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SITE SERVICING & STORMWATER MANAGEMENT REPORT

475 TERRY FOX DRIVE
OTTAWA, ONTARIO

REPORT NO. 24103

JANUARY 26, 2026

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1.0 INTRODUCTION

This report has been prepared in support of the Site Plan Control application for the proposed 6-storey apartment buildings located at 475 Terry Fox Drive in Ottawa, Ontario. This report describes the servicing for the proposed buildings and stormwater management for the 12,270 sq.m property. The property is currently vacant. Refer to Pre-Application Consultation meeting notes in Appendix A.

This report forms part of the site servicing and stormwater management design for the proposed development. Also refer to drawings C-1 to C-19 prepared by D.B. Gray Engineering Inc.

2.0 WATER SERVICING

2.1 WATER SUPPLY FOR FIREFIGHTING

The proposed buildings will have fully supervised sprinkler systems. The fire department connection for Building A and Building B will be located at the north entrance of the east façade of Building A. The fire department connection for Building C will be located at the main entrance. The sprinkler systems are to be designed, installed and maintained in accordance with NFPA standards and the Fire Underwriters Survey. Refer to Appendix B. A private fire hydrant (FH-8) is proposed to be located 25 m unobstructed distance to the proposed fire department connection for Building A and Building B. A private fire hydrant (FH-9) is proposed to be located 40 m unobstructed distance to the proposed fire department connection for Building C.

In accordance with City of Ottawa Technical Bulletin IWSTB-2024-05, when calculating the required fire flow where municipal pipe sizing is affected, the Fire Underwriters Survey Method is to be used. Using the Fire Underwriters Survey Method, the required fire flow is calculated to be 12,000 L/min (200 L/s) for Building A, and 11,000 L/min (183.3 L/s) for Building B and Building C. Refer to calculations in Appendix B.

There are no existing municipal watermains fronting the property. As such, looping a municipal watermain between the existing municipal watermain crossing Kanata Avenue between 150 Ingersoll Crescent and 152 Ingersoll Crescent (Connection 1), and the existing municipal watermain at the intersection of Terry Fox Drive and Tillsonburg Street (Connection 2) is proposed. The boundary conditions provided by the City of Ottawa for the 200 L/s fire flow indicate a hydraulic grade line (HGL) of 143.7 m at Connection 1 and 132.0 m at Connection 2. Refer to Appendix B.

Using EPANET, three models were created to analyze the hydraulics of the proposed watermains under fire flow conditions. Refer to Appendix B.

Building A
Based on a 40.5 L/s demand at FH-5, 40.5 L/s demand at FH-7, 38 L/s sprinkler demand and 1.3 L/s domestic demand at Building A, 1.3 L/s domestic demand at Building B, 40.5 L/s demand at FH-8, 40.5 L/s demand at FH-9, and 1.3 L/s domestic demand at Building C, and the 143.7 m HGL at Connection 1 and 132.0 m HGL at Connection 2 provided by the City of Ottawa, the pressures at the fire hydrants are determined to be 217 kPa (31 psi) at FH-5, 159 kPa (23 psi) at FH-7, 172 kPa (25 psi) at FH-8, and 161 kPa (23 psi) at FH-9. Since the pressures are above the Ontario Building Code's minimum required pressure of 140 kPa (20 psi), there is an adequate water supply for firefighting at Building A.

Building B
Based on a 48.4 L/s demand at FH-7, 1.3 L/s domestic demand at Building A, 38 L/s sprinkler demand and 1.3 L/s domestic demand at Building B, 48.4 L/s demand at FH-8, 48.4 L/s demand at FH-9, and 1.3 L/s domestic demand at Building C, and the 143.7 m HGL at Connection 1 and 132.0 m HGL at Connection 2 provided by the City of Ottawa, the pressures at the fire hydrants are determined to be 165 kPa (24 psi) at FH-7, 181 kPa (26 psi) at FH-8, and 167 kPa (24 psi) at FH-9. Since the pressures are above the Ontario Building Code's minimum required pressure of 140 kPa (20 psi), there is an adequate water supply for firefighting at Building B.

Building C
Based on a 48.4 L/s demand at FH-7, 1.3 L/s domestic demand at Building A, 1.3 L/s domestic demand at Building B, 48.4 L/s demand at FH-8, 48.4 L/s demand at FH-9, and 38 L/s sprinkler demand and 1.3 L/s domestic demand at Building C, and the 143.7 m HGL at Connection 1 and 132.0 m HGL at Connection 2 provided by the City of Ottawa, the pressures at the fire hydrants are determined to be 168 kPa (24 psi) at FH-7, 179 kPa (26 psi) at FH-8, and 166 kPa (24 psi) at FH-9. Since the pressures are above the Ontario Building Code's minimum required pressure of 140 kPa (20 psi), there is an adequate water supply for firefighting at Building C.

2.2 DOMESTIC WATER SUPPLY

In accordance with
i. the City of Ottawa Water Design Guidelines for the populations,
ii. City of Ottawa Technical Bulletin ISTB-2021-03 for the consumption rate, and
iii. the Ministry of the Environment Water Design Guidelines for the peaking factors, and

based on the 81 – 1 bedroom apartment units, 70 – 2 bedroom apartment units and 31 – 3 bedroom apartment units, the average daily demand is calculated to be 1.2 L/s, the maximum daily demand is calculated to be 3.9 L/s and the maximum hourly demand is calculated to be 5.8 L/s. Refer to calculations in Appendix B. Since the average daily demand is more than 50,000 L/day, a redundant water supply separated by an isolation valve is required to avoid the creation of a vulnerable service area.

The boundary conditions provided by the City of Ottawa indicate a minimum HGL of 156.2 m at Connection 1 and Connection 2, and a maximum HGL of 161.3 m at Connection 1 and Connection 2. Refer to Appendix B.

Using EPANET, a model was created to analyze the hydraulics of the proposed watermains. Based on a 5.8 L/s maximum hourly demand, and the 156.2 m HGL at Connection 1 and Connection 2 provided by the City of Ottawa, the minimum pressures at the buildings are determined to be 565 kPa (82 psi) at Building A, 565 kPa (82 psi) at Building B, and 570 kPa (83 psi) at Building C. Based on a 1.2 L/s average daily demand, and the 161.3 m HGL at Connection 1 and Connection 2 provided by the City of Ottawa, the maximum pressures at the buildings are determined to be 615 kPa (89 psi) at Building A, 615 kPa (89 psi) at Building B, and 620 kPa (90 psi) at Building C. Refer to Appendix B. This is an acceptable range for the proposed development. Since the water pressure is expected to be above 80 psi, pressure reducing valves are to be installed immediately after the water meters.

A looped 200 mm private watermain connecting to the looped 200 mm Kanata Avenue and Terry Fox Drive municipal watermains is proposed to service the development. 150 mm water services connecting to the looped 200 mm private watermain are proposed to service the sprinkler systems. The same 150 mm water services will provide adequate domestic water supplies.

3.0 SANITARY SERVICING

In accordance with

i. the City of Ottawa Sewer Design Guidelines for the populations,
ii. City of Ottawa Technical Bulletin ISTB-2018-01 for the average daily flow, Harmon Formula correction factor and infiltration allowance, and
iii. the Harmon Formula for the peaking factor, and

based on the 81 – 1 bedroom apartment units, 70 – 2 bedroom apartment units and 31 – 3 bedroom apartment units, the post-development sanitary flow rate is calculated to be 4.10 L/s. Refer to calculations in Appendix C.

200 mm sanitary sewer services at 2% slope (46.38 L/s capacity) are proposed to service the buildings. Refer to calculations in Appendix C. The proposed sanitary sewer services will connect to the proposed private sanitary sewer system.

A 200 mm private sanitary sewer at 0.32% slope (18.55 L/s capacity) is proposed to service the development. At the design flow rate the 200 mm sanitary sewer will only be at 22% capacity. The proposed 200 mm sanitary sewer will connect to the existing 375 mm Terry Fox Drive municipal sanitary sewer, which at 0.15% slope has a capacity of 67.91 L/s. Refer to calculations in Appendix C. The post-development increase in flow is expected to have an acceptable impact on the 375 mm Terry Fox Drive municipal sanitary sewer.

4.0 STORMWATER MANAGEMENT

4.1 QUANTITY CONTROL

The stormwater quantity control criterion is to control the post-development 100-year peak flow rate to the pre-development 100-year peak flow rate and the post-development 2-year peak flow rate to the pre-development 2-year peak flow rate using a pre-development runoff coefficient of 0.2 and time of concentration of 10 minutes. Using the Rational Method, the pre-development flow rates (maximum allowable release rates) are calculated to be 121.82 L/s during the 100-year event and 52.40 L/s during the 2-year event. The Rational and Modified Rational Methods are used to calculate the post-development flow rates and corresponding storage volumes. The 2-year runoff coefficients are increased by 25% to a maximum of 1.00 to calculate the 100-year runoff coefficients. Refer to calculations in Appendix D.

Drainage Area I (Uncontrolled Flow Off Site – 450 sq.m)
A few isolated sections of the perimeter of the property will drain uncontrolled off site. The flow rates are calculated at a time of concentration of 10 minutes.

	100-Year Event	2-Year Event
Maximum Flow Rate	6.52 L/s	2.30 L/s

Drainage Area II (6,325 sq.m)
An inlet control device (ICD) located in the outlet pipe of MH-7 will restrict the flow of stormwater and cause it to backup into the upstream infrastructure and pond above CB-1, CB/MH-2, CB/MH-4, CB/MH-5 and CB/MH-6. The ICD will be a plug style with a round orifice located at the bottom of the plug c/w a trash

basket manufactured by Pedro Plastics or approved equivalent sized by the manufacturer for a release rate of 25.94 L/s at 2.63 m. It is calculated that an orifice area of 5,915 sq.mm (±87 mm dia) with a discharge coefficient of 0.61 will restrict the maximum flow rate to 25.94 L/s at 2.63 m. Based on this orifice, the maximum flow rate during the 2-year event is calculated to be 15.52 L/s at 0.94 m. Since some of the restricted stormwater is proposed to be stored using underground infrastructure, an average release rate equal to 50% of the maximum release rate is used to calculate the required storage volumes. The underground infrastructure will include 30 – Soleno HydroStor HS180 chambers or approved equivalent surrounded by clear stone wrapped in a thermoplastic liner.

	100-Year Event	2-Year Event
Maximum Release Rate	25.94 L/s	15.52 L/s
Maximum Water Elevation	98.37 m	96.68 m
Maximum Volume Stored	261.60 cu.m	90.23 cu.m

Drainage Area III (5,495 sq.m)
An ICD located in the outlet pipe of CB/MH-14 will restrict the flow of stormwater and cause it to backup into the upstream infrastructure. The ICD will be a plug style with a round orifice located at the bottom of the plug manufactured by Pedro Plastics or approved equivalent sized by the manufacturer for a release rate of 73.67 L/s at 1.82 m. It is calculated that an orifice area of 20,212 sq.mm (±160 mm dia) with a discharge coefficient of 0.61 will restrict the maximum flow rate to 73.67 L/s at 1.82 m. Based on this orifice, the maximum flow rate during the 2-year event is calculated to be 50.11 L/s at 0.84 m. Since the restricted stormwater is proposed to be stored using underground infrastructure, an average release rate equal to 50% of the maximum release rate is used to calculate the required storage volumes. The underground infrastructure will include 22 – Soleno HydroStor HS180 chambers or approved equivalent surrounded by clear stone wrapped in a thermoplastic liner.

	100-Year Event	2-Year Event
Maximum ICD Release Rate	73.67 L/s	50.11 L/s
Maximum Overflow Rate	41.63 L/s	0.00 L/s
Total Maximum Release Rate	115.30 L/s	50.11 L/s
Maximum Water Elevation	95.68 m	94.70 m
Maximum Volume Stored	136.92 cu.m	59.49 cu.m

Summary
The maximum post-development release rate during the 100-year event is calculated to be 121.82 L/s, which is equal to the maximum allowable release rate during the 100-year event. To achieve the maximum allowable release rate, a maximum storage volume of 398.52 cu.m is required and provided during the 100-year event. The maximum post-development release rate during the 2-year event is calculated to be 52.40 L/s, which is equal to the maximum allowable release rate during the 2-year event. A maximum storage volume of 149.72 cu.m is required and provided during the 2-year event. The proposed development is expected to have a negligible impact on the 600 mm Terry Fox Drive and Kanata Avenue municipal culvert.

	100-Year Event	2-Year Event
Maximum Allowable Release Rate	121.82 L/s	52.40 L/s
Maximum Release Rate	121.82 L/s	52.40 L/s
Maximum Volume Required	398.52 cu.m	149.72 cu.m
Maximum Volume Stored	398.52 cu.m	149.72 cu.m

4.2 QUALITY CONTROL

The stormwater quality control recommendation is to provide an enhanced (80% TSS removal) level of protection. An oil grit separator (OGS) manhole is proposed to be located downstream of the inlet control device. Calculations by the manufacturer indicate that the CDS PMSU-2025-5 OGS will remove 83% of total suspended solids. Refer to calculations in Appendix D.

An Erosion & Sediment Control Plan has been developed to be implemented during construction. Refer to drawings C-8 to C-10 and notes on drawing C-11.

i. Sediment capture filter sock inserts are to be installed in all existing and proposed catch-basins and catch-basin/manholes adjacent to and within the site.
ii. A silt fence barrier is to be installed along the perimeter of the site.
iii. Any material deposited on the public road is to be removed.

4.3 STORM SERVICING

The peak flow rate draining into the last sewer segment of the private storm sewer system during the 2-year event is calculated to be 50.11 L/s. A 450 mm storm sewer at 0.195% slope (130.43 L/s capacity) is proposed to connect to the existing 600 mm Terry Fox Drive and Kanata Avenue municipal culvert, which at 0.5% slope has a capacity of 453.74 L/s. At the peak 2-year flow rate the proposed 450 mm storm sewer will only be at 38% capacity. Refer to calculations in Appendix D.

