Sambatek

Engineering | Surveying | Planning | Environmental

STORMWATER MANAGEMENT PLAN

FOR

VALLEY WEST SHOPPING CENTER

10520 FRANCE AVE S

BLOOMINGTON, MN

PREPARED BY:

JOSH PISTORIUS, EIT

BRADY BUSSELMAN, PE

PROJECT INTRODUCTION

The proposed project is a 0.88-acre redevelopment located at the Valley West Shopping Center located northwest of the intersection of W Old Shakopee Rd and France Ave S in Bloomington, MN. The project is located within the Lower Minnesota River Watershed District. Stormwater management onsite has been designed to meet the rate control and volume retention requirements of the City and Watershed. The City of Bloomington is the LGU.

EXISTING CONDITIONS

The existing project area is a building and parking lot. The project area to be disturbed is 0.88 acres, with 0.81 acres of impervious area (92% impervious). Geotechnical borings prepared by Braun Intertec show under lying soils to be poorly graded sands, which may be classified as Hydrologic Soil Group type A soils and are highly suitable for infiltration. The site drains into the adjacent storm sewer which travels north. There is currently no stormwater management system in place.

PROPOSED CONDITIONS

The proposed project will reconstruct the building and parking lot areas, with a reduced impervious area from 0.81 acres to 0.69 acres of new & reconstructed impervious (percentage impervious reduced to 78%). In order to provide stormwater management onsite, an underground infiltration system is proposed beneath the parking lot. The system will discharge to the existing storm sewer to the east. The subsurface system is designed only to meet volume and water quality. The reduction in impervious area alone is sufficient to meet rate control requirements, as demonstrated in the attached HydroCAD calculations. It should be noted that due to the lack of existing storm sewer in the area of the project, and due to the spread out nature of disturbed area, it is proposed to construct a new roof drain pipe for the 13,044 SF existing building roof. This roof is not part of the disturbed area, but when combined with the surface runoff captured south of the building, it routes a comparable amount of impervious area to the system.

Disturbed Area vs. Area Routed to Subsurface System (Acres)

	Disturbed Area (Existing)	Disturbed Area (Proposed)	Area Routed to Subsurface System
Pervious Area	0.07	0.19	0.10
Impervious Area	0.81	0.69	0.85
Total	0.88	0.88	0.95

RATE CONTROL

The City of Bloomington requires that the redevelopment must achieve a net reduction of pre-project discharge rates for the 2-, 10-, and 100-year 24-hour Atlas 14 rainfall events. Rate control is achieved onsite through the reduction of onsite impervious surface, as noted above and demonstrated in the attached HydroCAD calculations. The runoff rate control analysis was performed in HydroCAD using the MSE 3 rainfall distribution. The results of the analysis follow with additional information available in the appendices.

Maximum Rate of Runoff (cfs)

Storm Event	Total Existing	Total Proposed
2-year	3.23	2.34
10-year	5.17	4.26
100-year	9.58	8.78

VOLUME REDUCTION

The City of Bloomington requires onsite retention of the first 1.1 inches of runoff from new and reconstructed impervious surfaces. The proposed storm sewer onsite drains to an underground infiltration system which captures the first 1.1 inches of rainfall and bypasses the larger storm events. The system consists of 6 inches of bottom rock, a 30-inch chamber, and another 6 inches of top rock, for a total depth of 3.75 feet. The rock within the system has 40% voids, reducing the equivalent depth of the system to 2.9 feet. Based on the underlying HSG type A soils, an infiltration rate of 0.8 in/hr and maximum infiltration depth of 3.2 feet are used for the design. The results of the volume retention calculations are provided below.

$$Required\ Infiltration\ Volume(ft^3) = V_{inf} = 1(in) * \frac{1\ ft}{12\ in} * New\ Impervious\ Area\ (ft^2)$$

$$V_{inf}(ft^3) = 1.1(in) * \frac{1\ ft}{12\ in} * 30{,}056\ (ft^2) = 2{,}755\ ft^3$$

Volume Control Analysis

New Impervious Surface	30,056	sf
Design Infiltration/Filtration Rainfall Event	1.1	in
Required Infiltration/Filtration Volume	**2,755**	**cf**
Maximum Allowable Infiltration Rate	0.80	in/hr
Required Drawdown Time	48	hrs
Maximum Live Storage Depth	**3.2**	**ft**
Provided Volume Below Outlet	**2,764**	**cf**

WATER QUALITY

The City of Bloomington water quality requirements vs. the proposed system are shown in the table below. MIDS calculator results have been attached to this SWMP.

Water Quality – Removal Requirements vs. Actual (%)

	Minimum Required	Provided
TSS	90	97
TP	60	97

STORMWATER SYSTEM OPERATIONS & MAINTENANCE

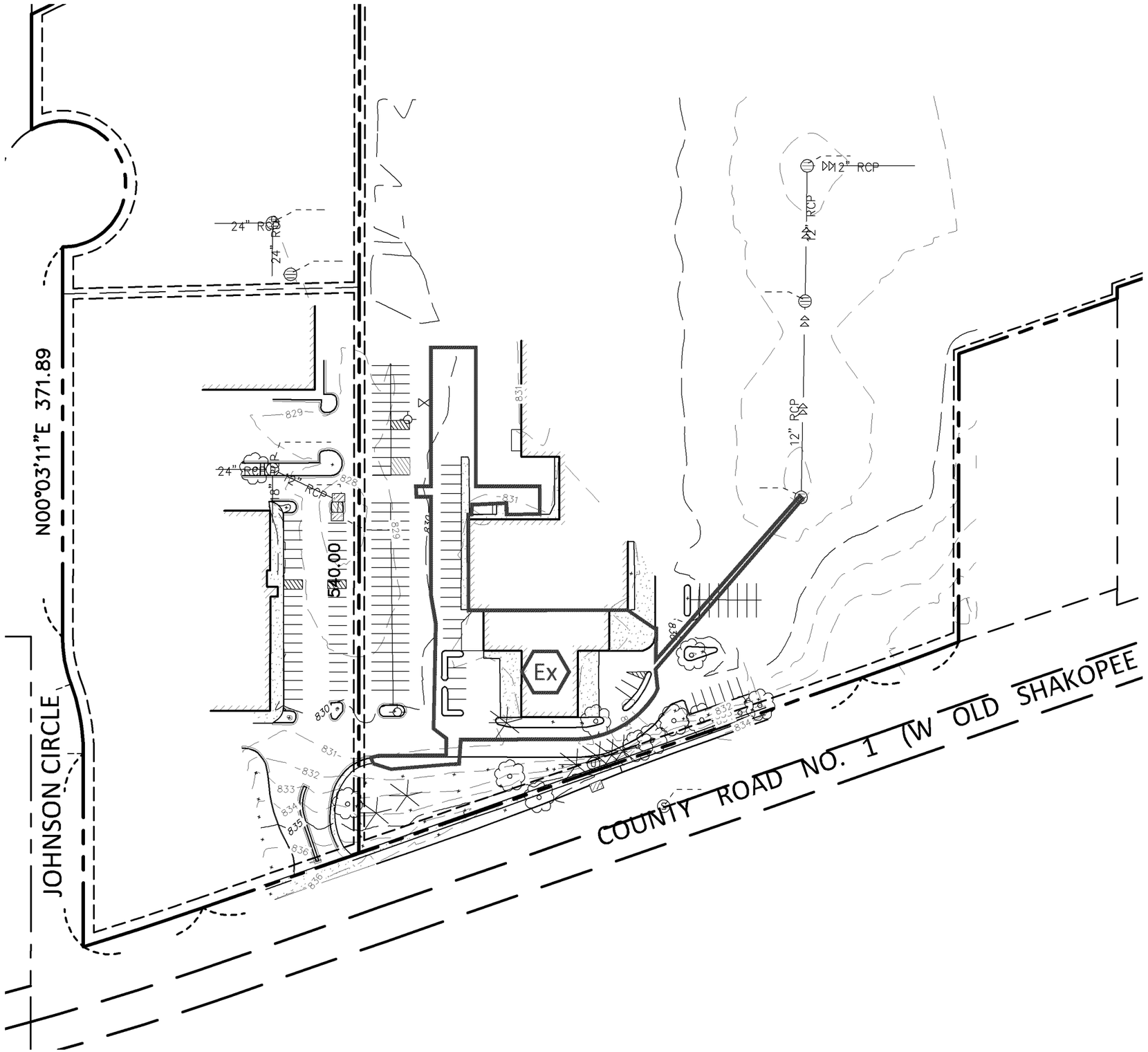
An operations & maintenance agreement has been prepared for the project, and is attached to this SWMP.

