

**Stormwater Management Report
25 Talbot Lane
5 & 25 Talbot Lane and
475 & 551 Governor's Highway
South Windsor, Connecticut**

Prepared by:

**Design Professionals, Inc.
21 Jeffrey Drive
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July 2, 2021



Table of Contents

<u>Section</u>	<u>Page</u>
Introduction	2
Pre-Development Site Conditions	2
Post-Development Site Conditions	2
Analysis of Results	4
Storm Sewer Analysis	4
Water Quality	4
Conclusion	5

Appendices

A	Pre-Development Drainage HydroCAD Report
B	Post-Development Drainage HydroCAD Report
C	NRCS Soil Map & Data
D	Storm Sewer Analysis Results
E	Water Quality Calculations
	Water Quality Volume Calculation
	Water Quality Basin and Forebay Stage Storage Reports
	Water Quality Flow Calculation
	Cultec Isolation Row Specs
F	Drainage Area Maps
	Existing Condition Drainage Area Map
	Proposed Condition Drainage Area Map

Introduction

UW Vintage Lane II, LLC is proposing an industrial development of a tract of land comprised of four properties located at 5 & 25 Talbot Lane and 475 & 551 Governor's Highway, South Windsor, Connecticut. The properties are referenced on the Town of South Windsor Tax Assessors map as GIS#: 88900005, 88900025, 36900475 and 36900551, respectively. The proposed development will include the construction of one 359,640 SF industrial building. Associated site improvements will include but not be limited to new access driveways, parking areas for vehicles, sidewalks, landscaping, lighting, utilities, and stormwater management BMP's.

The total combined tract area is 30.37 acres. 27.1± acres of this area are proposed to be disturbed during construction. For more information, please refer to the plans entitled "25 Talbot Lane ~ Site Plan Application ~ 5 & 25 Talbot Lane and 475 & 551 Governor's Highway ~ South Windsor, Ct ~ GIS#: 88900005, 88900025, 36900475 and 36900551" prepared by Design Professionals, Inc., and dated July 02, 2021, as amended.

Pre-Development Site Conditions

The existing surficial characteristics of the area to be developed can be primarily classified as undisturbed woodland area with industrial development to the west and residential properties to south and east. The northern property line along Governors Highway forms the drainage divide for storm water that falls within the ROW. No runoff from the site flows to the Governors Highway drainage system directly. Review of the site topography indicated all stormwater runoff generated across the tract would flow to one of four design points. These four design points were identified as follows:

1. **Design Point 1 (DP#1):** Existing stilling basin @ SW corner of property. Conveying water through Carla's Pasta (50 Talbot Lane) via a 36" HDPE culvert.
2. **Design Point 2 (DP#2):** Existing outlet structure with 24" RCP culvert outlet to the Cody Circle subsurface drainage system.
3. **Design Point 3 (DP#3):** Sheet flow runoff across the SE Property corner.
4. **Design Point 4 (DP#4):** Existing outlet structure with 15" RCP culvert outlet to Temple Beth Hillel's drainage system (20 Baker Lane).

DP#1 ultimately drains to The Newbury Brook, and is a part of local basin ID 4000-21-1. DP#2 - 4 ultimately drain to The Podunk River, and is a part of local basin ID 4004-00-2-R1. Existing conditions watershed delineations are identified in the Existing Conditions Drainage Map located in **Appendix F**.

Based on Natural Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG) mapping, soils types C, A/D, & B/D are located on site. See **Appendix C** for The NRCS Soil Map & Data.

An evaluation was performed to quantify the peak rate of stormwater discharge offsite to the design points identified. The Natural Resources Conservation Service's TR-55 Manual was followed in predicting the peak rates of runoff and volumes. HydroCAD computer modeling software was utilized.

Peak rates of stormwater runoff were evaluated for the 2-, 10-, 25-, 50- and 100-year storm events. For more information, please refer to the enclosed Pre-Development Drainage HydroCAD Report located in **Appendix A**.

Post-Development Site Conditions

The proposed development will include the construction of one 359,640 SF industrial building. Associated site improvements will include but not be limited to new access driveways, parking areas for vehicles, sidewalks, landscaping, lighting, utilities, and stormwater management BMP's. Site generated runoff from all proposed roofs, roadways, parking, and landscaped areas will be collected in an underground storm water conveyance system. This conveyance system will be comprised of a series of catchbasins connected with culverts and an underground stormwater chamber system. All first flush stormwater will either be directed to proposed isolation rows within the underground chamber system, or the forebay within the proposed water quality basin for treatment.

See **Appendix B** for the Post Development Condition and Pond summary HydroCAD reports. The Proposed Conditions Drainage Map for the site can be found in **Appendix F**.

Analysis of Results

The pre-development and post-development conditions were analyzed using HydroCAD consistent with National Resource Conservation Service (NRCS) hydrology methods. Four discharge locations (**Design Point #1 - 4**) were identified as points of interest for assessing downstream effects. The following table contains the data generated from the HydroCAD software:

Reach		2 year	10 year	25 year	50 year	100 year
DP#1 – Existing Stilling Basin	Pre	2.39	8.67	13.43	17.21	21.61
	Post	2.37	8.56	13.21	16.44	21.16
DP#2 – 24" RCP To Cody Circle	Pre	2.85	8.66	12.87	16.15	19.89
	Post	1.00	2.71	3.91	4.83	5.87
DP#3 – SE Overflow	Pre	0.91	2.85	4.26	5.36	6.62
	Post	0.94	2.82	4.18	5.24	6.45
DP#4 – 15" RCP To Temple Beth Hillel	Pre	2.21	7.27	11.01	13.95	17.32
	Post	0.67	2.02	2.98	3.74	4.60

As seen in the table above, most of the storm events evaluated for the subject project will result in peak runoff rates in the proposed condition that are less than the peak runoff rates of the existing condition for 2-, 10-, 25-, 50- and 100-year design storms. There was a small 0.03 cfs increase in peak flow to DP#3 in the 2-yr storm. This increase to DP#3 is offset by reductions in the peak flow to DP#2 & 4, all of which ultimately drain to the Podunk River. It is our opinion that this increase is negligible and will not cause any detrimental downstream impacts.

Storm Sewer Collection System

The proposed subsurface stormwater collection and conveyance system was designed to adequately convey proposed runoff under 10- year storm event conditions. The design of the storm sewers followed the guidelines set forth in the Connecticut Department of Transportation's Drainage Manual. It is estimated that during a 10-year storm event, all proposed subsurface culverts will convey storm runoff without resulting in any unacceptable flooding conditions. Autodesk Storm and Sanitary Analysis software was used for analysis. The computations are included as **Appendix D**.

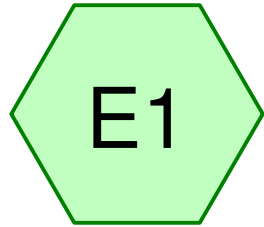
Water Quality

The proposed water quality basin and forebay were sized in accordance with the 2004 Connecticut Stormwater Quality Manual, to provide a pond volume that exceeds the determined water quality volume. The proposed forebay was also sized to store over 10% of this water quality volume as recommended by the 2004 Connecticut Stormwater Quality Manual. Cultec Isolator rows will also be utilized to address water quality for pavement surfaces draining to them. The number of isolator rows provided will be more than adequate to treat the required water quality flow rate based on the determined water quality flow and manufacture specs for treated flow rate per chamber. See **Appendix F** for water quality flow & volume calcs, pond and forebay stage storage reports, and Cultec Isolator rows manufactures specs.

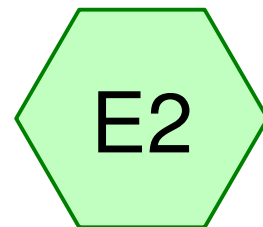
Conclusion

The proposed stormwater management system as discussed herein and shown on the referenced plans is appropriate for the proposed development on the subject site and should not pose any detrimental impacts to the environment.

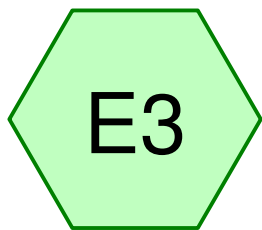
APPENDIX A
Watershed Computations
(Pre-Development Drainage HydroCAD Report)



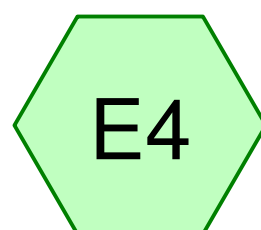
Existing E1 (DP1)



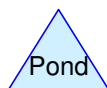
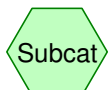
Existing E2 (DP2)



Existing E3 (DP3)



Existing E4 (DP4)



Routing Diagram for 1976.U Hydrocad

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1976.U Hydrocad

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Existing Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 2

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Existing E1 (DP1)	Runoff Area=14.370 ac 0.56% Impervious Runoff Depth=0.54" Flow Length=1,260' Tc=72.1 min CN=64 Runoff=2.39 cfs 0.642 af
Subcatchment E2: Existing E2 (DP2)	Runoff Area=10.640 ac 0.09% Impervious Runoff Depth=0.71" Flow Length=934' Tc=62.6 min CN=68 Runoff=2.85 cfs 0.626 af
Subcatchment E3: Existing E3 (DP3)	Runoff Area=2.920 ac 0.00% Impervious Runoff Depth=0.66" Flow Length=286' Tc=41.9 min CN=67 Runoff=0.91 cfs 0.161 af
Subcatchment E4: Existing E4 (DP4)	Runoff Area=6.569 ac 0.76% Impervious Runoff Depth=0.62" Flow Length=658' Tc=29.0 min CN=66 Runoff=2.21 cfs 0.338 af

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Existing Condition
Type III 24-hr 10-yr Rainfall=4.99"

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Page 3

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Existing E1 (DP1)	Runoff Area=14.370 ac 0.56% Impervious Runoff Depth=1.57" Flow Length=1,260' Tc=72.1 min CN=64 Runoff=8.67 cfs 1.885 af
Subcatchment E2: Existing E2 (DP2)	Runoff Area=10.640 ac 0.09% Impervious Runoff Depth=1.87" Flow Length=934' Tc=62.6 min CN=68 Runoff=8.66 cfs 1.660 af
Subcatchment E3: Existing E3 (DP3)	Runoff Area=2.920 ac 0.00% Impervious Runoff Depth=1.80" Flow Length=286' Tc=41.9 min CN=67 Runoff=2.85 cfs 0.437 af
Subcatchment E4: Existing E4 (DP4)	Runoff Area=6.569 ac 0.76% Impervious Runoff Depth=1.72" Flow Length=658' Tc=29.0 min CN=66 Runoff=7.27 cfs 0.942 af

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Existing Condition
Type III 24-hr 25-yr Rainfall=6.13"

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Page 4

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Existing E1 (DP1) Runoff Area=14.370 ac 0.56% Impervious Runoff Depth=2.36"
Flow Length=1,260' Tc=72.1 min CN=64 Runoff=13.43 cfs 2.822 af

Subcatchment E2: Existing E2 (DP2) Runoff Area=10.640 ac 0.09% Impervious Runoff Depth=2.72"
Flow Length=934' Tc=62.6 min CN=68 Runoff=12.87 cfs 2.413 af

Subcatchment E3: Existing E3 (DP3) Runoff Area=2.920 ac 0.00% Impervious Runoff Depth=2.63"
Flow Length=286' Tc=41.9 min CN=67 Runoff=4.26 cfs 0.640 af

Subcatchment E4: Existing E4 (DP4) Runoff Area=6.569 ac 0.76% Impervious Runoff Depth=2.54"
Flow Length=658' Tc=29.0 min CN=66 Runoff=11.01 cfs 1.389 af

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Existing Condition
Type III 24-hr 50-yr Rainfall=6.97"

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Page 5

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Existing E1 (DP1) Runoff Area=14.370 ac 0.56% Impervious Runoff Depth=2.98"
Flow Length=1,260' Tc=72.1 min CN=64 Runoff=17.21 cfs 3.567 af

Subcatchment E2: Existing E2 (DP2) Runoff Area=10.640 ac 0.09% Impervious Runoff Depth=3.39"
Flow Length=934' Tc=62.6 min CN=68 Runoff=16.15 cfs 3.002 af

Subcatchment E3: Existing E3 (DP3) Runoff Area=2.920 ac 0.00% Impervious Runoff Depth=3.28"
Flow Length=286' Tc=41.9 min CN=67 Runoff=5.36 cfs 0.799 af

Subcatchment E4: Existing E4 (DP4) Runoff Area=6.569 ac 0.76% Impervious Runoff Depth=3.18"
Flow Length=658' Tc=29.0 min CN=66 Runoff=13.95 cfs 1.741 af

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Existing Condition
Type III 24-hr 100-yr Rainfall=7.90"

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Page 6

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Existing E1 (DP1) Runoff Area=14.370 ac 0.56% Impervious Runoff Depth=3.70"
Flow Length=1,260' Tc=72.1 min CN=64 Runoff=21.61 cfs 4.433 af

Subcatchment E2: Existing E2 (DP2) Runoff Area=10.640 ac 0.09% Impervious Runoff Depth=4.15"
Flow Length=934' Tc=62.6 min CN=68 Runoff=19.89 cfs 3.681 af

Subcatchment E3: Existing E3 (DP3) Runoff Area=2.920 ac 0.00% Impervious Runoff Depth=4.04"
Flow Length=286' Tc=41.9 min CN=67 Runoff=6.62 cfs 0.983 af

Subcatchment E4: Existing E4 (DP4) Runoff Area=6.569 ac 0.76% Impervious Runoff Depth=3.93"
Flow Length=658' Tc=29.0 min CN=66 Runoff=17.32 cfs 2.149 af

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Existing Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 7

Summary for Subcatchment E1: Existing E1 (DP1)

Runoff = 2.39 cfs @ 13.14 hrs, Volume= 0.642 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 0.170	60	>75% Grass cover, Good, HSG A/D
* 0.010	71	>75% Grass cover, Good, HSG B/D
0.030	74	>75% Grass cover, Good, HSG C
* 0.080	98	IMPERVIOUS
1.200	30	Woods, Good, HSG A
* 1.860	54	Woods, Good, HSG A/D
* 3.710	66	Woods, Good, HSG B/D
7.310	70	Woods, Good, HSG C
14.370	64	Weighted Average
14.290		99.44% Pervious Area
0.080		0.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	100	0.0250	0.09		Sheet Flow, Woodland Sheet Flow
					Woods: Light underbrush n= 0.400 P2= 3.22"
52.4	1,144	0.0053	0.36		Shallow Concentrated Flow, Woodland SCF
					Woodland Kv= 5.0 fps
0.1	16	0.2450	2.47		Shallow Concentrated Flow, Woodland SCF
					Woodland Kv= 5.0 fps
72.1	1,260	Total			

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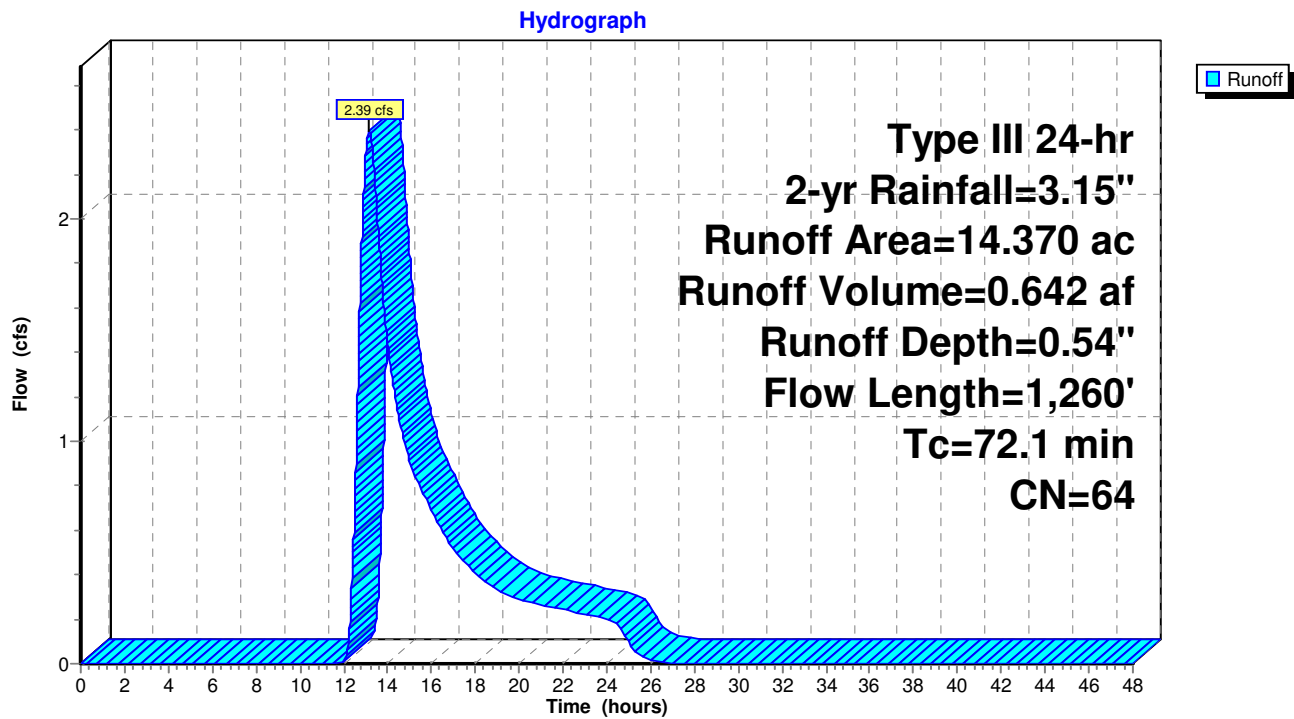
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Existing Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 8

Subcatchment E1: Existing E1 (DP1)



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Existing Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 9

Summary for Subcatchment E2: Existing E2 (DP2)

Runoff = 2.85 cfs @ 12.94 hrs, Volume= 0.626 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 0.150	71	>75% Grass cover, Good, HSG B/D
0.440	74	>75% Grass cover, Good, HSG C
* 0.010	98	IMPERVIOUS
* 4.610	66	Woods, Good, HSG B/D
5.430	70	Woods, Good, HSG C
10.640	68	Weighted Average
10.630		99.91% Pervious Area
0.010		0.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.2	100	0.0067	0.05		Sheet Flow, Woodland SF Woods: Light underbrush n= 0.400 P2= 3.22"
9.2	227	0.0067	0.41		Shallow Concentrated Flow, Woodland SCF Woodland Kv= 5.0 fps
20.2	607	0.0005	0.50	18.04	Channel Flow, Channel Flow Area= 36.0 sf Perim= 55.0' r= 0.65' n= 0.050 Scattered brush, heavy weeds
62.6	934	Total			

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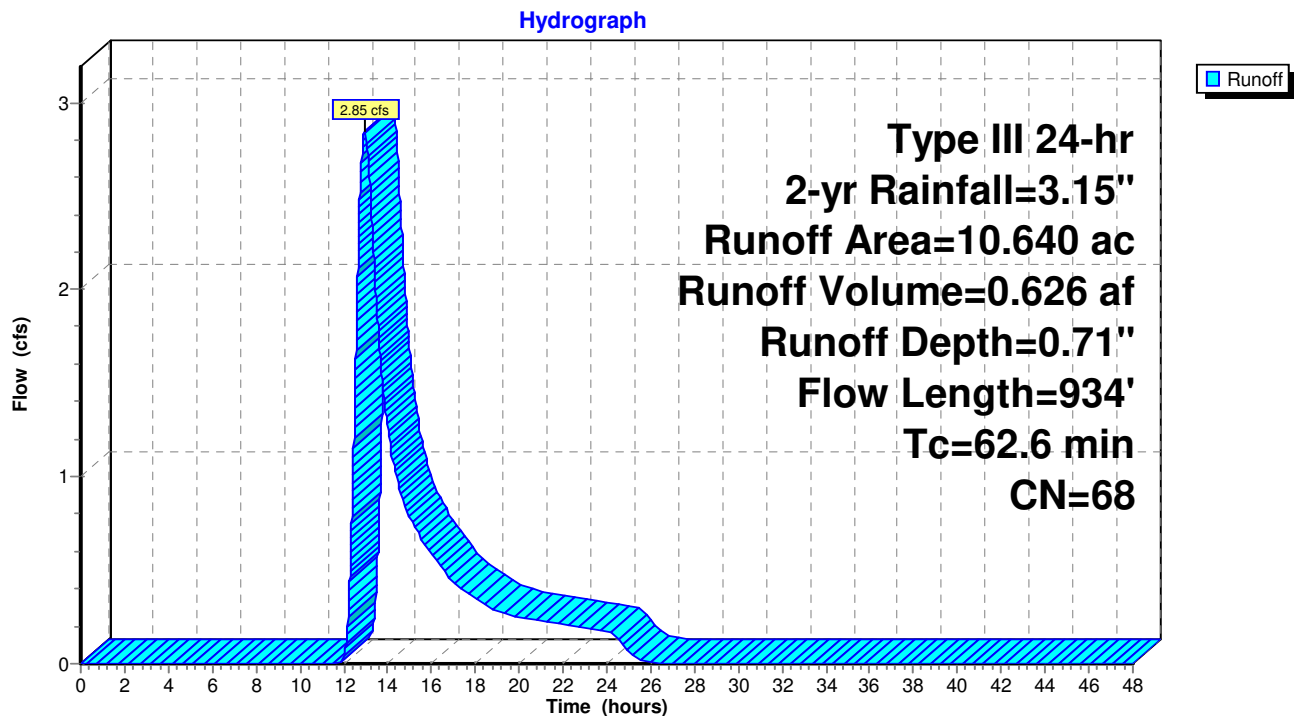
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Existing Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 10

Subcatchment E2: Existing E2 (DP2)



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Existing Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 11

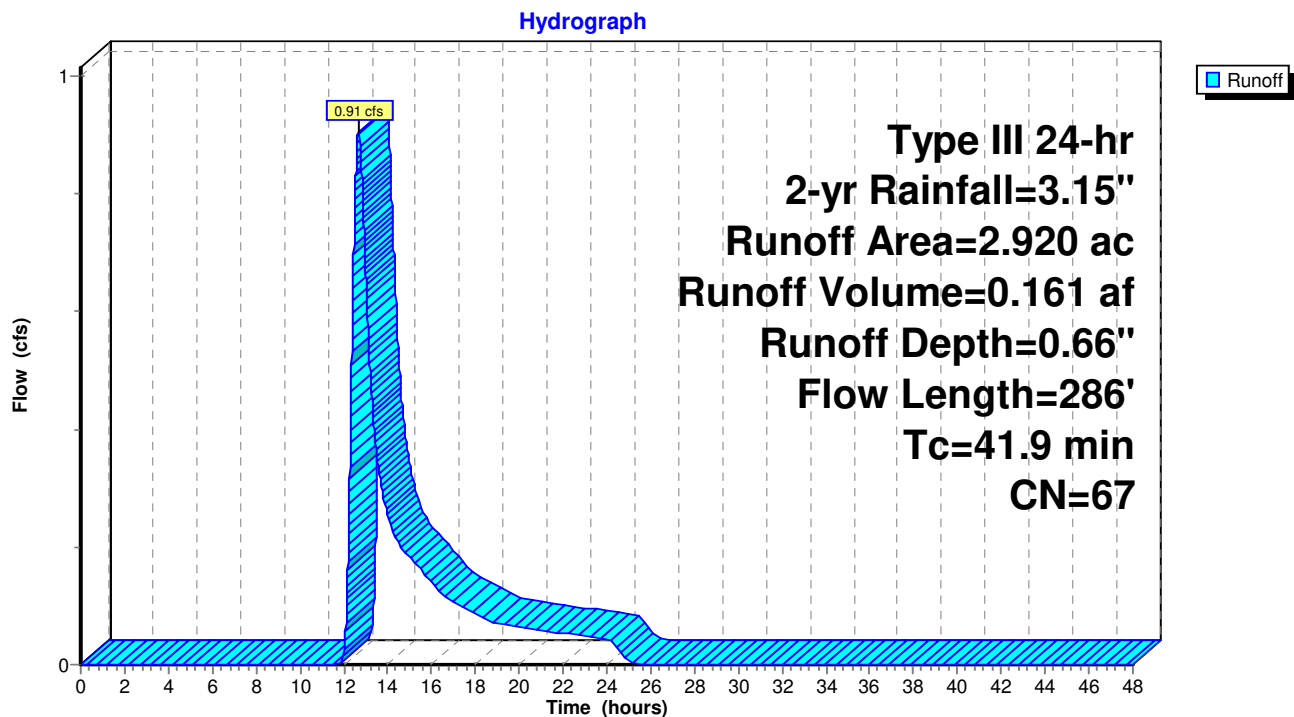
Summary for Subcatchment E3: Existing E3 (DP3)

Runoff = 0.91 cfs @ 12.67 hrs, Volume= 0.161 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 2.220	66	Woods, Good, HSG B/D
0.700	70	Woods, Good, HSG C
2.920	67	Weighted Average
2.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.9	100	0.0080	0.05		Sheet Flow, Woodland SF
					Woods: Light underbrush n= 0.400 P2= 3.22"
11.0	186	0.0032	0.28		Shallow Concentrated Flow, Woodland SCF
					Woodland Kv= 5.0 fps
41.9	286	Total			

Subcatchment E3: Existing E3 (DP3)

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Existing Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 12

Summary for Subcatchment E4: Existing E4 (DP4)

Runoff = 2.21 cfs @ 12.50 hrs, Volume= 0.338 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 0.070	66	>75% Grass cover, Good, HSG B/D
* 0.050	98	IMPERVIOUS
0.219	30	Woods, Good, HSG A
* 5.220	66	Woods, Good, HSG B/D
1.010	70	Woods, Good, HSG C
6.569	66	Weighted Average
6.519		99.24% Pervious Area
0.050		0.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	100	0.0496	0.11		Sheet Flow, Woodland SF Woods: Light underbrush n= 0.400 P2= 3.22"
9.9	294	0.0098	0.49		Shallow Concentrated Flow, Woodland SCF Woodland Kv= 5.0 fps
4.2	264	0.0022	1.05	37.66	Channel Flow, Channel Flow Area= 35.9 sf Perim= 55.0' r= 0.65' n= 0.050 Scattered brush, heavy weeds
29.0	658	Total			

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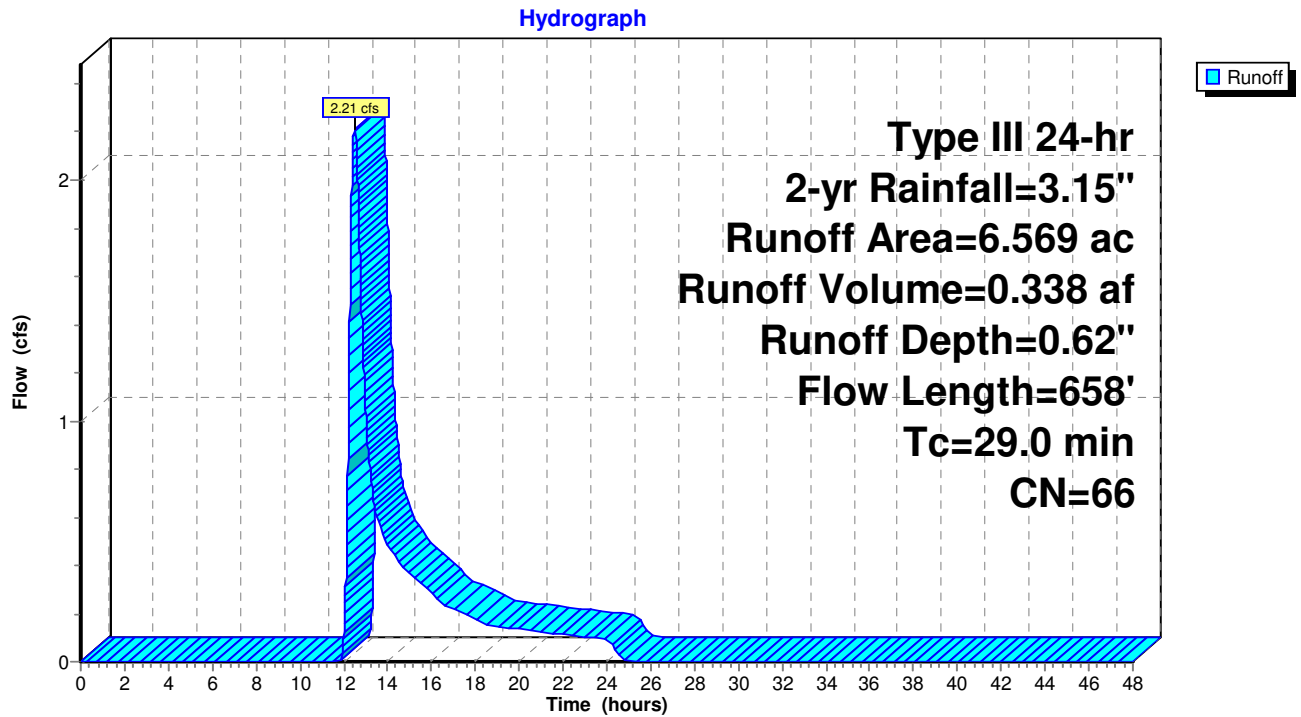
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Existing Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 13

Subcatchment E4: Existing E4 (DP4)



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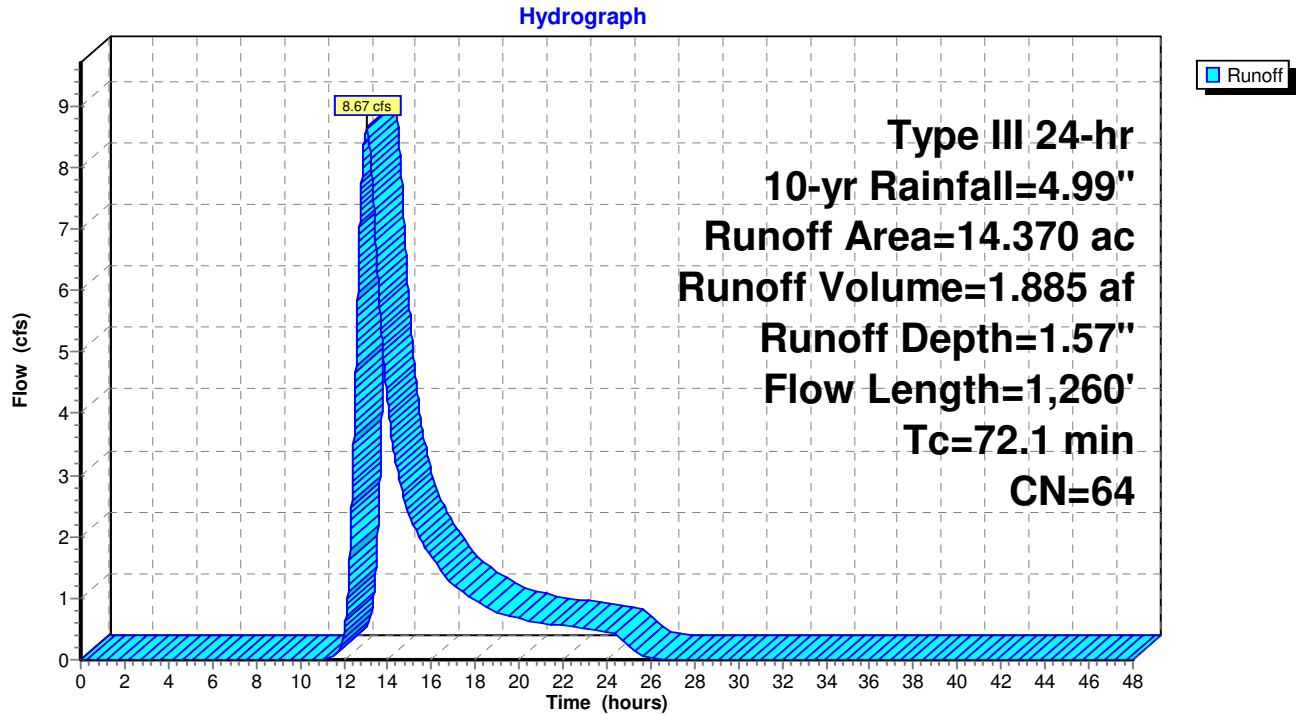
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Existing Condition
Type III 24-hr 10-yr Rainfall=4.99"

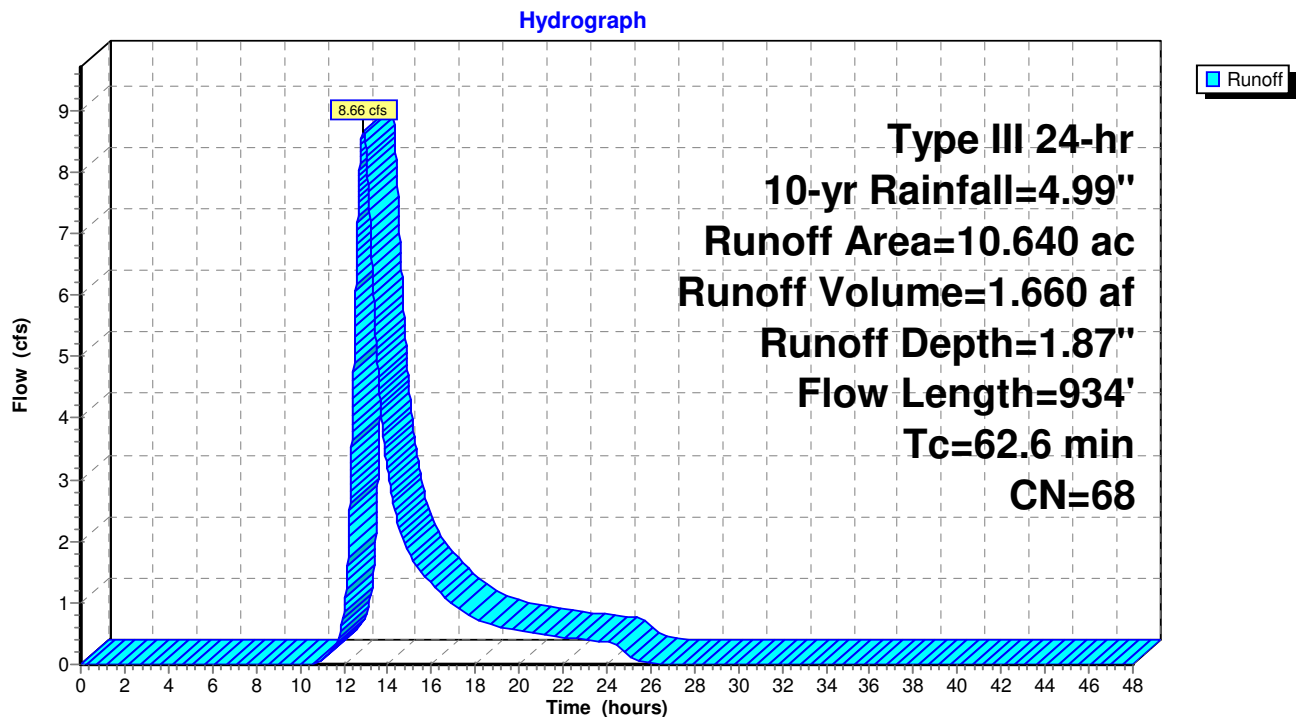
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Page 14

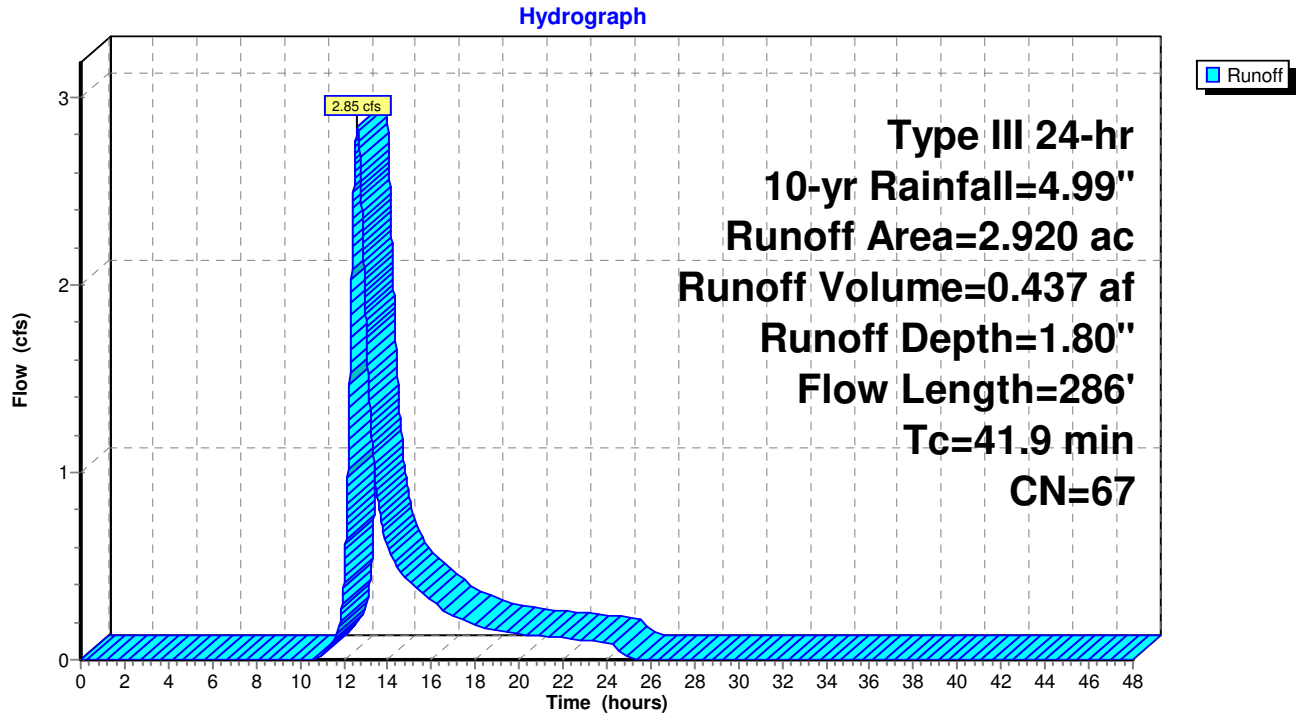
Subcatchment E1: Existing E1 (DP1)



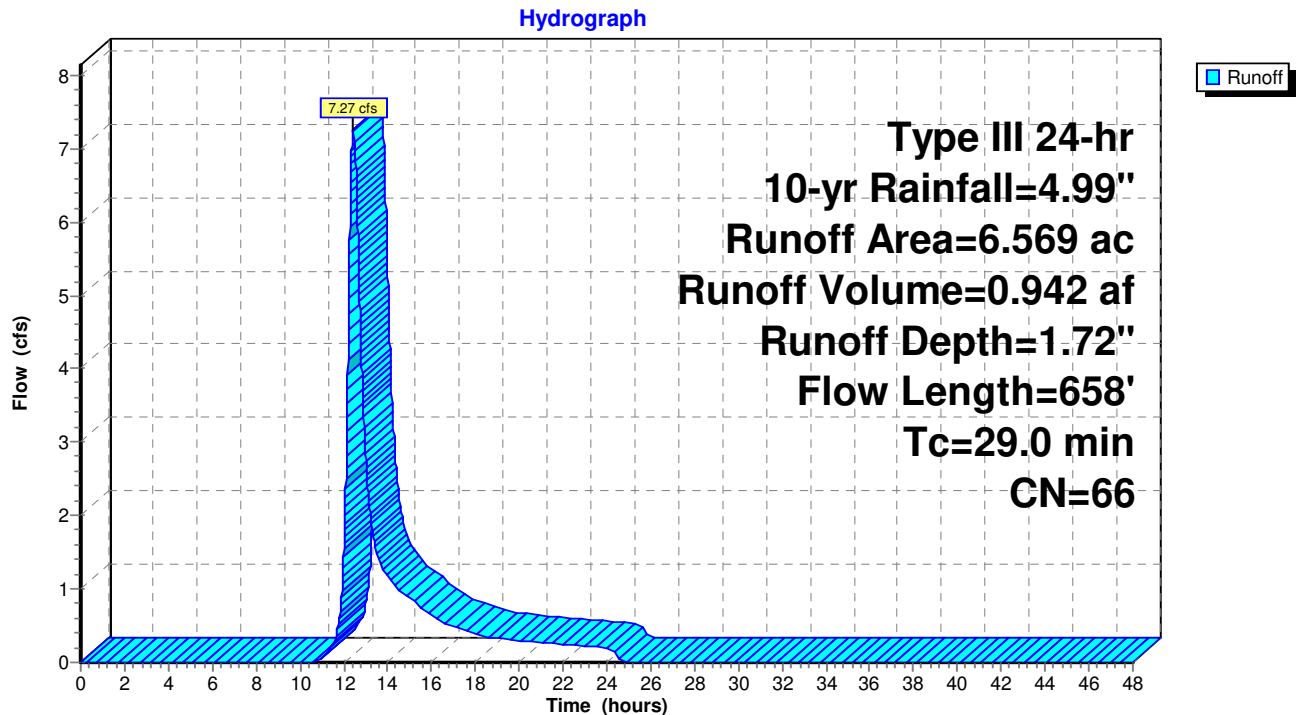
Subcatchment E2: Existing E2 (DP2)



