



David Schaeffer Engineering Ltd.

120 Iber Road, Suite 103

Stittsville, ON K2S 1E9

613-836-0856

dssel.ca

DESIGN BRIEF

FOR

**BARRHAVEN CONSERVANCY
DEVELOPMENT CORPORATION**

**PROPOSED RESIDENTIAL SITE
PLAN**

CONSERVANCY STACKED TOWNS

CITY OF OTTAWA

PROJECT NO.: 24-1398

SEPTEMBER 2025

© DSEL

**DESIGN BRIEF
FOR
PROPOSED RESIDENTIAL SITE PLAN**

BARRHAVEN CONSERVANCY DEVELOPMENT CORPORATION

PROJECT NO: 24-1398

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	Existing Conditions	1
1.2	Site Plan Layout	2
1.3	Consultation Summary.....	2
1.4	Required Permits / Approvals.....	2
2.0	GUIDELINES, PREVIOUS STUDIES, AND REPORTS	4
2.1	Existing Studies, Guidelines, and Reports	4
3.0	WATER SUPPLY SERVICING	7
3.1	Existing Water Supply Services	7
3.2	Water Supply Servicing Design	7
3.3	Water Supply Conclusion.....	8
4.0	WASTEWATER SERVICING	9
4.1	Existing Wastewater Services	9
4.2	Wastewater Design.....	9
4.3	Wastewater Servicing Conclusions	10
5.0	STORMWATER MANAGEMENT	11
5.1	Existing Stormwater Services	11
5.2	Stormwater Management Design and Objectives	11
5.3	Hydraulic Grade Line Analysis	13
5.4	Minor System Design	13
5.5	Major System Design	13
5.6	Grading and Drainage Design	13
5.7	Quantity Controls	14
5.8	Quality Controls	14
	5.8.1 Controlled Areas	14
	5.8.2 Stormtech Isolator Row Plus Drawdown Time	14
	5.8.3 Uncontrolled Areas	15

5.9	Operation and Maintenance	15
5.10	Stormwater Servicing Conclusions	15
6.0	EROSION AND SEDIMENT CONTROL	16
7.0	CONCLUSION AND RECOMMENDATIONS	17

DRAWINGS

Drawing 0	Title Page and Key Plan
Drawing 1	General Notes
Drawing 2	Details and Tables
Drawing 3	Details
Drawing 4	TWSI Details
Drawings 5	General Plan
Drawings 6	Lane 1 (STA. 0+0.000 to STA. 0+242.492)
Drawings 6	Private Street 4 & 6 Watermain Loop
Drawings 6	Street 4 Watermain & Street 6 Watermain Loop
Drawings 6	Private Street 4 & 6 Isolator Row Inlet
Drawing 9	Grading Plan
Drawing 10	Cross-Sections
Drawing 11	Sanitary Drainage Plan
Drawing 12	Storm Drainage Plan
Drawing 13	Static Ponding & 100 Year +20% Ponding Plan
Drawings 14-15	Erosion and Sediment Control Plans

TABLES

Table 1:	Development Statistics for BCDC East Condo Site Plan
Table 2:	Potential Required Permits/Approvals
Table 3:	Water Supply Design Criteria
Table 4:	Water Demand Proposed Conditions
Table 5:	Wastewater Design Criteria
Table 6:	Storm Sewer Design Criteria

APPENDICES

Appendix A General

- Overall Site Plan - Conservancy Stacked Towns

Appendix B Water Supply

- DSEL Fire Flow Calculation
- Barrhaven Conservancy East Water Distribution System Analysis – Final Report (Stantec Consulting Ltd., March 2025) – *Attached Under Separate Cover*

Appendix C Wastewater Collection

- DSEL 1398 Sanitary Design Sheet – Site Plan (August 2025)

Appendix D Stormwater Management

- SC-800 StormTech Chamber System Specifications and Design Drawings (August 2025)
- SC-800 Volume Calculations
- SC-800 TSS Removal Calculations
- ADS Drawdown Time Calculation
- DSEL 1398 Storm Design Sheet – Site Plan (July 2025)
- Geotechnical Review – Groundwater Infiltration (PG5036-MEMO.42 Rev 1, June 2025)
- Barrhaven Conservancy East Site Plan (Conservancy Stacked Towns) – SWM Analysis (JFSA, August 2025) – *Attached Under Separate Cover*

**DESIGN BRIEF
FOR
PROPOSED RESIDENTIAL SITE PLAN**

BARRHAVEN CONSERVANCY DEVELOPMENT CORPORATION

**CITY OF OTTAWA
PROJECT NO: 24-1398**

1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare a Design Brief in support of a site plan application for the stacked townhouse condo block within Barrhaven Conservancy East on behalf of the Barrhaven Conservancy Development Corporation (BCDC).

The overall Conservancy land area is approximately 139.7 ha (all land use components) and is located within the City of Ottawa urban boundary in the Barrhaven ward. The Conservancy East development area has previously had detailed design prepared and approved with initial phases of servicing/homebuilding currently under construction. The subject site plan block is within Phase 3 of the Conservancy East lands and is bound by the proposed townhomes fronting Les Emmerson (N) to the north, Les Emmerson (N) to the west, Conservancy Drive to the south, and Mineral Street to the east. The site plan block design (Q4 Architects Inc., April 2025) is provided in **Appendix A**.

The objective of this report is to provide sufficient detail with respect to the availability of site services to support the application of site plan control.

1.1 Existing Conditions

The **Conservancy East** lands containing the site plan block are relatively flat with the existing elevations ranging from 91.9 m in the north to 91 m in the south. All existing flows are either overland to the Jock River or conveyed to the Jock River by way of the Fraser-Clarke Watercourse (and its tributaries) and Borrisokane Road ditches which run through the subject property. The property is within the Jock River watershed and is under the jurisdiction of the RVCA.

1.2 Site Plan Layout

The proposed project consists of 10 blocks of stacked dwellings, above ground parking, walkways, and amenity space. See proposed site plan in **Appendix A**.

The predicted populations currently associated with the development concept are described in the following table below.

Table 1: Development Statistics for BCDC East Condo Site Plan

Land Use	Total Area (ha)	Projected Residential Units	Residential Population per Unit *	Projected Population
Stacked Townhouses	0.48	196	2.7	529
Parkette/Amenity	0.36			
Roads/parking/walkways	0.92			
Total	1.76	196		529

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

1.3 Consultation Summary

Consultation with the City of Ottawa Planning and Engineering Staff was initiated in July 2024 for the Conservancy East Stacked Condo block to review City Standards, submission requirements, and the availability of background information. The subject Site Plan was contemplated in the servicing of the Conservancy East Phase 3 & 4 subdivision area.

1.4 Required Permits / Approvals

The City of Ottawa must approve detailed engineering design drawings and reports prior to construction of the proposed infrastructure identified in this report.

The following additional approvals and permits listed in **Table 2** are expected to be required prior to construction of the municipal infrastructure detailed herein. Other permits and approvals may be required, as detailed in the other studies submitted as part of the Planning Act applications (e.g. *Tree Conservation Report, Phase 1 Environmental Site Assessment, etc.*).

Table 2: Potential Required Permits/Approvals

Agency	Permit/Approval Required	Trigger	Remarks
MECP / City of Ottawa	Environmental Compliance Approval	Construction of new sanitary & storm sewers.	MECP is expected to review the stormwater collection system and wastewater collection system by transfer of review.

MECP	Permit to Take Water	Construction of proposed land uses (e.g. basements for residential homes) and services.	Pumping of groundwater will be required during construction, given groundwater conditions and proposed land uses/ municipal infrastructure.
City of Ottawa	MOE Form 1 – Record of Watermains Authorized as a Future Alteration	Construction of watermains.	The City of Ottawa is expected to review the watermains on behalf of 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, SDG002, October 2012.
(City Standards)**
 - **Technical Bulletin ISDTB-2014-01, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, February 5, 2014.
(ISDTB-2014-01)**
 - **Technical Bulletin PIEDTB-2016-01, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, September 6, 2016.
(PIEDTB-2016-01)**
 - **Technical Bulletin ISTB-2018-01, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, March 21, 2018.
(ISTB-2018-01)**
 - **Technical Bulletin ISTB-2018-03, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, June, 2018.
(ISTB-2018-04)**
 - **Technical Bulletin ISTB-2019-02, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, July 8, 2019.
(ISTB-2019-02)**
 - **Technical Bulletin IWSTB-2024-04, Screening Criteria – Infiltration-type LIDs for Development,
City of Ottawa, September 12, 2024.**
- **Ottawa Design Guidelines – Water Distribution
City of Ottawa, July 2010.
(Water Supply Guidelines)**
 - **Technical Bulletin ISD-2010-2
City of Ottawa, December 15, 2010.
(ISD-2010-2)**
 - **Technical Bulletin ISDTB-2014-02
City of Ottawa, May 27, 2014.
(ISDTB-2014-02)**

- **Technical Bulletin ISTB-2018-02**
City of Ottawa, March 21, 2018.
(ISTB-2018-02)
- **Technical Bulletin ISTB-2021-03**
City of Ottawa, August 18, 2021
(ISTB-2021-03)
- **Technical Bulletin IWSTRB-2024-05**
City of Ottawa, November 18, 2024
(IWSTRB-2024-05)
- **Design Guidelines for Sewage Works,**
Ministry of the Environment, 2008.
(MOE Design Guidelines)
- **Stormwater Planning and Design Manual,**
Ministry of the Environment, March 2003.
(SWMP Design Manual)
- **Ontario Building Code Compendium**
Ministry of Municipal Affairs and Housing Building Development Branch,
January 1, 2010 Update.
(OBC)
- **Mississippi-Rideau Source Water Protection Plan,**
MVCA & RVCA, August 2014.
- **Erosion & Sediment Control Guidelines for Urban Construction,**
Greater Golden Horseshoe Area Conservation Authorities, December 2006.
- **Jock River Reach One Subwatershed Study**
Stantec, 2007
(Jock River SWS)
- **Design Brief for Barrhaven Conservancy East – Phase 3**
David Schaeffer Engineering Ltd., August 2025
(DSEL East Design Brief)
- **Barrhaven Conservancy East Water Distribution System Analysis (Final Report)**
Stantec, March 11, 2025
(Stantec Hydraulic Analysis)
- **Barrhaven Conservancy East Site Plan (Conservancy Stacked Towns) – Stormwater Analysis**
JFSA, August 2025
(JFSA SWM Analysis)

- **BCDC Phase 3 SWM Quality Control and Treatment Train Analysis**
JFSA, August 27, 2025
(JFSA Quality Control Memo)
- **Stormwater Management Report for Phase 3 of the Barrhaven Conservancy East**
JFSA, August 2025
(JFSA Ph.3 SWM Analysis)
- **Geotechnical Investigation, Proposed Residential Development, Conservancy Lands East, Ottawa, Ontario**
Paterson Group, March 14, 2024 (Project No. PG5036-1 Revision 7)
(Geotechnical Report)
- **Geotechnical Review – Groundwater Infiltration**
Paterson Group, June 16, 2025 (PG5036-MEMO.42 Revision 1)
(Paterson GW Infiltration Memo)
- **Compilation of Relevant Geotechnical and Hydrogeological Documents**
Paterson Group, August 18, 2025 (PG5036-LET.02)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The Conservancy East lands are located adjacent to the City of Ottawa's Pressure Zone (PZ) 3SW (previously known as PZ BARR). PZ SUC services the lands that are east of the subject property, as well as south of the Jock River.

An extension of the watermain network is proposed within the Conservancy East Subdivision, which will also provide a feed for the subject site plan block. The watermain for the subdivision were designed in accordance with the **Stantec Hydraulic Analysis** prepared by Stantec (March 2025) included under separate cover.

3.2 Water Supply Servicing Design

As shown in **Drawing 5**, water servicing will be provided internal to the site via 200mm and 150mm watermain that will be looped within the site plan block and connect to the 200mm diameter watermain on Mineral Street and Les Emmerson (N). Units 1-4 within Blocks 1 and units 7-10 within Block 9 will be serviced via 50mm copper watermain fed from the 150mm watermain off Private Street 6 and 4, respectively. The subject lands will be metered at the connections to Les Emerson Drive (N) and Mineral Street, and all mains contained within are private.

The **Stantec Hydraulic Analysis** estimated the required fire flow at 105 L/s (6,300 L/min). The City of Ottawa's recent Technical Bulletin (IWSSTB-2024-05) states that the requirement for levels of fire protection on private property in urban areas is covered in Section A-3.2.5.7 of the OBC and as such a fire flow requirement of 6,300 L/min was determined for the subject site plan blocks (Block 10) as outlined in Appendix A of the **Stantec Hydraulic Analysis**. The updated boundary conditions from the City, received on January 16, 2025, have been used to update the hydraulic model to demonstrate conformance with City guidelines. The updated boundary conditions used in the hydraulic analysis of Conservancy East, which includes the Site Plan block, can be found in Appendix B of the **Stantec Hydraulic Analysis**.

Table 3: Water Supply Design Criteria

Design Parameter	Value
Extracted from Section 4: Ottawa Design Guidelines, Water Distribution (July 2010)	
Residential – Detached Single	2.3 p/unit
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480kPa
During fire flow operating pressure must not drop below	140 kPa
Stantec Hydraulic Analysis, Stantec, June 2022 for Population Exceeding 3000 Persons	
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	13,000 L/min

Table 4 summarizes the estimated water supply demands seen in **Stantec Hydraulic Analysis** for the proposed site plan (Phase 4) based on the **Water Supply Guidelines**. Fire flows were estimated for the most constrained blocks within the site plan and yielded a required fire flow of 6,300 L/min.

Table 4: Water Demand Proposed Conditions

Design Parameter	Estimated Demand ¹ (L/min)	Boundary Condition (m H ₂ O / kPa)
Average Daily Demand	103.2	
Max Day + Fire Flow	257.4 + 6,300= 6557.4	
Peak Hour	565.8	
1) Water demand calculation per Water Supply Guidelines . See Appendix B for detailed calculations.		

3.3 Water Supply Conclusion

The site plan blocks will be serviced internally with meter chambers installed within the property boundary at the site entrances. The looped watermain network ultimately connects to the Conservancy East subdivision at Les Emmerson Street (N) and Mineral Street. The system has been reviewed for required domestic demand and fire flows and meets all necessary requirements.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site was considered in the design of the Barrhaven Conservancy East Subdivision and will drain to the existing SNC sanitary sewer which serves as the ultimate outlet for the overall development. Please refer to the **Sanitary Drainage Plan** prepared by DSEL, included as **Drawing 11**.

4.2 Wastewater Design

The site plan blocks fronting the Les Emmerson Drive (N), Conservancy Drive, and Mineral Street will connect directly to the sanitary sewers within the public ROW with one lateral servicing two units (upper and lower). The internal sanitary sewer layout within the site plan will consist of a 200mm PVC sanitary sewer that will follow Lane 1, connecting to Les Emmerson (MH17A) at the west and Mineral Street (MH46A) at the east. Internally, one lateral will service two units (upper and lower).

The site plan has an estimated population of 529 persons and as such total flows to the existing SNC sanitary sewer will be marginally increased, however, capacity is available to accommodate the site plan block as demonstrated in the **DSEL East Design Brief**. The Conservancy East Subdivision sewer design sheet is included in **Appendix C**.

