CITY OF BRAMPTON

Drainage and Stormwater Management Report

The Intermodal Drive Easterly Extension up to Gorewood Drive

FINAL REPORT

December 23, 2025

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December 23, 2025

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Version Control

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1 Introduction

The Intermodal Drive is an industrial collector road extending from its easterly property limit to approximately 160m west of Gorewood Drive. The City of Brampton's Airport Intermodal Secondary Plan Area 4 envisions a future extension of Intermodal Drive to Gorewood Drive which would provide an alternate and shorter route for traffic to access Steeles Avenue from east end of the employment area.

Intermodal Drive is a 2-lane, 26-30m Right-of-Way (ROW) industrial collector road. Arcadis has been retained by the City of Brampton for the Environmental Assessment (EA) to evaluate the need and opportunity for the implementation of its extension to Gorewood Drive. The overall objective of this project is to provide a safer and more efficient road network for all users. The location of the project is shown on **Figure 1**.

The City of Brampton has retained Arcadis to undertake a Stormwater Management Study as part of its Class Environmental Assessment (EA).

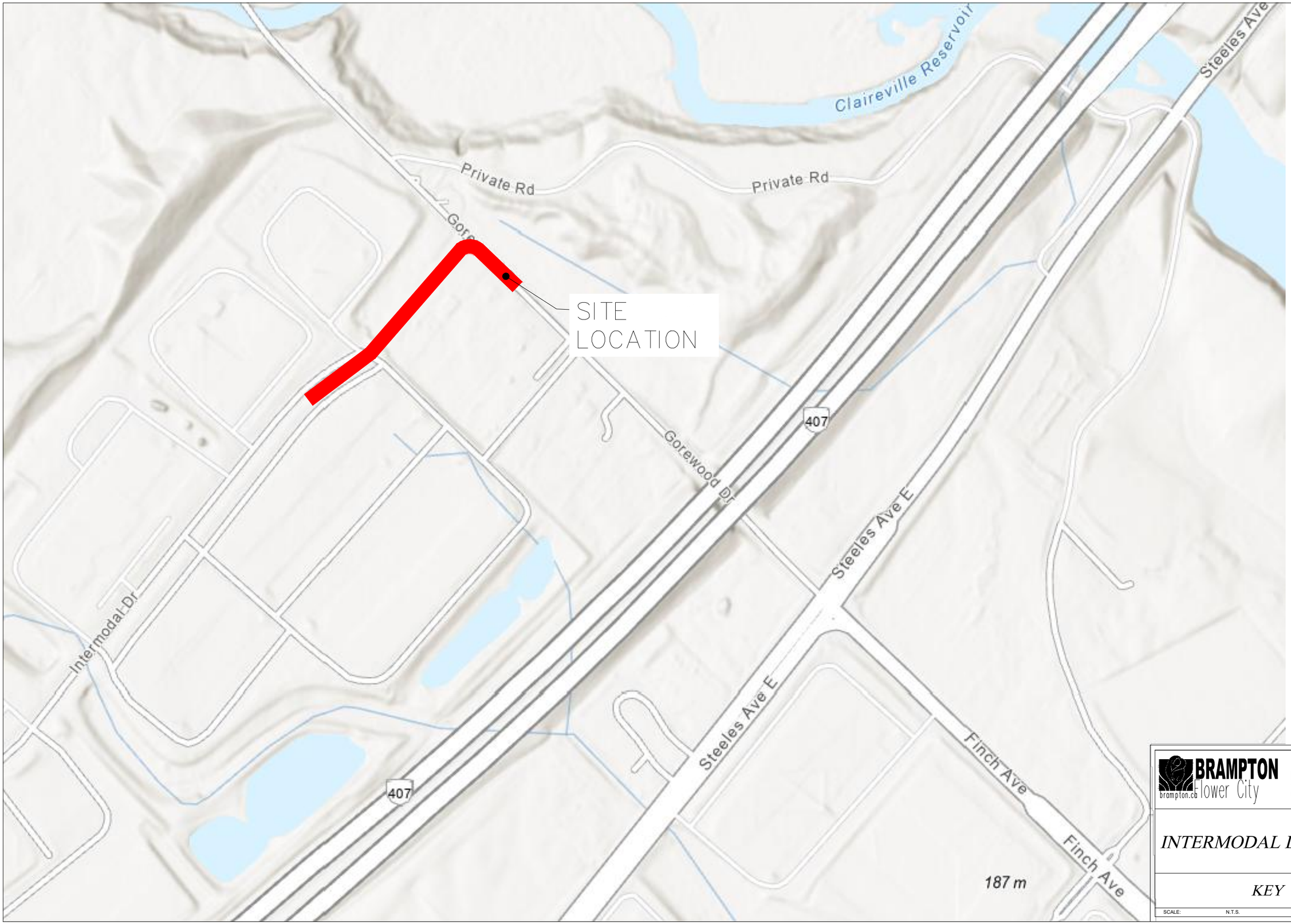
The purpose of this Drainage and Stormwater Management Report is to document the detailed drainage design in support of roadway extension project. The objectives Include identifying and evaluating existing drainage patterns, identifying potential stormwater runoff quality and quantity impacts to the receiving watercourse from any proposed increase in the pavement area and to propose an appropriate drainage system and stormwater management systems in conjunction of road integration.

This Drainage and Stormwater Management report is a supporting document to the Municipal Class EA for the proposed Intermodal Drive extension.

1.1 Background Information

In preparation of the Intermodal Drive extension Class Environmental Assessment Drainage and Stormwater Management Report, the following essential documents were obtained and reviewed:

- Ministry of the Environment, Parks and Conservation (MECP) Stormwater Management Practices Planning and Design Manual, March 2003;
- Toronto Region Conservation Authority (TRCA) Stormwater Management Criteria, August 2012;
- Toronto Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC) Low Impact Development Stormwater Management Planning and Design Guide, 2010;
- East Mimico creek wetland design brief, prepared by Aquafor Beech Ltd., September 2003;
- Master Environmental servicing plan, prepared by Pinchin Environmental Ltd., July 2015;
- Ministry of Transportation (MTO) Highway Drainage Design Standards, January 2008;
- Gorewood Drive Properties Report, prepared by C.F. Crozier Associates Inc., May 2025;
- The City of Brampton, Subdivision Design Manual (2008).



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INTERMODAL DR. EXTENSION

KEY PLAN

SCALE:	N.T.S.	DATE:	AUGUST 04, 2024

LAST UPDATED 21 SEP 16 - PMZ

1.2 Proposed Drainage and Roadway Improvements

As part of the Intermodal Drive extension EA design, the following preferred roadway improvements are proposed:

Preferred Roadway:

- New Multi-Use Paths (MUPs) are proposed on North side of Intermodal Drive extension to Gorewood Drive
- A new two-lane roadway with urban cross section (curb and gutter) from Intermodal Drive easterly property limit to the Gorewood Drive.
- New sidewalk (2.1m) on South side of Intermodal Drive extension to Gorewood Drive
- Approximately 150m of the existing west end of the Intermodal drive requires relocation of curb along both sides.
- Existing catch basins are to be adjusted/relocated where curb lines will be shifted as part of the proposed roadway alignment where needed.
- Two (2) Oil and Grit (OGS) Separators will be installed within Intermodal Drive project limits before discharging to outlets.
- One (1) infiltration chamber will be installed under the new section of Intermodal Drive before discharging the water into the receiving watercourse.
- There is one (1) low point located on the road which provides an overland flow route to major system runoff.

2 Site Description

2.1 Watershed and Sub Watershed

Intermodal Drive is a two lane east-west industrial collector road located within the City of Brampton. The stormwater from the site is conveyed by storm sewers and roadside ditches and discharged to receiving municipal storm sewers/watercourses.

The study area is located within the Mimico Creek and West Humber River Watershed under Toronto Regional Conservation Authority (TRCA) jurisdiction.

2.2 Land Use and Soil

Based on the site investigation and available information, the existing land use for the adjacent properties along Intermodal Drive includes commercial and industrial properties.

According to the Environmental Site Assessment report, "Master Environmental Servicing Plan Final Report, prepared by Aquafor Beech Ltd (April,2002), the Chinquacousy clay loam and Peel clay is present within the area.

2.3 Existing Drainage Condition

The existing drainage pattern of the project area was determined through analysis of the existing topographic survey data, TRCA's online GIS data and as-built drawings from City of Brampton where available. Where storm sewer information was unavailable, the topography of the land was used to determine the approximate external drainage areas.

Drainage is mainly influenced by the drainage infrastructure within Intermodal Drive ROW and surrounding subdivisions, topography, land cover and grade changes within the project limit. Drainage infrastructure within the project area includes roadside curbs, stormwater drains, and municipal storm sewers. Near the southeast extent of the project area, some roadside ditches and culverts are present.

Figures **SWM E1** depict the existing drainage condition within the project limits, including existing drainage infrastructures and landscaping, drainage area discretization, outlets, and the direction of overland flow routes. The Intermodal Drive corridor was sub-divided into two (2) drainage catchment areas. **Table 1** provides a summary of catchment areas that are currently draining to the existing outlets located along the corridor.

There are no stormwater management facilities for quantity and/or quality control within or adjacent to the project corridor. The runoff coefficients for each of the catchment areas were computed based on pervious and impervious areas. **Table 1** provides summary of existing catchment areas within the project corridor.

Table 1: Existing Catchment Areas

Catchment ID	Area (ha)	Impervious Area (ha)	Runoff Coefficient	Outlet		Watershed Name
C1	1.24	0.40	0.46	Outlet 2	Roadside Ditch	West Humber River
C2	1.36	0.61	0.54	Outlet	Municipal Storm Sewer	Mimico Creek

The runoff coefficients for each of the catchment areas were computed based on pervious and impervious areas. New storm sewers are proposed for Intermodal drive extension to convey internal and external drainage areas.

The approximately 150m of the existing roadway and boulevard areas at the west end are drained by a network of catch basins and storm sewers, that ultimately discharges into municipal road storm sewers.

Figures SWM E1 illustrate location of the external catchment areas.

2.4 Design Criteria

In conformance with the City of Brampton current policies and guidelines and MECP's approved Consolidated Linear Infrastructure - Environmental Compliance Approval (CLI-ECA) for City of Brampton, the following design criteria have been adopted in the development of drainage and stormwater management strategies for this project.

Culverts

According to the guidelines of MTO's Highway Drainage Design Standards 2008, the design return period for urban structures with a span less than 6.0m is 50-year. A structure with a span of over 6m on an Urban Arterial Road should be designed to convey the 100-year design storm at the required freeboard and soffit clearance. The following criterions were applied to evaluate hydraulic performance of the existing culverts.

Freeboard

Clause 1-10.8.2 of the Canadian Highway Bridge and Design Code (CHBDC) recommends a freeboard of 1.0 metre "….from the edge of through traffic lanes to the design high-water level ….." for the design storm. This freeboard is a recommended value although it is recognized that, due to site-specific considerations, it is not always feasible to provide this value.

Changes in Upstream Water Levels

In accordance with good design practice, any increase in the upstream flood elevation resulting from the construction of a new structure should be kept to a minimum.

The Design target for upstream water level increases is zero. Minor increases may be accepted if:

i. They are contained within the lands owned by the proponent;
ii. The increase is in a valley system in which the flood line does not change appreciably in a horizontal direction;
iii. No structures are impacted by the flood level change;
iv. The increase is contained within municipally owned land or easement;
v. The increase is at the face of the existing structure and does not impact upstream/downstream lands;
vi. Written approval is obtained from the affected landowner.

Storm Sewer System

- Minor drainage system to be sized to convey runoff from a 5-year storm.

Major System Drainage

- Major system flows (i.e. storms in excess of a 100-year event) to be conveyed overland to receiving drainage watercourses.

Water Quantity

- Mimico Creek Watershed: post-development peak flow rate controlled to the pre-development rates, for the 2, 5, 10, 25, 50 and 100-year design storms.
- West Humber River Watershed: No Quantity control is required.