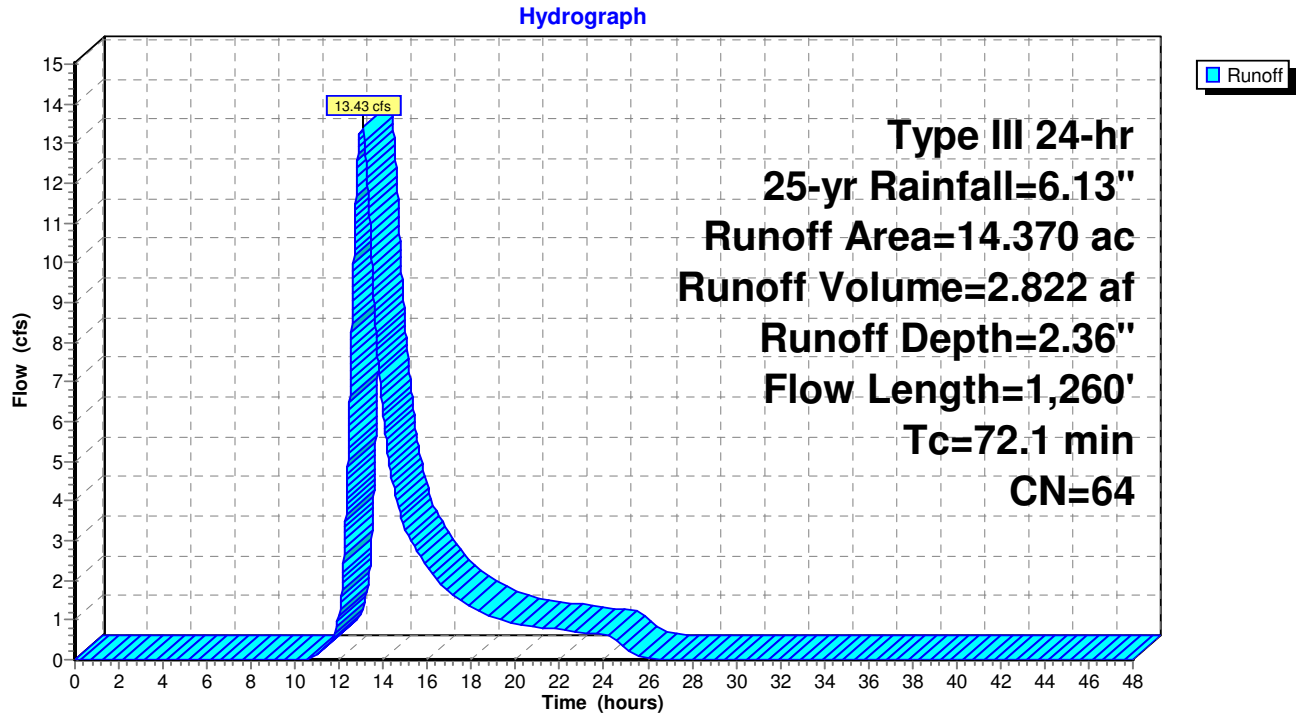
Subcatchment E3: Existing E3 (DP3)



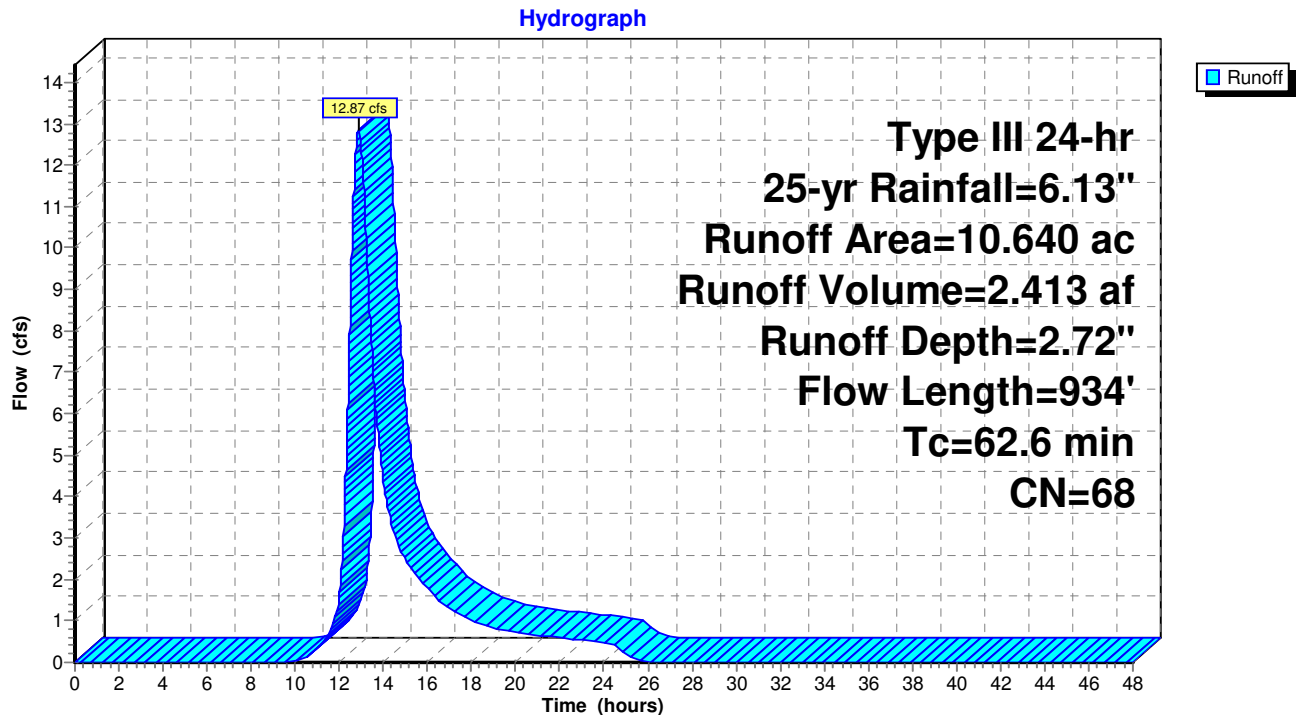
Subcatchment E4: Existing E4 (DP4)



Subcatchment E1: Existing E1 (DP1)



Subcatchment E2: Existing E2 (DP2)



1976.U Hydrocad

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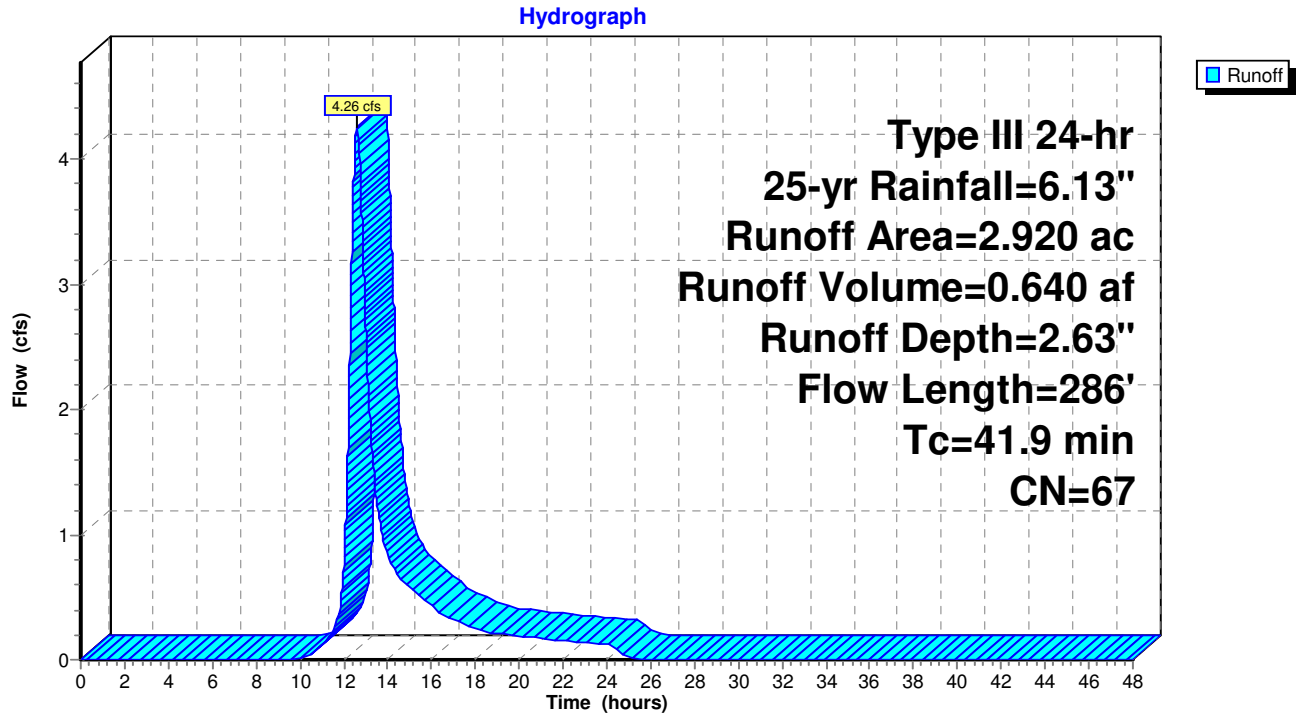
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Existing Condition
Type III 24-hr 25-yr Rainfall=6.13"

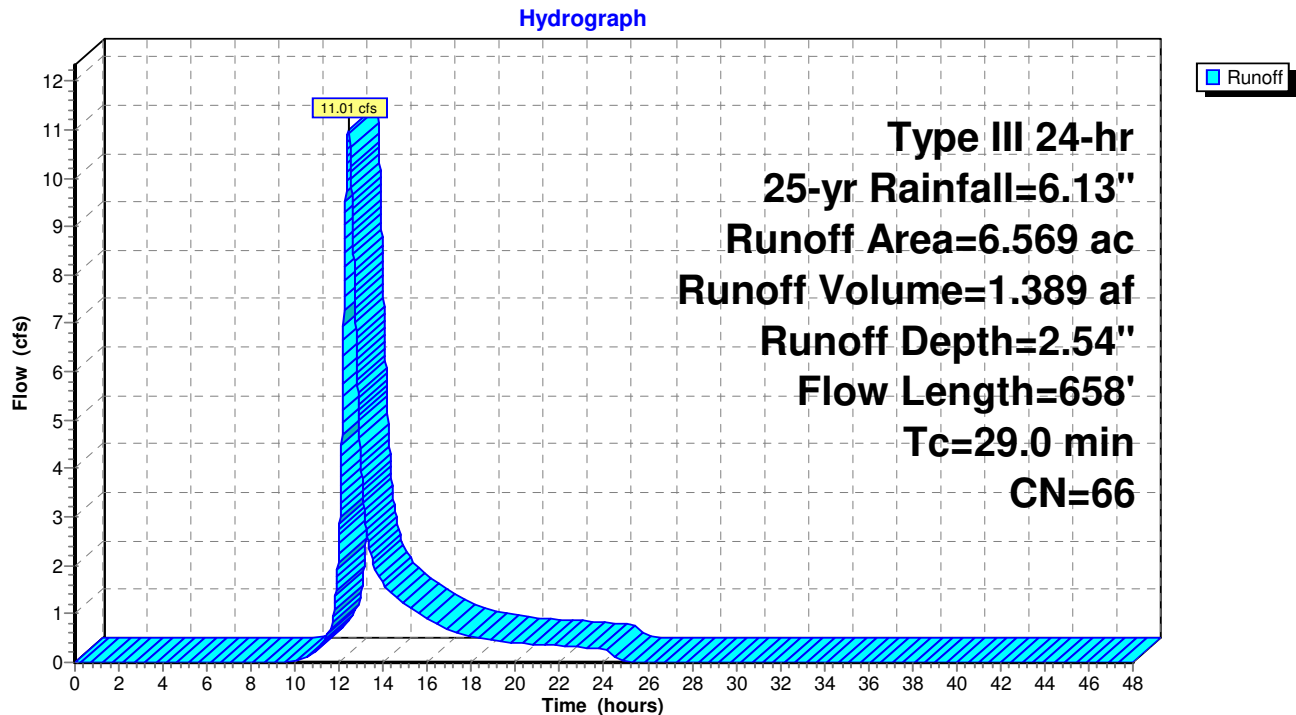
Printed 6/30/2021

Page 17

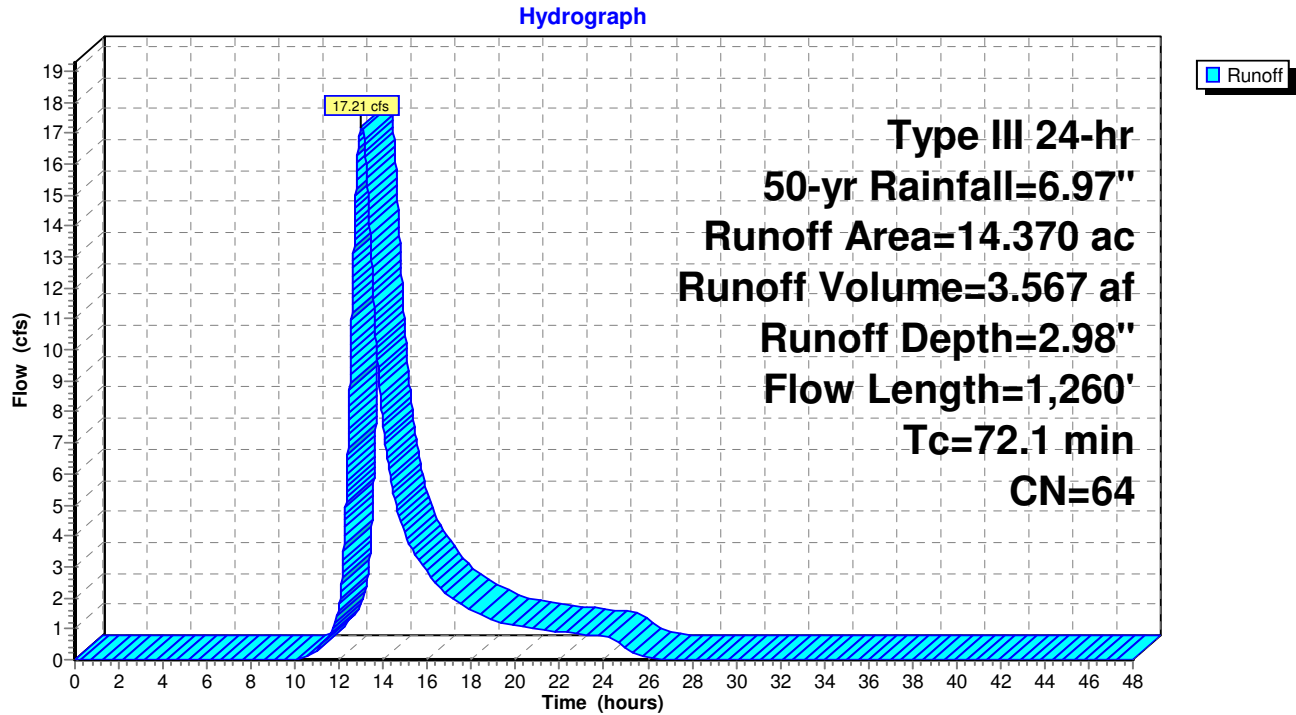
Subcatchment E3: Existing E3 (DP3)



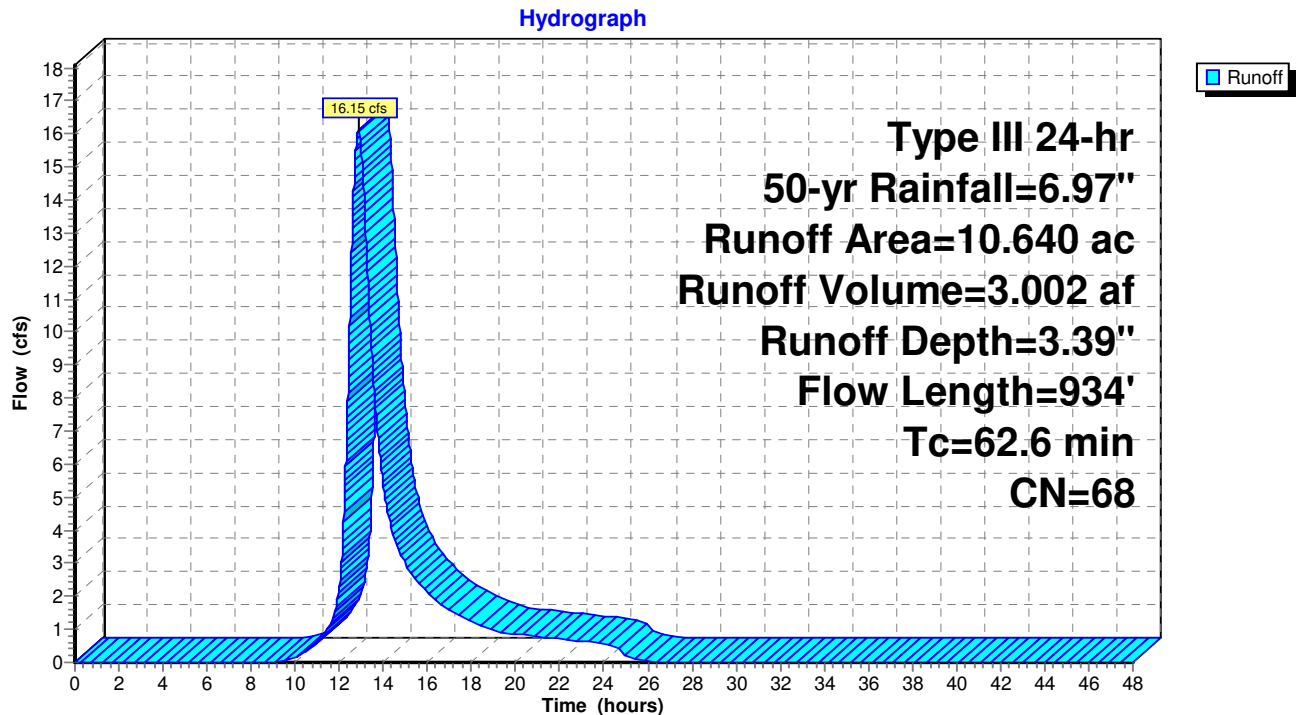
Subcatchment E4: Existing E4 (DP4)



Subcatchment E1: Existing E1 (DP1)



Subcatchment E2: Existing E2 (DP2)



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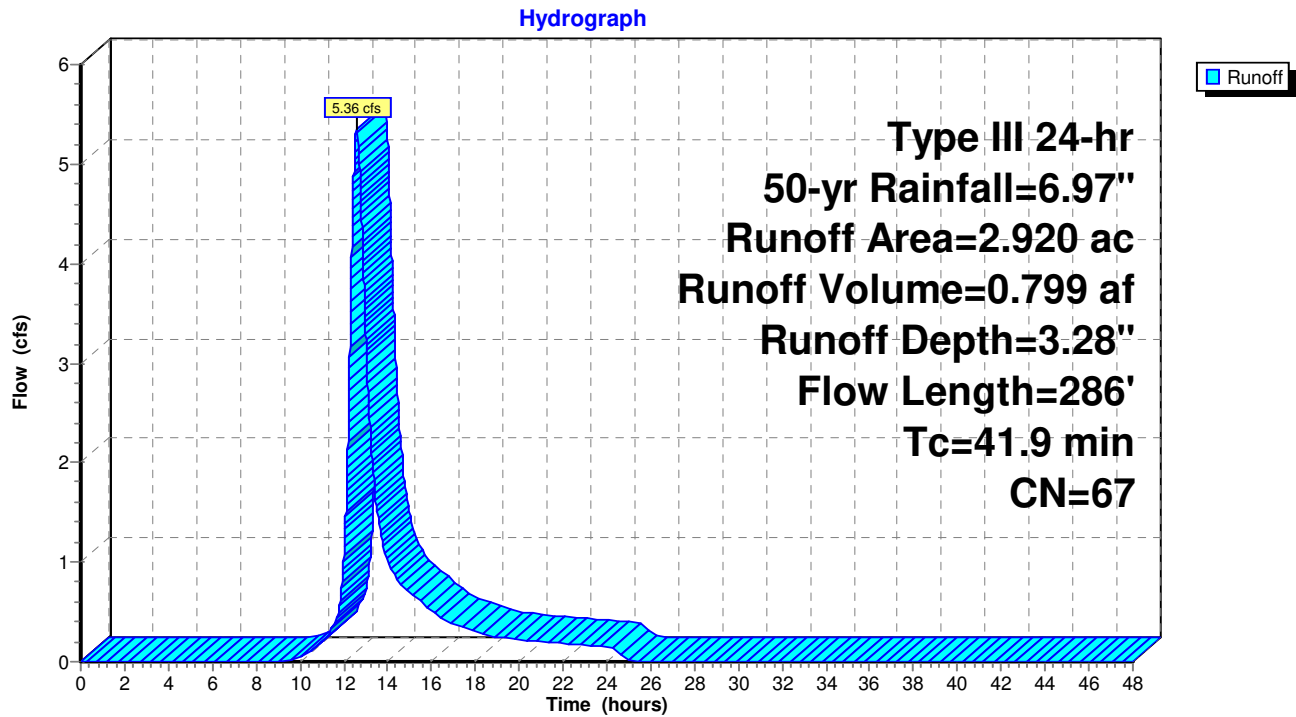
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Existing Condition
Type III 24-hr 50-yr Rainfall=6.97"

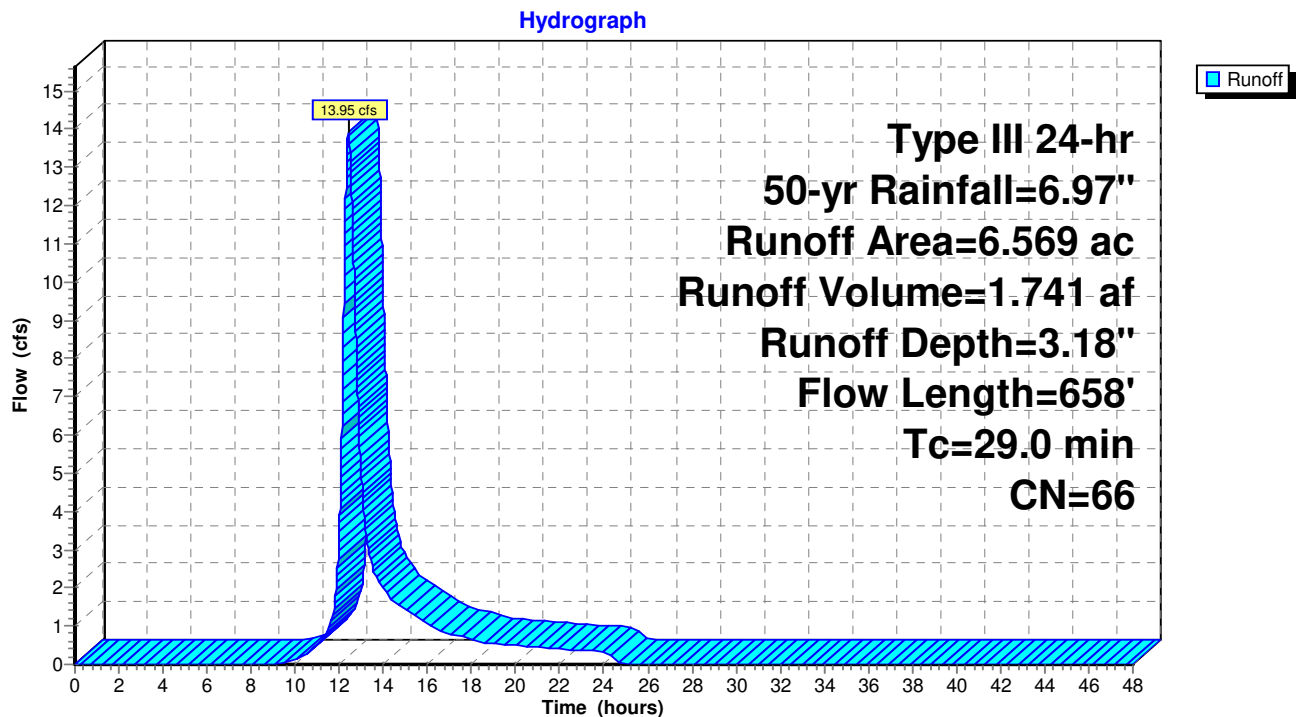
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Page 19

Subcatchment E3: Existing E3 (DP3)

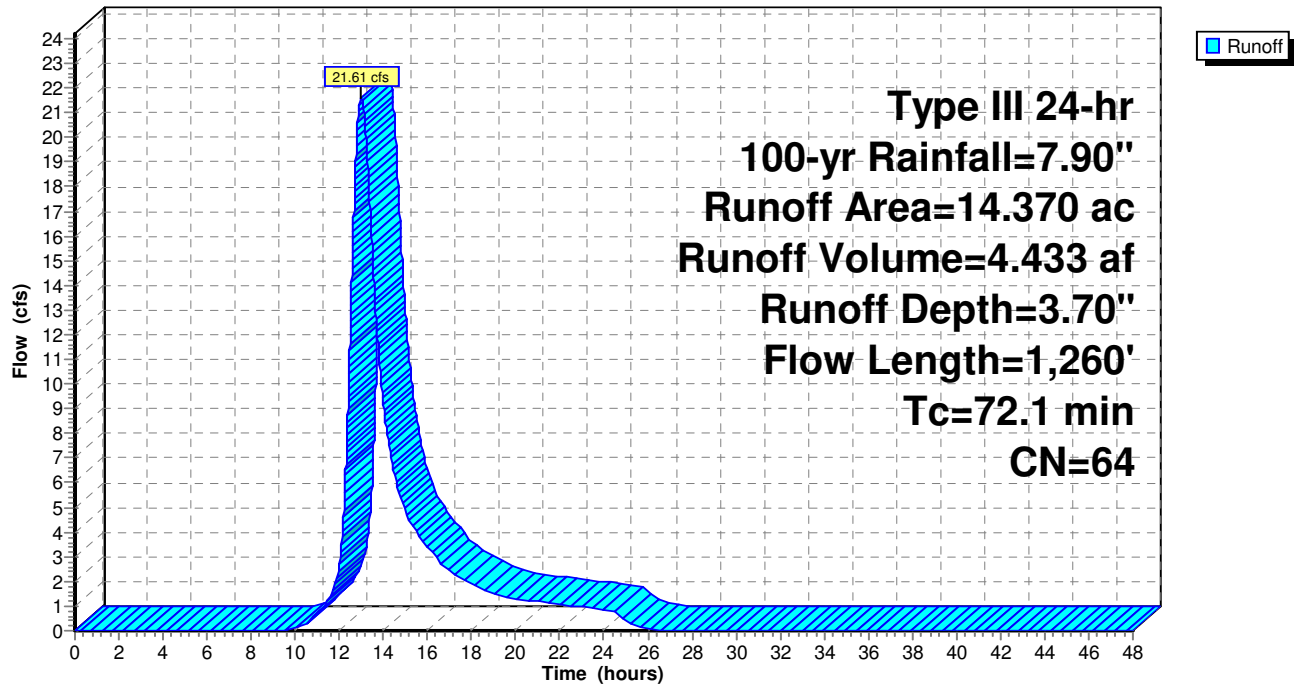


Subcatchment E4: Existing E4 (DP4)



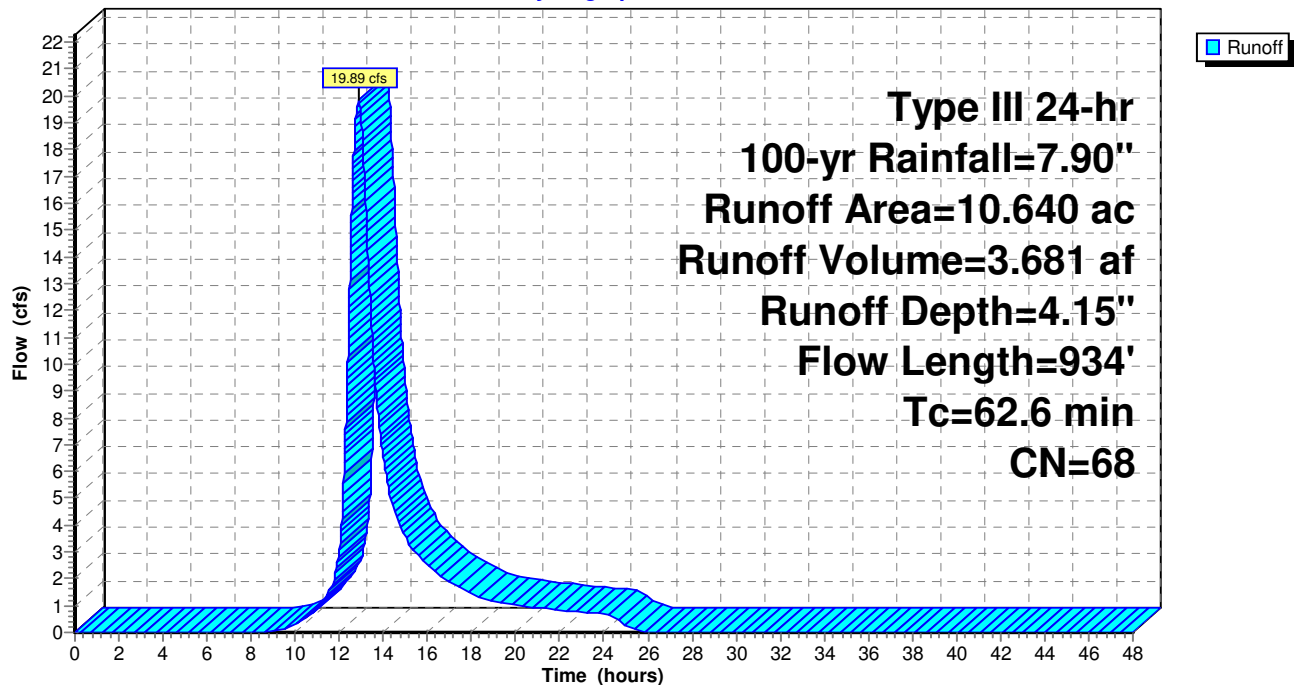
Subcatchment E1: Existing E1 (DP1)

Hydrograph



Subcatchment E2: Existing E2 (DP2)

Hydrograph



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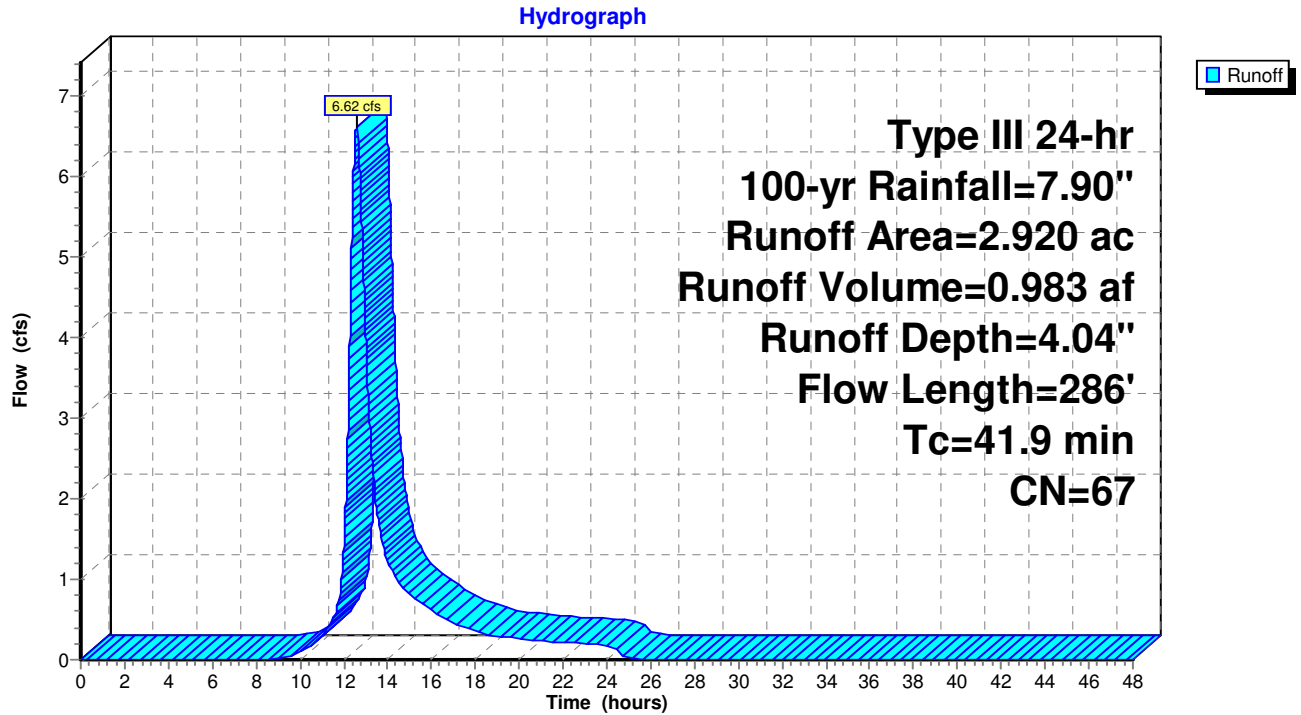
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Existing Condition
Type III 24-hr 100-yr Rainfall=7.90"

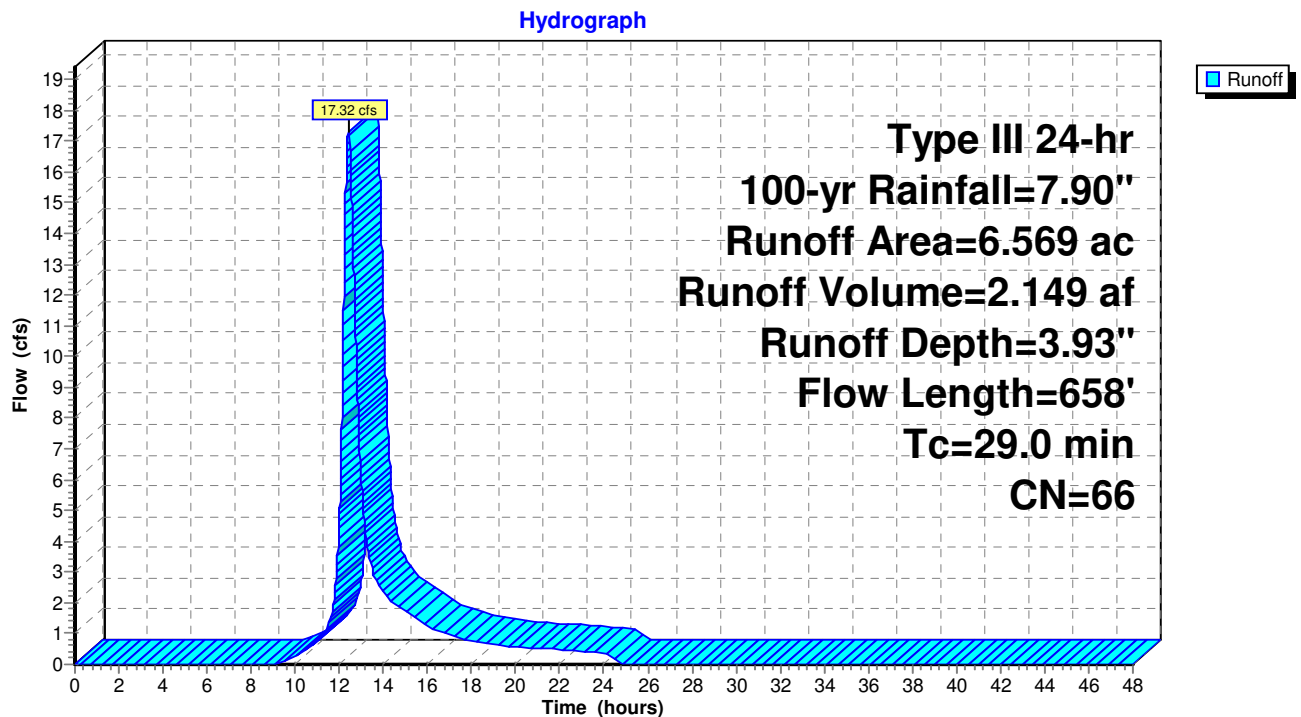
Printed 6/30/2021

Page 21

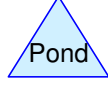
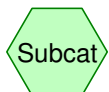
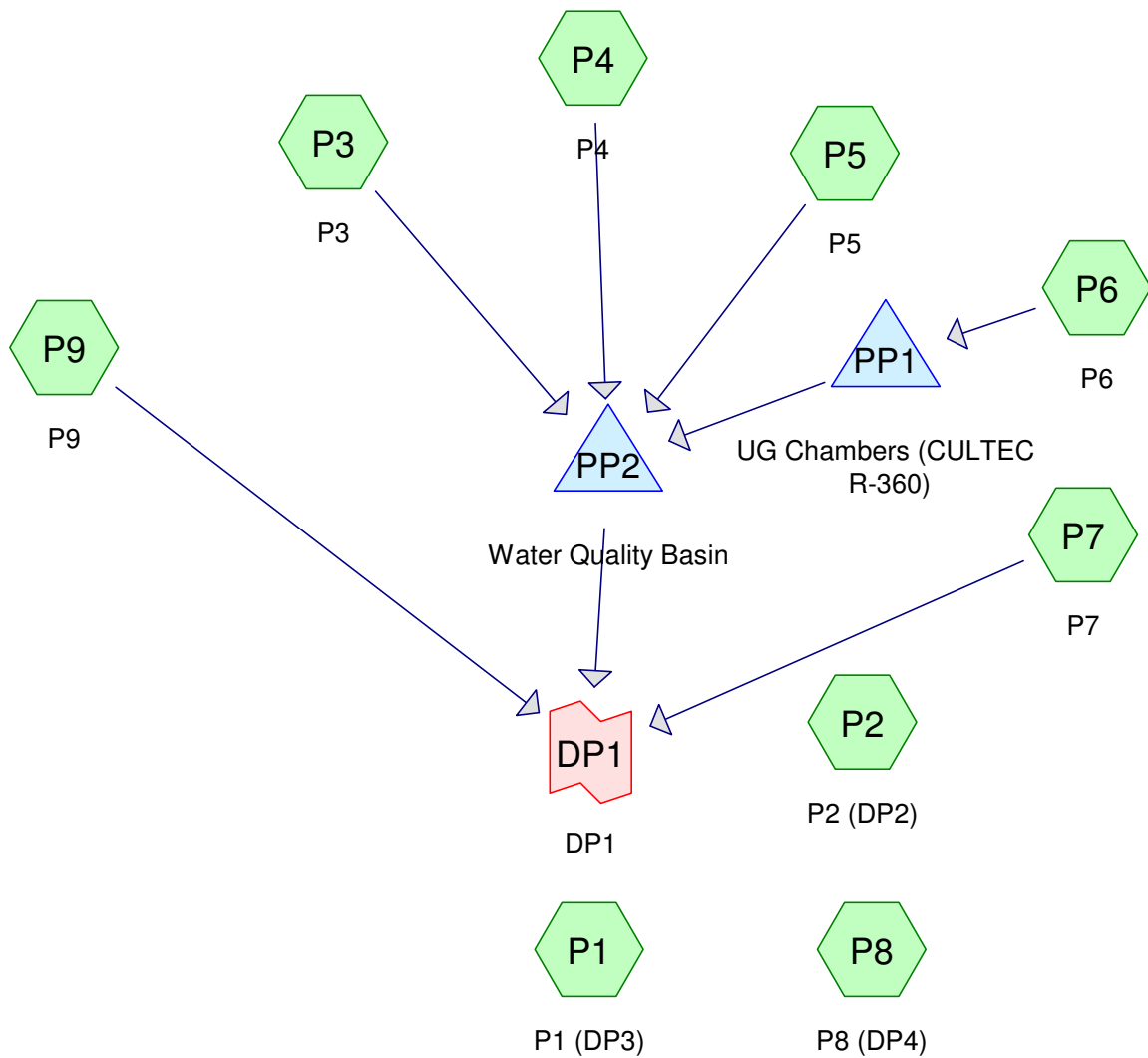
Subcatchment E3: Existing E3 (DP3)



Subcatchment E4: Existing E4 (DP4)



APPENDIX B
Watershed Computations
(Post-Development Drainage HydroCAD Report)



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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 2