Table 5 below summarizes the design standards used in the development of the proposed wastewater sewer system for the Barrhaven Conservancy East Subdivision. The sanitary calculation sheets have been updated to reflect the revised population and are included in **Appendix C**.

Table 5: Wastewater Design Criteria

Design Parameter	Value
Current Design Guidelines	
Residential – Stacked TH Condo	2.3 p/unit
Average Daily Demand	280 L/d/person
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Commercial / Institutional Flows	28,000 L/ha/day
Commercial / Institutional Peak Factor	1.5
Infiltration and Inflow Allowance	0.33 L/s/ha
Park Flows	28,000 L/ha/d
Park Peaking Factor	1.0
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$
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
<i>Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012, and associated Technical Bulletins.</i>	

4.3 Wastewater Servicing Conclusions

The subject property will be serviced by local sanitary sewers which will outlet to the existing infrastructure. The subject site has been contemplated in the downstream sewers. Sufficient capacity exists to support the development.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

As discussed in the **DSEL East Design Brief** the development of the site plan block was considered in the detailed subdivision design.

5.2 Stormwater Management Design and Objectives

The **DSEL East Design Brief** and **JFSA Ph.3 SWM Analysis** made the following assumptions regarding the proposed site plan block:

- The site plan block has a drainage area of approximately 1.76 hectares with 81% imperviousness.
- As modeled in the **JFSA SWM Analysis** the site plan block shows a drainage split where the minor system outlets to MH704 at Les Emmerson Drive (N) and to MH507 on Mineral Street. Flows within the site plan are directed to the two ADS Stormtech Chambers where they receive quality treatment and ultimately outlet to the subdivision minor system.
- The excess major system flows were anticipated to drain east and west overland to Les Emmerson Drive (N) and Mineral Street and subsequently to the Jock River.
- Quality and erosion treatment for the site plan block will be controlled within the site boundaries except for a portion that will drain to nearby roads or rear yard swales within the greater subdivision. These areas have been considered in the overall SWM design using the treatment train approach. Analysis is provided for these areas within the **JFSA Quality Control Memo**.
- The 100-year Chicago 3 Hour Event & 5-year Jock River Water Level results in a Hydraulic Grade Line (HGL) as reported in *Table 3* of the **JFSA SWM Analysis**.

On-site storm flows will be captured by local CB infrastructure and allocated to the two Stormtech Isolator Row Plus chambers within the parking areas. **Table 6** below summarizes the design standards used for the proposed on-site storm sewer system. Storm calculation sheets for the subject property have been appended to this technical brief in **Appendix D**.

Table 6: Storm Sewer Design Criteria

Design Parameter	Value
Minor System Design Return Period	1:2 year (PIEDTB-2016-01) for private 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 5-year storm event: A = 998.071 B = 6.053 C = 0.814	$i = \frac{A}{(t_c + B)^C}$
Minimum Time of Concentration	10 minutes
Rational Method	$Q = CiA$

Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$
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 Line to Building Opening	0.30 m
Design Parameter	Value
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 15cm 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 (version 7.4) – See JFSA report File No. 1474(03) in Appx D
Model Parameters	Fo = 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.
Historical Events	July 1st, 1979, August 4th, 1988 and August 8th, 1996
Climate Change Street Test	20% increase in the 100-year, 3-hour Chicago storm
<i>Extracted from City of Ottawa Sewer Design Guidelines, October 2012, and ISSU, and based on recent residential subdivisions in City of Ottawa.</i>	

5.3 Hydraulic Grade Line Analysis

A detailed hydraulic grade line (HGL) modelling analysis has been completed for the proposed system based on the 100-year 3-hour Chicago and 24-hour SCS design storms, including historical design storms and climate change stress test as required. The HGL and freeboard clearances are tabled in **JFSA SWM Analysis** for reference and submitted under separate cover.

5.4 Minor System Design

The minor stormwater management system conveys internal site runoff to the downstream municipal storm network. Stormwater is collected on-site through a network of catch basins (CBs) and storm sewers, which direct flows to MH704 via a 600 mm diameter storm sewer along Les Emmerson Drive (North) and to MH507 via a 675 mm diameter storm sewer along Mineral Street, both part of the broader Conservancy East Subdivision infrastructure.

Each catch basin in the system is modeled with orifice flow restrictions to simulate the hydraulic performance of CB grates. During significant rainfall events, this can result in minor ponding at CBs due to the grate constriction. Despite this, the system is engineered to ensure that the hydraulic grade line (HGL) for the 100-year design storm remains below ground surface at all maintenance holes. The peak outflows from the site under free outlet conditions are detailed in **Table 1** of the **JFSA SWM Analysis**. Per the JFSA analysis, the minor system peak outflows to MH704 and MH507, using the 100-year 3-hour Chicago design storm, are 222 L/s and 268 L/s, respectively. Overall, the minor system design meets the City of Ottawa's design criteria and ensures effective stormwater conveyance within the site. See storm design sheet within **Appendix D** demonstrating minor system peak flows.

5.5 Major System Design

Major system conveyance, or overland flow (OLF), is provided to accommodate flows in excess of the minor system capacity. OLF is accommodated by generally storing stormwater up to the 100-year design event in road sags then routing additional surface flow along the road network and rear yards storm retention tank between Lane 1 and Private Street 4 & 6, as shown in the Storm Drainage Plans, included as **Drawing 12**.

5.6 Grading and Drainage Design

The following additional grading criteria and guidelines are applied to detailed design, per City of **Ottawa Guidelines** and standard industry practices:

- Slope in grassed areas will be between 2% and 7%;
- Grades in excess of 7% will require terracing to a maximum of a 3:1 slope;
- 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;
- Grades within the roads and parking stalls are limited to min 1% and max 5%.

Drawing 9 illustrates the proposed detailed grading. External areas north of the development will be captured by the proposed system in the interim condition. It is expected that once

those parcels are developed, stormwater will be attenuated on-site and directed toward Mineral Street and Les Emmerson Drive (N) per City Standards. Where required, External lands to the east will be conveyed around the development in a cut of swale.

5.7 Quantity Controls

As outlined in **Section 1.1.4** of the **JFSA SWM Analysis**, the site does not have specific quantity control requirements as it will outlet to the lower reaches of the Jock River. However, runoff must be managed to avoid impacting the downstream storm sewer system. To address this, the site plan modeling is integrated into the broader subdivision model, enabling unified assessment of runoff and HGLs. No ICDs are proposed within this development.

5.8 Quality Controls

5.8.1 Controlled Areas

The subject lands are required to provide quality controls prior to directing stormwater to the municipal sewers and ultimately the Jock River. Quality control is provided through two Stormtech Isolator Row Plus chambers which are ETV rated and will provide 80% TSS removal within the site. This system will include CB Shields and deep sump catch basins to minimize the frequency of system maintenance.

Quality control is proposed by filtration through two Stormtech Isolator Row Plus chambers with an underdrain system at strategic locations within the site. The StormTech Isolator Row Plus chambers treat runoff from smaller rain events (up to the 25 mm) by directing flow into the Isolator Row chamber. For larger storms, excess flow bypasses the Isolator Row to prevent disturbance of trapped materials and is directed to the adjacent chamber row. When inflows exceed the Isolator Row's capacity, excess flow passes through the manifold/bypass and spreads into adjacent row both horizontally through the shared stone layer and vertically into neighboring chambers. This design maintains treatment performance while effectively distributing high flows across the chamber bed, protecting the system's long-term function.

This ensures effective treatment of frequent and higher TSS concentrated runoff while maintaining system performance during larger events. **Appendix D** contains the layouts provided by the manufacturer which have been incorporated into the design plans.

Appendix D contains detailed description and calculations demonstrating that 80% TSS removal will be achieved through the Stormtech Isolator Row Plus systems.

5.8.2 Stormtech Isolator Row Plus Drawdown Time

The drawdown time within the StormTech chamber system is ultimately governed by the capacity of the underdrain network and the rate at which volume can be dewatered is dictated by the hydraulic characteristics of the underdrain system that is situated approximately 0.2m below the chamber outlet invert.

The filter fabric and sediment accumulation may add localized resistance to flow; however, this worst-case scenario has been captured within the calculation provided by the manufacturer. Once water has passed through the chamber storage media and reached the underdrain, the drawdown rate is limited by the conveyance capacity of the underdrain.

Correspondence with the manufacturer, ADS, has been provided in Appendix D confirming that the drawdown time below the chamber outlets is approximately 1-2 hours.

5.8.3 Uncontrolled Areas

A 0.53ha of uncontrolled flow due to grading constraints will be treated by the subdivisions treatment train system which are tributary to a downstream OGS units sized with consideration for the subsection lands. Consideration of these areas have been assessed in the **JFSA Quality Control Memo**. The **Storm Drainage Plan** found in **Appendix D** highlights which downstream OGS unit the uncontrolled flows are tributary to in order to demonstrate that these uncontrolled flows will be treated appropriately.

5.9 Operation and Maintenance

The StormTech SC-800 Isolator Row Plus system requires regular inspection and cleaning to maintain performance. Inspections should occur every six months in the first year and be adjusted based on sediment buildup. If sediment reaches 3 inches, the system is cleaned using a JetVac process until clear water is observed. All covers are then replaced, and observations are recorded. To protect the system, upstream structures should also be cleaned. Filter cloth within CBs are recommended during construction to prevent debris and sediment entry. Furthermore, CB Shields proposed within the site capture debris and sediment in the deep sump catch basins before it enters the Stormtech chambers. They should be inspected every 6 months and after major storms, with debris removed and components cleaned or replaced as needed to maintain flow and performance. A site-specific OM manual has been developed for the site plan block and is provided in attached under separate cover.

5.10 Stormwater Servicing Conclusions

The SWM design for the site plan block assumes that all flow is ultimately directed to the Jock River, with on-site filtration via two Stormtech Isolator Row Plus chambers providing 80% TSS removal, as well as deep sump catchbasins and CB shields providing pretreatment for the site plan area. For uncontrolled drainage areas within the site plan block, the treatment of these areas is in conformance with the overall development treatment train approach for water quality control.

6.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. The extent of erosion losses is exaggerated during construction where vegetation has been removed and the top layer of soil becomes agitated. Prior to topsoil stripping, earthworks or construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fencing will be installed around the perimeter of the active part of the site (and headwater features) and will be cleaned and maintained throughout construction. The silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catchbasins will have catchbasin inserts installed during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access to prevent mud tracking onto adjacent roads.

The following additional 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 entering any existing ditches.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.

The Contractor will be required to complete regular inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not flowing under silt barriers.
- Clean and change inserts at catch basins.

7.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by BCDC to prepare a Design Brief in support of their application for site plan control. The preceding report outlines the following:

- Water – surrounding water main infrastructure within the Conservancy East Subdivision is available to support the subject lands. Sufficient pressure is available within the City's desired pressure range.
- Wastewater – Sanitary sewers within the development have been proposed or are under construction. The sanitary sewer network will be available and have capacity to support the site plan block.
- Stormwater – Storm servicing was considered in the design of the receiving sewers and downstream storm sewer system. The subject property consists of a series of catchbasins and gravity sewers that allocate flows to two Stromtech Isolator Row Plus chambers that will provide 80% TSS removal. Runoff from the development will be pretreated by CB shields and deep sump CBs and will ultimately outlet to Phase 3 of the Conservancy East subdivision.

The submitted materials demonstrate that the water, sanitary, and storm services currently proposed and/ or under construction can accommodate the contemplated development.

Prepared by,
David Schaeffer Engineering Ltd.



Per: Peter Mott, P.Eng.
© DSEL



David Schaeffer Engineering Ltd.

120 Iber Road, Suite 103

Stittsville, ON K2S 1E9

613-836-0856

dsel.ca

APPENDIX A

SITE AREA	17,615.32 m ² (1.76 ha)
PAVED AREA	5874m ² (33.34%)
LANDSCAPED AREA	7057.08 m ² (40.06%)
TOTAL BUILDING COVERAGE	4684.2325 m ² (26.592%)
TOTAL GROSS FLOOR AREA	17,617,5428 m ²
DENSITY (UPH)	111 UPH
ZONE CATEGORY	R4(2)

DWELLING BLOCK	DWELLING TYPE	GROSS FLOOR AREA (m ²)	UNITS
BLOCKS 8 - 10	24 UNITS STACKED DWELLING		48
BLOCKS 4 - 5 - 6 - 7 - 9	20 UNITS STACKED DWELLING		100
BLOCKS 1 - 2 - 3	16 UNITS STACKED DWELLING		48
TOTAL UNITS			196

ZONE PROVISION - PLANNED UNIT DEVELOPMENT		REQUIRED	PROPOSED
162A(2)	Min. Lot Area (m2)	1400 m ²	17615.32 m ²
162A(2)	Min. Lot Width (m)	18	223.9
162A(2)	Min. Front Yard Setback (m)	3	>3.4
162B.6	Min. Rear yard setback (m)	6	4.5
162B(2)	Min. Corner side setback	3	3
162A(2)	Max building Height (m)	15	13.5
161	Landscaped Area	30%	39%
131.1	Min. Width of Private Way / Parking Aisle (m)	6	6.1
131.4a	Min. Setback for Any Wall of a Residential Building Within a Planned Unit Development	1.2	5
131.2	Min. setback for any wall of a residential use building to a private way	1.8	>4.5
137	AMENITY AREA		
137.6	Total min. amenity area (4m ² per unit)	1176 m ²	4903.67 m ²
137.6	Min. Communal Amenity Area m ² (Min. 50% area)	588 m ²	2481.42 m ²
45	PERMITTED PROJECTION INTO REQUIRED YARDS		
65.5.i	Fire escapes, Open Stairways, Stoop (m)	>0.6m to lot line	0.5 m
65.6.a(i)	Covered or Uncovered Balcony, Porch and Deck	2m no closer than 1 to a lot line	2m no closer than 1.74 to a lot line

PARKING REQUIREMENTS		REQUIRED	PROPOSED
101 (Table R10)	Resident Parking - 1.2 spaces/unit	235	19% (1.0)
102 (Table column III)	Visitor Parking - 0.2 spaces/unit	39	22 (0.11)
106.1	Min. Perpendicular Parking Space Size (m)	2.4 x 5.2	2.6 x 5.2
107 (Table 107.d)	Min. Requires Aisle Width	6.0	6.1
BARRIER FREE PARKING			
Traffic and Parking By-law Section 111	Min. Barrier Free Parking **	1	1
BICYCLE STORAGE			
111	Min. bicycle parking space dimension, horizontal (m)	Width: 0.6m Length: 1.8m	0.6 1.8
111A(b)	Min. bicycle parking space access aisle Width (m)	1.5	1.5
111.1.1	Min. Bicycle Parking 0.5 spaces/unit	98	100
110(a)(b)	LANDSCAPE AREA SURROUNDING PARKING LOT		
110.a	Abutting a Street (m)	3	>16m
110.b	Not Abutting a street (m)	3	>3m
110.1.b	Min. % of parking lot landscape	15%	>19%
REFUSE COLLECTION AREAS			
110			
110.3b	Min. Waste collection setback to lot line	3	>30m
110.3.c/d	Opaque Screen Min. Height (m)	2	2***

**Per the 2015 Guide Accessibility Design Standards - Section 3.1.1 Design of Public Parking, 4% of parking spaces provided for public use must be accessible. 1 of the provided 21 visitor spaces have been designed to be barrier-free. 1 Type A site provided.		PH X		
***Section 110(3)(d) where an in-ground refuse container is provided, the screening requirement of Section (3)(c) above may be achieved with soft landscaping (Bylaw 2020-299)				
GARBAGE: REQUESTED BY ZONING:		0.231 X 196 = 45.27 CUBIC YARD (6.5 CU.YD./BIN)	= 7 BINS	PROPOSED: 8 BINS
GARBAGE: 0.231 CUBIC YARD /UNIT		0.018 X 196 = 0.34 CUBIC YARDS (6.5 CU.YD./BIN)	= 1 BIN	PROPOSED: 1 BIN
RECYCLING (GMP) 0.018 CUBIC YARD /UNIT		0.062 X 196 = 12.15 CUBIC YARDS (6.5 CU.YD./BIN)	= 2 BINS	PROPOSED: 2 BINS
RECYCLING (FIBRE) 0.062 CUBIC YARD /UNIT		240 L X 3.92 = 940 L (240 L /BIN)	= 4 BINS	PROPOSED: 4 BINS
ORGANIC 240L PER 50 UNITS			TOTAL BINS = 14 BINS	TOTAL PROPOSED: 15 BINS

- SITE PLAN NOTES
- DO NOT SCALE DRAWINGS FOR PRINT.
 - THIS DRAWING IS THE EXCLUSIVE PROPERTY OF Q4 ARCHITECTS AND CAIVAN . COPYRIGHT RESERVED.
 - WALKWAYS AND CURBS TO BE TIED INTO PUBLIC ROW WHERE APPLICABLE.
 - REFERENCE CITY OF OTTAWA T.W.S.I. DETAIL SC7.3

Q4A
ARCHITECTS

Q4 ARCHITECTS INC.

