 10mm Chicago Storm Event

CBMH1-MH108	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
MH102-MH100	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.90	0.00
MH104-MH102	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
MH106-MH104	1.00	0.03	0.00	0.00	0.06	0.00	0.00	0.91	0.02	0.00
MH108-MH106	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon Dec 22 22:30:19 2025
Analysis ended on: Mon Dec 22 22:30:19 2025
Total elapsed time: < 1 sec

1101 Baxter Road (121019)
PCSWMM Model Results - 3-hour 100-year Chicago Storm Event

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 19
Number of nodes 12
Number of links 10
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	03-C100yr-3hr	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
C-01	0.19	68.55	100.00	1.0000	Raingage1	TANK
C-02	0.16	55.78	100.00	2.0000	Raingage1	TANK
C-03	0.31	109.34	100.00	1.0000	Raingage1	TANK
C-04	0.10	26.29	100.00	2.0000	Raingage1	TANK
C-05	0.32	75.97	100.00	1.0000	Raingage1	TANK
C-06	0.37	88.08	100.00	2.0000	Raingage1	TANK
C-07	0.18	57.35	100.00	1.0000	Raingage1	TANK
C-08	0.36	97.28	9.55	2.0000	Raingage1	CBMH-1
C-09	0.19	46.20	100.00	2.0000	Raingage1	TANK
C-10	0.01	6.34	100.00	2.0000	Raingage1	TANK
C-11	0.05	43.13	40.94	2.0000	Raingage1	DR-E
C-12	0.12	66.01	100.00	2.0000	Raingage1	TANK
C-13	0.04	14.64	100.00	2.0000	Raingage1	TANK
C-14	0.06	192.53	12.36	2.0000	Raingage1	DR-N
C-15	0.03	21.22	100.00	2.0000	Raingage1	TANK
C-16	0.06	39.88	42.48	2.0000	Raingage1	DR-N
C-17	0.27	65.77	46.10	2.0000	Raingage1	CB15-16-17
C-18	0.18	97.18	23.51	2.0000	Raingage1	RYCB-2
C-19	0.14	16.12	19.91	2.0000	Raingage1	DR-E

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
C-08	AmmendedTopsoil	1	2352.00	10.00	65.70	0.00	100.00
C-11	AmmendedTopsoil	1	305.00	10.00	58.65	0.00	100.00
C-14	AmmendedTopsoil	1	531.00	10.00	87.05	0.00	100.00
C-16	AmmendedTopsoil	1	337.00	10.00	57.12	0.00	100.00
C-17	AmmendedTopsoil	1	1444.00	10.00	54.29	0.00	100.00
C-18	AmmendedTopsoil	1	1403.00	10.00	77.09	0.00	100.00
C-19	AmmendedTopsoil	1	1128.00	10.00	80.00	0.00	100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB15-16-17	JUNCTION	72.70	1.43	0.0	
RYCB-2	JUNCTION	74.39	1.20	0.0	
DR-E	OUTFALL	74.20	0.00	0.0	
DR-N	OUTFALL	73.70	0.00	0.0	
MH100	OUTFALL	71.12	0.30	0.0	
MHST-25501	OUTFALL	70.78	0.00	0.0	
CBMH-1	STORAGE	71.81	3.68	0.0	
MH102	STORAGE	71.16	2.74	0.0	
MH104	STORAGE	71.39	2.81	0.0	
MH106	STORAGE	71.61	4.17	0.0	

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PCSWMM Model Results - 3-hour 100-year Chicago Storm Event

MH108	STORAGE	71.75	4.16	0.0
TANK	STORAGE	70.90	2.90	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
CBMH1-MH108	CBMH-1	MH108	CONDUIT	9.4	0.3192	0.0130
MH102-MH100	MH102	MH100	CONDUIT	12.2	0.3279	0.0130
MH104-MH102	MH104	MH102	CONDUIT	66.5	0.3008	0.0130
MH106-MH104	MH106	MH104	CONDUIT	68.6	0.3061	0.0130
MH108-MH106	MH108	MH106	CONDUIT	37.4	0.2941	0.0130
OCB15	CB15-16-17	MH104	ORIFICE			
OCB16	CB15-16-17	MH104	ORIFICE			
OCB17	CB15-16-17	MH104	ORIFICE			
ORYCB-2	RYCB-2	MH108	ORIFICE			
Pump	TANK	MHST-25501	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
CBMH1-MH108	CIRCULAR	0.30	0.07	0.07	0.30	1	54.63
MH102-MH100	CIRCULAR	0.30	0.07	0.07	0.30	1	55.37
MH104-MH102	CIRCULAR	0.30	0.07	0.07	0.30	1	53.03
MH106-MH104	CIRCULAR	0.30	0.07	0.07	0.30	1	53.51
MH108-MH106	CIRCULAR	0.30	0.07	0.07	0.30	1	52.45

****
Analysis Options
****
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 10/21/2025 00:00:00
Ending Date 10/23/2025 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.001500 m

********** Runoff Quantity Continuity **********	Volume hectare-m	Depth mm
Total Precipitation	0.224	71.667
Evaporation Loss	0.000	0.000
Infiltration Loss	0.012	3.780
Surface Runoff	0.165	52.852
Final Storage	0.048	15.467
Continuity Error (%)	-0.602	

********** Flow Routing Continuity **********	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.165	1.654
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.147	1.472

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```
  Flooding Loss .............         0.000         0.000
  Evaporation Loss .........          0.000         0.000
  Exfiltration Loss ........          0.000         0.000
  Initial Stored Volume ....          0.000         0.000
  Final Stored Volume ......          0.018         0.182
  Continuity Error (%) .....         -0.006


  ***************************
  Time-Step Critical Elements
  ***************************
  None


  *********************************
  Highest Flow Instability Indexes
  *********************************
  All links are stable.


  *********************************
  Most Frequent Nonconverging Nodes
  *********************************
  Convergence obtained at all time steps.


  ************************
  Routing Time Step Summary
  ************************
  Minimum Time Step           :     1.50 sec
  Average Time Step           :     2.00 sec
  Maximum Time Step           :     2.00 sec
  % of Time in Steady State   :     0.00
  Average Iterations per Step :     2.00
  % of Steps Not Converging   :     0.00
  Time Step Frequencies       :
      2.000 -  1.516 sec      :   100.00 %
      1.516 -  1.149 sec      :     0.00 %
      1.149 -  0.871 sec      :     0.00 %
      0.871 -  0.660 sec      :     0.00 %
      0.660 -  0.500 sec      :     0.00 %
```

```
  ***************************
  Subcatchment Runoff Summary
  ***************************

