

114 Richmond Road

Phase 2 Site Servicing and Stormwater Management Report



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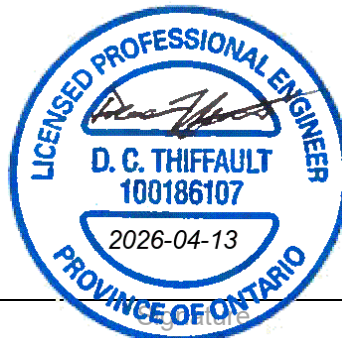
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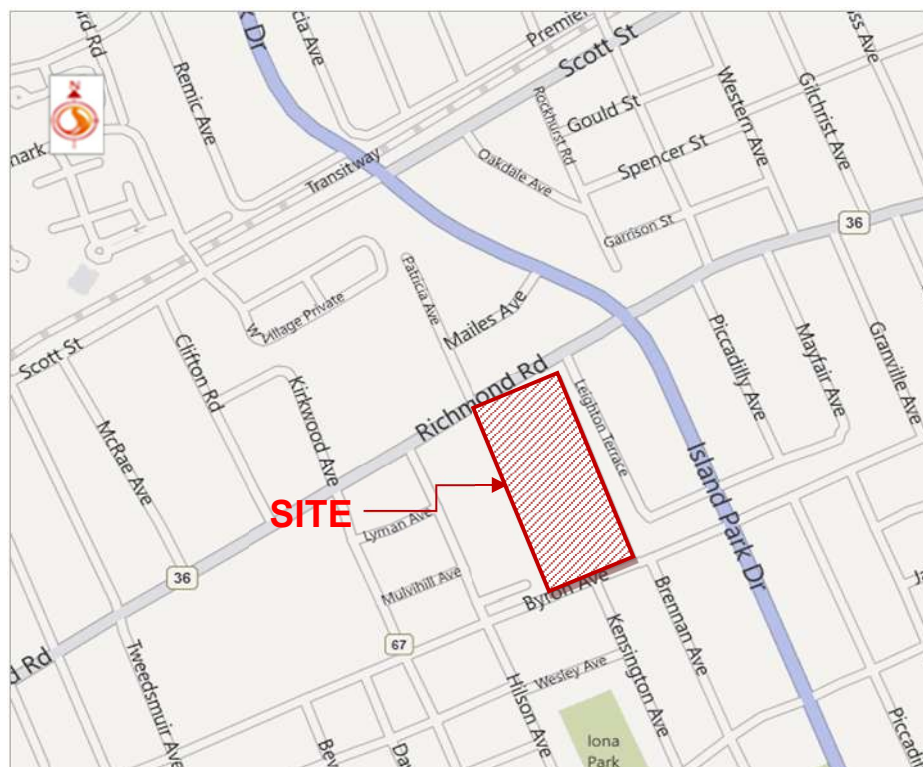
1 Introduction

1 Introduction

Stantec Consulting Ltd. (Stantec) has been commissioned by Concorde Properties Ltd. (Concord) to prepare the following servicing study in support of a Zoning By-law Amendment and Site Plan Control (SPC) Application for the proposed Phase 2 of the development located at 114 Richmond Road in the City of Ottawa, as indicated in **Figure 1-1**. The property is situated on the south side of Richmond Road to the southwest of the Richmond Road and Leighton Terrace intersection. The property extends south to the Byron Linear Tramway Park, adjacent to Byron Avenue. To the west is Hilson Avenue Public school, and to the southeast are existing single residential homes.

The 2.2 ha site was previously convent land, and the existing convent building and much of the land has been deemed a heritage site and a portion is to be preserved. The site development plan used for the purpose of this site servicing and stormwater management report consists of Phase 2 of the Site Development Plan as indicated on the Site Plan, drawing SP-01 provided by Project1 Studio Inc. (Rev.4, April 7, 2026). Phase 1 of the property was previously developed into three nine-storey condominium towers fronting onto Richmond Road and renovation of the existing convent building. The Phase 2 of the development consists of six back-to-back townhouse blocks with underground parking and a four-storey residential apartment building with associated underground parking.

Figure 1-1: Overall Development Location Plan



1.1 Site Statistics

Phase 2 of the development includes 173 residential dwelling units, including 47 apartments and 126 stacked townhouse units. The unit type breakdown per building is tabulated in **Table 1.1**.

Table 1.1: Phase 2 Unit Type Breakdown

Unit Type	Number
4-Storey Apartment	
1-Bedroom	26
2-bedroom/1-Bedroom+Den	19
2-Bedroom+Den	2
Subtotal	47
Stacked Townhouse Blocks	
Block 1	24
Block 2	24
Block 3	18
Block 4	18
Block 5	18
Block 6	24
Subtotal	126
Total	173

Table 1.2: Stacked Townhouse Unit Type Breakdown

Unit Type	Number
Townhouse Blocks – Type B: 1, 2, and 6	
2-bedroom Unit, 2-Storey	22
3-bedroom Unit, 2-Storey	2
Townhouse Blocks – Type C: 1, 2, and 6	
2-bedroom Unit, 1-Storey	6
2-bedroom Unit, 2-Storey	12

1.2 Objectives

This site servicing and stormwater management (SWM) report presents a servicing scheme that is free of conflicts, provides on-site servicing in accordance with City of Ottawa Design Guidelines, and uses the existing municipal infrastructure in accordance with any limitations communicated during consultation with the City of Ottawa staff. Details of the existing infrastructure located within the Byron Avenue and Richmond Road rights of way (ROWs) were obtained from available as-built drawings and site topographic survey by Annis, O'Sullivan, Vollebakk Ltd. (February 12, 2026).



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Criteria and constraints provided by the City of Ottawa have been used as a basis for the detailed servicing design of the proposed development. Specific and potential development constraints to be addressed are as follows:

- Potable Water Servicing
 - Estimate water demands to characterize the proposed feed(s) for the development.
 - Evaluate the adequacy of a dual connection to the existing 300 mm diameter watermain within the Byron Avenue ROW.
 - Develop a detailed hydraulic model to design and optimize the private onsite watermain loop.
 - Watermain servicing for the development is to be able to provide average day and maximum day (including peak hour) demands (i.e., non-emergency conditions) at pressures within the acceptable range of 345 to 552 kPa (50 to 80 psi)
 - Under fire flow (emergency) conditions, the water distribution system is to maintain a minimum pressure greater than 140 kPa (20 psi)
- Wastewater (Sanitary) Servicing
 - Estimate the sanitary sewage peak flows to characterize the proposed sanitary sewer servicing.
 - Design the sanitary service lateral(s) for the Phase 2 buildings and the onsite private sanitary sewers which will be connected to the existing sanitary sewer stub extending from Phase 1.
- Storm Sewer Servicing
 - Define major and minor conveyance systems in conjunction with the proposed grading plan.
 - Delineate and characterize stormwater drainage catchments.
 - Determine the stormwater management storage requirements to meet the allowable release rate for the overall site.
 - Design the proposed storm service lateral(s) and onsite private storm sewers which will be connected to the existing storm sewer stub extending from Phase 1.
- Prepare a grading plan in accordance with the proposed site plan and tie into existing grades at the property lines. Identify key drainage patterns and grading features.
- Provide an Erosion and Sediment Control Concept plan and Best Management Practices



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- Incorporate the relevant geotechnical information, constraints, and recommendations.
- Identify utility site constraints (existing infrastructure removals/accommodations, easements, offsets, etc.)
- Assess the availability of utility plant in proximity of the site
- Identify other approval requirements

Drawing SSP-1 illustrates the proposed internal servicing scheme for the site.



2 Background

Documents referenced in preparation of the design for the 114 Richmond Road (Phase 2A/2B)

Development include:

- *City of Ottawa Sewer Design Guidelines (SDG 004) 4th Edition*, City of Ottawa, December 2025, including all subsequent technical bulletins and amendments.
- *City of Ottawa Water Distribution Design Guidelines (WDG002) 2nd Edition*, City of Ottawa, December 8, 2025, including all subsequent technical bulletins and amendments.
- *Design Guidelines for Drinking Water Systems*, Ministry of the Environment, Conservation, and Parks (MECP), 2008, including all amendments.
- *Fire Protection Water Supply Guideline* for Part 3 in the Ontario Building Code, Office of the Fire Marshal (OFM), October 1999 (OFM-TG-03-1999)
- *Water Supply for Public Fire Protection*, Fire Underwriters Survey (FUS), 2020
- *Geotechnical Investigation – Proposed Residential Development Phases – 114 Richmond Road, Ottawa, Ontario.*, Paterson Group Consulting Engineers, Feb 24, 2026.
- *Pre-consultation: Meeting Feedback – Proposed Zoning By-law Amendment and Site Plan Control Application – 114 Richmond Road (File No.: PC2025-0274)*, City of Ottawa, October 28, 2025
- *Assessment of Adequacy of Public Services Report – Proposed Development at 114 Richmond Road*, Trow Associates Inc., March 12, 2010.
- *114 Richmond Road – Potable Water Servicing Analysis*, Stantec Consulting Ltd., August 2011.
- *Serviceability Report – Ashcroft Homes – 114 Richmond Road*, Stantec Consulting Ltd., June 26, 2013.



3 Water Servicing

3.1 Background

The site is located within Pressure Zone 1W of the City of Ottawa's Water Distribution System. The proposed development is expected to be serviced from the existing 305 mm diameter UCI watermain within Byron Avenue. There are existing fire hydrants on Byron Avenue.

3.2 Design Criteria

3.2.1 Water Demand and Allowable Pressure

The domestic water demand and allowable water pressure are assessed using the criteria City of Ottawa Water Distribution Guidelines (2025) as amended, and the ISTB 2021-03 Technical Bulletin.

Residential Apartment Population Density

Stacked Townhouse	2.3 persons / unit
Bachelor/1-Bedroom Apartment Unit	1.4 persons / unit
2-Bedroom/1-Bedroom+Den Apartment Unit	2.1 persons / unit
3-Bedroom/2-Bedroom+Den Apartment Unit	3.1 persons / unit

Residential Demand

Average Daily (AVDY)	280 L/cap/day
Maximum Daily (MXDY)	$2.5 \times \text{AVDY}$
Peak Hour (PKHR)	$2.2 \times \text{MXDY}$

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 2.3.2.

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.



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- The aggregate fire flow capacity of all fire hydrants within 305m 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

3.3 Water Demands

3.3.1 Potable (Domestic) Water Demands

The unit type breakdown identified in **Table 1.1** and the population densities are used to estimate the population of the Phase 2 development. The conservative estimate of 377 persons is determined by applying the population density of 2.3 persons per unit to all stacked townhomes (regardless of the number of bedrooms) and applied the population densities corresponding to the apartment unit types in the 4-storey building. The projected population and domestic peaking factors are used to estimate potable water demands for the proposed development, as summarized in **Table 3.2** and detailed in **Appendix A.1**.

Table 3.2: Estimated Water Demands

Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
373	1.2	3.0	6.6

3.3.2 Fire Flow Demands

Based on the current Site Plan, the fire flow requirement was calculated in accordance with Fire Underwriters Survey (FUS) methodology. The construction of the apartment building and townhouses was assumed to correspond to Residential Occupancy Classification (Group C) per Table 3.1.2.1 in the Ontario Building Code (2024) with a minimum 1-hr fire resistive rating for building components. The apartment building and underground parking are assumed to be fully sprinklered. The preliminary locations of the fire department connections (FDC) are shown on **Drawing SSP-1**.

As such, required fire flows for on-site buildings were estimated based on the building type of mass timber construction (Type IV-C, construction coefficient 1.0) for the apartment building and wood frame construction (Type V, construction coefficient 1.5) for the townhouses. To determine the effective floor area



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of each building, the sum of all floor areas was used, as per Page 22 of the FUS (2020) for the building types with Construction Coefficients from 1.0 to 1.5.

The effective floor area of the townhouse blocks will be each be split by two internal fire walls, as shown in **Drawings SSP-1** and **GP-1**. The worst-case required fire flows are determined to be for townhouse blocks 1 and 2 corresponding to 167 L/s (10,000 L/min). As a conservative approach, we have proceeded with a required fire flow of 200 L/s (12,000 L/s). Detailed fire flow calculations per the FUS methodology are included in **Appendix A.2**.

3.3.3 Boundary Conditions

The estimated domestic potable water and fire flow demands were supplied as part of a boundary conditions request to City of Ottawa staff. **Table 3.3** outlines the boundary conditions provided by the City of Ottawa on February 10, 2026 (See **Appendix A.3** for correspondence).

Table 3.3: Boundary Conditions

Connection	Byron Avenue
Min. HGL (m)	108.4
Max. HGL (m)	114.5
Max Day + Fire Flow (167 L/s) (m)	108.8
Max Day + Fire Flow (200 L/s) (m)	107.8

3.4 Proposed Watermain Servicing and Layout

The site will be serviced by a private, internal watermain network with a 200mm diameter watermain loop, and with 150mm branches for Block 6A and Block 6B services, Blocks 3, 4, & 5 combined service, and for the service to the 4-storey apartment building. The proposed private Figure 3-1: Proposed Watermain Network is shown in **Figure 3-1** and **Drawing SSP-1**. The network requires two connections, separated by an isolation valve, to the 305mm diameter watermain on Byron Avenue.

For townhouse blocks 1, 2 and 6, one (1) individual water service, connected to the watermain at the building frontage, will be provided for each townhouse unit. The stub to the apartment building and the combined service for townhouse Blocks 3, 4, and 5 will enter through the underground parking structures and be distributed to the individual units via the internal plumbing network. All building water services shall include a curb stop valve and valve box located between the building and the watermain at the building frontage.



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Figure 3-1: Proposed Watermain Network

To meet the site RFF, two new onsite fire hydrants are proposed. One of the new hydrants is located within 45m unobstructed distance from the fire department connections servicing the apartment building and townhouse underground parking, as per Section 3.2.5.15 of the Ontario Building Code.

3.5 Hydraulic Assessment

3.5.1 Level of Service

A detailed hydraulic model was developed to evaluate the level of service available in the proposed water network based on the City of Ottawa and Building Code design criteria for allowable pressures, as identified in **Section 3.2.1**.



3.5.2 Model Development

The proposed private watermain network was modelled using PCSWMM under the EPANET2 model. Hazen-Williams coefficients (“C-Factors”) were applied to the new watermain in accordance with the City of Ottawa’s Water Distribution Design Guidelines and as shown in **Table 3.4**.

Table 3.4: Proposed Watermain C-Factors

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

The ground elevation of each node was interpolated from the proposed finished site grades. Refer to **Drawing GP-1**.

The boundary conditions for the reservoirs are as per the boundary conditions provided in **Table 3.3: Boundary Conditions**.

3.6 Hydraulic Model Results

The PCSWMM hydraulic model was used to simulate the three proposed water demand scenarios:

- Average Day Demand (AVDY)
- Peak Hour Demand (PKHR)
- Maximum Day Demand + Fire Flow (MXDY + FF)

The level of service available from the network under each scenario was tested under average day, peak hour, and maximum day plus fire flow conditions.



3.6.1 Average Day Demand (AVDY)

The hydraulic model results indicate that under the average day demands, the pressure in the proposed watermain network ranged from 426.5 kPa to 456.7 kPa (61.9 psi to 66.2 psi). This pressure is within the serviceable limit of 276 kPa to 552 kPa (40 psi to 80 psi) as specified. Results are shown in **Figure 3-2**.



Figure 3-2: Residual Pressures (psi) under AVDY Demands



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3.6.2 Peak Hour Demand (PKHR)

The hydraulic modeling results indicate that under peak hour demands, the pressure in the proposed watermain ranges from 366.6 kPa to 396.8 kPa (53.6 psi to 57.5 psi). These pressures are within the serviceable limit of 276 kPa to 552 kPa (40 psi to 80 psi). Results are shown in Figure 3-3.

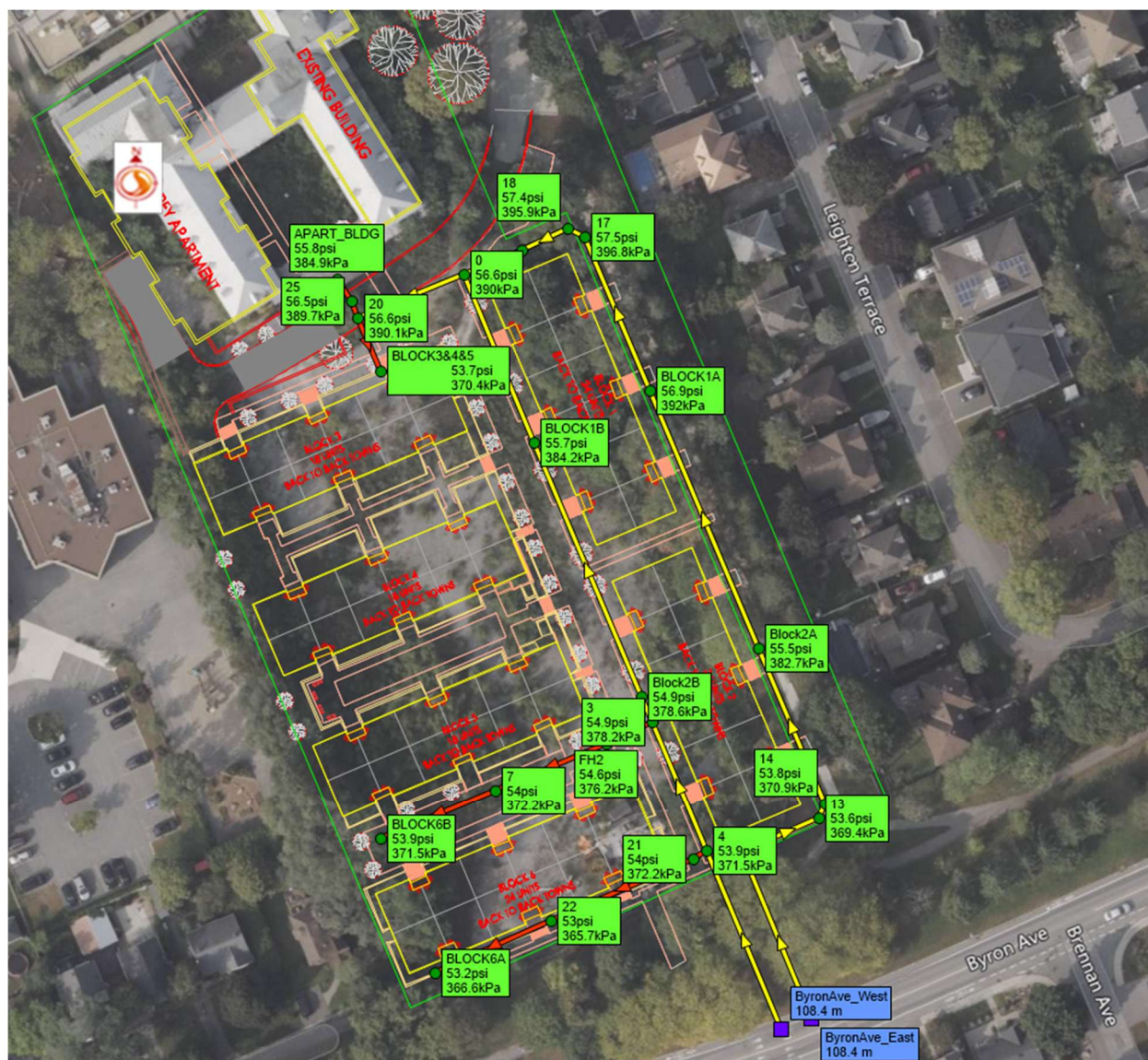


Figure 3-3: Residual Pressures (psi) under PKHR Demands



3.6.3 Maximum Day Demand + Fire Flow (MXDY + FF)

Hydraulic modelling was carried out to determine if the proposed watermain can provide the maximum day and fire flow demands to the proposed development while maintaining a residual pressure of 138 kPa (20 psi) or greater. The analysis was accomplished using a steady-state maximum day demand scenario along with the automated fire flow simulation feature of PCSWMM.

Figure 3-4 illustrates that the proposed watermain can deliver 200 L/s of fire flow and meet the critical demand scenario at the specified nodes while maintaining the required residual pressure of 138 kPa (20 psi).



Figure 3-4: Residual Pressure (psi) for MXDY+FF (200L/s) Demands



3.7 Aggregate Fire Flow and Hydrant Coverage

The minimum number of fire hydrants required to meet the RFF (200L/s) is assessed using the NFPA 1 Table 18.5.4.3 which is also listed in Appendix I of the City of Ottawa Technical Bulletin ISTB-2018-02. A fire hydrant coverage sketch (**Figure 3-5**) is included in **Appendix A.4**. The sketch shows the two proposed fire hydrants, the two existing fire hydrants, and the distances from hydrants to building central entrances.

This aggregate hydrant flow capacity is calculated and compiled in the Fire Hydrant Coverage Table included in **Appendix A.5**. Each building requires flow from two or three hydrants, at minimum, for the aggregate flow to meet the RFF. The following hydrants are required for each building:

Table 3.5: Phase 2 Fire Hydrant Coverage

Building	No. Hydrants	Hydrants
4-Storey Apartment	3	HYD-01, HYD-02, EX HYD-03
Block 1	3	HYD-01, HYD-02, EX HYD-04
Block 2	3	HYD-01, HYD-02, EX HYD-04
Block 3	2	HYD-01 and HYD-02
Block 4	2	HYD-01 and HYD-02
Block 5	2	HYD-01 and HYD-02
Block 6	3	HYD-01, HYD-02, EX HYD-03

3.8 Conclusion

Based on the projected population, the hydraulic boundary conditions provided by the City of Ottawa and the results of the hydraulic model, the proposed water servicing can provide sufficient flow and pressure to satisfy the needs of the development while respecting City of Ottawa design guidelines.

The mechanical consultant and/or plumbing contractor will need to determine the building water service sizes and requirements for booster pumps to service the upper stories of the apartment building at the building permit stage.



4 Sewer Servicing Background

Wastewater servicing for Phase 1 of the development was provided by a 375mm diameter sanitary sewer and a 375mm diameter storm sewer located along the northwest property line. These sewers run north from the Phase 2 boundary, pass through the Phase 1 internal building servicing corridor, and then connect to the sewers in the Richmond Road ROW. The intent of the Phase 1 building servicing corridor was to provide a legal outlet for the Phases 2 and 3 storm and sanitary building services. For design details of the pipes within the building services corridor, please refer to the Phase 1 mechanical drawings.

5 Wastewater Servicing

5.1 Background

The existing 375mm diameter internal sanitary sewer (of the Phase 1 servicing corridor) drains north and connects to the existing 375mm diameter (east-west) sanitary sewer in the Richmond Road ROW, which bends to drain north into a 450mm diameter sewer in the Patricia Avenue ROW. This sanitary system ultimately discharges to the trunk sewer on Scott Street. The servicing intent for Phase 2 will be to extend the 375mm diameter private sanitary sewer (**Drawing SSP-1**) south into the Phase 2 area.

For detailed information regarding the wastewater servicing for the Phase 1 area, please refer to the *Serviceability Report – Ashcroft Homes – 114 Richmond Road* (Stantec, June 2013) and additionally, the existing Amended Environmental Compliance Approval (ECA) Number 7171-9AYQGT, issued August 30, 2013.

5.2 Design Criteria

As outlined in the City of Ottawa Sewer Design Guidelines and the MECP's Design Guidelines for Sewage Works, the following criteria were used to calculate estimated wastewater flow rates and to size the sanitary sewers:

- 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 – 200mm dia. for residential areas, 250mm for commercial areas
- Average Wastewater Generation (Commercial) – 28,000L/ha/day
- Average Wastewater Generation (Residential) – 280L/cap/day
- Peak Factor (Commercial) – 1.5 (if Commercial over 25%+ contributing area, 1.0 otherwise)
- Peak Factor (Residential) – Per Harmon's w/ correction factor of 0.8
- Extraneous Flow Allowance – 0.33 l/s/ha (conservative value)
- Manhole Spacing – 120 m
- Minimum Cover – 2.5m



5.3 Proposed Servicing

As shown in **Drawing SA-1** and detailed in the sanitary sewer design sheet attached in **Appendix B.1**, the proposed PH2 site will be serviced by a network of 200 mm diameter gravity sewers which will direct the wastewater flows from the entire development site (approx. 4.6 L/s with allowance for infiltration) to the existing 375 mm diameter sanitary sewer.

The Wastewater generated from townhouse Blocks 3 to 5 are to be directed internally through the underground parking garage before outletting through the 200mm diameter service lateral at the north to the on-site sanitary sewer manhole SAN 2. The wastewater from townhouse Blocks 1, 2, and 6 will have one (1) individual sanitary sewer lateral for each townhouse stack, connecting to the 200mm diameter sanitary sewer network. All townhouse wastewater flows are routed to manhole SAN 2 and consequently routed internally through the underground parking garage of the 4-storey apartment building.