Water Quality

- Oil/Grit separators are to be designed according to the Ministry of the Environment, Conservation and Parks (MECP) 'Enhanced' Level of Protection (i.e. 80 percent long-term suspended solid removal);
- Grass Swales are to be designed to meet the following MOE criteria for quality control:

Minimum length of swale:	5 m
Allowable velocity (25 mm 4-hour Chicago Storm):	0.5 m/s
Minimum bottom width of swale:	0.75 m
Maximum flow depth:	0.5m

IDF curves

- MTO IDF curves for year-2099 are to be used for all hydrological analyses to consider possible Climate change outcomes.

Water Balance

City of Brampton's CLI ECA requirement:

As per CLI ECA's requirement, it's required to control the runoff from the 90th percentile (27-28mm) storm event.

TRCA requirement:

The retention of the first 5 mm of every rainfall event.

City of Brampton requirement:

The retention of runoff from rainfall events in the range of 27mm.

Erosion Target to Control Stormwater Runoff

City of Brampton's CLI ECA requirement:

It's required to detain minimum runoff volume generated from a 25mm storm event over 24 to 48 hours.

TRCA requirement:

- The minimum erosion control requirement for all watercourses within TRCA's jurisdiction is retention of the first 5 mm of every rainfall event.
- For sites with SWM ponds, 25mm - 48hr detention may also be required, depending on the results of the erosion assessment.

City of Brampton requirement:

As per the criteria, it's required to detain minimum runoff volume generated from a 25mm storm event over 24 to 48 hours.

Erosion And Sediment Control During Construction

An erosion and sediment control plan will be designed, constructed, and maintained during construction. The temporary erosion control plan will be in accordance with the "Erosion and Sediment Control Guide for Urban Construction, 2019".

3 SWM Plan and Design

3.1 Tributary Areas, Outlets and Drainage Patterns

Under proposed conditions, the quantity of runoff resulting from major storms will be conveyed to existing outlets as overland flow. There is one low point on the proposed road (one at Intermodal Drive at the watercourse) which will provide an overland flow route to major system runoff for the proposed road. The general direction of roadway overland flow is shown in Drawing **SWM P1** in **Appendix A**.

As part of the minor drainage system, stormwater will continue to be collected by a series of catchbasins and conveyed to the current storm sewers with eventual discharge to the existing outlets as shown in Drawing **SWM E1**.

Under proposed condition, the existing catchbasins will require relocation to the new curbs and series of catchbasins are proposed along the roadway extension. A detailed hydrologic analysis was conducted to calculate pre and post development condition flow within the right-of-way at all outlet locations. The analysis indicated that the quantity of runoff from the new section of the roadway will result decrease in runoff flow rates.

The MTO Intensity-Duration-Frequency (IDF) curves were used to determine rainfall intensity. The results of the pavement area analysis and major peak flow calculations are presented in **Table 2**. Detailed calculations are provided in **Appendix A**.

Table 2: Pavement Area Analysis and Major Peak Flow Calculations

Catchment ID	Total Area (ha)	Pavement Area (ha)	Percent Imperv. (%)	Runoff Coeff.	Flow (m^3/s)		
					10-Year	25-Year	100-Year
EXISTING CONDITION							
C1	1.24	0.40	32	0.46	0.19	0.22	0.27
C2	1.36	0.61	45	0.54	0.25	0.29	0.35
PROPOSED CONDITION							
C1	2.60	1.30	0.50	0.57	0.51	0.59	0.71
C2	Major Flow is diverted to The West Humber River Tributary						

The required storage volumes were calculated using Modified Rational Method and result indicates that no flow is contributing to Mimico creek outlet in proposed condition and therefore, no storage needed. **SWM E1** provides the location of stormwater outlets. For the outlets that are located within West Humber River watershed, the post-development peak flows controls are not required.

INTERMODAL DRIVE

C2A 0.73
0.34ha

C2B 0.42
0.20ha

C2C 0.25
0.35ha

C1A 0.31
0.28ha

C2 0.67
0.47ha

C1 0.67
0.85ha

C1B 0.25
0.11ha

GOREWOOD DRIVE

FLOODLINES AS PER FLOODPLAIN MAPPING PREPARED BY G.P. CHOZER & ASSOCIATES INC. (MAY, 2025)

LEGEND:

- INTERNAL CATCHMENT BOUNDARY
- C1 0.62 / 1.90 ha — CATCHMENT ID / RUNOFF COEFFICIENT / CATCHMENT AREA
- ROAD OVERLAND FLOW DIRECTION
- TRCA FLOODLINE
- EXTERNAL CATCHMENT BOUNDARY

60m 50m 40m 30m 20m 10m 0m 5m 10m

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INTERMODAL DR. EXTENSION SWM E1

EXISTING DRAINAGE PLAN

SCALE:	1:1000	DATE:	AUGUST 29, 2025

LAST UPDATED 21-SEP-16 - PMZ

Table 3 provides pavement area analysis and minor peak flow calculations.

Table 3: Pavement Area Analysis and Major Peak Flow Calculations

Catchment ID	Total Area (ha)	Pavement Area (ha)	Percent Imperv. (%)	Runoff Coeff.	Flow (m^3/s)
					5Year
EXISTING CONDITION					
C1	1.24	0.40	32	0.46	0.17
C2	1.36	0.61	45	0.54	0.22
PROPOSED CONDITION					
C1	1.24	1.10	88	0.79	0.29
C2	1.36	1.16	86	0.79	0.32

Table 4 and **5** provide 100-yr existing and proposed conditions flow and storage requirements and mitigation measures.

Table 4: 100-Year Existing and Proposed Conditions Flow and Storage Requirements

Catchment ID	Outlet	Peak Flow (m^3/s)			Impact on Peak Flows	Quantity Control Requirement
		Existing	Proposed	Increase in Flow		
C1	1	0.27	0.39*3	0.12	Increase	Not Required*1
C2	2	0.35	-	-	-*2	Not Required

**1- As Catchment C1 drains to west Humber River Watershed, Quantity Control is not required. However, best efforts have been made to reduce the impact of potential Erosion due to increased peak flow.*

**2- For Catchment C2, the major flow is diverted to West Humber River Tributary and only minor is contributing to Mimico Creek in proposed condition. The flow from minor system will continue to drain to existing municipal storm sewer which ultimately drains to SWM pond within Mimico Creek Watershed.*

**3- The proposed total flow to Catchment C1 shown discounts the minor flow which continues to drain to existing storm sewer to Mimico Creek.*

Table 5: Mitigation Measures Provided at Outlets

Catchment ID	Outlet	Storage Provided (m^3)	Mitigation Measures
C1 (Total flow to West Humber River Tributary)	1	394	Infiltration Chamber

The quantity control is not required, however, to reduce erosion due to increased peak flow, storage is provided in the LID chamber. Various Best Management Practices (BMPs) for stormwater management

INTERMODAL DRIVE

C1A 0.73 / 0.34ha

C1B 0.42 / 0.20ha

C1C 0.25 / 0.37ha

C1D 0.27 / 0.37ha

C1 0.79 / 1.18ha

C2 0.79 / 1.24ha

C1 0.79 / 1.36ha

C1E 0.25 / 0.13ha

Western EA Study Limits

Southern EA Study Limits

OUTLET 1

OUTLET 2

PROPOSED MC-4500 INFILTRATION CHAMBER INFILTRATION STORAGE PROVIDED-264m3

PROPOSED 450mmø CSP CULVERT

PROPOSED RIP-RAP TO BE PROVIDED AT THE OUTLET TO PREVENT EROSION

EXISTING 450mmø CSP CULVERT TO BE REMOVED

EXISTING 400mmø CSP CULVERT TO BE REMOVED

EXISTING 750mmø CSP CULVERT TO BE REMOVED AND RELOCATED

EXISTING FLAT BOTTOM DITCH TO BE RESTORED AND REALIGNED

FLOODLINES AS PER FLOODPLAIN MAPPING PREPARED BY C.F. CROZIER & ASSOCIATES INC. (MAY, 2025)

GOREWOOD DRIVE

PROP.DCB

PROP.DCBMH1

PROP.DCBMH2

PROP.DCBMH3

PROP.DCBMH4

PROP.DCBMH5

PROP.OGS1

PROP.OGS2

PROP.STM MH1

PROP.STM MH2

D.C.

730x1150mmø STM

LEGEND:

- INTERNAL CATCHMENT BOUNDARY
- CATCHMENT ID
- C1 0.62 / 1.90 ha — RUNOFF COEFFICIENT / CATCHMENT AREA
- ROAD OVERLAND FLOW DIRECTION
- TRCA FLOODLINE
- EXTERNAL CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY

60m 50m 40m 30m 20m 10m 0m 5m 10m

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INTERMODAL DR. EXTENSION SWM P1

PROPOSED DRAINAGE PLAN

SCALE: 1:1000 DATE: AUGUST 29, 2025

were reviewed and assessed for their applicability to this project. The Infiltration chamber and Oil and Grit Separator in line with storm sewers to prevent runoff from due to peak flows increase and to enhance water quality.

Infiltration Chamber

Low Impact Development (LID) measures, such as underground infiltration chamber, will be used within the roadway right-of-way (R-O-W) areas to offset any negative impacts due to the proposed improvements. Infiltration chamber capture runoff for infiltration to groundwater and reduce rates of runoff to the receiving drainage systems. It also provides water quality treatment through the capture of both particulate and dissolved constituents. The proposed underground chamber will be located approximately 1 m above the groundwater level.

Online storage pipes and underground storage chamber shall be designed to provide the required storage in the detailed design stage. Detailed calculations are provided in **Appendix A**.

3.2 Water Quality Control Measures

Under existing conditions, almost all the right-of-way (ROW) drains directly to the storm sewers and roadside ditches and no specific water quality treatment measures currently exist within the project limit.

Several stormwater quality control practices were reviewed and assessed for their applicability to this project. Due to the nature of this facility (i.e. linear transportation corridor), and limited space within the roadway right-of-way, it is determined that the SWM measures like Oil and Grit Separator (OGS) systems along with underground infiltration chamber will achieve water quality control objectives. The OGS units will be combined with underground infiltration chamber to establish a train of treatment approach wherever possible. The proposed water quality control will be achieved through oil and grit separator units and underground infiltration chamber.

Pavement Analysis

A pavement analysis was undertaken to determine the amount of additional pavement resulting from proposed sidewalks, multi-use paths, and driveways that will occur because of the proposed road widening. The pavement analysis is provided in **Table 6**.

Table 6: Pavement Area Analysis

Catchment ID	Existing Pavement (ha)	Proposed Pavement (ha)	Difference (ha)	Comment
C1	0.40	1.29	0.89	Increase

The following measures are proposed to enhance the existing water quality:

- Two (2) Oil/Grit Separator (OGS) units have been proposed within the project area at storm sewers outlet locations which are shown on Drawing **SWM P1** will be provided during detailed design stage.

- OGS-2 will discharge to the City of Brampton storm sewer system, and OGS-1 will drain to a flat bottom swale system and the swale will provide additional cleansing to stormwater before discharging to the creek.
- Underground infiltration chamber will enhance infiltration and thus provide water quality treatment.

Table 7 provides a summary of treatment measures for paved areas.

Table 7: Summary of Treatment Measures

Catchment	Outlet	Proposed Treatment Measure		Drainage Receiver
		Facility	Model	
C1	1	Oil and Grit Separator/ Infiltration Chamber	EFO-08/ MC-4500	Watercourse

The OGS units generally provide 50% TSS removal. Where there is significant increase in imperviousness in proposed condition, the OGS unit in addition to Infiltration Chamber is designed to provide Enhanced Level (80% TSS removal) of protection. The sizing calculations for the Oil and Grit Separators (OGS) will be provided during detail design stage.

Oil and Grit Separators

Two (2) Oil and Grit Separator (OGS) units have been proposed within the project limits where storm sewers are discharging to watercourse and municipal storm sewer. The locations of the proposed Oil and Grit Separators are shown in Drawing SWM P1 in **Appendix A**. The OGS units are designed to provide Enhanced Level (80% SS removal) of protection.