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: P1 (DP3)	Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=0.71" Flow Length=198' Tc=32.5 min CN=68 Runoff=0.94 cfs 0.143 af
Subcatchment P2: P2 (DP2)	Runoff Area=2.000 ac 0.50% Impervious Runoff Depth=0.85" Flow Length=514' Tc=30.9 min CN=71 Runoff=1.00 cfs 0.141 af
Subcatchment P3: P3	Runoff Area=9.760 ac 66.80% Impervious Runoff Depth=1.95" Tc=10.0 min CN=88 Runoff=19.47 cfs 1.588 af
Subcatchment P4: P4	Runoff Area=4.060 ac 100.00% Impervious Runoff Depth=2.92" Tc=6.0 min CN=98 Runoff=12.41 cfs 0.987 af
Subcatchment P5: P5	Runoff Area=3.460 ac 100.00% Impervious Runoff Depth=2.92" Tc=6.0 min CN=98 Runoff=10.58 cfs 0.841 af
Subcatchment P6: P6	Runoff Area=7.030 ac 68.42% Impervious Runoff Depth=1.95" Tc=10.0 min CN=88 Runoff=14.03 cfs 1.144 af
Subcatchment P7: P7	Runoff Area=3.120 ac 0.00% Impervious Runoff Depth=0.46" Flow Length=471' Tc=32.5 min CN=62 Runoff=0.65 cfs 0.120 af
Subcatchment P8: P8 (DP4)	Runoff Area=1.950 ac 0.00% Impervious Runoff Depth=0.71" Flow Length=490' Tc=41.0 min CN=68 Runoff=0.67 cfs 0.115 af
Subcatchment P9: P9	Runoff Area=0.720 ac 100.00% Impervious Runoff Depth=2.92" Tc=35.0 min CN=98 Runoff=1.17 cfs 0.175 af
Pond PP1: UG Chambers (CULTEC R-360)	Peak Elev=71.86' Storage=6,809 cf Inflow=14.03 cfs 1.144 af Outflow=12.86 cfs 1.059 af
Pond PP2: Water Quality Basin	Peak Elev=71.86' Storage=533,775 cf Inflow=50.91 cfs 4.475 af Outflow=0.70 cfs 2.201 af
Link DP1: DP1	Inflow=2.37 cfs 2.496 af Primary=2.37 cfs 2.496 af

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Proposed Condition
Type III 24-hr 10-yr Rainfall=4.99"

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Page 3

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: P1 (DP3)

Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=1.87"
Flow Length=198' Tc=32.5 min CN=68 Runoff=2.82 cfs 0.379 af

Subcatchment P2: P2 (DP2)

Runoff Area=2.000 ac 0.50% Impervious Runoff Depth=2.11"
Flow Length=514' Tc=30.9 min CN=71 Runoff=2.71 cfs 0.351 af

Subcatchment P3: P3

Runoff Area=9.760 ac 66.80% Impervious Runoff Depth=3.66"
Tc=10.0 min CN=88 Runoff=35.82 cfs 2.976 af

Subcatchment P4: P4

Runoff Area=4.060 ac 100.00% Impervious Runoff Depth=4.75"
Tc=6.0 min CN=98 Runoff=19.82 cfs 1.608 af

Subcatchment P5: P5

Runoff Area=3.460 ac 100.00% Impervious Runoff Depth=4.75"
Tc=6.0 min CN=98 Runoff=16.89 cfs 1.371 af

Subcatchment P6: P6

Runoff Area=7.030 ac 68.42% Impervious Runoff Depth=3.66"
Tc=10.0 min CN=88 Runoff=25.80 cfs 2.144 af

Subcatchment P7: P7

Runoff Area=3.120 ac 0.00% Impervious Runoff Depth=1.43"
Flow Length=471' Tc=32.5 min CN=62 Runoff=2.63 cfs 0.372 af

Subcatchment P8: P8 (DP4)

Runoff Area=1.950 ac 0.00% Impervious Runoff Depth=1.87"
Flow Length=490' Tc=41.0 min CN=68 Runoff=2.02 cfs 0.304 af

Subcatchment P9: P9

Runoff Area=0.720 ac 100.00% Impervious Runoff Depth=4.75"
Tc=35.0 min CN=98 Runoff=1.88 cfs 0.285 af

Pond PP1: UG Chambers (CULTEC R-360)

Peak Elev=72.59' Storage=8,884 cf Inflow=25.80 cfs 2.144 af
Outflow=23.44 cfs 2.050 af

Pond PP2: Water Quality Basin

Peak Elev=72.59' Storage=601,255 cf Inflow=90.70 cfs 8.005 af
Outflow=5.41 cfs 5.485 af

Link DP1: DP1

Inflow=8.56 cfs 6.142 af
Primary=8.56 cfs 6.142 af

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Proposed Condition
Type III 24-hr 25-yr Rainfall=6.13"

Printed 7/1/2021

Page 4

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: P1 (DP3)

Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=2.72"
Flow Length=198' Tc=32.5 min CN=68 Runoff=4.18 cfs 0.551 af

Subcatchment P2: P2 (DP2)

Runoff Area=2.000 ac 0.50% Impervious Runoff Depth=3.00"
Flow Length=514' Tc=30.9 min CN=71 Runoff=3.91 cfs 0.501 af

Subcatchment P3: P3

Runoff Area=9.760 ac 66.80% Impervious Runoff Depth=4.75"
Tc=10.0 min CN=88 Runoff=45.95 cfs 3.864 af

Subcatchment P4: P4

Runoff Area=4.060 ac 100.00% Impervious Runoff Depth=5.89"
Tc=6.0 min CN=98 Runoff=24.39 cfs 1.993 af

Subcatchment P5: P5

Runoff Area=3.460 ac 100.00% Impervious Runoff Depth=5.89"
Tc=6.0 min CN=98 Runoff=20.79 cfs 1.699 af

Subcatchment P6: P6

Runoff Area=7.030 ac 68.42% Impervious Runoff Depth=4.75"
Tc=10.0 min CN=88 Runoff=33.10 cfs 2.783 af

Subcatchment P7: P7

Runoff Area=3.120 ac 0.00% Impervious Runoff Depth=2.18"
Flow Length=471' Tc=32.5 min CN=62 Runoff=4.17 cfs 0.567 af

Subcatchment P8: P8 (DP4)

Runoff Area=1.950 ac 0.00% Impervious Runoff Depth=2.72"
Flow Length=490' Tc=41.0 min CN=68 Runoff=2.98 cfs 0.442 af

Subcatchment P9: P9

Runoff Area=0.720 ac 100.00% Impervious Runoff Depth=5.89"
Tc=35.0 min CN=98 Runoff=2.31 cfs 0.354 af

Pond PP1: UG Chambers (CULTEC R-360)

Peak Elev=73.19' Storage=10,120 cf Inflow=33.10 cfs 2.783 af
Outflow=30.22 cfs 2.687 af

Pond PP2: Water Quality Basin

Peak Elev=73.19' Storage=658,843 cf Inflow=115.27 cfs 10.243 af
Outflow=7.62 cfs 7.656 af

Link DP1: DP1

Inflow=13.21 cfs 8.576 af
Primary=13.21 cfs 8.576 af

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Proposed Condition
Type III 24-hr 50-yr Rainfall=6.97"

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Page 5

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: P1 (DP3)

Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=3.39"
Flow Length=198' Tc=32.5 min CN=68 Runoff=5.24 cfs 0.686 af

Subcatchment P2: P2 (DP2)

Runoff Area=2.000 ac 0.50% Impervious Runoff Depth=3.70"
Flow Length=514' Tc=30.9 min CN=71 Runoff=4.83 cfs 0.616 af

Subcatchment P3: P3

Runoff Area=9.760 ac 66.80% Impervious Runoff Depth=5.56"
Tc=10.0 min CN=88 Runoff=53.38 cfs 4.526 af

Subcatchment P4: P4

Runoff Area=4.060 ac 100.00% Impervious Runoff Depth=6.73"
Tc=6.0 min CN=98 Runoff=27.76 cfs 2.277 af

Subcatchment P5: P5

Runoff Area=3.460 ac 100.00% Impervious Runoff Depth=6.73"
Tc=6.0 min CN=98 Runoff=23.66 cfs 1.941 af

Subcatchment P6: P6

Runoff Area=7.030 ac 68.42% Impervious Runoff Depth=5.56"
Tc=10.0 min CN=88 Runoff=38.45 cfs 3.260 af

Subcatchment P7: P7

Runoff Area=3.120 ac 0.00% Impervious Runoff Depth=2.78"
Flow Length=471' Tc=32.5 min CN=62 Runoff=5.42 cfs 0.723 af

Subcatchment P8: P8 (DP4)

Runoff Area=1.950 ac 0.00% Impervious Runoff Depth=3.39"
Flow Length=490' Tc=41.0 min CN=68 Runoff=3.74 cfs 0.550 af

Subcatchment P9: P9

Runoff Area=0.720 ac 100.00% Impervious Runoff Depth=6.73"
Tc=35.0 min CN=98 Runoff=2.63 cfs 0.404 af

Pond PP1: UG Chambers (CULTEC R-360)

Peak Elev=73.61' Storage=10,775 cf Inflow=38.45 cfs 3.260 af
Outflow=35.27 cfs 3.161 af

Pond PP2: Water Quality Basin

Peak Elev=73.61' Storage=701,369 cf Inflow=132.73 cfs 11.905 af
Outflow=9.82 cfs 9.269 af

Link DP1: DP1

Inflow=16.44 cfs 10.395 af
Primary=16.44 cfs 10.395 af

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Proposed Condition
Type III 24-hr 100-yr Rainfall=7.90"

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Page 6

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: P1 (DP3)	Runoff Area=2.430 ac 0.00% Impervious Runoff Depth=4.15" Flow Length=198' Tc=32.5 min CN=68 Runoff=6.45 cfs 0.841 af
Subcatchment P2: P2 (DP2)	Runoff Area=2.000 ac 0.50% Impervious Runoff Depth=4.49" Flow Length=514' Tc=30.9 min CN=71 Runoff=5.87 cfs 0.749 af
Subcatchment P3: P3	Runoff Area=9.760 ac 66.80% Impervious Runoff Depth=6.47" Tc=10.0 min CN=88 Runoff=61.57 cfs 5.263 af
Subcatchment P4: P4	Runoff Area=4.060 ac 100.00% Impervious Runoff Depth=7.66" Tc=6.0 min CN=98 Runoff=31.49 cfs 2.592 af
Subcatchment P5: P5	Runoff Area=3.460 ac 100.00% Impervious Runoff Depth=7.66" Tc=6.0 min CN=98 Runoff=26.83 cfs 2.209 af
Subcatchment P6: P6	Runoff Area=7.030 ac 68.42% Impervious Runoff Depth=6.47" Tc=10.0 min CN=88 Runoff=44.35 cfs 3.791 af
Subcatchment P7: P7	Runoff Area=3.120 ac 0.00% Impervious Runoff Depth=3.48" Flow Length=471' Tc=32.5 min CN=62 Runoff=6.86 cfs 0.905 af
Subcatchment P8: P8 (DP4)	Runoff Area=1.950 ac 0.00% Impervious Runoff Depth=4.15" Flow Length=490' Tc=41.0 min CN=68 Runoff=4.60 cfs 0.675 af
Subcatchment P9: P9	Runoff Area=0.720 ac 100.00% Impervious Runoff Depth=7.66" Tc=35.0 min CN=98 Runoff=2.98 cfs 0.460 af
Pond PP1: UG Chambers (CULTEC R-360)	Peak Elev=74.05' Storage=10,796 cf Inflow=44.35 cfs 3.791 af Outflow=44.40 cfs 3.691 af
Pond PP2: Water Quality Basin	Peak Elev=74.05' Storage=746,968 cf Inflow=153.30 cfs 13.754 af Outflow=12.86 cfs 11.074 af
Link DP1: DP1	Inflow=21.16 cfs 12.438 af Primary=21.16 cfs 12.438 af

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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 7

Summary for Subcatchment P1: P1 (DP3)

Runoff = 0.94 cfs @ 12.53 hrs, Volume= 0.143 af, Depth= 0.71"

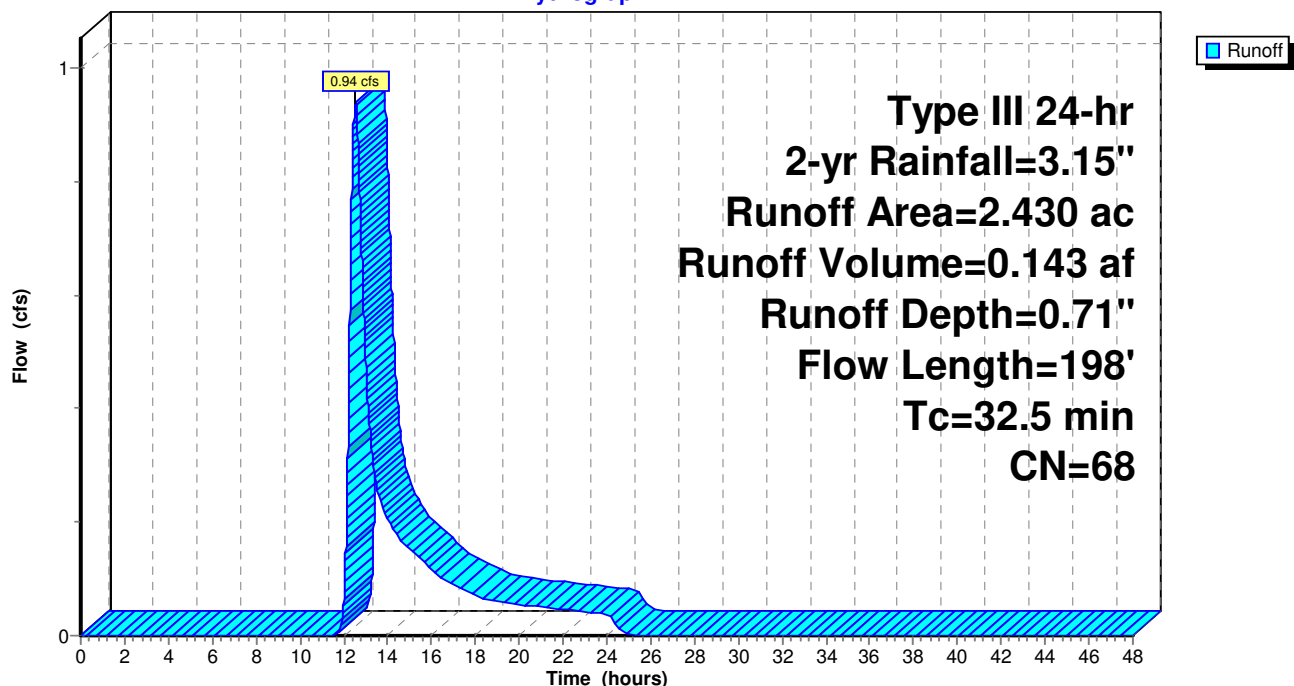
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 0.420	71	>75% Grass cover, Good, HSG B/D
0.160	74	>75% Grass cover, Good, HSG C
* 1.220	66	Woods, Good, HSG B/D
0.630	70	Woods, Good, HSG C
2.430	68	Weighted Average
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	28	0.2100	0.15		Sheet Flow, Woodland SF
					Woods: Light underbrush n= 0.400 P2= 3.22"
25.5	72	0.0067	0.05		Sheet Flow, Woodland SF
					Woods: Light underbrush n= 0.400 P2= 3.22"
4.0	98	0.0067	0.41		Shallow Concentrated Flow, Woodland SCF
					Woodland Kv= 5.0 fps
32.5	198	Total			

Subcatchment P1: P1 (DP3)

Hydrograph



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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 8

Summary for Subcatchment P2: P2 (DP2)

Runoff = 1.00 cfs @ 12.47 hrs, Volume= 0.141 af, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 0.280	71	>75% Grass cover, Good, HSG B/D
0.520	74	>75% Grass cover, Good, HSG C
* 0.010	98	IMPERVIOUS
* 0.380	66	Woods, Good, HSG B/D
0.810	70	Woods, Good, HSG C
2.000	71	Weighted Average
1.990		99.50% Pervious Area
0.010		0.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	100	0.0084	0.08		Sheet Flow, Grass SF Grass: Dense n= 0.240 P2= 3.22"
2.6	100	0.0084	0.64		Shallow Concentrated Flow, Grass SCF Short Grass Pasture Kv= 7.0 fps
6.9	190	0.0084	0.46		Shallow Concentrated Flow, Woodland SCF Woodland Kv= 5.0 fps
1.3	124	0.0050	1.58	57.03	Channel Flow, Channel Flow Area= 36.0 sf Perim= 55.0' r= 0.65' n= 0.050
30.9	514	Total			

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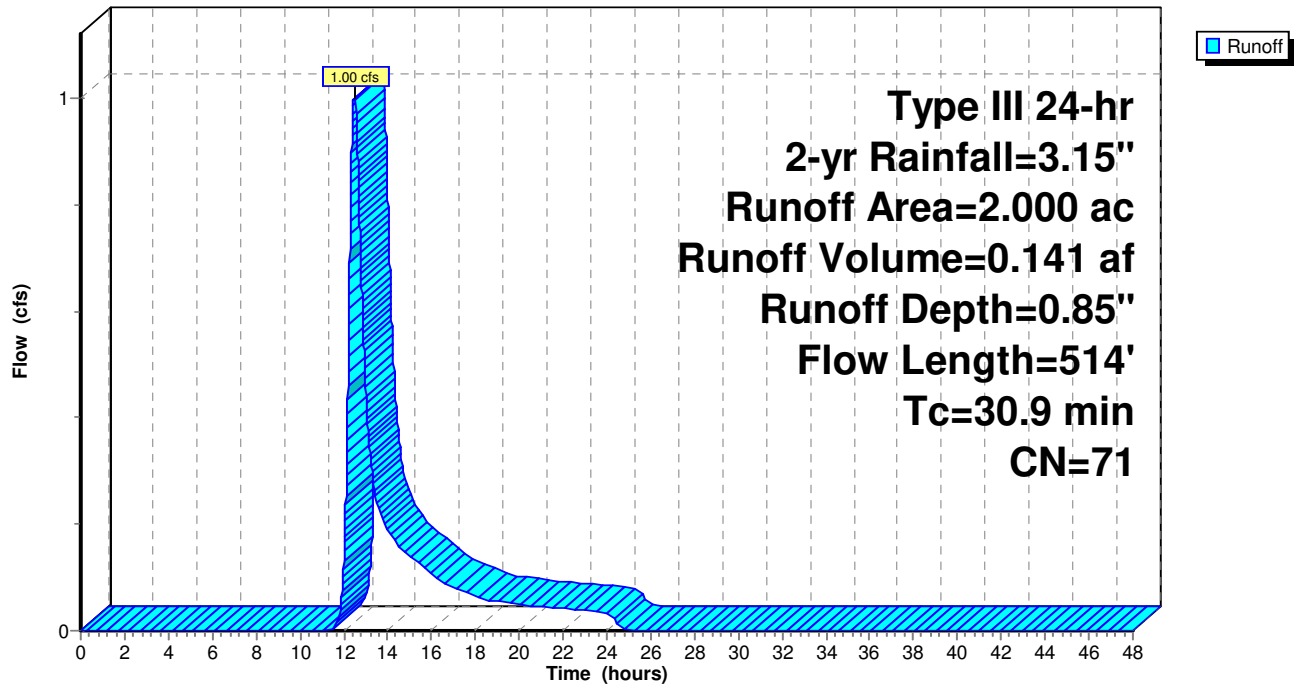
Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 9

Subcatchment P2: P2 (DP2)

Hydrograph



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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 10

Summary for Subcatchment P3: P3

Runoff = 19.47 cfs @ 12.14 hrs, Volume= 1.588 af, Depth= 1.95"

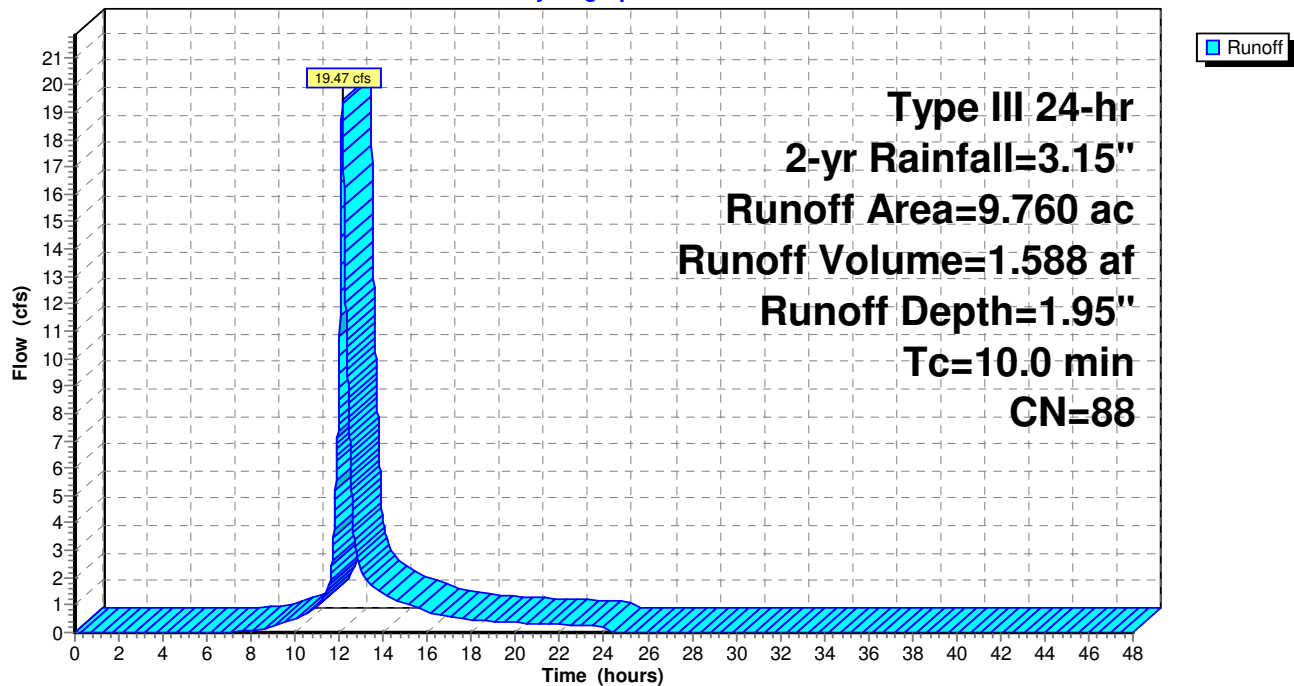
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
0.290	39	>75% Grass cover, Good, HSG A
* 0.030	60	>75% Grass cover, Good, HSG A/D
* 1.800	71	>75% Grass cover, Good, HSG B/D
1.120	74	>75% Grass cover, Good, HSG C
* 6.520	98	IMPERVIOUS
9.760	88	Weighted Average
3.240		33.20% Pervious Area
6.520		66.80% Impervious Area

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

Subcatchment P3: P3

Hydrograph



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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 11

Summary for Subcatchment P4: P4

Runoff = 12.41 cfs @ 12.08 hrs, Volume= 0.987 af, Depth= 2.92"

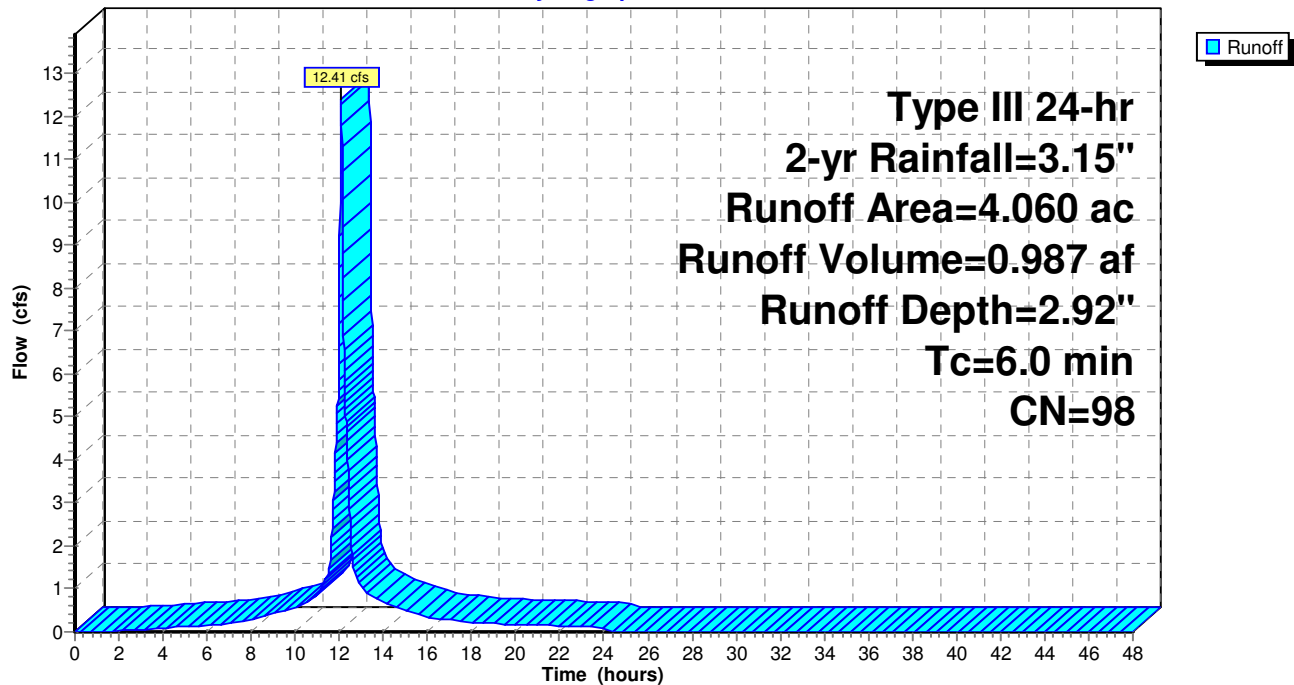
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 4.060	98	IMPERVIOUS
4.060		100.00% Impervious Area

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

Subcatchment P4: P4

Hydrograph



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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 12

Summary for Subcatchment P5: P5

Runoff = 10.58 cfs @ 12.08 hrs, Volume= 0.841 af, Depth= 2.92"

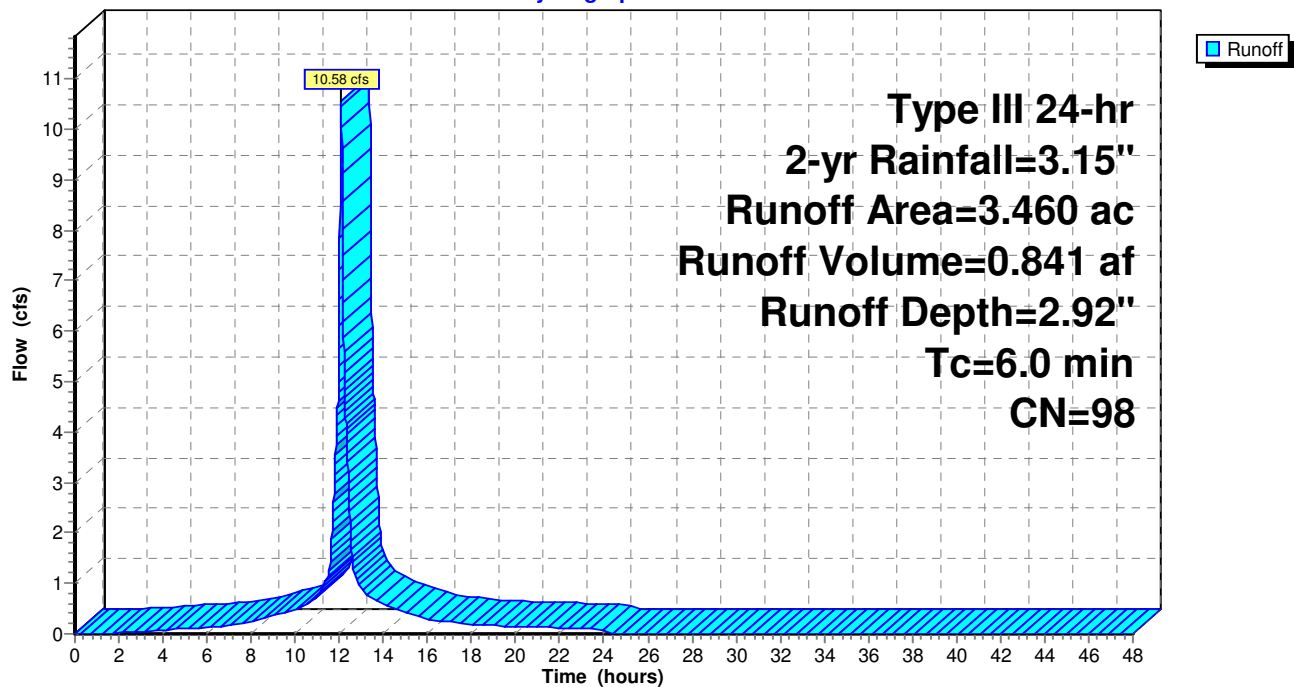
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 3.460	98	IMPERVIOUS
3.460		100.00% Impervious Area

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

Subcatchment P5: P5

Hydrograph



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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 13

Summary for Subcatchment P6: P6

Runoff = 14.03 cfs @ 12.14 hrs, Volume= 1.144 af, Depth= 1.95"

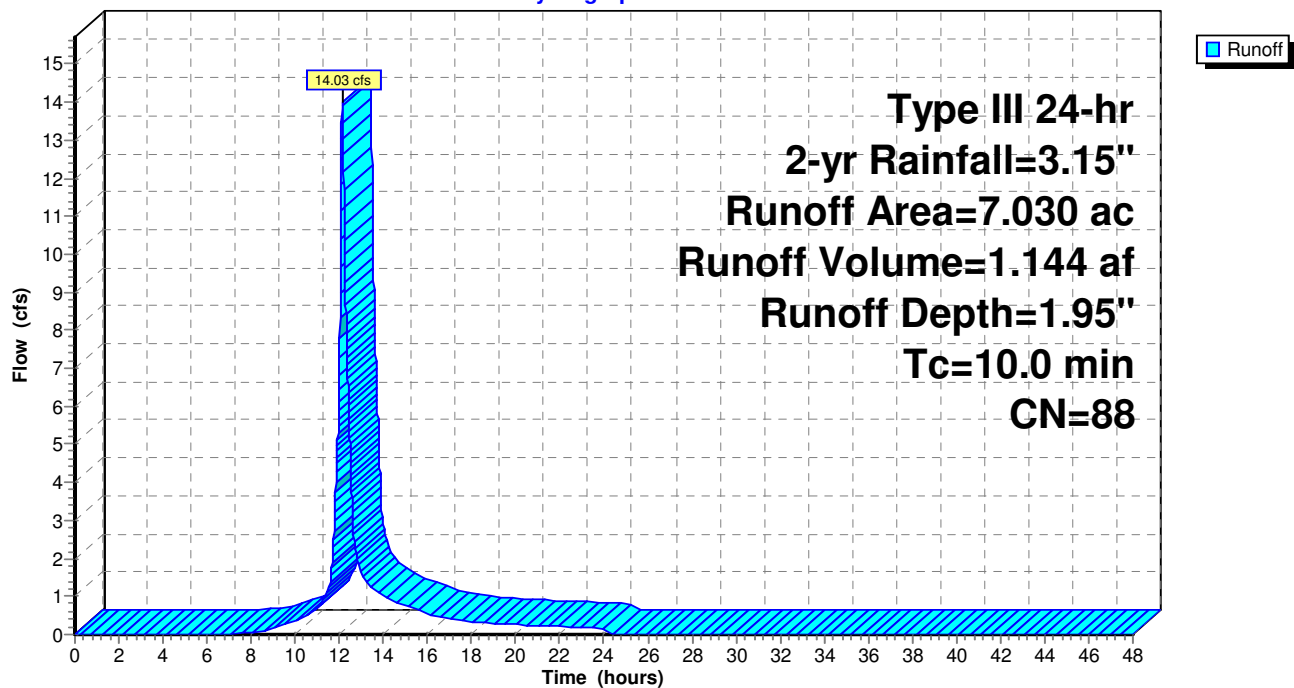
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
0.320	39	>75% Grass cover, Good, HSG A
* 0.060	60	>75% Grass cover, Good, HSG A/D
* 1.170	71	>75% Grass cover, Good, HSG B/D
0.670	74	>75% Grass cover, Good, HSG C
* 4.810	98	IMPERVIOUS
7.030	88	Weighted Average
2.220		31.58% Pervious Area
4.810		68.42% Impervious Area

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

Subcatchment P6: P6

Hydrograph



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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 14

Summary for Subcatchment P7: P7

Runoff = 0.65 cfs @ 12.60 hrs, Volume= 0.120 af, Depth= 0.46"

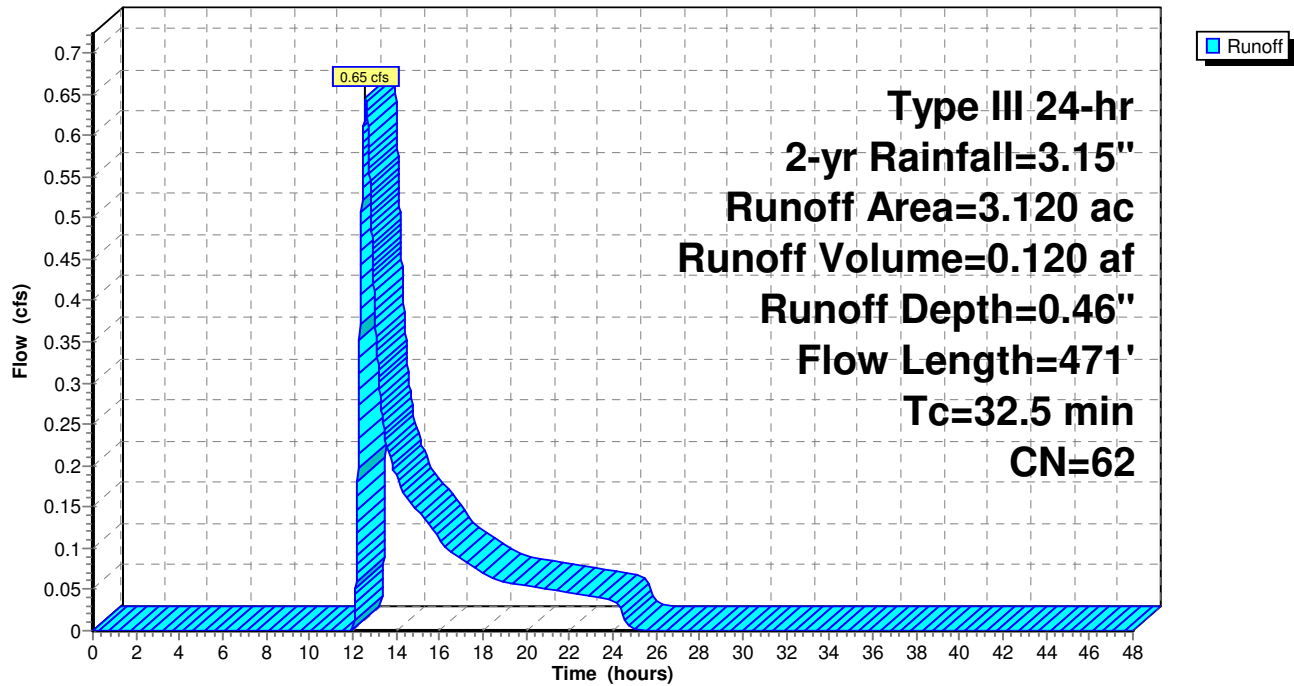
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 0.560	60	>75% Grass cover, Good, HSG A/D
* 0.200	71	>75% Grass cover, Good, HSG B/D
0.310	74	>75% Grass cover, Good, HSG C
* 1.200	54	Woods, Good, HSG A/D
* 0.250	66	Woods, Good, HSG B/D
0.600	70	Woods, Good, HSG C
3.120	62	Weighted Average
3.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	12	0.2600	0.21		Sheet Flow, Grass SF Grass: Dense n= 0.240 P2= 3.22"
21.6	88	0.0152	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.22"
10.0	371	0.0152	0.62		Shallow Concentrated Flow, Woodland SCF Woodland Kv= 5.0 fps
32.5	471	Total			

Subcatchment P7: P7

Hydrograph



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Type III 24-hr 2-yr Rainfall=3.15"

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Page 16

Summary for Subcatchment P8: P8 (DP4)

Runoff = 0.67 cfs @ 12.66 hrs, Volume= 0.115 af, Depth= 0.71"

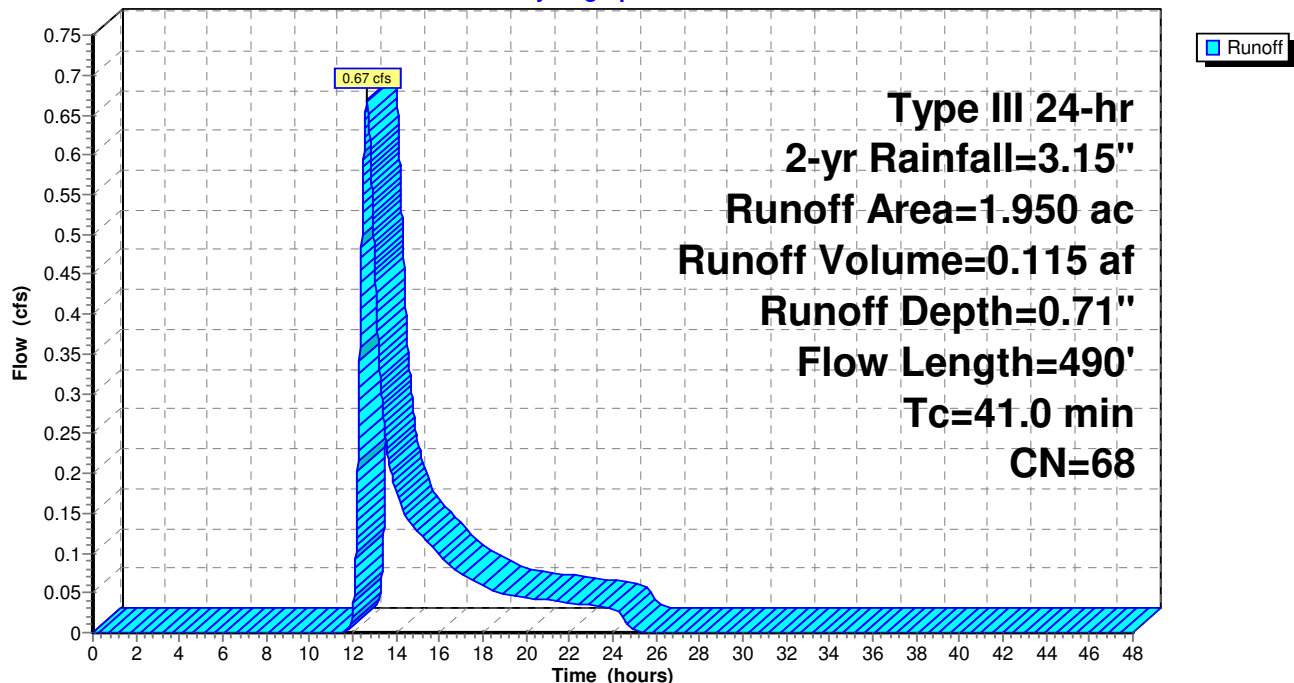
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 0.570	71	>75% Grass cover, Good, HSG B/D
0.050	74	>75% Grass cover, Good, HSG C
* 1.210	66	Woods, Good, HSG B/D
0.120	70	Woods, Good, HSG C
1.950	68	Weighted Average
1.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	16	0.2800	0.23		Sheet Flow, Grass SF Grass: Dense n= 0.240 P2= 3.22"
25.7	84	0.0089	0.05		Sheet Flow, Woodland SF Woods: Light underbrush n= 0.400 P2= 3.22"
14.2	390	0.0084	0.46		Shallow Concentrated Flow, Woodland SCF Woodland Kv= 5.0 fps
41.0	490	Total			

Subcatchment P8: P8 (DP4)

Hydrograph



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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 17

Summary for Subcatchment P9: P9

Runoff = 1.17 cfs @ 12.48 hrs, Volume= 0.175 af, Depth= 2.92"