Sanitary sewage from the apartment building (approximately 1.0L/s) is added to the wastewater flows. The sanitary system outlets the apartment on the northwest side of the foundation to a 300mm diameter sewer lateral (SAN STUB 13) and then into manhole SAN 12 which is tied into the existing 375mm sanitary sewer stub through a 6.4m extension of the 375mm diameter sewer. Manhole SAN 12 must be shifted approximately 6.4m south of its existing location and a new northeast invert will be cored into the manhole to accommodate the new service stub. The existing south invert of the manhole will need to be plugged with non-shrink concrete, and the manhole shall be re-benched.

Full port backwater valves are to be installed on all sanitary services within the site to prevent any potential surcharge from the downstream sanitary sewer from impacting the proposed property. Ultimate configuration, sizing, and pumping requirements of the internal plumbing system conveying the wastewater flows through the underground parking garages are to be confirmed by the mechanical consultant and/or plumbing contractor at building permit.

Drainage of the underground parking garages must be directed to the sanitary sewer system. Sump pumps/pits may be required, as determined and designed by the mechanical consultant and/or plumbing contractor at building permit.

From the previous approved Serviceability Report for Phase 1 of the 114 Richmond Road site, the approved peak flow rate from the overall site development (Phase 1, 2 and 3) was determined to be 21.5 L/s, which was found to be well within the available capacity of the downstream sewers on Patricia Avenue. Phase 1 of the development was proposed to utilize 9.0 L/s peak flows, with a balance of 11.7 L/s for Phase 2 and 0.84 L/s for Phase 3. Based on the revised sanitary sewer peak flow parameters per updates to the City's Sewer Design Guidelines, the estimated 4.6 L/s peak flow rate from Phase 2 of the development is well within the allocated peak flow rate. Excerpts of the serviceability study are provided in **Appendix B.2**.



6 Stormwater Management

6.1 Objectives

The objective of this stormwater management plan is to determine the measures necessary to control the quantity of stormwater released from the proposed development to criteria established within the previously approved serviceability report for the site, and to provide sufficient detail for approval and construction.

6.2 Background

The existing 375mm diameter internal storm sewer (of the Phase 1 servicing corridor) drains north and connects to the existing 600mm diameter (east-west) storm sewer in the Richmond Road ROW, which bends to drain north into a 975mm diameter storm sewer in the Patricia Avenue ROW. This storm system ultimately discharges to the trunk sewer on Scott Street. The servicing intent for Phase 2 building storm services will be to extend the 375mm diameter private storm sewer (**Drawing SSP-1**) south into the Phase 2 area.

6.3 SWM Criteria and Constraints

Criteria were established by combining current design practices outlined by the City of Ottawa Design Guidelines (2025), through the report titled "Assessment of Adequacy of Public Services Report" by Trow Associates (March 2010), and through consultation with City of Ottawa staff. The following summarizes the criteria, with the source of each criterion indicated in brackets:

General

- Use of the dual drainage principle (City of Ottawa).
- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff. (City of Ottawa)
- Assess impact of 100-year event outlined in the City of Ottawa Sewer Design Guidelines on major & minor drainage system (City of Ottawa)
- No quality control criteria have been previously identified for the subject site (Stantec, Trow)

Storm Sewer & Inlet Controls

- Size the internal private storm sewers to convey the 100-year storm event under free-flow conditions using City of Ottawa I-D-F parameters (City of Ottawa). 100-year storm flows need to be accommodated in the private storm pipe network to convey the peak flows for all storms up to and including the 100-year event from the internal site to the building cistern for detention and quantity management.



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Phase 2 Site Servicing and Stormwater Management Report

6 Stormwater Management

- Site discharge rates for each storm event to be restricted to 5-year storm event pre-development rates with a maximum pre-development C coefficient of 0.45, and time of concentration of 23.8 minutes (**205 L/s**) (Stantec, Trow).
- Proposed stormwater outlets for the site include:
 - the existing superpipe (3000x1500mm concrete storm tunnel) at the northeast side of the site, and
 - the 375mm storm sewer along the northwest property line (through the building corridor).
- 100-year Storm HGL to be a minimum of 0.30 m below building foundation footing (City of Ottawa).

Surface Storage & Overland Flow

- Building openings to be a minimum of 0.15m above the 100-year water level (City of Ottawa)
- Maximum depth of flow under either static or dynamic conditions shall be less than 0.35m (City of Ottawa)
- Balance of flows in excess of allowable release rate up to and including the 100-year storm event to be detained on-site. (Stantec, Trow)
- Provide adequate emergency overflow conveyance off-site for events beyond the 100-year storm (City of Ottawa)
- Where possible, major flow from the site is to be safely conveyed by surface routing towards Leighton Terrace and Richmond Road. (Stantec)

6.4 Stormwater Management

The Modified Rational Method was employed to assess the rate and volume of runoff generated during post-development conditions. The site was subdivided into drainage areas (subcatchments) tributary to stormwater controls as defined by the location of inlet control devices. A summary of subareas and runoff coefficients is provided in **Appendix C.2** and **Drawing SD-1** indicate the stormwater management drainage areas. Runoff coefficient values have been increased by 25% for the post-development 100-year storm event based on the City of Ottawa SDG. Rational method storm sewer design sheets have been supplied as part of **Appendix C.1**.

6.4.1 Allowable Release Rate

Based on prior consultation with City of Ottawa staff during Phase 1 of the development, the peak post-development discharge from the subject site is to be limited to that of the 5-year event discharge under pre-development conditions, to a maximum discharge coefficient C of 0.45 at a time of concentration of 23.8 minutes (see report excerpts in **Appendix C.3**) Peak flow rates have been calculated using the rational method as follows:

$$Q = 2.78 CiA$$

Where: Q = peak flow rate, L/s

A = drainage area, ha

I = rainfall intensity, mm/hr (per Ottawa IDF curves)



C = site runoff coefficient

The target release rate for the site is summarized in **Table 6.1**:

Table 6.1: Target Release Rates

Design Storm	Target Flow Rate (L/s)
All Events	205

6.4.2 Storage Requirements

The site requires quantity control measures to meet the restrictive stormwater release criteria. It is proposed that rooftop storage via restricted roof release in combination with the subsurface storage pipe constructed in Phase 1, as well as a proposed storage cistern are utilized to reduce site peak outflow to the target rate.

6.4.2.1 Rooftop Storage

It is proposed to retain stormwater on the flat rooftops of all townhouse blocks and the 4-storey apartment building by installing restricted flow roof drains. The following calculations assume the proposed roof drains will be equipped with standard Watts Model Adjustable “Accutrol” Weirs (see attached data sheet in **Appendix C.4**), or approved equivalent. Design for the existing roof areas (EX ROOF) is as per the approved Phase 1 Stormwater Management Report for the development.

Watts Drainage “Accutrol” roof drain weir data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. Other products may be specified for use, provided that the total roof drain release rate is restricted to match the maximum rate of release indicated in **Table 6.1**, and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater. Proposed drain release rates have been calculated based on the Accutrol weir settings defined in the modified rational method (MRM) analysis in **Appendix C.2**. Weir settings, storage volume and controlled release rates are summarized in **Table 6.2**.



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Table 6.2: Roof Control Areas

Design Storm	Roof Area ID	Depth (mm)	Accutrol Setting (%)	Discharge (L/s)	Volume Stored (m ³)
5-Year	EX ROOF	27	N/A	9.2	44.2
	ROOF R12	106	25% Open	4.8	12.9
	ROOF R13	112	25% Open	2.5	11.0
	ROOF R14	112	25% Open	2.5	11.0
	ROOF R15	112	25% Open	2.5	11.0
	ROOF 104A	110	25% Open	3.3	12.3
	ROOF 105A	110	25% Open	3.3	12.3
	ROOF 105B	110	25% Open	3.3	12.3
100-Year	EX ROOF	51	N/A	17.4	83.6
	ROOF R12	143	25% Open	5.5	31.3
	ROOF R13	150	25% Open	2.8	25.5
	ROOF R14	150	25% Open	2.8	25.5
	ROOF R15	150	25% Open	2.8	25.5
	ROOF 104A	148	25% Open	3.8	28.7
	ROOF 105A	148	25% Open	3.8	28.7
	ROOF 105B	148	25% Open	3.8	28.7

6.4.2.2 Uncontrolled Catchments

Due to grading constraints, some subcatchments were designed without a storage component. These areas flow offsite uncontrolled to Richmond Road and Byron Avenue and are not tributary to the on-site storm sewer outlets. Areas that discharge offsite without entering the proposed stormwater management system must be compensated for in areas with controls, as drainage will re-enter storm sewers tributary to Richmond Road further downstream of the site. **Table 6.3** summarizes the peak uncontrolled 5 and 100-year catchment release rates for areas that are non-tributary to the outlet sewer:

Table 6.3: Peak Uncontrolled (Non-Tributary) Release Rate

Design Storm	Intensity (mm/hr)	Area ID	Area (ha)	C	Tc (min)	Qrelease (L/s)	Qtotal (L/s)
5-Year	104.19	EX UNC1	0.09	0.80	10	21.6	27
		UNC2	0.04	0.48	10	5.9	
100-Year	178.56	EX UNC1	0.09	1.00	10	46.2	59
		UNC2	0.04	0.60	10	12.7	
Total Uncontrolled			0.14				



6.4.2.3 Surface Storage

Surface drainage directed to existing CBMH109, CBMH 107, and CBMH112 outlets to the downstream 3000mm x 1500mm superpipe within the previously constructed Phase 1 of the development. Flow restriction and surface storage is not provided at these catch basin manholes. Proposed catch basins for the Phase 2 drainage areas also do not utilize flow restriction or surface storage. Maximum static ponding limits are shown in the **SD-1 Drawing** to identify the maximum ponding area, ponding depth, and spill elevations that are anticipated if a catch basin or area drain becomes blocked or during events exceeding the 100-year event. If the spill elevation is reached, the ponded areas will overflow along the emergency overland flow routes as indicated by the overland flow arrows.

6.4.2.4 Subsurface Storage

Per the modified rational method calculations included as part of **Appendix C.2**, the remainder of the site is to be directed toward either the existing 3000mm x 1500mm storage superpipe, or to the proposed subsurface cistern sized to meet the target peak discharge rate for the 100-year event.

Storage volumes for the existing storage pipe and associated structures were previously determined within the approved development Phase 1 stormwater management report. The current development plan redirects impervious areas that previously drained to the superpipe to the new underground cistern. Consequently, the storage requirements of the superpipe are decreased in this phase. The current superpipe and ICD design are sufficient to suit the current development plan catchment areas and imperviousness.

It is anticipated that the subsurface cistern will be in the underground parking levels beneath the 4-storey apartment building. The cistern will likely be set below the outlet sewer invert elevation and will be required to be pumped to the gravity sewer outlet at the discharge rate specified. Storage volumes and controlled release rates for the two systems are summarized in **Table 6.4** and **Table 6.5**.

Table 6.4: Controlled Tributary Area (3000mm x 1500mm Superpipe)

Design Storm	Area IDs	Tributary Area (ha)	Design Head (m)	Elevation (m)	Discharge (L/s)	V _{required} (m ³)	V _{available} (m ³)
5-Year	EXST1, EXST3, C107A, C109A, C112A, EXT2	0.93	0.65	65.96	31.2	80.8	120.5
100-Year	EXST1, EXST3, C107A, C109A, C112A, EXT2	0.93	1.67	66.98	50.0	200.0	292.2

The following areas contribute to the underground cistern in both the 5-year and 100-year events:

Surface Drainage Areas (no upstream controls): CIST 1-2, CIST 2-1, CIST 3-1, CIST 4, CIST 5, CIST 6, CIST 7, EXT1, C103A, C104A, C104B, CIST 1-3, CIST 8, CIST 9, CIST 10, and CIST 11

Roof Drainage Areas (rooftop controls): R104A, R105A, R105B, R12, R13, R14, and R15



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Table 6.5: Controlled Tributary Area (Cistern)

Design Storm	Tributary Area (ha)	Discharge (L/s)	V _{required} (m ³)	V _{available} (m ³)
5-Year	1.30	77.8	37.7	142.0
100-Year	1.30	77.8	142.0	142.0

A cistern of 142 m³ volume is required for Phase 2 of this development. The cistern will be mechanically pumped at a maximum release rate of 77.8 L/s. The release rate of the cistern has been over-controlled to compensate for the runoff from the uncontrolled areas of the site, to ensure that the overall site meets the target release rate.

The final design of the cistern and outlet pump within the proposed building is to be completed by the mechanical and structural engineers and coordinated with the architect. In the event of a power outage or breakdown of the pump, the cistern will be designed with an emergency overflow spill outlet at or above the 100-year storage level of the cistern. The emergency overflow will spill into a gravity drain designed by the mechanical consultant to convey the 100-year flow rates. The drain inlet/invert will be set to allow flow by gravity through the building internal plumbing system to be wye-teed into the building storm service lateral downstream of the backwater flow prevention valve. The cistern's 100-year storage capacity requirements, allowable release rates, emergency overflow, and gravity drain outlet will need to be coordinated with the structural and mechanical engineering consultants at a later design phase.

6.4.3 Results

Table 6.6 demonstrates the proposed stormwater management plan is adequate and adheres to the overall target peak outflow rates for the site. The sum of the peak discharges through the three site outlets (uncontrolled overland flow, controlled superpipe discharge, and controlled/uncontrolled internal storm sewer discharge), were considered for the overall site.

Existing storm drainage areas EX ST2 and EX ROOF, are Phase 1 drainage areas that outlet to the 375mm diameter internal storm sewer. EX ST2 is an uncontrolled area draining to EX. CB1 and EX ROOF is an area that includes both controlled and uncontrolled roof drains. EX ROOF outlets through the 300mm diameter building storm service for Phase 1. The uncontrolled flows from EX ST2 were re-calculated based on the new subcatchment delineations. The release rate for EX ROOF was obtained from the Phase 1 design. These two subcatchment areas contribute to the internal storm sewer downstream of the Phase 2 storm service (including outflow from the cistern); hence the stormwater release rates for these two subcatchments were included in the overall peak flow rate to the 375mm diameter internal storm sewer outlet.



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Table 6.6: Summary of Total 5 and 100-Year Event Release Rates

Area	5-Year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Uncontrolled Overland Flows	27.5	58.9
Controlled – Superpipe Outlet	31.2	50.0
Controlled and Uncontrolled – 375mm Internal Storm Sewer Outlet	87.5	96.2
Total	146.2	205.0
Target	205.0	205.0

6.5 Stormwater Servicing

As shown in **Drawing SD-1** and detailed in the storm sewer design sheet attached in **Appendix C.1**, the proposed PH2 site will be serviced by a network of gravity sewers which will convey the 100-year stormwater flows from Phase 2 of the development site to the underground parking level of the apartment building, where a 142m³ cistern provides the principal stormwater management for the Phase 2 area. Stormwater servicing for each building is as follows:

- Blocks 1, 2, and 6 each have one (1) 200mm diameter storm service lateral connected to the private storm sewer system.
- Storm servicing for Blocks 3, 4, and 5 drain through the internal plumbing of the underground parking structure. The 300mm diameter storm service lateral connects the internal plumbing to the private storm sewer system.
- All roofs are flat and roof drains have restricted release rates to provide rooftop storage up to 150mm maximum depth. Flows from controlled roof drains are to be wye-teed into the building storm service laterals downstream of the backwater prevention valve.
- Roof drainage is conveyed through the building service laterals and storm sewer network to the cistern for additional quantity control.
- The 300mm diameter apartment building storm service lateral outlets to an extension of the existing 375mm diameter onsite storm sewer that forms part of the Phase 1 internal building servicing corridor.
- All building storm services will also accommodate the foundation drainage flows. Foundation drains are to be designed by the geotechnical or structural consultants at building permit.
- Full port backwater valves are required on all building storm service laterals within the site to prevent impacts to the foundation drainage from any potential surcharge in the downstream sewer system.
- Foundation drains for the underground parking structures will require sump pumps/pits to be designed by the mechanical consultant at building permit.
- Flows from sump pumps and the cistern pump are to be wye-teed into the building storm service laterals downstream of the backwater prevention valves.



7 Grading and Drainage

The proposed development, including Phase 1, measures approximately 2.23ha in area, with 0.38 of external areas draining into the site. The topography across the site is a gradual slope draining from south to north with a difference in elevation of approximately 3m. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements, adhere to the geotechnical recommendations (see **Section 11**) for the site, and provide for minimum cover requirements for storm and sanitary sewers, where possible. Site grading has been established to provide emergency overland flow routes required for stormwater management in accordance with City of Ottawa requirements.

The subject site maintains emergency overland flow routes for flows deriving from storm events in excess of the maximum design event to the proposed municipal rights-of-way at the northern and northeastern boundary of the development, and ultimately to Richmond Road and Leighton Terrace as depicted in **Drawing GP-1**. Existing rear yards along the western and eastern boundary of the site that previously drained onto the subject site area will be maintained (EXT1 and EXT2).

Several retaining walls are proposed at the west side of the site in the Phase 2 development, to accommodate the various grade changes. These walls are to be designed by others.



8 Utilities

As the subject site is bound to the east and west by an existing residential area / commercial main street, and by municipal rights-of-way to the north, south, and east, Hydro, Bell, Gas and Cable servicing for the proposed development should be readily available. Pole mounted Hydro infrastructure may exist along the western property line and will be relocated prior to development. It is anticipated that existing infrastructure will be sufficient to provide a means of distribution for the proposed site. Exact size, location and routing of utilities will be finalized after design circulation.



9 Approvals

Environmental Compliance Approvals (ECAs, formerly Certificates of Approval (CofA)) under the Ontario Water Resources Act are not expected to be a requirement for Phase 2 of this development as site sanitary and stormwater discharges are routed through the existing Phase 1 sewers of the development. The Phase 1 building servicing corridor forms a separate severed parcel owned by the applicant and thus constitutes a legal outlet. Approval was previously obtained for storm and sanitary sewers connecting to Richmond Road / Leighton Terrace as part of the Phase 1 servicing corridor. Existing downstream sewers have demonstrated adequate capacity to receive the flows from Phase 2.

For 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). It is possible that groundwater may be encountered during the foundation excavation on this site. A minimum of two to four weeks should be allotted for completion of the EASR registration and the preparation of the Water Taking and Discharge Plan by a Qualified Person as stipulated under O.Reg. 63/16. An MECP Permit to Take Water (PTTW), which is required for dewatering volumes exceeding 400,000L/day, is not anticipated for the site.



10 Erosion Control During Construction

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.

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 as indicated in **Drawing ECDS-1** to prevent the migration of sediment offsite.
7. Install trackout control mats (mud mats) at the entrance/egress 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 for the onsite works.



11 Geotechnical Investigation and Environmental Assessment

A Geotechnical Investigation Report was prepared by Paterson Group dated Feb 24, 2026. The report summarizes the existing soil conditions within the entirety of the development and construction recommendations. For details which are not summarized below, please see the original Paterson report.

Subsurface soil conditions within the subject area were determined from eight (8) boreholes and five (5) test pits distributed across the development. In general, soil stratigraphy consisted of topsoil underlain by silty clay and glacial till, followed by limestone bedrock. Bedrock/inferred bedrock elevations range from depths of 8.7 to 9.8m below ground surface. Groundwater Levels were measured in July 2010, and February 2021 and vary in elevation from 1.02m to 2.22m below ground surface. Monitoring wells measured in February 2021 showed the groundwater level to be substantially lower at 3.05 to 6.54m below ground surface.

No grade raise limitations were identified for the subject site.

Pipe bedding requirements for underground services and recommendations for rock removal were also identified for the subject site.

The required pavement structures for the proposed hard surfaced areas are outlined in the **Geotechnical Report** and in the **SSP-1 Drawing**. The report provides five (5) pavement structures depending on what the pavement is founded on:

- Rigid pavement structure – Underground parking levels
- Car only parking areas – Podium Deck
- Access lanes and heavy duty truck areas – Podium Deck
- Car only parking areas – Overburden
- Access lanes and heavy duty truck areas – Overburden



12 Conclusions

The potable water, wastewater, and storm water servicing conditions assessed in this report indicate that the existing public services immediately adjacent to the project site, the existing sewer stubs from Phase 1 of the development, and the proposed servicing strategy are adequate to support Phase 2 of this development.

12.1 Water Servicing

Based on the supplied boundary conditions for existing watermains and estimated domestic and fire flow demands for the Phase 2 site, it is anticipated that the proposed watermain loop and servicing in this development will provide sufficient capacity to sustain the required domestic demands and emergency fire flow demands of the proposed site. Fire flows greater than those required per OFM Guidelines are available for this development.

12.2 Sanitary Servicing

The proposed sanitary sewer network is sufficiently sized to provide gravity drainage of the site. The proposed development will be serviced by a network of gravity sewers which will direct wastewater flows to the existing 375mm diameter sanitary sewer stub constructed as part of the Phase 1 Servicing Corridor. The proposed drainage outlet has sufficient capacity to receive sanitary discharge from the site based on the findings of the Serviceability Report for Phase 1 of the development.

12.3 Stormwater Servicing

The proposed stormwater management plan complies with the goals specified previously through consultation with the City of Ottawa for Phase 1 of the development. The two principal methods of stormwater management onsite include the existing Phase 1 superpipe and associated ICD, and the proposed Phase 2 storage cistern with a mechanically pumped outlet. These detention features limit the peak storm sewer release rate from the overall site to the 5-year pre-development rate of 205L/s as determined by the background reports.

The proposed development will be serviced by a network of gravity sewers which will direct stormwater flows to the existing 375mm diameter storm sewer stub constructed as part of the Phase 1 Servicing Corridor. The downstream receiving sewer has sufficient capacity to accept runoff volumes and peak flow rates from the site based on the findings of the Serviceability Report for Phase 1 of the development.

12.4 Grading, Erosion Control, and Geotechnical Requirements

Grading for the site has been designed to provide an emergency overland flow route as per City requirements and reflects the recommendations made in the Geotechnical Investigation Report prepared by the Paterson Group. Erosion and sediment control best management practices and concept plan have been provided. The



contractor is responsible for implementing ESC measures during construction to reduce the impact on proposed stormwater infrastructure, existing facilities, and the receiving stormwater systems.

12.5 Utilities

Utility infrastructure exists within the Richmond Road and Byron Avenue ROWs at the northern and southern boundaries of the proposed Phase 2 site. It is anticipated that existing infrastructure will be sufficient to provide a means of distribution for the entirety of the development. Exact size, location and routing of utilities will be finalized after design circulation.

12.6 Approvals/Permits

An MECP ECA is not expected to be required for Phase 2 of the development, as approval was obtained for the receiving storm and sanitary sewers as part of Phase 1. For 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).



Appendix A Water Servicing

A.1 Domestic Water Demands



114 Richmond Road, Ottawa, ON - Domestic Water Demand Estimates

Site Plan provided by Project1 Studio Inc. Rev 1, 2026-04-07

Stantec Project No. 160402058

Densities as per City Guidelines ¹ :		
Townhouse(Typ.)	2.3	ppu
1-Bedroom	1.4	ppu
2 Bedroom/ 1-Bed+Den	2.1	ppu
2-Bed+Den	3.1	ppu



Type of Unit	No. of Units	Population	Daily Rate of Demand ² (L/cap/day)	Avg Day Demand		Max Day Demand ³		Max Hour Demand ³	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Apartment									
1-Bedroom	26	36	280	7.1	0.1	17.7	0.3	38.9	0.6
2-Bedroom/1-Bed+Den	19	40	280	7.8	0.1	19.4	0.3	42.7	0.7
2-Bed+Den	2	6	280	1.2	0.0	3.0	0.1	6.6	0.1
Subtotal	47	83		16.0	0.3	40.1	0.7	88.2	1.5
Townhouse			280						
Block 1 - Type B	24	55	280	10.7	0.2	26.8	0.4	59.0	1.0
Block 2 - Type B	24	55	280	10.7	0.2	26.8	0.4	59.0	1.0
Block 6 - Type B	24	55	280	10.7	0.2	26.8	0.4	59.0	1.0
Block 3 - Type C	18	41	280	8.1	0.1	20.1	0.3	44.3	0.7
Block 4 - Type C	18	41	280	8.1	0.1	20.1	0.3	44.3	0.7
Block 5 - Type C	18	41	280	8.1	0.1	20.1	0.3	44.3	0.7
Subtotal	126	290		56.4	0.9	140.9	2.3	309.9	5.2
Total Site :	173	373		72.4	1.2	181.0	3.0	398.2	6.6

Notes:

- 1 As per Table 4-1 from the City of Ottawa Water Design Guidelines (2025), the persons per unit for Townhouse (stacked) units is 2.3.
- 2 As per Table 4-2 from the City of Ottawa Water Design Guidelines (2025) the average daily rate of water demand for residential areas: 280 L/cap/day
- 3 As per Table 4.2 from the City of Ottawa Water Design Guidelines (2025), the water demand criteria used to estimate peak demand rates for residential areas are as follows:
 maximum daily demand rate = 2.5 x average day demand rate
 maximum hour demand rate = 2.2 x maximum day demand rate
- 4 Population counts are rounded up to the nearest whole number.

