FULLER ENGINEERING & LAND SURVEYING, LLC
525 John Street • Second Floor
Bridgeport, CT 06604
(203) 333-9465 (203) 336-1769 FAX

ENGINEERING REPORT

Project Name:

Madison Place
Luxury Townhouse Development
18 Powerhouse Road &
145 CT Route 32
Montville, CT

Information prepared for:

JNE Holdings, LLC
&
Town of Montville
Department of Public Works / Engineering Department

Dated: January 11 February 2025

FULLER ENGINEERING & LAND SURVEYING, LLC
525 JOHN STREET 2ND FLOOR BRIDGEPORT, CONNECTICUT 06604
PHONE (203)333-9465; FAX (203)336-1769

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PHASE 2

FULLER ENGINEERING & LAND SURVEYING, LLC
525 John Street – Second Floor – Bridgeport, CT 06604

Phone: (203) 333-9465 Fax: (203) 336-1769

STORMWATER STUDY

APPLICANT: JNE HOLDINGS, LLC

PROJECT LOCATION: WILTONS WAY 18 Powerhouse Road & 145 Route 32, Montville, Connecticut

INTRODUCTION

The proposed project consists of the merger of two parcels into one lot consisting of 110,146 S.F.:

145 CT Route 23
Site Area: 59,415 S.F.
One existing 4 family residential unit.

18 Powerhouse Road
Site Area 50,731 S.F.
One existing 2 family residential unit.

The proposed project is anticipated to be constructed in three phases. The drainage computations for this project are separated into two groups;

Drainage Study 1 (Phase 1 sitework);
Drainage Study 2 (Phase 2 and 3 sitework.)

DRAINAGE STUDY Phase 1

NARRATIVE

The subject of this report is a 1.337-(disturbed area) acre portion of a parcel located at 145 Route 32 in Montville, constituting Phase 1 of the proposed project. The purpose of this report is to determine the existing and proposed runoffs resulting from the proposed site improvements in order to design a stormwater management system.

PRE-DEVELOPMENT CONDITIONS

The subject parcel is located on the west side of Route 32, at its intersection with Powerhouse Road. The lot currently contains buildings and a driveway. The lot slopes moderately to steeply across its width, generally from the west to the east.

Existing soils at this location, as identified in the NRCS Soil Survey of Fairfield County, Connecticut, consist of Narragansett silt loam, 2 to 8 percent slopes, which has a Hydrologic classification of “B”.

The existing runoff from a 50-Year rainfall event is 5.92 c.f.s.

PROPOSED POST-DEVELOPMENT CONDITIONS

The proposal for this phase is to construct 3 residential units (two additional units with renovations to the existing house on Powerhouse Road), with associated driveway, site utilities, and miscellaneous site improvements.

The proposed runoff (prior to mitigation) from a 50-Year rainfall event is 6.88 c.f.s.

CALCULATIONS

The following computations of the existing and proposed conditions runoff flows were derived from the HydroCAD computer software. HydroCAD follows the NRCS TR-20 procedure for computing stormwater runoff. Computations were performed for a 50-year storm event, which has a 2% chance of occurring in any given 12-month period.

Existing Conditions (Phase 1):

Buildings	1,072 s.f.	CN 98
Driveway	1,107 s.f.	CN 98
Concrete slab	243 s.f.	CN 98
Lawn	55,821 s.f.	CN 69
Total	58,243 s.f.	

Weighted CN - 70

Proposed Conditions (Phase 1):

Building	4,741 s.f.	CN 98
Driveway/Parking	9,018 s.f.	CN 98
Lawn	44,484 s.f.	CN 69
Total	58,243 s.f.	

Weighted CN - 76

Groundwater Recharge Volume (GWV):

Impervious area = 23.6 %
WQV = (0.2624 * 1.337 ac)/12 x 1.3 = 0.03800645 ac-ft = 1,655.6 ft^3
GWV = 1,655.6 * 0.25 = 413.9 ft^3

SUMMARY:

	50 Year	25Yr.	10Yr.	5Yr.	2Yr.
Existing Runoff :	5.92 c.f.s	4.81	3.42	2.47	1.42
Proposed Runoff :	6.88 c.f.s	5.72	4.24	3.21	2.03
Runoff Retained:	1.54 c.f.s.	1.36	1.11	0.94	0.73
Areas Bypassing Retention Plus overflow:	5.28c.f.s.	4.32	3.12	2.29	1.36

CONCLUSION

The increased runoff resulting from the proposed site improvements will be retained in an on-site retention system. The runoff from the driveway will be routed to 192 linear feet of 48" concrete galleries. The increase in stormwater runoff is mitigated on-site.

This system will reduce the net peak run-off during a 50 Year (2%) rainfall event to 5.28 c.f.s. from its current peak of 5.92 c.f.s.

The bottom of the concrete galleries will be at elevation 97.0. No restrictive layer was found to an elevation of 96.0.

The proposed retention system provides a total of 3,131 ft^3 of storage, which will be adequate to maintain the net runoff during a 50 Year rainfall event, meets the Water Quality Volume and will provide groundwater recharge.

The maximum peak net runoff from the proposed conditions decrease compared to the peak runoff from the existing conditions for each of the rainfall events from the 2 Year to the 50 Year rainfall events, as the table above illustrates.

The proposed improvements will have no adverse impact on surrounding properties.

STORMWATER STUDY Phases 2 and 3

NARRATIVE:

The subject of this report is a 1.185 acre portion (Disturbed Area of Phases 2 and 3) of a parcel located at 145 Route 32 in Montville, constituting Phases 2 and 3 of the proposed project. The purpose of this report is to determine the existing and proposed runoffs resulting from the proposed site improvements in order to design a stormwater management system.

PRE-DEVELOPMENT CONDITIONS

The subject parcel is located on the west side of Route 32, at its intersection with Powerhouse Road. The lot currently contains buildings and a driveway. The lot slopes moderately to steeply across its width, generally from the west to the east.

Existing soils at this location, as identified in the NRCS Soil Survey of Fairfield County, Connecticut, consist of Narragansett silt loam, 2 to 8 percent slopes, which has a Hydrologic classification of "B".

The existing runoff from a 50-Year rainfall event is 5.10 c.f.s.

PROPOSED CONDITIONS:

The proposal for this phase is to construct 8 residential units (4 units in Phase 2 and 4 units in Phase 3), with associated driveway, site utilities, and miscellaneous site improvements.

The proposed runoff (prior to mitigation) from a 50-Year rainfall event is 6.87 c.f.s.

CALCULATIONS:

The following computations of the existing and proposed conditions runoff flows were derived from the HydroCAD computer software. HydroCAD follows the NRCS TR-20 procedure for computing stormwater runoff. Computations were performed for a 50-year storm event, which has a 2% chance of occurring in any given 12-month period.

Existing Conditions (Phases 2 and 3):

Lawn	51,610 s.f.	CN 69
Total	51,610 s.f.	

Weighted CN 69

Proposed Conditions (Phases 2 and 3):

Buildings	12,169	s.f.	CN 98
Driveway/Parking	10,597	s.f.	CN 98
Lawn	28,844	s.f.	CN 69
Total -	51,610	s.f.	

Weighted CN 82

Groundwater Recharge Volume (GWV):

Impervious area = 44.1 %
WQV = (0.4469 * 1.185 ac)/12 x 1.3 = 0.0573707 ac-ft = 2,499.1 ft^3
GWV = 2,499.1 * 0.25 = 624.8 ft^3

SUMMARY:

	50 Year	25Yr.	10Yr.	5Yr.	2Yr.
Existing Runoff	5.10 c.f.s	4.13	2.91	2.08	1.17
Proposed Runoff	6.87 c.f.s.	5.84	4.49	3.52	2.39
Runoff Retained:	2.97 c.f.s.	2.61	2.15	1.81	1.40
Areas Bypassing Retention Plus overflow:	3.86 c.f.s.	3.19	2.33	1.74	1.07

CONCLUSIONS:

The increased runoff resulting from the proposed site improvements will be retained in an on-site retention system. The runoff from the driveway and the roof of the northern building will be routed to 384 linear feet of 48” concrete galleries. The increase in stormwater runoff is mitigated on-site.

This system will reduce the net peak run-off during a 50 Year (2%) rainfall event to 3.86 c.f.s. from its current peak of 5.10 c.f.s.

The bottom of the concrete galleries will be at elevation 99.0. No restrictive layer was found to an elevation of 98.0.

The proposed retention system provides a total of 6,128 ft^3 of storage, which will be adequate to maintain the net runoff during a 50 Year rainfall event, meets the Water Quality Volume and will provide groundwater recharge.

The maximum peak net runoff from the proposed conditions decrease compared to the peak runoff from the existing conditions for each of the rainfall events from the 2 Year to the 50 Year rainfall events, as the table above illustrates.

The proposed improvements will have no adverse impact on surrounding properties.

SOIL EROSION AND SEDIMENTATION CONTROL (All Phases)

For temporary condition or during construction a silt fence shall be provided along the property lines. Anti-tracking aprons shall be provided at all access routes from the site to the public road. A temporary diversion berm with stone check dams @ 50 ft o.c. shall be maintained and relocated as required during construction. All planting areas shall be protected with slope stabilization measures.

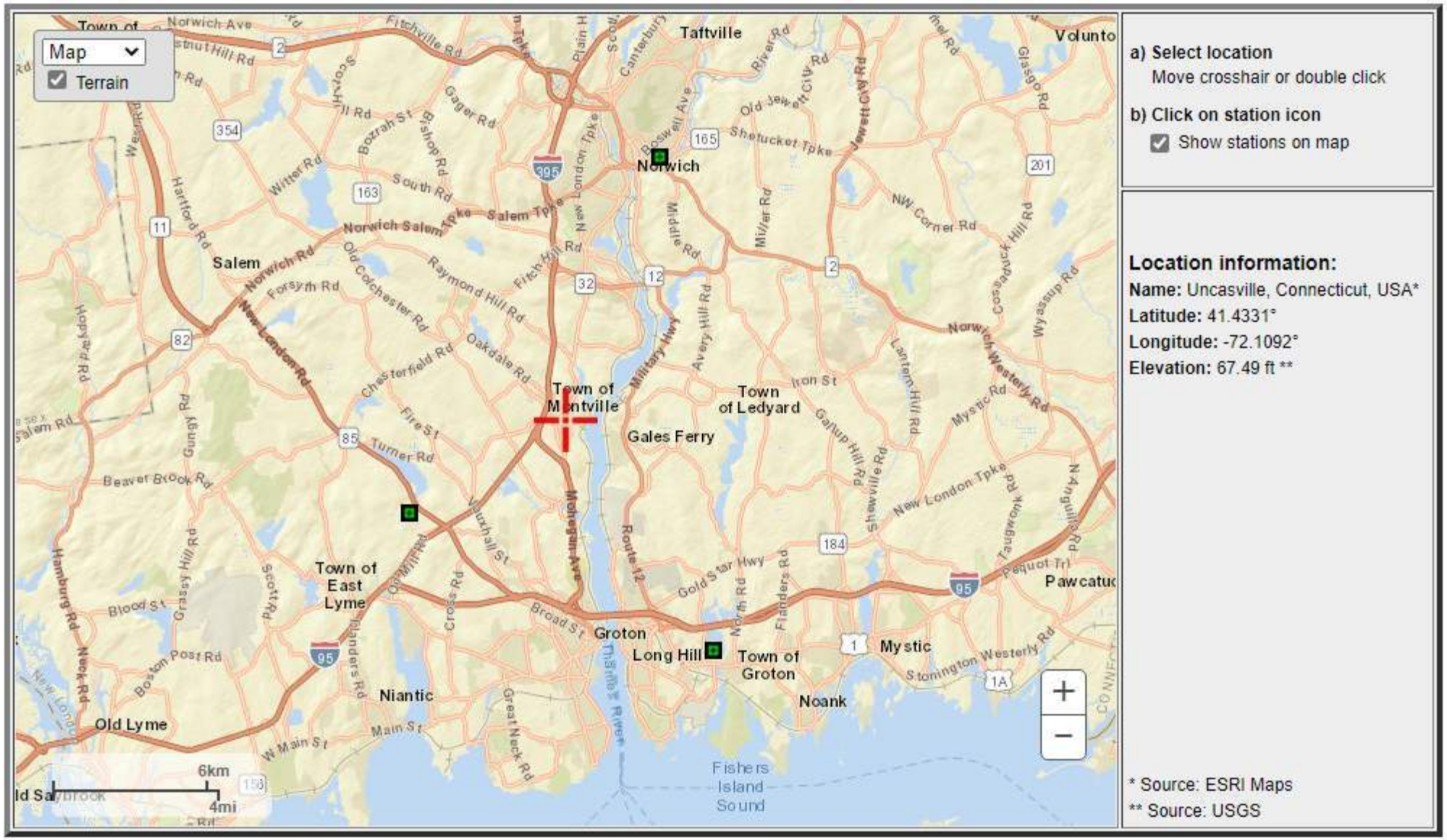
For permanent condition, all embankments, after being stabilized, shall be seeded to lawn or seed mixture as specified. Newly planted areas shall be covered with straw or erosion control blankets.

