Sullivan Engineering Group, LLC

Civil Engineers & Land Development Consultants

December 11, 2015

Town of Lexington – Planning Board

Re: 435-439 Lincoln Street, Lexington
Drainage Analysis for Balanced Housing Development

Planning Board Members;

A drainage analysis has been contacted at the above site to evaluate the proposed site development of fourteen (14) residential units. Soil testing was conducted onsite to determine soil characteristics and seasonal high groundwater table data. The soil testing logs and locations are shown on Sheet 2 of 12 of Definitive Site plan set. The soils were found to be highly suitable for groundwater recharge (coarse sand) with a seasonal high groundwater table approximately 8 feet below existing grade.

One of the first actions taken as part of the design process, was to evaluate the watershed area contributing surface runoff to the low lying depression at the southeasterly portion of the site. An evaluation of the 1 year storm event from the contributing watershed to the depression area shows that 3,978 cubic feet of water is stored within the depression. In order to qualify as in Isolated Land Subject to Flooding (ILSF) under the local Conservation Bylaw a minimum of 1/8 acre-foot (or 5,445 cubic feet) of storage needs to exist. Therefore, based on this analysis the above noted depression does not qualify as ILSF (HydroCAD analysis for the 1-year storm event is attached)

The existing site is broken into three (3) subcatchment areas draining to the depression area noted above, the wetland resource area to the rear of the property, and towards Lincoln Street. The drainage analysis will demonstrate that the peak rates and volumes of runoff to these three discharge points is equal to OR less in the postdevelopment scenario. In order to mitigate the increase in impervious area in the postdevelopment scenario the following drainage BMP's are proposed.

1) Drywells with crushed stone surrounding is provided to collect, store, and infiltrate the entire roofed area of each building. In the HydroCAD calculations, the largest roof area was modeled for the drywell selected. Since the drywell could handle the largest roof area, the additional roof areas were not modeled since the roof areas are smaller and the drywell design is consistent for all Buildings.
2) Roadway drainage will be directed to two proposed deep sump catchbasins with gas hoods at the site entrance, the catchbasins will discharge via 12" HDPE drain pipe to a stormceptor unit, and then drain to Infiltration Field #1 consisting of Quick4 Infiltrator Standard Units surrounded with crushed stone. Infiltration Field #1 has been sized to handle the 100 year storm event.
3) The existing depression area noted above will be filled as part of the site development. Since water historically drains to this location, a double catchbasin is proposed to collect runoff and will discharge to an infiltration field for mitigation. This field has been sized to handle the 100 year storm event.

The drainage systems have been designed in accordance with DEP Stormwater Standards. This includes a minimum 2 foot separation between the infiltration unit base and the seasonal high groundwater table, TSS removal, water volume storage in the BMP, and water recharge volume within the BMP.

PO Box 2004 Woburn, MA 01888 (781)854-8644 email: jacksull53@comcast.net

On the following page a summary of the Predevelopment vs. Postdevelopment drainage scenario is highlighted for the 2, 10, and 100 year storm.

Also included in this report are:

1) TSS removal worksheets
2) Water Quality calculations (volume and recharge data)
3) HydroCAD analysis for Predevelopment condition
4) HydroCAD analysis for Postdevelopment condition
5) Plan copies of the Predevelopment and Postdevelopment condition with subcatchment areas shown.

Very Truly Yours,

John (Jack) D. Sullivan III, PE

PO Box 2004 Woburn, MA 01888 (781)854-8644 email: jacksull53@comcast.net

SUMMARY OF HYDROLOGY

Lincoln Street, Lexington

Job No.:		Calced By:	JDS
Client:	NSCD	Date:	12/7/15
Location:	435-439 Lincoln Street	Revised:	

TABLE 1: Summary of Peak Rates of Stormwater Runoff

Evaluation Point	HydroCAD symbols	Existing Conditions Runoff (CFS)				HydroCAD symbols	Proposed Conditions Runoff (CFS)			
		2-Yr	10-Yr	25-Yr	100-Yr		2-Yr	10-Yr	25-Yr	100-Yr
To Lincoln St	WL2	0.04	0.39		1.33	WL2	0.00	0.01		0.14
To Rear Wetland	WL3	0.00	0.01		0.29	WL3	0.00	0.01		0.19

*** NOTE:**

Drain Piping is designed to handle the 10-year storm event.

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Lincoln Street - To Infiltration Field #1

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
Subsurface Infiltration Structure	**0.80**	**0.75**	**0.60**	**0.15**
Oil Grit Separator	**0.25**	**0.15**	**0.04**	**0.11**
	0.00	**0.11**	**0.00**	**0.11**
	0.00	**0.11**	**0.00**	**0.11**

Total TSS Removal = 89%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:
Prepared By: **JDS**
Date: **12/7/2015**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Lincoln Street - To Infiltration Field #2

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
Subsurface Infiltration Structure	**0.80**	**0.75**	**0.60**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**

Total TSS Removal = **85%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:
Prepared By: **JDS**
Date: **12/7/2015**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

STORMWATER QUALITY WORKSHEET

Stormwater Management Standard #3

Project:	Lincoln Street, Lexington	**Calc By:**	JDS
Date:	7-Dec-15	**Client:**	NSCD

SECTION 1: **Water Quality Volume Calculation:**

REQUIRED:

Impervious Area:

16,491 S.F = 0.38 Acres

Volume Required:

16,491 S.F x 1 Inches x $\frac{1 \text{ Ft}}{12 \text{ inches}}$ 1,374 C.F.

PROPOSED:

Field #1 (Infiltrators) = 1,380 C.F.

100- Year Storm

SO	1,380 C.F.	>	1,374 C.F.

SECTION 2: **Recharge Volume Calculations**

REQUIRED:

Total Impervious Area:

16,491 S.F = 0.38 Acres

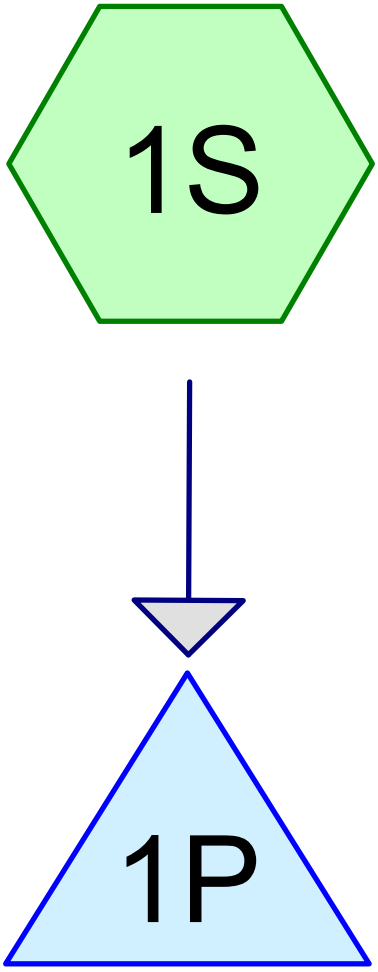
			Vol To Recharge (x Imp. Area)	
16,491	S.F. Over Soil Type "A" material	=	0.60	Inches of Runoff
	S.F. Over Soil Type "B" material	=	0.35	Inches of Runoff
	S.F. Over Soil Type "C" material	=	0.25	Inches of Runoff
	S.F. Over Soil Type "D" material		0.10	Inches of Runoff

Recharge Voulume:

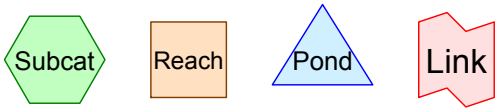
16,491 s.f. x 0.60 x $\frac{1 \text{ Ft}}{12 \text{ inches}}$ (Class A Soil) = 825 C.F.

Field #1	3,354 C.F.	>	825 C.F.

10 yr storm



Potential ILSF



Drainage Diagram for ILSF
Prepared by {enter your company name here} 12/11/2015
HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Runoff Area=156,289 sf Runoff Depth=0.31"
Flow Length=442' Tc=7.8 min CN=64 Runoff=0.62 cfs 0.091 af

Pond 1P: Potential ILSF Peak Elev=176.72' Storage=3,978 cf Inflow=0.62 cfs 0.091 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.588 ac Runoff Volume = 0.091 af Average Runoff Depth = 0.31"

Subcatchment 1S:

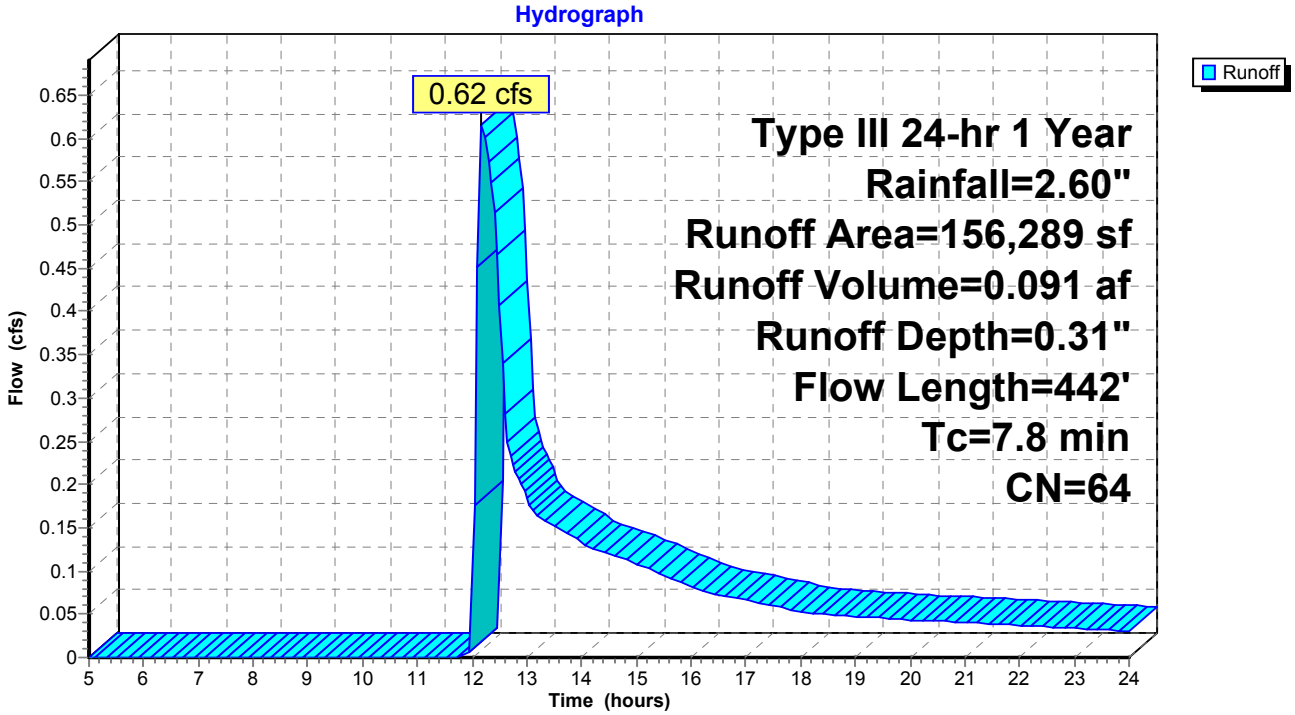
Runoff = 0.62 cfs @ 12.18 hrs, Volume= 0.091 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 Year Rainfall=2.60"

Area (sf)	CN	Description
3,708	98	Shop Roof
770	98	Garage Roof
565	98	Portion of Roof (#435)
4,338	98	Paved Driveways
22,045	72	Dirt roads, HSG A
71,444	79	Woods, Fair, HSG D
53,419	36	Woods, Fair, HSG A
156,289	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.2000	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	102	0.1300	1.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.8	442	Total			

Subcatchment 1S:



Pond 1P: Potential ILSF

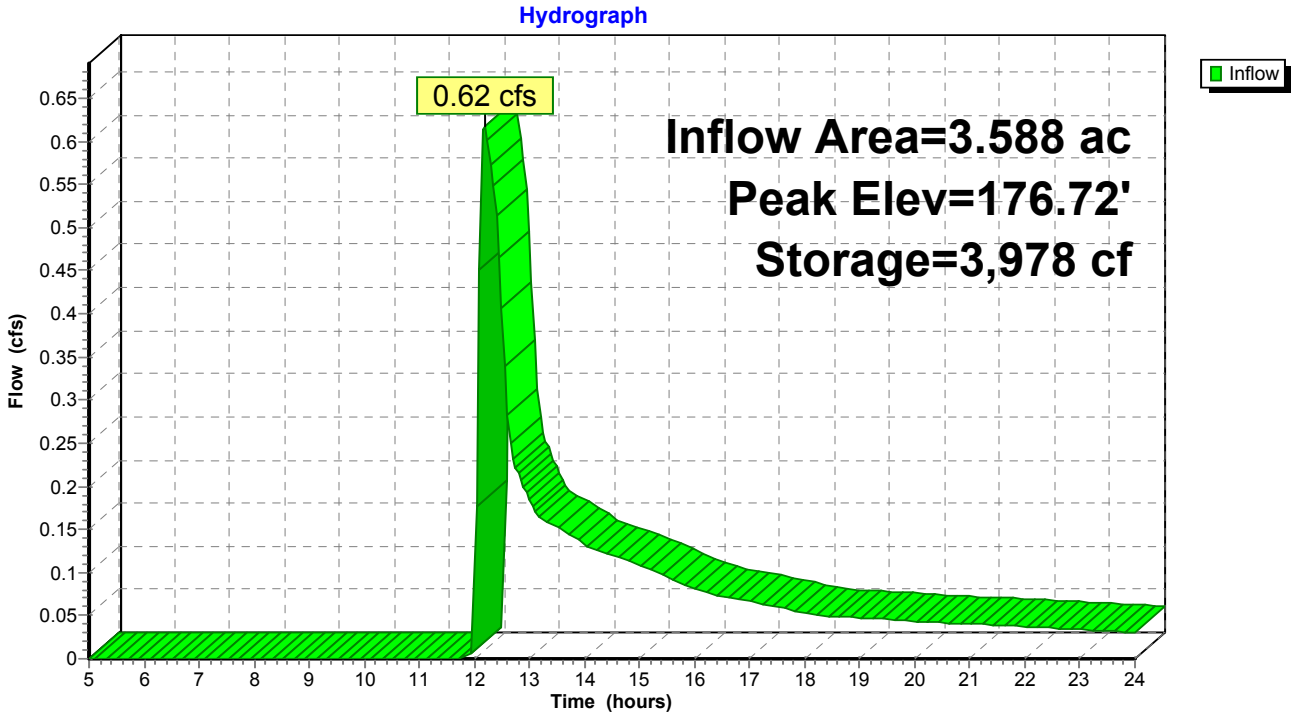
Inflow Area = 3.588 ac, Inflow Depth = 0.31" for 1 Year event
Inflow = 0.62 cfs @ 12.18 hrs, Volume= 0.091 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

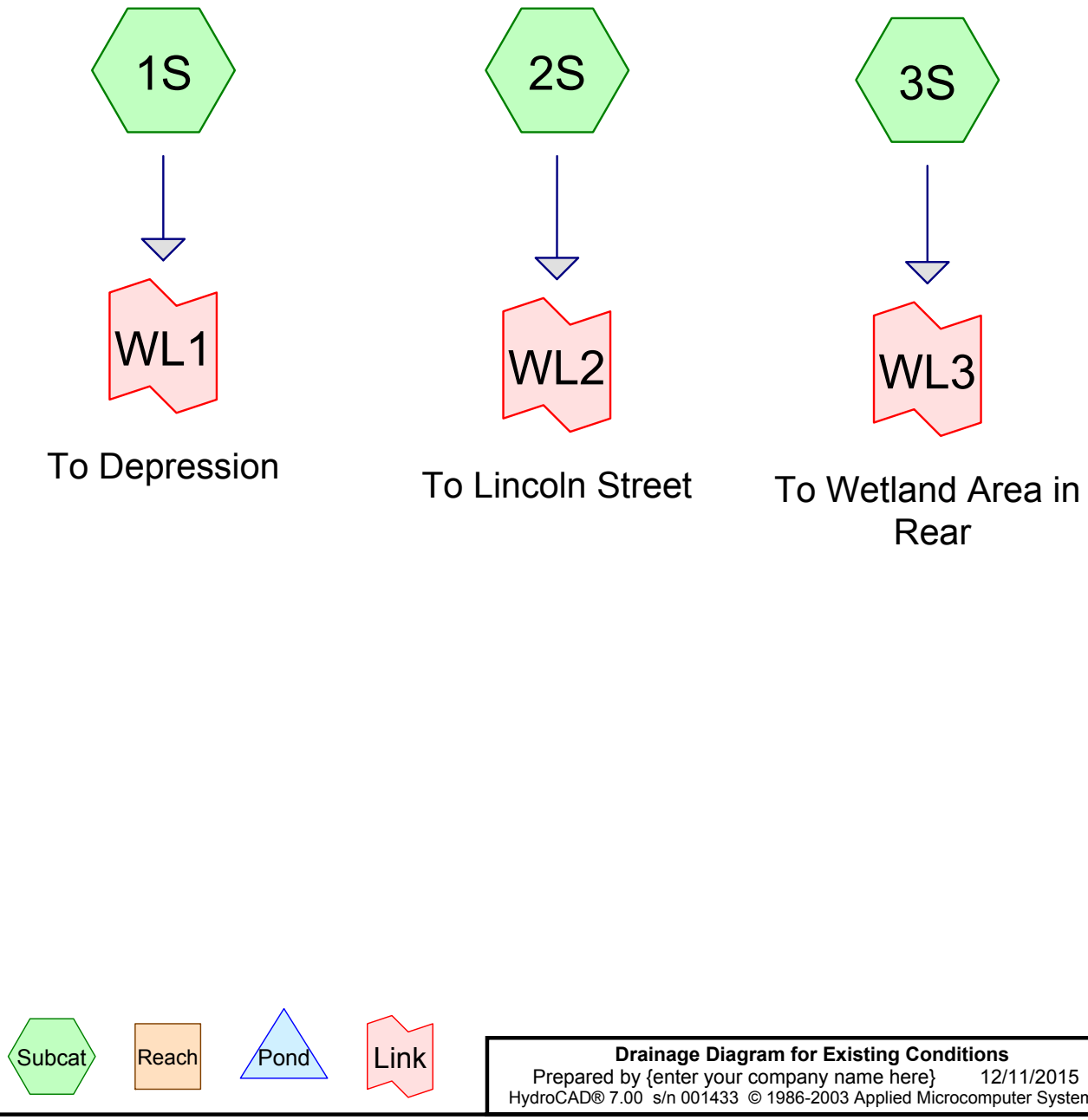
Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 176.72' @ 24.00 hrs Surf.Area= 4,212 sf Storage= 3,978 cf
Plug-Flow detention time= (not calculated)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	176.00'	11,015 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
176.00	842	0	0
178.00	10,173	11,015	11,015

Pond 1P: Potential ILSF





Drainage Diagram for Existing Conditions
Prepared by {enter your company name here} 12/11/2015
HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

Time span=0.10-36.00 hrs, dt=0.01 hrs, 3591 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Runoff Area=156,289 sf Runoff Depth=0.51"
Flow Length=442' Tc=7.9 min CN=64 Runoff=1.45 cfs 0.153 af

Subcatchment 2S: Runoff Area=37,081 sf Runoff Depth=0.17"
Flow Length=182' Tc=9.7 min CN=53 Runoff=0.04 cfs 0.012 af

Subcatchment 3S: Runoff Area=80,102 sf Runoff Depth=0.00"
Flow Length=340' Tc=10.6 min CN=36 Runoff=0.00 cfs 0.000 af

Link WL1: To Depression Inflow=1.45 cfs 0.153 af
Primary=1.45 cfs 0.153 af

Link WL2: To Lincoln Street Inflow=0.04 cfs 0.012 af
Primary=0.04 cfs 0.012 af

Link WL3: To Wetland Area in Rear Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 6.278 ac Runoff Volume = 0.166 af Average Runoff Depth = 0.32"

Subcatchment 1S:

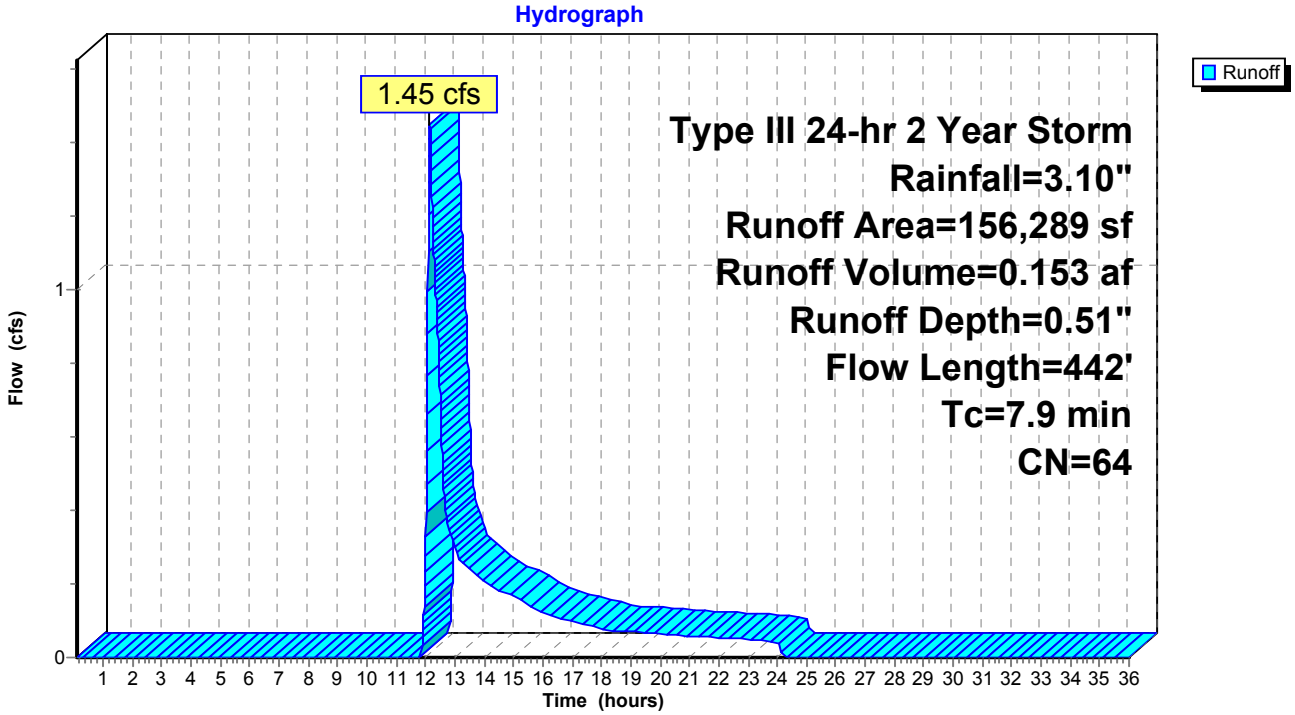
Runoff = 1.45 cfs @ 12.14 hrs, Volume= 0.153 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Storm Rainfall=3.10"

Area (sf)	CN	Description
3,708	98	Shop Roof
770	98	Garage Roof
565	98	Portion of Roof (#435)
4,338	98	Paved Driveways
22,045	72	Dirt roads, HSG A
71,444	79	Woods, Fair, HSG D
53,419	36	Woods, Fair, HSG A
156,289	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	102	0.1300	1.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.9	442	Total			

Subcatchment 1S:



Subcatchment 2S:

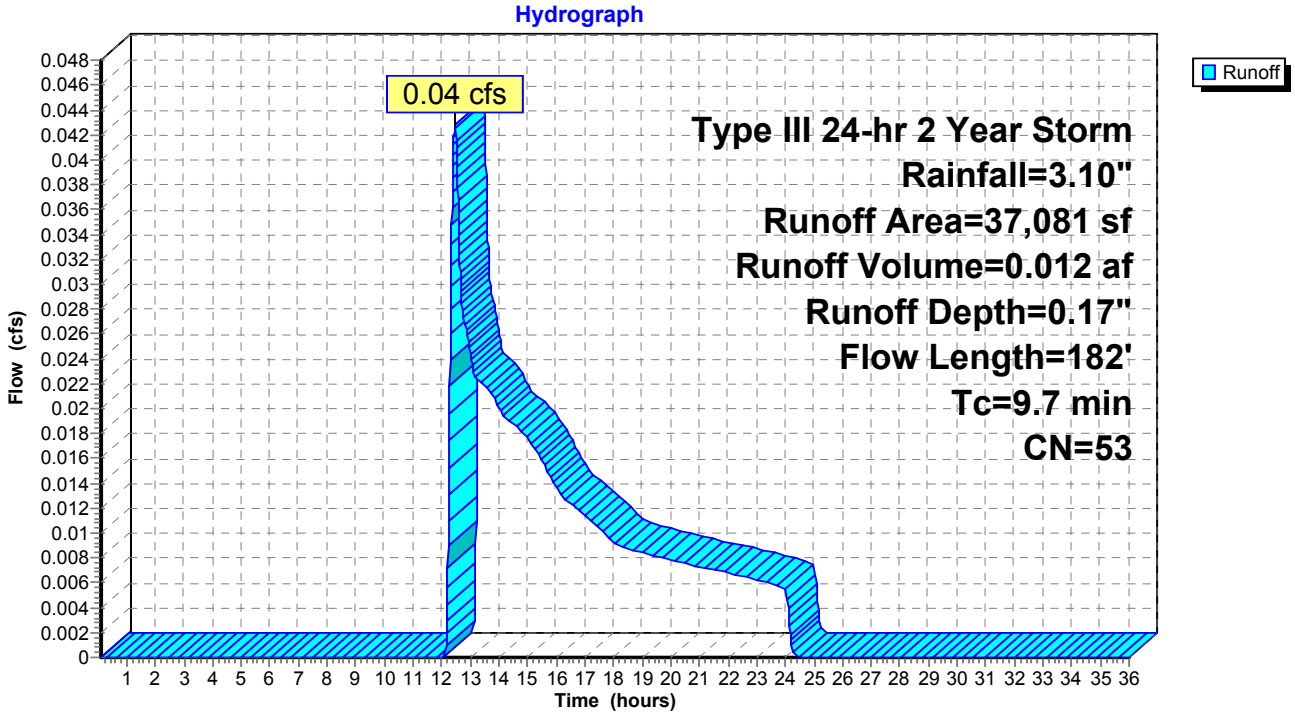
Runoff = 0.04 cfs @ 12.46 hrs, Volume= 0.012 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Storm Rainfall=3.10"

Area (sf)	CN	Description
1,541	98	Bldg Roof Areas
2,271	98	Paved Driveways
125	98	conc. walkway
4,300	36	Woods, Fair, HSG A
28,844	49	50-75% Grass cover, Fair, HSG A
37,081	53	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0140	0.1		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.1	132	0.0100	0.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.7	182	Total			

Subcatchment 2S:



Subcatchment 3S:

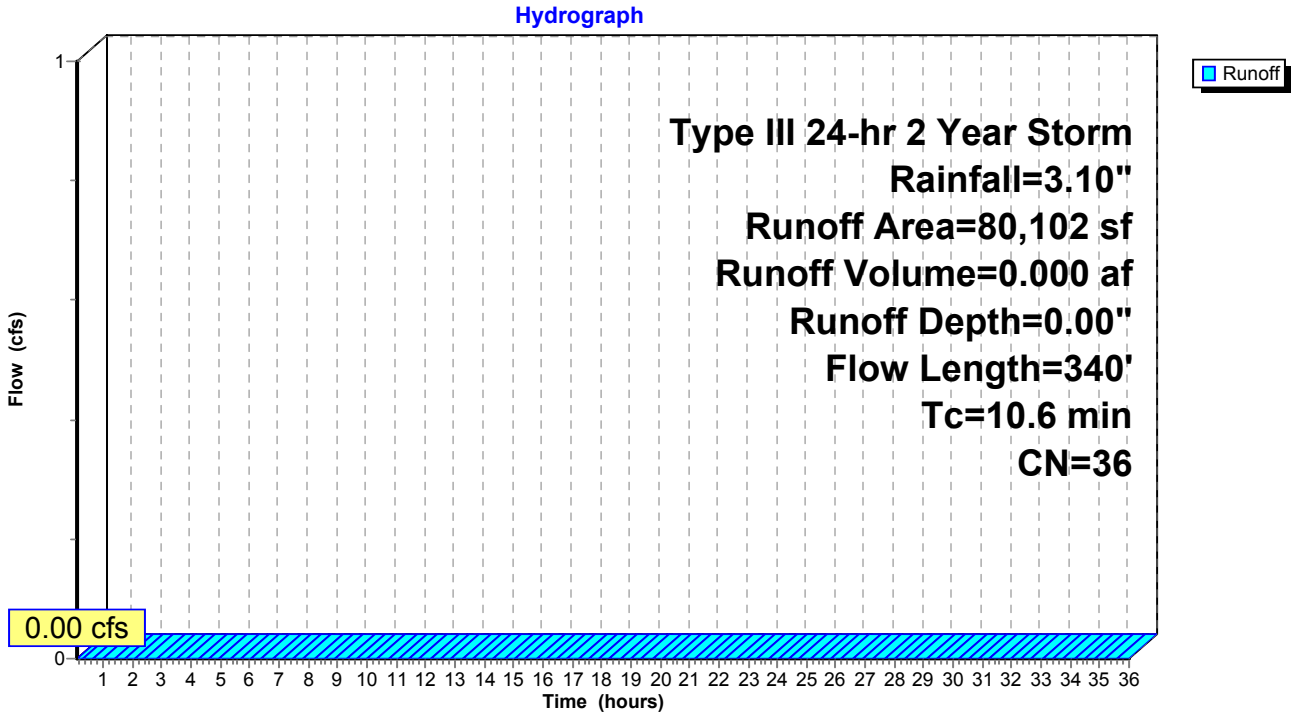
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Storm Rainfall=3.10"

Area (sf)	CN	Description
80,102	36	Woods, Fair, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.2800	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	49	0.1200	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	92	0.0600	1.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	149	0.0130	0.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	340	Total			

Subcatchment 3S:

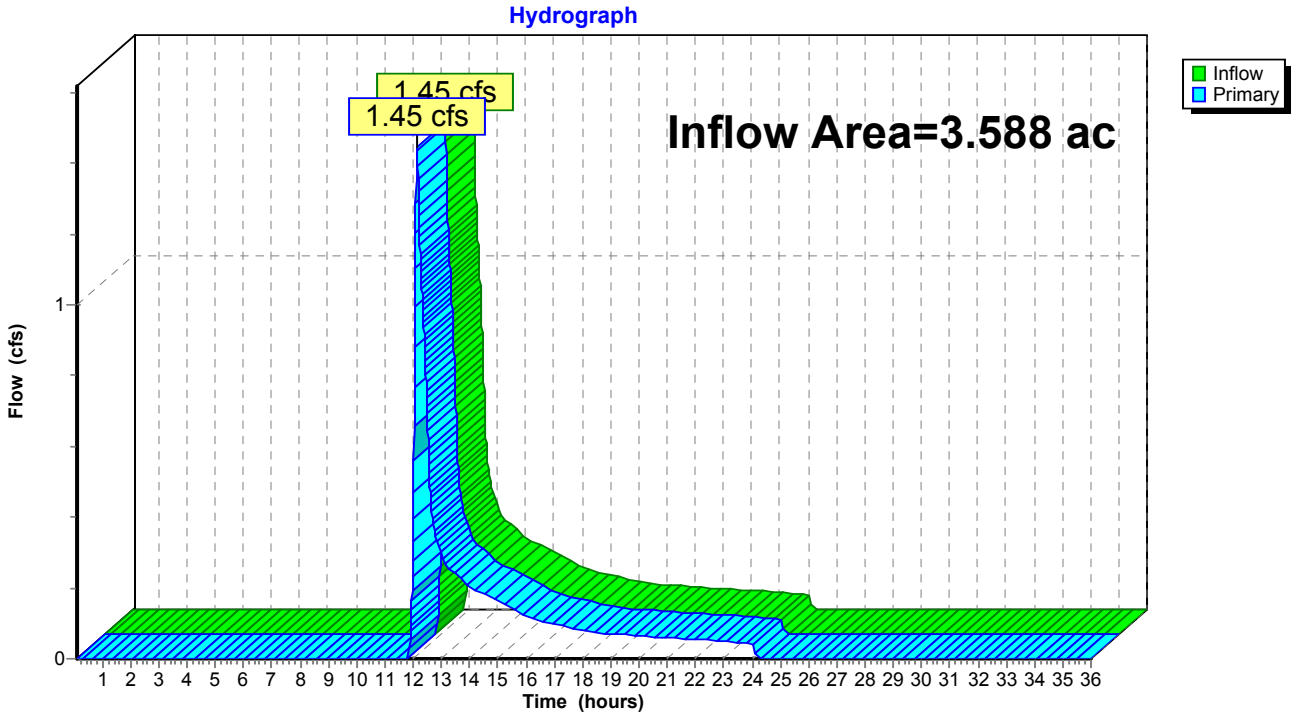


Link WL1: To Depression

Inflow Area = 3.588 ac, Inflow Depth = 0.51" for 2 Year Storm event
Inflow = 1.45 cfs @ 12.14 hrs, Volume= 0.153 af
Primary = 1.45 cfs @ 12.14 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL1: To Depression

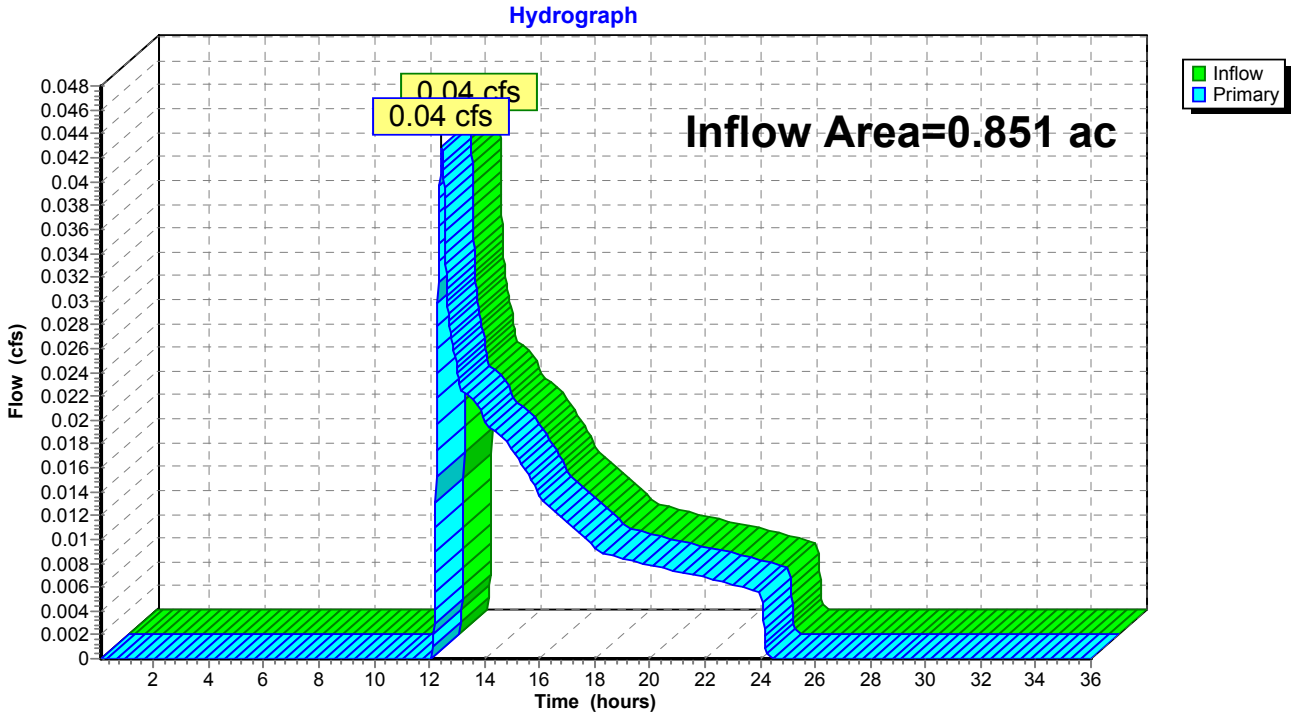


Link WL2: To Lincoln Street

Inflow Area = 0.851 ac, Inflow Depth = 0.17" for 2 Year Storm event
Inflow = 0.04 cfs @ 12.46 hrs, Volume= 0.012 af
Primary = 0.04 cfs @ 12.46 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL2: To Lincoln Street

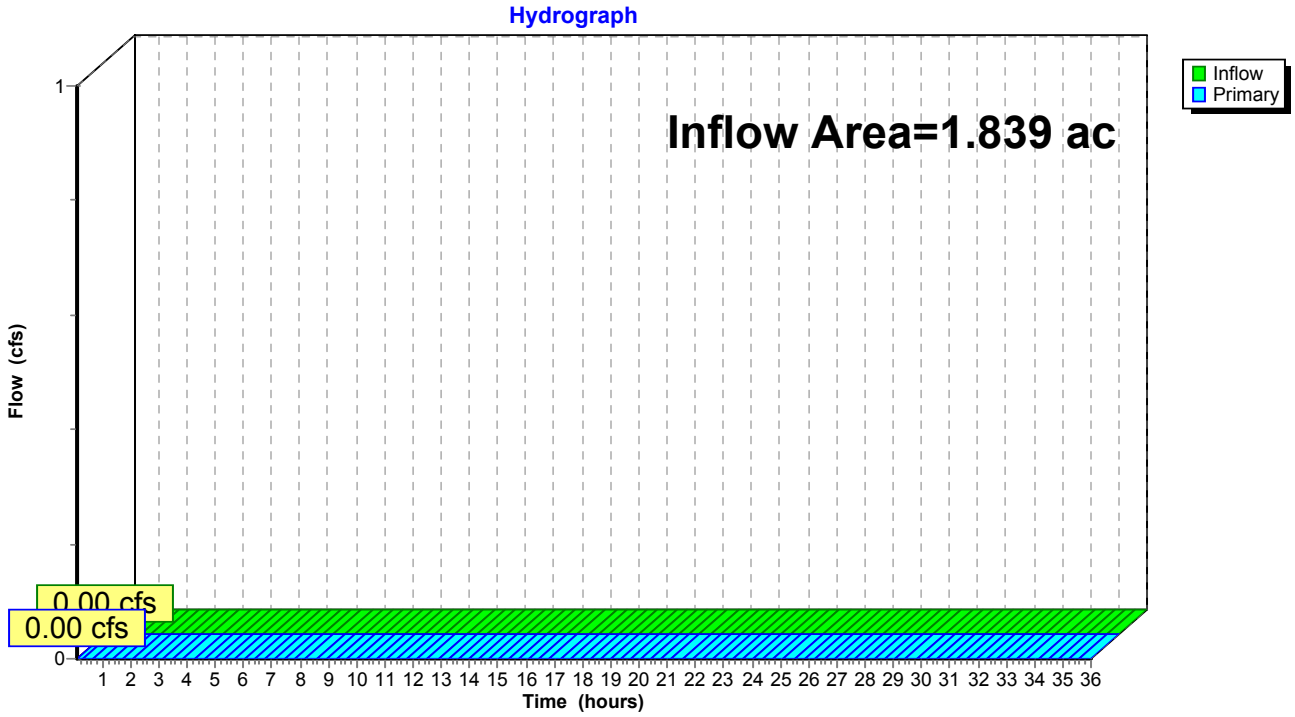


Link WL3: To Wetland Area in Rear

Inflow Area = 1.839 ac, Inflow Depth = 0.00" for 2 Year Storm event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL3: To Wetland Area in Rear



Time span=0.10-36.00 hrs, dt=0.01 hrs, 3591 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Runoff Area=156,289 sf Runoff Depth=1.33"
Flow Length=442' Tc=7.9 min CN=64 Runoff=4.81 cfs 0.397 af

Subcatchment 2S: Runoff Area=37,081 sf Runoff Depth=0.68"
Flow Length=182' Tc=9.7 min CN=53 Runoff=0.39 cfs 0.048 af

Subcatchment 3S: Runoff Area=80,102 sf Runoff Depth=0.06"
Flow Length=340' Tc=10.6 min CN=36 Runoff=0.01 cfs 0.009 af

Link WL1: To Depression Inflow=4.81 cfs 0.397 af
Primary=4.81 cfs 0.397 af

Link WL2: To Lincoln Street Inflow=0.39 cfs 0.048 af
Primary=0.39 cfs 0.048 af

Link WL3: To Wetland Area in Rear Inflow=0.01 cfs 0.009 af
Primary=0.01 cfs 0.009 af

Total Runoff Area = 6.278 ac Runoff Volume = 0.454 af Average Runoff Depth = 0.87"

Subcatchment 1S:

Runoff = 4.81 cfs @ 12.12 hrs, Volume= 0.397 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Storm Rainfall=4.60"

Area (sf)	CN	Description
3,708	98	Shop Roof
770	98	Garage Roof
565	98	Portion of Roof (#435)
4,338	98	Paved Driveways
22,045	72	Dirt roads, HSG A
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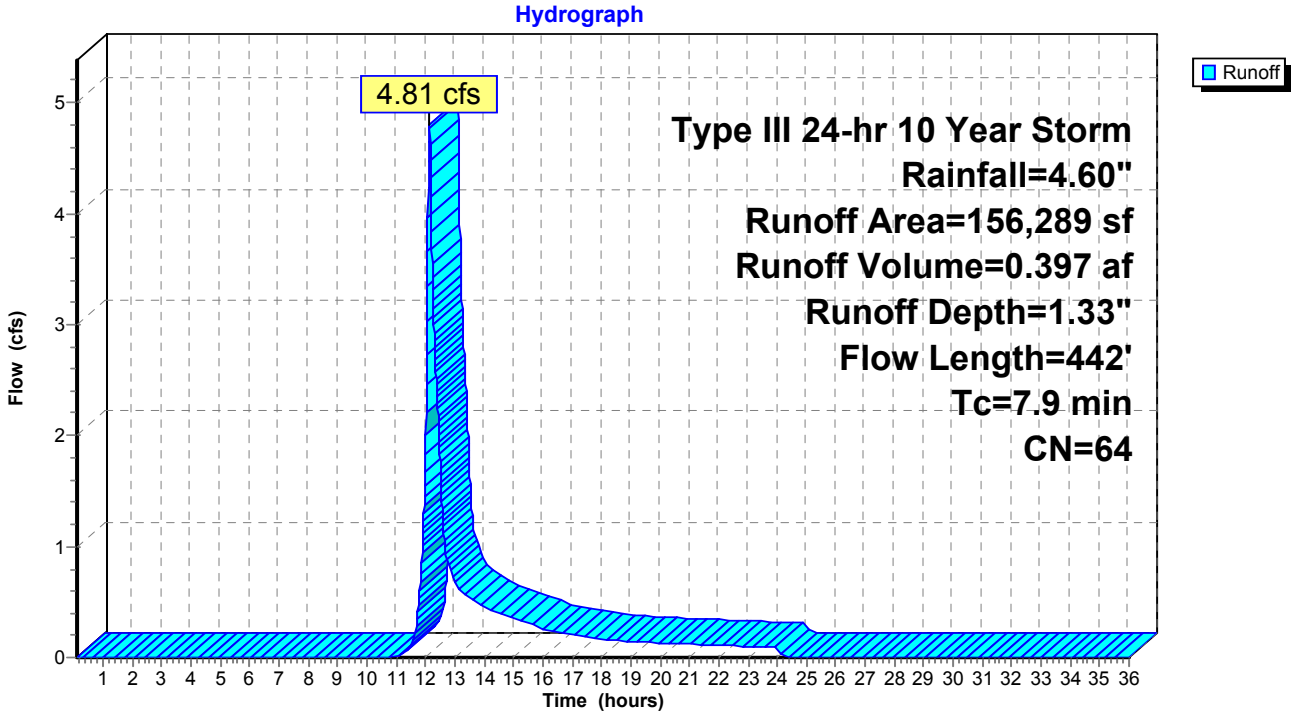
156,289	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	102	0.1300	1.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.9	442	Total			

Subcatchment 1S:



Subcatchment 2S:

Runoff = 0.39 cfs @ 12.18 hrs, Volume= 0.048 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
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Area (sf)	CN	Description
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
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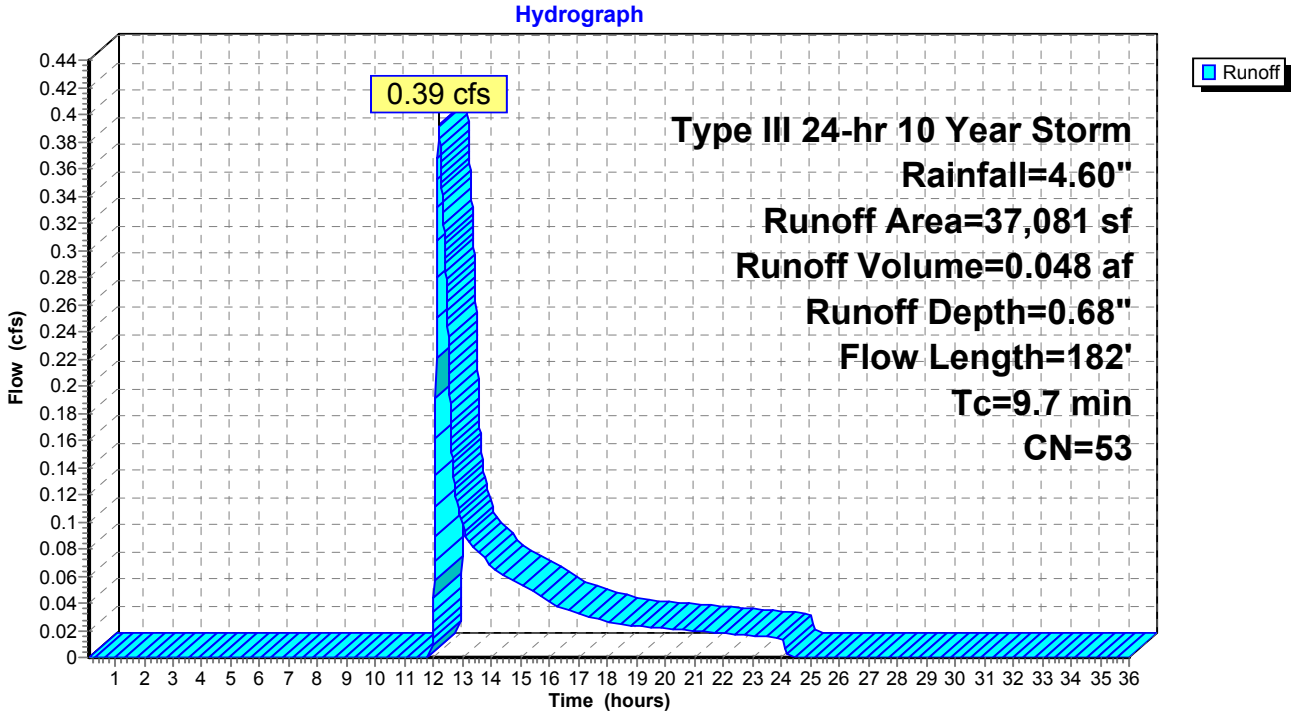
9.7	182	Total			

Subcatchment 2S:



Subcatchment 3S:

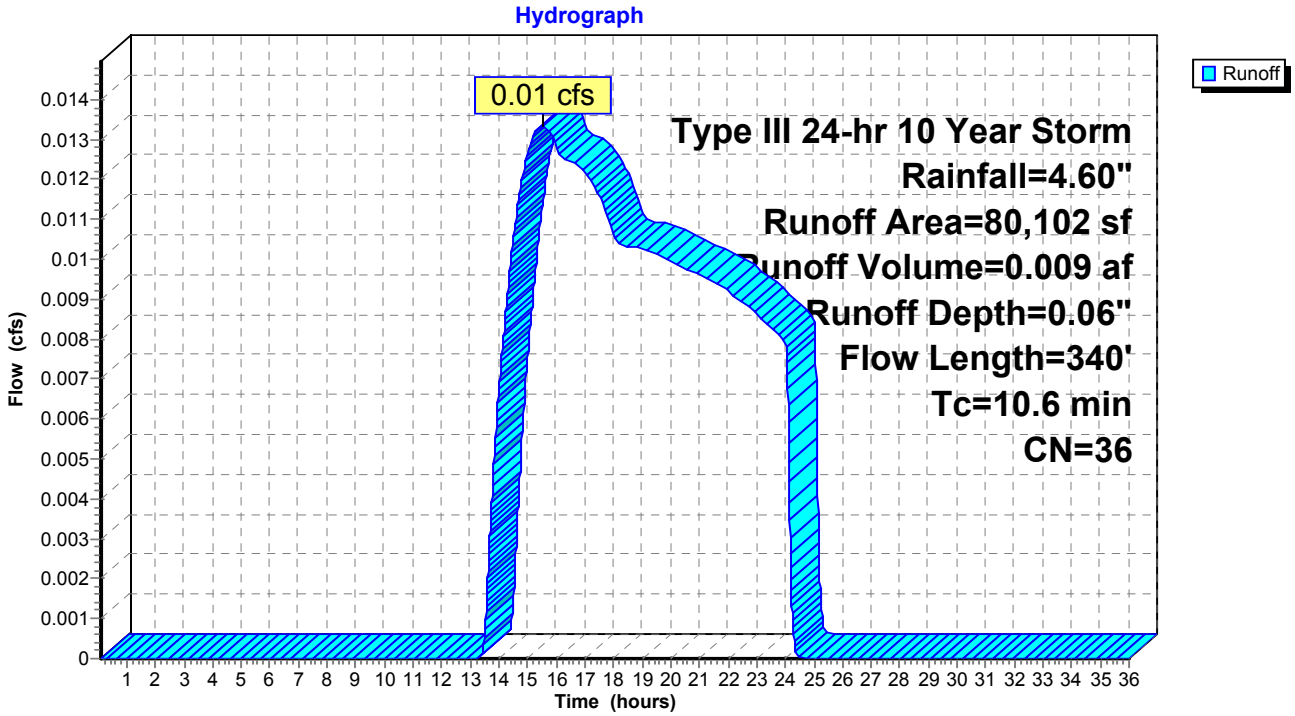
Runoff = 0.01 cfs @ 15.51 hrs, Volume= 0.009 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Storm Rainfall=4.60"

Area (sf)	CN	Description
80,102	36	Woods, Fair, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.2800	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	49	0.1200	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	92	0.0600	1.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	149	0.0130	0.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	340	Total			

Subcatchment 3S:

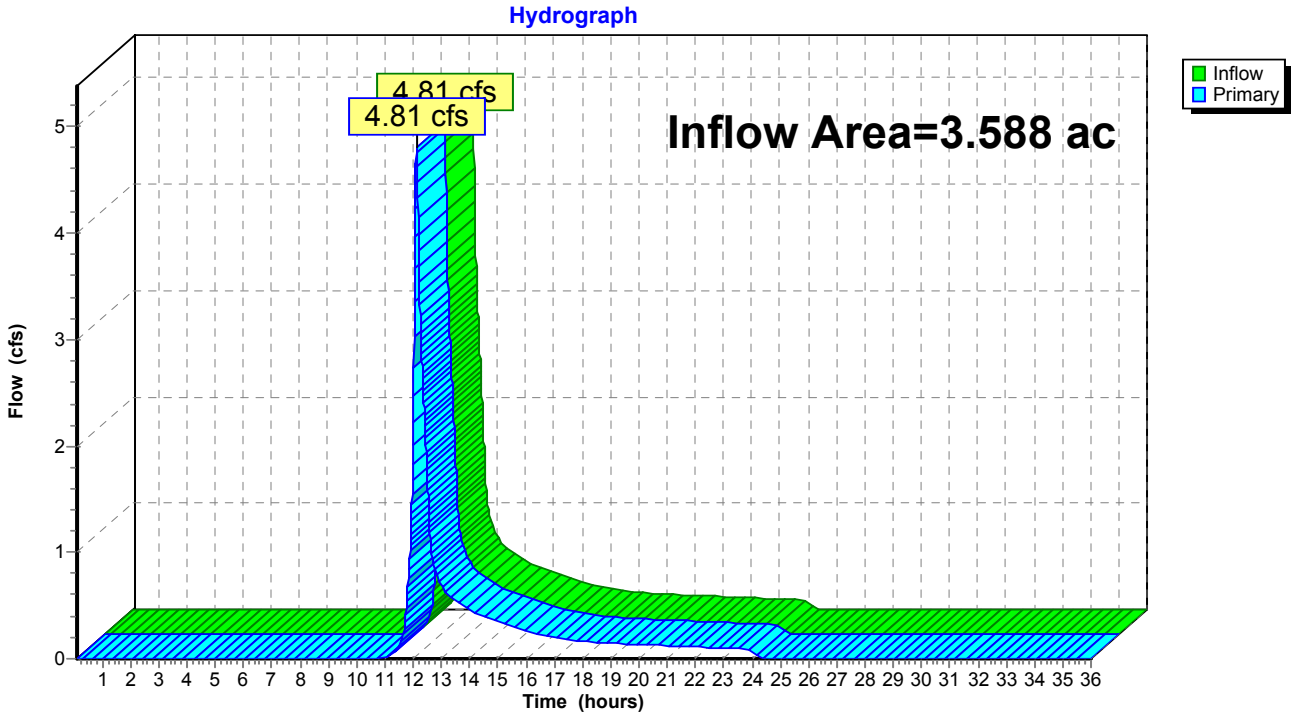


Link WL1: To Depression

Inflow Area = 3.588 ac, Inflow Depth = 1.33" for 10 Year Storm event
Inflow = 4.81 cfs @ 12.12 hrs, Volume= 0.397 af
Primary = 4.81 cfs @ 12.12 hrs, Volume= 0.397 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL1: To Depression

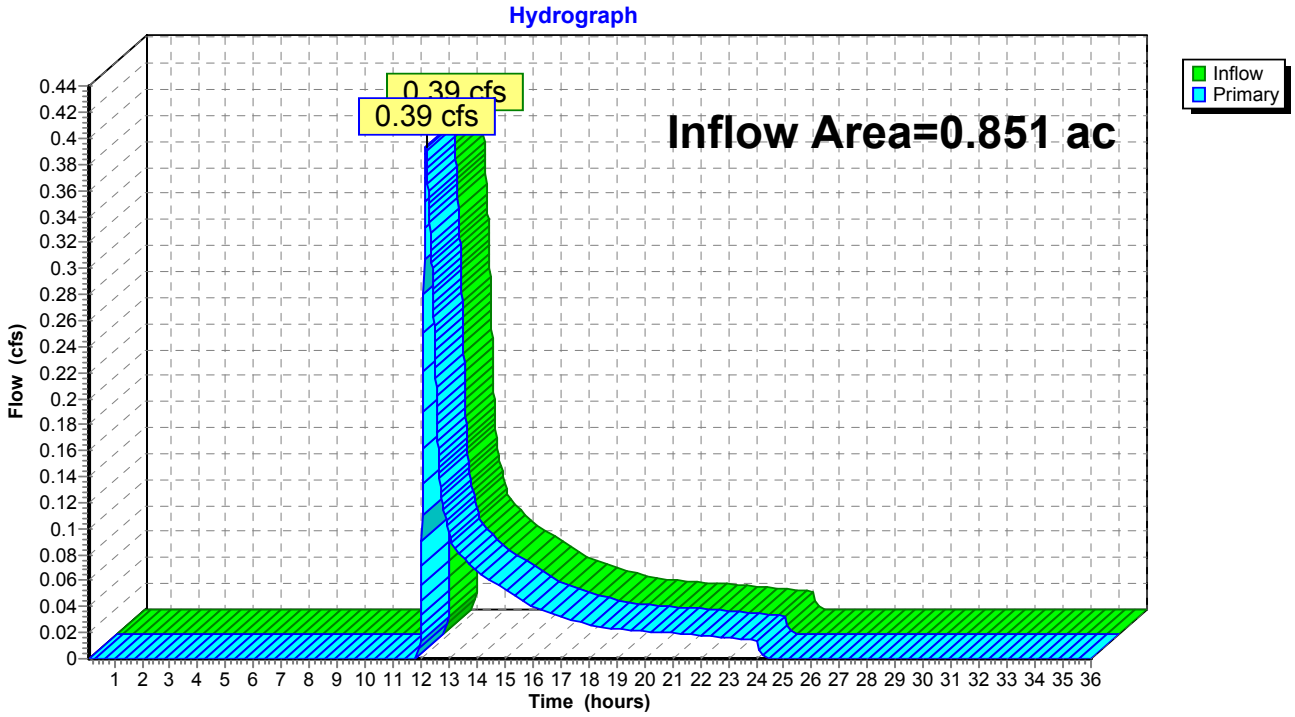


Link WL2: To Lincoln Street

Inflow Area = 0.851 ac, Inflow Depth = 0.68" for 10 Year Storm event
Inflow = 0.39 cfs @ 12.18 hrs, Volume= 0.048 af
Primary = 0.39 cfs @ 12.18 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL2: To Lincoln Street

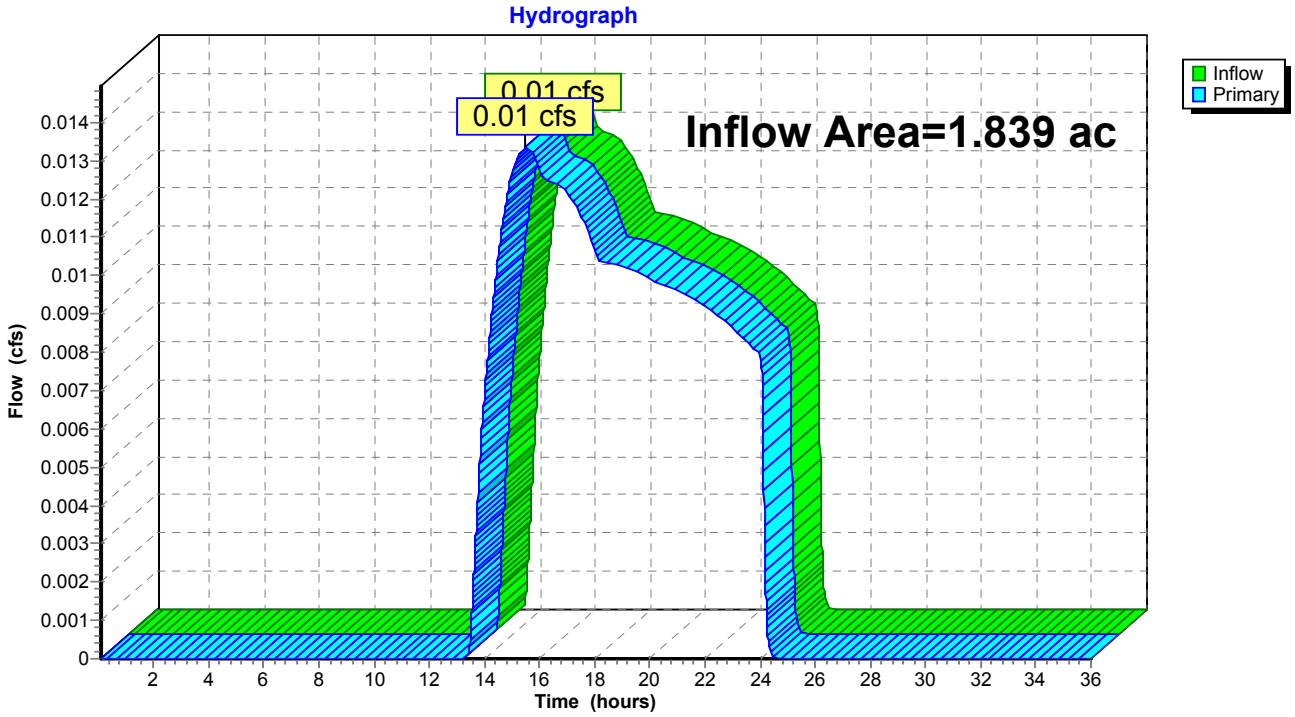


Link WL3: To Wetland Area in Rear

Inflow Area = 1.839 ac, Inflow Depth = 0.06" for 10 Year Storm event
Inflow = 0.01 cfs @ 15.51 hrs, Volume= 0.009 af
Primary = 0.01 cfs @ 15.51 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL3: To Wetland Area in Rear



Time span=0.10-36.00 hrs, dt=0.01 hrs, 3591 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Runoff Area=156,289 sf Runoff Depth=2.70"
Flow Length=442' Tc=7.9 min CN=64 Runoff=10.44 cfs 0.807 af

Subcatchment 2S: Runoff Area=37,081 sf Runoff Depth=1.70"
Flow Length=182' Tc=9.7 min CN=53 Runoff=1.33 cfs 0.121 af

Subcatchment 3S: Runoff Area=80,102 sf Runoff Depth=0.45"
Flow Length=340' Tc=10.6 min CN=36 Runoff=0.29 cfs 0.068 af

Link WL1: To Depression Inflow=10.44 cfs 0.807 af
Primary=10.44 cfs 0.807 af

Link WL2: To Lincoln Street Inflow=1.33 cfs 0.121 af
Primary=1.33 cfs 0.121 af

Link WL3: To Wetland Area in Rear Inflow=0.29 cfs 0.068 af
Primary=0.29 cfs 0.068 af

Total Runoff Area = 6.278 ac Runoff Volume = 0.996 af Average Runoff Depth = 1.90"

Subcatchment 1S:

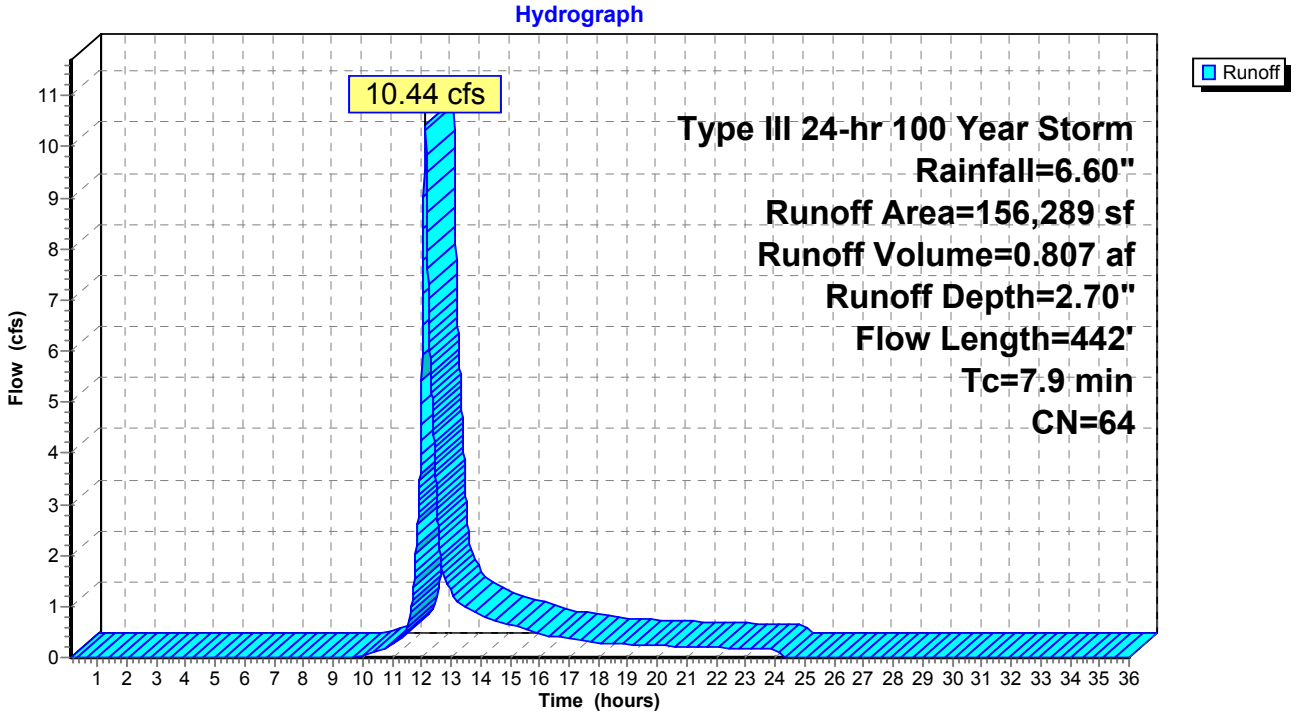
Runoff = 10.44 cfs @ 12.12 hrs, Volume= 0.807 af, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Storm Rainfall=6.60"