A.2 Fire Flow Demands (2020 FUS)





Date: 3/31/2026

Description: 4-storey wood frame apartment building (1hr Rated exterior per OBC 3.2.2.52)

Notes: Site Plan provided by Project1 Studio Inc. Rev 1, dated Dec 12, 2025.

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type III - Ordinary Construction / Type IV-C - Mass Timber Construction										1	-
2	Determine Effective Floor Area	Sum of All Floor Areas										-	-
		872	872	872	872						3488	-	
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min										-	13000
4	Determine Occupancy Charge	Limited Combustible										-15%	11050
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-4420
		Standard Water Supply										-10%	
		Not Fully Supervised or N/A										0%	
		% 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	3.1 to 10	19	4	61-80	Type I-II - Protected Openings	YES			0%	3868	
		East	10.1 to 20	46	3	> 100	Type V	NO			15%		
		South	20.1 to 30	19	4	61-80	Type V	NO			6%		
		West	10.1 to 20	46	2	81-100	Type V	NO			14%		
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min										10000	
		Total Required Fire Flow in L/s										166.7	
		Required Duration of Fire Flow (hrs)										2.00	
		Required Volume of Fire Flow (m³)										1200	



Project Name: 114 Richmond Road

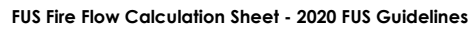
Date: 3/31/2026

Fire Flow Calculation #: 2

Description: 3-storey wood frame structure Back-back-Back Stacked townhouse - Firewalls separating blocks into three 8-unit clusters.

Notes: Site Plan provided by Project1 Studio Inc. Rev 1, dated Dec 12, 2025.

Step	Task	Notes								Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction								1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas								-	-
		262	262	262						786	-
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min								-	9000
4	Determine Occupancy Charge	Limited Combustible								-15%	7650
5	Determine Sprinkler Reduction	None								0%	0
		Non-Standard Water Supply or N/A								0%	
		Not Fully Supervised or N/A								0%	
		% Coverage of Sprinkler System								0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?	-	-	
		North	0 to 3	15	3	41-60	Type V	YES	0%	2372	
		East	20.1 to 30	17	2	21-49	Type V	NO	2%		
		South	3.1 to 10	15	3	41-60	Type V	NO	17%		
		West	10.1 to 20	17	3	41-60	Type V	NO	12%		
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min								10000	
		Total Required Fire Flow in L/s								166.7	
		Required Duration of Fire Flow (hrs)								2.00	
		Required Volume of Fire Flow (m³)								1200	



Date: 3/31/2026

Description: 3-storey wood frame structure Back-back-Back Stacked townhouse - Firewalls separating blocks into three 8-unit clusters.

Step	Task	Notes								Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction								1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas								-	-
		262	262	262						786	-
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min								-	9000
4	Determine Occupancy Charge	Limited Combustible								-15%	7650
5	Determine Sprinkler Reduction	None								0%	0
		Non-Standard Water Supply or N/A								0%	
		Not Fully Supervised or N/A								0%	
		% Coverage of Sprinkler System								0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?	-	-	
		North	3.1 to 10	15	3	41-60	Type V	NO	17%	2372	
		East	20.1 to 30	17	2	21-49	Type V	NO	2%		
		South	0 to 3	15	3	41-60	Type V	YES	0%		
		West	10.1 to 20	17	3	41-60	Type V	NO	12%		
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min								10000	
		Total Required Fire Flow in L/s								166.7	
		Required Duration of Fire Flow (hrs)								2.00	
		Required Volume of Fire Flow (m ³)								1200	



Project Name: 114 Richmond Road

Date: 3/31/2026

Fire Flow Calculation #: 4

Description: 3-storey wood frame structure Back-back-Back Stacked townhouse - Firewalls separating blocks into three 6-unit clusters.

Notes: Site Plan provided by Project1 Studio Inc. Rev 1, dated Dec 12, 2025.

Step	Task	Notes								Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction								1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas								-	-
		211	211	211						633	-
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min								-	8000
4	Determine Occupancy Charge	Limited Combustible								-15%	6800
5	Determine Sprinkler Reduction	None								0%	0
		Non-Standard Water Supply or N/A								0%	
		Not Fully Supervised or N/A								0%	
		% Coverage of Sprinkler System								0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?	-	-	
		North	10.1 to 20	16	3	41-60	Type I-II - Unprotected Openings	YES	0%	1632	
		East	10.1 to 20	14	3	41-60	Type V	NO	12%		
		South	10.1 to 20	16	3	41-60	Type V	NO	12%		
		West	0 to 3	14	2	21-49	Type V	YES	0%		
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min									8000
		Total Required Fire Flow in L/s									133.3
		Required Duration of Fire Flow (hrs)									2.00
		Required Volume of Fire Flow (m ³)									960



Date: 3/31/2026

Description: 3-storey wood frame structure with Firewalls separating into three 6-unit clusters.

Notes: Site Plan provided by Project1 Studio Inc. Rev 1, dated Dec 12, 2025.

Step	Task	Notes								Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction								1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas								-	-
		211	211	211						633	-
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min								-	8000
4	Determine Occupancy Charge	Limited Combustible								-15%	6800
5	Determine Sprinkler Reduction	None								0%	0
		Non-Standard Water Supply or N/A								0%	
		Not Fully Supervised or N/A								0%	
		% Coverage of Sprinkler System								0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?	-	-	
		North	10.1 to 20	16	3	41-60	Type V	NO	12%	2448	
		East	10.1 to 20	14	3	41-60	Type V	NO	12%		
		South	10.1 to 20	16	3	41-60	Type V	NO	12%		
		West	0 to 3	14	2	21-49	Type V	YES	0%		
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min								9000	
		Total Required Fire Flow in L/s								150.0	
		Required Duration of Fire Flow (hrs)								2.00	
		Required Volume of Fire Flow (m³)								1080	



Date: 3/31/2026

Description: 3-storey wood frame structure with Firewalls separating into three 6-unit clusters.

Notes: Site Plan provided by Project1 Studio Inc. Rev 1, dated Dec 12, 2025.

Step	Task	Notes									Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction									1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas									-	-
		211	211	211							633	-
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min									-	8000
4	Determine Occupancy Charge	Limited Combustible									-15%	6800
5	Determine Sprinkler Reduction	None									0%	0
		Non-Standard Water Supply or N/A									0%	
		Not Fully Supervised or N/A									0%	
		% Coverage of Sprinkler System									0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?		-	-	
		North	10.1 to 20	16	3	41-60	Type V	NO		12%	2380	
		East	10.1 to 20	13	3	21-49	Type V	NO		11%		
		South	10.1 to 20	16	3	41-60	Type V	NO		12%		
		West	0 to 3	13	3	21-49	Type V	YES		0%		
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min									9000	
		Total Required Fire Flow in L/s									150.0	
		Required Duration of Fire Flow (hrs)									2.00	
		Required Volume of Fire Flow (m³)									1080	



Date: 3/31/2026

Description: 3-storey wood frame structure with Firewalls separating into three 8-unit clusters.

Notes: Site Plan provided by Project1 Studio Inc. Rev 1, dated Dec 12, 2025.

Step	Task	Notes								Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction								1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas								-	-
		236	236	236						708	-
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min								-	9000
4	Determine Occupancy Charge	Limited Combustible								-15%	7650
5	Determine Sprinkler Reduction	None								0%	0
		Non-Standard Water Supply or N/A								0%	
		Not Fully Supervised or N/A								0%	
		% Coverage of Sprinkler System								0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?	-	-	
		North	10.1 to 20	17	3	41-60	Type V	NO	12%	1836	
		East	10.1 to 20	16	3	41-60	Type V	NO	12%		
		South	> 30	17	3	41-60	Type V	NO	0%		
		West	0 to 3	16	2	21-49	Type V	YES	0%		
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min								9000	
		Total Required Fire Flow in L/s								150.0	
		Required Duration of Fire Flow (hrs)								2.00	
		Required Volume of Fire Flow (m³)								1080	

A.3 Boundary Conditions



Kilborn, Kris

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Tuesday, February 10, 2026 9:04 AM
To: Wang, Ziyi; Azimi, Farbod
Cc: Renaud, Jean-Charles; Kilborn, Kris; Thiffault, Dustin
Subject: RE: Boundary Condition Request - 160402212 - 114 Richmond Road - PC2025-0274
Attachments: 114 Richmond Road February 2026.pdf

Good morning Ziyi

Please find requested BC for this site, based on information provided to the City, by your firm, attached and below:

The following are boundary conditions, HGL, for hydraulic analysis at 114 Richmond Road. (zone 1W) assumed to be connected via two connections to the 305mm watermain on Byron Avenue. (see attached PDF for location).

Connection 1

Minimum HGL = 108.4 m
Maximum HGL = 114.5 m
Max Day + Fire Flow (166.7 L/s) = 109.0 m
Max Day + Fire Flow (200 L/s) = 108.1 m

Connection 2

Minimum HGL = 108.4 m
Maximum HGL = 114.5 m
Max Day + Fire Flow (166.7 L/s) = 108.8 m
Max Day + Fire Flow (200 L/s) = 107.8 m

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

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

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Pronouns: he/him | Pronom: il

Project Manager - Infrastructure Approvals Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Development & Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)

City of Ottawa | Ville d'Ottawa

110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1

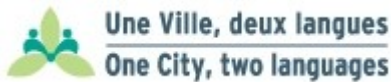
(613) 580 2424 Ext. | Poste 33017

Int. Mail Code | Code de Courrier Interne 01-14

shawn.wessel@ottawa.ca

 Please consider the environment before printing this email

Out of Office Alert :



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

From: Wang, Ziyi <Ziyi.Wang@stantec.com>

Sent: Tuesday, February 3, 2026 10:21 AM

To: Wessel, Shawn <shawn.wessel@ottawa.ca>; Azimi, Farbod <farbod.azimi@ottawa.ca>

Cc: Renaud, Jean-Charles <Jean-Charles.Renaud@ottawa.ca>; Kilborn, Kris <kris.kilborn@stantec.com>; Thiffault, Dustin <dustin.thiffault@stantec.com>

Subject: Boundary Condition Request - 160402212 - 114 Richmond Road - PC2025-0274

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ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Good morning Shawn,

Hope this email finds you well!

Our team at Stantec is working on the proposed development at 114 Richmond Road. This site is bounded by Richmond Road to the north, Byron Avenue to the south, Leighton Terrace to the east and adjacent to the Hilson Avenue Public School to the west. A pre-consultation meeting for this project was held on October 21, 2025. Please see the attached meeting feedback for your reference (file number PC2025-0274).

We would like to request the boundary condition for this development based on the following water and fire flow conditions:

- Domestic Demands
 - o Average Day Demand = 1.26 L/s 75.4 L/min)
 - o Max Day Demand = 3.14 L/s (188.6/min)
 - o Peak Hour Demand = 6.91 L/s (414.8 L/min)

We hope to request this boundary condition based on the fire flow in two types of proposed buildings. Their fire flow demand would be as follows:

- The Estimated Fire flow
 - o 10,000 L/min
 - o 12,000 L/min

The site boundary (red hatched portion) and the proposed potential connection points to the city's water main are shown in the picture below:



Please let me know if you have any questions or need anything else. Any help is greatly appreciated!

Sincerely,

Ziyi Wang, B.Eng
Engineering Graduate

Direct: (613) 784-2305
ziyi.wang@stantec.com



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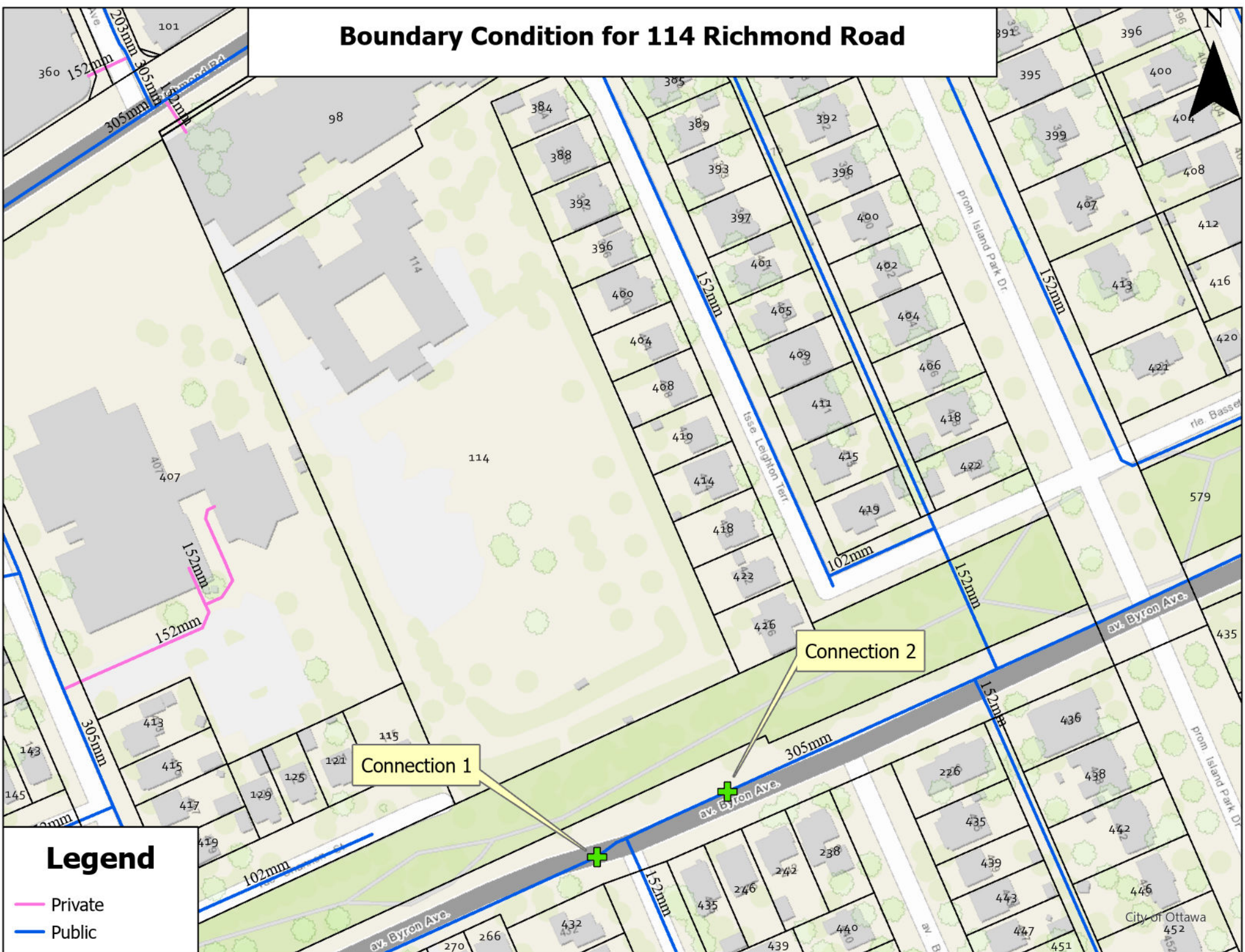
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Boundary Condition for 114 Richmond Road



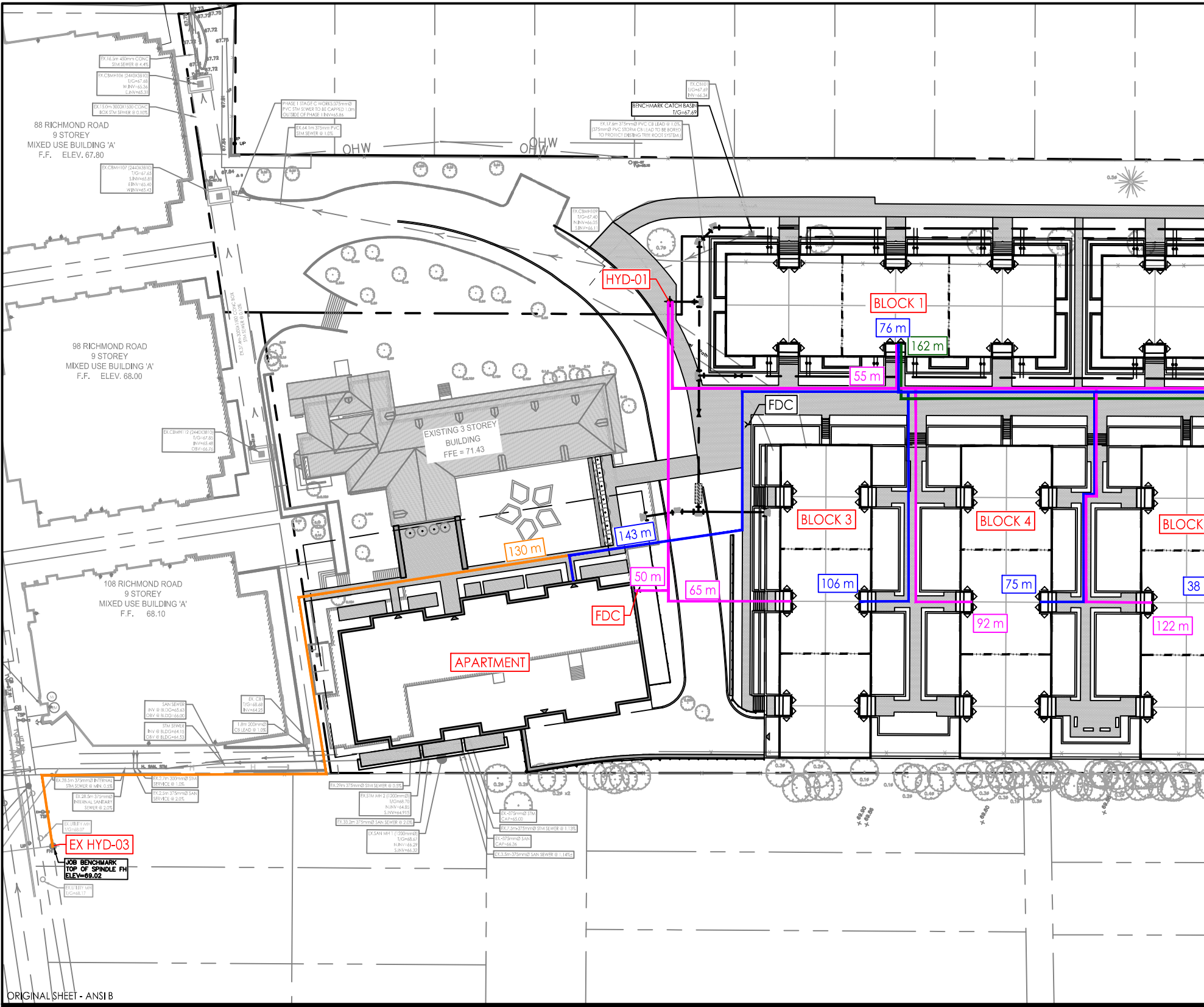
Legend

- Private
- Public

A.4 Hydrant Coverage Figure 3.5



W:\active\160402212\design\drawing\160402212 DB.dwg
2026/03/31 6:08 PM By: Gladish, Alyssa



ORIGINAL SHEET - ANSI B



Stantec Consulting Ltd.
300 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

Notes

NOT TO SCALE

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

A.5 Fire Hydrant Coverage Table



	Project:	114 Richmond Road	160402005
	TABLE 1: FIRE HYDRANT COVERAGE TABLE		
	Revision: 01 Revision Date: 3/31/2026	Prepared By: AG Checked By: DT	

Description	Hydrants ¹				Total Available Fire Flow (L/min)	Total Required Fire Flow ² (L/min)
	HYD-01	HYD-02	EX HYD-03	EX HYD-04		
4-STOREY APARTMENT BUILDING						
Distance from building (m)	50	143	130	-	-	-
Maximum fire flow capacity ³ (L/min)	5,678	3,785	3,785	0	13,248	10,020
BLOCK 1						
Distance from building (m)	55	76	-	162	-	-
Maximum fire flow capacity ³ (L/min)	5,678	3,785	0	2,839	12,302	10,020
BLOCK 2						
Distance from building (m)	110	20	-	106	-	-
Maximum fire flow capacity ³ (L/min)	3,785	5,678	0	3,785	13,248	10,020
BLOCK 3						
Distance from building (m)	65	106	-	-	-	-
Maximum fire flow capacity ³ (L/min)	5,678	3,785	0	0	9,463	7,980
BLOCK 4						
Distance from building (m)	92	75	-	-	-	-
Maximum fire flow capacity ³ (L/min)	3,785	5,678	0	0	9,463	9,000
BLOCK 5						
Distance from building (m)	122	38	-	-	-	-
Maximum fire flow capacity ³ (L/min)	3,785	5,678	0	0	9,463	9,000
BLOCK 6						
Distance from building (m)	-	35	-	50	-	-
Maximum fire flow capacity ³ (L/min)	0	5,678	0	5,678	11,356	9,000

NFPA 1 Table 18.5.4.3	
Distance to Building (m)	Maximum Capacity (L/min)
≤ 76	5,678
> 76 and ≤ 152	3,785
> 152 and ≤ 305	2,839

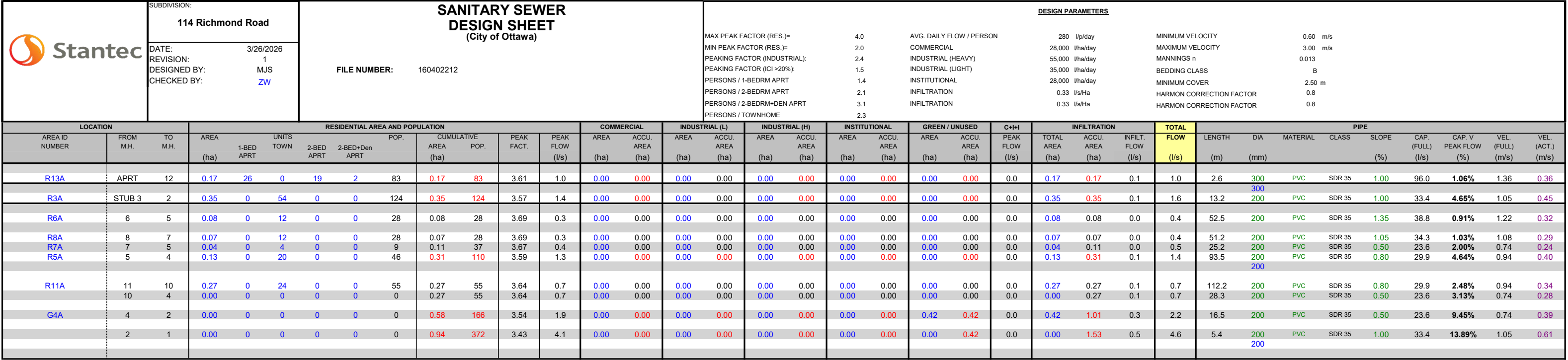
Notes:

- Hydrant locations as per Topographic Survey and SSP-1. Refer to fire hydrant coverage sketch.
- See FUS Calculations, Appendix B.2 for fire flow requirements.
- See NFPA 1 Table 18.5.4.3 for maximum fire flow capacity of hydrants by distance to building.

Appendix B Wastewater Servicing

B.1 Sanitary Sewer Design Sheet





B.2 Background Report Sanitary Excerpt



3.0 Water Servicing

A Potable Water Servicing Study was prepared by Stantec Consulting on February 12, 2013 and revised on April 10, 2013 to reflect servicing changes. A 250mm watermain connection is proposed within Richmond Road to service phase 1 of the development. The remaining development area will be serviced with a 250mm watermain connection in Hilson Avenue and another 250mm connection in Byron Avenue. The report outlines estimated water demands and residual pressures under average day, maximum day and peak hour demand conditions. The report indicates that minimum pressures are maintained during all demand scenarios. Fire flow calculations as per the Fire Underwriters Survey (FUS) indicate a required fire flow of 250L/s. The hydraulic analysis indicated that the proposed water servicing could provide the required fire flow while meeting minimum pressure requirements of 20psi (140kPa). Due to additional losses in the high rise buildings, additional pumping will be required at these buildings to maintain minimum pressures to each unit. For the detailed report see **Appendix D**.

