Permit Stormwater Report

For

Bridgeport Village Remodel

Tualatin, Oregon

Date: December 08, 2021

Prepared for:
BV Centercal, LLC

Prepared by:
Humber Design Group, Inc.
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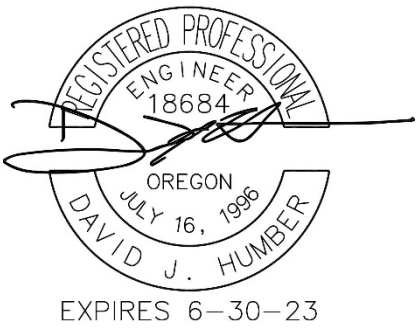
Report By: Andrew Xu
Supervised By: David Humber

City File No:
Humber Design Group, Inc. No: 505001

Engineer's Certification

The technical information and data contained in this report were prepared under the direction and supervision of the undersigned, whose seal, as a professional engineer licensed as such, is affixed below.



Humber Design Group, Inc.

Project Overview

Purpose of Report

This purpose of this report is to analyze the impact the proposed modification of the existing central courtyard “Village area” will have on the existing downstream stormwater conveyance system, and document the criteria used to design the proposed stormwater facility. Source information used to define the different features of the site is also provided.

Project Description and Location

The project is located in the existing Bridgeport Village located in City of Tigard, Oregon. The total existing area of the tax lot is about 27.54 acres.

The proposed modification of the existing central courtyard will make up 0.75 acres of the existing 27.54-acre development area will be modified. This evaluation will demonstrate that the proposed water systems will meet the code requirements for water conveyance outlined in the CWS chapter 4 for runoff Treatment and Control.

Existing Conditions

The existing site consists of multiple commercial buildings, parking garages, and parking lots in the 27.54 acre development. All onsite stormwater is treated via existing 70 cartridge water quality vault and conveyed to SW Findlay Rd.

Developed Conditions

Modification of the existing central courtyard layout (approx. 0.75 acres). Modification and replacement of existing hardscape/landscaping.

Offsite

No offsite work will be performed for this modification.

Downstream Conveyance

Existing onsite runoff and treated stormwater is conveyed to the northwest corner of the site out to SW Findlay Rd.

Regulatory Design Criteria

Stormwater Quantity Management-Design Criteria

All developments on sites one-half acre or greater in area shall be required to provide on-site detention per CWS Design Standards. Storm detention facilities shall be designed to provide storage using a 25-year event with safe overflow conveyance of the 100-year storm. Storms to be evaluated shall include the 2, 10, 25, and 100-year events. Allowable post development discharge rate for the 2,10, and 25- year events shall be of the pre-development discharge rate with a maximum allowable release rate of one half (0.5) cfs. No flow control orifice for the 25-year event shall be smaller than 2.5 inches.

The design of the stormwater quantity facilities used the following criteria to analyze the performance of the system:

Storm Event	Rainfall Depth (in)
2-yr	2.5
10-yr	3.5
25-yr	4.0
100-yr	4.5

- A Tc of 5 minutes was used in calculations involving the post-developed site conditions.
- The Santa Barbara Urban Hydrograph (SBUH) method was used to estimate the stormwater runoff for the site. See HydroCAD Calculations in Appendix E.
- According to the USDA soil survey, 100% of the soil on the proposed site consists of is Helvetia silt loam, 2 to 7 percent slopes.
- All impervious, and pervious areas uses runoff curve numbers (CN) of 98, and 79 respectively.

CWS Requirements

Stormwater quantity on-site detention facilities shall be designed to capture runoff so that the post-development runoff rates from the site do not exceed the pre-development runoff rates from the site, based on the 24-hour storm events to match 2, 10, and 25-year return storm events.

Stormwater Quality Management-Design Criteria

CWS Requirements

The original Storm Drainage Report for Bridgeport Village was prepared by LDC Design Group on March 4, 2004. The existing site was designed based on Clean Water Service's design guidelines for water quality treatment. The treatment flow was determined based upon a 4 hour storm event with 0.36 inches of rainfall over impervious surface areas. This flow was then used to size the applicable treatment device. In this case, the existing site utilizes a 70 cartridge stormfilter cartridge vault. Each stormfilter cartridge was designed to handle 15 gallons of stormwater per minute.

Potential Site Pollutants

The Department of Environmental Quality (DEQ) recognizes sediments, metals, various petroleum products, nutrients, pesticides, herbicides, and fungicides as common pollutants found in residential developments.

Maintenance Plan

All stormwater facilities on-site will be the responsibility of the property owner to maintain. The property owner will also agree to any maintenance standards set forth by the Clean Water Services. Refer to Appendix B for maintenance requirements.

Design Methodology

The project follows the water quantity requirements per chapter 4.03 Hydromodification Approach. A permanent stormwater detention facility will be constructed due to the square footage of modified impervious area being greater than 1,000 sq ft. Peak-flow matching detention design and calculations were performed using the SBUH methodology. The system was designed such that the post-development runoff rates from the site do not exceed the pre-development runoff rates per Table 4-7.

TABLE 4-7

Post-Development Peak Runoff Rate	**Pre-Development Peak Runoff Rate Target**
2-year, 24-hour	50% of 2-year, 24-hour
5-year, 24-hour	5-year, 24 hour
10-year, 24-hour	10-year, 24-hour

Design Parameters

Existing Site Conditions

The existing site consists of multiple commercial buildings, parking garages, and parking lots in the 27.45 acre development. All onsite stormwater is treated via existing 70 cartridge water quality vault and conveyed to SW Findlay Rd.

Soil Type

According to the geotechnical report titled *Geotechnical Investigation Report Cedar Grove Apartment Project* prepared on October 29, 2018, by Alder Geotechnical Services, the site consists mainly of silty and gravelly backfill soils. The maximum depth of fill encountered was 1 ½ ft. Abandoned underground utility trench backfills were observed up to about 8 ft deep

Post Developed Site Conditions

The proposed modification to the central courtyard will remove the existing impervious area and playground areas with new pavement design and new location for astroturf and playground areas. The modified plaza area will total 34,500 sf. Additional scope of work was added to the project via MARs for building B which added an additional total modified impervious area of 1,800 sf giving a total modified impervious area for the project of 36,300 sf. A (65) chamber ADS storm detention system will be installed to handle the hydromodification requirements for the modified impervious area for the project.

Calculation Methodology

HydroCAD version 10.00 was used to calculate all stormwater runoff quantities. The Santa Barbara Urban Hydrograph was used in conjunction with the SCS Type 1A 24- hour storm region.

Proposed Stormwater Conduit Sizing and Inlet Placement

All stormwater line sizes will be calculated using Manning's equation for a SBUH 25- year storm event.

Proposed Stormwater Quantity Control Facility Design

Due to the location central courtyard, the proposed 65 chamber ADS SC740 detention system will be located in the north western parking lot. The system will detain the storm run off from the existing parking lot equal to the modified impervious area via the two existing catch basins (34,500 sf). Due to the additional modified impervious area for the MAR improvements. The existing runoff from Building R1 will be intercepted from the downspout connection and into the new detention system. The total detained square footage will equal **43,350 sf** which will be detained in lieu of the **36,300 sf** of proposed modified improvements.

The post-developed outflow rates for the 2-year, the 5-year, and the 10-year storm events are equal to or less than the pre-developed outflow per CWS requirements. The facility will meet the post developed flow rate of 50% of the 2-year storm event and will safely convey the overflow of the 100-year storm. Refer to Appendix D for water quantity calculations.

	2-year	5-year	10-year	25-year
Pre-Developed	0.13 cfs	0.23 cfs	0.30 cfs	0.39 cfs
Post Developed Release Rate	**0.06 cfs**	**0.14 cfs**	**0.20 cfs**	**0.34 cfs**
Post Developed Flow Rate	0.57 cfs	0.72 cfs	0.80 cfs	0.91 cfs

Proposed Stormwater Quality Design

The original Storm Drainage Report for Bridgeport Village was prepared by LDC Design Group on March 4, 2004. The existing site was designed based on Clean Water Service's design guidelines for water quality treatment. The treatment flow was determined based upon a 4 hour storm event with 0.36 inches of rainfall over impervious surface areas. This flow was then used to size the applicable treatment device. In this case, the existing site utilizes a 70 cartridge stormfilter cartridge vault. Each stormfilter cartridge was designed to handle 15 gallons of stormwater per minute.

The proposed project will modify 36,300 sq-ft of existing impervious area which equates to roughly 3% of the entire 27.45 acre site. There will be little to no net change in impervious area being added to the total system. The existing system was designed to handle and treat the given basin.

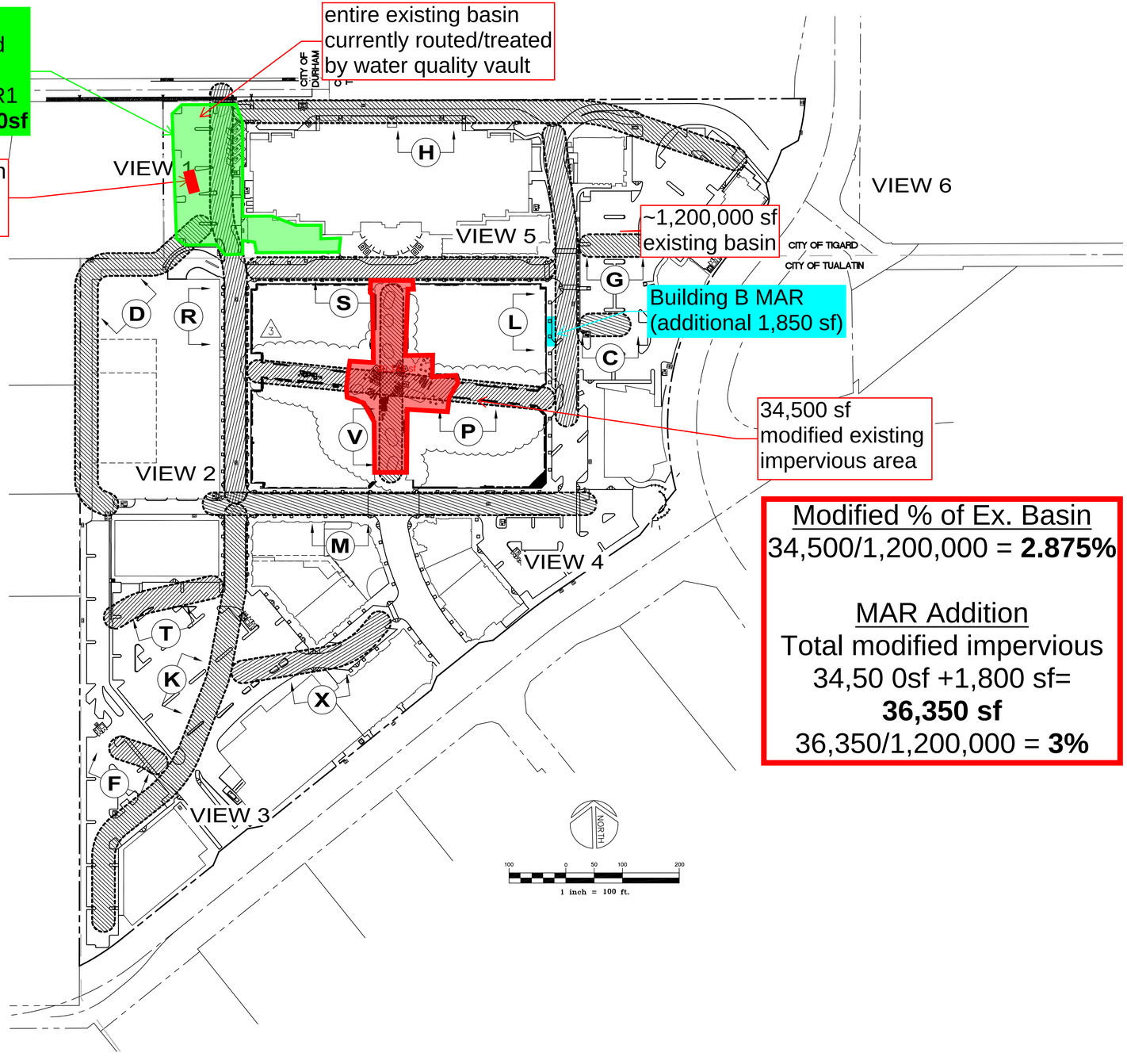
Appendix A

Basin Map

impervious area to be detained in lieu of modified plaza area
ex. parking lot + Building R1
total existing area = **43,350sf**

proposed storm system installed under ex. asphalt lot

entire existing basin currently routed/treated by water quality vault



~1,200,000 sf existing basin

Building B MAR (additional 1,850 sf)

34,500 sf modified existing impervious area

Modified % of Ex. Basin
34,500/1,200,000 = **2.875%**

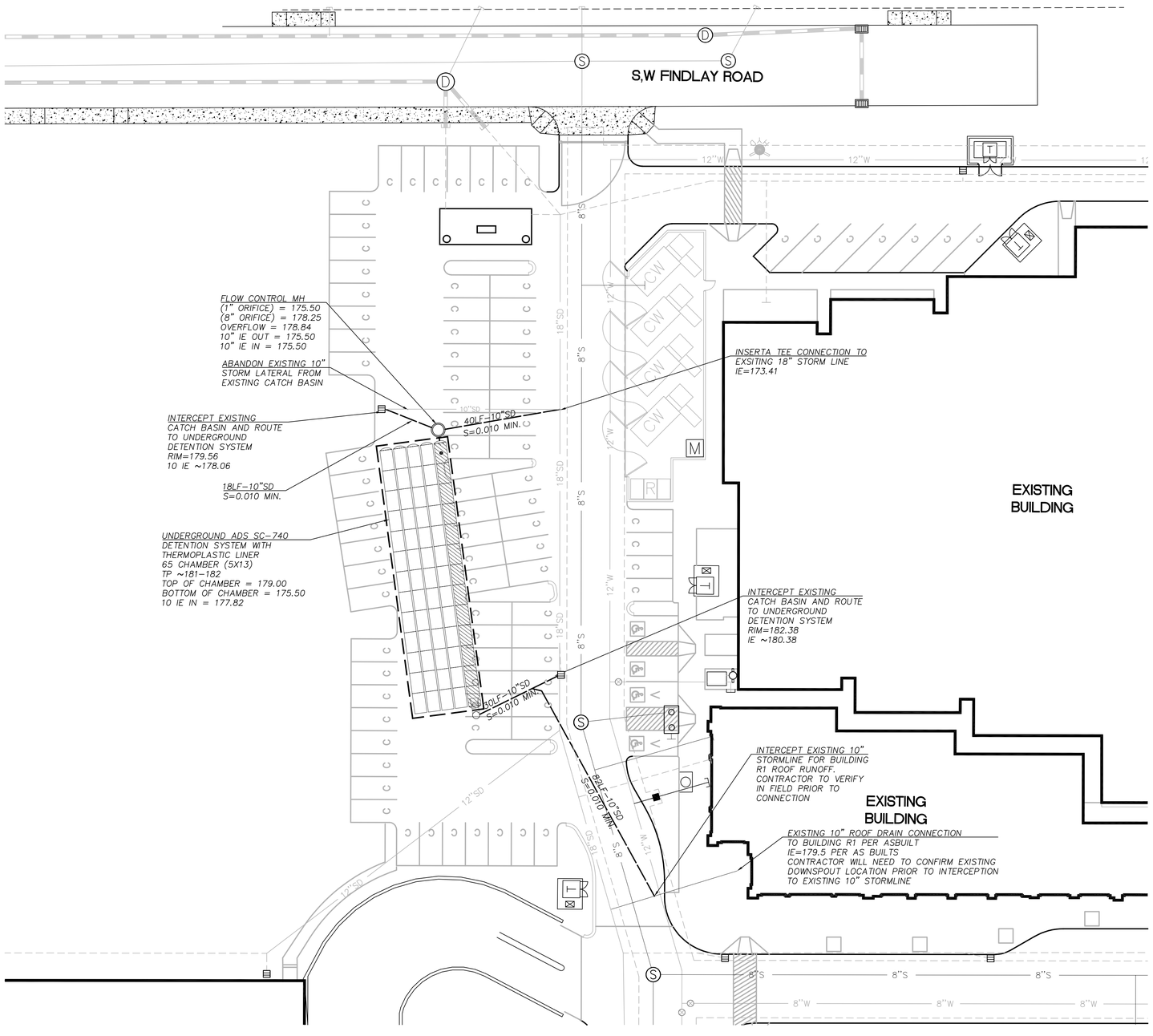
MAR Addition
Total modified impervious
34,50 0sf +1,800 sf=
36,350 sf
36,350/1,200,000 = **3%**

Appendix B

Utility Plan

SHEET LEGEND

SYMBOL	DESCRIPTION
———	PROPOSED STORM DRAIN
– – –	PROPOSED PERFORATED DRAIN
———	PROPOSED SANITARY
———	PROPOSED WATER
X"S	EXISTING SANITARY
X"SD	EXISTING STORM
X"W	EXISTING WATER
ADS SC-740 CHAMBER SYSTEM	SEE DETAIL 3, SHEET CG-301
FLOW CONTROL MH	SEE DETAIL 2, SHEET CG-301



GRAPHIC SCALE
0 20 40
1 inch = 20 ft.

