

Block 186 LOTS 5, 6, 7, 8, 9
ATLANTIC CITY, NJ

ATLANTIC CITY ATLANTIC COUNTY NEW JERSEY

STORM WATER NARRATIVE

NJDEP Policy Compliance Report
NJAC 7:7E-8.7 Stormwater Management

4-8-19



ARTHUR W. PONZIO CO. & ASSOCIATES, INC.
CIVIL ENGINEERS-LAND SURVEYORS-PLANNERS
400 N. DOVER AVENUE, ATLANTIC CITY, NJ 08401
PHONE: (609) 344-8194; FAX: (609) 344-1594

A handwritten signature in black ink, appearing to read 'Jon J. Barnhart', is written over a horizontal line.

Jon J. Barnhart, P.E.
N.J. License # GE43483

Existing Site Conditions:

The subject property is located at the intersection of Providence and Atlantic Avenue in Atlantic City, New Jersey. Site contains a total land area of 0.9 Acres. The site falls within the AE10 flood hazard areas as shown on the FEMA preliminary FIRM mapping for this location.

The property currently contains an asphalt surface parking facility and buildings and is currently 100% impervious, The site does not currently have any flooding and / or drainage issues. A municipal drainage system exists adjacent to this property which adequately supports this property at this time. These facilities are depicted on the enclosed development plans.

Proposed Site Conditions:

The project proposal is to construct a multi-story dormitory building with a central courtyard.

The site surface areas are broken down as follows:

Existing Impervious Site Area = 100%

Proposed Impervious Site Area = 83%

Based upon the above calculations, the project site does not meet the definition of a major development. The proposed area of disturbance is less than 1 acre and the proposed area of impervious surface is being decreased as a result of the proposed development. Accordingly, the project is not subject to the requirements of NJAC 7:7E-8.7 and the policy has been met.

Design Narrative:

The entire existing site drains to the adjacent municipal roadways and storm water system, as shown on the existing site survey. Although it is not required, the proposed storm water management system will provide an on-site storm rain garden system in order to assist in treatment and reducing a portion of the burden on the existing municipal system. All storm water not directed toward the rain garden area will be conveyed through a series of piping tied into the municipal storm water system, as shown on the enclosed development plans.

In addition, the project will reduce impervious coverage by 17% from the pre-development condition, further reducing the burden on the municipal system and surrounding properties.

This design approach exceeds the storm water requirements for the proposed development.

PRE-DEVELOPMENT

&

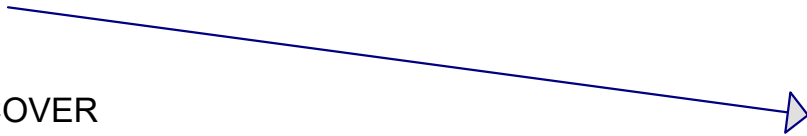
POST DEVELOPMENT

RUNOFF CALCULATIONS

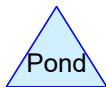
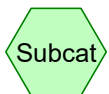




IMPERVIOUS COVER
(100%)



(new Pond)



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Page 2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.914	98	Unconnected pavement, HSG A (40S)
0.914	98	TOTAL AREA

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Page 3

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.914	HSG A	40S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.914		TOTAL AREA

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Page 4

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.914	0.000	0.000	0.000	0.000	0.914	Unconnected pavement	40S
0.914	0.000	0.000	0.000	0.000	0.914	TOTAL AREA	

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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 5

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 40S: IMPERVIOUS COVER Runoff Area=39,820 sf 100.00% Impervious Runoff Depth>3.07"
Flow Length=300' Tc=0.9 min CN=98 Runoff=4.75 cfs 0.234 af

Pond 41P: (new Pond)

Inflow=4.75 cfs 0.234 af
Primary=4.75 cfs 0.234 af

Total Runoff Area = 0.914 ac Runoff Volume = 0.234 af Average Runoff Depth = 3.07"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.914 ac

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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 6

Summary for Subcatchment 40S: IMPERVIOUS COVER (100%)

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

Runoff = 4.75 cfs @ 11.90 hrs, Volume= 0.234 af, Depth> 3.07"

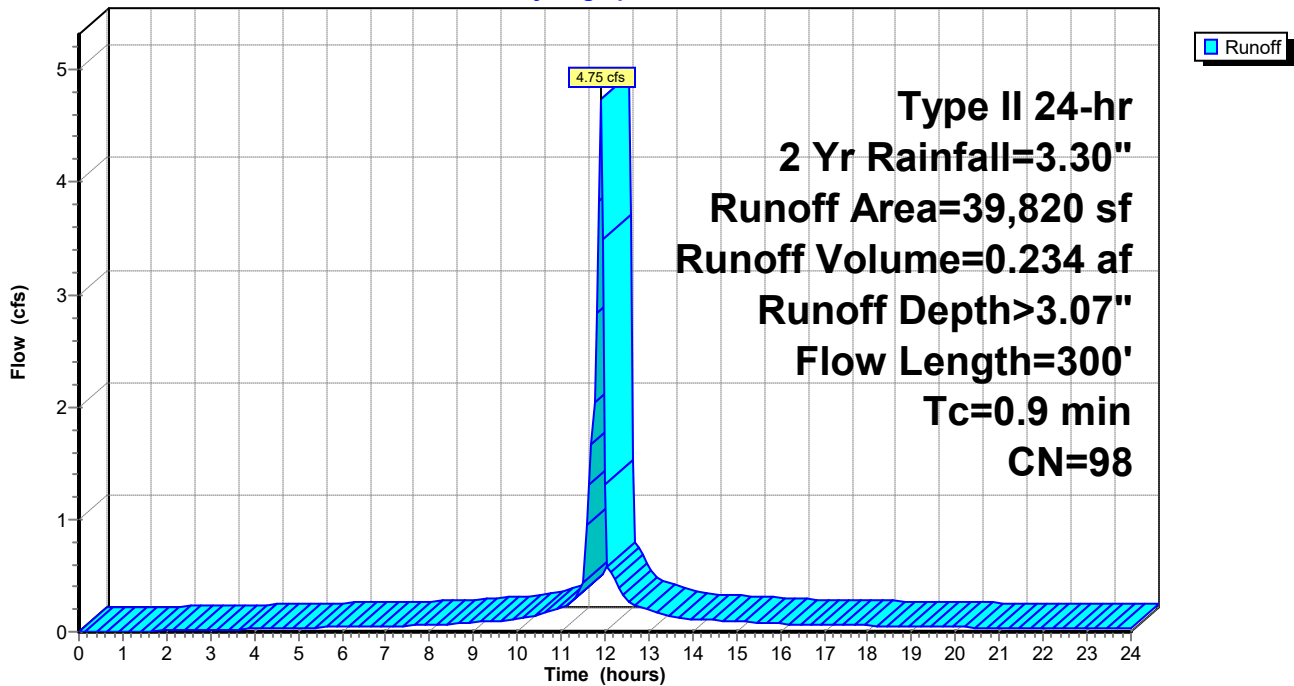
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 Yr Rainfall=3.30"

Area (sf)	CN	Description
39,820	98	Unconnected pavement, HSG A
39,820		100.00% Impervious Area
39,820		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	300		5.56		Direct Entry, Direct Entry

Subcatchment 40S: IMPERVIOUS COVER (100%)

Hydrograph



Summary for Pond 41P: (new Pond)

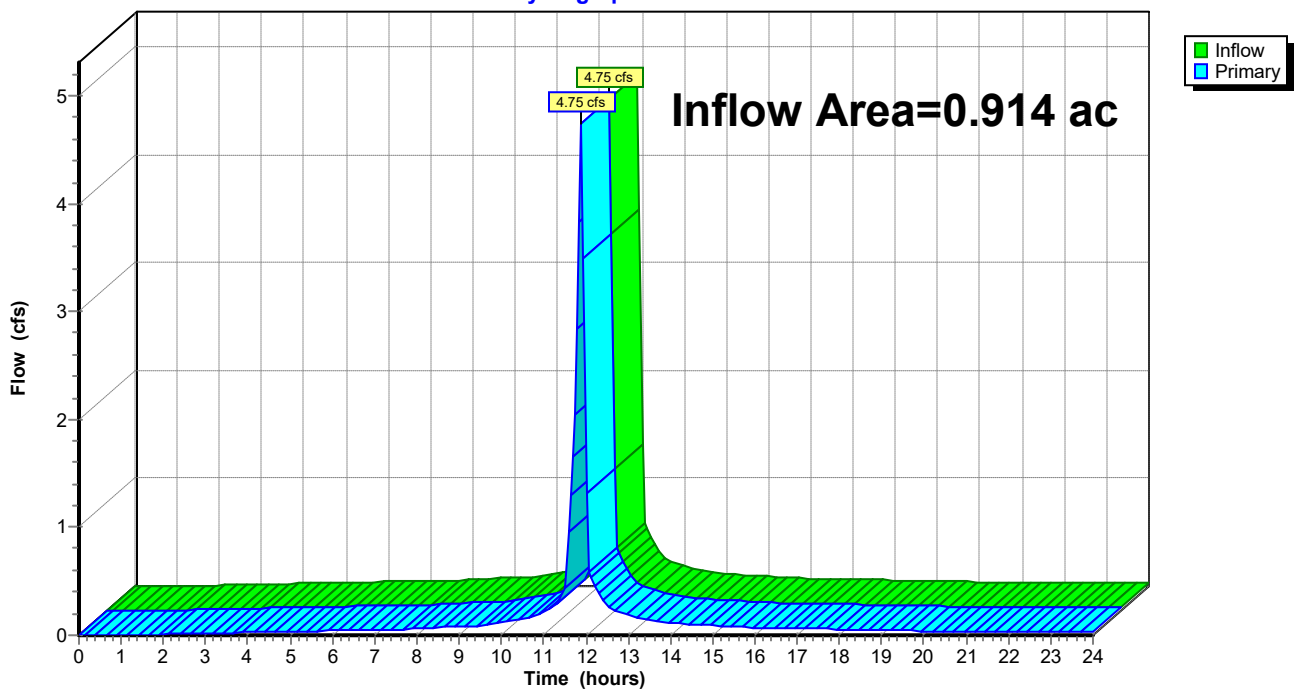
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.914 ac, 100.00% Impervious, Inflow Depth > 3.07" for 2 Yr event
Inflow = 4.75 cfs @ 11.90 hrs, Volume= 0.234 af
Primary = 4.75 cfs @ 11.90 hrs, Volume= 0.234 af, Atten= 0%, Lag= 0.0 min

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

Pond 41P: (new Pond)

Hydrograph



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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 8

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 40S: IMPERVIOUS COVER Runoff Area=39,820 sf 100.00% Impervious Runoff Depth>4.96"
Flow Length=300' Tc=0.9 min CN=98 Runoff=7.52 cfs 0.378 af

Pond 41P: (new Pond)

Inflow=7.52 cfs 0.378 af
Primary=7.52 cfs 0.378 af

Total Runoff Area = 0.914 ac Runoff Volume = 0.378 af Average Runoff Depth = 4.96"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.914 ac

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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 9

Summary for Subcatchment 40S: IMPERVIOUS COVER (100%)

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

Runoff = 7.52 cfs @ 11.90 hrs, Volume= 0.378 af, Depth> 4.96"

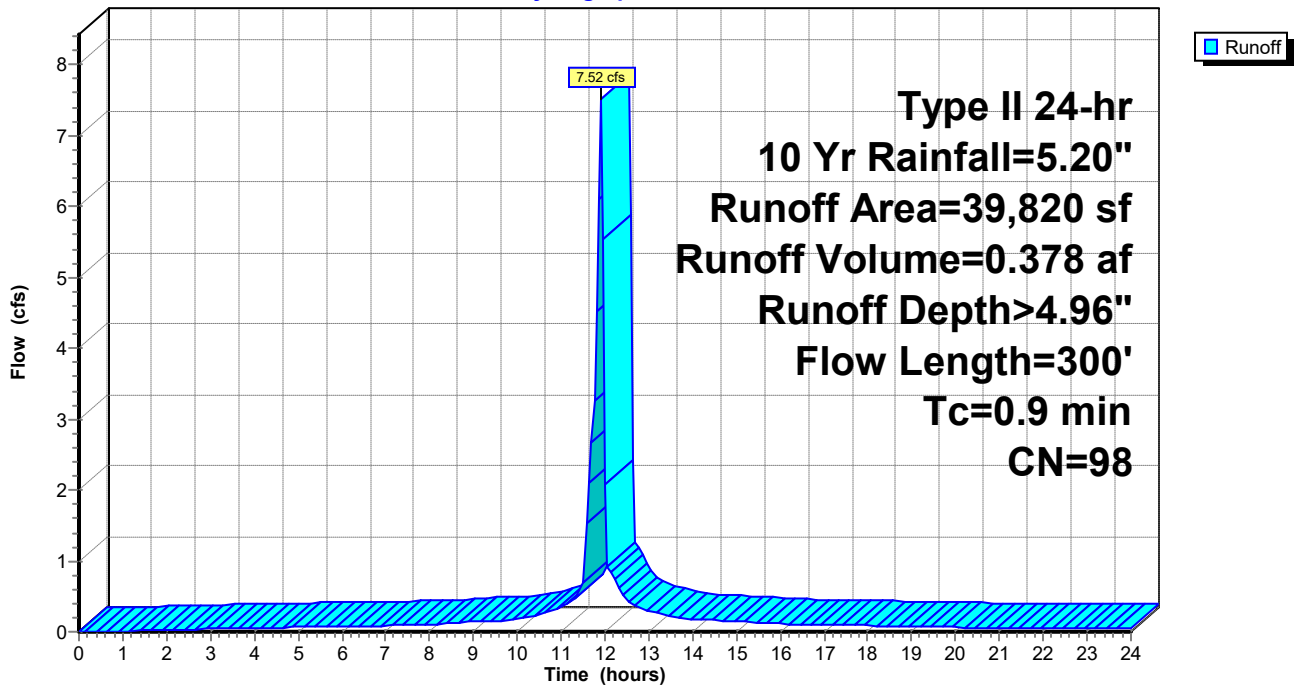
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Yr Rainfall=5.20"

Area (sf)	CN	Description
39,820	98	Unconnected pavement, HSG A
39,820		100.00% Impervious Area
39,820		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	300		5.56		Direct Entry, Direct Entry

Subcatchment 40S: IMPERVIOUS COVER (100%)

Hydrograph



Summary for Pond 41P: (new Pond)

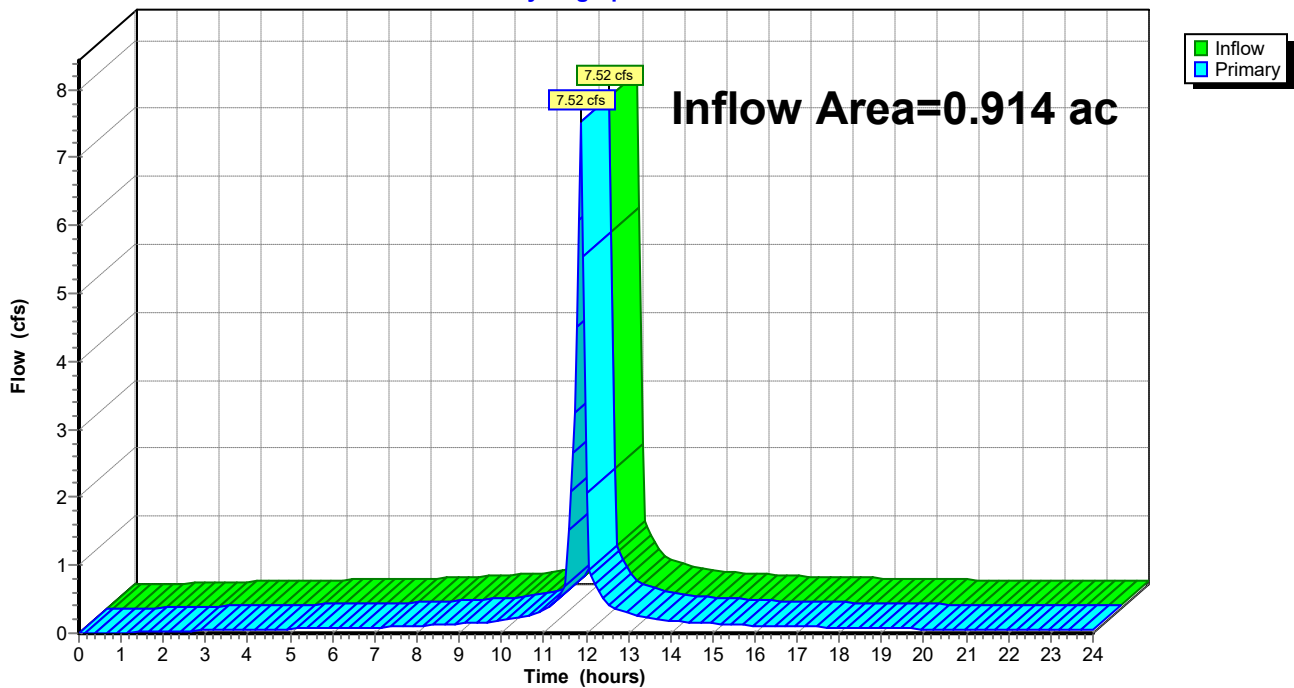
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.914 ac, 100.00% Impervious, Inflow Depth > 4.96" for 10 Yr event
Inflow = 7.52 cfs @ 11.90 hrs, Volume= 0.378 af
Primary = 7.52 cfs @ 11.90 hrs, Volume= 0.378 af, Atten= 0%, Lag= 0.0 min

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

Pond 41P: (new Pond)

Hydrograph



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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 11

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 40S: IMPERVIOUS COVER Runoff Area=39,820 sf 100.00% Impervious Runoff Depth>8.66"
Flow Length=300' Tc=0.9 min CN=98 Runoff=12.92 cfs 0.660 af

Pond 41P: (new Pond)

Inflow=12.92 cfs 0.660 af
Primary=12.92 cfs 0.660 af

Total Runoff Area = 0.914 ac Runoff Volume = 0.660 af Average Runoff Depth = 8.66"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.914 ac

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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 12

Summary for Subcatchment 40S: IMPERVIOUS COVER (100%)

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

Runoff = 12.92 cfs @ 11.90 hrs, Volume= 0.660 af, Depth> 8.66"