4.0 Wastewater Servicing

As illustrated on **Drawing SP-1**, a 250mm diameter sanitary sewer exists within Richmond Road which flows easterly towards the intersection of Richmond Road and Leighton Terrace. A 450mm diameter sanitary sewer exists at the intersection of Patricia Avenue and Richmond Road which runs northerly down Patricia Avenue. This existing sanitary sewer is a 450mm diameter pipe with a slope of minimum 1%. Based upon the size and slope of the existing pipe it is determined that this sewer has a flow capacity of 300 l/s. The existing sanitary service lateral from the existing building within the 114 Richmond Road property is currently serviced through this outlet at Patricia Avenue and will be removed.

It is proposed that the development will be constructed in 3 separate phases. The first Phase of the development will consist of construction of three - nine storey mixed use buildings and renovations to the existing 3 storey building. The second phase will consist of construction of 5 buildings consisting of residential and mixed use. The third phase will consist of 1 building with a mix of residential and commercial use. The entire site will be serviced through one connection onto Richmond Road. Residential unit counts and commercial areas were determined from the October 22, 2012 site plan and stats prepared by Roderick Lahey Architects in **Appendix A** of this report.

It is proposed to service the entire development through a new 375mm diameter sanitary sewer connection to Richmond Road. The servicing for the first phase will be connected within the building mechanical room via the 375mm diameter pipe, as illustrated in **Drawing SP-2**. The transition between PVC material and cast iron will occur within the building and will be designed

by the mechanical engineer. The cast iron sewer will continue southerly within the Phase 1 building servicing corridor and exit the foundation wall. This 375mm diameter sanitary sewer will be extended within a common trench, with the storm and utilities, along the westerly property edge to service the Phase 2 and 3 developments. The 375mm diameter sewer will be constructed between two existing manholes in Richmond Road, as indicated on Drawing SP-1. It is proposed to install a 1200mm diameter manhole within the Richmond road right of way which will connect to the existing 450mm diameter sanitary through the existing manhole located at the intersection of Patricia Avenue and Richmond Road. As there is insufficient room for the placement of a monitoring manhole for phase 1 commercial, a monitoring port will be placed within the outlet sewer pipe for the commercial areas.

A sanitary drainage area plan and sanitary sewer design sheets were prepared by Novatech Engineering Consultants on behalf of the City of Ottawa in May 2005, which identified the 114 Richmond road property tributary to the Patricia Avenue sanitary sewer. (See **Appendix C.**)

The calculations outlined below represent the flows anticipated for each phase of this development.

Phase 1

The City of Ottawa's Sewer Design Guidelines for commercial development indicate the allocation of capacity in the receiving sanitary sewer required.

Total Site Area = 0.829ha

Peaking Factor Commercial 1.5

Commercial Average Peak Flow = 50000 L/gross ha/d

Commercial Operational Flow = 17000 L/gross ha/d

Infiltration Rate = 0.28 L/s/ha

Total Infiltration Flow = (Area x infiltration rate) = 0.23 L/s

Total Flow = (Peak Flow x Site Area /86400) x Peak Factor + Infiltration Flow

Total Flow as per guidelines = 0.95 L/s.

By implementing the City of Ottawa's sewer design guidelines the following sanitary flows are calculated for the proposed condominium development.

Residential (Apartment)	Population	= 276 units x 1.8 persons/unit
		= 497 people
		= 497 x 350 L/c/d
		≈ 2.01 L/s average residential sanitary flow
		using a peaking factor of 4;
		≈ 8.05 L/s

Total peak sewage flow for commercial and residential Phase 1 ≈ 9.00 L/s

Phase 2

The City of Ottawa's Sewer Design Guidelines for commercial development indicate the allocation of capacity in the receiving sanitary sewer required.

Total Commercial Area = 0.49ha

Infiltration area = 0.45ha

Peaking Factor Commercial 1.5

Commercial Average Peak Flow = 50000 L/gross ha/d

Commercial Operational Flow = 17000 L/gross ha/d

Infiltration Rate = 0.28 L/s/ha

Total Infiltration Flow = (Area x infiltration rate) = 0.13 L/s

Total Flow = (Peak Flow x Site Area /86400) x Peak Factor + Infiltration Flow

Total Flow as per guidelines = 0.56 L/s.

By implementing the City of Ottawa's sewer design guidelines the following sanitary flows are calculated for the proposed condominium development.

Residential (Apartment)**1 Bedroom:**

$$\begin{aligned}\text{Population} &= 282 \text{ units} \times 1.4 \text{ person/unit} \\ &= 394.8 \text{ persons} \\ &= (394.8 \text{ persons} \times 350 \text{ L/p/d}) / 86400 \text{ s/day} \\ &= 1.60 \text{ L/s} \quad \text{average residential sanitary flow} \\ &\quad \text{using a peaking factor of 4;} \\ &= 6.40 \text{ L/s}\end{aligned}$$

2 Bedroom:

$$\begin{aligned}\text{Population} &= 138 \text{ units} \times 2.1 \text{ person/unit} \\ &= 289.8 \\ &= (289.8 \text{ persons} \times 350 \text{ L/p/d}) / 86400 \text{ s/day} \\ &= 1.17 \\ &\quad \text{using a peaking factor of 4;} \\ &= 4.70 \text{ L/s}\end{aligned}$$

Total peak sewage flow for commercial and residential Phase 2 **≈ 11.66L/s**

Phase 3

The City of Ottawa's Sewer Design Guidelines for commercial development indicate the allocation of capacity in the receiving sanitary sewer required.

Total Commercial Area = 0.26ha

Infiltration area = 0.26ha

Peaking Factor Commercial 1.5

Commercial Average Peak Flow = 50000 L/gross ha/d

Commercial Operational Flow = 17000 L/gross ha/d

Infiltration Rate = 0.28 L/s/ha

Total Infiltration Flow = (Area x infiltration rate) = 0.07 L/s

Total Flow = (Peak Flow x Site Area /86400) x Peak Factor + Infiltration Flow

Total Flow as per guidelines = 0.30 L/s.

By implementing the City of Ottawa's sewer design guidelines the following sanitary flows are calculated for the proposed condominium development.

Residential (Apartment)**1 Bedroom:**

$$\begin{aligned} \text{Population} &= 24 \text{ units} \times 1.4 \text{ person/unit} \\ &= 33.6 \text{ persons} \\ &= (33.6 \text{ persons} \times 350 \text{ L/p/d}) / 86400 \text{ s/day} \\ &= 0.14 \text{ L/s} \quad \text{average residential sanitary flow} \\ &\quad \text{using a peaking factor of 4;} \\ &= 0.54 \text{ L/s} \end{aligned}$$

Total peak sewage flow for commercial and residential Phase 3 **≈ 0.84L/s**

Total anticipated peak flow from phase 1, 2 and 3 is approximately **21.5L/s**

A review of the downstream sanitary sewers was completed from the intersection of Patricia Avenue and Richmond Road to the connection to the West Nepean Collector located at the intersection of Island Park Drive and Scott Street (approx 320 metres).

Included in **Appendix C** is a sanitary sewer design sheet that was prepared for the City of Ottawa in 2005 during the reconstruction of Richmond Road. In the design sheet associated sanitary drainage area plan, the proposed site is denoted as area B3.

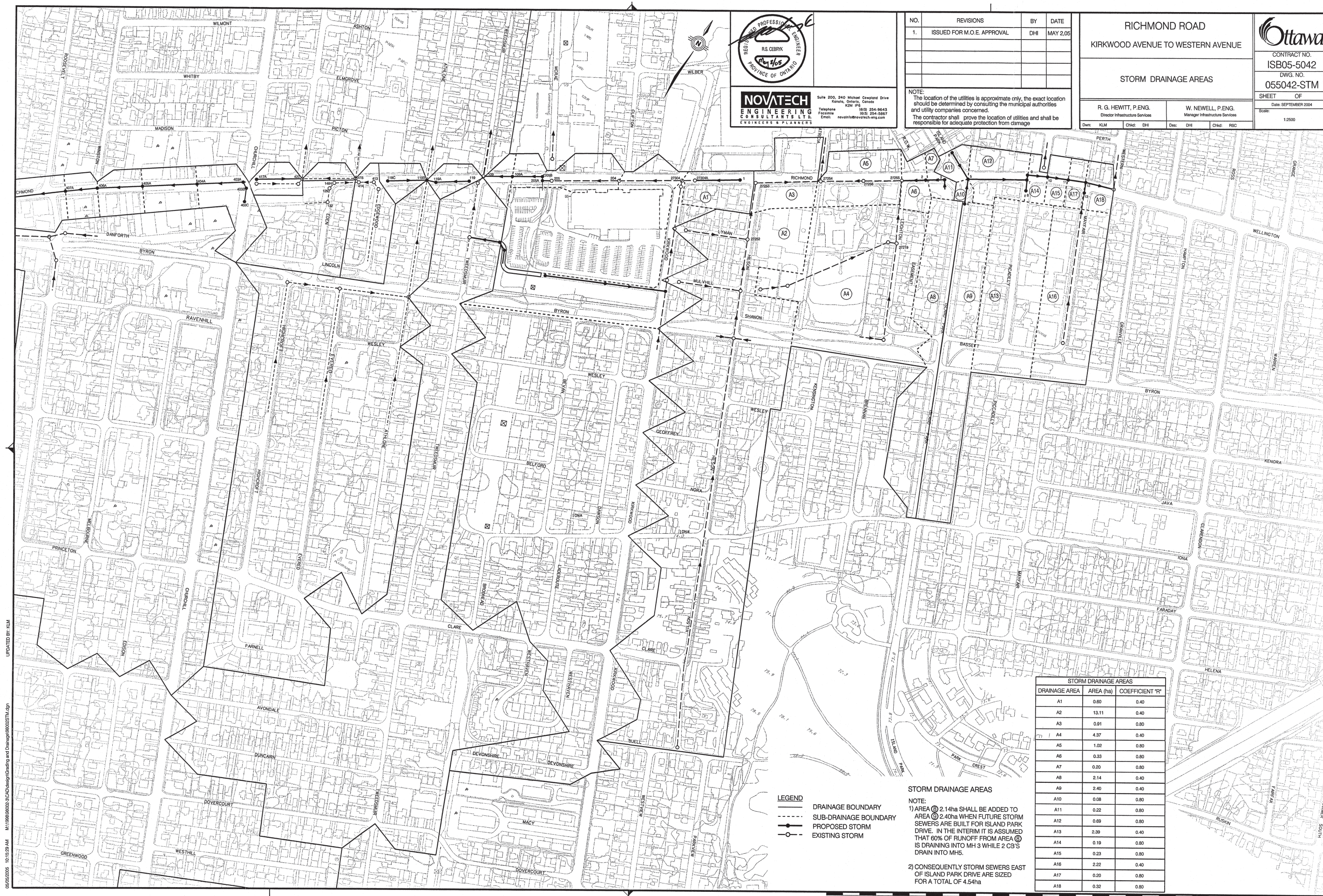
This information was expanded to include additional sanitary areas on Patricia Avenue to the collector sewer. The estimated sewage flows into the existing manhole at the intersection of

Patricia Avenue and Richmond Road are 73 L/sec (existing) + 23 L/sec (114 Richmond Rd). Additional commercial flows and residential flows of 17 L/sec are accumulated along Patricia Avenue.

An existing 450mm & 750mm sanitary sewer is present on Patricia Avenue, with a slope of between 1% and 2%. Based on this the minimum capacity for a 450mm sanitary sewer at 1.0% is 300 L/sec.

The total estimated sewage flows along Patricia Avenue including the new flows from the development of 114 Richmond Road are 111 L/sec. As the capacity of the existing 450mm sanitary sewer is approximately 300 L/sec the receiving sanitary sewer has adequate capacity to convey the necessary flow generated as a result to the proposed development.

Refer to **Appendix C** of this report for sanitary sewer design sheet and drainage areas indicating downstream flows within the 450mm diameter at Patricia Avenue indicating capacity within the receiving sewer for the 114 Richmond Road Development.



NOVATECH
ENGINEERING
CONSULTANTS LTD.
ENGINEERS & PLANNERS

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NO.	REVISIONS	BY	DATE
1.	ISSUED FOR M.O.E. APPROVAL	DHI	MAY 2,05

NOTE:
The location of the utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned.
The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

RICHMOND ROAD
KIRKWOOD AVENUE TO WESTERN AVENUE

STORM DRAINAGE AREAS

R. G. HEWITT, P.ENG.
Director Infrastructure Services

W. NEWELL, P.ENG.
Manager Infrastructure Services

Dwn: KLM Chkd: DHI Des: DHI Cncl: RSC

Ottawa

CONTRACT NO.
ISB05-5042

DWG. NO.
055042-STM

SHEET **OF**

Date: SEPTEMBER 2004

Scale: 1:2500

STORM DRAINAGE AREAS		
DRAINAGE AREA	AREA (ha)	COEFFICIENT "C"
A1	0.60	0.40
A2	13.11	0.40
A3	0.91	0.80
A4	4.37	0.40
A5	1.02	0.80
A6	0.33	0.80
A7	0.20	0.80
A8	2.14	0.40
A9	2.40	0.40
A10	0.08	0.80
A11	0.22	0.80
A12	0.69	0.80
A13	2.39	0.40
A14	0.19	0.80
A15	0.23	0.80
A16	2.22	0.40
A17	0.20	0.80
A18	0.32	0.80

STORM DRAINAGE AREAS

NOTE:
1) AREA A1 SHALL BE ADDED TO AREA A2 WHEN FUTURE STORM SEWERS ARE BUILT FOR ISLAND PARK DRIVE. IN THE INTERIM IT IS ASSUMED THAT 60% OF RUNOFF FROM AREA A1 IS DRAINING INTO MH 3 WHILE 2 C/S DRAIN INTO MHS.

2) CONSEQUENTLY STORM SEWERS EAST OF ISLAND PARK DRIVE ARE SIZED FOR A TOTAL OF 4.54ha

- LEGEND**
- DRAINAGE BOUNDARY
 - - - SUB-DRAINAGE BOUNDARY
 - PROPOSED STORM
 - EXISTING STORM

05/05/2005 10:15:29 AM M:\198\88002-3\CAD\Design\Grading and Drainage\055042STM.dgn UPDATED BY: KLM

STORM SEWER DESIGN SHEET

DESIGNED BY : DHI
CHECKED BY : RSC

PROJECT: Richmond Road
DEVELOPER: City of Ottawa

DATE: 2-May-05
REVISION:

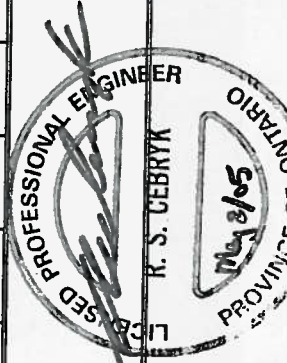
LOCATION				AREA (ha)				INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC (min)	RAINFALL INTENSITY (mm/hr)	PEAK FLOW Q (l/s)	PROPOSED SEWER							TIME OF FLOW (min)
STREET	FROM M.H.	TO M.H.		R= 0.40	R= 0.60	R= 0.80	TYPE OF PIPE						PIPE SIZE (mm)	PIPE ID (mm)	GRADE %	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY		
Richmond Road	1	27504 A		0.600			0.67	0.67	10.00	122.14	81.5	DR 35	300	299	1.47	71.5	116.6	1.66	0.72	
Richmond Road (closed for current conditions)	3	2		1.280			1.87	1.87	10.00	122.14	228.3	CONC	525	533	0.30	27.5	245.2	1.10	0.42	
Richmond Road	2	27255			0.330		0.73	2.60	10.42	119.61	311.2	CONC	525	533	0.50	32.7	316.6	1.42	0.38	
Leighton Terrace	27219	27255		4.370			4.86	4.86	16.50	79.00	363.9	CONC	525	533	1.62	75.0	569.9	2.55	0.49	
Richmond Road	27255	27254			1.020		2.27	9.00	16.50	92.50	832.1	CONC	600	610	0.30	128.0	574.9	1.96	1.09	
Hillman Avenue	27252	27253		13.110			14.58	14.58	25.00	60.90	887.8	CONC	1050	1067	0.57	85.0	2151.9	2.41	0.59	
Richmond Road	27253	27254			0.910		2.02	16.60	25.00	71.22	1182.5	CONC	1050	1067	0.93	93.0	2748.7	3.07	0.50	
Patricia Avenue	27254	EXIST			0.000		0.00	25.60	25.50	60.10	2192.5	CONC	900	914	1.24	110.0	2100.6	3.20	0.57	
Island Park Drive (closed for future conditions)	4	5		4.540			5.23	5.23	24.00	73.15	382.3	CONC	525	533	0.90	35.0	424.8	1.90	0.31	
Island Park Drive	6	5			0.220		0.49	0.49	10.00	122.14	59.8	DR 35	300	299	0.50	34.0	68.0	0.97	0.59	
Richmond Road	5	7			0.690		1.53	7.25	24.31	72.55	526.0	CONC	675	685	0.45	94.0	586.4	1.59	0.98	
Piccadilly Avenue	8	7		2.390			2.66	2.66	16.50	79.00	210.9	DR 35	450	448	0.60	11.0	218.1	1.38	0.13	
Richmond Road	7	9					0.00	9.91	25.29	70.68	760.3	CONC	750	762	0.60	5.0	899.6	1.97	0.04	
	9	10			0.190		0.42	10.33	25.33	70.61	729.4	CONC	750	762	0.60	28.0	899.6	1.97	0.24	
	10	11			0.230		0.51	10.84	25.57	70.17	760.8	CONC	750	762	0.60	34.0	899.6	1.97	0.29	
	11	12			0.200		0.44	11.29	25.86	69.66	786.2	CONC	750	762	0.60	27.0	899.6	1.97	0.23	
Mayfair Avenue	EXIST	13		2.220			2.47	2.47	16.50	79.00	195.0	DR 35	450	448	1.60	53.0	356.1	2.26	0.39	
Mayfair Avenue	13	12					0.00	0.00	16.50	79.00	0.0	DR 35	450	448	1.60	10.0	356.1	2.26	0.07	
Richmond Road	12	EXIST			0.32		0.71	12.00	26.09	69.25	834.9	CONC	900	914	0.60	40.0	1461.2	2.23	0.30	
Western Avenue	EXIST	EXIST			0.000		0.00	12.00	26.38	58.77	705.3	CONC	900	914	0.50	16.0	1333.9	2.03	0.13	

Q = 2.78 * A^{0.478}
Intensity / Duration Curve = 10 years
Inlet Time = 10 min. (Minimum)
Manning's Coefficient = 0.013

Italic Text = Existing

Any Time = Under Sized Sewer

NOTE: 10 years storm is used for Richmond Road and 5 year storm for Local Streets



Appendix C Stormwater Management

C.1 Storm Sewer Design Sheet



	114 Richmond Road		STORM SEWER DESIGN SHEET (City of Ottawa) FILE NUMBER: 160402212									DESIGN PARAMETERS I = a / (t+b) ^c (As per City of Ottawa Guidelines, 2012)																												
	DATE:	2026-04-01										a = 732.951 b = 6.199 c = 0.810	1:2 yr 998.071	1:5 yr 1174.184	1:10 yr 1735.688	MANNING'S n = 0.013	BEDDING CLASS = B																							
	REVISION:	1																																						
	DESIGNED BY:	MJS																																						
	CHECKED BY:	ZW																																						
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 YEAR (mm/h)	I ₅ YEAR (mm/h)	I ₁₀ YEAR (mm/h)	I ₁₀₀ 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)	
R105A,R105B,C105A,C105B	105	104	0.00	0.17	0.00	0.00	0.15	0.00	0.54	0.00	0.00	0.000	0.000	0.092	0.092	0.000	0.000	0.000	0.000	0.000	10.00 11.80	76.81	104.19	122.14	178.56	7.6	7.6	34.3	89.0	300	300	CIRCULAR	PVC	-	0.50	68.0	50.42%	0.97	0.83	1.80
R104A	104	103	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.092	0.000	0.000	0.000	0.000	0.000	11.80 12.06	70.53	95.57	111.99	163.65	3.8	11.4	35.9	13.5	300	300	CIRCULAR	PVC	-	0.50	68.0	52.76%	0.97	0.84	0.27
C103A	103	101	0.00	0.11	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.000	0.000	0.066	0.158	0.000	0.000	0.000	0.000	0.000	12.06 12.30	69.69	94.42	110.64	161.66	0.0	11.4	53.0	13.3	300	300	CIRCULAR	PVC	-	0.50	68.0	77.91%	0.97	0.95	0.23
R13,R14,R15, EXT1C, EXT1D, CIST4 to CIST11	STUB 102	101	0.00	0.29	0.00	0.00	0.19	0.00	0.41	0.00	0.00	0.000	0.000	0.118	0.118	0.000	0.000	0.000	0.000	0.000	10.00 10.22	76.81	104.19	122.14	178.56	8.5	8.5	42.7	14.7	300	300	CIRCULAR	PVC	-	1.00	96.2	44.41%	1.37	1.12	0.22
	101	STUB 100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.277	0.000	0.000	0.000	0.000	0.000	12.30 12.35	68.98	93.44	109.48	159.97	0.0	19.9	91.7	4.1	300 300	300 300	CIRCULAR	PVC	-	1.00	96.2	95.38%	1.37	1.42	0.05
CIST1-3	CIST1-3	CIST1-2	0.00	0.07	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.000	0.000	0.041	0.041	0.000	0.000	0.000	0.000	0.000	10.00 10.85	76.81	104.19	122.14	178.56	0.0	0.0	12.0	41.4	200	200	CIRCULAR	PVC	-	1.00	33.3	35.96%	1.05	0.81	0.85
CIST1-2, EXT1A, EXT1B	CIST1-2	STUB CIST1-1	0.00	0.09	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.000	0.000	0.046	0.088	0.000	0.000	0.000	0.000	0.000	10.85 10.90	73.70	99.92	117.11	171.17	0.0	0.0	24.4	3.0	200	200	CIRCULAR	PVC	-	1.00	33.3	73.20%	1.05	1.01	0.05
CISTERN (R12, CIST2-1, CIST3-1)		CIST	0.00	0.06	0.00	0.00	0.09	0.00	0.58	0.00	0.00	0.000	0.000	0.032	0.396	0.000	0.000	0.000	0.000	0.000	10.90 10.85	73.70	99.92	117.11	171.17	5.5	25.5	135.5		300	300									
	STUB 107	106	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	12.35 12.37	68.84	93.24	109.25	159.62	78.2	78.2	78.2	2.3	300	300	CIRCULAR	CONCRETE	-	1.75	127.2	61.48%	1.81	1.64	0.02

C.2 Modified Rational Method Calculations



Stormwater Management Calculations

Page 1 of 15

File No: 160402212
Project: 114 Richmond Road
Date: 10-Apr-26

SWM Approach:
Post-development to Pre-development flows

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table								
Sub-catchment Area			Area (ha) "A"		Runoff Coefficient "C"			Overall Runoff Coefficient
Catchment Type	ID / Description					"A x C"		
DRAINAGE AREAS TO SUPERPIPE OUTLET								
Controlled - Tributary	SUPERPIPE	Hard	0.456		0.9	0.410		
		Soft	0.472		0.2	0.094		
	Subtotal			0.9275			0.5046	0.544
Controlled - Superpipe	EXST3	Hard	0.255		0.9	0.229		
		Soft	0.075		0.2	0.015		
	Subtotal			0.33			0.2442	0.740
Controlled - Superpipe	EXST1	Hard	0.019		0.9	0.018		
		Soft	0.151		0.2	0.030		
	Subtotal			0.1706			0.047768	0.280
External - Tributary	EXT2	Hard	0.108		0.9	0.098		
		Soft	0.122		0.2	0.024		
	Subtotal			0.23			0.1219	0.530
Controlled - Superpipe	C109A	Hard	0.018		0.9	0.016		
		Soft	0.026		0.2	0.005		
	Subtotal			0.0440			0.02112	0.480
Controlled - Superpipe	C107A	Hard	0.042		0.9	0.038		
		Soft	0.063		0.2	0.013		
	Subtotal			0.1058			0.050784	0.480
Controlled - Superpipe	C112A	Hard	0.013		0.9	0.012		
		Soft	0.034		0.2	0.007		
	Subtotal			0.0471			0.01884	0.400
DRAINAGE AREAS TO INTERNAL STORM SEWER (OUTELT TO 600mm DIA. RICHMOND ROAD)								
Controlled - Tributary	CISTERN	Hard	0.864		0.9	0.778		
		Soft	0.432		0.2	0.086		
	Subtotal			1.2959			0.863957	0.667
Controlled - Cistern	CIST 11	Hard	0.000		0.9	0.000		
		Soft	0.011		0.2	0.002		
	Subtotal			0.0108			0.002268	0.210
Controlled - Cistern	CIST 10	Hard	0.000		0.9	0.000		
		Soft	0.008		0.2	0.002		
	Subtotal			0.0075			0.0015	0.200
Controlled - Cistern	CIST 9	Hard	0.017		0.9	0.015		
		Soft	0.019		0.2	0.004		
	Subtotal			0.0350			0.01855	0.530
Controlled - Cistern	CIST 8	Hard	0.014		0.9	0.012		
		Soft	0.015		0.2	0.003		
	Subtotal			0.0290			0.01537	0.530
Controlled - Cistern	CIST 7	Hard	0.012		0.9	0.011		
		Soft	0.020		0.2	0.004		
	Subtotal			0.0324			0.014904	0.460
Controlled - Cistern	CIST 6	Hard	0.010		0.9	0.009		
		Soft	0.015		0.2	0.003		
	Subtotal			0.0253			0.012144	0.480
Controlled - Cistern	CIST 5	Hard	0.011		0.9	0.010		
		Soft	0.022		0.2	0.004		
	Subtotal			0.0323			0.013889	0.430
Controlled - Cistern	CIST 4	Hard	0.011		0.9	0.010		
		Soft	0.015		0.2	0.003		
	Subtotal			0.0256			0.0128	0.500