8/19/2021 9:31:16 AM

ARCHITECT:

505 DESIGN

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704 348 7000

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PROJECT ADDRESS:
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Tigard, OR 97224

CONSULTANTS:

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Issued For:
CONSTRUCTION DOCUMENTS

01/30/2020
Professional Seals

No.	Description	Date

Project No: 1207

Issue Date
NOVEMBER 19 2021

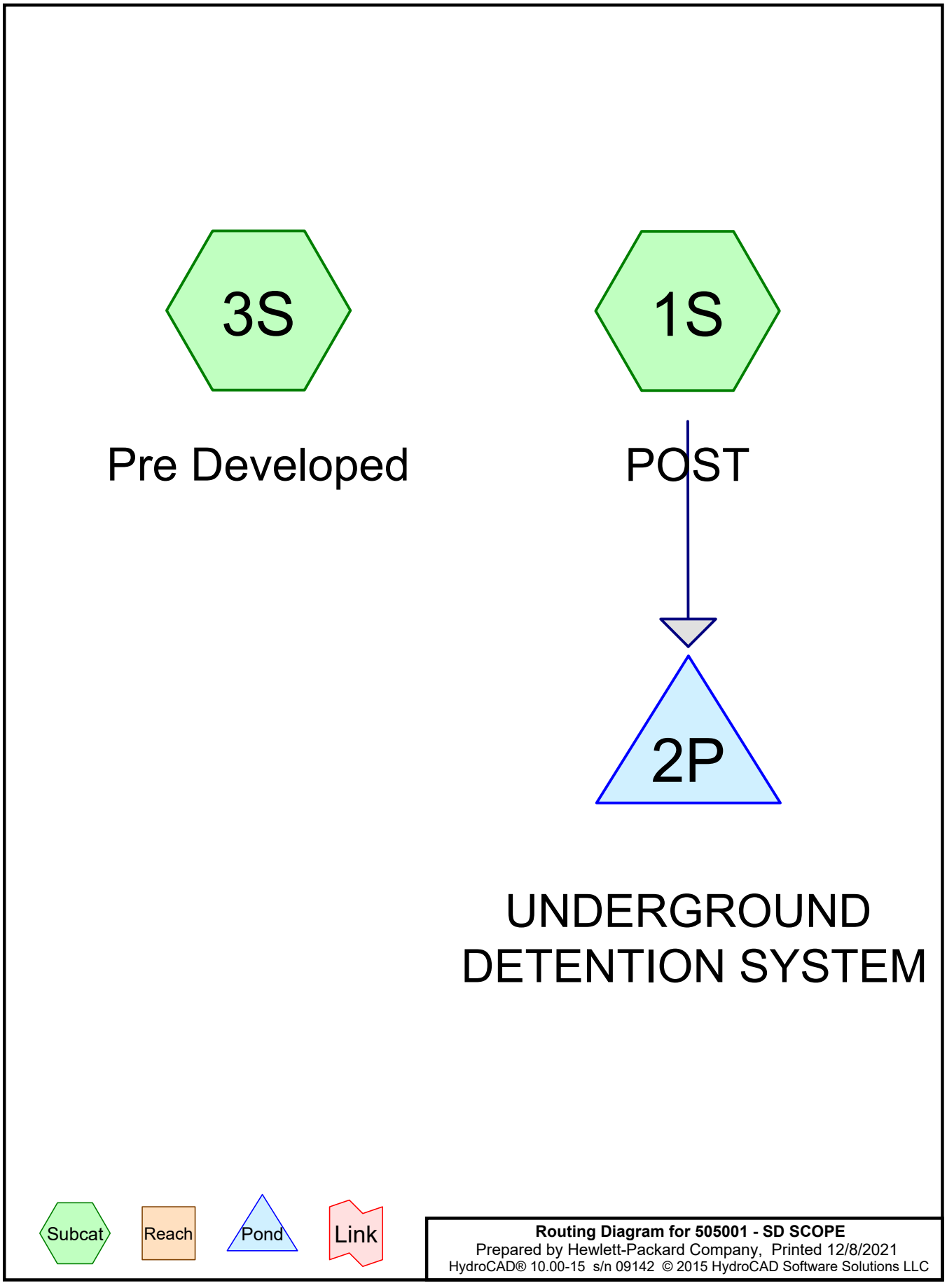
Sheet Title
UTILITY PLAN
UNDERGROUND
STORM DETENTION

Original drawing is 24 x 36. Do not scale contents of this drawing.

Sheet Number
CG-111

Appendix C

Storm Calculations



Routing Diagram for 505001 - SD SCOPE
Prepared by Hewlett-Packard Company, Printed 12/8/2021

Summary for Subcatchment 1S: POST

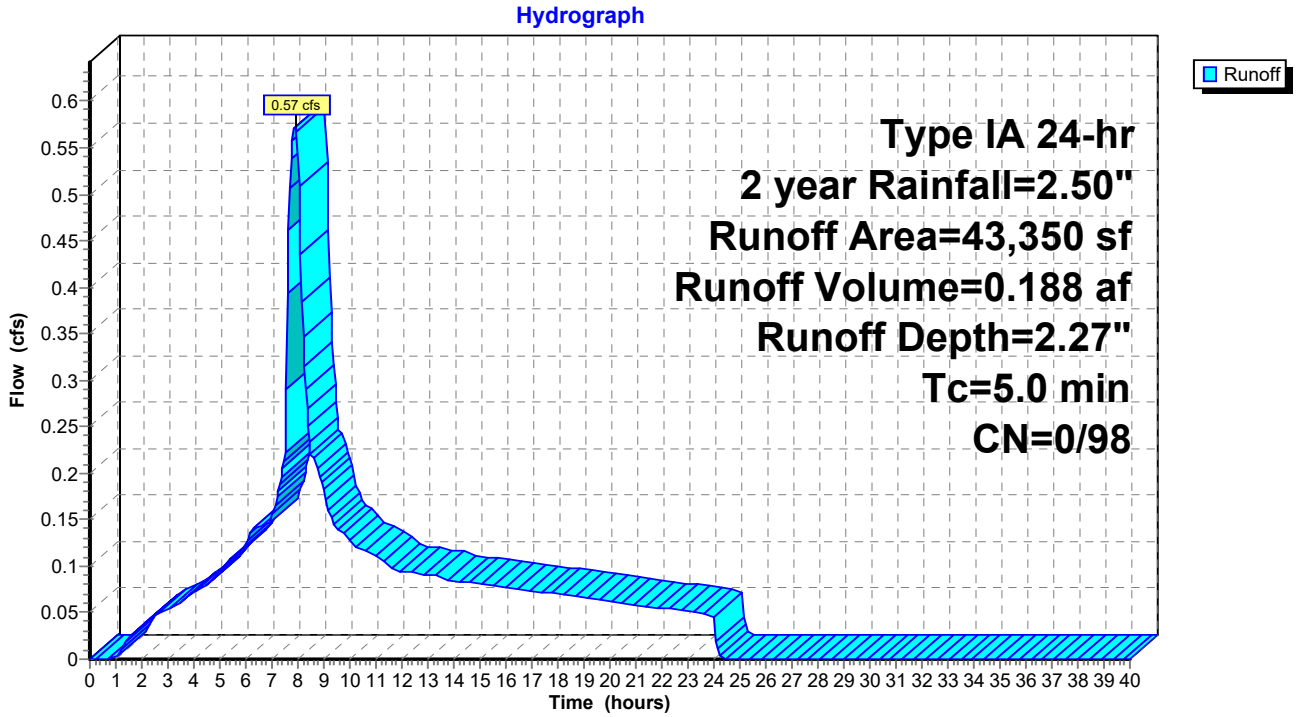
Runoff = 0.57 cfs @ 7.90 hrs, Volume= 0.188 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 year Rainfall=2.50"

	Area (sf)	CN	Description
*	43,350	98	
	43,350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: POST



Summary for Subcatchment 3S: Pre Developed

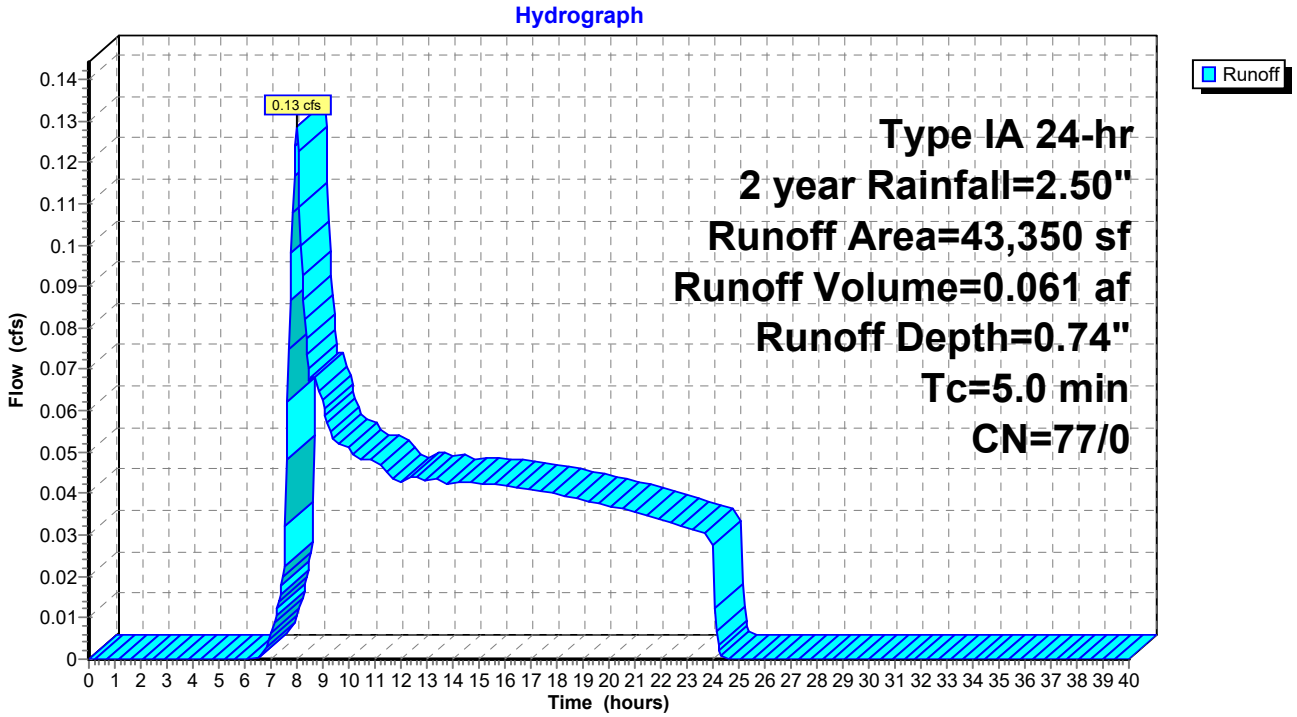
Runoff = 0.13 cfs @ 8.00 hrs, Volume= 0.061 af, Depth= 0.74"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 year Rainfall=2.50"

Area (sf)	CN	Description
43,350	77	Woods, Good, HSG D
43,350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: Pre Developed



Summary for Pond 2P: UNDERGROUND DETENTION SYSTEM

Inflow Area = 0.995 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 year event
Inflow = 0.57 cfs @ 7.90 hrs, Volume= 0.188 af
Outflow = 0.06 cfs @ 19.85 hrs, Volume= 0.159 af, Atten= 89%, Lag= 717.0 min
Primary = 0.06 cfs @ 19.85 hrs, Volume= 0.159 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 102.60' @ 19.85 hrs Surf.Area= 0.055 ac Storage= 0.097 af

Plug-Flow detention time= 722.9 min calculated for 0.159 af (84% of inflow)
Center-of-Mass det. time= 615.2 min (1,289.0 - 673.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	0.050 af	**25.25'W x 95.00'L x 3.50'H Field A** 0.193 af Overall - 0.069 af Embedded = 0.124 af x 40.0% Voids
#2A	100.50'	0.069 af	**ADS_StormTech SC-740** x 65 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 5 rows
		0.118 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**1.2" Horiz. Orifice/Grate** C= 0.620 Limited to weir flow at low heads
#2	Primary	103.40'	**8.0" Vert. Orifice/Grate** C= 0.620
#3	Primary	102.75'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.06 cfs @ 19.85 hrs HW=102.60' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 8.02 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION SYSTEM - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 5 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

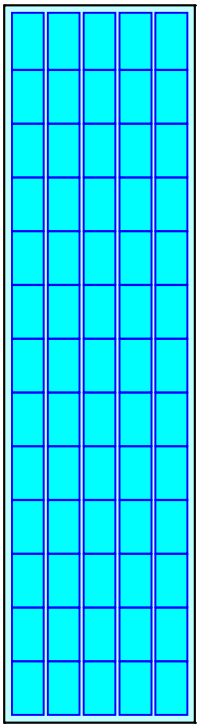
13 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 93.00' Row Length +12.0" End Stone x 2 = 95.00' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

65 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 5 Rows = 3,000.3 cf Chamber Storage

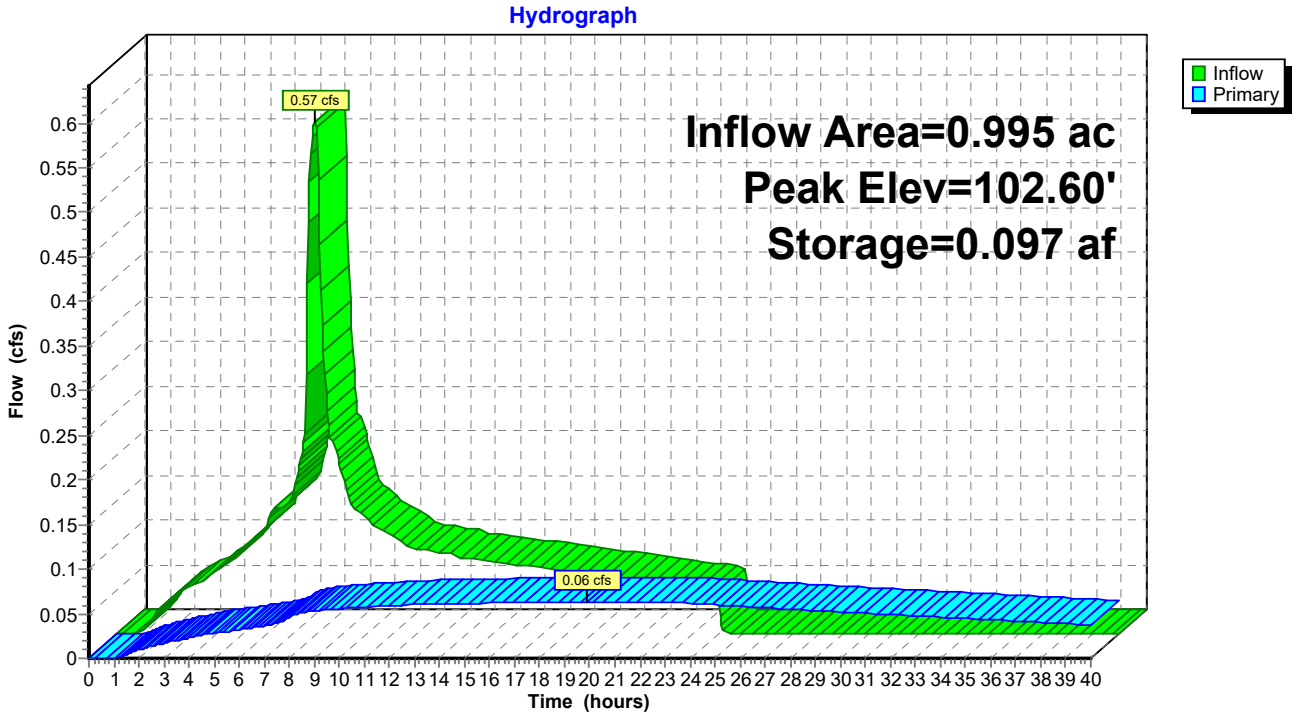
8,395.6 cf Field - 3,000.3 cf Chambers = 5,395.3 cf Stone x 40.0% Voids = 2,158.1 cf Stone Storage

Chamber Storage + Stone Storage = 5,158.4 cf = 0.118 af
Overall Storage Efficiency = 61.4%

65 Chambers
310.9 cy Field
199.8 cy Stone



Pond 2P: UNDERGROUND DETENTION SYSTEM



Summary for Subcatchment 1S: POST

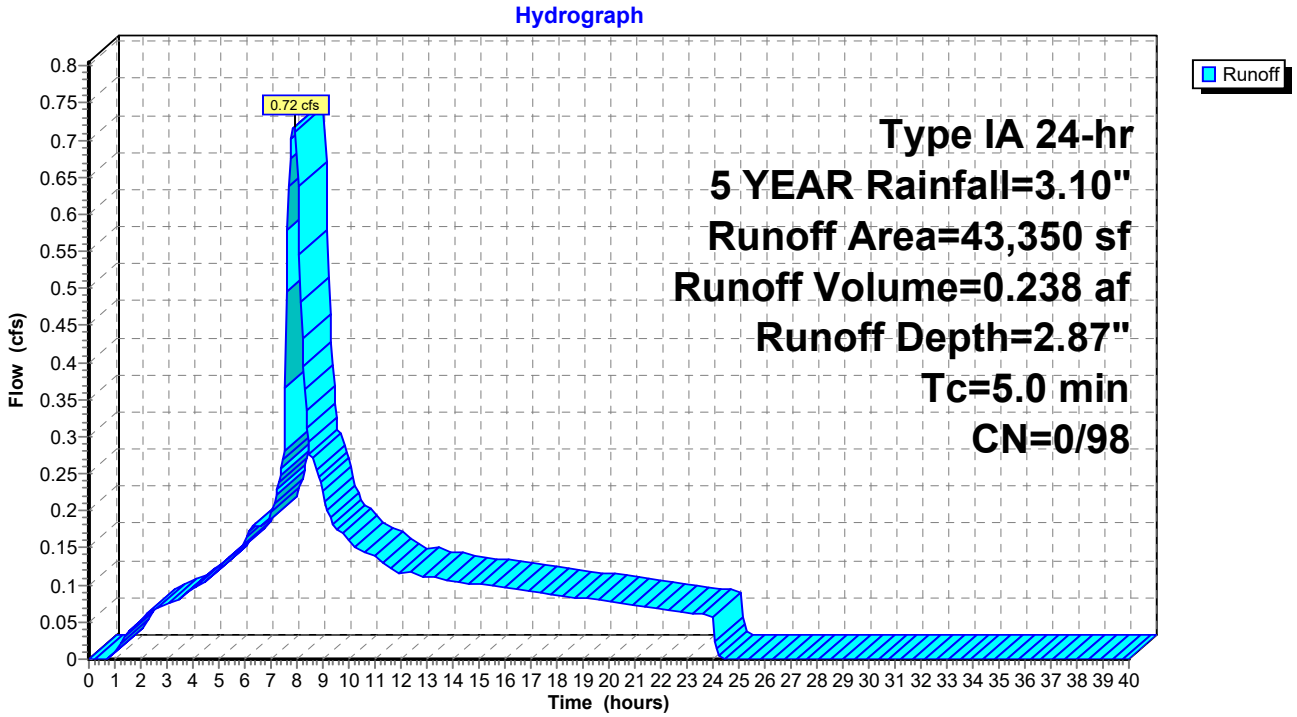
Runoff = 0.72 cfs @ 7.90 hrs, Volume= 0.238 af, Depth= 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 YEAR Rainfall=3.10"

	Area (sf)	CN	Description
*	43,350	98	
	43,350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: POST