APPENDIX "A"

MONTVILLE PRECIPITATION FREQUENCY (PF) RAINFALL DATA

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CT

#245 Norwich New London Road (CT State RTE. 32) Montville, CT



NOAA Atlas 14, Volume 10, Version 3
Location name: Uncasville, Connecticut, USA*
Latitude: 41.4331°, Longitude: -72.1092°
Elevation: 67.49 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.340** (0.266-0.427)	**0.406** (0.317-0.510)	**0.514** (0.400-0.648)	**0.604** (0.467-0.763)	**0.727** (0.545-0.952)	**0.820** (0.601-1.09)	**0.918** (0.654-1.26)	**1.03** (0.693-1.43)	**1.19** (0.770-1.70)	**1.32** (0.835-1.91)
10-min	**0.482** (0.377-0.605)	**0.576** (0.449-0.723)	**0.729** (0.567-0.918)	**0.856** (0.662-1.08)	**1.03** (0.772-1.35)	**1.16** (0.853-1.55)	**1.30** (0.926-1.78)	**1.46** (0.982-2.02)	**1.68** (1.09-2.40)	**1.87** (1.18-2.71)
15-min	**0.567** (0.443-0.712)	**0.677** (0.529-0.851)	**0.857** (0.667-1.08)	**1.01** (0.779-1.27)	**1.21** (0.908-1.59)	**1.37** (1.00-1.82)	**1.53** (1.09-2.10)	**1.71** (1.16-2.38)	**1.98** (1.28-2.83)	**2.20** (1.39-3.19)
30-min	**0.803** (0.627-1.01)	**0.958** (0.747-1.20)	**1.21** (0.942-1.53)	**1.42** (1.10-1.80)	**1.71** (1.28-2.24)	**1.93** (1.41-2.57)	**2.16** (1.54-2.96)	**2.42** (1.63-3.36)	**2.79** (1.81-3.99)	**3.10** (1.96-4.50)
60-min	**1.04** (0.811-1.30)	**1.24** (0.966-1.56)	**1.57** (1.22-1.97)	**1.84** (1.42-2.32)	**2.21** (1.66-2.89)	**2.49** (1.83-3.32)	**2.79** (1.99-3.82)	**3.12** (2.10-4.34)	**3.61** (2.34-5.15)	**4.01** (2.53-5.81)
2-hr	**1.36** (1.08-1.70)	**1.63** (1.28-2.03)	**2.05** (1.61-2.57)	**2.41** (1.88-3.02)	**2.90** (2.19-3.77)	**3.26** (2.41-4.31)	**3.65** (2.62-4.97)	**4.10** (2.78-5.65)	**4.75** (3.09-6.72)	**5.28** (3.36-7.59)
3-hr	**1.58** (1.25-1.96)	**1.89** (1.49-2.34)	**2.38** (1.88-2.96)	**2.79** (2.19-3.48)	**3.35** (2.54-4.34)	**3.78** (2.81-4.97)	**4.22** (3.05-5.73)	**4.74** (3.22-6.50)	**5.49** (3.59-7.74)	**6.12** (3.90-8.75)
6-hr	**2.01** (1.60-2.47)	**2.39** (1.90-2.94)	**3.00** (2.39-3.70)	**3.51** (2.78-4.35)	**4.22** (3.22-5.41)	**4.75** (3.55-6.19)	**5.30** (3.85-7.13)	**5.95** (4.07-8.08)	**6.89** (4.52-9.61)	**7.67** (4.91-10.9)
12-hr	**2.48** (2.00-3.02)	**2.94** (2.36-3.59)	**3.69** (2.96-4.52)	**4.31** (3.44-5.30)	**5.17** (3.98-6.58)	**5.81** (4.38-7.52)	**6.49** (4.74-8.65)	**7.28** (5.00-9.80)	**8.42** (5.55-11.6)	**9.37** (6.02-13.2)
24-hr	**2.90** (2.36-3.51)	**3.46** (2.80-4.18)	**4.36** (3.53-5.30)	**5.12** (4.11-6.24)	**6.15** (4.77-7.77)	**6.93** (5.26-8.89)	**7.75** (5.71-10.3)	**8.71** (6.02-11.6)	**10.1** (6.71-13.9)	**11.3** (7.31-15.7)
2-day	**3.25** (2.66-3.89)	**3.91** (3.20-4.69)	**4.99** (4.06-6.00)	**5.88** (4.77-7.11)	**7.12** (5.57-8.92)	**8.03** (6.15-10.3)	**9.02** (6.71-11.9)	**10.2** (7.09-13.5)	**12.0** (7.97-16.3)	**13.5** (8.75-18.6)
3-day	**3.52** (2.90-4.20)	**4.23** (3.48-5.06)	**5.40** (4.43-6.47)	**6.37** (5.19-7.66)	**7.70** (6.06-9.62)	**8.69** (6.69-11.0)	**9.76** (7.29-12.8)	**11.0** (7.70-14.5)	**13.0** (8.66-17.5)	**14.6** (9.51-20.0)
4-day	**3.78** (3.12-4.50)	**4.53** (3.74-5.39)	**5.75** (4.73-6.87)	**6.77** (5.53-8.12)	**8.17** (6.45-10.2)	**9.21** (7.11-11.7)	**10.3** (7.73-13.5)	**11.7** (8.15-15.3)	**13.7** (9.16-18.4)	**15.4** (10.0-21.0)
7-day	**4.50** (3.75-5.33)	**5.32** (4.43-6.30)	**6.66** (5.52-7.90)	**7.77** (6.40-9.26)	**9.30** (7.38-11.5)	**10.4** (8.10-13.1)	**11.7** (8.75-15.1)	**13.1** (9.20-17.0)	**15.2** (10.2-20.3)	**17.0** (11.1-23.1)
10-day	**5.22** (4.37-6.15)	**6.08** (5.08-7.16)	**7.48** (6.22-8.83)	**8.64** (7.14-10.2)	**10.2** (8.16-12.5)	**11.4** (8.90-14.2)	**12.7** (9.55-16.3)	**14.2** (9.99-18.4)	**16.3** (11.0-21.6)	**18.0** (11.8-24.3)
20-day	**7.42** (6.26-8.66)	**8.33** (7.03-9.74)	**9.83** (8.25-11.5)	**11.1** (9.23-13.0)	**12.8** (10.2-15.4)	**14.1** (11.0-17.2)	**15.4** (11.5-19.3)	**16.8** (11.9-21.5)	**18.7** (12.7-24.6)	**20.1** (13.3-26.9)
30-day	**9.25** (7.85-10.7)	**10.2** (8.65-11.9)	**11.8** (9.92-13.7)	**13.0** (10.9-15.3)	**14.8** (11.9-17.7)	**16.2** (12.7-19.6)	**17.5** (13.1-21.7)	**18.9** (13.5-24.0)	**20.5** (14.0-26.8)	**21.7** (14.4-28.9)
45-day	**11.5** (9.82-13.3)	**12.5** (10.7-14.5)	**14.1** (12.0-16.4)	**15.5** (13.1-18.0)	**17.4** (14.0-20.7)	**18.9** (14.8-22.7)	**20.3** (15.2-24.8)	**21.5** (15.4-27.2)	**23.0** (15.7-29.9)	**24.0** (15.9-31.7)
60-day	**13.4** (11.5-15.4)	**14.4** (12.3-16.6)	**16.2** (13.8-18.7)	**17.6** (14.9-20.4)	**19.6** (15.8-23.1)	**21.1** (16.6-25.3)	**22.6** (16.9-27.5)	**23.8** (17.1-30.0)	**25.2** (17.3-32.6)	**26.1** (17.4-34.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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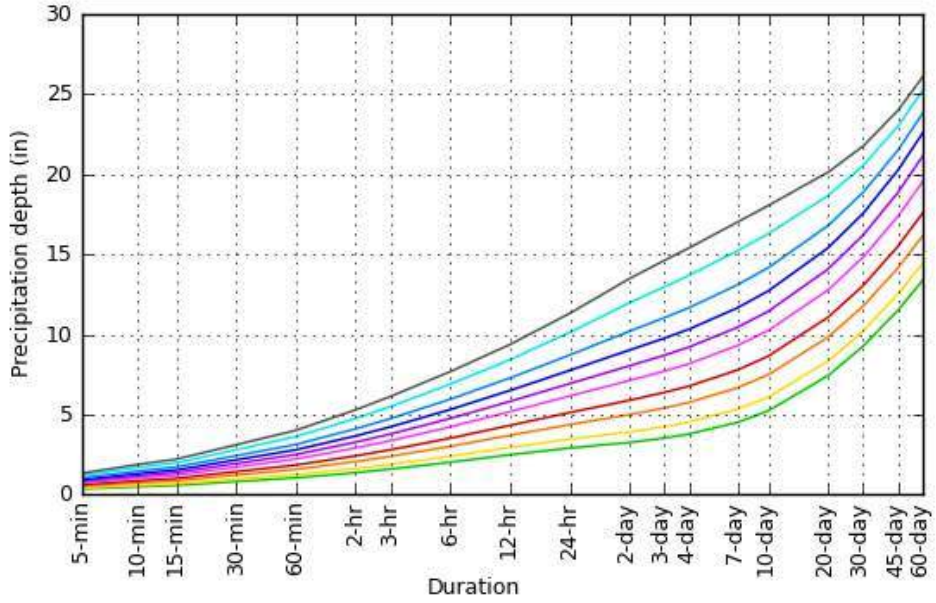
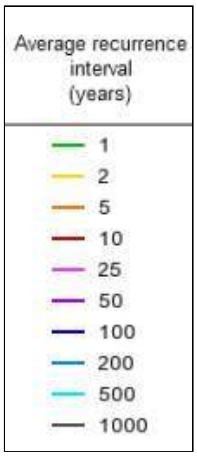
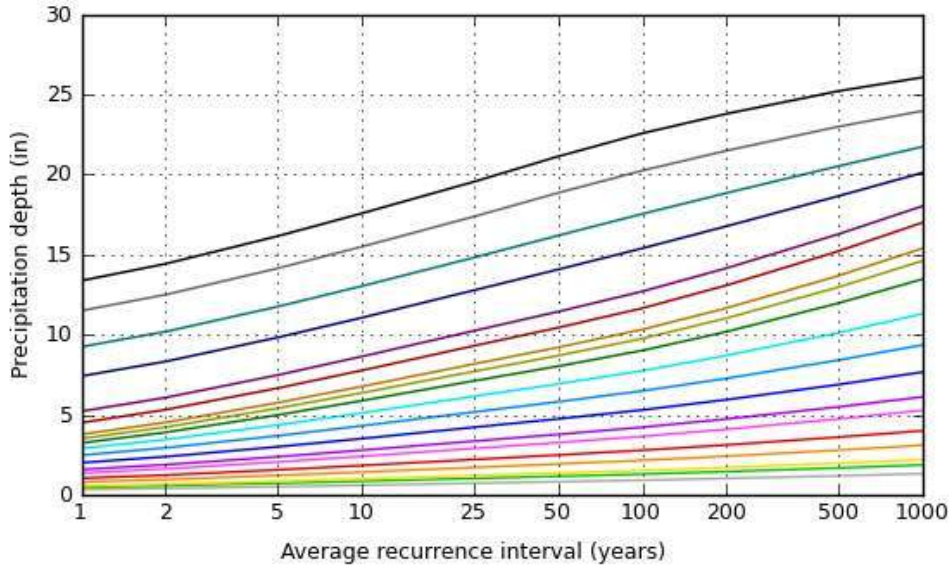
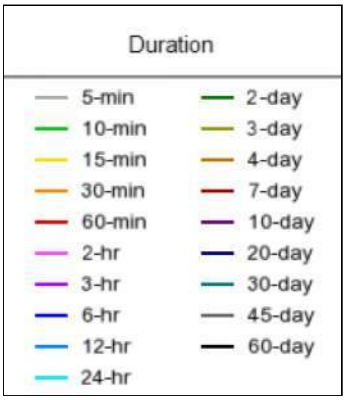
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 41.4331°, Longitude: -72.1092°









NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Thu Jan 20 18:50:23 2022

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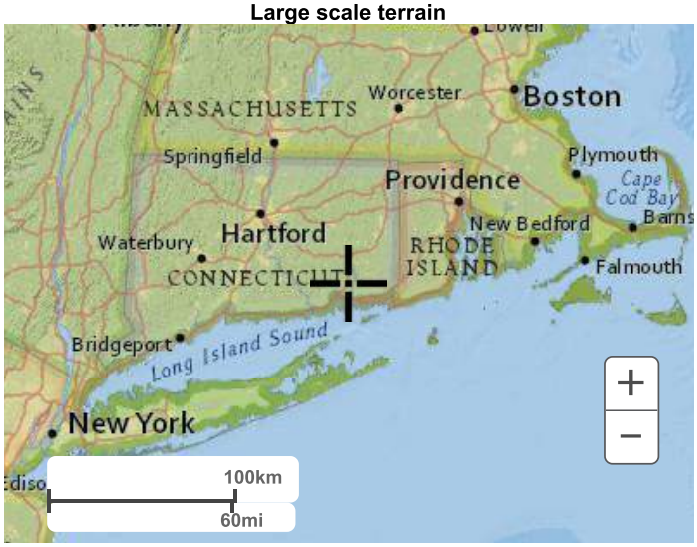
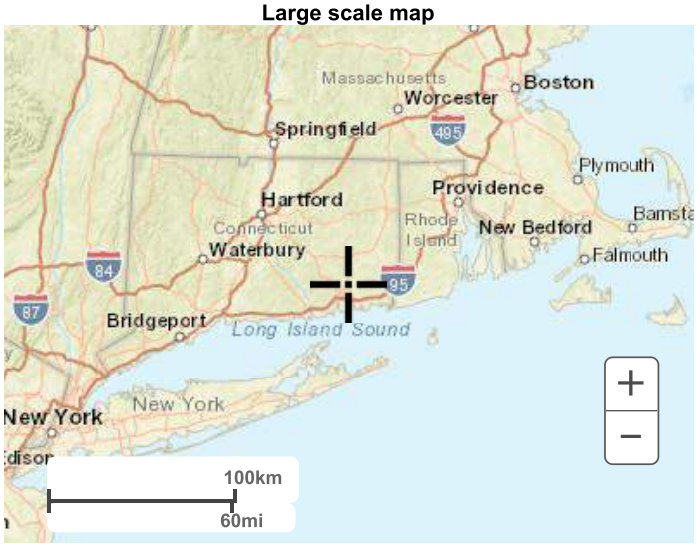
Maps & aerials

Small scale terrain

Large scale terrain



Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX “B”

NRCS SOIL MAP AND HYDROLOGIC SOIL GROUP RATINGS

Map Scale: 1:894 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

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, Eastern Part
Survey Area Data: Version 2, Aug 30, 2024

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

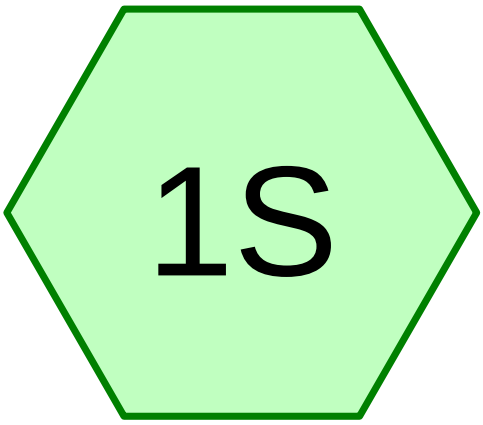
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
38C	Hinckley loamy sand, 3 to 15 percent slopes	0.1	3.2%
66B	Narragansett silt loam, 2 to 8 percent slopes	2.4	96.0%
68C	Narragansett silt loam, 3 to 15 percent slopes, extremely stony	0.0	0.7%
Totals for Area of Interest		**2.5**	**100.0%**

APPENDIX “C”

HYDROCAD ANALYSIS
PHASE 1



Existing Conditions

Subcat Reach Pond Link

Routing Diagram for 2578Existing
Prepared by Fairfield County Engineering LLC, Printed 2/6/2025
HydroCAD® 10.00-26 s/n 06020 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: Existing Conditions

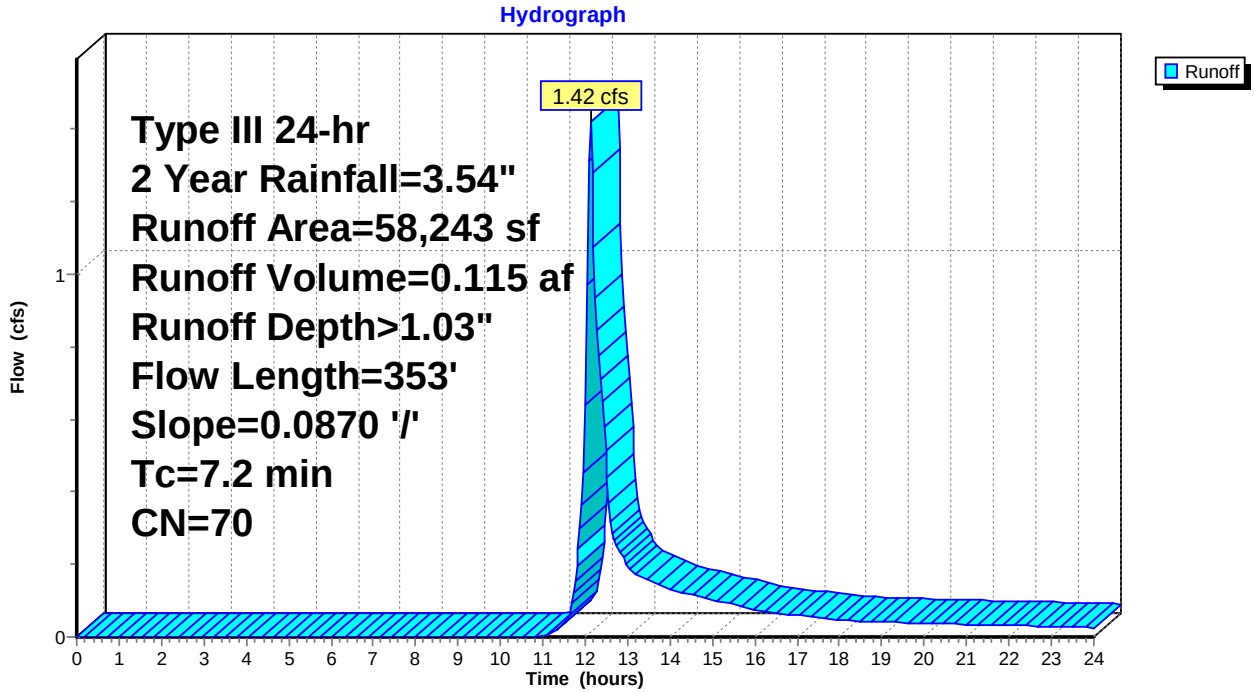
Runoff = 1.42 cfs @ 12.12 hrs, Volume= 0.115 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2 Year Rainfall=3.54"

	Area (sf)	CN	Description
*	1,072	98	Buildings
*	1,107	98	Driveway
*	243	98	Concrete slab
	55,821	69	50-75% Grass cover, Fair, HSG B
	58,243	70	Weighted Average
	55,821		95.84% Pervious Area
	2,422		4.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions



Summary for Subcatchment 1S: Existing Conditions

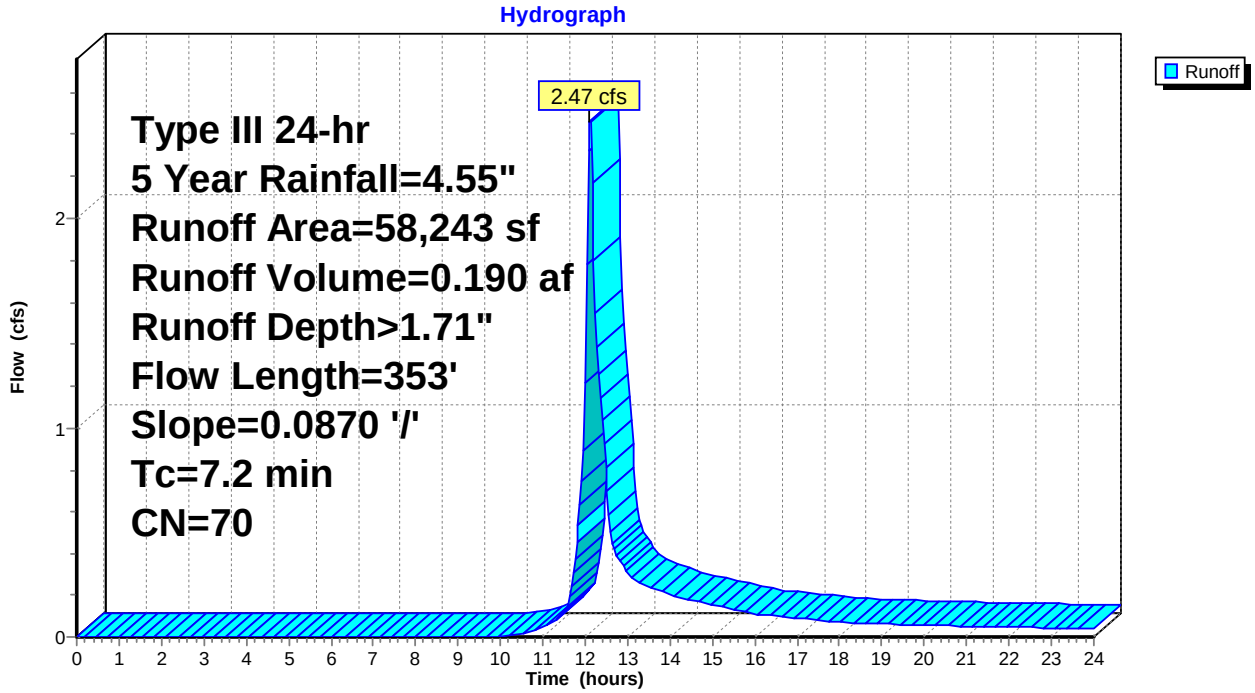
Runoff = 2.47 cfs @ 12.11 hrs, Volume= 0.190 af, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 5 Year Rainfall=4.55"

	Area (sf)	CN	Description
*	1,072	98	Buildings
*	1,107	98	Driveway
*	243	98	Concrete slab
	55,821	69	50-75% Grass cover, Fair, HSG B
	58,243	70	Weighted Average
	55,821		95.84% Pervious Area
	2,422		4.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions



Summary for Subcatchment 1S: Existing Conditions

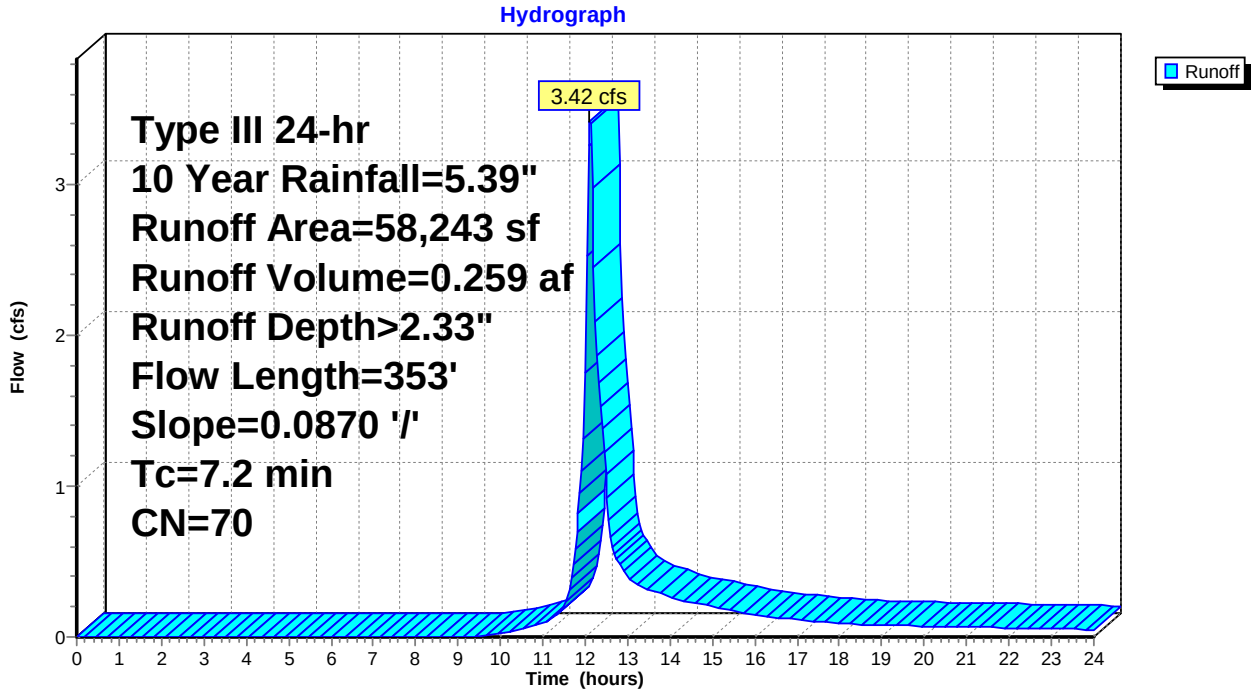
Runoff = 3.42 cfs @ 12.11 hrs, Volume= 0.259 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10 Year Rainfall=5.39"

	Area (sf)	CN	Description
*	1,072	98	Buildings
*	1,107	98	Driveway
*	243	98	Concrete slab
	55,821	69	50-75% Grass cover, Fair, HSG B
	58,243	70	Weighted Average
	55,821		95.84% Pervious Area
	2,422		4.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions



Summary for Subcatchment 1S: Existing Conditions

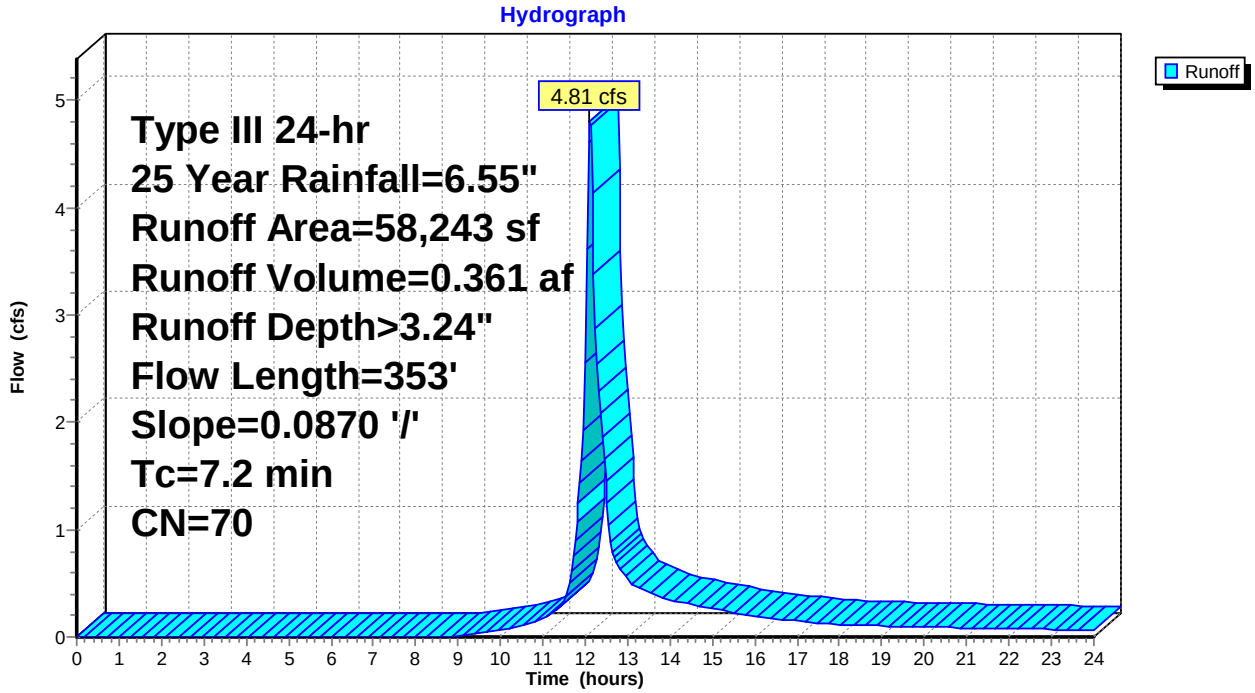
Runoff = 4.81 cfs @ 12.11 hrs, Volume= 0.361 af, Depth> 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25 Year Rainfall=6.55"

	Area (sf)	CN	Description
*	1,072	98	Buildings
*	1,107	98	Driveway
*	243	98	Concrete slab
	55,821	69	50-75% Grass cover, Fair, HSG B
	58,243	70	Weighted Average
	55,821		95.84% Pervious Area
	2,422		4.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions



Summary for Subcatchment 1S: Existing Conditions

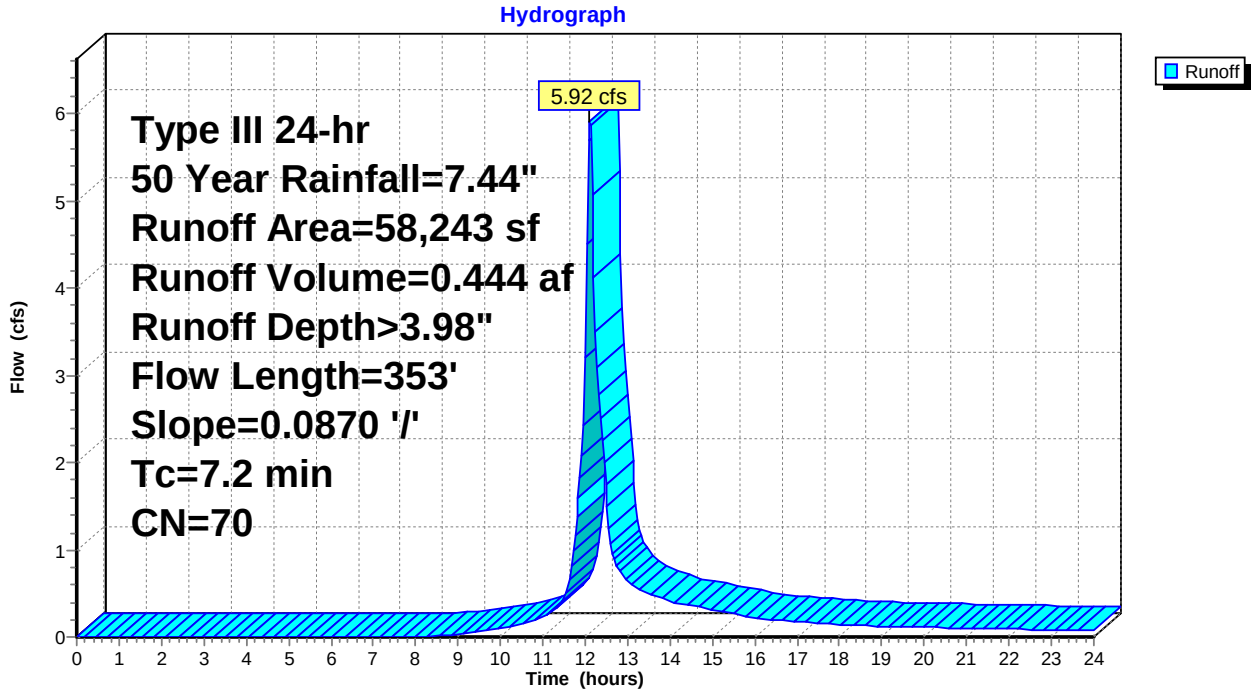
Runoff = 5.92 cfs @ 12.11 hrs, Volume= 0.444 af, Depth> 3.98"

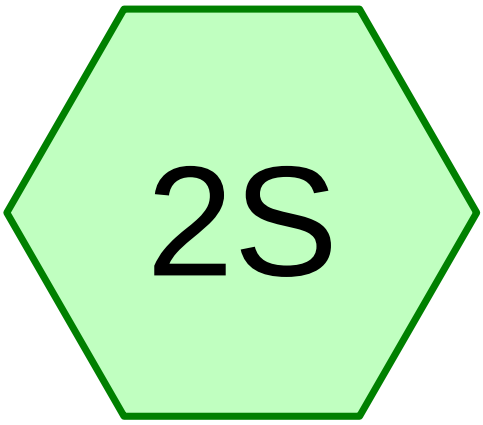
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 50 Year Rainfall=7.44"

	Area (sf)	CN	Description
*	1,072	98	Buildings
*	1,107	98	Driveway
*	243	98	Concrete slab
	55,821	69	50-75% Grass cover, Fair, HSG B
	58,243	70	Weighted Average
	55,821		95.84% Pervious Area
	2,422		4.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions





Proposed Conditions

Subcat Reach Pond Link

Routing Diagram for 2578Proposed
Prepared by Fairfield County Engineering LLC, Printed 2/6/2025
HydroCAD® 10.00-26 s/n 06020 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 2S: Proposed Conditions

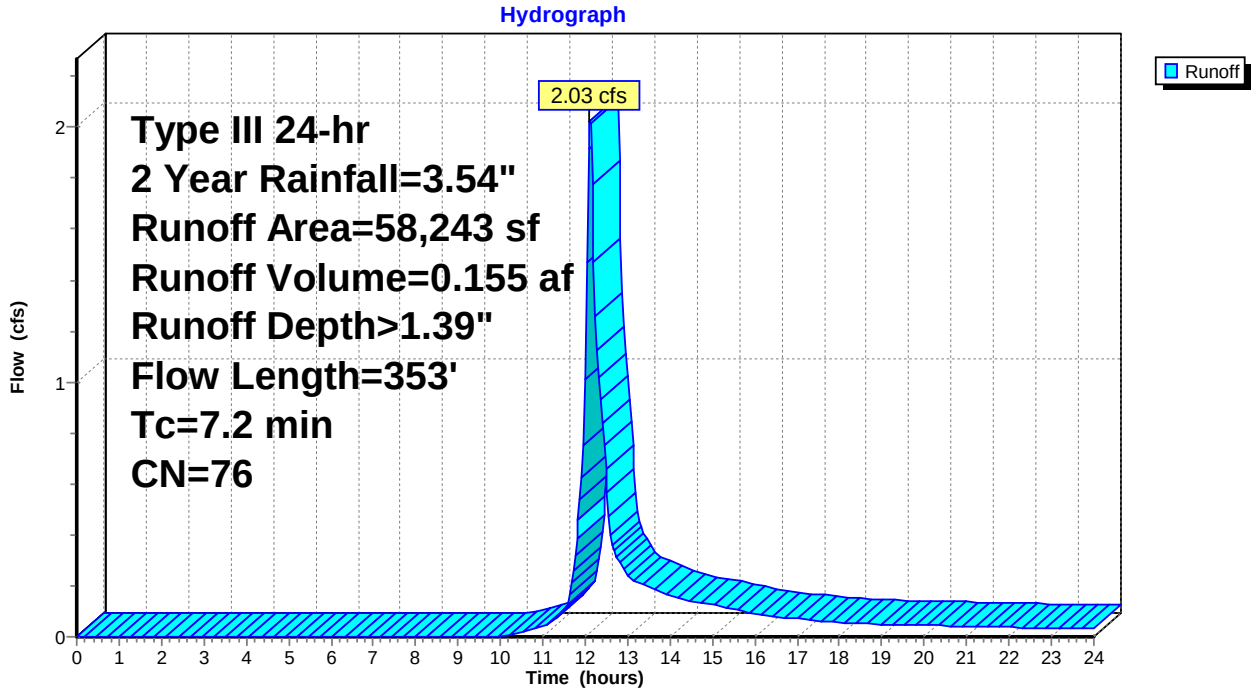
Runoff = 2.03 cfs @ 12.11 hrs, Volume= 0.155 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2 Year Rainfall=3.54"