Area (sf)	CN	Description
3,708	98	Shop Roof
770	98	Garage Roof
565	98	Portion of Roof (#435)
4,338	98	Paved Driveways
22,045	72	Dirt roads, HSG A
71,444	79	Woods, Fair, HSG D
53,419	36	Woods, Fair, HSG A
156,289	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	102	0.1300	1.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.9	442	Total			

Subcatchment 1S:



Subcatchment 2S:

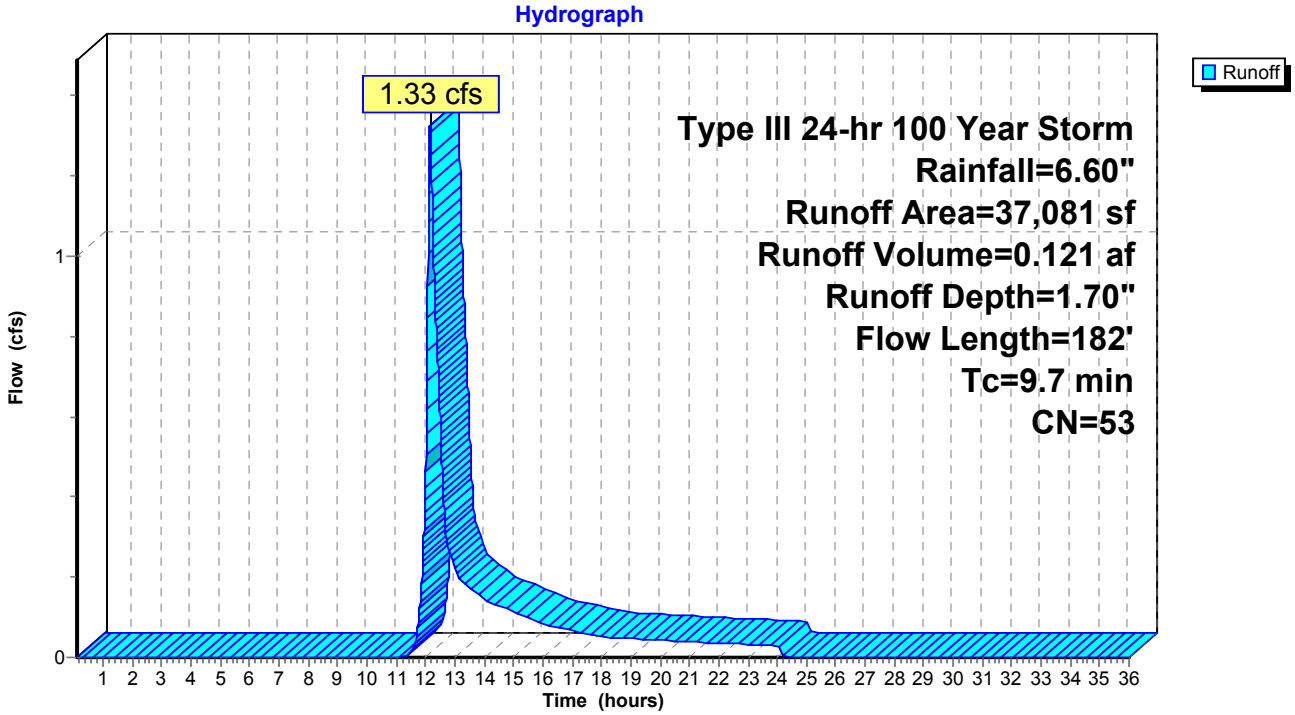
Runoff = 1.33 cfs @ 12.15 hrs, Volume= 0.121 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Storm Rainfall=6.60"

Area (sf)	CN	Description
1,541	98	Bldg Roof Areas
2,271	98	Paved Driveways
125	98	conc. walkway
4,300	36	Woods, Fair, HSG A
28,844	49	50-75% Grass cover, Fair, HSG A
37,081	53	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0140	0.1		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
3.1	132	0.0100	0.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.7	182	Total			

Subcatchment 2S:



Subcatchment 3S:

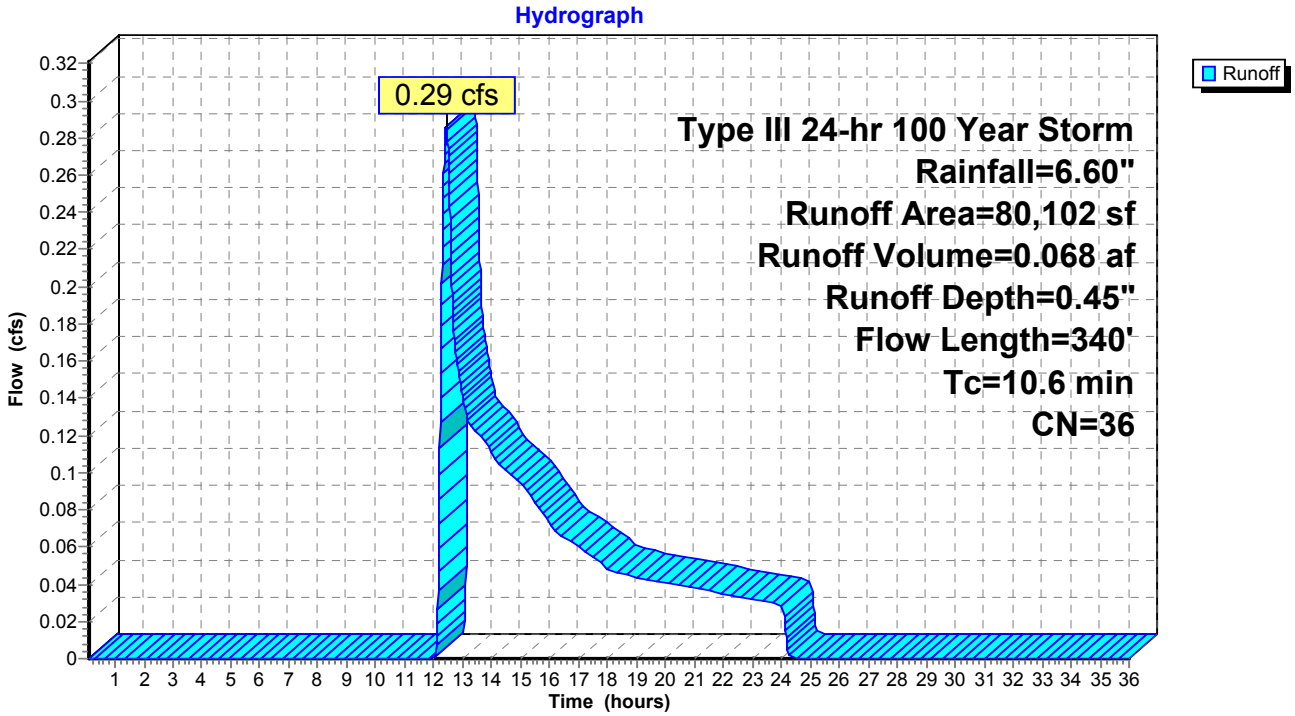
Runoff = 0.29 cfs @ 12.43 hrs, Volume= 0.068 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Storm Rainfall=6.60"

Area (sf)	CN	Description
80,102	36	Woods, Fair, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.2800	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	49	0.1200	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	92	0.0600	1.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	149	0.0130	0.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	340	Total			

Subcatchment 3S:

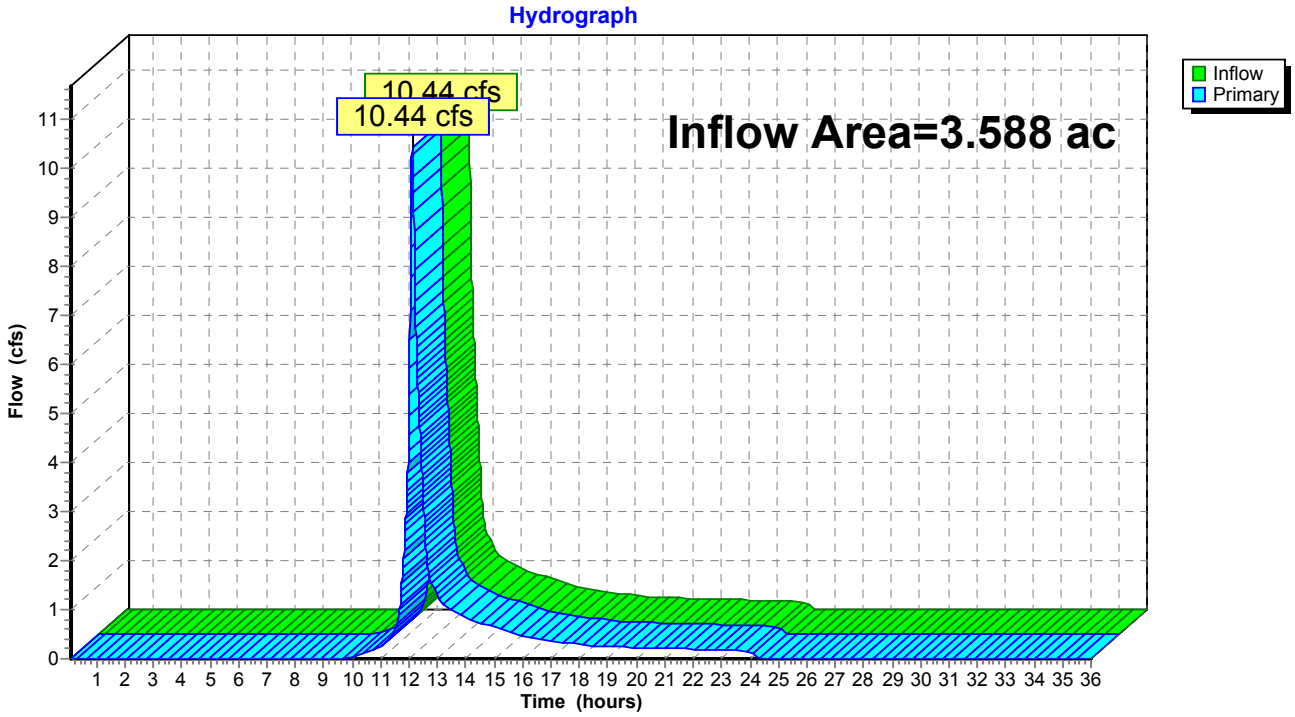


Link WL1: To Depression

Inflow Area = 3.588 ac, Inflow Depth = 2.70" for 100 Year Storm event
Inflow = 10.44 cfs @ 12.12 hrs, Volume= 0.807 af
Primary = 10.44 cfs @ 12.12 hrs, Volume= 0.807 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL1: To Depression

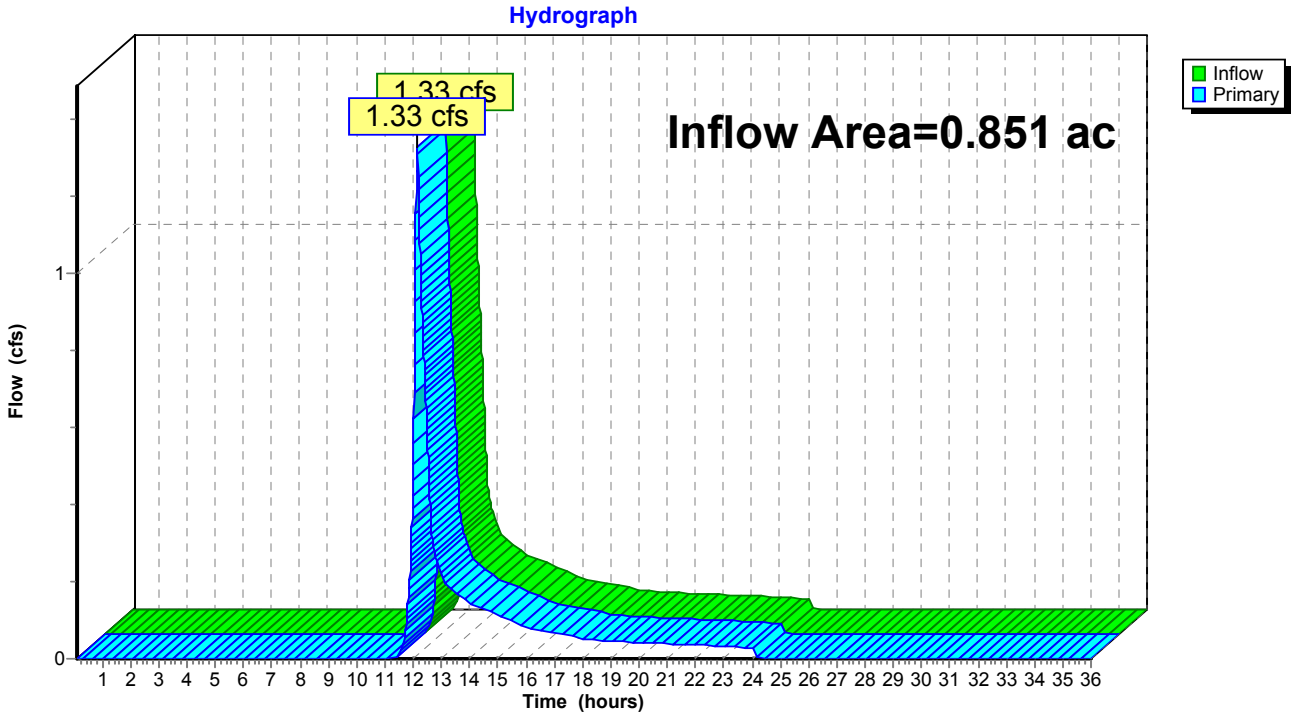


Link WL2: To Lincoln Street

Inflow Area = 0.851 ac, Inflow Depth = 1.70" for 100 Year Storm event
Inflow = 1.33 cfs @ 12.15 hrs, Volume= 0.121 af
Primary = 1.33 cfs @ 12.15 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL2: To Lincoln Street

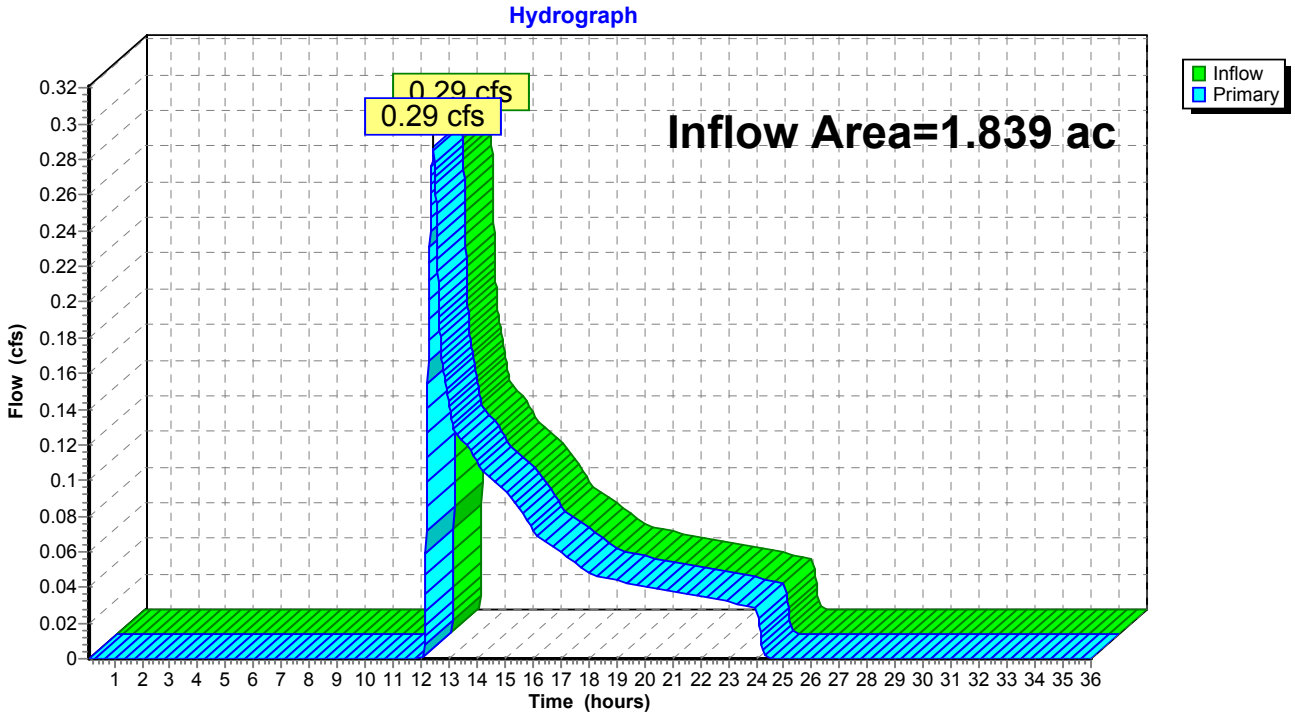


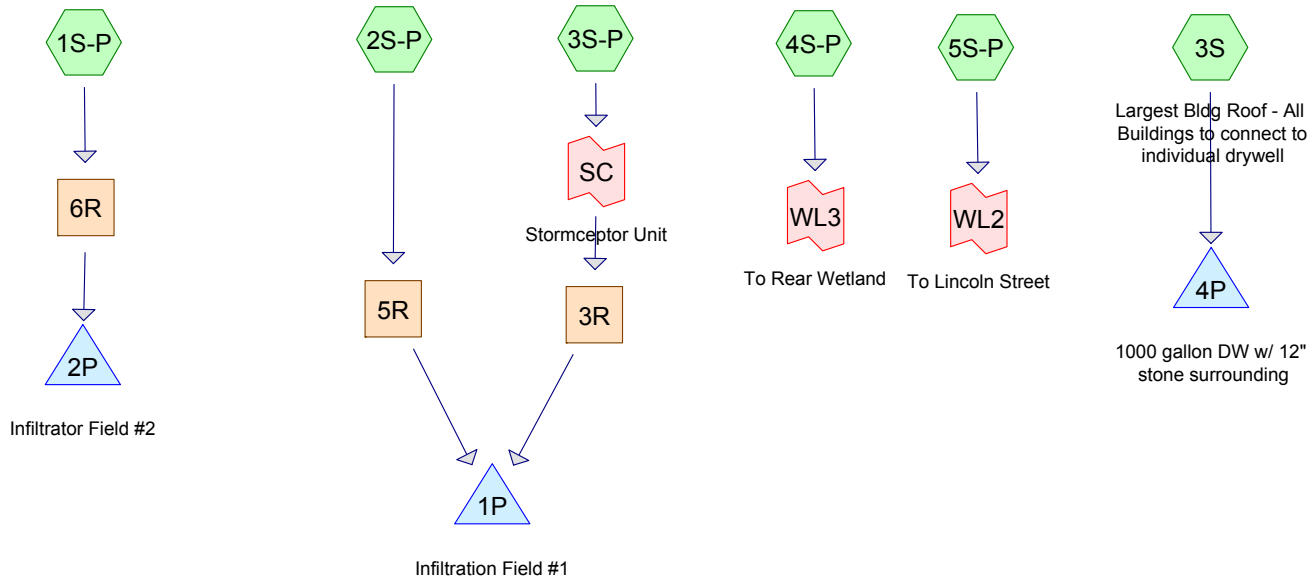
Link WL3: To Wetland Area in Rear

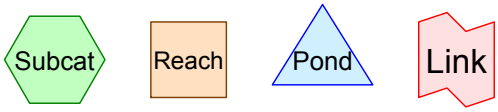
Inflow Area = 1.839 ac, Inflow Depth = 0.45" for 100 Year Storm event
Inflow = 0.29 cfs @ 12.43 hrs, Volume= 0.068 af
Primary = 0.29 cfs @ 12.43 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL3: To Wetland Area in Rear







Drainage Diagram for Post Development
Prepared by {enter your company name here} 12/11/2015
HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

Time span=0.10-36.00 hrs, dt=0.01 hrs, 3591 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S-P: Runoff Area=118,844 sf Runoff Depth=0.48"
Flow Length=410' Tc=8.3 min CN=63 Runoff=0.95 cfs 0.108 af

Subcatchment 2S-P: Runoff Area=13,413 sf Runoff Depth=0.00"
Flow Length=110' Tc=8.9 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Largest Bldg Roof - All Buildings to conned Runoff Area=1,900 sf Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.010 af

Subcatchment 3S-P: Runoff Area=52,811 sf Runoff Depth=0.20"
Flow Length=432' Tc=8.2 min CN=54 Runoff=0.08 cfs 0.020 af

Subcatchment 4S-P: Runoff Area=45,730 sf Runoff Depth=0.00"
Flow Length=340' Tc=17.2 min CN=37 Runoff=0.00 cfs 0.000 af

Subcatchment 5S-P: Runoff Area=21,033 sf Runoff Depth=0.00"
Flow Length=229' Tc=10.3 min CN=39 Runoff=0.00 cfs 0.000 af

Reach 3R: Peak Depth=0.11' Max Vel=1.7 fps Inflow=0.08 cfs 0.020 af
D=12.0" n=0.011 L=2.0' S=0.0050 '/' Capacity=2.98 cfs Outflow=0.08 cfs 0.020 af

Reach 5R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
D=12.0" n=0.011 L=21.0' S=0.0100 '/' Capacity=4.21 cfs Outflow=0.00 cfs 0.000 af

Reach 6R: Peak Depth=0.32' Max Vel=4.3 fps Inflow=0.95 cfs 0.108 af
D=12.0" n=0.011 L=16.0' S=0.0100 '/' Capacity=4.21 cfs Outflow=0.95 cfs 0.108 af

Pond 1P: Infiltration Field #1 Peak Elev=175.00' Storage=1 cf Inflow=0.08 cfs 0.020 af
Outflow=0.08 cfs 0.020 af

Pond 2P: Infiltrator Field #2 Peak Elev=175.01' Storage=35 cf Inflow=0.95 cfs 0.108 af
Discarded=0.94 cfs 0.108 af Primary=0.00 cfs 0.000 af Outflow=0.94 cfs 0.108 af

Pond 4P: 1000 gallon DW w/ 12" stone surroun Peak Elev=175.44' Storage=33 cf Inflow=0.13 cfs 0.010 af
Outflow=0.07 cfs 0.010 af

Link SC: Stormceptor Unit Inflow=0.08 cfs 0.020 af
Primary=0.08 cfs 0.020 af

Link WL2: To Lincoln Street Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link WL3: To Rear Wetland Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 5.825 ac Runoff Volume = 0.138 af Average Runoff Depth = 0.29"

Subcatchment 1S-P:

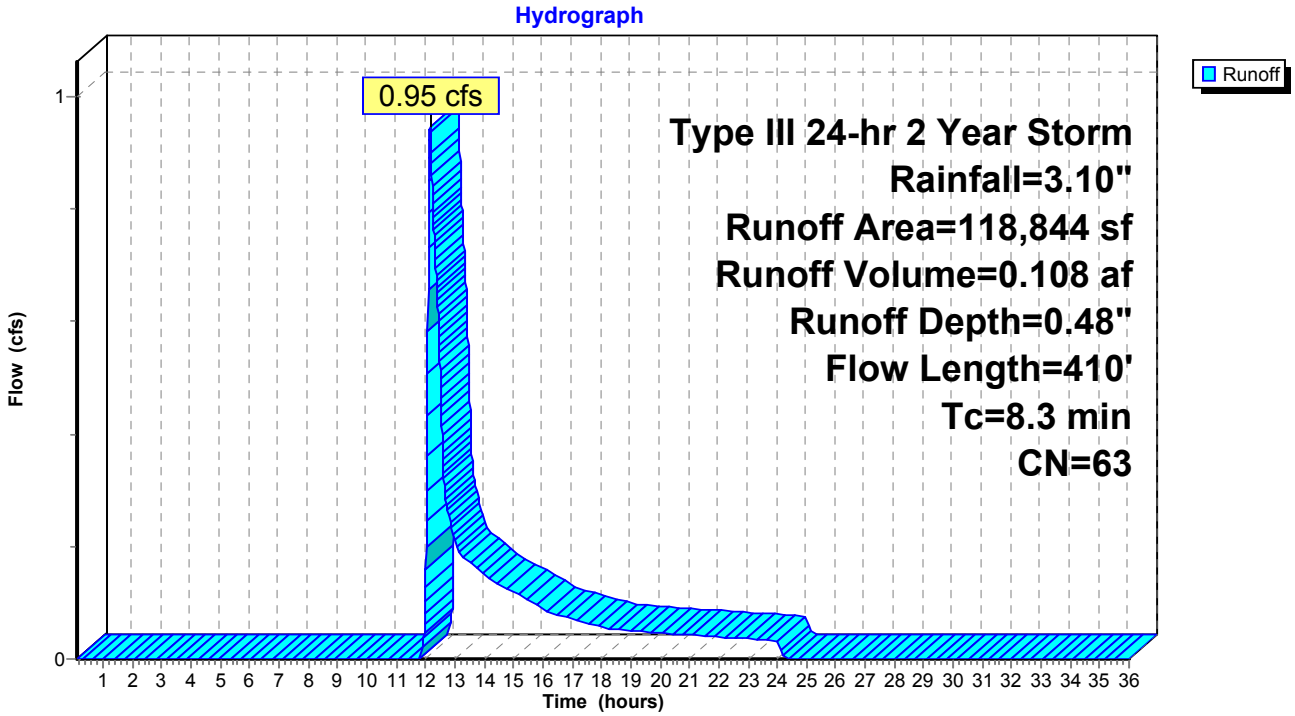
Runoff = 0.95 cfs @ 12.15 hrs, Volume= 0.108 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Storm Rainfall=3.10"

Area (sf)	CN	Description
71,444	79	Woods, Fair, HSG D
750	20	Patios (pervious)
2,400	76	Foot path - trail
11,700	36	Woods, Fair, HSG A
32,374	39	>75% Grass cover, Good, HSG A
176	98	Portion of Gazebo Roof
118,844	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	70	0.0300	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	410	Total			

Subcatchment 1S-P:



Subcatchment 2S-P:

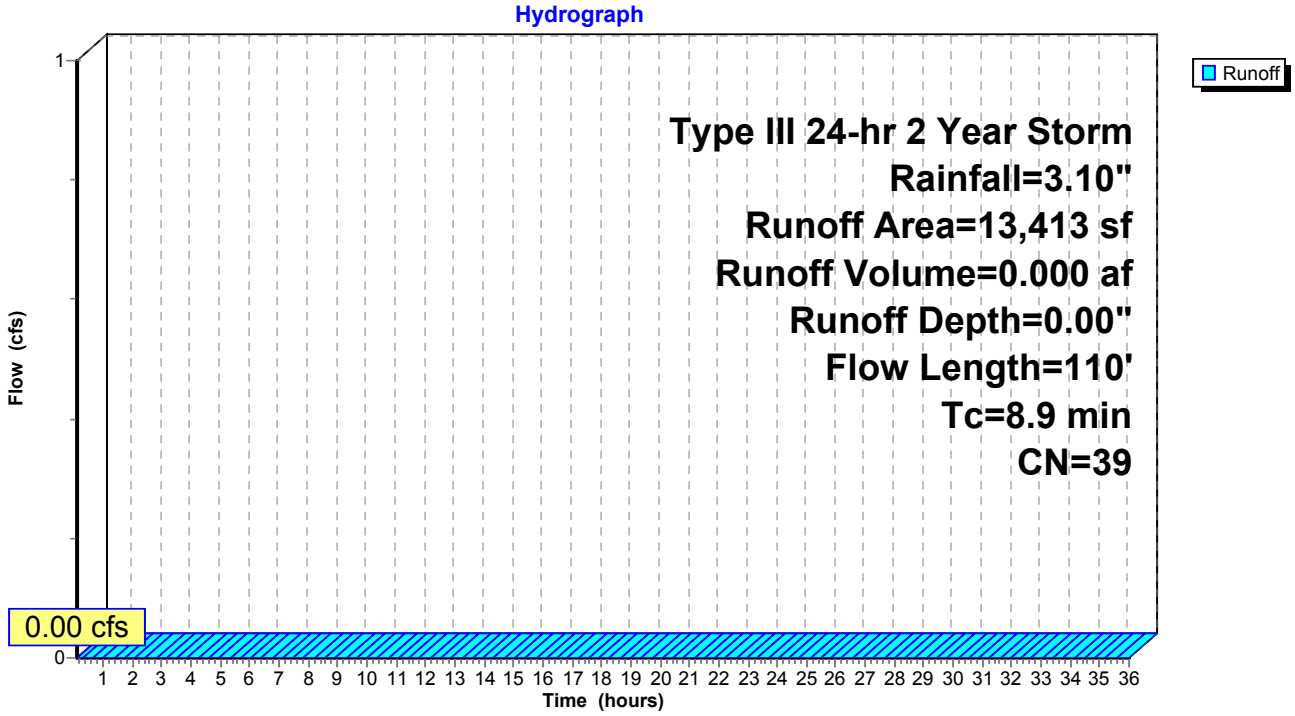
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Storm Rainfall=3.10"

Area (sf)	CN	Description
176	98	Portion of Gazebo Roof
150	20	Pervious Patio
2,430	36	Woods, Fair, HSG A
10,657	39	>75% Grass cover, Good, HSG A
13,413	39	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.1		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.4	60	0.0100	0.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.9	110	Total			

Subcatchment 2S-P:



Subcatchment 3S: Largest Bldg Roof - All Buildings to connect to individual drywell

