FUNCTIONAL SERVICING & PRELIMINARY STORMWATER MANAGEMENT REPORT

WYNDHAM RESIDENCE
15728 AIRPORT ROAD

TOWN OF CALEDON
REGION OF PEEL

PREPARED FOR:

WYNDHAM HOLDINGS INC.

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
2800 HIGH POINT DRIVE, SUITE 100
MILTON, ON L9T 6P4

MARCH 2021

CFCA FILE NO. 1856-5524

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev. 0	June 5, 2020	Issued for 1st Submission.
Rev. 1	March 30, 2021	Re-Issued for 1st Submission.

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Wyndham Holdings Inc. to prepare a Functional Servicing & Preliminary Stormwater Management Report to support the Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) applications for the proposed development located at 15728 Airport Road in the Town of Caledon, Regional Municipality of Peel (Peel Region).

This report provides information about the water and sanitary servicing as well as stormwater management according to the applicable standards and requirements of the Town of Caledon and Peel Region.

The reports and design standards referenced during the preparation of this report include:

- Region of Peel Public Works Design, Specifications & Procedures Manual Watermain Design Criteria (Revised June 2010)
- Region of Peel Public Works Design, Specifications & Procedures Manual Sanitary Sewer Design Criteria (Modified March 2017)
- Town of Caledon Development Standards Manual (Version 5.0, 2019)
- Ministry of the Environment (now Ministry of Environment, Conservation and Parks) – Stormwater Management Planning and Design Manual (March 2003)
- Fire Underwriters Survey – Water Supply for Public Fire Protection (1999)

2.0 Site Description

The subject property is approximately 0.96 ha and currently consists of a single-family residential dwelling, two asphalt driveways and three storage sheds. The landscaping on the property consists of trees and grass. The property is in a mixed-use residential area and is bounded by Airport Road to the east, private residences to the south, Caledon East Public School to the west, and a private lane access for the school to the north.

The elements envisioned for this development include a 3-storey retirement home overlying a lower basement level, complete with an at grade parking lot and site access to Airport Road.

The pertinent background information associated with the servicing and preliminary stormwater management strategy for the site have been reviewed, including:

- Site Plan (ABA Architects Inc., February 09, 2021)
- Topographic Survey (Young & Young Surveying Inc., May 29, 2018)
- Geotechnical Engineering Report (Grounded Engineering Inc., May 2020)
- Hydrogeological Report (Crozier Consulting Engineers, June 2020)

3.0 Population Equivalents

The Region of Peel Linear Infrastructure Sanitary Sewer Design Criteria (March 2017) provides the criteria to calculate population equivalents based on land use. These criteria were referenced to determine the equivalent population estimate for the existing and proposed buildings. The Design Criteria provided a value of 50 persons/ha for residential use, however, given that the there is one single-family dwelling currently onsite, a value of 5 persons living in the dwelling was assumed. Using the Region criteria would have provided a population equivalent of 48 persons on site. The institutional density for hospitals (3 persons/bed) was used for the retirement home, which assumes 1 bed per unit. Table 1 outlines the existing and proposed equivalent population estimate.

Table 1: Equivalent Population Estimate

Type	Units	Persons/Unit	Total Persons
Existing	1	5	5
Proposed	127	3	381

The proposed building has 127 units spread among the 3 floors. Considering the Peel Region unit density of 3 persons per bed, the total population for the proposed building is 381 persons.

4.0 Water Servicing

Peel Region is responsible for the operation and maintenance of the public water supply and treatment system in the Town of Caledon. Any local water supply system will connect to the Region's municipal water network. A Region of Peel Connection Demand Table has been included in Appendix A.

4.1 Existing Water Servicing

A review of Town of Caledon and Peel Region as-constructed drawings indicate that there is an existing 300 mm diameter poly-vinyl chloride (PVC) watermain on the west side of Airport Road (Peel Region drawing 22336-D dated construction record June 7, 1995).

The as-constructed drawing indicates an existing connection for the property to the 300 mm diameter PVC watermain, complete with a water box at the property line. The size of the water service connection is not labelled; however, it is assumed to be 19 mm to 25 mm in diameter as per Peel Region Watermain Design Criteria. The plan also shows two fire hydrants located on Airport Road, approximately 60 m to the north and approximately 60 m to the south of the center of the property.

4.2 Design Water Demand

The Region of Peel Linear Infrastructure Watermain Design Criteria (June 2010) was used to determine the maximum domestic water demand generated in the existing condition and by the proposed development based on the equivalent population estimate. An average daily water demand of 280 L/cap/day was used for the existing residential condition and an average daily water demand of 300 L/cap/day was used for the proposed development, along with daily and hourly peaking factors. Table 2 summarizes the estimated design water demand. Appendix A contains detailed water demand calculations.

Table 2: Existing and Proposed Domestic Water Demand

Standard	Building	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Maximum Hourly Demand (L/s)
Region of Peel Public Works Design, Specification & Procedures Manual – Linear Infrastructure Watermain Design Criteria (June 2010)	Existing Dwelling	0.02	0.03	0.05
	Proposed Building	1.32	1.85	3.97
	Increase	1.30	1.82	3.92

For this application, the domestic water service for the proposed building will be designed to convey a water demand equivalent to the maximum hourly demand of 3.92 L/s as shown in Table 2.

4.3 Fire Flow Demand

The Fire Underwriters Survey (FUS) method was used to estimate the fire flow demand for the proposed building. The retirement home will be ordinary construction and therefore, a construction coefficient of 1.0 was applied to the fire flow calculations (Water Supply for Public Fire Protection by Fire Underwriters Survey, 1999). The proposed retirement home will be equipped with an automatic sprinkler system which reduces the initial fire flow demand of each building by up to 50%. The automated sprinkler system is to be designed by the Mechanical Engineer; therefore, the detailed design of the system is not included in this report. Table 3 summarizes the required fire flow demand and duration of flow required for the proposed building.

Table 3: Estimated Fire Flow Demand

Method	Demand Flow (L/s)	Duration (h)
Water Supply for Public Fire Protection by Fire Underwriters Survey (1999)	133.3	2.00

Note: Floor area was determined by the largest floor plus 25% of each of the immediately adjoining floors.

As shown in Table 3, the proposed fire line is required to accommodate a fire flow demand of 133.3 L/s for a duration of 2.00 hours. This is based on the fire flow demand of the Lower Level, with floor area of 3655.5 m^2 and 25% of the above adjoining floor, for total area of 4458.7 m^2.

Refer to Appendix A for the Fire Flow Support Letter prepared by ABA Architects Inc. and detailed calculations of the proposed fire flow.

4.4 Proposed Water Servicing

The proposed development will have a single connection into the existing 300 mm diameter PVC watermain on the west side of Airport Road. The connection will split at the property line into an individual 100 mm diameter PVC domestic water service and individual 200 mm diameter PVC fire line per Peel Region Standard Drawing 1-8-3. The existing water service connection to the existing dwelling will be decommissioned during construction. The fire line will extend to service a proposed hydrant in the parking area to provide fire protection.

The proposed water servicing plan is shown on C102 – Preliminary Site Servicing Plan. The Mechanical Engineer will design the internal private water system including the internal sprinkler system within the building.

5.0 Sanitary Servicing

Peel Region is responsible for the operation and maintenance of the public sewage collection and treatment system in the Town of Caledon. Any local sewage system will connect to the Region's municipal sanitary sewage network. A Region of Peel Connection Demand Table has been included in Appendix A.

5.1 Existing Sanitary Servicing

A review of the Town of Caledon and Peel Region as-constructed drawings indicate that there is an existing 450 mm diameter concrete sanitary sewer on the east side of Airport Road (Peel Region drawing 22336-D dated construction record June 7, 1995).

The as-constructed drawing indicates an existing sanitary service connection for the property from the 450 mm diameter concrete sewer to the property line. The size of the connection is not labelled, however is assumed to be minimum of 125 mm per Peel Sanitary Sewer Design Criteria.

5.2 Design Sanitary Flow

The sanitary design flow for the subject property was calculated using the Region of Peel Public Works Design, Specifications & Procedures Manual – Linear Infrastructure Sanitary Sewer Manual (March 2017) and the equivalent population estimate described in Section 3.2. A unit sewage flow of 302.8 L/cap/d was used, and infiltration flow and a peaking factor were applied to the unit sewage flow to obtain the total estimated design sewage flow. A summary of the results is presented in Table 4, and detailed calculations are provided in Appendix B.

Table 4: Existing and Proposed Sanitary Design Flows

Standard	Building	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Flow (L/s)
Region of Peel Public Works Design, Specification & Procedures Manual – Linear Infrastructure Sanitary Sewer Manual (March 2017)	Existing Dwelling	0.02	4.44	0.08	0.19	0.27
	Proposed Building	1.34	4.03	5.38	0.19	5.58
	Increase	1.32	-	5.30	-	5.31

For this application, the sanitary service for the proposed building will be designed to convey a sanitary design flow of 5.31 L/s as shown in Table 4.

5.3 Proposed Sanitary Servicing

The development is proposed to be serviced by a 200 mm diameter PVC sanitary sewer at a slope of 2% which has a full flow capacity of 46 L/s. The service lateral capacity (46 L/s) exceeds the sanitary design flow (5.31 L/s) and therefore is sufficient to convey the flow. The lateral will extend from the existing 450 mm diameter municipal sewer in Airport Road to a property line manhole and ultimately to the building. The proposed sanitary servicing plan is shown on C102 – Preliminary Site Servicing Plan. The internal building plumbing will be designed by the Mechanical Engineer with their details and specifications.

6.0 Drainage Conditions

6.1 Existing Drainage

The subject property currently consists of one residential dwelling and three storage sheds, complete with an asphalt driveway with two accesses to Airport Road. The site has dense coverage of trees and landscaping. No municipal storm sewer servicing or private storm infrastructure exists. Ditches in the Airport Road right-of-way convey stormwater from the property.

According to the topographic survey prepared by Young & Young Surveying Inc. (Project 18-B7160, dated May 29, 2018), there are two existing 400 mm diameter corrugated steel pipe (CSP) culverts fronting the site in the ditch along Airport Road. The culverts convey stormwater below the existing driveway accesses.

Per the topographic survey, the existing topography indicates that stormwater generally drains north to south across the property. The site can be delineated into one catchment denoted as Catchment 101. Catchment 101 conveys major system drainage overland to the south and south-west corner of the property to the adjacent school lands. Stormwater from the site's frontage is conveyed overland directly into the Airport Road ditch.

The existing drainage conditions are illustrated on Figure 1 – Pre- Development Drainage Plan.

6.2 Proposed Drainage

The proposed development as described in Section 2.0 is a 3-storey retirement home overlying a lower basement level, complete with an at-grade parking lot and site access to Airport Road.

In the existing condition, the drainage from the 0.96 ha property generally drains to the neighbouring property to the south and the school field to the southwest. The proposed grading design significantly reduces the amount of drainage being conveyed to the neighbouring properties. The main overland flow route for the site will now utilize the site entrance on the east side, to convey the major storm system to the Airport Road right-of-way. A 450 mm diameter corrugated steel pipe (CSP) culvert is proposed to provide drainage for the existing ditch at the site entrance.

Minor system flows will be conveyed in storm sewers designed to accommodate the 5-year design storm per the Town of Caledon Development Standards Manual. Any storm greater than this will flow overland as the major system.

The proposed grading of the site results in the following catchments:

- Catchment UC01 (0.07 ha): Maintains the existing drainage pattern and conveys drainage uncontrolled south and east to the neighbouring properties. Area significantly reduced from existing condition.

- Catchment UC02 (0.02 ha): Maintains the existing drainage pattern and conveys drainage uncontrolled to the existing ditch on the east side of Airport Road.

- Catchment 201 (0.51 ha): Minor system flows from the roof and courtyard are collected by a double catch basin and stored in the underground stormwater chamber. The stormwater outlets from the underground chamber controlled by an orifice and is conveyed by a 300 mm PVC internal storm sewer that ultimately outlets to the Airport Road ditch. Major system flows are conveyed overland, ultimately discharging to Airport Road though the site entrance.

- Catchment 202 (0.37 ha): Minor system flows are conveyed to the parking lot, where catch basins convey drainage into an underground stormwater chamber. The drainage is discharged to a 300 mm PVC internal storm sewer that outlets to the Airport Road ditch. Major system flows are conveyed overland, ultimately discharging to Airport Road though the site entrance.

The proposed drainage conditions are illustrated on Figure 2 – Post-Development Drainage Plan. Stormwater runoff from Catchment 201and 202 will be captured in catch basins located throughout the courtyard and parking surfaces. A flat-bottom swale along the west side of the property will collect stormwater and spill into the parking lot. The swale will be designed as a Low Impact Development (LID) feature such as a vegetated ditch (bioswale) to provide quantity and quality control to stormwater. A spill point has been provided for the bioswale to allow overflow to enter the parking lot. Details of the swale design will be provided at the detailed design stage.

Minor system drainage will be conveyed to two underground stormwater chambers. The Catchment 202 chamber will be located within the parking lot. The Catchment 201 chamber will be located beneath the rear courtyard. Both chambers will detain and release controlled stormwater flows using a downstream orifice. Stormwater from each chamber will then be conveyed via the proposed internal storm sewer network through a quality control device and to a property line manhole. Ultimately the internal storm sewer network will discharge to the ditch in the Airport Road right-of-way.

7.0 Stormwater Management

Upon reviewing the Toronto and Region Conservation Authority (TRCA) Regulation Mapping, we found that the site is located outside TRCA regulated area and therefore is not subject to TRCA design criteria.

The proposed stormwater management design must comply with the Town of Caledon Development Standards Manual (Version 5.0, 2019). The stormwater management criteria based on the guidelines are as follows:

Water Quantity Control

Match post-development peak flows from each storm event up to the 100-year event to the pre-development peak flows.

Water Quality Control

Private stormwater discharging from the proposed development must achieve Ontario Ministry of the Environment, Conservation and Parks (MECP) Enhanced Level of protection (80% total suspended solids (TSS) removal) for water quality control.

The methods used to achieve the stormwater management criteria are described in the following sections.

7.1 Stormwater Quantity Control

Using the Town of Caledon intensity-duration frequency data (IDF), the Modified Rational Method was used to determine the pre- and post-development peak flow rates. The post-development peak flow rates were then used to determine the level of stormwater quantity control required for the proposed development.

As described in Section 5.2, Catchments UC01 and UC02 will be localized uncontrolled drainage over grassed areas.

Stormwater runoff for Catchment 201 will be collected in a double catch basin. A 75 mm orifice tube located at the downstream of the double catch basin will cause the water to back-up through a 9.7 m long, 300 mm diameter sewer into an underground storm chamber located within the courtyard. Following the storm event, the water will outlet from the chamber and be controlled by the 75 mm orifice tube to a release rate of 22.07 L/s.

Stormwater runoff for Catchment 202 is proposed to be controlled by a 100 mm orifice tube downstream of an underground chamber in the parking area. Stormwater flows from each of the controlled catchments will discharge through an Oil-Grit Separator (OGS) for quality control and outlet to the existing ditch in the Airport Road right-of-way. Table 5 summarizes the peak flows and subsequent storage requirements for each post-development catchment.

Table 5: Summary of Peak Flows and Storage Volumes

Storm Event (Year)	Peak Flow Rate (L/s)					Storage Required (m^3)	
	Pre-Development	Post-Development					
	Catchment 101	Uncontrolled (UC01 & UC02)	201 Release Rate (75 mm orifice)	202 Release Rate (100 mm orifice)	Total Release Rate	Catchment 201	Catchment 202
2	65.63	5.50	22.07	26.45	54.03	57.84	30.14
5	83.97	7.04			55.57	95.65	53.15
10	102.71	8.61			57.14	126.21	73.64
25	119.79	10.04			58.57	167.00	100.25
50	134.89	11.31			59.84	196.92	120.58
100	150.47	12.62			61.14	229.52	142.79

As shown in Table 5, the total post-development peak stormwater flows from Catchments 201, 202, UC01 and UC02 are significantly below the pre-development peak stormwater flows from Catchment 101 for all storm events. Therefore, the quantity control criterion is achieved.

Using orifice tubes, the post-development peak stormwater flows for Catchments 201 and 202 are controlled to complement the uncontrolled flows from catchments UC01 & UC02. As shown in Table 5, approximately 230 m^3 and 143 m^3 of storage is required during the 100-year storm event in Catchments 201 and 202, respectively.

The underground stormwater chamber in Catchment 201 is sized to provide 239 m^3 of storage required for the catchment.

Storage in Catchment 202 will be provided through a combination of surface ponding in the parking lot and underground storage. The underground stormwater chamber will provide 75 m^3 of storage and the surface ponding provides approximately 68 m^3 of storage for a total volume of 143 m^3, thereby meeting the storage requirements of 143 m^3 for Catchment 202. The extent of the surface ponding for the 100-year storm event is illustrated on C103 – Preliminary Site Grading Plan.

Appendix C contains the preliminary orifice sizing calculations and preliminary stormwater chamber design.

7.2 Stormwater Quality Control

Stormwater quality controls for the site must incorporate measures to provide an Enhanced Level of Protection (Level 1) according to the MECP (March 2003) guidelines. Enhanced water quality protection requires the removal of at least 80% of TSS from 90% of the annual runoff volume.

A treatment train approach including an OGS and LID measures will be used to achieve the stormwater quality control criteria. An area breakdown and associated TSS removal rate for each catchment is provided in Table 6.

Table 6: Area Breakdown and Associated TSS Removal

Catchment		Area (ha)	% of Total Development Area	TSS Removal Efficiency	Total TSS Removal
Catchment 201	Hardscaped Area	0.07	7.3%	80.0%	5.8%
	Landscaped Area + Building Roof	0.44	45.8%	80.0%	36.6%
Catchment 202	Paved Surface / Hardscaped Area	0.28	29.2%	80.0%	23.4%
	Landscaped Area	0.08	8.3%	80.0%	6.7%
Catchment UC01	Landscaped Area	0.07	7.3%	80.0%	5.8%
Catchment UC02	Landscaped Area	0.02	2.1%	80.0%	1.7%
	Total Site	**0.96**	**100%**	**-**	**80%**

As illustrated in Table 6, the weighted TSS removal for the site is 80% and achieves the required quality control criteria. 80% TSS removal efficiency was applied for landscaped areas, roof areas, and catchments draining to the OGS.

