F. Stormwater Management Appendix

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

Date: 9/1/2015
Project: Normandy
Project No: 29254

Calculated By: JC
Checked By:

Calculation to prove existng basin volume is less than 25% of required existing WQ volume

Required Existing Water Quality Volume Calculations -Redevelopment Impervious Potion (25% WQv)

P:	1.3	= 90% Rainfall Event Number from Figure #1
Rv:	0.5091	= 0.05 + 0.009(I)
I:	51	= Impervious coverage percentage
I:	5.28	= impervious area (in acres)
A:	10.35	= Total Drainage Area (in acres)

WQv: 0.571 = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

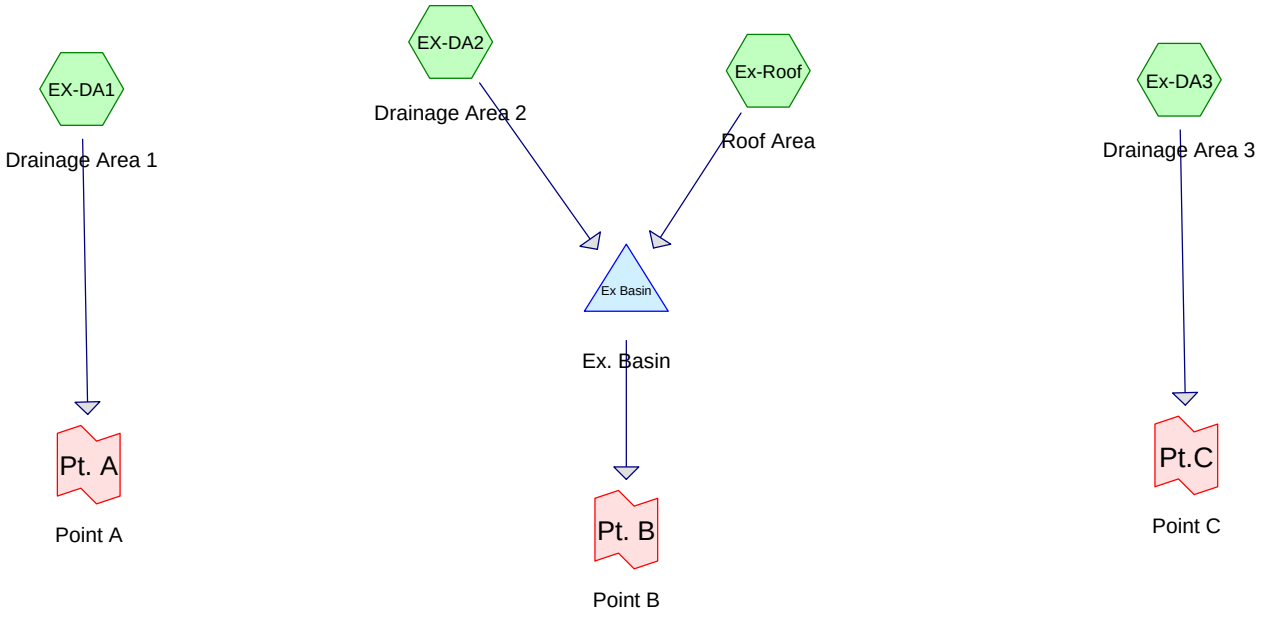
25% WQv:	**0.143**	(in ac-ft)
	6217	(in cu. ft)

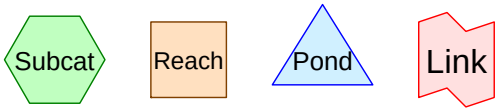
Total Volume Provided by Existing Basin

Elevation	Area (sf)	Ave area	Depth	Volume	Cummulative volume
215	600				
		863	1	863	863
216	1126				
		1655.5	1	1655.5	2519
217	2185				
		2682.5	0.7	1877.75	4396
217.7	3180				

Existing basin provide less than 25% required water quality volume

4396 < 6217





Routing Diagram for 29254 Normandy -Existing conditions for DEIS

Prepared by VHB Engineering, Surveying and Landscape Architecture P.C., Printed 11/3/2015

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.127	61	>75% Grass cover, Good, HSG B (EX-DA2)
2.039	74	>75% Grass cover, Good, HSG C (EX-DA1, EX-DA2, Ex-DA3)
4.087	98	Paved parking, HSG C (EX-DA1, EX-DA2, Ex-DA3)
1.170	98	Roofs, HSG B (Ex-Roof)
0.037	55	Woods, Good, HSG B (EX-DA2)
0.902	70	Woods, Good, HSG C (EX-DA1, EX-DA2, Ex-DA3)
8.362	**88**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.334	HSG B	EX-DA2, Ex-Roof
7.028	HSG C	EX-DA1, EX-DA2, Ex-DA3
0.000	HSG D	
0.000	Other	
8.362		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.127	2.039	0.000	0.000	2.166	>75% Grass cover, Good	EX-DA1, EX-DA2, Ex-DA3
0.000	0.000	4.087	0.000	0.000	4.087	Paved parking	EX-DA1, EX-DA2, Ex-DA3
0.000	1.170	0.000	0.000	0.000	1.170	Roofs	Ex-Roof
0.000	0.037	0.902	0.000	0.000	0.939	Woods, Good	EX-DA1, EX-DA2, Ex-DA3
0.000	**1.334**	**7.028**	**0.000**	**0.000**	**8.362**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	EX-DA1	0.00	0.00	123.0	0.0100	0.013	18.0	0.0	0.0
2	EX-DA2	0.00	0.00	108.0	0.0100	0.013	18.0	0.0	0.0
3	Ex-DA3	0.00	0.00	138.0	0.0100	0.013	18.0	0.0	0.0
4	Ex Basin	215.90	209.00	40.0	0.1725	0.013	15.0	0.0	0.0

Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-DA1: Drainage Area 1 Runoff Area=2.012 ac 49.30% Impervious Runoff Depth=1.42"
Flow Length=548' Tc=6.0 min CN=85 Runoff=3.29 cfs 0.238 af

Subcatchment EX-DA2: Drainage Area 2 Runoff Area=3.286 ac 60.26% Impervious Runoff Depth=1.64"
Flow Length=763' Tc=6.0 min CN=88 Runoff=6.19 cfs 0.450 af

Subcatchment Ex-DA3: Drainage Area 3 Runoff Area=1.894 ac 58.87% Impervious Runoff Depth=1.57"
Flow Length=538' Tc=6.0 min CN=87 Runoff=3.41 cfs 0.247 af

Subcatchment Ex-Roof: Roof Area Runoff Area=1.170 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=3.09 cfs 0.250 af

Pond Ex Basin: Ex. Basin Peak Elev=217.85' Storage=0.108 af Inflow=9.28 cfs 0.700 af
Outflow=7.95 cfs 0.684 af

Link Pt. A: Point A Inflow=3.29 cfs 0.238 af
Primary=3.29 cfs 0.238 af

Link Pt. B: Point B Inflow=7.95 cfs 0.684 af
Primary=7.95 cfs 0.684 af

Link Pt.C: Point C Inflow=3.41 cfs 0.247 af
Primary=3.41 cfs 0.247 af

Total Runoff Area = 8.362 ac Runoff Volume = 1.186 af Average Runoff Depth = 1.70"
37.13% Pervious = 3.105 ac 62.87% Impervious = 5.257 ac

Summary for Subcatchment EX-DA1: Drainage Area 1

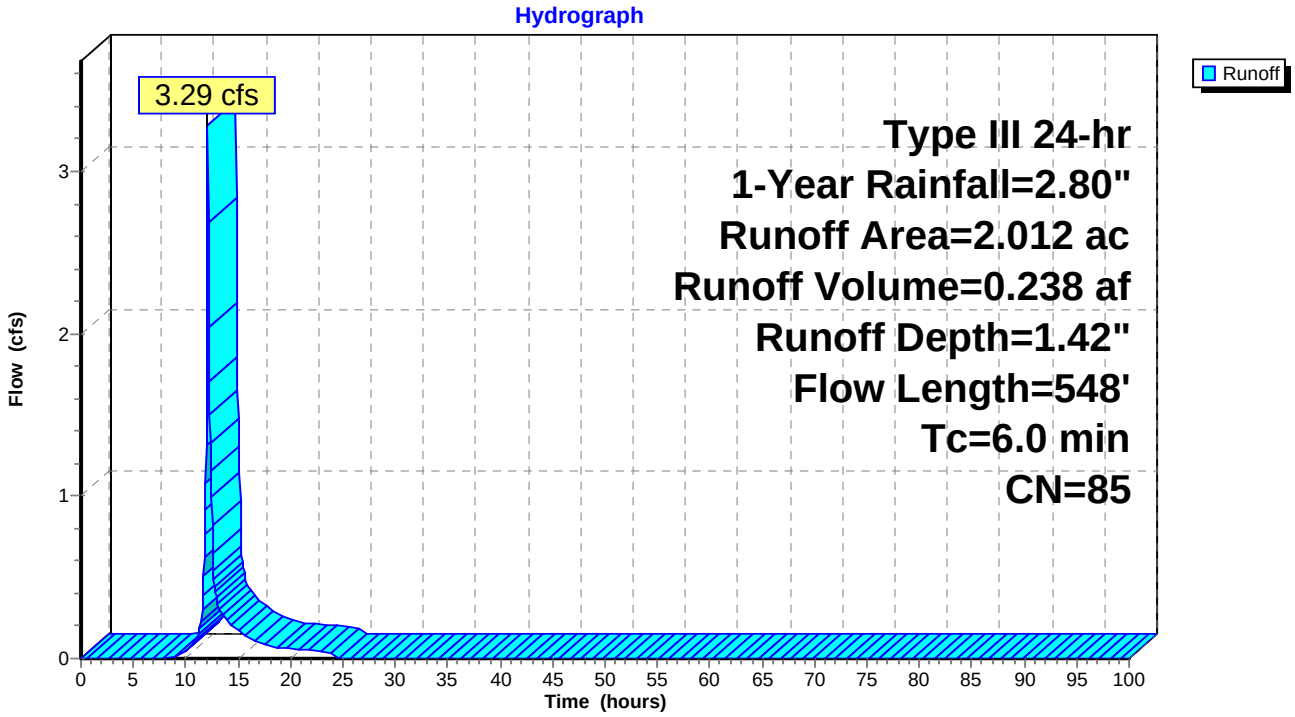
Runoff = 3.29 cfs @ 12.09 hrs, Volume= 0.238 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.580	74	>75% Grass cover, Good, HSG C
0.992	98	Paved parking, HSG C
0.440	70	Woods, Good, HSG C
2.012	85	Weighted Average
1.020		50.70% Pervious Area
0.992		49.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	70	0.2100	0.42		**Sheet Flow, A1 to B1** Grass: Short n= 0.150 P2= 3.50"
0.4	30	0.0330	1.38		**Sheet Flow, B1 to C1** Smooth surfaces n= 0.011 P2= 3.50"
1.3	325	0.0420	4.16		**Shallow Concentrated Flow, C1 to D1** Paved Kv= 20.3 fps
0.3	123	0.0100	5.94	10.50	**Pipe Channel, D1 to E1** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
4.7	548	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA1: Drainage Area 1



Summary for Subcatchment EX-DA2: Drainage Area 2

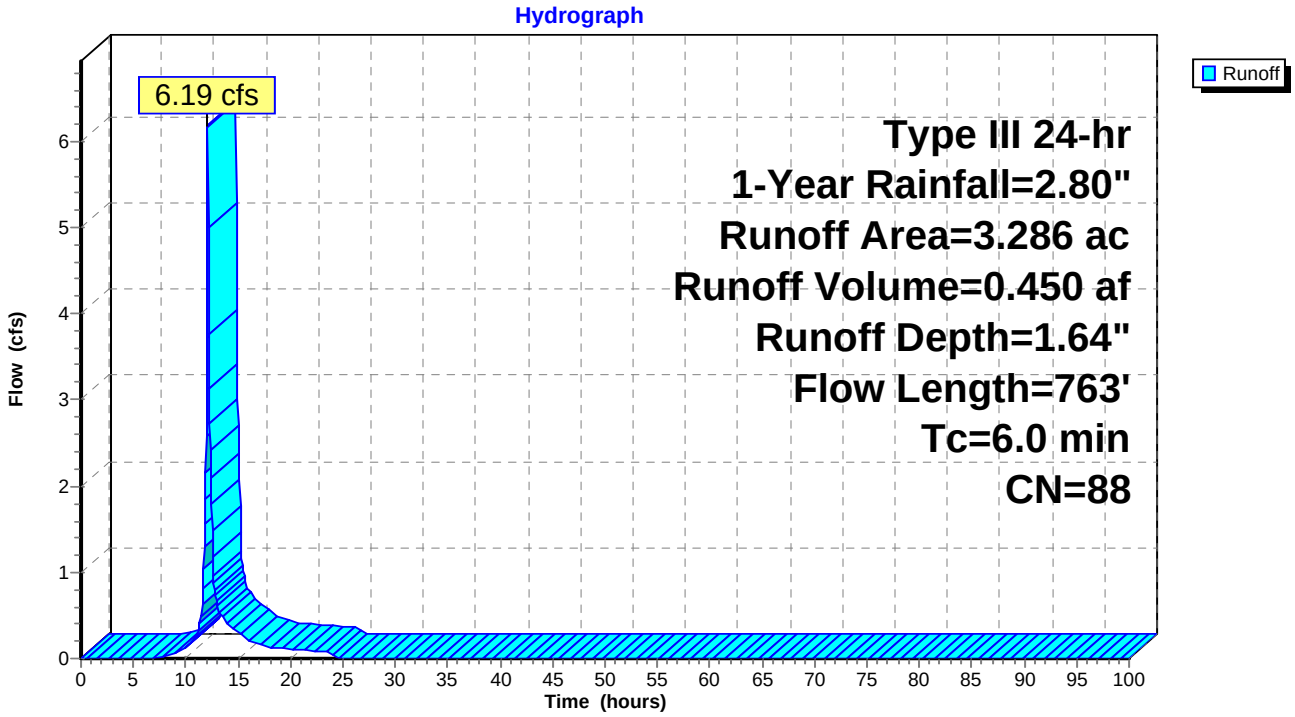
Runoff = 6.19 cfs @ 12.09 hrs, Volume= 0.450 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.127	61	>75% Grass cover, Good, HSG B
1.000	74	>75% Grass cover, Good, HSG C
1.980	98	Paved parking, HSG C
0.142	70	Woods, Good, HSG C
0.037	55	Woods, Good, HSG B
3.286	88	Weighted Average
1.306		39.74% Pervious Area
1.980		60.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	21	0.0470	0.18		**Sheet Flow, A2 to B2** Grass: Short n= 0.150 P2= 3.50"
0.7	78	0.0450	1.89		**Sheet Flow, B2 to C2** Smooth surfaces n= 0.011 P2= 3.50"
2.9	556	0.0250	3.21		**Shallow Concentrated Flow, C2 to D2** Paved Kv= 20.3 fps
0.3	108	0.0100	5.94	10.50	**Pipe Channel, D2 to E2** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
5.8	763	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA2: Drainage Area 2



Summary for Subcatchment Ex-DA3: Drainage Area 3

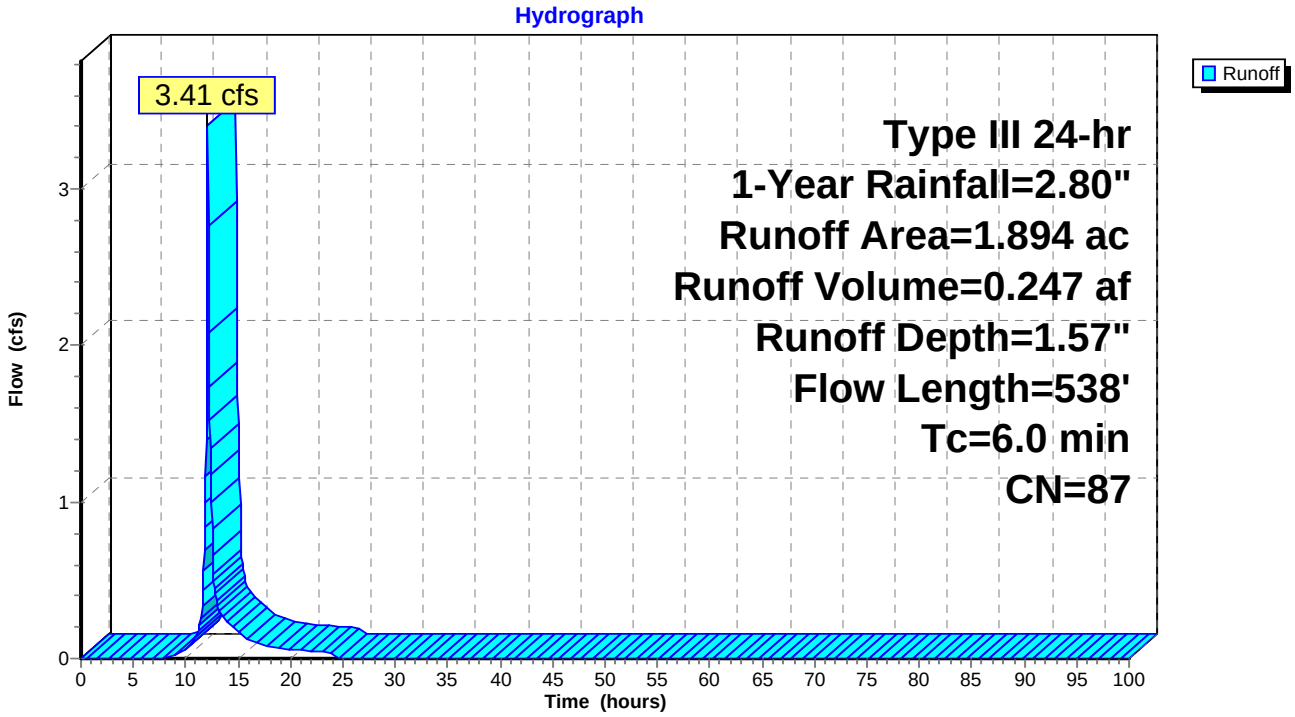
Runoff = 3.41 cfs @ 12.09 hrs, Volume= 0.247 af, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.459	74	>75% Grass cover, Good, HSG C
1.115	98	Paved parking, HSG C
0.320	70	Woods, Good, HSG C
1.894	87	Weighted Average
0.779		41.13% Pervious Area
1.115		58.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.1000	0.11		**Sheet Flow, A3 to B3** Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	15	0.0670	0.20		**Sheet Flow, B3 to C3** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0400	1.77		**Sheet Flow, C3 to D3** Smooth surfaces n= 0.011 P2= 3.50"
1.0	300	0.0580	4.89		**Shallow Concentrated Flow, D3 to E3** Paved Kv= 20.3 fps
0.4	138	0.0100	5.94	10.50	**Pipe Channel, E3 to F3** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
5.8	538	Total, Increased to minimum Tc = 6.0 min			

Subcatchment Ex-DA3: Drainage Area 3



Summary for Subcatchment Ex-Roof: Roof Area

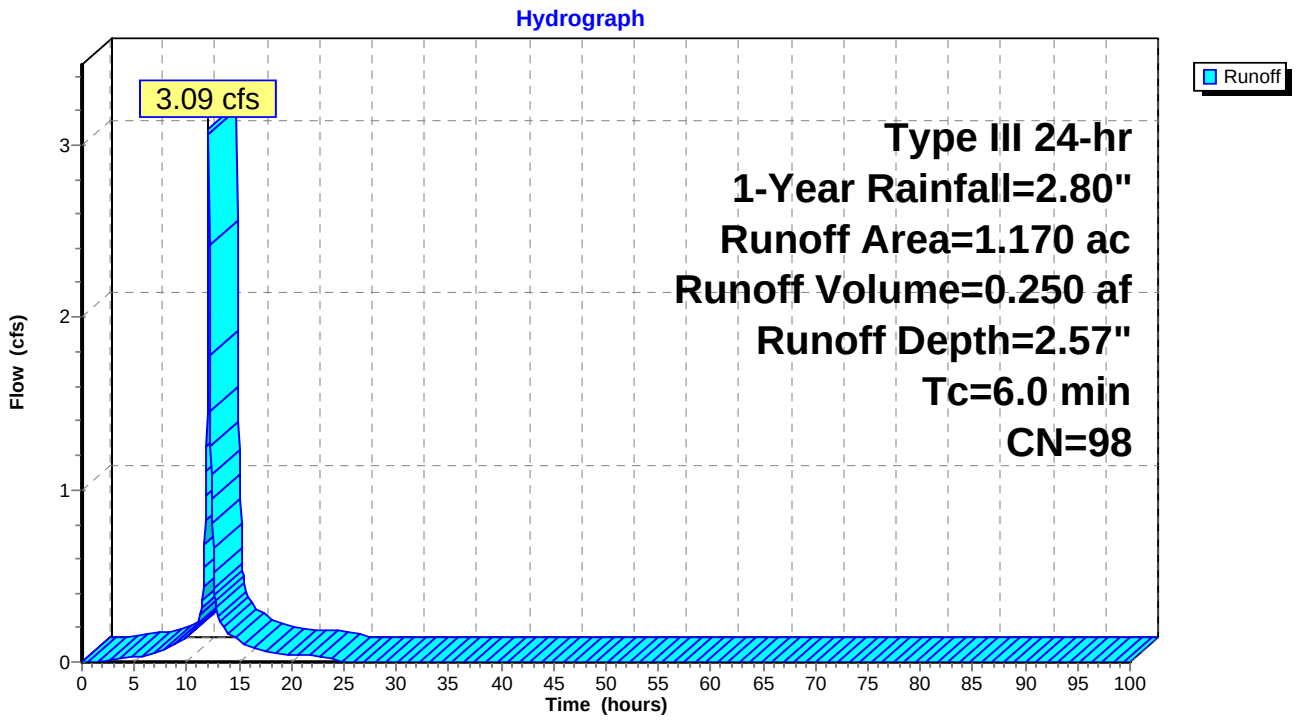
Runoff = 3.09 cfs @ 12.09 hrs, Volume= 0.250 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
1.170	98	Roofs, HSG B
1.170		100.00% Impervious Area

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

Subcatchment Ex-Roof: Roof Area



Summary for Pond Ex Basin: Ex. Basin

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 1.89" for 1-Year event
Inflow = 9.28 cfs @ 12.09 hrs, Volume= 0.700 af
Outflow = 7.95 cfs @ 12.15 hrs, Volume= 0.684 af, Atten= 14%, Lag= 3.5 min
Primary = 7.95 cfs @ 12.15 hrs, Volume= 0.684 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 217.85' @ 12.15 hrs Surf.Area= 0.070 ac Storage= 0.108 af

Plug-Flow detention time= 41.9 min calculated for 0.684 af (98% of inflow)
Center-of-Mass det. time= 28.8 min (827.5 - 798.7)

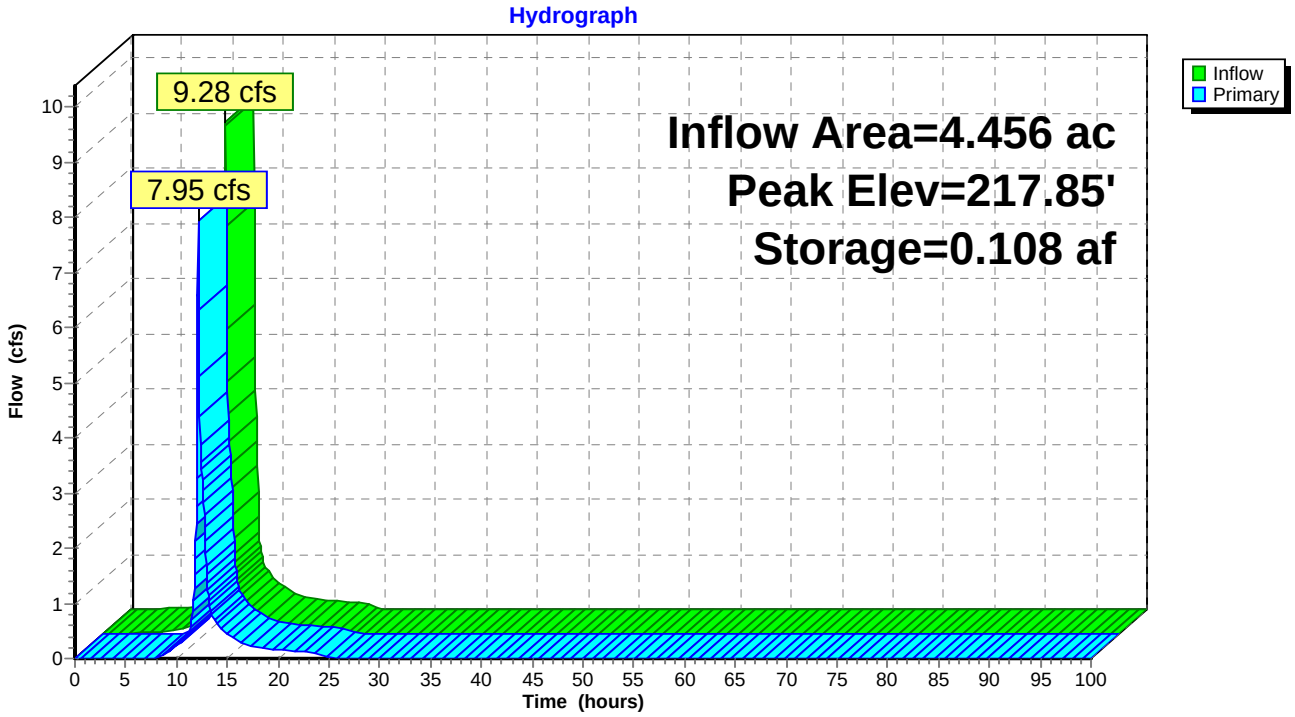
Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.200 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
215.00	0.013	0.000	0.000
216.00	0.026	0.019	0.019
217.00	0.050	0.038	0.057
218.00	0.073	0.061	0.119
219.00	0.090	0.082	0.200

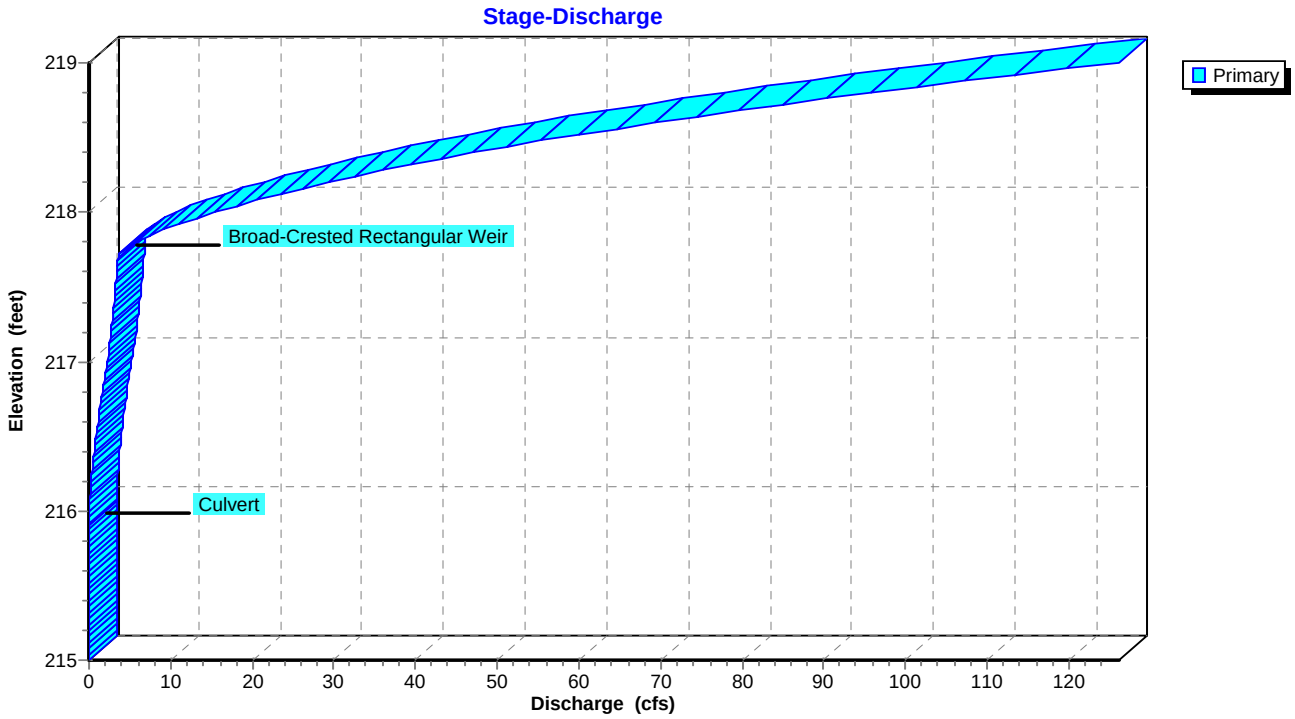
Device	Routing	Invert	Outlet Devices
#1	Primary	215.90'	**15.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 215.90' / 209.00' S= 0.1725 '/' Cc= 0.500 n= 0.013, Flow Area= 1.23 sf
#2	Primary	217.70'	**26.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=7.87 cfs @ 12.15 hrs HW=217.85' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.78 cfs @ 3.08 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 4.09 cfs @ 1.04 fps)

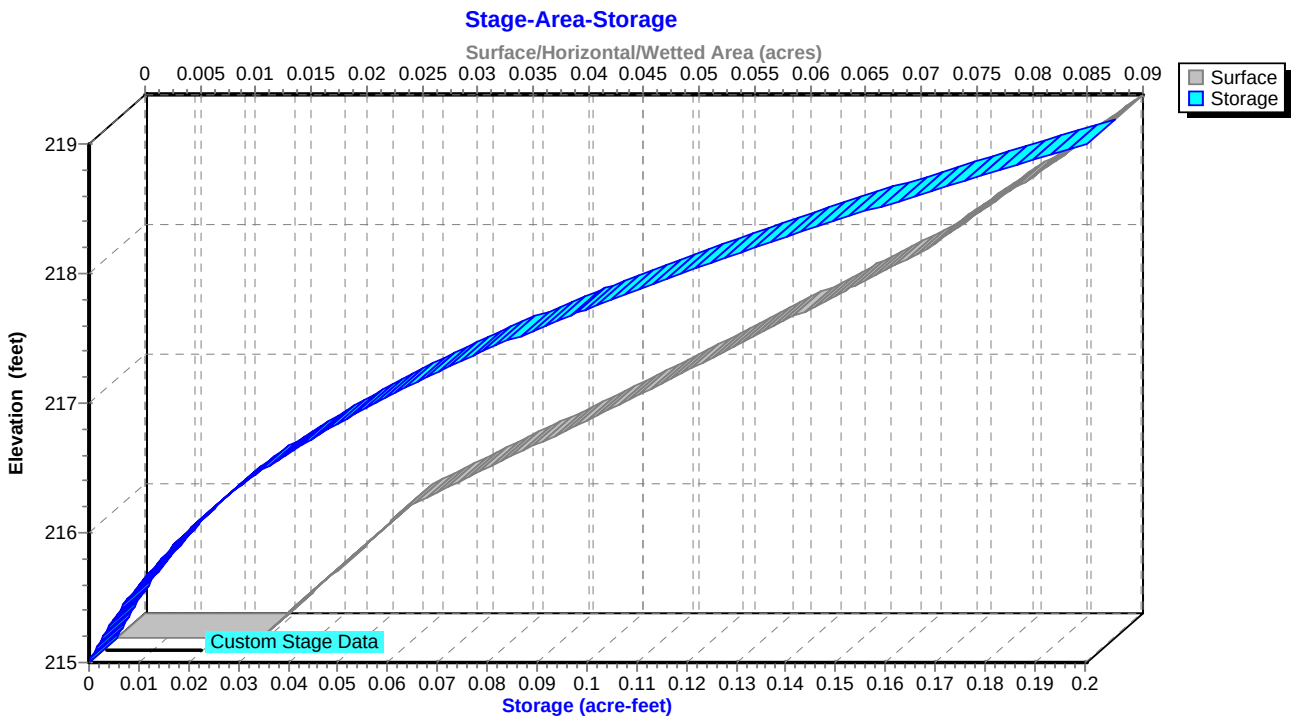
Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin

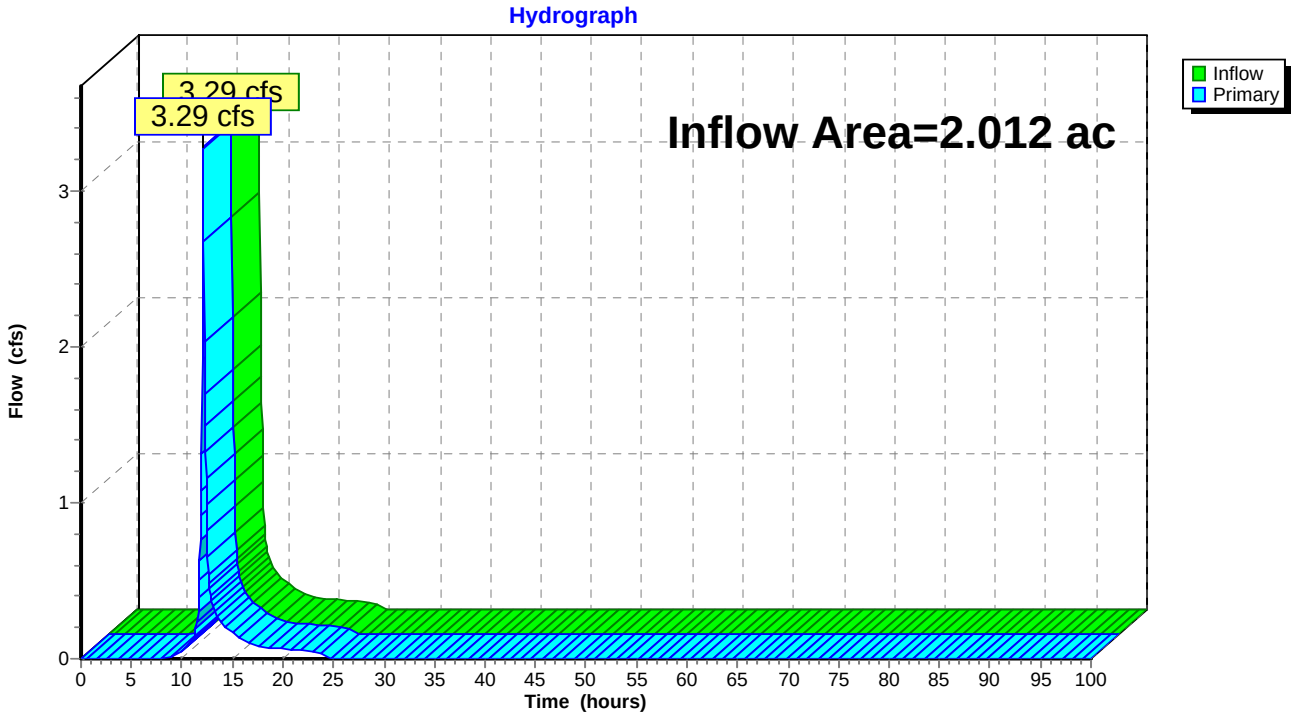


Summary for Link Pt. A: Point A

Inflow Area = 2.012 ac, 49.30% Impervious, Inflow Depth = 1.42" for 1-Year event
Inflow = 3.29 cfs @ 12.09 hrs, Volume= 0.238 af
Primary = 3.29 cfs @ 12.09 hrs, Volume= 0.238 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

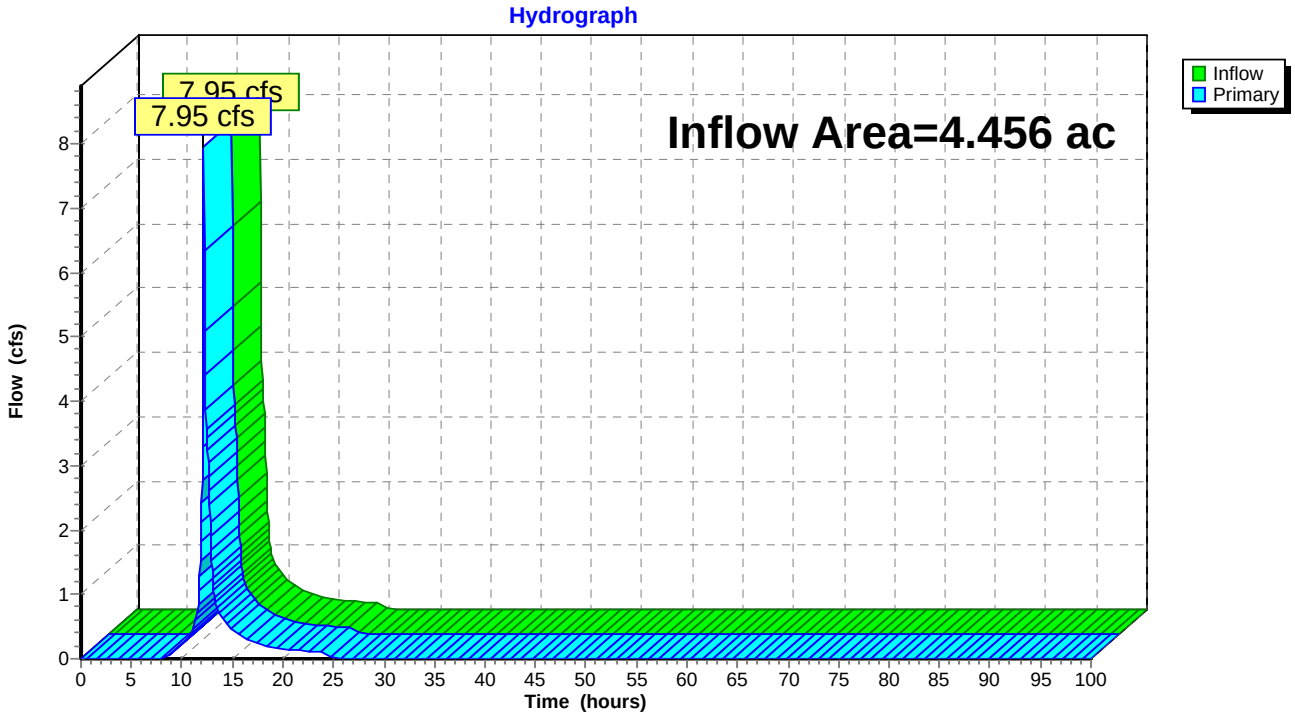


Summary for Link Pt. B: Point B

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 1.84" for 1-Year event
Inflow = 7.95 cfs @ 12.15 hrs, Volume= 0.684 af
Primary = 7.95 cfs @ 12.15 hrs, Volume= 0.684 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

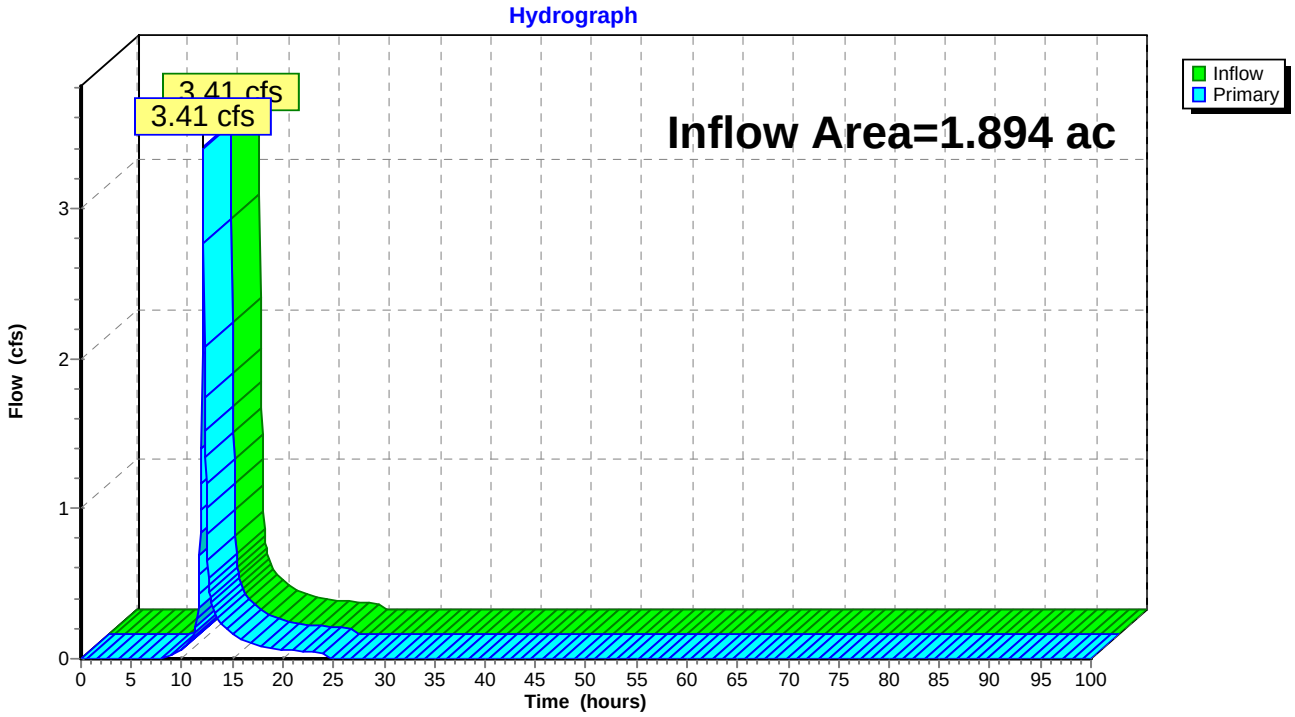


Summary for Link Pt.C: Point C

Inflow Area = 1.894 ac, 58.87% Impervious, Inflow Depth = 1.57" for 1-Year event
Inflow = 3.41 cfs @ 12.09 hrs, Volume= 0.247 af
Primary = 3.41 cfs @ 12.09 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-DA1: Drainage Area 1 Runoff Area=2.012 ac 49.30% Impervious Runoff Depth=2.91"
Flow Length=548' Tc=6.0 min CN=85 Runoff=6.68 cfs 0.488 af

Subcatchment EX-DA2: Drainage Area 2 Runoff Area=3.286 ac 60.26% Impervious Runoff Depth=3.20"
Flow Length=763' Tc=6.0 min CN=88 Runoff=11.83 cfs 0.875 af

Subcatchment Ex-DA3: Drainage Area 3 Runoff Area=1.894 ac 58.87% Impervious Runoff Depth=3.10"
Flow Length=538' Tc=6.0 min CN=87 Runoff=6.65 cfs 0.489 af

Subcatchment Ex-Roof: Roof Area Runoff Area=1.170 ac 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=5.02 cfs 0.416 af

Pond Ex Basin: Ex. Basin Peak Elev=218.01' Storage=0.120 af Inflow=16.86 cfs 1.291 af
Outflow=16.36 cfs 1.274 af

Link Pt. A: Point A Inflow=6.68 cfs 0.488 af
Primary=6.68 cfs 0.488 af

Link Pt. B: Point B Inflow=16.36 cfs 1.274 af
Primary=16.36 cfs 1.274 af

Link Pt.C: Point C Inflow=6.65 cfs 0.489 af
Primary=6.65 cfs 0.489 af

Total Runoff Area = 8.362 ac Runoff Volume = 2.268 af Average Runoff Depth = 3.25"
37.13% Pervious = 3.105 ac 62.87% Impervious = 5.257 ac

Summary for Subcatchment EX-DA1: Drainage Area 1

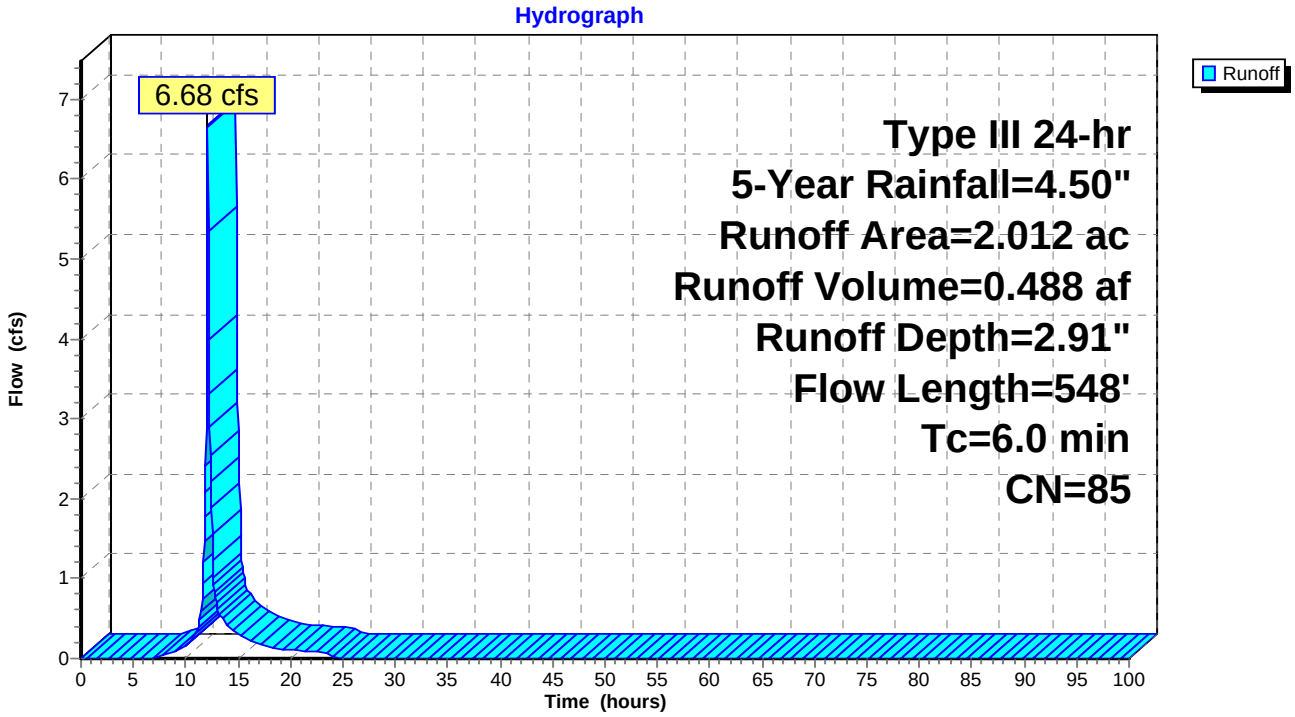
Runoff = 6.68 cfs @ 12.09 hrs, Volume= 0.488 af, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
0.580	74	>75% Grass cover, Good, HSG C
0.992	98	Paved parking, HSG C
0.440	70	Woods, Good, HSG C
2.012	85	Weighted Average
1.020		50.70% Pervious Area
0.992		49.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	70	0.2100	0.42		**Sheet Flow, A1 to B1** Grass: Short n= 0.150 P2= 3.50"
0.4	30	0.0330	1.38		**Sheet Flow, B1 to C1** Smooth surfaces n= 0.011 P2= 3.50"
1.3	325	0.0420	4.16		**Shallow Concentrated Flow, C1 to D1** Paved Kv= 20.3 fps
0.3	123	0.0100	5.94	10.50	**Pipe Channel, D1 to E1** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
4.7	548	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA1: Drainage Area 1



Summary for Subcatchment EX-DA2: Drainage Area 2

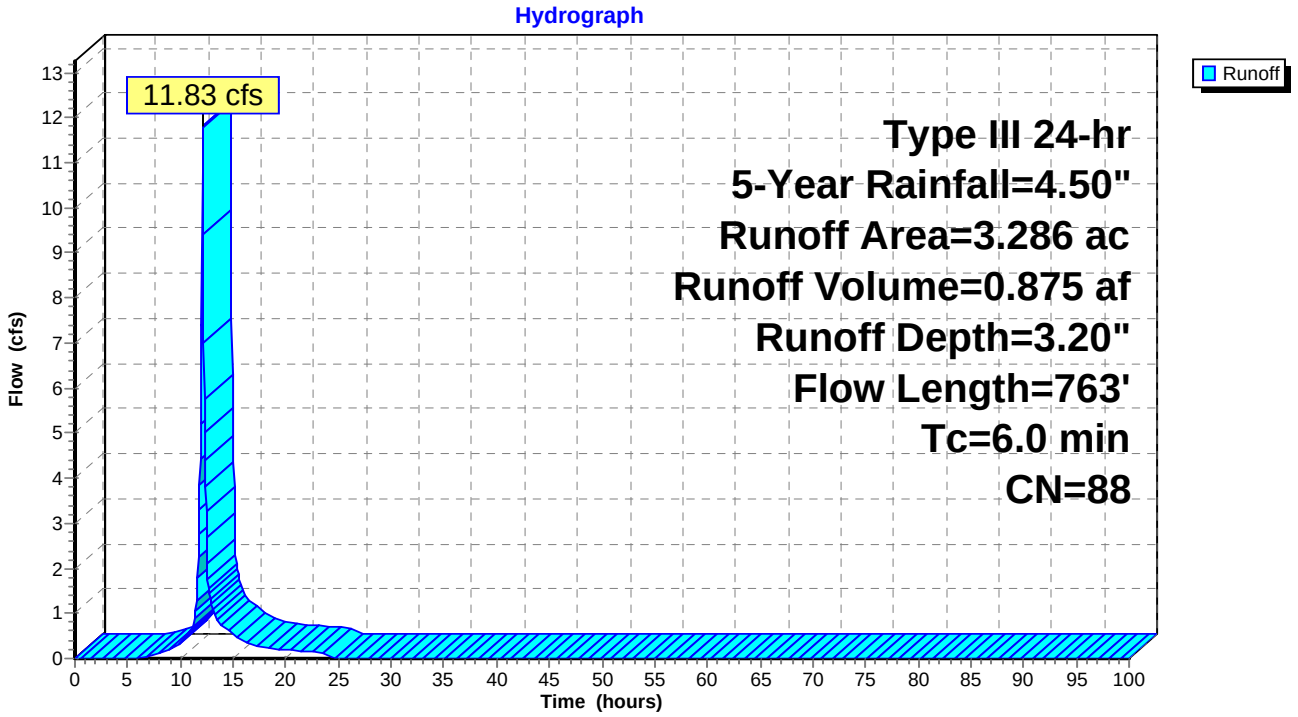
Runoff = 11.83 cfs @ 12.09 hrs, Volume= 0.875 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
0.127	61	>75% Grass cover, Good, HSG B
1.000	74	>75% Grass cover, Good, HSG C
1.980	98	Paved parking, HSG C
0.142	70	Woods, Good, HSG C
0.037	55	Woods, Good, HSG B
3.286	88	Weighted Average
1.306		39.74% Pervious Area
1.980		60.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	21	0.0470	0.18		**Sheet Flow, A2 to B2** Grass: Short n= 0.150 P2= 3.50"
0.7	78	0.0450	1.89		**Sheet Flow, B2 to C2** Smooth surfaces n= 0.011 P2= 3.50"
2.9	556	0.0250	3.21		**Shallow Concentrated Flow, C2 to D2** Paved Kv= 20.3 fps
0.3	108	0.0100	5.94	10.50	**Pipe Channel, D2 to E2** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
5.8	763	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA2: Drainage Area 2



Summary for Subcatchment Ex-DA3: Drainage Area 3

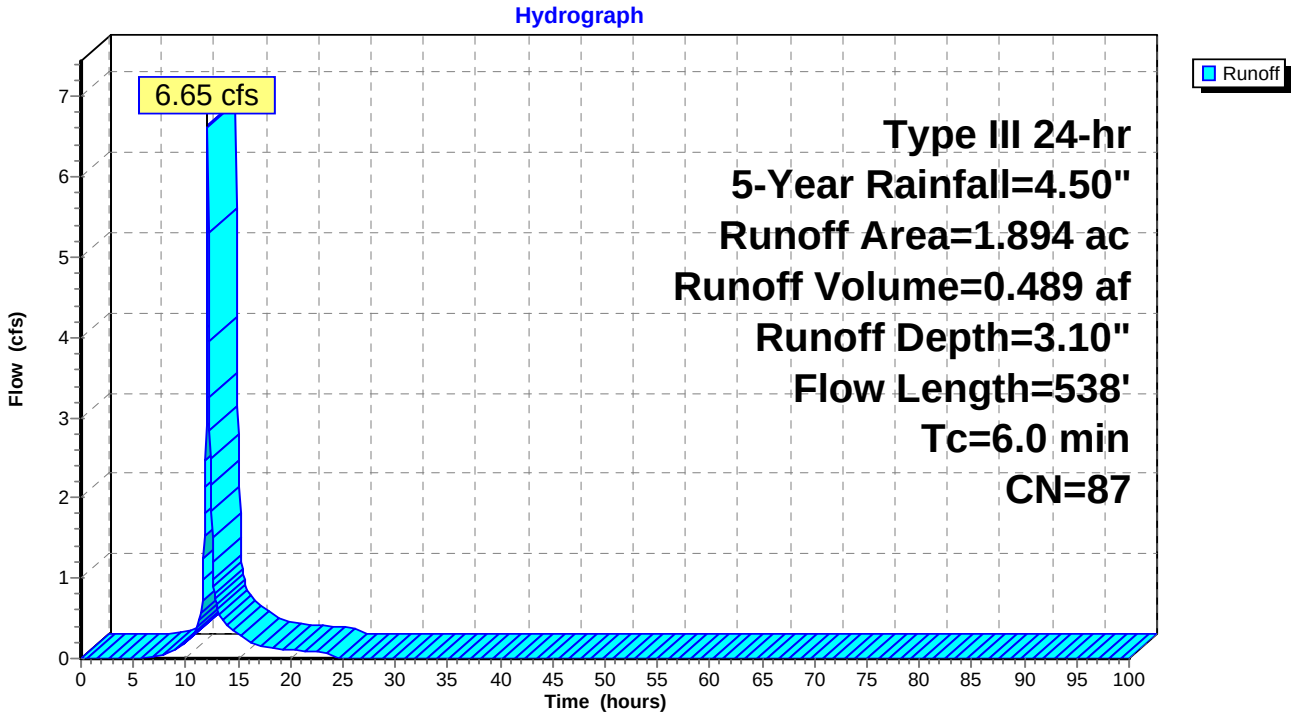
Runoff = 6.65 cfs @ 12.09 hrs, Volume= 0.489 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
0.459	74	>75% Grass cover, Good, HSG C
1.115	98	Paved parking, HSG C
0.320	70	Woods, Good, HSG C
1.894	87	Weighted Average
0.779		41.13% Pervious Area
1.115		58.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.1000	0.11		**Sheet Flow, A3 to B3** Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	15	0.0670	0.20		**Sheet Flow, B3 to C3** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0400	1.77		**Sheet Flow, C3 to D3** Smooth surfaces n= 0.011 P2= 3.50"
1.0	300	0.0580	4.89		**Shallow Concentrated Flow, D3 to E3** Paved Kv= 20.3 fps
0.4	138	0.0100	5.94	10.50	**Pipe Channel, E3 to F3** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
5.8	538	Total, Increased to minimum Tc = 6.0 min			

Subcatchment Ex-DA3: Drainage Area 3



Summary for Subcatchment Ex-Roof: Roof Area

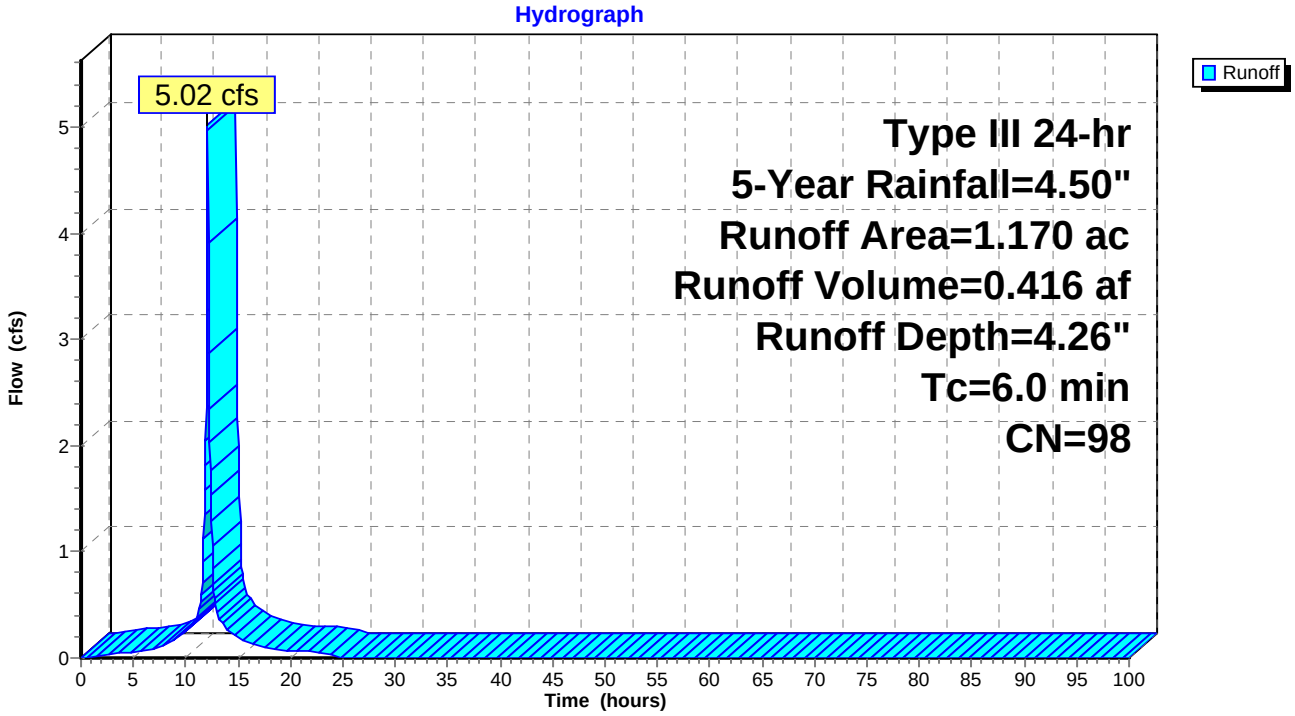
Runoff = 5.02 cfs @ 12.09 hrs, Volume= 0.416 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
1.170	98	Roofs, HSG B
1.170		100.00% Impervious Area

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

Subcatchment Ex-Roof: Roof Area



Summary for Pond Ex Basin: Ex. Basin

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 3.48" for 5-Year event
Inflow = 16.86 cfs @ 12.09 hrs, Volume= 1.291 af
Outflow = 16.36 cfs @ 12.10 hrs, Volume= 1.274 af, Atten= 3%, Lag= 0.8 min
Primary = 16.36 cfs @ 12.10 hrs, Volume= 1.274 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 218.01' @ 12.10 hrs Surf.Area= 0.073 ac Storage= 0.120 af

Plug-Flow detention time= 30.4 min calculated for 1.274 af (99% of inflow)
Center-of-Mass det. time= 21.4 min (806.4 - 785.0)

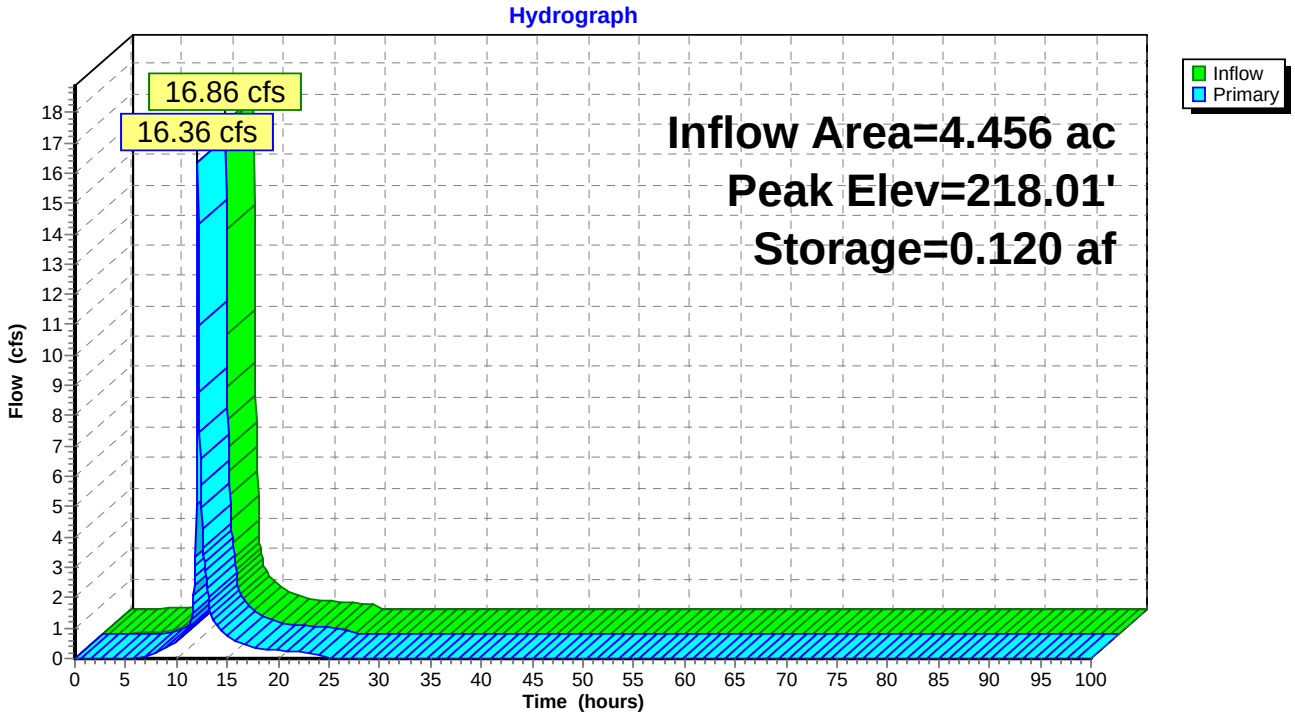
Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.200 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
215.00	0.013	0.000	0.000
216.00	0.026	0.019	0.019
217.00	0.050	0.038	0.057
218.00	0.073	0.061	0.119
219.00	0.090	0.082	0.200

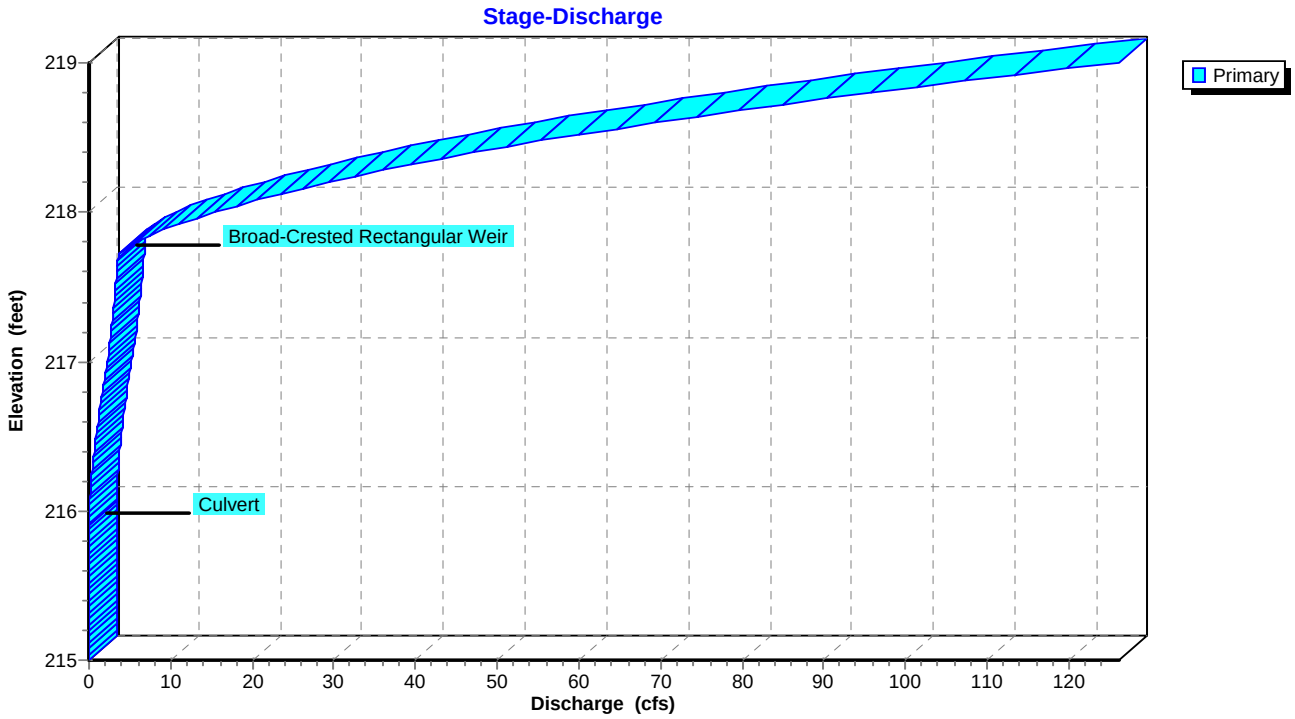
Device	Routing	Invert	Outlet Devices
#1	Primary	215.90'	**15.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 215.90' / 209.00' S= 0.1725 '/' Cc= 0.500 n= 0.013, Flow Area= 1.23 sf
#2	Primary	217.70'	**26.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=16.24 cfs @ 12.10 hrs HW=218.01' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.00 cfs @ 3.26 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 12.24 cfs @ 1.51 fps)

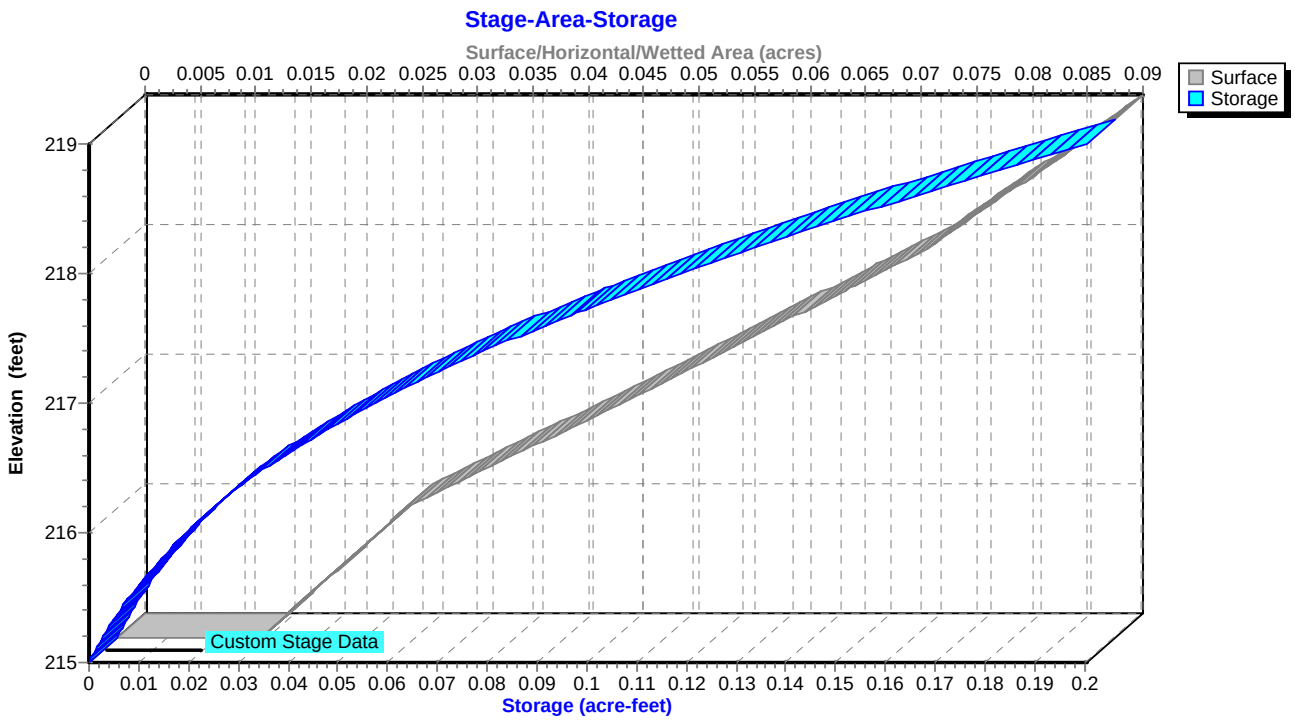
Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin

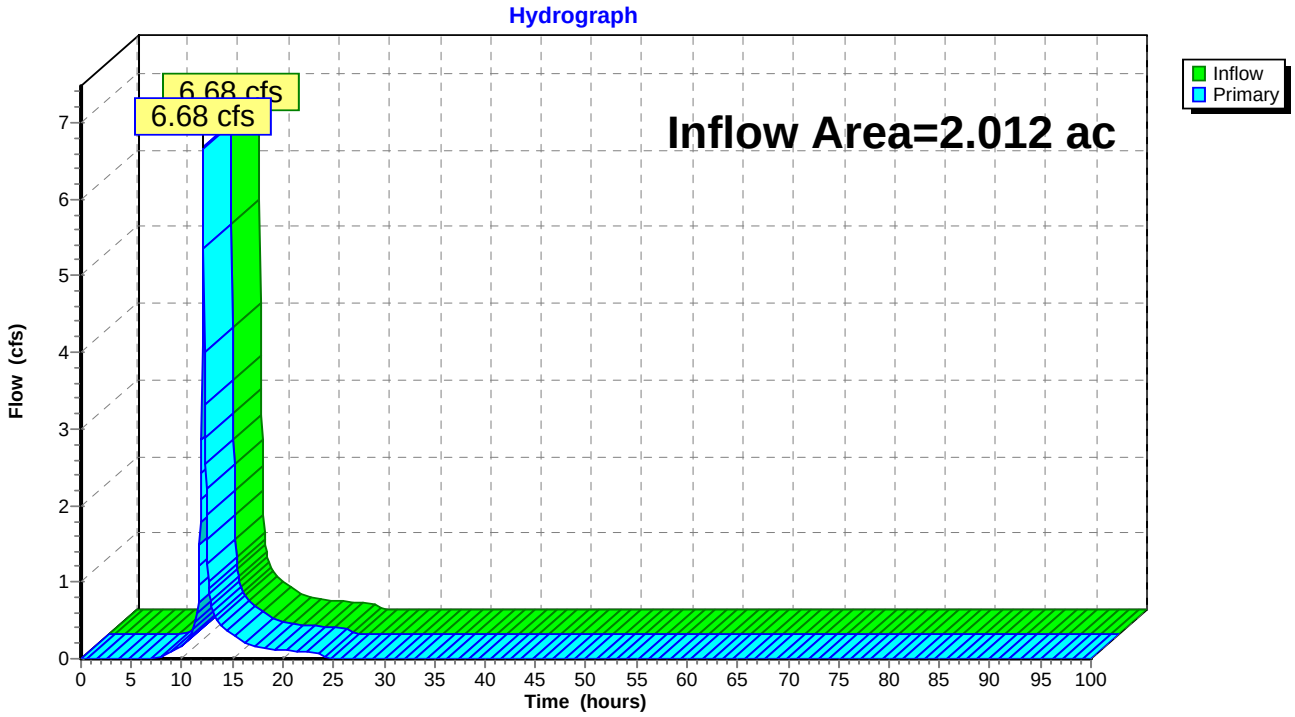


Summary for Link Pt. A: Point A

Inflow Area = 2.012 ac, 49.30% Impervious, Inflow Depth = 2.91" for 5-Year event
Inflow = 6.68 cfs @ 12.09 hrs, Volume= 0.488 af
Primary = 6.68 cfs @ 12.09 hrs, Volume= 0.488 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

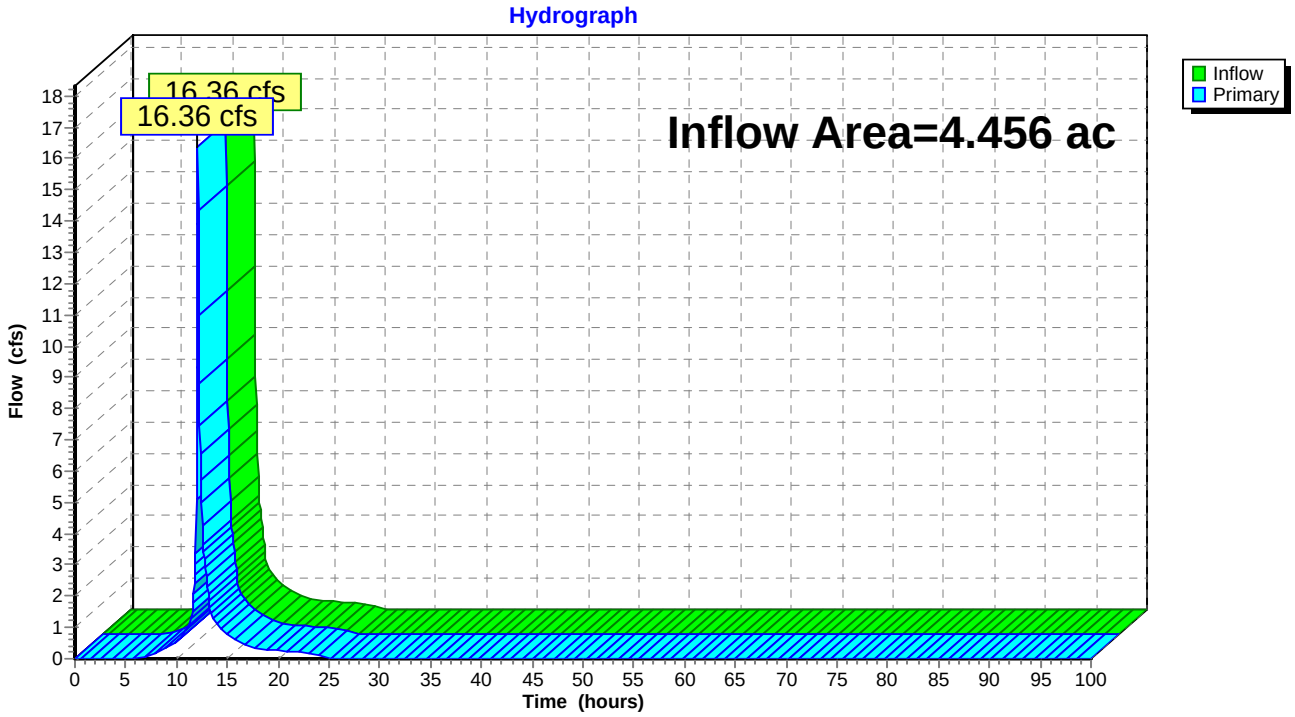


Summary for Link Pt. B: Point B

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 3.43" for 5-Year event
Inflow = 16.36 cfs @ 12.10 hrs, Volume= 1.274 af
Primary = 16.36 cfs @ 12.10 hrs, Volume= 1.274 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

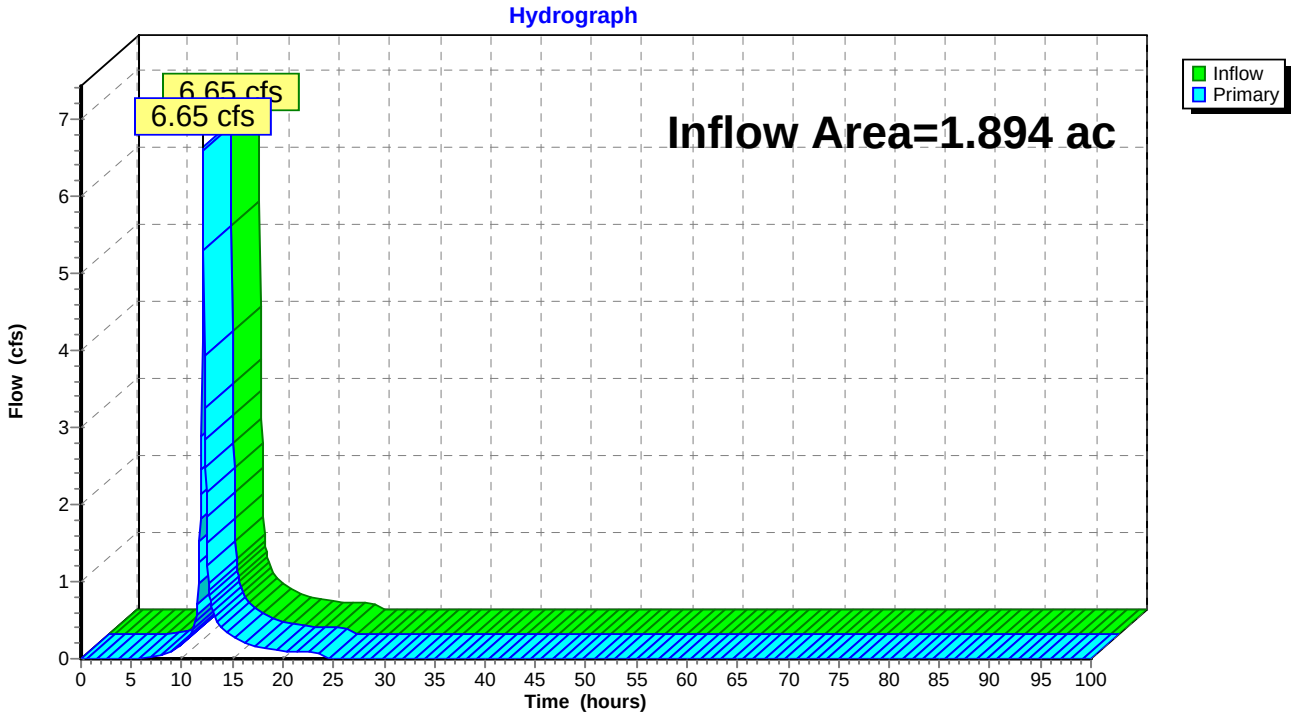


Summary for Link Pt.C: Point C

Inflow Area = 1.894 ac, 58.87% Impervious, Inflow Depth = 3.10" for 5-Year event
Inflow = 6.65 cfs @ 12.09 hrs, Volume= 0.489 af
Primary = 6.65 cfs @ 12.09 hrs, Volume= 0.489 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-DA1: Drainage Area 1 Runoff Area=2.012 ac 49.30% Impervious Runoff Depth=3.37"
Flow Length=548' Tc=6.0 min CN=85 Runoff=7.70 cfs 0.565 af

Subcatchment EX-DA2: Drainage Area 2 Runoff Area=3.286 ac 60.26% Impervious Runoff Depth=3.67"
Flow Length=763' Tc=6.0 min CN=88 Runoff=13.50 cfs 1.005 af

Subcatchment Ex-DA3: Drainage Area 3 Runoff Area=1.894 ac 58.87% Impervious Runoff Depth=3.57"
Flow Length=538' Tc=6.0 min CN=87 Runoff=7.61 cfs 0.563 af

Subcatchment Ex-Roof: Roof Area Runoff Area=1.170 ac 100.00% Impervious Runoff Depth=4.76"
Tc=6.0 min CN=98 Runoff=5.59 cfs 0.464 af

Pond Ex Basin: Ex. Basin Peak Elev=218.05' Storage=0.123 af Inflow=19.09 cfs 1.469 af
Outflow=18.55 cfs 1.452 af

Link Pt. A: Point A Inflow=7.70 cfs 0.565 af
Primary=7.70 cfs 0.565 af

Link Pt. B: Point B Inflow=18.55 cfs 1.452 af
Primary=18.55 cfs 1.452 af

Link Pt.C: Point C Inflow=7.61 cfs 0.563 af
Primary=7.61 cfs 0.563 af

Total Runoff Area = 8.362 ac Runoff Volume = 2.597 af Average Runoff Depth = 3.73"
37.13% Pervious = 3.105 ac 62.87% Impervious = 5.257 ac

Summary for Subcatchment EX-DA1: Drainage Area 1

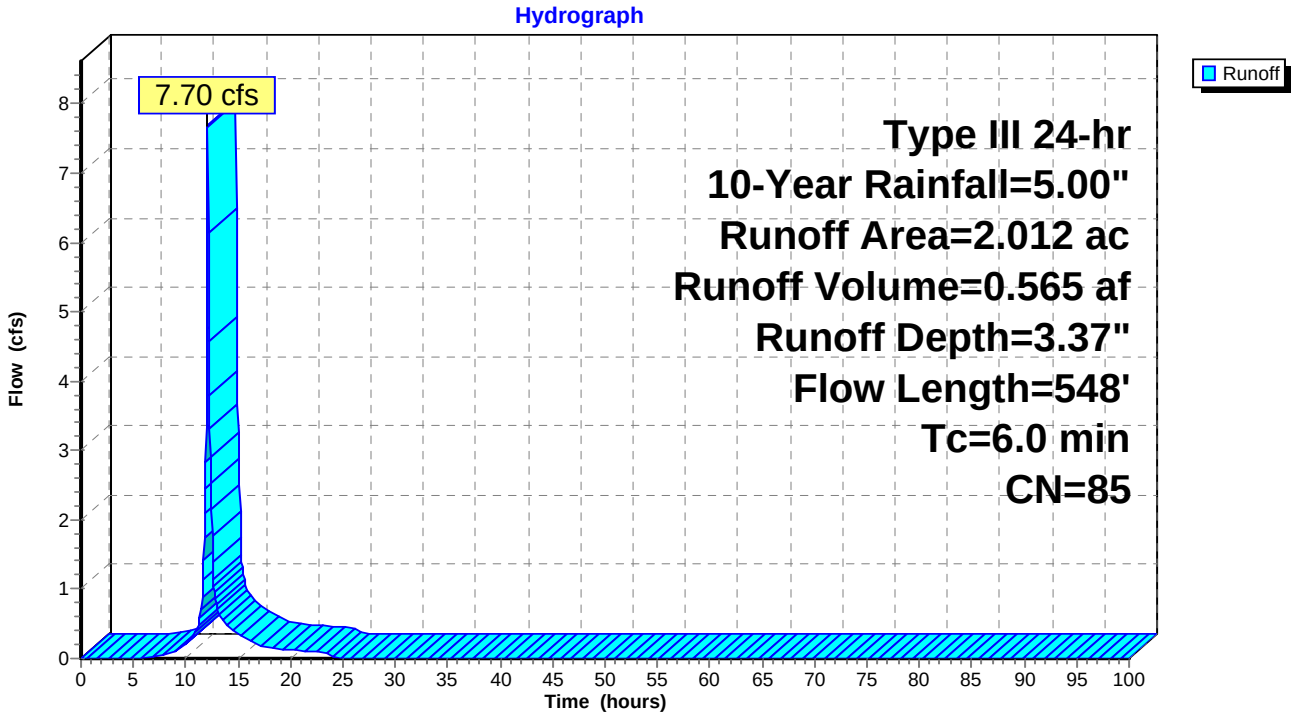
Runoff = 7.70 cfs @ 12.09 hrs, Volume= 0.565 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.580	74	>75% Grass cover, Good, HSG C
0.992	98	Paved parking, HSG C
0.440	70	Woods, Good, HSG C
2.012	85	Weighted Average
1.020		50.70% Pervious Area
0.992		49.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	70	0.2100	0.42		**Sheet Flow, A1 to B1** Grass: Short n= 0.150 P2= 3.50"
0.4	30	0.0330	1.38		**Sheet Flow, B1 to C1** Smooth surfaces n= 0.011 P2= 3.50"
1.3	325	0.0420	4.16		**Shallow Concentrated Flow, C1 to D1** Paved Kv= 20.3 fps
0.3	123	0.0100	5.94	10.50	**Pipe Channel, D1 to E1** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
4.7	548	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA1: Drainage Area 1



Summary for Subcatchment EX-DA2: Drainage Area 2

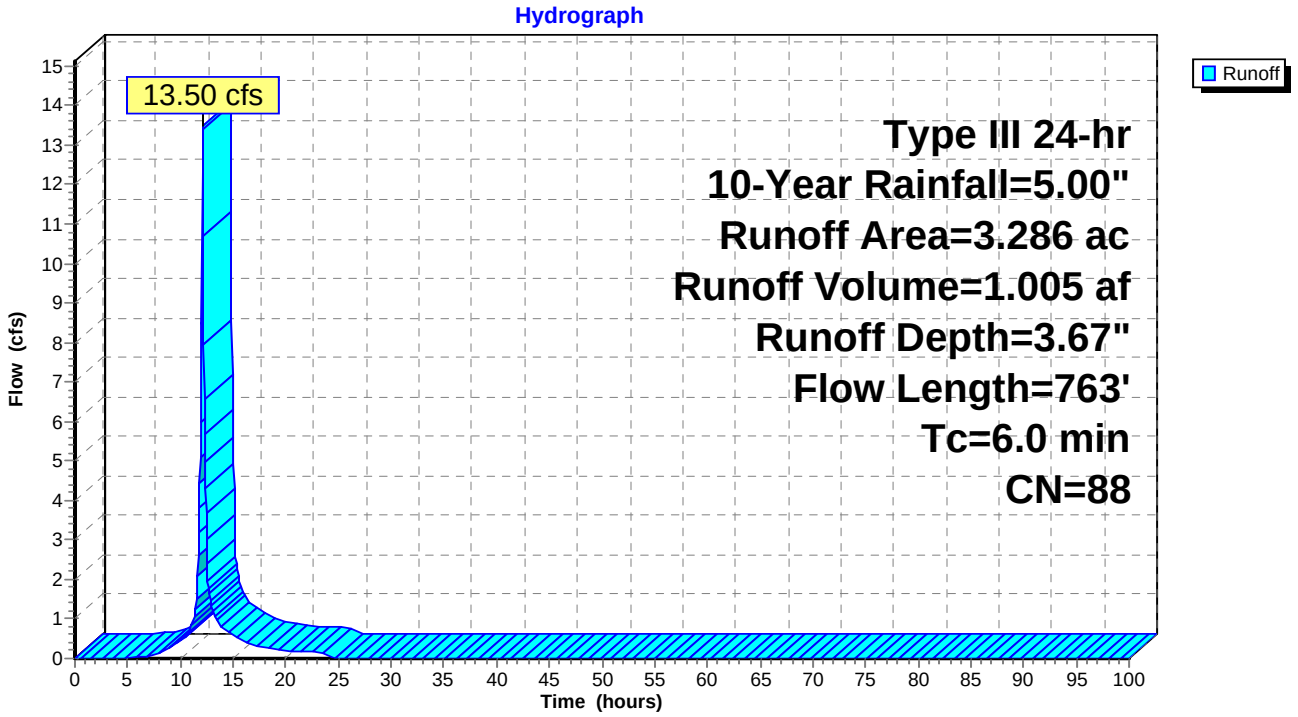
Runoff = 13.50 cfs @ 12.09 hrs, Volume= 1.005 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.127	61	>75% Grass cover, Good, HSG B
1.000	74	>75% Grass cover, Good, HSG C
1.980	98	Paved parking, HSG C
0.142	70	Woods, Good, HSG C
0.037	55	Woods, Good, HSG B
3.286	88	Weighted Average
1.306		39.74% Pervious Area
1.980		60.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	21	0.0470	0.18		**Sheet Flow, A2 to B2** Grass: Short n= 0.150 P2= 3.50"
0.7	78	0.0450	1.89		**Sheet Flow, B2 to C2** Smooth surfaces n= 0.011 P2= 3.50"
2.9	556	0.0250	3.21		**Shallow Concentrated Flow, C2 to D2** Paved Kv= 20.3 fps
0.3	108	0.0100	5.94	10.50	**Pipe Channel, D2 to E2** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
5.8	763	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA2: Drainage Area 2



Summary for Subcatchment Ex-DA3: Drainage Area 3

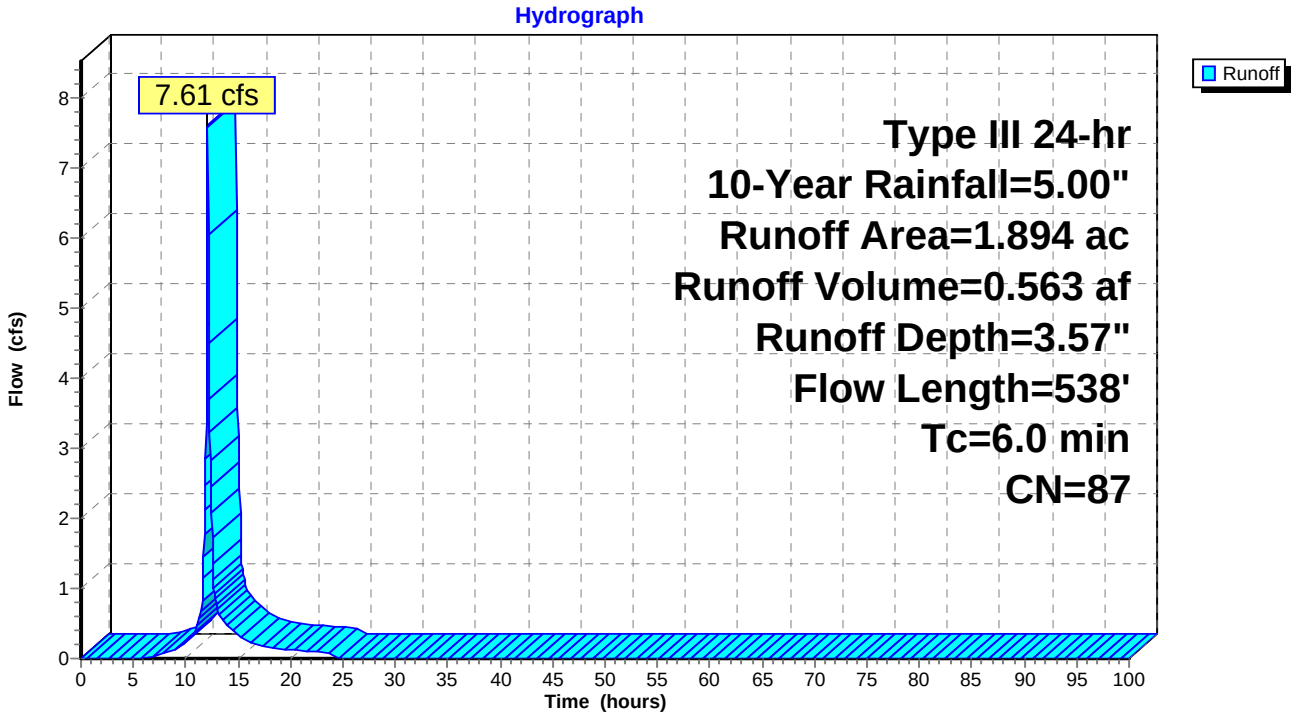
Runoff = 7.61 cfs @ 12.09 hrs, Volume= 0.563 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.459	74	>75% Grass cover, Good, HSG C
1.115	98	Paved parking, HSG C
0.320	70	Woods, Good, HSG C
1.894	87	Weighted Average
0.779		41.13% Pervious Area
1.115		58.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.1000	0.11		**Sheet Flow, A3 to B3** Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	15	0.0670	0.20		**Sheet Flow, B3 to C3** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0400	1.77		**Sheet Flow, C3 to D3** Smooth surfaces n= 0.011 P2= 3.50"
1.0	300	0.0580	4.89		**Shallow Concentrated Flow, D3 to E3** Paved Kv= 20.3 fps
0.4	138	0.0100	5.94	10.50	**Pipe Channel, E3 to F3** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
5.8	538	Total, Increased to minimum Tc = 6.0 min			