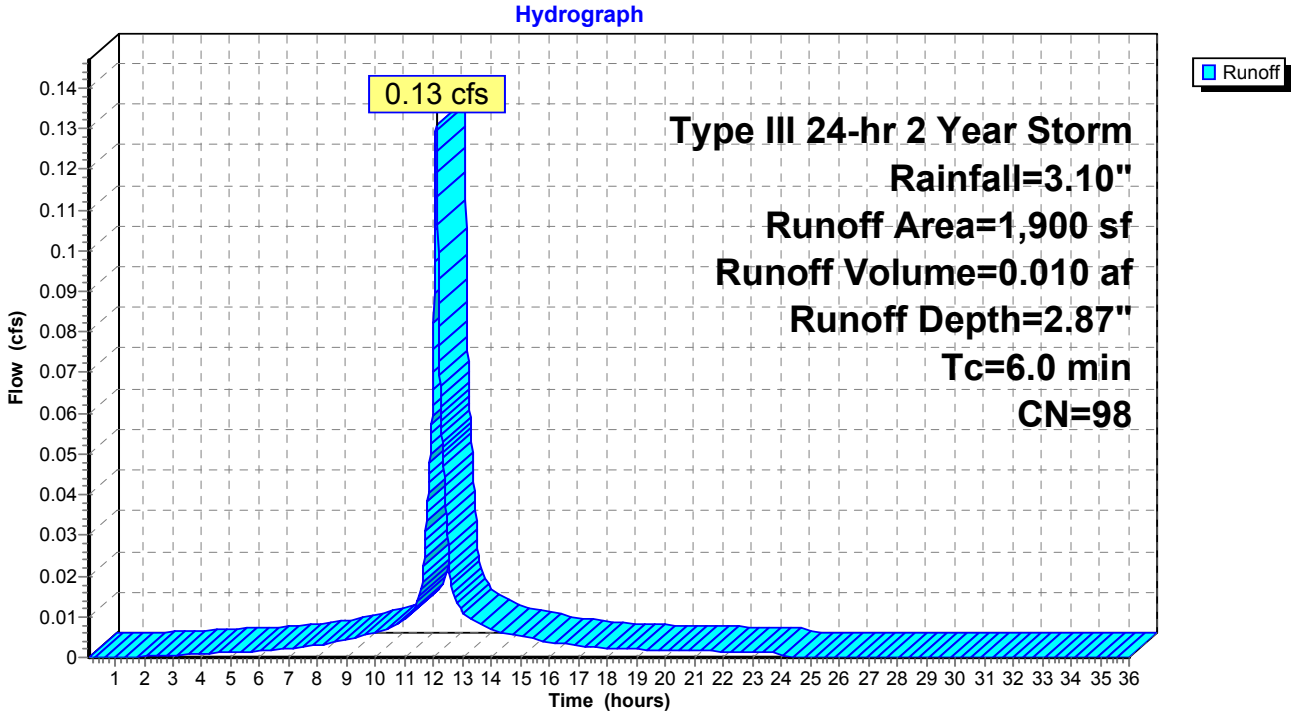
Runoff = 0.13 cfs @ 12.08 hrs, Volume= 0.010 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Storm Rainfall=3.10"

Area (sf)	CN	Description
1,900	98	Roof Area

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

Subcatchment 3S: Largest Bldg Roof - All Buildings to connect to individual drywell



Subcatchment 3S-P:

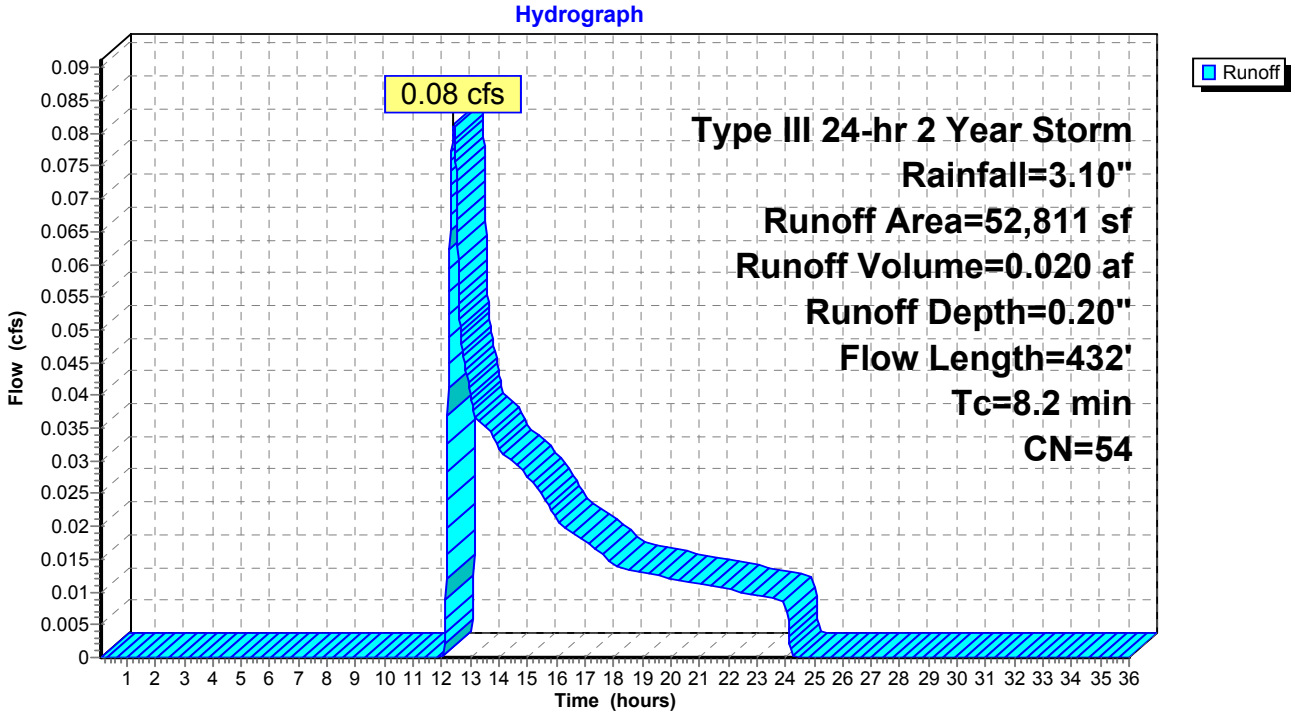
Runoff = 0.08 cfs @ 12.41 hrs, Volume= 0.020 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Storm Rainfall=3.10"

Area (sf)	CN	Description
13,454	98	Pavement areas
2,466	98	Sidewalk areas
456	98	Asphalt Berm
8,202	20	Paver Driveway (Pervious)
115	98	Ret. Walls
3,021	36	Woods, Fair, HSG A
25,097	39	>75% Grass cover, Good, HSG A
52,811	54	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	47	0.1000	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	335	0.0150	2.5		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.2	432	Total			

Subcatchment 3S-P:



Subcatchment 4S-P:

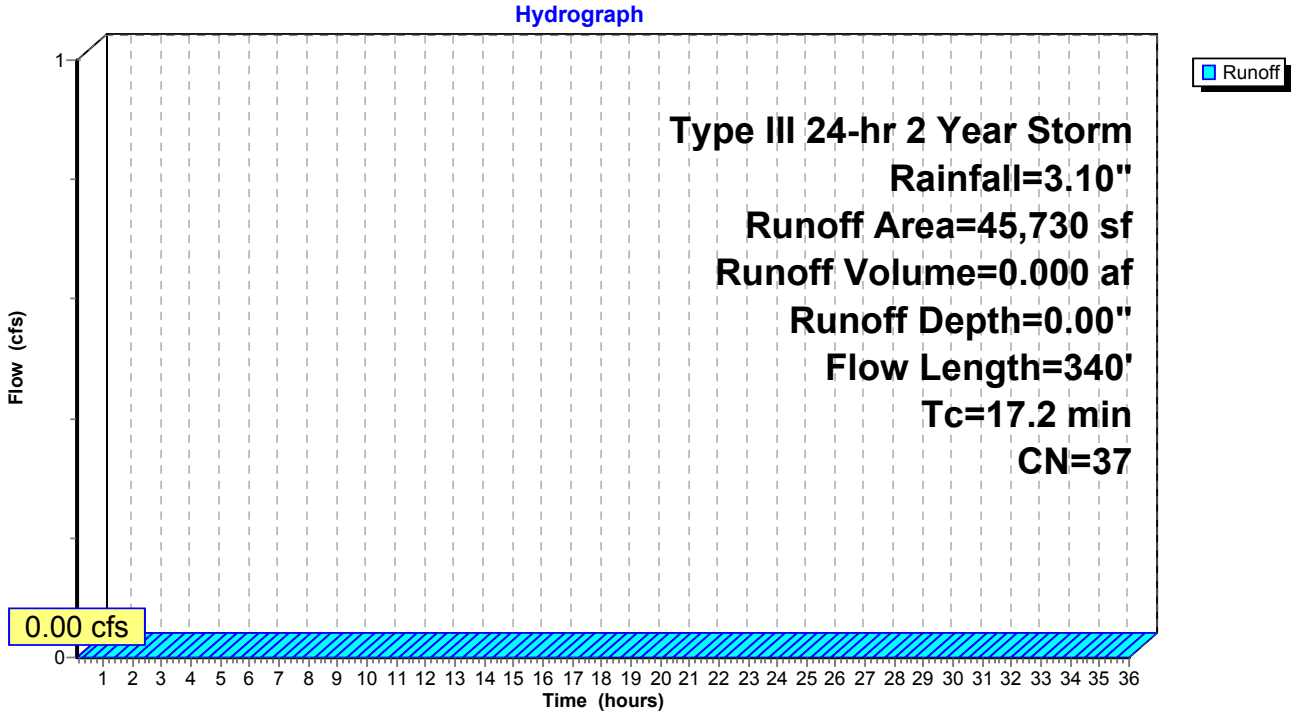
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Storm Rainfall=3.10"

Area (sf)	CN	Description
750	20	Pervious Patios
22,630	36	Woods, Fair, HSG A
22,350	39	>75% Grass cover, Good, HSG A
45,730	37	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0280	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	49	0.1200	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	92	0.0600	1.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	149	0.0130	0.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.2	340	Total			

Subcatchment 4S-P:



Subcatchment 5S-P:

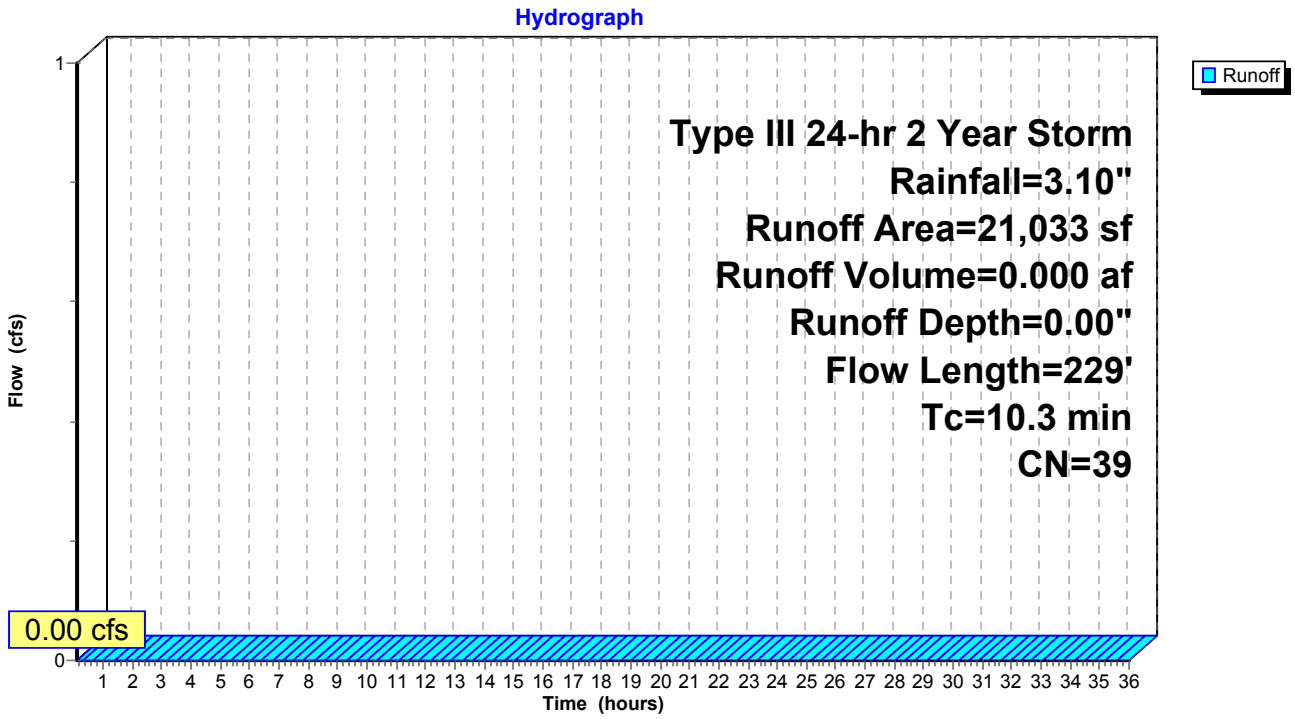
Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Storm Rainfall=3.10"

Area (sf)	CN	Description
450	20	Pervious Patios
20	98	Ret. Wall
20,563	39	>75% Grass cover, Good, HSG A
21,033	39	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0180	0.1		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.3	179	0.0100	0.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	229	Total			

Subcatchment 5S-P:



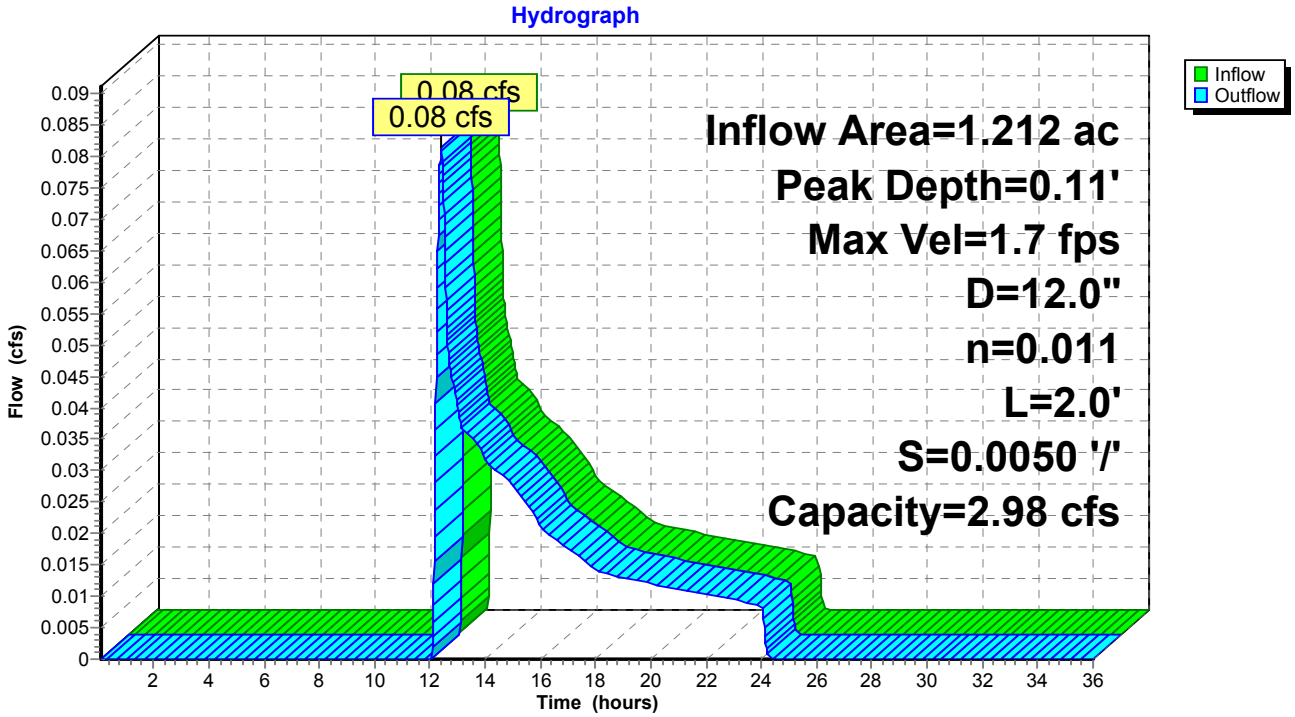
Reach 3R:

Inflow Area = 1.212 ac, Inflow Depth = 0.20" for 2 Year Storm event
Inflow = 0.08 cfs @ 12.41 hrs, Volume= 0.020 af
Outflow = 0.08 cfs @ 12.41 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.7 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.11' @ 12.41 hrs
Capacity at bank full= 2.98 cfs
Inlet Invert= 175.68', Outlet Invert= 175.67'
12.0" Diameter Pipe n= 0.011 Length= 2.0' Slope= 0.0050 '/'

Reach 3R:



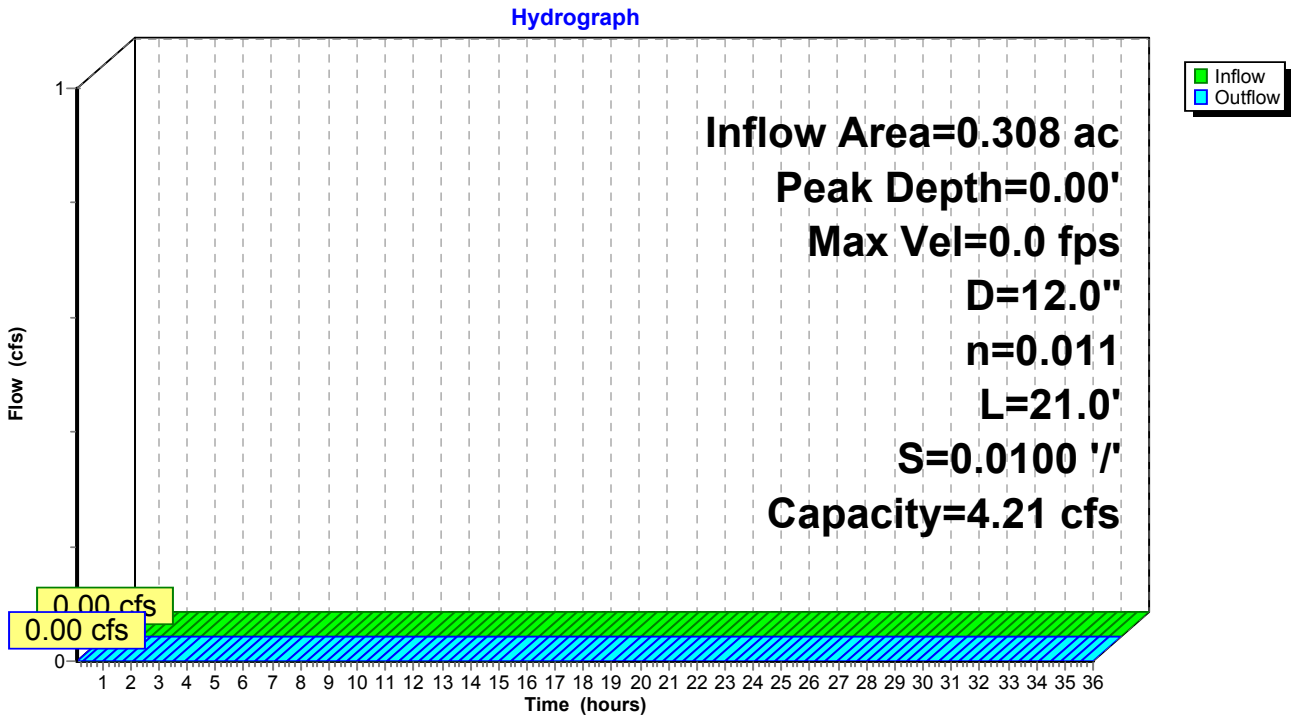
Reach 5R:

Inflow Area = 0.308 ac, Inflow Depth = 0.00" for 2 Year Storm event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 0.10 hrs
Capacity at bank full= 4.21 cfs
Inlet Invert= 175.88', Outlet Invert= 175.67'
12.0" Diameter Pipe n= 0.011 Length= 21.0' Slope= 0.0100 '/'

Reach 5R:



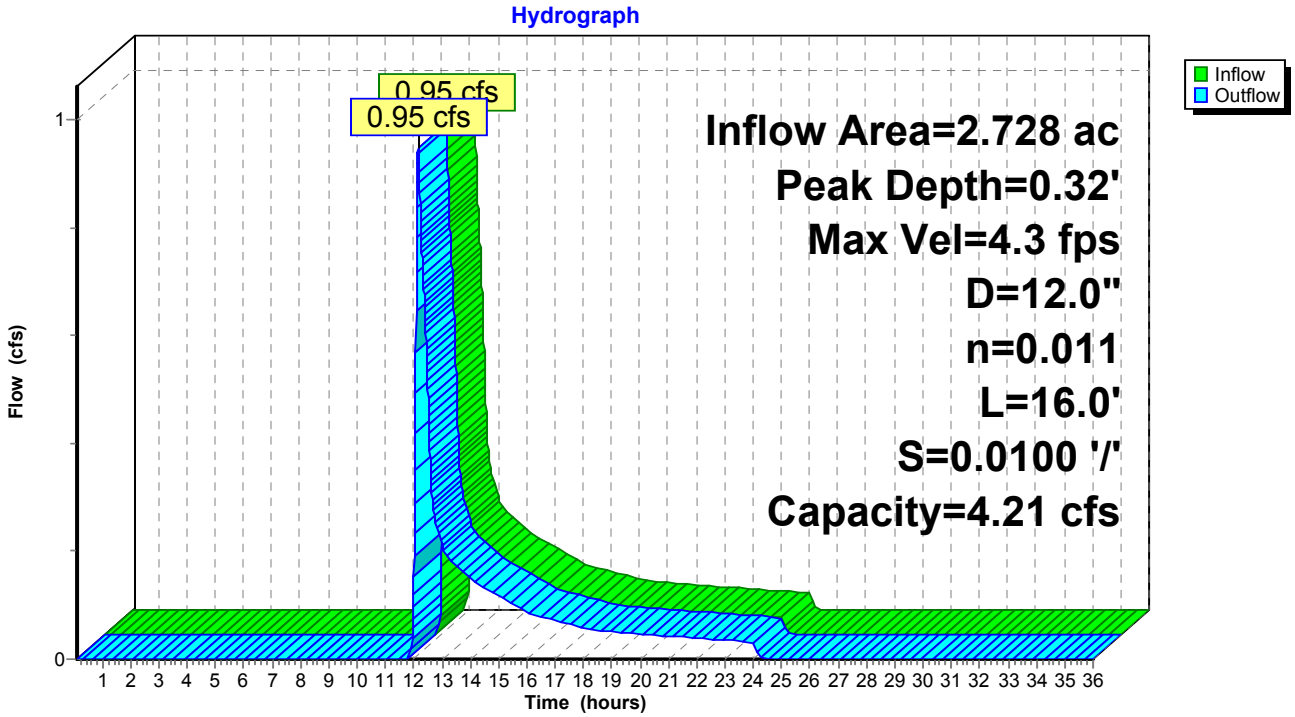
Reach 6R:

Inflow Area = 2.728 ac, Inflow Depth = 0.48" for 2 Year Storm event
Inflow = 0.95 cfs @ 12.15 hrs, Volume= 0.108 af
Outflow = 0.95 cfs @ 12.15 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.3 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.1 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.32' @ 12.15 hrs
Capacity at bank full= 4.21 cfs
Inlet Invert= 175.93', Outlet Invert= 175.77'
12.0" Diameter Pipe n= 0.011 Length= 16.0' Slope= 0.0100 '/'

Reach 6R:



Pond 1P: Infiltration Field #1

Inflow Area = 1.520 ac, Inflow Depth = 0.16" for 2 Year Storm event
Inflow = 0.08 cfs @ 12.41 hrs, Volume= 0.020 af
Outflow = 0.08 cfs @ 12.42 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.08 cfs @ 12.42 hrs, Volume= 0.020 af

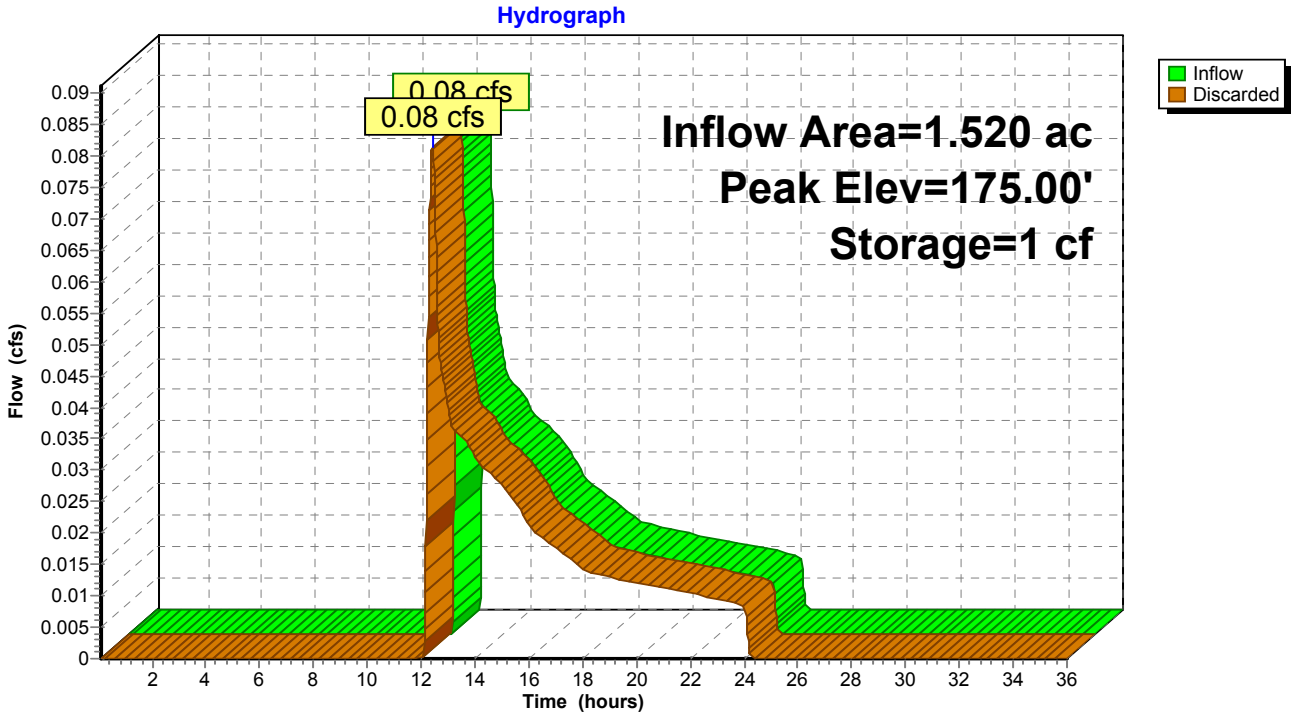
Routing by Stor-Ind method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Peak Elev= 175.00' @ 12.42 hrs Surf.Area= 1,395 sf Storage= 1 cf
Plug-Flow detention time= 0.2 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (974.2 - 974.0)

#	Invert	Avail.Storage	Storage Description
1	175.00'	354 cf	**10.49'W x 133.00'L x 1.17'H Prismatoid**
			1,632 cf Overall - 748 cf Embedded = 884 cf x 40.0% Voids
2	175.00'	748 cf	**34.0"W x 12.0"H x 4.00'L Parabolic Arch** x 99 Inside #1
		1,102 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.041666 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.97 cfs @ 12.42 hrs HW=175.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.97 cfs)

Pond 1P: Infiltration Field #1



Pond 2P: Infiltrator Field #2

Inflow Area =	2.728 ac,	Inflow Depth =	0.48"	for	2 Year Storm event
Inflow =	0.95 cfs @	12.15 hrs,	Volume=	0.108 af	
Outflow =	0.94 cfs @	12.16 hrs,	Volume=	0.108 af,	Atten= 1%, Lag= 0.7 min
Discarded =	0.94 cfs @	12.16 hrs,	Volume=	0.108 af	
Primary =	0.00 cfs @	0.10 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Peak Elev= 175.01' @ 12.16 hrs Surf.Area= 4,996 sf Storage= 35 cf
Plug-Flow detention time= 0.6 min calculated for 0.108 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (911.1 - 910.5)

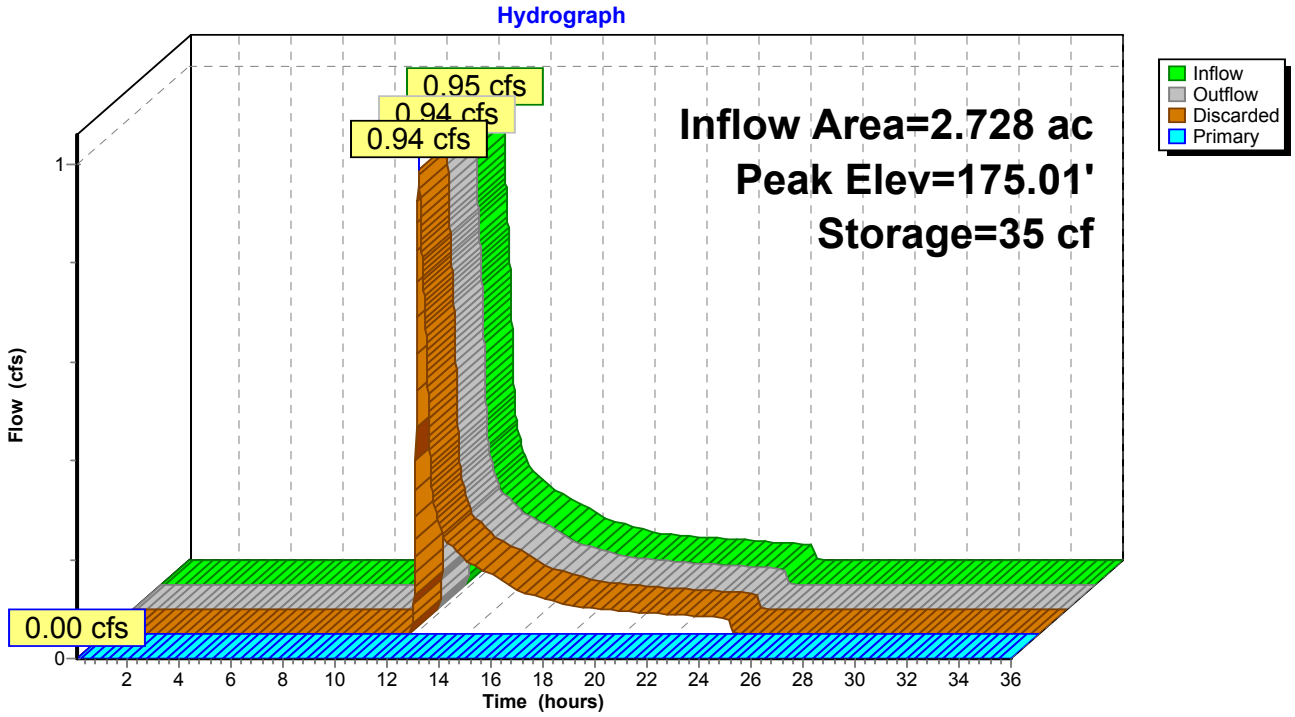
#	Invert	Avail.Storage	Storage Description
1	175.00'	3,289 cf	**27.14'W x 101.00'L x 3.00'H Prismatoid**
			8,223 cf Overall x 40.0% Voids
2	175.00'	1,511 cf	**34.0"W x 12.0"H x 4.00'L Parabolic Arch** x 200
		4,800 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.041660 fpm Exfiltration over entire Surface area**
2	Primary	178.83'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=3.47 cfs @ 12.16 hrs HW=175.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 3.47 cfs)

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=175.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Infiltrator Field #2



Pond 4P: 1000 gallon DW w/ 12" stone surrounding

Inflow Area = 0.044 ac, Inflow Depth = 2.87" for 2 Year Storm event
Inflow = 0.13 cfs @ 12.08 hrs, Volume= 0.010 af
Outflow = 0.07 cfs @ 11.99 hrs, Volume= 0.010 af, Atten= 49%, Lag= 0.0 min
Discarded = 0.07 cfs @ 11.99 hrs, Volume= 0.010 af

