TATHAM ENGINEERING

Enhancing our communities

2380 and 2396 Cléroux Crescent City of Ottawa

SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Bridor Developments

File 523650 | January 26, 2023

Document Control

File:

523650

Date:

January 26, 2023

Prepared by:

Tatham Engineering Limited
5335 Canotek Road, Unit 103
Ottawa, Ontario K1J 9L4

T 613-747-3636
tathameng.com

Prepared for:

Bridor Developments
996 St-Augustin Road, Unit B
Embrun, Ontario K0A 1W0

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

Disclaimer	Copyright
The information contained in this document is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and Tatham Engineering Limited undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.	This document may not be used for any purpose other than that provided in the contract between the Owner/Client and the Engineer nor may any section or element of this document be removed, reproduced, electronically stored or transmitted in any form without the express written consent of Tatham Engineering Limited.

Issue	Date	Description
1	January 25, 2023	Final Report
2	January 26, 2023	Final Report

Document Contents

Tables

Figures

Appendices

1 Introduction

Blanchard Letendre Engineering Ltd. (BL Engineering) was originally retained by Bridor Developments (Bridor) to complete site servicing and stormwater management (SWM) designs for the proposed site development located at 2380 and 2396 Cléroux Crescent in Ottawa. In January 2023, Tatham Engineering Limited (Tatham) was retained by Bridor to replace BL Engineering as the Engineer of Record for the project moving forward.

We note that the underground storage chambers, the infiltration gallery and the oil-grit separator that were previously proposed have been replaced with a dry low impact development SWM facility equipped with a SWM filter. 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 latest Site Servicing and SWM Report, dated May 5, 2022, is provided in Appendix F for reference.

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 Stantec Geomatics Ltd.

2 Site Plan

The site includes both 2380 and 2396 Cléroux Crescent in Ottawa and is bounded by Cléroux Crescent to the north, Orient Park Drive to the east, and developed residential properties to the south and west. As per the aerial photo (Figure 1) below, both lots within the existing 0.84 ha site consist of an existing residential dwelling, a stand-alone garage structure, and treed and grassed land. 2380 Cléroux Crescent has a paved driveway onto Cléroux Crescent, whereas 2396 Cléroux Crescent has paved driveways onto both Cléroux Crescent and Orient Park Drive. The existing dwellings and garage structures are proposed to be demolished prior to construction. The land will be developed with two new residential apartment buildings with underground and aboveground parking areas and shared entrances and drive aisles.

Figure 1: Existing Site Location

3 Stormwater Management

3.1 EXISTING SITE DRAINAGE CONDITIONS

In the existing condition, the majority of the site drains uncontrolled towards the southwest corner where runoff is captured by an existing catchbasin and conveyed south, within a municipal servicing easement, to an existing 375 mm diameter storm sewer on Orient Park Drive, via an existing 300 mm diameter storm sewer located (between 2488 and 2490 Orient Park Drive). The 300 mm diameter storm sewer is stubbed approximately 3 metres within the site. Refer to Drawing C400 for the existing condition site drainage plan.

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 drainage area delineation was determined based on the topographic survey, which was completed in July 2016. Existing condition land uses were established based on our review of online aerial photography and field reconnaissance.

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

The geotechnical investigation report identified a layer of reddish-brown silty sand across the site ranging in thickness from approximately 0.3 m to 0.8 m overlying a deep deposit of silty clay. For this reason, a hydrologic soil group ‘A’ was selected for determining the hydrologic parameters, which is conservative as it relates to establishing the allowable release rate from the site, considering the deep deposit of silty clay that exists below.

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	DRAINAGE AREA 101 0.84 ha (m^3/s)		
	3-hr CHI	6-hr CHI	24-hr SCS Type II
5-Year	0.017	0.020	0.030

3.3 PROPOSED STORMWATER MANAGEMENT PLAN

The proposed development will consist of two new 1,017 m^2, 3-storey, 40-unit residential apartment buildings with above and underground parking and hard and softscape areas. One drive aisle, with access to Cléroux Crescent and Orient Park Drive, will be shared by both apartment buildings. Since the runoff coefficient will increase in the proposed condition, due to an increase in imperviousness, post-development stormwater quantity control will be implemented. Water quality control is also required.

The SWM design has been developed to follow the existing site topography. As the property naturally drains towards the southwest corner and the Orient Park Drive storm sewer, the proposed SWM plan will also outlet to the existing storm sewer system on Orient Park Drive via the existing 300 mm diameter storm sewer stub. The emergency overland flow route has been designed to convey emergency flows eastward into the Orient Park Drive right of way via the proposed southeast site entrance.

Runoff generated within the proposed development will be directed to and captured by a series of on-site drainage structures and will be conveyed to a private dry low impact development SWM facility, capable of providing adequate SWM quantity and quality control of runoff, prior to discharging to the existing storm sewer on Orient Park Drive. The post-development drainage areas have been delineated according to the proposed grading plan. In order to attenuate post-development peak flow rates to the allowable release rate, runoff will be controlled by an orifice plate flow control installed in DICBMH4, which will restrict the flow rate that is discharged into the municipal storm sewer on Orient Park Drive. By restricting flow, onsite stormwater detention will be provided within the dry SWM facility. The combined controlled and uncontrolled post-development peak flow rate from the site during the 100-year storm event will be reduced to the allowable 5-year pre-development peak flow rate. The proposed SWM facility is described in further detail in the following section.

3.4 WATER QUANTITY CONTROL

3.4.1 Dry Low Impact Development SWM Facility and Control Structure

Water quantity control for the site will be provided in a proposed dry low impact development SWM facility. Under the proposed condition, 0.72 ha (including the area of the facility) with a combined imperviousness of 67% will drain to the dry SWM facility. The maximum active storage volume provided is 272 m^3 at an active storage depth of 0.85 m. The active storage volume provided is sufficient to attenuate the post-development peak flow rate from the 100-year storm event to the allowable 5-year pre-development peak flow rate.

The dry SWM facility will be fitted with multiple outlet controls which are summarized as follows:

- A storm pond control maintenance hole equipped with a ditch inlet frame and grate (DICBMH4) to protect the orifice control and outlet pipe from damage and to prevent blockages;
- A 55 mm diameter orifice flow control discharging into a 250 mm storm outlet pipe;
- An emergency spillout elevation of 80.45 m located at the southeast site entrance to safely direct emergency storm flows from the dry SWM facility, to Orient Park Drive in case of a storm exceeding the 100-year design storm or in case of a blockage; and
- 0.3 m of freeboard measured from the top of the active 100-year dry pond storage and the emergency spillout elevation.

The proposed dry low impact development SWM facility configuration, outlet structure and emergency spillout are illustrated on Drawing C200 included at the back of this report.

3.4.2 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.

The drainage area delineation for the contributing lands was completed utilizing the available topographic information combined with the proposed site grading illustrated on Drawing C200. Proposed surface cover and existing soil type were used to establish 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.

The time to peak values for the individual drainage areas were calculated using either the Bransby Williams and Airport Methods for runoff coefficient “C” values greater than and less than 0.4, respectively.

Peak runoff rates as well as the SWM facility operating characteristics are shown in the tables below and the results of the modelling are included in Appendix A.

Table 2: Proposed Condition Peak Flow Summary

DESIGN STORM	DRAINAGE AREAS 201 AND 202 CONTROLLED 0.72 ha (m^3/s)			DRAINAGE AREA 203 UNCONTROLLED 0.12 ha (m^3/s)			TOTAL SITE AREA CONTROLLED + UNCONTROLLED 0.84 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	0.011	0.011	0.011	0.006	0.006	0.009	0.017 (0.017)	0.017 (0.020)	0.020 (0.030)

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

Table 3: Proposed Dry Low Impact Development SWM Facility Operating Characteristics

DESIGN STORM	SWM FACILITY DISCHARGE (m^3/s)			SWM FACILITY STORAGE (m^3)			SWM FACILITY WATER LEVEL (m)		
	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	0.011	0.011	0.011	267	270	255	80.29	80.29	80.26

A comparison of the existing and proposed condition peak flow summaries confirms the proposed dry low impact development SWM facility will attenuate the post-development peak flow rate from the 100-year storm event to the allowable 5-year pre-development peak flow rate.

3.4.3 Roof Drainage

Each proposed building structure consists of a flat roof. Roof drains will be directly connected to the internal storm sewers and controlled by the orifice plate in DICBMH4. The scuppers will provide emergency spill outs in the event of a blockage.

3.4.4 Ramp Drainage

Runoff from each underground parking ramp will be captured by a trench drain located at the bottom of the ramp and conveyed to the foundation drain of the building which discharges directly into the SWM facility. Details related to the underground parking garage and ramp drainage will be coordinated with the mechanical engineer and submitted with the building permit application.

3.5 WATER QUALITY CONTROL

The proposed water quality treatment objective under the proposed condition is to provide MECP enhanced level treatment including 80% TSS removal from on-site runoff.

Water quality control for the development will be provided via a SWM filter located within the proposed dry low impact development SWM facility. The SWM filter is described in further detail in the following section.

3.5.1 SWM Filter

A 1.0 m deep SWM filter consisting of sand (85-88% by weight), fines (8%-12% by weight) and organic matter (3% to 5% by weight) is proposed in the base of the dry pond for enhanced level water quality control. Since the deep underlying soils within the site consist of silty clay, direct infiltration cannot be relied on. On this basis, a 100 mm diameter perforated subdrain in 0.3 m x 0.3 m of clearstone trench wrapped on all sides with Terrafix 270R has been incorporated below the SWM filter to ensure the long-term function of the filter. In accordance with table 3.2 of the MECP SWM design manual, a storage volume of 25 m^3 is required for 80% enhanced level water quality treatment of runoff from Drainage Areas 201 and 202 whereas 51 m^3 is provided. The provided water quality volume is more than double the required volume as is recommended in the MECP SWM design manual to account for frozen ground conditions. We note that the total water quality storage volume is provided above the SWM filter and below the DICBMH grate elevation to provide sufficient time for infiltration to occur during and following a storm event. The water quality storage volume has been treated as dead storage and has not been considered in the water quantity control storage requirements for the site. The SWM filter design calculations are included in Appendix A.

The SWM quality control calculations in Appendix A confirm the SWM plan for the site exceeds the City's and the MECP's requirements for enhanced level water quality protection.

4 Sanitary Sewer Design

4.1 EXISTING SITE CONDITION

Both existing lots within the site are serviced by separate 135mm diameter sanitary services which are connected to the existing 250mm diameter concrete sanitary sewer on Cléroux Crescent. The existing services will be abandoned, grouted and capped at the property line.

4.2 PROPOSED SANITARY SERVICE

The new residential apartment buildings, which include 40 units per building, will each discharge to a 150 mm diameter sanitary service connected to a 200 mm diameter PVC sanitary sewer and discharging to the existing municipal sanitary sewer on Orient Park Drive via the 250 mm diameter sanitary sewer stub located along the south property limit. The proposed building services and sanitary sewer will have a minimum slope of 1.0% for adequate self flushing. A monitoring manhole (SAN MH2) is proposed at the existing 250 mm stub to provide a connection between the new 200 mm service and the existing 250 mm diameter sewer. Refer to drawing C300 – Site Servicing Plan for the proposed sanitary servicing details.

Based on the City of Ottawa Sanitary Design Guidelines, the sanitary peak flows were evaluated as follows; Block A: 0.94 L/s and Block B: 1.15 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 services were sized to convey the above peak flows and the proposed sanitary sewer was sized to convey the total combined peak flow of 2.30 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 CONDITION

Both existing lots located within the site are serviced by separate 19 mm diameter water services which are connected to the existing 305 mm diameter ductile iron watermain on Cléroux Crescent. The existing services will be abandoned and blanked at the main.

There are five municipal fire hydrants within 150 m of the site, on Innes Road, Cléroux Crescent, and Orient Park Drive, which can be used for fire protection for the proposed development. The contributions of the existing nearby fire hydrants toward the proposed development's required fire flow are described in further detail in the sections below.

5.2 DOMESTIC WATER DEMANDS

The domestic water demands for the proposed development were calculated based on the City of Ottawa Design Guidelines. An average water demand of 280 L/c/d was utilized and daily and hourly peaking factors of 2.5 and 2.2 respectively were applied. The water demands for the proposed buildings are summarized in Table 4.

Table 4: Domestic Water Demands

	BLOCK A	BLOCK B	UNITS
Average Water Demand	17,640	18,032	L/d
Maximum Daily	44,100	45,080	L/d
Maximum Hourly	97,020	99,176	L/d

Refer to Appendix C for the water demand calculations.

5.3 PROPOSED DOMESTIC WATER SERVICES

Each new building will be serviced by a separate water connection as was suggested by City reviewers. Both services will be connected to the existing 305 mm diameter ductile iron watermain on Cléroux Crescent. A main line water valve is proposed in close proximity to the north service connection, between the proposed service connections, for isolation purposes during and following construction. Refer to Drawing C300 – Site Servicing Plan for the proposed water service details.

The Fixture Method from Section 7 of the OBC was used to size the new water services. Each building is expected to have a total of 460 fixture units. Assuming all fixtures are being used at the same time, the required water service capacity is 7.38 L/s. As such, a 100 mm diameter PVC DR-18 water service is proposed for each building and shall be confirmed by the mechanical engineer at the building permit phase. The above service capacity does not include allowances for fire fighting, irrigation, etc. Refer to Appendix C for the required water service capacity and sizing calculations.

5.4 FIRE PROTECTION

The required fire flow rate was calculated in accordance with the 1999 Fire Underwriters Survey (FUS). This method is based on the floor area of the building to be protected, type and combustibility of the structural frame and the separation distances with adjoining buildings. The required fire flow rate is 14,000 L/min. Refer to Appendix C for the fire flow calculations.

Each building is located within 90 m of a hydrant and therefore are compliant with OBC requirements. Fire flow protection will be provided by the following four existing hydrants, which are within 150 m (uninterrupted path) of the proposed buildings:

- One Class AA blue bonnet hydrant located 25 m from each proposed building (25 m east of Block A and 25 m north of Block B) on the south side of Cléroux Crescent;
- One Class AA blue bonnet hydrant located no further than 120 m from the proposed buildings (74 m northwest of Block A and 120 m northwest of Block B) on the south side of Innes Road;
- One Class AA blue bonnet hydrant located no further than 135 m from the proposed buildings (135 m southeast of Block A and 70 m southeast of Block B) on the south side of Cléroux Crescent; and
- One Class AA blue bonnet hydrant located no further than 140 m from the proposed buildings (140 m east of Block A and 95 m east of Block B) on the south side of Orient Park Drive.

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 four existing hydrants near the site consist of blue bonnet hydrants, and as such are Class AA-rated hydrants. As is summarized in Table 5, the required 14,000 L/min fire flow to the proposed buildings is available from the four existing hydrants.

Table 5: Hydrants Required for Fire Flow

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	1	5,700	17,100
AA	> 75 & ≤ 150	3,800	3	11,400	

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

A hydrant flow test is recommended to verify the available fire flow, pressure and overall fire protection.

6 Erosion and Sediment Control

During construction, sediment and erosion controls will be implemented around the site to reduce the potential for any sediment mobilizing off site. The construction and maintenance of erosion and 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 to the allowable 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 flow control located in DICBMH4. The combined 100-year post-development controlled, and uncontrolled peak flow will be reduced below the allowable 5-year pre-development peak flow rate prior to discharging into to the existing municipal storm sewer system on Orient Park Drive via the existing 300 mm diameter storm sewer (located within the municipal easement which extents from the site's south property limit to Orient Park Drive). Stormwater quantity control will be achieved with 272 m^3 of active surface storage in the low impact development dry SWM facility. MECP enhanced level stormwater quality control will be provided with a SWM filter located within the dry low impact development SWM facility.

7.2 SANITARY SERVICE

The estimated combined sanitary flow for the site is 2.30 L/s. The proposed development will be serviced via new 150 mm diameter sanitary building services and a 200 mm diameter sanitary sewer connecting to the existing municipal sanitary sewer system on Orient Park Drive via the existing 250 mm diameter sanitary sewer (located within the municipal easement which extents from the site's south property limit to Orient Park Drive).

7.3 WATER SERVICE

Each new building will be serviced with a new 100 mm diameter PVC DR-18 water service connected to the existing 305 mm diameter ductile iron watermain on Cléroux Crescent. The Block A water demands resulted in an average water demand of 17,640 L/d, a maximum daily demand of 44,100 L/d, and a peak hourly demand of 97,020 L/d. The Block B water demands resulted in an average water demand of 18,032 L/d, a maximum daily demand of 45,080 L/d, and a peak hourly demand of 99,176 L/d. The required fire flow rate is 14,000 L/min. A sprinkler system is not proposed in either of the new buildings. There are four fire hydrants surrounding the site that will provide adequate fire protection.

Appendix A: Stormwater Management Calculations

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	523650

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:	101
Catchment Area (ha):	0.84
Impervious %:	13%

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

Soil Symbol		**Us**											
Soil Series		Uplands											
Hydrologic Soils Group		A											
Soil Texture		sand											
Runoff Coefficient Type		1											
Area (ha)		0.84											
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	0.11	100	0.95									
Gravel	3		89	0.14									
Woodland	10		32	0.12									
Pasture/Lawns	5	0.73	49	0.15									
Meadows	8		38	0.14									
Cultivated	7		62	0.30									
Waterbody	12		50	0.05									
Average CN		55.68											
Average C		0.25											
Average IA		4.61											

Time to Peak Calculations

Max. Catchment Elev. (m):	83.60
Min. Catchment Elev. (m):	76.80
Catchment Length (m):	108
Catchment Slope (%):	6.30%
Method: Airport Method	
Time of Concentration (mins):	15.60

Summary

Catchment CN:	55.7
Catchment C:	0.25
Catchment IA (mm):	4.61
Time of Concentration (hrs):	0.26
Catchment Time to Peak (hrs):	0.17
Catchment Time Step (mins):	2.08

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	523650

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:	201
Catchment Area (ha):	0.63
Impervious %:	68%

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

Soil Symbol		**Us**											
Soil Series		Uplands											
Hydrologic Soils Group		A											
Soil Texture		sand											
Runoff Coefficient Type		1											
Area (ha)		0.63											
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	0.43	100	0.95									
Gravel	3		89	0.09									
Woodland	10		32	0.08									
Pasture/Lawns	5	0.20	49	0.10									
Meadows	8		38	0.09									
Cultivated	7		62	0.22									
Waterbody	12		50	0.05									
Average CN		83.81											
Average C		0.68											
Average IA		2.95											

Time to Peak Calculations

Max. Catchment Elev. (m):	83.60
Min. Catchment Elev. (m):	81.00
Catchment Length (m):	80
Catchment Slope (%):	3.25%
Method: Bransby-Williams Formula	
Time of Concentration (mins):	3.77

Summary

Catchment CN:	83.8
Catchment C:	0.68
Catchment IA (mm):	2.95
Time of Concentration (hrs):	0.06
Catchment Time to Peak (hrs):	0.04
Catchment Time Step (mins):	0.50

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	523650

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:	202
Catchment Area (ha):	0.09
Impervious %:	56%

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

Soil Symbol		**Us**											
Soil Series		Uplands											
Hydrologic Soils Group		A											
Soil Texture		sand											
Runoff Coefficient Type		1											
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	0.05	100	0.95									
Gravel	3		89	0.09									
Woodland	10		32	0.08									
Pasture/Lawns	5	0.04	49	0.10									
Meadows	8		38	0.09									
Cultivated	7		62	0.22									
Waterbody	12		50	0.05									
Average CN		77.33											
Average C		0.57											
Average IA		3.33											

Time to Peak Calculations

Max. Catchment Elev. (m):	83.20
Min. Catchment Elev. (m):	81.20
Catchment Length (m):	75
Catchment Slope (%):	2.67%
Method: Bransby-Williams Formula	
Time of Concentration (mins):	4.47

Summary

Catchment CN:	77.3
Catchment C:	0.57
Catchment IA (mm):	3.33
Time of Concentration (hrs):	0.07
Catchment Time to Peak (hrs):	0.05
Catchment Time Step (mins):	0.60

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Project Number	523650

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:	203
Catchment Area (ha):	0.12
Impervious %:	

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

Soil Symbol		**Us**											
Soil Series		Uplands											
Hydrologic Soils Group		A											
Soil Texture		sand											
Runoff Coefficient Type		1											
Area (ha)		0.12											
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	0.14									
Woodland	10		32	0.12									
Pasture/Lawns	5	0.12	49	0.15									
Meadows	8		38	0.14									
Cultivated	7		62	0.30									
Waterbody	12		50	0.05									
Average CN		49.00											
Average C		0.15											
Average IA		5.00											

Time to Peak Calculations

Max. Catchment Elev. (m):	81.60
Min. Catchment Elev. (m):	76.90
Catchment Length (m):	48
Catchment Slope (%):	9.79%
Method: Airport Method	
Time of Concentration (mins):	10.11

Summary

Catchment CN:	49.0
Catchment C:	0.15
Catchment IA (mm):	5.00
Time of Concentration (hrs):	0.17
Catchment Time to Peak (hrs):	0.11
Catchment Time Step (mins):	1.35

TATHAM ENGINEERING

Project :	2380 & 2396 CLÉROUX CRES
File No.	523650
Date:	Jan-23
Designed By:	HY
Checked By:	GC
Subject:	Dry LID SWM Facility Discharge Table

OUTLET CONTROL

Orifice Control

	Orifice
Orifice Size (mm):	55
Cross-Sectional Area (sq.m):	0.002376
Orifice Coefficient:	0.63
Invert Elevation (m):	77.40
Outlet Pipe Size (mm):	250

STAGE DISCHARGE TABLE & CONTROL STRUCTURE CONFIGURATION

Water Level	55 mm dia. Orifice		250 PVC	Total Discharge	Active Storage
	Head	Discharge	Capacity		
(m)	(m)	(cms)	(cms)	(cms)	(cm)
79.45	2.02	0.009	0	0.009	0.0
79.50	2.07	0.010	#REF!	0.010	10.5
79.55	2.12	0.010	#REF!	0.010	21.6
79.60	2.17	0.010	#REF!	0.010	33.3
79.65	2.22	0.010	#REF!	0.010	45.6
79.70	2.27	0.010	#REF!	0.010	58.6
79.75	2.32	0.010	#REF!	0.010	72.3
79.80	2.37	0.010	#REF!	0.010	86.7
79.85	2.42	0.010	#REF!	0.010	101.8
79.90	2.47	0.010	#REF!	0.010	117.6
79.95	2.52	0.011	#REF!	0.011	134.2
80.00	2.57	0.011	#REF!	0.011	151.5
80.05	2.62	0.011	#REF!	0.011	169.6
80.10	2.67	0.011	#REF!	0.011	188.5
80.15	2.72	0.011	#REF!	0.011	208.2
80.20	2.77	0.011	#REF!	0.011	228.7
80.25	2.82	0.011	#REF!	0.011	250.1
80.30	2.87	0.011	#REF!	0.011	272.4
80.35	2.92	0.011	#REF!	0.011	295.5
80.40	2.97	0.011	#REF!	0.011	319.5
80.45	3.02	0.012	#REF!	0.012	344.4
80.50	3.07	0.012	#REF!	0.012	370.3
80.55	3.12	0.012	#REF!	0.012	397.1
80.60	3.17	0.012	#REF!	0.012	424.9

Proposed Condition (Controled area)

Design Storm	Pond Operating Characteristics		
	Storage (m^3)	Total Outlfow (m^3/s)	Water Level (m)
100yr 24hr SCS	255	0.011	80.26
100yr 3hr Chicago	267	0.011	80.29
100yr 6hr Chicago	270	0.011	80.29

TATHAM ENGINEERING

Project :	2380 & 2396 CLÉROUX CRES
File No.	523650
Date:	Jan-23
Designed By:	HY
Checked By:	GC
Subject:	Dry LID SWM Facility

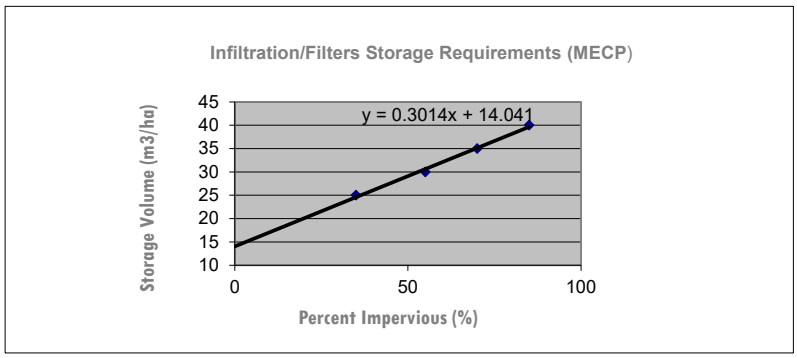
Dry Pond Storage

Elevation	Depth	Increasing Area	Accum Area	Volume	Quality Volume	Quantity Volume
(m)	(m)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)
79.15	0.00	0.00	139.00	0.00	0.00	0.00
79.20	0.05	9.92	148.92	7.20	7.20	0.00
79.25	0.10	10.26	159.18	7.70	14.90	0.00
79.30	0.15	10.60	169.78	8.22	23.12	0.00
79.35	0.20	10.95	180.73	8.76	31.88	0.00
79.40	0.25	11.29	192.02	9.32	41.20	0.00
79.45	0.30	11.63	203.65	9.89	51.09	0.00
79.50	0.35	11.97	215.62	10.48	0.00	10.48
79.55	0.40	12.31	227.93	11.09	0.00	21.57
79.60	0.45	12.65	240.58	11.71	0.00	33.28
79.65	0.50	13.00	253.58	12.35	0.00	45.63
79.70	0.55	13.34	266.92	13.01	0.00	58.64
79.75	0.60	13.68	280.60	13.69	0.00	72.33
79.80	0.65	14.02	294.62	14.38	0.00	86.71
79.85	0.70	14.36	308.99	15.09	0.00	101.80
79.90	0.75	14.71	323.69	15.82	0.00	117.61
79.95	0.80	15.05	338.74	16.56	0.00	134.17
80.00	0.85	15.39	354.13	17.32	0.00	151.49
80.05	0.90	15.73	369.86	18.10	0.00	169.59
80.10	0.95	16.07	385.93	18.89	0.00	188.48
80.15	1.00	16.42	402.35	19.71	0.00	208.19
80.20	1.05	16.76	419.11	20.53	0.00	228.72
80.25	1.10	17.10	436.21	21.38	0.00	250.11
80.30	1.15	17.44	453.65	22.24	0.00	272.35
80.35	1.20	17.78	471.43	23.13	0.00	295.48
80.40	1.25	18.12	489.55	24.02	0.00	319.50
80.45	1.30	18.47	508.02	24.94	0.00	344.44
80.50	1.35	18.81	526.83	25.87	0.00	370.31
80.55	1.40	19.15	545.98	26.82	0.00	397.13
80.60	1.45	19.49	565.47	27.78	0.00	424.91

TATHAM ENGINEERING

Project:	2380 & 2396 CLÉROUX CRES
File No.:	523650
Date:	Jan 2023
Designed by:	HY
Checked by:	GC
Subject:	Quality Storage Calculations - SWM Sand Filter

Contributing Drainage Area to Stormwater Sand Filter = 0.72 ha (Catchment 201+202)
Percent Impervious = 67%



MECP Table 3-2 Infiltration Practices	
80% Enhanced Level Treatment	
% Imp	m^3/ha
35	25.00
55	30.00
70	35.00
85	40.00

(As per MECP SWM Planning & Design Manual, 2003, Table 3-2)

Required Water Quality Storage Volume = 34.13 m^3/ha
= 24.6 m^3

Required Water Quality Storage Volume = 49.2 m^3 (Doubled to account for winter conditions)

Water Quality Volume Provided = 51.1 m^3 (Dead storage above the SWM Filter)

Stormwater Sand Filter Design

Sand filter media bed depth = 1 m (as recommended in Section 4.9.2 of the CVC/TRCA LID Manual (2010)

Maximum contributing drainage area = 5.0 ha (as recommended in Section 4.6.7 of the MECP SWM Manual)
Proposed drainage area to sand filter = 0.72 ha (OK, less than MECP recommended maximum)

Maximum surface storage depth = 0.5 m (as recommended in Table 4.10 of the MECP SWM Manual)
Proposed max. surface storage depth = 0.3 m (OK, less than MECP recommended maximum)

Sand Filter Footprint Surface Area = WQV / (d_b x V_r) (As per CVC / TRCA LID Manual Section 4.9.2)
Where WQV = 49.2 m^3 (Filtration Volume)
d_b = 1.00 m (Filter media bed depth)
V_r 0.4 (Void space ratio for filter bed)

Required Filter Footprint Surface Area = 122.9 m^2

Total water filter footprint surface area provided = 139.0 m^2 (exceeds the required footprint surface area, therefore OK)

Stormwater sand filter drawdown caculation

Max. surface ponding volume = 323.4 m^3
Assumed Percolation rate of imported sand filter = 210 mm/hr (as per table 4.4 of the MECP SWM Manual)
Safety factor = 2.5 (As per Table C2 of the CVC / TRCA LID Manual)
Total water filter footprint surface area provided = 139.0 m^2

Maximum drawdown time = 27.7 hrs

File No. 523650
Project: Proposed Apartment Buildings
Project Address: 2380 & 2396 CLÉROUX CRES
Client: Bridor Development

Date: January 23, 2023
Designed: HY
Checked: GC
Drawing Reference: STM-1

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})
A1	CB1	CBMH2	0.030	0.000	0.009	0.05	0.05	10.00	104.19	5.02	250	PVC	0.50%	24.0	42.05	0.86	0.47	**0.12**
A2	CBMH2	CBMH3	0.000	0.000	0.061	0.16	0.21	10.47	101.79	21.25	250	PVC	0.50%	23.5	42.05	0.86	0.46	**0.51**
A3	ROOF DRAIN	CBMH3	0.000	0.000	0.107	0.28	0.28	10.00	104.19	29.47	250	PVC	4.00%	12.6	118.94	2.42	0.09	**0.25**
A4	CBMH3	POND	0.000	0.000	0.059	0.16	0.65	10.92	99.55	64.42	375	PVC	0.50%	17.1	123.98	1.12	0.25	**0.52**
A5	ROOF DRAIN	POND	0.000	0.000	0.102	0.27	0.27	10.00	104.19	27.93	250	PVC	2.00%	4.0	84.10	1.71	0.04	**0.33**
A6	CB7	CB6	0.038	0.000	0.038	0.13	0.13	10.00	104.19	13.76	250	PVC	0.50%	23.2	42.05	0.86	0.45	**0.33**
A7	CB6	POND	0.002	0.000	0.012	0.03	0.17	10.45	101.87	16.88	250	PVC	0.50%	19.8	42.05	0.86	0.39	**0.40**
	POND	CBMH5	0.000	0.000	0.000	0.00	0.00	0.00	0.00	13.00	250	PVC	5.50%	22.0	139.46	2.84	0.13	**0.09**
A8	EX CB	CBMH5	0.120	0.000	0.000	0.10	0.10	10.00	104.19	10.43	250	PVC	0.50%	16.8	42.05	0.86	0.33	**0.25**

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. 523650 **Date:** January 23, 2023

Project: Proposed Apartment Buildings **Designed:** HY

Project Address: 2380 & 2396 CLÉROUX CRES **Checked:** GC

Client: Bridor Development **Drawing Reference:** STM-1

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)
CB1	CBMH2	79.90	79.78	82.25	82.25	2.10	2.22
CBMH2	CBMH3	79.72	79.60	82.25	82.00	2.28	2.15
CBMH3	POND	79.54	79.45	82.00		2.08	
CB7	CB6	79.52	79.40	80.30	80.35	0.53	0.70
CB6	POND	79.40	79.30	80.35		0.70	
DICBMH4	CBMH5	77.40	76.20	79.45	77.20	1.80	0.75
EX CB	CBMH5	75.00	74.97	76.90	77.20	1.65	1.98

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
```


***** 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: 01/19/2023 TIME: 10:23:53

USER:

COMMENTS: _____

****
** SIMULATION : Run 01 **
****

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								

```
    READ STORM                  5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\03956527-4cfb-41bf-a7d1-4d152ac3fb13\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr

*
 ** CALIB NASHYD         0101  1  5.0    0.84    0.02 12.08   8.00 0.16   0.000
    [CN=55.7         ]
    [ N = 3.0:Tp 0.17]
*
================================================================================
=======================


       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
Copyright 2007 - 2020 Smart City Water Inc
All rights reserved.


