TATHAM ENGINEERING

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3817-3843 Innes Road

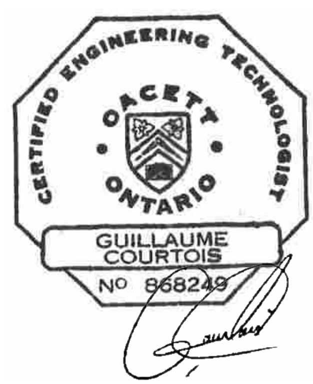
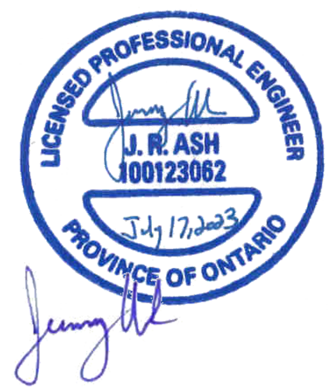
SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Bridor Developments

File 522676 | July 17, 2023

Document Control

File:	Prepared by:	Prepared for:
522676	**Tatham Engineering Limited** 5335 Canotek Road, Unit 103 Ottawa, Ontario K1J 9L4	**Bridor Developments** 996 St-Augustin Road, Unit B Embrun, Ontario K0A 1W0
Date: **July 17, 2023**	**T** 613-747-3636 **tathameng.com**	

Authored by:	Reviewed by:
	
Guillaume M. Courtois, C.E.T. Senior Technologist, Project Manager	Jeremy Ash, B.Sc.Eng., P.Eng. Director, Manager - Ottawa Office

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Issue	Date	Description
1	October 28, 2022	Final Report
2	April 13, 2022	Revised Final Report
3	July 17, 2023	Revised Final Report

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Appendices

1 Introduction

Blanchard Letendre Engineering Ltd. (BL Engineering) was originally retained by Bridor Developments (Bridor) to complete site servicing and stormwater management designs for the proposed site development located at 3817 – 3843 Innes Road in Ottawa. In September 2022, Tatham Engineering Limited (Tatham) was retained by Bridor to replace BL Engineering as the Engineer of Record for the project moving forward. The revisions made to this report, and the enclosed detailed engineering design drawings, have been completed to address the City's engineering comments dated June 21, 2022. We note that a hydrologic model, Visual Otthymo Version 6.0 (V06), has also been prepared to replace the rational method calculations previously submitted by BL Engineering, to further refine the SWM quantity control storage volume required. BL Engineering's original Site Servicing and SWM Report, dated May 3, 2022, is provided in Appendix G.

This report and detailed engineering drawings have been prepared based on the Site Plan prepared by P-Square Concepts and the site survey completed by Annis O'Sullivan Vollebekk.

2 Site Plan

As per the aerial picture in Figure 1, the existing 0.7 ha site consists of green space area with four (4) existing buildings that will be demolished prior to construction. The land will be developed with two (2) new residential apartment buildings.

Figure 1: Existing Site at 3817-3843 Innes Road, Orleans, Ontario

3 Stormwater Management

3.1 EXISTING SITE CONDITIONS

The site currently drains uncontrolled towards Innes Road where runoff is captured by the existing roadside catchbasins. The existing property naturally grades towards Innes Road away from the residential development on the north and west portion of the property. There is an existing gas station at the east side of the property that is developed at a lower elevation than the existing property. Refer to Drawing C400 for the pre-development drainage area.

3.2 EXISTING CONDITION HYDROLOGIC ANALYSIS

A Visual OTTHYMO hydrologic model (V06) scenario was developed to quantify the existing condition peak flows from the site.

The catchment delineation was determined based on the topographic survey. Existing condition land uses were established based on our review of online aerial photography.

A summary of all hydrologic parameters established for the existing condition hydrologic model has been included in Appendix A.

The peak flow for the 5-year storm event was calculated for the 3-hour Chicago, 6-hour Chicago and 24-hour SCS Type II design storms using IDF data derived from Meteorological Services of Canada (MSC) rainfall data taken from the MacDonald-Cartier Airport. Detailed calculations and Visual OTTHYMO modeling output are included in Appendix A with the results summarized below in Table 1.

Table 1: Existing Condition Peak Flow Summary

DESIGN STORM	CATCHMENT AREA EWS-01 0.7 ha (m^3/s)		
	3-hr CHI	6-hr CHI	24-hr SCS Type II
5-Year	0.050	0.051	0.054

3.3 PROPOSED STORMWATER MANAGEMENT

The development of the site will consist of adding two (2) new residential apartment buildings. The site will be modified by adding a total of 2592 square meters of building (Block A = 1296m^2; Block B = 1296m^2), asphalt parking and driving aisles, and amenity areas. As the runoff coefficient will increase in the proposed condition due to addition of hard surfaces, post-development stormwater quantity and quality control will be implemented.

The stormwater management design has been developed to follow the existing site topography. As the property naturally drains towards Innes Road, the proposed stormwater management plan will also outlet to the City storm sewer at Innes Road. The overland flow route has also been designed to convey emergency overland flow towards Innes Road.

The stormwater generated by the new hard surfaces will be directed to a series of drainage structures which will capture and covey runoff to the existing municipal system. The catchment areas have been delineated according to the proposed grading plan. In order to respect the 5-year pre-development allowable release rate, the outlets will be controlled by an orifice plate control which will limit the flow discharging to the City storm sewer at Innes Road. By restricting flow, onsite stormwater detention will be provided via surface ponding and underground storage which were designed to attenuate the post-development runoff from the 100-year storm event to the 5-year pre-development peak flow rate.

3.4 PROPOSED CONDITION HYDROLOGIC ANALYSIS

A VO6 model scenario was developed to quantify the proposed condition peak flow from the site. The peak flow for the 100-year storm event was calculated for the 3-hour Chicago, 6-hour Chicago, and 24-hour SCS Type II design storms using the previously described IDF data.

Runoff from the 100-year storm was overcontrolled such that the combined controlled peak flow from Catchments WS-01, WS-02, WS-03, and WS-07 and the uncontrolled peak flows from Catchments WS-04, WS-05, and WS-06 are reduced at or below the existing condition 5-year storm peak flow rate.

The catchment delineation for the contributing lands was completed according to the proposed site grading illustrated on drawing C200, which is included in Appendix F. The proposed surface cover and the existing soil type were used to establish the percent imperviousness, curve numbers, and other hydrologic parameters used in the hydrologic model. Summaries of all hydrologic parameters and stage-storage-discharge tables, established for the post-development hydrologic model, have been included in Appendix A.

Peak runoff rates are shown in the table below and the results of the modelling are included in Appendix A.

Table 2: Proposed Condition Peak Flow Summary

DESIGN STORM	CATCHMENT AREA WS-01 + WS-02 + WS-03 + WS-07 0.57 ha CONTROLLED (m^3/s)			CATCHMENT AREA WS-04 + WS-05 + WS-06 0.13 ha UNCONTROLLED (m^3/s)			TOTAL 0.7 ha (m^3/s)		
	3-hr CHI	6-hr CHI	24-hr SCS TYPE II	3-hr CHI	6-hr CHI	24-hr SCS TYPE II	3-hr CHI	6-hr CHI	24-hr SCS TYPE II
100-Year	0.025	0.025	0.024	0.026	0.027	0.026	0.049 (0.050)	0.050 (0.051)	0.050 (0.054)

Note: (0.100) refers to existing condition 5-year peak flow rate.

Table 2 above confirms the proposed SWM plan will attenuate the proposed condition 100-year peak flow at or below the existing condition 5-year peak flow.

3.5 PROPOSED STORMWATER QUANTITY CONTROL

The proposed stormwater management for the site will be achieved through the use of underground storage chambers (Stormtech SC-740) and surface ponding. The grading of the site has been designed to direct runoff from the controlled catchments into the onsite storm network, consisting of a series of drainage structures, underground stormwater chambers, and a control structure, prior to discharging into the 1350mm diameter municipal storm sewer at Innes Road. The proposed storm network and underground stormwater chambers are shown on the attached drawings in Appendix F.

The stormwater generated from the site will be controlled via an orifice plate located at the outlet of STM MH01, which will restrict flow directed to the municipal sewer. The proposed orifice plate will release a total of 25 L/s with a maximum head of 3.13 m (HWL = 91.69) during the 100-year storm event. As the flow will be restricted, 188.00 m^3 of stormwater storage will be required for the site. The Stormtech SC-740 underground chambers will provide 83.4 m^3 of storage volume whereas the parking and drive aisle areas will provide an additional 112.2 m^3 of surface storage. The combined storage volume of 195.6 m^3 is sufficient to meet the minimum storage requirement for the site. Refer to the underground chambers drawings in Appendix D.

Uncontrolled runoff from the two (2) underground parking ramps (catchments WS-04 and WS-05) will be captured by a trench drain located at the bottom of each ramp and conveyed to the foundation drains of each building. Details related to the underground parking ramp drainage will be coordinated with the mechanical designer and submitted with the building permit application.

Uncontrolled runoff from the area on the east and south sides of the site (catchment WS-06) will either be collected in the lawn catchbasins and 250 mm diameter perforated pipe which discharges directly into the water quality treatment unit (downstream of the orifice plate control) or will sheet flow towards Innes Road.

3.5.1 Roof Drainage

The proposed roofs are flat and roof draining and scuppers will discharge water onto the pavement area. All runoff from the roofs will be controlled by the orifice plate in STM MH01. The scuppers will provide emergency spill outs in the event of a blockage.

3.5.2 Underground Chambers

Underground storage chambers (Stormtech SC-740) have been specified to provide stormwater storage for the controlled portion of the site. The chambers have been designed with an impermeable liner to reduce potential groundwater impacts and the potential for a hydraulic connection between the chambers and the building foundation drains. An isolator row has been included with the storage chamber design to provide additional water quality treatment via filtration. A total of 83.4 m^3 will be provided by the underground chambers. The chambers will be connected to a proposed catchbasin-manhole on either side to provide sufficient access to the chambers for maintenance. The maintenance of the chambers is to be in accordance with the manufacturer's guidelines. Refer to Appendix D for the Stormtech SC-740 drawings.

3.6 PROPOSED STORMWATER QUALITY CONTROL

A water quality control requirement of 80% TSS removal is required by the City of Ottawa. In order to meet this requirement, a stormwater treatment unit will be constructed at the downstream end of the system. Using the Stormceptor sizing software, the EF04 was selected. The software generated report has been attached in Appendix D.

4 Sanitary Sewer Design

4.1 EXISTING SITE CONDITIONS

The existing site is serviced by separate services to each of the existing three (3) parcels and are connected to the existing 250mm diameter PVC sanitary sewer at Innes Road. The existing connections will be removed, and one new connection will service the new buildings.

4.2 PROPOSED SANITARY SERVICE

The new residential apartment buildings, which include 58 units in Block A and 58 units in Block B will discharge to the City sewer via a new 200mm diameter PVC sanitary service. The service will be located south of building Block A and will discharge to the existing 250mm diameter city sewer at Innes Road. The proposed 200mm diameter service will have a minimum slope of 1.00% to the City sewer for adequate self flushing. A monitoring manhole (SAN MH-A) is proposed upstream of the new connection. Refer to drawing C300 – Site Servicing Plan for the proposed sanitary service.

Based on the City of Ottawa Sanitary Design Guidelines, the sanitary peak flows were evaluated as follow; Block A: 1.64 L/s and Block B: 1.64 L/s. As per the City specific design parameters, the sanitary flow was evaluated based on the new building footprint and the total site area for each individual building. The proposed sanitary service was sized to convey the total combined peak flow of 3.28 L/s from both buildings. Refer to Appendix B for the sanitary sewer design calculation and design parameters set by the City of Ottawa.

5 Water Supply and Fire Protection

5.1 EXISTING SITE CONDITIONS

The existing site is serviced by separate 19mm diameter water services to each of the existing three (3) parcels and are connected to the existing 403mm diameter PVC watermain at Innes Road. The existing connections will be removed, and a new connection will service the new buildings. There are currently two (2) city fire hydrants at the front of the property. The hydrants are located on the south side of Innes Road, both within a 90m radius the main entrance of both buildings.

5.2 DOMESTIC WATER DEMANDS

The new residential apartment building water services were sized based on the City of Ottawa Design Guidelines. As per City guidelines, the average water demand per person of 280L/c/d was applied to the population of each building. The daily and hourly peaking factors of 2.5 and 2.2 respectively were applied as stated in the City of Ottawa guidelines. The water demands for the new buildings are summarized in Table 3.

Table 3: Domestic Water Demands

	BLOCK A	BLOCK B	BLOCK A+B	UNITS
Average Water Demand	26,656	26,656	53,312	L/d
Maximum Daily	66,640	66,640	133,280	L/d
Maximum Hourly	146,608	146,608	293,216	L/d

Based on the above, each building will be serviced with a 200 mm diameter PVC water service, connected to the 403 mm diameter PVC watermain at Innes Road. Each service will have its own shut-off valve at the property line with looping of the services within the private property. The proposed services are oversized to meet the combined Block A and B peak hour demand and are in accordance with the OBC, requiring a minimum service diameter of 150mm for buildings with sprinklers.

Refer to Appendix C for the water demand calculation sheet.

5.3 FIRE PROTECTION

The required fire flow rate was calculated in accordance with the 2020 Fire Underwriters Survey (FUS). This method is based on the type of building construction and the floor area of the building to be protected while accounting for reductions and surcharges related to combustibility of contents and the presence of a sprinkler system as well as building exposure of surrounding structures. The required fire flow rate is 6,000 L/min.

Each building is located within 90 m of a hydrant, in compliance with OBC requirements. Fire flow protection will be provided by the following three (3) hydrants, which are within 75 m (uninterrupted path) of the buildings:

- One existing Class AA blue bonnet hydrant located no further than 89 m from the proposed buildings (89 m southeast of Block A and 45 m southeast of Block B) on the south side of Innes Road;
- One existing Class AA blue bonnet hydrant located no further than 46 m from the proposed buildings (39 m south of Block A and 46 m southwest of Block B) on the south side of Innes Road; and
- One proposed Class AA blue bonnet hydrant located no further than 13 m from the proposed buildings (13 m southeast of Block A and 2 m south of Block B) on the north side of Innes Road.

All fire hydrant bonnets are color coded to indicate the available flow at a residual pressure of 150 kPa (20 psi), in accordance with the NFPA 291 Fire Flow Testing and Marking of Hydrants Code. The two (2) existing hydrants near the site consist of blue bonnet hydrants, and as such are Class AA-rated hydrants. Due to the proximity of the proposed hydrant to the existing hydrants, it will also be a Class AA-rated hydrant. As is summarized in Table 3, the required 6,000 L/min fire flow to the proposed buildings is available from the two (2) existing hydrants, while the proposed hydrant will further contribute to the available fire flow and will be located within 45 m of both of the Block A and B siamese connections in accordance with OBC requirements.

HYDRANT CLASS	DISTANCE TO BUILDING (m)[1]	CONTRIBUTION TO REQUIRED FIRE FLOW (L/min)	NUMBER OF USABLE NEARBY HYDRANTS	MAXIMUM FLOW TO BE CONSIDERED (L/min)	CUMULATIVE MAXIMUM FLOW TO BE CONSIDERED (L/min)
AA	≤ 75	5,700	2	11,400	15,200
AA	> 75 & ≤ 150	3,800	1	3,800	

Notes: 1. Distance of contributing hydrant from the structure, measured in accordance with NFPA 1.

A hydrant flow test is recommended to confirm the hydrant classes, thereby confirming adequate flow and pressure is available for fire protection.

5.4 WATER CAPACITY COMMENTS

The boundary conditions and HGL for hydraulic analysis for 3817-3843 Innes Road was obtained from the City and is attached in Appendix E. From the boundary conditions, the minimum HGL was evaluated at 130.3 m for the water main elevation at 91.6 m and a maximum pressure estimate of 55.1 psi.

6 Erosion and Sediment Control

During construction, sediment and erosion controls will be implemented around the property to reduce the potential for any sediment leaching off site. The construction and maintenance of the sediment controls must comply with the Ontario Provision Standard Specification OPSS 577. Refer to drawing C100 – Erosion and Sediment Control for additional details.

7 Summary

7.1 STORMWATER MANAGEMENT

The stormwater management design for the site will reduce the 100-year post-development peak flow from the site to the 5-year pre-development peak flow rate, thereby meeting the City's requirements. The post-development release rate from the controlled portion of the site will be restricted by an orifice plate located in STM MH01. The combined 100-year post-development controlled and uncontrolled peak flow will be reduced below the 5-year pre-development peak flow rate prior to discharging into the city sewer at Innes Road. Stormwater quantity control will be achieved with 83.4 m^3 of underground chamber storage and 112.2 m^3 of surface storage. The stormwater quality control will be met through the use of a stormwater treatment unit and supplemented by the isolator row in the underground chambers system.

7.2 SANITARY SERVICE

The estimated combined sanitary flow for the site is 3.28 L/s. The proposed development will be serviced via a new 200mm diameter PVC sanitary service connecting to the existing 250 mm diameter PVC sanitary sewer at Innes Road.

7.3 WATER SERVICE

Each proposed building will be serviced via a new 200mm diameter PVC water service to be connected to the existing 406mm diameter PVC watermain at Innes Road. The water demands for each of the buildings resulted in an average water demand of 26,656 L/d, a maximum daily demand of 66,640 L/d, and a peak hourly demand of 146,608 L/d. The required fire flow rate is 6,000 L/min. There will also be a new private fire hydrant installed in front of Block B.

Appendix A:
Stormwater Management Design

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Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	522676

Prepared By

Name	HY

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	N/A
Catchment ID:	EWS-01
Catchment Area (ha):	0.70
Impervious %:	23%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**FI**											
Soil Series		Farmington											
Hydrologic Soils Group		B											
Soil Texture		Loam or Silt Loam											
Runoff Coefficient Type		2											
Area (ha)		0.70											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.16	100	0.95									
Gravel	3		89	0.27									
Woodland	10		60	0.25									
Pasture/Lawns	5	0.54	69	0.28									
Meadows	8		65	0.27									
Cultivated	7		74	0.35									
Waterbody	12		50	0.05									
Average CN		76.09											
Average C		0.43											
Average IA		4.31											

Time to Peak Calculations

Max. Catchment Elev. (m):	94.20
Min. Catchment Elev. (m):	91.05
Catchment Length (m):	101
Catchment Slope (%):	3.12%
Method:	Bransby-Williams Formula
Time of Concentration (mins):	4.75

Summary

Catchment CN:	76.1
Catchment C:	0.43
Catchment IA (mm):	4.31
Time of Concentration (hrs):	0.08
Catchment Time to Peak (hrs):	0.05
Catchment Time Step (mins):	0.63

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Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	522676

Prepared By

Name	HY

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	N/A
Catchment ID:	WS-01
Catchment Area (ha):	0.24
Impervious %:	63%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**FI**											
Soil Series		Farmington											
Hydrologic Soils Group		B											
Soil Texture		Loam or Silt Loam											
Runoff Coefficient Type		2											
Area (ha)		0.24											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.15	100	0.95									
Gravel	3		89	0.27									
Woodland	10		60	0.25									
Pasture/Lawns	5	0.09	69	0.28									
Meadows	8		65	0.27									
Cultivated	7		74	0.35									
Waterbody	12		50	0.05									
Average CN		88.38											
Average C		0.70											
Average IA		3.13											

Time to Peak Calculations

Max. Catchment Elev. (m):	92.35
Min. Catchment Elev. (m):	91.80
Catchment Length (m):	16
Catchment Slope (%):	3.44%
Method:	Bransby-Williams Formula
Time of Concentration (mins):	0.82

Summary

Catchment CN:	88.4
Catchment C:	0.70
Catchment IA (mm):	3.13
Time of Concentration (hrs):	0.01
Catchment Time to Peak (hrs):	0.01
Catchment Time Step (mins):	0.11

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Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	522676

Prepared By

Name	HY

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	N/A
Catchment ID:	WS-02
Catchment Area (ha):	0.13
Impervious %:	100%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**FI**											
Soil Series		Farmington											
Hydrologic Soils Group		B											
Soil Texture		Loam or Silt Loam											
Runoff Coefficient Type		2											
Area (ha)		0.13											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.13	100	0.95									
Gravel	3		89	0.27									
Woodland	10		60	0.25									
Pasture/Lawns	5		69	0.28									
Meadows	8		65	0.27									
Cultivated	7		74	0.35									
Waterbody	12		50	0.05									
Average CN		100.00											
Average C		0.95											
Average IA		2.00											

Time to Peak Calculations

Max. Catchment Elev. (m):	92.65
Min. Catchment Elev. (m):	92.60
Catchment Length (m):	20
Catchment Slope (%):	0.25%
Method:	Bransby-Williams Formula
Time of Concentration (mins):	1.84

Summary

Catchment CN:	100.0
Catchment C:	0.95
Catchment IA (mm):	2.00
Time of Concentration (hrs):	0.03
Catchment Time to Peak (hrs):	0.02
Catchment Time Step (mins):	0.25

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Visual OTTHYMO Model
Parameter Calculations (NasHYD)

Project Details

Project Number	522676

Prepared By

Name	HY

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	N/A
Catchment ID:	WS-03
Catchment Area (ha):	0.13
Impervious %:	100%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**FI**											
Soil Series		Farmington											
Hydrologic Soils Group		B											
Soil Texture		Loam or Silt Loam											
Runoff Coefficient Type		2											
Area (ha)		0.13											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.13	100	0.95									
Gravel	3		89	0.27									
Woodland	10		60	0.25									
Pasture/Lawns	5		69	0.28									
Meadows	8		65	0.27									
Cultivated	7		74	0.35									
Waterbody	12		50	0.05									
Average CN		100.00											
Average C		0.95											
Average IA		2.00											

Time to Peak Calculations

Max. Catchment Elev. (m):	92.65
Min. Catchment Elev. (m):	92.60
Catchment Length (m):	20
Catchment Slope (%):	0.25%
Method:	Bransby-Williams Formula
Time of Concentration (mins):	1.84

Summary

Catchment CN:	100.0
Catchment C:	0.95
Catchment IA (mm):	2.00
Time of Concentration (hrs):	0.03
Catchment Time to Peak (hrs):	0.02
Catchment Time Step (mins):	0.25

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Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	522676

Prepared By

Name	HY

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	N/A
Catchment ID:	WS-04
Catchment Area (ha):	0.02
Impervious %:	100%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**FI**											
Soil Series		Farmington											
Hydrologic Soils Group		B											
Soil Texture		Loam or Silt Loam											
Runoff Coefficient Type		2											
Area (ha)		0.02											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.02	100	0.95									
Gravel	3		89	0.33									
Woodland	10		60	0.30									
Pasture/Lawns	5		69	0.35									
Meadows	8		65	0.33									
Cultivated	7		74	0.45									
Waterbody	12		50	0.05									
Average CN		100.00											
Average C		0.95											
Average IA		2.00											

Time to Peak Calculations

Max. Catchment Elev. (m):	92.40
Min. Catchment Elev. (m):	90.10
Catchment Length (m):	26
Catchment Slope (%):	8.85%
Method:	Bransby-Williams Formula
Time of Concentration (mins):	1.40

Summary

Catchment CN:	100.0
Catchment C:	0.95
Catchment IA (mm):	2.00
Time of Concentration (hrs):	0.02
Catchment Time to Peak (hrs):	0.02
Catchment Time Step (mins):	0.19

Visual OTTHYMO Model Parameter Calculations (NasHYD)

TATHAM ENGINEERING

Project Details

Project Number	522676

Prepared By

Name	HY

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	N/A
Catchment ID:	WS-05
Catchment Area (ha):	0.02
Impervious %:	100%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**FI**											
Soil Series		Farmington											
Hydrologic Soils Group		B											
Soil Texture		Loam or Silt Loam											
Runoff Coefficient Type		2											
Area (ha)		0.02											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.02	100	0.95									
Gravel	3		89	0.33									
Woodland	10		60	0.30									
Pasture/Lawns	5		69	0.35									
Meadows	8		65	0.33									
Cultivated	7		74	0.45									
Waterbody	12		50	0.05									
Average CN		100.00											
Average C		0.95											
Average IA		2.00											

Time to Peak Calculations

Max. Catchment Elev. (m):	92.40
Min. Catchment Elev. (m):	90.10
Catchment Length (m):	26
Catchment Slope (%):	8.85%
Method:	Bransby-Williams Formula
Time of Concentration (mins):	1.40

Summary

Catchment CN:	100.0
Catchment C:	0.95
Catchment IA (mm):	2.00
Time of Concentration (hrs):	0.02
Catchment Time to Peak (hrs):	0.02
Catchment Time Step (mins):	0.19

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	522676

Prepared By

Name	HY

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	N/A
Catchment ID:	WS-06
Catchment Area (ha):	0.09
Impervious %:	

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**FI**											
Soil Series		Farmington											
Hydrologic Soils Group		B											
Soil Texture		Loam or Silt Loam											
Runoff Coefficient Type		2											
Area (ha)		0.09											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.00	100	0.95									
Gravel	3		89	0.27									
Woodland	10		60	0.25									
Pasture/Lawns	5	0.09	69	0.28									
Meadows	8		65	0.27									
Cultivated	7		74	0.35									
Waterbody	12		50	0.05									
Average CN		70.03											
Average C		0.30											
Average IA		4.90											

Time to Peak Calculations

Max. Catchment Elev. (m):	92.40
Min. Catchment Elev. (m):	91.80
Catchment Length (m):	16
Catchment Slope (%):	3.75%
Method: Airport Method	
Time of Concentration (mins):	6.72

Summary

Catchment CN:	70.0
Catchment C:	0.30
Catchment IA (mm):	4.90
Time of Concentration (hrs):	0.11
Catchment Time to Peak (hrs):	0.07
Catchment Time Step (mins):	0.90

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	522676

Prepared By

Name	HY

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	N/A
Catchment ID:	WS-07
Catchment Area (ha):	0.07
Impervious %:	

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		FI										
Soil Series		Farmington										
Hydrologic Soils Group		B										
Soil Texture		Loam or Silt Loam										
Runoff Coefficient Type		2										
Area (ha)		0.07										
Percentage of Catchment		100%										
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2		100	0.95									
Gravel	3		89	0.27									
Woodland	10		60	0.25									
Pasture/Lawns	5	0.07	69	0.28									
Meadows	8		65	0.27									
Cultivated	7		74	0.35									
Waterbody	12		50	0.05									
Average CN		69.00											
Average C		0.28											
Average IA		5.00											

Time to Peak Calculations

Max. Catchment Elev. (m):	92.45
Min. Catchment Elev. (m):	92.20
Catchment Length (m):	16
Catchment Slope (%):	1.56%
Method: Airport Method	
Time of Concentration (mins):	9.23

Summary

Catchment CN:	69.0
Catchment C:	0.28
Catchment IA (mm):	5.00
Time of Concentration (hrs):	0.15
Catchment Time to Peak (hrs):	0.10
Catchment Time Step (mins):	1.23

TATHAM ENGINEERING

Project :	3817-3843 INNES ROAD
File No.	522676
Date:	Oct-22
Designed By:	HY
Checked By:	GC
Subject:	Stage-Storage-Discharge Table

OUTLET CONTROL

Orifice Control

	Orifice #1
Orifice Size (mm):	80
Cross-Sectional Area (sq.m):	0.005027
Orifice Coefficient:	0.63
Invert Elevation (m):	88.56
Outlet Pipe Size (mm):	375

STAGE DISCHARGE TABLE & CONTROL STRUCTURE CONFIGURATION

Water Level	80 mm dia. Orifice		Total Discharge	Active Storage
	Head	Discharge		
(m)	(m)	(cms)	(cms)	(cm)
90.10	1.50	0.017	0.017	0.0
90.15	1.55	0.017	0.017	6.7
90.20	1.60	0.018	0.018	13.3
90.25	1.65	0.018	0.018	20.0
90.30	1.70	0.018	0.018	26.2
90.35	1.75	0.019	0.019	32.5
90.40	1.80	0.019	0.019	38.7
90.45	1.85	0.019	0.019	44.7
90.50	1.90	0.019	0.019	50.6
90.55	1.95	0.020	0.020	56.4
90.60	2.00	0.020	0.020	61.8
90.65	2.05	0.020	0.020	67.0
90.70	2.10	0.020	0.020	71.9
90.75	2.15	0.021	0.021	76.4
90.80	2.20	0.021	0.021	80.2
90.85	2.25	0.021	0.021	83.4
90.90	2.30	0.021	0.021	83.4
90.95	2.35	0.021	0.021	83.4
91.00	2.40	0.022	0.022	83.4
91.05	2.45	0.022	0.022	83.4
91.10	2.50	0.022	0.022	83.4
91.15	2.55	0.022	0.022	83.4
91.20	2.60	0.023	0.023	83.4
91.25	2.65	0.023	0.023	83.4
91.30	2.70	0.023	0.023	83.4
91.35	2.75	0.023	0.023	83.4
91.40	2.80	0.023	0.023	83.4
91.45	2.85	0.024	0.024	83.9
91.50	2.90	0.024	0.024	87.6
91.55	2.95	0.024	0.024	97.4
91.60	3.00	0.024	0.024	116.7
91.65	3.05	0.024	0.024	148.4
91.70	3.10	0.025	0.025	195.6

Proposed Condition (Controled Area)

Design Storm	Underground Storage Chamber Operating Characteristics		
	Storage (m^3)	Total Outlfow (m^3/s)	Water Level (m)
100yr 24hr SCS	174	0.024	91.68
100yr 3hr Chicago	185	0.025	91.69
100yr 6hr Chicago	188	0.025	91.69
5yr 24hr SCS	81	0.023	90.81
5yr 3hr Chicago	84	0.023	91.45
5yr 6hr Chicago	85	0.023	91.46
2yr 24hr SCS	53	0.019	90.52
2yr 3hr Chicago	57	0.019	90.56

Proposed Condition (Controled + Uncontroled)

Design Storm	Total Outlfow (m^3/s)
100yr 24hr SCS	0.050
100yr 3hr Chicago	0.049
100yr 6hr Chicago	0.050

Existing Condition

Design Storm	Total Outlfow (m^3/s)
5yr 24hr SCS	0.054
5yr 3hr Chicago	0.050
5yr 6hr Chicago	0.051

TATHAM ENGINEERING

Project :	3817-3843 INNES ROAD
File No.	522676
Date:	Oct-22
Designed By:	HY
Checked By:	GC
Subject:	Storm chamber Stage Storage

Underground Chamber Storage

Elevation	Depth	Quantity Volume	Total # Chambers	Total Volume
(m)	(m)	(m^3)	(ea)	(m^3)
90.10	0.00	0.00	48	0.0
90.15	0.05	0.14	48	6.7
90.20	0.10	0.28	48	13.3
90.25	0.15	0.42	48	20.0
90.30	0.20	0.55	48	26.2
90.35	0.25	0.68	48	32.5
90.40	0.30	0.81	48	38.7
90.45	0.35	0.93	48	44.7
90.50	0.40	1.06	48	50.6
90.55	0.45	1.17	48	56.4
90.60	0.50	1.29	48	61.8
90.65	0.55	1.40	48	67.0
90.70	0.60	1.50	48	71.9
90.75	0.65	1.59	48	76.4
90.80	0.70	1.67	48	80.2
90.85	0.75	1.74	48	83.4

Parking Lot Surface Storage

Elevation	Depth	Increasing Area	Accum Area	Volume	Total Volume
(m)	(m)	(m^2)	(m^2)	(m^3)	(m^3)
91.40	0.00	0.00	0.00	0.00	0.0
91.45	0.05	31.17	31.17	0.52	0.5
91.50	0.10	93.50	124.67	3.64	4.2
91.55	0.15	155.83	280.50	9.87	14.0
91.60	0.20	218.17	498.67	19.22	33.2
91.65	0.25	280.50	779.17	31.69	64.9
91.70	0.30	342.83	1122.00	47.27	112.2

File No.	522676	**Date:**	October 23, 2022
Project:	Proposed Apartment Buildings	**Designed:**	HY
Project Address:	3817-3843 - Innes Road	**Checked:**	GC
Client:	Bridor Development	**Drawing Reference:**	C200 & C300 & C401

STORM WATER MANAGEMENT DESIGN SHEET

SEWER DESIGN

LOCATION			AREA (ha)			FLOW					STORM SEWER DATA							
WATERSHED / STREET	From MH	To MH	C = 0.30	C = 0.80	C = 0.95	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (l/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})
WS-06	LCB10	LCB09	0.087	0.000	0.003	0.06	0.06	10.00	104.19	5.87	250	PVC	0.50%	25.7	42.05	0.86	0.50	**0.14**
	LCB09	LCB08	0.000	0.000	0.000	0.00	0.06	10.50	101.62	5.72	250	PVC	0.50%	25.0	42.05	0.86	0.49	**0.14**
	LCB08	STMMH07	0.000	0.000	0.000	0.00	0.06	10.99	99.26	5.59	250	PVC	0.80%	40.7	53.19	1.08	0.63	**0.11**
WS-04	STMMH07	STMMH06	0.000	0.000	0.020	0.05	0.11	11.61	96.38	10.52	300	PVC	0.50%	40.2	68.38	0.97	0.69	**0.15**
WS-05	STMMH06	TREAMENT	0.000	0.000	0.020	0.05	0.16	12.31	93.41	15.13	300	PVC	0.50%	8.4	68.38	0.97	0.14	**0.22**
WS-07	LCB14	LCB13	0.050	0.000	0.000	0.03	0.03	10.00	104.19	2.90	250	PVC	0.50%	19.9	42.05	0.86	0.39	**0.07**
	LCB13	LCB12	0.000	0.000	0.000	0.00	0.03	10.39	102.19	2.84	250	PVC	0.50%	16.5	42.05	0.86	0.32	**0.07**
	LCB12	LCB11	0.000	0.000	0.000	0.00	0.03	10.71	100.60	2.80	250	PVC	0.50%	13.0	42.05	0.86	0.25	**0.07**
	LCB11	STM MH1	0.000	0.000	0.000	0.00	0.03	10.96	99.38	2.76	250	PVC	0.50%	23.6	42.0	0.86	0.46	**0.07**
WS-01 WS-02 WS-03	CBMH05	CBMH04	0.080	0.000	0.410	1.13	1.13	10.00	104.19	117.46	375	PVC	1.00%	0.0	175.3	1.59	0.00	**0.67**
	CBMH04	CBMH03	0.000	0.000	0.000	0.00	1.13	10.00	104.19	117.46	375	PVC	1.00%	19.8	175.3	1.59	0.21	**0.67**
	CBMH03	STM MH02	0.000	0.000	0.000	0.00	1.13	10.21	103.11	116.23	375	PVC	1.00%	10.4	175.3	1.59	0.11	**0.66**
	STM MH02	STM MH01	0.000	0.000	0.000	0.00	1.13	10.32	102.55	115.60	375	PVC	0.90%	28.5	166.3	1.51	0.32	**0.69**
	STM MH01	TREATMENT	0.000	0.000	0.000	0.00	1.16	11.42	97.25	50.00	375	PVC	4.40%	2.5	367.78	3.33	0.01	**0.14**
	TREATMENT	CITY	0.000	0.000	0.000	0.00	1.21	12.45	92.82	65.13	375	PVC	2.80%	11.6	293.4	2.66	0.07	**0.22**

DESIGN PARAMETERS NOTES

Runoff Coefficient (C)	
Grass	0.30
Gravel	0.80
Asphalt / rooftop	0.90

Q = 2.78 AIC, where
Q = Peak flow in Litres per second (L/s)
A = Area in hectares (ha)
I = Rainfall Intensity (mm/hr)
C = Runoff Coefficient

Ottawa Macdonald-Cartier International Airport IDF curve
$I_5 = 998.071 / (T_c + 6.053)^{0.814}$
Min. velocity = 0.76 m/s
Manning's "n" = 0.013

File No.	522676	**Date:**	October 23, 2022
Project:	Proposed Apartment Buildings	**Designed:**	HY
Project Address:	3817-3843 - Innes Road	**Checked:**	GC
Client:	Bridor Development	**Drawing Reference:**	C200 & C300 & C401

STORM WATER MANAGEMENT DESIGN SHEET

SEWER DESIGN

LOCATION		MANHOLE INFORMATION						
From MH	To MH	Up Invert (m)	Down Invert (m)	T/G Up Stream (m)	T/G Down Stream	Up Depth obv (m)	Down Depth obv (m)	Up Depth inv (m)
LCB10	LCB09	90.40	90.27	90.90	90.77	0.25	0.25	0.25
LCB09	LCB08	90.24	90.12	90.77	90.65	0.28	0.28	0.28
LCB08	STM MH07	90.06	89.75	90.65	91.65	0.34	1.65	0.34
STM MH07	STM MH06	88.78	88.72	91.65	92.00	2.57	2.98	2.57
LCB14	LCB13	91.30	91.20	91.80	91.70	0.25	0.25	0.25
LCB13	LCB12	91.17	91.08	91.70	91.58	0.28	0.25	0.28
LCB12	LCB11	91.05	90.98	91.58	91.48	0.28	0.25	0.28
LCB11	CBMH01	90.92	90.80	91.48	92.00	0.31	0.95	0.31
CBMH05	CBMH04	90.10	90.10	91.40	91.40	0.93	0.93	0.93
CBMH04	CBMH03	89.78	89.58	91.40	91.62	1.25	1.67	1.25
CBMH03	CBMH02	89.55	89.45	91.62	91.80	1.70	1.97	1.70
CBMH02	CBMH01	89.42	89.16	91.80	92.00	2.01	2.47	2.01
CBMH06	TREATMENT	88.49	88.45	92.00	92.03	3.21	3.28	3.21
CBMH01	TREATMENT	88.50	89.45	92.00	92.03	3.13	2.21	3.13
TREATMENT	CITY	88.39	88.13	92.03	91.77	3.27	3.27	3.27