  ------------------------------------------------------------------------------------------------------------------
-------------
                         Total      Total      Total      Total     Imperv       Perv      Total      Total
Peak  Runoff
                        Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff     Runoff
Runoff   Coeff
  Subcatchment             mm         mm         mm         mm         mm         mm         mm    10^6 ltr
LPS
  ------------------------------------------------------------------------------------------------------------------
-------------
  C-01                   71.67       0.00       0.00       0.00      70.51       0.00      70.51       0.13
93.23   0.984
  C-02                   71.67       0.00       0.00       0.00      70.42       0.00      70.42       0.11
80.85   0.983
  C-03                   71.67       0.00       0.00       0.00      70.52       0.00      70.52       0.22
154.72   0.984
  C-04                   71.67       0.00       0.00       0.00      70.50       0.00      70.50       0.07
48.60   0.984
  C-05                   71.67       0.00       0.00       0.00      70.64       0.00      70.64       0.22
157.53   0.986
  C-06                   71.67       0.00       0.00       0.00      70.53       0.00      70.53       0.26
182.48   0.984
  C-07                   71.67       0.00       0.00       0.00      70.54       0.00      70.54       0.12
87.27   0.984
  C-08                   71.67       0.00       0.00      13.91       2.30       8.77      18.60       0.07
5.82   0.259
  C-09                   71.67       0.00       0.00       0.00      70.53       0.00      70.53       0.13
93.72   0.984
  C-10                   71.67       0.00       0.00       0.00      70.26       0.00      70.26       0.01
4.96   0.980
  C-11                   71.67       0.00       0.00      10.74      11.88       7.57      26.29       0.01
4.37   0.367
  C-12                   71.67       0.00       0.00       0.00      70.29       0.00      70.29       0.09
60.02   0.981
  C-13                   71.67       0.00       0.00       0.00      70.38       0.00      70.38       0.03
18.85   0.982
  C-14                   71.67       0.00       0.00       4.96       1.13       3.71      14.97       0.01
```

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C-15	71.67	0.00	0.00	0.00	70.24	0.00	70.24	0.02
14.88	0.980							
C-16	71.67	0.00	0.00	10.87	12.78	7.54	26.98	0.02
5.33	0.376							
C-17	71.67	0.00	0.00	11.01	14.79	7.03	28.10	0.07
27.80	0.392							
C-18	71.67	0.00	0.00	7.72	3.79	5.39	18.10	0.03
4.86	0.253							
C-19	71.67	0.00	0.00	7.22	2.80	4.46	16.53	0.02
2.79	0.231							

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
C-08	AmmendedTopsoil	85.02	0.00	0.00	24.80	0.00	0.00	60.22	-0.00
C-11	AmmendedTopsoil	84.57	0.00	0.00	24.56	0.00	0.00	60.01	-0.00
C-14	AmmendedTopsoil	75.93	0.00	0.00	15.90	0.00	0.00	60.02	-0.00
C-16	AmmendedTopsoil	84.87	0.00	0.00	24.85	0.00	0.00	60.01	-0.00
C-17	AmmendedTopsoil	84.63	0.00	0.00	24.52	0.00	0.00	60.11	-0.00
C-18	AmmendedTopsoil	78.66	0.00	0.00	18.56	0.00	0.00	60.10	-0.00
C-19	AmmendedTopsoil	77.24	0.00	0.00	17.17	0.00	0.00	60.07	-0.00

****
Node Depth Summary

****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB15-16-17	JUNCTION	0.01	0.21	72.91	0 01:06	0.21
RYCB-2	JUNCTION	0.00	0.06	74.45	0 01:10	0.06
DR-E	OUTFALL	0.00	0.00	74.20	0 00:00	0.00
DR-N	OUTFALL	0.00	0.00	73.70	0 00:00	0.00
MH100	OUTFALL	0.02	0.18	71.30	0 01:10	0.18
MHST-25501	OUTFALL	0.00	0.00	70.78	0 00:00	0.00
CBMH-1	STORAGE	0.01	0.07	71.88	0 01:09	0.07
MH102	STORAGE	0.02	0.22	71.38	0 01:10	0.22
MH104	STORAGE	0.02	0.19	71.58	0 01:10	0.19
MH106	STORAGE	0.01	0.09	71.70	0 01:10	0.09
MH108	STORAGE	0.02	0.10	71.85	0 01:10	0.10
TANK	STORAGE	0.36	1.49	72.39	0 02:06	1.49

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB15-16-17	JUNCTION	27.80	27.80	0 01:05	0.0748	0.0748	0.001
RYCB-2	JUNCTION	4.86	4.86	0 01:05	0.0329	0.0329	0.001
DR-E	OUTFALL	7.15	7.15	0 01:10	0.037	0.037	0.000
DR-N	OUTFALL	5.81	5.81	0 01:05	0.0251	0.0251	0.000
MH100	OUTFALL	0.00	37.94	0 01:10	0	0.174	0.000
MHST-25501	OUTFALL	0.00	54.00	0 01:00	0	1.24	0.000
CBMH-1	STORAGE	5.82	5.82	0 01:05	0.0666	0.0666	0.049
MH102	STORAGE	0.00	38.23	0 01:10	0	0.174	-0.204
MH104	STORAGE	0.00	38.40	0 01:10	0	0.174	0.190
MH106	STORAGE	0.00	10.66	0 01:10	0	0.0995	-0.033

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MH108	STORAGE	0.00	10.68	0	01:10	0	0.0995	-0.026
TANK	STORAGE	997.10	997.10	0	01:10	1.42	1.42	-0.001

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
CBMH-1	0.000	0.3	0.0	0.0	0.000	1.9	0 01:09	5.82
MH102	0.000	0.6	0.0	0.0	0.000	8.2	0 01:10	37.94
MH104	0.000	0.6	0.0	0.0	0.000	6.7	0 01:10	38.23
MH106	0.000	0.4	0.0	0.0	0.000	2.2	0 01:10	10.63
MH108	0.000	0.4	0.0	0.0	0.000	2.4	0 01:10	10.66
TANK	0.249	14.2	0.0	0.0	1.045	59.7	0 02:06	54.00

****
Outfall Loading Summary
****

Outfall Node	Freq Pcnt	Flow LPS	Flow LPS	Volume 10^6 ltr
	Flow	Avg	Max	Total
DR-E	24.60	0.85	7.15	0.037
DR-N	15.09	0.95	5.81	0.025
MH100	59.14	1.70	37.94	0.174
MHST-25501	13.25	53.99	54.00	1.236
System	28.02	57.48	104.64	1.472

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
CBMH1-MH108	CONDUIT	5.82	0 01:08	0.54	0.11	0.23
MH102-MH100	CONDUIT	37.94	0 01:10	0.74	0.69	0.68
MH104-MH102	CONDUIT	38.23	0 01:10	0.82	0.72	0.64
MH106-MH104	CONDUIT	10.63	0 01:10	0.48	0.20	0.45
MH108-MH106	CONDUIT	10.66	0 01:10	0.62	0.20	0.29
OCB15	ORIFICE	0.00	0 00:00			0.00
OCB16	ORIFICE	27.80	0 01:06			1.00
OCB17	ORIFICE	0.00	0 00:00			0.00
ORYCB-2	ORIFICE	4.86	0 01:10			0.32
Pump	DUMMY	54.00	0 01:00			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

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CBMH1-MH108	1.00	0.01	0.00	0.00	0.02	0.00	0.00	0.97	0.00	0.00
MH102-MH100	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.39	0.00
MH104-MH102	1.00	0.01	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
MH106-MH104	1.00	0.01	0.00	0.00	0.17	0.00	0.00	0.82	0.09	0.00
MH108-MH106	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon Dec 22 22:14:31 2025
Analysis ended on: Mon Dec 22 22:14:32 2025
Total elapsed time: 00:00:01

Appendix D
Sanitary Sewer Design Sheets and Sanitary Calculations

Ben Sweet

From: Candow, Julie <julie.candow@ottawa.ca>
Sent: Friday, December 12, 2025 11:44 AM
To: Ben Sweet; Evan Garfinkel
Cc: Sam Bahia; Parth Kanani; Steve Zorgel; Bernier, John; Roy, Jean-Miguel; Nitsche, Kersten
Subject: RE: 1101 Baxter Road - Engineering (City File No.: PC2025-0029 / Novatech File No.: 121019)

Hi Ben,

Further to my email below regarding the sanitary sewer capacity, I am re-confirming that the only sanitary sewer allocation we can guarantee at this time would be the existing sanitary sewer outflow of the 1101 Baxter site as it currently operates.

As stated below, the Infrastructure Planning group has noted a review of the existing sanitary sewer model for the Pinecrest Sanitary Sewer Trunk is needed to identify whether there is any available capacity for redevelopment in the area. We have been advised that the next step will be a flow monitoring program to identify existing Inflow & Infiltration (I&I) for areas draining to the Pinecrest Trunk Sewer. This flow monitoring is expected to start Spring 2026. Preliminary results are expected by fall 2026 which will give us a basic understanding of whether additional flows can be made available for developments in our subject area. Based on the results of the monitoring, further works (projected 2027) may be required to remove any identified I&Is.

As we move through draft approval of the subdivision application, we can keep you informed on the sanitary sewer capacity of the Pinecrest Trunk as more information becomes available. For the time being, there is no surplus of sanitary capacity in the trunk sewer that we can allocate to your site.

Let me know if you have any further questions.

Julie Candow, P.Eng
Project Manager
Development Review – West Branch
Planning, Development and Building Services Dept.
110 Laurier Avenue West, 4th Floor East
Ottawa, ON K1P 1J1
613.580.2424 ext. 13850

From: Candow, Julie
Sent: November 07, 2025 10:19 AM
To: 'Ben Sweet' <b.sweet@novatech-eng.com>
Cc: Sam Bahia <s.bahia@novatech-eng.com>; Parth Kanani <p.kanani@novatech-eng.com>; Steve Zorgel <s.zorgel@novatech-eng.com>; Evan Garfinkel <egarfinkel@regionalgroup.com>; Bernier, John <John.Bernier@ottawa.ca>; Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Subject: RE: 1101 Baxter Road - Engineering (City File No.: PC2025-0029 / Novatech File No.: 121019)

Hi Ben,

I have forwarded your inquiry about the boundary condition results to our Infrastructure Planning department.

Regarding the sanitary sewer capacity, we don't have a clear answer yet, although discussions with upper management is ongoing.

The only sanitary sewer allocation we can guarantee at this time would be the existing sanitary sewer outflow of the site as it currently operates (sanitary sewer flows from the 1101 Baxter site after redevelopment would remain the same).

At this time, the Infrastructure Planning group has noted a review of the existing sanitary sewer model for the Pinecrest Sanitary Sewer Trunk is needed to identify whether there is any available capacity for redevelopment in the area. We have been advised that the next step will be a flow monitoring program to identify existing Inflow & Infiltration (I&I) for areas draining to the Pinecrest Trunk Sewer. This flow monitoring is expected to start Spring 2026. Preliminary results are expected by fall 2026 which will give us a basic understanding of whether additional flows can be made available for developments in our subject area. Based on the results of the monitoring, further works (projected 2027) may be required to remove any identified I&Is. A meeting is scheduled at the end of the month between our departments after which time Development Review should have more information as to how we will move forward with development applications in this area. I will provide more information as it becomes available to me.

Let me know if you have any further questions.

Julie Candow, P.Eng
Project Manager
Development Review – West Branch
Planning, Development and Building Services Dept.
110 Laurier Avenue West, 4th Floor East
Ottawa, ON K1P 1J1
613.580.2424 ext. 13850

From: Ben Sweet <b.sweet@novatech-eng.com>
Sent: November 05, 2025 1:30 PM
To: Candow, Julie <julie.candow@ottawa.ca>
Cc: Sam Bahia <s.bahia@novatech-eng.com>; Parth Kanani <p.kanani@novatech-eng.com>; Steve Zorgel <s.zorgel@novatech-eng.com>; Evan Garfinkel <egarfinkel@regionalgroup.com>; Bernier, John <John.Bernier@ottawa.ca>; Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Subject: RE: 1101 Baxter Road - Engineering (City File No.: PC2025-0029 / Novatech File No.: 121019)

Hi Julie,

Thank you for providing the watermain BC results.

Upon review the available fire flow at Connection 1 looks low considering that a looped watermain will be achieved via one of the two options (after disregarding Dempsey) for Connection 2. Can you confirm if the City included a

watermain link in the watermain BC results provided? If not, is it possible for the City to add a watermain link for the following scenarios and provide updated watermain BC results?

- Scenario 1 (Connection 1 and Connection 2A): 200mm dia @ 430m length
- Scenario 2 (Connection 1 and Connection 2C): 200mm dia. @ 185m length

Also, do you have any update, or sense of timing on when we will receive feedback from the Infrastructure Planning team on the sanitary sewer capacity?

Regards,

Ben Sweet, P.Eng., Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 250

From: Candow, Julie <julie.candow@ottawa.ca>
Sent: Wednesday, October 22, 2025 10:48 AM
To: Ben Sweet <b.sweet@novatech-eng.com>
Cc: Sam Bahia <s.bahia@novatech-eng.com>; Parth Kanani <p.kanani@novatech-eng.com>; Steve Zorgel <s.zorgel@novatech-eng.com>; Evan Garfinkel <egarfinkel@regionalgroup.com>; Bernier, John <John.Bernier@ottawa.ca>; Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Subject: RE: 1101 Baxter Road - Engineering (City File No.: PC2025-0029 / Novatech File No.: 121019)

Hi Ben,

Please see below the watermain BC results.

Please note that for the two higher RFFs proposed, we cannot accommodate those results. If RFF requests come in that high, we ask the proponent to look for ways to reduce their fire demand. Therefore, we have provided results for RFF#3, RFF#4 and RFF#5. Furthermore, results are not provided for the Demsey Ave connection as the City will not allow a connection to the 152mm diameter watermain in Demsey Ave.

The following are boundary conditions, HGL, for hydraulic analysis at 1101 Baxter Road (zone 1W) assumed to looped and connected via three (3) connections in two (2) separate scenarios in two (2) build-out phases. (see attached PDF for location).

Phase 1 (Interim):

Connection 1 – 203mm Watermain on Baxter Road:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Available fire flow at 20 psi = 64 L/s, Assuming ground elevation of 74.2 m.

Scenario 1: Connection 2A – 305mm Watermain on Iris Street:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (166.7 L/s) = 98.1 m

Max Day + Fire Flow (83.3 L/s) = 106.2 m

Available fire flow at 20 psi = 217 L/s, Assuming ground elevation of 74.8 m.

Scenario 2: Connection 2C – 203mm Watermain on Elmira Drive:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 99.9 m

Available fire flow at 20 psi = 128 L/s, Assuming ground elevation of 74.6 m.

Phase 1 & 2 (Ultimate):

Connection 1 – 203mm Watermain on Baxter Road:

Minimum HGL = 106.6 m

Maximum HGL = 115.1 m

Available fire flow at 20 psi = 57 L/s, Assuming ground elevation of 74.2 m.

Scenario 1: Connection 2A – 305mm Watermain on Iris Street:

Minimum HGL = 107.2 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (166.7 L/s) = 94.4 m

Max Day + Fire Flow (83.3 L/s) = 105.2 m

Available fire flow at 20 psi = 217 L/s, Assuming ground elevation of 74.8 m.

Scenario 2: Connection 2C – 203mm Watermain on Elmira Drive:

Minimum HGL = 106.2 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 98.1 m

Available fire flow at 20 psi = 122 L/s, Assuming ground elevation of 74.6 m.

The sanitary sewer capacity is still being evaluated by our Infrastructure Planning team. I will provide a separate email with those results once available.

Thanks,

Julie Candow, P.Eng
Project Manager
Development Review – West Branch
Planning, Development and Building Services Dept.
110 Laurier Avenue West, 4th Floor East
Ottawa, ON K1P 1J1
613.580.2424 ext. 13850

From: Ben Sweet <b.sweet@novatech-eng.com>
Sent: October 01, 2025 9:54 AM
To: Candow, Julie <julie.candow@ottawa.ca>
Cc: Sam Bahia <s.bahia@novatech-eng.com>; Parth Kanani <p.kanani@novatech-eng.com>; Steve Zorgel <s.zorgel@novatech-eng.com>; Evan Garfinkel <egarfinkel@regionalgroup.com>; Bernier, John <John.Bernier@ottawa.ca>
Subject: 1101 Baxter Road - Engineering (City File No.: PC2025-0029 / Novatech File No.: 121019)

Hi Julie,

This email is in regard to the 1101 Baxter Road development. Upon review of the pre-consultation meeting feedback, below are some engineering related items that we would like City Staff input on. If you have any questions or require additional information let me know.

Water Boundary Condition
See attached water demand sheets for Ph1 (interim), Ph1+Ph2 (ultimate), and supporting figure. The water demand sheets provide the phased domestic demands and high-level fire flow requirements for the water boundary condition request. It is planned that a looped watermain will be achieved via connection 1, along with one of three options for connection 2.

Conceptual Wastewater Flows
See below breakdown of conceptual wastewater flows for Ph1 (interim) and Ph1+Ph2 (ultimate).

Ph1 (interim) – 728 apartment units, 5200m2 commercial area
Subject Site peak design flow – 13.93L/s
Subject Site and External Areas total peak design flow – 17.77L/s

Ph1+Ph2 (ultimate) – 1448 apartment units, 9350m2 commercial area, and a 0.31ha park
Subject Site peak design flow – 26.07L/s
Subject Site and External Areas total peak design flow – 29.91L/s

The "External Areas" consists of 1050 Baxter Road, the Milestones, and the Scotiabank contributing to the wastewater flows to the 300mm dia. local sewer fronting the Subject Site and discharging to the 750mm dia. Pinecrest Creek Collector sewer. We have reviewed the local sewer between MHSA01282 to MHSA75835 and

there is sufficient capacity to accommodate the Subject Site within these sewers. However, input on the capacity of the Pinecrest Creek Collector sewer would be appreciated based on the conceptual wastewater flows provided above.

Stormwater Management

Although it is acknowledged that the Subject Site is located within the Pinecrest Creek/Westboro Study Area, based on my discussions with Sam Bahia, it was our understanding that the SWM would be reviewed with respect to the existing development/imperviousness which doesn't appear to be reflected in the feedback comments.

Regards,

Ben Sweet, P.Eng., Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 250

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This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

'

RMOC Environmental Services

Design Guidelines

Environmental Services Department
Tel. (613) 560-2050
Fax. (613) 560-6009

Services environnementaux
Tél. (613) 560-2050
Télécopieur (613) 560-6009

June 26, 1991

Re: Design Guidelines

The Environmental Services Department is please to provide you a copy of the Design Guidelines covering water and sewage works in the Region of Ottawa-Carleton.

This document is intended to assist area municipalities, developers and consulting engineers in designing municipal infrastructure facilities. The preparation of this document has been carried out by staff of the Environmental Services Department in consultation with a number of area consultants.

The "Guidelines" are a companion document to the existing Standard Specification manual and will become effective September 1, 1991.

The Department will issue periodic updates to this document and a mailing list will be maintained to this effect.

We would appreciate any comments that you have on the document. Please direct them to:

Manager, Engineering Services Branch
Engineering Division
Environmental Services Department
Regional Municipality of Ottawa-Carleton
111 Lisgar Street, 2nd floor
Ottawa, Ontario K2P 2L7

Your cooperation in using this document will assist the Department in timely implementation of new municipal infrastructure.

Your truly,

J. Miller, P. Eng.
Director
Engineering Division

7.0 SANITARY SEWER DESIGN CRITERIA

7.1 Design Flow

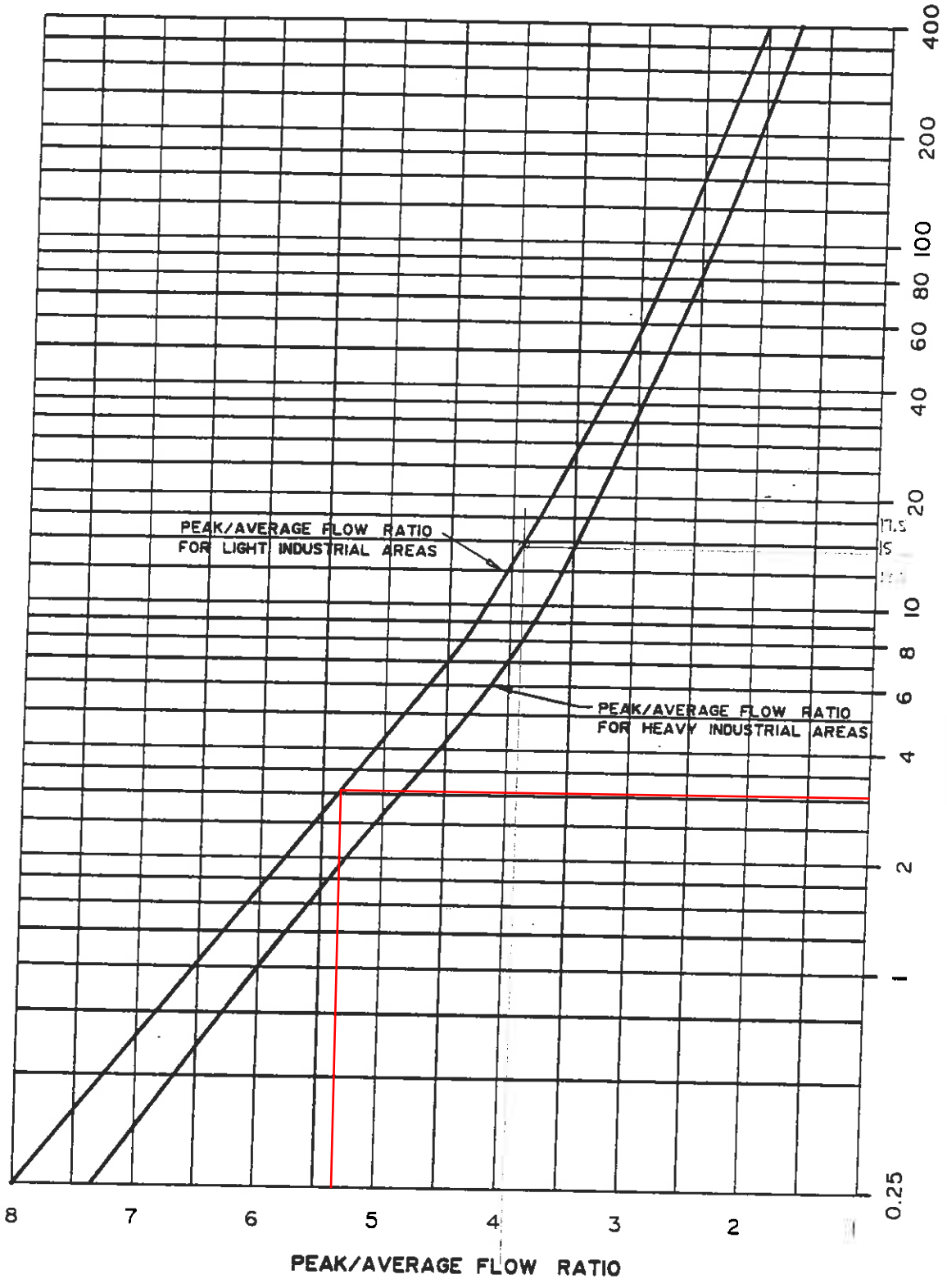
Design flows shall be calculated in accordance with the following minimum criteria. Local municipalities may require higher design values.

Flow Description			Recommended Flow Design Value
1)	Average Residential Flow		350 ~~450~~ l/cap/day
2)	Average Commercial Flow		50,000 l/ha/day
3)	Average Institutional Flow		50,000 l/ha/day (.6 l/s/ha)
4)	Average Light Industrial Flows		35,000 l/ha/day (.4 l/s/ha)
5)	Peak Residential Factor (Harmon)	MAX = 4.0 MIN = 2.0	$1 + \frac{14}{4 + P^{1/2}}$
6)	Peak Commercial Factor		1.5
7)	Peak Institutional Factor		1.5
8)	Peak Light Industrial Factor		See Figure 1, Appendix "F"
9)	Infiltration Allowance		0.28 ~~0.15~~ l/ha/sec

Above guidelines are for new developments only and are not to be used for estimating flows in existing sewers.

7.1.1 Sanitary Drainage Area Plan

