

STORMWATER MANAGEMENT REPORT

for the

Stone Rise

Located at

BLOCK 111; LOTS 4,10,11,12 & 13

In

**TOWNSHIP OF MARLBORO
MONMOUTH COUNTY, NJ**

Has been prepared for

**SPG Marlboro, LLC
94 GREEN STREET
WOODBIDGE, NJ 07095**

on

December 18, 2020

**Eric R. Ballou, PE
NJPE 42827**

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I. INTRODUCTION

The proposed project, known as Stone Rise, will consist of a residential complex of twenty-one (21) residential buildings, parking and a club house. The project is located within the Township of Marlboro, Monmouth County, New Jersey. The project consists of five (5) lots (4, 10, 11, 12 & 13) within Block 111, all of which are proposed to be merged into a single lot. The subject property is bounded on the north by existing residential homes along Texas Road and on the south, east and west by existing wooded areas. The 34-acre site is currently developed with a wrecking yard, former homestead, the remains of which are present on site, and surrounding woods.

The site slopes to the east draining into wetlands that ultimately drains into a stream along the eastern property line. A combination of infiltration/detention basins and a bio-retention basin will be utilized to meet required flow rate reductions, water quality and recharge.

It is the purpose of this report to demonstrate the following:

- 1) Required flow reductions for the post-development condition will be obtained through the use of two (2) surface infiltration/detention basins. Infiltration rate will be assumed to be zero for the purposes of calculating runoff rates.
- 2) The project will meet required water quality and recharge standards for storm water runoff through the use of two (2) surface infiltration / detention basins and a bio-retention basin.

Methods of determining stormwater runoff and peak discharge follow the procedures as outlined in “Urban Hydrology for Small Watersheds”, Soil Conservation Service Technical Release No. 55, and NOAA 24-hour rainfall data for Monmouth County for each storm event studied. Stormwater hydrographs were performed using HydroCAD Software Solutions’ “HydroCAD” (ver. 10.00-24) computer program.

The following 24-hour storm events were studied using a NOAA Point Precipitation Frequency Estimate, 24-hr D Storm distribution. The rainfall intensities are based upon NOAA Point Precipitation Frequency estimates:

Storm Frequency (Years)	Rainfall (Inches)
2	3.4
10	5.2
25	6.4
100	9.8

II. PRE-DEVELOPMENT CONDITIONS

A summary of the previously discussed drainage areas for the pre-development condition follows below. Refer to the Appendix B for accompanying Hydrograph calculations and Appendix H for the Pre-Development Drainage Map.

PRE-DEVELOPMENT

Total Analysis Area: 17.1 Acres

Watershed A

Subarea A1

Pervious Drainage Area that is tributary to the stream along the eastern property line.:
12.0 acres

Subarea A2

Gravel / Concrete coverage Drainage Area that is tributary to the stream along the eastern property line:
5.1 acres

III. POST DEVELOPMENT CONDITIONS

A summary of the previously discussed drainage areas for the post-development condition follows below. Refer to the Appendix C for Hydrograph calculations Appendix I for the Post-Development Drainage Map.

POST-DEVELOPMENT

Watershed A

Subarea A1i:	Impervious Drainage Area tributary to infiltration/detention Basin A: 6.4 acres
Subarea A1p:	Pervious Drainage Area tributary to infiltration/detention Basin A: 3.6 acres
Subarea B1i:	Impervious area tributary to Bio-Retention Basin B1: 1.6 acres
Subarea B1p:	Pervious area tributary to Bio-Retention Basin B1: 0.6 acres
Subarea B2i:	Impervious area tributary to the infiltration/detention Basin B2: 1.3 acres
Subarea B2p:	Pervious area tributary to infiltration/detention Basin B2: 1.9 acres
Subarea Ui:	Impervious area directly tributary to adjacent wetlands and stream: 0.2 acres
Subarea Up:	Pervious area directly tributary to adjacent wetlands and stream: 1.5 acres

IV. STORMWATER MANAGEMENT SUMMARY:

Pre- and Post-development computations for the resultant hydrographs, routing computations, and runoff volumes are appended, respectively, to this report. For each drainage area, the following summaries were generated:

Watershed A

Pre-development (17.1 ac)
Post-Development: (17.1 ac.)

Design Storm Frequency	Pre-Development Peak Flow (Total) (A)	NJDEP Reduction Factor	Total Allowable Post Development Flow	Post-Development Peak Flow	Difference
(Year)	(cfs)		(cfs)	(cfs)	(cfs)
2	7.5	0.50	3.7	3.5	-0.2
10	15.5	0.75	11.6	9.7	-1.9
100	37.7	0.80	30.1	29.0	-1.1

The above calculations and proposed stormwater management design demonstrate that the post-development flows and from the developed site will be reduced as required in the 2, 10 and 100-year storm events.

V. WATER QUALITY DISCUSSION

NJDEP Stormwater Management rules require that major developments provide 80% TSS reduction for post development runoff. We are proposing to construct a surface infiltration/detention basin A and a Bio-Retention Basin B1 to infiltrate the water quality storm event to meet the 80% TSS requirement. The calculations also show that infiltration and bio-retention basin completely evacuate within 12 hours. Please refer to Appendix D for Water Quality Calculations.

VI. GROUNDWATER RECHARGE DISCUSSION

Per these regulations, the project meets the definition for *Major Development*, and must therefore comply with Section 22-535.4.f.1.(b)(1)[b].

Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from preconstruction to post-construction for the 2-year storm is infiltrated.

The table below demonstrates the total two-year design storm runoff volumes in both the pre and post development condition, as well as the total volume of runoff that is infiltrated via the use of the subsurface infiltration/detention basin and bio-retention basin.

PRE-DEVELOPMENT vs. POST DEVELOPMENT VOLUME COMPARISON CHART (2-YEAR DESIGN EVENT) WATERSHED A

Design Storm Frequency	(A) Predevelopment Runoff Volume (ac-ft)	(B) Post Development Runoff Volume (ac-ft)	Volume Required To Be Infiltrated (B – A) (ac-ft)	Volume Infiltrated Through Basin Bottom (ac-ft)
2-Year	0.58	2.51	1.93	2.25

As demonstrated above, the volume infiltrated exceeds the volume required by regulations. The calculations also show that infiltration and bio-retention basin completely evacuate within 26 hours for a 2-year storm event. Please refer to Appendix D for Water Recharge Calculations.

VII. EMERGENCY SPILLWAY CALCULATIONS

Portions of the embankments of the detention basins are considered Class IV dams according to NJDEP Dam Safety regulations. In accordance with requirements, the emergency spillways are designed to convey a rainfall 50% greater than a 24-hour, 100 year, NOAA Type D Storm, with the principal spillway clogged. The top of the dams have

been set to be over 1 foot above the emergency spillway flood elevation to meet Class IV dam requirements. Please refer to Appendix E for Emergency Spillway Calculations.

VIII. LOW IMPACT DEVELOPMENT DISCUSSION

The proposed low impact design has addressed the following non-structural stormwater management strategies.:

7:8-5.3(b)(2): The design has decreased the amount of impervious area well below the ordinance allowable limits and has limited the parking to the ordinance requirements.

7:8-5.3(b)(8): We have disconnected impervious area along the southwest parking area that allows the runoff over the vegetated embankments of the bio-retention basin.

IX. CONCLUSION

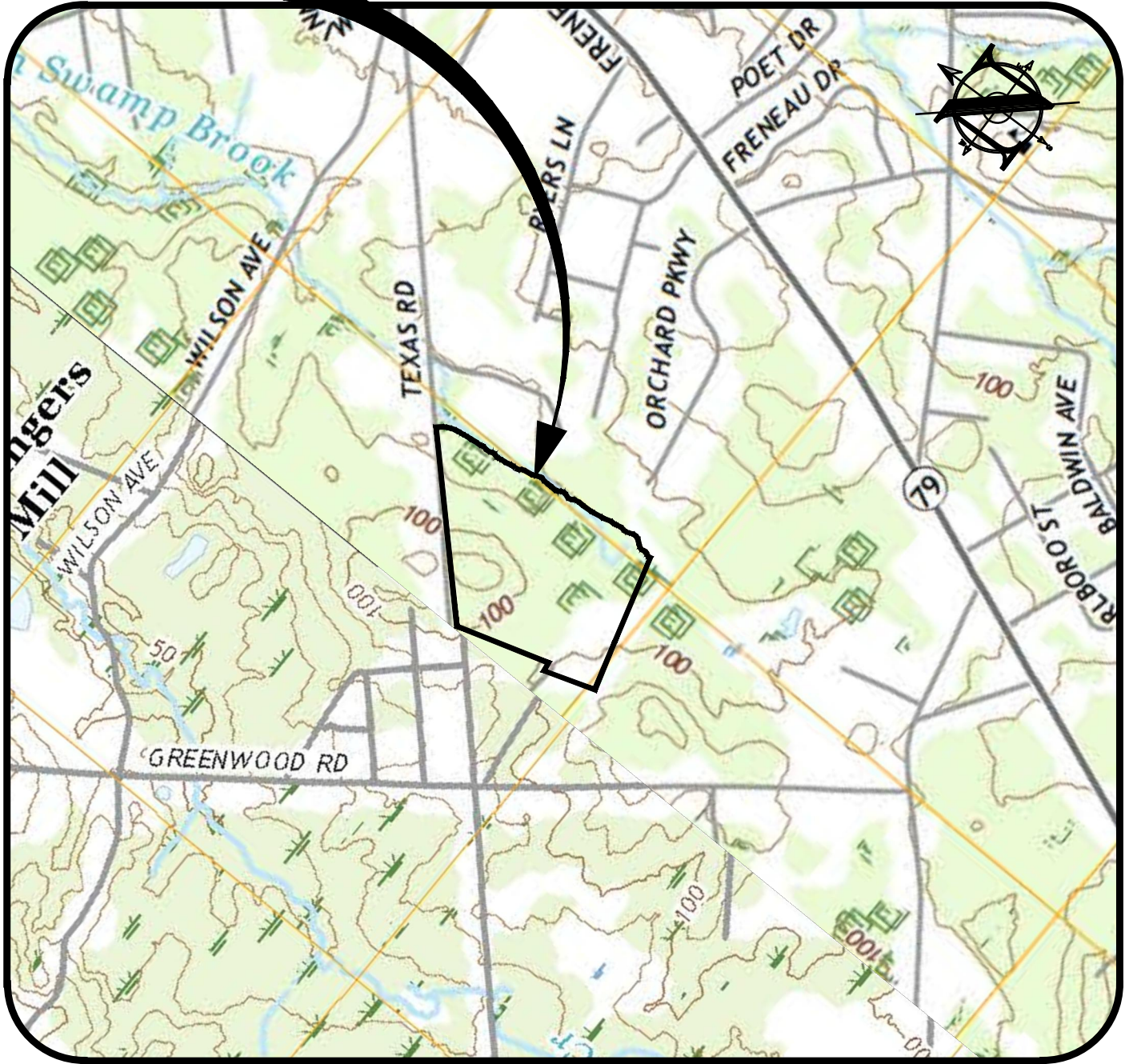
In conclusion, the project overall will comply with the storm water management requirements of the New Jersey Department of Environmental Protection and the Township of Marlboro for storm water rate reductions, water quality and recharge.

A P P E N D I X A

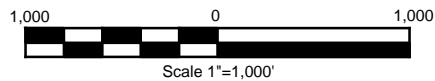
Exhibits:

- 1. USGS Map**
- 2. Soils Map**
- 3. FEMA Map**

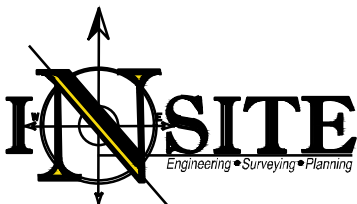
SITE



PLAN



USGS MAP



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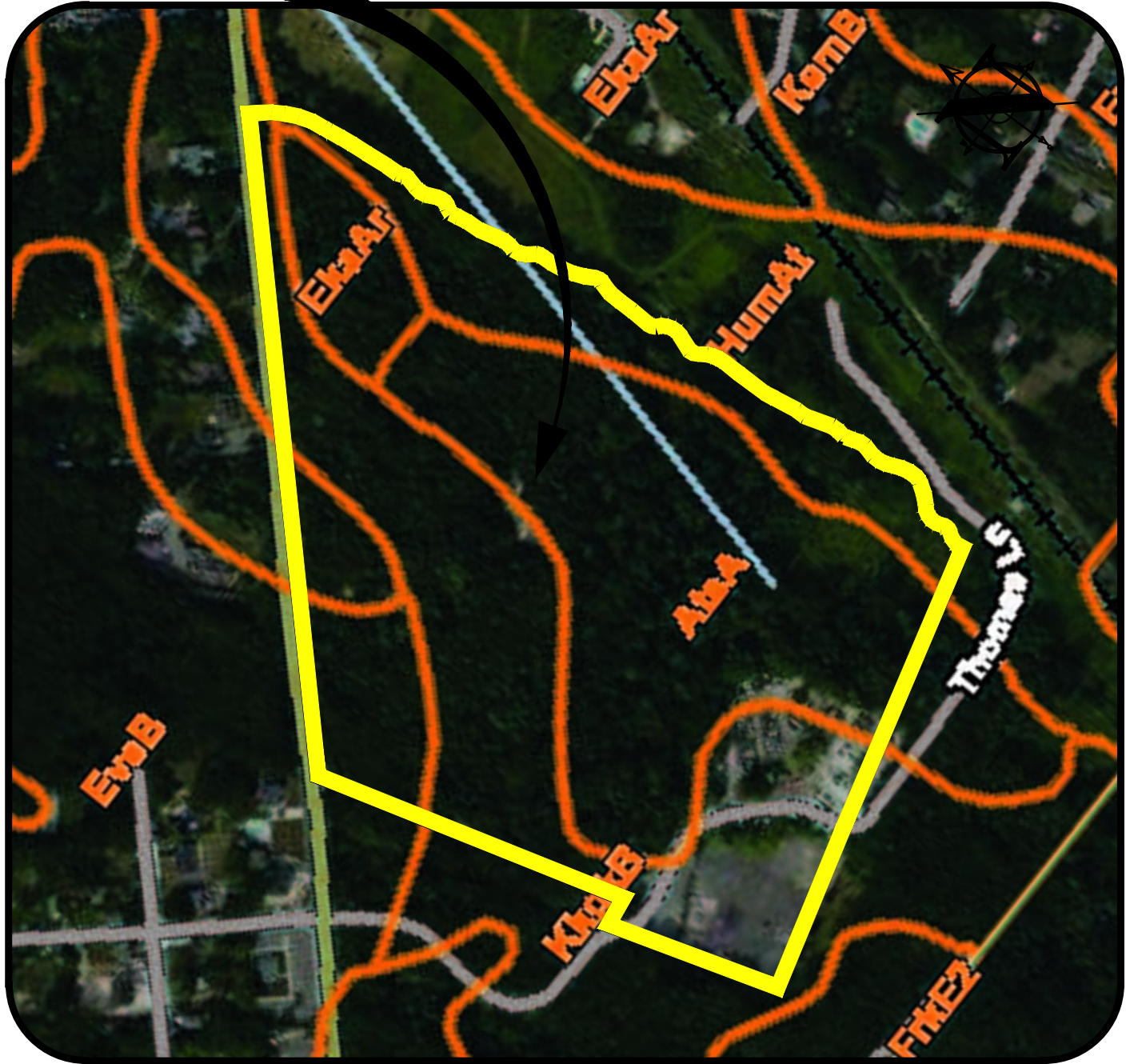
Site Location:
 137 TEXAS ROAD
 TOWNSHIP OF MARLBORO
 MONMOUTH COUNTY, NJ

Reference:
 UNITED STATES GEOLOGICAL SURVEY
 QUADRANGLE
 NEW JERSEY - MONMOUTH COUNTY
 7.5 MINUTE SERIES

InSite Project No.
 20-1417-01
Drawing No.
 20-1417-01r0
Date
 JULY 14, 2020

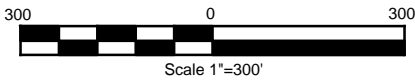
Revisions

SITE

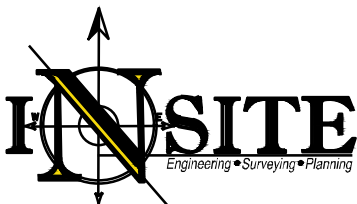


- | | |
|---|----------|
| Kkg&B - KLEJ LOAMY SAND CLAYEY SUBSTRATUM 0-5% SLOPES | HSG: A/D |
| AtsA - ATSION SAND 0-2% SLOPES | HSG: A/D |
| EveB - EVESBORO SAND 0-5% SLOPES | HSG: A |
| EkaAr - ELKTON LOAM 0-2% SLOPES | HSG: C/D |
| HumAt - HUMAQUEPTS 0-3% SLOPES | HSG: A/D |
| EvEC - EVESBORO SAND 0-5% SLOPES | HSG: A |

PLAN



SOILS MAP



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Site Location:
 137 TEXAS ROAD
 TOWNSHIP OF MARLBORO
 MONMOUTH COUNTY, NJ

InSite Project No.
 20-1417-01
Drawing No.
 20-1417-01r0
Date
 JULY 14, 2020

Reference:
 UNITED STATES DEPARTMENT OF AGRICULTURE
 NATURAL RESOURCES CONSERVATION SERVICE
 NATIONAL COOPERATIVE SOIL SURVEY
 WEBSOILSURVEY.NRCS.USDA.GOV

Revisions

SITE



ABERDEEN
OF MARLBORO

TEXAS ROAD

ZONE X

GREENWOOD
ROAD

EX

LIMIT OF
DETAILED STUDY

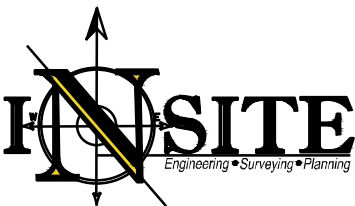


PLAN



Scale 1"=300'

FEMA FIRM MAP



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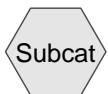
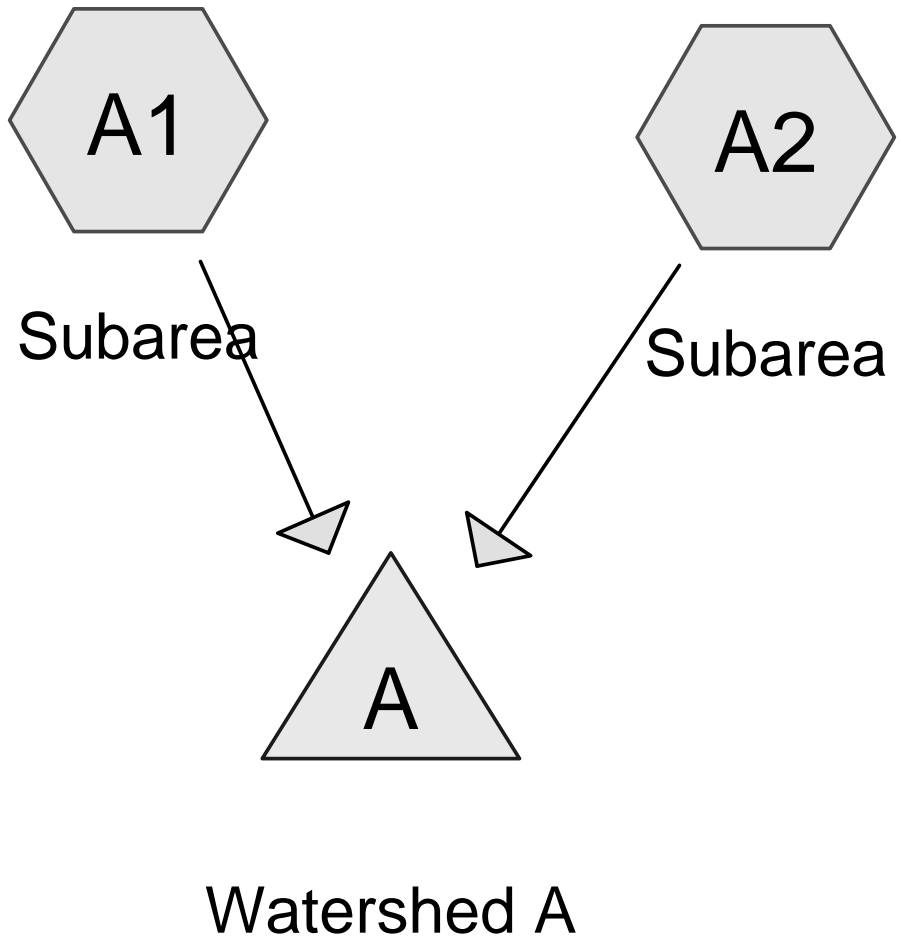
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20-1417-01
Drawing No.
20-1417-01r0
Date
JULY 14, 2020

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NATIONAL FLOOD INSURANCE PROGRAM
FIRM PANEL 0038F
MAP NUMBER 34025C0038F
EFFECTIVE DATE SEPTEMBER 25, 2009
FEDERAL EMERGENCY MANAGEMENT AGENCY
MSC.FEMA.GOV

Revisions

A P P E N D I X B

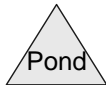
Pre-Development Flow Calculations



Subcat



Reach



Pond



Link

Pre-Development

NOAA 24-hr D 2-Year Rainfall=3.40"

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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 A1: Subarea

Runoff Area=12.0 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=842' Tc=22.2 min CN=30 Runoff=0.0 cfs 0.00 af

Subcatchment A2: Subarea

Runoff Area=5.1 ac 5.88% Impervious Runoff Depth=1.36"
Flow Length=655' Tc=8.0 min CN=77 Runoff=7.5 cfs 0.58 af

Pond A: Watershed A

Inflow=7.5 cfs 0.58 af
Primary=7.5 cfs 0.58 af

Total Runoff Area = 17.1 ac Runoff Volume = 0.58 af Average Runoff Depth = 0.40"
98.25% Pervious = 16.8 ac 1.75% Impervious = 0.3 ac

Pre-Development

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Subcatchment A1: Subarea

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
12.0	30	Woods, Good, HSG A
12.0		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.1300	0.18		Sheet Flow, 130-117 Woods: Light underbrush n= 0.400 P2= 3.89"
13.0	742	0.0360	0.95		Shallow Concentrated Flow, 117-90 Woodland Kv= 5.0 fps
22.2	842	Total			

Pre-Development

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Subcatchment A2: Subarea

Runoff = 7.5 cfs @ 12.16 hrs, Volume= 0.58 af, Depth= 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
* 4.8	76	Gravel, HSG A
* 0.2	98	Concrete, HSG A
* 0.1	98	Structures, HSG A
5.1	77	Weighted Average
4.8		94.12% Pervious Area
0.3		5.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.0370	0.50		Sheet Flow, 111.8-108.1 Cultivated: Residue<=20% n= 0.060 P2= 3.89"
4.7	555	0.0390	1.97		Shallow Concentrated Flow, 108.1-86.5 Nearly Bare & Untilled Kv= 10.0 fps
8.0	655	Total			

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 1.75% Impervious, Inflow Depth = 0.40" for 2-Year event
Inflow = 7.5 cfs @ 12.16 hrs, Volume= 0.58 af
Primary = 7.5 cfs @ 12.16 hrs, Volume= 0.58 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

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NOAA 24-hr D 10-Year Rainfall=5.20"

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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 A1: Subarea

Runoff Area=12.0 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=842' Tc=22.2 min CN=30 Runoff=0.0 cfs 0.01 af

Subcatchment A2: Subarea

Runoff Area=5.1 ac 5.88% Impervious Runoff Depth=2.79"
Flow Length=655' Tc=8.0 min CN=77 Runoff=15.5 cfs 1.19 af

Pond A: Watershed A

Inflow=15.5 cfs 1.20 af
Primary=15.5 cfs 1.20 af

Total Runoff Area = 17.1 ac Runoff Volume = 1.20 af Average Runoff Depth = 0.84"
98.25% Pervious = 16.8 ac 1.75% Impervious = 0.3 ac

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NOAA 24-hr D 10-Year Rainfall=5.20"

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Summary for Subcatchment A1: Subarea

Runoff = 0.0 cfs @ 24.00 hrs, Volume= 0.01 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
12.0	30	Woods, Good, HSG A
12.0		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.1300	0.18		Sheet Flow, 130-117 Woods: Light underbrush n= 0.400 P2= 3.89"
13.0	742	0.0360	0.95		Shallow Concentrated Flow, 117-90 Woodland Kv= 5.0 fps
22.2	842	Total			

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NOAA 24-hr D 10-Year Rainfall=5.20"

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Summary for Subcatchment A2: Subarea

Runoff = 15.5 cfs @ 12.15 hrs, Volume= 1.19 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
* 4.8	76	Gravel, HSG A
* 0.2	98	Concrete, HSG A
* 0.1	98	Structures, HSG A
5.1	77	Weighted Average
4.8		94.12% Pervious Area
0.3		5.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.0370	0.50		Sheet Flow, 111.8-108.1 Cultivated: Residue<=20% n= 0.060 P2= 3.89"
4.7	555	0.0390	1.97		Shallow Concentrated Flow, 108.1-86.5 Nearly Bare & Untilled Kv= 10.0 fps
8.0	655	Total			

Pre-Development

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NOAA 24-hr D 10-Year Rainfall=5.20"

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Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 1.75% Impervious, Inflow Depth = 0.84" for 10-Year event
Inflow = 15.5 cfs @ 12.15 hrs, Volume= 1.20 af
Primary = 15.5 cfs @ 12.15 hrs, Volume= 1.20 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

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NOAA 24-hr D 25-Year Rainfall=6.40"

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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 A1: Subarea

Runoff Area=12.0 ac 0.00% Impervious Runoff Depth=0.12"
Flow Length=842' Tc=22.2 min CN=30 Runoff=0.2 cfs 0.12 af

Subcatchment A2: Subarea

Runoff Area=5.1 ac 5.88% Impervious Runoff Depth=3.83"
Flow Length=655' Tc=8.0 min CN=77 Runoff=21.1 cfs 1.63 af

Pond A: Watershed A

Inflow=21.1 cfs 1.75 af
Primary=21.1 cfs 1.75 af

Total Runoff Area = 17.1 ac Runoff Volume = 1.75 af Average Runoff Depth = 1.23"
98.25% Pervious = 16.8 ac 1.75% Impervious = 0.3 ac

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NOAA 24-hr D 25-Year Rainfall=6.40"

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Summary for Subcatchment A1: Subarea