PRE SCS
```
================================================================================
======================
```

```
       V     V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V     V   I    SS     U   U   A A   L
        V   V    I     SS    U   U  AAAAA  L
        V   V    I      SS   U   U  A   A  L
         VV      I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```
Developed and Distributed by Smart City Water Inc


```
                   *****  S U M M A R Y   O U T P U T  *****
```

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

  Output  filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\b7c673a3-
d93a-420f-bf9f-618013aa73aa\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\b7c673a3-
d93a-420f-bf9f-618013aa73aa\scenario


DATE: 04/13/2023                          TIME: 04:37:59

USER:


COMMENTS: ____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : SCS 24hr 100yr                **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
```

```
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\90e40acb-43c5-4a93-9091-c0e287e47827\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 *  CALIB STANDHYD       0001  1  5.0    0.70    0.05 12.00  31.24 0.47   0.000
    [I%=23.0:S%= 2.00]
*
 FINISH

====================================================================================
=======================
```

PRE CHI
==
======================

```
       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

Developed and Distributed by Smart City Water Inc

***** S U M M A R Y   O U T P U T *****

Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

Output filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\51d2b20a-c962-46f2-b46d-0bcb89b18572\scenario
Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\51d2b20a-c962-46f2-b46d-0bcb89b18572\scenario

DATE: 04/13/2023   TIME: 04:39:21

USER:

COMMENTS: ____

```
**************************************************
** SIMULATION : Ottawa 5yr 3hr Chicago        **
**************************************************

W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                 min     ha   '  cms   hrs     mm          cms

    START @  0.00 hrs
    --------------------
```

```
    CHIC STORM                 10.0
    [ Ptot= 42.51 mm ]
*
 *  CALIB STANDHYD       0002  1  5.0    0.70    0.05  1.00  16.68 0.39   0.000
    [I%=23.0:S%= 2.00]
*
==========================================================================================
=======================


       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

  Output  filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\8106252e-
7f91-4954-a690-56795e9b7e1d\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\8106252e-
7f91-4954-a690-56795e9b7e1d\scenario


DATE: 04/13/2023                          TIME: 04:39:21

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Ottawa 5yr 6hr Chicago        **
  ************************************************
```

```
  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                  10.0
    [ Ptot= 49.04 mm ]
*
 *  CALIB STANDHYD       0002  1  5.0    0.70    0.05  2.00  20.47 0.42   0.000
    [I%=23.0:S%= 2.00]
*
 FINISH

=====================================================================================
=======================
```

```
POST SCS
===============================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

  Output  filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\dead66f3-
c7bd-44fa-ab3e-b90bcaf4653d\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\dead66f3-
c7bd-44fa-ab3e-b90bcaf4653d\scenario

DATE: 07/07/2023                          TIME: 09:35:09

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : SCS 24hr 100yr               **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
```

```
    READ STORM                  5.0
    [ Ptot=111.87 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 ** CALIB NASHYD         0115  1  5.0    0.09    0.01 12.00  52.83 0.47   0.000
    [CN=70.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                  5.0
    [ Ptot=111.87 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 *  CALIB STANDHYD       0120  1  5.0    0.02    0.01 12.00 104.94 0.94   0.000
    [I%=99.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot=111.87 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 *  CALIB STANDHYD       0123  1  5.0    0.02    0.01 12.00 104.94 0.94   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0115+  0120]  0124  3  5.0    0.11    0.02 12.00  62.30  n/a   0.000
*
    ADD [  0124+  0123]  0124  1  5.0    0.13    0.03 12.00  68.86  n/a   0.000
*
    READ STORM                  5.0
    [ Ptot=111.87 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 *  CALIB NASHYD         0119  1  5.0    0.07    0.01 12.00  51.49 0.46   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.17]
*
```

```
    READ STORM                  5.0
    [ Ptot=111.87 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 *  CALIB STANDHYD       0114  1  5.0    0.13    0.04 12.00 110.28 0.99   0.000
    [I%=99.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot=111.87 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 *  CALIB STANDHYD       0116  1  5.0    0.24    0.06 12.00  88.95 0.80   0.000
    [I%=63.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot=111.87 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 *  CALIB STANDHYD       0118  1  5.0    0.13    0.04 12.00 110.28 0.99   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0114+  0116]  0121  3  5.0    0.37    0.11 12.00  96.45  n/a   0.000
*
    ADD [  0121+  0118]  0121  1  5.0    0.50    0.15 12.00 100.04  n/a   0.000
*
    ADD [  0121+  0119]  0121  3  5.0    0.57    0.16 12.00  94.08  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0117  1  5.0    0.57    0.02 12.50  94.07  n/a   0.000
*
    ADD [  0117+  0124]  0122  3  5.0    0.70    0.05 12.00  89.39  n/a   0.000
*
====================================================================================
=======================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
```

```
        V   V    I     SS    U   U  AAAAA  L
        V   V    I      SS   U   U  A   A  L
         VV      I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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***** S U M M A R Y   O U T P U T *****

Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

Output filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\7a1ba2c2-14ca-403a-a7eb-89944acfee17\scenario
Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\7a1ba2c2-14ca-403a-a7eb-89944acfee17\scenario

DATE: 07/07/2023   TIME: 09:35:09

USER:

COMMENTS: ____

```
 ************************************************
 ** SIMULATION : SCS 24hr 2yr                  **
 ************************************************

 W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
   READ STORM                  5.0
   [ Ptot= 49.09 mm ]
   fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\a83aa445-7986-4108-a295-abaadc5
   remark: Ottawa Macdonald Cartier SCS 24 2yr
```

```
*
 ** CALIB NASHYD         0115  1  5.0    0.09    0.00 12.00  12.71 0.26   0.000
    [CN=70.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                 5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr

*
 *  CALIB STANDHYD       0120  1  5.0    0.02    0.00 12.00  38.96 0.79   0.000
    [I%=99.0:S%= 2.00]
*
    READ STORM                 5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr

*
 *  CALIB STANDHYD       0123  1  5.0    0.02    0.00 12.00  38.96 0.79   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0115+  0120]  0124  3  5.0    0.11    0.01 12.00  17.48  n/a   0.000
*
    ADD [  0124+  0123]  0124  1  5.0    0.13    0.01 12.00  20.79  n/a   0.000
*
    READ STORM                 5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr

*
 *  CALIB NASHYD         0119  1  5.0    0.07    0.00 12.00  12.24 0.25   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                 5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr
```

```
*
 *  CALIB STANDHYD       0114  1  5.0    0.13    0.02 12.00  47.73 0.97   0.000
    [I%=99.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr

*
 *  CALIB STANDHYD       0116  1  5.0    0.24    0.02 12.00  34.80 0.71   0.000
    [I%=63.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr

*
 *  CALIB STANDHYD       0118  1  5.0    0.13    0.02 12.00  47.73 0.97   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0114+  0116]  0121  3  5.0    0.37    0.04 12.00  39.35  n/a   0.000
*
    ADD [  0121+  0118]  0121  1  5.0    0.50    0.06 12.00  41.53  n/a   0.000
*
    ADD [  0121+  0119]  0121  3  5.0    0.57    0.07 12.00  37.93  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0117  1  5.0    0.57    0.02 12.08  37.92  n/a   0.000
*
    ADD [  0117+  0124]  0122  3  5.0    0.70    0.03 12.00  34.74  n/a   0.000
*
 FINISH

===================================================================================
=======================

===================================================================================
=======================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
```

```
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

  Output  filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\c957f93b-
a5df-4bb5-bf20-110906f17fd2\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\c957f93b-
a5df-4bb5-bf20-110906f17fd2\scenario


DATE: 07/07/2023                           TIME: 09:35:09

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : SCS 24hr 5yr                  **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 ** CALIB NASHYD         0115  1  5.0    0.09    0.01 12.00  21.83 0.33   0.000
```

```
    [CN=70.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 *  CALIB STANDHYD       0120  1  5.0    0.02    0.00 12.00  56.59 0.86   0.000
    [I%=99.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 *  CALIB STANDHYD       0123  1  5.0    0.02    0.00 12.00  56.59 0.86   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0115+  0120]  0124  3  5.0    0.11    0.01 12.00  28.15  n/a   0.000
*
    ADD [  0124+  0123]  0124  1  5.0    0.13    0.01 12.00  32.53  n/a   0.000
*
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 *  CALIB NASHYD         0119  1  5.0    0.07    0.00 12.00  21.11 0.32   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 *  CALIB STANDHYD       0114  1  5.0    0.13    0.03 12.00  64.47 0.98   0.000
```

```
    [I%=99.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 *  CALIB STANDHYD       0116  1  5.0    0.24    0.03 12.00  48.70 0.74   0.000
    [I%=63.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\8e062ce1-ae4c-4b1b-ad02-36629e5f04b7\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 *  CALIB STANDHYD       0118  1  5.0    0.13    0.03 12.00  64.47 0.98   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0114+  0116]  0121  3  5.0    0.37    0.06 12.00  54.24  n/a   0.000
*
    ADD [  0121+  0118]  0121  1  5.0    0.50    0.09 12.00  56.90  n/a   0.000
*
    ADD [  0121+  0119]  0121  3  5.0    0.57    0.09 12.00  52.51  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0117  1  5.0    0.57    0.02 12.08  52.50  n/a   0.000
*
    ADD [  0117+  0124]  0122  3  5.0    0.70    0.03 12.00  48.79  n/a   0.000
*
```

POST CHI
==

```
       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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***** S U M M A R Y   O U T P U T *****

Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

Output filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\ba4b3151-3434-4d95-884c-1dfe096b7b54\scenario
Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\ba4b3151-3434-4d95-884c-1dfe096b7b54\scenario

DATE: 07/07/2023   TIME: 09:12:30

USER:

COMMENTS: ____

```
  ************************************************
  ** SIMULATION : Ottawa 100yr 3hr Chicago      **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
```

```
    CHIC STORM                 10.0
    [ Ptot= 71.66 mm ]
*
 ** CALIB NASHYD         0104  1  5.0    0.07    0.01  1.17  24.49 0.34   0.000
    [CN=69.0          ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
    [ Ptot= 71.66 mm ]
*
 *  CALIB STANDHYD       0108  1  5.0    0.13    0.06  1.00  70.20 0.98   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 71.66 mm ]
*
 *  CALIB STANDHYD       0107  1  5.0    0.24    0.08  1.00  53.59 0.75   0.000
    [I%=63.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 71.66 mm ]
*
 *  CALIB STANDHYD       0103  1  5.0    0.13    0.06  1.00  70.20 0.98   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0103+  0104]  0110  3  5.0    0.20    0.07  1.00  54.20  n/a   0.000
*
    ADD [  0110+  0107]  0110  1  5.0    0.44    0.15  1.00  53.87  n/a   0.000
*
    ADD [  0110+  0108]  0110  3  5.0    0.57    0.22  1.00  57.59  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0111  1  5.0    0.57    0.02  1.50  57.58  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 71.66 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    0.09    0.01  1.17  25.29 0.35   0.000
    [CN=70.0          ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
    [ Ptot= 71.66 mm ]
*
 *  CALIB STANDHYD       0109  1  5.0    0.02    0.01  1.00  70.20 0.98   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 71.66 mm ]
*
```

```
 *  CALIB STANDHYD       0105  1  5.0    0.02    0.01  1.00  70.20 0.98   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0105+  0109]  0113  3  5.0    0.04    0.02  1.00  70.20  n/a   0.000
*
    ADD [  0113+  0112]  0113  1  5.0    0.13    0.03  1.00  39.11  n/a   0.000
*
    ADD [  0111+  0113]  0106  3  5.0    0.70    0.05  1.00  54.15  n/a   0.000
*
==================================================================================
======================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

  Output  filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\89d27013-
c96f-46e4-82e5-cbf43459bb00\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\89d27013-
c96f-46e4-82e5-cbf43459bb00\scenario


DATE: 07/07/2023                          TIME: 09:12:30

USER:


COMMENTS: ____________________________________________________________


  ************************************************
```

```
  ** SIMULATION : Ottawa 100yr 6hr Chicago      **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 82.32 mm ]
*
 ** CALIB NASHYD         0104  1  5.0    0.07    0.01  2.08  31.11 0.38   0.000
    [CN=69.0          ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
    [ Ptot= 82.32 mm ]
*
 *  CALIB STANDHYD       0108  1  5.0    0.13    0.06  2.00  80.82 0.98   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 82.32 mm ]
*
 *  CALIB STANDHYD       0107  1  5.0    0.24    0.08  2.00  62.77 0.76   0.000
    [I%=63.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 82.32 mm ]
*
 *  CALIB STANDHYD       0103  1  5.0    0.13    0.06  2.00  80.82 0.98   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0103+  0104]  0110  3  5.0    0.20    0.07  2.00  63.42  n/a   0.000
*
    ADD [  0110+  0107]  0110  1  5.0    0.44    0.15  2.00  63.07  n/a   0.000
*
    ADD [  0110+  0108]  0110  3  5.0    0.57    0.22  2.00  67.12  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0111  1  5.0    0.57    0.02  2.50  67.10  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 82.32 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    0.09    0.01  2.08  32.06 0.39   0.000
    [CN=70.0          ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
```

```
    [ Ptot= 82.32 mm ]
*
 *  CALIB STANDHYD       0109  1  5.0    0.02    0.01  2.00  80.82 0.98   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 82.32 mm ]
*
 *  CALIB STANDHYD       0105  1  5.0    0.02    0.01  2.00  80.82 0.98   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0105+  0109]  0113  3  5.0    0.04    0.02  2.00  80.82  n/a   0.000
*
    ADD [  0113+  0112]  0113  1  5.0    0.13    0.03  2.00  47.06  n/a   0.000
*
    ADD [  0111+  0113]  0106  3  5.0    0.70    0.05  2.00  63.38  n/a   0.000
*
=====================================================================================
=======================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

  Output  filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\77fdef6d-
96cf-44fd-bb58-e1e5ae8f13cc\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\77fdef6d-
96cf-44fd-bb58-e1e5ae8f13cc\scenario


DATE: 07/07/2023                           TIME: 09:12:30
```

USER:

COMMENTS: ____

```
  ************************************************
  ** SIMULATION : Ottawa 2yr 3hr Chicago       **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                 min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                10.0
    [ Ptot= 31.86 mm ]
*
 ** CALIB NASHYD         0104  1  5.0    0.07    0.00  1.17   5.09 0.16   0.000
    [CN=69.0          ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                10.0
    [ Ptot= 31.86 mm ]
*
 *  CALIB STANDHYD       0108  1  5.0    0.13    0.03  1.00  30.60 0.96   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 31.86 mm ]
*
 *  CALIB STANDHYD       0107  1  5.0    0.24    0.03  1.00  21.28 0.67   0.000
    [I%=63.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 31.86 mm ]
*
 *  CALIB STANDHYD       0103  1  5.0    0.13    0.03  1.00  30.60 0.96   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0103+  0104]  0110  3  5.0    0.20    0.03  1.00  21.67  n/a   0.000
*
    ADD [  0110+  0107]  0110  1  5.0    0.44    0.06  1.00  21.46  n/a   0.000
*
    ADD [  0110+  0108]  0110  3  5.0    0.57    0.09  1.00  23.54  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0111  1  5.0    0.57    0.02  1.25  23.52  n/a   0.000
*
```

```
    CHIC STORM                 10.0
    [ Ptot= 31.86 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    0.09    0.00  1.17   5.33 0.17   0.000
    [CN=70.0         ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
    [ Ptot= 31.86 mm ]
*
 *  CALIB STANDHYD       0109  1  5.0    0.02    0.00  1.00  30.60 0.96   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 31.86 mm ]
*
 *  CALIB STANDHYD       0105  1  5.0    0.02    0.00  1.00  30.60 0.96   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0105+  0109]  0113  3  5.0    0.04    0.01  1.00  30.60  n/a   0.000
*
    ADD [  0113+  0112]  0113  1  5.0    0.13    0.01  1.00  13.10  n/a   0.000
*
    ADD [  0111+  0113]  0106  3  5.0    0.70    0.03  1.00  21.59  n/a   0.000
*
==================================================================================
=======================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

  Output  filename:
```

```
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\b8b60c78-
bc3f-48f2-898f-38aea7123f8e\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\b8b60c78-
bc3f-48f2-898f-38aea7123f8e\scenario


DATE: 07/07/2023                           TIME: 09:12:30

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Ottawa 2yr 6hr Chicago        **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 36.86 mm ]
*
 ** CALIB NASHYD         0104  1  5.0    0.07    0.00  2.17   6.92 0.19   0.000
    [CN=69.0         ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
    [ Ptot= 36.86 mm ]
*
 *  CALIB STANDHYD       0108  1  5.0    0.13    0.03  2.00  35.57 0.96   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.86 mm ]
*
 *  CALIB STANDHYD       0107  1  5.0    0.24    0.03  2.00  25.11 0.68   0.000
    [I%=63.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.86 mm ]
*
 *  CALIB STANDHYD       0103  1  5.0    0.13    0.03  2.00  35.57 0.96   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0103+  0104]  0110  3  5.0    0.20    0.03  2.00  25.54  n/a   0.000
```

```
*
    ADD [  0110+  0107]  0110  1  5.0    0.44    0.06  2.00  25.31  n/a   0.000
*
    ADD [  0110+  0108]  0110  3  5.0    0.57    0.09  2.00  27.65  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0111  1  5.0    0.57    0.02  2.25  27.63  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.86 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    0.09    0.00  2.17   7.22 0.20   0.000
    [CN=70.0         ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
    [ Ptot= 36.86 mm ]
*
 *  CALIB STANDHYD       0109  1  5.0    0.02    0.00  2.00  33.37 0.91   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.86 mm ]
*
 *  CALIB STANDHYD       0105  1  5.0    0.02    0.00  2.00  33.37 0.91   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0105+  0109]  0113  3  5.0    0.04    0.01  2.00  33.37  n/a   0.000
*
    ADD [  0113+  0112]  0113  1  5.0    0.13    0.01  2.00  15.27  n/a   0.000
*
    ADD [  0111+  0113]  0106  3  5.0    0.70    0.03  2.00  25.33  n/a   0.000
*
 FINISH

=====================================================================================
=======================

=====================================================================================
=======================


       V    V   I   SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I   SS     U   U   A A   L
        V  V    I    SS    U   U  AAAAA  L
        V  V    I     SS   U   U  A   A  L
         VV     I   SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
```

```
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

  Output  filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\5cf402f8-
656f-4cb9-aed8-3cb566b8aff0\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\5cf402f8-
656f-4cb9-aed8-3cb566b8aff0\scenario


DATE: 07/07/2023                           TIME: 09:12:30

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Ottawa 5yr 3 hr Chicago       **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 42.51 mm ]
*
 ** CALIB NASHYD         0104  1  5.0    0.07    0.00  1.17   9.24 0.22   0.000
    [CN=69.0          ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
    [ Ptot= 42.51 mm ]
*
 *  CALIB STANDHYD       0108  1  5.0    0.13    0.04  1.00  41.19 0.97   0.000
    [I%=99.0:S%= 2.00]
*
```

```
    CHIC STORM                  10.0
    [ Ptot= 42.51 mm ]
*
 *  CALIB STANDHYD       0107  1  5.0    0.24    0.04  1.00  29.55 0.70   0.000
    [I%=63.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 42.51 mm ]
*
 *  CALIB STANDHYD       0103  1  5.0    0.13    0.04  1.00  41.19 0.97   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0103+  0104]  0110  3  5.0    0.20    0.04  1.00  30.01  n/a   0.000
*
    ADD [  0110+  0107]  0110  1  5.0    0.44    0.08  1.00  29.76  n/a   0.000
*
    ADD [  0110+  0108]  0110  3  5.0    0.57    0.12  1.00  32.37  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0111  1  5.0    0.57    0.02  1.25  32.35  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 42.51 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    0.09    0.00  1.17   9.62 0.23   0.000
    [CN=70.0          ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                  10.0
    [ Ptot= 42.51 mm ]
*
 *  CALIB STANDHYD       0109  1  5.0    0.02    0.01  1.00  41.19 0.97   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 42.51 mm ]
*
 *  CALIB STANDHYD       0105  1  5.0    0.02    0.01  1.00  41.19 0.97   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0105+  0109]  0113  3  5.0    0.04    0.01  1.00  41.19  n/a   0.000
*
    ADD [  0113+  0112]  0113  1  5.0    0.13    0.01  1.00  19.33  n/a   0.000
*
    ADD [  0111+  0113]  0106  3  5.0    0.70    0.03  1.00  29.93  n/a   0.000
*
=====================================================================================
=======================
```

```
       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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***** S U M M A R Y   O U T P U T *****

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat

  Output  filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\da3c740a-58f3-448e-bf72-403525343db2\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\da3c740a-58f3-448e-bf72-403525343db2\scenario


DATE: 07/07/2023                           TIME: 09:12:30

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Ottawa 5yr 6 hr Chicago       **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 49.04 mm ]
*
 ** CALIB NASHYD         0104  1  5.0    0.07    0.00  2.17  12.21 0.25   0.000
    [CN=69.0         ]
```

```
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
    [ Ptot= 49.04 mm ]
*
 *  CALIB STANDHYD       0108  1  5.0    0.13    0.04  2.00  47.68 0.97   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 49.04 mm ]
*
 *  CALIB STANDHYD       0107  1  5.0    0.24    0.04  2.00  34.77 0.71   0.000
    [I%=63.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 49.04 mm ]
*
 *  CALIB STANDHYD       0103  1  5.0    0.13    0.04  2.00  47.68 0.97   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0103+  0104]  0110  3  5.0    0.20    0.04  2.00  35.26  n/a   0.000
*
    ADD [  0110+  0107]  0110  1  5.0    0.44    0.08  2.00  34.99  n/a   0.000
*
    ADD [  0110+  0108]  0110  3  5.0    0.57    0.12  2.00  37.89  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0111  1  5.0    0.57    0.02  2.33  37.87  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 49.04 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    0.09    0.00  2.17  12.68 0.26   0.000
    [CN=70.0          ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                 10.0
    [ Ptot= 49.04 mm ]
*
 *  CALIB STANDHYD       0109  1  5.0    0.02    0.01  2.00  46.84 0.96   0.000
    [I%=99.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 49.04 mm ]
*
 *  CALIB STANDHYD       0105  1  5.0    0.02    0.01  2.00  46.84 0.96   0.000
    [I%=99.0:S%= 2.00]
*
    ADD [  0105+  0109]  0113  3  5.0    0.04    0.01  2.00  46.84  n/a   0.000
*
```