	Area (sf)	CN	Description
*	4,741	98	Building
*	9,018	98	Driveway/Parking
	44,484	69	50-75% Grass cover, Fair, HSG B
	58,243	76	Weighted Average
	44,484		76.38% Pervious Area
	13,759		23.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions



Summary for Subcatchment 2S: Proposed Conditions

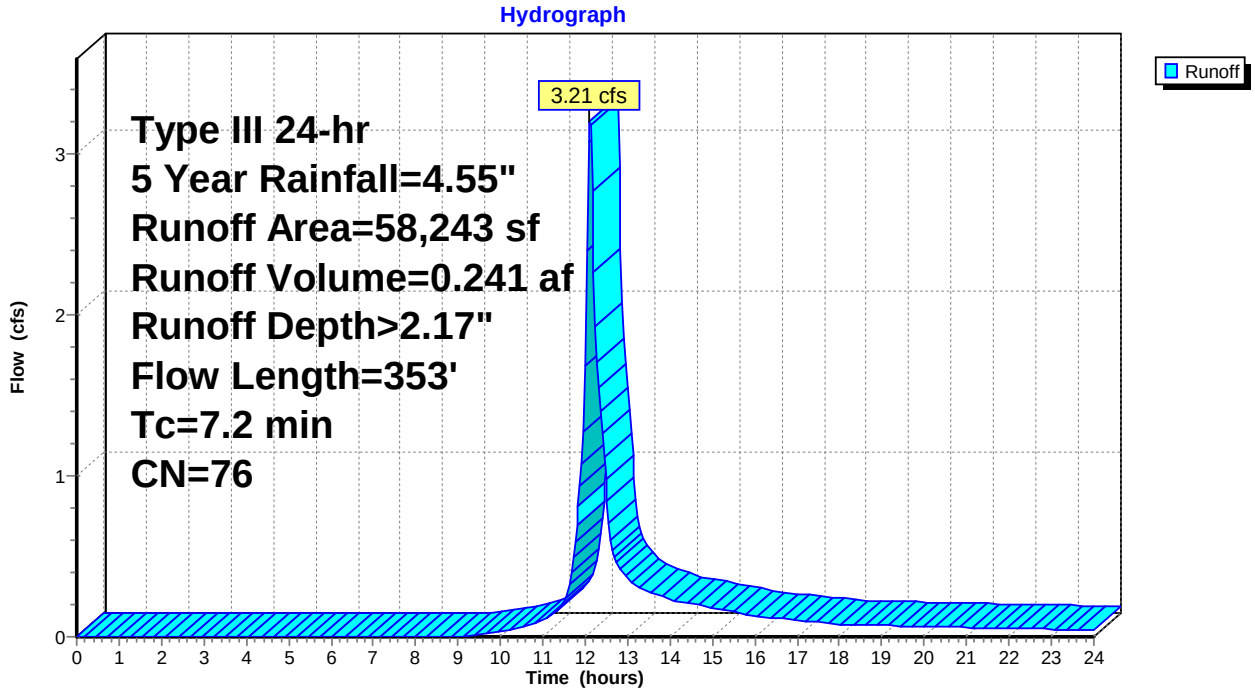
Runoff = 3.21 cfs @ 12.11 hrs, Volume= 0.241 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 5 Year Rainfall=4.55"

	Area (sf)	CN	Description
*	4,741	98	Building
*	9,018	98	Driveway/Parking
	44,484	69	50-75% Grass cover, Fair, HSG B
	58,243	76	Weighted Average
	44,484		76.38% Pervious Area
	13,759		23.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions



Summary for Subcatchment 2S: Proposed Conditions

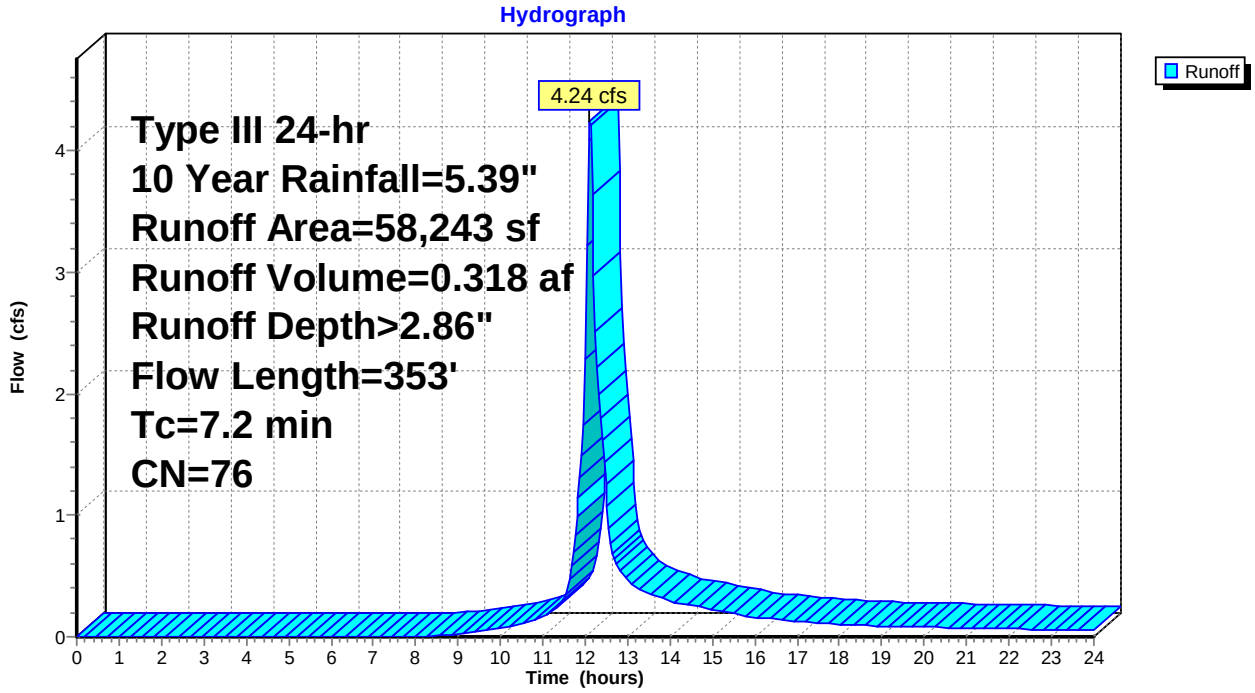
Runoff = 4.24 cfs @ 12.11 hrs, Volume= 0.318 af, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10 Year Rainfall=5.39"

	Area (sf)	CN	Description
*	4,741	98	Building
*	9,018	98	Driveway/Parking
	44,484	69	50-75% Grass cover, Fair, HSG B
	58,243	76	Weighted Average
	44,484		76.38% Pervious Area
	13,759		23.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions



Summary for Subcatchment 2S: Proposed Conditions

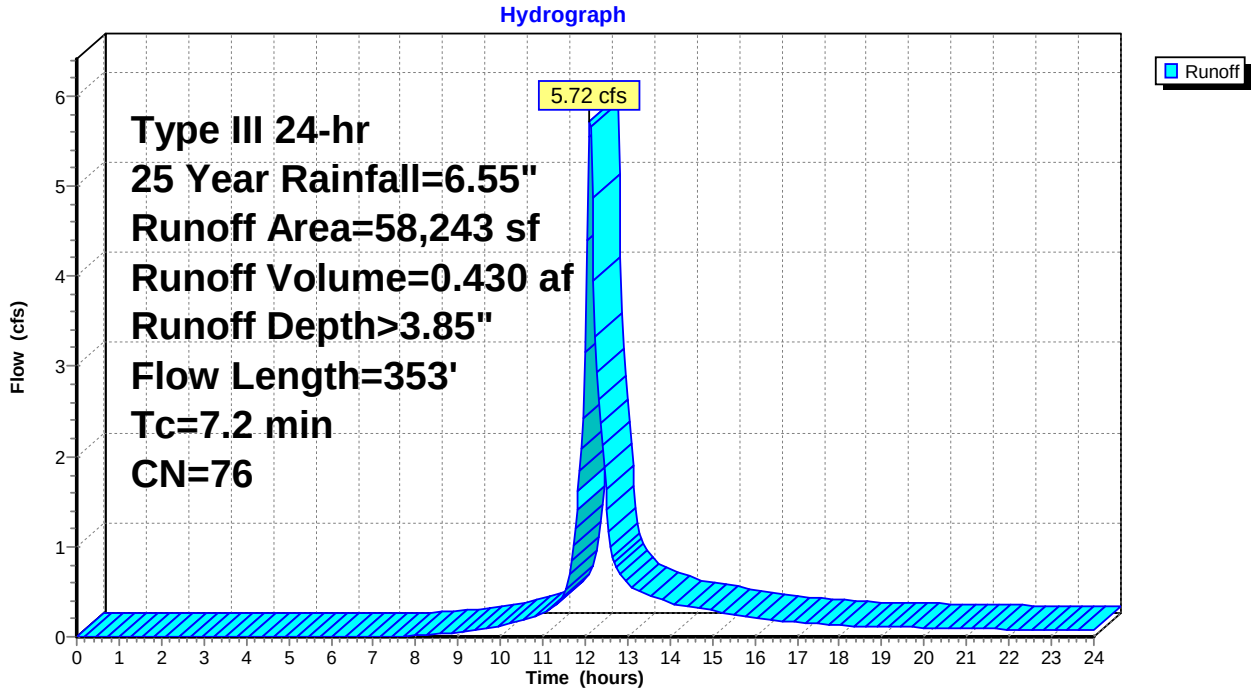
Runoff = 5.72 cfs @ 12.11 hrs, Volume= 0.430 af, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25 Year Rainfall=6.55"

	Area (sf)	CN	Description
*	4,741	98	Building
*	9,018	98	Driveway/Parking
	44,484	69	50-75% Grass cover, Fair, HSG B
	58,243	76	Weighted Average
	44,484		76.38% Pervious Area
	13,759		23.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions



Summary for Subcatchment 2S: Proposed Conditions

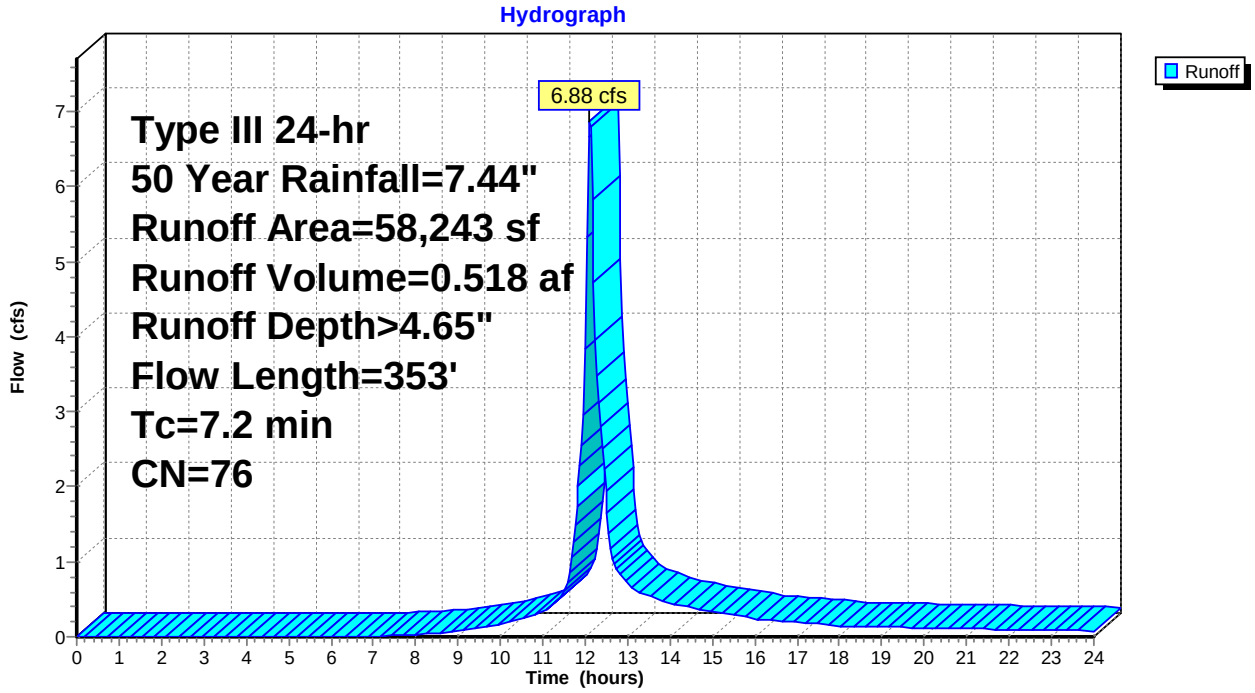
Runoff = 6.88 cfs @ 12.10 hrs, Volume= 0.518 af, Depth> 4.65"

