David Schaeffer Engineering Ltd.
120 Iber Road, Suite 103
Stittsville, ON K2S 1E9
613-836-0856
dsel.ca

DESIGN BRIEF

FOR

BARRHAVEN CONSERVANCY DEVELOPMENT CORPORATION

CONSERVANCY WEST - PHASE 6 SITE PLAN

CITY OF OTTAWA

PROJECT NO.: 21-1527

MAY 2026
1ST SUBMISSION

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare this Design Brief in support of a detailed engineering design for Phase 6 Site Plan of the Barrhaven Conservancy West development area on behalf of Barrhaven Conservancy Development Corporation (BCDC).

The subject Phase 6 site is located within Phase 5 and comprises 2.4 ha of the overall 16.3 ha Conservancy West Phase 5 area. The proposed site plan consists of stacked townhome blocks, open space, parking areas, and private roads.

This design brief demonstrates conformance with City of Ottawa design criteria and general industry practice. It aligns with applicable background studies, including the Conservancy West Phase 5 Design Brief. The objective of this report is to provide sufficient detail regarding the availability of site services to support the Site Plan Control application.

1.1 Site Plan Statistics

Phase 6 of the Conservancy West development consists of stacked townhome blocks, open space, parking areas, and private roads. The site plan is provided in Appendix A.

Population estimates for Phase 6 of the Conservancy West Subdivision are provided in Table 1, utilizing the occupancy rates from the City of Ottawa Design Guidelines for Water Distribution. Due to the individual units offering interior customization opportunities, the population estimates apply an occupancy rate of 2.3 persons per unit rather than the standard 2.1 persons per unit typically applied to a two bedroom dwelling to ensure a conservative and more accurate engineering design.

Table 1: Phase 6 Unit & Population Count

Housing	Count	Units	Occupancy Rate (p/unit)	Population
24 Unit Blocks	5	120	2.3	276
20 Unit Blocks	5	100	2.3	230
16 Unit Blocks	3	48	2.3	111
Phase 6 Totals		**268**	**-**	**617**

** NOTE:*

1. *Population projections may differ from population estimates used in background Transportation Studies, Planning Rationale, and other studies.*

1.2 Existing Conditions

The original Conservancy West property topography was relatively flat, with existing ground elevations varying between 91 m and 92 m. The subsurface profile generally consists of a thick layer of topsoil underlain by a silty clay deposit where it governs the permissible grade raise for this site.

The Conservancy West Phase 6 area falls within an area where the recommended permissible grade raise is 1.4 m, as shown on Figure PG5036-5 "Permissible Grade Raise Plan" by Paterson, enclosed in Appendix E for reference.

1.3 Pre-Consultation

The development team and City of Ottawa met on January 7, 2026 to discuss the proposed Site Plan Control application. The City of Ottawa provided pre-consultation feedback on the application dated January 14, 2026.

1.4 Required Permits / Approvals

The following additional approvals and permits listed in Table 2 are expected to be required prior to construction of the private infrastructure detailed herein. Other permits and approvals may be required, as detailed in the other studies submitted as part of the application for Site Plan Control.

Table 2: Potential Required Permits/Approvals

Agency	Approval Type	Trigger	Remarks
MECP	Permit to Take Water	Construction of proposed land uses (e.g. basements for residential homes) and services.	Pumping of groundwater may be required during construction, given groundwater conditions and proposed land uses and on-site/off-site municipal infrastructure.
City of Ottawa	MECP Form 1 – Record of Watermains Authorized as a Future Alteration.	Construction of watermains throughout the subdivision	The City of Ottawa will review the watermains on behalf of the MECP through the Form 1 – Record of Watermains Authorized as a Future Alteration.
MECP	Stormwater Management – Environmental Activity and Sector Registry O.Reg 137/25	Construction of private stormwater management infrastructure	Developer to register proposed stormwater management to the Environment Activity and Sector Registry in accordance with O.Reg 137/25
MECP	Environmental Compliance Approval. Ontario Water Resources Act S.53(1)	Establish new sanitary sewers designed to convey flow in excess of 10,000L/d.	City of Ottawa to review the sanitary sewers on behalf of the MECP through the transfer of review program.
City of Ottawa	Commence Work Notification (CWN)	Construction of new sanitary and storm sewers throughout the subdivision	The City of Ottawa will issue a commence work notification for construction of the sanitary and storm sewers once an approval is issued by the MECP.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