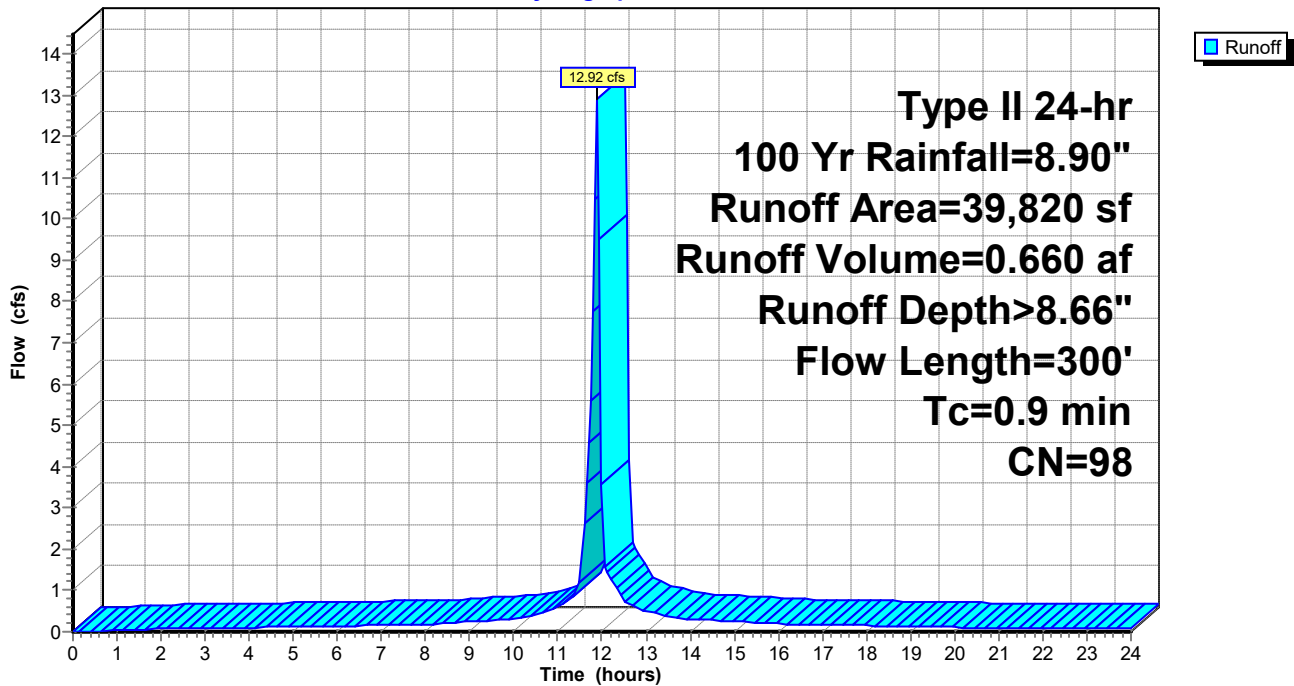
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Yr Rainfall=8.90"

Area (sf)	CN	Description
39,820	98	Unconnected pavement, HSG A
39,820		100.00% Impervious Area
39,820		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	300		5.56		Direct Entry, Direct Entry

Subcatchment 40S: IMPERVIOUS COVER (100%)

Hydrograph



Summary for Pond 41P: (new Pond)

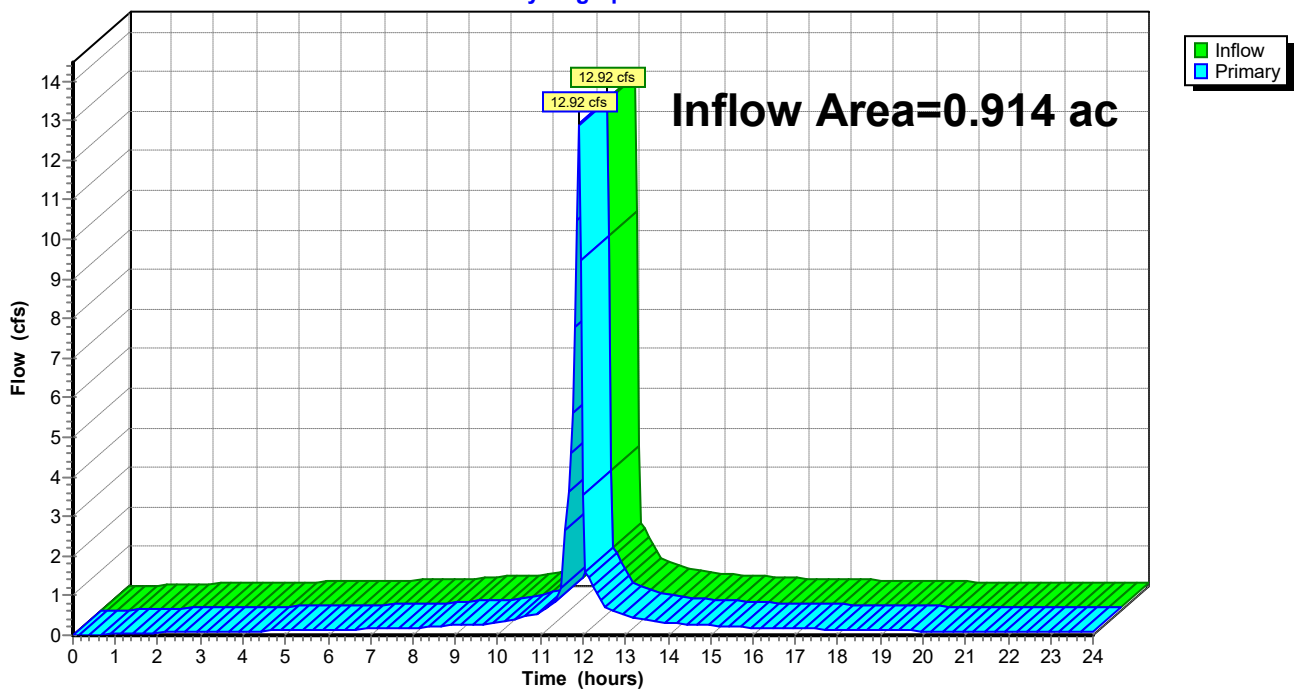
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.914 ac, 100.00% Impervious, Inflow Depth > 8.66" for 100 Yr event
Inflow = 12.92 cfs @ 11.90 hrs, Volume= 0.660 af
Primary = 12.92 cfs @ 11.90 hrs, Volume= 0.660 af, Atten= 0%, Lag= 0.0 min

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

Pond 41P: (new Pond)

Hydrograph



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NJ DEP 2-hr WQ Storm Rainfall=1.25"

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Page 14

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 40S: IMPERVIOUS COVER Runoff Area=39,820 sf 100.00% Impervious Runoff Depth=1.03"
Flow Length=300' Tc=0.9 min CN=98 Runoff=2.89 cfs 0.079 af

Pond 41P: (new Pond)

Inflow=2.89 cfs 0.079 af
Primary=2.89 cfs 0.079 af

Total Runoff Area = 0.914 ac Runoff Volume = 0.079 af Average Runoff Depth = 1.03"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.914 ac

Summary for Subcatchment 40S: IMPERVIOUS COVER (100%)

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.89 cfs @ 1.03 hrs, Volume= 0.079 af, Depth= 1.03"

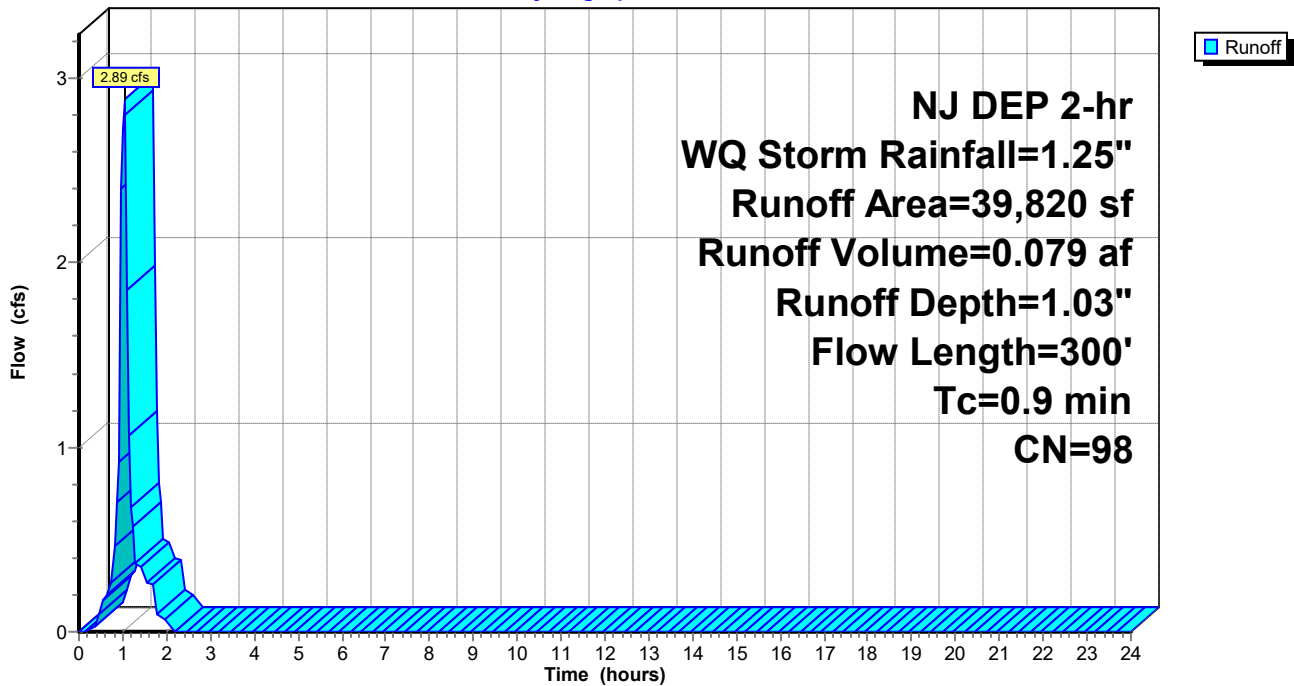
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (sf)	CN	Description
39,820	98	Unconnected pavement, HSG A
39,820		100.00% Impervious Area
39,820		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	300		5.56		Direct Entry, Direct Entry

Subcatchment 40S: IMPERVIOUS COVER (100%)

Hydrograph



Summary for Pond 41P: (new Pond)

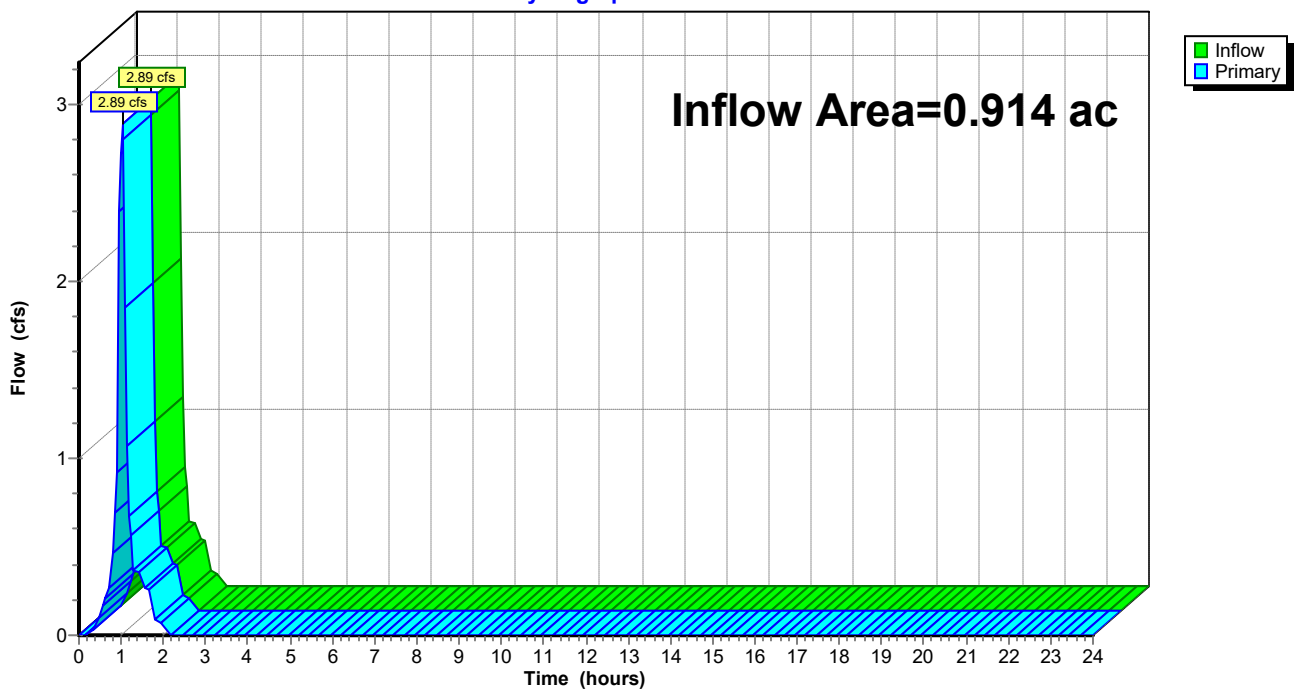
[40] Hint: Not Described (Outflow=Inflow)

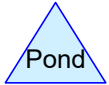
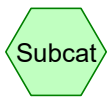
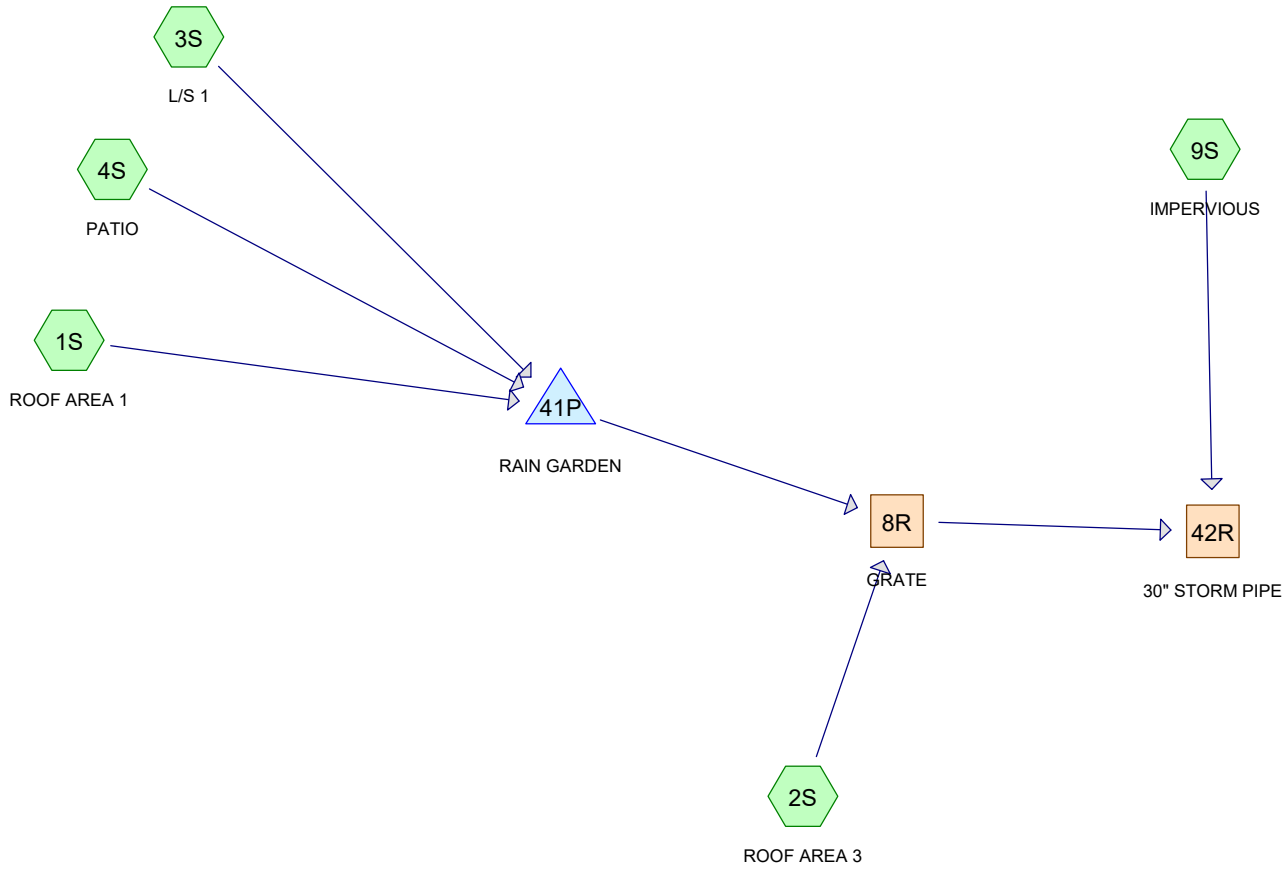
Inflow Area = 0.914 ac, 100.00% Impervious, Inflow Depth = 1.03" for WQ Storm event
Inflow = 2.89 cfs @ 1.03 hrs, Volume= 0.079 af
Primary = 2.89 cfs @ 1.03 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min

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

Pond 41P: (new Pond)

Hydrograph





Routing Diagram for 34588-Post-Development
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Page 2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.095	49	50-75% Grass cover, Fair, HSG A (3S)
0.232	98	Paved parking, HSG A (4S, 9S)
0.587	98	Roofs, HSG A (1S, 2S)
0.914	93	TOTAL AREA

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Page 3

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.914	HSG A	1S, 2S, 3S, 4S, 9S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.914		TOTAL AREA

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Page 4

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.095	0.000	0.000	0.000	0.000	0.095	50-75% Grass cover, Fair	3S
0.232	0.000	0.000	0.000	0.000	0.232	Paved parking	4S, 9S
0.587	0.000	0.000	0.000	0.000	0.587	Roofs	1S, 2S
0.914	0.000	0.000	0.000	0.000	0.914	TOTAL AREA	

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Page 5

Pipe Listing (selected 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	8R	4.00	3.52	95.0	0.0051	0.009	18.0	0.0	0.0
2	42R	2.00	1.00	400.0	0.0025	0.012	30.0	0.0	0.0

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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 6

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 1S: ROOF AREA 1	Runoff Area=12,508 sf 100.00% Impervious Runoff Depth>3.07" Flow Length=80' Tc=2.0 min CN=98 Runoff=1.42 cfs 0.073 af
Subcatchment 2S: ROOF AREA 3	Runoff Area=13,076 sf 100.00% Impervious Runoff Depth>3.07" Flow Length=80' Tc=2.0 min CN=98 Runoff=1.48 cfs 0.077 af
Subcatchment 3S: L/S 1	Runoff Area=4,140 sf 0.00% Impervious Runoff Depth>0.13" Flow Length=76' Tc=14.4 min CN=49 Runoff=0.00 cfs 0.001 af
Subcatchment 4S: PATIO	Runoff Area=3,350 sf 100.00% Impervious Runoff Depth>3.07" Flow Length=90' Tc=1.5 min CN=98 Runoff=0.39 cfs 0.020 af
Subcatchment 9S: IMPERVIOUS	Runoff Area=6,746 sf 100.00% Impervious Runoff Depth>3.07" Flow Length=85' Tc=0.9 min CN=98 Runoff=0.80 cfs 0.040 af
Reach 8R: GRATE	Avg. Flow Depth=0.56' Max Vel=5.28 fps Inflow=3.18 cfs 0.140 af 18.0" Round Pipe n=0.009 L=95.0' S=0.0051 '/' Capacity=10.79 cfs Outflow=3.19 cfs 0.140 af
Reach 42R: 30" STORM PIPE	Avg. Flow Depth=0.70' Max Vel=3.37 fps Inflow=3.87 cfs 0.179 af 30.0" Round Pipe n=0.012 L=400.0' S=0.0025 '/' Capacity=22.22 cfs Outflow=3.59 cfs 0.179 af
Pond 41P: RAIN GARDEN	Peak Elev=10.11' Storage=1,537 cf Inflow=1.81 cfs 0.094 af Outflow=1.76 cfs 0.063 af