The area, foundation and trench drains will drain to a storm sump and be pumped to an outlet 0.30 m above grade. Refer to mechanical.

5.0 CONCLUSIONS

1. Private fire hydrants are required and provided.

2. There is an adequate water supply for firefighting.
3. There is an acceptable range of water pressures.
4. Since the water pressure is expected to be above 80 psi, pressure reducing valves are to be installed immediately after the water meters.
5. The post-development sanitary flow rates will be adequately handled by the proposed sanitary sewer services and private sanitary sewer system.
6. The post-development increase in sanitary flow is expected to have an acceptable impact on the existing municipal sanitary sewer.
7. The maximum post-development release rate during the 100-year event will be equal to the maximum allowable release rate during the 100-year event, and the maximum allowable release during the 2-year event will be equal to the maximum allowable release rate during the 2-year event.
8. The proposed development is expected to have a negligible impact on the existing municipal culvert.
9. The proposed OGS will provide an enhanced (80% TSS removal) level of protection.
10. An Erosion & Sediment Control Plan has been developed to be implemented during construction.
11. The peak flow rates during the 2-year event will be adequately handled by the proposed private storm sewer system.

Prepared by D.B. Gray Engineering Inc.

APPENDIX A

PRE-APPLICATION CONSULTATION MEETING NOTES

File No.: PC2024-0342

September 5, 2024

Santan Singh
Ironclad Development Inc.
Via email: ssingh@icdev.ca

Subject: **Pre-Consultation: Meeting Feedback**
Proposed Zoning By-law Amendment and Site Plan Control Application – 475 Terry Fox Drive

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on August 29, 2024.

Pre-Consultation Preliminary Assessment

1 ☐	2 ☐	3 ☒	4 ☐	5 ☐

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

Next Steps

1. Please submit any subsequent submissions to planningcirculations@ottawa.ca, copying the file lead (Nishant Dave). Ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

2. Please note, if your development proposal changes significantly in scope, design, or density before the next submission, you may be requested to repeat the pre-consultation process before filing an Official application.

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

Policies

The following policies apply to the site:

a. The site is designated Minor Corridor and Neighborhood with portion of the lot within an Evolving Neighbourhood overlay shown on Schedule B3 – Suburban Transect.

b. Per Schedule C16 – Road Classification and Rights-of-Way Protection – Terry Fox has a 44.5 m protected Right-of-Way.

c. Per Schedule C4 – Urban Road Network, Terry Fox Drive is classified as an Arterial – Existing Road. Kanata Avenue is classified as Major Collector Existing Road.

d. There are no applicable area-specific policies or secondary plans associated with the subject property.

Official Plan Policies

1. The subject property is located in the suburban transect, designated Minor Corridor and Neighborhood, with portion of the lot within the Evolving Neighborhood. The overarching vision for this designation is supporting a mix of uses, including residential uses, higher densities along corridors and contributing to the goals of towards 15-minute neighbourhood.

2. Staff note that the proposed development of three, six-storey apartment dwellings on the subject site generally align with the OP policies.

Zoning

3. General Zoning Performance Requirements

    a. A major zoning by-law amendment will be required to add apartment dwelling, mid-rise as a permitted use.

    b. Provide additional dimensions on plans to confirm zoning compliance and/or identify any performance standards requiring relief.

4. Right of Way (ROW)

a. Please indicate the ROW boundaries on your site plan on Terry Fox Drive as part of your next submission.

5. Site Design and Configurations

    a. Staff are appreciative of the desire to redevelop this vacant, underutilized site.

    b. Explore opportunities to include active commercial services on ground floor to support cultural development in order to maintain, extend, or create a continuous stretch of active frontages along a Minor Corridor. Refer to section 6.2.2., subsection 1 of the Official Plan.

    c. Please explore alternative iterations of site configurations and building shape for this site. Consider reducing the number of buildings from three to two buildings.

        i. Consider amalgamating Building A and B into one L – shaped building, providing active frontages to both Terry Fox Drive and Kanata Avenue.

6. Landscaping Requirements

    a. Please note a minimum of 3-meter landscaped buffer is required along the perimeter of the subject property that abuts a public street, per Table 110 of the Zoning By-law. There appears to be deficiencies in the following location:

        i. Along the parking spaces and lot line abutting Kanata Avenue. Shift the parking spaces to accommodate for the 3-meter landscaped buffer.

    b. Consider opportunities for additional landscaping throughout the proposed surface parking lot through landscaped islands, landscaped medians, etc.

    c. Provide natural landscaping along the rear lot line to provide a tree buffer between the proposed development and residential homes to the east.

7. Aisle and Driveway

    a. Please provide rationale for a 7-meter driveway width to the underground parking spaces. Consider reducing the width to provide additional landscaping through landscaped islands, landscaped medians, etc. Refer to Section 107 of the Zoning By-law for additional information.

8. Amenity Area

a. How is the outdoor amenity area by Building C, fronting Terry Fox Drive, intended to function? Are all residents to use that space? Consider providing additional outdoor amenity areas closer to Buildings A and B for easy pedestrian access.

9. Parking Requirements

    a. Please provide parking calculations as part of the next submission.

    b. Please provide parking measurements as part of the next submission.

    c. Refer to Section 101, Table 101 of the Zoning By-law for applicable parking rates.

    d. Please provide rationale for substantial surface parking spaces. Consider reducing or shifting the parking spaces underground to provide additional landscaping throughout the site.

10. Bicycle Parking Requirements

    a. Provide additional information on proposed bicycle parking in the next submission. How many interior bicycle parking spaces are being provided?

        i. Please provide an adequate number of bicycle parking facilities in accordance with Policy 9 of Section 4.1.2:

            1. Long-term bicycle parking facilities shall be secure, sheltered and usable by all types of cyclists. Where located inside buildings, long-term bicycle parking facilities shall provide safe, accessible, direct and convenient access to the exterior; and

            2. Short-term bicycle parking facilities shall be highly visible, well-lit, near building entrances and where appropriate, sheltered.

    b. Provide bicycle parking calculation in the next submission.

    c. Please provide surface bicycle parking on site.

    d. Provide design details of the proposed bicycle parking in the next submission.

11. Waste Management Requirements

a. Refer to Section 110(3) of the Zoning By-law for provisions related to outdoor refuse collection areas located within or accessed via a parking lot.

b. Please note that all outdoor refuse collection and refuse loading areas contained within or accessed via a parking lot must be screened from view by an opaque screen with a minimum height of 2.0 metres, per Section 110(3)(c); however, where an in-ground refuse container is provided, the screening requirement of Section (3)(c) above may be achieved with soft landscaping, as per Section 110(3)(d).

c. Provide design details of the proposed waste enclosures.

d. Provide measurements for the proposed waste enclosure. Please note that the bins must be located at least 9 meters from a lot line abutting a public street, and 3 meters from any other lot line, as per Section 110(3)(a). There appears to be deficiencies in the following location:

    i. The waste enclosure abutting the lot line against Kanata Avenue. Please provide measurements to ensure zoning compliance; if not compliant, please shift the waste enclosure accordingly.

Required Applications

12. The following development applications are required to permit the proposed development. Please note all information including process, timeline and fees can be found here:

    a. Site Plan Control (Complex) – more information on the process can be found here.
    b. Zoning By-law Amendment (Major) – more information on the process can be found here.

Feel free to contact Nishant Dave, Planner I, for follow-up questions.

Urban Design

Comments:

13. Staff require a scoped Urban Design Brief, architectural plans (Site Plan, Building Elevations, etc.), and a Landscape Plan. Please refer to the attached Urban Design Brief Terms of Reference.

14. The development should be oriented towards public roads.

15. Active frontage along Terry Fox Drive and Kanata Avenue desired. Explore the potential for grade-related units and ground floor amenity areas.

16. Street trees required along Terry Fox Drive and Kanata Avenue.

17. Parking should be screened entirely from the public realm. Please endeavor to limit surface parking if possible.

18. Explore the potential to consolidate parking to limit the number of parking garage ramps.

19. Consideration for the corner – opportunity for enhanced architecture and landscaping.

20. Please provide a heavily landscaped buffer between the development and the adjacent low-rise neighbourhood.

21. Please relocate the waste room so that it is internal to the property and not along the public street.

22. Please provide outdoor amenity area details and ensure that there is some level of engagement with the adjacent park.

Feel free to contact Nader Kadri, Planner III, for follow-up questions.

Engineering

Watermain Design

23. Boundary Conditions - civil consultant to request boundary conditions from the City's assigned Project Manager, Development Review. Water boundary conditions request must include the location of the service and the expected loads required by the proposed development. Please provide all the following information:

    a. Location of service (show on a plan or map)

    b. Type of development

    c. Average daily demand: ___ l/s.

    d. Maximum daily demand: ___l/s.

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

    f. Required fire flow.

g. Supporting Calculations for all demands listed above and required fire flow as per Fire Underwriter Surveys.

24. Provide a watermain system analysis demonstrating adequate pressure as per section 4.2.2 of the Water Distribution Guidelines.

25. Demonstrate adequate hydrant coverage for fire protection. Please review Technical Bulletin ISTB-2018-02, Appendix I table 1 – maximum flow to be considered from a given hydrant.

26. There is currently no existing public watermain along the frontage of the site on Terry Fox Drive and Kanata Avenue. Since this development is proposing more than 50 residential units, a looped system is required to service this site.

    Internal discussions with stakeholders are on-going to determine the best alternative for the watermain extension. Although it was shared during the pre-consultation meeting with the applicant that the watermain could likely be extended through the park, it has been determined later on that this will not be accepted by the park's group.

    Additional information on the situation will be provided in a separate email once internal water groups have agreed on a better watermain alternative.

27. Please note that the watermain extension will need to be designed and approved prior to the approval of the site plan application. A design for the watermain will need to be submitted along with securities.

28. Two watermains separated by an isolation valve will be required to avoid the creation of a vulnerable service area for proposed developments with more than 50 residential units.

<u>Stormwater Management</u>

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

    a. Where no governing reports are present and/or there are no specific quantity control requirements, the following shall apply:

        i. The development should be controlled to ensure that post-development conditions (including flows) are consistent with pre-development conditions for all storm events (2-yr, 5-yr & 100-yr).

            - The applicant must demonstrate that there will be no increase in flooding and/or erosion to/of the Carp River;

        ii. The Carp River PCSWMM model shall be used as the representative pre-development condition for comparison purposes.

b. Base Flow Mitigation - Adhere to the Carp River Watershed Study (CRWSS) and provide a minimum of 10l/s over a 7-day period.

c. A minimum 70% Total Suspended Solids (TSS) removal per the CRWSS. Please consult the MVCA, as they may have additional quality control criteria for this development.

d. Infiltration target for this site is expected to be 73mm/year (low recharge area). Soil Infiltration testing will be required to support any proposed infiltration measure to meet this target.

Sanitary Design

30. A capacity review of the receiving 375mm sanitary pipe is required to demonstrate there is adequate residual capacity to accommodate the proposed development. The assessment shall take into account the approved growth in and around the Kanata Highlands. Please refer to *06 External Sanitary Servicing Plan.pdf*.

31. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

Additional Comments

32. 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.

33. Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (i.e., not in a parking area).

34. 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 that 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 that 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.

35. An MECP Environmental Compliance Approval may be required for the proposed development, depending on the details of a complete submission. The applicant is advised to refer to the Ontario Regulation 525/98 Approval Exemptions to confirm if an ECA is required.

36. The developer is notified that a Capital Works Project for resurfacing of Terry Fox is anticipated for 2028.

37. A slope stability report may be required for this site. Please consult the City of Ottawa Slope Stability Guidelines for Development Applications prior to your next submission.

38. A **Hydrogeological and Terrain Analysis Report** is likely required for this site. It is understood that the proposal does not contemplate using groundwater as a water supply or to install private servicing in the form of a septic system on the site. Therefore, the scope of the report would be to report on any impacts to groundwater. The requirements of these reports are outlined in the City's Hydrogeological and Terrain Analysis Guidelines in sections 5.0 for Site Plan Control Applications, 7.0 for Zoning By-law and Official Plan Amendments, and section 10.0 for Stormwater Management.

    a. A report would be required if the proposal involves:

        i. On-site stormwater management or infiltration features (e.g., ponds, LIDs, or underground storage). Infiltration is anticipated based on Carp River Subwatershed Study requirements. The report should provide a thorough understanding of the interaction between surface water and groundwater in order to ensure that the stormwater feature will operate as intended and that surrounding properties are not unduly impacted, and groundwater will not be contaminated, or

        ii. Dewatering operations to complete the works which could impact adjacent structures.

    b. Please contact the hydrogeological reviewer, Travis Smith (travis.smith@ottawa.ca), to submit proposed Terms of Reference for the work prior to any work being undertaken.

Feel free to contact Jean-Miguel Roy, Project Manager, for follow-up questions.

Noise

Comments:

39. Road noise study required at site plan control only.

Feel free to contact Mike Giampa (mike.giampa@ottawa.ca), TPM, for follow-up questions.

Transportation

Comments:

40. Right-of-way protection (Terry Fox and Kanata).

    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 required. The application will not be deemed complete until the submission of the draft step 2 (Scoping) including the functional draft RMA package (if applicable) and/or monitoring report (if applicable). Although a full review of the TIA Strategy report (step 3) is not required prior to an application, it is strongly recommended. Synchro files are required at Step 3.