                  *****  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\4761ae12-
6660-4e1c-9676-d871b8093e32\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\4761ae12-
6660-4e1c-9676-d871b8093e32\scenario


DATE: 01/19/2023                          TIME: 10:23:53

USER:


COMMENTS: _____________________________________________________________
```

```
  ***********************************************
  ** SIMULATION : Run 02                        **
  ***********************************************

  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\03956527-4cfb-41bf-a7d1-4d152ac3fb13\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 ** CALIB NASHYD         0101  1  5.0    0.84    0.03 12.00  14.22 0.22   0.000
    [CN=55.7         ]
    [ N = 3.0:Tp 0.17]
*
================================================================================
======================


       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
Copyright 2007 - 2020 Smart City Water Inc
All rights reserved.


                 *****  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\c92f24e4-
8db6-46b0-88af-6f3a6a3a6952\scenario
```

Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\c92f24e4-8db6-46b0-88af-6f3a6a3a6952\scenario

DATE: 01/19/2023 TIME: 10:23:54

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : Run 03                         **
  ************************************************

  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= 77.00 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\03956527-4cfb-41bf-a7d1-4d152ac3fb13\937e7433-4342-40da-96a5-67c3cdf
    remark: Ottawa Macdonald Cartier SCS 24 10yr

*
 ** CALIB NASHYD         0101  1  5.0    0.84    0.04 12.00  19.03 0.25   0.000
    [CN=55.7         ]
    [ N = 3.0:Tp 0.17]
*
================================================================================
======================


       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
Copyright 2007 - 2020 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\e47b3e90-6d5b-4b5b-a0dd-45c31ff72924\scenario
Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\e47b3e90-6d5b-4b5b-a0dd-45c31ff72924\scenario

DATE: 01/19/2023 TIME: 10:23:54

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : Run 04                         **
  ************************************************

  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= 91.08 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\03956527-4cfb-41bf-a7d1-4d152ac3fb13\8677e260-0877-4303-925b-23f8544
    remark: Ottawa Macdonald Cartier SCS 24 25yr

*
 ** CALIB NASHYD         0101  1  5.0    0.84    0.06 12.00  25.82 0.28   0.000
    [CN=55.7         ]
    [ N = 3.0:Tp 0.17]
*
================================================================================
=======================

       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
```


***** 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\f68a9a6e-b8dc-491f-bbd5-38b0c62db25c\scenario
Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\f68a9a6e-b8dc-491f-bbd5-38b0c62db25c\scenario

DATE: 01/19/2023 TIME: 10:23:54

USER:

COMMENTS: _____

```
**********************************************
** SIMULATION : Run 05                       **
**********************************************
```

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								
	READ STORM	5.0							
	[Ptot=101.52 mm]								
	fname : C:\Users\hyu\AppData\Local\Temp\03956527-4cfb-41bf-a7d1-4d152ac3fb13\55c88cf1-c07d-4de2-b4c7-fa9ea96								
	remark: Ottawa Macdonald Cartier SCS 24 50yr								

```
*
 ** CALIB NASHYD         0101  1  5.0    0.84    0.07 12.00  31.30 0.31   0.000
    [CN=55.7         ]
    [ N = 3.0:Tp 0.17]
*
================================================================================
=======================


       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
Copyright 2007 - 2020 Smart City Water Inc
All rights reserved.


                  *****  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\f81c5622-
08d5-48bf-bca3-1eb71c45cbd7\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\f81c5622-
08d5-48bf-bca3-1eb71c45cbd7\scenario


DATE: 01/19/2023                          TIME: 10:23:54

USER:


COMMENTS: _____________________________________________________________


  ********************************************
  ** SIMULATION : Run 06                     **
  ********************************************
```

```
  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\03956527-4cfb-41bf-a7d1-4d152ac3fb13\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 ** CALIB NASHYD         0101  1  5.0    0.84    0.08 12.00  37.07 0.33   0.000
    [CN=55.7         ]
    [ N = 3.0:Tp 0.17]
*
 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
```


***** 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: 01/19/2023 TIME: 10:24:18

USER:

COMMENTS: _____

```
**********************************************
** SIMULATION : Run 01                       **
**********************************************
```

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								

```
    CHIC STORM                10.0
    [ Ptot= 42.51 mm ]
*
 ** CALIB NASHYD         0101  1  5.0    0.84    0.02  1.17   5.97 0.14   0.000
    [CN=55.7         ]
    [ N = 3.0:Tp 0.17]
*
================================================================================
======================


       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
Copyright 2007 - 2020 Smart City Water Inc
All rights reserved.


                  *****  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: 01/19/2023                          TIME: 10:24:18

USER:


COMMENTS: _____________________________________________________________


  ********************************************
  ** SIMULATION : Run 02                     **
  ********************************************
```

```
  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         0101  1  5.0    0.84    0.02  2.17   7.98 0.16   0.000
    [CN=55.7         ]
    [ N = 3.0:Tp 0.17]
*
 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
```


***** 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: 01/25/2023 TIME: 05:21:52

USER:

COMMENTS: _____

```
**********************************************
** SIMULATION : Run 01                       **
**********************************************
```

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								

```
    READ STORM                  5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr

*
 ** CALIB NASHYD         0128  1  5.0    0.12    0.00 12.08   6.28 0.13   0.000
    [CN=49.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                  5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr

*
 *  CALIB STANDHYD       0130  1  5.0    0.63    0.07 12.00  34.69 0.71   0.000
    [I%=68.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot= 49.09 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\a83aa445-7986-4
108-a295-abaadc5
    remark: Ottawa Macdonald Cartier SCS 24 2yr

*
 *  CALIB STANDHYD       0131  1  5.0    0.09    0.01 12.00  28.54 0.58   0.000
    [I%=56.0:S%= 2.00]
*
    ADD [  0130+  0131]  0127  3  5.0    0.72    0.07 12.00  33.92  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0132  1  5.0    0.72    0.01 12.50  34.06  n/a   0.000
*
    ADD [  0128+  0132]  0129  3  5.0    0.84    0.01 12.08  30.09  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
```


***** 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\3e1f6bf3-ccfb-4f8c-872e-40caa5f9ed93\scenario
Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\3e1f6bf3-ccfb-4f8c-872e-40caa5f9ed93\scenario

DATE: 01/25/2023 TIME: 05:21:52

USER:

COMMENTS: _____

```
  ********************************************
  ** SIMULATION : Run 02                     **
  ********************************************

  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\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\5aca6ac2-ef25-4c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 ** CALIB NASHYD         0128  1  5.0    0.12    0.00 12.00  11.36 0.17   0.000
    [CN=49.0         ]
```

```
    [ N = 3.0:Tp 0.17]
*
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 *  CALIB STANDHYD       0130  1  5.0    0.63    0.09 12.00  47.77 0.72   0.000
    [I%=68.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot= 65.91 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\5aca6ac2-ef25-4
c6b-b023-6eea581
    remark: Ottawa Macdonald Cartier SCS 24 5yr

*
 *  CALIB STANDHYD       0131  1  5.0    0.09    0.01 12.00  41.32 0.63   0.000
    [I%=56.0:S%= 2.00]
*
    ADD [  0130+  0131]  0127  3  5.0    0.72    0.10 12.00  46.96  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0132  1  5.0    0.72    0.01 12.58  47.05  n/a   0.000
*
    ADD [  0128+  0132]  0129  3  5.0    0.84    0.01 12.08  41.95  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
Copyright 2007 - 2020 Smart City Water Inc
All rights reserved.
```

***** 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\20983300-3dd2-4350-9aff-ecc9603591ad\scenario
Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\20983300-3dd2-4350-9aff-ecc9603591ad\scenario

DATE: 01/25/2023 TIME: 05:21:52

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : Run 03                        **
  ************************************************

  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= 77.00 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\937e7433-4342-40da-96a5-67c3cdf
    remark: Ottawa Macdonald Cartier SCS 24 10yr

*
 ** CALIB NASHYD         0128  1  5.0    0.12    0.00 12.00  15.35 0.20   0.000
    [CN=49.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                  5.0
    [ Ptot= 77.00 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\937e7433-4342-40da-96a5-67c3cdf
    remark: Ottawa Macdonald Cartier SCS 24 10yr

*
```

```
 *  CALIB STANDHYD       0130  1  5.0    0.63    0.11 12.00  56.59 0.74   0.000
    [I%=68.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot= 77.00 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\937e7433-4342-4
0da-96a5-67c3cdf
    remark: Ottawa Macdonald Cartier SCS 24 10yr

*
 *  CALIB STANDHYD       0131  1  5.0    0.09    0.01 12.00  49.29 0.64   0.000
    [I%=56.0:S%= 2.00]
*
    ADD [  0130+  0131]  0127  3  5.0    0.72    0.12 12.00  55.68  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0132  1  5.0    0.72    0.01 12.67  55.74  n/a   0.000
*
    ADD [  0128+  0132]  0129  3  5.0    0.84    0.02 12.08  49.97  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
Copyright 2007 - 2020 Smart City Water Inc
All rights reserved.


                 *****  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\cb864a73-
4fb4-4f10-b511-fe2fc736f640\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\cb864a73-
```

4fb4-4f10-b511-fe2fc736f640\scenario

DATE: 01/25/2023 TIME: 05:21:52

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : Run 04                         **
  ************************************************

  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= 91.08 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\8677e260-0877-4
303-925b-23f8544
    remark: Ottawa Macdonald Cartier SCS 24 25yr

*
 ** CALIB NASHYD         0128  1  5.0    0.12    0.01 12.00  21.06 0.23   0.000
    [CN=49.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                  5.0
    [ Ptot= 91.08 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\8677e260-0877-4
303-925b-23f8544
    remark: Ottawa Macdonald Cartier SCS 24 25yr

*
 *  CALIB STANDHYD       0130  1  5.0    0.63    0.13 12.00  68.00 0.75   0.000
    [I%=68.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot= 91.08 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\8677e260-0877-4
303-925b-23f8544
    remark: Ottawa Macdonald Cartier SCS 24 25yr
```

```
*
 *  CALIB STANDHYD       0131  1  5.0    0.09    0.02 12.00  59.69 0.66   0.000
    [I%=56.0:S%= 2.00]
*
    ADD [  0130+  0131]  0127  3  5.0    0.72    0.14 12.00  66.96  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0132  1  5.0    0.72    0.01 13.00  67.02  n/a   0.000
*
    ADD [  0128+  0132]  0129  3  5.0    0.84    0.02 12.08  60.45  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
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2020 Smart City Water Inc
All rights reserved.


                  *****  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\3592b175-
6811-4e92-acdf-1c90c60f3294\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\3592b175-
6811-4e92-acdf-1c90c60f3294\scenario


DATE: 01/25/2023                          TIME: 05:21:52
```

USER:

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : Run 05                        **
  ***********************************************

  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=101.52 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\55c88cf1-c07d-4
de2-b4c7-fa9ea96
    remark: Ottawa Macdonald Cartier SCS 24 50yr

*
 ** CALIB NASHYD         0128  1  5.0    0.12    0.01 12.00  25.72 0.25   0.000
    [CN=49.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                  5.0
    [ Ptot=101.52 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\55c88cf1-c07d-4
de2-b4c7-fa9ea96
    remark: Ottawa Macdonald Cartier SCS 24 50yr

*
 *  CALIB STANDHYD       0130  1  5.0    0.63    0.15 12.00  76.60 0.75   0.000
    [I%=68.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot=101.52 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\55c88cf1-c07d-4
de2-b4c7-fa9ea96
    remark: Ottawa Macdonald Cartier SCS 24 50yr

*
 *  CALIB STANDHYD       0131  1  5.0    0.09    0.02 12.00  67.58 0.67   0.000
    [I%=56.0:S%= 2.00]
*
    ADD [  0130+  0131]  0127  3  5.0    0.72    0.17 12.00  75.48  n/a   0.000
```

```
*
 ** Reservoir
    OUTFLOW:             0132  1  5.0    0.72    0.01 13.00  75.61  n/a   0.000
*
    ADD [  0128+  0132]  0129  3  5.0    0.84    0.02 12.08  68.48  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
Copyright 2007 - 2020 Smart City Water Inc
All rights reserved.


                  *****  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\4fd264b8-
2922-458d-bc51-3b763d71b179\scenario
  Summary filename:
C:\Users\hyu\AppData\Local\Civica\VH5\e2c2d2be-418b-4c4d-a4c4-d228733f752c\4fd264b8-
2922-458d-bc51-3b763d71b179\scenario


DATE: 01/25/2023                          TIME: 05:21:52

USER:


COMMENTS: _____________________________________________________________


  ********************************************
  ** SIMULATION : Run 06                     **
  ********************************************
```

```
  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\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 ** CALIB NASHYD         0128  1  5.0    0.12    0.01 12.00  30.65 0.27   0.000
    [CN=49.0         ]
    [ N = 3.0:Tp 0.17]
*
    READ STORM                  5.0
    [ Ptot=111.87 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 *  CALIB STANDHYD       0130  1  5.0    0.63    0.17 12.00  85.23 0.76   0.000
    [I%=68.0:S%= 2.00]
*
    READ STORM                  5.0
    [ Ptot=111.87 mm ]
    fname :
C:\Users\hyu\AppData\Local\Temp\d69b40cb-a10c-407e-94b0-c245b2e4f1e7\e20e7578-d439-4
ffb-8edc-8fe2588
    remark: Ottawa Macdonald Cartier SCS 24 100yr

*
 *  CALIB STANDHYD       0131  1  5.0    0.09    0.02 12.00  75.55 0.68   0.000
    [I%=56.0:S%= 2.00]
*
    ADD [  0130+  0131]  0127  3  5.0    0.72    0.19 12.00  84.02  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0132  1  5.0    0.72    0.01 13.00  84.12  n/a   0.000
*
    ADD [  0128+  0132]  0129  3  5.0    0.84    0.02 12.08  76.48  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
```


***** 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: 01/20/2023 TIME: 02:15:48

USER:

COMMENTS: _____

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

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

START @ 0.00 hrs

```
    CHIC STORM                10.0
    [ Ptot= 71.66 mm ]
*
 ** CALIB NASHYD         0203  1  5.0    0.12    0.01  1.17  13.37 0.19   0.000
    [CN=49.0         ]
    [ N = 3.0:Tp 0.17]
*
    CHIC STORM                10.0
    [ Ptot= 71.66 mm ]
*
 *  CALIB STANDHYD       0202  1  5.0    0.09    0.03  1.00  45.40 0.63   0.000
    [I%=56.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 71.66 mm ]
*
 *  CALIB STANDHYD       0201  1  5.0    0.63    0.22  1.00  52.34 0.73   0.000
    [I%=68.0:S%= 2.00]
*
    ADD [  0201+  0202]  0094  3  5.0    0.72    0.25  1.00  51.48  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0093  1  5.0    0.72    0.01  2.33  51.54  n/a   0.000
*
    ADD [  0203+  0093]  0035  3  5.0    0.84    0.02  1.17  46.09  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
Copyright 2007 - 2020 Smart City Water Inc
All rights reserved.


                  *****  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: 01/20/2023 TIME: 02:15:48

USER:

COMMENTS: _____

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

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								
	CHIC STORM		10.0						
	[Ptot= 82.32 mm]								
*									
**	CALIB NASHYD	0203	1 5.0	0.12	0.01	2.17	17.43	0.21	0.000
	[CN=49.0]								
	[N = 3.0:Tp 0.17]								
*									
	CHIC STORM		10.0						
	[Ptot= 82.32 mm]								
*									
*	CALIB STANDHYD	0202	1 5.0	0.09	0.03	2.00	53.14	0.65	0.000
	[I%=56.0:S%= 2.00]								
*									
	CHIC STORM		10.0						
	[Ptot= 82.32 mm]								
*									
*	CALIB STANDHYD	0201	1 5.0	0.63	0.22	2.00	60.89	0.74	0.000
	[I%=68.0:S%= 2.00]								
*									
	ADD [0201+ 0202]	0094	3 5.0	0.72	0.25	2.00	59.92	n/a	0.000
*									
**	Reservoir								
	OUTFLOW:	0093	1 5.0	0.72	0.01	3.33	60.07	n/a	0.000
*									
	ADD [0203+ 0093]	0035	3 5.0	0.84	0.02	2.17	53.98	n/a	0.000

```
*
 FINISH

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

Appendix B:
Sanitary Service Calculations

File No. 523650
Project: Proposed Apartment Buildings
Project Address: 2380 & 2396 Cleroux Crescent
Client: Bridor Developments

Date: January 25, 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 A	SAN MH1	0.45	63.0	0.45	63.0	4.0	0.82	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.45	0.45	0.13	0.94	9.6	150	PVC	1.00%	15.23	0.86	78.60	78.50
SITE	PROP. BLDG B	SAN MH1	0.39	64.4	0.39	64.4	4.0	1.04	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.39	0.39	0.11	1.15	15.0	150	PVC	1.00%	15.23	0.86	78.65	78.50
	SAN MH1	SAN MH2	0.000	0.0	0.84	127.4	4.0	2.06	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.00	0.84	0.23	2.30	64.4	200	PVC	4.80%	71.86	2.29	78.38	75.29

DESIGN PARAMETERS NOTES

Average Daily Flow =	280	L/p/day
Commercial and Institutional Flow =	280000	L/ha/da
Industrial Flow =	35000	L/ha/da
Maximum Residential 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 A	Building B
Bachelor =	1.4	0	0
1 Bedroom =	1.4	30	28
2 Bedroom =	2.1	10	12
3 Bedroom =	3.1	0	0
		63	64.4

Appendix C:
Water Supply and Fire Protection Calculations

File No.	523650	**Date: Januray 25, 2023**
Project:	Proposed Apartment Buildings	**Designed: GC**
Project Address:	2380 & 2396 Cleroux Crescent	**Checked: JA**
Client:	Bridor Developments	**Drawing Reference: C300**

ANTICIPATED WATER DEMANDS

Population			
Appartments:	Person Per Unit	Block A	Block B
Bachelor =	1.4	0	0
1 Bedroom =	1.4	30	28
2 Bedroom =	2.1	10	12
3 Bedroom =	3.1	0	0
		63.00	64.40

	Block A	Block B	
Average Daily Demand Per Capita =	280	280	L/c/d
Average Daily Demand =	17640	18032	L/d
	0.20	0.21	L/s
Maximum Daily Peak Factor =	2.5	2.5	* As per City of Ottawa
Maximum Daily Residential =	44100	45080	L/d
	0.51	0.52	L/s
Maximum Hourly Peak Factor =	2.2	2.2	* As per City of Ottawa
Maximum Hourly Residential =	97020	99176	L/d
	1.12	1.15	L/s

REQUIRED WATER SERVICE CAPACITY (SAME FOR BLOCK A AND B)

Fixture Count per Building					
	1 Bedroom	2 Bedroom	Unit Counts	WSFU	Total
Unrinal Flush Tank	1	1	40	2	80
Sinks	2	2	80	1	80
Bathub	1	1	40	4	160
Diswasher	1	1	40	1.5	60
Washing Machine	1	1	40	2	80
					460

Total fixture units:	460	(as per OBC Table 7.6.3.2.A)
Conversion of fixture units to equivalent gpm:	117	gpm
Required Pipe Capacity =	637,766	L/d
=	7.38	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 = $(\pi/4) \times D^2$

Q = water supply flow rate to be accounted for in m^3/h

Minimum pipe diameter for each building: $d = (4Q/\pi V)^{1/2}$ (derived from Q = VA formula)

$d = 0.079$ m

$d = 79$ mm

Proposed pipe diameter for each building: 100 mm

TATHAM ENGINEERING

FUS Fire Flow Calculations (Worst Case Scenario)

Tatham File No. : 523650
Project : 2380 & 2396 Cleroux Crescent
Date : January 25, 2023
Designed by : GC
Checked by : JA

Step	Task	Term	Options	Multiplier	Choose:	Value	unit	Fire Flow
			Structural Framing Material					
1	Choose frame used for building	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				
			Floor Space Area					
2	Choose type of structure	Type of structure	Single family dwelling	0	Building	1		
			Townhouse - no. of units	0				
			Building	1				
3	Enter total floor space area (excluding basement)			1	3051.0		sq.m.	
4	Obtain fire flow before reductions	Required fire flow	**Fire Flow = 220 x C x Area$^{0.5}$**				L/min	**10,000**
							L/s	166.7
			Reductions or surcharge due to factors affecting burning					
5	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-0.25	Combustible	0		
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15			L/min	**10,000**
			Rapid burning	0.25			L/s	166.7
6	Choose reduction for sprinklers	Sprinkler reduction	Sprinklers conforming to NFPA13 (wet or dry system)	-0.30	False	0		
			Water supply is standard for both the system and fire department hose lines (siamese connection)	-0.10	False	0	L/min	**10,000**
			Fully supervised system (electronic monitoring system on at all times)	-0.10	False	0	L/s	166.7
7	Choose separation	Exposure distance between units	North side	Over 45m	0			
			East side	20.1 to 30m	0.1			
			South side	20.1 to 30m	0.1		L/min	**14,000**
			West side	10.1 to 20m	0.15	0.35	L/s	233.3
			Net required fire flow					
8	Obtain fire flow and duration		Minimum required fire flow rate (rounded to nearest 1000)				L/min	**14,000**
			Minimum required fire flow rate				L/s	**233.3**
			Required duration of fire flow				hr	**2**

TATHAM ENGINEERING

Water Pressure Calculations (Block A)

Tatham File No. : 523650
Project : 2380 & 2396 Cleroux Crescent
Date : January 25, 2023
Designed by : GC
Reviewed by : JA

Piezometric Head Equation (Derived from Bernoulli's Equation)

$$h = \frac{p}{\gamma} + z$$

Where:

h = HGL (m)
p = Pressure (Pa)
γ = Specific weight (N/m3) = 9810
z = Elevation of centreline of pipe (m) = 80.62

Water Pressure at Cleroux Crescent Connection			
HGL (m)		Pressure	
		kPa	psi
Max Day	131	494.23	71.68
Peak Hour	127	454.99	65.99
Max. Day + Fire =	123.1	416.73	60.44

Hazen Williams Equation

$$h_f = \frac{10.67 \times Q^{1.85} \times L}{C^{1.85} \times d^{4.87}}$$

Where:

h_f = Head loss over the length of pipe (m)
Q = Volumetric flow rate (m^3/s)
L = Length of pipe (m)
C = Pipe roughness coefficient
d = Pipe diameter (m)

Scenario 1: maximum daily demand

Q (L/s)	0.51	
C	150	
L (m.)	19.5	
I.D. (mm)	100	
V (m/s)	0.06	
h_f (m)	0.00	
Head Loss (psi)	0.00	
Pressure (psi)	71.68	
Service Obv. @ Street Connection (m)	80.67	
Service Obv. @ Building Connection (m)	80.45	
Pressure Adjustment (psi)	0.31	(due to service elevation difference from street to building)
Adjusted Min. Pressure (psi)	71.99	(must not be less than 50 psi; must not be more than 80 psi)

Scenario 2: maximum hourly demand

Q (L/s)	1.12	
C	150	
L (m.)	19.5	
I.D. (mm)	100	
V (m/s)	0.14	
h_f (m)	0.01	
Head Loss (psi)	0.01	
Pressure (psi)	65.98	
Service Obv. @ Street Connection (m)	80.67	
Service Obv. @ Building Connection (m)	80.45	
Pressure Adjustment (psi)	0.31	(due to service elevation difference from street to building)
Adjusted Min. Pressure (psi)	66.30	(must not be less than 40 psi; must not be more than 80 psi)

TATHAM ENGINEERING

Water Pressure Calculations (Block B)

Tatham File No. : 523650
Project : 2380 & 2396 Cleroux Crescent
Date : January 25, 2023
Designed by : GC
Reviewed by : JA

Piezometric Head Equation (Derived from Bernoulli's Equation)

$$h = \frac{p}{\gamma} + z$$

Where:

h = HGL (m)
p = Pressure (Pa)
γ = Specific weight (N/m3) = 9810
z = Elevation of centreline of pipe (m) = 81.01

Water Pressure at Cleroux Crescent Connection			
HGL (m)		Pressure	
		kPa	psi
Max Day	131	490.40	71.13
Peak Hour	127	451.16	65.44
Max. Day + Fire =	123.1	412.90	59.89

Hazen Williams Equation

$$h_f = \frac{10.67 \times Q^{1.85} \times L}{C^{1.85} \times d^{4.87}}$$

Where:

h_f = Head loss over the length of pipe (m)
Q = Volumetric flow rate (m^3/s)
L = Length of pipe (m)
C = Pipe roughness coefficient
d = Pipe diameter (m)

Scenario 1: maximum daily demand

Q (L/s)	0.52	
C	150	
L (m.)	14.7	
I.D. (mm)	100	
V (m/s)	0.07	
h_f (m)	0.00	
Head Loss (psi)	0.00	
Pressure (psi)	71.13	
Service Obv. @ Street Connection (m)	81.06	
Service Obv. @ Building Connection (m)	80.10	
Pressure Adjustment (psi)	1.37	(due to service elevation difference from street to building)
Adjusted Min. Pressure (psi)	72.49	(must not be less than 50 psi; must not be more than 80 psi)

Scenario 2: maximum hourly demand

Q (L/s)	1.15	
C	150	
L (m.)	14.7	
I.D. (mm)	100	
V (m/s)	0.15	
h_f (m)	0.00	
Head Loss (psi)	0.01	
Pressure (psi)	65.43	
Service Obv. @ Street Connection (m)	81.06	
Service Obv. @ Building Connection (m)	80.10	
Pressure Adjustment (psi)	1.37	(due to service elevation difference from street to building)
Adjusted Min. Pressure (psi)	66.80	(must not be less than 40 psi; must not be more than 80 psi)

Appendix D:
Boundary Conditions

Boundary Conditions
2396 Cleroux Street

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	31	0.51
Maximum Daily Demand	76	1.27
Peak Hour	167	2.79
Fire Flow Demand #1	10,000	166.67

Location

Results

Connection 1 – Cleroux St.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.0	67.8
Peak Hour	127.0	62.2
Max Day plus Fire 1	123.1	56.6

Ground Elevation = 83.2 m

Connection 2 – Orient Park Dr.

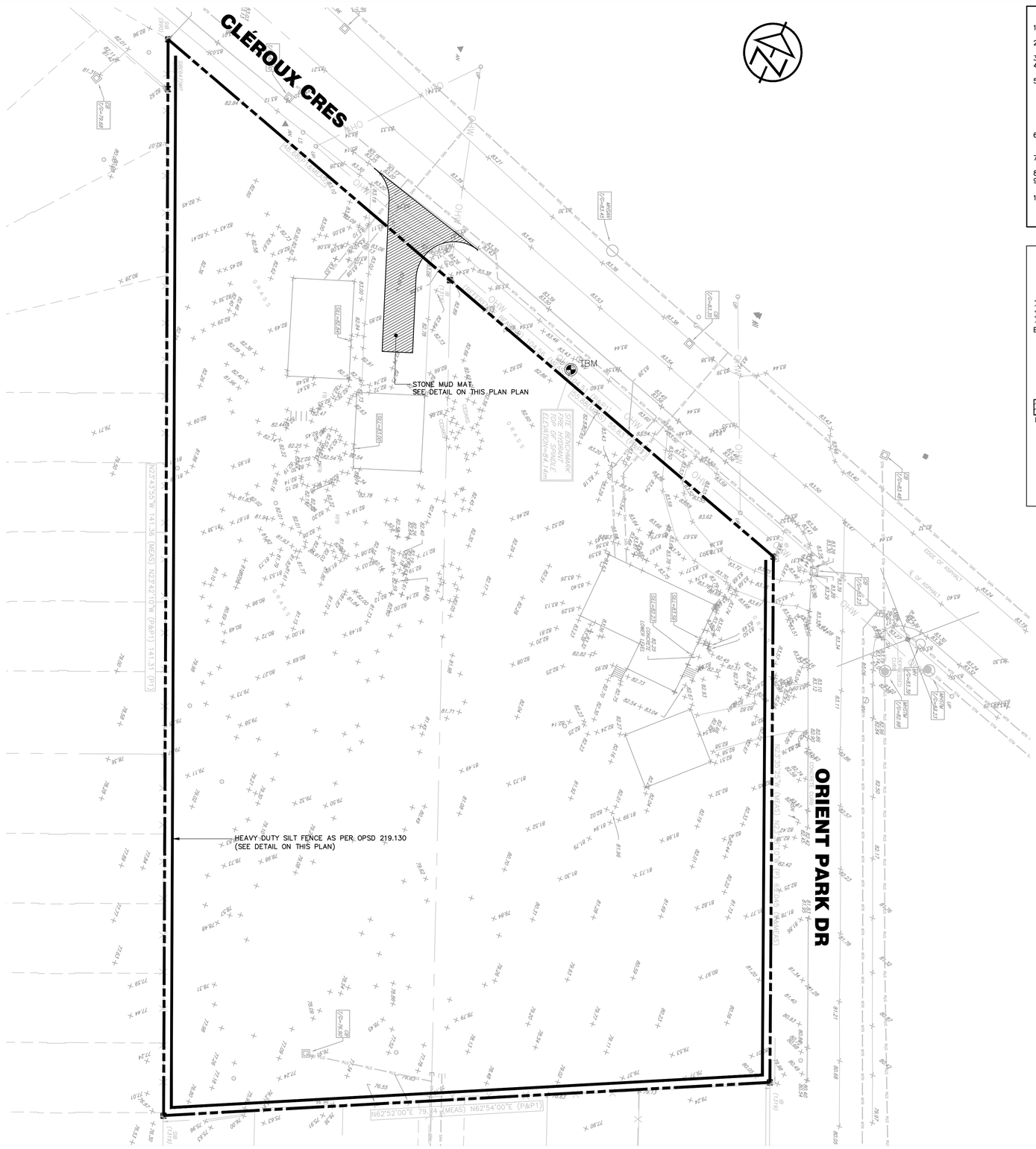
Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.0	70.2
Peak Hour	127.0	64.6
Max Day plus Fire 1	120.1	54.8

Ground Elevation = 81.6 m

Disclaimer

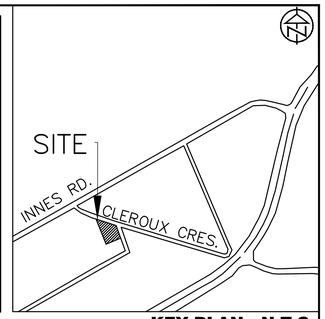
The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary 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 E:
Engineering Drawings

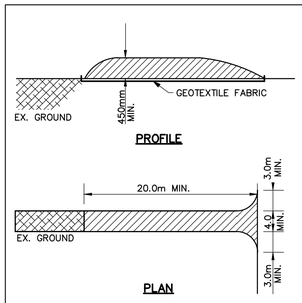


GENERAL NOTES

1. CONTRACTOR TO INSTALL AND MAINTAIN SILT FENCE AT LOCATIONS SHOWN OR AS DIRECTED BY THE ENGINEER.
2. CONTRACTOR TO ARRANGE PRE-CONSTRUCTION MEETING WITH ENGINEER AFTER PLACING ALL SILTATION CONTROL WORKS.
3. SILTATION AND EROSION CONTROL WORKS MUST BE INSTALLED PRIOR TO CONSTRUCTION.
4. ALL SEDIMENT CONTROL WORKS MUST BE CLEANED AND MAINTAINED AFTER EACH MAJOR STORM EVENT OR AS DEEMED NECESSARY BY THE ENGINEER.
5. THE CONTRACTOR WILL INSPECT THE SEDIMENT AND EROSION CONTROL MEASURES WEEKLY AND AFTER EACH MAJOR STORM EVENT. THE CONTRACTOR WILL NOTIFY THE ENGINEER OF CORRECTIVE ACTIONS REQUIRED AS SOON AS DEFICIENCIES ARE NOTED. THE CONTRACTOR MAINTAINS ULTIMATE RESPONSIBILITY TO ENSURE PROPER SEDIMENT AND EROSION CONTROL MEASURES ARE IMPLEMENTED AND MAINTAINED. ALL DEFICIENCIES AND CORRECTIVE MEASURES WILL BE DOCUMENTED IN A WEEKLY INSPECTION REPORT. A COPY OF THE WEEKLY INSPECTION REPORT WILL BE PROVIDED TO THE ENGINEER.
6. IF CONSTRUCTION IS INTERRUPTED AND/OR INACTIVITY EXCEEDS 30 DAYS, THEN STOCKPILED, STRIPPED OR EXPOSED AREAS MUST BE STABILIZED BY HYDROSEEDING AND ANY OTHER APPROPRIATE GEOTEXTILE MATERIAL, IF REQUIRED.
7. REMOVAL OF ALL SILT FENCES AT THE END OF CONSTRUCTION TO BE APPROVED BY THE ENGINEER AFTER THE SITE HAS STABILIZED.
8. ALL SILT FENCE TO OPSD 219.130.
9. CLEARING OF VEGETATION AND TREE COVER IS TO OCCUR OUTSIDE OF BIRD BREEDING SEASON AS RECOMMENDED BY ENVIRONMENT CANADA (APRIL 15 – AUGUST 15)
10. ALL SIDE SLOPES 3:1 OR GREATER ARE TO BE STABILIZED IMMEDIATELY WITH HYDROSEED (USING A NATIVE SEED MIX) UNLESS OTHERWISE NOTED. USE OF AN EROSION CONTROL BLANKET SUCH AS TERRAFIX S-100 (OR APPROVED EQUAL) IS RECOMMENDED IF CONSTRUCTION OCCURS OUTSIDE OF THE GROWING SEASON.



KEY PLAN - N.T.S.



STONE SIZE – THE STONE PAD SHALL BE A MIN. 450mm THICK. USE 50ømm STONE OR RECLAIMED CONCRETE EQUIVALENT FOR FIRST 10m FROM ADJACENT ROAD & 150mmø STONE. FOR REMAINDER OF STONE PAD.

LENGTH – AS REQUIRED BUT NOT LESS THAN 20m.

WIDTH – 4m MIN. BUT NOT LESS THAN THE WIDTH AT POINTS WHERE INGRESS. AND EGRESS OCCURS. GEOTEXTILE FABRIC (TERRAFIX 270R OR EQUAL) WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.

SURFACE WATER – ALL SURFACE WATER FLOWING OR DIRECTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE.

MAINTENANCE – THE CONTRACTOR SHALL MAINTAIN THE ENTRANCE IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY BY THE CONTRACTOR. UPON OBSERVATION OF CONTINUOUS MUD TRACKING ONTO ADJACENT STREETS, THE STONE MAT IS TO BE FULLY REPLACED.

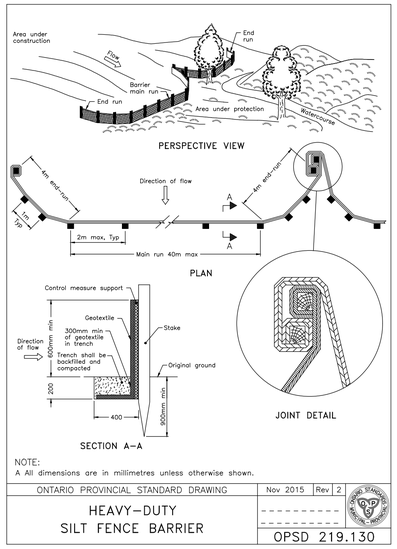
WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

INSPECTION AND REQUIRED MAINTENANCE AFTER EACH RAIN SHALL BE PROVIDED BY THE CONTRACTOR.

STONE MUD MAT DETAIL
SCALE: N.T.S

SCHEDULE OF CONSTRUCTION WORKS

1. IMPLEMENTATION OF EROSION CONTROL MEASURES AS SPECIFIED ON THIS PLAN
2. REMOVALS AS SPECIFIED ON THIS PLAN
3. TOPSOIL STRIPPING AND STOCKPILING
4. EARTH EXCAVATION AND GRADING



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
HEAVY-DUTY SILT FENCE BARRIER		
		OPSD 219.130

LEGEND

PROPERTY BOUNDARY

TOPOGRAPHIC SURVEY WAS COMPLETED BY STANTEC CONSULTING DATED JULY 19, 2016. ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM NCC VERTICAL CONTROL MONUMENT No.217 HAVING AN ELEVATION OF 85.00.

TBM: TOP OF SPINDLE OF FIRE HYDRANT LOCATED ON THE SITE NORTH ENTRANCE. ELEVATION=84.14m.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	JAN 2023

ENGINEER STAMP

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

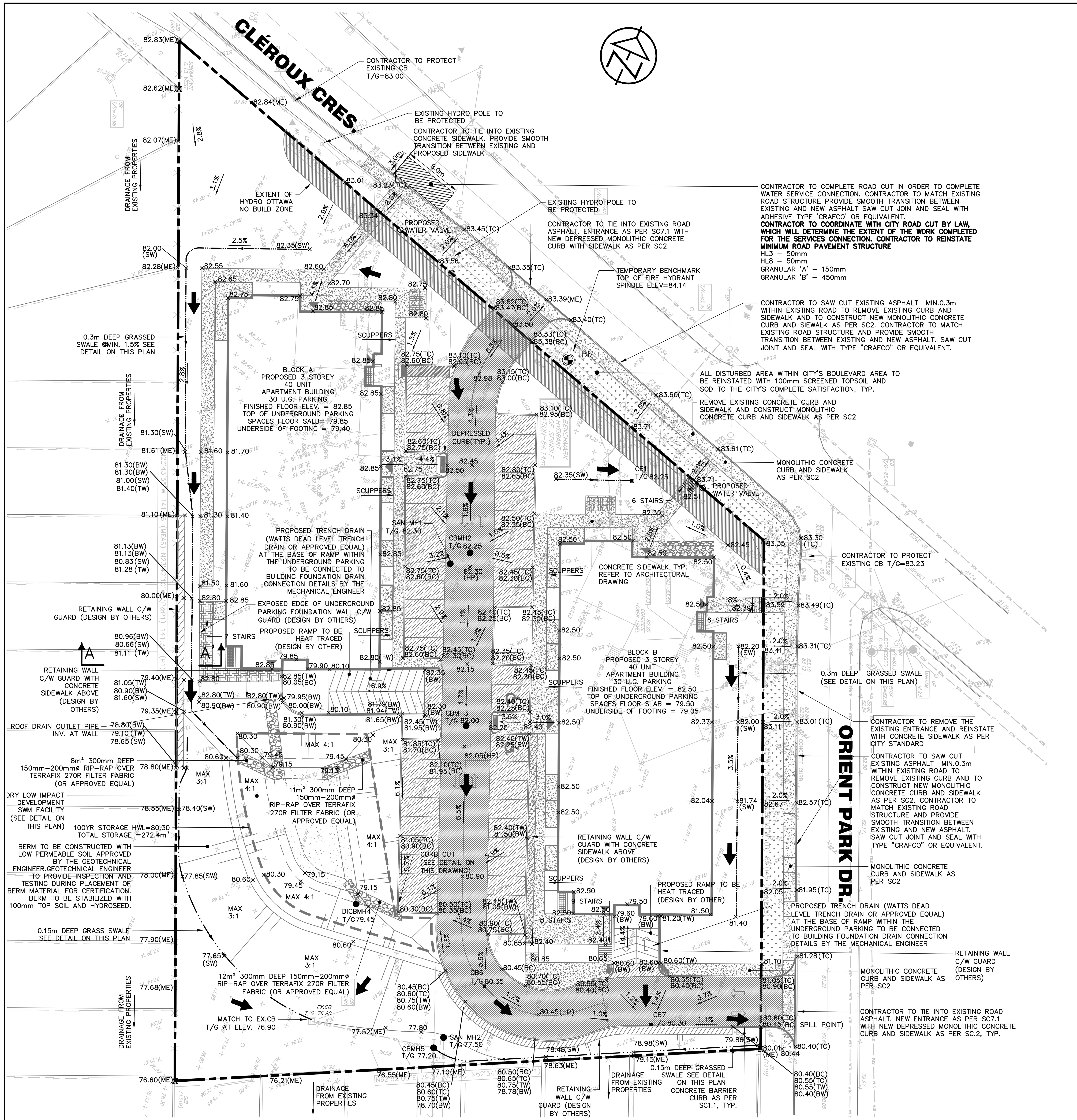
BRIDOR DEVELOPMENTS
2380 & 2396 CLÉROUX CRESCENT
CITY OF OTTAWA

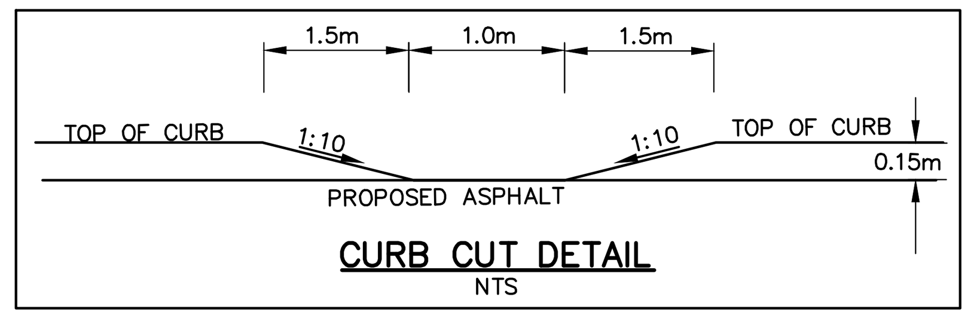
SITE SILTATION AND EROSION CONTROL PLAN

TATHAM ENGINEERING

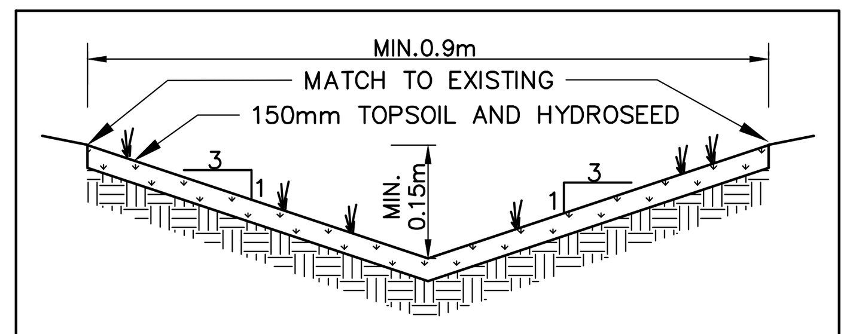
DESIGN: HY	FILE: 523650	DWG: **C100**
DRAWN: HY	DATE: JAN 2023	
CHECK: GC	SCALE: 1:300	

Drawing Name: 523650-C100.dwg Plotted: Jan 26, 2023

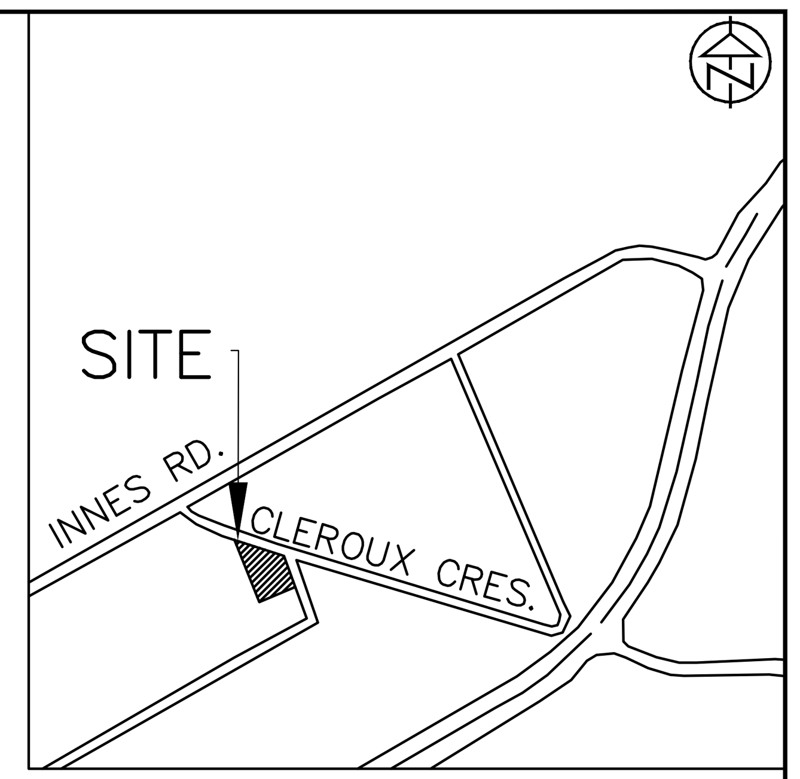




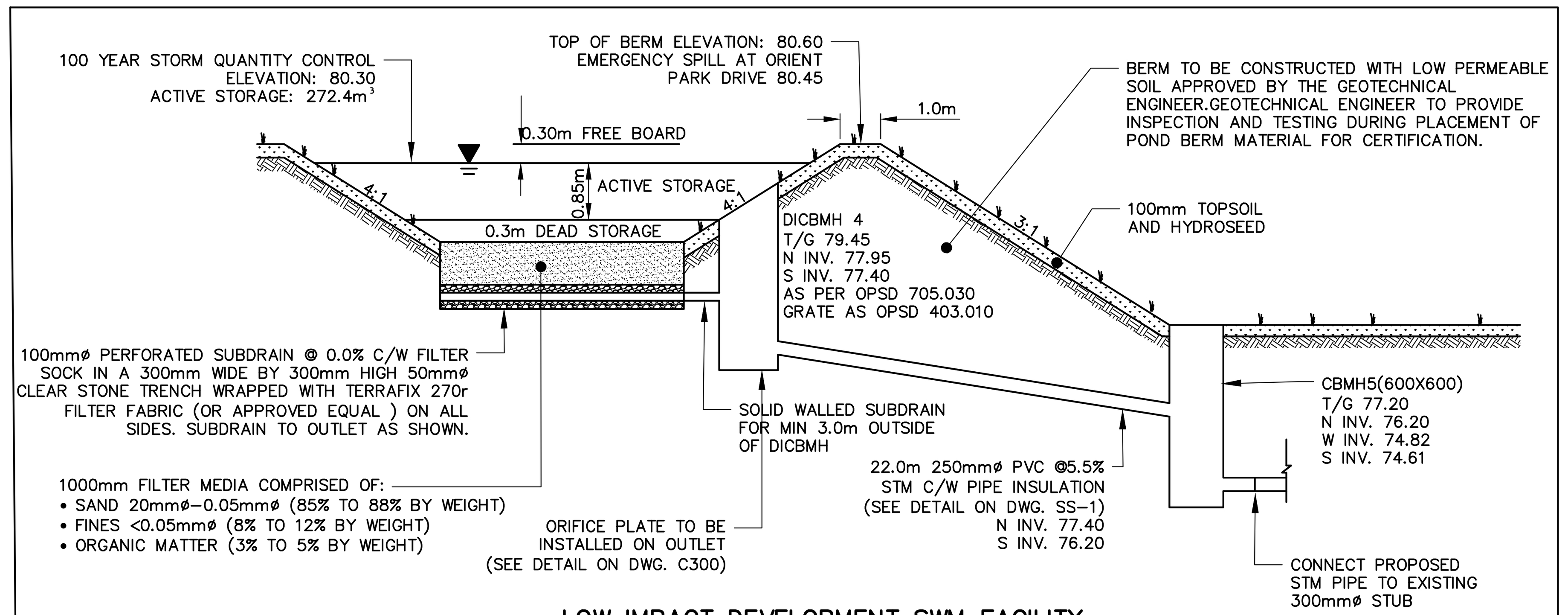
CURB CUT DETAIL
NTS



GRASSED SWALE DETAIL
NTS



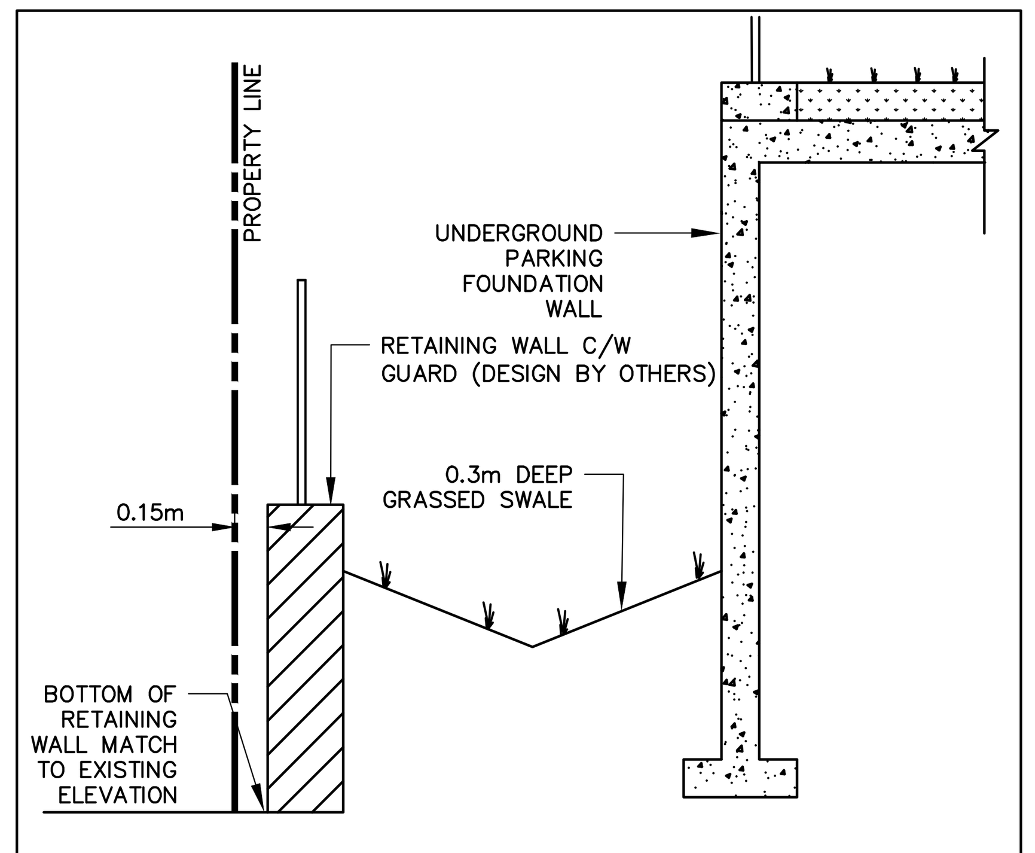
KEY PLAN - N.T.S.



LOW IMPACT DEVELOPMENT SWM FACILITY
SCALE: N.T.S

PAVEMENT STRUCTURE

Course	Compaction Requirement	Light Duty	Heavy Duty
Surface Course Asphalt	OPSS 310	50mm HL3 or HL5	40mm HL3 or HL5
Binder Course Asphalt	OPSS 310		50mm HL8(2 lifts)
Granular Base	100% SPMDD(ASTM-D698)	150mm OPSS 1010 Granular A	150mm OPSS 1010 Granular A
Granular Subbase	98% SPMDD(ASTM-D698)	300mm OPSS 1010 Granular B	450mm OPSS 1010 Granular B



SECTION A–A'
SCALE: N.T.S

LEGEND

LANDSCAPING STONES	PROPOSED CONCRETE FEATURES	× 262.25	PROPOSED ELEVATION
INTERLOCK STONE PAVER	PROPOSED SOD	× 262.25(ME)	PROPOSED ELEVATION MATCH EXISTING
	PROPOSED HEAVY DUTY ASPHALT	× 262.25(TC)	PROPOSED TOP OF CURB
	PROPOSED LIGHT DUTY ASPHALT	× 262.25(BC)	PROPOSED BOTTOM OF CURB
	PROPOSED DOOR ENTRANCE/EXIT	× 262.25(BC)	PROPOSED BOTTOM OF CONCRETE PAD
	PROPOSED OVERLAND FLOW ROUTE	89.20	EXISTING COUNTOUR
			PROPERTY BOUNDARY

TOPOGRAPHIC SURVEY WAS COMPLETED BY STANTEC CONSULTING DATED JULY 19, 2016. ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM NCC VERTICAL CONTROL MONUMENT No.217 HAVING AN ELEVATION OF 85.00.

TBM: TOP OF SPINDLE OF FIRE HYDRANT LOCATED ON THE SITE NORTH ENTRANCE. ELEVATION=84.14m.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	JAN 2023

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER J. R. ASH 100123082 PROVINCE OF ONTARIO

BRIDOR DEVELOPMENTS
2380 & 2396 CLÉROUX CRESCENT
CITY OF OTTAWA

SITE GRADING PLAN

TATHAM ENGINEERING

DESIGN: HY	FILE: 523650	DWG:
DRAWN: HY	DATE: JAN 2023	C200
CHECK: GC	SCALE: 1:300	

CLÉROUX CRES

APPROXIMATE LOCATION OF EXISTING 19mmø WATER SERVICE TO BE ABANDONED AND BLANKED AT THE MAIN. CONTRACTOR TO CONFIRM EXACT LOCATION OF EXISTING SERVICE PRIOR TO CONSTRUCTION.