Total Runoff Area = 0.914 ac Runoff Volume = 0.210 af Average Runoff Depth = 2.76"
10.40% Pervious = 0.095 ac 89.60% Impervious = 0.819 ac

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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 7

Summary for Subcatchment 1S: ROOF AREA 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.42 cfs @ 11.91 hrs, Volume= 0.073 af, Depth> 3.07"

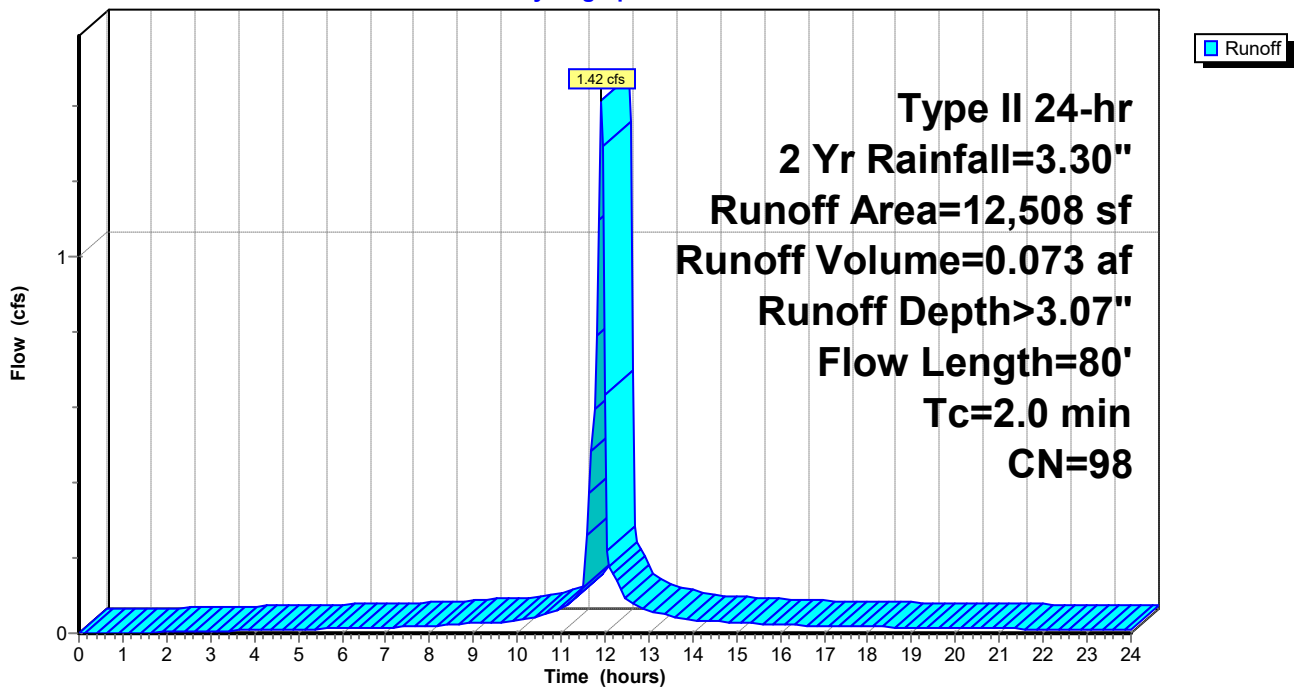
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
Type II 24-hr 2 Yr Rainfall=3.30"

Area (sf)	CN	Description
12,508	98	Roofs, HSG A
12,508		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	80		0.67		Direct Entry, Direct Entry

Subcatchment 1S: ROOF AREA 1

Hydrograph



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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 8

Summary for Subcatchment 2S: ROOF AREA 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.48 cfs @ 11.91 hrs, Volume= 0.077 af, Depth> 3.07"

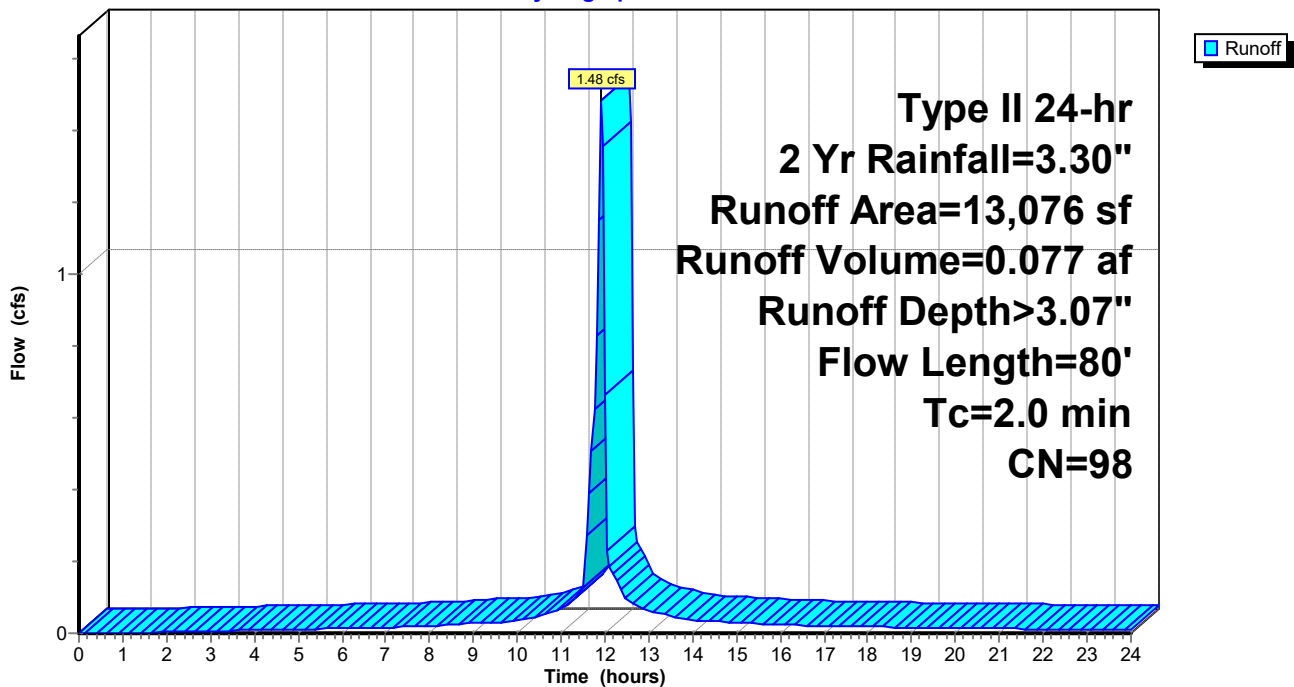
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
Type II 24-hr 2 Yr Rainfall=3.30"

Area (sf)	CN	Description
13,076	98	Roofs, HSG A
13,076		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	80		0.67		Direct Entry, DIRECT ENTRY

Subcatchment 2S: ROOF AREA 3

Hydrograph



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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 10

Summary for Subcatchment 4S: PATIO

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.39 cfs @ 11.90 hrs, Volume= 0.020 af, Depth> 3.07"

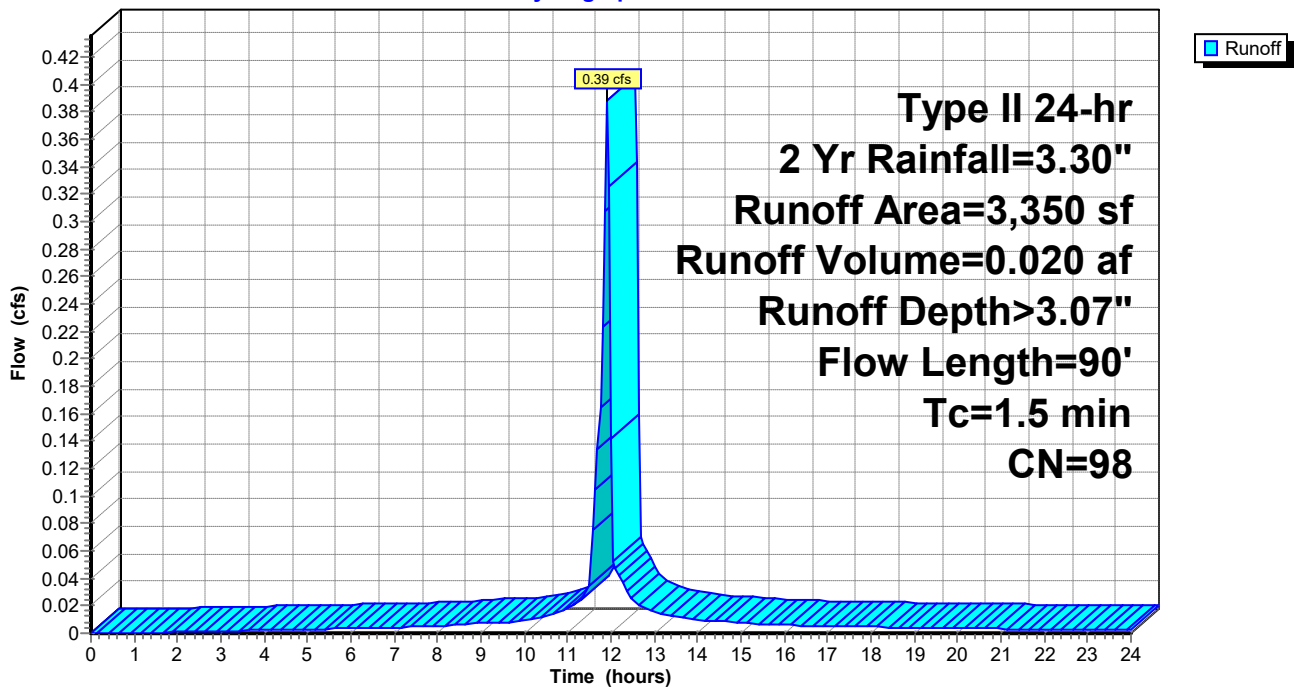
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
Type II 24-hr 2 Yr Rainfall=3.30"

Area (sf)	CN	Description
3,350	98	Paved parking, HSG A
3,350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	90		1.00		Direct Entry, DE

Subcatchment 4S: PATIO

Hydrograph



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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 11

Summary for Subcatchment 9S: IMPERVIOUS

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.80 cfs @ 11.90 hrs, Volume= 0.040 af, Depth> 3.07"

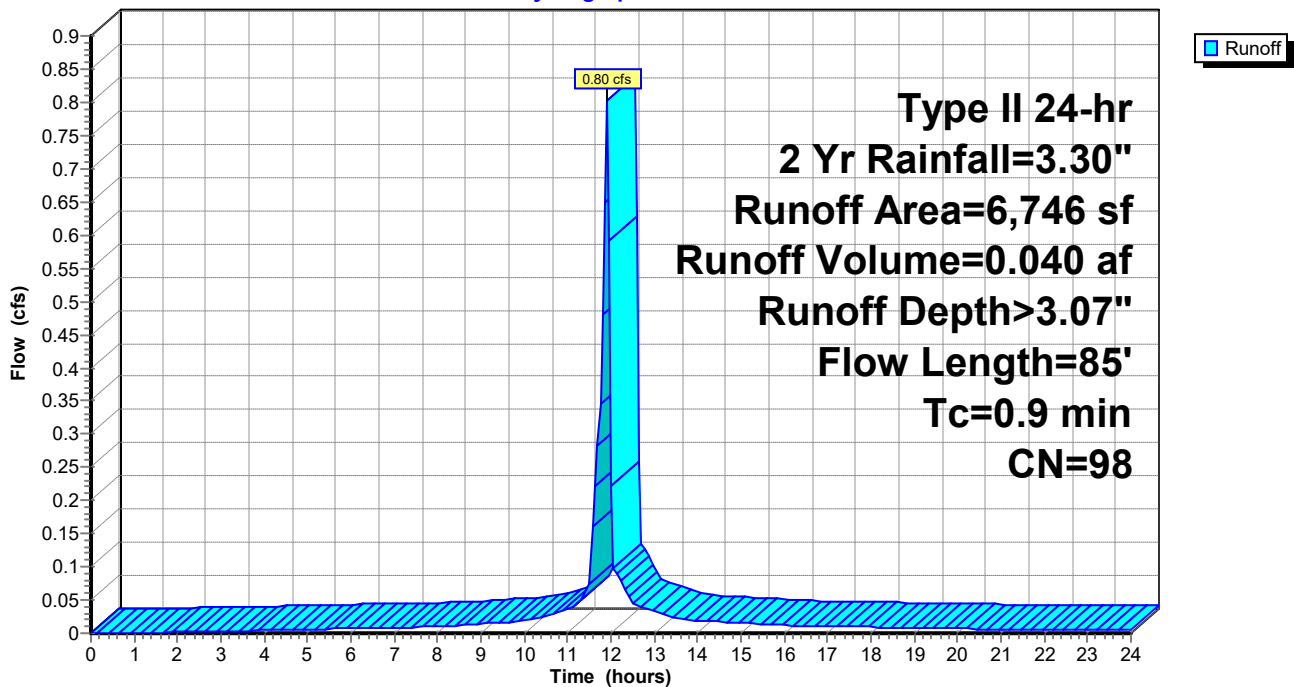
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
Type II 24-hr 2 Yr Rainfall=3.30"

Area (sf)	CN	Description
6,746	98	Paved parking, HSG A
6,746		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	85		1.57		Direct Entry, DE

Subcatchment 9S: IMPERVIOUS

Hydrograph



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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 12

Summary for Reach 8R: GRATE

[52] Hint: Inlet/Outlet conditions not evaluated

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.759 ac, 87.48% Impervious, Inflow Depth > 2.21" for 2 Yr event
Inflow = 3.18 cfs @ 11.92 hrs, Volume= 0.140 af
Outflow = 3.19 cfs @ 11.93 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.5 min

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

Max. Velocity= 5.28 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 1.41 fps, Avg. Travel Time= 1.1 min

Peak Storage= 58 cf @ 11.93 hrs

Average Depth at Peak Storage= 0.56'

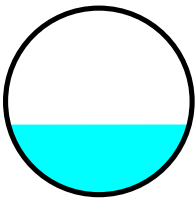
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 10.79 cfs

18.0" Round Pipe

n= 0.009 PVC, smooth interior

Length= 95.0' Slope= 0.0051 '/'

Inlet Invert= 4.00', Outlet Invert= 3.52'



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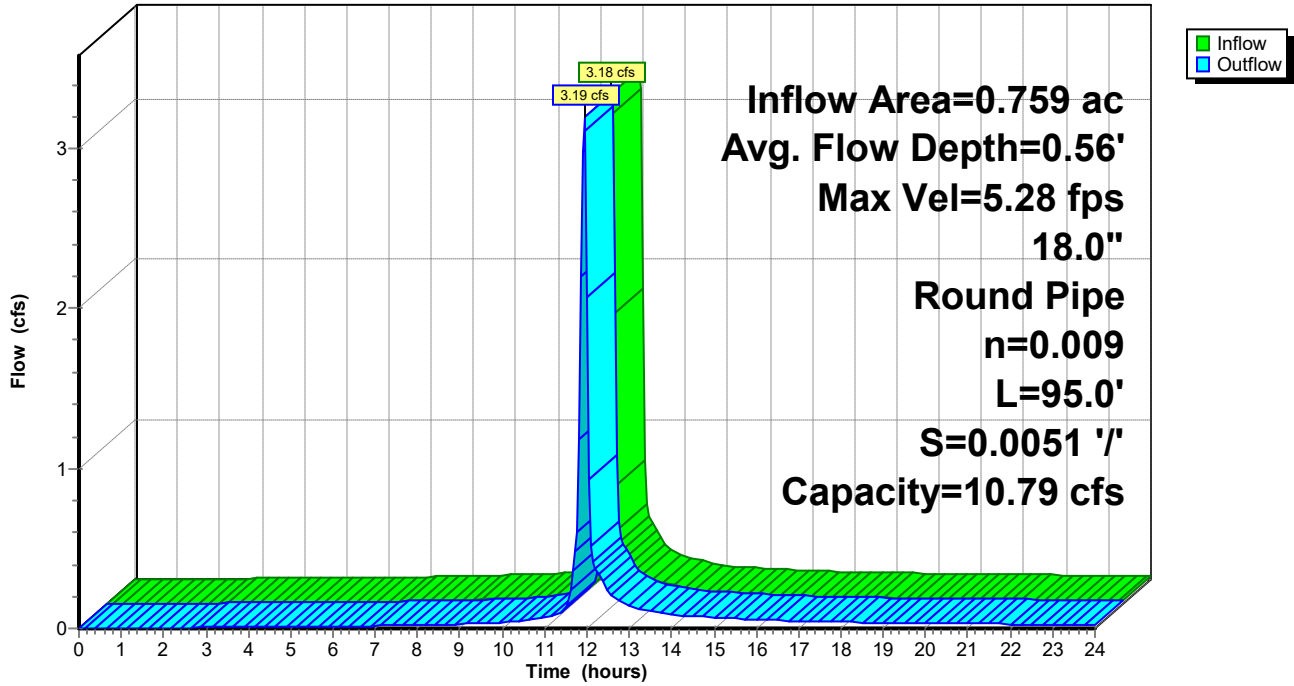
Type II 24-hr 2 Yr Rainfall=3.30"

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Page 13

Reach 8R: GRATE

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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 14

Summary for Reach 42R: 30" STORM PIPE

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.914 ac, 89.60% Impervious, Inflow Depth > 2.35" for 2 Yr event
Inflow = 3.87 cfs @ 11.92 hrs, Volume= 0.179 af
Outflow = 3.59 cfs @ 11.98 hrs, Volume= 0.179 af, Atten= 7%, Lag= 3.4 min

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

Max. Velocity= 3.37 fps, Min. Travel Time= 2.0 min

Avg. Velocity = 0.92 fps, Avg. Travel Time= 7.2 min

Peak Storage= 446 cf @ 11.94 hrs

Average Depth at Peak Storage= 0.70'

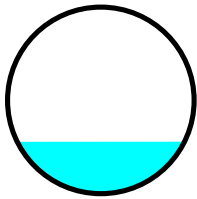
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 22.22 cfs