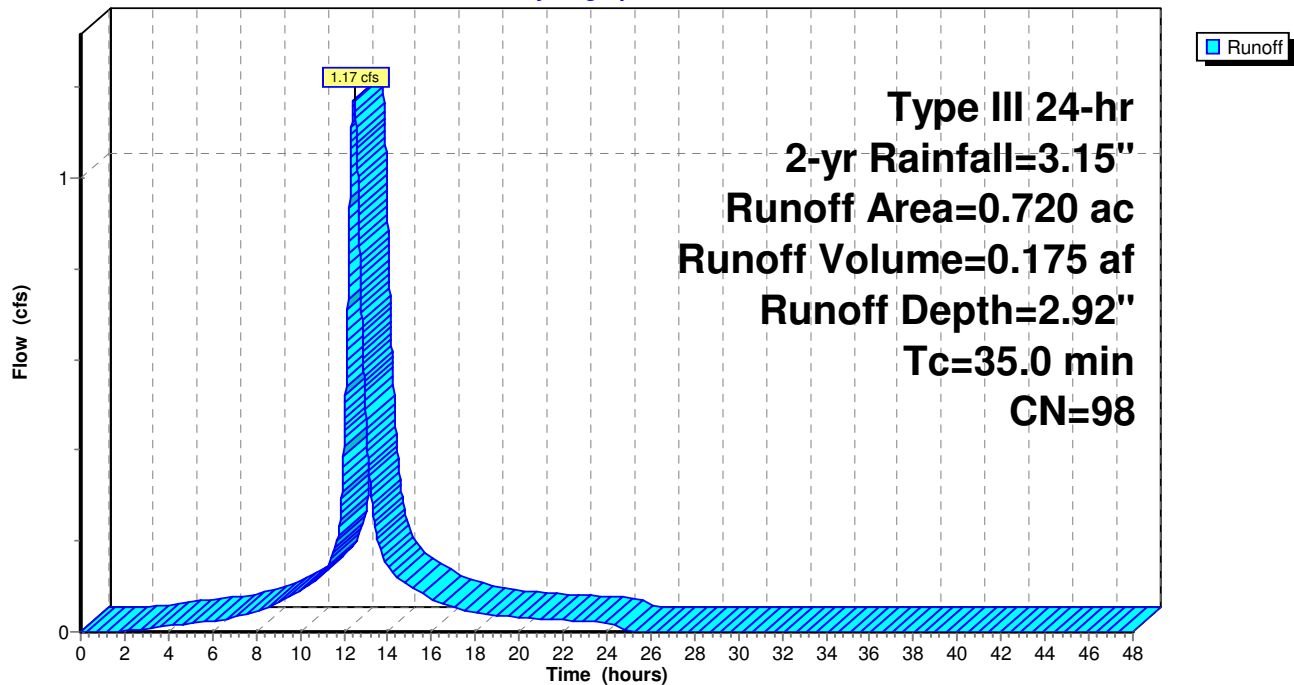
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.15"

Area (ac)	CN	Description
* 0.720	98	IMPERVIOUS
0.720		100.00% Impervious Area

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

Subcatchment P9: P9

Hydrograph



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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 18

Summary for Pond PP1: UG Chambers (CULTEC R-360)

Inflow Area = 7.030 ac, 68.42% Impervious, Inflow Depth = 1.95" for 2-yr event
 Inflow = 14.03 cfs @ 12.14 hrs, Volume= 1.144 af
 Outflow = 12.86 cfs @ 12.19 hrs, Volume= 1.059 af, Atten= 8%, Lag= 2.8 min
 Primary = 12.86 cfs @ 12.19 hrs, Volume= 1.059 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Starting Elev= 70.15' Surf.Area= 4,401 sf Storage= 1,192 cf

Peak Elev= 71.86' @ 23.02 hrs Surf.Area= 4,401 sf Storage= 6,809 cf (5,617 cf above start)

Plug-Flow detention time= 121.3 min calculated for 1.031 af (90% of inflow)

Center-of-Mass det. time= 65.7 min (885.1 - 819.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	69.56'	3,135 cf	7.00'W x 433.50'L x 4.00'H Field A 12,138 cf Overall - 4,300 cf Embedded = 7,838 cf x 40.0% Voids
#2A	70.06'	4,300 cf	Cultec R-360HD x 117 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf
#3B	69.56'	1,418 cf	7.00'W x 195.17'L x 4.00'H Field B 5,465 cf Overall - 1,918 cf Embedded = 3,546 cf x 40.0% Voids
#4B	70.06'	1,918 cf	Cultec R-360HD x 52 Inside #3 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf
#5	73.56'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#6	74.50'	1,908 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		12,725 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
73.56	48	0	0
74.50	48	45	45

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
74.50	5	0	0
75.00	422	107	107
76.00	3,180	1,801	1,908

Device	Routing	Invert	Outlet Devices
#1	Primary	70.15'	30.0" Round Culvert L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 70.15' / 70.11' S= 0.0080 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

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Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 19

#2 Primary

70.15' 30.0" Round Culvert

L= 40.0' CPP, square edge headwall, $K_e = 0.500$

Inlet / Outlet Invert= 70.15' / 70.00' S= 0.0038 '/' Cc= 0.900

n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

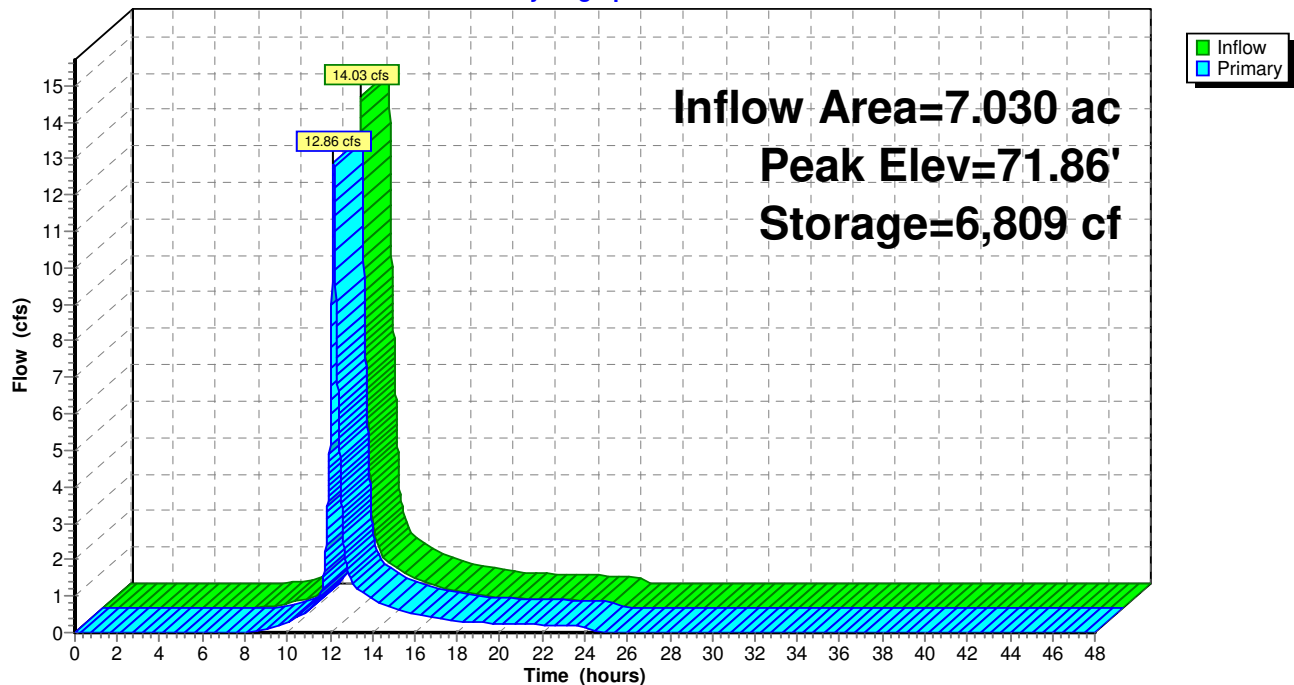
Primary OutFlow Max=12.85 cfs @ 12.19 hrs HW=71.39' TW=70.90' (Dynamic Tailwater)

1=Culvert (Barrel Controls 6.32 cfs @ 3.81 fps)

2=Culvert (Barrel Controls 6.52 cfs @ 3.93 fps)

Pond PP1: UG Chambers (CULTEC R-360)

Hydrograph



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Type III 24-hr 2-yr Rainfall=3.15"

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Page 20

Summary for Pond PP2: Water Quality Basin

Inflow Area = 24.310 ac, 77.54% Impervious, Inflow Depth > 2.21" for 2-yr event
 Inflow = 50.91 cfs @ 12.12 hrs, Volume= 4.475 af
 Outflow = 0.70 cfs @ 23.01 hrs, Volume= 2.201 af, Atten= 99%, Lag= 653.7 min
 Primary = 0.70 cfs @ 23.01 hrs, Volume= 2.201 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Starting Elev= 70.00' Surf.Area= 75,135 sf Storage= 381,514 cf

Peak Elev= 71.86' @ 23.01 hrs Surf.Area= 89,026 sf Storage= 533,775 cf (152,262 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 799.3 min (1,608.7 - 809.4)

Volume	Invert	Avail.Storage	Storage Description	
#1	61.00'	967,921 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
61.00	21,077	0	0	21,077
62.00	24,085	22,564	22,564	24,132
63.00	27,233	25,643	48,207	27,331
64.00	36,998	31,991	80,198	37,116
65.00	40,596	38,783	118,981	40,781
66.00	44,283	42,426	161,407	44,540
67.00	48,018	46,138	207,545	48,352
68.00	51,794	49,894	257,439	52,210
68.80	55,626	42,959	300,398	56,098
69.00	63,460	11,900	312,298	63,933
70.00	75,135	69,215	381,514	75,646
72.00	90,143	165,050	546,564	90,791
74.00	105,376	195,321	741,885	106,184
76.00	120,836	226,036	967,921	121,827

Device	Routing	Invert	Outlet Devices
#1	Primary	69.59'	24.0" Round Culvert L= 66.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.59' / 69.25' S= 0.0052 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	69.59'	7.0" W x 2.0" H Vert. Orifice/Grate C= 0.600
#3	Device 1	71.85'	38.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	73.20'	14.0" W x 11.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.70 cfs @ 23.01 hrs HW=71.86' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.70 cfs of 15.22 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.69 cfs @ 7.12 fps)
 3=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.27 fps)
 4=Orifice/Grate (Controls 0.00 cfs)

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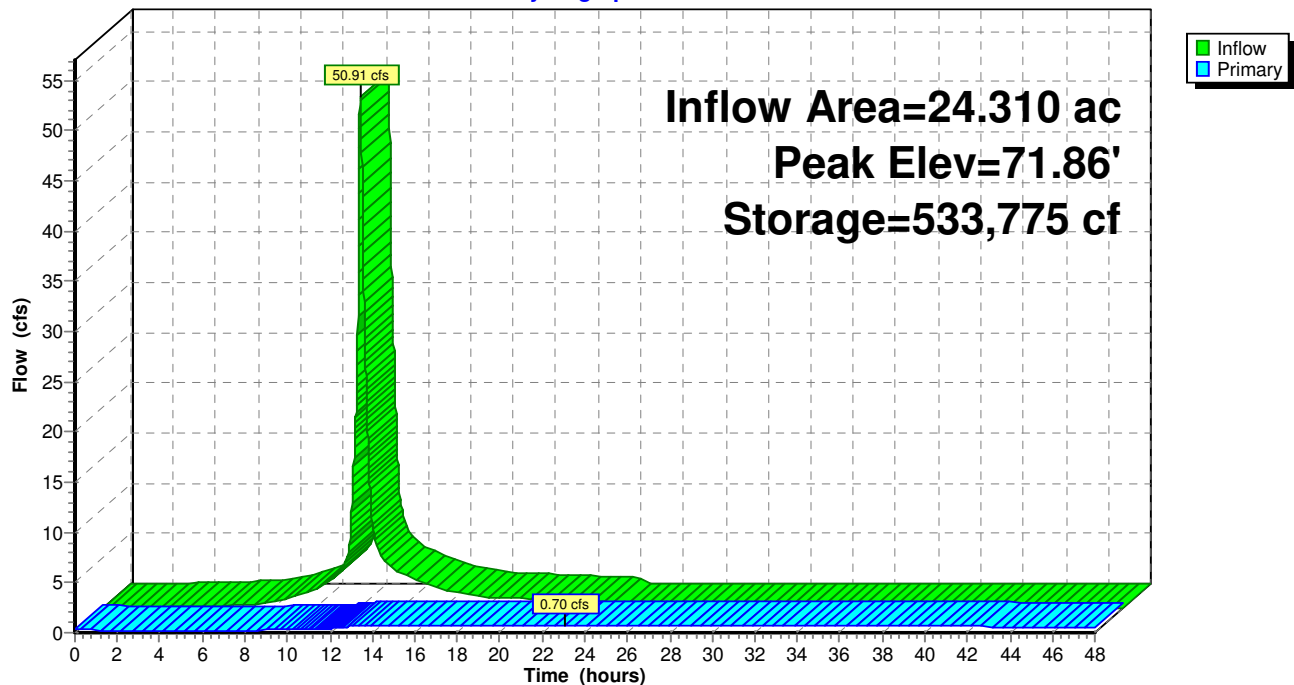
Proposed Condition
Type III 24-hr 2-yr Rainfall=3.15"

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Page 21

Pond PP2: Water Quality Basin

Hydrograph



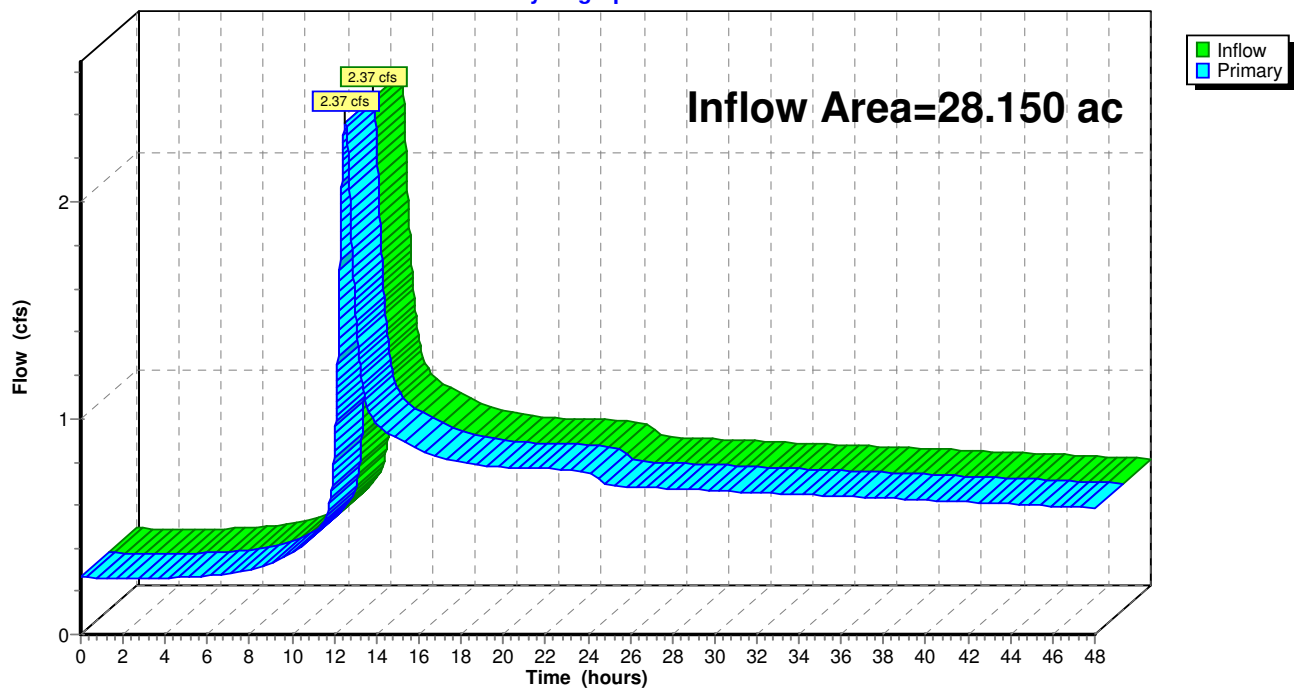
Summary for Link DP1: DP1

Inflow Area = 28.150 ac, 69.52% Impervious, Inflow Depth > 1.06" for 2-yr event
Inflow = 2.37 cfs @ 12.52 hrs, Volume= 2.496 af
Primary = 2.37 cfs @ 12.52 hrs, Volume= 2.496 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link DP1: DP1

Hydrograph



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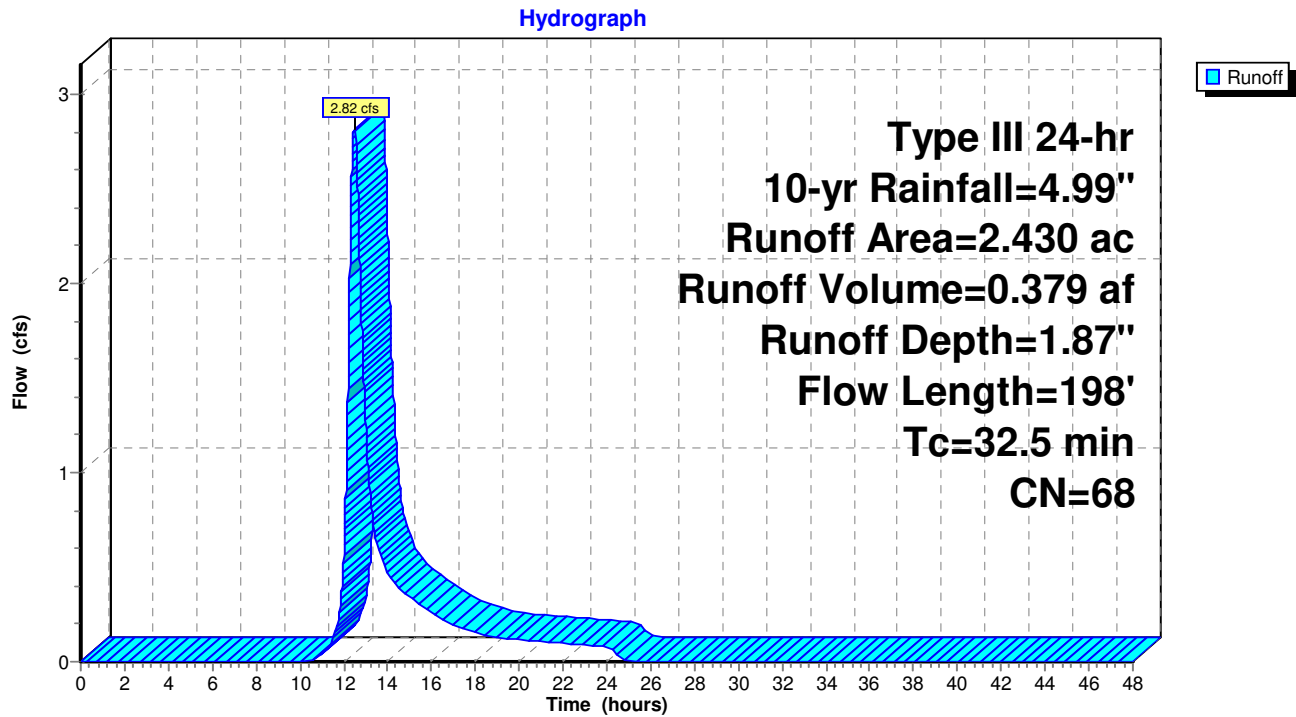
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Proposed Condition
Type III 24-hr 10-yr Rainfall=4.99"

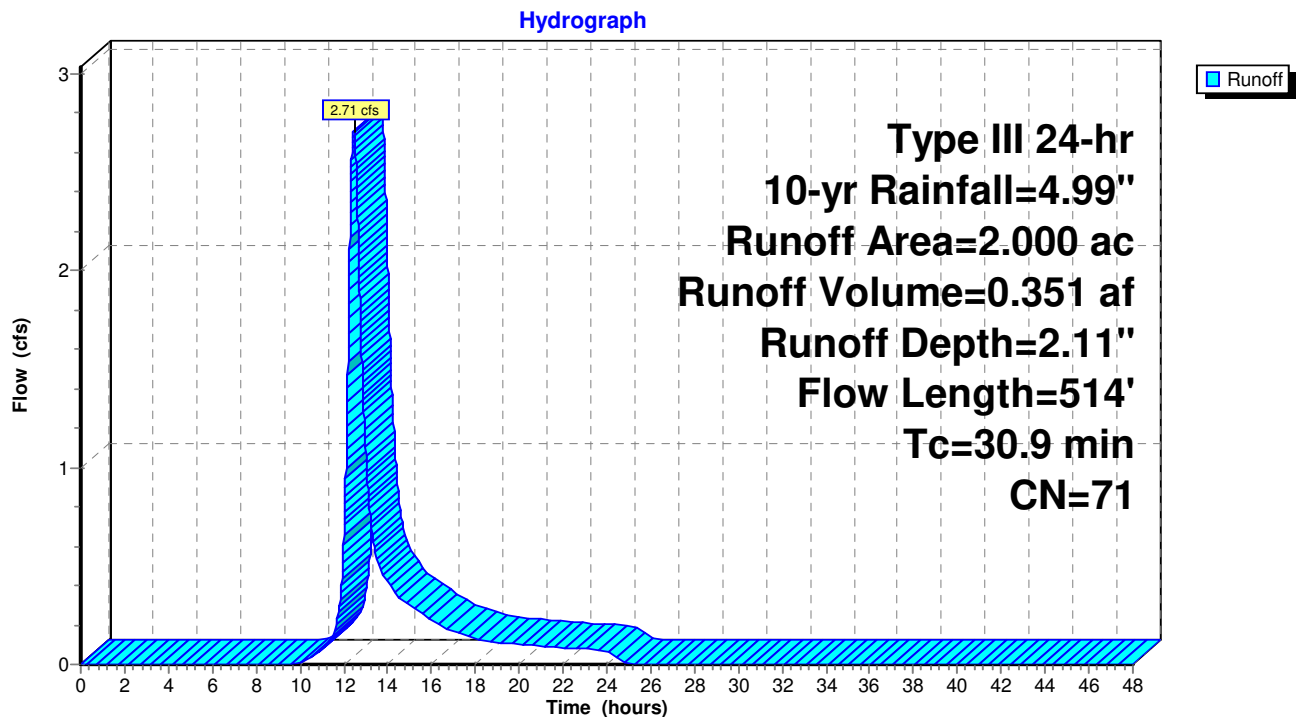
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Page 23

Subcatchment P1: P1 (DP3)



Subcatchment P2: P2 (DP2)



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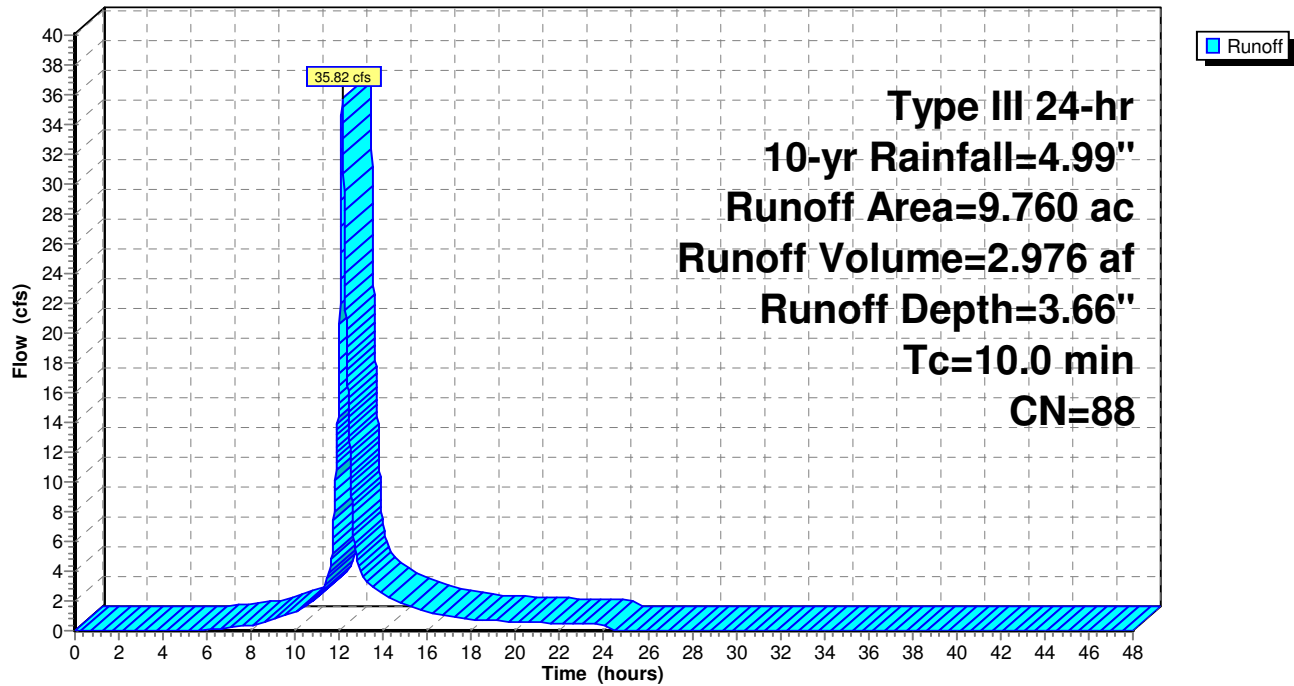
Proposed Condition
Type III 24-hr 10-yr Rainfall=4.99"

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Page 24

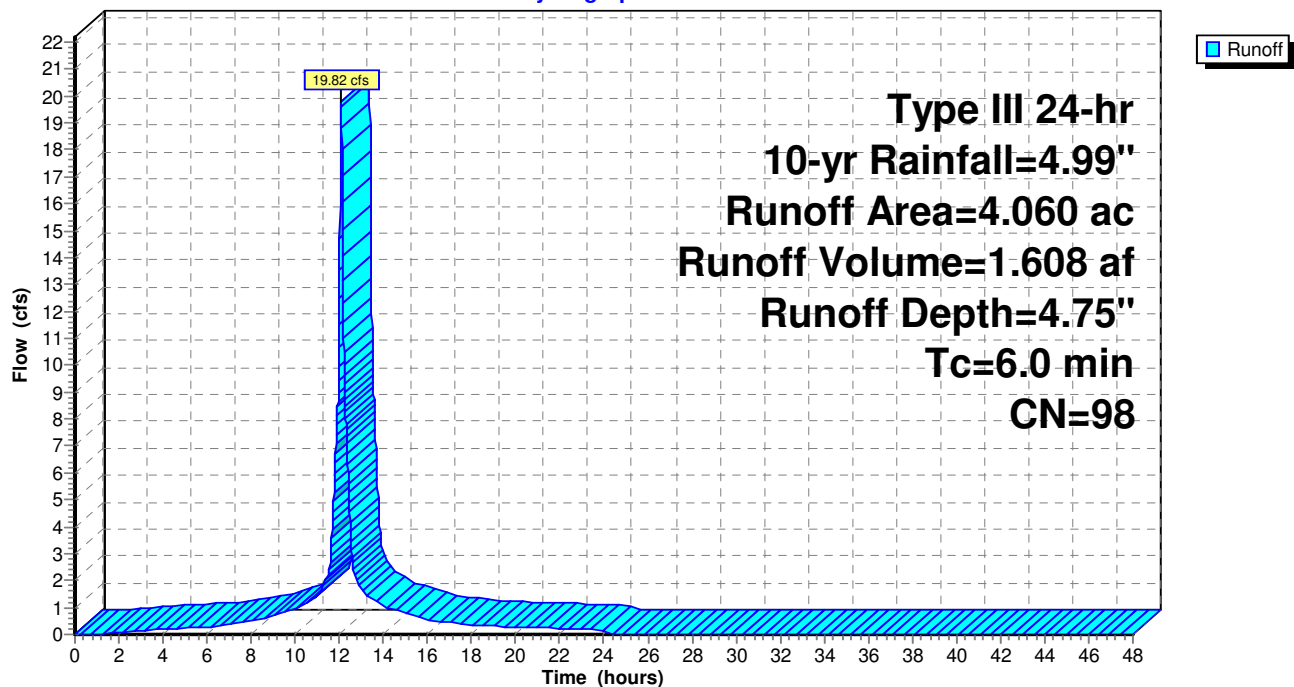
Subcatchment P3: P3

Hydrograph



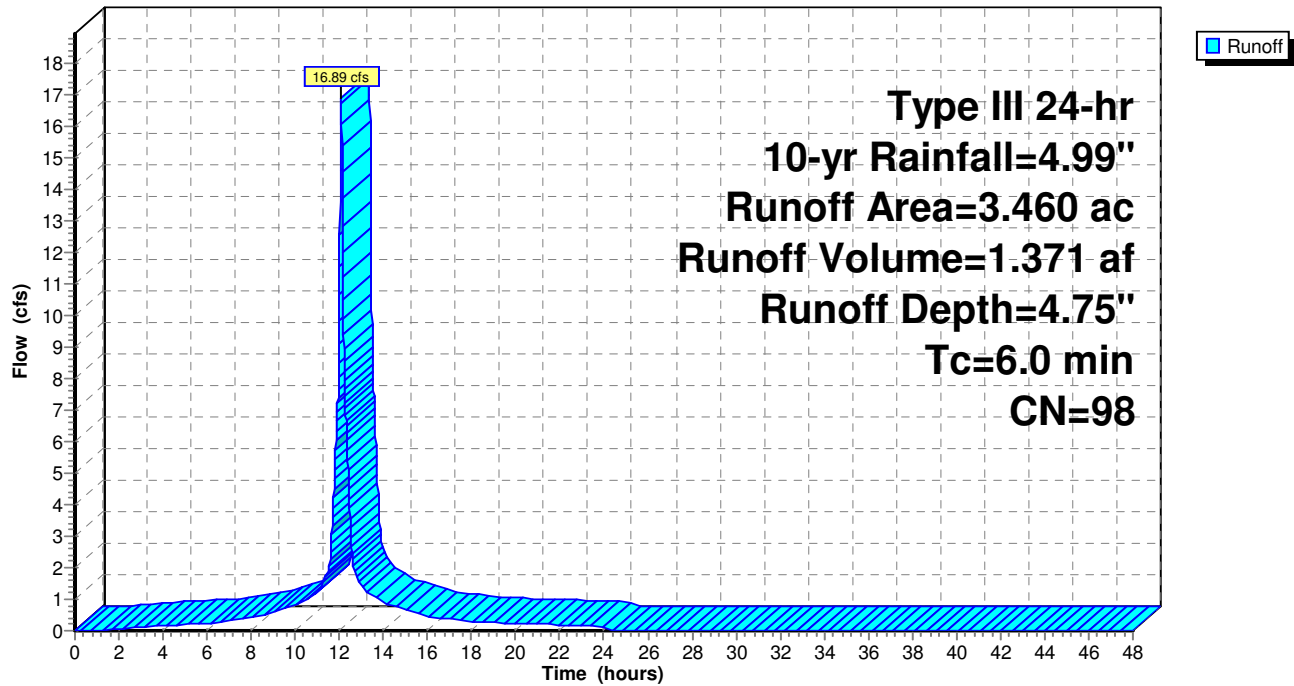
Subcatchment P4: P4

Hydrograph



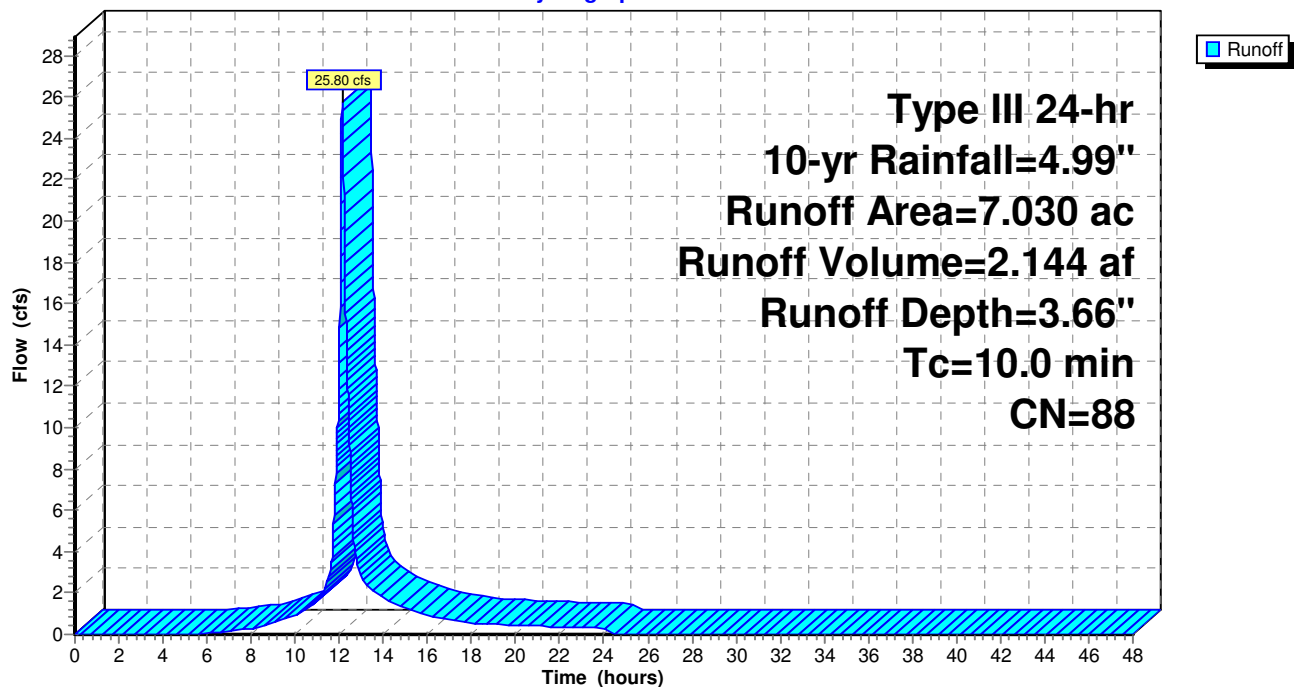
Subcatchment P5: P5

Hydrograph

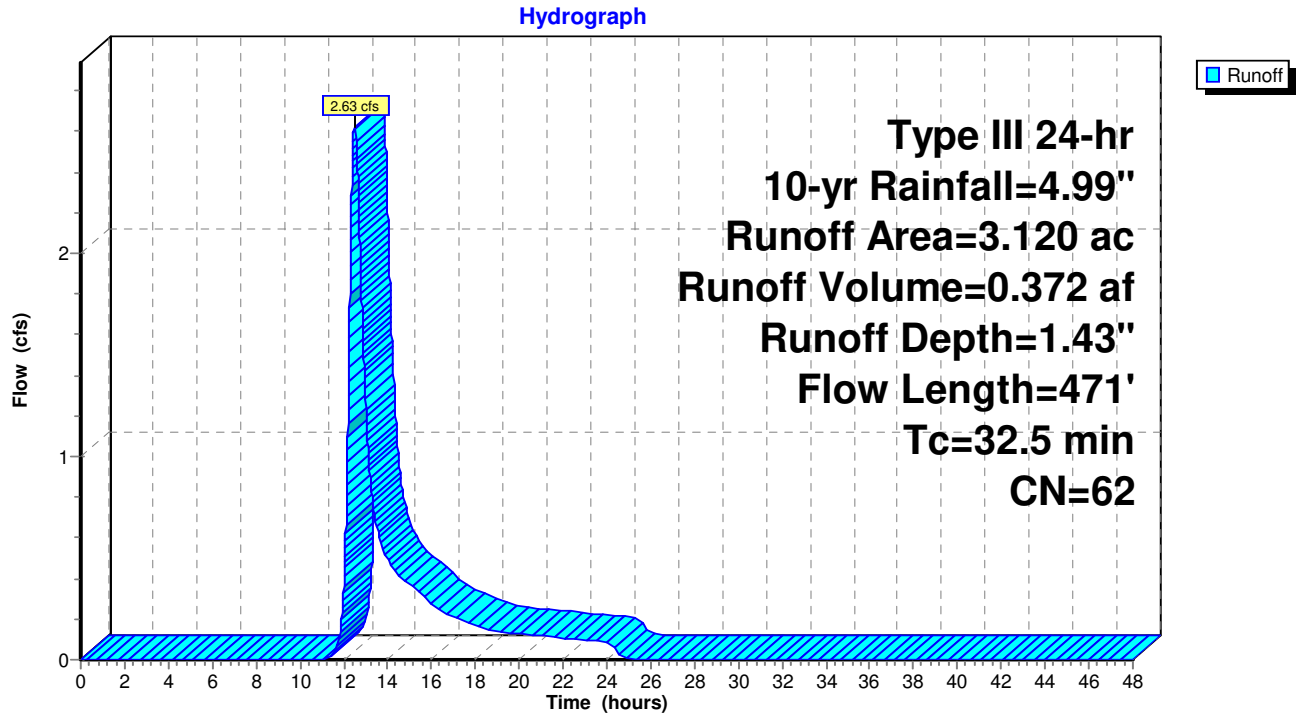


Subcatchment P6: P6

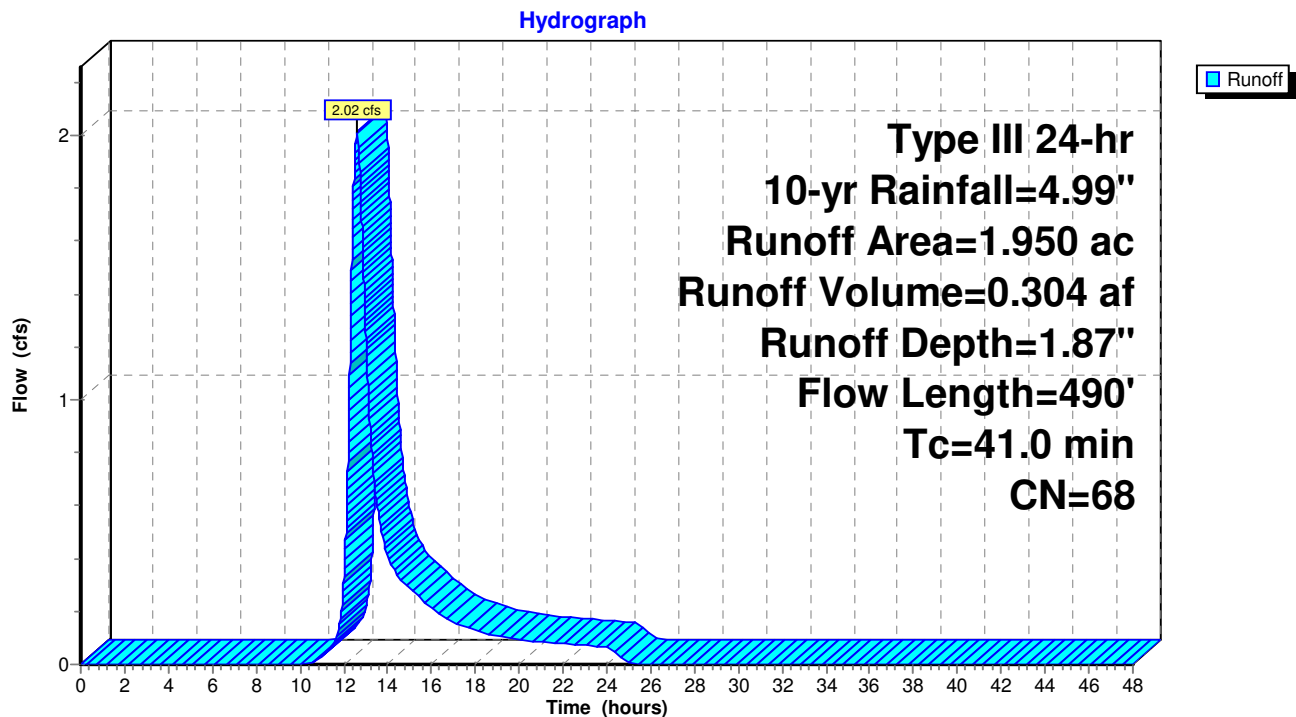
Hydrograph



Subcatchment P7: P7



Subcatchment P8: P8 (DP4)



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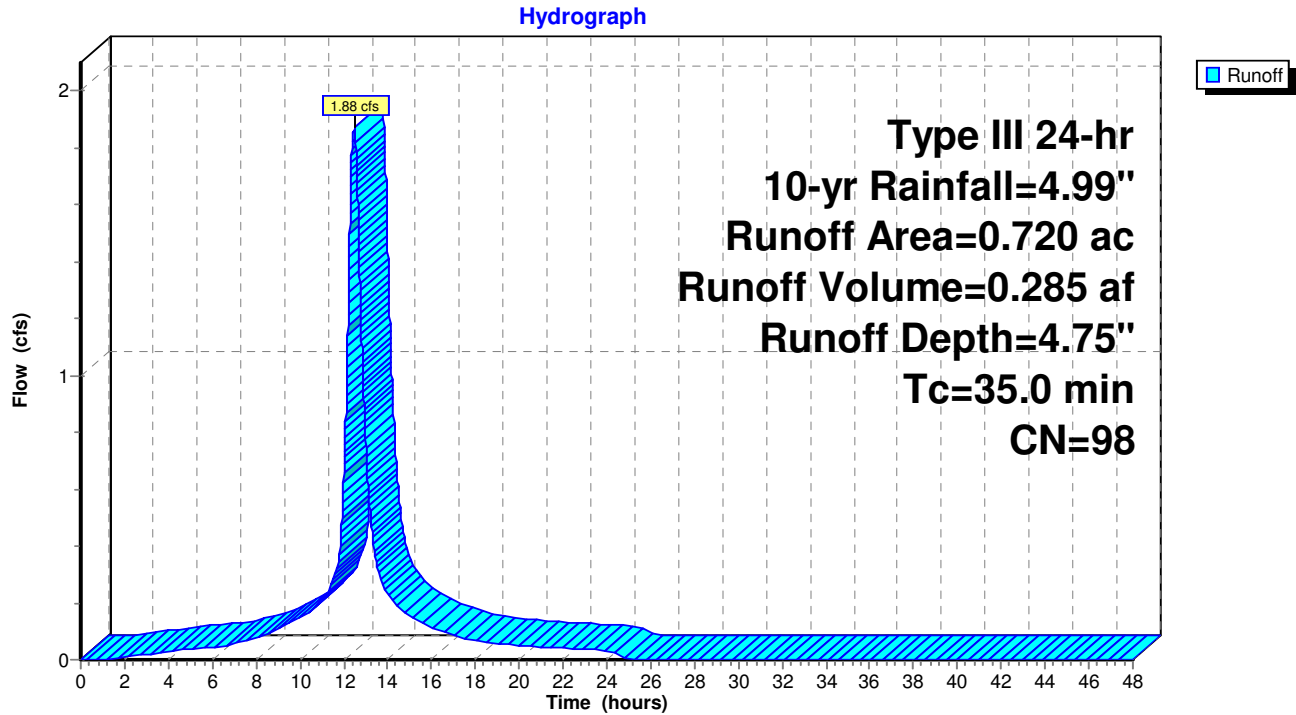
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Proposed Condition
Type III 24-hr 10-yr Rainfall=4.99"

