# Riverside South Community Centre and Library Phase 1

Site Servicing and Stormwater Management Report

Prepared for:
Diamond and Schmitt Architects

Date:
July 10, 2026

Prepared by:
Stantec Consulting Ltd.

Project/File:
160402150

Stantec Consulting Ltd.

# Revision Record

| Revision | Description | Author | Date | Quality Check | Date | Independent Review | Date |
|---|---|---|---|---|---|---|---|
| 0 | 1st Submission SPC | Dustin T. | 2026-07-09 | Dustin T. | 2026-07-10 | Alyssa G. | 2026-07-10 |

# Disclaimer

The conclusions in the Report titled Riverside South Community Centre and Library Phase 1 – Site Servicing and Stormwater Management Report are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Diamond and Schmitt Architects (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided by the Client to applicable authorities having jurisdiction and to other third parties in connection with the project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

Reviewed by:

Signature

Alyssa Gladish, P.Eng.

Printed Name


Approved by:

Signature

Dustin Thiffault, P.Eng.

Printed Name

# Table of Contents



**List of Tables**



**List of Figures**

**List of Appendices**

# 1 Introduction

Diamond and Schmitt Architects have commissioned Stantec Consulting Ltd. to prepare the following Site Servicing and Stormwater Management Report for development of the Riverside South Community Centre and Library. The subject property is located at the southwest parcel of phase 7A of the Riverside South Town Center community, south of Earl Armstrong Road within the City of Ottawa.

The block is currently zoned as Recreation Subzone 2 (REC2) and measures approximately 10.88 ha in area. The site itself is intended to be divided into two construction phases, with Phase 1 encompassing the eastern boundary of the site including the proposed library and community centre buildings and associated parking, whereas Phase 2 is to contain the remaining park programming, play fields, and a secondary parking area. The site is bordered by a future BRT corridor to the south, Jessie Chenevert Walk to the south, Portico Way to the west, and Town Square Street to the east.

The proposed Phase 1 development is comprised of a singular roughly 0.39ha building containing both the proposed community centre and library, including associated parking, fitness and play areas, a proposed splash pad and shade structure building. The objective of this report is to provide a servicing scenario for the site that is free of conflicts, provides on-site servicing in accordance with City of Ottawa design guidelines, and utilizes the existing and future local infrastructure in accordance with the various background studies including the *Design Brief Phase 7A* report (Arcadis, 2025), as outlined in Section 2.

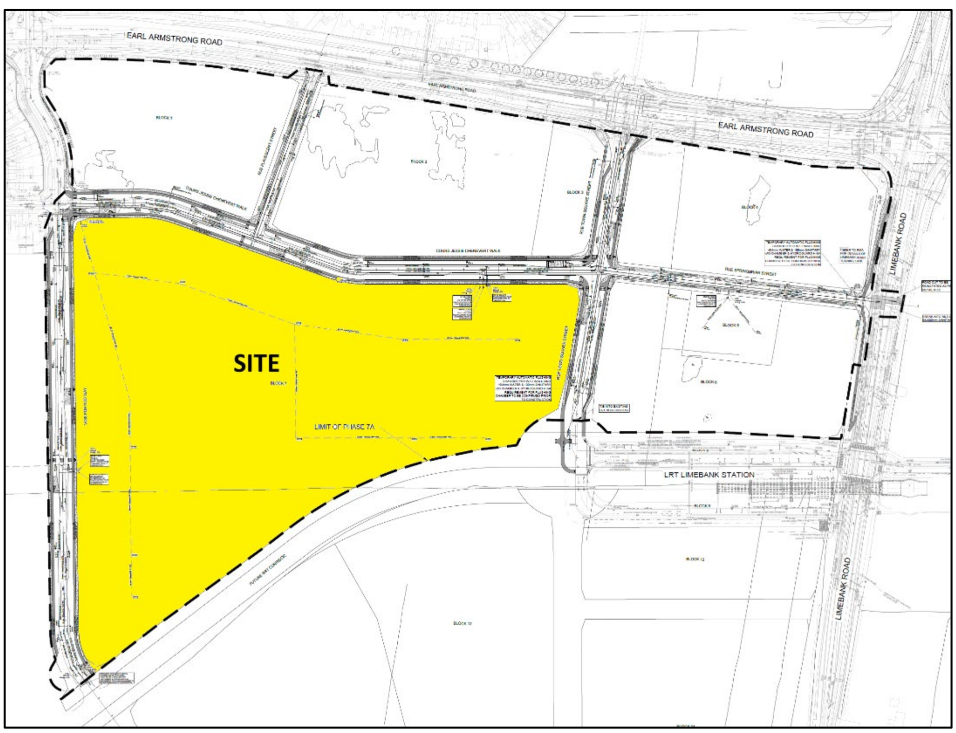



*Figure 1.1: Location of Riverside South Community Centre and Library*

# 2 Background

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

- *Design Brief Phase 7A – 980 Earl Armstrong Road and 4700 Limebank Road, Riverside South,* Arcadis, Revised March, 2025.
- *Geotechnical Investigation, Proposed Mixed-Use Development Town Center Phase 7A – Riverside South, Ottawa,* Paterson Group Inc., June 20, 2024.
- *Phase 1 Environmental Site Assessment Part of 980 Earl Armstrong Road and 4700 Limebank Road,* Paterson Group Inc., April 26, 2024.
- *Hydrogeological Review and Groundwater Impact Assessment Proposed Mixed-Use Development Town Center Phase 7A – Riverside South 980 Earl Armstrong Road,* Paterson Group Inc., October 3, 2024.
- *Stormwater Management Planning and Design Manual,* Ministry of the Environment (Ontario), March 2003
- *City of Ottawa Water Distribution Guidelines, 2nd Ed.,* City of Ottawa, December 2025
- *City of Ottawa Sewer Design Guidelines, 4th Ed.,* City of Ottawa, December 2025

# 3 Water Servicing

## 3.1 Background

The proposed development is currently within Pressure Zone 2W2C of the City of Ottawa's water distribution system, and forms part of the future SUC Zone reconstruction. As part of the detailed design of Phase 7A of the Riverside South subdivision, a water hydraulic analysis was completed to demonstrate that the water distribution network for the subdivision would adequately meet the domestic and fire supply requirements for development blocks. Results are documented in the Design Brief Phase 7A report (Arcadis, 2025). The proposed site (identified as Block 7 in background studies) will be serviced by the 200 mm diameter municipal watermain in Jessie Chenevert Walk that was constructed as part of the Phase 7A subdivision development.

## 3.2 Design Criteria

### 3.2.1 Water Demand and Allowable Pressure

The domestic water demand and allowable water pressure are assessed using the City of Ottawa Water Distribution Guidelines (2025) as amended.

| | |
|---|---|
| **Institutional Demand** | |
| Average Daily (AVDY) | 28,000 L/ha/day |
| Maximum Daily (MXDY) | 1.5 × AVDY |
| Peak Hour (PKHR) | 1.8 × MXDY |
| | |
| **Allowable Water Pressure** | |
| MXDY Flow | 345 kPa (50 psi) to 552 kPa (80 psi) |
| PKHR Flow Minimum | 276 kPa (40 psi) |
| MXDY + Fire Flow | 140 kPa (20 psi) |
| Maximum Allowable for Occupied Area | 552 kPa (80 psi) |

### 3.2.2 Fire Flow and Hydrant Capacity

Detailed fire flow requirements are assessed using the Fire Underwriters Survey (FUS) methodology (2020). Site specific criteria considered are noted in **Section 3.3.2**.

The minimum number of fire hydrants required to meet the fire flow is assessed using Section 18.5 of the National Fire Protection Agency (NFPA) Fire Code document.

- The aggregate fire flow capacity of all fire hydrants within 305 m of the building cannot be less than the required fire flow (RFF)

- Table 18.5.4.3 provides the maximum fire flow capacity for which an individual fire hydrant can be credited based on the unobstructed distance from the hydrant to the building.

*Table 3.1: Table 18.5.4.3 of the NFPA - Maximum Fire Hydrant Fire Flow Capacity*

| Distance to Building (m) | Maximum Capacity (L/min) |
|---|---|
| ≤76 | 5,678 |
| >76 and ≤152 | 3,785 |
| >152 and ≤305 | 2,839 |

Furthermore, per Section 3.2.5.15 of the Ontario Building Code, the unobstructed distance between the nearest hydrant and the building's fire department connection (FDC) cannot exceed 45 m.

## 3.3 Water Demands

### 3.3.1 Domestic Water Demands

Based on the assumptions that the Community Centre and Library fall within the "Other" Commercial and Institutional Demand Rates from Table 4.2 of the WDG (2025) as amended and the splash pad water play features are timed to demand a maximum flow rate of US 50GPM (189.3 L/min). The estimated demands for the site are summarized in **Table 3.2** and detailed in **Appendix A.1**.

*Table 3.2: Estimated Water Demands*

| | Floor Area (ha) | AVDY (L/s) | MXDY (L/s) | PKHR (L/s) |
|---|---|---|---|---|
| Institutional | 0.039 | 0.1 | 0.2 | 0.3 |
| Splash Pad | - | 3.2 | 3.2 | 3.2 |
| **Total** | **0.039** | **3.3** | **3.7** | **3.8** |

### 3.3.2 Fire Flow Demands

Noncombustible construction was considered in the assessment for fire flow requirements according to the Fire Underwriter's Survey (FUS) Guidelines. The FUS Guidelines indicate that low hazard occupancies include dwellings, apartments, dormitories, hotels, and schools. As such, a limited combustible building contents credit was applied for the building. Based on the FUS 2020 methodology and assuming the community centre and library will be fully sprinklered in conformance with NFPA 13, the worst-case required fire flow for the site is 6,000 L/min (100 L/s). As per the Arcadis Design Brief Phase 7A (2025) the Block was simulated with a fire flow of 13,000 L/min (216 L/s)

On-site fire protection will be provided by one new private hydrant and several existing public hydrants located near the building. The FUS calculation sheets and correspondence are attached in **Appendix A.2**.

### 3.3.3 Boundary Conditions

The Arcadis Design Brief Phase 7A (2025) models the worst-case fire flow of 217 L/s (13,000 L/min) and an assumed second fire flow of 167 L/s (10,000 L/min), using the boundary conditions provided by the City of Ottawa to establish the pressure and flow in the main on Jessie Chenevert Walk in the ultimate condition. The boundary conditions used for the Phase 7A analysis were identified as Connections 1-5, including Portico Way South, Portico Way North, Earl Armstrong Road East, and Limebank Road. Excerpts from the Design Brief are included in **Appendix A.3**.

The Arcadis Design Brief Phase 7A (2025) allows for the watermain demands at Node C22 (Town Square Place) 10.60 ha Gross Institutional Area, as summarized in **Table 3.3**, which allows for the estimated water demands identified in **Table 3.2.**

*Table 3.3: Institutional Water Demands – Design Brief (2025)*

| | Gross Area (ha) | AVDY (L/s) | MXDY (L/s) | PKHR (L/s) |
|---|---|---|---|---|
| Institutional | 10.60 | 3.4 | 5.2 | 9.3 |

### 3.3.4 Hydraulic Analysis

The approved hydraulic analysis provided in the Arcadis Design Brief Phase 7A (2025) includes the results at Node 22 as summarized in **Table 3.4**. The results shown are for the SUC Zone Reconstruction. The elevation at ground level is modelled to be 92.50m.

*Table 3.4: Summary of Hydraulic Analysis Node 22 – Design Brief (2025)*

| Condition | Design Flow (L/s) | HGL (m) | Residual Pressure (kPa) | Residual Pressure (psi) |
|---|---|---|---|---|
| **PKHR Min. HGL** | **3.44** | **143.37** | **498.49** | **72.3** |
| **AVDY Max. HGL** | **5.15** | **146.79** | **531.96** | **77.2** |
| **Max. Day + FF (217 L/s)** | **344.99** | **106.78** | **139.98** | **20.3** |

The hydraulic model found that the flow and pressure available from the municipal watermain adjacent to the site is adequate to service the Institutional/Park block. Since the proposed water demands are less than the design flows modelled in the Design Brief (2025), the proposed Site Plan can be adequately serviced by the existing infrastructure.

## 3.4 Proposed Watermain Servicing and Layout

Onsite (private) watermains are proposed to connect to the 200mm diameter watermain on Jessie Chenevert Walk. The onsite network provides connections to the proposed library building, community centre building and splash pad vault, and are sized to 150mm diameter PVC CL.150. One new onsite fire hydrant is proposed, as shown in Drawing SSP-1. The onsite hydrant is to be situated within 45m of the proposed fire department connection. The proposed onsite watermains are to provide required domestic and fire flows.

### 3.4.1 Fire Hydrant Coverage

There are three existing fire hydrants adjacent to the site within the municipal ROWs and one proposed onsite (private) hydrant. All hydrants are situated within 60m of the building. According to the NFPA 1 Table 18.5.4.3 in Appendix I of the City of Ottawa Technical Bulletin ISTB-2018-02, a hydrant situated less than 76 m away from a building can supply a maximum capacity of 5,678 L/min. Hence, any combination of the two hydrants can provide the site's required fire flow of 6,000L/min.

# 4 Wastewater Servicing

## 4.1 Background

The proposed development within Phase 7A of the Riverside South community will be serviced by the previously installed 150mm diameter service connection to the 250mm sanitary sewer in Jessie Chenevert Walk, which directs flows from the subdivision to the trunk sewer within Portico Way / Canyon Walk to the north.

## 4.2 Design Criteria

As outlined in the City of Ottawa Sewer Design Guidelines and the MECP Design Guidelines for Sewage Works, the following criteria are used to calculate the estimated wastewater flow rates and to determine the size and location of the sanitary service laterals:

- Minimum velocity = 0.6 m/s (0.8 m/s for upstream sections)
- Maximum velocity = 3.0 m/s
- Manning roughness coefficient for all smooth wall pipes = 0.013
- Minimum size of sanitary sewer service = 135 mm
- Minimum grade of sanitary sewer service = 1.0 % (2.0 % preferred)
- Average institutional wastewater generation = 28,000 L/ha/day (per City Design Guidelines)
- Peak Factor = 1.5 (institutional)
- Harmon correction factor = 0.8
- Infiltration allowance = 0.33 L/s/ha (per City Design Guidelines)
- Minimum cover for sewer service connections = 2.0 m

## 4.3 Proposed Servicing

Phase 1 of the site will be serviced via 150mm diameter gravity service lines, which will direct wastewater peak flows (approximately 0.8 L/s with allowance for infiltration) to the existing 250 mm diameter PVC sanitary sewer in Jessie Chenevert Walk. The receiving sewers within Jessie Chenevert and downstream have been sized to accommodate wastewater from the proposed development. The sanitary sewer design sheet for the proposed sanitary service within the site plan development and the sanitary design sheet and sanitary drainage area plan for the Riverside South Phase 7A subdivision are included in **Appendix B.2**.

Phase 1 of the site plan is represented by Area ID MH5C on the subdivision sanitary design sheet. As part of the subdivision design, it was assumed that the eastern portion of the block (approximately 1.47ha) would be developed with institutional uses totalling approximately 0.34ha of floor area, and that western portions of the block (the remaining 9.40ha) would only consider an infiltration allowance with respect to peak flow contribution. As Phase 1 is now proposed as 1.74ha with a building measuring approximately 0.39ha, design flows for the development block are marginally higher than the peak flows assumed at the time of subdivision design. As the design sheets for the subdivision sanitary sewer identify available capacity downstream of at least 19L/s, the marginal increase in sanitary flow from the site plan block can easily be accommodated in the downstream system.

Full port backwater valves are to be installed on all sanitary services within the site to prevent any surcharge from the downstream sewer mains from impacting the proposed site.

# 5 Stormwater Management

The following section describes the stormwater management (SWM) design for the proposed site plan in accordance with the background documents and governing criteria for Phase 7A of the Riverside South subdivision established in the Design Brief Phase 7A report (Arcadis, 2025).

## 5.1 Proposed Conditions

The development site is located within the southwest corner of Phase 7A of the Riverside South subdivision, and comprises a total area of approximately 10.88ha, and includes a 0.39ha institutional building and associated parking areas. Phase 1 of the development includes approximately 1.74ha of the overall site at the block's eastern boundary. Two connections to existing storm sewers have been provided for the site. The connection for Phase 1 discharges to the existing 1350mm diameter storm sewer within Jessie Chenevert Walk, whereas Phase 2 is ultimately to discharge to the existing storm sewers on Portico Way (see **Drawing SD-1**).

Stormwater collected from the development block and the overall Phase 7A subdivision is ultimately discharged to Mosquito Creek via Riverside South Pond 2. The pond has been sized to provide quantity and quality control (80 % TSS Removal) of runoff inclusive of the development site before discharge.

## 5.2 Criteria and Constraints

The overall approach for storm servicing and stormwater management for the proposed development is outlined in the Design Brief Phase 7A report by Arcadis (2025), excerpts of which can be found in **Appendix C.3**. The following summarizes the SWM criteria and constraints that will govern the detailed design of the proposed site as per the latest revision of the City of Ottawa Sewer Design Guidelines as well as the conclusions made in the Phase 7A Report.

- Design using the dual drainage principle. (City of Ottawa SDG)
- Minor system capture rate from Phase 1 up to the 100-year storm is to be restricted to **113 L/s**. (Design Brief Phase 7A – see discharge from area MH15C)
- Minor system capture rate from Phase 2 up to the 100-year storm is to be restricted to **579 L/s**. (Design Brief Phase 7A – see discharge from area MH34A)
- The hydraulic grade line in the storm sewer must remain at least 0.3m below the underside of adjacent building footings during the 100-year storm event or a minimum clearance of 0.3m from the pipe obvert. (City)
- Where there is footing drainage connected to the storm collection system, maximum 'climate change' HGL to be lower than proposed basement elevations. (City)
- Total maximum depth of flow under static and dynamic conditions shall be less than 0.35 m. (City)
- Design storm sewers along local roadways to convey the 2-year peak flow respectively under free-flow conditions using 2004 City of Ottawa I-D-F parameters and an inlet time of 10 minutes. (City)
- Assess impact of 2-year storm, and the worst case 100-year storm events, on the major and minor drainage system. (City)

- Building openings to be above the 100-year water level. (City)
- There must be at least 30 cm of vertical clearance between the spill elevation on the private street/parking and the lowest building opening that is in the proximity of the flow route or ponding area. (City)
- Provide adequate emergency overflow conveyance off-site. (City)

## 5.3 Design Methodology

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

- Create a Modified Rational Method model to quantify runoff from the development and identify surface and subsurface volume storage required to restrict site outflows to the allowable release rate.
- Size inlet control devices for the proposed catch basins to avoid surface ponding during the 2-year storm while meeting the required 0.3 m 100-year HGL to USF clearance and the minor system allowable release rate in the 100-year storm.
- Ensure that total dynamic and static surface ponding depths do not exceed 0.35 m during the 100-year storm scenario.

The site is designed using the “dual drainage” principle, whereby the minor (pipe) system is designed to convey the peak rate of runoff from the 2-year design storm and runoff from larger events is conveyed by both minor (pipe) and major (overland) channels, such as roadways and walkways, safely to the appropriate outlet without impacting proposed or existing downstream properties.

In keeping with the minor system target peak outflow, Inlet Control Devices (ICDs) or orifice plates have been specified for all catch basins to limit the inflow to the minor system. Restricted inlet rates to the sewer are necessary to meet the target peak outflows.

**Drawing SD-1** outlines the proposed storm sewer alignment, ICD locations, drainage divides, and labels. The storm sewer design sheet is included in **Appendix C.1**.

## 5.4 Modeling Rationale

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

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

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

### 5.4.1 Storage Requirements

The site requires quantity control measures to meet the restrictive stormwater release criteria. The use of controlled surface and subsurface storage volumes within a proposed underground storage facility (Cultec unit) are proposed to reduce site peak outflow to the allowable target release rate. As per City of Ottawa criteria, no surface ponding is permitted within the site during the 2-year storm event. Refer to **Appendix C** for the Modified Rational Method calculations which demonstrate that no surface storage is required in the 2-year event.

It is proposed to detain stormwater on the surface in parking lot areas using inlet control devices (ICDs) in associated catch basins. Additional runoff from storms in excess of the 100-year storm event that exceed available on-site storage will be directed overland towards the Jessie Chenevert ROW at the northern boundary of Phase 1. Phase 2 is expected to maintain an overland flow route to the west towards Portico Way per results of the Phase 7A design brief.

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

*Table 5.1 2-Year and 100-Year Peak Surface Volume and Controlled Discharge Summary*

| Area ID | ICD (Circular Orifice) | 2-Year Event | | | 100-Year Event | | |
|---|---|---|---|---|---|---|---|
| | | Release Rate (L/s) | $V_{required}$ ($m^3$) | $V_{available}$ ($m^3$) | Release Rate (L/s) | $V_{required}$ ($m^3$) | $V_{available}$ ($m^3$) |
| L103A | 127 mm | 22.4 | 0.0 | 18.0 | 39.5 | 15.4 | 18.0 |
| L104A | 83 mm | 15.9 | 0.5 | 25.1 | 17.3 | 18.7 | 25.1 |
| L105A | 95 mm | 20.7 | 0.2 | 33.1 | 22.4 | 19.3 | 33.1 |
| L107C | 83 mm | 7.2 | 0.0 | 60.0 | 17.5 | 2.1 | 60.0 |
| L200A | 102 mm | 13.5 | 0.0 | 7.7 | 24.9 | 5.9 | 7.7 |
| L201A | 95 mm | 13.5 | 0.0 | 10.4 | 22.0 | 7.6 | 10.4 |
| L202A | 95 mm | 12.7 | 0.0 | 9.8 | 22.9 | 7.1 | 9.8 |

Runoff captured by on-site catch basins is routed to the subsurface storage system (Cultec SWM Chambers Model 902HD) for further volume retention prior to discharge to sewers within Jessie Chenevert Walk. The proposed storage chambers are detailed on **Drawing DS-1** and are anticipated to provide an overall storage volume of approximately 400m3 between the bottom of stone elevation of 89.57 and top of storage system elevation of 91.33. Outflows from the system are controlled via in-line ICD within manhole

STM101 at an invert of 89.51. The manhole is to incorporate a weir wall between the invert of 89.51 and the top of storage elevation of 91.33 to allow additional site outflow in the event the primary orifice becomes blocked. Inverts to building connections have been set above this elevation to ensure 100yr storage elevations do not impact building services, and meet sufficient freeboard to anticipated building USF elevations as shown on **Drawing GP-1**. The table below identifies the required storage and anticipated controlled discharge rates from the Cultec unit during the 2 and 100-year storm events.

*Table 5.2 2-Year and 100-Year Peak Subsurface Volume and Controlled Discharge Summary*

| Area ID | ICD (Circular Orifice) | 2-Year Event | | | 100-Year Event | | |
|---|---|---|---|---|---|---|---|
| | | Release Rate (L/s) | $V_{required}$ ($m^3$) | $V_{available}$ ($m^3$) | Release Rate (L/s) | $V_{required}$ ($m^3$) | $V_{available}$ ($m^3$) |
| Tank | 200 mm | 60.0 | 122.7 | 400.0 | 111.3 | 384.7 | 400.0 |

### 5.4.2 Uncontrolled Areas

Due to grading restrictions, four subcatchment areas have been designed without a storage component. Areas UNC1-2 are located at the perimeter of the site where tie-ins to existing property line grades cannot permit capture of runoff to the minor system. Peak discharges from uncontrolled areas are not anticipated to have deleterious effects on downstream systems based on available ponding volumes within downstream rights-of-way as identified in the Phase 7A Design Brief.

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

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

| Storm Return Period | Area ID | Area (ha) | Runoff ‘C’ | Tc (min) | $Q_{release}$ (L/s) |
|---|---|---|---|---|---|
| 2-year | UNC-1 | 0.02 | 0.55 | 10 | 2.3 |
| | UNC-2 | 0.06 | 0.85 | 10 | 10.9 |
| 100-year | UNC-1 | 0.02 | 0.69 | 10 | 6.8 |
| | UNC-2 | 0.06 | 1.00 | 10 | 29.8 |

## 5.5 Results and Discussion

The following section summarizes the key hydrologic and hydraulic model results for the proposed site and demonstrates the proposed stormwater management plan meets target peak rates established in the background studies. For detailed model results or inputs please refer to **Appendix C.3**.