APPROXIMATE LOCATION OF EXISTING 135mmø SANITARY SERVICE TO BE ABANDONED, GROUTED AND CAPPED AT THE PROPERTY LINE. CONTRACTOR TO CONFIRM EXACT LOCATION OF EXISTING SERVICE PRIOR TO CONSTRUCTION.

PROPOSED WATER METER AND READOUT LOCATION

PROPOSED WATER SERVICE CONNECTION TO EXISTING 305mmø ON EXISTING WATERMAIN BY CITY FORCES

PROPOSED 305mmø GATE VALVE ON WATERMAIN AS PER WS24

PROP. 19.5m 100mmø PVC DR18 WATER SERVICE @ MIN.2.4m DEPTH

PROP. WATER VALVE AS PER W24

EXISTING 305mmø DI WATERMAIN

EXISTING 250mmø CONC SANITARY

EXTENT OF HYDRO OTTAWA NO BUILD ZONE

JOB BENCHMARK TOP OF SPINDLE ELEV=84.14

TBM

BLOCK A
PROPOSED 3 STOREY
40 UNIT
APARTMENT BUILDING
30 U.G. PARKING
FINISHED FLOOR ELEV. = 82.85
TOP OF UNDERGROUND PARKING SPACES FLOOR SALB= 79.85
UNDERSIDE OF FOOTING = 79.40

APPROXIMATE LOCATION OF EXISTING 19mmø WATER SERVICE TO BE ABANDONED AND BLANKED AT THE MAIN. CONTRACTOR TO CONFIRM EXACT LOCATION OF EXISTING SERVICE PRIOR TO CONSTRUCTION.

PROP. 24.0m 250mmø PVC DR35 STM PIPE @0.5%

PROP. 12.2m 250mmø PVC DR35 STM PIPE @4.1%

PROP. 12.2m 250mmø PVC DR35 STM PIPE @4.1%

CBMH2
T/G 82.25
W INV 80.00
E INV 80.00
NE INV. 79.78
S INV. 79.72

CB1
T/G 82.25
SW INV. 79.90

PROPOSED WATER METER AND READOUT LOCATION

STM PIPE INV. 80.50 FOUNDATION DRAIN TO BE PUMPED TO THE GRAVITY STORM PIPE INVERT SHOWN C/W BACKFLOW PREVENTOR AND CHECK VALVE. REFER TO MECHANICAL DRAWING

PROP. SAN SERVICE 9.6m -150mmø PVC DR35 @1.0% CONTRACTOR TO INSTALL BACKFLOW PREVENTOR AS PER S 14.1. INV. 78.60

SAN MH1
T/G 82.30
W INV 78.50
E INV 78.50
S INV 78.38

STM PIPE INV. 80.50 FOUNDATION DRAIN TO BE PUMPED TO THE GRAVITY STORM PIPE INVERT SHOWN C/W BACKFLOW PREVENTOR AND CHECK VALVE. REFER TO MECHANICAL DRAWING

PROP. SAN SERVICE 15.0m -150mmø PVC DR35 @1.0% CONTRACTOR TO INSTALL BACKFLOW PREVENTOR AS PER S14.1 INV. 78.65

TRENCH DRAIN AT BOTTOM OF THE RAMP CONNECTED TO FOUNDATION DRAIN. REFER TO MECHANICAL DRAWINGS

PIPE CROSSING #1
STM INV. 79.71
SAN OBV. 78.68

PROP. 64.4m 200mmø PVC DR35 SAN @4.8%

PROP. 23.5m 250mmø PVC DR35 STM PIPE @0.5%

PROP. 12.6m 250mmø PVC DR35 STM PIPE @4.0%

ROOF DRAIN (TO BE COORDINATED WITH MECHANICAL ENGINEER)

PROP. 4.0m 250mmø PVC DR35 STM PIPE @2.0%

INV. 81.60

CBMH3
T/G 82.00
N INV 79.60
E INV 79.75
W INV 79.54

BLOCK B
PROPOSED 3 STOREY
40 UNIT
APARTMENT BUILDING
30 U.G. PARKING
FINISHED FLOOR ELEV. = 82.50
TOP OF UNDERGROUND PARKING SPACES FLOOR SLAB = 79.50
UNDERSIDE OF FOOTING = 79.05

PROP. 17.1m 375mmø PVC DR35 STM PIPE @0.5%

INV. 79.45

PIPE CROSSING #2
STM INV. 79.52
SAN OBV. 77.48

ROOF DRAIN
INV. 80.26

DRY LOW IMPACT DEVELOPMENT FACILITY (SEE DWG. C200 FOR DETAILS)

WATER QUALITY STORAGE ELEVATION

100YR STORAGE HWL 80.30

INV. 79.30

DICBMH4
C/W ORIFICE PLATE
(SEE DETAIL ON THIS DRAWING)
RELEASE RATE 11L/S
INSTALLED ON OUTLET*
T/G 79.45
NW INV. 77.95
S INV. 77.40

TRENCH DRAIN AT BOTTOM OF THE RAMP CONNECTED TO FOUNDATION DRAIN. REFER TO MECHANICAL DRAWINGS

PIPE CROSSING #1
STM INV. 79.36
SAN OBV. 76.14

PROP. 19.8m 250mmø PVC DR35 STM PIPE @0.5% C/W PIPE INSULATION (SEE DETAIL ON THIS PLAN)

PROP. 22.0m 250mmø PVC DR35 STM @5.5% C/W PIPE INSULATION (SEE DETAIL ON THIS PLAN)

PROP. 23.2m 250mmø DR35 PVC STM PIPE @0.5% C/W PIPE INSULATION (SEE DETAIL ON THIS PLAN)

EX.CB T/G 76.90

CB6
T/G 80.35
W INV. 79.00
E INV. 79.40

CB7
T/G 80.30
W INV. 79.52

APPROXIMATE LOCATION OF EXISTING STORM SEWER, CONTRACTOR TO CONFIRM SIZE, DEPTH AND ALIGNMENT PRIOR TO CONSTRUCTION

CBMH5
T/G 77.2
N INV. 76.20
W INV. 74.97
S INV. 74.91

CONNECT TO EXISTING STORM 300mmø STORM INLET AND OUTLET AT INV. 74.91, CONTRACTOR TO CONFIRM EXISTING STORM AND SANITARY STUB ELEVATION PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCY TO THE ENGINEER.

CURB SUBDRAIN TO CONNECT TO CB, TYP.

SAN MH2
T/G 77.50
N INV. 75.29
S INV. 75.19
TO CONNECT TO EXISTING 250mmø SANITARY STUB AT INV. 75.19

EXISTING 300mmø STM SEWER STUB

EXISTING 250mmø SAN SEWER STUB

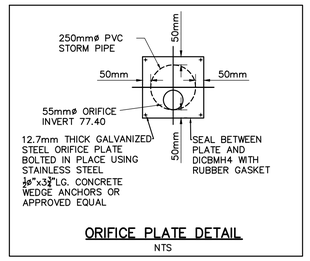
ORIENT PARK DR

APPROXIMATE EXISTING 135mmø SANITARY SERVICE TO BE ABANDONED, GROUTED AND CAPPED AT THE PROPERTY LINE. CONTRACTOR TO CONFIRM EXACT LOCATION OF EXISTING SERVICE PRIOR TO CONSTRUCTION.

PROPOSED WATER SERVICE CONNECTION TO EXISTING 305mmø WATERMAIN BY CITY FORCES

PROP. 14.7m 100mmø PVC DR18 WATER SERVICE @ MIN.2.4m DEPTH

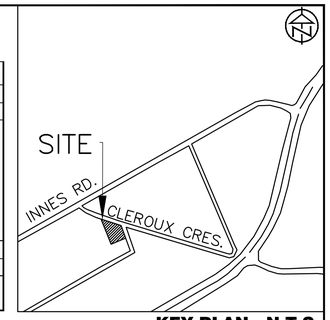
PROP. WATER VALVE AS PER W24



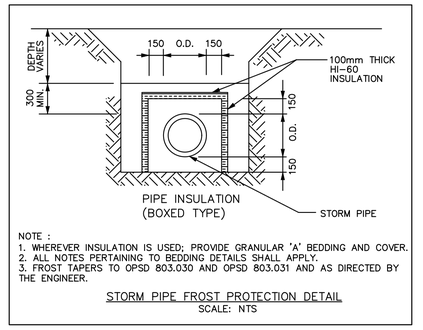
ORIFICE PLATE DETAIL
NTS

MANHOLE TABLE

STORM		
MH Number	**Size**	**Cover**
CB1	600X600mm	S19
CBMH2	1200mm	S28.1
CBMH3	1200mm	S28.1
DICBMH4	1200mm	OPSD 403.010
CBMH5	600mmX600mm	S28.1
CB6	600mmX600mm	S19
CB7	600mmX600mm	S19
SANITARY		
MH Number	**Size**	**Cover**
SANMH1	1200mm	S24
SANMH2	1200mm	S24

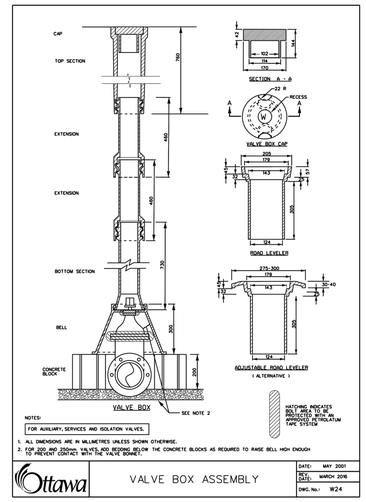


KEY PLAN - N.T.S.



NOTE :
1. WHEREVER INSULATION IS USED; PROVIDE GRANULAR 'A' BEDDING AND COVER.
2. ALL NOTES PERTAINING TO BEDDING DETAILS SHALL APPLY.
3. FROST TAPERS TO OPSD 803.030 AND OPSD 803.031 AND AS DIRECTED BY THE ENGINEER.

STORM PIPE FROST PROTECTION DETAIL
SCALE: NTS



NOTES:
FOR AUXILIARY, SERVICES AND ISOLATION VALVES.
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. FOR 200 AND 250mm VALVES ADD BEDDING BELOW THE CONCRETE BLOCKS AS REQUIRED TO RAISE BELL HIGH ENOUGH TO PREVENT CONTACT WITH THE VALVE BONNET.

HATCHING INDICATES ROAD LEVELER BOLTED TO BE REMOVED AT APPROVED ATTENUATION TAPE SYSTEM

Ottawa | VALVE BOX ASSEMBLY | DATE: MAY 2001 | SCALE: MARCH 2016 | DWG. No.: W24

LEGEND

- PROPOSED WATER SERVICE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- STM — STM — EXISTING STORM SEWER
- WTR — WTR — EXISTING WATERMAIN
- SAN — SAN — EXISTING SANITARY SEWER
- PROPOSED PIPE INSULATION
- PROPERTY BOUNDARY

TOPOGRAPHIC SURVEY WAS COMPLETED BY STANTEC CONSULTING DATED JULY 19, 2016. ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM NCC VERTICAL CONTROL MONUMENT No.217 HAVING AN ELEVATION OF 85.00.

TBM: TOP OF SPINDLE OF FIRE HYDRANT LOCATED ON THE SITE NORTH ENTRANCE. ELEVATION=84.14m.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	JAN 2023

ENGINEER STAMP

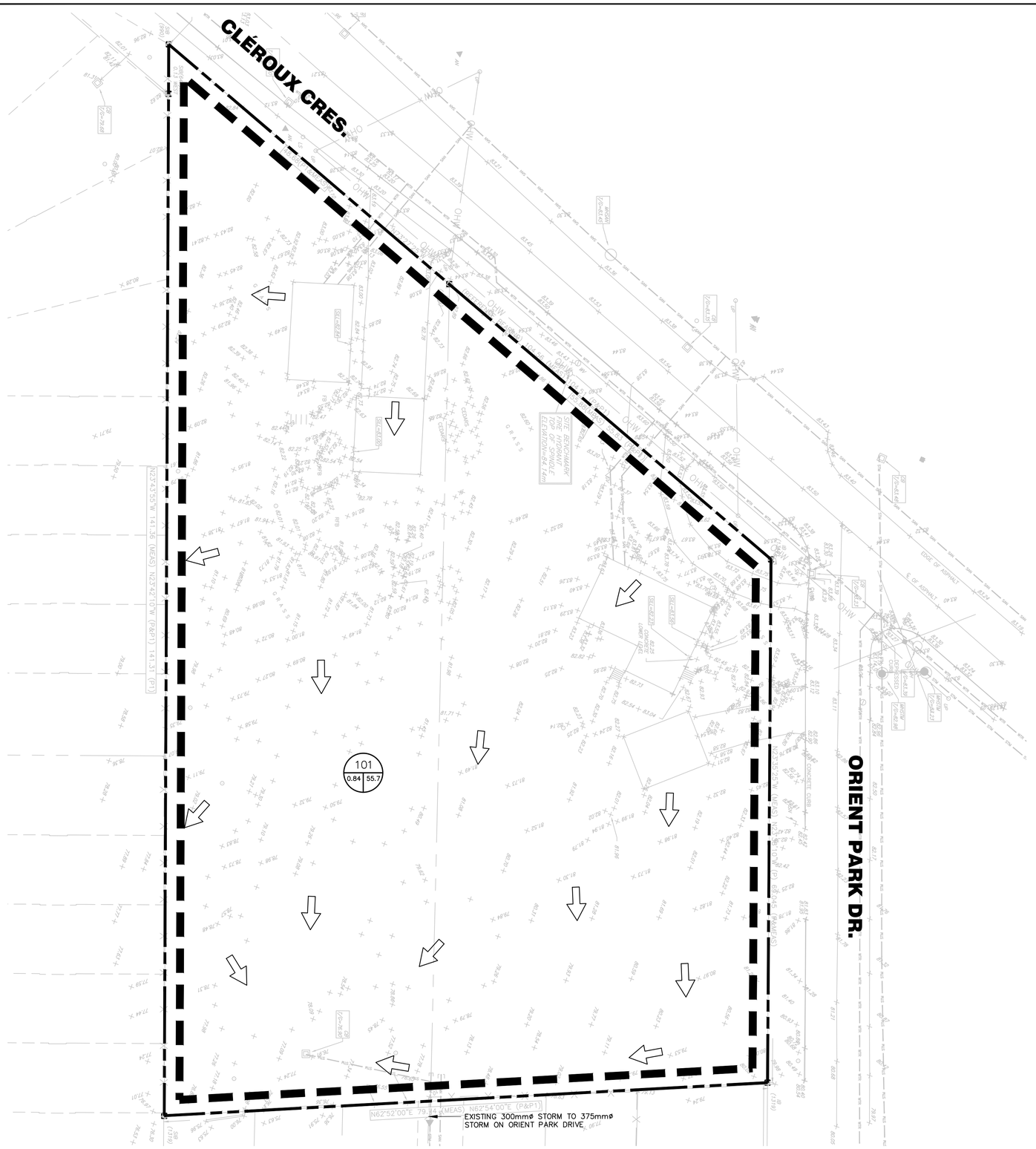
LICENSED PROFESSIONAL ENGINEER J.R.ASH 100123062 PROVINCE OF ONTARIO

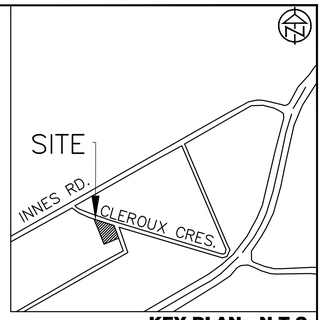
BRIDOR DEVELOPMENTS
2380 & 2396 CLÉROUX CRESCENT
CITY OF OTTAWA

SITE SERVICING PLAN

TATHAM ENGINEERING

DESIGN: HY	FILE: 523650	DWG: C300
DRAWN: HY	DATE: JAN 2023	
CHECK: GC	SCALE: 1:300	





KEY PLAN - N.T.S.

LEGEND

- SUBJECT PROPERTY BOUNDARY
- DRAINAGE AREA BOUNDARY
- EXISTING CONDITION DRAINAGE DIRECTION
- 101 / 0.84 / 55.7 — DRAINAGE AREA ID / CN / AREA (ha.)

TOPOGRAPHIC SURVEY WAS COMPLETED BY STANTEC CONSULTING DATED JULY 19, 2016. ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM NCC VERTICAL CONTROL MONUMENT No.217 HAVING AN ELEVATION OF 85.00.

TBM: TOP OF SPINDLE OF FIRE HYDRANT LOCATED ON THE SITE NORTH ENTRANCE. ELEVATION=84.14m.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	JAN 2023

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
J. R. ASH
100123062
Jan 26, 2023
PROVINCE OF ONTARIO

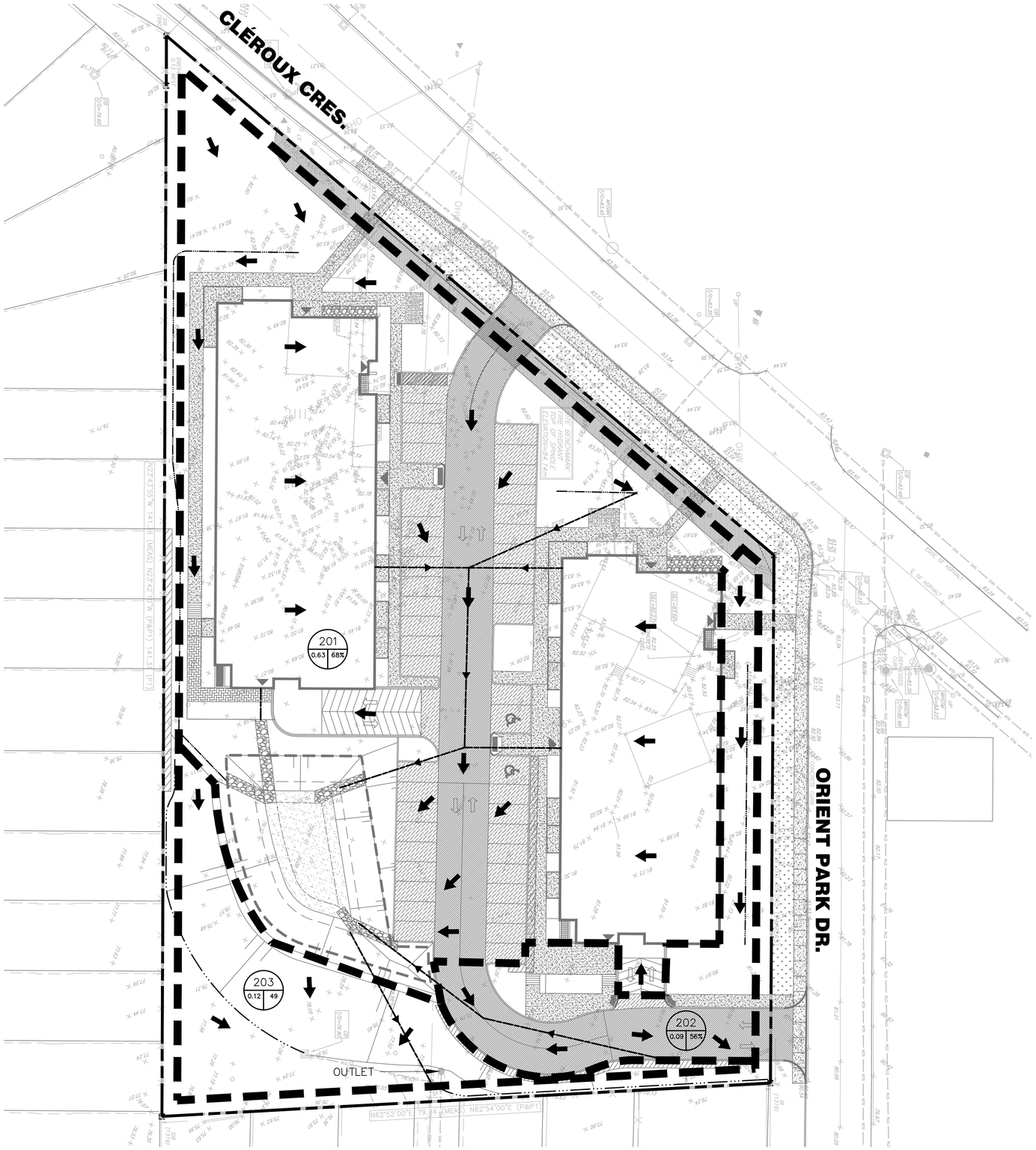
BRIDOR DEVELOPMENTS
2380 & 2396 CLÉROUX CRESCENT
CITY OF OTTAWA

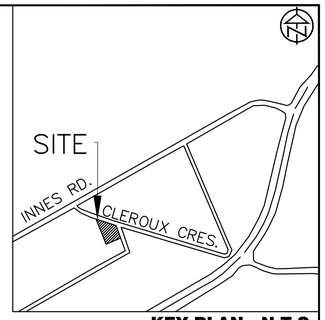
EXISTING CONDITION
SITE DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: HY	FILE: 523650	DWG: C400
DRAWN: HY	DATE: JAN 2023	
CHECK: GC	SCALE: 1:300	

Drawing Name: 523650-C400.dwg Plotted: Jan 26, 2023





KEY PLAN - N.T.S.

LEGEND

- SUBJECT PROPERTY BOUNDARY
- DRAINAGE AREA BOUNDARY
- PROPOSED CONDITION DRAINAGE DIRECTION
- 201 — DRAINAGE AREA ID
- 0.63 — AREA (ha.)
- 68% — CN/ % IMPERVIOUS

TOPOGRAPHIC SURVEY WAS COMPLETED BY STANTEC CONSULTING DATED JULY 19, 2016. ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM NCC VERTICAL CONTROL MONUMENT No.217 HAVING AN ELEVATION OF 85.00.

TBM: TOP OF SPINDLE OF FIRE HYDRANT LOCATED ON THE SITE NORTH ENTRANCE. ELEVATION=84.14m.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	JAN 2023

ENGINEER STAMP

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

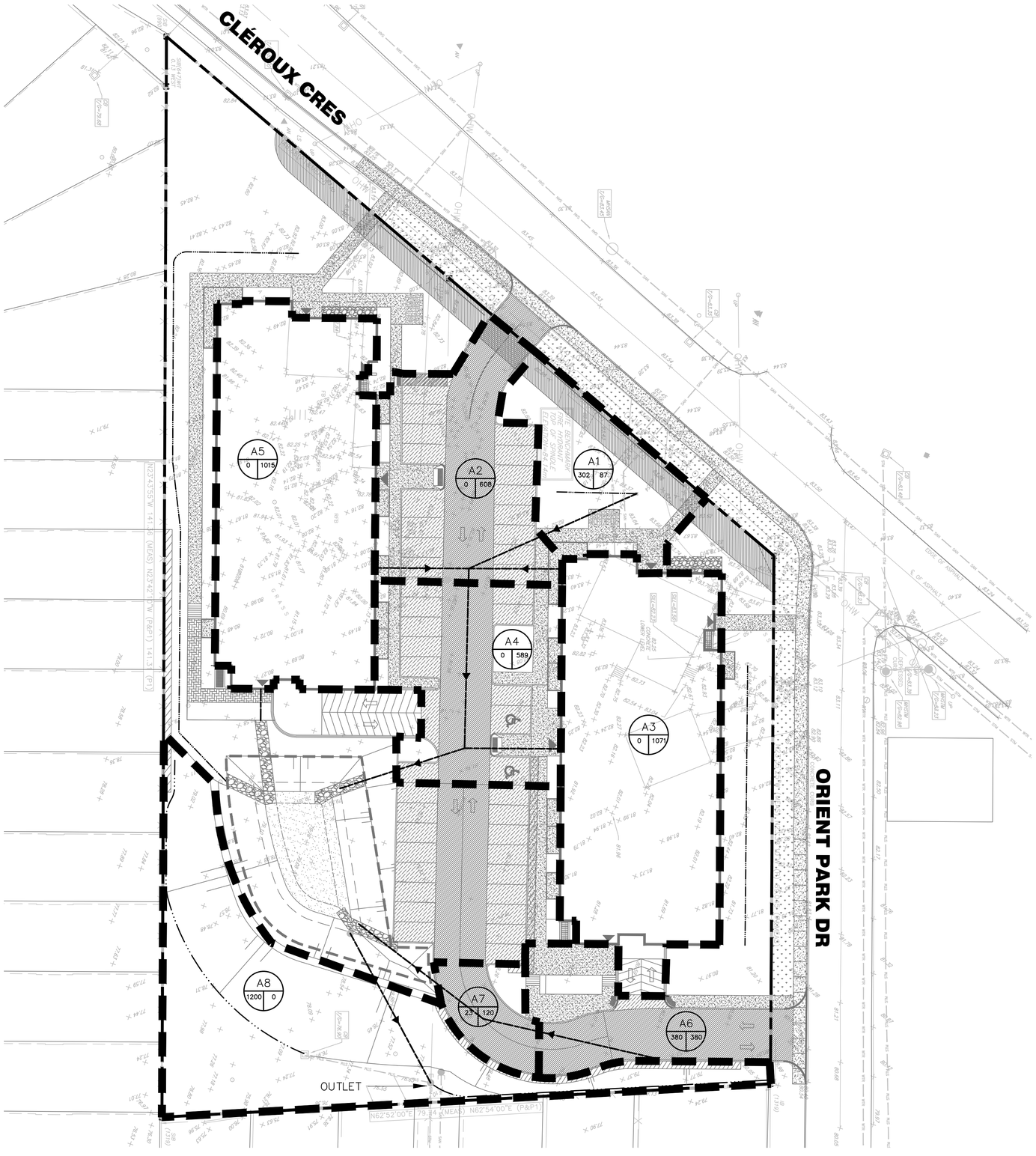
BRIDOR DEVELOPMENTS
2380 & 2396 CLÉROUX CRESCENT
CITY OF OTTAWA

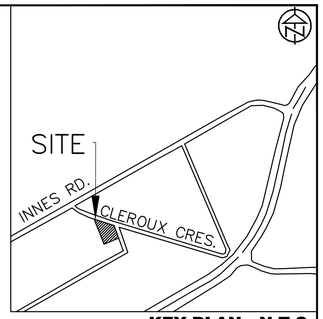
PROPOSED CONDITION
SITE DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: HY	FILE: 523650	DWG:
DRAWN: HY	DATE: JAN 2023	**C401**
CHECK: GC	SCALE: 1:300	

Drawing Name: 523650-c401.dwg Plotted: Jan 25, 2023





KEY PLAN - N.T.S.

LEGEND

- SUBJECT PROPERTY BOUNDARY
- DRAINAGE AREA BOUNDARY
- PROPOSED CONDITION DRAINAGE DIRECTION
- A2 / 0 / 608 — DRAINAGE AREA ID / IMPERVIOUS AREA (m^2.) / PERVIOUS AREA (m^2.)

TOPOGRAPHIC SURVEY WAS COMPLETED BY STANTEC CONSULTING DATED JULY 19, 2016. ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM NCC VERTICAL CONTROL MONUMENT No.217 HAVING AN ELEVATION OF 85.00.

TBM: TOP OF SPINDLE OF FIRE HYDRANT LOCATED ON THE SITE NORTH ENTRANCE.
ELEVATION=84.14m.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR SPA	JAN 2023

ENGINEER STAMP

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

BRIDOR DEVELOPMENTS
2380 & 2396 CLÉROUX CRESCENT
CITY OF OTTAWA

STORM DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: HY	FILE: 523650	DWG: C402
DRAWN: HY	DATE: JAN 2023	
CHECK: GC	SCALE: 1:300	

Drawing Name: 523650-C402.dwg Plotted: Jan 26, 2023

Appendix F:
BL Engineering Site Servicing and SWM Report
(May 5, 2022)

SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Project Address – 2380 & 2396 Cleroux Cres., Orleans, Ontario

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

By Blanchard Letendre Engineering Ltd.
Date – May 05, 2022
Our File Reference: 20-305

Previous Submission
October 14, 2020
February 04, 2022

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 2380 – 2396 Cleroux Crescent 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 two (2) existing houses with garage that will be demolished prior to construction. The property located at 2380 – 2396 Cleroux Cres., consist of approximately 0.839ha of undeveloped land. The land will be developed with two (2) new residential apartments building with underground parking with shared entrance and parking.

Figure 1- Existing site at 2308 - 2396 Cleroux Cres. 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 the surrounding roads, Cleroux Crescent and Orient Park as where the stormwater generated from the site is captured by the road site catchbasin. The south-west corner of the property drains uncontrolled towards the neighbouring backyards. An existing city catchbasin is installed in the corner with captures and conveys the stormwater towards the existing storm stub in the south easement. The existing property naturally grades south towards the existing neighbourhood backyard. There is an existing subdivision adjacent to property on the west and south portions. 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 constructing two (2) new three (3) storeys residential buildings. The site will be modified by adding two (2) new 1016 square meter building, 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 south towards the neighbour's backyard, the proposed site work has been prepared to limit the work at the south-west corner while maintaining the stormwater outlet to City storm sewer in the easement at the south end of the property. The overland flow route has also been designed to convey the storm runoff towards Oriental Park. By limiting the work at the south-west corner, where the biggest elevation drops occurs, the use of retaining walls near the neighbour's backyard won't be as intrusive.

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 300mm diameter storm sewer stub located in the easement at the south end portion of the property between 2492 and 2490 Orient Park Dr. 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 outlet will be controlled by a inlet control devise and limit the flow outletting to City storm sewer in the easement. By throttling the flow, stormwater retention will be completed with the use of 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 0.50 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 **102.08 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 =	0.50
I =	104.2 mm/hr
Tc =	10 min
Total =	0.839 ha
Allowable Release Rate=	**121.53 L/s**

As the site will outlet to the existing storm sewer stub located in the easement between 2492 and 2490 Orient Park Dr., the existing 300mm diameter sewer stub previously installed only has a full flow capacity of 96.70 L/s. As the proposed site will have some underground chambers, the release rate was lowered to 50% of the allowable release rate. Therefore, the site total release rate has been designed to meet the maximum flow of **60.76 L/s** to the existing 300mm diameter storm stub on Oriental Park.

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 infiltration gallery. 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 existing 300mm diameter storm city stubs that ultimately connect to the 375mm sewer on Orient Park Dr. 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 Oriental Park Dr. on the south-east 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 and minimize the grade raise of the site. All catchment areas were

designed to directed the stormwater overland to a series of cathcbasins, landscaping drains and subdrains which will capture and convey the stormwater to Oriental Park Dr.

The stormwater generated from site will be discharged to the existing storm sewer stub on Orient Park Dr. and be controlled using orifices plates installed in manhole MHCB02 and the landscape catchbasin, LCB14, which will throttle the flow direct to the municipal sewer. The combined flow restrictors will release a total of **58.53 L/s** with a maximum head of 1.92m (HWL = 80.22) at MHCB02 and 0.86m (HWL = 76.65) at LCB14 during the 100 year event. As the flow will be restricted stormwater storage will be required. A total of 70.82m^3 is required for the watershed 05 and 175.65m^3 is for the remaining watersheds. This storage will be provided with underground stormwater chambers and infiltration gallery as the property natural slopes does not promote overland storage. The underground storage and infiltration gallery have been designed to hold and convey the stormwater water to the sewer located at in the easement on Oriental Park. Using a void area of 40% in the gravel, the infiltration gallery will provide a total of 73.8 m^3 and the underground chambers will provide 176 m^3 which will hold more than the 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 convey the storm water generated from the ramps to the storm sewer downstream of the inlet control devices. These areas were left uncontrolled towards the city main stub.

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 uncontrolled.

3.4.2 Underground Chambers

The underground storage chambers have been designed to hold and convey the stormwater generated from area A1, A2, A3, A4, A6, A9 and A10. Area A6 is being captured by three landscape catchbasins and a subdrain. The underground chambers have been designed to hold the stormwater runoff under the proposed parking/ driving area. The chambers, which have been designed as per the manufacturer, were designed to also provide some filtration which is favorable for the final site TSS. A total of 176.00 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.