410 YONGE STREET
Suite 602, Toronto ON,
M2P 2B7

T: 416.322.6334
F: 416.322.7294
E: info@q4architects.com

The contractor / builder must verify all dimensions on the job and report any discrepancy to the designer before proceeding with the work.

Drawings are NOT to be scaled. All drawings and specifications are instruments of service and the copyright property of the designer and must be returned upon request.

Q4 Architects Inc. retains the copyright in all drawings, plans, sketches, and all digital information. They may not be copied or used for any other projects or purposes or distributed without the written consent of Q4 Architects Inc.

LEGEND

STACKED TOWNS	NO PARKING
ENTRANCE	BARRIER FREE PARKING
BALCONY	BARRIER FREE PARKING SIGNAGE
PORCH	V VISITOR PARKING
PROJECTION (STAIRS)	BKE RACKS
PAVERS	EARTH BIN (6.5 yd ⁻¹)
HEAVY DUTY CONCRETE PAVING	HYDRO TRANSFORMER
LIGHT DUTY ASPHALT PAVING	LIGHT POLE
CROSSWALK	S.S. SHOW STORAGE AREA
CURB (0.2m)	L/A LANDSCAPE AREA
DEPRESSED CURB	MEDIUM DECIDUOUS TREE*
TACTILE WALKING SURFACE INDICATOR	SMALL DECIDUOUS TREE*
BLOCK BOUNDARY	DECIDUOUS SHRUB*
WASTE ENCLOSURE FENCE	CONIFEROUS SHRUB*
WOOD PRIVACY FENCE	GRASSES/PERENNIALS*

ATTACHED A1 PLAN, FROM THE SURVEYED PLAN SEPT 13, XREF INTO DRAWING

*TREES AND SHRUB LOCATIONS TO BE CONFIRMED ON LANDSCAPE PLAN

14	SPI - CITY RESUBMISSION	2025.04.11	JM
13	SPI - CITY RESUBMISSION	2025.03.24	SW
12	ADDITIONAL COMMENT-ISSUED TO CLIENT	2024.12.03	JM/CT
11	NEW LAYOUT-ISSUED TO CLIENT	2024.11.27	JM/CT
10	ADDITIONAL COMMENTS-ISSUED TO CLIENT	2024.08.27	JM/CT
9	ADDITIONAL COMMENTS-ISSUED TO CLIENT	2024.08.26	JM/CT
8	ADDITIONAL COMMENTS-ISSUED TO CLIENT	2024.08.16	JM/CT
7	ADDITIONAL COMMENTS-ISSUED TO CLIENT	2024.08.06	JM/CT
6	ADDITIONAL SITE STATS-ISSUED TO CLIENT	2024.07.25	JM/CT
5	REVISED AS PER CITY AND CLIENT COMMENTS	2024.07.17	JM/CT
4	REVISED GARBAGE LAYOUT	2024.07.16	JM/CT
3	SPI-2 AFTER CITY'S COMMENTS	2024.07.15	JM/CT
2	ADD HYDRO TRANSFORMER	2024.07.05	JM/CT
1	G4A SPI	2024.06.27	JM/CT

Issued / Revision Chart

Project Title

**CONSERVANCY
STACKED TOWNS**

3285 Borrisokane Rd
Location OTTAWA, ON.

Plan No. 18754 and File No.
D07-12-24-0097

Part of Lot 14, Concession 3
(Rideau From 1), Geographic
Township of Nepean

Legal Name Part of PIN 04595-4929 (LT)

Client **CAIVAN**

Project No.

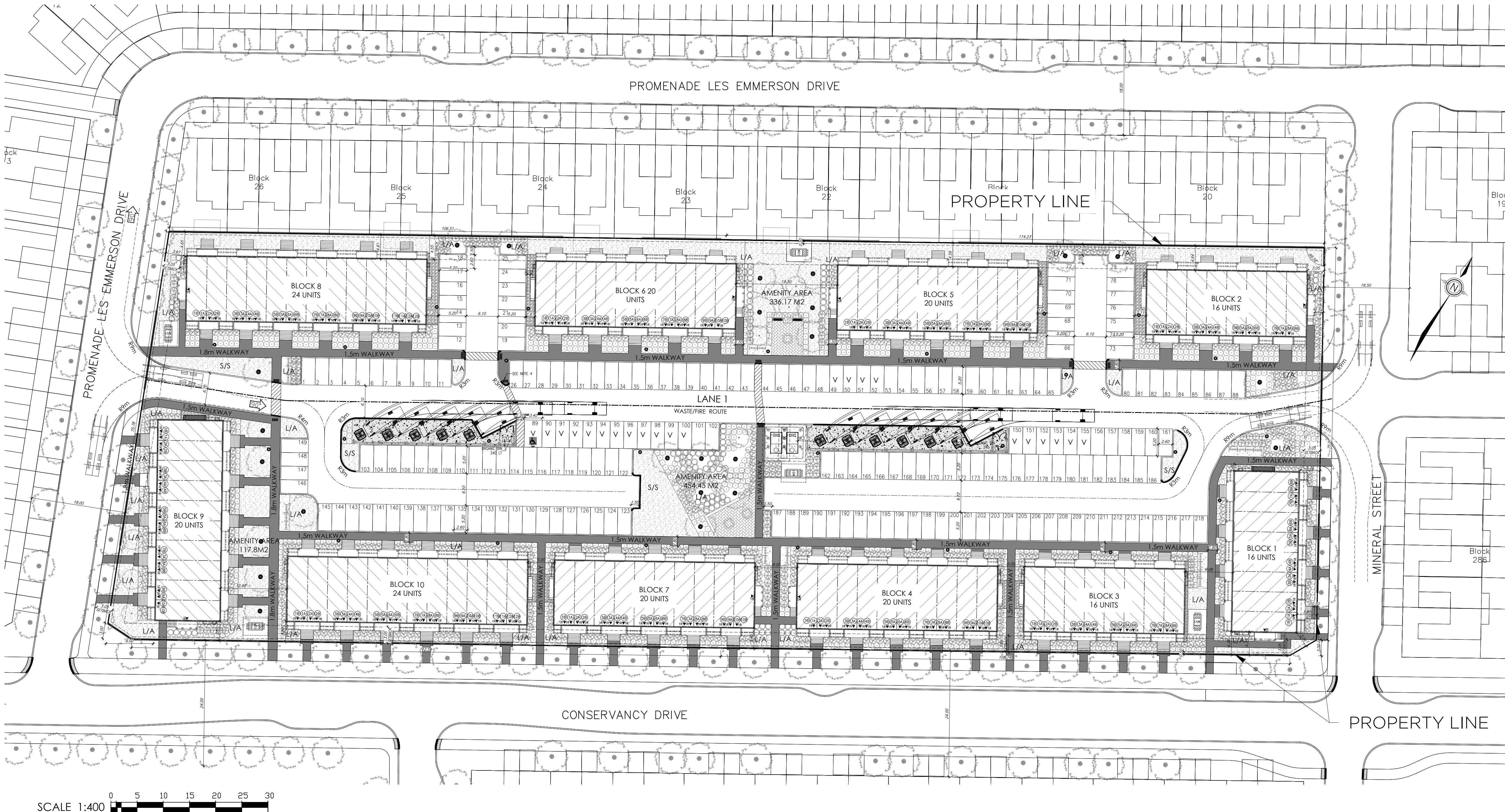
Scale **1:500**

Drawn By **CT**

Checked By **CT**

OVERALL SITE PLAN

SP1





David Schaeffer Engineering Ltd.

120 Iber Road, Suite 103

Stittsville, ON K2S 1E9

613-836-0856

dsel.ca

APPENDIX B

**Caivan
BCDC Site Plan
Required Fire Flow**

2025-01-14

**Required Fire Flow per IWSB-2024-05 (OBC A-3.2.5.7)
Block 10**



$$Q = K V S_{\text{tot}}$$

Where,

Q	201,272	minimum supply of water in litres
K	18	water supply coefficient from Table 1
V	7,454.50	total building volume in cubic metres
S _{tot}	1.50	total spacial coefficient from property line exposures

Buidling Volume	Area (m ²)	h (m)	V (m ³)
Basement	45.01	3.05	137.3
Ground	42.09	3.4	143.1
2nd floor	44.71	3.4	152.0
3rd floor	46.65	2.47	115.2
Attic	23.74	3.1	73.6

units total vol
621.2 X 12 7454.50 m³

Required minimum water supply flow rate, L/min

Q (L)		RFF (L/min)
	108,000	2700
108,000	135,000	3600
135,000	162,000	4500
162,000	190,000	5400
190,000	270,000	6300
270,000		9000

<---- Required Fire Flow

Spacial Coefficient

	m	S
North	44.7	0.00
South	30.9	0.00
West	12.7	0.00
East	5	0.50

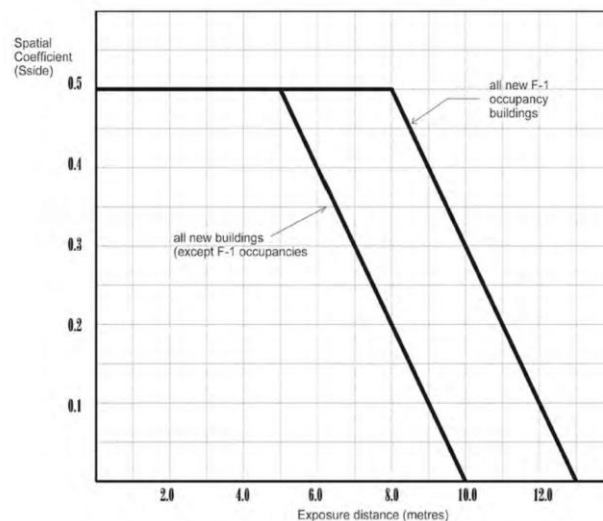


Figure 1
Spatial Coefficient vs Exposure Distance

**Caivan
BCDC Site Plan
Required Fire Flow**

2025-01-14

**Required Fire Flow per IWSB-2024-05 (OBC A-3.2.5.7)
Block 8**



$$Q = K V S_{\text{tot}}$$

Where,

Q	144,916	minimum supply of water in litres
K	18	water supply coefficient from Table 1
V	7,454.50	total building volume in cubic metres
S _{tot}	1.08	total spacial coefficient from property line exposures

Buidling Volume	Area (m ²)	h (m)	V (m ³)
Basement	45.01	3.05	137.3
Ground	42.09	3.4	143.1
2nd floor	44.71	3.4	152.0
3rd floor	46.65	2.47	115.2
Attic	23.74	3.1	73.6

units total vol
621.2 X 12 7454.50 m³

Required minimum water supply flow rate, L/min

Q (L)		RFF (L/min)
	108,000	2700
108,000	135,000	3600
135,000	162,000	4500
162,000	190,000	5400
190,000	270,000	6300
270,000		9000

<---- Required Fire Flow

Spacial Coefficient

	m	S
North	9.2	0.08
South	18.9	0
West	25.1	0
East	20.7	0

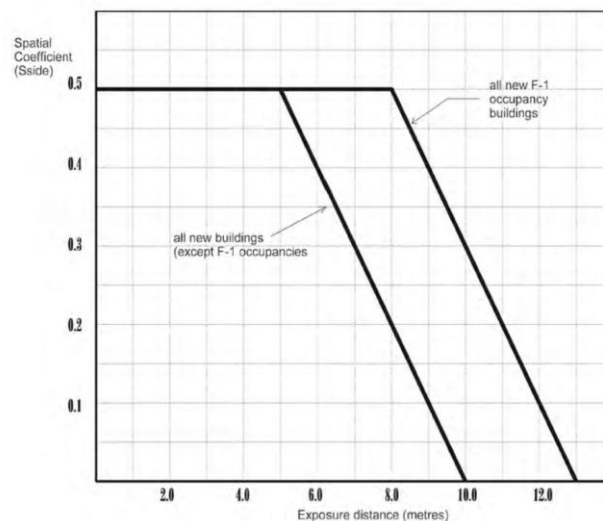


Figure 1
Spatial Coefficient vs Exposure Distance

**Caivan
BCDC Site Plan
Required Fire Flow**

2025-01-14

**Required Fire Flow per IWSB-2024-05 (OBC A-3.2.5.7)
Block 1**



$$Q = K V S_{\text{tot}}$$

Where,

Q	97,505	minimum supply of water in litres
K	18	water supply coefficient from Table 1
V	4,969.67	total building volume in cubic metres
S _{tot}	1.09	total spacial coefficient from property line exposures

Buidling Volume	Area (m ²)	h (m)	V (m ³)
Basement	45.01	3.05	137.3
Ground	42.09	3.4	143.1
2nd floor	44.71	3.4	152.0
3rd floor	46.65	2.47	115.2
Attic	23.74	3.1	73.6

621.2 X 8 4969.67 m³

Required minimum water supply flow rate, L/min

Q (L)	RFF (L/min)
108,000	2700
135,000	3600
162,000	4500
190,000	5400
270,000	9000