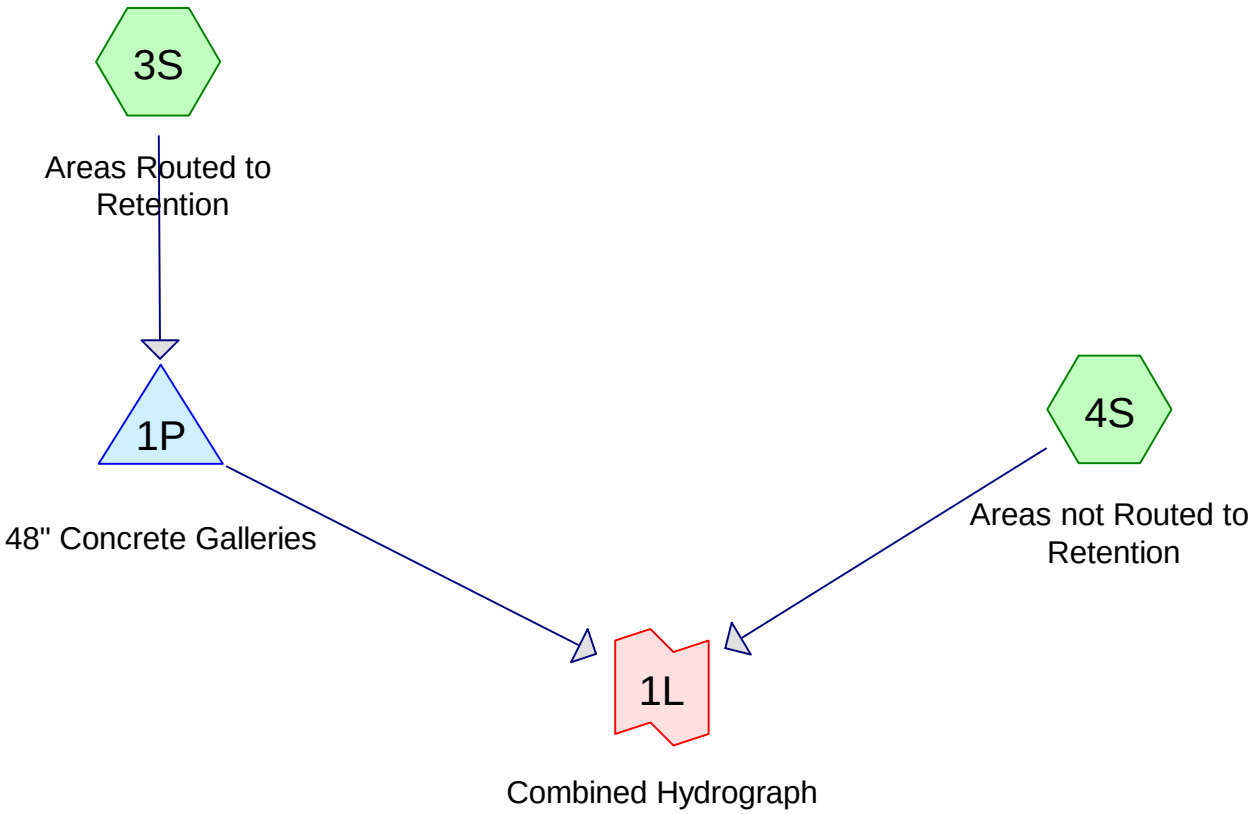
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 50 Year Rainfall=7.44"

	Area (sf)	CN	Description
*	4,741	98	Building
*	9,018	98	Driveway/Parking
	44,484	69	50-75% Grass cover, Fair, HSG B
	58,243	76	Weighted Average
	44,484		76.38% Pervious Area
	13,759		23.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions





Subcat Reach Pond Link

Routing Diagram for 2578Combined
Prepared by Fairfield County Engineering LLC, Printed 2/6/2025
HydroCAD® 10.00-26 s/n 06020 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 3S: Areas Routed to Retention

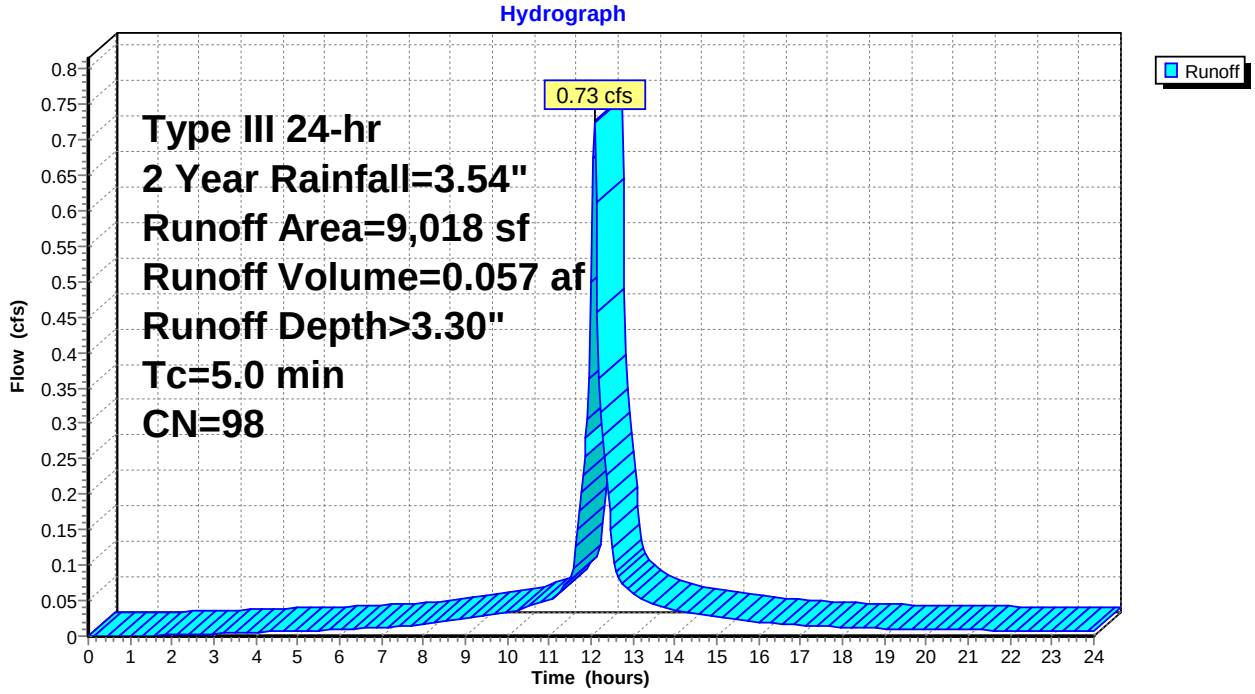
Runoff = 0.73 cfs @ 12.07 hrs, Volume= 0.057 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2 Year Rainfall=3.54"

	Area (sf)	CN	Description
*	9,018	98	Driveway/Parking
	9,018		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

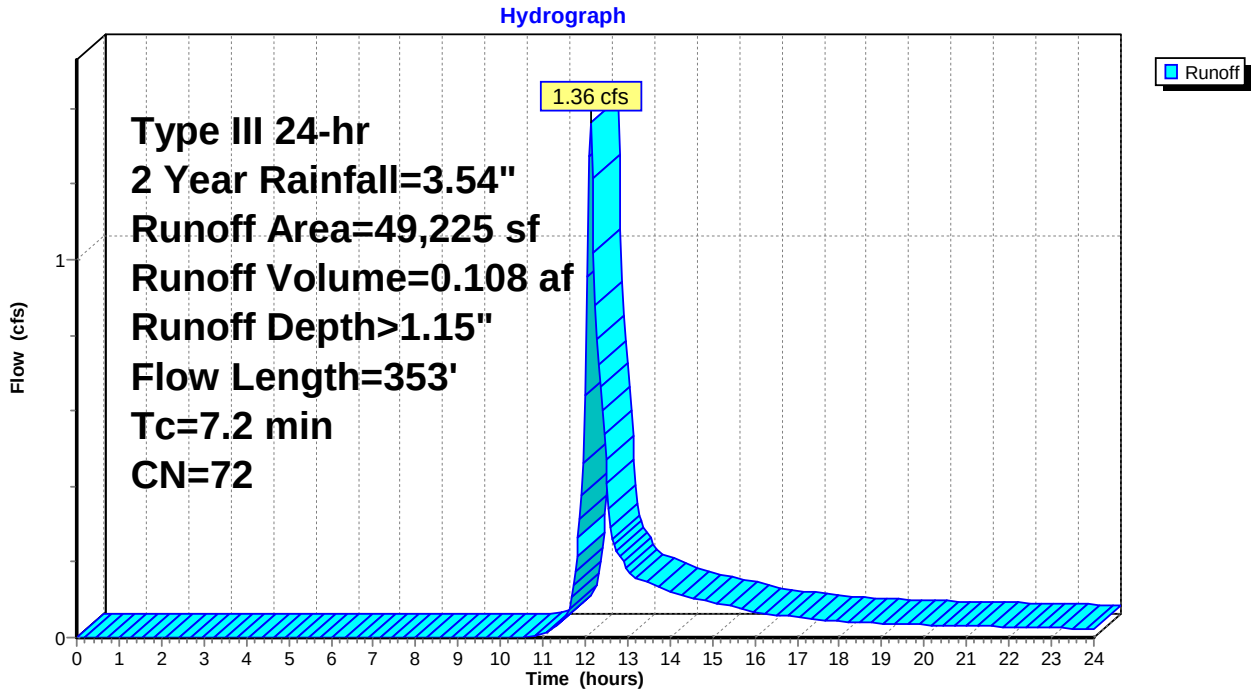
Runoff = 1.36 cfs @ 12.12 hrs, Volume= 0.108 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2 Year Rainfall=3.54"

	Area (sf)	CN	Description
*	4,741	98	Building
	44,484	69	50-75% Grass cover, Fair, HSG B
	49,225	72	Weighted Average
	44,484		90.37% Pervious Area
	4,741		9.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.207 ac,100.00% Impervious, Inflow Depth > 3.30" for 2 Year event
Inflow = 0.73 cfs @ 12.07 hrs, Volume= 0.057 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 100.03' @ 24.00 hrs Surf.Area= 900 sf Storage= 2,483 cf