3.4.3 Infiltration Gallery

The infiltration gallery has been design to hold and convey the stormwater generated from the site area A5. The infiltration gallery has been designed to hold the stormwater runoff generated from the grass area that drains towards the adjacent property south. The infiltration gallery will have a total length of 82m and stretch all along the south portion of the property. The infiltration gallery volume was calculated using an area of 1.5m heigh by 1.5m wide with a void ration of 40%. A total of 73.80 m^3 will be provided by the infiltration gallery. The infiltration gallery will be connected to the proposed manhole catchbasin manhole MH01.

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 two separate residential service connected to the the houses on the two parcels which are connected to the existing 250mm diameter sanitary on Cleroux Crescent. The existing connection will be abandoned at the property line as the new connections will be completed at the north end portion of the property where and existing sanitary stub was previously installed in the city right away between 2492 and 2490 Orient Park Dr.

4.2 Existing Site Conditions

The two new residential apartment building, which proposes 40 units each will discharge to the city main sewer stub on Orient Park Dr. via two new 150mm diameter sanitary services connected to the 200mm diameter sewer proposed between the two new buildings. The services will be discharged into the new sewer before being conveyed north to the existing 250mm diameter sanitary stub in the city easement between 2492 and 2490 Orient Park Dr. The proposed 150mm diameter service will be installed at a minimum of 1.00% slope directly to the new private sewer. A monitoring manhole is proposed at the sanitary stub which will also be a drop structure considering the change in elevation on the property. 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: **1.15 L/s** and Block B: **1.12L/s** for a total of **2.27 L/s** which is below the allowable flow of 7.0L/s as per the City of Ottawa property boundaries. 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 two separate 19mm diameter water service which services the existing two houses on the parcels and are connected to the existing 305mm diameter watermain on Cleroux Crescent. The existing connection will be removed and where two new connection will be installed to service the two new buildings. There is currently two (2) city fire hydrant, one (1) at the south façade of the property and the other at the north-west. The hydrants on south is located on the north side of Cleroux Crescent and the other is located on the north side of Orient Park Dr, both within the 90m radius from the building 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 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 **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 =	22050.00	22540.00	L/d
Maximum Daily =	55125.00	56350.50	L/d
Maximum Hourly =	121275.00	123970.50	L/d
Total Domestic Flow =	**1.40**	**1.43**	**L/s**
Total Fire Flow =	**166.67**	**161.67**	**L/s**

Refer to Appendix ‘C’ for the water flow calculation sheet.

The proposed buildings will be serviced with a new 100mm water service that will be connected to the existing 305mm watermain on Cleroux Crescent. The two new building will be connected to the new 100mm service via separate 50mm diameter water service. Each service will connect into the proposed mechanical room of the buildings. As per the City standard, two water service will be teed off the existing watermain on Cleroux with an isolation valve in between to allow maintenance on the city watermain without interrupting the water for the site.

5.3 Proposed Fire Demand

As the new residentials buildings will not have a sprinkler system, the new services were sized to supply only the domestic flow. Based on the Ontario building code calculations, the water flow

was evaluated at **166.67L/s** for Block A and **161.67L/s** for Block B. Refer to Appendix 'C' for the fire flow calculation sheet. As there is two existing water hydrants located within the 90m radius from the building main entrances, there will be no new private hydrant installed on the property.

5.4 Water Capacity Comments

The boundary conditions and HGL for hydraulic analysis for 2396 Cleroux Crescent was obtained from the city. See attached copy in Appendix 'E'. From the boundary conditions, the minimum HGL was evaluated at 131.0 m for the water main elevation at 83.2m and a maximum pressure estimate of 67.8 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 **60.76 L/s** thought flow restrictors installed in the sewers before outletting to the sewer main on Oriental Park. Stormwater quantity control will be achieved with 176m^3 of underground chamber and 73.8 m^3 in the infiltration gallery. 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 sewer located in the easement south of the property. The estimated sanitary flow of; Block A: **1.15 L/s** and Block B: **1.12L/s** a for the new connections will be directed to the existing sanitary sewer along the easement of Oriental Park.

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 100mm diameter water services to connected to the existing 305mm diameter main on Cleroux Crescent. The existing connections will be removed. The water demand for building was evaluated at: Block A: **1.40 L/s** and Block B: **1.43L/s** and the fire flow demand

at Block A: **166.67 L/s** and Block B: **161.67 L/s.** Sprinkler system are not proposed for the site. There is also two (2) fire located around the property within 90m from every entrance doors.

8.0 LIMITATION

This report was prepared for **Bridor Developement.**, and is only applicable for the property at 2380-2396 Cleroux Crescent, 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.	20-305	**Date:**	May 5, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	2396 Cleroux Crescent, Ottawa	**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	0.671	0.000	0.168	0.839	0.42
TOTAL	0.671	0.000	0.168	0.839	0.42

POST-DEVELOPMENT DRAINAGE AREA

Catchment Area	Runoff Coefficient			Total Area (ha)	Combined C
	C = 0.30	C = 0.80	C = 0.90		
WS-01	0.074	0.000	0.011	0.085	0.38
WS-02	0.033	0.000	0.070	0.103	0.71
WS-03	0.021	0.000	0.060	0.081	0.74
WS-04	0.015	0.000	0.063	0.078	0.78
WS-05	0.200	0.000	0.020	0.220	0.35
WS-06	0.052	0.000	0.000	0.052	0.30
WS-07- Ramp	0.000	0.000	0.005	0.005	0.90
WS-08 - Ramp	0.000	0.000	0.013	0.013	0.90
WS-09 - Roof	0.000	0.000	0.102	0.102	0.90
WS-10 - Roof	0.000	0.000	0.102	0.102	0.90
TOTAL	0.395	0.000	0.444	0.839	0.62

RUNOFF COEFFICIENT (C)

Grass	0.30
Gravel	0.80
Asphalt / rooftop	0.90

BLANCHARD LETENDRE
ENGINEERING

File No. 20-305
Project: Proposed Apartment Buildings
Project Address: 2396 Cleroux Crescent, Ottawa
Client: Bridor Development

Date: May 5, 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	MHCB08	0.052	0.000	0.000	0.03	0.03	10.00	104.19	3.01	250	PVC	0.40%	20.8	37.6	0.77	0.45	**0.08**
	MHCB08	MHCB02	0.000	0.000	0.000	0.00	0.03	10.45	101.86	2.95	250	PVC	1.00%	16.0	59.47	1.21	0.22	**0.05**
	LCB13	MHCB06	0.000	0.000	0.000	0.00	0.00	10.00	104.19	0.00	250	PVC	0.40%	18.0	37.6	0.77	0.39	**0.00**
	LCB12	LCB07	0.000	0.000	0.000	0.00	0.00	10.00	104.19	0.00	250	PVC	0.25%	31.0	29.73	0.61	0.85	**0.00**
WS-01	LCB07	MHCB06	0.074	0.000	0.011	0.07	0.07	10.85	99.89	6.83	250	PVC	0.40%	15.5	37.61	0.77	0.34	**0.18**
	MHCB06	MHCB05	0.000	0.000	0.000	0.00	0.07	11.19	98.30	6.72	250	PVC	1.00%	19.3	59.47	1.21	0.27	**0.11**
WS-02 + WS-10	MHCB05	MHCB04	0.033	0.000	0.172	0.45	0.52	11.46	97.09	50.18	250	PVC	1.00%	14.7	59.5	1.21	0.20	**0.84**
WS-03 + WS-09	MHCB04	MHCB03	0.021	0.000	0.162	0.42	0.93	11.66	96.18	89.70	450	PVC	0.25%	21.0	142.6	0.90	0.39	**0.63**
WS-04	MHCB03	MHCB02	0.015	0.000	0.063	0.17	1.10	12.05	94.49	103.80	450	PVC	0.25%	21.5	142.55	0.90	0.40	**0.73**
	MHCB02	MHCB01	0.000	0.000	0.000	0.00	1.10	12.45	92.82	101.97	450	PVC	1.00%	7.6	285.11	1.79	0.07	**0.36**
WS-05	LCB14	MHCB01	0.200	0.000	0.020	0.16	1.29	12.52	92.54	119.25	250	PVC	1.00%	9.2	59.47	1.21	0.13	**2.01**
	MHCB01	STORMCEPTOR	0.000	0.000	0.000	0.00	1.29	12.65	92.03	118.59	300	PVC	1.00%	3.2	96.70	1.37	0.04	**1.23**
	STORMCEPTOR	CITY	0.000	0.000	0.000	0.00	1.29	12.68	91.87	118.39	300	PVC	1.00%	16.1	96.7	1.37	0.20	**1.22**

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
* From City of Ottawa Stub in Easement

BLANCHARD LETENDRE
ENGINEERING

File No.	20-305	**Date:**	May 5, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	2396 Cleroux Crescent, Ottawa	**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	MHCB08	78.54	78.45	81.80	80.20	3.01	1.50	3.01
MHCB08	MHCB02	78.21	78.05	80.20	80.71	1.74	2.41	1.74
LCB13	MHCB06	80.37	80.29	82.42	82.75	1.80	2.21	1.80
LCB12	LCB07	81.23	81.16	82.40	82.60	0.92	1.19	0.92
LCB07	MHCB06	80.36	80.29	82.60	82.75	1.99	2.21	1.99
MHCB06	MHCB05	80.09	79.90	82.75	82.20	2.41	2.05	2.41
MHCB05	MHCB04	79.62	79.42	82.20	81.90	2.33	2.23	2.33
MHCB04	MHCB03	78.46	78.41	81.90	81.30	2.99	2.44	3.19
MHCB03	MHCB02	78.35	78.30	81.30	80.71	2.50	1.96	2.50
MHCB02	MHCB01	76.08	76.00	80.71	78.20	4.18	1.75	4.18
LCB14	MHCB01	75.24	75.15	76.65	78.20	1.16	2.80	1.41
MHCB01	STORMCEPTOR	74.91	74.88	78.20	78.00	2.99	2.82	3.29
STORMCEPTOR	CITY	74.82	74.73	78.00	77.40	2.88	2.37	2.88

BLANCHARD LETENDRE
ENGINEERING

File No.	20-305	**Date:**	May 5, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	2396 Cleroux Crescent, Ottawa	**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			$\sum R_5$
Un-Controlled	EWS-01	0.839	ha	R=	0.42
	Total Uncontrolled =	**0.839**	**ha**	**∑R=**	**0.42**

PRE-DEVELOPMENT ALLOWABLE RELEASE RATE

Q = 2.78CIA (L/s) $I_5 =$ **998.071 / (Tc + 6.053)$^{0.814}$**

C =	0.50	up to a maximum of 0.5 as per City of Ottawa Sewer Design Guidelines	
I =	104.2	mm/hr	
Tc =	10	min	
Total =	0.839	ha	
Allowable Release Rate=	**121.53**	L/s	
Allowable Release Rate=	**96.70**	L/s	* As per City 300mm Diameter Stub installed at 1.00%
Allowable Release Rate=	**60.76**	L/s	* 50% of Pre-Development Flow due to underground storage

POST-DEVELOPMENT STORMATER MANAGEMENT

Runoff	Catchment Area	Area			$\sum R_5$	$\sum R_{100}$
Controlled	WS-01	0.085	ha	R=	0.38	0.47
	WS-02	0.103	ha	R=	0.71	0.89
	WS-03	0.081	ha	R=	0.74	0.93
	WS-04	0.078	ha	R=	0.78	0.98
	WS-05	0.220	ha	R=	0.35	0.44
	WS-06	0.052	ha	R=	0.30	0.38
	WS-09 - Roof	0.102	ha	R=	0.90	1.00
	WS-10 - Roof	0.102	ha	R=	0.90	1.00
	Total Contolled =	**0.822**	**ha**	**∑R=**	**0.61**	**0.73**
Un-controlled	WS-07- Ramp	0.005	ha	R=	0.90	1.00
	WS-08 - Ramp	0.013	ha	R=	0.90	1.00
	Total Un-Controlled =	**0.017**	**ha**	**∑R=**	**0.90**	**1.00**

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

* WS-09 will not be accounted for as it will remain unaffected

		REQUIRED STORAGE (A1, A2, A3,A4,A6,A9, A10)			REQUIRED STORAGE (A5)				
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	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	127.97	64.78	20.00	28.24	0.00	39.46	1.30	60.76
15	83.6	102.63	74.37	20.00	22.65	0.00	39.46	1.05	21.05
20	70.3	86.29	79.54	20.00	19.04	0.00	39.46	0.88	20.88
25	60.9	74.80	82.19	20.00	16.51	0.00	39.46	0.76	20.76
30	53.9	66.24	83.22	20.00	14.62	0.00	39.46	0.67	20.67
35	48.5	59.59	83.14	20.00	13.15	0.00	39.46	0.61	20.61
40	44.2	54.27	82.25	20.00	11.98	0.00	39.46	0.55	20.55
45	40.6	49.90	80.73	20.00	11.01	0.00	39.46	0.51	20.51
50	37.7	46.25	78.74	20.00	10.21	0.00	39.46	0.47	20.47
60	32.9	40.46	73.66	20.00	8.93	0.00	39.46	0.41	20.41
70	29.4	36.08	67.52	20.00	7.96	0.00	39.46	0.37	20.37
80	26.6	32.62	60.60	20.00	7.20	0.00	39.46	0.33	20.33
90	24.3	29.83	53.09	20.00	6.58	0.00	39.46	0.30	20.30
500	6.3	7.71	0.00	20.00	1.70	0.00	39.46	0.08	20.08
720	4.7	5.75	0.00	20.00	1.27	0.00	39.46	0.06	20.06
1440	2.7	3.28	0.00	20.00	0.72	0.00	39.46	0.03	20.03

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

STORMATER STORAGE REQUIREMENTS

Total Storage Required =	**83.22**	**m^3**	
Underground Chambers =	176.00	m^3	
Total Available Storage =	**175.00**	**m^3**	

Total Storage Required =	**0.00**	**m^3**	
Infiltration Gallery =	73.80	m^3	
Total Available Storage =	**73.80**	**m^3**	

Inlet Control Device Parameters

Product	**Orifice Plate**	at MHCB 02	
Invert Level =	78.30	masl.	
HWL =	1.92	m	from inv.
HWL =	80.22	masl.	
Orifice Dia. =	**82**	mm	
Orifice Invert =	78.30	masl.	
Orifice Area =	0.0053	m2	
ICD Centerline =	78.45	masl.	
HWL Head =	1.91	m	from centerline
C =	0.61		
Controlled Release =	20.00	L/s	

Inlet Control Device Parameters

Product	**Orifice Plate**	at LCB14	
Invert Level =	75.74	masl.	
HWL =	0.86	m	from inv.
HWL =	76.60	masl.	
Orifice Dia. =	**142**	mm	
Orifice Invert =	75.74	masl.	
Orifice Area =	0.0158	m2	
ICD Centerline =	75.89	masl.	
HWL Head =	0.84	m	from centerline
C =	0.61		
Controlled Release =	39.46	L/s	

BLANCHARD LETENDRE
ENGINEERING

File No.	20-305	**Date:**	May 5, 2022
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	2396 Cleroux Crescent, Ottawa	**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	0.839	ha	R=	0.42
	Total Uncontrolled =	**0.839**	**ha**	**∑R=**	**0.42**

PRE-DEVELOPMENT ALLOWABLE RELEASE RATE

Q = 2.78CIA (L/s)

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

C =	0.50		up to a maximum of 0.5 as per City of Ottawa Sewer Design Guidelines
I =	104.2	mm/hr	
Tc =	10	min	
Total =	0.839	ha	
Allowable Release Rate=	**121.53**	L/s	
Release Rate=	**96.70**	L/s	* As per City 300mm Diameter Stub installed at 1.00%
Allowable Release Rate=	**60.76**	L/s	* 50% of Pre-Development Flow due to underground storage

POST-DEVELOPMENT STORMATER MANAGEMENT

Runoff	Catchment Area	Area			$\sum R_5$	$\sum R_{100}$
Controlled	WS-01	0.085	ha	R=	0.38	0.47
	WS-02	0.103	ha	R=	0.71	0.89
	WS-03	0.081	ha	R=	0.74	0.93
	WS-04	0.078	ha	R=	0.78	0.98
	WS-05	0.220	ha	R=	0.35	0.44
	WS-06	0.052	ha	R=	0.30	0.38
	WS-09 - Roof	0.102	ha	R=	0.90	1.00
	WS-10 - Roof	0.102	ha	R=	0.90	1.00
	Total Contolled =	**0.822**	**ha**	**∑R=**	**0.61**	**0.73**
Un-controlled	WS-07- Ramp	0.005	ha	R=	0.90	1.00
	WS-08 - Ramp	0.013	ha	R=	0.90	1.00
	Total Un-Controlled =	**0.017**	**ha**	**∑R=**	**0.90**	**1.00**

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

		REQUIRED STORAGE (A1, A2, A3,A4,A6,A9, A10)			REQUIRED STORAGE (A5)				
Time (min)	**Intensity (mm/hr)**	**Controlled Runoff (L/s)**	**Storage Volume (m^3)**	**Controlled Release Rate (L/s)**	**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	219.31	119.59	20.00	48.40	70.82	38.53	2.23	60.76
15	142.9	175.51	139.96	20.00	38.73	1.70	38.53	1.79	21.79
20	120.0	147.33	152.79	20.00	32.51	0.00	38.53	1.50	21.50
25	103.8	127.55	161.32	20.00	28.15	0.00	38.53	1.30	21.30
30	91.9	112.84	167.11	20.00	24.90	0.00	38.53	1.15	21.15
35	82.6	101.43	171.00	20.00	22.38	0.00	38.53	1.03	21.03
40	75.1	92.30	173.51	20.00	20.37	0.00	38.53	0.94	20.94
45	69.1	84.81	174.99	20.00	18.72	0.00	38.53	0.86	20.86
50	64.0	78.55	175.65	20.00	17.33	0.00	38.53	0.80	20.80
60	55.9	68.65	175.15	20.00	15.15	0.00	38.53	0.70	20.70
90	41.1	50.49	164.67	20.00	11.14	0.00	38.53	0.51	20.51
120	32.9	40.40	146.90	20.00	8.92	0.00	38.53	0.41	20.41