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

- Ottawa Sewer Design Guidelines, City of Ottawa, SDG004, December 2025 (Sewer Design Guidelines)
- Water Distribution Design Guidelines, City of Ottawa, WDG002, December 2025. (Water Supply Guidelines)
- Stormwater Planning and Design Manual Ministry of the Environment, March 2003. *(SWMP Design Manual)*
- Design Guidelines for Sewage Works, Ministry of the Environment, Conservation and Parks, 2008. (formerly MOECC) (MECP Design Guidelines)
- Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under an Environmental Compliance Approval, Ministry of Environment, Conservation and Parks, v2.0, May 31, 2023.
- Jock River Reach One Subwatershed Study Stantec, 2007 (Jock River SWS)
- Master Infrastructure Review – Barrhaven Conservancy David Schaeffer Engineering Ltd., July 2021 (Conservancy MIR)
- Sump Pump Feasibility Report, Proposed Residential Development, Conservancy Lands East and West, Ottawa, Ontario Paterson Group, December 5, 2022 (Project No. PG5036-1 LET.01 Rev3) (Sump Pump Memo)
- Geotechnical Investigation – Proposed Residential Development, Conservancy Lands West (Paterson Group, March 14, 2024);
- Adequacy of Services Report - Barrhaven Conservancy West – Phase 5 David Schaeffer Engineering Ltd., March 2024 (DSEL Report)
- Geotechnical and Hydrogeological Review – Long-Term Water Levels, Groundwater Conditions and LID Analysis Paterson Group, March 6, 2025 (Project No. PG5036-MEMO.44, Revision 2)
- Geotechnical Review – Groundwater Infiltration Paterson Group, June 16, 2025 (Project No. PG5036-MEMO.42, Revision 1)

  Barrhaven Conservancy West: Water Distribution System Analysis Phase 5, Stantec, April 2026 *(Stantec Hydraulic Analysis – West 2026)*

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property is located adjacent to the City of Ottawa's Pressure Zone (PZ) 3SW. The City of Ottawa has undertaken work to reconfigure the pressure zones servicing Barrhaven and the South Urban Community (SUC) in order to improve reliability and efficiency and to increase pumping capacity to accommodate for future growth in the area. There are three pumping stations servicing Zone 3SW and Zone SUC as follows: the Fallowfield Road Pumping Station (FRPS), the Barrhaven Pumping Station (BPS) and the Ottawa South Pumping Station (OSPS).

To connect to this broader municipal supply network, the following stubbed watermains, constructed through the Conservancy West Phase 5 lands, are available to service Phase 6 of the subject lands:

- A 200 mm diameter watermain plug coming from the 300mm diameter trunk on Street 1; and,
- A 200 mm diameter watermain plug coming from the 300mm diameter trunk on Street 4.

3.2 Water Supply Servicing Design

The proposed water distribution network will include 200 mm watermains and 50 mm diameter service laterals, arranged along the private road network in accordance with the general layout presented in the Drawing 4. Potable water will be supplied to the site plan through connections to the stub ends provided by the Conservancy West Phase 5 subdivision, with the watermain looped within the site plan block. The site will be serviced internally with meter chambers installed within the property boundary at the site entrances

The Stantec Hydraulic Analysis dated April 2026 was established to support the detailed design of the Phase 5 subdivision by confirming associated watermain sizing and redundancy needs as development progresses. Although intended for Phase 5, the information provided for Phase 6 remains consistent with the current design and the simulations performed across average day, peak hour, and maximum day plus fire flow scenarios to verify the distribution system are applicable.

3.2.1 Water Supply Design Criteria

The local watermain network was sized to meet maximum hour and maximum day plus fire flow demands. Table 4 summarizes the Water Supply Design Criteria employed in the preparation of the water demand estimate as provided by the City of Ottawa.