*Table 5.4: Target and Resultant Major and Minor System Release Rates*

| Storm event | Target Release Rate per Subdivision Design (L/s) | Phase 1 Minor System Release Rate (L/s) | Phase 1 Uncontrolled Release Rate (L/s) |
|---|---|---|---|
| 2-year, 3-hour Chicago | 113.0 | 60.0 | 13.2 |
| 100-year, 3-hour Chicago | | 111.3 | 36.6 |

## 5.6 Quality Control

Riverside South Pond 2 is a stormwater management pond located to the northeast of the adjacent Phase 7A subdivision. The pond has been designed to provide quality control treatment for the entirety of the subdivision including the proposed site plan block (Block 7). As outlined in the Design Brief for Phase 7A, Block 7 was assumed to have two runoff subcatchments with an associated area and runoff coefficient assigned for Phase 1 and Phase 2 of 1.47ha at C=0.75 and 9.40ha at C=0.40. The current design considers Phase 1 area of 1.47 at a runoff C=0.68, and the remaining lands for Phase 2 of 9.14ha at an assumed C=0.40. Given that the overall imperviousness of the two subcatchments has been reduced for the proposed design (rough AxC of 4.84 in the proposed condition vs 4.86 as contemplated in the Arcadis design brief), no impacts to the downstream stormwater management pond with respect to provision of adequate quality control for the block is expected.

# 6 Grading

The proposed RSCC&L Phase 1 development site measures approximately 1.74 ha in area. The topography across the site under existing conditions is relatively flat, and slopes gently toward the north. The objective of the grading design strategy is to satisfy the stormwater management requirements, adhere to permissible grade raise restrictions, and provide for minimum cover requirements for sewers, where possible. The grading design also follows the recommendations outlined in the Design Brief (2025).

The finished floor elevation (FFE) is consistent (93.65) between the two parts of the building (Library and Community Centre). Site grading has been established to provide barrier-free/accessible building entrances and direct most of the emergency overland drainage towards the Site Access at Jessie Chenevert Walk, in accordance with the City of Ottawa requirements. The top of foundation (TOF) elevation (93.85m) and all foundation openings are consistently a minimum of 150mm above the adjacent finished surface grades. The underside of footing (USF) elevation (91.95m) is provided with a minimum of 1.5m soil cover to protect against frost action as recommended in the geotechnical report (Paterson Group, 2024). Due to the limited grade change across the site and to adjacent sites, no retaining walls are proposed or anticipated. Some terracing is proposed along the back of curbs at the perimeter of the parking lot.

The grading plan (**Drawing GP-1**) was prepared considering the grade raise restrictions identified in the geotechnical report (Paterson Group, 2024). The permissible grade raise restrictions are shown in Drawing No., PG4958-20 in the Paterson Report, and included in the **Appendix D** excerpts. Due to the presence of the silty clay deposit in the RSCC&L Phase 1 Site, grade raise restrictions vary between up to 1.0m to 2.5m, as shown in Drawing No., PG4958-20.

# 7 Utilities

As the subject site lies within new residential community under development, electrical, gas, and telecommunications servicing for the proposed site will be readily available within the neighbouring rights-of-way. Exact size, location and routing of utilities will be established with the utility providers.

# 8 Approvals

Reporting on the Environmental Activity and Sector Registry (EASR) may be required for the site as some of the proposed works may be below the groundwater elevation shown in the geotechnical report. The geotechnical consultant shall determine whether EASR reporting is required prior to construction.

Per O.Reg. 525/98, the proposed stormwater management works service a single parcel of land, discharge into a separated storm sewer in Jessie Chenevert Walk which is included in the City's existing CLI ECA, and the site is not industrial, nor does it service industrial land.  As such, the proposed works for the RSCC&L development are likely exempt from Environmental Compliance Approval requirements.

# 9 Erosion Control

To protect downstream water quality and prevent sediment build-up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor. **Drawing ECDS-1** provides an erosion and sediment control (ESC) concept plan. Development and implementation of a detailed erosion and sediment control plan will be the responsibility of the Contractor.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with geotextiles, geogrid, or synthetic mulches.
6. Install silt barriers/fencing around the perimeter of the site to prevent the migration of sediment offsite.
7. Install track out control mats (mud mats) at the entrance/egress as shown in **Drawing ECDS-1** to prevent migration of sediment into the public ROW.
8. Provide sediment traps and basins during dewatering works.
9. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
10. Schedule the construction works at times which avoid flooding due to seasonal rains.

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

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

Refer to **Drawing ECDS-1** for the proposed location of silt fences, sediment traps, and other erosion control measures.

# 10 Geotechnical Investigation

A geotechnical report for the development was completed by Paterson Group Inc. in June 2024. The report summarizes the existing soil conditions within RSCC&L Phase 1 Site and construction recommendations. For details which are not summarized below, please see the Paterson report included in the submission package.

Subsurface soil conditions within the site were determined through field investigations conducted for the Riverside South Town Centre Phase 7A between April 2-8, 2024, in addition to information available from several previous investigations carried out by Paterson and others within the subject site and in adjacent sites. The current investigation included 19 boreholes, five of which were fitted with groundwater monitoring wells.

In general, soil stratigraphy consisted of a thin topsoil layer overlying a silty sand to sandy silt deposit (0.7 to 2.4 m thick) overlaying a silty clay deposit. In some locations the topsoil layer was underlain by a thin layer of silty clay and overlaying the silty sand layer.

Bedrock was estimated to occur at auger refusal between depths of 2.9 to 14.3m. Based on groundwater level readings measured in the monitoring wells and piezometers, the groundwater levels varied between 0.18 mbgs to 2.18 mbgs (93.17m to 90.32m elevation) as measured in April 2024. As groundwater levels fluctuate seasonally, these levels could vary at the time of construction, and the long-term groundwater levels were estimated to be at 2.5 to 3.5 mbgs. It should be noted that a post-development groundwater lowering of 0.5 m was considered in the permissible grade raise calculations and recommendations by Paterson. In addition, clay seals are recommended to be provided in the service trenches to reduce long-term lowering of the groundwater level at this site. Refer to the Paterson report (2024) for details.

Based on the results of the geotechnical investigation, the subject site is suitable for the proposed development, and it is recommended that the proposed building be founded on conventional spread footings placed on a suitable bearing surface. The report provides alternative foundation options if a suitable bearing surface is not encountered.

The geotechnical report recommends the pavement structure presented in

**Table 10.1** below.

*Table 10.1: Recommended Pavement Structure*

| Material | Driveways and Car-only Parking Areas | Local Residential Roadways |
|---|---|---|
| Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete | 50 mm | 40 mm |
| Binder Course – HL-8 or Superpave 19.0 Asphaltic Concrete | - | 50 mm |
| BASE – OPSS Granular A Crushed Stone | 150 mm | |

| | | |
|---|---|---|
| SUBBASE – OPSS Granular B Type II | 300 mm | 400 mm |

The geotechnical report also makes the following construction recommendations for other items pertaining to the civil servicing scope:

- Excavation, backfill, and engineered fill requirements.
- Pipe bedding and backfill requirements.
- Tree planting considerations and setbacks in sensitive marine clay soils.
- Foundation perimeter drains are recommended.
- All excess soil must be handled as per Ontario Regulation 406/19: On-Site and Excess Soil Management.

# 11 Conclusions and Recommendations

This Site Servicing and Stormwater Management report assessed the servicing conditions within the RSCC&L Phase 1 project site and evaluated the feasibility of new stormwater management infrastructure to meet LID infiltration targets and flow rate restrictions to the minor system. Other SPC design requirements appeared in this report including:

- potable water and fire flow servicing,
- sanitary servicing,
- stormwater servicing,
- grading and drainage,
- geotechnical considerations,
- utilities considerations,
- best management practices for erosion and sediment control during construction, and
- approvals considerations.

We trust that the information, servicing strategies, and the proposed stormwater management systems presented in this report are adequate to support the Site Plan Control Application for this development.

Please contact the author or engineer of record of this report if you have any questions or concerns.

# Appendix A Water Servicing

## A.1 Domestic Water Demands

**Riverside South Community Centre and Library, Ottawa, ON - Domestic Water Demand Estimates**

Site Plan provided by Diamond Schmitt (2026-03-16)

Stantec Project No. 160402150

City File No.

Revision: 1

Date Created: 6-Jul-2026
Created by: AG

Checked by: DT
Date Checked: 7-Jul-2026

| Demand conversion factors per Per Table 4.2 City Ottawa Water Distribution Design Guideline (Dec 2025): | | |
|---|---|---|
| Commercial/Institutional | 28000 | L/gross ha/day |
| Maximum Daily Peaking Factor | 1.5 | x AVDY |
| Peak Hour Peaking Factor | 1.8 | x MXDY |

| Unit Type | Institutional Area ($m^2$) | Average Day Demand (AVDY) | | Maximum Day Demand (MXDY) | | Peak Hour Demand (PKHR) | |
|---|---|---|---|---|---|---|---|
| | | (L/min) | (L/s) | (L/min) | (L/s) | (L/min) | (L/s) |
| **Institutional** | | | | | | | |
| Library and Community Centre | 3934.09 | 7.65 | 0.13 | 11.47 | 0.19 | 20.65 | 0.34 |
| Splash Pad[1] | - | 189.3 | 3.16 | 189.3 | 3.16 | 189.30 | 3.16 |
| **Total** | **3934.09** | **196.9** | **3.3** | **200.8** | **3.3** | **210.0** | **3.5** |

**Notes:**

1. Assume the splash pad water play features are timed to demand a maximum flow rate of US 50GPM (189.3 L/min).

## A.2 FUS Calculation Sheets

**FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines**

**Stantec Project #:** 160402150
**Project Name:** Riverside South Community Centre and Library
**Date Created:** 9-Jul-2026
**Created By:** A.Gladish
**Checked By:** D. Thiffault
**Fire Flow Calculation #:** 1
**Date Checked:** 10-Jul-2026

**Notes:** A Community Centre and Library, principally one storey building. Information from Site Plan by Diamond Schmitt dated March 16, 2026. Sprinklered with floor assemblies / load bearing walls as 1hr rated assemblies per OBC 3.2.2.52

| Step | Task | Notes | | | | | | | Value Used | Req'd Fire Flow (L/min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Determine Type of Construction | Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction | | | | | | | 0.8 | - |
| 2 | Determine Effective Floor Area | Sum of Largest Floor + 25% of Two Additional Floors | | | | | Vertical Openings Protected? | | YES | - |
| | | 3934 | | | | | | | 3934.09 | - |
| 3 | Determine Required Fire Flow | (F = 220 x C x $A^{1/2}$). Round to nearest 1000 L/min | | | | | | | - | 11000 |
| 4 | Determine Occupancy Charge | Limited Combustible | | | | | | | -15% | 9350 |
| 5 | Determine Sprinkler Reduction | Conforms to NFPA 13 | | | | | | | -30% | -4675 |
| | | Standard Water Supply | | | | | | | -10% | |
| | | Fully Supervised | | | | | | | -10% | |
| | | % Coverage of Sprinkler System | | | | | | | 100% | |
| 6 | Determine Increase for Exposures (Max. 75%) | Direction | Exposure Distance (m) | Exposed Length (m) | Exposed Height (Stories) | Length-Height Factor (m x stories) | Construction of Adjacent Wall | Firewall / Sprinklered ? | - | - |
| | | North | > 30 | 0 | 1 | 0-20 | Type I-II - Unprotected Openings | NO | 0% | 935 |
| | | East | 20.1 to 30 | 74 | 2 | > 100 | Type V | NO | 10% | |
| | | South | > 30 | 0 | 1 | 0-20 | Type I-II - Unprotected Openings | NO | 0% | |
| | | West | > 30 | 0 | 1 | 0-20 | Type I-II - Unprotected Openings | NO | 0% | |
| 7 | Determine Final Required Fire Flow | Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min | | | | | | | | 6000 |
| | | Total Required Fire Flow in L/s | | | | | | | | 100.0 |
| | | Required Duration of Fire Flow (hrs) | | | | | | | | 2.00 |
| | | Required Volume of Fire Flow ($m^3$) | | | | | | | | 720 |

## A.3 Water Modelling Background Report Excerpts

# 2 Water Supply

## 2.1 Existing Conditions

As noted in Section 1.5 there is an existing 406 mm watermain on Earl Armstrong Road, a 305 mm watermain on Portico Way and a 610 mm watermain on Limebank Road which has been constructed but not commissioned at the time of this report, connections to all of these watermains are proposed to service the site. **Figure 1.3** shows the location of the existing watermains.

## 2.2 Riverside South Community Infrastructure Servicing Study Update Phase 1 Mosquito Creek Study Area (2023 IBI Group)

The Infrastructure Servicing Study Update provided a macro level water servicing plan for the Phase 1 lands of the Mosquito Creek Study Area (Phase 1 ISSU). Major watermains in the Phase 1 lands are shown on Figure 3-2 Potable Water Servicing Plan, a copy is included in **Appendix B**. The figure shows the extension south of the 305 mm watermain on Portico Way and the 610 mm watermain on Limebank Road in the vicinity of the 980 Earl Armstrong & 4700 Limebank Road development.

## 2.3 Design Criteria

### 2.3.1 Water Demands

Water demands have been calculated for the site based on per unit population density and consumption rates taken from Tables 4.1 and 4.2 of the City of Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Single Family 3.4 person per unit
- Townhouse and Semi-Detached 2.7 person per unit
- Average Apartment 1.8 person per unit
- Residential Average Day Demand 280 l/cap/day
- Residential Peak Daily Demand 700 l/cap/day
- Residential Peak Hour Demand 1,540 l/cap/day
- ICI Average Day Demand 28,000 l/ha/day
- ICI Peak Daily Demand 42,000 l/ha/day
- ICI Peak Hour Demand 75,600 l/ha/day
- Employment Average Day Demand 35,000 l/ha/day
- Employment Peak Daily Demand 52,500 l/ha/day
- Employment Peak Hour Demand 94,500 l/ha/day

A water demand was calculated using the Draft Plan per **Figure 1.3** in **Appendix A.** The land use for Blocks 1 to 4, 6, 11, 13 and 14 is designated Town Center, a plan showing unit allocation within the Town Center is included in **Appendix C** and summarized in Table 3-2 in Section 3.3. There is a small area of commercial land which has the Employment sanitary flow rate of 35,000 l/ha/day, Block 7 the District Park uses the institutional rate of 28,000 l/ha/day. The total water demands are as follows;

- Average Day 14.77 l/s
- Maximum Day 30.59 l/s
- Peak Hour 65.14 l/s

### 2.3.2 System Pressure

The Ottawa Design Guidelines – Water Distribution (WDG001), July 2010, City of Ottawa, Clause 4.2.2 states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in Clause 4.2.2 of the guidelines are as follows:

| | |
|---|---|
| Minimum Pressure | Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi) |
| Fire Flow | During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event. |
| Maximum Pressure | Maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls will be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa. |

### 2.3.3 Fire Flow Rates

There are no building designs for this development at this time so that a fire flow calculation using the Underwriters Survey (FUS) methos cannot be done at this time. Boundary conditions have been provided for a 13,000 l/min fire flow which was the fire flow used in the Phase 1 ISSU water analysis. A boundary condition with a 10,000 l/min fire flow has also been provided as non-combustible and fire resistant multi-story buildings with protected vertical openings typically have fire flow rates less than 10,00 l/min. For this report the fire flow analysis is run with a 13,000 l/min fire flow.

### 2.3.4 Boundary Conditions

The City of Ottawa has provided four boundary conditions at the watermain connection locations at Portico Way (Connection1 and 5), two connections on Earl Armstrong (Connections 2 and 3) and at Limebank Road (Connection 4). Boundary conditions are provided for the existing pressure zone and for the SUC Zone Reconstruction. A copy of the boundary condition is included in **Appendix B** and summarized as follows;

*Table 2-1 Water Supply Boundary Conditions*

| | Max HGL (Basic Day) | Peak Hour | Max Day + Fire (10,000 l/min Fire Flow) | Max Day + Fire (13,000 l/min Fire Flow) |
|---|---|---|---|---|
| Connection 1 Existing Conditions | 132.1 m | 124.9 m | 124.9 m | 123.9 m |
| Connection 1 Future SUC Zone | 146.8 m | 143.5 m | 142.8 m | 141.3 m |
| Connection 2 Existing Conditions | 132.1 m | 124.9 m | 124.9 m | 124.9 m |
| Connection 2 Future SUC Zone | 146.8 m | 143.5 m | 143.5 m | 142.4 m |
| Connection 3 Existing Conditions | 132.1 m | 124.9 m | 124.9 m | 123.9 m |
| Connection 3 Future SUC Zone | 146.8 m | 143.4 m | 142.8 m | 141.3 m |
| Connection 4 Existing Conditions | 132.1 m | 124.9 m | 124.7 m | 122.5 m |
| Connection 4 Future SUC Zone | 146.8 m | 143.4 m | 141.9 m | 139.9 m |
| Connection 5 Existing Conditions | 132.1 m | 124.9 m | 124.8 m | 122.6 m |
| Connection 5 Future SUC Zone | 146.8 m | 143.4 m | 142.0 m | 140.0 m |

### 2.3.5 Hydraulic Model

A computer model has been created for the subject site using the InfoWater 12.4 program. The model includes the hydraulic boundary conditions at the connections to existing watermains.

## 2.4 Proposed Water Plan

### 2.4.1 Modeling Results

The hydraulic model was run under basic day, maximum day with fire flows and under peak hour conditions. Water pipes are sized to provide sufficient pressure and to deliver the required fire flows.

Results of the hydraulic model are included in **Appendix B** and summarized as follows:

*Table 2-2 Hydraulic model results*

| Scenario | Existing Zone | SUC Zone Reconfiguration |
|---|---|---|
| Basic Day (Max HGL) Pressure Range | 373.3 to 391.0 kPa | 517.4 to 535.0 kPa |
| Peak Hour Pressure Range | 302.8 to 320.4 kPa | 484.1 to 502.4 kPa |
| Max Day + 13,000 l/min Fire Flow Minimum Residual Pressure | 220.5 kPa | 314.3 kPa |

A comparison of the results and design criteria is summarized as follows:

Maximum Pressure — All nodes under both pressure zone scenarios have basic day pressures under 552 kPa (80 psi), pressure reducing control is not required for this development.

Minimum Pressure — All nodes under both scenarios pressure zone scenarios exceed the minimum value of 276 kPa (40 psi).

Fire Flow — Under the existing pressure zone condition with a 13,000 l/min fire all nodes have residual pressures above the minimum required pressure of 140 kPa (20 psi). Under the Post SUC Zone Reconfirmation the residual pressure increases to 327.8 kPa for the 13,000 l/min fire. All nodes can accommodate a 13,000 l/min fire flow, the required fire flow will be determined when building layouts are available.

### 2.4.2 Watermain Layout

As per the Phase 1 ISSU a 305mm watermain is extended south on Portico Way to the transit corridor. A 250 mm main is proposed on Town Square Street for the district park as per item 29 b) in the pre-consultation meeting as discussed in **Section 1.6**. All other watermains on Flavescent Street, Jessie Chenevert Walk and Springbriar Street in the development are proposed to be 204 mm diameter with the main on Flavescent Street connecting to a an existing 305mm watermain stub at Earl Armstrong Road. **Figure 2.1, Conceptual Water Plan** from the Assessment of Adequacy of Public Services report is included in **Appendix B**

As mentioned in **Section 1.4** the northern portion of the development will be developed in advance of the southern portion which will result un-looped mains on Town Square Street and Portico Way. On Town Square Street there are two hydrants on an un-looped main in front of the District Park, hydrant flows can be confirmed using the methodology of Technical Bulletin ISTB-2018-02 Appendix I – Guideline on Coordination of Hydrant Placement with Required Fire Flow when there is a site plan for the District Park. Fire protection for the District Park is also provided by hydrants on Jessie Chenevert Walk. On Town Square Street a connection to the existing watermain servicing the LRT Limebank Station can be constructed as shown on **Figure 2.1 in Appendix B** if required. The 305 mm watermain on Portico Way will not need to be extended until the southern portion of the site is developed which is not proposed at this time, should Portico Way be constructed in advance of the southern development the watermain can be installed but not commissioned until it extended south across the transit corridor. The spacing of isolation valves and fire hydrants in Phase 7A are per Tables 4.8 and 4.9 on the Ottawa Design Guidelines – Water Distribution

# Boundary Conditions
## Riverside South Town Center – April 2024 Update

**Provided Information**

| Scenario | Demand | |
|---|---|---|
| | L/min | L/s |
| Average Daily Demand | 671 | 11.19 |
| Maximum Daily Demand | 1,453 | 24.22 |
| Peak Hour | 3,062 | 51.03 |
| Fire Flow Demand #1 | 10,000 | 166.67 |
| Fire Flow Demand #2 | 13000 | 216.67 |

**Location**


*** Proposed watermains added to distribution model**

## Results

### Existing Condition (Pre- SUC Pressure Zone Reconfiguration)

**Connection 1 - Portico Way North**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 132.1 | 57.2 |
| Peak Hour | 124.9 | 47.0 |
| Max Day plus Fire Flow #1 | 124.9 | 47.0 |
| Max Day plus Fire Flow #2 | 123.9 | 45.6 |

[1] Ground Elevation = 91.9 m

**Connection 2 - Earl Armstrong Road West**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 132.1 | 56.6 |
| Peak Hour | 124.9 | 46.4 |
| Max Day plus Fire Flow #1 | 124.9 | 46.4 |
| Max Day plus Fire Flow #2 | 124.9 | 46.4 |

[1] Ground Elevation = 92.3 m

**Connection 3 - Earl Armstrong Road East**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 132.1 | 55.1 |
| Peak Hour | 124.9 | 45.0 |
| Max Day plus Fire Flow #1 | 124.9 | 44.9 |
| Max Day plus Fire Flow #2 | 123.9 | 43.6 |

[1] Ground Elevation = 93.3 m

**Connection 4 - Limebank Road**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 132.1 | 55.4 |
| Peak Hour | 124.9 | 45.2 |
| Max Day plus Fire Flow #1 | 124.7 | 44.9 |
| Max Day plus Fire Flow #2 | 122.5 | 41.8 |

[1] Ground Elevation = 93.1 m

**Connection 5 - Portico Way South**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 132.1 | 57.3 |
| Peak Hour | 124.9 | 47.1 |
| Max Day plus Fire Flow #1 | 124.8 | 47.0 |
| Max Day plus Fire Flow #2 | 122.6 | 43.9 |

[1] Ground Elevation = 91.8 m

## Future Condition (Post- SUC Pressure Zone Reconfiguration)

**Connection 1 - Portico Way**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 146.8 | 78.2 |
| Peak Hour | 143.5 | 73.3 |
| Max Day plus Fire Flow #1 | 142.8 | 72.4 |
| Max Day plus Fire Flow #2 | 141.3 | 70.3 |
| [1] Ground Elevation = | 91.9 | m |

**Connection 2 - Earl Armstrong Road West**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 146.8 | 77.6 |
| Peak Hour | 143.5 | 72.8 |
| Max Day plus Fire Flow #1 | 143.5 | 72.8 |
| Max Day plus Fire Flow #2 | 142.4 | 71.3 |
| [1] Ground Elevation = | 92.3 | m |

**Connection 3 - Earl Armstrong Road East**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 146.8 | 76.1 |
| Peak Hour | 143.4 | 71.3 |
| Max Day plus Fire Flow #1 | 142.8 | 70.4 |
| Max Day plus Fire Flow #2 | 141.3 | 68.2 |
| [1] Ground Elevation = | 93.3 | m |

**Connection 4 - Limebank Road**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 146.8 | 76.4 |
| Peak Hour | 143.4 | 71.5 |
| Max Day plus Fire Flow #1 | 141.9 | 69.3 |
| Max Day plus Fire Flow #2 | 139.9 | 66.5 |
| [1] Ground Elevation = | 93.1 | m |

**Connection 5 - Portico Way South**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 146.8 | 78.3 |
| Peak Hour | 143.4 | 73.5 |
| Max Day plus Fire Flow #1 | 142.0 | 71.4 |
| Max Day plus Fire Flow #2 | 140.0 | 68.6 |
| [1] Ground Elevation = | 91.8 | m |