```
    ADD [  0113+  0112]  0113  1  5.0    0.13    0.01  2.00  23.19  n/a   0.000
*
    ADD [  0111+  0113]  0106  3  5.0    0.70    0.03  2.00  35.14  n/a   0.000
*
```

Appendix B:
Sanitary Design

File No. 522676
Project: Proposed Apartment Buildings
Project Address: 3817-3843 - Innes Road
Client: Bridor Developments

Date: July 17, 2023
Designed: GC
Checked: JA
Drawing Reference: C300

SANITARY DESIGN SHEET
SEWER DESIGN

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL FLOW (l/s)	PIPE						MANHOLE	
STREET	FROM MH	TO MH	AREA (Ha)	POP.	CUMMULATIVE AREA (Ha)	CUMMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	AREA (Ha)	ACCU. AREA (Ha)	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)		LENGTH (m)	DIA. (mm)	MATERAIL	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	UP INVERT (m)	DOWN INVERT (m)
SITE	PROP. BLDG B	SAN MH-B	0.350	95.2	0.35	95.2	4.0	1.54	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.35	0.35	0.10	1.64	3.2	200	PVC	1.00%	32.80	1.04	88.71	88.68
SITE	SAN MH-B	SAN MH-A	0.000	0.0	0.35	95.2	4.0	1.54	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.00	0.35	0.10	1.64	46.7	200	PVC	1.50%	40.17	1.28	88.62	87.94
SITE	PROP. BLDG A	SAN MH-A	0.350	95.2	0.35	95.2	4.0	1.54	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.35	0.35	0.10	1.64	2.7	200	PVC	8.00%	92.77	2.95	88.70	88.48
SITE	SAN MH-A	TRUNK	0.000	0.0	0.70	190.4	4.0	3.09	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.00	0.70	0.20	3.28	14.9	200	PVC	6.00%	80.34	2.56	87.88	86.99

DESIGN PARAMETERS NOTES

Average Daily Flow =	350	L/p/day
Commercial and Institutional Flow =	50000	L/ha/da
Industrial Flow =	35000	L/ha/da
Maximum Resedential Peak Factor =	4	
Commercial and Institutional Peak Factor =	1.5	

Industrial Peak Factor =	7	as per Appendix 4-B
Extraneous Flow =	0.28	L/s/ha
Minimum Velocity =	0.76	m/s
Mannings n =	0.013	

Appartments:	Person Per Unit	Building B	Building A
Bachelor =	1.4	8	8
1 Bedroom =	1.4	30	30
2 Bedroom =	2.1	20	20
3 Bedroom =	3.1	0	0

Appendix C:
Watermain Design

File No.	522676	**Date: July 17, 2023**
Project:	Proposed Apartment Buildings	**Designed: GC**
Project Address:	3817-3843 - Innes Road	**Checked: JA**
Client:	Bridor Developments	**Drawing Reference: C300**

WATER CONSUMPTION CALCULATION

	BLOCK A	BLOCK B	BLOCK A + B	
Total Population =	95.20	95.20	190.40	ea.
Average Demand Per People =	280	280	280	L/c/d
Average Water Demand =	**26656.00**	**26656.00**	**53312.00**	L/d
	0.31	0.31	0.62	L/s
Maximum Daily Peak Factor =	2.5	2.5		* As per City of Ottawa
Maximum Daily Residential =	**66640.00**	**66640.00**	**133280.00**	L/d
	0.77	0.77	1.54	L/s
Maximum Hourly Peak Factor =	2.2	2.2		* As per City of Ottawa
Maximum Hourly Residentiall =	**146608.00**	**146608.00**	**293216.00**	L/d
	1.70	1.70	3.39	L/s

WATER SERVICE SIZING

Q = VA   Where: V = Design velocity of 1.5m/s x 3600 = 5400m/h (as per OBC guidelines)
A = area of pipe = (π/4) × D^2
Q = water supply flow rate to be accounted for in m^3/h (peak flow)

Minimum pipe diameter for individual blocks: d = $(4Q/\pi V)^{1/2}$ (derived from Q = VA formula)
d = 0.038 m
d = 38 mm

Minimum pipe diameter for combined blocks: d = $(4Q/\pi V)^{1/2}$ (derived from Q = VA formula)
d = 0.054 m
d = 54 mm

Proposed pipe diameter: 200 mm   (Min 150mm dia. pipe required as building is sprinklered, per OBC guidelines. To be conservative, upsized to allow for additional flow.)

Appartments:	Person Per Unit	Building A	Building B
Bachelor =	1.4	8	8
1 Bedroom =	1.4	30	30
2 Bedroom =	2.1	20	20
3 Bedroom =	3.1	0	0
		95.20	**95.20**

BLOCK A	Bachelor	1 Bedroom	2 Bedroom	Unit Counts	WSFU	Total
Unrinal Flush Tank	1	1	2	78	2	156
Sinks	2	2	2	116	1	116
Bathub	1	1	2	78	4	312
Diswasher	1	1	1	58	1.5	87
Washing Machine	1	1	1	58	2	116
Total						**787**

BLOCK B	Bachelor	1 Bedroom	2 Bedroom	Unit Counts	WSFU	Total
Unrinal Flush Tank	1	1	2	78	2	156
Sinks	2	2	2	116	1	116
Bathub	1	1	2	78	4	312
Diswasher	1	1	1	58	1.5	87
Washing Machine	1	1	1	58	2	116
Total						**787**

TATHAM ENGINEERING

FUS Fire Flow Calculations (Same for Blocks A & B)

Tatham File no. :	522656
Project:	3817-3843 Innes Road
Date:	17-Jul-23
Designed by:	GC
Checked by:	JA

$$RFF = 220C\sqrt{A}$$

Where:

RFF = the Required Fire Flow in litres per minutes (LPM)
C = the Construction Coefficient is related to the type of construction of the building
A = the Total Effective Floor Area (effective building area) in square metres of the building

Determine the Construction Coefficient (C)

1	Choose frame used for building	Coefficient C related to the type of construction	Type V Wood Frame Construction	1.5	Type II Noncombustible Construction	0.8	
			Type IV-A Mass Timber Construction	0.8			
			Type IV-B Mass Timber Construction	0.9			
			Type IV-C Mass Timber Construction	1.0			
			Type IV-D Mass Timber Construction	1.5			
			Type III Ordinary Construction	1.0			
			Type II Noncombustible Construction	0.8			
			Type I Fire Resistive Construction	0.6			

Determine Total Effective Floor Area (A)

2	Option 1						
	The Construction coefficient is greater or equal to 1	FALSE	100% of all floor area (Excluding basements at least 50% below grade)		Total Effective Area	0	sq.m.
	Option 2						
	The Construction coefficient is less than 1	TRUE	Are vertical openings in the building protected? (Per NBC Division B, Section 3.5. Vertical Transportation)	NO	Are the floor areas uniform throughout the building	YES	
	Unprotected Vertical Openings, Uniform Floor Area						
	TRUE	Number of Floors	4	Area of Floor(s) 1,296	Total Effective Area	3,888	sq.m.
	Unprotected Verticle Openings, Dissimillar Floor Area						
	FALSE	Area of 2 largest adjoining floors		Area of floors above 2 largest adjoining floors (up to a maximum of 8 floors)	Total Effective Area	0	sq.m.
	Protected Verticle Openings, Uniform Floor Area						
	FALSE	Number of Floors		Area of Floor(s)	Total Effective Area	0	sq.m.
	Protected Verticle Openings, Dissimillar Floor Area						
	FALSE	Area of the largest floor		Area of floor directly above largest floor / Area of floor directly below largest floor	Total Effective Area	0	sq.m.

Determine the Required Fire Flow

3	Obtain Required Fire Flow	$RFF = 220C\sqrt{A}$	Required Fire Flow	11,000	L/min
				183.3	L/s

Reduction or Surcharge Due to Factors Affecting Burning

4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15		
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15			9,350	L/min
			Rapid burning	0.25			155.8	L/s
5	Choose reduction for sprinklers	Sprinkler reduction	Sprinklers conforming to NFPA13 (wet or dry system)	-0.30	YES	-0.3		
			Water supply is standard for both the system and fire department hose lines (siamese connection)	-0.10	YES	-0.1		
			Fully supervised system (electronic monitoring system on at all times)	-0.10	YES	-0.1		
			All buildings within 30m of the proposed structure are confirmed to have a sprinkler system	-0.25	NO	0	4,675	L/min
							77.9	L/s

Exposure Adjustment Charge

6	Exposure distance between units	North side	Over 30m	Length - Height Value Assumed worst case exposed building facing wall	>100	Exposure Adjustment Charge	0	
		East side	10.1 to 20m		>100	Exposure Adjustment Charge	0.08	
		South side	Over 30m		>100	Exposure Adjustment Charge	0.00	
		West side	10.1 to 20m		>100	Exposure Adjustment Charge	0.08	
	Cumulative Required Fire Flow						5,423	L/min
							90.4	L/s

Total Required Fire Flow

7	Obtain fire flow, duration	Minimum required fire flow rate (rounded to nearest 1000)	**6,000**	L/min
		Minimum required fire flow rate	**100.0**	L/s
		Required duration of fire flow	**2**	Hrs

Appendix D:
Underground Chambers & Stormwater Treatment Unit

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

ADS™
Advanced Drainage Systems, Inc.

ADS SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

3817 INNES ROAD
OTTAWA, CANADA

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. 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".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. 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.
6. CHAMBERS SHALL BE DESIGNED, TESTED 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.
7. 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 AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. 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.
8. 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.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. 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.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. 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

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 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/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. 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.

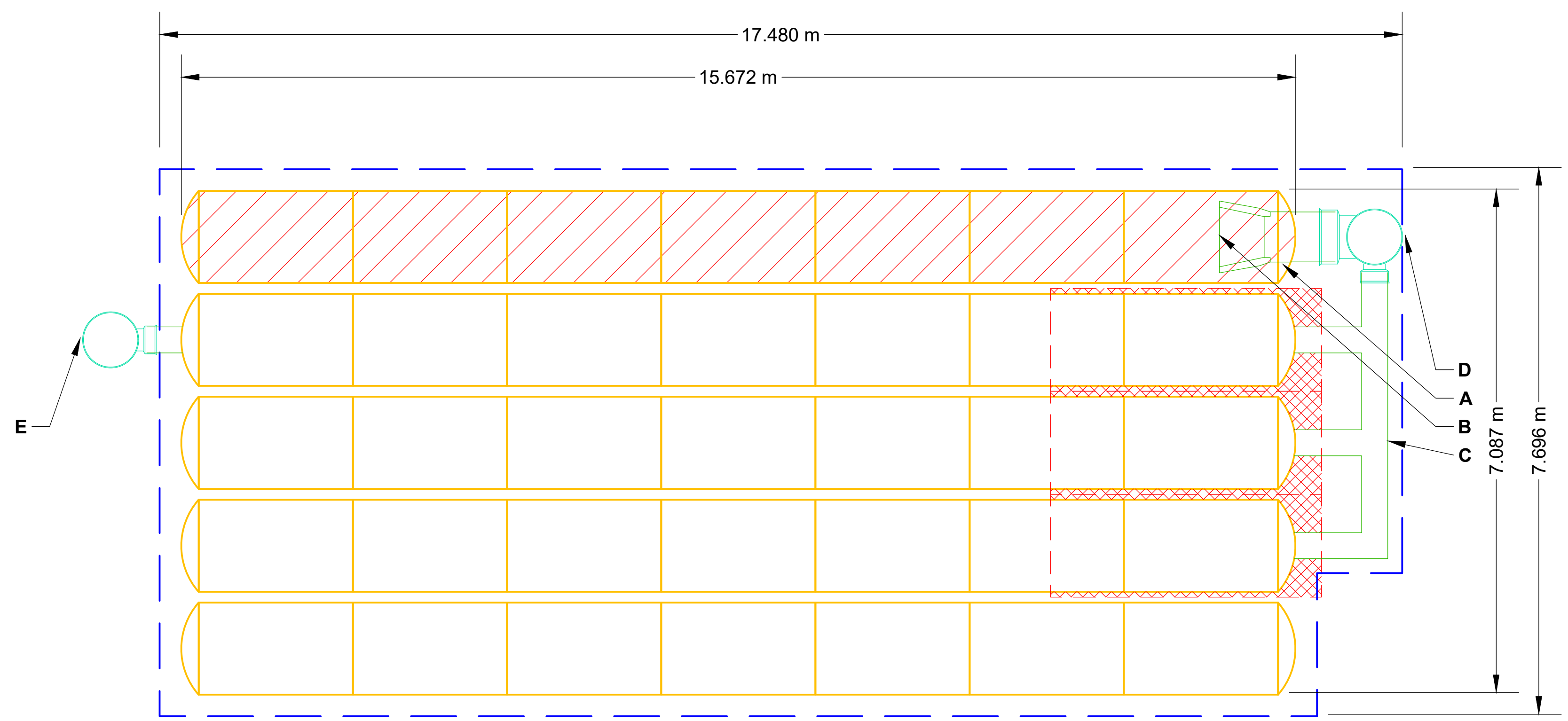
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT	
35	STORMTECH SC-740 CHAMBERS
10	STORMTECH SC-740 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	STONE VOID
83.4	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
132.1	SYSTEM AREA (m^2)
50.4	SYSTEM PERIMETER (m)

CONCEPTUAL ELEVATIONS	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.353
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.524
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.372
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.372
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.372
TOP OF STONE:	1.067
TOP OF SC-740 CHAMBER:	0.914
300 mm x 300 mm TOP MANIFOLD INVERT:	0.470
300 mm BOTTOM CONNECTION INVERT:	0.183
600 mm ISOLATOR ROW PLUS INVERT:	0.155
BOTTOM OF SC-740 CHAMBER:	0.152
BOTTOM OF STONE:	0.000

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	600 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC740ECEZ / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	3 mm	
FLAMP	B	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC74024RAMP		
MANIFOLD	C	300 mm x 300 mm TOP MANIFOLD, ADS N-12	318 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)	D	750 mm DIAMETER (610 mm SUMP MIN)		161 L/s IN
NYLOPLAST (OUTLET)	E	750 mm DIAMETER (DESIGN BY ENGINEER)		57 L/s OUT



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 3.810 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- 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.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

3817 INNES ROAD
OTTAWA, CANADA

DATE:
DRAWN: HY
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

StormTech®
Chamber System
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ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

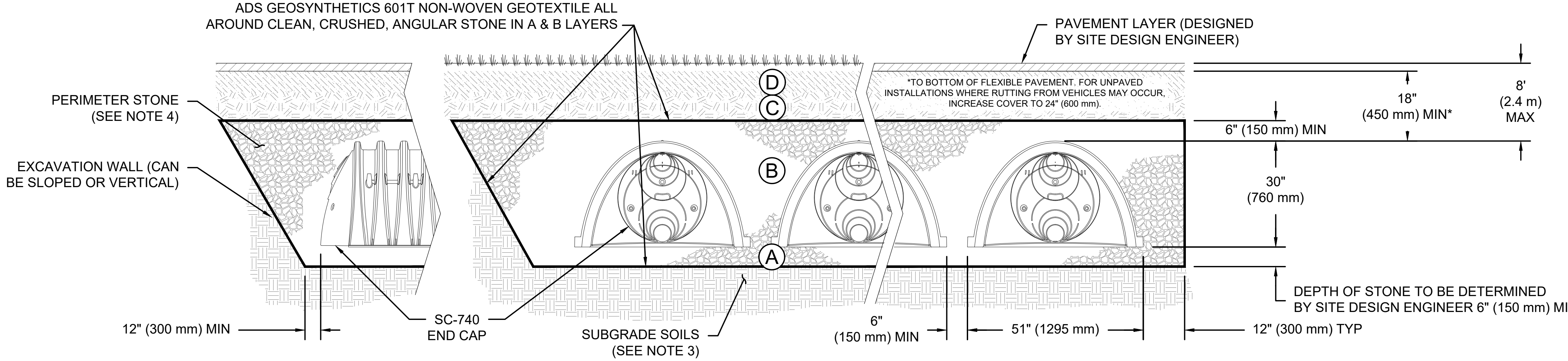
SCALE = 1 : 100

SHEET
2 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 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 18" (450 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	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	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.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 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.
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 SHALL BE GREATER THAN OR EQUAL TO 550 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 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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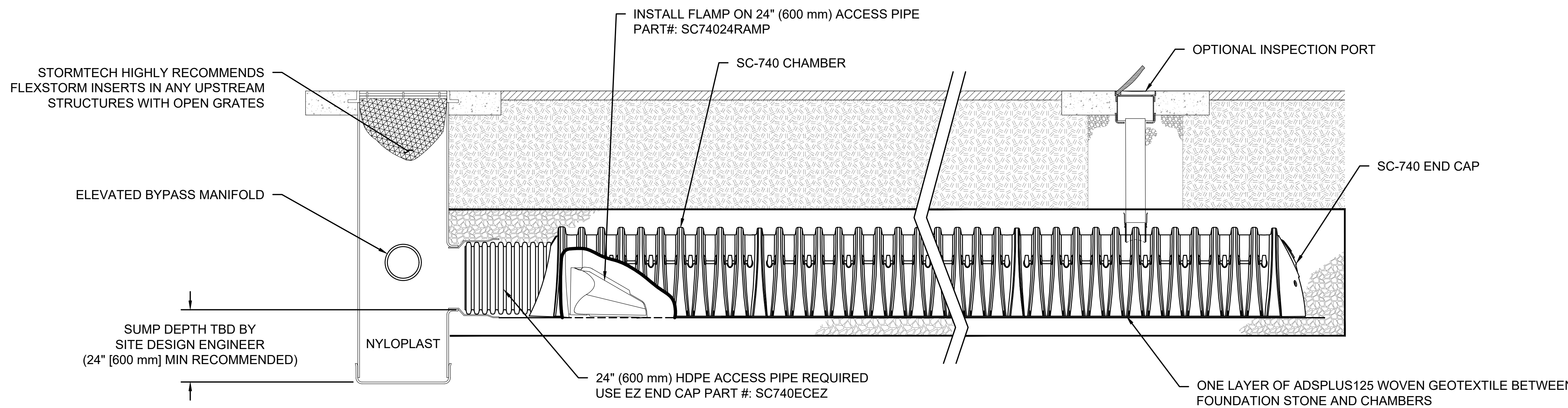
OTTAWA, CANADA

DATE:
DRAWN: HY
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

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



SC-740 ISOLATOR ROW PLUS DETAIL

NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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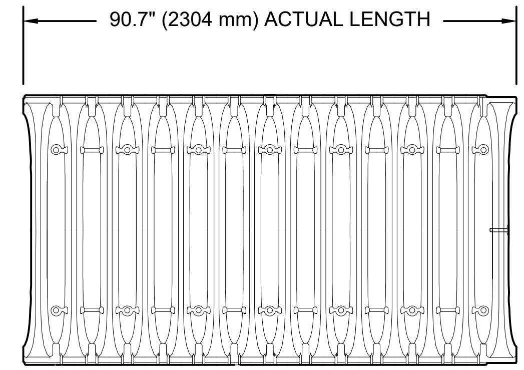
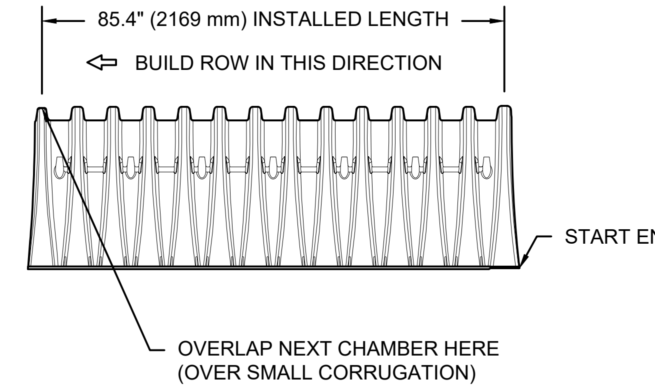
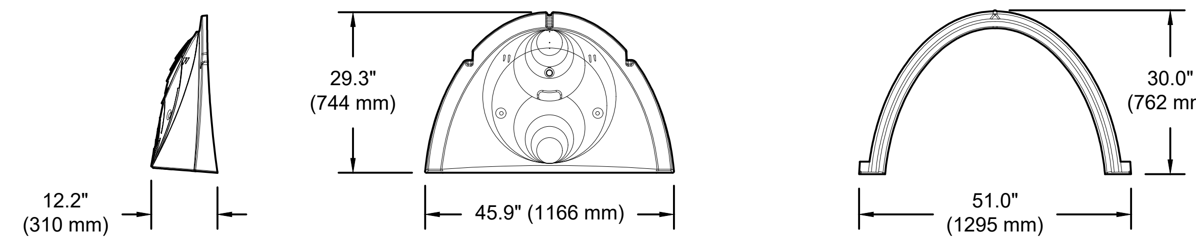
SC-740 TECHNICAL SPECIFICATION

NTS



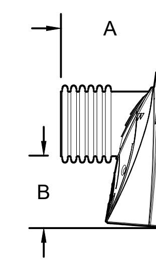


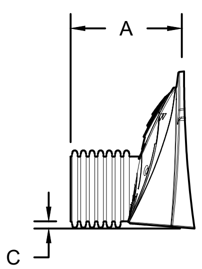


NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS





PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740ECEZ*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740ECEZ THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

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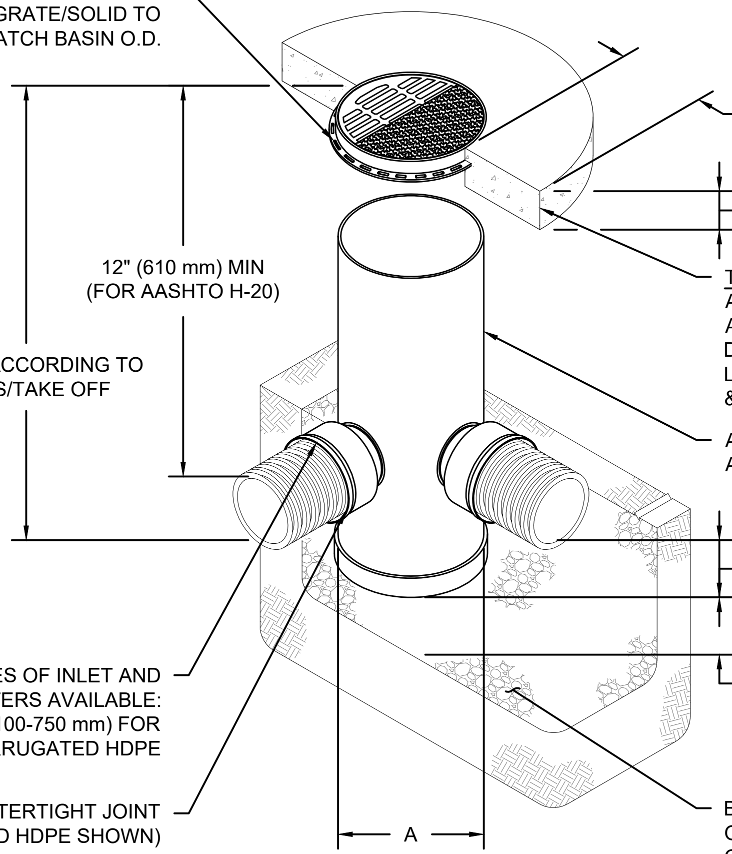
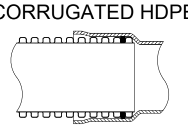
NYLOPLAST DRAIN BASIN

NTS





NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

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Nyloplast®

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Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

10/26/2022

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20
Site Name:	Innes
Drainage Area (ha):	0.54
% Imperviousness:	75.40

Runoff Coefficient 'c': 0.75

Project Name:	Innes Rd
Project Number:	522676
Designer Name:	Guillaume Courtois
Designer Company:	Tatham Engineering
Designer Email:	gcourtois@tathameng.com
Designer Phone:	613-747-3636
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	13.11
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	25.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	86
EFO6	94
EFO8	97
EFO10	99
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 86

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

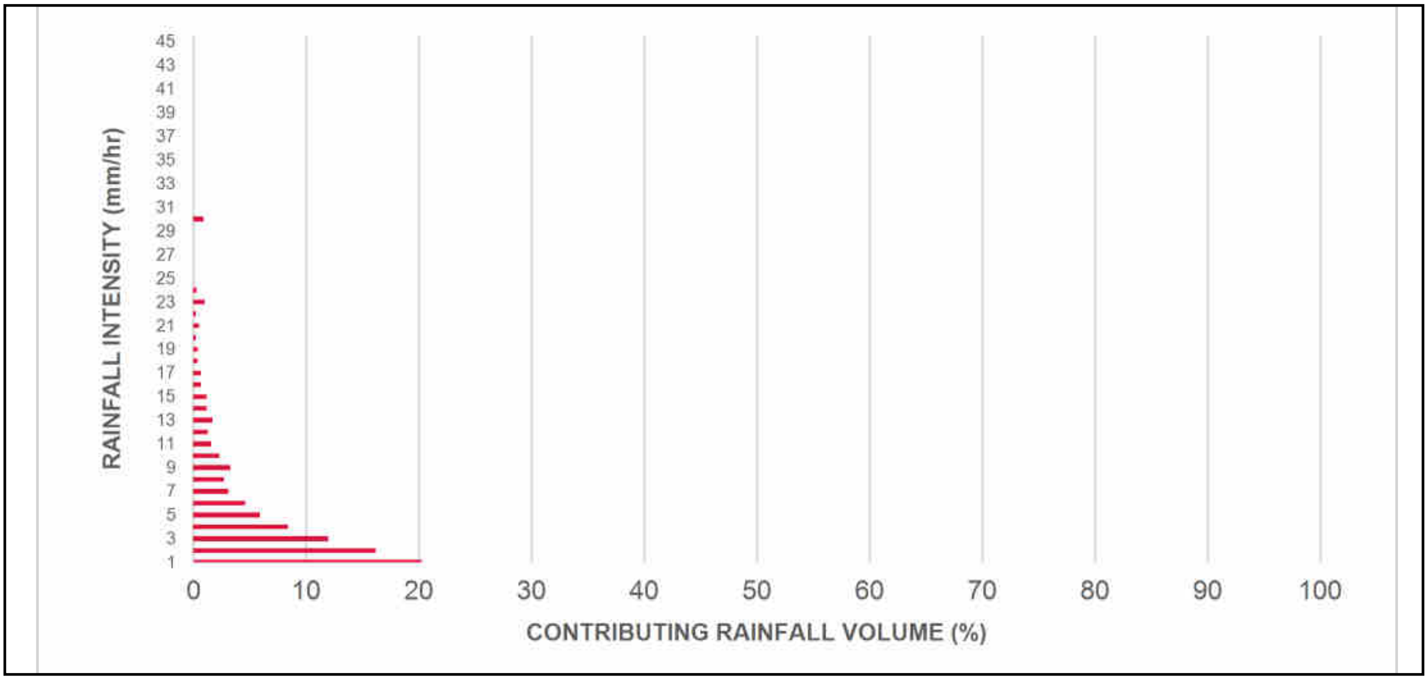
Particle Size (μm)	Percent Less Than	Particle Size Fraction (μm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

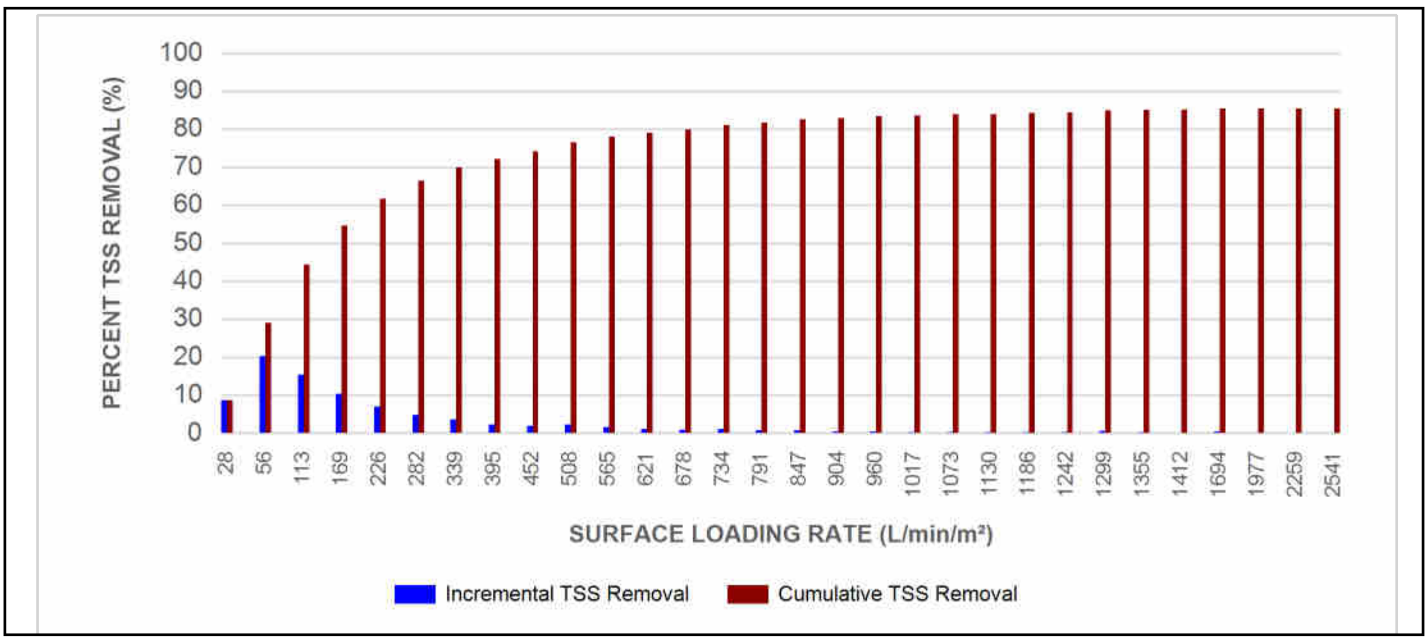
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.5	8.6	8.6	0.56	34.0	28.0	100	8.6	8.6
1	20.3	29.0	1.13	68.0	56.0	100	20.3	29.0
2	16.2	45.2	2.26	136.0	113.0	95	15.3	44.3
3	12.0	57.2	3.39	203.0	169.0	87	10.4	54.7
4	8.4	65.6	4.52	271.0	226.0	82	6.9	61.7
5	5.9	71.6	5.65	339.0	282.0	79	4.7	66.4
6	4.6	76.2	6.78	407.0	339.0	77	3.6	70.0
7	3.1	79.3	7.91	474.0	395.0	74	2.3	72.2
8	2.7	82.0	9.04	542.0	452.0	72	2.0	74.2
9	3.3	85.3	10.17	610.0	508.0	69	2.3	76.5
10	2.3	87.6	11.30	678.0	565.0	66	1.5	78.0
11	1.6	89.2	12.42	745.0	621.0	64	1.0	79.0
12	1.3	90.5	13.55	813.0	678.0	64	0.8	79.9
13	1.7	92.2	14.68	881.0	734.0	64	1.1	81.0
14	1.2	93.5	15.81	949.0	791.0	63	0.8	81.8
15	1.2	94.6	16.94	1017.0	847.0	63	0.7	82.5