42. The new required corner triangle dimensions will be embedded within Schedule C16 of the OP in 2024. For now, here is the requirements at all intersection types:

    a. Arterial/Arterial: overlapping 5m x 15m triangles

    b. Arterial/Collector: overlapping 5m x 15m triangles

    c. Collector/Collector: overlapping 5m x 15m triangles

    d. Arterial/Local: 3m x 9m with the longer dimension along the arterial road

    e. Collector/Local: 3m x 9m with the longer dimension along the collector road

43. No issues with the location of the proposed accesses as shown in the concept plan.

Feel free to contact Mike Giampa (mike.giampa@ottawa.ca), Transportation Project Manager, for follow-up questions.

Environment

Comments:

44. Bird Safe Design (since they are over 4 stories and near the Carp River natural area). Please review and incorporate bird safe design elements. Some of the risk factors include glass and related design traps such as corner glass and fly-

through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf

45. Urban heat Island effect - Please add features that reduce the urban heat island effect (see OP 10.3.3) produced by the parking lot and a building footprint. For example, this impact can be reduced by adding large canopy trees, green roofs or vegetation walls, or constructing the parking lot or building with low heat absorbing materials.

Feel free to contact Matthew Hayley (matthew.hayley@ottawa.ca), Environmental Planner, for follow-up questions.

Forestry

Comments:

46. Tree Conservation Report

    a. A Tree Conservation Report is required, in accordance with Schedule E of the Tree Protection By-law. Ownership of all trees on the subject site and with Critical Root Zones extending onto the subject site must be determined, and plans must show how they will be protected from proposed works.

    b. Section 4.8.2 of the New Official Plan provides strong direction to maintain the urban forest canopy and its ecosystem services during intensification noting when considering the impacts on individual trees, planning and development decisions, including Committee of Adjustment decisions, shall give priority to the retention and protection of large, healthy trees over replacement plantings and compensation. Applications must address the cumulative impacts on the urban forest, over time and space, with the goal of 40% urban forest canopy cover in mind. Further, that the City and the Committee of Adjustment may refuse a development application where it deems the loss of a tree(s) avoidable.

    c. The locations of vehicle entrances, curbs, buildings and above and below-ground structures should account for the retention and protection of significant trees on and adjacent to the site, particularly those that provide privacy for neighboring properties.

    d. Ownership of all existing trees must be determined in the TCR. If any shared or adjacent trees are impacted by the proposal, the applicant is responsible for consulting with the owners of the trees and for obtaining signed permission if any trees must be removed. If no permission is

granted, plans must be designed to allow for the full protection of these trees.

i. The trees along the east property line, providing shade and screening for the houses facing Insmill should be prioritized for retention, as well as any trees on City property.

ii. The setbacks for the proposed underground parking must be determined based on the ability to safely retain existing trees and/or to plant new trees with adequate soil volumes.

e. Consider opportunities to reduce surface parking to provide more greenspace on site.

f. A permit is required prior to removal of any protected trees on site. The tree permit will be released upon site plan approval. Please contact the planner associated with the file or the Planning Forester, Nancy Young (Nancy.young@ottawa.ca) for information on obtaining the tree permit.

g. To ensure that no harm is caused to breeding birds, tree removal and vegetation clearing should be avoided during the migratory bird season (April 15 – August 15) as specified by The City of Ottawa's Environmental Impact Study Guidelines.

47. Landscape Plan

a. A Landscape Plan is required with this application and must address all requirements within the Landscape Plan Terms of Reference https://documents.ottawa.ca/sites/documents/files/landscape_tor_en.pdf , including the projection of canopy cover toward the target of 40%, and confirmation of adequate soil volumes to support any proposed trees.

b. The Landscape Plan must show the setback distances between proposed and existing trees to buildings and underground structures to ensure that both the above and below-ground space proposed is sufficient for tree planting in the Right of Way and other landscaped areas.

c. The Official Plan section 4.8.2, sub 3 provides the following direction related to tree planting related to site plans:

i. Preserve and provide space for mature, healthy trees on private and public property, including the provision of adequate volumes of high-quality soil as recommended by a Landscape Architect;

ii. On urban properties subject to site plan control or community planning permits, development shall create tree planting areas within the site and in the adjacent boulevard, as applicable, that meet the soil volume requirements in any applicable City standards

or best management practices or in accordance with the recommendation of a Landscape Architect;

d. It is strongly encouraged to provide an area of green space with trees for shade on this property, both for amenity and to address the urban heat island created by surface parking.

e. Space must be provided on both the Terry Fox and Kanata Ave frontages (preferably within the ROW) to plant street trees to improve the streetscape and canopy cover of the site.

f. It is a Best Management Practice to provide one tree for every 5 surface parking spaces to address the urban heat island effect created by the pavement. Retention of existing trees in proximity to parking would count toward this.

48. Tree Conservation Report Requirements

a. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City.

    i. an approved TCR is a requirement of Site Plan approval.

    ii. The TCR may be combined with the LP provided all information is supplied.

b. 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.

c. Compensation may be required for the removal of city owned trees.

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.

    iii. Please ensure retained trees are shown on the landscape plan.

e. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter, and health condition.

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.

h. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available 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.

i. 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.

49. Landscape Plan tree planting requirements.

a. The City recommends the following Best Management Practices to improve the climate change resiliency of new developments:

    i. For parking lots, provide 1 new tree for every 5 parking spaces to help cool the landscape of the site.

    ii. Confirm sufficient Soil volumes to support canopy cover on site ($30m^3$ for street trees)

    iii. Proposed species must not include invasive species and target a minimum of 50% native species.

b. Minimum Setbacks

    i. Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.

    ii. Maintain 2.5m from curb.

    iii. Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.

    iv. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

c. 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.

iii. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).

iv. Plant native trees whenever possible.

v. No root barriers, dead-man anchor systems, or planters are permitted.

vi. No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

d. Hard surface planting

i. Curb style planter is highly recommended.

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

iii. Trees are to be planted at grade.

e. Soil Volume

i. Please document on the LP that adequate soil volumes can be met:

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

f. Sensitive Marine Clay

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

50. Tree Canopy

    a. The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40% urban forest canopy cover target.

    b. At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate. Indicate on the plan the projected future canopy cover at 40 years for the site.

51. Zoning Comments

    a. Generally speaking, since the majority of the area between buildings is proposed to be paved for parking with little to no opportunity for landscaping, it is preferred to consolidate the underground parking under all 3 buildings to reduce surface parking and provide greater setbacks between above and below-ground parking to the lot lines. This would provide more greenspace and plantable area between the new buildings and existing residences, as well as provide more amenity space.

    b. The following setbacks will be established through the zoning:

        i. The setbacks for all proposed elements along the east property line, adjacent to residential use, both above and below-ground, to allow for the retention and long-term viability of the existing trees, which provide screening and canopy cover for the site.

        ii. The setbacks for proposed elements near the Terry Fox and Kanata frontages which must be sufficient to plant large-growing trees for screening and canopy cover.

Feel free to contact Nancy Young (nancy.young@ottawa.ca), Forester, for follow-up questions.

Parkland

52. Parkland Dedication

    a. The amount of required parkland conveyance is to be calculated as per the City of Ottawa Parkland Dedication By-law No.2022-280 (or as amended):

    b. For cash-in-lieu of conveyance of parkland (residential > 18 units/net ha):

i. one hectare per 1,000 net residential units but shall not exceed a maximum of 10% of the gross land area where less than or equal to five hectares.

53. Form of Parkland Dedication

a. PFP will be requesting **cash-in-lieu of conveyance of parkland** for parkland dedication in accordance with the Parkland Dedication By-law.

b. At the time of site plan application PFP requests the following information to confirm and calculate the parkland conveyance:

i. Gross land area, in square meters
ii. Number of residential units proposed/existing
iii. Gross floor area of proposed residential development
iv. Gross floor area of proposed/existing commercial development
v. The proportion of commercial/residential development proposed on site.

c. Please note, if the proposed unit count, land use changes or gross floor area changes, then the parkland dedication requirement will be re-evaluated accordingly.

d. Cash-in-lieu of conveyance of parkland will be required prior to registration of the Site Plan Agreement. The Owner shall also pay the City's property appraisal fee.

54. Additional Comment for PFP staff:

a. Please note the site is adjacent to an existing park. No construction impacts will be permitted on the park.

b. Constrained park blocks are not accepted, and Parks is not amenable to a waterline being installed in the park. Another solution to service the site will be required.

c. Please note that zoning exceptions to permit reduced setbacks to the park boundary will not be supported by Parks and Facilities planning. Staff recommend a minimum of 3 meter setback of all above and below ground structures to the park boundary.

Feel free to contact Anissa McAlpine (anissa.mcalpine@ottawa,ca), Parks Planner, for follow-up questions.

Other

55. 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. The HPDS was passed by Council on April 13, 2022.

    a. At this time, the HPDS is not in effect and Council has referred the 2023 HPDS Update Report back to staff with direction to bring forward an updated report to Committee with recommendations for revised phasing timelines, resource requirements and associated amendments to the Site Plan Control By-law by no later than Q1 2024.

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

Submission Requirements and Fees

1. 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.
2. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

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

Yours Truly,
Nishant Dave

c.c. Stream Shen, Planner III (DR West)
Nader Kadri, Senior UD Planner
Sahara Shrestha, UD Planner
Jean-Migel Roy, Infrastructure Project Manager
Ryan Brault, Infrastructure Project Manager
Mike Giampa, Senior Transportation Project Manager
Anissa McAlpine, Parks Planner

Nancy Young, Planning Forester
Matthew Hayley, Environmental Planner

APPENDIX B

WATER SERVICING

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
d.gray@dbgrayengineering.com

October 28, 2025

475 Terry Fox Drive
6-Storey Apartment Building A
Ottawa, Ontario

FIRE FLOW CALCULATIONS
FUS Method

RFF = Required Fire Flow in litres per minute
= $220CA^{0.5}$

C = Construction Coefficient related to the type of construction of the building
= 1.5 Type V Wood Frame Construction

A = Total Effective Floor Area in square meters of the building

6th Floor:	1,295	sq.m
5th Floor:	1,295	sq.m
4th Floor:	1,295	sq.m
3rd Floor:	1,295	sq.m
2nd Floor:	1,295	sq.m
1st Floor:	1,295	sq.m
	7,770	sq.m

RFF = 29,089 L/min
= 29,000 L/min (rounded to nearest 1,000 L/min)

Occupancy and Contents Adjustment Factor
-15% Limited Combustible Contents

= -4,350 L/min Occupancy and Contents Adjustment Factor

RFF = 24,650 L/min

Automatic Sprinkler Protection Credit

30%	Sprinkler system designed, installed and maintained in accordance with NFPA standards
10%	Standard water supply for both the sprinkler system and fire department hose lines
10%	Fully supervised sprinkler system

= 12,325 L/min Automatic Sprinkler Protection Credit

Exposure Adjustment Charge

Side	Charge	Distance	Construction	Length	Storeys	Factor
North	0%	over 30 m				
East	0%	over 30 m				
South	0%	Automatic Sprinkler Protection in both Subject and Exposed Buildings				
West	0%	over 30 m				

0% Exposure Adjustment Charge

= 0 L/min Exposure Adjustment Charge

RFF = 12,325 L/min
= 12,000 L/min (rounded to nearest 1,000 L/min)
= 200 L/s

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
d.gray@dbgrayengineering.com

October 28, 2025

475 Terry Fox Drive
6-Storey Apartment Building B
Ottawa, Ontario

FIRE FLOW CALCULATIONS
FUS Method

RFF = Required Fire Flow in litres per minute
= $220CA^{0.5}$

C = Construction Coefficient related to the type of construction of the building
= 1.5 Type V Wood Frame Construction

A = Total Effective Floor Area in square meters of the building

6th Floor:	1,025	sq.m
5th Floor:	1,025	sq.m
4th Floor:	1,025	sq.m
3rd Floor:	1,025	sq.m
2nd Floor:	1,025	sq.m
1st Floor:	1,025	sq.m
	6,150	sq.m

RFF = 25,879 L/min
= 26,000 L/min (rounded to nearest 1,000 L/min)

Occupancy and Contents Adjustment Factor
-15% Limited Combustible Contents

= -3,900 L/min Occupancy and Contents Adjustment Factor

RFF = 22,100 L/min

Automatic Sprinkler Protection Credit

30%	Sprinkler system designed, installed and maintained in accordance with NFPA standards
10%	Standard water supply for both the sprinkler system and fire department hose lines
10%	Fully supervised sprinkler system

= 11,050 L/min Automatic Sprinkler Protection Credit

Exposure Adjustment Charge

Side	Charge	Distance	Construction	Length	Storeys	Factor
North	0%	Automatic Sprinkler Protection in both Subject and Exposed Buildings				
East	0%	Automatic Sprinkler Protection in both Subject and Exposed Buildings				
South	0%	over 30 m				
West	0%	over 30 m				

0% Exposure Adjustment Charge

= 0 L/min Exposure Adjustment Charge

RFF = 11,050 L/min

= 11,000 L/min (rounded to nearest 1,000 L/min)

= 183.3 L/s

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
d.gray@dbgrayengineering.com

October 28, 2025

475 Terry Fox Drive
6-Storey Apartment Building C
Ottawa, Ontario

FIRE FLOW CALCULATIONS
FUS Method

RFF = Required Fire Flow in litres per minute
= $220CA^{0.5}$

C = Construction Coefficient related to the type of construction of the building
= 1.5 Type V Wood Frame Construction

A = Total Effective Floor Area in square meters of the building

6th Floor:	1,075	sq.m
5th Floor:	1,075	sq.m
4th Floor:	1,075	sq.m
3rd Floor:	1,075	sq.m
2nd Floor:	1,075	sq.m
1st Floor:	1,075	sq.m
	6,450	sq.m

RFF = 26,503 L/min
= 27,000 L/min (rounded to nearest 1,000 L/min)

Occupancy and Contents Adjustment Factor
-15% Limited Combustible Contents

= -4,050 L/min Occupancy and Contents Adjustment Factor

RFF = 22,950 L/min

Automatic Sprinkler Protection Credit

	30%	Sprinkler system designed, installed and maintained in accordance with NFPA standards
	10%	Standard water supply for both the sprinkler system and fire department hose lines
	10%	Fully supervised sprinkler system
=	11,475	L/min Automatic Sprinkler Protection Credit

Exposure Adjustment Charge

Side	Charge	Distance	Construction	Length	Storeys	Factor
North	0%	over 30 m				
East	0%	over 30 m				
South	0%	over 30 m				
West	0%	Automatic Sprinkler Protection in both Subject and Exposed Buildings				

	0%	Exposure Adjustment Charge
=	0	L/min Exposure Adjustment Charge

RFF =	11,475	L/min
=	11,000	L/min (rounded to nearest 1,000 L/min)
=	183.3	L/s

Boundary Conditions
475 Terry Fox

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	72	1.20
Maximum Daily Demand	234	3.90
Peak Hour	354	5.90
Fire Flow Demand #1	12,000	200.00

Location

Results

Connection 1 – Kanata Avenue

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.3	75.4
Peak Hour	156.2	68.2
Max Day plus Fire Flow #1	143.7	50.5

[1] Ground Elevation = 108.2 m

Connection 2 – Terry Fox Drive

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.3	92.9
Peak Hour	156.2	85.7
Max Day plus Fire Flow #1	132.0	51.3

[1] Ground Elevation = 95.9 m

Notes

1. *As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:*
    - *If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.*
    - *Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.*

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.