Subcatchment Ex-DA3: Drainage Area 3



Summary for Subcatchment Ex-Roof: Roof Area

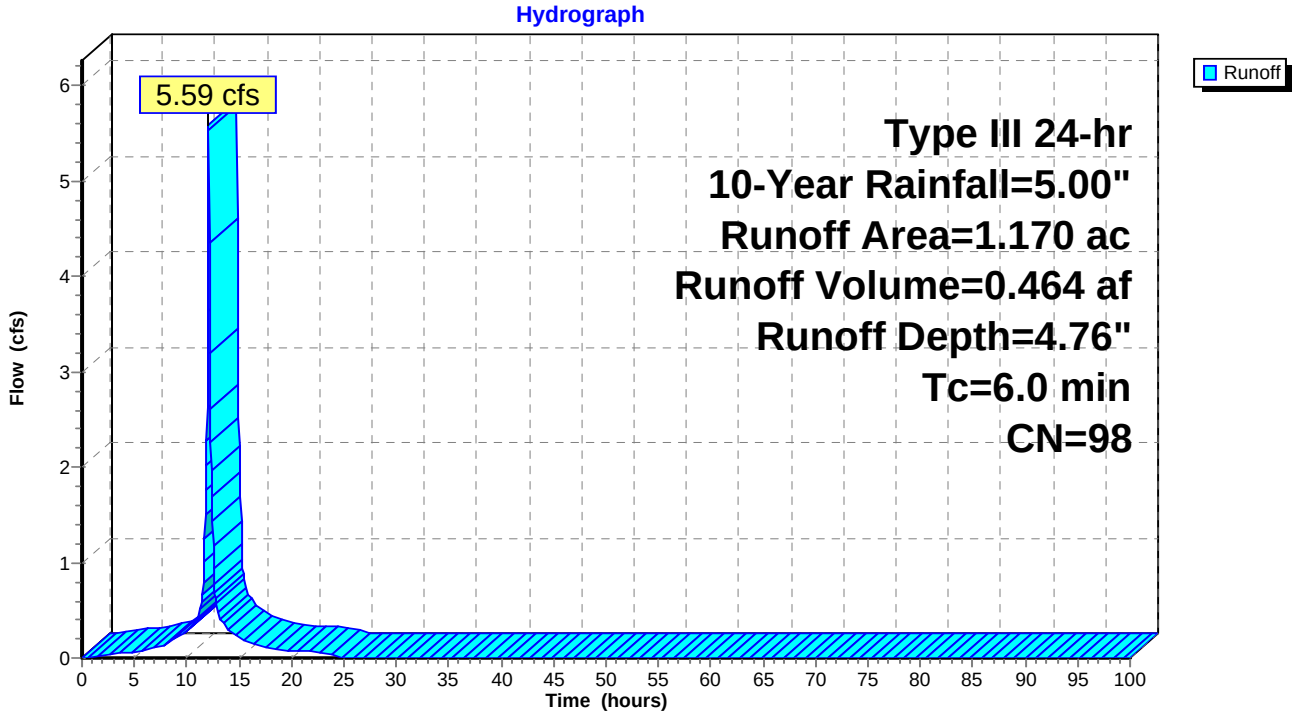
Runoff = 5.59 cfs @ 12.09 hrs, Volume= 0.464 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
1.170	98	Roofs, HSG B
1.170		100.00% Impervious Area

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

Subcatchment Ex-Roof: Roof Area



Summary for Pond Ex Basin: Ex. Basin

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 3.96" for 10-Year event
Inflow = 19.09 cfs @ 12.09 hrs, Volume= 1.469 af
Outflow = 18.55 cfs @ 12.10 hrs, Volume= 1.452 af, Atten= 3%, Lag= 0.8 min
Primary = 18.55 cfs @ 12.10 hrs, Volume= 1.452 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 218.05' @ 12.10 hrs Surf.Area= 0.074 ac Storage= 0.123 af

Plug-Flow detention time= 27.3 min calculated for 1.451 af (99% of inflow)
Center-of-Mass det. time= 20.1 min (802.2 - 782.1)

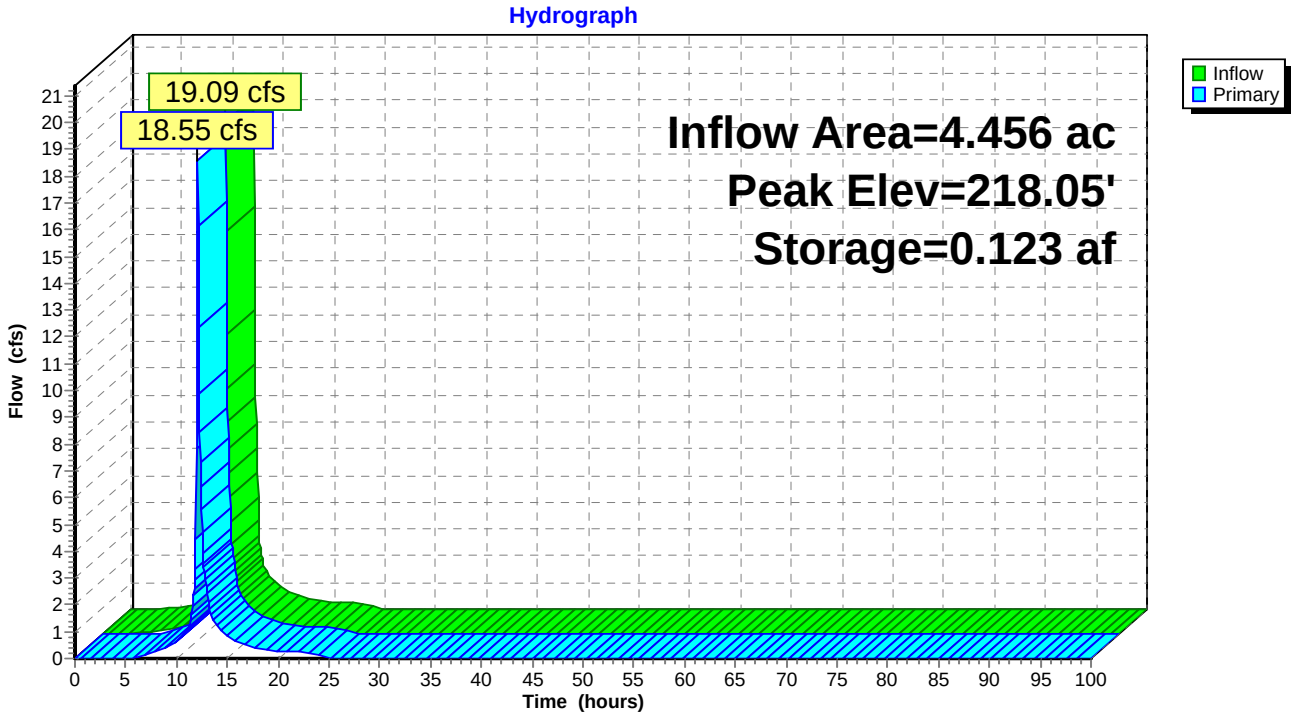
Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.200 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
215.00	0.013	0.000	0.000
216.00	0.026	0.019	0.019
217.00	0.050	0.038	0.057
218.00	0.073	0.061	0.119
219.00	0.090	0.082	0.200

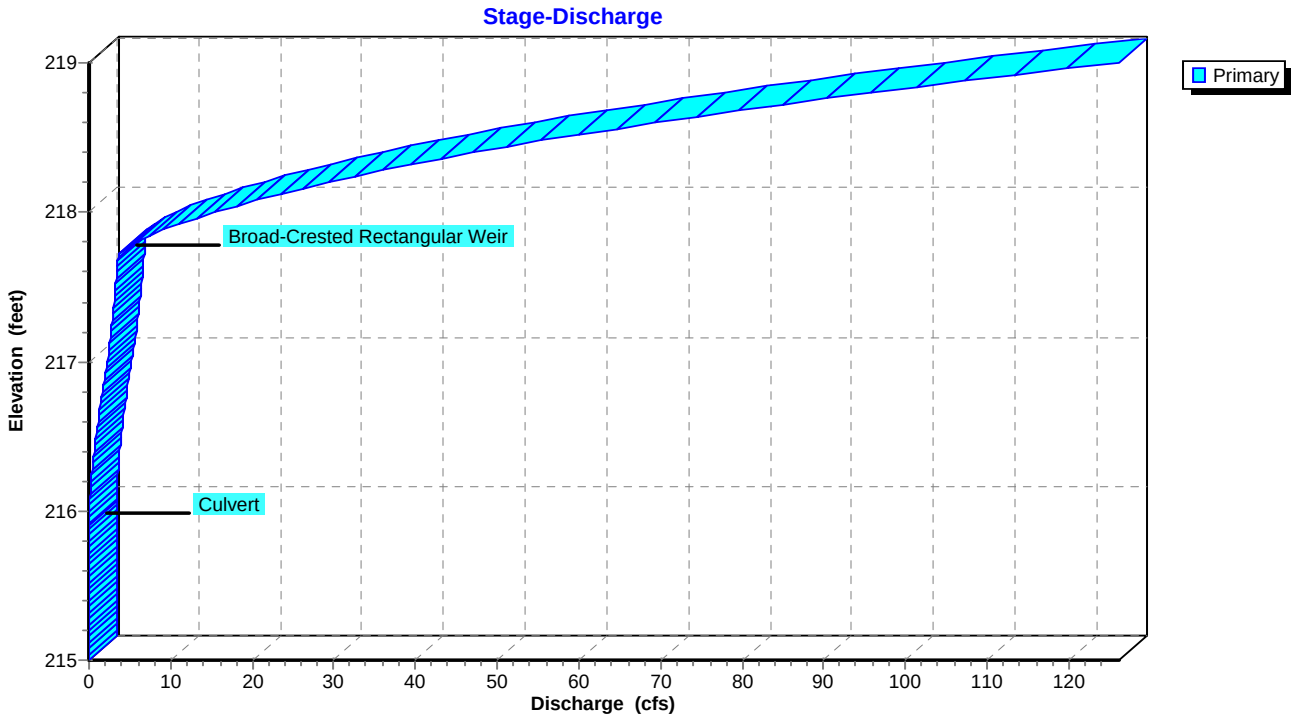
Device	Routing	Invert	Outlet Devices
#1	Primary	215.90'	**15.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 215.90' / 209.00' S= 0.1725 '/' Cc= 0.500 n= 0.013, Flow Area= 1.23 sf
#2	Primary	217.70'	**26.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=18.46 cfs @ 12.10 hrs HW=218.05' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.05 cfs @ 3.30 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 14.41 cfs @ 1.60 fps)

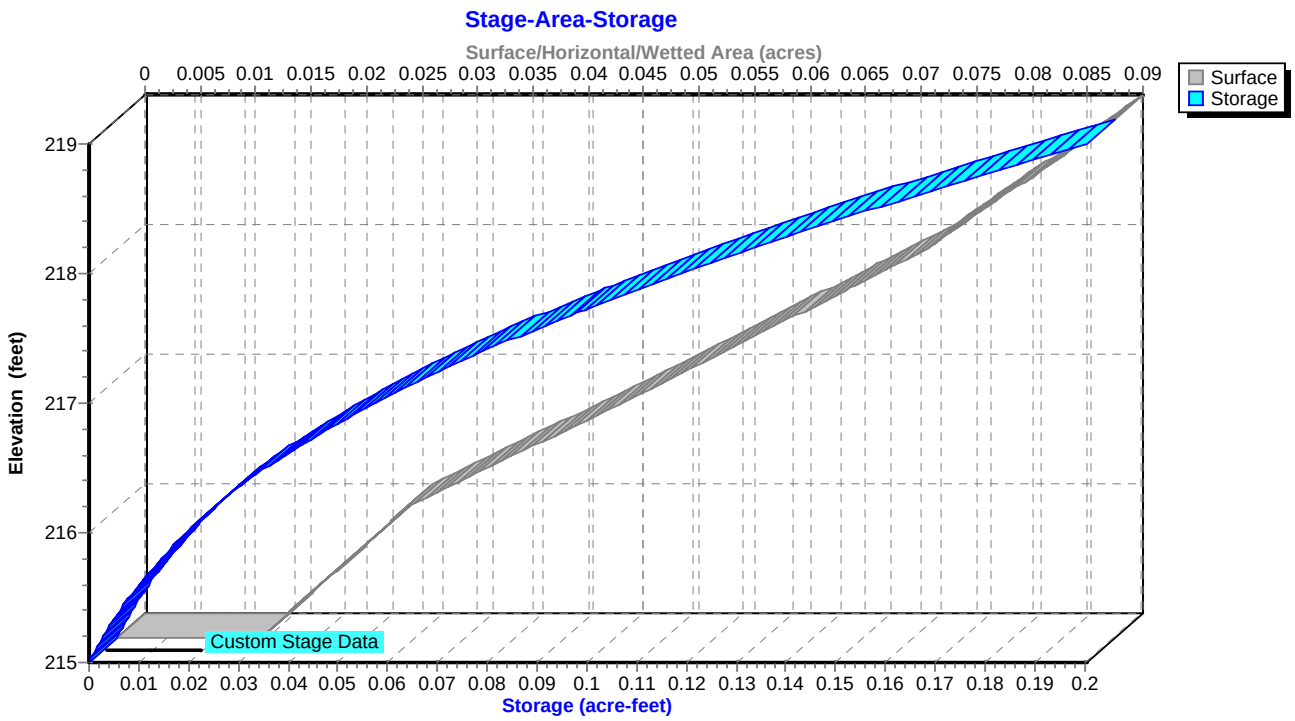
Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin

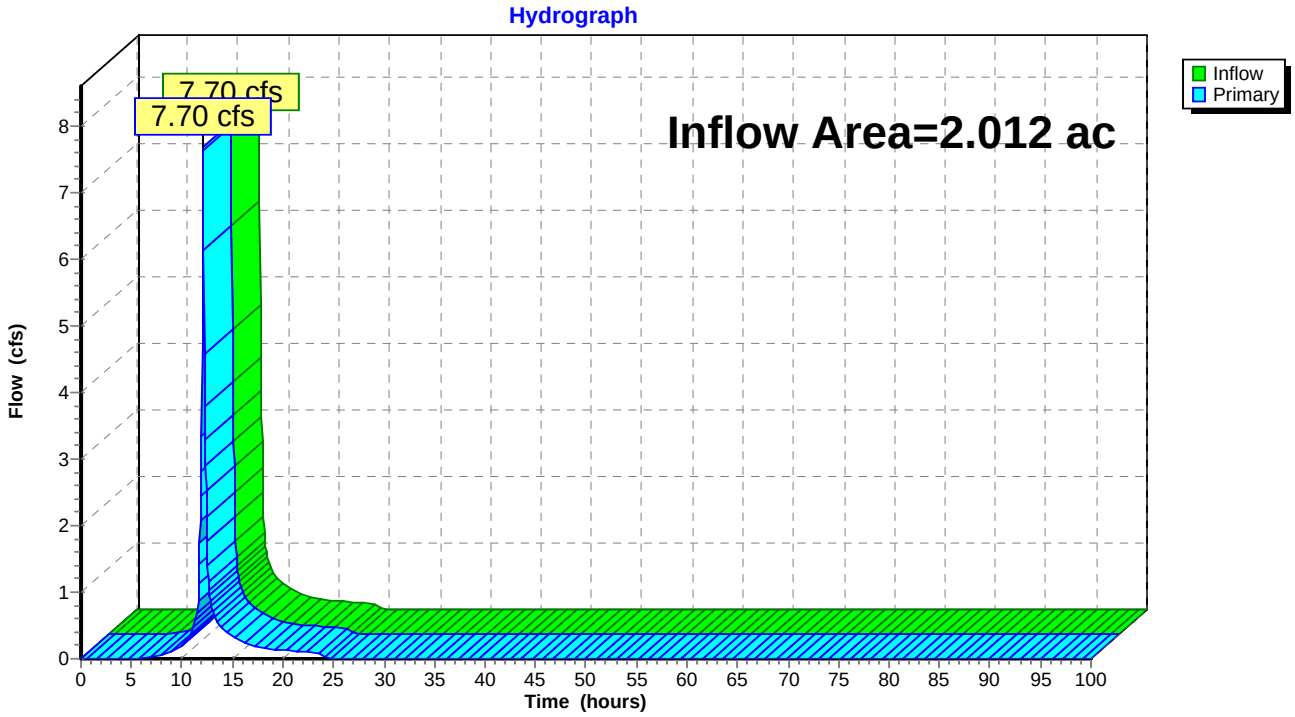


Summary for Link Pt. A: Point A

Inflow Area = 2.012 ac, 49.30% Impervious, Inflow Depth = 3.37" for 10-Year event
Inflow = 7.70 cfs @ 12.09 hrs, Volume= 0.565 af
Primary = 7.70 cfs @ 12.09 hrs, Volume= 0.565 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

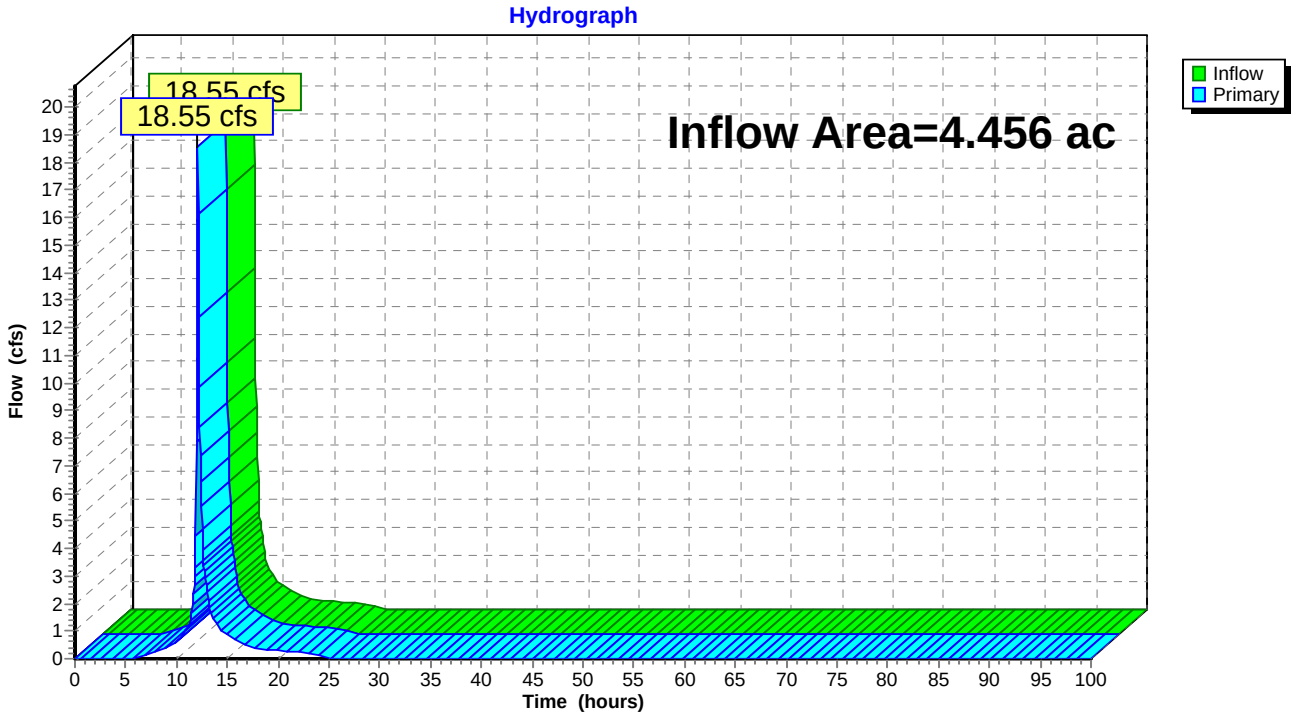


Summary for Link Pt. B: Point B

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 3.91" for 10-Year event
Inflow = 18.55 cfs @ 12.10 hrs, Volume= 1.452 af
Primary = 18.55 cfs @ 12.10 hrs, Volume= 1.452 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

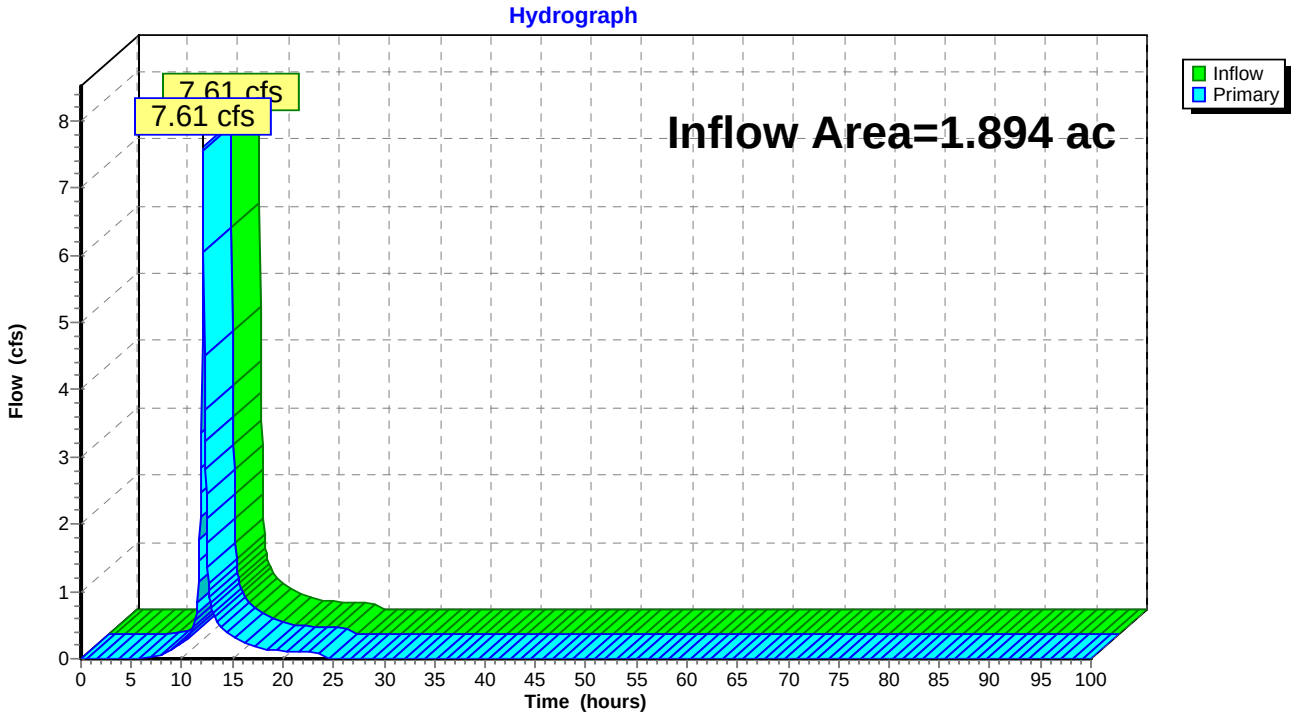


Summary for Link Pt.C: Point C

Inflow Area = 1.894 ac, 58.87% Impervious, Inflow Depth = 3.57" for 10-Year event
Inflow = 7.61 cfs @ 12.09 hrs, Volume= 0.563 af
Primary = 7.61 cfs @ 12.09 hrs, Volume= 0.563 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-DA1: Drainage Area 1 Runoff Area=2.012 ac 49.30% Impervious Runoff Depth=4.30"
Flow Length=548' Tc=6.0 min CN=85 Runoff=9.74 cfs 0.721 af

Subcatchment EX-DA2: Drainage Area 2 Runoff Area=3.286 ac 60.26% Impervious Runoff Depth=4.63"
Flow Length=763' Tc=6.0 min CN=88 Runoff=16.83 cfs 1.267 af

Subcatchment Ex-DA3: Drainage Area 3 Runoff Area=1.894 ac 58.87% Impervious Runoff Depth=4.52"
Flow Length=538' Tc=6.0 min CN=87 Runoff=9.53 cfs 0.713 af

Subcatchment Ex-Roof: Roof Area Runoff Area=1.170 ac 100.00% Impervious Runoff Depth=5.76"
Tc=6.0 min CN=98 Runoff=6.72 cfs 0.562 af

Pond Ex Basin: Ex. Basin Peak Elev=218.11' Storage=0.127 af Inflow=23.55 cfs 1.828 af
Outflow=22.92 cfs 1.812 af

Link Pt. A: Point A Inflow=9.74 cfs 0.721 af
Primary=9.74 cfs 0.721 af

Link Pt. B: Point B Inflow=22.92 cfs 1.812 af
Primary=22.92 cfs 1.812 af

Link Pt.C: Point C Inflow=9.53 cfs 0.713 af
Primary=9.53 cfs 0.713 af

Total Runoff Area = 8.362 ac Runoff Volume = 3.263 af Average Runoff Depth = 4.68"
37.13% Pervious = 3.105 ac 62.87% Impervious = 5.257 ac

Summary for Subcatchment EX-DA1: Drainage Area 1

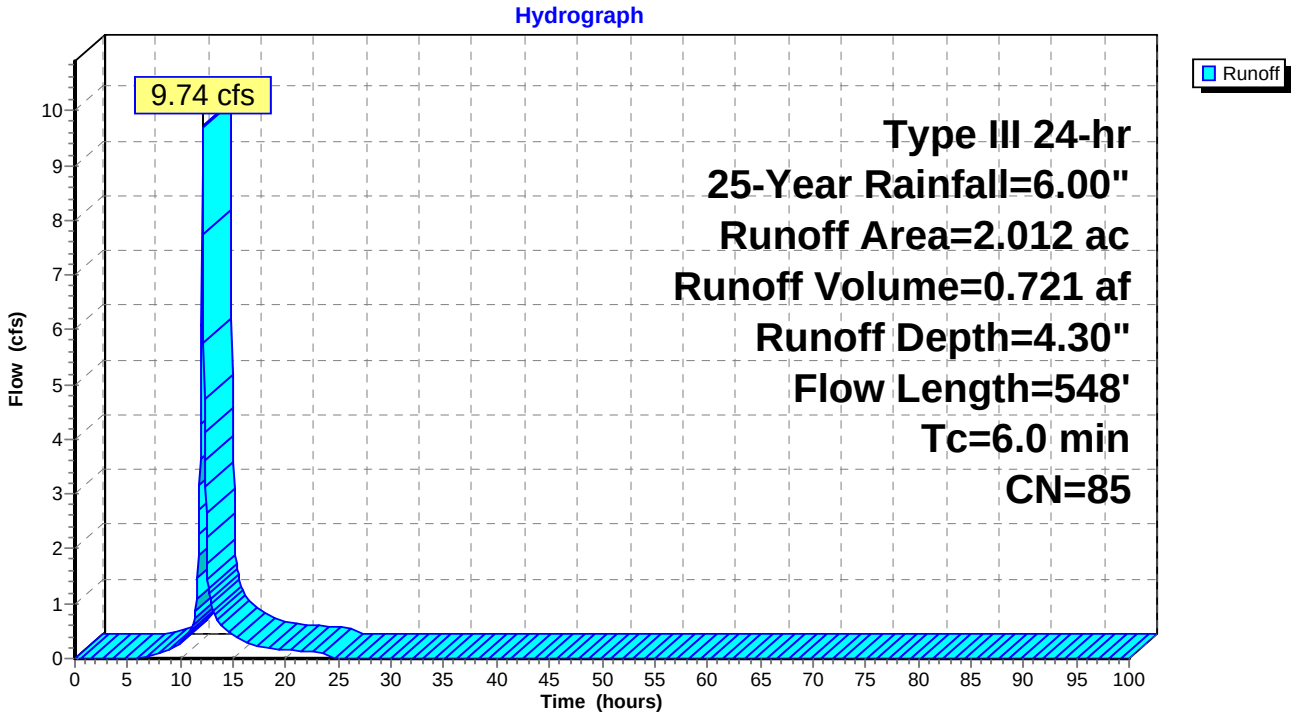
Runoff = 9.74 cfs @ 12.09 hrs, Volume= 0.721 af, Depth= 4.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
0.580	74	>75% Grass cover, Good, HSG C
0.992	98	Paved parking, HSG C
0.440	70	Woods, Good, HSG C
2.012	85	Weighted Average
1.020		50.70% Pervious Area
0.992		49.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	70	0.2100	0.42		**Sheet Flow, A1 to B1** Grass: Short n= 0.150 P2= 3.50"
0.4	30	0.0330	1.38		**Sheet Flow, B1 to C1** Smooth surfaces n= 0.011 P2= 3.50"
1.3	325	0.0420	4.16		**Shallow Concentrated Flow, C1 to D1** Paved Kv= 20.3 fps
0.3	123	0.0100	5.94	10.50	**Pipe Channel, D1 to E1** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
4.7	548	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA1: Drainage Area 1



Summary for Subcatchment EX-DA2: Drainage Area 2

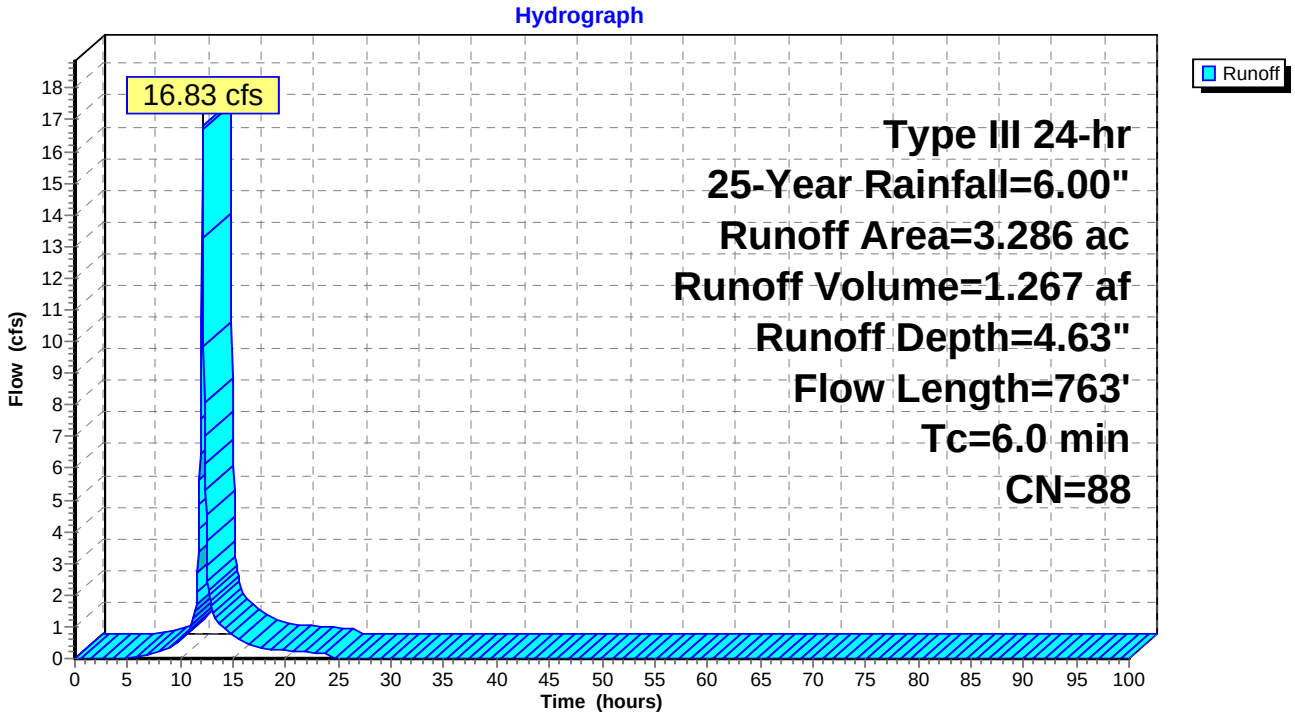
Runoff = 16.83 cfs @ 12.09 hrs, Volume= 1.267 af, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
0.127	61	>75% Grass cover, Good, HSG B
1.000	74	>75% Grass cover, Good, HSG C
1.980	98	Paved parking, HSG C
0.142	70	Woods, Good, HSG C
0.037	55	Woods, Good, HSG B
3.286	88	Weighted Average
1.306		39.74% Pervious Area
1.980		60.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	21	0.0470	0.18		**Sheet Flow, A2 to B2** Grass: Short n= 0.150 P2= 3.50"
0.7	78	0.0450	1.89		**Sheet Flow, B2 to C2** Smooth surfaces n= 0.011 P2= 3.50"
2.9	556	0.0250	3.21		**Shallow Concentrated Flow, C2 to D2** Paved Kv= 20.3 fps
0.3	108	0.0100	5.94	10.50	**Pipe Channel, D2 to E2** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
5.8	763	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA2: Drainage Area 2



Summary for Subcatchment Ex-DA3: Drainage Area 3

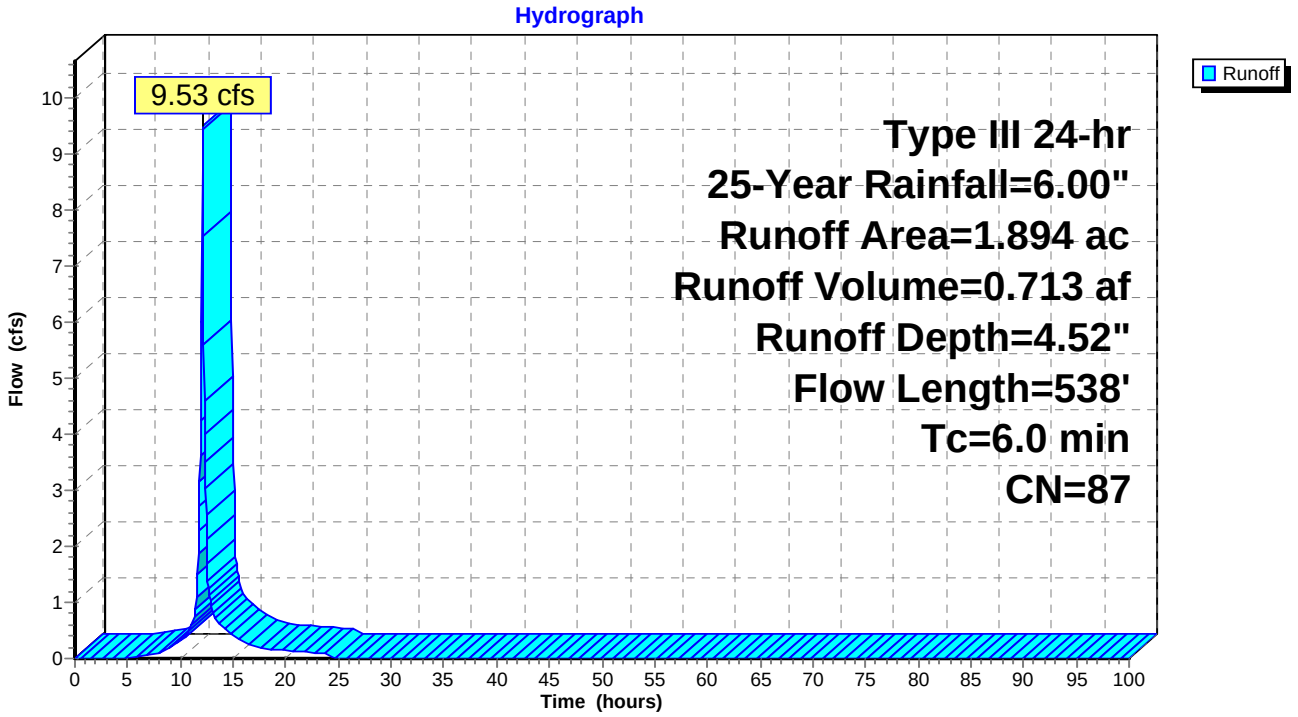
Runoff = 9.53 cfs @ 12.09 hrs, Volume= 0.713 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
0.459	74	>75% Grass cover, Good, HSG C
1.115	98	Paved parking, HSG C
0.320	70	Woods, Good, HSG C
1.894	87	Weighted Average
0.779		41.13% Pervious Area
1.115		58.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.1000	0.11		**Sheet Flow, A3 to B3** Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	15	0.0670	0.20		**Sheet Flow, B3 to C3** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0400	1.77		**Sheet Flow, C3 to D3** Smooth surfaces n= 0.011 P2= 3.50"
1.0	300	0.0580	4.89		**Shallow Concentrated Flow, D3 to E3** Paved Kv= 20.3 fps
0.4	138	0.0100	5.94	10.50	**Pipe Channel, E3 to F3** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
5.8	538	Total, Increased to minimum Tc = 6.0 min			

Subcatchment Ex-DA3: Drainage Area 3



Summary for Subcatchment Ex-Roof: Roof Area

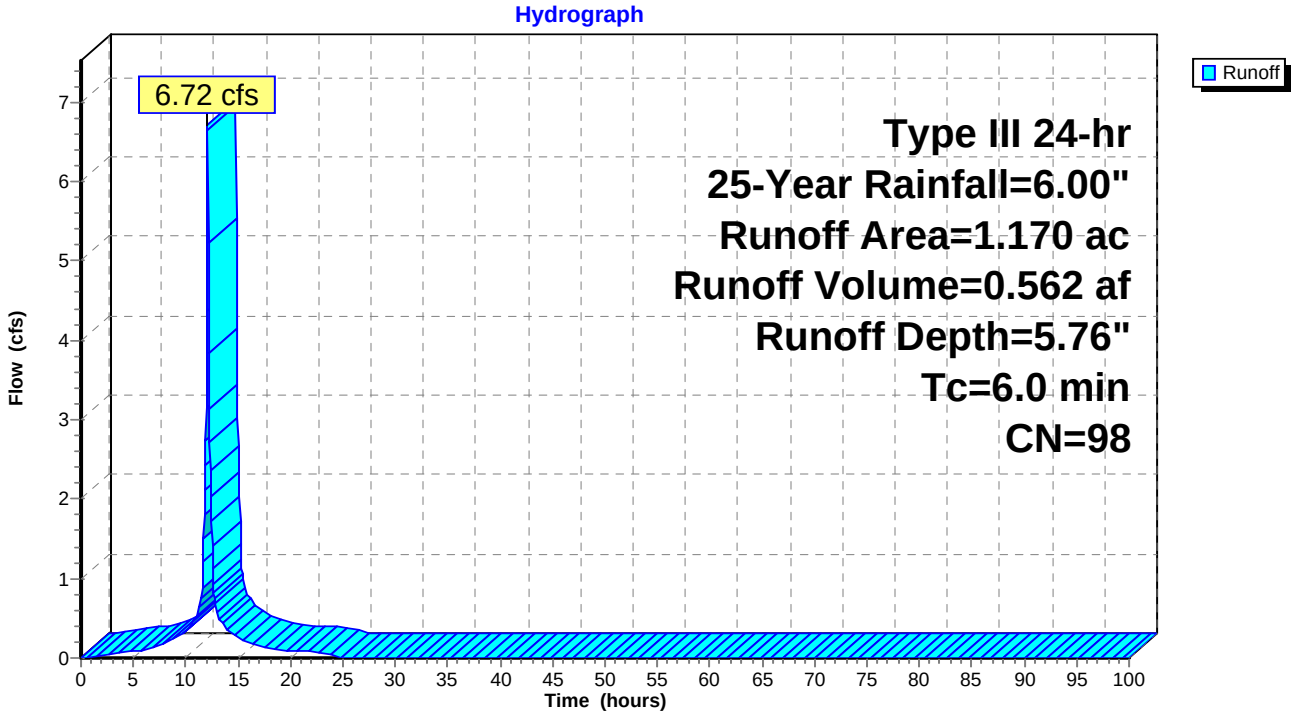
Runoff = 6.72 cfs @ 12.09 hrs, Volume= 0.562 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
1.170	98	Roofs, HSG B
1.170		100.00% Impervious Area

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

Subcatchment Ex-Roof: Roof Area



Summary for Pond Ex Basin: Ex. Basin

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 4.92" for 25-Year event
Inflow = 23.55 cfs @ 12.09 hrs, Volume= 1.828 af
Outflow = 22.92 cfs @ 12.10 hrs, Volume= 1.812 af, Atten= 3%, Lag= 0.7 min
Primary = 22.92 cfs @ 12.10 hrs, Volume= 1.812 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 218.11' @ 12.10 hrs Surf.Area= 0.075 ac Storage= 0.127 af

Plug-Flow detention time= 24.7 min calculated for 1.812 af (99% of inflow)
Center-of-Mass det. time= 18.0 min (795.3 - 777.2)

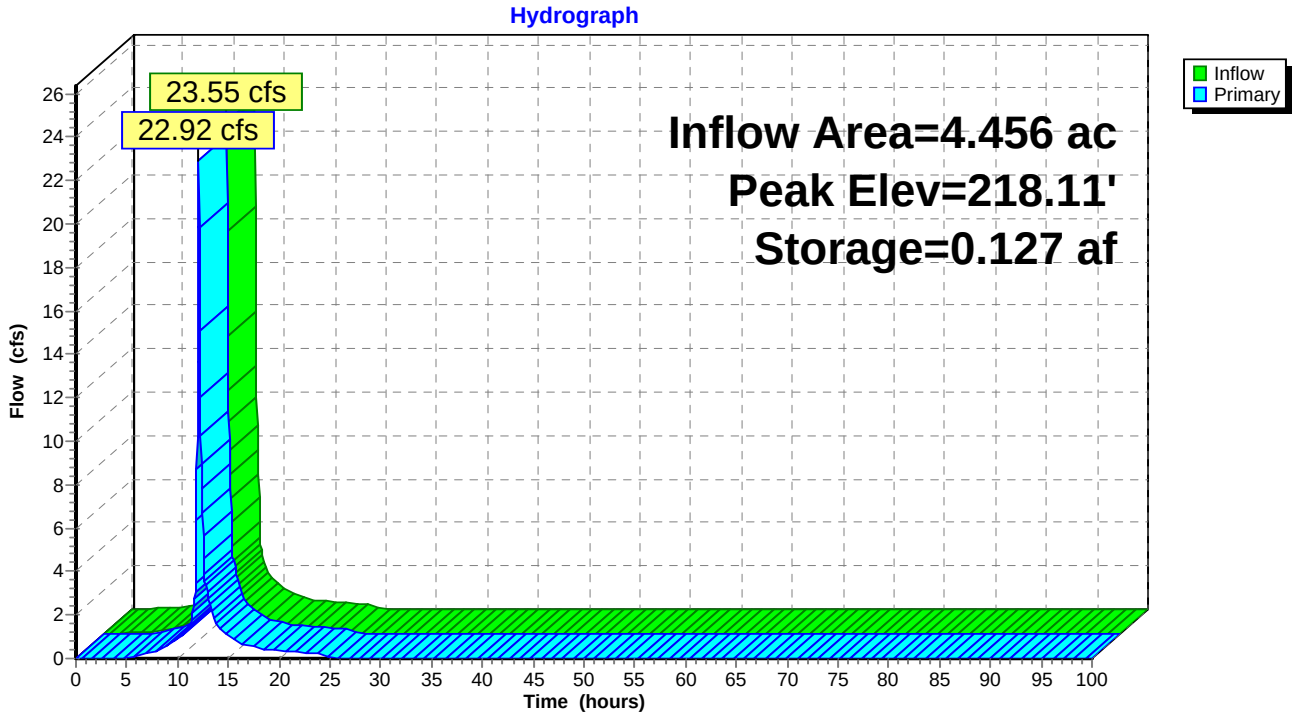
Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.200 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
215.00	0.013	0.000	0.000
216.00	0.026	0.019	0.019
217.00	0.050	0.038	0.057
218.00	0.073	0.061	0.119
219.00	0.090	0.082	0.200

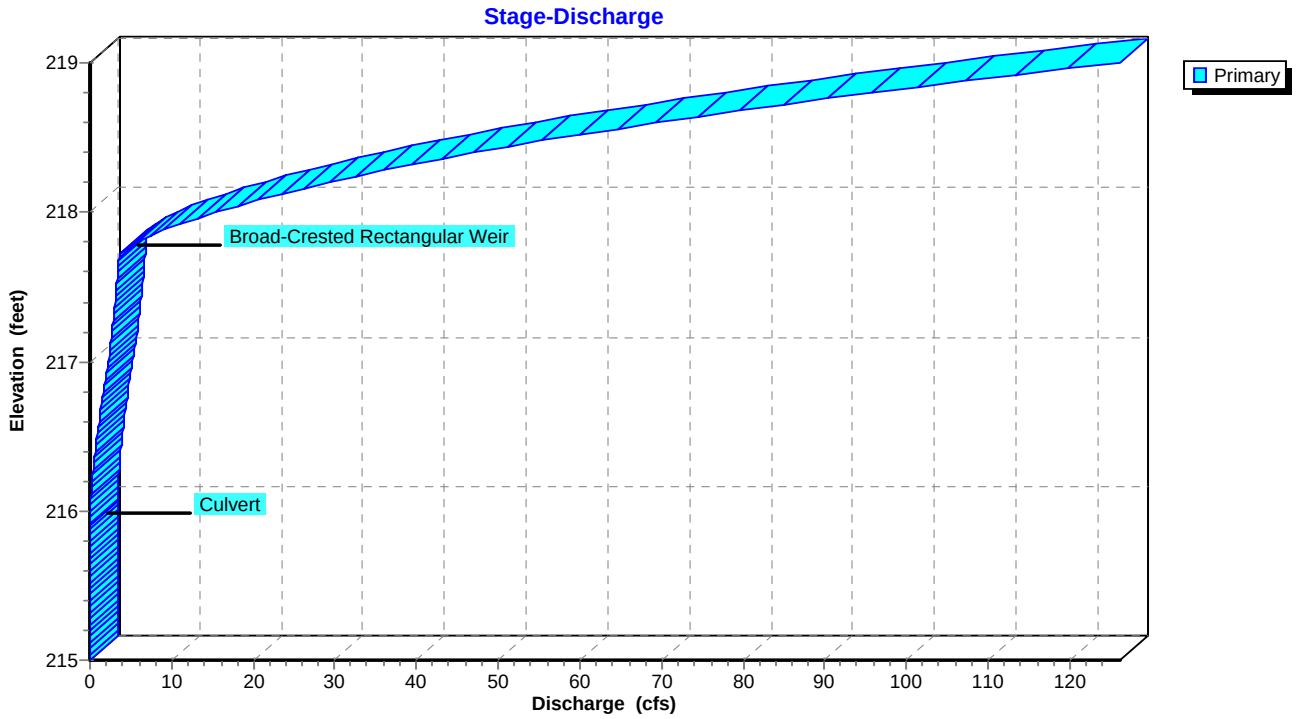
Device	Routing	Invert	Outlet Devices
#1	Primary	215.90'	**15.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 215.90' / 209.00' S= 0.1725 '/' Cc= 0.500 n= 0.013, Flow Area= 1.23 sf
#2	Primary	217.70'	**26.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=22.90 cfs @ 12.10 hrs HW=218.11' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.14 cfs @ 3.37 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 18.77 cfs @ 1.75 fps)

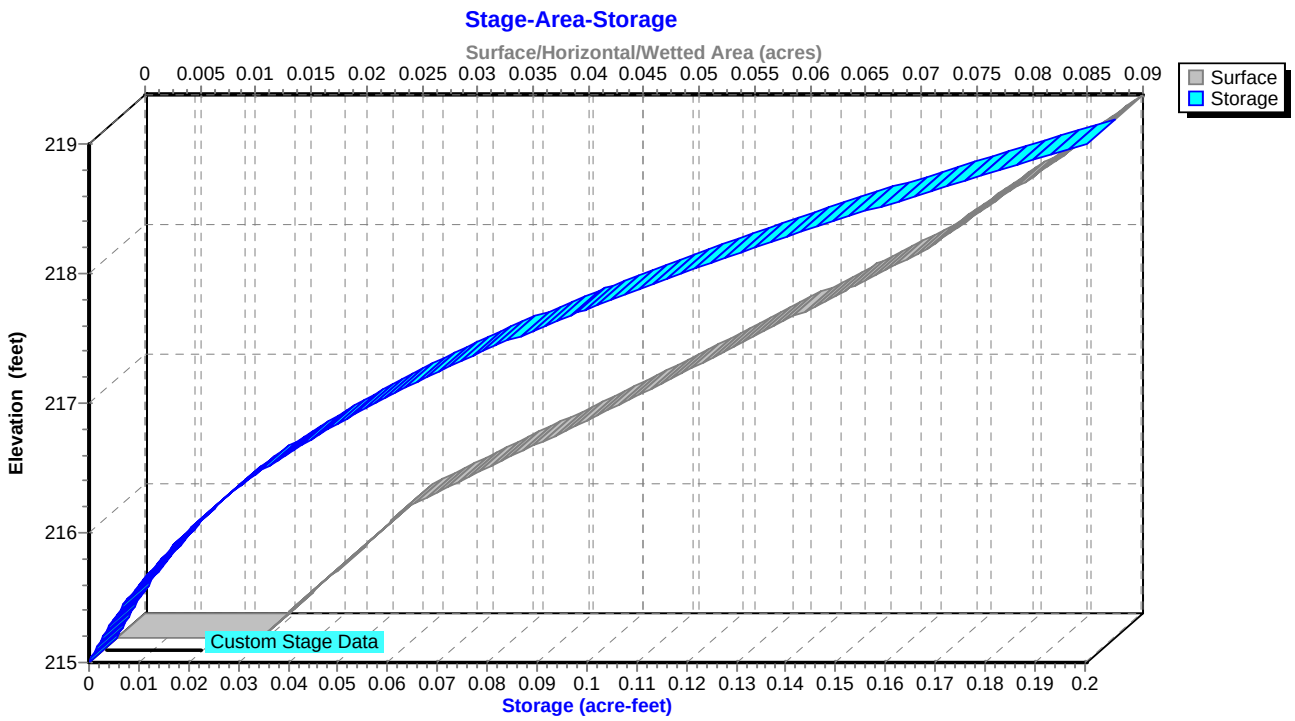
Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin

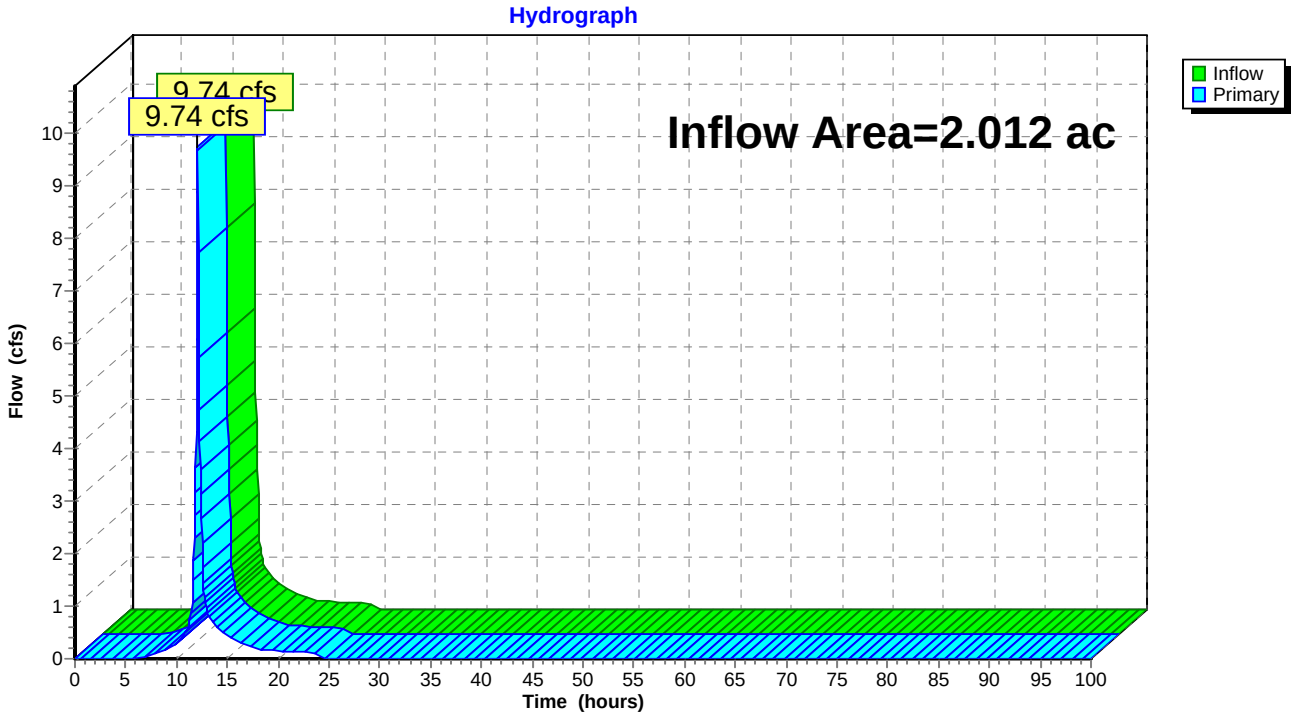


Summary for Link Pt. A: Point A

Inflow Area = 2.012 ac, 49.30% Impervious, Inflow Depth = 4.30" for 25-Year event
Inflow = 9.74 cfs @ 12.09 hrs, Volume= 0.721 af
Primary = 9.74 cfs @ 12.09 hrs, Volume= 0.721 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

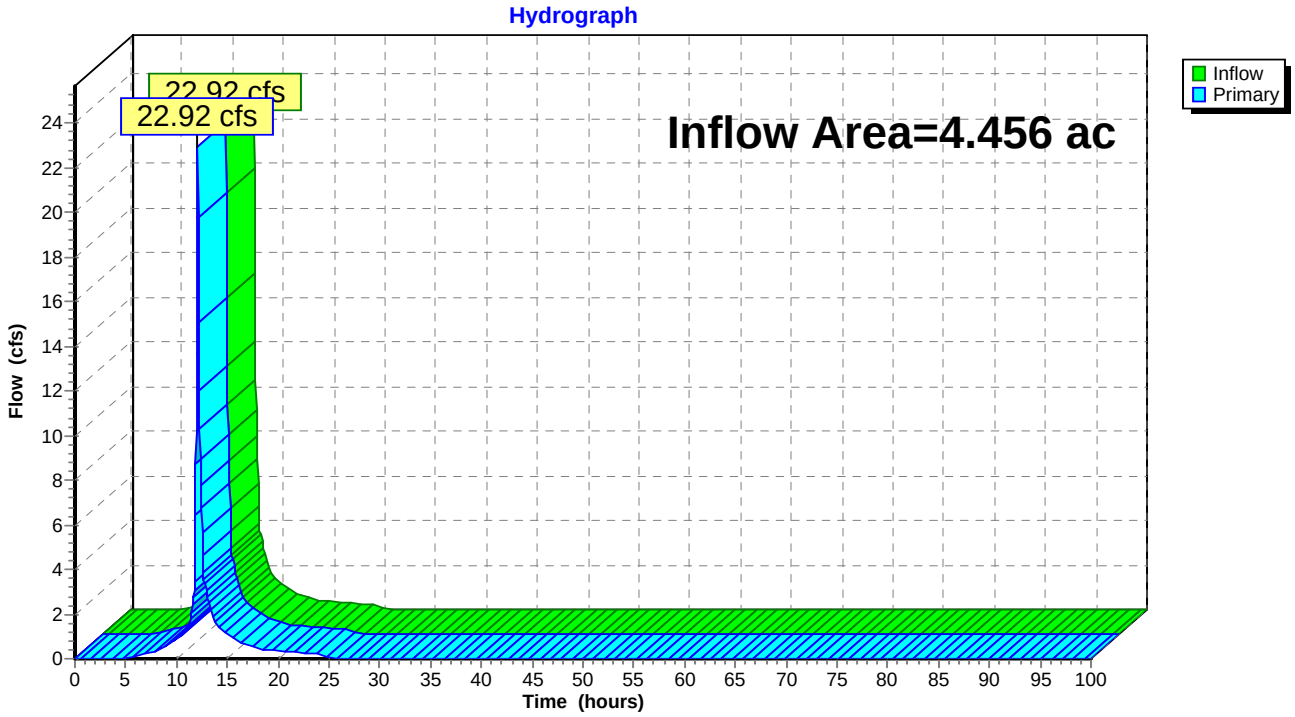


Summary for Link Pt. B: Point B

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 4.88" for 25-Year event
Inflow = 22.92 cfs @ 12.10 hrs, Volume= 1.812 af
Primary = 22.92 cfs @ 12.10 hrs, Volume= 1.812 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

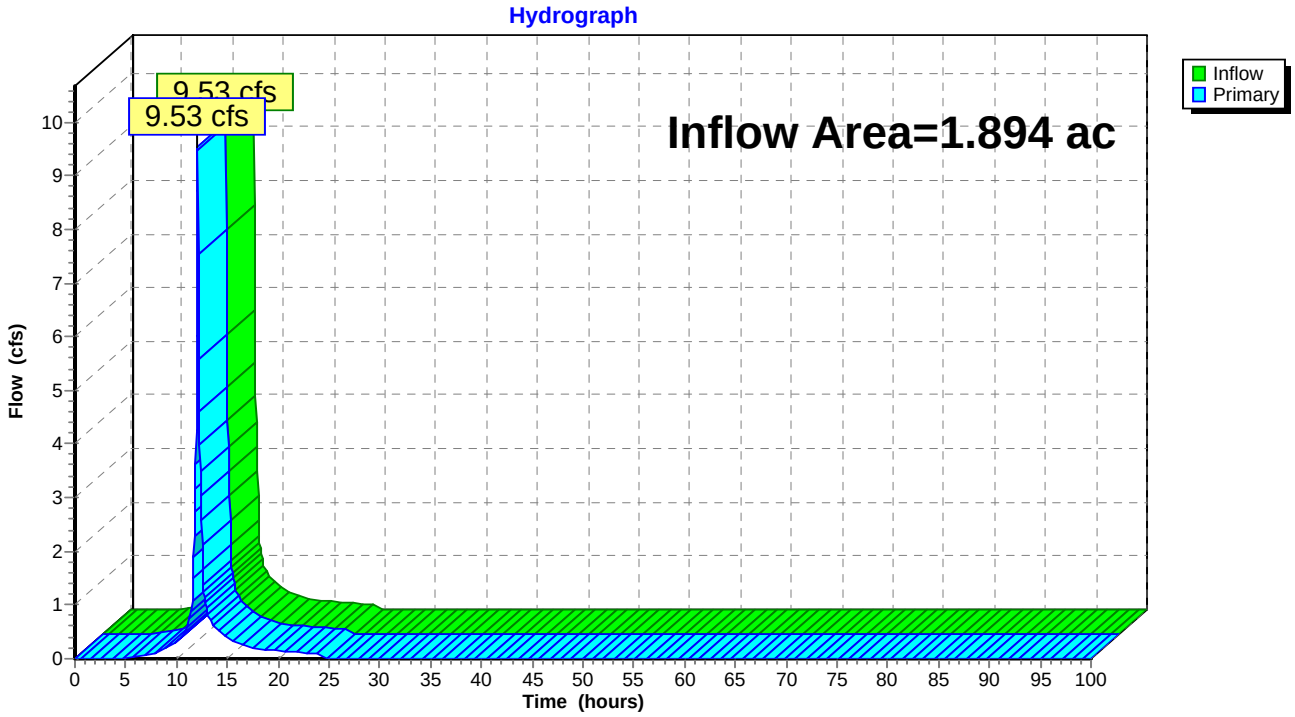


Summary for Link Pt.C: Point C

Inflow Area = 1.894 ac, 58.87% Impervious, Inflow Depth = 4.52" for 25-Year event
Inflow = 9.53 cfs @ 12.09 hrs, Volume= 0.713 af
Primary = 9.53 cfs @ 12.09 hrs, Volume= 0.713 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-DA1: Drainage Area 1 Runoff Area=2.012 ac 49.30% Impervious Runoff Depth=5.73"
Flow Length=548' Tc=6.0 min CN=85 Runoff=12.80 cfs 0.961 af

Subcatchment EX-DA2: Drainage Area 2 Runoff Area=3.286 ac 60.26% Impervious Runoff Depth=6.08"
Flow Length=763' Tc=6.0 min CN=88 Runoff=21.79 cfs 1.665 af

Subcatchment Ex-DA3: Drainage Area 3 Runoff Area=1.894 ac 58.87% Impervious Runoff Depth=5.96"
Flow Length=538' Tc=6.0 min CN=87 Runoff=12.40 cfs 0.941 af

Subcatchment Ex-Roof: Roof Area Runoff Area=1.170 ac 100.00% Impervious Runoff Depth=7.26"
Tc=6.0 min CN=98 Runoff=8.41 cfs 0.708 af

Pond Ex Basin: Ex. Basin Peak Elev=218.20' Storage=0.134 af Inflow=30.20 cfs 2.373 af
Outflow=29.44 cfs 2.356 af

Link Pt. A: Point A Inflow=12.80 cfs 0.961 af
Primary=12.80 cfs 0.961 af

Link Pt. B: Point B Inflow=29.44 cfs 2.356 af
Primary=29.44 cfs 2.356 af

Link Pt.C: Point C Inflow=12.40 cfs 0.941 af
Primary=12.40 cfs 0.941 af

Total Runoff Area = 8.362 ac Runoff Volume = 4.275 af Average Runoff Depth = 6.14"
37.13% Pervious = 3.105 ac 62.87% Impervious = 5.257 ac

Summary for Subcatchment EX-DA1: Drainage Area 1

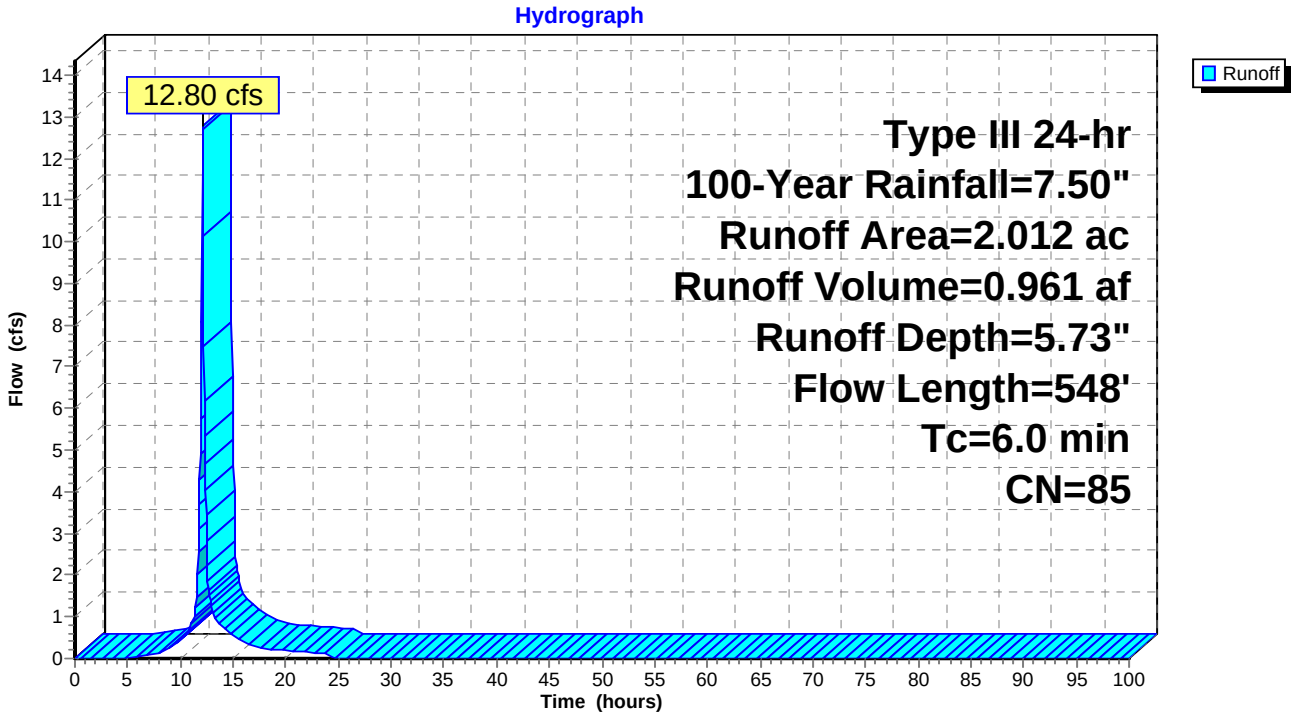
Runoff = 12.80 cfs @ 12.09 hrs, Volume= 0.961 af, Depth= 5.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.580	74	>75% Grass cover, Good, HSG C
0.992	98	Paved parking, HSG C
0.440	70	Woods, Good, HSG C
2.012	85	Weighted Average
1.020		50.70% Pervious Area
0.992		49.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	70	0.2100	0.42		**Sheet Flow, A1 to B1** Grass: Short n= 0.150 P2= 3.50"
0.4	30	0.0330	1.38		**Sheet Flow, B1 to C1** Smooth surfaces n= 0.011 P2= 3.50"
1.3	325	0.0420	4.16		**Shallow Concentrated Flow, C1 to D1** Paved Kv= 20.3 fps
0.3	123	0.0100	5.94	10.50	**Pipe Channel, D1 to E1** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
4.7	548	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA1: Drainage Area 1



Summary for Subcatchment EX-DA2: Drainage Area 2

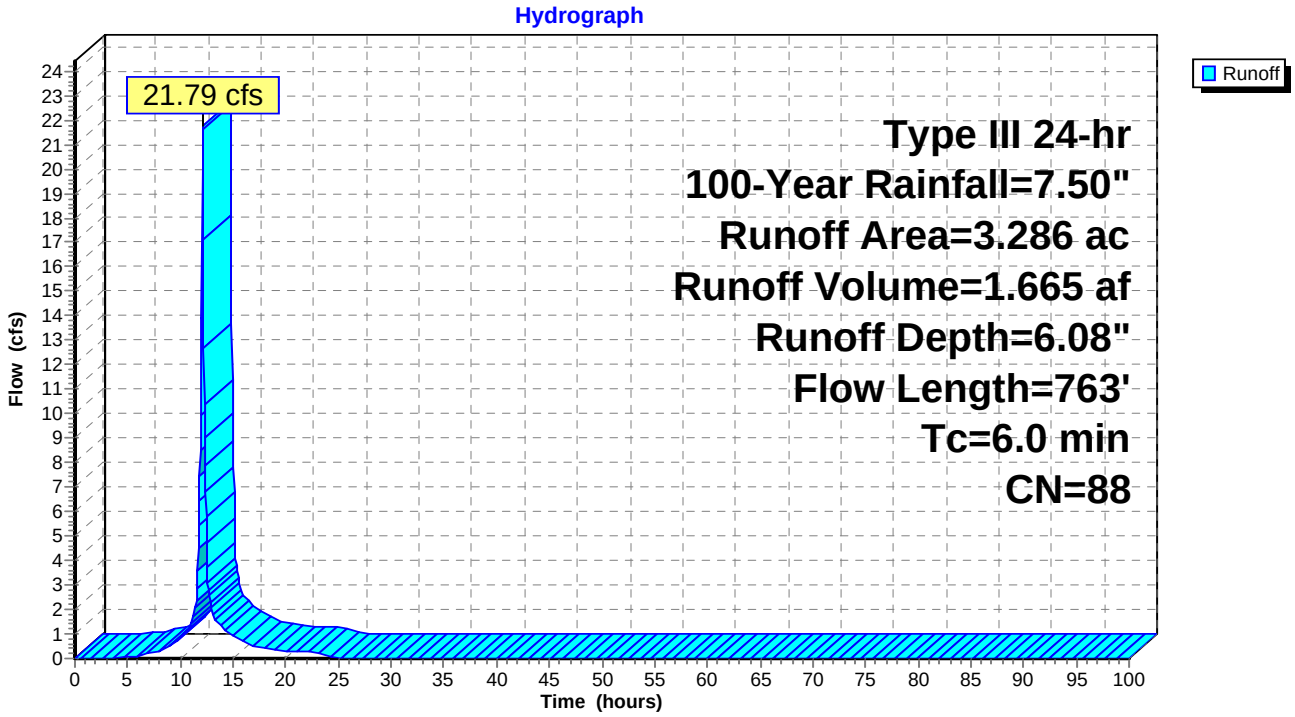
Runoff = 21.79 cfs @ 12.09 hrs, Volume= 1.665 af, Depth= 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.127	61	>75% Grass cover, Good, HSG B
1.000	74	>75% Grass cover, Good, HSG C
1.980	98	Paved parking, HSG C
0.142	70	Woods, Good, HSG C
0.037	55	Woods, Good, HSG B
3.286	88	Weighted Average
1.306		39.74% Pervious Area
1.980		60.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	21	0.0470	0.18		**Sheet Flow, A2 to B2** Grass: Short n= 0.150 P2= 3.50"
0.7	78	0.0450	1.89		**Sheet Flow, B2 to C2** Smooth surfaces n= 0.011 P2= 3.50"
2.9	556	0.0250	3.21		**Shallow Concentrated Flow, C2 to D2** Paved Kv= 20.3 fps
0.3	108	0.0100	5.94	10.50	**Pipe Channel, D2 to E2** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
5.8	763	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-DA2: Drainage Area 2



Summary for Subcatchment Ex-DA3: Drainage Area 3

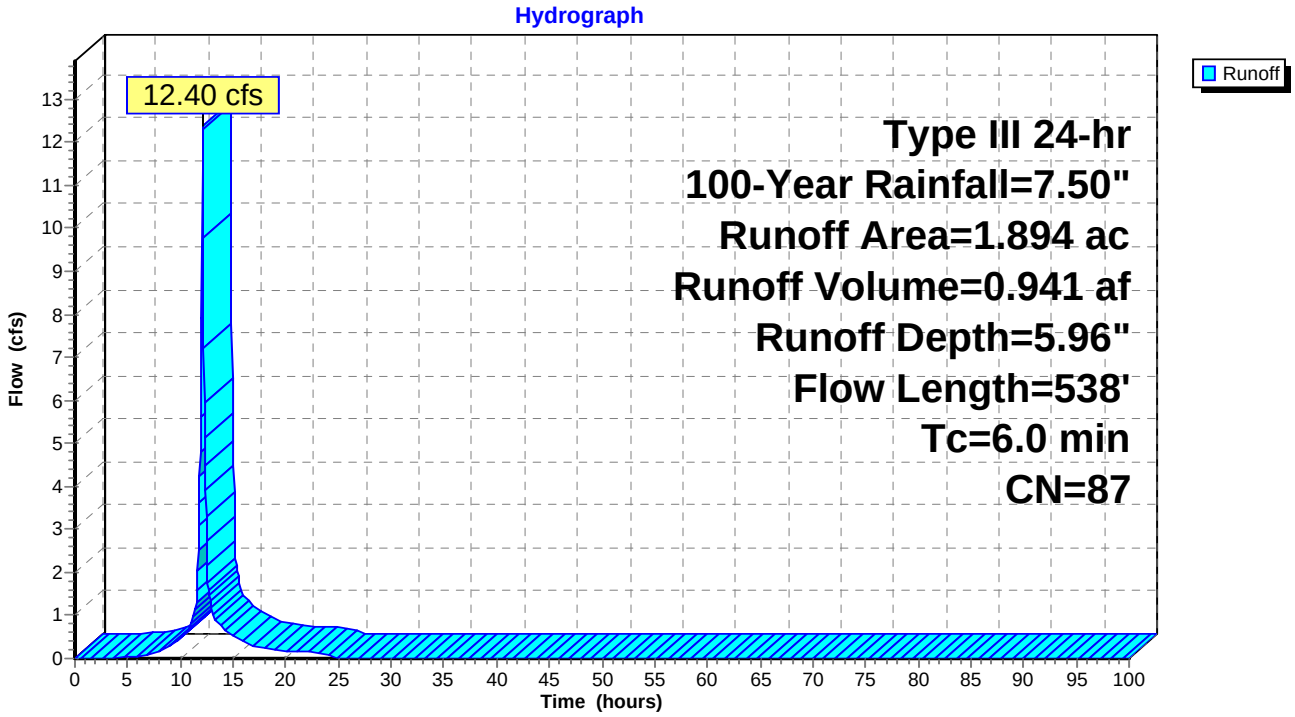
Runoff = 12.40 cfs @ 12.09 hrs, Volume= 0.941 af, Depth= 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.459	74	>75% Grass cover, Good, HSG C
1.115	98	Paved parking, HSG C
0.320	70	Woods, Good, HSG C
1.894	87	Weighted Average
0.779		41.13% Pervious Area
1.115		58.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.1000	0.11		**Sheet Flow, A3 to B3** Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	15	0.0670	0.20		**Sheet Flow, B3 to C3** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0400	1.77		**Sheet Flow, C3 to D3** Smooth surfaces n= 0.011 P2= 3.50"
1.0	300	0.0580	4.89		**Shallow Concentrated Flow, D3 to E3** Paved Kv= 20.3 fps
0.4	138	0.0100	5.94	10.50	**Pipe Channel, E3 to F3** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
5.8	538	Total, Increased to minimum Tc = 6.0 min			

Subcatchment Ex-DA3: Drainage Area 3



Summary for Subcatchment Ex-Roof: Roof Area

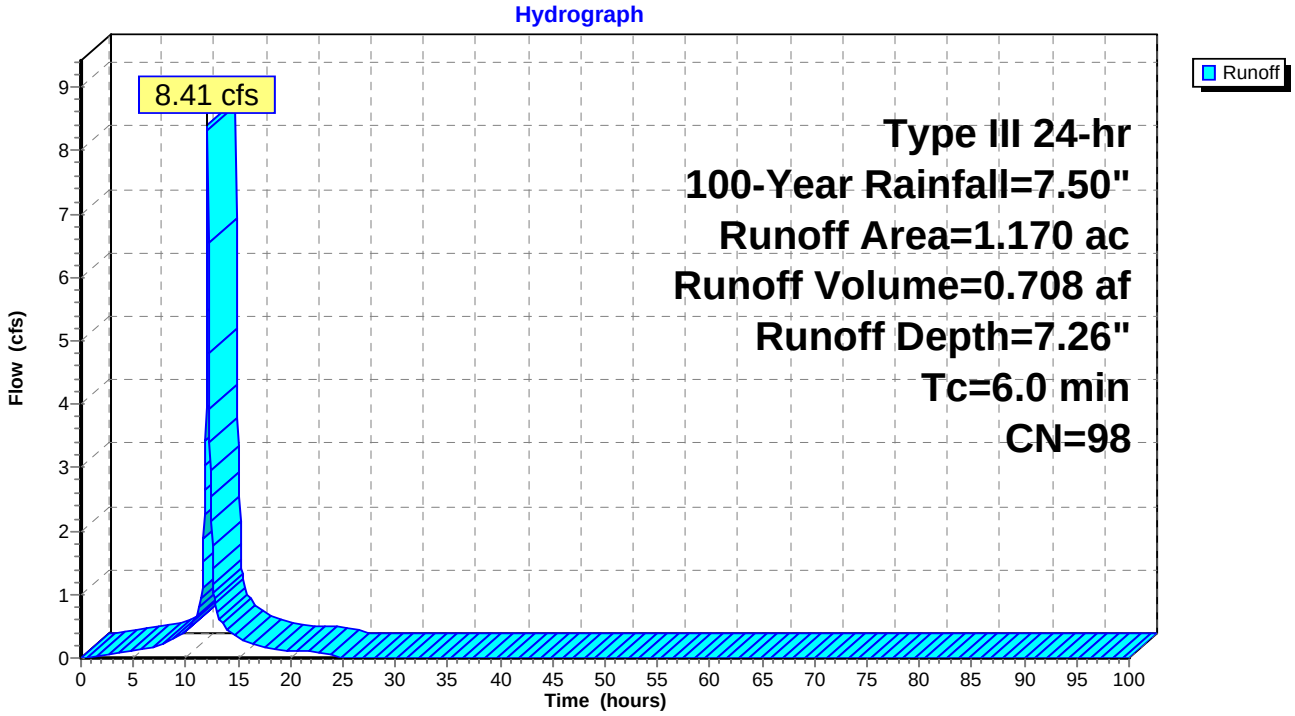
Runoff = 8.41 cfs @ 12.09 hrs, Volume= 0.708 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
1.170	98	Roofs, HSG B
1.170		100.00% Impervious Area

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

Subcatchment Ex-Roof: Roof Area



Summary for Pond Ex Basin: Ex. Basin

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 6.39" for 100-Year event
Inflow = 30.20 cfs @ 12.09 hrs, Volume= 2.373 af
Outflow = 29.44 cfs @ 12.10 hrs, Volume= 2.356 af, Atten= 3%, Lag= 0.7 min
Primary = 29.44 cfs @ 12.10 hrs, Volume= 2.356 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 218.20' @ 12.10 hrs Surf.Area= 0.076 ac Storage= 0.134 af

Plug-Flow detention time= 21.7 min calculated for 2.356 af (99% of inflow)
Center-of-Mass det. time= 16.0 min (787.6 - 771.6)

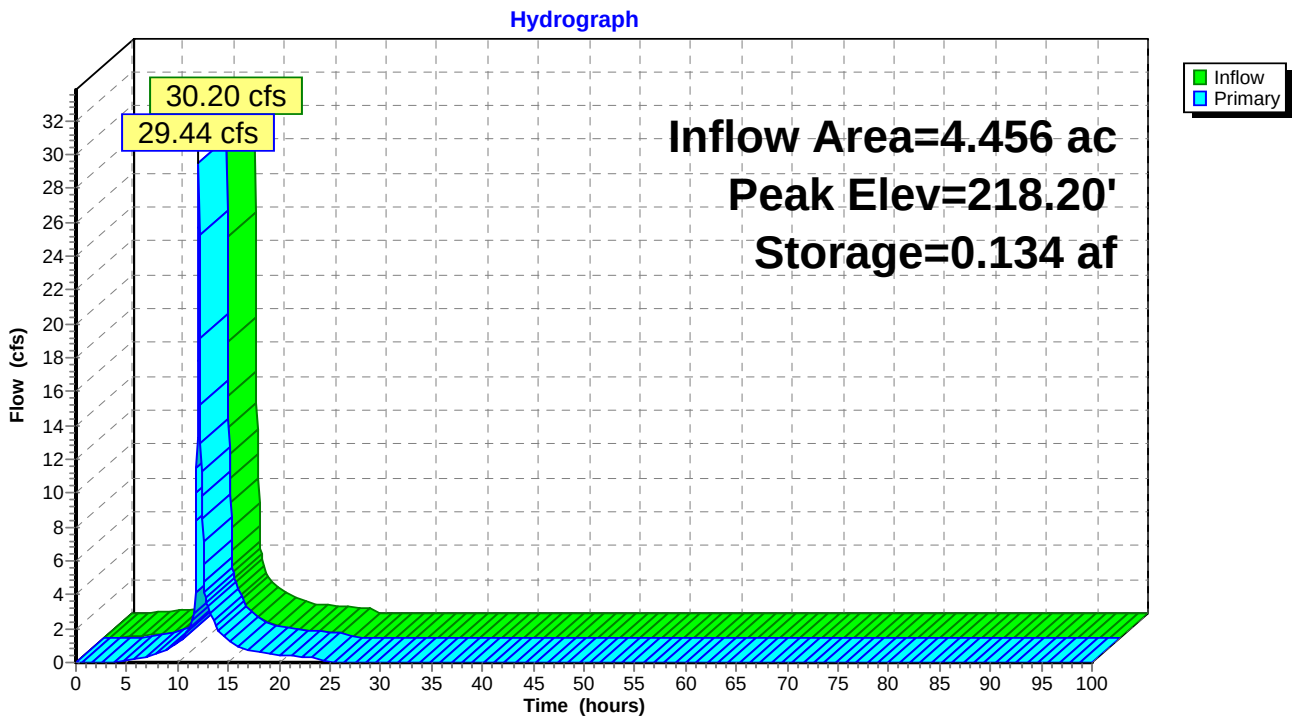
Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.200 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
215.00	0.013	0.000	0.000
216.00	0.026	0.019	0.019
217.00	0.050	0.038	0.057
218.00	0.073	0.061	0.119
219.00	0.090	0.082	0.200

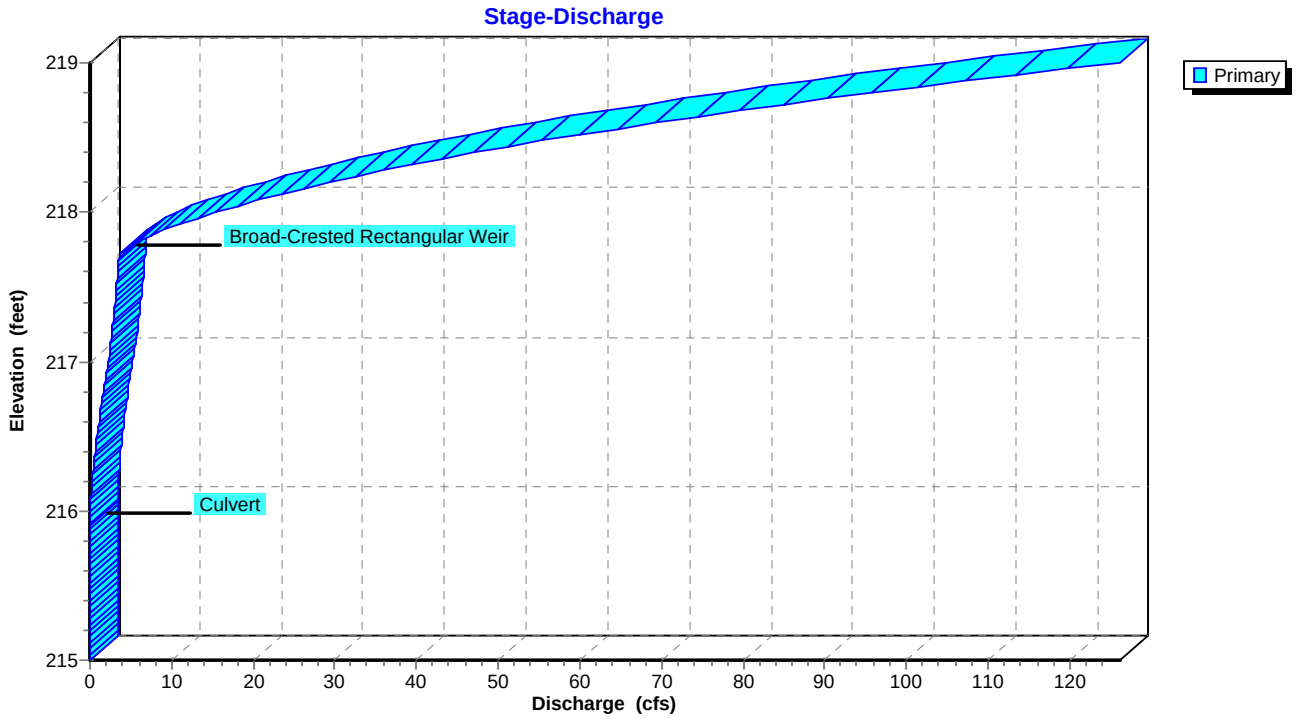
Device	Routing	Invert	Outlet Devices
#1	Primary	215.90'	**15.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 215.90' / 209.00' S= 0.1725 '/' Cc= 0.500 n= 0.013, Flow Area= 1.23 sf
#2	Primary	217.70'	**26.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=29.32 cfs @ 12.10 hrs HW=218.20' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.25 cfs @ 3.46 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 25.07 cfs @ 1.93 fps)

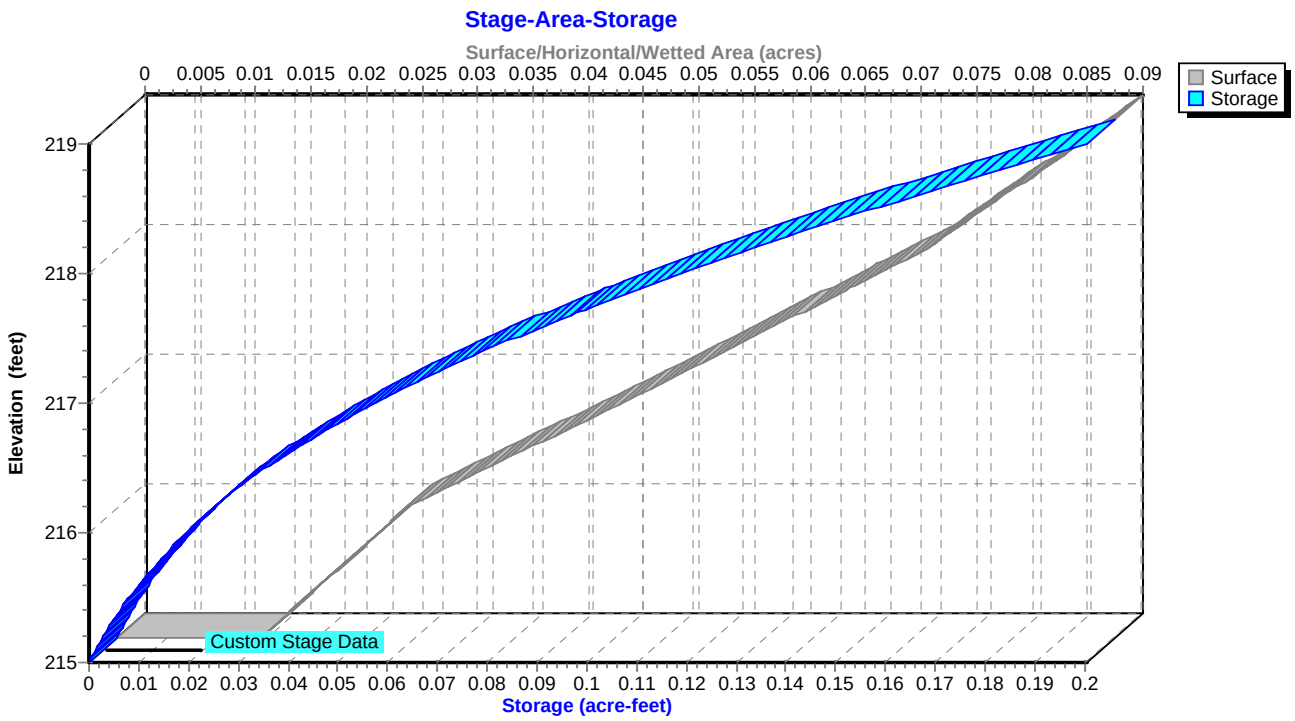
Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin



Pond Ex Basin: Ex. Basin

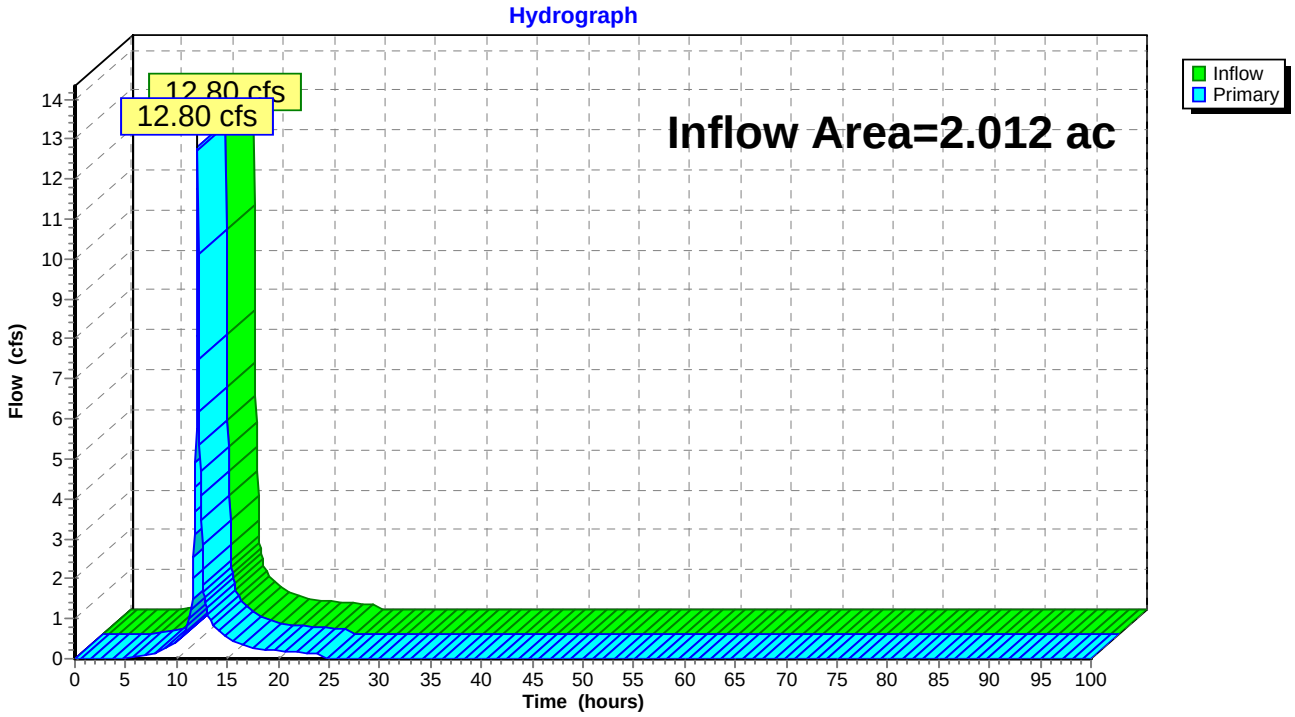


Summary for Link Pt. A: Point A

Inflow Area = 2.012 ac, 49.30% Impervious, Inflow Depth = 5.73" for 100-Year event
Inflow = 12.80 cfs @ 12.09 hrs, Volume= 0.961 af
Primary = 12.80 cfs @ 12.09 hrs, Volume= 0.961 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

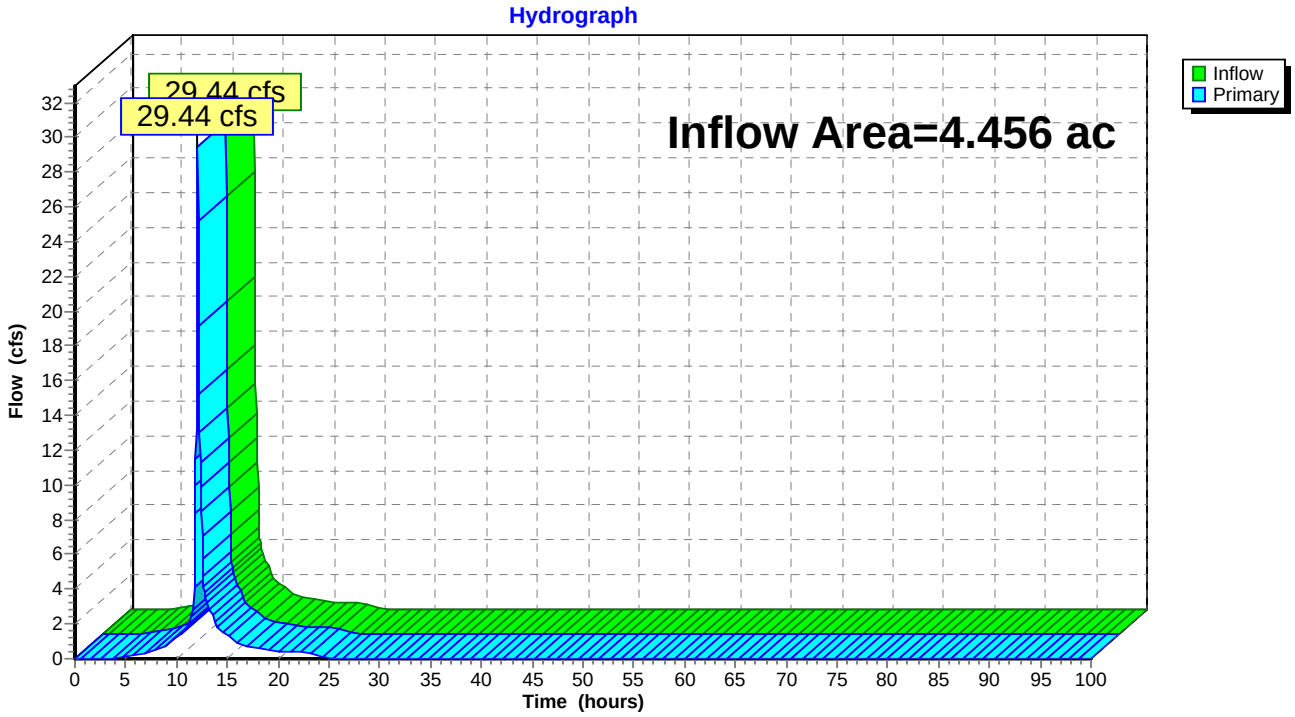


Summary for Link Pt. B: Point B

Inflow Area = 4.456 ac, 70.69% Impervious, Inflow Depth = 6.34" for 100-Year event
Inflow = 29.44 cfs @ 12.10 hrs, Volume= 2.356 af
Primary = 29.44 cfs @ 12.10 hrs, Volume= 2.356 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