Runoff = 0.2 cfs @ 14.87 hrs, Volume= 0.12 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
12.0	30	Woods, Good, HSG A
12.0		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.1300	0.18		Sheet Flow, 130-117 Woods: Light underbrush n= 0.400 P2= 3.89"
13.0	742	0.0360	0.95		Shallow Concentrated Flow, 117-90 Woodland Kv= 5.0 fps
22.2	842	Total			

Pre-Development

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NOAA 24-hr D 25-Year Rainfall=6.40"

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Summary for Subcatchment A2: Subarea

Runoff = 21.1 cfs @ 12.15 hrs, Volume= 1.63 af, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
* 4.8	76	Gravel, HSG A
* 0.2	98	Concrete, HSG A
* 0.1	98	Structures, HSG A
5.1	77	Weighted Average
4.8		94.12% Pervious Area
0.3		5.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.0370	0.50		Sheet Flow, 111.8-108.1 Cultivated: Residue<=20% n= 0.060 P2= 3.89"
4.7	555	0.0390	1.97		Shallow Concentrated Flow, 108.1-86.5 Nearly Bare & Untilled Kv= 10.0 fps
8.0	655	Total			

Pre-Development

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NOAA 24-hr D 25-Year Rainfall=6.40"

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Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 1.75% Impervious, Inflow Depth = 1.23" for 25-Year event
Inflow = 21.1 cfs @ 12.15 hrs, Volume= 1.75 af
Primary = 21.1 cfs @ 12.15 hrs, Volume= 1.75 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Pre-Development

NOAA 24-hr D 100-Year Rainfall=9.80"

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 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 A1: Subarea

Runoff Area=12.0 ac 0.00% Impervious Runoff Depth=0.93"
Flow Length=842' Tc=22.2 min CN=30 Runoff=3.5 cfs 0.93 af

Subcatchment A2: Subarea

Runoff Area=5.1 ac 5.88% Impervious Runoff Depth=6.95"
Flow Length=655' Tc=8.0 min CN=77 Runoff=37.4 cfs 2.95 af

Pond A: Watershed A

Inflow=37.7 cfs 3.88 af
Primary=37.7 cfs 3.88 af

Total Runoff Area = 17.1 ac Runoff Volume = 3.88 af Average Runoff Depth = 2.72"
98.25% Pervious = 16.8 ac 1.75% Impervious = 0.3 ac

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Summary for Subcatchment A1: Subarea

Runoff = 3.5 cfs @ 12.48 hrs, Volume= 0.93 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
12.0	30	Woods, Good, HSG A
12.0		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.1300	0.18		Sheet Flow, 130-117 Woods: Light underbrush n= 0.400 P2= 3.89"
13.0	742	0.0360	0.95		Shallow Concentrated Flow, 117-90 Woodland Kv= 5.0 fps
22.2	842	Total			

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NOAA 24-hr D 100-Year Rainfall=9.80"

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Summary for Subcatchment A2: Subarea

Runoff = 37.4 cfs @ 12.15 hrs, Volume= 2.95 af, Depth= 6.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
* 4.8	76	Gravel, HSG A
* 0.2	98	Concrete, HSG A
* 0.1	98	Structures, HSG A
5.1	77	Weighted Average
4.8		94.12% Pervious Area
0.3		5.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	100	0.0370	0.50		Sheet Flow, 111.8-108.1 Cultivated: Residue<=20% n= 0.060 P2= 3.89"
4.7	555	0.0390	1.97		Shallow Concentrated Flow, 108.1-86.5 Nearly Bare & Untilled Kv= 10.0 fps
8.0	655	Total			

Pre-Development

NOAA 24-hr D 100-Year Rainfall=9.80"

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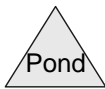
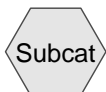
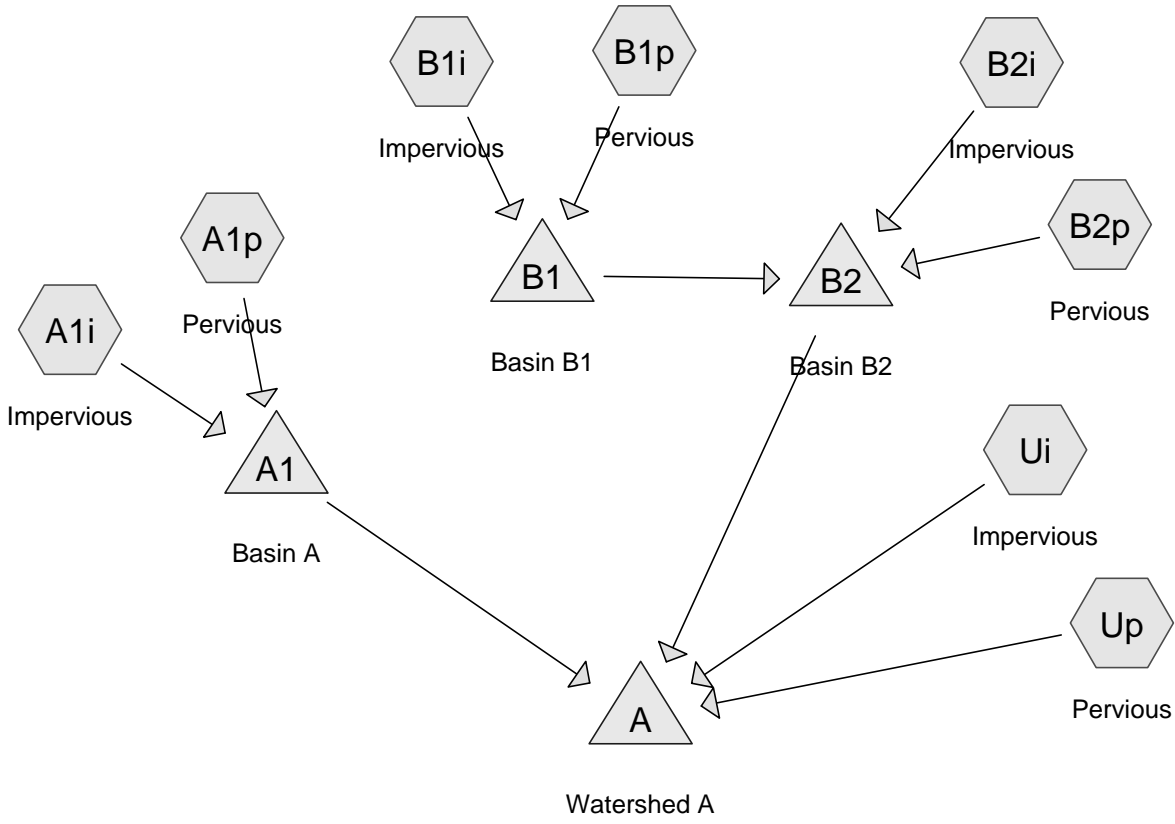
Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 1.75% Impervious, Inflow Depth = 2.72" for 100-Year event
Inflow = 37.7 cfs @ 12.15 hrs, Volume= 3.88 af
Primary = 37.7 cfs @ 12.15 hrs, Volume= 3.88 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

APPENDIX C

Post-Development Flow Calculations



Routing Diagram for Post Development
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Time span=0.00-300.00 hrs, dt=0.01 hrs, 30001 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 A1i: Impervious	Runoff Area=6.4 ac 100.00% Impervious Runoff Depth=3.17" Tc=10.0 min CN=98 Runoff=18.0 cfs 1.69 af
Subcatchment A1p: Pervious	Runoff Area=3.6 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=100' Slope=0.0320 '/' Tc=10.7 min CN=39 Runoff=0.0 cfs 0.00 af
Subcatchment B1i: Impervious	Runoff Area=1.6 ac 100.00% Impervious Runoff Depth=3.17" Tc=10.0 min CN=98 Runoff=4.5 cfs 0.42 af
Subcatchment B1p: Pervious	Runoff Area=0.6 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=126' Tc=10.0 min CN=39 Runoff=0.0 cfs 0.00 af
Subcatchment B2i: Impervious	Runoff Area=1.3 ac 100.00% Impervious Runoff Depth=3.17" Tc=10.0 min CN=98 Runoff=3.6 cfs 0.34 af
Subcatchment B2p: Pervious	Runoff Area=1.9 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=125' Tc=17.3 min CN=38 Runoff=0.0 cfs 0.00 af
Subcatchment Ui: Impervious	Runoff Area=0.2 ac 100.00% Impervious Runoff Depth=3.17" Tc=10.0 min CN=98 Runoff=0.6 cfs 0.05 af
Subcatchment Up: Pervious	Runoff Area=1.5 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=275' Tc=11.4 min CN=38 Runoff=0.0 cfs 0.00 af
Pond A: Watershed A	Inflow=3.5 cfs 2.26 af Primary=3.5 cfs 2.26 af
Pond A1: Basin A	Peak Elev=87.50' Storage=37,918 cf Inflow=18.0 cfs 1.69 af Outflow=2.3 cfs 1.59 af
Pond B1: Basin B1	Peak Elev=97.52' Storage=5,195 cf Inflow=4.5 cfs 0.42 af Outflow=4.4 cfs 0.32 af
Pond B2: Basin B2	Peak Elev=89.82' Storage=14,205 cf Inflow=7.9 cfs 0.66 af Outflow=1.1 cfs 0.62 af

Total Runoff Area = 17.1 ac Runoff Volume = 2.51 af Average Runoff Depth = 1.76"
44.44% Pervious = 7.6 ac 55.56% Impervious = 9.5 ac

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Summary for Subcatchment A1i: Impervious

Runoff = 18.0 cfs @ 12.17 hrs, Volume= 1.69 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
3.7	98	Paved parking, HSG A
2.7	98	Roofs, HSG A
6.4	98	Weighted Average
6.4		100.00% Impervious Area

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

Summary for Subcatchment A1p: Pervious

Runoff = 0.0 cfs @ 24.01 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
3.6	39	>75% Grass cover, Good, HSG A
3.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0320	0.16		Sheet Flow, 105.3 - 102.1 Grass: Dense n= 0.240 P2= 3.89"

Summary for Subcatchment B1i: Impervious

Runoff = 4.5 cfs @ 12.17 hrs, Volume= 0.42 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.6	98	Paved parking, HSG A
1.6		100.00% Impervious Area

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

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Summary for Subcatchment B1p: Pervious

Runoff = 0.0 cfs @ 24.01 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.6	39	>75% Grass cover, Good, HSG A
0.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	36	0.1140	0.14		Sheet Flow, 114 - 109.9 Woods: Light underbrush n= 0.400 P2= 3.89"
4.4	67	0.1330	0.25		Sheet Flow, 109.9 - 101.0 Grass: Dense n= 0.240 P2= 3.89"
0.1	23	0.0430	4.21		Shallow Concentrated Flow, 101.0 - 100.3 Paved Kv= 20.3 fps
8.8	126	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment B2i: Impervious

Runoff = 3.6 cfs @ 12.17 hrs, Volume= 0.34 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.3	98	Paved parking, HSG A
1.3		100.00% Impervious Area

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

Summary for Subcatchment B2p: Pervious

Runoff = 0.0 cfs @ 24.04 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.6	39	>75% Grass cover, Good, HSG A
0.3	30	Woods, Good, HSG A
1.9	38	Weighted Average
1.9		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0100	0.10		Sheet Flow, 102.5 - 101.5 Grass: Dense n= 0.240 P2= 3.89"
0.2	25	0.0160	2.04		Shallow Concentrated Flow, 101.5 - 101.1 Unpaved Kv= 16.1 fps
17.3	125	Total			

Summary for Subcatchment Ui: Impervious

Runoff = 0.6 cfs @ 12.17 hrs, Volume= 0.05 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.2	98	Paved parking, HSG A
0.2		100.00% Impervious Area

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

Summary for Subcatchment Up: Pervious

Runoff = 0.0 cfs @ 24.02 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.4	39	>75% Grass cover, Good, HSG A
0.1	30	Woods, Good, HSG A
1.5	38	Weighted Average
1.5		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0380	0.17		Sheet Flow, 94.0 - 90.2 Grass: Dense n= 0.240 P2= 3.89"
1.4	175	0.0180	2.16		Shallow Concentrated Flow, 90.2 - 87.0 Unpaved Kv= 16.1 fps
11.4	275	Total			

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Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 55.56% Impervious, Inflow Depth = 1.59" for 2-Year event
 Inflow = 3.5 cfs @ 12.83 hrs, Volume= 2.26 af
 Primary = 3.5 cfs @ 12.83 hrs, Volume= 2.26 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs

Summary for Pond A1: Basin A

Inflow Area = 10.0 ac, 64.00% Impervious, Inflow Depth = 2.03" for 2-Year event
 Inflow = 18.0 cfs @ 12.17 hrs, Volume= 1.69 af
 Outflow = 2.3 cfs @ 12.99 hrs, Volume= 1.59 af, Atten= 87%, Lag= 49.2 min
 Primary = 2.3 cfs @ 12.99 hrs, Volume= 1.59 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 87.50' @ 12.99 hrs Surf.Area= 15,482.6 sf Storage= 37,918 cf

Plug-Flow detention time= 298.2 min calculated for 1.59 af (94% of inflow)
 Center-of-Mass det. time= 262.6 min (1,023.8 - 761.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	118,746 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	14,755.0	0	0
86.00	15,110.0	14,933	14,933
87.00	15,360.0	15,235	30,168
88.00	15,605.0	15,483	45,650
89.00	15,830.0	15,718	61,368
90.00	16,110.0	15,970	77,338
91.00	16,290.0	16,200	93,538
92.00	16,455.0	16,373	109,910
92.50	18,890.0	8,836	118,746

Device	Routing	Invert	Outlet Devices
#1	Primary	84.90'	18.0" Round 18" Pipe L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.90' / 84.25' S= 0.0310 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	85.30'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	87.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.3 cfs @ 12.99 hrs HW=87.50' (Free Discharge)

- 1=18" Pipe (Passes 2.3 cfs of 11.6 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 2.3 cfs @ 6.58 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 0.0 cfs @ 0.07 fps)

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Summary for Pond B1: Basin B1

Inflow Area = 2.2 ac, 72.73% Impervious, Inflow Depth = 2.30" for 2-Year event
Inflow = 4.5 cfs @ 12.17 hrs, Volume= 0.42 af
Outflow = 4.4 cfs @ 12.19 hrs, Volume= 0.32 af, Atten= 3%, Lag= 1.3 min
Primary = 4.4 cfs @ 12.19 hrs, Volume= 0.32 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 97.52' @ 12.19 hrs Surf.Area= 4,819.8 sf Storage= 5,195 cf

Plug-Flow detention time= 177.6 min calculated for 0.32 af (75% of inflow)
Center-of-Mass det. time= 82.3 min (843.3 - 761.0)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	25,898 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,955.0	0	0
97.00	3,925.0	2,940	2,940
98.00	5,660.0	4,793	7,733
99.00	7,585.0	6,623	14,355
100.00	15,500.0	11,543	25,898

Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	18.0" Round 18" Pipe L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 93.52' S= 0.0200 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	97.40'	1.0" x 5.0" Horiz. Orifice/Grate X 8.00 columns X 14 rows C= 0.600 in 96.0" x 106.0" Grate (6% open area) Limited to weir flow at low heads

Primary OutFlow Max=4.3 cfs @ 12.19 hrs HW=97.52' (Free Discharge)

↑ **1=18" Pipe** (Passes 4.3 cfs of 12.8 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 4.3 cfs @ 1.11 fps)

Summary for Pond B2: Basin B2

Inflow Area = 5.4 ac, 53.70% Impervious, Inflow Depth = 1.46" for 2-Year event
Inflow = 7.9 cfs @ 12.18 hrs, Volume= 0.66 af
Outflow = 1.1 cfs @ 12.96 hrs, Volume= 0.62 af, Atten= 86%, Lag= 46.9 min
Primary = 1.1 cfs @ 12.96 hrs, Volume= 0.62 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 89.82' @ 12.96 hrs Surf.Area= 8,163.4 sf Storage= 14,205 cf

Plug-Flow detention time= 245.6 min calculated for 0.62 af (95% of inflow)
Center-of-Mass det. time= 214.8 min (1,015.2 - 800.4)

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Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	66,151 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	7,435.0	0	0
89.00	7,845.0	7,640	7,640
90.00	8,235.0	8,040	15,680
91.00	8,600.0	8,418	24,098
92.00	8,950.0	8,775	32,873
93.00	9,280.0	9,115	41,988
94.00	8,670.0	8,975	50,963
95.00	9,990.0	9,330	60,293
95.50	13,445.0	5,859	66,151

Device	Routing	Invert	Outlet Devices
#1	Primary	82.90'	18.0" Round 18" Pipe L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 82.90' / 82.30' S= 0.0182 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	88.20'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	90.50'	0.5' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.1 cfs @ 12.96 hrs HW=89.82' (Free Discharge)

- ↑ 1=18" Pipe (Passes 1.1 cfs of 21.1 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 1.1 cfs @ 5.63 fps)
- ↑ 3=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

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Time span=0.00-300.00 hrs, dt=0.01 hrs, 30001 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 A1i: Impervious	Runoff Area=6.4 ac 100.00% Impervious Runoff Depth=4.96" Tc=10.0 min CN=98 Runoff=27.6 cfs 2.65 af
Subcatchment A1p: Pervious	Runoff Area=3.6 ac 0.00% Impervious Runoff Depth=0.24" Flow Length=100' Slope=0.0320 '/' Tc=10.7 min CN=39 Runoff=0.2 cfs 0.07 af
Subcatchment B1i: Impervious	Runoff Area=1.6 ac 100.00% Impervious Runoff Depth=4.96" Tc=10.0 min CN=98 Runoff=6.9 cfs 0.66 af
Subcatchment B1p: Pervious	Runoff Area=0.6 ac 0.00% Impervious Runoff Depth=0.24" Flow Length=126' Tc=10.0 min CN=39 Runoff=0.0 cfs 0.01 af
Subcatchment B2i: Impervious	Runoff Area=1.3 ac 100.00% Impervious Runoff Depth=4.96" Tc=10.0 min CN=98 Runoff=5.6 cfs 0.54 af
Subcatchment B2p: Pervious	Runoff Area=1.9 ac 0.00% Impervious Runoff Depth=0.21" Flow Length=125' Tc=17.3 min CN=38 Runoff=0.1 cfs 0.03 af
Subcatchment Ui: Impervious	Runoff Area=0.2 ac 100.00% Impervious Runoff Depth=4.96" Tc=10.0 min CN=98 Runoff=0.9 cfs 0.08 af
Subcatchment Up: Pervious	Runoff Area=1.5 ac 0.00% Impervious Runoff Depth=0.21" Flow Length=275' Tc=11.4 min CN=38 Runoff=0.0 cfs 0.03 af
Pond A: Watershed A	Inflow=9.7 cfs 3.83 af Primary=9.7 cfs 3.83 af
Pond A1: Basin A	Peak Elev=88.33' Storage=50,842 cf Inflow=27.6 cfs 2.72 af Outflow=7.8 cfs 2.62 af
Pond B1: Basin B1	Peak Elev=97.56' Storage=5,386 cf Inflow=6.9 cfs 0.67 af Outflow=6.7 cfs 0.57 af
Pond B2: Basin B2	Peak Elev=90.90' Storage=23,231 cf Inflow=12.3 cfs 1.14 af Outflow=1.8 cfs 1.10 af

Total Runoff Area = 17.1 ac Runoff Volume = 4.07 af Average Runoff Depth = 2.86"
44.44% Pervious = 7.6 ac 55.56% Impervious = 9.5 ac

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Summary for Subcatchment A1i: Impervious

Runoff = 27.6 cfs @ 12.17 hrs, Volume= 2.65 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
3.7	98	Paved parking, HSG A
2.7	98	Roofs, HSG A
6.4	98	Weighted Average
6.4		100.00% Impervious Area

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

Summary for Subcatchment A1p: Pervious

Runoff = 0.2 cfs @ 12.95 hrs, Volume= 0.07 af, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
3.6	39	>75% Grass cover, Good, HSG A
3.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0320	0.16		Sheet Flow, 105.3 - 102.1 Grass: Dense n= 0.240 P2= 3.89"

Summary for Subcatchment B1i: Impervious

Runoff = 6.9 cfs @ 12.17 hrs, Volume= 0.66 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
1.6	98	Paved parking, HSG A
1.6		100.00% Impervious Area

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

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Summary for Subcatchment B1p: Pervious

Runoff = 0.0 cfs @ 12.92 hrs, Volume= 0.01 af, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
0.6	39	>75% Grass cover, Good, HSG A
0.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	36	0.1140	0.14		Sheet Flow, 114 - 109.9 Woods: Light underbrush n= 0.400 P2= 3.89"
4.4	67	0.1330	0.25		Sheet Flow, 109.9 - 101.0 Grass: Dense n= 0.240 P2= 3.89"
0.1	23	0.0430	4.21		Shallow Concentrated Flow, 101.0 - 100.3 Paved Kv= 20.3 fps
8.8	126	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment B2i: Impervious

Runoff = 5.6 cfs @ 12.17 hrs, Volume= 0.54 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
1.3	98	Paved parking, HSG A
1.3		100.00% Impervious Area

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

Summary for Subcatchment B2p: Pervious

Runoff = 0.1 cfs @ 13.13 hrs, Volume= 0.03 af, Depth= 0.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
1.6	39	>75% Grass cover, Good, HSG A
0.3	30	Woods, Good, HSG A
1.9	38	Weighted Average
1.9		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0100	0.10		Sheet Flow, 102.5 - 101.5
					Grass: Dense n= 0.240 P2= 3.89"
0.2	25	0.0160	2.04		Shallow Concentrated Flow, 101.5 - 101.1
					Unpaved Kv= 16.1 fps
17.3	125	Total			

Summary for Subcatchment Ui: Impervious

Runoff = 0.9 cfs @ 12.17 hrs, Volume= 0.08 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
0.2	98	Paved parking, HSG A
0.2		100.00% Impervious Area

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

Summary for Subcatchment Up: Pervious

Runoff = 0.0 cfs @ 13.06 hrs, Volume= 0.03 af, Depth= 0.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 10-Year Rainfall=5.20"

Area (ac)	CN	Description
1.4	39	>75% Grass cover, Good, HSG A
0.1	30	Woods, Good, HSG A
1.5	38	Weighted Average
1.5		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0380	0.17		Sheet Flow, 94.0 - 90.2
					Grass: Dense n= 0.240 P2= 3.89"
1.4	175	0.0180	2.16		Shallow Concentrated Flow, 90.2 - 87.0
					Unpaved Kv= 16.1 fps
11.4	275	Total			

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Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 55.56% Impervious, Inflow Depth = 2.69" for 10-Year event
Inflow = 9.7 cfs @ 12.50 hrs, Volume= 3.83 af
Primary = 9.7 cfs @ 12.50 hrs, Volume= 3.83 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs

Summary for Pond A1: Basin A

Inflow Area = 10.0 ac, 64.00% Impervious, Inflow Depth = 3.26" for 10-Year event
Inflow = 27.6 cfs @ 12.17 hrs, Volume= 2.72 af
Outflow = 7.8 cfs @ 12.47 hrs, Volume= 2.62 af, Atten= 72%, Lag= 18.3 min
Primary = 7.8 cfs @ 12.47 hrs, Volume= 2.62 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 88.33' @ 12.47 hrs Surf.Area= 15,679.3 sf Storage= 50,842 cf

Plug-Flow detention time= 241.9 min calculated for 2.62 af (96% of inflow)
Center-of-Mass det. time= 218.3 min (977.9 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	118,746 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	14,755.0	0	0
86.00	15,110.0	14,933	14,933
87.00	15,360.0	15,235	30,168
88.00	15,605.0	15,483	45,650
89.00	15,830.0	15,718	61,368
90.00	16,110.0	15,970	77,338
91.00	16,290.0	16,200	93,538
92.00	16,455.0	16,373	109,910
92.50	18,890.0	8,836	118,746

Device	Routing	Invert	Outlet Devices
#1	Primary	84.90'	18.0" Round 18" Pipe L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.90' / 84.25' S= 0.0310 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	85.30'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	87.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=7.8 cfs @ 12.47 hrs HW=88.33' (Free Discharge)

1=18" Pipe (Passes 7.8 cfs of 13.9 cfs potential flow)

2=Orifice/Grate (Orifice Controls 2.8 cfs @ 7.91 fps)

3=Broad-Crested Rectangular Weir (Weir Controls 5.0 cfs @ 3.01 fps)

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Summary for Pond B1: Basin B1

Inflow Area = 2.2 ac, 72.73% Impervious, Inflow Depth = 3.68" for 10-Year event
Inflow = 6.9 cfs @ 12.17 hrs, Volume= 0.67 af
Outflow = 6.7 cfs @ 12.19 hrs, Volume= 0.57 af, Atten= 2%, Lag= 1.2 min
Primary = 6.7 cfs @ 12.19 hrs, Volume= 0.57 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 97.56' @ 12.19 hrs Surf.Area= 4,888.2 sf Storage= 5,386 cf

Plug-Flow detention time= 141.4 min calculated for 0.57 af (84% of inflow)
Center-of-Mass det. time= 66.5 min (823.7 - 757.2)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	25,898 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,955.0	0	0
97.00	3,925.0	2,940	2,940
98.00	5,660.0	4,793	7,733
99.00	7,585.0	6,623	14,355
100.00	15,500.0	11,543	25,898

Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	18.0" Round 18" Pipe L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 93.52' S= 0.0200 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	97.40'	1.0" x 5.0" Horiz. Orifice/Grate X 8.00 columns X 14 rows C= 0.600 in 96.0" x 106.0" Grate (6% open area) Limited to weir flow at low heads

Primary OutFlow Max=6.7 cfs @ 12.19 hrs HW=97.56' (Free Discharge)

↑ **1=18" Pipe** (Passes 6.7 cfs of 12.9 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 6.7 cfs @ 1.29 fps)

Summary for Pond B2: Basin B2

Inflow Area = 5.4 ac, 53.70% Impervious, Inflow Depth = 2.53" for 10-Year event
Inflow = 12.3 cfs @ 12.18 hrs, Volume= 1.14 af
Outflow = 1.8 cfs @ 12.91 hrs, Volume= 1.10 af, Atten= 85%, Lag= 43.5 min
Primary = 1.8 cfs @ 12.91 hrs, Volume= 1.10 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 90.90' @ 12.91 hrs Surf.Area= 8,562.4 sf Storage= 23,231 cf

Plug-Flow detention time= 232.9 min calculated for 1.10 af (97% of inflow)
Center-of-Mass det. time= 214.3 min (1,010.6 - 796.3)