16	0.7	95.3	18.07	1084.0	904.0	62	0.4	82.9
17	0.7	96.1	19.20	1152.0	960.0	62	0.5	83.4
18	0.4	96.5	20.33	1220.0	1017.0	61	0.2	83.6
19	0.4	96.9	21.46	1288.0	1073.0	60	0.2	83.9
20	0.2	97.1	22.59	1355.0	1130.0	59	0.1	84.0
21	0.5	97.5	23.72	1423.0	1186.0	57	0.3	84.3
22	2.5	100.0	24.85	1491.0	1242.0	56	1.4	85.6
23	0.0	100.0	25.00	1500.0	1250.0	56	0.0	85.6
24	0.0	100.0	25.00	1500.0	1250.0	56	0.0	85.6
25	0.0	100.0	25.00	1500.0	1250.0	56	0.0	85.6
30	0.0	100.0	25.00	1500.0	1250.0	56	0.0	85.6
35	0.0	100.0	25.00	1500.0	1250.0	56	0.0	85.6
40	0.0	100.0	25.00	1500.0	1250.0	56	0.0	85.6
45	0.0	100.0	25.00	1500.0	1250.0	56	0.0	85.6
Estimated Net Annual Sediment (TSS) Load Reduction =								**86 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL
FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

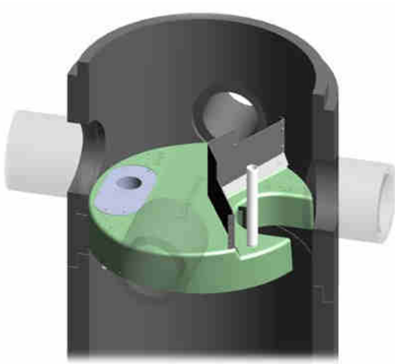
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

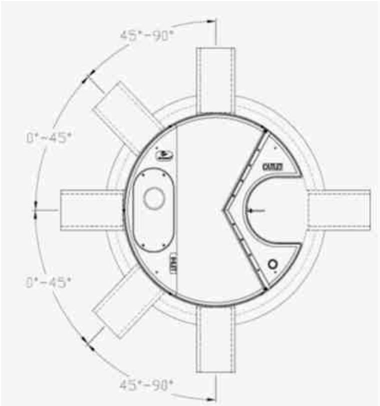
DESIGN FLEXIBILITY

►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.





INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

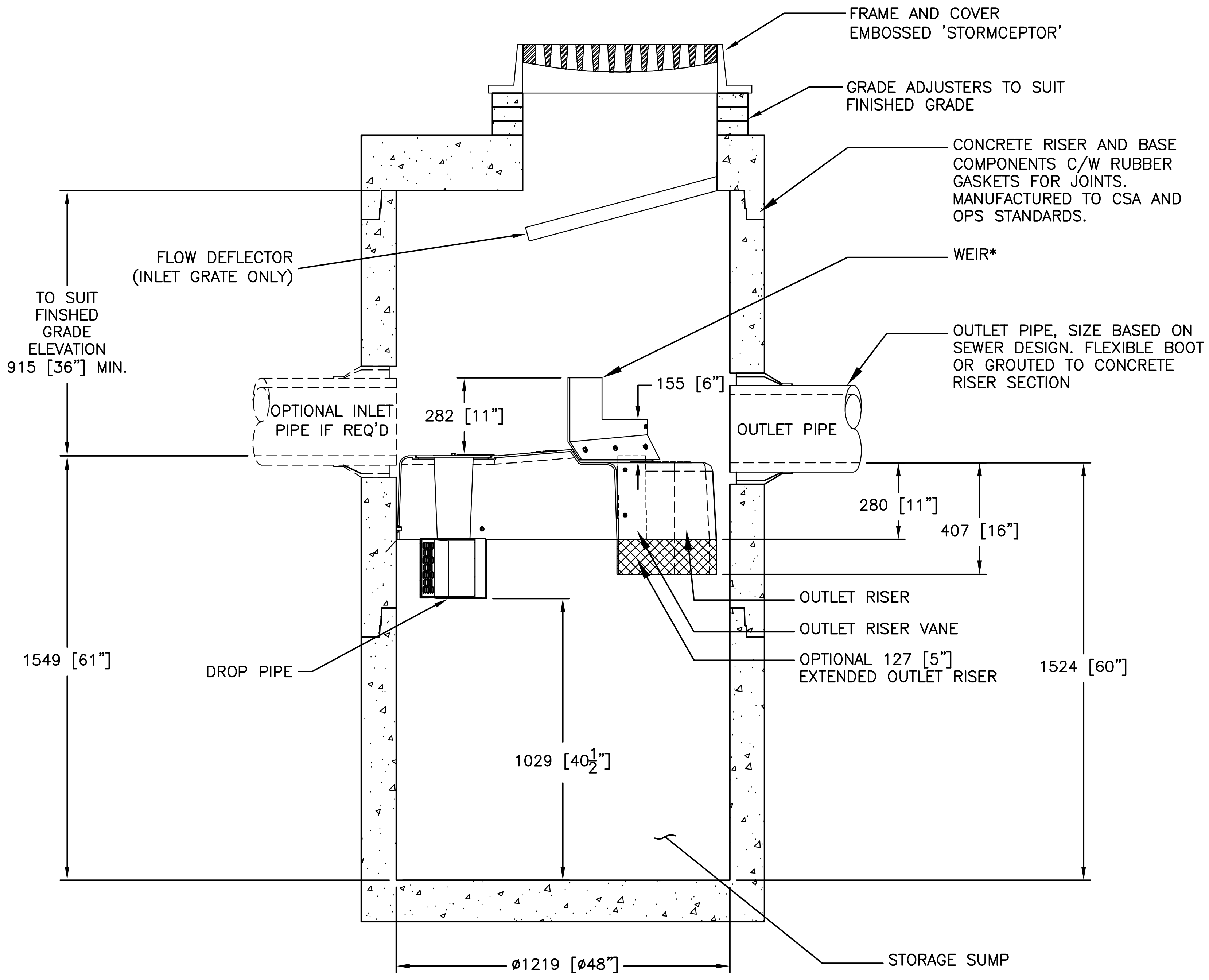
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

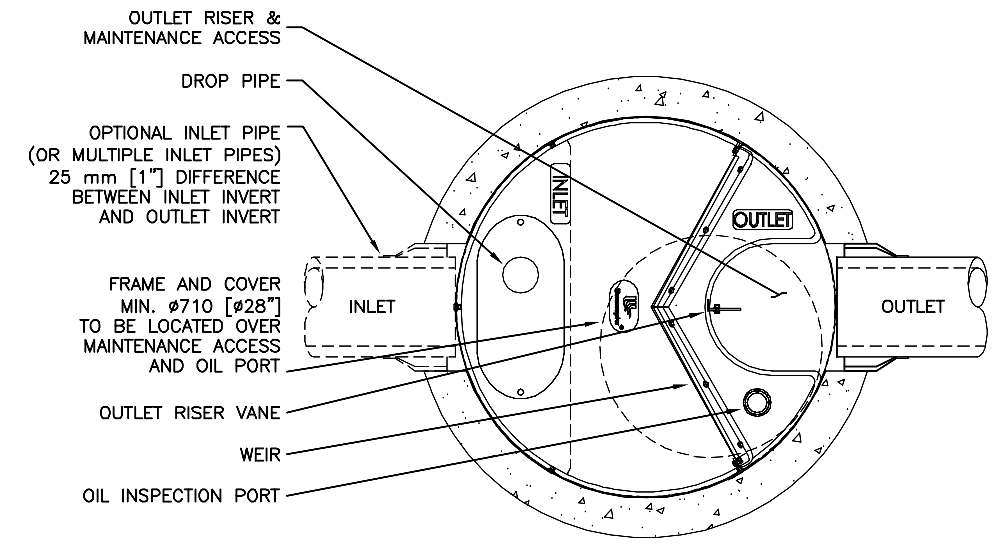
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

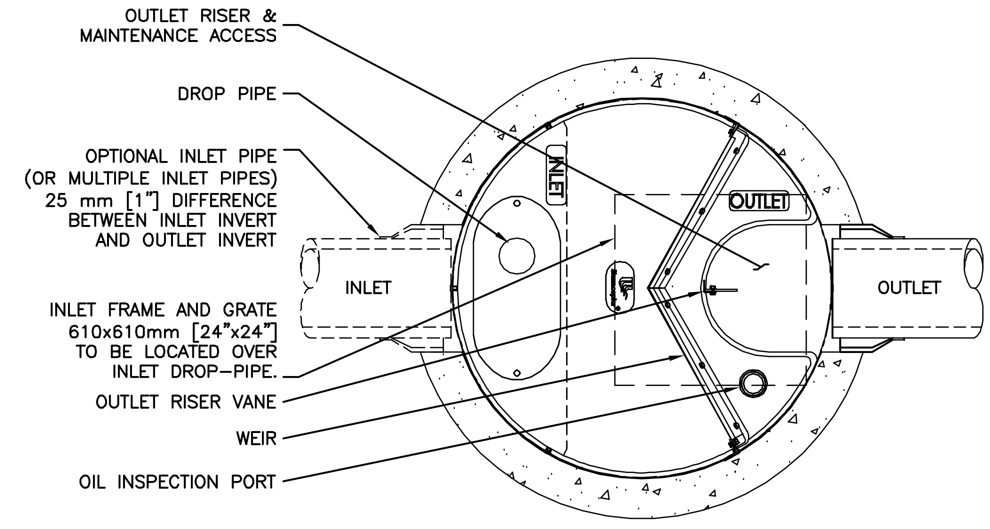
3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO4
STRUCTURE ID	*
HYDROCARBON STORAGE REQ'D (L)	*
WATER QUALITY FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
DRAINAGE AREA (HA)	*
DRAINAGE AREA IMPERVIOUSNESS (%)	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
0	5/26/17	INITIAL RELEASE	JSK
1	6/8/18	UPDATES	JSK
####	####	####	####
####	####	####	####
####	####	####	####

Stormceptor® EF

SCALE = NTS

imbrium

DATE: 10/13/2017	
DESIGNED: JSK	DRAWN: JSK
CHECKED: BSF	APPROVED: SP
PROJECT No.: EFO4	SEQUENCE No.: *
SHEET: 1 OF 1	

Appendix E:
Boundary Conditions

Boundary Conditions
3817-3843 Innes Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	769	12.82
Maximum Daily Demand	1,154	19.23
Peak Hour	1,385	23.08
Fire Flow Demand #1	5,600	93.33

Location

Results

Connection 1 – Innes Rd.

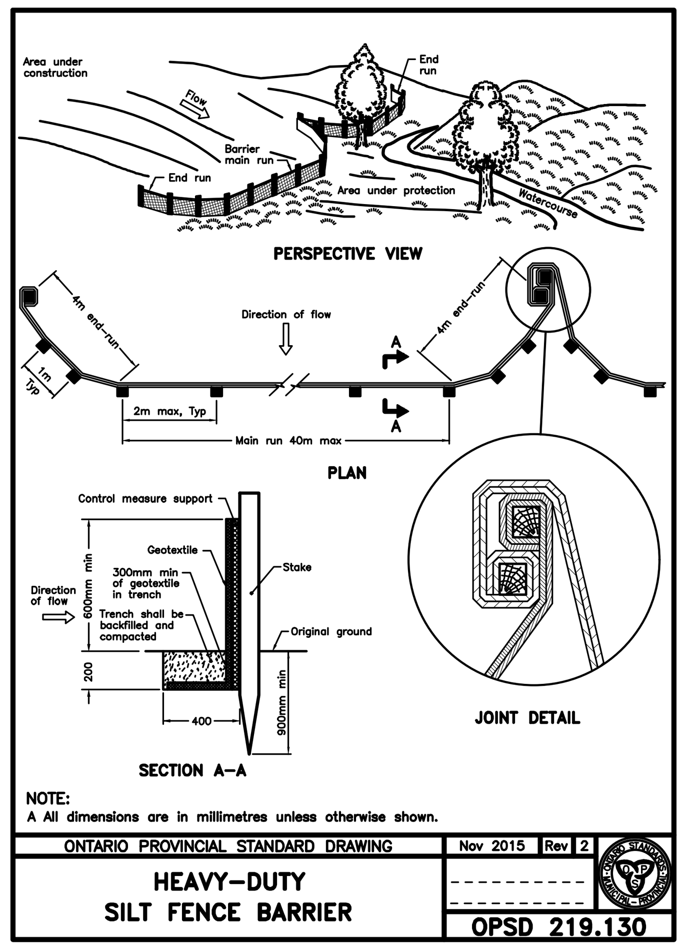
Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.3	55.1
Peak Hour	127.1	50.5
Max Day plus Fire 1	129.3	53.7

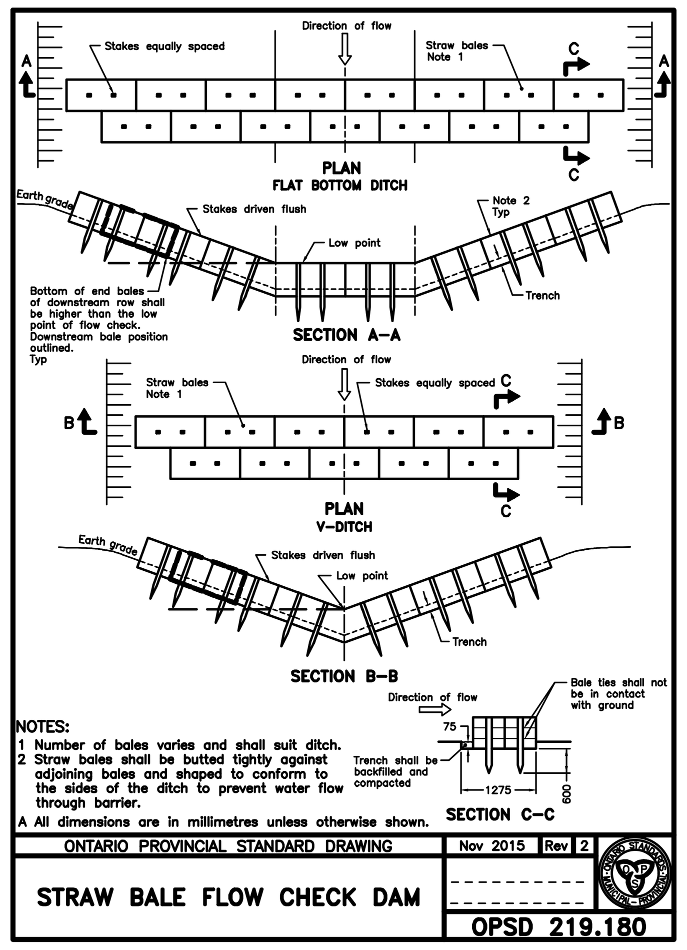
[1] Ground Elevation = 91.6 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Appendix F:
Engineering Drawings





EROSION AND SEDIMENT CONTROL MEASURES:

** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES **

1. **PRIOR TO START OF CONSTRUCTION:**

1.1. PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF ANY SOIL, AND CONSTRUCTION:

1.1.1. INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).

1.1.2. INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCH BASINS AND MANHOLES.

1.1.3. INSTALL SILTSACK FILTERS IN ALL CONCRETE CATCH BASIN STRUCTURES.

1.1.4. INSPECT MEASURES IMMEDIATELY AFTER INSTALLATION.

2. **DURING CONSTRUCTION:**

2.1. WORK TO BE DONE IN THE VICINITY OF MAJOR WATERWAYS TO BE CARRIED OUT FROM JULY TO SEPTEMBER ONLY.

2.2. MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE.

2.3. PROTECT DISTURBED AREAS FROM RUNOFF.

2.4. PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILIATED WITHIN 30 DAYS.

2.5. INSPECT SILT FENCE, FILTER CLOTHS, AND CATCH BASIN SUMPS WEEKLY AND AFTER EVERY MAJOR STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY

2.6. PLAN TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION.

2.7. EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES.

2.8. DO NOT LOCATE TOPSOIL PILES AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE PILE IS REMOVED. ALL TOPSOIL PILES ARE TO BE SEEDED IF THEY ARE TO REMAIN ON SITE LONG ENOUGH FOR SEEDS TO GROW (30 DAYS)

2.9. CONTROL WIND-BLOWN DUST OFF SITE TO ACCEPTABLE LEVELS BY SEEDING TOPSOIL PILES AND OTHER AREAS TEMPORARILY (PROVIDE WATERING AS REQUIRED).

2.10. ALL EROSION CONTROL STRUCTURE TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.

2.11. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THIS CONSULTING ENGINEER AND THE CITY DEPARTMENT OF PUBLIC WORKS. "TO PREVENT UNNECESSARY SEDIMENT DISCHARGE, THE CONTRACTOR IS PERMITTED TO PLACE ADDITIONAL SEDIMENT AND EROSION CONTROL MEASURES IN A TIMELY MANNER, IF REQUIRED. THE CONTRACTOR TO ADVISE CONSULTANT ONCE INSTALLED FOR INSPECTION."

2.12. CONTRACTOR RESPONSIBLE FOR CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING ETC, AT THE END OF EACH WORK DAY.

2.13. PROVIDE GRAVEL ENTRANCE WHEREVER EQUIPMENT LEAVES THE SITE TO PREVENT MUD TRACKING ONTO PAVED SURFACES. GRAVEL BED SHALL BE A MINIMUM OF 15m LONG. 4m WIDE AND 0.3m DEEP AND SHALL CONSIST OF COARSE (50mm CRUSHER-RUN LIMESTONE). MAINTAIN GRAVEL ENTRANCE IN CLEAN CONDITION.

2.14. DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPED.

2.15. ANY MUD/MATERIAL TRACKED ONTO THE ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER.

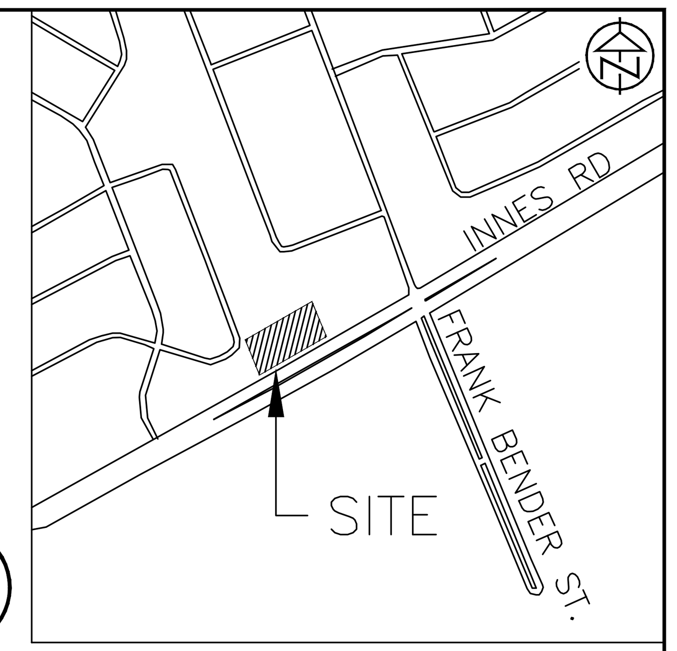
2.16. TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ABUTTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.

3. **AFTER CONSTRUCTION:**

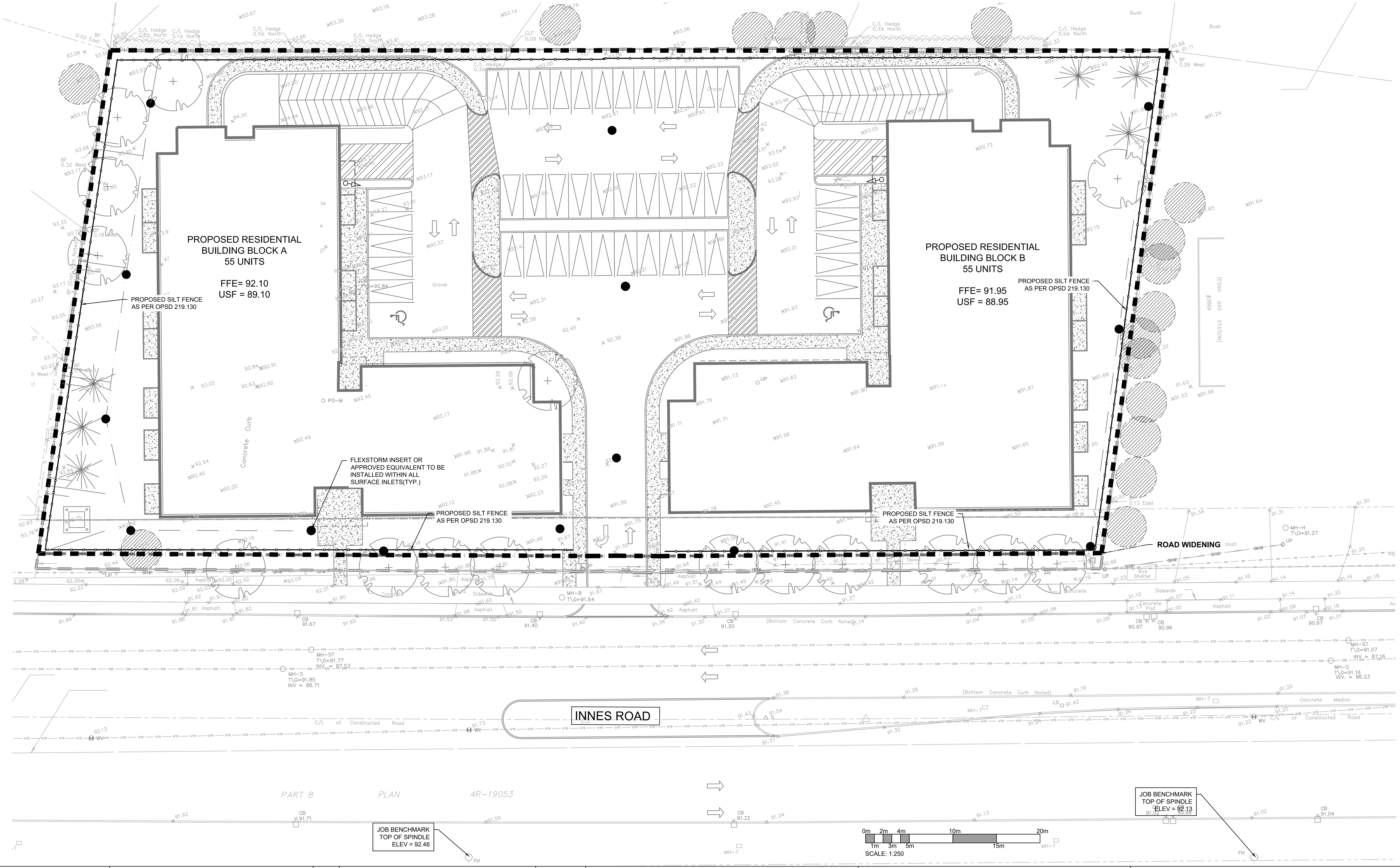
3.1. PROVIDE PERMANENT COVER CONSISTING OF TOPSOIL AND SEED TO DISTURBED AREA.

3.2. REMOVE STRAW BALE FLOW CHECK DAMS, SILT FENCES AND FILTER CLOTHS ON CATCH BASINS AND MANHOLE COVERS AFTER DISTURBED AREAS HAVE BEEN REHABILITATED AND STABILIZED.

3.3. INSPECT AND CLEAN CATCH BASIN SUMPS AND STORM SEWERS.



KEY PLAN - N.T.S.



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED ENTRANCE
- ×50.00 PROPOSED ELEVATION
- ×50.00(TC) PROPOSED TOP OF CURB ELEVATION
- ×50.00(BC) PROPOSED BOTTOM OF CURB ELEVATION
- ×50.00 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED SILT FENCE AS PER OPSD 219.130
- PROPOSED 250mmØ PERFORATED SUBDRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION AS PER W22
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WATERSHED NAME (WS-XX, CONTROLLED, AREA, CN)
- CN# OR % IMPERVIOUS
- AREA IN HECTARES
- PROPOSED GRASS AREA
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED WATER METER
- PROPOSED SIEMESE CONNECTION
- PROPOSED DRAIN OUTLET

BENCHMARK1: FIRE HYDRANT LOCATED ON SOUTH SIDE OF INNES ROAD, SOUTH OF SITE. TOP OF SPINDLE ELEV=92.46

BENCHMARK2: FIRE HYDRANT LOCATED ON SOUTH SIDE OF INNES ROAD, SOUTHEAST OF SITE(90.0m EAST FROM BENCHMARK 1) TOP OF SPINDLE ELEV=92.13

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	OCT. 2022
2.	RE-ISSUED FOR SPA	APR. 2023
3.	RE-ISSUED FOR SPA	JUL. 2023

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER J. R. ASH 100123062 PROVINCE OF ONTARIO

BRIDOR DEVELOPMENTS
3817-3843 INNES ROAD
CITY OF OTTAWA

SEDIMENT & EROSION CONTROL PLAN

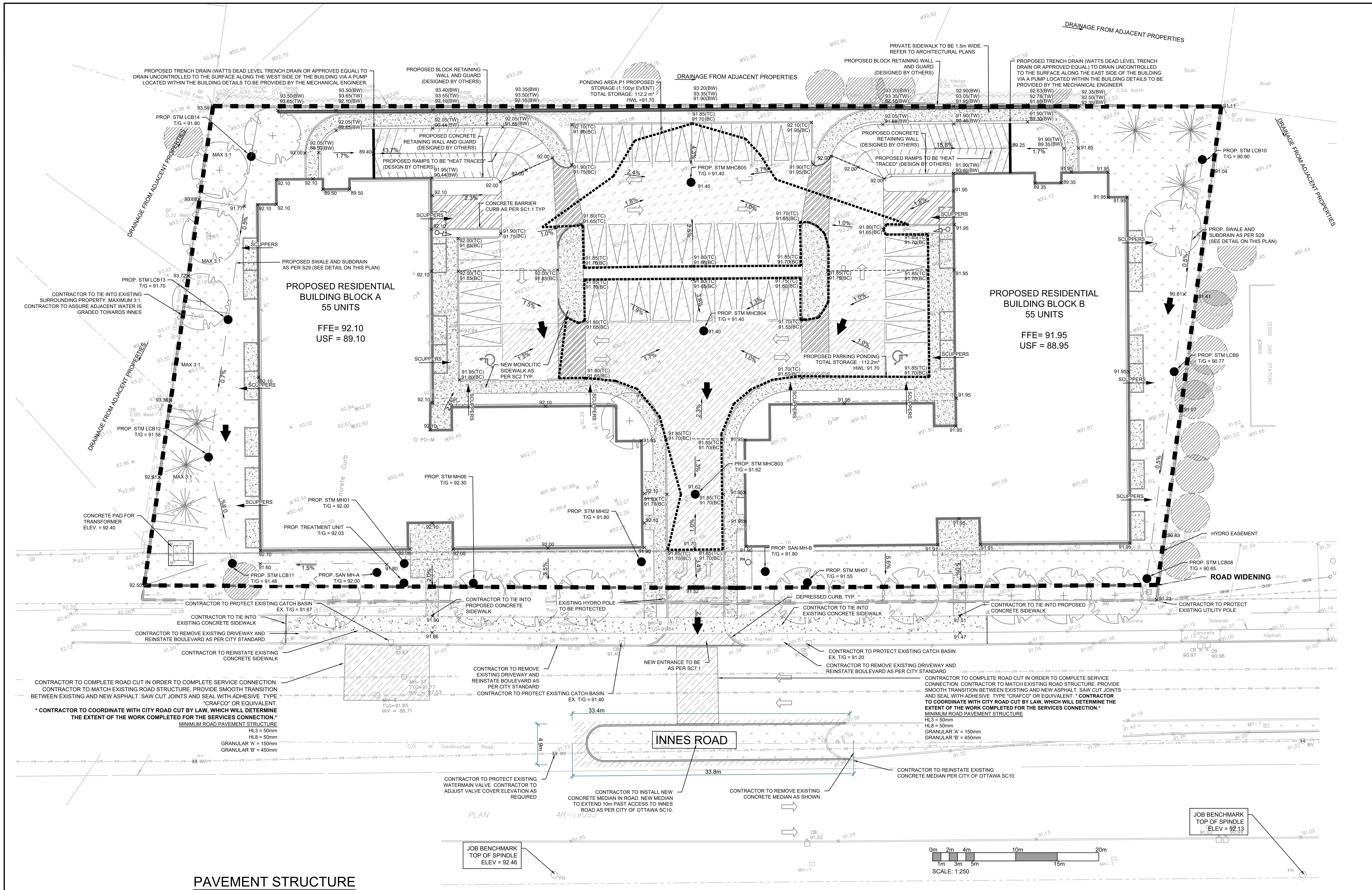
TATHAM ENGINEERING

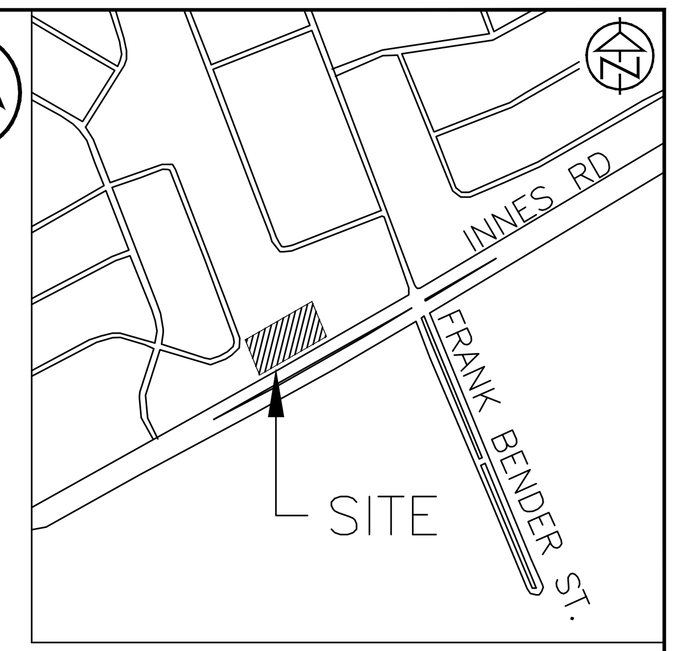
DESIGN: HY/GC	FILE: 522676	DWG:
DRAWN: HY	DATE: OCT 2022	C100
CHECK: GC	SCALE: 1:250	

Drawing Name: 522676-SG01.dwg, Plotted: Jul 17, 2023

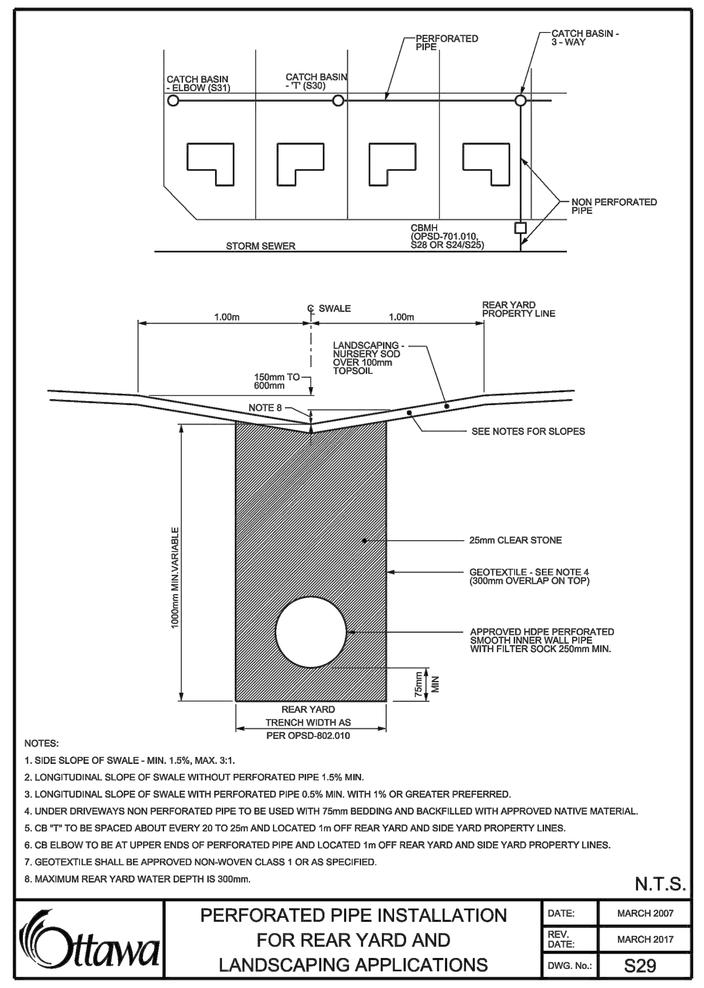
D07-12-20-0164

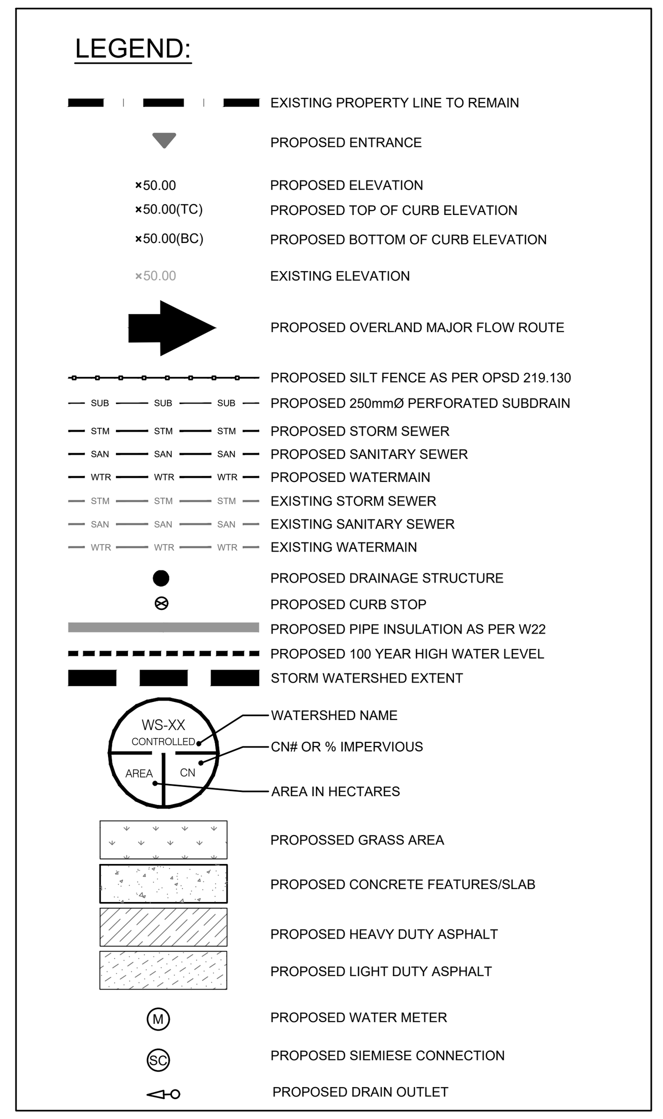
18285





KEY PLAN - N.T.S.





PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) LIGHT DUTY	HEAVY DUTY
SURFACE	HL.3 A/C (PG 58-28)	50	40
BINDER	HL.8 A/C (PG 58-28)	--	50
BASECOURSE	GRANULAR "A"	150	150
SUBBASE	GRANULAR "B" TYPE II	300	400

PONDING TABLE

100 year storm HWL = 91.70

PONDING AREA	VOLUME (m3)	DEPTH (mm)
P1	107.8	300

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3.	RE-ISSUED FOR SPA	JUL. 2023

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER J. R. ASH 100123062 PROVINCE OF ONTARIO

BRIDOR DEVELOPMENTS
3817-3843 INNES ROAD
CITY OF OTTAWA

SITE GRADING PLAN

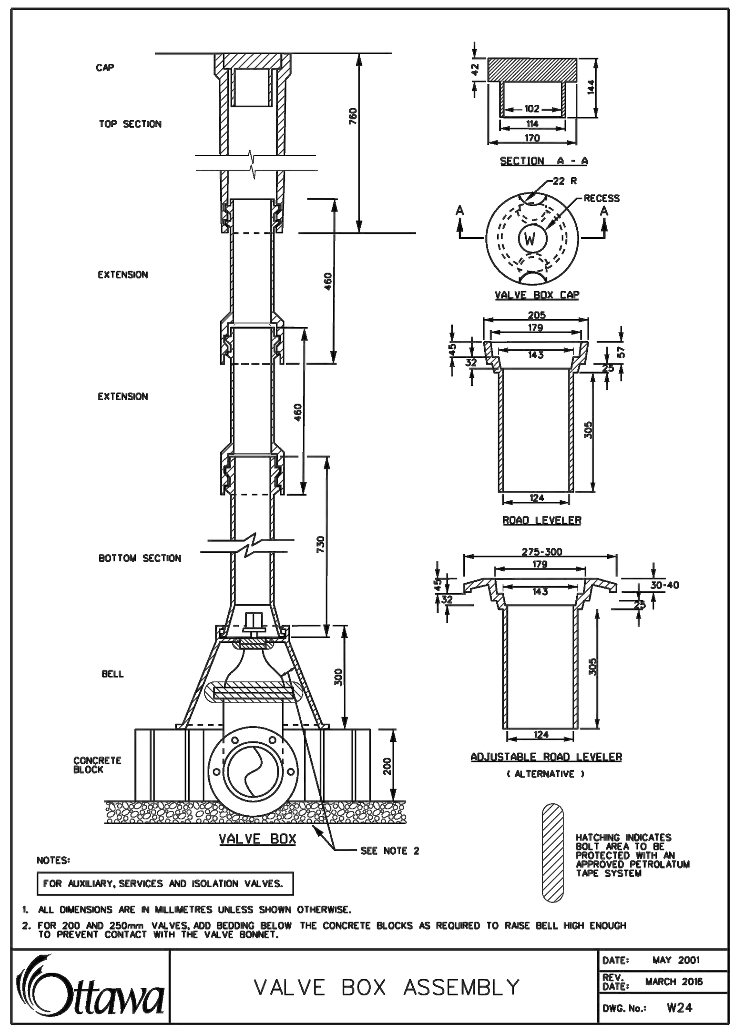
TATHAM ENGINEERING

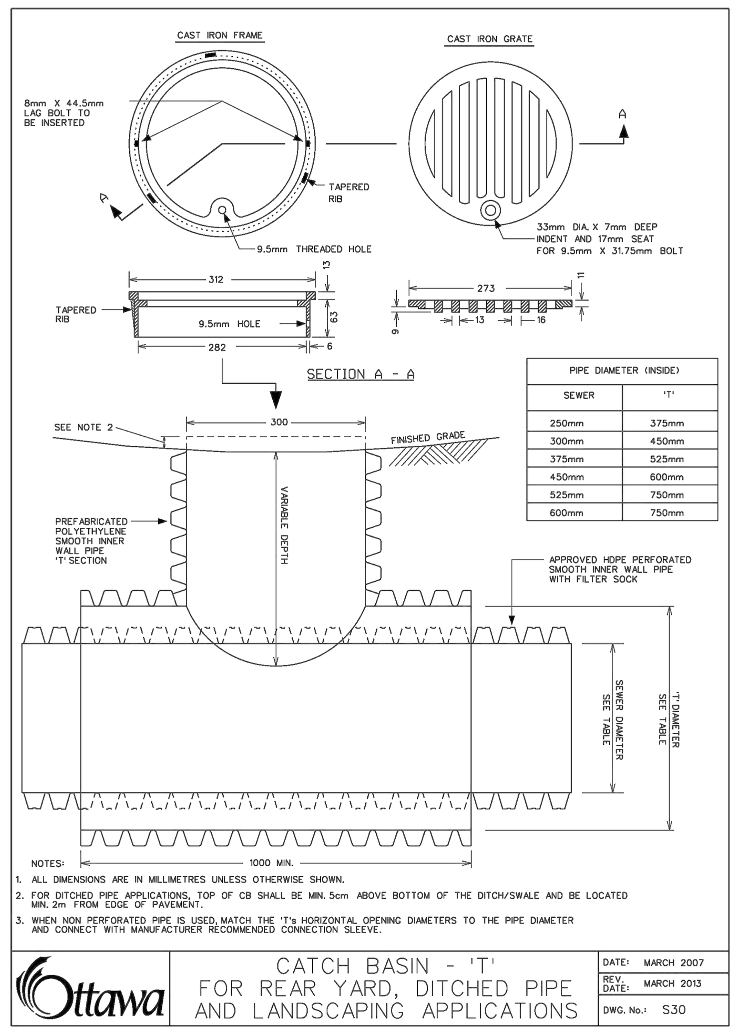
DESIGN: HY/GC	FILE: 522676	DWG:
DRAWN: HY	DATE: OCT 2022	C200
CHECK: GC	SCALE: 1:250	

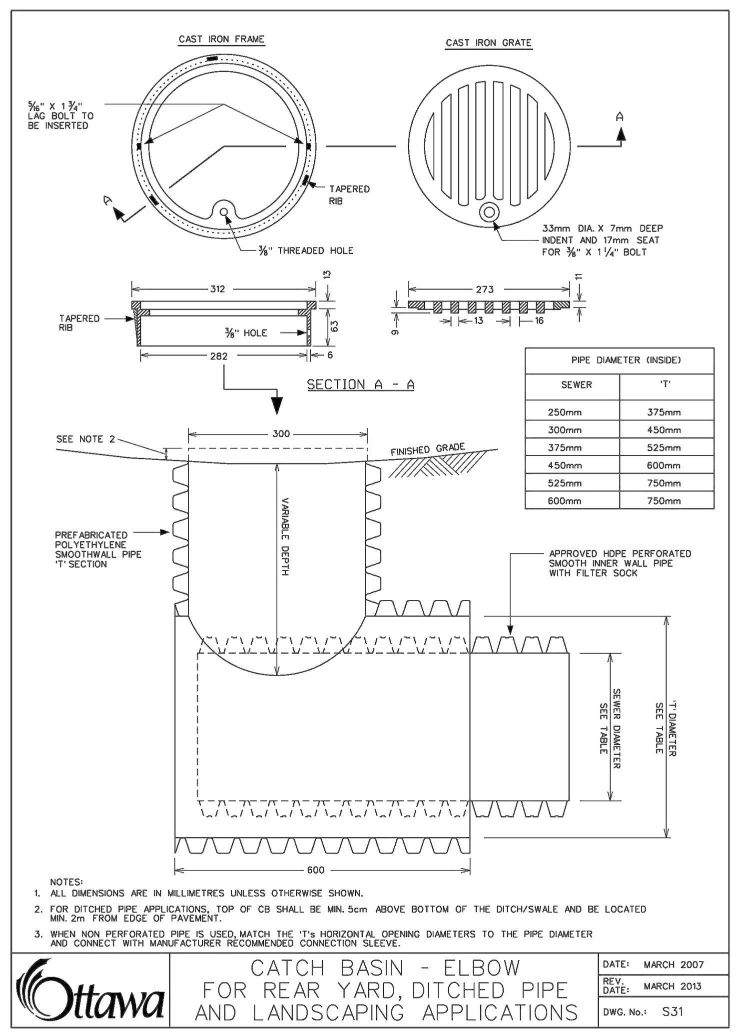
Drawing Name: 522676-SG01.dwg, Plotted: Jul 17, 2023

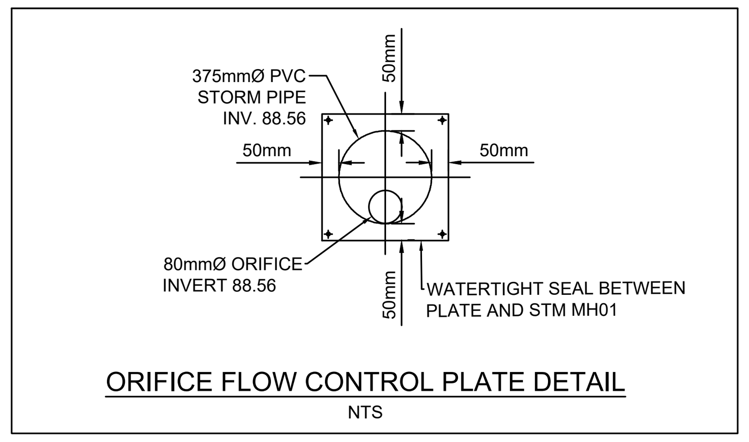
D07-12-20-0164

18285







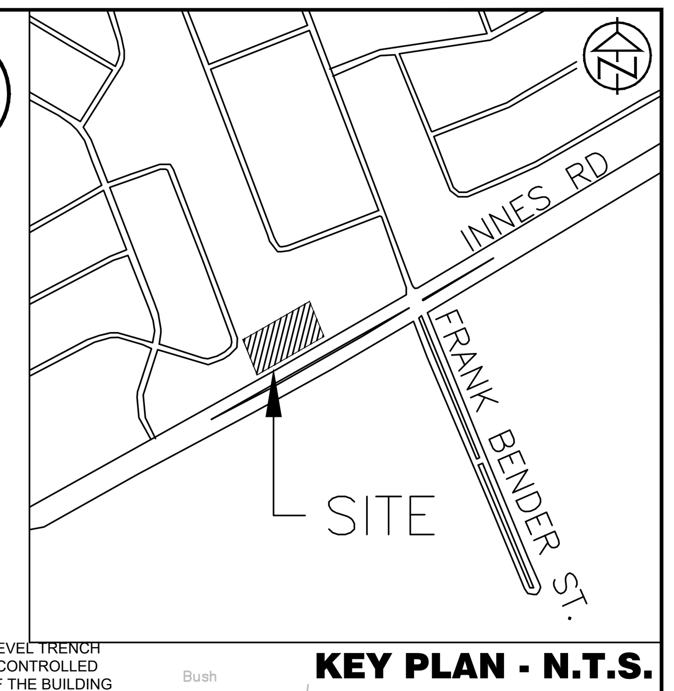


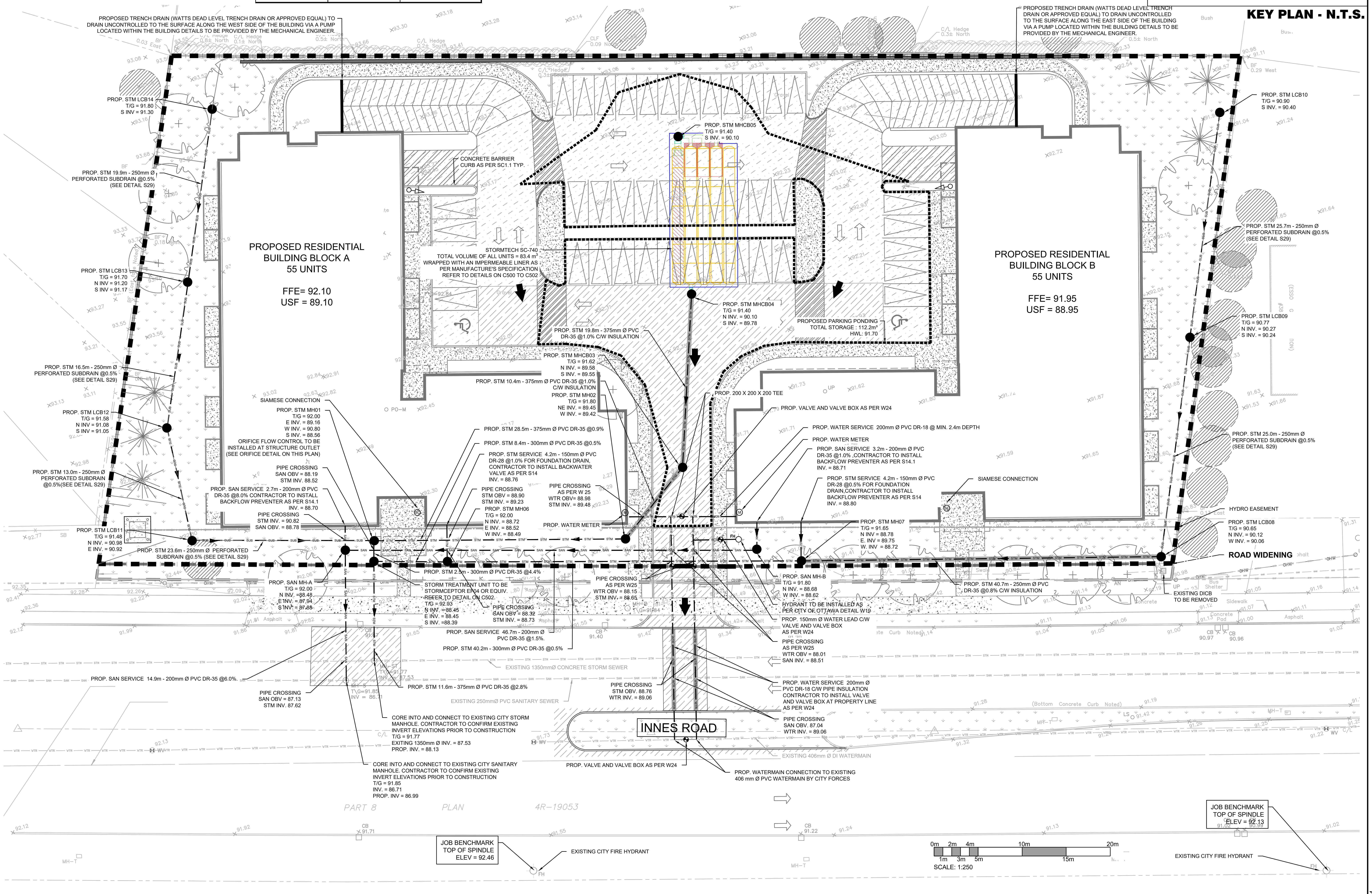
MANHOLE TABLE

STORM		
MH Number	Size	Cover
STM MH01	1200mm	S24.1
STM MH02	1200mm	S24.1
MHCB03	1200mm	S28.1
MHCB04	1200mm	S28.1
MHCB05	1200mm	S28.1
STM MH06	1200mm	S24.1
STM MH07	1200mm	S24.1
LCB08 TO LCB14	S30 AND S31	
SANITARY		
MH Number	Size	Cover
MHA	1200mm	S24
MHB	1200mm	S24

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED ELEVATION
- PROPOSED TOP OF CURB ELEVATION
- PROPOSED BOTTOM OF CURB ELEVATION
- EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED SILT FENCE AS PER OPSD 219.130
- PROPOSED 250mmØ PERFORATED SUBDRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED CATCHBASIN/MANHOLE/CATCHBASIN
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION AS PER W22
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED WATER METER
- PROPOSED SIEMESE CONNECTION
- PROPOSED ROOF LEADER





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1.	ISSUED FOR SPA	OCT. 2022
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3.	RE-ISSUED FOR SPA	JUL. 2023

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER J. R. ASH 100123062 July 17, 2023 PROVINCE OF ONTARIO

BRIDOR DEVELOPMENTS
3817-3843 INNES ROAD
CITY OF OTTAWA

SITE SERVICING PLAN

TATHAM ENGINEERING

DESIGN: HY/GC	FILE: 522676	DWG:
DRAWN: HY	DATE: OCT 2022	**C300**
CHECK: GC	SCALE: 1:250	

Drawing Name: 522676-SG01.dwg, Plotted: Jul 17, 2023

D07-12-20-0164

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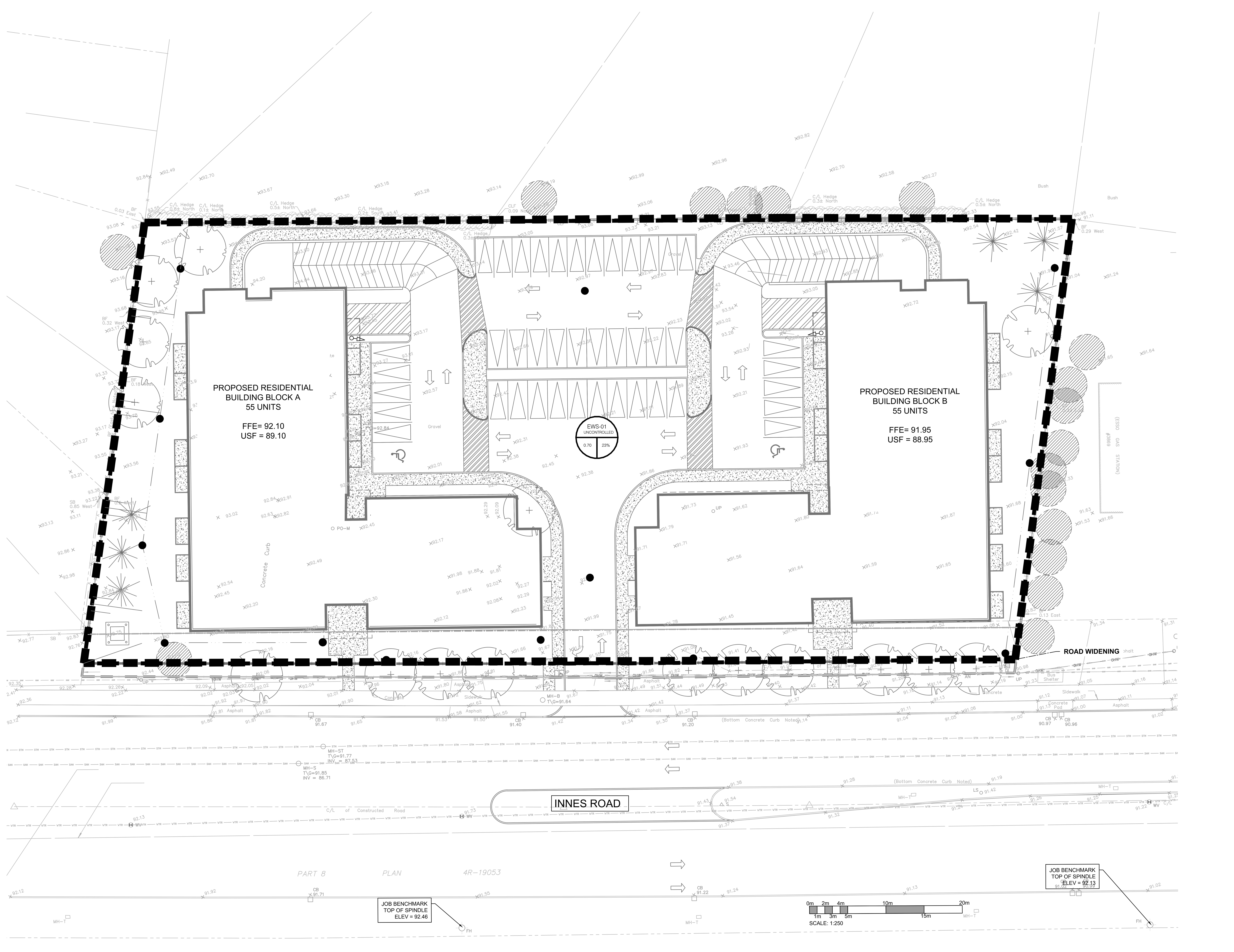

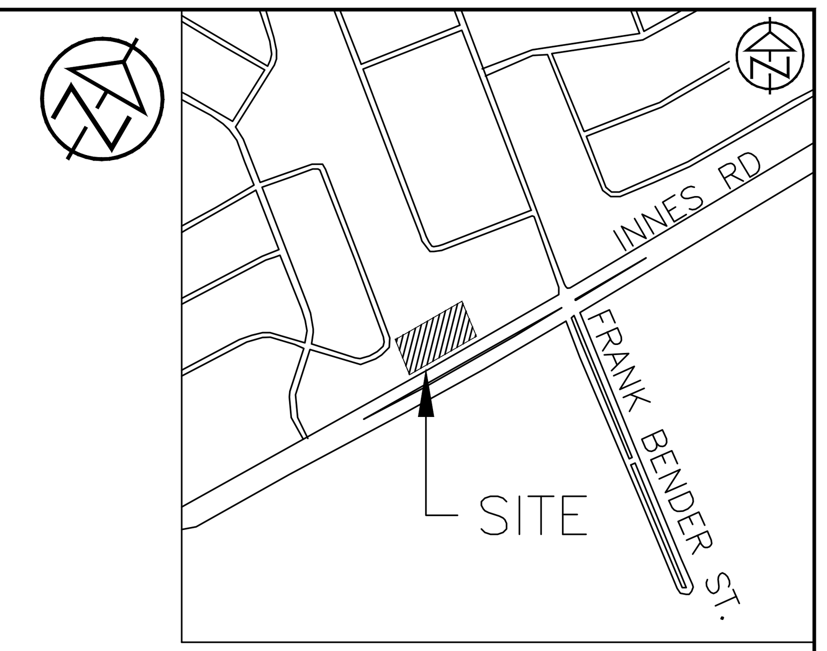

KEY PLAN - N.T.S.

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED ENTRANCE
- ×50.00 PROPOSED ELEVATION
- ×50.00(TC) PROPOSED TOP OF CURB ELEVATION
- ×50.00(BC) PROPOSED BOTTOM OF CURB ELEVATION
- ×50.00 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED SILT FENCE AS PER OPSD 219.130
- PROPOSED 250mmØ PERFORATED SUBDRAIN
- STM PROPOSED STORM SEWER
- SAN PROPOSED SANITARY SEWER
- WTR PROPOSED WATERMAIN
- STM EXISTING STORM SEWER
- SAN EXISTING SANITARY SEWER
- WTR EXISTING WATERMAIN
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION AS PER W22
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED: WATERSHED NAME; CN: CN# OR % IMPERVIOUS; AREA: AREA IN HECTARES
- PROPOSSED GRASS AREA
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- M PROPOSED WATER METER
- SC PROPOSED SIEMIESE CONNECTION
- PROPOSED DRAIN OUTLET

BENCHMARK1: FIRE HYDRANT LOCATED ON SOUTH SIDE OF INNES ROAD, SOUTH OF SITE.
TOP OF SPINDLE ELEV=92.46

BENCHMARK2: FIRE HYDRANT LOCATED ON SOUTH SIDE OF INNES ROAD, SOUTHEAST OF SITE(90.0m EAST FROM BENCHMARK 1)
TOP OF SPINDLE ELEV=92.13

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	OCT. 2022
2.	RE-ISSUED FOR SPA	APR. 2023
3.	RE-ISSUED FOR SPA	JUL. 2023

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
J. R. ASH
100123062
Jul 17, 2023
PROVINCE OF ONTARIO

BRIDOR DEVELOPMENTS
3817-3843 INNES ROAD
CITY OF OTTAWA

PRE DEVELOPMENT
DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: HY/GC	FILE: 522676	DWG:
DRAWN: HY	DATE: OCT 2022	**C400**
CHECK: GC	SCALE: 1:250	

Drawing Name: 522676-SG01.dwg, Plotted: Jul 17, 2023

D07-12-20-0164

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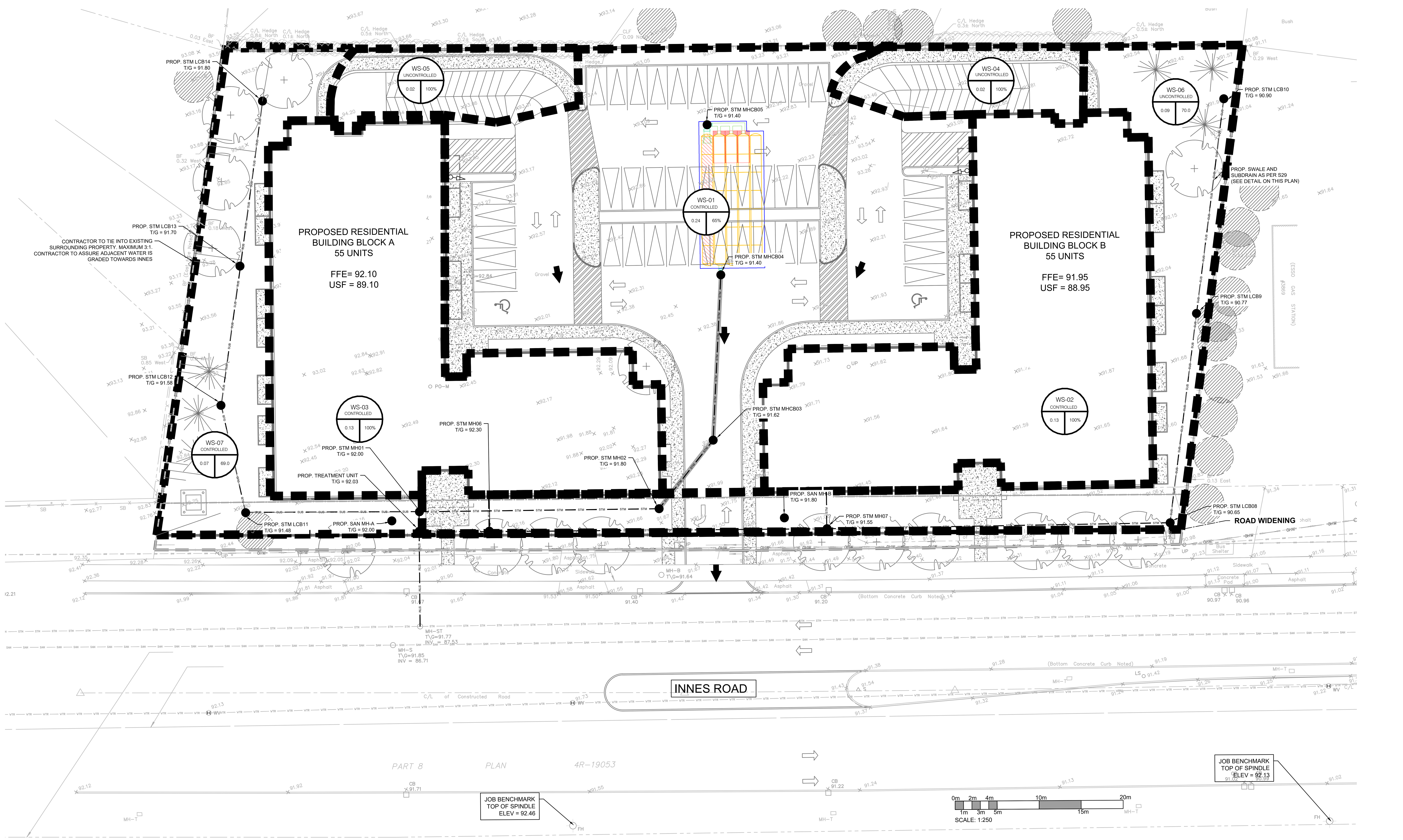

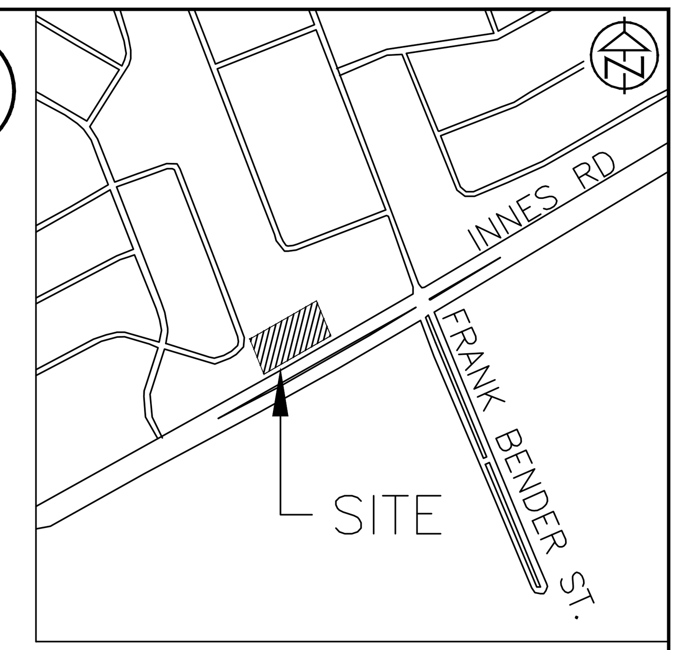

KEY PLAN - N.T.S.

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
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- PROPOSED WATERMAIN
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ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER J. R. ASH 100123062 July 17, 2023 PROVINCE OF ONTARIO

BRIDOR DEVELOPMENTS
3817-3843 INNES ROAD
CITY OF OTTAWA

POST DEVELOPMENT DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: HY/GC	FILE: 522676	DWG:
DRAWN: HY	DATE: OCT 2022	C401
CHECK: GC	SCALE: 1:250	

Drawing Name: 522676-SG01.dwg, Plotted: Jul 17, 2023

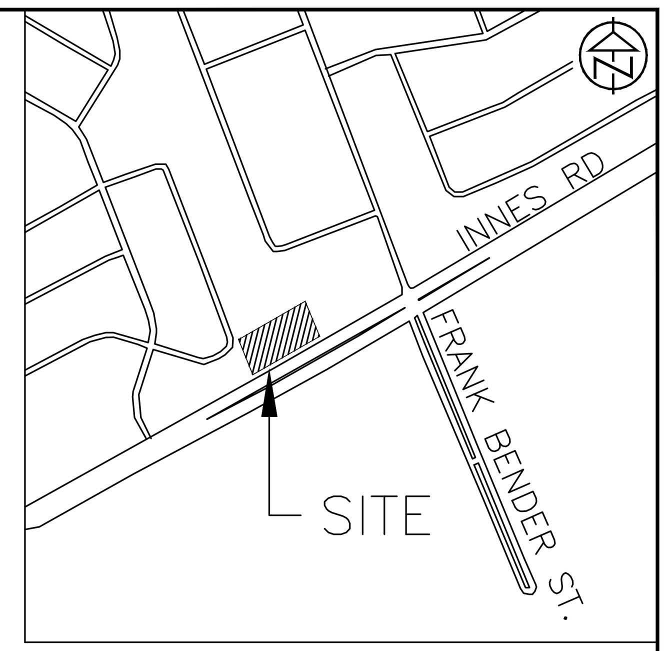
D07-12-20-0164

18285

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

ADS SiteAssist FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR APP

3817 INNES ROAD
OTTAWA, CANADA



KEY PLAN - N.T.S.

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. 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".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. 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.
6. CHAMBERS SHALL BE DESIGNED, TESTED 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.
7. 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 AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. 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.
8. 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.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. 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.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. 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

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 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/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. 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.

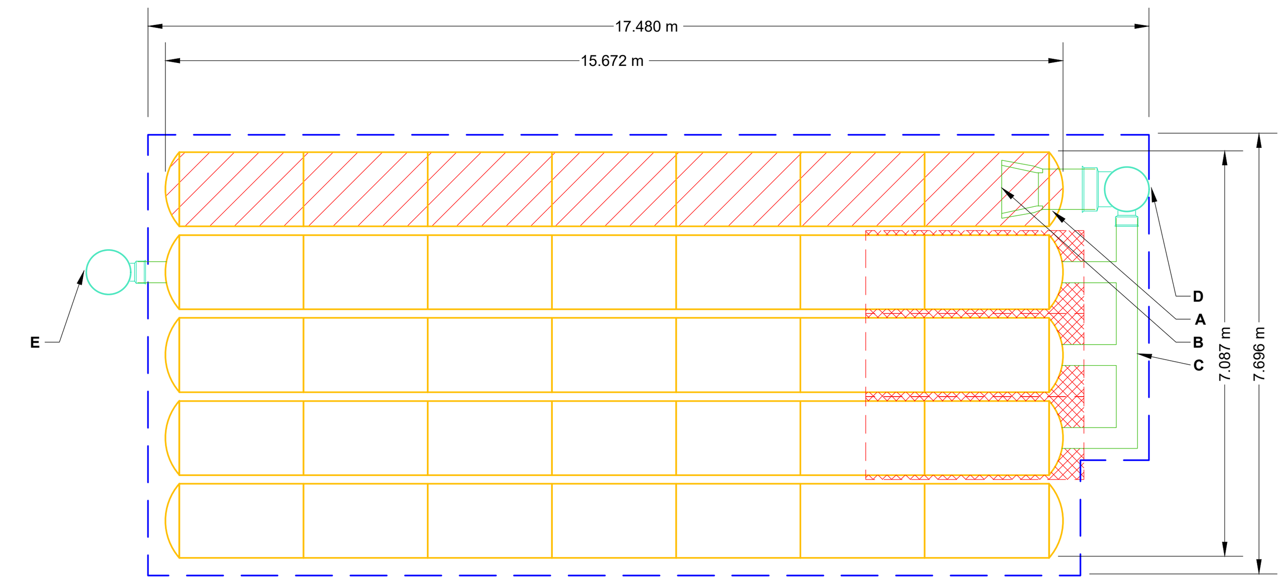
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT	
35	STORMTECH SC-740 CHAMBERS
10	STORMTECH SC-740 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	STONE VOID
83.4	INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
132.1	SYSTEM AREA (m²)
50.4	SYSTEM PERIMETER (m)

CONCEPTUAL ELEVATIONS	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.353
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.524
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.372
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.372
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.372
TOP OF STONE:	1.067
TOP OF SC-740 CHAMBER:	0.914
300 mm x 300 mm TOP MANIFOLD INVERT:	0.470
300 mm BOTTOM CONNECTION INVERT:	0.183
600 mm ISOLATOR ROW PLUS INVERT:	0.155
BOTTOM OF SC-740 CHAMBER:	0.152
BOTTOM OF STONE:	0.000