Underground Infiltration Chamber

The Infiltration chamber capture runoff and infiltrate to groundwater. This provides a high level of treatment through the capture of both particulate and dissolved constituents and reduces the rates of runoff to the receiving drainage systems. The infiltration chamber details, and maintenance and operation manual are provided in **Appendix A**.

For Catchment 1, the Stormtech MC-4500 model is proposed for infiltration which requires a total depth of 2.35 m for installation (including top and bottom cover).

3.3 Water Balance

Based on City of Brampton's CLI ECA water balance criteria, the minimum on-site runoff retention requires retaining all rainfall of the first 27 mm of each rainfall event through infiltration, re-use, and/or evapotranspiration.

On this basis, it is calculated that 264m3 of water is required to be infiltrated and stored within the corridor to meet the water balance criteria, as noted in **Table 8.**

Table 8: Water Balance Storage Requirement

Facility	Impervious Area (ha)	Storage Requirement to Retain 5 mm Of Rainfall (m3)
Intermodal Drive Corridor	1.29	264

The green areas within the Right-of-Way will provide infiltration for the water balance requirement. **Appendix A** provides calculation details on water balance.

Low Impact Development measures such as underground infiltration chamber can be used within the roadway right-of-way (R-O-W) areas to provide proposed storage requirement for water balance. Infiltration chamber capture runoff for infiltration to groundwater and reduce rates of runoff to the receiving drainage systems. It also provides water quality treatment through the capture of both particulate and dissolved constituents.

3.4 Erosion Control – Stormwater Runoff

Based on City of Brampton's CLI ECA Erosion Control volume criteria, It's required to detain minimum runoff volume generated from a 25mm storm event over 24 to 48 hours. The required volume is provided by Low Impact Development measure such as Infiltration Chamber. **Table 9** provides volume required and provided to detain runoff from 25mm storm event over 48 hours.

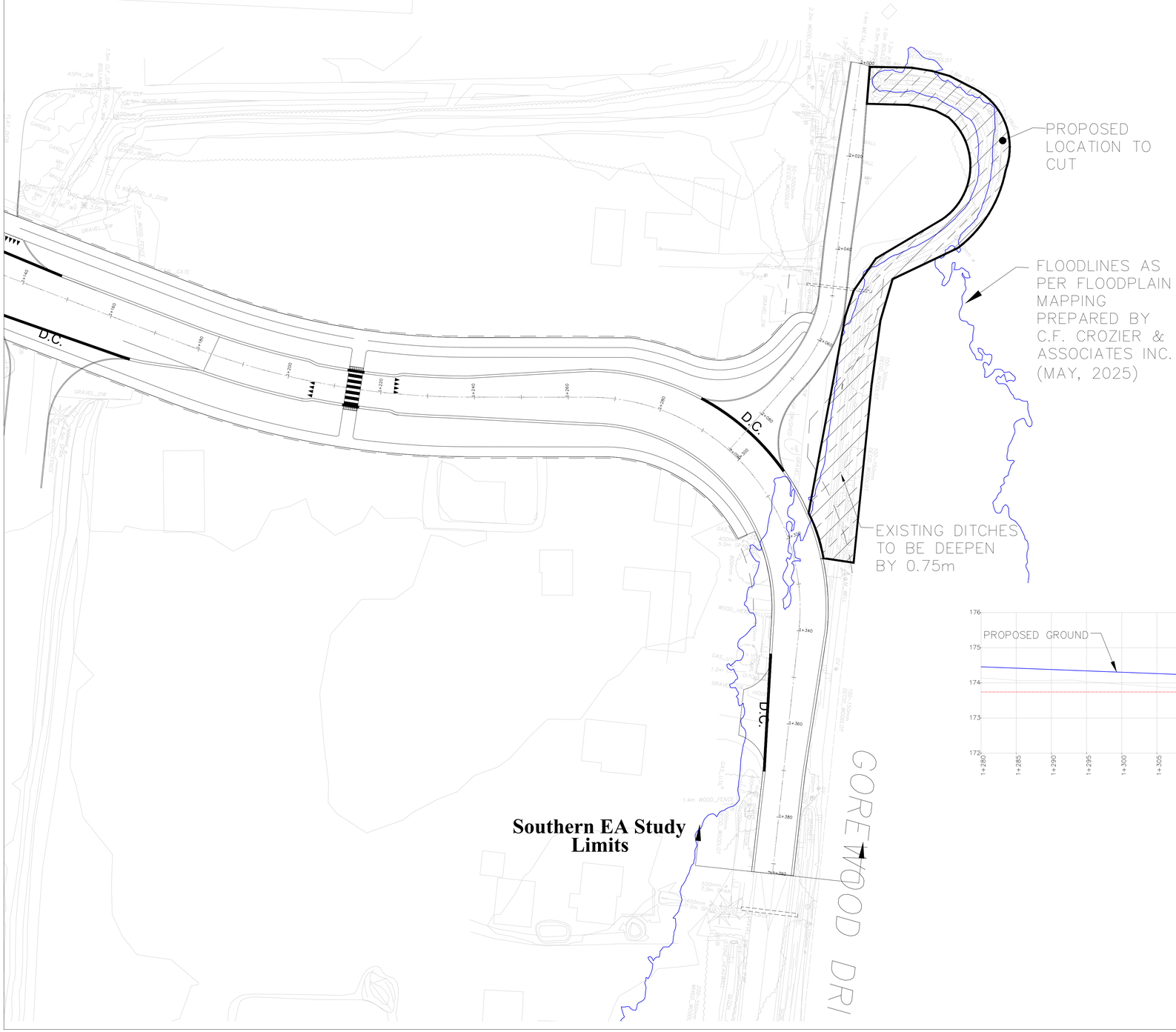
Table 9: Erosion Control Target Volume Required and Provided Comparison

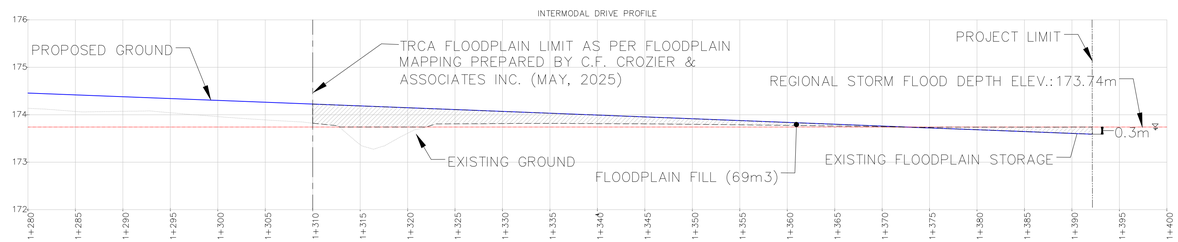
Facility	Volume Detention required (m3)	Volume Detention required (m3)
Intermodal Drive Corridor	244	264

4 Hydraulic Assessment

The proposed extension of Intermodal Drive will impact on Mimico Creek Floodplain limits. To assess potential impacts on floodplain mapping, a hydraulic model prepared by C.F. Crozier & Associates Inc. (May, 2025) was reviewed. The drainage plans show floodplain limits provided in this report. The following section provides a summary of cut and fill analysis for proposed development areas within Floodplain limits.

- The floodplain shown at the proposed Intermodal Drive Extension area is mainly due to backwater effects from overflows that are currently occurring at left overbank areas.
- The entire floodplain within the proposed Intermodal Drive extension area is delineated based on computer Regional Storm flood elevation of 173.74 m provided in the Gorewood Properties Floodplain Mapping Report prepared by C.F. Crozier & Associates Inc. (May 2025) . Therefore, any ground below this flood elevation (173.74 m) should be considered as an existing floodplain storage area. Any fill proposed within this floodplain storage area will be considered as a





60m 50m 40m 30m 20m 10m 0m 5m 10m

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INTERMODAL DR. EXTENSION

FLOODPLAIN ANLAYSIS PLAN

SCALE:	1:1000	DATE:	AUGUST 29, 2025

floodplain storage loss due to the proposed project. The Regional Floodplain limits are shown in **Figure 2.**

- The Cut and Fill Analysis was done using 0.1 cut and fill factor for existing and proposed surfaces within Floodplain Limits. As per the analysis, a total of approximately 69 m^3 of fill is proposed within the floodplain due to the Intermodal Drive extension project. This should not have any negative impact on the flood elevations and the velocity since the flooding is mainly due to backwater effects resulting from overflows at left overbank areas.
- In order to compensate proposed fill within Floodplain Limits, it is recommended that cut should be proposed within Floodplain Limits which will provide lost floodplain storage due to proposed development.

  The locations of Cut and Fill are shown on **Figure 2**.

5 Erosion And Sediment Control Measures During Construction

If uncontrolled, the construction activities associated with Intermodal Drive extension could result in increased rates of erosion and sedimentation within and adjacent to the study area Erosion, for the purposes of this discussion, is described as the process whereby soil particles are detached from an exposed surface and transported by water, wind or some other agent. Sedimentation is defined as the deposition of (eroded) particles at a "downstream" point, typically a watercourse. The potential environmental impacts from increased erosion and sedimentation include degradation of water quality; destruction of fisheries habitat; and increased flooding potential.

Erosion and sedimentation processes are typically accelerated due to construction activities. Literature indicates that construction activities can increase erosion and sedimentation rates by 2 to 3 orders of magnitude over that expected from a natural forested area. Erosion and sedimentation control are therefore an integral and important component in the design and construction of any project.

5.2 Erosion and Sediment Control Measures

To minimize the potential environmental impacts, the following erosion and sedimentation control practices will serve to guide the design and implementation phase of the Erosion and Sedimentation Control Plan:

- limit size of disturbed area,
- limit duration of soil exposure,
- retain existing vegetation where feasible,
- limit slope length and gradient of disturbed areas,
- preserve overland sheet flow and micro-drainage (avoid concentrated channel flows),
- break and redirect flows to lower gradients,
- design and implement staged stripping,
- prevent disturbance of previously stripped and stabilized parcels, and
- stabilize stripped parcels with temporary vegetative controls.

Appropriate permanent/temporary erosion control measures to be considered in the design and implementation of the Erosion and Sedimentation Control Plan are:

- **Hydroseeding** - One step application of seed and hydraulic slurry with adhesive binder (provides permanent stabilization for moderate to steep slopes).
- **Seed and Straw Mulch** - Alternative two step application that will be applied to provide permanent/temporary vegetative stabilization of disturbed areas.
- **Mulch (straw, wood etc.)** - Used to provide temporary erosion protection of exposed slopes during over-wintering and for disturbed areas inactive for greater than 45 days.
- **Sod** - Utilized to provide quick permanent stabilization of disturbed areas. Applications include lateral ditches with gradients < 5% and slopes with steep to moderate grades (i.e. 3% to 5%).
- **Erosion Control Blanket** - Applied as temporary/permanent erosion protection for slopes greater than 2:1 or as a ditch liner. For permanent applications, seed will be applied prior to installation.
- **Aggregate Stone** - Appropriate material, such as rip rap will be used to provide immediate permanent erosion protection of lateral ditches > 5% gradient; and along chute/spillways. Geotextile fabric will be applied prior to placement of any aggregate material.

5.3 Sediment Control

The following elements should be included in the sediment control plan:

- provision of a series of temporary interceptor/conveyor ditches to direct runoff to the siltation/watercourses.
- provision of rock or straw bale within drainage swales/ditches; and
- placement of a series of silt control fencing for the interception of sheet flow drainage.

All sediment control measures should not be removed until final stabilization of the site. In addition, any accumulated sediment shall be removed, as part of a maintenance program, from all control measures when accumulation reaches 50% of the height or volume of the control structure.

Environmental Inspection Process - As a component of erosion and sedimentation control, environmental inspections of the construction site will be conducted. Environmental inspections will be conducted to assess the performance of erosion and sedimentation control measures and identify any required maintenance. The frequent inspections will also permit the identification of localized erosion and sedimentation control issues that require site specific attention.

Implementation and Recommendation - A 200 m standby supply of prefabricated silt fence barrier, in addition to silt fence requirements, shall be maintained at the construction site prior to commencement of grading operations and throughout the duration of the contract.