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Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	66,151 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	7,435.0	0	0
89.00	7,845.0	7,640	7,640
90.00	8,235.0	8,040	15,680
91.00	8,600.0	8,418	24,098
92.00	8,950.0	8,775	32,873
93.00	9,280.0	9,115	41,988
94.00	8,670.0	8,975	50,963
95.00	9,990.0	9,330	60,293
95.50	13,445.0	5,859	66,151

Device	Routing	Invert	Outlet Devices
#1	Primary	82.90'	18.0" Round 18" Pipe L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 82.90' / 82.30' S= 0.0182 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	88.20'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	90.50'	0.5' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.8 cfs @ 12.91 hrs HW=90.90' (Free Discharge)

↑ **1=18" Pipe** (Passes 1.8 cfs of 22.9 cfs potential flow)

↑ **2=Orifice/Grate** (Orifice Controls 1.5 cfs @ 7.53 fps)

↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 0.4 cfs @ 1.84 fps)

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Time span=0.00-300.00 hrs, dt=0.01 hrs, 30001 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 A1i: Impervious	Runoff Area=6.4 ac 100.00% Impervious Runoff Depth=6.16" Tc=10.0 min CN=98 Runoff=34.1 cfs 3.29 af
Subcatchment A1p: Pervious	Runoff Area=3.6 ac 0.00% Impervious Runoff Depth=0.57" Flow Length=100' Slope=0.0320 '/ Tc=10.7 min CN=39 Runoff=0.7 cfs 0.17 af
Subcatchment B1i: Impervious	Runoff Area=1.6 ac 100.00% Impervious Runoff Depth=6.16" Tc=10.0 min CN=98 Runoff=8.5 cfs 0.82 af
Subcatchment B1p: Pervious	Runoff Area=0.6 ac 0.00% Impervious Runoff Depth=0.57" Flow Length=126' Tc=10.0 min CN=39 Runoff=0.1 cfs 0.03 af
Subcatchment B2i: Impervious	Runoff Area=1.3 ac 100.00% Impervious Runoff Depth=6.16" Tc=10.0 min CN=98 Runoff=6.9 cfs 0.67 af
Subcatchment B2p: Pervious	Runoff Area=1.9 ac 0.00% Impervious Runoff Depth=0.51" Flow Length=125' Tc=17.3 min CN=38 Runoff=0.3 cfs 0.08 af
Subcatchment Ui: Impervious	Runoff Area=0.2 ac 100.00% Impervious Runoff Depth=6.16" Tc=10.0 min CN=98 Runoff=1.1 cfs 0.10 af
Subcatchment Up: Pervious	Runoff Area=1.5 ac 0.00% Impervious Runoff Depth=0.51" Flow Length=275' Tc=11.4 min CN=38 Runoff=0.2 cfs 0.06 af
Pond A: Watershed A	Inflow=16.4 cfs 4.97 af Primary=16.4 cfs 4.97 af
Pond A1: Basin A	Peak Elev=88.82' Storage=58,523 cf Inflow=34.5 cfs 3.46 af Outflow=13.1 cfs 3.35 af
Pond B1: Basin B1	Peak Elev=97.59' Storage=5,577 cf Inflow=8.6 cfs 0.85 af Outflow=8.2 cfs 0.74 af
Pond B2: Basin B2	Peak Elev=91.45' Storage=28,004 cf Inflow=15.0 cfs 1.49 af Outflow=3.2 cfs 1.46 af

Total Runoff Area = 17.1 ac Runoff Volume = 5.22 af Average Runoff Depth = 3.66"
44.44% Pervious = 7.6 ac 55.56% Impervious = 9.5 ac

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Summary for Subcatchment A1i: Impervious

Runoff = 34.1 cfs @ 12.17 hrs, Volume= 3.29 af, Depth= 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
3.7	98	Paved parking, HSG A
2.7	98	Roofs, HSG A
6.4	98	Weighted Average
6.4		100.00% Impervious Area

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

Summary for Subcatchment A1p: Pervious

Runoff = 0.7 cfs @ 12.27 hrs, Volume= 0.17 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
3.6	39	>75% Grass cover, Good, HSG A
3.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0320	0.16		Sheet Flow, 105.3 - 102.1 Grass: Dense n= 0.240 P2= 3.89"

Summary for Subcatchment B1i: Impervious

Runoff = 8.5 cfs @ 12.17 hrs, Volume= 0.82 af, Depth= 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
1.6	98	Paved parking, HSG A
1.6		100.00% Impervious Area

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

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Summary for Subcatchment B1p: Pervious

Runoff = 0.1 cfs @ 12.26 hrs, Volume= 0.03 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
0.6	39	>75% Grass cover, Good, HSG A
0.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	36	0.1140	0.14		Sheet Flow, 114 - 109.9 Woods: Light underbrush n= 0.400 P2= 3.89"
4.4	67	0.1330	0.25		Sheet Flow, 109.9 - 101.0 Grass: Dense n= 0.240 P2= 3.89"
0.1	23	0.0430	4.21		Shallow Concentrated Flow, 101.0 - 100.3 Paved Kv= 20.3 fps
8.8	126	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment B2i: Impervious

Runoff = 6.9 cfs @ 12.17 hrs, Volume= 0.67 af, Depth= 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
1.3	98	Paved parking, HSG A
1.3		100.00% Impervious Area

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

Summary for Subcatchment B2p: Pervious

Runoff = 0.3 cfs @ 12.47 hrs, Volume= 0.08 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
1.6	39	>75% Grass cover, Good, HSG A
0.3	30	Woods, Good, HSG A
1.9	38	Weighted Average
1.9		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0100	0.10		Sheet Flow, 102.5 - 101.5 Grass: Dense n= 0.240 P2= 3.89"
0.2	25	0.0160	2.04		Shallow Concentrated Flow, 101.5 - 101.1 Unpaved Kv= 16.1 fps
17.3	125	Total			

Summary for Subcatchment Ui: Impervious

Runoff = 1.1 cfs @ 12.17 hrs, Volume= 0.10 af, Depth= 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
0.2	98	Paved parking, HSG A
0.2		100.00% Impervious Area

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

Summary for Subcatchment Up: Pervious

Runoff = 0.2 cfs @ 12.35 hrs, Volume= 0.06 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.40"

Area (ac)	CN	Description
1.4	39	>75% Grass cover, Good, HSG A
0.1	30	Woods, Good, HSG A
1.5	38	Weighted Average
1.5		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0380	0.17		Sheet Flow, 94.0 - 90.2 Grass: Dense n= 0.240 P2= 3.89"
1.4	175	0.0180	2.16		Shallow Concentrated Flow, 90.2 - 87.0 Unpaved Kv= 16.1 fps
11.4	275	Total			

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NOAA 24-hr D 25-Year Rainfall=6.40"

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Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 55.56% Impervious, Inflow Depth = 3.49" for 25-Year event
 Inflow = 16.4 cfs @ 12.41 hrs, Volume= 4.97 af
 Primary = 16.4 cfs @ 12.41 hrs, Volume= 4.97 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs

Summary for Pond A1: Basin A

Inflow Area = 10.0 ac, 64.00% Impervious, Inflow Depth = 4.15" for 25-Year event
 Inflow = 34.5 cfs @ 12.17 hrs, Volume= 3.46 af
 Outflow = 13.1 cfs @ 12.39 hrs, Volume= 3.35 af, Atten= 62%, Lag= 13.4 min
 Primary = 13.1 cfs @ 12.39 hrs, Volume= 3.35 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 88.82' @ 12.39 hrs Surf.Area= 15,789.3 sf Storage= 58,523 cf

Plug-Flow detention time= 214.4 min calculated for 3.35 af (97% of inflow)
 Center-of-Mass det. time= 195.2 min (955.0 - 759.8)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	118,746 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	14,755.0	0	0
86.00	15,110.0	14,933	14,933
87.00	15,360.0	15,235	30,168
88.00	15,605.0	15,483	45,650
89.00	15,830.0	15,718	61,368
90.00	16,110.0	15,970	77,338
91.00	16,290.0	16,200	93,538
92.00	16,455.0	16,373	109,910
92.50	18,890.0	8,836	118,746

Device	Routing	Invert	Outlet Devices
#1	Primary	84.90'	18.0" Round 18" Pipe L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.90' / 84.25' S= 0.0310 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	85.30'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	87.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=13.1 cfs @ 12.39 hrs HW=88.82' (Free Discharge)

- 1=18" Pipe (Passes 13.1 cfs of 15.1 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 3.0 cfs @ 8.59 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 10.1 cfs @ 3.81 fps)

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NOAA 24-hr D 25-Year Rainfall=6.40"

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Summary for Pond B1: Basin B1

Inflow Area = 2.2 ac, 72.73% Impervious, Inflow Depth = 4.64" for 25-Year event
Inflow = 8.6 cfs @ 12.17 hrs, Volume= 0.85 af
Outflow = 8.2 cfs @ 12.20 hrs, Volume= 0.74 af, Atten= 5%, Lag= 1.8 min
Primary = 8.2 cfs @ 12.20 hrs, Volume= 0.74 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 97.59' @ 12.20 hrs Surf.Area= 4,955.4 sf Storage= 5,577 cf

Plug-Flow detention time= 123.3 min calculated for 0.74 af (87% of inflow)
Center-of-Mass det. time= 58.8 min (815.1 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	25,898 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,955.0	0	0
97.00	3,925.0	2,940	2,940
98.00	5,660.0	4,793	7,733
99.00	7,585.0	6,623	14,355
100.00	15,500.0	11,543	25,898

Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	18.0" Round 18" Pipe L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 93.52' S= 0.0200 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	97.40'	1.0" x 5.0" Horiz. Orifice/Grate X 8.00 columns X 14 rows C= 0.600 in 96.0" x 106.0" Grate (6% open area) Limited to weir flow at low heads

Primary OutFlow Max=8.2 cfs @ 12.20 hrs HW=97.59' (Free Discharge)

↑ **1=18" Pipe** (Passes 8.2 cfs of 13.0 cfs potential flow)

↑ **2=Orifice/Grate** (Orifice Controls 8.2 cfs @ 2.12 fps)

Summary for Pond B2: Basin B2

Inflow Area = 5.4 ac, 53.70% Impervious, Inflow Depth = 3.31" for 25-Year event
Inflow = 15.0 cfs @ 12.18 hrs, Volume= 1.49 af
Outflow = 3.2 cfs @ 12.69 hrs, Volume= 1.46 af, Atten= 79%, Lag= 30.4 min
Primary = 3.2 cfs @ 12.69 hrs, Volume= 1.46 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 91.45' @ 12.69 hrs Surf.Area= 8,755.8 sf Storage= 28,004 cf

Plug-Flow detention time= 212.6 min calculated for 1.46 af (98% of inflow)
Center-of-Mass det. time= 197.8 min (992.5 - 794.7)

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NOAA 24-hr D 25-Year Rainfall=6.40"

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Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	66,151 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	7,435.0	0	0
89.00	7,845.0	7,640	7,640
90.00	8,235.0	8,040	15,680
91.00	8,600.0	8,418	24,098
92.00	8,950.0	8,775	32,873
93.00	9,280.0	9,115	41,988
94.00	8,670.0	8,975	50,963
95.00	9,990.0	9,330	60,293
95.50	13,445.0	5,859	66,151

Device	Routing	Invert	Outlet Devices
#1	Primary	82.90'	18.0" Round 18" Pipe L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 82.90' / 82.30' S= 0.0182 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	88.20'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	90.50'	0.5' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=3.2 cfs @ 12.69 hrs HW=91.45' (Free Discharge)

- ↑ **1=18" Pipe** (Passes 3.2 cfs of 23.8 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 1.6 cfs @ 8.33 fps)
- ↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 1.5 cfs @ 3.22 fps)

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Time span=0.00-300.00 hrs, dt=0.01 hrs, 30001 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 A1i: Impervious	Runoff Area=6.4 ac 100.00% Impervious Runoff Depth=9.56" Tc=10.0 min CN=98 Runoff=52.3 cfs 5.10 af
Subcatchment A1p: Pervious	Runoff Area=3.6 ac 0.00% Impervious Runoff Depth=1.99" Flow Length=100' Slope=0.0320 '/' Tc=10.7 min CN=39 Runoff=6.0 cfs 0.60 af
Subcatchment B1i: Impervious	Runoff Area=1.6 ac 100.00% Impervious Runoff Depth=9.56" Tc=10.0 min CN=98 Runoff=13.1 cfs 1.27 af
Subcatchment B1p: Pervious	Runoff Area=0.6 ac 0.00% Impervious Runoff Depth=1.99" Flow Length=126' Tc=10.0 min CN=39 Runoff=1.0 cfs 0.10 af
Subcatchment B2i: Impervious	Runoff Area=1.3 ac 100.00% Impervious Runoff Depth=9.56" Tc=10.0 min CN=98 Runoff=10.6 cfs 1.04 af
Subcatchment B2p: Pervious	Runoff Area=1.9 ac 0.00% Impervious Runoff Depth=1.87" Flow Length=125' Tc=17.3 min CN=38 Runoff=2.3 cfs 0.30 af
Subcatchment Ui: Impervious	Runoff Area=0.2 ac 100.00% Impervious Runoff Depth=9.56" Tc=10.0 min CN=98 Runoff=1.6 cfs 0.16 af
Subcatchment Up: Pervious	Runoff Area=1.5 ac 0.00% Impervious Runoff Depth=1.87" Flow Length=275' Tc=11.4 min CN=38 Runoff=2.2 cfs 0.23 af
Pond A: Watershed A	Inflow=29.0 cfs 8.55 af Primary=29.0 cfs 8.55 af
Pond A1: Basin A	Peak Elev=90.59' Storage=86,885 cf Inflow=58.0 cfs 5.70 af Outflow=18.9 cfs 5.59 af
Pond B1: Basin B1	Peak Elev=97.82' Storage=6,737 cf Inflow=14.1 cfs 1.37 af Outflow=12.1 cfs 1.27 af
Pond B2: Basin B2	Peak Elev=92.99' Storage=41,863 cf Inflow=23.9 cfs 2.60 af Outflow=8.5 cfs 2.56 af

Total Runoff Area = 17.1 ac Runoff Volume = 8.80 af Average Runoff Depth = 6.17"
44.44% Pervious = 7.6 ac 55.56% Impervious = 9.5 ac

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Summary for Subcatchment A1i: Impervious

Runoff = 52.3 cfs @ 12.17 hrs, Volume= 5.10 af, Depth= 9.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
3.7	98	Paved parking, HSG A
2.7	98	Roofs, HSG A
6.4	98	Weighted Average
6.4		100.00% Impervious Area

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

Summary for Subcatchment A1p: Pervious

Runoff = 6.0 cfs @ 12.20 hrs, Volume= 0.60 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
3.6	39	>75% Grass cover, Good, HSG A
3.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0320	0.16		Sheet Flow, 105.3 - 102.1 Grass: Dense n= 0.240 P2= 3.89"

Summary for Subcatchment B1i: Impervious

Runoff = 13.1 cfs @ 12.17 hrs, Volume= 1.27 af, Depth= 9.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
1.6	98	Paved parking, HSG A
1.6		100.00% Impervious Area

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

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Summary for Subcatchment B1p: Pervious

Runoff = 1.0 cfs @ 12.19 hrs, Volume= 0.10 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
0.6	39	>75% Grass cover, Good, HSG A
0.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	36	0.1140	0.14		Sheet Flow, 114 - 109.9 Woods: Light underbrush n= 0.400 P2= 3.89"
4.4	67	0.1330	0.25		Sheet Flow, 109.9 - 101.0 Grass: Dense n= 0.240 P2= 3.89"
0.1	23	0.0430	4.21		Shallow Concentrated Flow, 101.0 - 100.3 Paved Kv= 20.3 fps
8.8	126	Total, Increased to minimum Tc = 10.0 min			

Summary for Subcatchment B2i: Impervious

Runoff = 10.6 cfs @ 12.17 hrs, Volume= 1.04 af, Depth= 9.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
1.3	98	Paved parking, HSG A
1.3		100.00% Impervious Area

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

Summary for Subcatchment B2p: Pervious

Runoff = 2.3 cfs @ 12.29 hrs, Volume= 0.30 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
1.6	39	>75% Grass cover, Good, HSG A
0.3	30	Woods, Good, HSG A
1.9	38	Weighted Average
1.9		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0100	0.10		Sheet Flow, 102.5 - 101.5 Grass: Dense n= 0.240 P2= 3.89"
0.2	25	0.0160	2.04		Shallow Concentrated Flow, 101.5 - 101.1 Unpaved Kv= 16.1 fps
17.3	125	Total			

Summary for Subcatchment Ui: Impervious

Runoff = 1.6 cfs @ 12.17 hrs, Volume= 0.16 af, Depth= 9.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
0.2	98	Paved parking, HSG A
0.2		100.00% Impervious Area

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

Summary for Subcatchment Up: Pervious

Runoff = 2.2 cfs @ 12.21 hrs, Volume= 0.23 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.80"

Area (ac)	CN	Description
1.4	39	>75% Grass cover, Good, HSG A
0.1	30	Woods, Good, HSG A
1.5	38	Weighted Average
1.5		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0380	0.17		Sheet Flow, 94.0 - 90.2 Grass: Dense n= 0.240 P2= 3.89"
1.4	175	0.0180	2.16		Shallow Concentrated Flow, 90.2 - 87.0 Unpaved Kv= 16.1 fps
11.4	275	Total			

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Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 55.56% Impervious, Inflow Depth = 6.00" for 100-Year event
 Inflow = 29.0 cfs @ 12.41 hrs, Volume= 8.55 af
 Primary = 29.0 cfs @ 12.41 hrs, Volume= 8.55 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs

Summary for Pond A1: Basin A

Inflow Area = 10.0 ac, 64.00% Impervious, Inflow Depth = 6.84" for 100-Year event
 Inflow = 58.0 cfs @ 12.17 hrs, Volume= 5.70 af
 Outflow = 18.9 cfs @ 12.44 hrs, Volume= 5.59 af, Atten= 67%, Lag= 16.0 min
 Primary = 18.9 cfs @ 12.44 hrs, Volume= 5.59 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 90.59' @ 12.44 hrs Surf.Area= 16,216.1 sf Storage= 86,885 cf

Plug-Flow detention time= 172.0 min calculated for 5.59 af (98% of inflow)
 Center-of-Mass det. time= 160.3 min (921.1 - 760.8)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	118,746 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	14,755.0	0	0
86.00	15,110.0	14,933	14,933
87.00	15,360.0	15,235	30,168
88.00	15,605.0	15,483	45,650
89.00	15,830.0	15,718	61,368
90.00	16,110.0	15,970	77,338
91.00	16,290.0	16,200	93,538
92.00	16,455.0	16,373	109,910
92.50	18,890.0	8,836	118,746

Device	Routing	Invert	Outlet Devices
#1	Primary	84.90'	18.0" Round 18" Pipe L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.90' / 84.25' S= 0.0310 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	85.30'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	87.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=18.9 cfs @ 12.44 hrs HW=90.59' (Free Discharge)

- 1=18" Pipe (Inlet Controls 18.9 cfs @ 10.70 fps)
- 2=Orifice/Grate (Passes < 3.7 cfs potential flow)
- 3=Broad-Crested Rectangular Weir (Passes < 36.1 cfs potential flow)

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Summary for Pond B1: Basin B1

Inflow Area = 2.2 ac, 72.73% Impervious, Inflow Depth = 7.50" for 100-Year event
Inflow = 14.1 cfs @ 12.17 hrs, Volume= 1.37 af
Outflow = 12.1 cfs @ 12.22 hrs, Volume= 1.27 af, Atten= 14%, Lag= 3.2 min
Primary = 12.1 cfs @ 12.22 hrs, Volume= 1.27 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 97.82' @ 12.22 hrs Surf.Area= 5,346.2 sf Storage= 6,737 cf

Plug-Flow detention time= 88.8 min calculated for 1.27 af (92% of inflow)
Center-of-Mass det. time= 43.9 min (799.2 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	25,898 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,955.0	0	0
97.00	3,925.0	2,940	2,940
98.00	5,660.0	4,793	7,733
99.00	7,585.0	6,623	14,355
100.00	15,500.0	11,543	25,898

Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	18.0" Round 18" Pipe L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 93.52' S= 0.0200 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	97.40'	1.0" x 5.0" Horiz. Orifice/Grate X 8.00 columns X 14 rows C= 0.600 in 96.0" x 106.0" Grate (6% open area) Limited to weir flow at low heads

Primary OutFlow Max=12.1 cfs @ 12.22 hrs HW=97.82' (Free Discharge)

↑ **1=18" Pipe** (Passes 12.1 cfs of 13.6 cfs potential flow)

↑ **2=Orifice/Grate** (Orifice Controls 12.1 cfs @ 3.12 fps)

Summary for Pond B2: Basin B2

Inflow Area = 5.4 ac, 53.70% Impervious, Inflow Depth = 5.78" for 100-Year event
Inflow = 23.9 cfs @ 12.19 hrs, Volume= 2.60 af
Outflow = 8.5 cfs @ 12.49 hrs, Volume= 2.56 af, Atten= 64%, Lag= 17.9 min
Primary = 8.5 cfs @ 12.49 hrs, Volume= 2.56 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 92.99' @ 12.49 hrs Surf.Area= 9,275.5 sf Storage= 41,863 cf

Plug-Flow detention time= 170.4 min calculated for 2.56 af (99% of inflow)
Center-of-Mass det. time= 162.1 min (952.8 - 790.8)

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Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	66,151 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	7,435.0	0	0
89.00	7,845.0	7,640	7,640
90.00	8,235.0	8,040	15,680
91.00	8,600.0	8,418	24,098
92.00	8,950.0	8,775	32,873
93.00	9,280.0	9,115	41,988
94.00	8,670.0	8,975	50,963
95.00	9,990.0	9,330	60,293
95.50	13,445.0	5,859	66,151

Device	Routing	Invert	Outlet Devices
#1	Primary	82.90'	18.0" Round 18" Pipe L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 82.90' / 82.30' S= 0.0182 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	88.20'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	90.50'	0.5' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=8.5 cfs @ 12.49 hrs HW=92.99' (Free Discharge)

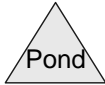
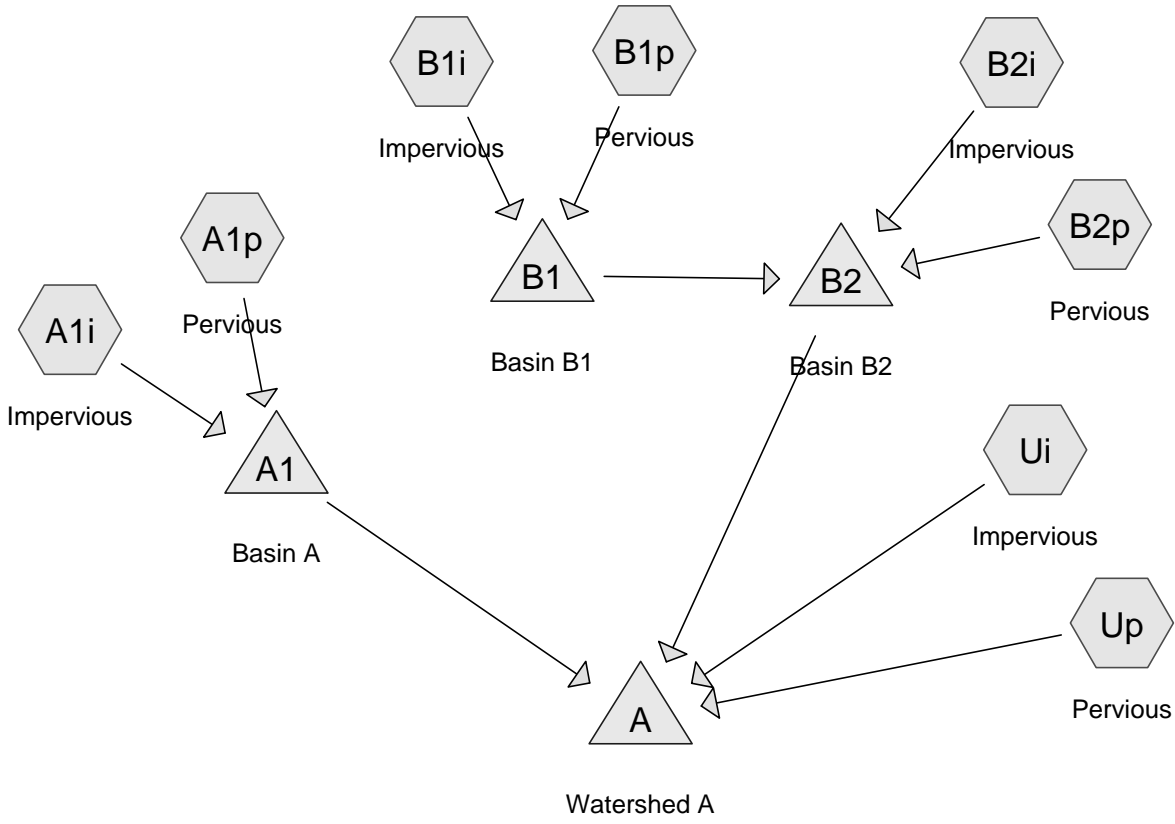
↑ **1=18" Pipe** (Passes 8.5 cfs of 26.0 cfs potential flow)

↑ **2=Orifice/Grate** (Orifice Controls 2.0 cfs @ 10.26 fps)

↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 6.5 cfs @ 5.23 fps)

A P P E N D I X D

Water Quality and Recharge Calculations



Routing Diagram for Post Development - Infiltration
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Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 A1i: Impervious Runoff Area=6.4 ac 100.00% Impervious Runoff Depth=3.17"
Tc=10.0 min CN=98 Runoff=18.0 cfs 1.69 af

Subcatchment A1p: Pervious Runoff Area=3.6 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=100' Slope=0.0320 '/' Tc=10.7 min CN=39 Runoff=0.0 cfs 0.00 af

Subcatchment B1i: Impervious Runoff Area=1.6 ac 100.00% Impervious Runoff Depth=3.17"
Tc=10.0 min CN=98 Runoff=4.5 cfs 0.42 af

Subcatchment B1p: Pervious Runoff Area=0.6 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=126' Tc=10.0 min CN=39 Runoff=0.0 cfs 0.00 af

Subcatchment B2i: Impervious Runoff Area=1.3 ac 100.00% Impervious Runoff Depth=3.17"
Tc=10.0 min CN=98 Runoff=3.6 cfs 0.34 af

Subcatchment B2p: Pervious Runoff Area=1.9 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=125' Tc=17.3 min CN=38 Runoff=0.0 cfs 0.00 af