The tributary areas used in the evaluation of the design flows shall be shown on a plan to a scale of 1:1000. This plan shall indicate the land use, area, population density or number of units, and the design flow in l/s. For each area entered on the design sheet, the manhole numbers, the size and grade of the sewers, and the plan number of the detailed plan and profile for each section of the sanitary sewer shall also be indicated.



Regional Municipality of Ottawa - Carleton Environmental Services Department

DESIGN GUIDELINES

SECTION 7 - SANITARY SEWER DESIGN

APPENDIX E

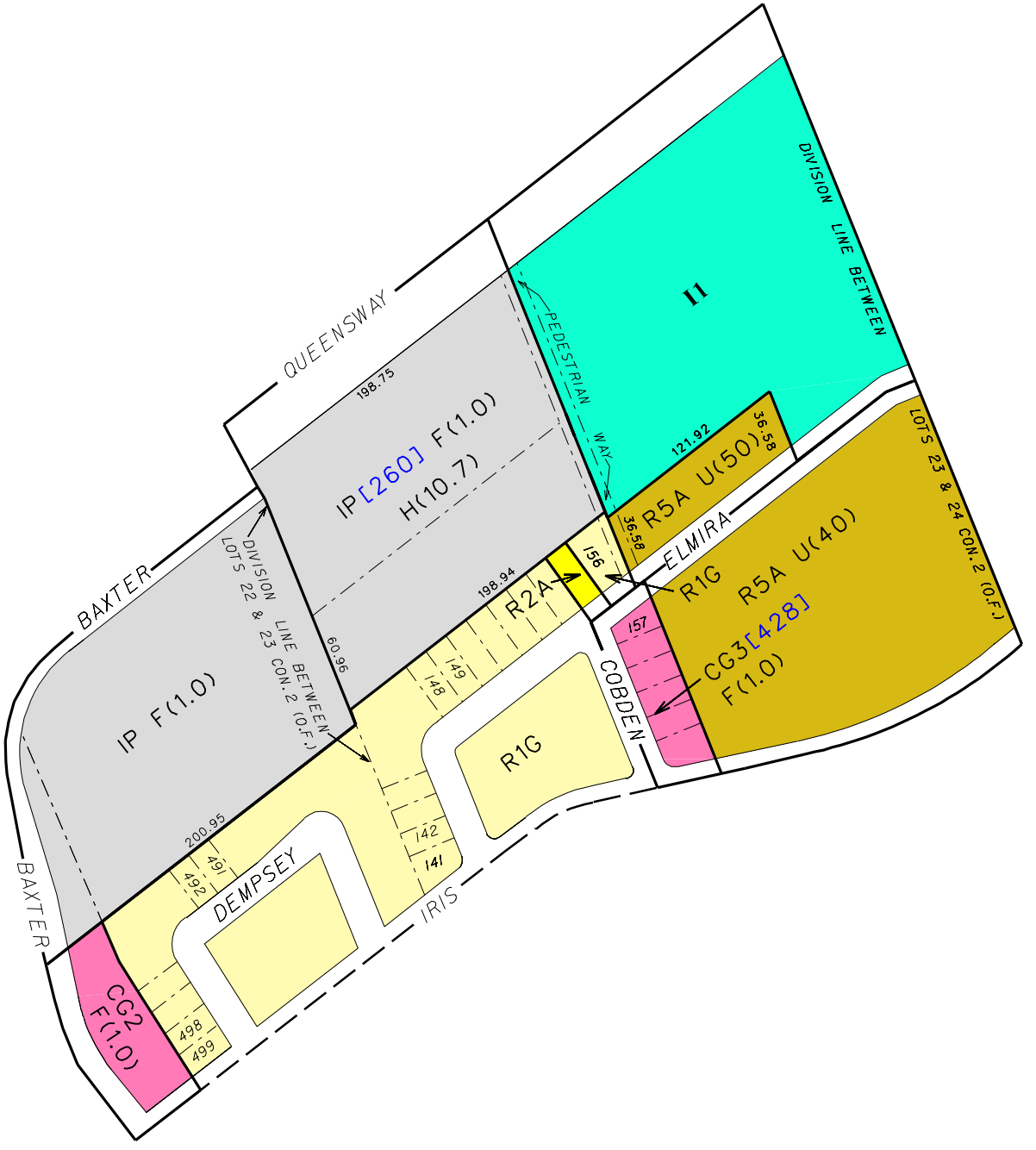
TYPICAL INDUSTRIAL SEWAGE

FLOW PEAKING FACTORS

Date: JUNE 1991

Rev.:

Figure: 1



NEIGHBOURHOOD MONITORING AREA NUMBER 3

QUEENSWAY TERRACE S.

ZONING - SUB AREA 5

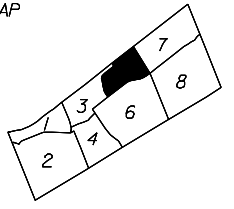
LEGEND

- INTERIM CONTROL
- HERITAGE
- FLOOD PLAIN
- p — TRANSITIONAL PARKING
- h — HOLDING ZONES
- H(30) — HEIGHT (IN METRES)
- U(30) — UNITS PER HECTARE
- * — PENDING FINAL APPROVAL
- F(1.0) — FLOOR SPACE INDEX
- SUB AREA BOUNDARY
- LOT LINES

the Zoning By-Law, 1998.

passed by CITY COUNCIL MAY 20,1998

KEY MAP



BAR SCALE / METRES

0 20 40 100

10 30 50 150

DIMENSIONS ARE METRIC

City of Ottawa / Ville d'Ottawa

PRODUCED BY PLANNING BRANCH
DEPARTMENT OF URBAN PLANNING & PUBLIC WORKS

STREET NETWORK PROVIDED BY DEPARTMENT OF CORPORATE SERVICES

SANITARY SEWER DESIGN SHEET
INTERIM BUILD-OUT (PHASE 1A)

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER ROAD
Date: 12/22/2025
Input By: Parth Kanani
Reviewed By: Ben Sweet
Drawing Reference: 121019-SAN

Legend: Design Input by User
As-Built Input by User
Cumulative Cell
Calculated Design Cell Output
Calculated Annual Cell Output
Calculated Rare Cell Output
Reference: City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

Location				Demand																				Design Capacity							
				Residential Flow									Industrial / Commercial / Institutional (ICI) Flow										Extraneous Flow Area Method		Total Design Flow	Proposed Sewer Pipe Sizing / Design							
Street	Area ID	From MH	To MH	Singles	Semis / Towns	Apts	Park Area	Population (in 1000's)	Cumulative Population (in 1000's)	Average Pop. Flow Q(c) (L/s)	Design Peaking Factor M	Peak Design Pop. Flow Q(p) (L/s)	Res. Drainage Area (ha.)	Cumulative Res. Drainage Area (ha.)	Industrial Area (ha.)	Cumulative Industrial Area (ha.)	Average Design Industrial Flow (L/s)	Industrial Peaking Factor	Commercial / Institutional Area (ha.)	Cumulative Commercial / Institutional Area (ha.)	Average Design Commercial / Institutional Flow (L/s)	Commercial / Institutional Peaking Factor	Cumulative ICI Area (ha.)	Peak Design ICI Flow Q (ici) (L/s)	Cumulative Extraneous Drainage Area (ha.)	Design Extraneous Flow Q(e) (L/s)	Total Peak Design Flow Q(D) (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Q(D) / Qfull
	1	EX BLDG	75835					0.000	0.000	0.00	3.80	0.00	0.000	0.000	2.040	2.040	0.83	1.50	0.000	0.000	0.00	1.50	2.040	1.24	2.040	0.67	1.91	5.0	200 PVC	0.203	0.013	0.36	20.5	0.63	9.3%
		75835	75836					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	2.040	0.83	1.50	0.000	0.000	0.00	1.50	2.040	1.24	2.040	0.67	1.91	68.5	200 PVC	0.203	0.013	0.45	23.0	0.71	8.3%
		75836	75837					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	2.040	0.83	1.50	0.000	0.000	0.00	1.50	2.040	1.24	2.040	0.67	1.91	84.0	200 PVC	0.203	0.013	0.57	25.8	0.80	7.4%
	2	EX BLDG	75838					0.000	0.000	0.00	3.80	0.00	0.000	0.000	1.230	1.230	0.50	1.50	0.000	0.000	0.00	1.50	1.230	0.75	1.230	0.41	1.15	21.0	150 PVC - DO NOT SPEC	0.152	0.013	8.17	45.4	2.49	2.5%
		75838	75837					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	1.230	0.50	1.50	0.000	0.000	0.00	1.50	1.230	0.75	1.230	0.41	1.15	55.4	200 PVC	0.203	0.013	0.70	28.6	0.88	4.0%
	14	75837	26026					0.000	0.000	0.00	3.80	0.00	0.007	0.007	0.000	3.270	1.32	1.50	0.000	0.000	0.00	1.50	3.270	1.99	3.277	1.08	3.07	7.0	250 PVC	0.254	0.013	1.42	73.9	1.46	4.2%
	19	26026	101					0.000	0.000	0.00	3.80	0.00	0.016	0.023	0.000	3.270	1.32	1.50	0.000	0.000	0.00	1.50	3.270	1.99	3.293	1.09	3.07	56.5	300 PVC	0.305	0.013	0.50	71.3	0.98	4.3%
	16	111	109				0.310	0.001	0.001	0.00	3.78	0.02	0.430	0.430	0.000	0.000	0.00	1.00	0.000	0.000	0.00	1.00	0.000	0.00	0.430	0.14	0.16	13.9	200 PVC	0.203	0.013	0.65	27.6	0.85	0.6%
	17	109	107					0.000	0.001	0.00	3.78	0.02	0.420	0.850	0.000	0.000	0.00	1.00	0.000	0.000	0.00	1.00	0.000	0.00	0.850	0.28	0.30	44.3	200 PVC	0.203	0.013	0.32	19.4	0.60	1.5%
		107	105					0.000	0.001	0.00	3.78	0.02	0.000	0.850	0.000	0.000	0.00	1.00	0.000	0.000	0.00	1.00	0.000	0.00	0.850	0.28	0.30	61.6	200 PVC	0.203	0.013	0.32	19.4	0.60	1.5%
	18	105	103					0.000	0.001	0.00	3.78	0.02	0.750	1.600	0.000	0.000	0.00	1.00	0.000	0.000	0.00	1.00	0.000	0.00	1.600	0.53	0.54	71.1	200 PVC	0.203	0.013	0.65	27.6	0.85	2.0%
		103	101					0.000	0.001	0.00	3.78	0.02	0.000	1.600	0.000	0.000	0.00	1.00	0.000	0.000	0.00	1.00	0.000	0.00	1.600	0.53	0.54	12.0	200 PVC	0.203	0.013	0.65	27.6	0.85	2.0%
	3	101	26027					0.000	0.001	0.00	3.78	0.02	0.099	1.722	0.000	3.270	1.32	1.50	0.000	0.000	0.00	1.50	3.270	1.99	4.992	1.65	3.65	56.5	300 PVC	0.305	0.013	0.50	71.3	0.98	5.1%
	4	26027	26028					0.000	0.001	0.00	3.78	0.02	0.160	1.882	0.000	3.270	1.32	1.50	0.000	0.000	0.00	1.50	3.270	1.99	5.152	1.70	3.70	77.5	300 PVC	0.305	0.013	0.51	72.0	0.99	5.1%
	15	PR BLDG	26028			360		0.648	0.649	2.10	3.33	7.01	1.540	1.540	0.000	0.000	0.00	1.00	0.000	0.000	0.00	1.00	0.000	0.00	1.540	0.51	7.52	20.0	200 PVC	0.203	0.013	1.00	34.2	1.06	22.0%
	5	26028	26029					0.000	0.649	2.10	3.33	7.01	0.160	3.582	0.000	3.270	1.32	1.50	0.000	0.000	0.00	1.50	3.270	1.99	6.852	2.26	11.26	67.0	300 PVC	0.305	0.013	0.50	71.3	0.98	15.8%
	6	26029	26030					0.000	0.649	2.10	3.33	7.01	0.055	3.637	0.000	3.270	1.32	1.50	0.000	0.000	0.00	1.50	3.270	1.99	6.907	2.28	11.27	43.7	300 PVC	0.305	0.013	0.50	71.3	0.98	15.8%
	7	26030	26031					0.000	0.649	2.10	3.33	7.01	0.081	3.718	0.000	3.270	1.32	1.50	0.000	0.000	0.00	1.50	3.270	1.99	6.988	2.31	11.30	67.0	300 PVC	0.305	0.013	0.71	85.0	1.16	13.3%
	8	EX BLDG	61331					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	0.000	0.00	1.50	0.370	0.370	0.12	1.50	0.370	0.18	0.370	0.12	0.30	38.6	150 PVC - DO NOT SPEC	0.152	0.013	2.40	24.6	1.35	1.2%
	9	61331	26031					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	0.000	0.00	1.50	0.580	0.950	0.31	1.50	0.950	0.46	0.950	0.31	0.78	55.8	200 PVC	0.203	0.013	5.21	78.1	2.41	1.0%
	10	26031	72809					0.000	0.649	2.10	3.33	7.01	0.036	3.754	0.000	3.270	1.32	1.50	0.000	0.950	0.31	1.50	4.220	2.45	7.974	2.63	12.09	30.4	300 PVC	0.305	0.013	0.30	55.3	0.76	21.9%
	11	72809	26032					0.000	0.649	2.10	3.33	7.01	0.140	3.894	0.000	3.270	1.32	1.50	0.000	0.950	0.31	1.50	4.220	2.45	8.114	2.68	12.13	95.5	300 PVC	0.305	0.013	0.50	71.3	0.98	17.0%
	12	26032	26033					0.000	0.649	2.10	3.33	7.01	0.200	4.094	0.000	3.270	1.32	1.50	0.000	0.950	0.31	1.50	4.220	2.45	8.314	2.74	12.20	94.0	300 PVC	0.305	0.013	1.50	123.6	1.69	9.9%
	13	26033	1282					0.000	0.649	2.10	3.33	7.01	0.220	4.314	0.000	3.270	1.32	1.50	0.000	0.950	0.31	1.50	4.220	2.45	8.534	2.82	12.27	94.0	300 PVC	0.305	0.013	0.53	73.4	1.01	16.7%
Totals				**0**	**0**	**360**	**0.310**	**0.649**	**0.649**	**2.10**	**3.33**	**7.01**	**4.314**	**4.314**	**3.270**	**3.270**	**1.32**	**1.50**	**0.950**	**0.950**	**0.31**	**1.50**	**4.220**	**2.45**	**8.534**	**2.82**	**12.27**	**1240.3**							

Demand Equation / Parameters

1. **Q(D), Q(A), Q(R) =** Q(p) + Q(fd) + Q(ici) + Q(e)
2. **Q(p) =** (P x q x M x K / 86,400)
3. **q =** 280 L/per person/day (design)
   200 L/per person/day (annual and rare)
4. **M = Harmon Formula (maximum of 4.0)**
5. **K =** 0.8 (design)
   0.6 (annual and rare)
6. **Park flow is considered equivalent to a single unit / ha**
   Park Demand = 4 single unit equivalent / park ha (~ 3,600 L/ha/day)
7. **Q(fd) =** 0.45 L/s/unit
8. **Q(ici) =** ICI Area x ICI Flow x ICI Peak
9. **Q(e) =** 0.33 L/s/ha (design)
   0.30 L/s/ha (annual)
   0.55 L/s/ha (rare)

Definitions

Q(D) = Peak Design Flow (L/s)
Q(A) = Peak Annual Flow (L/s)
Q(R) = Peak Rare Flow (L/s)
Q(p) = Peak Design Population Flow (L/s)
Q(q) = Average Population Flow (L/s)

	Singles	Semis / Towns	Apts
P = Residential Population =	3.4	2.7	1.8

q = Average Capita Flow
M = Harmon Formula
K = Harmon Correction Factor
Typ. Service Diameter (mm) = 135
Typ. Service Length (m) = 15 15
I/I Pipe Rate (L/mm dia/m/hr) = 0.007
Q(fd) = Foundation Flow (L/s)
Q(ici) = Industrial / Commercial / Institutional Flow (L/s)
Q(e) = Extraneous Flow (L/s)

Institutional / Commercial / Industrial	Industrial	Commercial / Institutional	
Design =	35000	28000	L/gross ha/day
Annual / Rare =	10000	17000	L/gross ha/day
ICI Peak *			
Design =	1.5	1.5	* ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only)
Annual / Rare =		1.0	

Capacity Equation

Q full = $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

Partial Pipe Flow

d / D = Partial pipe flow depth / pipe diameter
Q actual = Open channel hydraulics $(1000*(1/n)*A_p*R^{2/3}*So^{0.5})$ and uniform dimensional lookup chart for pipe flow depth (d)
V actual = Q actual / A actual and uniform dimensional lookup chart for pipe flow depth (d)

Definitions

Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A_p = Pipe flow area (m^2)
R = Hydraulic Radius of wetted area (dia./4 for full pipes)
So = Pipe slope/gradient

Partial Pipe Flow Check Rationale

Check Rationale, in order of importance:

1. Pipe Capacity Check; Q < Qfull
2. Min. Slope Check; Full Flow Velocity, Vfull > 0.6m/s
3. U/S Run Check; N/A if Number of Units > 10, Cumulative Population > 30, or Slope > 0.65%
4a. Flow Depth Check; d/D > 0.30. N/A, if slope > 0.65%
4b. Partial Flow Velocity Check; Vactual > 0.6m/s. N/A, if slope > 0.65%
5. Constructability Tolerance Check; Pipe Length <15m. N/A, if slope > 0.65%

Output:	Good	Design / Constructability Issue
1	OK	No Good (NG) NG Increase Capacity
2	OK	NG Vfull
3	OK	NG U/S Run 0.65% Min
4a	OK	Check Vactual
4b	OK	NG Vactual
5	OK	Short Run

SANITARY SEWER DESIGN SHEET
ULTIMATE BUILD-OUT (PHASE 1 2)

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER ROAD
Date: 12/22/2025
Input By: Parth Kanani
Reviewed By: Ben Sweet
Drawing Reference: 121019-SAN

Legend: Design Input by User
As-Built Input by User
Cumulative Cell
Calculated Design Cell Output
Calculated Annual Cell Output
Calculated Rare Cell Output
Reference: City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

Location				Demand																				Design Capacity							
				Residential Flow									Industrial / Commercial / Institutional (ICI) Flow										Extraneous Flow Area Method		Total Design Flow	Proposed Sewer Pipe Sizing / Design							
Street	Area ID	From MH	To MH	Singles	Semis / Towns	Apts	Park Area	Population (in 1000's)	Cumulative Population (in 1000's)	Average Pop. Flow Q(q) (L/s)	Design Peaking Factor M	Peak Design Pop. Flow Q(p) (L/s)	Res. Drainage Area (ha.)	Cumulative Res. Drainage Area (ha.)	Industrial Area (ha.)	Cumulative Industrial Area (ha.)	Average Design Industrial Flow (L/s)	Industrial Peaking Factor	Commercial / Institutional Area (ha.)	Cumulative Commercial / Institutional Area (ha.)	Average Design Commercial / Institutional Flow (L/s)	Commercial / Institutional Peaking Factor	Cumulative ICI Area (ha.)	Peak Design ICI Flow Q (ici) (L/s)	Cumulative Extraneous Drainage Area (ha.)	Design Extraneous Flow Q(e) (L/s)	Total Peak Design Flow Q(D) (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Q(D) / Qfull
	1	EX BLDG	75835					0.000	0.000	0.00	3.80	0.00	0.000	0.000	2.040	2.040	0.83	1.50	0.000	0.000	0.00	1.50	2.040	1.24	2.040	0.67	1.91	5.0	200 PVC	0.203	0.013	0.36	20.5	0.63	9.3%
		75835	75836					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	2.040	0.83	1.50	0.000	0.000	0.00	1.50	2.040	1.24	2.040	0.67	1.91	68.5	200 PVC	0.203	0.013	0.45	23.0	0.71	8.3%
		75836	75837					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	2.040	0.83	1.50	0.000	0.000	0.00	1.50	2.040	1.24	2.040	0.67	1.91	84.0	200 PVC	0.203	0.013	0.57	25.8	0.80	7.4%
	2	EX BLDG	75838					0.000	0.000	0.00	3.80	0.00	0.000	0.000	1.230	1.230	0.50	1.50	0.000	0.000	0.00	1.50	1.230	0.75	1.230	0.41	1.15	21.0	150 PVC - DO NOT SPEC	0.152	0.013	8.17	45.4	2.49	2.5%
		75838	75837					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	1.230	0.50	1.50	0.000	0.000	0.00	1.50	1.230	0.75	1.230	0.41	1.15	55.4	200 PVC	0.203	0.013	0.70	28.6	0.88	4.0%
	14	75837	26026					0.000	0.000	0.00	3.80	0.00	0.007	0.007	0.000	3.270	1.32	1.50	0.000	0.000	0.00	1.50	3.270	1.99	3.277	1.08	3.07	7.0	250 PVC	0.254	0.013	1.42	73.9	1.46	4.2%
	19	26026	101					0.000	0.000	0.00	3.80	0.00	0.016	0.023	0.000	3.270	1.32	1.50	0.000	0.000	0.00	1.50	3.270	1.99	3.293	1.09	3.07	56.5	300 PVC	0.305	0.013	0.50	71.3	0.98	4.3%
	16	111	109				0.310	0.001	0.001	0.00	3.78	0.02	0.430	0.430	0.000	0.000	0.00	1.00	0.000	0.000	0.00	1.00	0.000	0.00	0.430	0.14	0.16	13.9	200 PVC	0.203	0.013	0.65	27.6	0.85	0.6%
	17	109	107					0.000	0.001	0.00	3.78	0.02	0.420	0.850	0.000	0.000	0.00	1.00	0.000	0.000	0.00	1.00	0.000	0.00	0.850	0.28	0.30	44.3	200 PVC	0.203	0.013	0.32	19.4	0.60	1.5%
		107	105					0.000	0.001	0.00	3.78	0.02	0.000	0.850	0.000	0.000	0.00	1.00	0.000	0.000	0.00	1.00	0.000	0.00	0.850	0.28	0.30	61.6	200 PVC	0.203	0.013	0.32	19.4	0.60	1.5%
	18	105	103			768		1.382	1.384	4.48	3.16	14.19	0.750	1.600	0.000	0.000	0.00	1.50	0.415	0.415	0.13	1.50	0.415	0.20	2.015	0.66	15.05	71.1	200 PVC	0.203	0.013	0.65	27.6	0.85	54.6%
		103	101					0.000	1.384	4.48	3.16	14.19	0.000	1.600	0.000	0.000	0.00	1.50	0.000	0.415	0.13	1.50	0.415	0.20	2.015	0.66	15.05	12.0	200 PVC	0.203	0.013	0.65	27.6	0.85	54.6%
	3	101	26027					0.000	1.384	4.48	3.16	14.19	0.099	1.722	0.000	3.270	1.32	1.50	0.000	0.415	0.13	1.50	3.685	2.19	5.407	1.78	18.16	56.5	300 PVC	0.305	0.013	0.50	71.3	0.98	25.5%
	4	26027	26028					0.000	1.384	4.48	3.16	14.19	0.160	1.882	0.000	3.270	1.32	1.50	0.000	0.415	0.13	1.50	3.685	2.19	5.567	1.84	18.21	77.5	300 PVC	0.305	0.013	0.51	72.0	0.99	25.3%
	15	PR BLDG	26028			680		1.224	2.608	8.45	2.99	25.31	1.540	1.540	0.000	0.000	0.00	1.50	0.520	0.520	0.17	1.50	0.520	0.25	2.060	0.68	26.24	20.0	200 PVC	0.203	0.013	1.00	34.2	1.06	76.7%
	5	26028	26029					0.000	2.608	8.45	2.99	25.31	0.160	3.582	0.000	3.270	1.32	1.50	0.000	0.935	0.30	1.50	4.205	2.44	7.787	2.57	30.32	67.0	300 PVC	0.305	0.013	0.50	71.3	0.98	42.5%
	6	26029	26030					0.000	2.608	8.45	2.99	25.31	0.055	3.637	0.000	3.270	1.32	1.50	0.000	0.935	0.30	1.50	4.205	2.44	7.842	2.59	30.34	43.7	300 PVC	0.305	0.013	0.50	71.3	0.98	42.5%
	7	26030	26031					0.000	2.608	8.45	2.99	25.31	0.081	3.718	0.000	3.270	1.32	1.50	0.000	0.935	0.30	1.50	4.205	2.44	7.923	2.61	30.36	67.0	300 PVC	0.305	0.013	0.71	85.0	1.16	35.7%
	8	EX BLDG	61331					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	0.000	0.00	1.50	0.370	0.370	0.12	1.50	0.370	0.18	0.370	0.12	0.30	38.6	150 PVC - DO NOT SPEC	0.152	0.013	2.40	24.6	1.35	1.2%
	9	61331	26031					0.000	0.000	0.00	3.80	0.00	0.000	0.000	0.000	0.000	0.00	1.50	0.580	0.950	0.31	1.50	0.950	0.46	0.950	0.31	0.78	55.8	200 PVC	0.203	0.013	5.21	78.1	2.41	1.0%
	10	26031	72809					0.000	2.608	8.45	2.99	25.31	0.036	3.754	0.000	3.270	1.32	1.50	0.000	1.885	0.61	1.50	5.155	2.90	8.909	2.94	31.15	30.4	300 PVC	0.305	0.013	0.30	55.3	0.76	56.4%
	11	72809	26032					0.000	2.608	8.45	2.99	25.31	0.140	3.894	0.000	3.270	1.32	1.50	0.000	1.885	0.61	1.50	5.155	2.90	9.049	2.99	31.20	95.5	300 PVC	0.305	0.013	0.50	71.3	0.98	43.7%
	12	26032	26033					0.000	2.608	8.45	2.99	25.31	0.200	4.094	0.000	3.270	1.32	1.50	0.000	1.885	0.61	1.50	5.155	2.90	9.249	3.05	31.26	94.0	300 PVC	0.305	0.013	1.50	123.6	1.69	25.3%
	13	26033	1282					0.000	2.608	8.45	2.99	25.31	0.220	4.314	0.000	3.270	1.32	1.50	0.000	1.885	0.61	1.50	5.155	2.90	9.469	3.12	31.34	94.0	300 PVC	0.305	0.013	0.53	73.4	1.01	42.7%
Totals				0	0	1448	0.310	2.608	2.608	8.45	2.99	25.31	4.314	4.314	3.270	3.270	1.32	1.50	1.885	1.885	0.61	1.50	5.155	2.90	9.469	3.12	31.34	1240.3							

Demand Equation / Parameters

1. **Q(D), Q(A), Q(R) =** Q(p) + Q(fd) + Q(ici) + Q(e)
2. **Q(p) =** (P x q x M x K / 86,400)
3. **q =** 280 L/per person/day (design); 200 L/per person/day (annual and rare)
4. **M = Harmon Formula (maximum of 4.0)**
5. **K =** 0.8 (design); 0.6 (annual and rare)
6. **Park flow is considered equivalent to a single unit / ha**
   Park Demand = 4 single unit equivalent / park ha (~ 3,600 L/ha/day)
7. **Q(fd) =** 0.45 L/s/unit
8. **Q(ici) =** ICI Area x ICI Flow x ICI Peak
9. **Q(e) =** 0.33 L/s/ha (design); 0.30 L/s/ha (annual); 0.55 L/s/ha (rare)

Definitions

Q(D) = Peak Design Flow (L/s)
Q(A) = Peak Annual Flow (L/s)
Q(R) = Peak Rare Flow (L/s)
Q(p) = Peak Design Population Flow (L/s)
Q(q) = Average Population Flow (L/s)

	Singles	Semis / Towns	Apts
P = Residential Population =	3.4	2.7	1.8

q = Average Capita Flow
M = Harmon Formula
K = Harmon Correction Factor

Typ. Service Diameter (mm) =	135	
Typ. Service Length (m) =	15	15
I/I Pipe Rate (L/mm dia/m/hr) =	0.007	

Q(fd) = Foundation Flow (L/s)
Q(ici) = Industrial / Commercial / Institutional Flow (L/s)
Q(e) = Extraneous Flow (L/s)

Institutional / Commercial / Industrial	Industrial	Commercial / Institutional	
Design =	35000	28000	L/gross ha/day
Annual / Rare =	10000	17000	L/gross ha/day
ICI Peak *			
Design =	1.5	1.5	* ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only)
Annual / Rare =		1.0	

Capacity Equation

Q full = $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

Definitions

Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A_p = Pipe flow area (m^2)
R = Hydraulic Radius of wetted area (dia./4 for full pipes)
So = Pipe slope/gradient

Partial Pipe Flow

d / D = Partial pipe flow depth / pipe diameter
Q actual = Open channel hydraulics (1000*(1/n)*Ap*R2/3*So0.5) and uniform dimensional lookup chart for pipe flow depth (d)

V actual = Q actual / A actual and uniform dimensional lookup chart for pipe flow depth (d)

Partial Pipe Flow Check Rationale

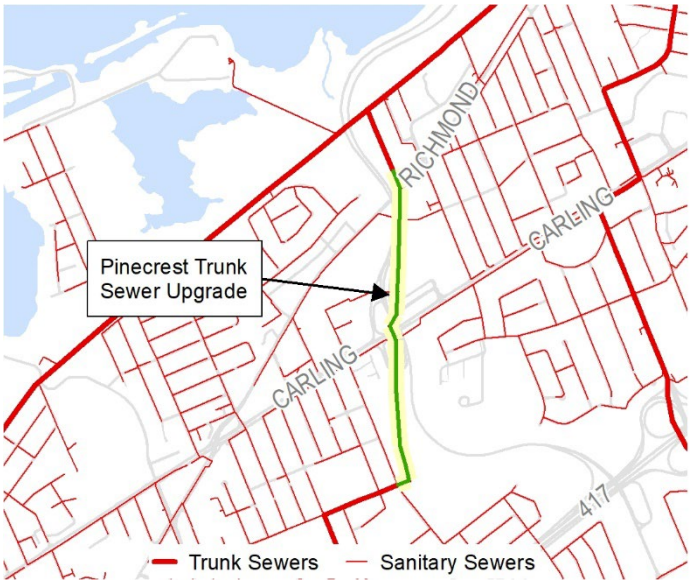
Check Rationale, in order of importance:

1. Pipe Capacity Check; Q < Qfull
2. Min. Slope Check; Full Flow Velocity, Vfull > 0.6m/s
3. U/S Run Check; N/A if Number of Units > 10, Cumulative Population > 30, or Slope > 0.65%
4a. Flow Depth Check; d/D > 0.30. N/A, if slope > 0.65%
4b. Partial Flow Velocity Check; Vactual > 0.6m/s. N/A, if slope > 0.65%
5. Constructability Tolerance Check; Pipe Length <15m. N/A, if slope > 0.65%

Output:

	Good	Design / Constructability Issue	
1	OK	No Good (NG)	NG Increase Capacity
2	OK		NG Vfull
3	OK		NG U/S Run 0.65% Min
4a	OK		Check Vactual
4b	OK		NG Vactual
5	OK		Short Run

Pinecrest Trunk Sewer Upgrade



PROJECT RATIONALE

What: Approximately 1.3 kilometres of upsizing to 1050mm diameter is required in the Pinecrest Trunk from Henley Street to Richmond Road.

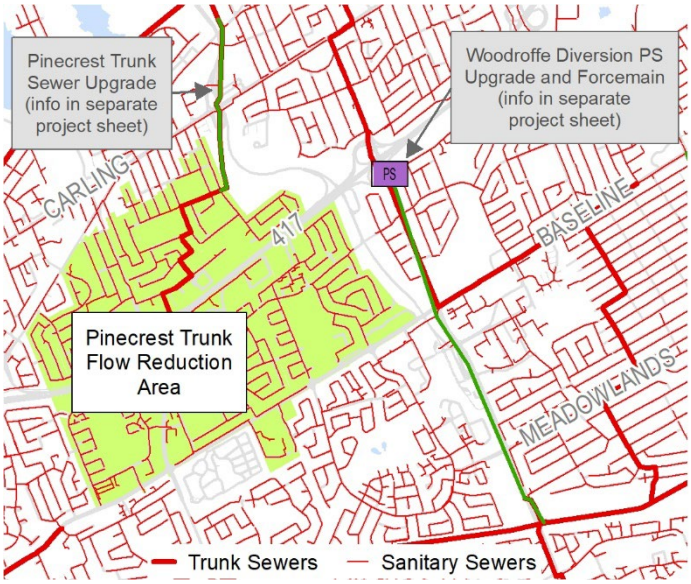
Why: The Pinecrest Trunk is operating at full capacity under existing conditions and will service two high priority upstream intensification hubs (Pinecrest Queensview and Lincoln Fields).

PROJECT SCHEDULE	
Budget Authority	2029-2034

PROJECT FUNDING	
Total Capital Estimate	$11.0 M
% Development Charge Funded	95%
% Rate Funded	5%
% Other Source Funded	0%

APPROVALS AND FOLLOW-UP ACTIONS	
EA Requirements	Depending on the final alignment, this project may be a Schedule B undertaking or will be exempt under the Municipal Engineers Class EA.
Follow-up Actions	The following actions are required to pursue implementation of this project: 1. Confirm growth timeline for intensification 2. Flow monitoring to confirm residual capacity in the Pinecrest Trunk 3. Functional, preliminary and detailed design 4. Implementation (tender and construction)

Pinecrest Trunk Flow Reduction



PROJECT RATIONALE

What: An Inflow & Infiltration flow reduction project has been recommended in the area upstream of the Pinecrest trunk sewer, to minimize the need for pipe upgrades.