Summary for Subcatchment 3S: Pre Developed

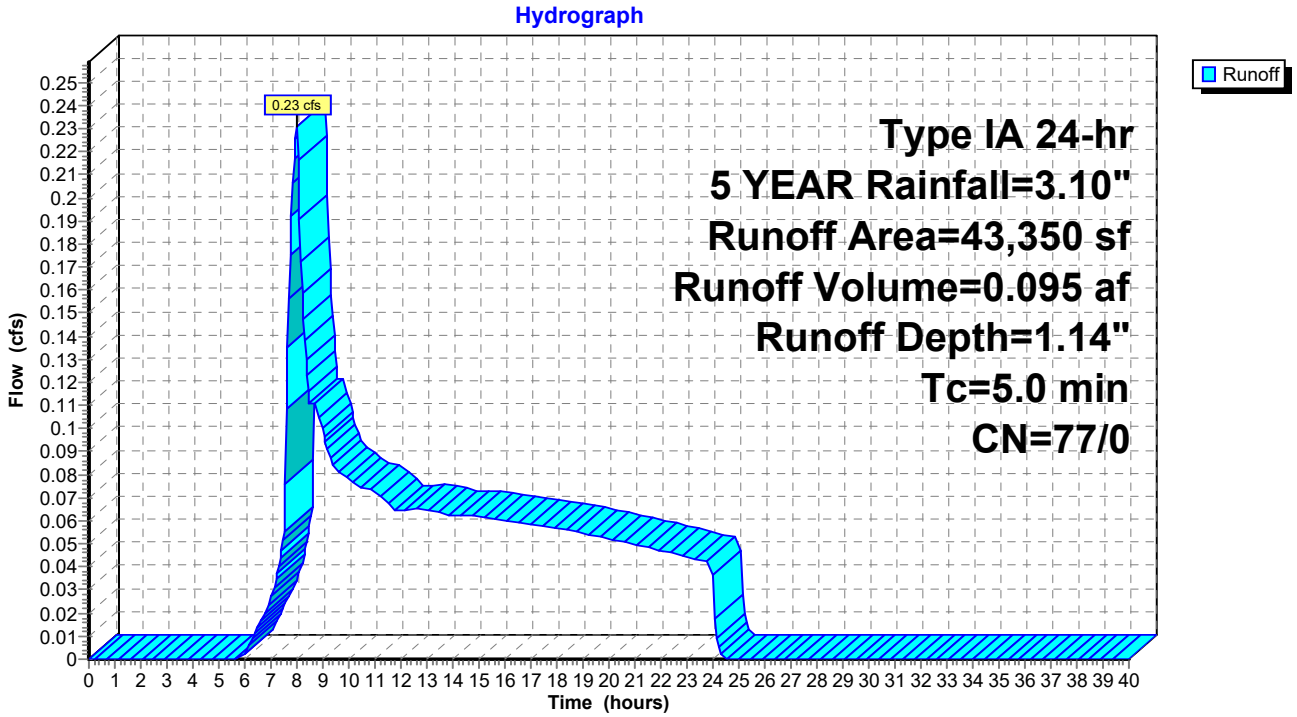
Runoff = 0.23 cfs @ 7.99 hrs, Volume= 0.095 af, Depth= 1.14"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 YEAR Rainfall=3.10"

Area (sf)	CN	Description
43,350	77	Woods, Good, HSG D
43,350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: Pre Developed



Summary for Pond 2P: UNDERGROUND DETENTION SYSTEM

Inflow Area = 0.995 ac,100.00% Impervious, Inflow Depth = 2.87" for 5 YEAR event
Inflow = 0.72 cfs @ 7.90 hrs, Volume= 0.238 af
Outflow = 0.14 cfs @ 11.02 hrs, Volume= 0.204 af, Atten= 81%, Lag= 187.5 min
Primary = 0.14 cfs @ 11.02 hrs, Volume= 0.204 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 102.89' @ 11.02 hrs Surf.Area= 0.055 ac Storage= 0.105 af

Plug-Flow detention time= 636.3 min calculated for 0.204 af (86% of inflow)
Center-of-Mass det. time= 536.5 min (1,203.9 - 667.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	0.050 af	**25.25'W x 95.00'L x 3.50'H Field A** 0.193 af Overall - 0.069 af Embedded = 0.124 af x 40.0% Voids
#2A	100.50'	0.069 af	**ADS_StormTech SC-740** x 65 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 5 rows
		0.118 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**1.2" Horiz. Orifice/Grate** C= 0.620 Limited to weir flow at low heads
#2	Primary	103.40'	**8.0" Vert. Orifice/Grate** C= 0.620
#3	Primary	102.75'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.14 cfs @ 11.02 hrs HW=102.89' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 8.46 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.29 fps)

Pond 2P: UNDERGROUND DETENTION SYSTEM - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 5 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

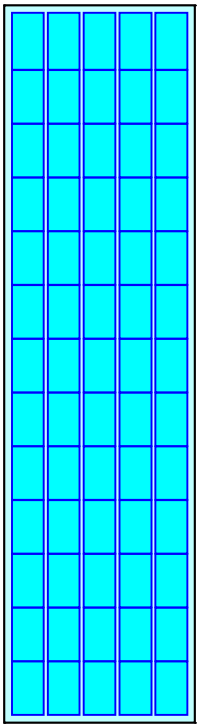
13 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 93.00' Row Length +12.0" End Stone x 2 = 95.00' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

65 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 5 Rows = 3,000.3 cf Chamber Storage

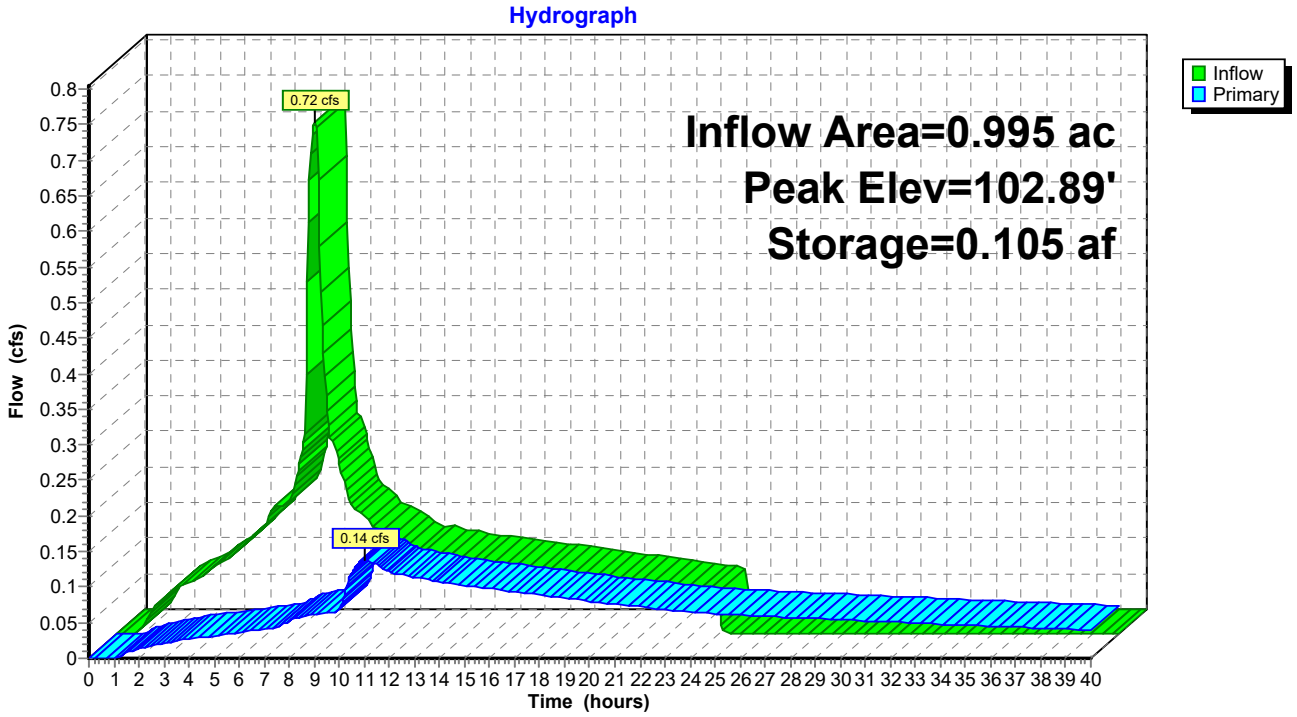
8,395.6 cf Field - 3,000.3 cf Chambers = 5,395.3 cf Stone x 40.0% Voids = 2,158.1 cf Stone Storage

Chamber Storage + Stone Storage = 5,158.4 cf = 0.118 af
Overall Storage Efficiency = 61.4%

65 Chambers
310.9 cy Field
199.8 cy Stone



Pond 2P: UNDERGROUND DETENTION SYSTEM



Summary for Subcatchment 1S: POST

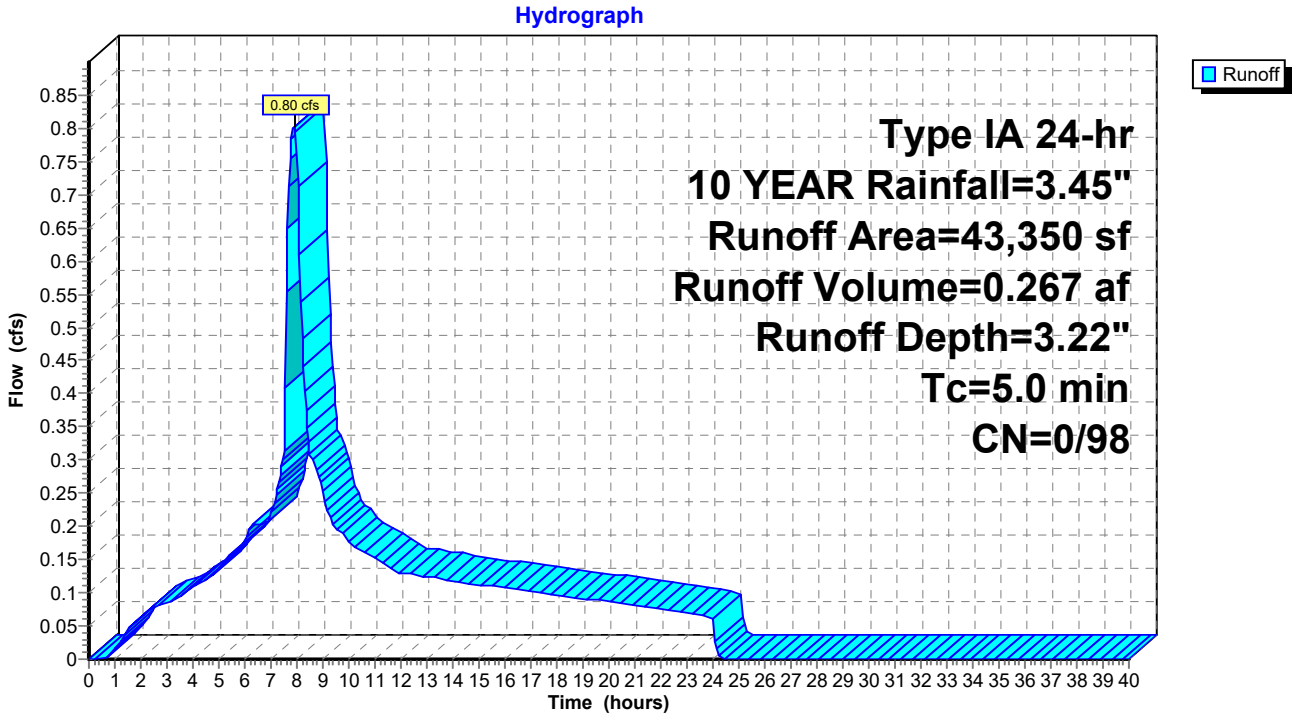
Runoff = 0.80 cfs @ 7.90 hrs, Volume= 0.267 af, Depth= 3.22"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.45"

	Area (sf)	CN	Description
*	43,350	98	
	43,350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: POST



Summary for Subcatchment 3S: Pre Developed

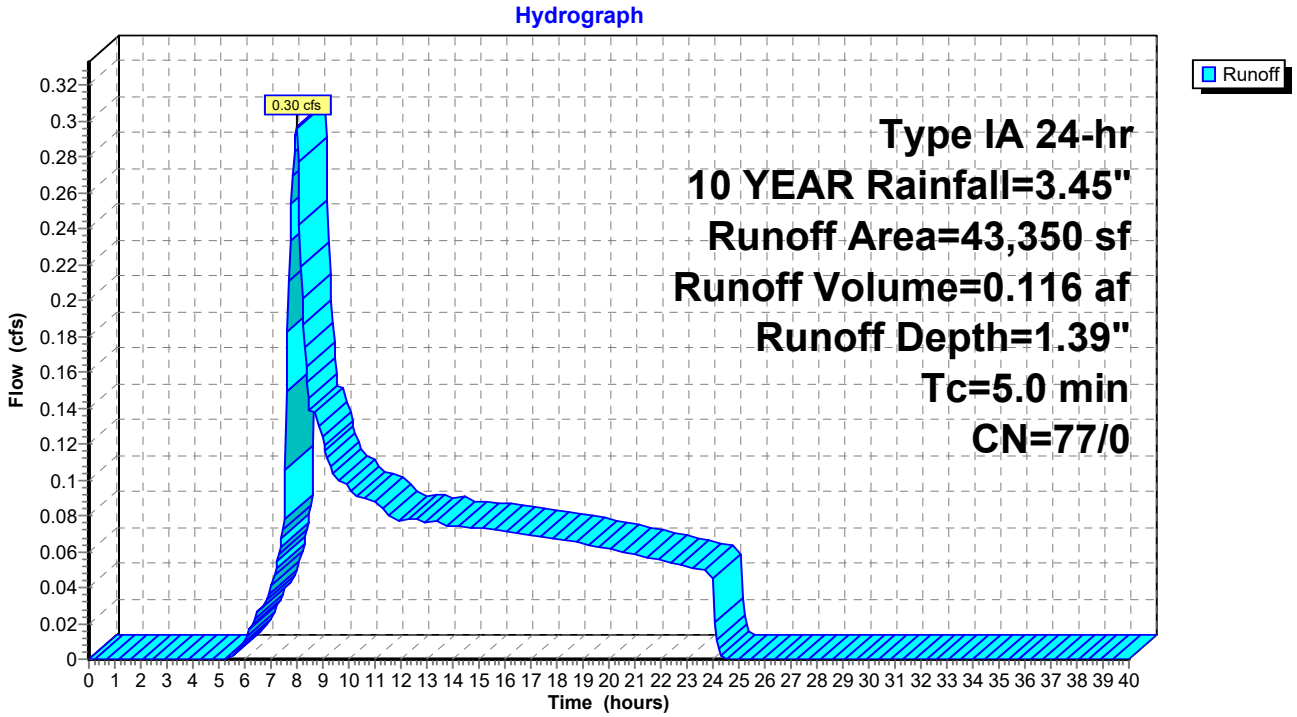
Runoff = 0.30 cfs @ 7.98 hrs, Volume= 0.116 af, Depth= 1.39"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.45"

Area (sf)	CN	Description
43,350	77	Woods, Good, HSG D
43,350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: Pre Developed



Summary for Pond 2P: UNDERGROUND DETENTION SYSTEM

Inflow Area = 0.995 ac,100.00% Impervious, Inflow Depth = 3.22" for 10 YEAR event
Inflow = 0.80 cfs @ 7.90 hrs, Volume= 0.267 af
Outflow = 0.20 cfs @ 9.40 hrs, Volume= 0.232 af, Atten= 75%, Lag= 89.9 min
Primary = 0.20 cfs @ 9.40 hrs, Volume= 0.232 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 102.95' @ 9.40 hrs Surf.Area= 0.055 ac Storage= 0.106 af

Plug-Flow detention time= 572.8 min calculated for 0.232 af (87% of inflow)
Center-of-Mass det. time= 482.4 min (1,146.8 - 664.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	0.050 af	**25.25'W x 95.00'L x 3.50'H Field A** 0.193 af Overall - 0.069 af Embedded = 0.124 af x 40.0% Voids
#2A	100.50'	0.069 af	**ADS_StormTech SC-740** x 65 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 5 rows
		0.118 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**1.2" Horiz. Orifice/Grate** C= 0.620 Limited to weir flow at low heads
#2	Primary	103.40'	**8.0" Vert. Orifice/Grate** C= 0.620
#3	Primary	102.75'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.20 cfs @ 9.40 hrs HW=102.95' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 8.54 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.13 cfs @ 1.52 fps)

Pond 2P: UNDERGROUND DETENTION SYSTEM - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 5 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

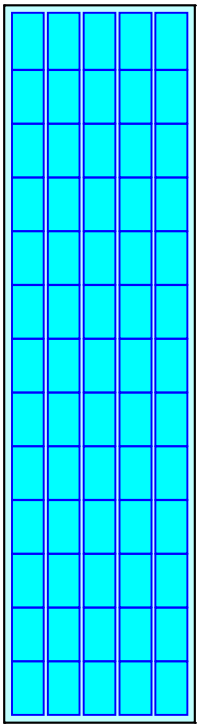
13 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 93.00' Row Length +12.0" End Stone x 2 = 95.00' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

65 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 5 Rows = 3,000.3 cf Chamber Storage

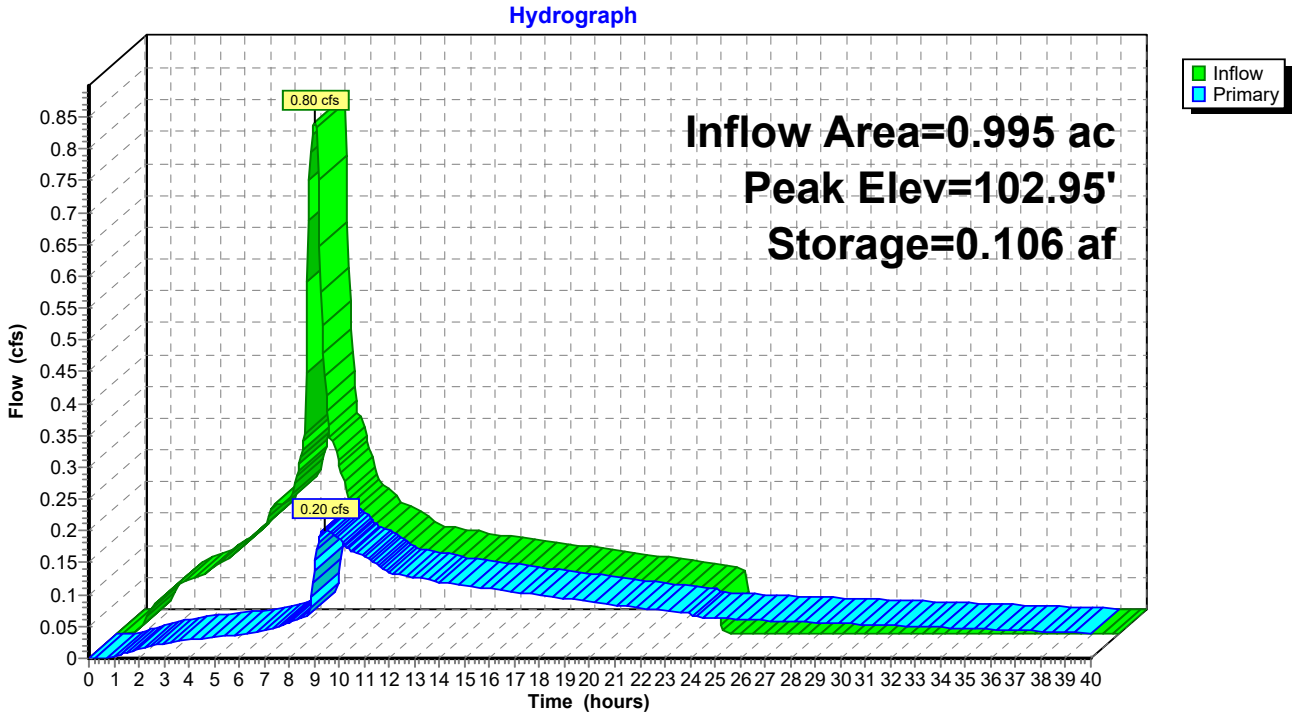
8,395.6 cf Field - 3,000.3 cf Chambers = 5,395.3 cf Stone x 40.0% Voids = 2,158.1 cf Stone Storage