SUMMARY

The proposed Valley West Shopping Center project will meet the requirements of the City of Bloomington, Lower Minnesota River Watershed District, and MPCA through construction of an underground infiltration system and through reduction of impervious area. This BMP will provide the required volume reduction and water quality removals prior to discharging stormwater runoff from the site to downstream receiving waters.

If you have any questions, comments, or additional information regarding this report, please contact me at bbusselman@sambatek.com or 763-259-6674.

APPENDIX A – DRAINAGE MAPS



LEGEND

- XX — LINK
- XX — POND
- XX — REACH
- XX — SUB-CATCHMENT

NORTH

0 100

SCALE IN FEET

CASE #PL2020-151

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Client

KRAUS ANDERSON

Project

VALLEY WEST

Location

BLOOMINGTON, MN

Certification

Summary

Approved: BB Drawn: AJR

Revision History

No.	Date	By	Submittal / Rev.

Sheet Title

EXISTING DRAINAGE MAP - LIMITS OF DISTURBANCE

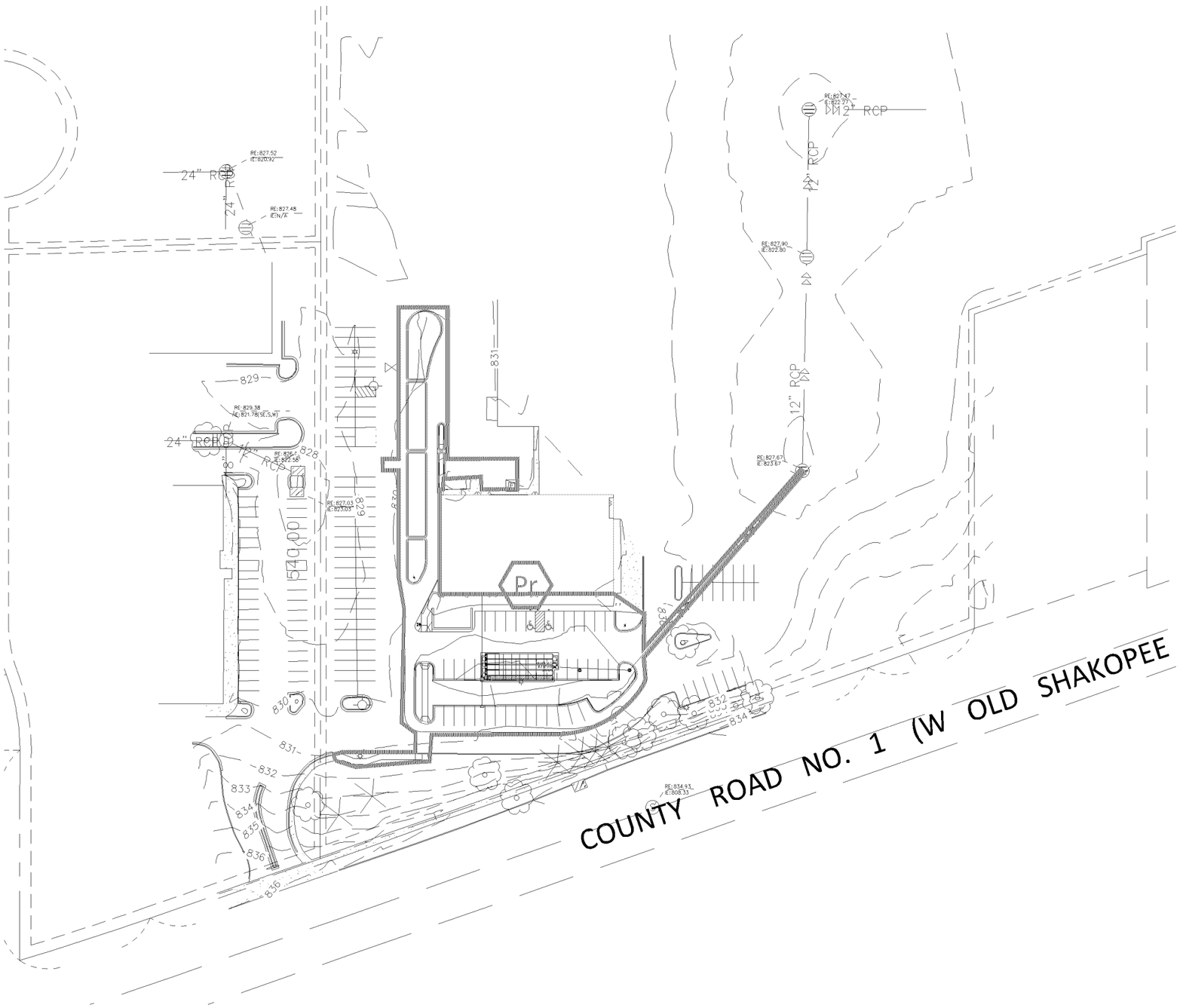
Sheet No. Revision

1/3

Project No. 21618

Dec 17, 2020 - 5:06pm - User:JPistorius C:\Users\JPistorius\appdata\local\temp\AcPublish_19752\21618-DRNBASE.dwg

CASE #PL2020-151



LEGEND

- XX — LINK
- XX — POND
- XX — REACH
- XX — SUB-CATCHMENT

NORTH

0 100

SCALE IN FEET

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Summary

Approved: BB Drawn: AJR

Revision History

No.	Date	By	Submittal / Rev.

Sheet Title

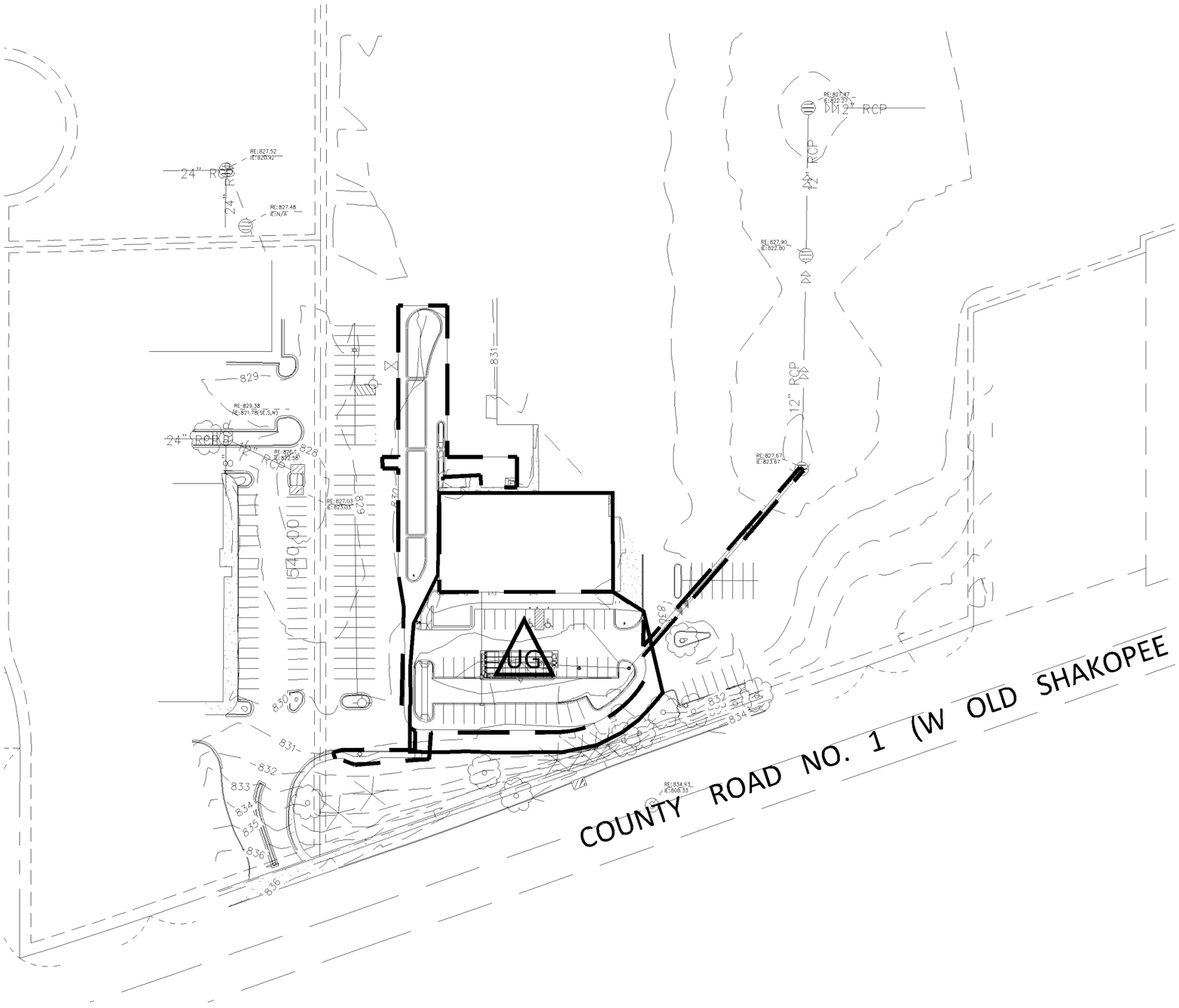
PROPOSED DRAINAGE MAP - LIMITS OF DISTURBANCE