30.0" Round Pipe

n= 0.012 Concrete pipe, finished

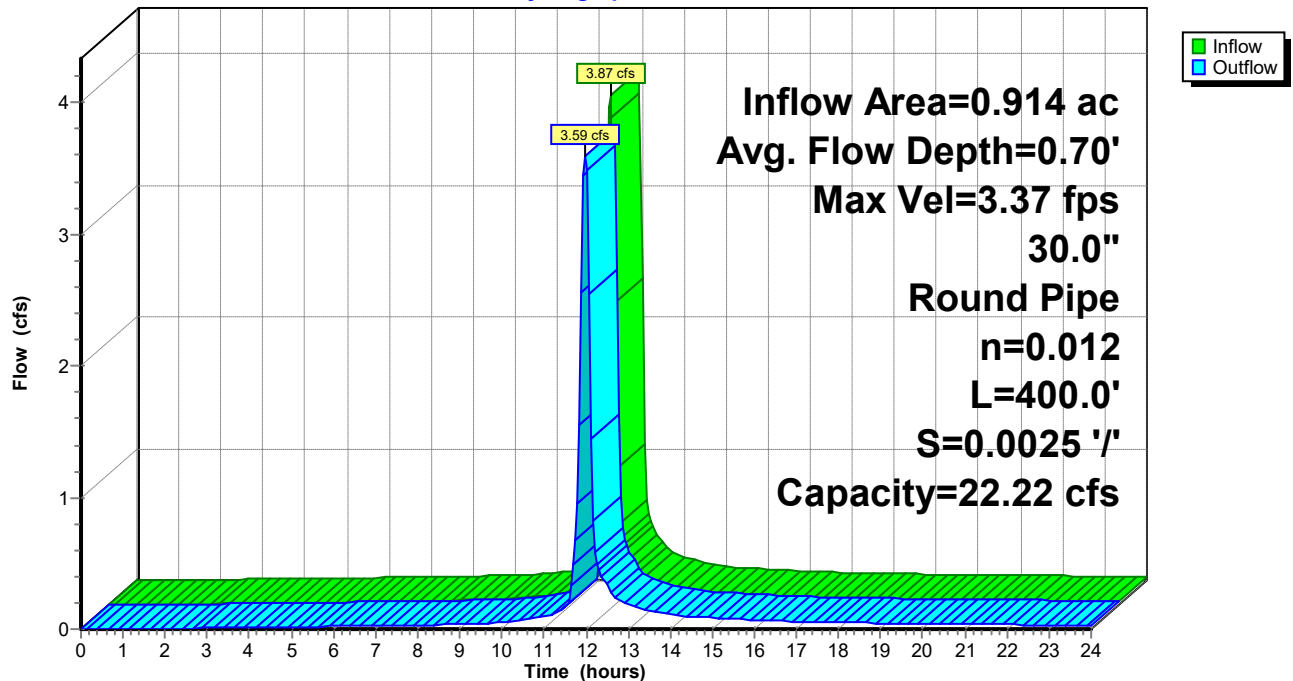
Length= 400.0' Slope= 0.0025 '/'

Inlet Invert= 2.00', Outlet Invert= 1.00'



Reach 42R: 30" STORM PIPE

Hydrograph



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Type II 24-hr 2 Yr Rainfall=3.30"

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Page 15

Summary for Pond 41P: RAIN GARDEN

Inflow Area = 0.459 ac, 79.30% Impervious, Inflow Depth > 2.46" for 2 Yr event
 Inflow = 1.81 cfs @ 11.91 hrs, Volume= 0.094 af
 Outflow = 1.76 cfs @ 11.93 hrs, Volume= 0.063 af, Atten= 3%, Lag= 1.3 min
 Primary = 1.76 cfs @ 11.93 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.11' @ 11.93 hrs Surf.Area= 1,642 sf Storage= 1,537 cf

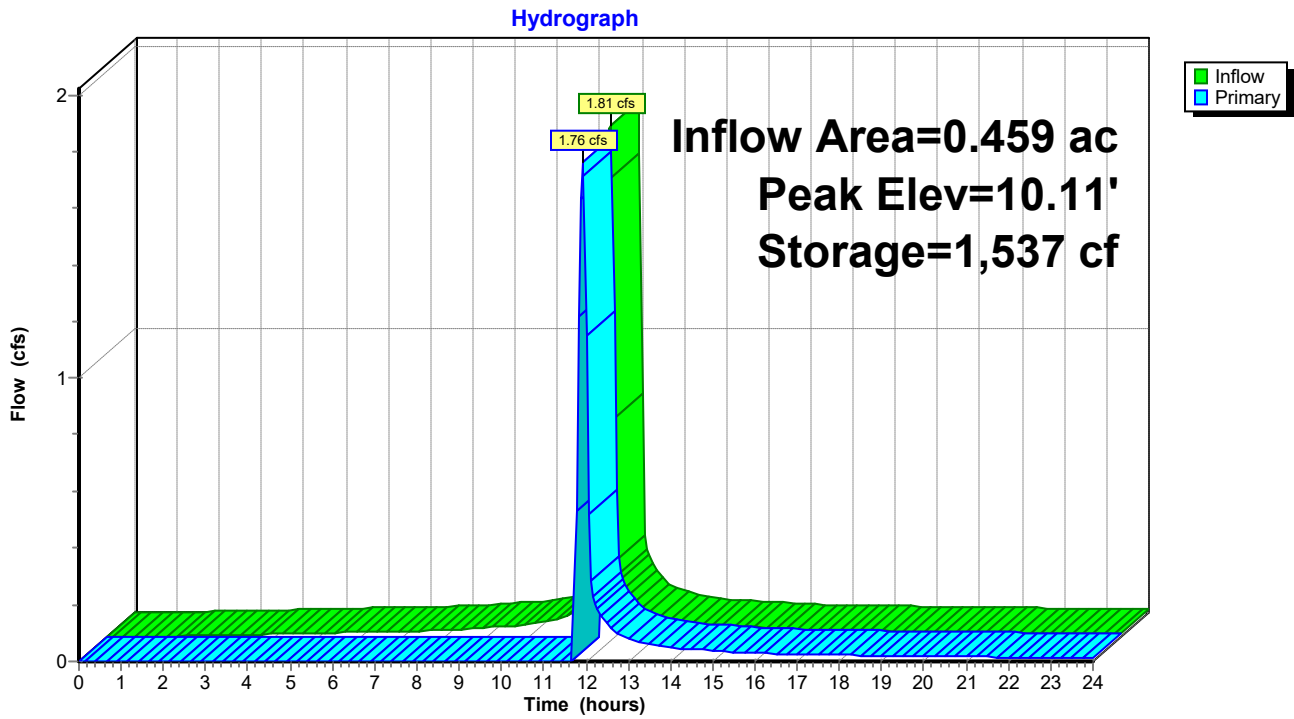
Plug-Flow detention time= 188.6 min calculated for 0.063 af (67% of inflow)
 Center-of-Mass det. time= 86.6 min (837.5 - 750.9)

Volume	Invert	Avail.Storage	Storage Description
#1	9.00'	4,314 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.00	1,123	0	0
10.00	1,583	1,353	1,353
11.00	2,100	1,842	3,195
11.50	2,379	1,120	4,314

Device	Routing	Invert	Outlet Devices
#1	Primary	10.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.68 cfs @ 11.93 hrs HW=10.11' (Free Discharge)
 ↑**1=Orifice/Grate** (Weir Controls 1.68 cfs @ 1.09 fps)

Pond 41P: RAIN GARDEN



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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 17

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 1S: ROOF AREA 1	Runoff Area=12,508 sf 100.00% Impervious Runoff Depth>4.96" Flow Length=80' Tc=2.0 min CN=98 Runoff=2.25 cfs 0.119 af
Subcatchment 2S: ROOF AREA 3	Runoff Area=13,076 sf 100.00% Impervious Runoff Depth>4.96" Flow Length=80' Tc=2.0 min CN=98 Runoff=2.35 cfs 0.124 af
Subcatchment 3S: L/S 1	Runoff Area=4,140 sf 0.00% Impervious Runoff Depth>0.71" Flow Length=76' Tc=14.4 min CN=49 Runoff=0.06 cfs 0.006 af
Subcatchment 4S: PATIO	Runoff Area=3,350 sf 100.00% Impervious Runoff Depth>4.96" Flow Length=90' Tc=1.5 min CN=98 Runoff=0.62 cfs 0.032 af
Subcatchment 9S: IMPERVIOUS	Runoff Area=6,746 sf 100.00% Impervious Runoff Depth>4.96" Flow Length=85' Tc=0.9 min CN=98 Runoff=1.27 cfs 0.064 af
Reach 8R: GRATE	Avg. Flow Depth=0.73' Max Vel=5.97 fps Inflow=5.08 cfs 0.249 af 18.0" Round Pipe n=0.009 L=95.0' S=0.0051 '/' Capacity=10.79 cfs Outflow=5.10 cfs 0.249 af
Reach 42R: 30" STORM PIPE	Avg. Flow Depth=0.89' Max Vel=3.85 fps Inflow=6.18 cfs 0.313 af 30.0" Round Pipe n=0.012 L=400.0' S=0.0025 '/' Capacity=22.22 cfs Outflow=5.74 cfs 0.313 af
Pond 41P: RAIN GARDEN	Peak Elev=10.16' Storage=1,606 cf Inflow=2.87 cfs 0.156 af Outflow=2.82 cfs 0.125 af
Total Runoff Area = 0.914 ac Runoff Volume = 0.344 af Average Runoff Depth = 4.52"	
10.40% Pervious = 0.095 ac 89.60% Impervious = 0.819 ac	

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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 18

Summary for Subcatchment 1S: ROOF AREA 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.25 cfs @ 11.91 hrs, Volume= 0.119 af, Depth> 4.96"

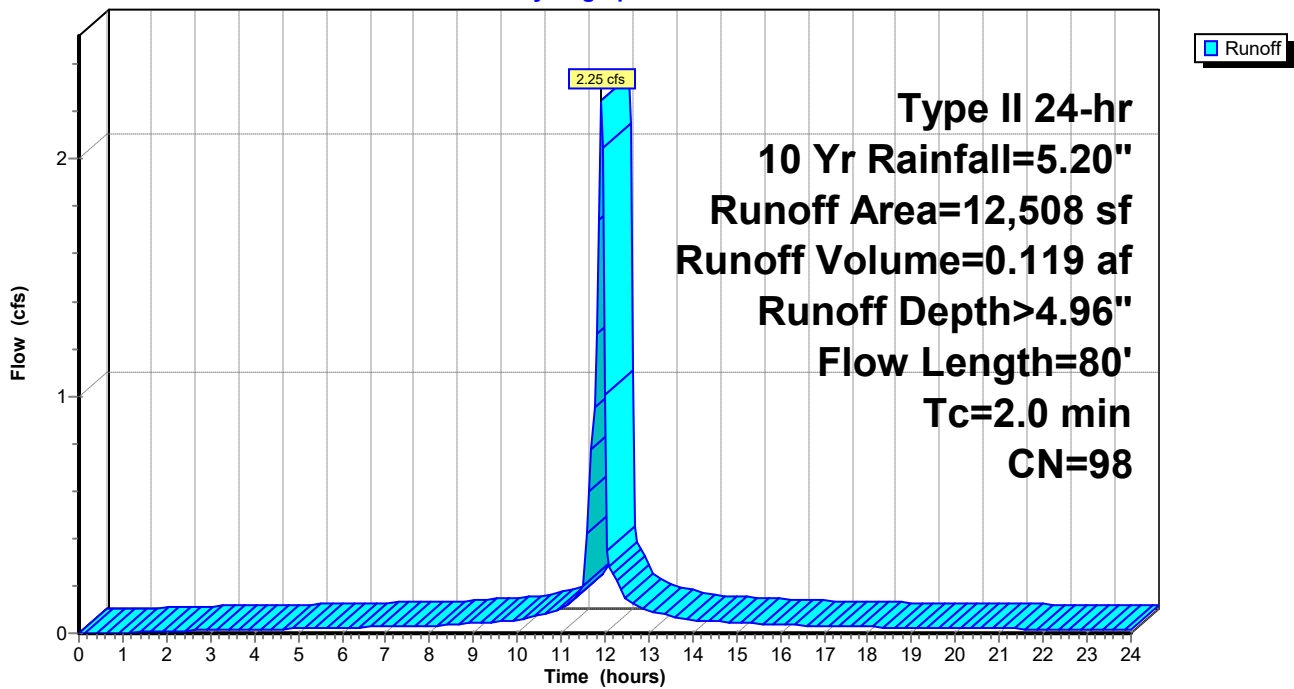
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
Type II 24-hr 10 Yr Rainfall=5.20"

Area (sf)	CN	Description
12,508	98	Roofs, HSG A
12,508		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	80		0.67		Direct Entry, Direct Entry

Subcatchment 1S: ROOF AREA 1

Hydrograph



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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 19

Summary for Subcatchment 2S: ROOF AREA 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.35 cfs @ 11.91 hrs, Volume= 0.124 af, Depth> 4.96"

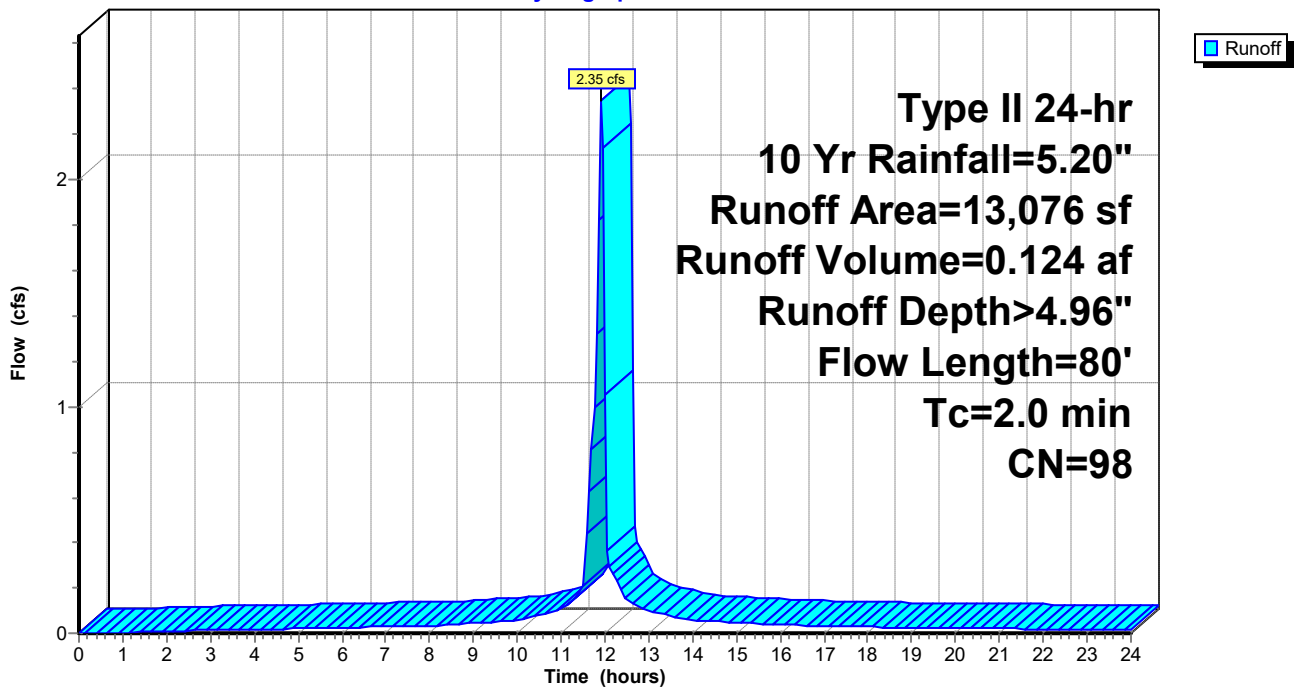
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10 Yr Rainfall=5.20"

Area (sf)	CN	Description
13,076	98	Roofs, HSG A
13,076		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	80		0.67		Direct Entry, DIRECT ENTRY

Subcatchment 2S: ROOF AREA 3

Hydrograph



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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 20

Summary for Subcatchment 3S: L/S 1

Runoff = 0.06 cfs @ 12.11 hrs, Volume= 0.006 af, Depth> 0.71"

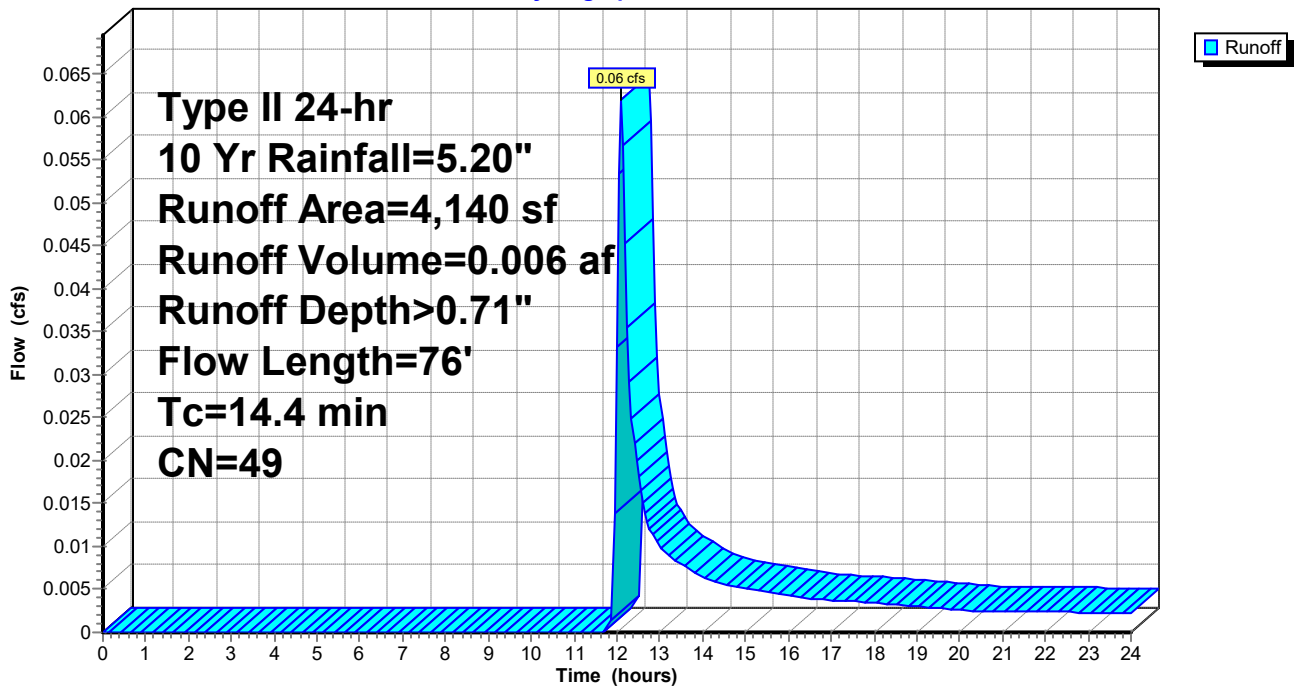
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Yr Rainfall=5.20"

Area (sf)	CN	Description
4,140	49	50-75% Grass cover, Fair, HSG A
4,140		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	76		0.09		Direct Entry, DIRECT ENTRY

Subcatchment 3S: L/S 1

Hydrograph



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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 21

Summary for Subcatchment 4S: PATIO

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.62 cfs @ 11.90 hrs, Volume= 0.032 af, Depth> 4.96"