- Where interceptor ditches and/or subsurface drains are specified, they shall be constructed prior to commencement of any related cut or fill activities.
- Cut and fill earth slopes and ditches, shall be treated with the specified cover material (seed and mulch, seed and erosion control blanket, seed and sod, rip rap, etc.) within 45 days from the commencement of the cut, fill or ditching operation. Commencement of a cut, fill or ditching operation shall be considered to have occurred when the original stabilizing cover has been removed, including grubbing, or has been covered with fill material.

- Run-off from the site and stockpiles shall be controlled to the extent possible to minimize sediment entry to the adjacent watercourses.
- Where dewatering is required, and where culverts are cleaned by hydraulic means, the effluent shall be discharged in a manner that prevents the entry of sediments to watercourses or scouring and erosion at the outlet.
- All erosion and sediment control measures will be clearly stated in the contract drawings and documents.
- Erosion and sediment control plan for the project must adhere to Erosion and Sediment Control (ESC) Guidelines for Urban Construction, December 2006, Greater Golden Horseshoe Area Conservation Authorities.

6 Conclusions

This report documents the Drainage stormwater management aspects associated with the extension of Intermodal Drive. It describes the existing and proposed drainage conditions within the study limits and outlines the proposed SWM Plan to mitigate the potential impacts of the proposed roadway improvements on receiving drainage systems. The findings of this study are summarized as follows:

- External catchment areas have been assessed and low point for major flow and sewer outlets for minor flow have been identified.
- The quantity of runoff from the improved section of the roadway will result in increase in runoff flow rates and specific measures/techniques to reduce peak flow rates of runoff are required.
- There is one low point located at Intermodal Drive within the project limit which provide overland flow route to major system runoff.
- Under proposed conditions, the existing catch basins will require relocation to the new curbs.
- The quantity of runoff from the extended section of the roadway will result in decrease runoff flow rates at the Mimico Creek Watershed and no storage is required due to decrease in peak flow rates.
- The quantity control for West Humber River Watershed is not required.
- Two (2) Oil/Grit Separator (OGS) units have been proposed within the project area in order to provide runoff quality controls.
- OGS-2 will discharge to the City of Brampton storm sewer system, and OGS-1 will drain to a flat bottom swale system and the swale will provide additional cleansing to stormwater before discharging to the creek.
- Infiltration chamber has been proposed within the project area at the outlets to provide further enhancement to water quality treatment.
- Water balance and Erosion Control volume will be achieved through use of proposed underground infiltration chamber and the proposed landscaped areas.
- As per the regional storm flood elevation of 173.74 m provided in the Gorewood Properties Floodplain Mapping Report prepared by C.F. Crozier & Associates Inc. (May, 2025), Any fill proposed within this floodplain storage area will be considered as floodplain storage loss and In order to compensate proposed fill within Floodplain Limits, it is recommended that cut should be proposed within Floodplain Limits.

Appendix A

Stormwater Management Calculations

Intermodal Drive Drainage Area Summary

Runoff Coefficients	
Material	**C Value**
Hard Surface	0.90
Vegetation	0.25
Permeable Pavement	0.25
Gravel	0.40
Compacted Gravel	0.80

Existing Condition								
Location/Station	**Catchment ID**	**Area (m^2)**			**Runoff Coefficient (-)**	**Area (ha)**		
		Total	**Hard Surface**	**Vegetation**		**Total**	**Hard Surface**	**Vegetation**
Outlet 1-West Humber Creek								
Intermodal	C1	8513	3856	4657	0.54	0.85	0.39	0.47
	C1A	2825	124	2701	0.28	0.28	0.01	0.27
	C1B	1093	0	1093	0.25	0.11	0.00	0.11
	Total C1	12431	3980	8451	0.46	1.24	0.40	0.85
Outlet 2-Mimico Creek								
Intermodal	C2	4720	3040	1680	0.67	0.47	0.30	0.17
	C2A	3419	2529	890	0.73	0.34	0.25	0.09
	C2B	2036	519	1517	0.42	0.20	0.05	0.15
	C2C	3431	0	3431	0.25	0.34	0.00	0.34
	Total C2	13606	6088	7518	0.54	1.36	0.61	0.75

Proposed Condition								
Location/Station	**Catchment ID**	**Area (m^2)**			**Runoff Coefficient (-)**	**Area (ha)**		
		Total	**Hard Surface**	**Vegetation**		**Total**	**Hard Surface**	**Vegetation**
Outlet 1-West Humber River								
Intermodal	C1	11820	9773	2047	0.79	1.18	0.98	0.20
	C1A	3419	2529	890	0.73	0.34	0.25	0.09
	C1B	2036	519	1517	0.42	0.20	0.05	0.15
	C1C	3678	0	3678	0.25	0.37	0.00	0.37
	C1D	3729	119	3610	0.27	0.37	0.01	0.36
	C1E	1285	0	1285	0.25	0.13	0.00	0.13
	Total C1	25967	12940	13027	0.57	2.60	1.29	1.30

Intermodal Drive Stormwater Management Summary

Location/Station	Drainage Catchment		Municipality	Applicable SWM Guidelines	Watershed	Conservation Authority	Quantity Control			Quality Control		Water Balance Control		Pre-Development Condition																Post-Development Condition														Required Storage Volume (m³)	Water Balance Requirement (mm)	Required Water Balance Storage Volume (m³)	Provided Infiltration Volume (m³)	Adequate Storage Volume?
	Catchment ID	Description					Required (Yes/No)	Municipal/CA Criteria	Post-Development Discharge To	Required (Yes/No)	Municipal/CA Criteria	Required (Yes/No)	Criteria	Area (ha)					% Impervious	Runoff Coefficient	Time of Concentration (min)	Flow (m^3/s)						Area (ha)			% Impervious	Runoff Coefficient	Time of Concentration (min)	Flow (m^3/s)											
														Hard Surface	Vegetation	Permeable Pavement	Gravel	Compacted Gravel	Total	C			2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	Hard Surface	Vegetation	Total				2-Year	5-Year	10-Year	25-Year	50-Year	100-Year					
Intermodal Dr - Internal & External	C2	Outlet 2	City of Brampton	• City of Brampton Stormwater Management Guidelines • TRCA Stormwater Management Criteria (SMC)	Mimico Creek	TRCA	No	Post to Pre for 2-100yr flows	Existing Municipal STM	Yes	80% TSS removal	Yes	on-site storage of run-off from 27 mm storm event	0.61	0.75	0.00	0.00	0.00	1.36	44.7	0.54	10.00	0.17	0.22	0.25	0.29	0.32	0.35	0.00	0.00	0.00	–	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	27	0	–	YES
	C3	Outlet 1	City of Brampton		West Humber River	TRCA	No	–	Roadside Ditch	Yes	80% TSS removal	Yes	on-site storage of run-off from 27 mm storm event	0.40	0.85	0.00	0.00	0.00	1.24	32.0	0.46	10.00	0.13	0.17	0.19	0.22	0.25	0.27	1.29	1.30	2.60	69.8	0.57	10.00	0.34	0.44	0.53	0.59	0.65	0.71	0.0	27	264	264	YES

Equations:

$$Q = CIA$$

where,
A = Subcatchment Area (hectares or acres)
C = Runoff Coefficient (dimensionless and varies from 0 to 1)
I = Rainfall Intensity (mm/hr or inch/hr)
Q = Peak Runoff Rate (flow units)

WATER BALANCE CALCULATIONS:

1. Water Balance Volume Required (To retain 27mm of Rainfall):

Site	Area (ha)	Storage Required to Retain 27mm Rainfall (m3)	Storage Provided to Retain 27mm Rainfall (m3)
Proposed Intermodal Drive Impervious Area	0.98	264	264

2. Water Balance Volume Provided (To retain 27mm of Rainfall):

Segment	Area (m2)	Infiltration Rate (mm/hr)	Time (hr)	Infiltration Volume Provided (m3)
Infiltration Chambers	330	5	48	79
Total Deficit-				185

MC-4500 Infiltration Chamber

Footprint	330	m2
Retention depth below outlet	1.4	m
Retention Storage	184.8	m3
Factor of Safety	0.4	
Retention Required	**264**	m3
Retention Provided	**264**	m3

Note-Infiltration rate is based Environmental Site Assessment report, "Master Environmental Servicing Plan Final Report, prepared by Aquafor Beech Ltd (April,2002). The soil is Chinquacousy clay loam and Peel clay . The assumed design IR for this soil is 5mm/hr with 2.5 factor of safety. A site specific Geotech Investigation is required in detail design stage.

EROSION CONTROL VOLUME CALCULATIONS:

1. Erosion Control Volume Required and Provided to retain 27mm of Rainfall over 48hours

Site	Area (ha)	Storage Required to Retain 25mm Rainfall (m3)	Storage Provided to Retain 25mm Rainfall (m3)
Proposed Intermodal Drive Impervious Area	0.98	244	264

StormTech® MC-4500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

Nominal Chamber Specifications
(not to scale)

Size (L x W x H)
52” x 100” x 60”
1321 mm x 2540 mm x 1524 mm

Chamber Storage
106.5 ft³ (3.01 m³)

Min. Installed Storage*
162.6 ft³ (4.60 m³)

Weight
125 lbs (56.7 kg)

Shipping
7 chambers/pallet
5 end caps/pallet
11 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 9” (230 mm) of stone between chambers/ end caps and 40% stone porosity.

Nominal End Cap Specifications
(not to scale)

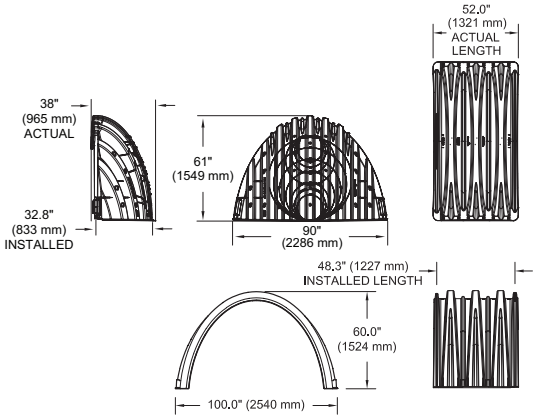
Size (L x W x H)
38” x 90” x 61”
965 mm x 2286 mm x 1549 mm

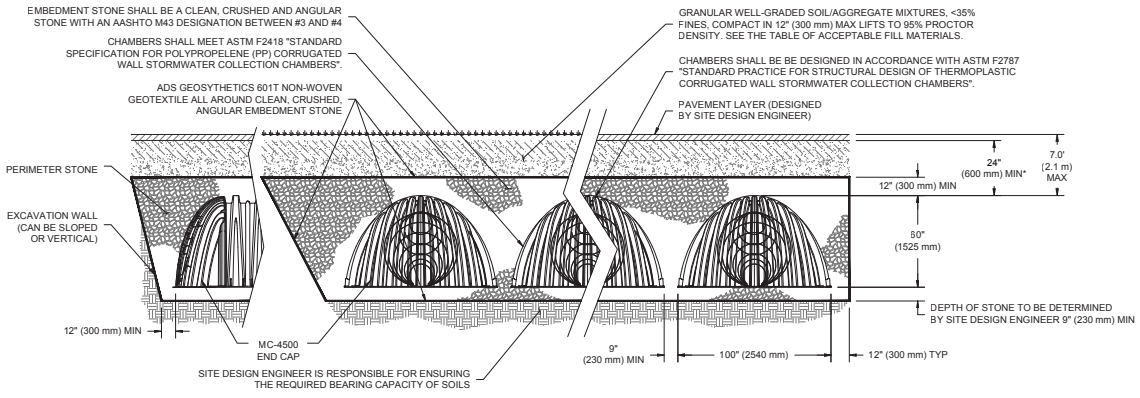
End Cap Storage
39.5 ft³ (1.12 m³)

Min. Installed Storage*
115.3 ft³ (3.26 m³)

Weight
90.0 lbs (40.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 12” (300 mm) of stone perimeter, 9” (230 mm) of stone between chambers/ end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

ADS StormTech™

StormTech MC-4500 Specifications

Storage Volume Per Chamber

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9 in (230 mm)	12 in (300 mm)	15 in (375 mm)	18 in (450 mm)
Chamber	106.5 (3.01)	162.6 (4.60)	166.3 (4.71)	169.9 (4.81)	173.6 (4.91)
End Cap	39.5 (1.12)	115.3 (3.26)	118.6 (3.36)	121.9 (3.45)	125.2 (3.54)

Note: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter in front of end cap.