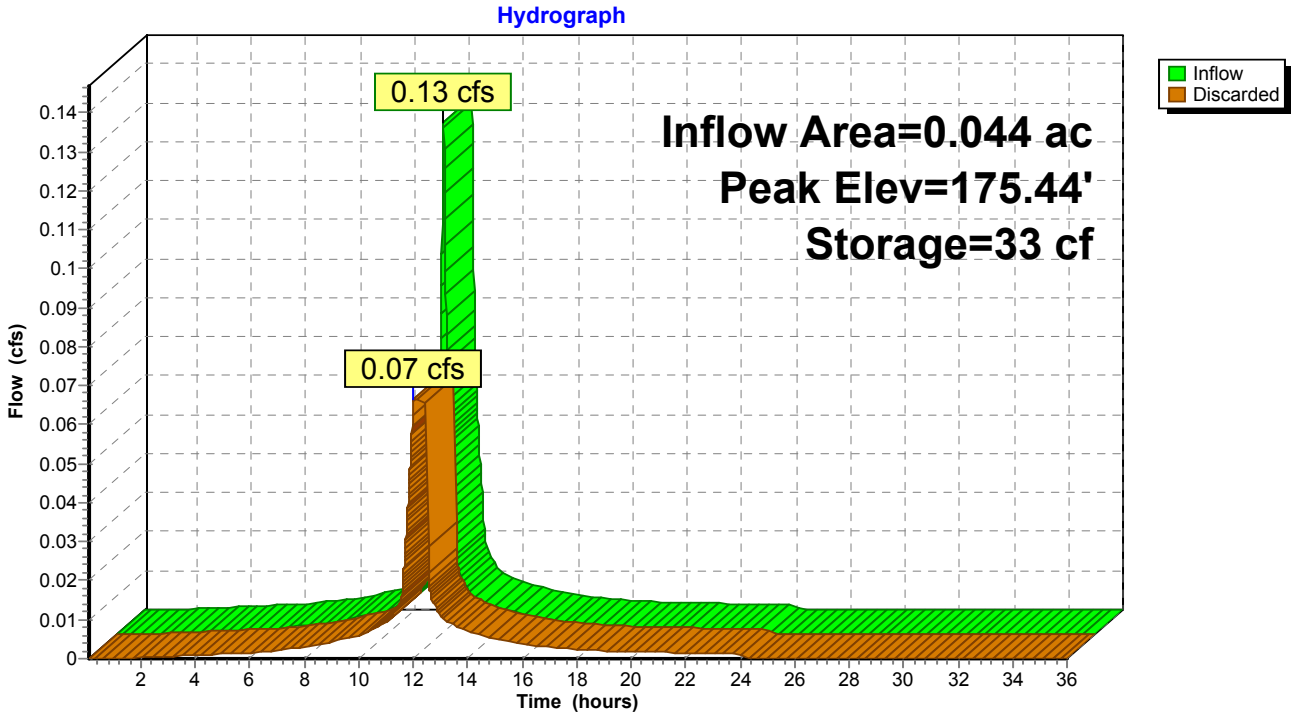
Routing by Stor-Ind method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Peak Elev= 175.44' @ 12.22 hrs Surf.Area= 96 sf Storage= 33 cf
Plug-Flow detention time= 2.0 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 2.0 min (759.0 - 757.1)

#	Invert	Avail.Storage	Storage Description
1	175.00'	54 cf	**7.67'W x 12.50'L x 3.17'H Prismatoid** 304 cf Overall - 168 cf Embedded = 135 cf x 40.0% Voids
2	175.00'	168 cf	**5.67'W x 10.50'L x 2.83'H Prismatoid** Inside #1
		223 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.041666 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.07 cfs @ 11.99 hrs HW=175.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Pond 4P: 1000 gallon DW w/ 12" stone surrounding

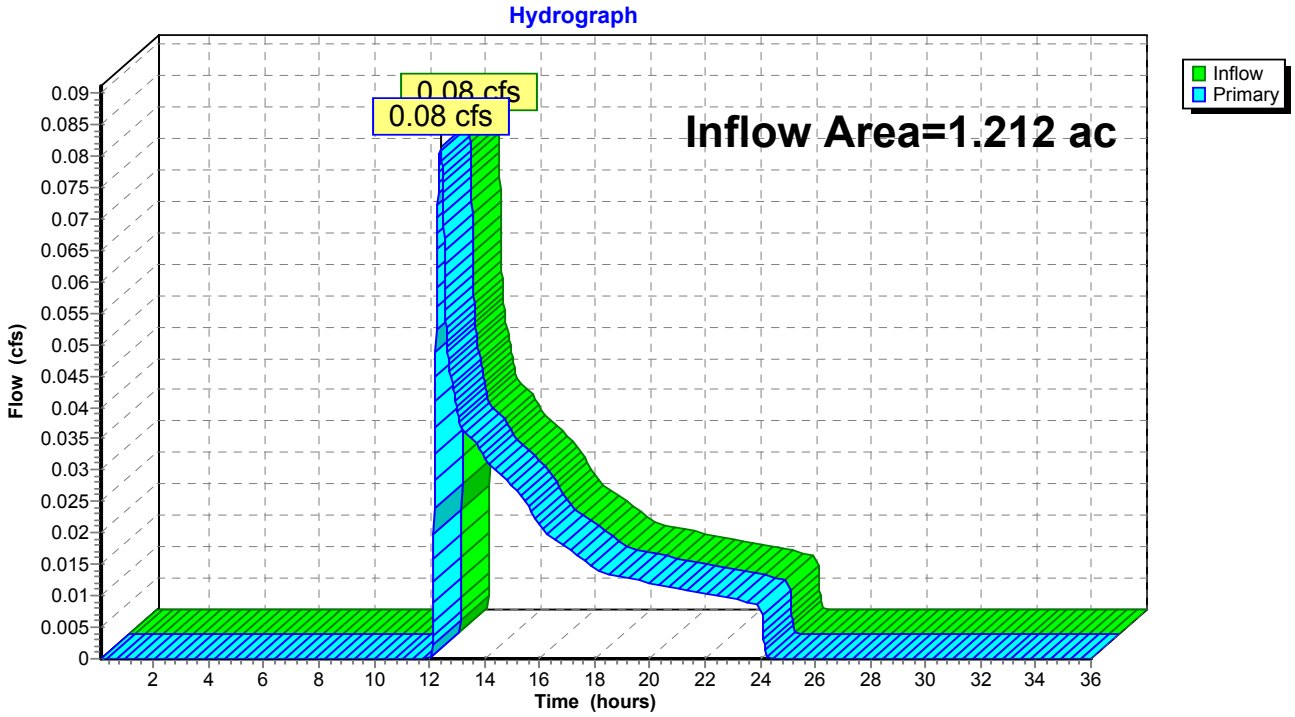


Link SC: Stormceptor Unit

Inflow Area = 1.212 ac, Inflow Depth = 0.20" for 2 Year Storm event
Inflow = 0.08 cfs @ 12.41 hrs, Volume= 0.020 af
Primary = 0.08 cfs @ 12.41 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link SC: Stormceptor Unit

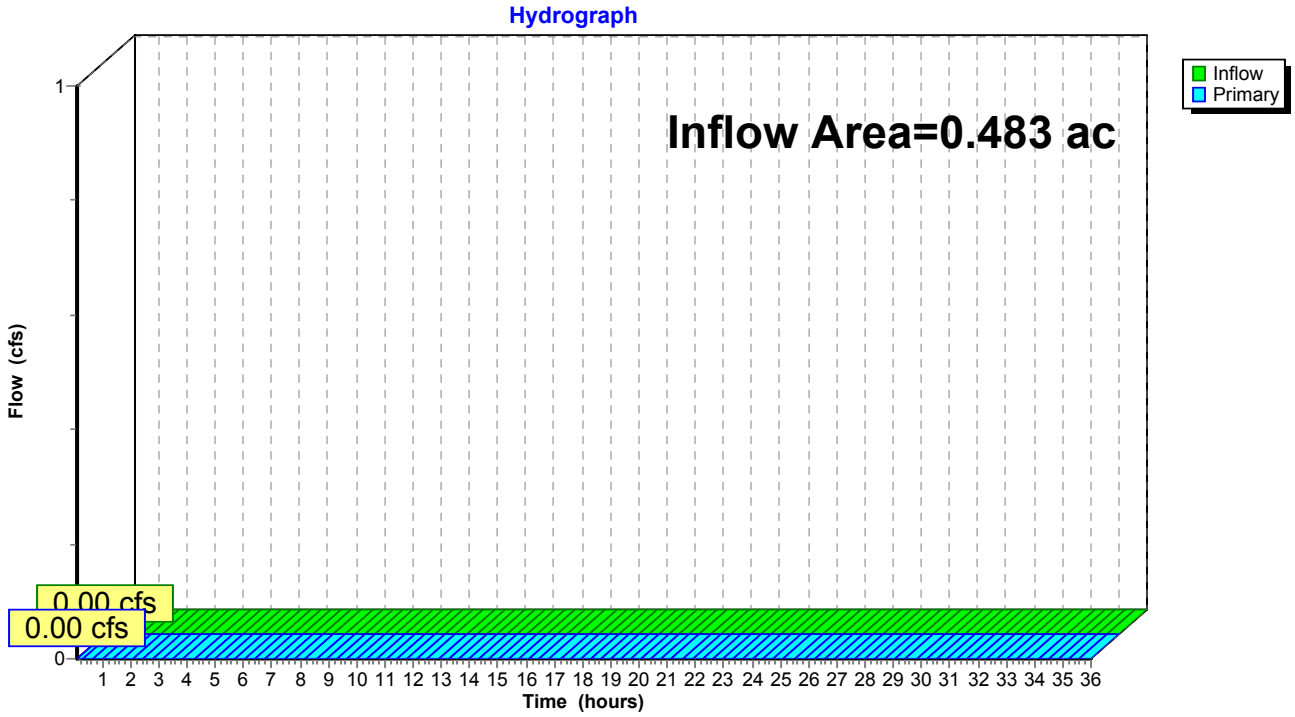


Link WL2: To Lincoln Street

Inflow Area = 0.483 ac, Inflow Depth = 0.00" for 2 Year Storm event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL2: To Lincoln Street

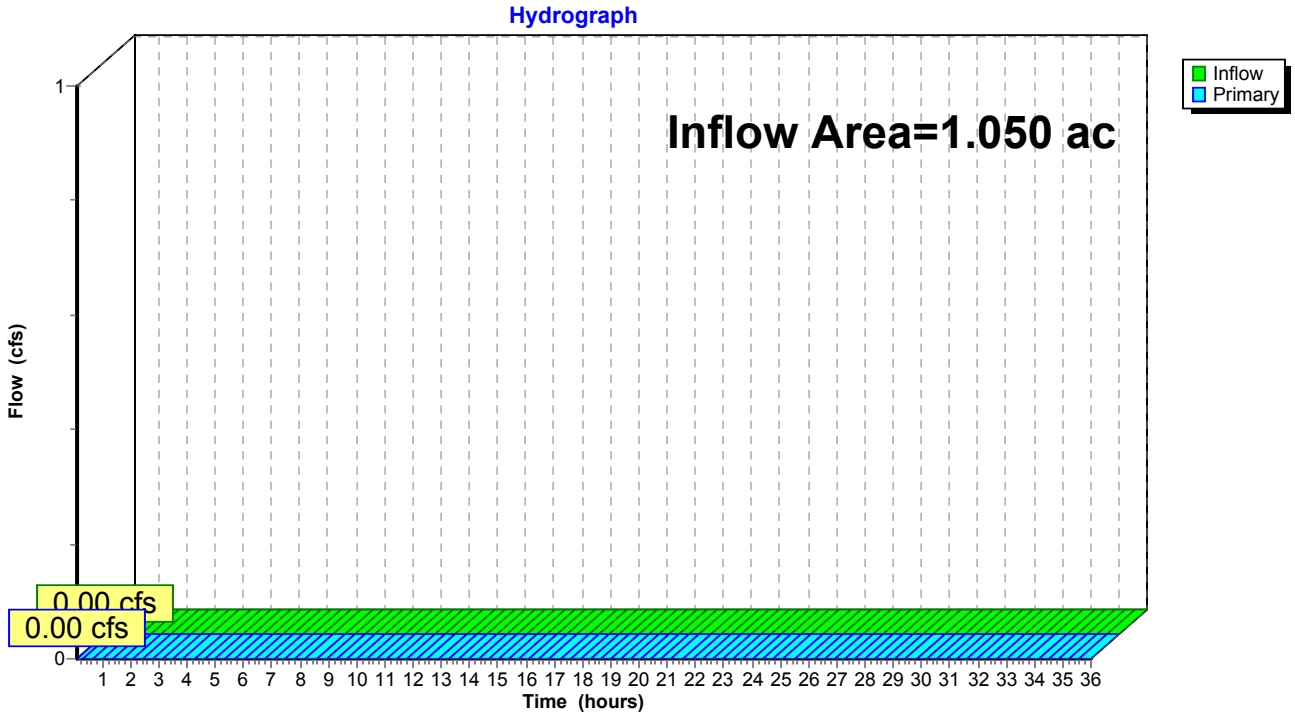


Link WL3: To Rear Wetland

Inflow Area = 1.050 ac, Inflow Depth = 0.00" for 2 Year Storm event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.10 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL3: To Rear Wetland



Time span=0.10-36.00 hrs, dt=0.01 hrs, 3591 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S-P: Runoff Area=118,844 sf Runoff Depth=1.26"
Flow Length=410' Tc=8.3 min CN=63 Runoff=3.38 cfs 0.287 af

Subcatchment 2S-P: Runoff Area=13,413 sf Runoff Depth=0.13"
Flow Length=110' Tc=8.9 min CN=39 Runoff=0.01 cfs 0.003 af

Subcatchment 3S: Largest Bldg Roof - All Buildings to conned Runoff Area=1,900 sf Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=0.20 cfs 0.016 af

Subcatchment 3S-P: Runoff Area=52,811 sf Runoff Depth=0.73"
Flow Length=432' Tc=8.2 min CN=54 Runoff=0.67 cfs 0.074 af

Subcatchment 4S-P: Runoff Area=45,730 sf Runoff Depth=0.08"
Flow Length=340' Tc=17.2 min CN=37 Runoff=0.01 cfs 0.007 af

Subcatchment 5S-P: Runoff Area=21,033 sf Runoff Depth=0.13"
Flow Length=229' Tc=10.3 min CN=39 Runoff=0.01 cfs 0.005 af

Reach 3R: Peak Depth=0.32' Max Vel=3.1 fps Inflow=0.67 cfs 0.074 af
D=12.0" n=0.011 L=2.0' S=0.0050 '/' Capacity=2.98 cfs Outflow=0.67 cfs 0.074 af

Reach 5R: Peak Depth=0.03' Max Vel=0.9 fps Inflow=0.01 cfs 0.003 af
D=12.0" n=0.011 L=21.0' S=0.0100 '/' Capacity=4.21 cfs Outflow=0.01 cfs 0.003 af

Reach 6R: Peak Depth=0.68' Max Vel=6.0 fps Inflow=3.38 cfs 0.287 af
D=12.0" n=0.011 L=16.0' S=0.0100 '/' Capacity=4.21 cfs Outflow=3.38 cfs 0.287 af

Pond 1P: Infiltration Field #1 Peak Elev=175.01' Storage=10 cf Inflow=0.67 cfs 0.077 af
Outflow=0.67 cfs 0.077 af

Pond 2P: Infiltrator Field #2 Peak Elev=175.04' Storage=125 cf Inflow=3.38 cfs 0.287 af
Discarded=3.36 cfs 0.287 af Primary=0.00 cfs 0.000 af Outflow=3.36 cfs 0.287 af

Pond 4P: 1000 gallon DW w/ 12" stone surroun Peak Elev=176.22' Storage=91 cf Inflow=0.20 cfs 0.016 af
Outflow=0.07 cfs 0.016 af

Link SC: Stormceptor Unit Inflow=0.67 cfs 0.074 af
Primary=0.67 cfs 0.074 af

Link WL2: To Lincoln Street Inflow=0.01 cfs 0.005 af
Primary=0.01 cfs 0.005 af

Link WL3: To Rear Wetland Inflow=0.01 cfs 0.007 af
Primary=0.01 cfs 0.007 af

Total Runoff Area = 5.825 ac Runoff Volume = 0.392 af Average Runoff Depth = 0.81"

Subcatchment 1S-P:

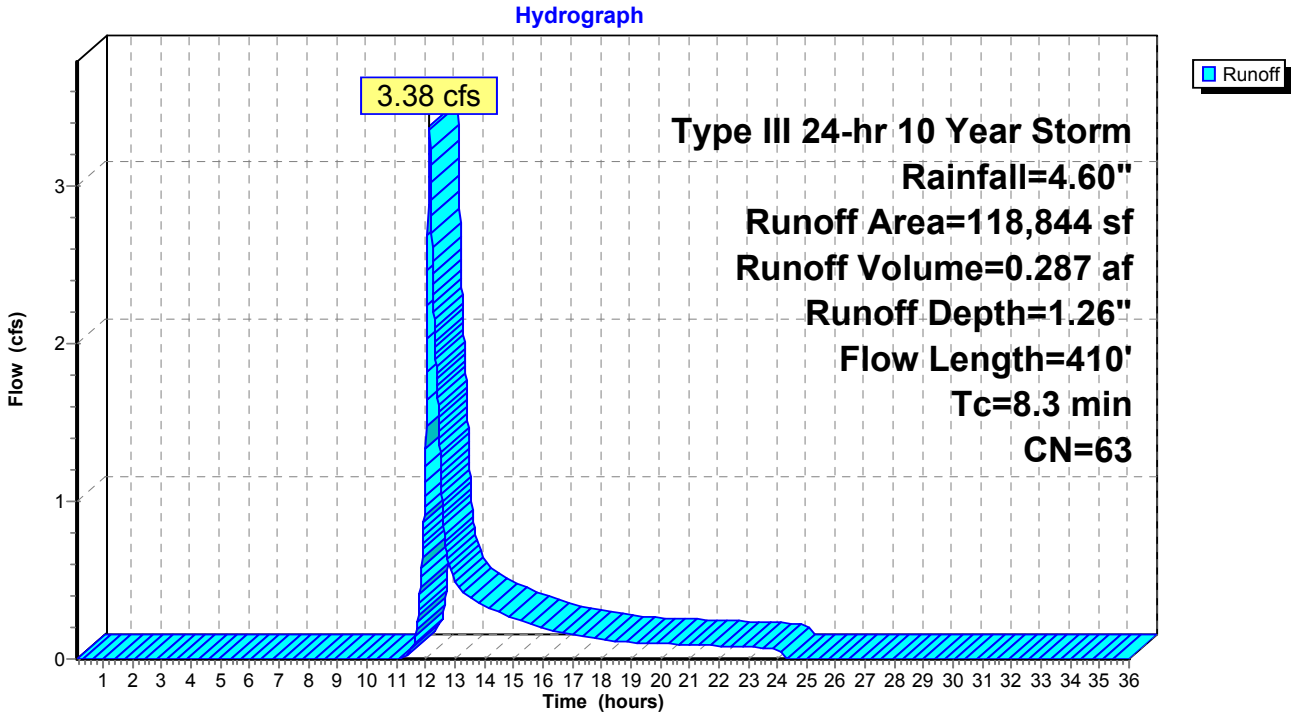
Runoff = 3.38 cfs @ 12.13 hrs, Volume= 0.287 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Storm Rainfall=4.60"

Area (sf)	CN	Description
71,444	79	Woods, Fair, HSG D
750	20	Patios (pervious)
2,400	76	Foot path - trail
11,700	36	Woods, Fair, HSG A
32,374	39	>75% Grass cover, Good, HSG A
176	98	Portion of Gazebo Roof
118,844	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	70	0.0300	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	410	Total			

Subcatchment 1S-P:



Subcatchment 2S-P:

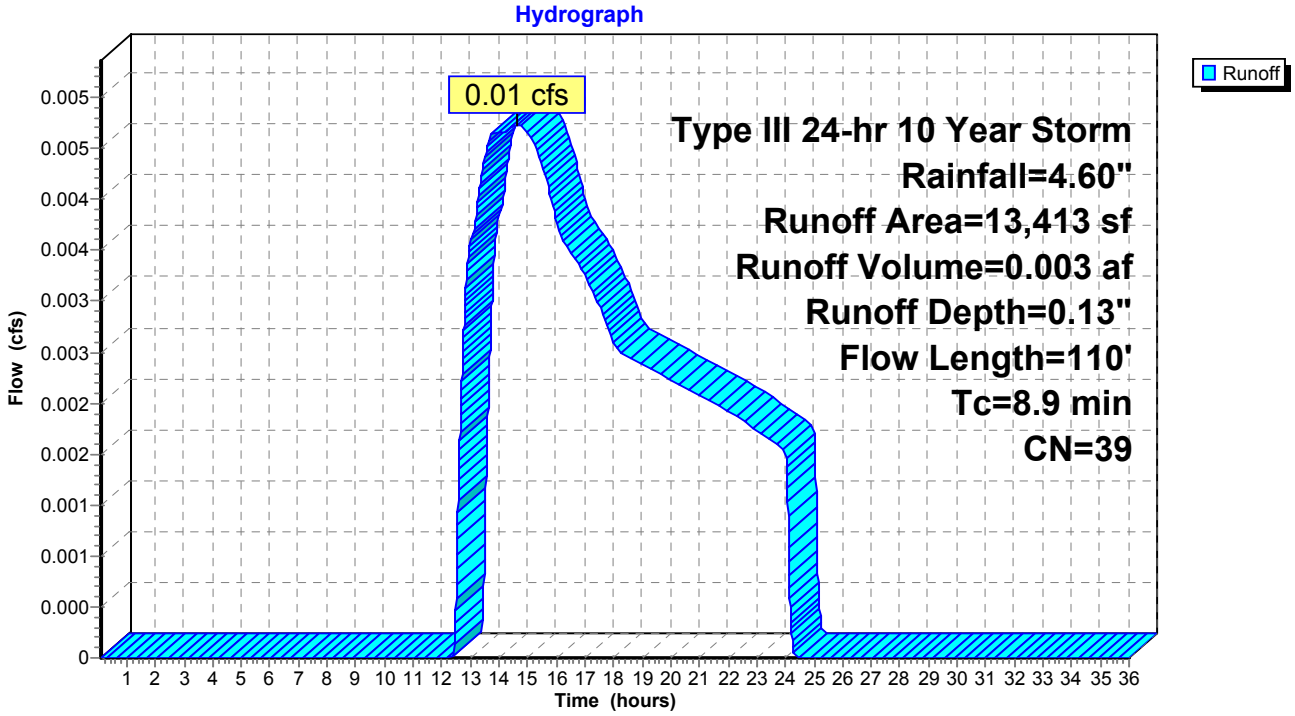
Runoff = 0.01 cfs @ 14.61 hrs, Volume= 0.003 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Storm Rainfall=4.60"

Area (sf)	CN	Description
176	98	Portion of Gazebo Roof
150	20	Pervious Patio
2,430	36	Woods, Fair, HSG A
10,657	39	>75% Grass cover, Good, HSG A
13,413	39	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.1		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.4	60	0.0100	0.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.9	110	Total			

Subcatchment 2S-P:



Subcatchment 3S: Largest Bldg Roof - All Buildings to connect to individual drywell

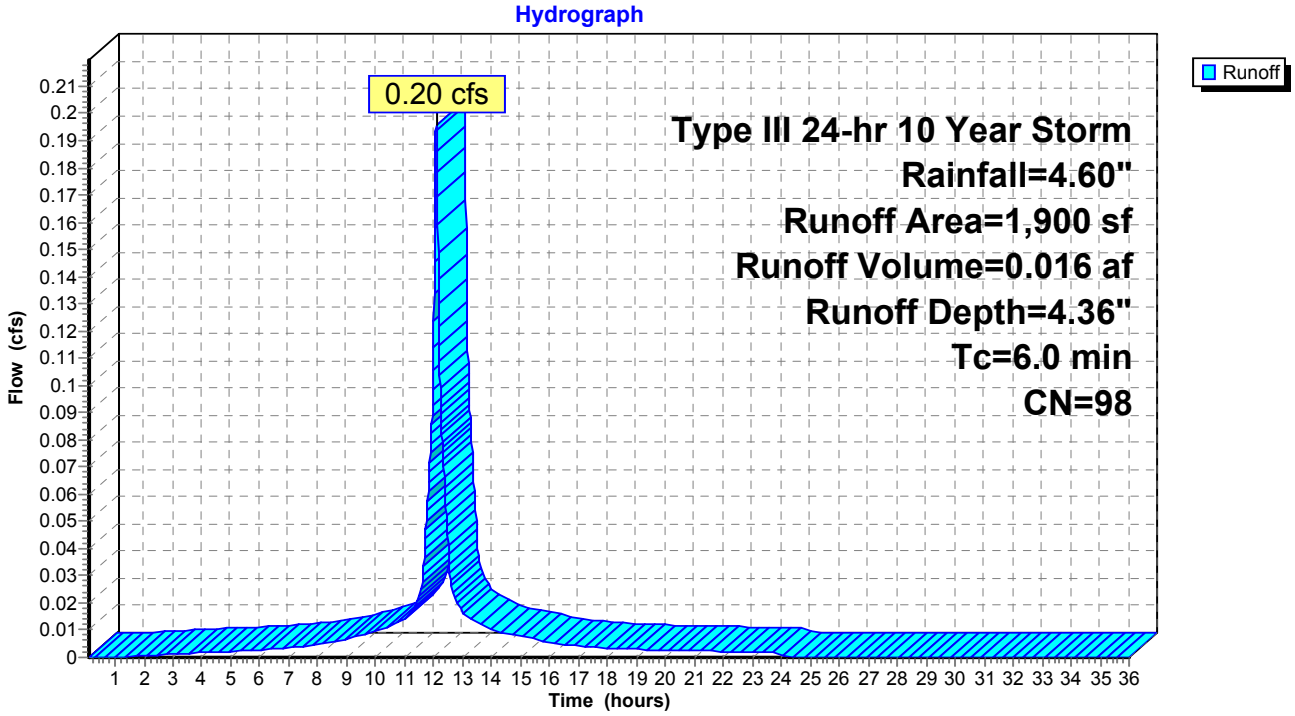
Runoff = 0.20 cfs @ 12.08 hrs, Volume= 0.016 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Storm Rainfall=4.60"

Area (sf)	CN	Description
1,900	98	Roof Area

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

Subcatchment 3S: Largest Bldg Roof - All Buildings to connect to individual drywell



Subcatchment 3S-P:

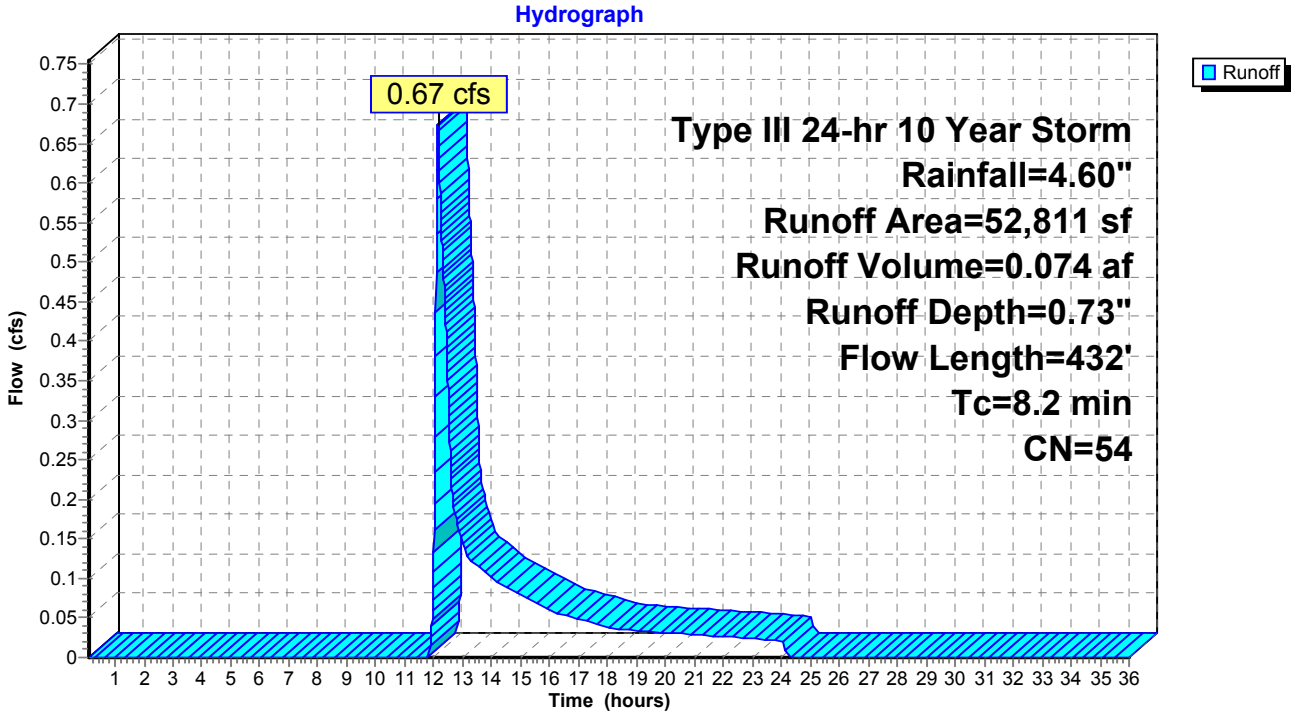
Runoff = 0.67 cfs @ 12.15 hrs, Volume= 0.074 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Storm Rainfall=4.60"

Area (sf)	CN	Description
13,454	98	Pavement areas
2,466	98	Sidewalk areas
456	98	Asphalt Berm
8,202	20	Paver Driveway (Pervious)
115	98	Ret. Walls
3,021	36	Woods, Fair, HSG A
25,097	39	>75% Grass cover, Good, HSG A
52,811	54	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	47	0.1000	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	335	0.0150	2.5		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.2	432	Total			

Subcatchment 3S-P:



Subcatchment 4S-P:

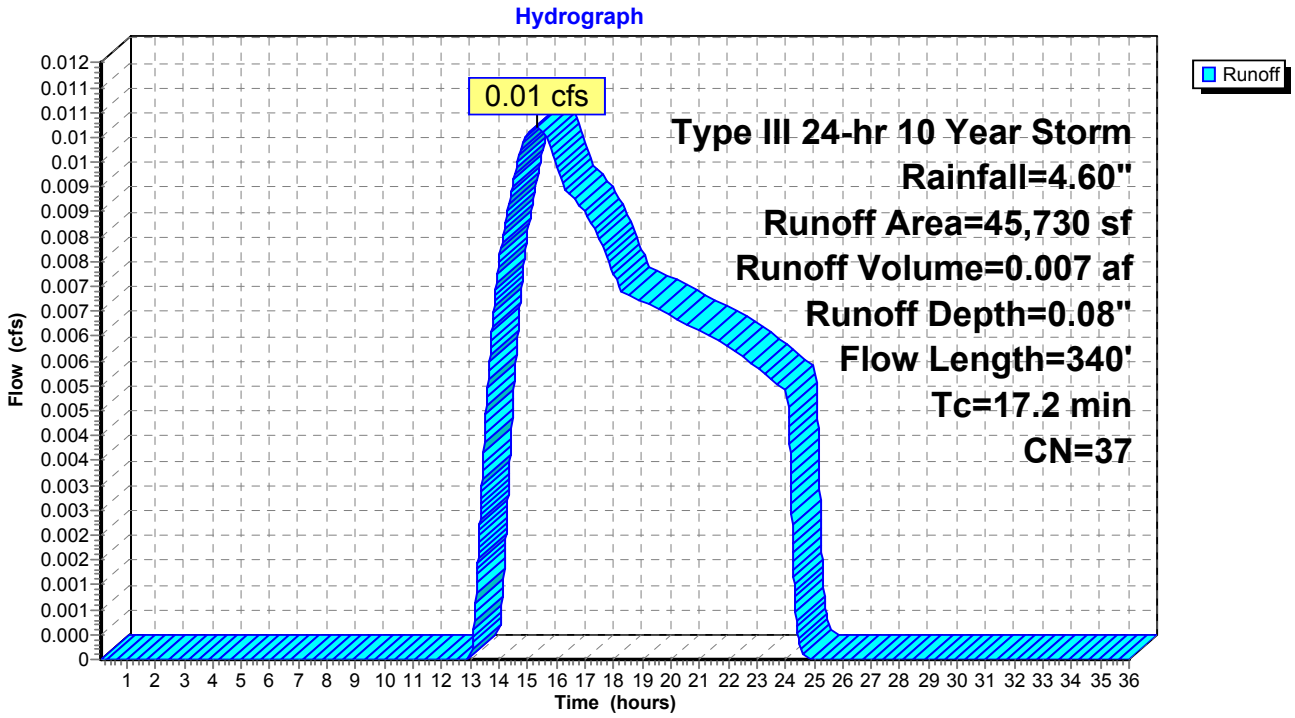
Runoff = 0.01 cfs @ 15.31 hrs, Volume= 0.007 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Storm Rainfall=4.60"