Water quality control for Catchment 201 and 202 will be provided with a Stormceptor EF6 OGS downstream of the underground stormwater chambers and orifice tubes. The new Stormceptor EF/EFO models sized for 60% removal of the Environmental Technology Verification (ETV) Particle Size Distribution (PSD) are comparable to sizing for 80% removal of the earlier model Stormceptor Fine PSD. The sizing results in Appendix C reflects this qualification. A technical bulletin explaining the equivalency is included in Appendix C.

In addition to the OGS, roof drains will be directed towards the courtyard's landscaped (i.e., grassed) area in Catchment 201, which will provide pre-treatment of stormwater runoff prior to entering the internal storm sewer network. In Catchment 202, prior to the parking lot area, a grassed flat bottom swale will provide additional water quality control to stormwater prior to entering the internal storm sewer network.

7.3 Sustainable Stormwater Management

Additional LID strategies will be considered by the building architect and landscape architect for use throughout the proposed development during the detailed design stage. The following LID strategies may be applicable for this site:

- **Rainwater Harvesting**: With minimal pretreatment, the captured rainwater within the underground storage tanks can be used for outdoor non-potable water uses such as irrigation, or in the buildings as gray water.

- **Green Roofs**: This method is beneficial due to its water quality, water balance, and peak flow control benefits. In addition to water resource management, green roofs improve energy efficiency, reduce urban heat island effects, and create greenspace for passive recreation.

- **Enhanced Grass Swale and Bioretention**: Enhanced grass swales are designed to convey, treat and attenuate stormwater runoff. These features slow water to allow sedimentation, filtration through the soil matrix, evapotranspiration, and infiltration into the underlying native soil. Bioretention methods, such as rain gardens and stormwater planters, temporarily store, treat and infiltrate runoff. They are typically designed to capture small storm events. Where underground parking facilities exist, infiltration is not a feasible option.

- **Permeable Pavement**: Porous asphalt, pervious concrete, permeable paver and plastic grid filled with gravel can be used for driveways, walkways and courtyards to reduce the amount of impervious area throughout the site. This approach encourages infiltration and reduces runoff volumes. Where underground parking facilities exists, infiltration is not a feasible option.

- **Enhanced Topsoil**: Enhanced topsoil provides water quality benefits in addition to water balance storage which will reduce the infrastructure required to store the required water balance volume.

LID strategies and an overall treatment train approach, where possible, will be specified during detailed design at the site plan approval stage.

8.0 Conclusions and Recommendations

The proposed development can be serviced for water, sanitary, and stormwater in accordance with the Town of Caledon and Peel Region requirements and standards. Our conclusions and recommendations include:

1. Water demand for the proposed building will be provided using a 200 mm diameter PVC fire line and 100 mm diameter PVC domestic line extending from the existing 300 mm diameter PVC watermain located in the Airport Road right-of-way.

2. Sanitary servicing for the proposed building will be provided with a 200 mm diameter PVC sanitary sewer at a 2% slope extending from the building to the existing 450 mm concrete sanitary sewer in the Airport Road right-of-way.

3. Stormwater runoff from Catchment 201 and Catchment 202 will be overcontrolled to account for the uncontrolled localized flows from Catchments UC01 and UC02. Water quantity controls will be provided using underground stormwater chambers and parking lot ponding, upstream of an orifice control tube. Both catchments outlet to the existing ditch located in the Airport Road right-of-way.

4. Water quality for Catchments 201 and 202 will be provided through a treatment train approach including a vegetated swale (bioswale) and an OGS (Stormceptor Model EF6 or equivalent) to achieve enhanced protection (80% TSS removal).

5. Erosion and Sediment Controls will be implemented on-site during construction and will be maintained until the site is stabilized.

Based on the above conclusions we support the proposed development application from the perspective of water supply, sanitary servicing, and stormwater management.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Daniel Doherty, E.I.T.
Land Development

C.F. CROZIER & ASSOCIATES INC.

Wayne Cooley, P.Eng.
Senior Technical Advisor

DD:NS/cj

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APPENDIX A

Water Demand Calculations

Crozier Consulting Engineers
File: 1856-5524
Date: March 2021

Wyndham Residence
15728 Airport Road
Town of Caledon, Region of Peel

Region of Peel Connection Demand Table

WATER CONNECTION

Connection point [3] 300mm dia. watermain on Airport Road			
Pressure zone of connection point			
Total equivalent population to be serviced [1]		381	
Total lands to be serviced		0.96 ha	
Hydrant flow test			
Hydrant flow test location		N/A	
	Pressure (kPa)	Flow (in l/s)	Time
Minimum water pressure	N/A	N/A	N/A
Maximum water pressure	N/A	N/A	N/A

No.	Water demands		
	Demand type	**Demand**	**Units**
1	Average day flow	1.32	l/s
2	Maximum day flow	1.85	l/s
3	Peak hour flow	3.97	l/s
4	Fire flow [2]	133.3	l/s
Analysis			
5	Maximum day plus fire flow	135.15	l/s

WASTEWATER CONNECTION

Connection point [4] 450mm dia. sanitary sewer on Airport Road		
Total equivalent population to be serviced		381
Total lands to be serviced		0.96 ha
6	Wastewater sewer effluent (in l/s)	5.58

[1] Please refer to design criteria for population equivalencies
[2] Please reference the Fire Underwriters Survey Document
[3] Please specify the connection point ID
[4] Please specify the connection point (wastewater line or manhole ID)
Also, the “total equivalent population to be serviced” and the “total lands to be serviced” should reference the connection point. (the FSR should contain one copy of Site Servicing Plan)

Please include the graphs associated with the hydrant flow test information table
Please provide Professional Engineer's signature and stamp on the demand table
All required calculations must be submitted with the demand table submission.

Detailed calculations of water demand and wastewater flows are provided in Appendices A and B respectively of the Functional Servicing and Preliminary Stormwater Management Report (Crozier Consulting Engineers, March 2021)

CROZIER & ASSOCIATES Consulting Engineers	Project: Wyndham Residence Address: 15728 Airport Road Project No.: 1856-5524	Date: 05.12.2020 Revised: 03.30.2021 Design: DD Check: NS

Existing Population Estimate

Site Area 0.96 **ha**

Population:

Residential Population:	**5**	persons
EXISTING POPULATION	**5**	persons

Peel Region Public Works Design Criteria Manual - Sanitary Sewer, Modified March 2017 provides value of 50 persons/ha. 5 persons was assumed for calculation as site is currently one single family dwelling

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CROZIER & ASSOCIATES Consulting Engineers	Project: Wyndham Residence Address: 15728 Airport Road Project No.: 1856-5524	Date: 05.12.2020 Revised: 03.30.2021 Design: DD Check: NS

Proposed Population Estimate

Site Area 0.96 **ha**

Proposed Building	# of Units
Floor 1 (Memory Care + Ambulatory Care)	47
Floor 2 (Studio + 1 Bed)	50
Floor 3 (1 Bedroom)	30
TOTAL	**127**

Source: ABA Architects, Site Plan, 2021.02.09, Project No.: 2018-127)

Population:

Equivalent - Institutional (Hospital)	3	persons/bed
Institutional Population:	**381**	persons
PROPOSED POPULATION:	**381**	persons

Source: Peel Region Public Works Design Criteria Manual - Sanitary Sewer, Modified March 2017.

Note: Population equivalent for Institutional (Hospital) persons/bed was used, as proposed building is retirement home and this was assumed the closest classification provided in Peel Region Design Manual. For calculation it was assumed that each unit has 1 bed, therefore equivalent 3 persons/unit.

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CROZIER & ASSOCIATES Consulting Engineers	Project: Wyndham Residence Address: 15728 Airport Road Project No.: 1856-5524

Date: 05.12.2020
Revised: 03.30.2021
Design: DD
Check: NS

Existing Water Demand

Population Estimate:

Residential:	5	persons

Design Criteria:

Average Consumption Rate:	0.280	m^3/cap.day
Maximum Daily Demand Peaking Factor:	2.00	
Maximum Hourly Demand Peaking Factor:	3.00	

Source: Peel Region Public Works Watermain Design Criteria, June 2010.

Residential Demand:

Average Daily Demand:	1.40	m^3/day
	0.02	L/s
Maximum Daily Demand:	2.80	m^3/day
	0.03	L/s
Maximum Hourly Demand:	4.20	m^3/day
	0.05	L/s

Existing Average Daily Demand:	**0.02**	L/s
Existing Maximum Daily Demand:	**0.03**	L/s
Existing Maximum Hourly Demand:	**0.05**	L/s

Estimates

CROZIER & ASSOCIATES
Consulting Engineers

Project:	Wyndham Residence	Date:	05.12.2020
Address:	15728 Airport Road	Revised:	03.30.2021
Project No.:	1856-5524	Design:	DD
		Check:	NS

Proposed Water Demand

Population Estimate:

Institutional: 381 persons

Design Criteria:

Average Consumption Rate:	0.300	m^3/cap.day	Source: Peel Region Public Works Watermain Design Criteria, June 2010.
Maximum Daily Demand Peaking Factor:	1.40		
Maximum Hourly Demand Peaking Factor:	3.00		

Residential Demand:

Average Daily Demand:	114.30	m^3/day
	1.32	L/s
Maximum Daily Demand:	160.02	m^3/day
	1.85	L/s
Maximum Hourly Demand:	342.90	m^3/day
	3.97	L/s

Proposed Average Daily Demand:	**1.32**	L/s
Proposed Maximum Daily Demand:	**1.85**	L/s
Proposed Maximum Hourly Demand:	**3.97**	L/s

Project: Wyndham Residence
Project No.: 1856-5524

Date: 2020.05.12
Revised: 2021.03.30
Designed By: DD
Checked By: NS

Fire Flow Calculations - Fire Underwriters Survey Method

Water Supply for Public Fire Protection (1999)
Fire Underwriters Survey
Notes:

1.) The development will be ordinary construction (C-value = 1.0).
2.) The building is assumed to have an automatic sprinkler protection system.
3.) The building is classified as a low hazard occupancy as per the appendix of the Water Supply for Public Fire Protection (1999) by FUS.

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

$$F = 220 * C * \sqrt{A}$$

Where:

F = the required fire flow in litres per minute
C = coefficient related to the type of construction
= 1.5 for wood frame construction (structure essentially all combustible)
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
= 0.8 for non-combustible construction (unprotected metal structural components)
= 0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building considered.

Proposed Development

1.0 C-Value	Largest Floor	3655.5 sq.m	Note:	Lower Level
	(Plus 25% of Adjoining Floors)	803.225 sq.m	Note:	25% Upper Level 1
		4458.7 sq.m		

Therefore F = 14,700 L/min

Fire flow determined above shall not exceed:

30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0% (No change)		

-15% Reduction(%)
-2,205 L/min reduction

Subtotal = 12,495 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above may be reduced by up to 50% for complete automatic sprinkler protection.

☑ **Assume complete automatic sprinkler protection (50% reduction)**
-6,248 L/min reduction

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 45 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation	Charge	Separation	Charge
0 to 3 m	25%	20.1 to 30 m	10%
3.1 to 10 m	20%	30.1 to 45 m	5%
10.1 to 20 m	15%	>45 m	0%

Exposed buildings

Name	Distance (m)	Charge	Surcharge (L/min)
North	n.a	0%	0
East	n.a	0%	0
South	30	10%	1,250
West	n.a	0%	0
		Total Surcharge	**1,250**

Determine Required Fire Flow

No.1	14,700	
No. 2	-2,205	reduction
No. 3	-6,248	reduction
No. 4	1,250	surcharge
Required Flow:	**7,497**	**L/min**
Rounded to nearest 1000 L/min:	**8,000**	**L/min**

or **133.3 L/s**
2,112.0 USGPM

Note: USGPM = 0.264*(L/min)

Required Duration of Fire Flow	
Flow Required (L/min)	Duration (hours)
2,000 or less	1.00
3,000	1.25
4,000	1.50
5,000	1.75
6,000	2.00
8,000	**2.00**
10,000	2.00
12,000	2.50
14,000	3.00
16,000	3.50
18,000	4.00
20,000	4.50
22,000	5.00
24,000	5.50
26,000	6.00
28,000	6.50
30,000	7.00
32,000	7.50
34,000	8.00
36,000	8.50
38,000	9.00
40,000 and over	9.50

aba architects inc.

Ms. Nicole Segal
C.F. Crozier & Associates
2800 High Point Drive, Suite 100
Milton, ON
L9T 6P4

Wednesday, April 15, 2020

Re: 15728 Airport Road – Fire Flow Support Letter

Dear Ms. Segal,

This letter serves to confirm that the proposed building located at 15728 Airport Road will be of combustible construction and sprinklered. All floor assemblies and vertical openings will have a minimum fire-resistance rating of 2 hours as per Ontario Building Code 3.2.2.48B.

We trust that this letter is sufficient to address Development Engineering's request to confirm the type of building construction.

Yours Truly,

Josh Bedard, HBAS, M.Arch, OAA, MRAIC
Vice President, Architecture

101 Randall Drive, Unit B, Waterloo ON N2V 1C5 ▪ 519.884.2711
architecture ▪ site planning ▪ interiors abarchitect.ca

APPENDIX B

Sanitary Flow Calculations

Project: Wyndham Residence
Address: 15728 Airport Road
Project No.: 1856-5524

Date: 05.12.2020
Revised: 03.30.2021
Design: DD
Check: NS

Existing Population Estimate

Site Area 0.96 **ha**

Population:

Residential Population: **5** persons

EXISTING POPULATION **5** persons

Peel Region Public Works Design Criteria Manual - Sanitary Sewer, Modified March 2017 provides value of 50 persons/ha. 5 persons was assumed for calculation as site is currently one single family dwelling

I:\1800\1856 - Wyndham Holdings Inc\5524 - 15728 Airport Rd\Design\Civil_Water\[5524_ Ex_Prop Wtr_San Demand_v3.xlsx]Population Estimates

Project: Wyndham Residence
Address: 15728 Airport Road
Project No.: 1856-5524

Date: 05.12.2020
Revised: 03.30.2021
Design: DD
Check: NS

Proposed Population Estimate

Site Area 0.96 **ha**

Proposed Building	# of Units
Floor 1 (Memory Care + Ambulatory Care)	47
Floor 2 (Studio + 1 Bed)	50
Floor 3 (1 Bedroom)	30
TOTAL	**127**

Source: ABA Architects, Site Plan, 2021.02.09, Project No.: 2018-127)

Population:

Equivalent - Institutional (Hospital) 3 persons/bed

Institutional Population: **381** persons

PROPOSED POPULATION: **381** persons

Source: Peel Region Public Works Design Criteria Manual - Sanitary Sewer, Modified March 2017.

Note: Population equivalent for Institutional (Hospital) persons/bed was used, as proposed building is retirement home and this was assumed the closest classification provided in Peel Region Design Manual. For calculation it was assumed that each unit has 1 bed, therefore equivalent 3 persons/unit.

I:\1700\1788 - Ranee Management\5378 - 1840 - 1850 Bloor St\Design\Civil_Water\[5378_ Ex_Prop Wtr_San Demand.xlsx]Population Estimates

CROZIER & ASSOCIATES
Consulting Engineers

Project:	Wyndham Residence	Date:	05.12.2020
Address:	15728 Airport Road	Revised:	03.30.2021
Project No.:	1856-5524	Design:	DD
		Check:	NS

Existing Sanitary Flow

Infiltration Area:

0.96 ha

Population Estimates:

Residential: 5 persons

Design Criteria:

Unit Sewage Flow:	0.3028	m^3/cap.day
Infiltration:	0.200	L/s/ha
Harmon Peaking Factor:		

Source: Peel Region Sanitary Sewer Design Criteria, March 2017. Standard Drawing 2-9-2

Modified Harmon Formula

$$M = 1+\frac{14}{4+\sqrt{Pe}}$$

Residential Sanitary Flow:

Average Dry Weather Flow:	1.51	m^3/day
	0.02	L/s
Existing Dry Weather Sanitary Flow:	0.02	L/s
Peaking Factor:	4.44	
Existing Peak Sanitary Flow:	0.08	L/s
Inflow/Infiltration Allowance:	0.19	L/s
Existing Design Sanitary Flow:	0.27	L/s

I:\1800\1856 - Wyndham Holdings Inc\5524 - 15728 Airport Rd\Design\Civil_Water\[5524_ Ex_Prop Wtr_San Demand_v3.xlsx]Population Estimates

CROZIER & ASSOCIATES Consulting Engineers

Project:	Wyndham Residence	Date:	05.12.2020
Address:	15728 Airport Road	Revised:	03.30.2021
Project No.:	1856-5524	Design:	DD
		Check:	NS

Proposed Sanitary Flow

Infiltration Area:

0.96 ha

Population Estimates:

Institutional: 381 persons

Design Criteria:

Unit Sewage Flow:	0.3028	m^3/cap.day	Source: Peel Region Sanitary Sewer Design Criteria, March 2017. Standard Drawing 2-9-2
Infiltration:	0.200	L/s/ha	
Harmon Peaking Factor:			

Modified Harmon Formula

$$M = 1 + \frac{14}{4+\sqrt{Pe}}$$

Residential Sanitary Flow:

Average Dry Weather Flow:	115.37	m^3/day
	1.34	L/s
Proposed Dry Weather Sanitary Flow:	1.34	L/s
Peaking Factor:	4.03	
Proposed Peak Sanitary Flow:	5.38	L/s
Inflow/Infiltration Allowance:	0.19	L/s
Proposed Design Sanitary Flow:	5.58	L/s

I:\1800\1856 - Wyndham Holdings Inc\5524 - 15728 Airport Rd\Design\Civil_Water\[5524_ Ex_Prop Wtr_San Demand_v3.xlsx]Population Estimates

APPENDIX C

Stormwater Management Calculations

CROZIER CONSULTING ENGINEERS

Project: 15728 Airport Road
Project No.: 1856-5524
Created By: DD
Checked By: NRS
Date: 2020.03.02
Updated: 2021.03.30

Modified Rational Calculations - Input Parameters

Storm Data: Caledon

Time of Concentration: T_c = 10 min (per Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
2 yr	1070	7.85	0.8759	85.72
5 yr	1593	11	0.8789	109.68
10 yr	2221	12	0.908	134.16
25 yr	3158	15	0.9335	156.47
50 yr	3886	16	0.9495	176.19
100 yr	4688	17	0.9624	196.54

Pre - Development Conditions				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.91	9,137	**0.25**	**0.24**
Impervious	0.05	500	**0.90**	**0.05**
Total Site	**0.96**	**9,637**	**-**	**0.28**