360	13.7	16.85	0.00	20.00	3.72	0.00	38.53	0.17	20.17
500	*10.5*	12.92	0.00	20.00	2.85	0.00	38.53	0.13	20.13
720	7.8	9.61	0.00	20.00	2.12	0.00	38.53	0.10	20.10

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

STORMATER STORAGE REQUIREMENTS

Total Storage Required =	**175.65 m^3**	**Total Storage Required =**	**70.82 m^3**
Underground Chambers =	176.00 m^3	Infiltration Gallery =	73.80 m^3
Total Available Storage =	**175.00 m^3**	**Total Available Storage =**	**73.80 m^3**

Inlet Control Device Parameters

Product	**Orifice Plate**	at MHCB 02	
Invert Level =	78.30	masl.	
HWL =	1.92	m	from inv.
HWL =	80.22	masl.	
Orifice Dia. =	**82**	mm	
Orifice Invert =	78.30	masl.	
Orifice Area =	0.0053	m2	
ICD Centerline =	78.45	masl.	
HWL Head =	1.91	m	from centerline
C =	0.61		
Controlled Release =	20.00	L/s	

Inlet Control Device Parameters

Product	**Orifice Plate**	at LCB14	
Invert Level =	75.74	masl.	
HWL =	0.86	m	from inv.
HWL =	76.60	masl.	
Orifice Dia. =	**142**	mm	
Orifice Invert =	75.74	masl.	
Orifice Area =	0.0158	m2	
ICD Centerline =	75.89	masl.	
HWL Head =	0.84	m	from centerline
C =	0.61		
Controlled Release =	39.46	L/s	

APPENDIX "B"
Sanitary Design

BLANCHARD LETENDRE
ENGINEERING

File No. 20-305
Project: Proposed Apartment Buildings
Project Address: 2396 Cleroux Crescent, Ottawa
Client: Bridor Development

Date: May 5, 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	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)	(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 A	SAN MH02	0.450	63.0	0.45	63.0	4.0	1.02	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.45	0.45	0.13	1.15	8.4	150	PVC	2.00%	21.54	1.22	78.67	78.50
SITE	PROP. BLDG B	SAN MH02	0.389	62.3	0.39	62.3	4.0	1.01	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.39	0.39	0.11	1.12	17.4	150	PVC	2.00%	21.54	1.22	78.85	78.50
	SAN MH02	SAN MH01	0.000	0.0	0.84	125.3	4.0	2.03	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.00	0.84	0.23	2.27	65.3	200	PVC	1.20%	35.93	1.14	76.38	75.60

DESIGN PARAMETERS NOTES

Average Daily Flow =	350 L/p/day	Industrial Peak Factor =	7 as per Appendix 4-B	**Appartments:**	Person Per Unit
Commercial and Institutional Flow =	50000 L/ha/da	Extraneous Flow =	0.28 L/s/ha	Bachelor =	1.4
Industrial Flow =	35000.00 L/ha/da	Minimum Velocity =	0.76 m/s	1 Bedroom =	1.4
Maximum Resedential Peak Flow =	4	Mannings n =	0.013	2 Bedroom =	2.1
Commection and Intitutional Peak Factor =	1.5			3 Bedroom =	3.1

Building A	Building B
30	28
10	12

APPENDIX "C"
Watermain Design

BLANCHARD LETENDRE
ENGINEERING

File No.	20-305	**Date:**	19/03/2021
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	2396 Cleroux Crescent, Ottawa	**Checked:**	Guillaume Brunet
Client:	Bridor Development	**Drawing Reference:**	C200 & C300

WATER CONSUMPTION CALCULATION

	BLOCK A	BLOCK B	
Total Building Floor Area =	**1016**	**1016**	m^2
Site Total Area =	**0.4195**	**0.4195**	ha
Total Population =	63.00	64.40	ea.
Average Demand Per People =	350	350	L/c/d
Average Water Demand =	**22050.00**	**22540.00**	L/d
Maximum Daily Peak Factor =	2.5	2.5	* As per City of Ottawa
Maximum Daily Residential =	**55125.00**	**56350.00**	L/d
Maximum Hourly Peak Factor =	2.2	2.2	* As per City of Ottawa
Maximum Hourly Residential =	**121275.00**	**123970.00**	L/d
Total Domestic Flow =	**1.40**	**1.43**	**L/s**
Total Fire Flow =	**166.67**	**161.67**	**L/s**

Appartments:	Person Per Unit	Building A	Building B
Bachelor =	1.4	0	0
1 Bedroom =	1.4	30	28
2 Bedroom =	2.1	10	12
3 Bedroom =	3.1	0	0
		63.00	**64.40**

BLOCK A	1 Bedroom	2 Bedroom	Unit Counts	WSFU	Total
Unrinal Flush Tank	1	1	40	2	80
Sinks	2	2	80	1	80
Bathub	1	1	40	4	160
Diswasher	1	1	40	1.5	60
Washing Machine	1	1	40	2	80
Total					**460**

BLOCK B	1 Bedroom	2 Bedroom	Unit Counts	WSFU	Total
Unrinal Flush Tank	1	1	40	2	80
Sinks	2	2	80	1	80
Bathub	1	1	40	4	160
Diswasher	1	1	40	1.5	60
Washing Machine	1	1	40	2	80
Total					**460**

BLANCHARD LETENDRE
ENGINEERING

File No.	20-305	**Date:**	18/02/2021
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	2396 Cleroux Crescent, Ottawa	**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	14	unit	
	Townhouse - no. of units	0				
	Building - no. of units per floor	0				
	Number of floors excluding the basement			3	floor	
	Floor space per unit	1	1,016	1,016	sq.m.	
Required fire flow	**Fire Flow = 220 x C x Area^0.5**				L/min	**9,717**
					L/s	162
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	**8,259**
	Rapid burning	0.25			L/s	138
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	**7,433**
	Fully supervised system	-0.10	True	-0.1	L/s	124
Exposure distance between units	North side	Over 45m	0			
	East side	20.1 to 30m	0.1			
	South side	20.1 to 30m	0.1		L/min	**10,035**
	West side	10.1 to 20m	0.15	0.35	L/s	167
			Minimum required fire flow rate (rounded to nearest 100)		L/min	**10,000**
			Minimum required fire flow rate		L/s	**167**
			Required duration of fire flow		min	**30**

BLANCHARD LETENDRE
ENGINEERING

File No.	20-305	**Date:**	19/03/2021
Project:	Proposed Apartment Buildings	**Designed:**	Guillaume Brunet
Project Address:	2396 Cleroux Crescent, Ottawa	**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	14	unit	
	Townhouse - no. of units	0				
	Building - no. of units per floor	0				
	Number of floors excluding the basement			3	floor	
	Floor space per unit	1	1,016	1,016	sq.m.	
Required fire flow	**Fire Flow = 220 x C x Area^0.5**				L/min	**9,717**
					L/s	162
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	**8,259**
	Rapid burning	0.25			L/s	138
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	**7,433**
	Fully supervised system	-0.10	True	-0.1	L/s	124
Exposure distance between units	North side	Over 45m	0			
	East side	20.1 to 30m	0.1			
	South side	20.1 to 30m	0.1		L/min	**9,663**
	West side	20.1 to 30m	0.1	0.3	L/s	161
			Minimum required fire flow rate (rounded to nearest 100)		L/min	**9,700**
			Minimum required fire flow rate		L/s	**162**
			Required duration of fire flow		min	**30**

APPENDIX "D"
Underground Chambers & Stormwater Treatment Unit

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	HAIDER NASRULLAH 647-850-9417 HAIDER.NASRULLAH@ADS-PIPE.COM
ADS SALES REP:	MICHAEL REID 613-882-4186 MICHAEL.REID@ADS-PIPE.COM
PROJECT NO:	S230845
ADS SITE COORDINATOR:	MATTHEW BEGHIN 519-710-3687 MATTHEW.BEGHIN@ADS-PIPE.COM

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

2396 CLEROUX CRESCENT

OTTAWA, ON.

MC-4500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
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" CHAMBER CLASSIFICATION 60x101.
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 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/IN/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
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 MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR 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 - 230 mm (9") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm).
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 300 mm (12") BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. 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 MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 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 CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING 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

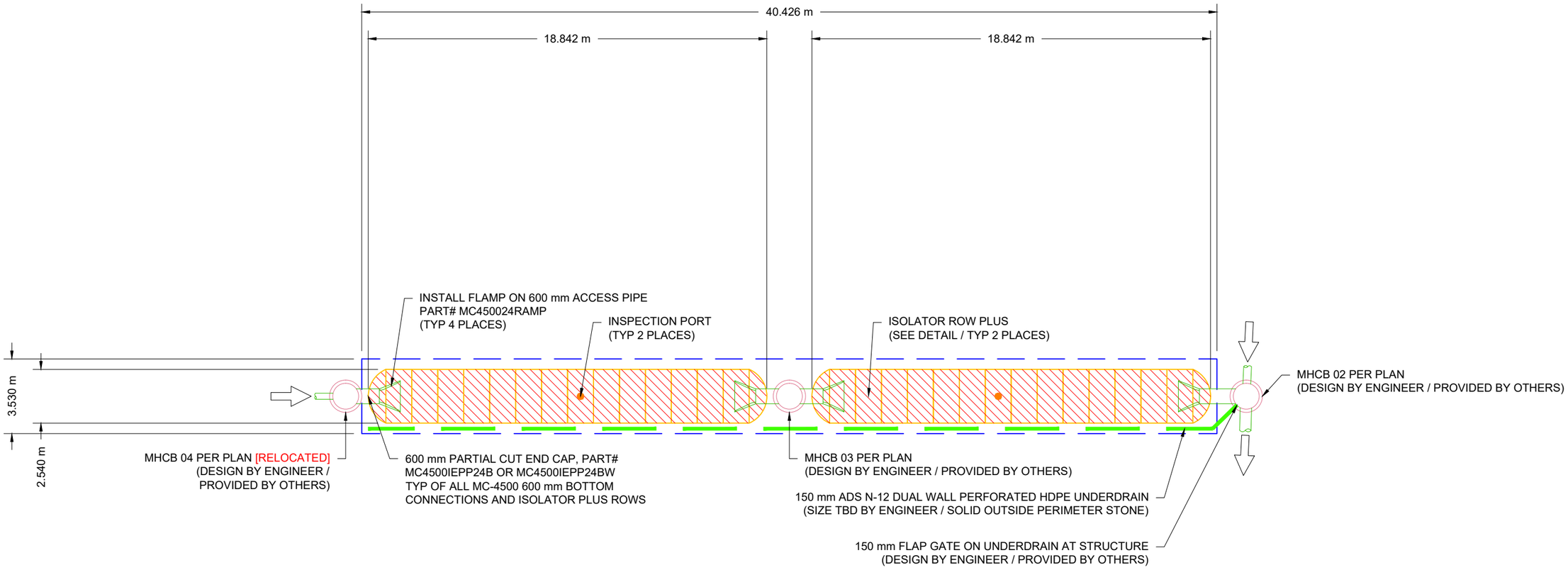
28	STORMTECH MC-4500 CHAMBERS
4	STORMTECH MC-4500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	% STONE VOID
170.9	**INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED)**
142.7	SYSTEM AREA (m²)
87.9	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS

82.051	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
80.679	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
80.527	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
80.527	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
80.527	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
80.222	TOP OF STONE:
79.917	TOP OF MC-4500 CHAMBER:
78.451	600 mm ISOLATOR ROW PLUS INVERT:
78.393	BOTTOM OF MC-4500 CHAMBER:
78.164	BOTTOM OF STONE:

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL 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.



2396 CLEROUX CRESCENT
OTTAWA, ON.

DATE: 12/23/21 | DRAWN: MAD
PROJECT #: S230845 | CHECKED: RWD

DATE	DRWN	CHKD	DESCRIPTION
02/03/22	RCT	RCT	NEW PLAN W/4500'S

StormTech®
Système de Chambres
888-892-2694 | WWW.STORMTECH.COM

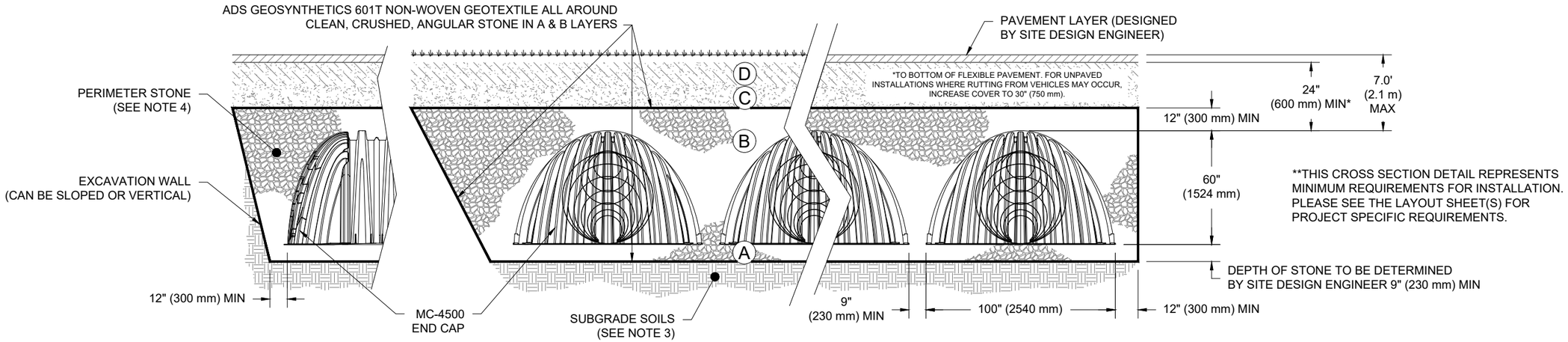
4640 TRUEMAN BLVD
HILLIARD, OH 43026

SCALE = 1 : 200

ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 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 24" (600 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 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
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, 4	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, 4	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 9" (230 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:

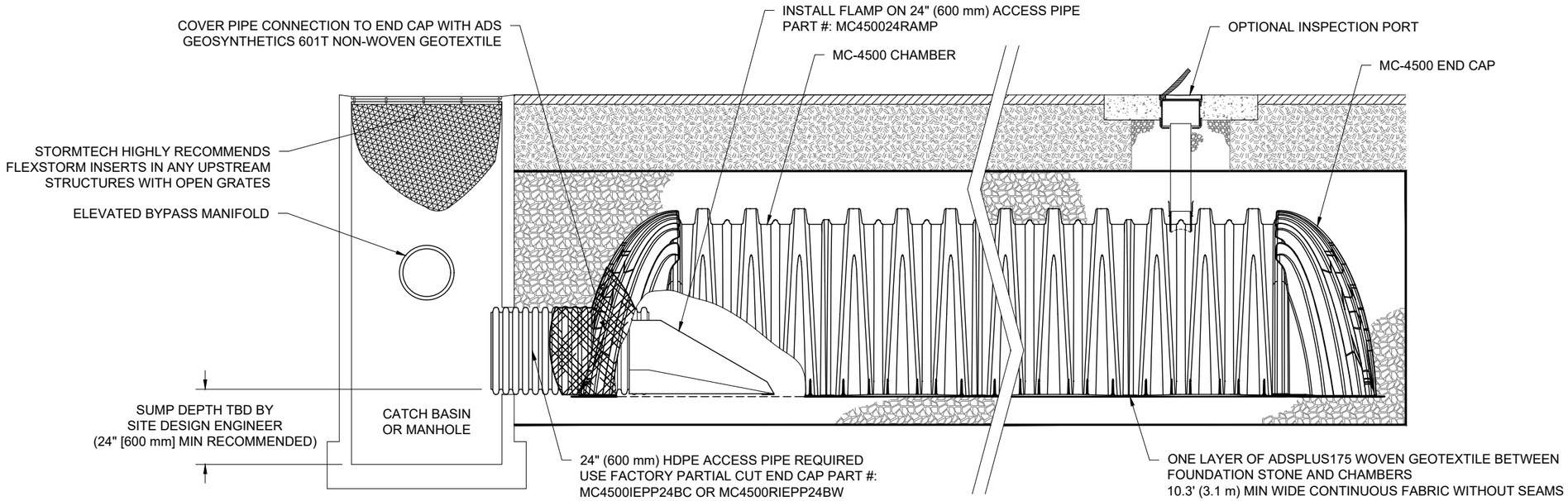
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC 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 3".
   - 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 500 LBS/IN/IN. 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.

2396 CLEROUX CRESCENT
OTTAWA, ON.
DATE: 12/23/21 DRAWN: MAD
PROJECT #: S230845 CHECKED: RWD

DATE	DRWN	CHKD	DESCRIPTION
02/03/22	RCT	RCT	NEW PLAN W/4500'S

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

4640 TRUEMAN BLVD
HILLIARD, OH 43026



MC-4500 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

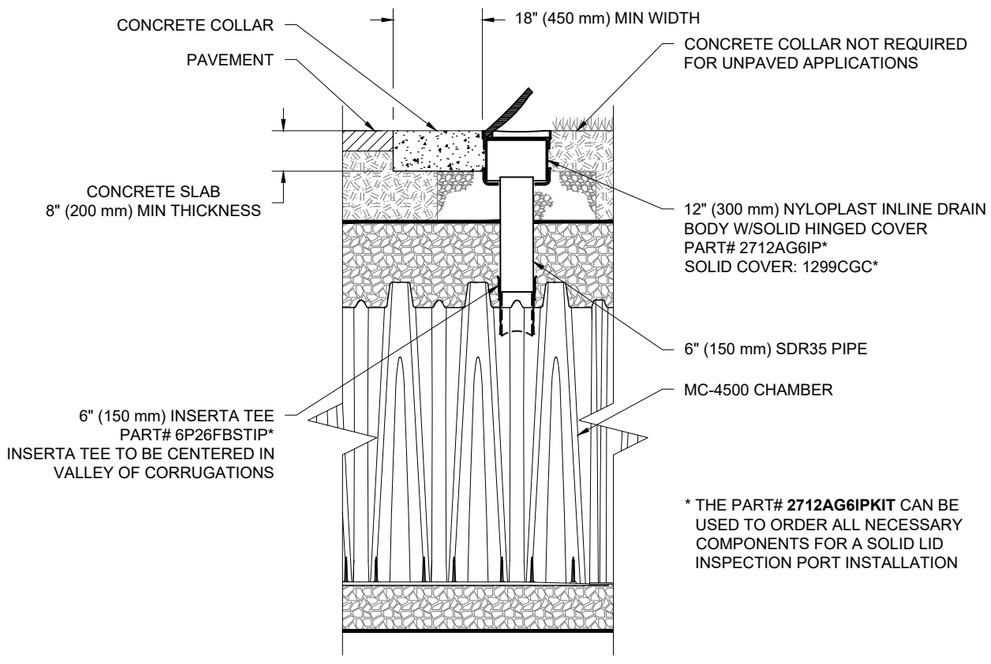
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

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.



MC-4500 6" (150 mm) INSPECTION PORT DETAIL
NTS

2396 CLEROUX CRESCENT
OTTAWA, ON.

DATE: 12/23/21 | DRAWN: MAD
PROJECT #: S230845 | CHECKED: RWD

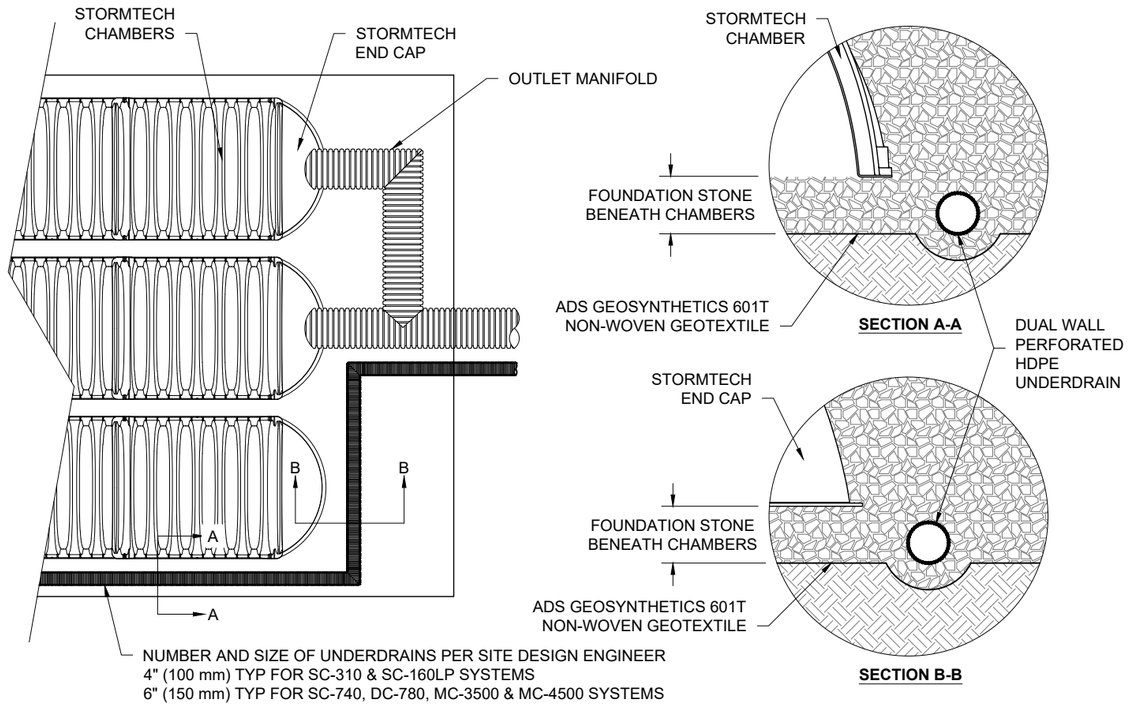
DATE	DRWN	CHKD	DESCRIPTION
02/03/22	RCT	RCT	NEW PLAN W/4500'S

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

4640 TRUEMAN BLVD
HILLIARD, OH 43026

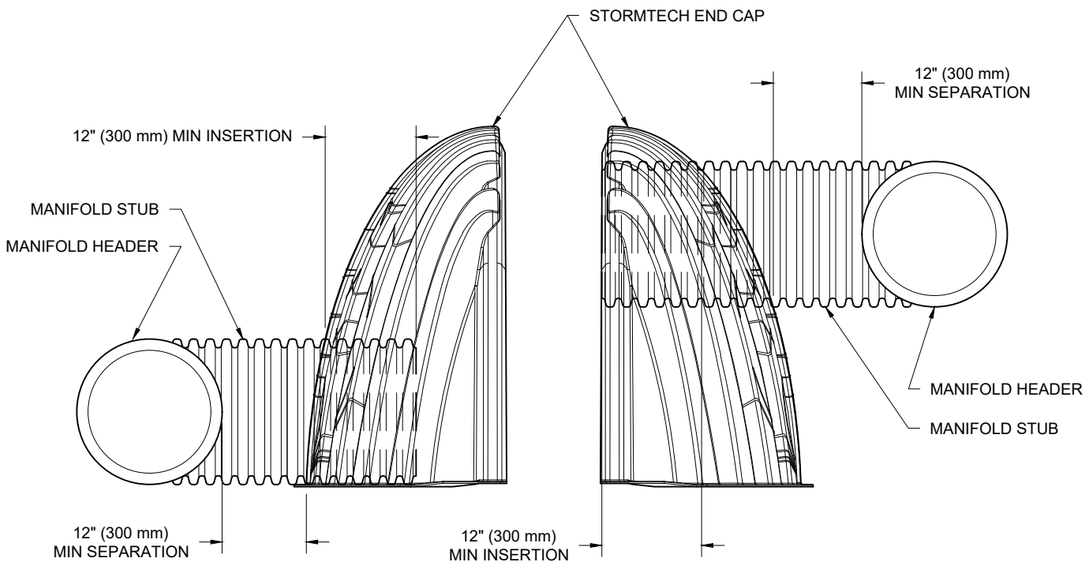
UNDERDRAIN DETAIL

NTS



MC-SERIES END CAP INSERTION DETAIL

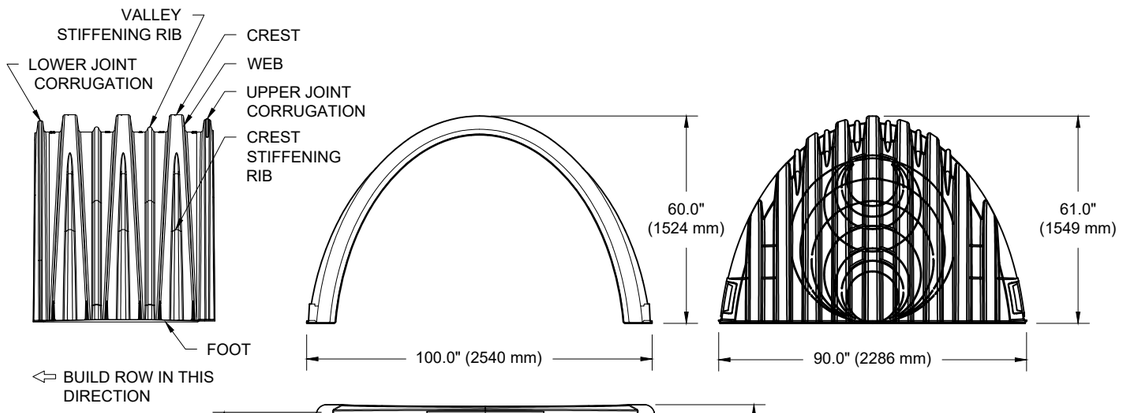
NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-4500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT (NOMINAL)	125.0 lbs.	(56.7 kg)

NOMINAL END CAP SPECIFICATIONS

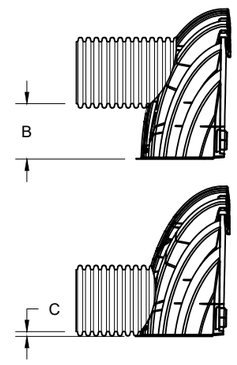
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC4500IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC4500IEPP06B		---	0.86" (22 mm)
MC4500IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC4500IEPP08B		---	1.01" (26 mm)
MC4500IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC4500IEPP10B		---	1.33" (34 mm)
MC4500IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC4500IEPP12B		---	1.55" (39 mm)
MC4500IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC4500IEPP15B		---	1.70" (43 mm)
MC4500IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC4500IEPP18TW			
MC4500IEPP18B		---	1.97" (50 mm)
MC4500IEPP18BW			
MC4500IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC4500IEPP24TW			
MC4500IEPP24B		---	2.26" (57 mm)
MC4500IEPP24BW			
MC4500IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC4500IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC4500IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

2396 CLEROUX CRESCENT
OTTAWA, ON.

DATE: 12/23/21 | DRAWN: MAD | CHECKED: RWD
PROJECT #: S230845

DATE	DRWN	CHKD	DESCRIPTION
02/03/22	RCT	RCT	NEW PLAN W/4500'S

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

4640 TRUEMAN BLVD
HILLIARD, OH 43026

PIPE CROSSING #1
STM INV. =79.66
SAN OBV = 78.685

PIPE CROSSING #1
STM INV. =78.65
SAN OBV = 78.45

FOUNDATION DRAIN CONNECTION

PROP. STM CB11
T/G = 79.90
E INV.= 78.70

PROP. STM 23.5m - 250mm Ø
PVC DR-35 @0.25%

PROPOSED UNDERGROUND STORAGE CHAMBERS AS PER STORMTECH CHAMBERS.
STORAGE PROVIDED = 120.90m3

PROP. SAN SEWER 65.1m - 200mm Ø PVC DR-36 @1.2%.

PROP. 150mm FOUNDATION DRAINS TO BE CONNECTED
DOWNSTREAM OF THE ICD.

PROP. STM 7.6 m - 450mm Ø PVC DR-35 @ 1.0%

PIPE CROSSING
STM INV.= 76.06
SAN OBV. = 75.90

PROP. STM MHCB01
T/G = 78.20
NE INV.= 76.00
S INV.= 75.65
SE INV.= 74.91

PROP. STM 3.2 m - 300mm Ø PVC DR-35 @1.00%

STORM TREATMENT UNIT TO BE STORMCEPTOR
EF06 OR EQUIV. REFER TO DETAIL ON C501.
T/G =78.00
N INV. = 74.88
S INV. = 74.82

PROP. STM - 9.2m - 250mm Ø
PERFORATED SUBDRAIN PIPE @1.00%

PROP. STM LCB15
T/G = 76.50
NE INV. = 75.90

PROP. STM LCB14
T/G = 76.40
NE INV. = 75.74
W INV. = 75.75
E INV. = 75.75

T/G = 82.20
N INV.= 79.90
S INV.= 79.60
E & W INV. = 79.65

PROP. STM 16.3m - 250mm
Ø PVC DR-35 @1.00%

PROP. STM MHCB04
T/G = 81.90
N INV.= 79.41
W INV.= 78.61
S INV.= 78.45

PROP. STM 17.3m - 250mm
Ø PVC DR-35 @0.25%

150mm Ø FOUNDATION
DRAIN CONNECTION

BLOCK B
PROPOSED 3 STOREY
40 UNIT APARTMENT
BUILDINGS 30 U.G.
PARKING
FFE = 82.75
USF = 79.70

NE INV. = 80.50

PROP. STM - 48m - 200mm Ø
PERFORATED SUBDRAIN PIPE

ORIENT PARK DR.

PROP. STM MHCB03
T/G = 81.30
N INV.= 78.40
S INV.= 78.34

PROP. STM 19.0 m - 300mm
Ø PVC DR-35 @ 2.0%

PROP. STM CB09
T/G = 79.50
S INV.= 78.36

PROP. STM LCB10
T/G = 81.80
SW INV.= 78.52

PIPE BEDDING AND BACKFILL TO BE AT LEAS
SEWERS AND WATER PIPE. BEDDING SHOU
THE PIPE. SPRINGLINE TO 300mm ABOVE TH
OR GRANULAR B TYPE II WITH MAXIMUM SIZ
REPORT.

PROP. STM 16.0 m - 300mm Ø
PVC DR-35 @ 1.0%

PROP. STM 20.8 m - 250mm
Ø PVC DR-35 @ 2.0%

PROP. STM MHCB02
T/G = 80.71
N INV.= 78.30
E INV.= 78.05
SW INV.= 76.08

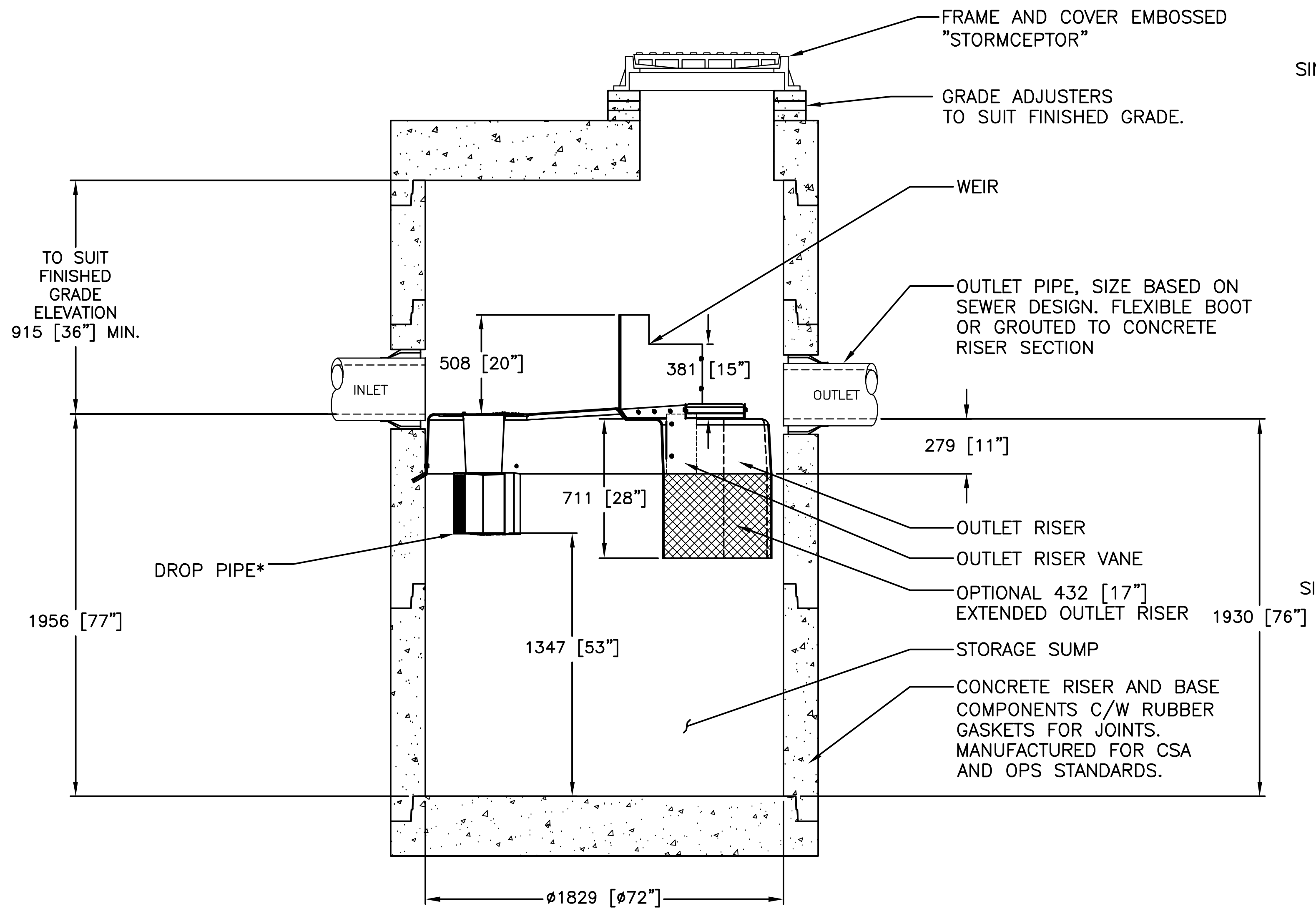
PROP. STM MHCB08
T/G = 80.20
N INV.= 78.33
NE INV. = 78.04
W INV.= 78.45

PROP. STM LCB16
T/G = 80.00
W INV. = 78.50

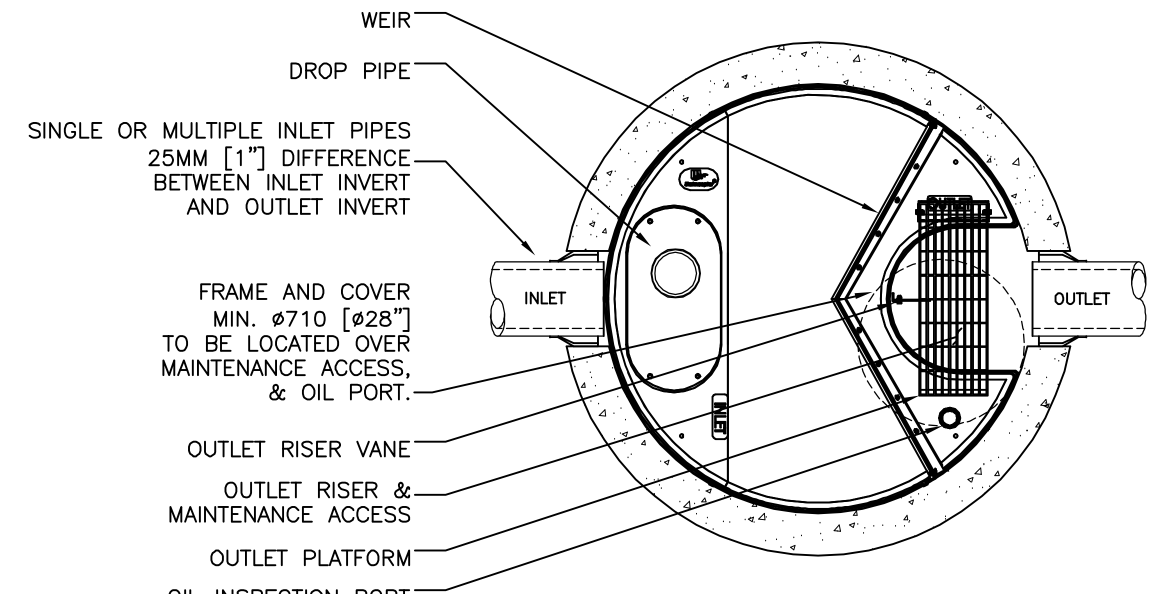
PROP. STM LCB16
T/G = 78.60
E INV. = 77.90

PROP. STM - 33 m - 200mm Ø

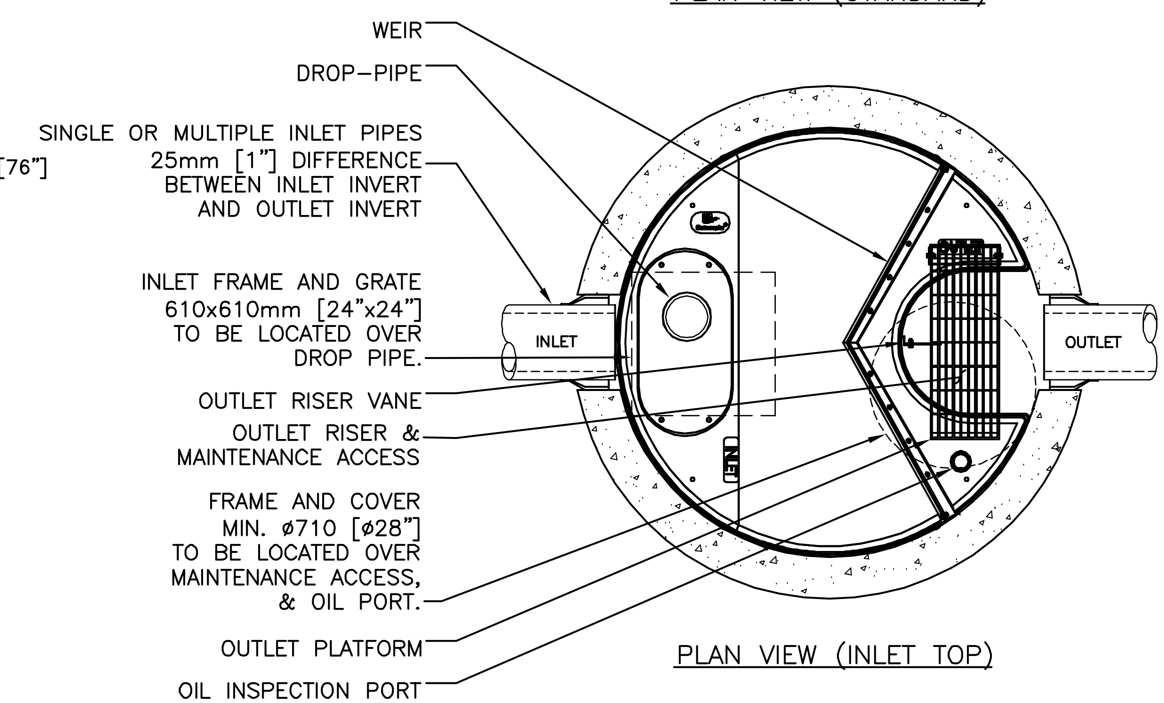
DRAWING NOT TO BE USED FOR CONSTRUCTION



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 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.

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
####	####	####	####
####	####	####	####
####	####	####	####

Stormceptor® EF

SCALE = NTS

imbrium®

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

I:\IMBRIUM\PRODUCTS\STORMCEPTOR EF\40 DRAWINGS & DETAILS\STANDARD DETAILS\EFO STANDARD DETAILS\EFO6-DETAIL.DWG 4/12/2019 11:05 AM

Project: **2396 Cleroux Street Rev1**

Chamber Model -	MC-4500	
Units -	**Metric**	Click Here for Imperial
Number of Chambers -	28	
Number of End Caps -	4	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	78.16	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm

☑ Include Perimeter Stone in Calculations

142.7 sq.meters Min. Area - 107.736 sq.meters

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Single End Cap *(cubic meters)*	Incremental Chambers *(cubic meters)*	Incremental End Cap *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Chamber, End Cap and Stone *(cubic meters)*	Cumulative System *(cubic meters)*	Elevation *(meters)*
2057	0.00	0.00	0.00	0.00	1.450	1.45	170.73	80.22
2032	0.00	0.00	0.00	0.00	1.450	1.45	169.28	80.20
2007	0.00	0.00	0.00	0.00	1.450	1.45	167.83	80.17
1981	0.00	0.00	0.00	0.00	1.450	1.45	166.39	80.15
1956	0.00	0.00	0.00	0.00	1.450	1.45	164.94	80.12