Table 3: Water Supply Design Criteria

Design Parameter	Value
Extracted from the City of Ottawa Design Guidelines, Water Distribution (December 2025)	
Residential – Multi-Level Townhome	2.3 p/unit
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
Stantec Hydraulic Analysis, Stantec, October 2025	
Residential – SFH, MLT	280 L/cap/day
Residential – Average Day Demand	Population x Demand
Residential – Max Day Demand	AVDY x 2.5
Residential – Peak Hour Demand	MXDY x 2.2
Fire Flow Requirement	6,300 L/min
During normal operating conditions desired operating pressure is within	350 kPa (50 psi) and 480 kPa (70 psi)
During peak hour conditions pressure must not drop below	275 kPa (40 psi)
During normal operating conditions pressure must not exceed	552 kPa (80 psi)
During fire flow operating pressure must not drop below	140 kPa (20 psi)

3.2.2 Water Demand Calculations

The domestic water demands used for the hydraulic analysis were determined based on the anticipated site population and the design criteria presented in Table 3. The resulting average day, maximum day, and peak hour demand rates are summarized in Table 4 and compared against the reported values in the Hydraulic Analysis (Stantec, 2026) included in Appendix B. The Hydraulic Analysis assumed a conservative occupancy rate of 2.7 persons per unit; this report applies a more accurate rate of 2.3 persons per unit, as explained in Section 1.1.

Table 4: Phase 6 Water Demands

Reference	Dwelling Type	Units	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
DSEL Phase 6 Demands	Multi-Level Townhome	268	617	2.00	5.00	11.00
Stantec Hydraulic Analysis	Multi-Level Townhome	268	724	2.35	5.86	12.90

The Phase 6 calculated demands are lower than those estimated in the Hydraulic Analysis across all demand scenarios, confirming that the analysis conclusions remain valid and applicable to the site.

3.2.3 Water Supply Results

This section summarizes the results of the hydraulic analysis for the subject site plan, including fire flow performance and system pressure under operating condition scenarios. Stantec Hydraulic Analysis included in Appendix B.

Fire Flow Requirements

The required fire flow for the development was established using the OBC/OFM method, given that the development is located within a private site block. A minimum required fire flow of 6,300 L/min was calculated for the residential areas

While the Stantec Hydraulic Analysis evaluates the combined demands of Phase 5A and Phase 6, the system maintains a fire flow capacity of 10,000 L/min at 20 psi residual pressure during a maximum day plus fire flow scenario. This performance is sustained under both existing pressure conditions and post SUC connection pressure conditions. Specifically, refer to the modeling results for Junction J383 and J385.

As the Phase 6 fire flow requirement of 6,300 L/min is well within the available system capacity of 10,000 L/min, the proposed distribution network is adequate to meet the fire flow demands of the development.

Available Service Pressures

The available pressure to service the Conservancy West Phase 6 site plan was modelled, and the results are shown in the following table.

Table 5: Available Service Pressures

Design Criteria	Service Pressures Analysis
During peak hour conditions pressure must not drop below 275 kPa (40 psi)	Peak Hour Demand Minimum Pressure = 450.92 kPa (65.4 psi)
During normal operating conditions pressure must not exceed 552 kPa (80 psi)	Average Day Demand Maximum Pressure = 610.19 kPa (88.5 psi)

Where maximum pressures exceed the City's operating threshold of 80 psi, pressure reducing valves (PRVs) will be installed. A pressure check will be conducted during construction to identify locations where pressures exceed the threshold.

While the existing conditions servicing pressures are currently non-compliant, the development will ultimately be serviced under SUC pressure conditions at a lower HGL of approximately 10 m (14 psi), at which point pressures will be acceptable.

3.3 Water Age Considerations

A water age analysis is not anticipated to be required for the phase 6 site plan, as the proposed watermain network will maintain a looped configuration from the initial stages of construction through occupancy. The two stub connections from Phase 5 ensure continuity with the existing municipal network, promoting adequate water turnover and limiting stagnation throughout the distribution system.

3.4 Water Supply Conclusion

The proposed water distribution network for the Conservancy West site plan – Phase 6 has been designed in accordance with the City of Ottawa Water Distribution Guidelines (2025) and the criteria established in the Stantec Hydraulic Analysis. The network will provide potable water to the development via connections to the existing municipal watermain infrastructure within the phase 5 subdivision, with the distribution system sized to meet both peak day demand and fire flow requirements while maintaining minimum residual pressures during all operating conditions.

The proposed network will maintain a looped configuration from the initial stages of construction, ensuring reliable pressure, adequate flow, and continuous water turnover. Modelling results confirm that a fire flow exceeding 6,300 L/min can be achieved under both pre and post-SUC conditions through the two connections to the City's water system, and that sufficient pressure is maintained throughout the distribution network to supply the development.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site was included in the design of the Barrhaven Conservancy West phase 5 Subdivision and will discharge into the existing 525 mm diameter sanitary trunk sewer located within the Barrhaven Conservancy East development, ultimately conveying flows to the South Nepean Collector (SNC).