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	600 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC740ECEZ / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	3 mm	
FLAMP	B	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC74024RAMP		
MANIFOLD	C	300 mm x 300 mm TOP MANIFOLD, ADS N-12	318 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)	D	750 mm DIAMETER (610 mm SUMP MIN)		161 L/s IN
NYLOPLAST (OUTLET)	E	750 mm DIAMETER (DESIGN BY ENGINEER)		57 L/s OUT



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 3.810 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES
- 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.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- NOT FOR CONSTRUCTION: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

3817 INNES ROAD
OTTAWA, CANADA
DATE:
DRAWN: HY
PROJECT #:
CHECKED: N/A

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

ADS 4640 TRUEMAN BLVD 1-800-733-7473

SCALE = 1 : 100

SHEET 2 OF 6

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARK1: FIRE HYDRANT LOCATED ON SOUTH SIDE OF INNES ROAD, SOUTH OF SITE. TOP OF SPINDLE ELEV=92.46

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ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER J. R. ASH 100123062 July 17, 2023 PROVINCE OF ONTARIO

BRIDOR DEVELOPMENTS
3817-3843 INNES ROAD
CITY OF OTTAWA

DETAILS - 1

TATHAM ENGINEERING

DESIGN: HY/GC	FILE: 522676	DWG: C500
DRAWN: HY	DATE: OCT 2022	
CHECK: GC	SCALE: 1:250	

Drawing Name: 522676-SG01.dwg, Plotted: Jul 17, 2023

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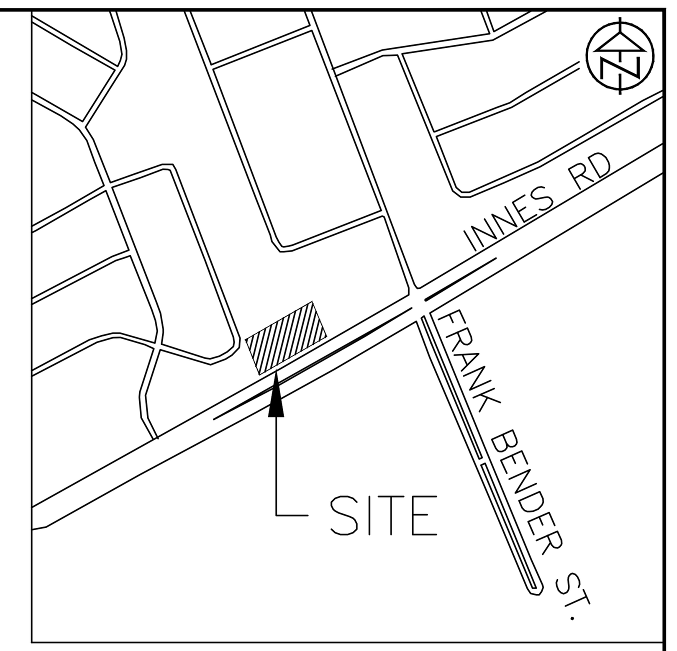
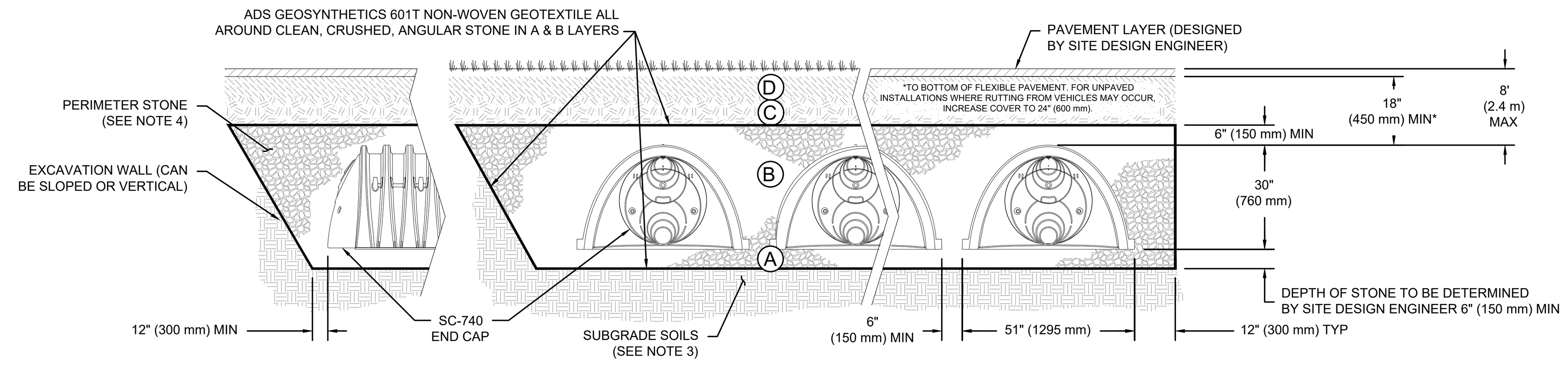


KEY PLAN - N.T.S.

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 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 18" (450 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	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	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.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 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.
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 SHALL BE GREATER THAN OR EQUAL TO 550 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 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

3817 INNES ROAD
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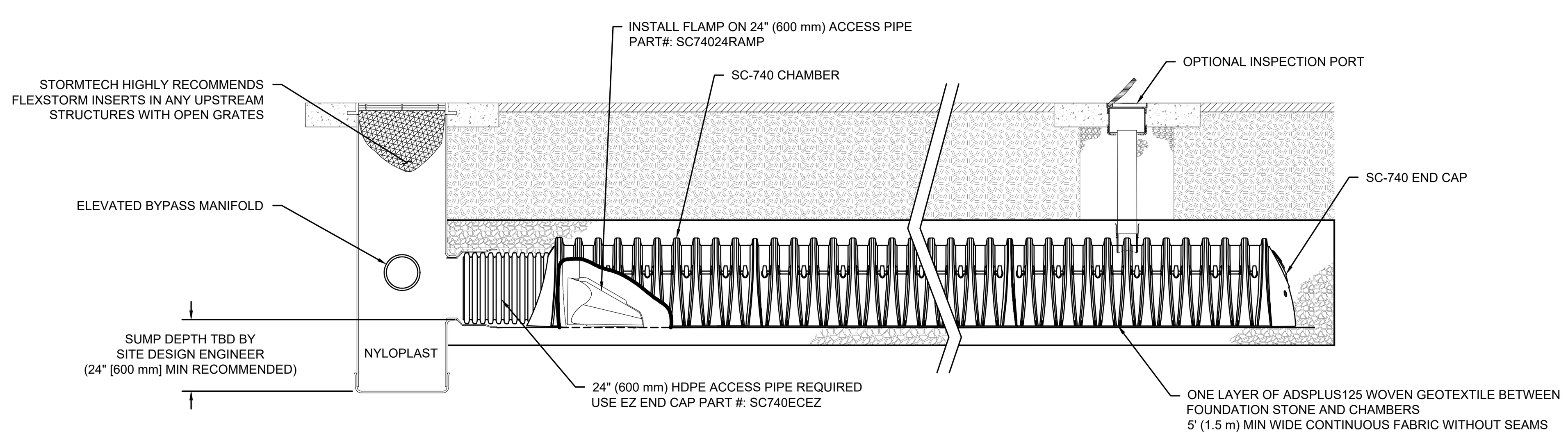
3 OF 6



SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

3817 INNES ROAD
OTTAWA, CANADA
StormTech® Chamber System
4640 TRUEMAN BLVD
1-800-733-7473
SHEET
4 OF 6

BENCHMARK1: FIRE HYDRANT LOCATED ON SOUTH SIDE OF INNES ROAD, SOUTH OF SITE.
TOP OF SPINDLE ELEV=92.46

BENCHMARK2: FIRE HYDRANT LOCATED ON SOUTH SIDE OF INNES ROAD, SOUTHEAST OF SITE(90.0m EAST FROM BENCHMARK 1)
TOP OF SPINDLE ELEV=92.13

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	OCT. 2022
2.	RE-ISSUED FOR SPA	APR. 2023
3.	RE-ISSUED FOR SPA	JUL. 2023

ENGINEER STAMP

BRIDOR DEVELOPMENTS
3817-3843 INNES ROAD
CITY OF OTTAWA

DETAILS - 2

TATHAM ENGINEERING

DESIGN: HY/GC	FILE: 522676	DWG: **C501**
DRAWN: HY	DATE: OCT 2022	
CHECK: GC	SCALE: 1:250	

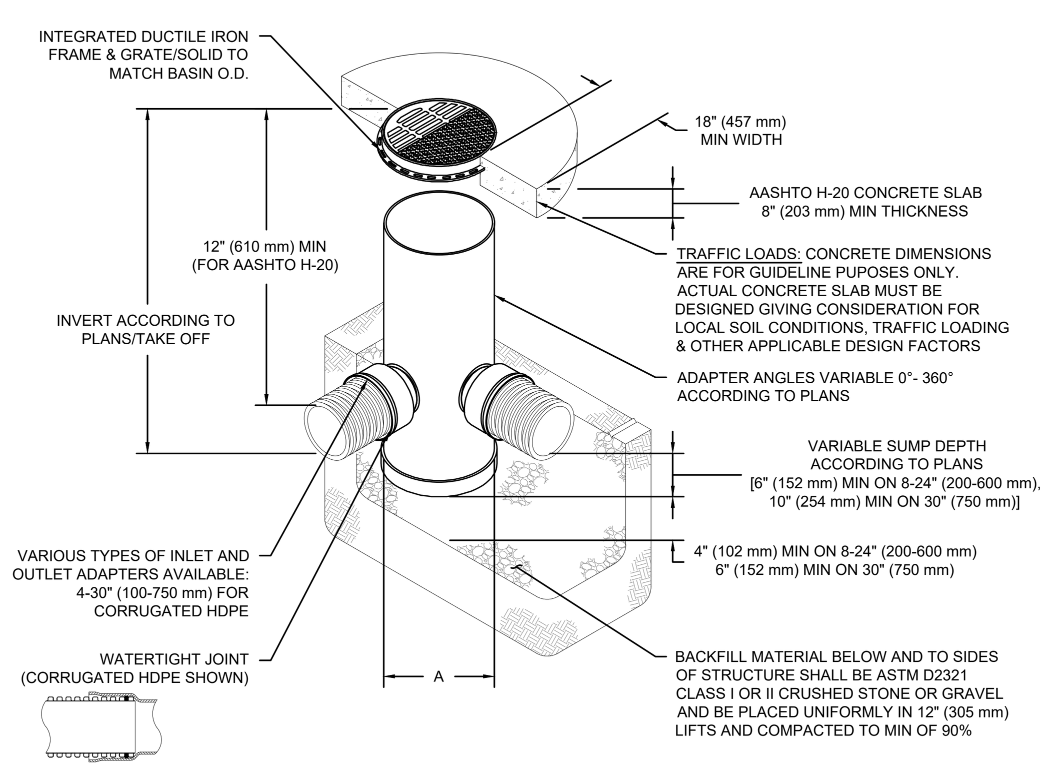
Drawing Name: 522676-SG01.dwg, Plotted: Jul 17, 2023

D07-12-20-0164

18285

NYLOPLAST DRAIN BASIN

NTS



NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: WWW.NYLOPLAST-US.COM
6. TO ORDER CALL: 800-821-6710

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

3817 INNES ROAD
OTTAWA, CANADA
DATE:
PROJECT #:
DRAWN: HY
CHECKED: N/A

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ADS
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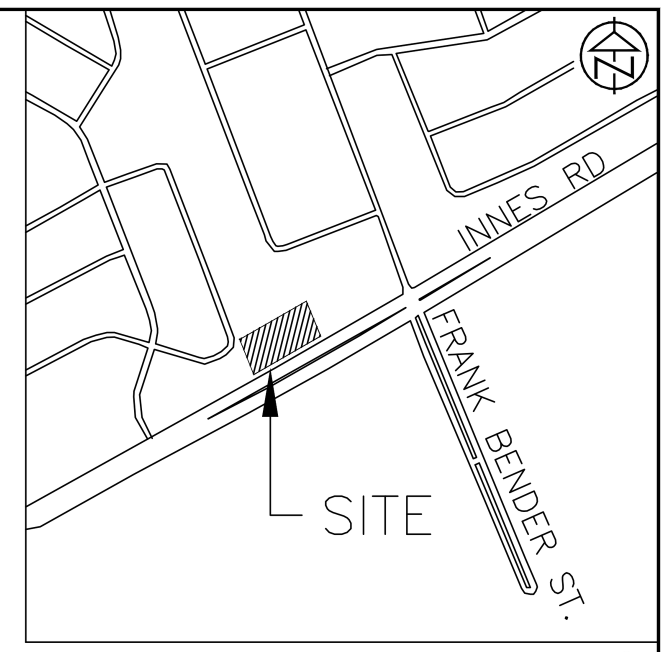
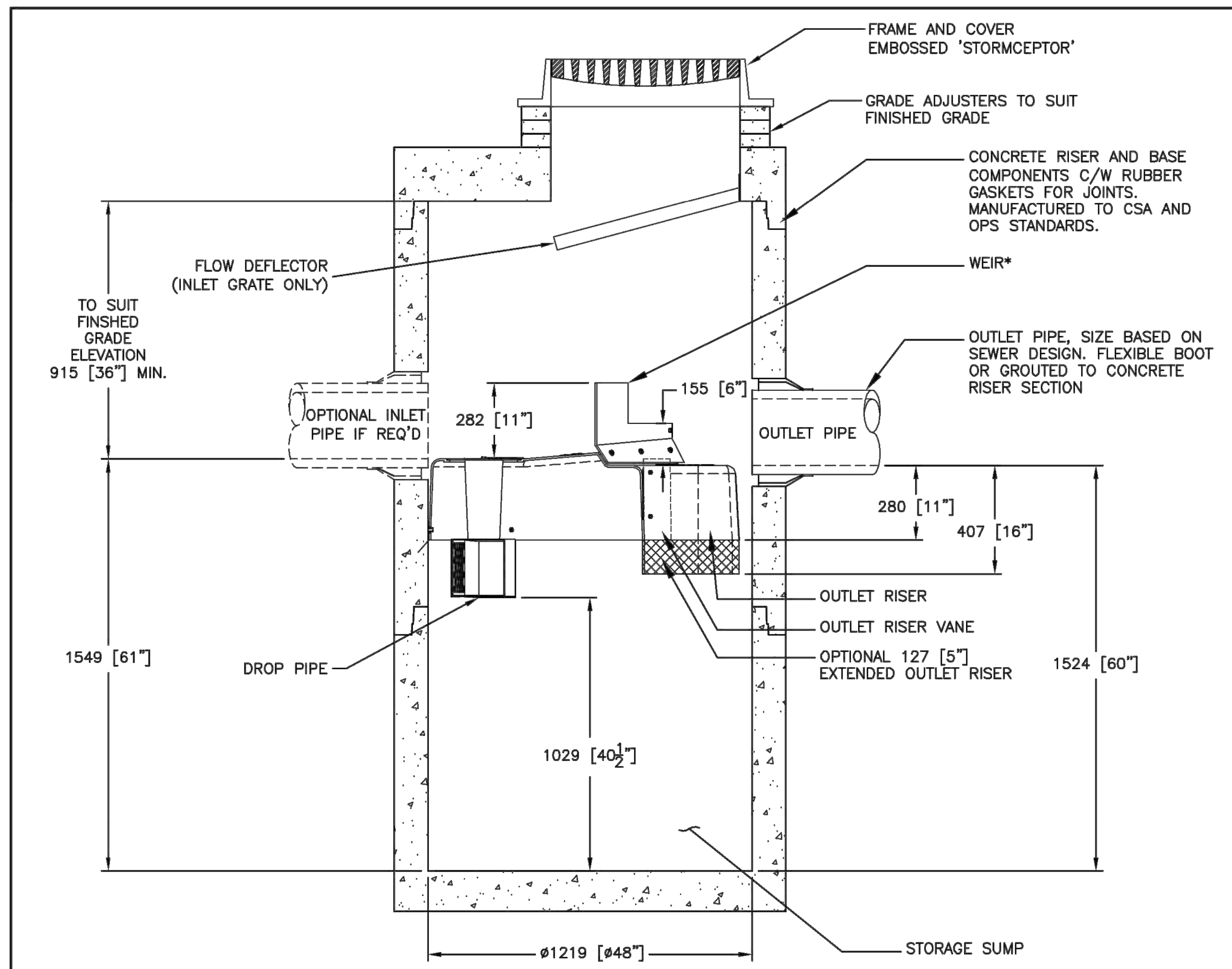
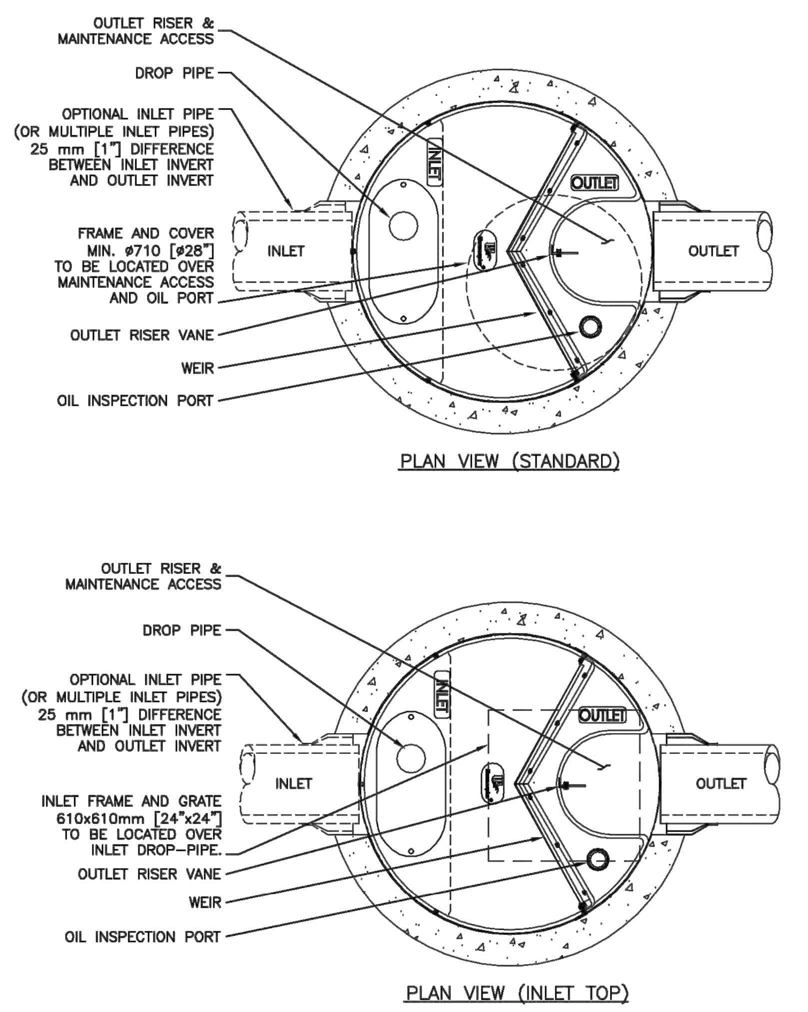
SHEET
6 OF 6



KEY PLAN - N.T.S.



SECTION VIEW



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO4				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

Stormceptor® EF
imbrium®
SCALE = NTS
DATE: 10/13/2017
DESIGNED: JSK
DRAWN: JSK
CHECKED: BSF
APPROVED: SP
PROJECT No.: EFO4
SEQUENCE No.: *
SHEET: 1 OF 1

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARK1: FIRE HYDRANT LOCATED ON SOUTH SIDE OF INNES ROAD, SOUTH OF SITE. TOP OF SPINDLE ELEV=92.46

BENCHMARK2: FIRE HYDRANT LOCATED ON SOUTH SIDE OF INNES ROAD, SOUTHEAST OF SITE(90.0m EAST FROM BENCHMARK 1) TOP OF SPINDLE ELEV=92.13

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	OCT. 2022
2.	RE-ISSUED FOR SPA	APR. 2023
3.	RE-ISSUED FOR SPA	JUL. 2023

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
J. R. ASH
100123062
July 17, 2023
PROVINCE OF ONTARIO

BRIDOR DEVELOPMENTS
3817-3843 INNES ROAD
CITY OF OTTAWA

DETAILS - 3

TATHAM ENGINEERING

DESIGN: HY/GC	FILE: 522676	DWG: C502
DRAWN: HY	DATE: OCT 2022	
CHECK: GC	SCALE: 1:250	

Drawing Name: 522676-SG01.dwg, Plotted: Jul 17, 2023

D07-12-20-0164

18285

Appendix G: BL Engineering's Site Servicing and SWM Report (May 3, 2022)

SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Project Address – 3817 – 3843 Innes Road, Ottawa

Owner/Client:	**Bridor Development**
Address:	**996-B St-Augustin Rd, Embrun ON**
City file Number:	

By Blanchard Letendre Engineering Ltd.
Date – May 3, 2022
Our File Reference: 20-184

Submission
April 5, 2021

Previous Submission
December 17, 2020

TABLE OF CONTENTS

APPENDIX TABLE

1.0 INTRODUCTION

Blanchard Letendre Engineering Ltd. (BLEL) was retained by Bridor Development. to complete their site servicing and stormwater management for the new proposed site located at 3817 – 3843 Innes Road in Ottawa. This report summarized proposed site servicing and stormwater management and should be read in conjunction with the engineering drawings prepare by BLEL. This report and site servicing plan have been prepared based on the site plan proposed by P-Square Concepts and the site survey completed by Annis O'Sullivan Vollebekk. The information contained herein is based on the provided drawings and if there is any discrepancy with the survey or site plan, BLEL should be informed in order to verify the information and complete the changes if required.

2.0 SITE PLAN

The proposed site is to be located in Orleans, Ontario. As per the aerial picture in figure 1, the existing site consist of and green space area with four (4) existing building that will be demolished prior to construction. The property located at 3817- 3843 Innes Road, consist of approximately 0.661ha of undeveloped land. The land will be developed with two (2) new residential apartments building and be severed into two separate properties with one (1) shared entrance.

Figure 1- Existing site at 3817 – 3843 Innes Road, Orleans, Ontario

3.0 STORM WATER MANAGEMENT

3.1 Existing Site Condition

The existing site currently has no stormwater management nor storm service connection. The site currently drains uncontrolled towards Innes road where the stormwater generated from the site is captured by the road site catchbasin. The existing property naturally grades towards Innes road away from the residential development on the north and west portion of the property. There is an existing gras station at the east side of the property that is developed at a lower elevation than the existing property. Refer to BL Engineering drawing C400 for the pre-development drainage area and existing grading showing the current drainage of the site.

3.2 Proposed Storm Water Management

The development of the site will consist of adding two (2) new residential apartment buildings. The site will be modified by adding a total of 2436 square meter of building (Block A = 1218m^2; Block B = 1218m^2) asphalt parking and driving and amities areas. As the runoff coefficient will increase due to addition of hard surfaces, post-development stormwater quantity and quality will be implemented.

The site stormwater management has been prepared in correlation with the existing site grading. To minimize the fill and site work required, the stormwater management has been developed to follow the existing site grading. As the property naturally drains towards Innes Road, the proposed stormwater management will outlet to City storm sewer on Innes Road. The overland flow route has also been designed to convey the storm runoff towards Innes road.

The stormwater generated by the new hard surfaces will be directed to a series of catchbasins which will capture and covey the water runoff to existing the surrounding ditches. The catchment areas have been delineated as per the proposed grading plan. Refer to Appendix ‘A’, for the catchment area and runoff coefficient. In order to respect the 5 year pre-development allowable release rate, the outlets will be controlled by inlet control device which will limit the flow outletting to City storm sewer on Innes road. By throttling the flow, stormwater retention will be completed with the use of overland ponding and underground storage which was designed to hold the 100 year storm event. Refer to Appendix ‘A’ for the stormwater flow and storage calculations.

3.3 Proposed Storm Water Management

The pre-development flow of the 5-year storm was calculated using a 5-year storm and a 10-minute time of concentration for the affected area. The pre-development flow of the 100-year storm was calculated using a 100-year storm and a 10-minute time of concentration for the affected area. From intensity duration curves established for the Ottawa area, the intensity was evaluated at of 104.2 mm/hr for the 5yr predevelopment flow and 178.6mm/hr for the 100-year predevelopment flow. A run-off coefficient of 0.45 was used as per the evaluated, see Appendix 'A' – Pre-Development Drainage Area table.

Using the Rational Method and considering the tributary areas of the proposed (see Appendix 'A'), the pre-development allowable release rate for the site was evaluated at **86.16 L/s**. See also the Storm Sewer Design Sheet in Appendix 'A'.

Allowable Release Rate (Q) =	**2.78CIA (L/s)**
I_5 =	**$998.071 / (Tc + 6.053)^{0.814}$**
C =	0.45
I =	104.2 mm/hr
Tc =	10 min
Total =	0.661 ha
Allowable Release Rate=	**86.16 L/s**

3.4 Proposed Stormwater Quantity Control

The proposed stormwater management for the site will be achieve primarily through the use of underground pipe storage and overland surface ponding. The grading of the site has been designed to direct the stormwater towards the series of catchbasins connected to the underground stormwater chambers before outleting south into the 1350mm diameter storm city sewer. The proposed underground stormwater chambers and cathcbasins are shown on the attached drawings in Appendix 'E'.

The proposed site has been graded to outlet overland onto Innes Road on the south side of the property. As the site naturally grades from the north side to the south side, the grades have been adjusted to suit this profile, to minimize the grade raise of the site. All catchment areas were designed to directed the stormwater overland to the south-east corner and to will be conveyed captured through a series of parking catchbasins and landscaping drains with subdrains.

The stormwater generated from site will be discharged to the existing storm sewer on Innes road and be controlled using an undersized pipe which will throttle the flow direct to the municipal sewer. The proposed inlet control device will release a total of **20.05 L/s** with a maximum head of 2.93m (HWL = 92.10) during the 100 year event. As the flow will be restricted, 223.81m^3 of stormwater storage will be required for this area. This storage will be provided with underground stormwater chambers and surface ponding. The underground storage has been designed to hold and convey the stormwater water to the sewer on Innes road. The underground chambers will prove 160.0 m^3 whereas the remaining will be stored on the parking and driving areas. An additional 65.82m^3 of storage was designed overland which combined with the underground chambers (163.3 m^3 + 68.82m^3 = 229.12 m^3) can hold more than the minimum required storage. Refer to the underground chambers in Appendix 'D'.

The two (2) underground parking ramp will be drained with separate catchbasin that will capture and to the underground garage drainage. These areas have been designated uncontrolled.

3.4.1 Roof Drainage

The proposed roofs are flat roof with roof drains. Drain and scuppers will be installed to drain the water onto the pavement area.

3.4.2 Underground Chambers

The underground storage chambers have been designed to hold and convey the stormwater generated from the site. The underground chambers have been designed to hold most of the stormwater under the proposed parking/ driving area. The chambers, which have been designed as isolator rows, were designed to also provide some filtration which is favorable for the final site TSS. A total of 163.30 m^3 will be provided by the underground chambers. The chambers will be connected to the proposed manhole catchbasin which will facilitates the maintenance of the chambers. The maintenance of the chambers is to be in accordance with the manufacture. Refer to Appendix “D” for Stormwater Storage Chambers.

3.5 Proposed Stormwater Quality Control

A water quality control requirement of 80% TSS removal was set by the City of Ottawa. In order to meet the requirements, a storm treatment unit will be installed and the downstream end of the system. Using the Stormceptor sizing software, the EF06 was selected. The software generated report has been attached (See Appendix "D").

4.0 SANITARY SEWER DESIGN

4.1 Existing Site Conditions

The existing site is currently being service by a three separate service which services the existing three parcels and are connected to the existing 250mm diameter sanitary on Innes Road. The existing connection will be removed and reinstated with three new connection that will service the new buildings.

4.2 Existing Site Conditions