### 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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.*

Arcadis
ARCADIS IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

# WATERMAIN DEMAND CALCULATION SHEET

FILE: 144320
DATE PRINTED: 06-Jun-24
DESIGN: LE


PROJECT : RSS TOWN CENTER - PHASE 7A
LOCATION : CITY OF OTTAWA
DEVELOPER : RIVERSIDE SOUTH DEVELOPMENT CORPORATION

| NODE | RESIDENTIAL UNITS SF | RESIDENTIAL UNITS SD & TH | RESIDENTIAL UNITS APT | RESIDENTIAL UNITS TC (ha) | RESIDENTIAL POP'N | NON-RESIDENTIAL INDTRL (ha.) | NON-RESIDENTIAL EMP (ha.) | NON-RESIDENTIAL INST. (ha.) | AVERAGE DAILY DEMAND (l/s) Res. | AVERAGE DAILY DEMAND (l/s) Non-res. | AVERAGE DAILY DEMAND (l/s) Total | MAXIMUM DAILY DEMAND (l/s) Res. | MAXIMUM DAILY DEMAND (l/s) Non-res. | MAXIMUM DAILY DEMAND (l/s) Total | MAXIMUM HOURLY DEMAND (l/s) Res. | MAXIMUM HOURLY DEMAND (l/s) Non-res. | MAXIMUM HOURLY DEMAND (l/s) Total | FIRE DEMAND (l/min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C05 | | | 45 | | 81 | | | | 0.26 | 0.00 | 0.26 | 0.66 | 0.00 | 0.66 | 1.44 | 0.00 | 1.44 | 13,000 |
| C12 | | | 350 | | 630 | | 0.19 | | 2.04 | 0.08 | 2.12 | 5.10 | 0.12 | 5.22 | 11.23 | 0.21 | 11.44 | 13,000 |
| C14 | | | 350 | | 630 | | 0.19 | | 2.04 | 0.08 | 2.12 | 5.10 | 0.12 | 5.22 | 11.23 | 0.21 | 11.44 | 13,000 |
| C16 | | | 175 | | 315 | | | | 1.02 | 0.00 | 2.12 | 2.55 | 0.00 | 2.55 | 5.61 | 0.00 | 5.61 | 13,000 |
| C18 | | | 235 | | 423 | | | | 1.37 | 0.00 | 1.37 | 3.43 | 0.00 | 3.43 | 7.54 | 0.00 | 7.54 | 13,000 |
| C22 | | | | | | | | 10.60 | 0.00 | 3.44 | 3.44 | 0.00 | 5.15 | 5.15 | 0.00 | 9.28 | 9.28 | 13,000 |
| C32 | | 120 | | | 324 | | | | 1.05 | 0.00 | 1.05 | 2.63 | 0.00 | 2.63 | 5.78 | 0.00 | 5.78 | 13,000 |
| C33 | | 48 | | | 130 | | | | 0.42 | 0.00 | 0.42 | 1.05 | 0.00 | 1.05 | 2.31 | 0.00 | 2.31 | 13,000 |
| C35 | | 205 | | | 554 | | | | 1.79 | 0.00 | 1.79 | 4.48 | 0.00 | 4.48 | 9.87 | 0.00 | 9.87 | 13,000 |
| C36 | | 9 | | | 24 | | | | 0.08 | 0.00 | 0.08 | 0.20 | 0.00 | 0.20 | 0.43 | 0.00 | 0.43 | 13,000 |
| TOTALS | | | | | 3,110 | | 0.38 | 10.60 | | | 14.77 | | | 30.59 | | | 65.14 | |

## ASSUMPTIONS

**RESIDENTIAL DENSITIES**
- Single Family (SF) 3.4 p / p / u
- Semi Detached (SD) & Townhouse (TH) 2.7 p / p / u
- Apartment (APT) 1.8 p / p / u
-Town Centre Area (TC) 122.4 p / p / ha

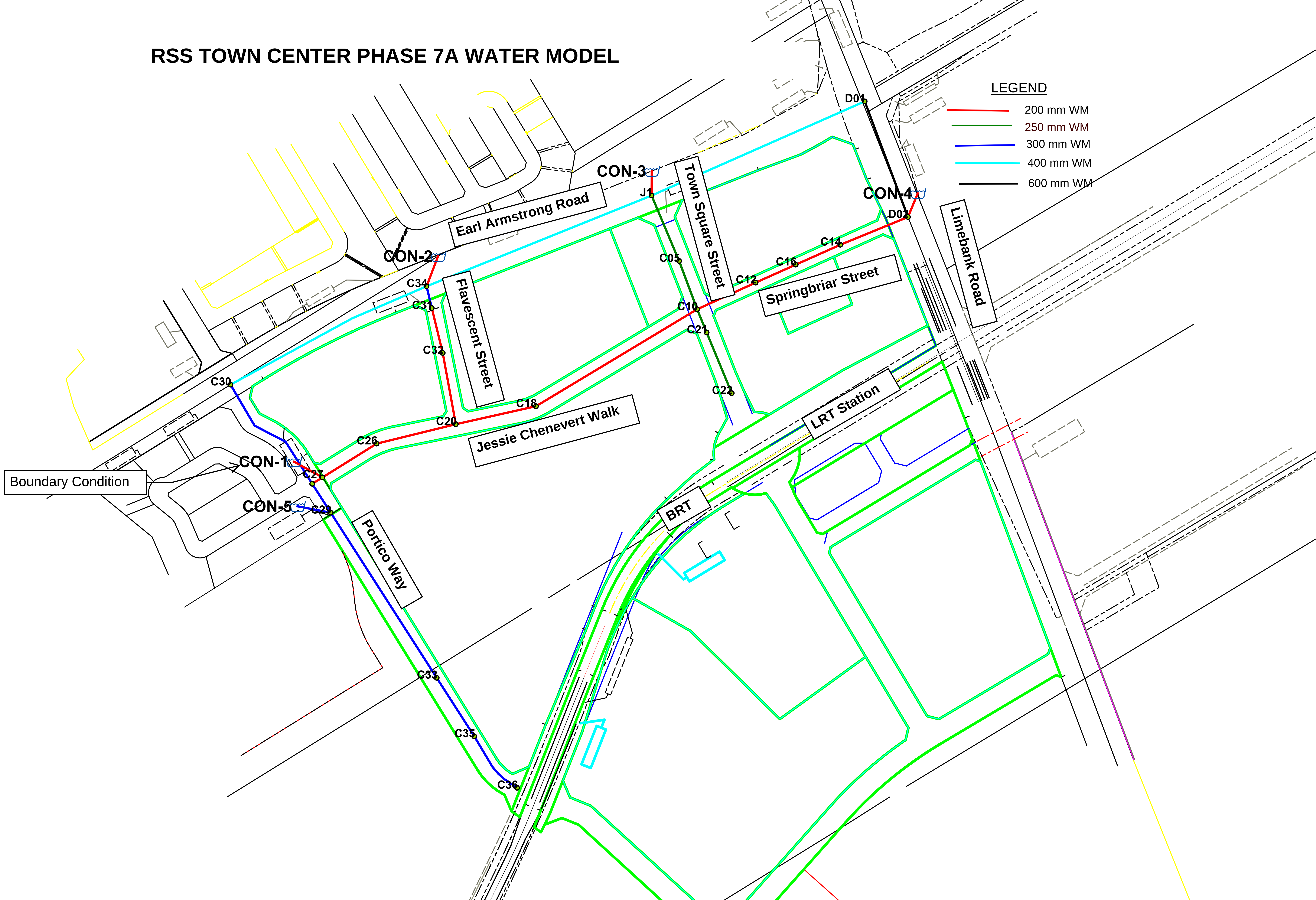
**AVG. DAILY DEMAND**
- Residential 280 l / cap / day
- Employment 35,000 l / ha / day
- INST 28,000 l / ha / day

**MAX. DAILY DEMAND**
- Residential 700 l / cap / day
- Employment 52,500 l / ha / day
- INST 42,000 l / ha / day

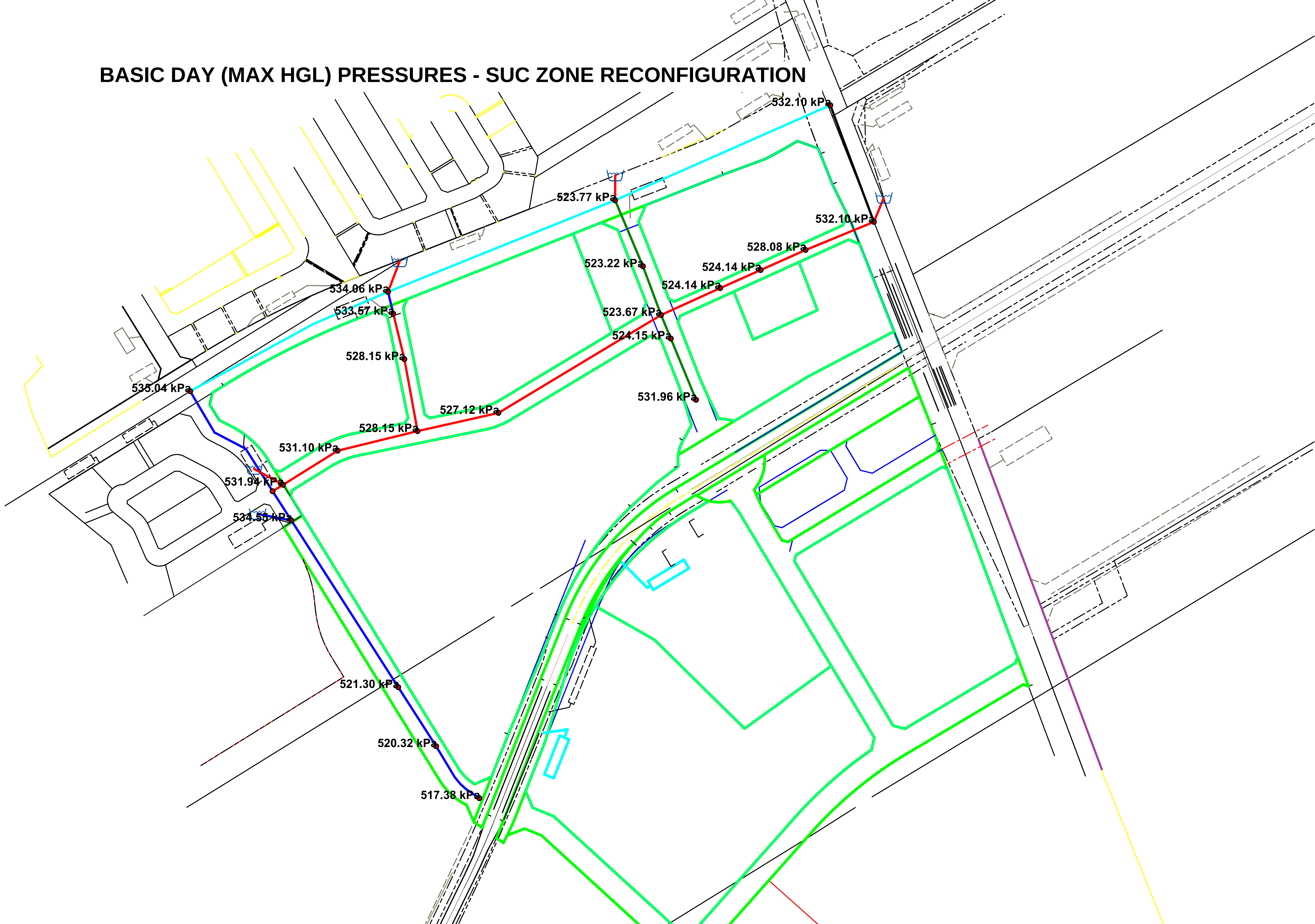
**MAX. HOURLY DEMAND**
- Residential 1,540 l / cap / day
- Employment 94,500 l / ha / day
- INST 75,600 l / ha / day

**FIRE FLOW**
- SF, SD, TH & ST 10,000 l / min
- ICI 13,000 l / min

# RSS TOWN CENTER PHASE 7A WATER MODEL

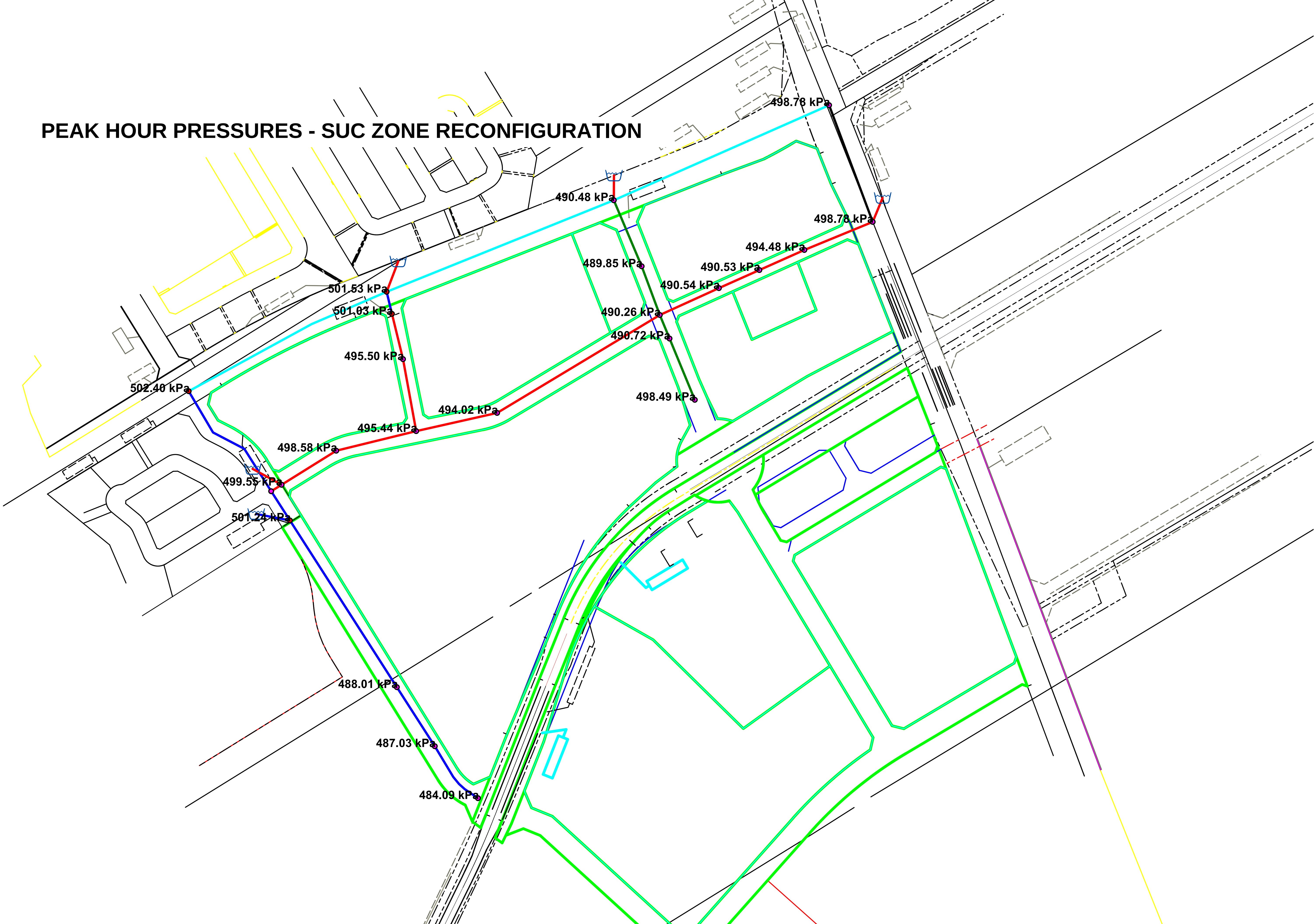


# BASIC DAY (MAX HGL) PRESSURES - SUC ZONE RECONFIGURATION



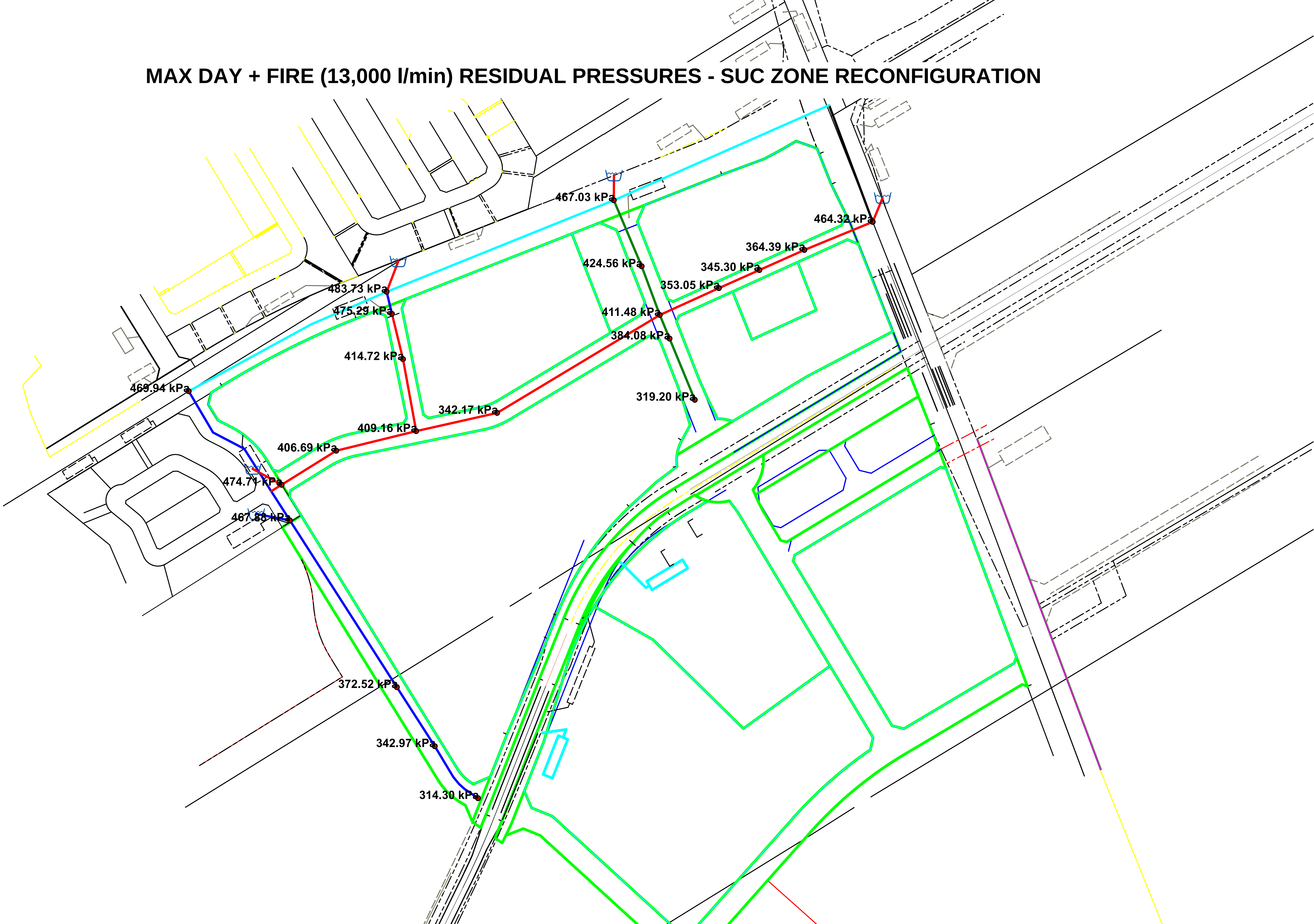
| | | ID | Demand (L/s) | Elevation (m) | Head (m) | Pressure (kPa) |
|---|---|---|---|---|---|---|
| 1 | ☐ | C05 | 0.26 | 93.40 | 146.79 | 523.22 |
| 2 | ☐ | C10 | 0.00 | 93.35 | 146.79 | 523.67 |
| 3 | ☐ | C12 | 2.12 | 93.30 | 146.79 | 524.14 |
| 4 | ☐ | C14 | 2.12 | 92.90 | 146.79 | 528.08 |
| 5 | ☐ | C16 | 1.02 | 93.30 | 146.79 | 524.14 |
| 6 | ☐ | C18 | 1.37 | 93.00 | 146.79 | 527.12 |
| 7 | ☐ | C20 | 0.00 | 92.90 | 146.80 | 528.15 |
| 8 | ☐ | C21 | 0.00 | 93.30 | 146.79 | 524.15 |
| 9 | ☐ | C22 | 3.44 | 92.50 | 146.79 | 531.96 |
| 10 | ☐ | C26 | 0.00 | 92.60 | 146.80 | 531.10 |
| 11 | ☐ | C27 | 0.00 | 92.52 | 146.80 | 531.94 |
| 12 | ☐ | C28 | 0.00 | 92.60 | 146.80 | 531.12 |
| 13 | ☐ | C29 | 0.00 | 92.25 | 146.80 | 534.55 |
| 14 | ☐ | C30 | 0.00 | 92.20 | 146.80 | 535.04 |
| 15 | ☐ | C31 | 0.00 | 92.35 | 146.80 | 533.57 |
| 16 | ☐ | C32 | 1.05 | 92.90 | 146.80 | 528.15 |
| 17 | ☐ | C33 | 0.42 | 93.60 | 146.80 | 521.30 |
| 18 | ☐ | C34 | 0.00 | 92.30 | 146.80 | 534.06 |
| 19 | ☐ | C35 | 1.79 | 93.70 | 146.80 | 520.32 |
| 20 | ☐ | C36 | 0.08 | 94.00 | 146.80 | 517.38 |
| 21 | ☐ | D01 | 0.00 | 92.50 | 146.80 | 532.10 |
| 22 | ☐ | D02 | 0.00 | 92.50 | 146.80 | 532.10 |
| 23 | ☐ | J1 | 0.00 | 93.35 | 146.80 | 523.77 |

# PEAK HOUR PRESSURES - SUC ZONE RECONFIGURATION



| | | ID | Demand (L/s) | Elevation (m) | Head (m) | Pressure (kPa) |
|---|---|---|---|---|---|---|
| 1 | ☐ | C05 | 0.66 | 93.40 | 143.39 | 489.85 |
| 2 | ☐ | C10 | 0.00 | 93.35 | 143.38 | 490.26 |
| 3 | ☐ | C12 | 5.22 | 93.30 | 143.36 | 490.54 |
| 4 | ☐ | C14 | 5.22 | 92.90 | 143.36 | 494.48 |
| 5 | ☐ | C16 | 2.55 | 93.30 | 143.36 | 490.53 |
| 6 | ☐ | C18 | 3.43 | 93.00 | 143.41 | 494.02 |
| 7 | ☐ | C20 | 0.00 | 92.90 | 143.46 | 495.44 |
| 8 | ☐ | C21 | 0.00 | 93.30 | 143.38 | 490.72 |
| 9 | ☐ | C22 | 5.15 | 92.50 | 143.37 | 498.49 |
| 10 | ☐ | C26 | 0.00 | 92.60 | 143.48 | 498.58 |
| 11 | ☐ | C27 | 0.00 | 92.52 | 143.49 | 499.55 |
| 12 | ☐ | C28 | 0.00 | 92.60 | 143.44 | 498.24 |
| 13 | ☐ | C29 | 0.00 | 92.25 | 143.40 | 501.24 |
| 14 | ☐ | C30 | 0.00 | 92.20 | 143.47 | 502.40 |
| 15 | ☐ | C31 | 0.00 | 92.35 | 143.48 | 501.03 |
| 16 | ☐ | C32 | 2.63 | 92.90 | 143.47 | 495.50 |
| 17 | ☐ | C33 | 1.05 | 93.60 | 143.40 | 488.01 |
| 18 | ☐ | C34 | 4.48 | 92.30 | 143.48 | 501.53 |
| 19 | ☐ | C35 | 0.20 | 93.70 | 143.40 | 487.03 |
| 20 | ☐ | C36 | 0.00 | 94.00 | 143.40 | 484.09 |
| 21 | ☐ | D01 | 0.00 | 92.50 | 143.40 | 498.78 |
| 22 | ☐ | D02 | 0.00 | 92.50 | 143.40 | 498.78 |
| 23 | ☐ | J1 | 0.00 | 93.35 | 143.40 | 490.48 |

# MAX DAY + FIRE (13,000 l/min) RESIDUAL PRESSURES - SUC ZONE RECONFIGURATION



Max Day + Fire (13,000 l/min) - SUC Zone - Fireflow Design Report

| | | ID | Total Demand (L/s) | Available Flow at Hydrant (L/s) | Critical Node ID | Critical Node Pressure (kPa) | Critical Node Head (m) | Design Flow (L/s) | Design Pressure (kPa) | Design Fire Node Pressure (kPa) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ☐ | C05 | 218.11 | 707.09 | C05 | 139.96 | 107.68 | 707.09 | 139.96 | 139.96 |
| 2 | ☐ | C10 | 216.67 | 612.51 | C10 | 139.96 | 107.63 | 612.51 | 139.96 | 139.96 |
| 3 | ☐ | C12 | 228.11 | 416.33 | C12 | 139.96 | 107.58 | 416.34 | 139.96 | 140.02 |
| 4 | ☐ | C14 | 228.11 | 438.92 | C14 | 139.96 | 107.18 | 438.92 | 139.96 | 140.00 |
| 5 | ☐ | C16 | 222.28 | 395.64 | C16 | 139.96 | 107.58 | 395.64 | 139.96 | 140.07 |
| 6 | ☐ | C18 | 224.21 | 373.92 | C18 | 139.96 | 107.28 | 373.92 | 139.96 | 139.97 |
| 7 | ☐ | C20 | 216.67 | 535.55 | C20 | 139.96 | 107.18 | 535.55 | 139.96 | 140.06 |
| 8 | ☐ | C21 | 216.67 | 478.15 | C21 | 139.96 | 107.58 | 478.15 | 139.96 | 140.35 |
| 9 | ☐ | C22 | 225.95 | 344.99 | C22 | 139.96 | 106.78 | 344.99 | 139.96 | 139.98 |
| 10 | ☐ | C26 | 216.67 | 509.81 | C26 | 139.96 | 106.88 | 509.81 | 139.96 | 139.98 |
| 11 | ☐ | C27 | 216.67 | 4,005.32 | C27 | 140.02 | 106.81 | 4,005.71 | 139.96 | 139.61 |
| 12 | ☐ | C29 | 216.67 | 9,975.58 | C36 | 122.71 | 106.52 | 9,689.13 | 139.96 | 157.75 |
| 13 | ☐ | C30 | 216.67 | 1,518.26 | C30 | 139.97 | 106.48 | 1,518.28 | 139.96 | 139.96 |
| 14 | ☐ | C31 | 216.67 | 1,662.51 | C31 | 139.97 | 106.63 | 1,662.54 | 139.96 | 139.96 |
| 15 | ☐ | C32 | 222.45 | 558.30 | C32 | 139.96 | 107.18 | 558.30 | 139.96 | 140.01 |
| 16 | ☐ | C33 | 218.98 | 462.77 | C36 | 135.95 | 107.87 | 459.50 | 139.96 | 144.05 |
| 17 | ☐ | C34 | 216.67 | 4,758.11 | C34 | 140.05 | 106.59 | 4,758.74 | 139.96 | 139.96 |
| 18 | ☐ | C35 | 226.54 | 398.95 | C36 | 137.02 | 107.98 | 396.92 | 139.96 | 142.90 |
| 19 | ☐ | C36 | 217.10 | 343.67 | C36 | 139.96 | 108.28 | 343.67 | 139.96 | 140.00 |
| 20 | ☐ | D02 | 216.67 | 4,096.07 | D02 | 140.02 | 106.79 | 4,096.50 | 139.96 | 139.95 |
| 21 | ☐ | J1 | 216.67 | 5,007.51 | J1 | 140.06 | 107.64 | 5,008.29 | 139.96 | 139.96 |