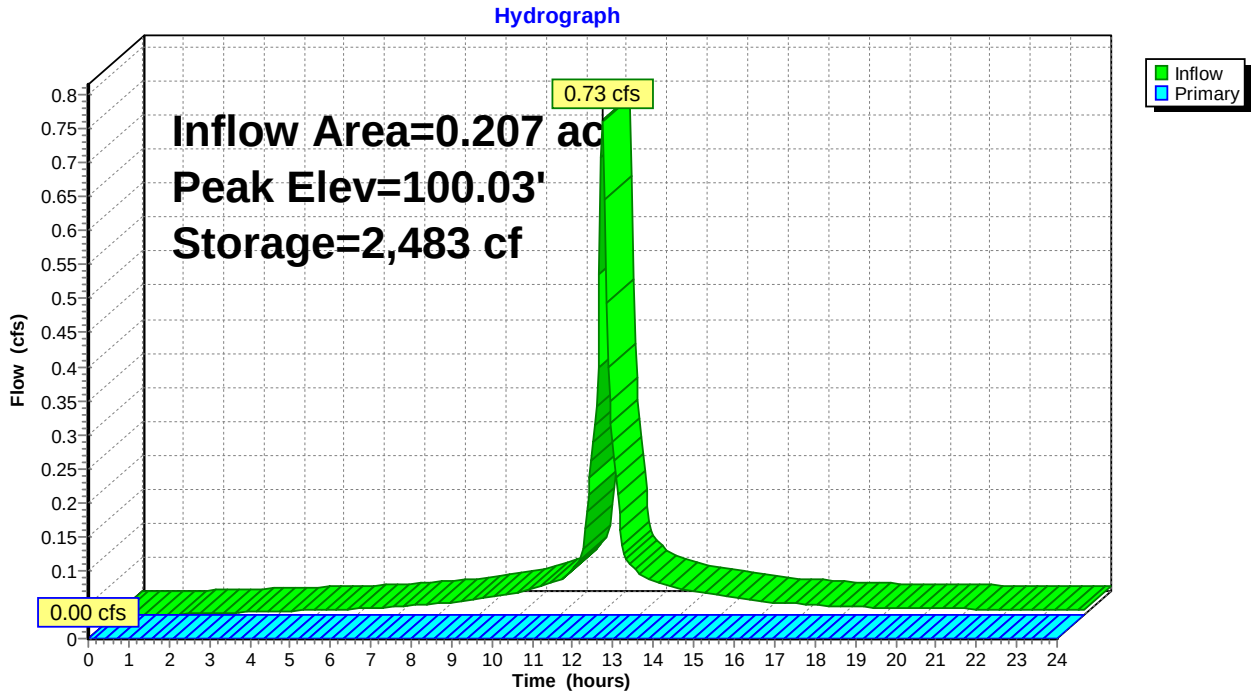
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	313 cf	**18.00'W x 50.00'L x 4.00'H Stone** 3,600 cf Overall - 2,819 cf Embedded = 781 cf x 40.0% Voids
#2	97.00'	2,819 cf	**16.00'W x 48.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		3,131 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=97.00' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: 48" Concrete Galleries

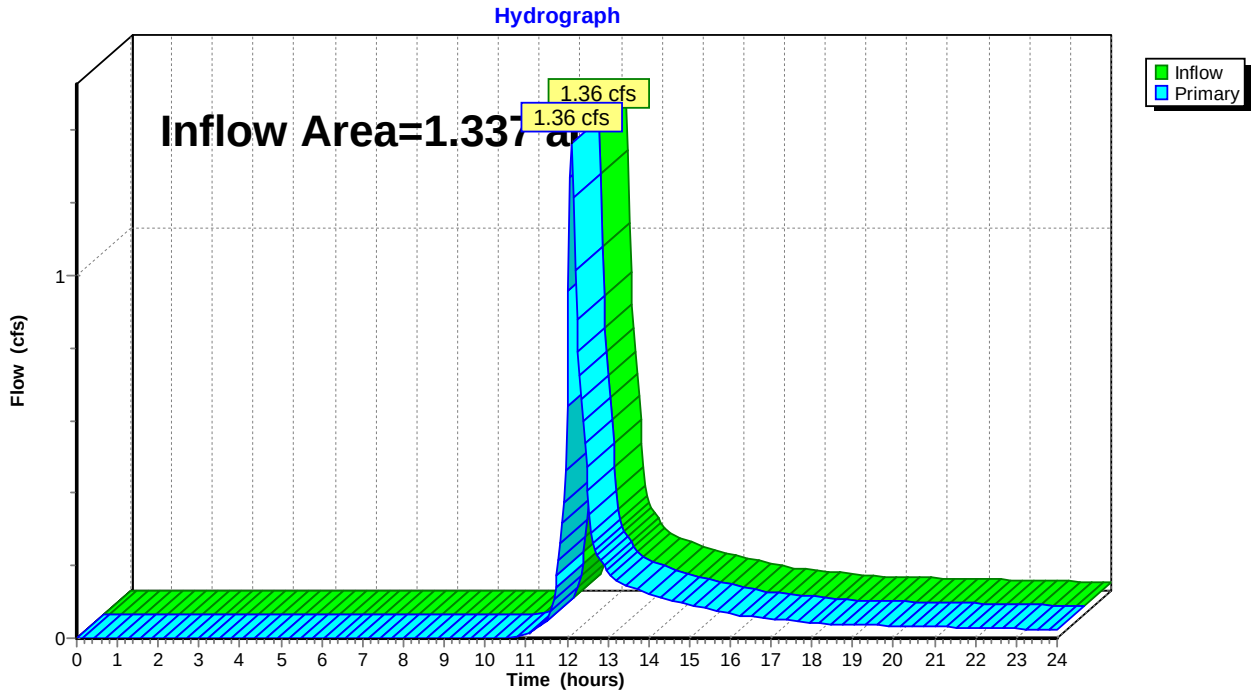


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.337 ac, 23.62% Impervious, Inflow Depth > 0.97" for 2 Year event
Inflow = 1.36 cfs @ 12.12 hrs, Volume= 0.108 af
Primary = 1.36 cfs @ 12.12 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



Summary for Subcatchment 3S: Areas Routed to Retention

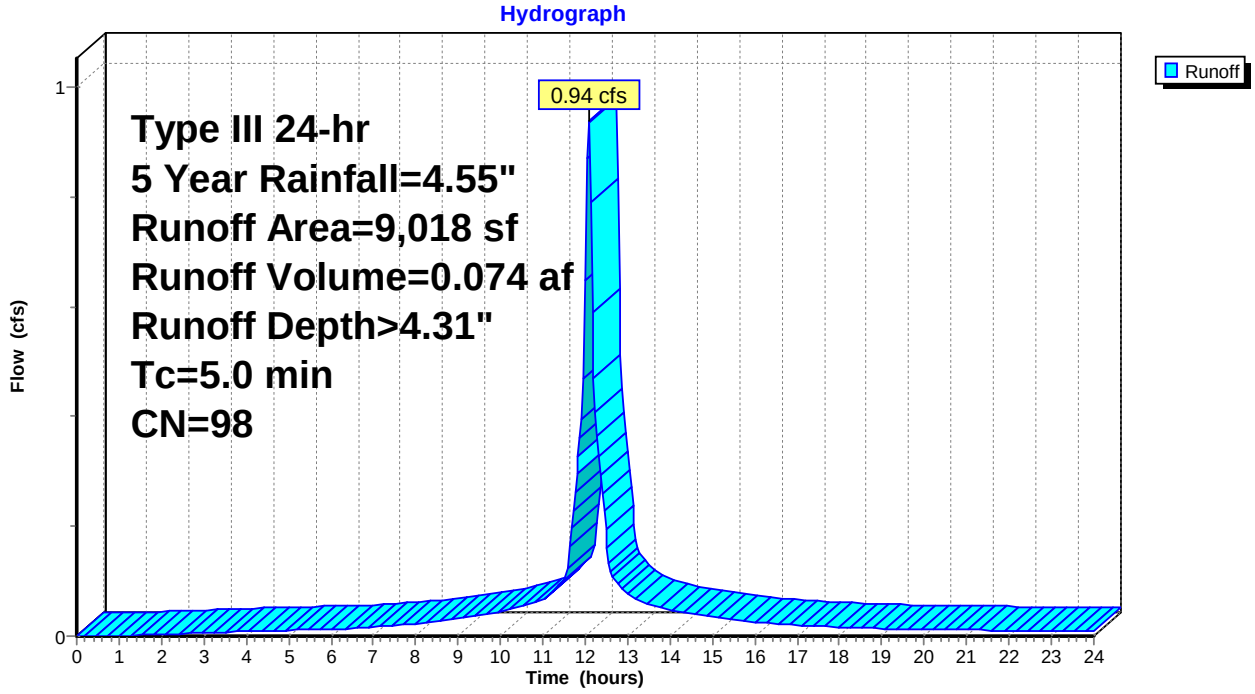
Runoff = 0.94 cfs @ 12.07 hrs, Volume= 0.074 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 5 Year Rainfall=4.55"

	Area (sf)	CN	Description
*	9,018	98	Driveway/Parking
	9,018		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

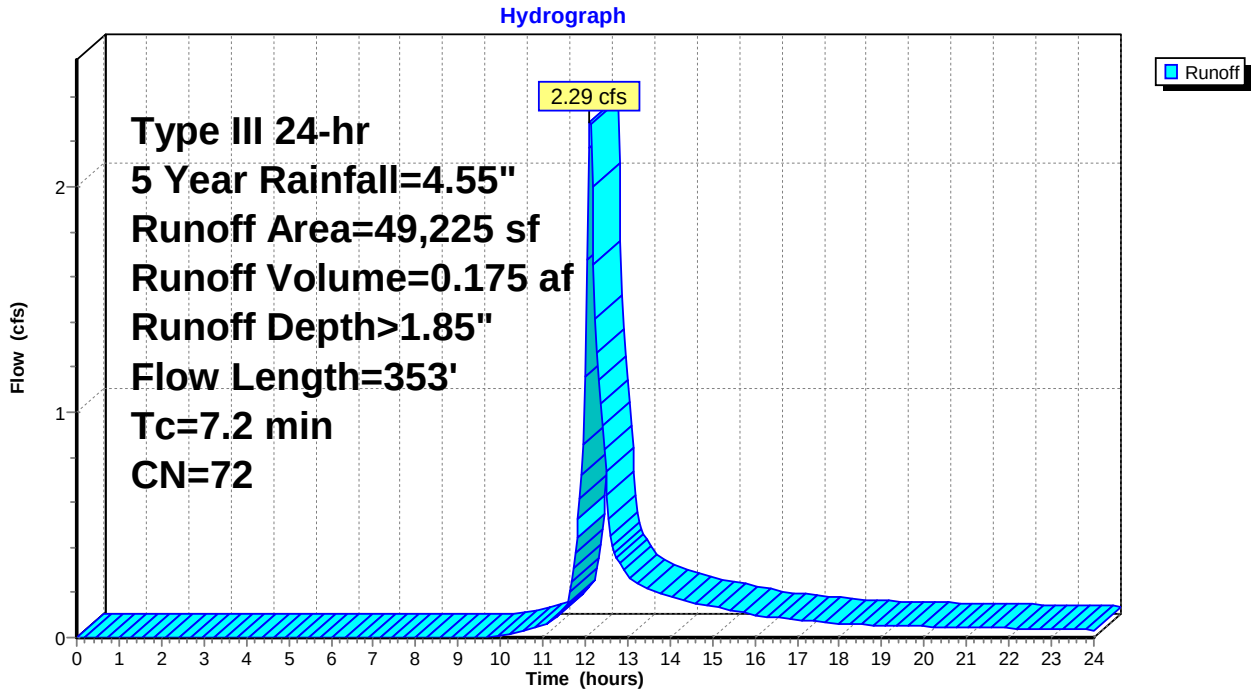
Runoff = 2.29 cfs @ 12.11 hrs, Volume= 0.175 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 5 Year Rainfall=4.55"

	Area (sf)	CN	Description
*	4,741	98	Building
	44,484	69	50-75% Grass cover, Fair, HSG B
	49,225	72	Weighted Average
	44,484		90.37% Pervious Area
	4,741		9.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.207 ac,100.00% Impervious, Inflow Depth > 4.31" for 5 Year event
Inflow = 0.94 cfs @ 12.07 hrs, Volume= 0.074 af
Outflow = 0.02 cfs @ 20.96 hrs, Volume= 0.003 af, Atten= 98%, Lag= 533.3 min
Primary = 0.02 cfs @ 20.96 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 101.02' @ 20.96 hrs Surf.Area= 900 sf Storage= 3,131 cf