Sheet No. Revision

2/3

Project No. 21618

CASE #PL2020-151



LEGEND

- XX — LINK
- XX — POND
- XX — REACH
- XX — SUB-CATCHMENT

NORTH

0 100

SCALE IN FEET

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Sheet Title

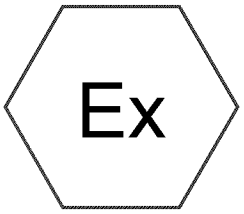
PROPOSED DRAINAGE MAP - AREA TO BMP

Sheet No. Revision

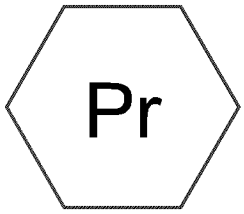
3/3

Project No. 21618

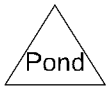
APPENDIX B – HYDROCAD CALCULATIONS



Existing Area to be Distrurbed



Proposed Area to be Redeveloped



Routing Diagram for 21618 - HydroCAD - SC740
Prepared by MFRA, Printed 12/17/2020

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.260	39	>75% Grass cover, Good, HSG A (Ex, Pr)
0.810	98	Paved parking, HSG A (Ex)
0.690	98	Paved parking, HSG C (Pr)
1.760	**89**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.070	HSG A	Ex, Pr
0.000	HSG B	
0.690	HSG C	Pr
0.000	HSG D	
0.000	Other	
1.760		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.260	0.000	0.000	0.000	0.000	0.260	>75% Grass cover, Good	Ex, Pr
0.810	0.000	0.690	0.000	0.000	1.500	Paved parking	Ex, Pr
1.070	**0.000**	**0.690**	**0.000**	**0.000**	**1.760**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Ex: Existing Area to be Runoff Area=0.880 ac 92.05% Impervious Runoff Depth=2.09"
Tc=5.0 min CN=93 Runoff=3.23 cfs 0.153 af

Subcatchment Pr: Proposed Area to be Runoff Area=0.880 ac 78.41% Impervious Runoff Depth=1.45"
Tc=5.0 min CN=85 Runoff=2.34 cfs 0.106 af

Total Runoff Area = 1.760 ac Runoff Volume = 0.259 af Average Runoff Depth = 1.77"
14.77% Pervious = 0.260 ac 85.23% Impervious = 1.500 ac

Summary for Subcatchment Ex: Existing Area to be Distrurbed

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

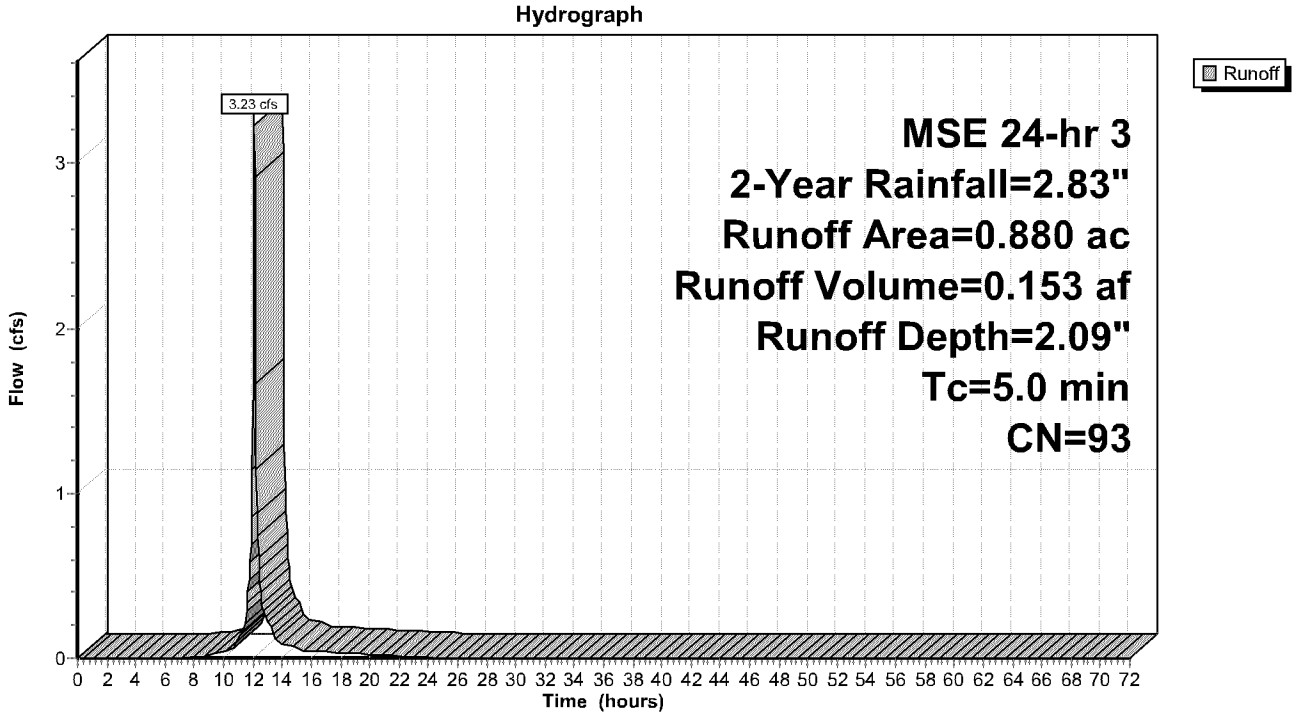
Runoff = 3.23 cfs @ 12.11 hrs, Volume= 0.153 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.83"

Area (ac)	CN	Description
0.810	98	Paved parking, HSG A
0.070	39	>75% Grass cover, Good, HSG A
0.880	93	Weighted Average
0.070		7.95% Pervious Area
0.810		92.05% Impervious Area