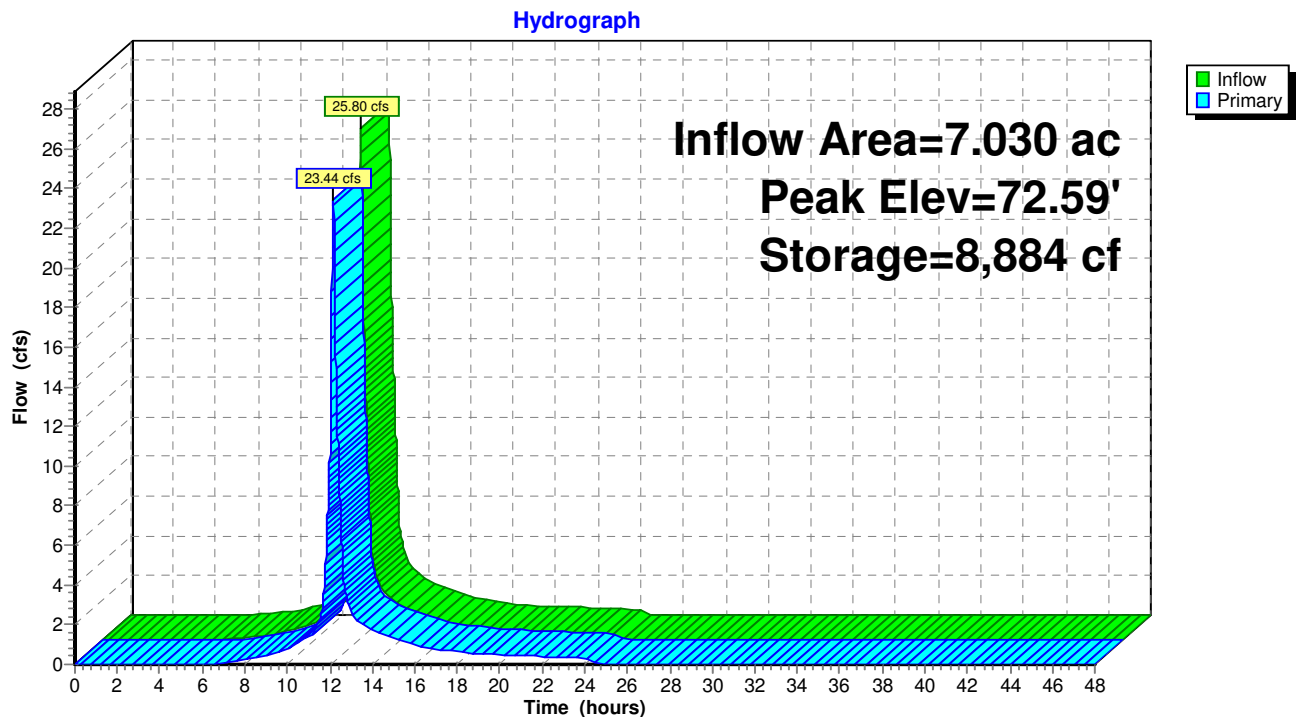
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Page 27

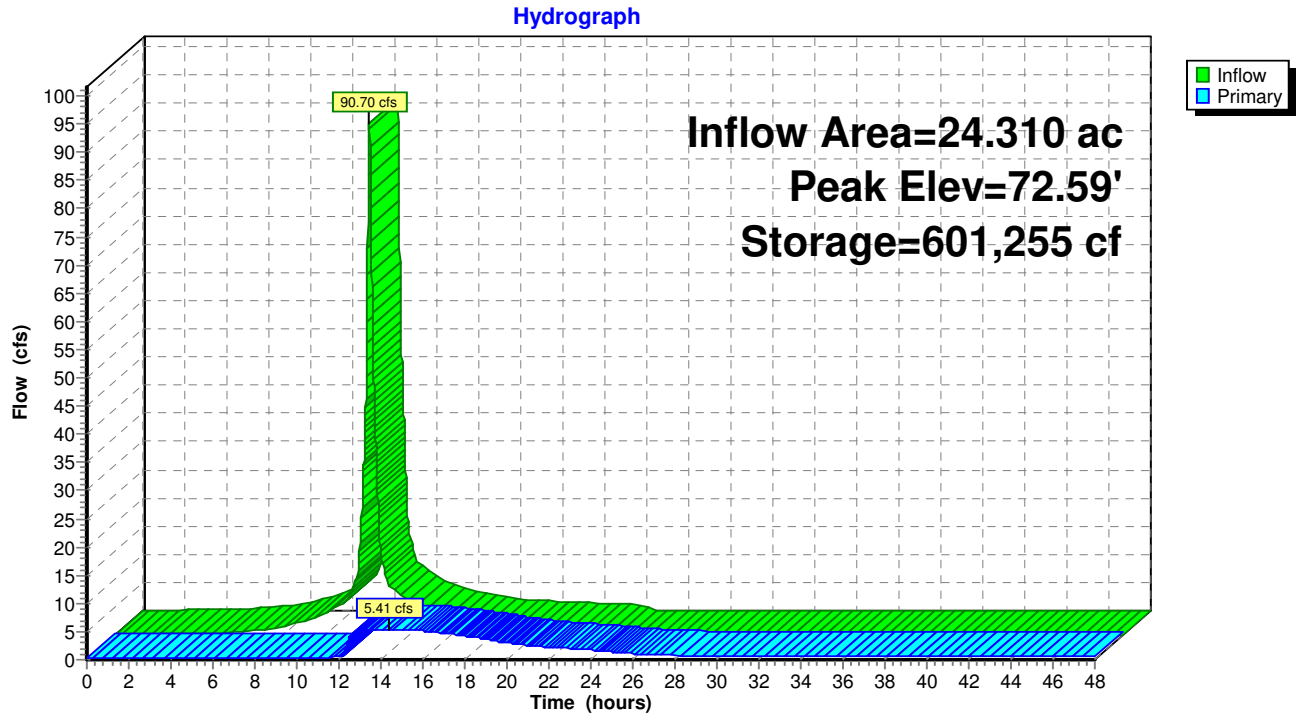
Subcatchment P9: P9



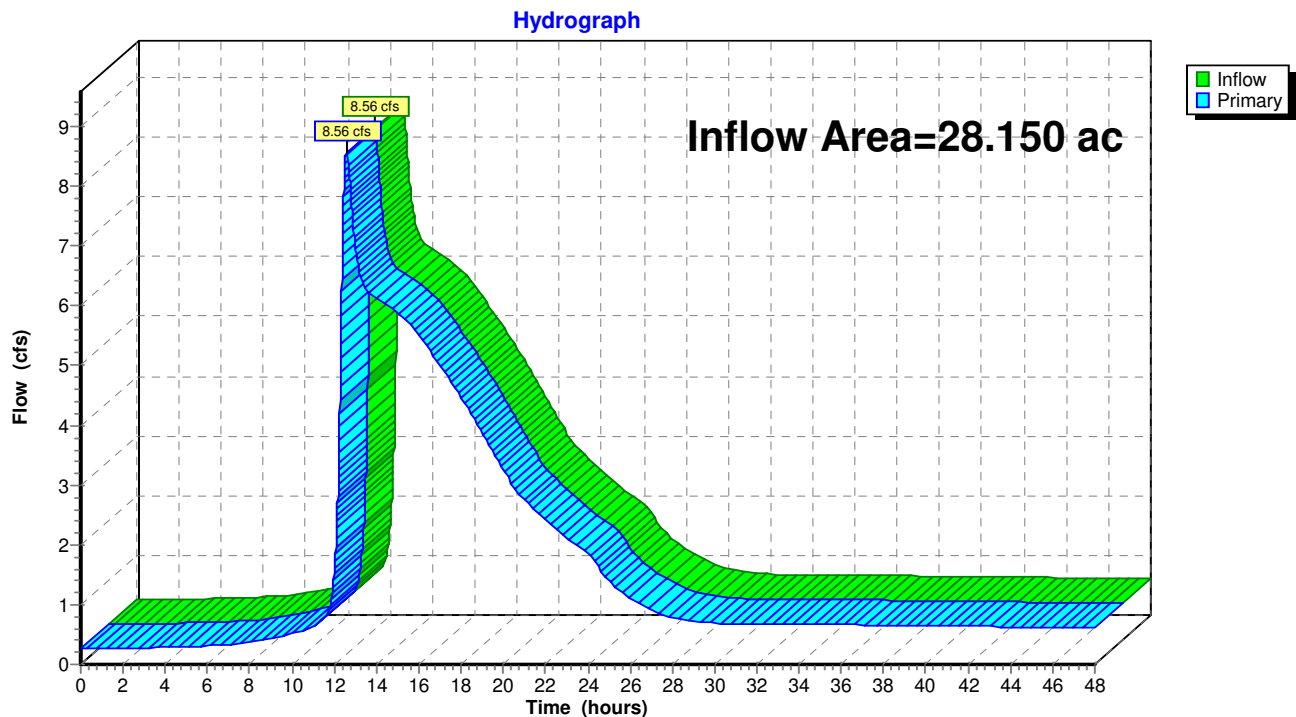
Pond PP1: UG Chambers (CULTEC R-360)



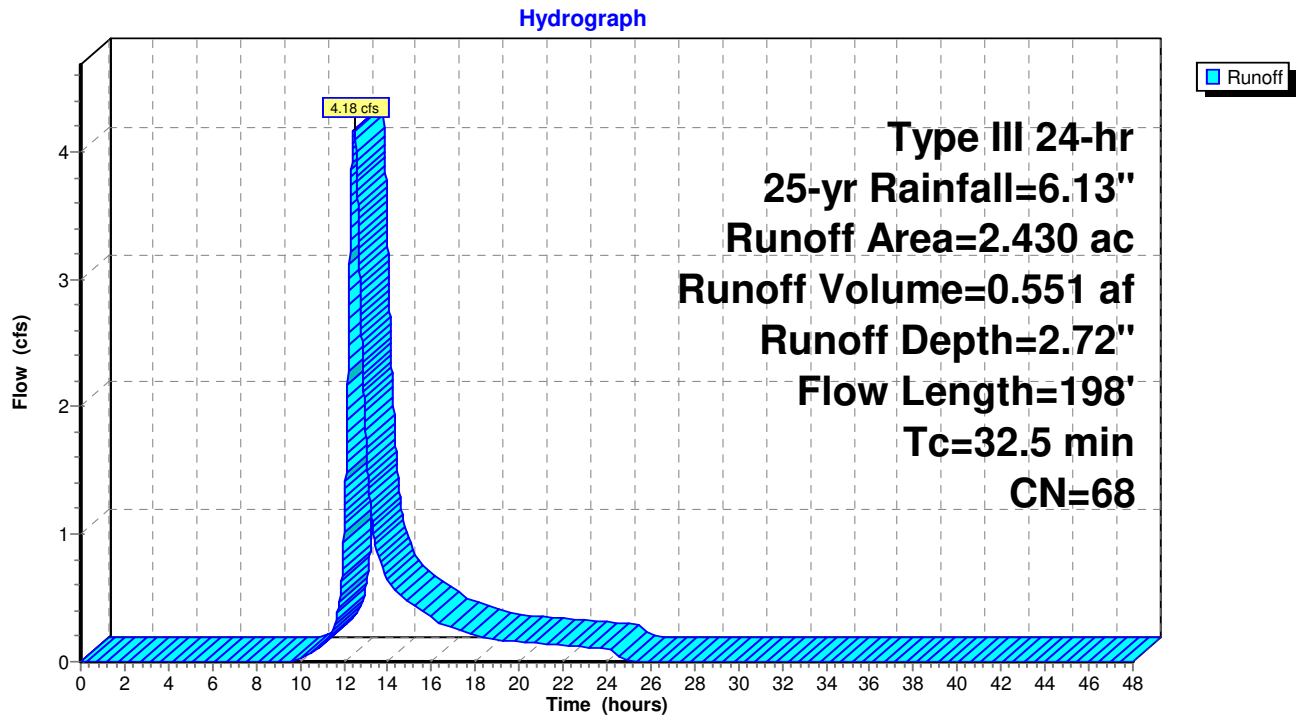
Pond PP2: Water Quality Basin



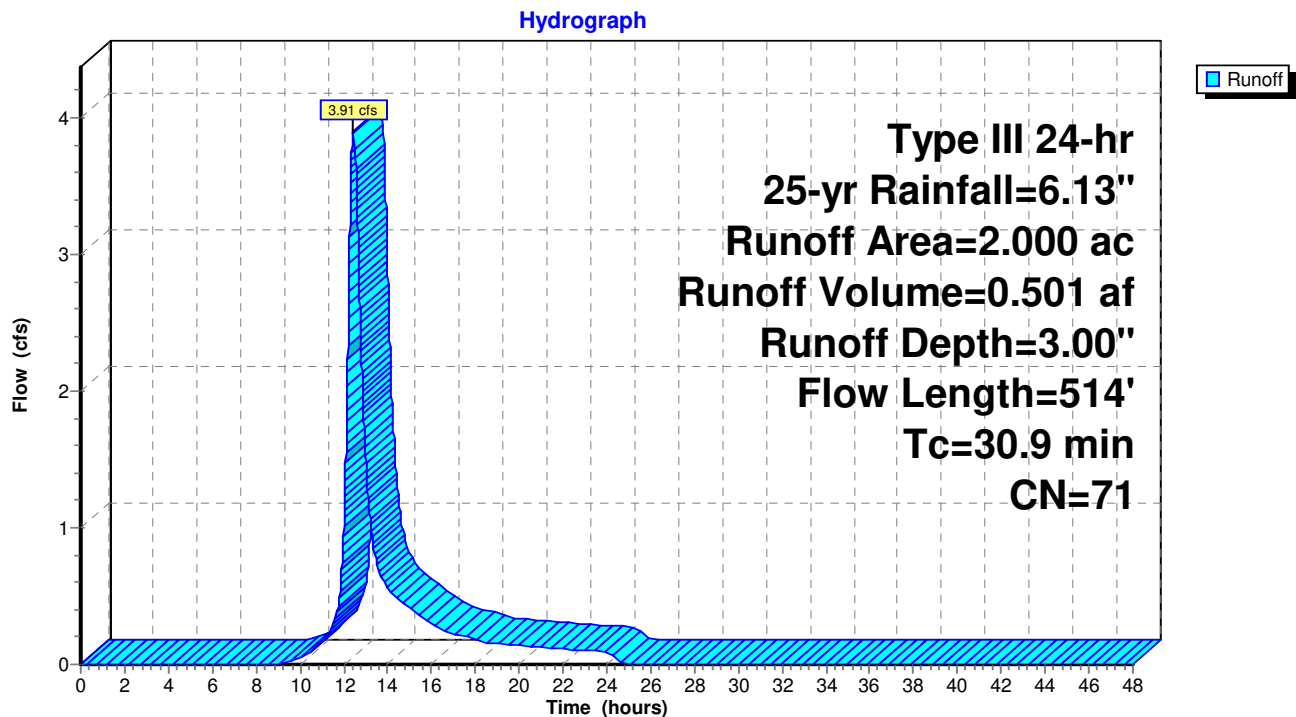
Link DP1: DP1



Subcatchment P1: P1 (DP3)



Subcatchment P2: P2 (DP2)



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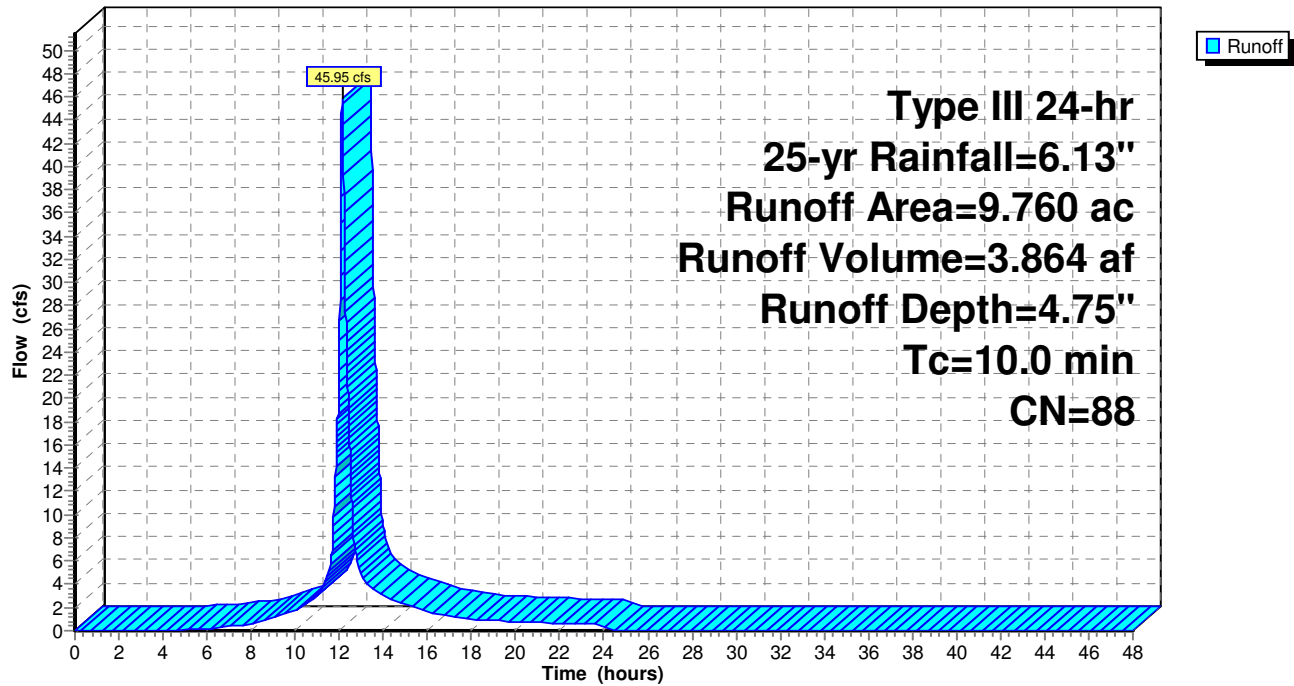
Proposed Condition
Type III 24-hr 25-yr Rainfall=6.13"

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Page 30

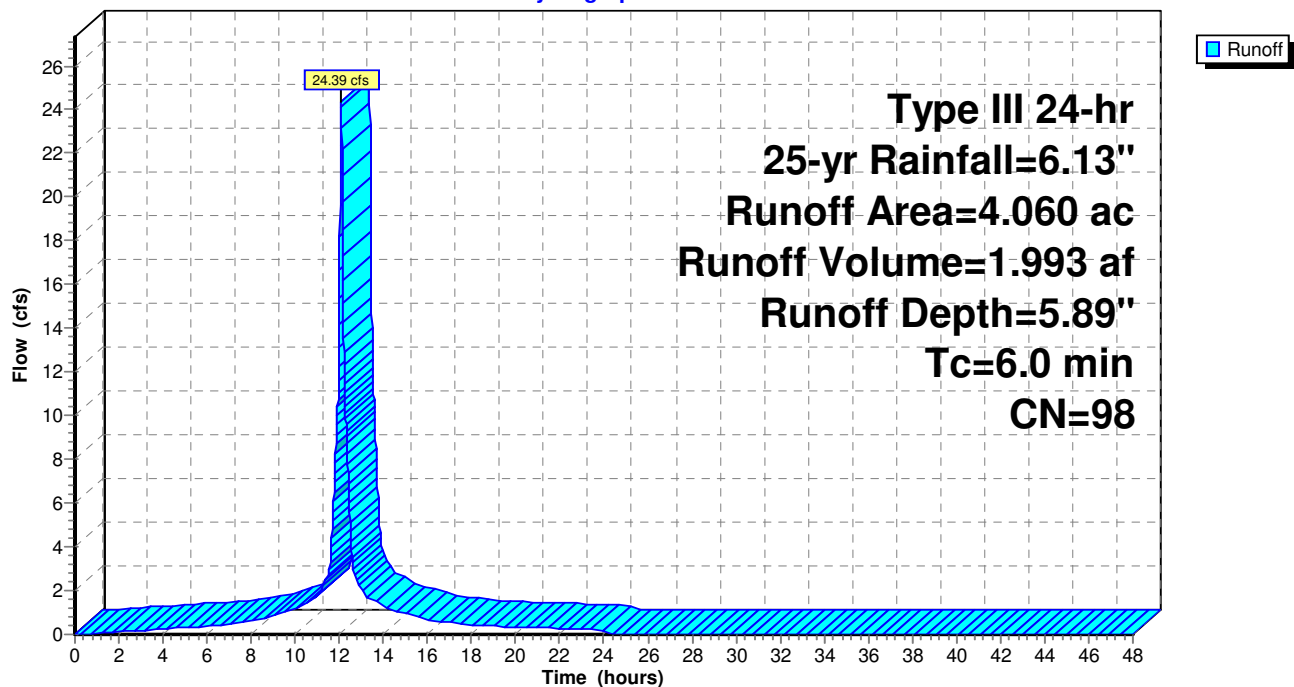
Subcatchment P3: P3

Hydrograph



Subcatchment P4: P4

Hydrograph



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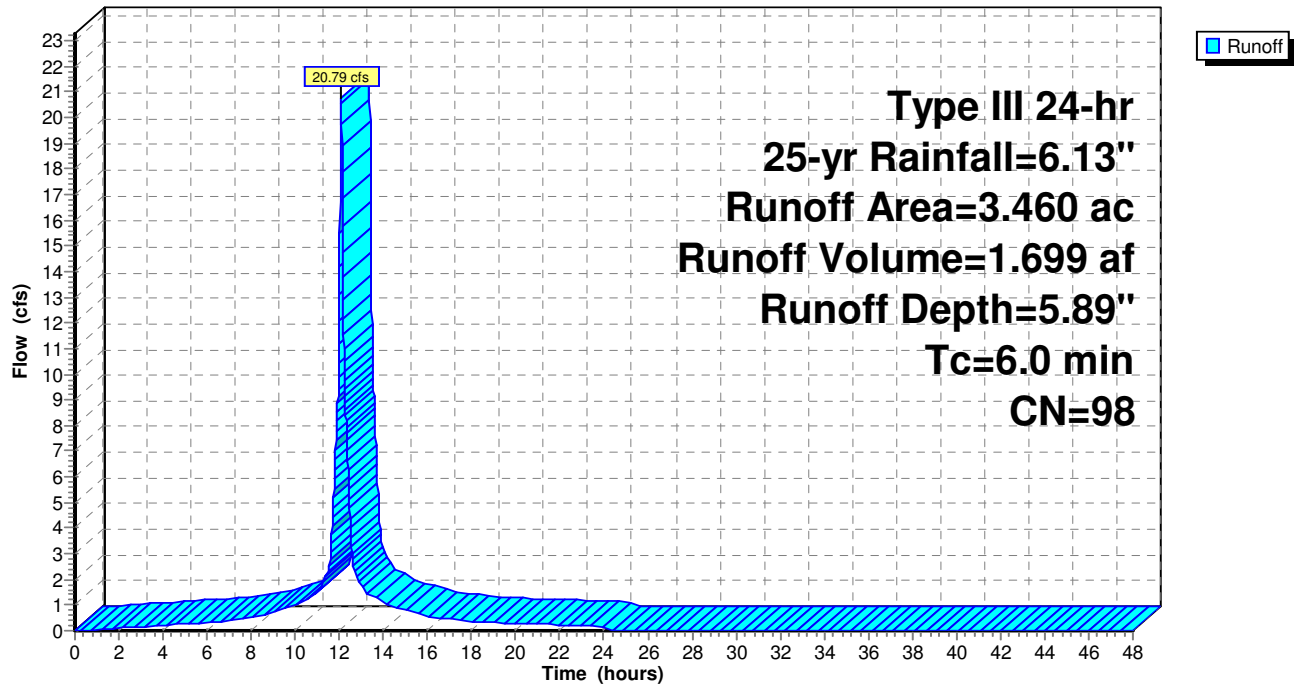
Proposed Condition
Type III 24-hr 25-yr Rainfall=6.13"

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Page 31

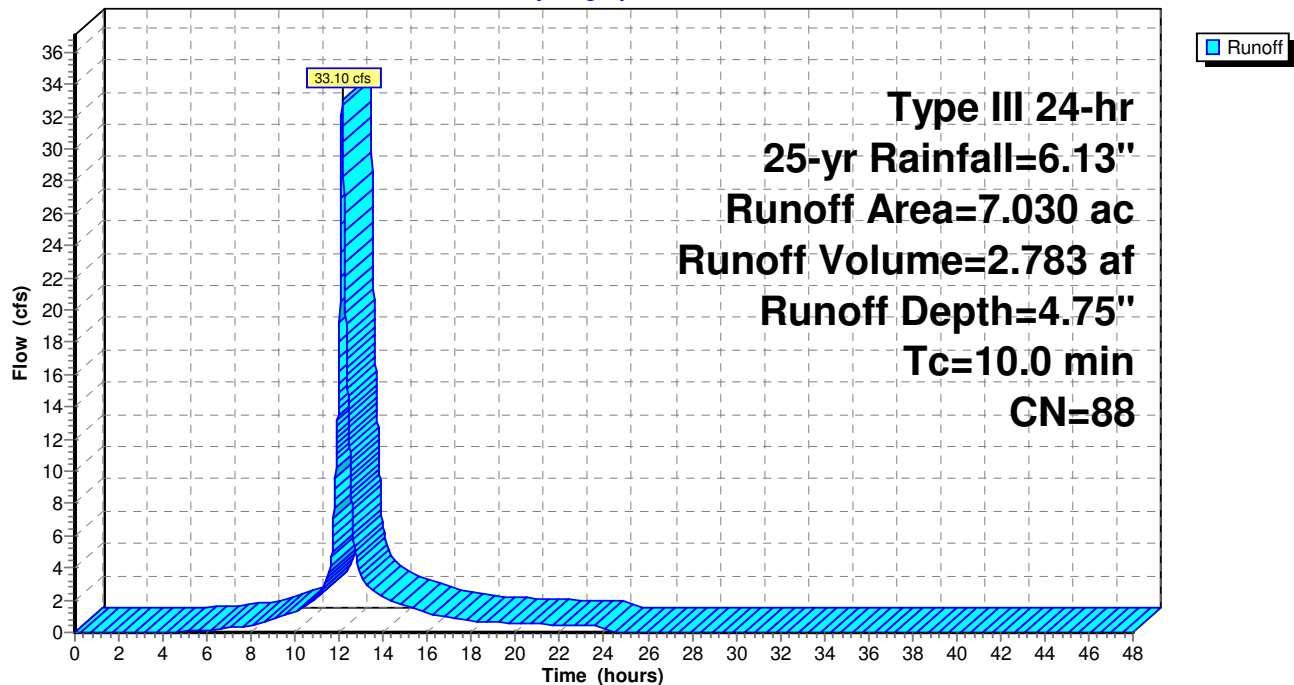
Subcatchment P5: P5

Hydrograph



Subcatchment P6: P6

Hydrograph



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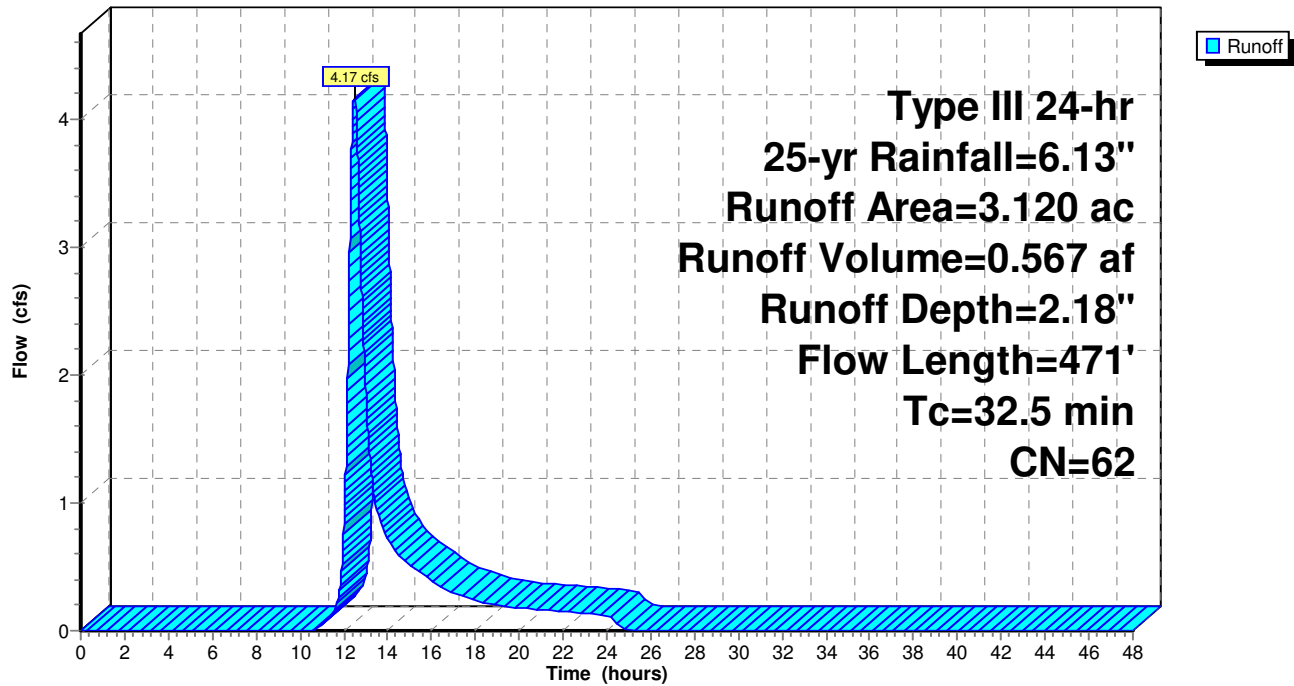
Proposed Condition
Type III 24-hr 25-yr Rainfall=6.13"

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Page 32

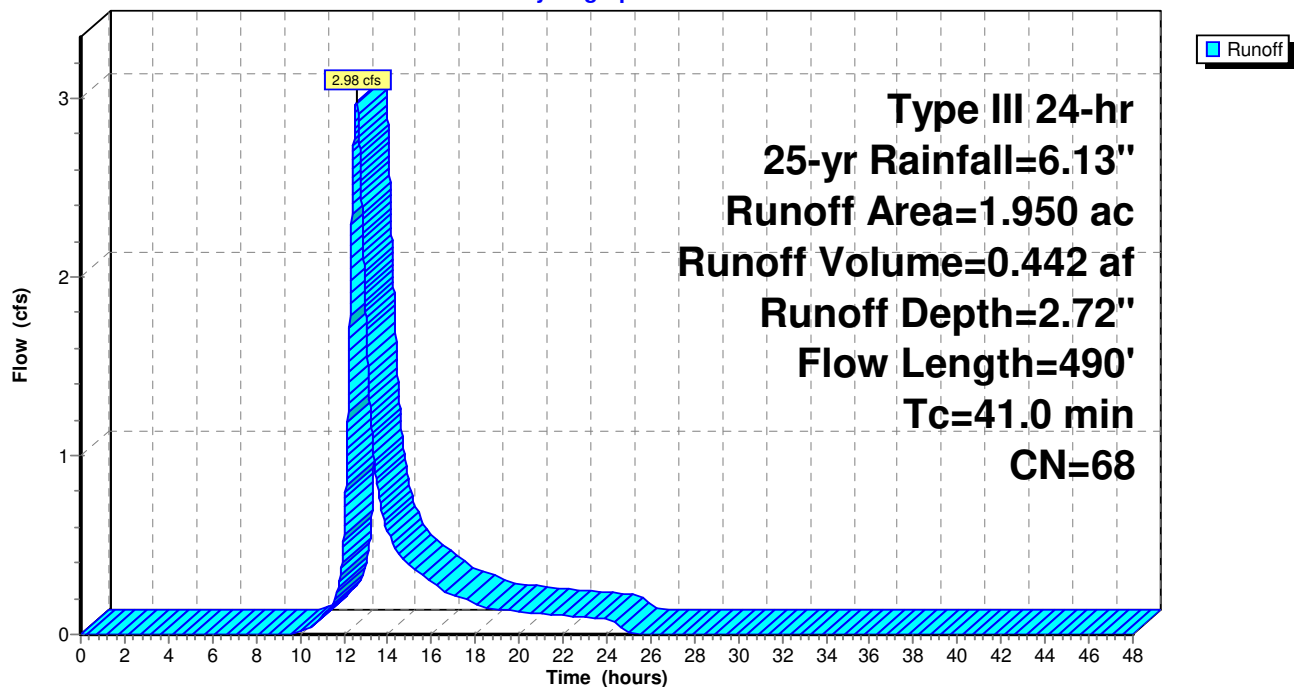
Subcatchment P7: P7

Hydrograph



Subcatchment P8: P8 (DP4)

Hydrograph



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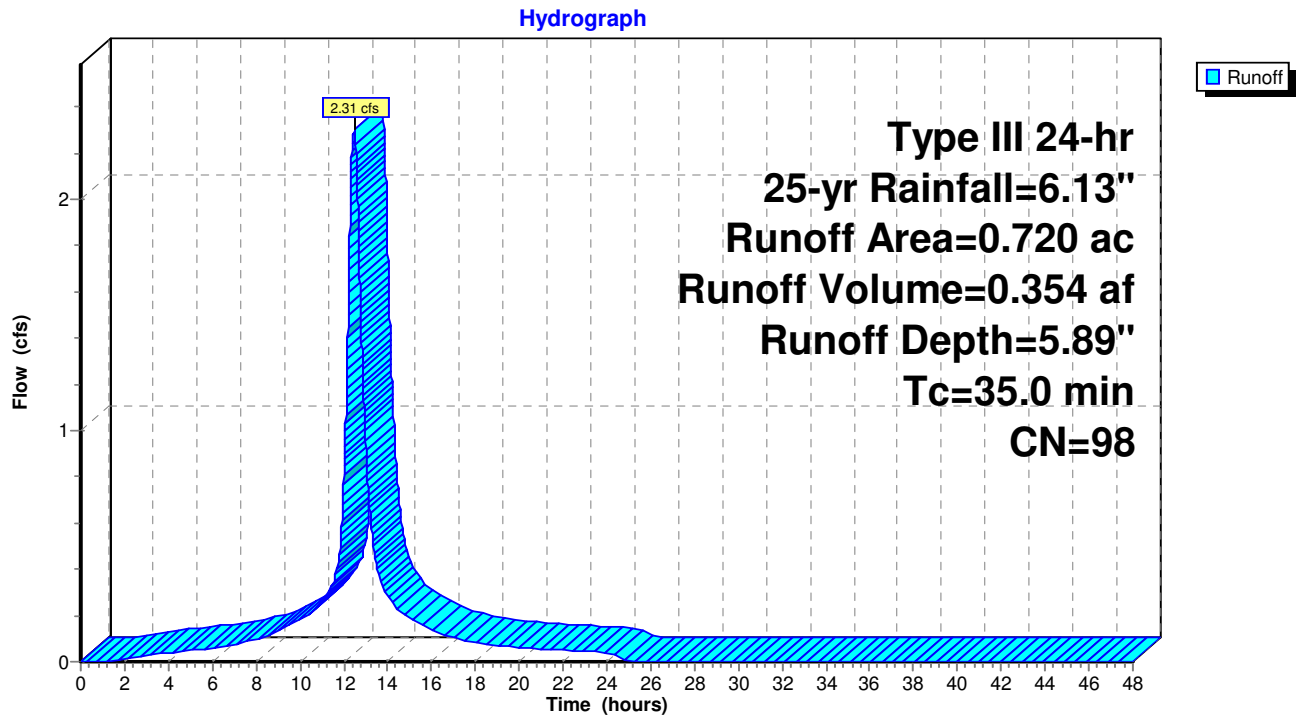
Proposed Condition

Type III 24-hr 25-yr Rainfall=6.13"

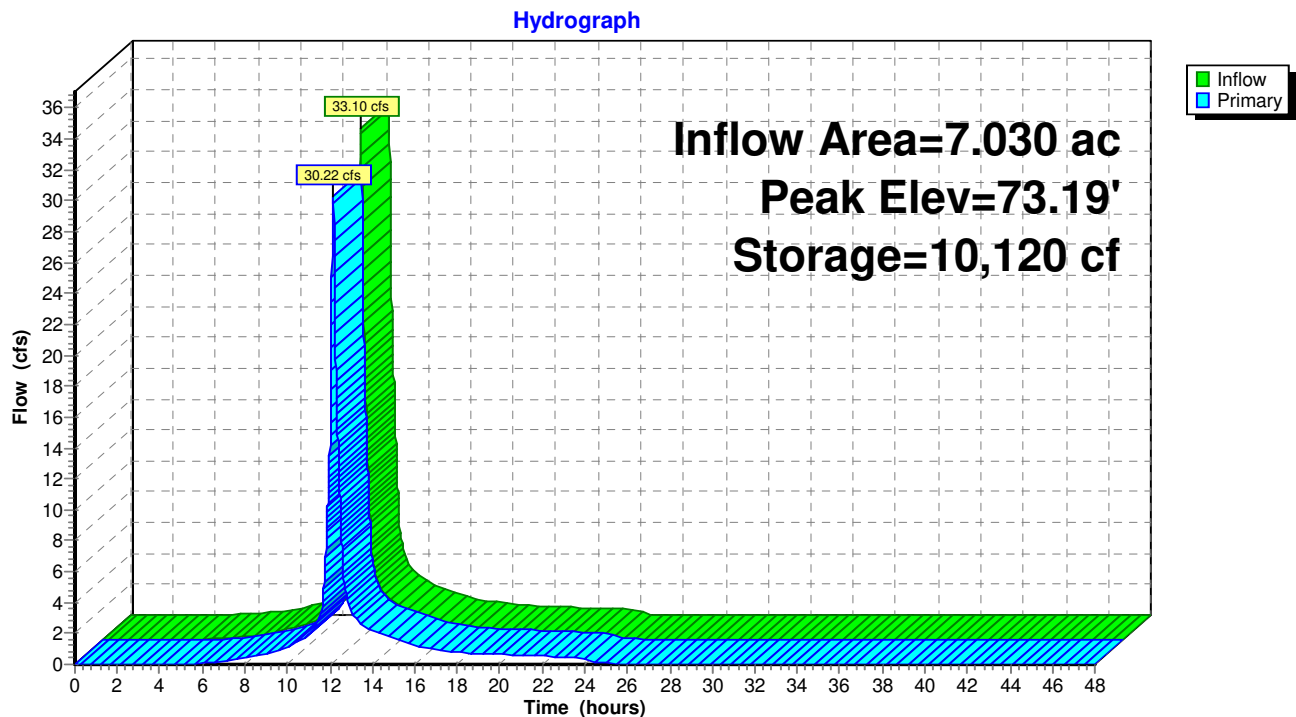
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Page 33