Chamber Storage + Stone Storage = 5,158.4 cf = 0.118 af
Overall Storage Efficiency = 61.4%

65 Chambers
310.9 cy Field
199.8 cy Stone



Pond 2P: UNDERGROUND DETENTION SYSTEM



Summary for Subcatchment 1S: POST

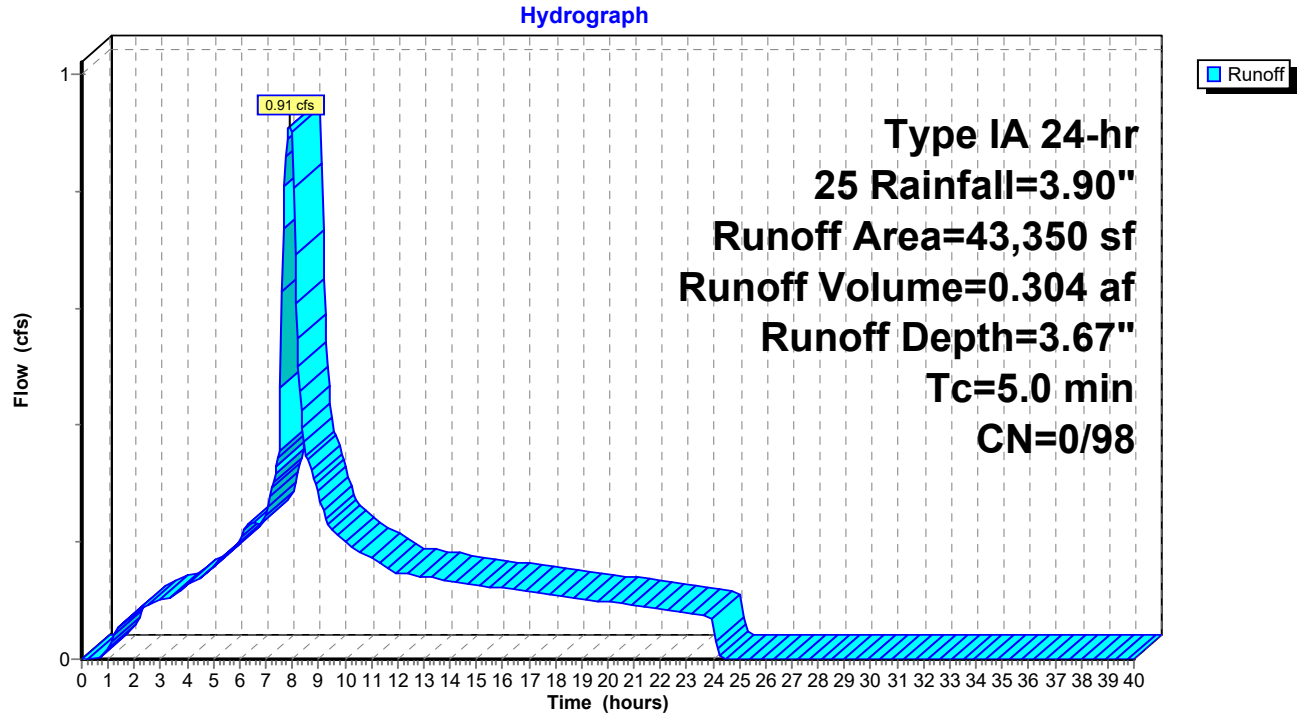
Runoff = 0.91 cfs @ 7.90 hrs, Volume= 0.304 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Rainfall=3.90"

	Area (sf)	CN	Description
*	43,350	98	
	43,350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: POST



Summary for Subcatchment 3S: Pre Developed

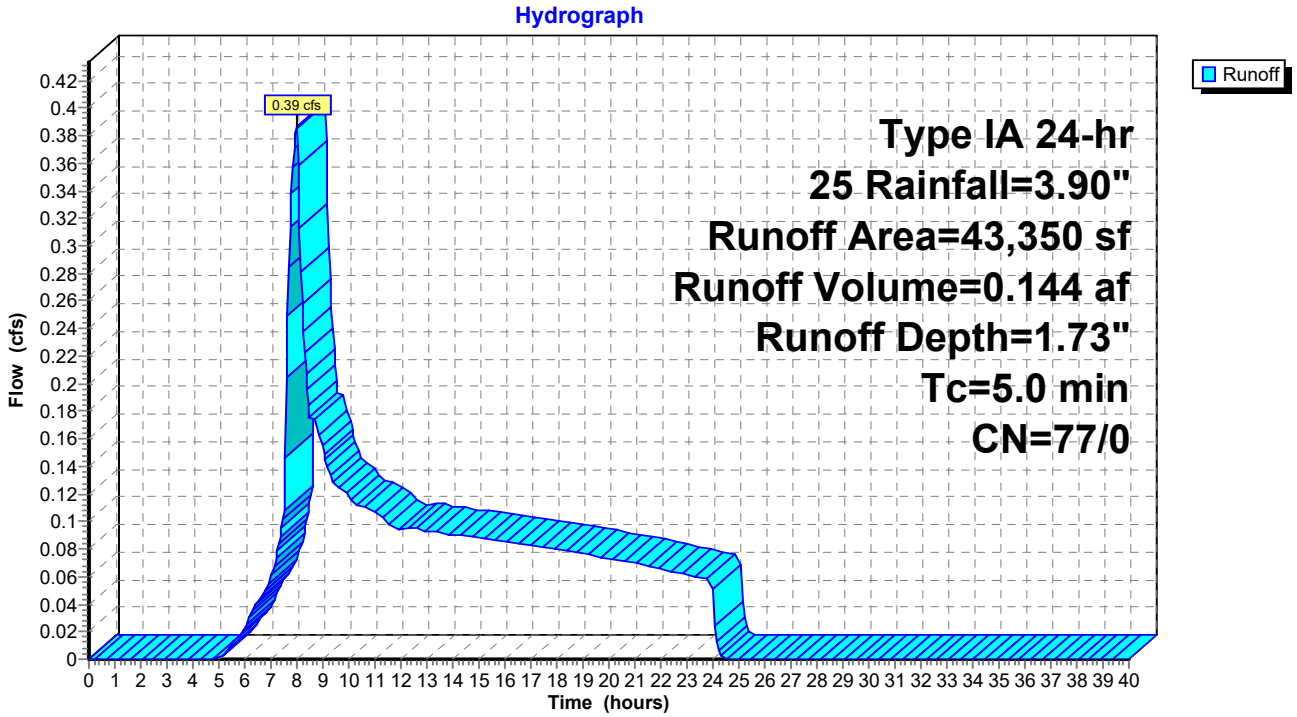
Runoff = 0.39 cfs @ 7.98 hrs, Volume= 0.144 af, Depth= 1.73"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Rainfall=3.90"

Area (sf)	CN	Description
43,350	77	Woods, Good, HSG D
43,350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: Pre Developed



Summary for Pond 2P: UNDERGROUND DETENTION SYSTEM

Inflow Area = 0.995 ac,100.00% Impervious, Inflow Depth = 3.67" for 25 event
Inflow = 0.91 cfs @ 7.90 hrs, Volume= 0.304 af
Outflow = 0.34 cfs @ 8.70 hrs, Volume= 0.269 af, Atten= 63%, Lag= 48.0 min
Primary = 0.34 cfs @ 8.70 hrs, Volume= 0.269 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 103.04' @ 8.70 hrs Surf.Area= 0.055 ac Storage= 0.108 af

Plug-Flow detention time= 508.1 min calculated for 0.269 af (89% of inflow)
Center-of-Mass det. time= 426.1 min (1,087.4 - 661.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	0.050 af	**25.25'W x 95.00'L x 3.50'H Field A** 0.193 af Overall - 0.069 af Embedded = 0.124 af x 40.0% Voids
#2A	100.50'	0.069 af	**ADS_StormTech SC-740** x 65 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 5 rows
		0.118 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**1.2" Horiz. Orifice/Grate** C= 0.620 Limited to weir flow at low heads
#2	Primary	103.40'	**8.0" Vert. Orifice/Grate** C= 0.620
#3	Primary	102.75'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.34 cfs @ 8.70 hrs HW=103.04' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 8.68 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 0.27 cfs @ 1.84 fps)

Pond 2P: UNDERGROUND DETENTION SYSTEM - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 5 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

13 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 93.00' Row Length +12.0" End Stone x 2 = 95.00' Base Length
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6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

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8,395.6 cf Field - 3,000.3 cf Chambers = 5,395.3 cf Stone x 40.0% Voids = 2,158.1 cf Stone Storage

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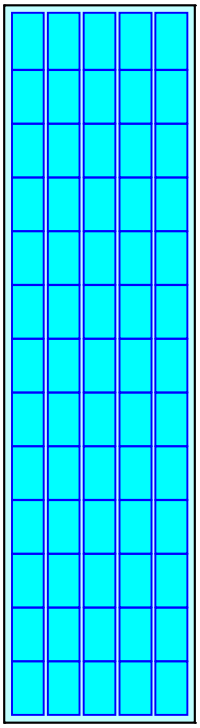
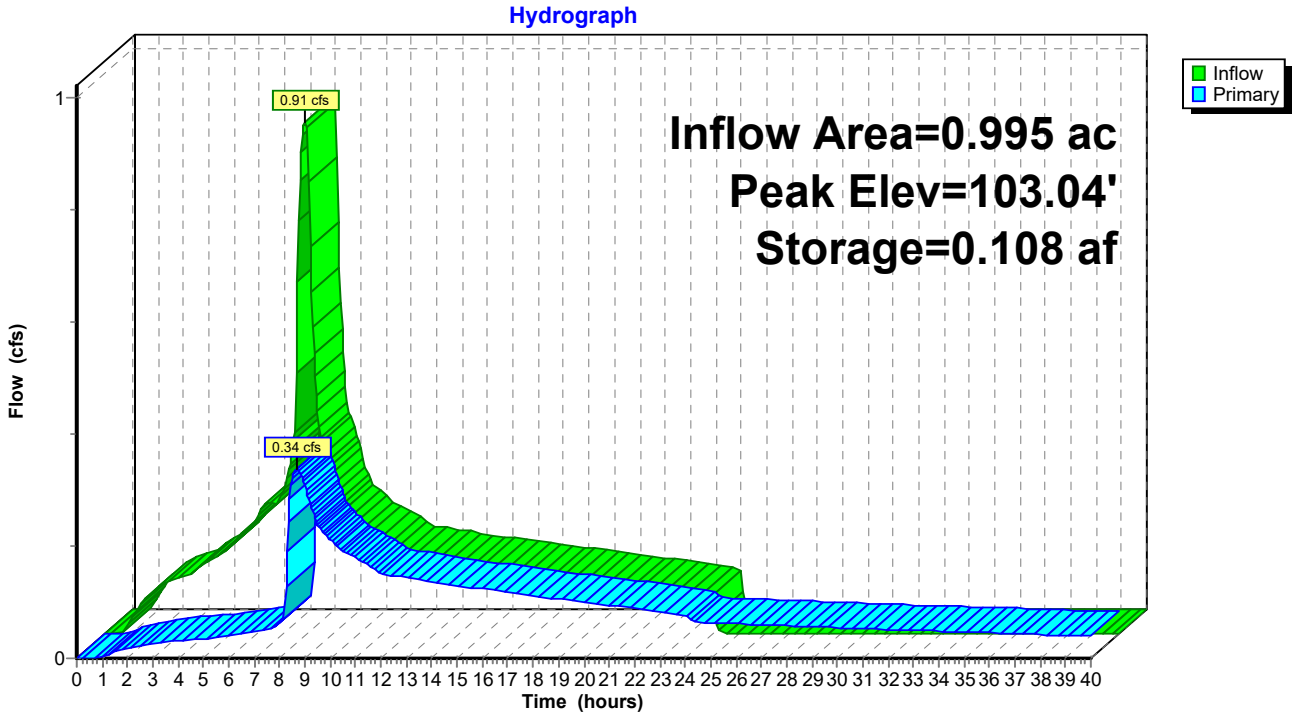
65 Chambers
310.9 cy Field
199.8 cy Stone



Pond 2P: UNDERGROUND DETENTION SYSTEM



Appendix D

Existing Storm Report

AR03-15

LDC
DESIGN GROUP INC

Storm Drainage Report

Bridgeport Village
March 4, 2004

Kenneth Karcher, PE

Prepared For: *Opus Northwest*
1000 SW Broadway, Suite 1130
Portland, OR 97205
503.916.8963

Prepared By: *LDC Design Group, Inc*
3300 NW 211th Terrace
Hillsboro, OR 97124
503.858.4242

Submitted to: *Cleanwater Services*

LDC
DESIGN GROUP INC

Storm Drainage Report

Bridgeport Village
March 4, 2004

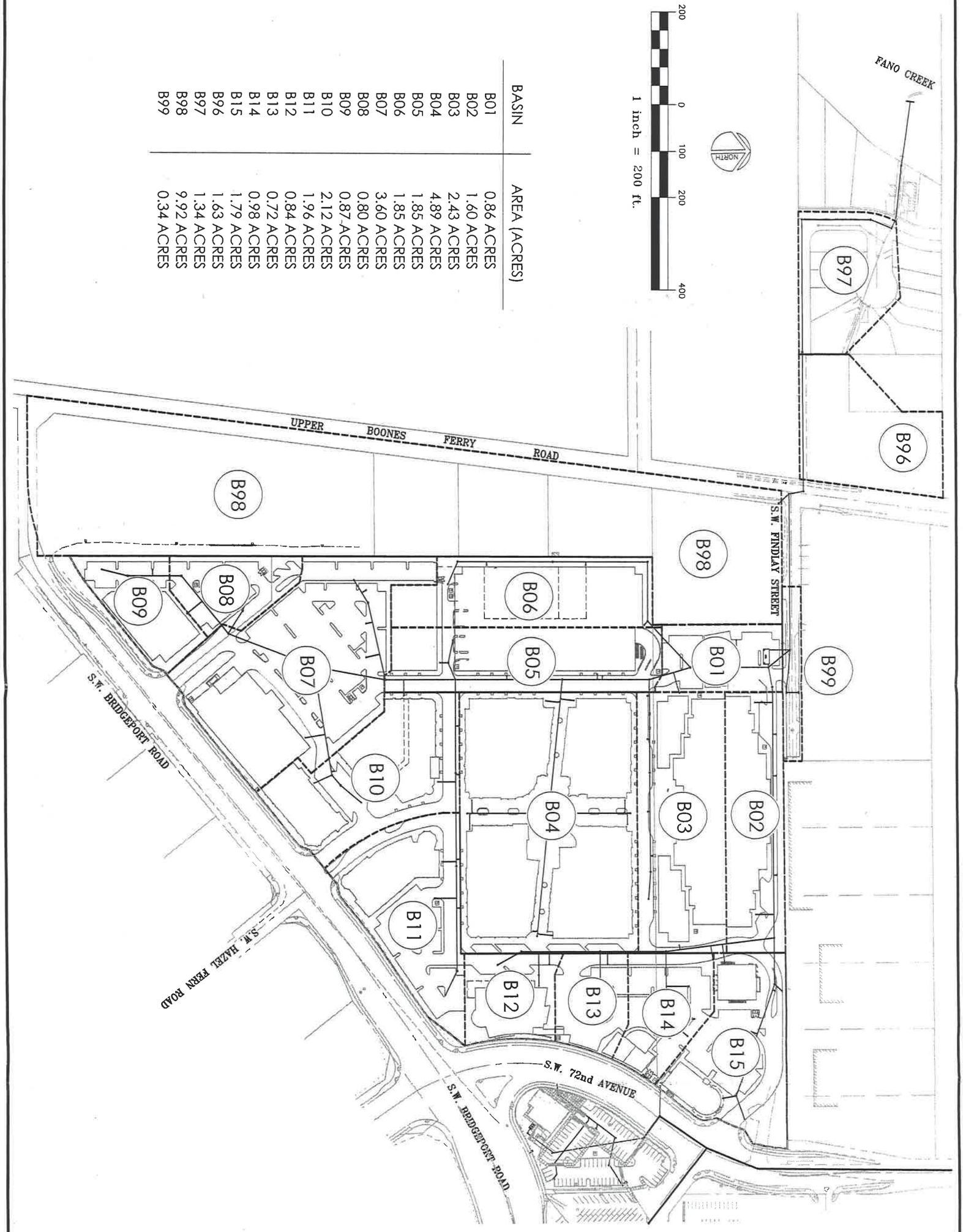
Prepared For: *Opus Northwest*
1000 SW Broadway, Suite 1130
Portland, OR 97205
503.916.8963

Prepared By: Kenneth D. Karcher
LDC Design Group, Inc
3300 NW 211th Terrace
Hillsboro, OR 97124
503.858.4258

Submitted to: *Cleanwater Services*

Contents

Attachment



BASIN	AREA (ACRES)
B01	0.86 ACRES
B02	1.60 ACRES
B03	2.43 ACRES
B04	4.89 ACRES
B05	1.85 ACRES
B06	1.85 ACRES
B07	3.60 ACRES
B08	0.80 ACRES
B09	0.87 ACRES
B10	2.12 ACRES
B11	1.96 ACRES
B12	0.84 ACRES
B13	0.72 ACRES
B14	0.98 ACRES
B15	1.79 ACRES
B96	1.63 ACRES
B97	1.34 ACRES
B98	9.92 ACRES
B99	0.34 ACRES

PREPARED FOR:
OPUS NORTHWEST L.L.C.
1000 S.W. BROADWAY
PORTLAND, OREGON 97105
(503) 916-8963

LDC DESIGN GROUP
Planners
Engineers
Surveyors
20085 N.W. TANASBOURNE DR.
HILLSBORO, OREGON 97124
PHONE:(503) 859-4242
FAX:(503) 645-5500
www.ldcdesign.com