Post - Development Conditions			
Catchment	**Area** (ha)	**Area** (m^2)	**C**
201	0.51	5,060	0.74
202	0.37	3,660	0.75
UC01	0.07	727	0.25
UC02	0.02	190	0.25
Total Site	**0.96**	**9,637**	**-**

Equations:

Peak Flow
$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d)$$

Intensity
$$i(T_d) = A / (T + B)^C$$

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CROZIER
CONSULTING ENGINEERS

Project: 15728 Airport Road
Project No.: 1856-5524
Created By: DD
Checked By: NRS
Date: 2020.03.02
Updated: 3/30/2021

Modified Rational Calculations - Peak Flows Summary

Pre-Development	
Storm Event	Peak Flow (L/s)
	Q_{101}
2 yr	65.63
5 yr	83.97
10 yr	102.71
25 yr	119.79
50 yr	134.89
100 yr	150.47

Storm Event	Peak Flow Rate					Required Storage (m^3)	
	Post-Development (L/s)						
	Q_{201}[1]	Q_{202}[2]	Q_{UC01}	Q_{UC02}	Q_{TOTAL}	201	202
2 yr	22.07	26.45	4.36	1.14	54.03	57.84	30.14
5 yr			5.58	1.46	55.57	95.65	53.15
10 yr			6.83	1.78	57.14	126.21	73.64
25 yr			7.96	2.08	58.57	167.00	100.25
50 yr			8.97	2.34	59.84	196.92	120.58
100 yr			10.00	2.61	61.14	229.52	142.79

1. Based on 75mm diameter orifice tube
2. Based on 100 mm diameter orifice tube

I:\1800\1856 - Wyndham Holdings Inc\5524 - 15728 Airport Rd\Design\Civil_Water\[5524_ Ex_Prop Wtr_San Demand_v3.xlsx]Population Estimates

CROZIER CONSULTING ENGINEERS

Project: 15728 Airport Road
Project No.: 1856-5524
Created By: DD
Checked By: NS
Date: 2020.03.02
Updated: 2021.03.30

Modified Rational Calculations - 100-Year Storm Event

CATCHMENT 201

Control Criteria

100 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

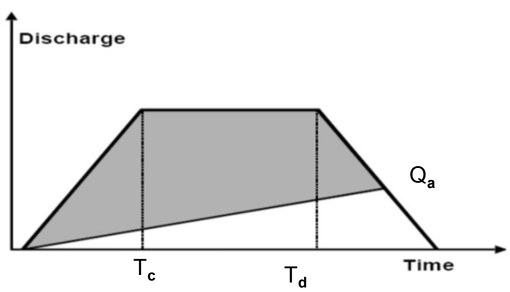
100 yr: Uncontrolled Post-Development Flow

Q_{post} = 206.06 L/s

100 yr: Pre-Development Target

$Q_{orifice}$ = 22.07 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	239.35	300	0.251	65.35
10	196.54	600	0.206	110.39
15	166.89	900	0.175	140.92
20	145.13	1200	0.152	162.72
25	128.46	1500	0.135	178.85
30	115.28	1800	0.121	191.07
35	104.59	2100	0.110	200.48
40	95.75	2400	0.100	207.81
45	88.31	2700	0.093	213.55
50	81.95	3000	0.086	218.04
55	76.47	3300	0.080	221.53
60	71.69	3600	0.075	224.21
65	67.47	3900	0.071	226.22
70	63.74	4200	0.067	227.68
75	60.40	4500	0.063	228.67
80	57.40	4800	0.060	229.27
85	54.69	5100	0.057	229.52
90	52.23	5400	0.055	229.47
95	49.98	5700	0.052	229.16
100	47.93	6000	0.050	228.63
105	46.03	6300	0.048	227.90
110	44.29	6600	0.046	226.99
115	42.67	6900	0.045	225.92
120	41.17	7200	0.043	224.71
125	39.78	7500	0.042	223.37
130	38.47	7800	0.040	221.91
135	37.25	8100	0.039	220.35
140	36.11	8400	0.038	218.70
145	35.04	8700	0.037	216.96
150	34.03	9000	0.036	215.13
Required Storage Volume:				**229.52**



Peak Flow

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storage

$$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$$

Modified Rational Calculations - 100-Year Storm Event

CATCHMENT 202

Control Criteria

100 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

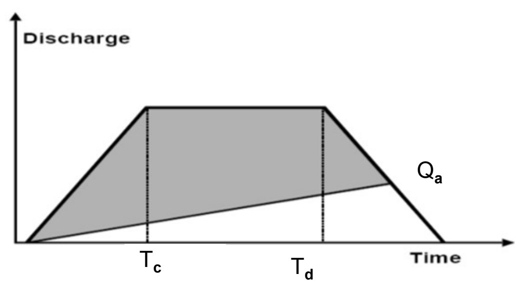
100 yr: Uncontrolled Post-Development Flow

Q_{post} = 151.06 L/s

100 yr: Pre-Development Target

$Q_{orifice}$ = 26.45 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	239.35	300	0.184	43.29
10	196.54	600	0.151	74.76
15	166.89	900	0.128	95.60
20	145.13	1200	0.112	110.04
25	128.46	1500	0.099	120.33
30	115.28	1800	0.089	127.74
35	104.59	2100	0.080	133.11
40	95.75	2400	0.074	136.94
45	88.31	2700	0.068	139.60
50	81.95	3000	0.063	141.35
55	76.47	3300	0.059	142.37
60	71.69	3600	0.055	142.79
65	67.47	3900	0.052	142.73
70	63.74	4200	0.049	142.26
75	60.40	4500	0.046	141.45
80	57.40	4800	0.044	140.34
85	54.69	5100	0.042	138.98
90	52.23	5400	0.040	137.41
95	49.98	5700	0.038	135.64
100	47.93	6000	0.037	133.71
105	46.03	6300	0.035	131.63
110	44.29	6600	0.034	129.43
115	42.67	6900	0.033	127.10
120	41.17	7200	0.032	124.67
125	39.78	7500	0.031	122.15
130	38.47	7800	0.030	119.54
135	37.25	8100	0.029	116.86
140	36.11	8400	0.028	114.10
145	35.04	8700	0.027	111.28
150	34.03	9000	0.026	108.41
Required Storage Volume:				**142.79**



Peak Flow
$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storage
$$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$$

Project: 15728 Airport Road
Project No.: 1856-5524
Created By: DD
Checked By: NRS
Date: 2020.03.02
Updated: 3/30/2021

Modified Rational Calculations - 50-Year Storm Event

CATCHMENT 201

Control Criteria

50 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

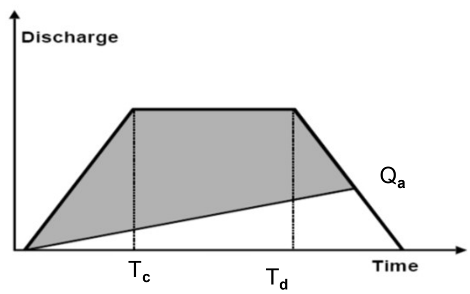
50 yr: Uncontrolled Post-Development Flow

Q_{post} = 184.73 L/s

50 yr: Unit Flow Rate Target

$Q_{orifice}$ = 22.07 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	215.80	300	0.226	57.94
10	176.19	600	0.185	97.59
15	149.09	900	0.156	124.13
20	129.36	1200	0.136	142.88
25	114.33	1500	0.120	156.62
30	102.50	1800	0.107	166.94
35	92.93	2100	0.097	174.81
40	85.04	2400	0.089	180.86
45	78.40	2700	0.082	185.52
50	72.75	3000	0.076	189.09
55	67.88	3300	0.071	191.80
60	63.63	3600	0.067	193.81
65	59.90	3900	0.063	195.24
70	56.58	4200	0.059	196.19
75	53.63	4500	0.056	196.72
80	50.97	4800	0.053	196.92
85	48.57	5100	0.051	196.81
90	46.40	5400	0.049	196.45
95	44.41	5700	0.047	195.85
100	42.59	6000	0.045	195.07
105	40.92	6300	0.043	194.10
110	39.37	6600	0.041	192.98
115	37.94	6900	0.040	191.72
120	36.62	7200	0.038	190.34
125	35.39	7500	0.037	188.84
130	34.23	7800	0.036	187.24
135	33.16	8100	0.035	185.55
140	32.15	8400	0.034	183.77
145	31.20	8700	0.033	181.92
150	30.30	9000	0.032	179.99
Required Storage Volume:				**196.92**



Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storage
$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$

Modified Rational Calculations - 50-Year Storm Event

CATCHMENT 202

Control Criteria

50 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

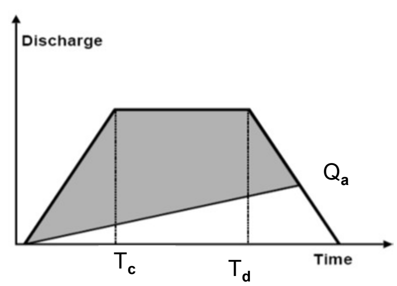
50 yr: Uncontrolled Post-Development Flow

Q_{post} = 135.42 L/s

50 yr: Unit Flow Rate Target

$Q_{orifice}$ = 26.45 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	215.80	300	0.166	37.86
10	176.19	600	0.135	65.38
15	149.09	900	0.115	83.29
20	129.36	1200	0.099	95.50
25	114.33	1500	0.088	104.03
30	102.50	1800	0.079	110.06
35	92.93	2100	0.071	114.28
40	85.04	2400	0.065	117.18
45	78.40	2700	0.060	119.05
50	72.75	3000	0.056	120.13
55	67.88	3300	0.052	120.58
60	63.63	3600	0.049	120.51
65	59.90	3900	0.046	120.02
70	56.58	4200	0.043	119.17
75	53.63	4500	0.041	118.02
80	50.97	4800	0.039	116.62
85	48.57	5100	0.037	115.01
90	46.40	5400	0.036	113.20
95	44.41	5700	0.034	111.22
100	42.59	6000	0.033	109.10
105	40.92	6300	0.031	106.86
110	39.37	6600	0.030	104.49
115	37.94	6900	0.029	102.03
120	36.62	7200	0.028	99.47
125	35.39	7500	0.027	96.84
130	34.23	7800	0.026	94.12
135	33.16	8100	0.025	91.34
140	32.15	8400	0.025	88.50
145	31.20	8700	0.024	85.60
150	30.30	9000	0.023	82.65
Required Storage Volume:				**120.58**



Peak Flow
$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storage
$$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$$

CROZIER CONSULTING ENGINEERS

Project: 15728 Airport Road
Project No.: 1856-5524
Created By: DD
Checked By: NRS
Date: 2020.03.02
Updated: 3/30/2021

Modified Rational Calculations - 25-Year Storm Event

CATCHMENT 201

Control Criteria

25 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

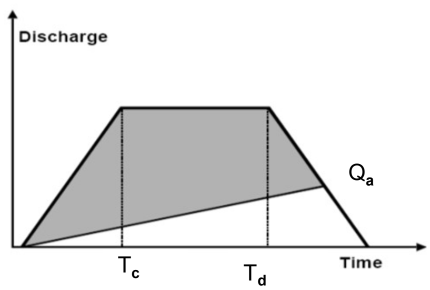
25 yr: Uncontrolled Post-Development Flow

Q_{post}= 164.05 L/s

25 yr: Unit Flow Rate Target

$Q_{orifice}$ = 22.07 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	192.71	300	0.202	50.68
10	156.47	600	0.164	85.19
15	131.98	900	0.138	107.98
20	114.29	1200	0.120	123.93
25	100.90	1500	0.106	135.50
30	90.39	1800	0.095	144.10
35	81.93	2100	0.086	150.58
40	74.95	2400	0.079	155.49
45	69.10	2700	0.072	159.20
50	64.13	3000	0.067	161.97
55	59.84	3300	0.063	164.00
60	56.11	3600	0.059	165.42
65	52.83	3900	0.055	166.35
70	49.92	4200	0.052	166.85
75	47.33	4500	0.050	167.00
80	45.00	4800	0.047	166.86
85	42.90	5100	0.045	166.45
90	40.99	5400	0.043	165.82
95	39.24	5700	0.041	164.99
100	37.65	6000	0.039	163.99
105	36.18	6300	0.038	162.83
110	34.83	6600	0.037	161.54
115	33.58	6900	0.035	160.12
120	32.41	7200	0.034	158.60
125	31.33	7500	0.033	156.98
130	30.32	7800	0.032	155.26
135	29.38	8100	0.031	153.47
140	28.49	8400	0.030	151.60
145	27.66	8700	0.029	149.66
150	26.88	9000	0.028	147.66
Required Storage Volume:				**167.00**



Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storage
$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$

Modified Rational Calculations - 25-Year Storm Event

CATCHMENT 202

Control Criteria

25 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

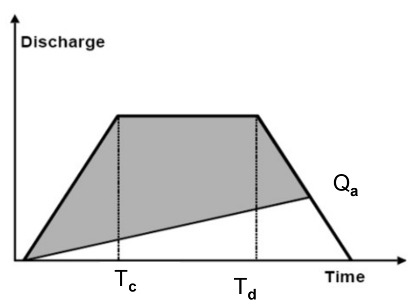
25 yr: Uncontrolled Post-Development Flow

Q_{post}= 120.26 L/s

25 yr: Unit Flow Rate Target

$Q_{orifice}$ = 26.45 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	192.71	300	0.148	32.53
10	156.47	600	0.120	56.29
15	131.98	900	0.101	71.46
20	114.29	1200	0.088	81.61
25	100.90	1500	0.078	88.55
30	90.39	1800	0.069	93.31
35	81.93	2100	0.063	96.52
40	74.95	2400	0.058	98.58
45	69.10	2700	0.053	99.76
50	64.13	3000	0.049	100.25
55	59.84	3300	0.046	100.20
60	56.11	3600	0.043	99.70
65	52.83	3900	0.041	98.84
70	49.92	4200	0.038	97.67
75	47.33	4500	0.036	96.24
80	45.00	4800	0.035	94.59
85	42.90	5100	0.033	92.75
90	40.99	5400	0.032	90.74
95	39.24	5700	0.030	88.60
100	37.65	6000	0.029	86.32
105	36.18	6300	0.028	83.93
110	34.83	6600	0.027	81.44
115	33.58	6900	0.026	78.87
120	32.41	7200	0.025	76.21
125	31.33	7500	0.024	73.48
130	30.32	7800	0.023	70.68
135	29.38	8100	0.023	67.82
140	28.49	8400	0.022	64.91
145	27.66	8700	0.021	61.95
150	26.88	9000	0.021	58.94
Required Storage Volume:				**100.25**



Peak Flow
$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storage
$$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$$

Modified Rational Calculations - 10-Year Storm Event

CATCHMENT 201

Control Criteria

10 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

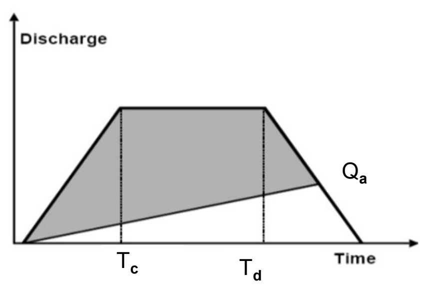
10 yr: Uncontrolled Post-Development Flow

Q_{post} = 140.66 L/s

10 yr: Unit Flow Rate Target

$Q_{orifice}$ = 22.07 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	169.55	300	0.178	43.40
10	134.16	600	0.141	71.15
15	111.40	900	0.117	88.56
20	95.47	1200	0.100	100.25
25	83.68	1500	0.088	108.42
30	74.58	1800	0.078	114.26
35	67.34	2100	0.071	118.47
40	61.44	2400	0.064	121.47
45	56.52	2700	0.059	123.58
50	52.37	3000	0.055	124.98
55	48.81	3300	0.051	125.81
60	45.72	3600	0.048	126.20
65	43.01	3900	0.045	126.21
70	40.63	4200	0.043	125.91
75	38.50	4500	0.040	125.35
80	36.60	4800	0.038	124.56
85	34.88	5100	0.037	123.58
90	33.32	5400	0.035	122.43
95	31.91	5700	0.033	121.14
100	30.61	6000	0.032	119.71
105	29.42	6300	0.031	118.16
110	28.32	6600	0.030	116.51
115	27.31	6900	0.029	114.77
120	26.37	7200	0.028	112.95
125	25.49	7500	0.027	111.05
130	24.68	7800	0.026	109.08
135	23.91	8100	0.025	107.05
140	23.20	8400	0.024	104.96
145	22.53	8700	0.024	102.81
150	21.89	9000	0.023	100.62
Required Storage Volume:				**126.21**



Peak Flow

$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storage

$$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$$

Modified Rational Calculations - 10-Year Storm Event

CATCHMENT 202

Control Criteria

10 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

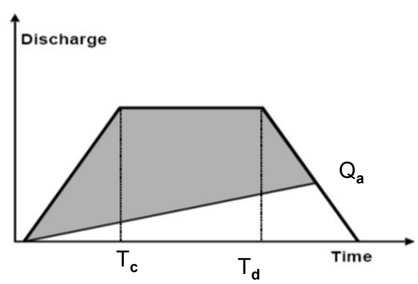
10 yr: Uncontrolled Post-Development Flow

Q_{post} = 103.12 L/s

10 yr: Unit Flow Rate Target

$Q_{orifice}$ = 26.45 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	169.55	300	0.130	27.19
10	134.16	600	0.103	46.00
15	111.40	900	0.086	57.22
20	95.47	1200	0.073	64.25
25	83.68	1500	0.064	68.70
30	74.58	1800	0.057	71.44
35	67.34	2100	0.052	72.98
40	61.44	2400	0.047	73.64
45	56.52	2700	0.043	73.64
50	52.37	3000	0.040	73.13
55	48.81	3300	0.038	72.20
60	45.72	3600	0.035	70.95
65	43.01	3900	0.033	69.41
70	40.63	4200	0.031	67.65
75	38.50	4500	0.030	65.70
80	36.60	4800	0.028	63.58
85	34.88	5100	0.027	61.32
90	33.32	5400	0.026	58.94
95	31.91	5700	0.025	56.45
100	30.61	6000	0.024	53.86
105	29.42	6300	0.023	51.19
110	28.32	6600	0.022	48.44
115	27.31	6900	0.021	45.62
120	26.37	7200	0.020	42.74
125	25.49	7500	0.020	39.81
130	24.68	7800	0.019	36.82
135	23.91	8100	0.018	33.79
140	23.20	8400	0.018	30.72
145	22.53	8700	0.017	27.61
150	21.89	9000	0.017	24.46
Required Storage Volume:				**73.64**