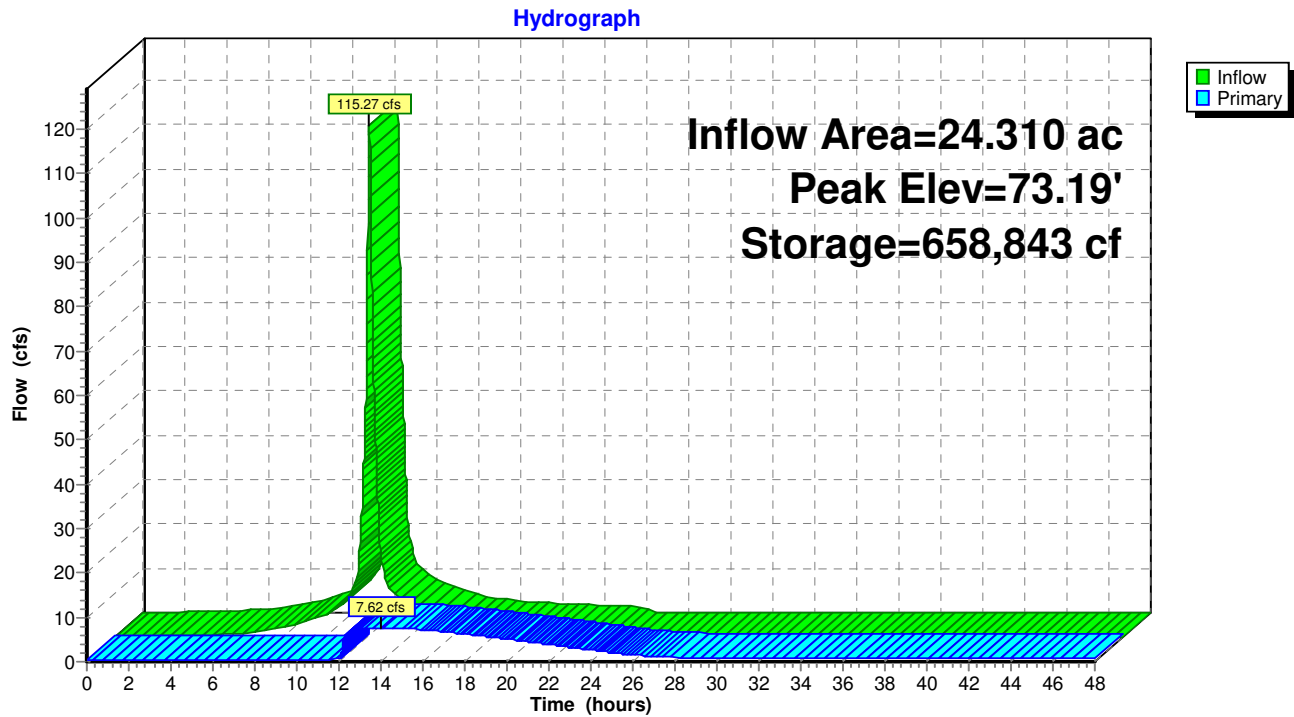
Subcatchment P9: P9



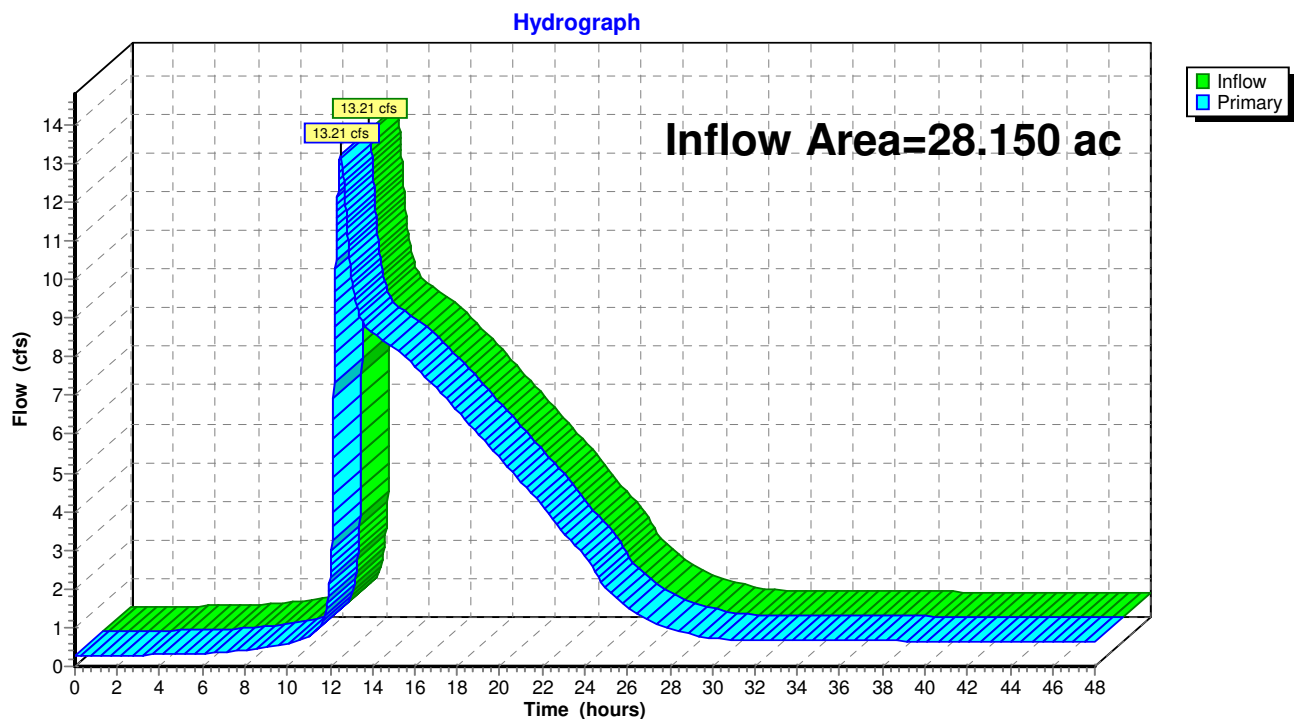
Pond PP1: UG Chambers (CULTEC R-360)



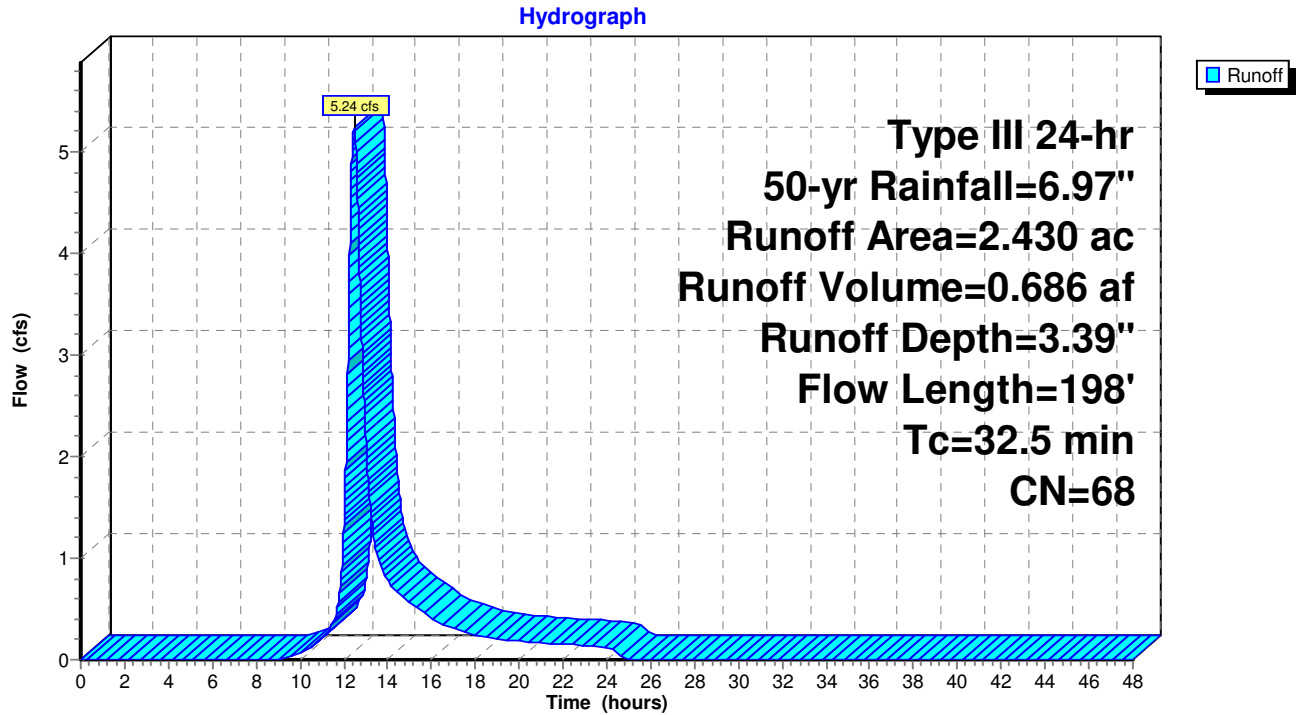
Pond PP2: Water Quality Basin



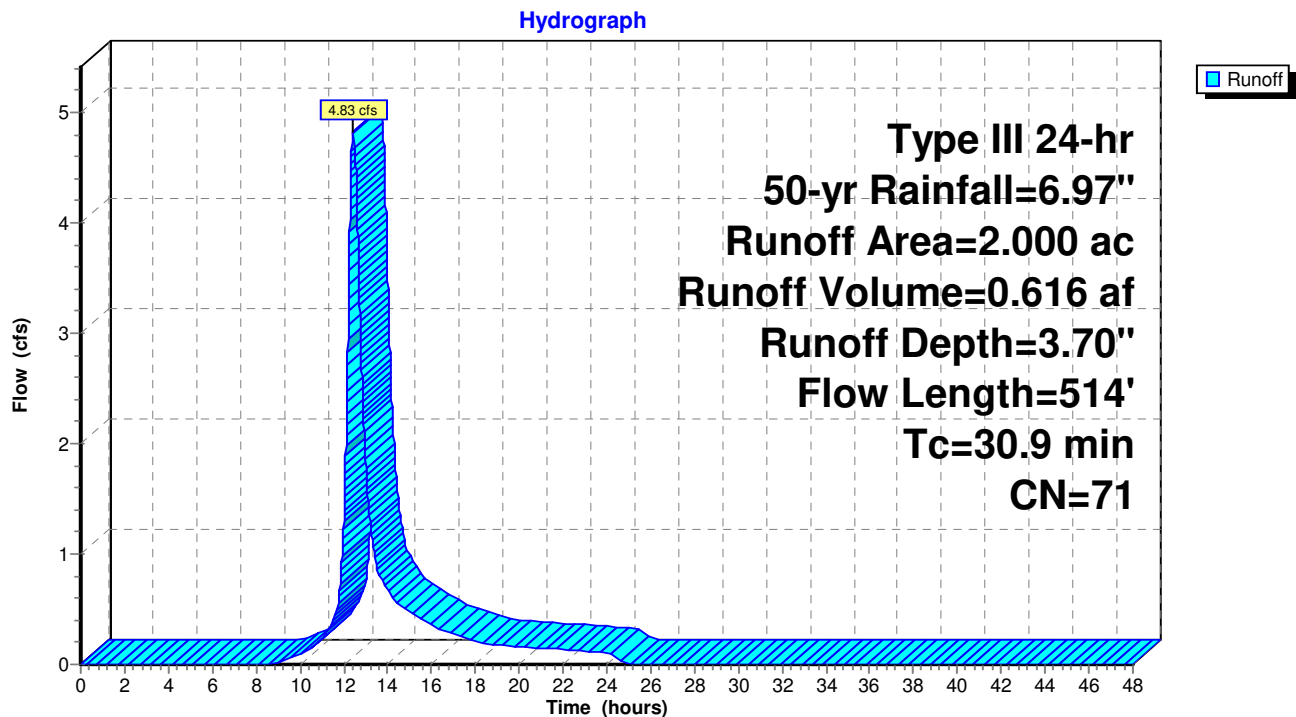
Link DP1: DP1



Subcatchment P1: P1 (DP3)



Subcatchment P2: P2 (DP2)



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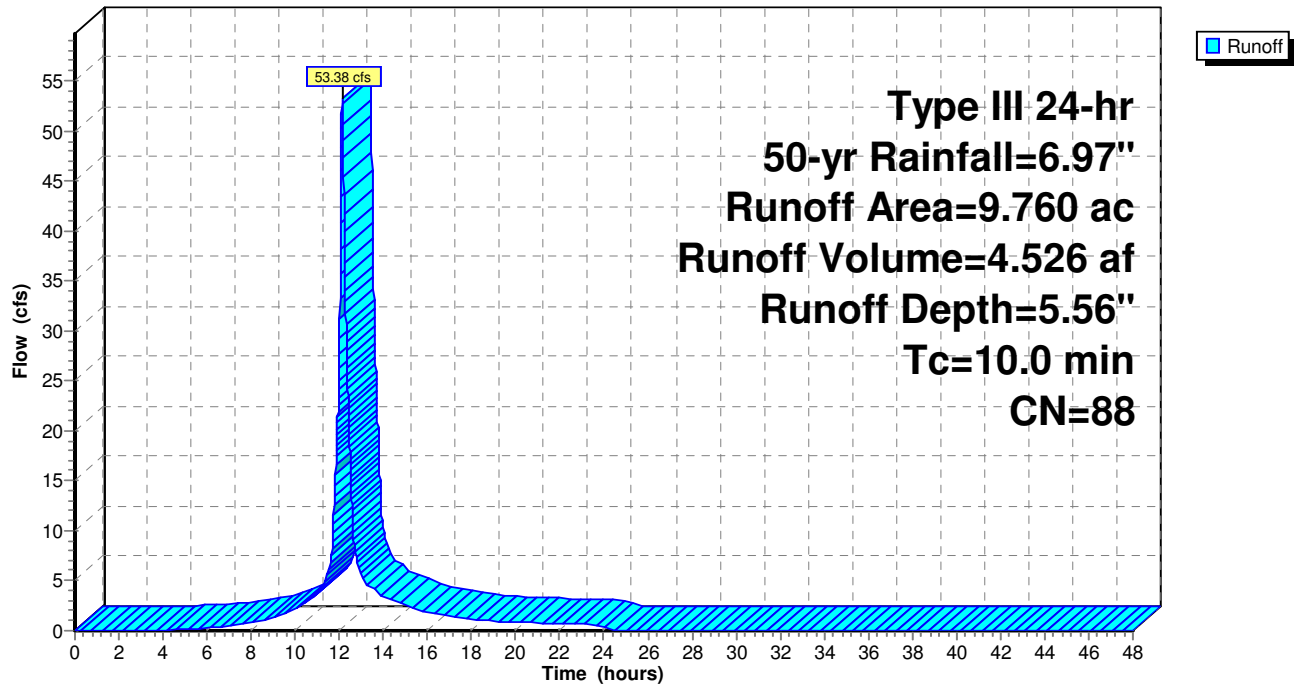
Proposed Condition
Type III 24-hr 50-yr Rainfall=6.97"

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Page 36

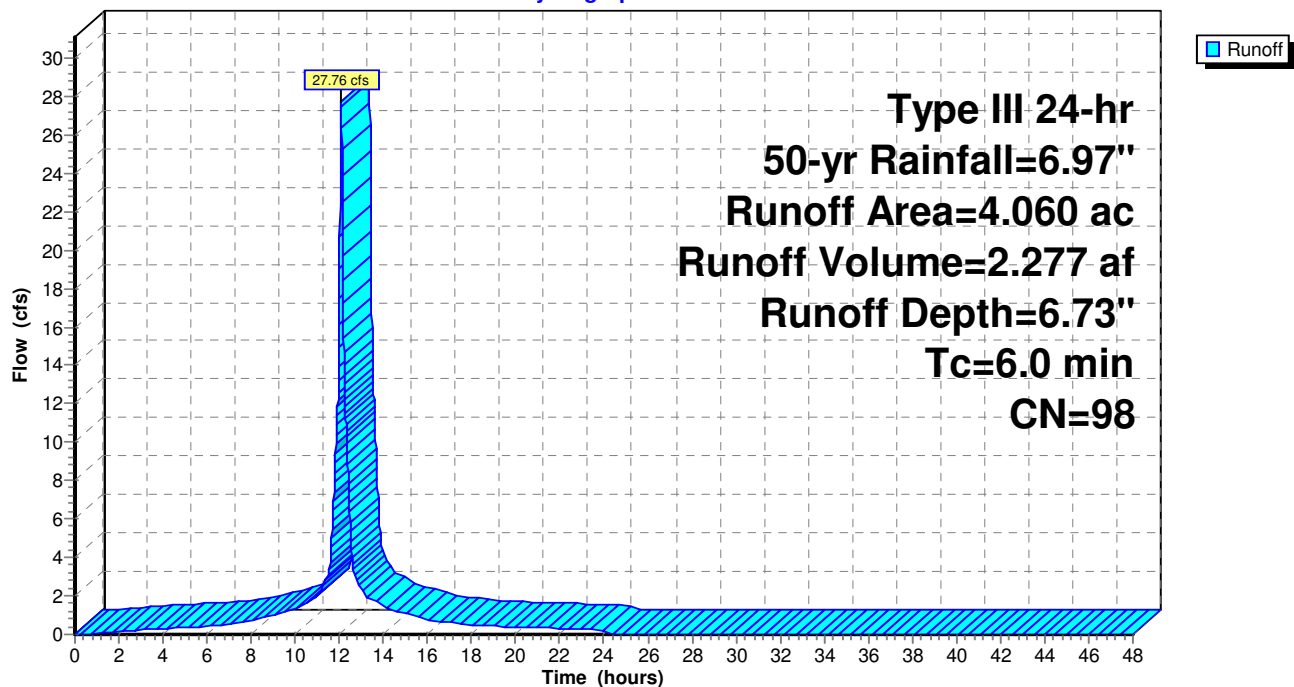
Subcatchment P3: P3

Hydrograph

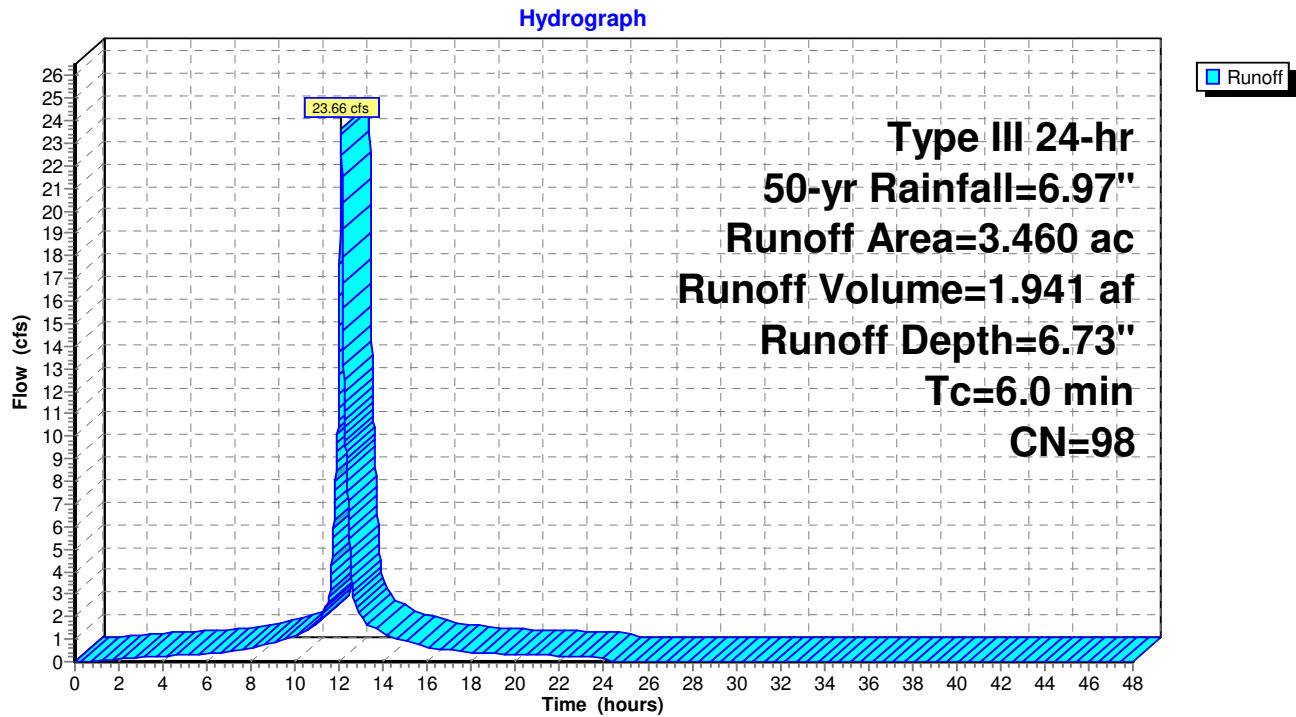


Subcatchment P4: P4

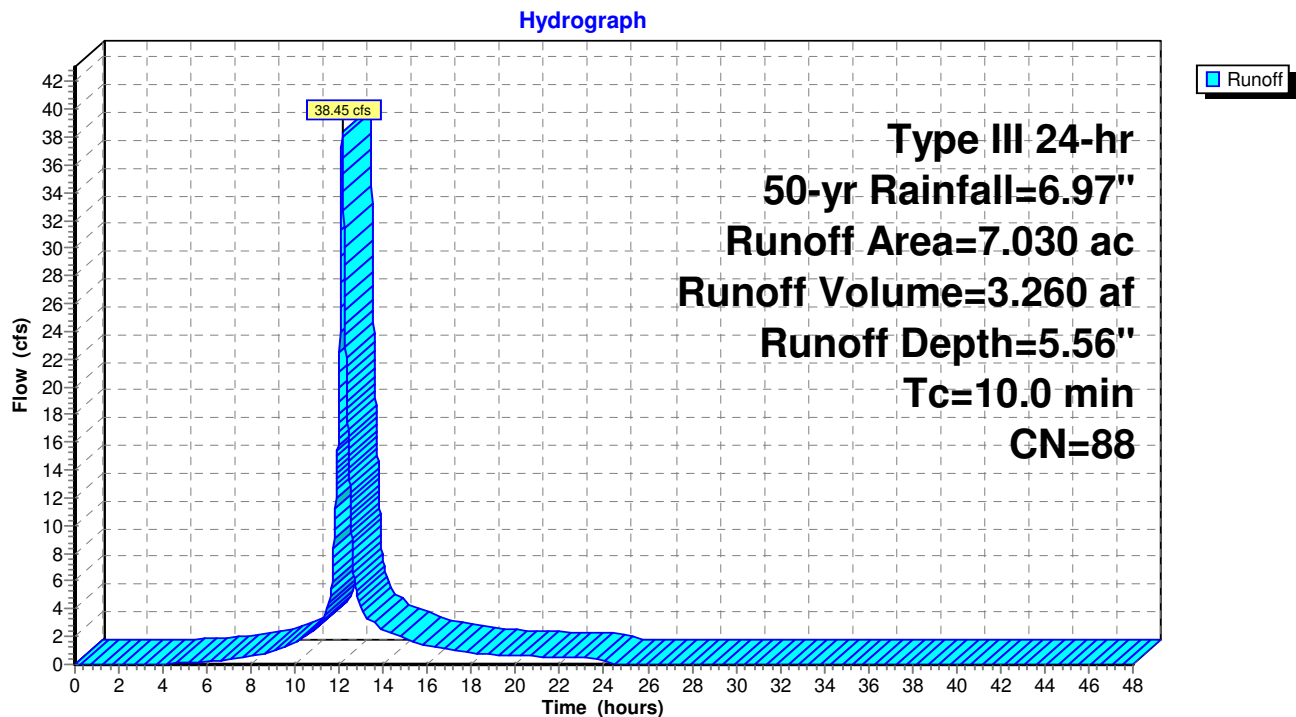
Hydrograph



Subcatchment P5: P5



Subcatchment P6: P6



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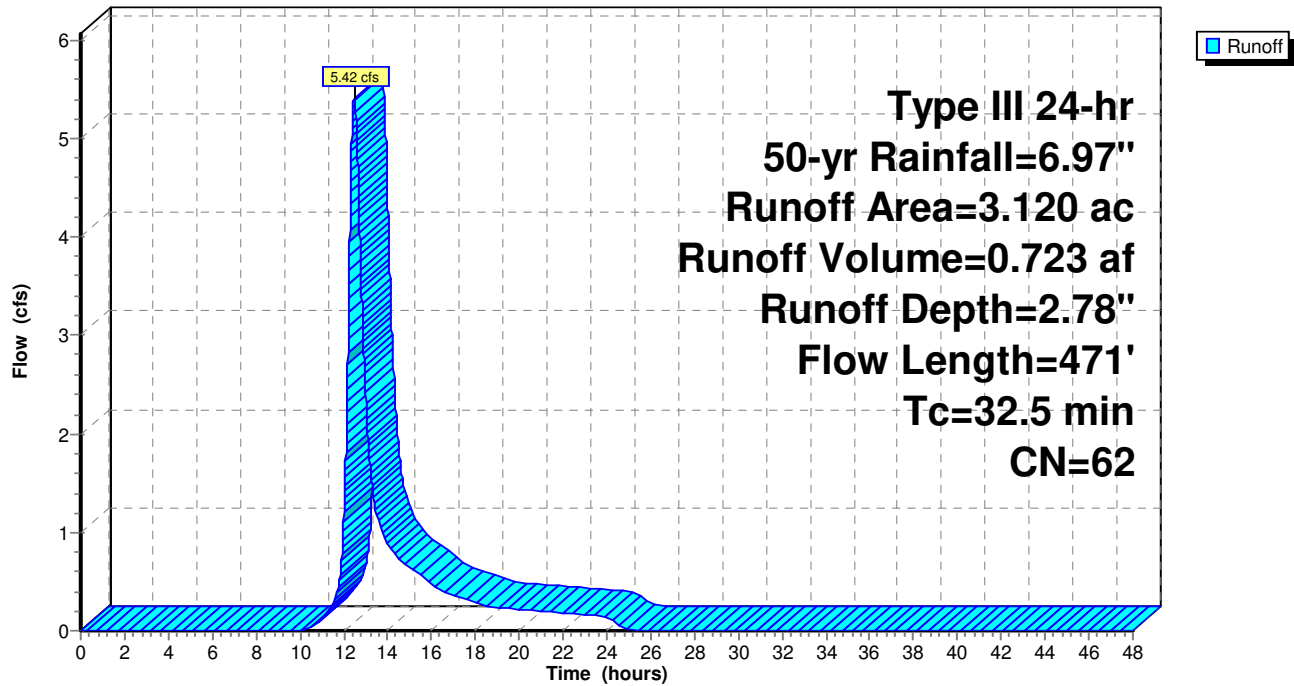
Proposed Condition
Type III 24-hr 50-yr Rainfall=6.97"

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Page 38

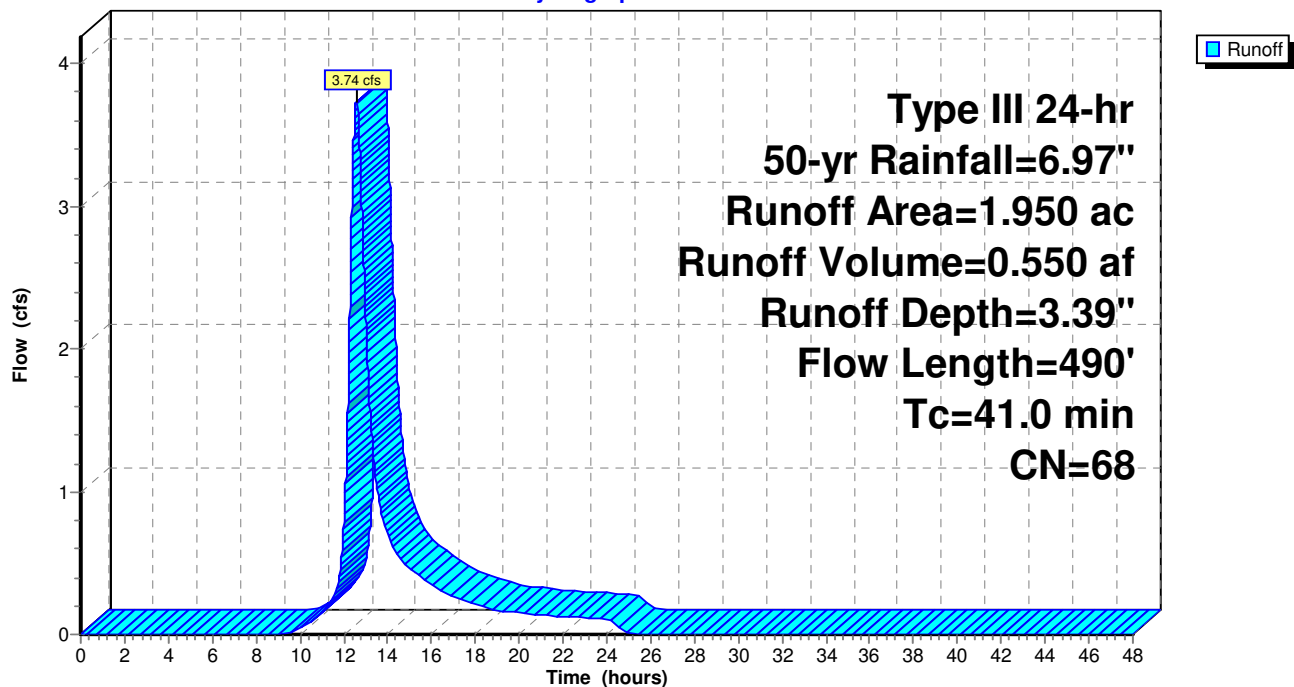
Subcatchment P7: P7

Hydrograph



Subcatchment P8: P8 (DP4)

Hydrograph



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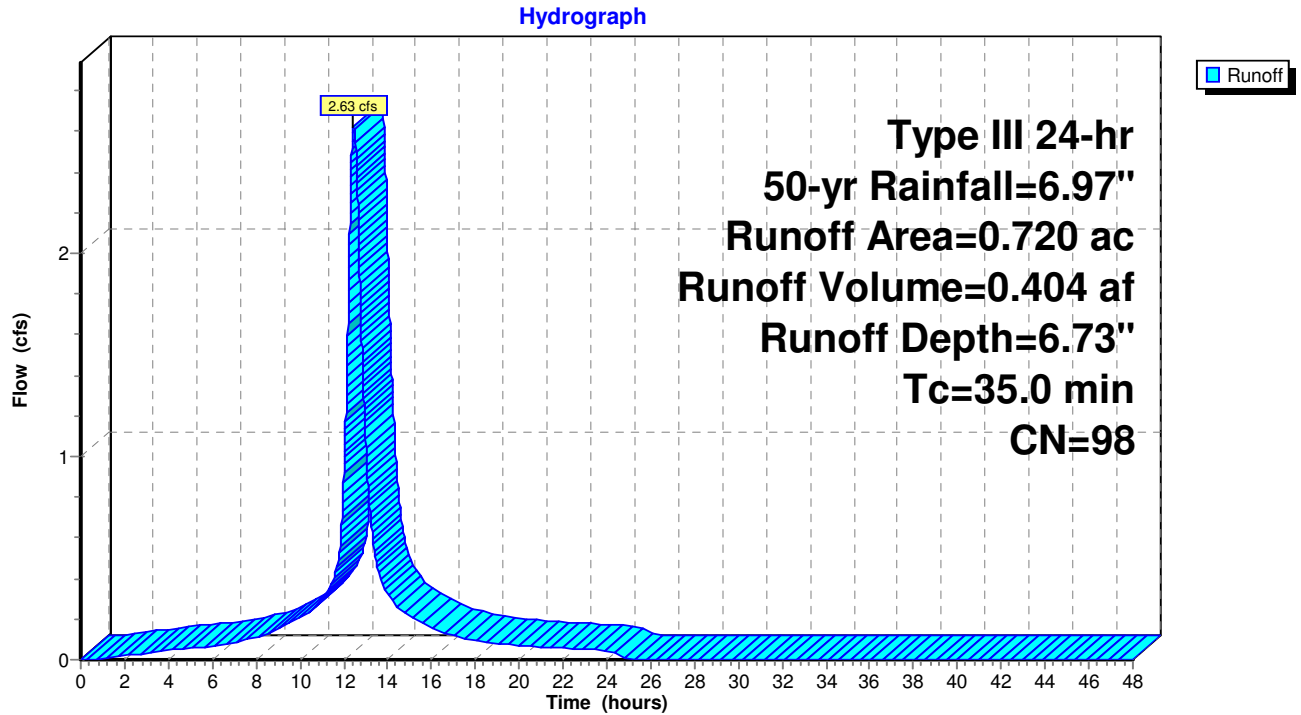
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Proposed Condition
Type III 24-hr 50-yr Rainfall=6.97"

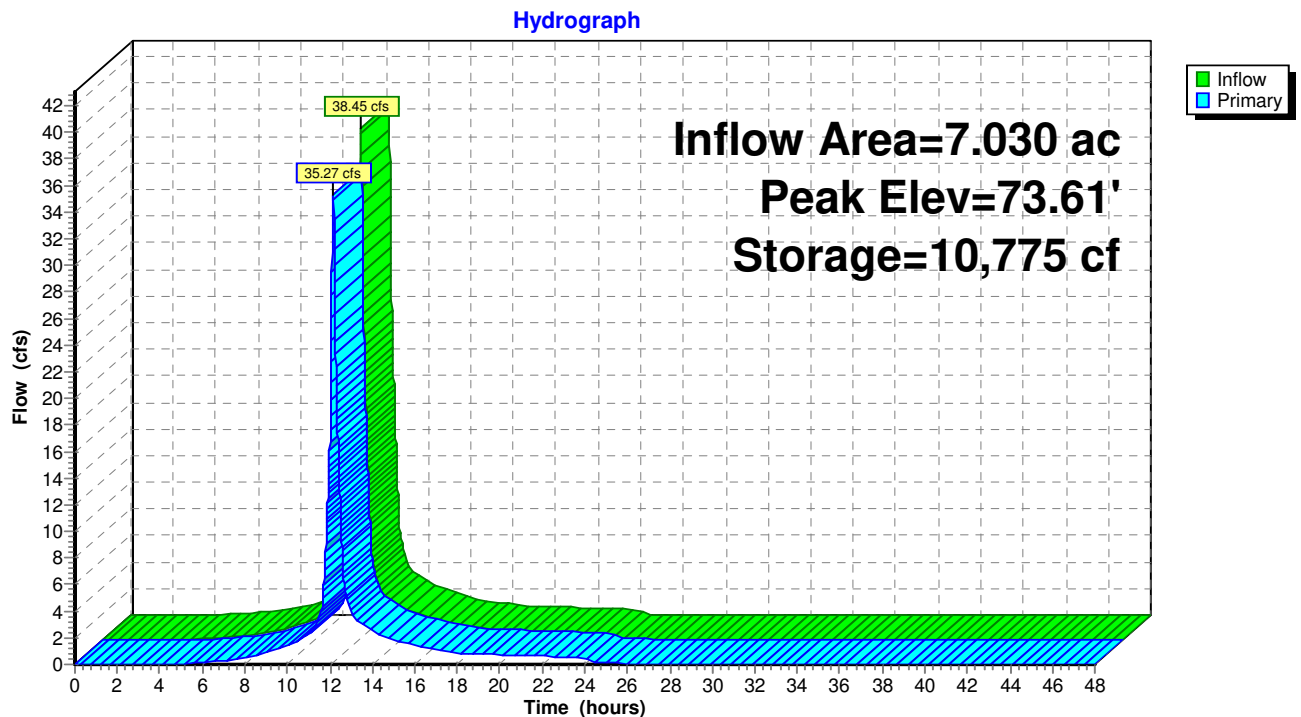
Printed 7/1/2021

Page 39

Subcatchment P9: P9

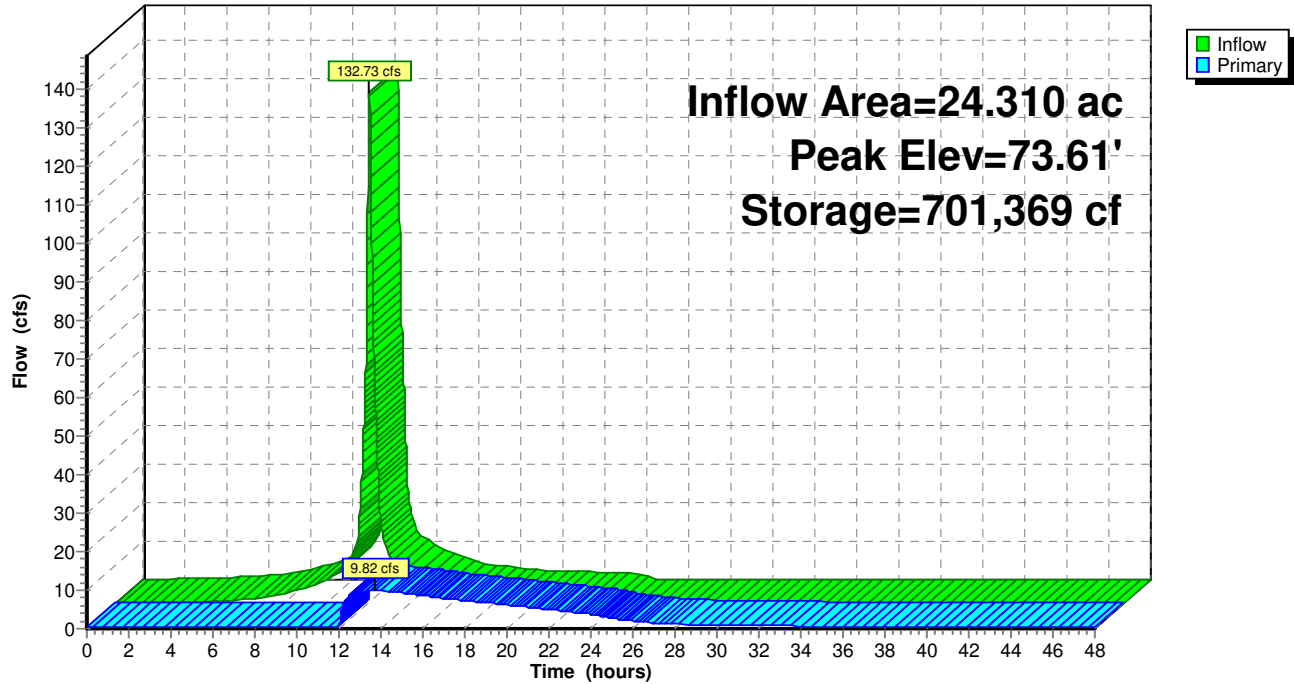


Pond PP1: UG Chambers (CULTEC R-360)