Sanitary infrastructure has been extended from Street 4 to the boundaries of the subject lands to facilitate the build-out of the development. The existing system possesses the necessary connectivity and capacity to support the integration of flows from the Phase 6 site plan, as shown on the Sanitary Drainage Plan prepared by DSEL and included as Drawing 14.

4.2 Wastewater Design

The proposed wastewater collection system is detailed on Drawings 4, with corresponding plan and profiles shown on Drawings 5-10. To provide adequate service, the subject site plan requires the installation of sanitary sewers ranging from 50 mm to 200 mm in diameter throughout the site plan. Blocks 4, 5, 6, 10, 11, 12 and 13 will connect directly to the sanitary sewers within the adjacent public right-of-way, with one lateral servicing two units per block. Blocks serviced internally will follow the same configuration, with one lateral servicing the upper and lower units. Detailed sanitary calculation sheets are provided in Appendix C.

Where sanitary sewers are placed below the long-term ground water level as determined by Paterson, MH sections are to be sealed tight with gaskets between sections and wrapped by an approved external membrane (Blueskin).

Table 7 below summarizes the Design Standards to be employed in the design of the proposed wastewater sewer system.

Table 6: Wastewater Design Criteria

Design Parameter	Value
Current Design Guidelines	
Residential – Multi-Level Townhome	2.3 p/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Infiltration and Inflow Allowance	0.33 L/s/ha for all areas
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade

Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from the City of Ottawa Sewer Design Guidelines, December 2025.	

The following table presents the sanitary flow allocations assigned to Phase 6 within the Conservancy West design sheets.

The design sheet allocation flows have been highlighted for ease of review and are included in Appendix C.

Table 7: Wastewater Peak Flow Allocation vs Proposal

	Design Brief – Conservancy West Allocation (2026)	**Design Brief – Phase 6 (2026)**
Area (Ha)	2.44	2.44
Population	617	617

The results presented above confirm that the existing 525 mm receiving sewer has sufficient capacity to accommodate Phase 6.

4.3 Wastewater Servicing Conclusion

The Barrhaven Conservancy West Phase 6 site plan is proposed to discharge sanitary flows into the 525 mm diameter sanitary trunk sewer located within the Barrhaven Conservancy West development, which ultimately outlets to the Conservancy East development and to the South Nepean Collector (SNC).

The calculated contributing wastewater peak flows for Phase 6 were evaluated at Manhole 37A and verified against the allocated flows established within the Conservancy West design sheets. The results confirm that the existing 525 mm receiving sewer has sufficient capacity to accommodate the full projected build-out of Phase 6, with no upgrades to the receiving sanitary infrastructure required.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

The Conservancy West Phase 6 site plan is located within the broader Barrhaven Conservancy West subdivision and has been designed to integrate with the Phase 5 stormwater drainage system. As such, stormwater flows from the site plan are conveyed through Phase 5, ultimately to the Jock River via the existing Foster Ditch.

5.2 Stormwater Management Requirements

The stormwater management (SWM) design for the Conservancy West Phase 6 site plan was carried out in accordance with the requirements established under the Phase 5 Subdivision SWM design. The following summarizes the applicable requirements for the site:

- Quantity Control – No on-site quantity controls are required provided that the drainage and associated runoff coefficients are consistent with the Stormwater Drainage Plan (Appendix D).

- Quality Control –Required to provide 80% TSS removal prior to discharge into the receiving sewers regardless of the proposed treatment measures downstream of site per discussion with the City.

- The minor system flow is based on the rational method, assuming a 10-minute time of concentration with an assumed runoff coefficient of 0.80. Any excess flow that exceeds the assumed conveyance capacity will overflow to the major system.

- Hydraulic Grade Line – Consistent with the proposed subdivision, the proposed site plan development units will be on sump pumps and that the HGL requirements remain consistent with the subdivision requirements of 0 m above the proposed road surface.