Area (sf)	CN	Description
750	20	Pervious Patios
22,630	36	Woods, Fair, HSG A
22,350	39	>75% Grass cover, Good, HSG A
45,730	37	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0280	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	49	0.1200	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	92	0.0600	1.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	149	0.0130	0.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.2	340	Total			

Subcatchment 4S-P:



Subcatchment 5S-P:

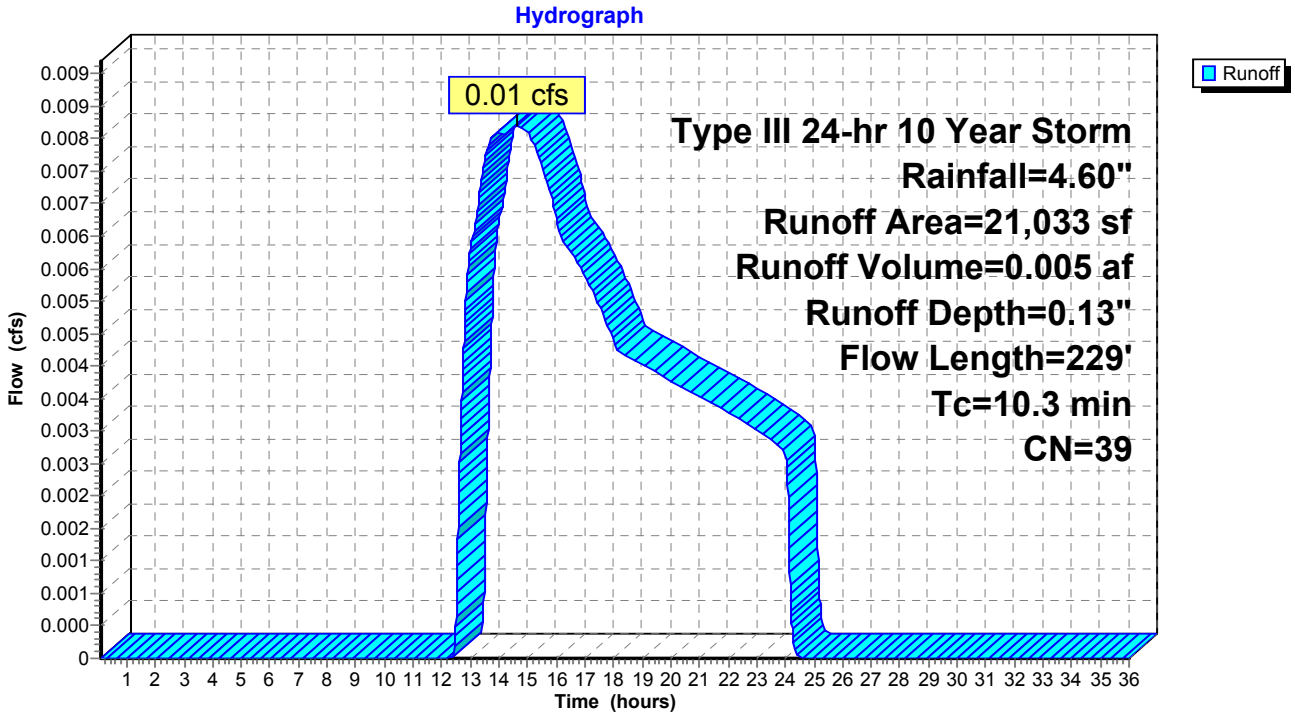
Runoff = 0.01 cfs @ 14.66 hrs, Volume= 0.005 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Storm Rainfall=4.60"

Area (sf)	CN	Description
450	20	Pervious Patios
20	98	Ret. Wall
20,563	39	>75% Grass cover, Good, HSG A
21,033	39	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0180	0.1		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.3	179	0.0100	0.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	229	Total			

Subcatchment 5S-P:



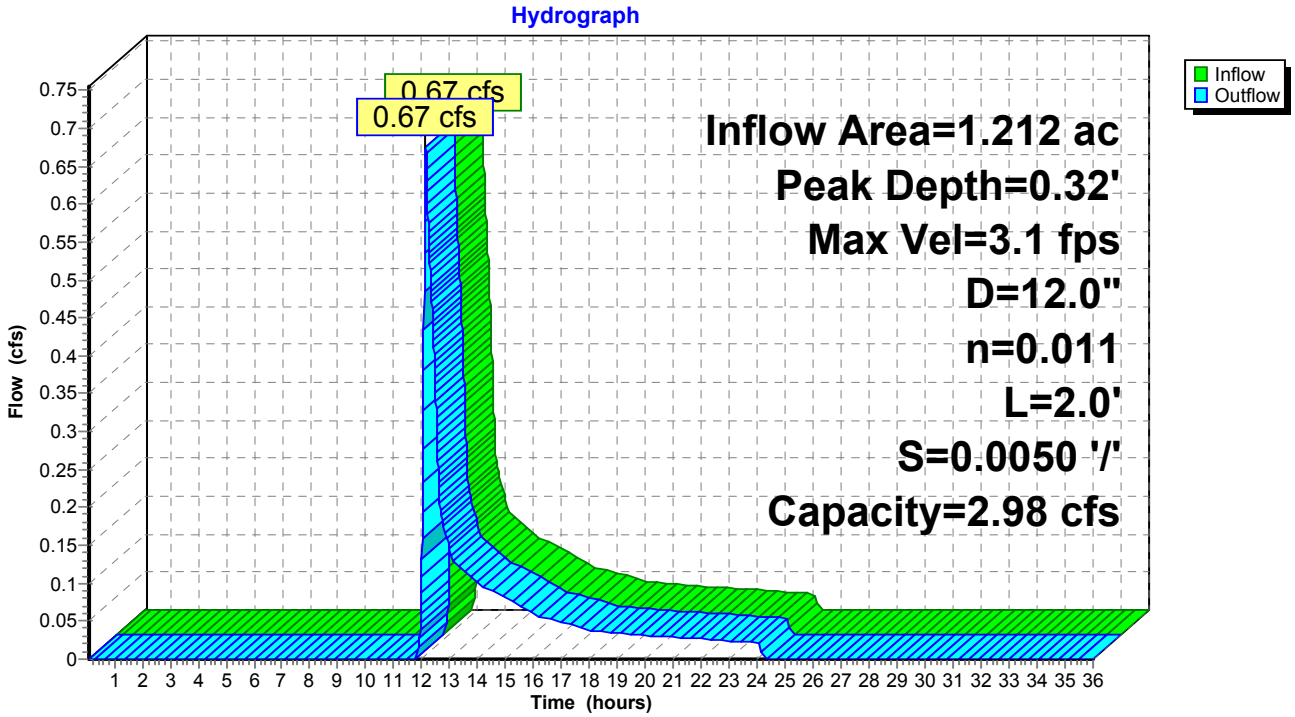
Reach 3R:

Inflow Area = 1.212 ac, Inflow Depth = 0.73" for 10 Year Storm event
Inflow = 0.67 cfs @ 12.15 hrs, Volume= 0.074 af
Outflow = 0.67 cfs @ 12.15 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.1 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.32' @ 12.15 hrs
Capacity at bank full= 2.98 cfs
Inlet Invert= 175.68', Outlet Invert= 175.67'
12.0" Diameter Pipe n= 0.011 Length= 2.0' Slope= 0.0050 '/'

Reach 3R:



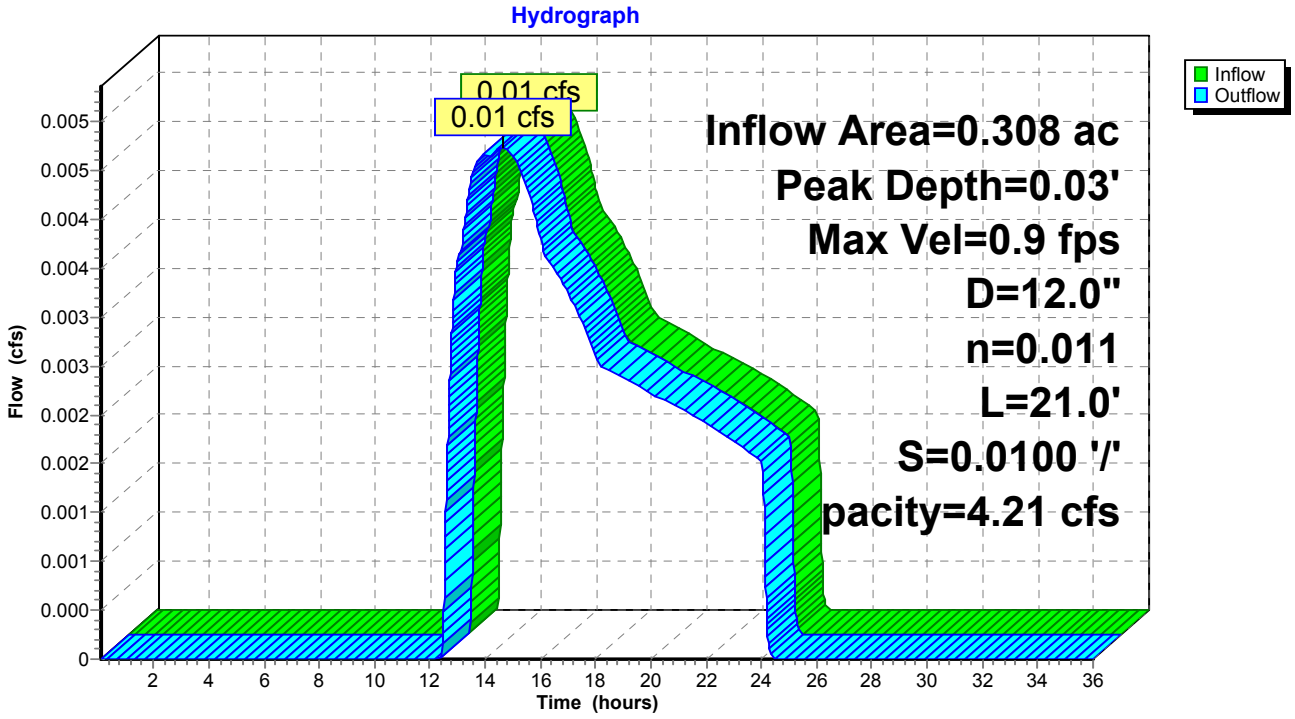
Reach 5R:

Inflow Area = 0.308 ac, Inflow Depth = 0.13" for 10 Year Storm event
Inflow = 0.01 cfs @ 14.61 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 14.63 hrs, Volume= 0.003 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.9 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.03' @ 14.62 hrs
Capacity at bank full= 4.21 cfs
Inlet Invert= 175.88', Outlet Invert= 175.67'
12.0" Diameter Pipe n= 0.011 Length= 21.0' Slope= 0.0100 '/'

Reach 5R:



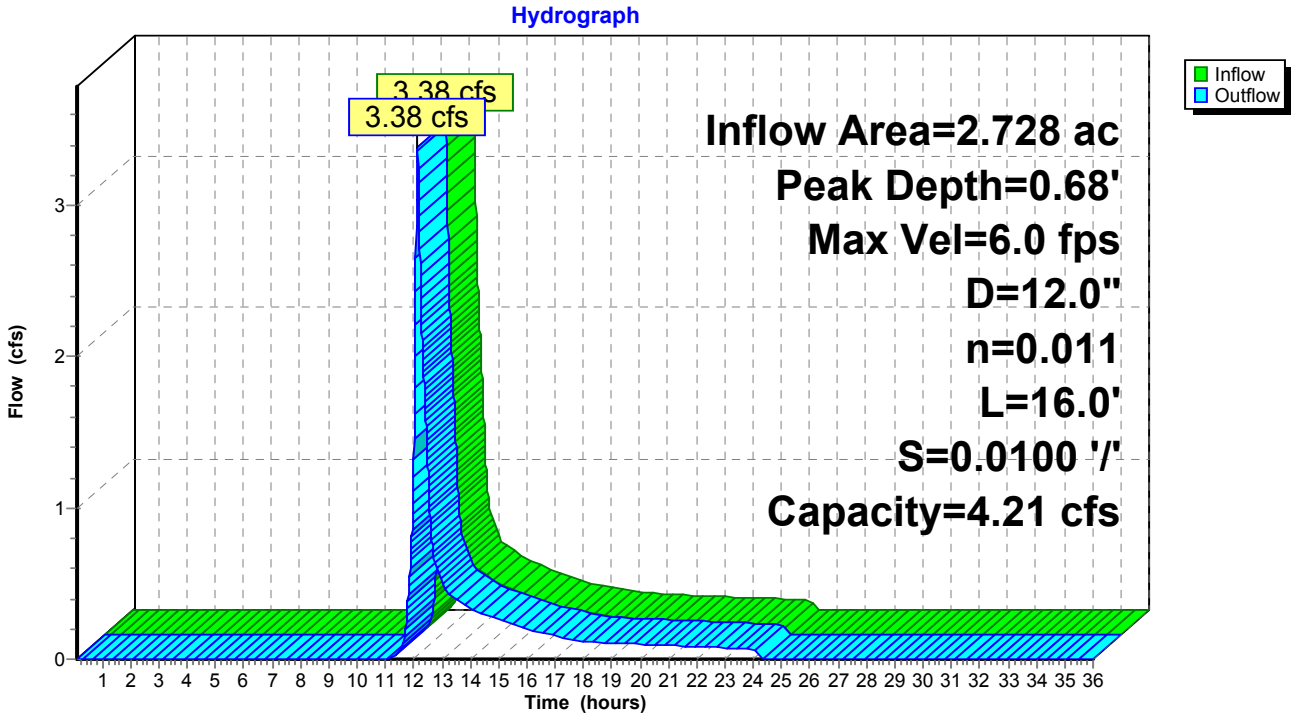
Reach 6R:

Inflow Area = 2.728 ac, Inflow Depth = 1.26" for 10 Year Storm event
Inflow = 3.38 cfs @ 12.13 hrs, Volume= 0.287 af
Outflow = 3.38 cfs @ 12.13 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.6 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.68' @ 12.13 hrs
Capacity at bank full= 4.21 cfs
Inlet Invert= 175.93', Outlet Invert= 175.77'
12.0" Diameter Pipe n= 0.011 Length= 16.0' Slope= 0.0100 '/'

Reach 6R:



Pond 1P: Infiltration Field #1

Inflow Area = 1.520 ac, Inflow Depth = 0.61" for 10 Year Storm event
Inflow = 0.67 cfs @ 12.15 hrs, Volume= 0.077 af
Outflow = 0.67 cfs @ 12.15 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.67 cfs @ 12.15 hrs, Volume= 0.077 af

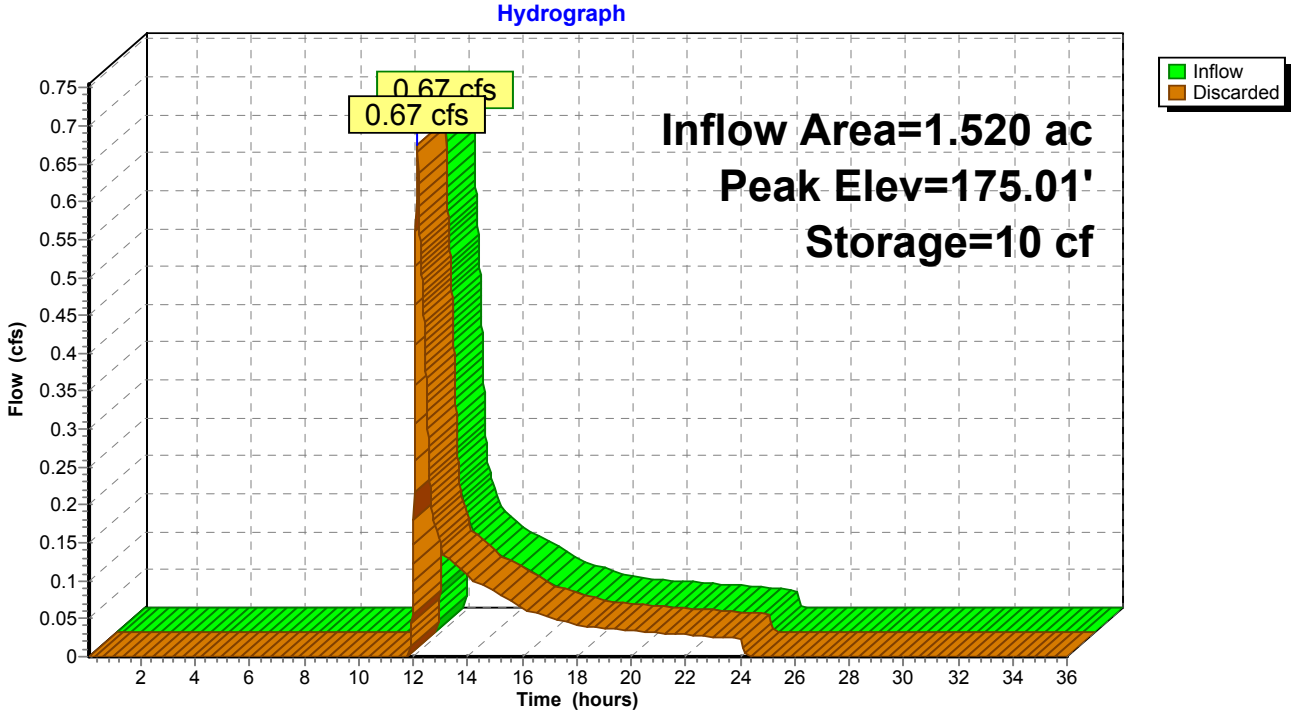
Routing by Stor-Ind method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Peak Elev= 175.01' @ 12.15 hrs Surf.Area= 1,395 sf Storage= 10 cf
Plug-Flow detention time= 0.2 min calculated for 0.077 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (913.7 - 913.5)

#	Invert	Avail.Storage	Storage Description
1	175.00'	354 cf	**10.49'W x 133.00'L x 1.17'H Prismatoid**
			1,632 cf Overall - 748 cf Embedded = 884 cf x 40.0% Voids
2	175.00'	748 cf	**34.0"W x 12.0"H x 4.00'L Parabolic Arch** x 99 Inside #1
		1,102 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.041666 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.97 cfs @ 12.15 hrs HW=175.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.97 cfs)

Pond 1P: Infiltration Field #1



Pond 2P: Infiltrator Field #2

Inflow Area =	2.728 ac,	Inflow Depth =	1.26"	for	10 Year Storm event
Inflow =	3.38 cfs @	12.13 hrs,	Volume=	0.287 af	
Outflow =	3.36 cfs @	12.14 hrs,	Volume=	0.287 af,	Atten= 1%, Lag= 0.6 min
Discarded =	3.36 cfs @	12.14 hrs,	Volume=	0.287 af	
Primary =	0.00 cfs @	0.10 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Peak Elev= 175.04' @ 12.14 hrs Surf.Area= 4,965 sf Storage= 125 cf
Plug-Flow detention time= 0.6 min calculated for 0.287 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (875.1 - 874.5)

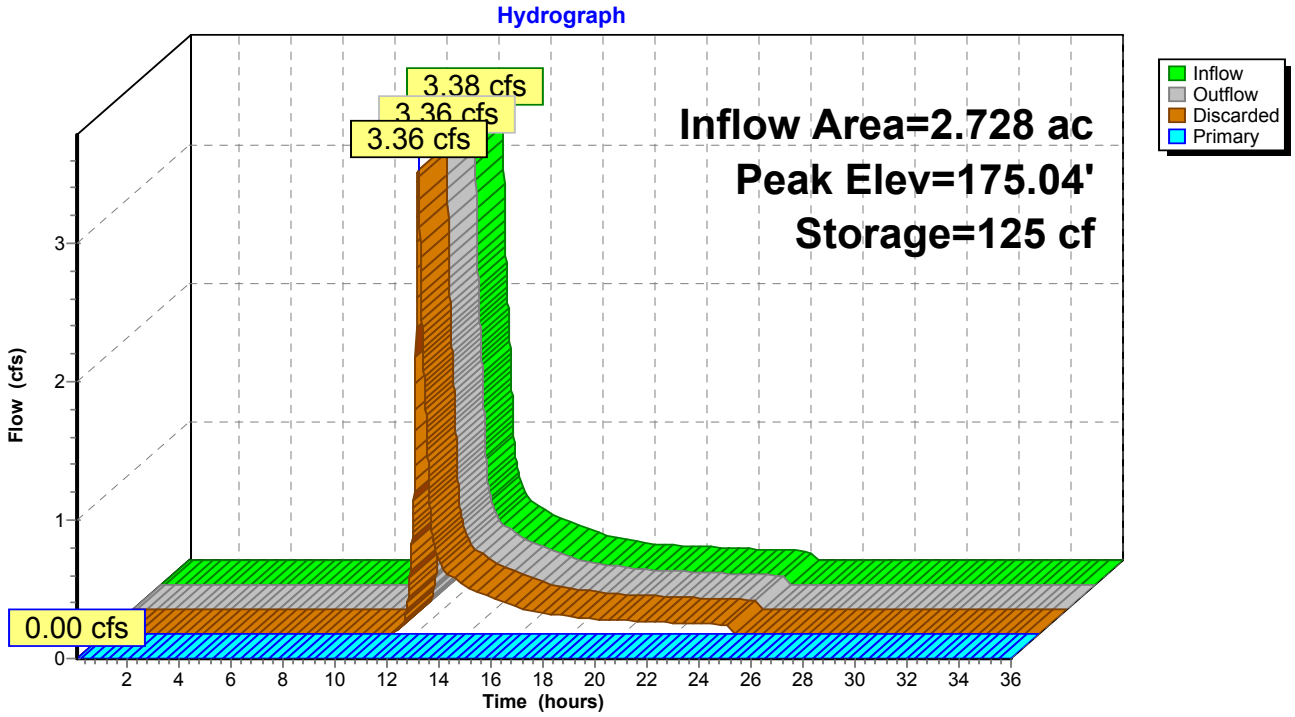
#	Invert	Avail.Storage	Storage Description
1	175.00'	3,289 cf	**27.14'W x 101.00'L x 3.00'H Prismatoid**
			8,223 cf Overall x 40.0% Voids
2	175.00'	1,511 cf	**34.0"W x 12.0"H x 4.00'L Parabolic Arch** x 200
		4,800 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.041660 fpm Exfiltration over entire Surface area**
2	Primary	178.83'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=3.45 cfs @ 12.14 hrs HW=175.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 3.45 cfs)

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=175.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Infiltrator Field #2



Pond 4P: 1000 gallon DW w/ 12" stone surrounding

Inflow Area = 0.044 ac, Inflow Depth = 4.36" for 10 Year Storm event
Inflow = 0.20 cfs @ 12.08 hrs, Volume= 0.016 af
Outflow = 0.07 cfs @ 11.85 hrs, Volume= 0.016 af, Atten= 66%, Lag= 0.0 min
Discarded = 0.07 cfs @ 11.85 hrs, Volume= 0.016 af

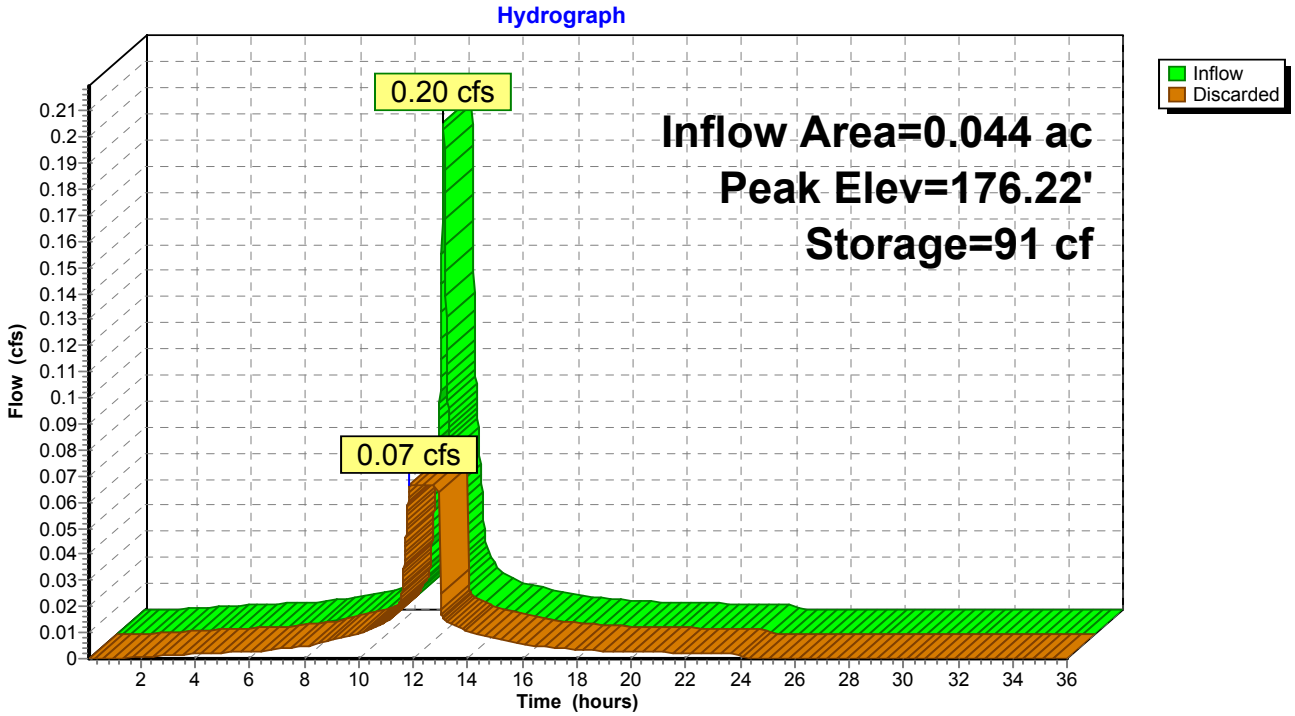
Routing by Stor-Ind method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Peak Elev= 176.22' @ 12.35 hrs Surf.Area= 96 sf Storage= 91 cf
Plug-Flow detention time= 5.6 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 5.6 min (755.0 - 749.4)

#	Invert	Avail.Storage	Storage Description
1	175.00'	54 cf	**7.67'W x 12.50'L x 3.17'H Prismatoid** 304 cf Overall - 168 cf Embedded = 135 cf x 40.0% Voids
2	175.00'	168 cf	**5.67'W x 10.50'L x 2.83'H Prismatoid** Inside #1
		223 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.041666 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.07 cfs @ 11.85 hrs HW=175.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Pond 4P: 1000 gallon DW w/ 12" stone surrounding

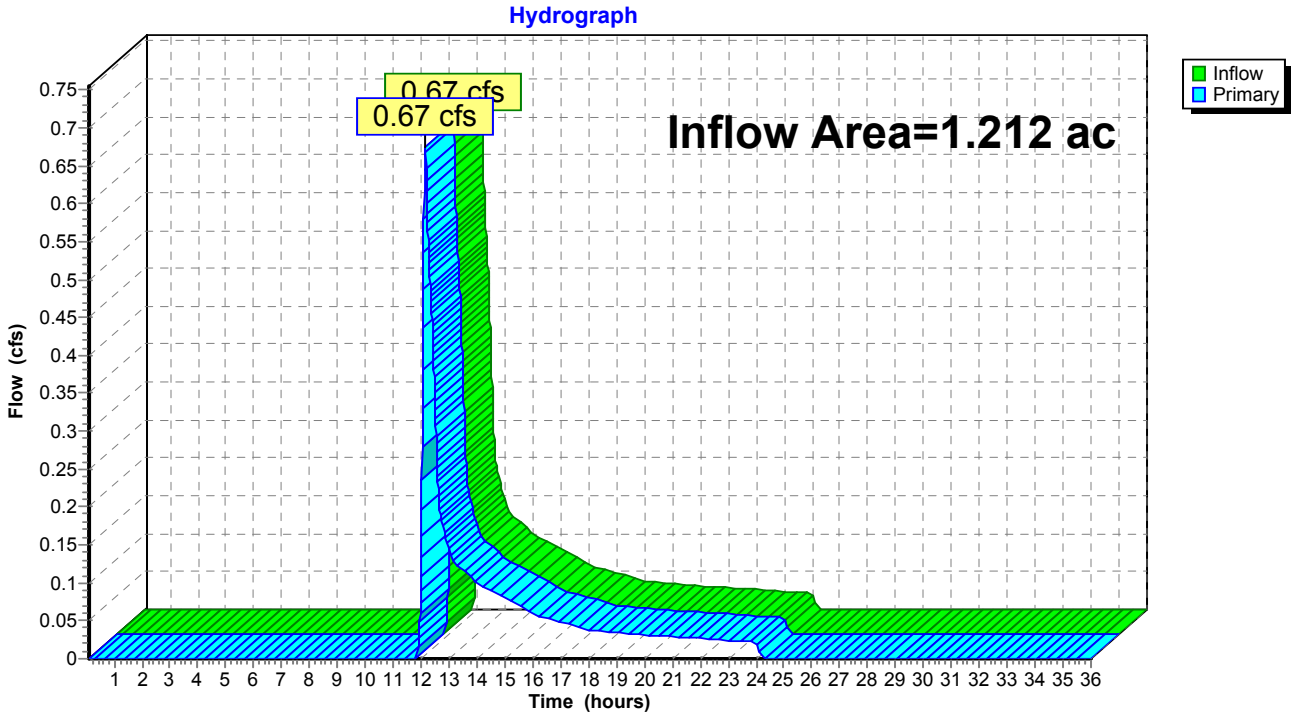


Link SC: Stormceptor Unit

Inflow Area = 1.212 ac, Inflow Depth = 0.73" for 10 Year Storm event
Inflow = 0.67 cfs @ 12.15 hrs, Volume= 0.074 af
Primary = 0.67 cfs @ 12.15 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link SC: Stormceptor Unit