Why: There is substantial planned intensification within the Lincoln Fields and Pinecrest Queensway intensification hubs. Inflow & Infiltration reduction would help to offset increasing wastewater flows from these new developments. This flow reduction project would also be beneficial for the West Nepean Collector by reducing extraneous wet weather flows that are conveyed to the WNC, which has extremely limited capacity. Other alternatives, such as flow diversion to the Lynwood Collector, may be required if targets for inflow and infiltration reduction are not met.

PROJECT SCHEDULE	
Budget Authority	2024-2029

PROJECT FUNDING	
Total Capital Estimate	$5.3 M
% Development Charge Funded	95%
% Rate Funded	5%
% Other Source Funded	0%

APPROVALS AND FOLLOW-UP ACTIONS	
EA Requirements	This project is exempt from the requirements of the Municipal Engineers Class EA
Follow-up Actions	The following actions are required to pursue implementation of this project: 1. Initiate flow monitoring to characterize flows within study area 2. Identify Inflow & Infiltration sources 3. Initiate flow removal activities 4. Determine if flow removal can create additional capacity that is sufficient to support the Pinecrest-Queensview intensification hub. Explore alternatives for diverting flows to the Lynwood Collector, such as a new diversion PS, if the targets for inflow and infiltration reduction are not met.

Appendix E
Water Demand Calculations

Ben Sweet

From: Candow, Julie <julie.candow@ottawa.ca>
Sent: Wednesday, November 19, 2025 3:20 PM
To: Ben Sweet
Cc: Sam Bahia; Parth Kanani; Steve Zorgel; Evan Garfinkel; Bernier, John; Roy, Jean-Miguel
Subject: RE: 1101 Baxter Road - Engineering (City File No.: PC2025-0029 / Novatech File No.: 121019)
Attachments: 1101 Baxter Road November 2025.pdf

Hi Ben,

Please see updated boundary conditions below. There was a miscommunication that the looped watermain would be private vs public. The results below and attached are assuming a looped public watermain through the site.

The following are boundary conditions, HGL, for hydraulic analysis at 1101 Baxter Road (zone 1W) assumed to publicly looped and connected via three (3) connections in two (2) separate scenarios in two (2) build-out phases. (see attached PDF for location).

Phase 1 (Interim):

Scenario 1:

Connection 1 – 203mm Watermain on Baxter Road:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 98.6 m

Available fire flow at 20 psi = 121 L/s, Assuming ground elevation of 74.2 m.

Connection 2A – 305mm Watermain on Iris Street:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (166.7 L/s) = 98.1 m

Max Day + Fire Flow (83.3 L/s) = 106.2 m

Available fire flow at 20 psi = 217 L/s, Assuming ground elevation of 74.8 m.

Scenario 2:

Connection 1 – 203mm Watermain on Baxter Road:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 99.8 m

Available fire flow at 20 psi = 130 L/s, Assuming ground elevation of 74.2 m.

Connection 2C – 203mm Watermain on Elmira Drive:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 102.3 m

Available fire flow at 20 psi = 153 L/s, Assuming ground elevation of 74.6 m.

Phase 1 & 2 (Ultimate):

Scenario 1:

Connection 1 – 203mm Watermain on Baxter Road:

Minimum HGL = 106.6 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 96.6 m

Available fire flow at 20 psi = 113 L/s, Assuming ground elevation of 74.2 m.

Connection 2A – 305mm Watermain on Iris Street:

Minimum HGL = 107.2 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (166.7 L/s) = 94.4 m

Max Day + Fire Flow (83.3 L/s) = 105.2 m

Available fire flow at 20 psi = 217 L/s, Assuming ground elevation of 74.8 m.

Scenario 2:

Connection 1 – 203mm Watermain on Baxter Road:

Minimum HGL = 106.6 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 97.6 m

Available fire flow at 20 psi = 120 L/s, Assuming ground elevation of 74.2 m.

Connection 2C – 203mm Watermain on Elmira Drive:

Minimum HGL = 106.2 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 100.4 m

Available fire flow at 20 psi = 142 L/s, Assuming ground elevation of 74.6 m.

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Julie Candow, P.Eng
Project Manager
Development Review – West Branch
Planning, Development and Building Services Dept.
110 Laurier Avenue West, 4th Floor East
Ottawa, ON K1P 1J1
613.580.2424 ext. 13850

From: Ben Sweet <b.sweet@novatech-eng.com>
Sent: November 05, 2025 1:30 PM
To: Candow, Julie <julie.candow@ottawa.ca>
Cc: Sam Bahia <s.bahia@novatech-eng.com>; Parth Kanani <p.kanani@novatech-eng.com>; Steve Zorgel <s.zorgel@novatech-eng.com>; Evan Garfinkel <egarfinkel@regionalgroup.com>; Bernier, John <John.Bernier@ottawa.ca>; Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Subject: RE: 1101 Baxter Road - Engineering (City File No.: PC2025-0029 / Novatech File No.: 121019)

Hi Julie,

Thank you for providing the watermain BC results.

Upon review the available fire flow at Connection 1 looks low considering that a looped watermain will be achieved via one of the two options (after disregarding Dempsey) for Connection 2. Can you confirm if the City included a watermain link in the watermain BC results provided? If not, is it possible for the City to add a watermain link for the following scenarios and provide updated watermain BC results?

- Scenario 1 (Connection 1 and Connection 2A): 200mm dia @ 430m length
- Scenario 2 (Connection 1 and Connection 2C): 200mm dia. @ 185m length

Also, do you have any update, or sense of timing on when we will receive feedback from the Infrastructure Planning team on the sanitary sewer capacity?

Regards,

Ben Sweet, P.Eng., Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 250

From: Candow, Julie <julie.candow@ottawa.ca>
Sent: Wednesday, October 22, 2025 10:48 AM
To: Ben Sweet <b.sweet@novatech-eng.com>
Cc: Sam Bahia <s.bahia@novatech-eng.com>; Parth Kanani <p.kanani@novatech-eng.com>; Steve Zorgel <s.zorgel@novatech-eng.com>; Evan Garfinkel <egarfinkel@regionalgroup.com>; Bernier, John <John.Bernier@ottawa.ca>; Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Subject: RE: 1101 Baxter Road - Engineering (City File No.: PC2025-0029 / Novatech File No.: 121019)

Hi Ben,

Please see below the watermain BC results.

Please note that for the two higher RFFs proposed, we cannot accommodate those results. If RFF requests come in that high, we ask the proponent to look for ways to reduce their fire demand. Therefore, we have provided results for RFF#3, RFF#4 and RFF#5. Furthermore, results are not provided for the Demsey Ave connection as the City will not allow a connection to the 152mm diameter watermain in Demsey Ave.

The following are boundary conditions, HGL, for hydraulic analysis at 1101 Baxter Road (zone 1W) assumed to looped and connected via three (3) connections in two (2) separate scenarios in two (2) build-out phases. (see attached PDF for location).

Phase 1 (Interim):

Connection 1 – 203mm Watermain on Baxter Road:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Available fire flow at 20 psi = 64 L/s, Assuming ground elevation of 74.2 m.

Scenario 1: Connection 2A – 305mm Watermain on Iris Street:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (166.7 L/s) = 98.1 m

Max Day + Fire Flow (83.3 L/s) = 106.2 m

Available fire flow at 20 psi = 217 L/s, Assuming ground elevation of 74.8 m.

Scenario 2: Connection 2C – 203mm Watermain on Elmira Drive:

Minimum HGL = 107.5 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 99.9 m

Available fire flow at 20 psi = 128 L/s, Assuming ground elevation of 74.6 m.

Phase 1 & 2 (Ultimate):

Connection 1 – 203mm Watermain on Baxter Road:

Minimum HGL = 106.6 m

Maximum HGL = 115.1 m

Available fire flow at 20 psi = 57 L/s, Assuming ground elevation of 74.2 m.

Scenario 1: Connection 2A – 305mm Watermain on Iris Street:

Minimum HGL = 107.2 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (166.7 L/s) = 94.4 m

Max Day + Fire Flow (83.3 L/s) = 105.2 m

Available fire flow at 20 psi = 217 L/s, Assuming ground elevation of 74.8 m.

Scenario 2: Connection 2C – 203mm Watermain on Elmira Drive:

Minimum HGL = 106.2 m

Maximum HGL = 115.1 m

Max Day + Fire Flow (83.3 L/s) = 98.1 m

Available fire flow at 20 psi = 122 L/s, Assuming ground elevation of 74.6 m.

The sanitary sewer capacity is still being evaluated by our Infrastructure Planning team. I will provide a separate email with those results once available.

Thanks,

Julie Candow, P.Eng
Project Manager

Development Review – West Branch
Planning, Development and Building Services Dept.
110 Laurier Avenue West, 4th Floor East
Ottawa, ON K1P 1J1
613.580.2424 ext. 13850

Classified as City of Ottawa - Internal / Ville d'Ottawa - classé interne

From: Ben Sweet <b.sweet@novatech-eng.com>
Sent: October 01, 2025 9:54 AM
To: Candow, Julie <julie.candow@ottawa.ca>
Cc: Sam Bahia <s.bahia@novatech-eng.com>; Parth Kanani <p.kanani@novatech-eng.com>; Steve Zorgel <s.zorgel@novatech-eng.com>; Evan Garfinkel <egarfinkel@regionalgroup.com>; Bernier, John <John.Bernier@ottawa.ca>
Subject: 1101 Baxter Road - Engineering (City File No.: PC2025-0029 / Novatech File No.: 121019)

Hi Julie,

This email is in regard to the 1101 Baxter Road development. Upon review of the pre-consultation meeting feedback, below are some engineering related items that we would like City Staff input on. If you have any questions or require additional information let me know.

Water Boundary Condition
See attached water demand sheets for Ph1 (interim), Ph1+Ph2 (ultimate), and supporting figure. The water demand sheets provide the phased domestic demands and high-level fire flow requirements for the water boundary condition request. It is planned that a looped watermain will be achieved via connection 1, along with one of three options for connection 2.

Conceptual Wastewater Flows
See below breakdown of conceptual wastewater flows for Ph1 (interim) and Ph1+Ph2 (ultimate).

Ph1 (interim) – 728 apartment units, 5200m2 commercial area
Subject Site peak design flow – 13.93L/s
Subject Site and External Areas total peak design flow – 17.77L/s

Ph1+Ph2 (ultimate) – 1448 apartment units, 9350m2 commercial area, and a 0.31ha park
Subject Site peak design flow – 26.07L/s
Subject Site and External Areas total peak design flow – 29.91L/s

The "External Areas" consists of 1050 Baxter Road, the Milestones, and the Scotiabank contributing to the wastewater flows to the 300mm dia. local sewer fronting the Subject Site and discharging to the 750mm dia. Pinecrest Creek Collector sewer. We have reviewed the local sewer between MHSA01282 to MHSA75835 and there is sufficient capacity to accommodate the Subject Site within these sewers. However, input on the capacity

of the Pinecrest Creek Collector sewer would be appreciated based on the conceptual wastewater flows provided above.

Stormwater Management
Although it is acknowledged that the Subject Site is located within the Pinecrest Creek/Westboro Study Area, based on my discussions with Sam Bahia, it was our understanding that the SWM would be reviewed with respect to the existing development/imperviousness which doesn't appear to be reflected in the feedback comments.

Regards,

Ben Sweet, P.Eng., Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 250

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Boundary Conditions for 1101 Baxter Road

N

Connection 1

Scenario 2:
Connection 2C

Proposed Public
203mm Watermain

1101

Scenario 1:
Connection 2A

Legend

Public

Private

aut./Hwy. 417

prom. Elmira

ch. Baxter Rd.

ch. Colonel Rd.

rue Iris St.

rue Soderlind

Dempsey Ave.

crois. Edwin Cres.

City of Ottawa

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Boundary Condition Request - Phase 1 (interim)

Novatech Project #: 121019
Project Name: 1101 Baxter Road
Date: 9/30/2025
Input By: Parth Kanani
Reviewed By: Ben Sweet
Drawing Reference: CSK 1

Legend: Input by User | No Input Required | Calculated Cells →

Reference: Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

Small System = NO

	# of Dwellings	Area (ha.)	Pop. Equiv.	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential Input						
Singles			0.00	0.00	0.00	0.00
Semis / Townhomes			0.00	0.00	0.00	0.00
Apartments (2-BR)			0.00	0.00	0.00	0.00
Apartments (1-BR)			0.00	0.00	0.00	0.00
Apartments (Avg)	728		1310.40	4.25	10.62	23.36
Industrial / Commercial / Institutional (ICI) Input						
Industrial Area - Light				0.00	0.00	0.00
Industrial Area - Heavy				0.00	0.00	0.00
Commercial Area		0.52		0.17	0.25	0.46
Institutional Area				0.00	0.00	0.00
Other Area				0.00	0.00	0.00
Totals	**728**	**0.52**	**1310.40**	**4.42**	**10.87**	**23.81**

Summary

i. Type of Development and Units:	Residential (728 Apartment Units), Commercial (5200m2)		
ii. Site Address:	1101 Baxter Road		
iii. Proposed Water Service Connection Location(s):	Refer to CSK 1 Connection #1 - Baxter Road Connection #2A - Iris Street Connection #2B - Dempsey Avenue Connection #2C - Elmira Drive		
iv. Average Day Flow Demand:		4.42	L/s
v. Peak Hour Flow Demand:		23.81	L/s
vi. Maximum Day Flow Demand:		10.87	L/s
vii. Required Fire Flow #1:		20000	L/min
viii. Required Fire Flow #2:		15000	L/min
ix. Required Fire Flow #3:		10000	L/min
x. Required Fire Flow #4:		5000	L/min
xi. Required Fire Flow #5:		Max Available @ 20 psi	

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Design Parameters

Residential					
Unit Type	**Singles**	**Semis/ Towns**	**Apts (2-BR)**	**Apts (1-BR)**	**Apts (Avg)**
Population Equiv.	3.4	2.7	2.1	1.4	1.8
Dailly Demand	L/per person/day				
Average Demand	280				
Basic Demand	200				

Residential Peaking Factors		**Max Day (x Avg Day)**	**Peak Hour (x Avg Day)**
	Pop.		
Small System (If Applicable)	0	9.50	14.30
	30	9.50	14.30
	150	4.90	7.40
Modified	300	3.60	*5.50*
	450	3.00	*5.50*
	500	2.90	*5.50*
Large System (Default)	> 500	2.50	5.50

Institutional / Commercial / Industrial				
Industrial		**Commercial**	**Institutional**	**Other Use**
Light	**Heavy**			
L/gross ha/day				L/m²/day
35,000	55,000	28,000	28,000	5
10,000	17,000	17,000	17,000	3

ICI Peaking Factors	**Max Day (x Avg Day)**	**Peak Hour (x Avg Day)**
	1.50	2.70

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Boundary Condition Request - Phase 1 + 2 (ultimate)

Novatech Project #: 121019
Project Name: 1101 Baxter Road
Date: 9/30/2025
Input By: Parth Kanani
Reviewed By: Ben Sweet
Drawing Reference: CSK 1

Legend: Input by User | No Input Required | Calculated Cells →

Reference: Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

Small System = NO

	# of Dwellings	Area (ha.)	Pop. Equiv.	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential Input						
Singles			0.00	0.00	0.00	0.00
Semis / Townhomes			0.00	0.00	0.00	0.00
Apartments (2-BR)			0.00	0.00	0.00	0.00
Apartments (1-BR)			0.00	0.00	0.00	0.00
Apartments (Avg)	1448		2606.40	8.45	21.12	46.46
Industrial / Commercial / Institutional (ICI) Input						
Industrial Area - Light				0.00	0.00	0.00
Industrial Area - Heavy				0.00	0.00	0.00
Commercial Area		0.935		0.30	0.45	0.82
Institutional Area				0.00	0.00	0.00
Other Area				0.00	0.00	0.00
Totals	**1448**	**0.94**	**2606.40**	**8.75**	**21.57**	**47.27**

Summary

i. Type of Development and Units:	Residential (1448 Apartment Units), Commercial (9350m2)		
ii. Site Address:	1101 Baxter Road		
iii. Proposed Water Service Connection Location(s):	Refer to CSK 1 Connection #1 - Baxter Road Connection #2A - Iris Street Connection #2B - Dempsey Avenue Connection #2C - Elmira Drive		
iv. Average Day Flow Demand:		8.75	L/s
v. Peak Hour Flow Demand:		47.27	L/s
vi. Maximum Day Flow Demand:		21.57	L/s
vii. Required Fire Flow #1:		20000	L/min
viii. Required Fire Flow #2:		15000	L/min
ix. Required Fire Flow #3:		10000	L/min
x. Required Fire Flow #4:		5000	L/min
xi. Required Fire Flow #5:		Max Available @ 20 psi	

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

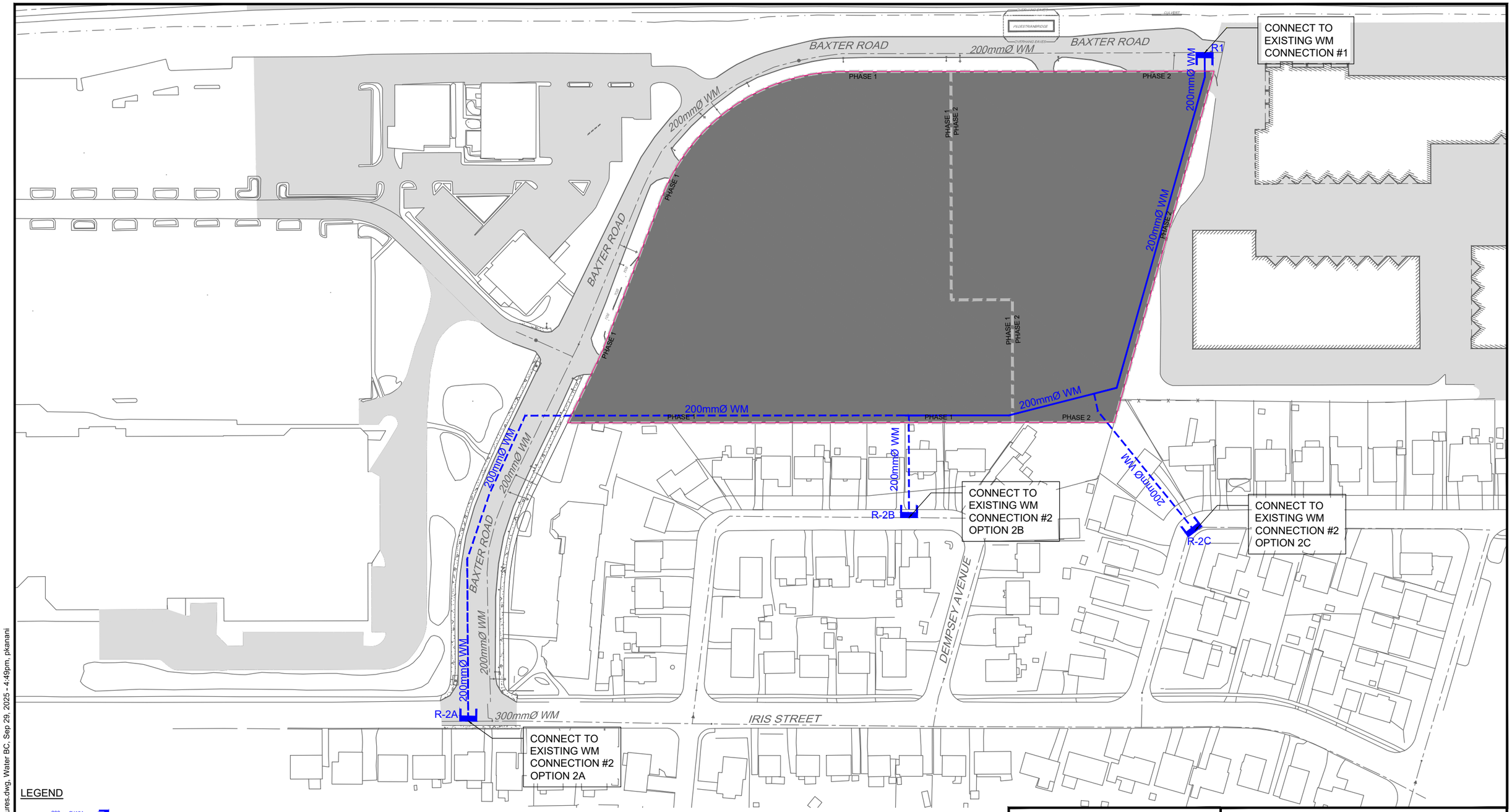
Design Parameters

Residential					
Unit Type	**Singles**	**Semis/ Towns**	**Apts (2-BR)**	**Apts (1-BR)**	**Apts (Avg)**
Population Equiv.	3.4	2.7	2.1	1.4	1.8
Dailly Demand	L/per person/day				
Average Demand	280				
Basic Demand	200				

Residential Peaking Factors		**Max Day (x Avg Day)**	**Peak Hour (x Avg Day)**
	Pop.		
Small System (If Applicable)	0	9.50	14.30
	30	9.50	14.30
	150	4.90	7.40
Modified	300	3.60	*5.50*
	450	3.00	*5.50*
	500	2.90	*5.50*
Large System (Default)	> 500	2.50	5.50

Institutional / Commercial / Industrial				
Industrial		**Commercial**	**Institutional**	**Other Use**
Light	**Heavy**			
L/gross ha/day				L/m²/day
35,000	55,000	28,000	28,000	5
10,000	17,000	17,000	17,000	3

ICI Peaking Factors	**Max Day (x Avg Day)**	**Peak Hour (x Avg Day)**
	1.50	2.70



LEGEND

- PROPOSED WATERMAIN & CONNECTION (200mmØ WM)
- PROPOSED WATERMAIN CONNECTION OPTIONS (200mmØ WM)
- EXISTING WATERMAIN (200mmØ WM)
- EXISTING VALVE LOCATION
- EXISTING REDUCER
- EXISTING HYDRANT
- PARCEL BOUNDARY
- EASEMENT

NOVATECH
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Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

1101 BAXTER ROAD

WATER BOUNDARY CONDITION

SCALE 1:1250 (0 10 20 30 40 50)
DATE SEP 2025
JOB 121019
FIGURE CSK-1

SHT11X17.DWG - 279mmX432mm

M:\2021\121019\CAD\Design\Figures\121019-Figures.dwg, Water BC, Sep 29, 2025 - 4:49pm, pkanani

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER
Date: 9/19/2025
Input By: PK
Reviewed By: BCS
Drawing Reference: Sketch/Figure/Drawing

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 28 Storey Buildings (A + B) with 2 Storey Podium
Type I - Fire resistive construction (2 hrs) **with Unprotected Openings**

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	3360			
		Total Floors/Storeys (Podium)	2			
		Tower Footprint (m^2)	1532			
		Total Floors/Storeys (Tower)	28			
		Protected Openings (1 hr)	No			
		A, Total Effective Floor Area (m^2)			**12,848**	
	F	**Base fire flow without reductions**				**15,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**12,750**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-5,738**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	37212	90%		
				Cumulative Total	**-45%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**2,550**
		East Side	20.1 - 30 m		10%	
		South Side	20.1 - 30 m		10%	
		West Side	>30m		0%	
				Cumulative Total	**20%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**10,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**167**
				or	USGPM	2,642

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER
Date: 9/19/2025
Input By: PK
Reviewed By: BCS
Drawing Reference: Sketch/Figure/Drawing

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 28 Storey Buildings (A + B) with 2 Storey Podium
Type I - Fire resistive construction (2 hrs) **with Protected Openings**

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	3360			
		Total Floors/Storeys (Podium)	2			
		Tower Footprint (m^2)	1532			
		Total Floors/Storeys (Tower)	28			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**4,583**	
	F	**Base fire flow without reductions**				**9,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**7,650**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,443**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	37212	90%		
				Cumulative Total	**-45%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**1,530**
		East Side	20.1 - 30 m		10%	
		South Side	20.1 - 30 m		10%	
		West Side	>30m		0%	
				Cumulative Total	**20%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**6,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**100**
				or	USGPM	1,585

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER
Date: 9/19/2025
Input By: PK
Reviewed By: BCS
Drawing Reference: Sketch/Figure/Drawing

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 28 Storey Buildings (C+D) with 2 Storey Podium
Type I - Fire resistive construction (2 hrs) **with Unprotected Openings**