Subcatchment Ui: Impervious Runoff Area=0.2 ac 100.00% Impervious Runoff Depth=3.17"
Tc=10.0 min CN=98 Runoff=0.6 cfs 0.05 af

Subcatchment Up: Pervious Runoff Area=1.5 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=275' Tc=11.4 min CN=38 Runoff=0.0 cfs 0.00 af

Pond A: Watershed A Inflow=1.8 cfs 0.27 af
Primary=1.8 cfs 0.27 af

Pond A1: Basin A Peak Elev=86.04' Storage=15,487 cf Inflow=18.0 cfs 1.69 af
Discarded=3.5 cfs 1.60 af Primary=1.1 cfs 0.09 af Outflow=4.6 cfs 1.69 af

Pond B1: Basin B1 Peak Elev=97.49' Storage=5,095 cf Inflow=4.5 cfs 0.42 af
Discarded=0.3 cfs 0.34 af Primary=3.3 cfs 0.08 af Outflow=3.6 cfs 0.42 af

Pond B2: Basin B2 Peak Elev=88.95' Storage=7,259 cf Inflow=6.3 cfs 0.43 af
Discarded=0.4 cfs 0.31 af Primary=0.7 cfs 0.12 af Outflow=1.0 cfs 0.43 af

Total Runoff Area = 17.1 ac Runoff Volume = 2.51 af Average Runoff Depth = 1.76"
44.44% Pervious = 7.6 ac 55.56% Impervious = 9.5 ac

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Subcatchment A1i: Impervious

Runoff = 18.0 cfs @ 12.17 hrs, Volume= 1.69 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
3.7	98	Paved parking, HSG A
2.7	98	Roofs, HSG A
6.4	98	Weighted Average
6.4		100.00% Impervious Area

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

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Subcatchment A1i: Impervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	3.40	3.17	0.0
1.00	0.04	0.00	0.0	54.00	3.40	3.17	0.0
2.00	0.08	0.01	0.1	55.00	3.40	3.17	0.0
3.00	0.13	0.03	0.1	56.00	3.40	3.17	0.0
4.00	0.18	0.06	0.2	57.00	3.40	3.17	0.0
5.00	0.23	0.09	0.3	58.00	3.40	3.17	0.0
6.00	0.29	0.14	0.3	59.00	3.40	3.17	0.0
7.00	0.36	0.19	0.4	60.00	3.40	3.17	0.0
8.00	0.44	0.27	0.5	61.00	3.40	3.17	0.0
9.00	0.54	0.35	0.6	62.00	3.40	3.17	0.0
10.00	0.67	0.48	0.9	63.00	3.40	3.17	0.0
11.00	0.88	0.68	1.6	64.00	3.40	3.17	0.0
12.00	1.63	1.41	8.6	65.00	3.40	3.17	0.0
13.00	2.52	2.29	2.3	66.00	3.40	3.17	0.0
14.00	2.73	2.50	1.1	67.00	3.40	3.17	0.0
15.00	2.86	2.63	0.7	68.00	3.40	3.17	0.0
16.00	2.96	2.73	0.6	69.00	3.40	3.17	0.0
17.00	3.04	2.81	0.5	70.00	3.40	3.17	0.0
18.00	3.11	2.88	0.4	71.00	3.40	3.17	0.0
19.00	3.17	2.94	0.4	72.00	3.40	3.17	0.0
20.00	3.22	2.99	0.3				
21.00	3.27	3.04	0.3				
22.00	3.32	3.09	0.3				
23.00	3.36	3.13	0.3				
24.00	3.40	3.17	0.2				
25.00	3.40	3.17	0.0				
26.00	3.40	3.17	0.0				
27.00	3.40	3.17	0.0				
28.00	3.40	3.17	0.0				
29.00	3.40	3.17	0.0				
30.00	3.40	3.17	0.0				
31.00	3.40	3.17	0.0				
32.00	3.40	3.17	0.0				
33.00	3.40	3.17	0.0				
34.00	3.40	3.17	0.0				
35.00	3.40	3.17	0.0				
36.00	3.40	3.17	0.0				
37.00	3.40	3.17	0.0				
38.00	3.40	3.17	0.0				
39.00	3.40	3.17	0.0				
40.00	3.40	3.17	0.0				
41.00	3.40	3.17	0.0				
42.00	3.40	3.17	0.0				
43.00	3.40	3.17	0.0				
44.00	3.40	3.17	0.0				
45.00	3.40	3.17	0.0				
46.00	3.40	3.17	0.0				
47.00	3.40	3.17	0.0				
48.00	3.40	3.17	0.0				
49.00	3.40	3.17	0.0				
50.00	3.40	3.17	0.0				
51.00	3.40	3.17	0.0				
52.00	3.40	3.17	0.0				

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Subcatchment A1p: Pervious

Runoff = 0.0 cfs @ 24.01 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
3.6	39	>75% Grass cover, Good, HSG A
3.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0320	0.16		Sheet Flow, 105.3 - 102.1 Grass: Dense n= 0.240 P2= 3.89"

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Subcatchment A1p: Pervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	3.40	0.00	0.0
1.00	0.04	0.00	0.0	54.00	3.40	0.00	0.0
2.00	0.08	0.00	0.0	55.00	3.40	0.00	0.0
3.00	0.13	0.00	0.0	56.00	3.40	0.00	0.0
4.00	0.18	0.00	0.0	57.00	3.40	0.00	0.0
5.00	0.23	0.00	0.0	58.00	3.40	0.00	0.0
6.00	0.29	0.00	0.0	59.00	3.40	0.00	0.0
7.00	0.36	0.00	0.0	60.00	3.40	0.00	0.0
8.00	0.44	0.00	0.0	61.00	3.40	0.00	0.0
9.00	0.54	0.00	0.0	62.00	3.40	0.00	0.0
10.00	0.67	0.00	0.0	63.00	3.40	0.00	0.0
11.00	0.88	0.00	0.0	64.00	3.40	0.00	0.0
12.00	1.63	0.00	0.0	65.00	3.40	0.00	0.0
13.00	2.52	0.00	0.0	66.00	3.40	0.00	0.0
14.00	2.73	0.00	0.0	67.00	3.40	0.00	0.0
15.00	2.86	0.00	0.0	68.00	3.40	0.00	0.0
16.00	2.96	0.00	0.0	69.00	3.40	0.00	0.0
17.00	3.04	0.00	0.0	70.00	3.40	0.00	0.0
18.00	3.11	0.00	0.0	71.00	3.40	0.00	0.0
19.00	3.17	0.00	0.0	72.00	3.40	0.00	0.0
20.00	3.22	0.00	0.0				
21.00	3.27	0.00	0.0				
22.00	3.32	0.00	0.0				
23.00	3.36	0.00	0.0				
24.00	3.40	0.00	0.0				
25.00	3.40	0.00	0.0				
26.00	3.40	0.00	0.0				
27.00	3.40	0.00	0.0				
28.00	3.40	0.00	0.0				
29.00	3.40	0.00	0.0				
30.00	3.40	0.00	0.0				
31.00	3.40	0.00	0.0				
32.00	3.40	0.00	0.0				
33.00	3.40	0.00	0.0				
34.00	3.40	0.00	0.0				
35.00	3.40	0.00	0.0				
36.00	3.40	0.00	0.0				
37.00	3.40	0.00	0.0				
38.00	3.40	0.00	0.0				
39.00	3.40	0.00	0.0				
40.00	3.40	0.00	0.0				
41.00	3.40	0.00	0.0				
42.00	3.40	0.00	0.0				
43.00	3.40	0.00	0.0				
44.00	3.40	0.00	0.0				
45.00	3.40	0.00	0.0				
46.00	3.40	0.00	0.0				
47.00	3.40	0.00	0.0				
48.00	3.40	0.00	0.0				
49.00	3.40	0.00	0.0				
50.00	3.40	0.00	0.0				
51.00	3.40	0.00	0.0				
52.00	3.40	0.00	0.0				

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Subcatchment B1i: Impervious

Runoff = 4.5 cfs @ 12.17 hrs, Volume= 0.42 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.6	98	Paved parking, HSG A
1.6		100.00% Impervious Area

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

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Subcatchment B1i: Impervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	3.40	3.17	0.0
1.00	0.04	0.00	0.0	54.00	3.40	3.17	0.0
2.00	0.08	0.01	0.0	55.00	3.40	3.17	0.0
3.00	0.13	0.03	0.0	56.00	3.40	3.17	0.0
4.00	0.18	0.06	0.1	57.00	3.40	3.17	0.0
5.00	0.23	0.09	0.1	58.00	3.40	3.17	0.0
6.00	0.29	0.14	0.1	59.00	3.40	3.17	0.0
7.00	0.36	0.19	0.1	60.00	3.40	3.17	0.0
8.00	0.44	0.27	0.1	61.00	3.40	3.17	0.0
9.00	0.54	0.35	0.2	62.00	3.40	3.17	0.0
10.00	0.67	0.48	0.2	63.00	3.40	3.17	0.0
11.00	0.88	0.68	0.4	64.00	3.40	3.17	0.0
12.00	1.63	1.41	2.1	65.00	3.40	3.17	0.0
13.00	2.52	2.29	0.6	66.00	3.40	3.17	0.0
14.00	2.73	2.50	0.3	67.00	3.40	3.17	0.0
15.00	2.86	2.63	0.2	68.00	3.40	3.17	0.0
16.00	2.96	2.73	0.1	69.00	3.40	3.17	0.0
17.00	3.04	2.81	0.1	70.00	3.40	3.17	0.0
18.00	3.11	2.88	0.1	71.00	3.40	3.17	0.0
19.00	3.17	2.94	0.1	72.00	3.40	3.17	0.0
20.00	3.22	2.99	0.1				
21.00	3.27	3.04	0.1				
22.00	3.32	3.09	0.1				
23.00	3.36	3.13	0.1				
24.00	3.40	3.17	0.1				
25.00	3.40	3.17	0.0				
26.00	3.40	3.17	0.0				
27.00	3.40	3.17	0.0				
28.00	3.40	3.17	0.0				
29.00	3.40	3.17	0.0				
30.00	3.40	3.17	0.0				
31.00	3.40	3.17	0.0				
32.00	3.40	3.17	0.0				
33.00	3.40	3.17	0.0				
34.00	3.40	3.17	0.0				
35.00	3.40	3.17	0.0				
36.00	3.40	3.17	0.0				
37.00	3.40	3.17	0.0				
38.00	3.40	3.17	0.0				
39.00	3.40	3.17	0.0				
40.00	3.40	3.17	0.0				
41.00	3.40	3.17	0.0				
42.00	3.40	3.17	0.0				
43.00	3.40	3.17	0.0				
44.00	3.40	3.17	0.0				
45.00	3.40	3.17	0.0				
46.00	3.40	3.17	0.0				
47.00	3.40	3.17	0.0				
48.00	3.40	3.17	0.0				
49.00	3.40	3.17	0.0				
50.00	3.40	3.17	0.0				
51.00	3.40	3.17	0.0				
52.00	3.40	3.17	0.0				

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Subcatchment B1p: Pervious

Runoff = 0.0 cfs @ 24.01 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.6	39	>75% Grass cover, Good, HSG A
0.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	36	0.1140	0.14		Sheet Flow, 114 - 109.9 Woods: Light underbrush n= 0.400 P2= 3.89"
4.4	67	0.1330	0.25		Sheet Flow, 109.9 - 101.0 Grass: Dense n= 0.240 P2= 3.89"
0.1	23	0.0430	4.21		Shallow Concentrated Flow, 101.0 - 100.3 Paved Kv= 20.3 fps
8.8	126	Total, Increased to minimum Tc = 10.0 min			

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Subcatchment B1p: Pervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	3.40	0.00	0.0
1.00	0.04	0.00	0.0	54.00	3.40	0.00	0.0
2.00	0.08	0.00	0.0	55.00	3.40	0.00	0.0
3.00	0.13	0.00	0.0	56.00	3.40	0.00	0.0
4.00	0.18	0.00	0.0	57.00	3.40	0.00	0.0
5.00	0.23	0.00	0.0	58.00	3.40	0.00	0.0
6.00	0.29	0.00	0.0	59.00	3.40	0.00	0.0
7.00	0.36	0.00	0.0	60.00	3.40	0.00	0.0
8.00	0.44	0.00	0.0	61.00	3.40	0.00	0.0
9.00	0.54	0.00	0.0	62.00	3.40	0.00	0.0
10.00	0.67	0.00	0.0	63.00	3.40	0.00	0.0
11.00	0.88	0.00	0.0	64.00	3.40	0.00	0.0
12.00	1.63	0.00	0.0	65.00	3.40	0.00	0.0
13.00	2.52	0.00	0.0	66.00	3.40	0.00	0.0
14.00	2.73	0.00	0.0	67.00	3.40	0.00	0.0
15.00	2.86	0.00	0.0	68.00	3.40	0.00	0.0
16.00	2.96	0.00	0.0	69.00	3.40	0.00	0.0
17.00	3.04	0.00	0.0	70.00	3.40	0.00	0.0
18.00	3.11	0.00	0.0	71.00	3.40	0.00	0.0
19.00	3.17	0.00	0.0	72.00	3.40	0.00	0.0
20.00	3.22	0.00	0.0				
21.00	3.27	0.00	0.0				
22.00	3.32	0.00	0.0				
23.00	3.36	0.00	0.0				
24.00	3.40	0.00	0.0				
25.00	3.40	0.00	0.0				
26.00	3.40	0.00	0.0				
27.00	3.40	0.00	0.0				
28.00	3.40	0.00	0.0				
29.00	3.40	0.00	0.0				
30.00	3.40	0.00	0.0				
31.00	3.40	0.00	0.0				
32.00	3.40	0.00	0.0				
33.00	3.40	0.00	0.0				
34.00	3.40	0.00	0.0				
35.00	3.40	0.00	0.0				
36.00	3.40	0.00	0.0				
37.00	3.40	0.00	0.0				
38.00	3.40	0.00	0.0				
39.00	3.40	0.00	0.0				
40.00	3.40	0.00	0.0				
41.00	3.40	0.00	0.0				
42.00	3.40	0.00	0.0				
43.00	3.40	0.00	0.0				
44.00	3.40	0.00	0.0				
45.00	3.40	0.00	0.0				
46.00	3.40	0.00	0.0				
47.00	3.40	0.00	0.0				
48.00	3.40	0.00	0.0				
49.00	3.40	0.00	0.0				
50.00	3.40	0.00	0.0				
51.00	3.40	0.00	0.0				
52.00	3.40	0.00	0.0				

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

Prepared by Insite Engineering, LLC

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Summary for Subcatchment B2i: Impervious

Runoff = 3.6 cfs @ 12.17 hrs, Volume= 0.34 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.3	98	Paved parking, HSG A
1.3		100.00% Impervious Area

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

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Subcatchment B2i: Impervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	3.40	3.17	0.0
1.00	0.04	0.00	0.0	54.00	3.40	3.17	0.0
2.00	0.08	0.01	0.0	55.00	3.40	3.17	0.0
3.00	0.13	0.03	0.0	56.00	3.40	3.17	0.0
4.00	0.18	0.06	0.0	57.00	3.40	3.17	0.0
5.00	0.23	0.09	0.1	58.00	3.40	3.17	0.0
6.00	0.29	0.14	0.1	59.00	3.40	3.17	0.0
7.00	0.36	0.19	0.1	60.00	3.40	3.17	0.0
8.00	0.44	0.27	0.1	61.00	3.40	3.17	0.0
9.00	0.54	0.35	0.1	62.00	3.40	3.17	0.0
10.00	0.67	0.48	0.2	63.00	3.40	3.17	0.0
11.00	0.88	0.68	0.3	64.00	3.40	3.17	0.0
12.00	1.63	1.41	1.7	65.00	3.40	3.17	0.0
13.00	2.52	2.29	0.5	66.00	3.40	3.17	0.0
14.00	2.73	2.50	0.2	67.00	3.40	3.17	0.0
15.00	2.86	2.63	0.2	68.00	3.40	3.17	0.0
16.00	2.96	2.73	0.1	69.00	3.40	3.17	0.0
17.00	3.04	2.81	0.1	70.00	3.40	3.17	0.0
18.00	3.11	2.88	0.1	71.00	3.40	3.17	0.0
19.00	3.17	2.94	0.1	72.00	3.40	3.17	0.0
20.00	3.22	2.99	0.1				
21.00	3.27	3.04	0.1				
22.00	3.32	3.09	0.1				
23.00	3.36	3.13	0.1				
24.00	3.40	3.17	0.0				
25.00	3.40	3.17	0.0				
26.00	3.40	3.17	0.0				
27.00	3.40	3.17	0.0				
28.00	3.40	3.17	0.0				
29.00	3.40	3.17	0.0				
30.00	3.40	3.17	0.0				
31.00	3.40	3.17	0.0				
32.00	3.40	3.17	0.0				
33.00	3.40	3.17	0.0				
34.00	3.40	3.17	0.0				
35.00	3.40	3.17	0.0				
36.00	3.40	3.17	0.0				
37.00	3.40	3.17	0.0				
38.00	3.40	3.17	0.0				
39.00	3.40	3.17	0.0				
40.00	3.40	3.17	0.0				
41.00	3.40	3.17	0.0				
42.00	3.40	3.17	0.0				
43.00	3.40	3.17	0.0				
44.00	3.40	3.17	0.0				
45.00	3.40	3.17	0.0				
46.00	3.40	3.17	0.0				
47.00	3.40	3.17	0.0				
48.00	3.40	3.17	0.0				
49.00	3.40	3.17	0.0				
50.00	3.40	3.17	0.0				
51.00	3.40	3.17	0.0				
52.00	3.40	3.17	0.0				

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Subcatchment B2p: Pervious

Runoff = 0.0 cfs @ 24.04 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.6	39	>75% Grass cover, Good, HSG A
0.3	30	Woods, Good, HSG A
1.9	38	Weighted Average
1.9		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0100	0.10		Sheet Flow, 102.5 - 101.5 Grass: Dense n= 0.240 P2= 3.89"
0.2	25	0.0160	2.04		Shallow Concentrated Flow, 101.5 - 101.1 Unpaved Kv= 16.1 fps
17.3	125	Total			

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Subcatchment B2p: Pervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	3.40	0.00	0.0
1.00	0.04	0.00	0.0	54.00	3.40	0.00	0.0
2.00	0.08	0.00	0.0	55.00	3.40	0.00	0.0
3.00	0.13	0.00	0.0	56.00	3.40	0.00	0.0
4.00	0.18	0.00	0.0	57.00	3.40	0.00	0.0
5.00	0.23	0.00	0.0	58.00	3.40	0.00	0.0
6.00	0.29	0.00	0.0	59.00	3.40	0.00	0.0
7.00	0.36	0.00	0.0	60.00	3.40	0.00	0.0
8.00	0.44	0.00	0.0	61.00	3.40	0.00	0.0
9.00	0.54	0.00	0.0	62.00	3.40	0.00	0.0
10.00	0.67	0.00	0.0	63.00	3.40	0.00	0.0
11.00	0.88	0.00	0.0	64.00	3.40	0.00	0.0
12.00	1.63	0.00	0.0	65.00	3.40	0.00	0.0
13.00	2.52	0.00	0.0	66.00	3.40	0.00	0.0
14.00	2.73	0.00	0.0	67.00	3.40	0.00	0.0
15.00	2.86	0.00	0.0	68.00	3.40	0.00	0.0
16.00	2.96	0.00	0.0	69.00	3.40	0.00	0.0
17.00	3.04	0.00	0.0	70.00	3.40	0.00	0.0
18.00	3.11	0.00	0.0	71.00	3.40	0.00	0.0
19.00	3.17	0.00	0.0	72.00	3.40	0.00	0.0
20.00	3.22	0.00	0.0				
21.00	3.27	0.00	0.0				
22.00	3.32	0.00	0.0				
23.00	3.36	0.00	0.0				
24.00	3.40	0.00	0.0				
25.00	3.40	0.00	0.0				
26.00	3.40	0.00	0.0				
27.00	3.40	0.00	0.0				
28.00	3.40	0.00	0.0				
29.00	3.40	0.00	0.0				
30.00	3.40	0.00	0.0				
31.00	3.40	0.00	0.0				
32.00	3.40	0.00	0.0				
33.00	3.40	0.00	0.0				
34.00	3.40	0.00	0.0				
35.00	3.40	0.00	0.0				
36.00	3.40	0.00	0.0				
37.00	3.40	0.00	0.0				
38.00	3.40	0.00	0.0				
39.00	3.40	0.00	0.0				
40.00	3.40	0.00	0.0				
41.00	3.40	0.00	0.0				
42.00	3.40	0.00	0.0				
43.00	3.40	0.00	0.0				
44.00	3.40	0.00	0.0				
45.00	3.40	0.00	0.0				
46.00	3.40	0.00	0.0				
47.00	3.40	0.00	0.0				
48.00	3.40	0.00	0.0				
49.00	3.40	0.00	0.0				
50.00	3.40	0.00	0.0				
51.00	3.40	0.00	0.0				
52.00	3.40	0.00	0.0				

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Subcatchment Ui: Impervious

Runoff = 0.6 cfs @ 12.17 hrs, Volume= 0.05 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.2	98	Paved parking, HSG A
0.2		100.00% Impervious Area

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

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Subcatchment Ui: Impervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	3.40	3.17	0.0
1.00	0.04	0.00	0.0	54.00	3.40	3.17	0.0
2.00	0.08	0.01	0.0	55.00	3.40	3.17	0.0
3.00	0.13	0.03	0.0	56.00	3.40	3.17	0.0
4.00	0.18	0.06	0.0	57.00	3.40	3.17	0.0
5.00	0.23	0.09	0.0	58.00	3.40	3.17	0.0
6.00	0.29	0.14	0.0	59.00	3.40	3.17	0.0
7.00	0.36	0.19	0.0	60.00	3.40	3.17	0.0
8.00	0.44	0.27	0.0	61.00	3.40	3.17	0.0
9.00	0.54	0.35	0.0	62.00	3.40	3.17	0.0
10.00	0.67	0.48	0.0	63.00	3.40	3.17	0.0
11.00	0.88	0.68	0.1	64.00	3.40	3.17	0.0
12.00	1.63	1.41	0.3	65.00	3.40	3.17	0.0
13.00	2.52	2.29	0.1	66.00	3.40	3.17	0.0
14.00	2.73	2.50	0.0	67.00	3.40	3.17	0.0
15.00	2.86	2.63	0.0	68.00	3.40	3.17	0.0
16.00	2.96	2.73	0.0	69.00	3.40	3.17	0.0
17.00	3.04	2.81	0.0	70.00	3.40	3.17	0.0
18.00	3.11	2.88	0.0	71.00	3.40	3.17	0.0
19.00	3.17	2.94	0.0	72.00	3.40	3.17	0.0
20.00	3.22	2.99	0.0				
21.00	3.27	3.04	0.0				
22.00	3.32	3.09	0.0				
23.00	3.36	3.13	0.0				
24.00	3.40	3.17	0.0				
25.00	3.40	3.17	0.0				
26.00	3.40	3.17	0.0				
27.00	3.40	3.17	0.0				
28.00	3.40	3.17	0.0				
29.00	3.40	3.17	0.0				
30.00	3.40	3.17	0.0				
31.00	3.40	3.17	0.0				
32.00	3.40	3.17	0.0				
33.00	3.40	3.17	0.0				
34.00	3.40	3.17	0.0				
35.00	3.40	3.17	0.0				
36.00	3.40	3.17	0.0				
37.00	3.40	3.17	0.0				
38.00	3.40	3.17	0.0				
39.00	3.40	3.17	0.0				
40.00	3.40	3.17	0.0				
41.00	3.40	3.17	0.0				
42.00	3.40	3.17	0.0				
43.00	3.40	3.17	0.0				
44.00	3.40	3.17	0.0				
45.00	3.40	3.17	0.0				
46.00	3.40	3.17	0.0				
47.00	3.40	3.17	0.0				
48.00	3.40	3.17	0.0				
49.00	3.40	3.17	0.0				
50.00	3.40	3.17	0.0				
51.00	3.40	3.17	0.0				
52.00	3.40	3.17	0.0				

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Subcatchment Up: Pervious

Runoff = 0.0 cfs @ 24.02 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.4	39	>75% Grass cover, Good, HSG A
0.1	30	Woods, Good, HSG A
1.5	38	Weighted Average
1.5		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0380	0.17		Sheet Flow, 94.0 - 90.2 Grass: Dense n= 0.240 P2= 3.89"
1.4	175	0.0180	2.16		Shallow Concentrated Flow, 90.2 - 87.0 Unpaved Kv= 16.1 fps
11.4	275	Total			

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Subcatchment Up: Pervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	3.40	0.00	0.0
1.00	0.04	0.00	0.0	54.00	3.40	0.00	0.0
2.00	0.08	0.00	0.0	55.00	3.40	0.00	0.0
3.00	0.13	0.00	0.0	56.00	3.40	0.00	0.0
4.00	0.18	0.00	0.0	57.00	3.40	0.00	0.0
5.00	0.23	0.00	0.0	58.00	3.40	0.00	0.0
6.00	0.29	0.00	0.0	59.00	3.40	0.00	0.0
7.00	0.36	0.00	0.0	60.00	3.40	0.00	0.0
8.00	0.44	0.00	0.0	61.00	3.40	0.00	0.0
9.00	0.54	0.00	0.0	62.00	3.40	0.00	0.0
10.00	0.67	0.00	0.0	63.00	3.40	0.00	0.0
11.00	0.88	0.00	0.0	64.00	3.40	0.00	0.0
12.00	1.63	0.00	0.0	65.00	3.40	0.00	0.0
13.00	2.52	0.00	0.0	66.00	3.40	0.00	0.0
14.00	2.73	0.00	0.0	67.00	3.40	0.00	0.0
15.00	2.86	0.00	0.0	68.00	3.40	0.00	0.0
16.00	2.96	0.00	0.0	69.00	3.40	0.00	0.0
17.00	3.04	0.00	0.0	70.00	3.40	0.00	0.0
18.00	3.11	0.00	0.0	71.00	3.40	0.00	0.0
19.00	3.17	0.00	0.0	72.00	3.40	0.00	0.0
20.00	3.22	0.00	0.0				
21.00	3.27	0.00	0.0				
22.00	3.32	0.00	0.0				
23.00	3.36	0.00	0.0				
24.00	3.40	0.00	0.0				
25.00	3.40	0.00	0.0				
26.00	3.40	0.00	0.0				
27.00	3.40	0.00	0.0				
28.00	3.40	0.00	0.0				
29.00	3.40	0.00	0.0				
30.00	3.40	0.00	0.0				
31.00	3.40	0.00	0.0				
32.00	3.40	0.00	0.0				
33.00	3.40	0.00	0.0				
34.00	3.40	0.00	0.0				
35.00	3.40	0.00	0.0				
36.00	3.40	0.00	0.0				
37.00	3.40	0.00	0.0				
38.00	3.40	0.00	0.0				
39.00	3.40	0.00	0.0				
40.00	3.40	0.00	0.0				
41.00	3.40	0.00	0.0				
42.00	3.40	0.00	0.0				
43.00	3.40	0.00	0.0				
44.00	3.40	0.00	0.0				
45.00	3.40	0.00	0.0				
46.00	3.40	0.00	0.0				
47.00	3.40	0.00	0.0				
48.00	3.40	0.00	0.0				
49.00	3.40	0.00	0.0				
50.00	3.40	0.00	0.0				
51.00	3.40	0.00	0.0				
52.00	3.40	0.00	0.0				