<---- Required Fire Flow

Spacial Coefficient

	m	S
North	25.8	0
South	31.9	0
West	9.1	0.09
East	23.3	0

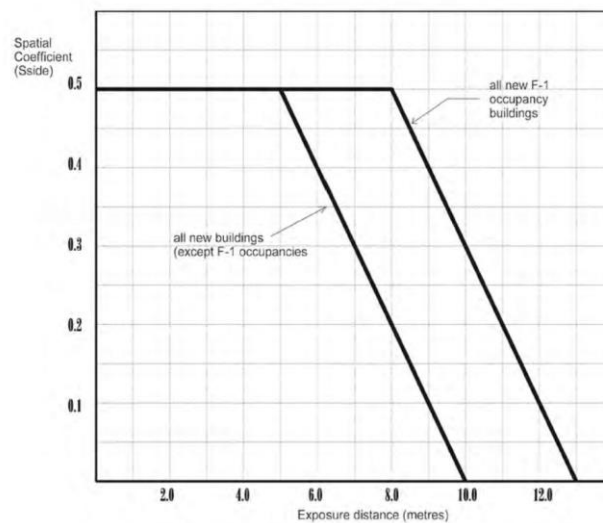
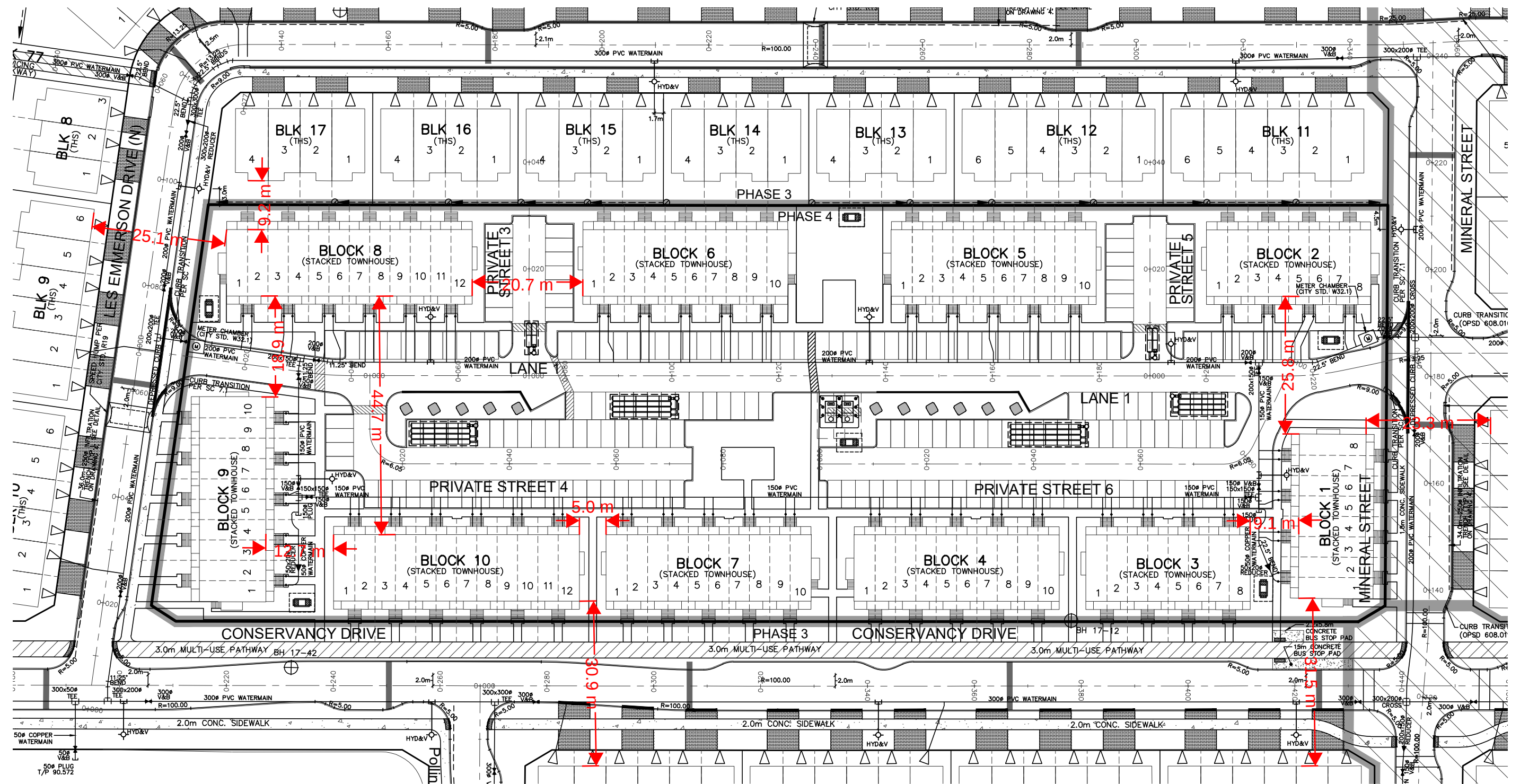


Figure 1
Spatial Coefficient vs Exposure Distance





David Schaeffer Engineering Ltd.

120 Iber Road, Suite 103

Stittsville, ON K2S 1E9

613-836-0856

dsel.ca

BARRHAVEN CONSERVANCY EAST WATER DISTRIBUTION SYSTEM ANALYSIS (FINAL REPORT)

STANTEC, MARCH 2025

(PROVIDED UNDER SEPARATE COVER)



David Schaeffer Engineering Ltd.

120 Iber Road, Suite 103

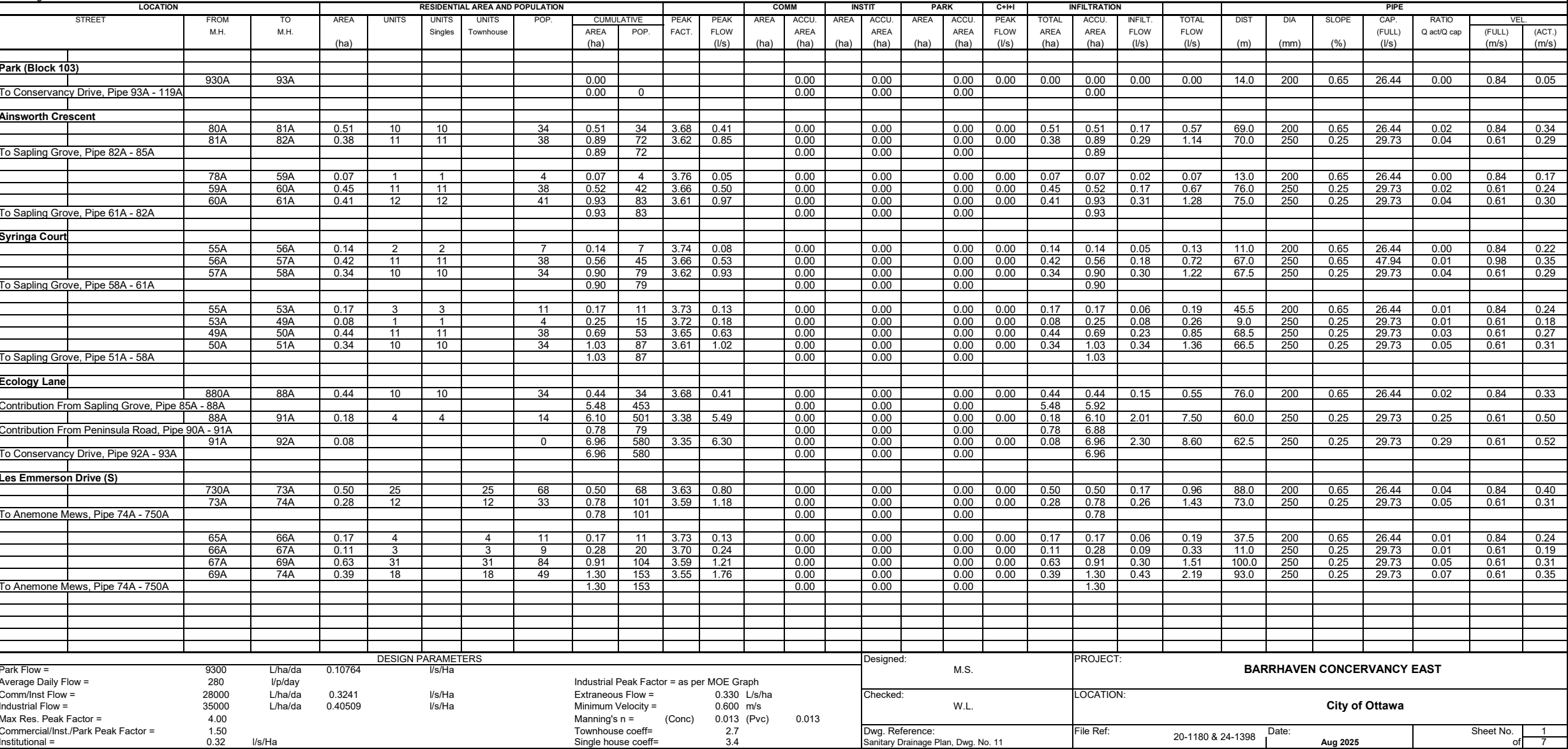
Stittsville, ON K2S 1E9

613-836-0856

dsel.ca

APPENDIX C

Manning's $n=0.013$



SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION										COMM		INSTIT		PARK		C+H	INFILTRATION					PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.			
								AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)		
Anemone Mews																															
Contribution From Peninsula Road, Pipe 62A - 63A								0.95	90				0.00		0.00		0.00		0.95	0.95											
Contribution From Peninsula Road, Pipe 89A - 63A								0.17	14				0.00		0.00		0.00		0.17	1.12											
			0.09				0	1.21	104				0.00		0.00		0.00		0.09	1.21											
	63A	75A	0.09				0	1.30	104	3.59	1.21		0.00		0.00		0.00	0.00	0.09	1.30	0.43	1.64	62.5	250	0.25	29.73	0.06	0.61	0.32		
To Conservancy Drive, Pipe 75A - 76A								1.30	104				0.00		0.00		0.00			1.30											
Contribution From Les Emmerson Drive (N), Pipe 70A - 72A								1.09	89				0.00		0.00		0.00		1.09	1.09											
Contribution From Les Emmerson Drive (N), Pipe 71A - 72A								2.38	313				0.00		0.00		0.00		2.38	3.47											
	72A	74A	0.27	6	6		21	3.74	423	3.41	4.67		0.00		0.00		0.00	0.00	0.27	3.74	1.23	5.91	58.5	250	0.25	29.73	0.20	0.61	0.47		
Contribution From Les Emmerson Drive (S), Pipe 69A - 74A								1.30	153				0.00		0.00		0.00		1.30	5.04											
Contribution From Les Emmerson Drive (S), Pipe 73A - 74A								0.78	101				0.00		0.00		0.00		0.78	5.82											
	74A	750A	0.26	6	6		21	6.08	698	3.32	7.50		0.00		0.00		0.00	0.00	0.26	6.08	2.01	9.51	53.0	250	0.25	29.73	0.32	0.61	0.54		
	750A	75A	0.01				0	6.09	698	3.32	7.50		0.00		0.00		0.00	0.00	0.01	6.09	2.01	9.51	9.5	250	0.25	29.73	0.32	0.61	0.54		
To Conservancy Drive, Pipe 75A - 76A								6.09	698				0.00		0.00		0.00			6.09											
Gallium Crescent																															
	30A	31A	0.37	10	10		34	0.37	34	3.68	0.41		0.00		0.00		0.00	0.00	0.37	0.37	0.12	0.53	65.0	200	0.65	26.44	0.02	0.84	0.33		
	31A	32A	0.34	9	9		31	0.71	65	3.63	0.77		0.00		0.00		0.00	0.00	0.34	0.71	0.23	1.00	64.0	250	0.25	29.73	0.03	0.61	0.28		
To Sapling Grove, Pipe 32A - 37A								0.71	65				0.00		0.00		0.00			0.71											
	30A	33A	0.13	2	2		7	0.13	7	3.74	0.08		0.00		0.00		0.00	0.00	0.13	0.13	0.04	0.13	9.5	200	0.65	26.44	0.00	0.84	0.22		
	33A	34A	0.16	3	3		11	0.29	18	3.71	0.22		0.00		0.00		0.00	0.00	0.16	0.29	0.10	0.31	43.5	250	0.25	29.73	0.01	0.61	0.19		
	34A	35A	0.12	1	1		4	0.41	22	3.70	0.26		0.00		0.00		0.00	0.00	0.12	0.41	0.14	0.40	11.5	250	0.25	29.73	0.01	0.61	0.21		
	35A	36A	0.44	11	11		38	0.85	60	3.64	0.71		0.00		0.00		0.00	0.00	0.44	0.85	0.28	0.99	68.5	250	0.25	29.73	0.03	0.61	0.27		
	36A	37A	0.31	9	9		31	1.16	91	3.60	1.06		0.00		0.00		0.00	0.00	0.31	1.16	0.38	1.45	61.5	250	0.25	29.73	0.05	0.61	0.31		
To Mineral Street, Pipe 37A - 39A								1.16	91				0.00		0.00		0.00			1.16											
Pollination Place																															
	250A	26A	0.11	2	2		7	0.11	7	3.74	0.08		0.00		0.00		0.00	0.00	0.11	0.11	0.04	0.12	25.5	200	0.65	26.44	0.00	0.84	0.20		
			0.09	1	1		4	0.20	11				0.00		0.00		0.00		0.09	0.20											
	26A	27A	0.09	1	1		4	0.29	15	3.72	0.18		0.00		0.00		0.00	0.00	0.09	0.29	0.10	0.28	11.0	200	0.65	26.44	0.01	0.84	0.27		
	27A	28A	0.39	10	10		34	0.68	49	3.65	0.58		0.00		0.00		0.00	0.00	0.39	0.68	0.22	0.80	63.5	250	0.25	29.73	0.03	0.61	0.26		
	28A	29A	0.34	10	10		34	1.02	83	3.61	0.97		0.00		0.00		0.00	0.00	0.34	1.02	0.34	1.31	62.5	250	0.25	29.73	0.04	0.61	0.30		
To Sapling Grove, Pipe 29A - 32A								1.02	83				0.00		0.00		0.00			1.02											
	250A	25A	0.09	2	2		7	0.09	7	3.74	0.08		0.00		0.00		0.00	0.00	0.09	0.09	0.03	0.11	19.5	200	0.65	26.44	0.00	0.84	0.20		
	25A	19A	0.04				0	0.13	7	3.74	0.08		0.00		0.00		0.00	0.00	0.04	0.13	0.04	0.13	8.0	250	0.25	29.73	0.00	0.61	0.15		
			0.27	5	5		17	0.40	24				0.00		0.00		0.00		0.27	0.40											
	19A	20A	0.28	5	5		17	0.68	41	3.67	0.49		0.00		0.00		0.00	0.00	0.28	0.68	0.22	0.71	71.0	250	0.25	29.73	0.02	0.61	0.25		
	20A	21A	0.19	4	4		14	0.87	55	3.64	0.65		0.00		0.00		0.00	0.00	0.19	0.87	0.29	0.94	54.5	250	0.25	29.73	0.03	0.61	0.27		
To Sapling Grove, Pipe 21A - 29A								0.87	55				0.00		0.00		0.00			0.87											
Sapling Grove																															
Contribution From Pollination Place, Pipe 20A - 21A								0.87	55				0.00		0.00		0.00		0.87	0.87											
	21A	29A	0.24	7	7		24	1.11	79	3.62	0.93		0.00		0.00		0.00	0.00	0.24	1.11	0.37	1.29	59.0	250	0.25	29.73	0.04	0.61	0.30		
Contribution From Pollination Place, Pipe 28A - 29A								1.02	83				0.00		0.00		0.00		1.02	2.13											
	29A	32A	0.23	10	10		34	2.36	196	3.52	2.24		0.00		0.00		0.00	0.00	0.23	2.36	0.78	3.02	58.5	250	0.25	29.73	0.10	0.61	0.39		
DESIGN PARAMETERS																Designed:		PROJECT:													
Park Flow =		9300	L/ha/da	0.10764	l/s/ha											M.S.		BARRHAVEN CONCERVANCY EAST													
Average Daily Flow =		280	l/p/day																												
Comm/Inst Flow =		28000	L/ha/da	0.3241	l/s/ha																										
Industrial Flow =		35000	L/ha/da	0.40509	l/s/ha																										