January 26, 2026

475 Terry Fox Drive

Ottawa, Ontario

EPANET RESULTS

Fire Flow Demand: 200 L/s
Maximum Daily Demand: 3.9 L/s

Fire Flow + Maximum Daily Demand: 203.9 L/s

Node ID	Demand (L/s)	HGL (m)	Elevation (m)	Pressure (m)	Pressure (kPa)	Pressure (psi)
1 - Tillsonburg Street Reservoir	-61.9	132.0	96.00	36.0	353	51
2 - FH-1	0.0	130.3	95.95	34.4	337	49
3 - FH-2	0.0	128.5	96.00	32.5	319	46
4 - FH-3	0.0	126.2	96.05	30.2	296	43
5 - FH-4	0.0	122.6	96.45	26.2	256	37
6 - FH-5	40.5	120.8	98.65	22.2	217	31
7 - Kanata Avenue Reservoir	-142.0	143.7	104.90	38.8	380	55
8 - FH-6	0.0	130.4	101.85	28.6	280	41
9 - E+000.0	0.0	120.9	99.25	21.7	212	31
10 - A+000.0	0.0	120.7	99.25	21.5	210	31
11 - B+000.0	0.0	115.5	98.20	17.3	170	25
12 - C+000.0	0.0	115.4	98.30	17.1	168	24
13 - D+000.0	0.0	115.4	98.35	17.1	167	24
14 - F+000.0	0.0	117.2	98.80	18.4	180	26
15 - A+164.0, E+138.2	0.0	115.7	98.15	17.6	172	25
16 - G+000.0	0.0	115.4	98.15	17.3	169	25
17 - FH-7	40.5	114.7	98.50	16.2	159	23
18 - Building A	39.3	114.3	98.55	15.8	154	22
19 - Building B	1.3	115.4	98.55	16.9	165	24
20 - FH-8	40.5	116.5	98.95	17.6	172	25
21 - FH-9	40.5	114.8	98.40	16.4	161	23
22 - H+000.0	0.0	115.7	98.15	17.6	172	25
23 - Building C	1.3	115.7	98.10	17.6	173	25

Link ID	Length (m)	Diameter (mm)	Roughness Coefficient	Minor Loss Coefficient	Flow (L/s)	Velocity (m/s)
1 - Node 1 to Node 2	50.6	200	110	2.20	61.9	2.0
2 - Node 2 to Node 3	63.6	200	110	0.60	61.9	2.0
3 - Node 3 to Node 4	84.6	200	110	0.60	61.9	2.0
4 - Node 4 to Node 5	104.9	200	110	4.30	61.9	2.0
5 - Node 5 to Node 6	65.5	200	110	0.60	61.9	2.0
6 - Node 6 to Node 10	15.1	200	110	0.60	21.4	0.7
7 - Node 7 to Node 8	90.8	200	110	2.20	142.0	4.5
8 - Node 8 to Node 9	71.2	200	110	0.90	142.0	4.5
9 - Node 9 to Node 10	2	200	110	0.80	55.2	1.8
10 - Node 10 to Node 11	106.4	200	110	3.70	76.6	2.4
11 - Node 11 to Node 12	6.8	200	110	0.60	36.1	1.2
12 - Node 13 to Node 12	2	200	110	0.80	3.2	0.1
13 - Node 16 to Node 13	42.9	200	110	1.25	4.5	0.1
14 - Node 9 to Node 14	52.6	200	110	2.95	86.8	2.8
15 - Node 14 to Node 15	85.6	200	110	1.85	46.3	1.5
16 - Node 15 to Node 16	5.9	200	110	1.80	45.0	1.4
17 - Node 11 to Node 17	5.5	150	100	2.00	40.5	2.3
18 - Node 12 to Node 18	10.6	150	100	2.25	39.3	2.2
19 - Node 13 to Node 19	10.7	150	100	2.25	1.3	0.1
20 - Node 14 to Node 20	3.1	150	100	2.00	40.5	2.3
21 - Node 16 to Node 21	2	150	100	2.00	40.5	2.3
22 - Node 15 to Node 22	4	200	110	0.80	1.3	0.0
23 - Node 22 to Node 23	33.6	150	100	1.30	1.3	0.1

January 26, 2026

475 Terry Fox Drive

Ottawa, Ontario

EPANET RESULTS

Fire Flow Demand: 183.3 L/s
Maximum Daily Demand: 3.9 L/s

Fire Flow + Maximum Daily Demand: 187.2 L/s

Node ID	Demand (L/s)	HGL (m)	Elevation (m)	Pressure (m)	Pressure (kPa)	Pressure (psi)
1 - Tillsonburg Street Reservoir	-53.1	132.0	96.00	36.0	353	51
2 - FH-1	0.0	130.7	95.95	34.8	341	49
3 - FH-2	0.0	129.4	96.00	33.4	327	47
4 - FH-3	0.0	127.6	96.05	31.6	309	45
5 - FH-4	0.0	124.9	96.45	28.5	279	40
6 - FH-5	0.0	123.6	98.65	25.0	245	35
7 - Kanata Avenue Reservoir	-134.0	143.7	104.90	38.8	380	55
8 - FH-6	0.0	131.8	101.85	30.0	294	43
9 - E+000.0	0.0	123.3	99.25	24.1	236	34
10 - A+000.0	0.0	123.2	99.25	24.0	235	34
11 - B+000.0	0.0	116.5	98.20	18.3	179	26
12 - C+000.0	0.0	116.4	98.30	18.1	177	26
13 - D+000.0	0.0	116.3	98.35	18.0	176	26
14 - F+000.0	0.0	118.4	98.80	19.6	192	28
15 - A+164.0, E+138.2	0.0	116.6	98.15	18.5	181	26
16 - G+000.0	0.0	116.3	98.15	18.2	178	26
17 - FH-7	48.4	115.3	98.50	16.8	165	24
18 - Building A	1.3	116.4	98.55	17.9	175	25
19 - Building B	39.3	115.1	98.55	16.6	162	24
20 - FH-8	48.4	117.4	98.95	18.5	181	26
21 - FH-9	48.4	115.4	98.40	17.0	167	24
22 - H+000.0	0.0	116.6	98.15	18.5	181	26
23 - Building C	1.3	116.6	98.10	18.5	181	26

Link ID	Length (m)	Diameter (mm)	Roughness Coefficient	Minor Loss Coefficient	Flow (L/s)	Velocity (m/s)
1 - Node 1 to Node 2	50.6	200	110	2.20	53.1	1.7
2 - Node 2 to Node 3	63.6	200	110	0.60	53.1	1.7
3 - Node 3 to Node 4	84.6	200	110	0.60	53.1	1.7
4 - Node 4 to Node 5	104.9	200	110	4.30	53.1	1.7
5 - Node 5 to Node 6	65.5	200	110	0.60	53.1	1.7
6 - Node 6 to Node 10	15.1	200	110	0.60	53.1	1.7
7 - Node 7 to Node 8	90.8	200	110	2.20	134.0	4.3
8 - Node 8 to Node 9	71.2	200	110	0.90	134.0	4.3
9 - Node 9 to Node 10	2	200	110	0.80	34.3	1.1
10 - Node 10 to Node 11	106.4	200	110	3.70	87.4	2.8
11 - Node 11 to Node 12	6.8	200	110	0.60	39.0	1.2
12 - Node 12 to Node 13	2	200	110	0.80	37.7	1.2
13 - Node 16 to Node 13	42.9	200	110	1.25	1.6	0.1
14 - Node 9 to Node 14	52.6	200	110	2.95	99.7	3.2
15 - Node 14 to Node 15	85.6	200	110	1.85	51.3	1.6
16 - Node 15 to Node 16	5.9	200	110	1.80	50.0	1.6
17 - Node 11 to Node 17	5.5	150	100	2.00	48.4	2.7
18 - Node 12 to Node 18	10.6	150	100	2.25	1.3	0.1
19 - Node 13 to Node 19	10.7	150	100	2.25	39.3	2.2
20 - Node 14 to Node 20	3.1	150	100	2.00	48.4	2.7
21 - Node 16 to Node 21	2	150	100	2.00	48.4	2.7
22 - Node 15 to Node 22	4	200	110	0.80	1.3	0.0
23 - Node 22 to Node 23	33.6	150	100	1.30	1.3	0.1

January 26, 2026

475 Terry Fox Drive

Ottawa, Ontario

EPANET RESULTS

Fire Flow Demand:	183.3	L/s
Maximum Daily Demand:	3.9	L/s
Fire Flow + Maximum Daily Demand:	187.2	L/s

Node ID	Demand	HGL	Elevation	Pressure		
	(L/s)	(m)	(m)	(m)	(kPa)	(psi)
1 - Tillsonburg Street Reservoir	-53.1	132.0	96.00	36.0	353	51
2 - FH-1	0.0	130.7	95.95	34.8	341	49
3 - FH-2	0.0	129.4	96.00	33.4	327	47
4 - FH-3	0.0	127.6	96.05	31.6	309	45
5 - FH-4	0.0	124.9	96.45	28.5	279	40
6 - FH-5	0.0	123.6	98.65	25.0	245	35
7 - Kanata Avenue Reservoir	-134.0	143.7	104.90	38.8	380	55
8 - FH-6	0.0	131.8	101.85	30.0	294	43
9 - E+000.0	0.0	123.3	99.25	24.1	236	34
10 - A+000.0	0.0	123.2	99.25	24.0	235	34
11 - B+000.0	0.0	116.8	98.20	18.6	182	26
12 - C+000.0	0.0	116.7	98.30	18.4	180	26
13 - D+000.0	0.0	116.7	98.35	18.4	180	26
14 - F+000.0	0.0	118.2	98.80	19.4	190	28
15 - A+164.0, E+138.2	0.0	116.2	98.15	18.1	177	26
16 - G+000.0	0.0	116.2	98.15	18.1	177	26
17 - FH-7	48.4	115.6	98.50	17.1	168	24
18 - Building A	1.3	116.7	98.55	18.2	178	26
19 - Building B	1.3	116.7	98.55	18.2	178	26
20 - FH-8	48.4	117.2	98.95	18.3	179	26
21 - FH-9	48.4	115.3	98.40	16.9	166	24
22 - H+000.0	0.0	116.1	98.15	18.0	176	26
23 - Building C	39.3	114.0	98.10	15.9	156	23

Link ID	Length (m)	Diameter (mm)	Roughness Coefficient	Minor Loss Coefficient	Flow (L/s)	Velocity (m/s)
1 - Node 1 to Node 2	50.6	200	110	2.20	53.1	1.7
2 - Node 2 to Node 3	63.6	200	110	0.60	53.1	1.7
3 - Node 3 to Node 4	84.6	200	110	0.60	53.1	1.7
4 - Node 4 to Node 5	104.9	200	110	4.30	53.1	1.7
5 - Node 5 to Node 6	65.5	200	110	0.60	53.1	1.7
6 - Node 6 to Node 10	15.1	200	110	0.60	53.1	1.7
7 - Node 7 to Node 8	90.8	200	110	2.20	134.0	4.3
8 - Node 8 to Node 9	71.2	200	110	0.90	134.0	4.3
9 - Node 9 to Node 10	2	200	110	0.80	32.0	1.0
10 - Node 10 to Node 11	106.4	200	110	3.70	85.1	2.7
11 - Node 11 to Node 12	6.8	200	110	0.60	36.7	1.2
12 - Node 12 to Node 13	2	200	110	0.80	35.4	1.1
13 - Node 13 to Node 16	42.9	200	110	1.25	34.1	1.1
14 - Node 9 to Node 14	52.6	200	110	2.95	102.0	3.3
15 - Node 14 to Node 15	85.6	200	110	1.85	53.6	1.7
16 - Node 15 to Node 16	5.9	200	110	1.80	14.3	0.5
17 - Node 11 to Node 17	5.5	150	100	2.00	48.4	2.7
18 - Node 12 to Node 18	10.6	150	100	2.25	1.3	0.1
19 - Node 13 to Node 19	10.7	150	100	2.25	1.3	0.1
20 - Node 14 to Node 20	3.1	150	100	2.00	48.4	2.7
21 - Node 16 to Node 21	2	150	100	2.00	48.4	2.7
22 - Node 15 to Node 22	4	200	110	0.80	39.3	1.3
23 - Node 22 to Node 23	33.6	150	100	1.30	39.3	2.2