Peak Flow
$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storage
$$S_d = Q_{post} \cdot T_d - Q_{target}(T_d + T_c)$$

Project: 15728 Airport Road
Project No.: 1856-5524
Created By: DD
Checked By: NRS
Date: 2020.03.02
Updated: 3/30/2021

Modified Rational Calculations - 5-Year Storm Event

CATCHMENT 201

Control Criteria

5 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

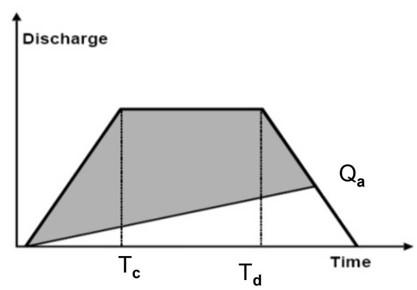
5 yr: Uncontrolled Post-Development Flow:

Q_{post} = 114.99 L/s

5 yr: Unit Flow Rate Target

$Q_{orifice}$ = 22.07 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	139.29	300	0.146	33.88
10	109.68	600	0.115	55.75
15	90.91	900	0.095	69.22
20	77.89	1200	0.082	78.12
25	68.29	1500	0.072	84.22
30	60.92	1800	0.064	88.47
35	55.06	2100	0.058	91.42
40	50.28	2400	0.053	93.42
45	46.32	2700	0.049	94.69
50	42.96	3000	0.045	95.40
55	40.09	3300	0.042	95.65
60	37.60	3600	0.039	95.54
65	35.41	3900	0.037	95.13
70	33.48	4200	0.035	94.47
75	31.77	4500	0.033	93.59
80	30.23	4800	0.032	92.52
85	28.84	5100	0.030	91.30
90	27.58	5400	0.029	89.93
95	26.43	5700	0.028	88.44
100	25.39	6000	0.027	86.84
105	24.42	6300	0.026	85.15
110	23.53	6600	0.025	83.36
115	22.71	6900	0.024	81.50
120	21.95	7200	0.023	79.57
125	21.23	7500	0.022	77.57
Required Storage Volume:				**95.65**



Peak Flow
$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storage
$$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$$

Project:	15728 Airport Road
Project No.:	1856-5524
Created By:	DD
Checked By:	NRS
Date:	2020.03.02
Updated:	3/30/2021

Modified Rational Calculations - 5-Year Storm Event

CATCHMENT 202

Control Criteria

5 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

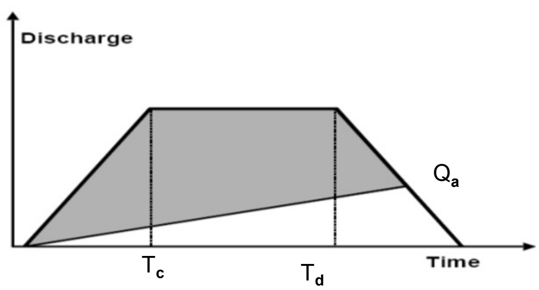
5 yr: Uncontrolled Post-Development Flow:

Q_{post} = 84.30 L/s

5 yr: Unit Flow Rate Target

$Q_{orifice}$ = 26.45 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	139.29	300	0.107	20.21
10	109.68	600	0.084	34.71
15	90.91	900	0.070	43.04
20	77.89	1200	0.060	48.03
25	68.29	1500	0.052	50.96
30	60.92	1800	0.047	52.53
35	55.06	2100	0.042	53.15
40	50.28	2400	0.039	53.07
45	46.32	2700	0.036	52.47
50	42.96	3000	0.033	51.44
55	40.09	3300	0.031	50.09
60	37.60	3600	0.029	48.47
65	35.41	3900	0.027	46.63
70	33.48	4200	0.026	44.60
75	31.77	4500	0.024	42.42
80	30.23	4800	0.023	40.09
85	28.84	5100	0.022	37.65
90	27.58	5400	0.021	35.11
95	26.43	5700	0.020	32.48
100	25.39	6000	0.020	29.77
105	24.42	6300	0.019	26.98
110	23.53	6600	0.018	24.13
115	22.71	6900	0.017	21.23
120	21.95	7200	0.017	18.27
125	21.23	7500	0.016	15.27
Required Storage Volume:				**53.15**



Peak Flow
$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storage
$$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$$

Modified Rational Calculations - 2-Year Storm Event

CATCHMENT 201

Control Criteria

2 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

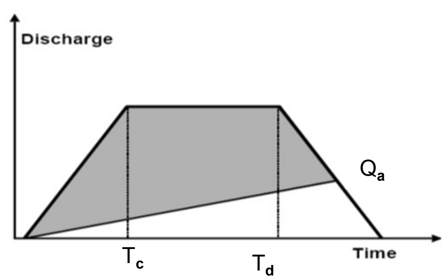
2 yr: Uncontrolled Post-Development Flow:

Q_{post}= 89.87 L/s

2 yr: Unit Flow Rate Target

$Q_{orifice}$ = 22.07 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	114.31	300	0.120	26.02
10	85.72	600	0.090	40.68
15	69.05	900	0.072	48.59
20	58.06	1200	0.061	53.18
25	50.24	1500	0.053	55.83
30	44.38	1800	0.047	57.26
35	39.81	2100	0.042	57.84
40	36.14	2400	0.038	57.82
45	33.13	2700	0.035	57.35
50	30.60	3000	0.032	56.53
55	28.46	3300	0.030	55.42
60	26.62	3600	0.028	54.10
65	25.01	3900	0.026	52.59
70	23.60	4200	0.025	50.92
75	22.34	4500	0.023	49.13
80	21.23	4800	0.022	47.22
85	20.22	5100	0.021	45.21
Required Storage Volume:				**57.84**



Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Storage
$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$

Project:	15728 Airport Road
Project No.:	1856-5524
Created By:	DD
Checked By:	NRS
Date:	2020.03.02
Updated:	3/30/2021

Modified Rational Calculations - 2-Year Storm Event

CATCHMENT 202

Control Criteria

2 yr: Control Post-Development Peak Flows to Pre-Development Peak Flows

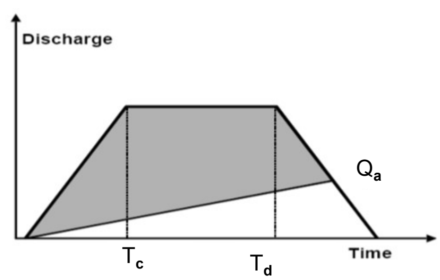
2 yr: Uncontrolled Post-Development Flow:

Q_{post}= 65.88 L/s

2 yr: Unit Flow Rate Target

$Q_{orifice}$ = 26.45 L/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	114.31	300	0.088	14.45
10	85.72	600	0.066	23.66
15	69.05	900	0.053	27.92
20	58.06	1200	0.045	29.74
25	50.24	1500	0.039	30.14
30	44.38	1800	0.034	29.65
35	39.81	2100	0.031	28.54
40	36.14	2400	0.028	26.98
45	33.13	2700	0.025	25.09
50	30.60	3000	0.024	22.95
55	28.46	3300	0.022	20.60
60	26.62	3600	0.020	18.09
65	25.01	3900	0.019	15.44
70	23.60	4200	0.018	12.68
75	22.34	4500	0.017	9.82
80	21.23	4800	0.016	6.88
85	20.22	5100	0.016	3.87
Required Storage Volume:				**30.14**



Peak Flow
$$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$$

Storage
$$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$$

PROJECT:	15728 Airport Road
PROJECT No.:	1856-5524
FILE:	Orifice Design
DATE:	2020.03.02
UPDATE:	3/30/2021
DESIGN:	DD
CHECK:	NRS

Orifice Design Summary - Catchment 201

Orifice Type =	Tube	
Invert Elevation =	308.05	m
Diameter of Orifice =	75	mm
Area of Orifice (A) =	0.0044	sq.m
Orifice Coefficient (Cd) =	0.820	
Calculation of Head		
Centroid Elevation =	308.09	m
Water Elevation =	309.98	m
Upstream Head*, (h) =	1.89	m
Qa =	**(Cd)(A)(2gh)^0.5**	
Actual Controlled Discharge, Qa =	0.02207	cms
Qa =	**22.07**	**L/s**

*Head is based upon orifice area @ orifice face not Vena Contracta

I:\1800\1856 - Wyndham Holdings Inc\5524 - 15728 Airport Rd\Design\Civil_Water\[5524_Modified Rational.xlsx]2yr Post-to-Pre Storage

CROZIER & ASSOCIATES Consulting Engineers

PROJECT:	15728 Airport Road
PROJECT No.:	1856-5524
FILE:	Orifice Design
DATE:	2020.03.02
UPDATE:	3/30/2021
DESIGN:	DD
CHECK:	NRS

Orifice Design Summary - Catchment 202

Orifice Type =	Tube	
Invert Elevation =	306.12	m
Diameter of Orifice =	100	mm
Area of Orifice (A) =	0.0079	sq.m
Orifice Coefficient (Cd) =	0.820	
Calculation of Head		
Centroid Elevation =	306.17	m
Water Elevation =	307.03	m
Upstream Head*, (h) =	0.86	m
Qa =	**(Cd)(A)(2gh)^0.5**	
Actual Controlled Discharge, Qa =	0.02645	cms
Qa =	**26.45**	**L/s**

*Head is based upon orifice area @ orifice face not Vena Contracta

I:\1800\1856 - Wyndham Holdings Inc\5524 - 15728 Airport Rd\Design\Civil_Water\[5524_Modified Rational.xlsx]2yr Post-to-Pre Storage

CROZIER CONSULTING ENGINEERS	**Project:** 15728 Airport Road **Project No.:** 1856-5524	**Date:** 2020.03.02 **Created By:** DD **Checked By:** NS

Water Balance Volume Requirement

Site Area	0.96	ha

Water Balance criteria is 5mm across site impervious area

Impervious Area:	0.66	ha
Volume Required:	33.00	m^3

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	HAIDER NASRULLAH 647-850-9417 HAIDER.NASRULLAH@ADS-PIPE.COM
ADS SALES REP:	HASSAN ELMI 416-985-9757 HASSAN.ELMI@ADS-PIPE.COM
PROJECT NO:	S218278

ADVANCED DRAINAGE SYSTEMS, INC.

FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

AIRPORT ROAD RETIREMENT RESIDENCE

CALEDON, ON

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

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

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

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

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

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

SC-310 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-310.

2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.

3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418-16a (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".

4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.

5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.

6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.

7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/IN/IN. 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 F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.

9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310 SYSTEM

1. STORMTECH SC-310 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.

2. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".

3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.

4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.

5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.

6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.

7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").

8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.

9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".

2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".

3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

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

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

PROPOSED LAYOUT : SYSTEM # 1

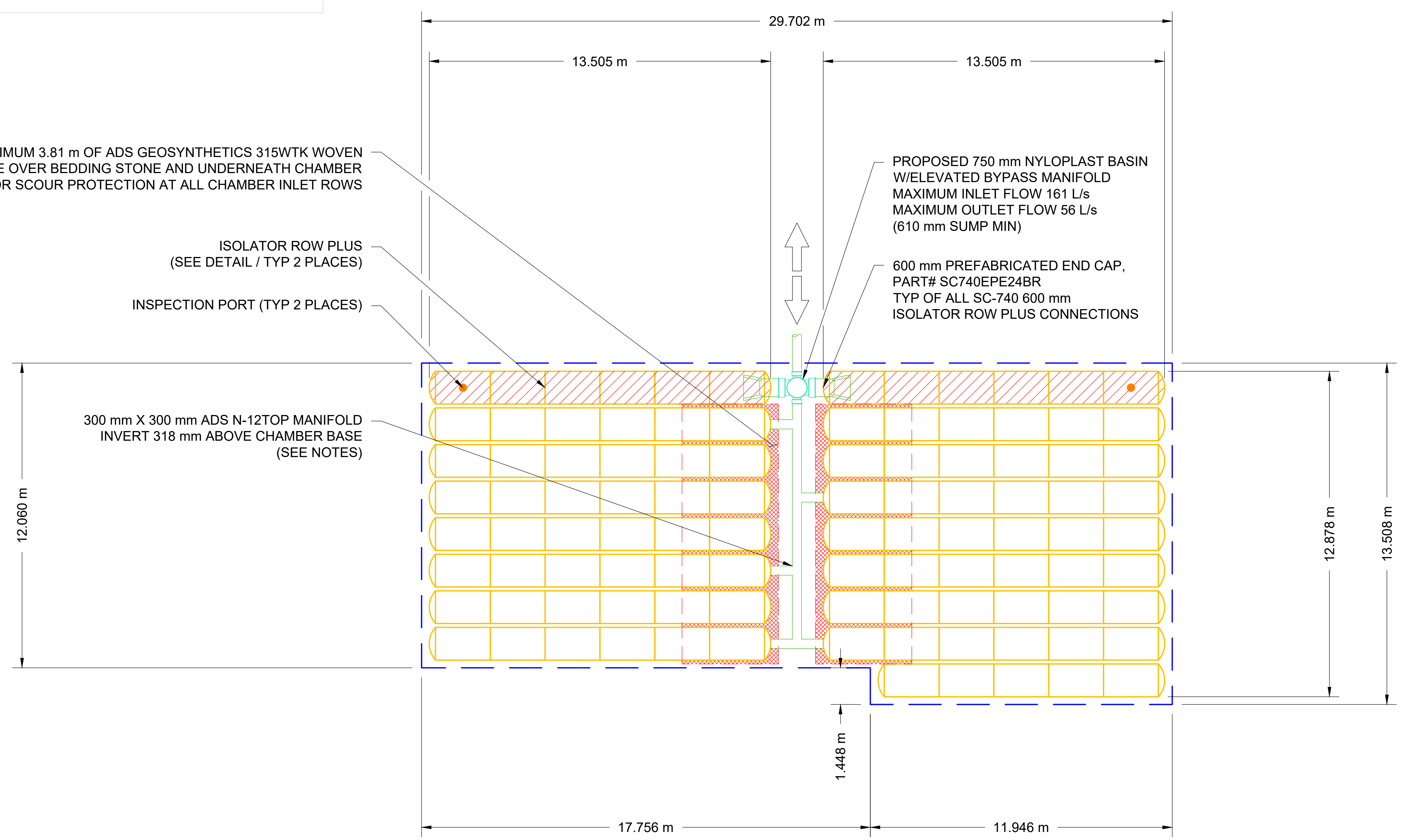
101	STORMTECH SC-740 CHAMBERS
34	STORMTECH SC-740 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	% STONE VOID
239.0	**INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED)**
375.5	SYSTEM AREA (m²)
86.4	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS : SYSTEM # 1

311.397	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
309.569	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
309.416	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
309.416	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
309.416	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
309.111	TOP OF STONE:
308.959	TOP OF SC-740 CHAMBER:
308.514	300 mm TOP MANIFOLD INVERT:
308.200	600 mm ISOLATOR ROW PLUS INVERT:
308.197	BOTTOM OF SC-740 CHAMBER:
308.045	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.
- 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.
- THE SITE DESIGN ENGINEER MUST REVIEW THE PROXIMITY OF THE CHAMBERS TO THE BUILDING/STRUCTURE. NO FOUNDATION LOADS SHALL BE TRANSMITTED TO THE CHAMBERS. THE SITE DESIGN ENGINEER MUST CONSIDER EFFECTS OF POSSIBLE SATURATED SOILS ON BEARING CAPACITY OF SOILS AND SEEPAGE INTO BASEMENTS.



AIRPORT ROAD RETIREMENT RESIDENCE
CALEDON, ON

DATE: 01/18/21 | DRAWN: BRE
PROJECT #: S218278 | CHECKED: NPB

DATE	DRWN	CHKD	DESCRIPTION

StormTech® Detention•Retention•Water Quality
520 CROMWELL AVENUE | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADS® ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026

SCALE = 1 : 200

SHEET 3 OF 10

PROPOSED LAYOUT : SYSTEM # 2

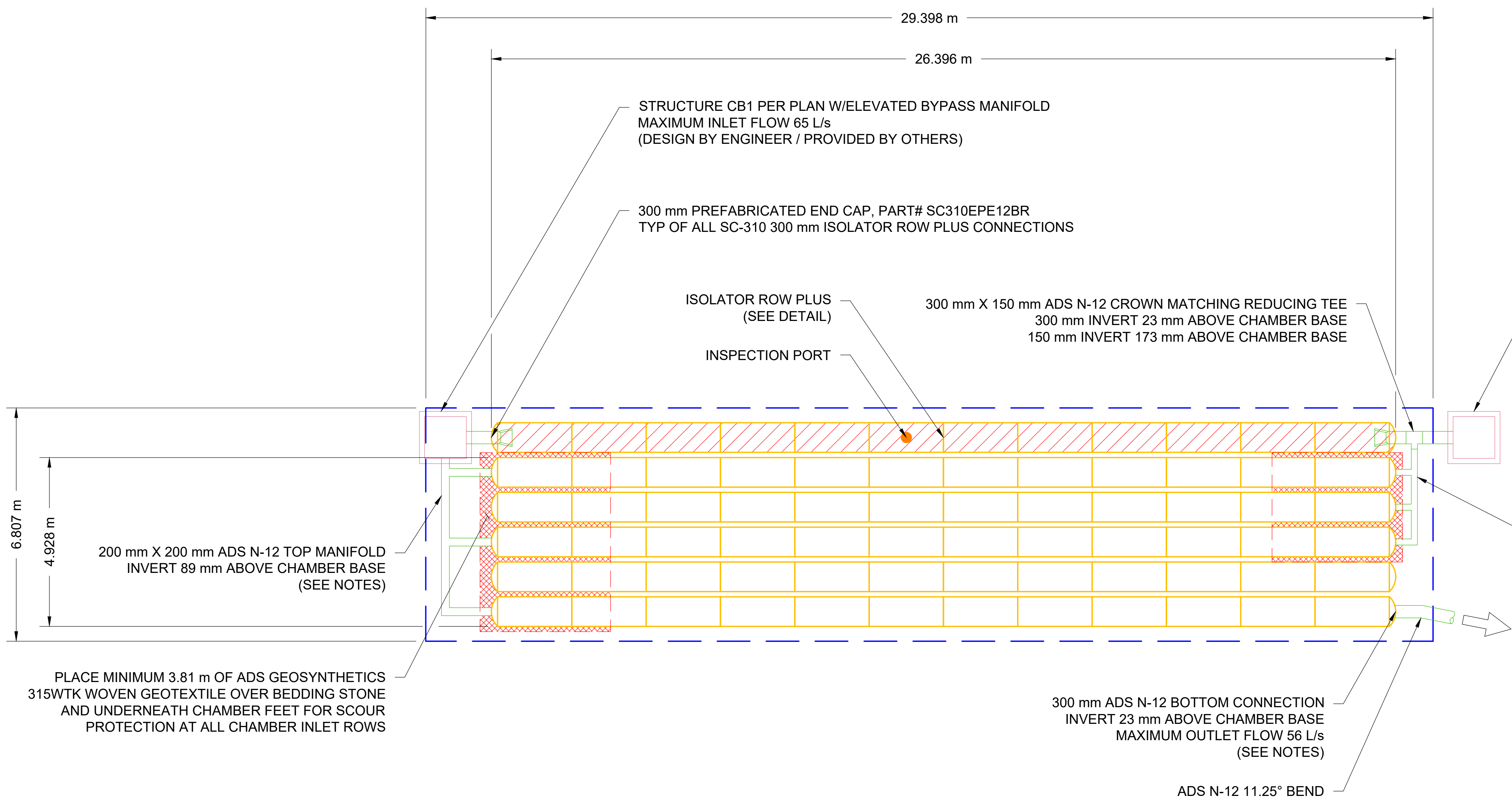
72	STORMTECH SC-310 CHAMBERS
12	STORMTECH SC-310 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	% STONE VOID
75.0	**INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED)**
200.1	SYSTEM AREA (m²)
72.4	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS : SYSTEM # 2

308.941	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
307.113	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
306.960	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
306.960	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
306.960	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
306.655	TOP OF STONE:
306.503	TOP OF SC-310 CHAMBER:
306.270	150 mm TOP MANIFOLD INVERT:
306.185	200 mm TOP MANIFOLD INVERT:
306.120	300 mm ISOLATOR ROW PLUS INVERT:
306.120	300 mm BOTTOM CONNECTION INVERT:
306.097	BOTTOM OF SC-310 CHAMBER:
305.945	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.