1930	0.00	0.00	0.00	0.00	1.450	1.45	163.49	80.09
1905	0.00	0.00	0.00	0.00	1.450	1.45	162.04	80.07
1880	0.00	0.00	0.00	0.00	1.450	1.45	160.59	80.04
1854	0.00	0.00	0.00	0.00	1.450	1.45	159.14	80.02
1829	0.00	0.00	0.00	0.00	1.450	1.45	157.69	79.99
1803	0.00	0.00	0.00	0.00	1.450	1.45	156.24	79.97
1778	0.00	0.00	0.00	0.00	1.450	1.45	154.79	79.94
1753	0.00	0.00	0.03	0.00	1.440	1.47	153.34	79.92
1727	0.00	0.00	0.09	0.00	1.410	1.51	151.87	79.89
1702	0.00	0.00	0.13	0.01	1.390	1.53	150.37	79.87
1676	0.01	0.00	0.17	0.01	1.380	1.55	148.84	79.84
1651	0.01	0.00	0.21	0.01	1.360	1.58	147.28	79.82
1626	0.01	0.00	0.36	0.01	1.300	1.67	145.70	79.79
1600	0.02	0.00	0.53	0.01	1.230	1.77	144.03	79.76
1575	0.02	0.00	0.63	0.02	1.190	1.84	142.26	79.74
1549	0.03	0.01	0.72	0.02	1.150	1.89	140.41	79.71
1524	0.03	0.01	0.80	0.02	1.120	1.94	138.52	79.69
1499	0.03	0.01	0.86	0.03	1.090	1.98	136.58	79.66
1473	0.03	0.01	0.92	0.03	1.070	2.02	134.60	79.64
1448	0.03	0.01	0.98	0.03	1.040	2.06	132.58	79.61
1422	0.04	0.01	1.03	0.04	1.020	2.09	130.52	79.59
1397	0.04	0.01	1.08	0.04	1.000	2.12	128.43	79.56
1372	0.04	0.01	1.12	0.04	0.980	2.15	126.31	79.54
1346	0.04	0.01	1.17	0.05		2.18	124.16	79.51
1321	0.04	0.01	1.21	0.05	0.950	2.20	121.98	79.48
1295	0.04	0.01	1.25	0.05		2.23	119.78	79.46
1270	0.05	0.01	1.29	0.06	0.910	2.25	117.55	79.43
1245	0.05	0.01	1.32	0.06		2.28	115.29	79.41
1219	0.05	0.02	1.36	0.06	0.880	2.30	113.01	79.38
1194	0.05	0.02	1.39	0.06		2.32	110.72	79.36
1168	0.05	0.02	1.42	0.07	0.850	2.34	108.40	79.33
1143	0.05	0.02	1.45	0.07		2.36	106.05	79.31
1118	0.05	0.02	1.48	0.07	0.830	2.38	103.70	79.28
1092	0.05	0.02	1.51	0.07		2.40	101.32	79.26
1067	0.05	0.02	1.53	0.08	0.810	2.41	98.92	79.23
1041	0.06	0.02	1.56	0.08		2.43	96.51	79.21
1016	0.06	0.02	1.58	0.08	0.780	2.45	94.08	79.18
991	0.06	0.02	1.61	0.08		2.46	91.63	79.15
965	0.06	0.02	1.63	0.09	0.760	2.48	89.17	79.13
940	0.06	0.02	1.65	0.09		2.49	86.69	79.10
914	0.06	0.02	1.67	0.09	0.740	2.51	84.19	79.08
889	0.06	0.02	1.69	0.09		2.52	81.69	79.05
864	0.06	0.02	1.71	0.09	0.730	2.53	79.17	79.03
838	0.06	0.02	1.73	0.10		2.55	76.63	79.00
813	0.06	0.02	1.75	0.10	0.710	2.56	74.09	78.98
787	0.06	0.03	1.77	0.10		2.57	71.53	78.95
762	0.06	0.03	1.78	0.10	0.690	2.58	68.96	78.93
737	0.06	0.03	1.80	0.10		2.59	66.38	78.90
711	0.06	0.03	1.81	0.10	0.680	2.60	63.79	78.88
686	0.07	0.03	1.83	0.11		2.61	61.19	78.85
660	0.07	0.03	1.84	0.11	0.670	2.62	58.58	78.82
635	0.07	0.03	1.86	0.11		2.63	55.96	78.80
610	0.07	0.03	1.87	0.11	0.660	2.64	53.33	78.77
584	0.07	0.03	1.88	0.11		2.65	50.69	78.75
559	0.07	0.03	1.90	0.11	0.650	2.65	48.05	78.72
533	0.07	0.03	1.91	0.11		2.66	45.39	78.70
508	0.07	0.03	1.92	0.12	0.640	2.67	42.73	78.67
483	0.07	0.03	1.93	0.12		2.68	40.06	78.65
457	0.07	0.03	1.94	0.12	0.630	2.68	37.38	78.62
432	0.07	0.03	1.95	0.12		2.69	34.70	78.60
406	0.07	0.03	1.96	0.12	0.620	2.69	32.01	78.57
381	0.07	0.03	1.96	0.12		2.70	29.32	78.55
356	0.07	0.03	1.97	0.12	0.610	2.70	26.62	78.52
330	0.07	0.03	1.98	0.12		2.71	23.91	78.49
305	0.07	0.03	1.99	0.12	0.610	2.72	21.20	78.47
279	0.07	0.03	1.99	0.12		2.72	18.49	78.44
254	0.07	0.03	2.00	0.13	0.600	2.73	15.77	78.42
229	0.00	0.00	0.00	0.00		1.45	13.04	78.39
203	0.00	0.00	0.00	0.00	1.450	1.45	11.59	78.37
178	0.00	0.00	0.00	0.00		1.45	10.14	78.34
152	0.00	0.00	0.00	0.00	1.450	1.45	8.69	78.32
127	0.00	0.00	0.00	0.00		1.45	7.25	78.29
102	0.00	0.00	0.00	0.00	1.450	1.45	5.80	78.27
76	0.00	0.00	0.00	0.00		1.45	4.35	78.24
51	0.00	0.00	0.00	0.00	1.450	1.45	2.90	78.21
25	0.00	0.00	0.00	0.00		1.45	1.45	78.19

APPENDIX "E"
Boundary Conditions

Boundary Conditions
2396 Cleroux Street

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	31	0.51
Maximum Daily Demand	76	1.27
Peak Hour	167	2.79
Fire Flow Demand #1	10,000	166.67

Location

Results

Connection 1 – Cleroux St.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.0	67.8
Peak Hour	127.0	62.2
Max Day plus Fire 1	123.1	56.6

Ground Elevation = 83.2 m

Connection 2 – Orient Park Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.0	70.2
Peak Hour	127.0	64.6
Max Day plus Fire 1	120.1	54.8

Ground Elevation = 81.6 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:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED EASEMENT
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- +50.00 PROPOSED ELEVATION
- +50.00HP PROPOSED HIGH POINT ELEVATION
- +50.00SW PROPOSED SWALE ELEVATION
- +50.00EX MATCH INTO EXISTING ELEVATION
- +50.00SD PROPOSED SIDEWALK
- - 70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM STM STM PROPOSED STORM SEWER
- SAN SAN SAN PROPOSED SANITARY SEWER
- WTR WTR WTR PROPOSED WATERMAIN
- SAN SAN SAN EXISTING SANITARY SEWER
- WTR WTR WTR EXISTING WATERMAIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX (CONTROLLED) 0.65 A 0.XXX R — WATERSHED NAME, RUNOFF COEFFICIENT, 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
- PROPOSED ACCESS GATE
- PROPOSED GROWING FIELD

g or invalid reference
\..\..\..\Desktop\OPSD 219.110 Rev#2 Nov15.pdf

g or invalid reference
\..\..\Desktop\OPSD 219.180 Rev#2 Nov15.pdf

ENGINEERING STAMP

LICENSED PROFESSIONAL ENGINEER
G. L. BRUNET
100191036
30 / 11 / 2021
PROVINCE OF ONTARIO

NO.	REVISION	DATE (DD/MM/YYYY)
#8		
#7		
#6		
#5		
#4		
#3	ISSUED AS PER CITY COMMENTS	05 / 05 / 2022
#2	ISSUED FOR SPA	04 / 02 / 2022
#1	ISSUED FOR SPA	19 / 03 / 2021

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

CLIENT:
BRIDOR DEVELOPMENTS
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
2396 CLEROUX CRES,
OTTAWA, ON

DRAWING:
SEDIMENT & EROSION CONTROL PLAN

PAPER FORMAT:	24x36
DRAWN BY:	BF + GB
CHECKED BY:	GB
DATE:	02-2022
SCALE:	1:300
PROJECT NUMBER:	20-305

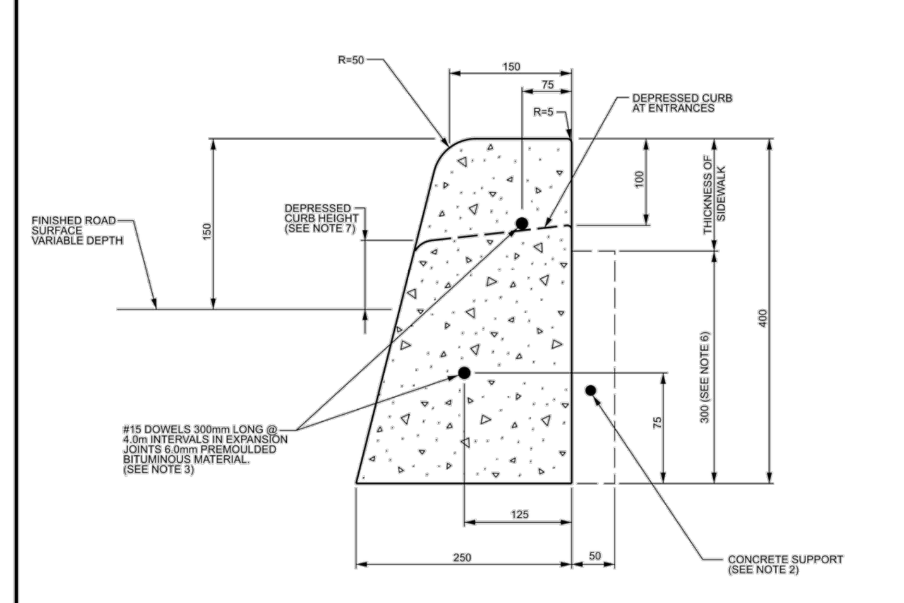
PAGE: C100

DWG # **18569**

D07-12-21-0081

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED EASEMENT
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00SW PROPOSED SWALE ELEVATION
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×50.00SD PROPOSED SIDEWALK
- × 70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX / CONTROLLED / AREA / RUNOFF: 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 ACCESS GATE
- PROPOSED GROWING FIELD



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.

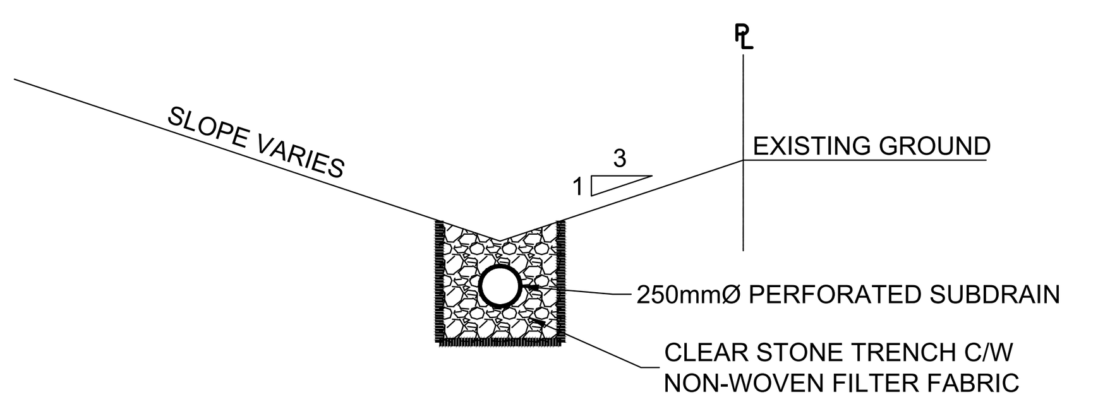
Ottawa	CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD-600.110)	DATE:	JANUARY 2003
		REV. DATE:	MARCH 2021
		DWG. No.:	SC1.1

MANHOLE TABLE
STORM

MH Number	Size (diameter)	Cover
MH00	Treatment Unit - 1800mm	S25, S24.1
MH01	1200mm	S25, S24.1
MHCB02	1200mm	S25, S28.1
MHCB03	1200mm	S25, S28.1
MHCB04	1200mm	S25, S28.1
MHCB05	1200mm	S25, S28.1
MHCB06	1200mm	S25, S28.1
MHCB08	1200mm	S25, S28.1
LCB07,10, 13, 14, 15, 16, 17	S30 AND S31	

MANHOLE TABLE
SANITARY

MH Number	Size (diameter)	Cover
MH101	1200mm	S24, S25 / OPSD 404.010
MH102	1200mm	S24, S25 / OPSD 404.010

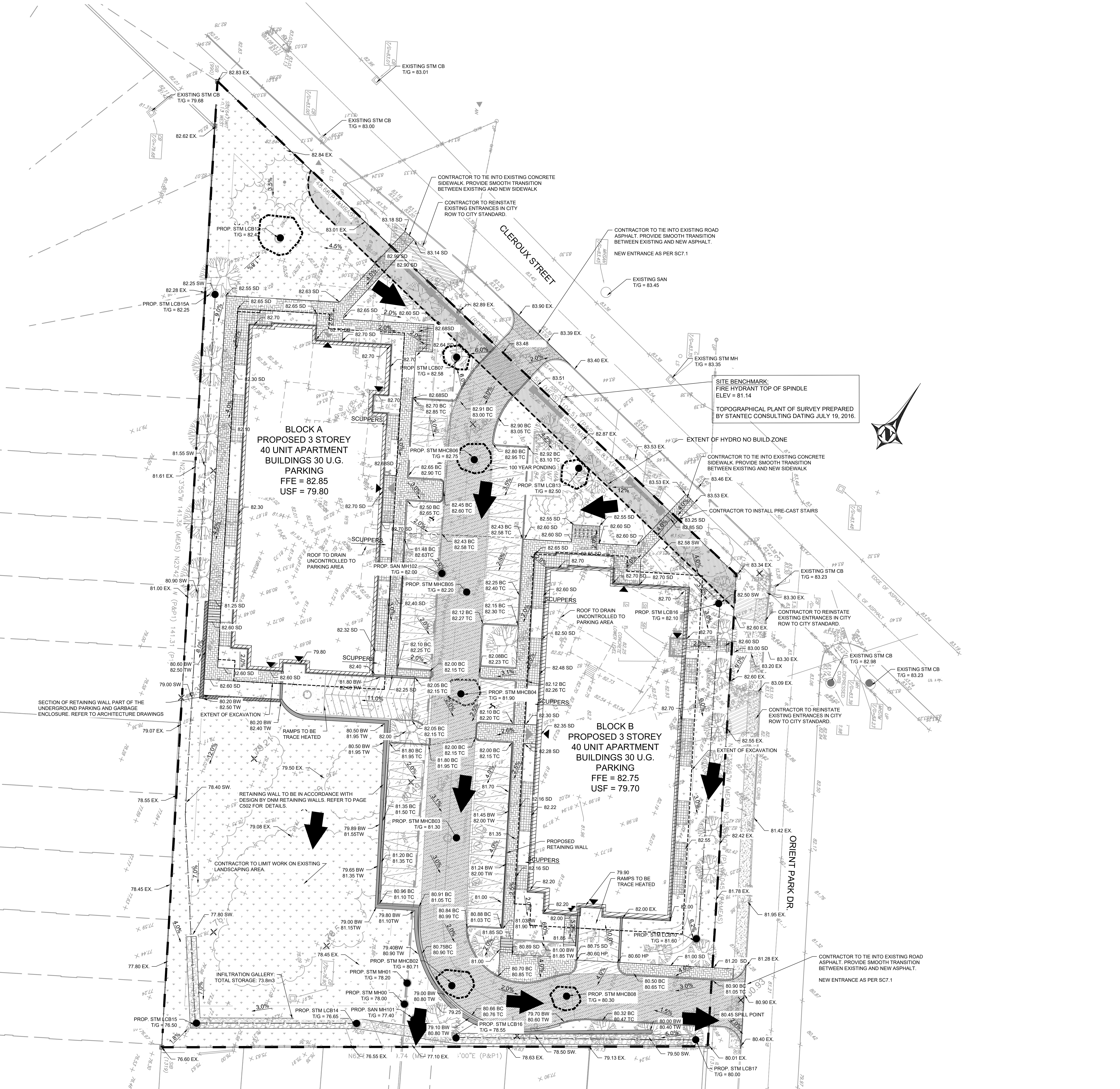


SWALE & SUBDRAIN - TYPICAL SECTION
(N.T.S.)

PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) TRUCK ROUTE (HEAVY TRAFFIC)
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	450

NOTE:
IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED.



ENGINEERING STAMP

NO.	REVISION	DATE (DD/MM/YYYY)
#8		
#7		
#6		
#5		
#4		
#3	ISSUED AS PER CITY COMMENTS	05 / 05 / 2022
#2	ISSUED FOR SPA	04 / 02 / 2022
#1	ISSUED FOR SPA	19 / 03 / 2021

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

CLIENT:
BRIDOR DEVELOPMENTS
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
2396 CLEROUX CRES,
OTTAWA, ON

DRAWING:
SITE GRADING PLAN

PAPER FORMAT:	24x36
DRAWN BY:	BF + GB
CHECKED BY:	GB
DATE:	02-2022
SCALE:	1:300
PROJECT NUMBER:	20-305

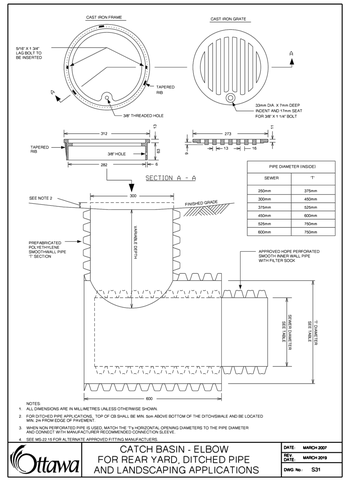
PAGE: C200

D07-12-21-0081

DWG # 18569

LEGEND:

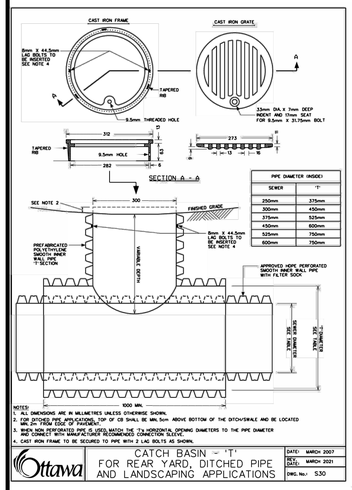
- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED EASEMENT
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00SW PROPOSED SWALE ELEVATION
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×50.00SD PROPOSED SIDEWALK
- 70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM STM STM PROPOSED STORM SEWER
- SAN SAN SAN PROPOSED SANITARY SEWER
- WTR WTR WTR PROPOSED WATERMAIN
- SAN SAN SAN EXISTING SANITARY SEWER
- WTR WTR WTR EXISTING WATERMAIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX (CONTROLLED AREA / UNCONTROLLED) WATERSHED NAME
- RUNOFF COEFFICIENT
- 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
- PROPOSED ACCESS GATE
- PROPOSED GROWING FIELD



PIPE DIAMETER (INSIDE)	
SEWER	T
250mm	375mm
300mm	450mm
375mm	525mm
450mm	600mm
525mm	750mm
600mm	750mm

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
2. FOR DITCHED PIPE APPLICATIONS, TOP OF CB SHALL BE MIN. 5cm ABOVE BOTTOM OF THE DITCH/SWALE AND BE LOCATED AND CONNECT WITH MANUFACTURER RECOMMENDED CONNECTION SLEEVE.
3. WHEN NON PERFORATED PIPE IS USED, MATCH THE T's HORIZONTAL OPENING DIAMETERS TO THE PIPE DIAMETER AND CONNECT WITH MANUFACTURER RECOMMENDED CONNECTION SLEEVE.
4. SEE MS-22.10 FOR ALTERNATE APPROVED FITTING MANUFACTURERS.

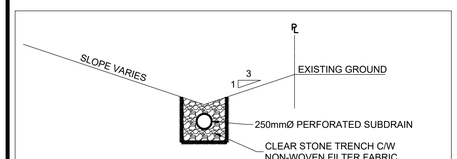
Ottawa	CATCH BASIN – ELBOW FOR REAR YARD, DITCHED PIPE AND LANDSCAPING APPLICATIONS	DATE: MARCH 2007 REV. DATE: MARCH 2019 DWG No.: S31



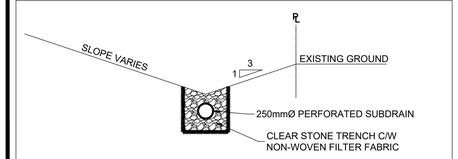
PIPE DIAMETER (INSIDE)	
SEWER	T
250mm	375mm
300mm	450mm
375mm	525mm
450mm	600mm
525mm	750mm
600mm	750mm

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
2. FOR DITCHED PIPE APPLICATIONS, TOP OF CB SHALL BE MIN. 5cm ABOVE BOTTOM OF THE DITCH/SWALE AND BE LOCATED AND CONNECT WITH MANUFACTURER RECOMMENDED CONNECTION SLEEVE.
3. WHEN NON PERFORATED PIPE IS USED, MATCH THE T's HORIZONTAL OPENING DIAMETERS TO THE PIPE DIAMETER AND CONNECT WITH MANUFACTURER RECOMMENDED CONNECTION SLEEVE.
4. CAST IRON FRAME TO BE SECURED TO PIPE WITH 2 LAG BOLTS AS SHOWN.

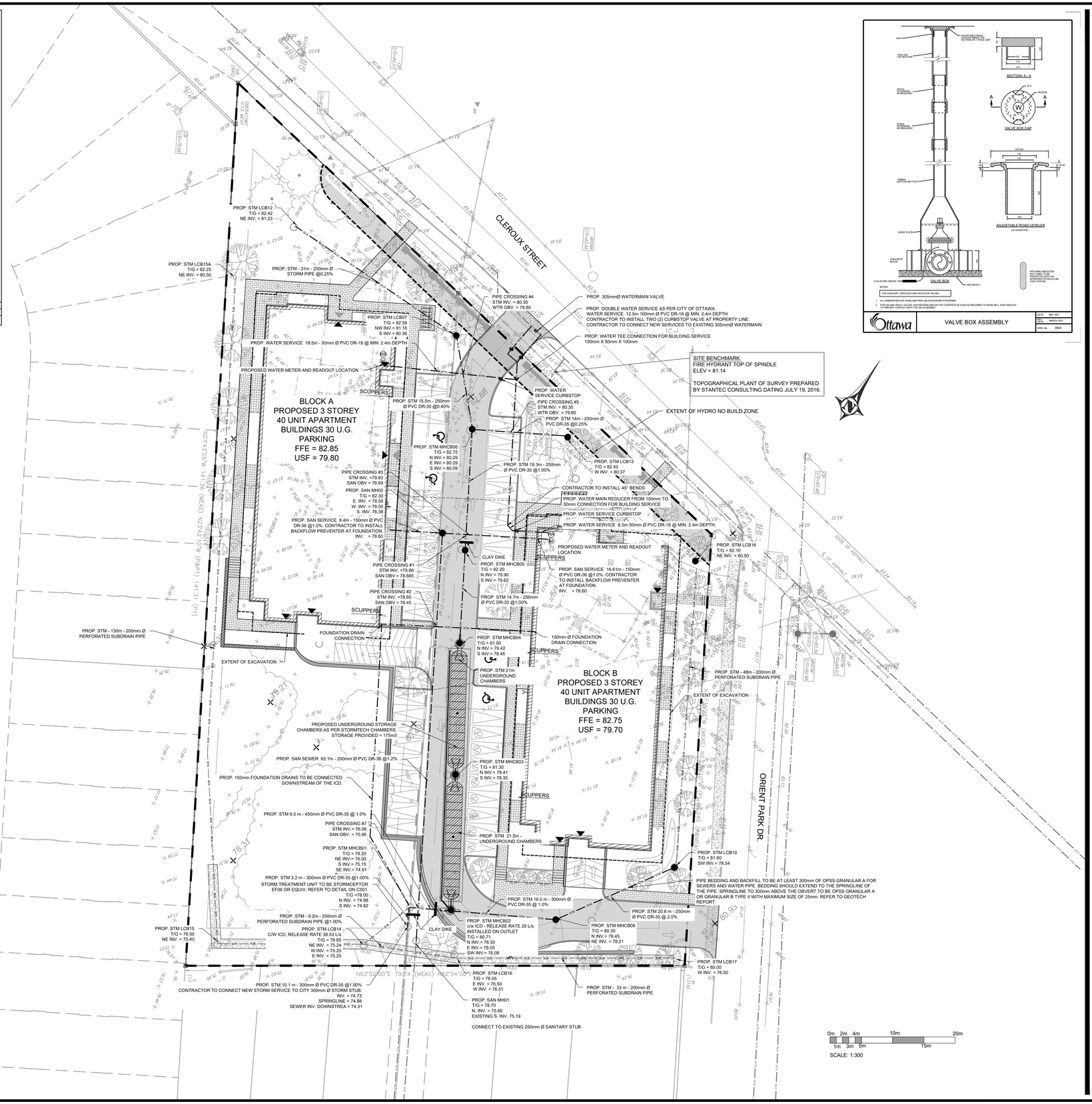
Ottawa	CATCH BASIN – 'T' FOR REAR YARD, DITCHED PIPE AND LANDSCAPING APPLICATIONS	DATE: MARCH 2007 REV. DATE: MARCH 2021 DWG No.: S30



SWALE & SUBDRAIN - TYPICAL SECTION
(N.T.S.)



SWALE & SUBDRAIN - TYPICAL SECTION
(N.T.S.)



NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE
2. FOR SID AND 50mm VALVES, ADD EDITIONAL BELOW THE CONCRETE BLOCKS AS REQUIRED TO RAISE BELL HIGH ENOUGH TO PREVENT CONTACT WITH THE VALVE BONNET

Ottawa	VALVE BOX ASSEMBLY	DATE: MAY 2001 REV. DATE: MARCH 2003 DWG. No.: W24

ENGINEERING STAMP

NO.	REVISION	DATE (DD/MM/YYYY)
#8		
#7		
#6		
#5		
#4		
#3	ISSUED AS PER CITY COMMENTS	05 / 05 / 2022
#2	ISSUED FOR SPA	04 / 02 / 2022
#1	ISSUED FOR SPA	19 / 03 / 2021

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

CLIENT:
BRIDOR DEVELOPMENTS
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
2396 CLEROUX CRES,
OTTAWA, ON

DRAWING:
SITE SERVICING PLAN

PAPER FORMAT:	24x36
DRAWN BY:	BF + GB
CHECKED BY:	GB
DATE:	02-2022
SCALE:	1:300
PROJECT NUMBER:	20-305

PAGE: C300

D07-12-21-0081

DWG # **18569**

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED EASEMENT
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00SW PROPOSED SWALE ELEVATION
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×50.00SD PROPOSED SIDEWALK
- 70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM PROPOSED STORM SEWER
- SAN PROPOSED SANITARY SEWER
- WTR PROPOSED WATERMAIN
- SAN EXISTING SANITARY SEWER
- WTR EXISTING WATERMAIN
- PROPOSED CATCHBASIN/MANHOLE/CATCHBASIN
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX — WATERSHED NAME
- 0.84 — RUNOFF COEFFICIENT
- 0.45 — 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
- PROPOSED WATER METER
- PROPOSED ACCESS GATE
- PROPOSED GROWING FIELD

CLEROUX STREET

ORIENT PARK DR.

ES-01
UNCONTROLLED
0.84 0.45

N23°43'55"W 141.35 (MEAS) N23°42'10"W (P&P1) 141.31 (P1)

N62°52'00"E 79.74 (MEAS) N62°54'00"E (P&P1)

0m 2m 4m 10m 20m
1m 3m 5m 15m
SCALE: 1:300

ENGINEERING STAMP

LICENSED PROFESSIONAL ENGINEER
G. L. BRUNET
100191036
30 / 11 / 2021
PROVINCE OF ONTARIO

NO.	REVISION	DATE (DD/MM/YYYY)
#8		
#7		
#6		
#5		
#4		
#3	ISSUED AS PER CITY COMMENTS	05 / 05 / 2022
#2	ISSUED FOR SPA	04 / 02 / 2022
#1	ISSUED FOR SPA	19 / 03 / 2021

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

CLIENT:
BRIDOR DEVELOPMENTS
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
2396 CLEROUX CRES,
OTTAWA, ON

DRAWING:
PRE-DEVELOPMENT DRAINAGE

PAPER FORMAT:	24x36
DRAWN BY:	BF + GB
CHECKED BY:	GB
DATE:	02-2022
SCALE:	1:300
PROJECT NUMBER:	20-305

PAGE: C400

D07-12-21-0081

DWG # **18569**

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED EASEMENT
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED DOOR ENTRANCE/EXIT
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00SW PROPOSED SWALE ELEVATION
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×50.00SD PROPOSED SIDEWALK
- 70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM PROPOSED STORM SEWER
- SAN PROPOSED SANITARY SEWER
- WTR PROPOSED WATERMAIN
- SAN EXISTING SANITARY SEWER
- WTR EXISTING WATERMAIN
- PROPOSED CATCHBASIN/MANHOLE/CATCHBASIN
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX (CONTROL) (AREA / RUNOFF) WATERSHED NAME / RUNOFF COEFFICIENT / 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
- PROPOSED ACCESS GATE
- PROPOSED GROWING FIELD

EXISTING STM CB T/G = 79.68
EXISTING STM CB T/G = 83.01
EXISTING STM CB T/G = 83.00
PROP. STM LCB12 T/G = 82.42
WS-01 CONTROLLED 0.085 0.38
PROP. STM LCB15A T/G = 82.25
CLEROUX STREET
EXISTING SAN T/G = 83.45
EXISTING STM MH T/G = 83.35
PROP. STM LCB07 T/G = 82.58
SITE BENCHMARK:
FIRE HYDRANT TOP OF SPINDLE
ELEV = 81.14
TOPOGRAPHICAL PLANT OF SURVEY PREPARED BY STANTEC CONSULTING DATING JULY 19, 2016.
BLOCK A
PROPOSED 3 STOREY
40 UNIT APARTMENT
BUILDINGS 30 U.G.
PARKING
FFE = 82.85
USF = 79.80
PROP. STM MHCB06 T/G = 82.75
100 YEAR PONDING
WS-02 CONTROLLED 0.103 0.71
PROP. STM LCB13 T/G = 82.50
WS-10 CONTROLLED 0.102 0.90
WS-06 CONTROLLED 0.050 0.30
PROP. SAN MH102 T/G = 82.00
PROP. STM MHCB05 T/G = 82.20
EXISTING STM CB T/G = 83.23
PROP. STM LCB16 T/G = 82.10
WS-03 CONTROLLED 0.081 0.74
WS-08 UN-CONTROLLED 0.013 0.50
PROP. STM MHCB04 T/G = 81.90
WS-09 CONTROLLED 0.102 0.90
EXISTING STM CB T/G = 82.98
EXISTING STM CB T/G = 83.23
BLOCK B
PROPOSED 3 STOREY
40 UNIT APARTMENT
BUILDINGS 30 U.G.
PARKING
FFE = 82.75
USF = 79.70
PROP. STM MHCB03 T/G = 81.30
WS-05 CONTROLLED 0.220 0.35
WS-04 CONTROLLED 0.078 0.78
ORIENT PARK DR.
PROP. STM LCB10 T/G = 81.60
WS-07 UN-CONTROLLED 0.005 0.90
INFILTRATION GALLERY: TOTAL STORAGE: 73.8m3
PROP. STM MHCB02 T/G = 80.71
PROP. STM MH01 T/G = 78.20
PROP. STM MH00 T/G = 78.00
PROP. STM MHCB08 T/G = 80.30
PROP. STM LCB15 T/G = 76.50
PROP. STM LCB14 T/G = 76.65
PROP. SAN MH101 T/G = 77.40
PROP. STM LCB16 T/G = 78.55
N62°52'00"E 79.74 (MEAS) N62°54'00"E (P&P1)
PROP. STM LCB17 T/G = 80.00
EDGE OF ASPHALT
0m 2m 4m 10m 20m
1m 3m 5m 15m
SCALE: 1:300

ENGINEERING STAMP

LICENSED PROFESSIONAL ENGINEER — G. L. PRUNET — 100191036 — 8th / 11 / 2021 — PROVINCE OF ONTARIO

NO.	REVISION	DATE (DD/MM/YYYY)
#8		
#7		
#6		
#5		
#4		
#3	ISSUED AS PER CITY COMMENTS	05 / 05 / 2022
#2	ISSUED FOR SPA	04 / 02 / 2022
#1	ISSUED FOR SPA	19 / 03 / 2021

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

CLIENT:
BRIDOR DEVELOPMENTS
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
2396 CLEROUX CRES,
OTTAWA, ON

DRAWING:
POST DEVELOPMENT STORAGE AREA

PAPER FORMAT:	24x36
DRAWN BY:	BF + GB
CHECKED BY:	GB
DATE:	02-2022
SCALE:	1:300
PROJECT NUMBER:	20-305

PAGE: C401

D07-12-21-0081