- The site plan is required to manage the majority of flows, up to and including the 100-year design storm, and convey them via a proposed storm sewer to MH220 at the southern entrance of Street 4. Boundary areas adjacent to Streets 1, 2, 3, 4, and 8 were anticipated to convey a total drainage area of 0.63 ha of uncontrolled flows to the adjacent rights-of-way. As these boundary areas consist of clean runoff from roof and landscape surfaces, water quality control is not required.

- The site plan is also expected to incorporate non-structural infiltration BMPs such as roof leaders to grassed areas, reduced lot grading, and/or grassed swales.

5.3 Stormwater Management Design

In addition to the above requirements, the following conveyance design assumptions were applied in developing the Phase 6 SWM design:

- Storm sewers on private roads are to be designed to provide at least a 2-year level of service without any ponding.

- Under full flow conditions, the allowable velocity in storm sewers is to be no less than 0.80 m/s and no greater than 6.0 m/s;

- For the 100-year storm and for all roads, the maximum depth of water (static and/or dynamic) on streets, rear yards, public space and parking areas shall not exceed 0.35 m at the gutter.

- The major system shall be designed with sufficient capacity to allow the excess runoff of a 100-year storm to be conveyed within the private streets, public ROW, or adjacent to each, provided the water level does not touch any part of the building envelope; must remain below all building openings during the stress test event (100-year + 20%); and must maintain 15 cm vertical clearance between spill elevation on the street and the ground elevation at the nearest building envelope;

- When catchbasins are installed in rear yards or landscaped areas, safe overland flow routes are to be provided to allow the release of excess flows from such areas. A minimum of 30 cm of vertical clearance is required between the rear yard spill elevation and the ground elevation at the adjacent building envelope.

5.3.1 Proposed Minor System

The Conservancy West Phase 6 site plan will be serviced by an internal gravity storm sewer system generally following the private road network and proposed servicing blocks. Drainage will be conveyed through the underground piped sewer system to proposed MH220 at the southern entrance.

Street catch basins will collect drainage from the streets and landscaped areas, while boundary areas will discharge uncontrolled to the adjacent rights-of-way. The minor system has been designed using the Rational Method to capture drainage for storm events up to the 2-year return period without surface ponding.

The following table summarizes the standards employed in the detailed design of the storm sewer network. The drainage area information can be found in the Storm Drainage Plans and rational method design sheets provided in Appendix D.

Table 8: Storm Sewer Design Criteria

Design Parameter	Value
Minor System Design Return Period	1:2 year (PIEDTB-2016-01) for local roads, without ponding
Major System Design Return Period	1:100 year
Intensity Duration Frequency Curve (IDF) 2-year storm event: A=732.951 | B=6.199 | C=0.810	$i = \frac{A}{(t_c + B)^C}$

Minimum Time of Concentration	10 minutes
Rational Method	$Q = CiA$
Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Runoff coefficient for paved and roof areas	0.9
Runoff coefficient for landscaped areas	0.2
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n' for pipe flow	0.013
Minimum Depth of Cover	1.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	6.0 m/s
Clearance from 100-Year Hydraulic Grade	0 m between the top of maintenance hole elevation and 100-year hydraulic grade line.
Max. Allowable Flow Depth on Municipal Roads	35 cm above gutter (PIEDTB-2016-01)
Extent of Major System	To be contained within the private road and parking areas or adjacent to the ROW provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event (100-year + 20%) and 15 cm vertical clearance is maintained between spill elevation on the street and the ground elevation at the nearest building envelope (PIEDTB-2016-01)
Stormwater Management Model	PCSWMM (v. 7.7)
Model Parameters	Of = 76.2 mm/hr, Fc = 13.2 mm/hr, DCAY = 4.14/hr, D.Stor.Imp. = 1.57 mm, D.Stor.Per. = 4.67 mm
Imperviousness	Based on runoff coefficient (C) where Percent Imperviousness = (C - 0.2) / 0.7 x 100%.
Design Storms	Chicago 3-hour Design Storms and 24-hour SCS Type II Design Storms. Maximum intensity averaged over 10 minutes.
Climate Change Street Test	20% increase in the 100-year, 3-hour Chicago storm
Extracted from the City of Ottawa Sewer Design Guidelines, December 2025	

5.3.2 Proposed Major System

Overland flow is accommodated by storing stormwater up to the 100-year design event in road sags, routing additional surface flow along the road network and servicing blocks toward the Phase 5 rights-of-way and ultimately to the downstream stormwater outlets.