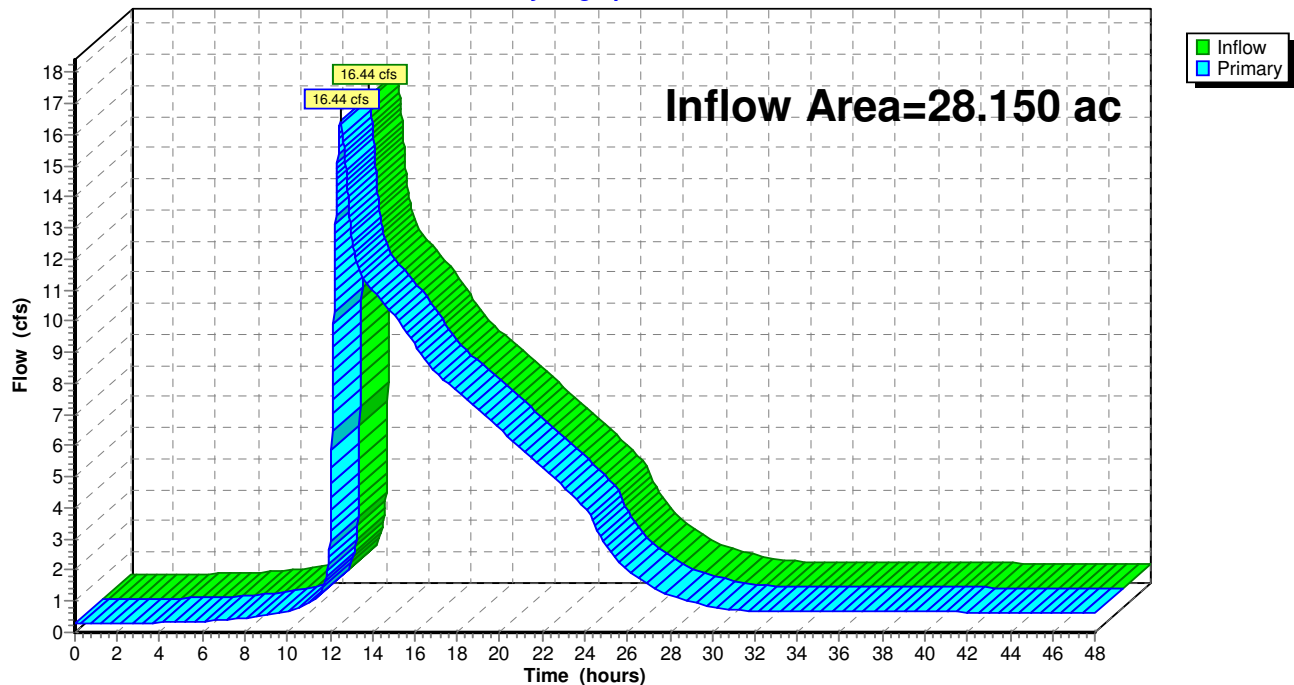
Pond PP2: Water Quality Basin

Hydrograph



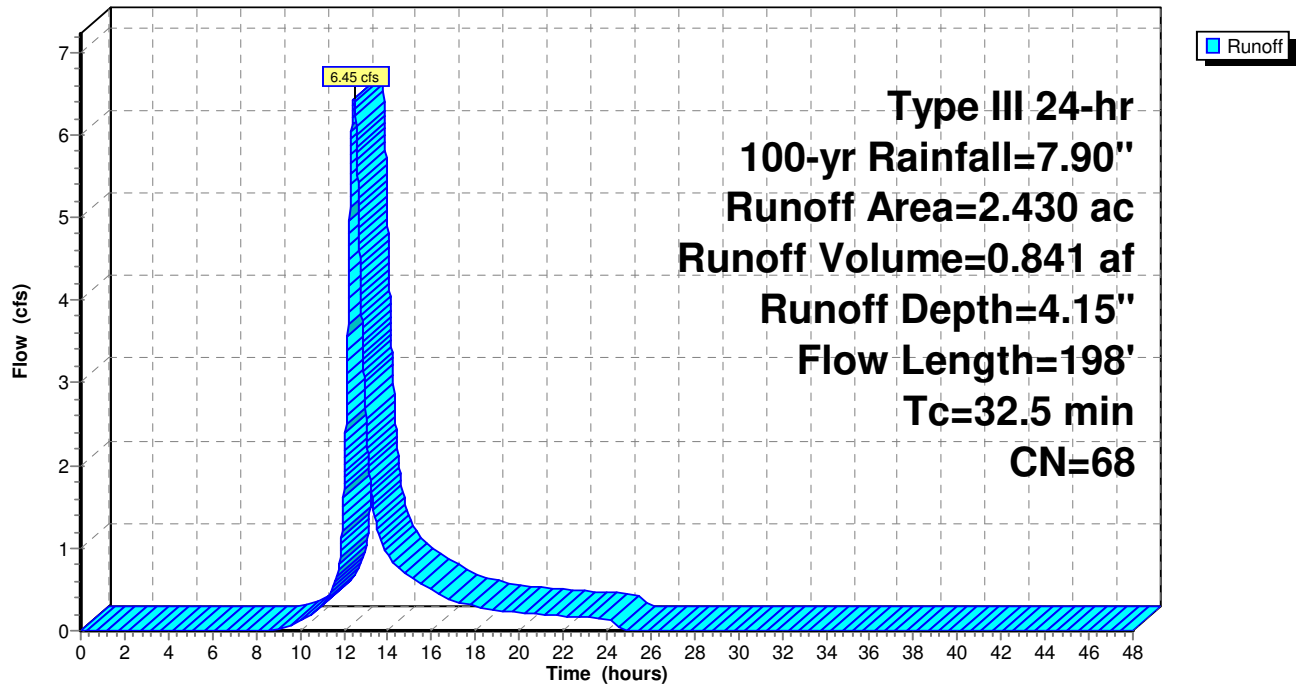
Link DP1: DP1

Hydrograph



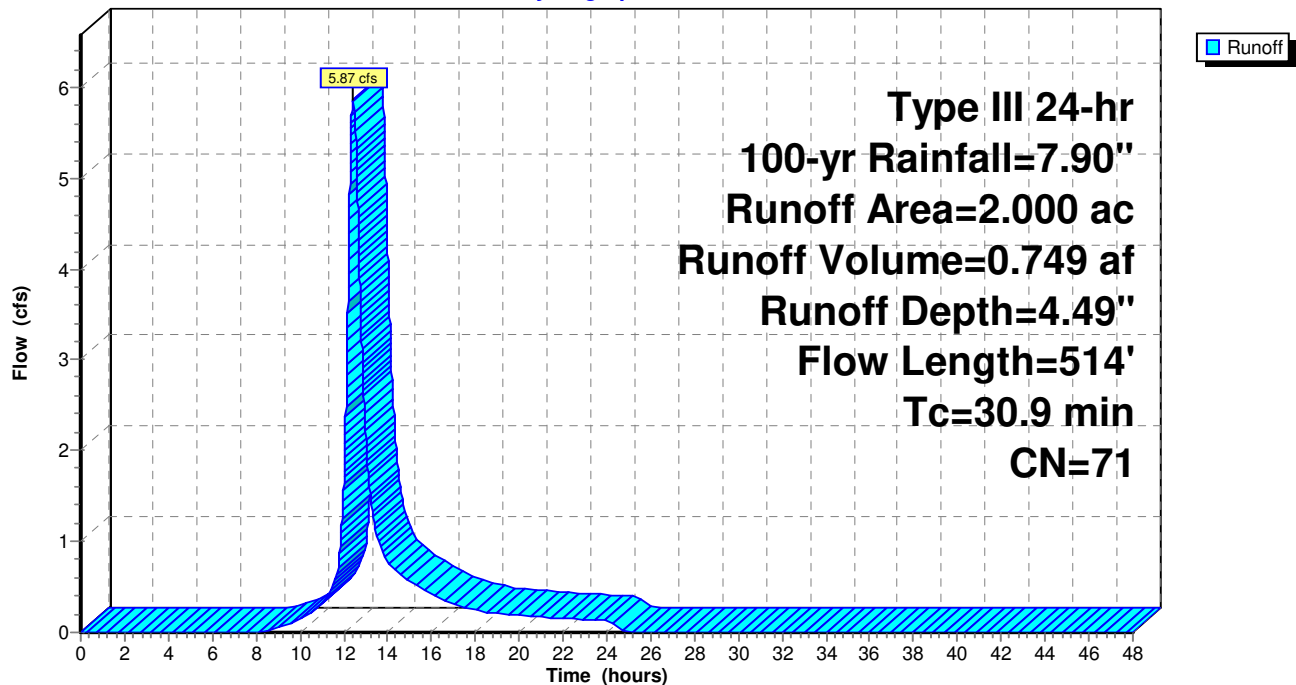
Subcatchment P1: P1 (DP3)

Hydrograph



Subcatchment P2: P2 (DP2)

Hydrograph



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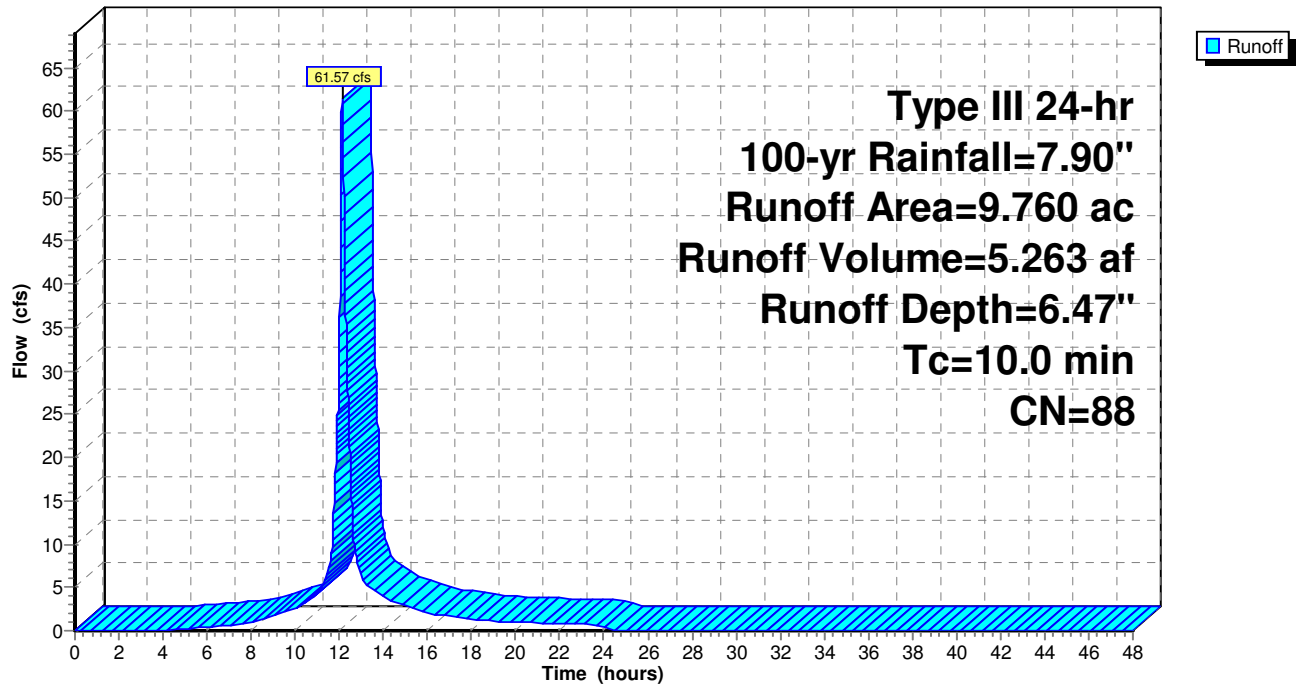
Proposed Condition
Type III 24-hr 100-yr Rainfall=7.90"

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Page 42

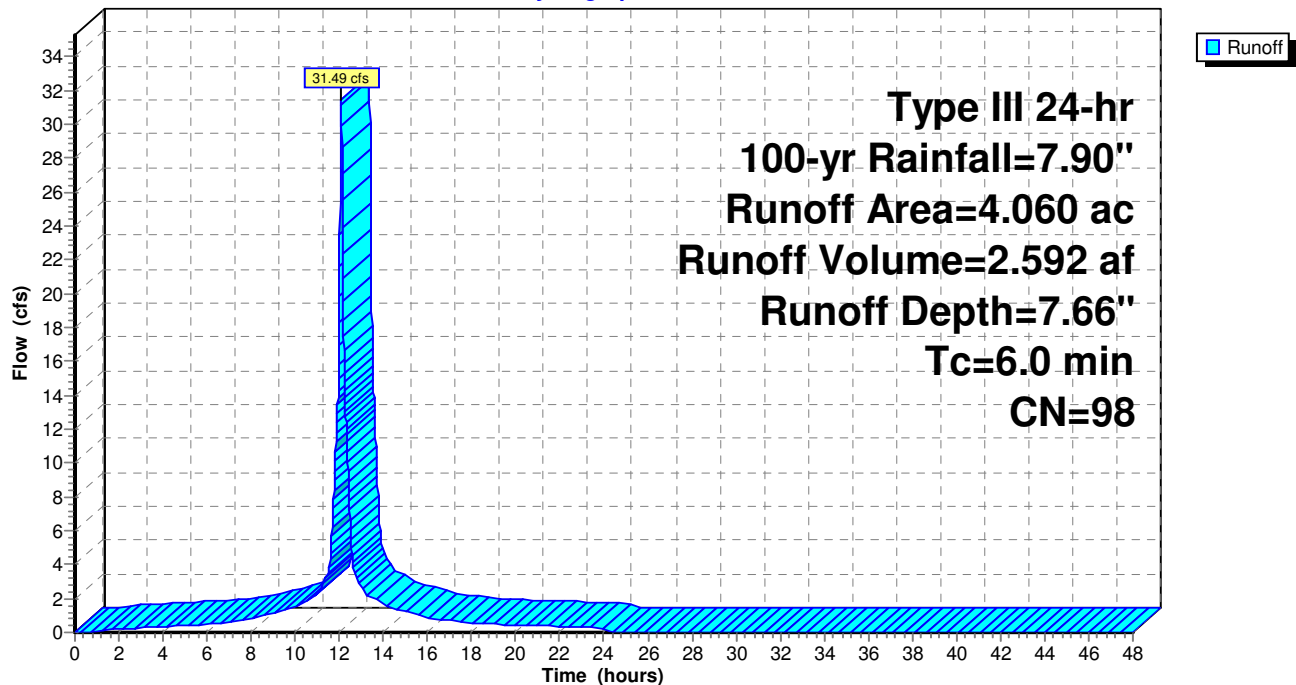
Subcatchment P3: P3

Hydrograph



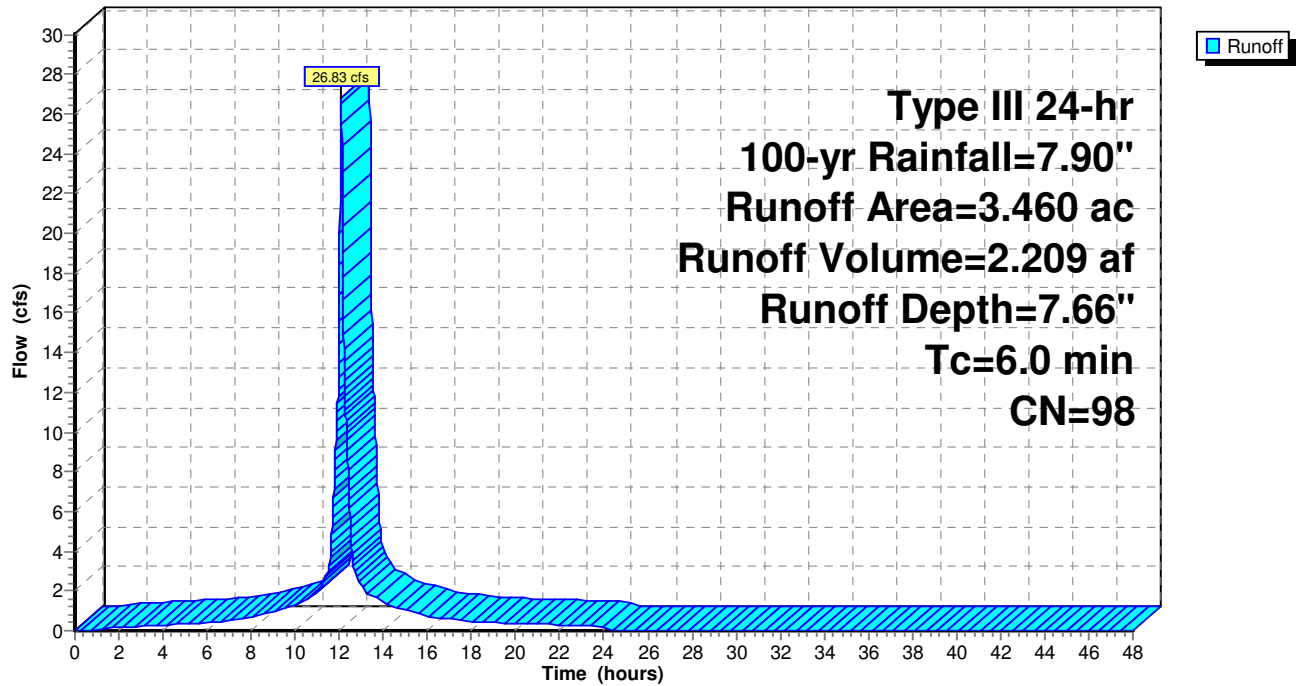
Subcatchment P4: P4

Hydrograph



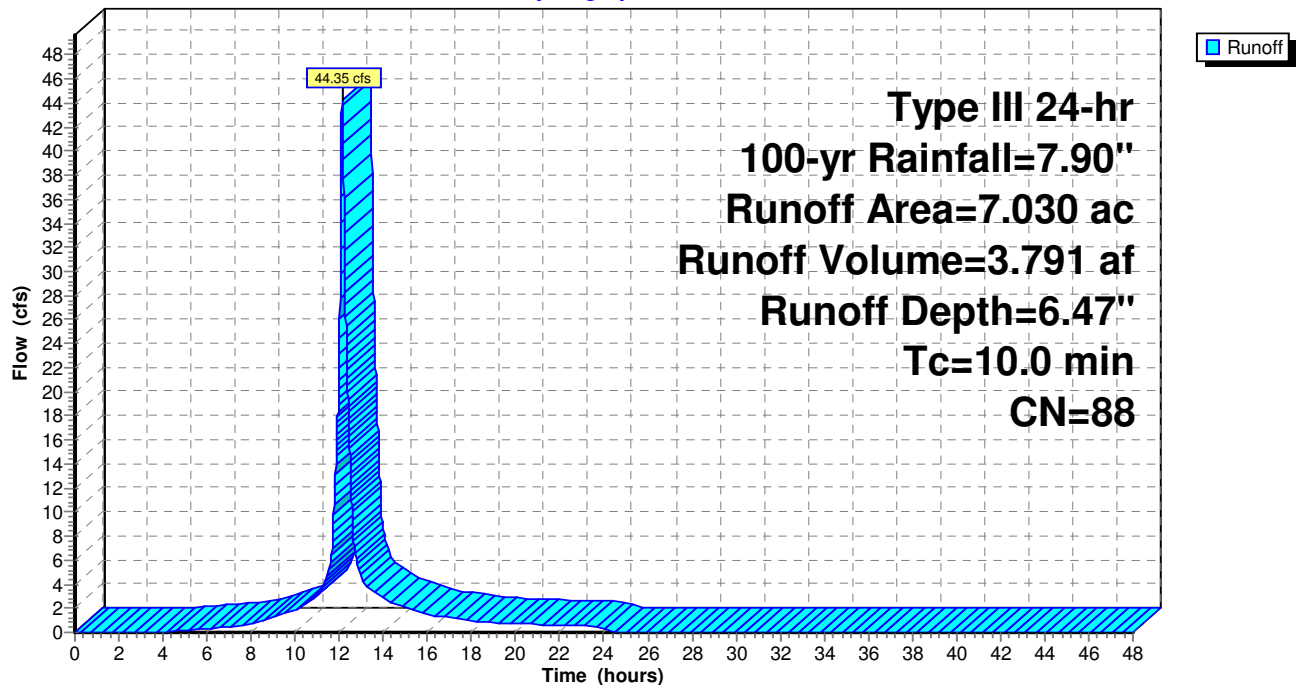
Subcatchment P5: P5

Hydrograph



Subcatchment P6: P6

Hydrograph



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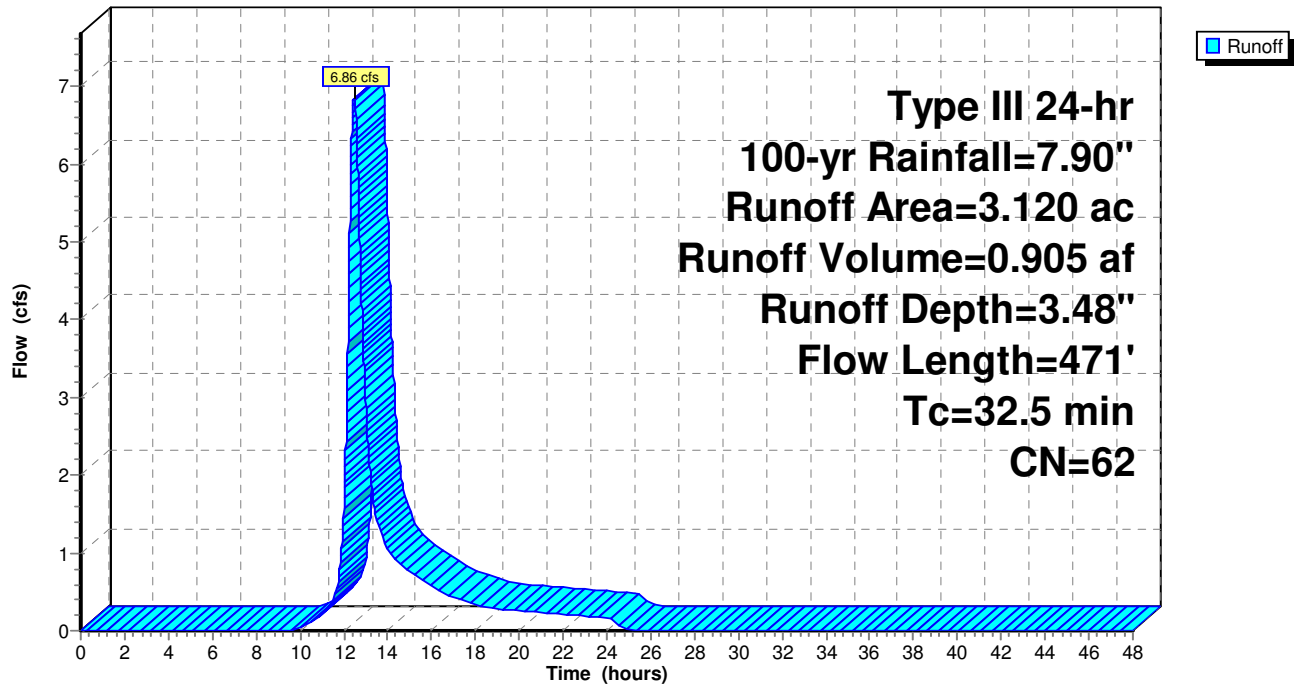
Proposed Condition
Type III 24-hr 100-yr Rainfall=7.90"

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Page 44

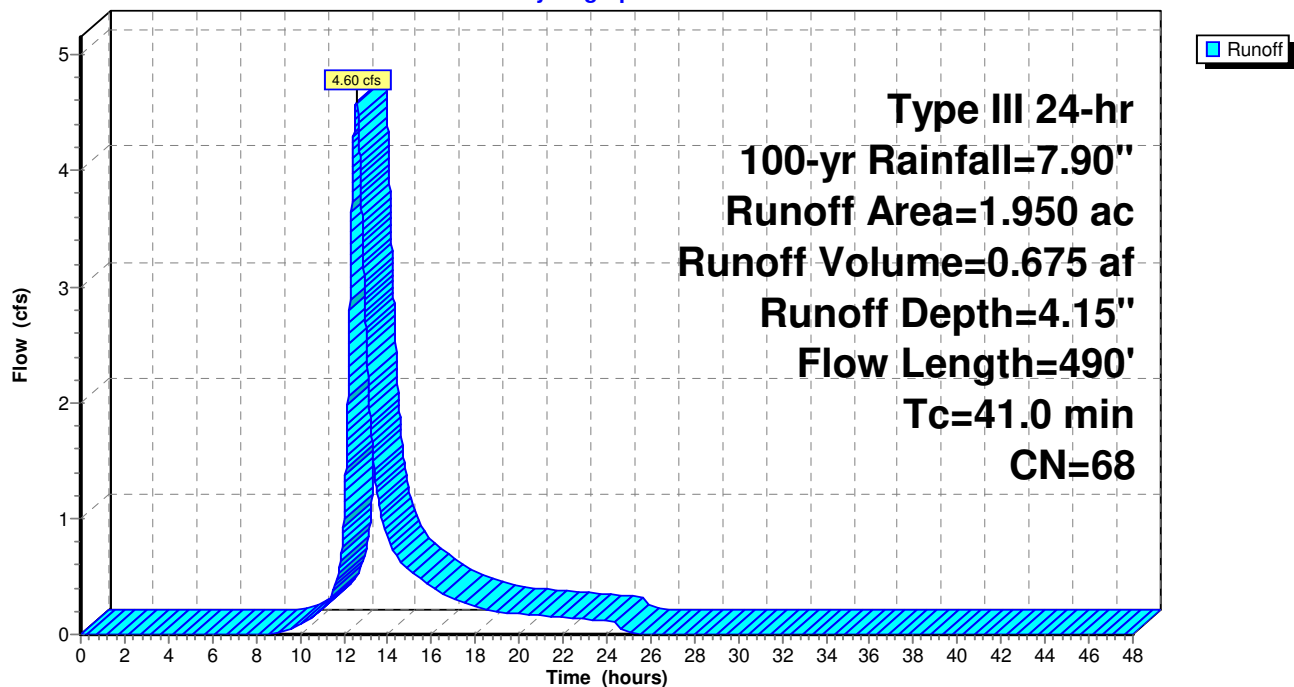
Subcatchment P7: P7

Hydrograph



Subcatchment P8: P8 (DP4)

Hydrograph



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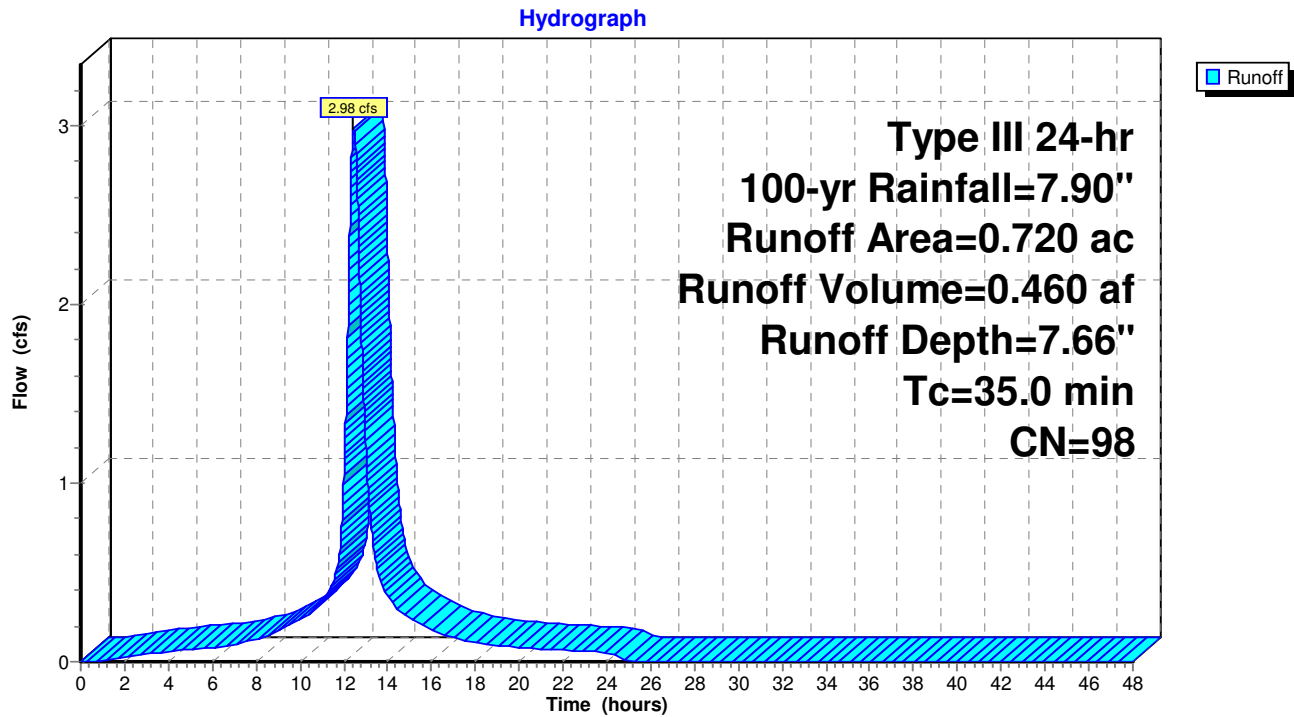
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Proposed Condition
Type III 24-hr 100-yr Rainfall=7.90"

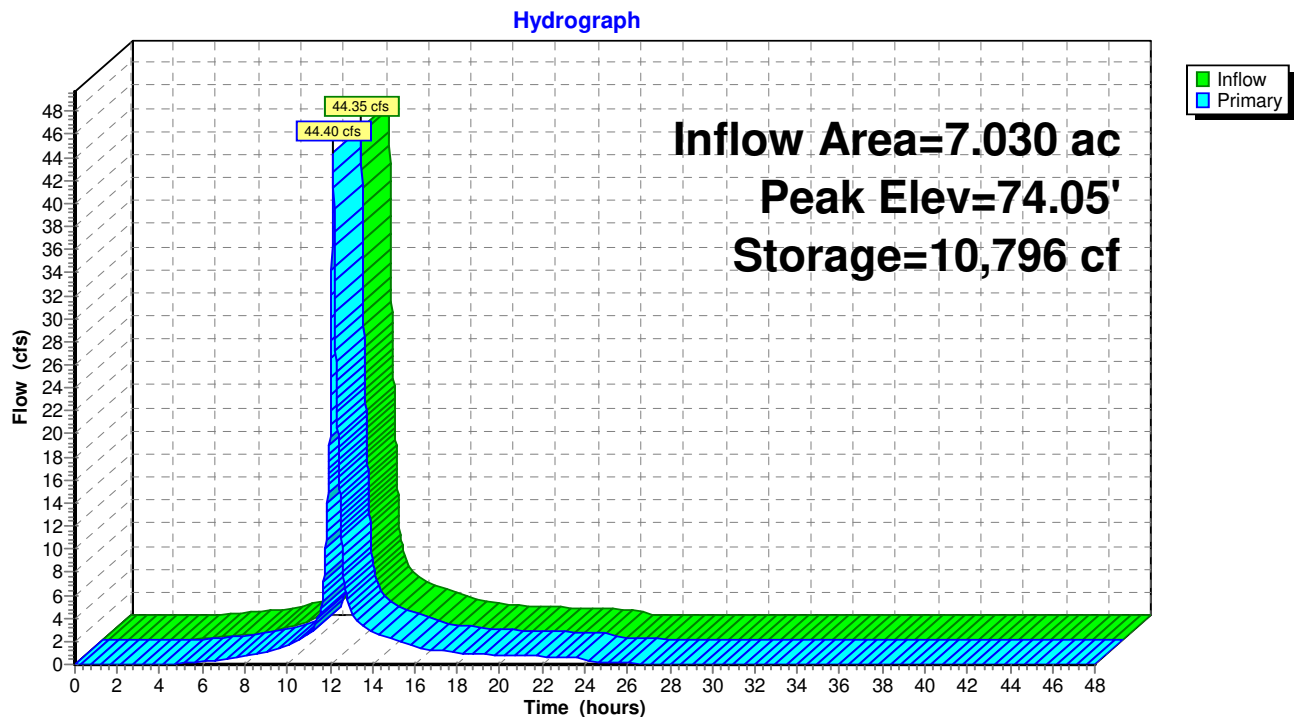
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Page 45

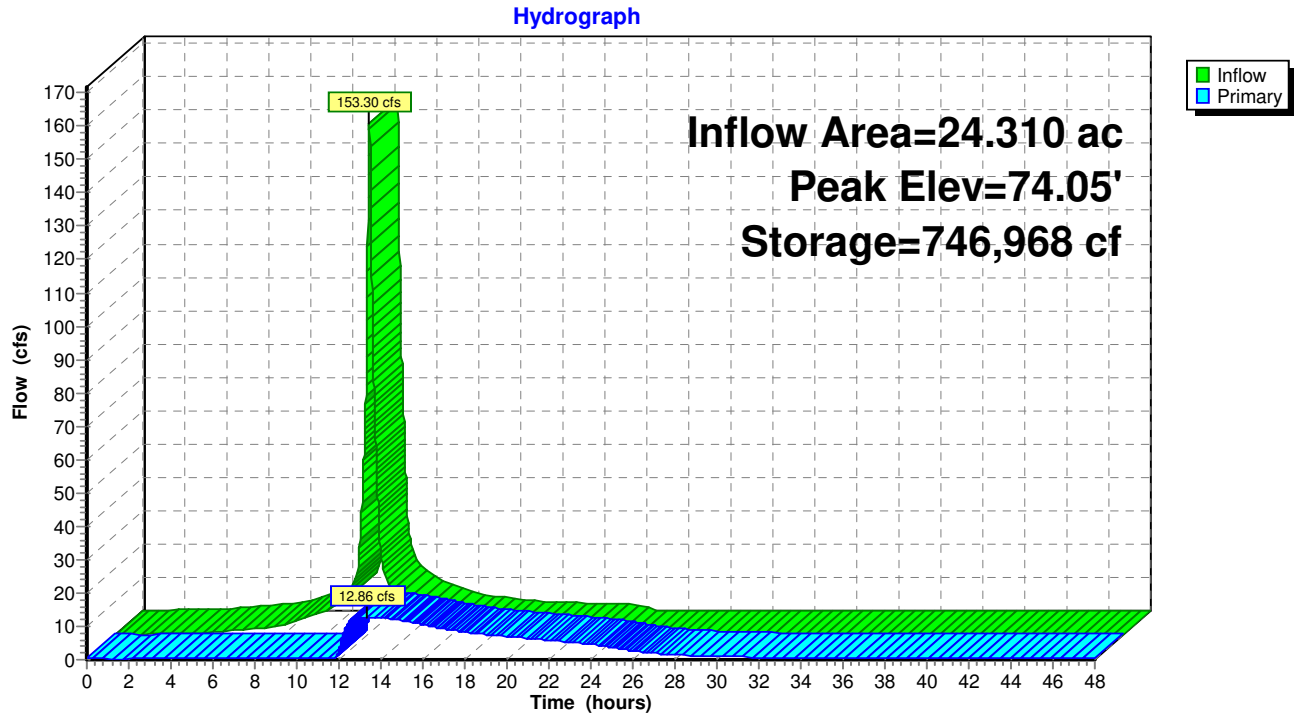
Subcatchment P9: P9



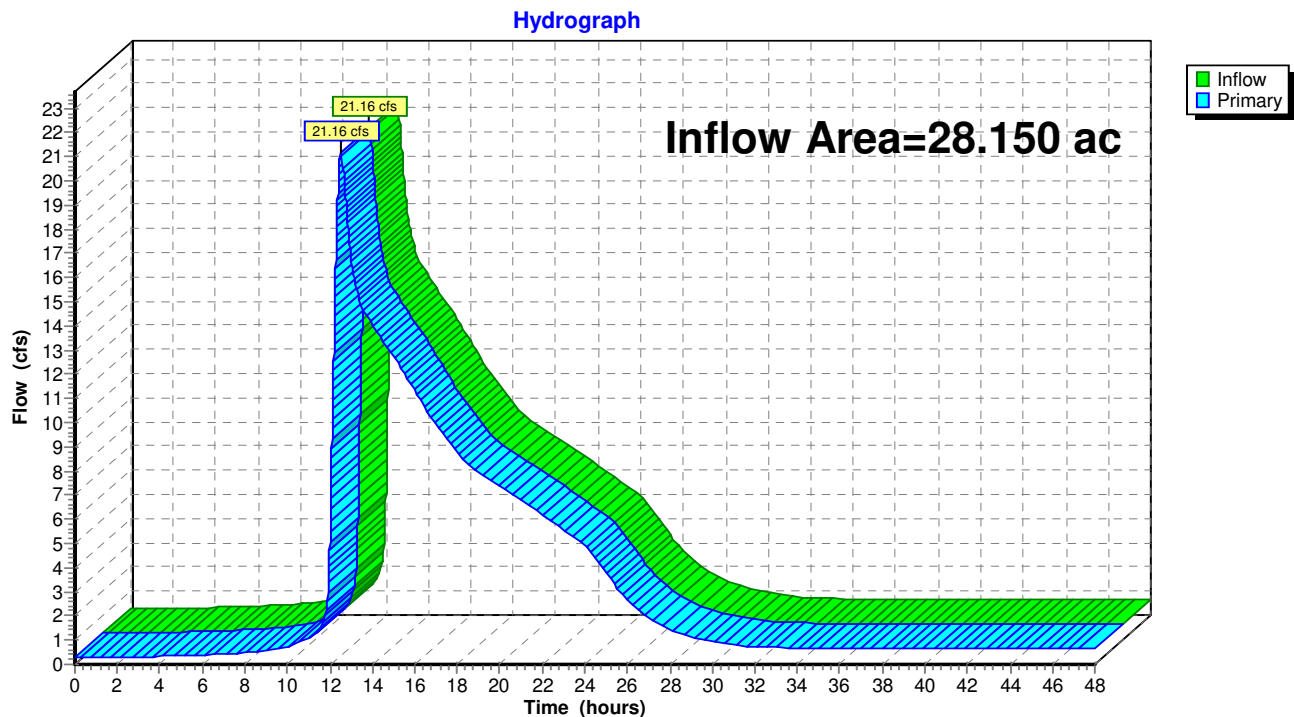
Pond PP1: UG Chambers (CULTEC R-360)



Pond PP2: Water Quality Basin



Link DP1: DP1



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Type III 24-hr 100-yr Rainfall=7.90"

Printed 7/1/2021

Page 47

Summary for Pond PP1: UG Chambers (CULTEC R-360)

Inflow Area = 7.030 ac, 68.42% Impervious, Inflow Depth = 6.47" for 100-yr event
 Inflow = 44.35 cfs @ 12.14 hrs, Volume= 3.791 af
 Outflow = 44.40 cfs @ 12.15 hrs, Volume= 3.691 af, Atten= 0%, Lag= 1.0 min
 Primary = 44.40 cfs @ 12.15 hrs, Volume= 3.691 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Starting Elev= 70.15' Surf.Area= 4,401 sf Storage= 1,192 cf

Peak Elev= 74.05' @ 13.32 hrs Surf.Area= 4,449 sf Storage= 10,796 cf (9,604 cf above start)

Plug-Flow detention time= 59.3 min calculated for 3.663 af (97% of inflow)

Center-of-Mass det. time= 36.1 min (822.3 - 786.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	69.56'	3,135 cf	7.00'W x 433.50'L x 4.00'H Field A 12,138 cf Overall - 4,300 cf Embedded = 7,838 cf x 40.0% Voids
#2A	70.06'	4,300 cf	Cultec R-360HD x 117 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf
#3B	69.56'	1,418 cf	7.00'W x 195.17'L x 4.00'H Field B 5,465 cf Overall - 1,918 cf Embedded = 3,546 cf x 40.0% Voids
#4B	70.06'	1,918 cf	Cultec R-360HD x 52 Inside #3 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap Cap Storage= +6.5 cf x 2 x 1 rows = 12.9 cf
#5	73.56'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#6	74.50'	1,908 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		12,725 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
73.56	48	0	0
74.50	48	45	45

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
74.50	5	0	0
75.00	422	107	107
76.00	3,180	1,801	1,908

Device	Routing	Invert	Outlet Devices
#1	Primary	70.15'	30.0" Round Culvert L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 70.15' / 70.11' S= 0.0080 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

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Proposed Condition
Type III 24-hr 100-yr Rainfall=7.90"

Printed 7/1/2021

Page 48

#2 Primary 70.15' **30.0" Round Culvert**
 L= 40.0' CPP, square edge headwall, Ke= 0.500
 Inlet / Outlet Invert= 70.15' / 70.00' S= 0.0038 '/' Cc= 0.900
 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=42.65 cfs @ 12.15 hrs HW=73.72' TW=72.90' (Dynamic Tailwater)

1=Culvert (Inlet Controls 21.33 cfs @ 4.34 fps)

2=Culvert (Inlet Controls 21.33 cfs @ 4.34 fps)

Summary for Pond PP2: Water Quality Basin

Inflow Area = 24.310 ac, 77.54% Impervious, Inflow Depth > 6.79" for 100-yr event
 Inflow = 153.30 cfs @ 12.12 hrs, Volume= 13.754 af
 Outflow = 12.86 cfs @ 13.34 hrs, Volume= 11.074 af, Atten= 92%, Lag= 73.4 min
 Primary = 12.86 cfs @ 13.34 hrs, Volume= 11.074 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Starting Elev= 70.00' Surf.Area= 75,135 sf Storage= 381,514 cf

Peak Elev= 74.05' @ 13.34 hrs Surf.Area= 105,736 sf Storage= 746,968 cf (365,454 cf above start)

Plug-Flow detention time= 1,361.1 min calculated for 2.315 af (17% of inflow)

Center-of-Mass det. time= 398.4 min (1,178.6 - 780.2)

Volume	Invert	Avail.Storage	Storage Description	
#1	61.00'	967,921 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
61.00	21,077	0	0	21,077
62.00	24,085	22,564	22,564	24,132
63.00	27,233	25,643	48,207	27,331
64.00	36,998	31,991	80,198	37,116
65.00	40,596	38,783	118,981	40,781
66.00	44,283	42,426	161,407	44,540
67.00	48,018	46,138	207,545	48,352
68.00	51,794	49,894	257,439	52,210
68.80	55,626	42,959	300,398	56,098
69.00	63,460	11,900	312,298	63,933
70.00	75,135	69,215	381,514	75,646
72.00	90,143	165,050	546,564	90,791
74.00	105,376	195,321	741,885	106,184
76.00	120,836	226,036	967,921	121,827

Device	Routing	Invert	Outlet Devices	
#1	Primary	69.59'	24.0" Round Culvert L= 66.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.59' / 69.25' S= 0.0052 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf	
#2	Device 1	69.59'	7.0" W x 2.0" H Vert. Orifice/Grate C= 0.600	
#3	Device 1	71.85'	38.0" W x 5.0" H Vert. Orifice/Grate C= 0.600	

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Type III 24-hr 100-yr Rainfall=7.90"

Printed 7/1/2021

Page 49

#4 Device 1 73.20' **14.0" W x 11.0" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=12.86 cfs @ 13.34 hrs HW=74.05' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 12.86 cfs of 28.13 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.98 cfs @ 10.07 fps)
- ↑ **3=Orifice/Grate** (Orifice Controls 8.96 cfs @ 6.79 fps)
- ↑ **4=Orifice/Grate** (Orifice Controls 2.93 cfs @ 2.96 fps)

APPENDIX C
NRCS Soil Map & Data



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for State of Connecticut



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface	2
Soil Map	5
Soil Map.....	6
Legend.....	7
Map Unit Legend.....	8
Map Unit Descriptions.....	8
State of Connecticut.....	10
13—Walpole sandy loam, 0 to 3 percent slopes.....	10
15—Scarboro muck, 0 to 3 percent slopes.....	11
36B—Windsor loamy sand, 3 to 8 percent slopes.....	13
306—Udorthents-Urban land complex.....	14
308—Udorthents, smoothed.....	15
701A—Ninigret fine sandy loam, 0 to 3 percent slopes.....	17
Soil Information for All Uses	19
Soil Properties and Qualities.....	19
Soil Qualities and Features.....	19
Hydrologic Soil Group.....	19
References	24

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


Custom Soil Resource Report Soil Map



Custom Soil Resource Report


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit


 Clay Spot


 Closed Depression

 Gravel Pit

 Gravelly Spot


 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot

 Other


 Special Line Features

Water Features

 Streams and Canals


Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
13	Walpole sandy loam, 0 to 3 percent slopes	20.6	42.8%
15	Scarboro muck, 0 to 3 percent slopes	2.1	4.4%
36B	Windsor loamy sand, 3 to 8 percent slopes	1.9	4.0%
306	Udorthents-Urban land complex	3.2	6.6%
308	Udorthents, smoothed	1.5	3.1%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	18.8	39.1%
Totals for Area of Interest		48.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut

13—Walpole sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkl

Elevation: 0 to 1,020 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Walpole and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Walpole

Setting

Landform: Outwash terraces, outwash plains, depressions, deltas, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread, dip, talf

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Sandy glaciofluvial deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

Oe - 0 to 1 inches: mucky peat

A - 1 to 7 inches: sandy loam

Bg - 7 to 21 inches: sandy loam

BC - 21 to 25 inches: gravelly sandy loam

C - 25 to 65 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.14 to 14.17 in/hr)

Depth to water table: About 0 to 4 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: B/D

Ecological site: F144AY028MA - Wet Outwash

Hydric soil rating: Yes

Minor Components

Sudbury

Percent of map unit: 10 percent
Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Scarboro

Percent of map unit: 10 percent
Landform: Outwash terraces, deltas, outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

15—Scarboro muck, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkt
Elevation: 0 to 1,350 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Scarboro and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scarboro

Setting

Landform: Outwash deltas, depressions, drainageways, outwash terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Sandy glaciofluvial deposits derived from schist and/or gneiss and/or granite

Typical profile

Oa - 0 to 8 inches: muck
A - 8 to 14 inches: mucky fine sandy loam
Cg1 - 14 to 22 inches: sand

Custom Soil Resource Report

Cg2 - 22 to 65 inches: gravelly sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

*Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(1.42 to 14.17 in/hr)*

Depth to water table: About 0 to 2 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: A/D

Ecological site: F144AY031MA - Very Wet Outwash

Hydric soil rating: Yes

Minor Components

Timakwa

Percent of map unit: 10 percent

Landform: Swamps

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope, tread, dip

Down-slope shape: Linear, concave

Across-slope shape: Linear, concave

Hydric soil rating: Yes

Walpole

Percent of map unit: 8 percent

Landform: Deltas, outwash terraces, depressions, outwash plains, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread, tal, dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Deerfield

Percent of map unit: 2 percent

Landform: Outwash plains, terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

36B—Windsor loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svkf

Elevation: 0 to 1,210 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Outwash terraces, deltas, outwash plains, dunes

Landform position (three-dimensional): Tread, riser

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: loamy sand

Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Hinckley, loamy sand

Percent of map unit: 10 percent

Landform: Eskers, kames, deltas, outwash plains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Deerfield, loamy sand

Percent of map unit: 5 percent

Landform: Outwash plains, terraces, deltas

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9lmg

Elevation: 0 to 2,000 feet

Mean annual precipitation: 43 to 56 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 120 to 185 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent

Urban land: 35 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Drift

Typical profile

A - 0 to 5 inches: loam

C1 - 5 to 21 inches: gravelly loam

C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)

Depth to water table: About 54 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 8 percent

Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 5 percent

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent

Hydric soil rating: No

308—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 9lmj

Elevation: 0 to 2,000 feet

Custom Soil Resource Report

Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

A - 0 to 5 inches: loam
C1 - 5 to 21 inches: gravelly loam
C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 24 to 54 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 7 percent
Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 7 percent
Hydric soil rating: No

Urban land

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Hydric soil rating: No

701A—Ninigret fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2y07d

Elevation: 0 to 1,260 feet

Mean annual precipitation: 43 to 54 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 140 to 185 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Ninigret and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ninigret

Setting

Landform: Outwash terraces, kames, moraines, outwash plains, kame terraces

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Linear, convex

Across-slope shape: Concave, convex

Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 8 inches: fine sandy loam

Bw1 - 8 to 16 inches: fine sandy loam

Bw2 - 16 to 26 inches: fine sandy loam

2C - 26 to 65 inches: stratified loamy sand to loamy fine sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 18 to 38 inches to strongly contrasting textural stratification

Drainage class: Moderately well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: About 17 to 39 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Custom Soil Resource Report

Ecological site: F144AY026CT - Moist Silty Outwash

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent

Landform: Moraines, kames, eskers, outwash terraces, outwash plains

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Side slope, crest, tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Agawam

Percent of map unit: 5 percent

Landform: Moraines, outwash terraces, outwash plains, kame terraces, kames

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Side slope, crest, tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Tisbury

Percent of map unit: 3 percent

Landform: Outwash terraces, outwash plains, deltas, valley trains

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

Raypol

Percent of map unit: 2 percent

Landform: Depressions, drainageways

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Custom Soil Resource Report

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.