Amount of Stone Per Chamber

English Tons (yds³)	Stone Foundation Depth			
	9 in	12 in	15 in	18 in
Chamber	7.4 (5.2)	7.8 (5.5)	8.3 (5.9)	8.8 (6.2)
End Cap	9.8 (7.0)	10.2 (7.3)	10.6 (7.6)	11.1 (7.9)
Metric Kilograms (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	6713 (4.0)	7076 (4.2)	7529 (4.5)	7983 (4.7)
End Cap	8890 (5.3)	9253 (5.5)	9616 (5.8)	10069 (6.0)

Note: 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps.

Volume Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth			
	9 in (230 mm)	12 in (300 mm)	15 in (375mm)	18 in (450 mm)
Chamber	10.5 (8.0)	10.8 (8.3)	11.2 (8.5)	11.5 (8.8)
End Cap	9.7 (7.4)	10.0 (7.6)	10.3 (7.9)	10.6 (8.1)

Note: Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

ADS StormTech products, manufactured in accordance with ASTM F2418 or ASTMF2922, comply with all requirements in the Build America, Buy America (BABA) Act.

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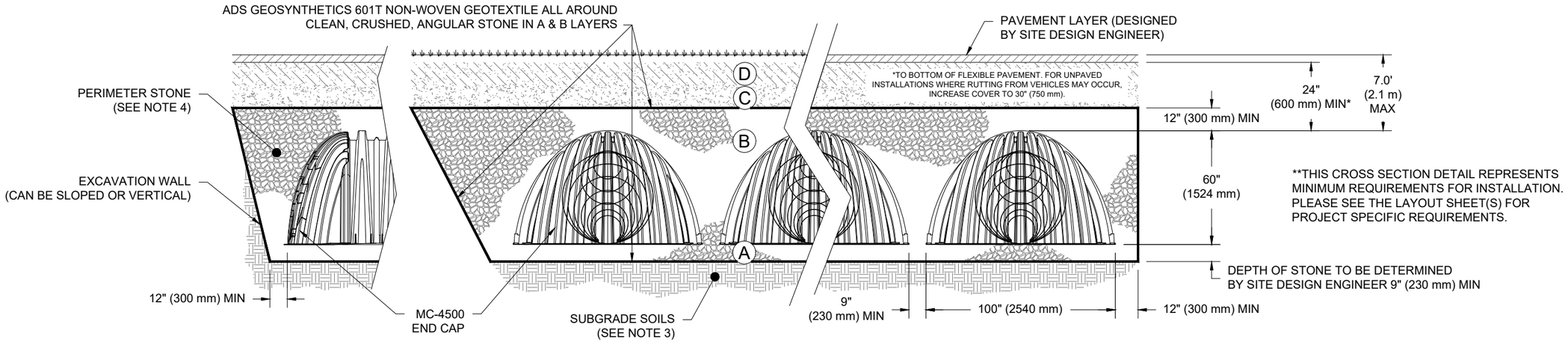
ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

MC-4500

STANDARD CROSS SECTION

DATE: 12/21/23 | DRAWN: SLS | PROJECT #: | CHECKED: SLS

DATE	DRWN	CHKD	DESCRIPTION

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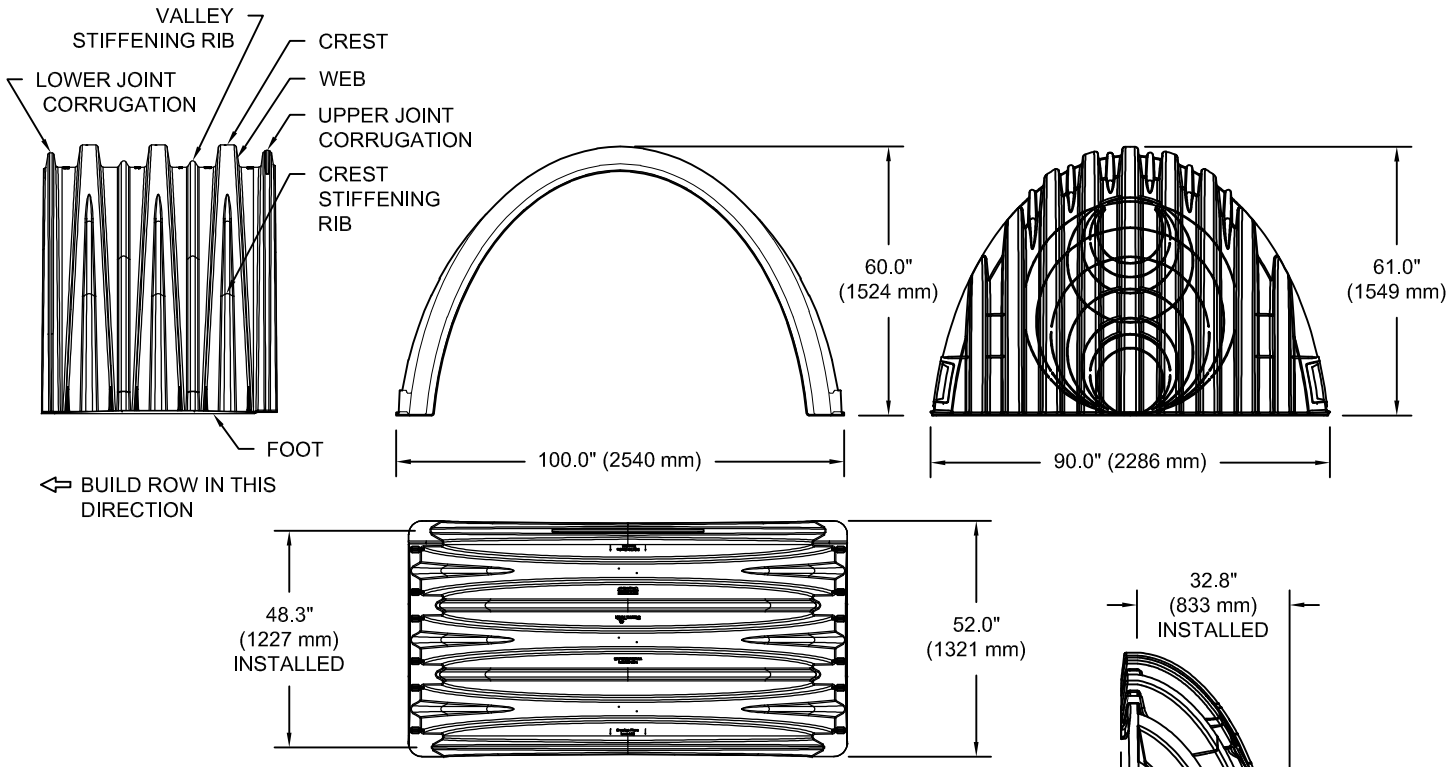
SHEET 1 OF 1

MC-4500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

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

NOMINAL END CAP SPECIFICATIONS

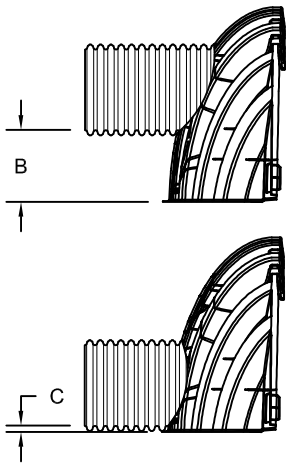
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

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

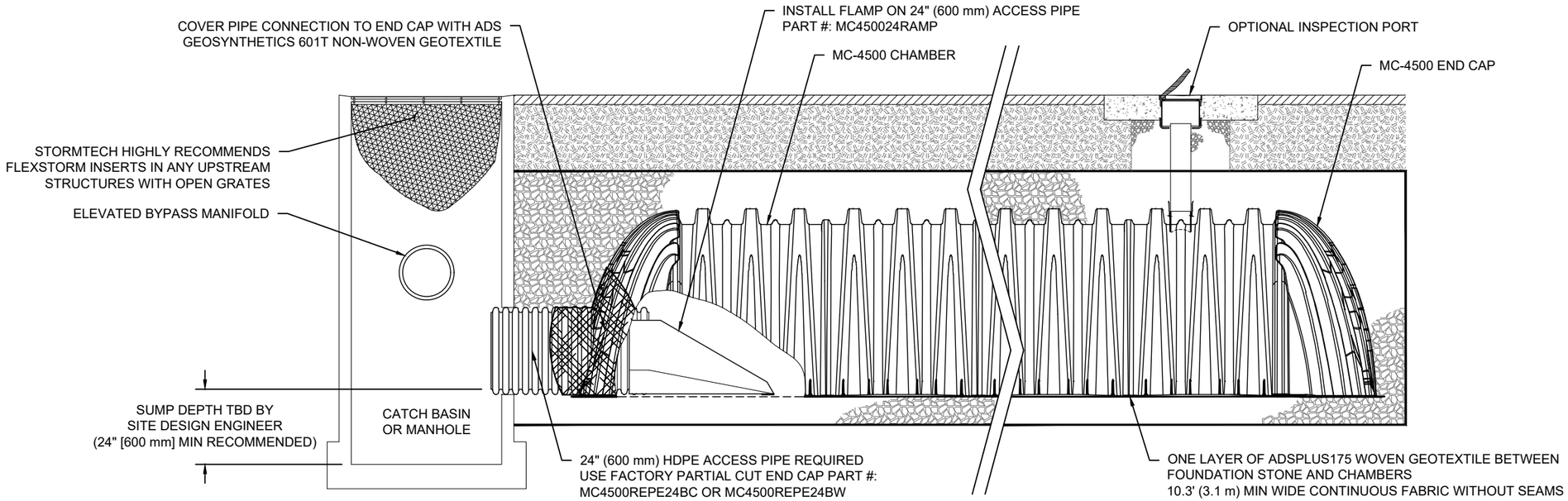
PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

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

NOTE: ALL DIMENSIONS ARE NOMINAL



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



MC-4500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

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

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

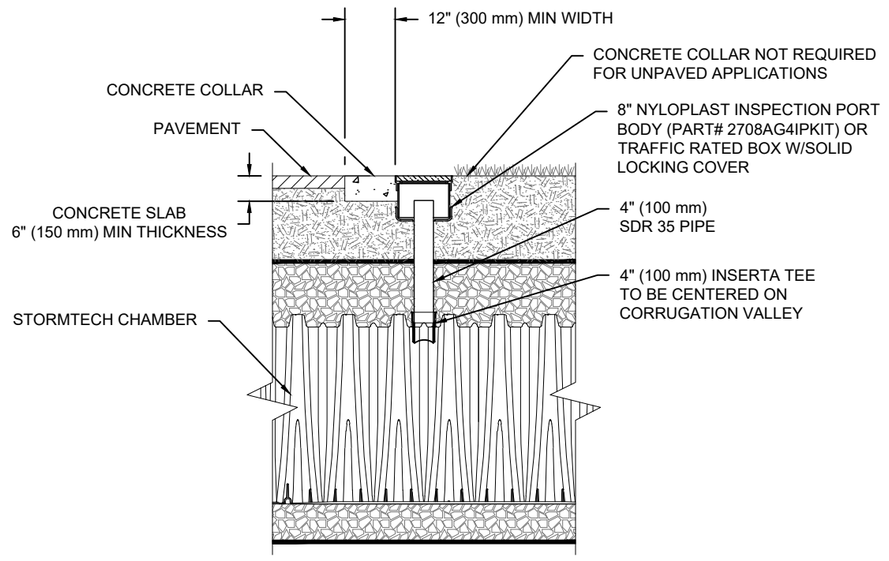
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

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

NOTES

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

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



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

4" PVC INSPECTION PORT DETAIL (MC SERIES CHAMBER)
NTS

MC-4500
ISOLATOR ROW PLUS DETAILS
DATE: 9/13/22 | DRAWN: KLJ | CHECKED: KLJ | PROJECT #:

DATE	DRWN	CHKD	DESCRIPTION

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026

Isolator® Row Plus
O&M Manual

ADS StormTech™

The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS), Total Phosphorus (TP), Total Petroluem Hydrocarbons (TPH) and Total Nitrogen (TN) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, SC-800, MC-3500, MC-4500 or MC-7200 models, are lined with filter fabric and connected to a closely located manhole for easy access. The fabric lined chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers allow stormwater to flow vertically out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS Isolator Row and Plus fabric are placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting.