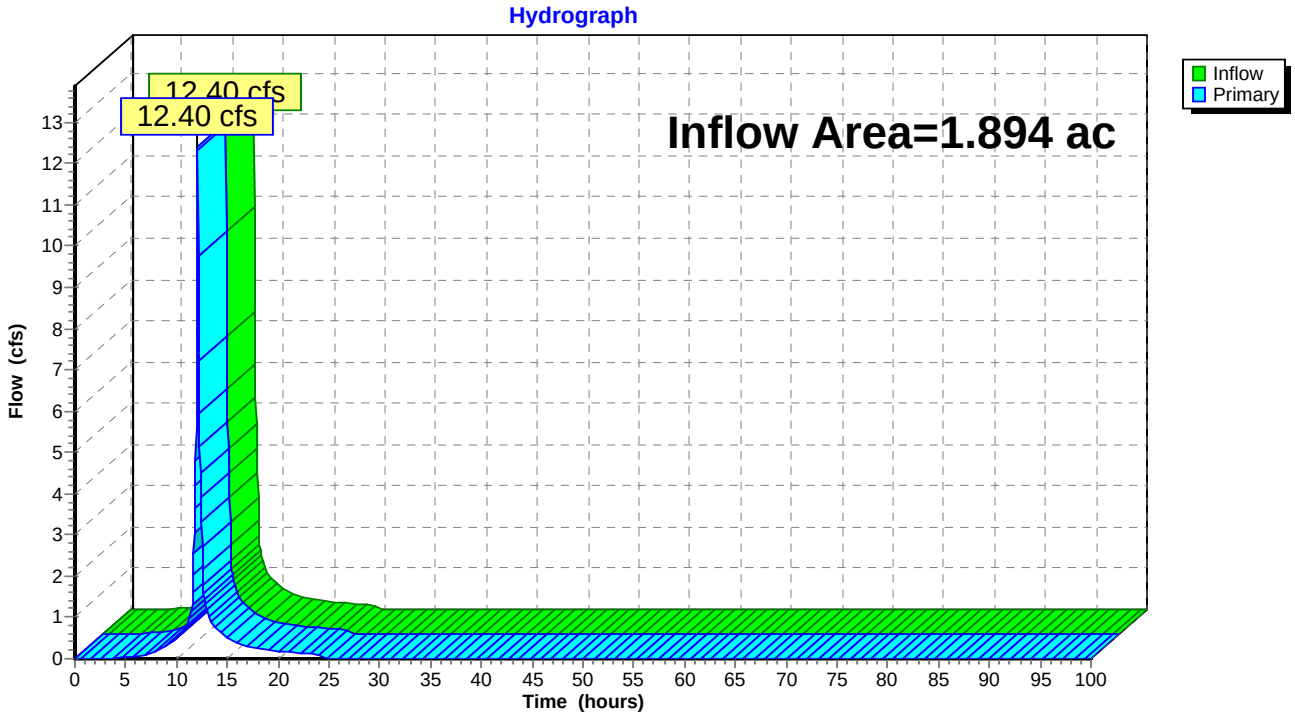


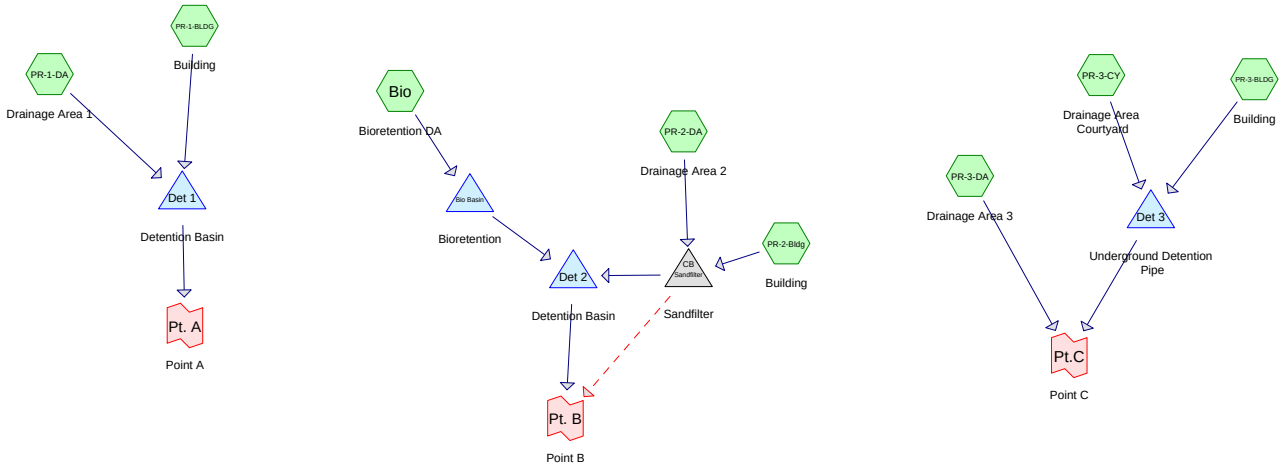
Summary for Link Pt.C: Point C

Inflow Area = 1.894 ac, 58.87% Impervious, Inflow Depth = 5.96" for 100-Year event
Inflow = 12.40 cfs @ 12.09 hrs, Volume= 0.941 af
Primary = 12.40 cfs @ 12.09 hrs, Volume= 0.941 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C





Subcat Reach Pond Link

Routing Diagram for 29254 Normandy -Proposed conditions - for DEIS commen

Prepared by VHB Engineering, Surveying and Landscape Architecture P.C., Printed 11/3/2015

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.495	61	>75% Grass cover, Good, HSG B (PR-2-DA)
2.580	74	>75% Grass cover, Good, HSG C (Bio, PR-1-DA, PR-2-DA, PR-3-CY, PR-3-DA)
2.733	98	Paved parking, HSG C (Bio, PR-1-DA, PR-2-DA, PR-3-CY)
1.095	98	Roofs, HSG B (PR-1-BLDG, PR-2-Bldg)
2.108	98	Roofs, HSG C (PR-2-Bldg, PR-3-BLDG)
0.049	55	Woods, Good, HSG B (PR-2-DA)
0.530	70	Woods, Good, HSG C (PR-1-DA, PR-2-DA, PR-3-DA)
9.590	**88**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.639	HSG B	PR-1-BLDG, PR-2-Bldg, PR-2-DA
7.951	HSG C	Bio, PR-1-DA, PR-2-Bldg, PR-2-DA, PR-3-BLDG, PR-3-CY, PR-3-DA
0.000	HSG D	
0.000	Other	
9.590		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.495	2.580	0.000	0.000	3.075	>75% Grass cover, Good	Bio, PR-1-DA, PR-2-DA, PR-3-CY, PR-3-DA
0.000	0.000	2.733	0.000	0.000	2.733	Paved parking	Bio, PR-1-DA, PR-2-DA, PR-3-CY
0.000	1.095	2.108	0.000	0.000	3.203	Roofs	PR-1-BLDG, PR-2-Bldg, PR-3-BLDG
0.000	0.049	0.530	0.000	0.000	0.579	Woods, Good	PR-1-DA, PR-2-DA, PR-3-DA
0.000	**1.639**	**7.951**	**0.000**	**0.000**	**9.590**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	Det 1	194.00	192.00	60.0	0.0333	0.013	18.0	0.0	0.0
2	Det 2	209.50	205.00	65.0	0.0692	0.013	24.0	0.0	0.0
3	Det 3	215.00	214.50	36.0	0.0139	0.013	18.0	0.0	0.0
4	Sandfilter	215.00	212.00	88.0	0.0341	0.012	18.0	0.0	0.0
5	Sandfilter	214.00	213.80	9.0	0.0222	0.012	8.0	0.0	0.0

Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 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 Bio: Bioretention DA Runoff Area=0.410 ac 32.20% Impervious Runoff Depth=1.22"
Tc=6.0 min CN=82 Runoff=0.57 cfs 0.042 af

Subcatchment PR-1-BLDG: Building Runoff Area=1.070 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=2.83 cfs 0.229 af

Subcatchment PR-1-DA: Drainage Area 1 Runoff Area=1.941 ac 39.82% Impervious Runoff Depth=1.29"
Tc=6.0 min CN=83 Runoff=2.86 cfs 0.208 af

Subcatchment PR-2-Bldg: Building Runoff Area=1.337 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=3.54 cfs 0.286 af

Subcatchment PR-2-DA: Drainage Area 2 Runoff Area=3.016 ac 51.59% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=84 Runoff=4.68 cfs 0.340 af

Subcatchment PR-3-BLDG: Building Runoff Area=0.796 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=2.10 cfs 0.170 af

Subcatchment PR-3-CY: Drainage Area Runoff Area=0.734 ac 37.06% Impervious Runoff Depth=1.29"
Tc=6.0 min CN=83 Runoff=1.08 cfs 0.079 af

Subcatchment PR-3-DA: Drainage Area 3 Runoff Area=0.286 ac 0.00% Impervious Runoff Depth=0.65"
Tc=6.0 min CN=71 Runoff=0.18 cfs 0.015 af

Pond Bio Basin: Bioretention Peak Elev=225.30' Storage=0.012 af Inflow=0.57 cfs 0.042 af
Outflow=0.10 cfs 0.042 af

Pond Det 1: Detention Basin Peak Elev=195.98' Storage=0.098 af Inflow=5.68 cfs 0.437 af
Outflow=2.16 cfs 0.437 af

Pond Det 2: Detention Basin Peak Elev=211.96' Storage=0.011 af Inflow=5.58 cfs 0.157 af
Outflow=5.18 cfs 0.157 af

Pond Det 3: Underground Detention Pipe Peak Elev=217.02' Storage=0.020 af Inflow=3.18 cfs 0.249 af
Outflow=2.18 cfs 0.249 af

Pond Sandfilter: Sandfilter Peak Elev=216.02' Inflow=8.21 cfs 0.626 af
Primary=5.48 cfs 0.115 af Secondary=2.73 cfs 0.512 af Outflow=8.21 cfs 0.626 af

Link Pt. A: Point A Inflow=2.16 cfs 0.437 af
Primary=2.16 cfs 0.437 af

Link Pt. B: Point B Inflow=7.90 cfs 0.668 af
Primary=7.90 cfs 0.668 af

Link Pt.C: Point C Inflow=2.34 cfs 0.265 af
Primary=2.34 cfs 0.265 af

Total Runoff Area = 9.590 ac Runoff Volume = 1.370 af Average Runoff Depth = 1.71"
38.10% Pervious = 3.654 ac 61.90% Impervious = 5.936 ac

Summary for Subcatchment Bio: Bioretention DA

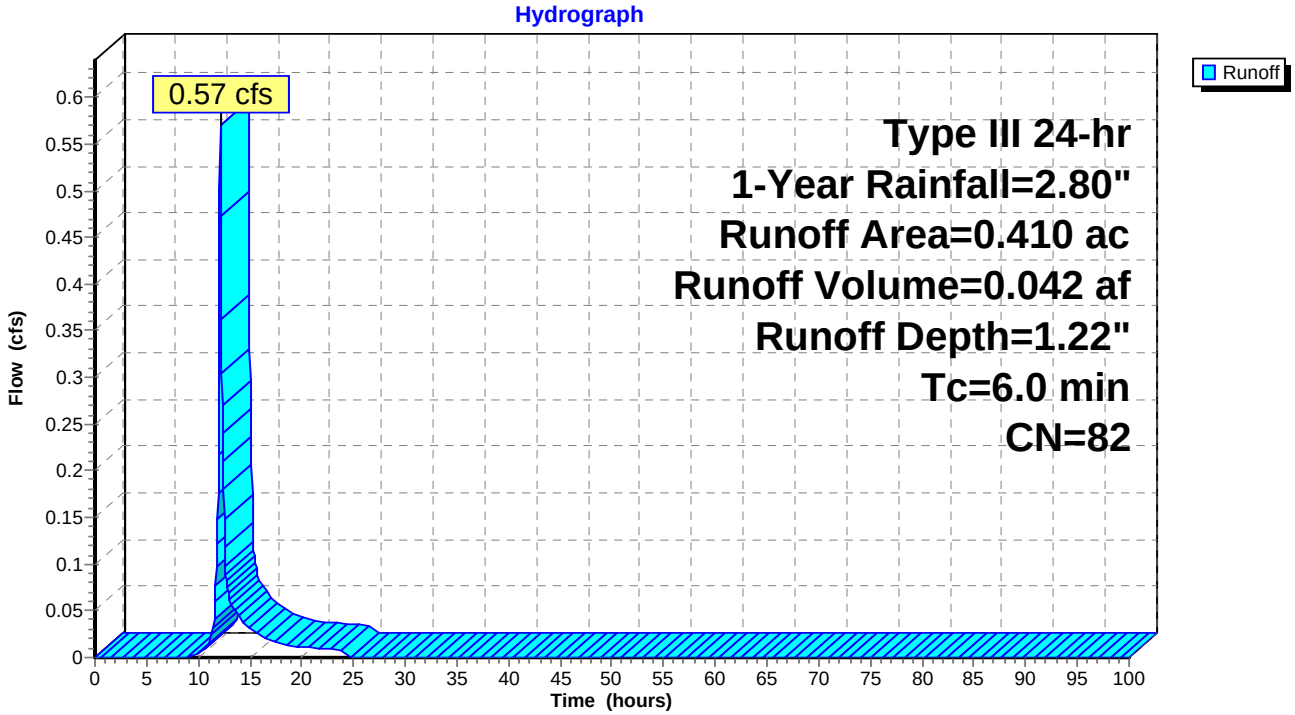
Runoff = 0.57 cfs @ 12.10 hrs, Volume= 0.042 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.278	74	>75% Grass cover, Good, HSG C
0.132	98	Paved parking, HSG C
0.410	82	Weighted Average
0.278		67.80% Pervious Area
0.132		32.20% Impervious Area

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

Subcatchment Bio: Bioretention DA



Summary for Subcatchment PR-1-BLDG: Building

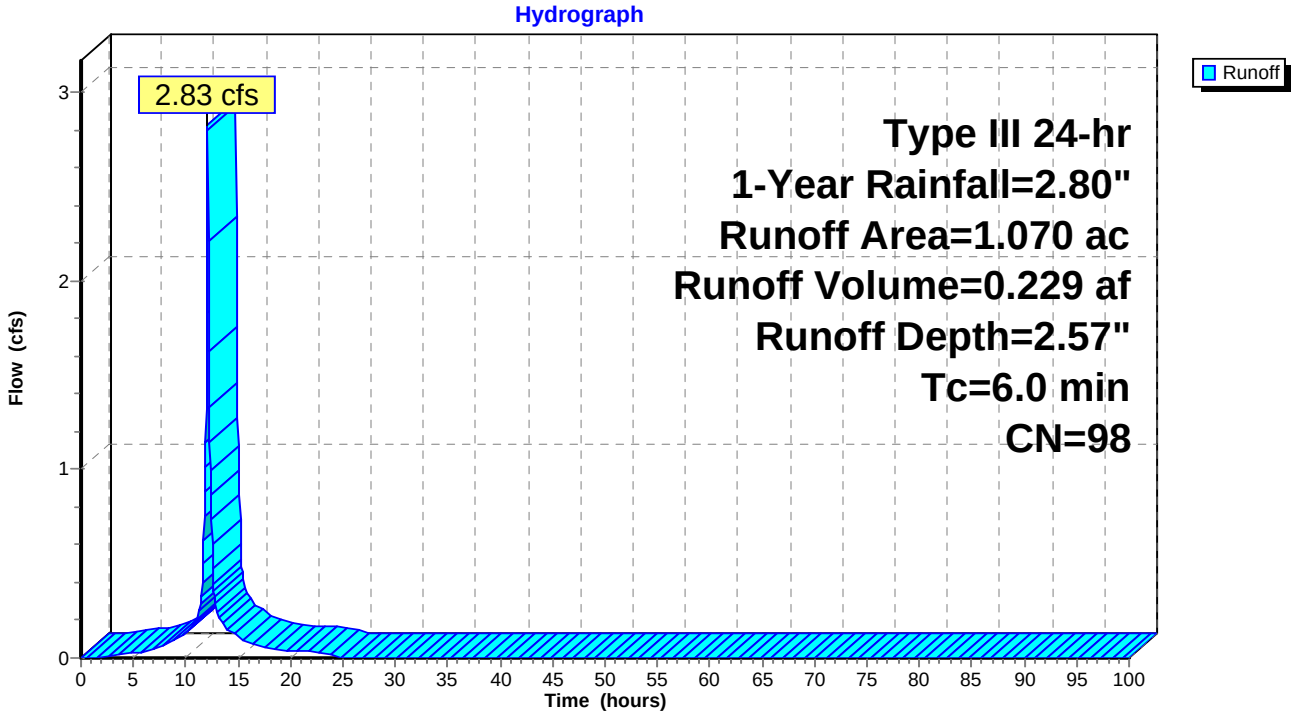
Runoff = 2.83 cfs @ 12.09 hrs, Volume= 0.229 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
1.070	98	Roofs, HSG B
1.070		100.00% Impervious Area

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

Subcatchment PR-1-BLDG: Building



Summary for Subcatchment PR-1-DA: Drainage Area 1

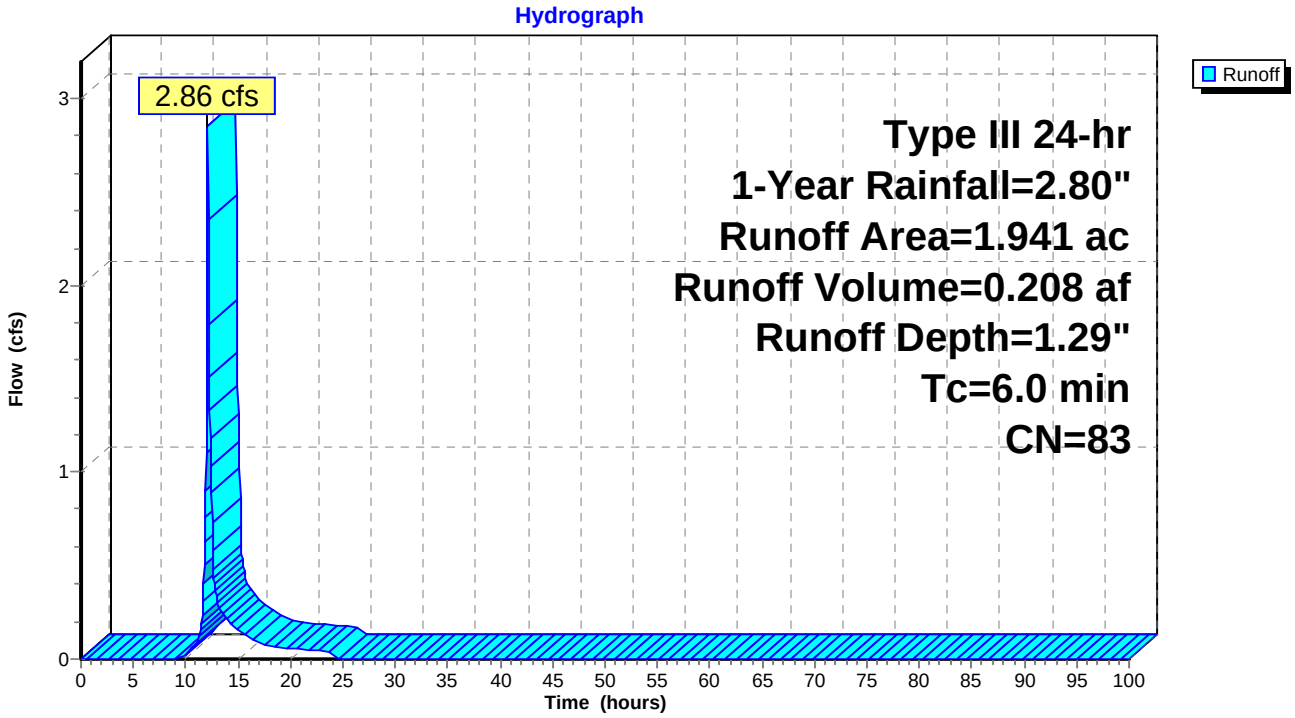
Runoff = 2.86 cfs @ 12.10 hrs, Volume= 0.208 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
1.000	74	>75% Grass cover, Good, HSG C
0.773	98	Paved parking, HSG C
0.168	70	Woods, Good, HSG C
1.941	83	Weighted Average
1.168		60.18% Pervious Area
0.773		39.82% Impervious Area

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

Subcatchment PR-1-DA: Drainage Area 1



Summary for Subcatchment PR-2-Bldg: Building

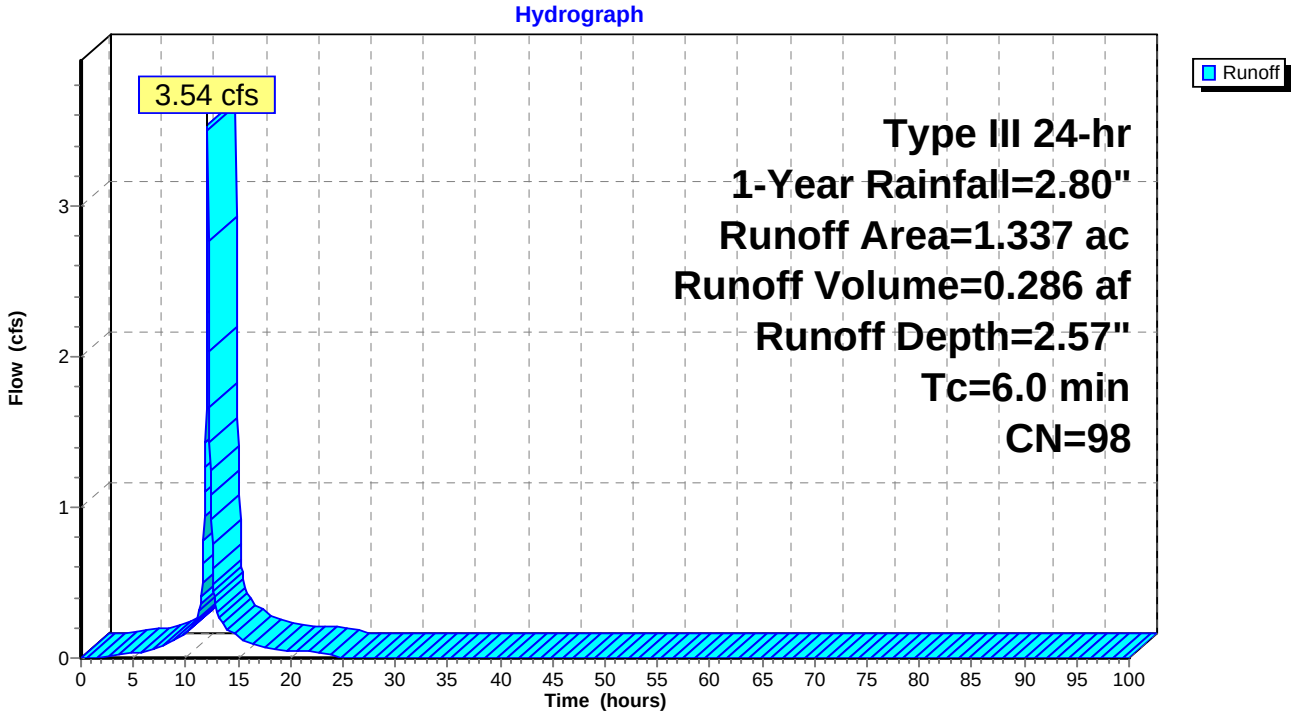
Runoff = 3.54 cfs @ 12.09 hrs, Volume= 0.286 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.025	98	Roofs, HSG B
1.312	98	Roofs, HSG C
1.337	98	Weighted Average
1.337		100.00% Impervious Area

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

Subcatchment PR-2-Bldg: Building



Summary for Subcatchment PR-2-DA: Drainage Area 2

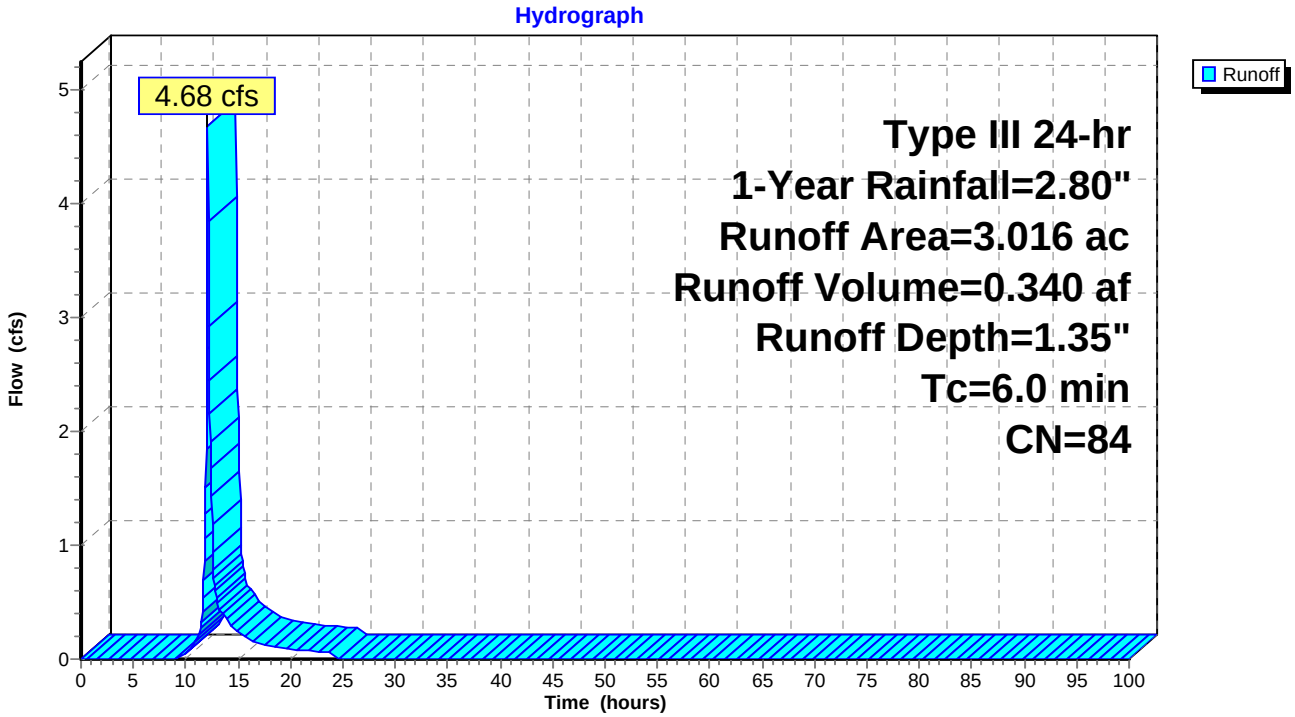
Runoff = 4.68 cfs @ 12.09 hrs, Volume= 0.340 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.495	61	>75% Grass cover, Good, HSG B
0.790	74	>75% Grass cover, Good, HSG C
1.556	98	Paved parking, HSG C
0.126	70	Woods, Good, HSG C
0.049	55	Woods, Good, HSG B
3.016	84	Weighted Average
1.460		48.41% Pervious Area
1.556		51.59% Impervious Area

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

Subcatchment PR-2-DA: Drainage Area 2



Summary for Subcatchment PR-3-BLDG: Building

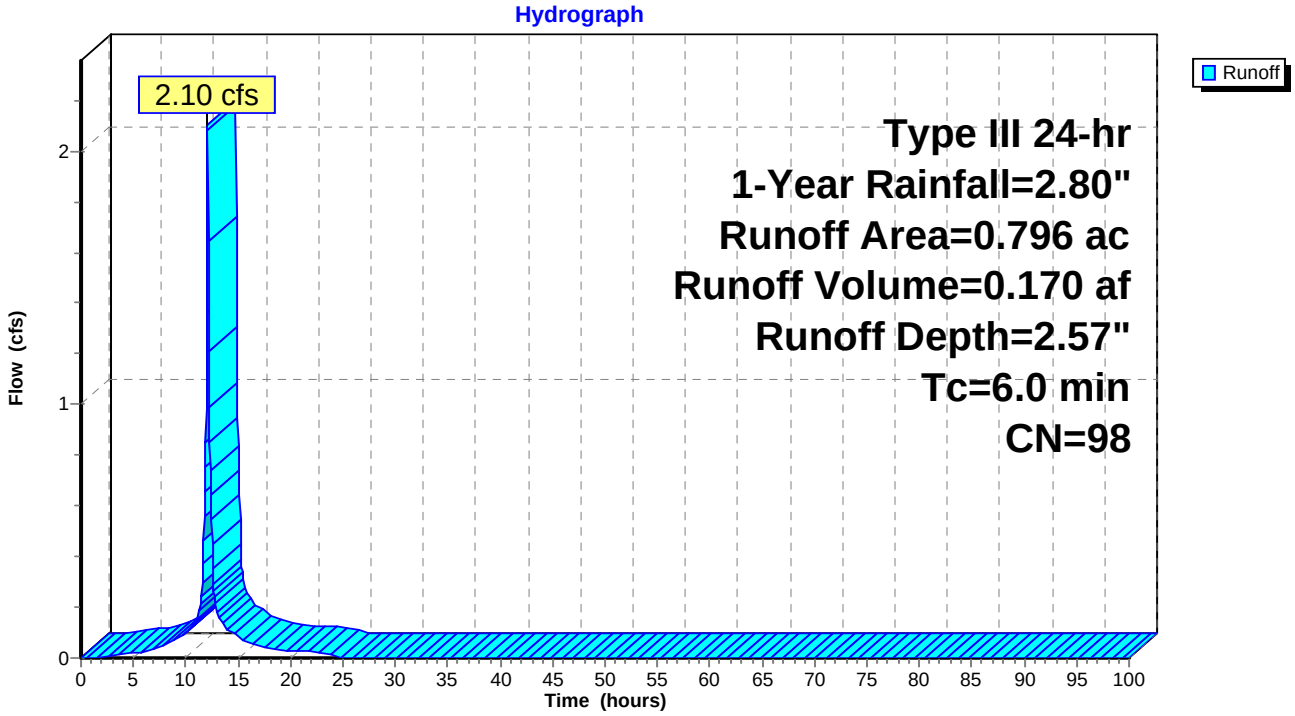
Runoff = 2.10 cfs @ 12.09 hrs, Volume= 0.170 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.796	98	Roofs, HSG C
0.796		100.00% Impervious Area

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

Subcatchment PR-3-BLDG: Building



Summary for Subcatchment PR-3-CY: Drainage Area Courtyard

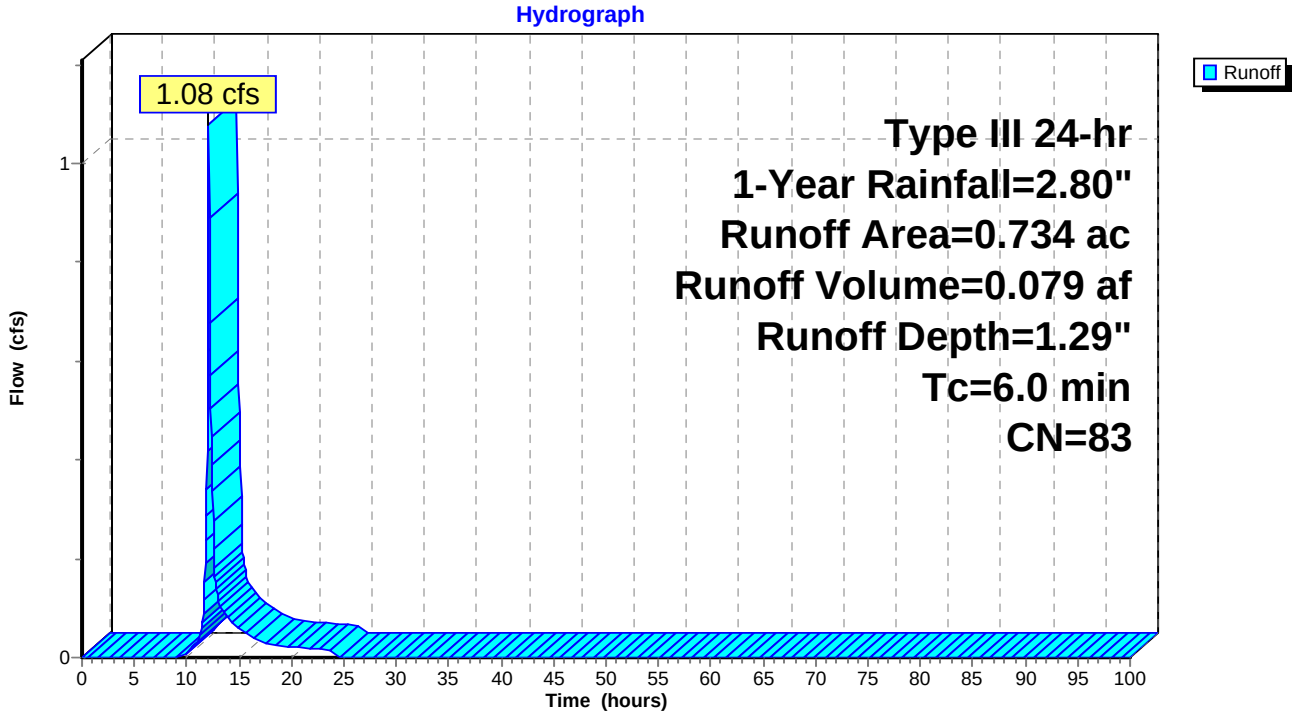
Runoff = 1.08 cfs @ 12.10 hrs, Volume= 0.079 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.462	74	>75% Grass cover, Good, HSG C
0.272	98	Paved parking, HSG C
0.734	83	Weighted Average
0.462		62.94% Pervious Area
0.272		37.06% Impervious Area

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

Subcatchment PR-3-CY: Drainage Area Courtyard



Summary for Subcatchment PR-3-DA: Drainage Area 3

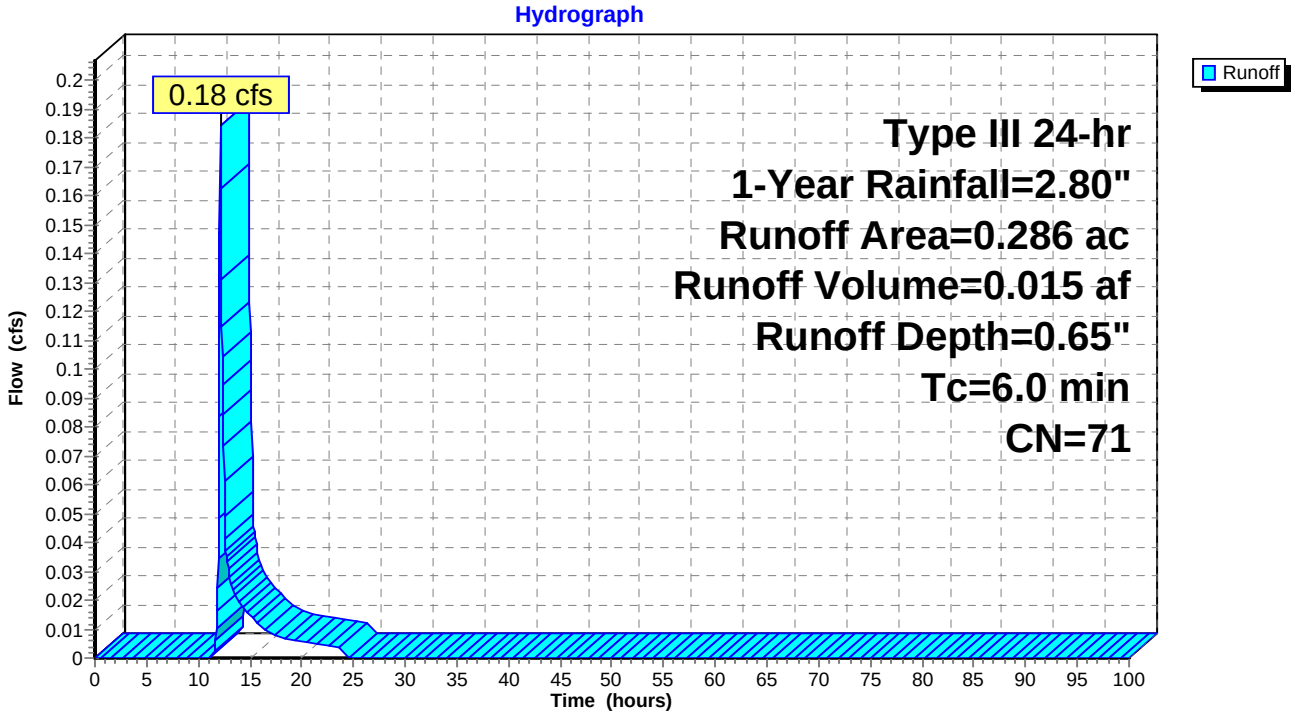
Runoff = 0.18 cfs @ 12.11 hrs, Volume= 0.015 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.236	70	Woods, Good, HSG C
0.286	71	Weighted Average
0.286		100.00% Pervious Area

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

Subcatchment PR-3-DA: Drainage Area 3



Summary for Pond Bio Basin: Bioretention

Inflow Area = 0.410 ac, 32.20% Impervious, Inflow Depth = 1.22" for 1-Year event
Inflow = 0.57 cfs @ 12.10 hrs, Volume= 0.042 af
Outflow = 0.10 cfs @ 11.85 hrs, Volume= 0.042 af, Atten= 82%, Lag= 0.0 min
Primary = 0.10 cfs @ 11.85 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 225.30' @ 12.60 hrs Surf.Area= 0.042 ac Storage= 0.012 af

Plug-Flow detention time= 36.2 min calculated for 0.042 af (100% of inflow)
Center-of-Mass det. time= 36.2 min (879.1 - 842.9)

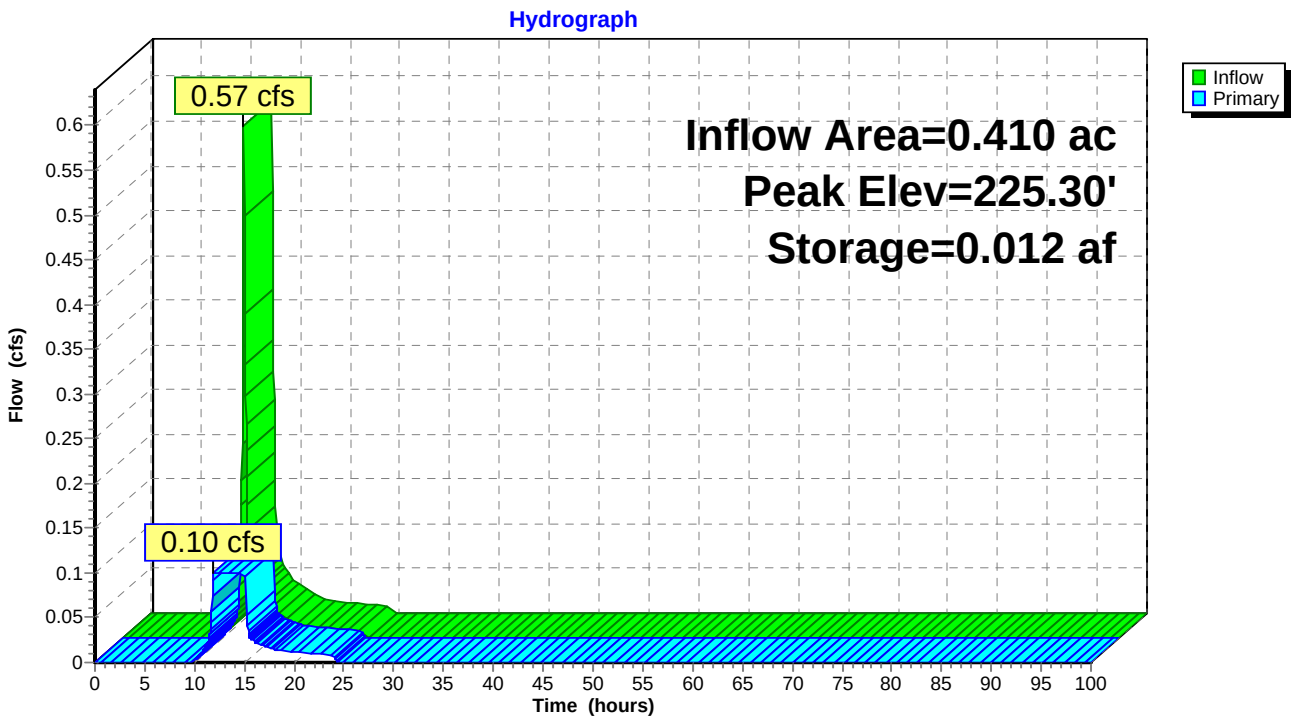
Volume	Invert	Avail.Storage	Storage Description
#1	225.00'	0.070 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
225.00	0.038	0.000	0.000
226.00	0.051	0.044	0.044
226.50	0.051	0.025	0.070

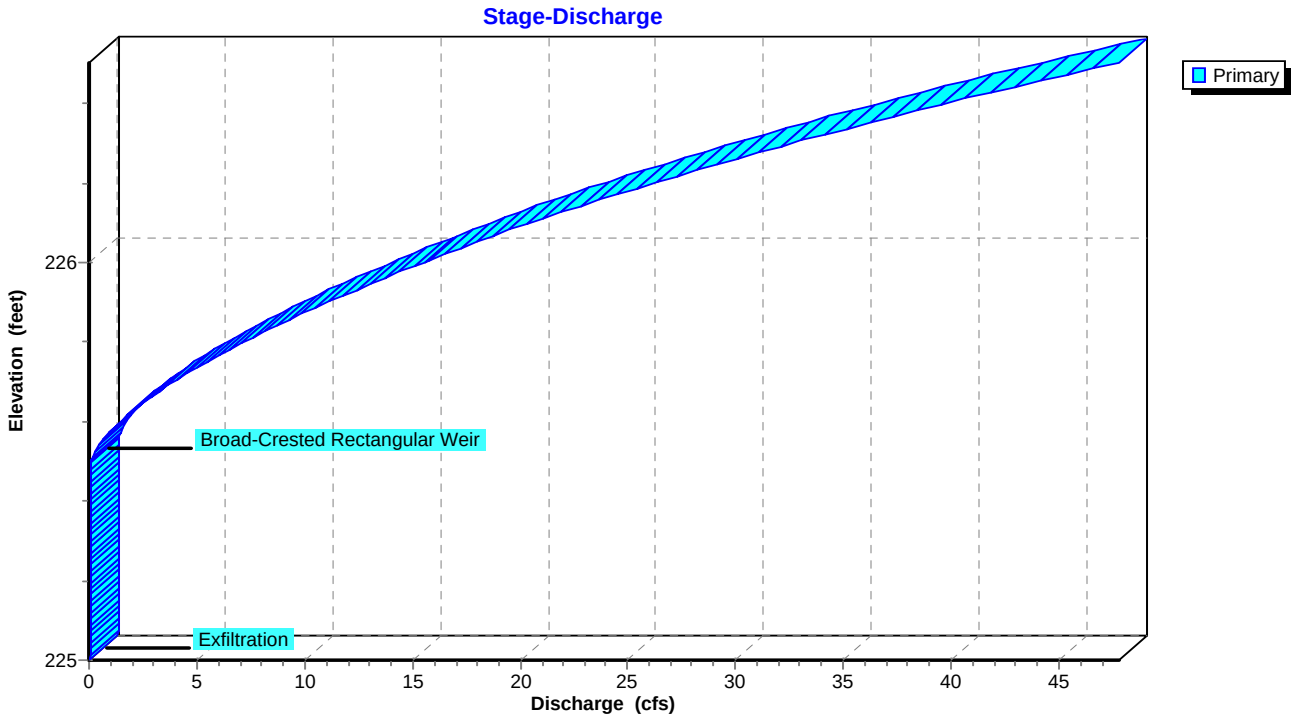
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	**0.10 cfs Exfiltration at all elevations**
#2	Primary	225.50'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.10 cfs @ 11.85 hrs HW=225.02' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

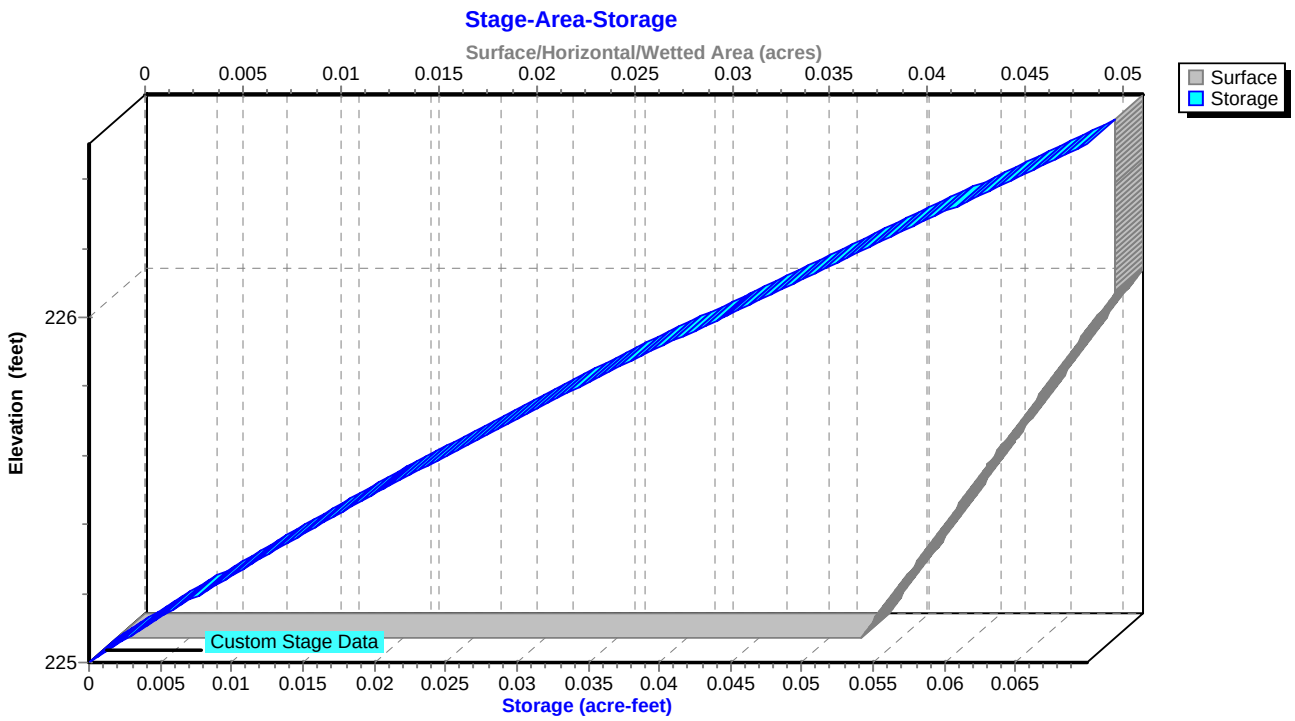
Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Summary for Pond Det 1: Detention Basin

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 1.74" for 1-Year event
Inflow = 5.68 cfs @ 12.09 hrs, Volume= 0.437 af
Outflow = 2.16 cfs @ 12.35 hrs, Volume= 0.437 af, Atten= 62%, Lag= 15.8 min
Primary = 2.16 cfs @ 12.35 hrs, Volume= 0.437 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 195.98' @ 12.35 hrs Surf.Area= 0.060 ac Storage= 0.098 af

Plug-Flow detention time= 35.4 min calculated for 0.437 af (100% of inflow)
Center-of-Mass det. time= 34.7 min (832.1 - 797.4)

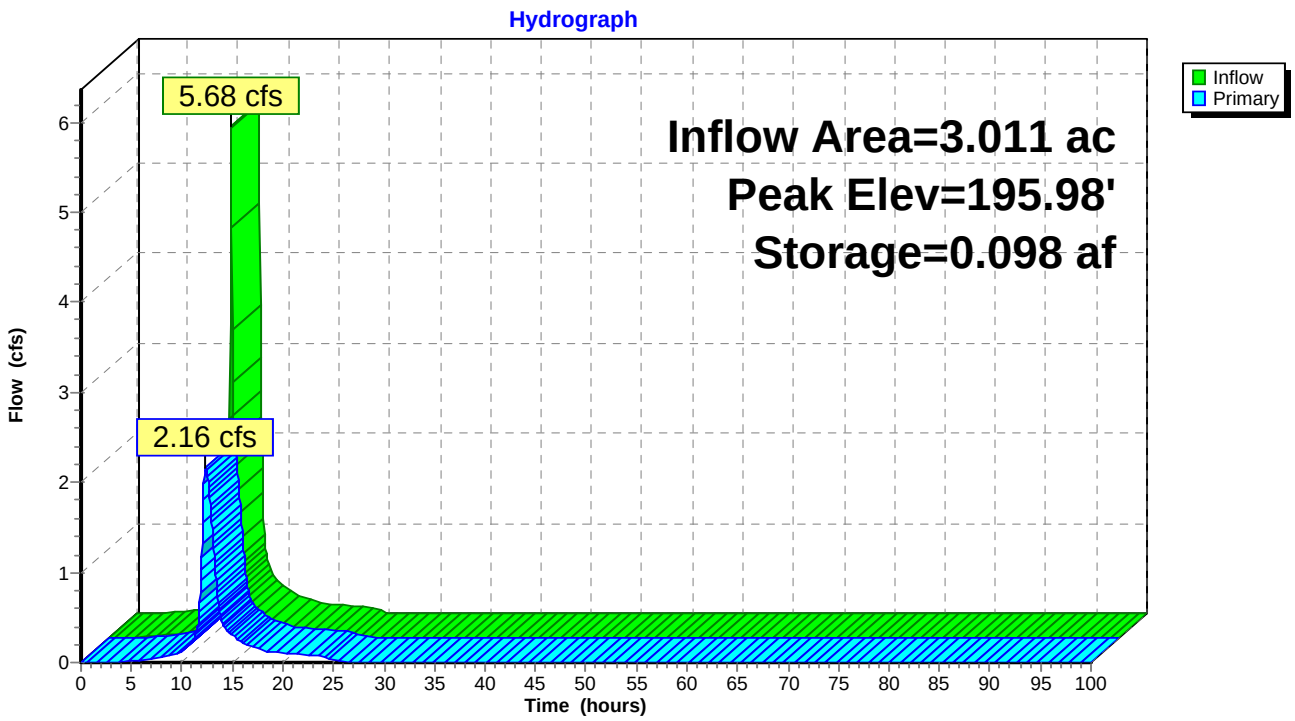
Volume	Invert	Avail.Storage	Storage Description
#1	194.00'	0.440 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
194.00	0.040	0.000	0.000
195.00	0.049	0.044	0.044
196.00	0.060	0.054	0.099
197.00	0.073	0.066	0.166
198.00	0.085	0.079	0.244
199.00	0.098	0.091	0.336
200.00	0.110	0.104	0.440

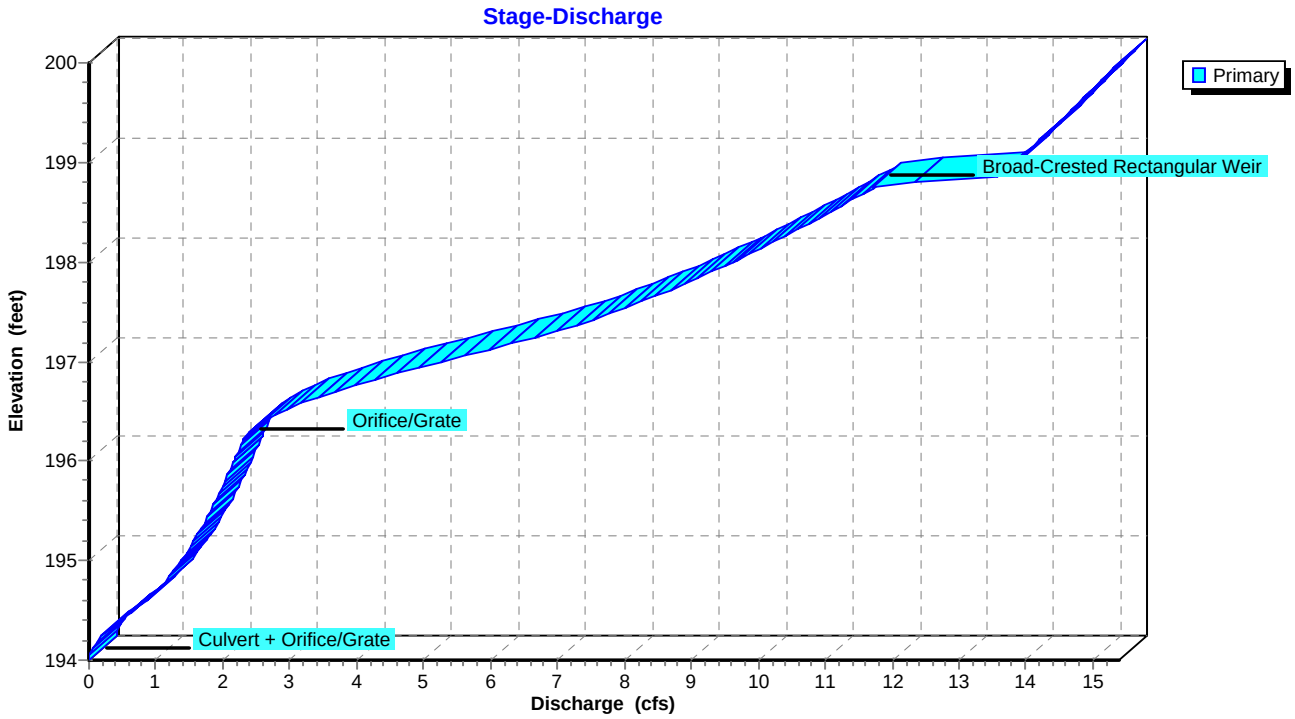
Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	**18.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 194.00' / 192.00' S= 0.0333 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	194.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	196.20'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	198.75'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.16 cfs @ 12.35 hrs HW=195.98' (Free Discharge)
└─**1=Culvert** (Passes 2.16 cfs of 7.46 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.16 cfs @ 6.18 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

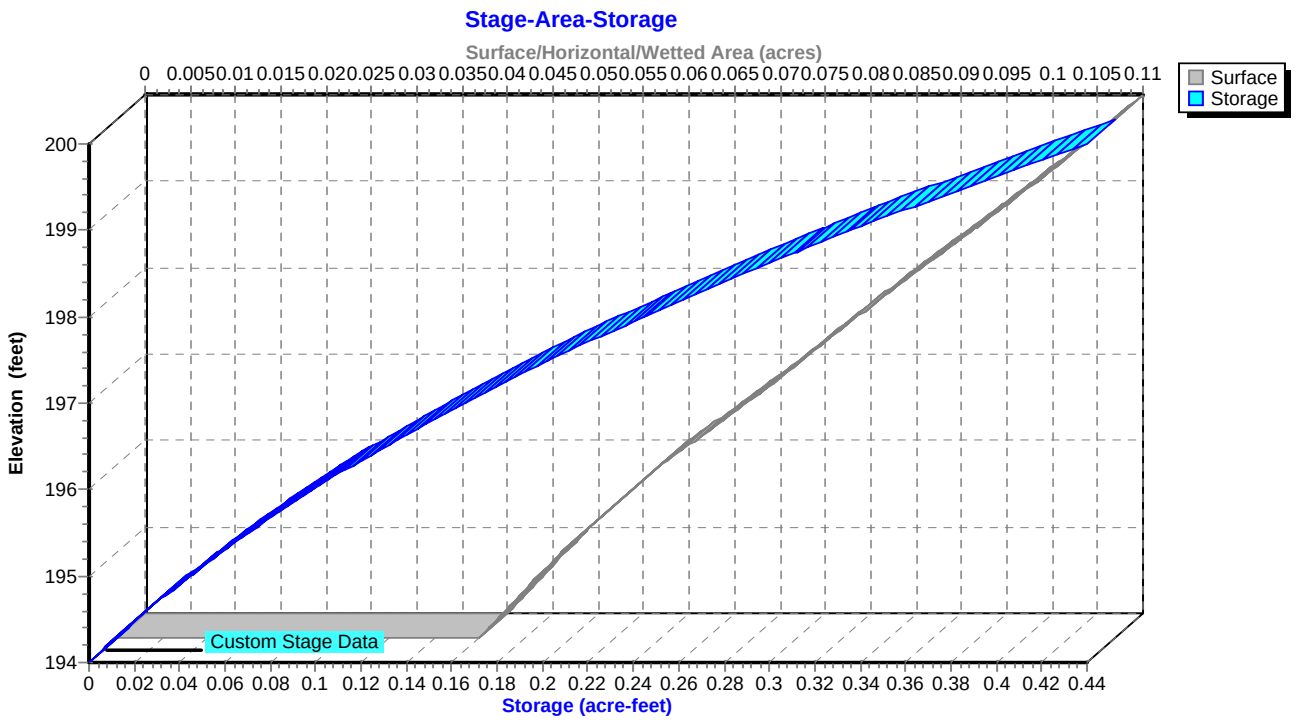
Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Summary for Pond Det 2: Detention Basin

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 0.39" for 1-Year event
Inflow = 5.58 cfs @ 12.09 hrs, Volume= 0.157 af
Outflow = 5.18 cfs @ 12.11 hrs, Volume= 0.157 af, Atten= 7%, Lag= 1.2 min
Primary = 5.18 cfs @ 12.11 hrs, Volume= 0.157 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 211.96' @ 12.11 hrs Surf.Area= 0.014 ac Storage= 0.011 af

Plug-Flow detention time= 3.4 min calculated for 0.157 af (100% of inflow)
Center-of-Mass det. time= 3.6 min (771.4 - 767.8)

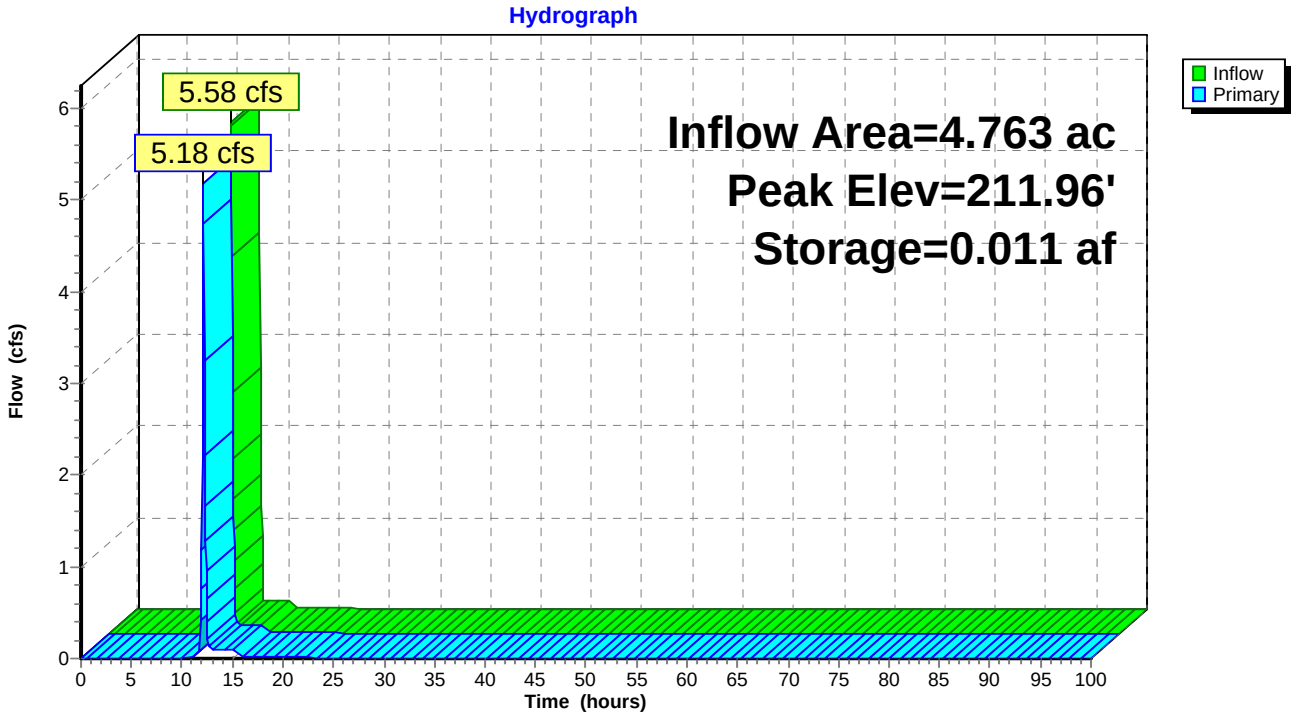
Volume	Invert	Avail.Storage	Storage Description
#1	211.00'	0.116 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
211.00	0.009	0.000	0.000
212.00	0.014	0.012	0.012
213.00	0.019	0.016	0.028
214.00	0.026	0.022	0.050
215.00	0.033	0.029	0.080
216.00	0.040	0.036	0.116

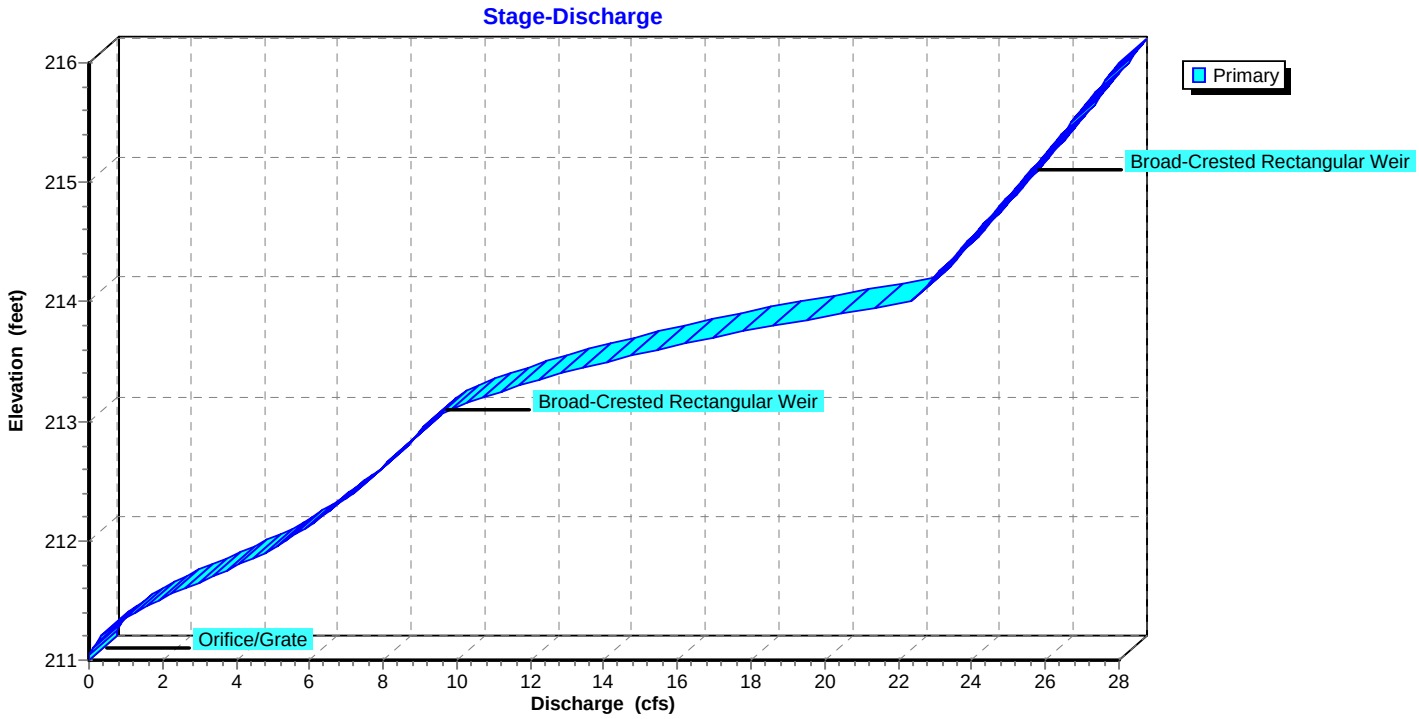
Device	Routing	Invert	Outlet Devices
#1	Primary	209.50'	**24.0" Round Culvert** L= 65.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 209.50' / 205.00' S= 0.0692 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	211.00'	**12.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	213.00'	**3.5' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#4	Device 1	215.00'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=5.06 cfs @ 12.11 hrs HW=211.94' (Free Discharge)
└─**1=Culvert** (Passes 5.06 cfs of 14.33 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 5.06 cfs @ 3.30 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

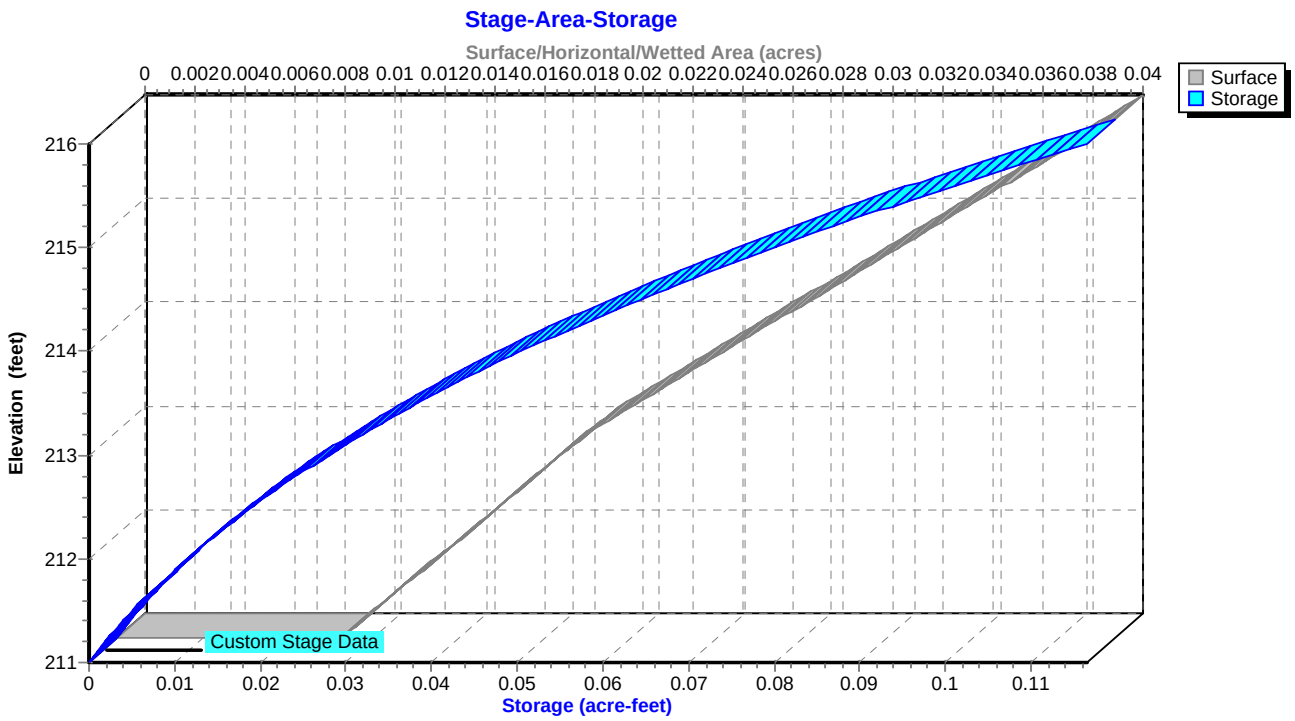
Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Summary for Pond Det 3: Underground Detention Pipe

Inflow Area = 1.530 ac, 69.80% Impervious, Inflow Depth = 1.95" for 1-Year event
Inflow = 3.18 cfs @ 12.09 hrs, Volume= 0.249 af
Outflow = 2.18 cfs @ 12.18 hrs, Volume= 0.249 af, Atten= 31%, Lag= 5.3 min
Primary = 2.18 cfs @ 12.18 hrs, Volume= 0.249 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 217.02' @ 12.18 hrs Surf.Area= 0.012 ac Storage= 0.020 af

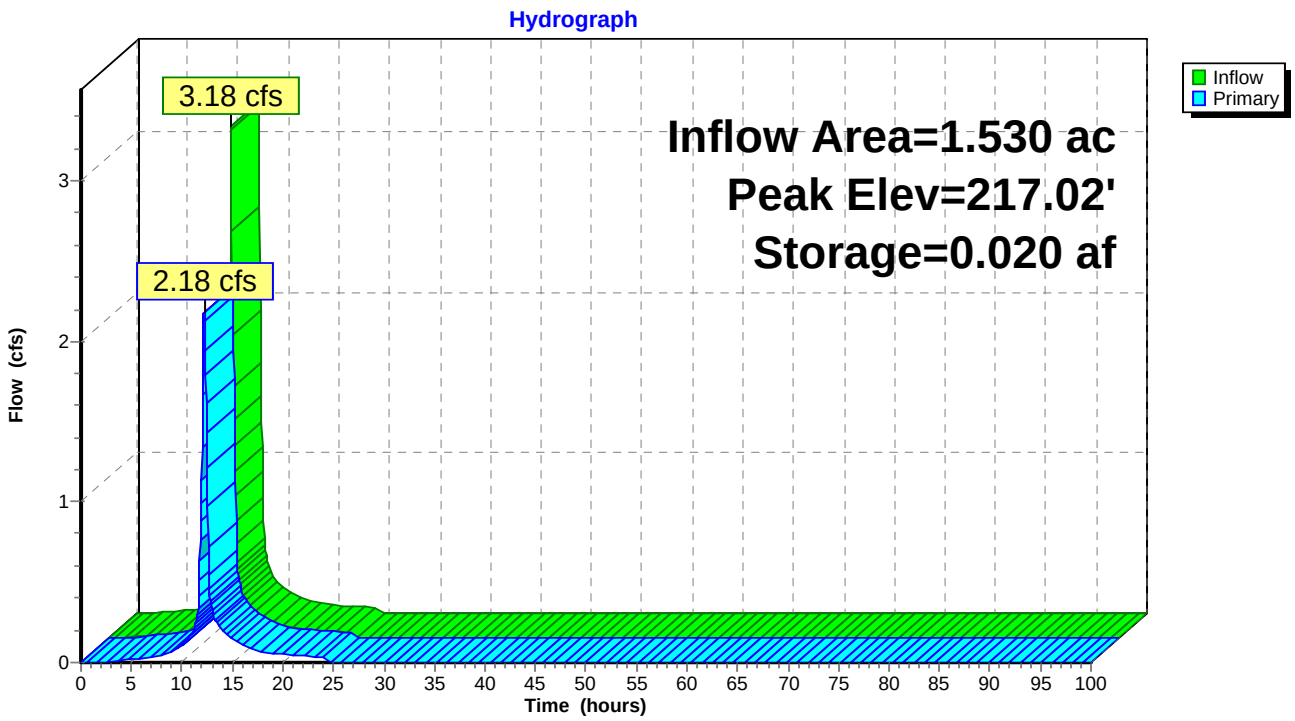
Plug-Flow detention time= 4.6 min calculated for 0.249 af (100% of inflow)
Center-of-Mass det. time= 4.6 min (789.2 - 784.6)

Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.033 af	**42.0" Round Pipe Storage** x 2 L= 75.0'

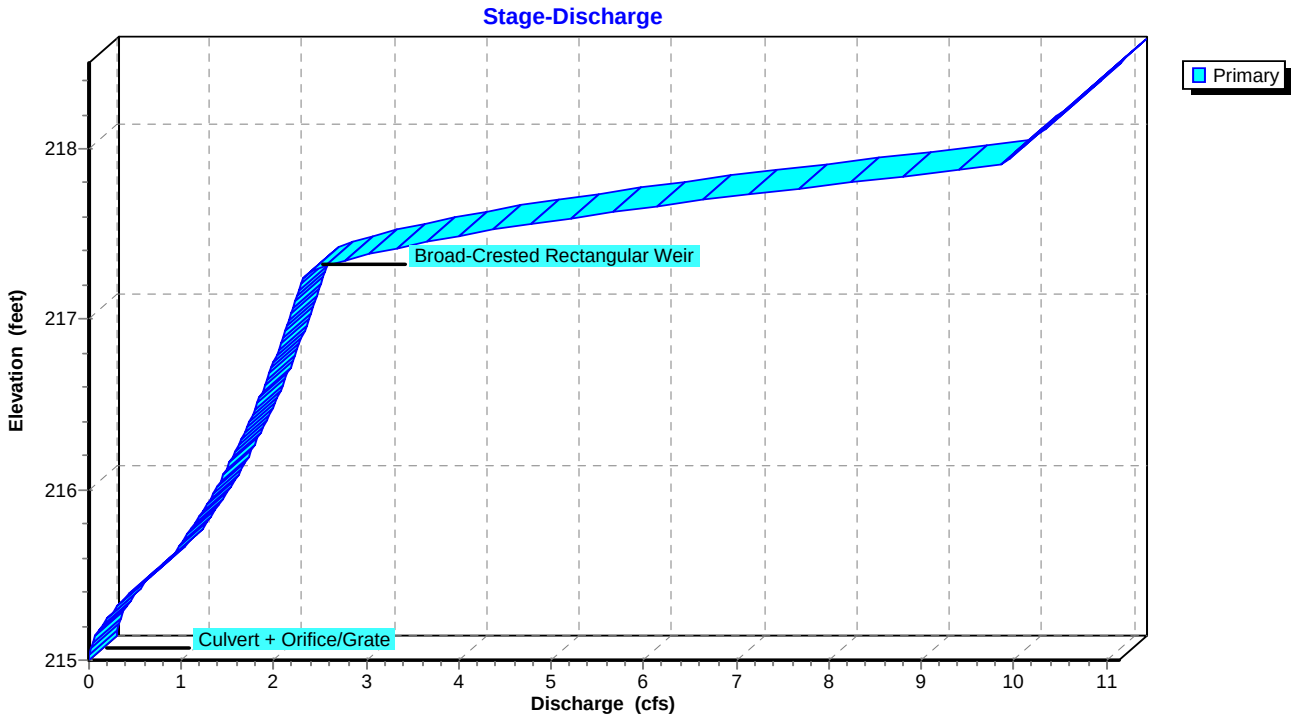
Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 36.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.00' / 214.50' S= 0.0139 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	215.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	217.25'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.17 cfs @ 12.18 hrs HW=217.00' (Free Discharge)
└─**1=Culvert** (Passes 2.17 cfs of 7.51 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.17 cfs @ 6.21 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

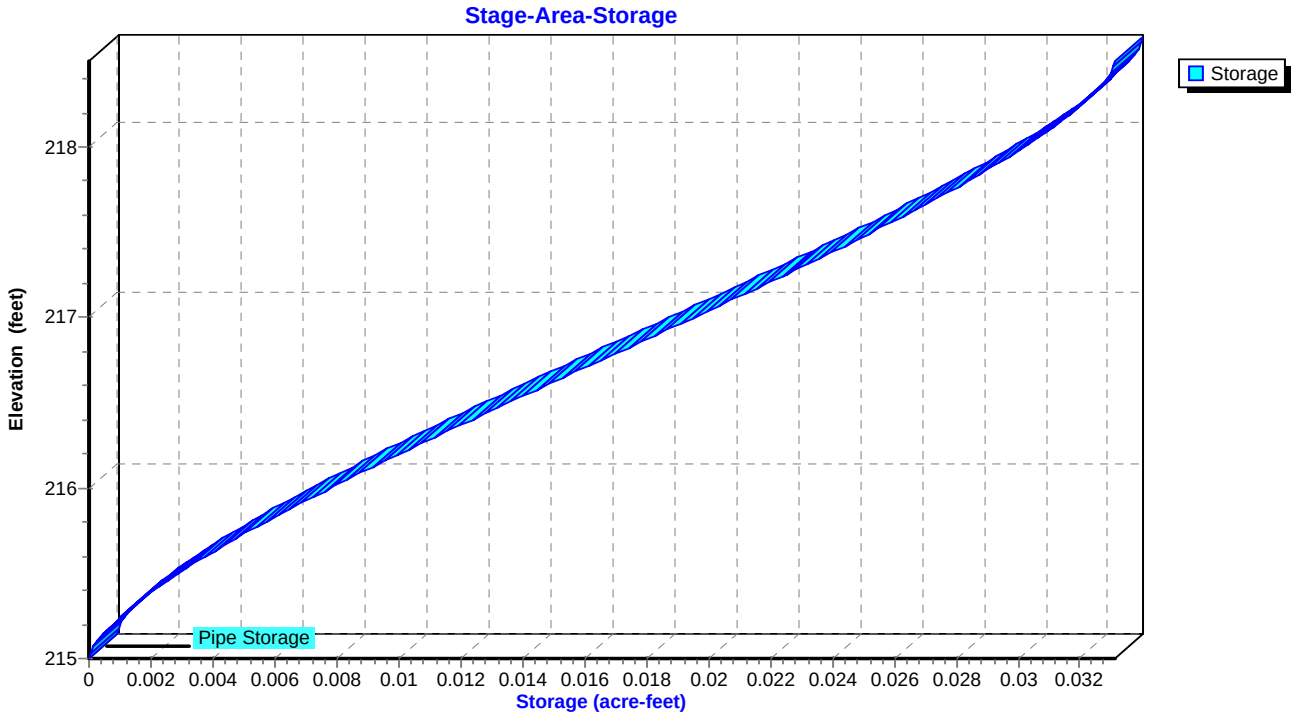
Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Summary for Pond Sandfilter: Sandfilter

Inflow Area = 4.353 ac, 66.46% Impervious, Inflow Depth = 1.73" for 1-Year event
Inflow = 8.21 cfs @ 12.09 hrs, Volume= 0.626 af
Outflow = 8.21 cfs @ 12.09 hrs, Volume= 0.626 af, Atten= 0%, Lag= 0.0 min
Primary = 5.48 cfs @ 12.09 hrs, Volume= 0.115 af
Secondary = 2.73 cfs @ 12.09 hrs, Volume= 0.512 af

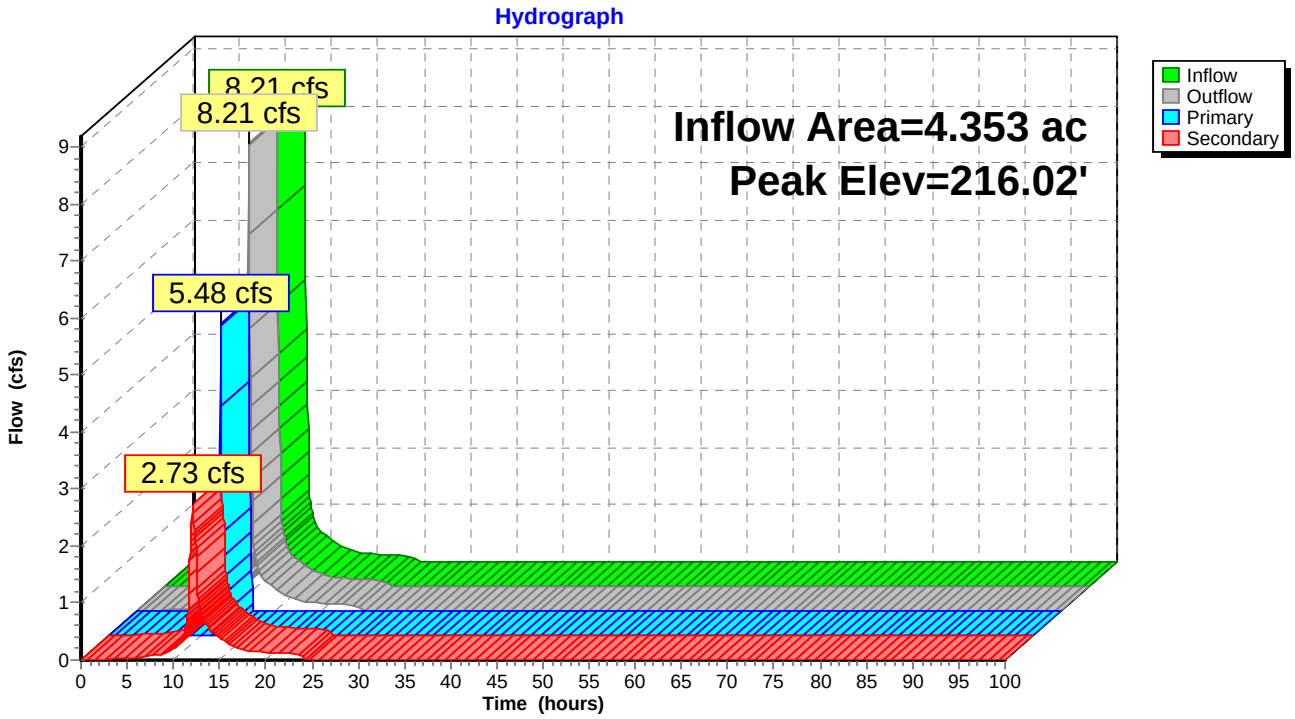
Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 216.02' @ 12.09 hrs
Flood Elev= 221.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 88.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 215.00' / 212.00' S= 0.0341 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	214.00'	**8.0" Round Culvert** L= 9.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 214.00' / 213.80' S= 0.0222 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

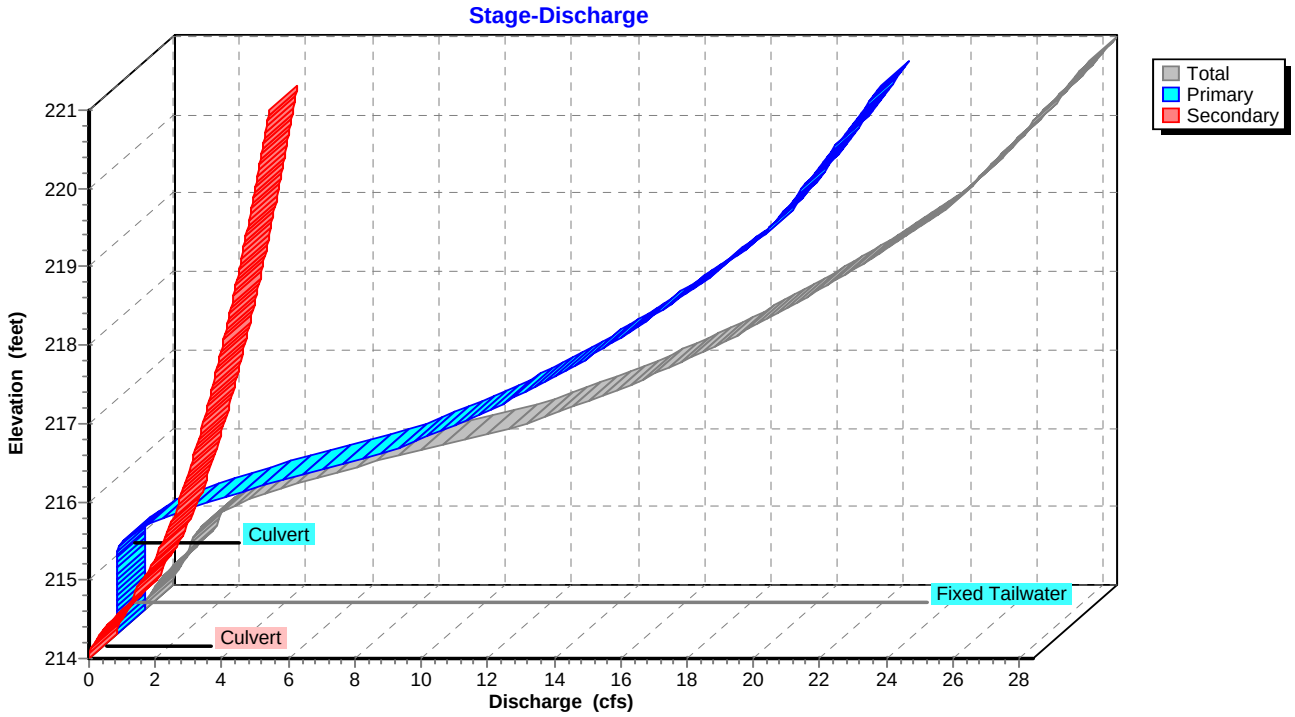
Primary OutFlow Max=5.33 cfs @ 12.09 hrs HW=216.00' TW=214.24' (Fixed TW Elev= 214.24')
└─**1=Culvert** (Inlet Controls 5.33 cfs @ 4.26 fps)

Secondary OutFlow Max=2.71 cfs @ 12.09 hrs HW=216.00' (Free Discharge)
└─**2=Culvert** (Inlet Controls 2.71 cfs @ 7.77 fps)

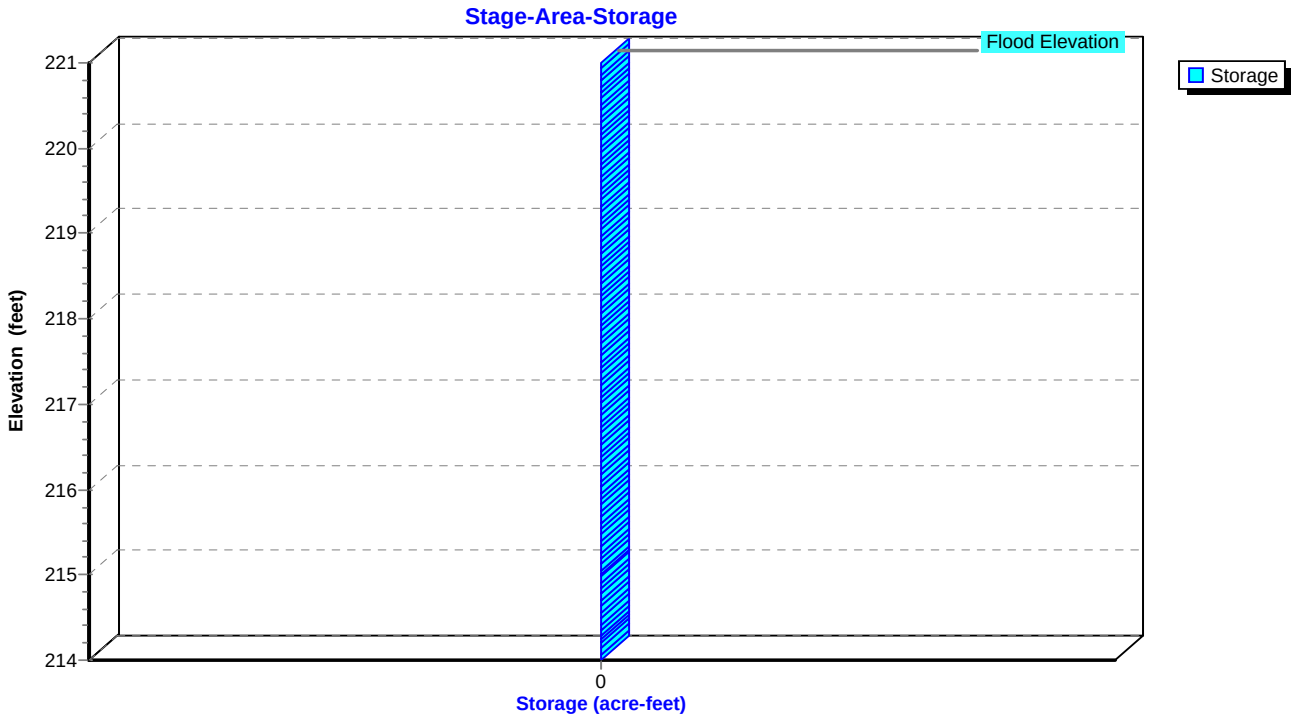
Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter

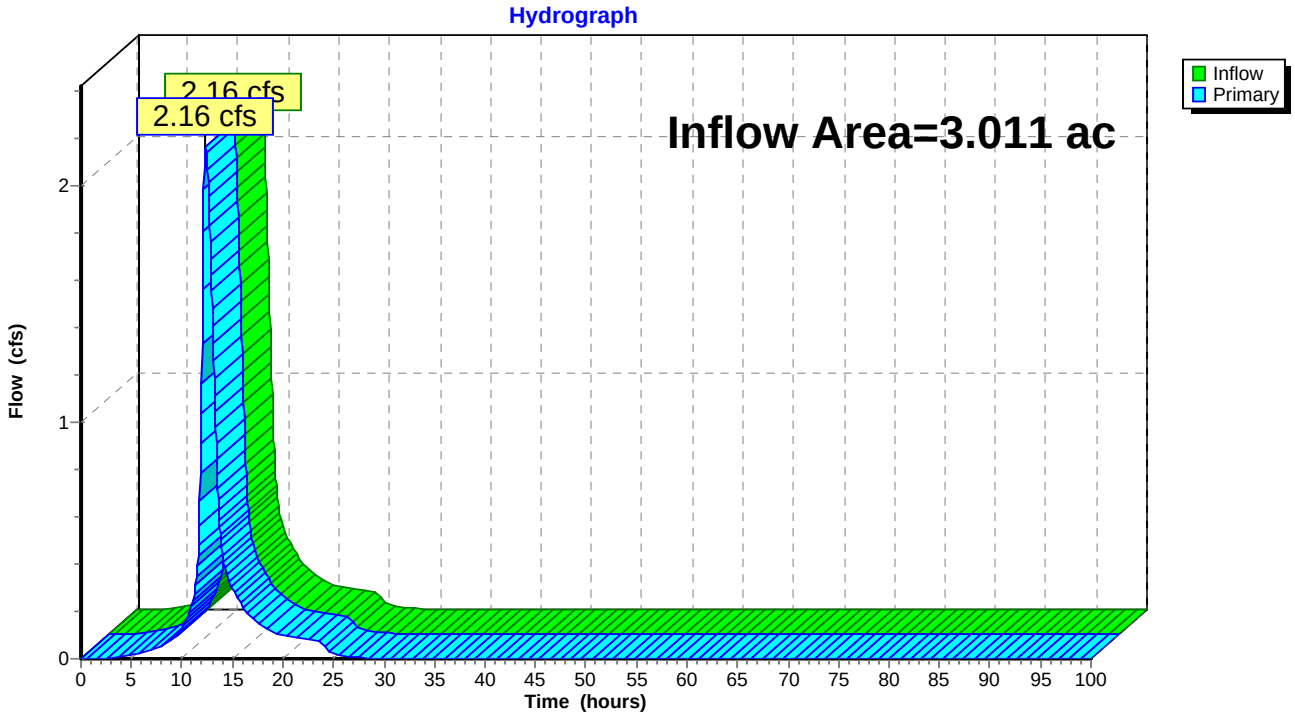


Summary for Link Pt. A: Point A

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 1.74" for 1-Year event
Inflow = 2.16 cfs @ 12.35 hrs, Volume= 0.437 af
Primary = 2.16 cfs @ 12.35 hrs, Volume= 0.437 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

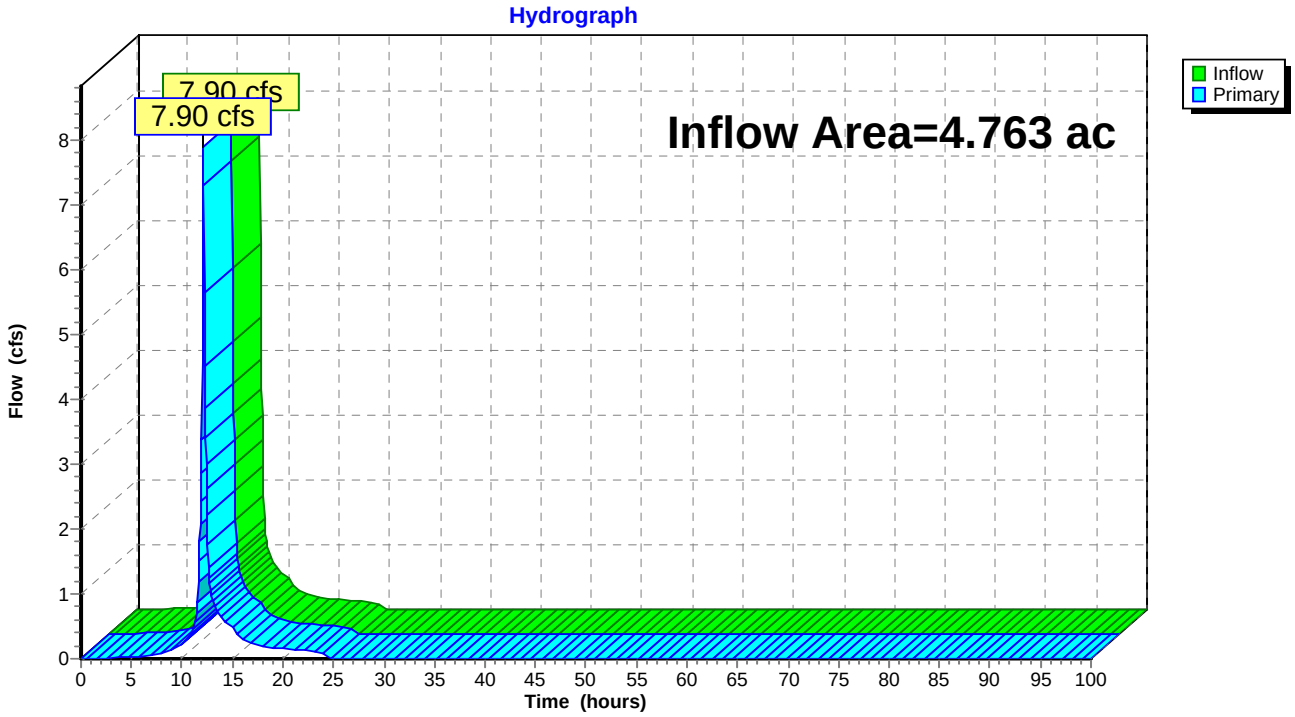


Summary for Link Pt. B: Point B

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 1.68" for 1-Year event
Inflow = 7.90 cfs @ 12.11 hrs, Volume= 0.668 af
Primary = 7.90 cfs @ 12.11 hrs, Volume= 0.668 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