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

Subcatchment Ex: Existing Area to be Distrurbed



Summary for Subcatchment Pr: Proposed Area to be Redeveloped

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

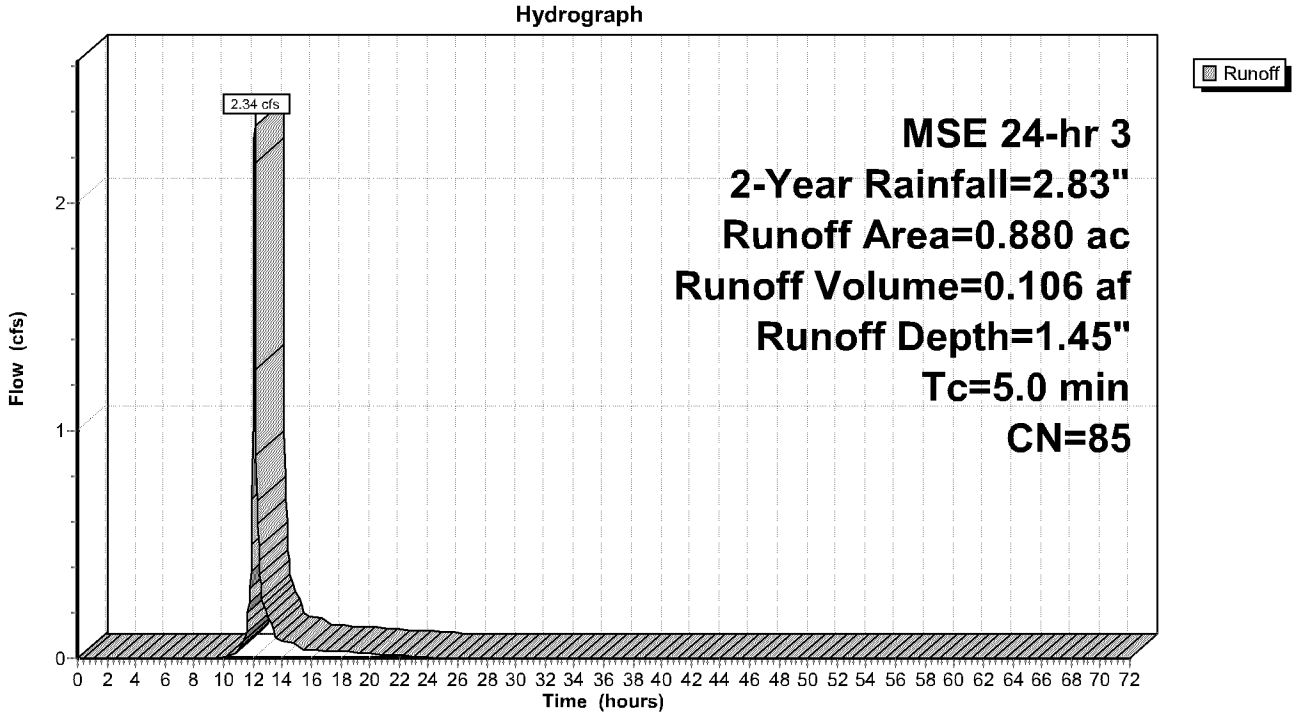
Runoff = 2.34 cfs @ 12.12 hrs, Volume= 0.106 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.83"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG C
0.190	39	>75% Grass cover, Good, HSG A
0.880	85	Weighted Average
0.190		21.59% Pervious Area
0.690		78.41% Impervious Area

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

Subcatchment Pr: Proposed Area to be Redeveloped



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Ex: Existing Area to be Runoff Area=0.880 ac 92.05% Impervious Runoff Depth=3.45"
Tc=5.0 min CN=93 Runoff=5.17 cfs 0.253 af

Subcatchment Pr: Proposed Area to be Runoff Area=0.880 ac 78.41% Impervious Runoff Depth=2.67"
Tc=5.0 min CN=85 Runoff=4.26 cfs 0.196 af

Total Runoff Area = 1.760 ac Runoff Volume = 0.449 af Average Runoff Depth = 3.06"
14.77% Pervious = 0.260 ac 85.23% Impervious = 1.500 ac

Summary for Subcatchment Ex: Existing Area to be Distrurbed

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

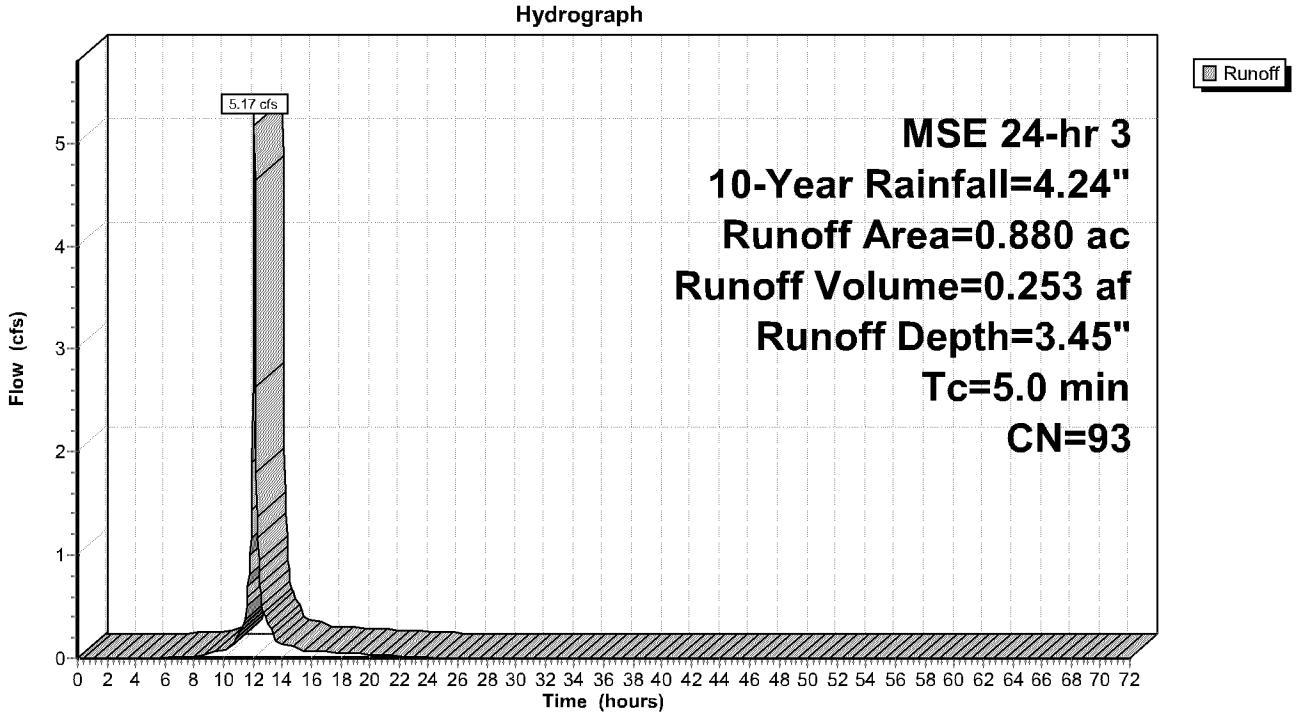
Runoff = 5.17 cfs @ 12.11 hrs, Volume= 0.253 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.24"

Area (ac)	CN	Description
0.810	98	Paved parking, HSG A
0.070	39	>75% Grass cover, Good, HSG A
0.880	93	Weighted Average
0.070		7.95% Pervious Area
0.810		92.05% Impervious Area