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 55.56% Impervious, Inflow Depth = 0.19" for 2-Year event
Inflow = 1.8 cfs @ 12.52 hrs, Volume= 0.27 af
Primary = 1.8 cfs @ 12.52 hrs, Volume= 0.27 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Pond A: Watershed A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.0		0.0	53.00	0.0		0.0
1.00	0.0		0.0	54.00	0.0		0.0
2.00	0.0		0.0	55.00	0.0		0.0
3.00	0.0		0.0	56.00	0.0		0.0
4.00	0.0		0.0	57.00	0.0		0.0
5.00	0.0		0.0	58.00	0.0		0.0
6.00	0.0		0.0	59.00	0.0		0.0
7.00	0.0		0.0	60.00	0.0		0.0
8.00	0.0		0.0	61.00	0.0		0.0
9.00	0.0		0.0	62.00	0.0		0.0
10.00	0.0		0.0	63.00	0.0		0.0
11.00	0.1		0.1	64.00	0.0		0.0
12.00	0.3		0.3	65.00	0.0		0.0
13.00	1.6		1.6	66.00	0.0		0.0
14.00	0.5		0.5	67.00	0.0		0.0
15.00	0.2		0.2	68.00	0.0		0.0
16.00	0.1		0.1	69.00	0.0		0.0
17.00	0.0		0.0	70.00	0.0		0.0
18.00	0.0		0.0	71.00	0.0		0.0
19.00	0.0		0.0	72.00	0.0		0.0
20.00	0.0		0.0				
21.00	0.0		0.0				
22.00	0.0		0.0				
23.00	0.0		0.0				
24.00	0.0		0.0				
25.00	0.0		0.0				
26.00	0.0		0.0				
27.00	0.0		0.0				
28.00	0.0		0.0				
29.00	0.0		0.0				
30.00	0.0		0.0				
31.00	0.0		0.0				
32.00	0.0		0.0				
33.00	0.0		0.0				
34.00	0.0		0.0				
35.00	0.0		0.0				
36.00	0.0		0.0				
37.00	0.0		0.0				
38.00	0.0		0.0				
39.00	0.0		0.0				
40.00	0.0		0.0				
41.00	0.0		0.0				
42.00	0.0		0.0				
43.00	0.0		0.0				
44.00	0.0		0.0				
45.00	0.0		0.0				
46.00	0.0		0.0				
47.00	0.0		0.0				
48.00	0.0		0.0				
49.00	0.0		0.0				
50.00	0.0		0.0				
51.00	0.0		0.0				
52.00	0.0		0.0				

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Pond A1: Basin A

Inflow Area = 10.0 ac, 64.00% Impervious, Inflow Depth = 2.03" for 2-Year event
 Inflow = 18.0 cfs @ 12.17 hrs, Volume= 1.69 af
 Outflow = 4.6 cfs @ 12.51 hrs, Volume= 1.69 af, Atten= 75%, Lag= 20.5 min
 Discarded = 3.5 cfs @ 12.51 hrs, Volume= 1.60 af
 Primary = 1.1 cfs @ 12.51 hrs, Volume= 0.09 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 86.04' @ 12.51 hrs Surf.Area= 15,119.1 sf Storage= 15,487 cf

Plug-Flow detention time= 21.9 min calculated for 1.69 af (100% of inflow)
 Center-of-Mass det. time= 21.9 min (783.0 - 761.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	118,746 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	14,755.0	0	0
86.00	15,110.0	14,933	14,933
87.00	15,360.0	15,235	30,168
88.00	15,605.0	15,483	45,650
89.00	15,830.0	15,718	61,368
90.00	16,110.0	15,970	77,338
91.00	16,290.0	16,200	93,538
92.00	16,455.0	16,373	109,910
92.50	18,890.0	8,836	118,746

Device	Routing	Invert	Outlet Devices
#1	Primary	84.90'	18.0" Round 18" Pipe L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.90' / 84.25' S= 0.0310 1/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	85.30'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	87.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Discarded	85.00'	10.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=3.5 cfs @ 12.51 hrs HW=86.04' (Free Discharge)
 ↳4=Exfiltration (Exfiltration Controls 3.5 cfs)

Primary OutFlow Max=1.1 cfs @ 12.51 hrs HW=86.04' (Free Discharge)
 ↳1=18" Pipe (Passes 1.1 cfs of 5.2 cfs potential flow)
 ↳2=Orifice/Grate (Orifice Controls 1.1 cfs @ 3.06 fps)
 ↳3=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Pond A1: Basin A

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.0	0	85.00	0.0	0.0	0.0
2.00	0.1	22	85.00	0.1	0.1	0.0
4.00	0.2	67	85.00	0.2	0.2	0.0
6.00	0.3	97	85.01	0.3	0.3	0.0
8.00	0.5	161	85.01	0.5	0.5	0.0
10.00	0.9	293	85.02	0.9	0.9	0.0
12.00	8.6	3,083	85.21	3.4	3.4	0.0
14.00	1.1	4,830	85.32	3.4	3.4	0.0
16.00	0.6	198	85.01	0.6	0.6	0.0
18.00	0.4	135	85.01	0.4	0.4	0.0
20.00	0.3	112	85.01	0.3	0.3	0.0
22.00	0.3	97	85.01	0.3	0.3	0.0
24.00	0.2	81	85.01	0.2	0.2	0.0
26.00	0.0	0	85.00	0.0	0.0	0.0
28.00	0.0	0	85.00	0.0	0.0	0.0
30.00	0.0	0	85.00	0.0	0.0	0.0
32.00	0.0	0	85.00	0.0	0.0	0.0
34.00	0.0	0	85.00	0.0	0.0	0.0
36.00	0.0	0	85.00	0.0	0.0	0.0
38.00	0.0	0	85.00	0.0	0.0	0.0
40.00	0.0	0	85.00	0.0	0.0	0.0
42.00	0.0	0	85.00	0.0	0.0	0.0
44.00	0.0	0	85.00	0.0	0.0	0.0
46.00	0.0	0	85.00	0.0	0.0	0.0
48.00	0.0	0	85.00	0.0	0.0	0.0
50.00	0.0	0	85.00	0.0	0.0	0.0
52.00	0.0	0	85.00	0.0	0.0	0.0
54.00	0.0	0	85.00	0.0	0.0	0.0
56.00	0.0	0	85.00	0.0	0.0	0.0
58.00	0.0	0	85.00	0.0	0.0	0.0
60.00	0.0	0	85.00	0.0	0.0	0.0
62.00	0.0	0	85.00	0.0	0.0	0.0
64.00	0.0	0	85.00	0.0	0.0	0.0
66.00	0.0	0	85.00	0.0	0.0	0.0
68.00	0.0	0	85.00	0.0	0.0	0.0
70.00	0.0	0	85.00	0.0	0.0	0.0
72.00	0.0	0	85.00	0.0	0.0	0.0

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Summary for Pond B1: Basin B1

Inflow Area = 2.2 ac, 72.73% Impervious, Inflow Depth = 2.30" for 2-Year event
 Inflow = 4.5 cfs @ 12.17 hrs, Volume= 0.42 af
 Outflow = 3.6 cfs @ 12.24 hrs, Volume= 0.42 af, Atten= 20%, Lag= 4.0 min
 Discarded = 0.3 cfs @ 12.24 hrs, Volume= 0.34 af
 Primary = 3.3 cfs @ 12.24 hrs, Volume= 0.08 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 97.49' @ 12.24 hrs Surf.Area= 4,783.6 sf Storage= 5,095 cf

Plug-Flow detention time= 110.4 min calculated for 0.42 af (100% of inflow)
 Center-of-Mass det. time= 110.4 min (871.4 - 761.0)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	25,898 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,955.0	0	0
97.00	3,925.0	2,940	2,940
98.00	5,660.0	4,793	7,733
99.00	7,585.0	6,623	14,355
100.00	15,500.0	11,543	25,898

Device	Routing	Invert	Outlet Devices
#1	Primary	93.50'	18.0" Round 18" Pipe L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.50' / 92.52' S= 0.0200 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	97.40'	1.0" x 5.0" Horiz. Orifice/Grate X 8.00 columns X 14 rows C= 0.600 in 96.0" x 106.0" Grate (6% open area) Limited to weir flow at low heads
#3	Discarded	96.00'	3.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.3 cfs @ 12.24 hrs HW=97.49' (Free Discharge)

↳ **3=Exfiltration** (Exfiltration Controls 0.3 cfs)

Primary OutFlow Max=3.2 cfs @ 12.24 hrs HW=97.49' (Free Discharge)

↳ **1=18" Pipe** (Passes 3.2 cfs of 15.3 cfs potential flow)

↳ **2=Orifice/Grate** (Weir Controls 3.2 cfs @ 1.01 fps)

Post Development - Infiltration

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Hydrograph for Pond B1: Basin B1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.0	0	96.00	0.0	0.0	0.0
2.00	0.0	9	96.00	0.0	0.0	0.0
4.00	0.1	28	96.01	0.0	0.0	0.0
6.00	0.1	42	96.02	0.1	0.1	0.0
8.00	0.1	68	96.03	0.1	0.1	0.0
10.00	0.2	243	96.12	0.2	0.2	0.0
12.00	2.1	2,875	96.98	0.3	0.3	0.0
14.00	0.3	4,612	97.39	0.3	0.3	0.0
16.00	0.1	3,789	97.21	0.3	0.3	0.0
18.00	0.1	2,665	96.93	0.3	0.3	0.0
20.00	0.1	1,583	96.62	0.2	0.2	0.0
22.00	0.1	717	96.32	0.2	0.2	0.0
24.00	0.1	61	96.03	0.1	0.1	0.0
26.00	0.0	0	96.00	0.0	0.0	0.0
28.00	0.0	0	96.00	0.0	0.0	0.0
30.00	0.0	0	96.00	0.0	0.0	0.0
32.00	0.0	0	96.00	0.0	0.0	0.0
34.00	0.0	0	96.00	0.0	0.0	0.0
36.00	0.0	0	96.00	0.0	0.0	0.0
38.00	0.0	0	96.00	0.0	0.0	0.0
40.00	0.0	0	96.00	0.0	0.0	0.0
42.00	0.0	0	96.00	0.0	0.0	0.0
44.00	0.0	0	96.00	0.0	0.0	0.0
46.00	0.0	0	96.00	0.0	0.0	0.0
48.00	0.0	0	96.00	0.0	0.0	0.0
50.00	0.0	0	96.00	0.0	0.0	0.0
52.00	0.0	0	96.00	0.0	0.0	0.0
54.00	0.0	0	96.00	0.0	0.0	0.0
56.00	0.0	0	96.00	0.0	0.0	0.0
58.00	0.0	0	96.00	0.0	0.0	0.0
60.00	0.0	0	96.00	0.0	0.0	0.0
62.00	0.0	0	96.00	0.0	0.0	0.0
64.00	0.0	0	96.00	0.0	0.0	0.0
66.00	0.0	0	96.00	0.0	0.0	0.0
68.00	0.0	0	96.00	0.0	0.0	0.0
70.00	0.0	0	96.00	0.0	0.0	0.0
72.00	0.0	0	96.00	0.0	0.0	0.0

Post Development - Infiltration

NOAA 24-hr D 2-Year Rainfall=3.40"

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Summary for Pond B2: Basin B2

Inflow Area = 5.4 ac, 53.70% Impervious, Inflow Depth = 0.95" for 2-Year event
 Inflow = 6.3 cfs @ 12.22 hrs, Volume= 0.43 af
 Outflow = 1.0 cfs @ 12.77 hrs, Volume= 0.43 af, Atten= 84%, Lag= 33.1 min
 Discarded = 0.4 cfs @ 12.77 hrs, Volume= 0.31 af
 Primary = 0.7 cfs @ 12.77 hrs, Volume= 0.12 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 88.95' @ 12.77 hrs Surf.Area= 7,824.5 sf Storage= 7,259 cf

Plug-Flow detention time= 81.4 min calculated for 0.43 af (100% of inflow)
 Center-of-Mass det. time= 81.4 min (840.1 - 758.7)

Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	82,563 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	7,435.0	0	0
89.00	7,845.0	7,640	7,640
90.00	8,235.0	8,040	15,680
91.00	8,600.0	8,418	24,098
92.00	8,950.0	8,775	32,873
93.00	9,280.0	9,115	41,988
94.00	9,670.0	9,475	51,463
95.00	9,990.0	9,830	61,293
96.00	13,445.0	11,718	73,010
96.50	24,765.0	9,553	82,563

Device	Routing	Invert	Outlet Devices
#1	Primary	82.90'	18.0" Round 18" Pipe L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 82.90' / 82.30' S= 0.0182 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	88.20'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	90.50'	0.5' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Discarded	88.00'	2.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.4 cfs @ 12.77 hrs HW=88.95' (Free Discharge)
 ↳ **4=Exfiltration** (Exfiltration Controls 0.4 cfs)

Primary OutFlow Max=0.7 cfs @ 12.77 hrs HW=88.95' (Free Discharge)
 ↳ **1=18" Pipe** (Passes 0.7 cfs of 19.6 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.7 cfs @ 3.40 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Post Development - Infiltration

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NOAA 24-hr D 2-Year Rainfall=3.40"

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Hydrograph for Pond B2: Basin B2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.0	0	88.00	0.0	0.0	0.0
2.00	0.0	14	88.00	0.0	0.0	0.0
4.00	0.0	68	88.01	0.0	0.0	0.0
6.00	0.1	106	88.01	0.1	0.1	0.0
8.00	0.1	171	88.02	0.1	0.1	0.0
10.00	0.2	293	88.04	0.2	0.2	0.0
12.00	1.7	1,680	88.22	0.4	0.3	0.0
14.00	0.2	5,195	88.68	0.8	0.4	0.5
16.00	0.1	2,351	88.31	0.4	0.4	0.0
18.00	0.1	545	88.07	0.3	0.3	0.0
20.00	0.1	143	88.02	0.1	0.1	0.0
22.00	0.1	116	88.02	0.1	0.1	0.0
24.00	0.1	99	88.01	0.1	0.1	0.0
26.00	0.0	3	88.00	0.0	0.0	0.0
28.00	0.0	0	88.00	0.0	0.0	0.0
30.00	0.0	0	88.00	0.0	0.0	0.0
32.00	0.0	0	88.00	0.0	0.0	0.0
34.00	0.0	0	88.00	0.0	0.0	0.0
36.00	0.0	0	88.00	0.0	0.0	0.0
38.00	0.0	0	88.00	0.0	0.0	0.0
40.00	0.0	0	88.00	0.0	0.0	0.0
42.00	0.0	0	88.00	0.0	0.0	0.0
44.00	0.0	0	88.00	0.0	0.0	0.0
46.00	0.0	0	88.00	0.0	0.0	0.0
48.00	0.0	0	88.00	0.0	0.0	0.0
50.00	0.0	0	88.00	0.0	0.0	0.0
52.00	0.0	0	88.00	0.0	0.0	0.0
54.00	0.0	0	88.00	0.0	0.0	0.0
56.00	0.0	0	88.00	0.0	0.0	0.0
58.00	0.0	0	88.00	0.0	0.0	0.0
60.00	0.0	0	88.00	0.0	0.0	0.0
62.00	0.0	0	88.00	0.0	0.0	0.0
64.00	0.0	0	88.00	0.0	0.0	0.0
66.00	0.0	0	88.00	0.0	0.0	0.0
68.00	0.0	0	88.00	0.0	0.0	0.0
70.00	0.0	0	88.00	0.0	0.0	0.0
72.00	0.0	0	88.00	0.0	0.0	0.0

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NJ DEP 2-hr WQ Rainfall=1.25"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 A1i: Impervious Runoff Area=6.4 ac 100.00% Impervious Runoff Depth=1.03"
Tc=10.0 min CN=98 Runoff=16.6 cfs 0.55 af

Subcatchment A1p: Pervious Runoff Area=3.6 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=100' Slope=0.0320 1/1 Tc=10.7 min CN=39 Runoff=0.0 cfs 0.00 af

Subcatchment B1i: Impervious Runoff Area=1.6 ac 100.00% Impervious Runoff Depth=1.03"
Tc=10.0 min CN=98 Runoff=4.2 cfs 0.14 af

Subcatchment B1p: Pervious Runoff Area=0.6 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=126' Tc=10.0 min CN=39 Runoff=0.0 cfs 0.00 af

Subcatchment B2i: Impervious Runoff Area=1.3 ac 100.00% Impervious Runoff Depth=1.03"
Tc=10.0 min CN=98 Runoff=3.4 cfs 0.11 af

Subcatchment B2p: Pervious Runoff Area=1.9 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=125' Tc=17.3 min CN=38 Runoff=0.0 cfs 0.00 af

Subcatchment Ui: Impervious Runoff Area=0.2 ac 100.00% Impervious Runoff Depth=1.03"
Tc=10.0 min CN=98 Runoff=0.5 cfs 0.02 af

Subcatchment Up: Pervious Runoff Area=1.5 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=275' Tc=11.4 min CN=38 Runoff=0.0 cfs 0.00 af

Pond A: Watershed A Inflow=0.9 cfs 0.06 af
Primary=0.9 cfs 0.06 af

Pond A1: Basin A Peak Elev=85.78' Storage=11,627 cf Inflow=16.6 cfs 0.55 af
Discarded=3.5 cfs 0.52 af Primary=0.6 cfs 0.03 af Outflow=4.1 cfs 0.55 af

Pond B1: Basin B1 Peak Elev=97.40' Storage=4,662 cf Inflow=4.2 cfs 0.14 af
Discarded=0.3 cfs 0.14 af Primary=0.1 cfs 0.00 af Outflow=0.4 cfs 0.14 af

Pond B2: Basin B2 Peak Elev=88.42' Storage=3,246 cf Inflow=3.4 cfs 0.11 af
Discarded=0.4 cfs 0.10 af Primary=0.1 cfs 0.01 af Outflow=0.5 cfs 0.11 af

Total Runoff Area = 17.1 ac Runoff Volume = 0.82 af Average Runoff Depth = 0.57"
44.44% Pervious = 7.6 ac 55.56% Impervious = 9.5 ac

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Subcatchment A1i: Impervious

Runoff = 16.6 cfs @ 1.15 hrs, Volume= 0.55 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
3.7	98	Paved parking, HSG A
2.7	98	Roofs, HSG A
6.4	98	Weighted Average
6.4		100.00% Impervious Area

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

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Subcatchment A1i: Impervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	1.25	1.03	0.0
1.00	0.63	0.43	6.7	54.00	1.25	1.03	0.0
2.00	1.25	1.03	0.8	55.00	1.25	1.03	0.0
3.00	1.25	1.03	0.0	56.00	1.25	1.03	0.0
4.00	1.25	1.03	0.0	57.00	1.25	1.03	0.0
5.00	1.25	1.03	0.0	58.00	1.25	1.03	0.0
6.00	1.25	1.03	0.0	59.00	1.25	1.03	0.0
7.00	1.25	1.03	0.0	60.00	1.25	1.03	0.0
8.00	1.25	1.03	0.0	61.00	1.25	1.03	0.0
9.00	1.25	1.03	0.0	62.00	1.25	1.03	0.0
10.00	1.25	1.03	0.0	63.00	1.25	1.03	0.0
11.00	1.25	1.03	0.0	64.00	1.25	1.03	0.0
12.00	1.25	1.03	0.0	65.00	1.25	1.03	0.0
13.00	1.25	1.03	0.0	66.00	1.25	1.03	0.0
14.00	1.25	1.03	0.0	67.00	1.25	1.03	0.0
15.00	1.25	1.03	0.0	68.00	1.25	1.03	0.0
16.00	1.25	1.03	0.0	69.00	1.25	1.03	0.0
17.00	1.25	1.03	0.0	70.00	1.25	1.03	0.0
18.00	1.25	1.03	0.0	71.00	1.25	1.03	0.0
19.00	1.25	1.03	0.0	72.00	1.25	1.03	0.0
20.00	1.25	1.03	0.0				
21.00	1.25	1.03	0.0				
22.00	1.25	1.03	0.0				
23.00	1.25	1.03	0.0				
24.00	1.25	1.03	0.0				
25.00	1.25	1.03	0.0				
26.00	1.25	1.03	0.0				
27.00	1.25	1.03	0.0				
28.00	1.25	1.03	0.0				
29.00	1.25	1.03	0.0				
30.00	1.25	1.03	0.0				
31.00	1.25	1.03	0.0				
32.00	1.25	1.03	0.0				
33.00	1.25	1.03	0.0				
34.00	1.25	1.03	0.0				
35.00	1.25	1.03	0.0				
36.00	1.25	1.03	0.0				
37.00	1.25	1.03	0.0				
38.00	1.25	1.03	0.0				
39.00	1.25	1.03	0.0				
40.00	1.25	1.03	0.0				
41.00	1.25	1.03	0.0				
42.00	1.25	1.03	0.0				
43.00	1.25	1.03	0.0				
44.00	1.25	1.03	0.0				
45.00	1.25	1.03	0.0				
46.00	1.25	1.03	0.0				
47.00	1.25	1.03	0.0				
48.00	1.25	1.03	0.0				
49.00	1.25	1.03	0.0				
50.00	1.25	1.03	0.0				
51.00	1.25	1.03	0.0				
52.00	1.25	1.03	0.0				

Post Development - Infiltration

Prepared by Insite Engineering, LLC

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Subcatchment A1p: Pervious

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
3.6	39	>75% Grass cover, Good, HSG A
3.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0320	0.16		Sheet Flow, 105.3 - 102.1 Grass: Dense n= 0.240 P2= 3.89"

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Subcatchment A1p: Pervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	1.25	0.00	0.0
1.00	0.63	0.00	0.0	54.00	1.25	0.00	0.0
2.00	1.25	0.00	0.0	55.00	1.25	0.00	0.0
3.00	1.25	0.00	0.0	56.00	1.25	0.00	0.0
4.00	1.25	0.00	0.0	57.00	1.25	0.00	0.0
5.00	1.25	0.00	0.0	58.00	1.25	0.00	0.0
6.00	1.25	0.00	0.0	59.00	1.25	0.00	0.0
7.00	1.25	0.00	0.0	60.00	1.25	0.00	0.0
8.00	1.25	0.00	0.0	61.00	1.25	0.00	0.0
9.00	1.25	0.00	0.0	62.00	1.25	0.00	0.0
10.00	1.25	0.00	0.0	63.00	1.25	0.00	0.0
11.00	1.25	0.00	0.0	64.00	1.25	0.00	0.0
12.00	1.25	0.00	0.0	65.00	1.25	0.00	0.0
13.00	1.25	0.00	0.0	66.00	1.25	0.00	0.0
14.00	1.25	0.00	0.0	67.00	1.25	0.00	0.0
15.00	1.25	0.00	0.0	68.00	1.25	0.00	0.0
16.00	1.25	0.00	0.0	69.00	1.25	0.00	0.0
17.00	1.25	0.00	0.0	70.00	1.25	0.00	0.0
18.00	1.25	0.00	0.0	71.00	1.25	0.00	0.0
19.00	1.25	0.00	0.0	72.00	1.25	0.00	0.0
20.00	1.25	0.00	0.0				
21.00	1.25	0.00	0.0				
22.00	1.25	0.00	0.0				
23.00	1.25	0.00	0.0				
24.00	1.25	0.00	0.0				
25.00	1.25	0.00	0.0				
26.00	1.25	0.00	0.0				
27.00	1.25	0.00	0.0				
28.00	1.25	0.00	0.0				
29.00	1.25	0.00	0.0				
30.00	1.25	0.00	0.0				
31.00	1.25	0.00	0.0				
32.00	1.25	0.00	0.0				
33.00	1.25	0.00	0.0				
34.00	1.25	0.00	0.0				
35.00	1.25	0.00	0.0				
36.00	1.25	0.00	0.0				
37.00	1.25	0.00	0.0				
38.00	1.25	0.00	0.0				
39.00	1.25	0.00	0.0				
40.00	1.25	0.00	0.0				
41.00	1.25	0.00	0.0				
42.00	1.25	0.00	0.0				
43.00	1.25	0.00	0.0				
44.00	1.25	0.00	0.0				
45.00	1.25	0.00	0.0				
46.00	1.25	0.00	0.0				
47.00	1.25	0.00	0.0				
48.00	1.25	0.00	0.0				
49.00	1.25	0.00	0.0				
50.00	1.25	0.00	0.0				
51.00	1.25	0.00	0.0				
52.00	1.25	0.00	0.0				

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Subcatchment B1i: Impervious

Runoff = 4.2 cfs @ 1.15 hrs, Volume= 0.14 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
1.6	98	Paved parking, HSG A
1.6		100.00% Impervious Area