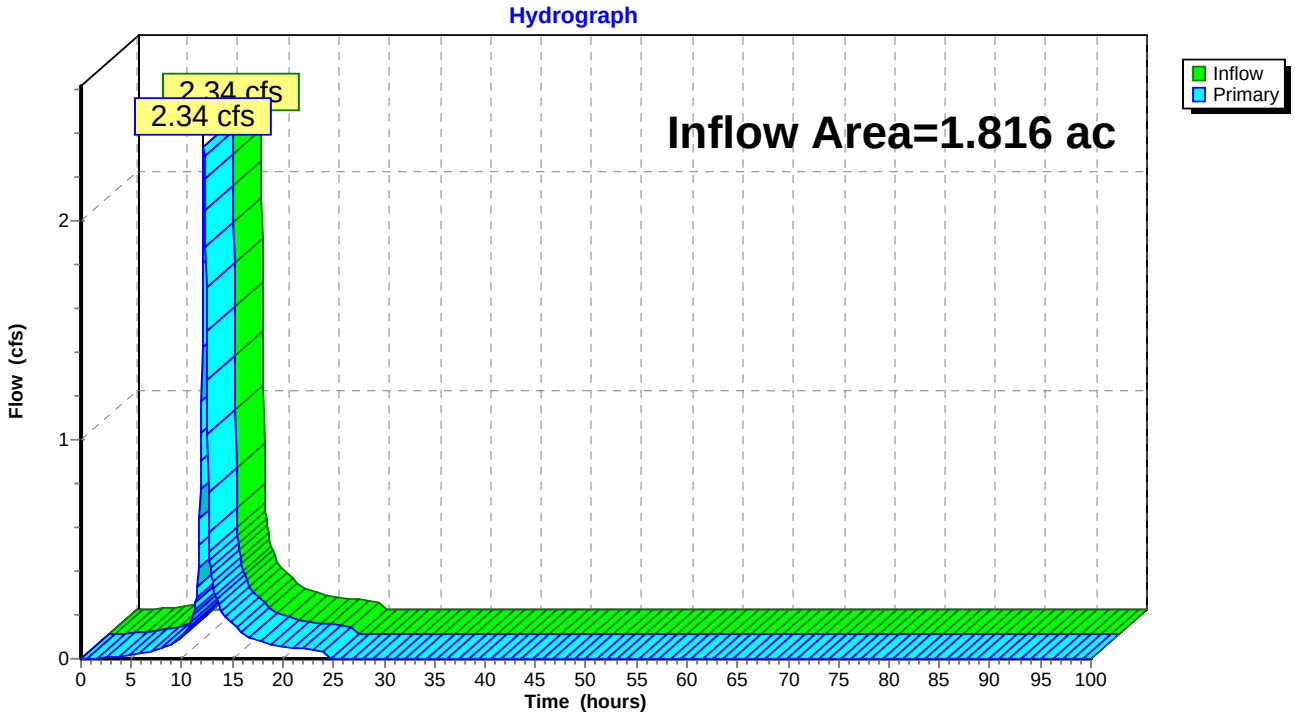


Summary for Link Pt.C: Point C

Inflow Area = 1.816 ac, 58.81% Impervious, Inflow Depth = 1.75" for 1-Year event
Inflow = 2.34 cfs @ 12.17 hrs, Volume= 0.265 af
Primary = 2.34 cfs @ 12.17 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 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 Bio: Bioretention DA Runoff Area=0.410 ac 32.20% Impervious Runoff Depth=2.64"
Tc=6.0 min CN=82 Runoff=1.24 cfs 0.090 af

Subcatchment PR-1-BLDG: Building Runoff Area=1.070 ac 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=4.59 cfs 0.380 af

Subcatchment PR-1-DA: Drainage Area 1 Runoff Area=1.941 ac 39.82% Impervious Runoff Depth=2.73"
Tc=6.0 min CN=83 Runoff=6.06 cfs 0.441 af

Subcatchment PR-2-Bldg: Building Runoff Area=1.337 ac 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=5.74 cfs 0.475 af

Subcatchment PR-2-DA: Drainage Area 2 Runoff Area=3.016 ac 51.59% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=84 Runoff=9.72 cfs 0.708 af

Subcatchment PR-3-BLDG: Building Runoff Area=0.796 ac 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=3.42 cfs 0.283 af

Subcatchment PR-3-CY: Drainage Area Runoff Area=0.734 ac 37.06% Impervious Runoff Depth=2.73"
Tc=6.0 min CN=83 Runoff=2.29 cfs 0.167 af

Subcatchment PR-3-DA: Drainage Area 3 Runoff Area=0.286 ac 0.00% Impervious Runoff Depth=1.75"
Tc=6.0 min CN=71 Runoff=0.56 cfs 0.042 af

Pond Bio Basin: Bioretention Peak Elev=225.56' Storage=0.023 af Inflow=1.24 cfs 0.090 af
Outflow=0.67 cfs 0.090 af

Pond Det 1: Detention Basin Peak Elev=197.08' Storage=0.171 af Inflow=10.65 cfs 0.821 af
Outflow=5.73 cfs 0.821 af

Pond Det 2: Detention Basin Peak Elev=213.19' Storage=0.032 af Inflow=12.11 cfs 0.418 af
Outflow=10.50 cfs 0.418 af

Pond Det 3: Underground Detention Pipe Peak Elev=217.62' Storage=0.027 af Inflow=5.71 cfs 0.450 af
Outflow=5.59 cfs 0.450 af

Pond Sandfilter: Sandfilter Peak Elev=217.02' Inflow=15.45 cfs 1.183 af
Primary=12.01 cfs 0.328 af Secondary=3.45 cfs 0.855 af Outflow=15.45 cfs 1.183 af

Link Pt. A: Point A Inflow=5.73 cfs 0.821 af
Primary=5.73 cfs 0.821 af

Link Pt. B: Point B Inflow=13.91 cfs 1.273 af
Primary=13.91 cfs 1.273 af

Link Pt.C: Point C Inflow=6.15 cfs 0.492 af
Primary=6.15 cfs 0.492 af

Total Runoff Area = 9.590 ac Runoff Volume = 2.585 af Average Runoff Depth = 3.24"
38.10% Pervious = 3.654 ac 61.90% Impervious = 5.936 ac

Summary for Subcatchment Bio: Bioretention DA

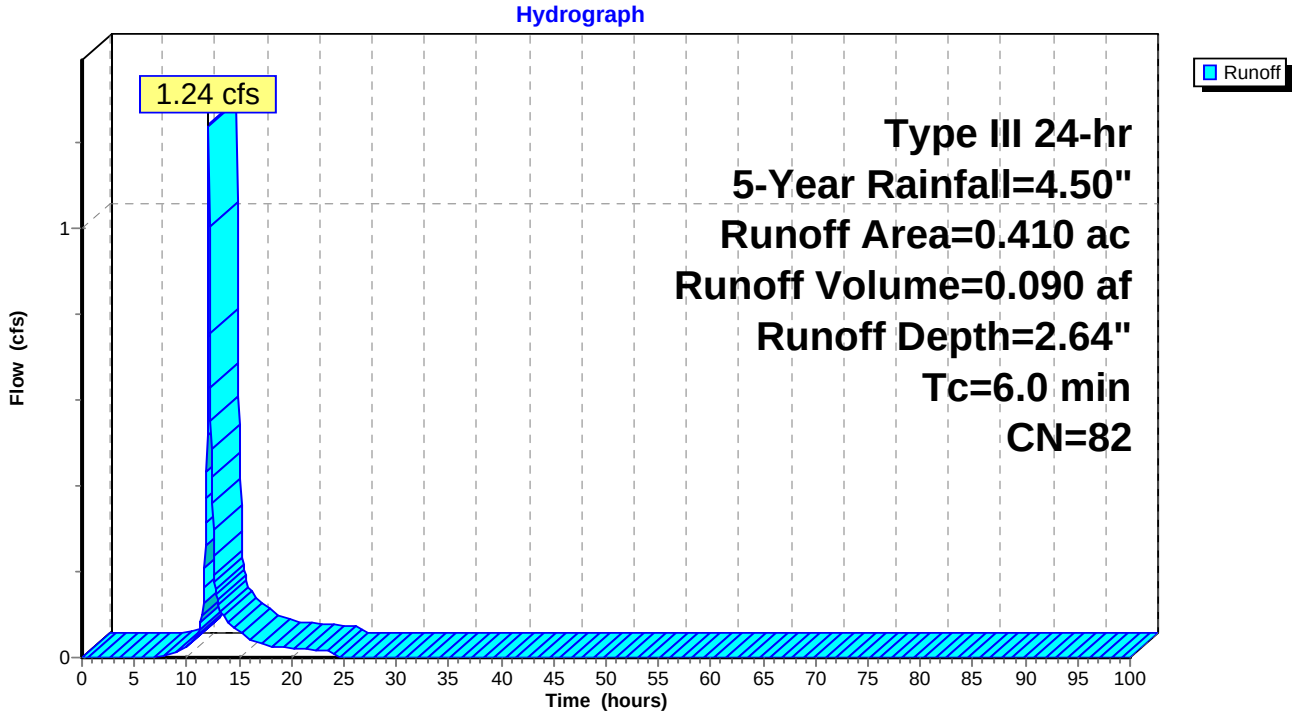
Runoff = 1.24 cfs @ 12.09 hrs, Volume= 0.090 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
0.278	74	>75% Grass cover, Good, HSG C
0.132	98	Paved parking, HSG C
0.410	82	Weighted Average
0.278		67.80% Pervious Area
0.132		32.20% Impervious Area

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

Subcatchment Bio: Bioretention DA



Summary for Subcatchment PR-1-BLDG: Building

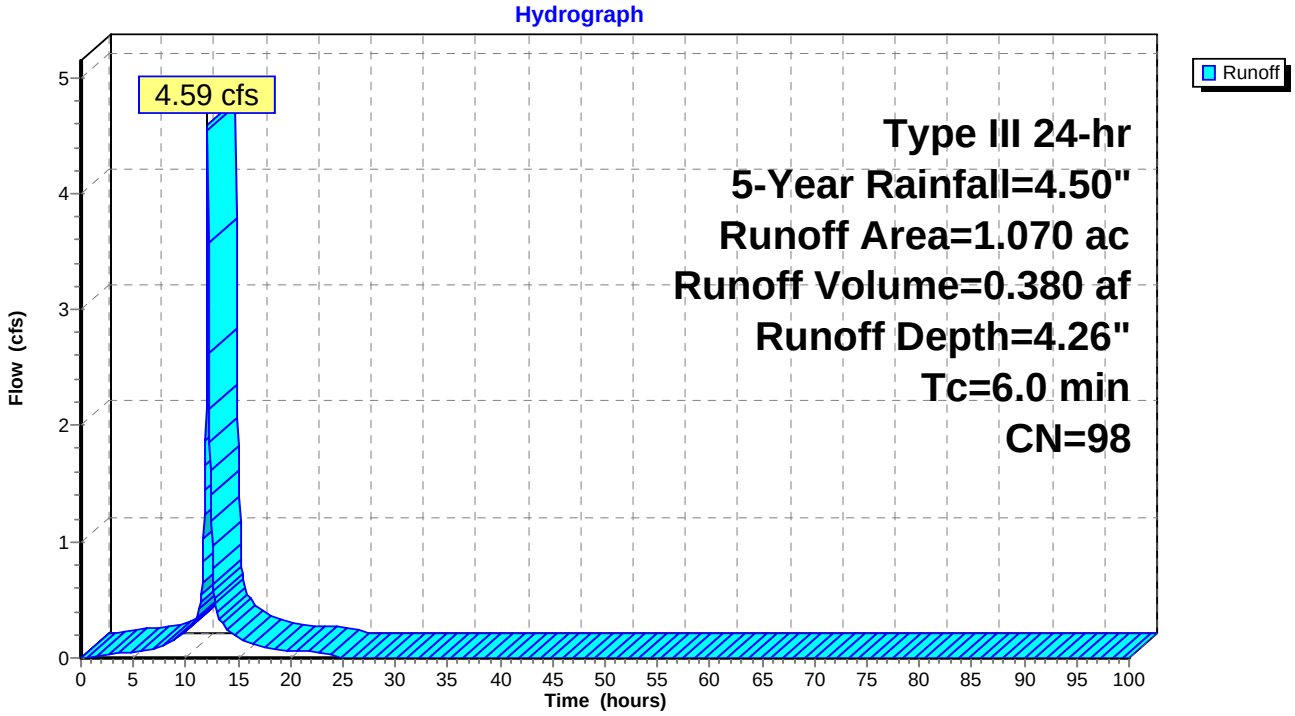
Runoff = 4.59 cfs @ 12.09 hrs, Volume= 0.380 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
1.070	98	Roofs, HSG B
1.070		100.00% Impervious Area

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

Subcatchment PR-1-BLDG: Building



Summary for Subcatchment PR-1-DA: Drainage Area 1

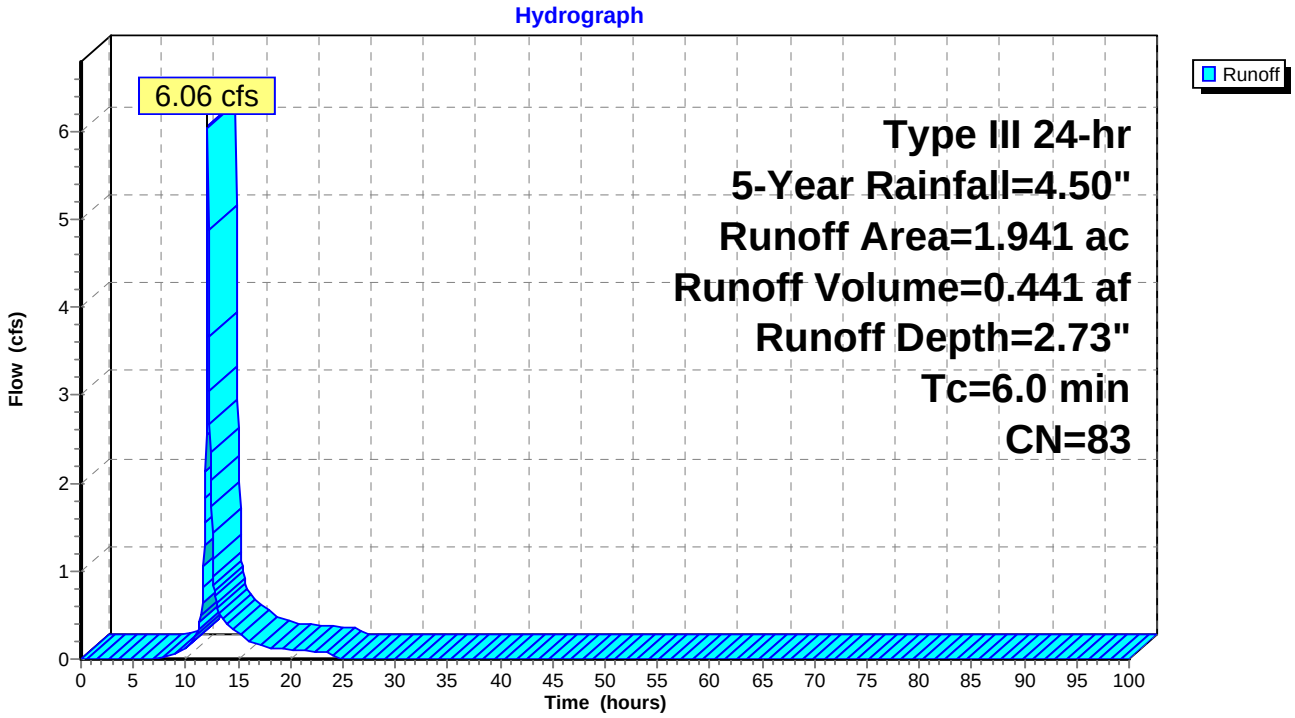
Runoff = 6.06 cfs @ 12.09 hrs, Volume= 0.441 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
1.000	74	>75% Grass cover, Good, HSG C
0.773	98	Paved parking, HSG C
0.168	70	Woods, Good, HSG C
1.941	83	Weighted Average
1.168		60.18% Pervious Area
0.773		39.82% Impervious Area

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

Subcatchment PR-1-DA: Drainage Area 1



Summary for Subcatchment PR-2-Bldg: Building

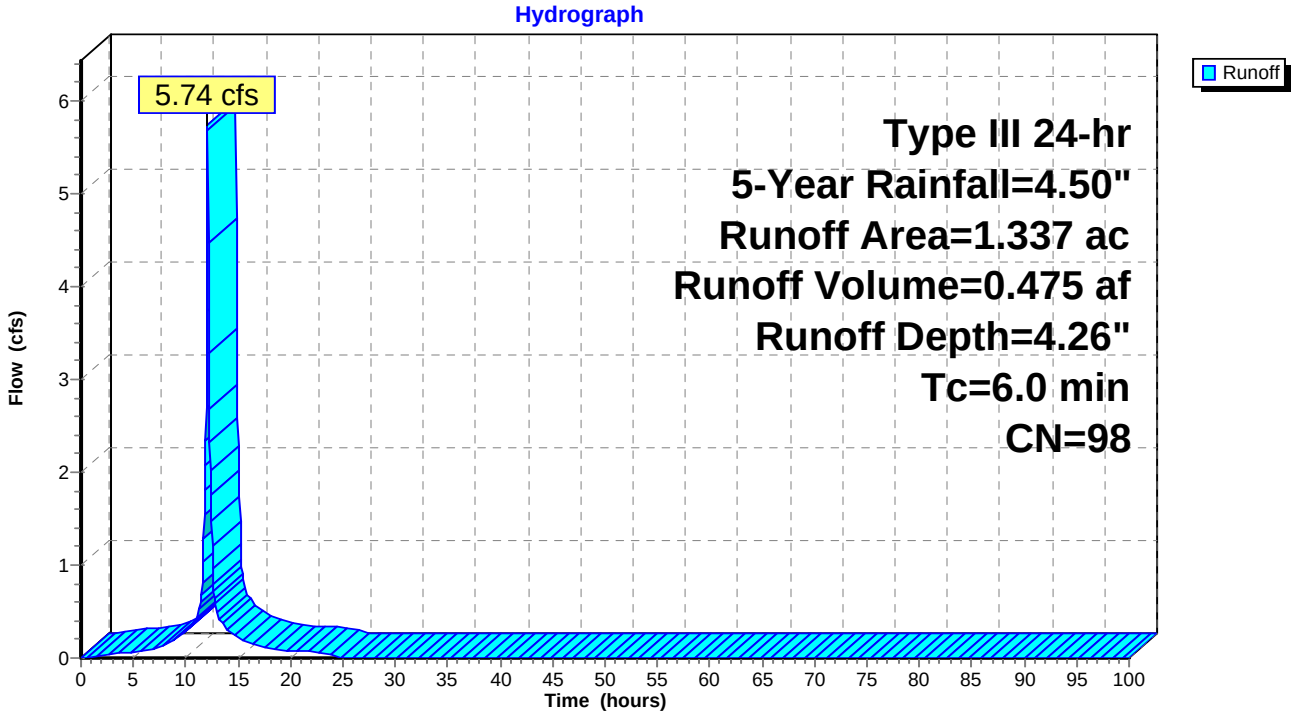
Runoff = 5.74 cfs @ 12.09 hrs, Volume= 0.475 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
0.025	98	Roofs, HSG B
1.312	98	Roofs, HSG C
1.337	98	Weighted Average
1.337		100.00% Impervious Area

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

Subcatchment PR-2-Bldg: Building



Summary for Subcatchment PR-2-DA: Drainage Area 2

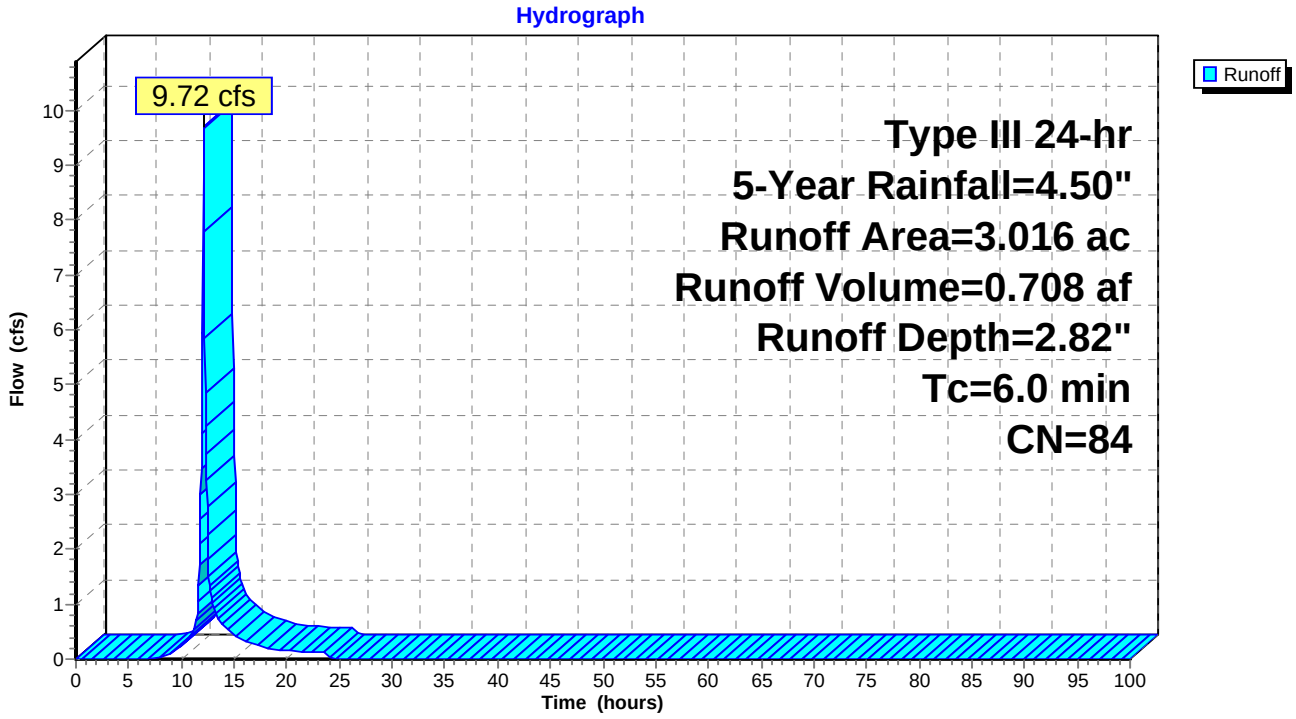
Runoff = 9.72 cfs @ 12.09 hrs, Volume= 0.708 af, Depth= 2.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
0.495	61	>75% Grass cover, Good, HSG B
0.790	74	>75% Grass cover, Good, HSG C
1.556	98	Paved parking, HSG C
0.126	70	Woods, Good, HSG C
0.049	55	Woods, Good, HSG B
3.016	84	Weighted Average
1.460		48.41% Pervious Area
1.556		51.59% Impervious Area

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

Subcatchment PR-2-DA: Drainage Area 2



Summary for Subcatchment PR-3-BLDG: Building

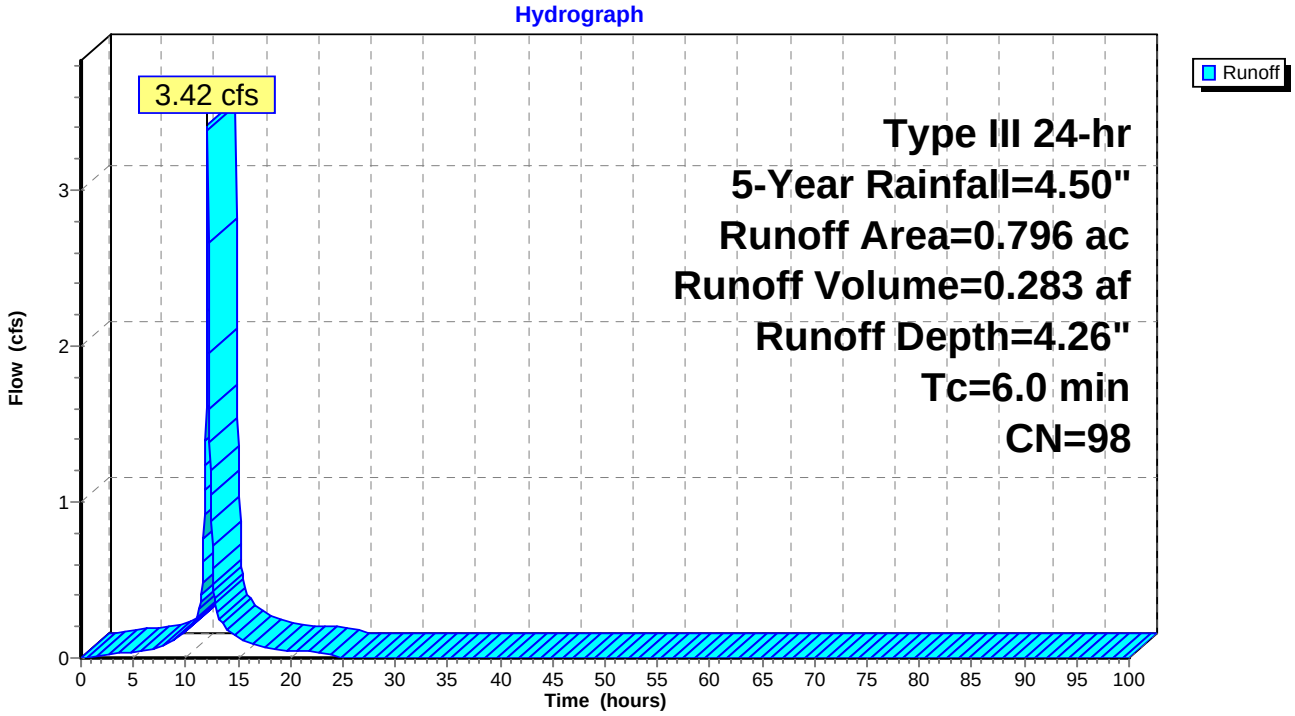
Runoff = 3.42 cfs @ 12.09 hrs, Volume= 0.283 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
0.796	98	Roofs, HSG C
0.796		100.00% Impervious Area

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

Subcatchment PR-3-BLDG: Building



Summary for Subcatchment PR-3-CY: Drainage Area Courtyard

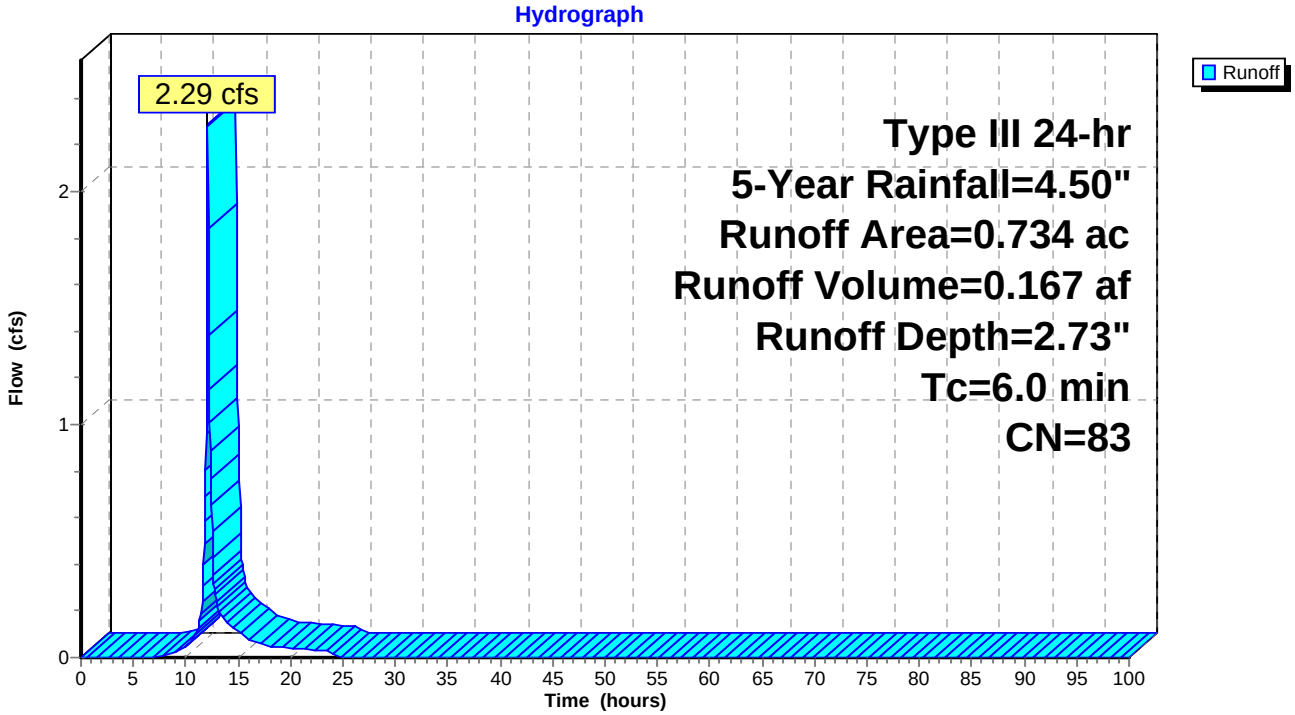
Runoff = 2.29 cfs @ 12.09 hrs, Volume= 0.167 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
0.462	74	>75% Grass cover, Good, HSG C
0.272	98	Paved parking, HSG C
0.734	83	Weighted Average
0.462		62.94% Pervious Area
0.272		37.06% Impervious Area

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

Subcatchment PR-3-CY: Drainage Area Courtyard



Summary for Subcatchment PR-3-DA: Drainage Area 3

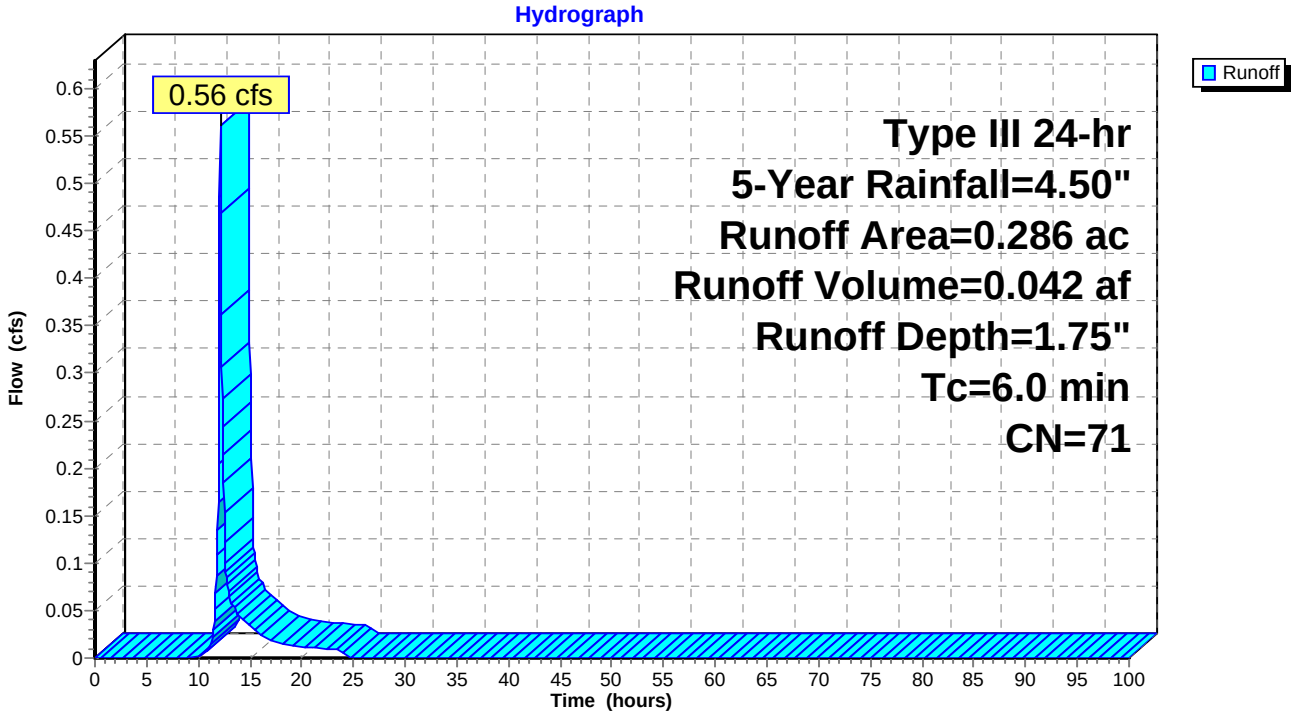
Runoff = 0.56 cfs @ 12.10 hrs, Volume= 0.042 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 5-Year Rainfall=4.50"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.236	70	Woods, Good, HSG C
0.286	71	Weighted Average
0.286		100.00% Pervious Area

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

Subcatchment PR-3-DA: Drainage Area 3



Summary for Pond Bio Basin: Bioretention

Inflow Area = 0.410 ac, 32.20% Impervious, Inflow Depth = 2.64" for 5-Year event
Inflow = 1.24 cfs @ 12.09 hrs, Volume= 0.090 af
Outflow = 0.67 cfs @ 12.25 hrs, Volume= 0.090 af, Atten= 46%, Lag= 9.8 min
Primary = 0.67 cfs @ 12.25 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 225.56' @ 12.25 hrs Surf.Area= 0.045 ac Storage= 0.023 af

Plug-Flow detention time= 64.0 min calculated for 0.090 af (100% of inflow)
Center-of-Mass det. time= 64.0 min (884.7 - 820.7)

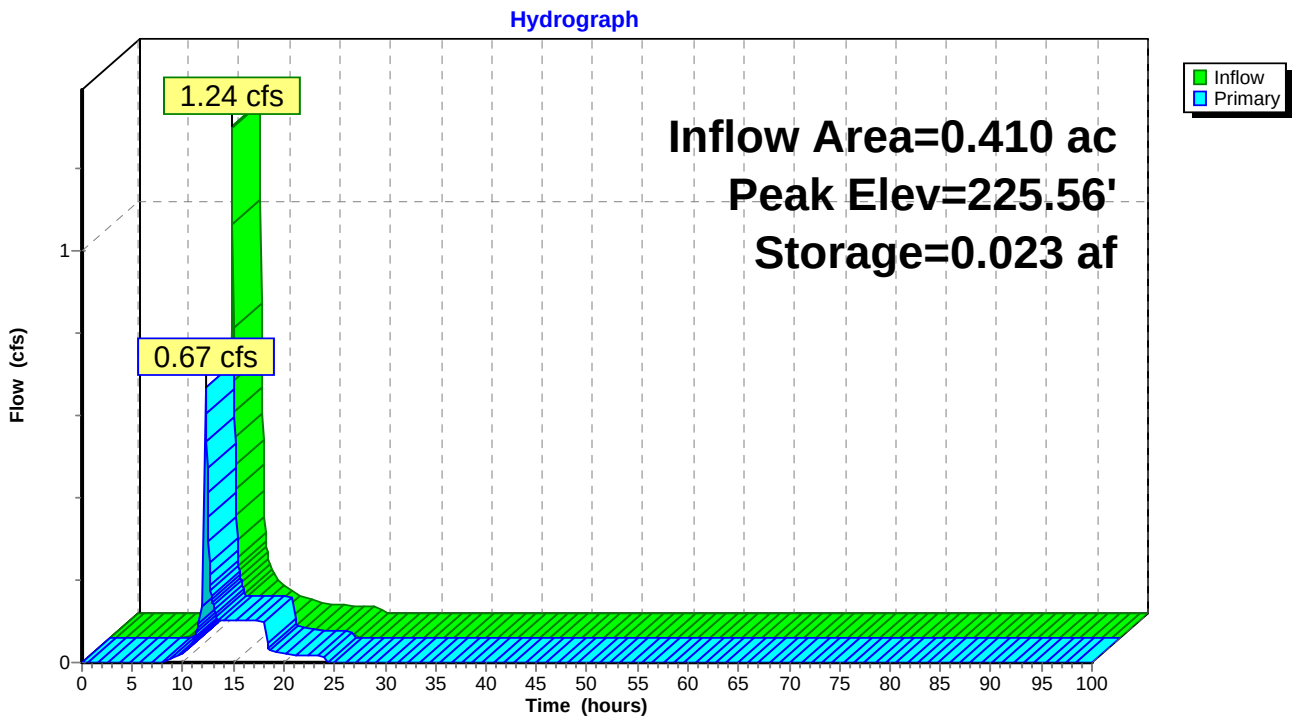
Volume	Invert	Avail.Storage	Storage Description
#1	225.00'	0.070 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
225.00	0.038	0.000	0.000
226.00	0.051	0.044	0.044
226.50	0.051	0.025	0.070

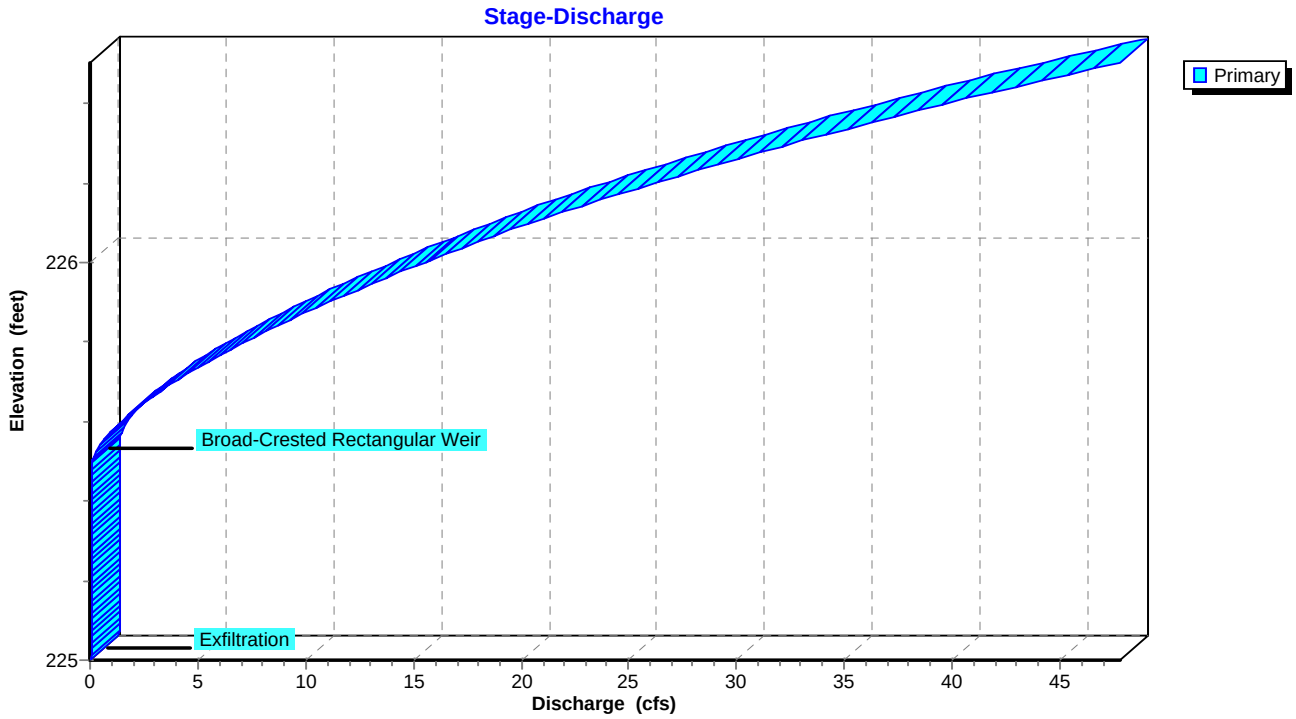
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	**0.10 cfs Exfiltration at all elevations**
#2	Primary	225.50'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.66 cfs @ 12.25 hrs HW=225.56' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.56 cfs @ 0.63 fps)

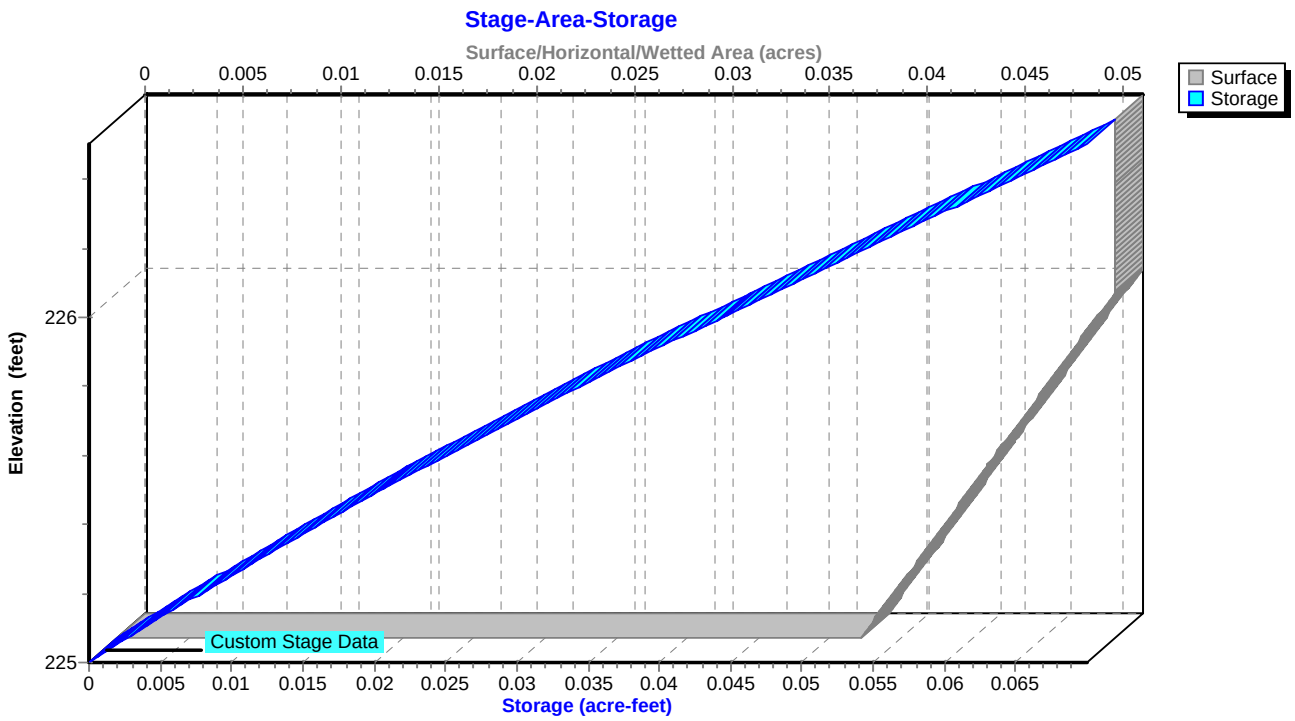
Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Summary for Pond Det 1: Detention Basin

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 3.27" for 5-Year event
Inflow = 10.65 cfs @ 12.09 hrs, Volume= 0.821 af
Outflow = 5.73 cfs @ 12.23 hrs, Volume= 0.821 af, Atten= 46%, Lag= 8.2 min
Primary = 5.73 cfs @ 12.23 hrs, Volume= 0.821 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 197.08' @ 12.23 hrs Surf.Area= 0.074 ac Storage= 0.171 af

Plug-Flow detention time= 29.9 min calculated for 0.821 af (100% of inflow)
Center-of-Mass det. time= 30.2 min (816.5 - 786.3)

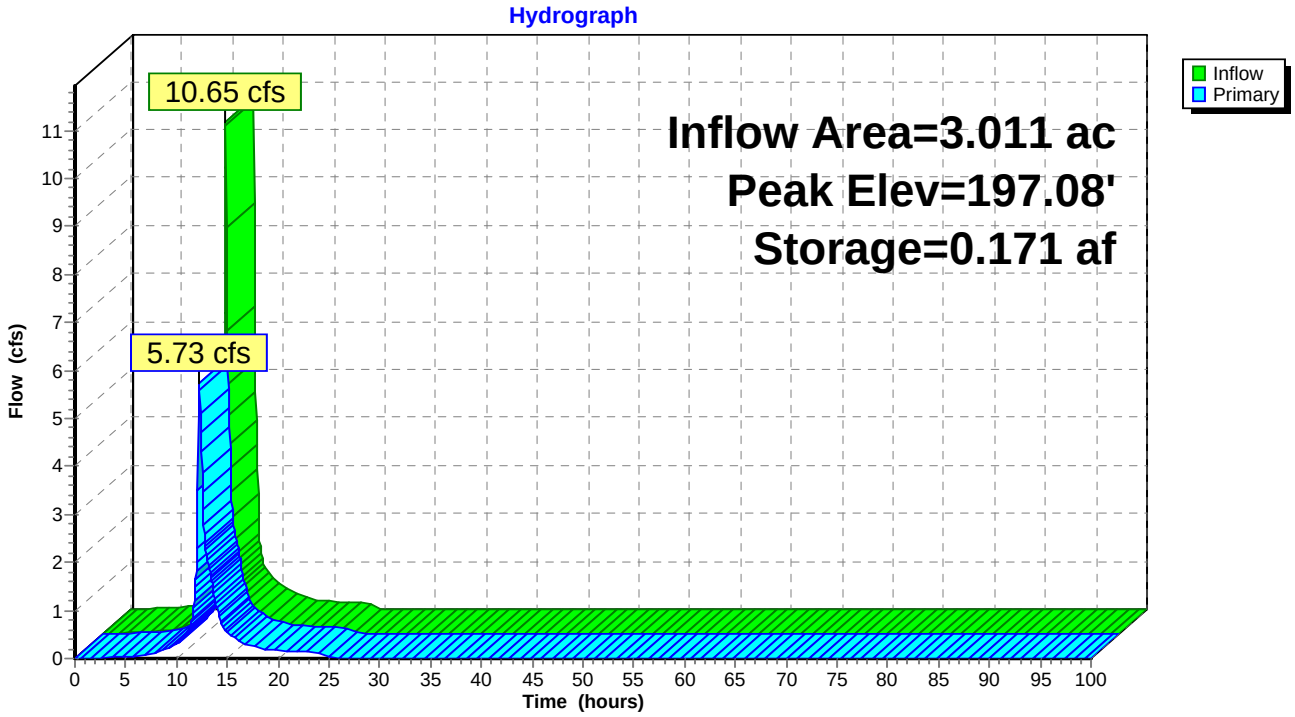
Volume	Invert	Avail.Storage	Storage Description
#1	194.00'	0.440 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
194.00	0.040	0.000	0.000
195.00	0.049	0.044	0.044
196.00	0.060	0.054	0.099
197.00	0.073	0.066	0.166
198.00	0.085	0.079	0.244
199.00	0.098	0.091	0.336
200.00	0.110	0.104	0.440

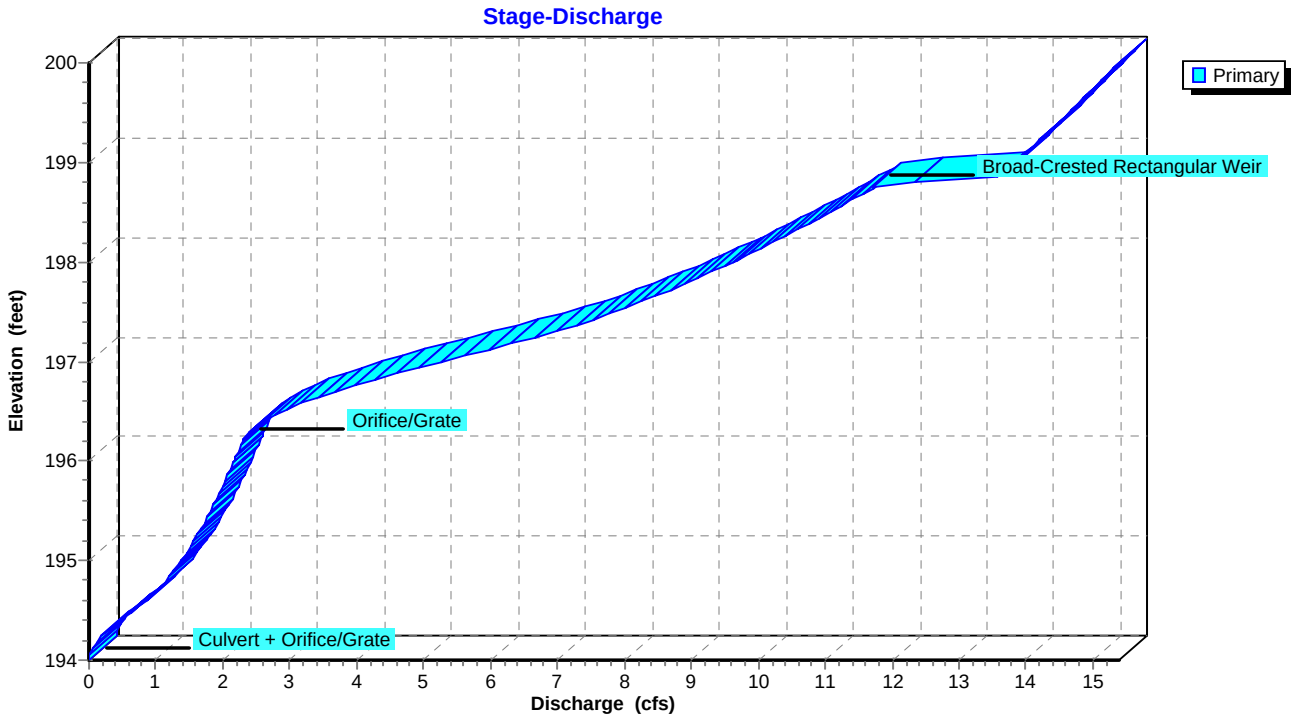
Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	**18.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 194.00' / 192.00' S= 0.0333 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	194.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	196.20'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	198.75'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=5.70 cfs @ 12.23 hrs HW=197.07' (Free Discharge)
└─**1=Culvert** (Passes 5.70 cfs of 10.24 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.78 cfs @ 7.97 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 2.92 cfs @ 3.18 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

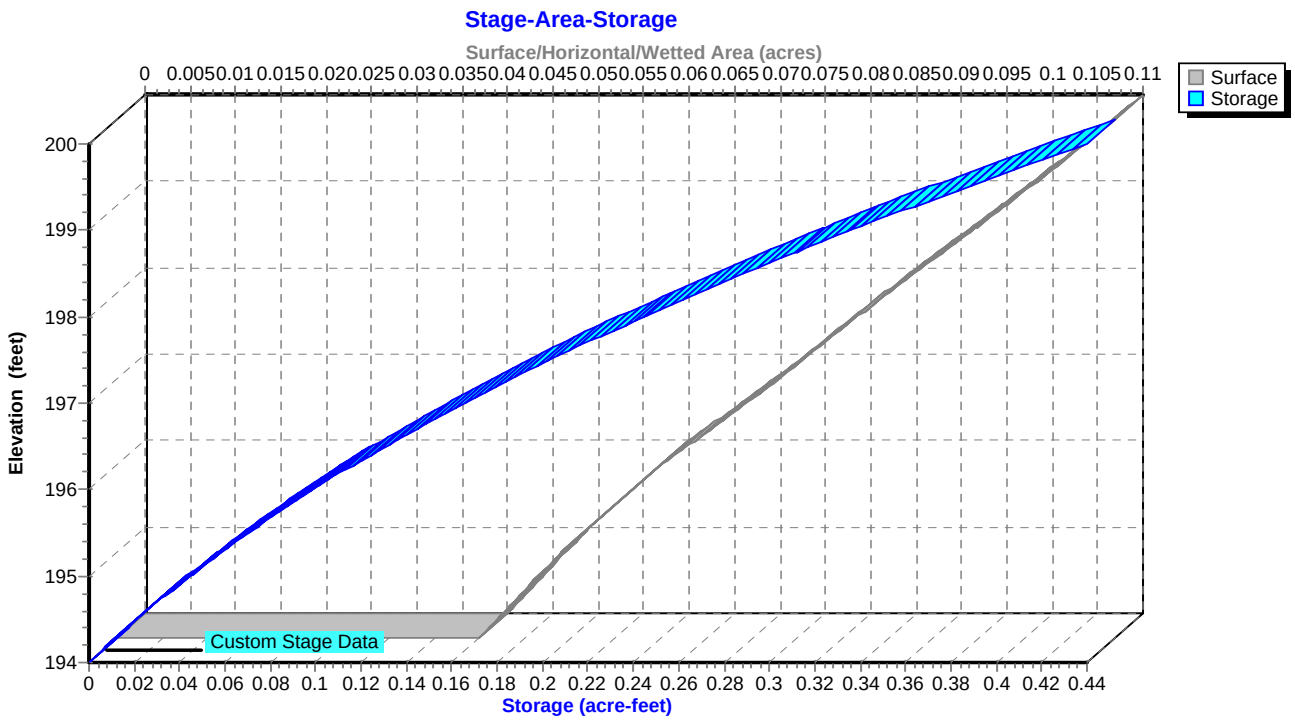
Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Summary for Pond Det 2: Detention Basin

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 1.05" for 5-Year event
Inflow = 12.11 cfs @ 12.09 hrs, Volume= 0.418 af
Outflow = 10.50 cfs @ 12.13 hrs, Volume= 0.418 af, Atten= 13%, Lag= 2.3 min
Primary = 10.50 cfs @ 12.13 hrs, Volume= 0.418 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 213.19' @ 12.13 hrs Surf.Area= 0.020 ac Storage= 0.032 af

Plug-Flow detention time= 3.0 min calculated for 0.418 af (100% of inflow)
Center-of-Mass det. time= 3.0 min (763.9 - 760.9)

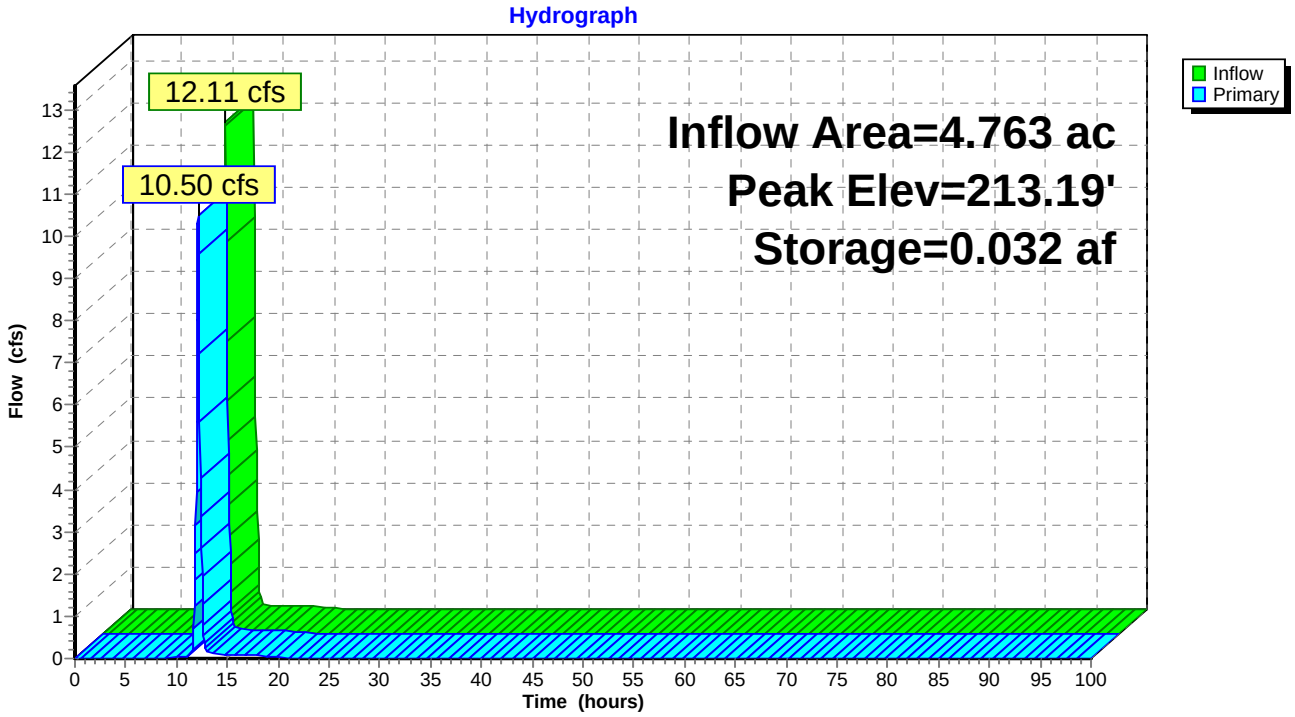
Volume	Invert	Avail.Storage	Storage Description
#1	211.00'	0.116 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
211.00	0.009	0.000	0.000
212.00	0.014	0.012	0.012
213.00	0.019	0.016	0.028
214.00	0.026	0.022	0.050
215.00	0.033	0.029	0.080
216.00	0.040	0.036	0.116

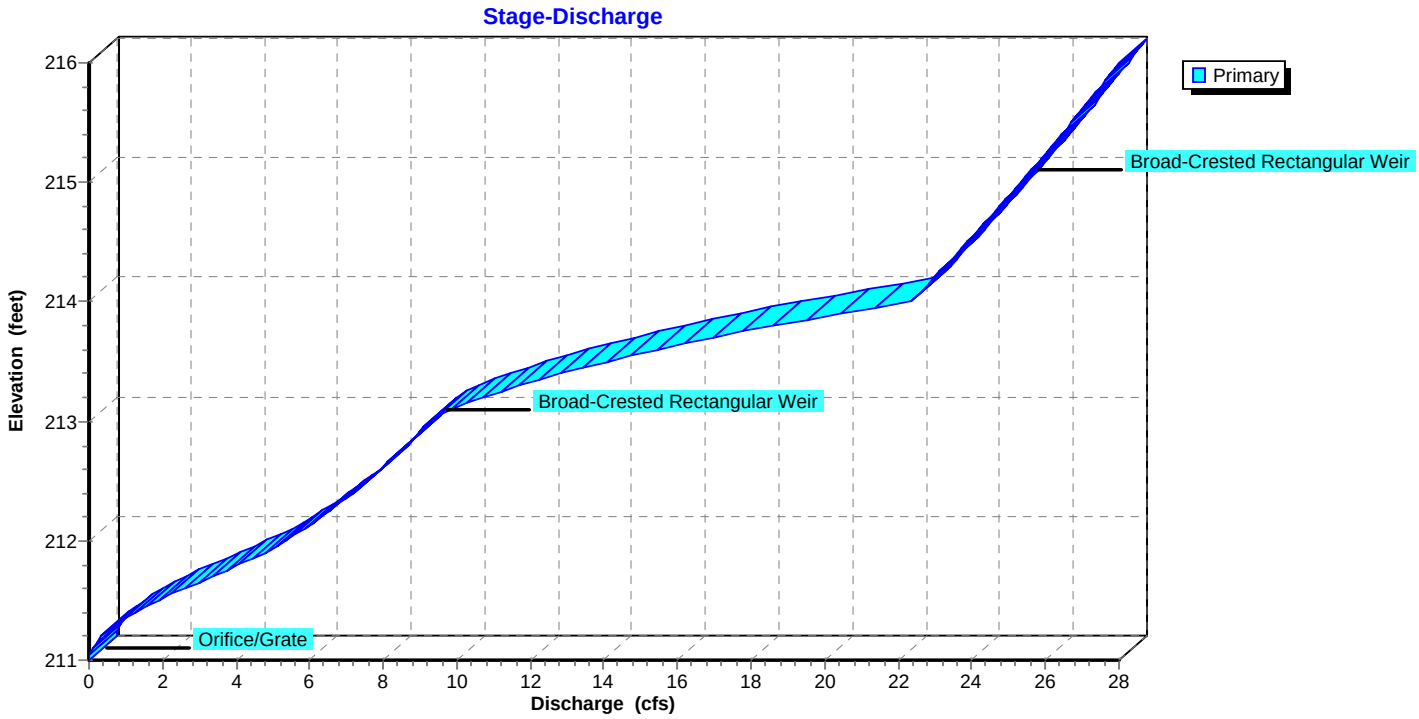
Device	Routing	Invert	Outlet Devices
#1	Primary	209.50'	**24.0" Round Culvert** L= 65.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 209.50' / 205.00' S= 0.0692 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	211.00'	**12.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	213.00'	**3.5' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#4	Device 1	215.00'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=10.30 cfs @ 12.13 hrs HW=213.15' (Free Discharge)
└─**1=Culvert** (Passes 10.30 cfs of 19.46 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 9.73 cfs @ 6.19 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.57 cfs @ 1.06 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

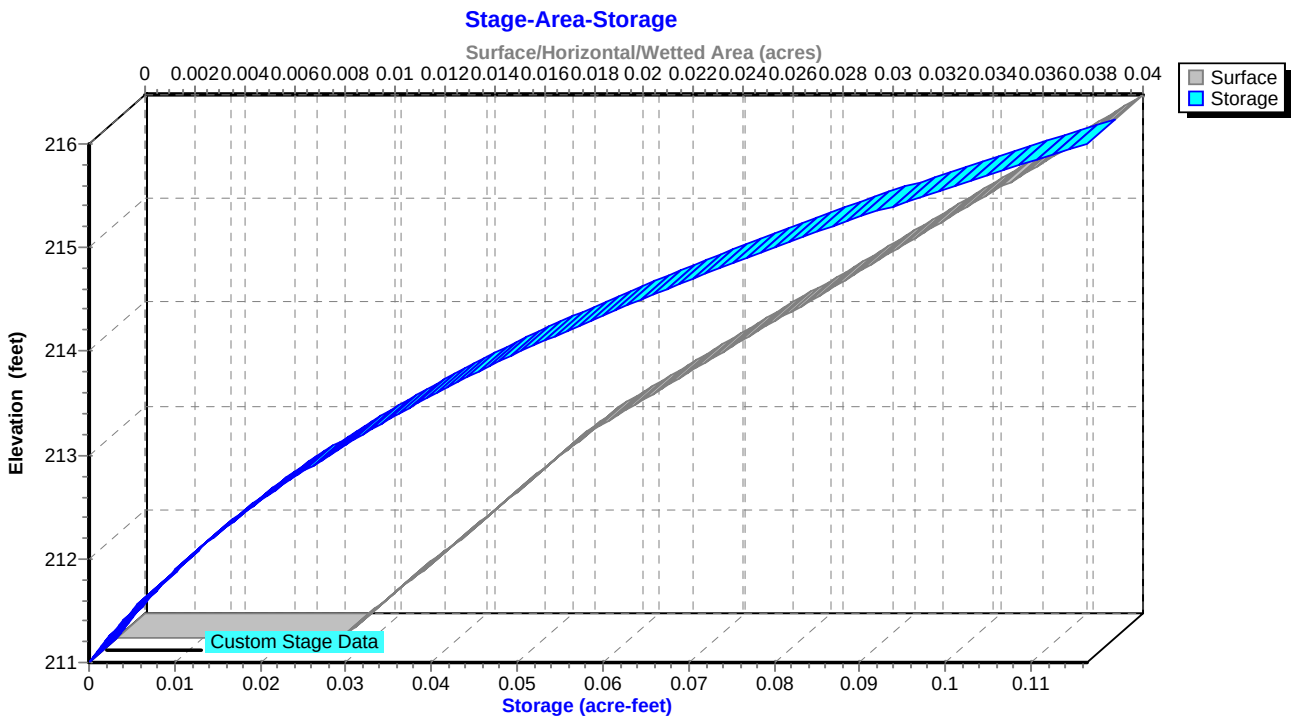
Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Summary for Pond Det 3: Underground Detention Pipe

Inflow Area = 1.530 ac, 69.80% Impervious, Inflow Depth = 3.53" for 5-Year event
Inflow = 5.71 cfs @ 12.09 hrs, Volume= 0.450 af
Outflow = 5.59 cfs @ 12.11 hrs, Volume= 0.450 af, Atten= 2%, Lag= 1.1 min
Primary = 5.59 cfs @ 12.11 hrs, Volume= 0.450 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 217.62' @ 12.11 hrs Surf.Area= 0.010 ac Storage= 0.027 af

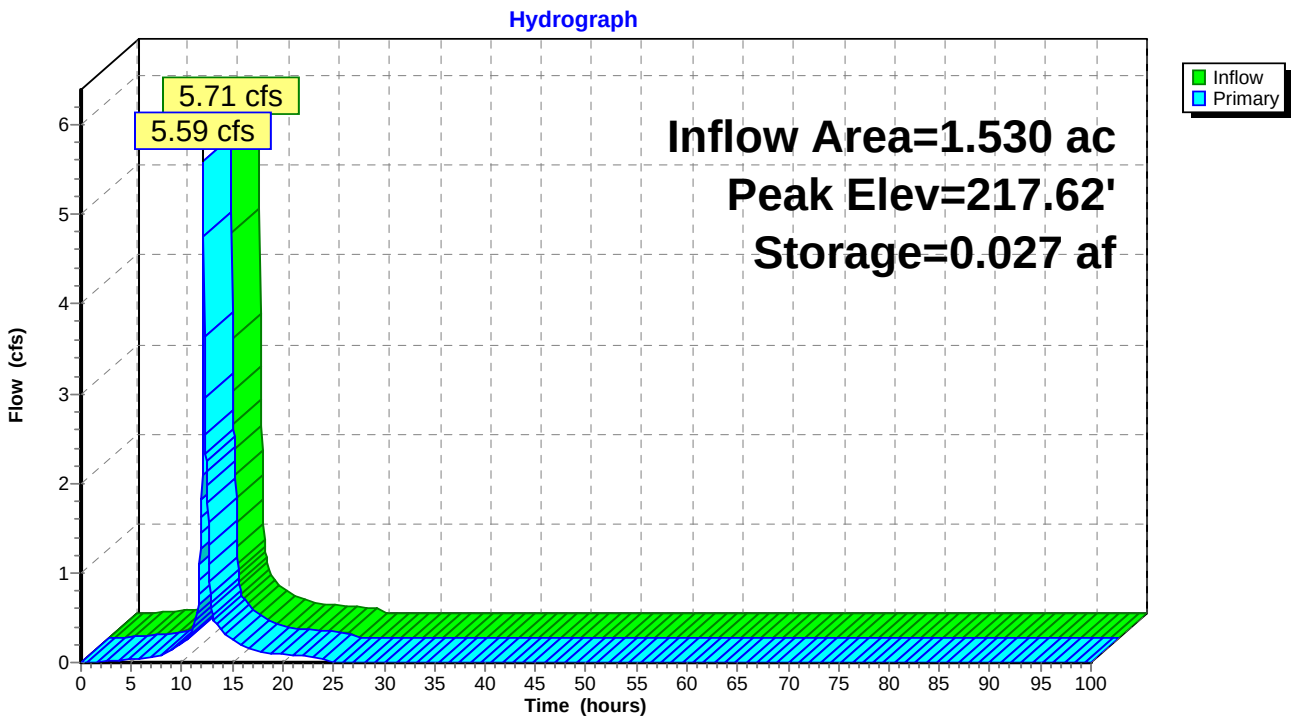
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.3 min (779.3 - 775.0)

Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.033 af	**42.0" Round Pipe Storage** x 2 L= 75.0'

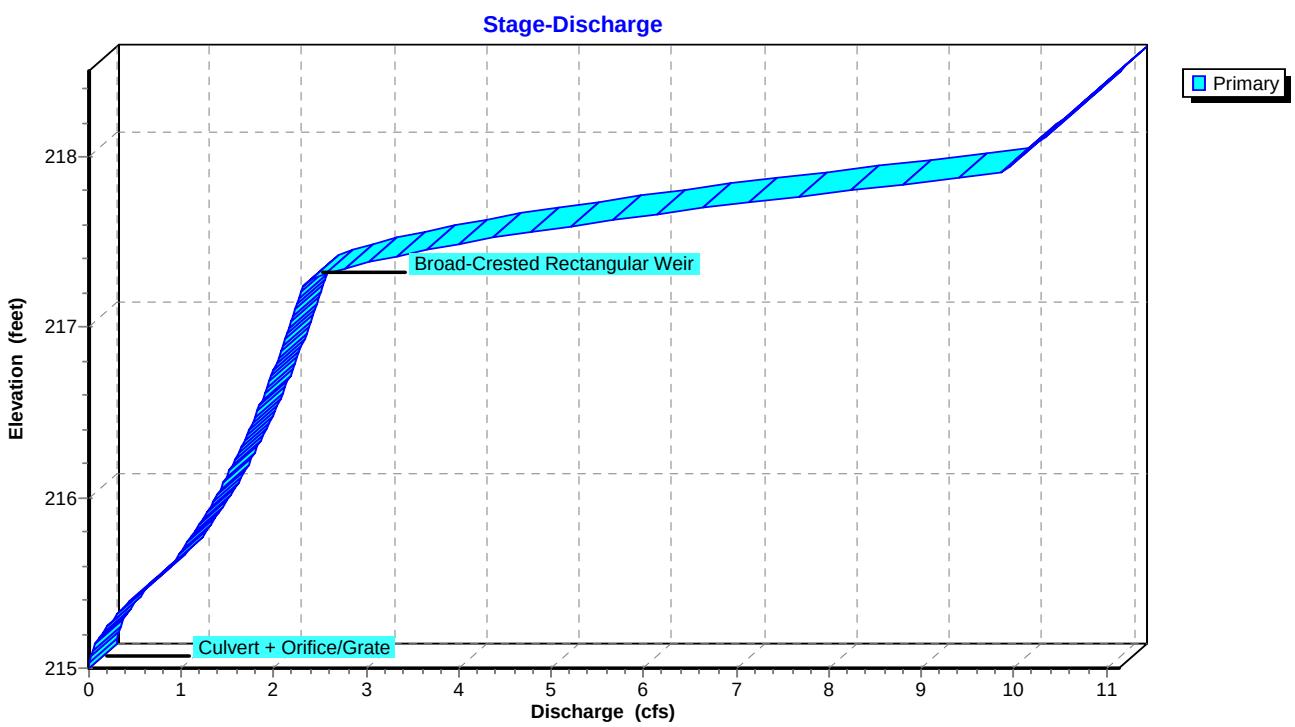
Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 36.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.00' / 214.50' S= 0.0139 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	215.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	217.25'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=5.46 cfs @ 12.11 hrs HW=217.61' (Free Discharge)
└─**1=Culvert** (Passes 5.46 cfs of 9.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.54 cfs @ 7.26 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 2.93 cfs @ 1.63 fps)

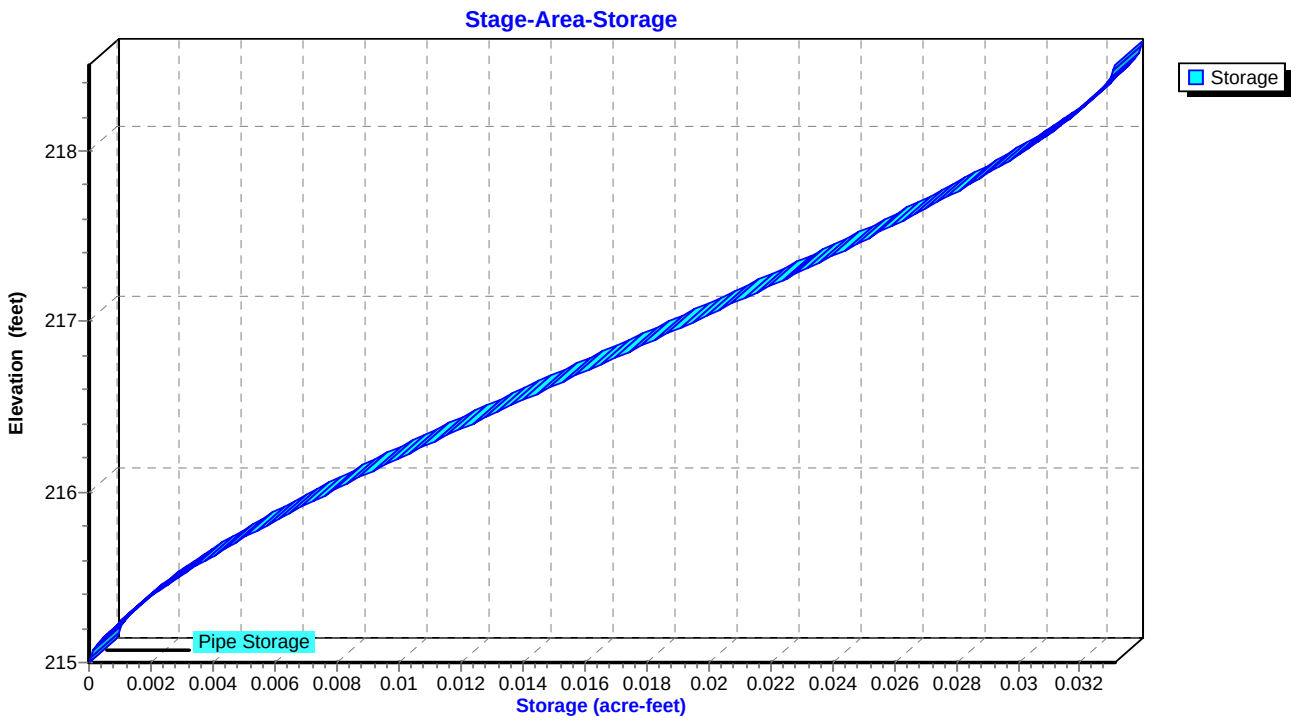
Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Summary for Pond Sandfilter: Sandfilter

Inflow Area = 4.353 ac, 66.46% Impervious, Inflow Depth = 3.26" for 5-Year event
Inflow = 15.45 cfs @ 12.09 hrs, Volume= 1.183 af
Outflow = 15.45 cfs @ 12.09 hrs, Volume= 1.183 af, Atten= 0%, Lag= 0.0 min
Primary = 12.01 cfs @ 12.09 hrs, Volume= 0.328 af
Secondary = 3.45 cfs @ 12.09 hrs, Volume= 0.855 af

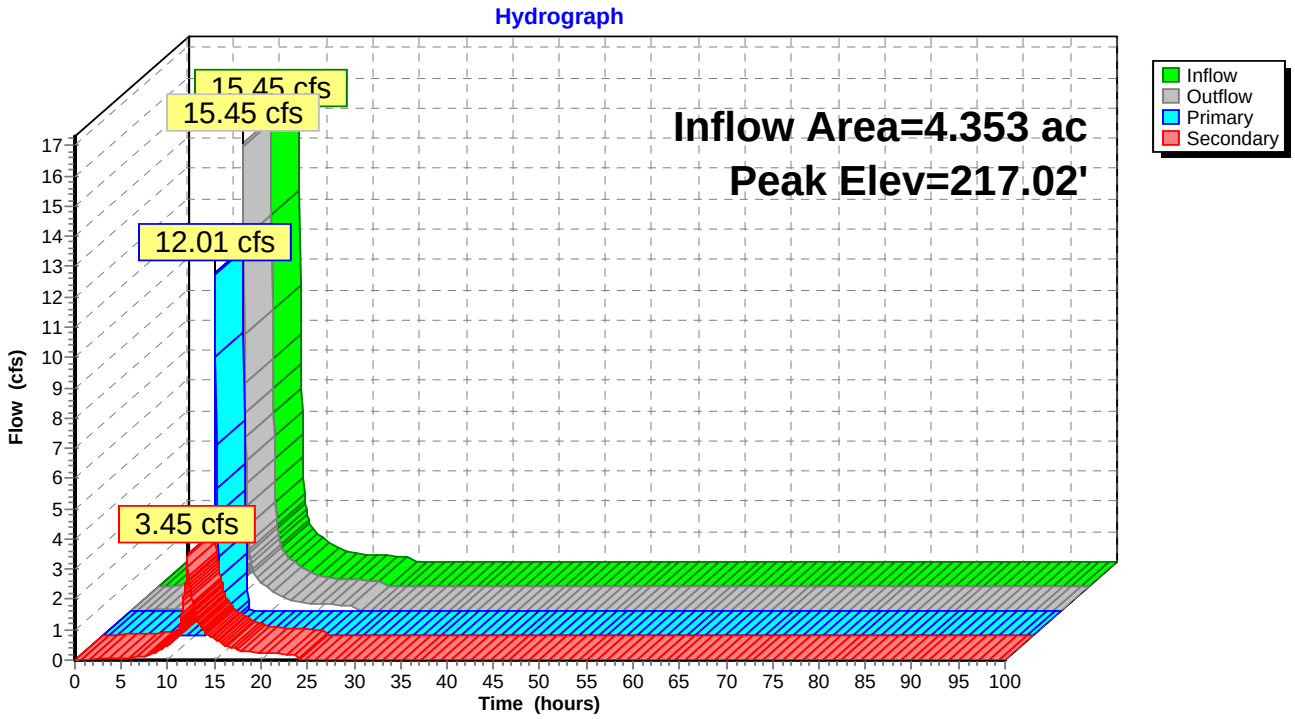
Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 217.02' @ 12.09 hrs
Flood Elev= 221.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 88.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 215.00' / 212.00' S= 0.0341 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	214.00'	**8.0" Round Culvert** L= 9.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 214.00' / 213.80' S= 0.0222 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

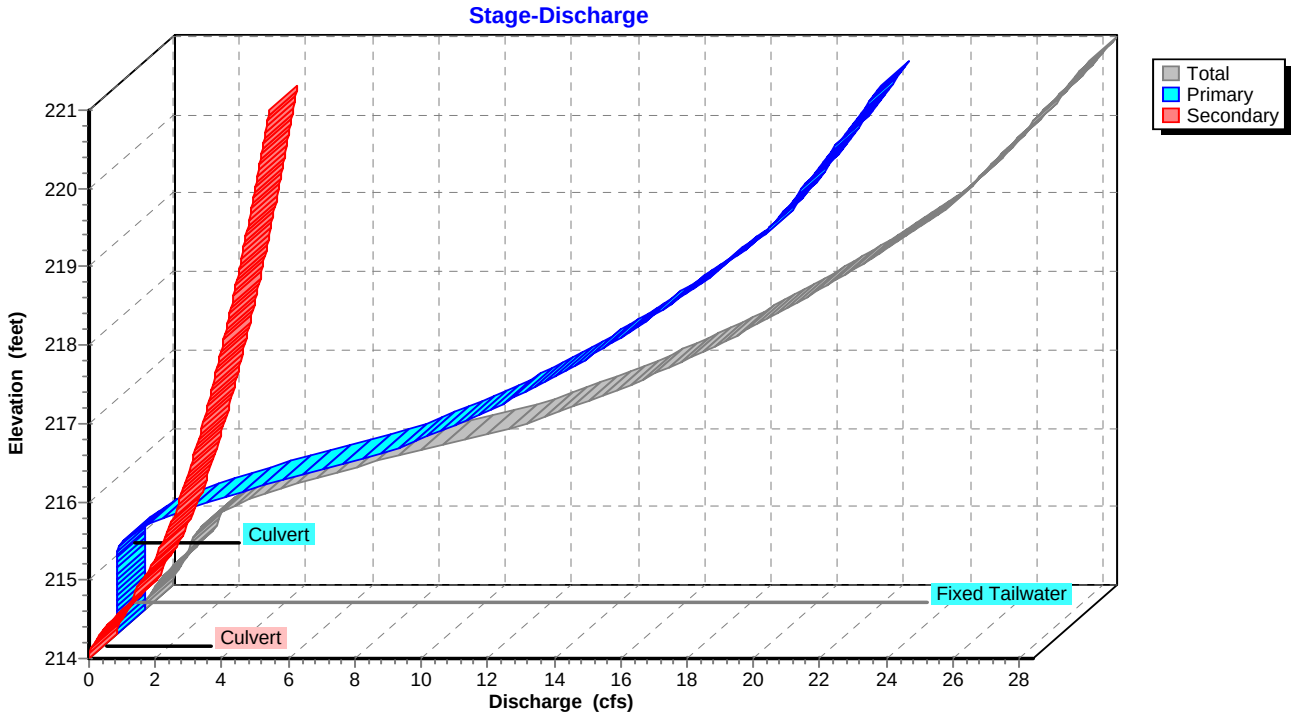
Primary OutFlow Max=11.70 cfs @ 12.09 hrs HW=216.96' TW=214.24' (Fixed TW Elev= 214.24')
└─**1=Culvert** (Inlet Controls 11.70 cfs @ 6.62 fps)

Secondary OutFlow Max=3.41 cfs @ 12.09 hrs HW=216.96' (Free Discharge)
└─**2=Culvert** (Inlet Controls 3.41 cfs @ 9.76 fps)

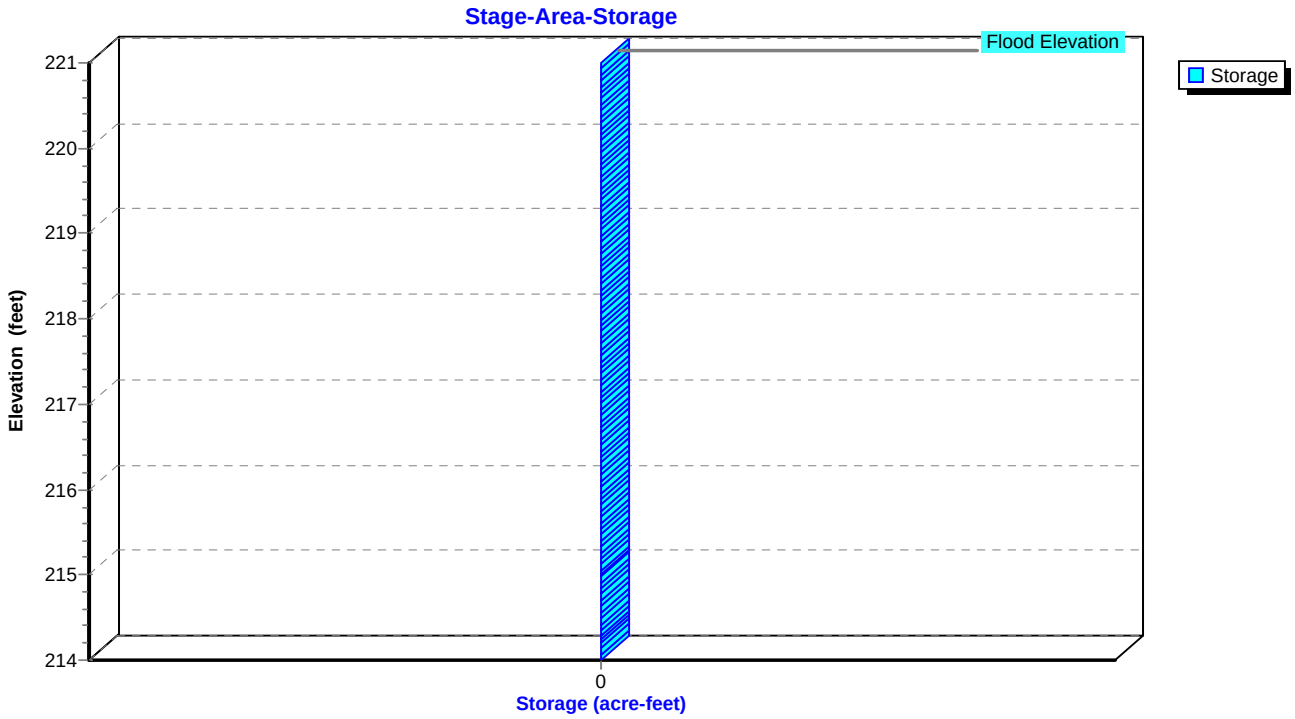
Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter

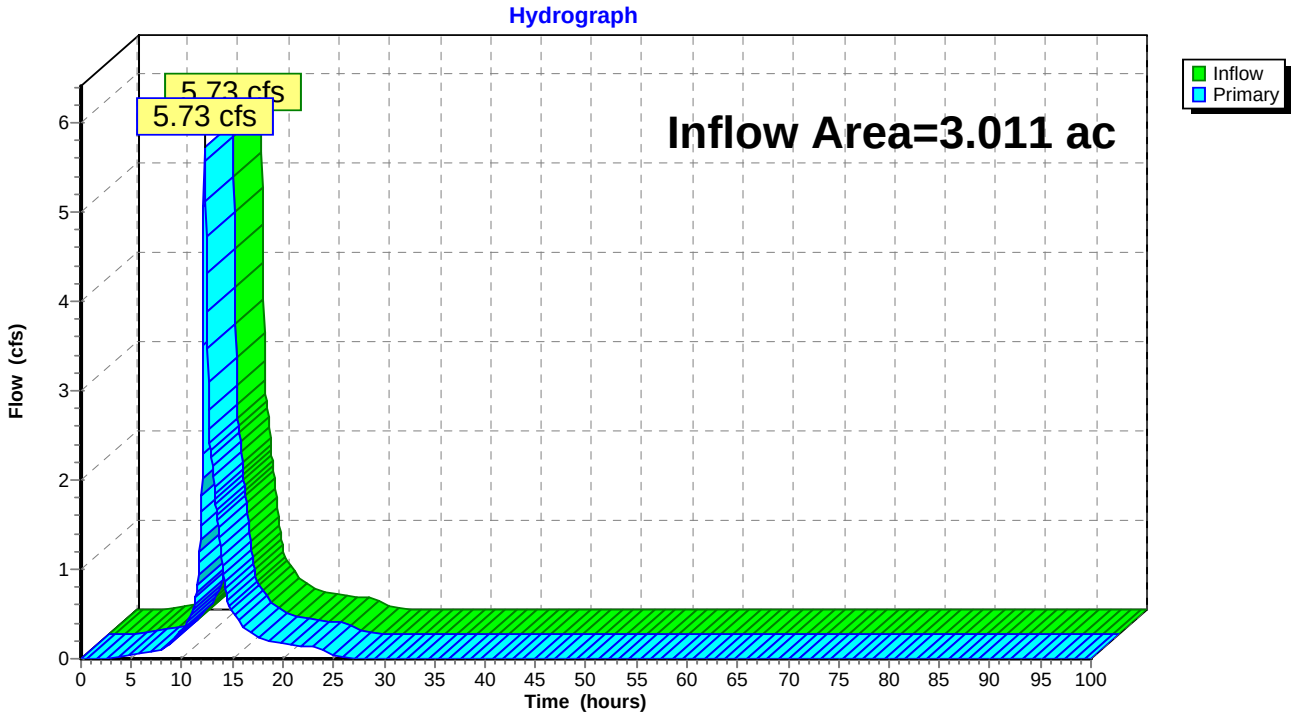


Summary for Link Pt. A: Point A

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 3.27" for 5-Year event
Inflow = 5.73 cfs @ 12.23 hrs, Volume= 0.821 af
Primary = 5.73 cfs @ 12.23 hrs, Volume= 0.821 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

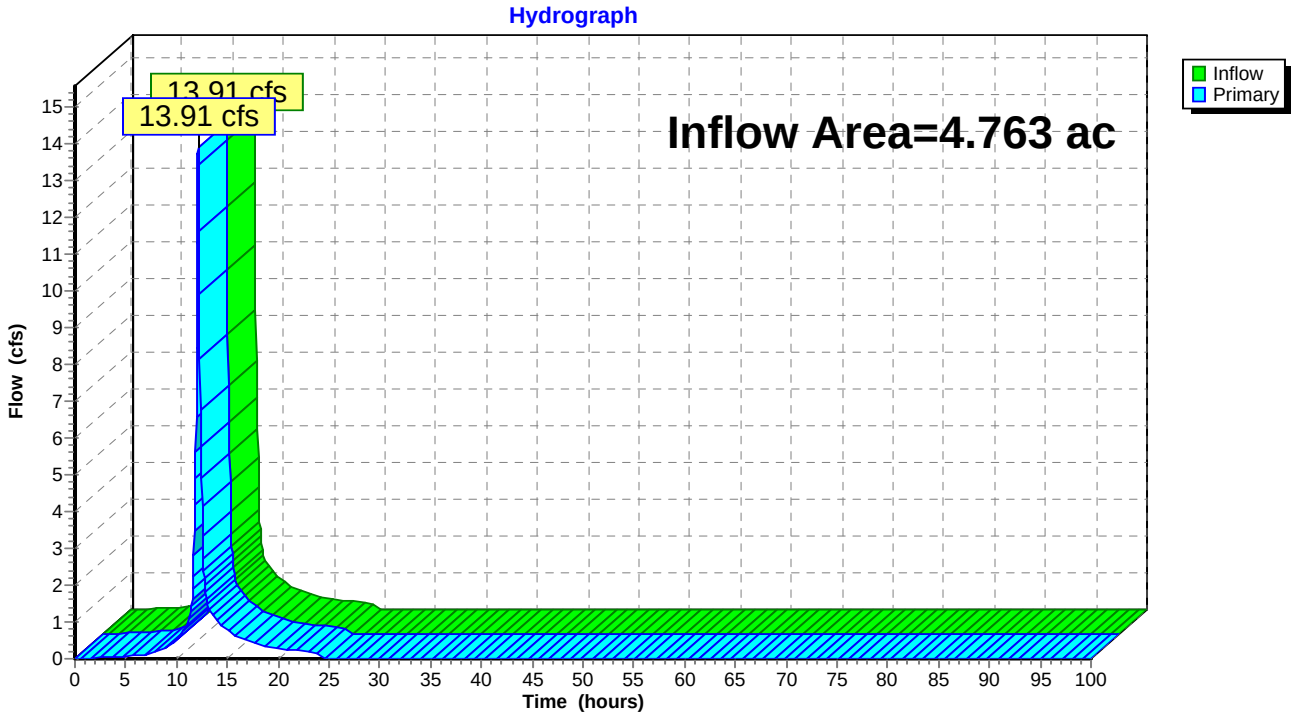


Summary for Link Pt. B: Point B

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 3.21" for 5-Year event
Inflow = 13.91 cfs @ 12.12 hrs, Volume= 1.273 af
Primary = 13.91 cfs @ 12.12 hrs, Volume= 1.273 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