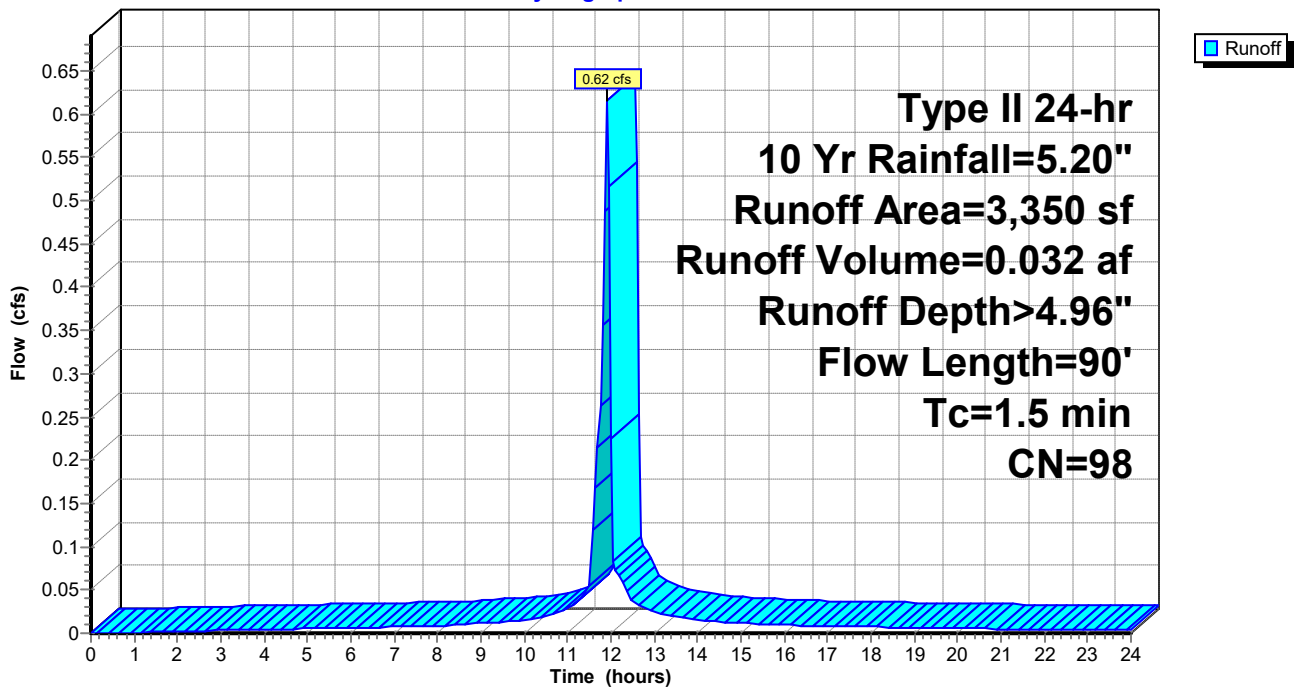
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
Type II 24-hr 10 Yr Rainfall=5.20"

Area (sf)	CN	Description
3,350	98	Paved parking, HSG A
3,350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	90		1.00		Direct Entry, DE

Subcatchment 4S: PATIO

Hydrograph



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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 22

Summary for Subcatchment 9S: IMPERVIOUS

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.27 cfs @ 11.90 hrs, Volume= 0.064 af, Depth> 4.96"

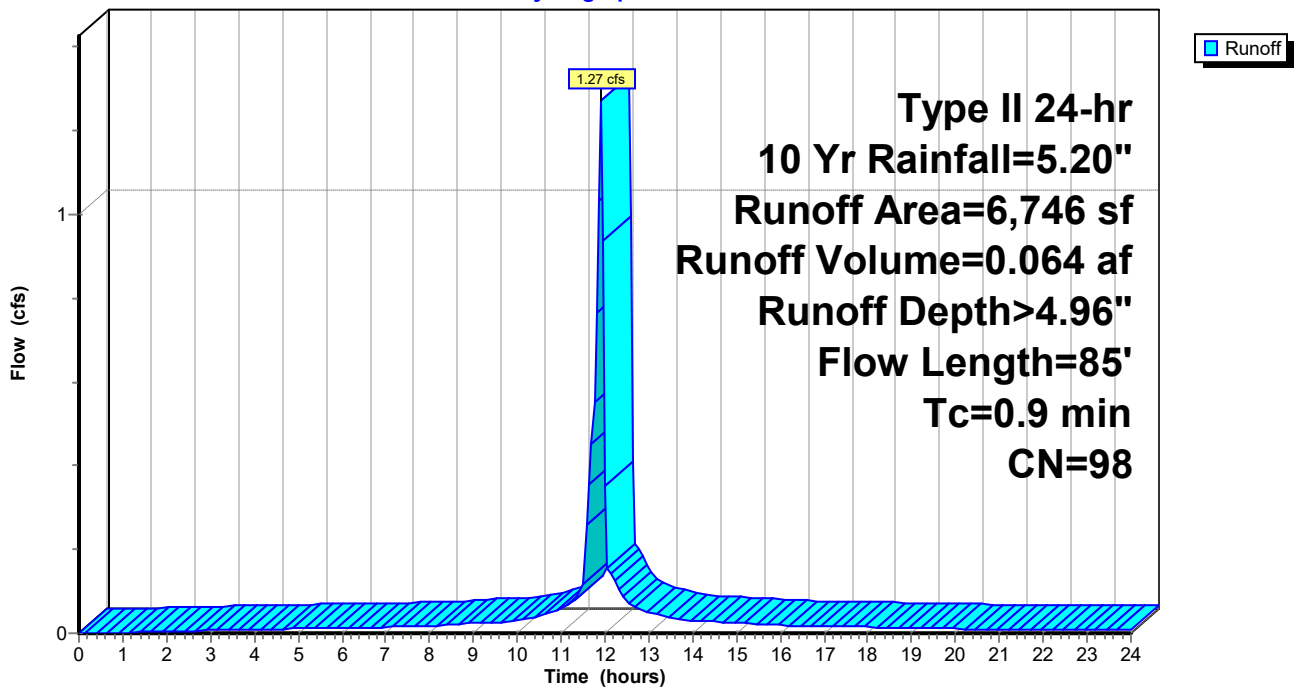
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10 Yr Rainfall=5.20"

Area (sf)	CN	Description
6,746	98	Paved parking, HSG A
6,746		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	85		1.57		Direct Entry, DE

Subcatchment 9S: IMPERVIOUS

Hydrograph



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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 23

Summary for Reach 8R: GRATE

[52] Hint: Inlet/Outlet conditions not evaluated

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.759 ac, 87.48% Impervious, Inflow Depth > 3.94" for 10 Yr event
Inflow = 5.08 cfs @ 11.92 hrs, Volume= 0.249 af
Outflow = 5.10 cfs @ 11.93 hrs, Volume= 0.249 af, Atten= 0%, Lag= 0.5 min

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

Max. Velocity= 5.97 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 1.66 fps, Avg. Travel Time= 1.0 min

Peak Storage= 81 cf @ 11.93 hrs

Average Depth at Peak Storage= 0.73'

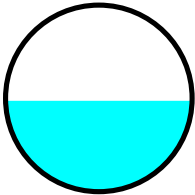
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 10.79 cfs

18.0" Round Pipe

n= 0.009 PVC, smooth interior

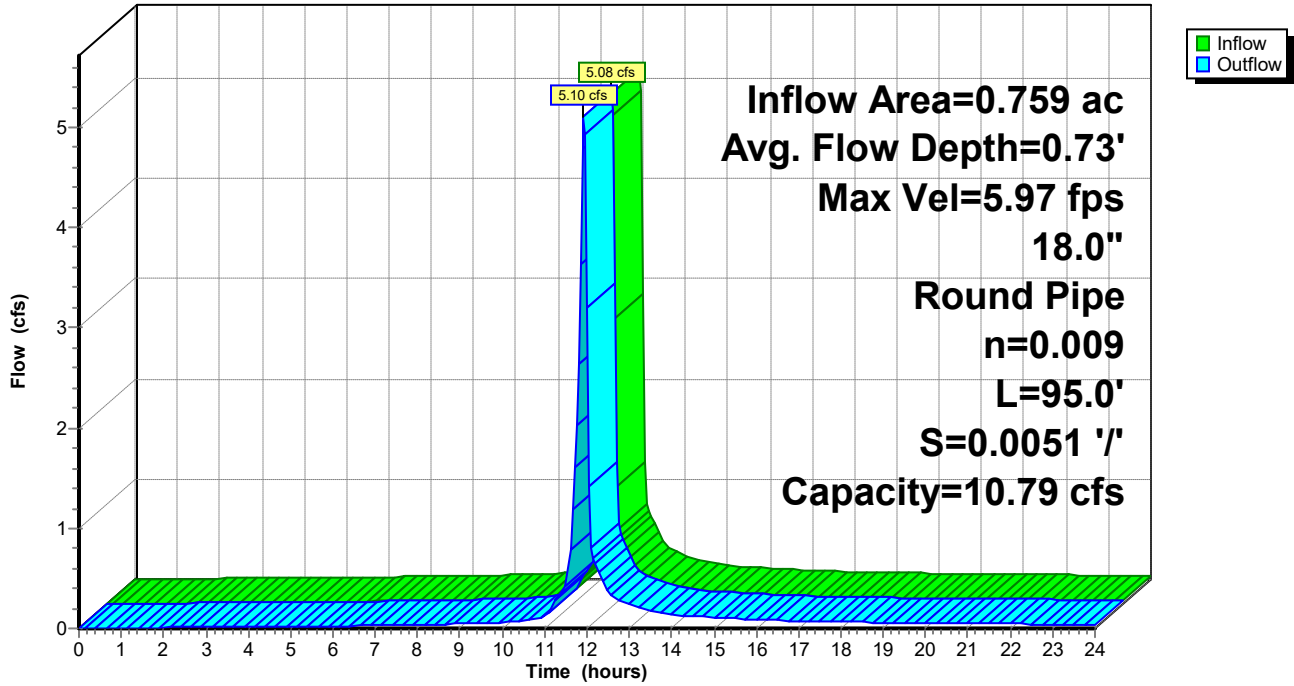
Length= 95.0' Slope= 0.0051 '/'

Inlet Invert= 4.00', Outlet Invert= 3.52'



Reach 8R: GRATE

Hydrograph



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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 25

Summary for Reach 42R: 30" STORM PIPE

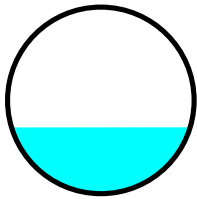
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.914 ac, 89.60% Impervious, Inflow Depth > 4.11" for 10 Yr event
Inflow = 6.18 cfs @ 11.92 hrs, Volume= 0.313 af
Outflow = 5.74 cfs @ 11.97 hrs, Volume= 0.313 af, Atten= 7%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.85 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 6.2 min

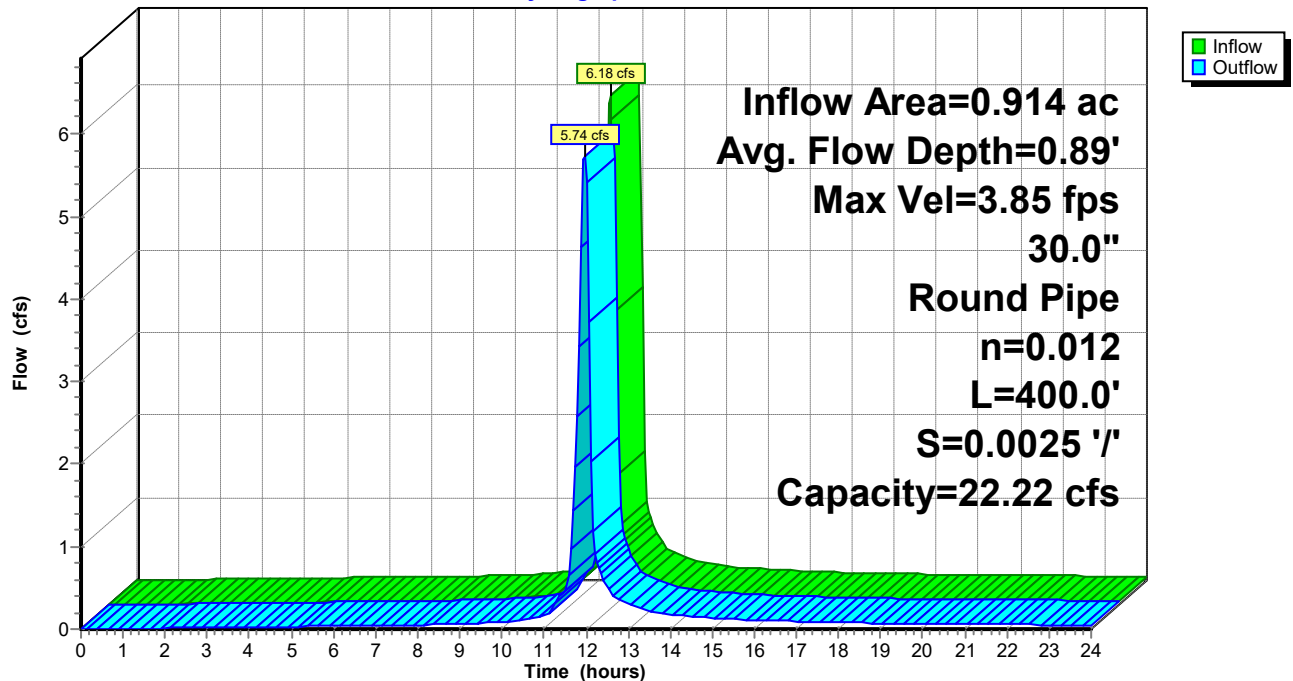
Peak Storage= 629 cf @ 11.94 hrs
Average Depth at Peak Storage= 0.89'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 22.22 cfs

30.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 400.0' Slope= 0.0025 '/'
Inlet Invert= 2.00', Outlet Invert= 1.00'



Reach 42R: 30" STORM PIPE

Hydrograph



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Type II 24-hr 10 Yr Rainfall=5.20"

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Page 26

Summary for Pond 41P: RAIN GARDEN

Inflow Area = 0.459 ac, 79.30% Impervious, Inflow Depth > 4.08" for 10 Yr event
 Inflow = 2.87 cfs @ 11.91 hrs, Volume= 0.156 af
 Outflow = 2.82 cfs @ 11.93 hrs, Volume= 0.125 af, Atten= 2%, Lag= 1.2 min
 Primary = 2.82 cfs @ 11.93 hrs, Volume= 0.125 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.16' @ 11.93 hrs Surf.Area= 1,664 sf Storage= 1,606 cf

Plug-Flow detention time= 150.9 min calculated for 0.125 af (80% of inflow)
 Center-of-Mass det. time= 68.5 min (814.3 - 745.9)

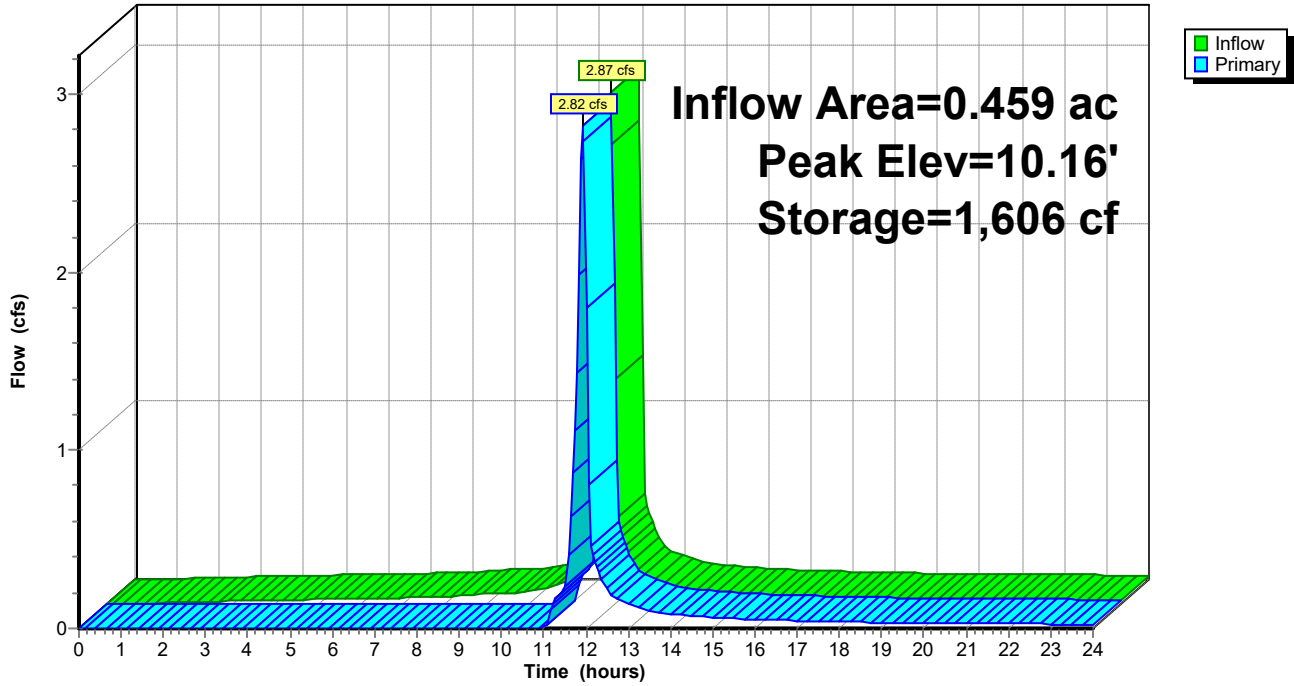
Volume	Invert	Avail.Storage	Storage Description
#1	9.00'	4,314 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.00	1,123	0	0
10.00	1,583	1,353	1,353
11.00	2,100	1,842	3,195
11.50	2,379	1,120	4,314

Device	Routing	Invert	Outlet Devices
#1	Primary	10.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.69 cfs @ 11.93 hrs HW=10.15' (Free Discharge)
 ↑**1=Orifice/Grate** (Weir Controls 2.69 cfs @ 1.27 fps)

Pond 41P: RAIN GARDEN

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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 28