# Appendix B Wastewater Servicing

## B.1 Sanitary Sewer Design Sheet

SUBDIVISION:

**Riverside South Community Centre and Library**

DATE: 7/10/2026
REVISION: 1
DESIGNED BY: JP
CHECKED BY: DT

# SANITARY SEWER DESIGN SHEET
(City of Ottawa)

**FILE NUMBER:** 160402150

**DESIGN PARAMETERS**

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

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | | | | COMMERCIAL | | INDUSTRIAL (L) | | INDUSTRIAL (H) | | INSTITUTIONAL | | GREEN / UNUSED | | C+I+I | INFILTRATION | | | TOTAL | PIPE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AREA ID NUMBER | FROM M.H. | TO M.H. | AREA (ha) | UNITS SINGLE | UNITS TOWN | UNITS APT | POP. | CUMULATIVE AREA (ha) | CUMULATIVE POP. | PEAK FACT. | PEAK FLOW (l/s) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | PEAK FLOW (l/s) | TOTAL AREA (ha) | ACCU. AREA (ha) | INFILT. FLOW (l/s) | FLOW (l/s) | LENGTH (m) | DIA (mm) | MATERIAL | CLASS | SLOPE (%) | CAP. (FULL) (l/s) | CAP. V PEAK FLOW (%) | VEL. (FULL) (m/s) | VEL. (ACT.) (m/s) |
| | 1B | 1 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 3.80 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.1 | 0.20 | 0.20 | 0.1 | 0.2 | 20.6 | 150 | PVC | DR 28 | 1.00 | 15.3 | **1.06%** | 0.86 | 0.23 |
| | 1A | 1 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 3.80 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.19 | 0.00 | 0.00 | 0.1 | 0.19 | 0.19 | 0.1 | 0.2 | 8.4 | 150 | PVC | DR 28 | 1.00 | 15.3 | **1.01%** | 0.86 | 0.23 |
| | 1 | 11 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 3.80 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 1.35 | 1.35 | 0.2 | 1.35 | 1.74 | 0.6 | 0.8 | 61.1 | 150 | PVC | DR 28 | 1.00 | 15.3 | **4.98%** | 0.86 | 0.38 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | 150 | | | | | | | |

## B.2 Sanitary Design Background Report Excerpts

**ARCADIS IBI GROUP**
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
**ibigroup.com**

**SANITARY SEWER DESIGN SHEET**
RSS Town Center - Phase 7A
Riverside South Development Corporation
CITY OF OTTAWA

| LOCATION: STREET | LOCATION: AREA ID | LOCATION: FROM MH | LOCATION: TO MH | RESIDENTIAL: AREA w/ Units (Ha) | DENSITIES (POP/HA): LD 59.5 | MD 71.8 | HDI 97.2 | HD2 194.4 | TC 122.4 | UNIT TYPES: SF | TH/SD | APT | AREA w/o Units (Ha) | POPULATION: IND | POPULATION: CUM | RES PEAK FACTOR | PEAK FLOW (L/s) | ICI AREAS: AREA (Ha): INSTITUTIONAL IND | INSTITUTIONAL CUM | COMMERCIAL IND | COMMERCIAL CUM | INDUSTRIAL IND | INDUSTRIAL CUM | ICI PEAK FACTOR | PEAK FLOW (L/s) | INFILTRATION ALLOWANCE: AREA (Ha) IND | AREA (Ha) CUM | FLOW (L/s) | FIXED FLOW (L/s): IND | FIXED FLOW (L/s): CUM | TOTAL FLOW (L/s) | PROPOSED SEWER DESIGN: CAPACITY (L/s) | LENGTH (m) | DIA (mm) | SLOPE (%) | VELOCITY (full) (m/s) | AVAILABLE CAPACITY L/s | AVAILABLE CAPACITY (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Limebank Outlet** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Town Square Street | MH10A | MH10A | MH3A | | | | | | | | | | 0.46 | 0.0 | 0.0 | 3.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.46 | 0.46 | 0.15 | 0.00 | 0.0 | 0.15 | 24.19 | 108.15 | 200 | 0.50 | 0.746 | 24.04 | 99.37% |
| Springbriar Street | MH3A,B&C | MH3A | MH2A | 4.92 | | | | | | | | 875 | 0.20 | 1575.0 | 1575.0 | 3.13 | 15.98 | 0.00 | 0.00 | 0.37 | 0.37 | 0.00 | 0.00 | 1.00 | 0.12 | 5.12 | 5.58 | 1.84 | 0.00 | 0.0 | 17.94 | 31.02 | 113.97 | 250 | 0.25 | 0.612 | 13.08 | 42.15% |
| | MH2A | MH2A | MH1A | | | | | | | | | | 0.70 | 0.0 | 1575.0 | 3.13 | 15.98 | 0.00 | 0.00 | 0.00 | 0.37 | 0.00 | 0.00 | 1.00 | 0.12 | 0.70 | 6.28 | 2.07 | 0.00 | 0.0 | 18.18 | 31.02 | 117.45 | 250 | 0.25 | 0.612 | 12.84 | 41.41% |
| | MH1A | MH1A | MH6A | | | | | | | | | | 0.06 | 0.0 | 1575.0 | 3.13 | 15.98 | 0.00 | 0.00 | 0.00 | 0.37 | 0.00 | 0.00 | 1.00 | 0.12 | 0.06 | 6.34 | 2.09 | 0.00 | 0.0 | 18.19 | 84.84 | 20.00 | 250 | 1.87 | 1.674 | 66.64 | 78.55% |
| **Portico East Outlet** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Town Square Street | MH4A&B | MH4A | MH5A | 0.58 | | | | | | | | 45 | 0.35 | 81.0 | 81.0 | 3.61 | 0.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.93 | 0.93 | 0.31 | 0.00 | 0.0 | 1.26 | 24.19 | 113.18 | 200 | 0.50 | 0.746 | 22.94 | 94.81% |
| Jessie Chenevert Walk | MH5A,B&C | MH5A | MH15A | 3.16 | | | | | | | | 235 | 1.71 | 423.0 | 504.0 | 3.38 | 5.52 | 0.34 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.11 | 4.87 | 5.80 | 1.91 | 0.00 | 0.0 | 7.54 | 31.02 | 105.66 | 250 | 0.25 | 0.612 | 23.48 | 75.69% |
| | MH15A | MH15A | MH16A | | | | | | | | | | 0.30 | 0.0 | 504.0 | 3.38 | 5.52 | 0.00 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.11 | 0.30 | 6.10 | 2.01 | 0.00 | 0.0 | 7.64 | 31.02 | 113.74 | 250 | 0.25 | 0.612 | 23.38 | 75.37% |
| | MH16A | MH16A | MH16C | | | | | | | | | | 0.24 | 0.0 | 504.0 | 3.38 | 5.52 | 0.00 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.11 | 0.24 | 6.34 | 2.09 | 0.00 | 0.0 | 7.72 | 31.02 | 12.34 | 250 | 0.25 | 0.612 | 23.30 | 75.11% |
| | | MH16C | MH17A | | | | | | | | | | | 0.0 | 504.0 | 3.38 | 5.52 | 0.00 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.11 | 0.00 | 6.34 | 2.09 | 0.00 | 0.0 | 7.72 | 31.02 | 83.10 | 250 | 0.25 | 0.612 | 23.30 | 75.11% |
| Flavescent Street | MH25A&B | MH25A | MH26A | 2.43 | | | | | | | 120 | | 0.16 | 324.0 | 324.0 | 3.45 | 3.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 2.59 | 2.59 | 0.85 | 0.00 | 0.0 | 4.48 | 31.02 | 66.01 | 250 | 0.25 | 0.612 | 26.54 | 85.56% |
| | MH26 | MH26A | MH17A | | | | | | | | | | 0.15 | 0.0 | 324.0 | 3.45 | 3.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.15 | 2.74 | 0.90 | 0.00 | 0.0 | 4.53 | 31.02 | 75.00 | 250 | 0.25 | 0.612 | 26.49 | 85.40% |
| Jessie Chenevert Walk | MH17A | MH17A | MH18A | | | | | | | | | | 0.21 | 0.0 | 828.0 | 3.28 | 8.80 | 0.00 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.11 | 0.21 | 9.29 | 3.07 | 0.00 | 0.0 | 11.98 | 31.02 | 83.29 | 250 | 0.25 | 0.612 | 19.04 | 61.38% |
| | MH18A | MH18A | MH19A | | | | | | | | | | 0.05 | 0.0 | 828.0 | 3.28 | 8.80 | 0.00 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.11 | 0.05 | 9.34 | 3.08 | 0.00 | 0.0 | 12.00 | 31.02 | 20.37 | 250 | 0.25 | 0.612 | 19.02 | 61.33% |
| | MH19A | MH19A | MH20A | | | | | | | | | | 0.19 | 0.0 | 828.0 | 3.28 | 8.80 | 0.00 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.11 | 0.19 | 9.53 | 3.14 | 0.00 | 0.0 | 12.06 | 31.02 | 70.65 | 250 | 0.25 | 0.612 | 18.96 | 61.12% |
| | | MH20A | SA70791 | | | | | | | | | | | 0.0 | 828.0 | 3.28 | 8.80 | 0.00 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.11 | 0.00 | 9.53 | 3.14 | 0.00 | 0.0 | 12.06 | 155.42 | 11.45 | 525 | 0.12 | 0.696 | 143.36 | 92.24% |
| **Portico South Outlet** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phase 1 ISSU Sanitary Drainage Areas South of Portico/BRT Intersection | 2006-CW, 119a,310A 2012-CW, 2110-CW, 2011-CW, 410B, 450A, 445A | | CAP30A | | 54.55 | 18.12 | | | 14.53 | | | | 31.61 | 6325.6 | 6325.6 | 2.72 | 55.74 | 7.67 | 7.67 | 1.51 | 1.51 | 14.53 | 14.53 | 1.00 | 8.86 | 127.99 | 127.99 | 42.24 | 0.00 | 0.0 | 106.84 | | | | | | | |
| Portico | MH30A | CAP30A | MH31A | | | | | | | | | | 0.07 | 0.0 | 6325.6 | 2.72 | 55.74 | 0.00 | 7.67 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.86 | 0.07 | 128.06 | 42.26 | 0.00 | 0.0 | 106.86 | 155.42 | 17.38 | 525 | 0.12 | 0.696 | 48.56 | 31.24% |
| | 2018-CW, MH31A | MH31A | MH32A | | | 18.70 | | | | | | | 0.07 | 1343.0 | 7668.6 | 2.65 | 65.97 | 0.00 | 7.67 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.86 | 27.95 | 156.01 | 51.48 | 0.00 | 0.0 | 126.32 | 155.42 | 28.42 | 525 | 0.12 | 0.696 | 29.10 | 18.73% |
| | MH32A | MH32A | MH33A | | | | | | | | | | 0.10 | 0.0 | 7668.6 | 2.65 | 65.97 | 0.00 | 7.67 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.86 | 0.10 | 156.11 | 51.52 | 0.00 | 0.0 | 126.35 | 155.42 | 38.23 | 525 | 0.12 | 0.696 | 29.07 | 18.71% |
| | MH33A | MH33A | MH34A | | | | | | | | | | 0.20 | 0.0 | 7668.6 | 2.65 | 65.97 | 0.00 | 7.67 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.86 | 0.20 | 156.31 | 51.58 | 0.00 | 0.0 | 126.41 | 155.42 | 78.00 | 525 | 0.12 | 0.696 | 29.01 | 18.66% |
| | MH34A&B | MH34A | MH35A | | | | | | | | | | 9.41 | 0.0 | 7668.6 | 2.65 | 65.97 | 0.00 | 7.67 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.86 | 9.41 | 165.72 | 54.69 | 0.00 | 0.0 | 129.52 | 155.42 | 120.00 | 525 | 0.12 | 0.696 | 25.90 | 16.66% |
| | MH35A&B | MH35A | MH36A | | | | | | | | | | 4.10 | 0.0 | 7668.6 | 2.65 | 65.97 | 0.00 | 7.67 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.86 | 4.10 | 169.82 | 56.04 | 0.00 | 0.0 | 130.87 | 155.42 | 120.00 | 525 | 0.12 | 0.696 | 24.55 | 15.79% |
| | MH36A | MH36A | SA70791 | | | | | | | | | | 0.08 | 0.0 | 7668.6 | 2.65 | 65.97 | 0.00 | 7.67 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.86 | 0.08 | 169.90 | 56.07 | 0.00 | 0.0 | 130.90 | 155.42 | 37.60 | 525 | 0.12 | 0.696 | 24.52 | 15.78% |
| Riverside South Phase 8 | 70791 | | SA70791 | 23.60 | | | 1.65 | | | 140 | 380 | | 2.61 | 1662.4 | 1662.4 | 3.12 | 16.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 27.86 | 27.86 | 9.19 | 0.00 | 0.0 | 25.99 | | | | | | | |
| Portico | | SA70791 | SA70790 | | | | | | | | | | 0.15 | 0.0 | 10159.0 | 2.56 | 84.23 | 0.00 | 8.01 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.97 | 0.15 | 207.44 | 68.46 | 0.00 | 0.0 | 161.65 | 204.74 | *52.82* | 525 | *0.21* | 0.916 | 43.09 | 21.05% |
| | | SA70790 | SA70789 | | | | | | | | | | 0.14 | 0.0 | 10159.0 | 2.56 | 84.23 | 0.00 | 8.01 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.97 | 0.14 | 207.58 | 68.50 | 0.00 | 0.0 | 161.70 | 191.87 | *49.21* | 525 | *0.18* | 0.859 | 30.18 | 15.73% |
| | | SA70789 | SA21883 | | | | | | | | | | 0.13 | 0.0 | 10159.0 | 2.56 | 84.23 | 0.00 | 8.01 | 0.00 | 1.51 | 0.00 | 14.53 | 1.00 | 8.97 | 0.13 | 207.57 | 68.50 | 0.00 | 0.0 | 161.70 | 255.60 | *61.62* | 525 | *0.32* | 1.144 | 93.90 | 36.74% |

**Design Parameters:**

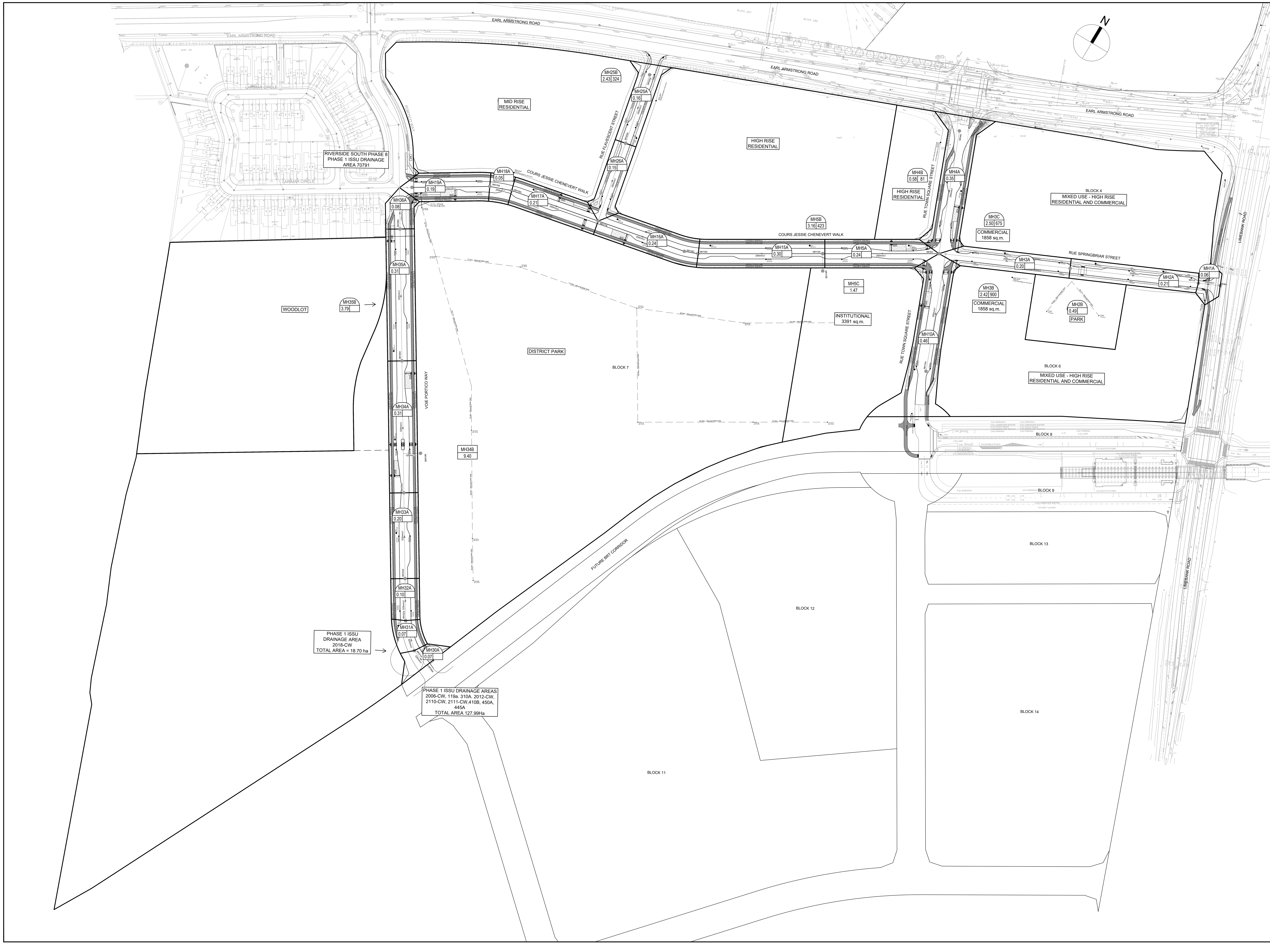
| Residential | | | ICI Areas | | | |
|---|---|---|---|---|---|---|
| SF | 3.4 | p/p/u | | | | |
| TH/SD | 2.7 | p/p/u | INST | 28,000 | L/Ha/day | |
| APT | 1.8 | p/p/u | COM | 28,000 | L/Ha/day | |
| | | | IND | 35,000 | L/Ha/day | MOE Chart |
| Other | 60 | p/p/Ha | | 17000 | L/Ha/day | |

**Notes:**
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 200 L/day
3. Infiltration allowance: 0.33
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
1.5 if greater than 20%, otherwise 1.0

**Designed:** LME
**Checked:**
**Dwg. Reference:** 144320-400

| No. | Revision | Date |
|---|---|---|
| 1. | Submission No. 1 | 2024-07-19 |
| 2. | Submission No. 2 | 2024-10-29 |
| 3. | Submission No. 4 | 2025-04-03 |

| File Reference: | | Date: | Sheet No: |
|---|---|---|---|
| 144320-6.04 | | 2025-04-03 | 1 of 1 |




CLIENT

Riverside South

COPYRIGHT

This drawing has been prepared solely for the intended use, thus any reproduction or distribution for any purpose other than authorized by Arcadis is forbidden. Written dimensions shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job, and Arcadis shall be informed of any variations from the dimensions and conditions shown on the drawing. Shop drawings shall be submitted to Arcadis for general conformance before proceeding with fabrication.

**Arcadis Professional Services (Canada) Inc.**
formerly IBI Group Professional Services (Canada) Inc.

ISSUES

| No. | DESCRIPTION | DATE |
|---|---|---|
| 1 | SUBMISSION 1 FOR CITY REVIEW | 2024-07-19 |
| 2 | SUBMISSION 2 FOR CITY REVIEW | 2024-10-29 |
| 3 | SUBMISSION 3 FOR CITY REVIEW | 2025-01-17 |
| 4 | REVISED SANITARY SEWER | 2025-04-04 |

SEE 010, 011 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

SITE

1:1500 0 15 45 75m

SEAL

LICENSED PROFESSIONAL ENGINEER
M. ERION
13379508
2025/04/04
PROVINCE OF ONTARIO

PRIME CONSULTANT

ARCADIS

333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
**www.arcadis.com**

PROJECT

RSS TOWN CENTER
980 EARL ARMSTRONG & 4700 LIMEBANK ROAD
PHASE 7A

PROJECT NO:
144320

| DRAWN BY: | CHECKED BY: |
|---|---|
| C.C | L.E. |
| PROJECT MGR: | APPROVED BY: |
| L.E. | L.E. |

SHEET TITLE

SANITARY DRAINAGE AREA PLAN

| SHEET NUMBER | ISSUE |
|---|---|
| 400 | 4 |

File Location: J:\144320_Riverside\7.0_Production\7.03_Design\04_Civil\Sheets\400 SANITARY DRAINAGE AREA PLAN.dwg Last Saved: October 28, 2024, by milnem4626 Plotted: April 4, 2025 12:12:25 PM by Cormier, Chris

D07-XX-XX-XXXX

XXXXX

SCALE CHECK 10mm 1 in

# Appendix C Stormwater Management and Servicing

## C.1 Storm Sewer Design Sheet

Stantec

**Riverside South Community Centre and Library**

DATE: 2026-07-10
REVISION: 1
DESIGNED BY: JP
CHECKED BY: DT

# STORM SEWER DESIGN SHEET
**(City of Ottawa)**

FILE NUMBER: 160402150

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2025)