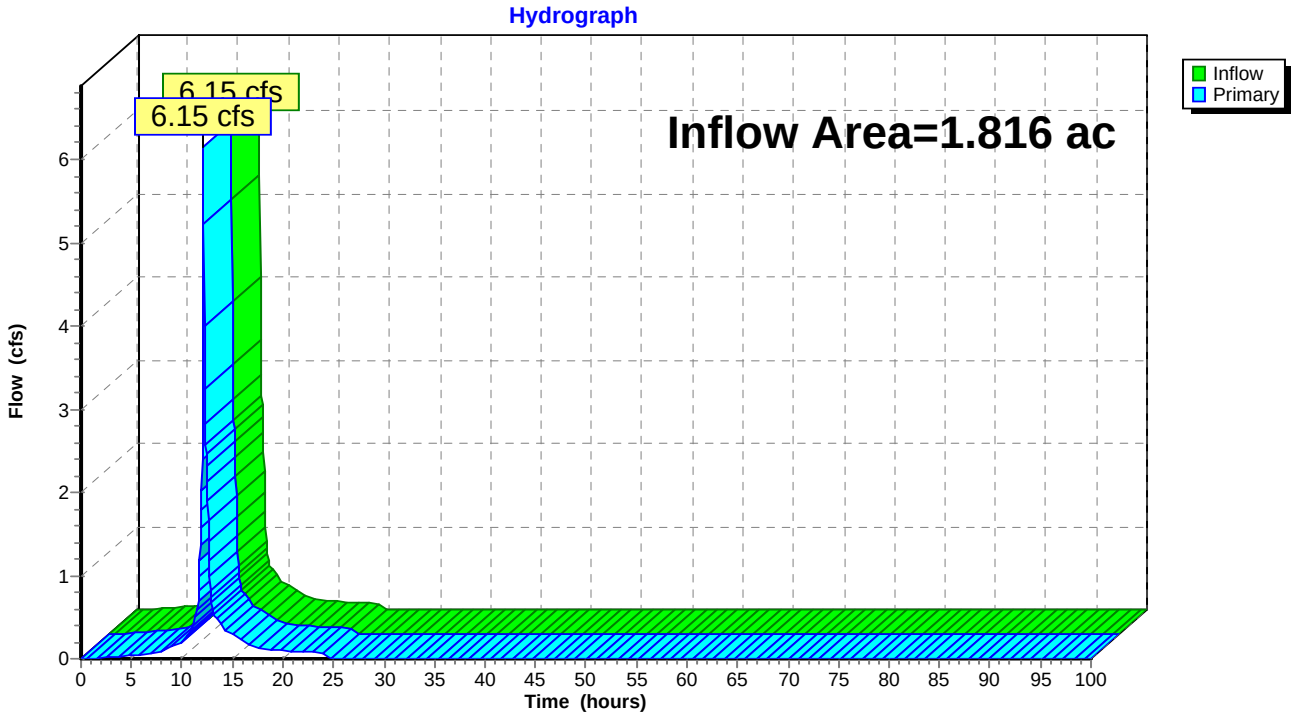


Summary for Link Pt.C: Point C

Inflow Area = 1.816 ac, 58.81% Impervious, Inflow Depth = 3.25" for 5-Year event
Inflow = 6.15 cfs @ 12.11 hrs, Volume= 0.492 af
Primary = 6.15 cfs @ 12.11 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 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 Bio: Bioretention DA Runoff Area=0.410 ac 32.20% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=82 Runoff=1.45 cfs 0.105 af

Subcatchment PR-1-BLDG: Building Runoff Area=1.070 ac 100.00% Impervious Runoff Depth=4.76"
Tc=6.0 min CN=98 Runoff=5.11 cfs 0.425 af

Subcatchment PR-1-DA: Drainage Area 1 Runoff Area=1.941 ac 39.82% Impervious Runoff Depth=3.17"
Tc=6.0 min CN=83 Runoff=7.04 cfs 0.513 af

Subcatchment PR-2-Bldg: Building Runoff Area=1.337 ac 100.00% Impervious Runoff Depth=4.76"
Tc=6.0 min CN=98 Runoff=6.39 cfs 0.531 af

Subcatchment PR-2-DA: Drainage Area 2 Runoff Area=3.016 ac 51.59% Impervious Runoff Depth=3.27"
Tc=6.0 min CN=84 Runoff=11.24 cfs 0.822 af

Subcatchment PR-3-BLDG: Building Runoff Area=0.796 ac 100.00% Impervious Runoff Depth=4.76"
Tc=6.0 min CN=98 Runoff=3.80 cfs 0.316 af

Subcatchment PR-3-CY: Drainage Area Runoff Area=0.734 ac 37.06% Impervious Runoff Depth=3.17"
Tc=6.0 min CN=83 Runoff=2.66 cfs 0.194 af

Subcatchment PR-3-DA: Drainage Area 3 Runoff Area=0.286 ac 0.00% Impervious Runoff Depth=2.12"
Tc=6.0 min CN=71 Runoff=0.69 cfs 0.050 af

Pond Bio Basin: Bioretention Peak Elev=225.58' Storage=0.024 af Inflow=1.45 cfs 0.105 af
Outflow=1.00 cfs 0.105 af

Pond Det 1: Detention Basin Peak Elev=197.31' Storage=0.189 af Inflow=12.15 cfs 0.938 af
Outflow=7.04 cfs 0.938 af

Pond Det 2: Detention Basin Peak Elev=213.45' Storage=0.037 af Inflow=13.95 cfs 0.504 af
Outflow=13.14 cfs 0.504 af

Pond Det 3: Underground Detention Pipe Peak Elev=217.67' Storage=0.027 af Inflow=6.46 cfs 0.510 af
Outflow=6.33 cfs 0.510 af

Pond Sandfilter: Sandfilter Peak Elev=217.45' Inflow=17.62 cfs 1.353 af
Primary=13.91 cfs 0.399 af Secondary=3.71 cfs 0.954 af Outflow=17.62 cfs 1.353 af

Link Pt. A: Point A Inflow=7.04 cfs 0.938 af
Primary=7.04 cfs 0.938 af

Link Pt. B: Point B Inflow=16.75 cfs 1.458 af
Primary=16.75 cfs 1.458 af

Link Pt.C: Point C Inflow=7.01 cfs 0.560 af
Primary=7.01 cfs 0.560 af

Total Runoff Area = 9.590 ac Runoff Volume = 2.957 af Average Runoff Depth = 3.70"
38.10% Pervious = 3.654 ac 61.90% Impervious = 5.936 ac

Summary for Subcatchment Bio: Bioretention DA

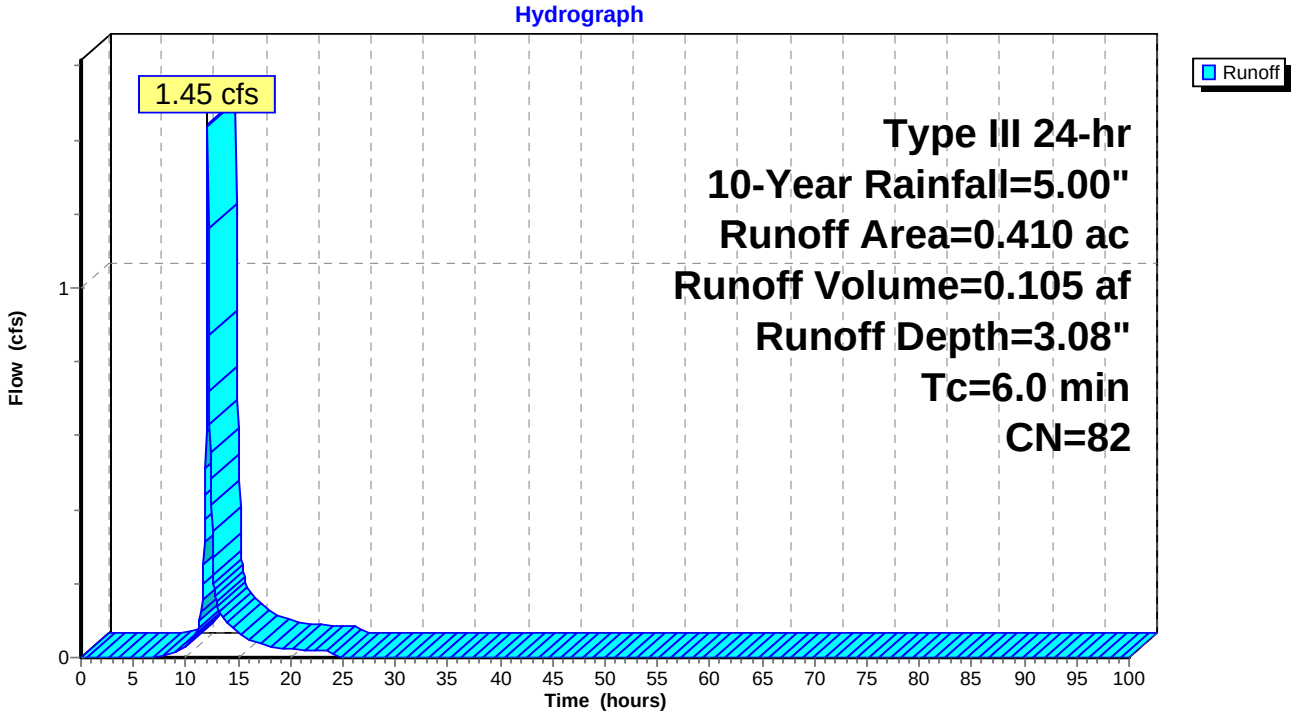
Runoff = 1.45 cfs @ 12.09 hrs, Volume= 0.105 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.278	74	>75% Grass cover, Good, HSG C
0.132	98	Paved parking, HSG C
0.410	82	Weighted Average
0.278		67.80% Pervious Area
0.132		32.20% Impervious Area

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

Subcatchment Bio: Bioretention DA



Summary for Subcatchment PR-1-BLDG: Building

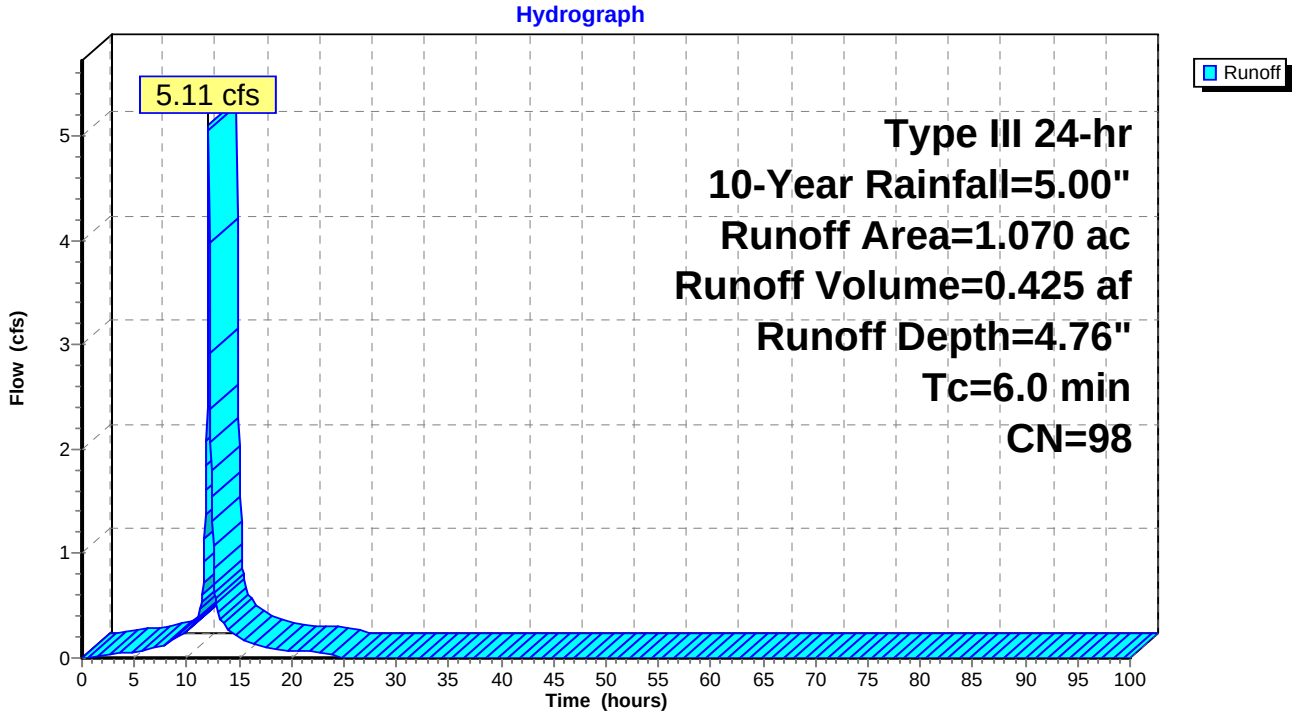
Runoff = 5.11 cfs @ 12.09 hrs, Volume= 0.425 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
1.070	98	Roofs, HSG B
1.070		100.00% Impervious Area

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

Subcatchment PR-1-BLDG: Building



Summary for Subcatchment PR-1-DA: Drainage Area 1

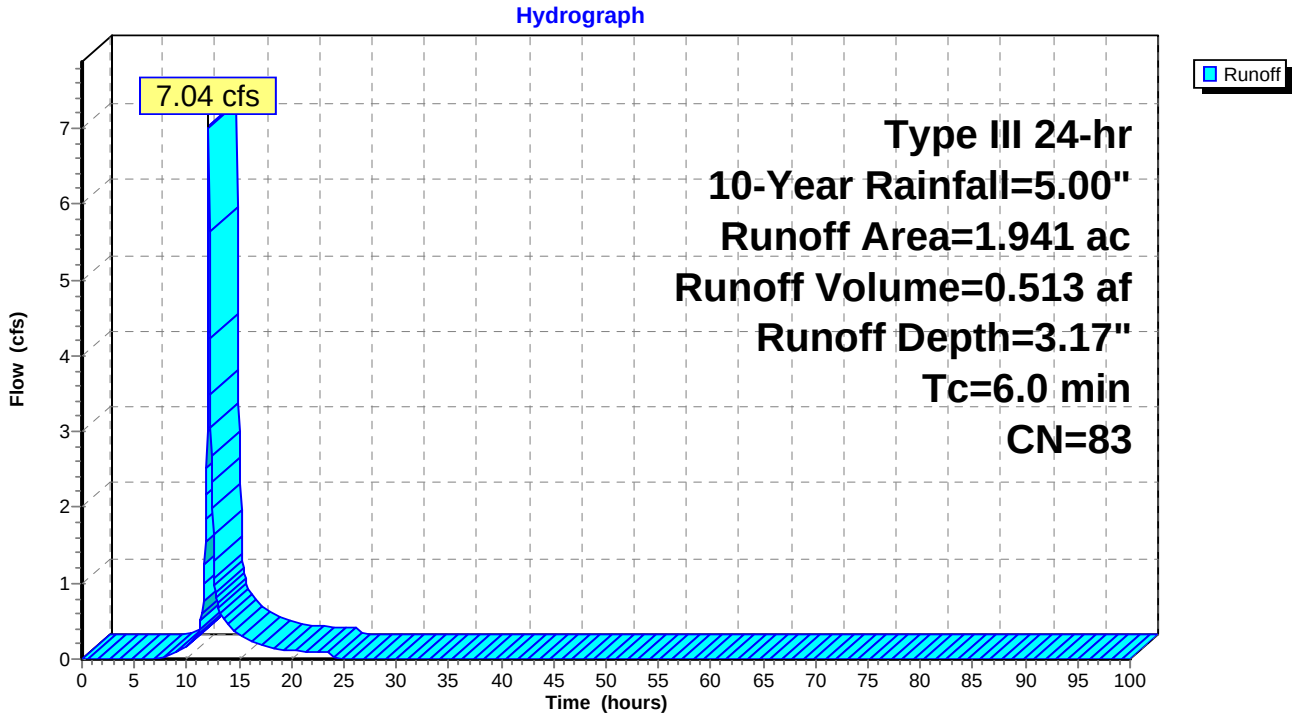
Runoff = 7.04 cfs @ 12.09 hrs, Volume= 0.513 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
1.000	74	>75% Grass cover, Good, HSG C
0.773	98	Paved parking, HSG C
0.168	70	Woods, Good, HSG C
1.941	83	Weighted Average
1.168		60.18% Pervious Area
0.773		39.82% Impervious Area

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

Subcatchment PR-1-DA: Drainage Area 1



Summary for Subcatchment PR-2-Bldg: Building

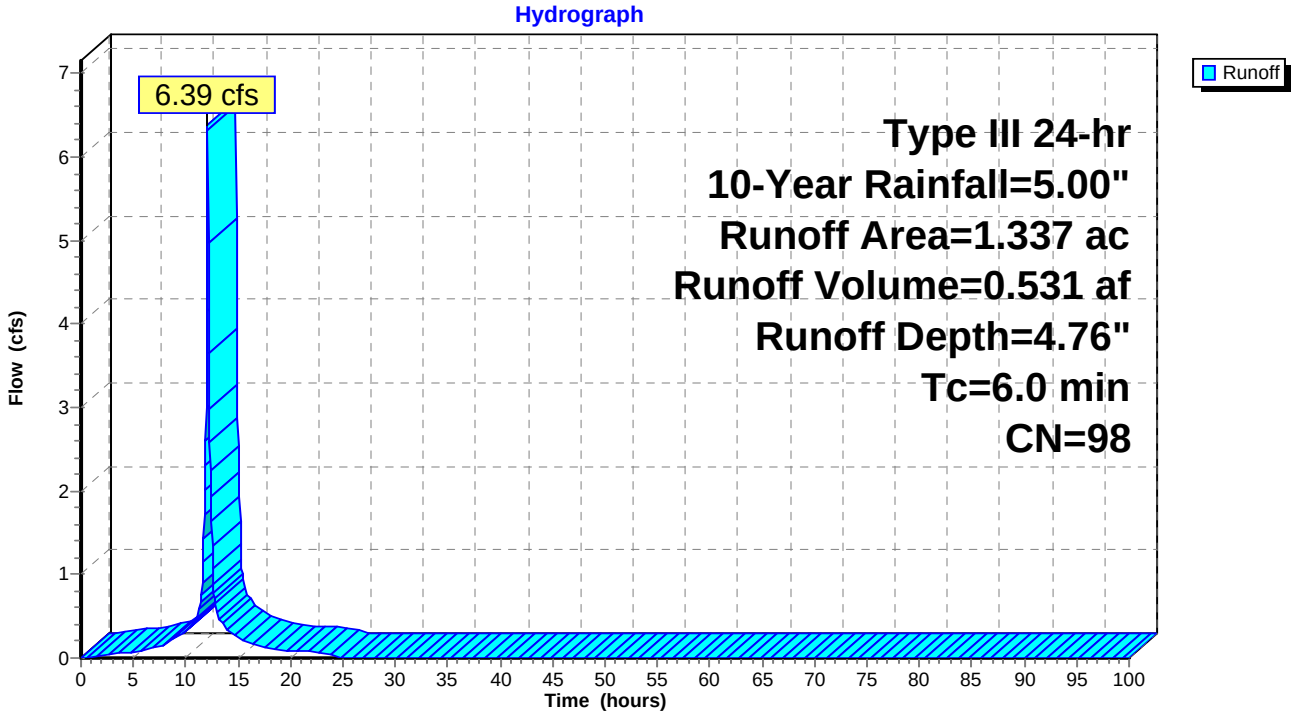
Runoff = 6.39 cfs @ 12.09 hrs, Volume= 0.531 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.025	98	Roofs, HSG B
1.312	98	Roofs, HSG C
1.337	98	Weighted Average
1.337		100.00% Impervious Area

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

Subcatchment PR-2-Bldg: Building



Summary for Subcatchment PR-2-DA: Drainage Area 2

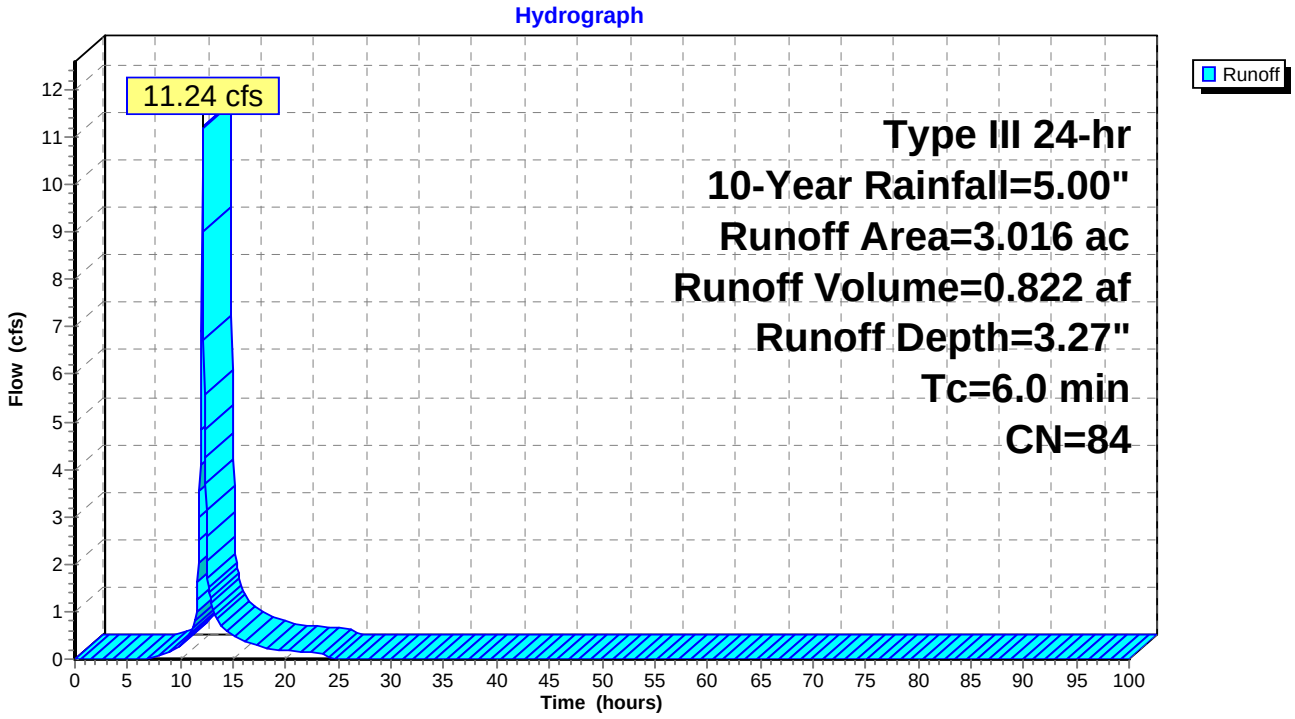
Runoff = 11.24 cfs @ 12.09 hrs, Volume= 0.822 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.495	61	>75% Grass cover, Good, HSG B
0.790	74	>75% Grass cover, Good, HSG C
1.556	98	Paved parking, HSG C
0.126	70	Woods, Good, HSG C
0.049	55	Woods, Good, HSG B
3.016	84	Weighted Average
1.460		48.41% Pervious Area
1.556		51.59% Impervious Area

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

Subcatchment PR-2-DA: Drainage Area 2



Summary for Subcatchment PR-3-BLDG: Building

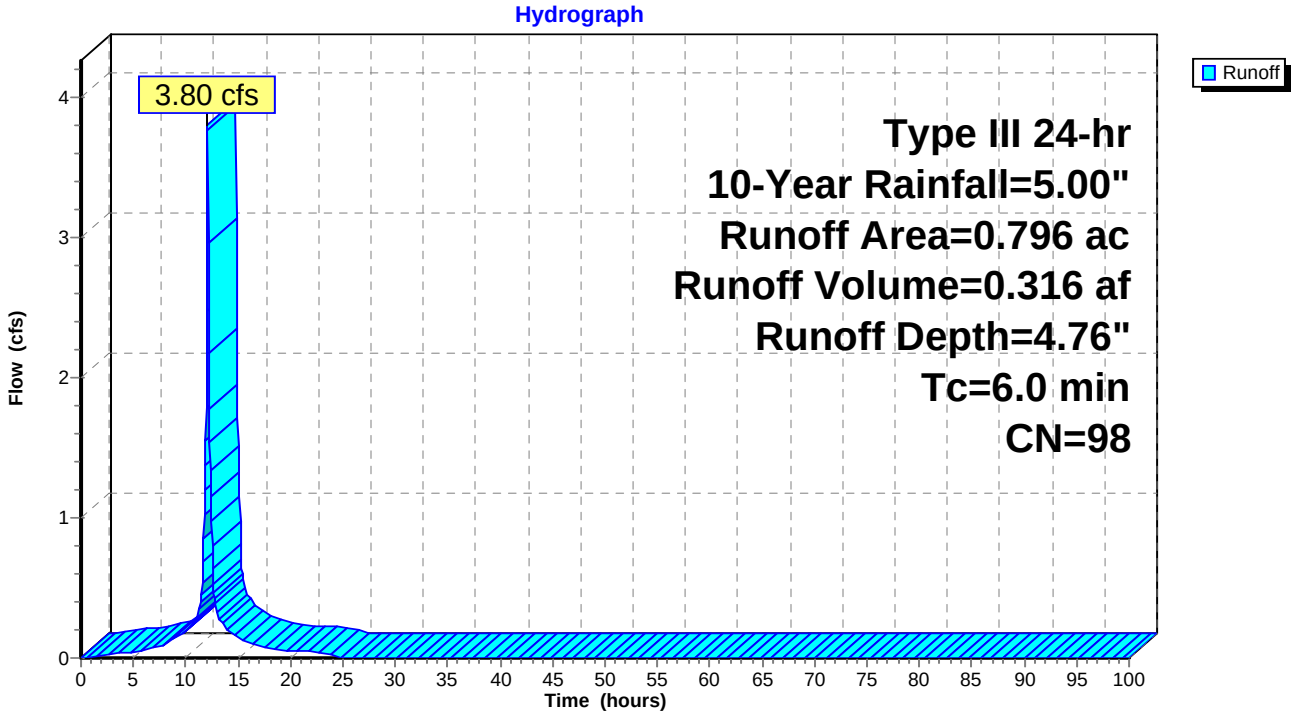
Runoff = 3.80 cfs @ 12.09 hrs, Volume= 0.316 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.796	98	Roofs, HSG C
0.796		100.00% Impervious Area

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

Subcatchment PR-3-BLDG: Building



Summary for Subcatchment PR-3-CY: Drainage Area Courtyard

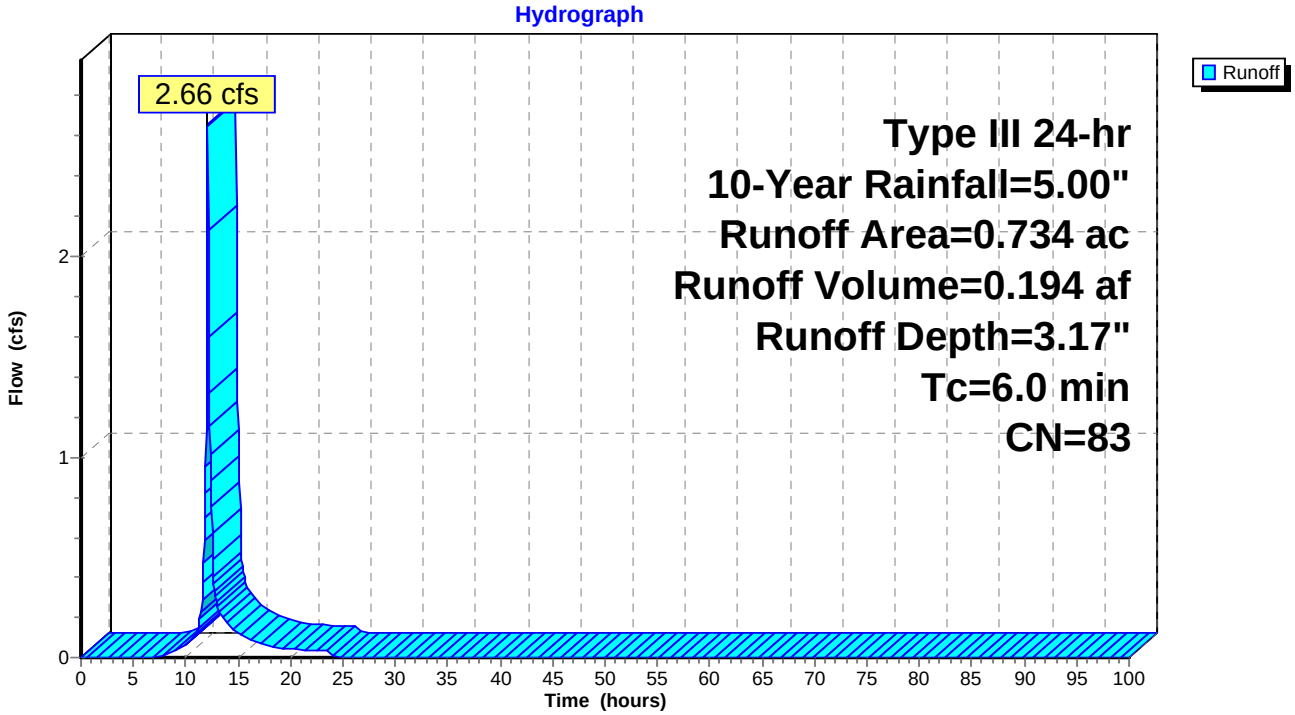
Runoff = 2.66 cfs @ 12.09 hrs, Volume= 0.194 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.462	74	>75% Grass cover, Good, HSG C
0.272	98	Paved parking, HSG C
0.734	83	Weighted Average
0.462		62.94% Pervious Area
0.272		37.06% Impervious Area

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

Subcatchment PR-3-CY: Drainage Area Courtyard



Summary for Subcatchment PR-3-DA: Drainage Area 3

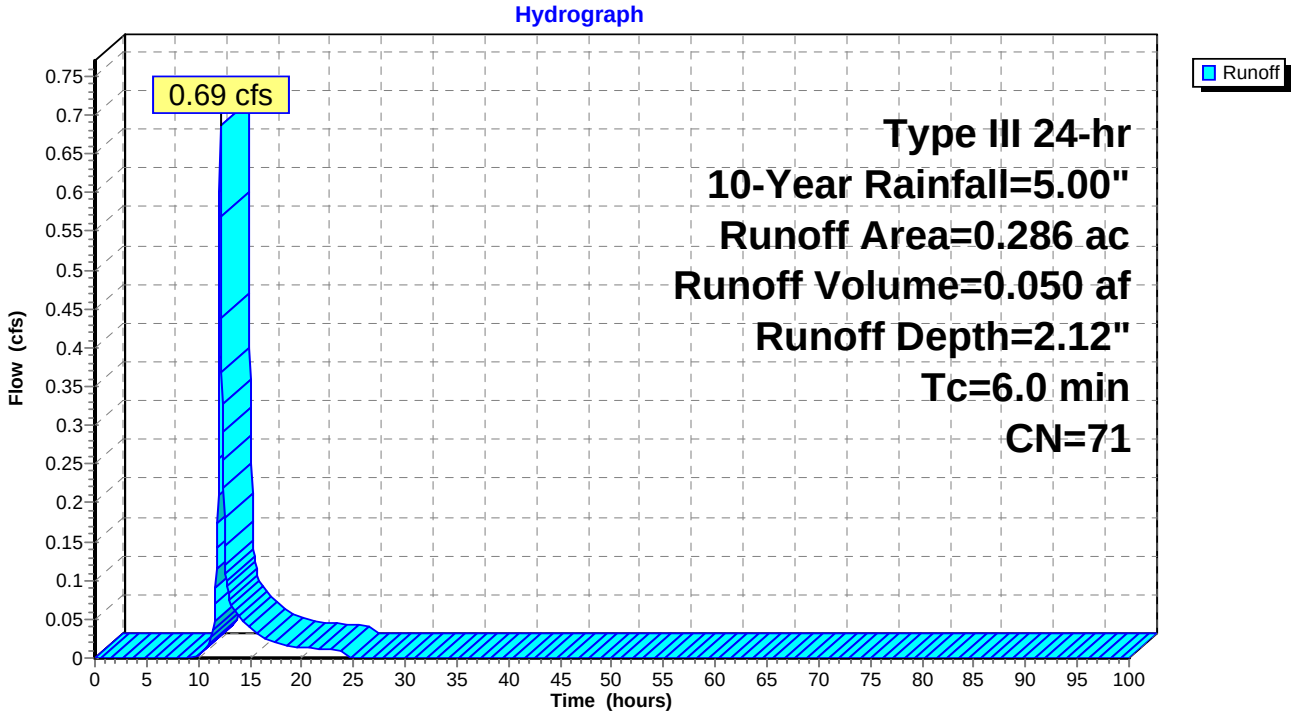
Runoff = 0.69 cfs @ 12.10 hrs, Volume= 0.050 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.236	70	Woods, Good, HSG C
0.286	71	Weighted Average
0.286		100.00% Pervious Area

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

Subcatchment PR-3-DA: Drainage Area 3



Summary for Pond Bio Basin: Bioretention

Inflow Area = 0.410 ac, 32.20% Impervious, Inflow Depth = 3.08" for 10-Year event
Inflow = 1.45 cfs @ 12.09 hrs, Volume= 0.105 af
Outflow = 1.00 cfs @ 12.20 hrs, Volume= 0.105 af, Atten= 31%, Lag= 6.3 min
Primary = 1.00 cfs @ 12.20 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 225.58' @ 12.20 hrs Surf.Area= 0.045 ac Storage= 0.024 af

Plug-Flow detention time= 60.6 min calculated for 0.105 af (100% of inflow)
Center-of-Mass det. time= 60.6 min (876.9 - 816.3)

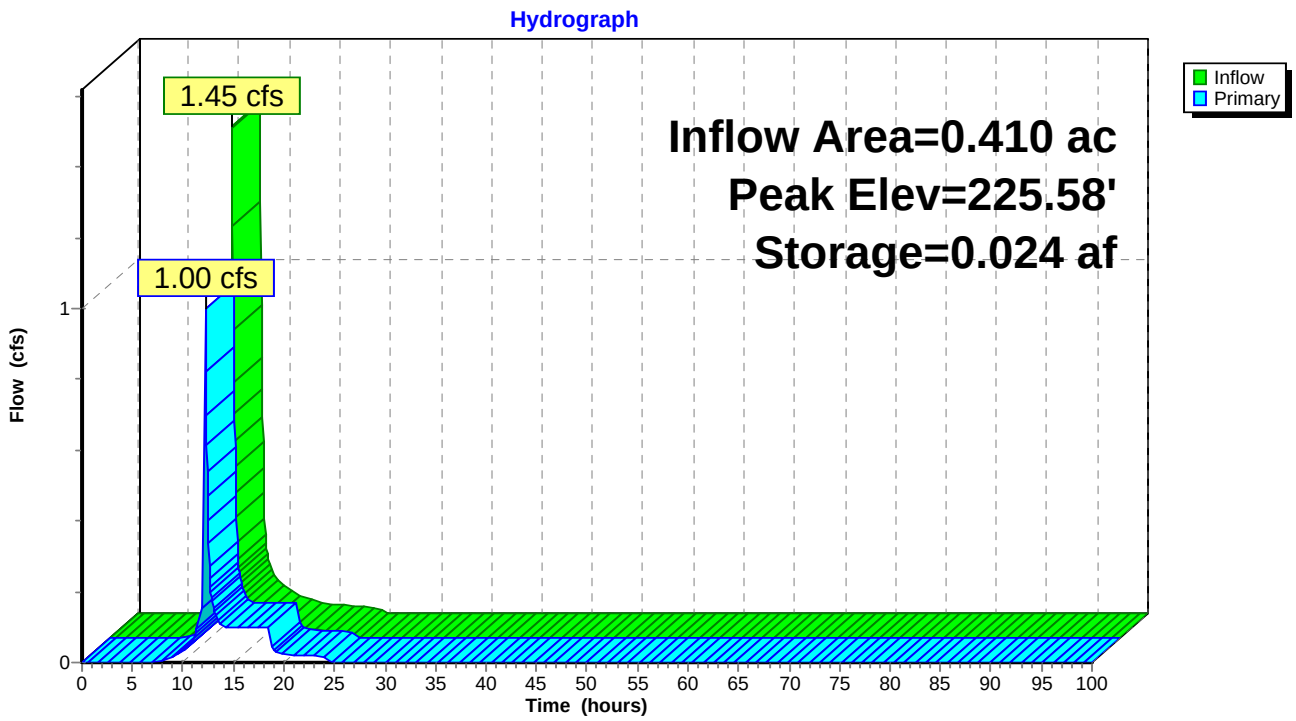
Volume	Invert	Avail.Storage	Storage Description
#1	225.00'	0.070 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
225.00	0.038	0.000	0.000
226.00	0.051	0.044	0.044
226.50	0.051	0.025	0.070

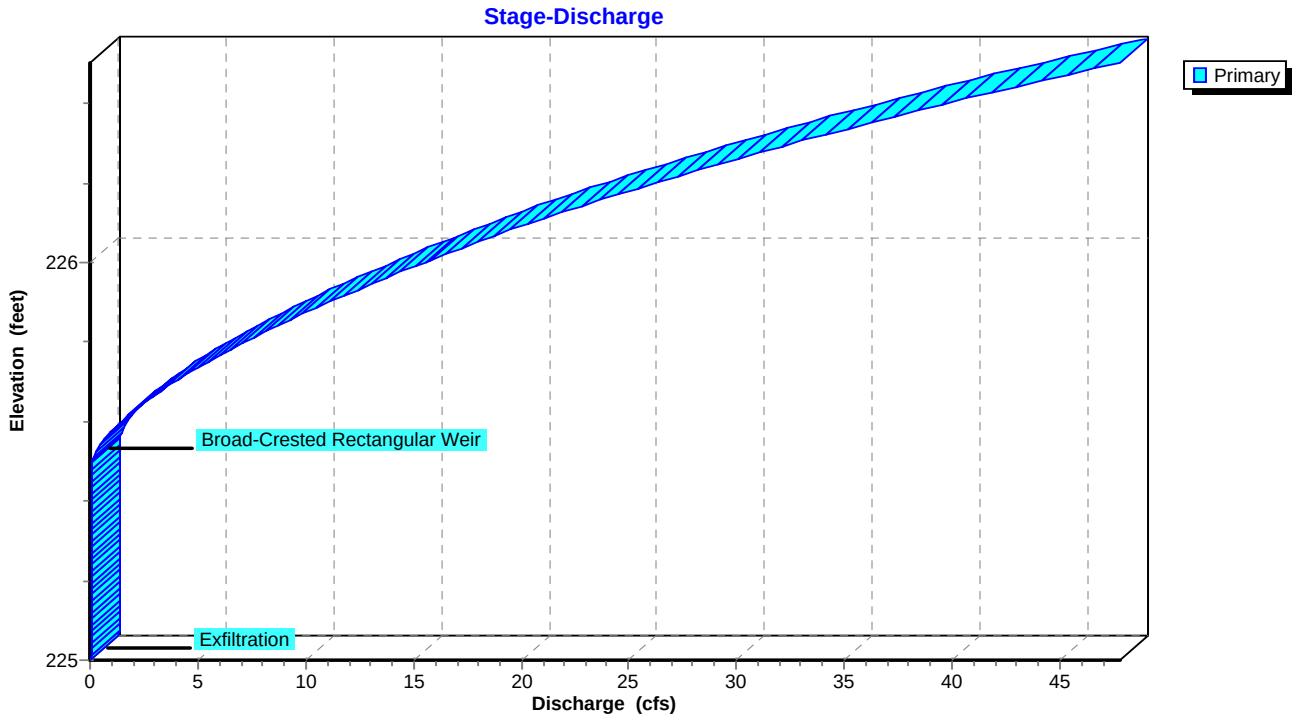
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	**0.10 cfs Exfiltration at all elevations**
#2	Primary	225.50'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.99 cfs @ 12.20 hrs HW=225.58' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.89 cfs @ 0.74 fps)

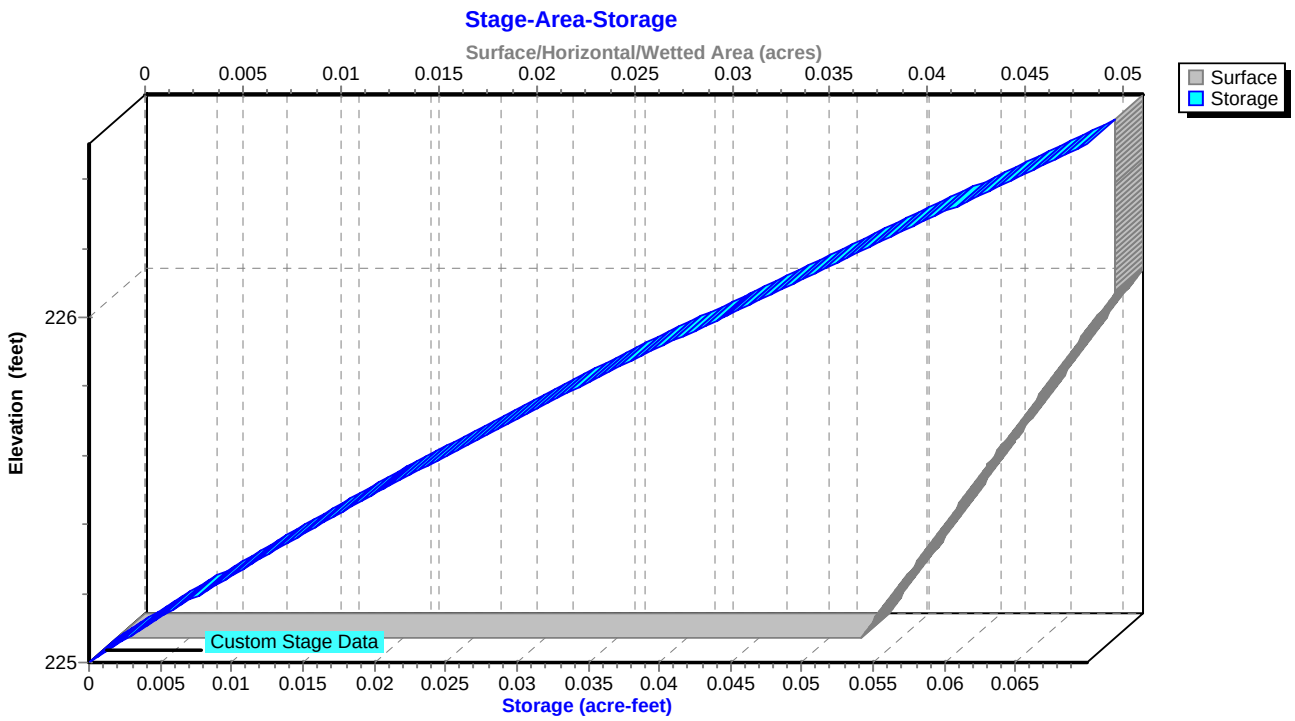
Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Summary for Pond Det 1: Detention Basin

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 3.74" for 10-Year event
Inflow = 12.15 cfs @ 12.09 hrs, Volume= 0.938 af
Outflow = 7.04 cfs @ 12.21 hrs, Volume= 0.938 af, Atten= 42%, Lag= 7.5 min
Primary = 7.04 cfs @ 12.21 hrs, Volume= 0.938 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 197.31' @ 12.21 hrs Surf.Area= 0.077 ac Storage= 0.189 af

Plug-Flow detention time= 28.6 min calculated for 0.938 af (100% of inflow)
Center-of-Mass det. time= 28.9 min (812.7 - 783.8)

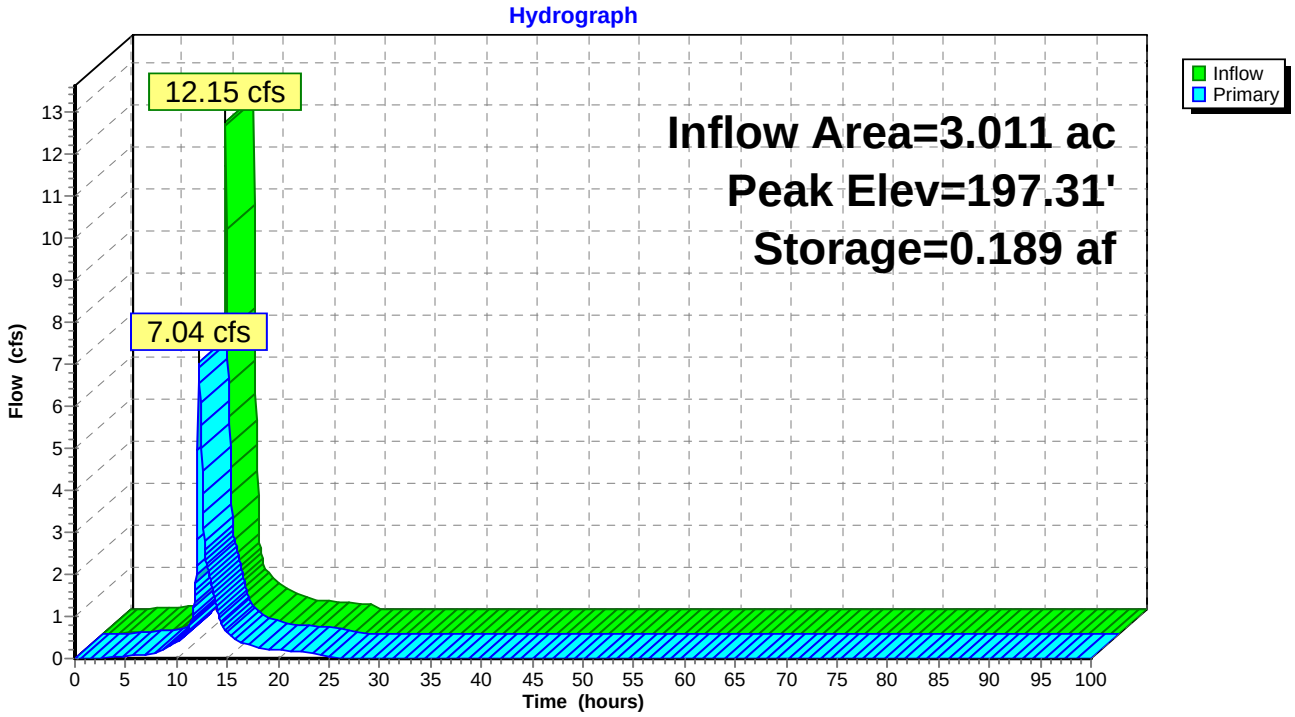
Volume	Invert	Avail.Storage	Storage Description
#1	194.00'	0.440 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
194.00	0.040	0.000	0.000
195.00	0.049	0.044	0.044
196.00	0.060	0.054	0.099
197.00	0.073	0.066	0.166
198.00	0.085	0.079	0.244
199.00	0.098	0.091	0.336
200.00	0.110	0.104	0.440

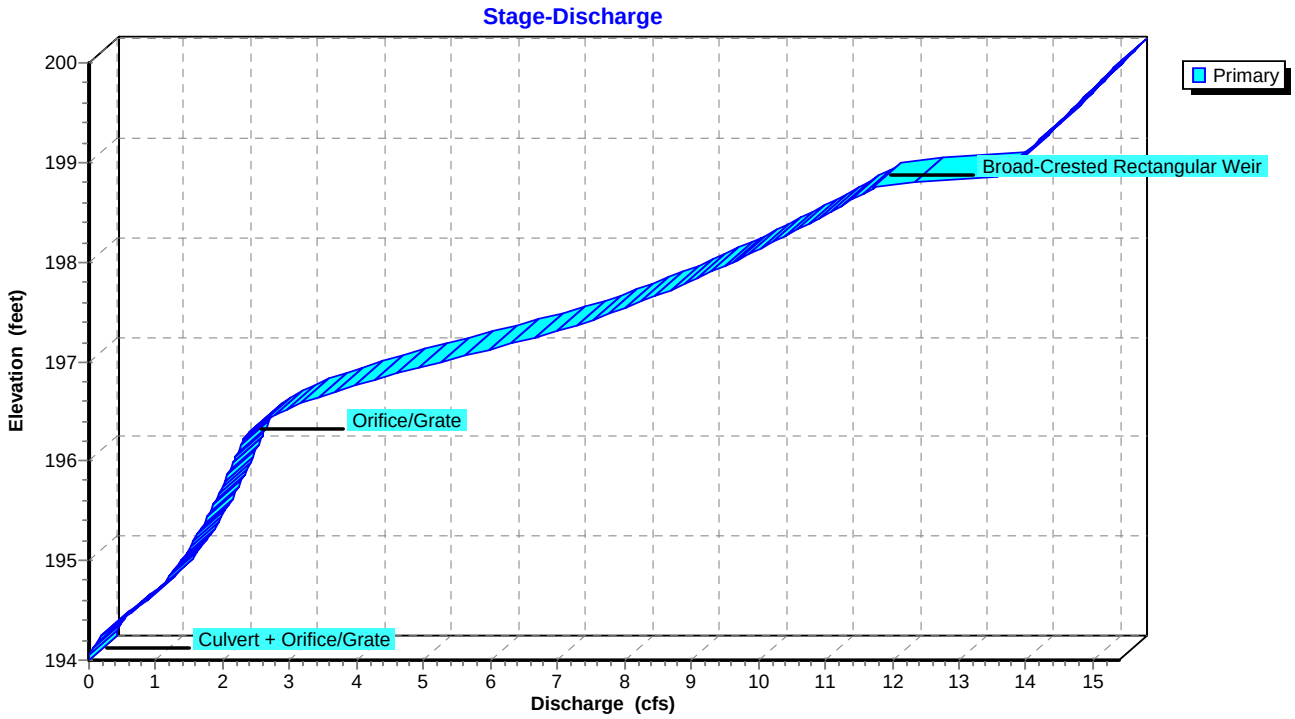
Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	**18.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 194.00' / 192.00' S= 0.0333 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	194.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	196.20'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	198.75'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=6.98 cfs @ 12.21 hrs HW=197.30' (Free Discharge)
└─**1=Culvert** (Passes 6.98 cfs of 10.73 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.90 cfs @ 8.29 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 4.09 cfs @ 3.57 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

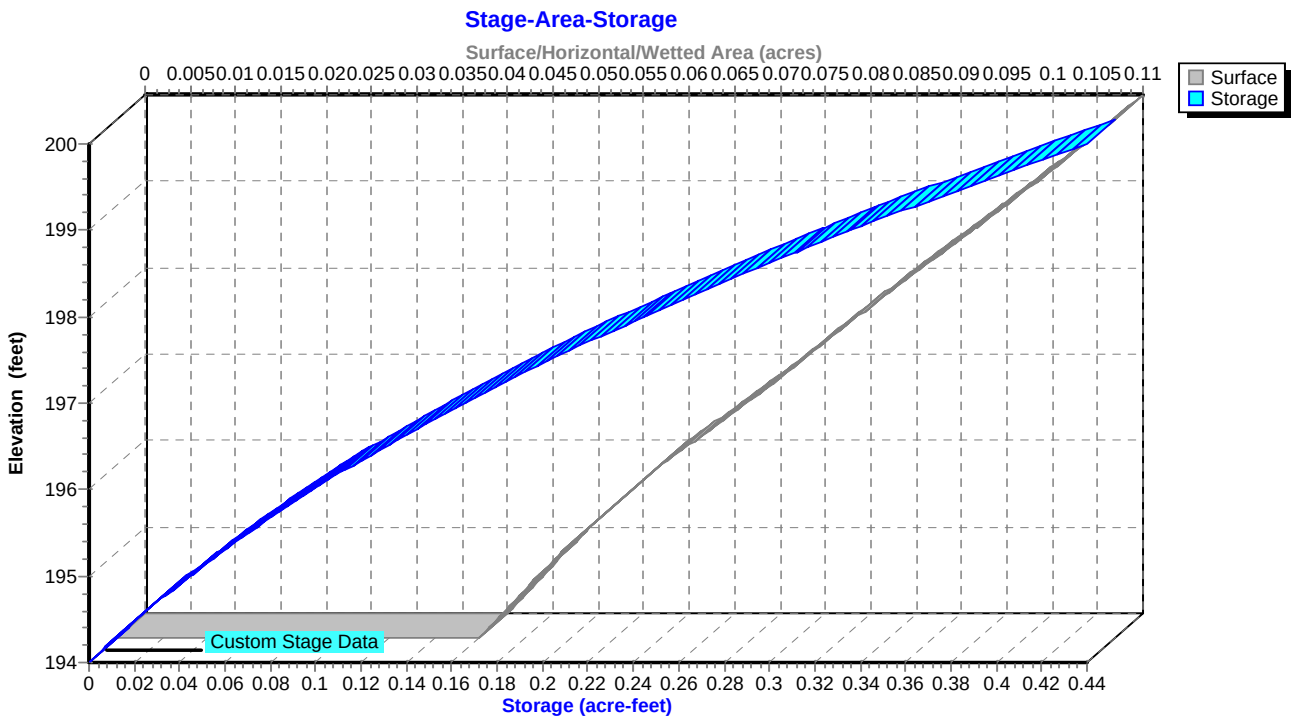
Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Summary for Pond Det 2: Detention Basin

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 1.27" for 10-Year event
Inflow = 13.95 cfs @ 12.09 hrs, Volume= 0.504 af
Outflow = 13.14 cfs @ 12.12 hrs, Volume= 0.504 af, Atten= 6%, Lag= 1.7 min
Primary = 13.14 cfs @ 12.12 hrs, Volume= 0.504 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 213.45' @ 12.12 hrs Surf.Area= 0.022 ac Storage= 0.037 af

Plug-Flow detention time= 3.3 min calculated for 0.504 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (761.2 - 758.3)

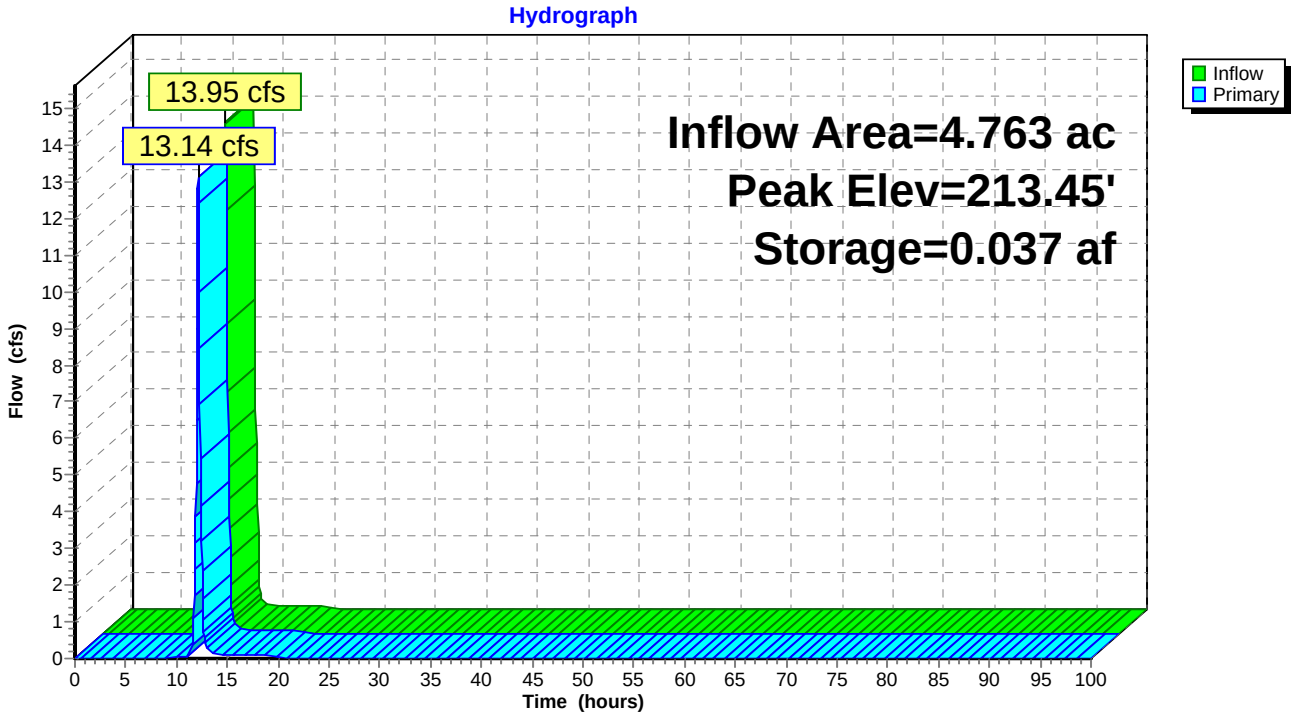
Volume	Invert	Avail.Storage	Storage Description
#1	211.00'	0.116 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
211.00	0.009	0.000	0.000
212.00	0.014	0.012	0.012
213.00	0.019	0.016	0.028
214.00	0.026	0.022	0.050
215.00	0.033	0.029	0.080
216.00	0.040	0.036	0.116

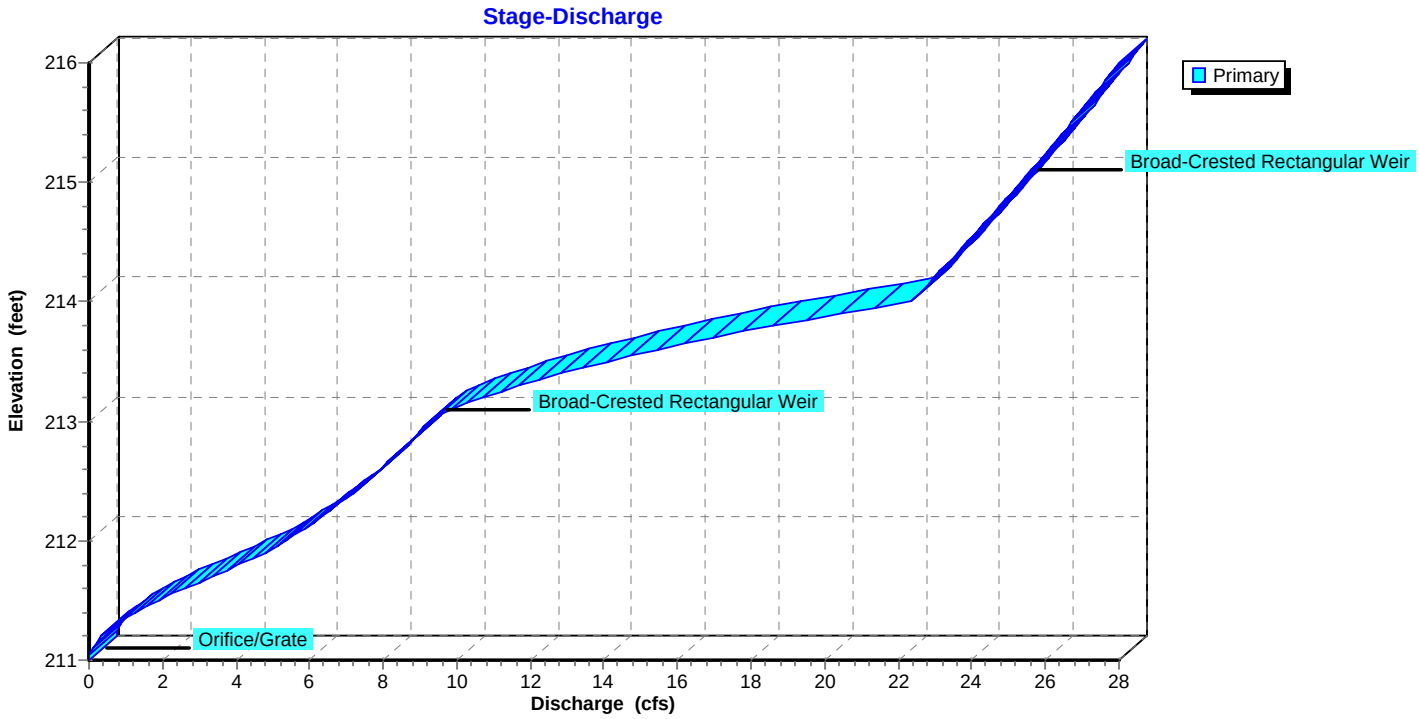
Device	Routing	Invert	Outlet Devices
#1	Primary	209.50'	**24.0" Round Culvert** L= 65.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 209.50' / 205.00' S= 0.0692 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	211.00'	**12.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	213.00'	**3.5' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#4	Device 1	215.00'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=12.63 cfs @ 12.12 hrs HW=213.38' (Free Discharge)
└─**1=Culvert** (Passes 12.63 cfs of 20.28 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 10.38 cfs @ 6.61 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Weir Controls 2.26 cfs @ 1.68 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

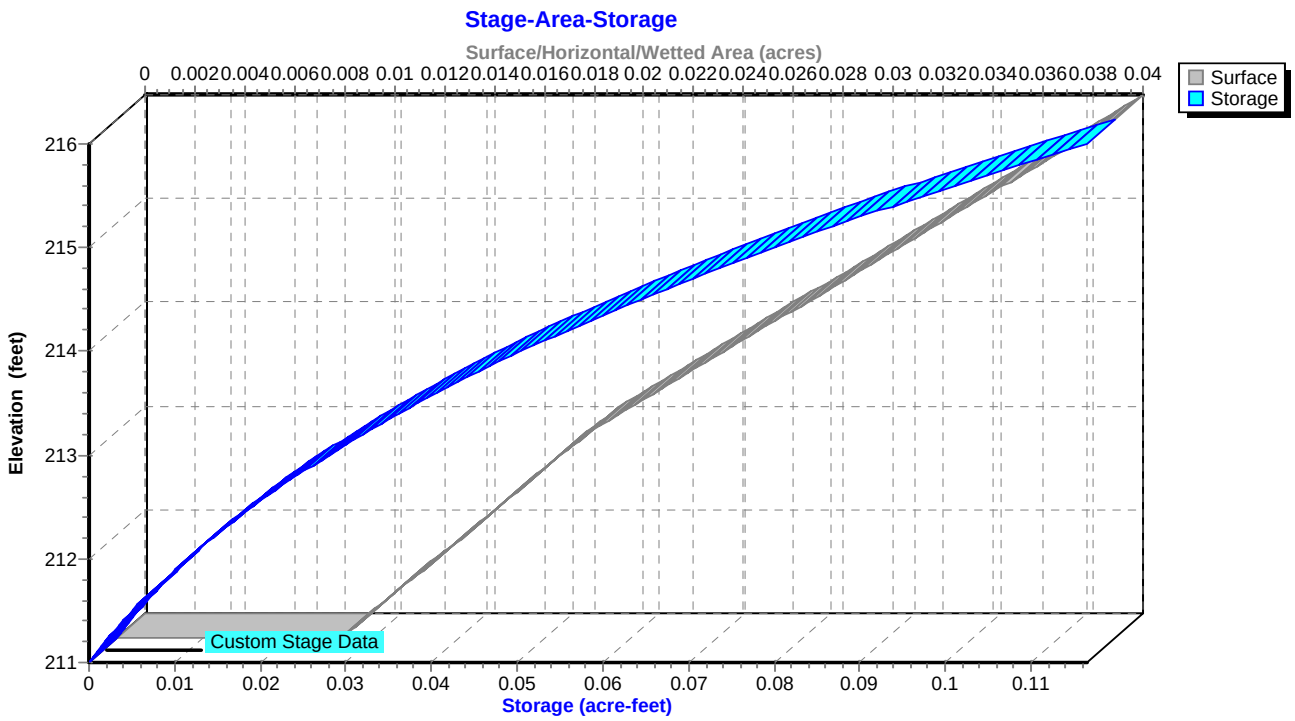
Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Summary for Pond Det 3: Underground Detention Pipe

Inflow Area = 1.530 ac, 69.80% Impervious, Inflow Depth = 4.00" for 10-Year event
Inflow = 6.46 cfs @ 12.09 hrs, Volume= 0.510 af
Outflow = 6.33 cfs @ 12.10 hrs, Volume= 0.510 af, Atten= 2%, Lag= 0.5 min
Primary = 6.33 cfs @ 12.10 hrs, Volume= 0.510 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 217.67' @ 12.10 hrs Surf.Area= 0.010 ac Storage= 0.027 af

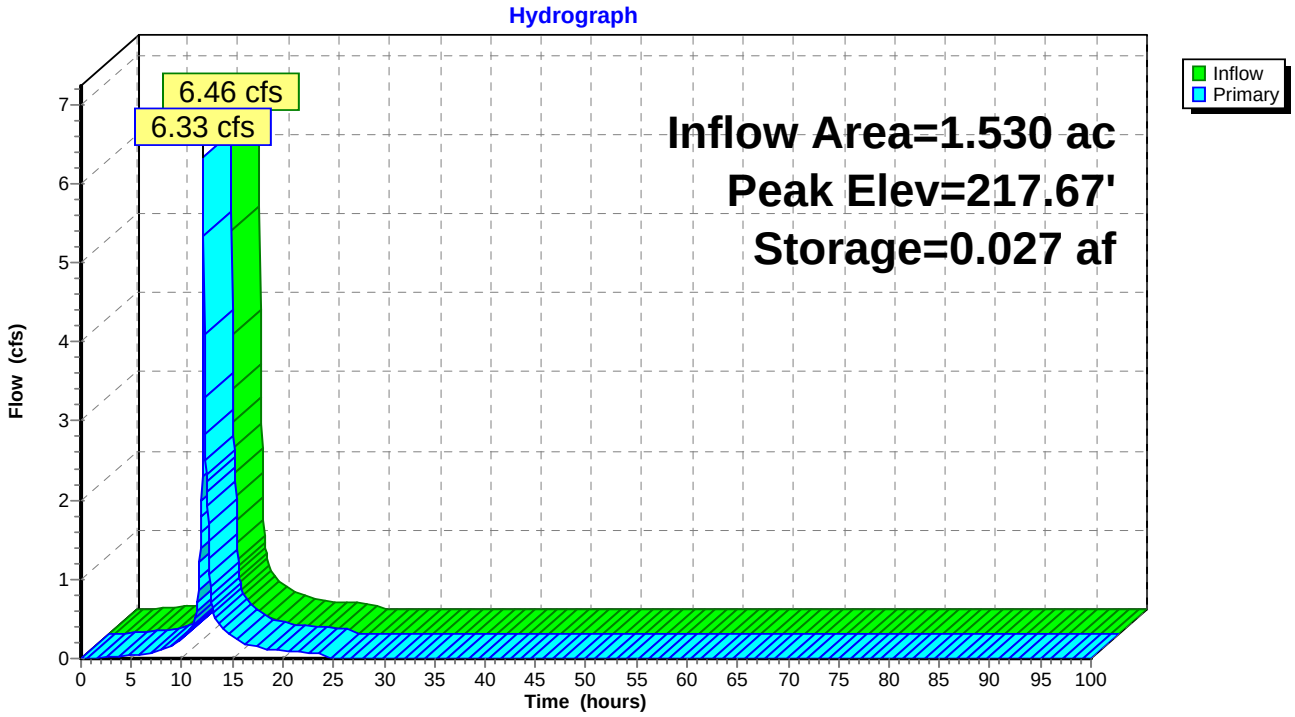
Plug-Flow detention time= 4.8 min calculated for 0.509 af (100% of inflow)
Center-of-Mass det. time= 4.3 min (777.2 - 772.9)

Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.033 af	**42.0" Round Pipe Storage** x 2 L= 75.0'

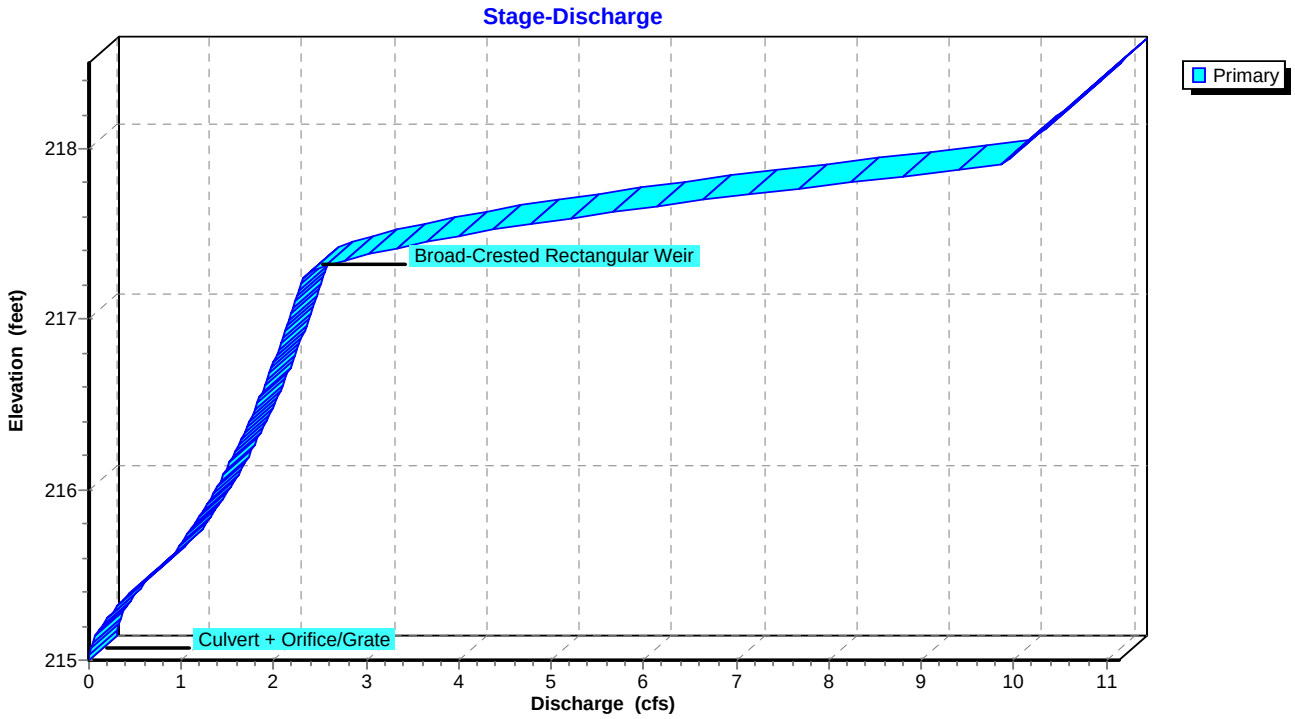
Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 36.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.00' / 214.50' S= 0.0139 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	215.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	217.25'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=6.27 cfs @ 12.10 hrs HW=217.67' (Free Discharge)
└─**1=Culvert** (Passes 6.27 cfs of 9.31 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.57 cfs @ 7.36 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 3.70 cfs @ 1.76 fps)

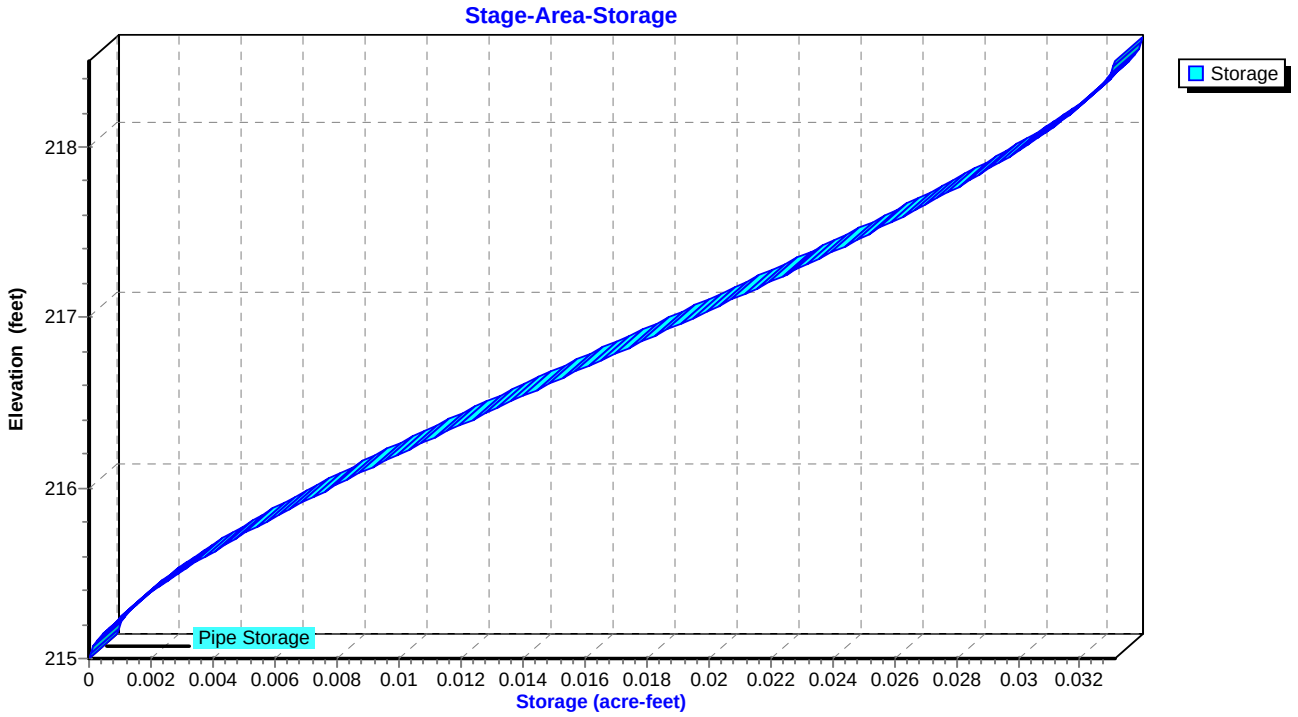
Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Summary for Pond Sandfilter: Sandfilter

Inflow Area =	4.353 ac, 66.46% Impervious, Inflow Depth = 3.73" for 10-Year event				
Inflow =	17.62 cfs @	12.09 hrs,	Volume=	1.353 af	
Outflow =	17.62 cfs @	12.09 hrs,	Volume=	1.353 af,	Atten= 0%, Lag= 0.0 min
Primary =	13.91 cfs @	12.09 hrs,	Volume=	0.399 af	
Secondary =	3.71 cfs @	12.09 hrs,	Volume=	0.954 af	

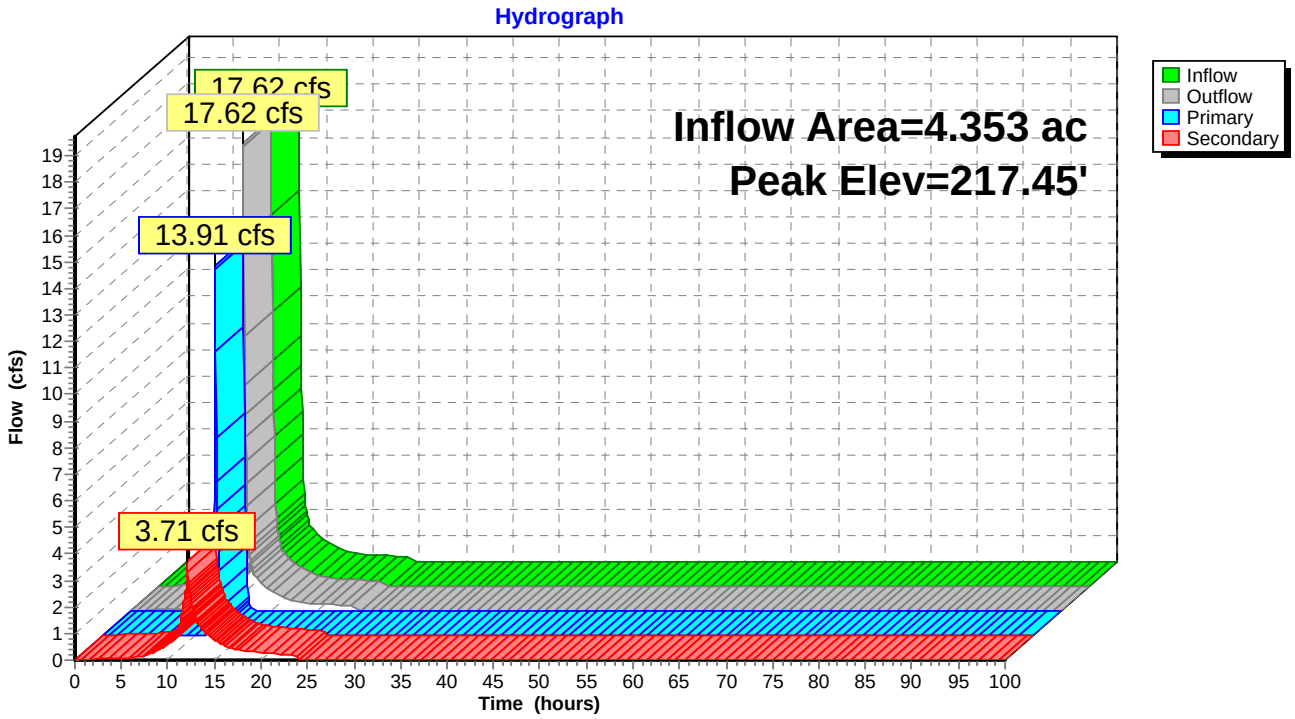
Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 217.45' @ 12.09 hrs
Flood Elev= 221.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 88.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 215.00' / 212.00' S= 0.0341 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	214.00'	**8.0" Round Culvert** L= 9.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 214.00' / 213.80' S= 0.0222 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

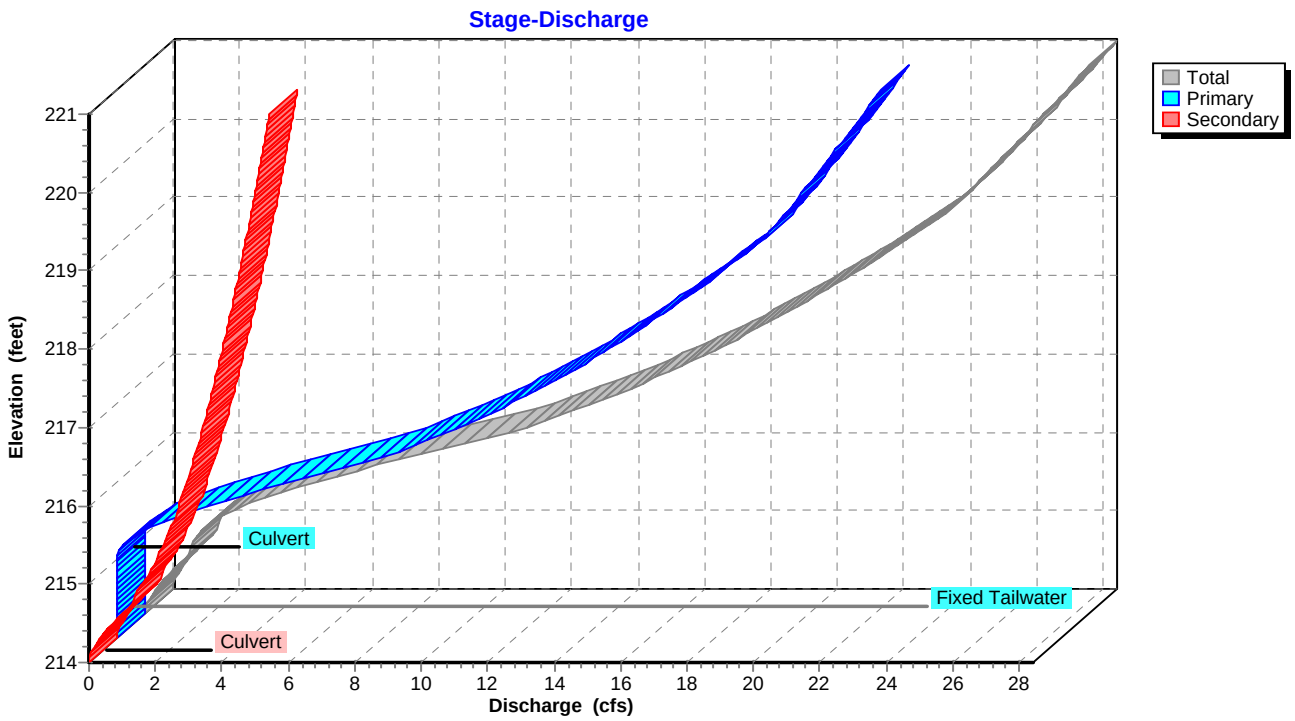
Primary OutFlow Max=13.55 cfs @ 12.09 hrs HW=217.37' TW=214.24' (Fixed TW Elev= 214.24')
└─**1=Culvert** (Inlet Controls 13.55 cfs @ 7.67 fps)

Secondary OutFlow Max=3.66 cfs @ 12.09 hrs HW=217.37' (Free Discharge)
└─**2=Culvert** (Inlet Controls 3.66 cfs @ 10.50 fps)

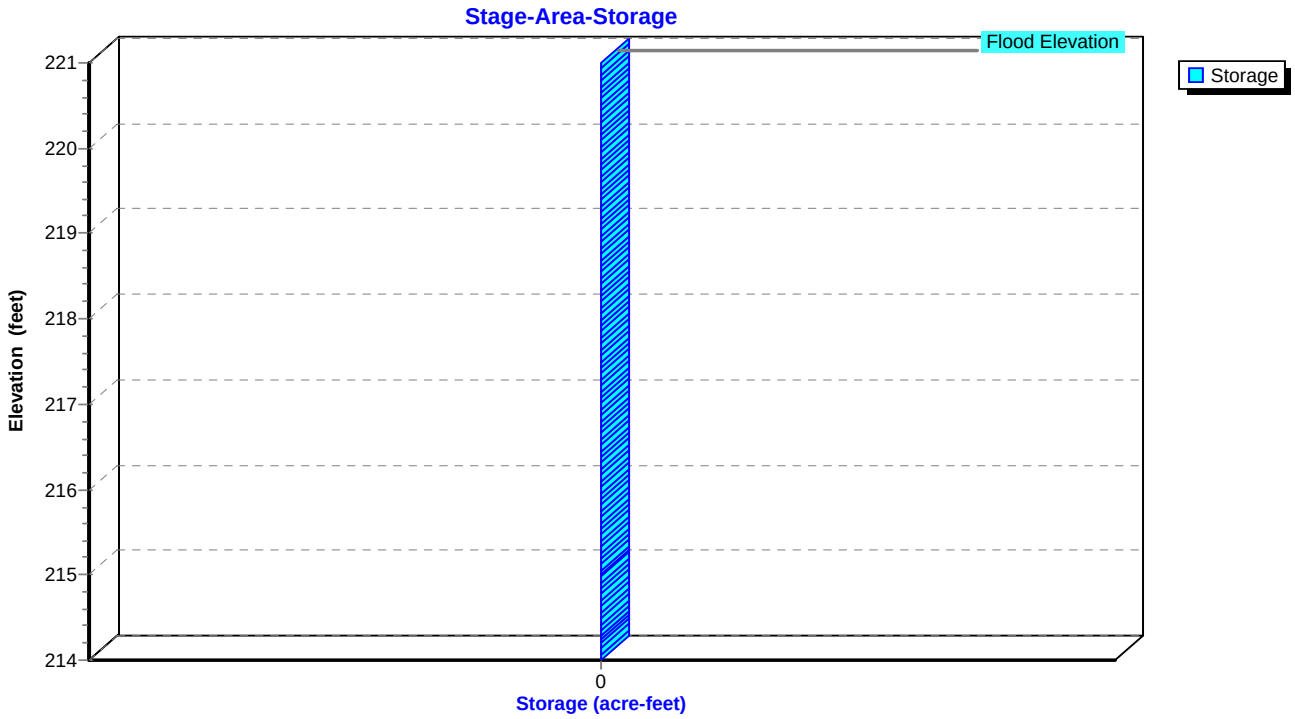
Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter

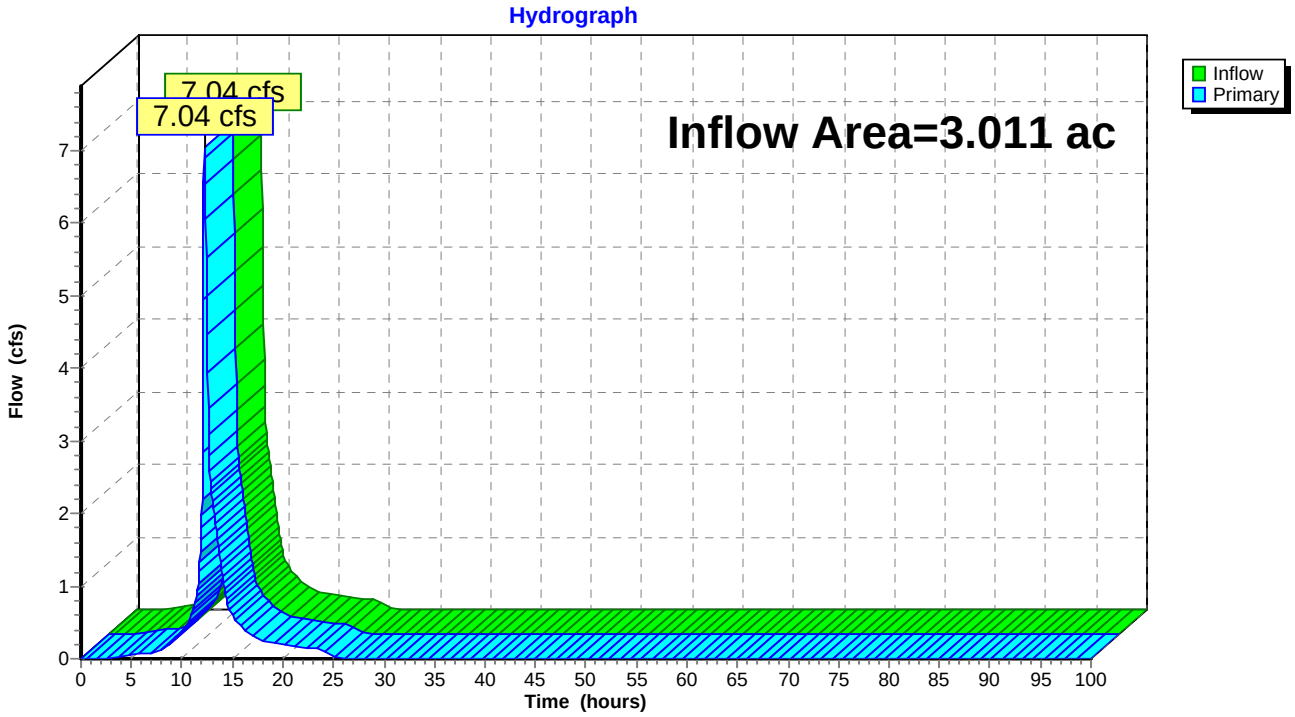


Summary for Link Pt. A: Point A

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 3.74" for 10-Year event
Inflow = 7.04 cfs @ 12.21 hrs, Volume= 0.938 af
Primary = 7.04 cfs @ 12.21 hrs, Volume= 0.938 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

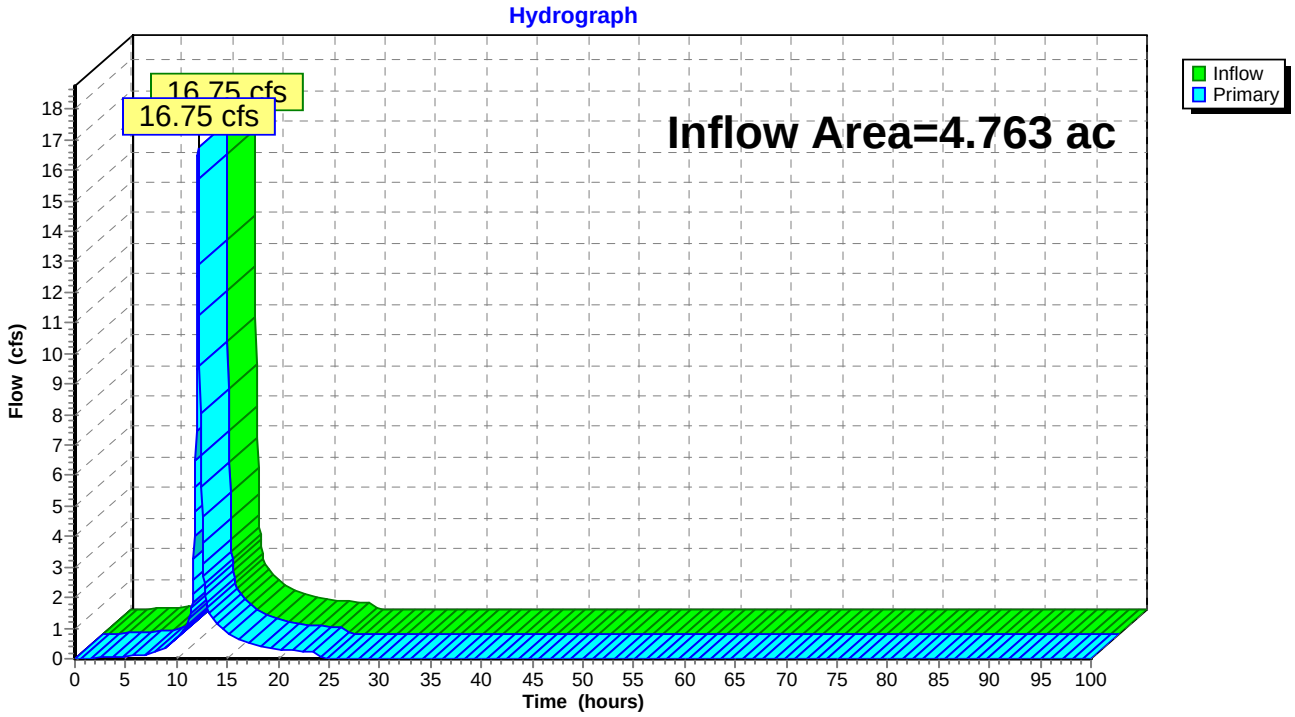


Summary for Link Pt. B: Point B

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 3.67" for 10-Year event
Inflow = 16.75 cfs @ 12.12 hrs, Volume= 1.458 af
Primary = 16.75 cfs @ 12.12 hrs, Volume= 1.458 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

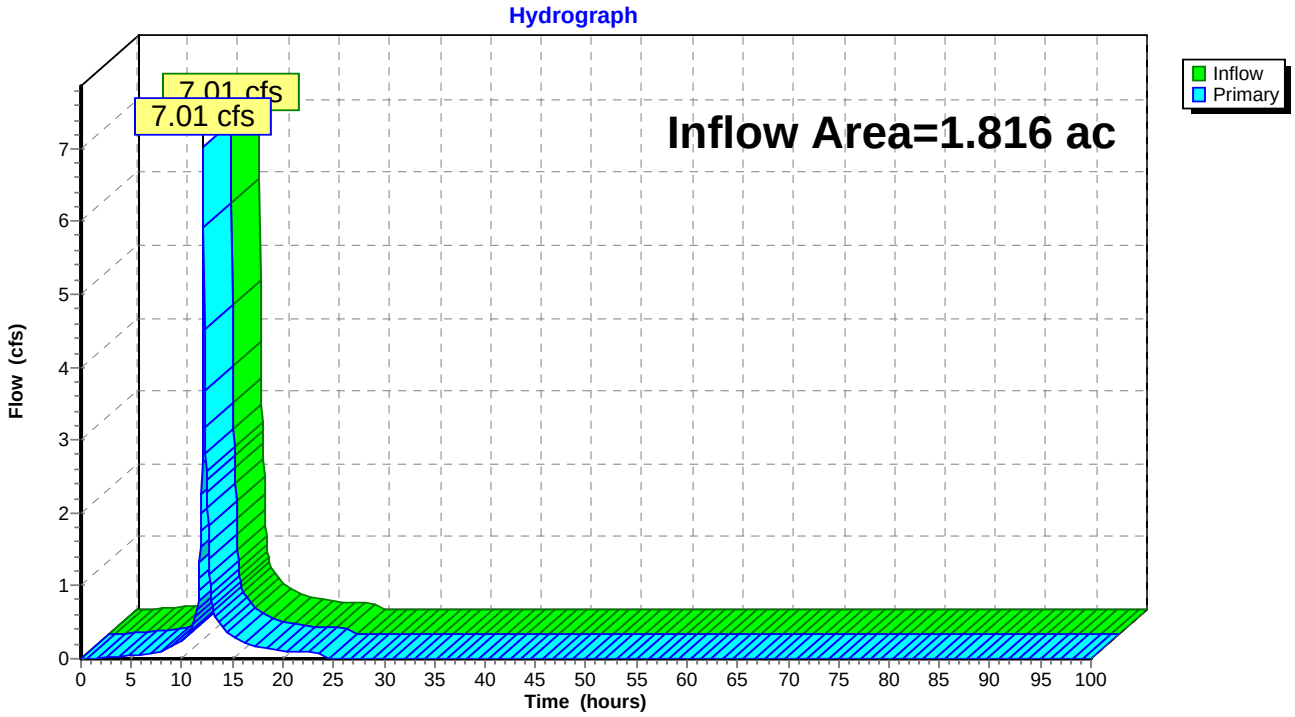


Summary for Link Pt.C: Point C

Inflow Area = 1.816 ac, 58.81% Impervious, Inflow Depth = 3.70" for 10-Year event
Inflow = 7.01 cfs @ 12.10 hrs, Volume= 0.560 af
Primary = 7.01 cfs @ 12.10 hrs, Volume= 0.560 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 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 Bio: Bioretention DA Runoff Area=0.410 ac 32.20% Impervious Runoff Depth=3.99"
Tc=6.0 min CN=82 Runoff=1.86 cfs 0.136 af