Custom Soil Resource Report Map—Hydrologic Soil Group



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
13	Walpole sandy loam, 0 to 3 percent slopes	B/D	20.6	42.8%
15	Scarboro muck, 0 to 3 percent slopes	A/D	2.1	4.4%
36B	Windsor loamy sand, 3 to 8 percent slopes	A	1.9	4.0%
306	Udorthents-Urban land complex	B	3.2	6.6%
308	Udorthents, smoothed	C	1.5	3.1%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	C	18.8	39.1%
Totals for Area of Interest			48.2	100.0%

Rating Options—Hydrologic Soil Group*Aggregation Method:* Dominant Condition*Component Percent Cutoff:* None Specified*Tie-break Rule:* Higher

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

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United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX D
Storm Sewer Analysis Results

Subbasin Summary

Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
Sub-CB-1	0.26	0.7600	0.73	0.55	0.14	1.21	0 00:07:00
Sub-CB-10	0.48	0.8800	0.68	0.59	0.28	2.83	0 00:06:00
Sub-CB-11	0.20	0.9000	0.68	0.61	0.12	1.19	0 00:06:00
Sub-CB-12	0.52	0.9000	0.68	0.61	0.32	3.15	0 00:06:00
Sub-CB-13	0.44	0.4400	0.77	0.34	0.15	1.13	0 00:08:00
Sub-CB-14 (double type ii)	0.52	0.5200	0.77	0.40	0.21	1.58	0 00:08:00
Sub-CB-15	0.51	0.8800	0.68	0.59	0.30	3.01	0 00:06:00
Sub-CB-16	0.47	0.8600	0.68	0.58	0.27	2.71	0 00:06:00
Sub-CB-17	0.22	0.9000	0.68	0.61	0.13	1.31	0 00:06:00
Sub-CB-18	0.88	0.6900	0.77	0.53	0.47	3.50	0 00:08:00
Sub-CB-19 (double type ii)	0.43	0.6900	0.73	0.50	0.22	1.86	0 00:07:00
Sub-CB-2	0.48	0.7900	0.73	0.57	0.28	2.36	0 00:07:00
Sub-CB-20	0.45	0.7800	0.68	0.53	0.24	2.38	0 00:06:00
Sub-CB-21	0.41	0.7500	0.73	0.54	0.22	1.92	0 00:07:00
Sub-CB-22	0.45	0.7700	0.73	0.56	0.25	2.15	0 00:07:00
Sub-CB-23 (double type ii)	0.31	0.5900	0.77	0.46	0.14	1.07	0 00:08:00
Sub-CB-24 (double type ii)	0.34	0.5800	0.77	0.45	0.15	1.15	0 00:08:00
Sub-CB-3	0.49	0.7500	0.73	0.54	0.26	2.27	0 00:07:00
Sub-CB-4	0.24	0.8500	0.68	0.57	0.14	1.37	0 00:06:00
Sub-CB-5	0.51	0.9000	0.68	0.61	0.31	3.09	0 00:06:00
Sub-CB-6	0.52	0.9000	0.68	0.61	0.32	3.16	0 00:06:00
Sub-CB-7	0.61	0.7800	0.73	0.57	0.35	2.98	0 00:07:00
Sub-CB-8 (double type ii)	0.49	0.5300	0.77	0.41	0.20	1.51	0 00:08:00
Sub-CB-9	0.34	0.6700	0.73	0.49	0.16	1.40	0 00:07:00
Sub-RA1	0.36	0.9000	0.68	0.61	0.22	2.19	0 00:06:00
Sub-RA2	0.74	0.9000	0.68	0.61	0.45	4.48	0 00:06:00
Sub-RA3	0.75	0.9000	0.68	0.61	0.46	4.58	0 00:06:00
Sub-RA4	0.69	0.9000	0.68	0.61	0.42	4.21	0 00:06:00
Sub-RA6	0.48	0.9000	0.68	0.61	0.29	2.90	0 00:06:00
Sub-RA7	0.42	0.9000	0.68	0.61	0.26	2.57	0 00:06:00
Sub-RB1	0.34	0.9000	0.68	0.61	0.21	2.08	0 00:06:00
Sub-RB2	0.71	0.9000	0.68	0.61	0.43	4.33	0 00:06:00
Sub-RB3	0.73	0.9000	0.68	0.61	0.44	4.43	0 00:06:00
Sub-RB4	0.70	0.9000	0.68	0.61	0.43	4.26	0 00:06:00
Sub-RB5	0.68	0.9000	0.68	0.61	0.41	4.13	0 00:06:00
Sub-RB6	0.47	0.9000	0.68	0.61	0.29	2.86	0 00:06:00
Sub-RB7	0.42	0.9000	0.68	0.61	0.26	2.57	0 00:06:00
Sub-YD-1	0.07	0.3000	0.86	0.26	0.02	0.11	0 00:10:00
Sub-YD-2	0.05	0.3000	0.86	0.26	0.01	0.07	0 00:10:00
Sub-YD-3	0.05	0.3000	0.86	0.26	0.01	0.08	0 00:10:00
Sub-YD-4	0.05	0.3000	0.86	0.26	0.01	0.08	0 00:10:00
Sub-YD-5	0.05	0.3000	0.86	0.26	0.01	0.08	0 00:10:00
Sub-YD-6	0.05	0.3000	0.86	0.26	0.01	0.08	0 00:10:00
Sub-YD-7	0.05	0.3000	0.86	0.26	0.01	0.08	0 00:10:00
Sub-YD-8	0.05	0.3000	0.86	0.26	0.01	0.08	0 00:10:00
Sub-YD-9	0.41	0.3000	0.86	0.26	0.11	0.64	0 00:10:00

Link Summary

From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow Velocity	Peak Flow Depth
		(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)	(ft/sec)	(ft)
CB-11	CB-10	124.00	73.07	72.45	0.5000	10.000	0.0120	1.15	1.68	5.36	0.51
CB-09	CB-10	146.00	73.18	72.45	0.5000	12.000	0.0120	1.35	2.72	5.54	0.50
RA6	TEE-2	16.00	76.00	71.03	31.0600	12.000	0.0120	2.90	21.51	19.12	0.25
RB4	CB-04	138.00	75.60	73.40	1.5900	12.000	0.0120	4.19	4.87	9.95	0.71
RB6	FE-3	163.00	75.86	73.00	1.7500	12.000	0.0120	2.80	5.11	9.78	0.53
RB3	CB-05	125.00	75.60	73.40	1.7600	12.000	0.0120	4.38	5.12	10.16	0.71
RB5	FE-2	163.00	75.86	73.00	1.7500	12.000	0.0120	4.05	5.11	10.54	0.67
RB2	CB-06	129.00	75.60	73.40	1.7100	12.000	0.0120	4.27	5.04	10.07	0.70
RB1	CB-06	208.00	75.60	73.40	1.0600	12.000	0.0120	2.00	3.97	8.30	0.50
YD-9	CB-17	27.00	72.75	72.50	0.9300	8.000	0.0120	0.63	1.26	3.62	0.33
RA1	DMH-1	21.00	75.60	75.12	2.2900	12.000	0.0120	2.18	5.84	6.89	0.42
CB-20	UG3-INLET	7.00	70.15	70.15	0.0000	30.000	0.0120	2.38	118.76	9.47	0.25
DMH-5	UG1-INLET	12.00	70.15	70.15	0.0000	30.000	0.0120	2.12	90.70	7.43	0.27
RA7	TEE-3	17.00	76.00	70.74	30.9400	12.000	0.0120	2.56	21.47	18.38	0.23
RB7	FE-4	164.00	75.86	73.00	1.7400	12.000	0.0120	2.51	5.10	9.54	0.49
CB-16	CB-15	122.00	71.88	71.27	0.5000	15.000	0.0120	4.21	4.95	4.59	0.88
CB-08 (double type ii)	CB-07	153.00	75.00	72.89	1.3800	10.000	0.0120	1.62	2.79	5.35	0.46
CB-06	CB-05	104.00	72.25	71.73	0.5000	24.000	0.0120	12.82	17.33	6.06	1.28
CB-05	CB-04	107.00	71.73	71.19	0.5000	30.000	0.0120	19.91	31.48	6.81	1.44
CB-04	CB-01	109.00	71.19	70.65	0.5000	30.000	0.0120	25.18	31.23	7.12	1.70
CB-03	CB-02	139.00	73.00	72.30	0.5000	12.000	0.0120	2.21	2.74	6.04	0.68
CB-02	CB-01	107.00	71.69	71.15	0.5000	15.000	0.0120	4.47	4.97	4.64	0.92
CB-01	FE-1	31.00	70.65	70.50	0.4800	30.000	0.0120	30.39	31.36	7.29	1.98
CB-07	CB-06	128.00	72.89	72.25	0.5000	15.000	0.0120	4.26	4.96	4.59	0.89
CB-10	CB-12	121.00	72.45	71.85	0.5000	18.000	0.0120	4.95	8.03	4.81	0.85
CB-14 (double type ii)	CB-13	124.00	73.56	72.40	0.9400	10.000	0.0120	1.87	2.30	4.73	0.57
CB-13	CB-12	110.00	72.40	71.85	0.5000	15.000	0.0120	2.94	4.95	4.23	0.69
CB-12	CB-15	117.00	71.85	71.27	0.5000	24.000	0.0120	9.99	17.26	5.71	1.09
CB-15	CB-18	192.00	71.27	70.30	0.5100	30.000	0.0120	16.73	21.98	5.00	1.63
CB-17	CB-16	124.00	72.50	71.88	0.5000	10.000	0.0120	1.65	1.68	3.58	0.70
CB-19 (double type ii)	CB-18	217.00	72.90	71.85	0.4800	12.000	0.0120	1.78	2.68	6.33	0.59
CB-18	UG4-INLET	6.00	70.30	70.15	2.5000	30.000	0.0120	21.57	146.25	21.33	0.65
CB-21	UG2-INLET	7.00	70.15	70.15	0.0000	30.000	0.0120	1.92	118.76	8.95	0.22
UG1-OUTLET B	DMH-6 (72 INSIDE %%C)	5.00	70.15	70.11	0.8000	30.000	0.0120	12.04	39.74	7.18	0.93
DMH-6 (72 INSIDE %%C)	FE-6	36.00	70.11	70.00	0.3100	36.000	0.0120	26.62	39.94	6.05	1.79
UG1-OUTLET A	FE-7	40.00	70.15	70.00	0.3800	30.000	0.0120	10.79	27.21	5.22	1.09
YD-1	CB-08 (double type ii)	75.00	76.15	75.00	1.5300	8.000	0.0120	0.18	1.62	3.06	0.15
YD-2	YD-1	97.00	76.65	76.15	0.5200	8.000	0.0120	0.07	0.94	2.54	0.12
YD-3	YD-4	97.00	76.05	75.55	0.5200	8.000	0.0120	0.08	0.94	2.58	0.13
YD-4	YD-5	97.00	75.55	75.05	0.5200	8.000	0.0120	0.15	0.94	2.01	0.18
YD-6	YD-5	97.00	74.60	74.10	0.5200	8.000	0.0120	0.22	0.94	2.22	0.22
YD-7	YD-6	97.00	75.10	74.60	0.5200	8.000	0.0120	0.15	0.94	2.00	0.18
YD-8	YD-7	97.00	75.60	75.10	0.5200	8.000	0.0120	0.08	0.94	2.59	0.13
YD-5	CB-14 (double type ii)	52.00	74.10	73.56	1.0400	8.000	0.0120	0.45	1.33	3.44	0.27
FE-8	OCS-1 (60 INSIDE %%C)	80.00	70.00	69.59	0.5100	24.000	0.0120	5.41	17.54	4.92	0.76
OCS-1 (60 INSIDE %%C)	FE-9	66.00	69.59	69.25	0.5200	24.000	0.0120	5.41	17.59	4.93	0.76
CB-23 (double type ii)	CB-24 (double type ii)	236.00	72.70	71.49	0.5100	12.000	0.0120	1.03	2.76	5.72	0.42
CB-24 (double type ii)	FE-5	23.00	71.49	71.30	0.8300	12.000	0.0120	2.12	3.51	4.67	0.56
CB-22	DMH-5	66.00	72.10	71.76	0.5200	12.000	0.0130	2.12	2.56	4.91	0.69
DMH-1	TEE-1	117.00	74.75	74.15	0.5100	18.000	0.0120	2.13	8.15	4.22	0.52
TEE-1	DMH-2	127.00	74.15	73.50	0.5100	18.000	0.0120	6.44	8.14	5.18	1.00
DMH-2	DMH-4	296.00	73.50	71.76	0.5900	24.000	0.0120	10.57	18.77	6.32	1.07
DMH-4	TEE-2	131.00	71.76	71.03	0.5600	24.000	0.0120	10.52	18.34	6.09	1.09
TEE-2	TEE-3	53.00	71.03	70.74	0.5500	24.000	0.0120	12.90	18.13	6.27	1.25
TEE-3	DMH-6 (72 INSIDE %%C)	109.00	70.74	70.11	0.5800	24.000	0.0120	14.99	18.63	6.65	1.36
RA2	TEE-1	16.95	75.60	74.15	8.5500	12.000	0.0120	4.48	11.29	13.55	0.44
RA3	DMH-2	25.69	75.60	73.50	8.1700	12.000	0.0120	4.57	11.03	13.40	0.45
RA4	DMH-3	35.00	79.60	78.80	2.2900	12.000	0.0120	4.19	5.84	8.10	0.63
DMH-3	FE-10	132.00	78.80	76.00	2.1200	12.000	0.0120	4.15	5.62	7.91	0.64
RA5	DMH-4	14.00	79.00	76.24	19.7100	12.000	0.0120	0.00	17.14	0.00	0.00

Junction Input

Element ID	Invert Elevation	Ground/Rim (Max) Elevation
	(ft)	(ft)
CB-01	70.65	75.40
CB-02	71.69	75.40
CB-03	72.39	75.40
CB-04	71.19	75.90
CB-05	71.73	75.80
CB-06	72.25	75.80
CB-07	72.89	75.60
CB-08 (double type ii)	75.00	77.70
CB-09	73.18	75.60
CB-10	72.45	75.40
CB-11	73.07	75.50
CB-12	71.85	75.90
CB-13	72.40	76.00
CB-14 (double type ii)	73.56	77.70
CB-15	71.27	75.90
CB-16	71.88	75.60
CB-17	72.50	75.50
CB-18	70.80	75.10
CB-19 (double type ii)	72.90	75.30
CB-20	70.65	76.50
CB-21	70.65	76.50
CB-22	72.10	74.40
CB-23 (double type ii)	72.70	75.10
CB-24 (double type ii)	71.49	75.10
DMH-1	74.75	77.75
DMH-2	73.50	77.75
DMH-3	76.65	81.80
DMH-4	71.76	78.84
DMH-5	70.65	76.30
DMH-5 (72 INSIDE %%C)	70.15	76.30
DMH-6 (72 INSIDE %%C)	70.11	74.40
FE-8	70.00	71.93
OCS-1 (60 INSIDE %%C)	69.59	75.40
RA1	75.60	77.69
RA2	75.60	77.71
RA3	75.60	77.71
RA4	79.60	79.55
RA5	79.00	81.39
RA6	76.00	77.71
RA7	76.00	-0.06
RB1	75.60	77.75
RB2	75.60	77.49
RB3	75.60	77.75
RB4	75.60	77.75
RB5	75.86	77.75
RB6	75.86	77.75
RB7	75.86	0.00
TEE-1	74.15	76.60
TEE-2	71.03	73.33
TEE-3	70.74	76.67
UG1-OUTLET A	70.15	73.05
UG1-OUTLET B	70.15	73.05
YD-1	76.15	79.80
YD-2	76.65	78.80
YD-3	76.05	77.80
YD-4	75.55	77.26
YD-5	74.10	77.00
YD-6	74.60	77.35
YD-7	75.10	77.35
YD-8	75.60	77.35
YD-9	72.75	74.50

Junction Results

Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Min Freeboard Attained	Time of Max HGL Occurrence
	(cfs)	(cfs)	(ft)	(ft)	(days hh:mm)
CB-01	30.40	1.21	72.64	2.76	0 00:06
CB-02	4.49	2.36	72.98	2.42	0 00:07
CB-03	2.27	2.27	73.69	1.71	0 00:07
CB-04	25.24	1.37	74.12	1.78	0 00:06
CB-05	19.96	3.09	74.11	1.69	0 00:06
CB-06	12.86	3.16	74.11	1.69	0 00:06
CB-07	4.32	2.98	73.80	1.80	0 00:07
CB-08 (double type ii)	1.65	1.51	75.46	2.24	0 00:08
CB-09	1.40	1.40	73.69	1.91	0 00:07
CB-10	4.99	2.83	73.31	2.09	0 00:06
CB-11	1.19	1.19	73.59	1.91	0 00:06
CB-12	10.01	3.15	72.94	2.96	0 00:06
CB-13	2.96	1.13	73.10	2.90	0 00:08
CB-14 (double type ii)	1.90	1.58	74.14	3.56	0 00:08
CB-15	16.91	3.01	72.91	2.99	0 00:06
CB-16	4.28	2.71	72.78	2.82	0 00:06
CB-17	1.69	1.31	75.50	0.00	0 00:06
CB-18	21.57	3.50	72.44	2.66	0 00:07
CB-19 (double type ii)	1.86	1.86	73.51	1.79	0 00:07
CB-20	2.38	2.38	70.90	5.60	0 00:06
CB-21	1.92	1.92	70.87	5.63	0 00:07
CB-22	2.15	2.15	72.80	1.60	0 00:07
CB-23 (double type ii)	1.07	1.07	73.13	1.97	0 00:08
CB-24 (double type ii)	2.12	1.15	72.05	3.05	0 00:08
DMH-1	2.18	0.00	75.54	2.21	0 00:06
DMH-2	10.82	0.00	74.59	3.16	0 00:06
DMH-3	4.19	0.00	79.44	2.36	0 00:06
DMH-4	10.57	0.00	76.24	2.60	0 00:00
DMH-5	2.12	0.00	72.46	3.84	0 00:07
DMH-5 (72 INSIDE %%C)	0.00	0.00	70.15	6.15	0 00:00
DMH-6 (72 INSIDE %%C)	26.62	0.00	71.90	2.50	0 00:07
FE-8	5.41	5.41	70.76	1.24	0 00:00
OCS-1 (60 INSIDE %%C)	5.41	0.00	70.35	5.05	0 00:04
RA1	2.18	2.18	76.02	1.67	0 00:06
RA2	4.48	4.48	76.04	1.67	0 00:06
RA3	4.58	4.58	76.05	1.66	0 00:06
RA4	4.21	4.21	80.23	0.37	0 00:06
RA5	0.00	0.00	79.00	2.39	0 00:00
RA6	2.90	2.90	76.25	1.46	0 00:06
RA7	2.57	2.57	76.23	0.77	0 00:06
RB1	2.08	2.08	76.11	1.64	0 00:06
RB2	4.33	4.33	76.32	1.18	0 00:06
RB3	4.43	4.43	76.32	1.43	0 00:06
RB4	4.26	4.26	76.32	1.43	0 00:06
RB5	4.12	4.12	76.54	1.21	0 00:06
RB6	2.86	2.86	76.40	1.36	0 00:06
RB7	2.57	2.57	76.36	0.50	0 00:06
TEE-1	6.52	0.00	75.17	1.43	0 00:06
TEE-2	12.91	0.00	72.28	1.05	0 00:07
TEE-3	15.01	0.00	72.10	4.57	0 00:07
UG1-OUTLET A	10.79	10.79	71.24	1.81	0 00:00
UG1-OUTLET B	11.63	11.63	71.08	1.97	0 00:00
YD-1	0.18	0.11	76.30	3.50	0 00:10
YD-2	0.07	0.07	76.78	2.02	0 00:10
YD-3	0.08	0.08	76.18	1.62	0 00:10
YD-4	0.15	0.08	75.73	1.53	0 00:10
YD-5	0.45	0.08	75.23	1.77	0 00:10
YD-6	0.22	0.08	74.82	2.53	0 00:10
YD-7	0.15	0.08	75.28	2.07	0 00:10
YD-8	0.08	0.08	75.73	1.62	0 00:10
YD-9	0.64	0.64	73.09	1.41	0 00:10

APPENDIX E
Water Quality Calculations

25 Talbot Lane – DPI Project No.:1976.U

July 2, 2021

Water Quality Volume Calculations

Per 2004 Connecticut Stormwater Quality Manual, Section 7.4.1:

Areas for Calculation: On Site to Forebay (P3)

	P3
Impervious	6.52
Pervious	3.24
Total Area	9.76
% Impervious	66.80%

Water Quality Volume (WQV) = (1")(R)(A)/12, where:

R = unitless volumetric runoff coefficient = $0.05 + 0.009(I)$, where:

I = percent impervious cover of drainage area = 66.80%

$R = 0.05 + 0.009(I)$

$R = 0.05 + 0.009(66.80)$

$R = \underline{0.651}$

A = drainage area in acres = 9.76 acres

$WQV = (1")(R)(A \text{ acres})/12 \text{ inches per foot}$

$WQV = (1")(0.651)(9.76 \text{ acres})/12 \text{ inches per foot}$

$WQV = \underline{0.529} \text{ acre-feet required} = 23,043.24 \text{ cft}$

Proposed BMP

The proposed water quality basin and forebay are proposed to provide **4,254 cft** (below basin outlet FE-8 @ Elev. 70) and **414,138 cft** (below check dam spillway at Elev. 302.50) of water quality storage, respectively. The forebay will provide storage for more than 10% of the determined water quality volume draining to the basin. The forebay in combination with the proposed wet pool of the water quality basin will provide a total water quality storage volume of **418,392 cft**; more than 100% of the water quality volume. Water quality basin and forebay stage storage reports are included as a part of this appendix.

WATER QUALITY BASIN
STAGE STORAGE TABLE

ELEV	AREA (sq. ft.)	DEPT H (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
69.00	3,068.10	N/A	N/A	0.00	N/A	0.00
70.00	5,562.65	1.00	4315.37	4315.37	4253.98	4253.98

FOREBAY
STAGE STORAGE TABLE

ELEV	AREA (sq. ft.)	DEPT H (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
61.00	21,077.46	N/A	N/A	0.00	N/A	0.00
62.00	24,085.35	1.00	22581.41	22581.41	22564.69	22564.69
63.00	27,233.44	1.00	25659.40	48240.80	25643.29	48207.98
64.00	36,997.69	1.00	32115.57	80356.37	31991.15	80199.13
65.00	40,595.68	1.00	38796.68	119153.05	38782.77	118981.91
66.00	44,282.92	1.00	42439.30	161592.35	42425.95	161407.85
67.00	48,018.06	1.00	46150.49	207742.85	46137.89	207545.74
68.00	51,793.77	1.00	49905.91	257648.76	49894.01	257439.75
68.80	55,626.02	0.80	42967.91	300616.67	42958.80	300398.54
69.00	63,460.17	0.20	11908.62	312525.29	11900.02	312298.56
70.00	69,503.50	1.00	66481.83	379007.13	66458.93	378757.50
70.50	72,027.27	0.50	35382.69	414389.82	35380.82	414138.31

25 Talbot Lane – DPI Project No.:1976.U

July 2, 2021

Water Quality Flow Calculations

Per 2004 Connecticut Stormwater Quality Manual

Per Appendix B page B-3:

Water Quality Flow (WQF) = (qu)(A)(Q), where:

qu = unit peak discharge (cfs/mi²/inch) per Exhibit 4-III

A = drainage area (mi²)

Q = runoff depth (in watershed inches)

= [Water Quality Volume (WQV) (in acre-feet)] x [12 inches/foot] / drainage area (acres)

ISOLATION ROW-4 (CB9 – CB18)

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

6 mins = 0.10 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 88

Ia = 0.273 inches

Design Precipitation (P) = 1" for water quality storms per Appendix B

Ia/P = 0.273

Unit Peak Discharge qu = 625 cfs/mi²/inch

Drainage Area A = 242,629.2 sf = 5.57 acres = 0.0087 mi²

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (1")(R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 68.04%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(68.04)

R = 0.662

A = drainage area in acres = 5.57 acres

WQV = (1")(R)(A)/12

WQV = (1")(0.662)(5.57 acres) / 12 in/ft

WQV = 0.307 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.307 acre-feet x 12 in/ft) / 5.57 acres

Q = 0.661 in

WQF = qu x A x Q

WQF = 625 cfs/mi²/inch x 0.0087 mi² x 0.661 in

WQF = **3.594 cfs required**

Proposed

The proposed **36** chamber **R-360HD** Cultec Isolator row (@ **0.102 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **3.59 cfs** water quality flow. The current design plan will provide **3.67 cfs** of WQF. See isolator row sizing chart included in the appendix.

25 Talbot Lane – DPI Project No.:1976.U

July 2, 2021

Water Quality Flow Calculations

Per 2004 Connecticut Stormwater Quality Manual

Per Appendix B page B-3:

Water Quality Flow (WQF) = (qu)(A)(Q), where:

qu = unit peak discharge (cfs/mi²/inch) per Exhibit 4-III

A = drainage area (mi²)

Q = runoff depth (in watershed inches)

= [Water Quality Volume (WQV) (in acre-feet)] x [12 inches/foot] / drainage area (acres)

ISOLATION ROW-3 (CB20)

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

6 mins = 0.10 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 88

Ia = 0.273 inches

Design Precipitation (P) = 1" for water quality storms per Appendix B

Ia/P = 0.273

Unit Peak Discharge qu = 625 cfs/mi²/inch

Drainage Area A = 25,264.8 sf = 0.58 acres = 0.00084 mi²

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (1")(R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 60.34%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(60.34)

R = 0.593

A = drainage area in acres = 0.58 acres

WQV = (1")(R)(A)/12

WQV = (1")(0.593)(0.58 acres) / 12 in/ft

WQV = 0.029 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.029 acre-feet x 12 in/ft) / 0.58 acres

Q = 0.600 in

WQF = qu x A x Q

WQF = 625 cfs/mi²/inch x 0.00084 mi² x 0.600 in

WQF = **0.315 cfs required**

Proposed

The proposed 4 chamber **R-360HD** Cultec Isolator row (@ **0.102 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.32 cfs** water quality flow. The current design plan will provide **0.41 cfs** of WQF. See isolator row sizing chart included in the appendix.

25 Talbot Lane – DPI Project No.:1976.U

July 2, 2021

Water Quality Flow Calculations

Per 2004 Connecticut Stormwater Quality Manual

Per Appendix B page B-3:

Water Quality Flow (WQF) = (qu)(A)(Q), where:

qu = unit peak discharge (cfs/mi²/inch) per Exhibit 4-III

A = drainage area (mi²)

Q = runoff depth (in watershed inches)

= [Water Quality Volume (WQV) (in acre-feet)] x [12 inches/foot] / drainage area (acres)

ISOLATION ROW-2 (CB21)

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

6 mins = 0.10 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 92

Ia = 0.174 inches

Design Precipitation (P) = 1" for water quality storms per Appendix B

Ia/P = 0.174

Unit Peak Discharge qu = 630 cfs/mi²/inch

Drainage Area A = 18,295.2 sf = 0.42 acres = 0.00066 mi²

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (1")(R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 76.19%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(76.19)

R = 0.736

A = drainage area in acres = 0.42 acres

WQV = (1")(R)(A)/12

WQV = (1")(0.736)(0.42 acres) / 12 in/ft

WQV = 0.026 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.026 acre-feet x 12 in/ft) / 0.42 acres

Q = 0.743 in

WQF = qu x A x Q

WQF = 630 cfs/mi²/inch x 0.00066 mi² x 0.743 in

WQF = **0.309 cfs required**

Proposed

The proposed **4** chamber **R-360HD** Cultec Isolator row (@ **0.102 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.31 cfs** water quality flow. The current design plan will provide **0.41 cfs** of WQF. See isolator row sizing chart included in the appendix.

25 Talbot Lane – DPI Project No.:1976.U

July 2, 2021

Water Quality Flow Calculations

Per 2004 Connecticut Stormwater Quality Manual

Per Appendix B page B-3:

Water Quality Flow (WQF) = (qu)(A)(Q), where:

qu = unit peak discharge (cfs/mi²/inch) per Exhibit 4-III

A = drainage area (mi²)

Q = runoff depth (in watershed inches)

= [Water Quality Volume (WQV) (in acre-feet)] x [12 inches/foot] / drainage area (acres)

ISOLATION ROW-1 (CB22)

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

6 mins = 0.10 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 91

Ia = 0.198 inches

Design Precipitation (P) = 1" for water quality storms per Appendix B

Ia/P = 0.198

Unit Peak Discharge qu = 630 cfs/mi²/inch

Drainage Area A = 19,602 sf = 0.45 acres = 0.0007 mi²

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (1")(R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 77.78%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(77.78)

R = 0.750

A = drainage area in acres = 0.45 acres

WQV = (1")(R)(A)/12

WQV = (1")(0.750)(0.45 acres) / 12 in/ft

WQV = 0.028 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.028 acre-feet x 12 in/ft) / 0.45 acres

Q = 0.747 in

WQF = qu x A x Q

WQF = 630 cfs/mi²/inch x 0.0007 mi² x 0.747 in

WQF = **0.329 cfs required**

Proposed

The proposed 4 chamber **R-360HD** Cultec Isolator row (@ **0.102 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.33 cfs** water quality flow. The current design plan will provide **0.41 cfs** of WQF. See isolator row sizing chart included in the appendix.

CULTEC Separator Row Sizing Tables (Imperial)

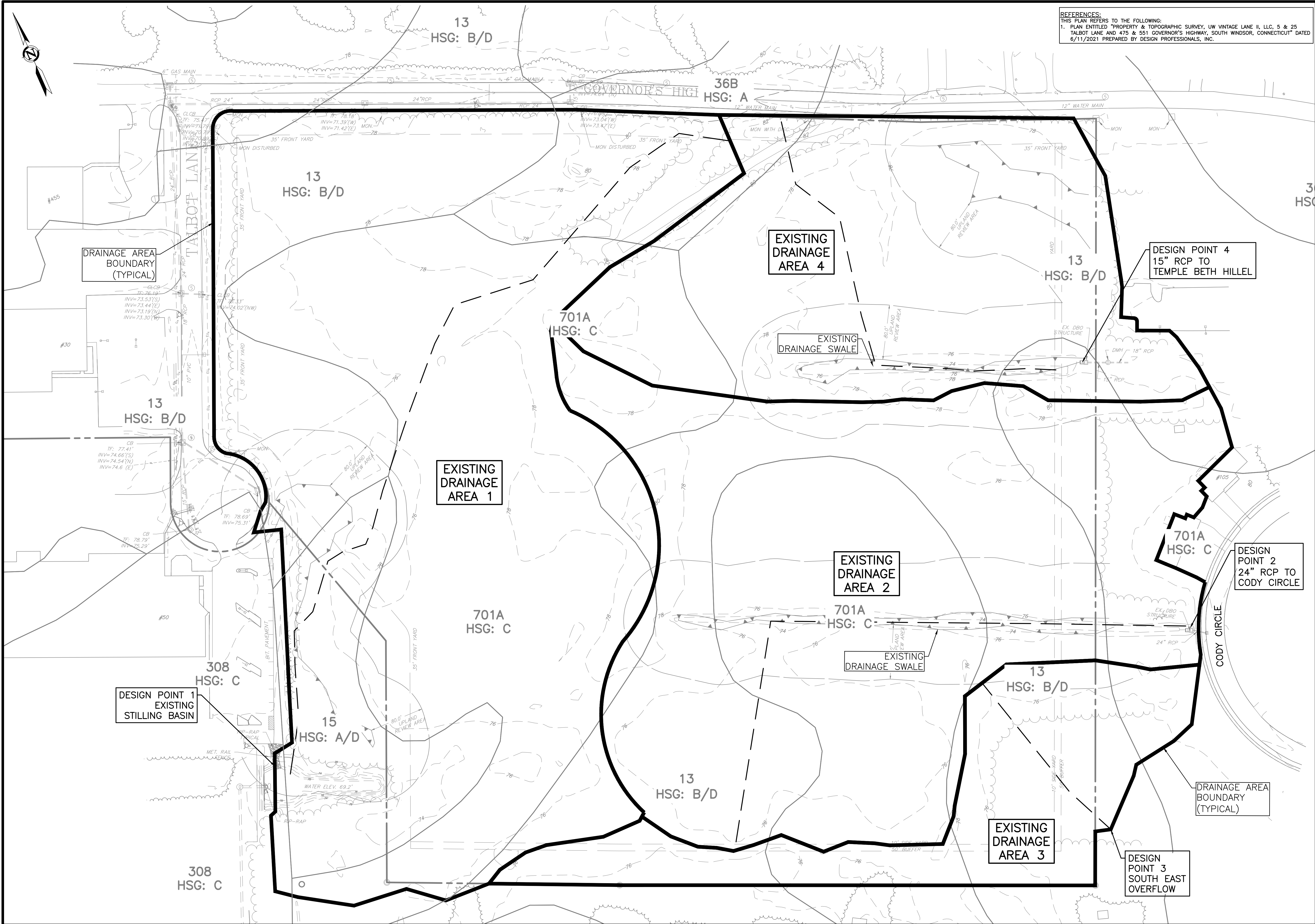
Maine DEP / ADS Equivalent Sizing (OK 110 Particle Distribution)

	80% TSS Flow Rate (Maine DEP)	Chamber Width	Installed Chamber Length	Bottom Area	Treatment Rate / Chamber
CONTACTOR 100HD	2.5 gpm/sf	3.00'	7.5'	22.50 s.f.	0.125 cfs
RECHARGER 150XLHD	2.5 gpm/sf	2.75'	10.25'	28.18 s.f.	0.157 cfs
RECHARGER 180HD	2.5 gpm/sf	3.00'	6.33'	18.99 s.f.	0.106 cfs
RECHARGER 280HD	2.5 gpm/sf	3.91'	7.00'	27.37 s.f.	0.152 cfs
RECHARGER 330XLHD	2.5 gpm/sf	4.33'	7.00'	31.31 s.f.	0.174 cfs
RECHARGER 360HD	2.5 gpm/sf	5.00'	3.67'	18.35 s.f.	0.102 cfs
RECHARGER 902HD	2.5 gpm/sf	6.50'	3.67'	23.86 s.f.	0.133 cfs

ETV (ETV / NJDEP Particle Distribution)

	80% TSS Flow Rate (ETV)	Chamber Width	Installed Chamber Length	Bottom Area	Treatment Rate / Chamber
CONTACTOR 100HD	1.0 gpm/sf	3.00'	7.5'	22.50 s.f.	0.050 cfs
RECHARGER 150XLHD	1.0 gpm/sf	2.75'	10.25'	28.18 s.f.	0.063 cfs
RECHARGER 180HD	1.0 gpm/sf	3.00'	6.33'	18.99 s.f.	0.042 cfs
RECHARGER 280HD	1.0 gpm/sf	3.91'	7.00'	27.37 s.f.	0.061 cfs
RECHARGER 330XLHD	1.0 gpm/sf	4.33'	7.00'	31.31 s.f.	0.070 cfs
RECHARGER 360HD	1.0 gpm/sf	5.00'	3.67'	18.35 s.f.	0.041 cfs
RECHARGER 902HD	1.0 gpm/sf	6.50'	3.67'	23.86 s.f.	0.053 cfs

APPENDIX F
Drainage Area Maps



REFERENCES:
THIS PLAN REFERS TO THE FOLLOWING:
1. PLAN ENTITLED "PROPERTY & TOPOGRAPHIC SURVEY, UW VINTAGE LANE II, LLC, 5 & 25 TALBOT LANE AND 475 & 551 GOVERNOR'S HIGHWAY, SOUTH WINDSOR, CONNECTICUT" DATED 6/11/2021 PREPARED BY DESIGN PROFESSIONALS, INC.

21 JUNE 2021
P.O. BOX 167
SOUTH WINDSOR, CT 06074
860-268-2452
www.designprofessionals.com

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CIVIL & TRAFFIC ENGINEERS / LAND SURVEYORS
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PREPARED FOR:
UW Vintage Lane II, LLC
PO Box 504
South Glastonbury, CT 06073
860-268-2452 T

PROJECT NO:
1976U
DATE:
07/02/21
DRAWN BY:
BPW
CHECKED BY:
DHI

25 TALBOT LANE
SITE PLAN APPLICATION
5 & 25 TALBOT ROAD
475 & 551 GOVERNOR'S HIGHWAY
SOUTH WINDSOR, CONNECTICUT
GIS Nos. 88900005, 88900025, 36900475, 36900551

NO. DATE BY REVISIONS

EXISTING DRAINAGE MAP
SCALE: 0 30' 60' 120'
1" = 60'

SHEET
C-DA1
SHEET 1 OF 2