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle
Ottawa, Ontario K1T 4E9

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May 30, 2025

475 Terry Fox Drive

6-Storey Apartment Buildings

Ottawa, Ontario

WATER DEMAND CALCULATIONS

	Number of Units	Persons per Unit	Population
1 Bedroom:	81	1.4	113.4
2 Bedroom:	70	2.1	147
3 Bedroom:	31	3.1	96.1
Average:	0	1.8	0
Total:	182		356.5

Average Daily Demand:	280	L/capita/day				
	69.3	L/min	1.2	L/s	18.3	USgpm
Maximum Daily Demand:	3.4	(Peaking factor for a population of 356.5 interpolated from MOE Design Guidelines for Drinking Water Systems Table 3-3)				
	233.9	L/min	3.9	L/s	61.8	USgpm
Maximum Hourly Demand:	5.1	(Peaking factor for a population of 356.5 interpolated from MOE Design Guidelines for Drinking Water Systems Table 3-3)				
	350.8	L/min	5.8	L/s	92.7	USgpm

January 26, 2026

475 Terry Fox Drive

Ottawa, Ontario

EPANET RESULTS

Fire Flow Demand: 0 L/s
Maximum Hourly Demand: 5.8 L/s

Fire Flow + Maximum Hourly Demand: 5.8 L/s

Node ID	Demand (L/s)	HGL (m)	Elevation (m)	Pressure (m)	Pressure (kPa)	Pressure (psi)
1 - Tillsonburg Street Reservoir	-2.2	156.2	96.00	60.2	590	86
2 - FH-1	0.0	156.2	95.95	60.3	591	86
3 - FH-2	0.0	156.2	96.00	60.2	590	86
4 - FH-3	0.0	156.2	96.05	60.2	590	86
5 - FH-4	0.0	156.2	96.45	59.8	586	85
6 - FH-5	0.0	156.2	98.65	57.6	564	82
7 - Kanata Avenue Reservoir	-3.5	156.2	104.90	51.3	503	73
8 - FH-6	0.0	156.2	101.85	54.4	533	77
9 - E+000.0	0.0	156.2	99.25	57.0	558	81
10 - A+000.0	0.0	156.2	99.25	57.0	558	81
11 - B+000.0	0.0	156.2	98.20	58.0	569	82
12 - C+000.0	0.0	156.2	98.30	57.9	568	82
13 - D+000.0	0.0	156.2	98.35	57.9	567	82
14 - F+000.0	0.0	156.2	98.80	57.4	563	82
15 - A+164.0, E+138.2	0.0	156.2	98.15	58.1	569	83
16 - G+000.0	0.0	156.2	98.15	58.1	569	83
17 - FH-7	0.0	156.2	98.50	57.7	566	82
18 - Building A	1.9	156.2	98.55	57.7	565	82
19 - Building B	1.9	156.2	98.55	57.7	565	82
20 - FH-8	0.0	156.2	98.95	57.3	561	81
21 - FH-9	0.0	156.2	98.40	57.8	567	82
22 - H+000.0	0.0	156.2	98.15	58.1	569	83
23 - Building C	1.9	156.2	98.10	58.1	570	83

Link ID	Length (m)	Diameter (mm)	Roughness Coefficient	Minor Loss Coefficient	Flow (L/s)	Velocity (m/s)
1 - Node 1 to Node 2	50.6	200	110	2.20	2.2	0.07
2 - Node 2 to Node 3	63.6	200	110	0.60	2.2	0.07
3 - Node 3 to Node 4	84.6	200	110	0.60	2.2	0.07
4 - Node 4 to Node 5	104.9	200	110	4.30	2.2	0.07
5 - Node 5 to Node 6	65.5	200	110	0.60	2.2	0.07
6 - Node 6 to Node 10	15.1	200	110	0.60	2.2	0.07
7 - Node 7 to Node 8	90.8	200	110	2.20	3.5	0.11
8 - Node 8 to Node 9	71.2	200	110	0.90	3.5	0.11
9 - Node 9 to Node 10	2	200	110	0.80	0.8	0.03
10 - Node 10 to Node 11	106.4	200	110	3.70	3.0	0.10
11 - Node 11 to Node 12	6.8	200	110	0.60	3.0	0.10
12 - Node 12 to Node 13	2	200	110	0.80	1.1	0.04
13 - Node 16 to Node 13	42.9	200	110	1.25	0.8	0.03
14 - Node 9 to Node 14	52.6	200	110	2.95	2.7	0.09
15 - Node 14 to Node 15	85.6	200	110	1.85	2.7	0.09
16 - Node 15 to Node 16	5.9	200	110	1.80	0.8	0.03
17 - Node 11 to Node 17	5.5	150	100	2.00	0.0	0.00
18 - Node 12 to Node 18	10.6	150	100	2.25	1.9	0.11
19 - Node 13 to Node 19	10.7	150	100	2.25	1.9	0.11
20 - Node 14 to Node 20	3.1	150	100	2.00	0.0	0.00
21 - Node 16 to Node 21	2	150	100	2.00	0.0	0.00
22 - Node 15 to Node 22	4	200	110	0.80	1.9	0.06
23 - Node 22 to Node 23	33.6	150	100	1.30	1.9	0.11

January 26, 2026

475 Terry Fox Drive

Ottawa, Ontario

EPANET RESULTS

Fire Flow Demand: 0 L/s
Average Daily Demand: 1.2 L/s

Fire Flow + Average Daily Demand: 1.2 L/s

Node ID	Demand (L/s)	HGL (m)	Elevation (m)	Pressure (m)	Pressure (kPa)	Pressure (psi)
1 - Tillsonburg Street Reservoir	-0.5	161.3	96.00	65.3	640	93
2 - FH-1	0.0	161.3	95.95	65.4	641	93
3 - FH-2	0.0	161.3	96.00	65.3	640	93
4 - FH-3	0.0	161.3	96.05	65.3	640	93
5 - FH-4	0.0	161.3	96.45	64.9	636	92
6 - FH-5	0.0	161.3	98.65	62.7	614	89
7 - Kanata Avenue Reservoir	-0.7	161.3	104.90	56.4	553	80
8 - FH-6	0.0	161.3	101.85	59.5	583	85
9 - E+000.0	0.0	161.3	99.25	62.1	608	88
10 - A+000.0	0.0	161.3	99.25	62.1	608	88
11 - B+000.0	0.0	161.3	98.20	63.1	619	90
12 - C+000.0	0.0	161.3	98.30	63.0	618	90
13 - D+000.0	0.0	161.3	98.35	63.0	617	90
14 - F+000.0	0.0	161.3	98.80	62.5	613	89
15 - A+164.0, E+138.2	0.0	161.3	98.15	63.2	619	90
16 - G+000.0	0.0	161.3	98.15	63.2	619	90
17 - FH-7	0.0	161.3	98.50	62.8	616	89
18 - Building A	0.4	161.3	98.55	62.8	615	89
19 - Building B	0.4	161.3	98.55	62.8	615	89
20 - FH-8	0.0	161.3	98.95	62.4	611	89
21 - FH-9	0.0	161.3	98.40	62.9	617	89
22 - H+000.0	0.0	161.3	98.15	63.2	619	90
23 - Building C	0.4	161.3	98.10	63.2	620	90

Link ID	Length (m)	Diameter (mm)	Roughness Coefficient	Minor Loss Coefficient	Flow (L/s)	Velocity (m/s)
1 - Node 1 to Node 2	50.6	200	110	2.20	0.5	0.01
2 - Node 2 to Node 3	63.6	200	110	0.60	0.5	0.01
3 - Node 3 to Node 4	84.6	200	110	0.60	0.5	0.01
4 - Node 4 to Node 5	104.9	200	110	4.30	0.5	0.01
5 - Node 5 to Node 6	65.5	200	110	0.60	0.5	0.01
6 - Node 6 to Node 10	15.1	200	110	0.60	0.5	0.01
7 - Node 7 to Node 8	90.8	200	110	2.20	0.7	0.02
8 - Node 8 to Node 9	71.2	200	110	0.90	0.7	0.02
9 - Node 9 to Node 10	2	200	110	0.80	0.2	0.01
10 - Node 10 to Node 11	106.4	200	110	3.70	0.6	0.02
11 - Node 11 to Node 12	6.8	200	110	0.60	0.6	0.02
12 - Node 12 to Node 13	2	200	110	0.80	0.2	0.01
13 - Node 16 to Node 13	42.9	200	110	1.25	0.2	0.01
14 - Node 9 to Node 14	52.6	200	110	2.95	0.6	0.02
15 - Node 14 to Node 15	85.6	200	110	1.85	0.6	0.02
16 - Node 15 to Node 16	5.9	200	110	1.80	0.2	0.01
17 - Node 11 to Node 17	5.5	150	100	2.00	0.0	0.00
18 - Node 12 to Node 18	10.6	150	100	2.25	0.4	0.02
19 - Node 13 to Node 19	10.7	150	100	2.25	0.4	0.02
20 - Node 14 to Node 20	3.1	150	100	2.00	0.0	0.00
21 - Node 16 to Node 21	2	150	100	2.00	0.0	0.00
22 - Node 15 to Node 22	4	200	110	0.80	0.4	0.01
23 - Node 22 to Node 23	33.6	150	100	1.30	0.4	0.02

APPENDIX C

SANITARY SERVICING

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
d.gray@dbgrayengineering.com

SANITARY SEWER CALCULATIONS

Project: 475 Terry Fox Drive
6-Storey Apartment Buildings
Ottawa, Ontario

Date: October 28, 2025

Residential Average Daily Flow:	280	L/capita/day	Residential Peaking Factor:	Harmon Formula	
Commercial Average Daily Flow:	28,000	L/ha/day	Harmon Formula Correction Factor:	0.8	
Institutional Average Daily Flow:	28,000	L/ha/day	Commercial Peaking Factor:	1.5	
Light Industrial Average Daily Flow:	35,000	L/ha/day	Institutional Peaking Factor:	1.5	
Heavy Industrial Average Daily Flow:	55,000	L/ha/day	Industrial Peaking Factor:	Ministry of the Environment	
Infiltration Allowance:	0.33	L/s/ha	Manning's Roughness Coefficient:	0.013	

		Residential													Commercial				Infiltration			Q	Sewer Data						
		Individual									Cumulative				Individual	Cumulative			Individual	Cumulative									
Location		Single	Semi	Duplex	Apartment	Apartment	Apartment	Apartment	Area	Population	Area	Population	Peaking	Flow Rate	Area	Area	Peaking	Flow Rate	Area	Area	Flow Rate	Total	Length	Nominal	Actual	Slope	Velocity	Q_{Full}	
From	To	Family	Detached		(1 Bed)	(2 Bed)	(3 Bed)	(Average)	(ha)		(ha)		Factor	(L/s)	(ha)	(ha)	Factor	(L/s)	(ha)	(ha)	(L/s)	Flow Rate (L/s)	(m)	Diameter (mm)	Diameter (mm)	(%)	(m/s)	Capacity (L/s)	Q / Q_{Full}
		ppu = 3.4	ppu = 2.7	ppu = 2.3	ppu = 1.4	ppu = 2.1	ppu = 3.1	ppu = 1.8																				
Building B	MH-SA.1				65	43	20		0.8180	243.3	0.8180	243.3	3.2	2.52					0.8180	0.8180	0.27	2.79	5	200	200	2	1.48	46.38	6%
MH-SA.1	MH-SA.2								0.0000	0.0	0.8180	243.3	3.2	2.52					0.0000	0.8180	0.27	2.79	48.8	200	200	0.32	0.59	18.55	15%
Building C	MH-SA.2				16	27	11		0.4090	113.2	0.4090	113.2	3.2	1.17					0.4090	0.4090	0.13	1.31	10.5	200	200	2	1.48	46.38	3%
MH-SA.2	375 SAN								0.0000	0.0	1.2270	356.5	3.2	3.70					0.0000	1.2270	0.40	4.10	78.4	200	200	0.32	0.59	18.55	22%
																						Existing 375 mm Terry Fox Drive Municipal Sanitary Sewer:		375	375	0.15	0.61	67.91	

APPENDIX D

STORMWATER MANAGEMENT

SUMMARY TABLES

100-YEAR EVENT

Drainage Area	Maximum Allowable Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA I (Uncontrolled Flow Off Site)	-	6.52	-	-
AREA II	-	25.94	261.60	261.60
AREA III	-	115.30	136.92	136.92
TOTAL (AREA I + AREA III)	121.82	121.82	398.52	398.52

2-YEAR EVENT

Drainage Area	Maximum Allowable Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA I (Uncontrolled Flow Off Site)	-	2.30	-	-
AREA II	-	15.52	90.23	90.23
AREA III	-	50.11	59.49	59.49
TOTAL (AREA I + AREA III)	52.40	52.40	149.72	149.72

January 26, 2026

475 Terry Fox Drive

Ottawa, Ontario

STORMWATER MANAGEMENT CALCULATIONS
Modified Rational Method

100-YEAR EVENT

MAXIMUM ALLOWABLE RELEASE RATE

Area (A):	12,270	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	179	mm/hr
Runoff Coeficient (C):	0.2	
Maximum Allowable Release Rate (2.78AiC):	121.82	L/s

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(100-YEAR EVENT)

			C
Roof Area:	0	sq.m	1.00
Hard Area:	25	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Soft Area:	425	sq.m	0.25
Total Catchment Area:	450	sq.m	0.29

Area (A):	450	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	179	mm/hr
Runoff Coeficient (C):	0.29	
Flow Rate (2.78AiC):	6.52	L/s

DRAINAGE AREA II

(100-YEAR EVENT)

			C
Roof Area:	1,325	sq.m	1.00
Hard Area:	3,725	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Soft Area:	1,275	sq.m	0.25
Total Catchment Area:	6,325	sq.m	0.85