PROJECT
BRIDGEPORT VILLAGE
CITY OF TUALTIN

DRAWING TITLE:
DRAINAGE ANALYSIS
BASIN DELINEATION

JOB NO.: 2751

DRAWING NO. 1 OF 1

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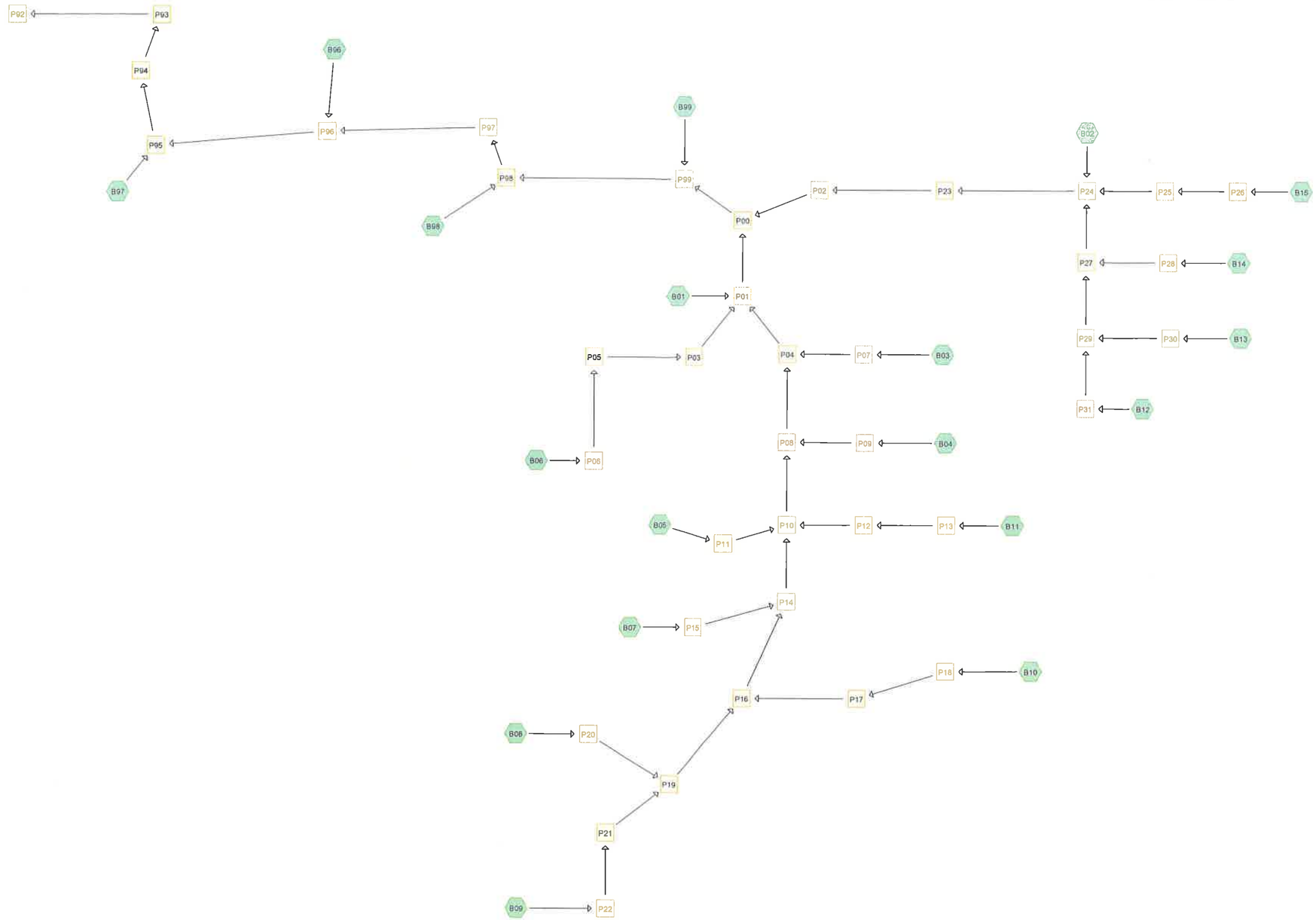


Subcat Reach Pond Link

Drainage Diagram for 2751-Drainage-03-02-04

Prepared by LDC Design Group Inc. 3/3/2004

Hydrological Summary

Storm Events		
2-Year, 24-Hour Event	=	2.50"
10-Year, 24-Hour Event	=	3.50"
25-Year, 24-Hour Event	=	3.90"
100-Year, 24-Hour Event	=	4.50"

SCS Curve Numbers		
	Type	CN
Pervious	C	86
Impervious	C	98

Basin Summary

Basin	Pervious		Impervious		Total	
	Area	CN	Area	CN	Area	CN
B96	1.22 ac	86	0.41 ac	98	1.63 ac	89
B97	0.60 ac	86	0.74 ac	98	1.34 ac	93
B98	8.67 ac	86	1.25 ac	98	9.92 ac	88
B99	0.03 ac	86	0.31 ac	98	0.34 ac	97
B01	0.09 ac	86	0.77 ac	98	0.86 ac	97
B02	0.19 ac	86	1.41 ac	98	1.60 ac	97
B03	0.02 ac	86	2.41 ac	98	2.43 ac	98
B04	0.05 ac	86	4.84 ac	98	4.89 ac	98
B05	0.02 ac	86	1.83 ac	98	1.85 ac	98
B06	0.13 ac	86	1.70 ac	98	1.83 ac	97
B07	0.04 ac	86	3.56 ac	98	3.60 ac	98
B08	0.12 ac	86	0.68 ac	98	0.80 ac	96
B09	0.13 ac	86	0.74 ac	98	0.87 ac	96
B10	0.02 ac	86	2.10 ac	98	2.12 ac	98
B11	0.29 ac	86	1.67 ac	98	1.96 ac	96
B12	0.07 ac	86	0.78 ac	98	0.85 ac	97
B13	0.06 ac	86	0.66 ac	98	0.72 ac	97
B14	0.10 ac	86	0.88 ac	98	0.98 ac	97
B15	0.36 ac	86	1.43 ac	98	1.79 ac	96

Total Impervious Onsite = 25.46 ac

Offsite Basins - B96 Thru B99
Onsite Basins - B01 Thru B15

Water Quality Calculation

Description: The following calculation is based on Clean Water Service's design guidelines for water quality treatment. A treatment flow is determined based upon a 4 hour storm event with 0.36 inches of rainfall over impervious surface areas. This flow is then used to size the applicable treatment device. In this case, we have selected Stormfilter, which is manufactured by Stormwater Management, Inc. Each stormfilter cartridge can handle 15 gallons of stormwater per minute. In this instance, a stormfilter unit consisting of 70 cartridges is needed to meet the requirements of Clean Water Services. Please see calculation below.

Water Quality Area

Bridgeport Village = **25.46 acres of impervious area**

Water Quality Flow

WQ Volume (cf) = $\frac{0.36 \text{ in} \times \text{Impervios Area (sf)}}{12 \text{ (in/ft)}}$

WQ Flow (cfs) = $\frac{\text{WQ Volume (cf)}}{(4 \text{ hr})(60 \text{ min/hr})(60 \text{ sec/min})}$

$= \frac{\text{Impervios Area (sf)}}{480{,}000 \text{ sec/ft}}$

$= \frac{25.46\text{ac} \times 43{,}560 \text{ sf/ac}}{480{,}000 \text{ sec/ft}}$

= **2.31 cfs**

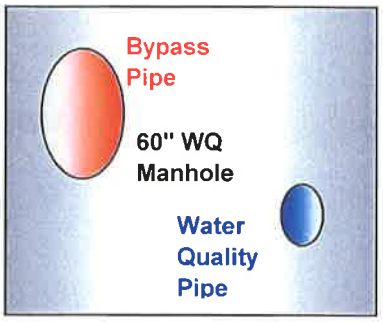
Stormwater Filters

= 1037 gpm

= 1037gpm / 15 gpm per cartridge

= **70 Cartridges Required** ⇦

Water Quality Manhole



10" OE = 18" IE
Elevation = 172.72

Outfall Pipes

	Size	Length	Slope	n	Q_{CAP}	IE	OE
WQ Pipe	10"	7 LF	0.0111	0.013	2.31 cfs	171.89	172.72
Bypass	18"	59 LF	0.0580	0.013	25.30 cfs	172.72	174.22

Design: The water quality pipe has been sized and sloped to direct 100% of the water quality flow through the water quality manhole. Specifically, a 10" pipe at a slope of 0.0111 will carry 2.31 cfs of runoff under non-pressure full-pipe flow conditions. During larger storm events, the stormwater level in the control manhole will rise above the obvert of the water quality pipe. When this occurs, the invert of the bypass pipe will begin to intercept stormwater. The table below shows the distribution of pipe flow as the water level rises above the obvert of the water quality pipe (elevation = 172.72).

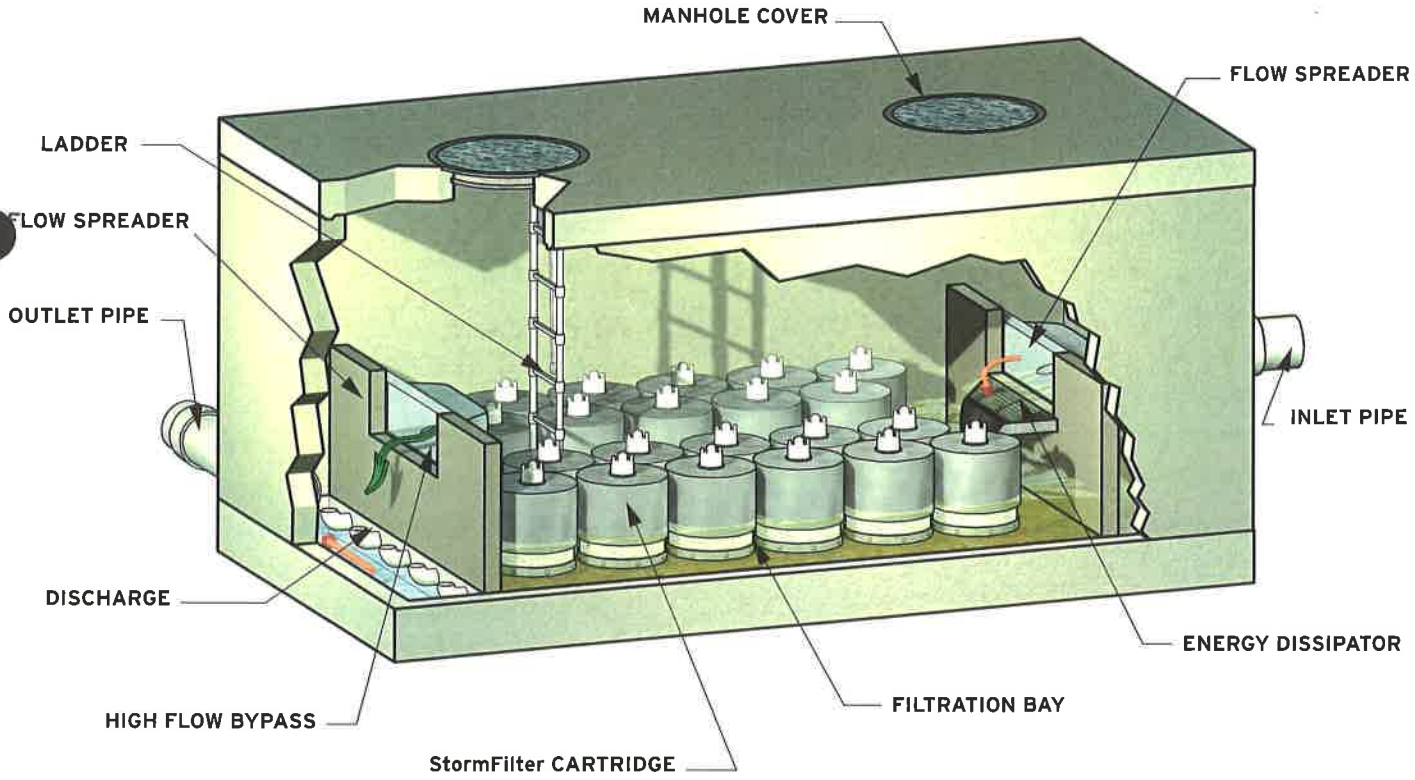
Water Quality Manhole Performance

Stage		WQ Pipe					Bypass Pipe (P00)					Total Q
Head	HGL	Slope	A	P_{WET}	R_{HYD}	Q_{WQ1}	Slope	Area	P_{WET}	R_{HYD}	Q_{BYPASS}	Q_{TOTAL}
(ft)	(ft)	(ft/LF)	(sq ft)	(ft)	(ft)	(cfs)	(ft/LF)	(sq ft)	(ft)	(ft)	(cfs)	(cfs)
0.00	172.72	0.0111	0.5454	2.6180	0.20833	2.31	0.0580	0	0	0	0	2.31
0.10	172.82	0.0254	0.5454	2.6180	0.20833	3.49	0.0580	0.05	0.78	0.06	0.22	3.72
0.20	172.92	0.0397	0.5454	2.6180	0.20833	4.36	0.0580	0.14	1.12	0.12	0.96	5.33
0.30	173.02	0.0540	0.5454	2.6180	0.20833	5.09	0.0580	0.25	1.39	0.18	2.22	7.31
0.40	173.12	0.0683	0.5454	2.6180	0.20833	5.72	0.0580	0.38	1.63	0.23	3.94	9.66
0.50	173.22	0.0825	0.5454	2.6180	0.20833	6.29	0.0580	0.52	1.85	0.28	6.06	12.36
0.60	173.32	0.0968	0.5454	2.6180	0.20833	6.82	0.0580	0.66	2.05	0.32	8.53	15.34
0.70	173.42	0.1111	0.5454	2.6180	0.20833	7.30	0.0580	0.81	2.26	0.36	11.23	18.54
0.80	173.52	0.1254	0.5454	2.6180	0.20833	7.76	0.0580	0.96	2.46	0.39	14.09	21.85
0.8927	173.61	0.1386	0.5454	2.6180	0.20833	8.16	0.0580	1.10	2.64	0.41	16.79	24.94
0.90	173.62	0.1397	0.5454	2.6180	0.20833	8.19	0.0580	1.11	2.66	0.42	17.00	25.18
1.00	173.72	0.1540	0.5454	2.6180	0.20833	8.60	0.0580	1.25	2.87	0.44	19.83	28.43
1.0172	173.74	0.1564	0.5454	2.6180	0.20833	8.67	0.0580	1.28	2.90	0.44	20.30	28.97
1.10	173.82	0.1683	0.5454	2.6180	0.20833	8.99	0.0580	1.39	3.08	0.45	22.46	31.45
1.20	173.92	0.1825	0.5454	2.6180	0.20833	9.36	0.0580	1.52	3.32	0.46	24.73	34.09
1.30	174.02	0.1968	0.5454	2.6180	0.20833	9.72	0.0580	1.63	3.59	0.45	26.42	36.14
1.40	174.12	0.2111	0.5454	2.6180	0.20833	10.07	0.0580	1.72	3.93	0.44	27.21	37.28
1.50	174.22	0.2254	0.5454	2.6180	0.20833	10.40	0.0580	1.77	4.71	0.38	25.30	35.70

0.00	Less than Capacity, Non-Pressure Flow		Water Quality Event
0.00	At Capacity, Non-Pressure Flow		25-Year Event
0.00	Over Capacity, Pressure Flow		100-Year Event

THE STORMWATER MANAGEMENT StormFilter®

StormFilter



STORMWATER MANAGEMENT INC.™

12021-B NE Airport Way, Portland, OR 97220 // 800.548.4667 800.561.1271 stormwaterinc.com

Pipe Table - 25 Year Event

(1) PIPE	(2) SIZE	(3) LENGTH	(4) SLOPE	(5) HEAD LOSS	(6) Q_{ACTUAL}	(7) MANN. "N"	(8) $Q_{CAPACITY}$	(9) VELOCITY
P92	36"	116 LF	0.0331	0.29'	32.81 cfs	0.013	121.3 cfs	17.17 fps
P93	36"	22 LF	0.0025	0.06'	32.81 cfs	0.013	33.35 cfs	4.72 fps
P94	36"	49 LF	0.0025	0.12'	32.81 cfs	0.013	33.35 cfs	4.72 fps
P95	36"	147 LF	0.0025	0.36'	32.81 cfs	0.013	33.35 cfs	4.72 fps
P96	30"	286 LF	0.0025	1.71'	31.71 cfs	0.013	20.51 cfs	4.18 fps
P97	30"	301 LF	0.0025	1.68'	30.56 cfs	0.013	20.51 cfs	4.18 fps
P98	30"	31 LF	0.0025	0.18'	30.56 cfs	0.013	20.51 cfs	4.18 fps
P99	30"	389 LF	0.0025	1.48'	25.28 cfs	0.013	20.51 cfs	4.18 fps
P00	18"	59 LF	0.0549	3.34'	24.97 cfs	0.013	24.61 cfs	13.93 fps
P01	18"	167 LF	0.0100	5.80'	19.57 cfs	0.013	10.50 cfs	5.94 fps
P02	18"	43 LF	0.0030	0.12'	5.40 cfs	0.013	5.75 cfs	3.26 fps
P03	12"	135 LF	0.0200	0.30'	1.67 cfs	0.013	5.04 cfs	6.42 fps
P04	18"	92 LF	0.0030	2.45'	17.11 cfs	0.013	5.75 cfs	3.26 fps
P05	12"	128 LF	0.0050	0.29'	1.67 cfs	0.013	2.52 cfs	3.21 fps
P06	12"	407 LF	0.0050	0.90'	1.67 cfs	0.013	2.52 cfs	3.21 fps
P07	12"	413 LF	0.0050	1.67'	2.26 cfs	0.013	2.52 cfs	3.21 fps
P08	18"	187 LF	0.0073	3.74'	14.85 cfs	0.013	8.97 cfs	5.08 fps
P09	15"	290 LF	0.0050	1.44'	4.55 cfs	0.013	4.57 cfs	3.72 fps
P10	18"	229 LF	0.0050	2.21'	10.30 cfs	0.013	7.43 cfs	4.20 fps
P11	12"	39 LF	0.0040	0.10'	1.72 cfs	0.013	2.25 cfs	2.87 fps
P12	12"	305 LF	0.0050	0.74'	1.75 cfs	0.013	2.52 cfs	3.21 fps
P13	12"	319 LF	0.0050	0.77'	1.75 cfs	0.013	2.52 cfs	3.21 fps
P14	15"	150 LF	0.0130	1.68'	6.82 cfs	0.013	7.37 cfs	6.00 fps
P15	15"	168 LF	0.0060	0.46'	3.35 cfs	0.013	5.00 cfs	4.08 fps
P16	15"	156 LF	0.0200	0.46'	3.47 cfs	0.013	9.14 cfs	7.44 fps
P17	12"	235 LF	0.0040	0.72'	1.97 cfs	0.013	2.25 cfs	2.87 fps
P18	12"	29 LF	0.0101	0.09'	1.97 cfs	0.013	3.58 cfs	4.56 fps
P19	12"	195 LF	0.0050	0.35'	1.49 cfs	0.013	2.52 cfs	3.21 fps
P20	12"	57 LF	0.0051	0.03'	0.72 cfs	0.013	2.54 cfs	3.24 fps
P21	12"	159 LF	0.0400	0.08'	0.78 cfs	0.013	7.13 cfs	9.07 fps
P22	12"	114 LF	0.0050	0.06'	0.78 cfs	0.013	2.52 cfs	3.21 fps
P23	18"	300 LF	0.0030	0.80'	5.40 cfs	0.013	5.75 cfs	3.26 fps
P24	18"	239 LF	0.0030	0.64'	5.40 cfs	0.013	5.75 cfs	3.26 fps
P25	15"	100 LF	0.0030	0.07'	1.60 cfs	0.013	3.54 cfs	2.88 fps
P26	12"	256 LF	0.0050	0.52'	1.60 cfs	0.013	2.52 cfs	3.21 fps
P27	15"	233 LF	0.0050	0.31'	2.33 cfs	0.013	4.57 cfs	3.72 fps
P28	15"	147 LF	0.0040	0.03'	0.90 cfs	0.013	4.09 cfs	3.33 fps
P29	15"	141 LF	0.0050	0.08'	1.44 cfs	0.013	4.57 cfs	3.72 fps
P30	12"	77 LF	0.0050	0.03'	0.66 cfs	0.013	2.52 cfs	3.21 fps
P31	12"	170 LF	0.0050	0.09'	0.78 cfs	0.013	2.52 cfs	3.21 fps

Offsite Pipes - P92 Thru P99
Onsite Pipes - P00 Thru P31

Hydraulic Grade Line Analysis - 25 Year Event

Description: The hydraulic grade line analysis is shown below. During the 25-year 24-hour event 4.20 feet of freeboard is anticipated at the catch basin in the northeast corner of the site, which is the worst case scenario. Accordingly, the proposed conveyance system exceeds the requirements of Clean Water Services, which requires at least one foot of freeboard during the 25-year event.