AIRPORT ROAD RETIREMENT RESIDENCE

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4640 TRUEMAN BLVD
HILLIARD, OH 43026

SCALE = 1 : 150

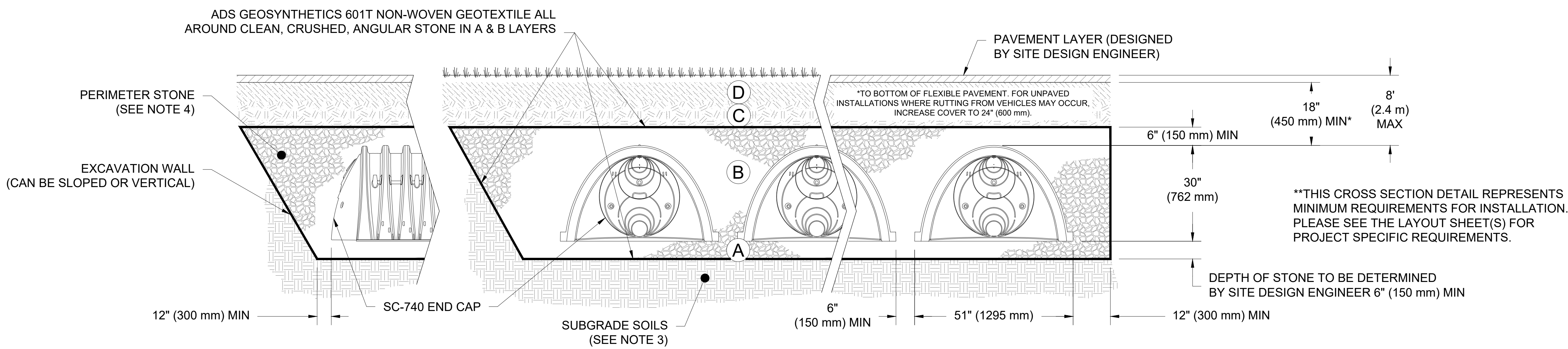
SHEET 4 OF 10

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:

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



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 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.

AIRPORT ROAD RETIREMENT RESIDENCE
CALEDON, ON

DATE: 01/18/21 DRAWN: BRE
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ADS® ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
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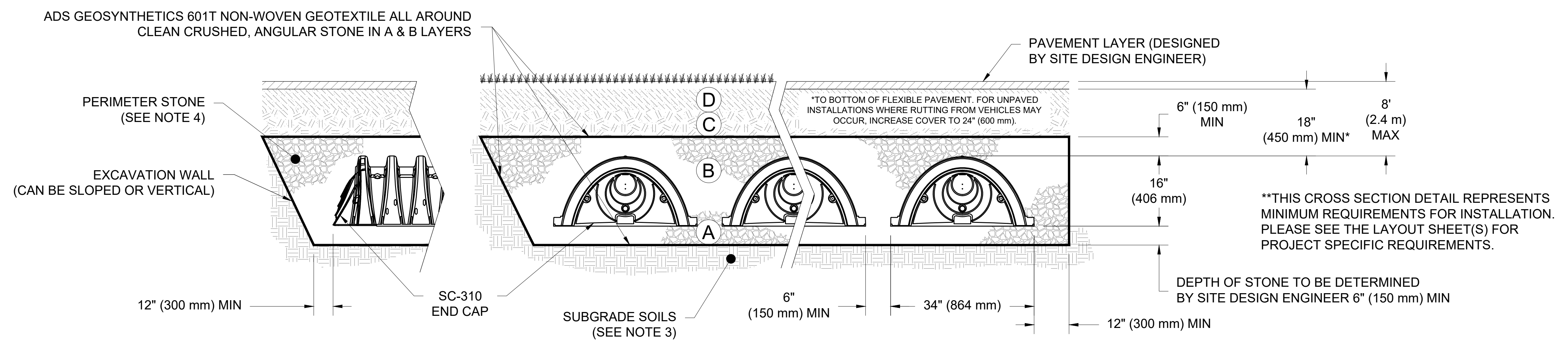
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418-16a (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
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   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 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.

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CALEDON, ON
DATE: 01/18/21 DRAWN: BRE
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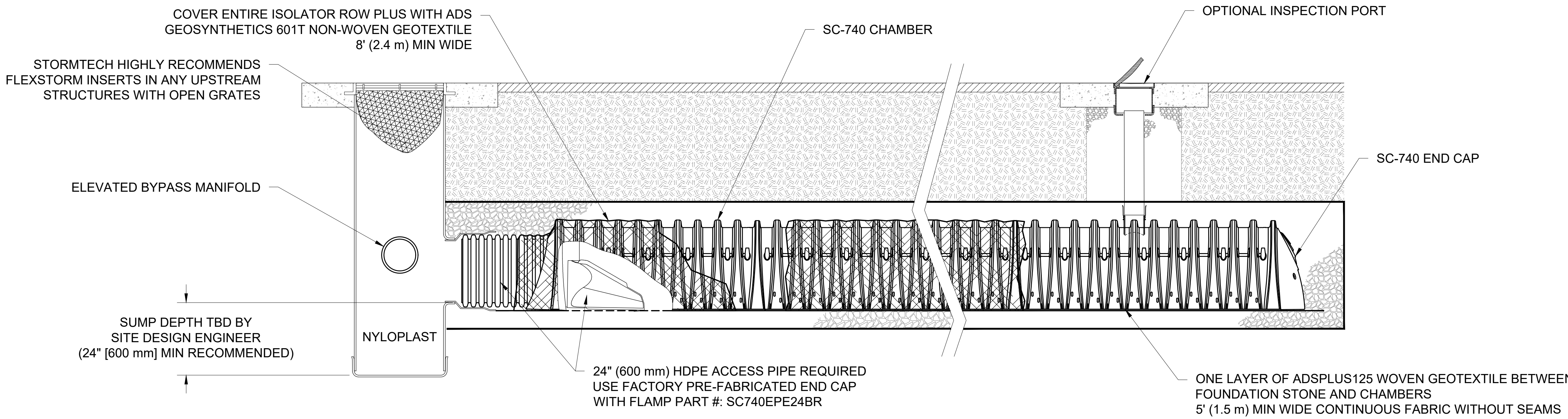


SC-740 ISOLATOR ROW PLUS DETAIL

NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW 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 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 ROWS

B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW

B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW 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 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

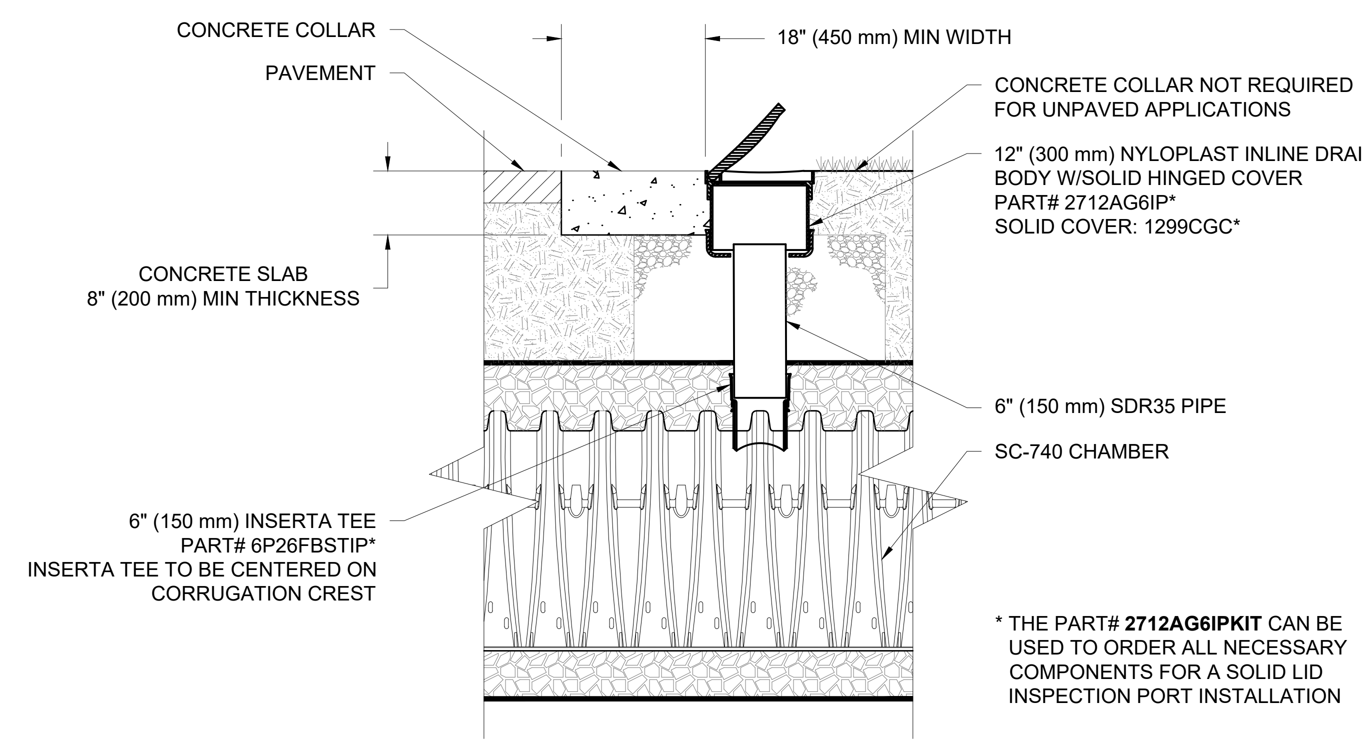
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

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.



SC-740 6" (150 mm) INSPECTION PORT DETAIL

NTS

AIRPORT ROAD RETIREMENT RESIDENCE

CALEDON, ON

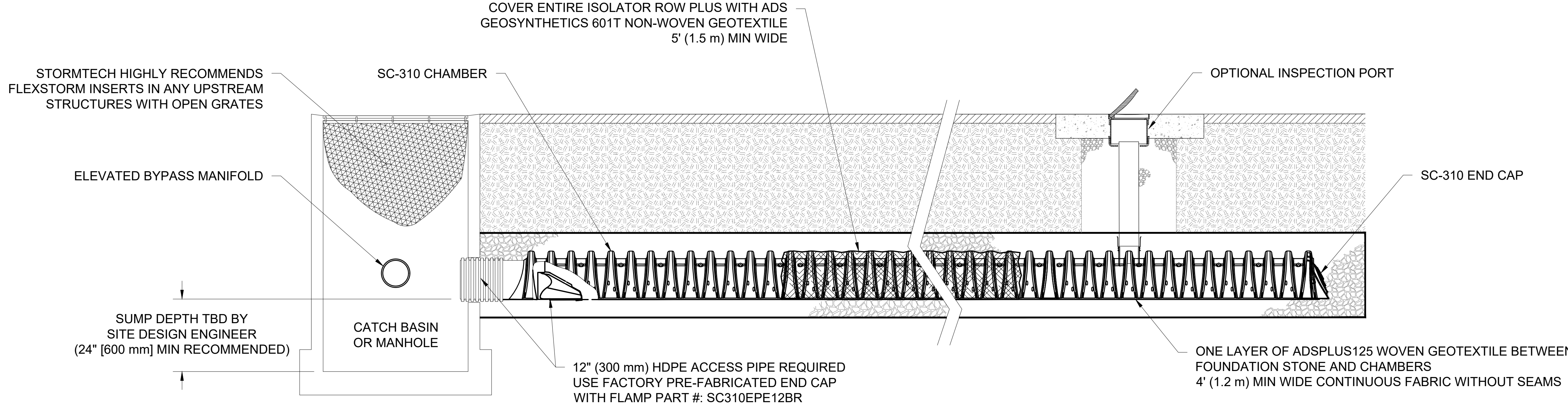
DATE: 01/18/21 DRAWN: BRE

PROJECT #: S218278 CHECKED: NPB

DATE	DRWN	CHKD	DESCRIPTION

StormTech
Detention • Retention • Water Quality
520 CROMWELL AVENUE | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADS
ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026



SC-310 ISOLATOR ROW PLUS DETAIL

NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW 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 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 ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW 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 USING THE JETVAC PROCESS

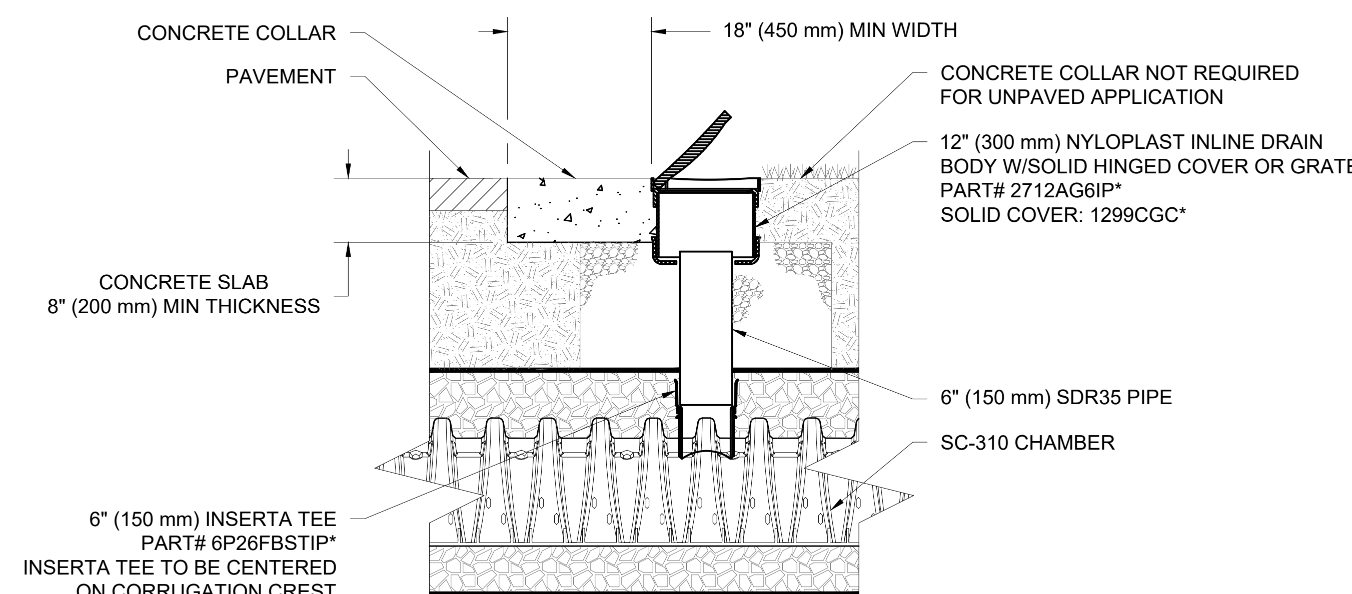
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

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# **2712AG6IPKIT** CAN BE USED TO ORDER ALL NECESSARY COMPONENTS FOR A SOLID LID INSPECTION PORT INSTALLATION

SC-310 6" (150 mm) INSPECTION PORT DETAIL

NTS

AIRPORT ROAD RETIREMENT RESIDENCE
CALEDON, ON

DATE: 01/18/21 DRAWN: BRE
PROJECT #: S218278 CHECKED: NPB

DATE	DRWN	CHKD	DESCRIPTION

StormTech® Detention•Retention•Water Quality
520 CROMWELL AVENUE | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