The new residential apartment building, which proposes 55 units for Block A and 55 units for Block B will discharge to the city via one new 200mm diameter sanitary services. The service will be located on the south face of the buildings Block A and will discharge to the existing 250mm diameter city sewer running along Innes road. The proposed 200mm diameter service will be installed at a minimum of 1.00% slope directly to the city sewer. A monitoring manhole (SAN-MH-A) is proposed for the new connection to city. Refer to drawing C300 – Site Servicing Plan for the existing and proposed sanitary service.

Based on the City of Ottawa Sanitary Design Guidelines, the sanitary peak loads were evaluated as follow; Block A: **1.57 L/s** and Block B: **1.57L/s.** As per the City specific design parameters, the sanitary flow was evaluated based on the new building footprint and the total site area for each individual building. Refer to Appendix 'B' for the sanitary sewer design calculation and design parameters set by the City of Ottawa.

5.0 WATER CONNECTION DESIGN

5.1 Existing Site Conditions

The existing site is currently being service by a three separate 19mm diameter water service which services the existing three parcels and are connected to the existing 403mm diameter watermain on Innes Road. The existing connection will be removed and reinstated with a new connection that will service the new buildings. There is currently two (2) city fire hydrant at the front of the property. The two (2) hydrants are located on the south side of Innes Road both within the 90m radius from the building main entrance. Refer to drawing C300 – Site Servicing Plan for the existing and proposed water services and city existing infrastructure.

5.2 Proposed Domestic Water Service

The two new residential apartment buildings water services were sized based on the City of Ottawa Design Guidelines and the AWWA Standards. Based on the number of fixtures proposed and on the average water demand for residential developments the daily water consumption was evaluated for the proposed building. As per the city guidelines, the average water demand per person of is **350L/c/d** was applied to the population of the new building. The daily and hourly peak factor of **2.5** and **2.2** respectively were applied to the water demand as stated in the City of Ottawa guideline. By using the average demand and peaking factors, the daily water demand for the new buildings were evaluated as follow:

	BLOCK A	BLOCK B	UNITS
Average Water Demand =	**31850.00**	**31850.00**	L/d
Maximum Daily =	**79625.00**	**79625.00**	L/d
Maximum Hourly =	**175175.00**	**175175.00**	L/d
Total Domestic Flow =	**2.03**	**2.03**	**L/s**
Total Fire Flow =	**203.33**	**203.33**	**L/s**

Refer to Appendix 'C' for the water flow calculation sheet.

5.3 Proposed Fire Demand

The new property will be serviced by a new fire hydrant located in front of Block B. Since the fire hydrants are located on the south side of Innes Road, the 45 meters of unobstructed path of travel is not possible hence the new fire hydrant will be installed. The fire hydrant will be installed in the city right of way and have a separate connection to the city 405mm diameter watermain.

The new residentials buildings Block A and Block B will not have a sprinkler system as it is not required in the building code. Hence the new services were sized to supply only the domestic water. Therefore the buildings Block A and Block B will be serviced with two (2) new 75mm water service which will connect to the existing 405mm diameter watermain on Innes Road. The new service will be installed at the south elevation of the new buildings and be placed in the same trench as the other services.

5.4 Water Capacity Comments

The boundary conditions and HGL for hydraulic analysis for 3817 Innes was obtained from the city. See attached copy in Appendix 'E'. From the boundary conditions, the minimum HGL was evaluated at 130.3 m for the water main elevation at 91.6m and a maximum pressure estimate of 55.1 psi.

6.0 EROSION AND SEDIMENT CONTROL

During the construction, sediment and erosion protect will be implemented around the property to prevent any sediments from leaching off site. The construction and maintenance of the sediment controls must comply with the Ontario Provision Standard Specification OPSS 577. Refer to drawing C100 – Erosion and Sediment Control for the perimeter fence proposed.

7.0 CONCLUSION AND LIMITATION OF REPORT

7.1 Stormwater Management

The stormwater management proposed for the site will maintain the site to its pre-development release rate conditions and meet the requirements from the City of Ottawa. The post development release rate will be maintained to its pre-development rate of **86.16 L/s** thought an **orifice plate of 103mm**, the outlet to the sewer main on Innes Road. Stormwater quantity control will be achieved with 160.00m^3 underground chamber and 65.82 m^3 overland. The stormwater quality control will be met through the use of a stormwater treatment unit and isolator rows in the underground chambers.

7.2 Sanitary Service

The current site will be services with three new 200mm sanitary connection onto Innes Road. The estimated sanitary flow of; Block A: **1.57 L/s** and Block B: **1.57L/s,** for the new connections will be directed to the existing sanitary sewer along Innes Road.

7.3 Water Service

Currently the existing buildings on site are serviced with an existing 19mm diameter water service that will be replaced with a new 10mm diameter water service to be connected to the existing 406mm diameter main on Innes Road. The existing connections will all be replaced with new water services. The water demand for the building was evaluated at: Block A: **2.03 L/s** and Block B: **2.03L/s** and the fire flow demand at Block A: **203.33 L/s** and Block B: **203.33 L/s.** There will also be a new fire hydrant installed on the property at the front of Block B in the city right of way.

8.0 LIMITATION

This report was prepared for **Bridor Developement.**, and is only applicable for the property at 3817 – 3843 Innes Road, Ottawa.

Any changes to the existing site may require a review by Blanchard Letendre engineering Ltd. to ensure all information is consistent with the proposed design.

Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely Yours,

Guillaume Brunet, P. Eng.

APPENDIX "A"
Stormwater Management Design

BLANCHARD LETENDRE
ENGINEERING

File No. 20-184
Project: Proposed Apartment Buildings
Project Address: 3817-3843 - Innes Road
Client: Bridor Development

Date: May 3, 2022
Designed: Guillaume Brunet
Checked: Guillaume Brunet
Drawing Reference: C200 & C300

STORM WATER MANAGEMENT DESIGN SHEET

SEWER DESIGN

LOCATION			AREA (ha)			FLOW					STORM SEWER DATA							
WATERSHED / STREET	From MH	To MH	C = 0.30	C = 0.80	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (l/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})
WS-06	LCB10	LCB09	0.045	0.000	0.014	0.06	0.06	10.00	104.19	6.13	200	PVC	0.25%	25.0	16.40	0.52	0.80	**0.37**
	LCB09	LCB08	0.000	0.000	0.000	0.00	0.06	10.80	100.16	5.89	200	PVC	0.25%	26.2	16.40	0.52	0.84	**0.36**
	LCB08	LCB07	0.000	0.000	0.000	0.00	0.06	11.63	96.28	5.66	200	PVC	0.25%	25.5	16.40	0.52	0.81	**0.35**
	LCB07	LCB06	0.000	0.000	0.000	0.00	0.06	12.45	92.82	5.46	200	PVC	0.25%	17.0	16.40	0.52	0.54	**0.33**
	LCB06	CBMH03	0.000	0.000	0.000	0.00	0.06	12.99	90.66	5.33	250	PVC	0.25%	13.1	29.73	0.61	0.36	**0.18**
WS-07	LCB15	LCB14	0.045	0.000	0.014	0.06	0.06	10.00	104.19	6.13	200	PVC	0.25%	19.2	16.40	0.52	0.61	**0.37**
	LCB14	LCB13	0.000	0.000	0.000	0.00	0.06	10.61	101.06	5.94	200	PVC	0.25%	16.5	16.40	0.52	0.53	**0.36**
	LCB13	LCB12	0.000	0.000	0.000	0.00	0.06	11.14	98.53	5.79	200	PVC	0.25%	11.5	16.40	0.52	0.37	**0.35**
	LCB12	LCB11	0.000	0.000	0.000	0.00	0.06	11.51	96.85	5.69	200	PVC	0.25%	40.0	16.4	0.52	1.28	**0.35**
	LCB11	CBMH03	0.000	0.000	0.000	0.00	0.06	12.78	91.47	5.38	250	PVC	0.25%	16.0	29.7	0.61	0.44	**0.18**
WS-01	CBMH05	CBMH04	0.086	0.000	0.168	0.47	0.47	10.00	104.19	48.86	375	PVC	0.40%	15.7	110.9	1.00	0.26	**0.44**
WS-02+ WS-03	CBMH04	CBMH03A	0.000	0.000	0.243	0.61	1.08	10.26	102.84	110.85	375	PVC	0.40%	19.2	110.9	1.00	0.32	**1.00**
	CBMH03A	CBMH03	0.000	0.000	0.145	0.36	1.44	10.58	101.23	145.82	375	PVC	0.40%	2.6	110.9	1.00	0.04	**1.31**
	CBMH03	TREATMENT	0.000	0.000	0.000	0.00	1.20	13.35	89.29	106.74	300	PVC	0.40%	28.5	61.16	0.87	0.55	**1.75**
	TREATMENT	CBMH01	0.000	0.000	0.000	0.00	1.20	13.90	87.28	104.35	300	PVC	0.40%	4.5	61.16	0.87	0.09	**1.71**
	CBMH01	CITY	0.000	0.000	0.000	0.00	1.20	13.99	86.98	103.98	300	PVC	1.00%	13.2	96.7	1.37	0.16	**1.08**

DESIGN PARAMETERS NOTES

Runoff Coefficient (C)

Grass	0.30
Gravel	0.80
Asphalt / rooftop	0.90

Q = 2.78 AIC, where
Q = Peak flow in Litres per second (L/s)
A = Area in hectares (ha)
I = Rainfall Intensity (mm/hr)
C = Runoff Coefficient

Ottawa Macdonald-Cartier International Airport IDF curve
$I_5 = 998.071 / (T_c + 6.053)^{0.814}$
Min. velocity = 0.76 m/s
Manning's "n" = 0.013

BLANCHARD LETENDRE
ENGINEERING

File No.	20-184	**Date:**	May 3, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	3817-3843 - Innes Road	**Checked:**	Guillaume Brunet
Client:	Bridor Development	**Drawing Reference:**	C200 & C300

STORM WATER MANAGEMENT DESIGN SHEET

SEWER DESIGN

LOCATION		MANHOLE INFORMATION						
From MH	To MH	Up Invert (m)	Down Invert (m)	T/G Up Stream (m)	T/G Down Stream	Up Depth obv (m)	Down Depth obv (m)	Up Depth inv (m)
LCB10	LCB09	90.38	90.32	91.80	91.70	1.22	1.18	1.22
LCB09	LCB08	90.26	90.19	91.70	91.30	1.24	0.91	1.24
LCB08	LCB07	90.13	90.07	91.30	91.75	0.97	1.48	0.97
LCB07	LCB06	90.01	89.97	91.75	91.95	1.54	1.73	1.54
LCB06	CBMH03	89.77	89.73	91.95	91.80	1.93	1.87	1.98
LCB15	LCB14	90.62	90.57	92.20	92.10	1.38	1.33	1.38
LCB14	LCB13	90.51	90.47	92.10	92.10	1.39	1.43	1.39
LCB13	LCB12	90.41	90.38	92.10	92.00	1.49	1.42	1.49
LCB12	LCB11	90.32	90.22	92.00	92.20	1.48	1.73	1.48
LCB11	CBMH03	89.72	89.68	92.20	91.80	2.23	1.74	2.28
CBMH05	CBMH04	89.61	89.55	91.80	91.80	1.81	1.87	1.81
CBMH04	CBMH03A	89.49	89.41	91.80	91.80	1.93	2.09	1.93
CBMH03A	CBMH03	89.35	89.34	91.80	91.80	2.07	2.16	2.07
CBMH03	TREATMENT	89.28	89.17	91.80	92.25	2.22	2.78	2.14
TREATMENT	CBMH01	89.11	89.09	92.25	92.30	2.84	2.91	2.84
CBMH01	CITY	89.03	88.90	92.30	91.77	2.97	2.57	2.97

BLANCHARD LETENDRE
ENGINEERING

File No.	20-184	**Date:**	May 3, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	3817-3843 - Innes Road	**Checked:**	Guillaume Brunet
Client:	Bridor Development	**Drawing Reference:**	C200 & C300

PRE-DEVELOPMENT DRAINAGE AREA (AFFECTED AREA)

Catchment Area	**Runoff Coefficient**			**Total Area (ha)**	**Combined C**
	C = 0.3	**C = 0.80**	**C = 0.90**		
E-01	0.501	0.000	0.160	0.661	0.45
TOTAL	0.501	0.000	0.160	0.661	0.45

POST-DEVELOPMENT DRAINAGE AREA

Catchment Area	**Runoff Coefficient**			**Total Area (ha)**	**Combined C**
	C = 0.30	**C = 0.80**	**C = 0.90**		
WS-01	0.086	0.000	0.168	0.254	0.70
WS-02 - Roof	0.000	0.000	0.122	0.122	0.90
WS-03 - Roof	0.000	0.000	0.122	0.122	0.90
WS-04 - Ramp	0.000	0.000	0.023	0.023	0.90
WS-05 - Ramp	0.000	0.000	0.023	0.023	0.90
WS-06	0.045	0.000	0.014	0.059	0.44
WS-07	0.045	0.000	0.014	0.059	0.44
TOTAL	0.176	0.000	0.485	0.661	0.74

RUNOFF COEFFICIENT (C)

Grass	0.30
Gravel	0.80
Asphalt / rooftop	0.90

BLANCHARD LETENDRE
ENGINEERING

File No.	20-184	**Date:**	May 3, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	3817-3843 - Innes Road	**Checked:**	Guillaume Brunet
Client:	Bridor Development	**Drawing Reference:**	C200 & C300

STORM WATER MANAGEMENT DESIGN SHEET
5 YEAR STORM EVENT

PRE-DEVELOPMENT STORMATER MANAGEMENT

Runoff	Catchment Area	Area			∑R₅
Un-Controlled	EWS-01	0.661	ha	R=	0.45
	Total Uncontrolled =	**0.661**	**ha**	**∑R=**	**0.45**

PRE-DEVELOPMENT ALLOWABLE RELEASE RATE

Q = 2.78CIA (L/s)

$$I_5 = 998.071 / (Tc + 6.053)^{0.814}$$

C =	0.45	up to a maximum of 0.5 as per City of Ottawa Sewer Design Guidelines	
I =	104.2	mm/hr	
Tc =	10	min	
Total =	0.661	ha	
Allowable Release Rate=	**86.16**	L/s	
Allowable Release Rate=	**43.08**	L/s	50% of flow as per City of Ottawa

POST-DEVELOPMENT STORMATER MANAGEMENT

Runoff	Catchment Area	Area			$\sum R_5$	$\sum R_{100}$
Controlled	WS-01	0.254	ha	R=	0.70	0.87
	WS-02 - Roof	0.122	ha	R=	0.90	1.00
	WS-03 - Roof	0.122	ha	R=	0.90	1.00
	WS-06	0.059	ha	R=	0.44	0.55
	WS-07	0.059	ha	R=	0.44	0.55
	Total Contolled =	**0.615**	**ha**	**∑R=**	**0.73**	**0.86**
Un-controlled	WS-04 - Ramp	0.023	ha	R=	0.90	1.00
	WS-05 - Ramp	0.023	ha	R=	0.90	1.00
	Total Un-Controlled =	**0.046**	**ha**	**∑R=**	**0.90**	**1.00**

$$I_5 = 998.071 / (Tc + 6.053)^{0.814}$$

		REQUIRED STORAGE				
Time (min)	**Intensity (mm/hr)**	**Controlled Runoff (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Uncontrolled Runoff (L/s)**	**Total Release Rate (L/s)**
10	104.2	129.66	65.77	20.05	6.05	26.09
15	83.6	103.98	75.54	20.05	4.85	24.90
20	70.3	87.42	80.85	20.05	4.08	24.12
25	60.9	75.78	83.60	20.05	3.53	23.58
30	53.9	67.11	84.71	20.05	3.13	23.18
35	48.5	60.38	84.69	20.05	2.82	22.86
40	44.2	54.98	83.85	20.05	2.56	22.61
45	40.6	50.56	82.38	20.05	2.36	22.40
50	37.7	46.86	80.43	20.05	2.19	22.23
60	32.9	41.00	75.42	20.05	1.91	21.96
70	29.4	36.55	69.32	20.05	1.70	21.75
80	26.6	33.05	62.44	20.05	1.54	21.59
90	24.3	30.22	54.96	20.05	1.41	21.46
500	6.3	7.81	0.00	20.05	0.36	20.41
720	4.7	5.83	0.00	20.05	0.27	20.32
1440	2.7	3.32	0.00	20.05	0.16	20.20

Storage Volume = (Controlled Runoff - Controlled RR)/1000 * (Time*60s)

STORMATER STORAGE REQUIREMENTS

Total Storage Required =	**84.71 m^3**
Surface Ponding =	65.52 m^3
Underground Chambers =	163.30 m^3
Total Available Storage =	**228.82 m^3**

BLANCHARD LETENDRE
ENGINEERING

File No.	20-184	**Date:**	May 3, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	3817-3843 - Innes Road	**Checked:**	Guillaume Brunet
Client:	Bridor Development	**Drawing Reference:**	C200 & C300

STORM WATER MANAGEMENT DESIGN SHEET
100 YEAR STORM EVENT

PRE-DEVELOPMENT STORMATER MANAGEMENT

Runoff	Catchment Area	Area			$\sum R_5$
Un-Controlled	EWS-01	0.661	ha	R=	0.45
	Total Uncontrolled =	**0.661**	**ha**	**∑R=**	**0.45**

PRE-DEVELOPMENT ALLOWABLE RELEASE RATE

Q = 2.78CIA (L/s)

$I_5 = 998.071 / (Tc + 6.053)^{0.814}$

C =	0.45	up to a maximum of 0.5 as per City of Ottawa Sewer Design Guidelines	
I =	104.2	mm/hr	