Subcatchment PR-1-BLDG: Building Runoff Area=1.070 ac 100.00% Impervious Runoff Depth=5.76"
Tc=6.0 min CN=98 Runoff=6.14 cfs 0.514 af

Subcatchment PR-1-DA: Drainage Area 1 Runoff Area=1.941 ac 39.82% Impervious Runoff Depth=4.09"
Tc=6.0 min CN=83 Runoff=9.00 cfs 0.662 af

Subcatchment PR-2-Bldg: Building Runoff Area=1.337 ac 100.00% Impervious Runoff Depth=5.76"
Tc=6.0 min CN=98 Runoff=7.68 cfs 0.642 af

Subcatchment PR-2-DA: Drainage Area 2 Runoff Area=3.016 ac 51.59% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=84 Runoff=14.30 cfs 1.055 af

Subcatchment PR-3-BLDG: Building Runoff Area=0.796 ac 100.00% Impervious Runoff Depth=5.76"
Tc=6.0 min CN=98 Runoff=4.57 cfs 0.382 af

Subcatchment PR-3-CY: Drainage Area Runoff Area=0.734 ac 37.06% Impervious Runoff Depth=4.09"
Tc=6.0 min CN=83 Runoff=3.40 cfs 0.250 af

Subcatchment PR-3-DA: Drainage Area 3 Runoff Area=0.286 ac 0.00% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=71 Runoff=0.95 cfs 0.069 af

Pond Bio Basin: Bioretention Peak Elev=225.61' Storage=0.026 af Inflow=1.86 cfs 0.136 af
Outflow=1.68 cfs 0.136 af

Pond Det 1: Detention Basin Peak Elev=197.78' Storage=0.226 af Inflow=15.14 cfs 1.176 af
Outflow=8.91 cfs 1.176 af

Pond Det 2: Detention Basin Peak Elev=213.78' Storage=0.045 af Inflow=19.10 cfs 0.686 af
Outflow=18.23 cfs 0.687 af

Pond Det 3: Underground Detention Pipe Peak Elev=217.77' Storage=0.028 af Inflow=7.97 cfs 0.632 af
Outflow=7.82 cfs 0.632 af

Pond Sandfilter: Sandfilter Peak Elev=218.50' Inflow=21.97 cfs 1.697 af
Primary=17.68 cfs 0.550 af Secondary=4.29 cfs 1.147 af Outflow=21.97 cfs 1.697 af

Link Pt. A: Point A Inflow=8.91 cfs 1.176 af
Primary=8.91 cfs 1.176 af

Link Pt. B: Point B Inflow=22.43 cfs 1.834 af
Primary=22.43 cfs 1.834 af

Link Pt.C: Point C Inflow=8.77 cfs 0.701 af
Primary=8.77 cfs 0.701 af

Total Runoff Area = 9.590 ac Runoff Volume = 3.710 af Average Runoff Depth = 4.64"
38.10% Pervious = 3.654 ac 61.90% Impervious = 5.936 ac

Summary for Subcatchment Bio: Bioretention DA

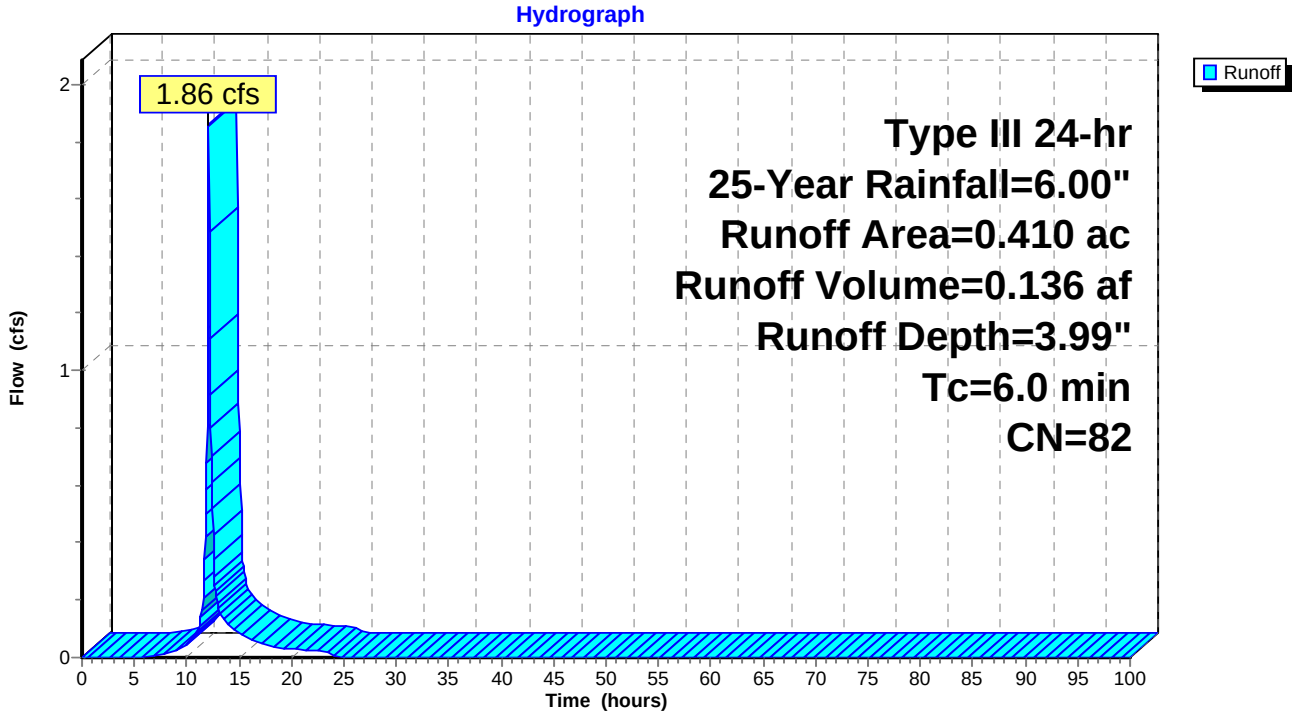
Runoff = 1.86 cfs @ 12.09 hrs, Volume= 0.136 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
0.278	74	>75% Grass cover, Good, HSG C
0.132	98	Paved parking, HSG C
0.410	82	Weighted Average
0.278		67.80% Pervious Area
0.132		32.20% Impervious Area

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

Subcatchment Bio: Bioretention DA



Summary for Subcatchment PR-1-BLDG: Building

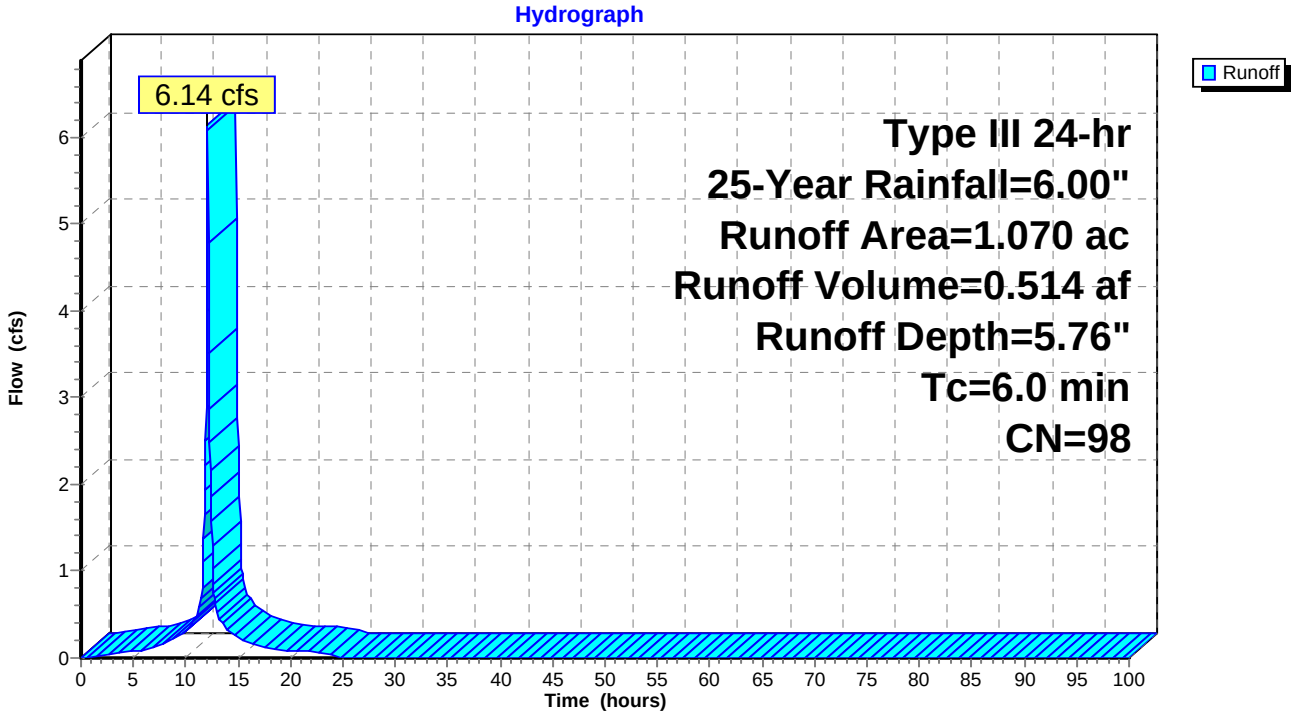
Runoff = 6.14 cfs @ 12.09 hrs, Volume= 0.514 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
1.070	98	Roofs, HSG B
1.070		100.00% Impervious Area

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

Subcatchment PR-1-BLDG: Building



Summary for Subcatchment PR-1-DA: Drainage Area 1

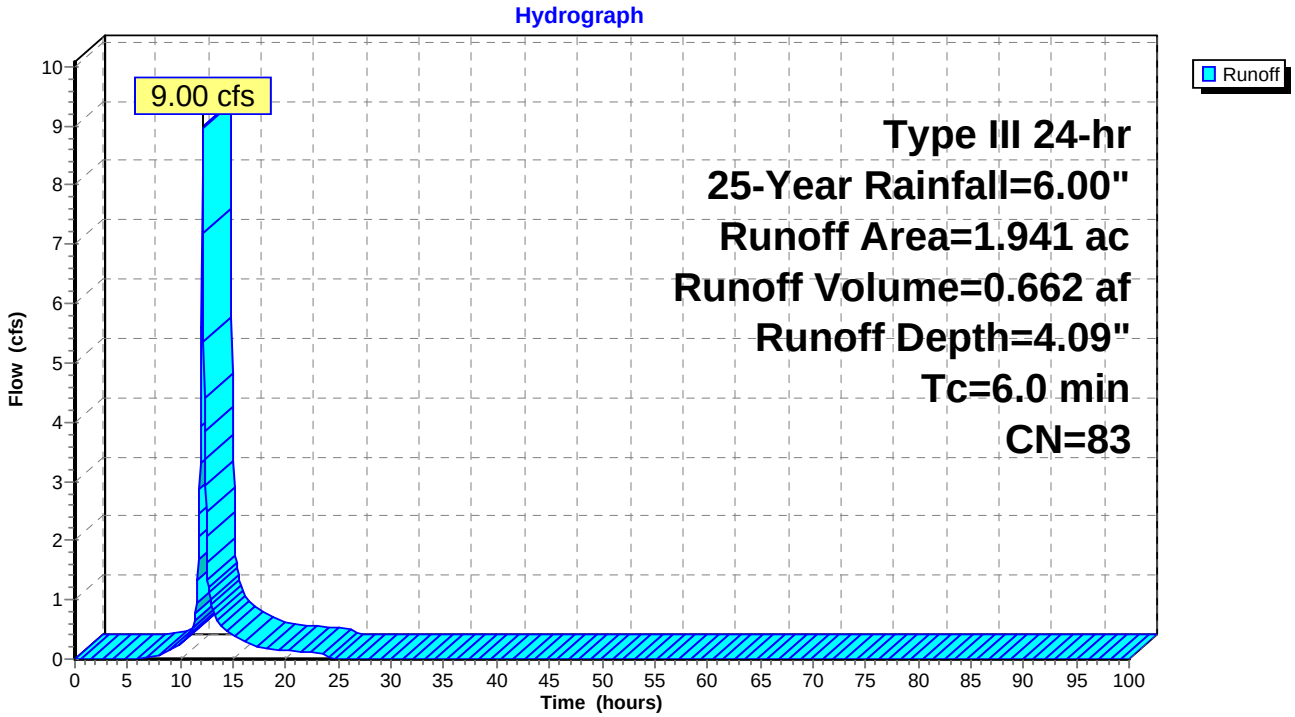
Runoff = 9.00 cfs @ 12.09 hrs, Volume= 0.662 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
1.000	74	>75% Grass cover, Good, HSG C
0.773	98	Paved parking, HSG C
0.168	70	Woods, Good, HSG C
1.941	83	Weighted Average
1.168		60.18% Pervious Area
0.773		39.82% Impervious Area

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

Subcatchment PR-1-DA: Drainage Area 1



Summary for Subcatchment PR-2-Bldg: Building

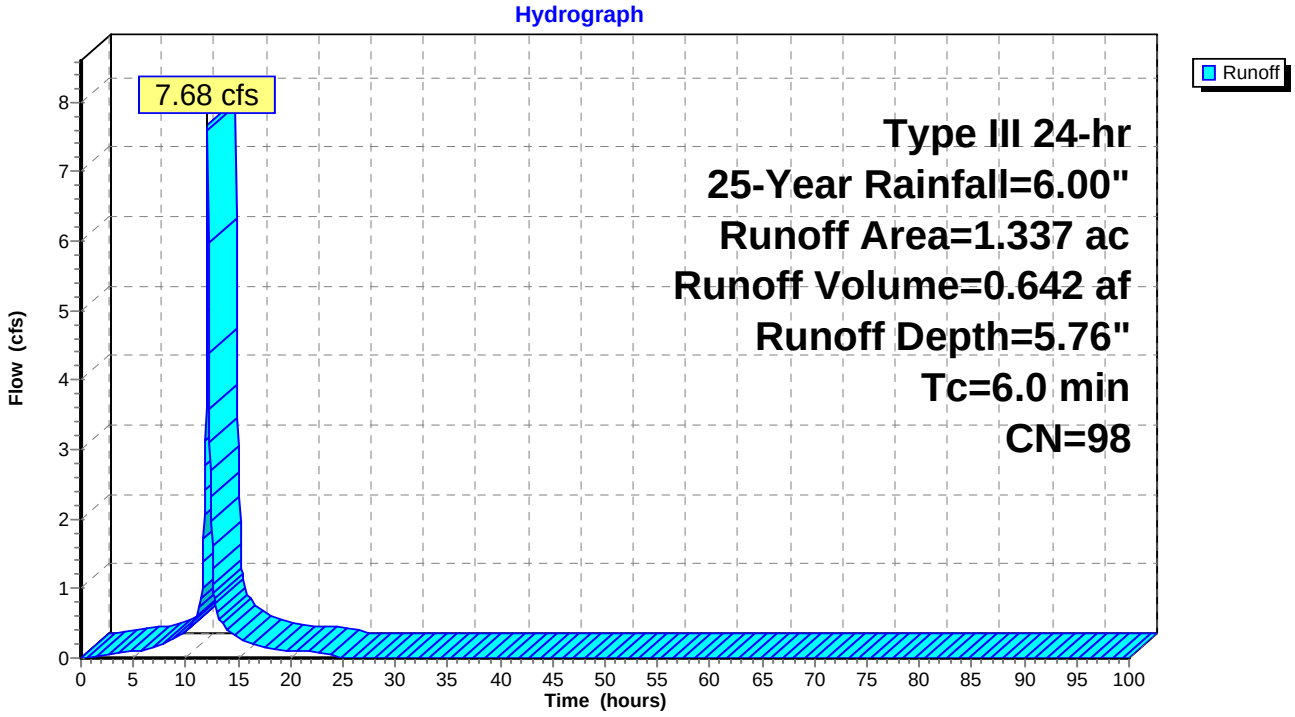
Runoff = 7.68 cfs @ 12.09 hrs, Volume= 0.642 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
0.025	98	Roofs, HSG B
1.312	98	Roofs, HSG C
1.337	98	Weighted Average
1.337		100.00% Impervious Area

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

Subcatchment PR-2-Bldg: Building



Summary for Subcatchment PR-2-DA: Drainage Area 2

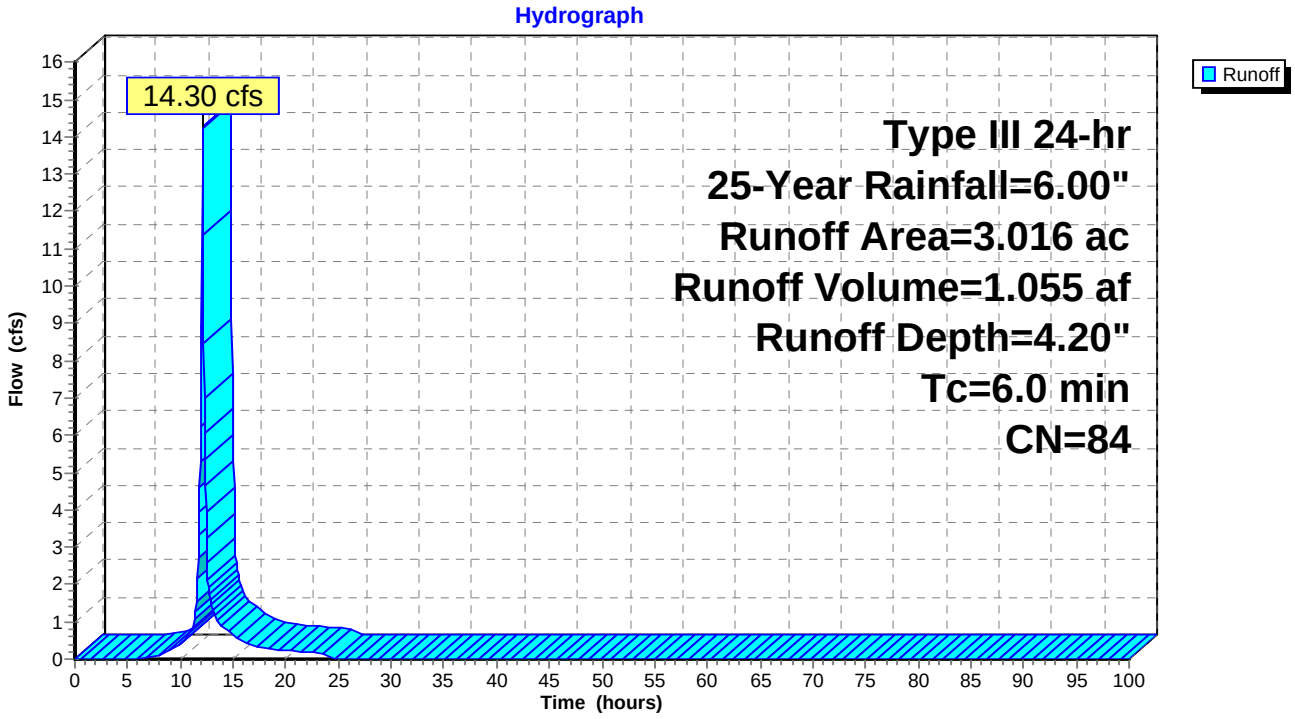
Runoff = 14.30 cfs @ 12.09 hrs, Volume= 1.055 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
0.495	61	>75% Grass cover, Good, HSG B
0.790	74	>75% Grass cover, Good, HSG C
1.556	98	Paved parking, HSG C
0.126	70	Woods, Good, HSG C
0.049	55	Woods, Good, HSG B
3.016	84	Weighted Average
1.460		48.41% Pervious Area
1.556		51.59% Impervious Area

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

Subcatchment PR-2-DA: Drainage Area 2



Summary for Subcatchment PR-3-BLDG: Building

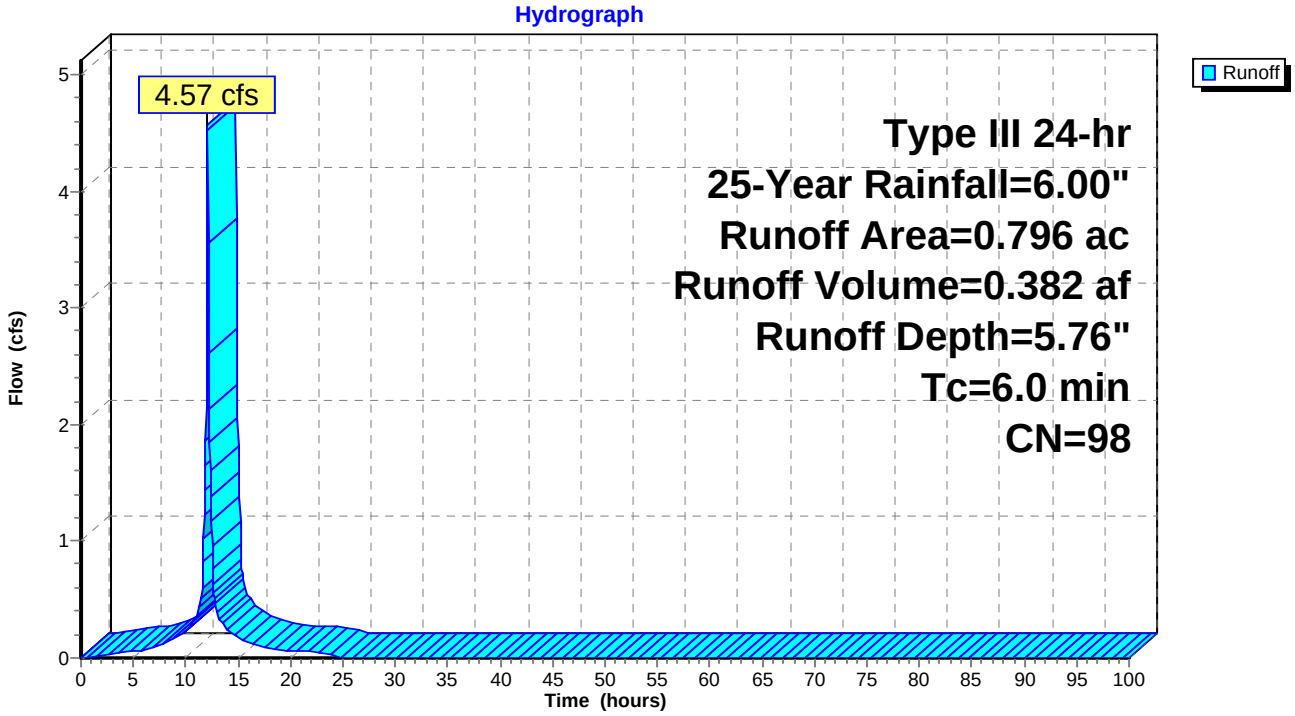
Runoff = 4.57 cfs @ 12.09 hrs, Volume= 0.382 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
0.796	98	Roofs, HSG C
0.796		100.00% Impervious Area

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

Subcatchment PR-3-BLDG: Building



Summary for Subcatchment PR-3-CY: Drainage Area Courtyard

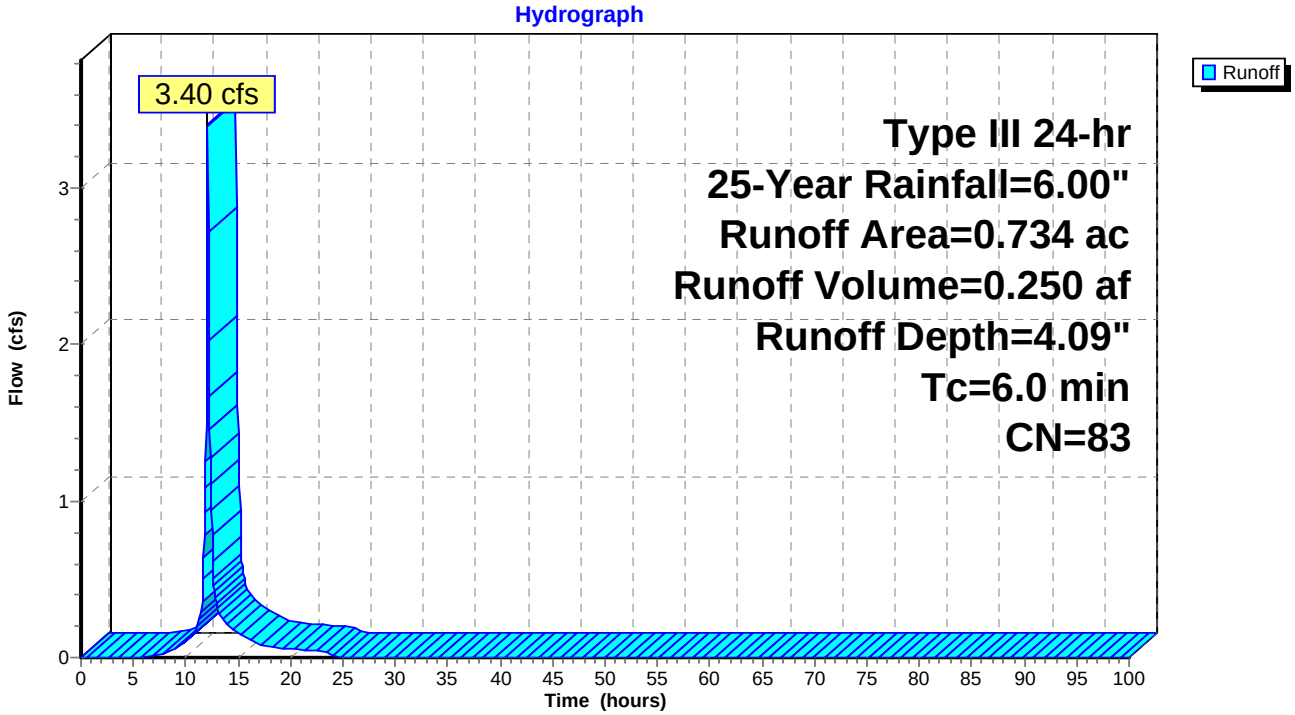
Runoff = 3.40 cfs @ 12.09 hrs, Volume= 0.250 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
0.462	74	>75% Grass cover, Good, HSG C
0.272	98	Paved parking, HSG C
0.734	83	Weighted Average
0.462		62.94% Pervious Area
0.272		37.06% Impervious Area

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

Subcatchment PR-3-CY: Drainage Area Courtyard



Summary for Subcatchment PR-3-DA: Drainage Area 3

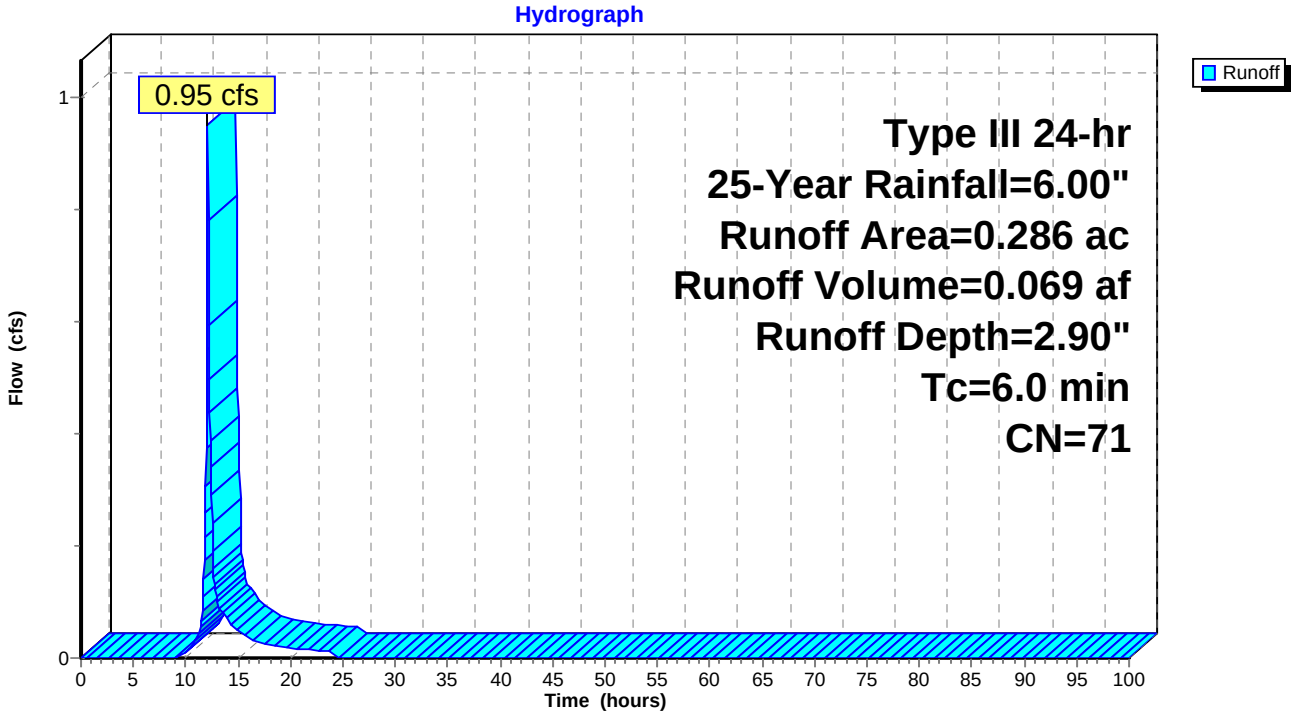
Runoff = 0.95 cfs @ 12.09 hrs, Volume= 0.069 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.236	70	Woods, Good, HSG C
0.286	71	Weighted Average
0.286		100.00% Pervious Area

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

Subcatchment PR-3-DA: Drainage Area 3



Summary for Pond Bio Basin: Bioretention

Inflow Area = 0.410 ac, 32.20% Impervious, Inflow Depth = 3.99" for 25-Year event
Inflow = 1.86 cfs @ 12.09 hrs, Volume= 0.136 af
Outflow = 1.68 cfs @ 12.14 hrs, Volume= 0.136 af, Atten= 10%, Lag= 2.9 min
Primary = 1.68 cfs @ 12.14 hrs, Volume= 0.136 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 225.61' @ 12.14 hrs Surf.Area= 0.046 ac Storage= 0.026 af

Plug-Flow detention time= 55.2 min calculated for 0.136 af (100% of inflow)
Center-of-Mass det. time= 55.2 min (864.1 - 808.9)

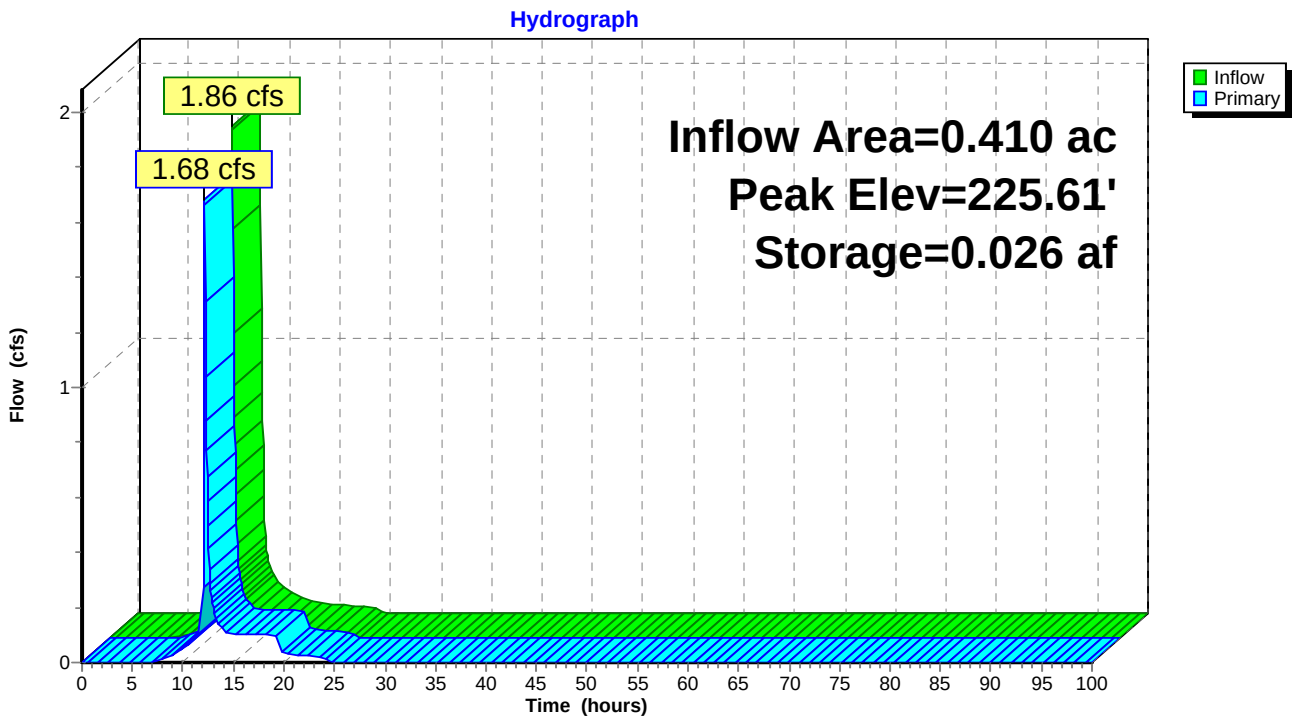
Volume	Invert	Avail.Storage	Storage Description
#1	225.00'	0.070 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
225.00	0.038	0.000	0.000
226.00	0.051	0.044	0.044
226.50	0.051	0.025	0.070

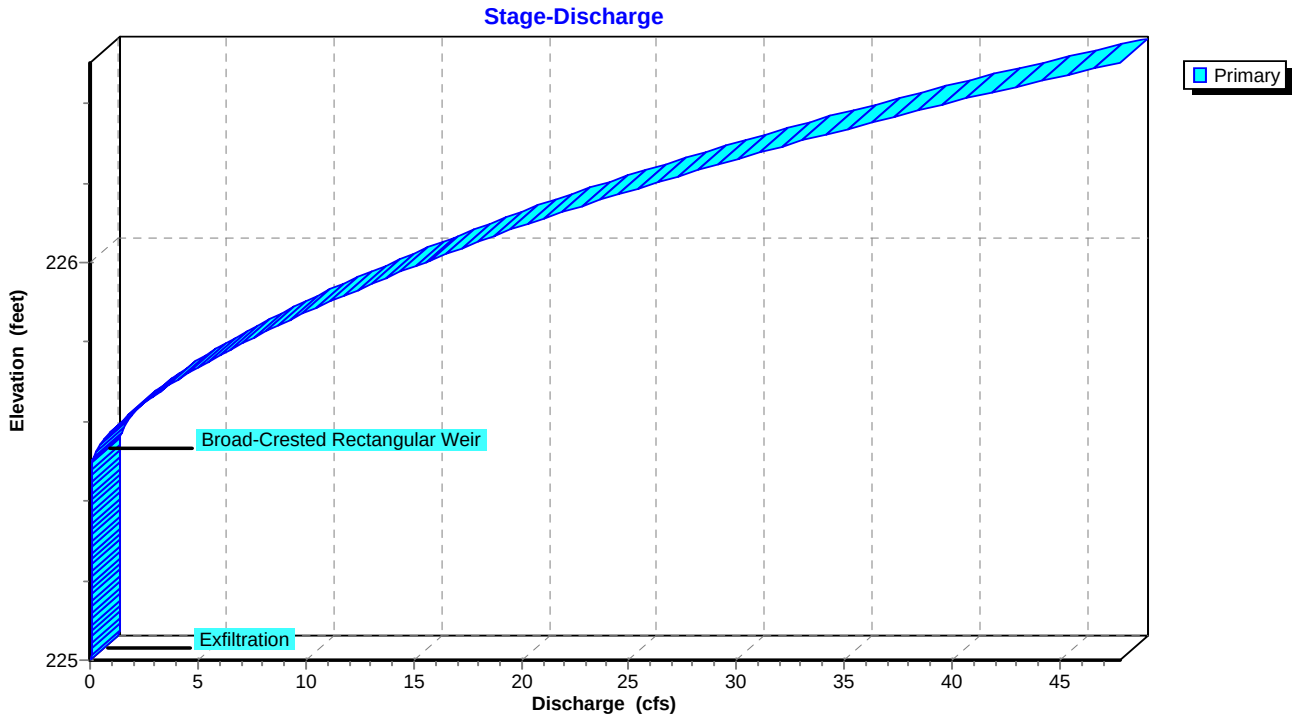
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	**0.10 cfs Exfiltration at all elevations**
#2	Primary	225.50'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.63 cfs @ 12.14 hrs HW=225.61' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.53 cfs @ 0.88 fps)

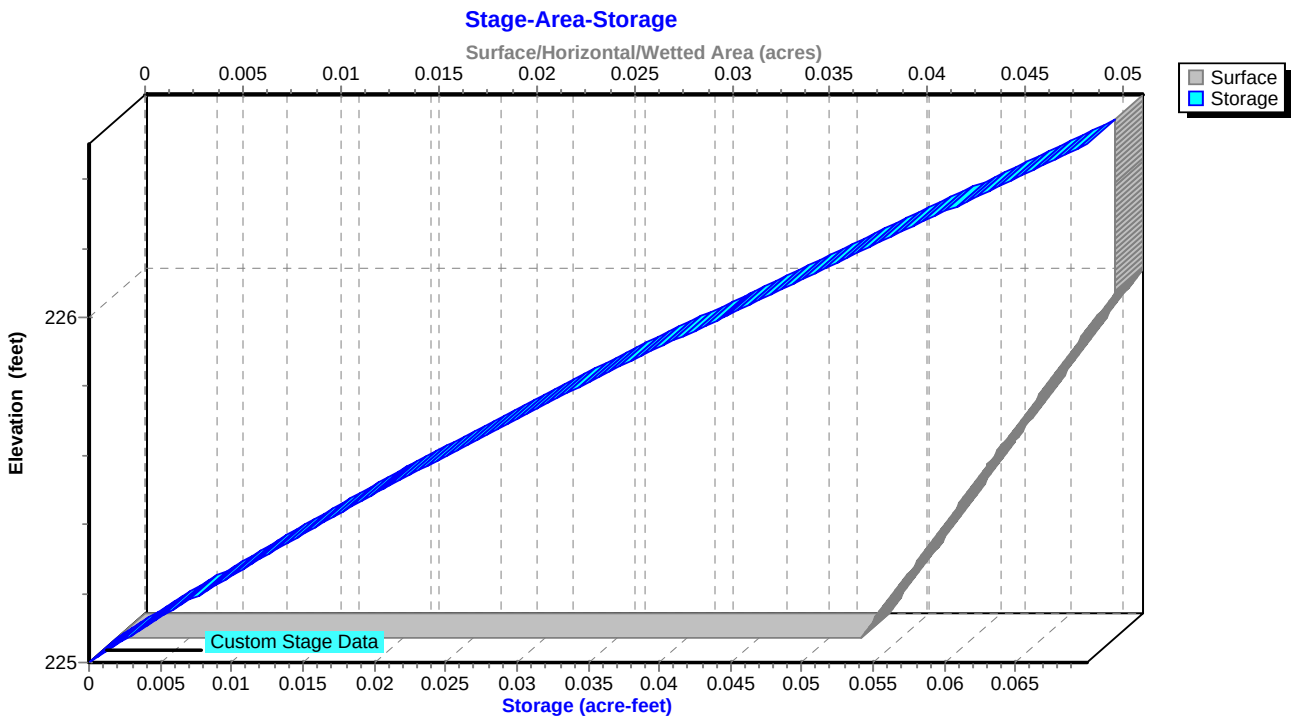
Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Summary for Pond Det 1: Detention Basin

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 4.69" for 25-Year event
Inflow = 15.14 cfs @ 12.09 hrs, Volume= 1.176 af
Outflow = 8.91 cfs @ 12.21 hrs, Volume= 1.176 af, Atten= 41%, Lag= 7.2 min
Primary = 8.91 cfs @ 12.21 hrs, Volume= 1.176 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 197.78' @ 12.21 hrs Surf.Area= 0.082 ac Storage= 0.226 af

Plug-Flow detention time= 26.8 min calculated for 1.175 af (100% of inflow)
Center-of-Mass det. time= 27.1 min (806.6 - 779.5)

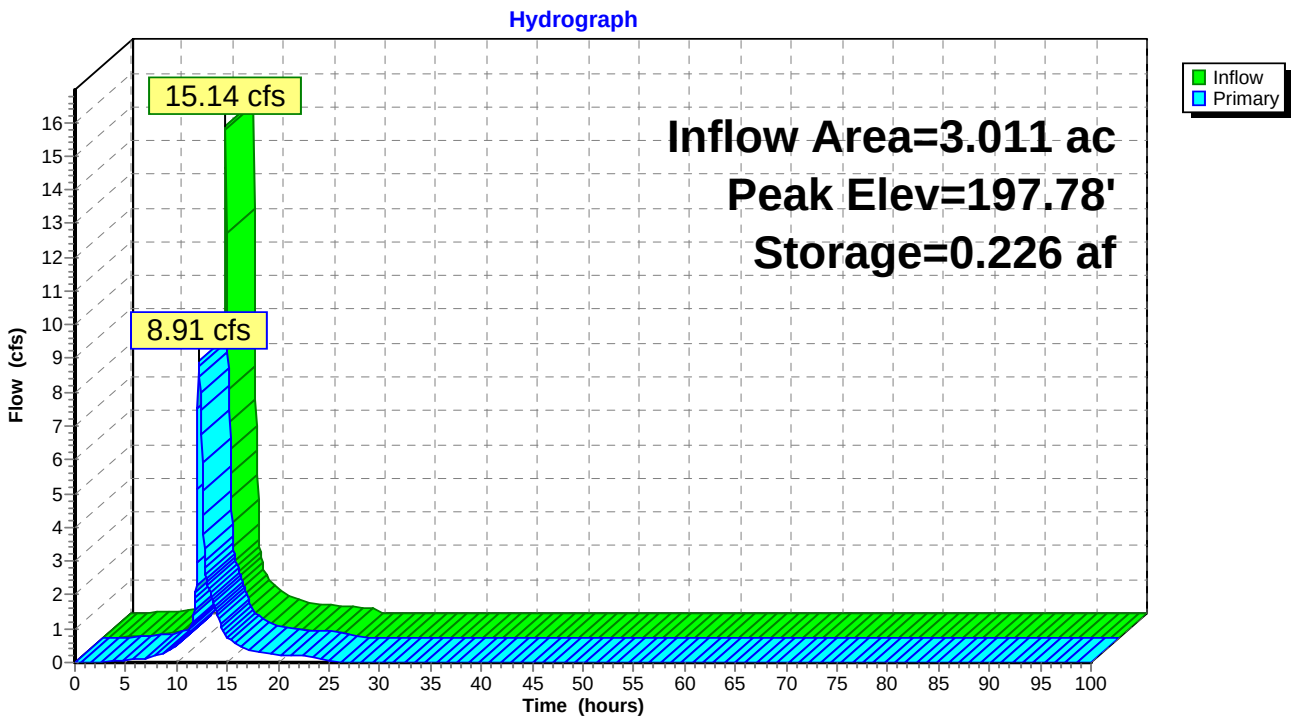
Volume	Invert	Avail.Storage	Storage Description
#1	194.00'	0.440 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
194.00	0.040	0.000	0.000
195.00	0.049	0.044	0.044
196.00	0.060	0.054	0.099
197.00	0.073	0.066	0.166
198.00	0.085	0.079	0.244
199.00	0.098	0.091	0.336
200.00	0.110	0.104	0.440

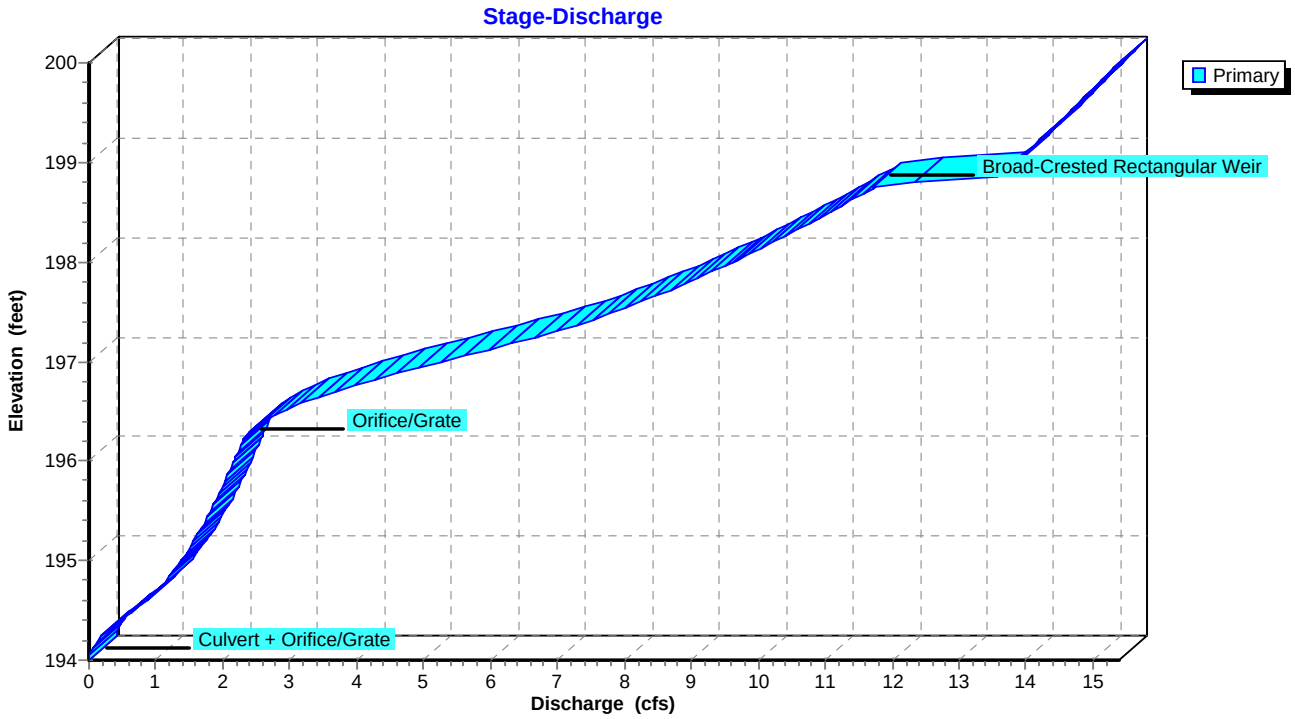
Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	**18.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 194.00' / 192.00' S= 0.0333 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	194.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	196.20'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	198.75'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=8.87 cfs @ 12.21 hrs HW=197.77' (Free Discharge)
└─**1=Culvert** (Passes 8.87 cfs of 11.68 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 3.12 cfs @ 8.93 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 5.76 cfs @ 4.69 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

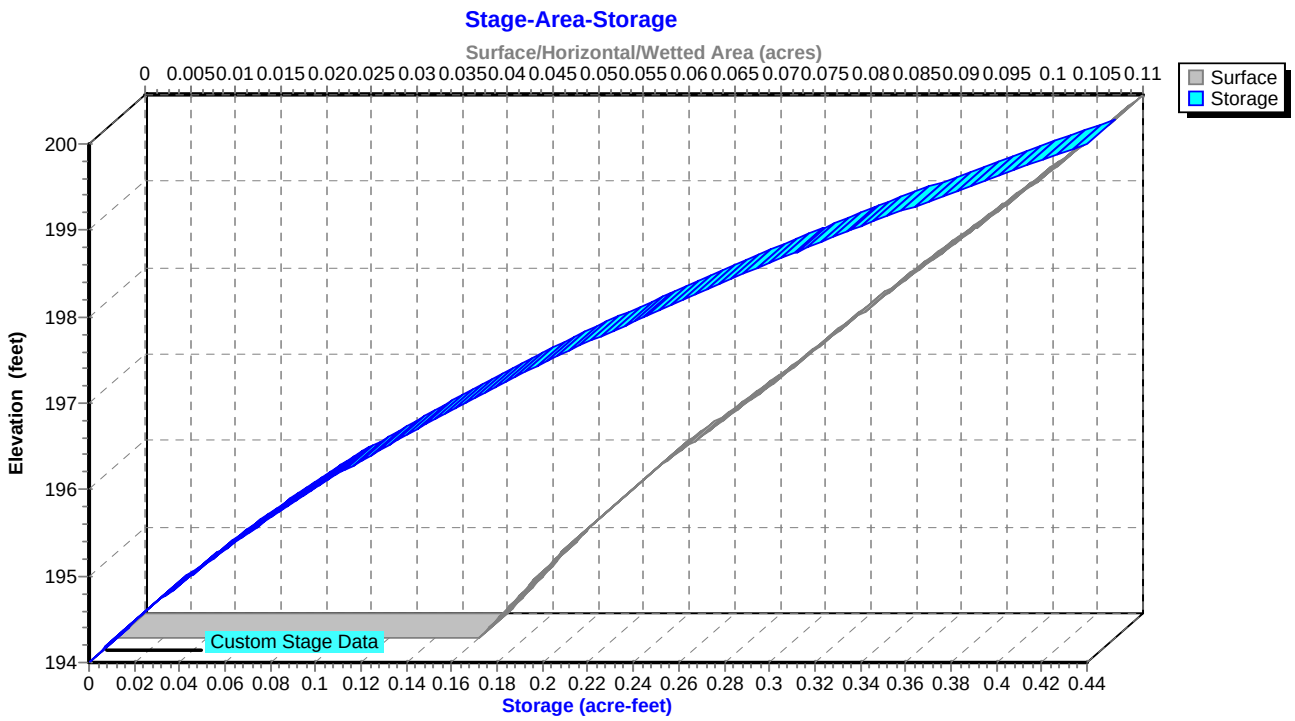
Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Summary for Pond Det 2: Detention Basin

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 1.73" for 25-Year event
Inflow = 19.10 cfs @ 12.10 hrs, Volume= 0.686 af
Outflow = 18.23 cfs @ 12.11 hrs, Volume= 0.687 af, Atten= 5%, Lag= 1.1 min
Primary = 18.23 cfs @ 12.11 hrs, Volume= 0.687 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 213.78' @ 12.12 hrs Surf.Area= 0.024 ac Storage= 0.045 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.6 min (757.0 - 754.4)

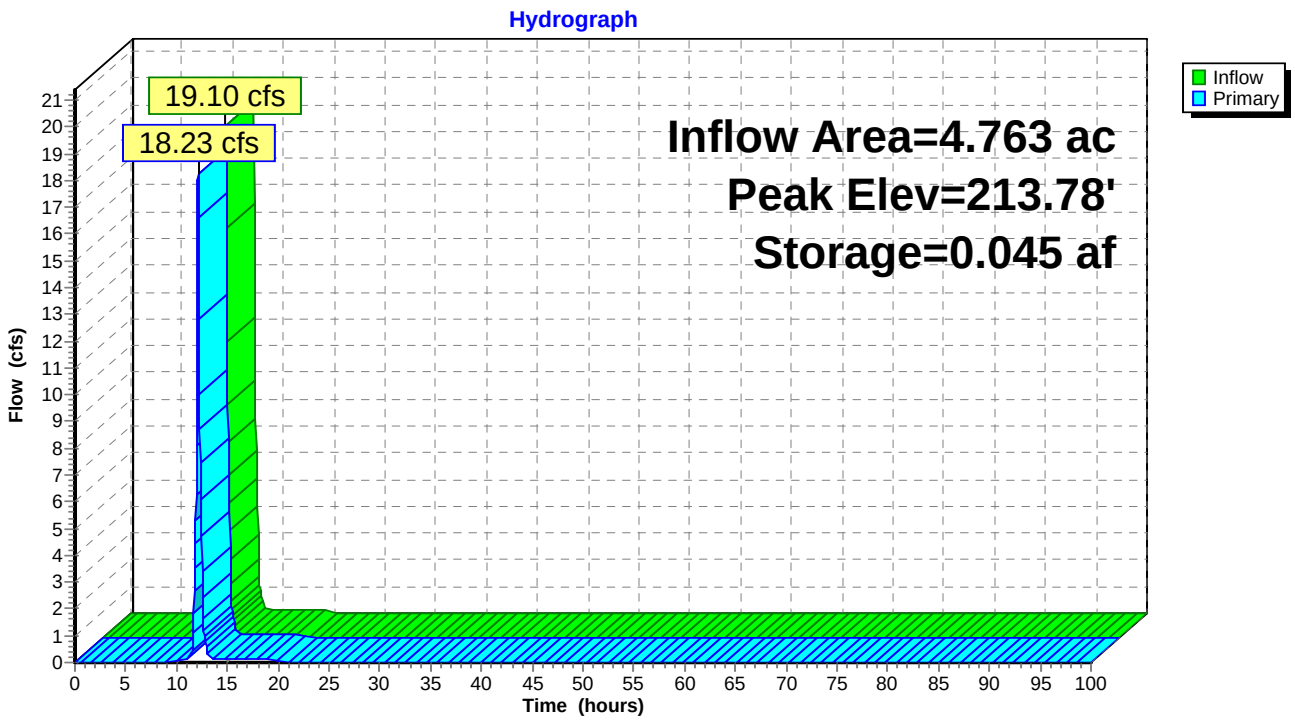
Volume	Invert	Avail.Storage	Storage Description
#1	211.00'	0.116 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
211.00	0.009	0.000	0.000
212.00	0.014	0.012	0.012
213.00	0.019	0.016	0.028
214.00	0.026	0.022	0.050
215.00	0.033	0.029	0.080
216.00	0.040	0.036	0.116

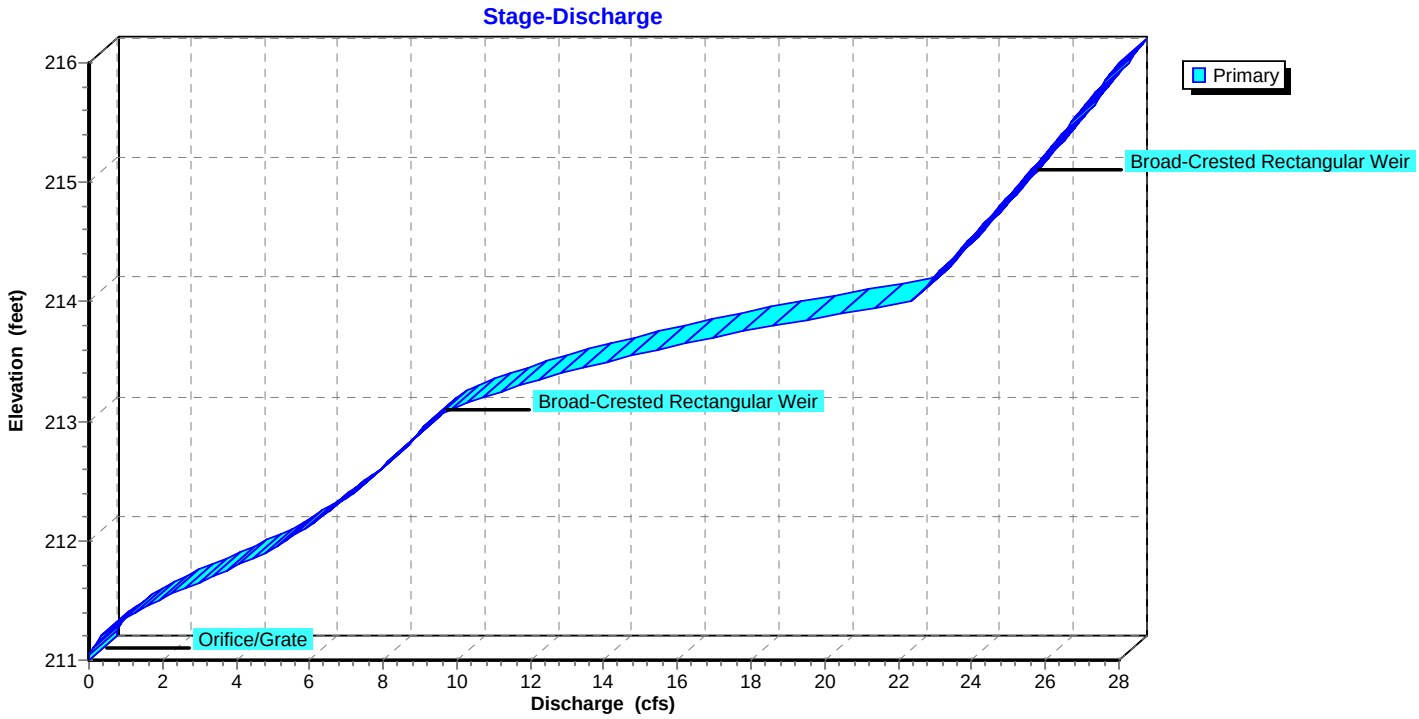
Device	Routing	Invert	Outlet Devices
#1	Primary	209.50'	**24.0" Round Culvert** L= 65.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 209.50' / 205.00' S= 0.0692 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	211.00'	**12.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	213.00'	**3.5' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#4	Device 1	215.00'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=17.56 cfs @ 12.11 hrs HW=213.74' (Free Discharge)
└─**1=Culvert** (Passes 17.56 cfs of 21.49 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 11.31 cfs @ 7.20 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Weir Controls 6.25 cfs @ 2.42 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

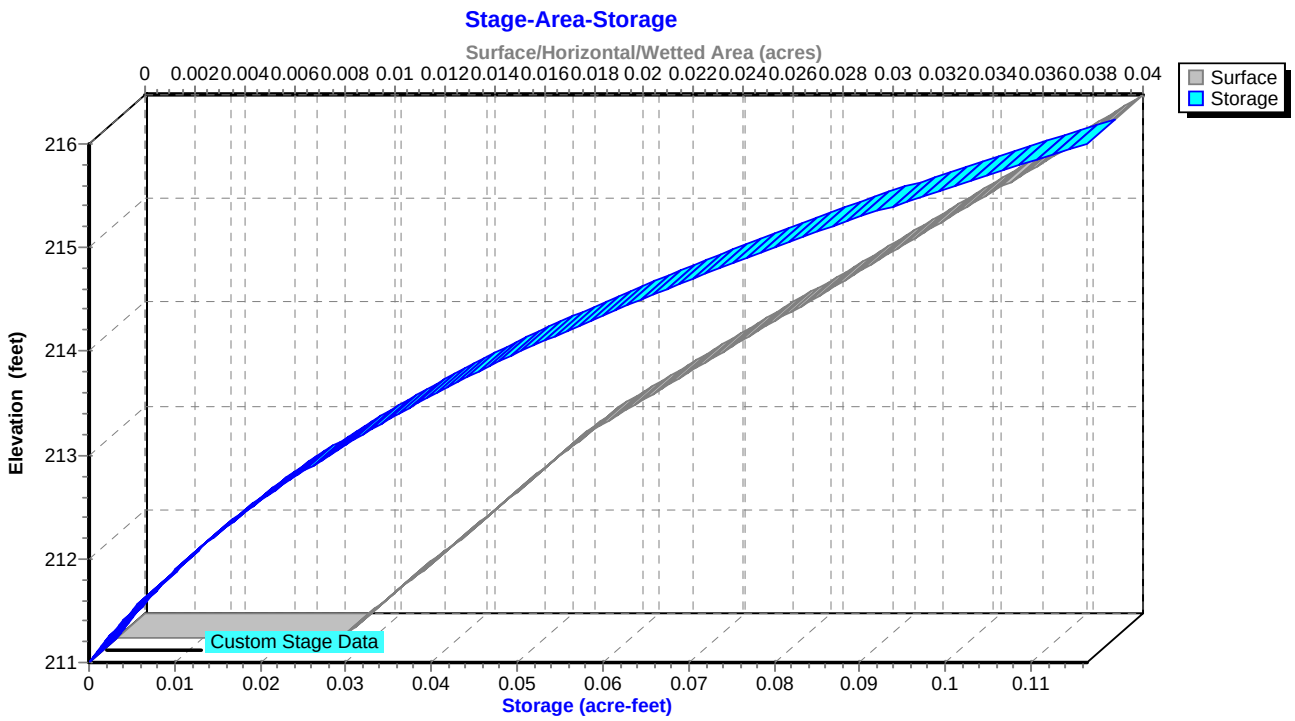
Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Summary for Pond Det 3: Underground Detention Pipe

Inflow Area = 1.530 ac, 69.80% Impervious, Inflow Depth = 4.96" for 25-Year event
Inflow = 7.97 cfs @ 12.09 hrs, Volume= 0.632 af
Outflow = 7.82 cfs @ 12.10 hrs, Volume= 0.632 af, Atten= 2%, Lag= 0.4 min
Primary = 7.82 cfs @ 12.10 hrs, Volume= 0.632 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 217.77' @ 12.09 hrs Surf.Area= 0.010 ac Storage= 0.028 af

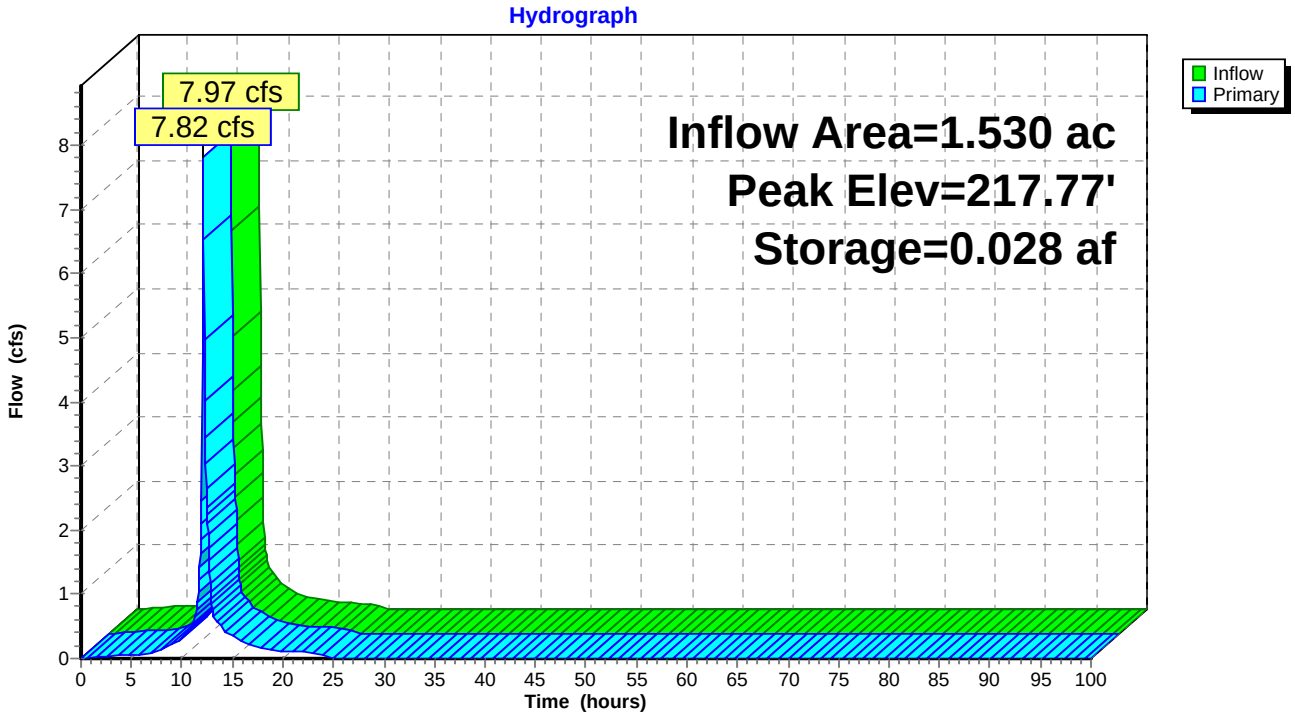
Plug-Flow detention time= 4.6 min calculated for 0.632 af (100% of inflow)
Center-of-Mass det. time= 4.1 min (773.4 - 769.3)

Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.033 af	**42.0" Round Pipe Storage** x 2 L= 75.0'

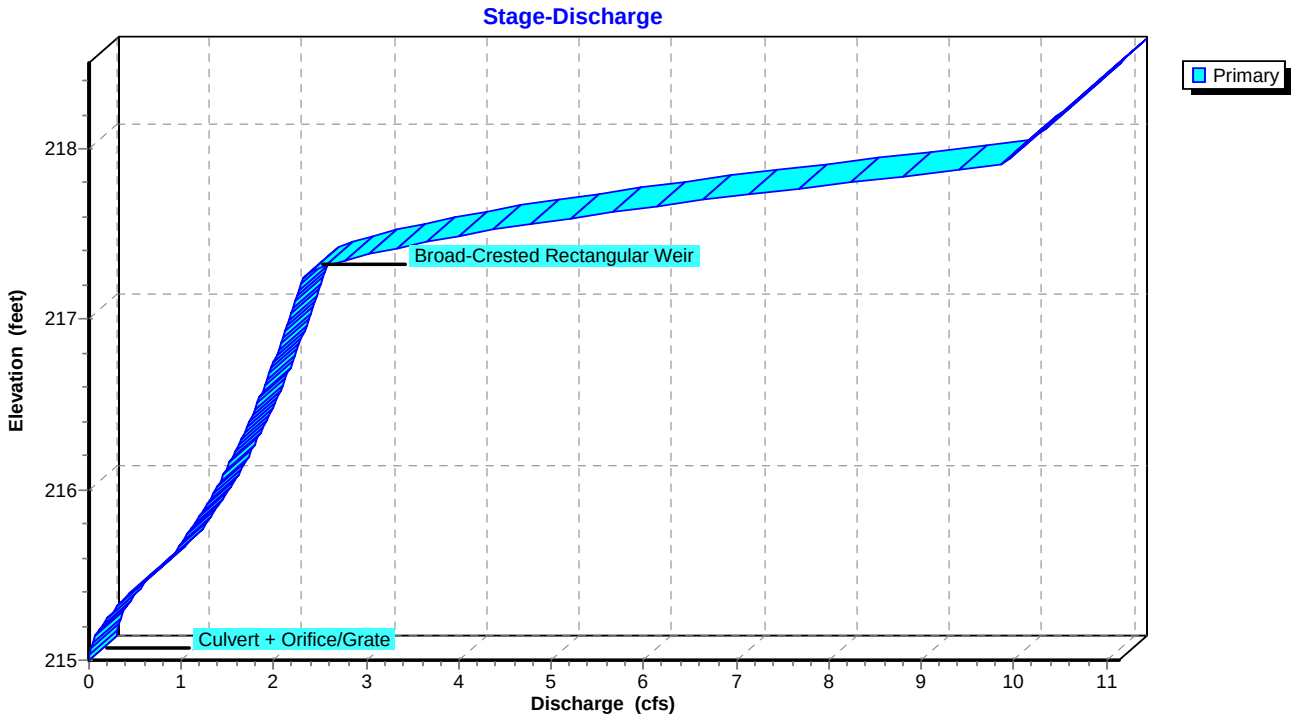
Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 36.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.00' / 214.50' S= 0.0139 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	215.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	217.25'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=7.72 cfs @ 12.10 hrs HW=217.77' (Free Discharge)
└─**1=Culvert** (Passes 7.72 cfs of 9.54 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.62 cfs @ 7.51 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 5.10 cfs @ 1.97 fps)

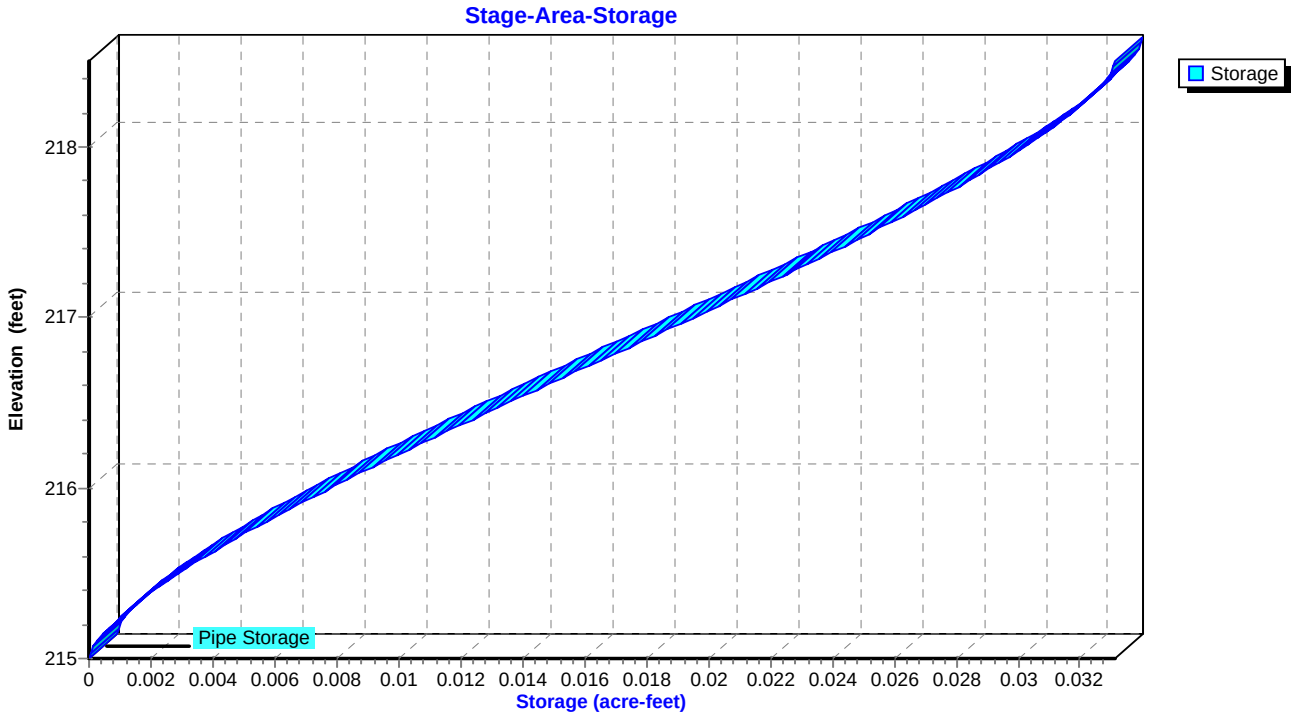
Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Summary for Pond Sandfilter: Sandfilter

Inflow Area = 4.353 ac, 66.46% Impervious, Inflow Depth = 4.68" for 25-Year event
Inflow = 21.97 cfs @ 12.09 hrs, Volume= 1.697 af
Outflow = 21.97 cfs @ 12.09 hrs, Volume= 1.697 af, Atten= 0%, Lag= 0.0 min
Primary = 17.68 cfs @ 12.09 hrs, Volume= 0.550 af
Secondary = 4.29 cfs @ 12.09 hrs, Volume= 1.147 af

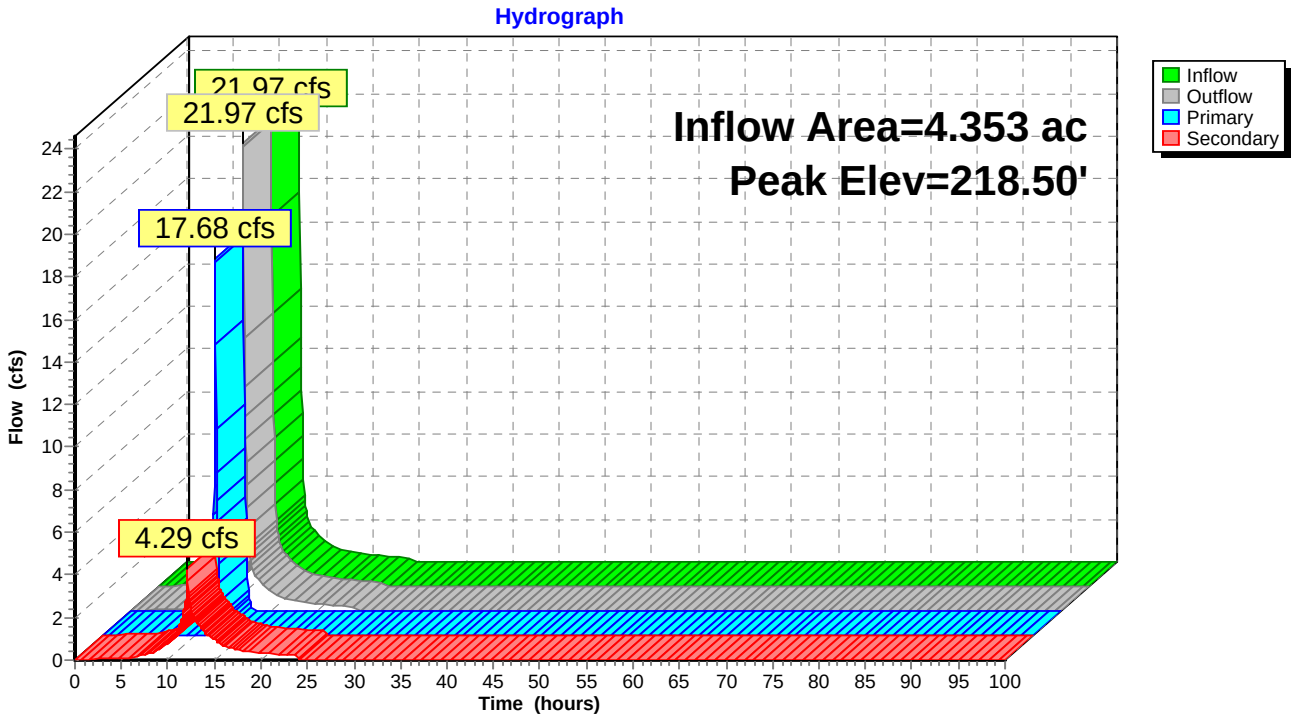
Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 218.50' @ 12.09 hrs
Flood Elev= 221.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 88.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 215.00' / 212.00' S= 0.0341 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	214.00'	**8.0" Round Culvert** L= 9.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 214.00' / 213.80' S= 0.0222 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

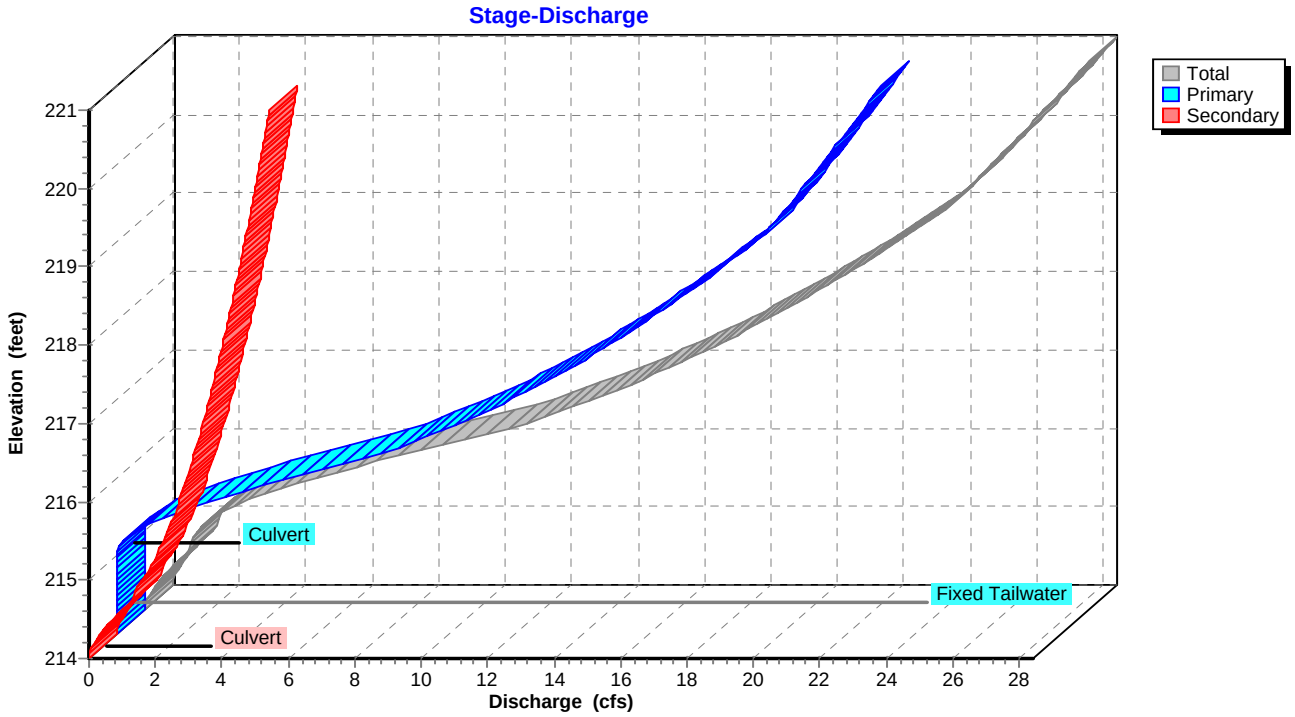
Primary OutFlow Max=17.22 cfs @ 12.09 hrs HW=218.37' TW=214.24' (Fixed TW Elev= 214.24')
└─**1=Culvert** (Inlet Controls 17.22 cfs @ 9.75 fps)

Secondary OutFlow Max=4.22 cfs @ 12.09 hrs HW=218.37' (Free Discharge)
└─**2=Culvert** (Inlet Controls 4.22 cfs @ 12.10 fps)

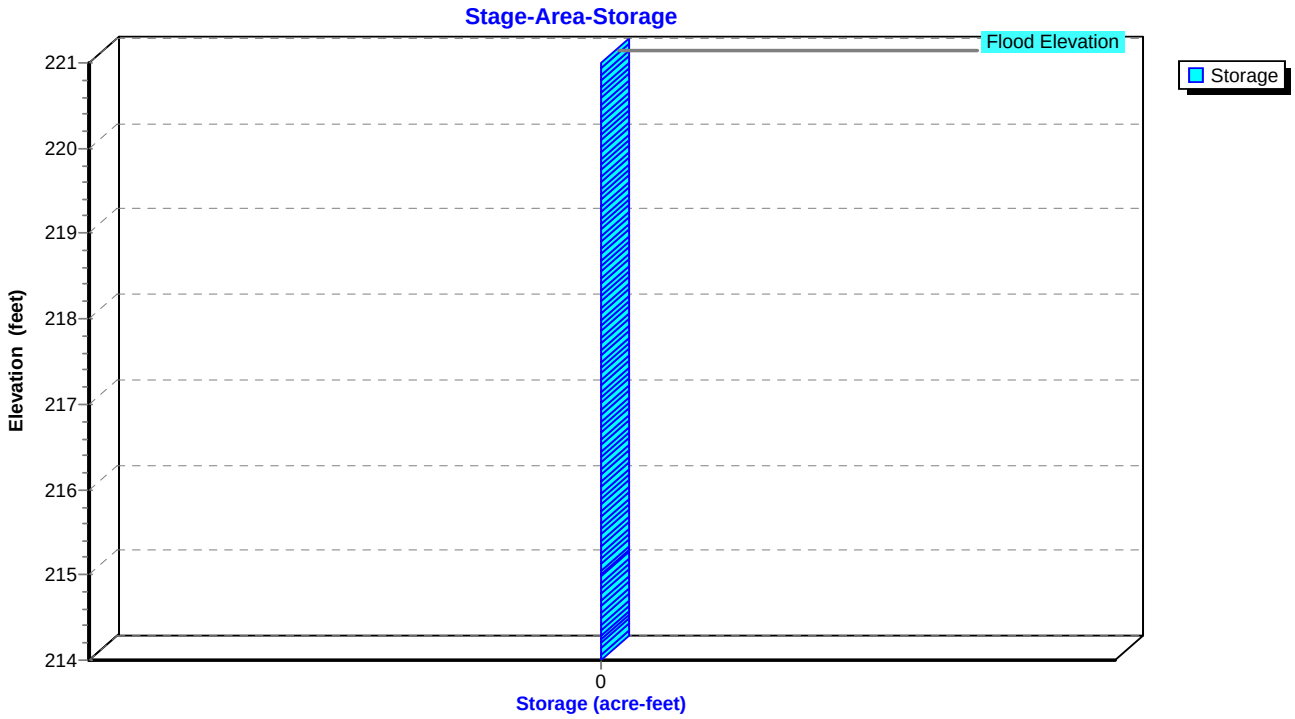
Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter

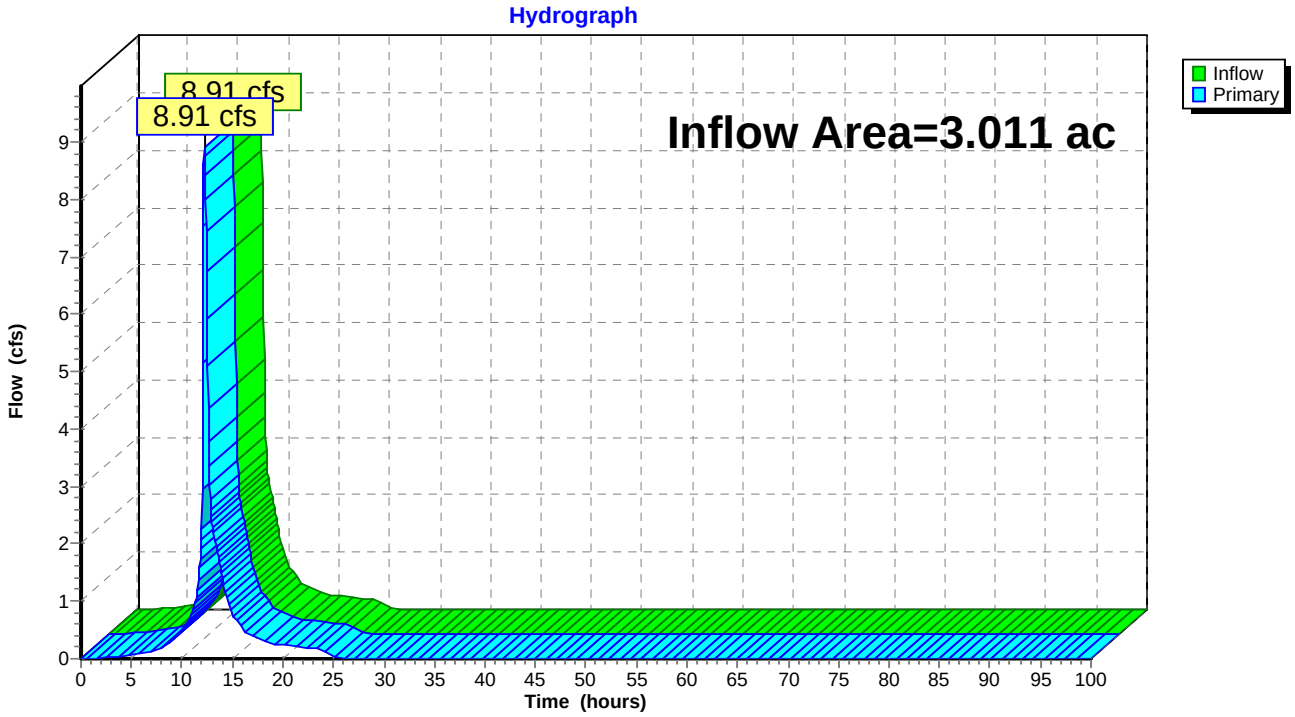


Summary for Link Pt. A: Point A

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 4.69" for 25-Year event
Inflow = 8.91 cfs @ 12.21 hrs, Volume= 1.176 af
Primary = 8.91 cfs @ 12.21 hrs, Volume= 1.176 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

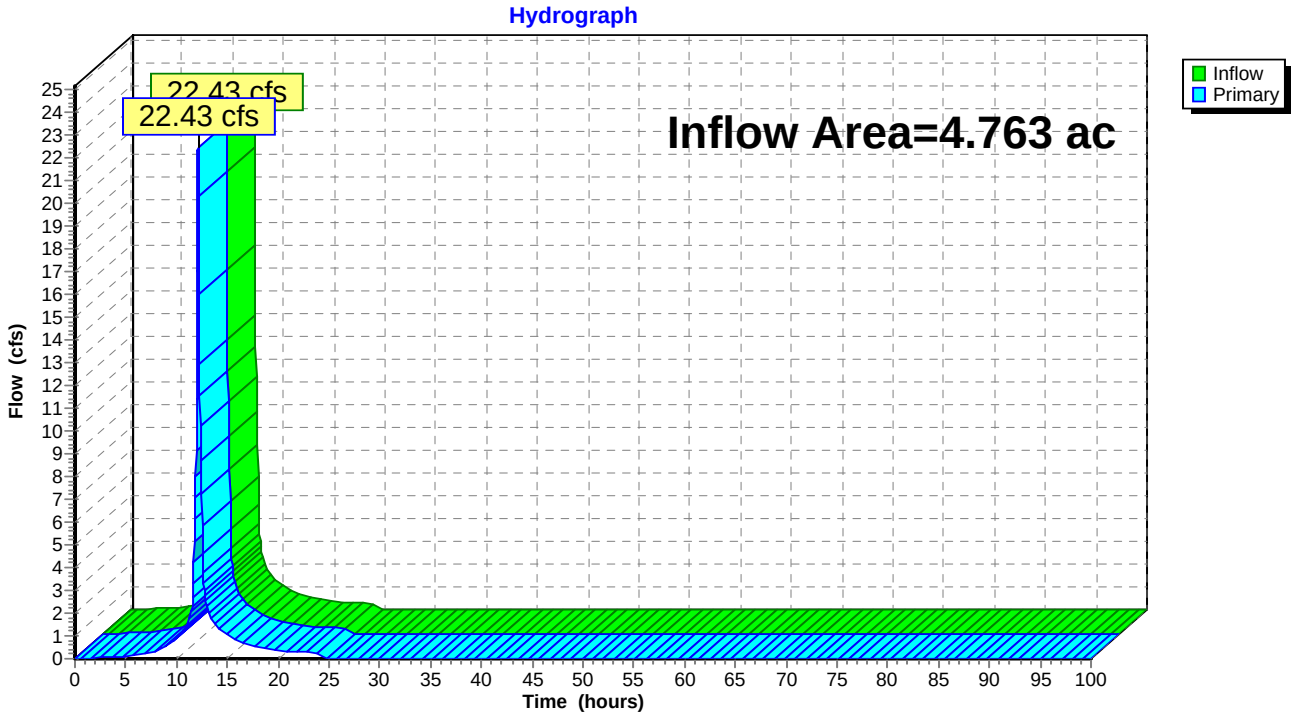


Summary for Link Pt. B: Point B

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 4.62" for 25-Year event
Inflow = 22.43 cfs @ 12.11 hrs, Volume= 1.834 af
Primary = 22.43 cfs @ 12.11 hrs, Volume= 1.834 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

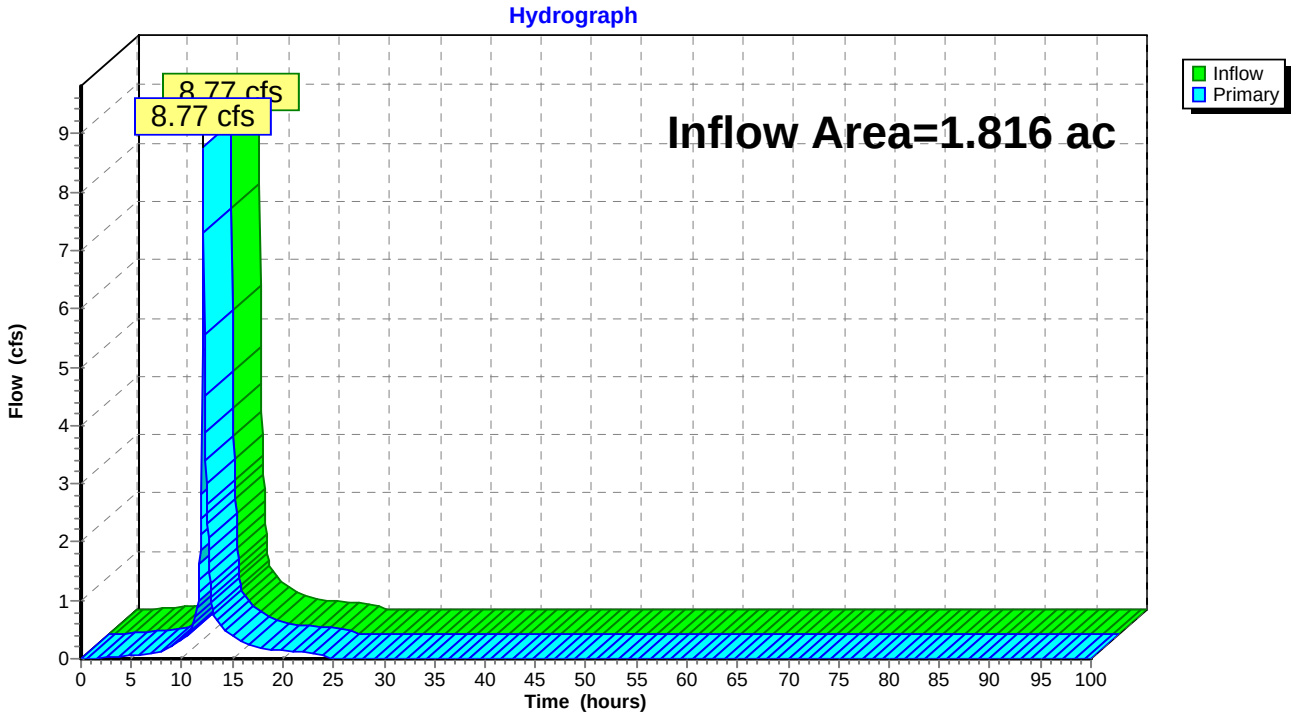


Summary for Link Pt.C: Point C

Inflow Area = 1.816 ac, 58.81% Impervious, Inflow Depth = 4.63" for 25-Year event
Inflow = 8.77 cfs @ 12.09 hrs, Volume= 0.701 af
Primary = 8.77 cfs @ 12.09 hrs, Volume= 0.701 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 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 Bio: Bioretention DA Runoff Area=0.410 ac 32.20% Impervious Runoff Depth=5.39"
Tc=6.0 min CN=82 Runoff=2.48 cfs 0.184 af

Subcatchment PR-1-BLDG: Building Runoff Area=1.070 ac 100.00% Impervious Runoff Depth=7.26"
Tc=6.0 min CN=98 Runoff=7.69 cfs 0.647 af

Subcatchment PR-1-DA: Drainage Area 1 Runoff Area=1.941 ac 39.82% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=83 Runoff=11.96 cfs 0.890 af

Subcatchment PR-2-Bldg: Building Runoff Area=1.337 ac 100.00% Impervious Runoff Depth=7.26"
Tc=6.0 min CN=98 Runoff=9.61 cfs 0.809 af

Subcatchment PR-2-DA: Drainage Area 2 Runoff Area=3.016 ac 51.59% Impervious Runoff Depth=5.62"
Tc=6.0 min CN=84 Runoff=18.89 cfs 1.412 af

Subcatchment PR-3-BLDG: Building Runoff Area=0.796 ac 100.00% Impervious Runoff Depth=7.26"
Tc=6.0 min CN=98 Runoff=5.72 cfs 0.482 af

Subcatchment PR-3-CY: Drainage Area Runoff Area=0.734 ac 37.06% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=83 Runoff=4.52 cfs 0.336 af

Subcatchment PR-3-DA: Drainage Area 3 Runoff Area=0.286 ac 0.00% Impervious Runoff Depth=4.15"
Tc=6.0 min CN=71 Runoff=1.36 cfs 0.099 af

Pond Bio Basin: Bioretention Peak Elev=225.64' Storage=0.027 af Inflow=2.48 cfs 0.184 af
Outflow=2.40 cfs 0.184 af

Pond Det 1: Detention Basin Peak Elev=198.50' Storage=0.289 af Inflow=19.65 cfs 1.537 af
Outflow=11.08 cfs 1.537 af