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	3080			
		Total Floors/Storeys (Podium)	2			
		Tower Footprint (m^2)	1532			
		Total Floors/Storeys (Tower)	28			
		Protected Openings (1 hr)	No			
		A, Total Effective Floor Area (m^2)			**12,288**	
	F	**Base fire flow without reductions**				**15,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**12,750**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-5,738**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	37000	90%		
				Cumulative Total	**-45%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**3,188**
		East Side	>30m		0%	
		South Side	10.1 - 20 m		15%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**10,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**167**
				or	USGPM	2,642

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER
Date: 9/19/2025
Input By: PK
Reviewed By: BCS
Drawing Reference: Sketch/Figure/Drawing

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 28 Storey Buildings (C+D) with 2 Storey Podium
Type I - Fire resistive construction (2 hrs) **with Protected Openings**

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	No	0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	3080			
		Total Floors/Storeys (Podium)	2			
		Tower Footprint (m^2)	1532			
		Total Floors/Storeys (Tower)	28			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**4,233**	
	F	**Base fire flow without reductions**				**9,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**7,650**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,443**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	37000	90%		
				Cumulative Total	**-45%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**1,913**
		East Side	>30m		0%	
		South Side	10.1 - 20 m		15%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**6,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**100**
				or	USGPM	1,585

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER
Date: 9/19/2025
Input By: PK
Reviewed By: BCS
Drawing Reference: Sketch/Figure/Drawing

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 11 Storey Building (E) with 1 Storey Podium
Type I - Fire resistive construction (2 hrs) **with Unprotected Openings**

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1650			
		Total Floors/Storeys (Podium)	1			
		Tower Footprint (m^2)	1290			
		Total Floors/Storeys (Tower)	11			
		Protected Openings (1 hr)	No			
		A, Total Effective Floor Area (m^2)			**8,100**	
	F	**Base fire flow without reductions**				**12,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**10,200**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-4,590**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	11880	90%		
				Cumulative Total	**-45%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**2,550**
		East Side	>30m		0%	
		South Side	10.1 - 20 m		15%	
		West Side	>30m		0%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**8,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**133**
				or	USGPM	2,114

FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER
Date: 9/19/2025
Input By: PK
Reviewed By: BCS
Drawing Reference: Sketch/Figure/Drawing

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 11 Storey Building (E) with 1 Storey Podium
Type I - Fire resistive construction (2 hrs) **with Protected Openings**

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	No	0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1650			
		Total Floors/Storeys (Podium)	1			
		Tower Footprint (m^2)	1290			
		Total Floors/Storeys (Tower)	11			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**2,295**	
	F	**Base fire flow without reductions**				**6,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,100**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,295**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	11880	90%		
				Cumulative Total	**-45%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**1,275**
		East Side	>30m		0%	
		South Side	10.1 - 20 m		15%	
		West Side	>30m		0%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**4,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**67**
				or	USGPM	1,057

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER
Date: 9/19/2025
Input By: PK
Reviewed By: BCS
Drawing Reference: Sketch/Figure/Drawing

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 15 Storey Building (F) with 1 Storey Podium
Type I - Fire resistive construction (2 hrs) **with Unprotected Openings**

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1560			
		Total Floors/Storeys (Podium)	1			
		Tower Footprint (m^2)	880			
		Total Floors/Storeys (Tower)	15			
		Protected Openings (1 hr)	No			
		A, Total Effective Floor Area (m^2)			**5,960**	
	F	**Base fire flow without reductions**				**10,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,825**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	11070	90%		
				Cumulative Total	**-45%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**2,550**
		East Side	>30m		0%	
		South Side	10.1 - 20 m		15%	
		West Side	>30m		0%	
				Cumulative Total	**30%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**7,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**117**
				or	USGPM	1,849

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121019
Project Name: 1101 BAXTER
Date: 9/19/2025
Input By: PK
Reviewed By: BCS
Drawing Reference: Sketch/Figure/Drawing

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 15 Storey Building (F) with 1 Storey Podium
Type I - Fire resistive construction (2 hrs) **with Protected Openings**

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	No	0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1560			
		Total Floors/Storeys (Podium)	1			
		Tower Footprint (m^2)	880			
		Total Floors/Storeys (Tower)	15			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**2,000**	
	F	**Base fire flow without reductions**				**6,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,100**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,295**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	11070	90%		
				Cumulative Total	**-45%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**1,530**
		East Side	>30m		0%	
		South Side	10.1 - 20 m		15%	
		West Side	>30m		0%	
				Cumulative Total	**30%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**4,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**67**
				or	USGPM	1,057

Appendix F
Geotechnical Investigation (soft copy)

PATERSON GROUP

Geotechnical Investigation

Proposed Development

1101 Baxter Road
Ottawa, Ontario

Prepared for Regional Group

Report PG7639-1 dated September 26, 2025

Table of Contents

PAGE

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Regional Group to conduct a geotechnical investigation for the proposed development to be located at 1101 Baxter Road within the City of Ottawa, Ontario (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 existing subsoil and groundwater information at this site by means of boreholes.
- Provide geotechnical recommendations for the design of the proposed development, including construction considerations which may affect its design.

This 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 available drawings, it is understood that the proposed development will consist of 4 high-rise structures (Buildings A through D) and 2 mid-rise structures (Buildings E and F). It is understood that the proposed buildings will have 2 or 3 levels of underground parking.

It is further understood that the proposed development will include asphalt-paved access lanes and landscaped areas. It is also anticipated that the subject site will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current investigation was carried out on August 25th and 26th, 2025, and consisted of 5 boreholes (BH 1-25 through BH 5-25) advanced to a maximum depth of 13.5 m below the existing ground surface. The borehole locations were distributed in a manner to provide general coverage of the subject site. A previous field program conducted in January 2017 by Paterson included 7 boreholes (BH 1 through BH 7) at the subject site, which were advanced to a maximum depth of 5.5 m below the existing ground surface.

A total of 5 boreholes (BS-1 through BS-5) were also completed by others in October 2018, extending to a maximum depth of 10.7 m.

These borehole locations were distributed in a manner to provide general coverage of the subject site. The approximate locations of the boreholes are shown on Drawing PG7639-1 - Test Hole Location Plan and included in Appendix 2.

The boreholes were advanced using a track-mounted auger drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The drilling procedure consisted of augering and rock coring to the required depths at the selected locations, and sampling and testing the overburden.

Sampling and In Situ Testing

Soil samples were collected from the boreholes using two different techniques, namely, sampled directly from the auger flights (AU) or collected using a 50 mm diameter split-spoon (SS) sampler. Rock cores (RC) were obtained using 47.6 mm inside diameter coring equipment.

All samples were visually inspected and initially classified on site. The auger and split-spoon samples were placed in sealed plastic bags, and rock cores were placed in cardboard boxes. All samples were transported to our laboratory for further examination and classification. The depths at which the auger, split spoon and rock core samples were recovered from the boreholes are shown as AU, SS and RC, respectively, on the Soil Profile and Test Data sheets presented 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.

A recovery value and a Rock Quality Designation (RQD) value were calculated for each drilled section (core run) of bedrock and are shown on the borehole logs. The recovery value is the ratio, in percentage, of the length of the bedrock sample recovered over the length of the drilled section (core run). The RQD value is the ratio, in percentage, of the total length of intact rock pieces longer than 100 mm in one core run over the length of the core run. These values are indicative of the quality of the bedrock.

The subsurface conditions observed in the test holes were recorded in detail in the field. The soil profiles are presented on the Soil Profile and Test Data sheets in Appendix 1.

Groundwater

Boreholes BH 1-25 through BH 3-25 from the most recent geotechnical investigation were fitted with 51 mm diameter PVC groundwater monitoring wells. The groundwater level readings were obtained after a suitable stabilization period subsequent to the completion of the field investigation.

The groundwater observations are discussed in Section 4.3 and presented in the Soil Profile and Test Data sheets presented in Appendix 1.

Typical monitoring well construction details are described below:

- ❑ 1.5 m or less, as needed, depending on the soil profile, of slotted 51 mm diameter PVC screen at specified intervals within the borehole column.
- ❑ 51 mm diameter PVC riser pipe from the top of the screen to the ground surface.
- ❑ No. 3 silica sand backfill within the annular space around the screen.
- ❑ 300 mm thick bentonite hole plug directly above PVC slotted screen.
- ❑ Clean backfill from the top of the bentonite plug to the ground surface.

Refer to the Soil Profile and Test Data sheets in Appendix 1 for specific well construction details.

3.2 Field Survey

The recent borehole locations (BH 1-25 through BH 5-25), and ground surface elevations at these borehole locations, were surveyed by Paterson using a GPS unit with respect to a geodetic datum. The previous boreholes (BH 1 through BH 7) were surveyed with respect to a temporary benchmark (TBM) consisting of the top spindle of the fire hydrant located at the entrance to 1101 Baxter Road, which was assigned an assumed elevation of 100.00 m.

The boreholes by others are also referenced to a geodetic datum.

The locations of the boreholes are presented on Drawing PG7639-1 - 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 2 sieve analyses, including hydrometer tests, were completed on selected soil samples. Moisture content testing was completed on all recovered soil samples. The results of the testing are presented in Section 4.2 and are provided in Appendix 1.

3.4 Analytical Testing

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

4.0 Observations

4.1 Surface Conditions

The subject site is currently occupied by an existing commercial building surrounded by asphalt-paved roadways and parking areas with landscaped margins. The site is bordered by Baxter Road and further by the Queensway Highway 417 to the north, commercial buildings to the east and west, and residential dwellings and further by Iris Street to the south.

The existing ground surface across the subject site is relatively level at an approximate geodetic elevation of 74 m, and the site is at-grade with Baxter Road.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile across the site consists of an approximate 0.05 to 0.07 m layer of asphalt, which is underlain by fill followed by silty sand, alternating layers of silty sand/silty clay, and a glacial till deposit. The fill material was generally observed to consist of silty sand to silty clay with gravel and crushed stone, and extended to approximate depths ranging from 0.4 to 3 m below the existing ground surface.

A brown silty sand deposit was encountered underlying the fill. The silty sand material was additionally observed to transition to grey at approximate depths of 1.2 to 3 m below the ground surface. A silty clay to clayey silt deposit with silty sand seams was encountered beneath the silty sand material extending to depths of about 6 to 11 m below the existing ground surface.

A glacial till deposit was encountered underlying the silty clay to clayey silt, and was generally observed to consist of silty clay to clayey silt with varying amounts of sand, gravel, cobbles and boulders.

Bedrock

Auger refusal was encountered at approximate depths ranging from 9.7 to 12 m below the existing ground surface. Bedrock was cored in boreholes BH 1-25 to BH 3-25, where it was observed to consist of grey limestone. Based on the RQDs of the recovered rock core, the bedrock was poor to excellent in quality, generally improving with depth.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific details of the subsurface profiles encountered at the borehole locations.

Grain Size Distribution and Hydrometer Testing

Hydrometer tests were completed on selected silty clay samples recovered from boreholes BH 1-25 and BH 2-25. The results are summarized in Table 1 and presented on the Sieve Analysis Results sheet in Appendix 1.

Table 1 – Grain Size Distribution Results

Sample	Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 1-25-SS7	4.5	0.0	38.8	57.2	4.0
BH 2-25-SS11	7.6	0.0	55.7	36.3	8.0

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

4.3 Groundwater

The groundwater level readings in the monitoring wells and standpipe piezometers are provided below in Table 2, and on the Soil Profile and Test Data sheets in Appendix 1.

Table 2 – Summary of Groundwater Level Readings

Borehole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
		Depth (m)	Elevation (m)	
Previous Investigations				
BH 1*	-	2.29	-	February 6, 2017
BH 2*	-	3.19	-	February 6, 2017
BH 6*	-	3.57	-	February 6, 2017
BH 7*	-	4.03	-	February 6, 2017
Current Investigation				
BH 1-25*	74.04	3.60	70.98	September 18, 2025
BH 2-25*	74.06	5.02	69.04	September 18, 2025
BH 3-25*	74.64	Blocked	-	September 18, 2025

Note: The ground surface elevation at each borehole location was surveyed by Paterson and was referenced to a geodetic datum.
* Denotes a monitoring well

It should be noted that the groundwater level readings in the monitoring wells can be influenced by surface water becoming trapped in the backfill materials. 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 approximate depths of 3 to 5 m below the existing ground surface.

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

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is suitable for the proposed development. The recommended foundation support for the proposed buildings will depend on the number of underground parking levels:

- For 2 or fewer underground parking levels, foundation support should consist of end-bearing piles advanced to bedrock,
- For 3 or more underground parking levels, foundation support should consist of conventional spread footings bearing on clean, surface sounded bedrock.

Bedrock removal may be required to complete the excavation of the underground parking levels, dependent on their depth. Foundations and other debris from demolished structures may also be present at this site, and the need for their removal should be anticipated by the contractor.

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

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and fill, such as those containing organic or deleterious materials, should be stripped from under any buildings and other settlement-sensitive structures.

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

Bedrock Removal

Should it be required, bedrock removal can be accomplished by hoe ramming where the bedrock is weathered and/or where only a small quantity of the bedrock needs to be removed. Sound bedrock may be removed by line drilling and controlled blasting in conjunction with hoe ramming.

Prior to considering blasting operations, the blasting effects on the existing services, buildings and other structures should be addressed. A pre-blast or pre-construction survey of the existing structures located in proximity of the blasting operations should be completed prior to commencing site activities. The extent of the survey should be determined by the blasting consultant and should be sufficient to respond to any inquiries/claims related to the blasting operations.

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

Vibration Considerations

Construction operations are the cause of vibrations, and possibly, sources of nuisance to the community. Therefore, means to reduce the vibration levels should be incorporated in the construction operations to maintain, as much as possible, a cooperative environment with the residents.

The following construction equipment could be the source of vibrations: hoe ram, compactor, dozer, crane, truck traffic, etc. Vibrations, whether caused by blasting operations or by construction operations, could be the source of detrimental vibrations on the nearby buildings and structures. Therefore, all vibrations are recommended to be limited.

Two parameters are used to determine the permissible vibrations, namely, the maximum peak particle velocity and the frequency. For low frequency vibrations, the maximum allowable peak particle velocity is less than that for high frequency vibrations. As a guideline, the peak particle velocity should be less than 15 mm/s between frequencies of 4 to 12 Hz, and 50 mm/s above a frequency of 40 Hz (interpolate between 12 and 40 Hz). The guidelines are for current construction standards. Considering that these guidelines are above perceptible human level and, in some cases, could be very disturbing to some people, a pre-construction survey is recommended to be completed to minimize the risks of claims during or following the construction of the proposed building.

Compacted Granular Fill Working Platform (Pile Foundation)

Where the proposed buildings will be supported on a driven pile foundation that requires the use of heavy equipment (i.e. pile driving crane), it is conventional practice to install a compacted granular fill layer, at a convenient elevation, to allow the equipment to access the site without getting stuck and causing significant disturbance.