DWG # **18569**

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	HAIDER NASRULLAH 647-850-9417 HAIDER.NASRULLAH@ADS-PIPE.COM
ADS SALES REP:	MICHAEL REID 613-882-4186 MICHAEL.REID@ADS-PIPE.COM
PROJECT NO:	S220845
ADS SITE COORDINATOR:	MATTHEW BEGHIN 519-710-3687 MATTHEW.BEGHIN@ADS-PIPE.COM

Advanced Drainage Systems, Inc.

SiteAssist® FOR STORMTECH® INSTALLATION INSTRUCTIONS VISIT OUR APP

2396 CLEROUX CRESCENT

OTTAWA, ON.

MC-4500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
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" CHAMBER CLASSIFICATION 60x101.
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 PAIRED (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 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/IN/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
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 MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONE/SHOOTER 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 - 230 mm (9") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm).
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 300 mm (12") BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. 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 MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 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 CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING 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

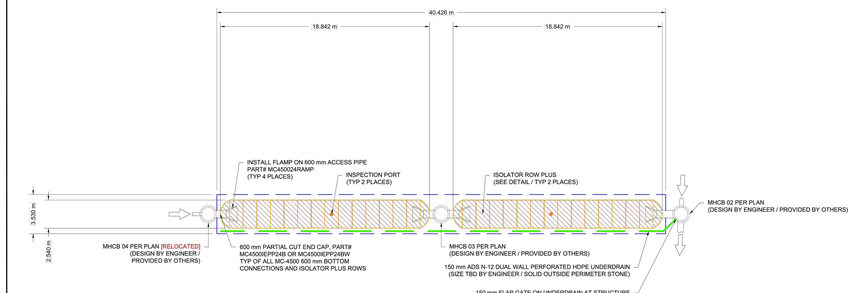
28	STORMTECH MC-4500 CHAMBERS
4	STORMTECH MC-4500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	% STONE VOID
178.9	**INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED)**
142.7	SYSTEM AREA (m²)
87.8	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS

82.051	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED);
80.579	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC);
80.527	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
80.527	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT);
80.527	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT);
80.222	TOP OF STONE:
79.917	TOP OF MC-4500 CHAMBER:
78.451	600 mm ISOLATOR ROW PLUS INVERT:
78.393	BOTTOM OF MC-4500 CHAMBER:
78.164	BOTTOM OF STONE:

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER, SEE TECHNICAL 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.



2396 CLEROUX CRESCENT
OTTAWA, ON.
DATE: 12/23/21 | DRAWN: MAD
PROJECT #: S220845 | CHECKED: RWD

ISSUE	BY	DESCRIPTION
1	ACT	NEW PLAN ISSUED
2	ACT	ADDED ISOLATOR ROW PLUS DETAILS
DATE	DRWG. CHKD	

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS AND IS SUBJECT TO ADS TERMS AND CONDITIONS OF SALE. IT IS THE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCTS SPECIFIED ARE ALL ADEQUATE FOR SITE SPECIFIC CONDITIONS. IT IS THE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCTS SPECIFIED ARE ALL ADEQUATE FOR SITE SPECIFIC CONDITIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW THIS DRAWING AND REPORT ANY DISCREPANCIES WITH THE INFORMATION SHOWN HEREON TO THE ENGINEER PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCTS SPECIFIED ARE ALL ADEQUATE FOR SITE SPECIFIC CONDITIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW THIS DRAWING AND REPORT ANY DISCREPANCIES WITH THE INFORMATION SHOWN HEREON TO THE ENGINEER PRIOR TO CONSTRUCTION.

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

4640 TRUEMAN BLVD
HILLIARD, OH 43026

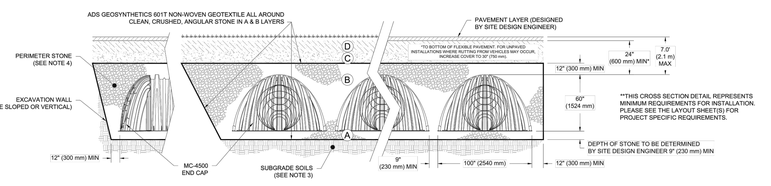
SCALE = 1 : 200

SHEET 2 OF 5

ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 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 24" (600 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 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
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, 4	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, 4	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 9" (230 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" CHAMBER CLASSIFICATION 60x101
2. MC-4500 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 3".
   - 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 500 LBS/IN/IN. 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.

2396 CLEROUX CRESCENT
OTTAWA, ON.
DATE: 12/23/21 | DRAWN: MAD
PROJECT #: S220845 | CHECKED: RWD

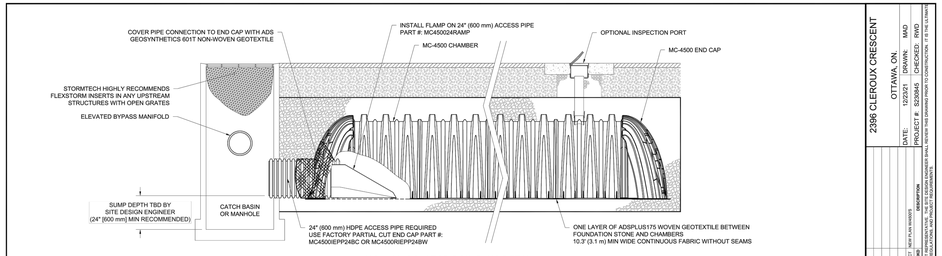
ISSUE	BY	DESCRIPTION
1	ACT	NEW PLAN ISSUED
DATE	DRWG. CHKD	

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS AND IS SUBJECT TO ADS TERMS AND CONDITIONS OF SALE. IT IS THE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCTS SPECIFIED ARE ALL ADEQUATE FOR SITE SPECIFIC CONDITIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW THIS DRAWING AND REPORT ANY DISCREPANCIES WITH THE INFORMATION SHOWN HEREON TO THE ENGINEER PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCTS SPECIFIED ARE ALL ADEQUATE FOR SITE SPECIFIC CONDITIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW THIS DRAWING AND REPORT ANY DISCREPANCIES WITH THE INFORMATION SHOWN HEREON TO THE ENGINEER PRIOR TO CONSTRUCTION.

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

4640 TRUEMAN BLVD
HILLIARD, OH 43026

SHEET 3 OF 5



MC-4500 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.

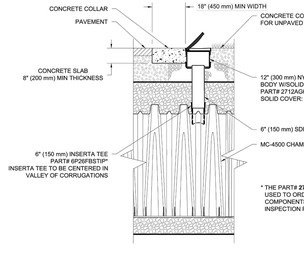
STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

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.



* THE PART# **2712AG60PKIT** CAN BE USED TO ORDER ALL NECESSARY COMPONENTS FOR A SOLID LID INSPECTION PORT INSTALLATION

MC-4500 6" (150 mm) INSPECTION PORT DETAIL
NTS

2396 CLEROUX CRESCENT
OTTAWA, ON.
DATE: 12/23/21 | DRAWN: MAD
PROJECT #: S220845 | CHECKED: RWD

ISSUE	BY	DESCRIPTION
DATE	DRWG. CHKD	

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS AND IS SUBJECT TO ADS TERMS AND CONDITIONS OF SALE. IT IS THE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCTS SPECIFIED ARE ALL ADEQUATE FOR SITE SPECIFIC CONDITIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW THIS DRAWING AND REPORT ANY DISCREPANCIES WITH THE INFORMATION SHOWN HEREON TO THE ENGINEER PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCTS SPECIFIED ARE ALL ADEQUATE FOR SITE SPECIFIC CONDITIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW THIS DRAWING AND REPORT ANY DISCREPANCIES WITH THE INFORMATION SHOWN HEREON TO THE ENGINEER PRIOR TO CONSTRUCTION.

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

4640 TRUEMAN BLVD
HILLIARD, OH 43026

SHEET 4 OF 5

ENGINEERING STAMP

LICENSED PROFESSIONAL ENGINEER
G. L. BRUNET
100191036
30 / 11 / 2021
PROVINCE OF ONTARIO

#8		
#7		
#6		
#5		
#4		
#3	ISSUED AS PER CITY COMMENTS	05 / 05 / 2022
#2	ISSUED FOR SPA	04 / 02 / 2022
#1	ISSUED FOR SPA	19 / 03 / 2021
NO.	REVISION	DATE (DD/MM/YYYY)

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

CLIENT:
BRIDOR DEVELOPMENTS
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
2396 CLEROUX CRES,
OTTAWA, ON

DRAWING:
DETAILS - 1

PAPER FORMAT:	24x36
DRAWN BY:	BF + GB
CHECKED BY:	GB
DATE:	02-2022
SCALE:	
PROJECT NUMBER:	20-305

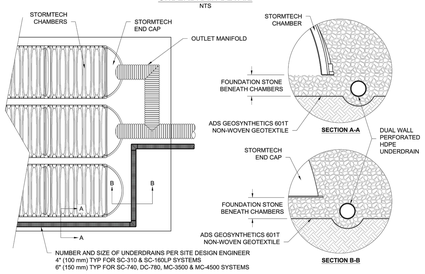
PAGE: C500

D0?-12-21-0081

DWG # **18569**

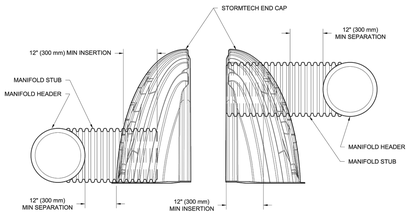
UNDERDRAIN DETAIL

NTS



MC-SERIES END CAP INSERTION DETAIL

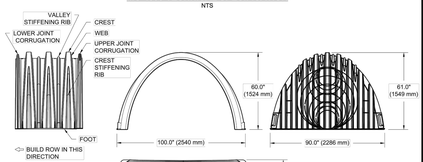
NTS

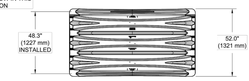


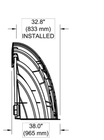
NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-4500 TECHNICAL SPECIFICATION

NTS







NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT (NOMINAL)	125.0 lbs.	(56.7 kg)

NOMINAL END CAP SPECIFICATIONS

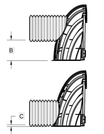
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC4500IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC4500IEPP06B		---	0.86" (22 mm)
MC4500IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC4500IEPP08B		---	1.01" (26 mm)
MC4500IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC4500IEPP10B		---	1.33" (34 mm)
MC4500IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC4500IEPP12B		---	1.55" (39 mm)
MC4500IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC4500IEPP15B		---	1.70" (43 mm)
MC4500IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC4500IEPP18TW			
MC4500IEPP18B		---	1.97" (50 mm)
MC4500IEPP18BW			
MC4500IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC4500IEPP24TW			
MC4500IEPP24B		---	2.26" (57 mm)
MC4500IEPP24BW			
MC4500IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC4500IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC4500IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

2386 CLEROUX CRESCENT
OTTAWA, ON.

DATE:	12/23/21	DRAWN:	MAD
PROJECT #:	82208445	CHECKED:	RWD

ISSUED	BY	DESCRIPTION
2022/01/27	KCT	MUNICIPAL REVISIONS
DATE	DRWN / CHKD	DESCRIPTION

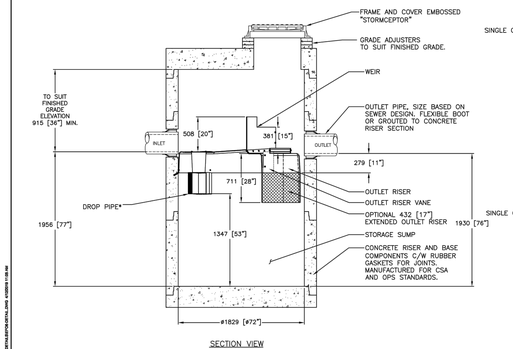
THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF ADS AND MAY NOT BE REPRODUCED, MODIFIED OR USED IN ANY WAY WITHOUT THE EXPRESS WRITTEN CONSENT OF ADS. ALL RIGHTS RESERVED. COPYRIGHT © 2018 ADS

StormTech® Chamber System
1-888-892-2694 | WWW.STORMTECH.COM

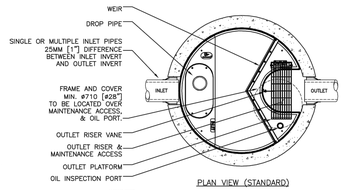
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026

SHEET 5 OF 5

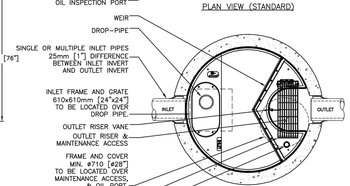
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

ISSUED	BY	DESCRIPTION
2022	JSK	ADDED OUTLET PLATFORM
2022	JSK	ADDED OIL PORT
2022	JSK	ADDED OUTLET PLATFORM
2021	BDT	INITIAL RELEASE
ISSUED	BY	REVISIONS DESCRIPTION

Stormceptor® EF

SCALE = NTS

imbriumrr

DATE: 10/13/2017

DESIGNED:	ASSEMBLED:
JSK	JSK
DRAWN:	CHECKED:
BDT	BP
PROJECT No.:	SEQUENCE No.:
EFO6	*
SHEET:	1 OF 1

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m² (27.9 gpm/ft²) FOR STORMCEPTOR EF8 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.

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

STANDARD DETAIL
NOT FOR CONSTRUCTION

ENGINEERING STAMP

NO.	REVISION	DATE (DD/MM/YYYY)
#8		
#7		
#6		
#5		
#4		
#3	ISSUED AS PER CITY COMMENTS	05 / 05 / 2022
#2	ISSUED FOR SPA	04 / 02 / 2022
#1	ISSUED FOR SPA	19 / 03 / 2021

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

CLIENT:

BRIDOR DEVELOPMENTS
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:

NEW RESIDENTIAL DEVELOPMENT
2396 CLEROUX CRES,
OTTAWA, ON

DRAWING:

DETAILS - 1

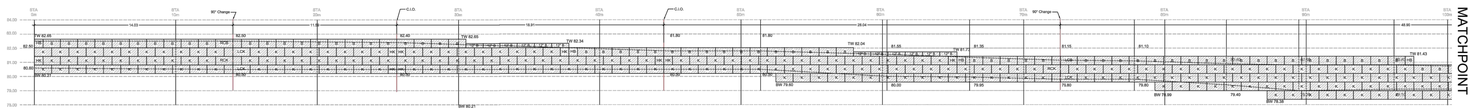
PAPER FORMAT:	24x36
DRAWN BY:	BF + GB
CHECKED BY:	GB
DATE:	02-2022
SCALE:	
PROJECT NUMBER:	20-305

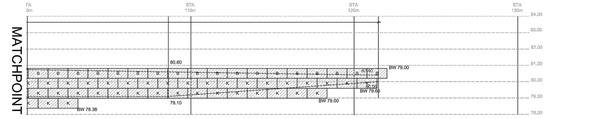
PAGE:

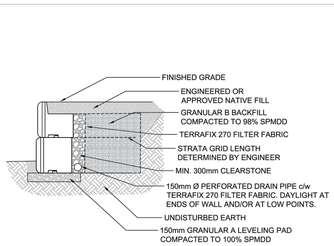
C501

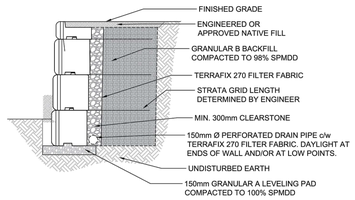
D07-12-21-0081

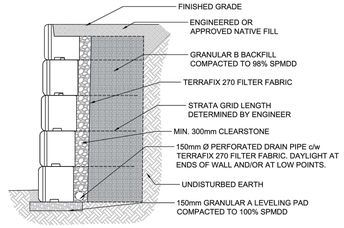
DWG # 18569

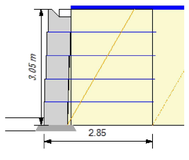


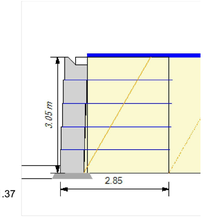












DNM Stone Terra™ PRELIMINARY BLOCK COUNT

12" BENCH	12" B	12
FULL BENCH	B	83
HALF BENCH	HB	4
LEFT BENCH	LCB	1
RIGHT BENCH	RCB	1
12" KEYED	12" K	0
FULL KEYED	K	254
HALF KEYED	HK	9
LEFT KEYED	LCK	3
RIGHT KEYED	RCK	2
	SG350 - 5 ROLLS	

GENERAL NOTES:

1. THE FOLLOWING NOTES SHALL GOVERN UNLESS NOTED OTHERWISE ON THE DRAWINGS.
2. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL PROJECT DRAWINGS AND CONTRACT DOCUMENTS.
3. PRIOR TO COMMENCING WORK THE CONTRACTOR WILL VERIFY ALL MEASUREMENTS AND CONDITIONS ON SITE AND REPORT TO THE ENGINEER ANY DISCREPANCIES OR UNSATISFACTORY CONDITIONS THAT MAY AFFECT THE PROPER COMPLETION OF WORK.
4. SEE FIELD CONSTRUCTION MANUAL FOR INSTALLATION DETAILS.
5. DRAWINGS ARE METRIC AND NOT TO BE SCALED.
6. OUTSIDE CURVES WILL REQUIRE BACKS OF BLOCKS TO BE TRIMMED.
7. CONTRACTORS CONSTRUCTION LOADS MUST NOT EXCEED THE ABOVE DESIGN LOADS. DESIGN LOADS MAY ONLY BE APPLIED AFTER THE WALL HAS BEEN INSTALLED AND APPROVED.

SOIL AND BACKFILL:

1. SPECIFIED SOIL BEARING CAPACITY MUST BE VERIFIED BY A GEOTECHNICAL ENGINEER PRIOR TO COMMENCING CONSTRUCTION OF THE FOUNDATION. CONDITIONS FOUND TO BE UNSATISFACTORY IN BEARING CAPACITY MUST BE REPORTED TO THE PROJECT GEOTECHNICAL ENGINEER.
2. FOUNDATIONS MUST BEAR ON SUITABLE MATERIAL.
3. BACKFILL TO BE INSTALLED AND COMPACTED IN LIFTS NOT GREATER THAN 200mm WHERE HEAVY EQUIPMENT IS USED AND 150mm WHERE HAND OPERATED EQUIPMENT IS USED. HAND OPERATED EQUIPMENT MUST BE USED WHEN WITHIN 1m OF THE WALL.

DNM Systems Ltd Retaining Walls

REA Analysis

Project:	Olgin Development
Location:	Ottawa
Designer:	ds
Date:	2021-02-26
Section:	Section 1
Design Method:	CAN_CSA_S6
Design Unit:	StoneTerra

SOIL PARAMETERS	φ	coh	γ
Reinforced Soil:	30 deg	0.00 kNpsm	18.85 kNpcm
Retained Soil:	30 deg	0.00 kNpsm	18.85 kNpcm
Foundation Soil:	30.00 deg	0.00 kNpsm	18.85 kNpcm

Leveling Pad: Crushed Stone

GEOMETRY

Design Height:	3.05 m	Live Load:	2.40 kNpsm
Wall Batter/Tilt:	2.4/ 0.00 deg	Live Load Offset:	0.00 m
Embedment:	0.20 m	Live Load Width:	6.00 m
Leveling Pad Depth:	0.15 m	Dead Load:	0.00 kNpsm
Slope Angle:	0.0 deg	Dead Load Offset:	0.0 m
Slope Length:	0.0 m	Dead Load Width:	0.0 m
Slope Toe Offset:	0.0 m	Leveling Pad Width:	0.91 m

DNM Systems Ltd Retaining Walls

RESULTS

CDR Sliding:	1.54 (fnd)	CDR Bearing:	3.61
Eccentricity (e/L):	0.13	Bearing:	83.09; srvc 71.37
FoS Connection:	1.68		

ID	Height	Length	Geogrid.	Tr (Ta*Rf)	% Cvrg	EP (Pa)	LL (Pql)	DL (Pqd)	TMax	CDR Str	Tallow Cn	CDR Pk	CDR PO/	CDR Sldg	Grid
4	2.44	2.85	SG350	32.04	100	3.30	1.25	0.00	4.54	7.05	11.31	2.49	1.74/[3.30]	93.20	0.93
3	1.83	2.85	SG350	32.04	100	5.85	0.83	0.00	6.68	4.80	15.62	2.34	2.64/[5.85]	29.74	1.26
2	1.22	2.85	SG350	32.04	100	8.77	0.83	0.00	9.59	3.34	19.93	2.08	3.33/[8.77]	14.87	1.59
1	.61	2.85	SG350	32.04	100	11.68	0.83	0.00	12.51	2.56	21.06	1.68	2.74/[11.68]	9.07 [1.54]	1.91

Column Descriptions:

Ta: allowable geogrid strength
Rc %: percent coverage for geosynthetics
EP (Pa) internal active earth pressure
LL (Pql) earth pressure due to live load surcharge
DL (Pqd) earth pressure due to dead load surcharge
Tmax maximum earth pressure on geosynthetic layer
FSstr factor of safety on geogrid strength (Ta/Tmax)
Ta cn allowable tension on the connection
FS Pkcn, factor of safety on the connection (Ta cn/Tmax)
FS PO, factor of safety on pullout (Ta pullout/(Tmax - LL)
Grid Embedment, depth of embedment beyond the theoretical failure plane.

NO.	DATE	DESCRIPTION
R0	2021-01-26	ISSUED FOR APPROVALS

REVISION/ISSUED:

..\..\DNM General\AJW logo.jpg

100 MATHESON BLVD. E., UNIT #201,
MISSISSAUGA, ON. L4Z 2G7
Phone: (905)-840-0530
Fax: (905)-212-9012

DNM Retaining Wall Systems
4795 19TH SIDEROAD
KING, ON L7B 0E4
Phone: (905)-864-9808
Fax: (905)-864-9818

PROJECT:
OLIGO DEVELOPMENTS

C:\Users\Estimator\Desktop\DNM General\DNM_LOGO.jpg

LOCATION:
996-B ST. AUGUSTIN RD.
EMBRUN, ON

DRAWING DESCRIPTION:
ELEVATION, CROSS SECTIONS, & LAYOUT

REFERENCE FILE:
BASED ON INFORMATION FOUND ON: GRADING PLAN/20-035-C200/DRAWN BY: BF+GB/DATE:02-2021

DRAWN BY:	CHECKED BY:
DS	

DATE STARTED: 2021-02-26

PROJECT NO. EST12897

SHEET NO. 1

ENGINEERING STAMP

G. L. BRUNET
100191036
30/11/2021

NO.	REVISION	DATE (DD/MM/YYYY)
#8		
#7		
#6		
#5		
#4		
#3	ISSUED AS PER CITY COMMENTS	05 / 05 / 2022
#2	ISSUED FOR SPA	04 / 02 / 2022
#1	ISSUED FOR SPA	19 / 03 / 2021

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

CLIENT:
BRIDOR DEVELOPMENTS
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
2396 CLEROUX CRES,
OTTAWA, ON

DRAWING:
DETAILS - 1

PAPER FORMAT:	24x36
DRAWN BY:	BF + GB
CHECKED BY:	GB
DATE:	02-2022
SCALE:	
PROJECT NUMBER:	20-305

PAGE: C502

D07-12-21-0081