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

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Subcatchment B1i: Impervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	1.25	1.03	0.0
1.00	0.63	0.43	1.7	54.00	1.25	1.03	0.0
2.00	1.25	1.03	0.2	55.00	1.25	1.03	0.0
3.00	1.25	1.03	0.0	56.00	1.25	1.03	0.0
4.00	1.25	1.03	0.0	57.00	1.25	1.03	0.0
5.00	1.25	1.03	0.0	58.00	1.25	1.03	0.0
6.00	1.25	1.03	0.0	59.00	1.25	1.03	0.0
7.00	1.25	1.03	0.0	60.00	1.25	1.03	0.0
8.00	1.25	1.03	0.0	61.00	1.25	1.03	0.0
9.00	1.25	1.03	0.0	62.00	1.25	1.03	0.0
10.00	1.25	1.03	0.0	63.00	1.25	1.03	0.0
11.00	1.25	1.03	0.0	64.00	1.25	1.03	0.0
12.00	1.25	1.03	0.0	65.00	1.25	1.03	0.0
13.00	1.25	1.03	0.0	66.00	1.25	1.03	0.0
14.00	1.25	1.03	0.0	67.00	1.25	1.03	0.0
15.00	1.25	1.03	0.0	68.00	1.25	1.03	0.0
16.00	1.25	1.03	0.0	69.00	1.25	1.03	0.0
17.00	1.25	1.03	0.0	70.00	1.25	1.03	0.0
18.00	1.25	1.03	0.0	71.00	1.25	1.03	0.0
19.00	1.25	1.03	0.0	72.00	1.25	1.03	0.0
20.00	1.25	1.03	0.0				
21.00	1.25	1.03	0.0				
22.00	1.25	1.03	0.0				
23.00	1.25	1.03	0.0				
24.00	1.25	1.03	0.0				
25.00	1.25	1.03	0.0				
26.00	1.25	1.03	0.0				
27.00	1.25	1.03	0.0				
28.00	1.25	1.03	0.0				
29.00	1.25	1.03	0.0				
30.00	1.25	1.03	0.0				
31.00	1.25	1.03	0.0				
32.00	1.25	1.03	0.0				
33.00	1.25	1.03	0.0				
34.00	1.25	1.03	0.0				
35.00	1.25	1.03	0.0				
36.00	1.25	1.03	0.0				
37.00	1.25	1.03	0.0				
38.00	1.25	1.03	0.0				
39.00	1.25	1.03	0.0				
40.00	1.25	1.03	0.0				
41.00	1.25	1.03	0.0				
42.00	1.25	1.03	0.0				
43.00	1.25	1.03	0.0				
44.00	1.25	1.03	0.0				
45.00	1.25	1.03	0.0				
46.00	1.25	1.03	0.0				
47.00	1.25	1.03	0.0				
48.00	1.25	1.03	0.0				
49.00	1.25	1.03	0.0				
50.00	1.25	1.03	0.0				
51.00	1.25	1.03	0.0				
52.00	1.25	1.03	0.0				

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Subcatchment B1p: Pervious

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.6	39	>75% Grass cover, Good, HSG A
0.6		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	36	0.1140	0.14		Sheet Flow, 114 - 109.9 Woods: Light underbrush n= 0.400 P2= 3.89"
4.4	67	0.1330	0.25		Sheet Flow, 109.9 - 101.0 Grass: Dense n= 0.240 P2= 3.89"
0.1	23	0.0430	4.21		Shallow Concentrated Flow, 101.0 - 100.3 Paved Kv= 20.3 fps
8.8	126	Total, Increased to minimum Tc = 10.0 min			

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Subcatchment B1p: Pervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	1.25	0.00	0.0
1.00	0.63	0.00	0.0	54.00	1.25	0.00	0.0
2.00	1.25	0.00	0.0	55.00	1.25	0.00	0.0
3.00	1.25	0.00	0.0	56.00	1.25	0.00	0.0
4.00	1.25	0.00	0.0	57.00	1.25	0.00	0.0
5.00	1.25	0.00	0.0	58.00	1.25	0.00	0.0
6.00	1.25	0.00	0.0	59.00	1.25	0.00	0.0
7.00	1.25	0.00	0.0	60.00	1.25	0.00	0.0
8.00	1.25	0.00	0.0	61.00	1.25	0.00	0.0
9.00	1.25	0.00	0.0	62.00	1.25	0.00	0.0
10.00	1.25	0.00	0.0	63.00	1.25	0.00	0.0
11.00	1.25	0.00	0.0	64.00	1.25	0.00	0.0
12.00	1.25	0.00	0.0	65.00	1.25	0.00	0.0
13.00	1.25	0.00	0.0	66.00	1.25	0.00	0.0
14.00	1.25	0.00	0.0	67.00	1.25	0.00	0.0
15.00	1.25	0.00	0.0	68.00	1.25	0.00	0.0
16.00	1.25	0.00	0.0	69.00	1.25	0.00	0.0
17.00	1.25	0.00	0.0	70.00	1.25	0.00	0.0
18.00	1.25	0.00	0.0	71.00	1.25	0.00	0.0
19.00	1.25	0.00	0.0	72.00	1.25	0.00	0.0
20.00	1.25	0.00	0.0				
21.00	1.25	0.00	0.0				
22.00	1.25	0.00	0.0				
23.00	1.25	0.00	0.0				
24.00	1.25	0.00	0.0				
25.00	1.25	0.00	0.0				
26.00	1.25	0.00	0.0				
27.00	1.25	0.00	0.0				
28.00	1.25	0.00	0.0				
29.00	1.25	0.00	0.0				
30.00	1.25	0.00	0.0				
31.00	1.25	0.00	0.0				
32.00	1.25	0.00	0.0				
33.00	1.25	0.00	0.0				
34.00	1.25	0.00	0.0				
35.00	1.25	0.00	0.0				
36.00	1.25	0.00	0.0				
37.00	1.25	0.00	0.0				
38.00	1.25	0.00	0.0				
39.00	1.25	0.00	0.0				
40.00	1.25	0.00	0.0				
41.00	1.25	0.00	0.0				
42.00	1.25	0.00	0.0				
43.00	1.25	0.00	0.0				
44.00	1.25	0.00	0.0				
45.00	1.25	0.00	0.0				
46.00	1.25	0.00	0.0				
47.00	1.25	0.00	0.0				
48.00	1.25	0.00	0.0				
49.00	1.25	0.00	0.0				
50.00	1.25	0.00	0.0				
51.00	1.25	0.00	0.0				
52.00	1.25	0.00	0.0				

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Subcatchment B2i: Impervious

Runoff = 3.4 cfs @ 1.15 hrs, Volume= 0.11 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
1.3	98	Paved parking, HSG A
1.3		100.00% Impervious Area

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

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Subcatchment B2i: Impervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	1.25	1.03	0.0
1.00	0.63	0.43	1.4	54.00	1.25	1.03	0.0
2.00	1.25	1.03	0.2	55.00	1.25	1.03	0.0
3.00	1.25	1.03	0.0	56.00	1.25	1.03	0.0
4.00	1.25	1.03	0.0	57.00	1.25	1.03	0.0
5.00	1.25	1.03	0.0	58.00	1.25	1.03	0.0
6.00	1.25	1.03	0.0	59.00	1.25	1.03	0.0
7.00	1.25	1.03	0.0	60.00	1.25	1.03	0.0
8.00	1.25	1.03	0.0	61.00	1.25	1.03	0.0
9.00	1.25	1.03	0.0	62.00	1.25	1.03	0.0
10.00	1.25	1.03	0.0	63.00	1.25	1.03	0.0
11.00	1.25	1.03	0.0	64.00	1.25	1.03	0.0
12.00	1.25	1.03	0.0	65.00	1.25	1.03	0.0
13.00	1.25	1.03	0.0	66.00	1.25	1.03	0.0
14.00	1.25	1.03	0.0	67.00	1.25	1.03	0.0
15.00	1.25	1.03	0.0	68.00	1.25	1.03	0.0
16.00	1.25	1.03	0.0	69.00	1.25	1.03	0.0
17.00	1.25	1.03	0.0	70.00	1.25	1.03	0.0
18.00	1.25	1.03	0.0	71.00	1.25	1.03	0.0
19.00	1.25	1.03	0.0	72.00	1.25	1.03	0.0
20.00	1.25	1.03	0.0				
21.00	1.25	1.03	0.0				
22.00	1.25	1.03	0.0				
23.00	1.25	1.03	0.0				
24.00	1.25	1.03	0.0				
25.00	1.25	1.03	0.0				
26.00	1.25	1.03	0.0				
27.00	1.25	1.03	0.0				
28.00	1.25	1.03	0.0				
29.00	1.25	1.03	0.0				
30.00	1.25	1.03	0.0				
31.00	1.25	1.03	0.0				
32.00	1.25	1.03	0.0				
33.00	1.25	1.03	0.0				
34.00	1.25	1.03	0.0				
35.00	1.25	1.03	0.0				
36.00	1.25	1.03	0.0				
37.00	1.25	1.03	0.0				
38.00	1.25	1.03	0.0				
39.00	1.25	1.03	0.0				
40.00	1.25	1.03	0.0				
41.00	1.25	1.03	0.0				
42.00	1.25	1.03	0.0				
43.00	1.25	1.03	0.0				
44.00	1.25	1.03	0.0				
45.00	1.25	1.03	0.0				
46.00	1.25	1.03	0.0				
47.00	1.25	1.03	0.0				
48.00	1.25	1.03	0.0				
49.00	1.25	1.03	0.0				
50.00	1.25	1.03	0.0				
51.00	1.25	1.03	0.0				
52.00	1.25	1.03	0.0				

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Subcatchment B2p: Pervious

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
1.6	39	>75% Grass cover, Good, HSG A
0.3	30	Woods, Good, HSG A
1.9	38	Weighted Average
1.9		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	100	0.0100	0.10		Sheet Flow, 102.5 - 101.5 Grass: Dense n= 0.240 P2= 3.89"
0.2	25	0.0160	2.04		Shallow Concentrated Flow, 101.5 - 101.1 Unpaved Kv= 16.1 fps
17.3	125	Total			

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Subcatchment B2p: Pervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	1.25	0.00	0.0
1.00	0.63	0.00	0.0	54.00	1.25	0.00	0.0
2.00	1.25	0.00	0.0	55.00	1.25	0.00	0.0
3.00	1.25	0.00	0.0	56.00	1.25	0.00	0.0
4.00	1.25	0.00	0.0	57.00	1.25	0.00	0.0
5.00	1.25	0.00	0.0	58.00	1.25	0.00	0.0
6.00	1.25	0.00	0.0	59.00	1.25	0.00	0.0
7.00	1.25	0.00	0.0	60.00	1.25	0.00	0.0
8.00	1.25	0.00	0.0	61.00	1.25	0.00	0.0
9.00	1.25	0.00	0.0	62.00	1.25	0.00	0.0
10.00	1.25	0.00	0.0	63.00	1.25	0.00	0.0
11.00	1.25	0.00	0.0	64.00	1.25	0.00	0.0
12.00	1.25	0.00	0.0	65.00	1.25	0.00	0.0
13.00	1.25	0.00	0.0	66.00	1.25	0.00	0.0
14.00	1.25	0.00	0.0	67.00	1.25	0.00	0.0
15.00	1.25	0.00	0.0	68.00	1.25	0.00	0.0
16.00	1.25	0.00	0.0	69.00	1.25	0.00	0.0
17.00	1.25	0.00	0.0	70.00	1.25	0.00	0.0
18.00	1.25	0.00	0.0	71.00	1.25	0.00	0.0
19.00	1.25	0.00	0.0	72.00	1.25	0.00	0.0
20.00	1.25	0.00	0.0				
21.00	1.25	0.00	0.0				
22.00	1.25	0.00	0.0				
23.00	1.25	0.00	0.0				
24.00	1.25	0.00	0.0				
25.00	1.25	0.00	0.0				
26.00	1.25	0.00	0.0				
27.00	1.25	0.00	0.0				
28.00	1.25	0.00	0.0				
29.00	1.25	0.00	0.0				
30.00	1.25	0.00	0.0				
31.00	1.25	0.00	0.0				
32.00	1.25	0.00	0.0				
33.00	1.25	0.00	0.0				
34.00	1.25	0.00	0.0				
35.00	1.25	0.00	0.0				
36.00	1.25	0.00	0.0				
37.00	1.25	0.00	0.0				
38.00	1.25	0.00	0.0				
39.00	1.25	0.00	0.0				
40.00	1.25	0.00	0.0				
41.00	1.25	0.00	0.0				
42.00	1.25	0.00	0.0				
43.00	1.25	0.00	0.0				
44.00	1.25	0.00	0.0				
45.00	1.25	0.00	0.0				
46.00	1.25	0.00	0.0				
47.00	1.25	0.00	0.0				
48.00	1.25	0.00	0.0				
49.00	1.25	0.00	0.0				
50.00	1.25	0.00	0.0				
51.00	1.25	0.00	0.0				
52.00	1.25	0.00	0.0				

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Subcatchment Ui: Impervious

Runoff = 0.5 cfs @ 1.15 hrs, Volume= 0.02 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.2	98	Paved parking, HSG A
0.2		100.00% Impervious Area

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

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Subcatchment Ui: Impervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	1.25	1.03	0.0
1.00	0.63	0.43	0.2	54.00	1.25	1.03	0.0
2.00	1.25	1.03	0.0	55.00	1.25	1.03	0.0
3.00	1.25	1.03	0.0	56.00	1.25	1.03	0.0
4.00	1.25	1.03	0.0	57.00	1.25	1.03	0.0
5.00	1.25	1.03	0.0	58.00	1.25	1.03	0.0
6.00	1.25	1.03	0.0	59.00	1.25	1.03	0.0
7.00	1.25	1.03	0.0	60.00	1.25	1.03	0.0
8.00	1.25	1.03	0.0	61.00	1.25	1.03	0.0
9.00	1.25	1.03	0.0	62.00	1.25	1.03	0.0
10.00	1.25	1.03	0.0	63.00	1.25	1.03	0.0
11.00	1.25	1.03	0.0	64.00	1.25	1.03	0.0
12.00	1.25	1.03	0.0	65.00	1.25	1.03	0.0
13.00	1.25	1.03	0.0	66.00	1.25	1.03	0.0
14.00	1.25	1.03	0.0	67.00	1.25	1.03	0.0
15.00	1.25	1.03	0.0	68.00	1.25	1.03	0.0
16.00	1.25	1.03	0.0	69.00	1.25	1.03	0.0
17.00	1.25	1.03	0.0	70.00	1.25	1.03	0.0
18.00	1.25	1.03	0.0	71.00	1.25	1.03	0.0
19.00	1.25	1.03	0.0	72.00	1.25	1.03	0.0
20.00	1.25	1.03	0.0				
21.00	1.25	1.03	0.0				
22.00	1.25	1.03	0.0				
23.00	1.25	1.03	0.0				
24.00	1.25	1.03	0.0				
25.00	1.25	1.03	0.0				
26.00	1.25	1.03	0.0				
27.00	1.25	1.03	0.0				
28.00	1.25	1.03	0.0				
29.00	1.25	1.03	0.0				
30.00	1.25	1.03	0.0				
31.00	1.25	1.03	0.0				
32.00	1.25	1.03	0.0				
33.00	1.25	1.03	0.0				
34.00	1.25	1.03	0.0				
35.00	1.25	1.03	0.0				
36.00	1.25	1.03	0.0				
37.00	1.25	1.03	0.0				
38.00	1.25	1.03	0.0				
39.00	1.25	1.03	0.0				
40.00	1.25	1.03	0.0				
41.00	1.25	1.03	0.0				
42.00	1.25	1.03	0.0				
43.00	1.25	1.03	0.0				
44.00	1.25	1.03	0.0				
45.00	1.25	1.03	0.0				
46.00	1.25	1.03	0.0				
47.00	1.25	1.03	0.0				
48.00	1.25	1.03	0.0				
49.00	1.25	1.03	0.0				
50.00	1.25	1.03	0.0				
51.00	1.25	1.03	0.0				
52.00	1.25	1.03	0.0				

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Subcatchment Up: Pervious

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
1.4	39	>75% Grass cover, Good, HSG A
0.1	30	Woods, Good, HSG A
1.5	38	Weighted Average
1.5		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0380	0.17		Sheet Flow, 94.0 - 90.2 Grass: Dense n= 0.240 P2= 3.89"
1.4	175	0.0180	2.16		Shallow Concentrated Flow, 90.2 - 87.0 Unpaved Kv= 16.1 fps
11.4	275	Total			

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Subcatchment Up: Pervious

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.0	53.00	1.25	0.00	0.0
1.00	0.63	0.00	0.0	54.00	1.25	0.00	0.0
2.00	1.25	0.00	0.0	55.00	1.25	0.00	0.0
3.00	1.25	0.00	0.0	56.00	1.25	0.00	0.0
4.00	1.25	0.00	0.0	57.00	1.25	0.00	0.0
5.00	1.25	0.00	0.0	58.00	1.25	0.00	0.0
6.00	1.25	0.00	0.0	59.00	1.25	0.00	0.0
7.00	1.25	0.00	0.0	60.00	1.25	0.00	0.0
8.00	1.25	0.00	0.0	61.00	1.25	0.00	0.0
9.00	1.25	0.00	0.0	62.00	1.25	0.00	0.0
10.00	1.25	0.00	0.0	63.00	1.25	0.00	0.0
11.00	1.25	0.00	0.0	64.00	1.25	0.00	0.0
12.00	1.25	0.00	0.0	65.00	1.25	0.00	0.0
13.00	1.25	0.00	0.0	66.00	1.25	0.00	0.0
14.00	1.25	0.00	0.0	67.00	1.25	0.00	0.0
15.00	1.25	0.00	0.0	68.00	1.25	0.00	0.0
16.00	1.25	0.00	0.0	69.00	1.25	0.00	0.0
17.00	1.25	0.00	0.0	70.00	1.25	0.00	0.0
18.00	1.25	0.00	0.0	71.00	1.25	0.00	0.0
19.00	1.25	0.00	0.0	72.00	1.25	0.00	0.0
20.00	1.25	0.00	0.0				
21.00	1.25	0.00	0.0				
22.00	1.25	0.00	0.0				
23.00	1.25	0.00	0.0				
24.00	1.25	0.00	0.0				
25.00	1.25	0.00	0.0				
26.00	1.25	0.00	0.0				
27.00	1.25	0.00	0.0				
28.00	1.25	0.00	0.0				
29.00	1.25	0.00	0.0				
30.00	1.25	0.00	0.0				
31.00	1.25	0.00	0.0				
32.00	1.25	0.00	0.0				
33.00	1.25	0.00	0.0				
34.00	1.25	0.00	0.0				
35.00	1.25	0.00	0.0				
36.00	1.25	0.00	0.0				
37.00	1.25	0.00	0.0				
38.00	1.25	0.00	0.0				
39.00	1.25	0.00	0.0				
40.00	1.25	0.00	0.0				
41.00	1.25	0.00	0.0				
42.00	1.25	0.00	0.0				
43.00	1.25	0.00	0.0				
44.00	1.25	0.00	0.0				
45.00	1.25	0.00	0.0				
46.00	1.25	0.00	0.0				
47.00	1.25	0.00	0.0				
48.00	1.25	0.00	0.0				
49.00	1.25	0.00	0.0				
50.00	1.25	0.00	0.0				
51.00	1.25	0.00	0.0				
52.00	1.25	0.00	0.0				

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Pond A: Watershed A

Inflow Area = 17.1 ac, 55.56% Impervious, Inflow Depth = 0.04" for WQ event
Inflow = 0.9 cfs @ 1.35 hrs, Volume= 0.06 af
Primary = 0.9 cfs @ 1.35 hrs, Volume= 0.06 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

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Hydrograph for Pond A: Watershed A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.0		0.0	53.00	0.0		0.0
1.00	0.2		0.2	54.00	0.0		0.0
2.00	0.3		0.3	55.00	0.0		0.0
3.00	0.0		0.0	56.00	0.0		0.0
4.00	0.0		0.0	57.00	0.0		0.0
5.00	0.0		0.0	58.00	0.0		0.0
6.00	0.0		0.0	59.00	0.0		0.0
7.00	0.0		0.0	60.00	0.0		0.0
8.00	0.0		0.0	61.00	0.0		0.0
9.00	0.0		0.0	62.00	0.0		0.0
10.00	0.0		0.0	63.00	0.0		0.0
11.00	0.0		0.0	64.00	0.0		0.0
12.00	0.0		0.0	65.00	0.0		0.0
13.00	0.0		0.0	66.00	0.0		0.0
14.00	0.0		0.0	67.00	0.0		0.0
15.00	0.0		0.0	68.00	0.0		0.0
16.00	0.0		0.0	69.00	0.0		0.0
17.00	0.0		0.0	70.00	0.0		0.0
18.00	0.0		0.0	71.00	0.0		0.0
19.00	0.0		0.0	72.00	0.0		0.0
20.00	0.0		0.0				
21.00	0.0		0.0				
22.00	0.0		0.0				
23.00	0.0		0.0				
24.00	0.0		0.0				
25.00	0.0		0.0				
26.00	0.0		0.0				
27.00	0.0		0.0				
28.00	0.0		0.0				
29.00	0.0		0.0				
30.00	0.0		0.0				
31.00	0.0		0.0				
32.00	0.0		0.0				
33.00	0.0		0.0				
34.00	0.0		0.0				
35.00	0.0		0.0				
36.00	0.0		0.0				
37.00	0.0		0.0				
38.00	0.0		0.0				
39.00	0.0		0.0				
40.00	0.0		0.0				
41.00	0.0		0.0				
42.00	0.0		0.0				
43.00	0.0		0.0				
44.00	0.0		0.0				
45.00	0.0		0.0				
46.00	0.0		0.0				
47.00	0.0		0.0				
48.00	0.0		0.0				
49.00	0.0		0.0				
50.00	0.0		0.0				
51.00	0.0		0.0				
52.00	0.0		0.0				

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Pond A1: Basin A

Inflow Area = 10.0 ac, 64.00% Impervious, Inflow Depth = 0.66" for WQ event
 Inflow = 16.6 cfs @ 1.15 hrs, Volume= 0.55 af
 Outflow = 4.1 cfs @ 1.40 hrs, Volume= 0.55 af, Atten= 75%, Lag= 15.5 min
 Discarded = 3.5 cfs @ 1.40 hrs, Volume= 0.52 af
 Primary = 0.6 cfs @ 1.40 hrs, Volume= 0.03 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 85.78' @ 1.40 hrs Surf.Area= 15,031.4 sf Storage= 11,627 cf

Plug-Flow detention time= 29.7 min calculated for 0.55 af (100% of inflow)
 Center-of-Mass det. time= 29.7 min (103.7 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	118,746 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	14,755.0	0	0
86.00	15,110.0	14,933	14,933
87.00	15,360.0	15,235	30,168
88.00	15,605.0	15,483	45,650
89.00	15,830.0	15,718	61,368
90.00	16,110.0	15,970	77,338
91.00	16,290.0	16,200	93,538
92.00	16,455.0	16,373	109,910
92.50	18,890.0	8,836	118,746

Device	Routing	Invert	Outlet Devices
#1	Primary	84.90'	18.0" Round 18" Pipe L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.90' / 84.25' S= 0.0310 1/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	85.30'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	87.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Discarded	85.00'	10.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=3.5 cfs @ 1.40 hrs HW=85.78' (Free Discharge)
 ↳4=Exfiltration (Exfiltration Controls 3.5 cfs)

Primary OutFlow Max=0.6 cfs @ 1.40 hrs HW=85.78' (Free Discharge)
 ↳1=18" Pipe (Passes 0.6 cfs of 3.4 cfs potential flow)
 ↳2=Orifice/Grate (Orifice Controls 0.6 cfs @ 2.36 fps)
 ↳3=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Pond A1: Basin A

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.0	0	85.00	0.0	0.0	0.0
2.00	0.8	7,778	85.52	3.6	3.5	0.2
4.00	0.0	0	85.00	0.0	0.0	0.0
6.00	0.0	0	85.00	0.0	0.0	0.0
8.00	0.0	0	85.00	0.0	0.0	0.0
10.00	0.0	0	85.00	0.0	0.0	0.0
12.00	0.0	0	85.00	0.0	0.0	0.0
14.00	0.0	0	85.00	0.0	0.0	0.0
16.00	0.0	0	85.00	0.0	0.0	0.0
18.00	0.0	0	85.00	0.0	0.0	0.0
20.00	0.0	0	85.00	0.0	0.0	0.0
22.00	0.0	0	85.00	0.0	0.0	0.0
24.00	0.0	0	85.00	0.0	0.0	0.0
26.00	0.0	0	85.00	0.0	0.0	0.0
28.00	0.0	0	85.00	0.0	0.0	0.0
30.00	0.0	0	85.00	0.0	0.0	0.0
32.00	0.0	0	85.00	0.0	0.0	0.0
34.00	0.0	0	85.00	0.0	0.0	0.0
36.00	0.0	0	85.00	0.0	0.0	0.0
38.00	0.0	0	85.00	0.0	0.0	0.0
40.00	0.0	0	85.00	0.0	0.0	0.0
42.00	0.0	0	85.00	0.0	0.0	0.0
44.00	0.0	0	85.00	0.0	0.0	0.0
46.00	0.0	0	85.00	0.0	0.0	0.0
48.00	0.0	0	85.00	0.0	0.0	0.0
50.00	0.0	0	85.00	0.0	0.0	0.0
52.00	0.0	0	85.00	0.0	0.0	0.0
54.00	0.0	0	85.00	0.0	0.0	0.0
56.00	0.0	0	85.00	0.0	0.0	0.0
58.00	0.0	0	85.00	0.0	0.0	0.0
60.00	0.0	0	85.00	0.0	0.0	0.0
62.00	0.0	0	85.00	0.0	0.0	0.0
64.00	0.0	0	85.00	0.0	0.0	0.0
66.00	0.0	0	85.00	0.0	0.0	0.0
68.00	0.0	0	85.00	0.0	0.0	0.0
70.00	0.0	0	85.00	0.0	0.0	0.0
72.00	0.0	0	85.00	0.0	0.0	0.0

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Summary for Pond B1: Basin B1

Inflow Area = 2.2 ac, 72.73% Impervious, Inflow Depth = 0.75" for WQ event
 Inflow = 4.2 cfs @ 1.15 hrs, Volume= 0.14 af
 Outflow = 0.4 cfs @ 1.86 hrs, Volume= 0.14 af, Atten= 91%, Lag= 42.9 min
 Discarded = 0.3 cfs @ 1.86 hrs, Volume= 0.14 af
 Primary = 0.1 cfs @ 1.86 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 97.40' @ 1.86 hrs Surf.Area= 4,623.8 sf Storage= 4,662 cf

Plug-Flow detention time= 153.7 min calculated for 0.14 af (100% of inflow)
 Center-of-Mass det. time= 153.8 min (227.8 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	25,898 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,955.0	0	0
97.00	3,925.0	2,940	2,940
98.00	5,660.0	4,793	7,733
99.00	7,585.0	6,623	14,355
100.00	15,500.0	11,543	25,898

Device	Routing	Invert	Outlet Devices
#1	Primary	93.50'	18.0" Round 18" Pipe L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.50' / 92.52' S= 0.0200 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	97.40'	1.0" x 5.0" Horiz. Orifice/Grate X 8.00 columns X 14 rows C= 0.600 in 96.0" x 106.0" Grate (6% open area) Limited to weir flow at low heads
#3	Discarded	96.00'	3.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.3 cfs @ 1.86 hrs HW=97.40' (Free Discharge)

↳ **3=Exfiltration** (Exfiltration Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 1.86 hrs HW=97.40' (Free Discharge)