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

Subcatchment Ex: Existing Area to be Distrurbed



Summary for Subcatchment Pr: Proposed Area to be Redeveloped

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

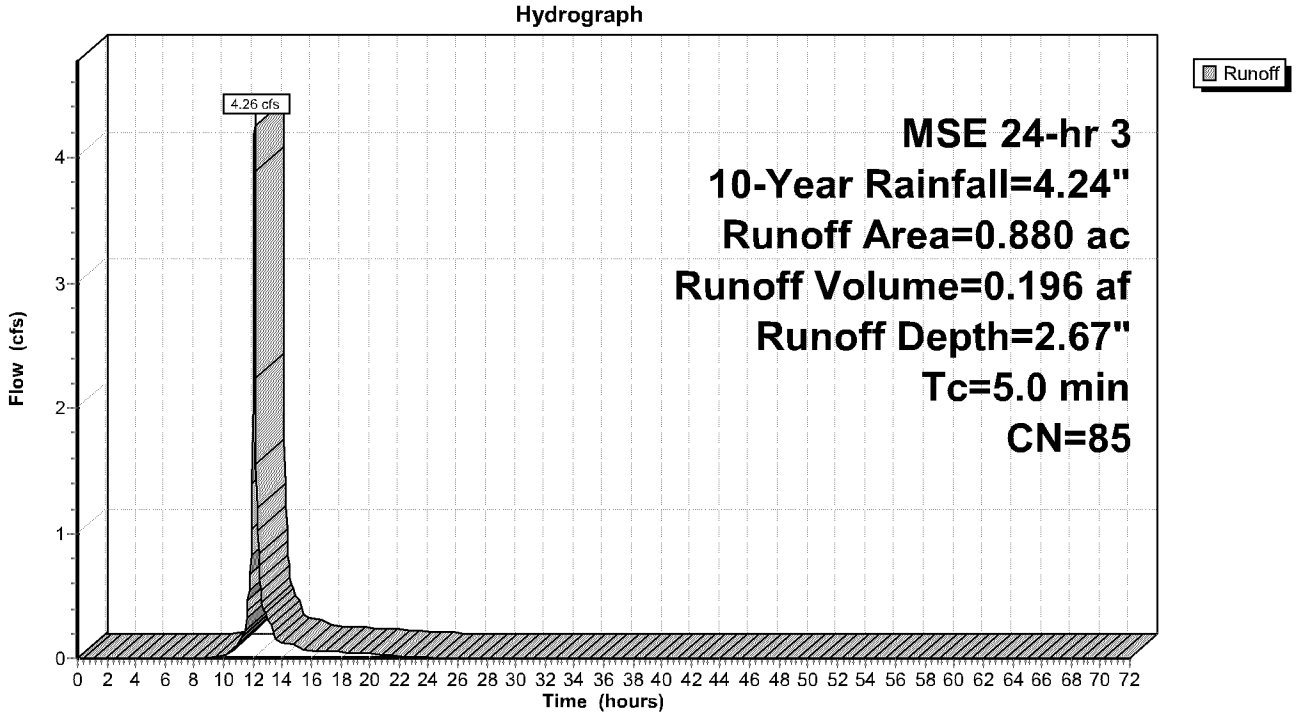
Runoff = 4.26 cfs @ 12.12 hrs, Volume= 0.196 af, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.24"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG C
0.190	39	>75% Grass cover, Good, HSG A
0.880	85	Weighted Average
0.190		21.59% Pervious Area
0.690		78.41% Impervious Area

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

Subcatchment Pr: Proposed Area to be Redeveloped



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Ex: Existing Area to be Runoff Area=0.880 ac 92.05% Impervious Runoff Depth=6.67"
Tc=5.0 min CN=93 Runoff=9.58 cfs 0.489 af

Subcatchment Pr: Proposed Area to be Runoff Area=0.880 ac 78.41% Impervious Runoff Depth=5.73"
Tc=5.0 min CN=85 Runoff=8.78 cfs 0.420 af

Total Runoff Area = 1.760 ac Runoff Volume = 0.909 af Average Runoff Depth = 6.20"
14.77% Pervious = 0.260 ac 85.23% Impervious = 1.500 ac

Summary for Subcatchment Ex: Existing Area to be Distrurbed

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

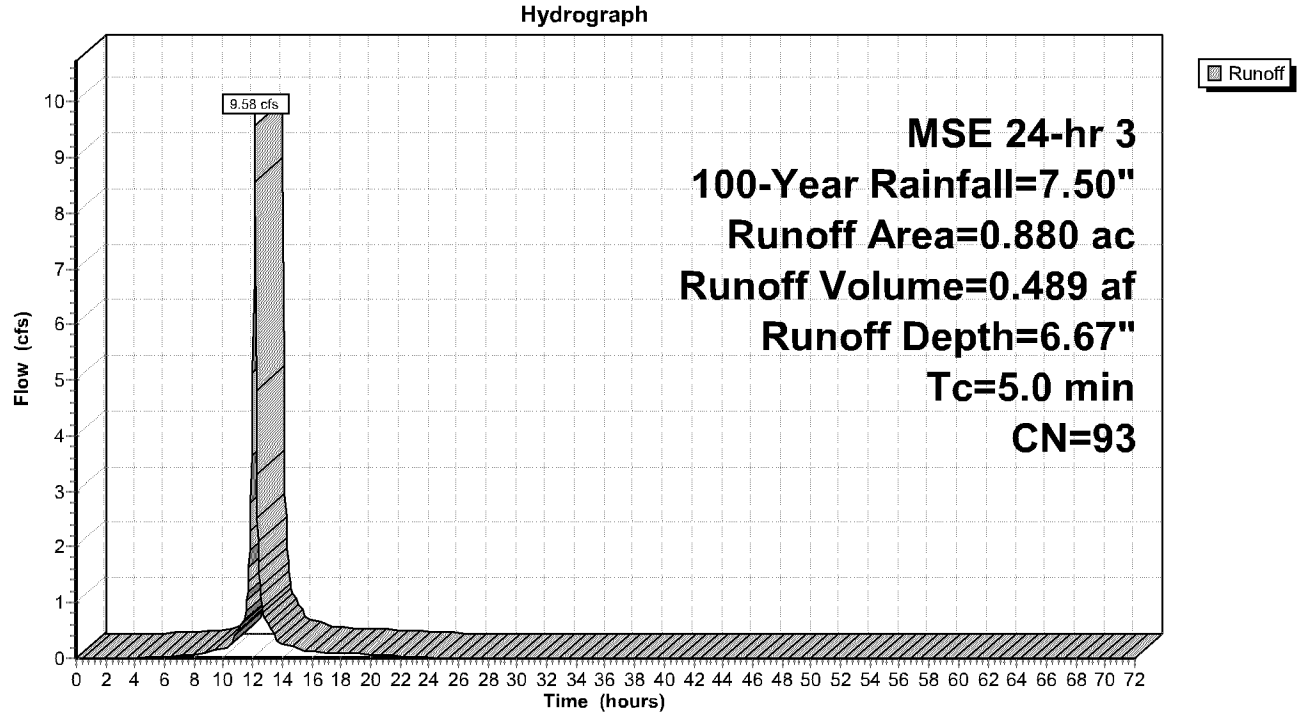
Runoff = 9.58 cfs @ 12.11 hrs, Volume= 0.489 af, Depth= 6.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.810	98	Paved parking, HSG A
0.070	39	>75% Grass cover, Good, HSG A
0.880	93	Weighted Average
0.070		7.95% Pervious Area
0.810		92.05% Impervious Area

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

Subcatchment Ex: Existing Area to be Distrurbed



Summary for Subcatchment Pr: Proposed Area to be Redeveloped

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

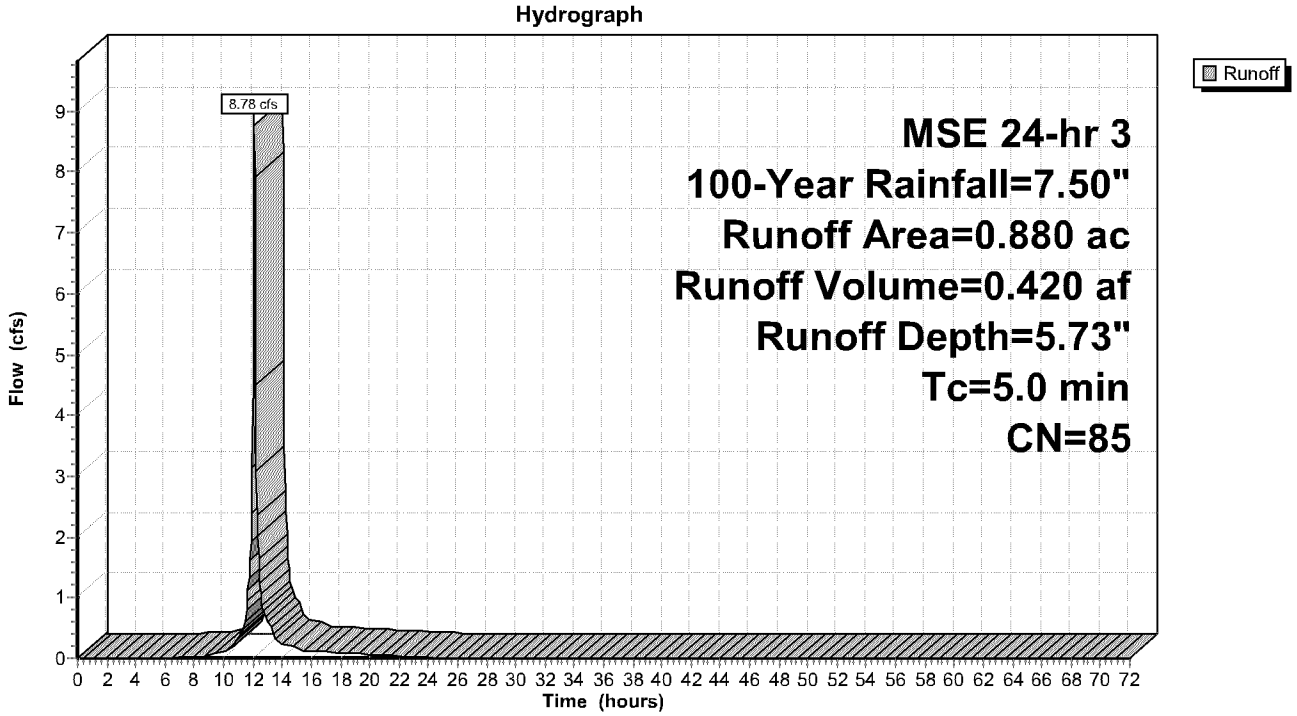
Runoff = 8.78 cfs @ 12.11 hrs, Volume= 0.420 af, Depth= 5.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG C
0.190	39	>75% Grass cover, Good, HSG A
0.880	85	Weighted Average
0.190		21.59% Pervious Area
0.690		78.41% Impervious Area