Water Elevation:	98.37	m
Head:	2.63	m
Centroid of ICD Orifice:	95.73	m
Invert of Outlet Pipe of MH-7:	95.69	m
Orifice Diameter:	87	mm
Orifice Area:	5,915	sq.mm
Discharge Coefficient:	0.61	
Maximum Release Rate:	25.94	L/s

DRAINAGE AREA II (Continued)

(100-YEAR EVENT)

Surface Storage

CB/MH	Top Area	Depth	Volume	
CB-1	87	0.10	2.85	cu.m
CB/MH-2	256	0.20	16.90	cu.m
CB/MH-4	403	0.20	26.65	cu.m
CB/MH-5	283	0.15	14.01	cu.m
CB/MH-6	364	0.20	24.05	cu.m

Chamber Storage

No. of Chambers	Volume Per Chamber	No. of Rows	No. of End Caps	Volume Per End Cap	Volume	
30	3.2	2	4	0.4	97.60	cu.m

Clear Stone Storage

Length	Width	Depth	Volume	40% Voids	
33.931	4.689	1.47	136.28	54.51	cu.m

CB/MH Storage

CB/MH	Invert	Size	Volume	
CB-1	96.02	0.61	0.87	cu.m
CB/MH-2	95.92	1.219	2.86	cu.m
MH-3	95.77	1.219	3.03	cu.m
CB/MH-4	95.72	1.219	3.09	cu.m
CB/MH-5	95.92	1.219	2.86	cu.m
CB/MH-6	95.84	1.219	2.95	cu.m
MH-7	95.69	1.219	3.13	cu.m

Pipe Storage

From	Invert	To	Invert	Length	Diameter	Volume	
CB-1	96.02	CB/MH-2	95.84	6.9	250	0.34	cu.m
CB/MH-2	95.92	MH-3	95.77	33.2	250	1.63	cu.m
MH-3	95.77	CB/MH-4	95.72	9.6	250	0.47	cu.m
CB/MH-4	95.72	MH-7	95.69	8.5	300	0.60	cu.m
CB/MH-5	95.92	CB/MH-6	95.84	22.2	300	1.57	cu.m
CB/MH-6	95.84	MH-7	95.76	23.1	300	1.63	cu.m

Maximum Volume Stored: 261.60 cu.m

Maximum Volume Required: 261.60 cu.m

DRAINAGE AREA II (Continued)

(100-YEAR EVENT)

Time (min)	i (mm/hr)	2.78AiC (L/s)	50% Release Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	179	266.50	12.97	253.53	152.12
15	143	213.27	12.97	200.30	180.27
20	120	179.03	12.97	166.06	199.27
25	104	154.99	12.97	142.02	213.03
30	92	137.11	12.97	124.14	223.46
35	83	123.25	12.97	110.28	231.58
40	75	112.16	12.97	99.18	238.04
45	69	103.06	12.97	90.09	243.24
50	64	95.45	12.97	82.48	247.44
55	60	88.99	12.97	76.02	250.86
60	56	83.42	12.97	70.45	253.63
65	53	78.58	12.97	65.60	255.86
70	50	74.31	12.97	61.34	257.63
75	47	70.53	12.97	57.56	259.01
80	45	67.15	12.97	54.18	260.05
85	43	64.11	12.97	51.14	260.80
90	41	61.36	12.97	48.39	261.29
95	39	58.86	12.97	45.89	261.55
100	38	56.57	12.97	43.60	261.60
105	36	54.47	12.97	41.50	261.46
110	35	52.54	12.97	39.57	261.15
115	34	50.75	12.97	37.78	260.69
120	33	49.10	12.97	36.12	260.10
125	32	47.55	12.97	34.58	259.37
130	31	46.12	12.97	33.14	258.53
135	30	44.77	12.97	31.80	257.57
140	29	43.51	12.97	30.54	256.52
145	28	42.32	12.97	29.35	255.37
150	28	41.21	12.97	28.24	254.14
180	24	35.67	12.97	22.70	245.20
210	21	31.56	12.97	18.59	234.19
240	19	28.37	12.97	15.39	221.68
270	17	25.81	12.97	12.84	208.02
300	16	23.72	12.97	10.75	193.44
330	15	21.97	12.97	9.00	178.12
360	14	20.48	12.97	7.51	162.17
390	13	19.20	12.97	6.23	145.71
420	12	18.08	12.97	5.11	128.80
450	11	17.10	12.97	4.13	111.50
480	11	16.23	12.97	3.26	93.86
510	10	15.45	12.97	2.48	75.93
540	10	14.75	12.97	1.78	57.72

DRAINAGE AREA III

(100-YEAR EVENT)

			C
Roof Area:	2,070	sq.m	1.00
Hard Area:	1,725	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Soft Area:	1,700	sq.m	0.25
Total Catchment Area:	5,495	sq.m	0.77

Water Elevation:	95.68	m
Head:	1.82	m
Centroid of ICD Orifice:	93.86	m
Invert of Outlet Pipe of CB/MH-14:	93.78	m
Orifice Diameter:	160	mm
Orifice Area:	20,212	sq.mm
Discharge Coefficient:	0.61	
Maximum ICD Release Rate:	73.67	L/s
Maximum Overflow Rate:	41.63	L/s
Total Maximum Release Rate:	115.30	L/s

DRAINAGE AREA III (Continued)

(100-YEAR EVENT)

Chamber Storage

No. of Chambers	Volume Per Chamber	No. of Rows	No. of End Caps	Volume Per End Cap	Volume	
22	3.2	1	2	0.4	71.20	cu.m

Clear Stone Storage

Length	Width	Depth	Volume	40% Voids	
49.100	2.586	1.47	115.45	46.18	cu.m

CB/MH Storage

CB/MH	Invert	Size	Volume	
CB-8	94.71	0.61	0.36	cu.m
CB/MH-9	94.63	1.219	1.23	cu.m
CB-10	94.52	0.61	0.43	cu.m
CB/MH-11	94.49	1.219	1.39	cu.m
MH-12	94.33	1.219	1.58	cu.m
CB/MH-13	94.21	1.219	1.72	cu.m
CB/MH-14	93.78	1.219	2.22	cu.m

Pipe Storage

From	Invert	To	Invert	Length	Diameter	Volume	
MH-7	95.69	MH-12	95.61	21	300	0.08	cu.m
CB-8	94.71	CB/MH-9	94.63	17.8	250	0.87	cu.m
CB/MH-9	94.63	MH-12	94.33	69.6	250	3.42	cu.m
CB-10	94.52	CB/MH-11	94.49	6.1	250	0.30	cu.m
CB/MH-11	94.49	MH-12	94.30	15.2	250	0.75	cu.m
MH-12	94.33	CB/MH-13	94.21	47.2	375	5.21	cu.m

Maximum Volume Stored: 136.92 cu.m

Maximum Volume Required: 136.92 cu.m

DRAINAGE AREA III (Continued)

(100-YEAR EVENT)

Time (min)	i (mm/hr)	2.78AiC (L/s)	Inflow from Area II (L/s)	50% ICD Release Rate (L/s)	50% Overflow Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	179	209.48	25.94	36.84	0.00	198.59	119.15
15	143	167.64	25.94	36.84	4.61	152.13	136.92
20	120	140.72	25.94	36.84	15.73	114.10	136.92
25	104	121.83	25.94	36.84	19.66	91.28	136.92
30	92	107.78	25.94	36.84	20.82	76.07	136.92
35	83	96.88	25.94	36.84	20.78	65.20	136.92
40	75	88.16	25.94	36.84	20.21	57.05	136.92
45	69	81.01	25.94	36.84	19.40	50.71	136.92
50	64	75.03	25.94	36.84	18.50	45.64	136.92
55	60	69.95	25.94	36.84	17.56	41.49	136.92
60	56	65.57	25.94	36.84	16.65	38.03	136.92
65	53	61.76	25.94	36.84	15.76	35.11	136.92
70	50	58.41	25.94	36.84	14.92	32.60	136.92
75	47	55.44	25.94	36.84	14.12	30.43	136.92
80	45	52.78	25.94	36.84	13.36	28.53	136.92
85	43	50.39	25.94	36.84	12.65	26.85	136.92
90	41	48.23	25.94	36.84	11.98	25.36	136.92
95	39	46.26	25.94	36.84	11.35	24.02	136.92
100	38	44.47	25.94	36.84	10.75	22.82	136.92
105	36	42.82	25.94	36.84	10.19	21.73	136.92
110	35	41.30	25.94	36.84	9.66	20.75	136.92
115	34	39.89	25.94	36.84	9.16	19.84	136.92
120	33	38.59	25.94	36.84	8.68	19.02	136.92
125	32	37.38	25.94	36.84	8.23	18.26	136.92
130	31	36.25	25.94	36.84	7.80	17.55	136.92
135	30	35.19	25.94	36.84	7.39	16.90	136.92
140	29	34.20	25.94	36.84	7.01	16.30	136.92
145	28	33.27	25.94	36.84	6.64	15.74	136.92
150	28	32.39	25.94	36.84	6.29	15.21	136.92
180	24	28.04	25.94	36.84	4.47	12.68	136.92
210	21	24.81	25.94	36.84	3.05	10.87	136.92
240	19	22.30	25.94	36.84	1.90	9.51	136.92
270	17	20.29	25.94	36.84	0.94	8.45	136.92
300	16	18.64	25.94	36.84	0.14	7.61	136.92
330	15	17.27	25.94	36.84	0.00	6.37	126.22
360	14	16.10	25.94	36.84	0.00	5.21	112.43
390	13	15.09	25.94	36.84	0.00	4.20	98.24
420	12	14.21	25.94	36.84	0.00	3.32	83.69
450	11	13.44	25.94	36.84	0.00	2.55	68.84
480	11	12.76	25.94	36.84	0.00	1.87	53.72
510	10	12.15	25.94	36.84	0.00	1.25	38.37
540	10	11.60	25.94	36.84	0.00	0.70	22.81

2-YEAR EVENT

MAXIMUM ALLOWABLE RELEASE RATE

Area (A):	12,270	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	77	mm/hr
Runoff Coeficient (C):	0.2	
Maximum Allowable Release Rate (2.78AiC):	52.40	L/s

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(2-YEAR EVENT)

			C
Roof Area:	0	sq.m	0.90
Hard Area:	25	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Soft Area:	425	sq.m	0.20
Total Catchment Area:	450	sq.m	0.24

Area (A):	450	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	77	mm/hr
Runoff Coeficient (C):	0.24	
Flow Rate (2.78AiC):	2.30	L/s

DRAINAGE AREA II

(2-YEAR EVENT)

			C
Roof Area:	1,325	sq.m	0.90
Hard Area:	3,725	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Soft Area:	1,275	sq.m	0.20
Total Catchment Area:	6,325	sq.m	0.76

Water Elevation:	96.68	m
Head:	0.94	m
Centroid of ICD Orifice:	95.73	m
Invert of Outlet Pipe of MH-7:	95.69	m
Orifice Diameter:	87	mm
Orifice Area:	5,915	sq.mm
Discharge Coefficient:	0.61	
Maximum Release Rate:	15.52	L/s

DRAINAGE AREA II (Continued)

(2-YEAR EVENT)

Chamber Storage

No. of Chambers	Stage Volume	No. of Rows	No. of End Caps	Stage Volume	Volume	
30	2.095	2	4	0.324	64.15	cu.m

Clear Stone Storage

Length	Width	Depth	Volume	40% Voids	
33.931	4.689	0.62	33.83	13.53	cu.m

CB/MH Storage

CB/MH	Invert	Size	Volume	
CB-1	96.02	0.61	0.24	cu.m
CB/MH-2	95.92	1.219	0.88	cu.m
MH-3	95.77	1.219	1.06	cu.m
CB/MH-4	95.72	1.219	1.12	cu.m
CB/MH-5	95.92	1.219	0.88	cu.m
CB/MH-6	95.84	1.219	0.98	cu.m
MH-7	95.69	1.219	1.15	cu.m

Pipe Storage

From	Invert	To	Invert	Length	Diameter	Volume	
CB-1	96.02	CB/MH-2	95.84	6.9	250	0.34	cu.m
CB/MH-2	95.92	MH-3	95.77	33.2	250	1.63	cu.m
MH-3	95.77	CB/MH-4	95.72	9.6	250	0.47	cu.m
CB/MH-4	95.72	MH-7	95.69	8.5	300	0.60	cu.m
CB/MH-5	95.92	CB/MH-6	95.84	22.2	300	1.57	cu.m
CB/MH-6	95.84	MH-7	95.76	23.1	300	1.63	cu.m

Maximum Volume Stored: 90.23 cu.m

Maximum Volume Required: 90.23 cu.m

DRAINAGE AREA II (Continued)

(2-YEAR EVENT)

Time (min)	i (mm/hr)	2.78AiC (L/s)	50% Release Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	77	102.49	7.76	94.73	56.84
15	62	82.42	7.76	74.66	67.20
20	52	69.43	7.76	61.67	74.01
25	45	60.27	7.76	52.51	78.77
30	40	53.43	7.76	45.68	82.22
35	36	48.12	7.76	40.36	84.76
40	33	43.85	7.76	36.10	86.63
45	30	40.35	7.76	32.59	88.00
50	28	37.42	7.76	29.66	88.98
55	26	34.92	7.76	27.16	89.64
60	25	32.77	7.76	25.01	90.04
65	23	30.89	7.76	23.14	90.23
70	22	29.24	7.76	21.48	90.23
75	21	27.77	7.76	20.02	90.07
80	20	26.46	7.76	18.70	89.78
85	19	25.28	7.76	17.52	89.36
90	18	24.21	7.76	16.45	88.84
95	17	23.24	7.76	15.48	88.23
100	17	22.35	7.76	14.59	87.53
105	16	21.53	7.76	13.77	86.76
110	16	20.78	7.76	13.02	85.92
115	15	20.08	7.76	12.32	85.01
120	15	19.43	7.76	11.67	84.05
125	14	18.83	7.76	11.07	83.04
130	14	18.27	7.76	10.51	81.98
135	13	17.74	7.76	9.98	80.87
140	13	17.25	7.76	9.49	79.73
145	13	16.79	7.76	9.03	78.54
150	12	16.35	7.76	8.59	77.32
180	11	14.18	7.76	6.42	69.36
210	9	12.56	7.76	4.81	60.56
240	8	11.31	7.76	3.55	51.14
270	8	10.30	7.76	2.55	41.24
300	7	9.48	7.76	1.72	30.96
330	7	8.79	7.76	1.03	20.37
360	6	8.20	7.76	0.44	9.53
390	6	7.69	7.69	0.00	0.00
420	5	7.25	7.25	0.00	0.00