↳ **1=18" Pipe** (Passes 0.0 cfs of 15.1 cfs potential flow)

↳ **2=Orifice/Grate** (Weir Controls 0.0 cfs @ 0.17 fps)

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Pond B1: Basin B1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.0	0	96.00	0.0	0.0	0.0
2.00	0.2	4,623	97.39	0.3	0.3	0.0
4.00	0.0	2,614	96.92	0.3	0.3	0.0
6.00	0.0	981	96.42	0.2	0.2	0.0
8.00	0.0	3	96.00	0.0	0.0	0.0
10.00	0.0	0	96.00	0.0	0.0	0.0
12.00	0.0	0	96.00	0.0	0.0	0.0
14.00	0.0	0	96.00	0.0	0.0	0.0
16.00	0.0	0	96.00	0.0	0.0	0.0
18.00	0.0	0	96.00	0.0	0.0	0.0
20.00	0.0	0	96.00	0.0	0.0	0.0
22.00	0.0	0	96.00	0.0	0.0	0.0
24.00	0.0	0	96.00	0.0	0.0	0.0
26.00	0.0	0	96.00	0.0	0.0	0.0
28.00	0.0	0	96.00	0.0	0.0	0.0
30.00	0.0	0	96.00	0.0	0.0	0.0
32.00	0.0	0	96.00	0.0	0.0	0.0
34.00	0.0	0	96.00	0.0	0.0	0.0
36.00	0.0	0	96.00	0.0	0.0	0.0
38.00	0.0	0	96.00	0.0	0.0	0.0
40.00	0.0	0	96.00	0.0	0.0	0.0
42.00	0.0	0	96.00	0.0	0.0	0.0
44.00	0.0	0	96.00	0.0	0.0	0.0
46.00	0.0	0	96.00	0.0	0.0	0.0
48.00	0.0	0	96.00	0.0	0.0	0.0
50.00	0.0	0	96.00	0.0	0.0	0.0
52.00	0.0	0	96.00	0.0	0.0	0.0
54.00	0.0	0	96.00	0.0	0.0	0.0
56.00	0.0	0	96.00	0.0	0.0	0.0
58.00	0.0	0	96.00	0.0	0.0	0.0
60.00	0.0	0	96.00	0.0	0.0	0.0
62.00	0.0	0	96.00	0.0	0.0	0.0
64.00	0.0	0	96.00	0.0	0.0	0.0
66.00	0.0	0	96.00	0.0	0.0	0.0
68.00	0.0	0	96.00	0.0	0.0	0.0
70.00	0.0	0	96.00	0.0	0.0	0.0
72.00	0.0	0	96.00	0.0	0.0	0.0

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Summary for Pond B2: Basin B2

Inflow Area = 5.4 ac, 53.70% Impervious, Inflow Depth = 0.25" for WQ event
 Inflow = 3.4 cfs @ 1.15 hrs, Volume= 0.11 af
 Outflow = 0.5 cfs @ 1.60 hrs, Volume= 0.11 af, Atten= 85%, Lag= 27.4 min
 Discarded = 0.4 cfs @ 1.60 hrs, Volume= 0.10 af
 Primary = 0.1 cfs @ 1.60 hrs, Volume= 0.01 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 88.42' @ 1.60 hrs Surf.Area= 7,609.2 sf Storage= 3,246 cf

Plug-Flow detention time= 79.9 min calculated for 0.11 af (100% of inflow)
 Center-of-Mass det. time= 79.9 min (154.1 - 74.1)

Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	82,563 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	7,435.0	0	0
89.00	7,845.0	7,640	7,640
90.00	8,235.0	8,040	15,680
91.00	8,600.0	8,418	24,098
92.00	8,950.0	8,775	32,873
93.00	9,280.0	9,115	41,988
94.00	9,670.0	9,475	51,463
95.00	9,990.0	9,830	61,293
96.00	13,445.0	11,718	73,010
96.50	24,765.0	9,553	82,563

Device	Routing	Invert	Outlet Devices
#1	Primary	82.90'	18.0" Round 18" Pipe L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 82.90' / 82.30' S= 0.0182 ' / S= 0.0182 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	88.20'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	90.50'	0.5' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Discarded	88.00'	2.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.4 cfs @ 1.60 hrs HW=88.42' (Free Discharge)
 ↳ **4=Exfiltration** (Exfiltration Controls 0.4 cfs)

Primary OutFlow Max=0.1 cfs @ 1.60 hrs HW=88.42' (Free Discharge)
 ↳ **1=18" Pipe** (Passes 0.1 cfs of 18.6 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 1.61 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Post Development - Infiltration

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NJ DEP 2-hr WQ Rainfall=1.25"

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Hydrograph for Pond B2: Basin B2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.0	0	88.00	0.0	0.0	0.0
2.00	0.2	3,057	88.40	0.5	0.4	0.1
4.00	0.0	482	88.06	0.3	0.3	0.0
6.00	0.0	10	88.00	0.0	0.0	0.0
8.00	0.0	0	88.00	0.0	0.0	0.0
10.00	0.0	0	88.00	0.0	0.0	0.0
12.00	0.0	0	88.00	0.0	0.0	0.0
14.00	0.0	0	88.00	0.0	0.0	0.0
16.00	0.0	0	88.00	0.0	0.0	0.0
18.00	0.0	0	88.00	0.0	0.0	0.0
20.00	0.0	0	88.00	0.0	0.0	0.0
22.00	0.0	0	88.00	0.0	0.0	0.0
24.00	0.0	0	88.00	0.0	0.0	0.0
26.00	0.0	0	88.00	0.0	0.0	0.0
28.00	0.0	0	88.00	0.0	0.0	0.0
30.00	0.0	0	88.00	0.0	0.0	0.0
32.00	0.0	0	88.00	0.0	0.0	0.0
34.00	0.0	0	88.00	0.0	0.0	0.0
36.00	0.0	0	88.00	0.0	0.0	0.0
38.00	0.0	0	88.00	0.0	0.0	0.0
40.00	0.0	0	88.00	0.0	0.0	0.0
42.00	0.0	0	88.00	0.0	0.0	0.0
44.00	0.0	0	88.00	0.0	0.0	0.0
46.00	0.0	0	88.00	0.0	0.0	0.0
48.00	0.0	0	88.00	0.0	0.0	0.0
50.00	0.0	0	88.00	0.0	0.0	0.0
52.00	0.0	0	88.00	0.0	0.0	0.0
54.00	0.0	0	88.00	0.0	0.0	0.0
56.00	0.0	0	88.00	0.0	0.0	0.0
58.00	0.0	0	88.00	0.0	0.0	0.0
60.00	0.0	0	88.00	0.0	0.0	0.0
62.00	0.0	0	88.00	0.0	0.0	0.0
64.00	0.0	0	88.00	0.0	0.0	0.0
66.00	0.0	0	88.00	0.0	0.0	0.0
68.00	0.0	0	88.00	0.0	0.0	0.0
70.00	0.0	0	88.00	0.0	0.0	0.0
72.00	0.0	0	88.00	0.0	0.0	0.0

APPENDIX E
Emergency Spillway Calculations

Emergency Spillways

Prepared by Insite Engineering, LLC

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NOAA 24-hr D 150-Year Rainfall=14.70"

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Time span=0.00-300.00 hrs, dt=0.01 hrs, 30001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond A1: Basin A

Peak Elev=91.35' Storage=99,306 cf Inflow=95.1 cfs 9.19 af
Outflow=92.4 cfs 9.16 af

Pond B2: Basin B2

Peak Elev=94.14' Storage=52,228 cf Inflow=36.0 cfs 4.38 af
Outflow=35.5 cfs 4.24 af

Emergency Spillways

NOAA 24-hr D 150-Year Rainfall=14.70"

Prepared by Insite Engineering, LLC

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Summary for Pond A1: Basin A

Inflow Area = 10.0 ac, 64.00% Impervious, Inflow Depth = 11.02" for 150-Year event
 Inflow = 95.1 cfs @ 12.17 hrs, Volume= 9.19 af
 Outflow = 92.4 cfs @ 12.19 hrs, Volume= 9.16 af, Atten= 3%, Lag= 1.3 min
 Primary = 92.4 cfs @ 12.19 hrs, Volume= 9.16 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
 Starting Elev= 90.59' Surf.Area= 16,216.2 sf Storage= 86,896 cf
 Peak Elev= 91.35' @ 12.19 hrs Surf.Area= 16,348.1 sf Storage= 99,306 cf (12,410 cf above start)

Plug-Flow detention time= 179.6 min calculated for 7.17 af (78% of inflow)
 Center-of-Mass det. time= 6.5 min (767.9 - 761.4)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	118,746 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
85.00	14,755.0	0	0
86.00	15,110.0	14,933	14,933
87.00	15,360.0	15,235	30,168
88.00	15,605.0	15,483	45,650
89.00	15,830.0	15,718	61,368
90.00	16,110.0	15,970	77,338
91.00	16,290.0	16,200	93,538
92.00	16,455.0	16,373	109,910
92.50	18,890.0	8,836	118,746

Device	Routing	Invert	Outlet Devices
#1	Primary	90.66'	60.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=92.2 cfs @ 12.19 hrs HW=91.35' (Free Discharge)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 92.2 cfs @ 2.22 fps)

Summary for Pond B2: Basin B2

Inflow Area = 5.4 ac, 53.70% Impervious, Inflow Depth = 9.73" for 150-Year event
 Inflow = 36.0 cfs @ 12.19 hrs, Volume= 4.38 af
 Outflow = 35.5 cfs @ 12.22 hrs, Volume= 4.24 af, Atten= 1%, Lag= 1.5 min
 Primary = 35.5 cfs @ 12.22 hrs, Volume= 4.24 af

Routing by Stor-Ind method, Time Span= 0.00-300.00 hrs, dt= 0.01 hrs / 2
 Starting Elev= 92.99' Surf.Area= 9,276.7 sf Storage= 41,896 cf
 Peak Elev= 94.14' @ 12.22 hrs Surf.Area= 8,849.1 sf Storage= 52,228 cf (10,332 cf above start)

Plug-Flow detention time= 179.6 min calculated for 3.28 af (75% of inflow)
 Center-of-Mass det. time= 21.5 min (808.4 - 786.9)

Emergency Spillways

NOAA 24-hr D 150-Year Rainfall=14.70"

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Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	66,151 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	7,435.0	0	0
89.00	7,845.0	7,640	7,640
90.00	8,235.0	8,040	15,680
91.00	8,600.0	8,418	24,098
92.00	8,950.0	8,775	32,873
93.00	9,280.0	9,115	41,988
94.00	8,670.0	8,975	50,963
95.00	9,990.0	9,330	60,293
95.50	13,445.0	5,859	66,151

Device	Routing	Invert	Outlet Devices
#1	Primary	93.66'	40.0' long x 18.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=35.4 cfs @ 12.22 hrs HW=94.14' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Weir Controls 35.4 cfs @ 1.86 fps)

A P P E N D I X F

Conduit Outlet Protection Calculations

InSite Engineering LLC

Project Name: Marlboro Residential
Project #: 20-1417-01
Date: 10/21/2020
Structure Name: FES A33
Pipe Diameter (in.): 24

CONDUIT OUTLET PROTECTION

Inside Width, $W_o =$	2	ft	
Inside Height, $D_o =$	2	ft	
Design Flow, $Q_{25} =$	13.1	cfs	
(Q/W_o) $q =$	6.55	cfs/ft	
Basin 2-Year WSE =	0.00		
Tailwater, TW =	0.40	ft	Pipe Invert = 85.00
Assumed (TW = 0.2D _o)			TW Elevation = 85.40
			1/2 D _o = Pipe C/L = 86.00

If TW Elev < 1/2 D_o

Length of Apron	$L_a =$	$1.8 \left(\frac{q}{D_o^{1/2}} \right) + 7D_o$	
	$L_a =$	22.3 ft	USE 22 ft
Width of Apron	$W_a =$	$3 W_o + L_a$	
	$W_a =$	28.3 ft	USE 28 ft

If TW Elev \geq 1/2 D_o

Length of Apron	$L_a =$	$3 \left(\frac{q}{D_o^{1/2}} \right)$	
	$L_a =$	13.9 ft	USE 14 ft
Width of Apron	$W_a =$	$3 W_o + 0.4 L_a$	
	$W_a =$	11.6 ft	USE 12 ft

RipRap Size	$D_{50} =$	$\frac{0.016 q^{1.33}}{TW}$	
	$D_{50} =$	0.487 ft	
	$D_{50} =$	5.8 in	USE 6 in

Apron Thickness	$Th =$	2D ₅₀ ft with filter fabric	
	$Th =$	1.0 ft with filter fabric	USE 12 in

RipRap Volume	$V =$	$\frac{1/2(3W_o + W_a)(L_a)(Th)}{27}$	
	$V =$	13.8 cy	

InSite Engineering LLC

Project Name: Marlboro Residential
Project #: 20-1417-01
Date: 10/21/2020
Structure Name: FES B15
Pipe Diameter (in.): 18

CONDUIT OUTLET PROTECTION

Inside Width, $W_o =$	1.5	ft	
Inside Height, $D_o =$	1.5	ft	
Design Flow, $Q_{25} =$	3.2	cfs	
(Q/W_o) $q =$	2.13	cfs/ft	
Basin 2-Year WSE =	0.00		
Tailwater, TW =	0.30	ft	Pipe Invert = 82.30
Assumed (TW = 0.2D _o)			TW Elevation = 82.60
			1/2 D _o = Pipe C/L = 83.05

If TW Elev < 1/2 D_o

Length of Apron	$L_a =$	$1.8 \left(\frac{q}{D_o^{1/2}} \right) + 7D_o$	
	$L_a =$	13.6 ft	USE 14 ft
Width of Apron	$W_a =$	$3 W_o + L_a$	
	$W_a =$	18.1 ft	USE 18 ft

If TW Elev \geq 1/2 D_o

Length of Apron	$L_a =$	$3 \left(\frac{q}{D_o^{1/2}} \right)$	
	$L_a =$	5.2 ft	USE 5 ft
Width of Apron	$W_a =$	$3 W_o + 0.4 L_a$	
	$W_a =$	6.6 ft	USE 7 ft

RipRap Size	$D_{50} =$	$\frac{0.016 q^{1.33}}{TW}$	
	$D_{50} =$	0.146 ft	
	$D_{50} =$	1.8 in	USE 3 in

Apron Thickness	$Th =$	$2D_{50}$ ft with filter fabric	
	$Th =$	0.5 ft with filter fabric	USE 6 in

RipRap Volume	$V =$	$\frac{1/2(3W_o + W_a)(L_a)(Th)}{27}$	
	$V =$	2.9 cy	

InSite Engineering LLC

Project Name: Marlboro Residential
Project #: 20-1417-01
Date: 10/21/2020
Structure Name: HW A28
Pipe Diameter (in.): 42

CONDUIT OUTLET PROTECTION

Inside Width, W_o =	3.5	ft	
Inside Height, D_o =	3.5	ft	
Design Flow, Q_{25} =	34.5	cfs	
(Q/W_o) q =	9.86	cfs/ft	
Basin 2-Year WSE =	2.50		
Tailwater, TW =	2.50	ft	Pipe Invert = 85.00
Assumed (TW = 0.2 D_o)			TW Elevation = 87.50
			1/2 D_o = Pipe C/L = 86.75

If TW Elev < 1/2 D_o

Length of Apron	L_a	=	$1.8 \left(\frac{q}{D_o^{1/2}} \right) + 7D_o$	
	L_a	=	34.0 ft	USE 34 ft
Width of Apron	W_a	=	$3 W_o + L_a$	
	W_a	=	44.5 ft	USE 44 ft

If TW Elev \geq 1/2 D_o

Length of Apron	L_a	=	$3 \left(\frac{q}{D_o^{1/2}} \right)$	
	L_a	=	15.8 ft	USE 16 ft
Width of Apron	W_a	=	$3 W_o + 0.4 L_a$	
	W_a	=	16.8 ft	USE 17 ft

RipRap Size	D_{50}	=	$\frac{0.016}{TW} q^{1.33}$	
	D_{50}	=	0.134 ft	
	D_{50}	=	1.6 in	USE 3 in

Apron Thickness	Th	=	2 D_{50} ft with filter fabric	
	Th	=	0.5 ft with filter fabric	USE 6 in

RipRap Volume	V	=	$\frac{1/2(3W_o+W_a)(L_a)(Th)}{27}$	
	V	=	17.3 cy	

InSite Engineering LLC

Project Name: Marlboro Residential
Project #: 20-1417-01
Date: 10/21/2020
Structure Name: HW B9 / HW B10
Pipe Diameter (in.): 18

CONDUIT OUTLET PROTECTION

Inside Width, $W_o =$	1.5	ft	
Inside Height, $D_o =$	1.5	ft	
Design Flow, $Q_{25} =$	4.1	cfs	
(Q/W_o) $q =$	2.73	cfs/ft	
Basin 2-Year WSE =	1.52		
Tailwater, TW =	1.52	ft	Pipe Invert = 85.00
Assumed (TW = 0.2D _o)			TW Elevation = 86.52
			1/2 D _o = Pipe C/L = 85.75

If TW Elev < 1/2 D_o

Length of Apron	$L_a =$	$1.8 \left(\frac{q}{D_o^{1/2}} \right) + 7D_o$	
	$L_a =$	14.5 ft	USE 15 ft
Width of Apron	$W_a =$	$3 W_o + L_a$	
	$W_a =$	19.0 ft	USE 19 ft

If TW Elev ≥ 1/2 D_o

Length of Apron	$L_a =$	$3 \left(\frac{q}{D_o^{1/2}} \right)$	
	$L_a =$	6.7 ft	USE 7 ft
Width of Apron	$W_a =$	$3 W_o + 0.4 L_a$	
	$W_a =$	7.2 ft	USE 7 ft

RipRap Size	$D_{50} =$	$\frac{0.016 q^{1.33}}{TW}$	
	$D_{50} =$	0.040 ft	
	$D_{50} =$	0.5 in	USE 3 in

Apron Thickness	$Th =$	$2D_{50}$ ft with filter fabric	
	$Th =$	0.5 ft with filter fabric	USE 6 in

RipRap Volume	$V =$	$\frac{1/2(3W_o+W_a)(L_a)(Th)}{27}$	
	$V =$	3.2 cy	

InSite Engineering LLC

Project Name: Marlboro Residential
Project #: 20-1417-01
Date: 10/21/2020
Structure Name: HW B13
Pipe Diameter (in.): 24

CONDUIT OUTLET PROTECTION

Inside Width, $W_o =$	2	ft	
Inside Height, $D_o =$	2	ft	
Design Flow, $Q_{25} =$	15	cfs	
(Q/W_o) $q =$	7.50	cfs/ft	
Basin 2-Year WSE =	1.82		
Tailwater, TW =	1.82	ft	Pipe Invert = 88.00
Assumed (TW = 0.2D _o)			TW Elevation = 89.82
			1/2 D _o = Pipe C/L = 89.00

If TW Elev < 1/2 D_o

Length of Apron	$L_a =$	$1.8 \left(\frac{q}{D_o^{1/2}} \right) + 7D_o$	
	$L_a =$	23.5 ft	USE 24 ft
Width of Apron	$W_a =$	$3 W_o + L_a$	
	$W_a =$	29.5 ft	USE 30 ft

If TW Elev ≥ 1/2 D_o

Length of Apron	$L_a =$	$3 \left(\frac{q}{D_o^{1/2}} \right)$	
	$L_a =$	15.9 ft	USE 16 ft
Width of Apron	$W_a =$	$3 W_o + 0.4 L_a$	
	$W_a =$	12.4 ft	USE 12 ft

RipRap Size	$D_{50} =$	$\frac{0.016}{TW} q^{1.33}$	
	$D_{50} =$	0.128 ft	
	$D_{50} =$	1.5 in	USE 3 in

Apron Thickness	$Th =$	$2D_{50}$ ft with filter fabric	
	$Th =$	0.5 ft with filter fabric	USE 6 in

RipRap Volume	$V =$	$\frac{1/2(3W_o + W_a)(L_a)(Th)}{27}$	
	$V =$	7.7 cy	

APPENDIX G

Tier A- Major Development Stormwater Summary

Attachment D – Major Development Stormwater Summary

General Information

1. Project Name:			
2. Municipality:	County:	Block(s):	Lot(s):
3. Site Location (State Plane Coordinates – NAD83):		E:	N:
4. Date of Final Approval for Construction by Municipality: Date of Certificate of Occupancy:			
5. Project Type (check all that apply): Residential Commercial Industrial Other (please specify) _____			
6. Soil Conservation District Project Number:			
7. Did project require an NJDEP Land Use Permit?		Yes	No
		Land Use Permit #:	
8. Did project require the use of any mitigation measures?		Yes	No
If yes, which standard was mitigated? _____			

Site Design Specifications

1. Area of Disturbance (acres):	Area of Proposed Impervious (acres):
2. List all Hydrologic Soil Groups:	
3. Please Identify the Amount of Each Best Management Practices (BMPs) Utilized in Design Below:	
Bioretention Systems _____	Constructed Wetlands _____
Dry Wells _____	Extended Detention Basins _____
Infiltration Basins _____	Combination Infiltration/Detention Basins _____
Manufactured Treatment Devices _____	
Pervious Paving Systems _____	Sand Filters _____
Vegetative Filter Strips _____	Wet Ponds _____
Grass Swales _____	Subsurface Gravel Wetlands _____
Other _____	

Storm Event Information

Storm Event - Rainfall (inches and duration):	2 yr.: _____	10 yr.: _____
	100 yr.: _____	WQDS: _____
Runoff Computation Method:		
NRCS: Dimensionless Unit Hydrograph	NRCS: Delmarva Unit Hydrograph	Rational
Other: _____		Modified Rational

Basin Specifications (answer all that apply)

If more than one basin, attach multiple sheets

1. Type of Basin:	Surface/Subsurface (select one):			Surface	Subsurface
2. Owner (select one):		Private: If so, Name:		Phone number:	
Public					
3. Basin Construction Completion Date:					
4. Drain Down Time (hr.):					
5. Design Soil Permeability (in./hr.):					
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):				Date Obtained:	
7. Groundwater Recharge Methodology (select one):		2 Year Difference	NJGRS	Other	NA
8. Groundwater Mounding Analysis (select one):		Yes	No	If, Yes Methodology Used:	
9. Maintenance Plan Submitted:		Yes	No	Is the Basin Deed Restricted: Yes No	

Comments:

Name of Person Filling Out This Form: _____

Signature: _____

Title: _____

Date: _____

2/2/2018

Basin Specifications (answer all that apply)				
If more than one basin, attach multiple sheets				
1. Type of Basin:	Surface/Subsurface (select one): Surface Subsurface			
2. Owner (select one):	Public	Private: If so, Name:	Phone number:	
3. Basin Construction Completion Date:				
4. Drain Down Time (hr.):				
5. Design Soil Permeability (in./hr.):				
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):			Date Obtained:	
7. Groundwater Recharge Methodology (select one):	2 Year Difference	NJGRS	Other	NA
8. Groundwater Mounding Analysis (select one):	Yes	No	If, Yes Methodology Used:	
9. Maintenance Plan Submitted:	Yes	No	Is the Basin Deed Restricted:	Yes No

Basin Specifications (answer all that apply)				
If more than one basin, attach multiple sheets				
1. Type of Basin:	Surface/Subsurface (select one): Surface Subsurface			
2. Owner (select one):	Public	Private: If so, Name:	Phone number:	
3. Basin Construction Completion Date:				
4. Drain Down Time (hr.):				
5. Design Soil Permeability (in./hr.):				
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):			Date Obtained:	
7. Groundwater Recharge Methodology (select one):	2 Year Difference	NJGRS	Other	NA
8. Groundwater Mounding Analysis (select one):	Yes	No	If, Yes Methodology Used:	
9. Maintenance Plan Submitted:	Yes	No	Is the Basin Deed Restricted:	Yes No

Basin Specifications (answer all that apply)				
If more than one basin, attach multiple sheets				
1. Type of Basin:	Surface/Subsurface (select one): Surface Subsurface			
2. Owner (select one):	Public	Private: If so, Name:	Phone number:	
3. Basin Construction Completion Date:				
4. Drain Down Time (hr.):				
5. Design Soil Permeability (in./hr.):				
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):			Date Obtained:	
7. Groundwater Recharge Methodology (select one):	2 Year Difference	NJGRS	Other	NA
8. Groundwater Mounding Analysis (select one):	Yes	No	If, Yes Methodology Used:	
9. Maintenance Plan Submitted:	Yes	No	Is the Basin Deed Restricted:	Yes No