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

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

| LOCATION | | | DRAINAGE AREA | | | | | | | | | | | | | | | | | | | | | | | | | PIPE SELECTION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AREA ID NUMBER | FROM M.H. | TO M.H. | AREA (2-YEAR) (ha) | AREA (5-YEAR) (ha) | AREA (10-YEAR) (ha) | AREA (100-YEAR) (ha) | AREA (ROOF) (ha) | C (2-YEAR) (-) | C (5-YEAR) (-) | C (10-YEAR) (-) | C (100-YEAR) (-) | A x C (2-YEAR) (ha) | ACCUM AxC (2YR) (ha) | A x C (5-YEAR) (ha) | ACCUM. AxC (5YR) (ha) | A x C (10-YEAR) (ha) | ACCUM. AxC (10YR) (ha) | A x C (100-YEAR) (ha) | ACCUM. AxC (100YR) (ha) | T of C (min) | $I_{2\text{-YEAR}}$ (mm/h) | $I_{5\text{-YEAR}}$ (mm/h) | $I_{10\text{-YEAR}}$ (mm/h) | $I_{100\text{-YEAR}}$ (mm/h) | $Q_{CONTROL}$ (L/s) | ACCUM. $Q_{CONTROL}$ (L/s) | $Q_{ACT}$ (CIA/360) (L/s) | LENGTH (m) | PIPE WIDTH OR DIAMETE (mm) | PIPE HEIGHT (mm) | PIPE SHAPE (-) | MATERIAL (-) | CLASS (-) | SLOPE % | $Q_{CAP}$ (FULL) (L/s) | % FULL (-) | VEL. (FULL) (m/s) | VEL. (ACT) (m/s) | TIME OF FLOW (min) |
| L200A | TANK | 101 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.90 | 0.00 | 0.00 | 0.00 | 0.063 | 0.999 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 12.11 | 69.54 | 94.22 | 110.39 | 161.30 | 0.0 | 0.0 | 193.0 | 4.2 | 600 | 600 | CIRCULAR | CONCRETE | - | 0.50 | 453.4 | **42.58%** | 1.55 | 1.26 | 0.06 |
| | 101 | 100 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.999 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 12.17 | 69.37 | 93.98 | 110.12 | 160.90 | 0.0 | 0.0 | 192.6 | 20.5 | 600 | 600 | CIRCULAR | CONCRETE | - | 0.50 | 451.6 | **42.65%** | 1.55 | 1.26 | 0.27 |
| | | | | | | | | | | | | | | | | | | | | **12.44** | | | | | | | | | 600 | 600 | | | | | | | | | |
| L107A | 107B | 107A | 0.48 | 0.00 | 0.00 | 0.00 | 0.00 | 0.49 | 0.00 | 0.00 | 0.00 | 0.235 | 0.235 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 0.0 | 0.0 | 50.2 | 39.4 | 300 | 300 | CIRCULAR | PVC | - | 1.00 | 96.2 | **52.17%** | 1.37 | 1.18 | 0.56 |
| L107C | 107A | 106 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.00 | 0.00 | 0.034 | 0.269 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.56 | 74.73 | 101.34 | 118.79 | 173.63 | 0.0 | 0.0 | 55.8 | 77.8 | 300 | 300 | CIRCULAR | PVC | - | 0.70 | 80.6 | **69.31%** | 1.14 | 1.08 | 1.20 |
| | 106 | 103 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.269 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 11.76 | 70.66 | 95.74 | 112.19 | 163.94 | 0.0 | 0.0 | 52.8 | 18.8 | 375 | 375 | CIRCULAR | PVC | - | 0.70 | 137.9 | **38.27%** | 1.31 | 1.03 | 0.31 |
| | | | | | | | | | | | | | | | | | | | | **12.06** | | | | | | | | | | | | | | | | | | | |
| L105A, L105B | 105 | 104 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.63 | 0.00 | 0.00 | 0.00 | 0.133 | 0.133 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 0.0 | 0.0 | 28.4 | 18.0 | 300 | 300 | CIRCULAR | PVC | - | 0.70 | 80.4 | **35.35%** | 1.14 | 0.88 | 0.34 |
| | | | | | | | | | | | | | | | | | | | | **10.34** | | | | | | | | | | | | | | | | | | | |
| L104C | 104C | 104 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.90 | 0.00 | 0.00 | 0.00 | 0.180 | 0.180 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 0.0 | 0.0 | 38.4 | 19.4 | 300 | 300 | CIRCULAR | PVC | - | 1.00 | 96.2 | **39.94%** | 1.37 | 1.09 | 0.30 |
| | | | | | | | | | | | | | | | | | | | | **10.30** | | | | | | | | | | | | | | | | | | | |
| L104B | 104B | 104 | 0.19 | 0.00 | 0.00 | 0.00 | 0.00 | 0.90 | 0.00 | 0.00 | 0.00 | 0.171 | 0.171 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 0.0 | 0.0 | 36.5 | 10.0 | 300 | 300 | CIRCULAR | PVC | - | 10.00 | 304.1 | **12.00%** | 4.32 | 2.41 | 0.07 |
| | | | | | | | | | | | | | | | | | | | | **10.07** | | | | | | | | | | | | | | | | | | | |
| L104A | 104 | 103 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.78 | 0.00 | 0.00 | 0.00 | 0.078 | 0.562 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.34 | 75.52 | 102.42 | 120.06 | 175.50 | 0.0 | 0.0 | 118.0 | 41.1 | 375 | 375 | CIRCULAR | PVC | - | 0.80 | 147.7 | **79.84%** | 1.40 | 1.38 | 0.50 |
| | | | | | | | | | | | | | | | | | | | | **10.84** | | | | | | | | | | | | | | | | | | | |
| L103A | 103A | 103 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.75 | 0.00 | 0.00 | 0.00 | 0.105 | 0.105 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 0.0 | 0.0 | 22.4 | 7.3 | 200 | 200 | CIRCULAR | PVC | - | 1.00 | 33.3 | **67.19%** | 1.05 | 0.98 | 0.12 |
| | | | | | | | | | | | | | | | | | | | | **10.12** | | | | | | | | | | | | | | | | | | | |
| | 103 | TANK | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.936 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 12.06 | 69.70 | 94.43 | 110.64 | 161.67 | 0.0 | 0.0 | 181.3 | 4.5 | 450 | 450 | CIRCULAR | CONCRETE | - | 0.75 | 256.7 | **70.61%** | 1.56 | 1.48 | 0.05 |
| | | | | | | | | | | | | | | | | | | | | **12.11** | | | | | | | | | 450 | 450 | | | | | | | | | |
| L202A | 202A | 202B | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.85 | 0.00 | 0.00 | 0.00 | 0.060 | 0.060 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 0.0 | 0.0 | 12.7 | 12.7 | 200 | 200 | CIRCULAR | PVC | - | 6.00 | 81.6 | **15.56%** | 2.57 | 1.55 | 0.14 |
| | | | | | | | | | | | | | | | | | | | | **10.14** | | | | | | | | | 200 | 200 | | | | | | | | | |
| L201A | 201A | 201B | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.90 | 0.00 | 0.00 | 0.00 | 0.063 | 0.063 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 0.0 | 0.0 | 13.4 | 15.5 | 200 | 200 | CIRCULAR | PVC | - | 5.50 | 78.1 | **17.21%** | 2.46 | 1.51 | 0.17 |
| | | | | | | | | | | | | | | | | | | | | **10.17** | | | | | | | | | 200 | 200 | | | | | | | | | |

## C.2 Modified Rational Method (MRM) Design Sheet

## Stormwater Management Calculations

File No: **PROJECT # 160402150**
Project: **Riverside South Community Centre and Library**
Date: **10-Jul-26**

| SWM Approach: |
|---|
| Post-development to Predefined Release Rate |

**Post-Development Site Conditions:**

**Overall Runoff Coefficient for Site and Sub-Catchment Areas**

**Runoff Coefficient Table**

| Sub-catchment Area Catchment Type | ID / Description | | Area (ha) "A" | | Runoff Coefficient "C" | "A x C" | | Overall Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| Uncontrolled - Non-Tributary | UNC-2 | Hard | 0.056 | | 0.9 | 0.050 | | |
| | | Soft | 0.004 | | 0.2 | 0.001 | | |
| | | Subtotal | | 0.06 | | | 0.051 | 0.850 |
| Uncontrolled - Non-Tributary | UNC-1 | Hard | 0.010 | | 0.9 | 0.009 | | |
| | | Soft | 0.010 | | 0.2 | 0.002 | | |
| | | Subtotal | | 0.02 | | | 0.011 | 0.550 |
| Uncontrolled - Tributary | L105B | Hard | 0.020 | | 0.9 | 0.018 | | |
| | | Soft | 0.080 | | 0.2 | 0.016 | | |
| | | Subtotal | | 0.1 | | | 0.034 | 0.340 |
| Controlled - Tributary | L105A | Hard | 0.110 | | 0.9 | 0.099 | | |
| | | Soft | 0.000 | | 0.2 | 0.000 | | |
| | | Subtotal | | 0.11 | | | 0.099 | 0.900 |
| Controlled - Tributary | L200A | Hard | 0.070 | | 0.9 | 0.063 | | |
| | | Soft | 0.000 | | 0.2 | 0.000 | | |
| | | Subtotal | | 0.07 | | | 0.063 | 0.900 |
| Controlled - Tributary | L202A | Hard | 0.065 | | 0.9 | 0.059 | | |
| | | Soft | 0.005 | | 0.2 | 0.001 | | |
| | | Subtotal | | 0.07 | | | 0.0595 | 0.850 |
| Controlled - Tributary | L201A | Hard | 0.070 | | 0.9 | 0.063 | | |
| | | Soft | 0.000 | | 0.2 | 0.000 | | |
| | | Subtotal | | 0.07 | | | 0.063 | 0.900 |
| Controlled - Tributary | L103A | Hard | 0.110 | | 0.9 | 0.099 | | |
| | | Soft | 0.030 | | 0.2 | 0.006 | | |
| | | Subtotal | | 0.14 | | | 0.105 | 0.750 |
| Controlled - Tributary | L107C | Hard | 0.011 | | 0.9 | 0.010 | | |
| | | Soft | 0.119 | | 0.2 | 0.024 | | |
| | | Subtotal | | 0.13 | | | 0.0338 | 0.260 |
| Uncontrolled - Tributary | L107A | Hard | 0.199 | | 0.9 | 0.179 | | |
| | | Soft | 0.281 | | 0.2 | 0.056 | | |
| | | Subtotal | | 0.48 | | | 0.2352 | 0.490 |
| Uncontrolled - Tributary | L104C | Hard | 0.200 | | 0.9 | 0.180 | | |
| | | Soft | 0.000 | | 0.2 | 0.000 | | |
| | | Subtotal | | 0.2 | | | 0.18 | 0.900 |
| Uncontrolled - Tributary | L104B | Hard | 0.190 | | 0.9 | 0.171 | | |
| | | Soft | 0.000 | | 0.2 | 0.000 | | |
| | | Subtotal | | 0.19 | | | 0.171 | 0.900 |
| Controlled - Tributary | TANK | Hard | 0.000 | | 0.9 | 0.000 | | |
| | | Soft | 0.000 | | 0.2 | 0.000 | | |
| | | Subtotal | | 0 | | | 0 | 0.000 |
| Controlled - Tributary | L104A | Hard | 0.083 | | 0.9 | 0.075 | | |
| | | Soft | 0.017 | | 0.2 | 0.003 | | |
| | | Subtotal | | 0.1 | | | 0.078 | 0.780 |
| **Total** | | | | **1.740** | | | **1.184** | |
| **Overall Runoff Coefficient= C:** | | | | | | | | **0.68** |

| | |
|---|---|
| **Total Controlled Roof Areas** | **0.000 ha** |
| **Total Tributary Surface Areas (Controlled and Uncontrolled)** | **1.660 ha** |
| **Total Tributary Area to Outlet** | **1.660 ha** |
| **Total Uncontrolled Areas (Non-Tributary)** | **0.080 ha** |
| **Total Site** | **1.740 ha** |

# Stormwater Management Calculations

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**2 yr Intensity**
**City of Ottawa**

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

| | |
|---|---|
| a = | 732.951 |
| b = | 6.199 |
| c = | 0.81 |

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

**2 YEAR Post-Development Target Release from Portion of Site**

**Subdrainage Area:** Predevelopment Tributary Area to Outlet
**Area (ha):** 1.7400
**C:** 0.75
**Q:** 113.0 L/s

**2 YEAR Modified Rational Method for Entire Site**

**Subdrainage Area:** UNC-2 — Uncontrolled - Non-Tributary
**Area (ha):** 0.06
**C:** 0.85

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 10.9 | 10.9 | | |
| 20 | 52.0 | 7.4 | 7.4 | | |
| 30 | 40.0 | 5.7 | 5.7 | | |
| 40 | 32.9 | 4.7 | 4.7 | | |
| 50 | 28.0 | 4.0 | 4.0 | | |
| 60 | 24.6 | 3.5 | 3.5 | | |
| 70 | 21.9 | 3.1 | 3.1 | | |
| 80 | 19.8 | 2.8 | 2.8 | | |
| 90 | 18.1 | 2.6 | 2.6 | | |
| 100 | 16.7 | 2.4 | 2.4 | | |
| 110 | 15.6 | 2.2 | 2.2 | | |
| 120 | 14.6 | 2.1 | 2.1 | | |

**Subdrainage Area:** UNC-1 — Uncontrolled - Non-Tributary
**Area (ha):** 0.02
**C:** 0.55

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 2.3 | 2.3 | | |
| 20 | 52.0 | 1.6 | 1.6 | | |
| 30 | 40.0 | 1.2 | 1.2 | | |
| 40 | 32.9 | 1.0 | 1.0 | | |
| 50 | 28.0 | 0.9 | 0.9 | | |
| 60 | 24.6 | 0.8 | 0.8 | | |
| 70 | 21.9 | 0.7 | 0.7 | | |
| 80 | 19.8 | 0.6 | 0.6 | | |
| 90 | 18.1 | 0.6 | 0.6 | | |
| 100 | 16.7 | 0.5 | 0.5 | | |
| 110 | 15.6 | 0.5 | 0.5 | | |
| 120 | 14.6 | 0.4 | 0.4 | | |

**Subdrainage Area:** L105B — Uncontrolled - Tributary
**Area (ha):** 0.10
**C:** 0.34

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 7.3 | 7.3 | | |
| 20 | 52.0 | 4.9 | 4.9 | | |
| 30 | 40.0 | 3.8 | 3.8 | | |
| 40 | 32.9 | 3.1 | 3.1 | | |
| 50 | 28.0 | 2.7 | 2.7 | | |
| 60 | 24.6 | 2.3 | 2.3 | | |
| 70 | 21.9 | 2.1 | 2.1 | | |
| 80 | 19.8 | 1.9 | 1.9 | | |
| 90 | 18.1 | 1.7 | 1.7 | | |
| 100 | 16.7 | 1.6 | 1.6 | | |
| 110 | 15.6 | 1.5 | 1.5 | | |
| 120 | 14.6 | 1.4 | 1.4 | | |

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**100 yr Intensity**
**City of Ottawa**

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

| | |
|---|---|
| a = | 1735.688 |
| b = | 6.014 |
| c = | 0.820 |

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

**100 YEAR Post-Development Target Release from Portion of Site**

**Subdrainage Area:** Predevelopment Tributary Area to Outlet
**Area (ha):** 1.7400
**C:** 0.75
**Q:** 113.0 L/s

**100 YEAR Modified Rational Method for Entire Site**

**Subdrainage Area:** UNC-2 — Uncontrolled - Non-Tributary
**Area (ha):** 0.06
**C:** 1.00

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 29.8 | 29.8 | | |
| 20 | 120.0 | 20.0 | 20.0 | | |
| 30 | 91.9 | 15.3 | 15.3 | | |
| 40 | 75.1 | 12.5 | 12.5 | | |
| 50 | 64.0 | 10.7 | 10.7 | | |
| 60 | 55.9 | 9.3 | 9.3 | | |
| 70 | 49.8 | 8.3 | 8.3 | | |
| 80 | 45.0 | 7.5 | 7.5 | | |
| 90 | 41.1 | 6.9 | 6.9 | | |
| 100 | 37.9 | 6.3 | 6.3 | | |
| 110 | 35.2 | 5.9 | 5.9 | | |
| 120 | 32.9 | 5.5 | 5.5 | | |

**Subdrainage Area:** UNC-1 — Uncontrolled - Non-Tributary
**Area (ha):** 0.02
**C:** 0.69

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 6.8 | 6.8 | | |
| 20 | 120.0 | 4.6 | 4.6 | | |
| 30 | 91.9 | 3.5 | 3.5 | | |
| 40 | 75.1 | 2.9 | 2.9 | | |
| 50 | 64.0 | 2.4 | 2.4 | | |
| 60 | 55.9 | 2.1 | 2.1 | | |
| 70 | 49.8 | 1.9 | 1.9 | | |
| 80 | 45.0 | 1.7 | 1.7 | | |
| 90 | 41.1 | 1.6 | 1.6 | | |
| 100 | 37.9 | 1.4 | 1.4 | | |
| 110 | 35.2 | 1.3 | 1.3 | | |
| 120 | 32.9 | 1.3 | 1.3 | | |

**Subdrainage Area:** L105B — Uncontrolled - Tributary
**Area (ha):** 0.10
**C:** 0.43

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 21.1 | 21.1 | | |
| 20 | 120.0 | 14.2 | 14.2 | | |
| 30 | 91.9 | 10.9 | 10.9 | | |
| 40 | 75.1 | 8.9 | 8.9 | | |
| 50 | 64.0 | 7.6 | 7.6 | | |
| 60 | 55.9 | 6.6 | 6.6 | | |
| 70 | 49.8 | 5.9 | 5.9 | | |
| 80 | 45.0 | 5.3 | 5.3 | | |
| 90 | 41.1 | 4.9 | 4.9 | | |
| 100 | 37.9 | 4.5 | 4.5 | | |
| 110 | 35.2 | 4.2 | 4.2 | | |
| 120 | 32.9 | 3.9 | 3.9 | | |

# Stormwater Management Calculations

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**Subdrainage Area:** L105A — Controlled - Tributary
**Area (ha):** 0.11
**C:** 0.90

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 21.1 | 20.7 | 0.4 | **0.2** |
| 20 | 52.0 | 14.3 | 14.3 | 0.0 | 0.0 |
| 30 | 40.0 | 11.0 | 11.0 | 0.0 | 0.0 |
| 40 | 32.9 | 9.0 | 9.0 | 0.0 | 0.0 |
| 50 | 28.0 | 7.7 | 7.7 | 0.0 | 0.0 |
| 60 | 24.6 | 6.8 | 6.8 | 0.0 | 0.0 |
| 70 | 21.9 | 6.0 | 6.0 | 0.0 | 0.0 |
| 80 | 19.8 | 5.5 | 5.5 | 0.0 | 0.0 |
| 90 | 18.1 | 5.0 | 5.0 | 0.0 | 0.0 |
| 100 | 16.7 | 4.6 | 4.6 | 0.0 | 0.0 |
| 110 | 15.6 | 4.3 | 4.3 | 0.0 | 0.0 |
| 120 | 14.6 | 4.0 | 4.0 | 0.0 | 0.0 |

Storage: Above CB

Orifice Equation: CdA(2gh)^0.5 Where C = 0.57
Orifice Diameter: 95 mm
Invert Elevation 91.67 m Vol within CB = 0.5m3
T/G Elevation 93.05 m
Max Ponding Depth 0.00 m
Downstream W/L 91.33 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 5-year Water Level | 93.05 | 1.33 | 20.7 | 0.2 | 33.1 | OK |

**Subdrainage Area:** L200A — Controlled - Tributary
**Area (ha):** 0.07
**C:** 0.90

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 13.5 | 13.5 | 0.0 | **0.0** |
| 20 | 52.0 | 9.1 | 9.1 | 0.0 | **0.0** |
| 30 | 40.0 | 7.0 | 7.0 | 0.0 | **0.0** |
| 40 | 32.9 | 5.8 | 5.8 | 0.0 | **0.0** |
| 50 | 28.0 | 4.9 | 4.9 | 0.0 | **0.0** |
| 60 | 24.6 | 4.3 | 4.3 | 0.0 | **0.0** |
| 70 | 21.9 | 3.8 | 3.8 | 0.0 | **0.0** |
| 80 | 19.8 | 3.5 | 3.5 | 0.0 | **0.0** |
| 90 | 18.1 | 3.2 | 3.2 | 0.0 | **0.0** |
| 100 | 16.7 | 2.9 | 2.9 | 0.0 | **0.0** |
| 110 | 15.6 | 2.7 | 2.7 | 0.0 | **0.0** |
| 120 | 14.6 | 2.6 | 2.6 | 0.0 | **0.0** |

Storage: Above CB

Orifice Equation: CdA(2gh)^0.5 Where C = 0.57
Orifice Diameter: 102 mm
Invert Elevation 91.68 m
T/G Elevation 93.06 m
Max Ponding Depth 0.00 m
Downstream W/L 0.00 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 5-year Water Level | 92.16 | 0.42 | 13.5 | 0.0 | 7.7 | OK |

**Subdrainage Area:** L202A — Controlled - Tributary
**Area (ha):** 0.07
**C:** 0.85

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 12.7 | 12.7 | 0.0 | **0.0** |
| 20 | 52.0 | 8.6 | 8.6 | 0.0 | **0.0** |
| 30 | 40.0 | 6.6 | 6.6 | 0.0 | **0.0** |
| 40 | 32.9 | 5.4 | 5.4 | 0.0 | **0.0** |
| 50 | 28.0 | 4.6 | 4.6 | 0.0 | **0.0** |
| 60 | 24.6 | 4.1 | 4.1 | 0.0 | **0.0** |
| 70 | 21.9 | 3.6 | 3.6 | 0.0 | **0.0** |
| 80 | 19.8 | 3.3 | 3.3 | 0.0 | **0.0** |
| 90 | 18.1 | 3.0 | 3.0 | 0.0 | **0.0** |
| 100 | 16.7 | 2.8 | 2.8 | 0.0 | **0.0** |
| 110 | 15.6 | 2.6 | 2.6 | 0.0 | **0.0** |
| 120 | 14.6 | 2.4 | 2.4 | 0.0 | **0.0** |

Storage: Above CB

Orifice Equation: CdA(2gh)^0.5 Where C = 0.57
Orifice Diameter: 95 mm
Invert Elevation 91.61 m
T/G Elevation 92.99 m
Max Ponding Depth 0.00 m
Downstream W/L 91.33 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 5-year Water Level | 92.16 | 0.50 | 12.7 | 0.0 | 9.8 | OK |

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**Subdrainage Area:** L105A — Controlled - Tributary
**Area (ha):** 0.11
**C:** 1.00

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 54.6 | 22.4 | 32.2 | **19.3** |
| 20 | 120.0 | 36.7 | 22.4 | 14.2 | 17.1 |
| 30 | 91.9 | 28.1 | 22.4 | 5.6 | 10.2 |
| 40 | 75.1 | 23.0 | 22.4 | 0.5 | 1.3 |
| 50 | 64.0 | 19.6 | 19.6 | 0.0 | 0.0 |
| 60 | 55.9 | 17.1 | 17.1 | 0.0 | 0.0 |
| 70 | 49.8 | 15.2 | 15.2 | 0.0 | 0.0 |
| 80 | 45.0 | 13.8 | 13.8 | 0.0 | 0.0 |
| 90 | 41.1 | 12.6 | 12.6 | 0.0 | 0.0 |
| 100 | 37.9 | 11.6 | 11.6 | 0.0 | 0.0 |
| 110 | 35.2 | 10.8 | 10.8 | 0.0 | 0.0 |
| 120 | 32.9 | 10.1 | 10.1 | 0.0 | 0.0 |

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.57
Orifice Diameter: 95 mm
Invert Elevation 91.67 m
T/G Elevation 93.05 m
Max Ponding Depth 0.23 m
Downstream W/L 91.33 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 100-year Water Level | 93.28 | 1.56 | 22.4 | 19.3 | 33.1 | OK |
| | | | | | 13.81 | |

**Subdrainage Area:** L200A — Controlled - Tributary
**Area (ha):** 0.07
**C:** 1.00

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 34.7 | 24.9 | 9.8 | **5.9** |
| 20 | 120.0 | 23.3 | 23.3 | 0.0 | 0.0 |
| 30 | 91.9 | 17.9 | 17.9 | 0.0 | 0.0 |
| 40 | 75.1 | 14.6 | 14.6 | 0.0 | 0.0 |
| 50 | 64.0 | 12.4 | 12.4 | 0.0 | 0.0 |
| 60 | 55.9 | 10.9 | 10.9 | 0.0 | 0.0 |
| 70 | 49.8 | 9.7 | 9.7 | 0.0 | 0.0 |
| 80 | 45.0 | 8.8 | 8.8 | 0.0 | 0.0 |
| 90 | 41.1 | 8.0 | 8.0 | 0.0 | 0.0 |
| 100 | 37.9 | 7.4 | 7.4 | 0.0 | 0.0 |
| 110 | 35.2 | 6.9 | 6.9 | 0.0 | 0.0 |
| 120 | 32.9 | 6.4 | 6.4 | 0.0 | 0.0 |

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.57
Orifice Diameter: 102 mm
Invert Elevation 91.68 m
T/G Elevation 93.06 m
Max Ponding Depth 0.12 m
Downstream W/L 0.00 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 100-year Water Level | 93.18 | 1.45 | 24.9 | 5.9 | 7.7 | OK |
| | | | | | 1.80 | |

**Subdrainage Area:** L202A — Controlled - Tributary
**Area (ha):** 0.07
**C:** 1.00

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 34.7 | 22.9 | 11.8 | **7.1** |
| 20 | 120.0 | 23.3 | 22.9 | 0.4 | 0.5 |
| 30 | 91.9 | 17.9 | 17.9 | 0.0 | 0.0 |
| 40 | 75.1 | 14.6 | 14.6 | 0.0 | 0.0 |
| 50 | 64.0 | 12.4 | 12.4 | 0.0 | 0.0 |
| 60 | 55.9 | 10.9 | 10.9 | 0.0 | 0.0 |
| 70 | 49.8 | 9.7 | 9.7 | 0.0 | 0.0 |
| 80 | 45.0 | 8.8 | 8.8 | 0.0 | 0.0 |
| 90 | 41.1 | 8.0 | 8.0 | 0.0 | 0.0 |
| 100 | 37.9 | 7.4 | 7.4 | 0.0 | 0.0 |
| 110 | 35.2 | 6.9 | 6.9 | 0.0 | 0.0 |
| 120 | 32.9 | 6.4 | 6.4 | 0.0 | 0.0 |