A typical working platform could consist of 0.6 m of OPSS Granular B, Type II material placed and compacted to a minimum of 98% of its standard Proctor maximum dry density (SPMDD) in lifts not exceeding 300 mm in thickness.

Once the piles have been driven and cut off, the working platform can be re-graded, and soil tracked in, or soil pumping up from the pile installation locations, can be bladed off and the surface can be topped up, if necessary, and re-compacted to act as the substrate for further fill placement for the basement slabs.

Fill Placement

Fill used for grading beneath the proposed buildings should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the buildings and paved areas should be compacted to at least 98% of the material's SPMDD.

Non-specified existing fill, along with site-excavated soil, can be used as general landscaping fill where settlement of the ground surface is of minor concern. This material should be spread in thin lifts and at least 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.

Lean Concrete Placement

Where foundation support for the proposed buildings consists of conventional spread footings bearing on clean, surface sounded bedrock, and where rock overbreak occurs at the underside of footing (USF) elevation, lean concrete (minimum **17 MPa** compressive strength at 28 days) can be used to re-instate the subgrade from the bedrock surface to the USF elevation. Typically, the excavation side walls will be used as the form to support the concrete. The lean concrete placement should be at least 150 mm wider than all sides of the footing (strip and pad footings) at the base of the excavation. The additional width of the concrete poured will suffice in providing a direct transfer of the footing load to the underlying bedrock.

5.3 Foundation Design

Conventional Spread Footings bearing on Bedrock

Footings placed on clean, surface sounded bedrock, or on lean concrete which is placed directly over the clean, surface sounded bedrock, can be designed using a factored bearing resistance value at serviceability limit states (SLS) and ultimate limit states (ULS) of **3,000 kPa**, incorporating a geotechnical resistance factor of 0.5.

A clean, surface-sounded bedrock bearing surface should be free of loose materials, and have no near-surface seams, voids, fissures or open joints which can be detected from surface sounding with a rock hammer. The bedrock sounding should be carried out by the geotechnical consultant.

Footings bearing on an acceptable bedrock bearing surface and designed using the bearing resistance values provided herein will be subjected to negligible potential post-construction total and differential settlements.

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 a sound bedrock bearing medium when a plane extending down and out from the bottom edge of the footing at a minimum of 1H:6V (or flatter) passes only through sound bedrock or a material of the same or higher capacity as the bedrock, such as concrete. A weathered bedrock or soil bearing medium will require a lateral support zone of 1H:1V (or flatter).

Pile Foundation

Where the founding depth of the proposed building(s) is significantly above the bedrock surface, it is recommend that foundation support consist of piles driven to refusal in the bedrock. For deep foundations, concrete-filled steel pipe piles are generally utilized in the Ottawa area. Applicable pile resistance values at ultimate limit states (ULS) are given in Table 3 on the next page. Note that these are all geotechnical axial resistance values.

The geotechnical pile resistance values were estimated using the Hiley dynamic formula.

Table 3 - Pile Foundation Design Data		
Pile Outside Diameter (mm)	**Pile Wall Thickness (mm)**	**Geotechnical Axial Resistance Factored at ULS (kN)**
245	9	1,000
245	11	1,250
245	13	1,500

The minimum centre-to-centre pile spacing is 2.5 times the pile diameter. The closer the piles are spaced, however, the more potential that the driving of subsequent piles in a group could have influence on piles in the group that have already been driven. These effects, primarily consisting of uplift of previously driven piles, are checked as part of the field review of the pile driving operations.

Re-striking of all piles at least once will also be required after at least 48 hours have elapsed since initial driving.

Prior to the commencement of production pile driving, a limited number of indicator piles should be installed across the site. It is recommended that each indicator pile be dynamically load tested to evaluate pile stresses, hammer efficiency, pile load transfer, and end-of-driving criteria for end-bearing in the bedrock.

Downdrag loads would also need to be considered if grade raises are proposed as part of the site development. More details regarding downdrag can be provided upon request.

Permissible Grade Raise Restrictions

Consideration must be given to potential settlements which could occur due to the presence of the silty clay/clayey silt deposit and the combined loads from the proposed buildings, 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. A minimum value of 50% of the live load is often recommended by Paterson.

A permissible grade raise restriction of **1.2 m** is recommended for finished grading at the site. A post-development groundwater lowering of 0.5 m was considered in our permissible grade raise restriction calculations.

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

The preliminary site class for seismic site response can be taken as **Class X_D**, although this can be finalized once the project design becomes more advanced. A site-specific shear wave velocity test is recommended to accurately determine the applicable seismic site classification for the foundation design of the proposed development, as presented in Table 4.1.8.4.A of the Ontario Building Code (OBC) 2024.

The proposed buildings supported on end-bearing piles extending to bedrock or footings bearing directly on clean, surface sounded bedrock will not be subject to liquefaction.

5.5 Basement Floor Slab

With the removal of all topsoil and fill, containing significant amounts of deleterious or organic materials, the native soil or bedrock subgrade will be considered an acceptable subgrade surface on which to commence backfilling for basement slab construction.

It is anticipated that the basement area for the proposed development will be mostly parking, and the recommended pavement structures noted in Section 5.8 will be applicable. However, if storage or other uses of the lower level will involve the construction of a concrete floor slab, the upper 200 mm of sub-slab fill is recommended to consist of 19 mm clear crushed stone.

In consideration of the groundwater conditions encountered during the geotechnical investigation, an underslab drainage system, consisting of lines of perforated drainage pipe subdrains connected to a positive outlet, should be provided in the clear crushed stone layer under the lowest level floor slabs. This is discussed further in Section 6.1.

5.6 Basement Wall

There are several combinations of retained soils that could be applicable for the basement walls of the proposed buildings. However, the conditions can be well-represented by assuming the retained soil consists of a material with an angle of internal friction of 30 degrees and a drained unit weight of 20 kN/m^3.

Two distinct conditions, static and seismic, must be reviewed for design calculations. The parameters for design calculations for the two conditions are presented below.

Lateral Earth Pressures

The static horizontal earth pressure (po) can be calculated using a triangular earth pressure distribution equal to Ko·γ·H where:

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

An additional pressure having a magnitude equal to $K_o \cdot q$ and acting on the entire height of the wall should be added to the above diagram for any surcharge loading, q (kPa), that may be placed at ground surface adjacent to the wall. The surcharge pressure will only be applicable for static analyses and should not be used in conjunction with the seismic loading case.

Actual earth pressures could be higher than the "at-rest" case if care is not exercised during the compaction of the backfill materials to maintain a minimum separation of 0.3 m from the walls with the compaction equipment.

Seismic Earth Pressures

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

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

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

The peak ground acceleration (a_{max}) for this site is 0.359g for a Site Class X_D according to the OBC 2024. Note that the vertical seismic coefficient is assumed to be zero.

The earth force component (P_o) under seismic conditions can be calculated using $P_o = 0.5\ K_o\ \gamma\ H^2$, where $K_o = 0.5$ for the soil conditions noted above.

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

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

The earth forces calculated are unfactored. For the ULS case, the earth loads should be factored as live loads, as per OBC 2024.

5.7 Rock Anchor Design

Where required for foundation uplift resistance, rock anchors could be used. The geotechnical design of grouted rock anchors in bedded sedimentary bedrock is based upon two possible failure modes.

The anchor can fail either by shear failure along the grout/rock interface or by pullout of a 60 to 90 degree cone of rock with the apex of the cone near the middle of the bonded length of the anchor. Both modes of failure have to be examined, as described in the following section. A third failure mode of shear failure along the grout/steel interface should be reviewed by the structural engineer to ensure all typical failure modes have been reviewed.

Anchors can be of the “passive” or the “prestressed/post-tensioned” type, depending on whether the anchor tendon is provided with prestress load or not prior to being put into service.

Regardless of whether an anchor is of the passive or the prestressed type, it is recommended that the anchor be provided with a bonded length, or fixed anchor length, at the base of the anchor, which will provide the anchor capacity, as well as an unbonded length, or free anchor length, between the rock surface and the start of the bonded length.

As the depth at which the apex of the shear failure cone develops is midway along the bonded length, a fully bonded anchor would tend to have a shallower cone, and therefore less geotechnical resistance, than one where the bonded length was just the bottom part of the overall anchor.

Grout to Rock Bond

The Canadian Foundation Engineering Manual recommends a maximum allowable grout to rock bond stress (for sound rock) of 1/30 of the unconfined compressive strength (UCS) of either the grout or rock (but less than 1.3 MPa) for an anchor of minimum length (depth) of 3 m.

Generally, the UCS of limestone ranges between about 60 and 90 MPa, which is stronger than most routine grouts. A factored at ULS tensile grout to rock bond resistance value of **1.0 MPa**, incorporating a resistance factor of 0.4, can be used. A minimum grout strength of 40 MPa is recommended.

Rock Cone Uplift

Based on the bedrock quality observed in the boreholes, and assuming that the bond zone will be in competent bedrock located 1 m below the bedrock surface, a Rock Mass Rating (RMR) of 65 was assigned to the bedrock, and Hoek and Brown parameters (m and s) were taken as 0.575 and 0.00293, respectively.

Recommended Rock Anchor Lengths

Parameters used to calculate rock anchor lengths are provided in Table 4 below:

Table 4 - Parameters Used in Rock Anchor Review	
Grout to Rock Bond Strength - Factored at ULS	1.0 MPa
Compressive Strength - Grout	40 MPa
Rock Mass Rating (RMR) - Good quality Limestone Hoek and Brown parameters	62 m=0.575 and s=0.00293
Unconfined compressive strength - Limestone	50 MPa
Unit weight - Submerged Bedrock	15.2 kN/m^3
Apex angle of failure cone	60^o
Apex of failure cone	mid-point of fixed anchor length

From a geotechnical perspective, the fixed anchor length will depend on the diameter of the drill holes. Recommended anchor lengths for a 75- and 125-mm diameter holes are provided in Table 5 below:

Table 5 - Recommended Rock Anchor Lengths - Grouted Rock Anchor				
Diameter of Drill Hole (mm)	**Anchor Lengths (m)**			**Factored Tensile Resistance (kN)**
	Bonded Length	**Unbonded Length**	**Total Length**	
75	2.0	0.8	2.8	450
	2.6	1.0	3.6	600
	3.2	1.2	4.4	750
125	4.5	2.0	6.5	1000
	1.6	0.6	2.2	600
	2.0	1.0	3.0	750
	2.6	1.4	4.0	1000

Other Considerations

The anchor drill holes should be a maximum of 1.5 to 2 times the rock anchor diameter, inspected by Paterson personnel and should be flushed clean prior to grouting. A tremie tube is recommended to place grout from the bottom of the anchor hole. Compressive strength testing is recommended to be completed for the rock anchor grout. A set of grout cubes should be tested for each day that grout is prepared.

The geotechnical capacity of each rock anchor should be proof tested at the time of construction and reviewed at the time of testing by Paterson field personnel. More information on proof testing can be provided upon request.

5.8 Pavement Structure

Lowest Underground Parking Level

For design purposes, it is recommended that the rigid pavement structure for the lowest underground parking level consist of Category C2, 32 MPa concrete at 28 days with air entrainment of 5 to 8%. The recommended rigid pavement structure is further presented in Table 6 on the next page.

Table 6 – Recommended Rigid Pavement Structure – Lower Parking Level	
Thickness (mm)	**Material Description**
150	**Exposure Class C2 – 32 MPa Concrete** (5 to 8% Air Entrainment)
300	**BASE –** OPSS Granular A Crushed Stone
SUBGRADE – Existing imported fill, or OPSS Granular B Type I or II material placed over bedrock.	

To control cracking due to shrinking of the concrete floor slab, it is recommended that strategically located saw cuts be used to create control joints within the concrete floor slab of the lower underground parking level. The control joints are generally recommended to be located at the center of the column lines and spaced at approximately 24 to 36 times the slab thickness (for example, a 0.15 m thick slab should have control joints spaced between 3.6 and 5.4 m).

The joints should be cut between 25 and 30% of the thickness of the concrete floor slab and completed as early as 4 hour after the concrete has been poured during warm temperatures and up to 12 hours during cooler temperatures.

Pavement Structure on Podium Deck

The pavement structures presented in Tables 7 and 8 should be used for car only parking areas, at grade access lanes, and heavy loading parking areas over the top of the podium structure, where present as part of the proposed development:

Table 7 – Recommended Pavement Structure - Car Only Parking Areas Over Podium Deck	
Thickness (mm)	**Material Description**
50	**Wear Course** – HL-3 or Superpave 12.5 Asphaltic Concrete
200	**BASE** - OPSS Granular A Crushed Stone
See below*	**Thermal Break** -** Rigid Insulation (See Following Paragraph)
n/a	**Waterproofing Membrane and IKO Protection Board**
SUBGRADE – Reinforced concrete podium deck *If specified by others, not required from a geotechnical perspective	

Table 8 - Recommended Pavement Structure – Access Lanes, Fire Truck Lane, Ramp, and Heavy Loading Areas Over Podium Deck	
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
300	**BASE** - OPSS Granular A Crushed Stone
See below*	**Thermal Break** -** Rigid Insulation (See Following Paragraph)
n/a	**Waterproofing Membrane and IKO Protection Board**
SUBGRADE – Reinforced concrete podium deck *If specified by others, not required from a geotechnical perspective	

Pavement Structure on Overburden Soils

The flexible pavement structure presented in Table 9 should be used for access lanes and heavy loading areas located on the overburden soils.

Table 9 – Recommended Pavement Structure – Access Lanes and Heavy Loading Area	
Thickness (mm)	**Material Description**
40	**Wear Course –** Superpave 12.5 Asphaltic Concrete
50	**Binder Course –**Superpave 19.0 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.	

Other Considerations

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

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the SPMDD using suitable vibratory equipment.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage & Waterproofing

It is recommended that the proposed building's foundation walls be blind-poured against a composite drainage board which is fastened to the temporary shoring system.

It is also recommended that 100 mm diameter sleeves at 3 m centres be cast at the foundation wall/footing interface to allow for the infiltration of water from the composite drainage board to flow to an interior perimeter drainage pipe. The perimeter drainage pipe should direct water to sump pit(s) within the lower basement area.

Requirements for waterproofing of the foundation walls should be reviewed once the project design becomes more advanced. Elevators and any other pits located below the underslab drainage system should be waterproofed.

Underslab Drainage

Underslab drainage will be required to control water infiltration below the underground parking levels. For preliminary design purposes, we recommend that 100 mm perforated pipes be placed at approximately 6 m centers. The spacing of the underslab drainage system should be confirmed at the time of completing the excavation, when water infiltration can be better assessed.

Foundation Backfill

Where sufficient space is available for conventional backfilling, the backfill material against the exterior sides of the foundation walls should consist of free-draining, non-frost-susceptible granular materials. The site materials will be frost susceptible and, as such, are not recommended for re-use as backfill unless a composite drainage system (such as Delta Drain 6000) connected to a drainage system is provided.

6.2 Protection of Footings Against Frost Action

Perimeter footings of heated structures are recommended to be protected against the deleterious effects of frost action. A minimum of 1.5 m of soil cover, or an

equivalent combination of soil cover and foundation insulation, should be provided in this regard.

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

However, the foundations are generally not expected to require protection against frost action due to the founding depth. Unheated structures such as the access ramp may require insulation for protection against the deleterious effects of frost action.

6.3 Excavation Side Slopes

The side slopes of excavations in the overburden 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.

Unsupported Excavations

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

The subsurface soils are considered to be 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.

A trench box is recommended to protect personnel working in trenches with steep or vertical sides. Services are expected to be installed by “cut and cover” methods and excavations should not remain open for extended periods of time.

Temporary Shoring

Due to the depth of excavation and the proximity of the proposed development to the property boundaries, temporary shoring may be required to support the overburden soils of the adjacent properties. The design and approval of the shoring system, where required, will be the responsibility of the shoring contractor and the