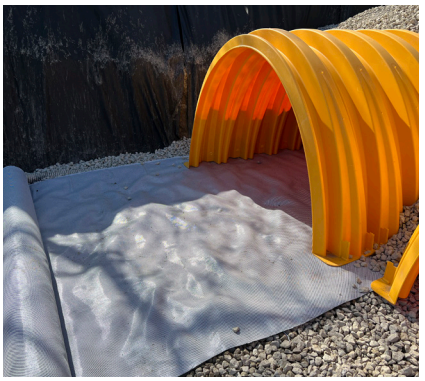
The Isolator Row Plus is designed to capture the “first flush” runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row Plus Flamp™ is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end, or more difficult to remove and require confined space entry into the chamber area. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

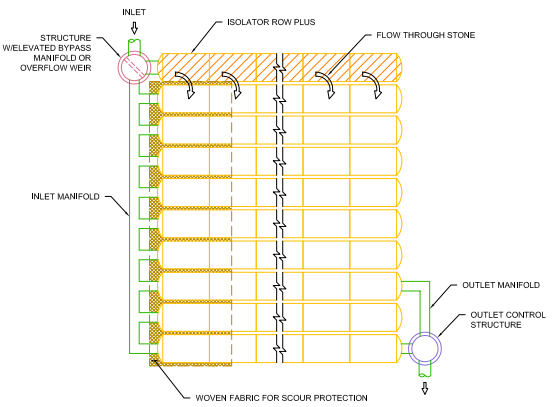
The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*

Looking down the Isolator Row Plus from the manhole opening, ADS Plus Fabric is shown between the chamber and stone base.



StormTech Isolator Row Plus with Overflow Structure (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

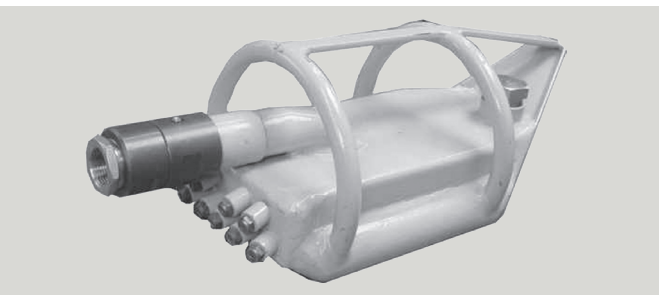
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3" (75 mm) throughout the length of the Isolator Row Plus, clean-out should be performed.

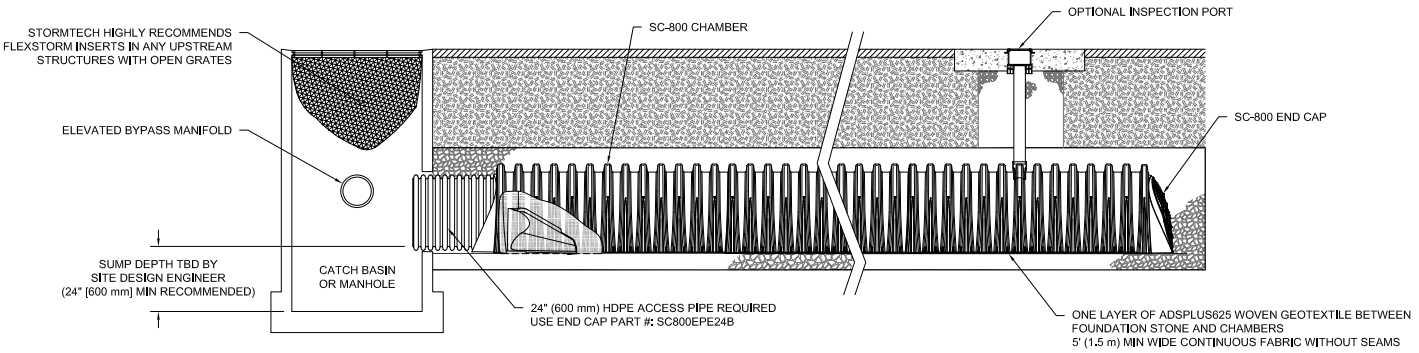
Maintenance

The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entry.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row Plus (*not to scale*)



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
   iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
   i. Remove cover from manhole at upstream end of Isolator Row Plus
   ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
      1. Mirrors on poles or cameras may be used to avoid a confined space entry
      2. Follow OSHA regulations for confined space entry if entering manhole
   iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
   If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

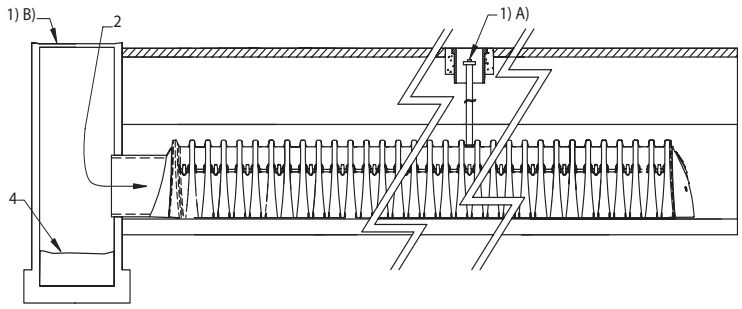
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row Plus, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

adspipe.com

800-821-6710

StormTech® Installation Guide

MC-3500 & MC-4500 Chamber

StormTech SiteAssist

Required Materials and Equipment List

- Acceptable fill materials per Table 1
- ADS Plus and non-woven geotextile fabrics
- StormTech solid end caps, pre-cored and pre-fabricated end caps
- StormTech chambers, manifolds and fittings

Note: MC-3500 chamber pallets are 77" x 90" (2.0 m x 2.3 m) and weigh about 2010 lbs. (912 kg) and MC-4500 pallets are 100" x 52" (2.5 m x 1.3 m) and weigh about 840 lbs. (381 kg). Unloading chambers requires 72" (1.8 m) (min.) forks and/or tie downs (straps, chains, etc).

Important Notes:

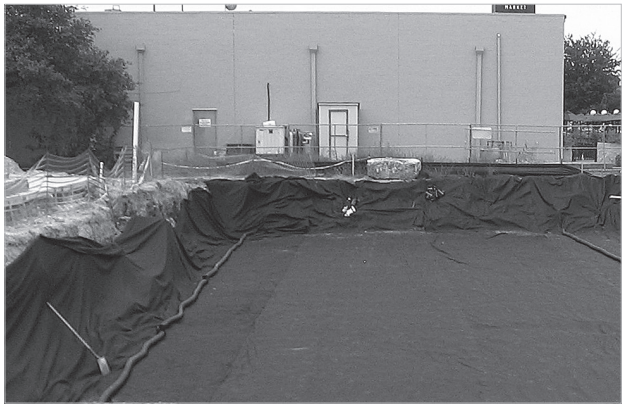
A. This installation guide provides the minimum requirements for proper installation of chambers. Nonadherence to this guide may result in damage to chambers during installation. Replacement of damaged chambers during or after backfilling is costly and very time consuming. It is recommended that all installers are familiar with this guide, and that the contractor inspects the chambers for distortion, damage and joint integrity as work progresses.

B. Use of a dozer to push embedment stone between the rows of chambers may cause damage to chambers and is not an acceptable backfill method. Any chambers damaged by using the "dump and push" method are not covered under the StormTech standard warranty.

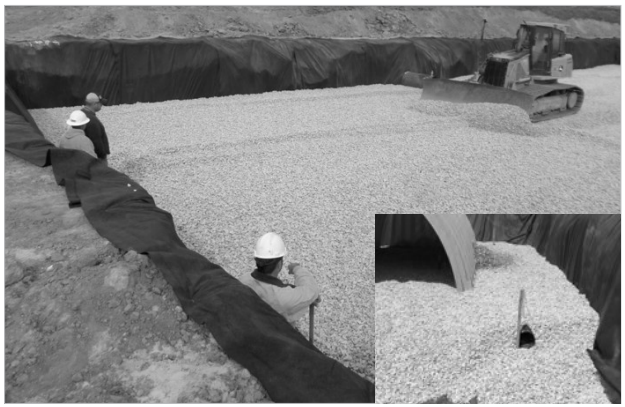
C. Care should be taken in the handling of chambers and end caps. End caps must be stored standing upright. Avoid dropping, prying or excessive force on chambers during removal from pallet and initial placement.

Requirements for System Installation

Excavate bed and prepare subgrade per engineer's plans. Plans and specifications should include Best Management Practices (BMPs) to deter contamination of open pits during construction.



Place non-woven geotextile over prepared soils and up excavation walls.



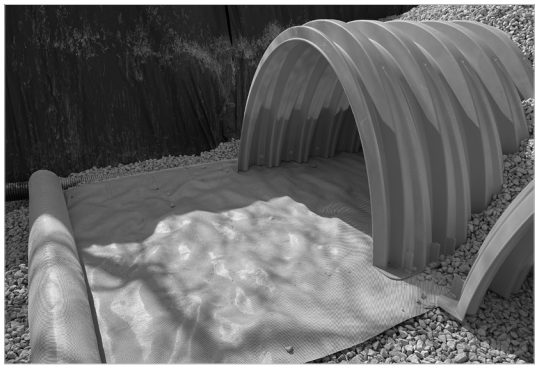
Place clean, crushed, angular stone foundation 9" (230 mm) min. Install underdrains if required. Compact to achieve a flat surface.

Manifold, Scour Fabric and Chamber Assembly

Install manifolds and lay out ADS Plus Fabric at inlet rows. Place ADS Plus Fabric at each inlet end cap parallel to the row (min. 17.5 ft (5.33 m)). Place a continuous piece entire length of Isolator® Plus Row(s).

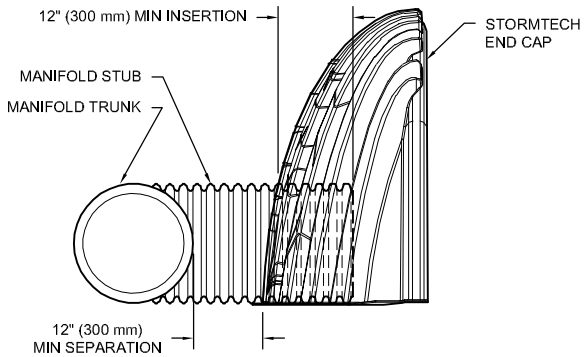
Align the first chamber and end cap of each row with inlet pipes. Contractor may choose to postpone stone placement around end chambers and leave ends of rows open for easy inspection of chambers during the backfill process.

Continue installing chambers by overlapping chamber end corrugations. Chamber joints are labeled “Lower Joint – Overlap Here” and “Build this direction – Upper Joint” Be sure that the chamber placement does not exceed the reach of the construction equipment used to place the stone. Maintain minimum 6” (150 mm) spacing between MC-3500 rows and 9” (230 mm) spacing between MC-4500 rows.



Place a continuous layer of ADS PLUS fabric between the foundation stone and the Isolator Row PLUS chambers, making sure the fabric lays flat and extends the entire width of the chamber feet.
When used on an Isolator Row PLUS, a 24” FLAMP (flared end ramp) is attached to the inside of the inlet pipe with a provided threaded rod and bolt. The FLAMP then lays on top of the ADS PLUS fabric.