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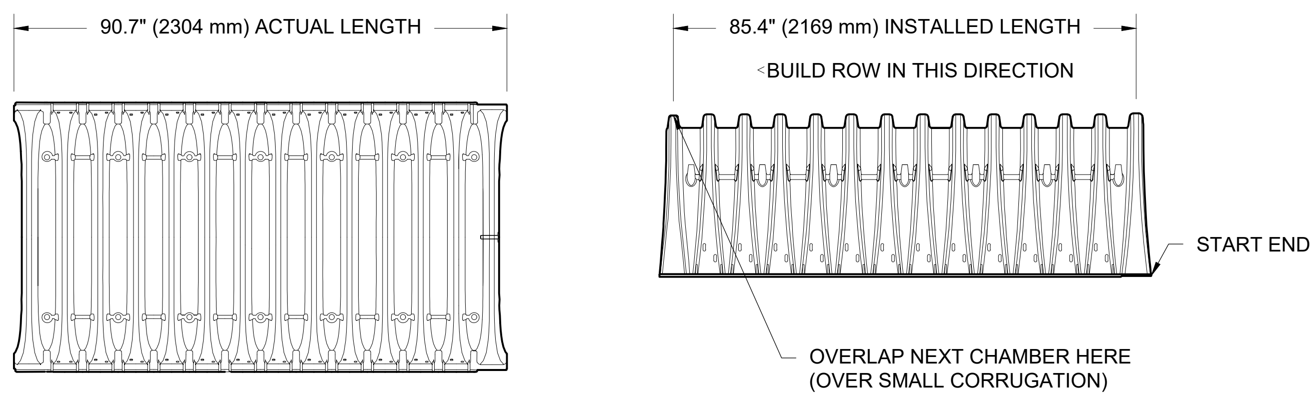
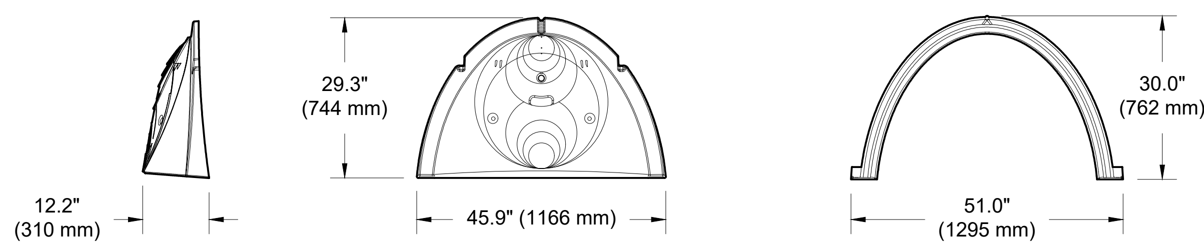
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE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

SC-740 TECHNICAL SPECIFICATION

NTS

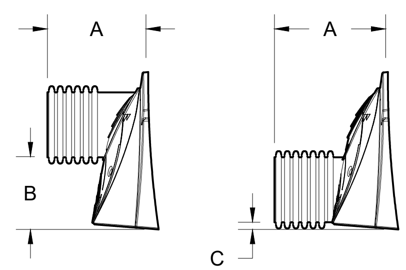




NOMINAL CHAMBER SPECIFICATIONS

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

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



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

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)
SC740EPE24BR*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

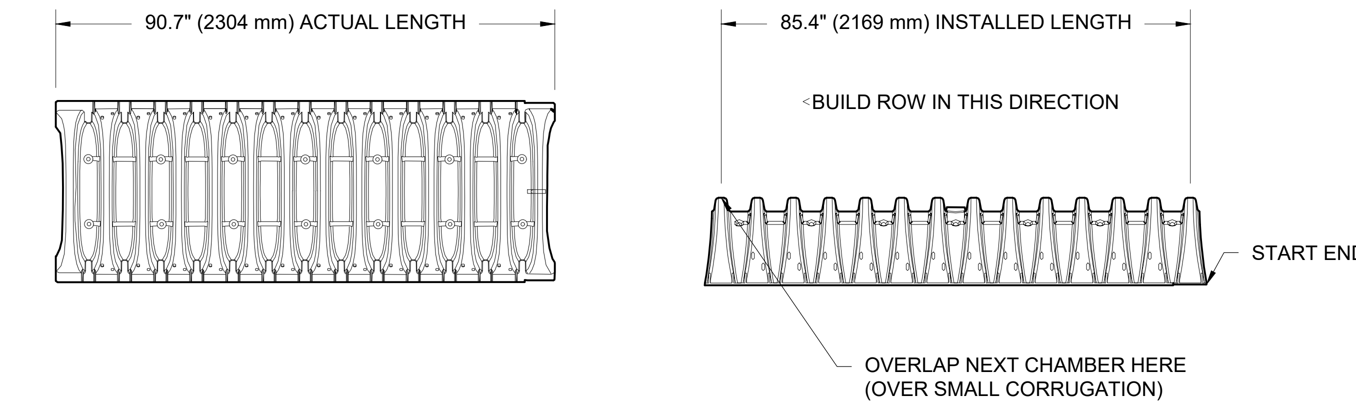
ALL STUBS, EXCEPT FOR THE SC740EPE24B/SC740EPE24BR ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

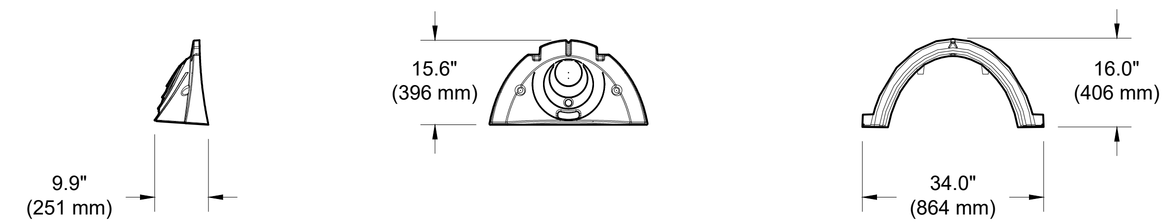
* FOR THE SC740EPE24B/SC740EPE24BR THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

SC-310 TECHNICAL SPECIFICATION

NTS

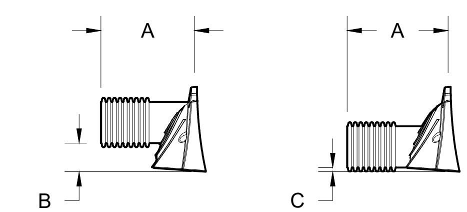




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	31.0 CUBIC FEET	(0.88 m³)
WEIGHT	35.0 lbs.	(16.8 kg)

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



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

PART #	STUB	A	B	C
SC310EPE06T / SC310EPE06TPC	6" (150 mm)	9.6" (244 mm)	5.8" (147 mm)	---
SC310EPE06B / SC310EPE06BPC			---	0.5" (13 mm)
SC310EPE08T / SC310EPE08TPC	8" (200 mm)	11.9" (302 mm)	3.5" (89 mm)	---
SC310EPE08B / SC310EPE08BPC			---	0.6" (15 mm)
SC310EPE10T / SC310EPE10TPC	10" (250 mm)	12.7" (323 mm)	1.4" (36 mm)	---
SC310EPE10B / SC310EPE10BPC			---	0.7" (18 mm)
SC310EPE12B	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)
SC310EPE12BR	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)

ALL STUBS, EXCEPT FOR THE SC310EPE12B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC310EPE12B THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

AIRPORT ROAD RETIREMENT RESIDENCE
CALEDON, ON

DATE: 01/18/21 DRAWN: BRE
PROJECT #: S218278 CHECKED: NPB

DATE	DRWN	CHKD	DESCRIPTION

StormTech®
Detention•Retention•Water Quality
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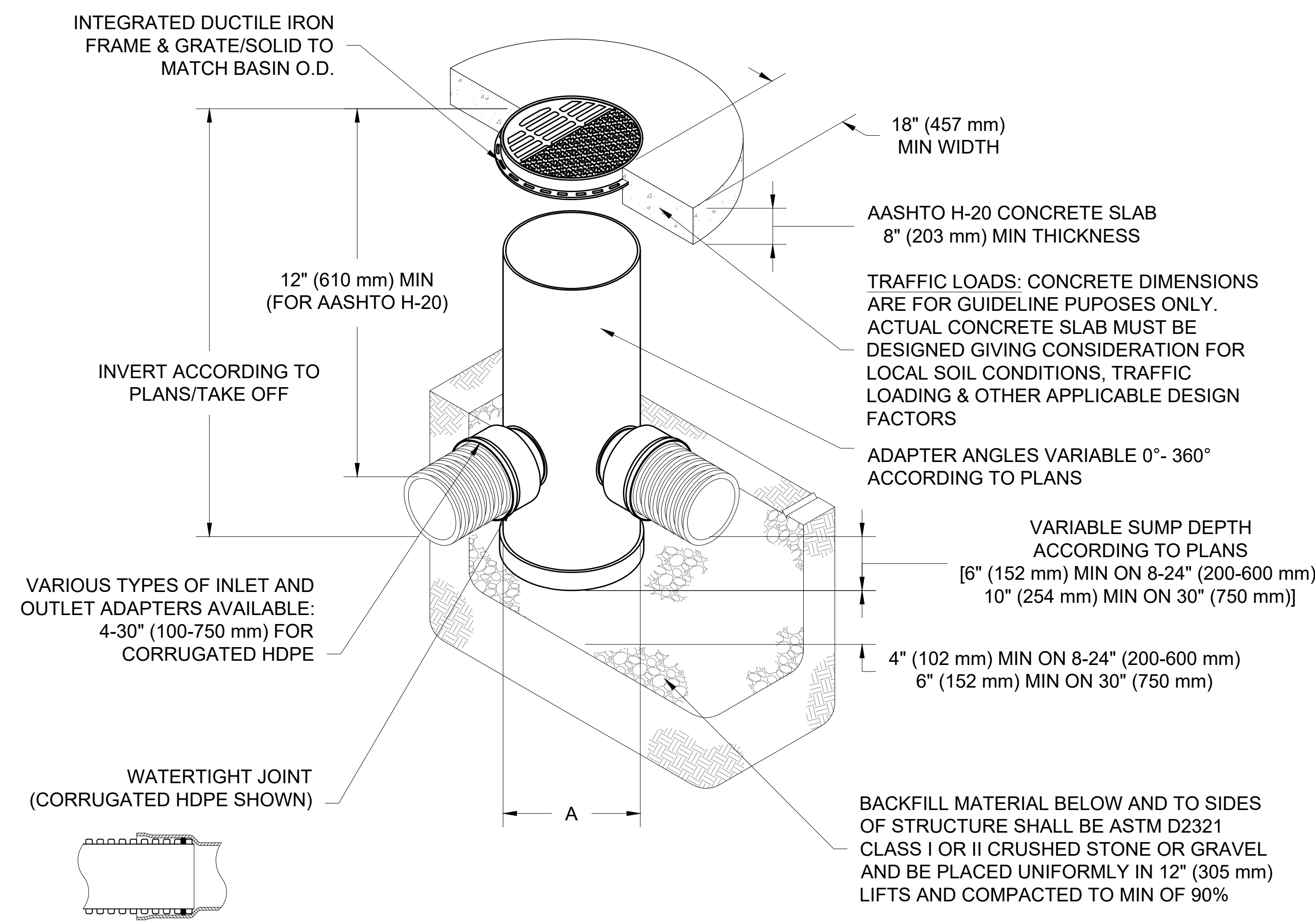
ADS®
ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026

NYLOPLAST DRAIN BASIN

NTS



NOTES

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

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

AIRPORT ROAD RETIREMENT RESIDENCE

CALEDON, ON

DATE: 01/18/21 DRAWN: BRE

PROJECT #: S218278 CHECKED: NPB

DATE	DRWN	CHKD	DESCRIPTION

Nyloplast®
3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com

ADS® ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

03/30/2021

Province:	Ontario
City:	Caledon
Nearest Rainfall Station:	TORONTO LESTER B. PEARSON INT'L AP
NCDC Rainfall Station Id:	8733
Years of Rainfall Data:	44
Site Name:	
Drainage Area (ha):	0.96
Runoff Coefficient 'c':	0.75
Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0
Required Water Quality Runoff Volume Capture (%):	
Estimated Water Quality Flow Rate (L/s):	
Oil / Fuel Spill Risk Site?	No
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Project Name:	15728 Airport Road
Project Number:	1856-5524
Designer Name:	Daniel Doherty
Designer Company:	Crozier & Associates
Designer Email:	ddoherty@cfcrozier.ca
Designer Phone:	905-875-0026
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EF4	54
EF6	61
EF8	64
EF10	66
EF12	67

Recommended Stormceptor EF Model: **EF6**

Estimated Net Annual Sediment (TSS) Load Reduction (%): **61**

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

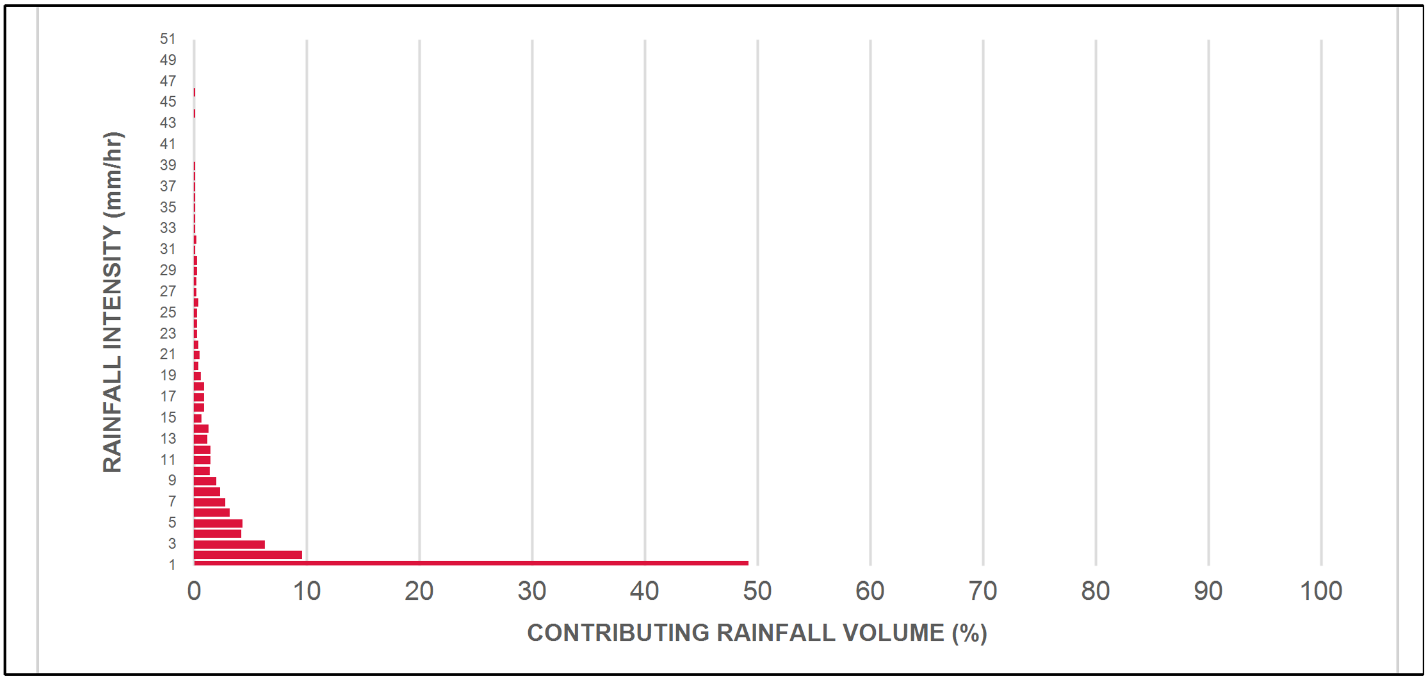
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a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

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

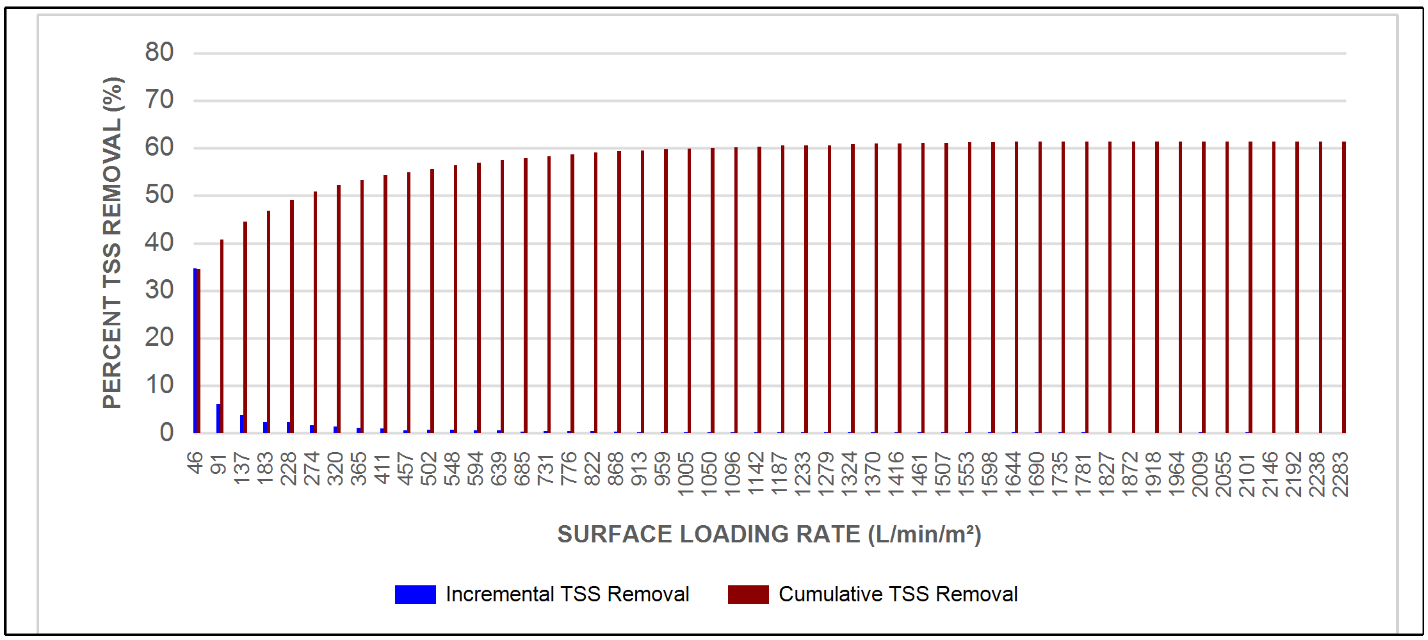
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	49.2	49.2	2.00	120.0	46.0	70	34.6	34.6
2	9.6	58.8	4.00	240.0	91.0	63	6.1	40.7
3	6.3	65.1	6.00	360.0	137.0	60	3.8	44.5
4	4.2	69.3	8.01	480.0	183.0	56	2.3	46.8
5	4.3	73.6	10.01	600.0	228.0	53	2.3	49.1
6	3.2	76.8	12.01	721.0	274.0	52	1.7	50.8
7	2.8	79.6	14.01	841.0	320.0	50	1.4	52.2
8	2.3	81.9	16.01	961.0	365.0	49	1.1	53.3
9	2.0	83.9	18.01	1081.0	411.0	48	1.0	54.3
10	1.4	85.3	20.02	1201.0	457.0	48	0.7	54.9
11	1.5	86.8	22.02	1321.0	502.0	47	0.7	55.6
12	1.5	88.3	24.02	1441.0	548.0	47	0.7	56.3
13	1.2	89.5	26.02	1561.0	594.0	46	0.6	56.9
14	1.3	90.8	28.02	1681.0	639.0	46	0.6	57.5
15	0.7	91.5	30.02	1801.0	685.0	46	0.3	57.8
16	0.9	92.4	32.03	1922.0	731.0	45	0.4	58.2
17	0.9	93.3	34.03	2042.0	776.0	45	0.4	58.6
18	0.9	94.2	36.03	2162.0	822.0	45	0.4	59.0
19	0.6	94.8	38.03	2282.0	868.0	45	0.3	59.3
20	0.4	95.2	40.03	2402.0	913.0	44	0.2	59.5
21	0.5	95.7	42.03	2522.0	959.0	44	0.2	59.7
22	0.4	96.1	44.04	2642.0	1005.0	44	0.2	59.9
23	0.3	96.4	46.04	2762.0	1050.0	45	0.1	60.0
24	0.3	96.7	48.04	2882.0	1096.0	45	0.1	60.1
25	0.3	97.0	50.04	3002.0	1142.0	46	0.1	60.3