shoring designer, who is a licensed professional engineer and is hired by the shoring contractor. It is the responsibility of the shoring contractor to ensure that the temporary shoring is in compliance with safety requirements, designed to avoid any damage to adjacent structures and includes dewatering control measures.

In the event that subsurface conditions differ from the approved design during the actual installation, it is the responsibility of the shoring contractor to commission the required experts to re-assess the design and implement the required changes.

The designer should also take into account the impact of a significant precipitation event and designate design measures to ensure that precipitation will not negatively impact the shoring system or soils supported by the system. Any changes to the approved shoring design system should be reported immediately to the owner's structural designer prior to implementation.

The temporary shoring system may consist of a soldier pile and lagging system. Any additional loading due to street traffic, construction equipment, adjacent structures and facilities, etc., should be added to the earth pressures provided in Table 10. The earth pressures acting on the shoring system may be calculated using the parameters below

Table 10 – Soil Parameters for Shoring System Design

Parameters	Values
Active Earth Pressure Coefficient (K_a)	0.33
Passive Earth Pressure Coefficient (K_p)	3
At-rest Earth Pressure Coefficient (K_o)	0.5
Total Unit Weight (γ), kN/m^3	210
Submerged Unit Weight (γ'), kN/m^3	13

The active earth pressure should be calculated where wall movements are permissible while the at-rest pressure should be calculated if no movement is permissible. The dry unit weight should be calculated above the groundwater level while the effective unit weight should be calculated below the groundwater level.

The hydrostatic groundwater pressure should be included to the earth pressure distribution wherever the effective unit weight is calculated for earth pressures. If the groundwater level is lowered, the dry unit weight for the soil should be calculated full weight, with no hydrostatic groundwater pressure component.

For design purposes, the minimum factor of safety of 1.5 should be calculated.

6.4 Pipe Bedding and Backfill

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

A minimum of 150 mm of OPSS Granular A should be placed for bedding for sewer or water pipes when placed on a soil subgrade. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to a minimum of 300 mm above the obvert of the pipe, should consist of OPSS Granular A (concrete or PSM PVC pipes) or sand (concrete pipe). The bedding and cover materials should be placed in maximum 225 mm thick lifts and compacted to 98% of the SPMDD. It should generally be possible to re-use materials above the cover material if the operations are carried out in dry weather conditions.

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) and above the cover material should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 225 mm thick loose lifts and compacted to a minimum of 98% of the material's SPMDD. All cobbles larger than 200 mm in their longest direction should be segregated from re-use as trench backfill.

6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavations should be controllable using open sumps. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

Dewatering Permit

Under the current regulations enacted by the Ministry of Environment, Conservation and Parks (MECP), any dewatering in excess of 50,000 L/day requires a registration on the Environmental Activity and Sector Registry (EASR), so long as that dewatering is related to construction. If the dewatering is not related to construction, a Permit to Take Water obtained from the MECP will be required. In the event that an EASR is required to facilitate dewatering of the proposed development, a minimum of 3 to 4 weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan, to be prepared by a

Qualified Person as stipulated under O.Reg. 63/16. Should a Permit to Take Water be required, a minimum of five to six months should be allotted for completion of the permit, due to the minimum review period imposed by the MECP.

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

6.6 Winter Construction

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 using 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. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

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

7.0 Recommendations

Once the project design becomes more developed, the drawings should be sent to Paterson for review and to determine if this report needs to be revised.

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

- ❑ Review of the geotechnical aspects of the excavation contractor's shoring design, prior to construction.
- ❒ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❒ Observation of all bearing surfaces prior to the placement of concrete.
- ❒ Sampling and testing of the concrete and fill materials used.
- ❒ Observation of all subgrades prior to backfilling materials.
- ❒ 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 must be handled as per *Ontario Regulation 406/19: On-Site and Excess Soil Management*.

8.0 Statement of Limitations

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

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

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

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

Otillia McLaughlin, B.Eng.

Scott S. Dennis, P.Eng.

Report Distribution:

- ❑ Regional Group (1 digital copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

RECORD OF BOREHOLE SHEETS BY OTHERS

SIEVE ANALYSIS RESULTS

ANALYTICAL TESTING RESULTS

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

1101 Baxter Road, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 361008.85 **NORTHING:** 5023811.94 **ELEVATION:** 74.04

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: August 25, 2025

FILE NO. : PG7639

HOLE NO. : BH 1-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	MONITORING WELL CONSTRUCTION	ELEVATION (m)
GROUND SURFACE								
ASPHALT 0.06m [73.98m]			AU 1			4		74
FILL: Gravel and crushed stone 0.41m [73.63m]								
Compact, brown **SILTY SAND**		1	SS 2	42	4-6-5-3 11	7		73
- Silt content increased by 1.52 m depth		2	SS 3	50	3-2-2-1 4			72
- Grey by 2.21 m depth			SS 4	42	0-0-0-0 0	23		
2.79m [71.25m]						34		
Firm, grey **SILTY CLAY**		3	SS 5	100	P	43		71
3.35m [70.69m]						30		
Grey **SILTY CLAY** to **CLAYEY SILT** 3.73m [70.31m]								
Very loose to loose, grey **SILTY SAND** to **SANDY SILT**		4	SS 6	25	P	21		70
- Compact by 5.03 m depth		5	SS 7	42	1-2-2-6 4	18		69
- 25 mm gravel seam at 5.64 m depth			SS 8	33	5-4-7-5 11	19		
5.87m [68.17m]						14		
Firm to stiff, grey **SILTY CLAY**, some grave		6	SS 9	87	4-5-4-3 9	13		68
6.30m [67.74m]								
GLACIAL TILL: Stiff to very stiff, grey clayey silt, trace gravel, with cobbles and boulders		7	SS 10	25	2-4-3-3 7	19		67
		8	SS 11	17	2-4-4-10 8	12		66
			SS 12		6-5-6-6 11	21		
9.07m [64.97m]		9						65
GLACIAL TILL: Hard, grey clayey silt, with gravel, cobbles and boulders			SS 13	75	14-26-40-50 66	10		
- Rock fragments below 9.45 m depth		10	SS 14					
9.83m [64.21m]								

PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) — 20 40 60 80

REMOULDED SHEAR STRENGTH (kPa)

UNDRAINED SHEAR STRENGTH (kPa) — 20 40 60 80

PL (%) WATER CONTENT (%) LL (%) — 20 40 60 80

121

3.60 m 2025-09-18

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

1101 Baxter Road, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 361008.85 **NORTHING:** 5023811.94 **ELEVATION:** 74.04

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: August 25, 2025

FILE NO. : PG7639

HOLE NO. : BH 1-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80	REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80	PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	MONITORING WELL CONSTRUCTION	ELEVATION (m)
9.85m [64.21m]		10	SS 15	54	24-20-21-25 41	15					64
GLACIAL TILL: Dense, grey silty sand, with gravel, cobbles and boulders			SS 16	0	50-/-/-/ 50/0.03						
10.36m [63.68m]		11	RC 1	73	RQD 86					11.13m	63
BOULDER 10.85m [63.19m]											
BEDROCK: Good quality, grey limestone - Vertical fragment from 11.00 m to 11.51 m depth		12	RC 2	100	RQD 87					12.65m	62
12.65m [61.39m]											
End of Borehole		13									61
(GWL at 3.60 m depth - September 18, 2025)		14									60
		15									59
		16									58
		17									57
		18									56
		19									55
		20									

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

1101 Baxter Road, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 361119.62 **NORTHING:** 5023970.08 **ELEVATION:** 74.06

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: August 25, 2025

FILE NO. : PG7639

HOLE NO. : BH 2-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	MONITORING WELL CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
ASPHALT 0.05m [74.01m]			AU 1			16			74
FILL: Brown silty clay, some gravel, sand and crushed stone 0.69m [73.37m]									
Very loose to loose, brown silty sand		1	SS 2	8	1-1-2-4 3	9			73
		2	SS 3	42	3-5-3-6 8	17			72
			SS 4	0	5-10-9-5 19				
2.97m [71.09m]		3							71
Loose, brown **SILTY SAND** to **SANDY SILT**			SS 5	79	2-3-5-4 8	32			
3.73m [70.33m]									
Firm, grey **SILTY CLAY** to **CLAYEY SILT** 3.96m [70.10m]		4	SS 6	67	1-4-6-2 10				70
Compact, grey **SILTY SAND** to **SANDY SILT** 4.50m [69.56m]									
Firm, grey **SILTY CLAY** to **CLAYEY SILT** 4.88m [69.18m]		5	SS 7	92	1-1-1-1 2	40 28		5.02 m 2025-09-18	69
Very loose, grey **SILTY SAND** to **SANDY SILT**, trace clay 5.64m [68.42m]			SS 8	92	2-2-2-3 4	26 32			
Stiff to very stiff, grey **SILTY CLAY** to **CLAYEY SILT**		6	SS 9	83	0-0-2-2 2	25			68
		7	SS 10	100	P	30		121	67
7.54m [66.52m]								7.42m	
Very loose, grey **SILTY SAND** to **SANDY SILT**		8	SS 11	92	1-1-1-3 2	24			66
8.31m [65.75m]									
Stiff, grey **CLAYEY SILT**, trace sand			SS 12	83	1-1-3-1 4	22			
9.45m [64.61m]		9						8.94m	65
GLACIAL TILL: Very stiff, grey **CLAYEY SILT**, with gravel, cobbles and boulders			SS 13	54	3-2-28-50 30	12			
		10	RC 1	86	RQD 33				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

1101 Baxter Road, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 361119.62 **NORTHING:** 5023970.08 **ELEVATION:** 74.06

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: August 25, 2025

FILE NO. : PG7639

HOLE NO. : BH 2-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	MONITORING WELL CONSTRUCTION	ELEVATION (m)
- Rock fragments below 9.60 m depth 9.65m [64.41m]		10	RC 1						64
BEDROCK: Poor to good quality, grey limestone		11	RC 2	100	RQD 97				63
11.99m [62.07m]		12							62
End of Borehole (GWL at 5.02 m depth - September 18, 2025)		13							61
		14							60
		15							59
		16							58
		17							57
		18							56
		19							55
		20							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

1101 Baxter Road, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 361037.40 **NORTHING:** 5023925.02 **ELEVATION:** 74.65

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: August 26, 2025

FILE NO. : PG7639

HOLE NO. : BH 3-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	MONITORING WELL CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
TOPSOIL and organics			AU 1			4			
0.10m [74.55m]									
Loose to compact, brown **SILTY SAND**, trace organics		1	SS 2	33	3-4-2-3 6	9			74
		2	SS 3	58	7-13-18-26 31	12			73
			SS 4	50	8-11-16-19 27	11			72
- Grey by 3.05 m depth		3	SS 5	67	8-15-8-14 23	17			71
		4	SS 3	33	10-11-5-5 16	20			70
4.50m [70.15m]									
Very stiff, grey **SILTY CLAY** to **CLAYEY SILT**		5	SS 7	100	1-1-1-1 2	30		5.00m	
		6	SS 8	83	P	33	△5 ▲10 121		69
- Sand content increasing with depth			SS 9	100	P	25		6.53m	68
6.78m [67.87m]									
Compact, grey **SILTY SAND**, trace clay		7	SS 10	83	8-12-16-15 28	18			67
- Silt content increasing with depth		8	SS 11	75	2-7-7-3 14	21			
8.31m [66.34m]									
Very stiff, grey **CLAYEY SILT** to **SILTY CLAY**, trace gravel and sand		9	SS 12	71	4-3-3-7 6	21			66
			SS 13	62	1-5-3-3 8	24			65
		10	SS 14						

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

1101 Baxter Road, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 361037.40 **NORTHING:** 5023925.02 **ELEVATION:** 74.65

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: August 26, 2025

FILE NO. : PG7639

HOLE NO. : BH 3-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	MONITORING WELL CONSTRUCTION	ELEVATION (m)
10.97m [63.68m]		10	SS 14	54	2-3-2-1 5	26			64
GLACIAL TILL: Dense, grey **CLAYEY SILT** to **SILTY CLAY**, with gravel, cobbles, boulders and sand - Sand content increasing with depth		11	SS 15	50	4-2-2-4 4	10			63
11.99m [62.66m]			SS 16	100	1-2-6-50 8	11			
BEDROCK: Excellent quality, grey limestone		12							62
13.51m [61.14m]		13	RC 1	100	RQD 95				61
End of Borehole		14							60
		15							59
		16							58
		17							57
		18							56
		19							55
		20							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

1101 Baxter Road, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 361108.67 **NORTHING:** 5023988.16 **ELEVATION:** 73.64

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: August 26, 2025

FILE NO. : PG7639

HOLE NO. : BH 4-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
ASPHALT 0.08m [73.56m]			AU 1			2			73
FILL: Brown silty sand, with gravel 0.51m [73.12m]									
Loose to compact, brown **SILTY SAND**		1	SS 2	50	2-4-4-4 8	7			72
		2	SS 3	50	2-4-4-6 8	15			71
			SS 4	67	4-6-8-9 14	19			
- Grey by 2.97 m depth 3.28m [70.36m]		3	SS 5	75	2-8-5-3 13	24 28			70
Very stiff, grey **SILTY CLAY** to **CLAYEY SILT** - Silt content increasing with depth 4.50m [69.14m]		4	SS 6	83	P	30	△14 106 ▲		69
Loose, grey **SILTY SAND** to **SANDY SILT**, trace clay 5.26m [68.38m]		5	SS 7	75	1-2-3-2 5	34			68
Stiff, grey **SILTY CLAY** to **CLAYEY SILT**, trace sand - Sand seam from 5.64 m to 5.79 m depth 6.71m [66.93m]		6	SS 8	100	1-1-1-1 2	30			67
			SS 9	100	1-1-1-1 2	29			
End of Borehole		7							66
		8							65
		9							64
		10							

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

1101 Baxter Road, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 360999.73 **NORTHING:** 5023800.59 **ELEVATION:** 74.11

PROJECT: Proposed Development

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: August 26, 2025

FILE NO. : PG7639

HOLE NO. : BH 5-25

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N OR RQD	SAMPLE WATER CONTENT (%)	PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
ASPHALT 0.06m [74.05m]			AU 1			2			74
FILL: Compact, brown silty sand, with gravel 0.46m [73.65m]									
Loose to compact, brown **SILTY SAND** to **SANDY SILT**		1	SS 2	33	6-5-4-4 9	21			73
- Grey by 1.27 m depth		2	SS 3	50	2-3-4-4 7	21			72
			SS 4	50	2-4-6-6 10	23			
3.73m [70.38m]		3	SS 5	58	2-5-5-4 10	23			71
Very stiff, grey **SILTY CLAY**, with gravel and sand		4	SS 6	25	2-8-11-8 19	9			70
4.50m [69.61m]									
Loose to compact, grey **SILTY SAND** to **SANDY SILT**		5	SS 7	67	2-3-5-3 8	25			69
		6	SS 8	4	7-10-8-10 18	20			68
6.71m [67.40m]			SS 9	58	5-8-8-7 16	9			
End of Borehole		7							67
		8							66
		9							65
		10							

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1101 Baxter Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located between entrances for 1101 Baxter Road. Assumed elevation = 100.00m.

FILE NO. PE3956

REMARKS

HOLE NO. BH 1

BORINGS BY CME 55 Power Auger **DATE** January 31, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	99.31
Asphaltic concrete 0.08							
FILL: Crushed stone 0.23							
FILL: Brown sand		SS	1	67	11	1	98.31
1.83		SS	2	75	16	2	97.31
		SS	3	67	15		
Compact, brown **SILTY SAND,** trace clay		SS	4	67	12	3	96.31
- grey by 3.7m depth		SS	5	75	10	4	95.31
		SS	6	67	14	5	94.31
		SS	7	75	15		
6.10						6	93.31
End of Borehole							
(GWL @ 2.29m - Feb. 6, 2017)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**
20 40 60 80

Monitoring Well Construction

100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1101 Baxter Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located between entrances for 1101 Baxter Road. Assumed elevation = 100.00m.

FILE NO. PE3956

REMARKS

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger **DATE** January 31, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	100.10
Asphaltic concrete 0.08							
FILL: Crushed stone 0.30							
		SS	1	58	7	1	99.10
FILL: Brown sand							
		SS	2	67	8	2	98.10
2.69		SS	3	92	8		
		SS	4	100	2	3	97.10
Loose to very loose, brown **SILTY SAND,** trace clay							
		SS	5	83	4	4	96.10
- grey by 4.4m depth							
		SS	6	67	W	5	95.10
5.18							
End of Borehole							
(GWL @ 3.19m - Feb. 6, 2017)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1101 Baxter Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located between entrances for 1101 Baxter Road. Assumed elevation = 100.00m.

FILE NO. PE3956

REMARKS

HOLE NO. BH 3

BORINGS BY CME 55 Power Auger **DATE** January 31, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08							
FILL: Crushed stone 0.25							
FILL: Brown sand		SS	1	67	11	1	98.86
		SS	2	58	3	2	97.86
		SS	3	67	4		
2.97						3	96.86
Very loose, brown **SILTY SAND**		SS	4	67	2		
- grey by 4.4m depth		SS	5	75	1	4	95.86
		SS	6	50	W	5	94.86
5.18							
End of Borehole							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1101 Baxter Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located between entrances for 1101 Baxter Road. Assumed elevation = 100.00m.

FILE NO. PE3956

REMARKS

HOLE NO. BH 4

BORINGS BY CME 55 Power Auger **DATE** January 31, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
Asphaltic concrete 0.08									
FILL: Crushed stone 0.30									
FILL: Brown sand		SS	1	58	6	1	98.21		
		SS	2	75	7	2	97.21		
2.13									
		SS	3	100	3	3	96.21		
Very loose, brown **SILTY SAND,** trace clay		SS	4	67	1	4	95.21		
		SS	5	75	1				
- grey by 4.4m depth		SS	6	100	W	5	94.21		
5.18									
End of Borehole									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1101 Baxter Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located between entrances for 1101 Baxter Road. Assumed elevation = 100.00m.

FILE NO. PE3956

REMARKS

HOLE NO. BH 5

BORINGS BY CME 55 Power Auger **DATE** January 31, 2017

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							0	99.92
Asphaltic concrete	0.08							
FILL; Crushed stone	0.30							
			SS	1	67	35	1	98.92
FILL: Brown sand			SS	2	58	16	2	97.92
			SS	3	58	11		
			SS	4	58	4	3	96.92
	3.66							
			SS	5	25	5	4	95.92
Loose, grey **SAND,** trace silt								
			SS	6	50	5	5	94.92
	5.18							
End of Borehole								

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

148.7

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1101 Baxter Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located between entrances for 1101 Baxter Road. Assumed elevation = 100.00m.

FILE NO. PE3956

REMARKS

HOLE NO. BH 6

BORINGS BY Portable Drill **DATE** February 13, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	100.25
Concrete floor							
0.28							
FILL: Crushed stone, some silty sand, trace styrofoam		SS	1	83			
		SS	2	38		1	99.25
1.37							
Brown **SILTY SAND,** trace gravel		SS	3	75			
		SS	4	75		2	98.25
- trace clay by 2.4m depth		SS	5	38			
		SS	6	75		3	97.25
3.56							
Grey **CLAYEY SILT,** trace sand and gravel		SS	7	71		4	96.25
4.27							
Grey **SILTY SAND**		SS	8	75			
5.08						5	95.25
End of Borehole							
(GWL @ 3.57m - Feb. 6, 2017)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

150

400