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 1S: ROOF AREA 1	Runoff Area=12,508 sf 100.00% Impervious Runoff Depth>8.66" Flow Length=80' Tc=2.0 min CN=98 Runoff=3.86 cfs 0.207 af
Subcatchment 2S: ROOF AREA 3	Runoff Area=13,076 sf 100.00% Impervious Runoff Depth>8.66" Flow Length=80' Tc=2.0 min CN=98 Runoff=4.04 cfs 0.217 af
Subcatchment 3S: L/S 1	Runoff Area=4,140 sf 0.00% Impervious Runoff Depth>2.69" Flow Length=76' Tc=14.4 min CN=49 Runoff=0.32 cfs 0.021 af
Subcatchment 4S: PATIO	Runoff Area=3,350 sf 100.00% Impervious Runoff Depth>8.66" Flow Length=90' Tc=1.5 min CN=98 Runoff=1.06 cfs 0.055 af
Subcatchment 9S: IMPERVIOUS	Runoff Area=6,746 sf 100.00% Impervious Runoff Depth>8.66" Flow Length=85' Tc=0.9 min CN=98 Runoff=2.19 cfs 0.112 af
Reach 8R: GRATE	Avg. Flow Depth=1.05' Max Vel=6.78 fps Inflow=8.87 cfs 0.469 af 18.0" Round Pipe n=0.009 L=95.0' S=0.0051 '/' Capacity=10.79 cfs Outflow=8.92 cfs 0.469 af
Reach 42R: 30" STORM PIPE	Avg. Flow Depth=1.22' Max Vel=4.46 fps Inflow=10.77 cfs 0.581 af 30.0" Round Pipe n=0.012 L=400.0' S=0.0025 '/' Capacity=22.22 cfs Outflow=10.11 cfs 0.580 af
Pond 41P: RAIN GARDEN	Peak Elev=10.23' Storage=1,728 cf Inflow=5.03 cfs 0.284 af Outflow=4.97 cfs 0.253 af

Total Runoff Area = 0.914 ac Runoff Volume = 0.612 af Average Runoff Depth = 8.04"
10.40% Pervious = 0.095 ac 89.60% Impervious = 0.819 ac

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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 29

Summary for Subcatchment 1S: ROOF AREA 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.86 cfs @ 11.91 hrs, Volume= 0.207 af, Depth> 8.66"

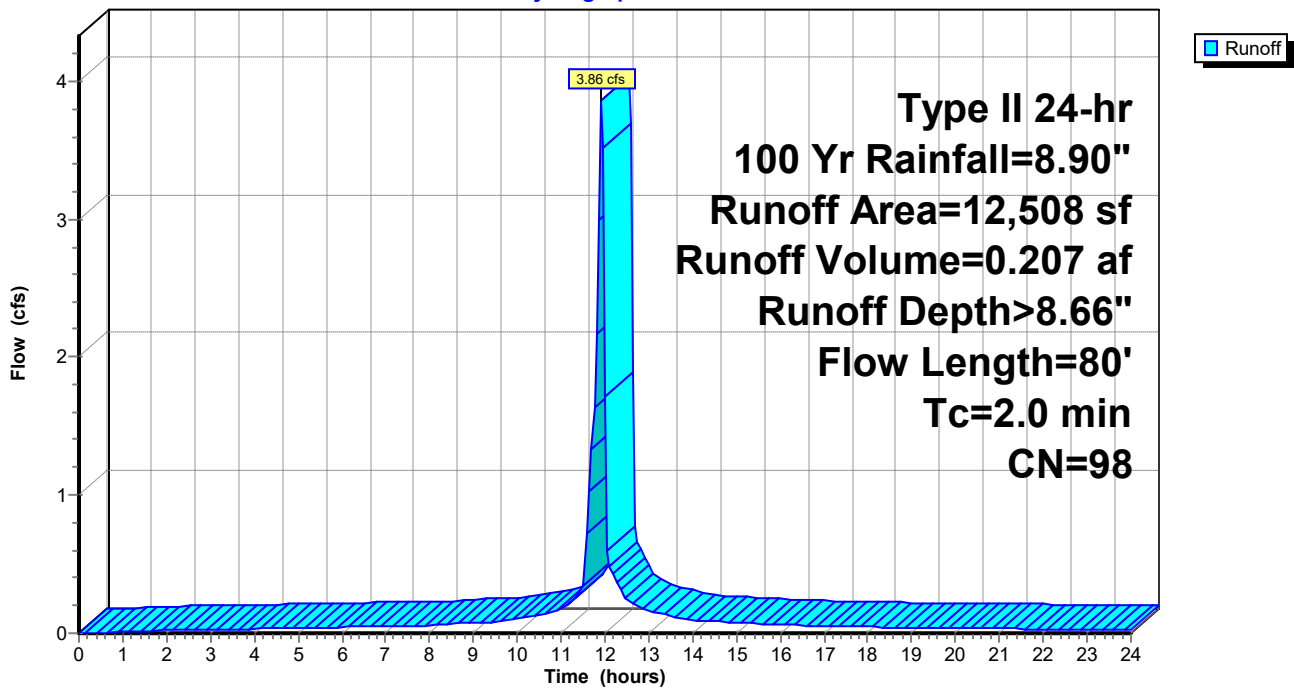
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100 Yr Rainfall=8.90"

Area (sf)	CN	Description
12,508	98	Roofs, HSG A
12,508		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	80		0.67		Direct Entry, Direct Entry

Subcatchment 1S: ROOF AREA 1

Hydrograph



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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 30

Summary for Subcatchment 2S: ROOF AREA 3

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

Runoff = 4.04 cfs @ 11.91 hrs, Volume= 0.217 af, Depth> 8.66"

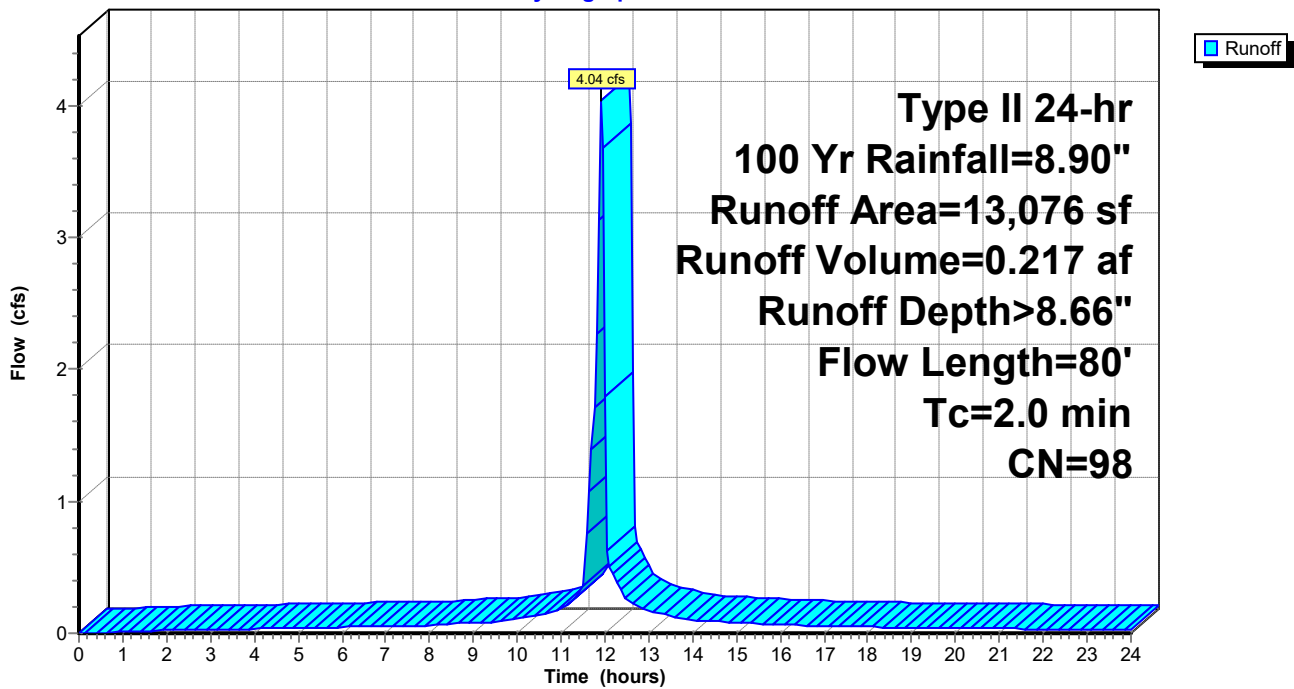
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Yr Rainfall=8.90"

Area (sf)	CN	Description
13,076	98	Roofs, HSG A
13,076		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	80		0.67		Direct Entry, DIRECT ENTRY

Subcatchment 2S: ROOF AREA 3

Hydrograph



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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 31

Summary for Subcatchment 3S: L/S 1

Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.021 af, Depth> 2.69"

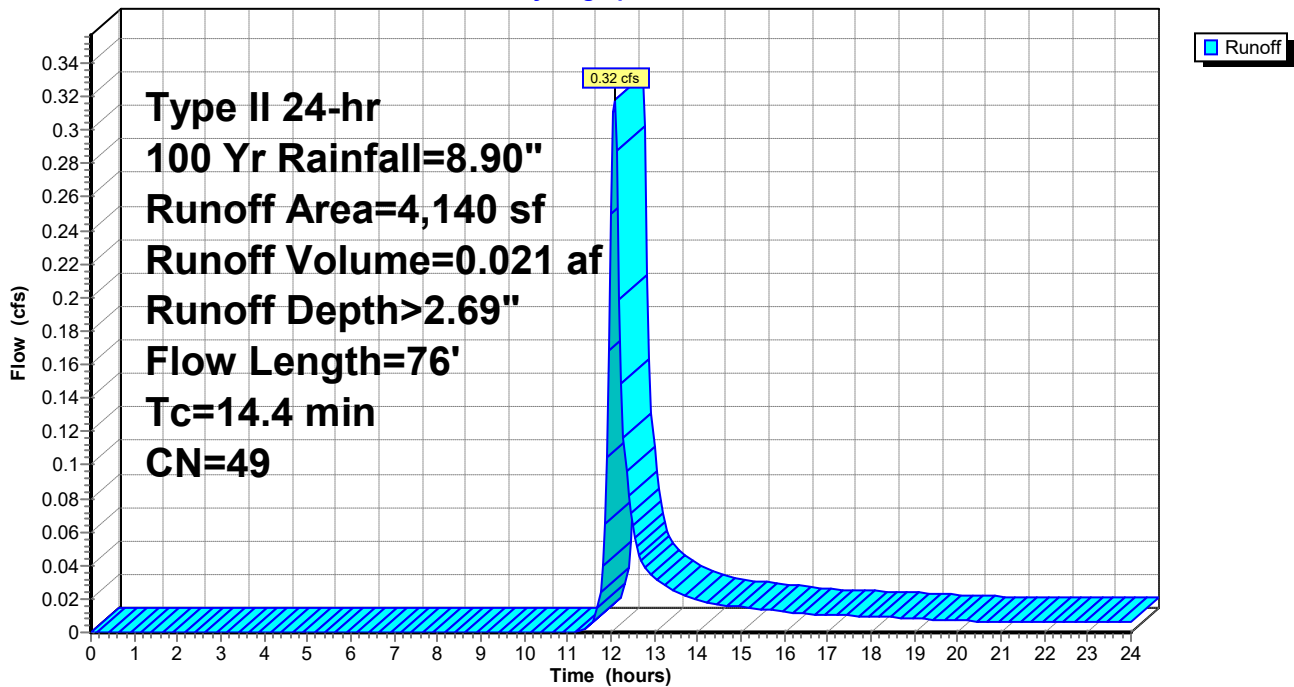
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 Yr Rainfall=8.90"

Area (sf)	CN	Description
4,140	49	50-75% Grass cover, Fair, HSG A
4,140		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	76		0.09		Direct Entry, DIRECT ENTRY

Subcatchment 3S: L/S 1

Hydrograph



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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 32

Summary for Subcatchment 4S: PATIO

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.06 cfs @ 11.90 hrs, Volume= 0.055 af, Depth> 8.66"

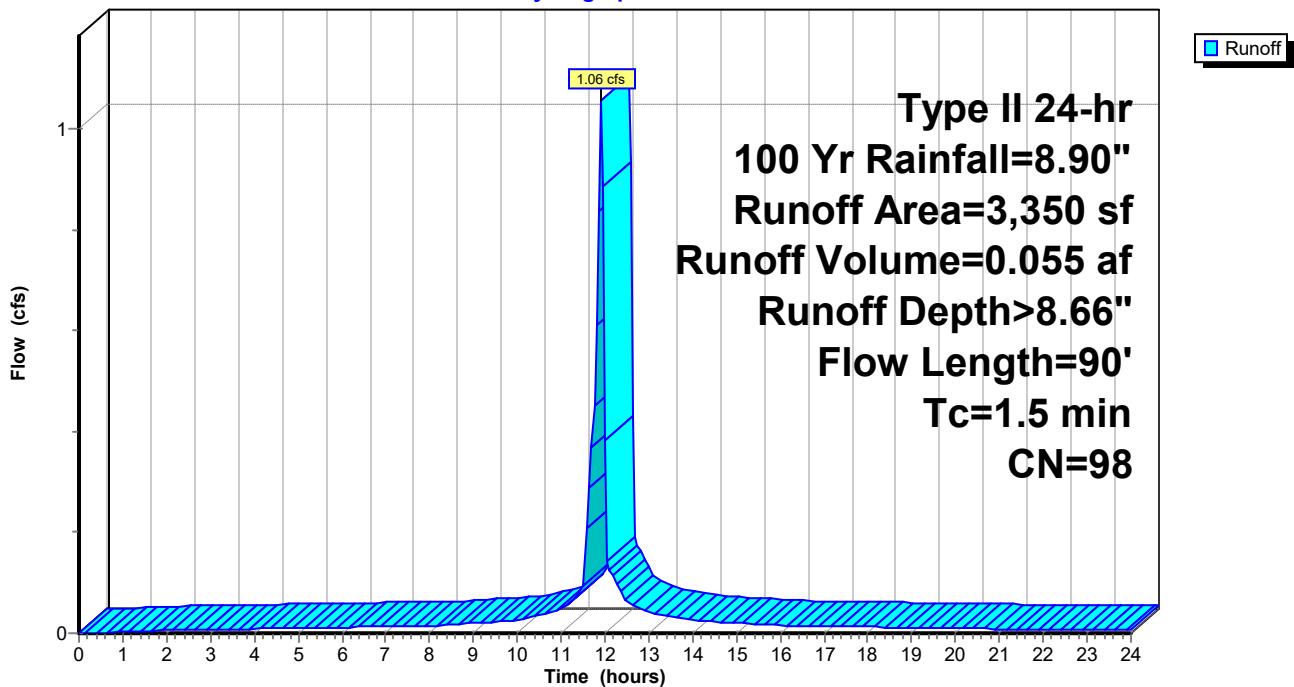
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
Type II 24-hr 100 Yr Rainfall=8.90"

Area (sf)	CN	Description
3,350	98	Paved parking, HSG A
3,350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	90		1.00		Direct Entry, DE

Subcatchment 4S: PATIO

Hydrograph



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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 33

Summary for Subcatchment 9S: IMPERVIOUS

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.19 cfs @ 11.90 hrs, Volume= 0.112 af, Depth> 8.66"

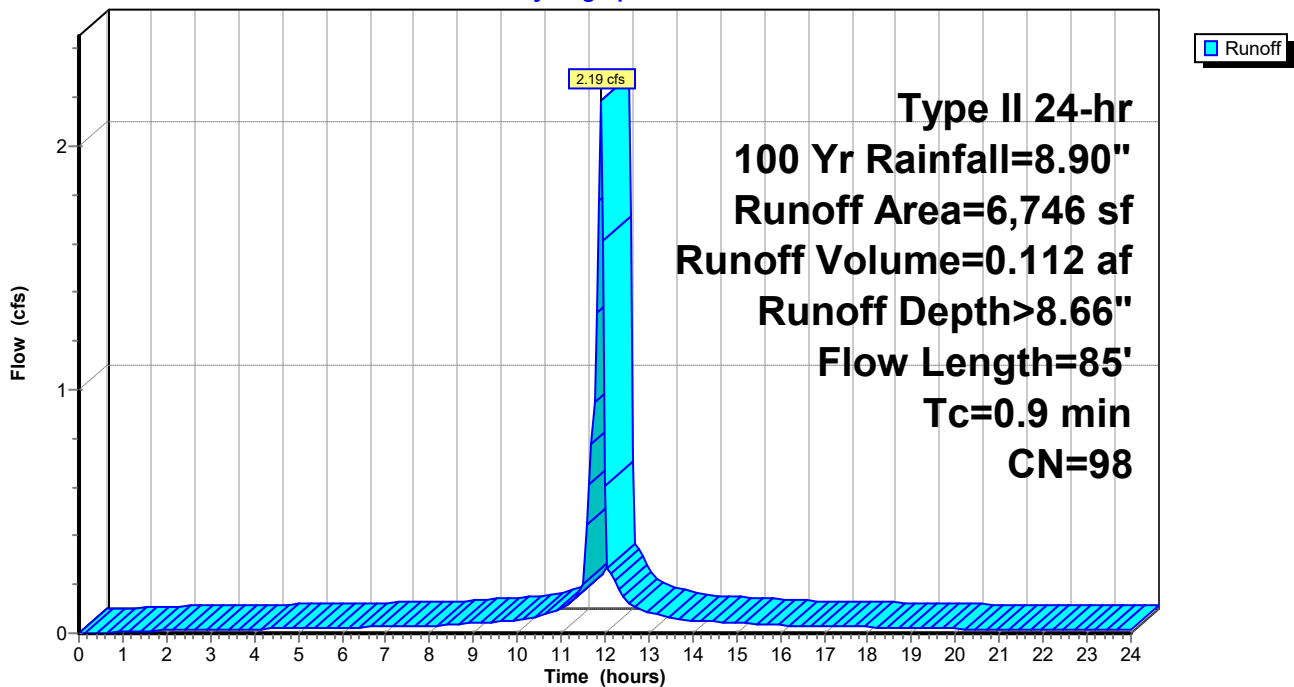
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100 Yr Rainfall=8.90"

Area (sf)	CN	Description
6,746	98	Paved parking, HSG A
6,746		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	85		1.57		Direct Entry, DE

Subcatchment 9S: IMPERVIOUS

Hydrograph



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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 34

Summary for Reach 8R: GRATE

[52] Hint: Inlet/Outlet conditions not evaluated

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.759 ac, 87.48% Impervious, Inflow Depth > 7.42" for 100 Yr event
Inflow = 8.87 cfs @ 11.92 hrs, Volume= 0.469 af
Outflow = 8.92 cfs @ 11.93 hrs, Volume= 0.469 af, Atten= 0%, Lag= 0.4 min

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

Max. Velocity= 6.78 fps, Min. Travel Time= 0.2 min

Avg. Velocity = 2.02 fps, Avg. Travel Time= 0.8 min

Peak Storage= 125 cf @ 11.93 hrs

Average Depth at Peak Storage= 1.05'

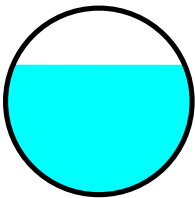
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 10.79 cfs