Tc =	10	min	
Total =	0.661	ha	
Allowable Release Rate=	**86.16**	L/s	
Allowable Release Rate=	**43.08**	L/s	50% of flow as per City of Ottawa

POST-DEVELOPMENT STORMATER MANAGEMENT

Runoff	Catchment Area	Area			$\sum R_5$	$\sum R_{100}$
	WS-01	0.254	ha	R=	0.70	0.87
	WS-02 - Roof	0.122	ha	R=	0.90	1.00
	WS-03 - Roof	0.122	ha	R=	0.90	1.00
	WS-06	0.059	ha	R=	0.44	0.55
	WS-07	0.059	ha	R=	0.44	0.55
	Total Contolled =	**0.615**	**ha**	**∑R=**	**0.73**	**0.86**
Un-controlled	WS-04 - Ramp	0.023	ha	R=	0.90	1.00
	WS-05 - Ramp	0.023	ha	R=	0.90	1.00
	Total Un-Controlled =	**0.046**	**ha**	**∑R=**	**0.90**	**1.00**

$I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$

		REQUIRED STORAGE				
Time (min)	**Intensity (mm/hr)**	**Controlled Runoff (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**Uncontrolled Runoff (L/s)**	**Total Release Rate (L/s)**
10	178.6	262.65	145.56	20.05	23.03	43.08
15	142.9	210.19	171.13	20.05	18.43	38.48
20	120.0	176.44	187.67	20.05	7.74	27.78
25	103.8	152.75	199.06	20.05	6.70	26.74
30	91.9	135.13	207.15	20.05	5.93	25.97
35	82.6	121.47	212.98	20.05	5.33	25.37
40	75.1	110.53	217.17	20.05	4.85	24.89
45	69.1	101.57	220.11	20.05	4.45	24.50
50	64.0	94.07	222.08	20.05	4.12	24.17
60	55.9	82.22	223.81	20.05	3.60	23.65
90	41.1	60.47	218.29	20.05	2.65	22.70
120	32.9	48.39	204.05	20.05	2.12	22.17
360	13.7	20.18	2.96	20.05	0.88	20.93
500	*10.5*	15.48	0.00	20.05	0.68	20.73
720	7.8	11.51	0.00	20.05	0.50	20.55

Storage Volume = (Controlled Runoff - Controlled RR)/1000 * (Time*60s)

STORMATER STORAGE REQUIREMENTS

Total Storage Required =	**223.81**	**m^3**
Surface Ponding =	65.52	m^3
Underground Chambers =	163.30	m^3
Total Available Storage =	**228.82**	**m^3**

Inlet Control Device Parameters

Product	**Orifice Plate**	at CB01	
HWL =	92.00	m (highest HWL)	
Grate Level =	92.00	m	from inv.
Invert Level =	89.30	m	
Outlet Pipe Dia. =	300	mm	
Max. Flow =	20.05	L/s	
ICD Centerline =	89.45		
HWL Head =	2.55	m (from centerlin	from centerline
C=	0.86		
Orifice Area =	0.008	m2	
Orifice Diameter =	**103**	mm (min. 75mm)	

APPENDIX “B”
Sanitary Design

BLANCHARD LETENDRE
ENGINEERING

File No. 20-184
Project: Proposed Apartment Buildings
Project Address: 3817-3843 - Innes Road
Client: Bridor Development

Date: May 3, 2022
Designed: Guillaume Brunet
Checked: Guillaume Brunet
Drawing Reference: C200 & C300

SANITARY DESIGN SHEET
SEWER DESIGN

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL FLOW (l/s)	PIPE						MANHOLE	
					CUMMULATIVE																							
STREET	FROM MH	TO MH	AREA (Ha)	POP.	AREA (Ha)	POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	AREA (Ha)	ACCU. AREA (Ha)	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)		LENGTH (m)	DIA. (mm)	MATERAIL	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	UP INVERT (m)	DOWN INVERT (m)
SITE	PROP. BLDG B	TRUNK	0.331	91.0	0.33	91.0	4.0	1.47	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.33	0.33	0.09	1.57	25.3	200	PVC	1.00%	32.80	1.04	86.90	86.65
SITE	PROP. BLDG A	TRUNK	0.331	91.0	0.66	182.0	4.0	2.95	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.33	0.66	0.19	3.13	25.3	200	PVC	1.00%	32.80	1.04	87.18	86.93

DESIGN PARAMETERS NOTES

Average Daily Flow =	350	L/p/day
Commercial and Institutional Flow =	50000	L/ha/da
Industrial Flow =	35000.00	L/ha/da
Maximum Resedential Peak Flow =	4	
Commection and Intitutional Peak Factor =	1.5	

Industrial Peak Factor =	7	as per Appendix 4-B
Extraneous Flow =	0.28	L/s/ha
Minimum Velocity =	0.76	m/s
Mannings n =	0.013	

Appartments:	Person Per Unit	Building B	Building A
Bachelor =	1.4	0	0
1 Bedroom =	1.4	35	35
2 Bedroom =	2.1	20	20
3 Bedroom =	3.1	0	0

APPENDIX "C"
Watermain Design

BLANCHARD LETENDRE
ENGINEERING

File No.	20-184	**Date:**	May 3, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	3817-3843 - Innes Road	**Checked:**	Guillaume Brunet
Client:	Bridor Development	**Drawing Reference:**	C200 & C300

WATER CONSUMPTION CALCULATION

	BLOCK A	BLOCK B	
Total Building Floor Area =	**892.05**	**557.05**	m^2
Site Total Area =	**0.24**	**0.24**	ha
Total Population =	91.00	91.00	ea.
Average Demand Per People =	350	350	L/c/d
Average Water Demand =	**31850.00**	**31850.00**	L/d
Maximum Daily Peak Factor =	2.5	2.5	* As per City of Ottawa
Maximum Daily Residential =	**79625.00**	**79625.00**	L/d
Maximum Hourly Peak Factor =	2.2	2.2	* As per City of Ottawa
Maximum Hourly Residentiall =	**175175.00**	**175175.00**	L/d
Total Domestic Flow =	**2.03**	**2.03**	**L/s**
Total Fire Flow =	**203.33**	**203.33**	**L/s**

Appartments:	Person Per Unit	Building A	Building B
Bachelor =	1.4	0	0
1 Bedroom =	1.4	35	35
2 Bedroom =	2.1	20	20
3 Bedroom =	3.1	0	0
		91.00	**91.00**

BLOCK A	1 Bedroom	2 Bedroom	Unit Counts	WSFU	Total
Unrinal Flush Tank	1	2	75	2	150
Sinks	2	2	110	1	110
Bathub	1	2	75	4	300
Diswasher	1	1	55	1.5	82.5
Washing Machine	1	1	55	2	110
Total					**752.5**

BLOCK B	1 Bedroom	2 Bedroom	Unit Counts	WSFU	Total
Unrinal Flush Tank	1	2	75	2	150
Sinks	2	2	110	1	110
Bathub	1	2	75	4	300
Diswasher	1	1	55	1.5	82.5
Washing Machine	1	1	55	2	110
Total					**752.5**

BLANCHARD LETENDRE
ENGINEERING

File No.	20-184	**Date:**	May 3, 2021
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	3817-3843 - Innes Road	**Checked:**	Guillaume Brunet
Client:	Bridor Development	**Drawing Reference:**	C200 & C300

BLOCK B

Term	Options	Multiplier	Choose:	Value	unit	Fire Flow
Coefficient C related to the type of construction	Wood Frame	1.5	Non-combustible construction	0.8		
	Ordinary Construction	1.0				
	Non-combustible construction	0.8				
	Fire resistive construction <2 hrs	0.7				
	Fire resistive construction >2 hrs	0.6				
Type of housing	Single family dwelling	0	Building - no. of units per floor	15	unit	
	Townhouse - no. of units	0				
	Building - no. of units per floor	2				
	Number of floors excluding the basement			4	floor	
	Floor space per unit	1	1,218	1,218	sq.m.	
Required fire flow	**Fire Flow = 220 x C x Area^0.5**				L/min	**12,285**
					L/s	205
Occupancy hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15		
	Limited combustible	-0.15				
	Combustible	0				
	Free burning	0.15			L/min	**10,442**
	Rapid burning	0.25			L/s	174
Sprinkler reduction	Sprinklers (NFPA13)	-0.30	False	0		
	Water supply is standard for both the system and fire department hose lines	-0.10	False	0	L/min	**9,398**
	Fully supervised system	-0.10	True	-0.1	L/s	157
Exposure distance between units	North side	Over 45m	0			
	East side	10.1 to 20m	0.15			
	South side	Over 45m	0		L/min	**12,217**
	West side	10.1 to 20m	0.15	0.3	L/s	204
				Minimum required fire flow rate (rounded to nearest 100)	L/min	**12,200**
				Minimum required fire flow rate	L/s	**203**
				Required duration of fire flow	min	**30**

BLANCHARD LETENDRE ENGINEERING

File No.	20-184	**Date:**	May 3, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	3817-3843 - Innes Road	**Checked:**	Guillaume Brunet
Client:	Bridor Development	**Drawing Reference:**	C200 & C300

BLOCK A

Term	Options	Multiplier	Choose:	Value	unit	Fire Flow
Coefficient C related to the type of construction	Wood Frame	1.5	Non-combustible construction	0.8		
	Ordinary Construction	1.0				
	Non-combustible construction	0.8				
	Fire resistive construction <2 hrs	0.7				
	Fire resistive construction >2 hrs	0.6				
Type of housing	Single family dwelling	0	Building - no. of units per floor	15	unit	
	Townhouse - no. of units	0				
	Building - no. of units per floor	2				
	Number of floors excluding the basement			4	floor	
	Floor space per unit	1	1,218	1,218	sq.m.	
Required fire flow	**Fire Flow = 220 x C x Area^0.5**				L/min	**12,285**
					L/s	205
Occupancy hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15		
	Limited combustible	-0.15				
	Combustible	0				
	Free burning	0.15			L/min	**10,442**
	Rapid burning	0.25			L/s	174
Sprinkler reduction	Sprinklers (NFPA13)	-0.30	False	0		
	Water supply is standard for both the system and fire department hose lines	-0.10	False	0	L/min	**9,398**
	Fully supervised system	-0.10	True	-0.1	L/s	157
Exposure distance between units	North side	Over 45m	0			
	East side	10.1 to 20m	0.15			
	South side	Over 45m	0		L/min	**12,217**
	West side	10.1 to 20m	0.15	0.3	L/s	204
Minimum required fire flow rate (rounded to nearest 100)					L/min	**12,200**
Minimum required fire flow rate					L/s	**203**
Required duration of fire flow					min	**30**

APPENDIX "D"
Underground Chambers & Stormwater Treatment Unit

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

09/25/2020

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA MACDONALD-CARTIER INT'L AP
NCDC Rainfall Station Id:	6000
Years of Rainfall Data:	37
Site Name:	Innes Road
Drainage Area (ha):	0.72
Runoff Coefficient 'c':	0.80
Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	20.82
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	93.85
Site Sediment Transport Rate (kg/ha/yr):	480.00
Estimated Average Annual Sediment Load (kg/yr):	276.48

Project Name:	Innes Road
Project Number:	20-184
Designer Name:	GUILLAUME BRUNET
Designer Company:	BL ENGINEERING
Designer Email:	guillaume@blengineering.ca
Designer Phone:	613-693-0700
EOR Name:	GUILLAUME BRUNET
EOR Company:	BL ENGINEERING
EOR Email:	guillaume@blengineering.ca
EOR Phone:	613-693-0700

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	74
EFO6	83
EFO8	87
EFO10	89
EFO12	90

Recommended Stormceptor EFO Model: EFO6

Estimated Net Annual Sediment (TSS) Load Reduction (%): 83

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

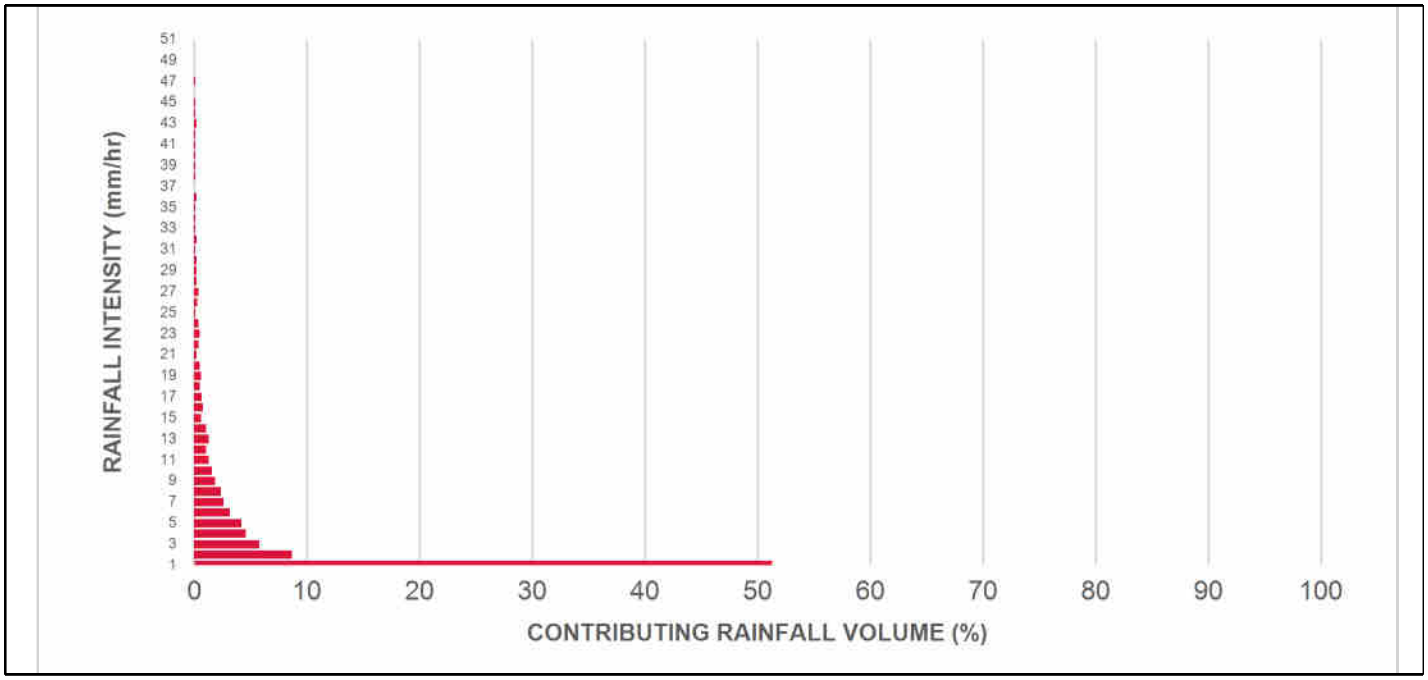
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (μm)	Percent Less Than	Particle Size Fraction (μm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

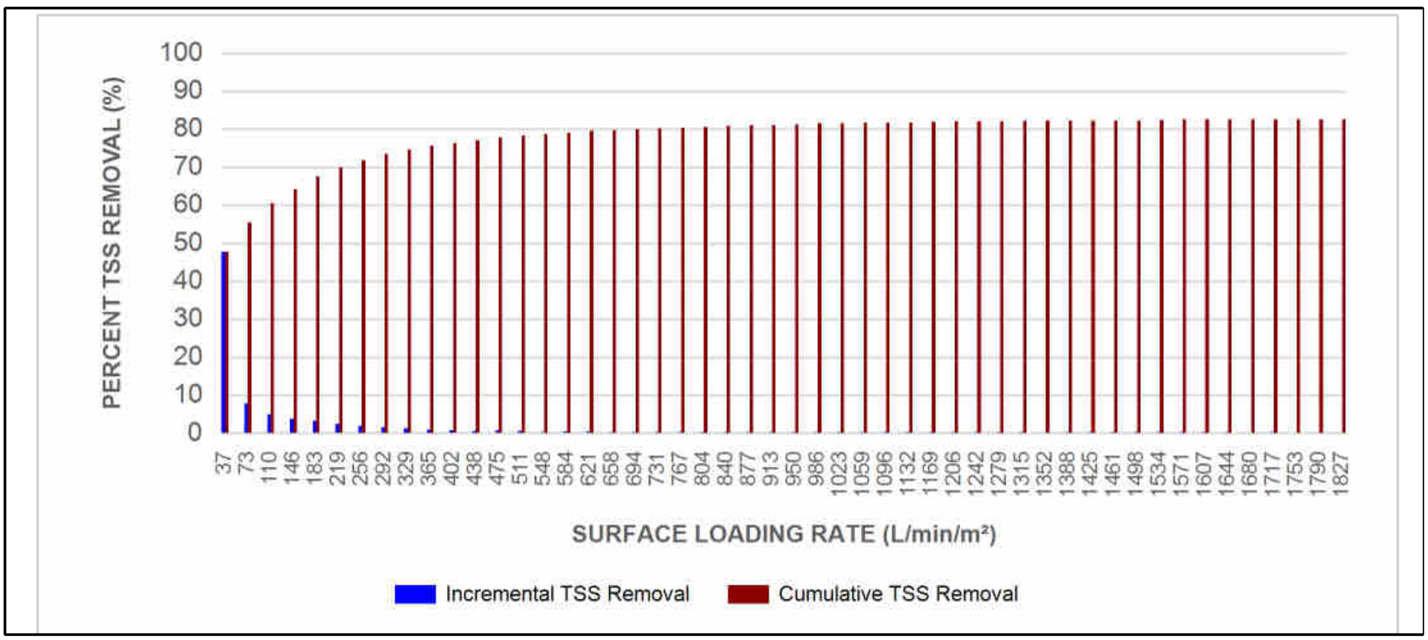
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	51.3	51.3	1.60	96.0	37.0	93	47.7	47.7
2	8.7	60.0	3.20	192.0	73.0	90	7.8	55.5
3	5.8	65.8	4.80	288.0	110.0	86	5.0	60.5
4	4.6	70.4	6.41	384.0	146.0	83	3.8	64.3
5	4.2	74.6	8.01	480.0	183.0	78	3.3	67.6
6	3.2	77.8	9.61	576.0	219.0	74	2.4	70.0
7	2.6	80.4	11.21	673.0	256.0	72	1.9	71.8
8	2.4	82.8	12.81	769.0	292.0	68	1.6	73.5
9	1.9	84.7	14.41	865.0	329.0	65	1.2	74.7
10	1.6	86.3	16.01	961.0	365.0	62	1.0	75.7
11	1.3	87.6	17.61	1057.0	402.0	58	0.8	76.4
12	1.1	88.7	19.22	1153.0	438.0	57	0.6	77.1
13	1.3	90.0	20.82	1249.0	475.0	56	0.7	77.8
14	1.1	91.1	22.42	1345.0	511.0	55	0.6	78.4
15	0.6	91.7	24.02	1441.0	548.0	54	0.3	78.7
16	0.8	92.5	25.62	1537.0	584.0	53	0.4	79.1
17	0.7	93.2	27.22	1633.0	621.0	52	0.4	79.5
18	0.5	93.7	28.82	1729.0	658.0	52	0.3	79.8
19	0.6	94.3	30.42	1825.0	694.0	52	0.3	80.1
20	0.5	94.8	32.03	1922.0	731.0	51	0.3	80.3
21	0.2	95.0	33.63	2018.0	767.0	51	0.1	80.4
22	0.4	95.4	35.23	2114.0	804.0	51	0.2	80.6
23	0.5	95.9	36.83	2210.0	840.0	51	0.3	80.9
24	0.4	96.3	38.43	2306.0	877.0	51	0.2	81.1
25	0.1	96.4	40.03	2402.0	913.0	50	0.1	81.1

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
26	0.3	96.7	41.63	2498.0	950.0	50	0.2	81.3
27	0.4	97.1	43.23	2594.0	986.0	50	0.2	81.5
28	0.2	97.3	44.84	2690.0	1023.0	50	0.1	81.6
29	0.2	97.5	46.44	2786.0	1059.0	49	0.1	81.7
30	0.2	97.7	48.04	2882.0	1096.0	49	0.1	81.8
31	0.1	97.8	49.64	2978.0	1132.0	49	0.0	81.8
32	0.2	98.0	51.24	3074.0	1169.0	48	0.1	81.9
33	0.1	98.1	52.84	3171.0	1206.0	48	0.0	82.0
34	0.1	98.2	54.44	3267.0	1242.0	48	0.0	82.0
35	0.1	98.3	56.04	3363.0	1279.0	47	0.0	82.1
36	0.2	98.5	57.65	3459.0	1315.0	47	0.1	82.2
37	0.0	98.5	59.25	3555.0	1352.0	47	0.0	82.2
38	0.1	98.6	60.85	3651.0	1388.0	46	0.0	82.2
39	0.1	98.7	62.45	3747.0	1425.0	45	0.0	82.3
40	0.1	98.8	64.05	3843.0	1461.0	44	0.0	82.3
41	0.1	98.9	65.65	3939.0	1498.0	43	0.0	82.3
42	0.1	99.0	67.25	4035.0	1534.0	42	0.0	82.4
43	0.2	99.2	68.86	4131.0	1571.0	41	0.1	82.5
44	0.1	99.3	70.46	4227.0	1607.0	40	0.0	82.5
45	0.1	99.4	72.06	4323.0	1644.0	39	0.0	82.5
46	0.0	99.4	73.66	4420.0	1680.0	38	0.0	82.5
47	0.1	99.5	75.26	4516.0	1717.0	38	0.0	82.6
48	0.0	99.5	76.86	4612.0	1753.0	37	0.0	82.6
49	0.0	99.5	78.46	4708.0	1790.0	36	0.0	82.6
50	0.0	99.5	80.06	4804.0	1827.0	35	0.0	82.6
Estimated Net Annual Sediment (TSS) Load Reduction =								**83 %**

RAINFALL DATA FROM OTTAWA MACDONALD-CARTIER INT'L AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance									
Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

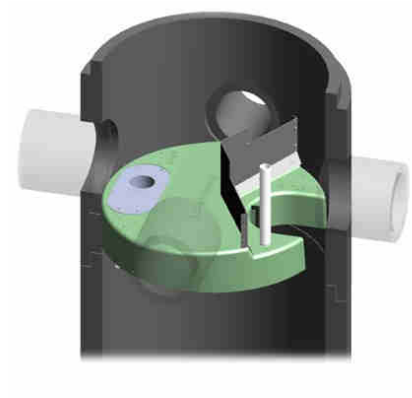
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

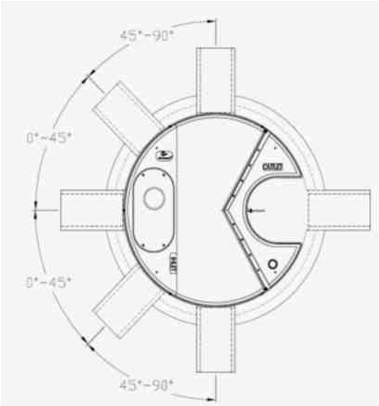
DESIGN FLEXIBILITY

►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.





INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR
"OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

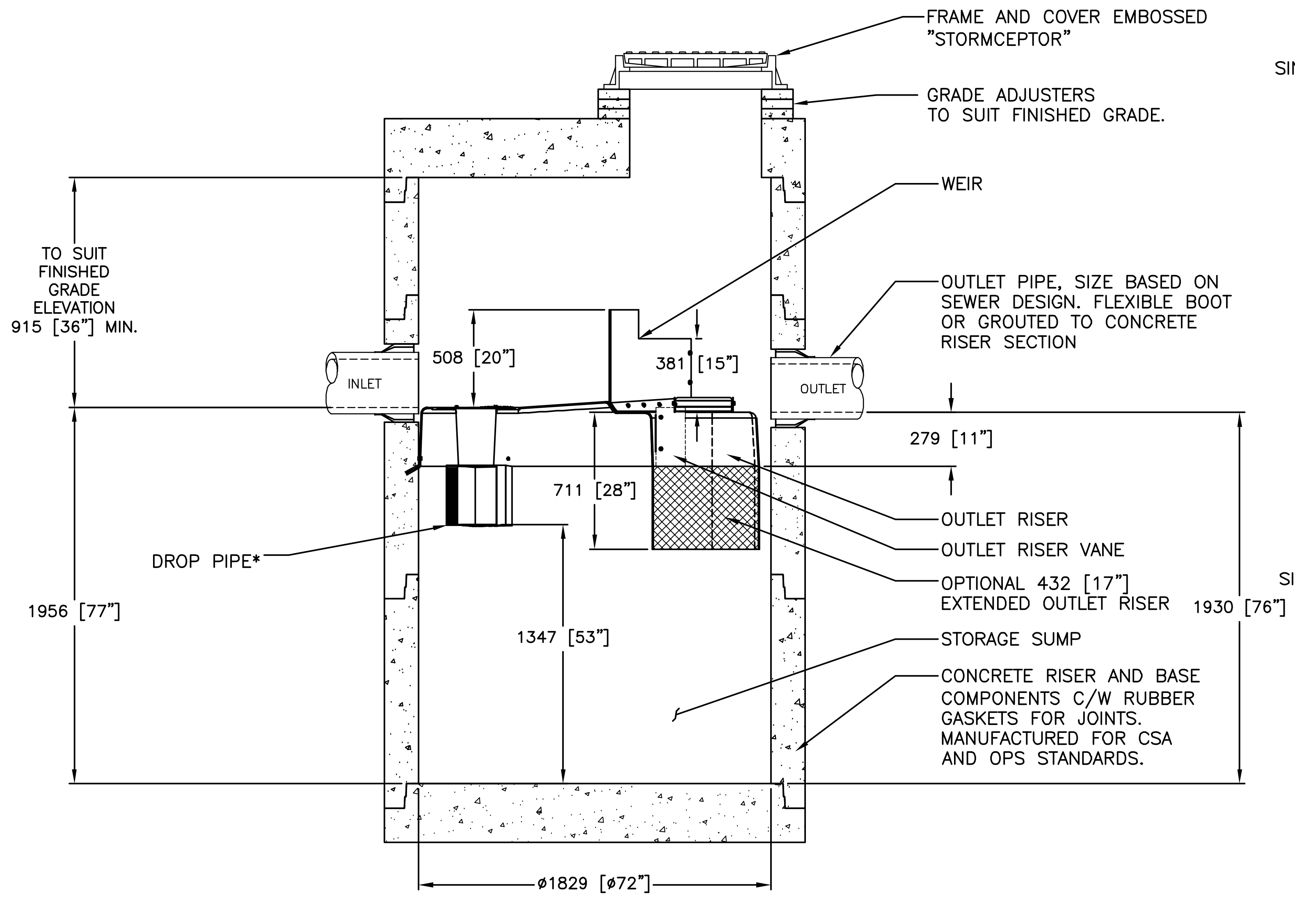
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

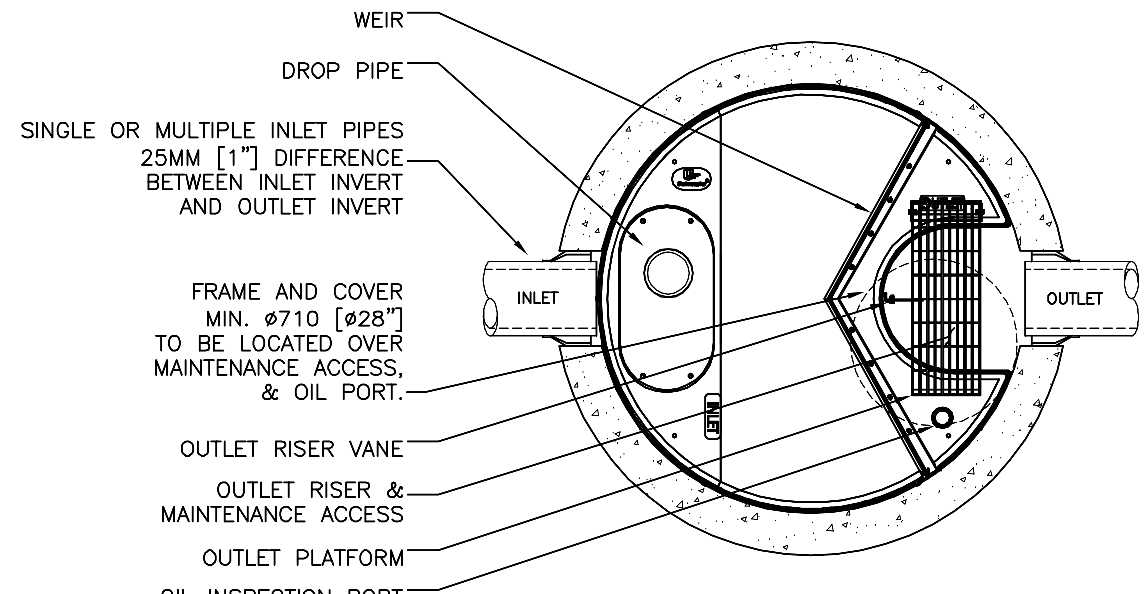
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m2 to 2600 L/min/m2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

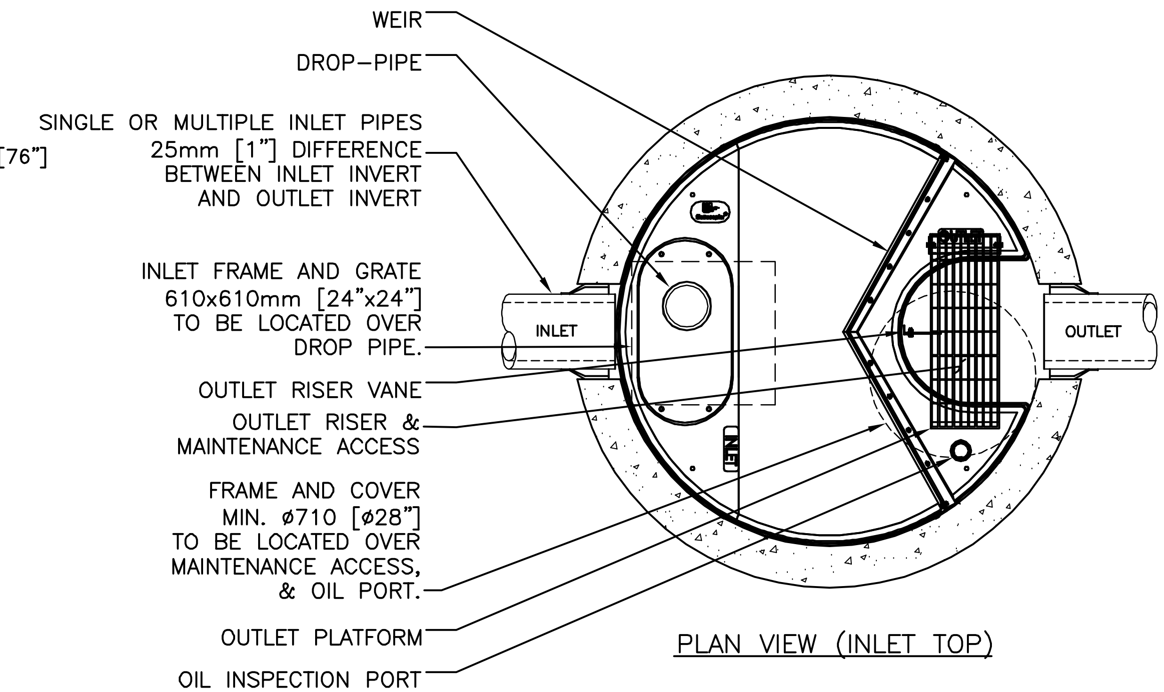
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF6 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO6 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMCEPTOR (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO6				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
0	05/26/17	INITIAL RELEASE	JSK
1	6/8/18	OUTLET PLATFORM	JSK
####	####	####	####
####	####	####	####
####	####	####	####

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If discrepancies between the supplied information upon which the drawing is based and actual field conditions are encountered as site work progresses, these discrepancies must be reported to Imbrium immediately for re-evaluation of the design. Imbrium accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

Stormceptor® EF

imbrium®

407 FAIRVIEW DRIVE, WHITBY, ON L1N 3A9
TF 800-565-4801 CA 416-960-9900 INTL +1-416-960-9900

SCALE = NTS

DATE: 10/13/2017	
DESIGNED: JSK	DRAWN: JSK
CHECKED: BSF	APPROVED: SP
PROJECT No.: EFO6	SEQUENCE No.: *
SHEET: 1 OF 1	

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APPENDIX "E"
Boundary Conditions

Boundary Conditions
3817-3843 Innes Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	769	12.82
Maximum Daily Demand	1,154	19.23
Peak Hour	1,385	23.08