DRAINAGE AREA III

(2-YEAR EVENT)

			C
Roof Area:	2,070	sq.m	0.90
Hard Area:	1,725	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Soft Area:	1,700	sq.m	0.20
Total Catchment Area:	5,495	sq.m	0.68

Water Elevation:	94.70	m
Head:	0.84	m
Centroid of ICD Orifice:	93.86	m
Invert of Outlet Pipe of CB/MH-14:	93.78	m
Orifice Diameter:	160	mm
Orifice Area:	20,212	sq.mm
Discharge Coefficient:	0.61	
Maximum Release Rate:	50.11	L/s

DRAINAGE AREA III (Continued)

(2-YEAR EVENT)

Chamber Storage

No. of Chambers	Stage Volume	No. of Rows	No. of End Caps	Stage Volume	Volume	
22	1.682	1	2	0.268	37.54	cu.m

Clear Stone Storage

Length	Width	Depth	Volume	40% Voids	
49.100	2.586	0.49	24.94	9.97	cu.m

CB/MH Storage

CB/MH	Invert	Size	Volume	
CB-8	94.71	0.61	0.00	cu.m
CB/MH-9	94.63	1.219	0.08	cu.m
CB-10	94.52	0.61	0.07	cu.m
CB/MH-11	94.49	1.219	0.25	cu.m
MH-12	94.33	1.219	0.43	cu.m
CB/MH-13	94.21	1.219	0.57	cu.m
CB/MH-14	93.78	1.219	1.08	cu.m

Pipe Storage

From	Invert	To	Invert	Length	Diameter	Volume	
MH-7	95.69	MH-12	95.61	21	300	0.00	cu.m
CB-8	94.71	CB/MH-9	94.63	17.8	250	0.07	cu.m
CB/MH-9	94.63	MH-12	94.33	69.6	250	3.21	cu.m
CB-10	94.52	CB/MH-11	94.49	6.1	250	0.25	cu.m
CB/MH-11	94.49	MH-12	94.30	15.2	250	0.75	cu.m
MH-12	94.33	CB/MH-13	94.21	47.2	375	5.21	cu.m

Maximum Volume Stored: 59.49 cu.m

Maximum Volume Required: 59.49 cu.m

DRAINAGE AREA III (Continued)

(2-YEAR EVENT)

Time (min)	i (mm/hr)	2.78AiC (L/s)	Inflow from Area II (L/s)	50% Release Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	77	80.19	15.52	25.05	70.65	42.39
15	62	64.49	15.52	25.05	54.95	49.45
20	52	54.32	15.52	25.05	44.78	53.74
25	45	47.16	15.52	25.05	37.62	56.43
30	40	41.81	15.52	25.05	32.27	58.08
35	36	37.65	15.52	25.05	28.11	59.03
40	33	34.31	15.52	25.05	24.77	59.45
45	30	31.57	15.52	25.05	22.03	59.49
50	28	29.28	15.52	25.05	19.74	59.21
55	26	27.32	15.52	25.05	17.78	58.69
60	25	25.64	15.52	25.05	16.10	57.96
65	23	24.17	15.52	25.05	14.63	57.06
70	22	22.88	15.52	25.05	13.34	56.02
75	21	21.73	15.52	25.05	12.19	54.86
80	20	20.70	15.52	25.05	11.16	53.59
85	19	19.78	15.52	25.05	10.24	52.23
90	18	18.94	15.52	25.05	9.40	50.78
95	17	18.18	15.52	25.05	8.64	49.26
100	17	17.48	15.52	25.05	7.95	47.67
105	16	16.84	15.52	25.05	7.31	46.03
110	16	16.25	15.52	25.05	6.72	44.33
115	15	15.71	15.52	25.05	6.17	42.58
120	15	15.20	15.52	25.05	5.66	40.79
125	14	14.73	15.52	25.05	5.19	38.95
130	14	14.29	15.52	25.05	4.75	37.08
135	13	13.88	15.52	25.05	4.34	35.18
140	13	13.50	15.52	25.05	3.96	33.24
145	13	13.13	15.52	25.05	3.59	31.27
150	12	12.79	15.52	25.05	3.25	29.27
180	11	11.09	15.52	25.05	1.56	16.81
210	9	9.83	15.52	25.05	0.29	3.68
240	8	8.85	15.52	24.36	0.00	0.00
270	8	8.06	15.52	23.58	0.00	0.00
300	7	7.42	15.52	22.93	0.00	0.00
330	7	6.87	15.52	22.39	0.00	0.00
360	6	6.41	15.52	21.93	0.00	0.00
390	6	6.02	15.38	21.40	0.00	0.00
420	5	5.67	14.50	20.17	0.00	0.00

50-YEAR EVENT

MAXIMUM ALLOWABLE RELEASE RATE

Area (A):	12,270	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	161	mm/hr
Runoff Coeficient (C):	0.2	
Maximum Allowable Release Rate (2.78AiC):	110.16	L/s

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(50-YEAR EVENT)

			C
Roof Area:	0	sq.m	1.00
Hard Area:	25	sq.m	1.00
Gravel Area:	0	sq.m	0.84
Soft Area:	425	sq.m	0.24
Total Catchment Area:	450	sq.m	0.28

Area (A):	450	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	161	mm/hr
Runoff Coeficient (C):	0.28	
Flow Rate (2.78AiC):	5.70	L/s

DRAINAGE AREA II

(50-YEAR EVENT)

			C
Roof Area:	1,325	sq.m	1.00
Hard Area:	3,725	sq.m	1.00
Gravel Area:	0	sq.m	0.84
Soft Area:	1,275	sq.m	0.24
Total Catchment Area:	6,325	sq.m	0.85

Water Elevation:	98.34	m
Head:	2.61	m
Centroid of ICD Orifice:	95.73	m
Invert of Outlet Pipe of MH-7:	95.69	m
Orifice Diameter:	87	mm
Orifice Area:	5,915	sq.mm
Discharge Coefficient:	0.61	
Maximum Release Rate:	25.81	L/s

DRAINAGE AREA II (Continued)

(50-YEAR EVENT)

Surface Storage

CB/MH	Top Area	Depth	Volume	
CB-1	46	0.07	1.09	cu.m
CB/MH-2	191	0.17	10.89	cu.m
CB/MH-4	301	0.17	17.17	cu.m
CB/MH-5	190	0.12	7.66	cu.m
CB/MH-6	271	0.17	15.49	cu.m

Chamber Storage

No. of Chambers	Volume Per Chamber	No. of Rows	No. of End Caps	Volume Per End Cap	Volume	
30	3.2	2	4	0.4	97.60	cu.m

Clear Stone Storage

Length	Width	Depth	Volume	40% Voids	
33.931	4.689	1.47	136.28	54.51	cu.m

CB/MH Storage

CB/MH	Invert	Size	Volume	
CB-1	96.02	0.61	0.86	cu.m
CB/MH-2	95.92	1.219	2.83	cu.m
MH-3	95.77	1.219	3.00	cu.m
CB/MH-4	95.72	1.219	3.06	cu.m
CB/MH-5	95.92	1.219	2.83	cu.m
CB/MH-6	95.84	1.219	2.92	cu.m
MH-7	95.69	1.219	3.09	cu.m

Pipe Storage

From	Invert	To	Invert	Length	Diameter	Volume	
CB-1	96.02	CB/MH-2	95.84	6.9	250	0.34	cu.m
CB/MH-2	95.92	MH-3	95.77	33.2	250	1.63	cu.m
MH-3	95.77	CB/MH-4	95.72	9.6	250	0.47	cu.m
CB/MH-4	95.72	MH-7	95.69	8.5	300	0.60	cu.m
CB/MH-5	95.92	CB/MH-6	95.84	22.2	300	1.57	cu.m
CB/MH-6	95.84	MH-7	95.76	23.1	300	1.63	cu.m

Maximum Volume Stored: 229.23 cu.m

Maximum Volume Required: 229.23 cu.m

DRAINAGE AREA II (Continued)

(50-YEAR EVENT)

Time (min)	i (mm/hr)	2.78AiC (L/s)	50% Release Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	161	240.42	12.90	227.52	136.51
15	129	192.40	12.90	179.50	161.55
20	108	161.51	12.90	148.61	178.33
25	94	139.83	12.90	126.92	190.38
30	83	123.70	12.90	110.79	199.43
35	75	111.19	12.90	98.28	206.40
40	68	101.18	12.90	88.28	211.86
45	62	92.97	12.90	80.07	216.19
50	58	86.11	12.90	73.21	219.62
55	54	80.28	12.90	67.38	222.34
60	51	75.26	12.90	62.36	224.48
65	48	70.89	12.90	57.98	226.13
70	45	67.04	12.90	54.14	227.37
75	43	63.63	12.90	50.72	228.26
80	41	60.58	12.90	47.67	228.84
85	39	57.84	12.90	44.93	229.15
90	37	55.35	12.90	42.45	229.23
95	36	53.10	12.90	40.19	229.10
100	34	51.04	12.90	38.13	228.78
105	33	49.14	12.90	36.24	228.30
110	32	47.40	12.90	34.49	227.66
115	31	45.79	12.90	32.88	226.89
120	30	44.29	12.90	31.39	225.99
125	29	42.90	12.90	30.00	224.97
130	28	41.60	12.90	28.70	223.85
135	27	40.39	12.90	27.49	222.63
140	26	39.25	12.90	26.35	221.32
145	26	38.18	12.90	25.28	219.92
150	25	37.18	12.90	24.27	218.45
180	22	32.18	12.90	19.28	208.22
210	19	28.47	12.90	15.57	196.13
240	17	25.59	12.90	12.69	182.68
270	16	23.29	12.90	10.38	168.18
300	14	21.40	12.90	8.49	152.87
330	13	19.82	12.90	6.91	136.88
360	12	18.48	12.90	5.57	120.33
390	12	17.32	12.90	4.42	103.31
420	11	16.31	12.90	3.41	85.89
450	10	15.43	12.90	2.52	68.12
480	10	14.64	12.90	1.74	50.05
510	9	13.94	12.90	1.04	31.70
540	9	13.31	12.90	0.40	13.11

DRAINAGE AREA III

(50-YEAR EVENT)

			C
Roof Area:	2,070	sq.m	1.00
Hard Area:	1,725	sq.m	1.00
Gravel Area:	0	sq.m	0.84
Soft Area:	1,700	sq.m	0.24
Total Catchment Area:	5,495	sq.m	0.76

Water Elevation:	95.68	m
Head:	1.82	m
Centroid of ICD Orifice:	93.86	m
Invert of Outlet Pipe of CB/MH-14:	93.78	m
Orifice Diameter:	160	mm
Orifice Area:	20,212	sq.mm
Discharge Coefficient:	0.61	
Maximum ICD Release Rate:	73.67	L/s
Maximum Overflow Rate:	22.65	L/s
Total Maximum Release Rate:	96.32	L/s

DRAINAGE AREA III (Continued)

(50-YEAR EVENT)

Chamber Storage

No. of Chambers	Volume Per Chamber	No. of Rows	No. of End Caps	Volume Per End Cap	Volume	
22	3.2	1	2	0.4	71.20	cu.m

Clear Stone Storage

Length	Width	Depth	Volume	40% Voids	
49.100	2.586	1.47	115.45	46.18	cu.m

CB/MH Storage

CB/MH	Invert	Size	Volume	
CB-8	94.71	0.61	0.36	cu.m
CB/MH-9	94.63	1.219	1.23	cu.m
CB-10	94.52	0.61	0.43	cu.m
CB/MH-11	94.49	1.219	1.39	cu.m
MH-12	94.33	1.219	1.58	cu.m
CB/MH-13	94.21	1.219	1.72	cu.m
CB/MH-14	93.78	1.219	2.22	cu.m

Pipe Storage

From	Invert	To	Invert	Length	Diameter	Volume	
MH-7	95.69	MH-12	95.61	21	300	0.08	cu.m
CB-8	94.71	CB/MH-9	94.63	17.8	250	0.87	cu.m
CB/MH-9	94.63	MH-12	94.33	69.6	250	3.42	cu.m
CB-10	94.52	CB/MH-11	94.49	6.1	250	0.30	cu.m
CB/MH-11	94.49	MH-12	94.30	15.2	250	0.75	cu.m
MH-12	94.33	CB/MH-13	94.21	47.2	375	5.21	cu.m

Maximum Volume Stored: 136.92 cu.m

Maximum Volume Required: 136.92 cu.m

DRAINAGE AREA III (Continued)

(50-YEAR EVENT)