Boundary areas from the site plan that are adjacent to Streets 1, 2, 3, 4, and 8 were anticipated to convey a total drainage area of 0.63 ha of uncontrolled flows to the adjacent rights-of-way. Refer to the Drainage Plan in Appendix D.

The grading design includes a saw-toothed-road design with 0.10% minimum grade from high point to high point to maximize available surface storage for management of flows up to the 100-year design event where possible. The maximum depth of flow on local and collector streets is 0.35 m during the 100-year event. The depth of flow may extend adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event (100 year + 20%). There must be at least 15 cm of vertical clearance between the spill elevation on the street and the ground elevation at the nearest building envelope. There must be at least 30 cm of vertical clearance between the rear yard spill elevation and the ground elevation at the adjacent building envelope.

5.3.3 Quality Control

The proposed stormwater management system will utilize an Isolator Row treatment system to achieve the 80% Total Suspended Solids (TSS) removal requirement. The system captures and retains sediment within a designated row of chambers wrapped in woven geotextile fabric, which allows water to pass through while trapping solids within the chambers.

The Isolator Row was sized to treat the runoff volume generated by a 25 mm design storm. This sizing process utilizes the contributing drainage area and the weighted runoff coefficient to ensure the system provides sufficient filtration surface area and flow path length. See sizing calculations in Appendix D.

Isolator Row Operation & Maintenance

Maintenance of the isolator row system should be completed per manufacturers specifications. Generally, it is conducted through inspection ports to monitor sediment accumulation. When sediment depth reaches the manufacturer-recommended threshold of 75 mm, the system is cleaned using standard Jet Vac equipment, whereby a high-pressure water nozzle flushes debris to the upstream manhole for removal by vacuum truck. Collected materials must be transported to a licensed waste handling facility in accordance with Ontario Regulation 347 (General – Waste Management), and disposal of any waste on the property is prohibited. The Owner must ensure all contractors handling stormwater waste are properly licensed and comply with applicable environmental regulations.

The chambers should be inspected every six months during the first year, with frequency adjusted based on findings, and assessed for cracks, odours, deformation, and debris.

Sediment accumulation must be measured annually using inspection ports, and cleaning performed as required to prevent buildup. During winter and spring melt seasons, increased inspection frequency is recommended, as snowmelt can mobilize debris and sediment.

5.3.4 Foundation Drainage (Sump Pumps)

Consistent with the Conservancy West Phase 5 design, standard basement gravity connections to the storm sewer system are not feasible. Sump pumps will therefore be implemented for all residential blocks, as the site grading is constrained by the proximity of the Jock River and grade raise restrictions.

The City of Ottawa Sewer Design Guidelines, December 2025 outline the screening criteria for the use of sump pump systems for foundation drainage in greenfield developments on clay soils. The subject site has been assessed as meeting these criteria, consistent with previous phases of the Conservancy development. A supporting Sump Pump Feasibility Report was prepared by Paterson Group (December 2021) and is provided under separate cover.

5.4 Minor & Major System Analysis

The Phase 5 PCSWMM hydraulic model was updated to incorporate the detailed site plan design to analyze the capacity and performance of the proposed storm sewer network under both minor and major system conditions.

5.4.1 Hydraulic Grade Line Analysis

The hydraulic grade line (HGL) analysis was completed as part of the detailed design of Phase 6 to confirm sufficient freeboard between the HGL and the proposed centreline of road. As stated previously the Phase 6 lay out was incorporated into the existing Phase 5 PCSWMM model, replacing the assumptions previously made for the Phase 6 site plan block area, and the same modelling scenarios were run to confirm that the drainage system performance remains acceptable.

Consistent with the Phase 5 analysis, each catch basin in the system is modelled with orifice flow restrictions to simulate the hydraulic performance of CB grates. During significant rainfall events, this can result in minor ponding at catch basins due to the grate constriction. The HGL for the 100-year event and stress test (100-year + 20%) was analyzed under a fixed downstream elevation based on the 5-year spring water level on the Jock River, which is approximately 91.15 m throughout the site based on the November 2004 Jock River Flood Risk Mapping Hydraulics Report. For lower return periods, the 100-year spring water level on the Jock River was applied, ranging from 91.87 m per the RVCA.