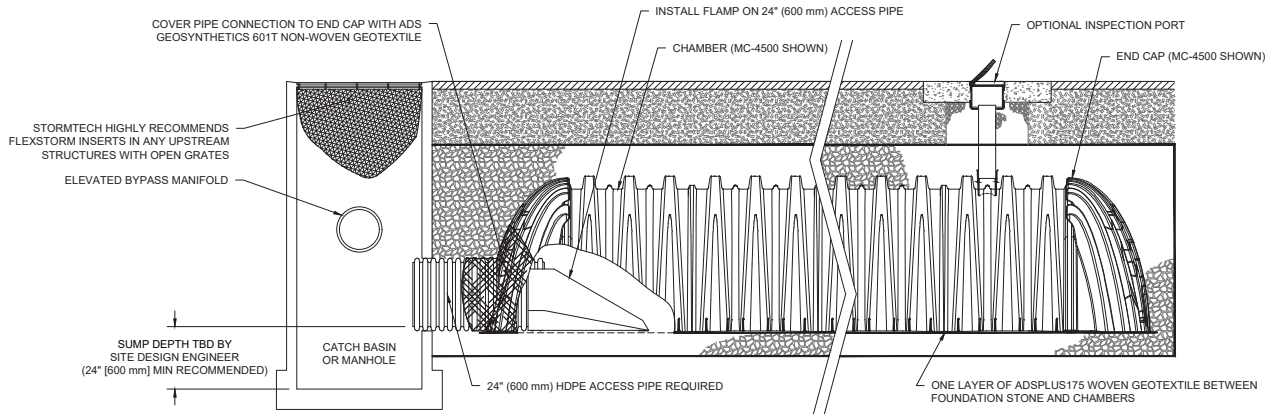
Manifold Insertion



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

Insert inlet and outlet manifolds a minimum 12” (300 mm) into chamber end caps. Manifold header should be a minimum 12” (300 mm) from base of end cap.

StormTech Isolator Row Plus Detail

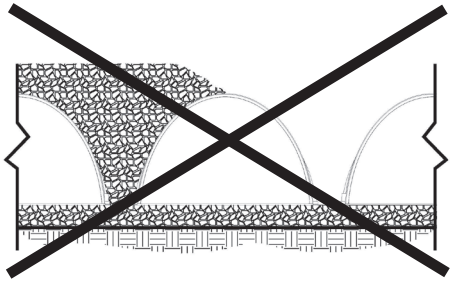


Initial Anchoring of Chambers – Embedment Stone

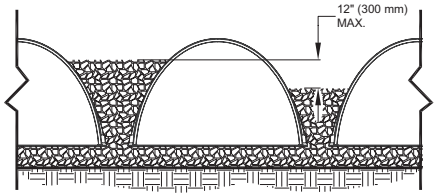
Initial embedment shall be spotted along the centerline of the chamber evenly anchoring the lower portion of the chamber. This is best accomplished with a stone conveyor or excavator reaching along the row.

No equipment shall be operated on the bed at this stage of the installation. Excavators must be located off the bed. Dump trucks shall not dump stone directly on to the bed. Dozers or loaders are not allowed on the bed at this time.

Backfill of Chambers – Embedment Stone

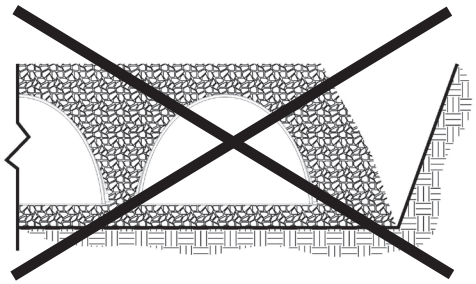


Uneven Backfill

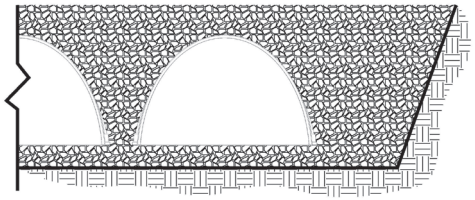


Even Backfill

Backfill chambers evenly. Stone column height should never differ by more than 12” (300 mm) between adjacent chamber rows or between chamber rows and perimeter.



Perimeter Not Backfilled

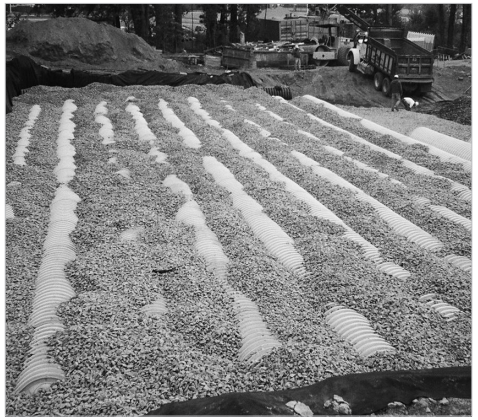


Perimeter Fully Backfilled

Perimeter stone must be brought up evenly with chamber rows. Perimeter must be fully backfilled, with stone extended horizontally to the excavation wall.

Backfill of Chambers – Embedment Stone and Cover Stone

Continue evenly backfilling between rows and around perimeter until embedment stone reaches tops of chambers and a minimum 12” (300 mm) of cover stone is in place. Perimeter stone must extend horizontally to the excavation wall for both straight or sloped sidewalls. The recommended backfill methods are with a stone conveyor outside of the bed or build as you go with an excavator inside the bed reaching along the rows. Backfilling while assembling chambers rows as shown in the picture will help to ensure that equipment reach is not exceeded.

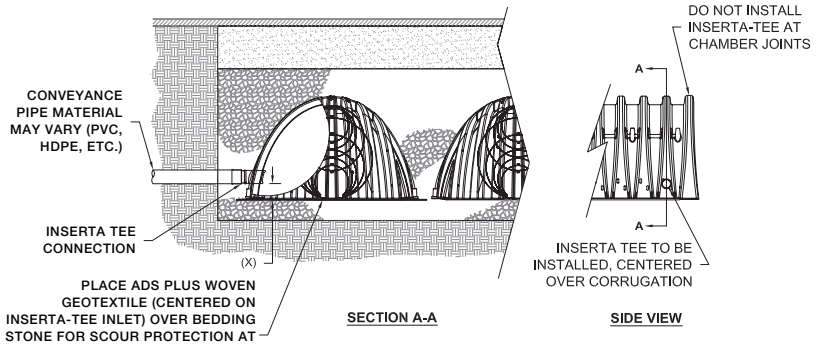


Only after chambers have been backfilled to top of chamber and with a minimum 12” (300 mm) of cover stone on top of chambers can skid loaders and small LGP dozers be used to final grade cover stone and backfill material in accordance with ground pressure limits in Table 2. Equipment must push material parallel to rows only. Never push perpendicular to rows. StormTech recommends the contractor inspect chamber rows before placing final backfill. Any chambers damaged by construction equipment shall be removed and replaced.

Final Backfill of Chambers – Fill Material

Install non-woven geotextile over stone. Geotextile must overlap 24” (600 mm) where edges meet. Compact at 18” (450 mm) of fill for MC-3500 and 24” (600 mm) of fill for MC-4500. Roller travel parallel with rows.

Inserta Tee Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
MC-3500	12” (250 mm)	6” (150 mm)
MC-4500	12” (250 mm)	8” (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

Table 1- Acceptable Fill Materials

Material Location	Description	AASHTO M43 Designation[1]	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 the 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) for MC-3500 and 24" (600 mm) for MC-4500 above the top of the chamber. Note that pavement subbase may be 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 compaction after min. 18" (450 mm) for MC-3500 and 24" (600 mm) for MC-4500 of material over the chambers is reached. Compact additional layers in 12" (300 mm) max. lifts to a min. 95% Proctor density for well-graded material and 95% relative density for processed aggregate materials.
(B) **Embedment Stone:** Embedment Stone surrounding chambers from the foundation stone to the 'C' layer above.	Clean, crushed, angular stone or Recycled Concrete[4]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	No compaction required.
(A) **Foundation Stone:** Foundation Stone below the chambers from the subgrade up to the foot (bottom) of the chamber.	Clean, crushed, angular stone or Recycled Concrete[4]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	Place and compact in 9" (225 mm) lifts using two full coverages with a vibratory compactor.[2, 3]

Please Note:

1. The listed AASHTO designations are for gradations only. The stone must also be clean, crushed, angular. For example, a specification for #4 stone would state: "clean, crushed, angular no. 4 (AASHTO M43) stone".
2. StormTech compaction requirements are met for 'A' location materials when placed and compacted in 9" (230 mm) (max) lifts using two full coverages with a vibratory compactor.
3. Where infiltration surfaces may be comprised by compaction, for standard installations and 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. Where recycled concrete aggregate is used in layers 'A' or 'B' the material should also meet the acceptable criteria outlined in ADS Technical Note 6.20 "Recycled Concrete Structural Backfill".

Figure 1- Inspection Port Detail

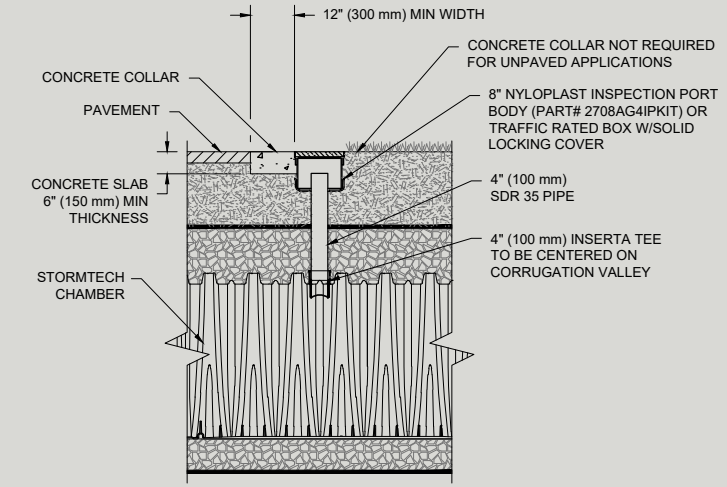
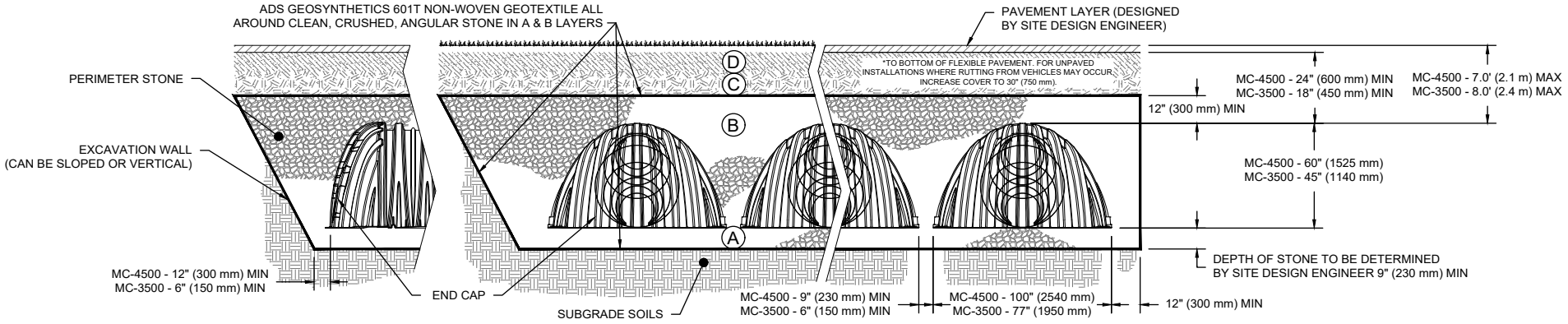


Figure 2 - Fill Material Locations



Notes:

1. 36” (900 mm) of stabilized cover materials over the chambers is recommended during the construction phase if general construction activities, such as full dump truck travel and dumping, are to occur over the bed.
2. During paving operations, dump truck axle loads on 18” (450mm) of cover for MC-3500s may be necessary. Precautions should be taken to avoid rutting of the road base layer, to ensure that compaction requirements have been met, and that a minimum of 18” (450mm) of cover for MC-3500s exists over the chambers. Contact StormTech for additional guidance on allowable axle loads during paving.
3. Ground pressure for track dozers is the vehicle operating weight divided by total ground contact area for both tracks. Excavators will exert higher ground pressures based on loaded bucket weight and boom extension.
4. Mini-excavators (<8,000lbs/3,628 kg) can be used with at least 12” (300 mm) of stone over the chambers and are limited by the maximum ground pressures in Table 2 based on a full bucket at maximum boom extension.
5. StormTech does not require compaction of initial fill at 18” (450 mm) of cover. However, requirements by others for 6” (150 mm) lifts may necessitate the use of small compactors at 18” (450 mm) of cover.
6. Storage of materials such as construction materials, equipment, spoils, etc. should not be located over the StormTech system. The use of equipment over the StormTech system not covered in Table 2 (ex. soil mixing equipment, cranes, etc) is limited. Please contact StormTech for more information.
7. Allowable track loads based on vehicle travel only. Excavators shall not operate on chamber beds until the total backfill reaches 3 feet (900 mm) over the entire bed.