Pond Det 2: Detention Basin Peak Elev=214.24' Storage=0.057 af Inflow=25.39 cfs 0.983 af
Outflow=23.30 cfs 0.982 af

Pond Det 3: Underground Detention Pipe Peak Elev=217.93' Storage=0.030 af Inflow=10.24 cfs 0.818 af
Outflow=9.95 cfs 0.818 af

Pond Sandfilter: Sandfilter Peak Elev=221.00' Inflow=28.50 cfs 2.221 af
Primary=23.06 cfs 0.799 af Secondary=5.43 cfs 1.422 af Outflow=28.50 cfs 2.221 af

Link Pt. A: Point A Inflow=11.08 cfs 1.537 af
Primary=11.08 cfs 1.537 af

Link Pt. B: Point B Inflow=28.52 cfs 2.404 af
Primary=28.52 cfs 2.404 af

Link Pt.C: Point C Inflow=11.31 cfs 0.917 af
Primary=11.31 cfs 0.917 af

Total Runoff Area = 9.590 ac Runoff Volume = 4.859 af Average Runoff Depth = 6.08"
38.10% Pervious = 3.654 ac 61.90% Impervious = 5.936 ac

Summary for Subcatchment Bio: Bioretention DA

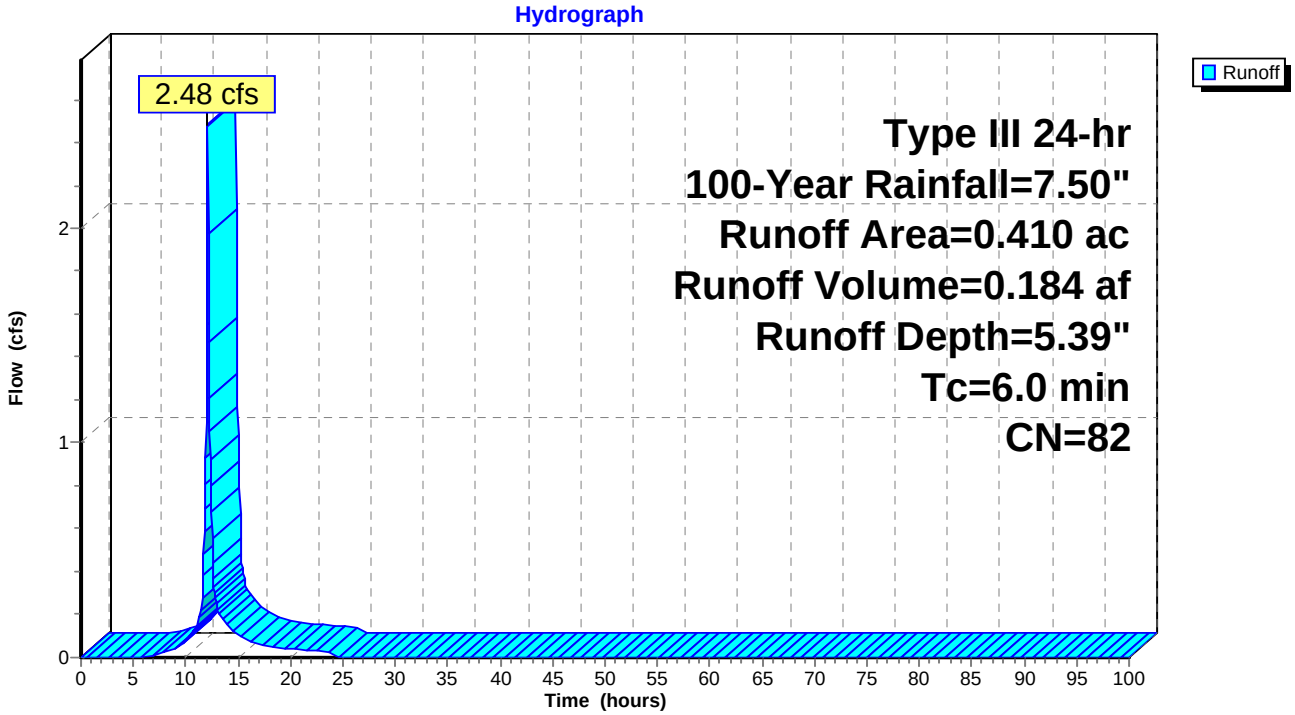
Runoff = 2.48 cfs @ 12.09 hrs, Volume= 0.184 af, Depth= 5.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.278	74	>75% Grass cover, Good, HSG C
0.132	98	Paved parking, HSG C
0.410	82	Weighted Average
0.278		67.80% Pervious Area
0.132		32.20% Impervious Area

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

Subcatchment Bio: Bioretention DA



Summary for Subcatchment PR-1-BLDG: Building

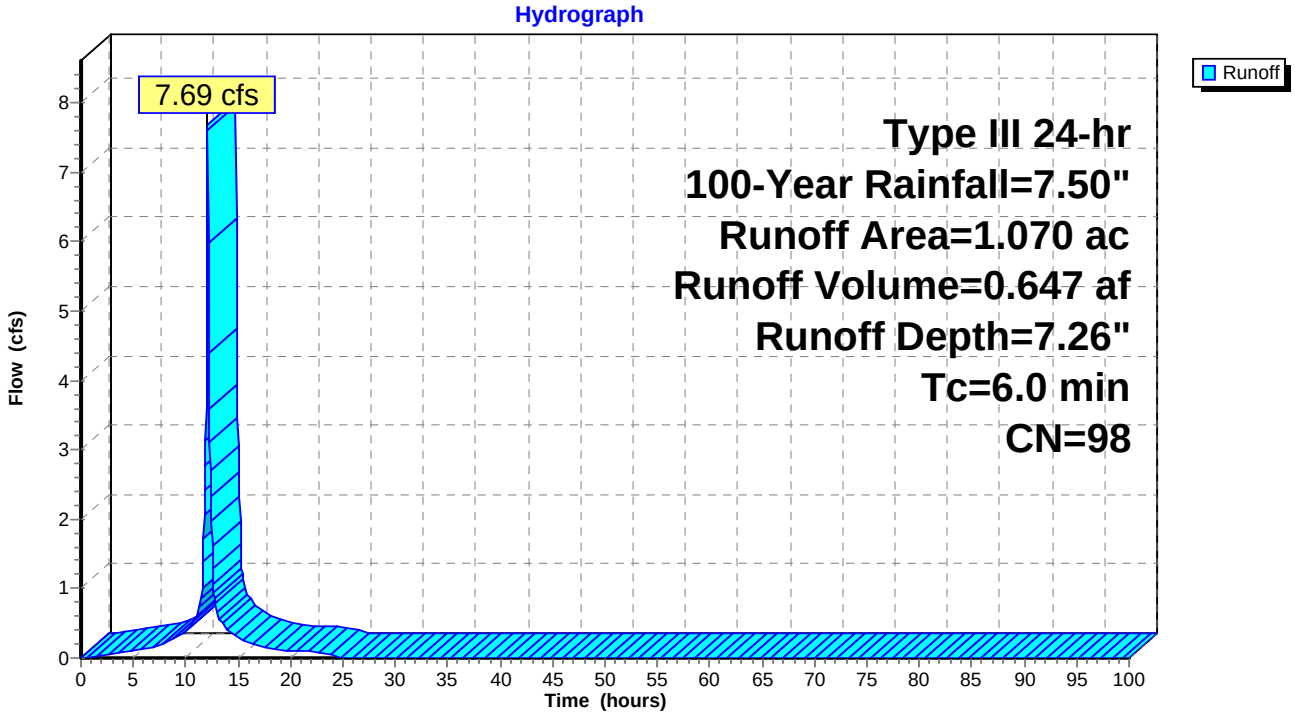
Runoff = 7.69 cfs @ 12.09 hrs, Volume= 0.647 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
1.070	98	Roofs, HSG B
1.070		100.00% Impervious Area

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

Subcatchment PR-1-BLDG: Building



Summary for Subcatchment PR-1-DA: Drainage Area 1

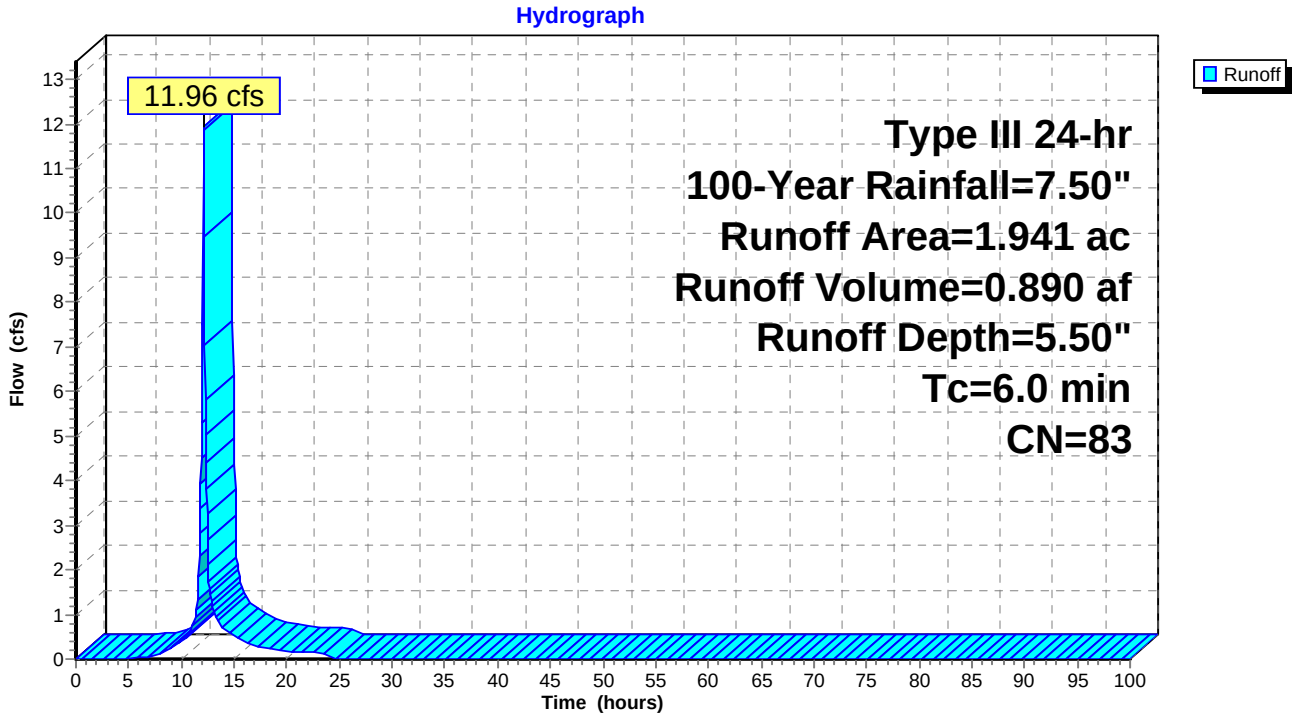
Runoff = 11.96 cfs @ 12.09 hrs, Volume= 0.890 af, Depth= 5.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
1.000	74	>75% Grass cover, Good, HSG C
0.773	98	Paved parking, HSG C
0.168	70	Woods, Good, HSG C
1.941	83	Weighted Average
1.168		60.18% Pervious Area
0.773		39.82% Impervious Area

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

Subcatchment PR-1-DA: Drainage Area 1



Summary for Subcatchment PR-2-Bldg: Building

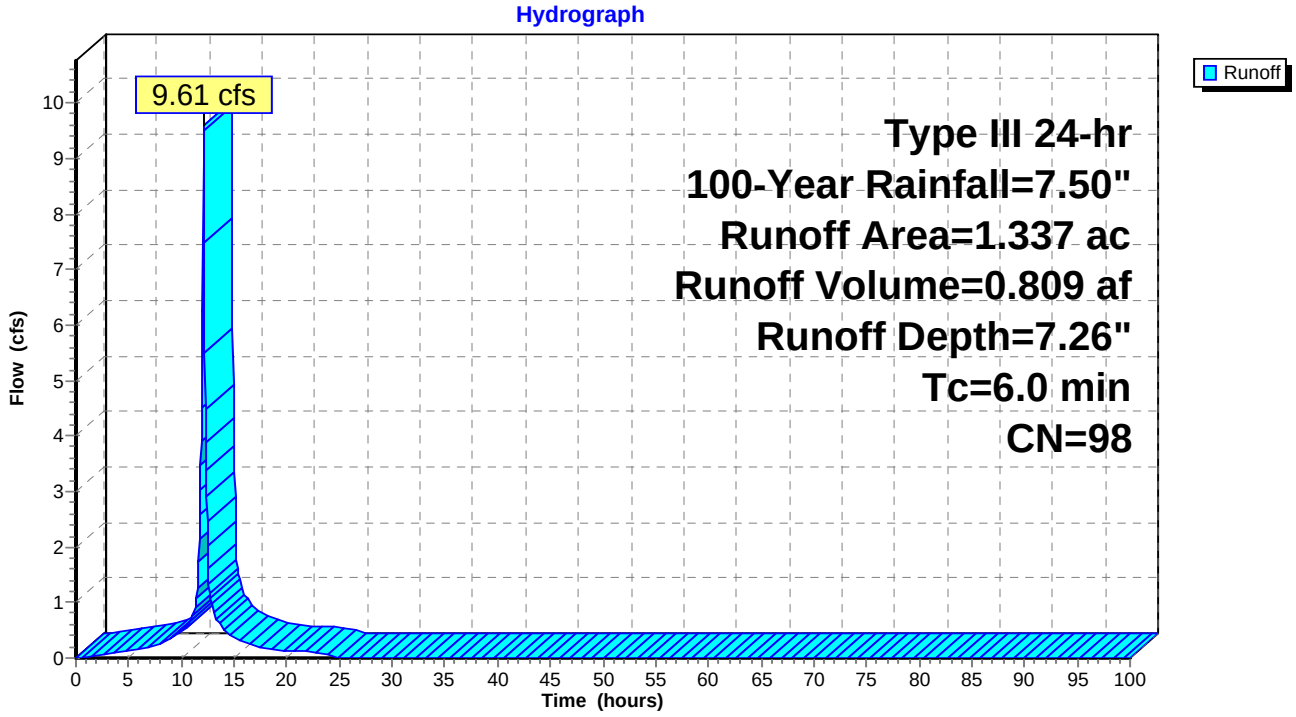
Runoff = 9.61 cfs @ 12.09 hrs, Volume= 0.809 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.025	98	Roofs, HSG B
1.312	98	Roofs, HSG C
1.337	98	Weighted Average
1.337		100.00% Impervious Area

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

Subcatchment PR-2-Bldg: Building



Summary for Subcatchment PR-2-DA: Drainage Area 2

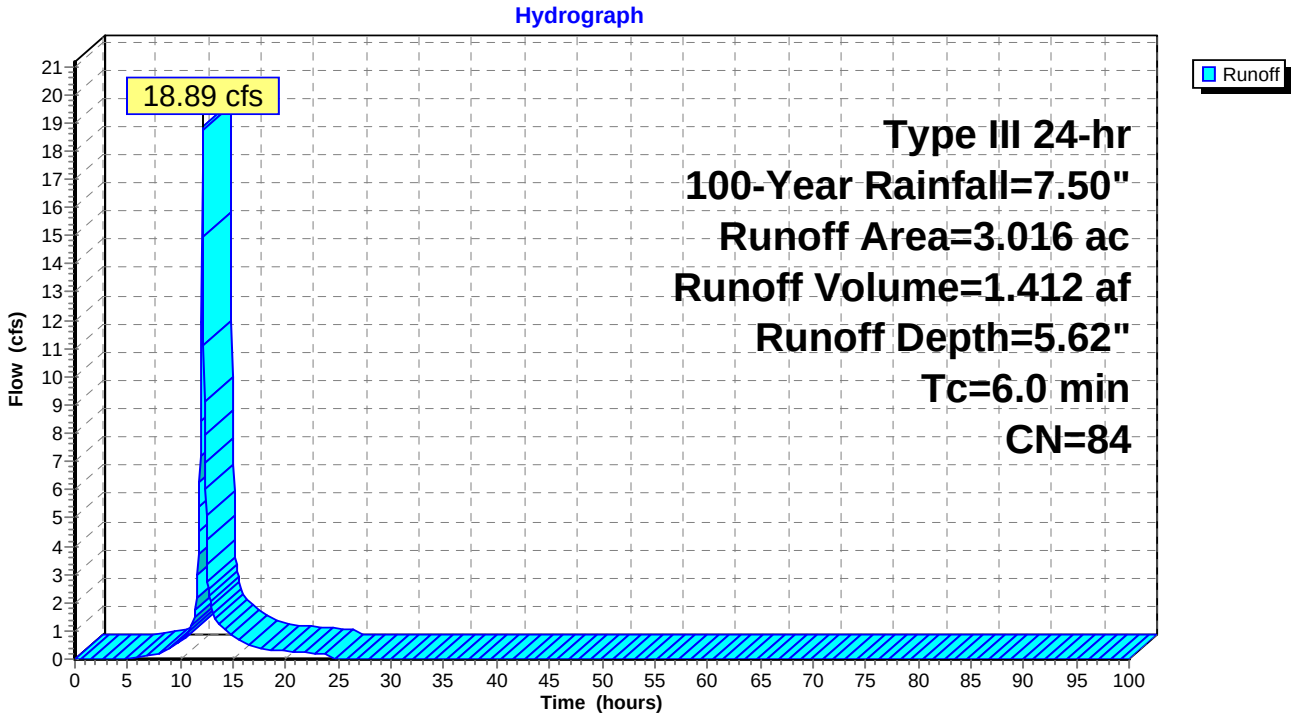
Runoff = 18.89 cfs @ 12.09 hrs, Volume= 1.412 af, Depth= 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.495	61	>75% Grass cover, Good, HSG B
0.790	74	>75% Grass cover, Good, HSG C
1.556	98	Paved parking, HSG C
0.126	70	Woods, Good, HSG C
0.049	55	Woods, Good, HSG B
3.016	84	Weighted Average
1.460		48.41% Pervious Area
1.556		51.59% Impervious Area

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

Subcatchment PR-2-DA: Drainage Area 2



Summary for Subcatchment PR-3-BLDG: Building

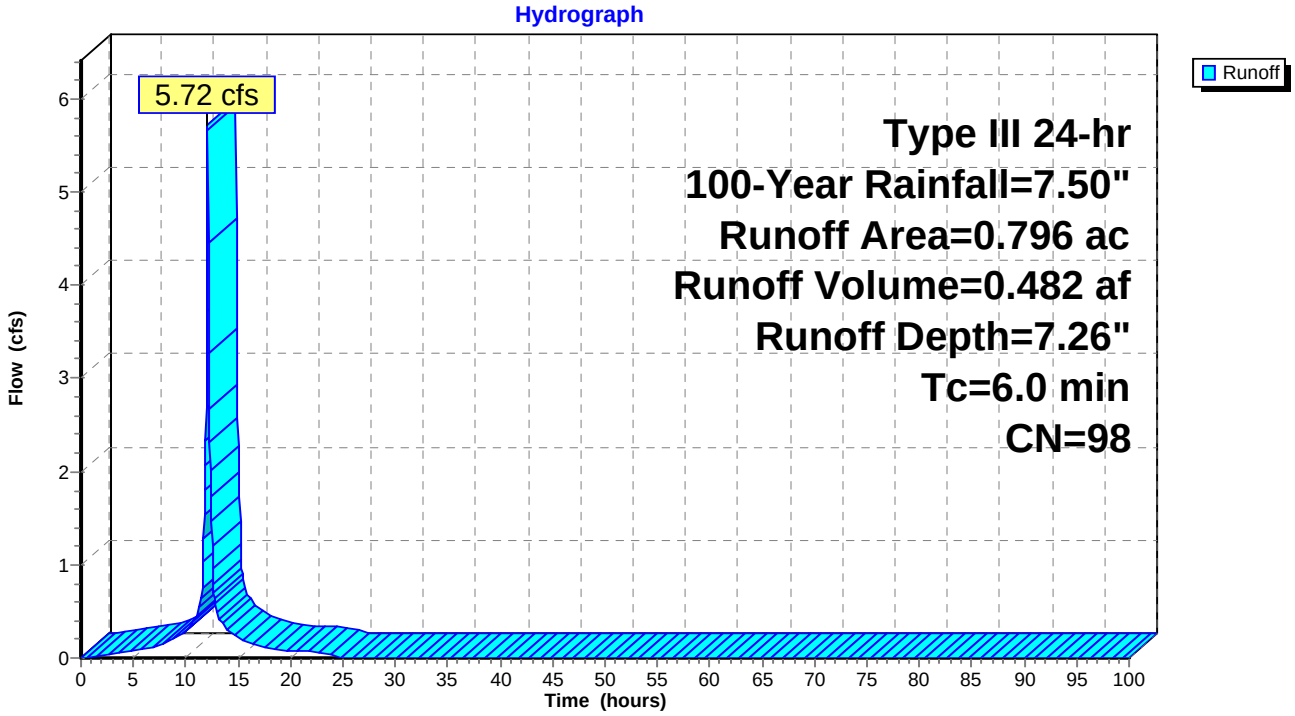
Runoff = 5.72 cfs @ 12.09 hrs, Volume= 0.482 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.796	98	Roofs, HSG C
0.796		100.00% Impervious Area

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

Subcatchment PR-3-BLDG: Building



Summary for Subcatchment PR-3-CY: Drainage Area Courtyard

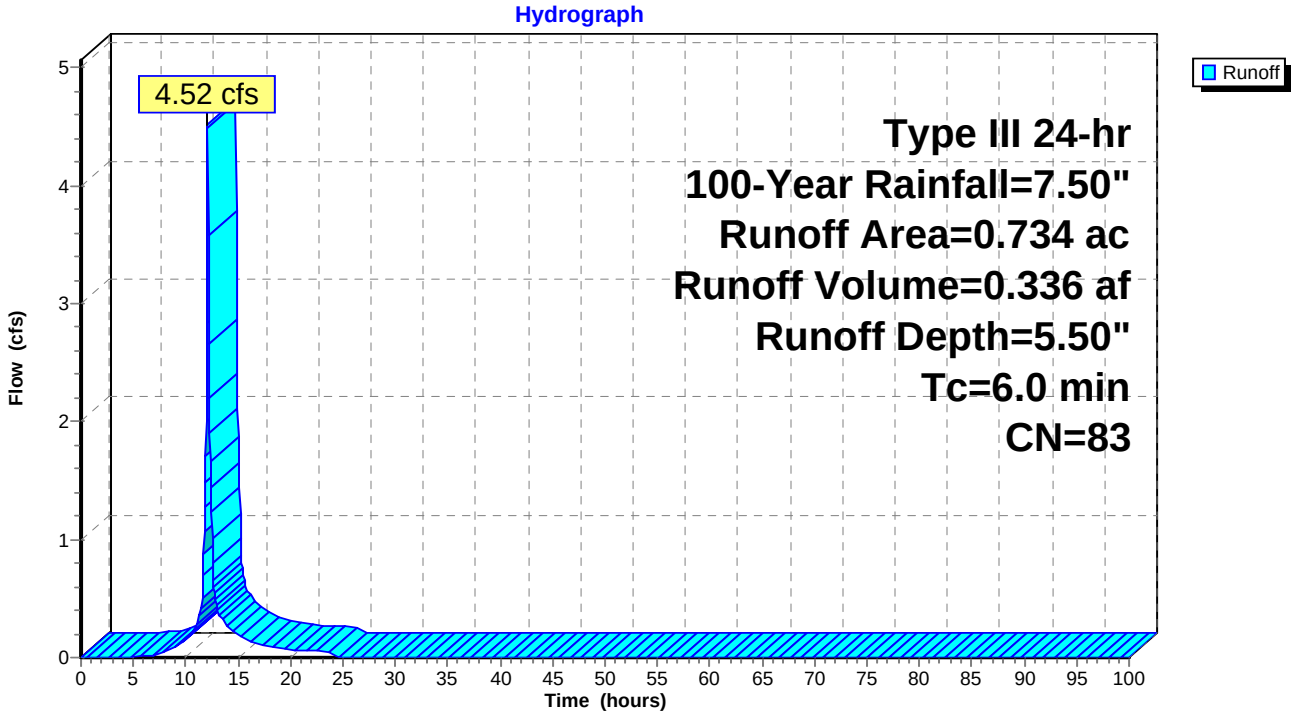
Runoff = 4.52 cfs @ 12.09 hrs, Volume= 0.336 af, Depth= 5.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.462	74	>75% Grass cover, Good, HSG C
0.272	98	Paved parking, HSG C
0.734	83	Weighted Average
0.462		62.94% Pervious Area
0.272		37.06% Impervious Area

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

Subcatchment PR-3-CY: Drainage Area Courtyard



Summary for Subcatchment PR-3-DA: Drainage Area 3

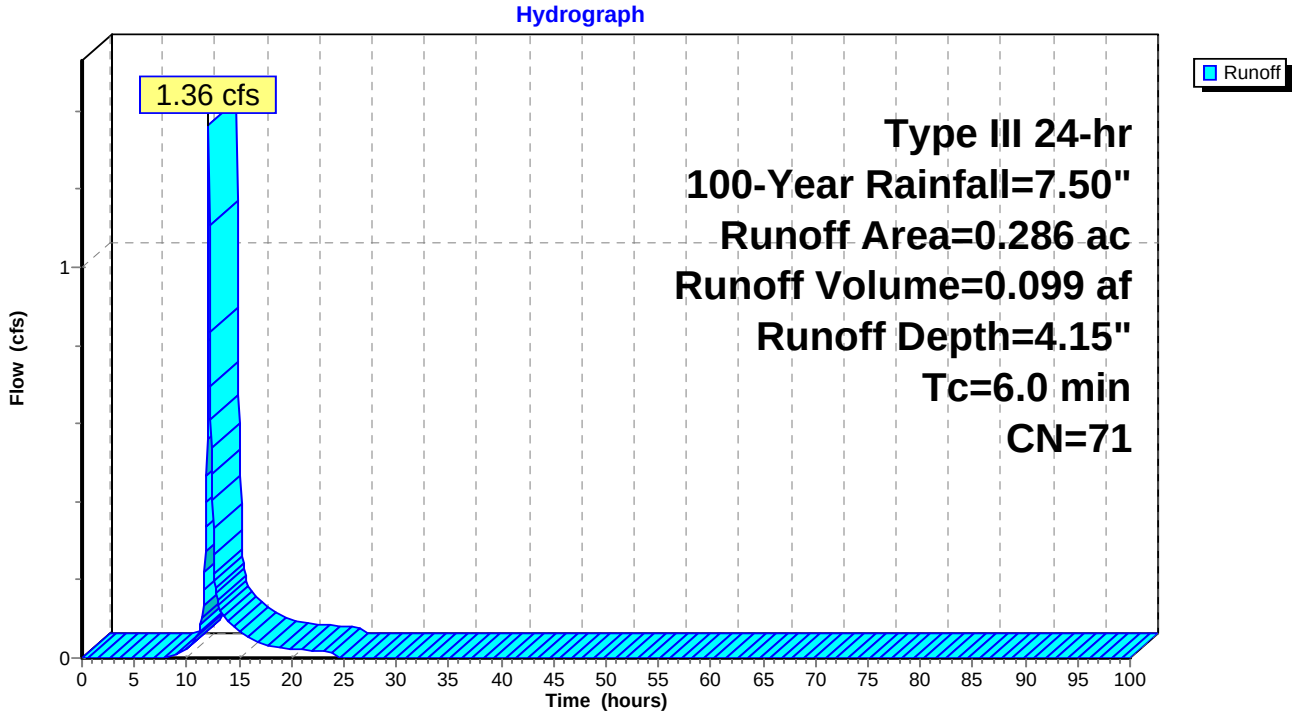
Runoff = 1.36 cfs @ 12.09 hrs, Volume= 0.099 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.50"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.236	70	Woods, Good, HSG C
0.286	71	Weighted Average
0.286		100.00% Pervious Area

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

Subcatchment PR-3-DA: Drainage Area 3



Summary for Pond Bio Basin: Bioretention

Inflow Area = 0.410 ac, 32.20% Impervious, Inflow Depth = 5.39" for 100-Year event
Inflow = 2.48 cfs @ 12.09 hrs, Volume= 0.184 af
Outflow = 2.40 cfs @ 12.11 hrs, Volume= 0.184 af, Atten= 3%, Lag= 1.4 min
Primary = 2.40 cfs @ 12.11 hrs, Volume= 0.184 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 225.64' @ 12.11 hrs Surf.Area= 0.046 ac Storage= 0.027 af

Plug-Flow detention time= 49.0 min calculated for 0.184 af (100% of inflow)
Center-of-Mass det. time= 49.0 min (849.4 - 800.5)

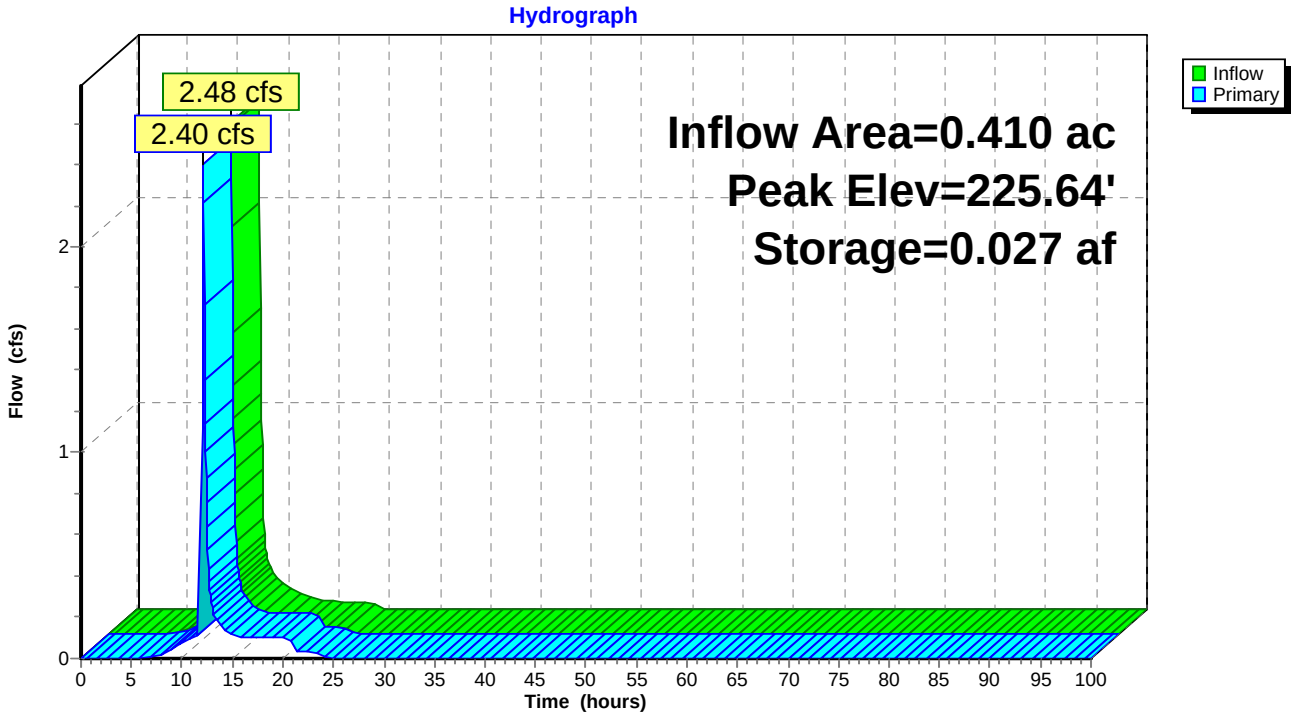
Volume	Invert	Avail.Storage	Storage Description
#1	225.00'	0.070 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
225.00	0.038	0.000	0.000
226.00	0.051	0.044	0.044
226.50	0.051	0.025	0.070

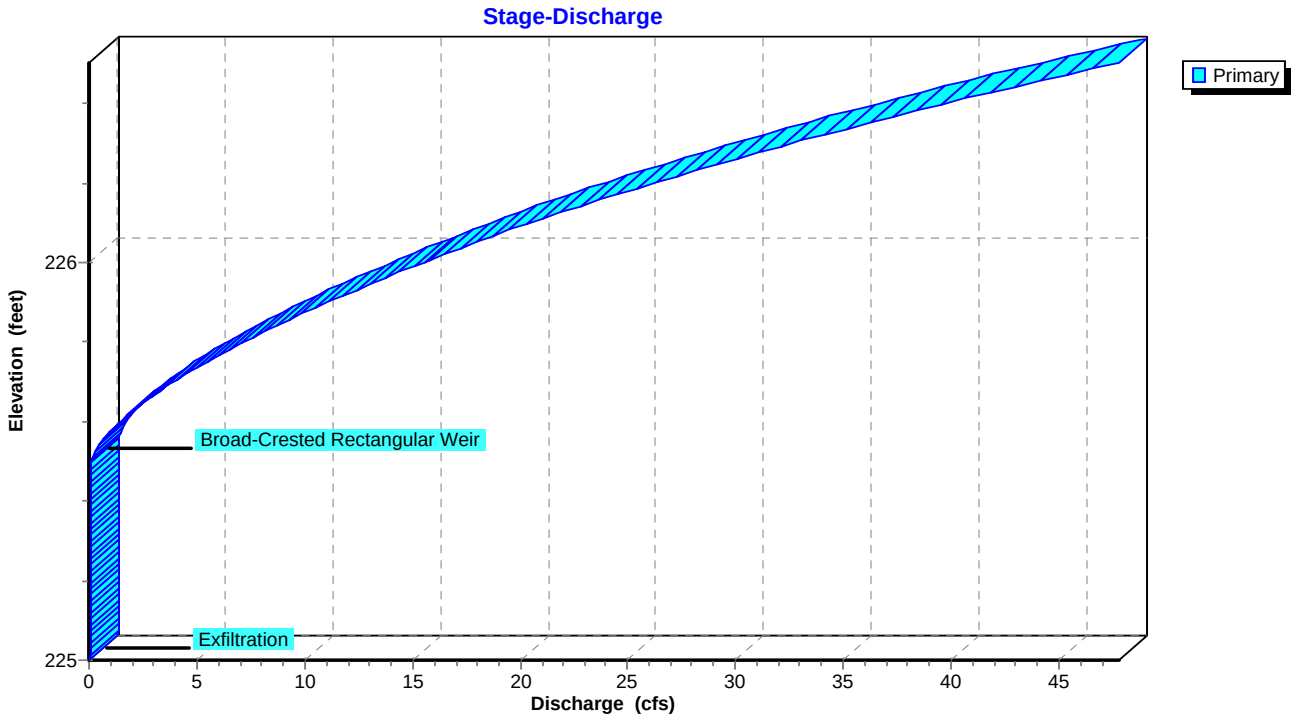
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	**0.10 cfs Exfiltration at all elevations**
#2	Primary	225.50'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.33 cfs @ 12.11 hrs HW=225.64' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 2.23 cfs @ 1.00 fps)

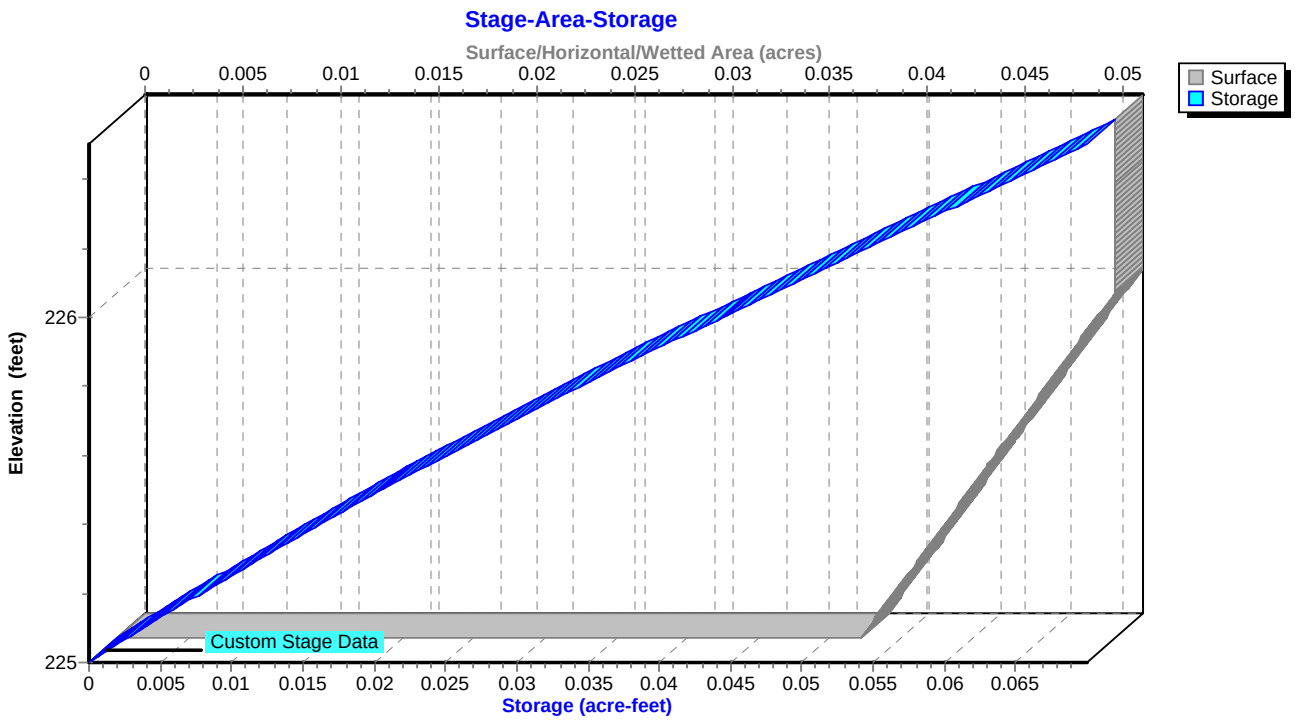
Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Summary for Pond Det 1: Detention Basin

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 6.13" for 100-Year event
Inflow = 19.65 cfs @ 12.09 hrs, Volume= 1.537 af
Outflow = 11.08 cfs @ 12.22 hrs, Volume= 1.537 af, Atten= 44%, Lag= 7.6 min
Primary = 11.08 cfs @ 12.22 hrs, Volume= 1.537 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 198.50' @ 12.22 hrs Surf.Area= 0.091 ac Storage= 0.289 af

Plug-Flow detention time= 25.5 min calculated for 1.536 af (100% of inflow)
Center-of-Mass det. time= 25.6 min (800.0 - 774.4)

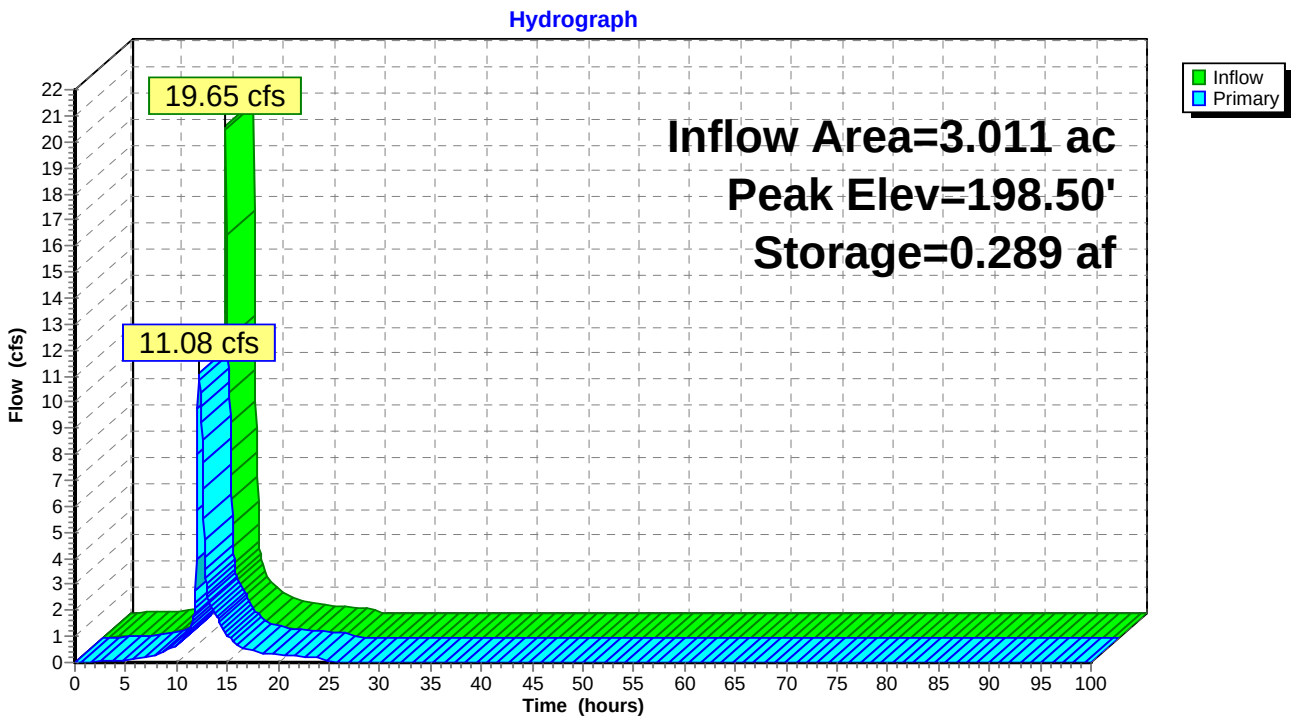
Volume	Invert	Avail.Storage	Storage Description
#1	194.00'	0.440 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
194.00	0.040	0.000	0.000
195.00	0.049	0.044	0.044
196.00	0.060	0.054	0.099
197.00	0.073	0.066	0.166
198.00	0.085	0.079	0.244
199.00	0.098	0.091	0.336
200.00	0.110	0.104	0.440

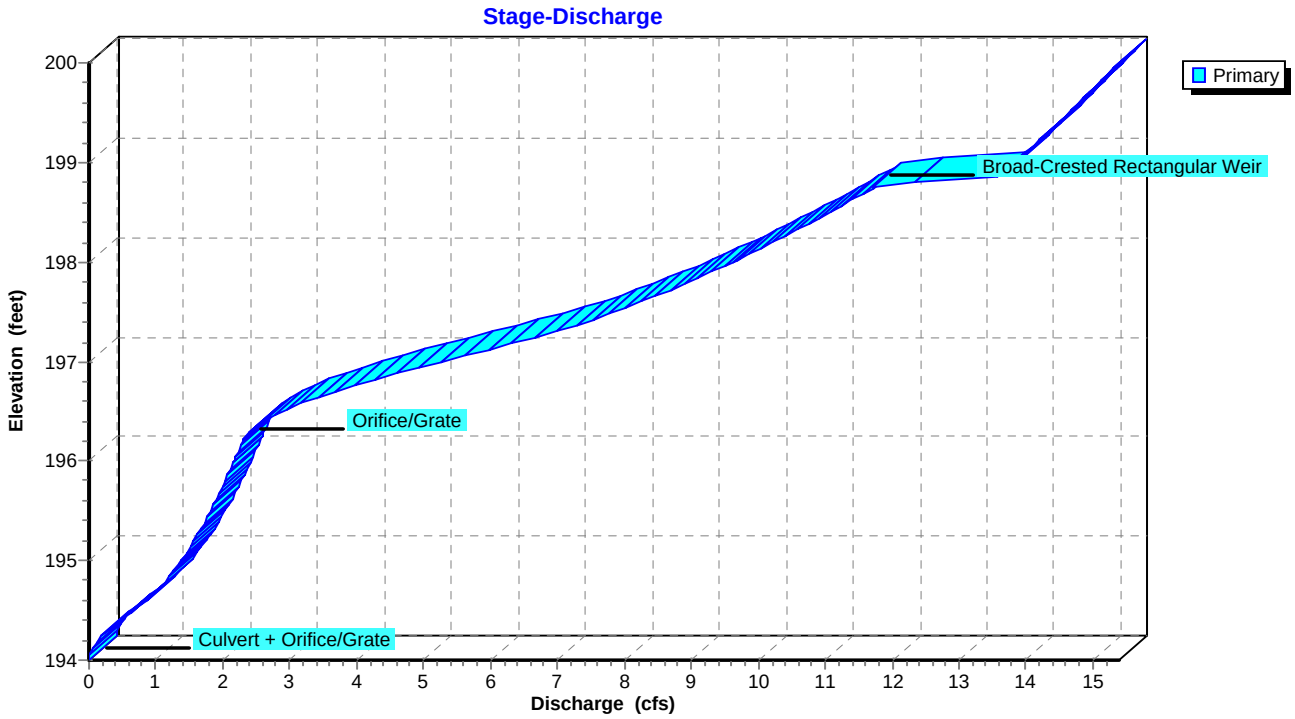
Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	**18.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 194.00' / 192.00' S= 0.0333 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	194.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	196.20'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	198.75'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=11.03 cfs @ 12.22 hrs HW=198.48' (Free Discharge)
└─**1=Culvert** (Passes 11.03 cfs of 12.98 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 3.42 cfs @ 9.81 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 7.61 cfs @ 6.20 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

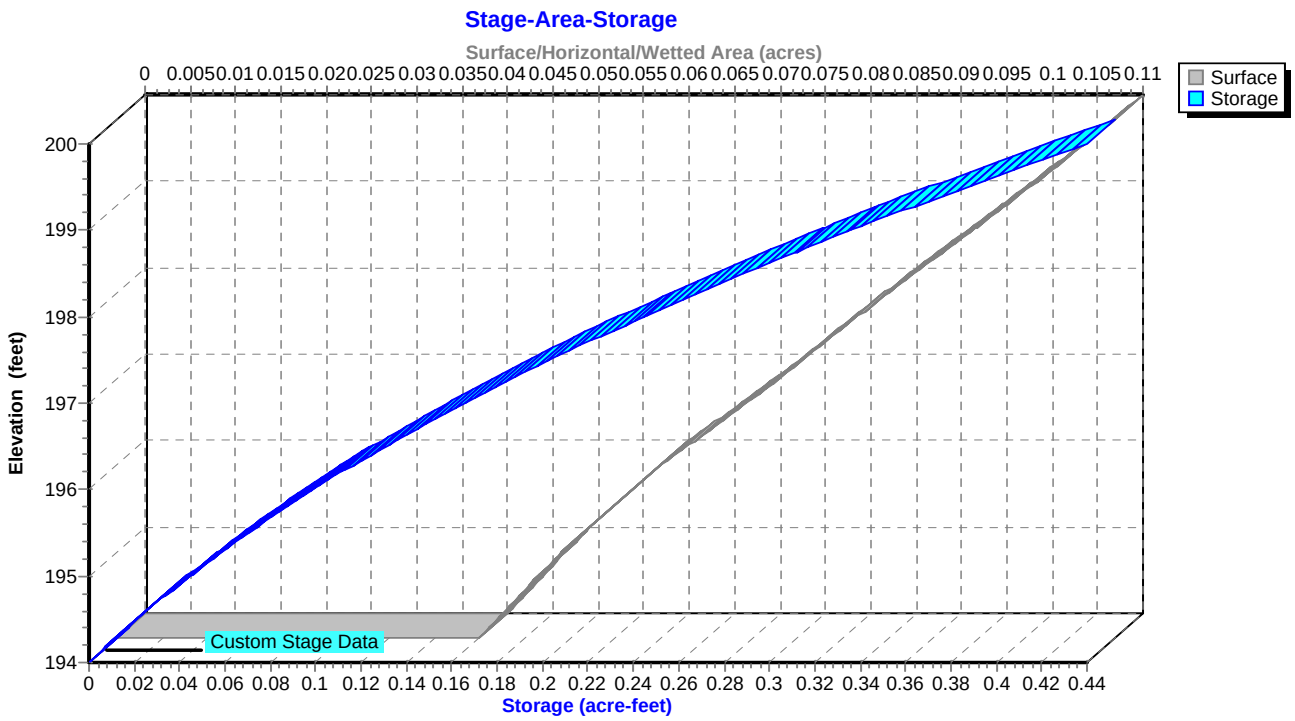
Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Summary for Pond Det 2: Detention Basin

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 2.48" for 100-Year event
Inflow = 25.39 cfs @ 12.09 hrs, Volume= 0.983 af
Outflow = 23.30 cfs @ 12.12 hrs, Volume= 0.982 af, Atten= 8%, Lag= 1.9 min
Primary = 23.30 cfs @ 12.12 hrs, Volume= 0.982 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 214.24' @ 12.12 hrs Surf.Area= 0.028 ac Storage= 0.057 af

Plug-Flow detention time= 2.8 min calculated for 0.982 af (100% of inflow)
Center-of-Mass det. time= 2.5 min (753.1 - 750.6)

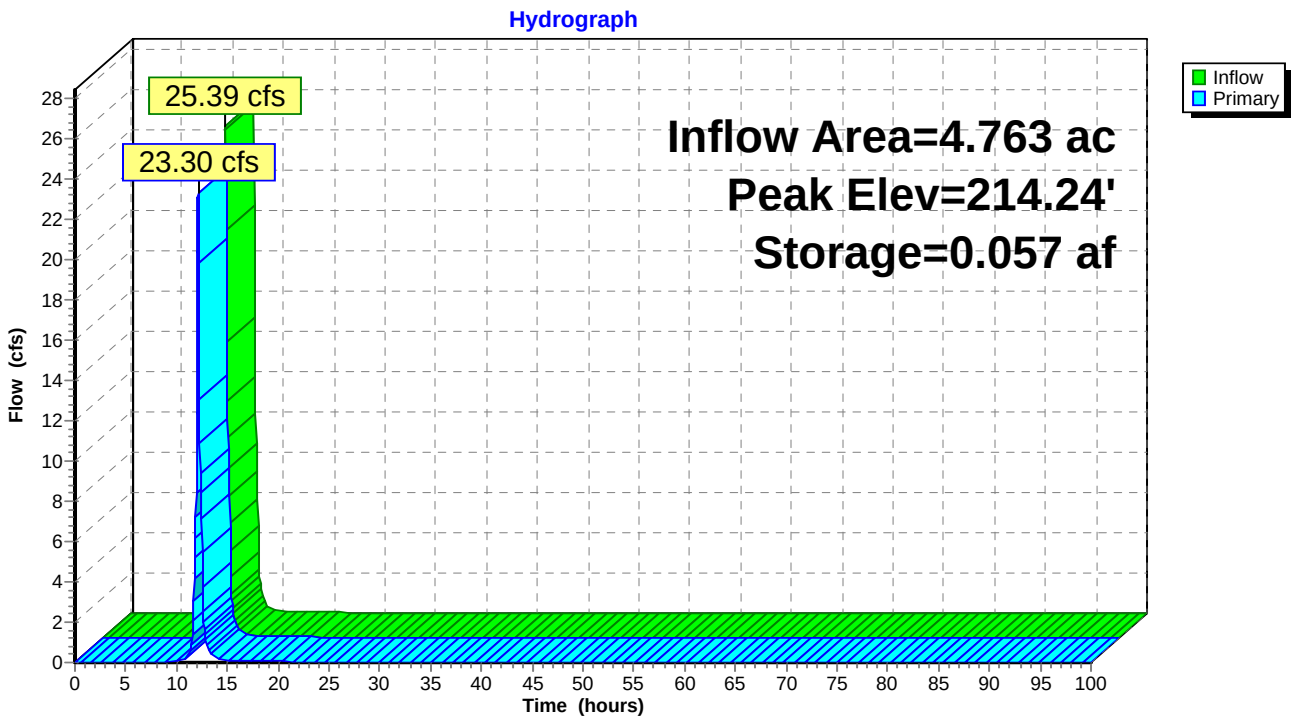
Volume	Invert	Avail.Storage	Storage Description
#1	211.00'	0.116 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
211.00	0.009	0.000	0.000
212.00	0.014	0.012	0.012
213.00	0.019	0.016	0.028
214.00	0.026	0.022	0.050
215.00	0.033	0.029	0.080
216.00	0.040	0.036	0.116

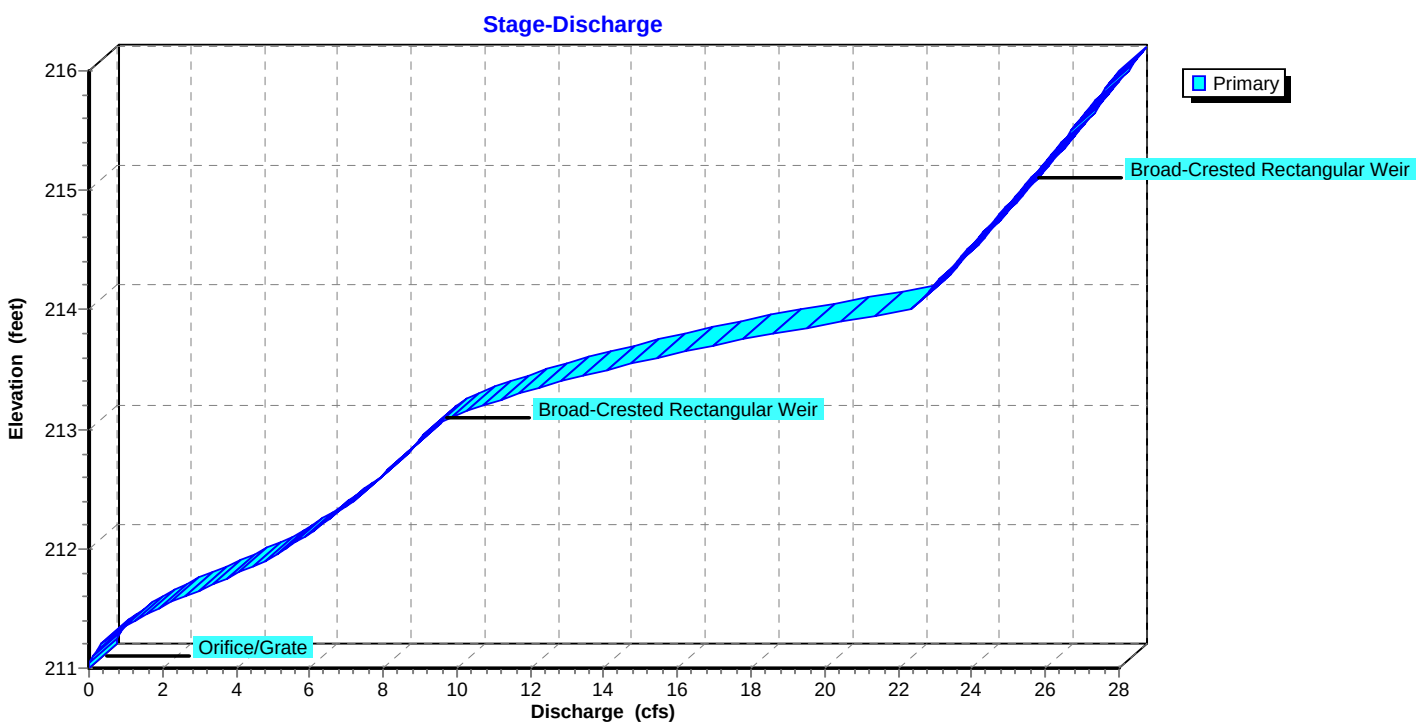
Device	Routing	Invert	Outlet Devices
#1	Primary	209.50'	**24.0" Round Culvert** L= 65.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 209.50' / 205.00' S= 0.0692 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	211.00'	**12.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	213.00'	**3.5' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#4	Device 1	215.00'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=22.95 cfs @ 12.12 hrs HW=214.19' (Free Discharge)
└─**1=Culvert** (Inlet Controls 22.95 cfs @ 7.31 fps)
  ├─**2=Orifice/Grate** (Passes < 12.42 cfs potential flow)
  ├─**3=Broad-Crested Rectangular Weir** (Passes < 14.07 cfs potential flow)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

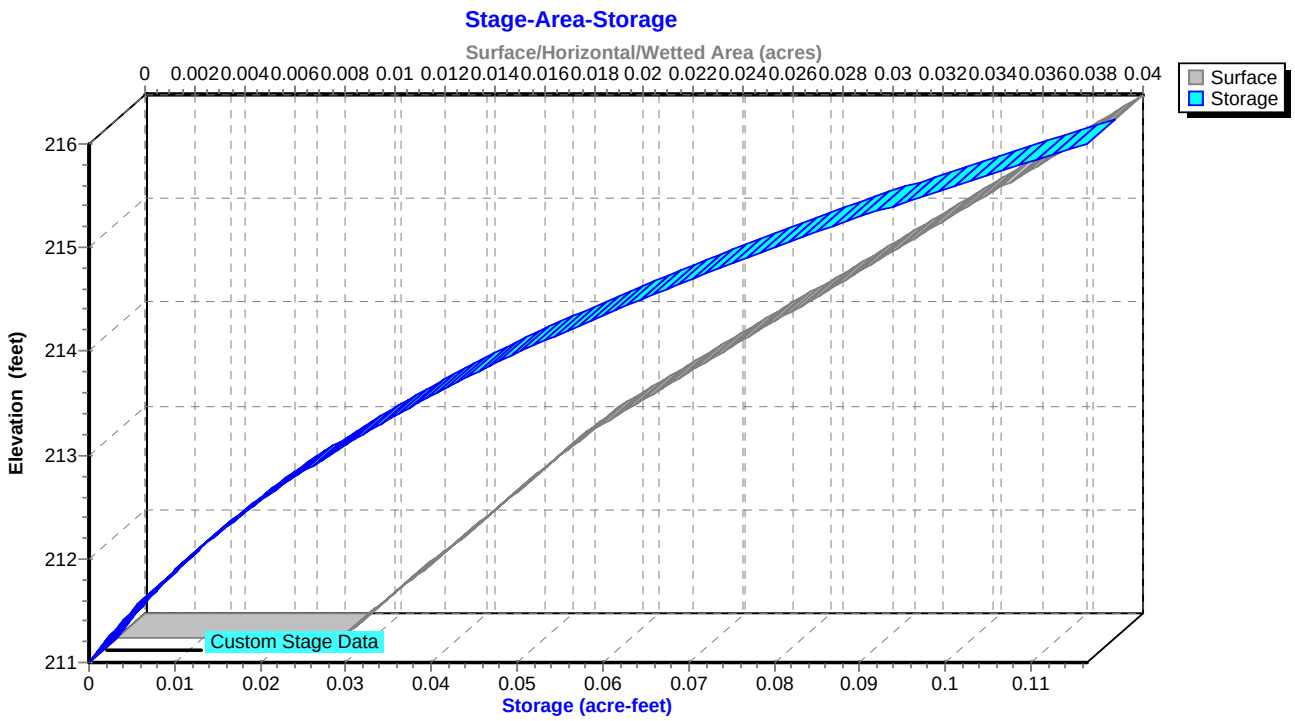
Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Summary for Pond Det 3: Underground Detention Pipe

Inflow Area = 1.530 ac, 69.80% Impervious, Inflow Depth = 6.42" for 100-Year event
Inflow = 10.24 cfs @ 12.09 hrs, Volume= 0.818 af
Outflow = 9.95 cfs @ 12.09 hrs, Volume= 0.818 af, Atten= 3%, Lag= 0.3 min
Primary = 9.95 cfs @ 12.09 hrs, Volume= 0.818 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 217.93' @ 12.09 hrs Surf.Area= 0.009 ac Storage= 0.030 af

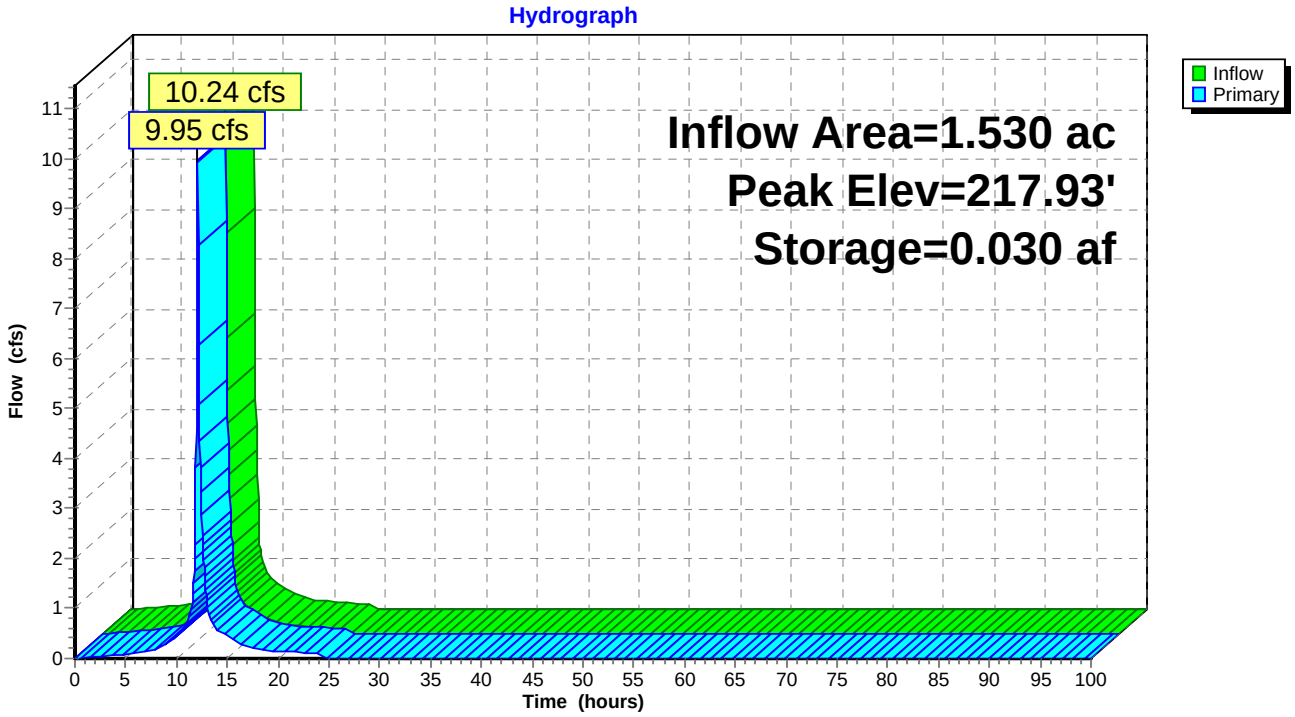
Plug-Flow detention time= 4.1 min calculated for 0.818 af (100% of inflow)
Center-of-Mass det. time= 3.8 min (768.8 - 765.0)

Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.033 af	**42.0" Round Pipe Storage** x 2 L= 75.0'

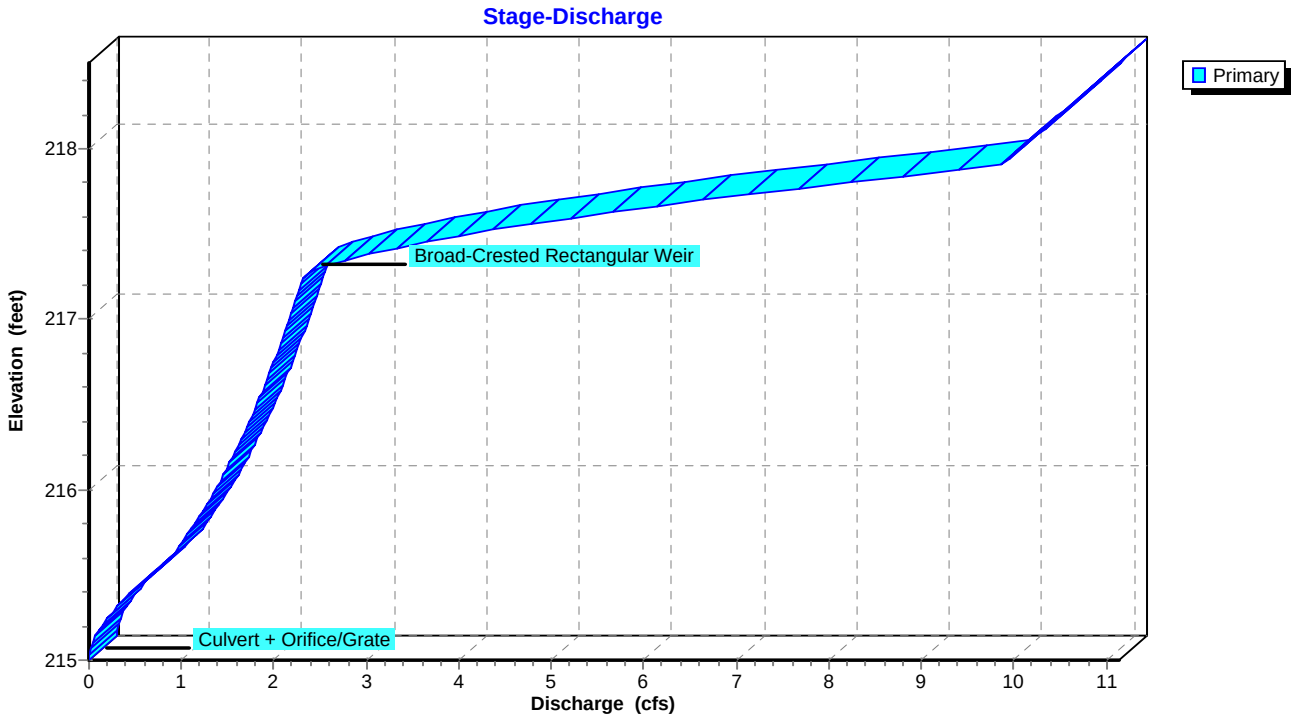
Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 36.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.00' / 214.50' S= 0.0139 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	215.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	217.25'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=9.89 cfs @ 12.09 hrs HW=217.92' (Free Discharge)
└─**1=Culvert** (Inlet Controls 9.89 cfs @ 5.60 fps)
  ├─**2=Orifice/Grate** (Passes < 2.70 cfs potential flow)
  └─**3=Broad-Crested Rectangular Weir** (Passes < 7.57 cfs potential flow)

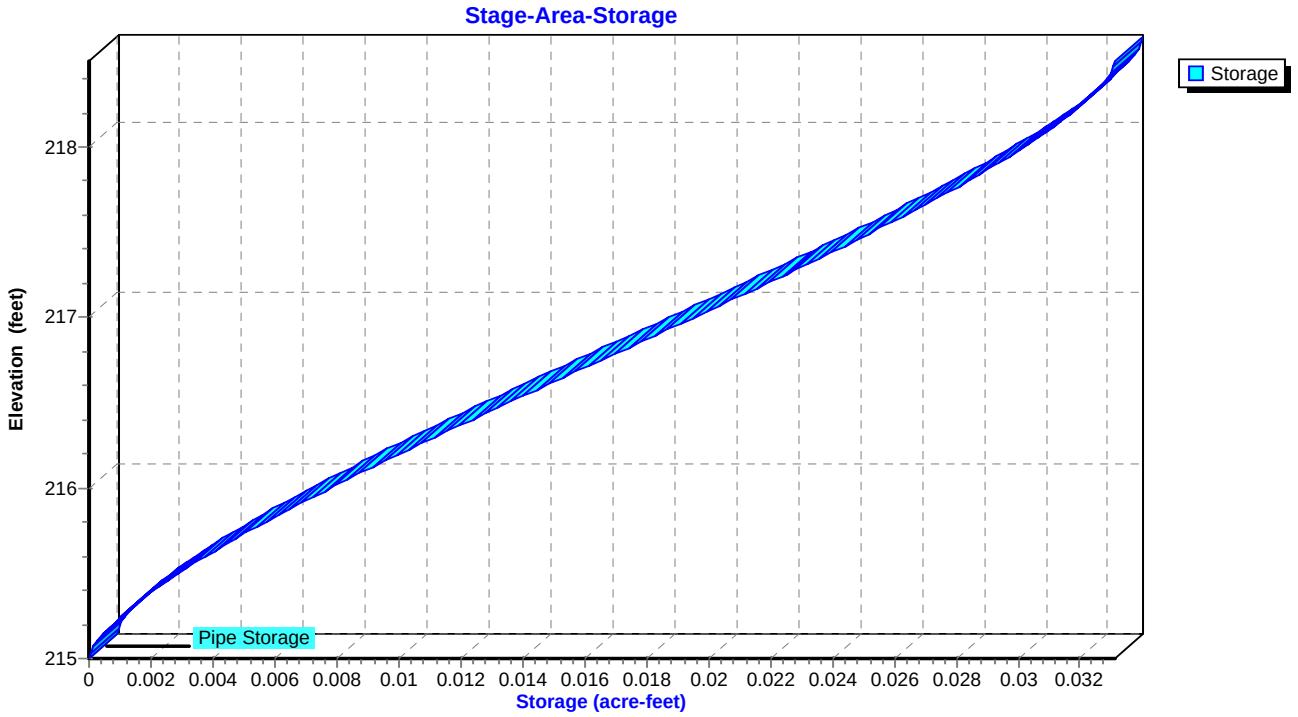
Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Summary for Pond Sandfilter: Sandfilter

Inflow Area =	4.353 ac, 66.46% Impervious, Inflow Depth = 6.12" for 100-Year event				
Inflow =	28.50 cfs @	12.09 hrs,	Volume=	2.221 af	
Outflow =	28.50 cfs @	12.09 hrs,	Volume=	2.221 af,	Atten= 0%, Lag= 0.0 min
Primary =	23.06 cfs @	12.09 hrs,	Volume=	0.799 af	
Secondary =	5.43 cfs @	12.09 hrs,	Volume=	1.422 af	

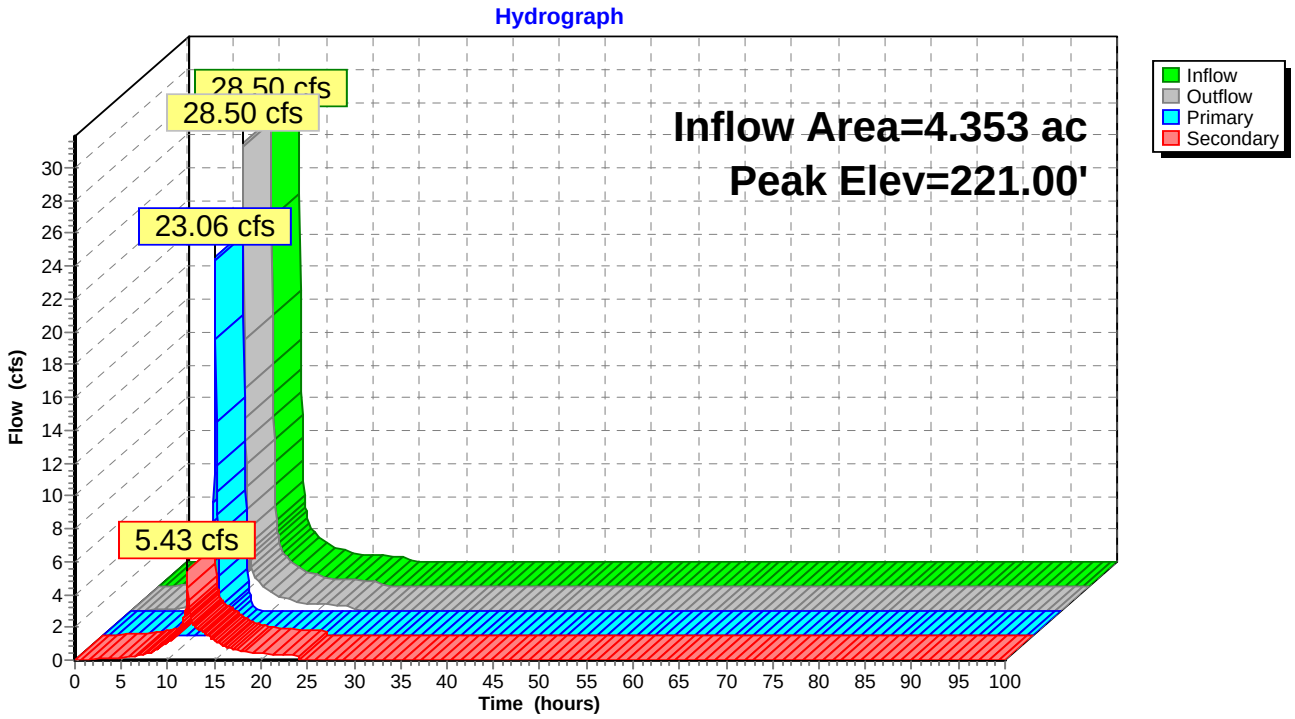
Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 221.00' @ 12.09 hrs
Flood Elev= 221.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 88.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 215.00' / 212.00' S= 0.0341 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	214.00'	**8.0" Round Culvert** L= 9.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 214.00' / 213.80' S= 0.0222 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

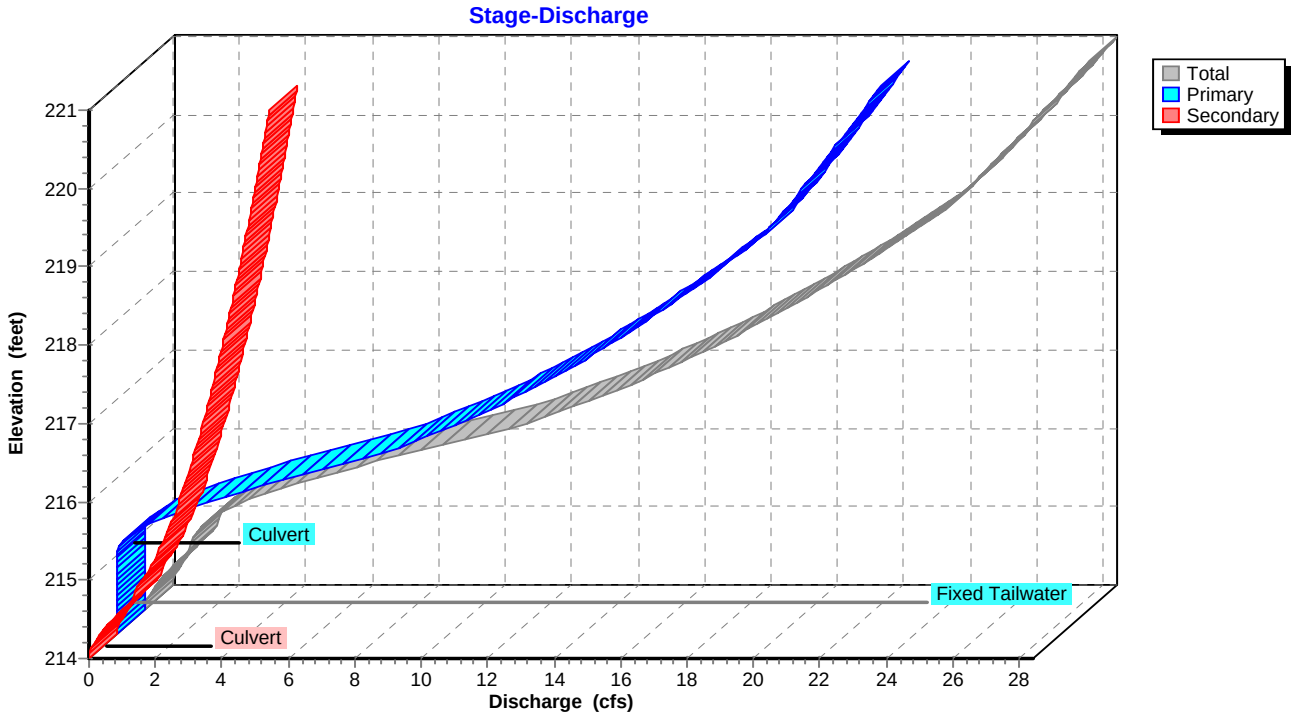
Primary OutFlow Max=22.48 cfs @ 12.09 hrs HW=220.70' TW=214.24' (Fixed TW Elev= 214.24')
└─**1=Culvert** (Outlet Controls 22.48 cfs @ 12.72 fps)

Secondary OutFlow Max=5.31 cfs @ 12.09 hrs HW=220.72' (Free Discharge)
└─**2=Culvert** (Inlet Controls 5.31 cfs @ 15.21 fps)

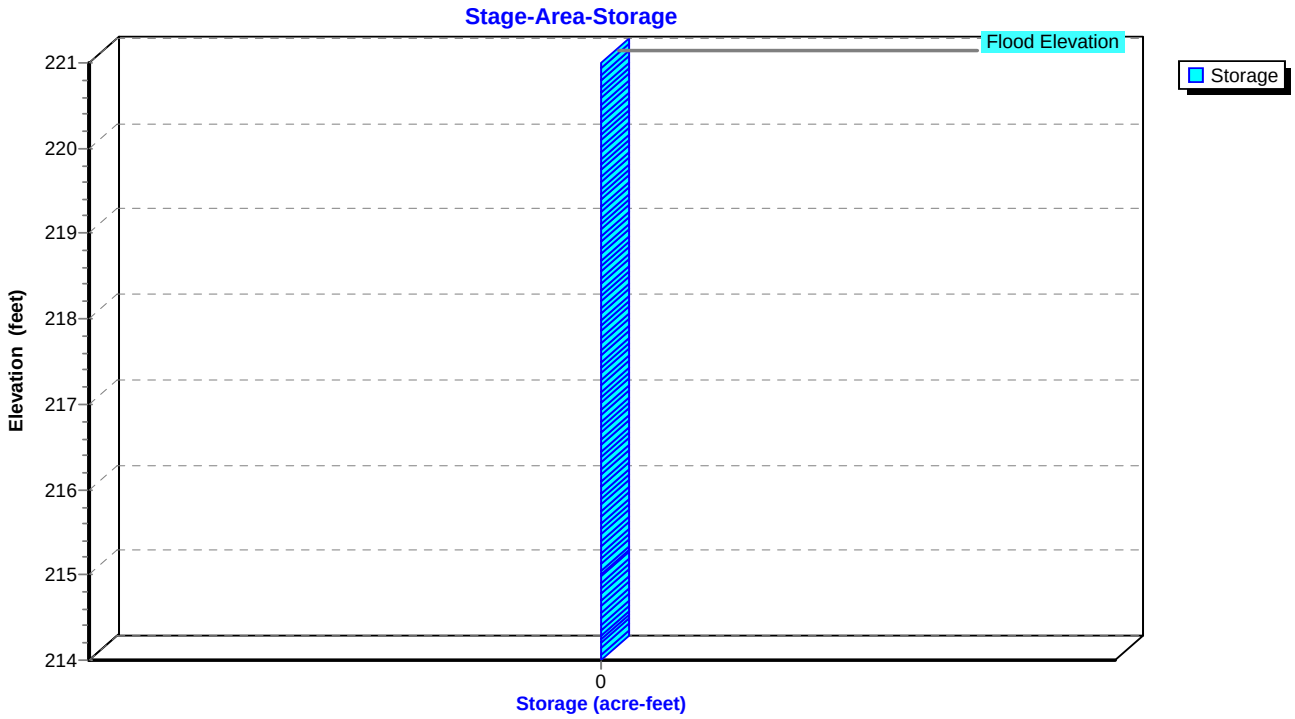
Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter

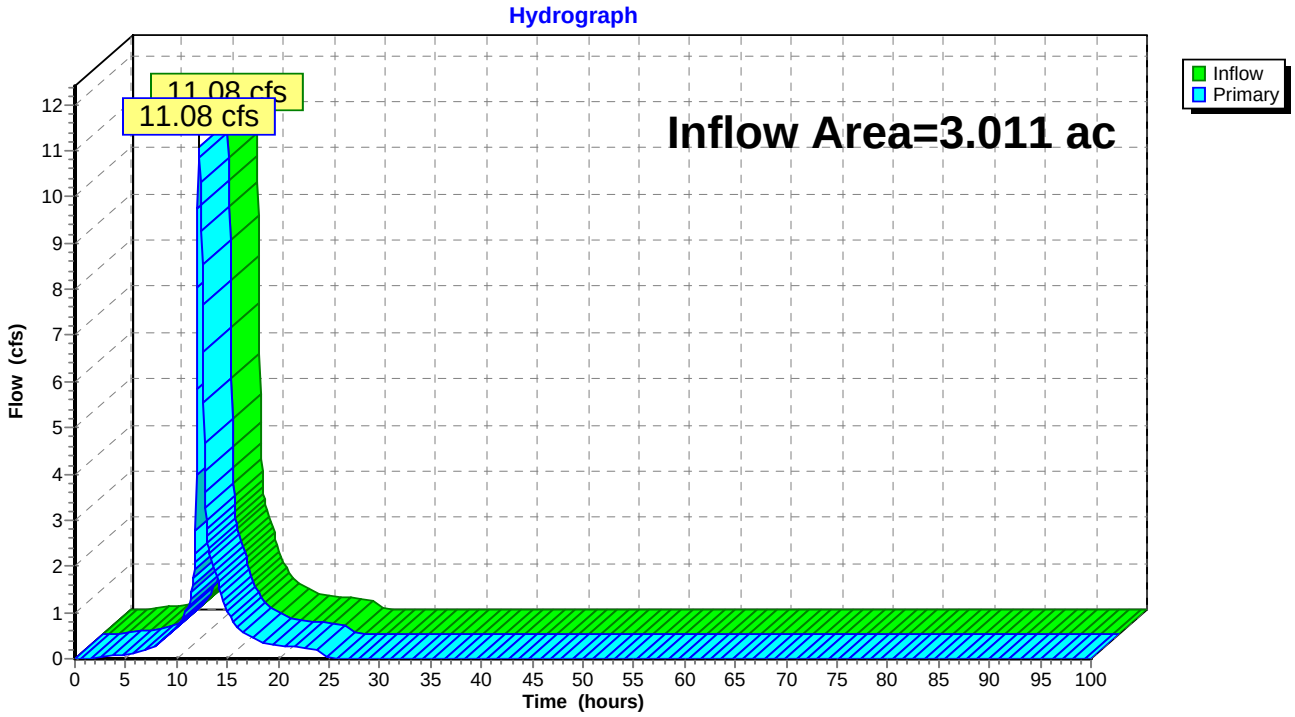


Summary for Link Pt. A: Point A

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 6.13" for 100-Year event
Inflow = 11.08 cfs @ 12.22 hrs, Volume= 1.537 af
Primary = 11.08 cfs @ 12.22 hrs, Volume= 1.537 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

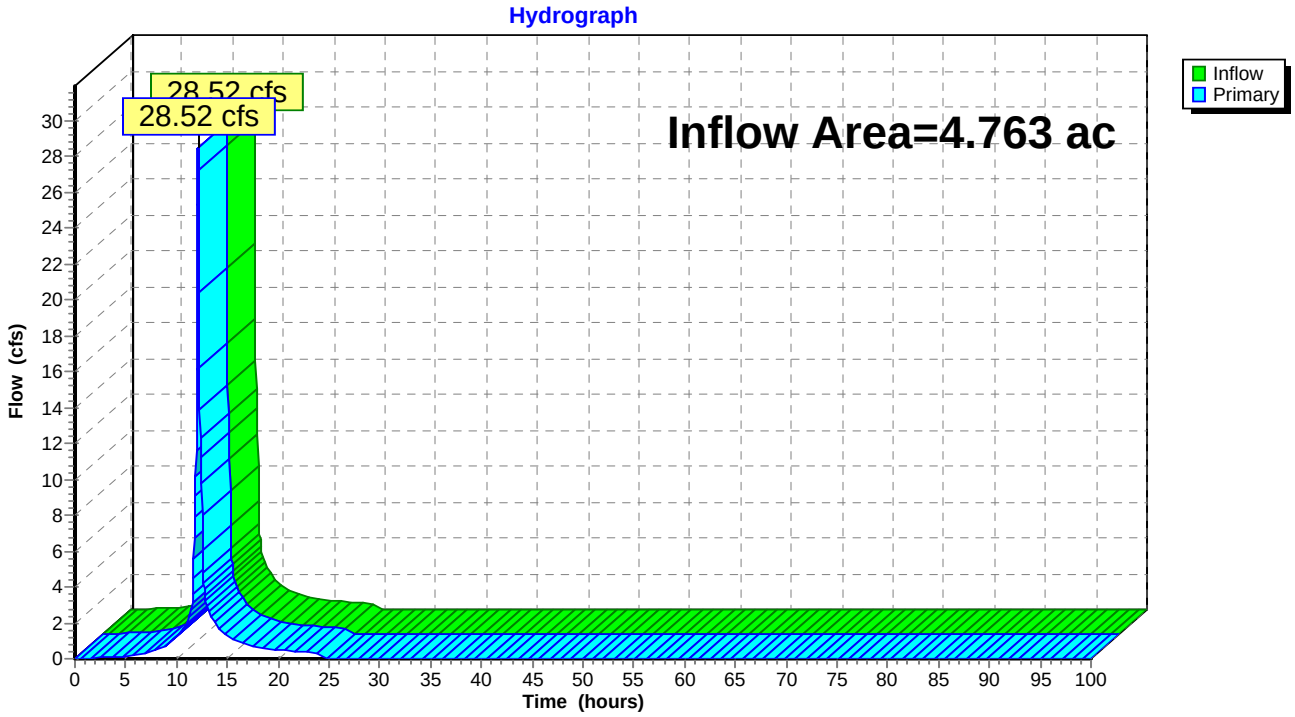


Summary for Link Pt. B: Point B

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 6.06" for 100-Year event
Inflow = 28.52 cfs @ 12.11 hrs, Volume= 2.404 af
Primary = 28.52 cfs @ 12.11 hrs, Volume= 2.404 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

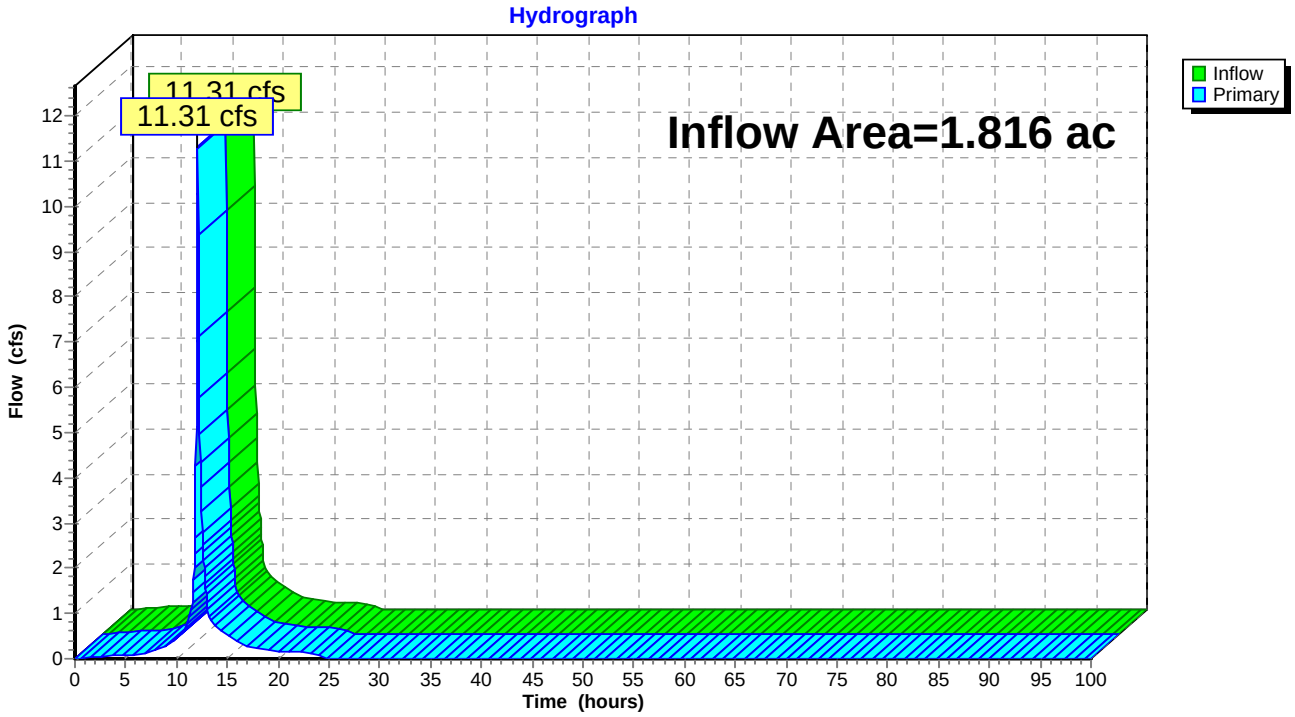


Summary for Link Pt.C: Point C

Inflow Area = 1.816 ac, 58.81% Impervious, Inflow Depth = 6.06" for 100-Year event
Inflow = 11.31 cfs @ 12.09 hrs, Volume= 0.917 af
Primary = 11.31 cfs @ 12.09 hrs, Volume= 0.917 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Time span=0.00-100.00 hrs, dt=0.05 hrs, 2001 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 Bio: Bioretention DA Runoff Area=0.410 ac 32.20% Impervious Runoff Depth=1.38"
Tc=6.0 min CN=82 Runoff=0.65 cfs 0.047 af

Subcatchment PR-1-BLDG: Building Runoff Area=1.070 ac 100.00% Impervious Runoff Depth=2.77"
Tc=6.0 min CN=98 Runoff=3.04 cfs 0.247 af

Subcatchment PR-1-DA: Drainage Area 1 Runoff Area=1.941 ac 39.82% Impervious Runoff Depth=1.45"
Tc=6.0 min CN=83 Runoff=3.22 cfs 0.234 af

Subcatchment PR-2-Bldg: Building Runoff Area=1.337 ac 100.00% Impervious Runoff Depth=2.77"
Tc=6.0 min CN=98 Runoff=3.80 cfs 0.308 af

Subcatchment PR-2-DA: Drainage Area 2 Runoff Area=3.016 ac 51.59% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=84 Runoff=5.25 cfs 0.381 af

Subcatchment PR-3-BLDG: Building Runoff Area=0.796 ac 100.00% Impervious Runoff Depth=2.77"
Tc=6.0 min CN=98 Runoff=2.26 cfs 0.184 af

Subcatchment PR-3-CY: Drainage Area Runoff Area=0.734 ac 37.06% Impervious Runoff Depth=1.45"
Tc=6.0 min CN=83 Runoff=1.22 cfs 0.088 af

Subcatchment PR-3-DA: Drainage Area 3 Runoff Area=0.286 ac 0.00% Impervious Runoff Depth=0.76"
Tc=6.0 min CN=71 Runoff=0.22 cfs 0.018 af

Pond Bio Basin: Bioretention Peak Elev=225.36' Storage=0.014 af Inflow=0.65 cfs 0.047 af
Outflow=0.10 cfs 0.047 af

Pond Det 1: Detention Basin Peak Elev=196.19' Storage=0.110 af Inflow=6.25 cfs 0.481 af
Outflow=2.29 cfs 0.481 af

Pond Det 2: Detention Basin Peak Elev=212.09' Storage=0.013 af Inflow=6.34 cfs 0.184 af
Outflow=5.80 cfs 0.184 af

Pond Det 3: Underground Detention Pipe Peak Elev=217.26' Storage=0.023 af Inflow=3.47 cfs 0.272 af
Outflow=2.33 cfs 0.272 af

Pond Sandfilter: Sandfilter Peak Elev=216.11' Inflow=9.04 cfs 0.690 af
Primary=6.24 cfs 0.137 af Secondary=2.80 cfs 0.552 af Outflow=9.04 cfs 0.690 af

Link Pt. A: Point A Inflow=2.29 cfs 0.481 af
Primary=2.29 cfs 0.481 af

Link Pt. B: Point B Inflow=8.58 cfs 0.737 af
Primary=8.58 cfs 0.737 af

Link Pt.C: Point C Inflow=2.52 cfs 0.290 af
Primary=2.52 cfs 0.290 af

Total Runoff Area = 9.590 ac Runoff Volume = 1.508 af Average Runoff Depth = 1.89"
38.10% Pervious = 3.654 ac 61.90% Impervious = 5.936 ac