B15

Pipe	P92	P93	P94	P95	P96	P97	P98	P99	P00	P02
HGLpipe	0.29'	0.06'	0.12'	0.36'	1.71'	1.68'	0.18'	1.48'	3.34'	0.12'
HGLstep	0.20'	0.20'	0.20'	3.09'	0.20'	0.20'	0.20'	0.20'	1.00'	0.00'
HGLtot	0.49'	0.26'	0.32'	3.45'	1.91'	1.88'	0.38'	1.68'	4.34'	0.12'
156.60	157.09'	157.35'	157.67'	161.12'	163.03'	164.91'	165.29'	166.97'	171.31'	171.43'

Pipe	P23	P24	P25	P26	10" Lat					Grate
HGLpipe	0.80'	0.64'	0.07'	0.52'	0.32'					
HGLstep	0.00'	0.00'	0.75'	0.25'	0.17'					
HGLtot	0.80'	0.64'	0.82'	0.77'	0.49'					
171.43	172.23'	172.87'	173.69'	174.46'	174.95'					179.15'

Freeboard ► **4.20'**

Subcatchment B01:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.79 cfs @ 7.86 hrs, Volume= 0.254 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
0.770	98	Impervious
0.090	86	Pervious
0.860	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B02:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.46 cfs @ 7.86 hrs, Volume= 0.473 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
1.410	98	Impervious
0.190	86	Pervious
1.600	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B03:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.26 cfs @ 7.86 hrs, Volume= 0.741 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
2.410	98	Impervious
0.020	86	Pervious
2.430	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B04:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.55 cfs @ 7.86 hrs, Volume= 1.492 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
4.840	98	Impervious
0.050	86	Pervious
4.890	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B05:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.72 cfs @ 7.86 hrs, Volume= 0.564 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
1.830	98	Impervious
0.020	86	Pervious
1.850	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B06:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.67 cfs @ 7.86 hrs, Volume= 0.541 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
1.700	98	Impervious
0.130	86	Pervious
1.830	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B07:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 3.35 cfs @ 7.86 hrs, Volume= 1.098 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
3.560	98	Impervious
0.040	86	Pervious
3.600	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B08:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.72 cfs @ 7.86 hrs, Volume= 0.229 af, Depth= 3.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
0.680	98	Impervious
0.120	86	Pervious
0.800	96	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B09:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.78 cfs @ 7.86 hrs, Volume= 0.249 af, Depth= 3.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
0.740	98	Impervious
0.130	86	Pervious
0.870	96	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B10:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.97 cfs @ 7.86 hrs, Volume= 0.647 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
2.100	98	Impervious
0.020	86	Pervious
2.120	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B11:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.75 cfs @ 7.86 hrs, Volume= 0.561 af, Depth= 3.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
1.670	98	Impervious
0.290	86	Pervious
1.960	96	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B12:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.78 cfs @ 7.86 hrs, Volume= 0.251 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
0.780	98	Impervious
0.070	86	Pervious
0.850	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B13:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.66 cfs @ 7.86 hrs, Volume= 0.213 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
0.660	98	Impervious
0.060	86	Pervious
0.720	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B14:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.90 cfs @ 7.86 hrs, Volume= 0.290 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
0.880	98	Impervious
0.100	86	Pervious
0.980	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B15:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.60 cfs @ 7.86 hrs, Volume= 0.513 af, Depth= 3.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
1.430	98	Impervious
0.360	86	Pervious
1.790	96	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B96:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.15 cfs @ 7.91 hrs, Volume= 0.370 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
0.410	98	Impervious
1.220	86	Pervious
1.630	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B97:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.10 cfs @ 7.88 hrs, Volume= 0.348 af, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
0.740	98	Impervious
0.600	86	Pervious
1.340	93	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B98:

Runoff = 6.30 cfs @ 8.10 hrs, Volume= 2.163 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
1.250	98	Impervious
8.670	86	Pervious
9.920	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Subcatchment B99:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.31 cfs @ 7.86 hrs, Volume= 0.101 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 year Rainfall=3.90"

Area (ac)	CN	Description
0.310	98	Impervious
0.030	86	Pervious
0.340	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Reach P00:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 27.150 ac, Inflow Depth = 3.59" for 25 year event
Inflow = 24.97 cfs @ 7.86 hrs, Volume= 8.118 af
Outflow = 24.97 cfs @ 7.86 hrs, Volume= 8.118 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P01:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 21.210 ac, Inflow Depth = 3.61" for 25 year event
Inflow = 19.57 cfs @ 7.86 hrs, Volume= 6.378 af
Outflow = 19.57 cfs @ 7.86 hrs, Volume= 6.378 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P02:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.940 ac, Inflow Depth = 3.51" for 25 year event
Inflow = 5.40 cfs @ 7.86 hrs, Volume= 1.740 af
Outflow = 5.40 cfs @ 7.86 hrs, Volume= 1.740 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P03:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.830 ac, Inflow Depth = 3.55" for 25 year event
Inflow = 1.67 cfs @ 7.86 hrs, Volume= 0.541 af
Outflow = 1.67 cfs @ 7.86 hrs, Volume= 0.541 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P04:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.520 ac, Inflow Depth = 3.62" for 25 year event
Inflow = 17.11 cfs @ 7.86 hrs, Volume= 5.583 af
Outflow = 17.11 cfs @ 7.86 hrs, Volume= 5.583 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P05:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.830 ac, Inflow Depth = 3.55" for 25 year event
Inflow = 1.67 cfs @ 7.86 hrs, Volume= 0.541 af
Outflow = 1.67 cfs @ 7.86 hrs, Volume= 0.541 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P06:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.830 ac, Inflow Depth = 3.55" for 25 year event
Inflow = 1.67 cfs @ 7.86 hrs, Volume= 0.541 af
Outflow = 1.67 cfs @ 7.86 hrs, Volume= 0.541 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P07:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.430 ac, Inflow Depth = 3.66" for 25 year event
Inflow = 2.26 cfs @ 7.86 hrs, Volume= 0.741 af
Outflow = 2.26 cfs @ 7.86 hrs, Volume= 0.741 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P08:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16.090 ac, Inflow Depth = 3.61" for 25 year event
Inflow = 14.85 cfs @ 7.86 hrs, Volume= 4.842 af
Outflow = 14.85 cfs @ 7.86 hrs, Volume= 4.842 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P09:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.890 ac, Inflow Depth = 3.66" for 25 year event
Inflow = 4.55 cfs @ 7.86 hrs, Volume= 1.492 af
Outflow = 4.55 cfs @ 7.86 hrs, Volume= 1.492 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P10:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11.200 ac, Inflow Depth = 3.59" for 25 year event
Inflow = 10.30 cfs @ 7.86 hrs, Volume= 3.350 af
Outflow = 10.30 cfs @ 7.86 hrs, Volume= 3.350 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P11:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.850 ac, Inflow Depth = 3.66" for 25 year event
Inflow = 1.72 cfs @ 7.86 hrs, Volume= 0.564 af
Outflow = 1.72 cfs @ 7.86 hrs, Volume= 0.564 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P12:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.960 ac, Inflow Depth = 3.44" for 25 year event
Inflow = 1.75 cfs @ 7.86 hrs, Volume= 0.561 af
Outflow = 1.75 cfs @ 7.86 hrs, Volume= 0.561 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P13:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.960 ac, Inflow Depth = 3.44" for 25 year event
Inflow = 1.75 cfs @ 7.86 hrs, Volume= 0.561 af
Outflow = 1.75 cfs @ 7.86 hrs, Volume= 0.561 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P14:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.390 ac, Inflow Depth = 3.61" for 25 year event
Inflow = 6.82 cfs @ 7.86 hrs, Volume= 2.224 af
Outflow = 6.82 cfs @ 7.86 hrs, Volume= 2.224 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P15:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.600 ac, Inflow Depth = 3.66" for 25 year event
Inflow = 3.35 cfs @ 7.86 hrs, Volume= 1.098 af
Outflow = 3.35 cfs @ 7.86 hrs, Volume= 1.098 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P16:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.790 ac, Inflow Depth = 3.56" for 25 year event
Inflow = 3.47 cfs @ 7.86 hrs, Volume= 1.125 af
Outflow = 3.47 cfs @ 7.86 hrs, Volume= 1.125 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P17:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.120 ac, Inflow Depth = 3.66" for 25 year event
Inflow = 1.97 cfs @ 7.86 hrs, Volume= 0.647 af
Outflow = 1.97 cfs @ 7.86 hrs, Volume= 0.647 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P18:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.120 ac, Inflow Depth = 3.66" for 25 year event
Inflow = 1.97 cfs @ 7.86 hrs, Volume= 0.647 af
Outflow = 1.97 cfs @ 7.86 hrs, Volume= 0.647 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P19:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.670 ac, Inflow Depth = 3.44" for 25 year event
Inflow = 1.49 cfs @ 7.86 hrs, Volume= 0.478 af
Outflow = 1.49 cfs @ 7.86 hrs, Volume= 0.478 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P20:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.800 ac, Inflow Depth = 3.44" for 25 year event
Inflow = 0.72 cfs @ 7.86 hrs, Volume= 0.229 af
Outflow = 0.72 cfs @ 7.86 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P21:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.870 ac, Inflow Depth = 3.44" for 25 year event
Inflow = 0.78 cfs @ 7.86 hrs, Volume= 0.249 af
Outflow = 0.78 cfs @ 7.86 hrs, Volume= 0.249 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P22:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.870 ac, Inflow Depth = 3.44" for 25 year event
Inflow = 0.78 cfs @ 7.86 hrs, Volume= 0.249 af
Outflow = 0.78 cfs @ 7.86 hrs, Volume= 0.249 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P23:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.940 ac, Inflow Depth = 3.51" for 25 year event
Inflow = 5.40 cfs @ 7.86 hrs, Volume= 1.740 af
Outflow = 5.40 cfs @ 7.86 hrs, Volume= 1.740 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P24:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.940 ac, Inflow Depth = 3.51" for 25 year event
Inflow = 5.40 cfs @ 7.86 hrs, Volume= 1.740 af
Outflow = 5.40 cfs @ 7.86 hrs, Volume= 1.740 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P25:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.790 ac, Inflow Depth = 3.44" for 25 year event
Inflow = 1.60 cfs @ 7.86 hrs, Volume= 0.513 af
Outflow = 1.60 cfs @ 7.86 hrs, Volume= 0.513 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P26:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.790 ac, Inflow Depth = 3.44" for 25 year event
Inflow = 1.60 cfs @ 7.86 hrs, Volume= 0.513 af
Outflow = 1.60 cfs @ 7.86 hrs, Volume= 0.513 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P27:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.550 ac, Inflow Depth = 3.55" for 25 year event
Inflow = 2.33 cfs @ 7.86 hrs, Volume= 0.754 af
Outflow = 2.33 cfs @ 7.86 hrs, Volume= 0.754 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P28:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.980 ac, Inflow Depth = 3.55" for 25 year event
Inflow = 0.90 cfs @ 7.86 hrs, Volume= 0.290 af
Outflow = 0.90 cfs @ 7.86 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P29:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.570 ac, Inflow Depth = 3.55" for 25 year event
Inflow = 1.44 cfs @ 7.86 hrs, Volume= 0.464 af
Outflow = 1.44 cfs @ 7.86 hrs, Volume= 0.464 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P30:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.720 ac, Inflow Depth = 3.55" for 25 year event
Inflow = 0.66 cfs @ 7.86 hrs, Volume= 0.213 af
Outflow = 0.66 cfs @ 7.86 hrs, Volume= 0.213 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P31:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.850 ac, Inflow Depth = 3.55" for 25 year event
Inflow = 0.78 cfs @ 7.86 hrs, Volume= 0.251 af
Outflow = 0.78 cfs @ 7.86 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P92:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.380 ac, Inflow Depth = 3.30" for 25 year event
Inflow = 32.81 cfs @ 7.93 hrs, Volume= 11.100 af
Outflow = 32.81 cfs @ 7.93 hrs, Volume= 11.100 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P93:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.380 ac, Inflow Depth = 3.30" for 25 year event
Inflow = 32.81 cfs @ 7.93 hrs, Volume= 11.100 af
Outflow = 32.81 cfs @ 7.93 hrs, Volume= 11.100 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P94:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.380 ac, Inflow Depth = 3.30" for 25 year event
Inflow = 32.81 cfs @ 7.93 hrs, Volume= 11.100 af
Outflow = 32.81 cfs @ 7.93 hrs, Volume= 11.100 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P95:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.380 ac, Inflow Depth = 3.30" for 25 year event
Inflow = 32.81 cfs @ 7.93 hrs, Volume= 11.100 af
Outflow = 32.81 cfs @ 7.93 hrs, Volume= 11.100 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P96:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.040 ac, Inflow Depth = 3.30" for 25 year event
Inflow = 31.71 cfs @ 7.93 hrs, Volume= 10.752 af
Outflow = 31.71 cfs @ 7.93 hrs, Volume= 10.752 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P97:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 37.410 ac, Inflow Depth = 3.33" for 25 year event
Inflow = 30.56 cfs @ 7.93 hrs, Volume= 10.382 af
Outflow = 30.56 cfs @ 7.93 hrs, Volume= 10.382 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P98:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 37.410 ac, Inflow Depth = 3.33" for 25 year event
Inflow = 30.56 cfs @ 7.93 hrs, Volume= 10.382 af
Outflow = 30.56 cfs @ 7.93 hrs, Volume= 10.382 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P99:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 27.490 ac, Inflow Depth = 3.59" for 25 year event
Inflow = 25.28 cfs @ 7.86 hrs, Volume= 8.219 af
Outflow = 25.28 cfs @ 7.86 hrs, Volume= 8.219 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pipe Table - 100 Year Event

(1) PIPE	(2) SIZE	(3) LENGTH	(4) SLOPE	(5) HEAD LOSS	(6) Q_{ACTUAL}	(7) MANN. "N"	(8) $Q_{CAPACITY}$	(9) VELOCITY
P92	36"	116 LF	0.0331	0.39'	38.57 cfs	0.013	121.3 cfs	17.17 fps
P93	36"	22 LF	0.0025	0.08'	38.57 cfs	0.013	33.35 cfs	4.72 fps
P94	36"	49 LF	0.0025	0.17'	38.57 cfs	0.013	33.35 cfs	4.72 fps
P95	36"	147 LF	0.0025	0.50'	38.57 cfs	0.013	33.35 cfs	4.72 fps
P96	30"	286 LF	0.0025	2.37'	37.27 cfs	0.013	20.51 cfs	4.18 fps
P97	30"	301 LF	0.0025	2.31'	35.87 cfs	0.013	20.51 cfs	4.18 fps
P98	30"	31 LF	0.0025	0.24'	35.87 cfs	0.013	20.51 cfs	4.18 fps
P99	30"	389 LF	0.0025	2.00'	29.35 cfs	0.013	20.51 cfs	4.18 fps
P00	18"	59 LF	0.0549	4.45'	28.99 cfs	0.013	24.61 cfs	13.93 fps
P01	18"	167 LF	0.0100	7.81'	22.71 cfs	0.013	10.50 cfs	5.94 fps
P02	18"	43 LF	0.0030	0.16'	6.28 cfs	0.013	5.75 cfs	3.26 fps
P03	12"	135 LF	0.0200	0.41'	1.95 cfs	0.013	5.04 cfs	6.42 fps
P04	18"	92 LF	0.0030	3.29'	19.85 cfs	0.013	5.75 cfs	3.26 fps
P05	12"	128 LF	0.0050	0.39'	1.95 cfs	0.013	2.52 cfs	3.21 fps
P06	12"	407 LF	0.0050	1.22'	1.95 cfs	0.013	2.52 cfs	3.21 fps
P07	12"	413 LF	0.0050	2.24'	2.62 cfs	0.013	2.52 cfs	3.21 fps
P08	18"	187 LF	0.0073	5.04'	17.23 cfs	0.013	8.97 cfs	5.08 fps
P09	15"	290 LF	0.0050	1.94'	5.27 cfs	0.013	4.57 cfs	3.72 fps
P10	18"	229 LF	0.0050	2.97'	11.95 cfs	0.013	7.43 cfs	4.20 fps
P11	12"	39 LF	0.0040	0.13'	1.99 cfs	0.013	2.25 cfs	2.87 fps
P12	12"	305 LF	0.0050	1.01'	2.05 cfs	0.013	2.52 cfs	3.21 fps
P13	12"	319 LF	0.0050	1.06'	2.05 cfs	0.013	2.52 cfs	3.21 fps
P14	15"	150 LF	0.0130	2.25'	7.91 cfs	0.013	7.37 cfs	6.00 fps
P15	15"	168 LF	0.0060	0.61'	3.88 cfs	0.013	5.00 cfs	4.08 fps
P16	15"	156 LF	0.0200	0.61'	4.03 cfs	0.013	9.14 cfs	7.44 fps
P17	12"	235 LF	0.0040	0.98'	2.29 cfs	0.013	2.25 cfs	2.87 fps
P18	12"	29 LF	0.0101	0.12'	2.29 cfs	0.013	3.58 cfs	4.56 fps
P19	12"	195 LF	0.0050	0.47'	1.74 cfs	0.013	2.52 cfs	3.21 fps
P20	12"	57 LF	0.0051	0.04'	0.84 cfs	0.013	2.54 cfs	3.24 fps
P21	12"	159 LF	0.0400	0.11'	0.91 cfs	0.013	7.13 cfs	9.07 fps
P22	12"	114 LF	0.0050	0.08'	0.91 cfs	0.013	2.52 cfs	3.21 fps
P23	18"	300 LF	0.0030	1.06'	6.28 cfs	0.013	5.75 cfs	3.26 fps
P24	18"	239 LF	0.0030	0.83'	6.28 cfs	0.013	5.75 cfs	3.26 fps
P25	15"	100 LF	0.0030	0.09'	1.87 cfs	0.013	3.54 cfs	2.88 fps
P26	12"	256 LF	0.0050	0.71'	1.87 cfs	0.013	2.52 cfs	3.21 fps
P27	15"	233 LF	0.0050	0.42'	2.71 cfs	0.013	4.57 cfs	3.72 fps
P28	15"	147 LF	0.0040	0.04'	1.04 cfs	0.013	4.09 cfs	3.33 fps
P29	15"	141 LF	0.0050	0.10'	1.67 cfs	0.013	4.57 cfs	3.72 fps
P30	12"	77 LF	0.0050	0.04'	0.77 cfs	0.013	2.52 cfs	3.21 fps
P31	12"	170 LF	0.0050	0.11'	0.90 cfs	0.013	2.52 cfs	3.21 fps

Offsite Pipes - P92 Thru P99
Onsite Pipes - P00 Thru P31

Hydraulic Grade Line Analysis - 100 Year Event

Description: The hydraulic grade line analysis is shown below. During the 100-year 24-hour event 0.10 feet of freeboard is anticipated at the catch basin in the northeast corner of the site, which is the worst case scenario. Accordingly, the proposed conveyance system exceeds the requirements of Clean Water Services, which requires at least 1.0 feet of freeboard during the 25-year event. Flooding or ponding of stormwater is not anticipated during the 100-year event.