Stormwater Management Calculations

File No: 160402212
Project: 114 Richmond Road
Date: 10-Apr-26

SWM Approach:
Post-development to Pre-development flows

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table							
Catchment Type	Sub-catchment Area	ID / Description	Area (ha) "A"	Runoff Coefficient "C"	"A x C"	Overall Runoff Coefficient	
Controlled - Cistern	CIST 3-1	Hard	0.015	0.9	0.014		
		Soft	0.020	0.2	0.004		
		Subtotal		0.0353	0.01765		0.500
Controlled - Cistern	CIST 2-1	Hard	0.015	0.9	0.014		
		Soft	0.005	0.2	0.001		
		Subtotal		0.0198	0.014652		0.740
Controlled - Cistern	CIST 1-3	Hard	0.038	0.9	0.035		
		Soft	0.034	0.2	0.007		
		Subtotal		0.0726	0.041382		0.570
Controlled - Cistern	CIST 1-2	Hard	0.021	0.9	0.019		
		Soft	0.012	0.2	0.002		
		Subtotal		0.0329	0.021056		0.640
Controlled - Roof & Cistern	R12	Hard	0.089	0.9	0.080		
		Soft	0.000	0.2	0.000		
		Subtotal		0.0889	0.08001		0.900
Controlled - Roof & Cistern	R15	Hard	0.064	0.9	0.057		
		Soft	0.000	0.2	0.000		
		Subtotal		0.0638	0.05742		0.900
Controlled - Roof & Cistern	R14	Hard	0.064	0.9	0.057		
		Soft	0.000	0.2	0.000		
		Subtotal		0.0638	0.05742		0.900
Controlled - Roof & Cistern	R13	Hard	0.064	0.9	0.057		
		Soft	0.000	0.2	0.000		
		Subtotal		0.0638	0.05742		0.900
Controlled - Roof & Cistern	R105B	Hard	0.075	0.9	0.068		
		Soft	0.000	0.2	0.000		
		Subtotal		0.0750	0.0675		0.900
Controlled - Roof & Cistern	R105A	Hard	0.075	0.9	0.068		
		Soft	0.000	0.2	0.000		
		Subtotal		0.0750	0.0675		0.900
Controlled - Roof & Cistern	R104A	Hard	0.075	0.9	0.068		
		Soft	0.000	0.2	0.000		
		Subtotal		0.0750	0.0675		0.900
Existing Roof	E ROOF	Hard	0.250	0.9	0.225		
		Soft	0.000	0.2	0.000		
		Subtotal		0.25	0.225		0.900
Controlled - Cistern	C105B	Hard	0.051	0.9	0.046		
		Soft	0.057	0.2	0.011		
		Subtotal		0.1079	0.057187		0.530
Controlled - Cistern	C105A	Hard	0.032	0.9	0.029		
		Soft	0.032	0.2	0.006		
		Subtotal		0.0637	0.035035		0.550
Controlled - Cistern	C103A	Hard	0.063	0.9	0.057		
		Soft	0.047	0.2	0.009		
		Subtotal		0.1105	0.0663		0.600
Uncontrolled - Tributary	EXST-2	Hard	0.002	0.9	0.002		
		Soft	0.000	0.2	0.000		
		Subtotal		0.002	0.0018		0.900
External - Tributary	EXT1	Hard	0.049	0.9	0.044		
		Soft	0.101	0.2	0.020		
		Subtotal		0.15	0.0645		0.430

Stormwater Management Calculations

File No: 160402212
Project: 114 Richmond Road
Date: 10-Apr-26

SWM Approach:
Post-development to Pre-development flows

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table							
Catchment Type	Sub-catchment Area	ID / Description		Area (ha) "A"	Runoff Coefficient "C"	"A x C"	Overall Runoff Coefficient
Uncontrolled - Non-Tributary							
Uncontrolled - Non-Tributary	E UNC1	Hard		0.080	0.9	0.072	
		Soft		0.013	0.2	0.003	
		Subtotal			0.093		0.0744
Uncontrolled - Non-Tributary	UNC-2	Hard		0.017	0.9	0.015	
		Soft		0.026	0.2	0.005	
		Subtotal			0.0426		0.020448
Total				2.611		1.690	
Overall Runoff Coefficient= C:							0.65

Internal Storm Sewer Outlet

Total Roof Areas	0.755 ha
Total Tributary Surface Areas (Controlled and Uncontrolled)	0.793 ha
Total Tributary Area to Internal Storm Sewer Outlet	1.548 ha

Superpipe Outlet

Total Roof Areas	0.000 ha
Total Tributary Surface Areas (Controlled and Uncontrolled)	0.928 ha
Total Tributary Area to Superpipe Outlet	0.928 ha

Total Uncontrolled Areas (Non-Tributary)	0.136 ha
Total Site	2.611 ha

Stormwater Management Calculations

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

5 yr Intensity City of Ottawa	$I = a/(t + b)^c$	a =	998.071	t (min)	I (mm/hr)
		b =	6.053	5	141.18
		c =	0.814	10	104.19
				15	83.56
				20	70.25
				25	60.90
				30	53.93
				35	48.52
				40	44.18
				45	40.63
				50	37.65
				55	35.12
				60	32.94

5 YEAR Predevelopment Target Release from Entire Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 2.61
C: 0.45

Typical Time of Concentration

tc (min)	I (5 yr) (mm/hr)	Qtarget (L/s)
23.8	62.88	205

5 YEAR Modified Rational Method for Superpipe Outlet

Subdrainage Area: SUPERPIPE Controlled - Tributary
EXST1, EXST3, C107A, C109A, C112A, EXT2
Area (ha): 0.93
C: 0.54

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)
10	104.19	146.2	31.2	115.0	69.0
20	70.25	98.5	31.2	67.3	80.8
30	53.93	75.7	31.2	44.4	80.0
40	44.18	62.0	31.2	30.8	73.9
50	37.65	52.8	31.2	21.6	64.8
60	32.94	46.2	31.2	15.0	54.0
70	29.37	41.2	31.2	10.0	42.0
80	26.56	37.3	31.2	6.1	29.1
90	24.29	34.1	31.2	2.9	15.5
100	22.41	31.4	31.2	0.2	1.4
110	20.82	29.2	31.2	0.0	0.0
120	19.47	27.3	31.2	0.0	0.0

Storage: Storage Within Subsurface Pipe

Orifice Equation: $Q = CdA(2gh)^{0.5}$ Where Cd = 0.61
Orifice Diameter: 135.00 mm 300x1500 Pipe 102.3
Invert Elevation: 65.31 m 3x 2440x3810 Manholes 18.2
Max Ponding Depth: 0.65 m 375mm Pipe 0.0
Downstream W/L: 65.31 m 1200 CBMH 0.0

Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Level	65.96	0.65	31.2	80.8	120.5 OK

5 YEAR Modified Rational Method for Uncontrolled - Non-Tributary Areas

Subdrainage Area: E UNC1 Uncontrolled - Non-Tributary
Area (ha): 0.09
C: 0.80

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)
10	104.19	21.6	21.6
20	70.25	14.5	14.5
30	53.93	11.2	11.2
40	44.18	9.1	9.1
50	37.65	7.8	7.8
60	32.94	6.8	6.8
70	29.37	6.1	6.1
80	26.56	5.5	5.5
90	24.29	5.0	5.0
100	22.41	4.6	4.6
110	20.82	4.3	4.3
120	19.47	4.0	4.0

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

100 yr Intensity City of Ottawa	$I = a/(t + b)^c$	a =	1735.688	t (min)	I (mm/hr)
		b =	6.014	5	242.70
		c =	0.820	10	178.56
				15	142.89
				20	119.95
				25	103.85
				30	91.87
				35	82.58
				40	75.15
				45	69.05
				50	63.95
				55	59.62
				60	55.89

100 YEAR Modified Rational Method for Superpipe Outlet

Subdrainage Area: SUPERPIPE Controlled - Tributary
EXST1, EXST3, C107A, C109A, C112A, EXT2
Area (ha): 0.93
C: 0.68

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)
10	178.56	313.1	50.0	263.1	157.9
20	119.95	210.3	50.0	160.4	192.4
30	91.87	161.1	50.0	111.1	200.0
40	75.15	131.8	50.0	81.8	196.3
50	63.95	112.1	50.0	62.2	186.5
60	55.89	98.0	50.0	48.0	172.9
70	49.79	87.3	50.0	37.3	156.8
80	44.99	78.9	50.0	28.9	138.8
90	41.11	72.1	50.0	22.1	119.4
100	37.90	66.5	50.0	16.5	98.9
110	35.20	61.7	50.0	11.7	77.5
120	32.89	57.7	50.0	7.7	55.5

Storage: Storage Within Subsurface Pipe

Orifice Equation: $Q = CdA(2gh)^{0.5}$ Where Cd = 0.61
Orifice Diameter: 135.00 mm 300x1500 Pipe 235.8
Invert Elevation: 65.31 m 3x 2440x3810 Manholes 46.6
Max Ponding Depth: 1.67 m 375mm Pipe 9.0
Downstream W/L: 65.31 m 1200 CBMH 0.8

Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	66.98	1.67	50.0	200.0	292.2 OK

100 YEAR Modified Rational Method for Uncontrolled - Non-Tributary Areas

Subdrainage Area: E UNC1 Uncontrolled - Non-Tributary
Area (ha): 0.09
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)
10	178.56	46.2	46.2
20	119.95	31.0	31.0
30	91.87	23.8	23.8
40	75.15	19.4	19.4
50	63.95	16.5	16.5
60	55.89	14.5	14.5
70	49.79	12.9	12.9
80	44.99	11.6	11.6
90	41.11	10.6	10.6
100	37.90	9.8	9.8
110	35.20	9.1	9.1
120	32.89	8.5	8.5

Stormwater Management Calculations

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

Subdrainage Area: UNC-2		Uncontrolled - Non-Tributary	
Area (ha): 0.04			
C: 0.48			
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)
10	104.19	5.9	5.9
20	70.25	4.0	4.0
30	53.93	3.1	3.1
40	44.18	2.5	2.5
50	37.65	2.1	2.1
60	32.94	1.9	1.9
70	29.37	1.7	1.7
80	26.56	1.5	1.5
90	24.29	1.4	1.4
100	22.41	1.3	1.3
110	20.82	1.2	1.2
120	19.47	1.1	1.1

5 YEAR Modified Rational Method for Internal Storm Sewer Outlet

Subdrainage Area: CISTERN		Controlled - Tributary	
Uncontrolled Areas: CIST 1-2, CIST 2-1, CIST 3-1, CIST 4, CIST 5, CIST 6, CIST 7, EXT1, C103A, C104A, C104B, CIST 1-3, CIST 8, CIST 9, CIST 10, CIST 11			
Area (ha): 0.79			
C: 0.52			
Controlled Areas: R104A, R105A, R105B, R12, R13, R14, R15			
Total Area (ha): 1.30			
C: 0.67			

tc (min)	I (5 yr) (mm/hr)	Qunc (L/s)	Qcontrol (L/s)	Qtotal (L/s)	Qstored (L/s)	Vstored (m³)
10	104.19	119.0	21.5	140.6	62.8	37.7
20	70.25	80.3	22.0	102.3	24.5	29.4
30	53.93	61.6	22.1	83.7	5.9	10.7
40	44.18	50.5	22.1	72.5	0.0	0.0
50	37.65	43.0	21.9	64.9	0.0	0.0
60	32.94	37.6	21.7	59.3	0.0	0.0
70	29.37	33.6	21.4	55.0	0.0	0.0
80	26.56	30.3	21.1	51.5	0.0	0.0
90	24.29	27.8	20.8	48.5	0.0	0.0
100	22.41	25.6	20.4	46.0	0.0	0.0
110	20.82	23.8	20.0	43.8	0.0	0.0
120	19.47	22.2	19.6	41.8	0.0	0.0

Storage: Cistern located in underground parking level

Target (L/s)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
104.00	77.8	37.7	142.0	OK

5-year Water Level

104.34

Subdrainage Area: R12		Controlled - Roof & Cistern				
Area (ha):	0.09	Maximum Storage Depth:				150 mm
C:	0.90					
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	104.19	23.2	4.8	18.4	11.1	101.3
20	70.25	15.6	4.8	10.8	12.9	106.0
30	53.93	12.0	4.8	7.2	12.9	105.8
40	44.18	9.8	4.8	5.0	12.1	103.8
50	37.65	8.4	4.7	3.6	10.9	100.9
60	32.94	7.3	4.7	2.7	9.6	96.2
70	29.37	6.5	4.6	2.0	8.3	90.8
80	26.56	5.9	4.5	1.5	7.0	85.4
90	24.29	5.4	4.4	1.0	5.7	80.0
100	22.41	5.0	4.3	0.7	4.4	74.6
110	20.82	4.6	4.1	0.5	3.5	67.1
120	19.47	4.3	4.0	0.4	2.6	60.0

Storage: Roof Storage

Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
105.98	0.11	4.8	12.9	35.6	0.00

5-year Water Level

22.62

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

Subdrainage Area: UNC-2		Uncontrolled - Non-Tributary	
Area (ha): 0.04			
C: 0.60			
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)
10	178.56	12.7	12.7
20	119.95	8.5	8.5
30	91.87	6.5	6.5
40	75.15	5.3	5.3
50	63.95	4.5	4.5
60	55.89	4.0	4.0
70	49.79	3.5	3.5
80	44.99	3.2	3.2
90	41.11	2.9	2.9
100	37.90	2.7	2.7
110	35.20	2.5	2.5
120	32.89	2.3	2.3

100 YEAR Modified Rational Method for Internal Storm Sewer Outlet

Subdrainage Area: CISTERN		Controlled - Tributary	
Uncontrolled Areas: CIST 1-2, CIST 2-1, CIST 3-1, CIST 4, CIST 5, CIST 6, CIST 7, EXT1, C103A, C104A, C104B, CIST 1-3, CIST 8, CIST 9, CIST 10, CIST 11			
Area: 0.79			
C: 0.65			
Controlled Areas: R104A, R105A, R105B, R12, R13, R14, R15			
Total Area (ha): 1.30			
C: 0.67			

tc (min)	I (100 yr) (mm/hr)	Qunc (L/s)	Qcontrol (L/s)	Qtotal (L/s)	Qstored (L/s)	Vstored (m³)
10	178.56	255.0	23.9	278.9	201.1	120.7
20	119.95	171.3	24.8	196.1	118.3	142.0
30	91.87	131.2	25.2	156.4	78.6	141.4
40	75.15	107.3	25.3	132.6	54.8	131.5
50	63.95	91.3	25.3	116.6	38.8	116.5
60	55.89	79.8	25.3	105.1	27.3	98.2
70	49.79	71.1	25.2	96.3	18.5	77.6
80	44.99	64.3	25.0	89.3	11.5	55.1
90	41.11	58.7	24.9	83.6	5.8	31.3
100	37.90	54.1	24.7	78.9	1.1	6.3
110	35.20	50.3	24.5	74.8	0.0	0.0
120	32.89	47.0	24.4	71.3	0.0	0.0

Storage: Cistern located in underground parking level

Target (L/s)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
78.2	77.8	142.0	142.0	OK

100-year Water Level

0.03

Subdrainage Area: R12		Controlled - Roof & Cistern				
Area (ha): 0.09		Maximum Storage Depth: 150 mm				
C: 1.00						
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)
10	178.56	44.1	5.3	38.8	23.3	129.5 0.00
20	119.95	29.6	5.5	24.2	29.0	139.1 0.00
30	91.87	22.7	5.5	17.2	30.9	142.2 0.00
40	75.15	18.6	5.5	13.0	31.3	142.8 0.00
50	63.95	15.8	5.5	10.3	30.8	142.1 0.00
60	55.89	13.8	5.5	8.3	29.9	140.6 0.00
70	49.79	12.3	5.5	6.8	28.7	138.6 0.00
80	44.99	11.1	5.4	5.7	27.4	136.3 0.00
90	41.11	10.2	5.4	4.8	25.9	133.8 0.00
100	37.90	9.4	5.3	4.0	24.3	131.2 0.00
110	35.20	8.7	5.3	3.4	22.6	128.4 0.00
120	32.89	8.1	5.2	2.9	21.0	125.7 0.00

Storage: Roof Storage

Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
142.84	0.14	5.5	31.3	35.6	0.00

100-year Water Level

4.29

Stormwater Management Calculations

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

Subdrainage Area: R13		Controlled - Roof & Cistern				
Area (ha): 0.06		Maximum Storage Depth: 150 mm				
C: 0.90						
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	104.19	16.6	2.4	14.2	8.5	103.4 0.00
20	70.25	11.2	2.5	8.8	10.5	110.2 0.00
30	53.93	8.6	2.5	6.1	11.0	112.0 0.00
40	44.18	7.1	2.5	4.6	11.0	111.9 0.00
50	37.65	6.0	2.5	3.5	10.6	110.7 0.00
60	32.94	5.3	2.4	2.8	10.1	108.9 0.00
70	29.37	4.7	2.4	2.3	9.5	106.7 0.00
80	26.56	4.2	2.4	1.8	8.8	104.3 0.00
90	24.29	3.9	2.4	1.5	8.1	101.8 0.00
100	22.41	3.6	2.4	1.2	7.3	98.7 0.00
110	20.82	3.3	2.3	1.0	6.6	94.8 0.00
120	19.47	3.1	2.3	0.8	6.0	90.9 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
5-year Water Level	112.04	0.11	2.5	11.0	25.5	0.00
14.49						

Subdrainage Area: R14		Controlled - Roof & Cistern				
Area (ha): 0.06		Maximum Storage Depth: 150 mm				
C: 0.90						
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	104.19	16.6	2.4	14.2	8.5	103.4 0.00
20	70.25	11.2	2.5	8.8	10.5	110.2 0.00
30	53.93	8.6	2.5	6.1	11.0	112.0 0.00
40	44.18	7.1	2.5	4.6	11.0	111.9 0.00
50	37.65	6.0	2.5	3.5	10.6	110.7 0.00
60	32.94	5.3	2.4	2.8	10.1	108.9 0.00
70	29.37	4.7	2.4	2.3	9.5	106.7 0.00
80	26.56	4.2	2.4	1.8	8.8	104.3 0.00
90	24.29	3.9	2.4	1.5	8.1	101.8 0.00
100	22.41	3.6	2.4	1.2	7.3	98.7 0.00
110	20.82	3.3	2.3	1.0	6.6	94.8 0.00
120	19.47	3.1	2.3	0.8	6.0	90.9 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
5-year Water Level	112.04	0.11	2.5	11.0	25.5	0.00
14.49						

Subdrainage Area: R15		Controlled - Roof & Cistern				
Area (ha): 0.06		Maximum Storage Depth: 150 mm				
C: 0.90						
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	104.19	16.6	2.4	14.2	8.5	103.4 0.00
20	70.25	11.2	2.5	8.8	10.5	110.2 0.00
30	53.93	8.6	2.5	6.1	11.0	112.0 0.00
40	44.18	7.1	2.5	4.6	11.0	111.9 0.00
50	37.65	6.0	2.5	3.5	10.6	110.7 0.00
60	32.94	5.3	2.4	2.8	10.1	108.9 0.00
70	29.37	4.7	2.4	2.3	9.5	106.7 0.00
80	26.56	4.2	2.4	1.8	8.8	104.3 0.00
90	24.29	3.9	2.4	1.5	8.1	101.8 0.00
100	22.41	3.6	2.4	1.2	7.3	98.7 0.00
110	20.82	3.3	2.3	1.0	6.6	94.8 0.00
120	19.47	3.1	2.3	0.8	6.0	90.9 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
5-year Water Level	112.04	0.11	2.5	11.0	25.5	0.00
14.49						

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

Subdrainage Area: R13		Controlled - Roof & Cistern				
Area (ha): 0.06		Maximum Storage Depth: 150 mm				
C: 1.00						
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	178.56	31.7	2.7	29.0	17.4	131.1 0.00
20	119.95	21.3	2.8	18.5	22.2	142.3 0.00
30	91.87	16.3	2.8	13.5	24.3	147.1 0.00
40	75.15	13.3	2.8	10.5	25.2	149.2 0.00
50	63.95	11.3	2.8	8.5	25.5	150.0 0.00
60	55.89	9.9	2.8	7.1	25.5	149.9 0.00
70	49.79	8.8	2.8	6.0	25.2	149.2 0.00
80	44.99	8.0	2.8	5.2	24.8	148.2 0.00
90	41.11	7.3	2.8	4.5	24.2	146.9 0.00
100	37.90	6.7	2.8	3.9	23.6	145.4 0.00
110	35.20	6.2	2.8	3.5	22.9	143.8 0.00
120	32.89	5.8	2.8	3.1	22.1	142.1 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
100-year Water Level	149.99	0.15	2.8	25.5	25.5	0.00
0.01						

Subdrainage Area: R14		Controlled - Roof & Cistern				
Area (ha): 0.06		Maximum Storage Depth: 150 mm				
C: 1.00						
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	178.56	31.7	2.7	29.0	17.4	131.1 0.00
20	119.95	21.3	2.8	18.5	22.2	142.3 0.00
30	91.87	16.3	2.8	13.5	24.3	147.1 0.00
40	75.15	13.3	2.8	10.5	25.2	149.2 0.00
50	63.95	11.3	2.8	8.5	25.5	150.0 0.00
60	55.89	9.9	2.8	7.1	25.5	149.9 0.00
70	49.79	8.8	2.8	6.0	25.2	149.2 0.00
80	44.99	8.0	2.8	5.2	24.8	148.2 0.00
90	41.11	7.3	2.8	4.5	24.2	146.9 0.00
100	37.90	6.7	2.8	3.9	23.6	145.4 0.00
110	35.20	6.2	2.8	3.5	22.9	143.8 0.00
120	32.89	5.8	2.8	3.1	22.1	142.1 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
100-year Water Level	149.99	0.15	2.8	25.5	25.5	0.00
0.01						

Subdrainage Area: R15		Controlled - Roof & Cistern				
Area (ha): 0.06		Maximum Storage Depth: 150 mm				
C: 1.00						
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	178.56	31.7	2.7	29.0	17.4	131.1 0.00
20	119.95	21.3	2.8	18.5	22.2	142.3 0.00
30	91.87	16.3	2.8	13.5	24.3	147.1 0.00
40	75.15	13.3	2.8	10.5	25.2	149.2 0.00
50	63.95	11.3	2.8	8.5	25.5	150.0 0.00
60	55.89	9.9	2.8	7.1	25.5	149.9 0.00
70	49.79	8.8	2.8	6.0	25.2	149.2 0.00
80	44.99	8.0	2.8	5.2	24.8	148.2 0.00
90	41.11	7.3	2.8	4.5	24.2	146.9 0.00
100	37.90	6.7	2.8	3.9	23.6	145.4 0.00
110	35.20	6.2	2.8	3.5	22.9	143.8 0.00
120	32.89	5.8	2.8	3.1	22.1	142.1 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
100-year Water Level	149.99	0.15	2.8	25.5	25.5	0.00
0.01						