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+H	INFILTRATION			PIPE																
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s) (ACT.) (m/s)										
Contribution From Gallium Crescent, Pipe 31A - 32A									0.71	65				0.00		0.00		0.00		0.71	3.07																		
		32A	37A	0.19	7	7		24	3.26	285	3.47	3.21		0.00		0.00		0.00	0.00	0.19	3.26	1.08	4.28	58.5	250	0.25	29.73	0.14	0.61	0.43									
To Mineral Street, Pipe 37A - 39A									3.26	285				0.00		0.00		0.00			3.26																		
		510A	51A	0.18	3	3		11	0.18	11	3.73	0.13		0.00		0.00		0.00	0.00	0.18	0.18	0.06	0.19	48.5	200	0.65	26.44	0.01	0.84	0.24									
Contribution From Syringa Court, Pipe 50A - 51A									1.03	87				0.00		0.00		0.00	1.03	1.21																			
		51A	58A	0.25	5	5		17	1.46	115	3.58	1.33		0.00		0.00		0.00	0.00	0.25	1.46	0.48	1.82	58.5	250	0.25	29.73	0.06	0.61	0.33									
Contribution From Syringa Court, Pipe 57A - 58A									0.90	79				0.00		0.00		0.00		0.90	2.36																		
		58A	61A	0.19	4	4		14	2.55	208	3.51	2.37		0.00		0.00		0.00	0.00	0.19	2.55	0.84	3.21	58.5	250	0.25	29.73	0.11	0.61	0.39									
Contribution From Ainsworth Crescent, Pipe 60A - 61A									0.93	83				0.00		0.00		0.00		0.93	3.48																		
		61A	82A	0.22	4	4		14	3.70	305	3.46	3.42		0.00		0.00		0.00	0.00	0.22	3.70	1.22	4.64	60.0	250	0.25	29.73	0.16	0.61	0.44									
Contribution From Ainsworth Crescent, Pipe 81A - 82A									0.89	72				0.00		0.00		0.00		0.89	4.59																		
		82A	85A	0.18	4	4		14	4.77	391	3.42	4.34		0.00		0.00		0.00	0.00	0.18	4.77	1.57	5.91	58.5	250	0.25	29.73	0.20	0.61	0.47									
Contribution From Meander Way, Pipe 84A - 85A									0.50	45				0.00		0.00		0.00		0.50	5.27																		
		85A	88A	0.21	5	5		17	5.48	453	3.40	4.99		0.00		0.00		0.00	0.00	0.21	5.48	1.81	6.79	58.5	250	0.25	29.73	0.23	0.61	0.49									
To Ecology Lane, Pipe 88A - 91A									5.48	453				0.00		0.00		0.00			5.48																		
Mineral Street																																							
		430A	46A	0.09				0	0.09	0				0.00		0.00		0.00	0.00	0.09	0.09	0.03	0.03	45.5	200	0.65	26.44	0.00	0.84	0.14									
Contribution From BCDK EAST STACKED CONDO SITE PLAN, Pipe 124A - 46A									0.62	84				0.00		0.00		0.00		0.62	0.71																		
				0.07	16		16	37	0.78	121				0.00		0.00		0.00	0.00	0.07	0.78																		
		46A	47A	0.20	6		6	17	0.98	138	3.56	1.59		0.00		0.00		0.00	0.00	0.20	0.91	0.30	1.89	62.5	250	0.25	29.73	0.06	0.61	0.34									
To Conservancy Drive, Pipe 47A - 48A									0.98	138				0.00		0.00		0.00			0.91																		
Contribution From Sapling Grove, Pipe 32A - 37A									3.26	285				0.00		0.00				3.26	3.26																		
Contribution From Gallium Crescent, Pipe 36A - 37A									1.16	91				0.00		0.00		0.00		1.16	4.42																		
		37A	39A	0.08				0	4.50	376	3.43	4.18		0.00		0.00		0.00	0.00	0.08	4.50	1.49	5.66	60.0	250	0.25	29.73	0.19	0.61	0.47									
Contribution From Peninsula Road, Pipe 38A - 39A									1.06	164				0.00		0.00		0.00		1.06	5.56																		
		39A	47A	0.08				0	5.64	540	3.37	5.89		0.00		0.00		0.00	0.00	0.08	5.64	1.86	7.75	62.5	250	0.25	29.73	0.26	0.61	0.51									
To Conservancy Drive, Pipe 47A - 48A									5.64	540				0.00		0.00		0.00			5.64																		
BCDK EAST STACKED CONDO SITE PLAN																																							
		126A	130A	0.54	34		34	79	0.54	79	3.62	0.93		0.00		0.00		0.00	0.00	0.54	0.54	0.18	1.10	87.0	200	0.65	26.44	0.04	0.84	0.41									
		130A	17A	0.09	10			23	0.63	102	3.59	1.19		0.00		0.00		0.00	0.00	0.09	0.63	0.21	1.40	36.0	200	0.35	19.40	0.07	0.62	0.36									
To Les Emmerson Drive (N), Pipe 17A - 18A									0.63	102				0.00		0.00		0.00			0.63																		
		132A	123A	0.57	32		32	74	0.57	74	3.62	0.87		0.00		0.00		0.00	0.00	0.57	0.57	0.19	1.06	80.0	200	0.65	26.44	0.04	0.84	0.41									
		123A	124A	0.05	4		4	10	0.62	84	3.61	0.98		0.00		0.00		0.00	0.00	0.05	0.62	0.20	1.19	11.5	200	0.35	19.40	0.06	0.62	0.34									
		124A	46A						0.62	84	3.61	0.98		0.00		0.00		0.00	0.00	0.00	0.62	0.20	1.19	11.0	250	0.25	29.73	0.04	0.61	0.29									
To Mineral Street, Pipe 46A - 47A									0.62	84				0.00		0.00		0.00			0.62																		
Les Emmerson Drive (N)																																							
		210A	18A						0.00					0.00		0.00	3.22	3.22	0.52	3.22	3.22	1.06	1.58	14.0	200	0.65	26.44	0.06	0.84	0.46									
To Conservancy Drive, Pipe 18A - 23A									0.00	0				0.00		0.00		3.22			3.22																		
		64A	70A	0.45	10	10		34	0.45	34	3.68	0.41		0.00		0.00		0.00	0.00	0.45	0.45	0.15	0.55	70.5	200	0.65	26.44	0.02	0.84	0.34									
		70A	72A	0.64	16	16		55	1.09	89	3.61	1.04		0.00		0.00		0.00	0.00	0.64	1.09	0.36	1.40	119.0	250	0.25	29.73	0.05	0.61	0.31									
To Anemone Mews, Pipe 72A - 74A									1.09	89				0.00		0.00		0.00			1.09																		
		16A	17A	0.20	7		7	19	0.20	19	3.71	0.23				0.00		0.00	0.00	0.20	0.20	0.07	0.29	51.5	200	0.65	26.44	0.01	0.84	0.27									
DESIGN PARAMETERS															Designed:					PROJECT:																			
Park Flow =		9300	L/ha/da	0.10764	l/s/Ha										M.S.					BARRHAVEN CONCERNVANCY EAST																			
Average Daily Flow =		280	l/p/day																																				
Comm/Inst Flow =		28000	L/ha/da	0.3241	l/s/Ha																																		
Industrial Flow =		35000	L/ha/da	0.40509	l/s/Ha																																		
Max Res. Peak Factor =		4.00																																					
Commercial/Inst./Park Peak Factor =		1.50																																					
Institutional =		0.32	l/s/Ha																																				

SANITARY SEWER CALCULATION SHEET

Manning's $n=0.013$

LOCATION				RESIDENTIAL AREA AND POPULATION										COMM		INSTIT		PARK		C+H	INFILTRATION			TOTAL	PIPE			RATIO		VEL.	
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	Q act/Q cap	(FULL) (m/s)	(ACT.) (m/s)	
									0.63	102				0.00		0.00		0.00		0.63	0.83										
Contribution From BCDC EAST STACKED CONDO SITE PLAN, Pipe 130A - 17A				0.12	20		20	46	0.95	167	2.00	1.08		0.00		0.00	0.00	0.00	0.00	0.12	0.95	0.31	1.40								
		17A	18A	0.22	8		8	22	1.17	189	3.53	2.16		0.00		0.00	0.00	0.00	0.00	0.22	1.17	0.39	2.55	63.5	250	0.25	29.73	0.09	0.61	0.37	
To Conservancy Drive, Pipe 18A - 23A									1.17	189				0.00		0.00		0.00		1.17											

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I	INFILTRATION			PIPE														
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.								
								AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)							
Contribution From Borrisokane Road, Pipe 1001A - 10A								0.56	44				0.00		0.00		0.00		0.56	71.85																
Contribution From Borrisokane Road, Pipe 1003A - 10A								0.90	77				0.00		0.00		0.00		0.90	72.75																
		10A	11A	0.17			0	50.96	5074	2.79	45.90		17.91		0.00		4.05	9.36	0.17	72.92	24.06	79.32	72.5	525	0.10	136.00	0.58	0.63	0.65							
Contribution From Ephemeral Crescent, Pipe 6A - 11A								1.13	156				0.00		0.00		0.00		1.13	74.05																
Contribution From Deciduous Crescent, Pipe 9A - 11A								0.77	88				0.00		0.00		0.00		0.77	74.82																
		11A	15A	0.11			0	52.97	5318	2.78	47.84		17.91		0.00		4.05	9.36	0.11	74.93	24.73	81.93	60.0	525	0.10	136.00	0.60	0.63	0.66							
Contribution From Deciduous Crescent, Pipe 14A - 15A								0.85	99				0.00		0.00		0.00		0.85	75.78																
Contribution From Ephemeral Crescent, Pipe 4A - 15A								1.25	135				0.00		0.00		0.00		1.25	77.03																
		15A	18A	0.13			0	55.20	5552	2.76	49.70		17.91		0.00		4.05	9.36	0.13	77.16	25.46	84.52	60.5	525	0.10	136.00	0.62	0.63	0.66							
Contribution From Les Emmerson Drive (N), Pipe 17A - 18A								1.17	189				0.00		0.00		0.00		1.17	78.33																
Contribution From Les Emmerson Drive (N), Pipe 210A - 18A								0.00	0				0.00		0.00		3.22		3.22	81.55																
				0.05	14	14	32	56.42	5773				17.91		0.00		7.27		0.05	81.60																
		18A	23A	0.16			0	56.58	5773	2.75	51.44		17.91		0.00		7.27	9.88	0.16	81.76	26.98	88.30	73.0	525	0.10	136.00	0.65	0.63	0.67							
				0.13	30	30	69	56.71	5842				17.91		0.00		10.49		0.13	81.89																
		23A	24A	0.34	9	9	31	57.05	5873	2.74	52.22		17.91		0.00		7.27	9.88	0.34	82.23	27.14	89.23	71.0	525	0.10	136.00	0.66	0.63	0.67							
				0.14	36	36	83	57.19	5956				17.91		0.00		10.49		0.14	82.37																
		24A	47A	0.45	15	15	51	57.64	6007	2.74	53.27		17.91		0.00		7.27	9.88	0.45	82.82	27.33	90.48	106.0	525	0.10	136.00	0.67	0.63	0.67							
Contribution From Mineral Street, Pipe 39A - 47A								5.64	540				0.00		0.00		0.00		5.64	88.46																
Contribution From Mineral Street, Pipe 46A - 47A								0.98	138				0.00		0.00		0.00		0.91	89.37																
		47A	48A	0.56	14	14	48	64.82	6733	2.70	58.88		17.91		0.00		7.27	9.88	0.56	89.93	29.68	98.43	99.0	525	0.10	136.00	0.72	0.63	0.68							
		48A	75A	0.42	10	10	34	65.24	6767	2.70	59.14		17.91		0.00		7.27	9.88	0.42	90.35	29.82	98.83	76.5	525	0.10	136.00	0.73	0.63	0.68							
Contribution From Anemone Mews, Pipe 63A - 75A								1.30	104				0.00		0.00		0.00		1.30	91.65																
Contribution From Anemone Mews, Pipe 750A - 75A								6.09	698				0.00		0.00		0.00		6.09	97.74																
		75A	76A	0.31	7	7	24	72.94	7593	2.66	65.40		17.91		0.00		7.27	9.88	0.31	98.05	32.36	107.64	62.0	525	0.10	136.00	0.79	0.63	0.70							
		76A	77A	0.39	11	11	38	73.33	7631	2.66	65.69		17.91		0.00		7.27	9.88	0.39	98.44	32.49	108.05	60.0	525	0.10	136.00	0.79	0.63	0.70							
		77A	92A	0.33	9	9	31	73.66	7662	2.65	65.92		17.91		0.00		7.27	9.88	0.33	98.77	32.59	108.40	53.0	525	0.10	136.00	0.80	0.63	0.70							
Contribution From Ecology Lane, Pipe 91A - 92A								6.96	580				0.00		0.00		0.00		6.96	105.73																
		92A	93A	0.51	12	12	41	81.13	8283	2.63	70.55		17.91		0.00		7.27	9.88	0.51	106.24	35.06	115.49	90.5	525	0.10	136.00	0.85	0.63	0.70							
Contribution From Park (Block 103), Pipe 930A - 93A								0.00	0				0.00		0.00		0.00		0.00	106.24																
		93A	119A	0.37	6	6	21	81.50	8304	2.63	70.71		17.91		0.00	0.52	7.79	9.96	0.89	107.13	35.35	116.03	88.0	525	0.10	136.00	0.85	0.63	0.71							
To Canoe Street, Pipe 119A - 120A								81.50	8304				17.91		0.00		7.79			107.13																
Meander Way																																				
		84A	85A	0.50	13	13	45	0.50	45	3.66	0.53		0.00		0.00		0.00	0.00	0.50	0.50	0.17	0.70	92.5	200	0.65	26.44	0.03	0.84	0.36							
To Sapling Grove, Pipe 85A - 88A								0.50	45				0.00		0.00		0.00			0.50																
		84A	86A	0.16	1	1	4	0.16	4	3.76	0.05		0.00		0.00		0.00	0.00	0.16	0.16	0.05	0.10	13.0	200	0.65	26.44	0.00	0.84	0.20							
		86A	87A	0.22	4	4	14	0.38	18	3.71	0.22		0.00		0.00		0.00	0.00	0.22	0.38	0.13	0.34	50.5	250	0.65	47.94	0.01	0.98	0.28							
		87A	114A	0.23	5	5	17	0.61	35	3.67	0.42		0.00		0.00		0.00	0.00	0.23	0.61	0.20	0.62	58.0	250	0.25	29.73	0.02	0.61	0.24							
		114A	115A	0.07	1	1	4	0.68	39	3.67	0.46		0.00		0.00		0.00	0.00	0.07	0.68	0.22	0.69	10.0	250	0.25	29.73	0.02	0.61	0.25							
		115A	116A	0.63	17	17	58	1.31	97	3.60	1.13		0.00		0.00		0.00	0.00	0.63	1.31	0.43	1.56	110.5	250	0.25	29.73	0.05	0.61	0.32							
To Peninsula Road, Pipe 116A - 117A								1.31	97				0.00		0.00		0.00			1.31																
Peninsula Road																																				
		89A	63A	0.17	4	4	14	0.17	14	3.72	0.17		0.00		0.00		0.00	0.00	0.17	0.17	0.06	0.22	41.0	200	0.65	26.44	0.01	0.84	0.26							
To Anemone Mews, Pipe 63A - 75A								0.17	14				0.00		0.00		0.00			0.17																
		380A	38A	0.46	18	18	62	0.46	62	3.64	0.73		0.00		0.00		0.00	0.00	0.46	0.46	0.15	0.88	56.5	200	0.65	26.44	0.03	0.84	0.39							
		38A	39A	0.60	30	30	102	1.06	164	3.54	1.88		0.00		0.00		0.00	0.00	0.60	1.06	0.35	2.23	108.5	250	0.25	29.73	0.08	0.61	0.36							
To Mineral Street, Pipe 39A - 47A								1.06	164				0.00		0.00		0.00			1.06																
DESIGN PARAMETERS														Designed:					PROJECT:																	
Park Flow =	9300	L/ha/da																																		