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

Subcatchment Pr: Proposed Area to be Redeveloped



APPENDIX C– MIDS CALCULATOR RESULTS

Project Information

Calculator Version:	Version 3: January 2017
Project Name:	Valley West End Cap Redevelopment
User Name / Company Name:	Sambatek, Inc.
Date:	December 16, 2020
Project Description:	
Construction Permit?:	No

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55431
Annual Rainfall (inches):	31.3
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land	0	0	0	0	0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.19	0	0	0	0.19
				Impervious Area (acres)	0.69
				Total Area (acres)	0.88

Site Areas Routed to BMPs*

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.19				0.19
				Impervious Area (acres)	0.69
				Total Area (acres)	0.88

*NOTE: ACTUAL AREA ROUTED TO BMP IS 0.1 ACRES MANAGED TURF AND 0.85 ACRES IMPERVIOUS. HOWEVER, THE REQUIRED IMPERVIOUS AREA TO BE INFILTRATED IS 0.69 ACRES, WHICH IS WHAT THE BMP IS DESIGNED TO INFILTRATE. MIDS CALCULATOR WILL NOT ALLOW MORE IMPERVIOUS TO BE ROUTED TO A BMP THAN IS INCLUDED IN THE TOTAL SITE AREA.

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	2755	ft3
Volume removed by BMPs towards performance goal:	2755	ft^3
Percent volume removed towards performance goal	**100**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	1.6057	acre-ft
Annual runoff volume removed by BMPs:	1.5498	acre-ft
Percent annual runoff volume removed:	**97**	**%**
Post development annual particulate P load:	0.721	lbs
Annual particulate P removed by BMPs:	0.696	lbs
Post development annual dissolved P load:	0.59	lbs
Annual dissolved P removed by BMPs:	0.569	lbs
Percent annual total phosphorus removed:	**97**	**%**
Post development annual TSS load:	238	lbs
Annual TSS removed by BMPs:	229.7	lbs
Percent annual TSS removed:	**97**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
1 - Underground infiltration	3474	2755	2755	0	100

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
1 - Underground infiltration	1.6057	0	1.5498	0.0558999999	97

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Underground infiltration	0.7206	0	0.6955	0.0251	97

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Underground infiltration	0.5896	0	0.5691	0.0205	97

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Underground infiltration	238.03	0	229.74	8.2899999999	97

BMP Schematic

APPENDIX D – DRAFT BORING LOGS

F:\2019\B1904635.dwg,Geotech,5/9/2019 5:13:18 PM

CASE #PL2020-191

DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

DRAFT
Subject to Change

N

20' 0 40'

SCALE: 1"= 40'

BRAUN INTERTEC
The Science You Build On.

11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
brauninterтec.com

Project No:
B1904635

Drawing No:
B1904635

Drawn By:	JAG
Date Drawn:	5/8/19
Checked By:	RJF
Last Modified:	5/9/19

[illegible] West Stormwater System

10606 [illegible]ance Avenue S.

Bloomington, Minnesota

Soil Boring Location Sketch

CASE #PL2020-191

BRAUN INTERTEC
The Science You Build On.

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1904635
Geotechnical Evaluation
Valley West Stormwater System
10606 France Avenue South
Bloomington, Minnesota

BORING: **ST-1**

LOCATION: See attached sketch

NORTHING: EASTING:

DRILLER:	M. Barber	LOGGED BY:	R. Fritz	START DATE:	05/15/19	END DATE:	05/15/19
SURFACE ELEVATION:		RIG:	GP-1	METHOD:	3 1/4" HSA	SURFACING:	Bituminous

WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
0.8		PAVEMENT, 5 inches bituminous over 4 inches aggregate base.					
		POORLY GRADED SAND (SP), fine to medium sand, brown, moist, loose to medium dense (TERRACE DEPOSIT)		5-5-4 (9) 168"			
5				2-2-3 (5) 144"			
				4-3-4 (7) 144"			
10				5-5-6 (11) 168"			
14.5				7-7-8-10/0" (REF) 204"			
		END OF BORING					
15		Boring immediately backfilled					
20							
25							
30							

CASE #PL2020-191

BRAUN INTERTEC
The Science You Build On.

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1904635
Geotechnical Evaluation
Valley West Stormwater System
10606 France Avenue South
Bloomington, Minnesota

BORING: **ST-2**

LOCATION: See attached sketch

NORTHING: EASTING:

DRILLER:	M. Barber	LOGGED BY:	R. Fritz	START DATE:	05/15/19	END DATE:	05/15/19
SURFACE ELEVATION:		RIG:	GP-1	METHOD:	3 1/4" HSA	SURFACING:	Bituminous

WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
0.8		PAVEMENT, 5 inches bituminous over 3 1/2 inches aggregate base.					
		FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium sand, brown, moist		4-4-3 (7) 156"			
4.0		POORLY GRADED SAND (SP), fine to medium sand, brown, moist, loose to medium dense (TERRACE DEPOSIT)		1-1-1 (2) 144"			
				3-3-3 (6) 156"			
				5-3-3 (6) 168"			
14.5		END OF BORING		7-7-6-5/0" (REF) 216"			
		Boring immediately backfilled					

APPENDIX E – MAINTENANCE AGREEMENT

VALLEY WEST SHOPPING CENTER
END CAP REDEVELOPMENT
MAINTENANCE PLAN

Project Name & Address: Valley West Shopping Center End Cap Redevelopment

10520 France Avenue South, Bloomington MN 55431

LIST OF VALLEY WEST SHOPPING CENTER END CAP REDEVELOPMENT STORMWATER MANAGEMENT PRACTICES

1. StormTech Underground Infiltration Basin w/ Isolator Row

2. Standard Catch Basin Manhole w/ Sump

3. Storm Sewer Pipe & Standard Manholes

RESPONSIBLE PARTY FOR MAINTENANCE OF STORMWATER MANAGEMENT PRACTICES

The OWNER will be responsible for ongoing maintenance of the stormwater management practices. The OWNER for the site is:

Kraus Anderson
501 S 8th Street
Minneapolis, MN 55404
TEL: 612-336-6410
Contact: Tim Marco

NOW THEREFORE, the OWNER makes this agreement and hereby declares that this agreement shall constitute covenants to run with the Property, and further declares that the Property shall be owned, used, occupied, and conveyed subject to the covenants and restrictions set forth in this declaration, all of which shall be binding in perpetuity on all persons owning or acquiring any right, title or interest in the Property, and their heirs, successors, personal representative and assigns, but only during the period of ownership of that right, title of interest.

1. OWNER will inspect the Facilities at least annually.

2. OWNER will maintain and repair the Facilities:
   a. In the case of the basins and other facilities where sediment collects, to preserve live storage or capacity at or above the design volume or, where no design live storage volume or capacity is incorporated into the permit, the volume or capacity recommended by the manufacturer.

   b. In the case of conveyances and other structures, to preserve design hydraulic capacity.

   c. In the case of all facilities, as necessary to preserve the integrity and intended function of the facility.