B15

Pipe	P92	P93	P94	P95	P96	P97	P98	P99	P00	P02
HGLpipe	0.39'	0.08'	0.17'	0.50'	2.37'	2.31'	0.24'	2.00'	4.45'	0.16'
HGLstep	0.20'	0.20'	0.20'	3.09'	0.20'	0.20'	0.20'	0.20'	1.00'	0.00'
HGLtot	0.59'	0.28'	0.37'	3.59'	2.57'	2.51'	0.44'	2.20'	5.45'	0.16'
156.60	157.19'	157.47'	157.84'	161.43'	164.00'	166.51'	166.95'	169.15'	174.60'	174.76'

Pipe	P23	P24	P25	P26	10" Lat					Grate
HGLpipe	1.06'	0.83'	0.09'	0.71'	0.43'					
HGLstep	0.00'	0.00'	0.75'	0.25'	0.17'					
HGLtot	1.06'	0.83'	0.84'	0.96'	0.60'					
174.76	175.82'	176.65'	177.49'	178.45'	179.05'					179.15'

Freeboard ► **0.10'**

Subcatchment B01:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.91 cfs @ 7.86 hrs, Volume= 0.297 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
0.770	98	Impervious
0.090	86	Pervious
0.860	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B02:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.70 cfs @ 7.86 hrs, Volume= 0.553 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
1.410	98	Impervious
0.190	86	Pervious
1.600	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B03:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.62 cfs @ 7.85 hrs, Volume= 0.863 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
2.410	98	Impervious
0.020	86	Pervious
2.430	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B04:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.27 cfs @ 7.85 hrs, Volume= 1.736 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
4.840	98	Impervious
0.050	86	Pervious
4.890	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B05:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.99 cfs @ 7.85 hrs, Volume= 0.657 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
1.830	98	Impervious
0.020	86	Pervious
1.850	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B06:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.95 cfs @ 7.86 hrs, Volume= 0.632 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
1.700	98	Impervious
0.130	86	Pervious
1.830	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B07:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 3.88 cfs @ 7.85 hrs, Volume= 1.278 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
3.560	98	Impervious
0.040	86	Pervious
3.600	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B08:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.84 cfs @ 7.86 hrs, Volume= 0.269 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
0.680	98	Impervious
0.120	86	Pervious
0.800	96	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B09:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.91 cfs @ 7.86 hrs, Volume= 0.292 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
0.740	98	Impervious
0.130	86	Pervious
0.870	96	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B10:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.29 cfs @ 7.85 hrs, Volume= 0.753 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
2.100	98	Impervious
0.020	86	Pervious
2.120	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B11:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.05 cfs @ 7.86 hrs, Volume= 0.658 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
1.670	98	Impervious
0.290	86	Pervious
1.960	96	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B12:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.90 cfs @ 7.86 hrs, Volume= 0.294 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
0.780	98	Impervious
0.070	86	Pervious
0.850	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B13:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.77 cfs @ 7.86 hrs, Volume= 0.249 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
0.660	98	Impervious
0.060	86	Pervious
0.720	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B14:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.04 cfs @ 7.86 hrs, Volume= 0.338 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
0.880	98	Impervious
0.100	86	Pervious
0.980	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B15:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.87 cfs @ 7.86 hrs, Volume= 0.601 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
1.430	98	Impervious
0.360	86	Pervious
1.790	96	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B96:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.40 cfs @ 7.90 hrs, Volume= 0.447 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
0.410	98	Impervious
1.220	86	Pervious
1.630	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B97:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.30 cfs @ 7.88 hrs, Volume= 0.414 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
0.740	98	Impervious
0.600	86	Pervious
1.340	93	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Subcatchment B98:

Runoff = 7.71 cfs @ 8.10 hrs, Volume= 2.623 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
1.250	98	Impervious
8.670	86	Pervious
9.920	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Subcatchment B99:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.36 cfs @ 7.86 hrs, Volume= 0.117 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 year Rainfall=4.50"

Area (ac)	CN	Description
0.310	98	Impervious
0.030	86	Pervious
0.340	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, SCS MINIMUM**

Reach P00:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 27.150 ac, Inflow Depth = 4.19" for 100 year event
Inflow = 28.99 cfs @ 7.86 hrs, Volume= 9.469 af
Outflow = 28.99 cfs @ 7.86 hrs, Volume= 9.469 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P01:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 21.210 ac, Inflow Depth = 4.21" for 100 year event
Inflow = 22.71 cfs @ 7.86 hrs, Volume= 7.434 af
Outflow = 22.71 cfs @ 7.86 hrs, Volume= 7.434 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P02:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.940 ac, Inflow Depth = 4.11" for 100 year event
Inflow = 6.28 cfs @ 7.86 hrs, Volume= 2.035 af
Outflow = 6.28 cfs @ 7.86 hrs, Volume= 2.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P03:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.830 ac, Inflow Depth = 4.14" for 100 year event
Inflow = 1.95 cfs @ 7.86 hrs, Volume= 0.632 af
Outflow = 1.95 cfs @ 7.86 hrs, Volume= 0.632 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P04:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.520 ac, Inflow Depth = 4.21" for 100 year event
Inflow = 19.85 cfs @ 7.86 hrs, Volume= 6.505 af
Outflow = 19.85 cfs @ 7.86 hrs, Volume= 6.505 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P05:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.830 ac, Inflow Depth = 4.14" for 100 year event
Inflow = 1.95 cfs @ 7.86 hrs, Volume= 0.632 af
Outflow = 1.95 cfs @ 7.86 hrs, Volume= 0.632 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P06:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.830 ac, Inflow Depth = 4.14" for 100 year event
Inflow = 1.95 cfs @ 7.86 hrs, Volume= 0.632 af
Outflow = 1.95 cfs @ 7.86 hrs, Volume= 0.632 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P07:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.430 ac, Inflow Depth = 4.26" for 100 year event
Inflow = 2.62 cfs @ 7.85 hrs, Volume= 0.863 af
Outflow = 2.62 cfs @ 7.85 hrs, Volume= 0.863 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P08:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16.090 ac, Inflow Depth = 4.21" for 100 year event
Inflow = 17.23 cfs @ 7.86 hrs, Volume= 5.642 af
Outflow = 17.23 cfs @ 7.86 hrs, Volume= 5.642 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P09:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.890 ac, Inflow Depth = 4.26" for 100 year event
Inflow = 5.27 cfs @ 7.85 hrs, Volume= 1.736 af
Outflow = 5.27 cfs @ 7.85 hrs, Volume= 1.736 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P10:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11.200 ac, Inflow Depth = 4.19" for 100 year event
Inflow = 11.95 cfs @ 7.86 hrs, Volume= 3.907 af
Outflow = 11.95 cfs @ 7.86 hrs, Volume= 3.907 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P11:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.850 ac, Inflow Depth = 4.26" for 100 year event
Inflow = 1.99 cfs @ 7.85 hrs, Volume= 0.657 af
Outflow = 1.99 cfs @ 7.85 hrs, Volume= 0.657 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P12:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.960 ac, Inflow Depth = 4.03" for 100 year event
Inflow = 2.05 cfs @ 7.86 hrs, Volume= 0.658 af
Outflow = 2.05 cfs @ 7.86 hrs, Volume= 0.658 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P13:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.960 ac, Inflow Depth = 4.03" for 100 year event
Inflow = 2.05 cfs @ 7.86 hrs, Volume= 0.658 af
Outflow = 2.05 cfs @ 7.86 hrs, Volume= 0.658 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P14:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.390 ac, Inflow Depth = 4.21" for 100 year event
Inflow = 7.91 cfs @ 7.86 hrs, Volume= 2.591 af
Outflow = 7.91 cfs @ 7.86 hrs, Volume= 2.591 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P15:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.600 ac, Inflow Depth = 4.26" for 100 year event
Inflow = 3.88 cfs @ 7.85 hrs, Volume= 1.278 af
Outflow = 3.88 cfs @ 7.85 hrs, Volume= 1.278 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P16:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.790 ac, Inflow Depth = 4.16" for 100 year event
Inflow = 4.03 cfs @ 7.86 hrs, Volume= 1.314 af
Outflow = 4.03 cfs @ 7.86 hrs, Volume= 1.314 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P17:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.120 ac, Inflow Depth = 4.26" for 100 year event
Inflow = 2.29 cfs @ 7.85 hrs, Volume= 0.753 af
Outflow = 2.29 cfs @ 7.85 hrs, Volume= 0.753 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P18:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.120 ac, Inflow Depth = 4.26" for 100 year event
Inflow = 2.29 cfs @ 7.85 hrs, Volume= 0.753 af
Outflow = 2.29 cfs @ 7.85 hrs, Volume= 0.753 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P19:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.670 ac, Inflow Depth = 4.03" for 100 year event
Inflow = 1.74 cfs @ 7.86 hrs, Volume= 0.561 af
Outflow = 1.74 cfs @ 7.86 hrs, Volume= 0.561 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P20:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.800 ac, Inflow Depth = 4.03" for 100 year event
Inflow = 0.84 cfs @ 7.86 hrs, Volume= 0.269 af
Outflow = 0.84 cfs @ 7.86 hrs, Volume= 0.269 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P21:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.870 ac, Inflow Depth = 4.03" for 100 year event
Inflow = 0.91 cfs @ 7.86 hrs, Volume= 0.292 af
Outflow = 0.91 cfs @ 7.86 hrs, Volume= 0.292 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P22:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.870 ac, Inflow Depth = 4.03" for 100 year event
Inflow = 0.91 cfs @ 7.86 hrs, Volume= 0.292 af
Outflow = 0.91 cfs @ 7.86 hrs, Volume= 0.292 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P23:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.940 ac, Inflow Depth = 4.11" for 100 year event
Inflow = 6.28 cfs @ 7.86 hrs, Volume= 2.035 af
Outflow = 6.28 cfs @ 7.86 hrs, Volume= 2.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P24:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.940 ac, Inflow Depth = 4.11" for 100 year event
Inflow = 6.28 cfs @ 7.86 hrs, Volume= 2.035 af
Outflow = 6.28 cfs @ 7.86 hrs, Volume= 2.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P25:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.790 ac, Inflow Depth = 4.03" for 100 year event
Inflow = 1.87 cfs @ 7.86 hrs, Volume= 0.601 af
Outflow = 1.87 cfs @ 7.86 hrs, Volume= 0.601 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P26:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.790 ac, Inflow Depth = 4.03" for 100 year event
Inflow = 1.87 cfs @ 7.86 hrs, Volume= 0.601 af
Outflow = 1.87 cfs @ 7.86 hrs, Volume= 0.601 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P27:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.550 ac, Inflow Depth = 4.14" for 100 year event
Inflow = 2.71 cfs @ 7.86 hrs, Volume= 0.881 af
Outflow = 2.71 cfs @ 7.86 hrs, Volume= 0.881 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P28:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.980 ac, Inflow Depth = 4.14" for 100 year event
Inflow = 1.04 cfs @ 7.86 hrs, Volume= 0.338 af
Outflow = 1.04 cfs @ 7.86 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P29:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.570 ac, Inflow Depth = 4.14" for 100 year event
Inflow = 1.67 cfs @ 7.86 hrs, Volume= 0.542 af
Outflow = 1.67 cfs @ 7.86 hrs, Volume= 0.542 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P30:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.720 ac, Inflow Depth = 4.14" for 100 year event
Inflow = 0.77 cfs @ 7.86 hrs, Volume= 0.249 af
Outflow = 0.77 cfs @ 7.86 hrs, Volume= 0.249 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P31:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.850 ac, Inflow Depth = 4.14" for 100 year event
Inflow = 0.90 cfs @ 7.86 hrs, Volume= 0.294 af
Outflow = 0.90 cfs @ 7.86 hrs, Volume= 0.294 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P92:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.380 ac, Inflow Depth = 3.88" for 100 year event
Inflow = 38.57 cfs @ 7.93 hrs, Volume= 13.070 af
Outflow = 38.57 cfs @ 7.93 hrs, Volume= 13.070 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P93:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.380 ac, Inflow Depth = 3.88" for 100 year event
Inflow = 38.57 cfs @ 7.93 hrs, Volume= 13.070 af
Outflow = 38.57 cfs @ 7.93 hrs, Volume= 13.070 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P94:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.380 ac, Inflow Depth = 3.88" for 100 year event
Inflow = 38.57 cfs @ 7.93 hrs, Volume= 13.070 af
Outflow = 38.57 cfs @ 7.93 hrs, Volume= 13.070 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P95:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.380 ac, Inflow Depth = 3.88" for 100 year event
Inflow = 38.57 cfs @ 7.93 hrs, Volume= 13.070 af
Outflow = 38.57 cfs @ 7.93 hrs, Volume= 13.070 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P96:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.040 ac, Inflow Depth = 3.89" for 100 year event
Inflow = 37.27 cfs @ 7.93 hrs, Volume= 12.656 af
Outflow = 37.27 cfs @ 7.93 hrs, Volume= 12.656 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P97:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 37.410 ac, Inflow Depth = 3.92" for 100 year event
Inflow = 35.87 cfs @ 7.93 hrs, Volume= 12.209 af
Outflow = 35.87 cfs @ 7.93 hrs, Volume= 12.209 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P98:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 37.410 ac, Inflow Depth = 3.92" for 100 year event
Inflow = 35.87 cfs @ 7.93 hrs, Volume= 12.209 af
Outflow = 35.87 cfs @ 7.93 hrs, Volume= 12.209 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach P99:

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 27.490 ac, Inflow Depth = 4.18" for 100 year event
Inflow = 29.35 cfs @ 7.86 hrs, Volume= 9.586 af
Outflow = 29.35 cfs @ 7.86 hrs, Volume= 9.586 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Appendix

Detail Drawings

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	COLIN STEER 971-710-3750 COLIN.STEER@ADS-PIPE.COM
ADS SALES REP:	STEVE FORSETH 971-279-9281 STEVE.FORSETH@ADS-PIPE.COM
PROJECT NO:	S268567

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

BRIDGEPORT VILLAGE

TIGARD,OR

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 MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE 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 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), 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 - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
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 36" (900 mm) 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

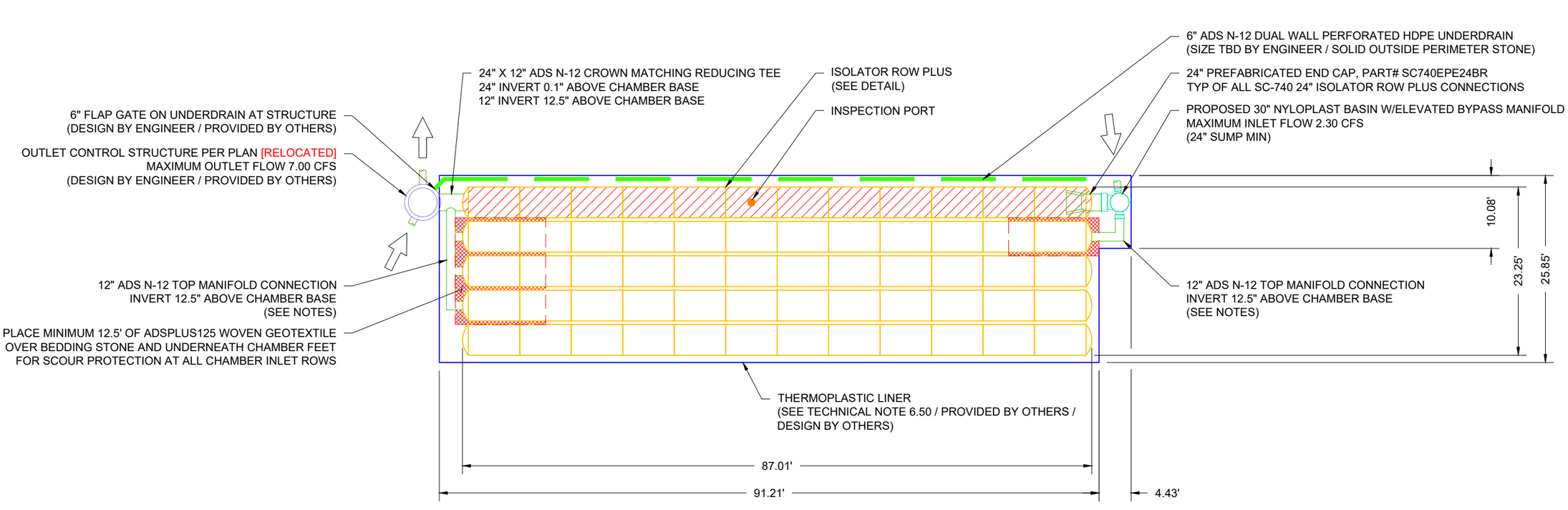
60	STORMTECH SC-740 CHAMBERS
10	STORMTECH SC-740 END CAPS
6	STONE ABOVE (in)
6	STONE BELOW (in)
40	% STONE VOID
2402	SYSTEM AREA (ft²)
243	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS

186.50	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)
180.50	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)
180.00	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
180.00	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)
180.00	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT)
179.00	TOP OF STONE
178.50	TOP OF SC-740 CHAMBER
177.04	12" TOP MANIFOLD INVERT
176.01	24" BOTTOM MANIFOLD INVERT
176.01	24" ISOLATOR ROW PLUS CONNECTION INVERT
176.00	BOTTOM OF SC-740 CHAMBER
175.50	UNDERDRAIN INVERT
175.50	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.