As applied in the Phase 5 analysis, the following three modelling scenarios were assessed and results are included in Appendix D:

- 2-year through 100-year and stress test with 5-year Jock River boundary condition;
- 5-year with 100-year Jock River boundary condition; and
- 2-year through 100-year free flowing conditions for outlet channel design.

The maximum resulting HGL from the combination of these scenarios is reflected on the drawing set. As shown in Appendix D and on the engineering drawings, the majority of the proposed storm sewers will be surcharged; however, the HGL does not exceed the top of any catch basin grate or manhole rim elevation throughout the development. HGL analysis results are presented in Appendix D.

5.4.2 Overland Flow Ponding

Major system conveyance, or overland flow (OLF), is provided to accommodate flows in excess of the minor system capacity. OLF is managed by storing stormwater up to the 100-year design event in road sags and routing additional surface flow along the road network, as shown in the Storm Drainage Plans included as Drawing 15.

The Internal major system drainage is conveyed to a set of catch basins designed to capture the full major system flows prior to conveyance to the outlet. Boundary areas adjacent to Streets 1, 2, 3, 4, and 8 are anticipated to convey uncontrolled flows to the adjacent rights-of-way. The uncontrolled drainage areas are summarized in Table 9 and are consistent with the projected values established in the Conservancy West Phase 5 design.

Table 9: Uncontrolled Overland Flows

	Design Brief – Conservancy West (2026)	**Design Brief – Phase 6 (2026)**
Uncontrolled Area (Ha)	0.63	0.66
Runoff Coefficient	0.80	0.80

The PCSWMM model was used to verify the performance of the major system under the 100-year design storm and stress test conditions. Results confirm that ponding depths will not exceed 350 mm on both the Phase 5 right-of-way and the private street during both 100-year storm and the 100-year +20% stress. In addition, the product of flow velocity and depth remains within the accepted safe limit of 0.6 m^2/s throughout the development. Overland flow analysis results are presented in Appendix D.

5.5 Stormwater Management Conclusion

The stormwater drainage design for the Conservancy West Phase 6 site plan has been developed in accordance with the requirements established under the Phase 5 Subdivision, which was designed to accommodate the Phase 6 stormwater flows. With respect to stormwater quantity, no on-site control is required as the drainage area and runoff coefficients remain generally consistent with the Stormwater Drainage Plan in Appendix D. For water quality, a proposed Isolator Row treatment system satisfies the 80% TSS removal requirement prior to discharge into the downstream municipal sewers.

The Phase 6 layout was incorporated into the existing Phase 5 PCSWMM model, replacing the prior Phase 6 assumptions, and the analysis confirms that the drainage system performs consistently with the Phase 5 design and has sufficient capacity to convey excess flows during the 100-year storm event and safely capture and convey the 2-year flow to the proposed adjacent municipal storm sewers.

6.0 GRADING

The grading design for the Conservancy West Phase 6 site plan was developed to optimize earthworks across the site. In addition to the applicable City of Ottawa Guidelines, the following criteria were applied to the detailed design:

- Driveway slopes will have a maximum slope of 6%;
- Grading in grassed/landscaped areas to range from 2% to 3:1, with terracing required for slopes larger than 7%;
- Swales are to be 0.15m deep with 3:1 side slopes unless otherwise indicated on the drawings; and,
- Perforated pipe will be required for drainage swales if they are less than 1.5% in slope.

The proposed grading drawings are included in the design drawing package.

Grade Raise Exceedance

The detailed grading design has been prepared to mitigate exceedances of the permissible grade raise limits to the extent possible. Due to the severity of these restrictions, certain locations throughout the site still exceed the allowable limits.

In areas where proposed elevations surpass the allowable limits, mitigation measures will be required to ensure long-term soil stability and prevent settlement of the underlying silty clay. These measures must be coordinated with a licensed Geotechnical Engineer and may include lightweight fill, surcharge loading, or other techniques recommended by the geotechnical consultant. A detailed review and sign-off of the grading design by a licensed Geotechnical Engineer is required prior to construction.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion is a natural process governed by soil type, climate, and topography. Construction activity accelerates this process by removing vegetation and disturbing the upper soil layer, increasing the site's vulnerability to erosion losses. During construction, stormwater management objectives shift toward mitigating the environmental impacts of construction and protecting both existing and newly installed infrastructure. Erosion and sediment controls are to be in place prior to any topsoil stripping, earthworks, or infrastructure construction, and maintained throughout all phases of construction.