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.57
Orifice Diameter: 95 mm
Invert Elevation 91.61 m
T/G Elevation 92.99 m
Max Ponding Depth 0.30 m
Downstream W/L 91.33 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 100-year Water Level | 93.29 | 1.63 | 22.9 | 7.1 | 9.8 | OK |
| | | | | | 2.72 | |

# Stormwater Management Calculations

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**Subdrainage Area:** L201A — Controlled - Tributary
**Area (ha):** 0.07
**C:** 0.90

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 13.5 | 13.5 | 0.0 | **0.0** |
| 20 | 52.0 | 9.1 | 9.1 | 0.0 | **0.0** |
| 30 | 40.0 | 7.0 | 7.0 | 0.0 | **0.0** |
| 40 | 32.9 | 5.8 | 5.8 | 0.0 | **0.0** |
| 50 | 28.0 | 4.9 | 4.9 | 0.0 | **0.0** |
| 60 | 24.6 | 4.3 | 4.3 | 0.0 | **0.0** |
| 70 | 21.9 | 3.8 | 3.8 | 0.0 | **0.0** |
| 80 | 19.8 | 3.5 | 3.5 | 0.0 | **0.0** |
| 90 | 18.1 | 3.2 | 3.2 | 0.0 | **0.0** |
| 100 | 16.7 | 2.9 | 2.9 | 0.0 | **0.0** |
| 110 | 15.6 | 2.7 | 2.7 | 0.0 | **0.0** |
| 120 | 14.6 | 2.6 | 2.6 | 0.0 | **0.0** |

Storage: Above CB

Orifice Equation: CdA(2gh)^0.5 — Where C = 0.57
Orifice Diameter: 95 mm
Invert Elevation 91.70 m
T/G Elevation 93.08 m
Max Ponding Depth 0.00 m
Downstream W/L 91.33 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 5-year Water Level | 92.31 | 0.56 | 13.5 | 0.0 | 10.4 | OK |

**Subdrainage Area:** L103A — Controlled - Tributary
**Area (ha):** 0.14
**C:** 0.75

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 22.4 | 22.4 | 0.0 | **0.0** |
| 20 | 52.0 | 15.2 | 15.2 | 0.0 | **0.0** |
| 30 | 40.0 | 11.7 | 11.7 | 0.0 | **0.0** |
| 40 | 32.9 | 9.6 | 9.6 | 0.0 | **0.0** |
| 50 | 28.0 | 8.2 | 8.2 | 0.0 | **0.0** |
| 60 | 24.6 | 7.2 | 7.2 | 0.0 | **0.0** |
| 70 | 21.9 | 6.4 | 6.4 | 0.0 | **0.0** |
| 80 | 19.8 | 5.8 | 5.8 | 0.0 | **0.0** |
| 90 | 18.1 | 5.3 | 5.3 | 0.0 | **0.0** |
| 100 | 16.7 | 4.9 | 4.9 | 0.0 | **0.0** |
| 110 | 15.6 | 4.5 | 4.5 | 0.0 | **0.0** |
| 120 | 14.6 | 4.3 | 4.3 | 0.0 | **0.0** |

Storage: Above CB

Orifice Equation: CdA(2gh)^0.5 — Where C = 0.57
Orifice Diameter: 127 mm
Invert Elevation 91.62 m
T/G Elevation 93.00 m
Max Ponding Depth 0.00 m
Downstream W/L 91.33 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 5-year Water Level | 92.17 | 0.49 | 22.4 | 0.0 | 18.0 | OK |

**Subdrainage Area:** L107C — Controlled - Tributary
**Area (ha):** 0.13
**C:** 0.26

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 7.2 | 7.2 | 0.0 | **0.0** |
| 20 | 52.0 | 4.9 | 4.9 | 0.0 | **0.0** |
| 30 | 40.0 | 3.8 | 3.8 | 0.0 | **0.0** |
| 40 | 32.9 | 3.1 | 3.1 | 0.0 | **0.0** |
| 50 | 28.0 | 2.6 | 2.6 | 0.0 | **0.0** |
| 60 | 24.6 | 2.3 | 2.3 | 0.0 | **0.0** |
| 70 | 21.9 | 2.1 | 2.1 | 0.0 | **0.0** |
| 80 | 19.8 | 1.9 | 1.9 | 0.0 | **0.0** |
| 90 | 18.1 | 1.7 | 1.7 | 0.0 | **0.0** |
| 100 | 16.7 | 1.6 | 1.6 | 0.0 | **0.0** |
| 110 | 15.6 | 1.5 | 1.5 | 0.0 | **0.0** |
| 120 | 14.6 | 1.4 | 1.4 | 0.0 | **0.0** |

Storage: Above CB

Orifice Equation: CdA(2gh)^0.5 — Where C = 0.57
Orifice Diameter: 83 mm
Invert Elevation 91.72 m
T/G Elevation 93.10 m
Max Ponding Depth 0.00 m
Downstream W/L 0.00 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 5-year Water Level | 92.04 | 0.28 | 7.2 | 0.0 | 60.0 | OK |

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**Subdrainage Area:** L201A — Controlled - Tributary
**Area (ha):** 0.07
**C:** 1.00

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 34.7 | 22.0 | 12.7 | **7.6** |
| 20 | 120.0 | 23.3 | 22.0 | 1.3 | 1.6 |
| 30 | 91.9 | 17.9 | 17.9 | 0.0 | 0.0 |
| 40 | 75.1 | 14.6 | 14.6 | 0.0 | 0.0 |
| 50 | 64.0 | 12.4 | 12.4 | 0.0 | 0.0 |
| 60 | 55.9 | 10.9 | 10.9 | 0.0 | 0.0 |
| 70 | 49.8 | 9.7 | 9.7 | 0.0 | 0.0 |
| 80 | 45.0 | 8.8 | 8.8 | 0.0 | 0.0 |
| 90 | 41.1 | 8.0 | 8.0 | 0.0 | 0.0 |
| 100 | 37.9 | 7.4 | 7.4 | 0.0 | 0.0 |
| 110 | 35.2 | 6.9 | 6.9 | 0.0 | 0.0 |
| 120 | 32.9 | 6.4 | 6.4 | 0.0 | 0.0 |

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.57
Orifice Diameter: 95 mm
Invert Elevation 91.70 m
T/G Elevation 93.08 m
Max Ponding Depth 0.17 m
Downstream W/L 91.33 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 100-year Water Level | 93.25 | 1.50 | 22.0 | 7.6 | 10.4 | OK |
| | | | | | 2.76 | |

**Subdrainage Area:** L103A — Controlled - Tributary
**Area (ha):** 0.14
**C:** 0.94

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 65.2 | 39.5 | 25.6 | **15.4** |
| 20 | 120.0 | 43.8 | 39.5 | 4.2 | 5.1 |
| 30 | 91.9 | 33.5 | 33.5 | 0.0 | 0.0 |
| 40 | 75.1 | 27.4 | 27.4 | 0.0 | 0.0 |
| 50 | 64.0 | 23.3 | 23.3 | 0.0 | 0.0 |
| 60 | 55.9 | 20.4 | 20.4 | 0.0 | 0.0 |
| 70 | 49.8 | 18.2 | 18.2 | 0.0 | 0.0 |
| 80 | 45.0 | 16.4 | 16.4 | 0.0 | 0.0 |
| 90 | 41.1 | 15.0 | 15.0 | 0.0 | 0.0 |
| 100 | 37.9 | 13.8 | 13.8 | 0.0 | 0.0 |
| 110 | 35.2 | 12.8 | 12.8 | 0.0 | 0.0 |
| 120 | 32.9 | 12.0 | 12.0 | 0.0 | 0.0 |

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.57
Orifice Diameter: 127 mm
Invert Elevation 91.62 m
T/G Elevation 93.00 m
Max Ponding Depth 0.20 m
Downstream W/L 91.33 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 100-year Water Level | 93.20 | 1.52 | 39.5 | 15.4 | 18.0 | OK |
| | | | | | 2.62 | |

**Subdrainage Area:** L107C — Controlled - Tributary
**Area (ha):** 0.13
**C:** 0.33

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 21.0 | 17.5 | 3.4 | **2.1** |
| 20 | 120.0 | 14.1 | 14.1 | 0.0 | 0.0 |
| 30 | 91.9 | 10.8 | 10.8 | 0.0 | 0.0 |
| 40 | 75.1 | 8.8 | 8.8 | 0.0 | 0.0 |
| 50 | 64.0 | 7.5 | 7.5 | 0.0 | 0.0 |
| 60 | 55.9 | 6.6 | 6.6 | 0.0 | 0.0 |
| 70 | 49.8 | 5.8 | 5.8 | 0.0 | 0.0 |
| 80 | 45.0 | 5.3 | 5.3 | 0.0 | 0.0 |
| 90 | 41.1 | 4.8 | 4.8 | 0.0 | 0.0 |
| 100 | 37.9 | 4.5 | 4.5 | 0.0 | 0.0 |
| 110 | 35.2 | 4.1 | 4.1 | 0.0 | 0.0 |
| 120 | 32.9 | 3.9 | 3.9 | 0.0 | 0.0 |

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.57
Orifice Diameter: 83 mm
Invert Elevation 91.72 m
T/G Elevation 93.10 m
Max Ponding Depth 0.30 m
Downstream W/L 0.00 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 100-year Water Level | 93.40 | 1.64 | 17.5 | 2.1 | 60.0 | OK |
| | | | | | 57.94 | |

# Stormwater Management Calculations

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**Subdrainage Area:** L107A — Uncontrolled - Tributary
**Area (ha):** 0.48
**C:** 0.49

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 50.2 | 50.2 | | |
| 20 | 52.0 | 34.0 | 34.0 | | |
| 30 | 40.0 | 26.2 | 26.2 | | |
| 40 | 32.9 | 21.5 | 21.5 | | |
| 50 | 28.0 | 18.3 | 18.3 | | |
| 60 | 24.6 | 16.1 | 16.1 | | |
| 70 | 21.9 | 14.3 | 14.3 | | |
| 80 | 19.8 | 13.0 | 13.0 | | |
| 90 | 18.1 | 11.9 | 11.9 | | |
| 100 | 16.7 | 10.9 | 10.9 | | |
| 110 | 15.6 | 10.2 | 10.2 | | |
| 120 | 14.6 | 9.5 | 9.5 | | |

**Subdrainage Area:** L104C — Uncontrolled - Tributary
**Area (ha):** 0.20
**C:** 0.90

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 38.4 | 38.4 | | |
| 20 | 52.0 | 26.0 | 26.0 | | |
| 30 | 40.0 | 20.0 | 20.0 | | |
| 40 | 32.9 | 16.4 | 16.4 | | |
| 50 | 28.0 | 14.0 | 14.0 | | |
| 60 | 24.6 | 12.3 | 12.3 | | |
| 70 | 21.9 | 11.0 | 11.0 | | |
| 80 | 19.8 | 9.9 | 9.9 | | |
| 90 | 18.1 | 9.1 | 9.1 | | |
| 100 | 16.7 | 8.4 | 8.4 | | |
| 110 | 15.6 | 7.8 | 7.8 | | |
| 120 | 14.6 | 7.3 | 7.3 | | |

**Subdrainage Area:** L104B — Uncontrolled - Tributary
**Area (ha):** 0.19
**C:** 0.90

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 36.5 | 36.5 | | |
| 20 | 52.0 | 24.7 | 24.7 | | |
| 30 | 40.0 | 19.0 | 19.0 | | |
| 40 | 32.9 | 15.6 | 15.6 | | |
| 50 | 28.0 | 13.3 | 13.3 | | |
| 60 | 24.6 | 11.7 | 11.7 | | |
| 70 | 21.9 | 10.4 | 10.4 | | |
| 80 | 19.8 | 9.4 | 9.4 | | |
| 90 | 18.1 | 8.6 | 8.6 | | |
| 100 | 16.7 | 8.0 | 8.0 | | |
| 110 | 15.6 | 7.4 | 7.4 | | |
| 120 | 14.6 | 6.9 | 6.9 | | |

**Subdrainage Area:** TANK — Controlled - Tributary
**Area (ha):** 0.00
**C:** 0.00 *Includes runoff from all upstream tributary areas

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 238.3 | 60.0 | 178.3 | 107.0 |
| 20 | 52.0 | 162.2 | 60.0 | 102.2 | **122.7** |
| 30 | 40.0 | 124.8 | 60.0 | 64.8 | 116.7 |
| 40 | 32.9 | 102.5 | 60.0 | 42.5 | 101.9 |
| 50 | 28.0 | 87.4 | 60.0 | 27.4 | 82.3 |
| 60 | 24.6 | 76.6 | 60.0 | 16.6 | 59.6 |
| 70 | 21.9 | 68.3 | 60.0 | 8.3 | 34.9 |
| 80 | 19.8 | 61.8 | 60.0 | 1.8 | 8.7 |
| 90 | 18.1 | 56.6 | 56.6 | 0.0 | 0.0 |
| 100 | 16.7 | 52.2 | 52.2 | 0.0 | 0.0 |
| 110 | 15.6 | 48.5 | 48.5 | 0.0 | 0.0 |
| 120 | 14.6 | 45.4 | 45.4 | 0.0 | 0.0 |

Storage: Underground Tank

Orifice Equation: CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 200 mm
Invert Elevation 89.51 m
T/G Elevation 93.37 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 5-year Water Level | 90.11 | 0.50 | 60.0 | 122.7 | 122.7 | OK |

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**Subdrainage Area:** L107A — Uncontrolled - Tributary
**Area (ha):** 0.48
**C:** 0.61

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 145.9 | 145.9 | | |
| 20 | 120.0 | 98.0 | 98.0 | | |
| 30 | 91.9 | 75.1 | 75.1 | | |
| 40 | 75.1 | 61.4 | 61.4 | | |
| 50 | 64.0 | 52.3 | 52.3 | | |
| 60 | 55.9 | 45.7 | 45.7 | | |
| 70 | 49.8 | 40.7 | 40.7 | | |
| 80 | 45.0 | 36.8 | 36.8 | | |
| 90 | 41.1 | 33.6 | 33.6 | | |
| 100 | 37.9 | 31.0 | 31.0 | | |
| 110 | 35.2 | 28.8 | 28.8 | | |
| 120 | 32.9 | 26.9 | 26.9 | | |

**Subdrainage Area:** L104C — Uncontrolled - Tributary
**Area (ha):** 0.20
**C:** 1.00

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 99.3 | 99.3 | | |
| 20 | 120.0 | 66.7 | 66.7 | | |
| 30 | 91.9 | 51.1 | 51.1 | | |
| 40 | 75.1 | 41.8 | 41.8 | | |
| 50 | 64.0 | 35.6 | 35.6 | | |
| 60 | 55.9 | 31.1 | 31.1 | | |
| 70 | 49.8 | 27.7 | 27.7 | | |
| 80 | 45.0 | 25.0 | 25.0 | | |
| 90 | 41.1 | 22.9 | 22.9 | | |
| 100 | 37.9 | 21.1 | 21.1 | | |
| 110 | 35.2 | 19.6 | 19.6 | | |
| 120 | 32.9 | 18.3 | 18.3 | | |

**Subdrainage Area:** L104B — Uncontrolled - Tributary
**Area (ha):** 0.19
**C:** 1.00

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 94.3 | 94.3 | | |
| 20 | 120.0 | 63.4 | 63.4 | | |
| 30 | 91.9 | 48.5 | 48.5 | | |
| 40 | 75.1 | 39.7 | 39.7 | | |
| 50 | 64.0 | 33.8 | 33.8 | | |
| 60 | 55.9 | 29.5 | 29.5 | | |
| 70 | 49.8 | 26.3 | 26.3 | | |
| 80 | 45.0 | 23.8 | 23.8 | | |
| 90 | 41.1 | 21.7 | 21.7 | | |
| 100 | 37.9 | 20.0 | 20.0 | | |
| 110 | 35.2 | 18.6 | 18.6 | | |
| 120 | 32.9 | 17.4 | 17.4 | | |

**Subdrainage Area:** TANK — Controlled - Tributary
**Area (ha):** 0.00
**C:** 0.00 *Includes runoff from all upstream tributary areas

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 527.3 | 111.3 | 416.0 | 249.6 |
| 20 | 120.0 | 403.9 | 111.3 | 292.6 | 351.1 |
| 30 | 91.9 | 323.2 | 111.3 | 211.9 | 381.4 |
| 40 | 75.1 | 271.6 | 111.3 | 160.3 | **384.7** |
| 50 | 64.0 | 234.2 | 111.3 | 122.9 | 368.6 |
| 60 | 55.9 | 204.7 | 111.3 | 93.4 | 336.2 |
| 70 | 49.8 | 182.4 | 111.3 | 71.0 | 298.4 |
| 80 | 45.0 | 164.8 | 111.3 | 53.5 | 256.6 |
| 90 | 41.1 | 150.6 | 111.3 | 39.2 | 211.9 |
| 100 | 37.9 | 138.8 | 111.3 | 27.5 | 165.0 |
| 110 | 35.2 | 128.9 | 111.3 | 17.6 | 116.2 |
| 120 | 32.9 | 120.5 | 111.3 | 9.2 | 65.9 |

Storage: Underground Tank

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.61
Orifice Diameter: 200 mm
Invert Elevation 89.51 m
T/G Elevation 93.37 m

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 100-year Water Level | 91.33 | 1.72 | 111.3 | 384.7 | 400.0 | OK |
| | | | | | 15.32 | |

# Stormwater Management Calculations

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**Subdrainage Area:** L104A — Controlled - Tributary
**Area (ha):** 0.10
**C:** 0.78

| tc (min) | I (2 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 76.8 | 16.7 | 15.9 | 0.8 | **0.5** |
| 20 | 52.0 | 11.3 | 11.3 | 0.0 | 0.0 |
| 30 | 40.0 | 8.7 | 8.7 | 0.0 | 0.0 |
| 40 | 32.9 | 7.1 | 7.1 | 0.0 | 0.0 |
| 50 | 28.0 | 6.1 | 6.1 | 0.0 | 0.0 |
| 60 | 24.6 | 5.3 | 5.3 | 0.0 | 0.0 |
| 70 | 21.9 | 4.8 | 4.8 | 0.0 | 0.0 |
| 80 | 19.8 | 4.3 | 4.3 | 0.0 | 0.0 |
| 90 | 18.1 | 3.9 | 3.9 | 0.0 | 0.0 |
| 100 | 16.7 | 3.6 | 3.6 | 0.0 | 0.0 |
| 110 | 15.6 | 3.4 | 3.4 | 0.0 | 0.0 |
| 120 | 14.6 | 3.2 | 3.2 | 0.0 | 0.0 |

Storage: Surface Storage Above CB

| | | | | |
|---|---|---|---|---|
| Orifice Equation: | ː CdA(2gh)^0.5 | | Where C = | 0.57 |
| Orifice Diameter: | 83 | mm | | |
| Invert Elevation | 91.64 | m | Vol within CB = 0.5m3 | |
| T/G Elevation | 93.02 | m | | |
| Max Ponding Depth | 0.00 | m | | |
| Downstream W/L | 0.00 | m | | |

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 5-year Water Level | 93.02 | 1.34 | 15.9 | 0.5 | 25.1 | OK |

**SUMMARY TO OUTLET**

| | | | Vrequired | Vavailable* |
|---|---|---|---|---|
| **Tributary Area** | 1.660 | ha | | |
| **Total 2yr Flow to Sewer** | 60.0 | L/s | 123 | 287 $m^3$ |
| **Non-Tributary Area** | 0.080 | ha | | |
| **Total 2yr Flow Uncontrolled** | 13.2 | L/s | | |
| **Total Area** | 1.740 | ha | | |
| **Total 2yr Flow** | 60.0 | L/s | | |
| **Target** | 113.0 | L/s | | |

**Project #PROJECT # 160402150, Riverside South Community Centre and Library**
**Modified Rational Method Calculations for Storage**

**Subdrainage Area:** L104A — Controlled - Tributary
**Area (ha):** 0.10
**C:** 0.98

| tc (min) | I (100 yr) (mm/hr) | Qactual (L/s) | Qrelease (L/s) | Qstored (L/s) | Vstored (m^3) |
|---|---|---|---|---|---|
| 10 | 178.6 | 48.4 | 17.3 | 31.1 | **18.7** |
| 20 | 120.0 | 32.5 | 17.3 | 15.2 | 18.3 |
| 30 | 91.9 | 24.9 | 17.3 | 7.6 | 13.7 |
| 40 | 75.1 | 20.4 | 17.3 | 3.1 | 7.4 |
| 50 | 64.0 | 17.3 | 17.3 | 0.1 | 0.2 |
| 60 | 55.9 | 15.2 | 15.2 | 0.0 | 0.0 |
| 70 | 49.8 | 13.5 | 13.5 | 0.0 | 0.0 |
| 80 | 45.0 | 12.2 | 12.2 | 0.0 | 0.0 |
| 90 | 41.1 | 11.1 | 11.1 | 0.0 | 0.0 |
| 100 | 37.9 | 10.3 | 10.3 | 0.0 | 0.0 |
| 110 | 35.2 | 9.5 | 9.5 | 0.0 | 0.0 |
| 120 | 32.9 | 8.9 | 8.9 | 0.0 | 0.0 |

Storage: Surface Storage Above CB

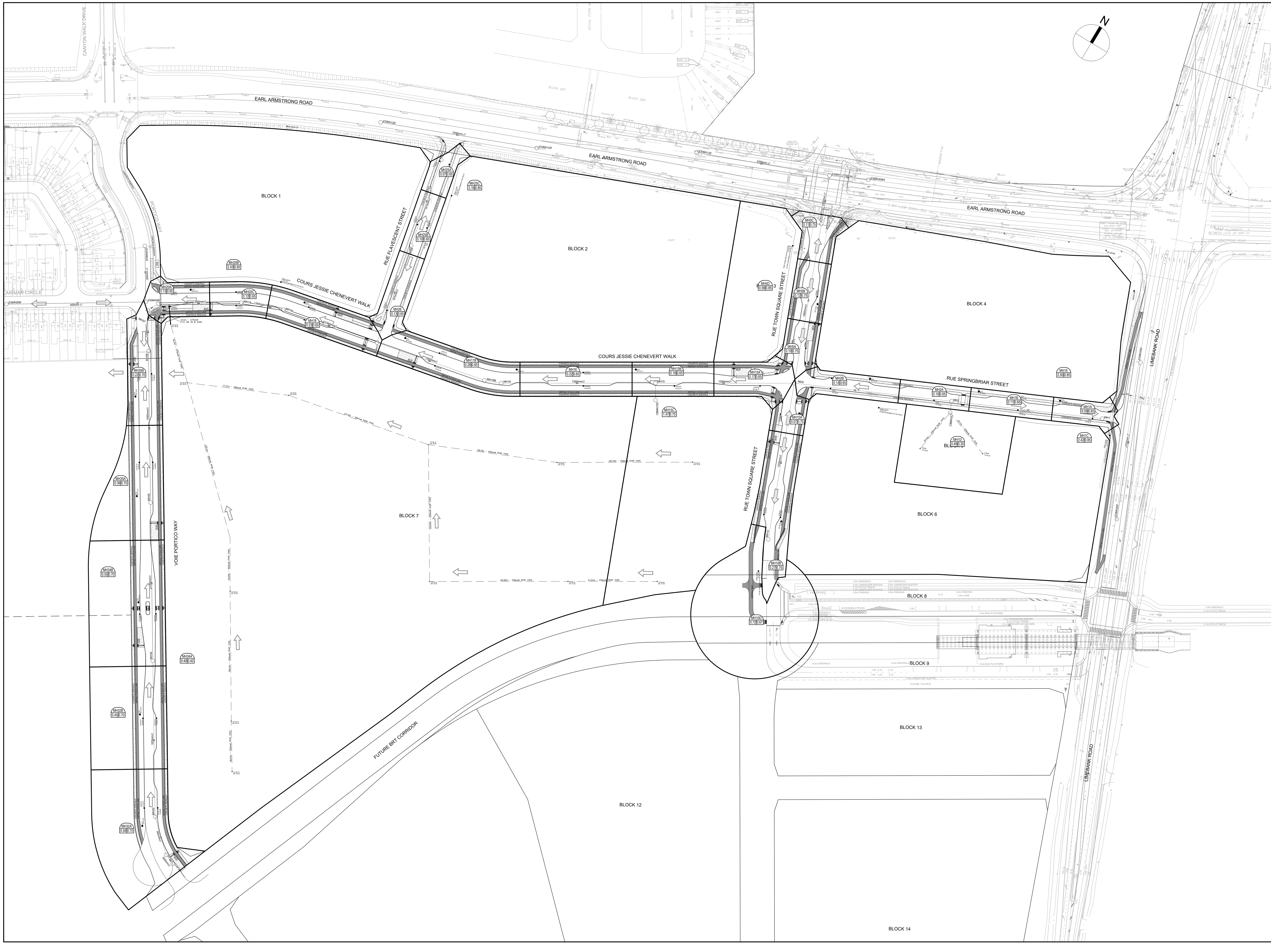
| | | | |
|---|---|---|---|
| Orifice Equation: | Q = CdA(2gh)^0.5 | Where C = | 0.57 |
| Orifice Diameter: | 83 mm | | |
| Invert Elevation | 91.64 m | | |
| T/G Elevation | 93.02 m | | |
| Max Ponding Depth | 0.25 m | | |
| Downstream W/L | 91.33 m | | |

| | Stage | Head (m) | Discharge (L/s) | Vreq (cu. m) | Vavail (cu. m) | Volume Check |
|---|---|---|---|---|---|---|
| 100-year Water Level | 93.27 | 1.59 | 17.3 | 18.7 | 25.1 | OK |
| | | | | | 6.43 | |

**SUMMARY TO OUTLET**

| | | | Vrequired | Vavailable* |
|---|---|---|---|---|
| **Tributary Area** | 1.660 | ha | | |
| **Total 100yr Flow to Sewer** | 111.3 | L/s | 461 | 564 $m^3$ |
| **Non-Tributary Area** | 0.080 | ha | | |
| **Total 100yr Flow Uncontrolled** | 36.6 | L/s | | |
| **Total Area** | 1.740 | ha | | |
| **Total 100yr Flow** | 111.3 | L/s | | |
| **Target** | 113.0 | L/s | | |

## C.3 Storm Design Background Report Excerpts




CLIENT

Riverside South

COPYRIGHT

This drawing has been prepared solely for the intended use, thus any reproduction or distribution for any purpose other than authorized by Arcadis is forbidden. Written dimensions shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job, and Arcadis shall be informed of any variations from the dimensions and conditions shown on the drawing. Shop drawings shall be submitted to Arcadis for general conformance before proceeding with fabrication.