Call StormTech at **888.892.2694** for technical and product information or visit www.stormtech.com

Table 2 - Maximum Allowable Construction Vehicle Loads[6]

Material Location	Fill Depth over Chambers in. (mm)	Maximum Allowable Wheel Loads		Maximum Allowable Track Loads[6]		Maximum Allowable Roller Loads
		Max Axle Load for Trucks lbs (kN)	Max Wheel Load for Loaders lbs (kN)	Track Width in. (mm)	Max Ground Pressure psf (kPa)	Max Drum Weight or Dynamic Force lbs (kN)
Ⓓ Final Fill Material	36” (900) Compacted	32,000 (142)	16,000 (71)	12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	4050 (194) 2760 (132) 2130 (102) 1770 (84) 1530 (73)	38,000 (169)
Ⓒ Initial Fill Material	24” (600) Compacted	32,000 (142)	16,000 (71)	12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	2750 (131) 1920 (92) 1520 (73) 1310 (63) 1180 (56)	20,000 (89)
	24” (600) Loose/Dumped	MC-3500		12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	2430 (116) 1730 (82) 1390 (66) 1210 (58) 1100 (52)	16,000 (71)
		32,000 (142)	16,000 (71)			
		MC-4500				
		24,000 (107)	12,000 (53)			
	18” (450)	MC-3500		12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	2140 (102) 1530 (73) 1260 (60) 1120 (53) 1030 (49)	5,000 (22) (static loads only)[5]
		32,000 (142)	16,000 (71)			
		MC-4500				
		24,000 (107)	12,000 (53)			
Ⓑ Embedment Stone	12” (300)	Not Allowed	Not Allowed	12” (305) 18” (457) 24” (610) 30” (762)	1100 (53) 710 (34) 660 (32) 580 (28)	Not Allowed
	6” (150)	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed

Table 3 - Placement Methods and Descriptions

Material Location	Placement Methods/ Restrictions	Wheel Load Restrictions	Track Load Restrictions	Roller Load Restrictions
		See Table 2 for Maximum Construction Loads		
Ⓓ Final Fill Material	A variety of placement methods may be used. All construction loads must not exceed the maximum limits in Table 2.	36” (900 mm) minimum cover required for dump trucks to dump over chambers.	Dozers to push parallel to rows.[4]	Roller travel parallel to rows only until 36” (900 mm) compacted cover is reached.
Ⓒ Initial Fill Material	Excavator positioned off bed recommended. Small excavator allowed over chambers. Small dozer allowed.	Asphalt can be dumped into paver when compacted pavement subbase reaches 18” (450 mm) for MC-3500 and 24” (600 mm) for MC-4500 above top of chambers.	Small LGP track dozers & skid loaders allowed to grade cover stone with at least 12” (300 mm) stone under tracks at all times. Equipment must push parallel to rows at all times.	Use dynamic force of roller only after compacted fill depth reaches 18” (450 mm) for MC-3500 and 24” (600 mm) for MC-4500 over chambers. Roller travel parallel to chamber rows only.
Ⓑ Embedment Stone	No equipment allowed on bare chambers. Use excavator or stone conveyor positioned off bed or on foundation stone to evenly fill around all chambers to at least the top of chambers.	No wheel loads allowed. Material must be placed outside the limits of the chamber bed.	No tracked equipment is allowed on chambers until a min. 12” (300 mm) cover stone is in place.	No rollers allowed.
Ⓐ Foundation Stone	No StormTech restrictions. Contractor responsible for any conditions or requirements by others relative to subgrade bearing capacity, dewatering or protection of subgrade.			

ADS StormTech™

StormTech® Standard Limited Warranty

STANDARD LIMITED WARRANTY OF STORMTECH LLC ("STORMTECH"): PRODUCTS

(A) This Limited Warranty applies solely to the StormTech chambers and end plates manufactured by StormTech and sold to the original purchaser (the "Purchaser"). The chambers and end plates are collectively referred to as the "Products."

(B) The structural integrity of the Products, when installed strictly in accordance with StormTech's written installation instructions at the time of installation, are warranted to the Purchaser against defective materials and workmanship for one (1) year from the date of purchase. Should a defect appear in the Limited Warranty period, the Purchaser shall provide StormTech with written notice of the alleged defect at StormTech's corporate headquarters within ten (10) days of the discovery of the defect. The notice shall describe the alleged defect in reasonable detail. StormTech agrees to supply replacements for those Products determined by StormTech to be defective and covered by this Limited Warranty. The supply of replacement products is the sole remedy of the Purchaser for breaches of this Limited Warranty. StormTech's liability specifically excludes the cost of removal and/or installation of the Products.

(C) THIS LIMITED WARRANTY IS EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE PRODUCTS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

(D) This Limited Warranty only applies to the Products when the Products are installed in a single layer. UNDER NO CIRCUMSTANCES, SHALL THE PRODUCTS BE INSTALLED IN A MULTI-LAYER CONFIGURATION.

(E) No representative of StormTech has the authority to change this Limited Warranty in any manner or to extend this Limited Warranty. This Limited Warranty does not apply to any person other than to the Purchaser.

(F) Under no circumstances shall StormTech be liable to the Purchaser or to any third party for product liability claims; claims arising from the design, shipment, or installation of the Products, or the cost of other goods or services related to the purchase and installation of the Products. For this Limited Warranty to apply, the Products must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and StormTech's written installation instructions.

(G) THE LIMITED WARRANTY DOES NOT EXTEND TO INCIDENTAL, CONSEQUENTIAL, SPECIAL OR INDIRECT DAMAGES. STORMTECH SHALL NOT BE LIABLE FOR PENALTIES OR LIQUIDATED DAMAGES, INCLUDING LOSS OF PRODUCTION AND PROFITS; LABOR AND MATERIALS; OVERHEAD COSTS; OR OTHER LOSS OR EXPENSE INCURRED BY THE PURCHASER OR ANY THIRD PARTY. SPECIFICALLY EXCLUDED FROM LIMITED WARRANTY COVERAGE ARE DAMAGE TO THE PRODUCTS ARISING FROM ORDINARY WEAR AND TEAR; ALTERATION, ACCIDENT, MISUSE, ABUSE OR NEGLECT; THE PRODUCTS BEING SUBJECTED TO VEHICLE TRAFFIC OR OTHER CONDITIONS WHICH ARE NOT PERMITTED BY STORMTECH'S WRITTEN SPECIFICATIONS OR INSTALLATION INSTRUCTIONS; FAILURE TO MAINTAIN THE MINIMUM GROUND COVERS SET FORTH IN THE INSTALLATION INSTRUCTIONS; THE PLACEMENT OF IMPROPER MATERIALS INTO THE PRODUCTS; FAILURE OF THE PRODUCTS DUE TO IMPROPER SITING OR IMPROPER SIZING; OR ANY OTHER EVENT NOT CAUSED BY STORMTECH. A PRODUCT ALSO IS EXCLUDED FROM LIMITED WARRANTY COVERAGE IF SUCH PRODUCT IS USED IN A PROJECT OR SYSTEM IN WHICH ANY GEOTEXTILE PRODUCTS OTHER THAN THOSE PROVIDED BY ADVANCED DRAINAGE SYSTEMS ARE USED. THIS LIMITED WARRANTY REPRESENTS STORMTECH'S SOLE LIABILITY TO THE PURCHASER FOR CLAIMS RELATED TO THE PRODUCTS, WHETHER THE CLAIM IS BASED UPON CONTRACT, TORT, OR OTHER LEGAL THEORY.

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adspipe.com
800-821-6710

ADS PLUS WOVEN GEOTEXTILE SPECIFICATION

For use with StormTech® Isolator® Row Plus

Scope

This specification describes ADS Plus woven geotextile.

ADS Plus woven geotextile fabrics are woven polypropylene materials offering optimum performance when used in stabilization applications. Produced from first quality raw materials, they provide the perfect balance of strength and separation in styles capable of functioning exceptionally well in a wide range of performance requirements.

Filter Fabric Properties

Property[1]	Test Method	Unit	M.A.R.V. (Minimum Average Roll Value)[2]
Weight	ASTM D5261	oz/yd^2 (g/m^2)	8.0 (271.25)
Grab Tensile Strength	ASTM D4632	lbs (kN)	325 (1.45)
Grab Elongation	ASTM D4632	%	15
Trapezoidal Tear Strength	ASTM D4533	lbs (kN)	125 (0.89)
CBR Puncture Resistance	ASTM D6241	lbs (kN)	1,124 (5.0)

1. The property values listed above are subject to change without notice.
2. Minimum Average Roll Values (MARV) is calculated as the average minus two standard deviations. Statistically, it yields approximately 97.5% degree of confidence that any samples taken from quality assurance testing will meet or exceed the values described above.

Dimensions

ADS Plus shall be delivered to the jobsite in roll form with each roll individually identified and nominally measuring 12.5’ (3.8 m) width x 360’ (110 m) length for Plus125 and 6.25’ (1.9 m) width x 360’ (110 m) length for Plus625.

ADS 0601T NONWOVEN GEOTEXTILE SPECIFICATION

Scope

This specification describes ADS 0601T (6.0 oz) nonwoven geotextile.

Filter Fabric Requirements

ADS 0601T (6.0 oz) is a needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, which are formed into a random network for dimensional stability. ADS 0601T (6.0 oz) resists ultraviolet deterioration, rotting, biological degradation, naturally encountered basics and acids. Polypropylene is stable within a pH range of 2 to 13. ADS 0601T (6.0 oz) conforms to the physical property values listed below:

Filter Fabric Properties

Property	Test Method	Unit	M.A.R.V. (Minimum Average Roll Value)
Grab Tensile	ASTM D4632	lbs (kN)	160 (0.711)
Grab Elongation	ASTM D4632	%	50
Trapezoid Tear Strength	ASTM D4533	lbs (kN)	60 (0.267)
CBR Puncture Resistance	ASTM D6241	lbs (kN)	410 (1.82)
Permittivity*	ASTM D4491	sec^{-1}	1.5
Water Flow*	ASTM D4491	gpm/ft^2 ($l/min/m^2$)	110 (4480)
AOS*	ASTM D4751	US Sieve (mm)	70 (0.212)
Melting Point	ASTM D276	Fahrenheit (Celsius)	320 (160)
UV Resistance	ASTM D4355	%/hrs	70/500

Packaging

Roll Dimensions (W x L) - ft. (m)	3.0/5.0/6.25/7.5/9.0/12.5 x 360 -15 x 300 (0.9/1.5/1.9/2.3/2.7/3.8 x 110 - 4.5 x 91)
Roll Square Yards (Square Meters)	120/200/250/300/360/500 - 500 (100/167/209/251/301/418 - 418)
Estimated Roll Weight - lbs (kg)	44/65/97.5/102/141/195 - 195 (20/29/44/46/64/88 - 88)

* At the time of manufacturing. Handling may change these properties.