Name of Person Filling Out This Form: _____

Signature: _____

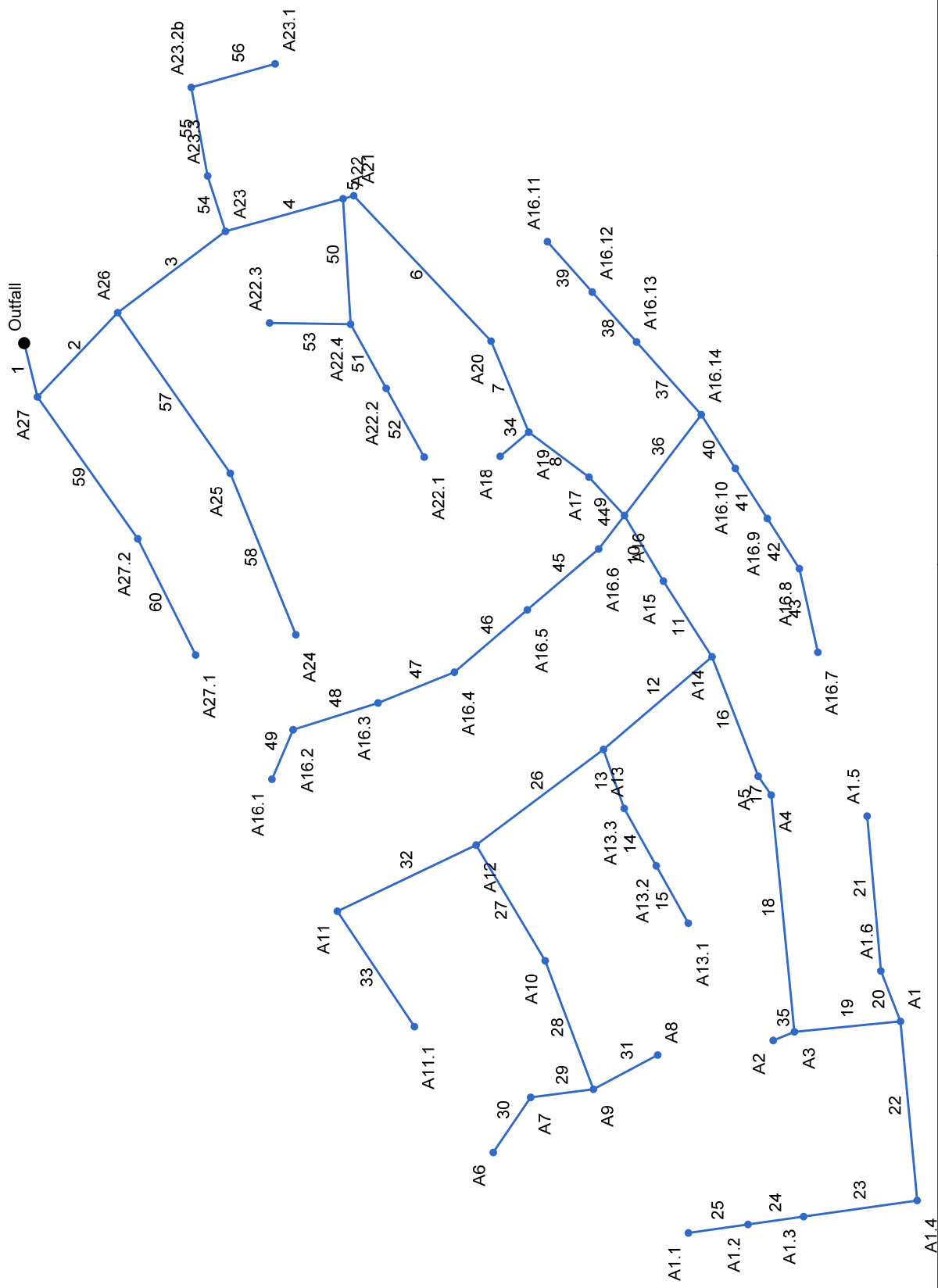
Title: _____

Date: _____

A P P E N D I X H

Storm Sewer Conduit Capacity Calculations

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Line No.	DnStm Ln No	Inlet ID	Drng Area (ac)	Runoff Coeff (C)	Incr CxA	Total CxA	i Inlet (in/hr)	i Sys (in/hr)	Incr Q (cfs)	Total Runoff (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	HGL Up (ft)
1	Outfall	A27	0.12	0.80	0.10	7.55	7.14	5.30	0.69	40.06	100.09	7.14	42	Cir	0.012	42	0.84	85.35	85.00	94.30	87.32 j
2	1	A26	0.16	0.80	0.13	7.06	7.14	5.35	0.91	37.77	148.40	12.54	36	Cir	0.012	96	4.22	93.05	89.00	99.95	95.05
3	2	A23	0.17	0.80	0.14	6.42	7.14	5.40	0.97	34.70	0.00	7.12	36	Cir	0.012	115	0.43	93.55	93.05	100.29	95.46
4	3	A22	0.12	0.80	0.10	6.10	7.14	5.46	0.69	33.27	0.00	7.04	36	Cir	0.012	110	0.40	93.99	93.55	99.62	95.88
5	4	A21	0.23	0.80	0.18	5.49	7.14	5.46	1.31	29.97	0.00	6.11	30	Cir	0.012	10	0.40	94.53	94.49	99.76	97.10
6	5	A20	0.23	0.80	0.18	5.30	7.14	5.53	1.31	29.32	0.00	5.97	30	Cir	0.012	165	0.40	95.19	94.53	101.71	98.54
7	6	A19	0.00	0.80	0.00	5.12	0.00	5.56	0.00	28.46	0.00	5.80	30	Cir	0.012	75	0.37	95.47	95.19	102.16	99.21
8	7	A17	0.14	0.80	0.11	4.86	7.14	5.59	0.80	27.13	0.00	5.53	30	Cir	0.012	64	0.40	95.73	95.47	101.95	99.97
9	8	A16	0.00	0.80	0.00	4.74	0.00	5.61	0.00	26.60	0.00	5.42	30	Cir	0.012	43	0.42	95.91	95.73	102.51	100.36
10	9	A15	0.13	0.80	0.10	3.16	7.14	5.65	0.74	17.84	0.00	3.64	30	Cir	0.012	60	0.40	96.15	95.91	102.23	100.91
11	10	A14	0.16	0.80	0.13	3.06	7.14	5.70	0.91	17.41	0.00	3.55	30	Cir	0.012	71	0.39	96.43	96.15	103.05	101.13
12	11	A13	0.17	0.80	0.14	1.69	7.14	5.80	0.97	9.79	0.00	3.12	24	Cir	0.012	120	0.40	97.41	96.93	103.30	101.71
13	12	A13.3	0.45	0.80	0.36	0.54	7.14	7.14	2.57	3.83	0.00	4.87	12	Cir	0.012	47	0.50	101.54	101.30	103.40	102.77
14	13	A13.2	0.08	0.80	0.06	0.18	7.14	7.14	0.46	1.26	0.00	2.30	10	Cir	0.012	51	0.50	101.97	101.71	103.40	103.10
15	14	A13.1	0.14	0.80	0.11	0.11	7.14	7.14	0.80	0.80	0.00	2.29	8	Cir	0.012	51	0.50	102.40	102.14	103.61	103.33
16	11	A5	0.11	0.80	0.09	1.24	7.14	6.78	0.63	8.41	0.00	2.68	24	Cir	0.012	98	0.40	97.32	96.93	102.84	101.63
17	16	A4	0.13	0.80	0.10	1.15	7.14	6.82	0.74	7.85	0.00	2.50	24	Cir	0.012	18	0.38	97.39	97.32	102.78	101.71
18	17	A3	0.19	0.80	0.15	1.05	7.14	7.14	1.09	7.48	0.00	2.38	24	Cir	0.012	176	0.40	98.10	97.39	103.39	101.96
19	18	A1	0.07	0.80	0.06	0.78	7.14	7.14	0.40	5.54	0.00	1.76	24	Cir	0.012	97	0.40	98.49	98.10	102.39	102.21
20	19	A1.6	0.13	0.80	0.10	0.28	7.14	7.14	0.74	2.00	0.00	2.55	12	Cir	0.012	41	0.99	100.64	100.23	102.95	102.43
21	20	A1.5	0.22	0.80	0.18	0.18	7.14	7.14	1.26	1.26	0.00	3.60	8	Cir	0.012	115	1.00	101.89	100.74	103.60	103.55
22	19	A1.4	0.18	0.80	0.14	0.44	7.14	7.14	1.03	3.14	0.00	2.56	15	Cir	0.012	133	0.40	99.52	98.99	103.35	102.58
23	22	A1.3	0.12	0.80	0.10	0.30	7.14	7.14	0.69	2.11	0.00	2.69	12	Cir	0.012	104	0.40	100.02	99.60	102.90	103.05

Project File: 201022 Pipe Capacity (2).stm

Number of lines: 60

Date: 10/26/2020

NOTES: Intensity = 55.79 / (Inlet time + 11.10) ^ 0.74 -- Return period = 25 Yrs. ; ** Critical depth

Line No.	DnStm Ln No	Inlet ID	Drng Area (ac)	Runoff Coeff (C)	Incr CxA	Total CxA	i Inlet (in/hr)	i Sys (in/hr)	Incr Q (cfs)	Total Runoff (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	HGL Up (ft)
24	23	A1.2	0.22	0.80	0.18	0.20	7.14	7.14	1.26	1.43	0.00	2.62	10	Cir	0.012	51	0.39	100.39	100.19	103.20	103.29
25	24	A1.1	0.03	0.80	0.02	0.02	7.14	7.14	0.17	0.17	0.00	0.49	8	Cir	0.012	55	0.40	100.61	100.39	103.20	103.35
26	12	A12	0.14	0.80	0.11	1.02	7.14	6.01	0.80	6.10	0.00	1.94	24	Cir	0.012	136	0.40	97.95	97.41	104.31	102.08
27	26	A10	0.36	0.80	0.29	0.50	7.14	6.21	2.06	3.08	0.00	1.74	18	Cir	0.012	106	0.40	98.87	98.45	103.63	102.25
28	27	A9	0.10	0.80	0.08	0.21	7.14	6.75	0.57	1.40	0.00	0.79	18	Cir	0.012	105	0.40	99.29	98.87	103.99	102.29
29	28	A7	0.00	0.80	0.00	0.06	0.00	7.14	0.00	0.46	0.00	0.26	18	Cir	0.012	58	0.40	99.52	99.29	104.57	102.32
30	29	A6	0.08	0.80	0.06	0.06	7.14	7.14	0.46	0.46	0.00	0.37	15	Cir	0.012	53	0.62	100.10	99.77	103.00	102.32
31	28	A8	0.08	0.80	0.06	0.06	7.14	7.14	0.46	0.46	0.00	0.37	15	Cir	0.012	64	0.41	99.80	99.54	104.00	102.32
32	26	A11	0.13	0.80	0.10	0.41	7.14	7.14	0.74	2.91	0.00	2.37	15	Cir	0.012	136	0.50	99.38	98.70	103.90	102.41
33	32	A11.1	0.38	0.80	0.30	0.30	7.14	7.14	2.17	2.17	0.00	2.76	12	Cir	0.012	110	1.00	100.73	99.63	104.00	102.89
34	7	A18	0.33	0.80	0.26	0.26	7.14	7.14	1.89	1.89	0.00	4.07	15	Cir	0.012	32	1.01	99.58	99.26	101.93	100.13
35	18	A2	0.15	0.80	0.12	0.12	7.14	7.14	0.86	0.86	0.00	0.70	15	Cir	0.012	20	0.39	98.93	98.85	103.93	102.16
36	9	A16.14	0.00	0.80	0.00	0.63	0.00	7.14	0.00	4.51	0.00	2.55	18	Cir	0.012	102	1.00	97.46	96.44	103.00	100.98
37	36	A16.13	0.34	0.80	0.27	0.32	7.14	7.14	1.94	2.29	0.00	4.19	10	Cir	0.012	80	0.50	98.36	97.96	101.95	101.82
38	37	A16.12	0.03	0.80	0.02	0.05	7.14	7.14	0.17	0.34	0.00	0.63	10	Cir	0.012	55	0.49	98.63	98.36	101.95	101.97
39	38	A16.11	0.03	0.80	0.02	0.02	7.14	7.14	0.17	0.17	0.00	0.49	8	Cir	0.012	55	0.51	99.08	98.80	101.95	101.98
40	36	A16.10	0.02	0.80	0.02	0.31	7.14	7.14	0.11	2.23	0.00	4.09	10	Cir	0.012	50	0.52	97.88	97.62	102.90	101.52
41	40	A16.9	0.22	0.80	0.18	0.30	7.14	7.14	1.26	2.11	0.00	3.88	10	Cir	0.012	47	0.51	98.12	97.88	102.90	102.03
42	41	A16.8	0.03	0.80	0.02	0.12	7.14	7.14	0.17	0.86	0.00	1.57	10	Cir	0.012	47	0.51	98.36	98.12	102.90	102.21
43	42	A16.7	0.12	0.80	0.10	0.10	7.14	7.14	0.69	0.69	0.00	1.96	8	Cir	0.012	64	0.50	98.77	98.45	102.00	102.41
44	9	A16.6	0.46	0.80	0.37	0.95	7.14	7.14	2.63	6.80	0.00	3.85	18	Cir	0.012	34	0.79	96.20	95.93	102.05	100.94
45	44	A16.5	0.10	0.80	0.08	0.58	7.14	7.14	0.57	4.17	0.00	2.36	18	Cir	0.012	79	0.51	96.60	96.20	102.20	101.16
46	45	A16.4	0.19	0.80	0.15	0.50	7.14	7.14	1.09	3.60	0.00	2.93	15	Cir	0.012	81	0.49	97.25	96.85	102.05	101.42

Project File: 201022 Pipe Capacity (2).stm Number of lines: 60 Date: 10/26/2020

NOTES: Intensity = 55.79 / (Inlet time + 11.10) ^ 0.74 – Return period = 25 Yrs. ; ** Critical depth

Line No.	DnStm Ln No	Inlet ID	Drng Area (ac)	Runoff Coeff (C)	Incr CxA	Total CxA	i Inlet (in/hr)	i Sys (in/hr)	Incr Q (cfs)	Total Runoff (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	HGL Up (ft)
47	46	A16.3	0.15	0.80	0.12	0.35	7.14	7.14	0.86	2.51	0.00	3.20	12	Cir	0.012	73	0.51	97.87	97.50	102.05	101.80
48	47	A16.2	0.17	0.80	0.14	0.23	7.14	7.14	0.97	1.66	0.00	3.04	10	Cir	0.012	80	0.50	98.44	98.04	102.20	102.27
49	48	A16.1	0.12	0.80	0.10	0.10	7.14	7.14	0.69	0.69	0.00	1.96	8	Cir	0.012	41	0.99	99.02	98.61	102.80	102.55
50	4	A22.4	0.11	0.80	0.09	0.51	7.14	7.14	0.63	3.66	0.00	5.00	12	Cir	0.012	93	2.00	97.29	95.43	101.30	98.10
51	50	A22.2	0.40	0.80	0.32	0.39	7.14	7.14	2.29	2.80	0.00	5.13	10	Cir	0.012	57	0.51	97.75	97.46	101.30	99.09
52	51	A22.1	0.09	0.80	0.07	0.07	7.14	7.14	0.51	0.51	0.00	1.47	8	Cir	0.012	61	0.50	98.23	97.92	101.25	99.39
53	50	A22.3	0.04	0.80	0.03	0.03	7.14	7.14	0.23	0.23	0.00	0.89	10	Cir	0.012	74	0.50	97.83	97.46	102.37	98.13
54	3	A23.3	0.02	0.80	0.02	0.19	7.14	7.14	0.11	1.37	0.00	3.43	10	Cir	0.012	44	0.50	96.60	96.38	100.60	97.17
55	54	A23.2b	0.17	0.80	0.14	0.18	7.14	7.14	0.97	1.26	0.00	3.04	10	Cir	0.012	67	0.49	96.93	96.60	100.70	97.47
56	55	A23.1	0.05	0.80	0.04	0.04	7.14	7.14	0.29	0.29	0.00	1.30	8	Cir	0.012	78	0.50	97.49	97.10	101.40	97.80
57	2	A25	0.51	0.80	0.41	0.51	7.14	7.14	2.91	3.66	0.00	5.18	15	Cir	0.012	157	1.00	96.00	94.43	100.20	96.77
58	57	A24	0.13	0.80	0.10	0.10	7.14	7.14	0.74	0.74	0.00	2.36	12	Cir	0.012	133	2.00	98.92	96.25	102.79	99.28
59	1	A27.2	0.38	0.80	0.30	0.39	7.14	7.14	2.17	2.80	0.00	6.87	12	Cir	0.012	139	4.06	95.65	90.00	99.10	96.37
60	59	A27.1	0.11	0.80	0.09	0.09	7.14	7.14	0.63	0.63	0.00	3.11	8	Cir	0.012	101	1.00	97.00	95.99	100.50	97.37

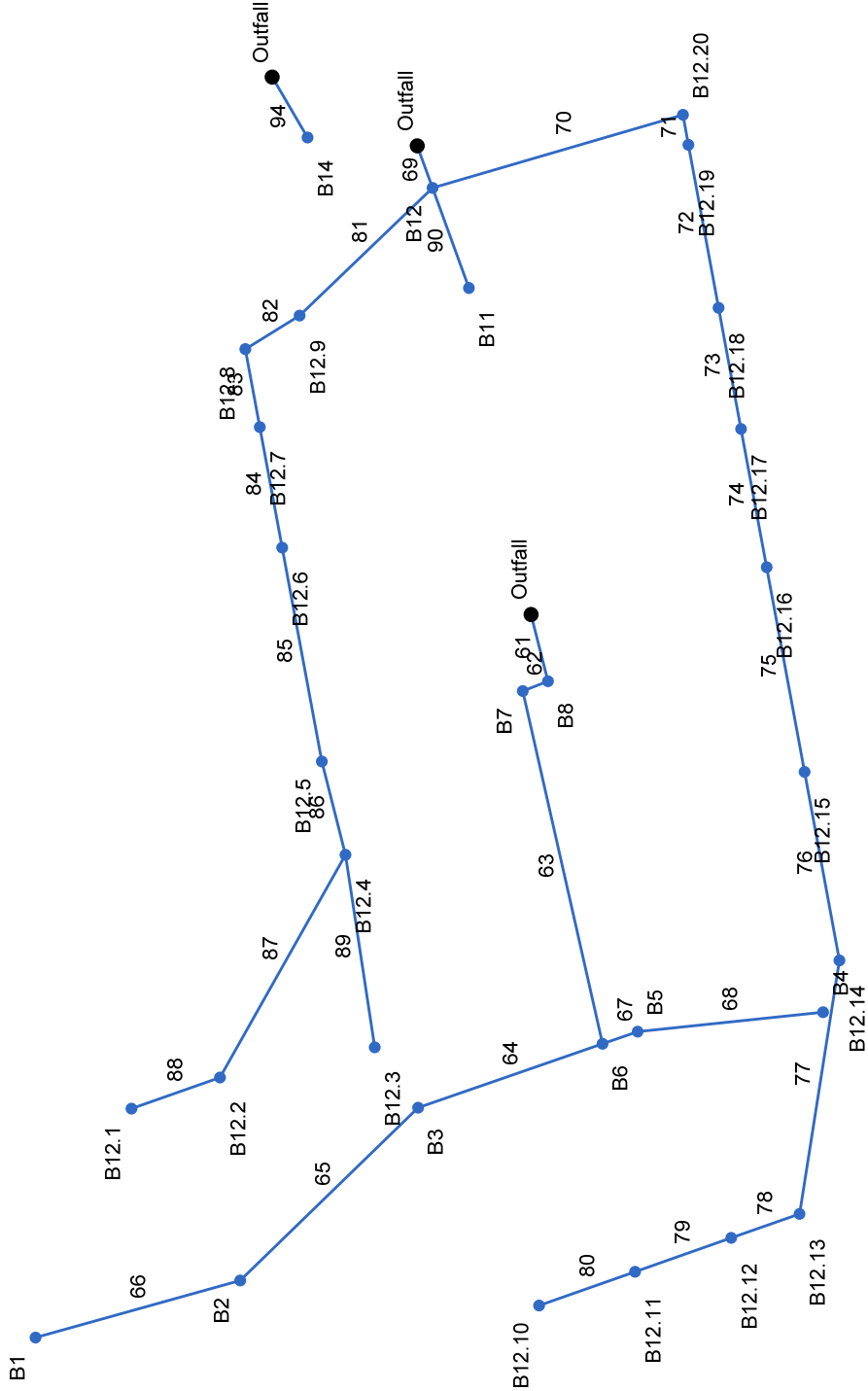
Project File: 201022 Pipe Capacity (2).stm

Number of lines: 60

Date: 10/26/2020

NOTES: Intensity = 55.79 / (Inlet time + 11.10) ^ 0.74 -- Return period = 25 Yrs. ; ** Critical depth

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Line No.	DnStm Ln No	Inlet ID	Drng Area (ac)	Runoff Coeff (C)	Incr CxA	Total CxA	i Inlet (in/hr)	i Sys (in/hr)	Incr Q (cfs)	Total Runoff (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	HGL Up (ft)
61	Outfall	B8	0.00	0.80	0.00	0.74	0.00	6.79	0.00	5.00	0.00	4.13	18	Cir	0.012	31	0.00	96.00	96.00	99.86	97.14
62	61	B7	0.00	0.80	0.00	0.74	0.00	6.82	0.00	5.02	0.00	3.08	18	Cir	0.012	14	0.41	96.06	96.06	100.16	97.34
63	62	B6	0.00	0.80	0.00	0.74	0.00	7.10	0.00	5.22	0.00	3.19	18	Cir	0.012	162	0.30	96.55	96.06	100.96	97.78
64	63	B3	0.26	0.80	0.21	0.50	7.14	7.14	1.49	3.54	0.00	2.24	18	Cir	0.012	105	0.30	96.87	96.55	100.32	98.03
65	64	B2	0.18	0.80	0.14	0.29	7.14	7.14	1.03	2.06	0.00	1.61	18	Cir	0.012	124	0.30	97.24	96.87	100.73	98.13
66	65	B1	0.18	0.80	0.14	0.14	7.14	7.14	1.03	1.03	0.00	1.58	15	Cir	0.012	115	0.40	97.70	97.24	101.50	98.22
67	63	B5	0.11	0.80	0.09	0.24	7.14	7.14	0.63	1.71	0.00	1.40	15	Cir	0.012	20	0.30	96.61	96.55	100.23	97.97
68	67	B4	0.19	0.80	0.15	0.15	7.14	7.14	1.09	1.09	0.00	0.92	15	Cir	0.012	102	0.30	96.92	96.61	100.31	98.00
69	Outfall	B12	0.00	0.80	0.00	3.27	0.00	7.14	0.00	23.37	0.00	9.22	24	Cir	0.012	20	0.98	88.20	88.00	100.81	90.18
70	69	B12.20	0.00	0.80	0.00	1.53	0.00	7.14	0.00	10.91	0.00	5.74	24	Cir	0.012	141	0.50	93.03	92.32	101.13	94.21
71	70	B12.19	0.23	0.80	0.18	1.53	7.14	7.14	1.31	10.91	0.00	6.18	18	Cir	0.012	14	0.51	93.60	93.53	100.60	95.16
72	71	B12.18	0.03	0.80	0.02	1.34	7.14	7.14	0.17	9.60	0.00	5.43	18	Cir	0.012	74	0.50	93.97	93.60	100.65	95.98
73	72	B12.17	0.06	0.80	0.05	1.32	7.14	7.14	0.34	9.43	0.00	5.33	18	Cir	0.012	55	0.51	94.25	93.97	100.45	96.59
74	73	B12.16	0.25	0.80	0.20	1.27	7.14	7.14	1.43	9.08	0.00	5.14	18	Cir	0.012	63	0.49	94.56	94.25	100.20	97.21
75	74	B12.15	0.37	0.80	0.30	1.07	7.14	7.14	2.11	7.66	0.00	4.33	18	Cir	0.012	93	0.51	95.03	94.56	100.65	97.84
76	75	B12.14	0.13	0.80	0.10	0.78	7.14	7.14	0.74	5.54	0.00	4.52	15	Cir	0.012	86	0.50	95.71	95.28	100.25	98.52
77	76	B12.13	0.31	0.80	0.25	0.67	7.14	7.14	1.77	4.80	0.00	3.91	15	Cir	0.012	114	0.50	96.28	95.71	101.00	99.28
78	77	B12.12	0.27	0.80	0.22	0.42	7.14	7.14	1.54	3.03	0.00	3.86	12	Cir	0.012	39	0.49	96.72	96.53	101.10	99.84
79	78	B12.11	0.07	0.80	0.06	0.21	7.14	7.14	0.40	1.49	0.00	1.89	12	Cir	0.012	55	0.49	97.00	96.73	101.10	100.04
80	79	B12.10	0.19	0.80	0.15	0.15	7.14	7.14	1.09	1.09	0.00	1.38	12	Cir	0.012	55	0.49	97.27	97.00	101.10	100.11
81	69	B12.9	0.05	0.80	0.04	0.74	7.14	7.14	0.29	5.31	0.00	4.64	24	Cir	0.012	92	0.50	93.98	93.52	101.86	94.79
82	81	B12.8	0.00	0.80	0.00	0.70	0.00	7.14	0.00	5.03	0.00	4.65	15	Cir	0.012	33	0.51	94.90	94.73	101.43	95.93
83	82	B12.7	0.22	0.80	0.18	0.70	7.14	7.14	1.26	5.03	0.00	4.10	15	Cir	0.012	35	0.51	95.08	94.90	100.85	96.44

Project File: 201022 Pipe Capacity (2).stm Number of lines: 34 Date: 10/26/2020

NOTES: Intensity = 55.79 / (Inlet time + 11.10) ^ 0.74 – Return period = 25 Yrs. ; ** Critical depth

Line No.	DnSim Ln No	Inlet ID	Drng Area (ac)	Runoff Coeff (C)	Incr CxA	Total CxA	i Inlet (in/hr)	i Sys (in/hr)	Incr Q (cfs)	Total Runoff (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	HGL Up (ft)
84	83	B12.6	0.03	0.80	0.02	0.53	7.14	7.14	0.17	3.77	0.00	3.07	15	Cir	0.012	55	0.49	95.35	95.08	100.65	96.73
85	84	B12.5	0.14	0.80	0.11	0.50	7.14	7.14	0.80	3.60	0.00	4.58	12	Cir	0.012	97	0.50	96.09	95.60	100.15	97.65
86	85	B12.4	0.16	0.80	0.13	0.39	7.14	7.14	0.91	2.80	0.00	5.13	10	Cir	0.012	43	0.51	96.48	96.26	100.70	98.42
87	86	B12.2	0.16	0.80	0.13	0.15	7.14	7.14	0.91	1.09	0.00	3.11	8	Cir	0.012	120	0.50	97.08	96.48	101.00	99.92
88	87	B12.1	0.03	0.80	0.02	0.02	7.14	7.14	0.17	0.17	0.00	0.49	8	Cir	0.012	50	0.50	97.50	97.25	101.00	100.08
89	86	B12.3	0.14	0.80	0.11	0.11	7.14	7.14	0.80	0.80	0.00	2.29	8	Cir	0.012	87	0.50	96.91	96.48	100.10	99.42
90	69	B11	1.25	0.80	1.00	1.00	7.14	7.14	12.15	7.14	0.00	8.71	18	Cir	0.012	49	2.02	94.50	93.52	97.40	95.82
91	Outfall	A32	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.73	24	Cir	0.012	23	0.43	82.10	82.00	86.79	82.69
92	91	A31	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.72	24	Cir	0.012	69	3.13	84.25	82.10	89.75	84.84
93	92	A30	0.00	0.80	0.00	0.00	0.00	0.00	2.90	0.00	0.00	3.72	24	Cir	0.012	21	3.14	84.90	84.25	87.55	85.49
94	Outfall	B14	0.00	0.80	0.00	0.00	0.00	0.00	1.60	0.00	0.00	3.36	18	Cir	0.012	33	1.82	82.90	82.30	93.00	83.47

Project File: 201022 Pipe Capacity (2).stm Number of lines: 34 Date: 10/26/2020

NOTES: Intensity = 55.79 / (Inlet time + 11.10) ^ 0.74 -- Return period = 25 Yrs. ; ** Critical depth

A P P E N D I X I

DRAINAGE MAPS:

- 1. Pre-Development Drainage Area Map**
- 2. Post-Development Drainage Area Map**
- 3. Inlet Drainage Area Map**