Summary for Subcatchment Bio: Bioretention DA

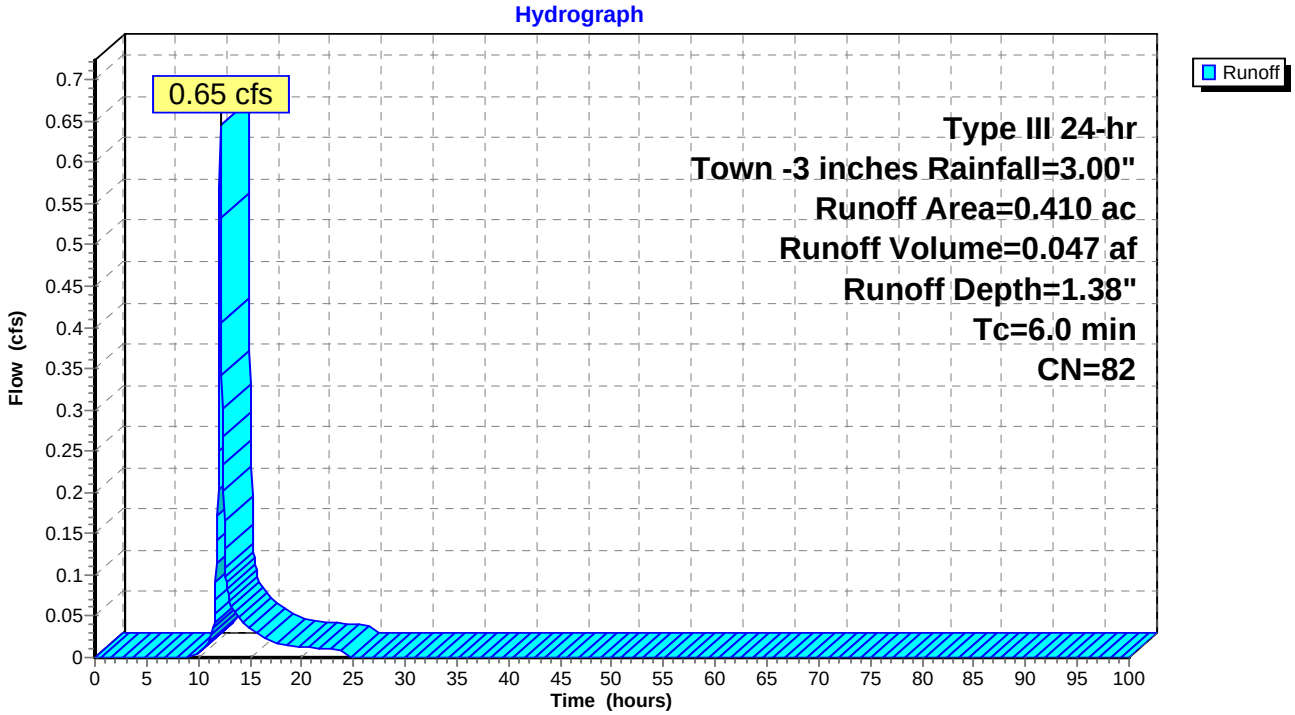
Runoff = 0.65 cfs @ 12.10 hrs, Volume= 0.047 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr Town -3 inches Rainfall=3.00"

Area (ac)	CN	Description
0.278	74	>75% Grass cover, Good, HSG C
0.132	98	Paved parking, HSG C
0.410	82	Weighted Average
0.278		67.80% Pervious Area
0.132		32.20% Impervious Area

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

Subcatchment Bio: Bioretention DA



Summary for Subcatchment PR-1-BLDG: Building

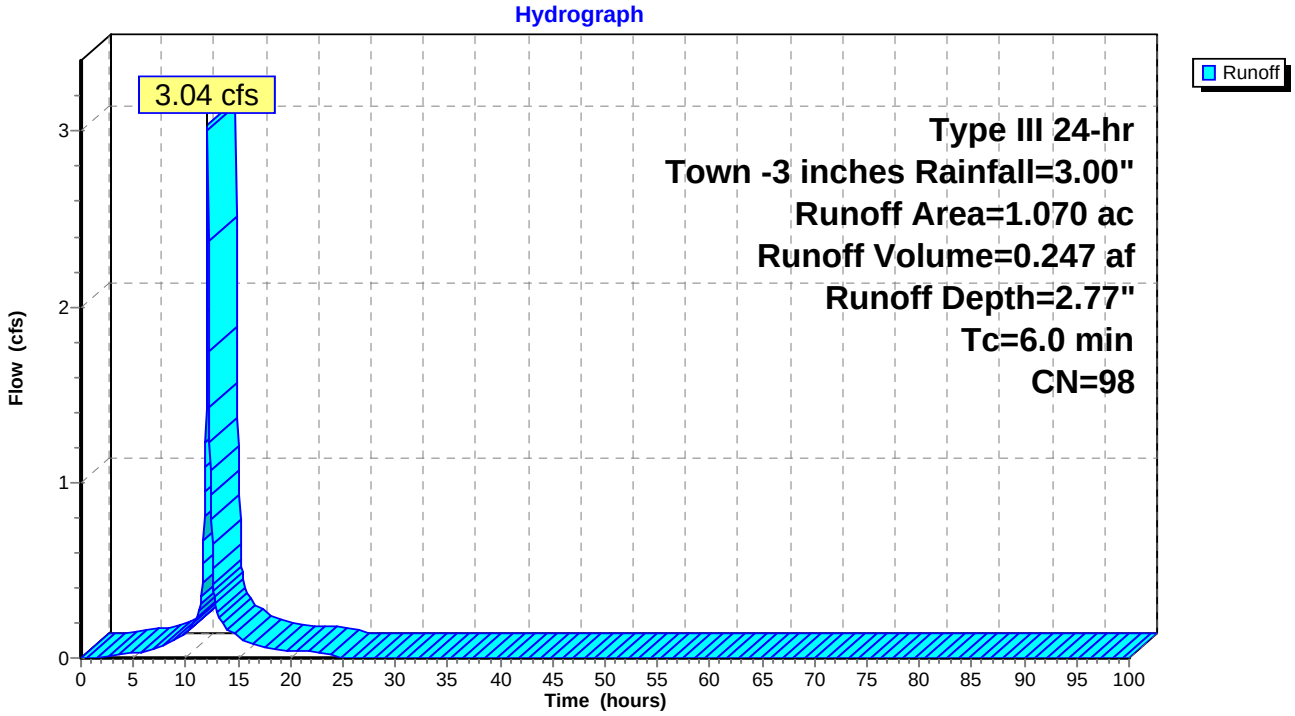
Runoff = 3.04 cfs @ 12.09 hrs, Volume= 0.247 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr Town -3 inches Rainfall=3.00"

Area (ac)	CN	Description
1.070	98	Roofs, HSG B
1.070		100.00% Impervious Area

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

Subcatchment PR-1-BLDG: Building



Summary for Subcatchment PR-1-DA: Drainage Area 1

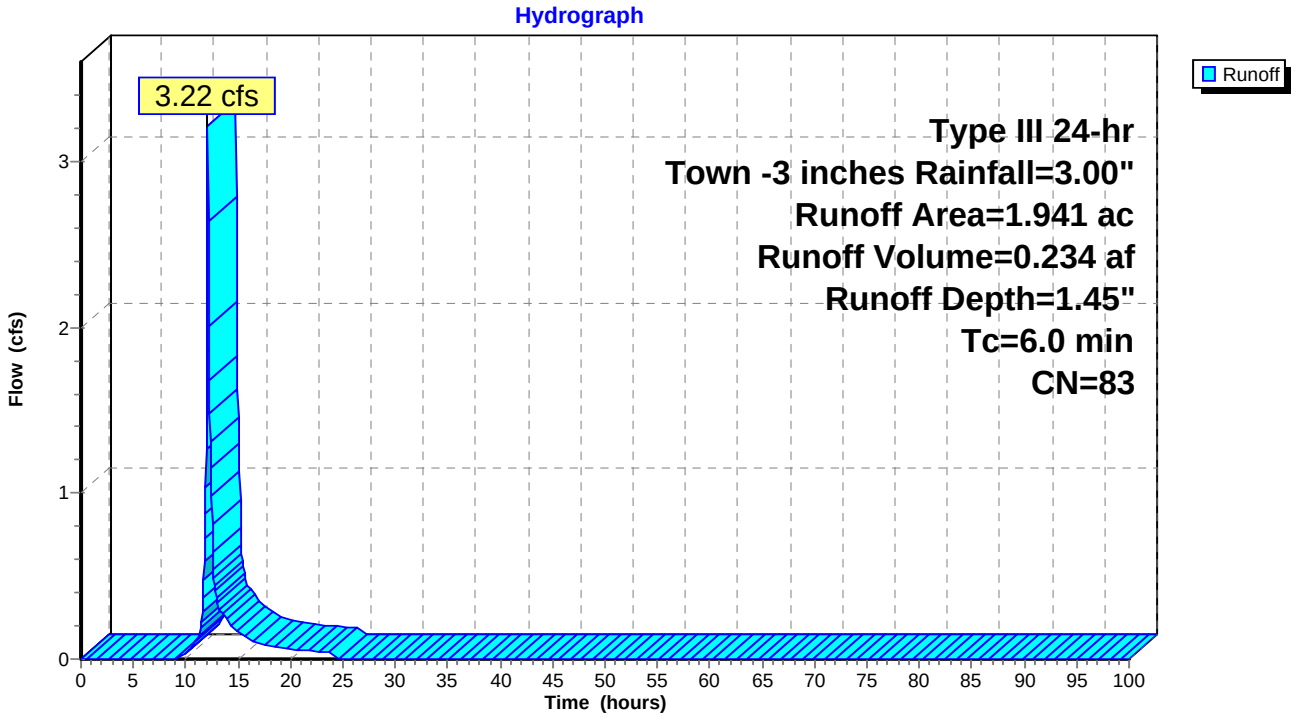
Runoff = 3.22 cfs @ 12.09 hrs, Volume= 0.234 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr Town -3 inches Rainfall=3.00"

Area (ac)	CN	Description
1.000	74	>75% Grass cover, Good, HSG C
0.773	98	Paved parking, HSG C
0.168	70	Woods, Good, HSG C
1.941	83	Weighted Average
1.168		60.18% Pervious Area
0.773		39.82% Impervious Area

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

Subcatchment PR-1-DA: Drainage Area 1



Summary for Subcatchment PR-2-Bldg: Building

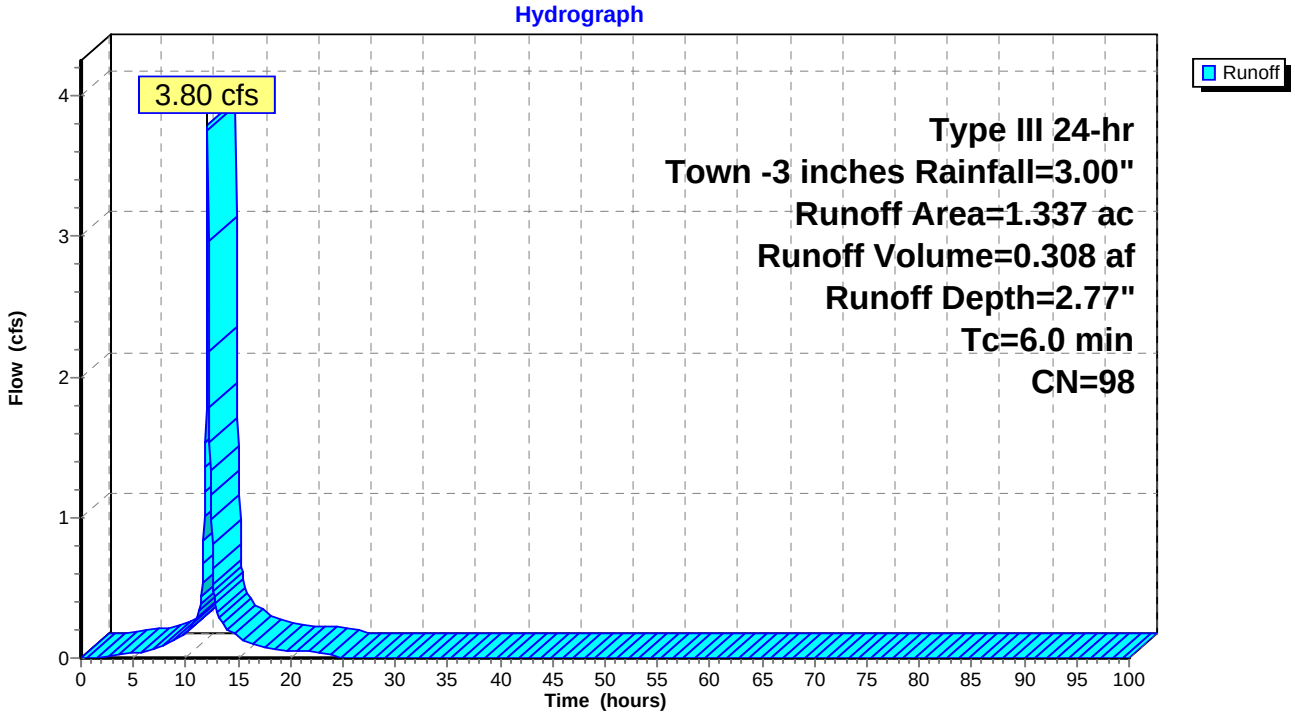
Runoff = 3.80 cfs @ 12.09 hrs, Volume= 0.308 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr Town -3 inches Rainfall=3.00"

Area (ac)	CN	Description
0.025	98	Roofs, HSG B
1.312	98	Roofs, HSG C
1.337	98	Weighted Average
1.337		100.00% Impervious Area

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

Subcatchment PR-2-Bldg: Building



Summary for Subcatchment PR-2-DA: Drainage Area 2

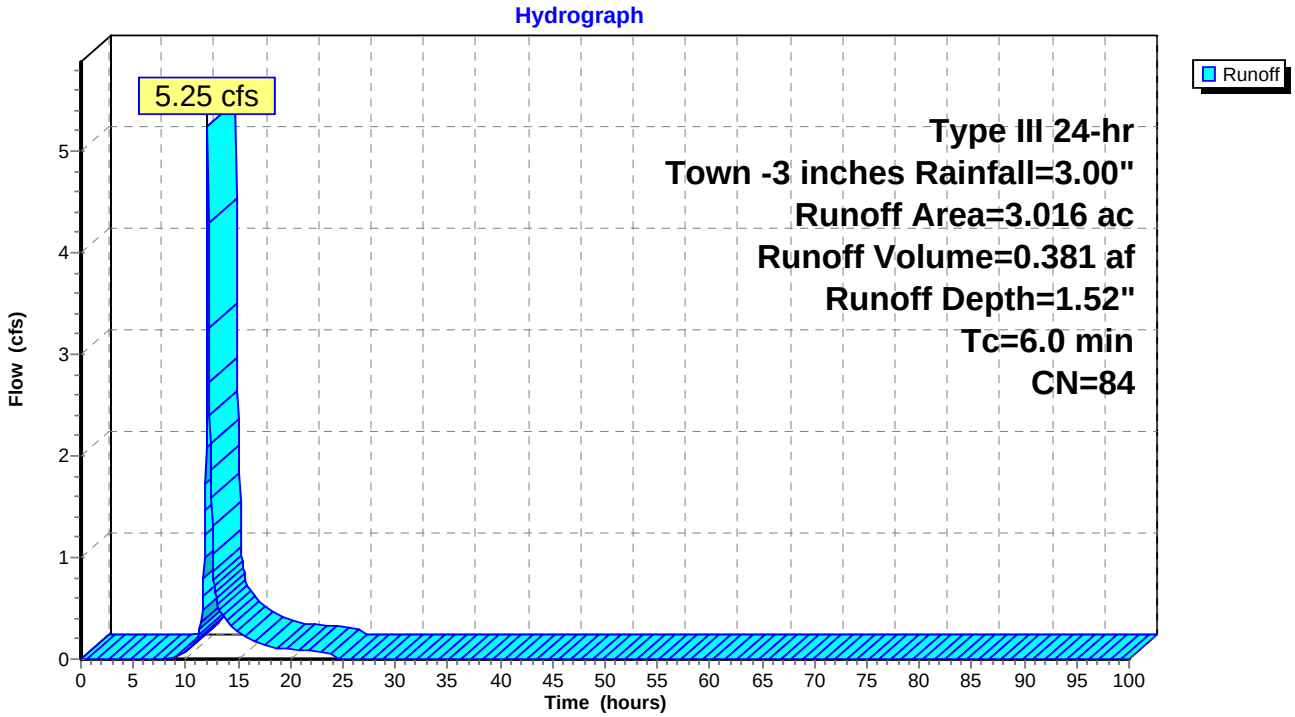
Runoff = 5.25 cfs @ 12.09 hrs, Volume= 0.381 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr Town -3 inches Rainfall=3.00"

Area (ac)	CN	Description
0.495	61	>75% Grass cover, Good, HSG B
0.790	74	>75% Grass cover, Good, HSG C
1.556	98	Paved parking, HSG C
0.126	70	Woods, Good, HSG C
0.049	55	Woods, Good, HSG B
3.016	84	Weighted Average
1.460		48.41% Pervious Area
1.556		51.59% Impervious Area

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

Subcatchment PR-2-DA: Drainage Area 2



Summary for Subcatchment PR-3-BLDG: Building

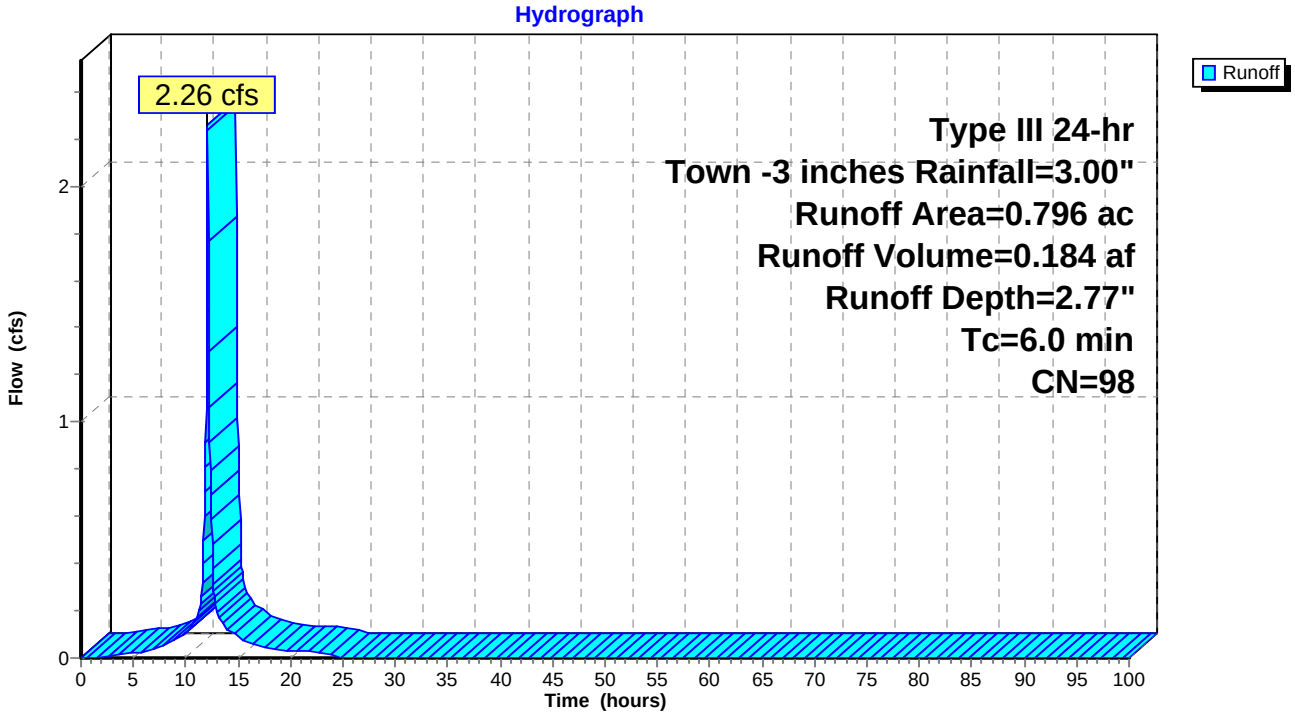
Runoff = 2.26 cfs @ 12.09 hrs, Volume= 0.184 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr Town -3 inches Rainfall=3.00"

Area (ac)	CN	Description
0.796	98	Roofs, HSG C
0.796		100.00% Impervious Area

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

Subcatchment PR-3-BLDG: Building



Summary for Subcatchment PR-3-CY: Drainage Area Courtyard

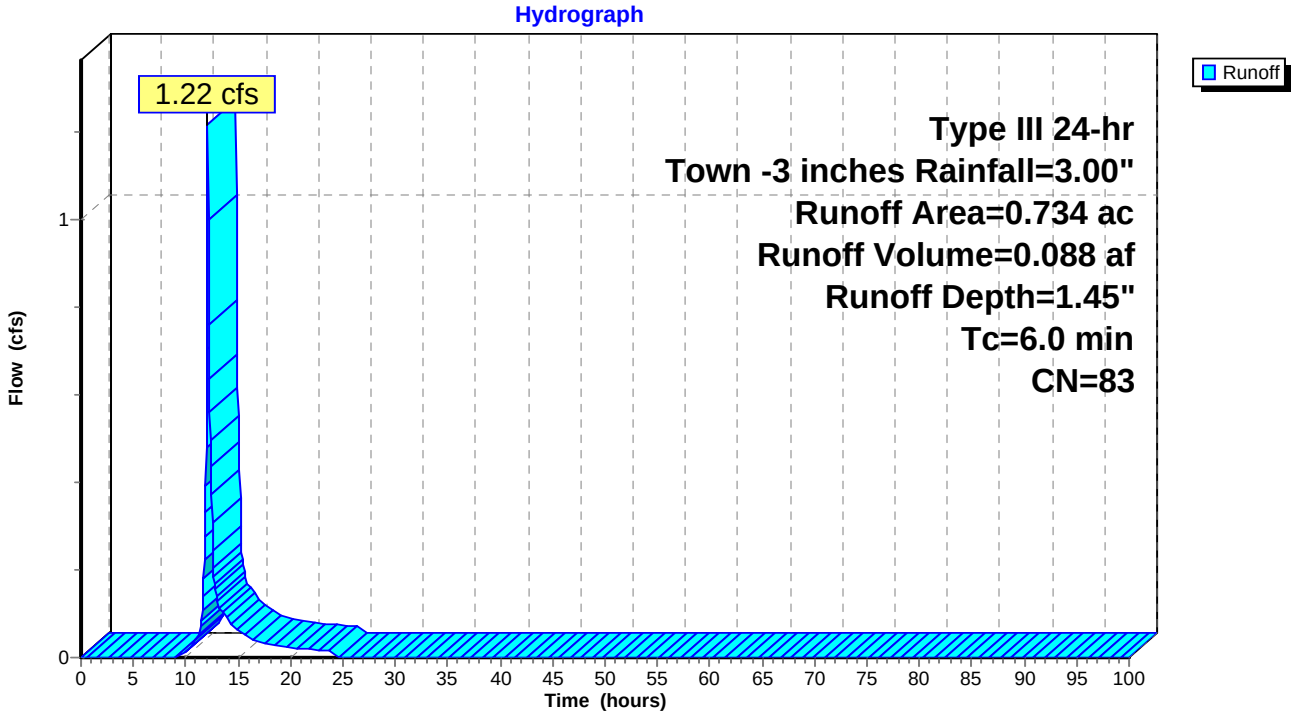
Runoff = 1.22 cfs @ 12.09 hrs, Volume= 0.088 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr Town -3 inches Rainfall=3.00"

Area (ac)	CN	Description
0.462	74	>75% Grass cover, Good, HSG C
0.272	98	Paved parking, HSG C
0.734	83	Weighted Average
0.462		62.94% Pervious Area
0.272		37.06% Impervious Area

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

Subcatchment PR-3-CY: Drainage Area Courtyard



Summary for Subcatchment PR-3-DA: Drainage Area 3

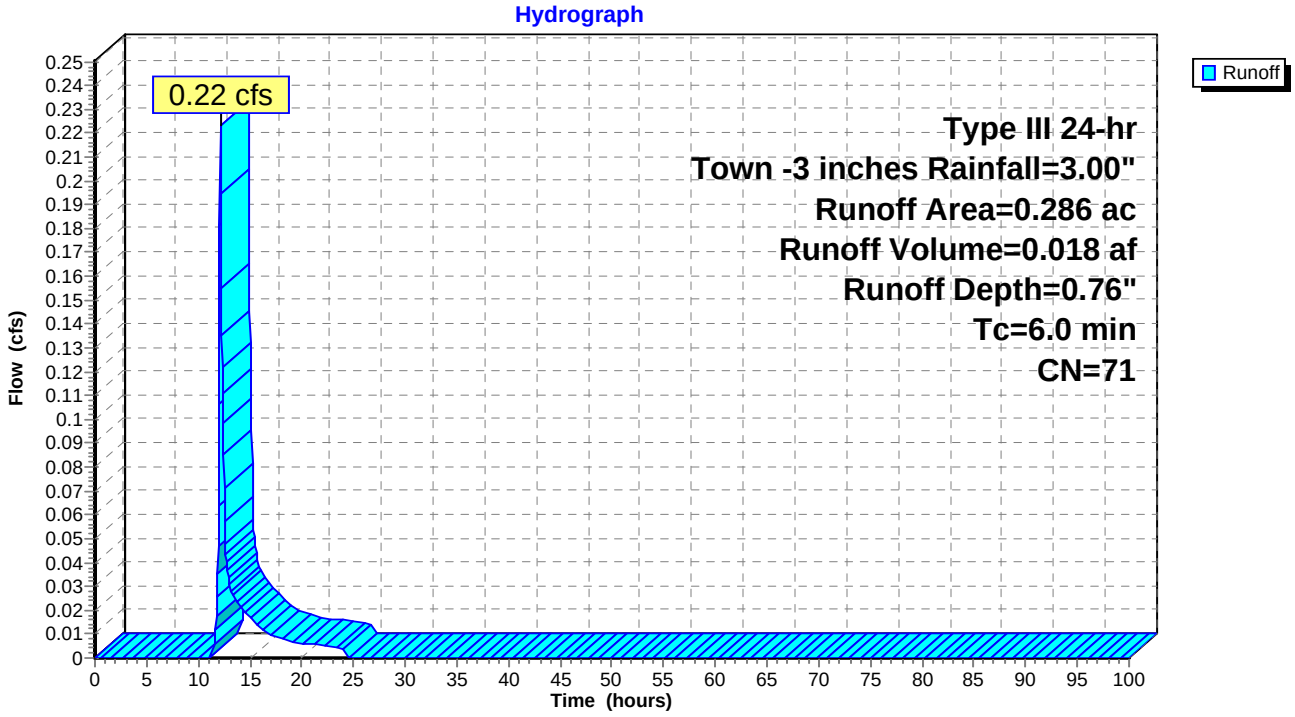
Runoff = 0.22 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Type III 24-hr Town -3 inches Rainfall=3.00"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.236	70	Woods, Good, HSG C
0.286	71	Weighted Average
0.286		100.00% Pervious Area

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

Subcatchment PR-3-DA: Drainage Area 3



Summary for Pond Bio Basin: Bioretention

Inflow Area = 0.410 ac, 32.20% Impervious, Inflow Depth = 1.38" for Town -3 inches event
Inflow = 0.65 cfs @ 12.10 hrs, Volume= 0.047 af
Outflow = 0.10 cfs @ 11.80 hrs, Volume= 0.047 af, Atten= 85%, Lag= 0.0 min
Primary = 0.10 cfs @ 11.80 hrs, Volume= 0.047 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 225.36' @ 12.65 hrs Surf.Area= 0.043 ac Storage= 0.014 af

Plug-Flow detention time= 45.8 min calculated for 0.047 af (100% of inflow)
Center-of-Mass det. time= 45.7 min (885.2 - 839.4)

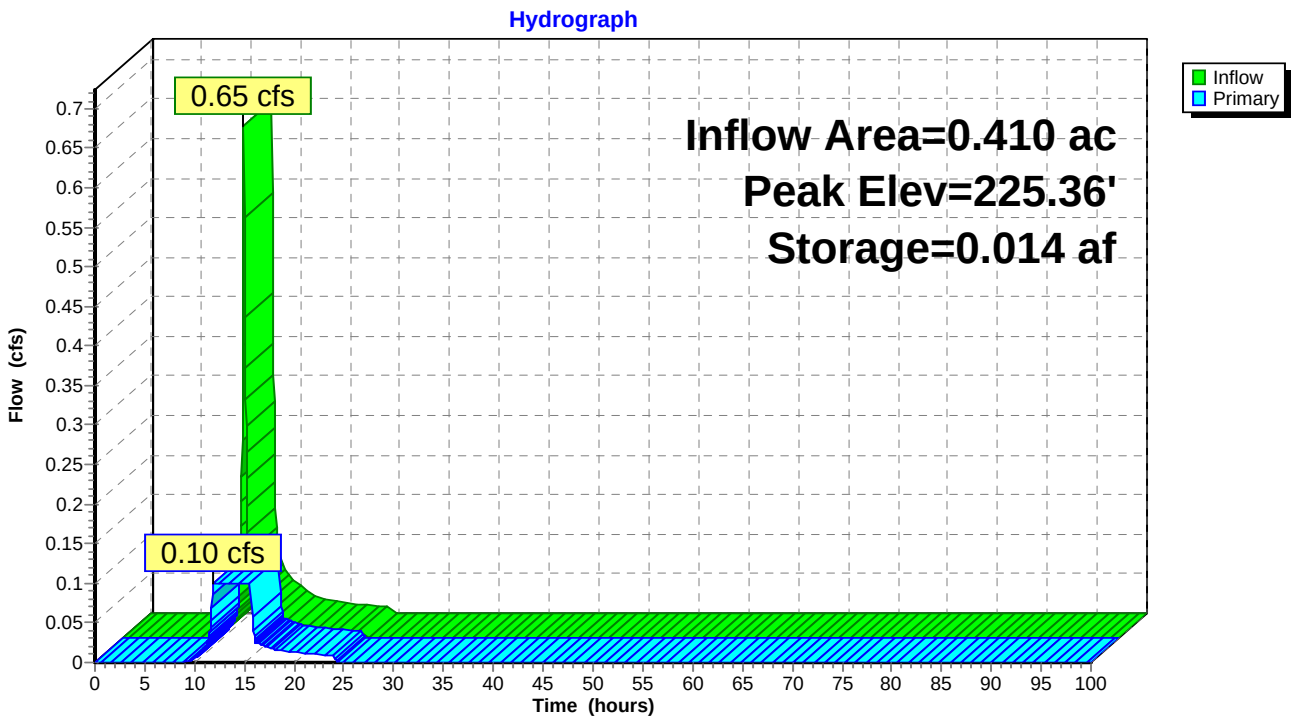
Volume	Invert	Avail.Storage	Storage Description
#1	225.00'	0.070 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
225.00	0.038	0.000	0.000
226.00	0.051	0.044	0.044
226.50	0.051	0.025	0.070

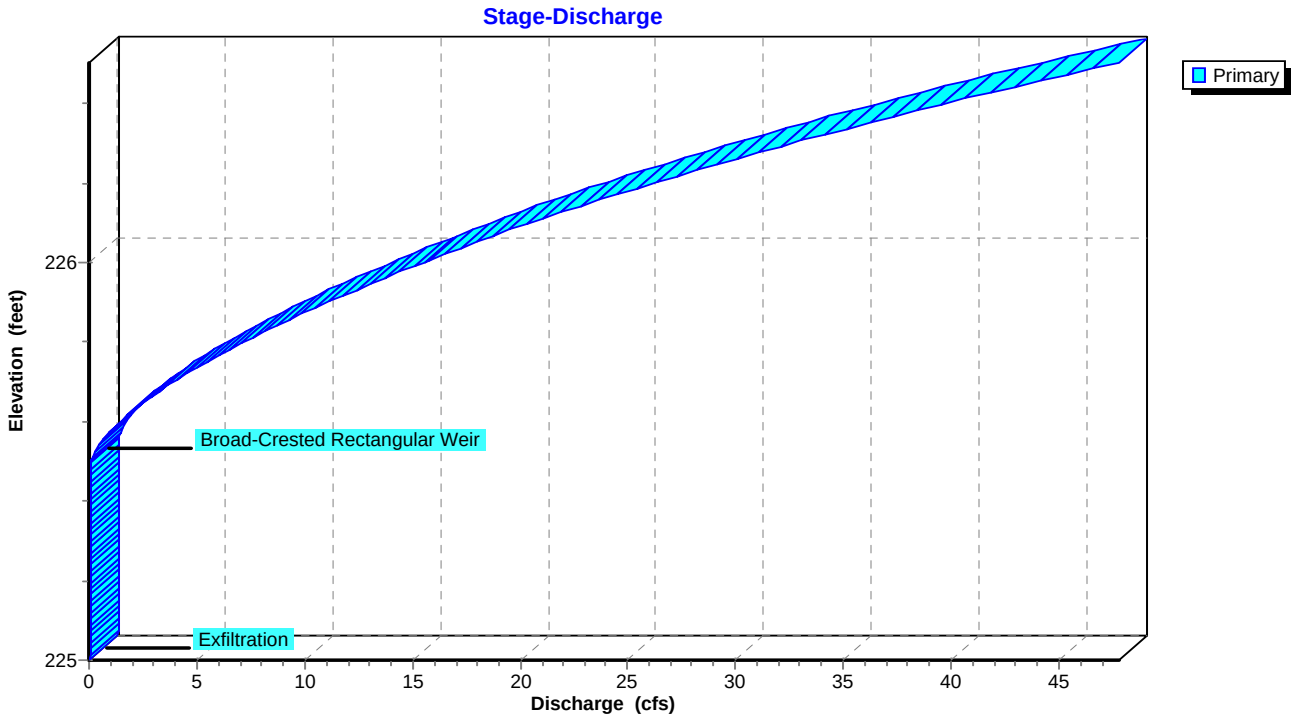
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	**0.10 cfs Exfiltration at all elevations**
#2	Primary	225.50'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.10 cfs @ 11.80 hrs HW=225.02' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

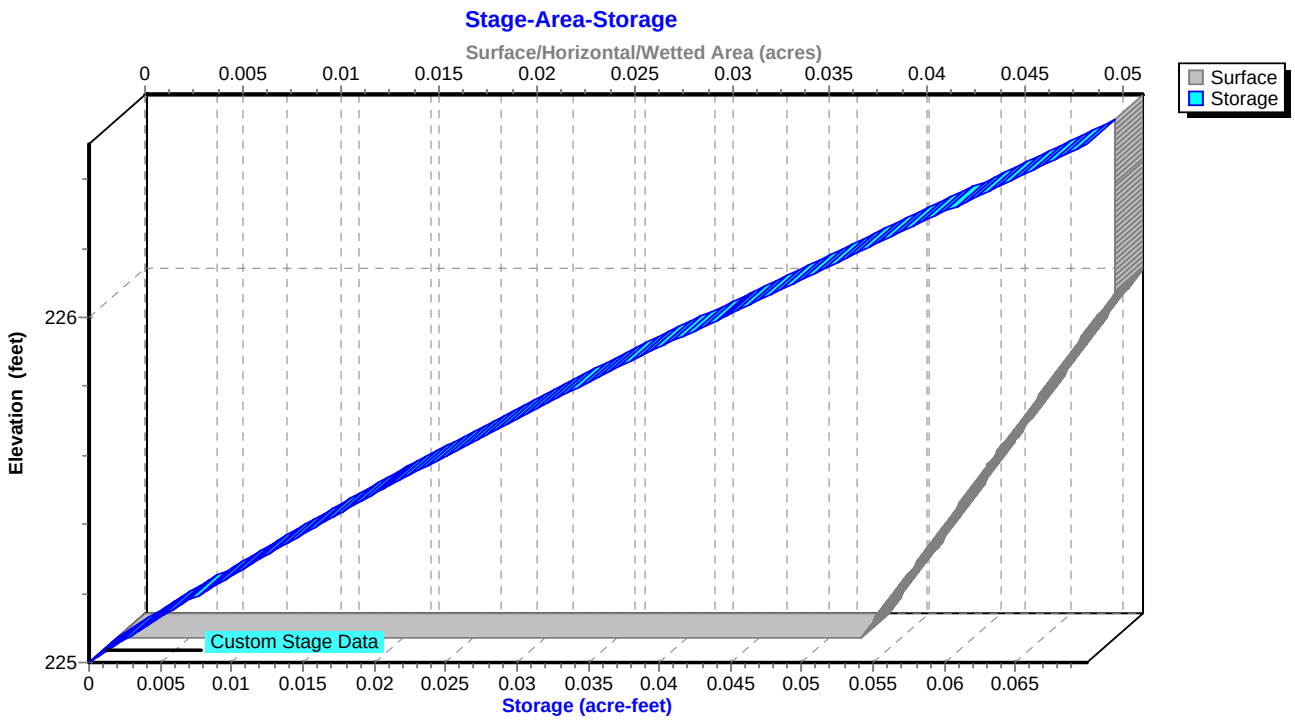
Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Pond Bio Basin: Bioretention



Summary for Pond Det 1: Detention Basin

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 1.92" for Town -3 inches event
Inflow = 6.25 cfs @ 12.09 hrs, Volume= 0.481 af
Outflow = 2.29 cfs @ 12.37 hrs, Volume= 0.481 af, Atten= 63%, Lag= 16.5 min
Primary = 2.29 cfs @ 12.37 hrs, Volume= 0.481 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 196.19' @ 12.37 hrs Surf.Area= 0.062 ac Storage= 0.110 af

Plug-Flow detention time= 34.3 min calculated for 0.481 af (100% of inflow)
Center-of-Mass det. time= 34.5 min (830.4 - 795.9)

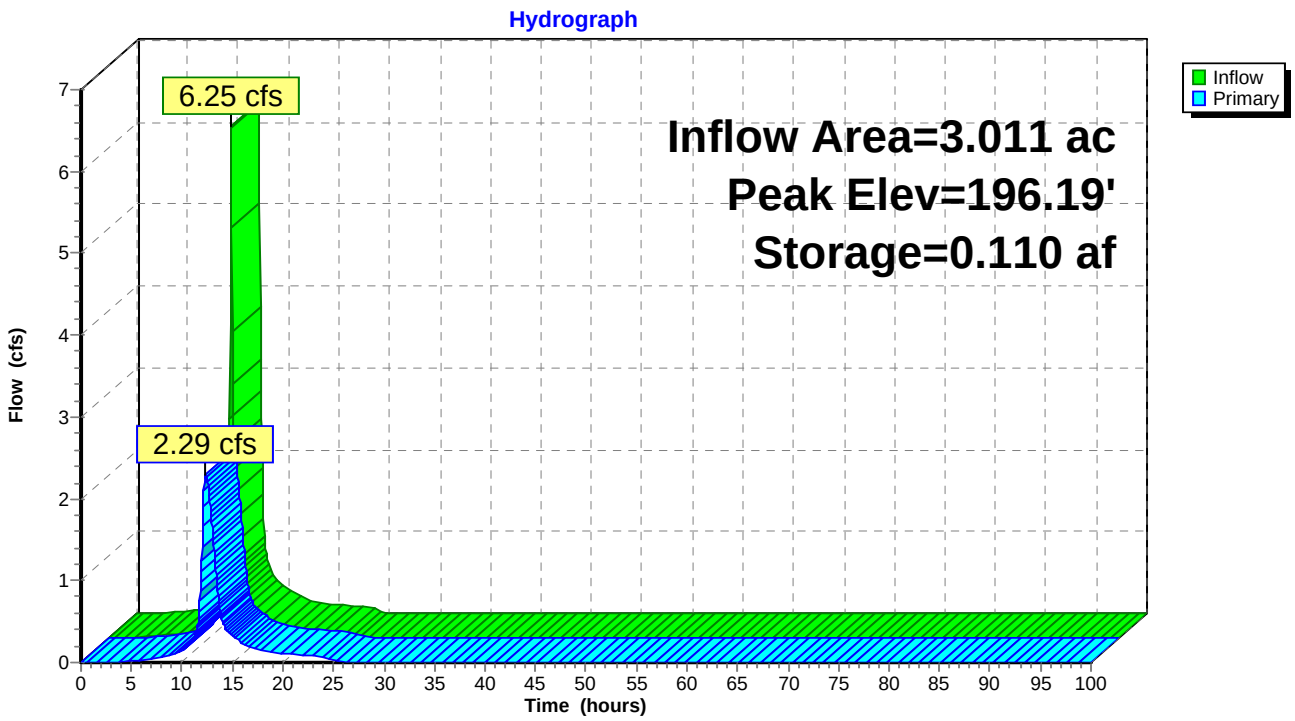
Volume	Invert	Avail.Storage	Storage Description
#1	194.00'	0.440 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
194.00	0.040	0.000	0.000
195.00	0.049	0.044	0.044
196.00	0.060	0.054	0.099
197.00	0.073	0.066	0.166
198.00	0.085	0.079	0.244
199.00	0.098	0.091	0.336
200.00	0.110	0.104	0.440

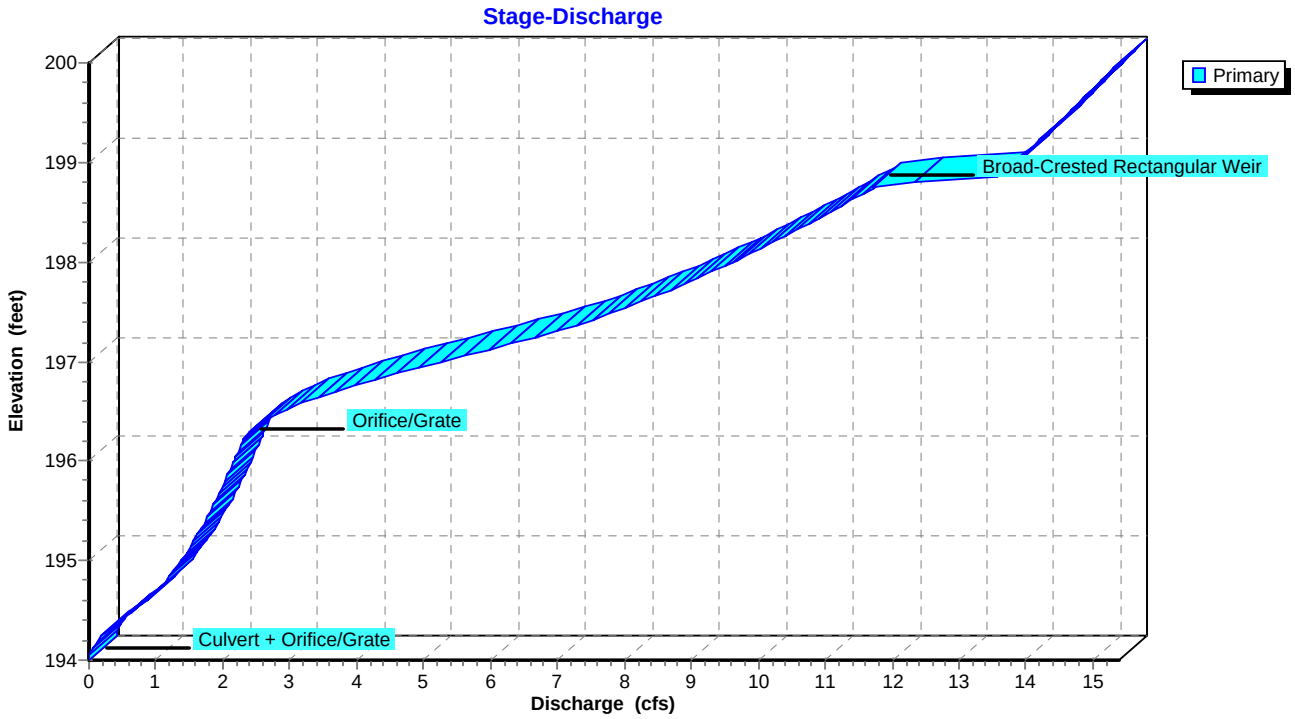
Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	**18.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 194.00' / 192.00' S= 0.0333 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	194.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	196.20'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	198.75'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.29 cfs @ 12.37 hrs HW=196.18' (Free Discharge)
└─**1=Culvert** (Passes 2.29 cfs of 8.04 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.29 cfs @ 6.55 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

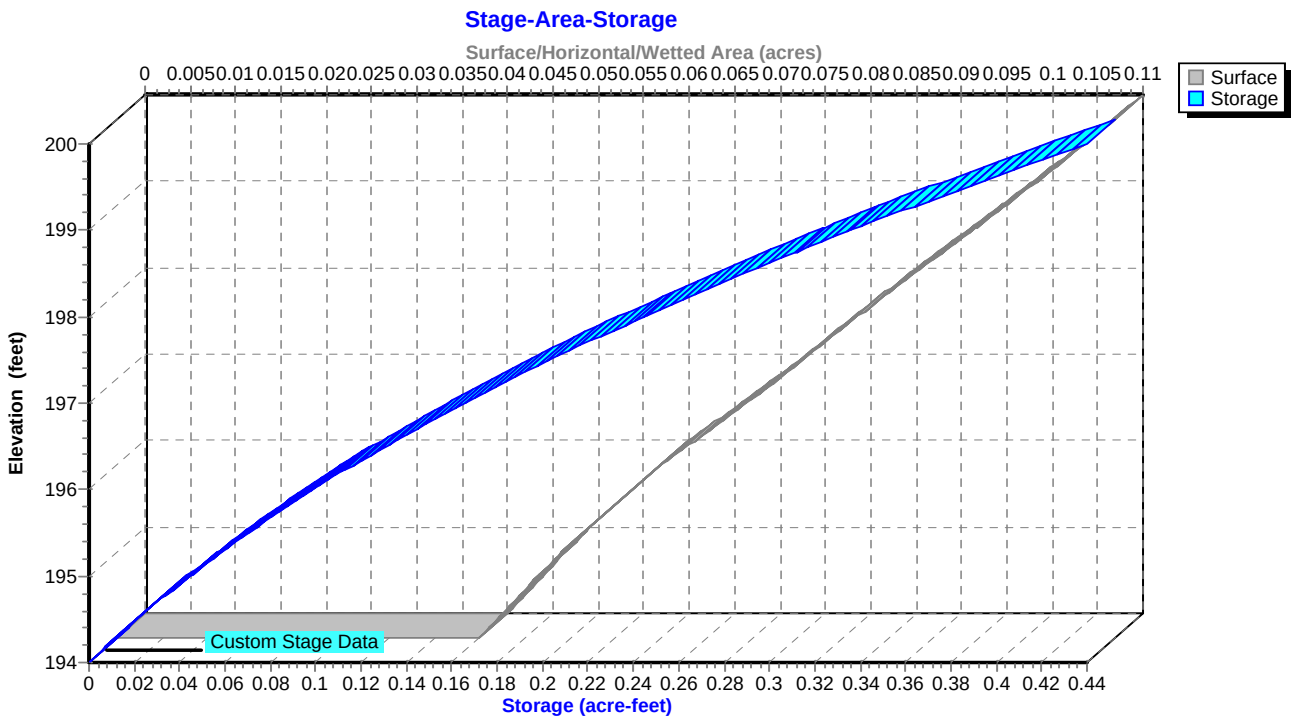
Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Pond Det 1: Detention Basin



Summary for Pond Det 2: Detention Basin

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 0.46" for Town -3 inches event
Inflow = 6.34 cfs @ 12.09 hrs, Volume= 0.184 af
Outflow = 5.80 cfs @ 12.11 hrs, Volume= 0.184 af, Atten= 9%, Lag= 1.4 min
Primary = 5.80 cfs @ 12.11 hrs, Volume= 0.184 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 212.09' @ 12.11 hrs Surf.Area= 0.014 ac Storage= 0.013 af

Plug-Flow detention time= 3.5 min calculated for 0.184 af (100% of inflow)
Center-of-Mass det. time= 3.5 min (771.1 - 767.6)

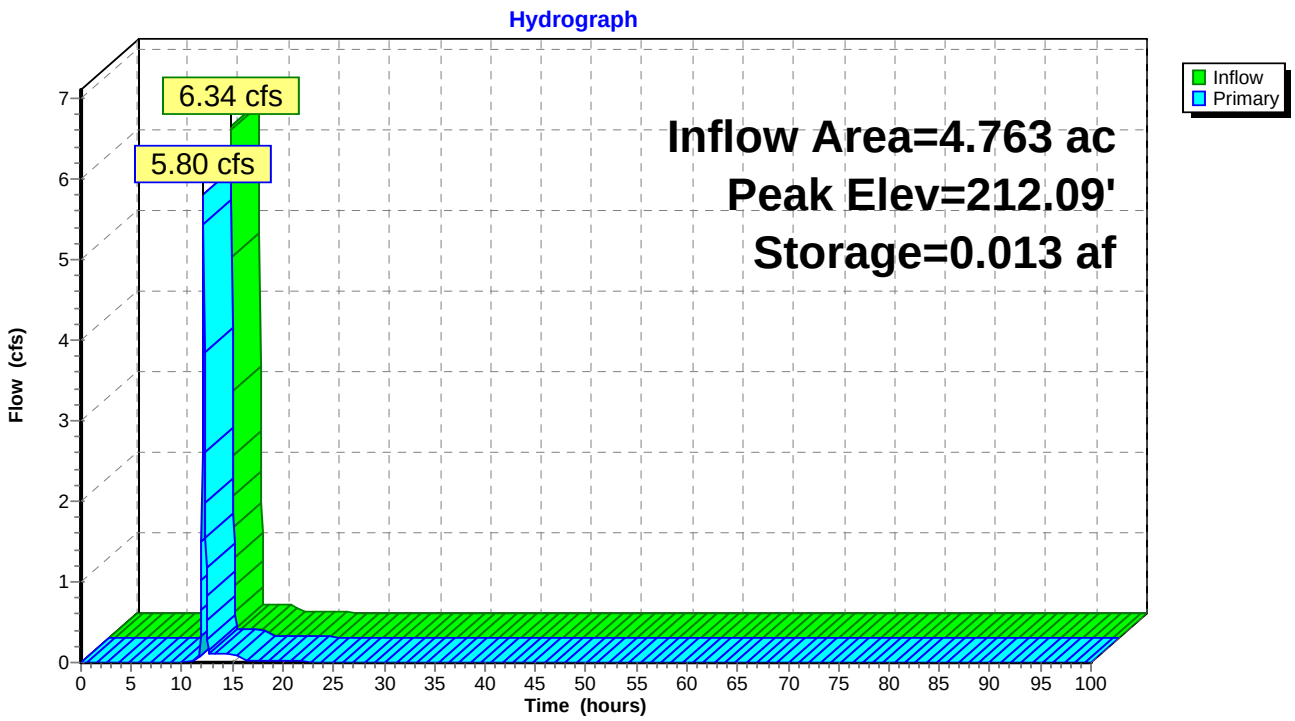
Volume	Invert	Avail.Storage	Storage Description
#1	211.00'	0.116 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
211.00	0.009	0.000	0.000
212.00	0.014	0.012	0.012
213.00	0.019	0.016	0.028
214.00	0.026	0.022	0.050
215.00	0.033	0.029	0.080
216.00	0.040	0.036	0.116

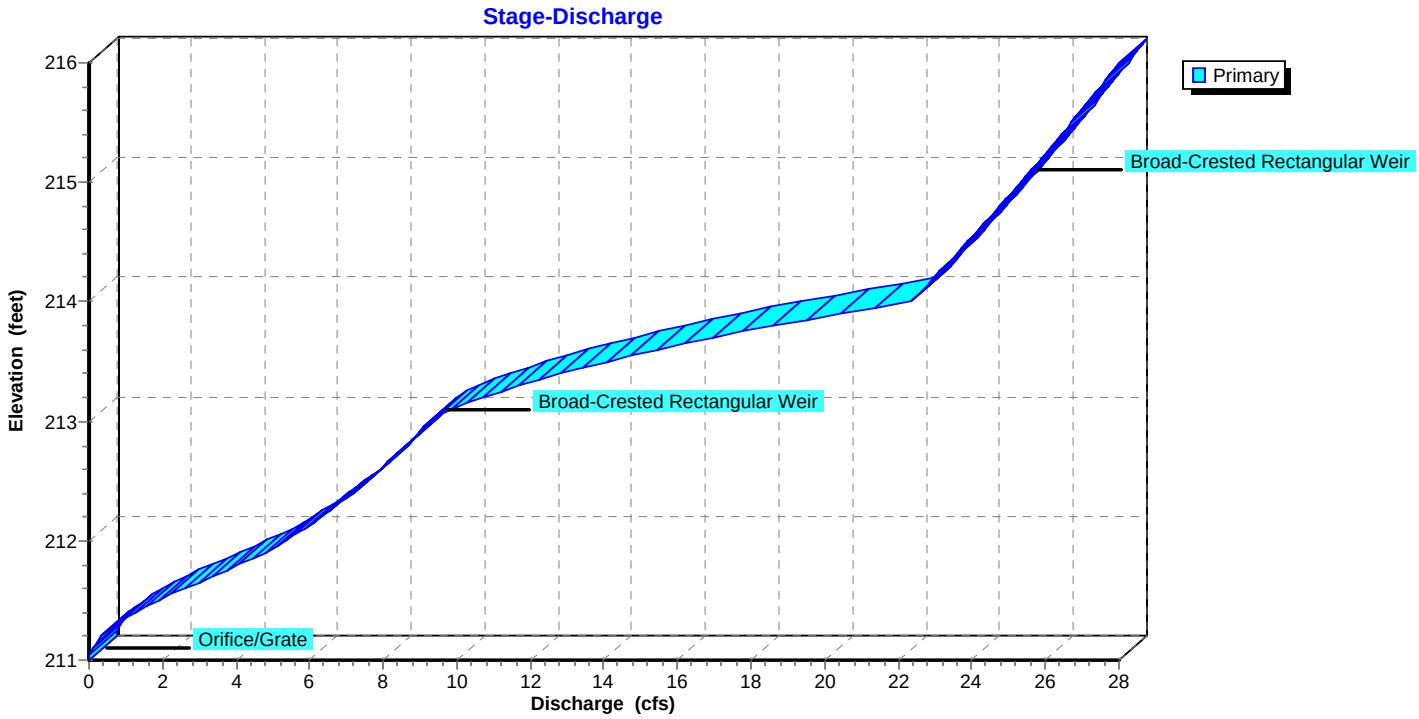
Device	Routing	Invert	Outlet Devices
#1	Primary	209.50'	**24.0" Round Culvert** L= 65.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 209.50' / 205.00' S= 0.0692 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	211.00'	**12.0" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Device 1	213.00'	**3.5' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#4	Device 1	215.00'	**16.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=5.65 cfs @ 12.11 hrs HW=212.06' (Free Discharge)
└─**1=Culvert** (Passes 5.65 cfs of 14.91 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 5.65 cfs @ 3.60 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

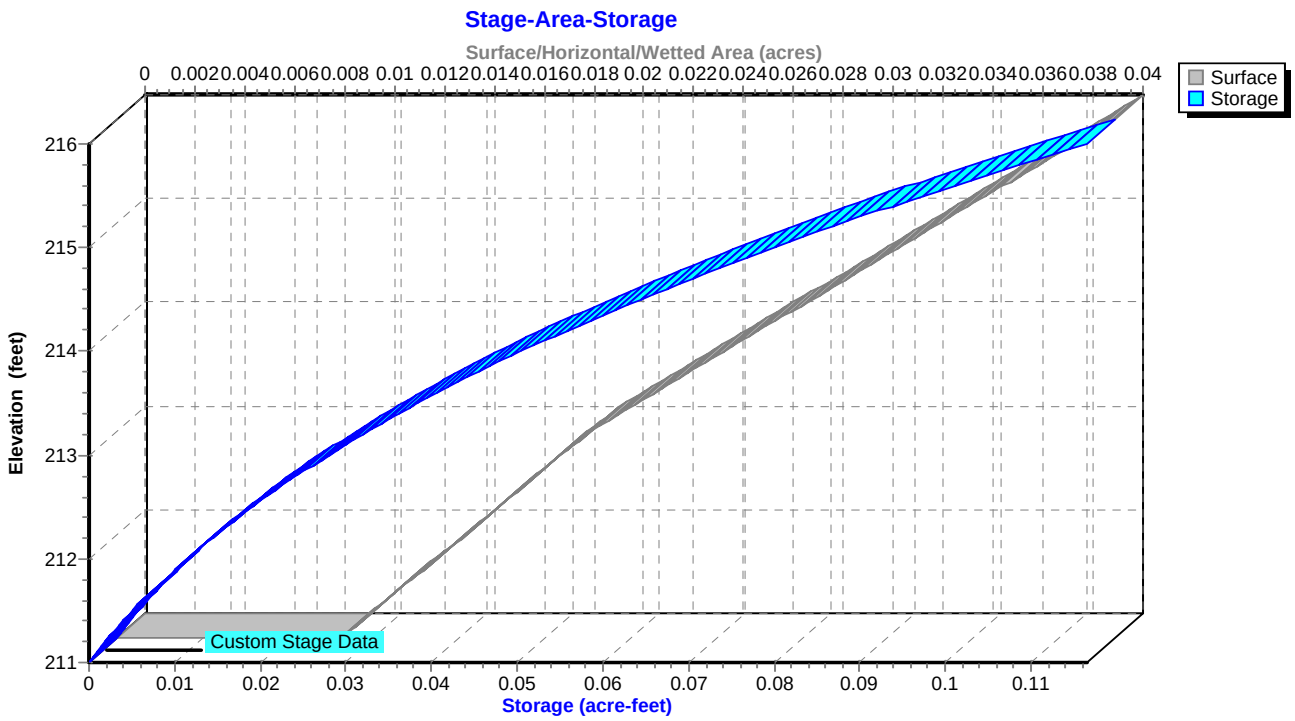
Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Pond Det 2: Detention Basin



Summary for Pond Det 3: Underground Detention Pipe

Inflow Area = 1.530 ac, 69.80% Impervious, Inflow Depth = 2.13" for Town -3 inches event
Inflow = 3.47 cfs @ 12.09 hrs, Volume= 0.272 af
Outflow = 2.33 cfs @ 12.18 hrs, Volume= 0.272 af, Atten= 33%, Lag= 5.5 min
Primary = 2.33 cfs @ 12.18 hrs, Volume= 0.272 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 217.26' @ 12.18 hrs Surf.Area= 0.012 ac Storage= 0.023 af

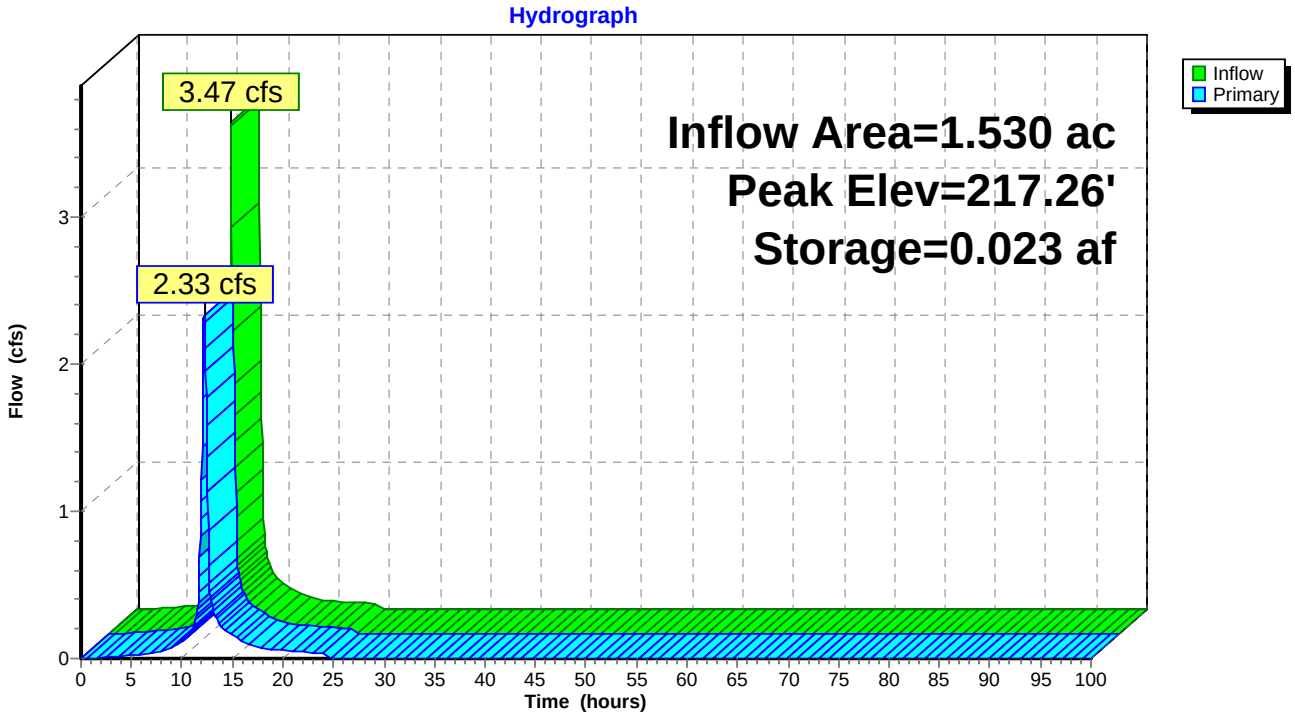
Plug-Flow detention time= 4.9 min calculated for 0.272 af (100% of inflow)
Center-of-Mass det. time= 4.7 min (787.9 - 783.2)

Volume	Invert	Avail.Storage	Storage Description
#1	215.00'	0.033 af	**42.0" Round Pipe Storage** x 2 L= 75.0'

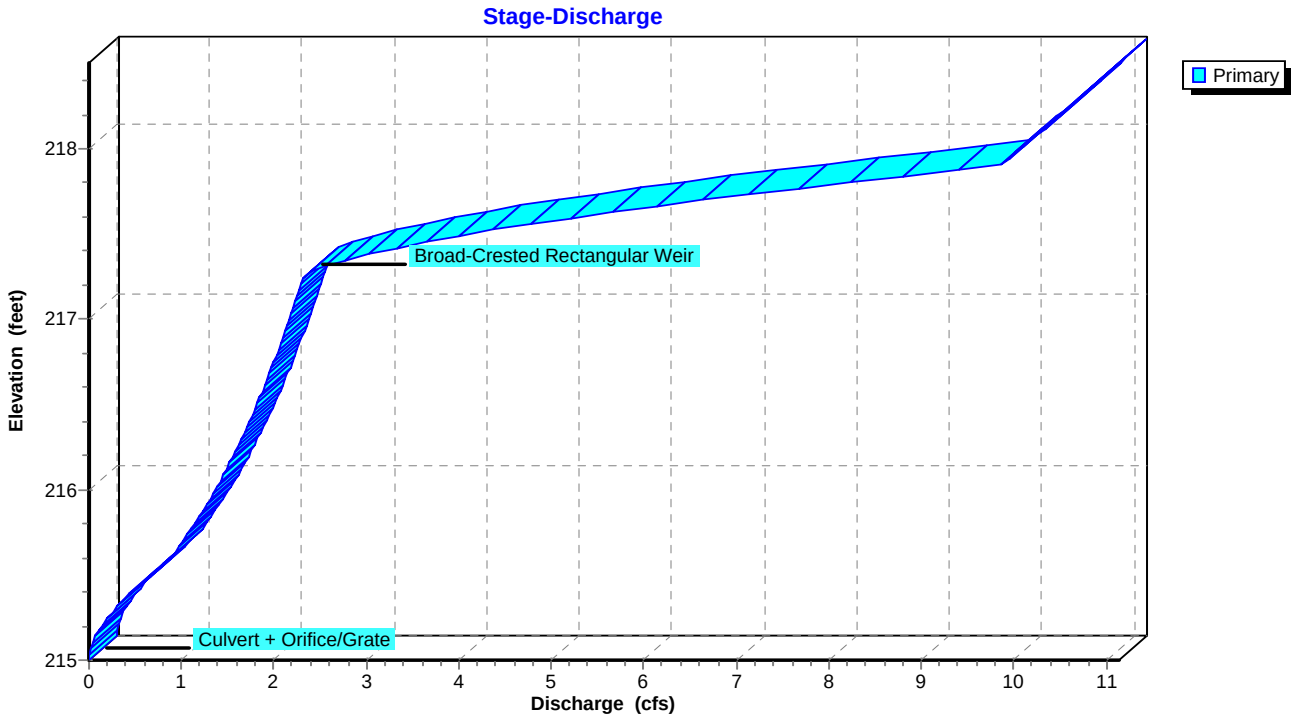
Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 36.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 215.00' / 214.50' S= 0.0139 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	215.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	217.25'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.32 cfs @ 12.18 hrs HW=217.24' (Free Discharge)
└─**1=Culvert** (Passes 2.32 cfs of 8.19 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.32 cfs @ 6.65 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

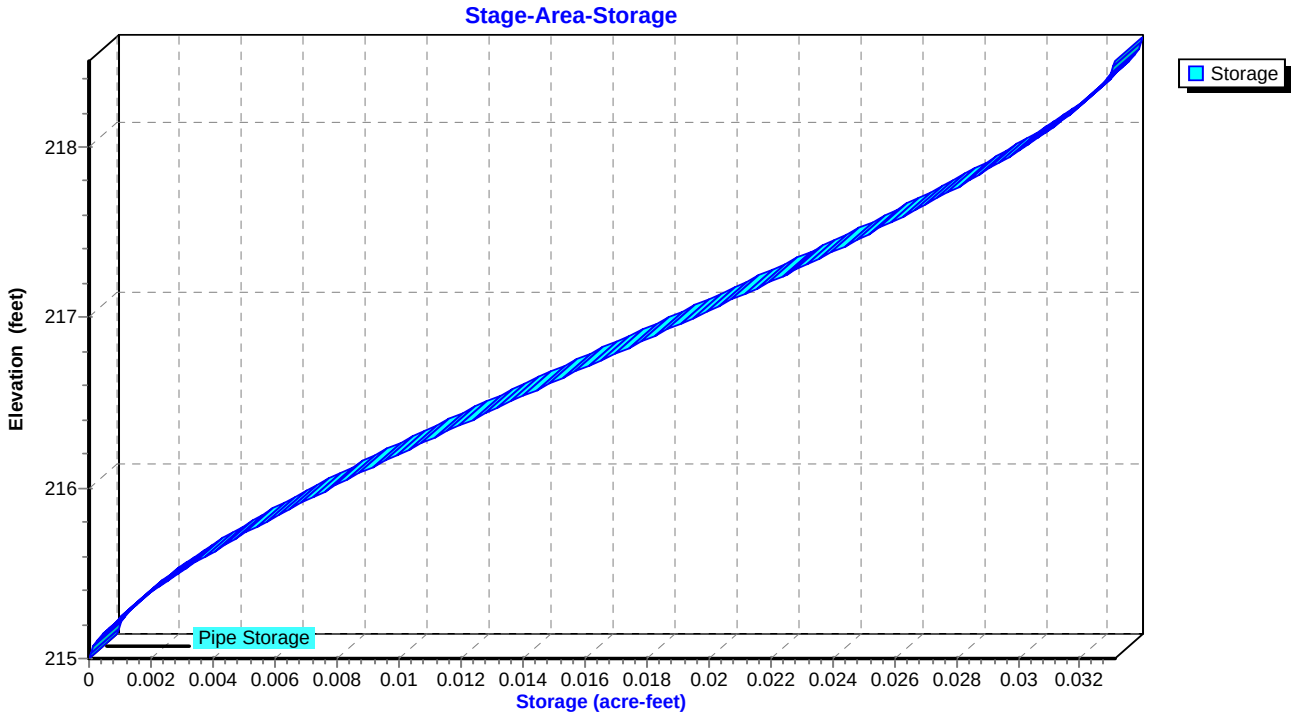
Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Pond Det 3: Underground Detention Pipe



Summary for Pond Sandfilter: Sandfilter

Inflow Area =	4.353 ac,	66.46% Impervious,	Inflow Depth =	1.90"	for Town -3 inches event
Inflow =	9.04 cfs @	12.09 hrs,	Volume=	0.690 af	
Outflow =	9.04 cfs @	12.09 hrs,	Volume=	0.690 af,	Atten= 0%, Lag= 0.0 min
Primary =	6.24 cfs @	12.09 hrs,	Volume=	0.137 af	
Secondary =	2.80 cfs @	12.09 hrs,	Volume=	0.552 af	

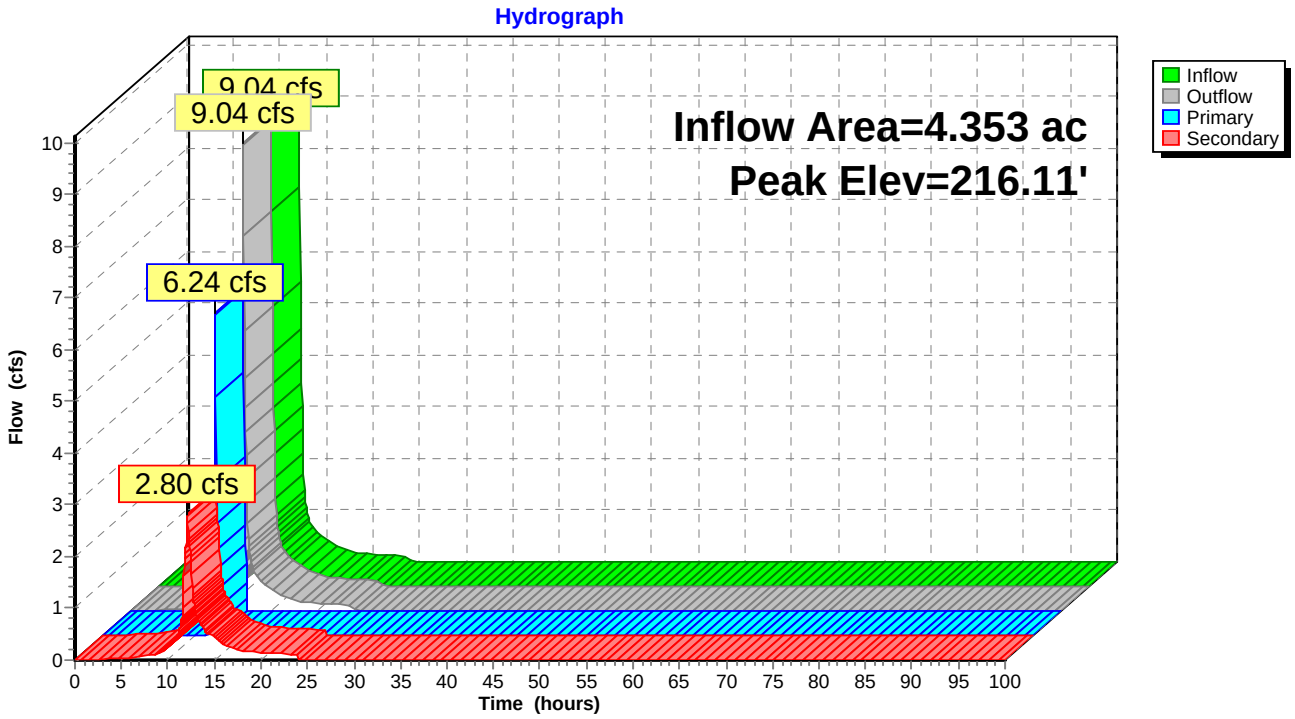
Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs
Peak Elev= 216.11' @ 12.09 hrs
Flood Elev= 221.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	215.00'	**18.0" Round Culvert** L= 88.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 215.00' / 212.00' S= 0.0341 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	214.00'	**8.0" Round Culvert** L= 9.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 214.00' / 213.80' S= 0.0222 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

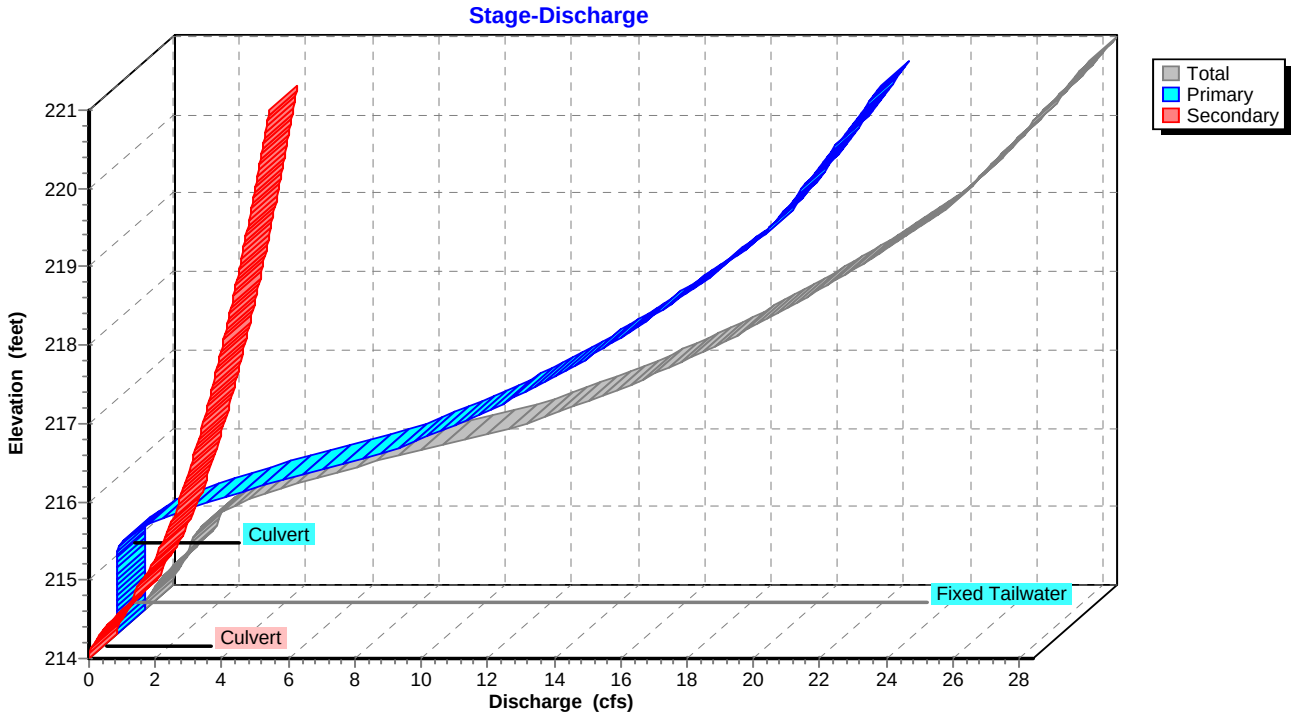
Primary OutFlow Max=6.07 cfs @ 12.09 hrs HW=216.09' TW=214.24' (Fixed TW Elev= 214.24')
└─**1=Culvert** (Inlet Controls 6.07 cfs @ 4.43 fps)

Secondary OutFlow Max=2.78 cfs @ 12.09 hrs HW=216.08' (Free Discharge)
└─**2=Culvert** (Inlet Controls 2.78 cfs @ 7.97 fps)

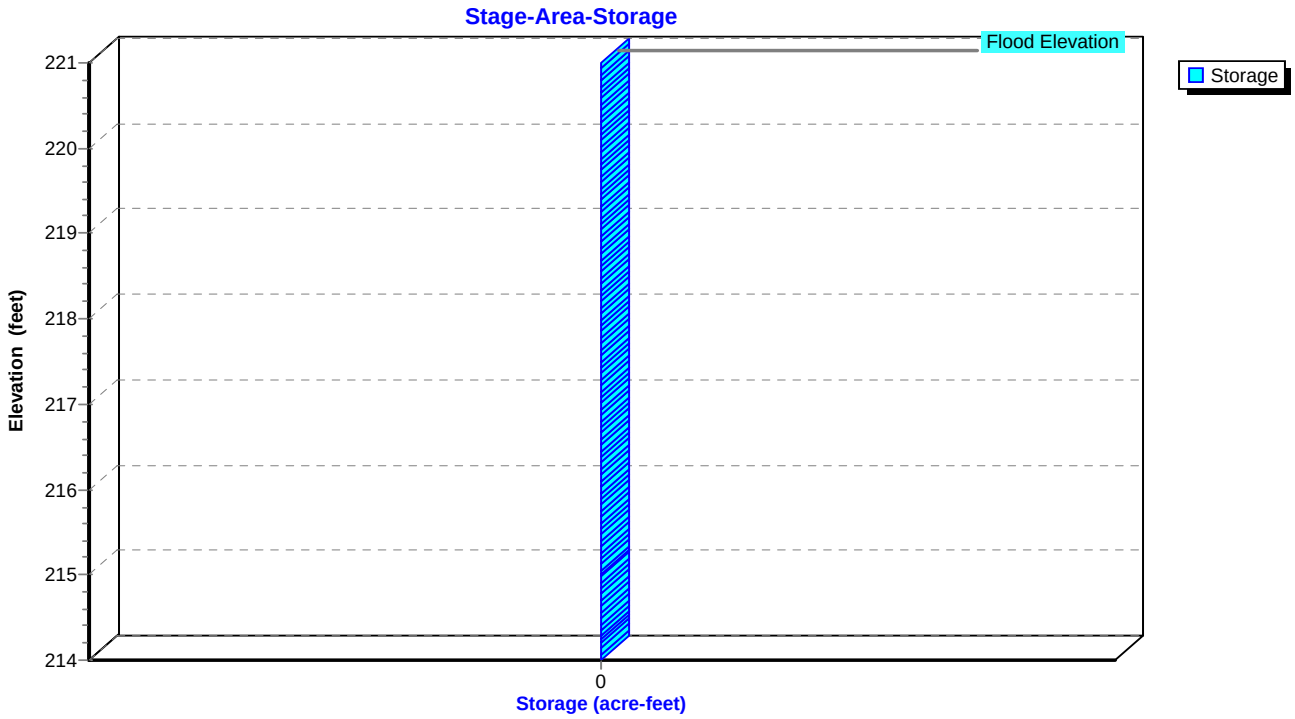
Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter



Pond Sandfilter: Sandfilter

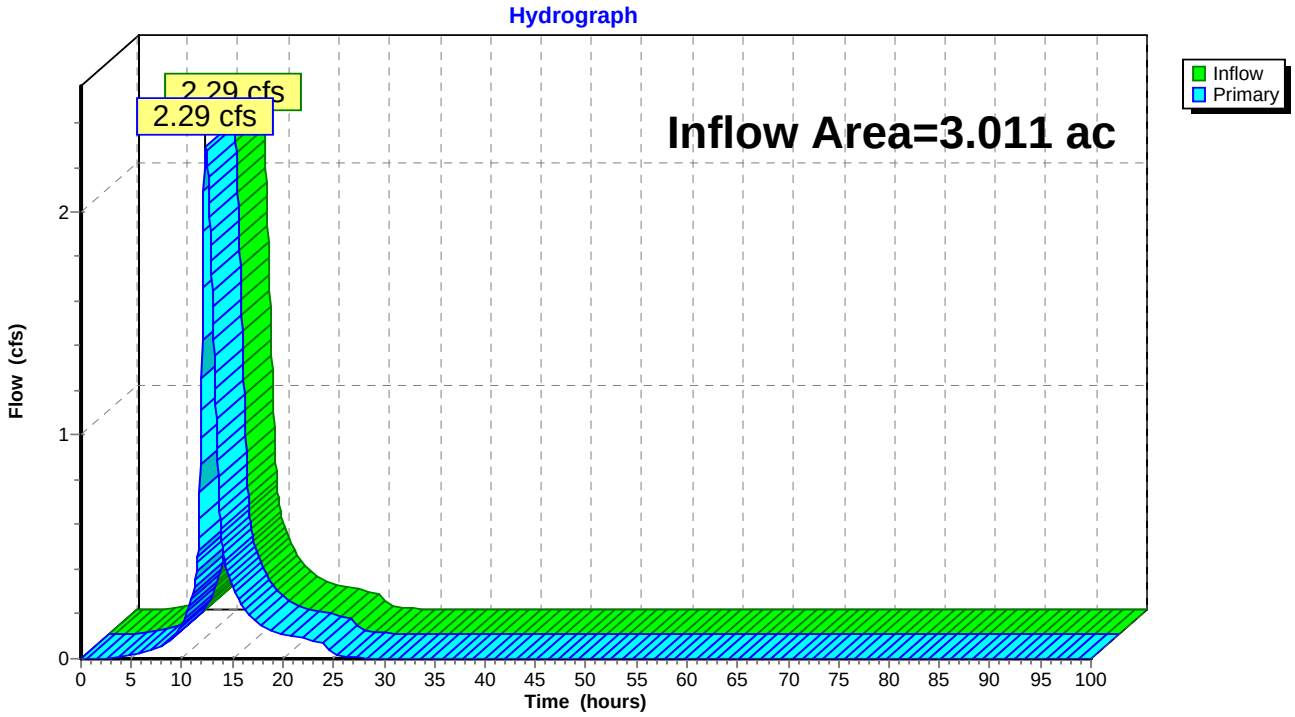


Summary for Link Pt. A: Point A

Inflow Area = 3.011 ac, 61.21% Impervious, Inflow Depth = 1.92" for Town -3 inches event
Inflow = 2.29 cfs @ 12.37 hrs, Volume= 0.481 af
Primary = 2.29 cfs @ 12.37 hrs, Volume= 0.481 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. A: Point A

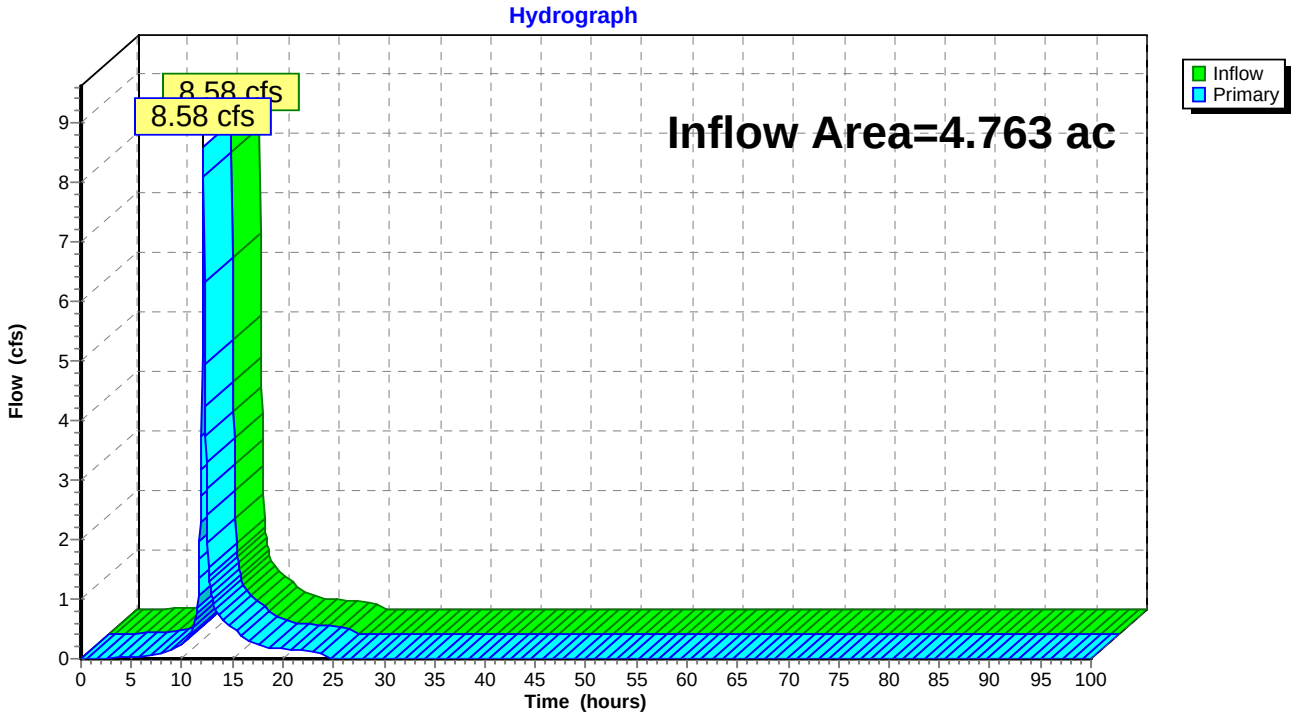


Summary for Link Pt. B: Point B

Inflow Area = 4.763 ac, 63.51% Impervious, Inflow Depth = 1.86" for Town -3 inches event
Inflow = 8.58 cfs @ 12.11 hrs, Volume= 0.737 af
Primary = 8.58 cfs @ 12.11 hrs, Volume= 0.737 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt. B: Point B

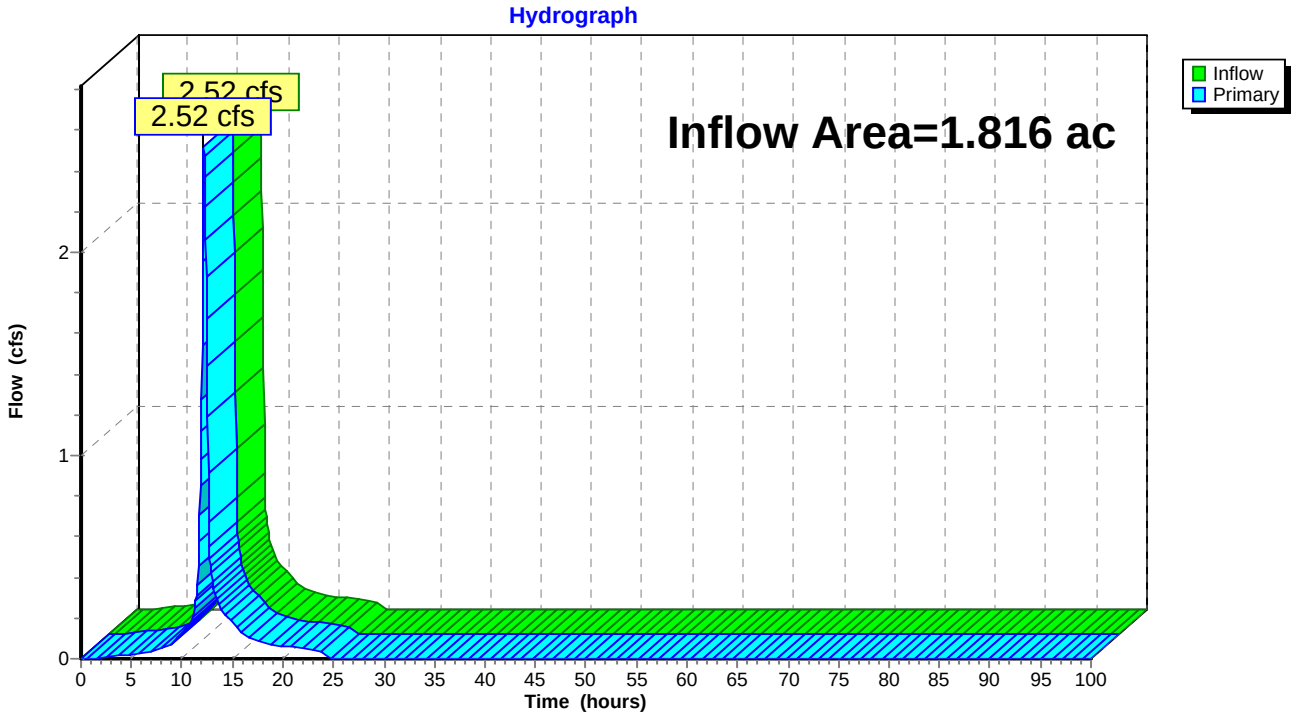


Summary for Link Pt.C: Point C

Inflow Area = 1.816 ac, 58.81% Impervious, Inflow Depth = 1.92" for Town -3 inches event
Inflow = 2.52 cfs @ 12.17 hrs, Volume= 0.290 af
Primary = 2.52 cfs @ 12.17 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.05 hrs

Link Pt.C: Point C



Saved Tuesday, September 01, 2015 4:37:06 PM JCHEONG Plotted Tuesday, November 03, 2015 10:44:42 AM Cheong, Jason

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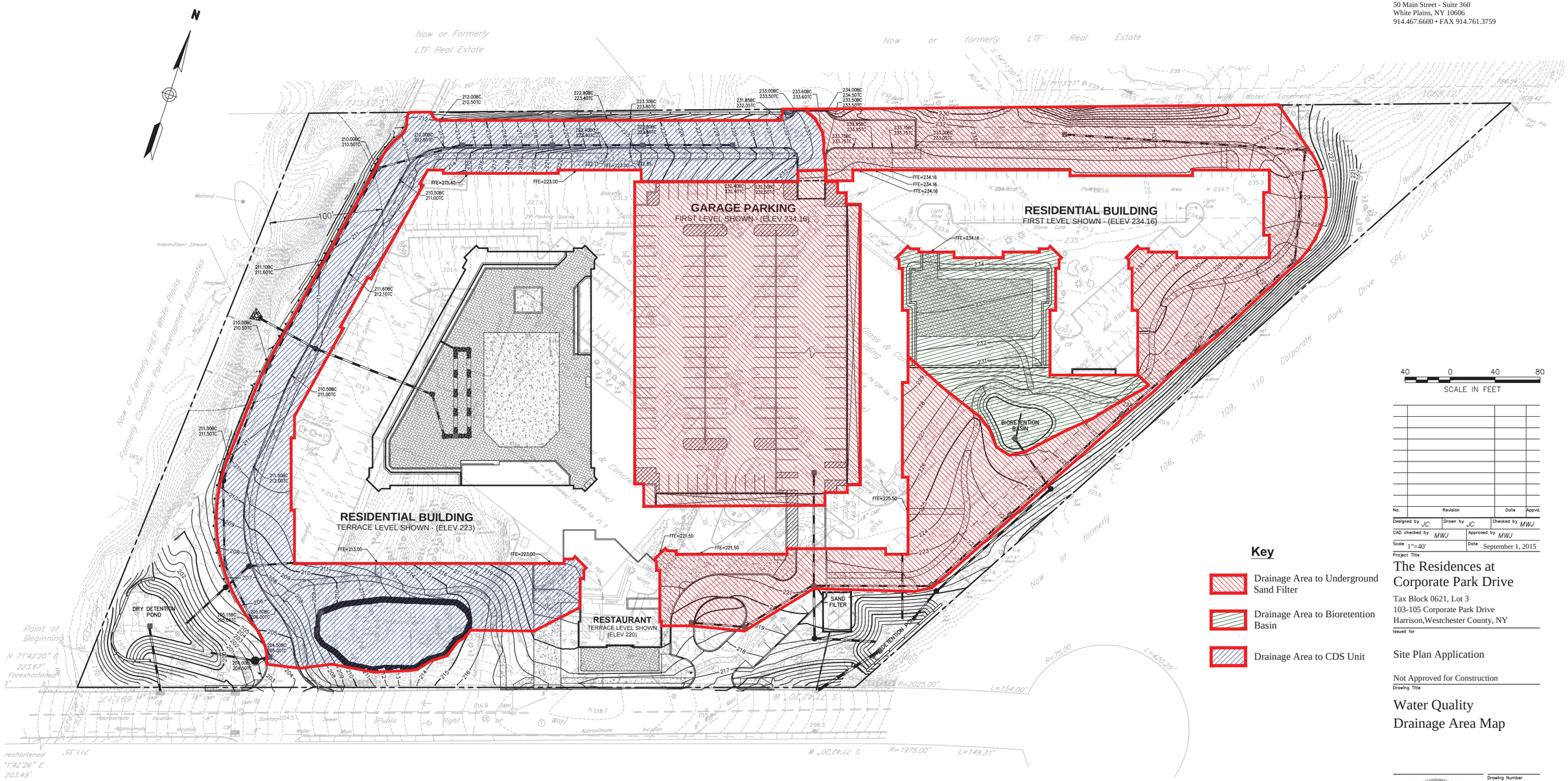

No.	Revision	Date	Appvd.

Designed by JC | Drawn by JC | Checked by MWJ
CAD checked by MWJ | Approved by MWJ
Scale 1"=40' | Date September 1, 2015

Project Title

The Residences at Corporate Park Drive

Tax Block 0621, Lot 3
103-105 Corporate Park Drive
Harrison,Westchester County, NY

Issued for

Site Plan Application

Not Approved for Construction

Drawing Title

Water Quality Drainage Area Map

Drawing Number

WQ-1

Sheet 1 of 1

Project Number 29254.00

Michael W. Junghans
N.Y. Professional Engineer
NY Lic. No. 072072