Time (min)	i (mm/hr)	2.78AiC (L/s)	Inflow from Area II (L/s)	50% ICD Release Rate (L/s)	50% Overflow Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	161	188.67	25.81	36.84	0.00	177.64	106.59
15	129	150.98	25.81	36.84	0.00	139.96	125.96
20	108	126.74	25.81	36.84	1.61	114.10	136.92
25	94	109.73	25.81	36.84	7.42	91.28	136.92
30	83	97.07	25.81	36.84	9.98	76.07	136.92
35	75	87.25	25.81	36.84	11.03	65.20	136.92
40	68	79.40	25.81	36.84	11.32	57.05	136.92
45	62	72.96	25.81	36.84	11.22	50.71	136.92
50	58	67.57	25.81	36.84	10.91	45.64	136.92
55	54	63.00	25.81	36.84	10.48	41.49	136.92
60	51	59.06	25.81	36.84	10.00	38.03	136.92
65	48	55.63	25.81	36.84	9.49	35.11	136.92
70	45	52.61	25.81	36.84	8.98	32.60	136.92
75	43	49.93	25.81	36.84	8.48	30.43	136.92
80	41	47.54	25.81	36.84	7.99	28.53	136.92
85	39	45.39	25.81	36.84	7.51	26.85	136.92
90	37	43.44	25.81	36.84	7.06	25.36	136.92
95	36	41.67	25.81	36.84	6.62	24.02	136.92
100	34	40.05	25.81	36.84	6.20	22.82	136.92
105	33	38.56	25.81	36.84	5.80	21.73	136.92
110	32	37.20	25.81	36.84	5.42	20.75	136.92
115	31	35.93	25.81	36.84	5.06	19.84	136.92
120	30	34.76	25.81	36.84	4.71	19.02	136.92
125	29	33.67	25.81	36.84	4.38	18.26	136.92
130	28	32.65	25.81	36.84	4.07	17.55	136.92
135	27	31.70	25.81	36.84	3.77	16.90	136.92
140	26	30.80	25.81	36.84	3.48	16.30	136.92
145	26	29.96	25.81	36.84	3.20	15.74	136.92
150	25	29.17	25.81	36.84	2.93	15.21	136.92
180	22	25.26	25.81	36.84	1.55	12.68	136.92
210	19	22.34	25.81	36.84	0.45	10.87	136.92
240	17	20.08	25.81	36.84	0.00	9.06	130.40
270	16	18.27	25.81	36.84	0.00	7.25	117.41
300	14	16.79	25.81	36.84	0.00	5.77	103.77
330	13	15.55	25.81	36.84	0.00	4.53	89.61
360	12	14.50	25.81	36.84	0.00	3.47	75.01
390	12	13.59	25.81	36.84	0.00	2.57	60.03
420	11	12.80	25.81	36.84	0.00	1.78	44.75
450	10	12.11	25.81	36.84	0.00	1.08	29.18
480	10	11.49	25.81	36.84	0.00	0.46	13.38
510	9	10.94	25.81	36.75	0.00	0.00	0.00
540	9	10.44	25.81	36.25	0.00	0.00	0.00

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A FINE PARTICLE SIZE DISTRIBUTION

Project Name: 475 Terry Fox Dr.
Location: Ottawa, ON
OGS #: OGS

Engineer: D. B. Grey Engineering Inc.
Contact: Ryan Faith
Report Date: 7-Jul-25

Area	1.205	ha	**Rainfall Station #**	215	
Weighted C	0.71		**Particle Size Distribution**	FINE	
CDS Model	2025		**CDS Treatment Capacity**	45	l/s

Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (l/s)	Treated Flowrate (l/s)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.5	9.2%	9.2%	1.2	1.2	2.6	98.1	9.0
1.0	10.6%	19.8%	2.4	2.4	5.2	97.4	10.3
1.5	9.9%	29.7%	3.6	3.6	7.9	96.6	9.6
2.0	8.4%	38.1%	4.8	4.8	10.5	95.8	8.0
2.5	7.7%	45.8%	5.9	5.9	13.1	95.1	7.3
3.0	5.9%	51.7%	7.1	7.1	15.7	94.3	5.6
3.5	4.4%	56.1%	8.3	8.3	18.4	93.6	4.1
4.0	4.7%	60.7%	9.5	9.5	21.0	92.8	4.3
4.5	3.3%	64.0%	10.7	10.7	23.6	92.1	3.1
5.0	3.0%	67.1%	11.9	11.9	26.2	91.3	2.8
6.0	5.4%	72.4%	14.3	14.3	31.5	89.8	4.8
7.0	4.4%	76.8%	16.6	16.6	36.7	88.3	3.8
8.0	3.5%	80.3%	19.0	19.0	42.0	86.8	3.1
9.0	2.8%	83.2%	21.4	21.4	47.2	85.3	2.4
10.0	2.2%	85.3%	23.8	23.8	52.5	83.8	1.8
15.0	7.0%	92.3%	35.7	35.7	78.7	76.3	5.3
20.0	4.5%	96.9%	47.6	45.3	100.0	66.9	3.0
25.0	1.4%	98.3%	59.5	45.3	100.0	53.5	0.8
30.0	0.7%	99.0%	71.4	45.3	100.0	44.6	0.3
35.0	0.5%	99.5%	83.2	45.3	100.0	38.2	0.2
40.0	0.5%	100.0%	95.1	45.3	100.0	33.4	0.2
45.0	0.0%	100.0%	107.0	45.3	100.0	29.7	0.0
50.0	0.0%	100.0%	118.9	45.3	100.0	26.7	0.0
							89.9

Removal Efficiency Adjustment[2] = 6.5%

Predicted Net Annual Load Removal Efficiency = 83%

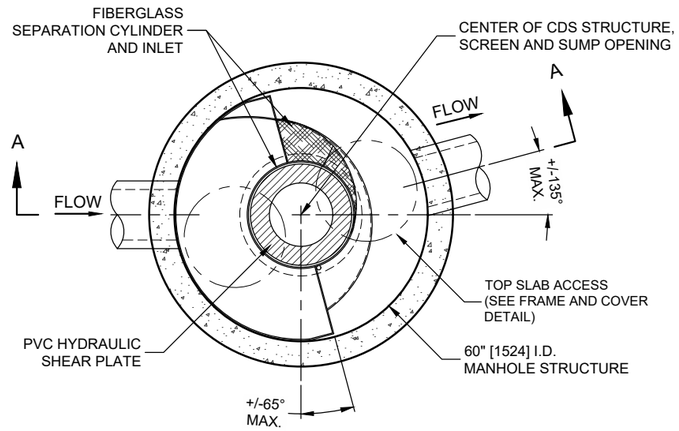
Predicted Annual Rainfall Treated = 99%

1 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa ON

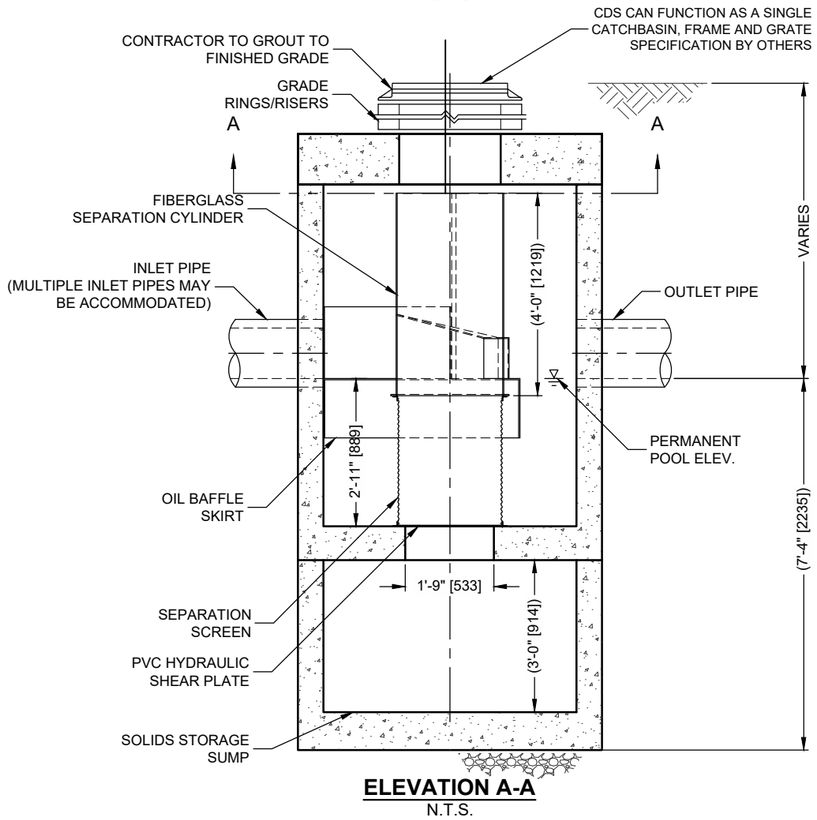
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

3 - CDS efficiency based on testing conducted at the University of Central Florida.

4 - CDS design and scaling based on original manufacturer model and product specifications.



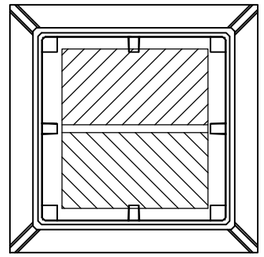
PLAN VIEW B-B
N.T.S.



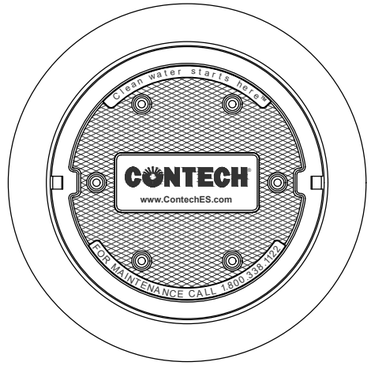
ELEVATION A-A
N.T.S.

CDS PMSU 2025-5-C DESIGN NOTES

THE STANDARD CDS PMSU 2025-5-C CONFIGURATION IS SHOWN.
ANTI-BUOYANCY SLAB MAY BE INCLUDED (NOT SHOWN).
SUMP DEPTH SHOWN IS TYPICAL, CAN BE EXTENDED AS REQUIRED.
HYDRAULIC CHARACTERISTICS VARY BASED ON PIPE SIZE, MATERIAL, AND CDS UNIT SELECTION. FOR CUSTOM HYDRAULIC ANALYSIS PLEASE CONTACT ECHELON ENVIRONMENTAL.
FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT ECHELON ENVIRONMENTAL.



FRAME AND GRATE
(DIMENSIONS VARIES)
N.T.S.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET HS20 (AASHTO M 306) AND BE CAST WITH THE CONTECH LOGO.
6. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

ECHELON ENVIRONMENTAL
55 ALBERT STREET, MARKHAM ON L3P2T4
CONTACT: INFO@ECHELONENVIRONMENTAL.CA
905-948-0000

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CONTECH ENGINEERED SOLUTIONS LLC

CDS PMSU 2025-5-C
ONLINE CDS
STANDARD DETAIL

DATE: 13-FEB-25
REVISION:1
DRAWN BY: PG

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
d.gray@dbgrayengineering.com

STORM SEWER CALCULATIONS

Rational Method

2-YEAR EVENT

Project: 475 Terry Fox Drive
6-Storey Apartment Buildings
Ottawa, Ontario

Date: October 28, 2025

Manning's Roughness Coefficient: 0.013

Location		Individual					Cumulative				Sewer Data							
From	To	Roof C = 0.90 (ha)	Hard C = 0.90 (ha)	Gravel C = 0.70 (ha)	Soft C = 0.20 (ha)	2.78AC	2.78AC	Time (min)	Rainfall Intensity (mm/hr)	Q Flow Rate (L/s)	Length (m)	Nominal Diameter (mm)	Actual Diameter (mm)	Slope (%)	Velocity (m/s)	Q_{Full} Capacity (L/s)	Time (min)	Q / Q_{Full}
CB-1	CB/MH-2	0.0050	0.0375		0.0075	0.1105	0.1105	10.00	77	8.49	6.9	250	250	2.5	1.92	94.03	0.06	9%
CB/MH-2	MH-3	0.0625	0.0800		0.0075	0.3607	0.4712	10.06	77	36.08	33.2	250	250	0.432	0.80	39.09	0.69	92%
MH-3	CB/MH-4					0.0000	0.4712	10.75	74	34.88	9.6	250	250	0.432	0.80	39.09	0.20	89%
CB/MH-4	MH-7	0.0225	0.0550		0.0175	0.2036	0.6748	10.96	73	49.48	8.5	300	300	0.34	0.80	56.39	0.18	88%
CB/MH-5	CB/MH-6	0.0425	0.1450		0.0700	0.5080	0.5080	10.00	77	39.02	22.2	300	300	0.34	0.80	56.39	0.46	69%
CB/MH-6	MH-7		0.0550		0.0225	0.1501	0.6582	10.46	75	49.41	23.1	300	300	0.34	0.80	56.39	0.48	88%
MH-7	MH-12							11.13	73	15.52	21	300	300	0.34	0.80	56.39	0.44	28%
CB-8	CB/MH-9	0.0350	0.0075		0.0150	0.1147	0.1147	10.00	77	8.81	17.8	250	250	0.432	0.80	39.09	0.37	23%
CB/MH-9	MH-12	0.0200	0.0100		0.0475	0.1015	0.2161	10.37	75	16.30	69.6	250	250	0.432	0.80	39.09	1.46	42%
CB-10	CB/MH-11	0.0150			0.0025	0.0389	0.0389	10.00	77	2.99	6.1	250	250	0.432	0.80	39.09	0.13	8%
CB/MH-11	MH-12	0.0475	0.0950		0.0375	0.3774	0.4163	10.13	76	31.77	15.2	250	250	1	1.21	59.47	0.21	53%
MH-12	MH-13							11.83	70	60.06	47.2	375	375	0.25	0.79	87.67	0.99	69%
MH-13	CB/MH-14							12.82	67	60.06	22 - Soleno HydroStor HS180 Chambers							
CB/MH-14	MH-15	0.0895	0.0600		0.0675	0.4116		12.82	67	50.11	19.7	450	456	0.195	0.80	130.43	0.41	38%
MH-15	CB/MH-16							13.23	66	50.11	7.1	450	456	0.195	0.80	130.43	0.15	38%
							Existing 600 mm Terry Fox Drive and Kanata Avenue Municipal Culvert:					600	610	0.5	1.55	453.74		