Manning's $n=0.013$

1398_SAN_Designsheets_Aug1525.xlsx

SANITARY SEWER CALCULATION SHEET

Manning's $n=0.013$

LOCATION				RESIDENTIAL AREA AND POPULATION										COMM		INSTIT		PARK		C+H	INFILTRATION					PIPE				
STREET		FROM M.H.	TO M.H.	AREA	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.	
									AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)
		109A	117A	0.58	15	15		51	0.74	55	3.64	0.65		0.00		0.00		0.00	0.00	0.58	0.74	0.24	0.89	103.0	250	0.25	29.73	0.03	0.61	0.27
To Peninsula Road, Pipe 117A - 118A									0.74	55				0.00		0.00		0.00			0.74									
		112A	113A	0.05	1	1		4	0.05	4	3.76	0.05		0.00		0.00		0.00	0.00	0.05	0.05	0.02	0.07	15.5	200	0.65	26.44	0.00	0.84	0.17
Contribution From Canoe Street, Pipe 108A - 113A									3.58	222				0.00		0.00		0.00		3.58	3.63									
		113A	118A	0.43	10	10		34	4.06	260	3.48	2.94		0.00		0.00		0.00	0.00	0.43	4.06	1.34	4.27	74.0	250	0.25	29.73	0.14	0.61	0.43
Contribution From Peninsula Road, Pipe 117A - 118A									2.64	198				0.00		0.00		0.00		2.64	6.70									
		118A	1180A	0.16	3	3		11	6.86	469	3.39	5.15		0.00		0.00		0.00	0.00	0.16	6.86	2.26	7.42	42.5	250	0.25	29.73	0.25	0.61	0.50
		1180A	119A	0.03				0	6.89	469	3.39	5.15		0.00		0.00		0.00	0.00	0.03	6.89	2.27	7.43	20.0	250	0.25	29.73	0.25	0.61	0.50
Contribution From Conservancy Drive, Pipe 93A - 119A									81.50	8304				17.91		0.00		7.79		107.13	114.02									
		119A	120A	0.17				0	88.56	8773	2.61	74.17		17.91		0.00		7.79	9.96	0.17	114.19	37.68	121.82	75.0	525	0.10	136.00	0.90	0.63	0.71
		120A	121A	0.21	4	4		14	88.77	8787	2.61	74.27		17.91		0.00		7.79	9.96	0.21	114.40	37.75	121.99	87.5	525	0.10	136.00	0.90	0.63	0.71
		121A	122A						88.77	8787	2.61	74.27		17.91		0.00		7.79	9.96	0.00	114.40	37.75	121.99	10.0	525	0.10	136.00	0.90	0.63	0.71
																				</										



David Schaeffer Engineering Ltd.

120 Iber Road, Suite 103

Stittsville, ON K2S 1E9

613-836-0856

dse.ca

APPENDIX D

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	HAIDER NASRULLAH 647-850-9417 HAIDER.NASRULLAH@ADSPIPE.COM
ADS SALES REP	BRAD DUNLOP 613-893-7336 BRAD.DUNLOP@ADSPIPE.COM
PROJECT NO.	S430138
ONTARIO SITE COORDINATOR:	RYAN RUBENSTEIN 519-710-3687 RYAN.RUBENSTEIN@ADSPIPE.COM



1398 BCDC OTTAWA, ON, CANADA

SC-800 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH SC-800.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 750 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-800 SYSTEM

- STORMTECH SC-800 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 75 mm (3") SPACING BETWEEN THE CHAMBER ROWS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

- STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
- THE USE OF CONSTRUCTION EQUIPMENT OVER SC-800 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/SC-800/DC-780 CONSTRUCTION GUIDE".
- FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT: C2		PROPOSED ELEVATIONS: C2		*INVERT ABOVE BASE OF CHAMBER				
21	STORMTECH SC-800 CHAMBERS	93.884	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
4	STORMTECH SC-800 END CAPS	91.979	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	PRE-CORED END CAP	A	450 mm TOP PRE-CORED END CAP, PART#: SC800EPE18TPC / TYP OF ALL 450 mm TOP CONNECTIONS	203 mm	
152	STONE ABOVE (mm)	91.827	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	PREFABRICATED EZ END CAP	B	600 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC800ECEZ / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	58 mm	
152	STONE BELOW (mm)	91.827	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	PRE-CORED END CAP	C	450 mm BOTTOM PRE-CORED END CAP, PART#: SC800EPE18BPC / TYP OF ALL 450 mm BOTTOM CONNECTIONS	51 mm	
40	% STONE VOID	91.827	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):	FLAMP	D	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC80024RAMP		
63.3	INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED)	91.598	TOP OF STONE:	MANIFOLD	E	450 mm x 450 mm TOP MANIFOLD, ADS N-12	203 mm	
98.4	SYSTEM AREA (m²)	91.446	TOP OF SC-800 CHAMBER:	PIPE CONNECTION	F	450 mm BOTTOM CONNECTION	51 mm	
63.8	SYSTEM PERIMETER (m)	90.811	450 mm TOP MANIFOLD INVERT:	CONCRETE STRUCTURE	G	MH 535 (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		79 L/s IN
		90.666	600 mm ISOLATOR ROW PLUS CONNECTION INVERT:	CONCRETE STRUCTURE	H	OCS MH 536 (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		113 L/s OUT
		90.659	450 mm BOTTOM CONNECTION INVERT:	UNDERDRAIN	I	150 mm ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		
		90.608	BOTTOM OF SC-800 CHAMBER:	INSPECTION PORT	J	150 mm SEE DETAIL		
		90.456	UNDERDRAIN INVERT:	PIPE BEND	K	450 mm X 11.25° ADS N-12 BEND		
		90.456	BOTTOM OF STONE:					

DATE	DWN	CHK
1/14/2025	JR	JR
4/17/2025	RCT	RCT
5/22/2025	MV	HAK
6/3/2025	RCT	RCT
7/8/25	AP	HAK
8/18/2025	AP	HAK
8/22/2025	AP	JPR

StormTech®
Chamber System

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 100

SHEET
3 OF 6

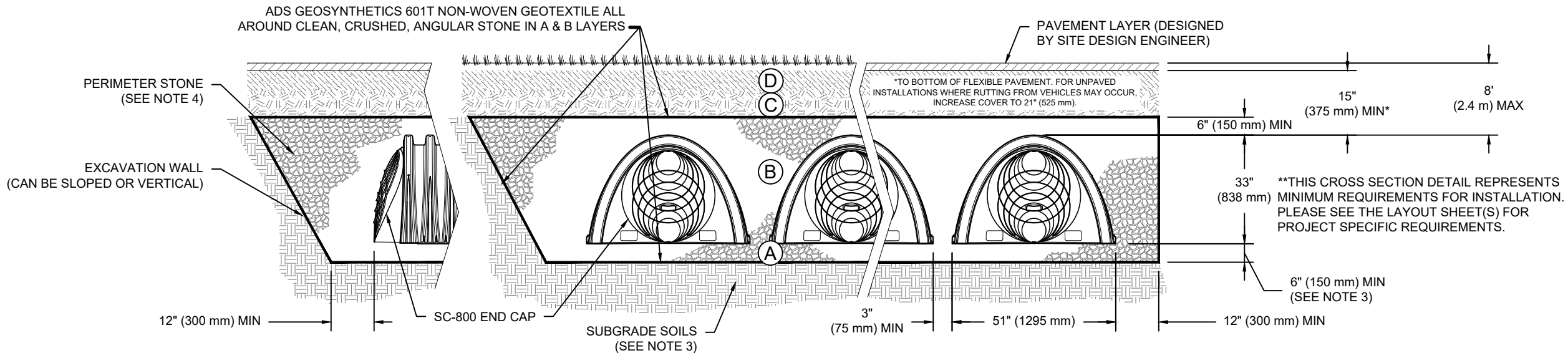
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS/STORMTECH UNDER THE DIRECTION OF THE PROJECT'S ENGINEER OF RECORD (EOR) OR OTHER PROJECT REPRESENTATIVE. THIS DRAWING IS NOT INTENDED FOR USE IN BIDDING OR CONSTRUCTION WITHOUT THE EOR'S PRIOR APPROVAL. EOR SHALL REVIEW THIS DRAWING PRIOR TO BIDDING AND/OR CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE EOR TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

ACCEPTABLE FILL MATERIALS: STORMTECH SC-800 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 15" (375 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE ⁵	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE ⁵	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

PLEASE NOTE:

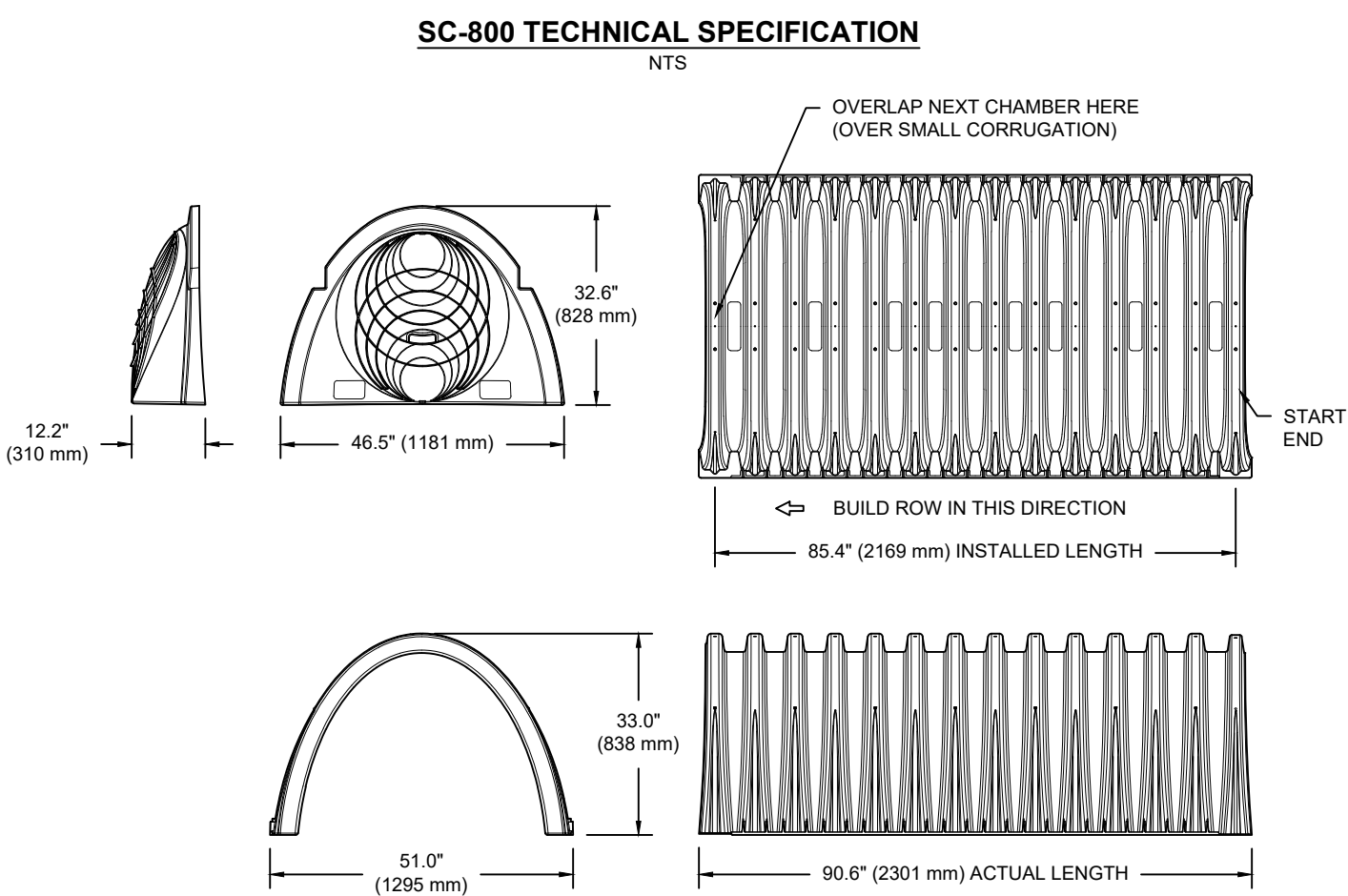
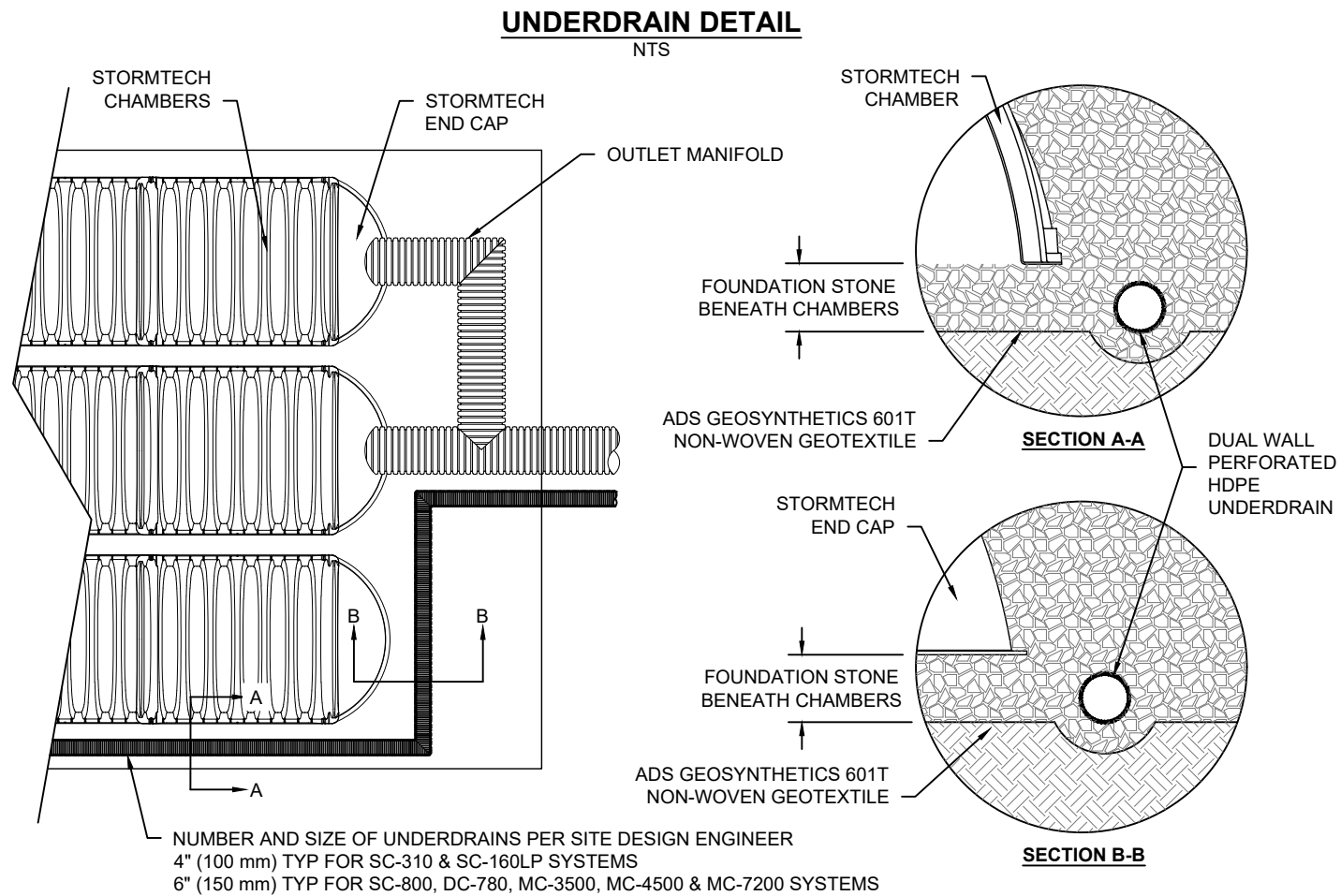
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-800 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 750 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