Fire Flow Demand #1	5,600	93.33

Location

Results

Connection 1 – Innes Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.3	55.1
Peak Hour	127.1	50.5
Max Day plus Fire 1	129.3	53.7

[1] Ground Elevation = 91.6 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

APPENDIX "F"
Engineering Drawings

EROSION AND SEDIMENT CONTROL MEASURES:

** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES **

1. **PRIOR TO START OF CONSTRUCTION:**

1.1. PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF ANY SOIL, AND CONSTRUCTION:

1.1.1. INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).

1.1.2. INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCH BASINS AND MANHOLES.

1.1.3. INSTALL SILTSACK FILTERS IN ALL CONCRETE CATCH BASIN STRUCTURES.

1.1.4. INSPECT MEASURES IMMEDIATELY AFTER INSTALLATION.

2. **DURING CONSTRUCTION:**

2.1. WORK TO BE DONE IN THE VICINITY OF MAJOR WATERWAYS TO BE CARRIED OUT FROM JULY TO SEPTEMBER ONLY.

2.2. MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE.

2.3. PROTECT DISTURBED AREAS FROM RUNOFF.

2.4. PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILIATED WITHIN 30 DAYS.

2.5. INSPECT SILT FENCE, FILTER CLOTHS, AND CATCH BASIN SUMPS WEEKLY AND AFTER EVERY MAJOR STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY

2.6. PLAN TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION.

2.7. EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES.

2.8. DO NOT LOCATE TOPSOIL PILES AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE PILE IS REMOVED. ALL TOPSOIL PILES ARE TO BE SEEDED IF THEY ARE TO REMAIN ON SITE LONG ENOUGH FOR SEEDS TO GROW (30 DAYS).

2.9. CONTROL WIND-BLOWN DUST OFF SITE TO ACCEPTABLE LEVELS BY SEEDING TOPSOIL PILES AND OTHER AREAS TEMPORARILY (PROVIDE WATERING AS REQUIRED).

2.10. ALL EROSION CONTROL STRUCTURE TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.

2.11. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THIS CONSULTING ENGINEER AND THE CITY DEPARTMENT OF PUBLIC WORKS. "TO PREVENT UNNECESSARY SEDIMENT DISCHARGE, THE CONTRACTOR IS PERMITTED TO PLACE ADDITIONAL SEDIMENT AND EROSION CONTROL MEASURES IN A TIMELY MANNER, IF REQUIRED. THE CONTRACTOR TO ADVISE CONSULTANT ONCE INSTALLED FOR INSPECTION."

2.12. CONTRACTOR RESPONSIBLE FOR CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING ETC, AT THE END OF EACH WORK DAY.

2.13. PROVIDE GRAVEL ENTRANCE WHEREVER EQUIPMENT LEAVES THE SITE TO PREVENT MUD TRACKING ONTO PAVED SURFACES. GRAVEL BED SHALL BE A MINIMUM OF 15m LONG. 4m WIDE AND 0.3m DEEP AND SHALL CONSIST OF COARSE (50mm CRUSHER-RUN LIMESTONE). MAINTAIN GRAVEL ENTRANCE IN CLEAN CONDITION.

2.14. DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPED.

2.15. ANY MUD/MATERIAL TRACKED ONTO THE ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER.

2.16. TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ABUTTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.

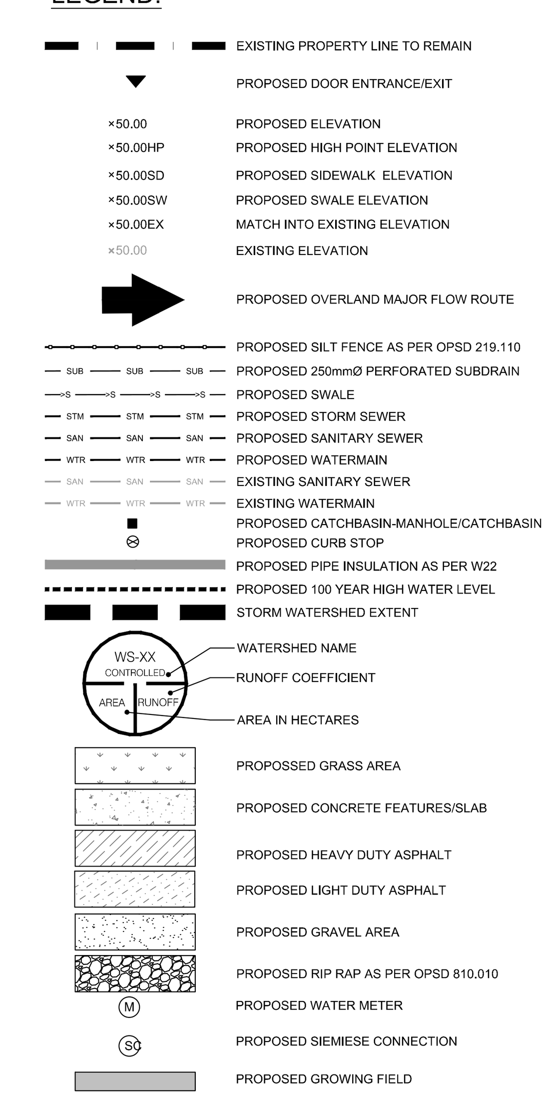
3. **AFTER CONSTRUCTION:**

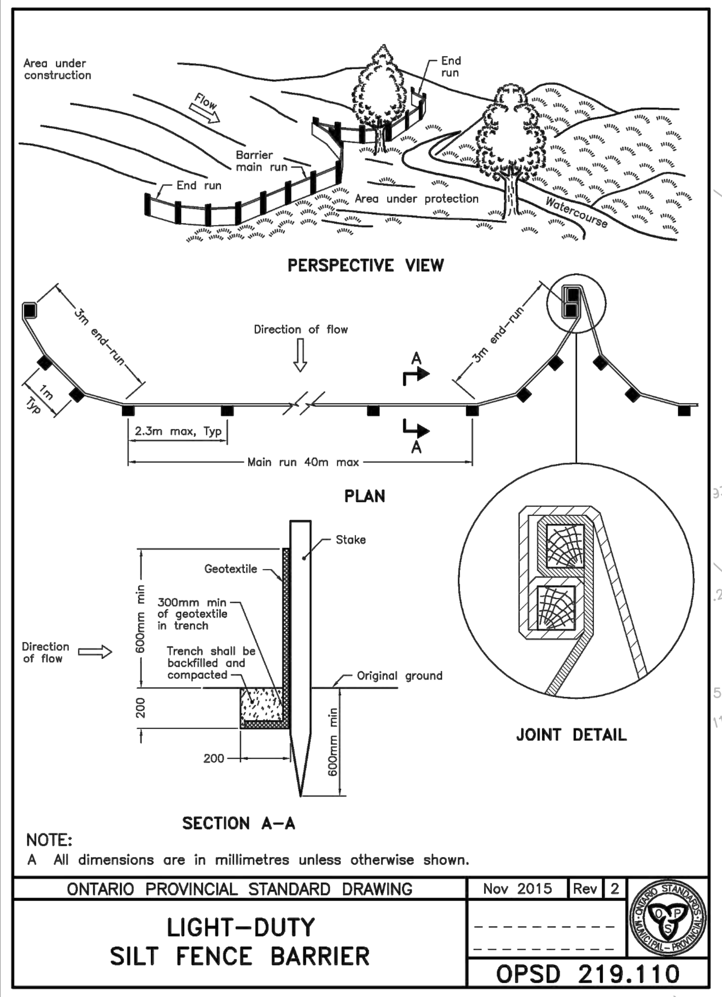
3.1. PROVIDE PERMANENT COVER CONSISTING OF TOPSOIL AND SEED TO DISTURBED AREA.

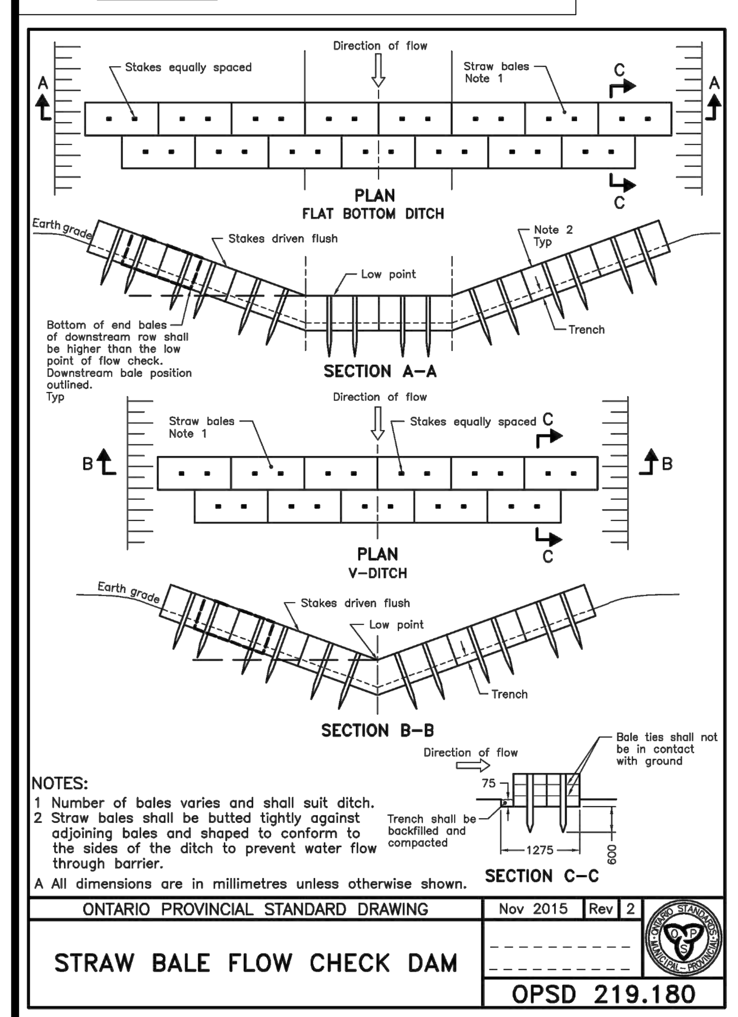
3.2. REMOVE STRAW BALE FLOW CHECK DAMS, SILT FENCES AND FILTER CLOTHS ON CATCH BASINS AND MANHOLE COVERS AFTER DISTURBED AREAS HAVE BEEN REHABILITATED AND STABILIZED.

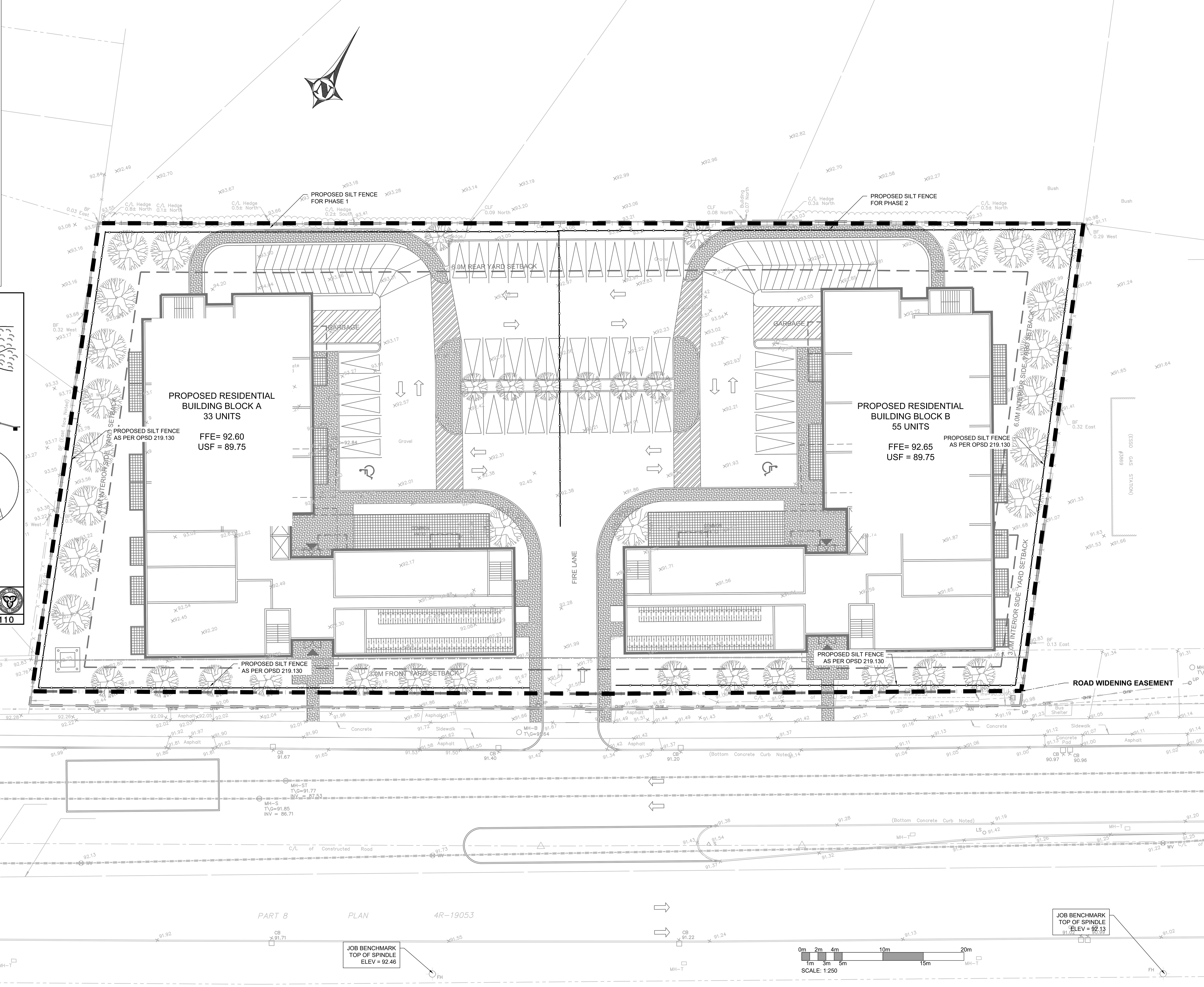
3.3. INSPECT AND CLEAN CATCH BASIN SUMPS AND STORM SEWERS.

LEGEND:









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BLANCHARD LETENDRE ENGINEERING
767, Notre Dame, Local 42, Embrun, Ontario, K0A 1W1
(613) 693-0700 blengineering.ca

CLIENT:
OLIGO DEVELOPMENT
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
3817 - 3843 INNES RD,
ORLEANS, ON

DRAWING:
SEDIMENT & EROSION CONTROL PLAN

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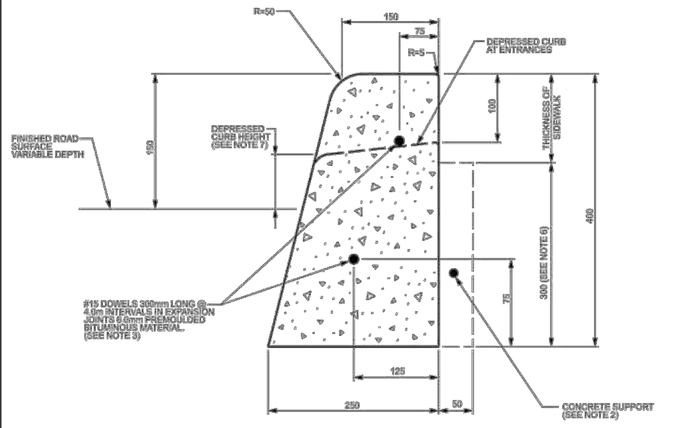
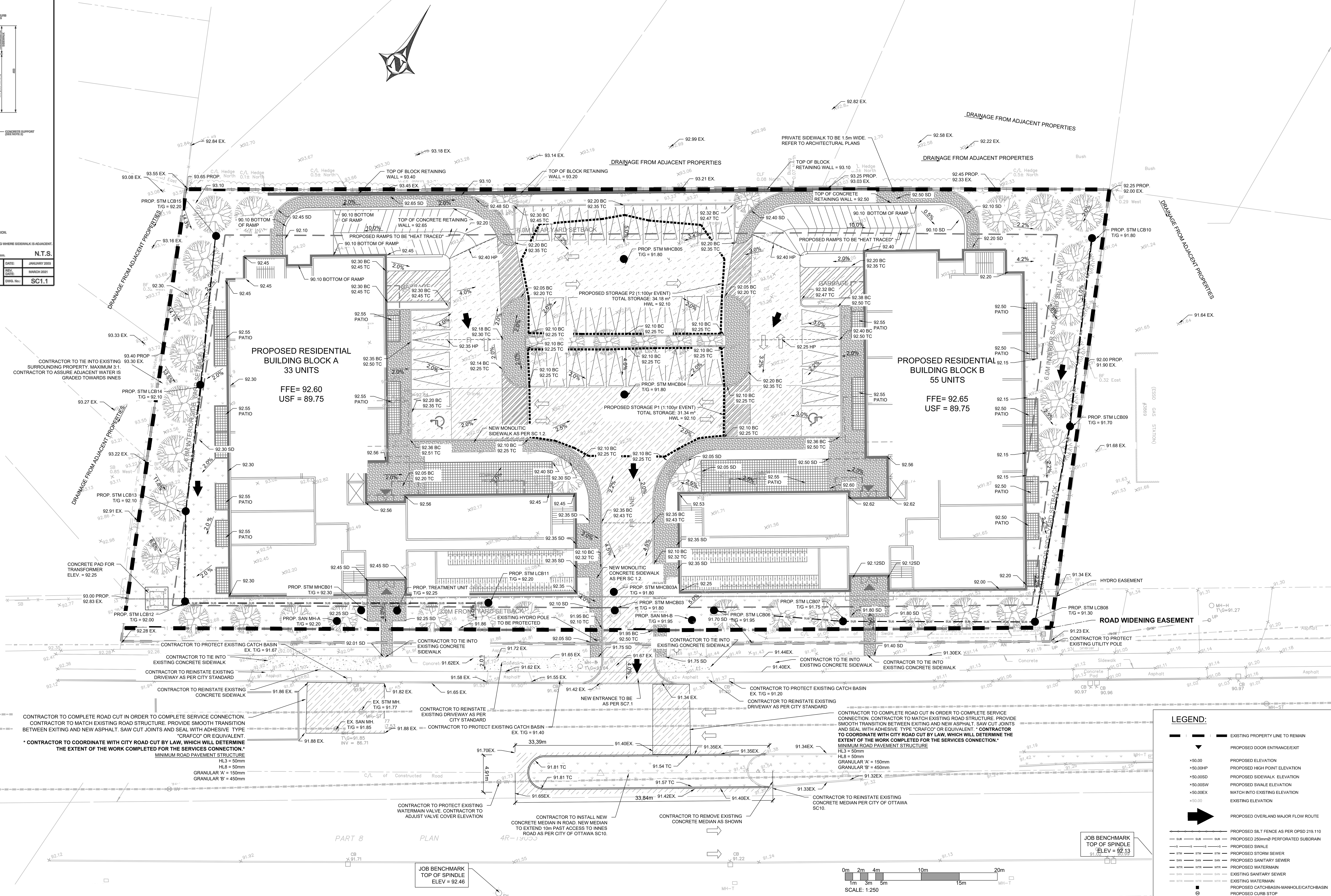


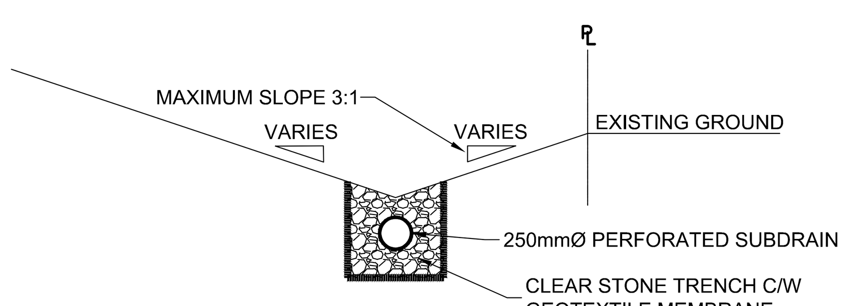
CONCRETE BARRIER CURB

NOTES:
1. THE FULL CURB DEPTH SHALL BE CARRIED THROUGH THE DEPRESSED ACCESS CROSSING.
2. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
3. IF AN EXTRUSION CURBING MACHINE IS USED, THE EXPANSION BITUMINOUS MATERIAL AND THE #15 DOWELS ARE TO BE PLACED AT THE END OF THE EXTRUSION.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
5. DUMMY JOINTS SHALL BE 25mm DEEP, FRONT, BACK AND TOP OF SECTION AT 4m SPACING OR MATCH JOINTING WHERE SIDEWALK IS ADJACENT.
6. FOR DEPRESSED CURB AT ENTRANCES USE 250.
7. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13mm.

N.T.S.

Ottawa	CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD-600.110)	DATE:	JANUARY 2003
		REV. DATE:	MARCH 2021
		DWG. No.:	SC1.1





SWALE & SUBDRAIN - TYPICAL SECTION

(N.T.S.)

PONDING TABLE		
100 year storm HWL = 92.10		
PONDING AREA	VOLUME (m3)	DEPTH (mm)
P1	31.34	300
P2	34.18	300

PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) LIGHT DUTY	HEAVY DUTY
SURFACE	HL.3 A/C (PG 58-28)	50	40
BINDER	HL.8 A/C (PG 58-28)	--	50
BASECOURSE	GRANULAR "A"	150	150
SUBBASE	GRANULAR "B" TYPE II	300	400

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED ELEVATION
- PROPOSED HIGH POINT ELEVATION
- PROPOSED SIDEWALK ELEVATION
- PROPOSED SWALE ELEVATION
- MATCH INTO EXISTING ELEVATION
- EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED 250mmØ PERFORATED SUBDRAIN
- PROPOSED SWALE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION AS PER W22
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES
- PROPOSED GRASS AREA
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED GRAVEL AREA
- PROPOSED RIP RAP AS PER OPSD 810.010
- PROPOSED WATER METER
- PROPOSED SIEMESE CONNECTION
- PROPOSED GROWING FIELD

ENGINEERING STAMP

LICENSED PROFESSIONAL ENGINEER
G. L. BRUNET
100191036
03/05/2022
PROVINCE OF ONTARIO

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BLANCHARD LETENDRE
ENGINEERING

CLIENT:
OLIGO DEVELOPMENT
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
3817 - 3843 INNES RD,
ORLEANS, ON

DRAWING:
SITE GRADING PLAN

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LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED DOOR ENTRANCE/EXIT
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00SD PROPOSED SIDEWALK ELEVATION
- ×50.00SW PROPOSED SWALE ELEVATION
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×50.00 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
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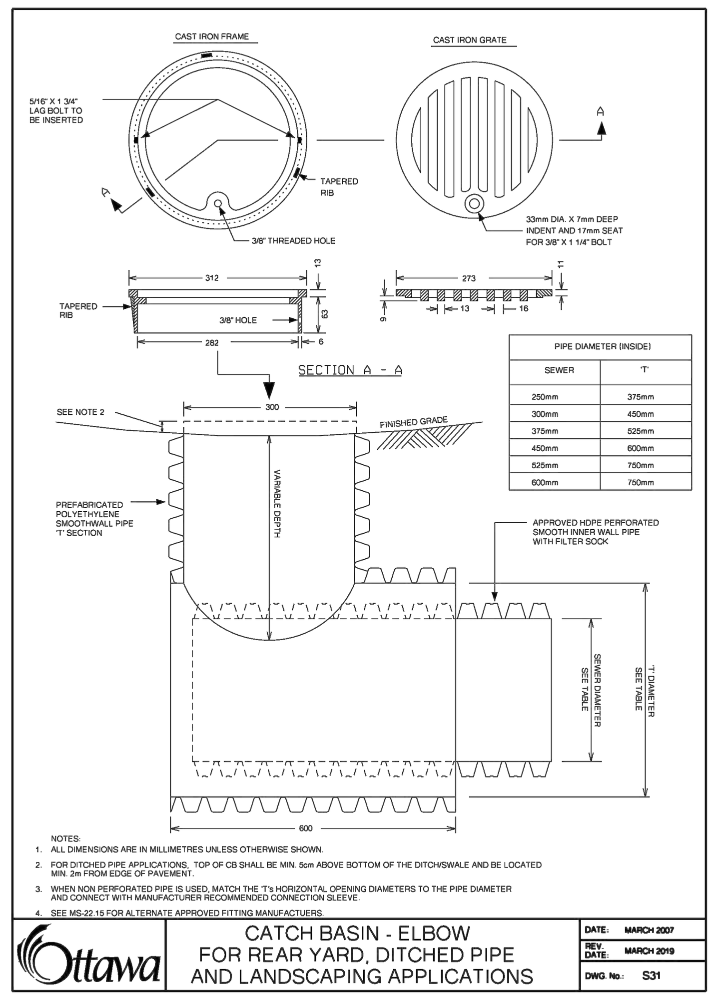
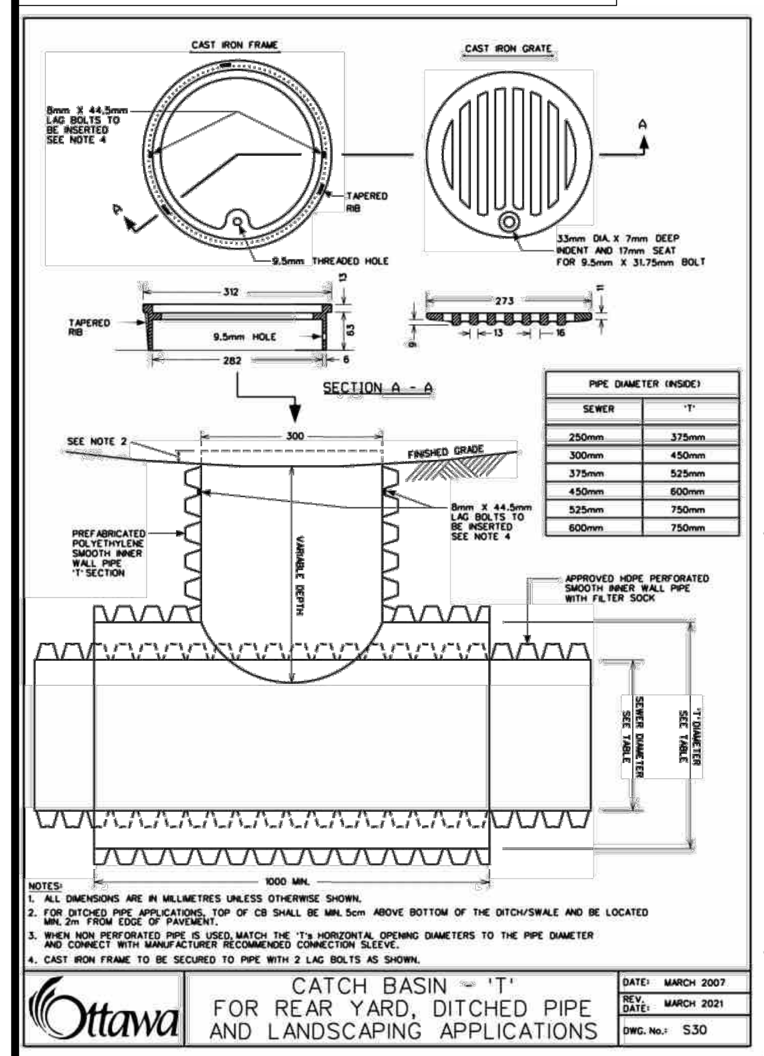
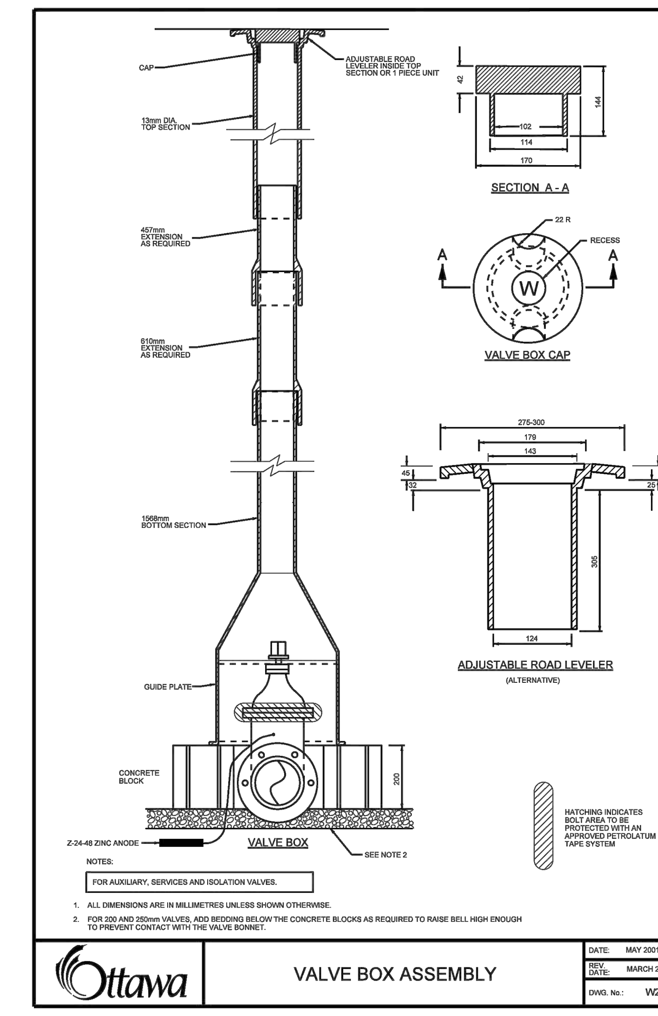
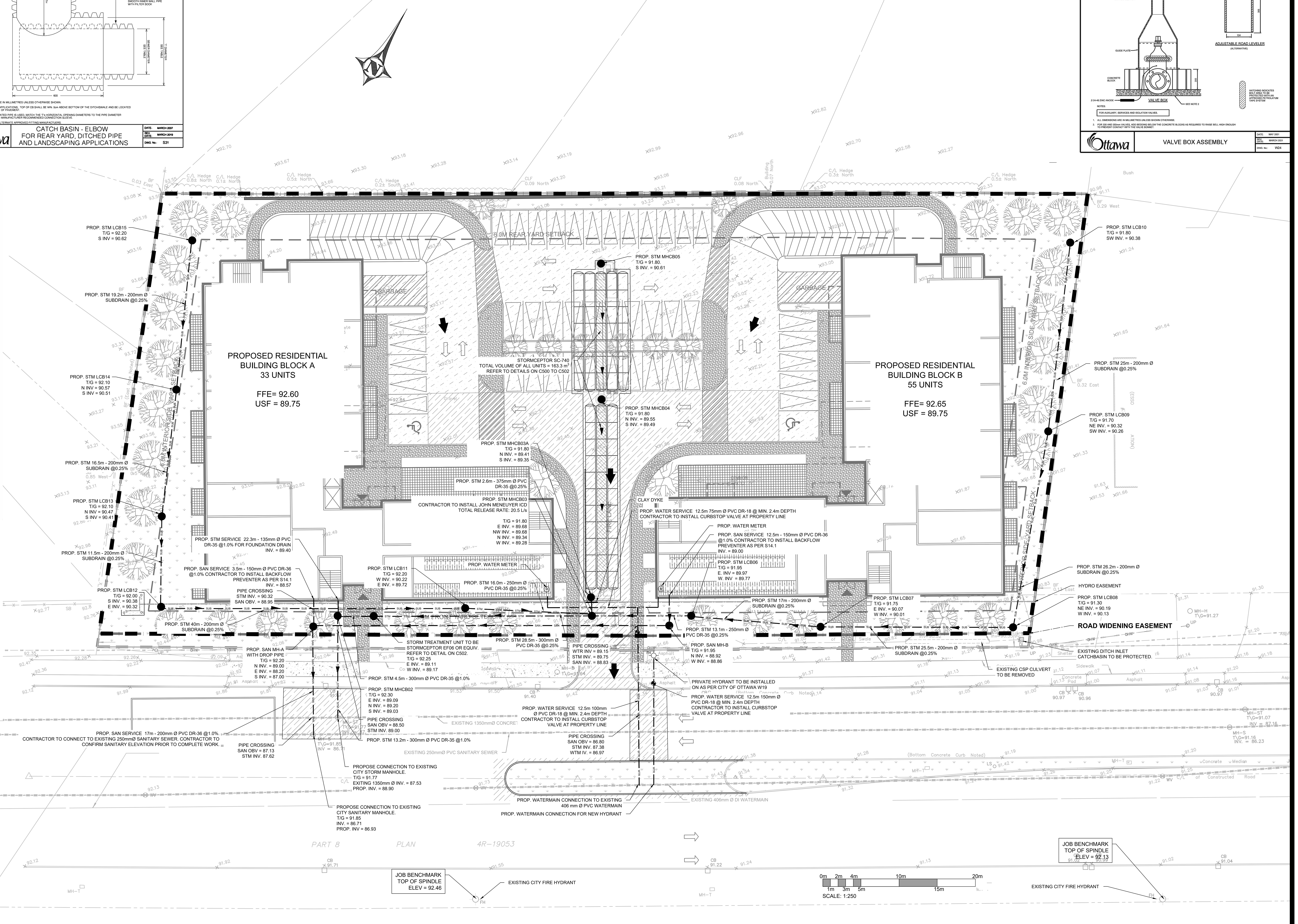






MANHOLE TABLE

MH Number	Size	Cover
STORM		
MH01	1200mm	S23
MHCB02	1200mm	S28.1
MHCB03	1200mm	S28.1
MHCB03A	1200mm	S28.1
MHCB04	1200mm	S28.1
MHCB05	1200mm	S28.1
LCB06 TO LCB15	S30 AND S31	
SANITARY		
MHA	1200mm	S24
MHB	1200mm	S24



ENGINEERING STAMP

G. L. BRUNET
100191036
03/05/2022
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

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BLANCHARD LETENDRE
ENGINEERING
767, Notre Dame, Local 42, Embrun, Ontario, K0A 1W1
(613) 693-0700
blengineering.ca

CLIENT:
OLIGO DEVELOPMENT
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
3817 - 3843 INNES RD,
ORLEANS, ON

DRAWING:
SITE SERVICING PLAN

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LEGEND:

Symbol	Description
	EXISTING PROPERTY LINE TO REMAIN
	PROPOSED DOOR ENTRANCE/EXIT
×50.00	PROPOSED ELEVATION
×50.00HP	PROPOSED HIGH POINT ELEVATION
×50.00SD	PROPOSED SIDEWALK ELEVATION
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×50.00	EXISTING ELEVATION
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	PROPOSED SILT FENCE AS PER OPSD 219.110
	PROPOSED 250mmØ PERFORATED SUBDRAIN
>S	PROPOSED SWALE
STM	PROPOSED STORM SEWER
SAN	PROPOSED SANITARY SEWER
WTR	PROPOSED WATERMAIN
SAN	EXISTING SANITARY SEWER
WTR	EXISTING WATERMAIN
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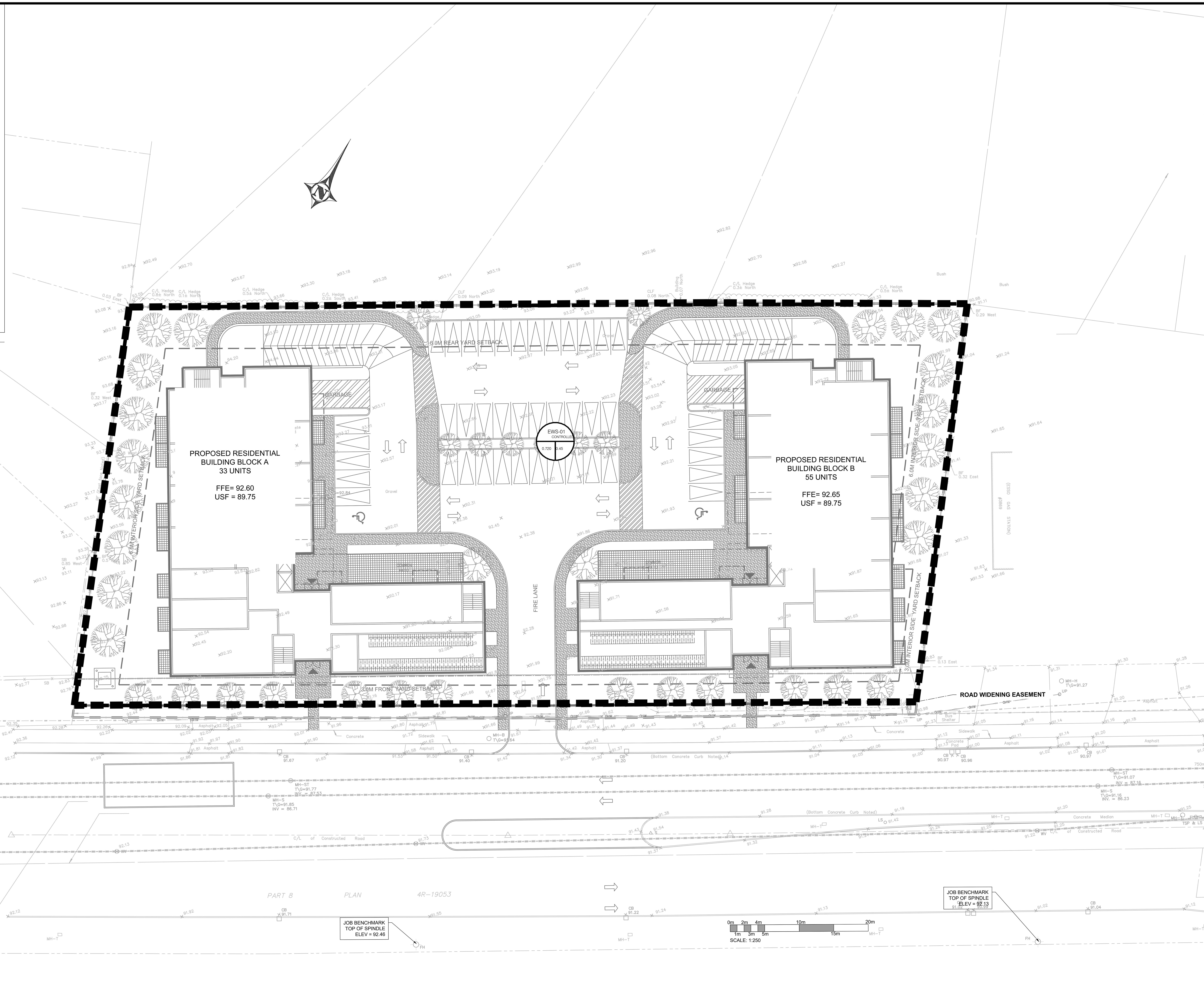
	PROPOSED CURB STOP
	PROPOSED PIPE INSULATION AS PER W22
	PROPOSED 100 YEAR HIGH WATER LEVEL
	STORM WATERSHED EXTENT
WS-XX CONTROLLED	WATERSHED NAME
RUNOFF	RUNOFF COEFFICIENT
AREA	AREA IN HECTARES
	PROPOSSED GRASS AREA
	PROPOSED CONCRETE FEATURES/SLAB
	PROPOSED HEAVY DUTY ASPHALT
	PROPOSED LIGHT DUTY ASPHALT
	PROPOSED GRAVEL AREA
	PROPOSED RIP RAP AS PER OPSD 810.010
M	PROPOSED WATER METER
SC	PROPOSED SIEMIESE CONNECTION
	PROPOSED GROWING FIELD



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BLANCHARD LETENDRE
ENGINEERING
767 Notre Dame, Local 42, Embrun, Ontario, K0A 1W
(613) 693-0700
blengineering.ca

CLIENT:
OLIGO DEVELOPMENT
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
3817 - 3843 INNES RD,
ORLEANS, ON

DRAWING:
PRE DEVELOPMENT DRAINAGE AREA

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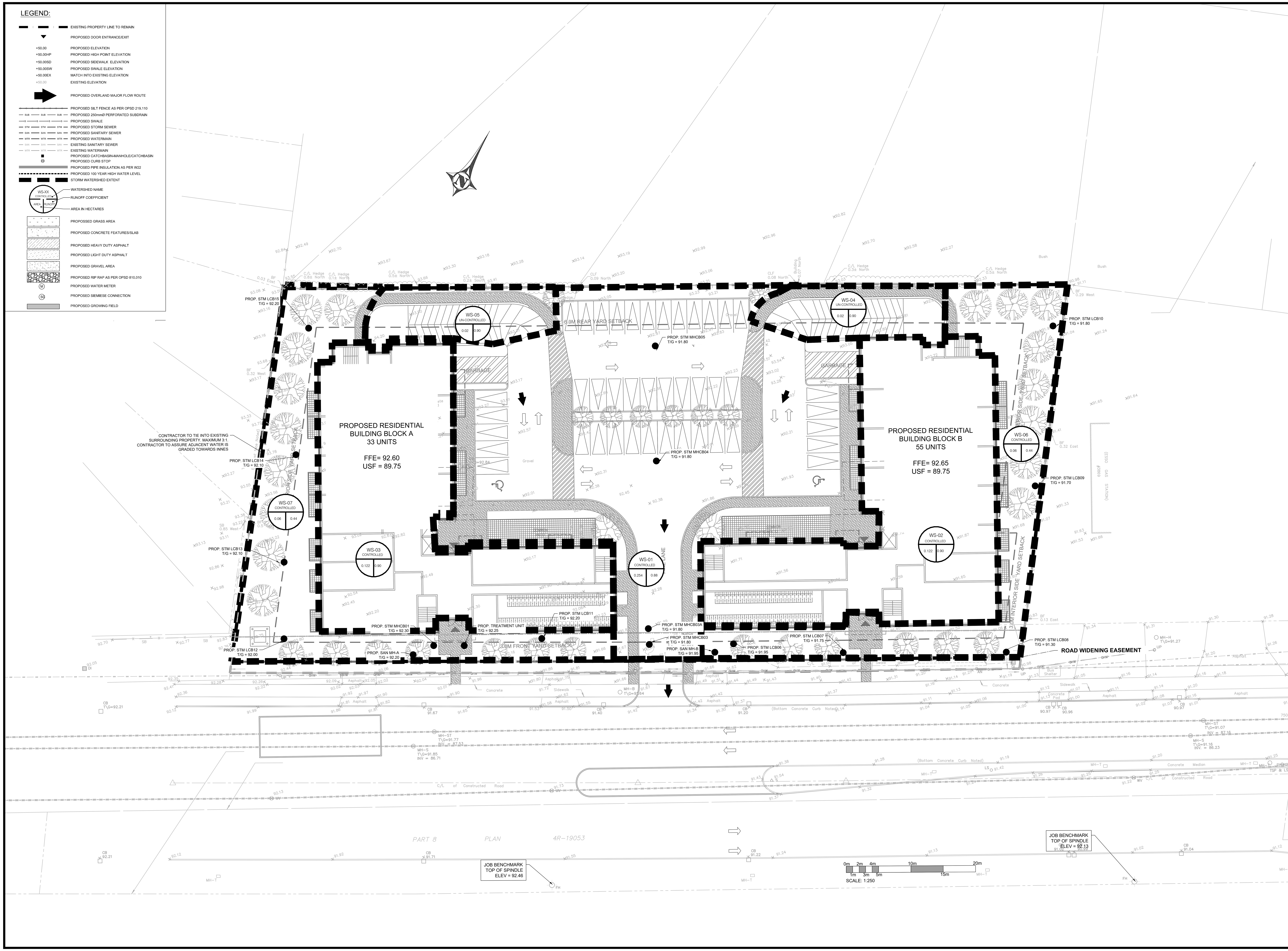

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BLANCHARD LETENDRE ENGINEERING
747 Notre-Dame, Local 42, Embrun, Ontario, K0A 1W1
(613) 693-0700

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OLIGO DEVELOPMENT
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
3817 - 3843 INNES RD, ORLEANS, ON

DRAWING:
POST DEVELOPMENT DRAINAGE AREA

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PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

ADS
Advanced Drainage Systems, Inc.

ADS SiteAssist
FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR APP

3817 INNES ROAD
OTTAWA, CANADA

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. 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".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. 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.
6. CHAMBERS SHALL BE DESIGNED, TESTED 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.
7. 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 AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. 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.
8. 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.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. 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.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. 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

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 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/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. 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.

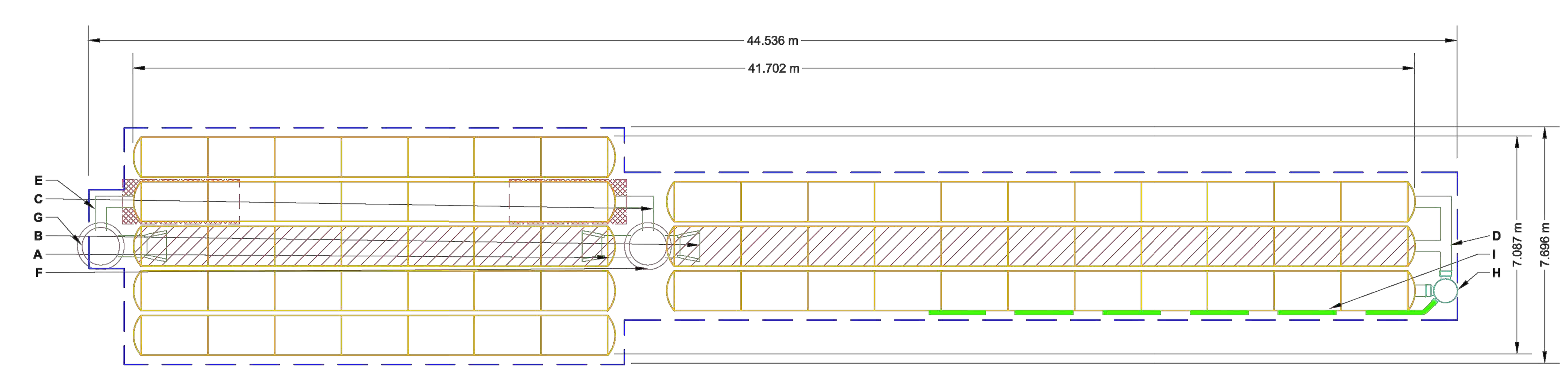
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT	
68	STORMTECH SC-740 CHAMBERS
16	STORMTECH SC-740 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	STONE VOID
163.3	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
258.4	SYSTEM AREA (m^2)
104.5	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	93.198
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	91.369
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	91.217
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	91.217
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	91.217
TOP OF STONE:	90.912
TOP OF SC-740 CHAMBER:	90.759
300 mm x 300 mm TOP MANIFOLD INVERT:	90.315
300 mm x 300 mm TOP MANIFOLD INVERT:	90.315
300 mm x 300 mm BOTTOM MANIFOLD INVERT:	90.028
300 mm BOTTOM CONNECTION INVERT:	90.028
600 mm ISOLATOR ROW PLUS INVERT:	90.000
600 mm ISOLATOR ROW PLUS INVERT:	90.000
BOTTOM OF SC-740 CHAMBER:	89.997
UNDERDRAIN INVERT:	89.845
BOTTOM OF STONE:	89.845

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	600 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC740ECEZ / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	3 mm	
FLAMP	B	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC74024RAMP (TYP 3 PLACES)		
MANIFOLD	C	300 mm x 300 mm TOP MANIFOLD, ADS N-12	318 mm	
MANIFOLD	D	300 mm x 300 mm BOTTOM MANIFOLD, ADS N-12	30 mm	
MANIFOLD	E	300 mm x 300 mm TOP MANIFOLD, ADS N-12	318 mm	
CONCRETE STRUCTURE	F	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		65 L/s IN
CONCRETE STRUCTURE	G	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		65 L/s IN
NYLOPLAST (OUTLET)	H	750 mm DIAMETER (DESIGN BY ENGINEER)		113 L/s OUT
UNDERDRAIN	I	150 mm ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



ISOLATOR ROW PLUS (SEE DETAIL/TYP 2 PLACES)

PLACE MINIMUM 3.810 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES
- 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.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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100191036
03/05/2022
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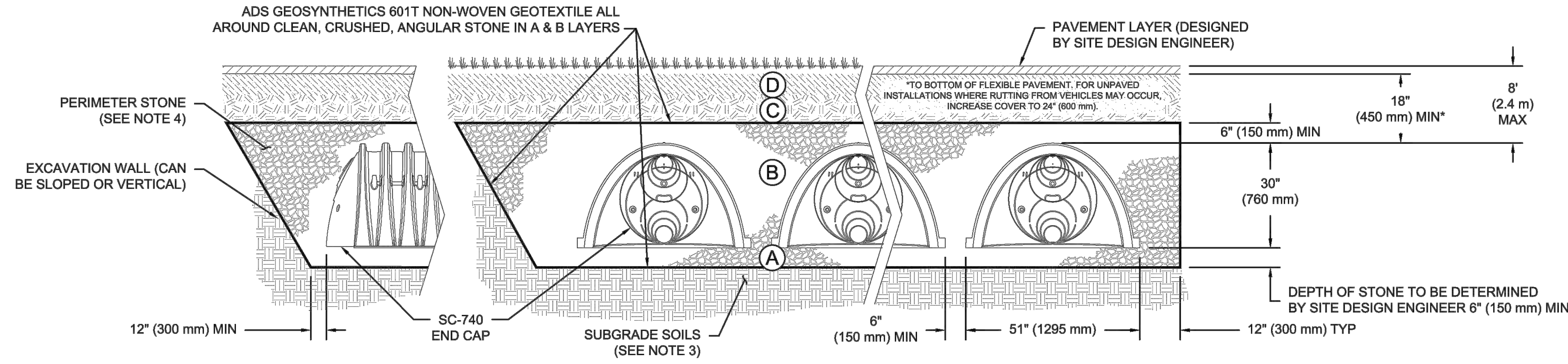
ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

	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 18" (450 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	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	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.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 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.
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 SHALL BE GREATER THAN OR EQUAL TO 550 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 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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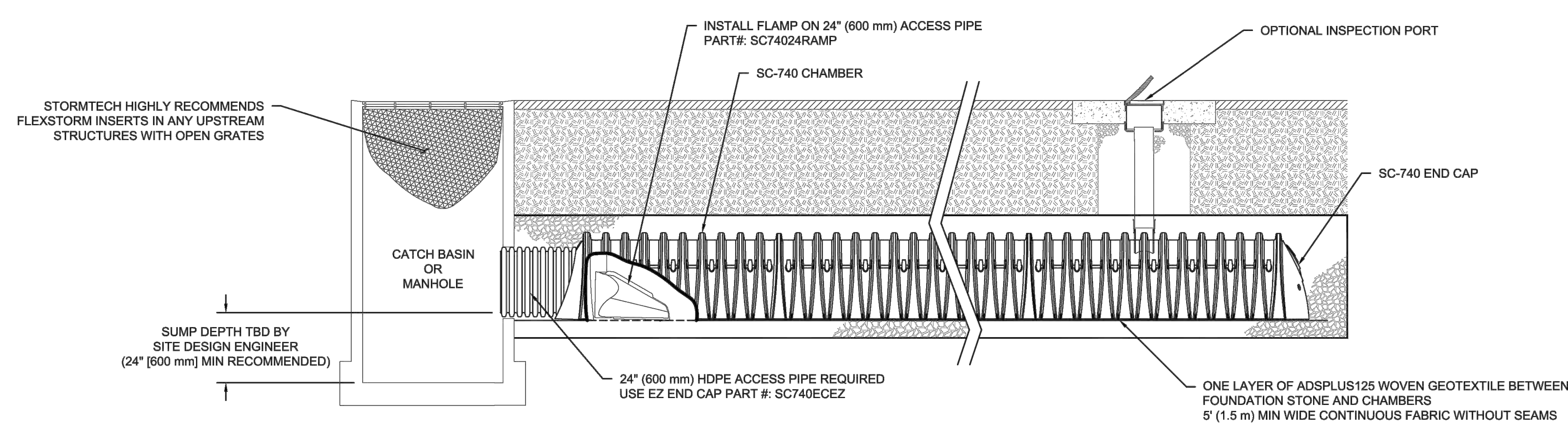

SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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NYLOPLAST DRAIN BASIN

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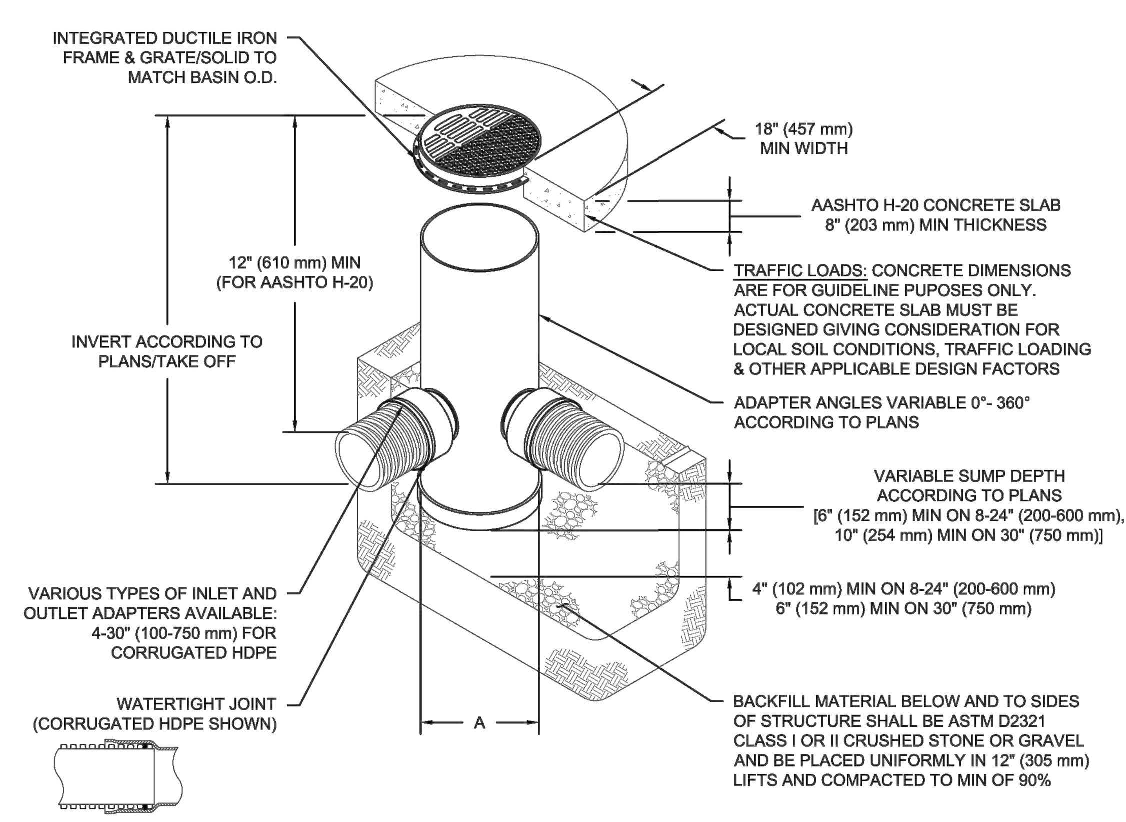

NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

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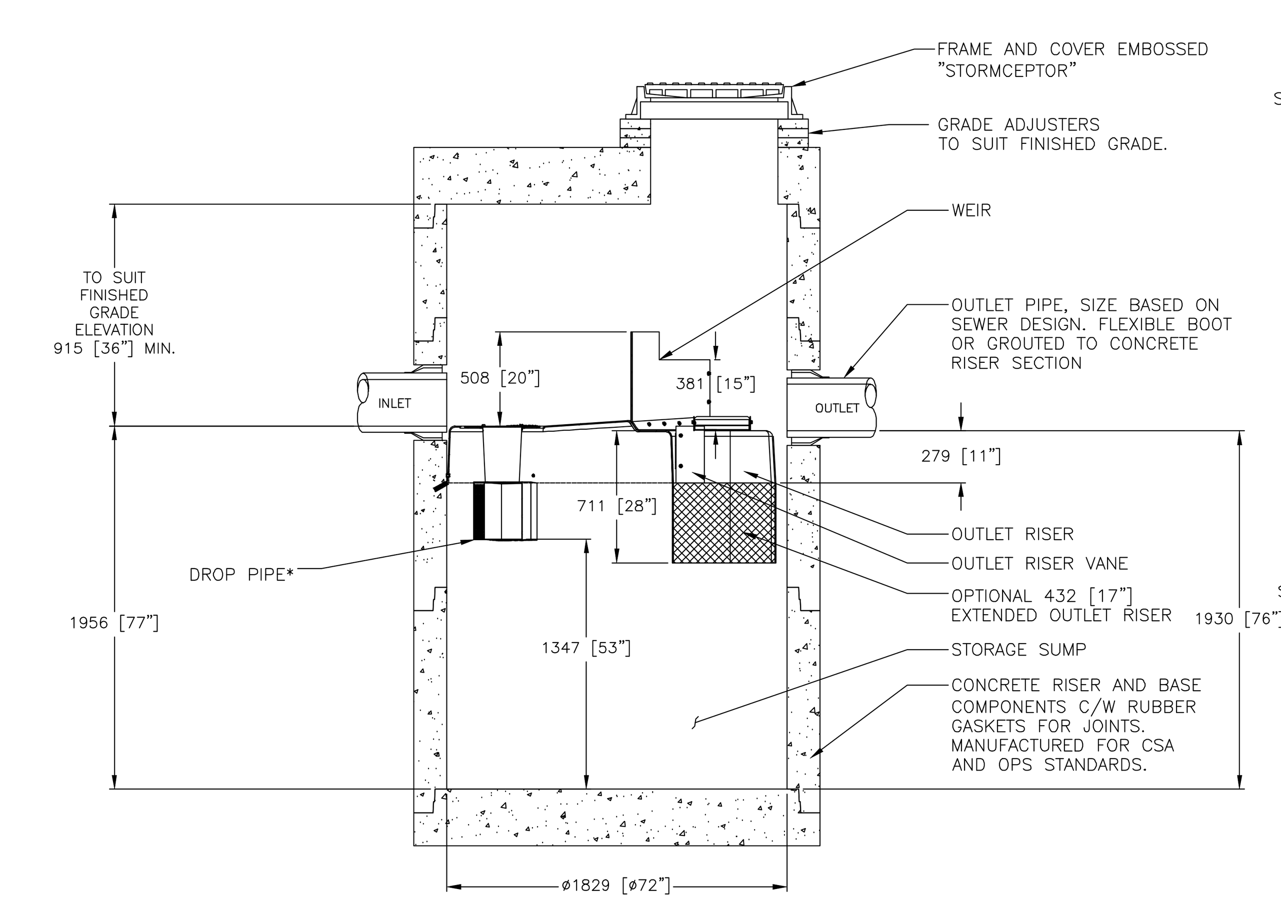
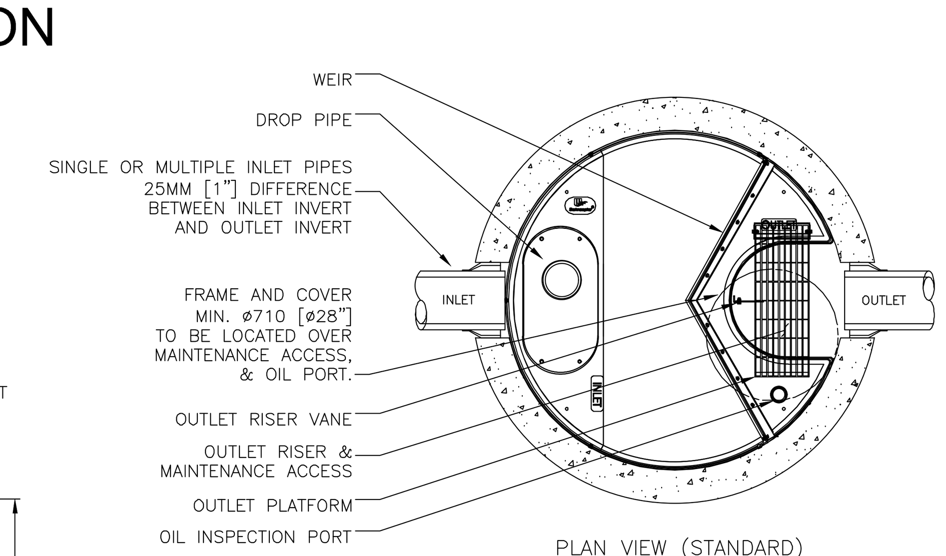
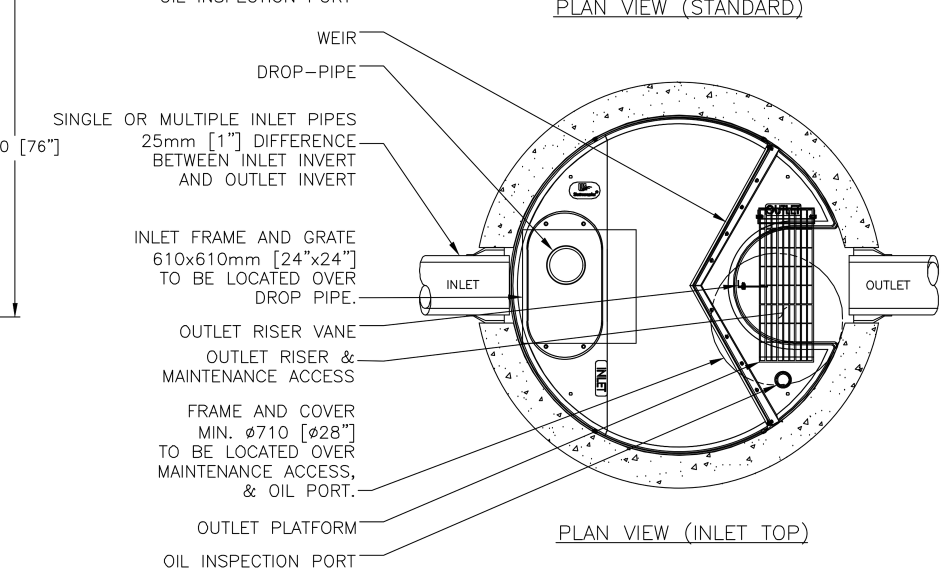


SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m2 (27.9 gpm/ft2) FOR STORMCEPTOR EF6 AND 535 L/min/m2 (13.1 gpm/ft2) FOR STORMCEPTOR EFO6 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS					
STORMCEPTOR MODEL	EFO6				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*
* PER ENGINEER OF RECORD					

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