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
26	0.4	97.4	52.04	3122.0	1187.0	46	0.2	60.5
27	0.2	97.6	54.04	3243.0	1233.0	47	0.1	60.6
28	0.2	97.8	56.04	3363.0	1279.0	47	0.1	60.6
29	0.3	98.1	58.05	3483.0	1324.0	48	0.1	60.8
30	0.3	98.4	60.05	3603.0	1370.0	49	0.1	60.9
31	0.1	98.5	62.05	3723.0	1416.0	49	0.0	61.0
32	0.2	98.7	64.05	3843.0	1461.0	47	0.1	61.1
33	0.1	98.8	66.05	3963.0	1507.0	46	0.0	61.1
34	0.1	98.9	68.05	4083.0	1553.0	44	0.0	61.2
35	0.1	99.0	70.06	4203.0	1598.0	43	0.0	61.2
36	0.1	99.1	72.06	4323.0	1644.0	42	0.0	61.3
37	0.1	99.2	74.06	4444.0	1690.0	41	0.0	61.3
38	0.1	99.3	76.06	4564.0	1735.0	40	0.0	61.3
39	0.1	99.4	78.06	4684.0	1781.0	39	0.0	61.4
40	0.0	99.4	80.06	4804.0	1827.0	38	0.0	61.4
41	0.0	99.4	82.07	4924.0	1872.0	37	0.0	61.4
42	0.0	99.4	84.07	5044.0	1918.0	36	0.0	61.4
43	0.0	99.4	86.07	5164.0	1964.0	35	0.0	61.4
44	0.1	99.5	88.07	5284.0	2009.0	34	0.0	61.4
45	0.0	99.5	90.07	5404.0	2055.0	33	0.0	61.4
46	0.1	99.6	92.07	5524.0	2101.0	33	0.0	61.4
47	0.0	99.6	94.08	5645.0	2146.0	32	0.0	61.4
48	0.0	99.6	96.08	5765.0	2192.0	31	0.0	61.4
49	0.0	99.6	98.08	5885.0	2238.0	31	0.0	61.4
50	0.0	99.6	100.08	6005.0	2283.0	30	0.0	61.4
Estimated Net Annual Sediment (TSS) Load Reduction =								**61 %**

RAINFALL DATA FROM TORONTO LESTER B. PEARSON INT'L AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

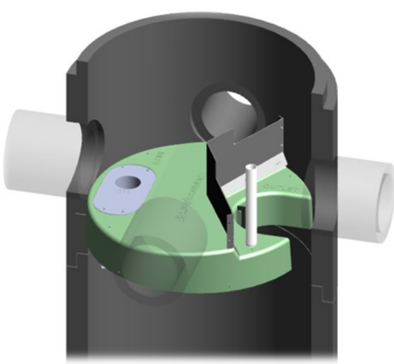
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

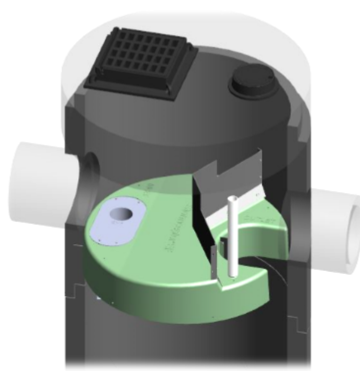
DESIGN FLEXIBILITY

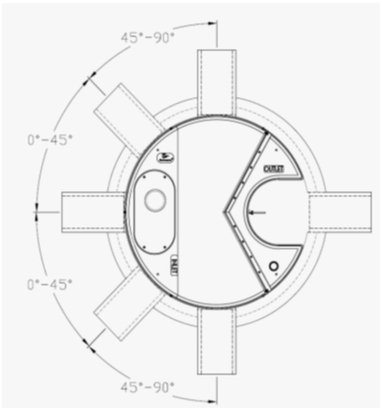
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

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

Pollutant Capacity

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

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EF

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	46	1320	48	1980	35
30	70	690	46	1350	48	2010	34

60	67	720	45	1380	49	2040	34
90	63	750	45	1410	49	2070	33
120	61	780	45	1440	48	2100	33
150	58	810	45	1470	47	2130	32
180	56	840	45	1500	46	2160	32
210	54	870	45	1530	45	2190	31
240	53	900	45	1560	44	2220	31
270	52	930	44	1590	43	2250	30
300	51	960	44	1620	42	2280	30
330	50	990	44	1650	42	2310	30
360	49	1020	44	1680	41	2340	29
390	48	1050	45	1710	40	2370	29
420	48	1080	45	1740	39	2400	29
450	48	1110	45	1770	39	2430	28
480	47	1140	46	1800	38	2460	28
510	47	1170	46	1830	37	2490	28
540	47	1200	47	1860	37	2520	27
570	46	1230	47	1890	36	2550	27
600	46	1260	47	1920	36	2580	27
630	46	1290	48	1950	35		

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

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

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 SIZING METHODOLOGY

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

imbrium®

TECHNICAL BULLETIN

Sizing Stormceptor® EF/EFO for Removal of Canadian ETV and Stormceptor Fine Particle Size Distributions

(Issued April 23, 2018)

The Canadian ETV Particle Size Distribution ("ETV PSD", shown in Table 1 below) is reasonably representative of the PSD of particulates found in typical urban stormwater runoff, and was used in sediment removal and scour performance testing of Stormceptor® EF/EFO in compliance with the provisions of the Canadian ETV protocol titled *Procedure for Laboratory Testing of Oil-Grit Separators*. Municipalities across Canada are increasingly adopting the sediment removal target of 60% removal of the ETV PSD when sizing an oil-grit separator for pretreatment of stormwater runoff, replacing former sediment removal targets that were based on removal of coarser particle size distributions.

Imbrium Systems supports and recommends adoption of 60% removal of the ETV PSD as a Canada-wide standard for sizing of Stormceptor® EF/EFO. However, it is recognized that in some areas there may continue to be sediment removal targets that are based on removal of coarser particle size distributions. Imbrium engineers have performed extensive sizing analyses to determine the estimated removal efficiency of various coarser PSDs as compared to 60% removal of the ETV PSD. Removal efficiencies were calculated for a wide range of influent flow rates, utilizing Stokes' Law for particle settling and the dimensions and hydraulic capacities of each Stormceptor model size.

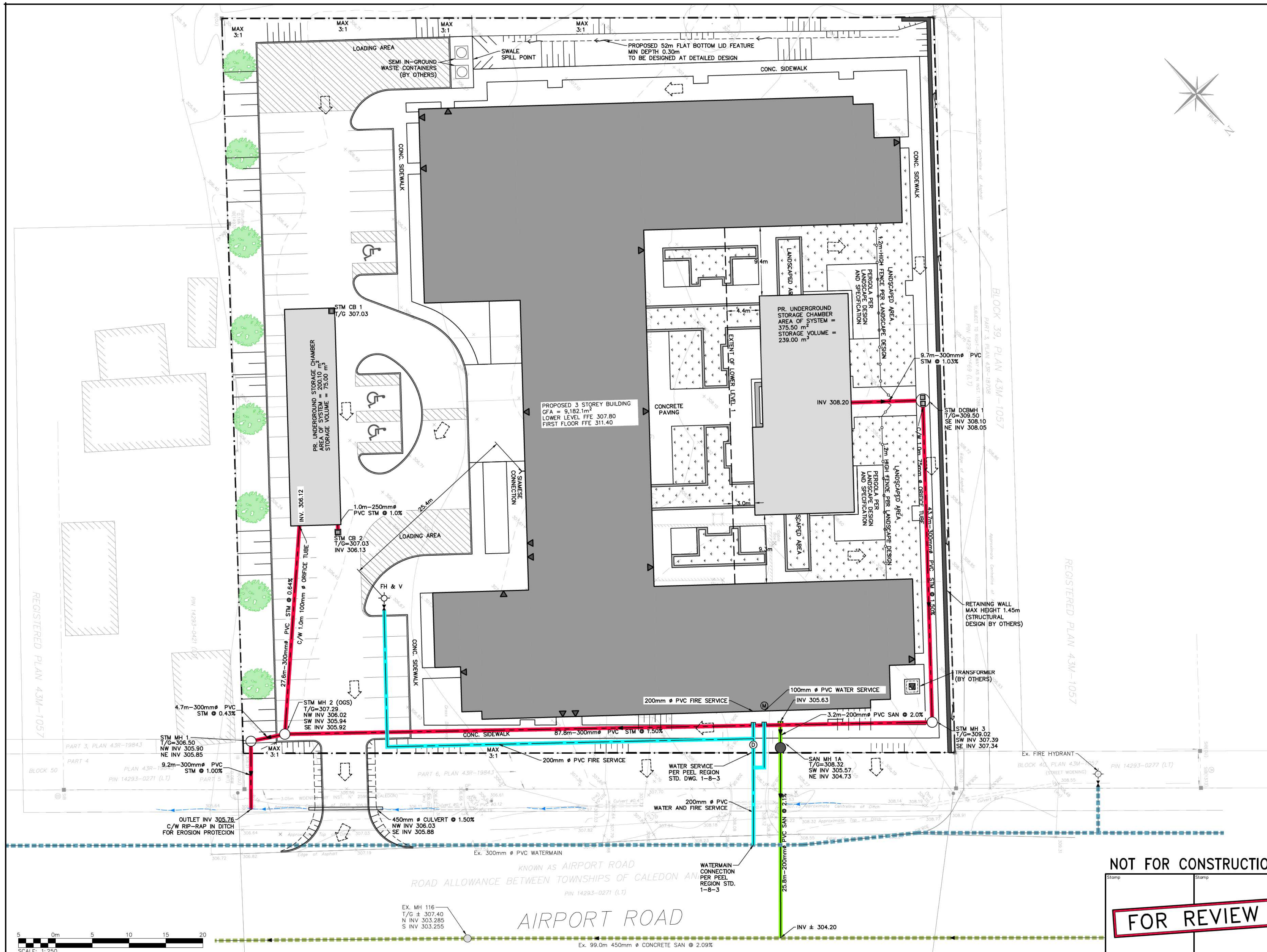
Based on these analyses, sizing Stormceptor® EF/EFO for 60% removal of the ETV PSD is comparable to sizing for 80% removal of the Stormceptor Fine PSD.

Table 1: Particle Size Distribution of Test Sediment

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

The particle size distribution shown in Table 1 above is the Canadian ETV Particle Size Distribution ("ETV PSD") specified in the Canadian ETV protocol titled *Procedure for Laboratory Testing of Oil-Grit Separators*.

FIGURES



NOT FOR CONSTRUCTION

FOR REVIEW

LEGEND

- PROPERTY LINE
- EXISTING WATERMAIN & GATE VALVE
- EXISTING SANITARY SEWER & MANHOLE
- PROPOSED WATERMAIN & GATE VALVE
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED SIAMESE CONNECTION
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED ELECTRICAL TRANSFORMER
- PROPOSED WATER METER
- DETECTOR CHECK VALVE IN CHAMBER
- PROPOSED SLOPE (4:1 MAX. UNLESS NOTED)
- PROPOSED TREE (BY OTHERS)

No.	ISSUE / REVISION	YYYY/MMM/DD
1	RE-ISSUED FOR 1st SUBMISSION	2021/MAR/30
0	ISSUED FOR 1st SUBMISSION	2020/JUN/05

SURVEY NOTES:

SURVEY COMPLETED BY YOUNG & YOUNG SURVEYING INC. (MAY 29. 2018)
PROJECT No. 18-B7160

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY ABA ARCHITECTS INC.
DRAWING: SITE PLAN (2021-02-09)
PROJECT No. 2018-127

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.

ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project

WYNDHAM RESIDENCE
15728 AIRPORT ROAD
TOWN OF CALEDON

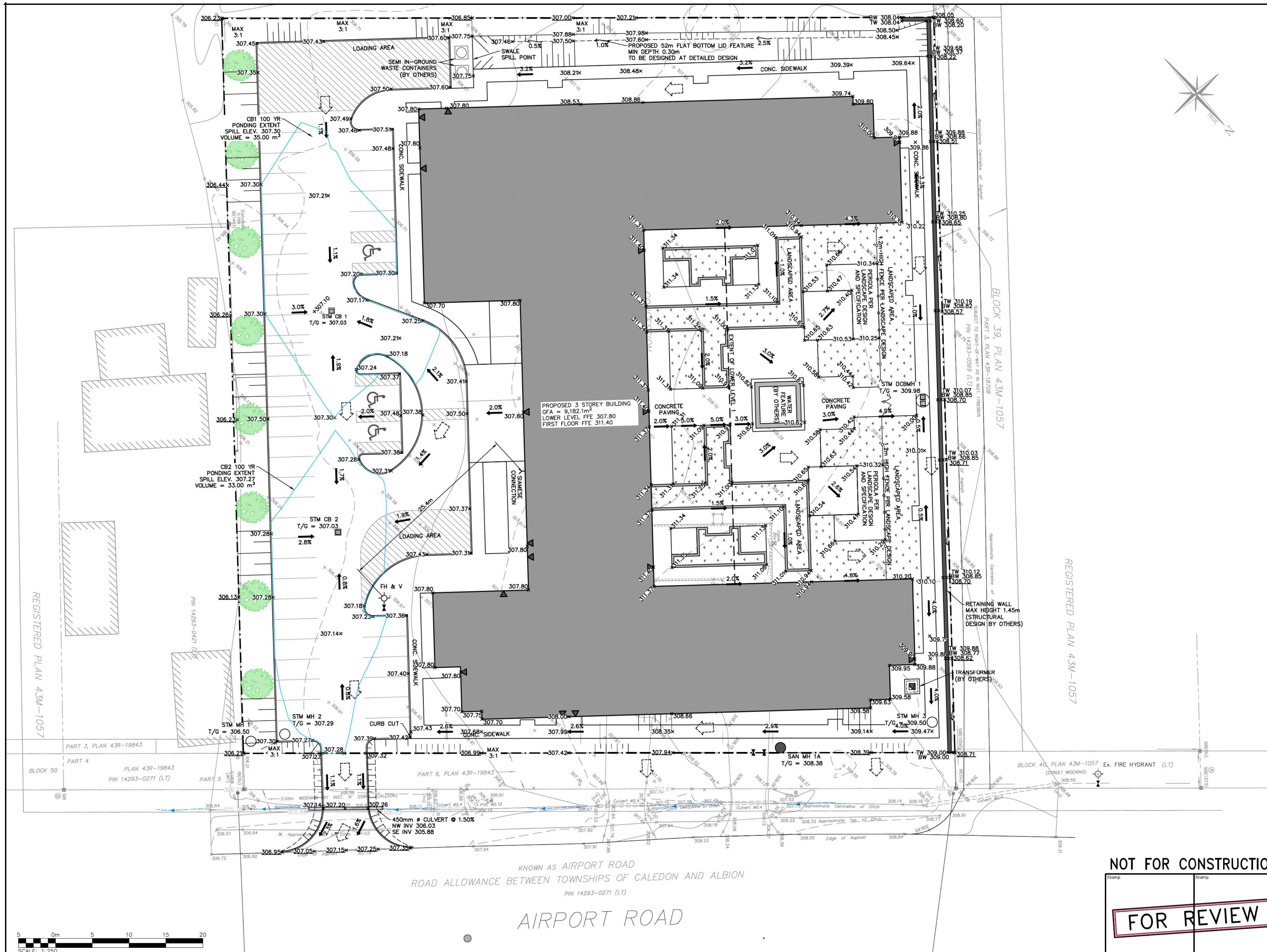
Drawing

PRELIMINARY SITE SERVICING PLAN

CROZIER
CONSULTING ENGINEERS

2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
D.D.	D.D. / N.R.S.	1856-5524	
Check	Check	Scale	Dwg.
N.R.S.	W.C.	1:250	C102



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING FENCE
- ×215.00 EXISTING GRADE
- ×215.00 PROPOSED GRADE
- ×215.00 PROPOSED GRADE (TO MATCH EXISTING)
- 2.0% PROPOSED MINOR FLOW DIRECTION
- 2.0% PROPOSED GRASSED SWALE
- PROPOSED EXTENT OF 100 YR SURFACE PONDING
- PROPOSED RETAINING WALL
- PROPOSED SLOPE (4:1 MAX. UNLESS NOTED)
- BUILDING ENTRANCE (PERSONNEL DOOR)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- PROPOSED ELECTRICAL TRANSFORMER
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED SIAMESE (FIRE DEPT.) CONNECTION
- PROPOSED TREE (BY OTHERS)
- PROPOSED 1.2m HIGH FENCE (BY OTHERS)
- PROPOSED LANDSCAPE AREA IN COURTYARD (BY OTHERS)

No.	ISSUE / REVISION	YYYY/MMM/DD
1	RE-ISSUED FOR 1st SUBMISSION	2021/MAR/30
0	ISSUED FOR 1st SUBMISSION	2020/JUN/05

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Project

WYNDHAM RESIDENCE
15728 AIRPORT ROAD
TOWN OF CALEDON

Drawing

PRELIMINARY SITE GRADING PLAN

NOT FOR CONSTRUCTION

Stamp | Stamp

FOR REVIEW

CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
D.D.	D.D. / N.R.S.	1856-5524	
Check	**Check**	**Scale**	**Dwg.**
N.R.S.	W.C.	1:250	C103