[illegible]



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 33.0" X 85.4"	(1295 mm X 838 mm X 2169 mm)
CHAMBER STORAGE	50.6 CUBIC FEET	(1.43 m³)
MINIMUM INSTALLED STORAGE*	78.4 CUBIC FEET	(2.22 m³)
WEIGHT	81.8 lbs.	(37.1 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	46.5" X 32.6" X 10.5"	(1181 mm X 828 mm X 267 mm)
END CAP STORAGE	3.4 CUBIC FEET	(0.09 m³)
MINIMUM INSTALLED STORAGE**	14.7 CUBIC FEET	(0.42 m³)
WEIGHT	15.7 lbs.	(7.1 kg)

* ASSUMES 6" (150 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS, 3" (75 mm) BETWEEN CHAMBERS

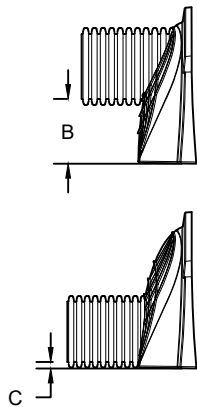
**ASSUMES 6" (150 mm) STONE ABOVE AND BELOW END CAPS, 3" (150 mm) BETWEEN ROWS, 12" (300 mm) BEYOND END CAPS

PRE-CORED HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "BPC"

PRE-CORED HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "TPC"

PART #	STUB	B	C
SC800EPE06TPC	6" (150 mm)	21.4" (544 mm)	---
SC800EPE06BPC		---	0.9" (23 mm)
SC800EPE08TPC	8" (200 mm)	19.2" (488 mm)	---
SC800EPE08BPC		---	1.0" (25 mm)
SC800EPE10TPC	10" (250 mm)	17.0" (432 mm)	---
SC800EPE10BPC		---	1.2" (30 mm)
SC800EPE12TPC	12" (300 mm)	14.4" (366 mm)	---
SC800EPE12BPC		---	1.6" (41 mm)
SC800EPE15TPC	15" (375 mm)	11.3" (287 mm)	---
SC800EPE15BPC		---	1.7" (43 mm)
SC800EPE18TPC	18" (450 mm)	8.0" (203 mm)	---
SC800EPE18BPC		---	2.0" (51 mm)
SC800EPE24BPC	24" (600 mm)	---	2.3" (58 mm)
SC800EPE	NONE	SOLID END CAP	

NOTE: ALL DIMENSIONS ARE NOMINAL



1398 BCDC

OTTAWA, ON, CANADA

DATE: 01/14/2025

PROJECT #: S430138

CHECKED: RCT

DATE	DWN	CHK
1/14/2025	JR	JR
4/17/2025	RCT	RCT
5/22/2025	MV	HAK
6/3/2025	RCT	RCT
7/8/25	AP	HAK
8/18/2025	AP	HAK
8/22/2025	AP	JPR

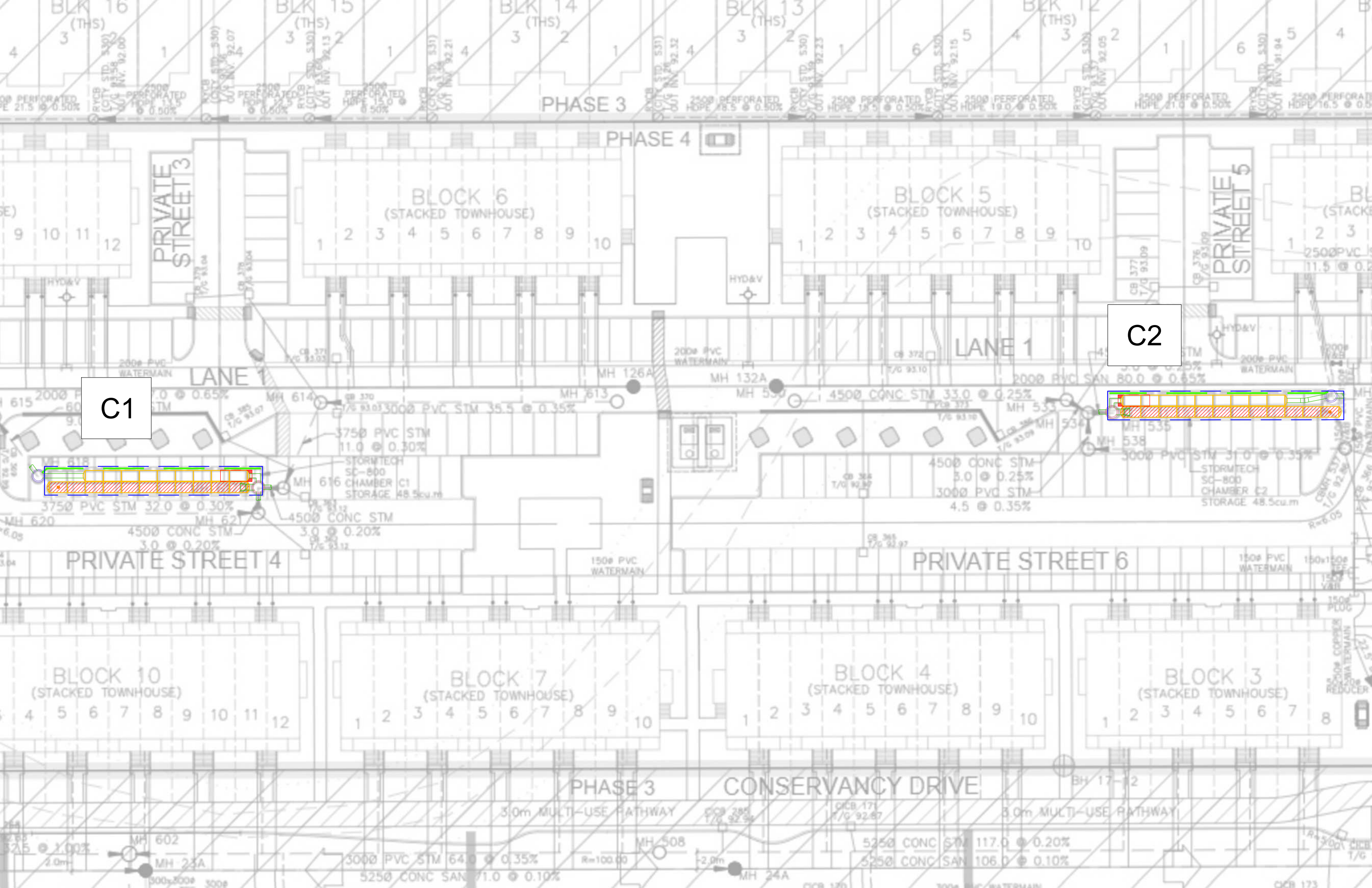
StormTech®
Chamber System

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

ADS

SHEET
6 OF 6

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS BY STORMTECH UNDER THE DIRECTION OF THE PROJECT'S ENGINEER OF RECORD (EOR) OR OTHER PROJECT REPRESENTATIVE. THIS DRAWING IS NOT INTENDED FOR USE IN BIDDING OR CONSTRUCTION WITHOUT THE EOR'S PRIOR APPROVAL. EOR SHALL REVIEW THIS DRAWING PRIOR TO BIDDING AND/OR CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE EOR TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.



C1

C2

Project: C1

Chamber Model -
Units -
Number of Chambers -
Number of End Caps -
Voids in the stone (porosity) -
Base of Stone Elevation -
Amount of Stone Above Chambers -
Amount of Stone Below Chambers -

SC-800
Metric
20
4
40
90.75
152
152



Area of System- 90.8549 sq.meters Min. Area - 62.65 sq.meters

Version 1.1

☒ Include Perimeter Stone in Calculations

☐ Click for Stage Area Data

☐ Click to Invert Stage Area Data

[Click Here for Imperial](#)

Interpolation Tools

☐ Click to Define Top and/or Bottom of storage
☐ Click to Define Target Volume & Reference Elevation

StormTech SC-800 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic)	Elevation (meters)
1143	0.000	0.000	0.00	0.00	0.92	0.92	58.97	91.89
1118	0.000	0.000	0.00	0.00	0.92	0.92	58.05	91.87
1092	0.000	0.000	0.00	0.00	0.92	0.92	57.13	91.84
1067	0.000	0.000	0.00	0.00	0.92	0.92	56.20	91.82
1041	0.000	0.000	0.00	0.00	0.92	0.92	55.28	91.79
1016	0.000	0.000	0.00	0.00	0.92	0.92	54.36	91.77
991	0.002	0.000	0.04	0.00	0.91	0.95	53.43	91.74
965	0.006	0.000	0.11	0.00	0.88	0.99	52.49	91.72
940	0.008	0.000	0.16	0.00	0.86	1.02	51.50	91.69
914	0.014	0.000	0.29	0.00	0.81	1.10	50.48	91.66
889	0.021	0.000	0.42	0.00	0.75	1.18	49.38	91.64
864	0.025	0.001	0.51	0.00	0.72	1.23	48.20	91.61
838	0.029	0.001	0.57	0.00	0.69	1.27	46.98	91.59
813	0.032	0.001	0.63	0.00	0.67	1.31	45.71	91.56
787	0.034	0.001	0.69	0.01	0.65	1.34	44.40	91.54
762	0.037	0.002	0.73	0.01	0.63	1.37	43.06	91.51
737	0.039	0.002	0.78	0.01	0.61	1.39	41.69	91.49
711	0.041	0.002	0.82	0.01	0.59	1.42	40.30	91.46
686	0.043	0.002	0.85	0.01	0.58	1.44	38.88	91.44
660	0.044	0.003	0.89	0.01	0.56	1.46	37.44	91.41
635	0.046	0.003	0.92	0.01	0.55	1.48	35.98	91.39
610	0.047	0.003	0.95	0.01	0.54	1.50	34.50	91.36
584	0.049	0.003	0.98	0.01	0.53	1.52	33.00	91.33
559	0.050	0.004	1.00	0.01	0.52	1.53	31.48	91.31
533	0.051	0.004	1.03	0.01	0.51	1.55	29.95	91.28
508	0.052	0.004	1.05	0.02	0.50	1.56	28.40	91.26
483	0.054	0.004	1.07	0.02	0.49	1.58	26.84	91.23
457	0.055	0.004	1.09	0.02	0.48	1.59	25.26	91.21
432	0.056	0.004	1.11	0.02	0.47	1.60	23.68	91.18
406	0.057	0.004	1.13	0.02	0.46	1.61	22.08	91.16
381	0.057	0.005	1.15	0.02	0.46	1.62	20.46	91.13
356	0.058	0.005	1.16	0.02	0.45	1.63	18.84	91.11
330	0.059	0.005	1.18	0.02	0.44	1.64	17.21	91.08
305	0.060	0.005	1.19	0.02	0.44	1.65	15.57	91.05
279	0.060	0.005	1.21	0.02	0.43	1.66	13.91	91.03
254	0.061	0.005	1.22	0.02	0.43	1.67	12.25	91.00
229	0.062	0.005	1.23	0.02	0.42	1.68	10.59	90.98
203	0.062	0.005	1.25	0.02	0.42	1.68	8.91	90.95
178	0.063	0.004	1.26	0.01	0.41	1.69	7.23	90.93
152	0.000	0.000	0.00	0.00	0.92	0.92	5.54	90.90
127	0.000	0.000	0.00	0.00	0.92	0.92	4.62	90.88
102	0.000	0.000	0.00	0.00	0.92	0.92	3.69	90.85
76	0.000	0.000	0.00	0.00	0.92	0.92	2.77	90.83
51	0.000	0.000	0.00	0.00	0.92	0.92	1.85	90.80
25	0.000	0.000	0.00	0.00	0.92	0.92	0.92	90.78

Project: C2

Chamber Model -
Units -
Number of Chambers -
Number of End Caps -
Voids in the stone (porosity) -
Base of Stone Elevation -
Amount of Stone Above Chambers -
Amount of Stone Below Chambers -

SC-800
Metric
21
4
40
90.46
152
152



Area of System- 98.43969 sq.meters Min. Area - 65.63 sq.meters

Version 1.1

☒ Include Perimeter Stone in Calculations

☐ Click for Stage Area Data

☐ Click to Invert Stage Area Data

[Click Here for Imperial](#)

Interpolation Tools

☐ Click to Define Top and/or Bottom of storage
☐ Click to Define Target Volume & Reference Elevation