BRIDGEPORT VILLAGE
TIGARD,OR
DATE: 11-18-21 DRAWN: TLN
PROJECT #: S268567 CHECKED: CTS

DATE	DRWN	CHKD	DESCRIPTION

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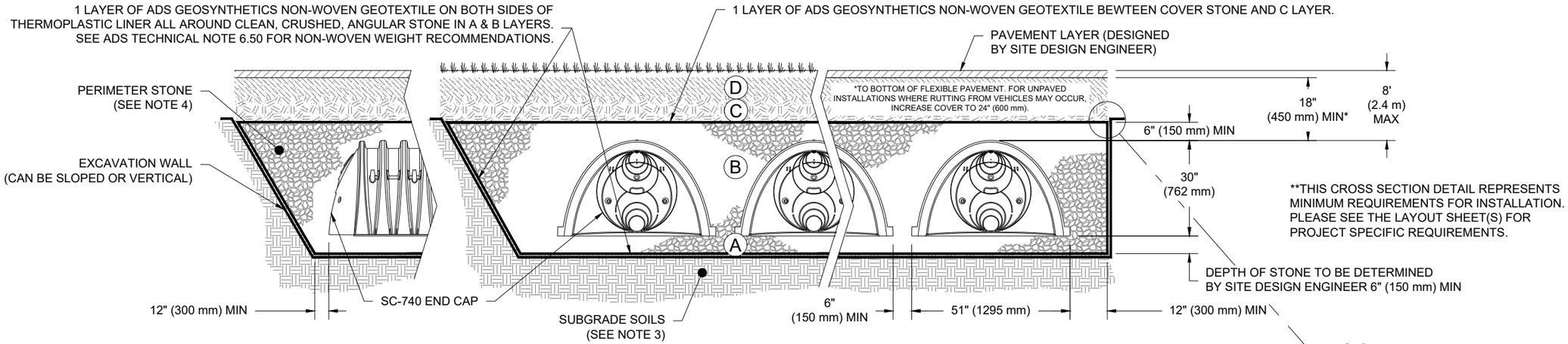
4640 TRUEMAN BLVD
HILLIARD, OH 43026

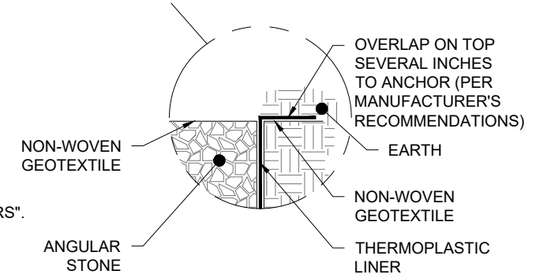
0 15' 30'

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.





THERMOPLASTIC LINER DETAIL

NOTES:

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

BRIDGEPORT VILLAGE
TIGARD,OR
DATE: 11-18-21 | DRAWN: TLN | CHECKED: CTS | PROJECT #: S268567

DATE	DRWN	CHKD	DESCRIPTION

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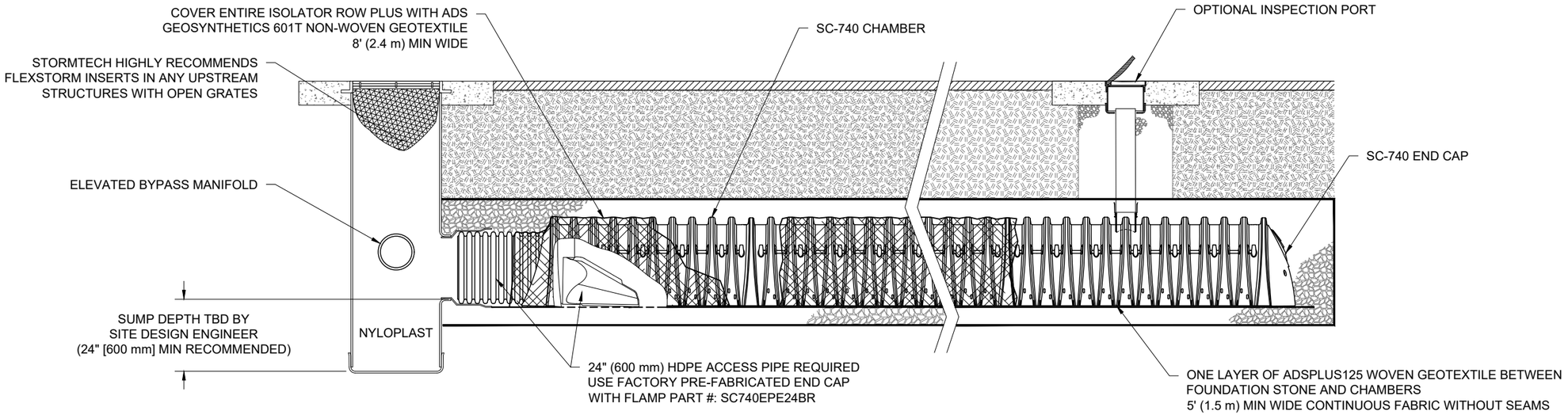
HILLIARD, OH 43026

ADS



SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

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

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

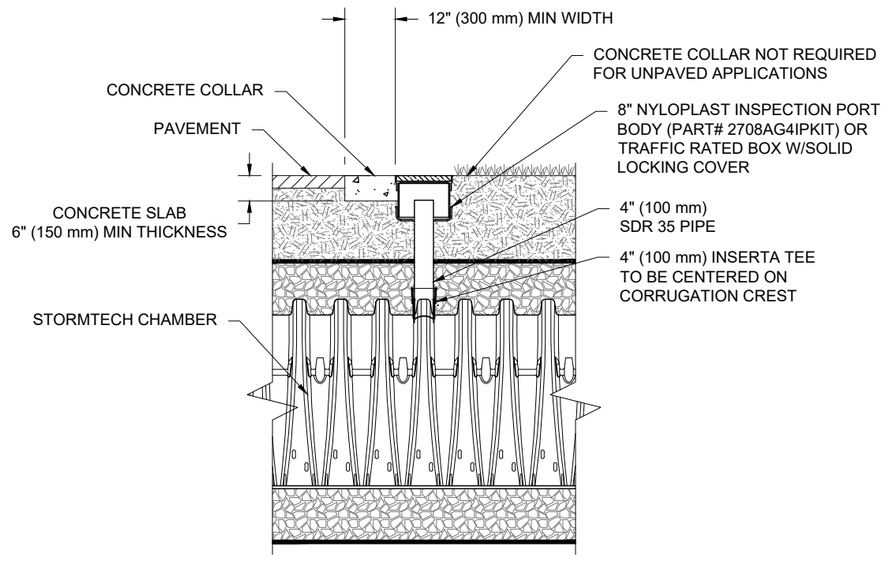
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

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

NOTES

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

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



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

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

BRIDGEPORT VILLAGE
TIGARD,OR
DATE: 11-18-21 | DRAWN: TLN
PROJECT #: S268567 | CHECKED: CTS

DATE	DRWN	CHKD	DESCRIPTION

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

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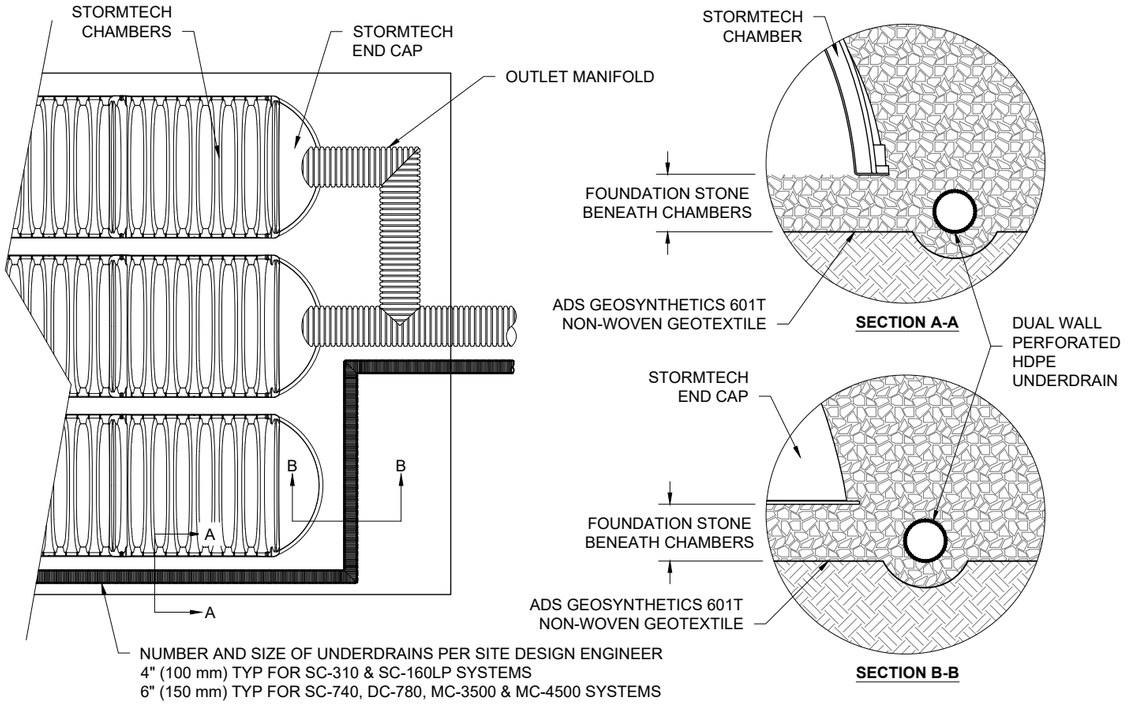
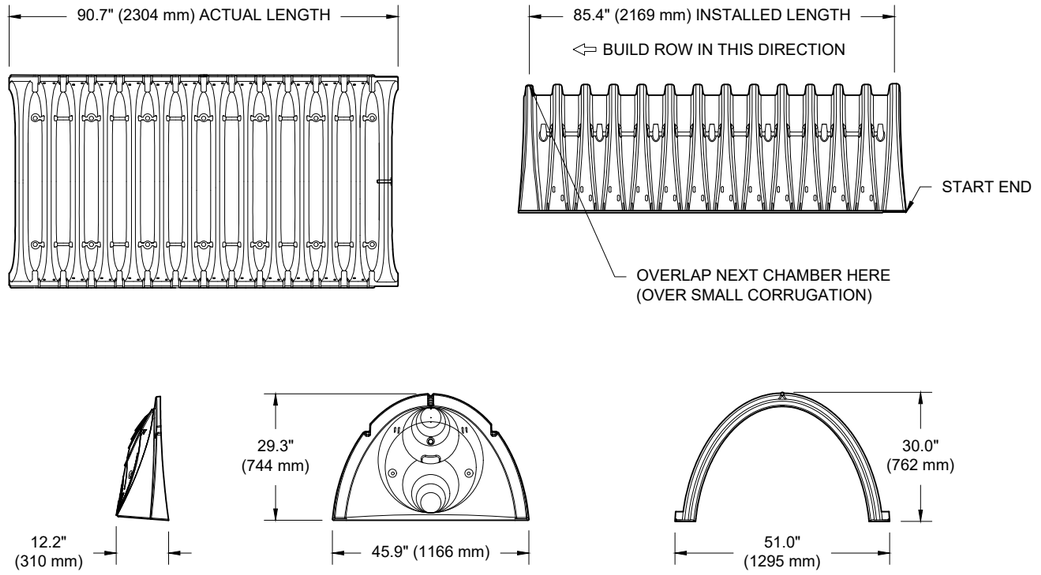
UNDERDRAIN DETAIL

NTS



SC-740 TECHNICAL SPECIFICATION

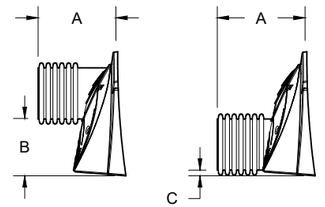
NTS



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

BRIDGEPORT VILLAGE
TIGARD,OR

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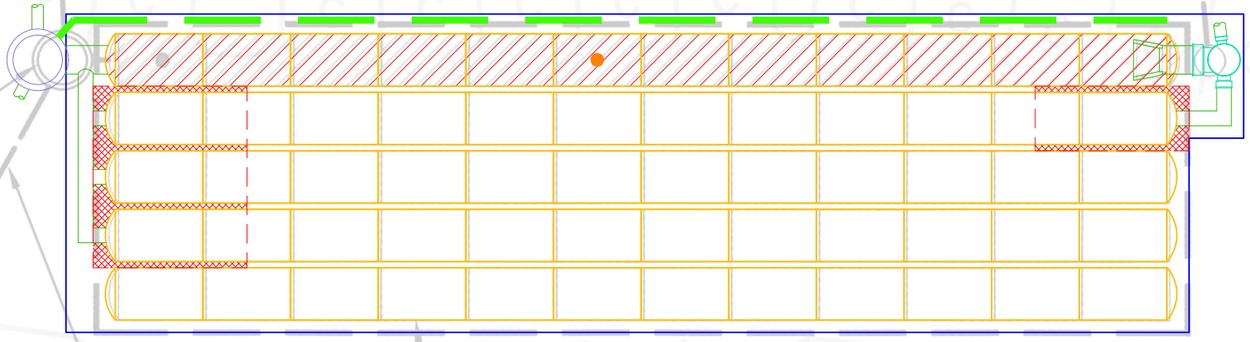


Appendix H

Maintenance Requirements

StormTech
Detention • Retention • Water Quality
An ADS company

Isolator® Row O&M Manual

THE MOST ADVANCED NAME IN WATER MANAGEMENT SOLUTIONS™

ADS®

THE ISOLATOR® ROW

INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-160LP, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the SC-160LP, DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

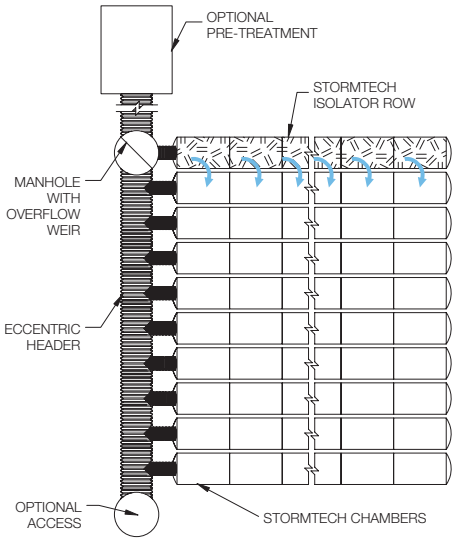
The Isolator Row is typically designed to capture the “first flush” and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means 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.

Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

StormTech Isolator Row with Overflow Spillway (not to scale)



ISOLATOR ROW 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 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 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 inches throughout the length of the Isolator Row, clean-out should be performed.

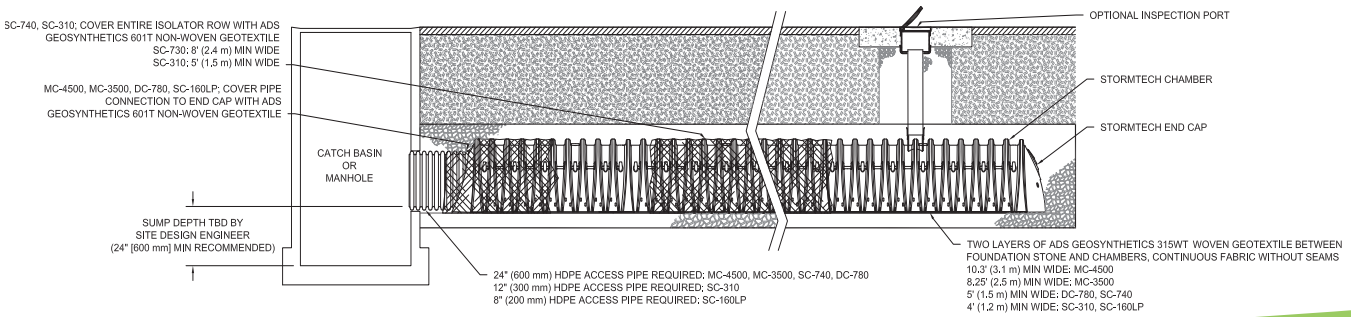
MAINTENANCE

The Isolator Row 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 entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row 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. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

StormTech Isolator Row (not to scale)

Note: Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-4500 chamber models and is not required over the entire Isolator Row.



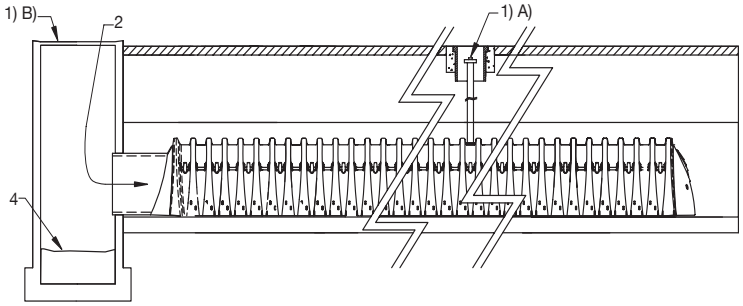
ISOLATOR ROW STEP BY STEP MAINTENANCE PROCEDURES

STEP 1
Inspect Isolator Row 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 Rows
  - i. Remove cover from manhole at upstream end of Isolator Row
  - ii. Using a flashlight, inspect down Isolator Row 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 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, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

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A division of ADS

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1-800-821-6710 www.ads-pipe.com

Appendix I

Geotechnical Report (Separate PDF)