Stormwater Management Calculations

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

Subdrainage Area: R104A		Controlled - Roof & Cistern				
Area (ha): 0.08		Maximum Storage Depth: 150 mm				
C: 0.90						
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	104.19	19.6	3.2	16.4	9.8	102.7 0.00
20	70.25	13.2	3.3	9.9	11.9	108.9 0.00
30	53.93	10.1	3.3	6.8	12.3	110.1 0.00
40	44.18	8.3	3.3	5.0	12.0	109.3 0.00
50	37.65	7.1	3.2	3.8	11.4	107.6 0.00
60	32.94	6.2	3.2	3.0	10.7	105.2 0.00
70	29.37	5.5	3.2	2.3	9.8	102.6 0.00
80	26.56	5.0	3.1	1.8	8.8	99.6 0.00
90	24.29	4.6	3.1	1.5	7.9	95.2 0.00
100	22.41	4.2	3.0	1.2	7.0	90.8 0.00
110	20.82	3.9	3.0	0.9	6.1	86.4 0.00
120	19.47	3.7	2.9	0.7	5.2	82.1 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
5-year Water Level	110.09	0.11	3.3	12.3	30.0	0.00
17.69						

Subdrainage Area: R105A		Controlled - Roof & Cistern				
Area (ha): 0.08		Maximum Storage Depth: 150 mm				
C: 0.90						
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	104.19	19.6	3.2	16.4	9.8	102.7 0.00
20	70.25	13.2	3.3	9.9	11.9	108.9 0.00
30	53.93	10.1	3.3	6.8	12.3	110.1 0.00
40	44.18	8.3	3.3	5.0	12.0	109.3 0.00
50	37.65	7.1	3.2	3.8	11.4	107.6 0.00
60	32.94	6.2	3.2	3.0	10.7	105.2 0.00
70	29.37	5.5	3.2	2.3	9.8	102.6 0.00
80	26.56	5.0	3.1	1.8	8.8	99.6 0.00
90	24.29	4.6	3.1	1.5	7.9	95.2 0.00
100	22.41	4.2	3.0	1.2	7.0	90.8 0.00
110	20.82	3.9	3.0	0.9	6.1	86.4 0.00
120	19.47	3.7	2.9	0.7	5.2	82.1 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
5-year Water Level	110.09	0.11	3.3	12.3	30.0	0.00
17.69						

Subdrainage Area: R105B		Controlled - Roof & Cistern				
Area (ha): 0.08		Maximum Storage Depth: 150 mm				
C: 0.90						
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	104.19	19.6	3.2	16.4	9.8	102.7 0.00
20	70.25	13.2	3.3	9.9	11.9	108.9 0.00
30	53.93	10.1	3.3	6.8	12.3	110.1 0.00
40	44.18	8.3	3.3	5.0	12.0	109.3 0.00
50	37.65	7.1	3.2	3.8	11.4	107.6 0.00
60	32.94	6.2	3.2	3.0	10.7	105.2 0.00
70	29.37	5.5	3.2	2.3	9.8	102.6 0.00
80	26.56	5.0	3.1	1.8	8.8	99.6 0.00
90	24.29	4.6	3.1	1.5	7.9	95.2 0.00
100	22.41	4.2	3.0	1.2	7.0	90.8 0.00
110	20.82	3.9	3.0	0.9	6.1	86.4 0.00
120	19.47	3.7	2.9	0.7	5.2	82.1 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
5-year Water Level	110.09	0.11	3.3	12.3	30.0	0.00
17.69						

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

Subdrainage Area: R104A		Controlled - Roof & Cistern				
Area (ha): 0.08		Maximum Storage Depth: 150 mm				
C: 1.00						
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	178.56	37.2	3.5	33.7	20.2	130.6 0.00
20	119.95	25.0	3.7	21.3	25.6	141.3 0.00
30	91.87	19.2	3.7	15.4	27.8	145.6 0.00
40	75.15	15.7	3.8	11.9	28.6	147.2 0.00
50	63.95	13.3	3.8	9.6	28.7	147.5 0.00
60	55.89	11.7	3.7	7.9	28.5	147.0 0.00
70	49.79	10.4	3.7	6.6	27.9	145.9 0.00
80	44.99	9.4	3.7	5.7	27.2	144.5 0.00
90	41.11	8.6	3.7	4.9	26.3	142.8 0.00
100	37.90	7.9	3.7	4.2	25.4	140.9 0.00
110	35.20	7.3	3.6	3.7	24.4	138.9 0.00
120	32.89	6.9	3.6	3.2	23.3	136.8 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
100-year Water Level	147.51	0.15	3.8	28.7	30.0	0.00
1.26						

Subdrainage Area: R105A		Controlled - Roof & Cistern				
Area (ha): 0.08		Maximum Storage Depth: 150 mm				
C: 1.00						
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	178.56	37.2	3.5	33.7	20.2	130.6 0.00
20	119.95	25.0	3.7	21.3	25.6	141.3 0.00
30	91.87	19.2	3.7	15.4	27.8	145.6 0.00
40	75.15	15.7	3.8	11.9	28.6	147.2 0.00
50	63.95	13.3	3.8	9.6	28.7	147.5 0.00
60	55.89	11.7	3.7	7.9	28.5	147.0 0.00
70	49.79	10.4	3.7	6.6	27.9	145.9 0.00
80	44.99	9.4	3.7	5.7	27.2	144.5 0.00
90	41.11	8.6	3.7	4.9	26.3	142.8 0.00
100	37.90	7.9	3.7	4.2	25.4	140.9 0.00
110	35.20	7.3	3.6	3.7	24.4	138.9 0.00
120	32.89	6.9	3.6	3.2	23.3	136.8 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
100-year Water Level	147.51	0.15	3.8	28.7	30.0	0.00
1.26						

Subdrainage Area: R105B		Controlled - Roof & Cistern				
Area (ha): 0.08		Maximum Storage Depth: 150 mm				
C: 1.00						
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m³)	Depth (mm)
10	178.56	37.2	3.5	33.7	20.2	130.6 0.00
20	119.95	25.0	3.7	21.3	25.6	141.3 0.00
30	91.87	19.2	3.7	15.4	27.8	145.6 0.00
40	75.15	15.7	3.8	11.9	28.6	147.2 0.00
50	63.95	13.3	3.8	9.6	28.7	147.5 0.00
60	55.89	11.7	3.7	7.9	28.5	147.0 0.00
70	49.79	10.4	3.7	6.6	27.9	145.9 0.00
80	44.99	9.4	3.7	5.7	27.2	144.5 0.00
90	41.11	8.6	3.7	4.9	26.3	142.8 0.00
100	37.90	7.9	3.7	4.2	25.4	140.9 0.00
110	35.20	7.3	3.6	3.7	24.4	138.9 0.00
120	32.89	6.9	3.6	3.2	23.3	136.8 0.00
Storage: Roof Storage						
Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check	
100-year Water Level	147.51	0.15	3.8	28.7	30.0	0.00
1.26						

Stormwater Management Calculations

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

Subdrainage Area: E ROOF		Existing Roof				
Area (ha): 0.25		Maximum Storage Depth: 150mm				
C: 0.90						
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)
10	104.19	65.2	8.8	35.2	42.2	26.0
20	70.25	43.9	9.2	24.5	44.2	27.2
30	53.93	33.7	9.2	18.4	44.2	27.2
40	44.18	27.6	9.0	14.5	43.5	26.8
50	37.65	23.6	8.8	11.8	42.4	26.1
60	32.94	20.6	8.6	9.8	41.2	25.3
70	29.37	18.4	8.3	8.3	39.9	24.6
80	26.56	16.6	8.0	7.2	38.6	23.8
90	24.29	15.2	7.8	6.2	37.4	23.0
100	22.41	14.0	7.5	5.5	36.2	22.3
110	20.82	13.0	7.3	4.9	35.1	21.6
120	19.47	0.0	7.3	4.9	35.1	21.6
Storage: Roof Storage						
Depth (mm)		Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
5-year Water Level		27.2	0.03	9.2	44.2	243.8

Subdrainage Area: EXST-2		Uncontrolled - Tributary	
Area (ha): 0.002			
C: 0.90			
tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	
10	104.19	0.5	
20	70.25	0.4	
30	53.93	0.3	
40	44.18	0.2	
50	37.65	0.2	
60	32.94	0.2	
70	29.37	0.1	
80	26.56	0.1	
90	24.29	0.1	
100	22.41	0.1	
110	20.82	0.1	
120	19.47	0.1	

		Vrequired	Vavailable*	
Tributary Area - 375mm Internal STM Sewer		1.5 ha		
Total 5yr Flow to Sewer		87.5 L/s	38	142 m³ Ok
Tributary Area - Superpipe		0.9 ha		
Total 5yr Flow to Sewer		31.2 L/s	81	120 m³ Ok
Non-Tributary Area		0.1 ha		
Total 5yr Flow Uncontrolled		27.5 L/s		
Total Area		2.6 ha		
Total 5yr Flow		146.2 L/s		
5-Year Target Release Rate		205 L/s		

Project #160402212, 114 Richmond Road Modified Rational Method Calculations for Storage

Subdrainage Area: E ROOF		Existing Roof				
Area (ha): 0.25		Maximum Storage Depth: 150mm				
C: 1.00						
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)
10	178.56	124.1	16.6	66.7	80.1	49.3
20	119.95	83.4	17.4	46.5	83.6	51.5
30	91.87	63.8	17.4	34.8	83.6	51.5
40	75.15	52.2	17.1	27.4	82.1	50.5
50	63.95	44.4	16.6	22.2	80.0	49.2
60	55.89	38.8	16.1	18.5	77.6	47.7
70	49.79	34.6	15.6	15.6	75.1	46.2
80	44.99	31.3	15.1	13.5	72.7	44.7
90	41.11	28.6	14.6	11.7	70.3	43.3
100	37.90	26.3	14.2	10.3	68.1	41.9
110	35.20	24.5	13.7	9.2	65.9	40.6
120	32.89	0.0	13.7	9.2	65.9	40.6

Storage: Roof Storage

Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	51.5	0.05	17.4	83.6	243.8

Subdrainage Area: EXST-2		Uncontrolled - Tributary	
Area (ha): 0.002			
C: 1.00			
tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	
10	178.56	1.0	
20	119.95	0.7	
30	91.87	0.5	
40	75.15	0.4	
50	63.95	0.4	
60	55.89	0.3	
70	49.79	0.3	
80	44.99	0.3	
90	41.11	0.2	
100	37.90	0.2	
110	35.20	0.2	
120	32.89	0.2	

		Vrequired	Vavailable*	
Tributary Area - 375mm Internal STM Sewer		1.5 ha		
Total 100yr Flow to Sewer		96.2 L/s	142	142 m³ Ok
Tributary Area - Superpipe		0.9 ha		
Total 100yr Flow to Sewer		50.0 L/s	200	292 m³ Ok
Non-Tributary Area		0.1 ha		
Total 100yr Flow Uncontrolled		58.9 L/s		
Total Area		2.6 ha		
Total 100yr Flow		205.0 L/s		
5-Year Target Release Rate		205 L/s		

Roof Drain Design Calculation Sheet

Project #160402212, 114 Richmond Road
Roof Drain Design Sheet, Area R12
Watts Adjustable Accutrol Weir - Single Notch Roof Drain

Rating Curve				Volume Estimation				Water Depth (m)
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m)		
						Increment	Accumulated	
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0019	0	0.025	20	0	0	0.025
0.050	0.0006	0.0038	1	0.050	79	1	1	0.050
0.075	0.0007	0.0043	4	0.075	178	3	4	0.075
0.100	0.0008	0.0047	11	0.100	316	6	11	0.100
0.125	0.0009	0.0052	21	0.125	494	10	21	0.125
0.150	0.0009	0.0057	36	0.150	711	15	36	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.2	304.5	1.2	0.0845742
4.3	734.6	3.1	0.2886261
10.4	1287.5	6.1	0.6462539
20.4	1929.6	10.0	1.1822563
35.4	2638.7	15.0	1.9152323

Rooftop Storage Summary

Total Building Area (sq.m)	889	
Assume Available Roof Area (sq.m)	711.2	80%
Roof Imperviousness	0.99	
Roof Drain Requirement (sq.m/Notch)	232	
Number of Roof Notches*	6	
Max. Allowable Depth of Roof Ponding (m)	0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)	35.6	
Estimated 100 Year Drawdown Time (h)	1.7	

* Note: Number of drains can be reduced if multiple-notch drain used.

Adjustable Accutrol Weir Flow Rate Settings From Watts Drain Catalogue					
Head (m)	L/s				
	Open	75%	50%	0.25	Closed
0.025	0.3154	0.31542	0.31542	0.31542	0.315417
0.05	0.6308	0.63083	0.63083	0.63083	0.315417
0.075	0.9462	0.8674	0.78854	0.70969	0.315417
0.1	1.2617	1.10396	0.94625	0.78854	0.315417
0.125	1.5771	1.34052	1.10396	0.8674	0.315417
0.15	1.8925	1.57708	1.26167	0.94625	0.315417

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.005	0.006	-
Depth (m)	0.106	0.143	0.150
Volume (cu.m)	12.9	31.3	35.6
Draintime (hrs)	0.8	1.7	

Roof Drain Design Calculation Sheet

Project #160402212, 114 Richmond Road
Roof Drain Design Sheet, Area R13
Watts Adjustable Accutrol Weir - Single Notch Roof Drain

Rating Curve				Volume Estimation				Water Depth (m)
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m)		
						Increment	Accumulated	
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0009	0	0.025	14	0	0	0.025
0.050	0.0006	0.0019	1	0.050	57	1	1	0.050
0.075	0.0007	0.0021	3	0.075	128	2	3	0.075
0.100	0.0008	0.0024	8	0.100	227	4	8	0.100
0.125	0.0009	0.0026	15	0.125	354	7	15	0.125
0.150	0.0009	0.0028	26	0.150	510	11	26	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
0.8	437.0	0.8	0.12139
3.1	1054.4	2.2	0.41427
7.4	1847.9	4.4	0.92758
14.7	2769.6	7.2	1.69692
25.4	3787.4	10.8	2.74897

Rooftop Storage Summary

Total Building Area (sq.m)	638
Assume Available Roof Area (sq. 80%)	510.4
Roof Imperviousness	0.99
Roof Drain Requirement (sq.m/Notch)	232
Number of Roof Notches*	3
Max. Allowable Depth of Roof Ponding (m)	0.15
Max. Allowable Storage (cu.m)	25.5
Estimated 100 Year Drawdown Time (h)	2.8

* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).

* Note: Number of drains can be reduced if multiple-notch drain used.

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.002	0.003	-
Depth (m)	0.112	0.150	0.150
Volume (cu.m)	11.0	25.5	25.5
Drainage time (hrs)	1.3	2.8	

Adjustable Accutrol Weir Flow Rate Settings From Watts Drain Catalogue					
Head (m)	L/s				
	Open	75%	50%	25%	Closed
0.025	0.3154	0.3154	0.3154	0.3154	0.3154
0.05	0.6308	0.6308	0.6308	0.6308	0.3154
0.075	0.9462	0.8674	0.7885	0.7097	0.3154
0.1	1.2617	1.104	0.9462	0.7885	0.3154
0.125	1.5771	1.3405	1.104	0.8674	0.3154
0.15	1.8925	1.5771	1.2617	0.9462	0.3154

Roof Drain Design Calculation Sheet

Project #160402212, 114 Richmond Road
Roof Drain Design Sheet, Area R14
Watts Adjustable Accutrol Weir - Single Notch Roof Drain

Rating Curve				Volume Estimation				Water Depth (m)
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m)		
						Increment	Accumulated	
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0009	0	0.025	14	0	0	0.025
0.050	0.0006	0.0019	1	0.050	57	1	1	0.050
0.075	0.0007	0.0021	3	0.075	128	2	3	0.075
0.100	0.0008	0.0024	8	0.100	227	4	8	0.100
0.125	0.0009	0.0026	15	0.125	354	7	15	0.125
0.150	0.0009	0.0028	26	0.150	510	11	26	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
0.8	437.0	0.8	0.12139
3.1	1054.4	2.2	0.41427
7.4	1847.9	4.4	0.92758
14.7	2769.6	7.2	1.69692
25.4	3787.4	10.8	2.74897

Rooftop Storage Summary

Total Building Area (sq.m)	638
Assume Available Roof Area (sq. 80%)	510.4
Roof Imperviousness	0.99
Roof Drain Requirement (sq.m/Notch)	232
Number of Roof Notches*	3
Max. Allowable Depth of Roof Ponding (m)	0.15
Max. Allowable Storage (cu.m)	25.5
Estimated 100 Year Drawdown Time (h)	2.8

* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).

* Note: Number of drains can be reduced if multiple-notch drain used.

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.002	0.003	-
Depth (m)	0.112	0.150	0.150
Volume (cu.m)	11.0	25.5	25.5
Drainage time (hrs)	1.3	2.8	

Adjustable Accutrol Weir Flow Rate Settings From Watts Drain Catalogue					
Head (m)	L/s				
	Open	75%	50%	25%	Closed
0.025	0.3154	0.3154	0.3154	0.3154	0.3154
0.05	0.6308	0.6308	0.6308	0.6308	0.3154
0.075	0.9462	0.8674	0.7885	0.7097	0.3154
0.1	1.2617	1.104	0.9462	0.7885	0.3154
0.125	1.5771	1.3405	1.104	0.8674	0.3154
0.15	1.8925	1.5771	1.2617	0.9462	0.3154

Roof Drain Design Calculation Sheet

Project #160402212, 114 Richmond Road
Roof Drain Design Sheet, Area R15
Watts Adjustable Accutrol Weir - Single Notch Roof Drain

Rating Curve				Volume Estimation				Water Depth (m)
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m)		
						Increment	Accumulated	
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0009	0	0.025	14	0	0	0.025
0.050	0.0006	0.0019	1	0.050	57	1	1	0.050
0.075	0.0007	0.0021	3	0.075	128	2	3	0.075
0.100	0.0008	0.0024	8	0.100	227	4	8	0.100
0.125	0.0009	0.0026	15	0.125	354	7	15	0.125
0.150	0.0009	0.0028	26	0.150	510	11	26	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
0.8	437.0	0.8	0.12139
3.1	1054.4	2.2	0.41427
7.4	1847.9	4.4	0.92758
14.7	2769.6	7.2	1.69692
25.4	3787.4	10.8	2.74897

Rooftop Storage Summary

Total Building Area (sq.m)	638	
Assume Available Roof Area (sq. m)	80%	510.4
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		3
Max. Allowable Depth of Roof Ponding (m)	0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)	25.5	
Estimated 100 Year Drawdown Time (h)	2.8	

* Note: Number of drains can be reduced if multiple-notch drain used.

Adjustable Accutrol Weir Flow Rate Settings From Watts Drain Catalogue					
Head (m)	L/s				
	Open	75%	50%	25%	Closed
0.025	0.3154	0.3154	0.3154	0.3154	0.3154
0.05	0.6308	0.6308	0.6308	0.6308	0.3154
0.075	0.9462	0.8674	0.7885	0.7097	0.3154
0.1	1.2617	1.104	0.9462	0.7885	0.3154
0.125	1.5771	1.3405	1.104	0.8674	0.3154
0.15	1.8925	1.5771	1.2617	0.9462	0.3154

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.002	0.003	-
Depth (m)	0.112	0.150	0.150
Volume (cu.m)	11.0	25.5	25.5
Drainage time (hrs)	1.3	2.8	

Roof Drain Design Calculation Sheet

Project #160402212, 114 Richmond Road
Roof Drain Design Sheet, Area R104A
Watts Adjustable Accutrol Weir - Single Notch Roof Drain

Rating Curve				Volume Estimation				Water Depth (m)
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m)		
						Increment	Accumulated	
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0013	0	0.025	17	0	0	0.025
0.050	0.0006	0.0025	1	0.050	67	1	1	0.050
0.075	0.0007	0.0028	4	0.075	150	3	4	0.075
0.100	0.0008	0.0032	9	0.100	267	5	9	0.100
0.125	0.0009	0.0035	17	0.125	417	8	17	0.125
0.150	0.0009	0.0038	30	0.150	600	13	30	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.0	385.3	1.0	0.10703
3.6	929.6	2.6	0.36525
8.8	1629.2	5.1	0.81781
17.2	2441.9	8.5	1.49611
29.9	3339.2	12.6	2.42366

Rooftop Storage Summary

Total Building Area (sq.m)	750
Assume Available Roof Area (sq. 80%)	600
Roof Imperviousness	0.99
Roof Drain Requirement (sq.m/Notch)	232
Number of Roof Notches*	4
Max. Allowable Depth of Roof Ponding (m)	0.15
Max. Allowable Storage (cu.m)	30.0
Estimated 100 Year Drawdown Time (h)	2.3

* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).

* Note: Number of drains can be reduced if multiple-notch drain used.

Adjustable Accutrol Weir Flow Rate Settings From Watts Drain Catalogue					
Head (m)	L/s				
	Open	75%	50%	25%	Closed
0.025	0.3154	0.3154	0.3154	0.3154	0.3154
0.05	0.6308	0.6308	0.6308	0.6308	0.3154
0.075	0.9462	0.8674	0.7885	0.7097	0.3154
0.1	1.2617	1.104	0.9462	0.7885	0.3154
0.125	1.5771	1.3405	1.104	0.8674	0.3154
0.15	1.8925	1.5771	1.2617	0.9462	0.3154

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.003	0.004	-
Depth (m)	0.110	0.148	0.150
Volume (cu.m)	12.3	28.7	30.0
Drainage time (hrs)	1.1	2.3	

Roof Drain Design Calculation Sheet

Project #160402212, 114 Richmond Road
Roof Drain Design Sheet, Area R105A
Watts Adjustable Accutrol Weir - Single Notch Roof Drain

Rating Curve				Volume Estimation				Water Depth (m)
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m)		
						Increment	Accumulated	
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0013	0	0.025	17	0	0	0.025
0.050	0.0006	0.0025	1	0.050	67	1	1	0.050
0.075	0.0007	0.0028	4	0.075	150	3	4	0.075
0.100	0.0008	0.0032	9	0.100	267	5	9	0.100
0.125	0.0009	0.0035	17	0.125	417	8	17	0.125
0.150	0.0009	0.0038	30	0.150	600	13	30	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.0	385.3	1.0	0.10703
3.6	929.6	2.6	0.36525
8.8	1629.2	5.1	0.81781
17.2	2441.9	8.5	1.49611
29.9	3339.2	12.6	2.42366

Rooftop Storage Summary

Total Building Area (sq.m)	750
Assume Available Roof Area (sq. 80%)	600
Roof Imperviousness	0.99
Roof Drain Requirement (sq.m/Notch)	232
Number of Roof Notches*	4
Max. Allowable Depth of Roof Ponding (m)	0.15
Max. Allowable Storage (cu.m)	30.0
Estimated 100 Year Drawdown Time (h)	2.3

* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).

* Note: Number of drains can be reduced if multiple-notch drain used.

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.003	0.004	-
Depth (m)	0.110	0.148	0.150
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0.1	1.2617	1.104	0.9462	0.7885	0.3154
0.125	1.5771	1.3405	1.104	0.8674	0.3154
0.15	1.8925	1.5771	1.2617	0.9462	0.3154

Roof Drain Design Calculation Sheet

Project #160402212, 114 Richmond Road
Roof Drain Design Sheet, Area R105B
Watts Adjustable Accutrol Weir - Single Notch Roof Drain

Rating Curve				Volume Estimation				Water Depth (m)
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m)		
						Increment	Accumulated	
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0013	0	0.025	17	0	0	0.025
0.050	0.0006	0.0025	1	0.050	67	1	1	0.050
0.075	0.0007	0.0028	4	0.075	150	3	4	0.075
0.100	0.0008	0.0032	9	0.100	267	5	9	0.100
0.125	0.0009	0.0035	17	0.125	417	8	17	0.125
0.150	0.0009	0.0038	30	0.150	600	13	30	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.0	385.3	1.0	0.10703
3.6	929.6	2.6	0.36525
8.8	1629.2	5.1	0.81781
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Rooftop Storage Summary

Total Building Area (sq.m)	750	
Assume Available Roof Area (sq. 80%)	600	
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Roof Drain Requirement (sq.m/Notch)	232	
Number of Roof Notches*	4	
Max. Allowable Depth of Roof Ponding (m)	0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)	30.0	
Estimated 100 Year Drawdown Time (h)	2.3	

* Note: Number of drains can be reduced if multiple-notch drain used.