FREQUENCY OF INSPECTION, INSPECTION ACTIVITIES, AND MAINTENANCE ACTIVITIES

1. StormTech Underground Infiltration Basin w/ Isolator Row

Frequency of Inspection/Indicator of Maintenance: Semi-Annually/Average depth of sediment exceeds 3" throughout isolator row

Description of Inspection Activities: See Appendix B for manufacturer's guidelines

Description of Maintenance Activities: See Appendix B for manufacturer's guidelines

2. Standard Catch Basin Manhole w/ Sump

Frequency of Inspection/Indicator of Maintenance: Semi-Annually/Average depth of sediment exceeds 6" in the sump

Description of Inspection Activities: Practice should be inspected (and cleaned out if deemed necessary) semi-annually to ensure that sediment is not beginning to wash out during storm events. Pipes and grate should be inspected to ensure no debris is causing blockage.

Description of Maintenance Activities: Practice should be cleaned out and sediment should be removed once per year. Remove any blockages or obstructions in pipes or grate.

5. Storm Sewer Pipe & Standard Manholes

Frequency of Inspection/Indicator of Maintenance: Annually/manholes and catch basins are flooding.

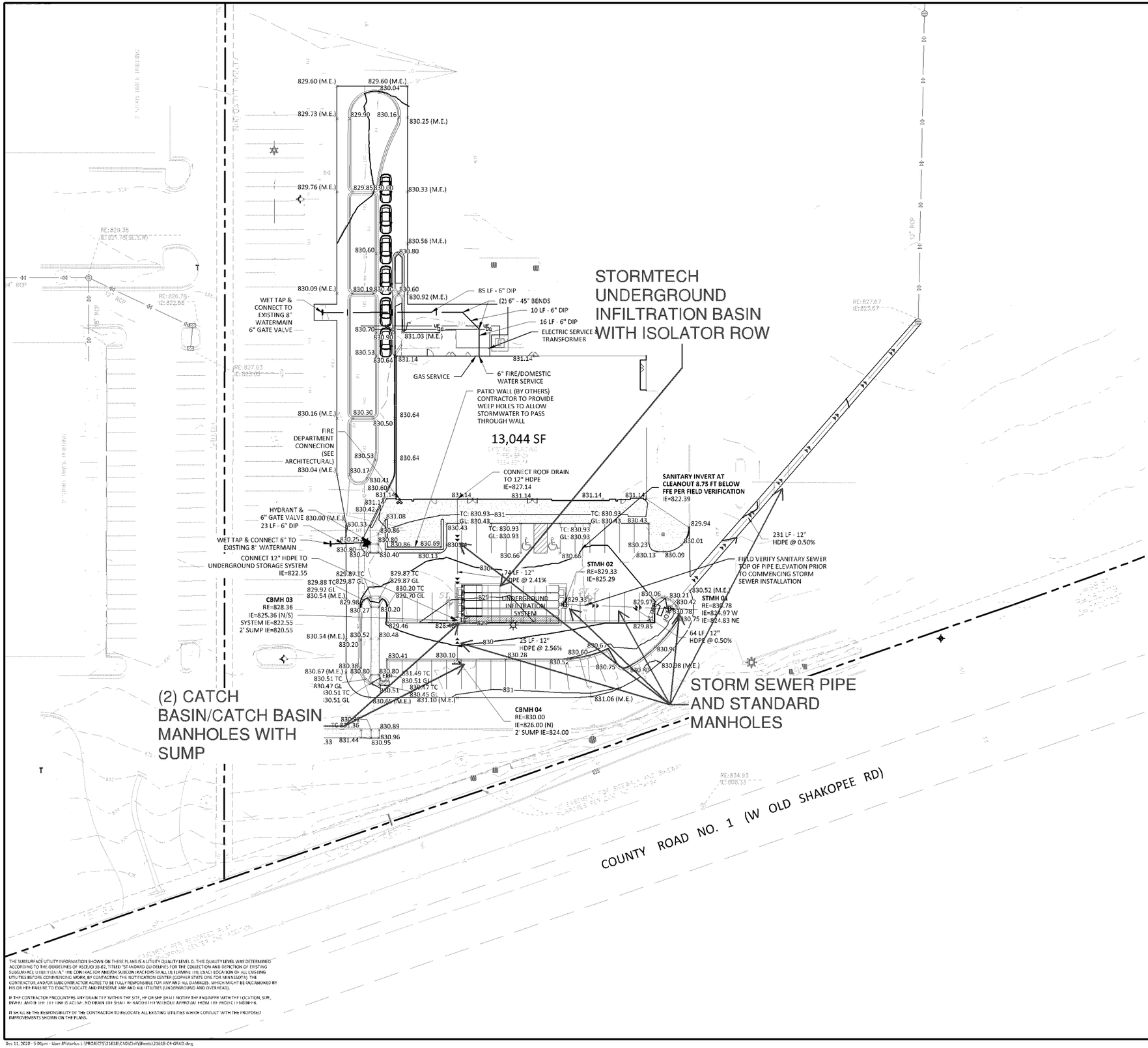
Description of Inspection Activities: Practice should be inspected (and cleaned out if deemed necessary) annually to ensure that pipe conveyance is maintained during storm events. Pipes should be inspected to ensure no debris is causing blockage.

Description of Maintenance Activities: Practice should be cleaned out and sediment should be removed once per year. Remove any blockages or obstructions in pipes.

Drafted by:
Sambatek, Inc.
12800 Whitewater Drive, Suite 300
Minnetonka, MN 55343

APPENDIX A – STORMWATER MANAGEMENT PRACTICES EXHIBIT

CASE #PL2020-191



THE SUBSURFACE UTILITY INFORMATION SHOWN ON THESE PLANS IS A UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF ASCE/CI 38-02, TITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA." THE CONTRACTOR AND/OR SUBCONTRACTORS SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, BY CONTACTING THE NOTIFICATION CENTER (GOPHER STATE ONE FOR MINNESOTA). THE CONTRACTOR AND/OR SUBCONTRACTOR AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES, WHICH MIGHT BE OCCASIONED BY HIS OR HER FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES (UNDERGROUND AND OVERHEAD).

IF THE CONTRACTOR ENCOUNTERS ANY DRAIN TILE WITHIN THE SITE, HE OR SHE SHALL NOTIFY THE ENGINEER WITH THE LOCATION, SIZE, DEPTH AND DIRECTION OF FLOW. DO NOT CUT DRAIN TILE WITHOUT APPROVAL FROM THE PROJECT ENGINEER.

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

LEGEND

	PROPOSED	EXISTING
PROPERTY LIMIT		
CURB & GUTTER		
STORM SEWER		
DRAINTILE		
BUILDING		
RETAINING WALL		
WETLAND LIMITS		
TREELINE		
SPOT ELEVATION	902.5	902.5
CONTOUR	902	902
RIP RAP		
OVERFLOW ELEV.	EOF 902.5	
SOIL BORINGS		
SPOT ELEVATION-MATCH EXISTING (FIELD VERIFY AND CONTACT ENGINEER IF DISCREPANCIES EXIST)	902.5 (M.E.)	

Sambatek
www.sambatek.com
12800 Whitewater Drive, Suite 300
Minnetonka, MN 55343
763.476.6010 telephone
763.476.8532 facsimile
Engineering | Surveying | Planning | Environmental

Client
KRAUS ANDERSON

501 S 8TH STREET
MINNEAPOLIS, MN 55404

Project
VALLEY WEST SHOPPING CENTER END CAP

Location
BLOOMINGTON, MN
10520 FRANCE AVENUE S.

Certification

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed professional ENGINEER under the laws of the state of Minnesota.

Brady D. Busselman
Registration No. 44579 Date: 10/19/2020

If applicable, contact us for a wet signed copy of this plan which is available upon request at Sambatek's, Minnetonka, MN office.