18.0" Round Pipe

n= 0.009 PVC, smooth interior

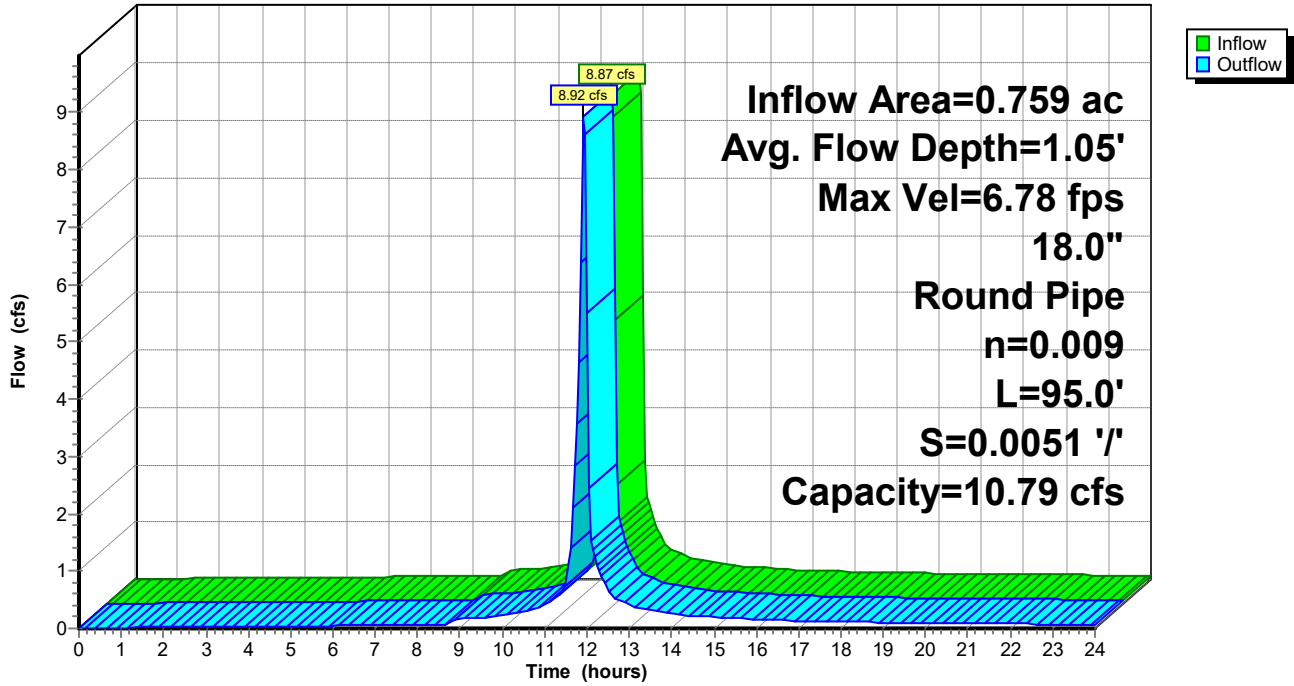
Length= 95.0' Slope= 0.0051 '/'

Inlet Invert= 4.00', Outlet Invert= 3.52'



Reach 8R: GRATE

Hydrograph



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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 36

Summary for Reach 42R: 30" STORM PIPE

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.914 ac, 89.60% Impervious, Inflow Depth > 7.63" for 100 Yr event
Inflow = 10.77 cfs @ 11.92 hrs, Volume= 0.581 af
Outflow = 10.11 cfs @ 11.96 hrs, Volume= 0.580 af, Atten= 6%, Lag= 2.3 min

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

Max. Velocity= 4.46 fps, Min. Travel Time= 1.5 min

Avg. Velocity = 1.30 fps, Avg. Travel Time= 5.1 min

Peak Storage= 950 cf @ 11.94 hrs

Average Depth at Peak Storage= 1.22'

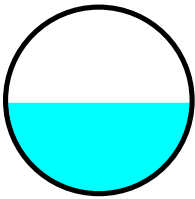
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 22.22 cfs

30.0" Round Pipe

n= 0.012 Concrete pipe, finished

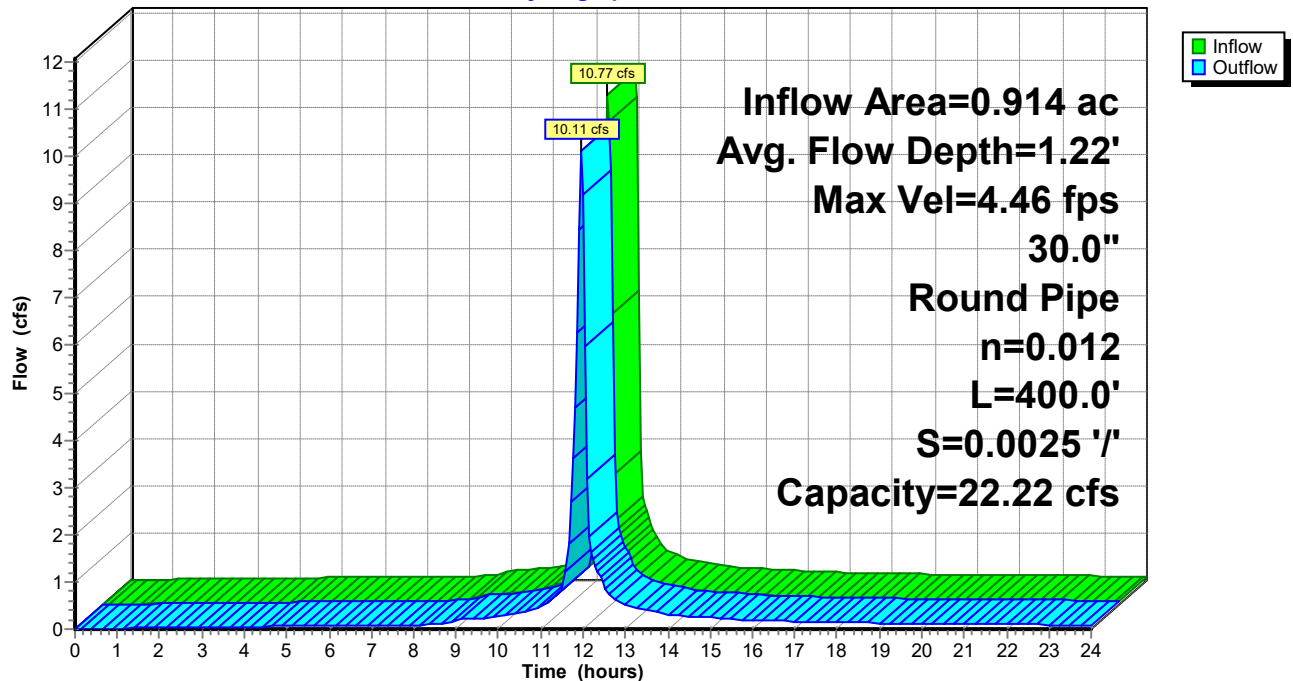
Length= 400.0' Slope= 0.0025 '/'

Inlet Invert= 2.00', Outlet Invert= 1.00'



Reach 42R: 30" STORM PIPE

Hydrograph



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Type II 24-hr 100 Yr Rainfall=8.90"

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Page 37

Summary for Pond 41P: RAIN GARDEN

Inflow Area = 0.459 ac, 79.30% Impervious, Inflow Depth > 7.42" for 100 Yr event
 Inflow = 5.03 cfs @ 11.91 hrs, Volume= 0.284 af
 Outflow = 4.97 cfs @ 11.93 hrs, Volume= 0.253 af, Atten= 1%, Lag= 1.1 min
 Primary = 4.97 cfs @ 11.93 hrs, Volume= 0.253 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.23' @ 11.93 hrs Surf.Area= 1,701 sf Storage= 1,728 cf

Plug-Flow detention time= 108.2 min calculated for 0.253 af (89% of inflow)
 Center-of-Mass det. time= 51.2 min (793.2 - 742.0)

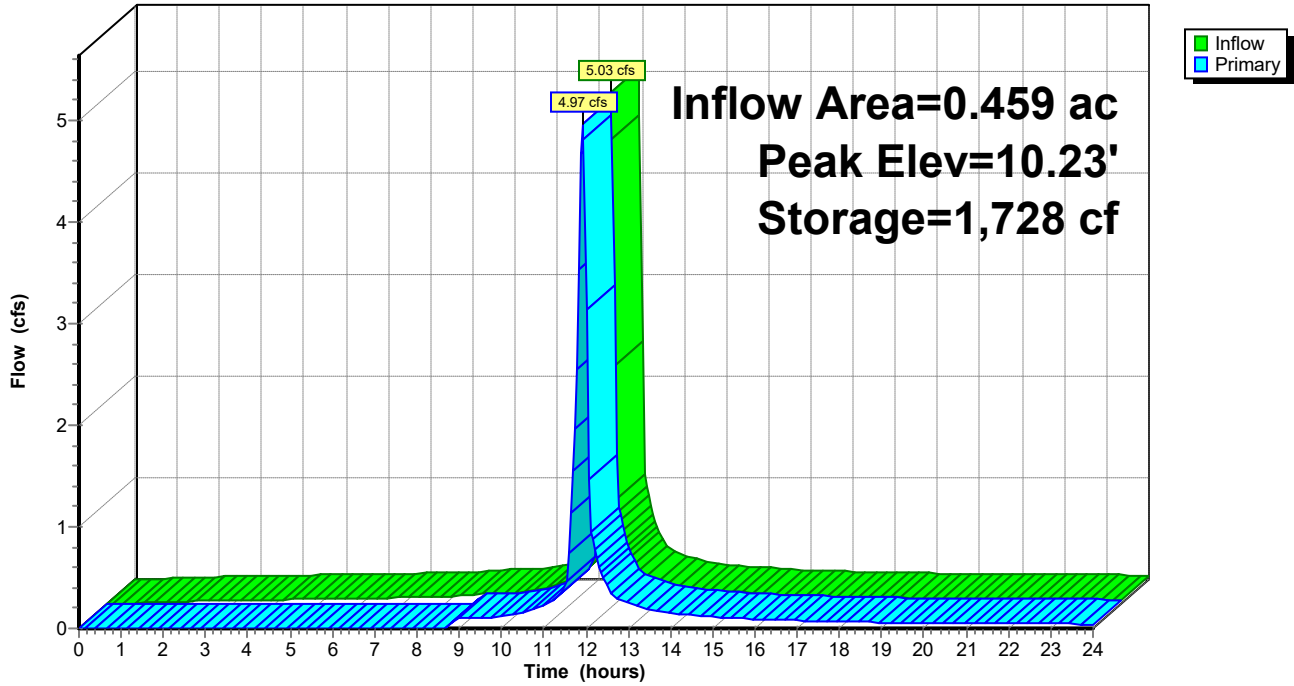
Volume	Invert	Avail.Storage	Storage Description
#1	9.00'	4,314 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.00	1,123	0	0
10.00	1,583	1,353	1,353
11.00	2,100	1,842	3,195
11.50	2,379	1,120	4,314

Device	Routing	Invert	Outlet Devices
#1	Primary	10.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.75 cfs @ 11.93 hrs HW=10.22' (Free Discharge)
 ↑**1=Orifice/Grate** (Weir Controls 4.75 cfs @ 1.54 fps)

Pond 41P: RAIN GARDEN

Hydrograph



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NJ DEP 2-hr WQ Storm Rainfall=1.25"

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Page 39

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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 1S: ROOF AREA 1	Runoff Area=12,508 sf 100.00% Impervious Runoff Depth=1.03" Flow Length=80' Tc=2.0 min CN=98 Runoff=0.88 cfs 0.026 af
Subcatchment 2S: ROOF AREA 3	Runoff Area=13,076 sf 100.00% Impervious Runoff Depth=1.03" Flow Length=80' Tc=2.0 min CN=98 Runoff=0.92 cfs 0.026 af
Subcatchment 3S: L/S 1	Runoff Area=4,140 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=76' Tc=14.4 min CN=49 Runoff=0.00 cfs 0.000 af
Subcatchment 4S: PATIO	Runoff Area=3,350 sf 100.00% Impervious Runoff Depth=1.03" Flow Length=90' Tc=1.5 min CN=98 Runoff=0.24 cfs 0.007 af
Subcatchment 9S: IMPERVIOUS	Runoff Area=6,746 sf 100.00% Impervious Runoff Depth=1.03" Flow Length=85' Tc=0.9 min CN=98 Runoff=0.49 cfs 0.013 af
Reach 8R: GRATE	Avg. Flow Depth=0.30' Max Vel=3.72 fps Inflow=0.92 cfs 0.026 af 18.0" Round Pipe n=0.009 L=95.0' S=0.0051 '/' Capacity=10.79 cfs Outflow=0.91 cfs 0.026 af
Reach 42R: 30" STORM PIPE	Avg. Flow Depth=0.41' Max Vel=2.46 fps Inflow=1.39 cfs 0.040 af 30.0" Round Pipe n=0.012 L=400.0' S=0.0025 '/' Capacity=22.22 cfs Outflow=1.30 cfs 0.040 af
Pond 41P: RAIN GARDEN	Peak Elev=10.00' Storage=1,359 cf Inflow=1.12 cfs 0.031 af Outflow=0.03 cfs 0.000 af

Total Runoff Area = 0.914 ac Runoff Volume = 0.071 af Average Runoff Depth = 0.93"
10.40% Pervious = 0.095 ac 89.60% Impervious = 0.819 ac

Summary for Subcatchment 1S: ROOF AREA 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.88 cfs @ 1.04 hrs, Volume= 0.025 af, Depth= 1.03"

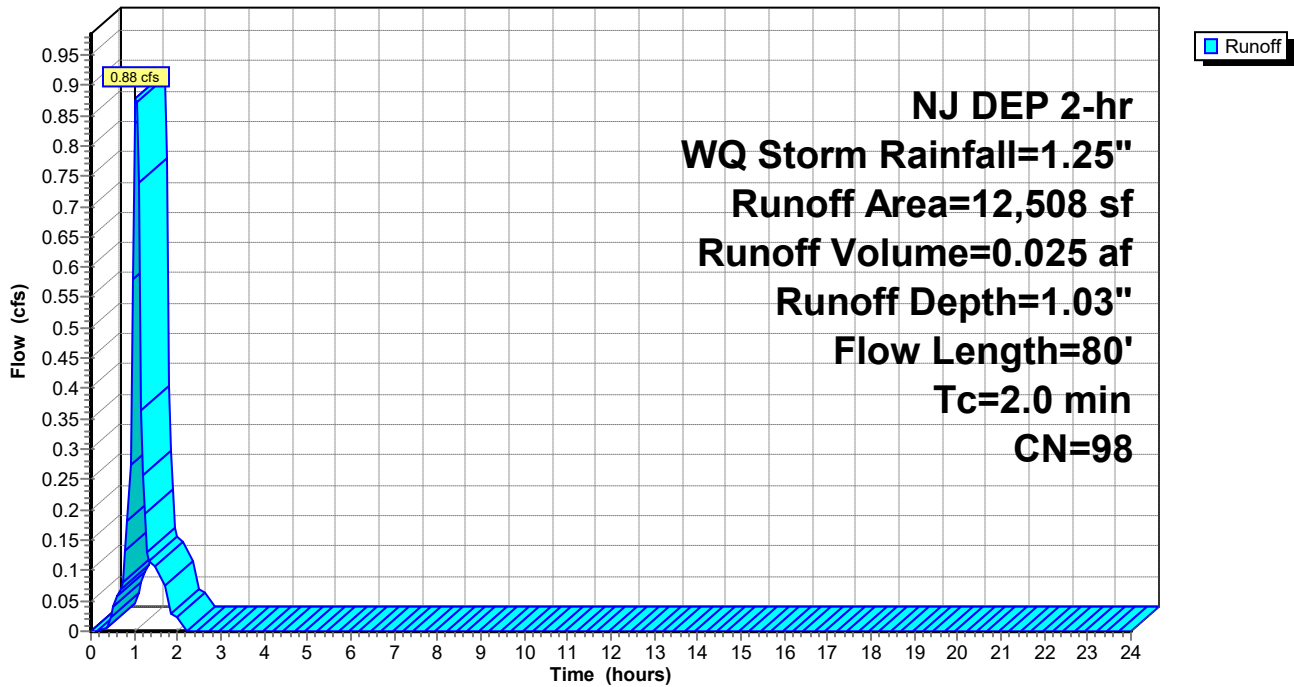
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (sf)	CN	Description
12,508	98	Roofs, HSG A
12,508		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	80		0.67		Direct Entry, Direct Entry

Subcatchment 1S: ROOF AREA 1

Hydrograph



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NJ DEP 2-hr WQ Storm Rainfall=1.25"

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Page 41

Summary for Subcatchment 2S: ROOF AREA 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.92 cfs @ 1.04 hrs, Volume= 0.026 af, Depth= 1.03"

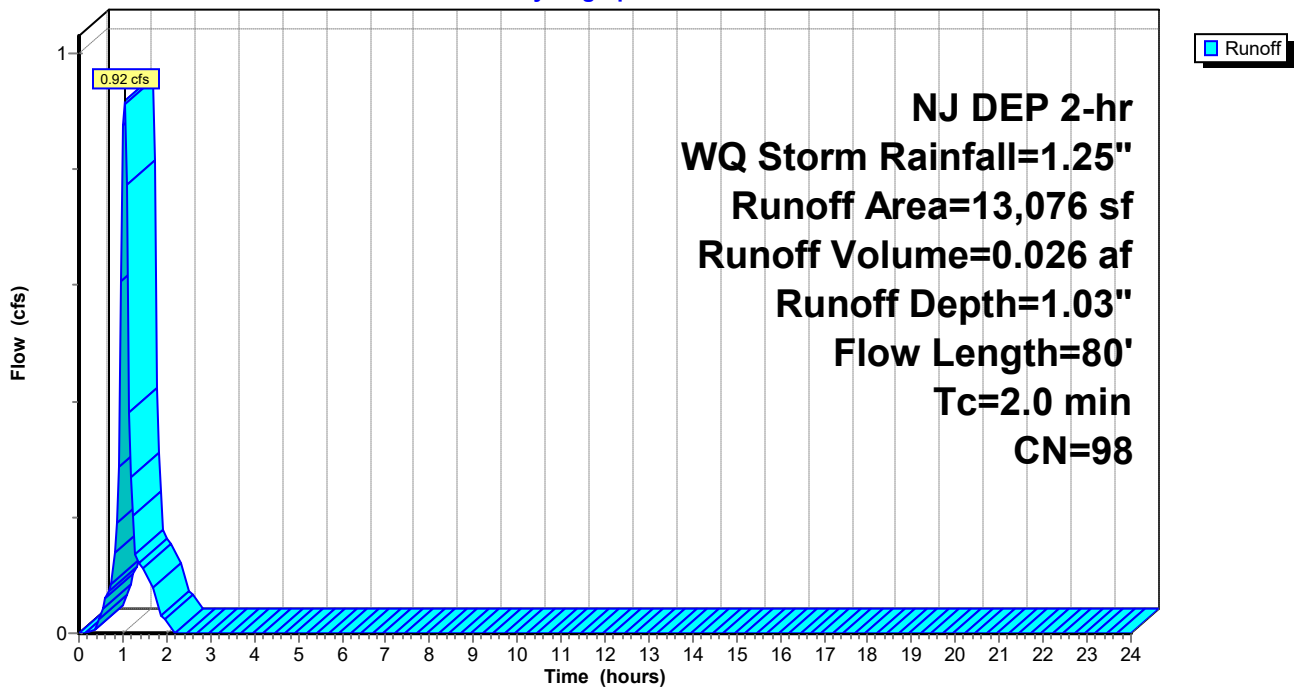
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (sf)	CN	Description
13,076	98	Roofs, HSG A
13,076		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	80		0.67		Direct Entry, DIRECT ENTRY