Adjustable Accutrol Weir Flow Rate Settings From Watts Drain Catalogue					
Head (m)	L/s				
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0.05	0.6308	0.6308	0.6308	0.6308	0.3154
0.075	0.9462	0.8674	0.7885	0.7097	0.3154
0.1	1.2617	1.104	0.9462	0.7885	0.3154
0.125	1.5771	1.3405	1.104	0.8674	0.3154
0.15	1.8925	1.5771	1.2617	0.9462	0.3154

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.003	0.004	-
Depth (m)	0.110	0.148	0.150
Volume (cu.m)	12.3	28.7	30.0
Drainage time (hrs)	1.1	2.3	

C.3 Background Report Storm Excerpts



5.0 Stormwater Management and Servicing

The stormwater management (SWM) criteria for 114 Richmond Road were established in a report titled "Assessment of Adequacy of Public Services Report" prepared by Trow Associates Inc. and dated March 12, 2010. This report indicated a 5-year predevelopment release rate of 194.3L/s based on a site area of 2.21ha and a pre-development runoff coefficient of 0.45. (see **Appendix C** for Excerpts from Trow's report). As per the City of Ottawa's request in an email received September 6, 2011, the allowable release rate has been revised to reflect a calculated time of concentration of 23.8 minutes, based on existing site conditions. Note that the proposed site also receives external drainage from neighbouring properties. These external flows will be captured and conveyed by the proposed system. The target rate for the site is therefore **205 L/s** when external drainage areas are included.

This SWM analysis will demonstrate that the proposed development meets the above criteria, as well as the following:

- Maximum permitted hydraulic grade line (HGL) to be a minimum of 0.30 m below building foundation will be addressed through installation of pumps.
- Size storm sewers to convey 5 year storm event under free-flow conditions using 2004 City of Ottawa I-D-F parameters (*City of Ottawa*). Due to servicing restrictions on the west side of the site, the sewers connecting to Richmond Road are sized to convey the 100 year restricted release rate from roof tops and the underground storm reservoir.
- All flows in excess of the allowable release rate, up to and including the 100-year storm, are to be detained onsite.
- Where possible, maximum ponding depth of 0.30 m (*City of Ottawa*). Note that due to grading restrictions a depression exists within the treed area that is to be preserved and cannot be regraded. No overland flow route is available from this area and as such maximum ponding depths of 0.3m cannot be achieved.
- Standing water depths at parking lot sags not to cause surface flooding on any building or structure (*City of Ottawa*)
- Subdrains required in swales where longitudinal gradient is less than 1.5% (*City of Ottawa*)
- Where possible, major flow from the site is to be safely conveyed by surface routing towards Leighton Terrace and Richmond Road. A depression exists currently within the treed area that is to be preserved and cannot be regraded. Due to elevation changes across the site no overland flow route can be provided at this location. Flows in this area will be captured in a catchbasin and conveyed through the proposed storm sewers but no overland flow route can be provided.

C.4 Watts Accutrol Adjustable Weir





Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

ADJUSTABLE ACCUTROL(for Large Sump Roof Drains only)

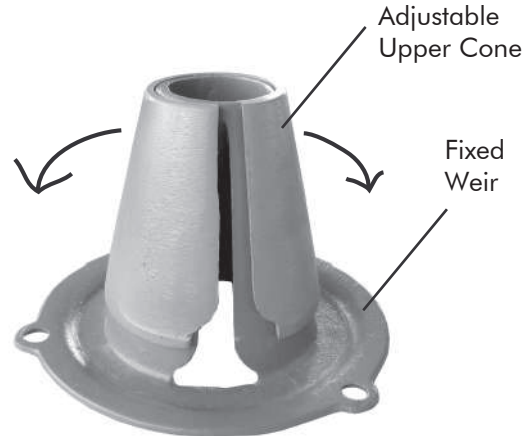
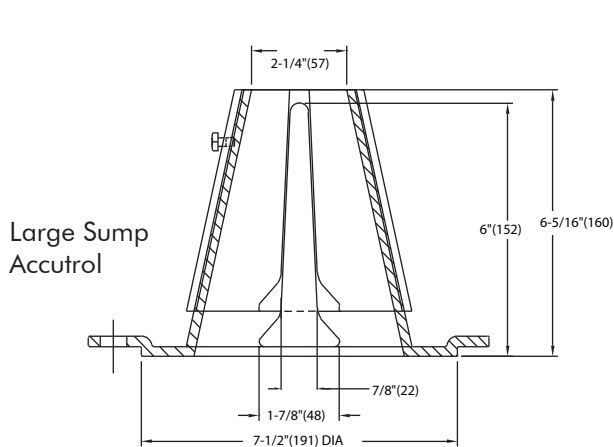
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.

Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2" of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3" of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm(per inch of head) x 2 inches of head] + 2-1/2 gpm(for the third inch of head) = 12-1/2 gpm.



1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	Head of Water					
	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	10	10	10	10	10

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

WATTS Drainage reserves the right to modify or change product design or construction without prior notice and without incurring any obligation to make similar changes and modifications to products previously or subsequently sold. See your WATTS Drainage representative for any clarification. Dimensions are subject to manufacturing tolerances.



CANADA: 5435 North Service Road, Burlington, ON, L7L 5H7 TEL: 905-332-6718 TOLL-FREE: 1-888-208-8927 Website: www.wattsdrainage.ca



Appendix D City Correspondence



October 28, 2025

Jordan Tannis
Concorde Properties
Via email: jt@concorde-properties.ca

**Subject: Pre-Consultation: Meeting Feedback
Proposed Zoning By-law Amendment and Site Plan Control
Application – 114 Richmond Road**

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on October 21, 2025.

Pre-Consultation Preliminary Assessment

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. For your next submission, please submit the required Application Form, together with the necessary studies and/or plans to planningcirculations@ottawa.ca, copy (cc:) to the file lead and planning support.
2. In your subsequent pre-consultation or application submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed is requested with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.
3. Please note, if your development proposal changes significantly in scope, design, or density it is recommended that a subsequent pre-consultation application be submitted.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.
 - a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

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

Planning

Comments:

1. General:

- a. Please show the entire extent of the site on all plans in future submissions.

2. Subject site:

- a. The subject site is located within Westboro neighbourhood on the south side of Richmond Road. The site is generally rectangular shape with a pole that allows 8.84m of frontage onto Leighton Terrace, and also has 15.24m frontage on Shannon Street and 93.73m along the Byron Linear Park. The site is approximately 17,153 square metres in size.
 - b. The site is currently occupied by the Sisters of the Visitation convent building on the northwest corner on the site, which is a heritage building that is currently vacant, as well as the Nun's walk which is a heritage-protected pathway along the eastern portion of the property.

3. Proposal:

- a. This is a Phase 1 pre-consultation for the Zoning By-law Amendment and Site Plan Control applications to facilitate the construction of six new three-storey "back to back townhomes" containing 113 residential units, and to convert the existing church building into office and commercial uses.

The Site Plan states that the unit type is "back to back stacked towns"

- i. For the purposes of this comment, staff are reviewing the Zoning By-law in effect at the time of the pre-consultation. In the current Zoning By-law, "Stacked Dwelling" is defined as a residential use building of four or fewer storeys in height containing four or more principal dwelling units where the units are divided horizontally and vertically, and in which each dwelling unit has an independent entrance to the interior.
 - ii. Confirm that the proposal meets the Zoning By-law definition. Please submit floor plans with the formal submission.

- b. A driveway from Leighton Terrace is proposed to lead to a parking garage which projects above-grade under blocks 3, 4 and 5 to 96 underground vehicular parking spaces. Along the driveway are and additoinal 49 surface parking spaces for visitor spaces and for the future new uses in the heritage building.
4. Policies:
- a. Official Plan: Inner Urban Transect, Neighbourhood, Evolving Overlay
 - b. Richmond Road / Westboro Secondary Plan
 - i. Northern half: four to six storeys
 - ii. Southern half: maximum four storeys
 - c. Richmond Road is a Transit Priority Corridor
 - d. The site is approximately 630 metres from Westboro O Train Station
 - e. Byron Linear Park is a Major Pathway
5. Staff support the development of townhouses on the subject site, and appreciate the effort to provide large household dwellings.
6. Parking:
- a. Staff understand that the driveway access is proposed from Leighton Terrace.
 - b. Staff encourage the reduction of the amount of surface parking proposed. It is acknowledged that these spaces are to support visitor parking and the future uses of the heritage building; however, fewer surface parking spaces would be supported by staff, particularly along the curved driveway where this is potential conflict with the pedestrian pathway network. This is supported by policy in this particiular context, given the nearby transit, bicycle and walking facilities, and mix of uses nearby.
 - c. It is encouraged to increase soft landscaping on the site where parking is currently proposed to support the planting of large canopy trees.
 - d. Be cautious of the pedestrian easement that covers a portion of the site. Please confirm if the wording of the easement restricts obstructions in the easement, such as established parking spaces.
 - e. In the design of the vehicular areas over the easement, please consider how this can still be a pedestrian friendly area connecting the Byron linear park through the Nun's walk to Richmond via the easement.

- f. Staff appreciate the renderings of the parking garage beneath the townhomes, which demonstrate effort to make the garage less visible. Please share any existing examples of this type of parking garage design.
 - g. Staff are interested in what the landscape treatment proposed above the parking garage (between blocks 3, 4, and 5) to ensure it is a safe and inviting place.
 - h. Please consider where snow is being stored, and ensure that it is not stored on vegetation and that it is not causing any issues from a heritage perspective.
7. There are some concerns regarding the perception of safety on the subject site. Please consider strategies for lighting and design to ensure that between the townhouse blocks feels safe and not enclosed. Refer to CPTED practices.
8. There are requirements in the current and draft New Zoning By-laws for amenity area. Please indicate how these requirements are being met in the design.
9. Confirm the depth of the window wells.
10. How is waste storage and collection proposed to happen? Is there a staging area for storage or pick-up?
11. Bicycle parking is encouraged to be provided at a 1:1 ratio and located in an indoor, secure location.

Urban Design

Comments:

12. An Urban Design Brief is not required.
13. The site is situated in a Design Priority Area, however, the scale of the project does not trigger Urban Design Review Panel.
14. Additional drawings and studies are required as shown on the SPIL. Please follow the terms of references ([Planning application submission information and materials | City of Ottawa](#)) to prepare these drawings and studies. These include:
- a. Site Plan
 - b. Landscape Plan
 - c. Building Elevations
 - d. Conceptual Floorplans

Preliminary Design Comments:

15. The requested plans should capture the site in its entirety.
16. Urban Design Staff are generally supportive of the proposed site organization, including the overall built form approach for the stacked back-to-back townhouse development. Please confirm that the Blocks 1 and 2 will not impact the tree root systems within the MUP area.
17. Urban Design Staff encourage the Applicant to consider CPTED principles re design of the site. Please delineate which pedestrian walkways will be publicly accessible vs. private or semi-private.
18. For the stacked back-to-back townhomes, please ensure that building materiality considers the site's heritage.
19. More details are needed on the preservation on the former convent building. However, staff are supportive of the introduction of additional commercial uses on the property.
20. Please ensure that the landscaping strategy is robust and includes opportunities for medium to large trees.

Engineering

Comments:

21. General

- a. Any utilities installed within the existing Right of Way or road modifications within the existing Right of Way, or shoring system with tie backs encroaching on existing ROW shall require Municipal Consent. The installation of any structure, footing, geo-membrane or perforated pipe encroaching into the existing ROW shall not be permitted in the absence of Municipal Consent Approval.
- b. It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an Existing Conditions Plan.
- c. Any easements on the subject site shall be identified and respected by any development proposal and shall adhere to the conditions identified in the easement agreement. A legal survey plan shall be provided and all easements shall be shown on the engineering plans.
- d. Deep excavation and dewatering operations have the potential to cause damages to the neighboring adjacent buildings/ City infrastructure. Construction activities (excavation, dewatering, vibrations associated with

construction, etc.) shall not impact on any adjacent buildings and infrastructure.

- e. All underground and above ground building footprints and permanent walls need to be shown on the plans to confirm that any permanent structure does not extend either above or below into the existing property lines and sight triangles.
- f. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-424 x.44455).
- g. Please refer to the City of Ottawa Guide to Preparing Studies and Plans [Engineering]: Specific information has been incorporated into both the Guide to Preparing Studies and Plans for a site plan. [Planning application submission information and materials](#). The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.

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

- a. Application of the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
- b. For separated sewer systems built up until 2016, the design of the storm sewers were based on a 5-year storm; storm systems after such time are, generally, based on a 2-year level-of-service.
- c. In separated areas, the pre-development runoff shall have a maximum equivalent runoff coefficient (C) of 0.5 or the pre-development C value, whichever is lower (§ 8.3.7.3). In the absence of site-specific data, the allowable release rate shall be based on a 2-year storm event.
- d. The time of concentration (T_c) used to determine the pre-development condition should be calculated. A calculated time of concentration cannot be less than 10 minutes, since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations.
- e. Flows to the storm sewer in excess of the 2-year pre-development release rate (allowable), up to and including the 100-year storm event, must be detained on site. The SWM measures required to avoid impact on downstream sewer system will be subject to review.
- h. Outlets should not be submerged.

- f. The quantity control criteria to control post-development runoff from the subject site up to and including the 100-year storm event, to a 2-year pre-development level. The pre-development runoff coefficient will need to be determined as per existing conditions but in no case more than $c = 0.5$.
 - g. Two separate sewer laterals (one for sanitary and other for storm) will be required.
 - h. Quality control criteria: Quality control is only required should surface parking be proposed - 80% TSS removal as per City of Ottawa, MOE and Rideau Valley Conservation Authority. Please consult with the local conservation authority (RVCA) regarding water quality criteria prior to submission of a Site Plan Control Proposal application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report.
23. Deep Services (Storm, Sanitary and/or Water Supply)
- a. Provide plan and profile drawings if private mains are proposed on the site.
 - b. Provide Right-of-Way (ROW) cross-sections if a private road is proposed.
 - c. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.
 - d. Any easements on the subject site must be identified and respected by all development proposals, particularly the existing 300 mm public storm sewer located on the site that runs through 392 and 396 Leighton Terrace. All easements shall comply with the conditions outlined in the easement agreement. A legal survey plan must be provided, and all easements shall be clearly shown on all engineering drawings.
 - e. Connections to trunk sewers and easement sewers are typically not permitted unless authorized by Asset Management.
 - f. Storm and sanitary service laterals shall incorporate monitoring manholes located in an accessible location on private property near the property line (ie. Not within a parking area, garage ramp or private approach limit). Where underground parking extends to lot line a cast in place monitoring maintenance hole is required within the underground parking garage structure.
 - g. Review provision of a high-level sewer.

- h. CCTV inspections of the City's sewer infrastructure is required to document and record pre- and post-construction conditions, ensuring that no damage has occurred to City-owned infrastructure.
- i. Sewer connections to be made above the springline of the sewermain as per:
 - i. Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.
 - ii. Std Dwg S11 (For rigid main sewers) – lateral must be less than 50% the diameter of the sewermain.
 - iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less than 50% the diameter of the sewermain.
 - iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

24. Water

A 152 mm dia. UCI watermain (1945) is available within Leighton Terr.

- a. Water Supply Redundancy: As per ISTB-2021-03, Industrial, commercial, institutional service areas with a basic day demand greater than 50 m³/day (0.57 L/s) and residential areas serving 50 or more dwellings shall be connected with a minimum of two watermains, separated by an isolation valve, to avoid the creation of a vulnerable service area. Individual residential facilities with a basic day demand greater than 50 m³/day (0.57 L/s) shall be connected with a minimum of two water services, separated by an isolation valve, to avoid the creation of a vulnerable service area.
- b. Water Data Cards will have to be submitted to size the water meter for the water services greater than 19mm diameter (future requirement).
- c. Existing water services are to be blanked at the watermain.
- d. Boundary conditions are required to confirm that the required fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information to the City of Ottawa via email to request water distribution



network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions:

- i. Location of service
 - ii. Type of development
 - iii. The amount of fire flow required (per OBC or FUS).
 - iv. Average daily demand: ____ l/s.
 - v. Maximum daily demand: ____ l/s.
 - vi. Maximum hourly daily demand: ____ l/s.
 - vii. Note: Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons.
- e. For private developments, a single DMA chamber is required when the site is serviced by a connection of 150 mm or larger, or when there are two or more private connections to the public watermain. District Metering Area Chambers is one of the primary water loss detection methods being utilized by the City to is the use of District Metered Areas (DMA's) to ensure accurate recording of all water usage and billing, in light of recent incidents of leakage in the private watermain.

New developments and private site developments serviced by a connection from 150 mm to 400 mm shall provide at least one DMA chamber. Chamber location and requirements are subject to the review of the Water and Environmental Services Department. Depending on the size, configuration of the development and the number of connections to the public system, more than one flow monitoring chamber may be required.

For 150 mm to 300 mm watermains, DMA chambers shall be based on the standard Circular Chamber detail drawing for Gate Valves (W3). For 400 mm watermains, DMA chambers shall be based on the Circular Chamber detail drawing for Butterfly Valves (W2). The detail drawing W32.1 should be followed when applicable, depending on the specific development and direction from the Water Department. The DMA chambers shall include a standard isolation valve and two 50 mm standard nozzles, one tapped on each side of the valve. The chamber is to be installed at, or as close to the property line as possible and the isolation valve will also serve as the curb stop for the property. Valves and chambers shall be installed and corrosion protection added in accordance with the Standard. Please also refer to the Water Supply By-law 2025-227.

25. Fire-fighting flow rate(s)

- a. Fire flow demand requirements shall be based on IWSTB-2024-05.
- b. Please review Technical Bulletin ISTB-2024-05, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A hydrant coverage figure shall be provided and demonstrate there is adequate fire protection for the proposal.
- c. Type of development and the amount of fire flow required (L/min). Please note that the FUS method should only be used if the OBC method indicates more than 9,000 L/min.
- d. Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF) (*only if applicable as per 17.b).
- e. Hydrant capacity shall be assessed to demonstrate the RFF can be achieved. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

26. Storm Sewer

A 525 mm dia. CONC storm sewer (1974) is available within Leighton Terr.

- a. A storm sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices. If there is no space to accommodate a monitoring maintenance hole, a test port giving access to the city personnel shall be provided.
- b. A backwater valve is required on the Storm service for protection.
- c. No deep-rooted plantings within proximity to servicing, including sewer laterals and water services.

27. Sanitary Sewer

A 225 mm dia. CONC sanitary sewer is available within Leighton Terr.

- a. For the sanitary sewer capacity, please provide the estimated proposed sanitary sewer discharge and we confirm if sanitary sewer main has the capacity. Modeling can be provided to ensure capacity for sanitary sewers for the proposed development by City's Water Distribution Department – Modeling Group, through PM and upon request.
- b. Include correspondence from the Architect within the Appendix of the report confirming the number of units and a unit type breakdown to support the calculated building populations.

- c. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.
- d. A sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices. If there is no space to accommodate a monitoring maintenance hole, a test port giving access to the city personnel shall be provided.
- e. A backwater valve is required on the Sanitary service for protection.
- f. No deep-rooted plantings within proximity to servicing, including sewer laterals and water services.

28. Stormwater

- a. Please provide a stormwater management report (SWM) based on the Stormwater Management Criteria applicable for the site.
- b. Document how any foundation drainage system will be integrated into the servicing design and show the positive outlet on the plan. Foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention. It is recommended that the foundation drainage system be drained by a sump pump connection to the storm sewer to minimize risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.
- c. Please note that as per Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14) there shall be no surface ponding on private parking areas during the 2-year storm rainfall event.
- d. Underground Storage: Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.

When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.

In the event that there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.

Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports (maintenance) etc. UG storage to provide actual 2- and 100-year event storage requirements.

With regard to all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective.

- e. If rooftop control and storage is proposed as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a Roof Drain Plan as part of the submission.

Please note that the minimum orifice dia. for a plug style ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s in order to reduce the likelihood of plugging.

- f. The location and drainage direction of any proposed scuppers or downspouts for drainage review must be specified. Please note that any roof drains must discharge to surface level towards the street or lane and be at least 1.5m away from building foundation walls to prevent cycling to foundation drains. All proposed scuppers should be located at the front and back sides of the property, not on the sides to prevent damage to neighbouring properties. If scuppers are used on the sides, they should be connected to downspouts with splash pads. A splash pad is required when the downspout is situated less than 1.5 meters from a neighboring property.
- g. If Window wells are proposed, they are to be indirectly connected to the footing drains. A detail of window well with indirect connection is required, as is a note at window well location speaking to indirect connection.
- h. There must be at least 15cm of vertical clearance between the spill elevation and the ground elevation at the building envelope that is in proximity of the flow route or ponding area. The exception in this case would be at reverse sloped loading dock locations. At these locations, a minimum of 15cm of vertical clearance must be provided below loading dock



openings. Ensure to provide discussion in report and ensure grading plan matches if applicable.

- i. Street catch basins are not to be located at any proposed entrances.

29. Grading, Survey Plan and Erosion

- a. Please provide an updated survey plan or a Pre-Development Drainage Area Plan to define the pre-development drainage areas/patterns. Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution.
- b. Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A topographical plan of survey shall be provided as part of the submission and a note provided on the plans.
- c. Encroachment or alteration will not be permitted within any easements including but not limited to drainage easements, access easements, utility easements or any other easements without authorization from easement owner.
- d. No adverse alterations of existing grading and drainage patterns are permitted and no excess drainage to be directed towards adjacent properties.
- e. Erosion and sediment control plan must be provided.

30. Geotechnical

- a. A Geotechnical Study/Investigation shall be prepared in support of this development proposal.
- b. Reducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long-term damages associated with lowering the groundwater in this area.
- c. Geotechnical Study shall be consistent with the Geotechnical Investigation and Reporting Guidelines for Development Applications. [Geotechnical Investigation and Reporting \(ottawa.ca\)](http://ottawa.ca/geotechnical). See the Studies Plans and Identification List for more information.
- d. Pre-Construction (Piling/Hoe Ramming or close proximity to City Assets) and/or Pre-Blasting (if applicable) Survey required for any buildings/dwellings in proximity of 75m of site and circulation of notice of vibration/noise to residents within 150 m of site. Conditions for Pre-

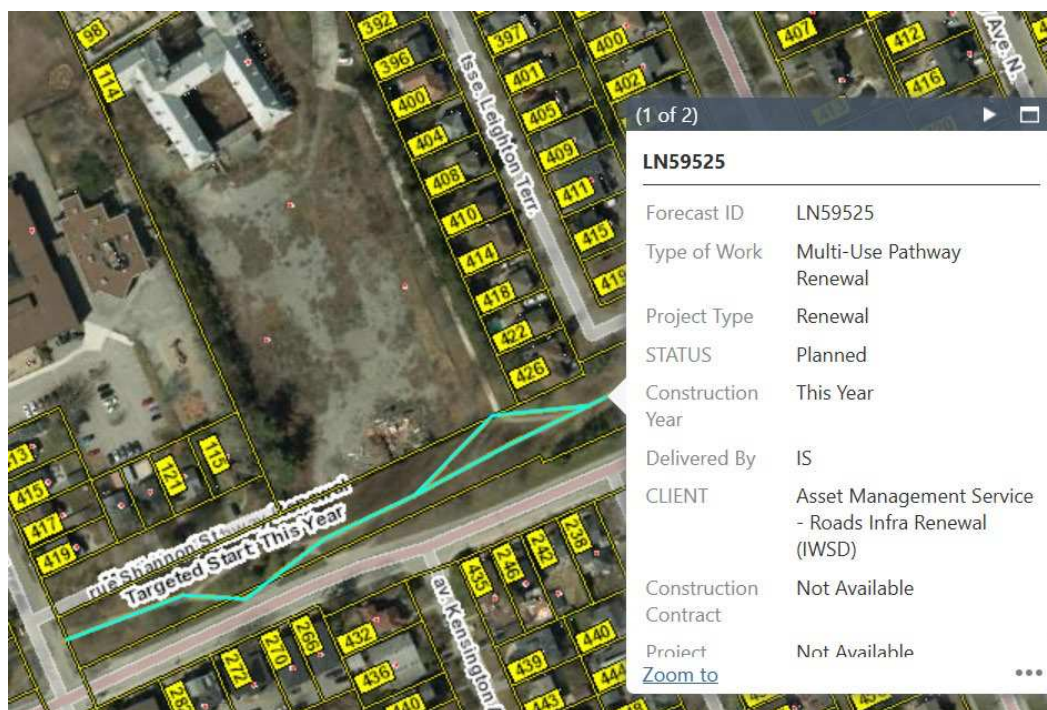
Construction/ Pre-Blast Survey & Use of Explosives will be applied to agreements. Refer to City's Standard S.P. No. F-1201 entitled Use of Explosives, as amended.

- e. If Sensitive marine clay soils are present in this area that are susceptible to soil shrinkage that can lead to foundation and building damages. All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m will need to be achieved. A memorandum addressing the Tree in Clay Soil Guidelines prepared by a geotechnical engineer is required to be provided to the City.

<https://ottawa.ca/en/city-hall/planning-and-development/community-plans-and-design-guidelines/design-and-planning/completed-guidelines/tree-planting-sensitive-marine-clay-soils-2017-guidelines>

31. Capital Works Projects scheduled

There is a City Capital Construction forecast project in the area, on Byron Avenue. The forecast renewal plan for the Multi-Use Pathway with forecast ID LN59525, scheduled to be targeted this year. Please coordinate construction activities with the appropriate City of Ottawa staff including the project manager. Please refer to the GeoOttawa image below for reference.