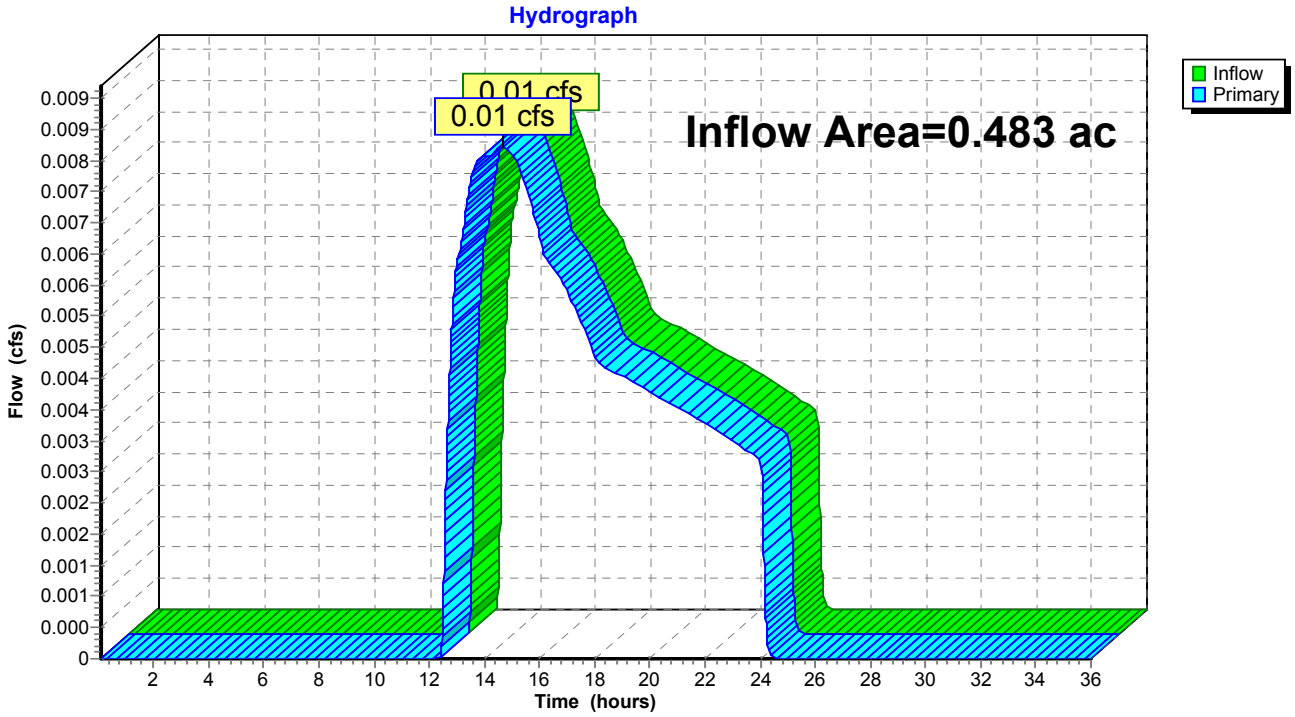


Link WL2: To Lincoln Street

Inflow Area = 0.483 ac, Inflow Depth = 0.13" for 10 Year Storm event
Inflow = 0.01 cfs @ 14.66 hrs, Volume= 0.005 af
Primary = 0.01 cfs @ 14.66 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL2: To Lincoln Street

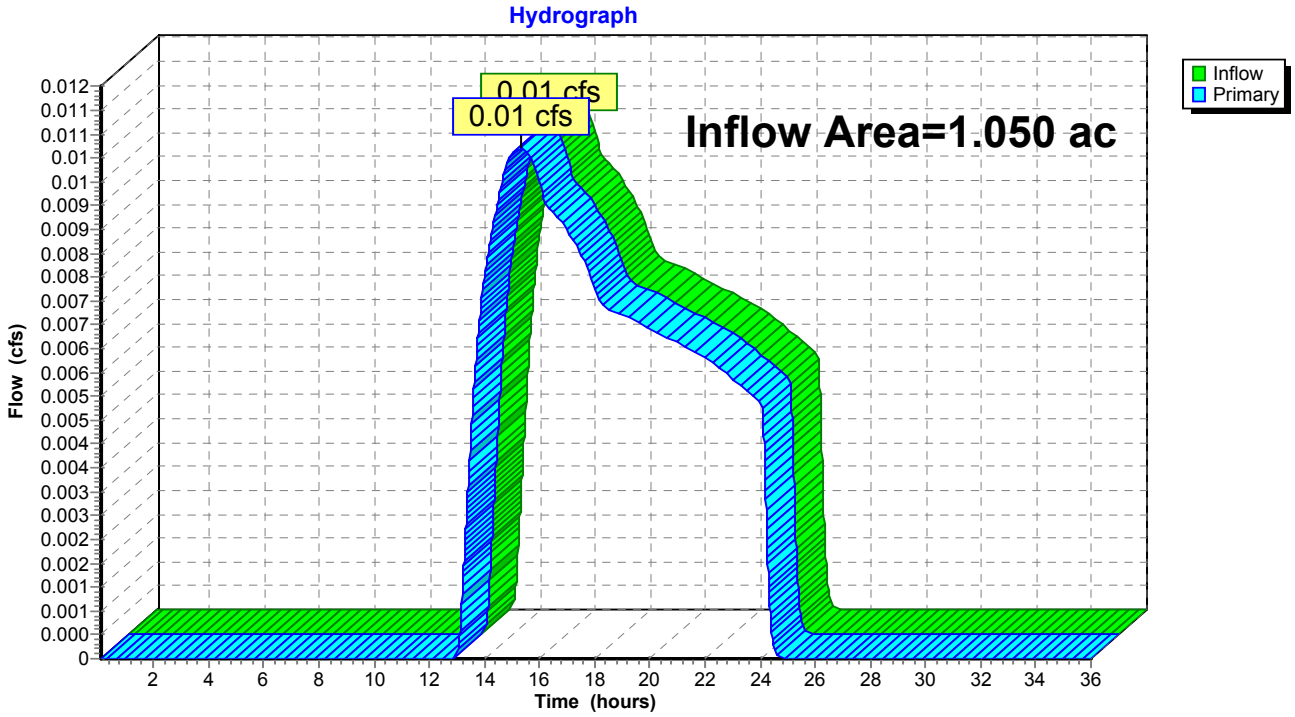


Link WL3: To Rear Wetland

Inflow Area = 1.050 ac, Inflow Depth = 0.08" for 10 Year Storm event
Inflow = 0.01 cfs @ 15.31 hrs, Volume= 0.007 af
Primary = 0.01 cfs @ 15.31 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL3: To Rear Wetland



Time span=0.10-36.00 hrs, dt=0.01 hrs, 3591 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S-P: Runoff Area=118,844 sf Runoff Depth=2.61"
Flow Length=410' Tc=8.3 min CN=63 Runoff=7.52 cfs 0.592 af

Subcatchment 2S-P: Runoff Area=13,413 sf Runoff Depth=0.63"
Flow Length=110' Tc=8.9 min CN=39 Runoff=0.09 cfs 0.016 af

Subcatchment 3S: Largest Bldg Roof - All Buildings to conned Runoff Area=1,900 sf Runoff Depth=6.36"
Tc=6.0 min CN=98 Runoff=0.28 cfs 0.023 af

Subcatchment 3S-P: Runoff Area=52,811 sf Runoff Depth=1.79"
Flow Length=432' Tc=8.2 min CN=54 Runoff=2.13 cfs 0.181 af

Subcatchment 4S-P: Runoff Area=45,730 sf Runoff Depth=0.50"
Flow Length=340' Tc=17.2 min CN=37 Runoff=0.19 cfs 0.044 af

Subcatchment 5S-P: Runoff Area=21,033 sf Runoff Depth=0.63"
Flow Length=229' Tc=10.3 min CN=39 Runoff=0.14 cfs 0.025 af

Reach 3R: Peak Depth=0.62' Max Vel=4.1 fps Inflow=2.13 cfs 0.181 af
D=12.0" n=0.011 L=2.0' S=0.0050 '/' Capacity=2.98 cfs Outflow=2.13 cfs 0.181 af

Reach 5R: Peak Depth=0.10' Max Vel=2.2 fps Inflow=0.09 cfs 0.016 af
D=12.0" n=0.011 L=21.0' S=0.0100 '/' Capacity=4.21 cfs Outflow=0.09 cfs 0.016 af

Reach 6R: Peak Depth=1.00' Max Vel=6.1 fps Inflow=7.52 cfs 0.592 af
D=12.0" n=0.011 L=16.0' S=0.0100 '/' Capacity=4.21 cfs Outflow=4.46 cfs 0.592 af

Pond 1P: Infiltration Field #1 Peak Elev=175.90' Storage=936 cf Inflow=2.18 cfs 0.197 af
Outflow=0.97 cfs 0.197 af

Pond 2P: Infiltrator Field #2 Peak Elev=176.09' Storage=2,703 cf Inflow=4.46 cfs 0.592 af
Discarded=3.44 cfs 0.592 af Primary=0.00 cfs 0.000 af Outflow=3.44 cfs 0.592 af

Pond 4P: 1000 gallon DW w/ 12" stone surrou Peak Elev=177.65' Storage=196 cf Inflow=0.28 cfs 0.023 af
Outflow=0.07 cfs 0.023 af

Link SC: Stormceptor Unit Inflow=2.13 cfs 0.181 af
Primary=2.13 cfs 0.181 af

Link WL2: To Lincoln Street Inflow=0.14 cfs 0.025 af
Primary=0.14 cfs 0.025 af

Link WL3: To Rear Wetland Inflow=0.19 cfs 0.044 af
Primary=0.19 cfs 0.044 af

Total Runoff Area = 5.825 ac Runoff Volume = 0.882 af Average Runoff Depth = 1.82"

Subcatchment 1S-P:

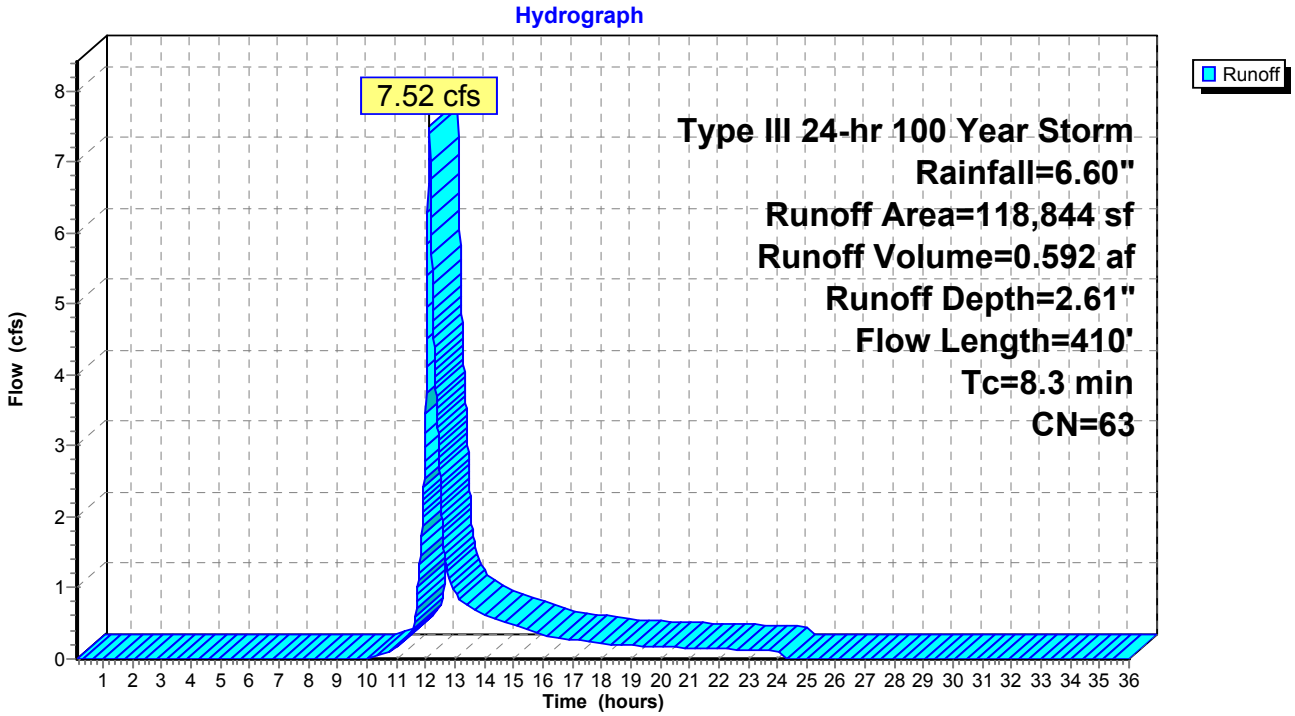
Runoff = 7.52 cfs @ 12.12 hrs, Volume= 0.592 af, Depth= 2.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Storm Rainfall=6.60"

Area (sf)	CN	Description
71,444	79	Woods, Fair, HSG D
750	20	Patios (pervious)
2,400	76	Foot path - trail
11,700	36	Woods, Fair, HSG A
32,374	39	>75% Grass cover, Good, HSG A
176	98	Portion of Gazebo Roof
118,844	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.2000	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	70	0.0300	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.3	410	Total			

Subcatchment 1S-P:



Subcatchment 2S-P:

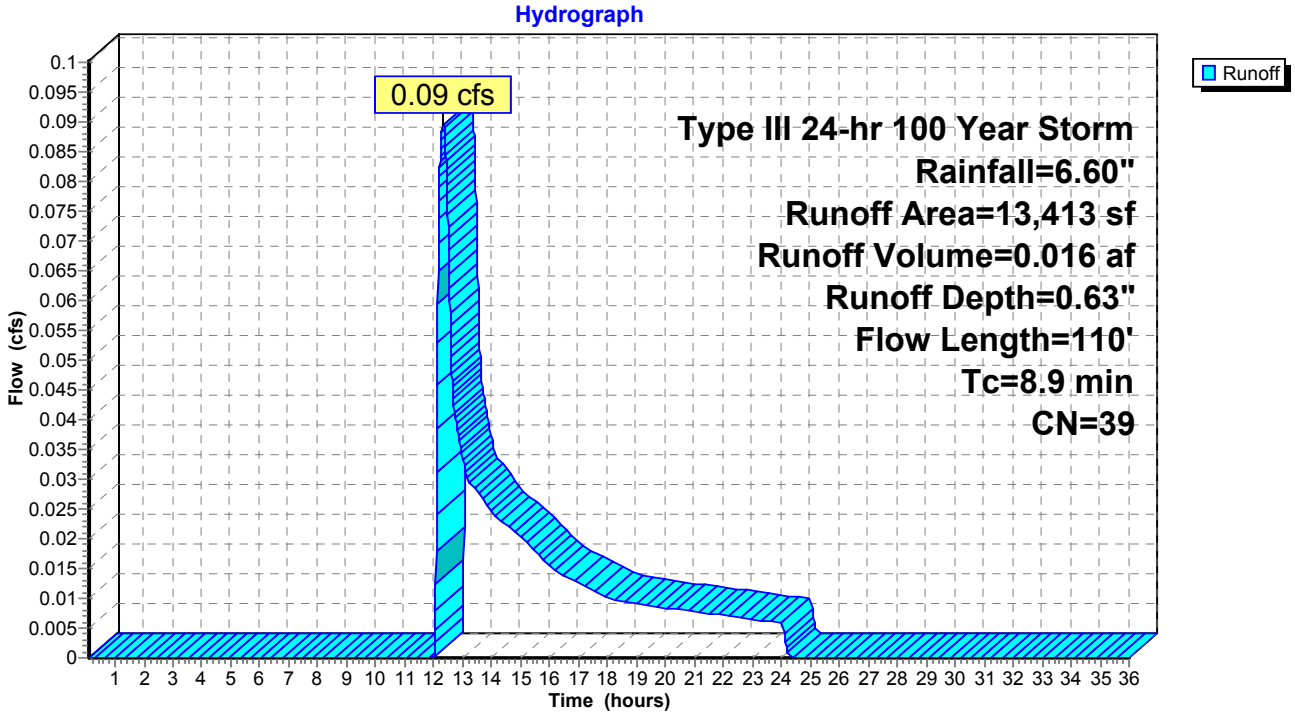
Runoff = 0.09 cfs @ 12.33 hrs, Volume= 0.016 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Storm Rainfall=6.60"

Area (sf)	CN	Description
176	98	Portion of Gazebo Roof
150	20	Pervious Patio
2,430	36	Woods, Fair, HSG A
10,657	39	>75% Grass cover, Good, HSG A
13,413	39	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.1		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.4	60	0.0100	0.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.9	110	Total			

Subcatchment 2S-P:



Subcatchment 3S: Largest Bldg Roof - All Buildings to connect to individual drywell

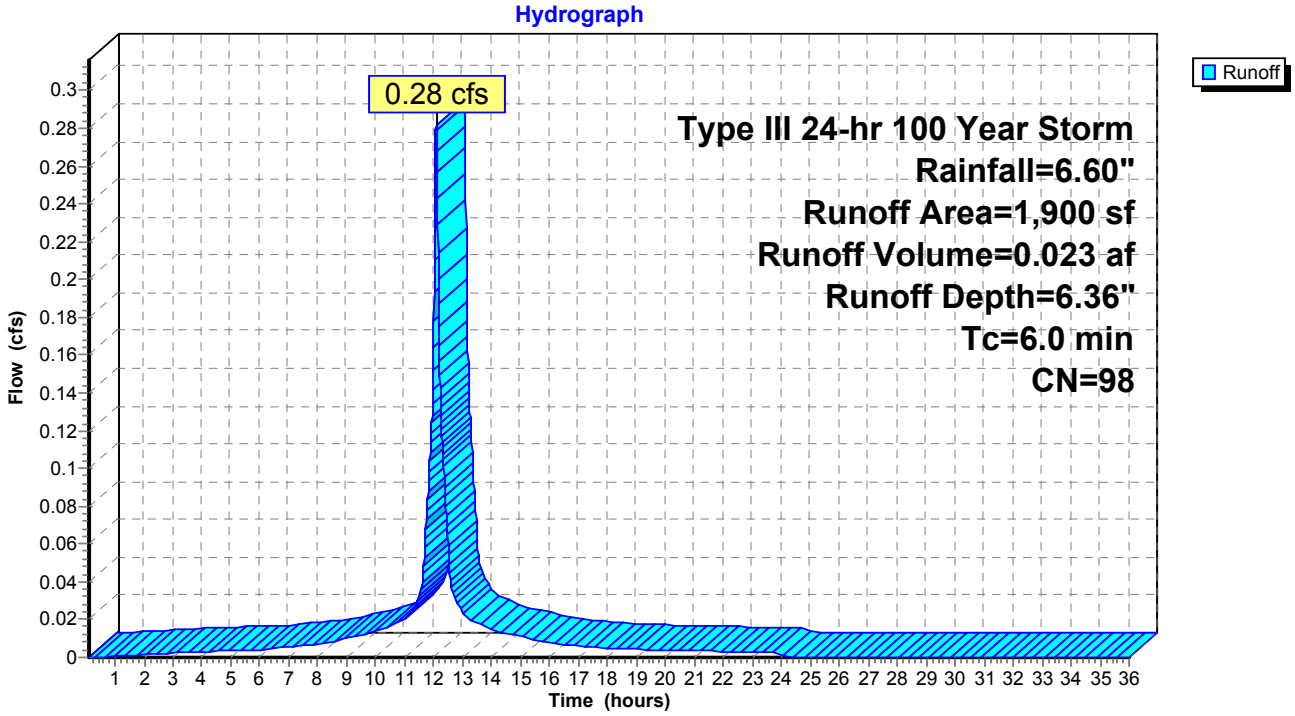
Runoff = 0.28 cfs @ 12.08 hrs, Volume= 0.023 af, Depth= 6.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Storm Rainfall=6.60"

Area (sf)	CN	Description
1,900	98	Roof Area

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

Subcatchment 3S: Largest Bldg Roof - All Buildings to connect to individual drywell



Subcatchment 3S-P:

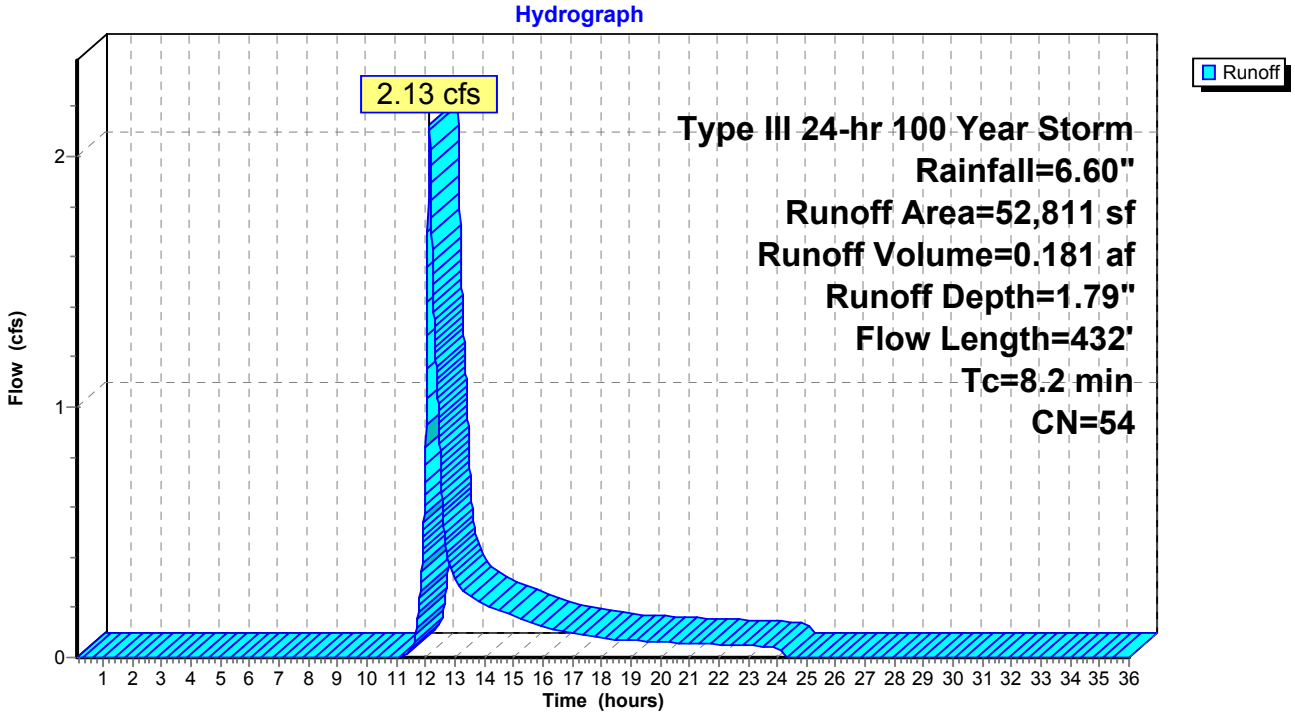
Runoff = 2.13 cfs @ 12.13 hrs, Volume= 0.181 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Storm Rainfall=6.60"

Area (sf)	CN	Description
13,454	98	Pavement areas
2,466	98	Sidewalk areas
456	98	Asphalt Berm
8,202	20	Paver Driveway (Pervious)
115	98	Ret. Walls
3,021	36	Woods, Fair, HSG A
25,097	39	>75% Grass cover, Good, HSG A
52,811	54	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	47	0.1000	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	335	0.0150	2.5		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.2	432	Total			

Subcatchment 3S-P:



Subcatchment 4S-P:

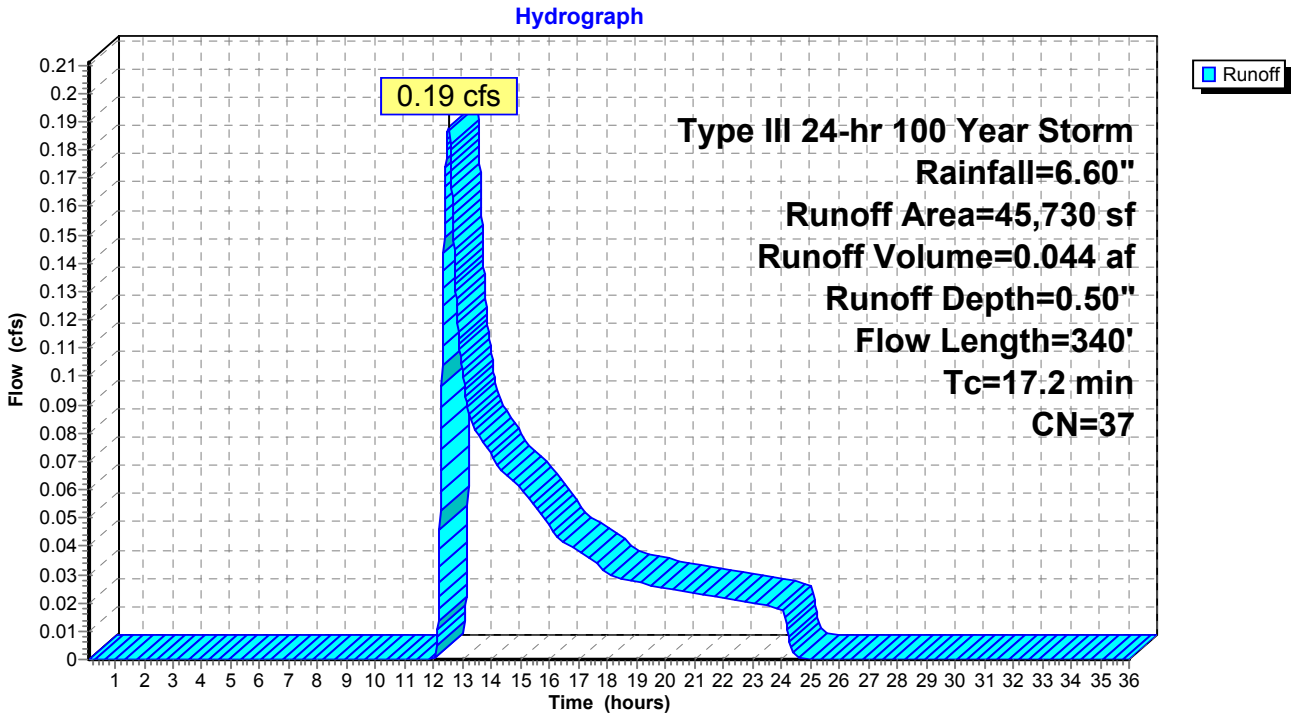
Runoff = 0.19 cfs @ 12.51 hrs, Volume= 0.044 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Storm Rainfall=6.60"

Area (sf)	CN	Description
750	20	Pervious Patios
22,630	36	Woods, Fair, HSG A
22,350	39	>75% Grass cover, Good, HSG A
45,730	37	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0280	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.5	49	0.1200	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	92	0.0600	1.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	149	0.0130	0.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.2	340	Total			

Subcatchment 4S-P:



Subcatchment 5S-P:

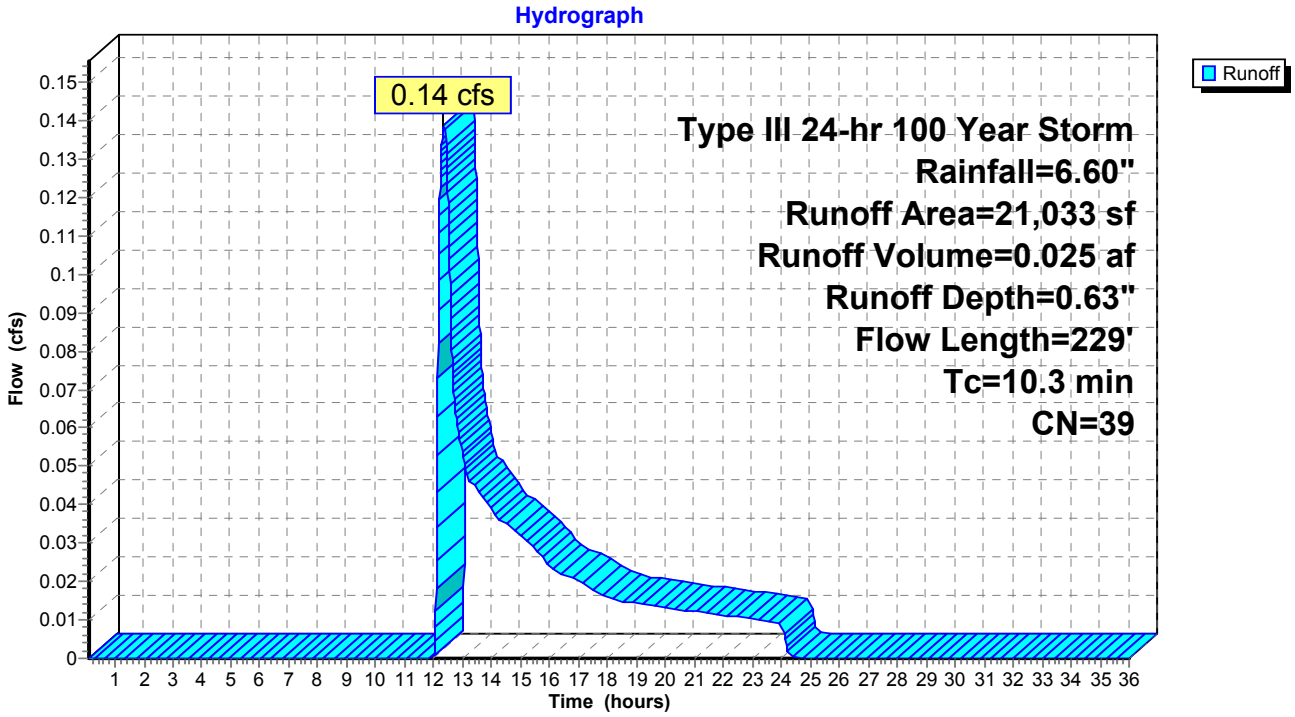
Runoff = 0.14 cfs @ 12.35 hrs, Volume= 0.025 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Storm Rainfall=6.60"

Area (sf)	CN	Description
450	20	Pervious Patios
20	98	Ret. Wall
20,563	39	>75% Grass cover, Good, HSG A
21,033	39	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0180	0.1		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
4.3	179	0.0100	0.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	229	Total			

Subcatchment 5S-P:



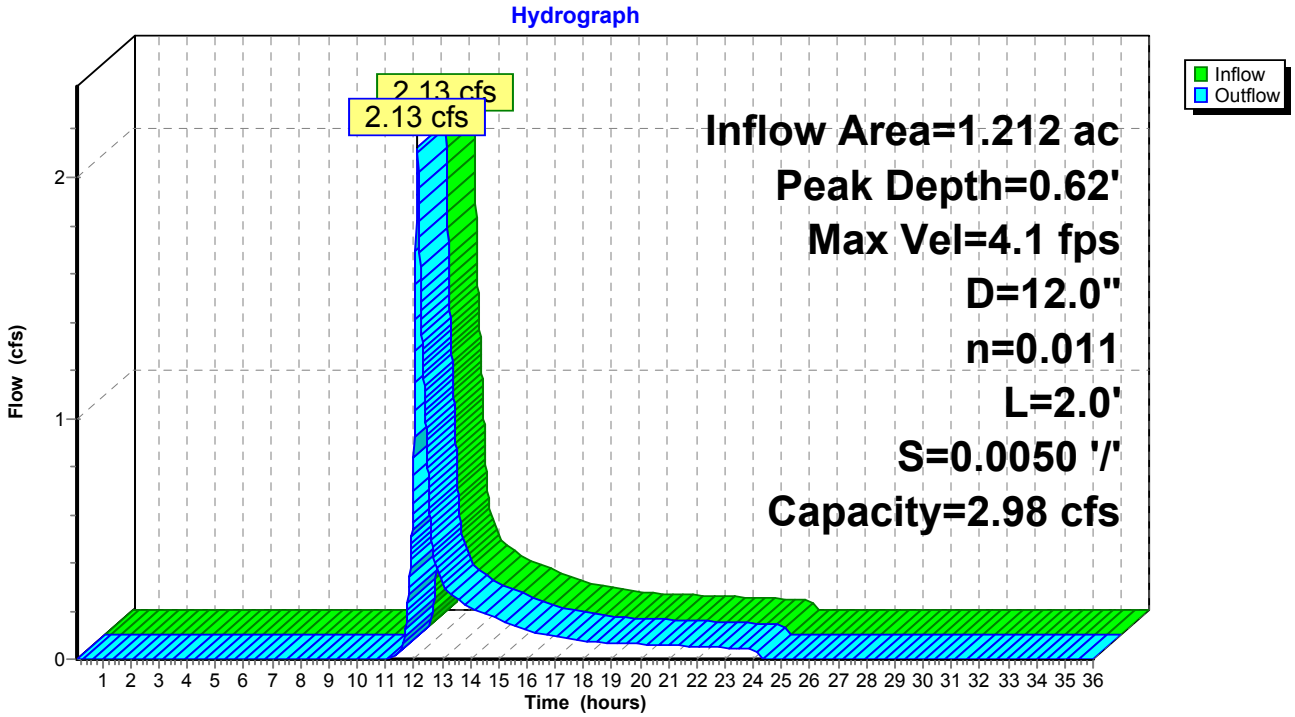
Reach 3R:

Inflow Area = 1.212 ac, Inflow Depth = 1.79" for 100 Year Storm event
Inflow = 2.13 cfs @ 12.13 hrs, Volume= 0.181 af
Outflow = 2.13 cfs @ 12.13 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.1 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.8 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.62' @ 12.13 hrs
Capacity at bank full= 2.98 cfs
Inlet Invert= 175.68', Outlet Invert= 175.67'
12.0" Diameter Pipe n= 0.011 Length= 2.0' Slope= 0.0050 '/'

Reach 3R:



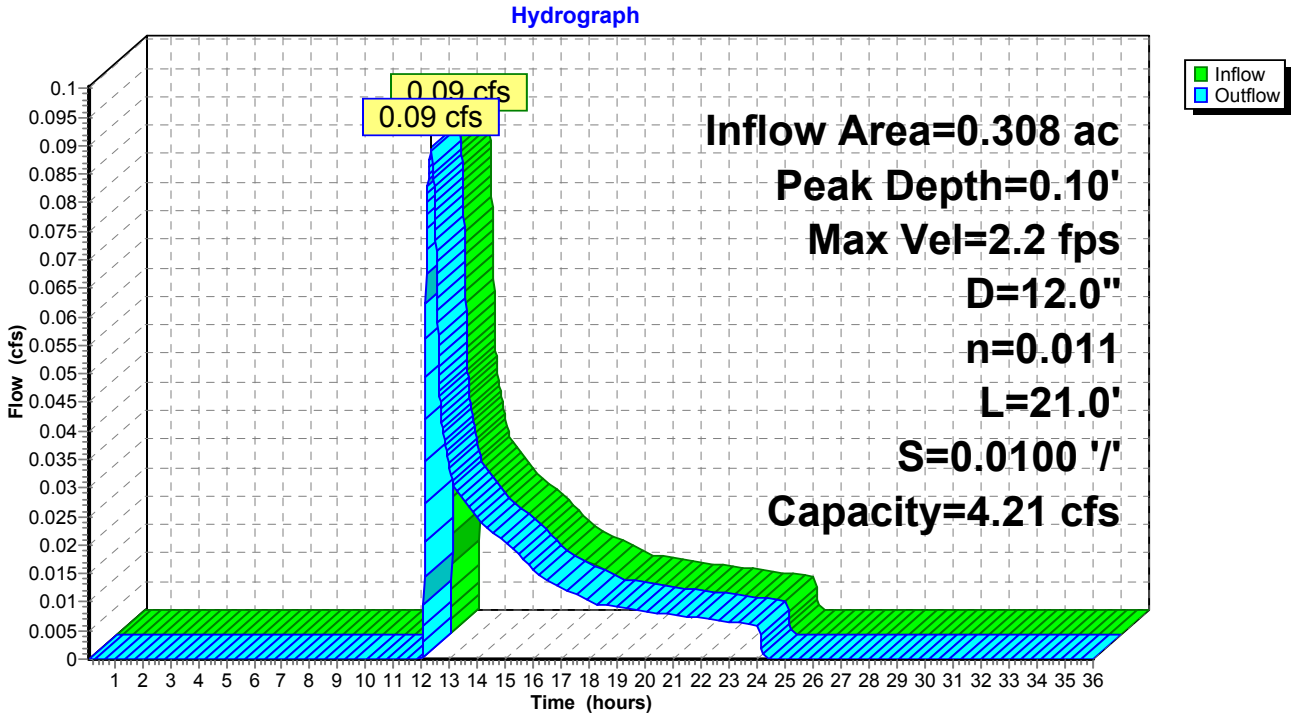
Reach 5R:

Inflow Area = 0.308 ac, Inflow Depth = 0.63" for 100 Year Storm event
Inflow = 0.09 cfs @ 12.33 hrs, Volume= 0.016 af
Outflow = 0.09 cfs @ 12.33 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.2 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.10' @ 12.33 hrs
Capacity at bank full= 4.21 cfs
Inlet Invert= 175.88', Outlet Invert= 175.67'
12.0" Diameter Pipe n= 0.011 Length= 21.0' Slope= 0.0100 '/'

Reach 5R:



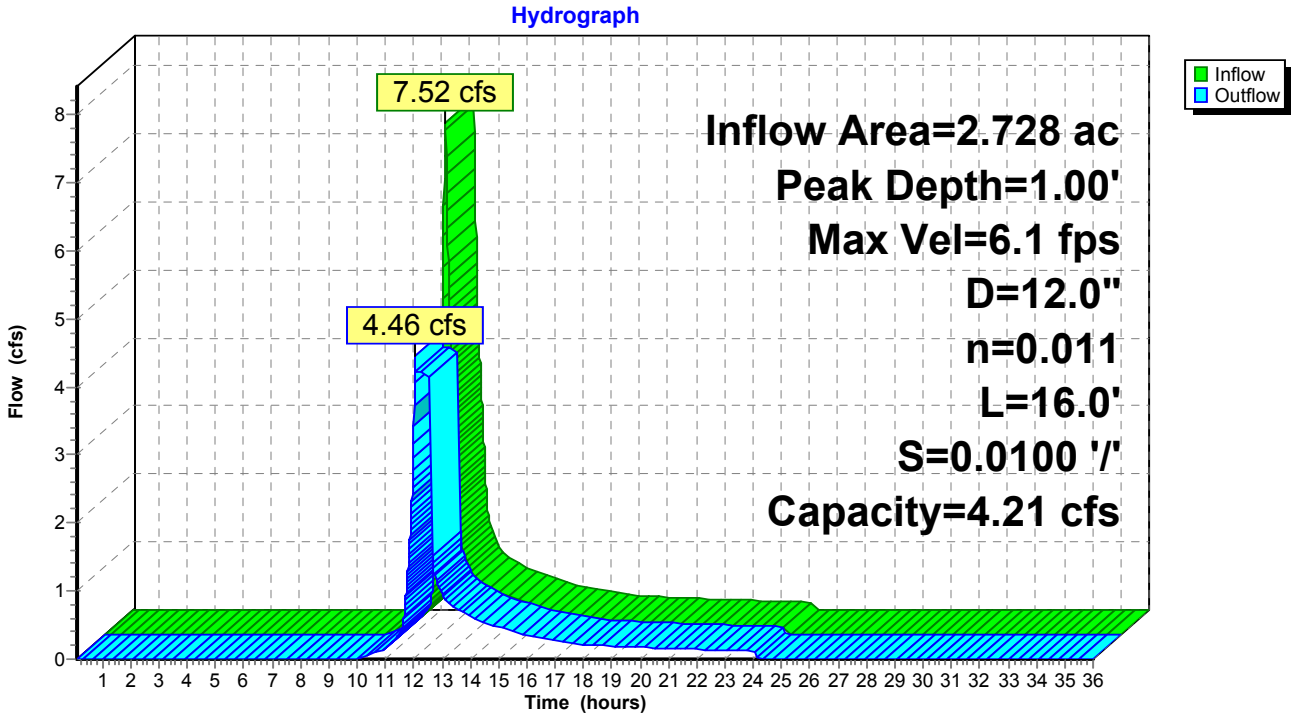
Reach 6R:

Inflow Area = 2.728 ac, Inflow Depth = 2.61" for 100 Year Storm event
Inflow = 7.52 cfs @ 12.12 hrs, Volume= 0.592 af
Outflow = 4.46 cfs @ 12.03 hrs, Volume= 0.592 af, Atten= 41%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.1 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.0 fps, Avg. Travel Time= 0.1 min

Peak Depth= 1.00' @ 12.04 hrs
Capacity at bank full= 4.21 cfs
Inlet Invert= 175.93', Outlet Invert= 175.77'
12.0" Diameter Pipe n= 0.011 Length= 16.0' Slope= 0.0100 '/'

Reach 6R:



Pond 1P: Infiltration Field #1

Inflow Area =	1.520 ac,	Inflow Depth =	1.55"	for	100 Year Storm event
Inflow =	2.18 cfs @	12.13 hrs,	Volume=	0.197 af	
Outflow =	0.97 cfs @	12.02 hrs,	Volume=	0.197 af,	Atten= 55%, Lag= 0.0 min
Discarded =	0.97 cfs @	12.02 hrs,	Volume=	0.197 af	

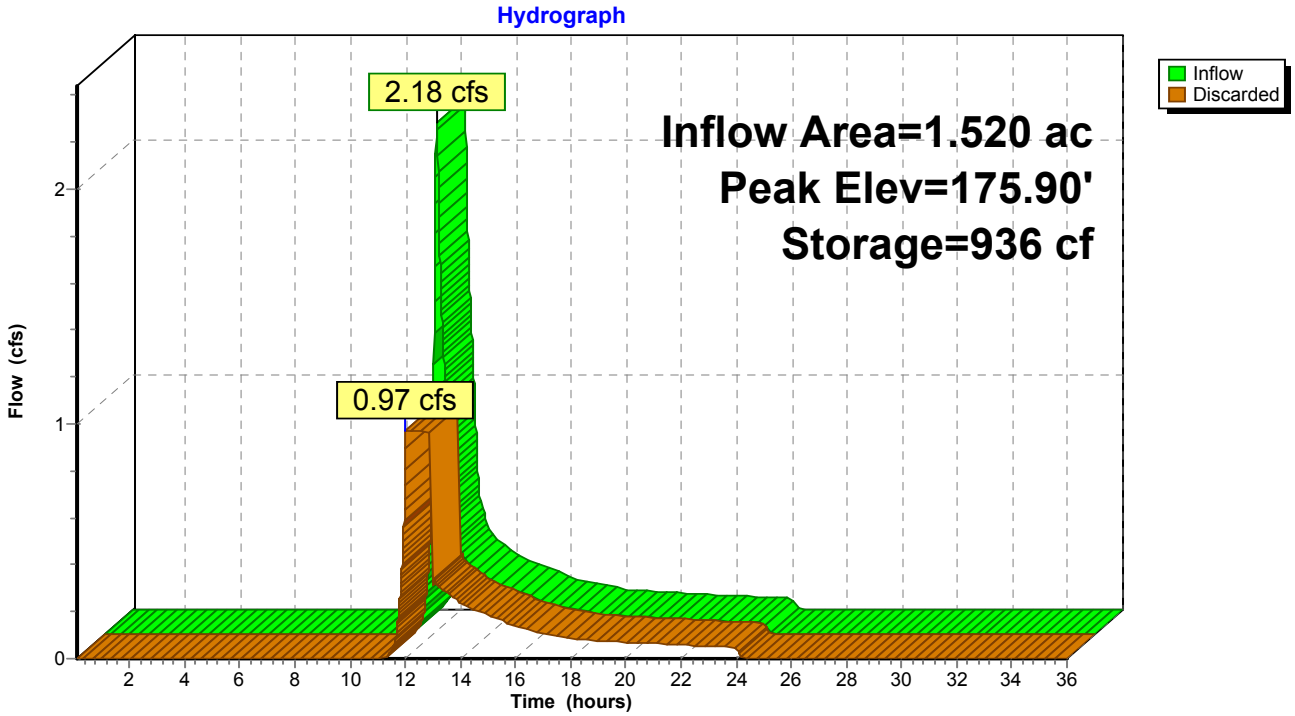
Routing by Stor-Ind method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Peak Elev= 175.90' @ 12.47 hrs Surf.Area= 1,395 sf Storage= 936 cf
Plug-Flow detention time= 4.2 min calculated for 0.197 af (100% of inflow)
Center-of-Mass det. time= 4.2 min (884.9 - 880.7)

#	Invert	Avail.Storage	Storage Description
1	175.00'	354 cf	**10.49'W x 133.00'L x 1.17'H Prismatoid**
			1,632 cf Overall - 748 cf Embedded = 884 cf x 40.0% Voids
2	175.00'	748 cf	**34.0"W x 12.0"H x 4.00'L Parabolic Arch** x 99 Inside #1
		1,102 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.041666 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.97 cfs @ 12.02 hrs HW=175.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.97 cfs)

Pond 1P: Infiltration Field #1



Pond 2P: Infiltrator Field #2

Inflow Area =	2.728 ac,	Inflow Depth =	2.61"	for	100 Year Storm event
Inflow =	4.46 cfs @	12.03 hrs,	Volume=	0.592 af	
Outflow =	3.44 cfs @	12.02 hrs,	Volume=	0.592 af,	Atten= 23%, Lag= 0.0 min
Discarded =	3.44 cfs @	12.02 hrs,	Volume=	0.592 af	
Primary =	0.00 cfs @	0.10 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Peak Elev= 176.09' @ 12.64 hrs Surf.Area= 2,741 sf Storage= 2,703 cf
Plug-Flow detention time= 3.8 min calculated for 0.592 af (100% of inflow)
Center-of-Mass det. time= 3.8 min (857.3 - 853.5)

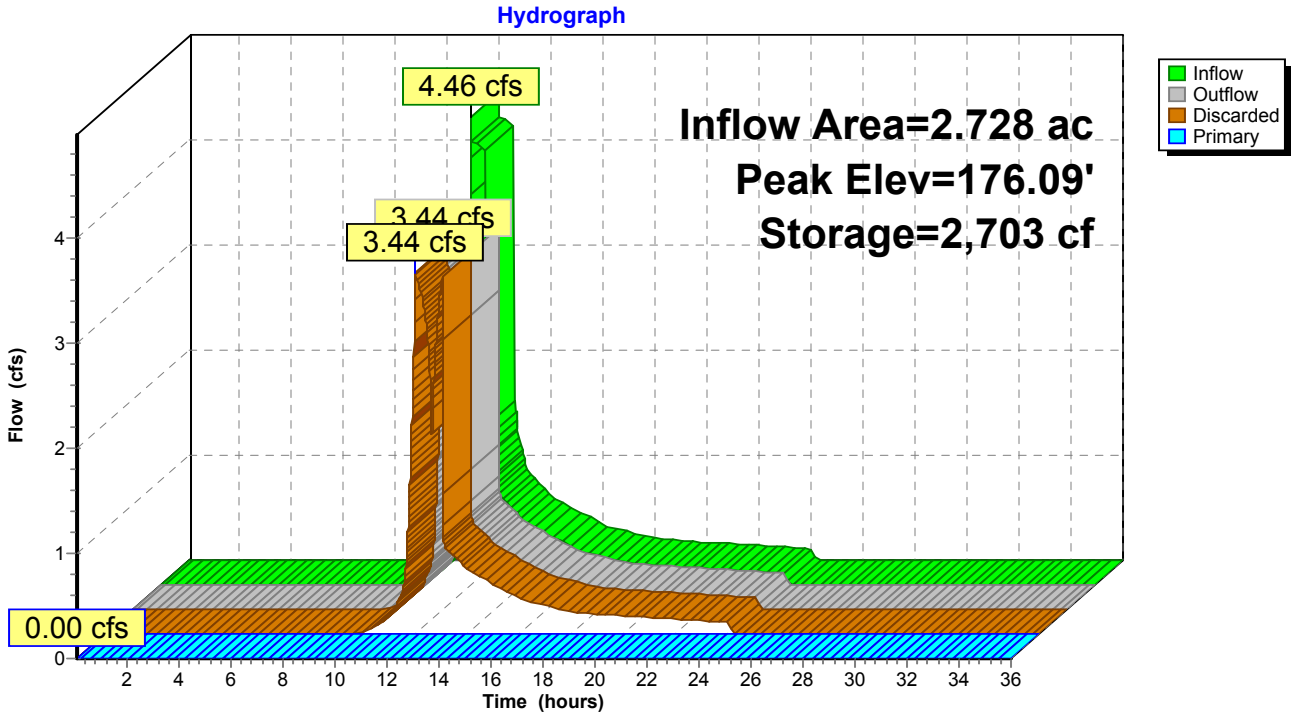
#	Invert	Avail.Storage	Storage Description
1	175.00'	3,289 cf	**27.14'W x 101.00'L x 3.00'H Prismatoid**
			8,223 cf Overall x 40.0% Voids
2	175.00'	1,511 cf	**34.0"W x 12.0"H x 4.00'L Parabolic Arch** x 200
		4,800 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.041660 fpm Exfiltration over entire Surface area**
2	Primary	178.83'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=3.44 cfs @ 12.02 hrs HW=175.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 3.44 cfs)

Primary OutFlow Max=0.00 cfs @ 0.10 hrs HW=175.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Infiltrator Field #2



Pond 4P: 1000 gallon DW w/ 12" stone surrounding

Inflow Area =	0.044 ac,	Inflow Depth =	6.36"	for	100 Year Storm event
Inflow =	0.28 cfs @	12.08 hrs,	Volume=	0.023 af	
Outflow =	0.07 cfs @	11.73 hrs,	Volume=	0.023 af,	Atten= 76%, Lag= 0.0 min
Discarded =	0.07 cfs @	11.73 hrs,	Volume=	0.023 af	

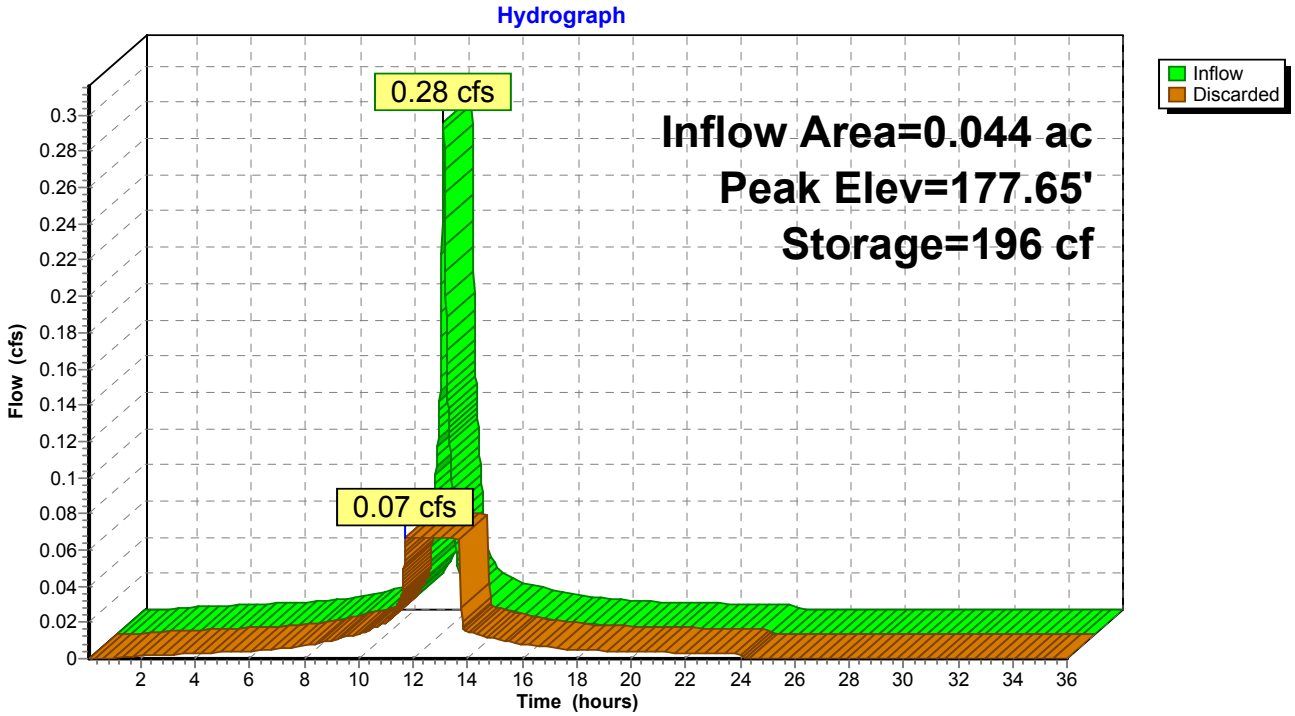
Routing by Stor-Ind method, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs
Peak Elev= 177.65' @ 12.47 hrs Surf.Area= 96 sf Storage= 196 cf
Plug-Flow detention time= 13.4 min calculated for 0.023 af (100% of inflow)
Center-of-Mass det. time= 13.4 min (757.1 - 743.8)

#	Invert	Avail.Storage	Storage Description
1	175.00'	54 cf	**7.67'W x 12.50'L x 3.17'H Prismatoid** 304 cf Overall - 168 cf Embedded = 135 cf x 40.0% Voids
2	175.00'	168 cf	**5.67'W x 10.50'L x 2.83'H Prismatoid** Inside #1
		223 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.041666 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.07 cfs @ 11.73 hrs HW=175.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Pond 4P: 1000 gallon DW w/ 12" stone surrounding

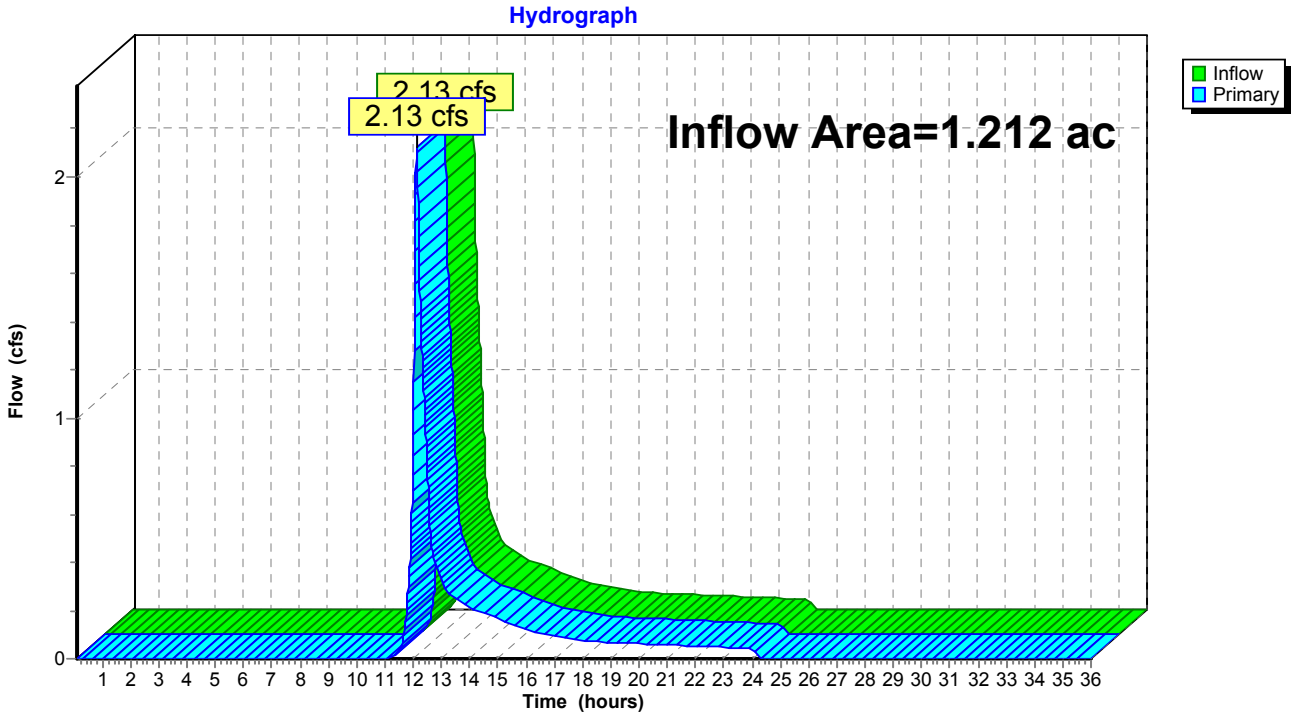


Link SC: Stormceptor Unit

Inflow Area = 1.212 ac, Inflow Depth = 1.79" for 100 Year Storm event
Inflow = 2.13 cfs @ 12.13 hrs, Volume= 0.181 af
Primary = 2.13 cfs @ 12.13 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link SC: Stormceptor Unit

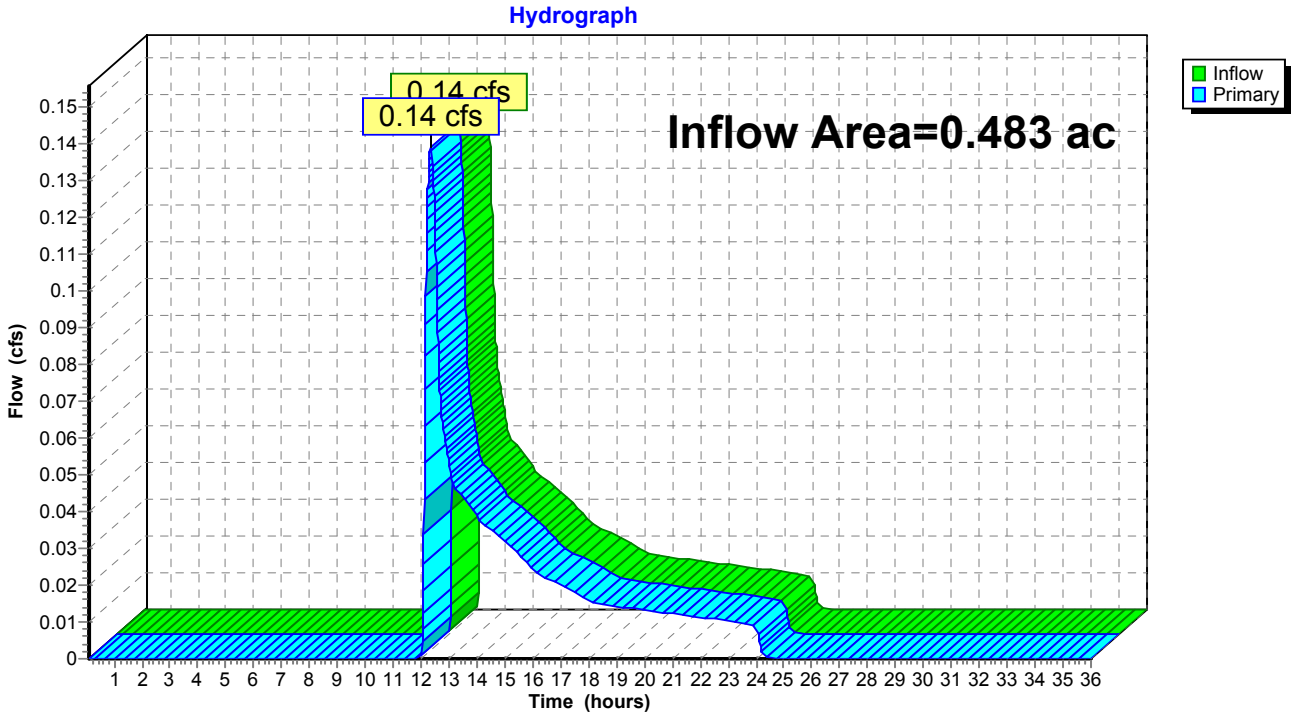


Link WL2: To Lincoln Street

Inflow Area = 0.483 ac, Inflow Depth = 0.63" for 100 Year Storm event
Inflow = 0.14 cfs @ 12.35 hrs, Volume= 0.025 af
Primary = 0.14 cfs @ 12.35 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

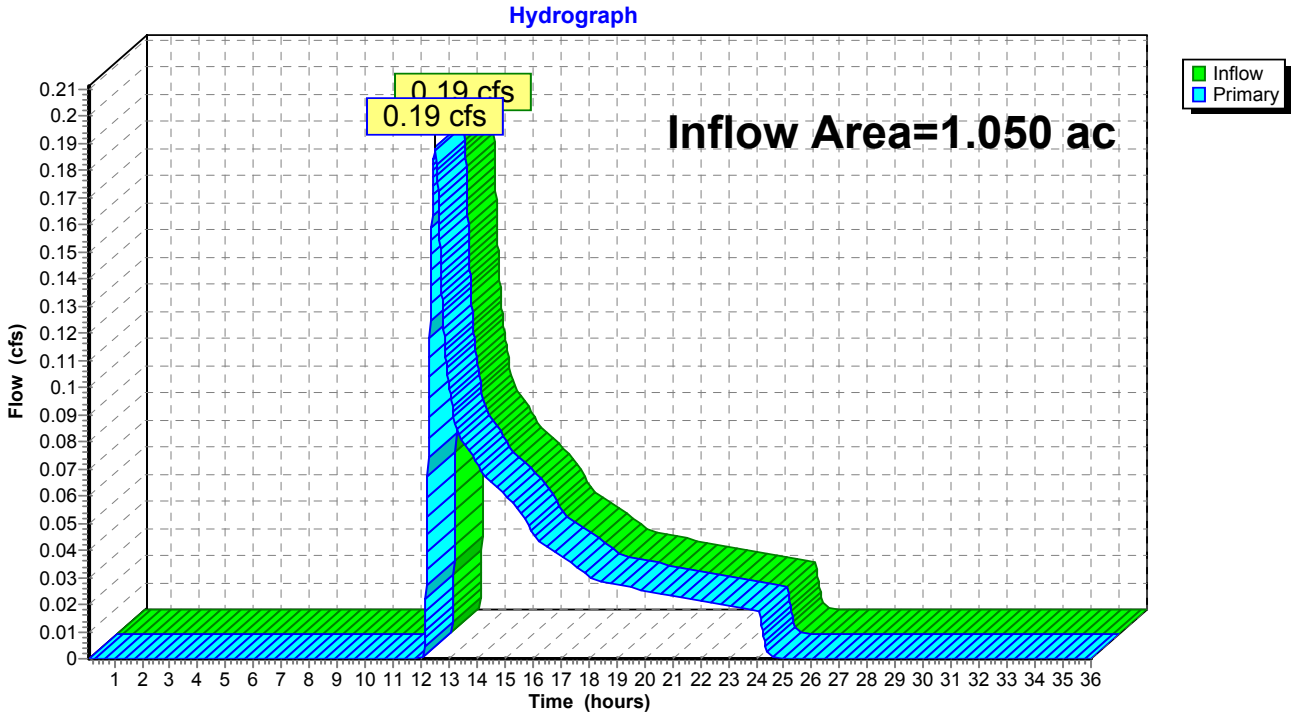
Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL2: To Lincoln Street



Link WL3: To Rear Wetland

Inflow Area = 1.050 ac, Inflow Depth = 0.50" for 100 Year Storm event
Inflow = 0.19 cfs @ 12.51 hrs, Volume= 0.044 af
Primary = 0.19 cfs @ 12.51 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.10-36.00 hrs, dt= 0.01 hrs

Link WL3: To Rear Wetland