StormTech SC-800 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic)	Elevation (meters)
1143	0.000	0.000	0.00	0.00	1.00	1.00	63.30	91.60
1118	0.000	0.000	0.00	0.00	1.00	1.00	62.30	91.57
1092	0.000	0.000	0.00	0.00	1.00	1.00	61.30	91.55
1067	0.000	0.000	0.00	0.00	1.00	1.00	60.30	91.52
1041	0.000	0.000	0.00	0.00	1.00	1.00	59.30	91.50
1016	0.000	0.000	0.00	0.00	1.00	1.00	58.30	91.47
991	0.002	0.000	0.04	0.00	0.98	1.03	57.30	91.45
965	0.006	0.000	0.12	0.00	0.95	1.07	56.27	91.42
940	0.008	0.000	0.17	0.00	0.93	1.10	55.20	91.40
914	0.014	0.000	0.30	0.00	0.88	1.18	54.10	91.37
889	0.021	0.000	0.44	0.00	0.82	1.27	52.92	91.35
864	0.025	0.001	0.53	0.00	0.79	1.32	51.65	91.32
838	0.029	0.001	0.60	0.00	0.76	1.36	50.33	91.29
813	0.032	0.001	0.67	0.00	0.73	1.40	48.97	91.27
787	0.034	0.001	0.72	0.01	0.71	1.44	47.57	91.24
762	0.037	0.002	0.77	0.01	0.69	1.47	46.13	91.22
737	0.039	0.002	0.82	0.01	0.67	1.49	44.66	91.19
711	0.041	0.002	0.86	0.01	0.65	1.52	43.17	91.17
686	0.043	0.002	0.90	0.01	0.64	1.54	41.65	91.14
660	0.044	0.003	0.93	0.01	0.62	1.57	40.11	91.12
635	0.046	0.003	0.96	0.01	0.61	1.59	38.54	91.09
610	0.047	0.003	1.00	0.01	0.60	1.60	36.96	91.07
584	0.049	0.003	1.02	0.01	0.59	1.62	35.35	91.04
559	0.050	0.004	1.05	0.01	0.57	1.64	33.73	91.01
533	0.051	0.004	1.08	0.01	0.56	1.66	32.09	90.99
508	0.052	0.004	1.10	0.02	0.55	1.67	30.43	90.96
483	0.054	0.004	1.12	0.02	0.54	1.68	28.76	90.94
457	0.055	0.004	1.15	0.02	0.53	1.70	27.08	90.91
432	0.056	0.004	1.17	0.02	0.53	1.71	25.38	90.89
406	0.057	0.004	1.19	0.02	0.52	1.72	23.67	90.86
381	0.057	0.005	1.21	0.02	0.51	1.73	21.95	90.84
356	0.058	0.005	1.22	0.02	0.50	1.75	20.21	90.81
330	0.059	0.005	1.24	0.02	0.50	1.76	18.47	90.79
305	0.060	0.005	1.25	0.02	0.49	1.76	16.71	90.76
279	0.060	0.005	1.27	0.02	0.48	1.77	14.95	90.74
254	0.061	0.005	1.28	0.02	0.48	1.78	13.17	90.71
229	0.062	0.005	1.30	0.02	0.47	1.79	11.39	90.68
203	0.062	0.005	1.31	0.02	0.47	1.80	9.60	90.66
178	0.063	0.004	1.32	0.01	0.47	1.80	7.80	90.63
152	0.000	0.000	0.00	0.00	1.00	1.00	6.00	90.61
127	0.000	0.000	0.00	0.00	1.00	1.00	5.00	90.58
102	0.000	0.000	0.00	0.00	1.00	1.00	4.00	90.56
76	0.000	0.000	0.00	0.00	1.00	1.00	3.00	90.53
51	0.000	0.000	0.00	0.00	1.00	1.00	2.00	90.51
25	0.000	0.000	0.00	0.00	1.00	1.00	1.00	90.48



ADS Isolator Row PLUS Sizing

Project Name:	1398 BCDC - System C1		
Consulting Engineer:	DSEL		
Location:	Ottawa, Ontario		
Sizing Completed By:	Haider Nasrullah	Email:	haider.nasrullah@ads-pipe.com

Stormtech Details	
Chamber Model	SC-800
No. Chamber in Isolator Row PLUS:	11

Notes: Refer to Stormtech drawings for full IR+ configuration.

Treatment Details	
Water Quality Flow Rate Required	78 L/s
Water Quality Flow Rate Provided	78.1 L/s
TSS Removal Achieved	>81%

StormTech Isolator Row Sizing Chart

StormTech Isolator Row Plus - Water Quality Flowrate for >81% TSS Removal								
	SC-160	SC-310	SC-740	DC-780	SC-800	MC-3500	MC-4500	MC-7200
Chamber Bottom Area (m ²)	1.06	1.64	2.58	2.58	2.54	3.99	2.8	4.65
Treated Flowrate/Chamber (L/s)	3.11	4.53	7.36	7.36	7.1	11.32	7.93	12.74

Isolator Row PLUS removal efficiency based on verified ETV test report. For dimensions and configuration of Isolator Row PLUS, please see Stormtech drawing package.



ADS Isolator Row PLUS Sizing

Project Name:	1398 BCDC - System C2		
Consulting Engineer:	DSEL		
Location:	Ottawa, Ontario		
Sizing Completed By:	Haider Nasrullah	Email:	haider.nasrullah@ads-pipe.com

Stormtech Details	
Chamber Model	SC-800
No. Chamber in Isolator Row PLUS:	12

Notes: Refer to Stormtech drawings for full IR+ configuration.

Treatment Details	
Water Quality Flow Rate Required	82 L/s
Water Quality Flow Rate Provided	85.2 L/s
TSS Removal Achieved	>81%

StormTech Isolator Row Sizing Chart

StormTech Isolator Row Plus - Water Quality Flowrate for >81% TSS Removal								
	SC-160	SC-310	SC-740	DC-780	SC-800	MC-3500	MC-4500	MC-7200
Chamber Bottom Area (m ²)	1.06	1.64	2.58	2.58	2.54	3.99	2.8	4.65
Treated Flowrate/Chamber (L/s)	3.11	4.53	7.36	7.36	7.1	11.32	7.93	12.74

Isolator Row PLUS removal efficiency based on verified ETV test report. For dimensions and configuration of Isolator Row PLUS, please see Stormtech drawing package.

Peter Mott

From: Haider Nasrullah <Haider.Nasrullah@adspipe.com>
Sent: August 20, 2025 3:11 PM
To: Peter Mott
Cc: Adam Fobert
Subject: RE: 1398 BCDC Site Plan - Stormtech Chambers
Attachments: REV6 - 1398 BCDC (S430138) - 8-18-25.pdf; REV6 - 1398 BCDC (S430138) - 8-18-25.dwg; REV6 - 1398 BCDC - Volume - C1.pdf; REV6 - 1398 BCDC - Volume - C2.pdf; DSEL - 1398 BCDC - System C1 - ADS Isolator Row Plus.pdf; DSEL - 1398 BCDC - System C2 - ADS Isolator Row Plus.pdf

EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hey Peter,

Please see attached the revised drawing with the new inverts. We have to add 2 more chambers to IR+, I should have those revisions done soon. I have attached the IR+ sizing reports.

For the drawdown time, I used the equation from here

https://wiki.sustainabletechnologies.ca/wiki/Flow_through_perforated_pipe

With 22m of 150mm subdrain, clogging factor of 0.5 as worst-case scenario, Cd as 0.61, opening area of 0.00635m²/m, acting head of 0.2m.

The drain down via the subdrain should around 1-2 hours for the 200mm of storage below the outlet.

Regards,

Haider Nasrullah, P.Eng., PMP

Engineered Products Manager

haider.nasrullah@adspipe.com

(647) 850-9417



www.ads-pipcanada.ca



STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Arterial Roads Return Frequency = 10 years



Manning	0.013
---------	-------

LOCATION			AREA (Ha)																FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Area	From Node	To Node	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	FLOW (min.)	Q/Q full
BCDC EAST STACKED CONDO SITE PLAN																																	
	613	614	0.13	0.83	0.29	0.29			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	22	300	300	PVC	0.35	35.5	57.2089	0.8093	0.7310	0.390
	614	616	0.09	0.79	0.20	0.49			0.00	0.00			0.00	0.00			0.00	0.00	10.73	74.11	100.48	117.77	172.14	36	375	375	PVC	0.30	11.0	96.0323	0.8695	0.2109	0.377
	616	617	0.04	0.77	0.08	0.57			0.00	0.00			0.00	0.00			0.00	0.00	10.94	73.37	99.47	116.58	170.38	42	450	450	CONC	0.20	3.0	127.5033	0.8017	0.0624	0.329
To Chamber C1						0.57				0.00			0.00				0.00		11.00														
	CBMH 619	620	0.19	0.77	0.40	0.40			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	31	300	300	PVC	0.35	8.5	57.2089	0.8093	0.1750	0.537
	620	621	0.09	0.74	0.18	0.58			0.00	0.00			0.00	0.00			0.00	0.00	10.18	76.14	103.28	121.06	176.97	44	375	375	PVC	0.30	32.0	96.0323	0.8695	0.6134	0.461
	621	617	0.09	0.79	0.20	0.78			0.00	0.00			0.00	0.00			0.00	0.00	10.79	73.90	100.20	117.44	171.66	58	450	450	CONC	0.20	3.0	127.5033	0.8017	0.0624	0.452
To Chamber C1						0.78				0.00			0.00				0.00		10.85														
Contribution from Chamber C1						1.35				0.00			0.00				0.00		11.00														
	618	615			0.00	1.35			0.00	0.00			0.00	0.00			0.00	0.00	11.00	73.15	99.17	116.23	169.87	99	600	600	CONC	0.15	9.0	237.8056	0.8411	0.1783	0.416
	615	704			0.00	1.35			0.00	0.00			0.00	0.00			0.00	0.00	11.18	72.54	98.34	115.24	168.43	98	600	600	CONC	0.15	48.5	237.8056	0.8411	0.9611	0.412
To Les Emmerson Drive (N), Pipe 704 - 705						1.35				0.00			0.00				0.00		12.14														
	CBMH 537	538	0.22	0.82	0.51	0.51			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	39	300	300	PVC	0.35	31.0	57.2089	0.8093	0.6384	0.686
	538	534			0.00	0.51			0.00	0.00			0.00	0.00			0.00	0.00	10.64	74.44	100.94	118.31	172.93	38	300	300	PVC	0.35	4.5	57.2089	0.8093	0.0927	0.664
To Pipe 534 - 535						0.51				0.00			0.00				0.00		10.73														
	530	533	0.33	0.81	0.75	0.75			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	57	450	450	CONC	0.25	33.0	142.5531	0.8963	0.6136	0.402
	533	534	0.06	0.74	0.12	0.86			0.00	0.00			0.00	0.00			0.00	0.00	10.61	74.53	101.06	118.45	173.14	64	450	450	CONC	0.25	3.0	142.5531	0.8963	0.0558	0.451
Contribution From Pipe 538 - 534						0.51				0.00			0.00				0.00		10.73														
	534	535			0.00	1.37			0.00	0.00			0.00	0.00			0.00	0.00	10.73	74.11	100.48	117.77	172.14	102	450	450	CONC	0.25	3.0	142.5531	0.8963	0.0558	0.714
To Chamber C2						1.37				0.00			0.00				0.00		10.79														
Contribution from Chamber C2						1.37				0.00			0.00				0.00		10.79														
	536	531			0.00	1.37			0.00	0.00			0.00	0.00			0.00	0.00	10.79	73.91	100.21	117.45	171.67	101	450	450	CONC	0.25	14.5	142.5531	0.8963	0.2696	0.712
	531	532			0.00	1.37			0.00	0.00			0.00	0.00			0.00	0.00	11.06	72.97	98.93	115.94	169.45	100	450	450	CONC	0.20	13.0	127.5033	0.8017	0.2703	0.786
To Mineral Street, Pipe 532 - 507						1.37				0.00			0.00				0.00		11.33														

Definitions:
 $Q = 2.78 \text{ AIR}$, where
 Q = Peak Flow in Litres per second (L/s)
 A = Areas in hectares (ha)
 I = Rainfall Intensity (mm/h)
 R = Runoff Coefficient

Notes:

- 1) Ottawa Rainfall-Intensity Curve
- 2) Min. Velocity = 0.80 m/s



Designed:	W.L.	PROJECT: BCDC EAST STACKED CONDO SITE PLAN BARRHAVEN CONSERVANCY EAST Ph4		
Checked:	W.L.	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref:	Date:	Sheet No.	
Dwg. 12	20-1180	23 Jul 2025	SHEET 1 OF 1	

re: Geotechnical Review – Groundwater Infiltration
Proposed Residential Development – Conservancy Lands East and West
Borrisokane Road – Ottawa, Ontario

to: Caivan Communities – Hugo Lalonde – hugo.lalonde@caivan.com

date: October 21, 2024

file: PG5036-MEMO.42

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a geotechnical review and recommendations with respect to management of groundwater infiltration into the sump pits of townhouse blocks and back-to-back style residential dwellings. This memorandum should be read in conjunction with the Sump Pump Feasibility Report (Paterson Group Report PG5036-LET.01 Revision 3 dated September 5, 2022).

Geotechnical Review & Recommendations

The subject residential development consists of single-family homes, townhouse blocks and back-to-back style residential buildings. Buildings which include a basement level will use sump pump(s) to provide an outlet for stormwater and spring melt water collected from the perimeter foundation drainage system.

Based on the geotechnical investigation completed by others, the subsurface profile at the subject site generally consists of topsoil underlain by a very stiff to stiff, brown silty clay crust, becoming firm to stiff and grey in colour by approximate depths of 2.5 to 3.0 m below the existing ground surface. The silty clay deposit generally extended to the maximum depth of the boreholes. The long-term groundwater elevation at the subject site is expected at an approximate geodetic elevation ranging from 88.3 to 90.0 m.

Hydraulic conductivity (slug) testing was completed by Paterson and by others at select monitoring wells installed during the geotechnical investigation, by others. Based on the results of the slug testing, the silty clay within the subject site has a hydraulic conductivity ranging from 5.0×10^{-8} and 2.0×10^{-5} m/sec.

It is understood that the proposed townhouse blocks may consist of up to 12 units, with an approximate building footprint of 720 m². From the hydraulic conductivity of the in-situ soils and the sizing of the building footprint, sump pumps for the proposed townhouse blocks should be sized to handle an approximate volume of up to 200,000 L/day.



As such, it is recommended that the proposed townhouse blocks be outfitted with a sufficient number of sump pumps to effectively drain this volume of water. The location(s) of the sump pump(s) should be evenly distributed across each building footprint.

We trust that the current submission meets your immediate requirements.

Best Regards,

Paterson Group Inc.

Kevin A. Pickard, P.Eng.



Scott S. Dennis, P.Eng.





David Schaeffer Engineering Ltd.

120 Iber Road, Suite 103

Stittsville, ON K2S 1E9

613-836-0856

dssel.ca

- **STORMWATER MANAGEMENT REPORT FOR PHASE 3 OF THE BARRHAVEN CONSERVANCY EAST (JFSA, AUGUST 2025)**
- **BCDC PHASE 3 SWM QUALITY CONTROL AND TREATMENT TRAIN ANALYSIS (JFSA, AUGUST 2025)**
- **BARRHAVEN CONSERVANCY EAST SITE PLAN (CONSERVANCY STACKED TOWNS) – STORMWATER ANALYSIS (JFSA, AUGUST 2025)**

(PROVIDED UNDER SEPARATE COVER)