Subcatchment 2S: ROOF AREA 3

Hydrograph



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NJ DEP 2-hr WQ Storm Rainfall=1.25"

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Page 42

Summary for Subcatchment 3S: L/S 1

[45] Hint: Runoff=Zero

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

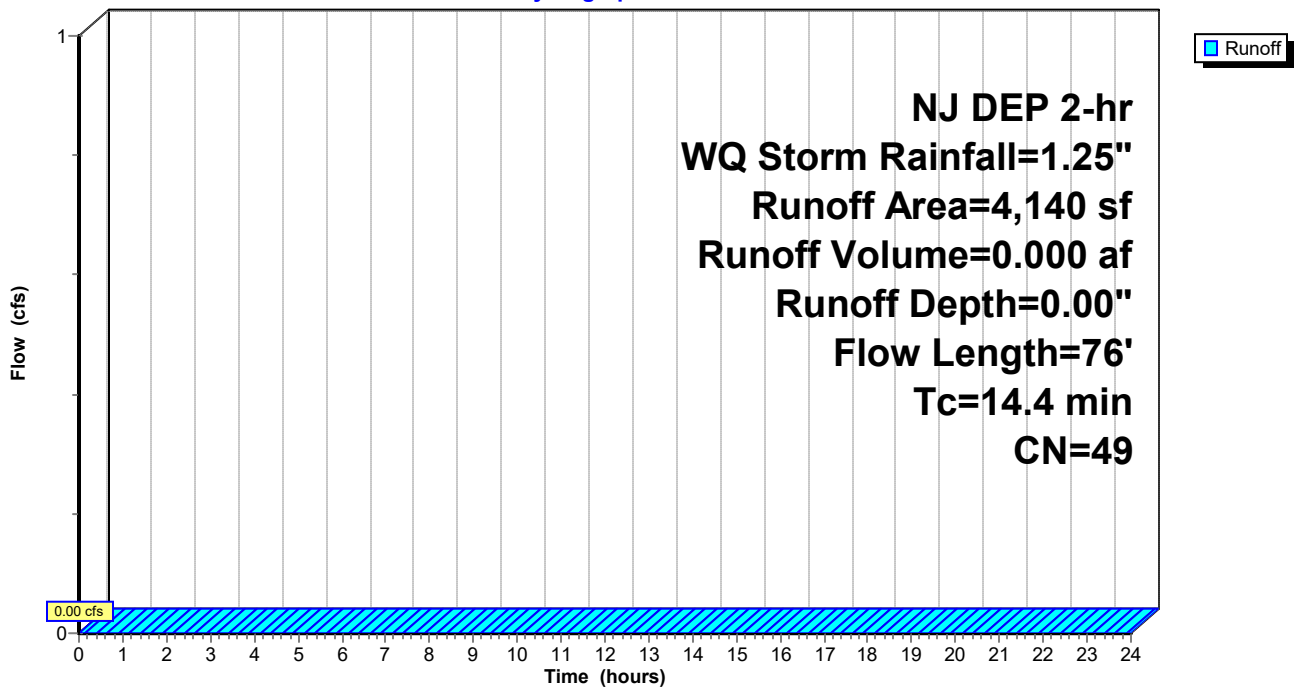
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (sf)	CN	Description
4,140	49	50-75% Grass cover, Fair, HSG A
4,140		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	76		0.09		Direct Entry, DIRECT ENTRY

Subcatchment 3S: L/S 1

Hydrograph



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NJ DEP 2-hr WQ Storm Rainfall=1.25"

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Page 43

Summary for Subcatchment 4S: PATIO

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.24 cfs @ 1.03 hrs, Volume= 0.007 af, Depth= 1.03"

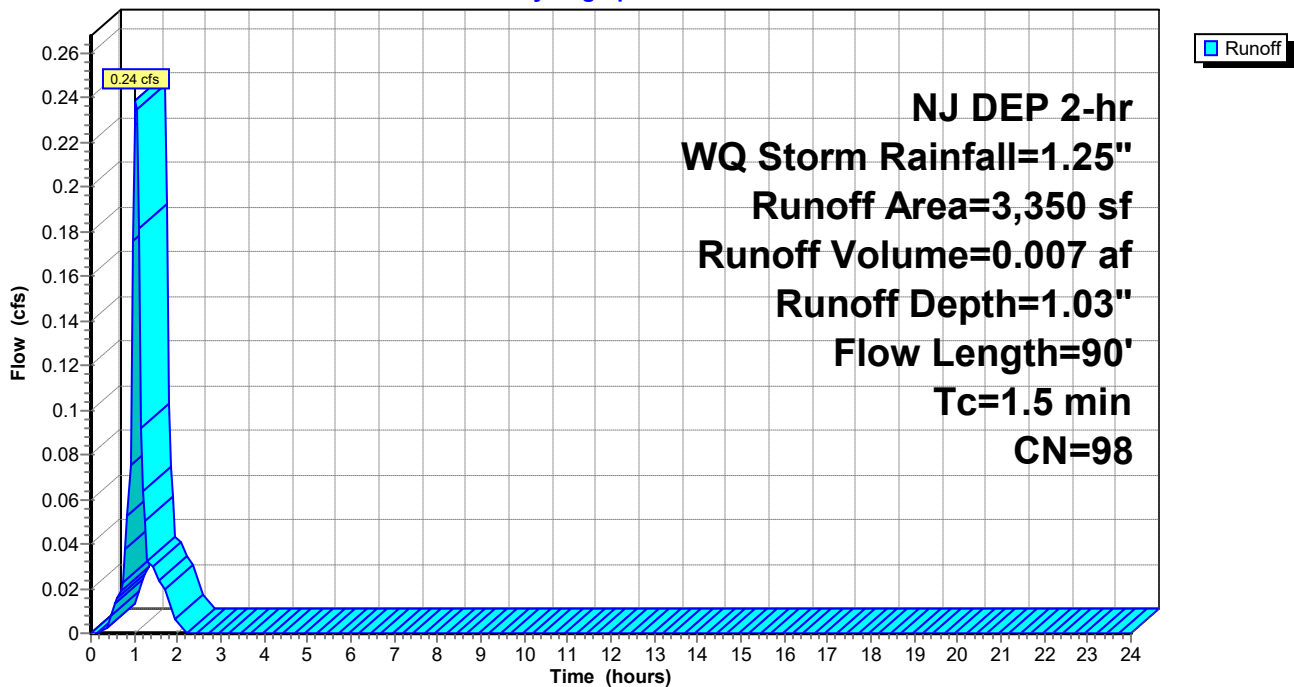
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (sf)	CN	Description
3,350	98	Paved parking, HSG A
3,350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	90		1.00		Direct Entry, DE

Subcatchment 4S: PATIO

Hydrograph



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NJ DEP 2-hr WQ Storm Rainfall=1.25"

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Page 44

Summary for Subcatchment 9S: IMPERVIOUS

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.49 cfs @ 1.03 hrs, Volume= 0.013 af, Depth= 1.03"

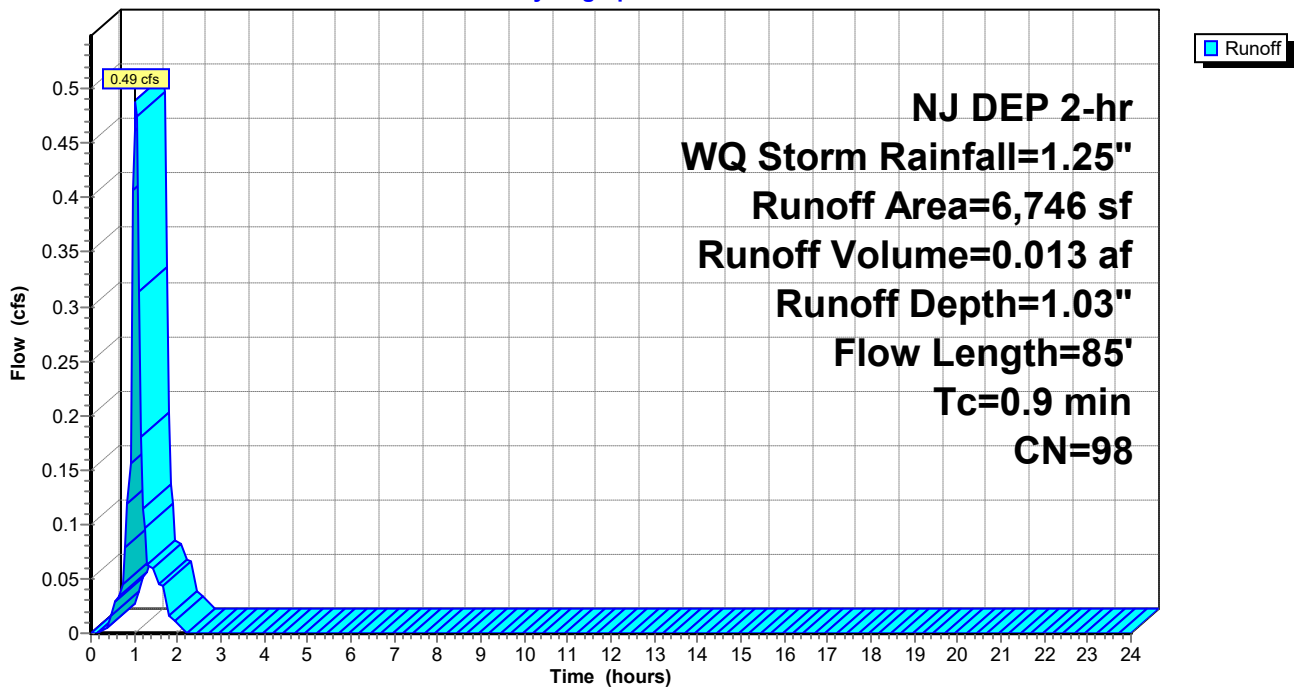
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.05$ hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (sf)	CN	Description
6,746	98	Paved parking, HSG A
6,746		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	85		1.57		Direct Entry, DE

Subcatchment 9S: IMPERVIOUS

Hydrograph



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NJ DEP 2-hr WQ Storm Rainfall=1.25"

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Page 45

Summary for Reach 8R: GRATE

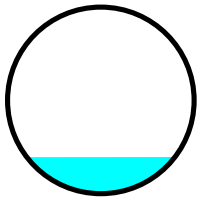
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.759 ac, 87.48% Impervious, Inflow Depth = 0.41" for WQ Storm event
Inflow = 0.92 cfs @ 1.04 hrs, Volume= 0.026 af
Outflow = 0.91 cfs @ 1.05 hrs, Volume= 0.026 af, Atten= 1%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.72 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 0.9 min

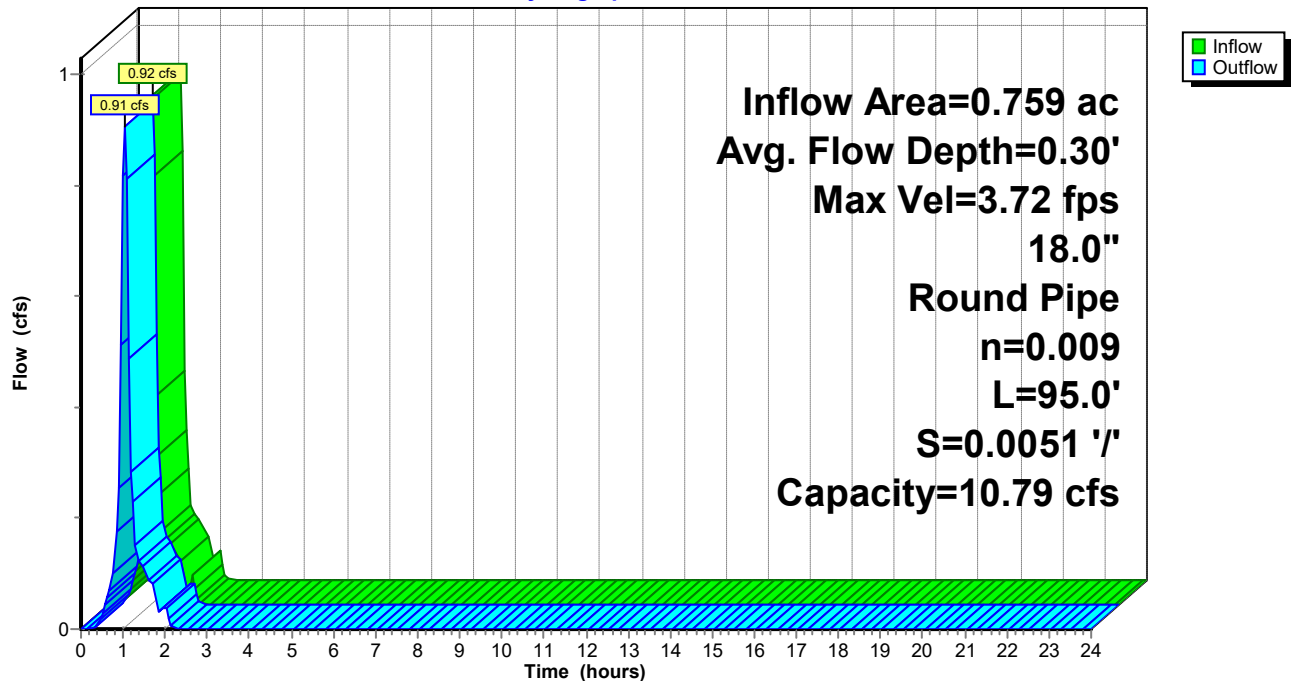
Peak Storage= 23 cf @ 1.04 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 10.79 cfs

18.0" Round Pipe
n= 0.009 PVC, smooth interior
Length= 95.0' Slope= 0.0051 '/'
Inlet Invert= 4.00', Outlet Invert= 3.52'



Reach 8R: GRATE

Hydrograph



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NJ DEP 2-hr WQ Storm Rainfall=1.25"

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Page 46

Summary for Reach 42R: 30" STORM PIPE

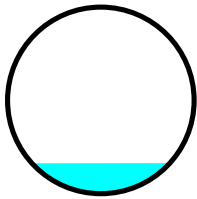
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.914 ac, 89.60% Impervious, Inflow Depth = 0.52" for WQ Storm event
Inflow = 1.39 cfs @ 1.04 hrs, Volume= 0.040 af
Outflow = 1.30 cfs @ 1.12 hrs, Volume= 0.040 af, Atten= 7%, Lag= 4.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.46 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.91 fps, Avg. Travel Time= 7.3 min

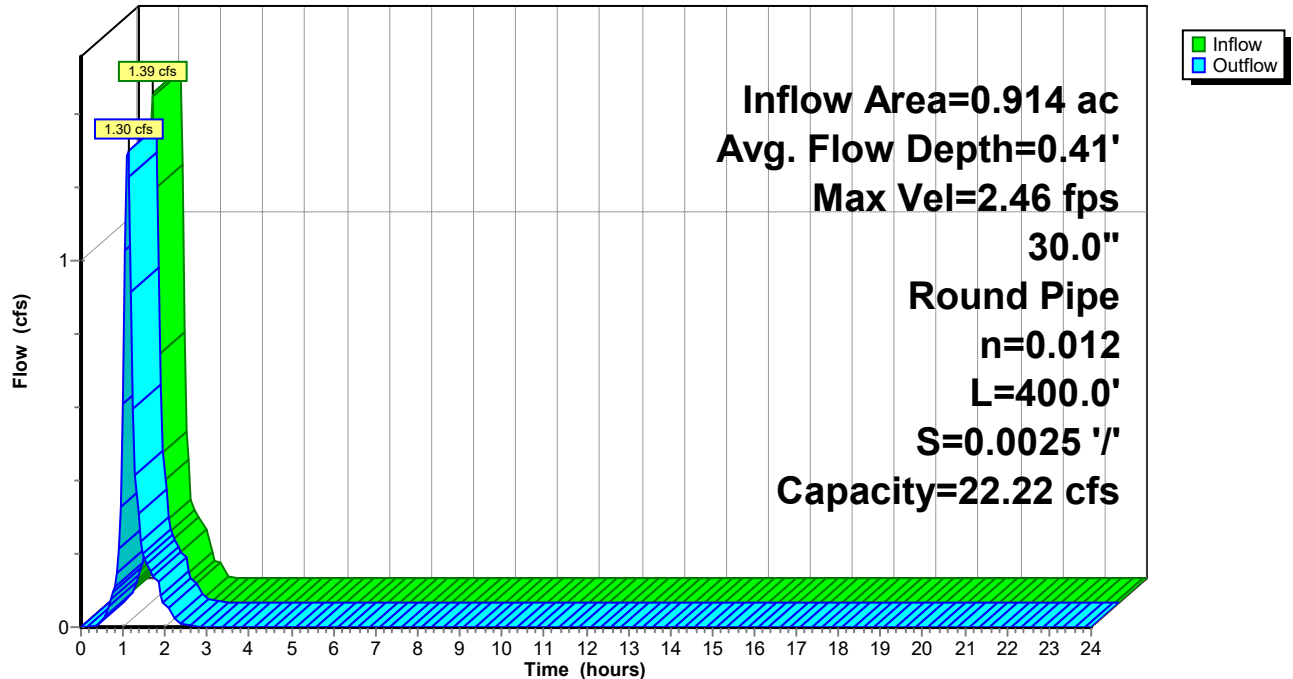
Peak Storage= 212 cf @ 1.07 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 22.22 cfs

30.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 400.0' Slope= 0.0025 '/'
Inlet Invert= 2.00', Outlet Invert= 1.00'



Reach 42R: 30" STORM PIPE

Hydrograph



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NJ DEP 2-hr WQ Storm Rainfall=1.25"

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Page 47

Summary for Pond 41P: RAIN GARDEN

Inflow Area = 0.459 ac, 79.30% Impervious, Inflow Depth = 0.82" for WQ Storm event
 Inflow = 1.12 cfs @ 1.03 hrs, Volume= 0.031 af
 Outflow = 0.03 cfs @ 2.01 hrs, Volume= 0.000 af, Atten= 98%, Lag= 58.8 min
 Primary = 0.03 cfs @ 2.01 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.00' @ 2.01 hrs Surf.Area= 1,585 sf Storage= 1,359 cf

Plug-Flow detention time= 95.7 min calculated for 0.000 af (1% of inflow)
 Center-of-Mass det. time= 55.8 min (122.3 - 66.5)

Volume	Invert	Avail.Storage	Storage Description
#1	9.00'	4,314 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.00	1,123	0	0
10.00	1,583	1,353	1,353
11.00	2,100	1,842	3,195
11.50	2,379	1,120	4,314

Device	Routing	Invert	Outlet Devices
#1	Primary	10.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 2.01 hrs HW=10.00' (Free Discharge)
 ↑**1=Orifice/Grate** (Weir Controls 0.01 cfs @ 0.19 fps)

Pond 41P: RAIN GARDEN

Hydrograph