Summary

Designed: AR Drawn: JMW
Approved: BDB Book / Page:
Phase: PRELIMINARY Initial Issue: 10/19/2020

Revision History

No.	Date	By	Submittal / Revision
	09/30/20	JGP	CUP/Permit Set
	10/19/20	JMW	Permit Plans
	12/11/20	JGP	City Comment Response

Sheet Title
GRADING, DRAINAGE & UTILITY PLAN

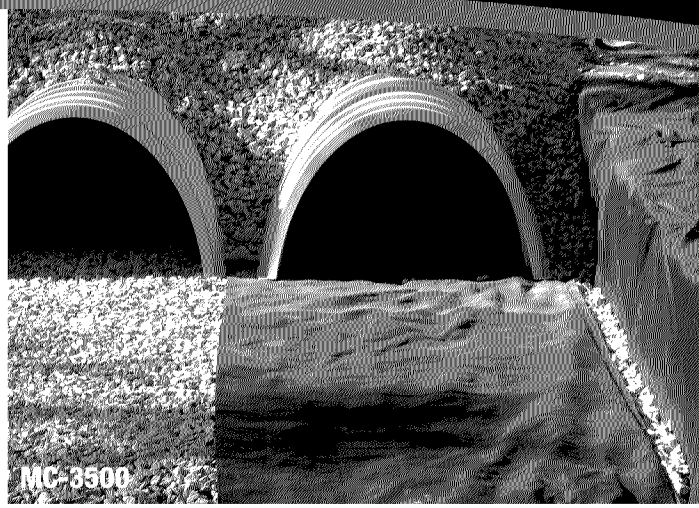
Sheet No. Revision
C4.01

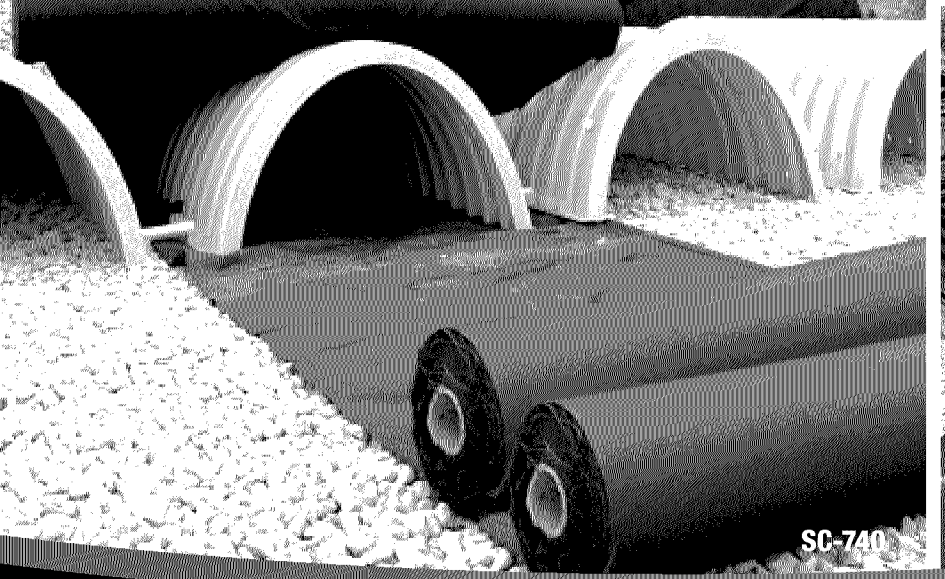
Project No. 21618

APPENDIX B – STORMTECH INSPECTION AND MAINTENANCE

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) and Total Phosphorus (TP) removal with easy access for inspection and maintenance.

THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-160, 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.

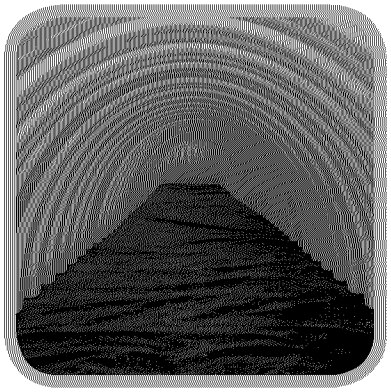
A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed 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-160, 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 provides access to the Isolator Row and typically includes a high flow weir. When flow rates or volumes exceed the Isolator Row weir capacity the water will flow over the weir and discharge through a manifold to the other chambers.

Another acceptable design uses one open grate inlet structure. Using a "high/low" design (low invert elevation on the Isolator Row and a higher invert elevation on the manifold) an open grate structure can provide the advantages of the Isolator Row by creating a differential between the Isolator Row and manifold thus allowing for settlement in the Isolator Row.

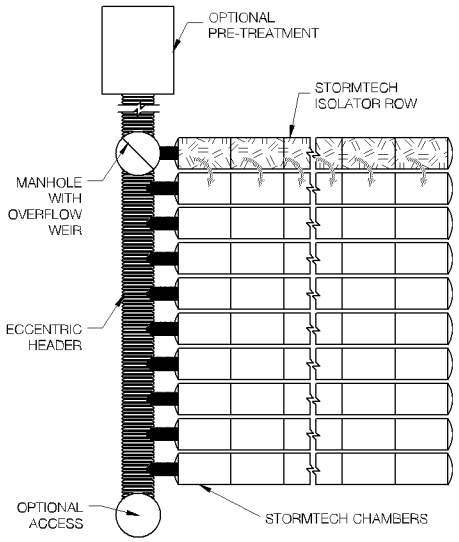
The Isolator Row may be part of a treatment train system. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

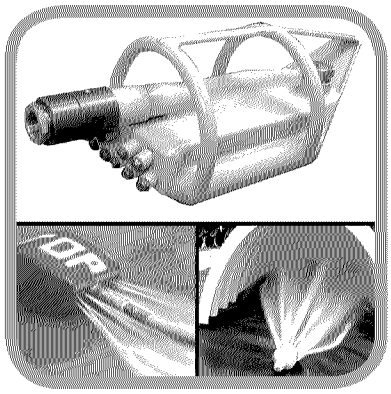
Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.



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.

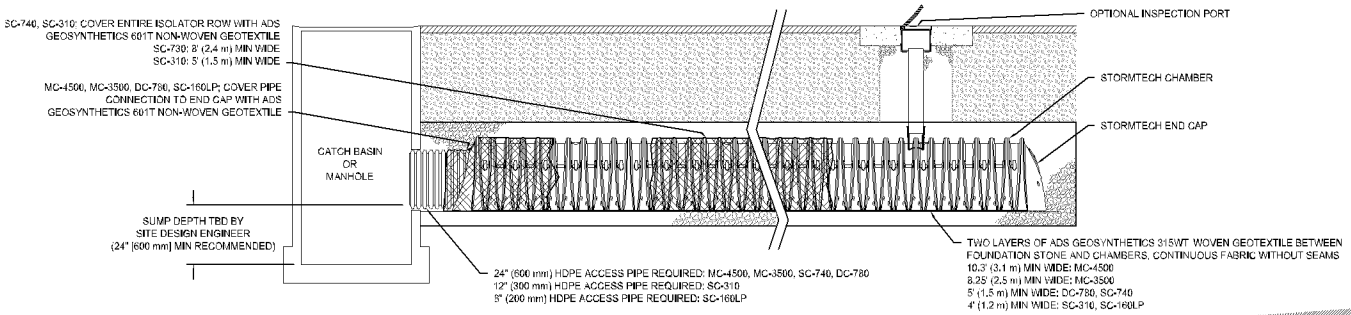
MAINTENANCE

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.

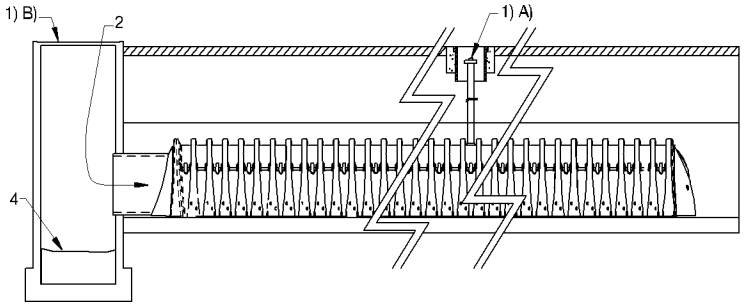
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

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

StormTech® Detention • Retention • Water Quality
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1-800-821-6710 www.ads-pipe.com