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING GRADE (× 215.00)
- EXISTING OVERLAND FLOW DIRECTION
- EXISTING STORM DRAINAGE CATCHMENT
- CATCHMENT I.D. (ID)
- AREA (ha) | RUNOFF COEFFICIENT (A | RC)

No.	ISSUE / REVISION	YYYY/MMM/DD
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0	ISSUED FOR 1st SUBMISSION	2020/JUN/05

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Project

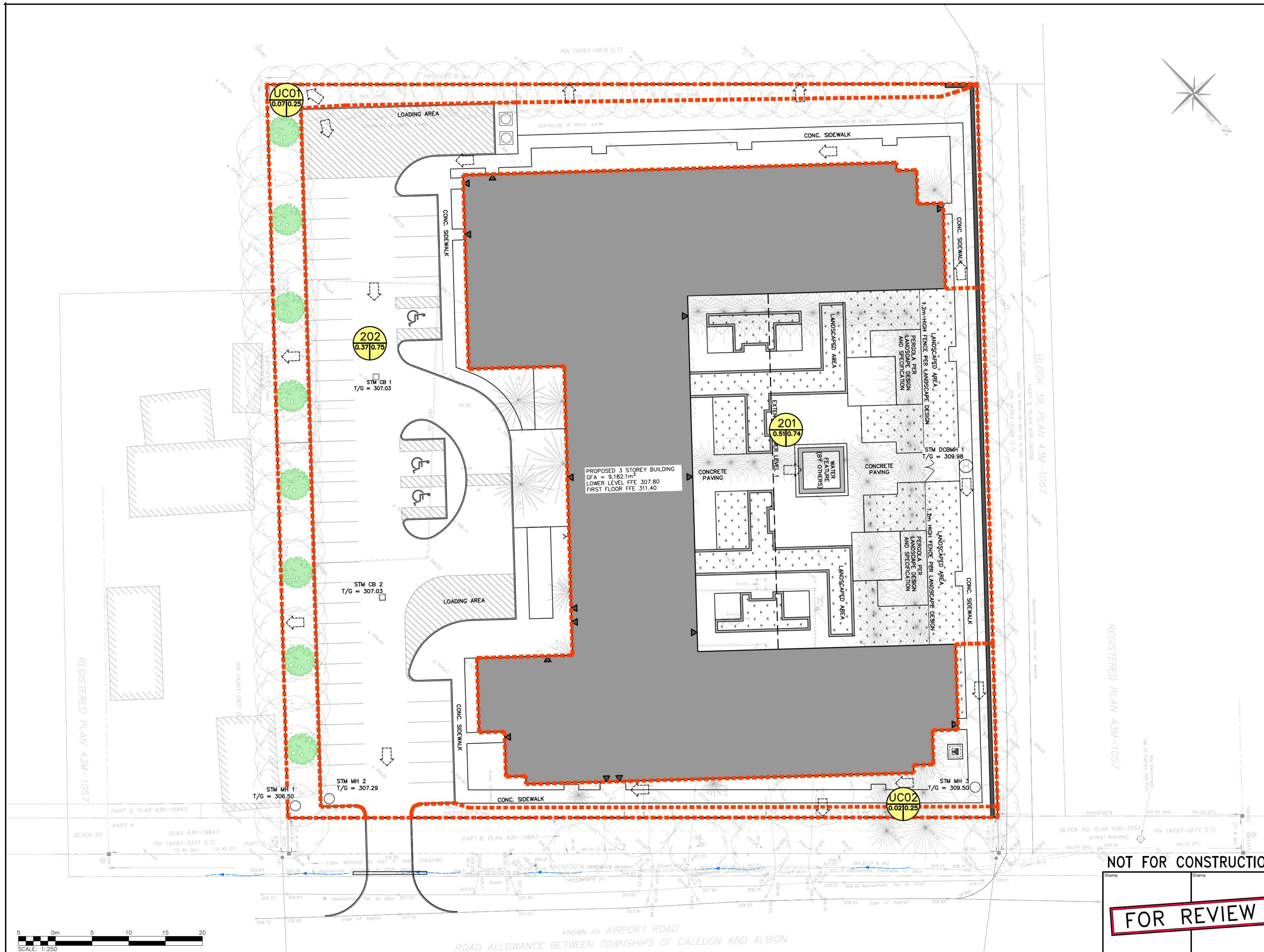
WYNDHAM RESIDENCE
15728 AIRPORT ROAD
TOWN OF CALEDON

Drawing

PRE-DEVELOPMENT DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
D.D.	D.D. / N.R.S.	1856-5524	
Check	**Check**	**Scale**	**Dwg.**
N.R.S.	W.C.	1:250	FIG 1



LEGEND

	PROPERTY LINE
	EXISTING CONTOUR (0.5m)
	EXISTING CONTOUR (1.0m)
	EXISTING DITCH
	EXISTING GRADE
	PROPOSED OVERLAND FLOW DIRECTION
	PROPOSED STORM DRAINAGE CATCHMENT
ID / A | RC	CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT
	PROPOSED TREE (BY OTHERS)
	BUILDING ENTRANCE (PERSONNEL DOOR)

No.	ISSUE / REVISION	YYYY/MMM/DD
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0	ISSUED FOR 1st SUBMISSION	2020/JUN/05

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PROJECT No. 2018-127

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NOT FOR CONSTRUCTION

Stamp

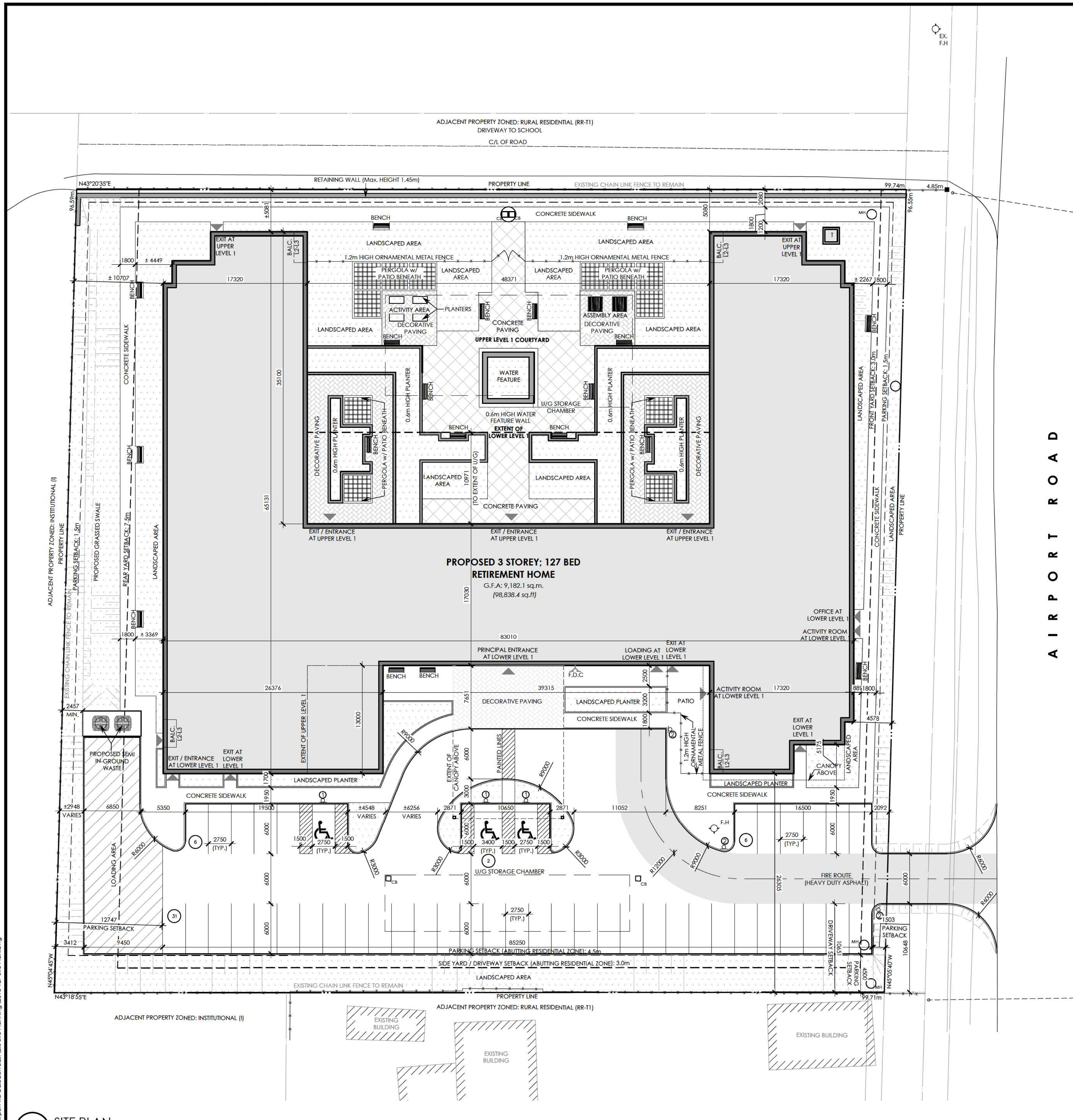
FOR REVIEW

Project
WYNDHAM RESIDENCE
15728 AIRPORT ROAD
TOWN OF CALEDON

Drawing
POST-DEVELOPMENT DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
D.D.	D.D. / N.R.S.	1856-5524	
Check: N.R.S.	Check: W.C.	Scale: 1:250	Dwg.: FIG 2



01 SP-01 SITE PLAN

1:250

SITE PLAN NOTES

1. LEGAL DESCRIPTION: PART OF LOT 2 CONCESSION 6 EAST OF HURONTARIO STREET, TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL.
2. SITE INFORMATION TAKEN FROM YOUNG & YOUNG SURVEYING INC. FILE # 18-B7160
3. FOR SITE GRADING, SERVICES & STORM WATER MANAGEMENT REFER TO DRAWINGS PREPARED BY C.F. CROZIER & ASSOCIATES INC.; PROJECT # 1856-5524 DATED TBD
4. FOR LANDSCAPE WORK REFER TO DRAWINGS PREPARED BY HILL DESIGN STUDIO PROJECT # 2019-26.
5. FOR SITE LIGHTING REFER TO DRAWINGS PREPARED BY TBD.
6. ALL ROADS & ISLANDS SHALL HAVE 150mm CURBS UNLESS NOTED OTHERWISE.
7. CURB RADIUS = 1.20m UNLESS OTHERWISE DIMENSIONED.
8. STANDARD PARKING STALLS TO BE 2.75m x 5.5m
8. BARRIER FREE PARKING STALLS TO MEET TOWN OF CALEDON REQUIREMENTS FOR TYPE 'A' (3.4m x 5.5m) AND TYPE 'B'. (2.75m x 5.5m) INCLUDING ALL APPLICABLE ACCESS AISLES (1.5m WIDE).
9. ALL OUTDOOR LIGHTING MUST BE FULL CUT-OFF AND HAVE NO GLARE.
10. TREE PROTECTION FENCING SHOULD BE ERECTED AROUND ALL EXISTING LANDSCAPED AREAS TO REMAIN AND SHOULD REMAIN ON SITE FOR THE DURATION OF THE CONSTRUCTION.
11. ALL ROOF-TOP EQUIPMENT TO BE SCREENED AND/OR LOCATED SO THAT IT CANNOT BE VIEWED FROM THE STREET.
12. SIGNAGE (BUILDING, PYLON & OTHERWISE) NOT APPROVED VIA THE SITE PLAN APPROVAL PROCESS.
13. THERE WILL BE NO OUTDOOR STORAGE OF ANY ITEMS ON SITE.
14. ALL GARBAGE TO BE STORED IN SEMI IN-GROUND WASTE SYSTEM PROVIDED ON-SITE.
15. LIGHT FIXTURES & BOLLARDS ARE NOT TO OBSTRUCT PEDESTRIAN MOVEMENT.
16. EXCESS SNOW TO BE REMOVED FROM SITE.

SITE LEGEND

EXISTING LIGHT STANDARD	PROPOSED SIGN
EXISTING HYDRO POLE	PROPOSED CATCHBASIN
ENTRANCE/EXIT	PROPOSED MANHOLE
FIRE DEPARTMENT CONNECTION	
FIRE HYDRANT (FH)	TRANSFORMER C/W CONCRETE PAD AND GROUNDING RODS
BARRIER FREE PARKING SPACE	
FLUSH CURBING (FC)	PARKING COUNT BUBBLE
CONCRETE CURB	PROPOSED FENCE
PROPERTY LINE	
PROPOSED FIRE ROUTE	ACCESSIBLE PARKING SIGN Rb-93 (30x45) cm SUPPORT: STEEL
PROPOSED CONCRETE	
PROPOSED LANDSCAPE/SOD	FIRE ROUTE SIGN S-5 (30x45) cm SUPPORT: STEEL OR WALL

SITE DATA - 15728 Airport Rd., Caledon East					ZBL 2006-50: Institutional (I)
DENSITY	Minimum		Maximum		Provided
Beds / hectare					131
AREAS	Metric		Imperial		%
Site Area *(Fully Serviced Lot: Min. 460 sq.m.)*	**0.96**	**ha**	**2.4**	**acre**	-
	9,629.4	**sq m**	**103,653.6**	**sq ft**	**100%**
Building Footprint at grade (Max. 25%)	3,212.9	sq m	34,584.2	sq ft	33%
Asphalt Area	1,909.7	sq m	20,556.3	sq ft	20%
Concrete Area	1,932.1	sq m	20,797.2	sq ft	20%
Total Impervious Area	**7,054.6**	**sq m**	**75,937.6**	**sq ft**	**73%**
Landscaped/Sodded Area	2,574.8	sq m	27,715.9	sq ft	27%
Total Permeable Area	**2,574.8**	**sq m**	**27,715.9**	**sq ft**	**27%**
SETBACKS (Fully Serviced Lot)	Required		Provided		
Front Yard Setback (East)(Airport Rd.)	3.0	m	4.5	m	
Rear Yard Setback (West)	7.5	m	10.7	m	
Side Yard Setback (North)	-	m	5.0	m	
Side Yard Setback (South) (Abutting Res. Zone)	3.0	m	26.3	m	
Driveway Setback (South) (Abutting Res. Zone)	3.0	m	10.6	m	
Parking Setback (East)(Airport Rd.)	1.5	m	1.5	m	
Parking Setback (West)	1.5	m	12.7	m	
Parking Setback (South) (Abutting Res. Zone)	4.5	m	4.5	m	
FRONTAGE	Min Required		Provided		
Lot Frontage *(Fully Serviced Lot)*	9.0	m	96.5	m	
LANDSCAPING	Min Required		Provided		
Landscaped Area (20% of Site Area)	1,925.9	sq m	4,506.87	sq m	47%
Planting Strip Width (West) (Rear Yard)	3.0	m	Min. 2.4	m	
Planting Strip Width (South) (Abutting Res. Zone)	3.0	m	4.50	m	

BUILDING DATA						
BUILDING AREAS						
Below Grade	*Area (sq.m.)*	*# of Floors*	Metric		Imperial	
Lower Level 1 (Partially Below Grade)	3655.5	1	3,655.5	sq m	39,349.0	sq ft
Above Grade	*Area (sq.m.)*	*# of Floors*	Metric		Imperial	
Upper Level 1	3212.9	1	3,212.9	sq m	34,584.2	sq ft
Level 2 - 3	2984.6	2	5,969.2	sq m	64,254.3	sq ft
Total Floor Area (Above Grade)		3	**9,182.1**	**sq m**	**98,838.4**	**sq ft**
Total Gross Floor Area (Above & Below Grade)			**12,837.6**	**sq m**	**138,187.5**	**sq ft**
BUILDING HEIGHT (Max. 10.5m)			Metric		Imperial	
	Height (m)	*# of Floors*				
Basement (from Avg. Grade: 309.44m)	3.6	0.5	1.6	m	5.0	ft
Ground Floor	3.4	1	3.4	m	11.0	ft
Typical Floor (2nd - 3rd Floor)	3.0	2	6.0	m	19.0	ft
Parapet			1.1	m	3.0	ft
Total Building Height		3	**12.1**	**m**	**39.0**	**ft**

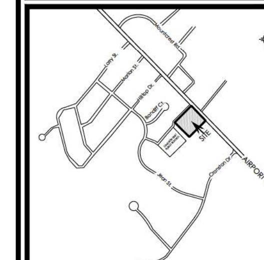
RESIDENTIAL							
UNITS	*# of Floors*	Studio	1 Bed	Ambulatory Care	Memory Care	Units/Flr	Beds/Flr
Ground Floor	1	-	-	26	21	47	47
Level 2	1	20	30	-		50	50
Level 3	1	-	30	-	-	30	30
Total	3	20	60	26	21	**127**	127

AMENITY	Metric		Imperial	
PROVIDED				
Interior Amenity (Activity Rooms)	581.4	sq m	6,258.3	sq ft
Outdoor Amenity (Internal Courtyard)	1,518.3	sq m	16,343.1	sq ft
Total	**2,099.7**	**sq m**	**22,601.5**	**sq ft**

Parking Data				
VEHICLES				
REQUIRED (Zoning By Law Requirement)				Spaces
Long Term Care Facility: (0.5 spaces /bed)				64
Total Parking Required				**64**
Barrier Free Parking Required (4% applies for 13-100 spaces req'd)			*3*	
Type A Required			*1*	
Type B Required			*2*	
PROVIDED	Type A	Type B	Standard	Total:
Surface Parking (0.3spaces/bed)	1	2	42	45
Total Parking Provided				**45**

PROJECT NORTH

No.	REVISIONS	DATE
01	ISSUED TO CONSULTANTS	2020.12.08
02	ISSUED TO CONSULTANTS	2021.02.09



KEY MAP
N.T.S.

CHRONOLOGY | DATE

aba architects inc.

CLIENT
HIGHGATE HOLDINGS

PROJECT NAME
WYNDHAM RESIDENCE
15728 AIRPORT RD.
CALEDON EAST, ON

DRAWING TITLE
SITE PLAN

SCALE 1:250
SHEET SIZE 610x914
PROJECT NUMBER 2018-127
DRAWING NUMBER SPA.01

LAST SAVED BY: Rubmar DATE: February 9, 2021