Drawings 17 & 18 provide direction to the contractor for controlling and treating runoff on site. The ESC plan is a living document that is reviewed at all stages of construction and following storm events.

The Owner is responsible for installing and maintaining temporary sediment and erosion control measures throughout construction. Inspections are required every two weeks and following each significant storm event, defined as a rainfall depth of 25 mm or greater within any 24-hour period. These measures are to remain in place until they are no longer required, at which point they shall be removed and all disturbed areas reinstated.

All grubbing, equipment storage, and construction activity are to be confined to the development envelope. Areas outside the development envelope are to remain undisturbed, and no fill is to be placed beyond the envelope unless a permit has been issued accordingly.

The following specific recommendations to the Contractor will be included in contract documents.

- Limit extent of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from leaving the site and entering existing watercourses, and clean and maintain throughout construction.
- Install catch basin inserts during construction to protect from silt entering the storm sewer system.
- Install plugs to protect infiltration trenches during construction.
- Install mud mats in order to prevent mud tracking onto adjacent roadways.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.
- Plan construction at proper time to avoid flooding.

- The Contractor will, at every rainfall, complete inspections to ensure proper performance.

- Erosion and sediment controls will remain in place until the working areas have been stabilized and re-vegetated.

8.0 UTILITIES

Utility services extending to the site may require connections to multiple existing infrastructure points: consultation with Enbridge gas, Hydro Ottawa, Rogers, and Bell is required as part of the development process to confirm the servicing plan for the subject lands.

9.0 CONCLUSION AND RECOMMENDATIONS

This Design Brief provides details on the planned on-site services for the Conservancy West Phase 6 site plan and is summarized as follows:

- The proposed water distribution network will be supplied via two 200 mm stub connections from the Conservancy West Phase 5 development, with the watermain looped within the site plan block. Hydraulic modelling confirms that the system has sufficient capacity to meet the fire flow requirement of 6,300 L/min and maintain minimum residual pressures under all operating conditions.

- The proposed sanitary sewer network has been designed in accordance with the City of Ottawa Sewer Design Guidelines (December 2025). The calculated peak flows for Phase 6, evaluated at MH37A, confirm that the existing 525 mm receiving sewer has sufficient capacity to accommodate the full build-out of the development, with no upgrades to the receiving sanitary infrastructure required.

- All residential units within the development will be serviced by sump pumps, as standard basement gravity connections are not feasible due to grade raise restrictions, HGL elevations, and proximity to the Jock River. The subject site has been assessed as meeting the City of Ottawa screening criteria for sump pump use in greenfield developments on clay soils.

- Stormwater flows from the Phase 6 site plan are conveyed through the Phase 5 storm sewer network to the Jock River via the Foster Ditch. No on-site quantity control is required provided that the drainage and runoff coefficients remain consistent with the Stormwater Drainage Plan. The proposed Isolator Row treatment system achieves the required 80% TSS removal.

- The Phase 6 layout was incorporated into the existing Phase 5 PCSWMM model and confirms that the drainage system has sufficient capacity to convey excess flows during the 100-year storm event and safely capture and convey the 2-year flow to the outlet. The HGL also does not exceed the top of any catch basin grate or manhole rim elevation throughout the development.

- Non-structural infiltration BMPs, including roof leaders directed to grassed areas, reduced lot grading, and grassed swales, have been incorporated into the design in accordance with the Jock River Reach One Subwatershed Study recommendations.

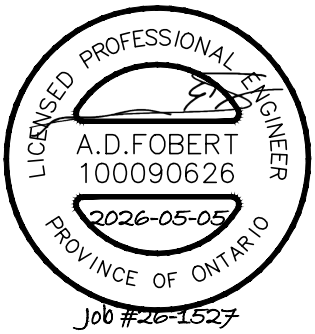
- The grading design has been developed to optimize earthworks and mitigate exceedances of the permissible grade raise limits. Where proposed elevations exceed allowable limits, mitigation measures are to be coordinated with and signed off by a licensed Geotechnical Engineer prior to construction.

- Erosion and sediment control measures will be implemented prior to the commencement of any earthworks and maintained throughout all phases of construction.

David Schaeffer Engineering Ltd.

Per: Martin Frechette, P.Eng.

David Schaeffer Engineering Ltd.



Per: Adam Fobert, P.Eng.

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