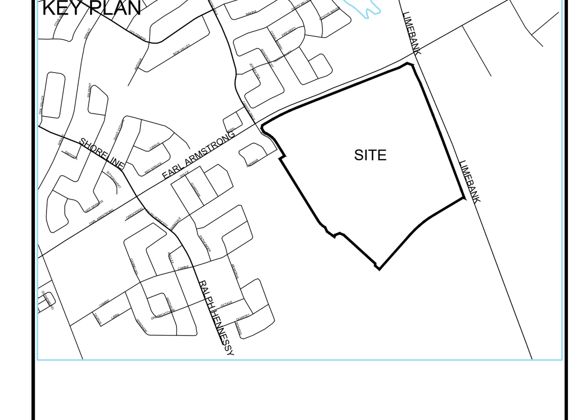
**Arcadis Professional Services (Canada) Inc.**
formerly IBI Group Professional Services (Canada) Inc.

ISSUES

| No. | DESCRIPTION | DATE |
|---|---|---|
| 1 | SUBMISSION 1 FOR CITY REVIEW | 2024-07-19 |
| 2 | SUBMISSION 2 FOR CITY REVIEW | 2024-10-29 |
| 3 | SUBMISSION 3 FOR CITY REVIEW | 2025-01-17 |

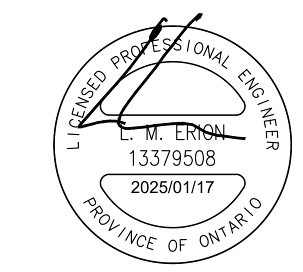
SEE 010, 011 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN




1:1250

SEAL




PRIME CONSULTANT

ARCADIS

333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
**www.arcadis.com**

PROJECT

RSS TOWN CENTER
980 EARL ARMSTRONG & 4700 LIMEBANK ROAD
PHASE 7A

| PROJECT NO: 144320 | |
|---|---|
| DRAWN BY: **C.C** | CHECKED BY: **L.E.** |
| PROJECT MGR: **L.E.** | APPROVED BY: **L.E.** |

SHEET TITLE

STORM DRAINAGE AREA PLAN

| SHEET NUMBER | ISSUE |
|---|---|
| 500 | 3 |

File Location: J:\144320_Riverside\7.0_Production\7.03_Design\04_Civil\Sheets\500 STORM DRAINAGE AREA PLAN.dwg Last Saved: October 29, 2024, by donel5754 Plotted: January 20, 2025 2:50:54 PM by Cormier, Chris

D07-XX-XX-XXXX

SCALE CHECK 1 in 10mm

XXXXX

**ARCADIS IBI GROUP**
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
ibigroup.com

**STORM SEWER DESIGN SHEET**
RSS Town Center - Phase 7A
Riverside South Development Corporation
City of Ottawa

| LOCATION | | | | AREA (Ha) | | | | | | | | | | | | | RATIONAL DESIGN FLOW | | | | | | | | | | | | | | | | | | | | SEWER DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2 YEAR | | | | | | | | 5 YEAR | | | 100 YEAR | | 2 YEAR | | 5 YEAR | | 100 YEAR | | | | | | | | | | | | | | | | | | | | | | | | |
| STREET | AREA ID | FROM | TO | C= 0.20 | C= 0.30 | C= 0.40 | C= 0.65 | C= 0.70 | C= 0.75 | C= 0.85 | C= 0.90 | C= 0.65 | C= 0.70 | C= 0.75 | C= 0.67 | C= 0.75 | IND 2.78AC | CUM 2.78AC | IND 2.78AC | CUM 2.78AC | IND 2.78AC | CUM 2.78AC | INLET (min) | TIME IN PIPE | TOTAL (min) | i (2) (mm/hr) | i (5) (mm/hr) | i (10) (mm/hr) | i (100) (mm/hr) | 2yr PEAK FLOW (L/s) | 5yr PEAK FLOW (L/s) | 10yr PEAK FLOW (L/s) | 100yr PEAK FLOW (L/s) | FIXED FLOW IND | FIXED FLOW CUM | DESIGN FLOW (L/s) | CAPACITY (L/s) | LENGTH (m) | PIPE SIZE (mm) DIA | W | H | SLOPE (%) | VELOCITY (m/s) | AVAIL CAP (2yr) (L/s) | (%) |
| Portico Way | | CAP30 | MH31 | | | | | | | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | | | 10.00 | 0.17 | 10.17 | 76.81 | 104.19 | 122.14 | 178.56 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 59.68 | 8.25 | 300 | | | 0.35 | 0.818 | 59.68 | 100.00% |
| | | MH31 | MH32 | | | | | | | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | | | 10.17 | 0.61 | 10.78 | 76.17 | 103.31 | 121.10 | 177.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 59.68 | 30.13 | 300 | | | 0.35 | 0.818 | 59.68 | 100.00% |
| | MH32A&B | MH32 | MH34 | | | | | | | | | | 1.01 | | | | 0.00 | 0.00 | 1.97 | 1.97 | | | 10.78 | 1.96 | 12.74 | 73.93 | 100.24 | 117.48 | 171.71 | 0.00 | 197.01 | 0.00 | 0.00 | 0.00 | 0.00 | 197.01 | 224.33 | 118.12 | 525 | | | 0.25 | 1.004 | 27.32 | 12.18% |
| | MH34A&B | MH34 | MH35 | | | 9.40 | | | | | | | 0.55 | | | | 10.45 | 10.45 | 1.07 | 3.04 | | | 12.74 | 1.62 | 14.36 | 67.66 | 91.64 | 107.36 | 156.85 | 707.27 | 278.19 | 0.00 | 0.00 | 0.00 | 0.00 | 985.46 | 1,103.33 | 120.00 | 1050 | | | 0.15 | 1.234 | 117.87 | 10.68% |
| | MH35A,B&C | MH35 | MH36 | | | | | | | | | | 0.58 | | | | 0.00 | 10.45 | 1.13 | 4.16 | | | 14.36 | 1.55 | 15.91 | 63.31 | 85.67 | 100.34 | 146.54 | 661.78 | 356.77 | 0.00 | 0.00 | 0.00 | 0.00 | 1,018.56 | 1,103.33 | 114.85 | 1050 | | | 0.15 | 1.234 | 84.78 | 7.68% |
| | | MH36 | MH37 | | | | | | | | | | | | | | 0.00 | 10.45 | 0.00 | 4.16 | | | 15.91 | 0.47 | 16.38 | 59.69 | 80.72 | 94.51 | 137.99 | 623.93 | 336.13 | 0.00 | 0.00 | 0.00 | 0.00 | 960.07 | 1,286.19 | 31.10 | 1200 | | | 0.10 | 1.102 | 326.13 | 25.36% |
| | | MH37 | MH20 | | | | | | | | | | | | | | 0.00 | 10.45 | 0.00 | 4.16 | | | 16.38 | 0.14 | 16.52 | 58.68 | 79.33 | 92.89 | 135.61 | 613.38 | 330.38 | 0.00 | 0.00 | 0.00 | 0.00 | 943.77 | 1,286.19 | 9.16 | 1200 | | | 0.10 | 1.102 | 342.43 | 26.62% |
| Jessie Chenevert Walk | | | | | | | | | | 2.43 | | 0.25 | | | | | 5.74 | 16.19 | 0.45 | 4.62 | | | 16.52 | 0.80 | 17.33 | 58.39 | 78.94 | 92.42 | 134.92 | 945.64 | 364.39 | 0.00 | 0.00 | 0.00 | 0.00 | 1,310.03 | 1,928.87 | 63.00 | 1350 | | | 0.12 | 1.305 | 618.84 | 32.08% |
| | | MH19 | MH18 | | | | | | | | | | | | | | 0.00 | 16.19 | 0.00 | 4.62 | | | 17.33 | 0.41 | 17.74 | 56.77 | 76.72 | 89.81 | 131.10 | 919.37 | 354.16 | 0.00 | 0.00 | 0.00 | 0.00 | 1,273.52 | 1,928.87 | 32.43 | 1350 | | | 0.12 | 1.305 | 655.35 | 33.98% |
| | MH18 | MH18 | MH17 | | | | | | | | | 0.23 | | | | | 0.00 | 16.19 | 0.42 | 5.03 | | | 17.74 | 0.96 | 18.70 | 55.97 | 75.63 | 88.53 | 129.22 | 906.47 | 380.57 | 0.00 | 0.00 | 0.00 | 0.00 | 1,287.03 | 1,928.87 | 75.16 | 1350 | | | 0.12 | 1.305 | 641.84 | 33.28% |
| Flavescent Street | | | | | | | 0.17 | | | 3.16 | | | | | | | 7.77 | 7.77 | | | | | 10.00 | 1.19 | 11.19 | 76.81 | 104.19 | 122.14 | 178.56 | 597.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 622.60 | 739.33 | 68.64 | 975 | | | 0.10 | 0.959 | 116.72 | 15.79% |
| | MH26 | MH26 | MH17 | | | | 0.13 | | | | | | | | | | 0.23 | 8.01 | | | | | 11.19 | 1.36 | 12.55 | 72.51 | 98.29 | 115.19 | 168.35 | 580.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 622.60 | 739.33 | 78.00 | 975 | | | 0.10 | 0.959 | 116.72 | 15.79% |
| Jessie Chenevert Walk | | | | | | | | | | | | 0.28 | | | | | 0.00 | 24.20 | 0.51 | 5.54 | | | 18.70 | 1.10 | 19.80 | 54.22 | 73.24 | 85.72 | 125.10 | 1,312.32 | 405.57 | 0.00 | 0.00 | 0.00 | 0.00 | 1,717.88 | 1,928.87 | 86.35 | 1350 | | | 0.12 | 1.305 | 210.99 | 10.94% |
| | | MH16B | MH16 | | | | | | | | | | | | | | 0.00 | 24.20 | 0.00 | 5.54 | | | 19.80 | 0.16 | 19.97 | 52.35 | 70.68 | 82.72 | 120.70 | 1,267.06 | 391.44 | 0.00 | 0.00 | 0.00 | 0.00 | 1,658.50 | 1,928.87 | 12.85 | 1350 | | | 0.12 | 1.305 | 270.37 | 14.02% |
| | MH16 | MH16 | MH15 | | | | | | | | | 0.22 | | | | | 0.00 | 24.20 | 0.40 | 5.94 | | | 19.97 | 1.49 | 21.46 | 52.08 | 70.32 | 82.29 | 120.07 | 1,260.63 | 417.38 | 0.00 | 0.00 | 0.00 | 0.00 | 1,678.01 | 1,928.87 | 117.00 | 1350 | | | 0.12 | 1.305 | 250.87 | 13.01% |
| | MH15A,B&C | MH15 | MH5 | | | | | | 1.47 | | | 0.33 | | | | | 3.06 | 27.27 | 0.60 | 6.53 | | | 21.46 | 1.34 | 22.80 | 49.79 | 67.20 | 78.62 | 114.69 | 1,357.81 | 438.91 | 0.00 | 0.00 | 0.00 | 0.00 | 1,796.72 | 1,928.87 | 105.20 | 1350 | | | 0.12 | 1.305 | 132.15 | 6.85% |
| Springbriar Street | | | | | 0.49 | | 0.20 | | | 4.92 | | | | | | | 12.40 | 12.40 | | | | | 10.00 | 1.55 | 11.55 | 76.81 | 104.19 | 122.14 | 178.56 | 952.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 952.08 | 1,103.33 | 114.99 | 1050 | | | 0.15 | 1.234 | 151.26 | 13.71% |
| | MH2A&B | MH2 | MH5 | | | | 0.24 | | | | | | | | | | 0.43 | 12.83 | | | | | 11.55 | 1.62 | 13.17 | 71.32 | 96.65 | 113.26 | 165.51 | 914.97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 914.97 | 1,103.33 | 120.00 | 1050 | | | 0.15 | 1.234 | 188.36 | 17.07% |
| Town Square Street | | | | | | | | | | | | | | 0.07 | 0.72 | 0.27 | 0.00 | 0.00 | 0.15 | 6.68 | 1.90 | 1.90 | 10.00 | 1.82 | 11.82 | 76.81 | 104.19 | 122.14 | 178.56 | 0.00 | 695.76 | 0.00 | 339.98 | 0.00 | 0.00 | 1,035.74 | 1,286.19 | 120.00 | 1200 | | | 0.10 | 1.102 | 250.46 | 19.47% |
| Town Square Street | | | | | | | | | | 0.58 | | | | 0.33 | | | 1.37 | 41.47 | 0.69 | 7.37 | 0.00 | 1.90 | 22.80 | 0.77 | 23.58 | 47.92 | 64.64 | 75.62 | 110.29 | 1,987.08 | 476.12 | 0.00 | 210.00 | 0.00 | 0.00 | 2,673.20 | 8,130.98 | 122.53 | 1950 | | | 0.30 | 2.638 | 5457.77 | 67.12% |
| | | 2EX-125 | 2EX-131 | | | | | | | | | | | | | | 0.00 | 41.47 | 0.00 | 7.37 | 0.00 | 1.90 | 23.58 | 0.40 | 23.98 | 46.91 | 63.26 | 74.00 | 107.92 | 1,945.13 | 465.97 | 0.00 | 205.48 | 0.00 | 0.00 | 2,616.58 | 4,694.42 | 37.00 | 1950 | | | 0.10 | 1.523 | 2077.84 | 44.26% |

**Definitions:**
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

**Notes:**
1. Mannings coefficient (n) = 0.013

**Designed:** LME

**Checked:**

**Dwg. Reference:** 144320-500

| No. | Revision | Date |
|---|---|---|
| 1. | Submission No. 1 | 2024-07-19 |
| 2. | Submission No. 2 | 2024-10-29 |
| 3. | Submission No. 3 | 2025-01-16 |

| File Reference: | Date: | Sheet No: |
|---|---|---|
| 144320-6.04 | 2025-01-15 | 1 of 1 |

| DRAINAGE AREA ID | CONTINUOUS/ SAG | ROAD TYPE | MINOR SYSTEM DESIGN TARGET (BASED ON ROAD TYPE) | | 100 YEAR CAPTURED FLOW (L/S) (3 HOUR CHICAGO STORM) | ICD ORIFICE SIZE (MM DIA.) (TWO ICDs PER DRAINAGE AREA) | |
|---|---|---|---|---|---|---|---|
| | | | MINOR SYSTEM DESIGN STORM | GENERATED FLOW ON INDIVIDUAL SEGMENT SIMULATED (L/S) | | | |
| S2B-Ph7A | Sag | 26mROW-9.4mAsphalt | 5 | 26.9 | 33.7 | 83 | 83 |
| S32A-Ph7A | Sag | 26mROW-9.4mAsphalt | 5 | 127.0 | 141.6 | 178 | 152 |
| S32B-Ph7A | Sag | 26mROW-9.4mAsphalt | 5 | 102.8 | 119.3 | 152 | 152 |
| S20C-Ph7A | Sag | 26mROW-9.4mAsphalt | 5 | 21.8 | 33.8 | 83 | 83 |
| S34B-Ph7A | Sag | 26mROW-9.4mAsphalt | 5 | 125.6 | 143.4 | 178 | 152 |
| S35A-Ph7A | Sag | 26mROW-9.4mAsphalt | 5 | 82.8 | 134.0 | 178 | 152 |
| S35B-Ph7A | Sag | 26mROW-9.4mAsphalt | 5 | 50.1 | 51.6 | 102 | 102 |
| S5A-Ph7A | Sag | 26mROW-12mAsphalt | 2 | 16.2 | 33.5 | 83 | 83 |
| S5B-Ph7A | Sag | 26mROW-12mAsphalt | 2 | 20.0 | 34.4 | 83 | 83 |
| S5C-Ph7A | Sag | 26mROW-12mAsphalt | 2 | 18.3 | 42.4 | 94 | 94 |
| Development Blocks | | | | | | | |
| B20B-Ph7A | Block | Rear Yard | 2 | 478.8 | 479.0 | n/a | |
| B25C-Ph7A | Block | Rear Yard | 2 | 621.7 | 622.0 | n/a | |
| B1C-Ph7A | Block | Rear Yard | 2 | 476.2 | 477.0 | n/a | |
| B1D-Ph7A | Block | Rear Yard | 2 | 15.4 | 16.0 | n/a | |
| B1E-Ph7A | Block | Rear Yard | 2 | 492.6 | 493.0 | n/a | |
| B15C-Ph7A | Block | Rear Yard | 2 | 113.0 | 113.0 | n/a | |
| B34A-Ph7A | Block | Rear Yard | 2 | 578.7 | 579.0 | n/a | |
| B5D-Ph7A | Block | Rear Yard | 2 | 114.6 | 115.0 | n/a | |
| EXT-Ph7A | External | External | 100 | 307.4 | 307 | n/a | |

The available on-site storage and the results of the PCSWMM evaluation for Town Center Phase 7A are presented in **Table 4-**. The ponding plan is presented on **Drawing 144320-200** to **Drawing 144320-202.**

# Appendix D Geotechnical Report Excerpts

# 3.0 Method of Investigation

## 3.1 Field Investigation

### Field Program

The field program for the current geotechnical investigation was carried out between April 2 to April 8, 2024, and consisted of advancing a total of 19 boreholes to a maximum depth of 11.3 m below the existing ground surface. In addition, a number of previous investigations have been carried out by Paterson and others within the subject site and on adjacent sites in the last several years.

The test hole locations were distributed in a manner to provide general coverage of the subject site and taking into consideration underground utilities and site features. The borehole locations from the current investigation and relevant boreholes from previous investigations are shown on Drawing PG4958-19 - Test Hole Location Plan included in Appendix 2.

The boreholes were completed using a track-mounted power 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 testing procedure consisted of augering to the required depth at the selected locations and sampling 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. All samples were visually inspected and initially classified on site, placed in sealed plastic bags, and transported to our laboratory for further examination and classification. The depths at which the auger and split-spoon samples were recovered from the boreholes are shown as AU and SS, respectively, on the Soil Profile and Test Data sheets in Appendix 1.

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

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

The overburden thickness was evaluated by a dynamic cone penetration test (DCPT) completed at boreholes BH 3-24, BH 11-24, and BH 18-24. The DCPT testing consists of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

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

**Groundwater**

Boreholes BH 1-24, BH 7-24, BH 8-24, BH 13-24, and BH 17-24 were fitted with 51 mm diameter PVC groundwater monitoring wells. The other boreholes were fitted with flexible piezometers to permit monitoring of the groundwater levels subsequent to the completion of the sampling program. The groundwater observations are discussed in Subsection 4.3 and presented in the Soil Profile and Test Data sheets in Appendix 1.

**Monitoring Well Installation**

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 annular space around the screen.
- 300 mm thick bentonite hole plug directly above PVC slotted screen.
- Clean backfill from top of 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 borehole locations and ground surface elevation at each test hole location were surveyed by Paterson using a high precision GPS and referenced to a geodetic datum. The location of the boreholes and ground surface elevation at each test hole location are presented on Drawing PG4958-19 - Test Hole Location Plan in Appendix 2.

# 4.0 Observations

## 4.1 Surface Conditions

The subject site is located on the south-west quadrant of the intersection of Limebank Road and Earl Armstrong Road. The site is currently largely undeveloped and predominately consists of agricultural land with some tree covered areas and an asphalt access lane located on the north-east side of the site. Construction on the future O-Train network extension is currently underway running east-west through the central portion of the site.

The subject site is bordered by Earl Armstrong Road followed by a residential development and a currently under construction commercial development to the north. Further, the site is bordered by Limebank Road followed by agricultural lands to the east, agricultural lands to the south, and by a densely treed area followed by a residential development to the west. The ground surface across the subject site gradually slopes down towards the north at approximate geodetic elevations of 94.0 to 91.5 m. The site is located below grade of surrounding roadways.

## 4.2 Subsurface Profile

**Overburden**

The subsurface profile at the test hole locations consists of a thin topsoil layer underlayin by alternating layers of a loose to compact silty sand to sandy silt, silty clay, and clayey silt. Generally, the soil profile consists of an approximately 0.7 to 2.4 m thick silty sand to sandy silt deposit overlaying a silty clay deposit. In some locations a thin layer of silty clay was encountered directly below the topsoil and overlaying the silty sand layer.

The silty clay deposit was encountered at all test hole locations and generally consisted of a very stiff to stiff brown silty clay crust overlaying a stiff to firm grey silty clay deposit. The presence of the brown silty clay crust layer directly overlaying the grey silty clay was absent at the location of boreholes BH 2-24, BH 5-24, BH 6-24, BH 8-24, and BH 9-24. The silty clay deposit was found to extend as deep as over 11.3 m below the existing ground surface and was generally observed to be underlayin by a thin deposit of clayey silt across the majority of the site. At the location of boreholes BH 12-24, BH 12A-24, and BH 12B-24 the silty clay deposit was observed at ground surface and directly overlayed the glacial till deposit at a depth of approximately 2.9 m below the existing ground surface.

A deposit of glacial till was observed at depths of approximately 2.6 to 9.6 m below the existing ground surface in BH 1-24, BH 3-24, BH 6-24, BH 7-24, BH 8-24, BH 12-24, BH 12A-24, and BH 13-24. The glacial till deposit generally consists of compact to dense, grey clayey silt, grey silty sand to sandy silt, or grey silty clay with variable amounts of gravel, cobbles, and boulders.

Practical refusal to augering or DCPT testing was encountered at BH 3-24, BH 11-24, BH 12-24, BH 12A-24, BH 12B-24, and BH 18-24 at depths ranging from 2.9 to 14.3 m below the existing ground surface.

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

**Bedrock**

Based on available geological mapping, the local bedrock consists of interbedded sandstone and dolomite of the March Formation. The overburden thickness is generally anticipated to range between approximately 5 to 15 m.

**Atterberg Limits Testing**

Atterberg limits testing was completed on select silty clay samples recovered from BH 1- 24, BH 3-24, BH 4-24, BH 5-24, BH 6-24, BH 7-24, BH 8-24, BH 11-24, BH 14-24, BH 15-24, BH 17-24, and BH 18-24. The results of the Atterberg limits tests is presented in Table 1 and on the Atterberg Limits Testing Results sheet in Appendix 1.

| Table 4 – Summary of Groundwater Level Readings | | | | |
|---|---|---|---|---|
| **Borehole Number** | **Ground Surface Elevation (m)** | **Measured Groundwater Level** | | **Date Recorded** |
| | | **Depth (m)** | **Elevation (m)** | |
| BH 1-24 | 93.09 | 0.43 | 92.66 | April 18, 2024 |
| BH 2-24 | 92.31 | 0.08 | 92.23 | |
| BH 3-24 | 93.60 | 0.67 | 92.93 | |
| BH 4-24 | 93.12 | 0.28 | 92.84 | |
| BH 5-24 | 92.60 | 1.03 | 91.57 | |
| BH 6-24 | 92.55 | 1.84 | 90.71 | |
| BH 7-24 | 92.31 | 0.40 | 91.91 | |
| BH 8-24 | 92.50 | 2.18 | 90.32 | |
| BH 9-24 | 91.69 | 0.72 | 90.97 | |
| BH 10-24 | 92.32 | 0.10 | 92.22 | |
| BH 11-24 | 92.31 | 1.05 | 91.26 | |
| BH 12B-24 | 93.47 | 0.30 | 93.17 | |
| BH 13-24 | 93.05 | 1.26 | 91.79 | |
| BH 14-24 | 92.32 | 0.37 | 91.95 | |
| BH 15-24 | 92.21 | 0.41 | 91.8 | |
| BH 16-24 | 92.30 | 1.36 | 90.94 | |
| BH 17-24 | 91.89 | 1.48 | 90.41 | |
| BH 18-24 | 91.96 | 0.35 | 91.61 | |
| BH 19-24 | 91.62 | 0.18 | 91.44 | |
| **Note:** The ground surface elevation at each borehole location was surveyed using a handheld GPS and are referenced to a geodetic datum. | | | | |

It should be noted that surface water can become trapped within a backfilled borehole that can lead to higher than typical groundwater level observations.