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1101 Baxter Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located between entrances for 1101 Baxter Road. Assumed elevation = 100.00m.

FILE NO. PE3956

REMARKS

HOLE NO. BH 7

BORINGS BY Portable Drill **DATE** February 13, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	100.29
Reinforced concrete slab							
0.51							
FILL: Brown silty sand, trace concrete and gravel		SS	1	71		1	99.29
1.22							
		SS	2	58			
		SS	3	83		2	98.29
Brown **FINE SAND,** with silt, some gravel		SS	4	33			
		SS	5	100		3	97.29
3.66							
		SS	6	25		4	96.29
Grey **SILTY SAND,** some gravel, trace clay		SS	7	100			
		SS	8	100		5	95.29
5.49							
End of Borehole							
(GWL @ 4.03m - Feb. 6, 2017)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

The standard terminology to describe the relative strength of cohesionless soils is the compactness condition, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm. An SPT N value of "P" denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

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

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their "sensitivity". The sensitivity, S_t, is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube, generally recovered using a piston sampler
G	-	"Grab" sample from test pit or surface materials
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

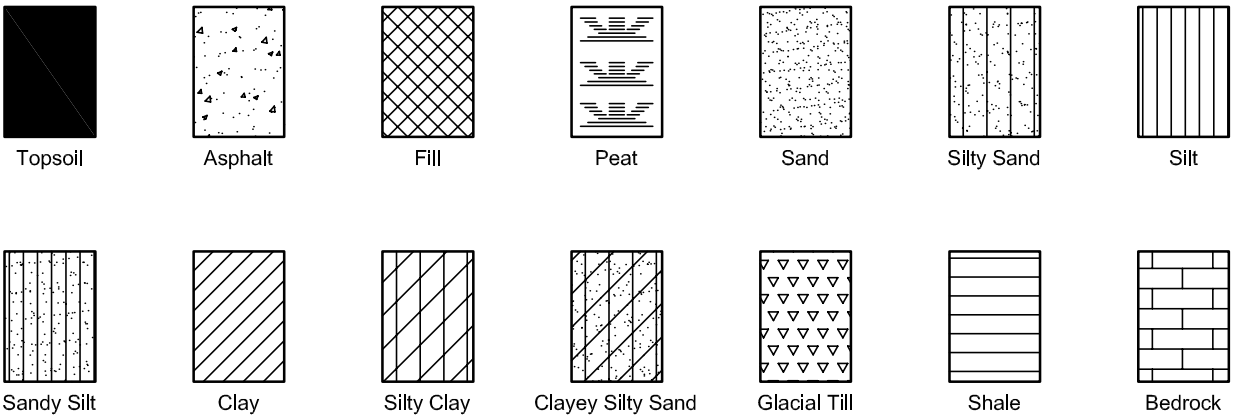
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

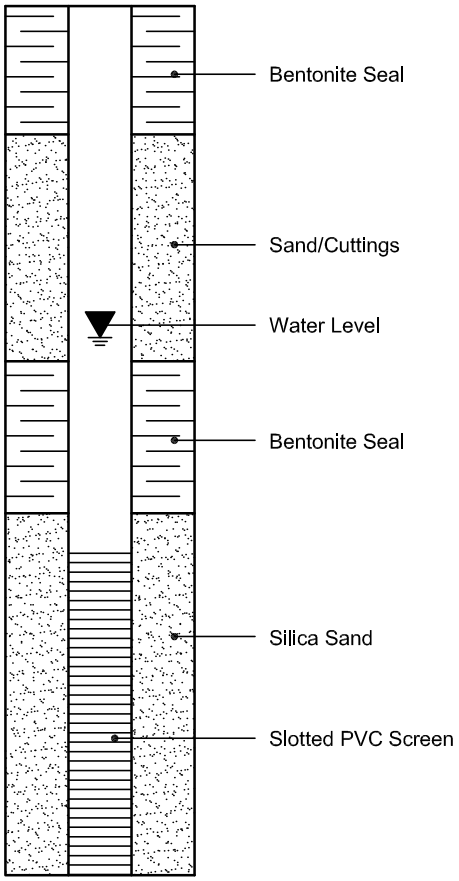
SYMBOLS AND TERMS (continued)

STRATA PLOT

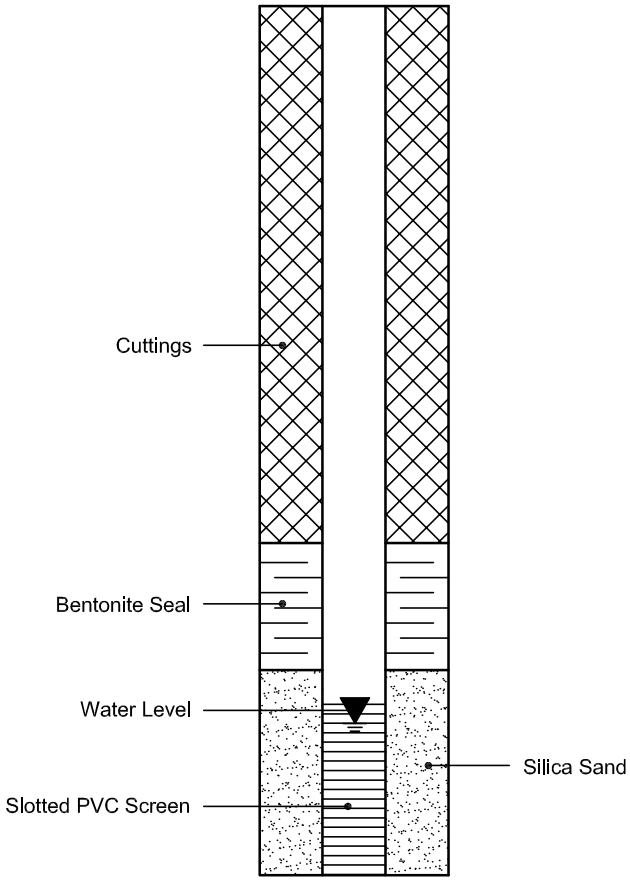


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Morrison Hershfield
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Telephone: 613-739-2910

RECORD OF BOREHOLE BS-1 (ENVIRONMENTAL)

CLIENT Regional Group
PROJECT NAME 1101 Baxter Road Limited Phase II ESA
PROJECT NUMBER 180564700
PROJECT LOCATION 1101 Baxter Road, Ottawa, ON
DATE STARTED 10/15/18 **COMPLETED** 10/15/18
MTM Zone9 361020.12m E 5023750.97m N **ELEVATION**
DRILLING CONTRACTOR Strata Drilling Group
GROUNDWATER LEVELS:
METHOD Direct Push - DT35 Dual Tube Sampling System
STATIC WATER LEVEL 2.21 m below ground surface
LOGGED BY MD **CHECKED BY** CG
MEASUREMENT DATE 10/17/2018
DRILLING SUPERVISED BY: MORRISON HERSHFIELD

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations: ▲ IBL (ppm) 500 1000 1500 2000	Headspace Combustible Vapour Concentrations: ✠ HEX (ppm) 2500 5000 7500; ◔ HEX (%LEL) 25 50 75	ANALYSES	WELL DIAGRAM
0		0.2 ASPHALTIC CONCRETE					Flush Mount Casing
		0.3 FILL - (SP) SAND; light brown; moist	SA1	1	0		
		(ML) SANDY SILT, trace gravel; brownish grey; moist to wet	SA2	0	0		
1			SA3	0	0		
2		2.4					
		(SM/ML) SILTY SAND to SANDY SILT, trace gravel; grey; wet	SA4	0	0		Bentonite Seal
3			SA5	0	0		
4			SA6	1	0		
			SA7	1	0		
5			SA8	1	0		Silica Sand #1
6			SA9	0	0		
7			SA10	1	0	PHC, VOC	50mm Diam. PVC #10 Slot Screen
8		8.2					
		(SM) SILTY SAND, some gravel, trace clay (GLACIAL TILL); grey; wet	SA11	0	120		Silica Sand #1
9			SA12	0	10		
10							Cave

(Continued Next Page)

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RECORD OF BOREHOLE BS-1 (ENVIRONMENTAL)

CLIENT Regional Group **PROJECT NAME** 1101 Baxter Road Limited Phase II ESA

PROJECT NUMBER 180564700 **PROJECT LOCATION** 1101 Baxter Road, Ottawa, ON

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations ▲ IBL (ppm) 500 1000 1500 2000	Headspace Combustible Vapour Concentrations ✠ HEX (ppm) 2500 5000 7500 ◓ HEX (%LEL) 25 50 75	ANALYSES	WELL DIAGRAM
10		(SM) SILTY SAND, some gravel, trace clay (GLACIAL TILL); grey; wet *(continued)*	SA13	0	0		
		10.7 End of Borehole at 10.7m.					

*Density of material increased around 6.0m. Drillers had difficulty advancing outer casing and switched from a dual tube sampling system to a macro-core sampling system.

**Soil from sample SA11 was submit for VOC and benzo(a)pyrene TCLP analysis.

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RECORD OF BOREHOLE BS-2 (ENVIRONMENTAL)

CLIENT Regional Group
PROJECT NAME 1101 Baxter Road Limited Phase II ESA
PROJECT NUMBER 180564700
PROJECT LOCATION 1101 Baxter Road, Ottawa, ON
DATE STARTED 10/15/18 **COMPLETED** 10/15/18
MTM Zone9 361068.82m E 5023834.77m N **ELEVATION**
DRILLING CONTRACTOR Strata Drilling Group
GROUNDWATER LEVELS:
METHOD Direct Push - DT35 Dual Tube Sampling System
STATIC WATER LEVEL ---
LOGGED BY MD **CHECKED BY** CG
MEASUREMENT DATE

DRILLING SUPERVISED BY: MORRISON HERSHFIELD

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations ▲ IBL (ppm) 500 1000 1500 2000	Headspace Combustible Vapour Concentrations ✠ HEX (ppm) 2500 5000 7500 / ◔ HEX (%LEL) 25 50 75	ANALYSES	WELL DIAGRAM
0		0.1 ASPHALTIC CONCRETE					
		0.3 FILL - (GP) SANDY GRAVEL; greyish brown; moist					
1		FILL - (SP) SAND, some silt; light brown; moist	SA1	▲ 0	✠ 0		
2			SA2	▲ 0	✠ 0		
3			SA3	▲ 0	✠ 0	PHC, VOC	
		2.9					
		3.1 FILL - (SP) SAND; black staining from decaying organic matter					
		FILL - 1 m long piece of decaying wood in liner and clogging cutting shoe					
4		4.0					
		(SM/ML) SILTY SAND to SANDY SILT, trace clay; grey; wet	SA4	▲ 0	✠ 0		
5			SA5	▲ 0	✠ 0		
6			SA6	▲ 0	✠ 10		
7			SA7	▲ 0	✠ 0		
		7.6 End of Borehole at 7.6 m.					

ENVIRONMENTAL BH PLOTS BAXTER ROAD PROJECT FILE.GPJ GINT STD CANADA LAB.GDT 10/22/18

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RECORD OF BOREHOLE BS-3 (ENVIRONMENTAL)

CLIENT Regional Group
PROJECT NAME 1101 Baxter Road Limited Phase II ESA
PROJECT NUMBER 180564700
PROJECT LOCATION 1101 Baxter Road, Ottawa, ON
DATE STARTED 10/15/18 **COMPLETED** 10/15/18
MTM Zone9 361160.25m E 5023917.43m N **ELEVATION**
DRILLING CONTRACTOR Strata Drilling Group
GROUNDWATER LEVELS:
METHOD Direct Push - DT35 Dual Tube Sampling System
STATIC WATER LEVEL 2.42 m below ground surface
LOGGED BY MD **CHECKED BY** CG
MEASUREMENT DATE 10/17/2018
DRILLING SUPERVISED BY: MORRISON HERSHFIELD

DEPTH (m)	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations: IBL (ppm)	Headspace Combustible Vapour Concentrations: HEX (ppm)	HEX (%LEL)	ANALYSES
0			500 1000 1500 2000	2500 5000 7500	25 50 75	
0.2	ASPHALTIC CONCRETE					
	FILL - (GP) SANDY GRAVEL, some silt; angular; greyish brown; moist	SA1	5	320		
0.8	FILL - (SP) SAND, trace gravel; light brown; moist	SA2	3	0		
1.5	(SM) SILTY SAND; brown; moist	SA3	3	0		
2.3	(SM/ML) SILTY SAND to SANDY SILT; grey; wet	SA4	4	0		Metals, PHC, VOC
	*Soil from sample SA4 was submit for metals, inorganics and benzo(a)pyrene TCLP analysis.	SA5	1	0		
		SA6	0	0		
		SA7	1	0		
		SA8	4	0		
		SA9	0	0		
		SA10	0	0		
		SA11	4	0		
9.1		SA12	3	0		
9.5	(SM) SILTY SAND, trace gravel, trace clay (GLACIAL TILL); grey; wet					
	End of Borehole at 9.45 m due to bedrock.					

WELL DIAGRAM: Flush Mount Casing; Bentonite Seal; Silica Sand #1; 50mm Diam. PVC #10 Slot Screen; Silica Sand #1; Cave

ENVIRONMENTAL BH PLOTS BAXTER ROAD PROJECT FILE.GPJ GINT STD CANADA LAB.GDT 10/22/18

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RECORD OF BOREHOLE BS-4 (ENVIRONMENTAL)

CLIENT Regional Group
PROJECT NAME 1101 Baxter Road Limited Phase II ESA
PROJECT NUMBER 180564700
PROJECT LOCATION 1101 Baxter Road, Ottawa, ON
DATE STARTED 10/19/18 **COMPLETED** 10/19/18
MTM Zone9 361080.23m E 5023876.72m N **ELEVATION**
DRILLING CONTRACTOR Strata Drilling Group
GROUNDWATER LEVELS:
METHOD Direct Push - Macro Core Sampling System
STATIC WATER LEVEL ---
LOGGED BY MD **CHECKED BY** CG
MEASUREMENT DATE
DRILLING SUPERVISED BY: MORRISON HERSHFIELD

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations ▲ IBL (ppm) 500 1000 1500 2000	Headspace Combustible Vapour Concentrations ✠ HEX (ppm) 2500 5000 7500 / ◔ HEX (%LEL) 25 50 75	ANALYSES	WELL DIAGRAM
0		REINFORCED CONCRETE					
0.5		FILL - (SP) SAND, trace gravel, trace silt; brown; moist	SA1	19	0		
1			SA2	26	0		
2			SA3	28	0		
2.5		(SM) SILTY SAND, trace clay; brown to dark brown; moist	SA4	38	0	Metals	
3			SA5	22	0		
3.8		(SM) SILTY SAND, trace clay; brownish grey to grey; wet	SA6	43	0	PHC, VOC, PAH	
4			SA7	38	0		
5			SA8	15	0		
5.8			SA9	11	0		
6		(ML) SILT, some clay; grey; wet					
6.1		End of Borehole at 6.1 m.					

ENVIRONMENTAL BH PLOTS BAXTER ROAD PROJECT FILE.GPJ GINT STD CANADA LAB.GDT 10/22/18

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Ottawa, ON K1H 1E1
Telephone: 613-739-2910

RECORD OF BOREHOLE BS-5 (ENVIRONMENTAL)

CLIENT Regional Group
PROJECT NAME 1101 Baxter Road Limited Phase II ESA
PROJECT NUMBER 180564700
PROJECT LOCATION 1101 Baxter Road, Ottawa, ON
DATE STARTED 10/19/18 **COMPLETED** 10/19/18
MTM Zone9 361147.95m E 5023870.2m N **ELEVATION**
DRILLING CONTRACTOR Strata Drilling Group
GROUNDWATER LEVELS:
METHOD Direct Push - Macro Core Sampling System
STATIC WATER LEVEL ---
LOGGED BY MD **CHECKED BY** CG
MEASUREMENT DATE
DRILLING SUPERVISED BY: MORRISON HERSHFIELD

DEPTH (m)	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations: IBL (ppm)	Headspace Combustible Vapour Concentrations: HEX (ppm)	HEX (%LEL)	ANALYSES
0	REINFORCED CONCRETE (0.3)					
	FILL - (GP) SANDY GRAVEL, some silt; angular to subangular; light grey; moist (0.6)	SA1	167	0		
	FILL - (SW) GRAVELLY SAND, trace silt; brown; moist (0.8)	SA2	223	0		
1	FILL - (SM) SILTY SAND; light brown; moist	SA3	25	0		
2		SA4	49	0		
	FILL - (SM) SILTY SAND; dark grey; moist to wet; hydrocarbon odour; dark staining (2.7)	SA5	308	530		
3		SA6	1144	3600		Metals, PAH, PHC, VOC
	FILL - (MH) CLAYEY SILT; grey; w>PL; hydrocarbon odour; dark staining (3.5)					
	(SM) SILTY SAND; grey; wet; slight hydrocarbon odour (3.7)	SA7	170	95		
4		SA8	100	115		
		SA9	177	165		
5		SA10	42	80		PHC, VOC
6	(ML) CLAYEY SILT; grey; wet; slight to trace hydrocarbon odour (6.1)	SA11	27	0		
		SA12	9	0		
7	End of Borehole at 7.3 m. (7.3)					

*A blind duplicate of sample SA10 was submitted to the lab under the ID SA21 for analysis of PHC and VOCs.

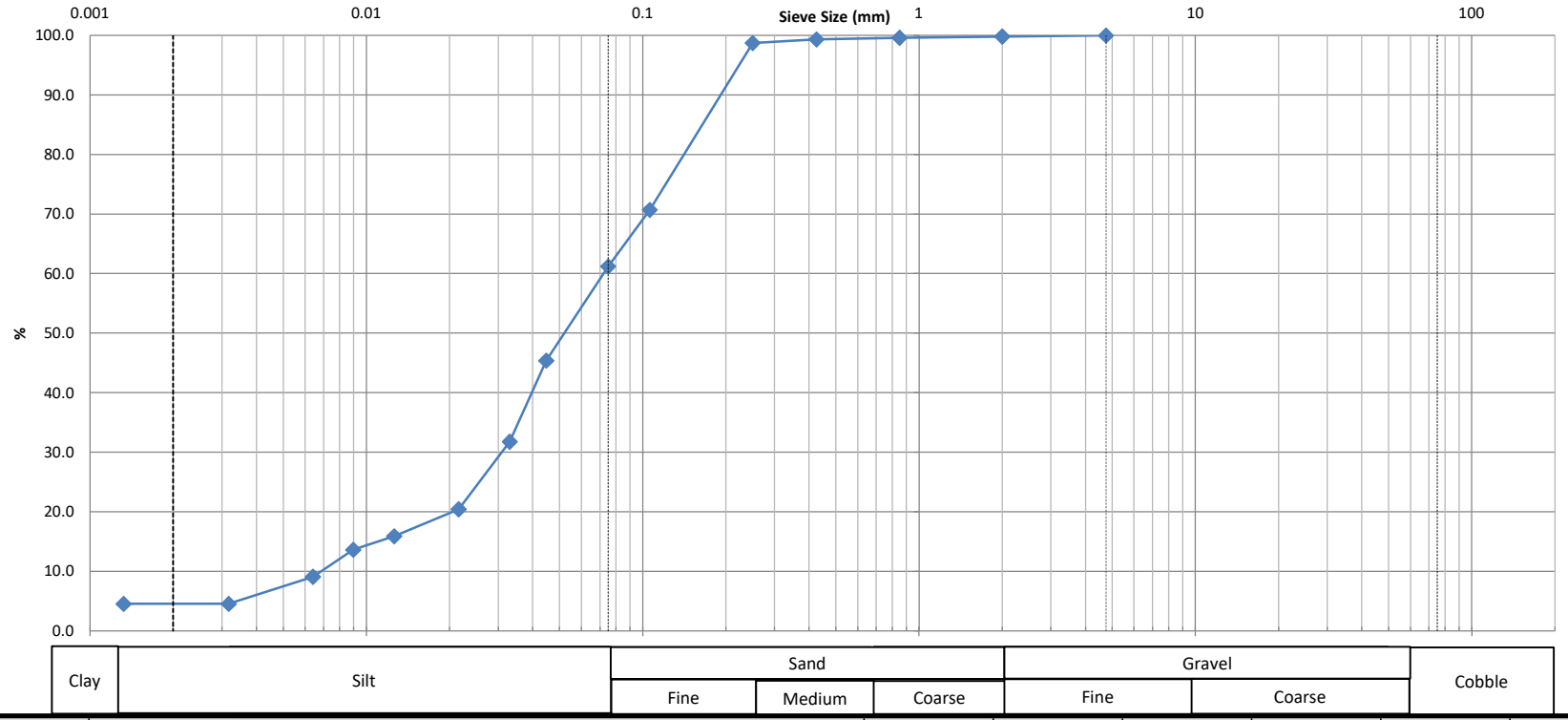
WELL DIAGRAM

ENVIRONMENTAL BH PLOTS BAXTER ROAD PROJECT FILE.GPJ GINT STD CANADA LAB.GDT 10/22/18

PATERSON GROUP

SIEVE ANALYSIS
ASTM C136

CLIENT:	Regional Group	DEPTH:	15'-17'	FILE NO:	PG7639
CONTRACT NO.:		BH OR TP No.:	BH1-25	LAB NO:	62467
PROJECT:	1101 Baxter Rd.			DATE RECEIVED:	2-Sep-25
				DATE TESTED:	2-Sep-25
DATE SAMPLED:	25-Aug-25			DATE REPORTED:	9-Sep-25
SAMPLED BY:	A.A			TESTED BY:	C.M



Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						19.6%					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					0.0	38.8		57.2		4.0	

Comments:

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

PATERSON GROUP

HYDROMETER
LS-702 ASTM-422

CLIENT:	Regional Group	DEPTH:	15'-17'	FILE NO.:	PG7639
PROJECT:	1101 Baxter Rd.	BH OR TP No.:	BH1-25	DATE SAMPLED:	25-Aug-25
LAB No. :	62467	TESTED BY:	C.M	DATE RECEIVED:	02-Sep-25
SAMPLED BY:	A.A	DATE REPT'D:	09-Sep-25	DATE TESTED:	02-Sep-25

SAMPLE INFORMATION

SAMPLE MASS	SPECIFIC GRAVITY
180.7	2.700

INITIAL WEIGHT	50.08	**HYGROSCOPIC MOISTURE**		
WEIGHT CORRECTED	43.51	TARE WEIGHT	0.00	ACTUAL WEIGHT
WT. AFTER WASH BACK SIEVE	22.05	AIR DRY	208.00	208.00
SOLUTION CONCENTRATION	40 g/L	OVEN DRY	180.70	180.70
		CORRECTED	0.869	

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
26.5			
19			
13.2			
9.5			
4.75	**0.0**	0.0	**100.0**
2.0	**0.32**	0.2	**99.8**
Pan	**180.38**		
0.850	**0.09**	0.4	**99.6**
0.425	**0.24**	0.7	**99.3**
0.250	**0.55**	1.3	**98.7**
0.106	**14.60**	29.3	**70.7**
0.075	**19.37**	38.8	**61.2**
Pan	**22.05**		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	7:07	26.0	6.0	23.0	0.0448	45.5	**45.4**
2	7:08	20.0	6.0	23.0	0.0330	31.8	**31.8**
5	7:11	15.0	6.0	23.0	0.0215	20.5	**20.4**
15	7:21	13.0	6.0	23.0	0.0126	15.9	**15.9**
30	7:36	12.0	6.0	23.0	0.0090	13.6	**13.6**
60	8:06	10.0	6.0	23.0	0.0064	9.1	**9.1**
250	11:16	8.0	6.0	23.0	0.0032	4.5	**4.5**
1440	7:06	8.0	6.0	23.0	0.0013	4.5	**4.5**

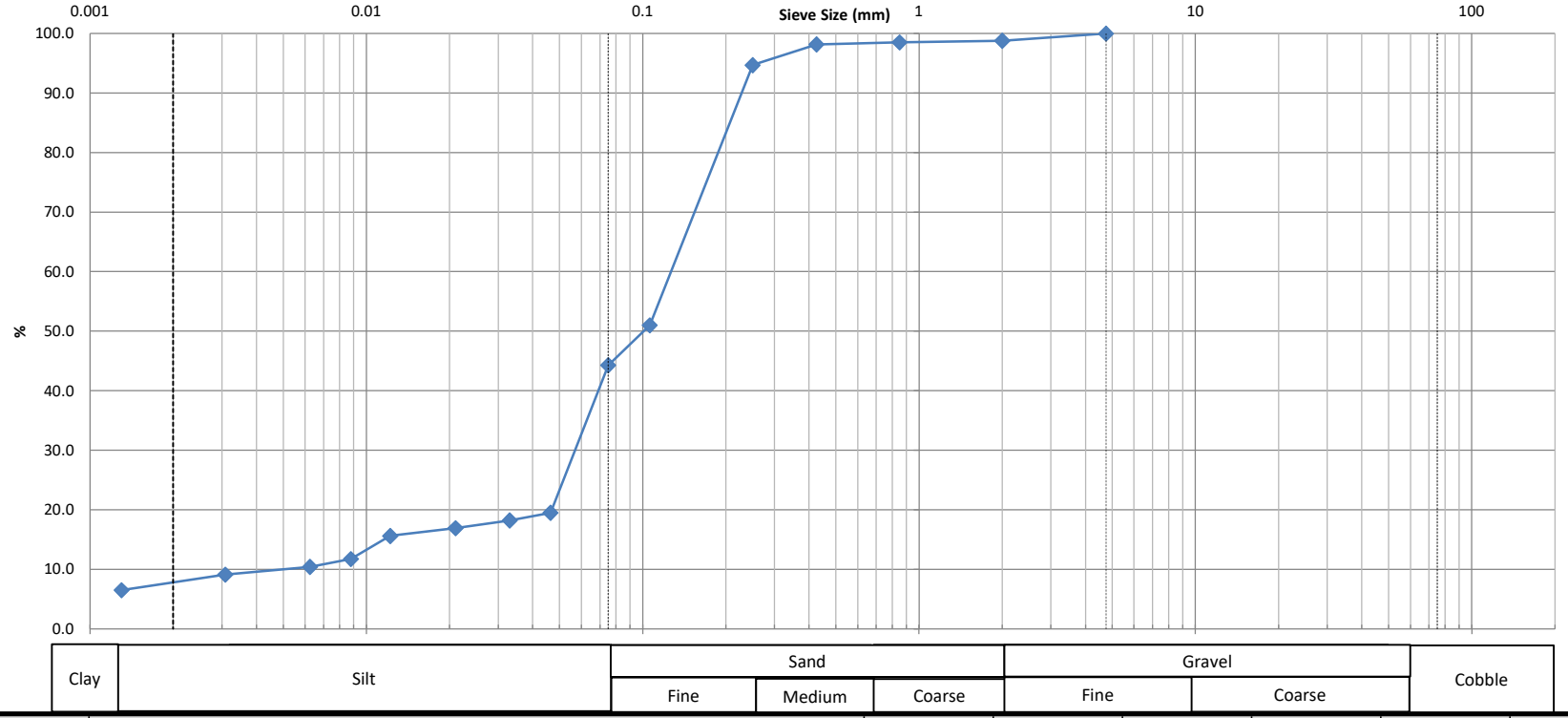
Moisture = 19.6%

REVIEWED BY:	C. Beadow	Joe Forsyth, P. Eng.
		

PATERSON GROUP

SIEVE ANALYSIS
ASTM C136

CLIENT:	Regional Group	DEPTH:	25'-27'	FILE NO:	PG7639
CONTRACT NO.:		BH OR TP No.:	BH2-25	LAB NO:	62468
PROJECT:	1101 Baxter Rd.			DATE RECEIVED:	2-Sep-25
				DATE TESTED:	2-Sep-25
DATE SAMPLED:	25-Aug-25			DATE REPORTED:	9-Sep-25
SAMPLED BY:	A.A			TESTED BY:	C.M



Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						24.8%					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					0.0	55.7		36.3		8.0	

Comments:

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

PATERSON GROUP

HYDROMETER
LS-702 ASTM-422

CLIENT:	Regional Group	DEPTH:	25'-27'	FILE NO.:	PG7639
PROJECT:	1101 Baxter Rd.	BH OR TP No.:	BH2-25	DATE SAMPLED:	25-Aug-25
LAB No. :	62468	TESTED BY:	C.M	DATE RECEIVED:	02-Sep-25
SAMPLED BY:	A.A	DATE REPT'D:	09-Sep-25	DATE TESTED:	02-Sep-25

09-Sep

SAMPLE MASS	SPECIFIC GRAVITY
247.5	2.700

INITIAL WEIGHT	50.07	**HYGROSCOPIC MOISTURE**		
WEIGHT CORRECTED	75.11	TARE WEIGHT	0.00	ACTUAL WEIGHT
WT. AFTER WASH BACK SIEVE	28.55	AIR DRY	165.00	165.00
SOLUTION CONCENTRATION	40 g/L	OVEN DRY	247.50	247.50
		CORRECTED	1.500	

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
26.5			
19			
13.2			
9.5			
4.75	**0.0**	0.0	**100.0**
2.0	**2.99**	1.2	**98.8**
Pan	**244.50**		
0.850	**0.13**	1.5	**98.5**
0.425	**0.31**	1.8	**98.2**
0.250	**2.07**	5.3	**94.7**
0.106	**24.23**	49.0	**51.0**
0.075	**27.63**	55.7	**44.3**
Pan	**28.55**		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	7:10	21.0	6.0	23.0	0.0464	19.7	**19.5**
2	7:11	20.0	6.0	23.0	0.0330	18.4	**18.2**
5	7:14	19.0	6.0	23.0	0.0210	17.1	**16.9**
15	7:24	18.0	6.0	23.0	0.0122	15.8	**15.6**
30	7:39	15.0	6.0	23.0	0.0088	11.8	**11.7**
60	8:09	14.0	6.0	23.0	0.0063	10.5	**10.4**
250	11:19	13.0	6.0	23.0	0.0031	9.2	**9.1**
1440	7:09	11.0	6.0	23.0	0.0013	6.6	**6.5**

Moisture = 24.8%

REVIEWED BY:	C. Beadow	Joe Forsyth, P. Eng.

	Client ID:	BH4-25/SS7/15' to 17'	-	-	-		
	Sample Date:	26-Aug-25 12:00	-	-	-	-	-
	Sample ID:	2539168-01	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	78.6	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.98	-	-	-	-	-
Resistivity	0.1 Ohm.m	25.6	-	-	-	-	-
Anions							
Chloride	5 ug/g	148	-	-	-	-	-
Sulphate	5 ug/g	70	-	-	-	-	-

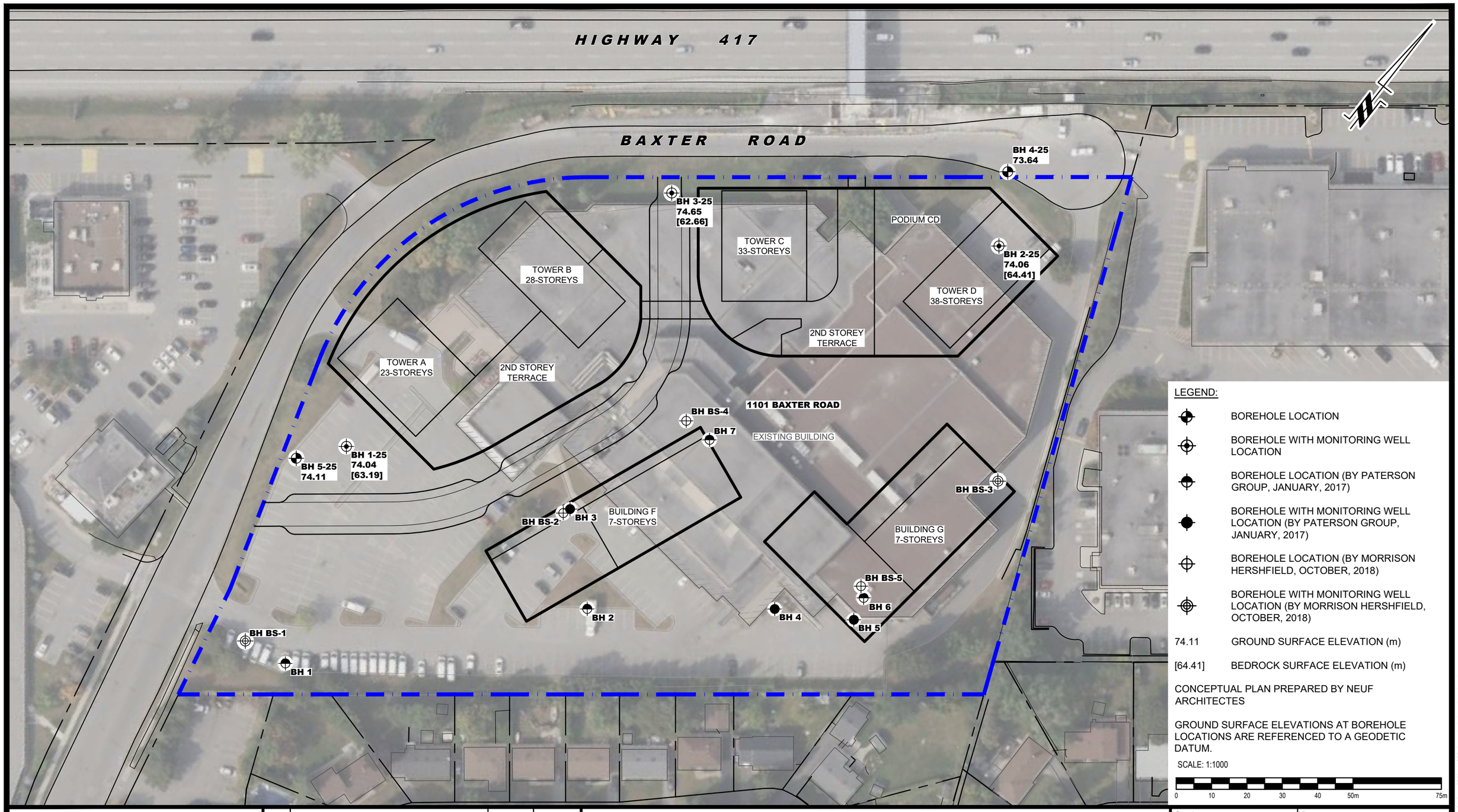
APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG7639-1 – TEST HOLE LOCATION PLAN

FIGURE 1

KEY PLAN



LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION (BY PATERSON GROUP, JANUARY, 2017)
- BOREHOLE WITH MONITORING WELL LOCATION (BY PATERSON GROUP, JANUARY, 2017)
- BOREHOLE LOCATION (BY MORRISON HERSHFIELD, OCTOBER, 2018)
- BOREHOLE WITH MONITORING WELL LOCATION (BY MORRISON HERSHFIELD, OCTOBER, 2018)

74.11 GROUND SURFACE ELEVATION (m)

[64.41] BEDROCK SURFACE ELEVATION (m)

CONCEPTUAL PLAN PREPARED BY NEUF ARCHITECTES

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

SCALE: 1:1000

0 10 20 30 40 50m 75m

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

NO.	REVISIONS	DATE	INITIAL

REGIONAL GROUP
GEOTECHNICAL INVESTIGATION
PROPOSED DEVELOPMENT
1101 BAXTER ROAD
OTTAWA, ONTARIO

Title:
TEST HOLE LOCATION PLAN

Scale: 1:1000	Date: 09/2025
Drawn by: ZS	Report No.: PG7639-1
Checked by: OM	Dwg. No.: PG7639-1
Approved by: SD	Revision No.:

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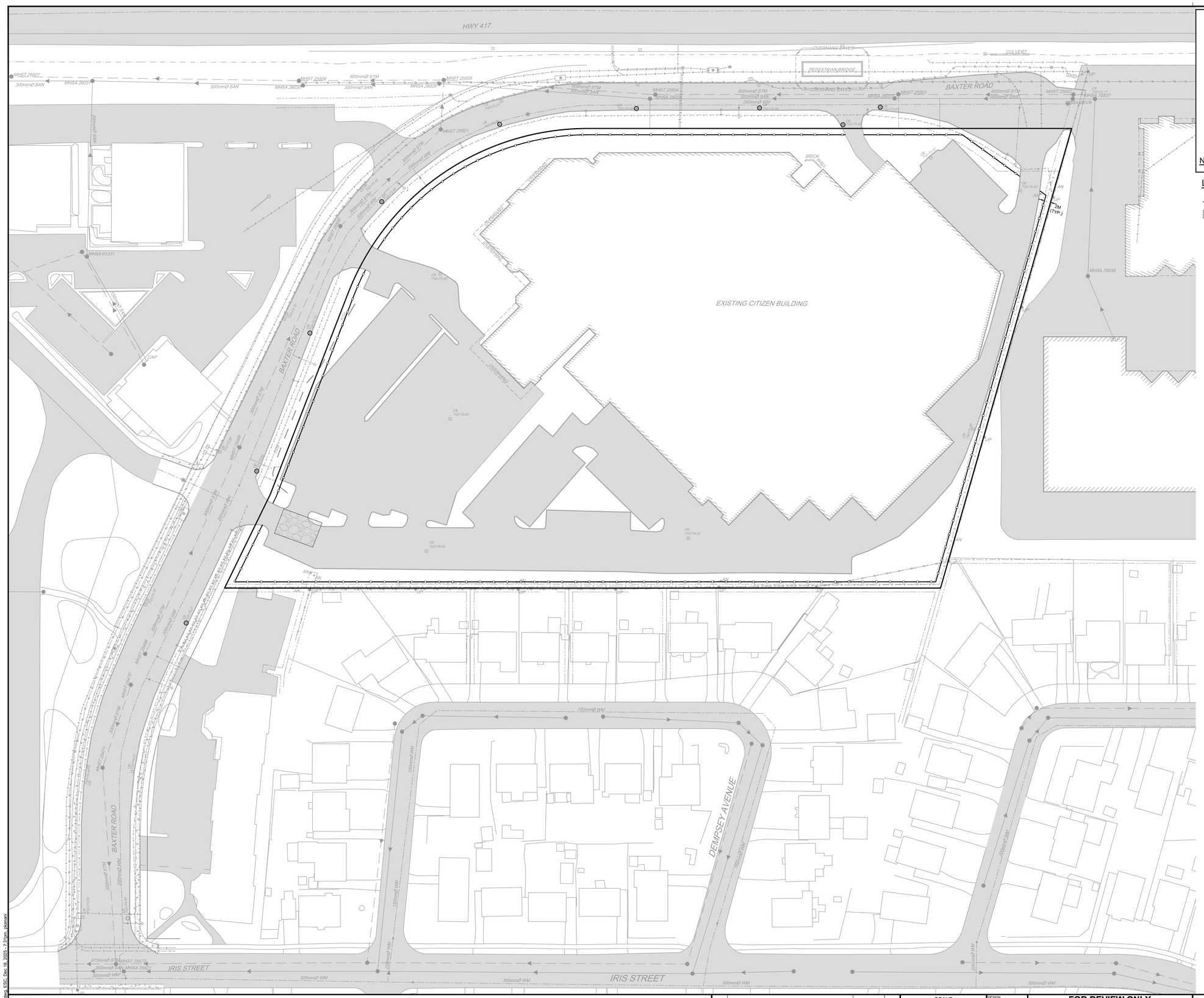
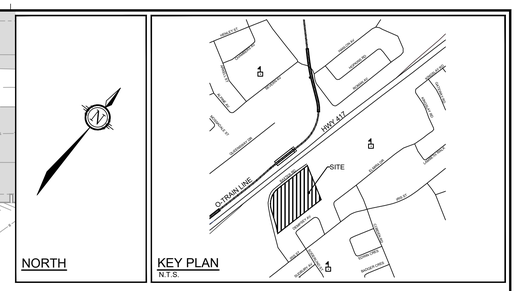
11x17

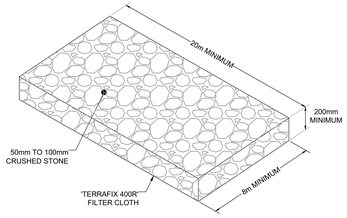
Drawings



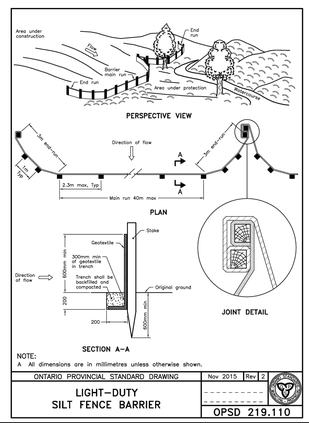


LEGEND

- LIGHT DUTY SILT FENCE BARRIER AS PER OPSD 219.110
- PROPOSED MUD MAT (REFER TO DETAIL)
- PROPOSED FILTER BAGS AT EXISTING CATCHBASINS



MUD MAT DETAIL
NTS



NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

PRELIMINARY

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1	ISSUED FOR CITY REVIEW	DEC 22/25	BHB

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DESIGN PJK
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Suite 200, 240 Michael Cowpland Drive
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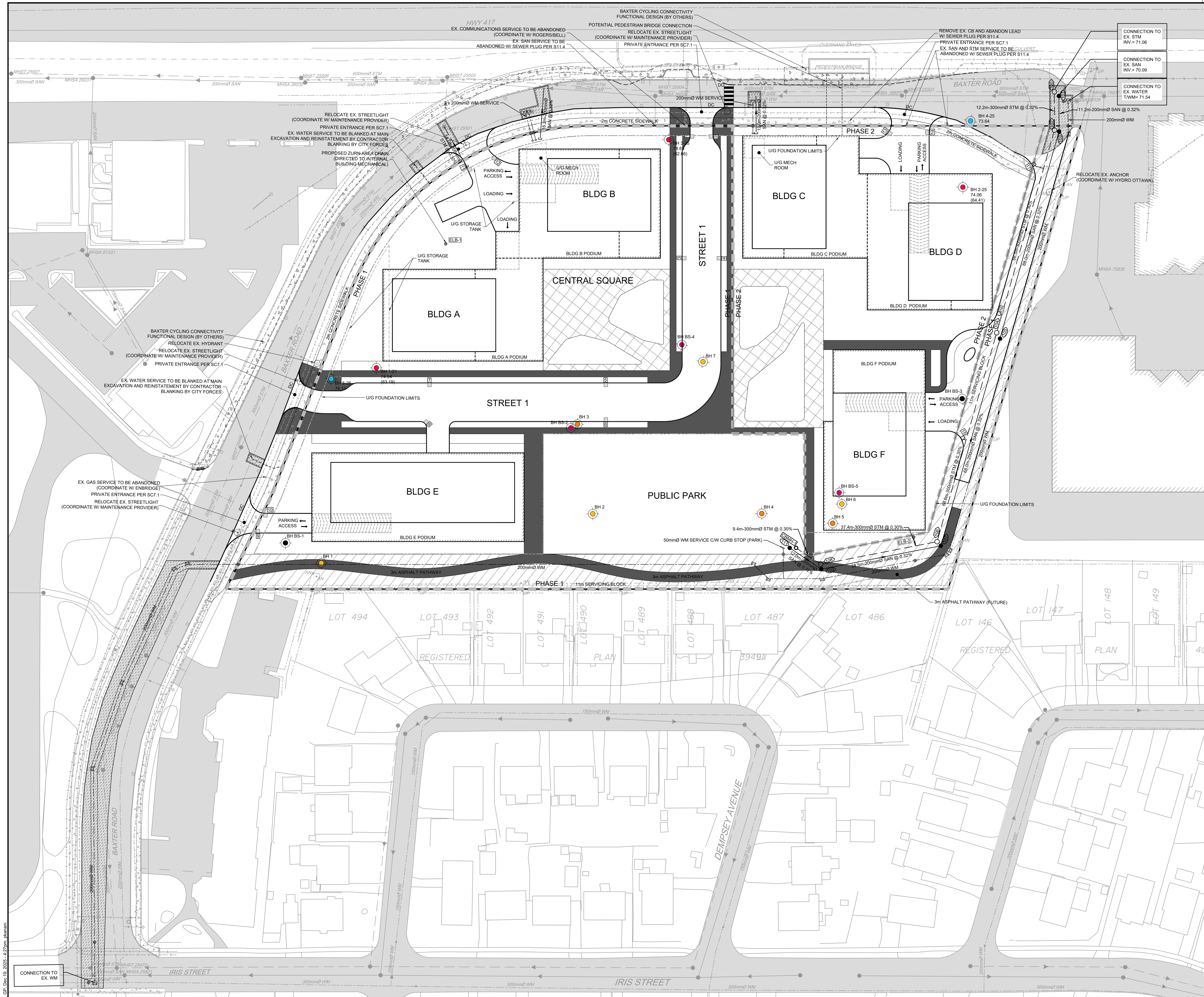
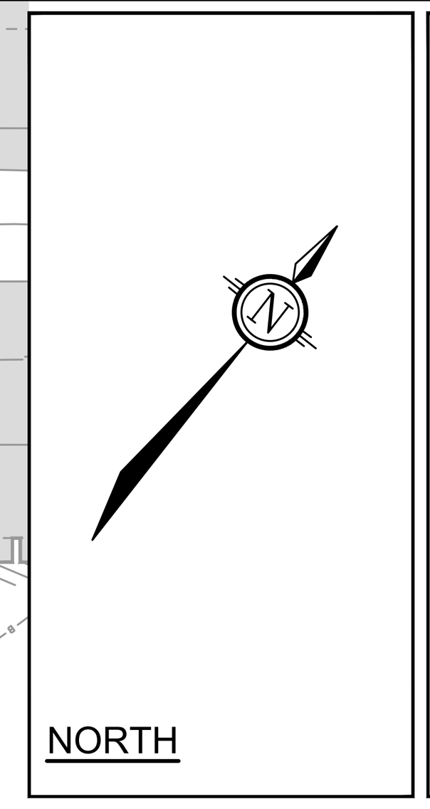
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

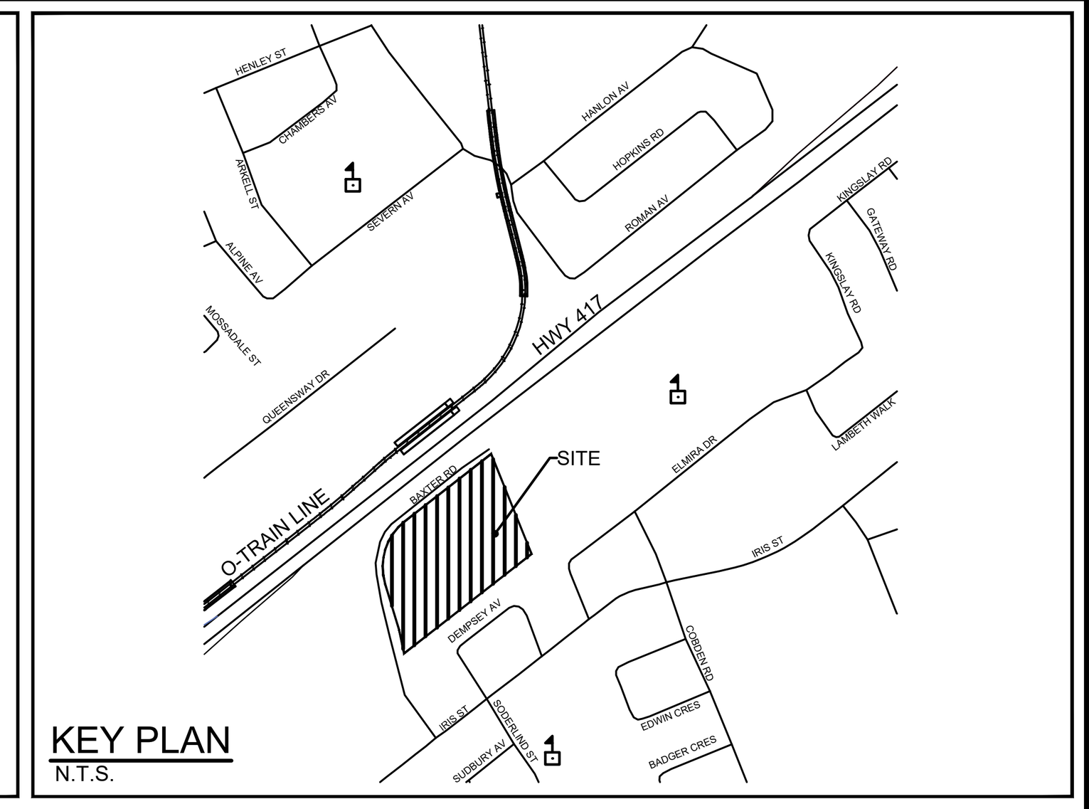
LOCATION
CITY OF OTTAWA
1101 BAXTER ROAD

DRAWING NAME
CONCEPTUAL EROSION AND SEDIMENT CONTROL PLAN

PROJECT No. 121019-00
REV REV #01
DRAWING No. 121019-ESC







LEGEND

200mmØ WM	PROPOSED WATERMAIN
	PROPOSED VALVE LOCATION
V&VB	VALVE & VALVE BOX
T/F=98.45	PROPOSED TOP OF BOTTOM FLANGE
HYD	PROPOSED HYDRANT C/W VALVE & LEAD
BEND	PROPOSED BEND AND THRUSTBLOCK 11.25°, 22.5°, 45° or TEE (SEE PLAN AND PROFILES)
5	PROPOSED SANITARY MH & SEWER
6	PROPOSED STORM MH & SEWER
	PROPOSED LANDSCAPE TEE CATCHBASIN & PERFORATED SUBDRAIN
	PROPOSED LANDSCAPE ELBOW CATCHBASIN & PERFORATED SUBDRAIN
	PROPOSED ROAD CATCHBASIN MANHOLE & LEAD
	PROPOSED REAR YARD CATCHBASIN & LEAD
	PROPOSED ROAD CATCHBASIN
	PROPOSED DITCH INLET CATCHBASIN
	PROPOSED ZURN AREA DRAIN(DIRECTED TO INTERNAL BUILDING MECHANICAL)
	DIRECTION OF FLOW
1	CRITICAL PIPE CROSSING LOCATION. SEE TABLE FOR DATA
	FENCE - CHAINLINK
	PROPOSED 2.0m CONCRETE SIDEWALK WITH TWSI
	PROPOSED PATHWAY
	UNDERGROUND FOUNDATION LIMIT
	TOP OF SLOPE
	EASEMENT
	ROAD CUT
BH 1-25 74.65 — ORIGINAL GROUND ELEVATION (62.66) — TOP OF ROCK ELEVATION	APPROXIMATE BOREHOLE WITH MONITORING WELL LOCATION 2025
BH 1-25 74.65 — ORIGINAL GROUND ELEVATION	APPROXIMATE BOREHOLE LOCATION 2025
	APPROXIMATE BOREHOLE (BY PATERSON GROUP) 2017
	APPROXIMATE BOREHOLE WITH MONITORING WELL LOCATION (BY PATERSON GROUP) 2017
	APPROXIMATE BOREHOLE LOCATION (BY MORRISON HERSHFIELD) OCTOBER, 2018
	APPROXIMATE BOREHOLE AND MONITORING WELL LOCATION (BY MORRISON HERSHFIELD) OCTOBER, 2018

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LOCATION
CITY OF OTTAWA
1101 BAXTER ROAD

DRAWING NAME
CONCEPTUAL
GENERAL PLAN OF SERVICE

PROJECT No. 121019-00
REV REV #01
DRAWING No. 121019-GP

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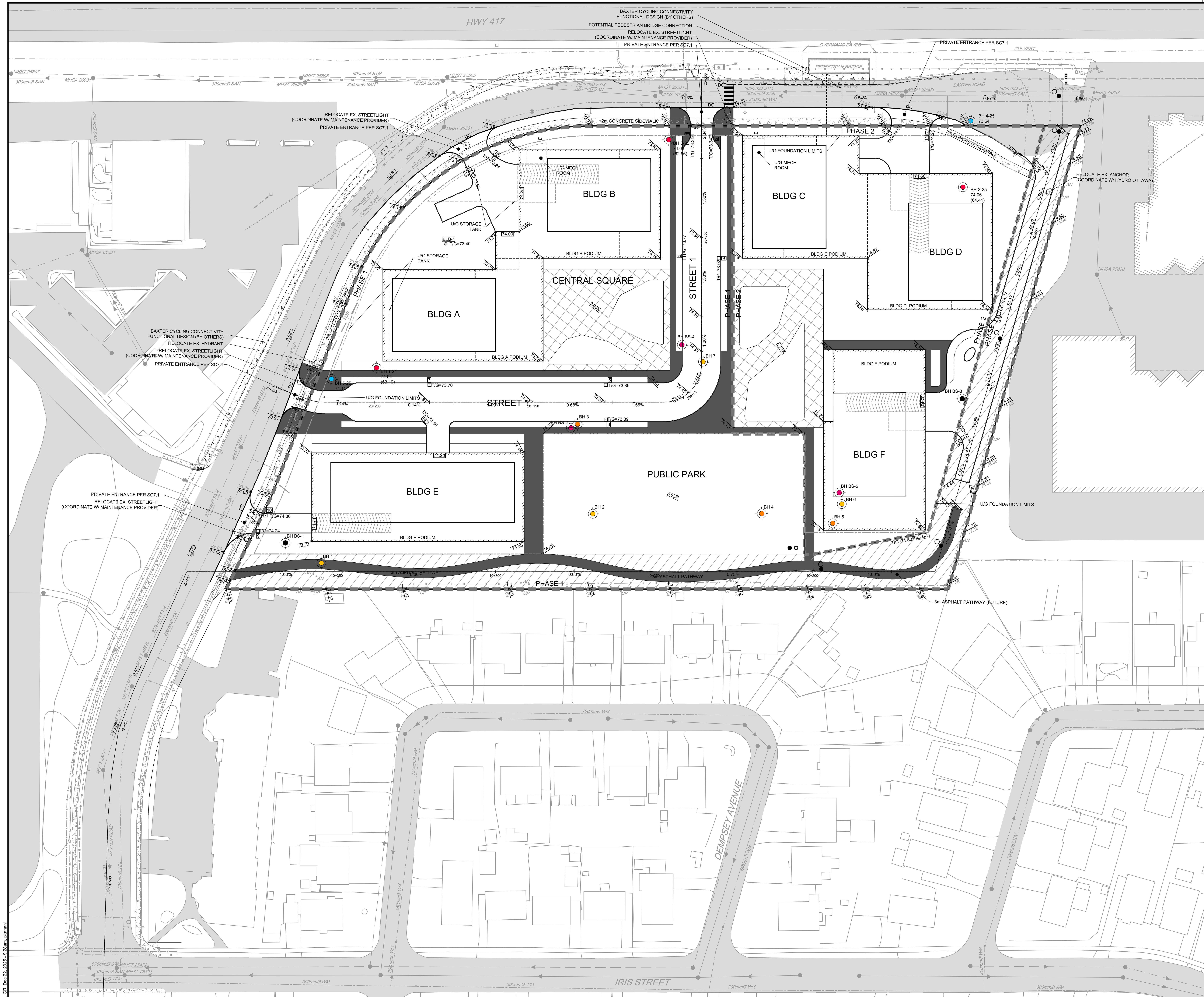

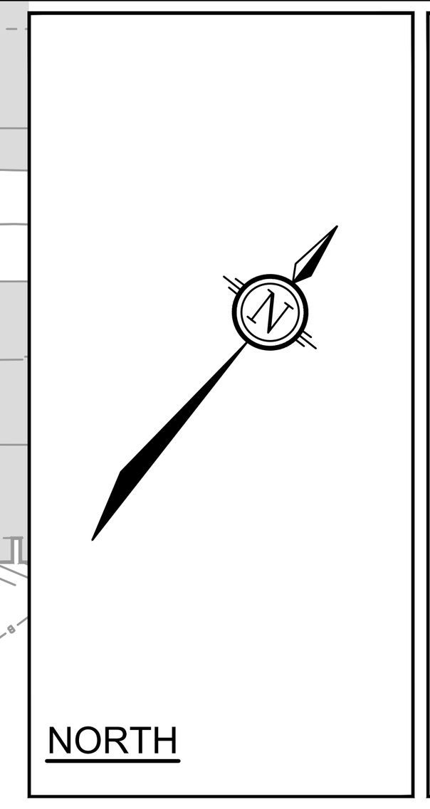

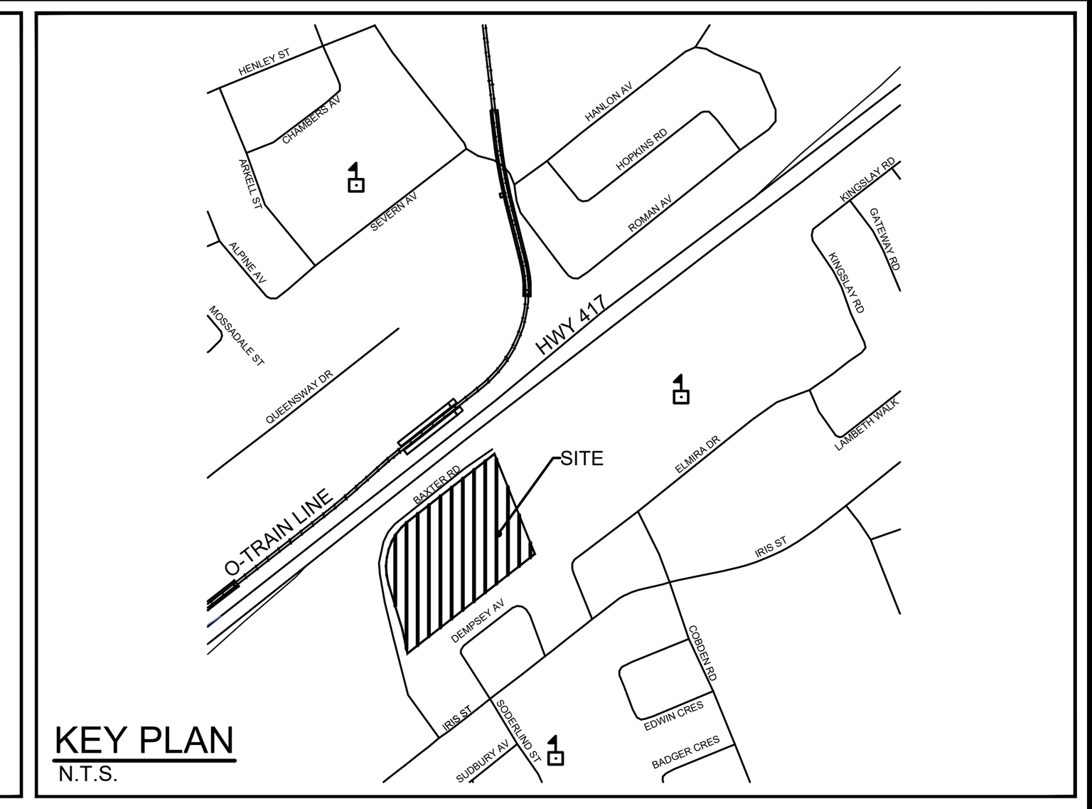

LEGEND

- 120.46 PROPOSED ELEVATION / 118.56 EXISTING ELEVATION
- 127.55 PROPOSED TERRACE ELEVATION
- 3.2% GRADE AND DIRECTION
- MAJOR OVERLAND FLOW DIRECTION
- PROPOSED TERRACING
- PROPOSED SWALE
- PROPOSED SANITARY MH
- PROPOSED STORM MH
- PROPOSED LANDSCAPE TEE CATCH BASIN
- PROPOSED LANDSCAPE ELBOW CATCH BASIN
- PROPOSED REAR YARD CATCH BASIN MANHOLE
- PROPOSED REAR YARD CATCH BASIN
- PROPOSED ROAD CATCHBASIN
- FENCE - CHAINLINK
- PROPOSED 2.0m CONCRETE SIDEWALK WITH TWSI
- PROPOSED PATHWAY
- UNDERGROUND FOUNDATION LIMIT
- TOP OF SLOPE
- EASEMENT
- ROAD CUT
- APPROXIMATE BOREHOLE WITH MONITORING WELL LOCATION 2025
  BH 1-25
  74.65 —ORIGINAL GROUND ELEVATION
  (62.66)—TOP OF ROCK ELEVATION
- APPROXIMATE BOREHOLE LOCATION 2025
  BH 1-25
  74.65 —ORIGINAL GROUND ELEVATION
- APPROXIMATE BOREHOLE (BY PATERSON GROUP) 2017
- APPROXIMATE BOREHOLE WITH MONITORING WELL LOCATION (BY PATERSON GROUP) 2017
- APPROXIMATE BOREHOLE LOCATION (BY MORRISON HERSHFIELD) OCTOBER, 2018
- APPROXIMATE BOREHOLE AND MONITORING WELL LOCATION (BY MORRISON HERSHFIELD) OCTOBER, 2018

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LOCATION
CITY OF OTTAWA
1101 BAXTER ROAD

DRAWING NAME
CONCEPTUAL GRADING PLAN

PROJECT No. 121019-00
REV REV #01
DRAWING No. 121019-GR

PLANB1.DWG - 1000mmx707mm

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LOCATION
CITY OF OTTAWA
1101 BAXTER ROAD

DRAWING NAME
CONCEPTUAL SANITARY DRAINAGE PLAN

PROJECT No. 121019-00
REV REV #01
DRAWING No. 121019-SAN

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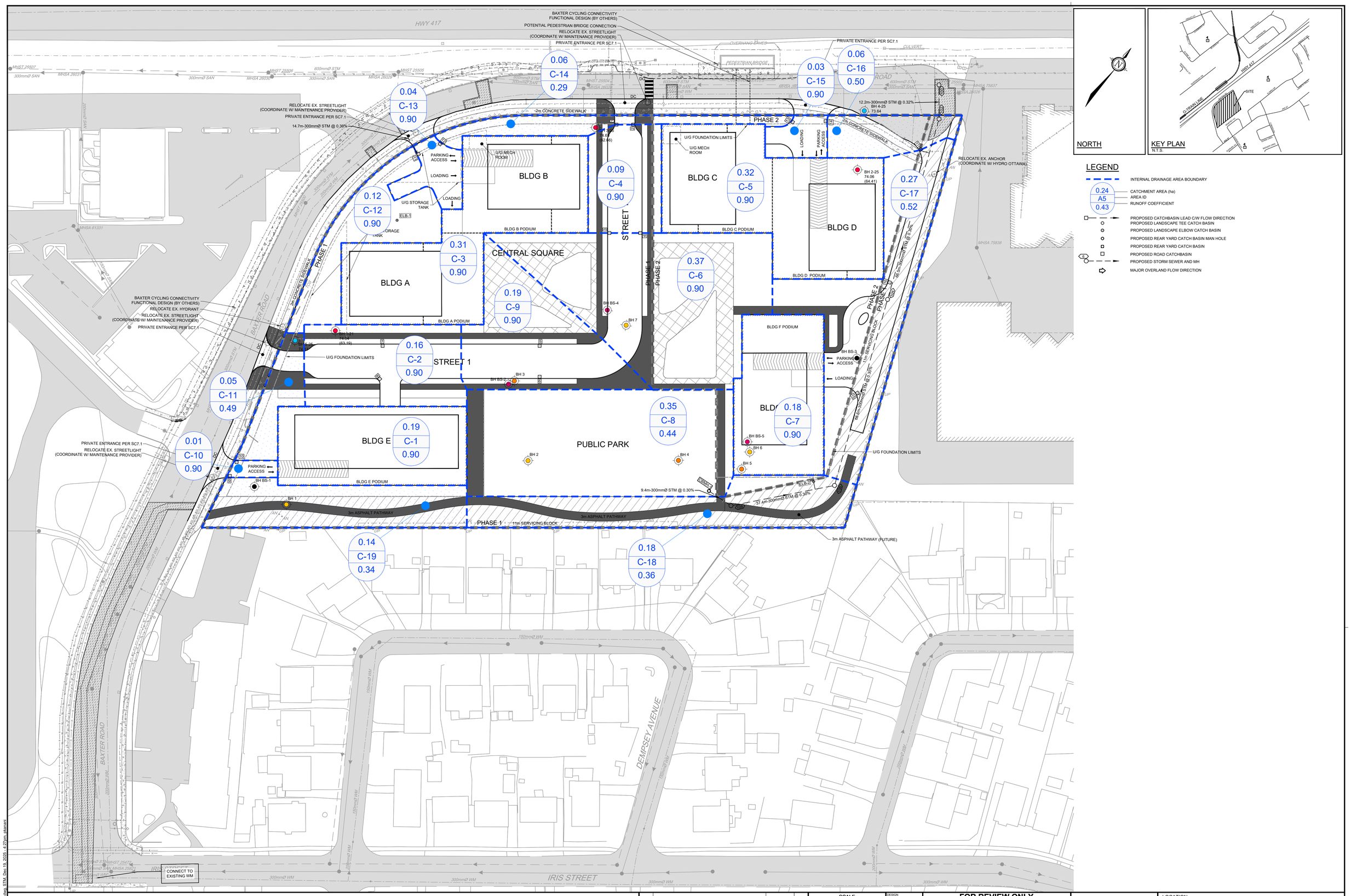

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LOCATION
CITY OF OTTAWA
1101 BAXTER ROAD

DRAWING NAME
CONCEPTUAL
STORM DRAINAGE PLAN

PROJECT No. 121019-00
REV REV #01
DRAWING No. 121019-STM

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