Disclaimer:

The City of Ottawa does not guarantee the accuracy or completeness of the data and information contained on the above image(s) and does not assume any responsibility or liability with respect to any damage or loss arising from the use or interpretation of the image(s) provided. This image is for schematic purposes only.

32. Snow Storage

Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patterns or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site please indicate this on the plan(s).

33. Road Reinstatement

Where the proposed development requires three or more road cuts, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By- Law 2003-445 and City Standard Detail Drawing R10. The amount of overlay will depend on condition of roadway and width of roadway(s).

34. Exterior Site Lighting

Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES) and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a Certification (Statement) Letter from an acceptable professional engineer stating that the design is compliant.

35. Environmental Site Assessment

A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.

The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg.

153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.

Official Plan Section 4.8.4:

<https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-4-review-development-applications#4-8-protection-health-and-safety>

36. RSC (Record of the site Conditions)

A Record of Site Condition (RSC) in accordance with O.Reg. 153/04 is required to be filed and acknowledged by the Ministry prior to issuance of a building permit when changing the land use (zoning) of a property to a more sensitive land use. Additionally, a memorandum prepared by an environmental consultant is required confirming that no potential contaminating activities have taken place within the RSC area since the filling of the RSC.

[Submitting a record of site condition | Ontario.ca](#)

37. Construction approach

Please note that these comments are considered preliminary based on the information available to date and therefore maybe amended as additional details become available and presented to the City. It is the responsibility of the applicant to verify the above information. The applicant may contact me for follow-up questions related to engineering/infrastructure prior to submission of an application if necessary.

Feel free to contact Shawn Wessel, Infrastructure Project Manager at shawn.wessel@ottawa.ca, or Farbod Azimi, Infrastructure Project Manager at farbod.azimi@ottawa.ca for follow-up questions.

Noise

Comments:

38. A Noise Study (Transportation Noise Assessment) is required for the proposed development due to the proximity to Richmond Road (arterial road) & Byron Avenue (collector road).

39. The Noise Study must include required warning clauses which are required as per City of Ottawa ENCG and NPC-300.

Feel free to contact Shawn Wessel, Infrastructure Project Manager at shawn.wessel@ottawa.ca, or Farbod Azimi, Infrastructure Project Manager at farbod.azimi@ottawa.ca for follow-up questions.

Transportation

Comments:

40. Right-of-way protection.

- a. See [Schedule C16 of the Official Plan](#).
- b. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

41. A TIA is warranted, please proceed to **Step 2; TIA Scoping report**. The application will not be deemed complete without Step 2 being submitted at least 14 calendar days prior to a Phase 3 pre-consultation or formal application. A **TIA Strategy report (Step 3)** with the Synchro files will be required at the formal application. Refer to the City of Ottawa website for the updated TIA process: [Transportation Impact Assessment Guidelines | City of Ottawa](#).

Feel free to contact Mike Giampa, Transportation Project Manager, for follow-up questions.

Environment

Comments:

42. There are no triggers for an Environmental Impact Study.

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

44. Please consider if there are features that can be added reduce the urban heat island effect (see OP 10.3). For example, this impact can be reduced by adding large canopy trees, green roofs or vegetation walls, or incorporating building with low heat absorbing materials.

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

Forestry

Comments:

45. Tree preservation / Tree Removal

- a. A Tree Conservation Report (TCR) must be supplied for review
 - i. An approved TCR is a requirement of Site Plan approval.
 - ii. The Planning Forester strongly suggests that a RPF be contracted to develop the TCR
- b. Trees along the east and west property lines are to be preserved and protected
 - i. Note the large maples along the 'Nuns Walk' cannot be impacted
- c. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
- d. The TCR must contain 2 separate plans:
 - i. Plan/Map 1 - show existing conditions with tree cover information
 - ii. Plan/Map 2 - show proposed development with tree cover information.
- e. The TCR must list all trees on site, as well as off-site trees if the CRZ (critical root zone) extends into the developed area, by species, diameter and health condition.
 - i. For ease of review, the Planning Forester suggests that all trees be numbered and referenced in an inventory table.
 - ii. If there are stands of similar trees, please contact the planning forester to determine the most appropriate way of documenting the information
- f. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
- g. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained.
 - i. Compensation may be required for the removal of city owned trees.
- h. The removal of trees on a property line will require the permission of both property owners.
- i. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
 - i. The location of tree protection fencing must be shown on the plan.
 - ii. Show the critical root zone of the retained trees.

- j. The city encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.

46. Landscape Plan - tree planting technical submission requirements

- a. Please ensure all retained trees are shown on the LP
- b. Minimum Setbacks
 - i. Maintain 1.5m from sidewalk, MUP/cycle track, water service laterals.
 - ii. Maintain 2.5m from curb.
 - iii. Coniferous species require a minimum 4.5m setback from curb, sidewalk, or MUP/cycle track/pathway.
- b. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas.
- c. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.
- d. Tree specifications
 - i. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
 - ii. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage.
- e. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; if possible, include watering and warranty as described in the specification.
- f. No root barriers, dead-man anchor systems, or planters are permitted.
- g. No tree stakes unless necessary
- h. Hard surface planting
 - i. If there are hard surface plantings, a planting detail must be provided.
 - ii. Curb style planter is highly recommended.
 - iii. No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
 - iv. Trees are to be planted at grade.
- i. Soil Volume - Please demonstrate as per the **Landscape Plan Terms of Reference** that the available soil volumes for new plantings will meet or exceed the following:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

- j. Sensitive Marine Clay - Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines.
- k. The city requests that consideration be given to planting native species where ever there is a high probability of survival to maturity.
- l. Efforts shall be made to provide as much future canopy cover as possible at a site level, through tree planting and tree retention. The Landscape Plan shall show/document that the proposed tree planting and retention will contribute to the City's overall canopy cover over time. Please provide a projection of the future canopy cover for the site to 40 years.
- m. Page 7 of the Landscape Plan Terms of Reference requires applicants to submit a digital, georeferenced CAD or GIS file of the final approved LP. Please follow this link to review the submission requirements: https://documents.ottawa.ca/sites/documents/files/landscape_for_en.pdf . The file can be sent to the Planning Forester or Planning File Lead.

Feel free to contact Mark Richardson, Planning Forester, for follow-up questions.

Parkland

Comments:

- 47. The application, at time of pre-consultation submission, is subject to parkland dedication/conveyance requirements in accordance with the City of Ottawa Parkland Dedication By-law No. 2022-280, as amended, which includes the ability for Parks & Facilities Planning to request and require a land (parkland) dedication component for the proposed development.
- 48. PFP will be requesting cash-in-lieu of conveyance of parkland (CILP) at the rate specified in the Parkland Dedication By-law No.2022-280, as amended.
 - a. CILP rate for residential uses > 18 units/net ha = one hectare per 1,000 net residential units but shall not exceed a maximum of 10% of the gross land area where the land is less than or equal to five hectares.

49. Please note, if the planned development proposal changes as a result of required modifications associated with the City's Development Review process, such as but not limited to, built form or model type change, increased unit or density count or land use changes, the parkland dedication requirement will be re-evaluated accordingly.
50. Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the development application and the requested supporting documentation.

Feel free to contact Mike Russett, Parks Planner, for follow-up questions.

Heritage

General Comments:

51. The property at 114 Richmond Road is designated under Part IV of the Ontario Heritage Act, as a former convent including a stone Gothic revival house, the monastery with inward-facing plan with wings arranged around a central courtyard, and a chapel. The grounds with gardens, flowerbeds and mature trees, the layout of paths, including the tee-lined path along the periphery of the site (the Nun's walk), which was used for recreation purposes by the nuns are also important elements of the designation.
52. A heritage permit will be required to facilitate any alterations including the proposed demolition and new construction.
53. As part of any development on this site, heritage staff will be looking to ensure the retention and rehabilitation of the existing heritage building and that its cultural heritage value are conserved. More information about how its conservation is expected to be undertaken will be needed as part of the required applications.
54. Staff will be looking to have an understanding of any alterations to the convent to facilitate the adaptive reuse to determine potential impacts on the character defining attributes, including the "pinwheel plan" and central staircase in the stone house and the interior volume of the chapel.
55. A Heritage Impact Assessment and Conservation Plan will be required in support of the planning and heritage approvals which should speak to comments 3 and 4 above.
56. Retaining a heritage consultant, architect and or engineer with expertise in heritage buildings is highly recommended and would be beneficial to the project.
57. The proposed retention and adaptive reuse of the former convent is very positive.

58. Staff also appreciate the design elements and materials already proposed for the new townhouse blocks that appear to reference some elements of the historic building.
59. It will be very important ensure that the convent is integrated into the broader site design rather than a separate property. The relationship between the existing building and proposed new construction should be further strengthened:
- a. This could be achieved through site design and landscaping, as well as architectural expression and materiality of the buildings, which can also support further compatibility.
 - b. Ensure enough space between Blocks 1 and 2 that back on to the tree-lined path to ensure the retention of the trees.
60. At this point, heritage staff have concerns with the proposed removal of the southwest wing to accommodate surface parking spaces. Further, the proposed parking spaces in the northeast section of the site are also problematic they interrupt the pedestrian access to the Nun's Walk and will be in the most publicly visible area to experience the convent.
61. The arrangement of buildings around the courtyard and the landscaping within the courtyard are integral elements to understanding the site's cultural heritage value. Staff will be looking to ensure the conservation of that arrangement and the sense of enclosure the buildings provide continues. Staff will be looking for further rationale regarding the appropriateness of the proposed retention of the existing stone wall in the HIA and how/if it offsets the loss the wing, as well as alternative options/other mitigation measures that could be considered.
62. There may also be a great opportunity to recreate the historic pattern of flower beds in the courtyard as part of this project; please consider how this can be incorporated into the project.

Feel free to contact MacKenzie Kimm, Heritage Planner, MacKenzie.Kimm@ottawa.ca for follow-up questions.

Community Comments

Hampton Iona Community Association Comments

Density

63. The community has long complained about the over intensification of this site. As you may know, there was a community appeal to the then OMB regarding this development based on the density, particularly south of the convent. That appeal ultimately reached a negotiated settlement and did not go to a hearing. Given this history, I believe that the community (and myself) will be supportive of the much lower level of intensification now being proposed by the

applicant. As well, the mix of housing sizes is such that many of the units seemed to be designed for families unlike what was likely to have been built by the previous owner. Given the variety of schools in the area, including one right next store, the availability of family housing is to be encouraged. As well, if many of the ground floor units are larger and are only on one level, this might be an option for seniors in the community who are looking to downsize but would prefer not to go into small mid-to-high rise apartments or condos requiring elevators. This type of intensification being proposed is more reminiscent of what was built around St. George's Church on Picadilly which has blended into the community very well. This level of intensification is probably much closer to what is being built on the Oblate Lands along Main Street than the much higher level previously planned for the this site. A particular concern of residents along the west side of Leighton Terrace was the potential for a 4-5 story building running parallel to the street with the residents being able to look down on their backyards and into their back windows. At only 3 stories, the impact on people on Leighton Terrace should be far more acceptable.

Site Access

64. One of the most contentious issues associated with this development has been the proposed access to the site at the south end. Ashcroft had pursued both being able to exit onto Shannon (which it was allowed by right) or putting a driveway through the Byron Linear Park. Both options were highly contentious and unpopular with the community. The community will be greatly relieved to learn that the proposed development will be existing onto Leighton Terrace. Further steps may have to be taken to prevent right hand turns onto Leighton if that is the desire of the residents of Leighton Terrace. On the other hand, there is significant traffic on Richmond Road, particularly during rush hours. Cars trying to turn either right or left onto Richmond from Leighton will only add to the congestion. If a side road could be built along the west side of the convent along the fence with Hilson Public School to bring cars to the signalized intersection at which the condo parking garage exits, the situation might be much better.

Accessibility

65. While only briefly discussed, care should be taken to make sure that a portion of this development will result in accessible housing. The buildings over the parking garage may not be considered accessible given the stairs required to get up to the front doors but hopefully the other buildings will be designed with accessibility in mind. As well, this development should be reviewed with Emergency services to make sure that it is accessible for ambulances, fire trucks, police, etc. Questions were raised about this at the meeting. I would note that in the past, Ashcroft had proposed to build seniors housing on the site, presumably through their Alavida division (now in receivership). This was a proposal that Ashcroft also made for the condos on the north side of Richmond Road but never fulfilled. Given Ashcroft's history, there was, however, little expectation that this

would happen and was viewed as a bait and switch strategy to get community buy-in for greater density. Once buy-in for greater heights for seniors housing, the developer would turn around and build regular housing knowing that the zoning was not specific to seniors' housing. That being said, while there is no expectation or requirement for seniors' housing on the site, it would be good if some of the units were accessible for seniors and others who are still fully independent but may have some accessibility issues.

Parkland

66. I am not sure as to what amount of parkland is required by the applicant to provide for this development. It was my understanding that the applicant was looking at Cash-in-Lieu of Parkland. As proposed by Tim Gray of Westboro CA, there is a perfect win-win solution for the community and the developer. This is for the developer to give the Nun's Walk to the City as parkland. This will ensure that the walkway stays as a public facility and that the adjoining trees are preserved and that the walkway is properly maintained, including snow removal in the winter. It will also save money for the developer as they will be giving away land that couldn't be used for development (hopefully) and save having to make an actual cash payment to the City. This in turn will also hopefully cut the cost of development slightly. The walkway is extremely well used both by residents of the condos on Richmond Road, particularly those walking their dogs on the Byron Linear Park or going to the off-leash Hampton Park, and residents south of the development walking to Richmond Road. While a pathway as a park may not be typical since it actually connects to the Byron Linear Park, it would be just an extension of a existing City linear park. Given the proximity of Iona Park, Hampton Park, the new Crane Park and Hilson Public School, an additional green walkway would be more useful than another typical park area with play structures.

Restoration of the Convent

67. The developer's plans were very limited and scant with respect to the restoration of the convent or their experience in restoring heritage buildings. Given the cost of the property and the cost of restoring the convent, it was not clear that the developer has a fully developed business case for the convent restoration. It would be very useful for the community to have a better sense of the restoration details when this proposal goes public as well as the tools that the City has to make sure the restoration occurs. Unfortunately, in the past, too many Ottawa developers view restoring historic buildings as a wasteful cost and not as an opportunity. While I understand that the developer is buying the property from the bankruptcy trustees and not the City and that those trustees cannot and will not impose any conditions on the restoration of the convent (only detailing what heritage status means for the building), the City should be requesting a detailed plan from the developer for its restoration, including the intended use. Ashcroft was always deliberately vague on the intended use of the Convent building over the 15 years it owned the site. Restoration of the convent should also include

the outdoor spaces. I was surprised that the developer was not familiar with the patio on the north side of the Convent that had been put in place by Split Tree Cocktail.

Parking/Cars

68. Over time, continual parking on the neighbourhood streets has been increasing. This has been due to new developments and infill being built with insufficient parking for the amount of people moving in who still have cars. While the City may want to decrease car ownership, particularly near transit stations, this is not what many people want, particularly families. The developer should be able to determine what level of cars is required for their development to be viable (and the units rentable) and be able to provide a sufficient level of parking that the market requires, not what officials think are appropriate. As well, the success of any commercial uses of the convent, including offices and retail/restaurant outlets will be dependent on the ability to provide sufficient parking. That being said, the locations for on-site parking should be reviewed for their impact on the landscaping of the site. In particular, the area adjoining the east side of the convent, is particularly treed and that should be protected. I don't know if there is surplus parking spaces in the existing condo on Richmond Road, but perhaps, the developer can rent space in the building if more parking is required for their development. Facilities should also be made available for EV charging and car sharing on the site as well as sufficient bicycle parking.

Landscaping

69. The schematics in the presentation did not show a great deal of landscaping. Further details may be required to show how the site will be landscaped. Given the lack of development on the site for the past 10 years, a natural forest has developed. While this will be lost to the development, it would be great if the resulting landscaping, particularly tree cover could be maximized.

Construction

70. The community will want details about the construction of the proposed development. Such details would include: amount of time to develop the site, including whether this is being built in phases or all at once; construction vehicle access; whether blasting will be required; protection for the Nun's Walk from any potential construction impacts; protection of the Convent building from any potential construction impacts, etc.

Overall

71. Overall, I believe that the community will view the proposed development as a significant improvement over what was previously planned for the site.

Westboro Community Association Comments:

Overall Impression

72. The WCA is generally very supportive of the proposed low-rise development. We view this approach as a significant improvement over the previous mid-rise proposal, as low-rise buildings will have a much lower impact on adjacent neighbours and the broader community.
73. We are also encouraged that the proposal includes a focus on family-oriented units, which responds to a key housing need within the community.

Parking and Transportation

74. Given the inclusion of family-sized units, we believe that a high percentage of on-site parking is necessary. The WCA would support a 1:1 parking ratio within the underground garage. That said, we also encourage the continued promotion of active transportation and car-sharing options as part of the overall development plan.
75. We would like to see a reduction in surface parking along the project's access road—perhaps by limiting parking to one side only. In exchange, additional parking could be provided on the west side of the Convent, where 15 surface spaces are currently proposed. A reconfigured L-shaped parking lot in that area would be less visible from the street and could better accommodate garbage collection and deliveries.

Site Functionality and Emergency Access

76. We strongly recommend that the developer consult with Ottawa Fire Services and EMS as early as possible to ensure the design meets emergency access requirements. Their input may have an impact on the overall block layout.
77. We are also concerned about the day-to-day functionality of the site—particularly regarding garbage pickup, deliveries, and resident move-ins and move-outs. Ensuring that these activities are properly planned will improve both site operations and community compatibility.

Restoration of the Convent

78. The WCA views the restoration of the Convent as a critical element of this project and a top community priority. While the current concept appears to build upon the earlier plans (minus the mid-rise towers), more detailed information is required.
79. We support the proposed focus on office space within the restored Convent, as this seems practical given current market challenges for retail and the relatively

lower cost compared to residential conversions. We are also pleased to see space allocated for a restaurant, which we hope will ultimately be viable.

80. We strongly encourage that the Convent courtyard be retained as open green space accessible to residents, office tenants, and, where possible, the public.
81. The WCA also requests that stones from the demolished west and south sections of the Convent be preserved and reused on site—perhaps to create a stone wall or another architectural feature.
82. Our greatest concern, however, is ensuring that the restoration occurs in a timely manner. The community was promised that proceeds from the 98 Richmond development would fund the Convent’s rehabilitation, yet little or no work has been done to halt its deterioration. The City must take proactive steps to ensure that construction of the new low-rise buildings and restoration of the Convent are tied together contractually. The community will not accept a repeat of unfulfilled promises.
83. We recognize that the Convent’s restoration is complex and costly and urge the City to provide all possible support to the developer in bringing this important heritage asset back to life. We can support a reduced footprint if that approach helps ensure the building’s long-term preservation.

Nun’s Walk

84. The WCA considers Nun’s Walk an important community asset that should be publicly owned and maintained. Residents should not have to rely on a private company for its upkeep, nor should the developer be burdened with maintaining land over which they have limited rights.
85. Currently, it is unclear who holds responsibility for its maintenance. The City should explore parkland dedication or other compensation options that would allow ownership and control of Nun’s Walk and its adjacent trees to be transferred to the City.
86. Given that Nun’s Walk falls under O1[1763]S256 zoning, which significantly restricts development potential, we believe the City would likely lose an Ontario Land Tribunal (OLT) challenge if the developer sought compensation or relief. A worst-case scenario would be the loss of Nun’s Walk to future development.
87. The WCA urges the City and the developer to work together to reach a mutually beneficial agreement that protects Nun’s Walk and its tree canopy in perpetuity. A modest adjustment to the current 20-metre width—reducing it to 17 or 15 metres—could allow the developer limited use of 3–5 metres for the low-rise portion of the project while preserving the essential character of the walkway.

Conclusion

88. The WCA understands that restoring the Convent adds significant cost to this project, but the community's expectation has always been clear: the Convent must be restored. With the information currently available, we are encouraged that this concept represents a balanced approach that can work for both the developer and the community.
89. This is a unique and historically significant property, and it deserves a thoughtful design that respects its heritage and restores its former grandeur.
90. Thank you for the opportunity to provide these comments. We look forward to continued dialogue as this proposal evolves.

Other

91. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design and will be applicable to Site Plan Control and Plan of Subdivision applications.
- a. The HPDS was passed by Council on April 13, 2022, but is not in effect at this time, as Council has referred the 2023 HPDS Update Report back to staff with the direction to bring forward an updated report to Committee at a later date. The timing of an updated report to Committee is unknown at this time, and updates will be shared when they are available.
 - b. Please refer to the HPDS information at ottawa.ca/HPDS for more information.
92. Under the Affordable Housing Community Improvement Plan, a Tax Increment Equivalent Grant (TIEG) program was created to incentivize the development of affordable rental units. It provides a yearly fixed grant for 20 years. The grant helps offset the revenue loss housing providers experience when incorporating affordable units in their developments.
- a. To be eligible for the TIEG program you must meet the following criteria:
 - i. the greater of five units OR 15 per cent of the total number of units within the development must be made affordable
 - ii. provide a minimum of 15 per cent of each unit type in the development as affordable
 - iii. enter into an agreement with the city to ensure the units maintain affordable for a minimum period of 20 years at or below the city-wide average market rent for the entire housing stock based on building form and unit type, as defined by the Canada Mortgage and Housing Corporation

- iv. must apply after a formal Site Plan Control submission, or Building Permit submission for projects not requiring Site Plan Control, and prior to Occupancy Permit issuance
- b. Please refer to the TIEG information at [Affordable housing community improvement plan](#) / [Plan d'améliorations communautaires pour le logement abordable](#) for more details or contact the TIEG coordinator via email at affordablehousingcip@ottawa.ca.

Submission Requirements and Fees

1. Site Plan Control – Complex, Zoning By-law Amendment – Major (under current Zoning By-law)
 - a. Additional information regarding fees related to planning applications can be found [here](#).
2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
 - a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

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

Sincerely,
Margot Linker, Planner II, Development Review

Encl. Study and Plan Identification List
List of Technical Agencies
Supplementary Development Information
HPDS Overview for Applicants
HPDS Example Checklist

c.c. Jean-Charles Renaud, Planner III, Development Review
Spencer Mulvaney, Planner I, Development Review
Mike Giampa, Transportation Project Manager
Nader Kadri, Planner III, Urban Design
MacKenzie Kimm, Planner III, Heritage Planning
Mark Richardson, Planner Forester
Matthew Hayley, Environmental Planner
Mike Russett, Parks Planner, PSP



Farbod Azimi, Infrastructure Project Manager, Development Review
Shawn Wessel, Infrastructure Project Manager, Development Review

Gladish, Alyssa

From: Kilborn, Kris
Sent: Tuesday, March 31, 2026 10:03 AM
To: Gladish, Alyssa
Subject: FW: 114 Richmond - Landscape

[Fyi – see below](#)

Kris Kilborn

Principal, Business Center Practice Leader



From: Ryan Koolwine <Koolwine@project1studio.ca>
Sent: Wednesday, March 25, 2026 9:49 AM
To: Kilborn, Kris <kris.kilborn@stantec.com>
Cc: Sharp, Mike <Mike.Sharp@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>; Noora Lamberg <Lamberg@project1studio.ca>; Connor Gallagher <connor@tripine.ca>
Subject: RE: 114 Richmond - Landscape

Hi Kris,

The townhouses will be Part 9, but the apartment building will be Part 3 and will be sprinkled. And yes, the parking structure under the towns will need to be sprinklered. The firewalls you've shown work for us.

Cheers,

Ryan Koolwine

project1studio | 613 884-3939 x1

From: Kilborn, Kris <kris.kilborn@stantec.com>
Sent: March 24, 2026 3:03 PM
To: Ryan Koolwine <Koolwine@project1studio.ca>
Cc: Sharp, Mike <Mike.Sharp@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>; Noora Lamberg <Lamberg@project1studio.ca>; Connor Gallagher <connor@tripine.ca>
Subject: RE: 114 Richmond - Landscape

Hey Ryan good afternoon. Thanks for sending along. As we are into our stormwater analysis we can maybe look at adjustments for this after first submission.

Quick question for you. Will the underground parking for the towns and apartment be required to be sprinklered? And confirming that towns and apartment fall under Part 9 of OBC

We have shown a Siamese connection on the apartment block to fall within 45m of the proposed hydrant and added a hydrant in front of block 6 along the fire route.

See attached plan with proposed firewalls shown in green. Assuming the apartment is sprinklered also.

With every community, we redefine what's possible.

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