The Long-term groundwater levels can also be estimated based on the observed color, consistency, and moisture content of the recovered soil samples. Based on these observations, the long-term groundwater table can be expected at approximately **2.5 to 3.5 m** below the existing ground surface. It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.

A series of well points may be required to control groundwater in-flow for excavations that extend below the water table. It is assumed that the excavations will be carried out within the confines of a fully braced trench box or other acceptable shoring system designed by a qualified engineer to resist the design lateral earth pressures and potential basal heave issues.

Due to the presence of a silty clay deposit, the proposed grading throughout the subject site will be subjected to a permissible grade restriction. Permissible grade raise recommendations are discussed in Subsection 5.3. 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.

Bedrock removal may be required to complete the excavations for basement levels of proposed high-rise buildings. Line drilling and controlled blasting where large quantities of bedrock need to be removed is recommended. All contractors should be prepared for bedrock and oversized boulder removal. The blasting operations should be planned and completed under the guidance of a professional engineer with experience in blasting operations.

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

## 5.2 Site Grading and Preparation

**Stripping Depth**

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

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

## Fill Placement

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

Non-specified existing fill along with site-excavated soil could be placed as general landscaping fill and beneath exterior parking areas where settlement of the ground surface is of minor concern. These materials should be spread in a maximum of 300 mm thick loose 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 a maximum 300 mm thick loose lift to at least 95% of the material's SPMDD. The placement of subgrade material should be reviewed at the time of placement by Paterson personnel.

Non-specified existing fill and site-excavated soils are not suitable for placement as backfill against foundation walls, unless used in conjunction with a geocomposite drainage membrane, such as Miradrain G100N or Delta Drain 6000, connected to a perimeter drainage system.

## Bedrock Removal

If required, bedrock removal can be accomplished by hoe ramming where only small quantities of the bedrock need to be removed. Sound bedrock may be removed by line drilling and controlled blasting and/or hoe ramming.

Prior to considering blasting operations, the blasting effects on the existing surrounding services, buildings, LRT, and other structures should be addressed. A pre-blast or pre-construction survey of the existing adjacent structures located in the proximity of the blasting operations should be carried out 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 or claims related to the blasting operations. It should be noted that a Vibration Monitoring Control Plan (VMCP) may be required to address vibration monitoring for the LRT.

As a general guideline, peak particle velocities (measured at the structures) should not exceed the below noted vibration limits during the blasting program to reduce the risks of damage to the existing surrounding structures. The blasting operations should be planned and conducted under the supervision of a licensed professional engineer who is also an experienced blasting consultant.

Excavation side slopes in sound bedrock can be carried out using near vertical sidewalls. A minimum 1 m horizontal ledge should be left between the bottom of the overburden excavation and the top of the bedrock surface to provide an area to allow for potential sloughing of the overburden. The 1 m horizontal ledge setback can be eliminated with a shoring program which has drilled piles extending below the proposed founding elevation.

**Vibration Considerations**

Construction operations are the cause of vibrations, and possibly, sources of nuisance to the community. Therefore, means to reduce the vibration levels as much as possible should be incorporated into the construction operations to maintain, as much as possible, a cooperative environment with the surrounding 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 20 mm/s for frenquicies equal to or less than 40 Hz, and below 50 mm/s above a frequency of 40 Hz. These 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 buildings. It should be noted that lower peak particle velocity limits may be required for construction activities near the LRT.

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

**Permissible Grade Raise Recommendations**

Due to the presence of the silty clay deposit, a permissible grade raise restriction is recommended. The recommended grade raise restrictions are shown on Drawing PG4958-20 – Permissible Grade Raise Plan included in Appendix 2. A post-development groundwater lowering of 0.5 m was considered in our permissible grade raise calculations.

It should be noted that a previous test fill pile program was carried out at the site from December 2019 to December 2020. The program consisted of two 30 x 30 m pads each containing two settlement plates, the height of the fill pads ranged from approximately 2.1 to 2.4 m above the existing ground surface. The location of the test fill pads is shown on drawing PG4958-19 – Test Hole Location Plan and the results are presented in Figure 2 – Test Fill Pile Settlement Monitoring Program Area B in Appendix 2.

If greater 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 site class for seismic site response can be taken as **Class D** for foundations founded upon a silty sand or silty clay bearing medium and as **Class C** for foundations founded upon a glacial till or bedrock bearing medium for foundations considered at the subject site.

Higher site classes such as Class A or Class B may be provided for buildings founded upon or within 3 m of the bedrock surface. However, they would have to be confirmed by site specific shear wave velocity testing. Such testing may be considered once more detailed plans are available for the proposed development. The soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest version of the Ontario Building Code (OBC) 2012 for a full discussion of the earthquake design requirements.

## 5.7 Pavement Design

For design purposes, the pavement structures presented in the following tables could be used for the design of driveways, local residential streets, and roadways with bus traffic.

It should be noted that for residential driveways and car only parking areas, an Ontario Traffic Category A is applicable. For local roadways, an Ontario Traffic Category B should be used for design purposes.

| **Table 7 - Recommended Pavement Structure - Driveways** | |
|---|---|
| **Thickness (mm)** | **Material Description** |
| 50 | **Wear Course** - HL-3 or Superpave 12.5 Asphaltic Concrete |
| 150 | **BASE** - OPSS Granular A Crushed Stone |
| 300 | **SUBBASE** - OPSS Granular B Type II |
| **SUBGRADE** - Either in-situ soil, or OPSS Granular B Type I or II material over in-situ soil. | |

| **Table 8 - Recommended Pavement Structure - Local Residential Roadways** | |
|---|---|
| **Thickness (mm)** | **Material Description** |
| 40 | **Wear Course** - Superpave 12.5 Asphaltic Concrete |
| 50 | **Wear Course** - Superpave 19.0 Asphaltic Concrete |
| 150 | **BASE** - OPSS Granular A Crushed Stone |
| 400 | **SUBBASE** - OPSS Granular B Type II |
| **SUBGRADE** - Either in-situ soil, or OPSS Granular B Type I or II material over in-situ soil. | |

| **Table 9 - Recommended Pavement Structure - Arterial Roadways with Bus Traffic** | |
|---|---|
| **Thickness (mm)** | **Material Description** |
| 40 | **Wear Course** - Superpave 12.5 Asphaltic Concrete |
| 50 | **Upper Binder Course** - Superpave 19.0 Asphaltic Concrete |
| 50 | **Lower Binder Course** - Superpave 19.0 Asphaltic Concrete |
| 150 | **BASE** - OPSS Granular A Crushed Stone |
| 600 | **SUBBASE** - OPSS Granular B Type II |
| **SUBGRADE** - Either in-situ soil, or OPSS Granular B Type I or II material over in-situ soil. | |

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

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 100% of the material's SPMDD using suitable compaction equipment.

**Pavement Structure Drainage**

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

Where silty clay is anticipated at subgrade level, consideration should be given to installing subdrains during the pavement construction as per City of Ottawa standards. The subdrain inverts should be approximately 300 mm below subgrade level, and the subgrade surface should be crowned to promote water flow to drainage lines.

# 6.0 Design and Construction Precautions

## 6.1 Foundation Drainage and Backfill

It is recommended that a perimeter foundation drainage system be designed for the future structures. The system should consist of a 150 mm diameter, geotextile wrapped, perforated, corrugated, plastic pipe, surrounded on all sides by 150 mm of 19 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structures. The pipe should have a positive outlet, such as a gravity connection to the storm sewer.

Buildings proposed throughout the development of the subject site whose basement levels are founded below the long-term groundwater table should be provided a groundwater suppression system. The groundwater suppression system would consist of installing a waterproofing membrane over a drainage geocomposite installed on the exterior portion of the foundation wall. The waterproofing membrane is recommended to extend between the bottom of the foundation and up to a minimum of 1 m above the long-term groundwater level. A groundwater suppression system would also be recommended for structures located below the buildings foundations (i.e.- elevator shafts, sump pits, etc).

Due to the preliminary nature of the development, the requirement for groundwater suppression systems will be assessed once the number of proposed basement levels for the future mid and high-rise buildings is known. Details pertaining to the groundwater suppression system may also be provided at that time.

Backfill against the exterior sides of the foundation walls should consist of free-draining non-frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a composite drainage system, such as Delta Drain 6000 or an approved equivalent. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

Backfill material below sidewalk or asphalt paved subgrade areas or other settlement sensitive structures should consist of free draining, non-frost susceptible material placed in maximum 300 mm thick loose lifts and compacted to at least 98% of its SPMDD under dry and above freezing conditions.

## 6.2 Protection of Footings Against Frost Action

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

Other exterior unheated footings are more prone to deleterious movement associated with frost action. These should be provided with a minimum 2.1 m thick soil cover (or insulation equivalent).

Where footings are founded directly on clean, surface-sounded bedrock with no near-surface cracks or fissures and is approved by Paterson personnel at the time of the excavation, the minimum soil cover, listed above, is not required.

## 6.3 Excavation Side Slopes

**Temporary Side Slopes**

The temporary excavation side slopes anticipated should either be excavated to acceptable slopes or retained by shoring systems from the beginning of the excavation until the structures are backfilled.

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsurface soil is considered to be mainly a Type 2 and Type 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 maintain a safe working distance from the excavation sides.

Excavation side slopes carried out for the building footprint are recommended to be provided surface protection from erosion by rain and surface water runoff where shoring is not anticipated to be implemented. This can be accomplished by covering the entire surface of the excavation side-slopes with tarps secured between the top and bottom of the excavation and approved by Paterson personnel at the time of construction. It is further recommended to maintain a relatively dry surface along the bottom of the excavation footprint to mitigate the potential for sloughing of side-slopes.

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.

where:

$N_b$ - stability factor dependent upon the geometry of the excavation and given in Figure 1 on the following page.
$s_u$ - undrained shear strength of the soil below the base level
$\sigma_z$ - total overburden and surcharge pressures at the bottom of the excavation

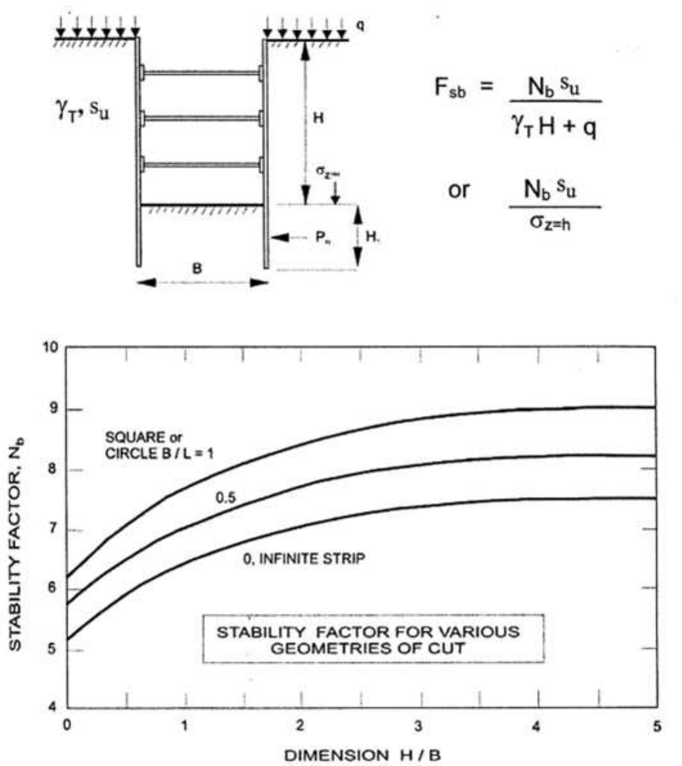



Figure 1 – Stability Factor for Various Geometries of Cut

A safety factor of 2 is generally recommended to be considered for excavation base stability.

## 6.4 Pipe Bedding and Backfill

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

At least 150 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe, should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm. The bedding and cover materials should be placed in maximum 225 mm thick lifts and compacted to a minimum of 99% of the material's standard Proctor maximum dry density.

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

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

**Clay Seals**

To reduce long-term lowering of the groundwater level at this site, clay seals should be provided in the service trenches. The seals should be at least 1.5 m long and should extend from trench wall to trench wall. Generally, the seals should extend from the frost line and fully penetrate the bedding, sub-bedding, and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in maximum 225 mm thick loose layers and compacted to a minimum of 95% of the material's SPMDD using a sheepsfoot roller. The clay seals should be placed at the site boundaries and at strategic locations at no more than 60 m intervals in the service trenches.

## 6.5 Groundwater Control

**Groundwater Control for Building Construction**

Due to the relatively impervious nature of the silty clay materials, it is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbances to the founding medium.

Due to the permeable glacial till deposit encountered within the groundwater table at the subject site, it is anticipated that conventional pumping with open sumps may be difficult to control the groundwater influx through servicing trench and deep basement excavations. If excavations well below groundwater level and within the permeable sand or glacial till deposits are considered, dewatering from outside the excavations using deep wells, well points or other means may be required.

Above the permeable sand and glacial till deposit, it is anticipated that groundwater infiltration into the excavations should be low to moderate, if encountered, and controllable using open sumps. Similar conditions may arise where excavations are undertaken below the depth of a silty clay deposit and into more permeable soils.

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

**Permit to Take Water**

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

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

## 6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project.

The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures 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 founding level.

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

## 6.7 Corrosion Potential and Sulphate

The results of analytical testing 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 non-aggressive to moderately aggressive corrosive environment.

## 6.8 Landscaping Considerations

**Tree Planting Considerations**

In accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines), Paterson completed review of the soils at the site to determine applicable tree planting setbacks. Atterberg limits testing was completed for recovered silty clay samples at selected locations throughout the subject site. The results of our Atterberg limits, shrinkage, and hydrometer testing are presented in Appendix 1.

Based on the results of the Atterberg limit testing mentioned above, the plasticity index was found to be less than 40% for all the tested silty clay samples. In addition, based on the moisture levels and consistency of the encountered clay, the silty clay deposit encountered across the subject site is considered to be a low to medium sensitivity sily clay deposit.

The following tree planting setbacks are recommended for low to medium sensitivity silty clay deposits throughout the subject site.

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

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

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

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

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

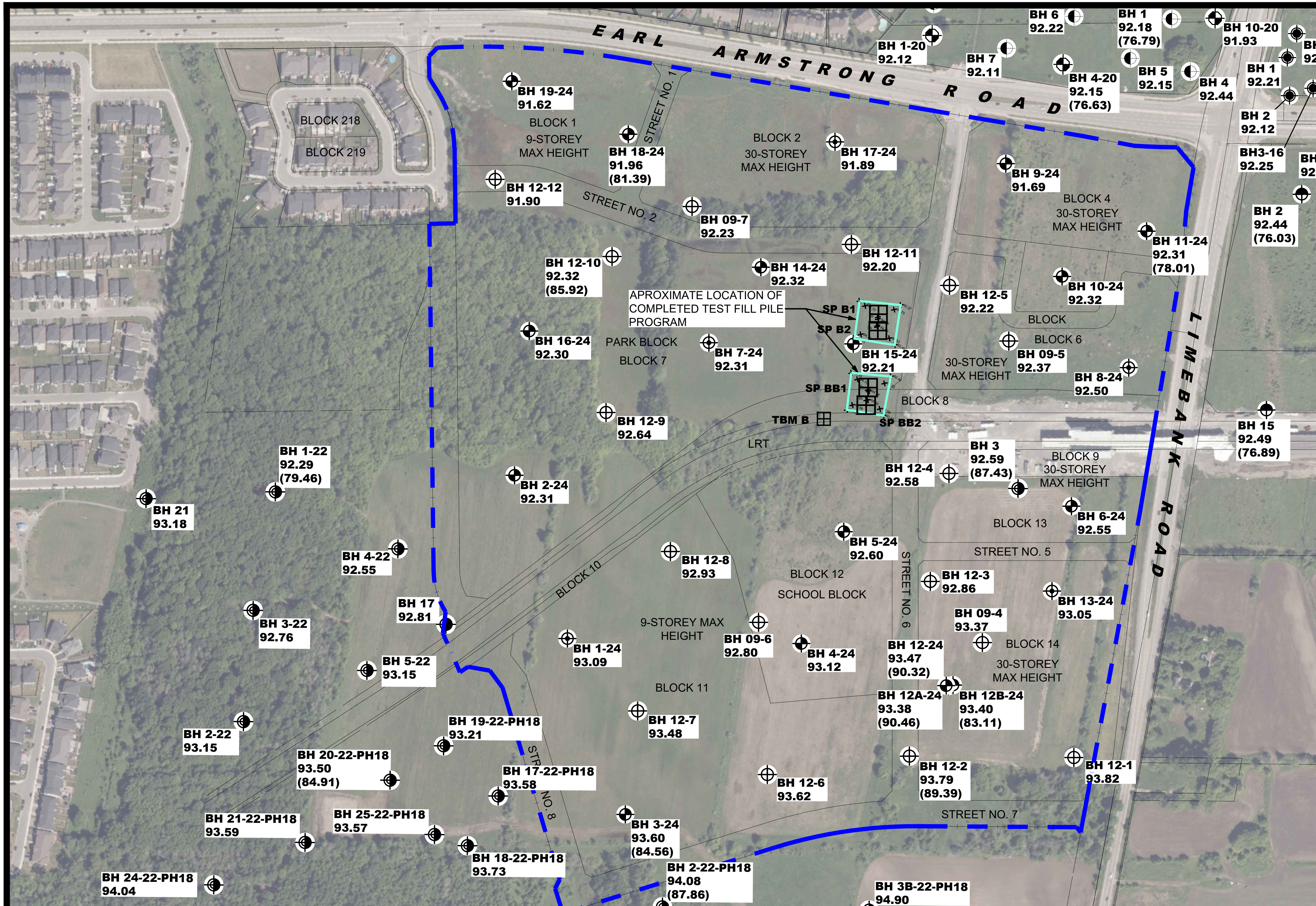
- Grading surrounding the tree must promote drainage to the tree root zone (in such a manner as not to be detrimental to the tree).

**Above-Ground Swimming Pools, Hot Tubs, Decks and Additions**

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

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

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




LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION BY OTHERS (GOLDER ASSOCIATES)
- BOREHOLE LOCATION (BY PATERSON GROUP, PG4958, 2022)
- BOREHOLE LOCATION (BY PATERSON GROUP, PG5304, MARCH 2020)
- BOREHOLE LOCATION (BY PATERSON GROUP, PG2776, APRIL 2016)
- BOREHOLE LOCATION (BY PATERSON GROUP, PG2744, DECEMBER 2012)
- BOREHOLE LOCATION (BY PATERSON GROUP, PG2404, MAY 2011)
- SP B1 / SP B2 — COMPLETED TEST FILL PAD LOCATION
- 92.32 — GROUND SURFACE ELEVATION (m)
- (90.32) — PRACTICAL REFUSAL TO DCPT / AUGERING ELEVATION (m)

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

SCALE: 1:4000

0 50 100 150 200 250 300m

p:\autocad drawings\geotechnical\pg49xx\pg4958\pg4958-19-test hole location plan.dwg

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

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |

RIVERSIDE SOUTH LIMITED PARTNERSHIP
GEOTECHNICAL INVESTIGATION
PROPOSED MIXED-USE DEVELOPMENT
RIVERSIDE SOUTH - TOWN CENTER PHASE 7A

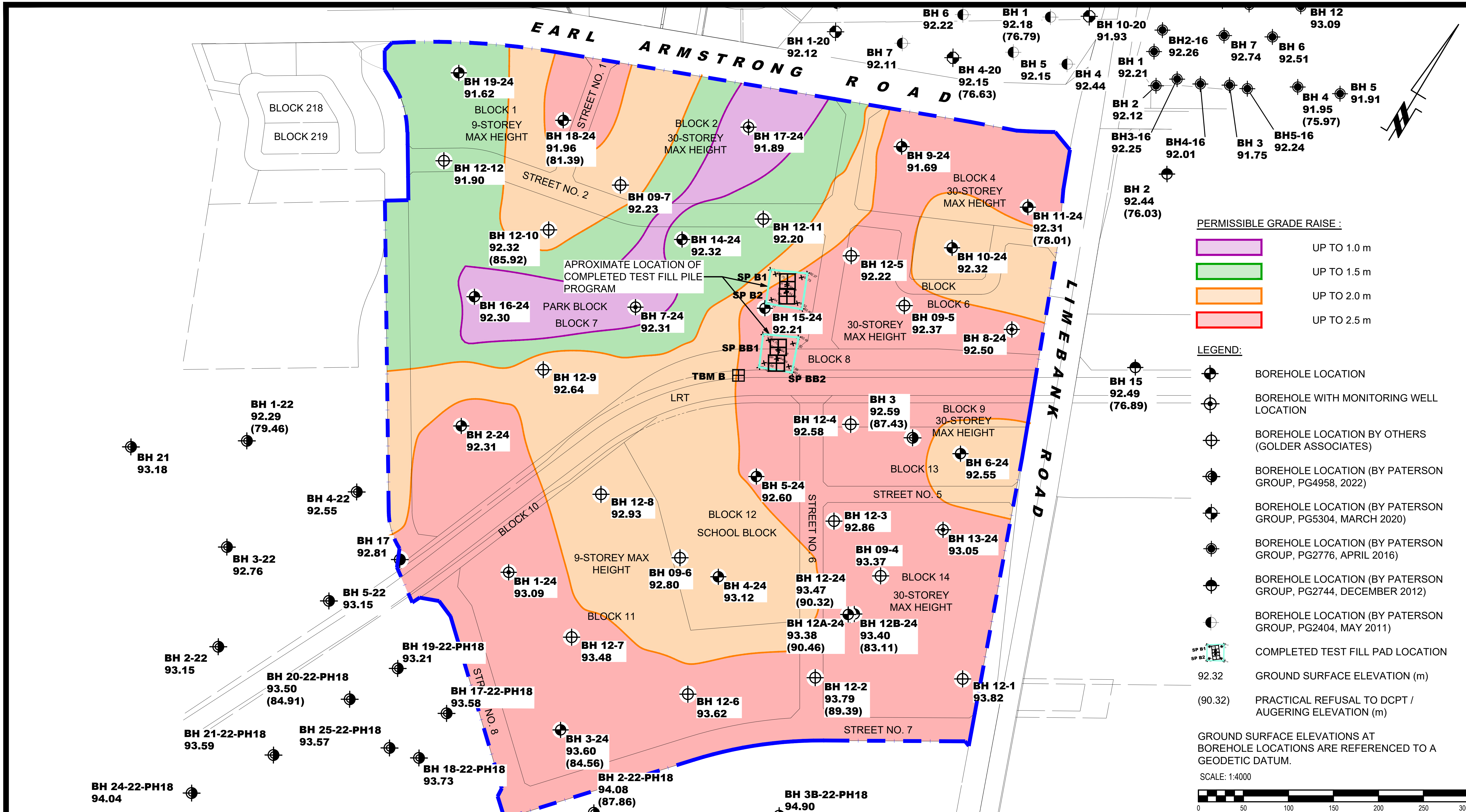
OTTAWA, ONTARIO

Title:

# TEST HOLE LOCATION PLAN

| | |
|---|---|
| Scale: 1:4000 | Date: 06/2024 |
| Drawn by: ZS | Report No.: PG4958-6 |
| Checked by: NP | Dwg. No.: PG4958-19 |
| Approved by: DJG | Revision No.: |

11x17




p:\autocad drawings\geotechnical\pg49xx\pg4958\pg4958-19-test hole location plan.dwg

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

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|

RIVERSIDE SOUTH LIMITED PARTNERSHIP
GEOTECHNICAL INVESTIGATION
PROPOSED MIXED-USE DEVELOPMENT
RIVERSIDE SOUTH - TOWN CENTER PHASE 7A

OTTAWA, ONTARIO

Title:

# PERMISSIBLE GRADE RAISE PLAN

| | |
|---|---|
| Scale: 1:4000 | Date: 06/2024 |
| Drawn by: ZS | Report No.: PG4958-6 |
| Checked by: NP | Dwg. No.: PG4958-20 |
| Approved by: DJG | Revision No.: |

11x17

With every community, we redefine what's possible.

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

**Stantec Consulting Ltd.**
300 - 1331 Clyde Avenue
Ottawa ON  K2C 3G4
stantec.com