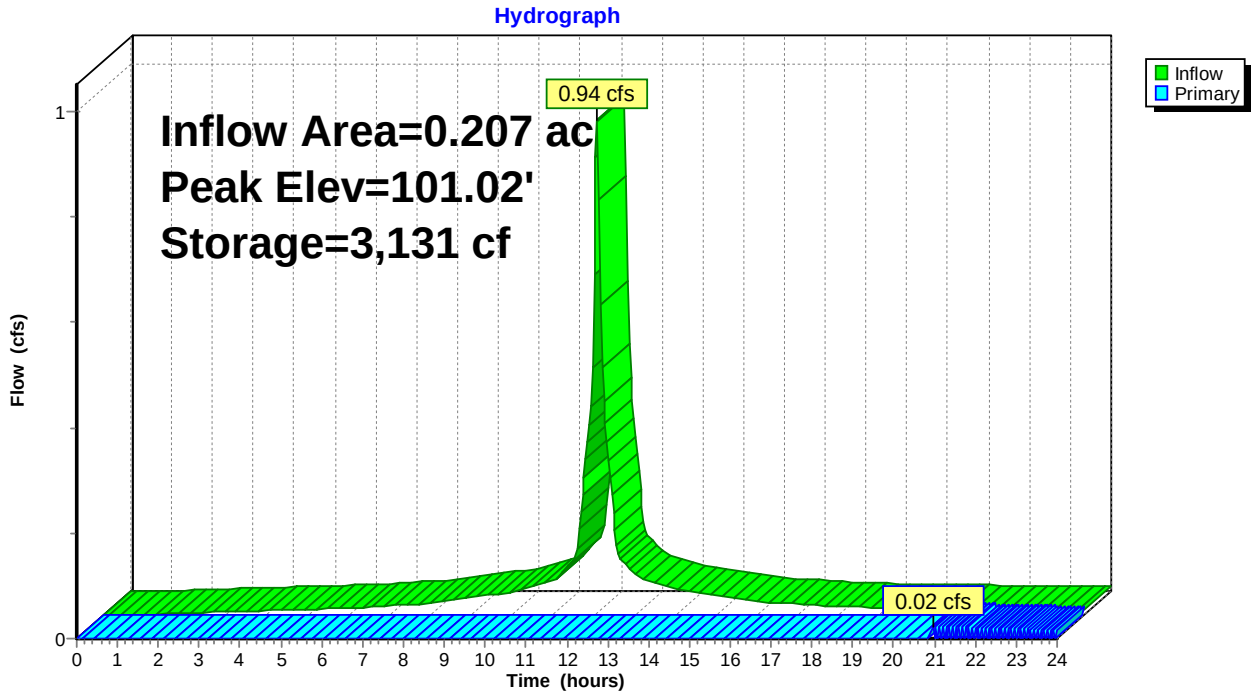
Plug-Flow detention time= 1,099.5 min calculated for 0.003 af (3% of inflow)
Center-of-Mass det. time= 595.1 min (1,343.5 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	313 cf	**18.00'W x 50.00'L x 4.00'H Stone** 3,600 cf Overall - 2,819 cf Embedded = 781 cf x 40.0% Voids
#2	97.00'	2,819 cf	**16.00'W x 48.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		3,131 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 20.96 hrs HW=101.02' (Free Discharge)
1=Orifice/Grate (Weir Controls 0.02 cfs @ 0.48 fps)

Pond 1P: 48" Concrete Galleries

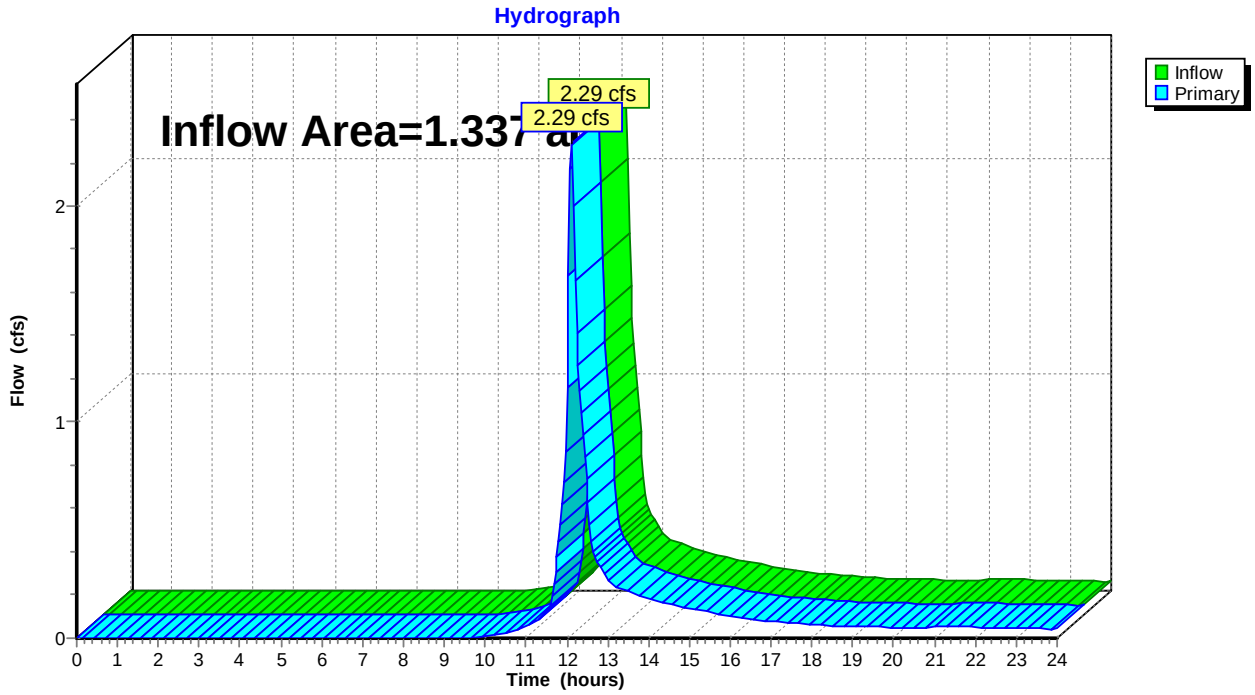


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.337 ac, 23.62% Impervious, Inflow Depth > 1.59" for 5 Year event
Inflow = 2.29 cfs @ 12.11 hrs, Volume= 0.177 af
Primary = 2.29 cfs @ 12.11 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



Summary for Subcatchment 3S: Areas Routed to Retention

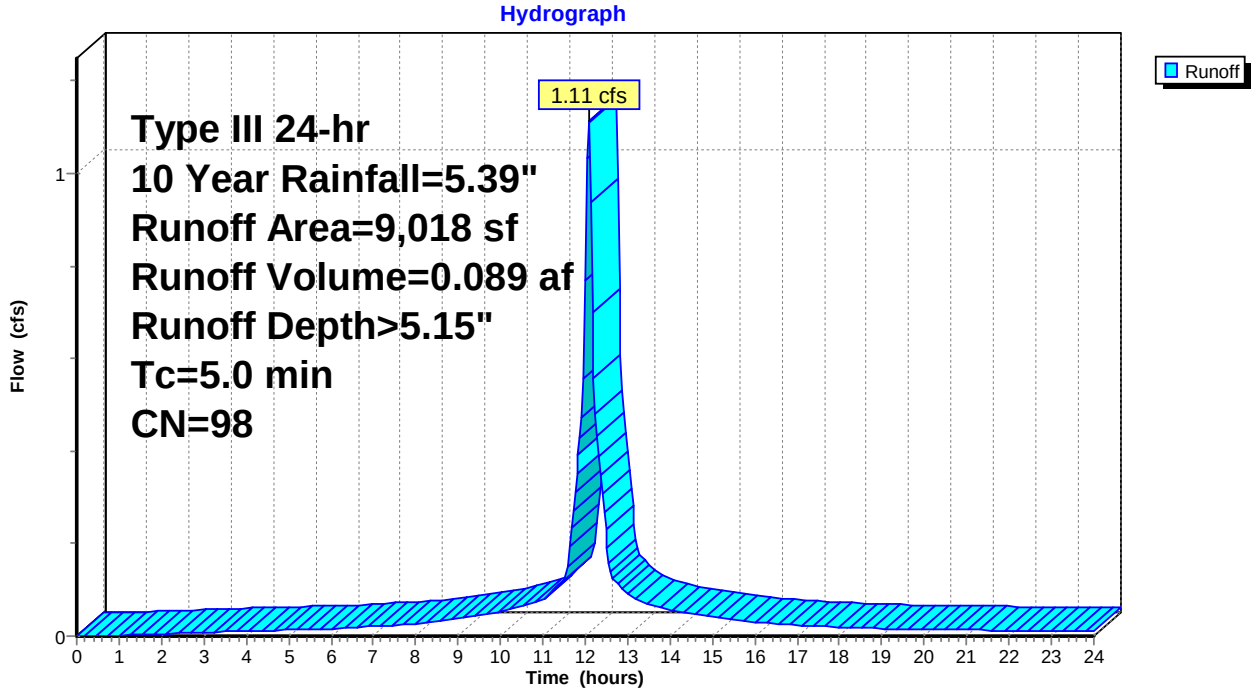
Runoff = 1.11 cfs @ 12.07 hrs, Volume= 0.089 af, Depth> 5.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10 Year Rainfall=5.39"

	Area (sf)	CN	Description
*	9,018	98	Driveway/Parking
	9,018		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

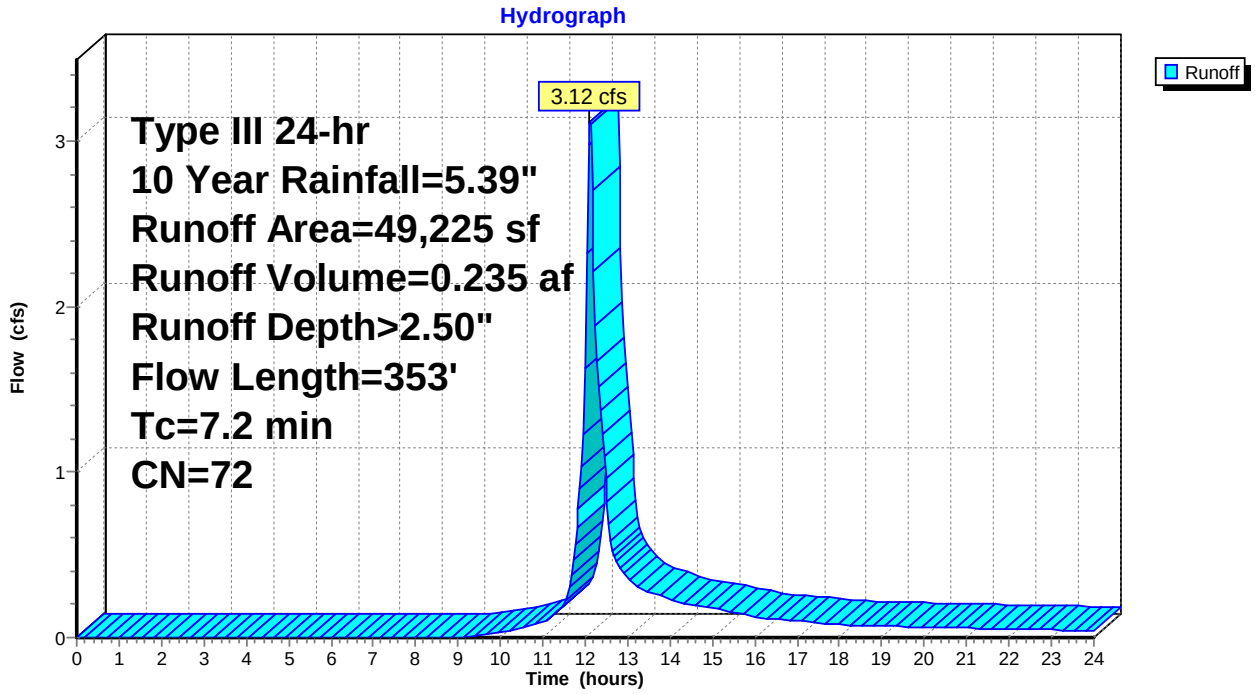
Runoff = 3.12 cfs @ 12.11 hrs, Volume= 0.235 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10 Year Rainfall=5.39"

	Area (sf)	CN	Description
*	4,741	98	Building
	44,484	69	50-75% Grass cover, Fair, HSG B
	49,225	72	Weighted Average
	44,484		90.37% Pervious Area
	4,741		9.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.207 ac,100.00% Impervious, Inflow Depth > 5.15" for 10 Year event
Inflow = 1.11 cfs @ 12.07 hrs, Volume= 0.089 af
Outflow = 0.10 cfs @ 14.24 hrs, Volume= 0.017 af, Atten= 91%, Lag= 130.1 min
Primary = 0.10 cfs @ 14.24 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 101.07' @ 14.24 hrs Surf.Area= 900 sf Storage= 3,131 cf

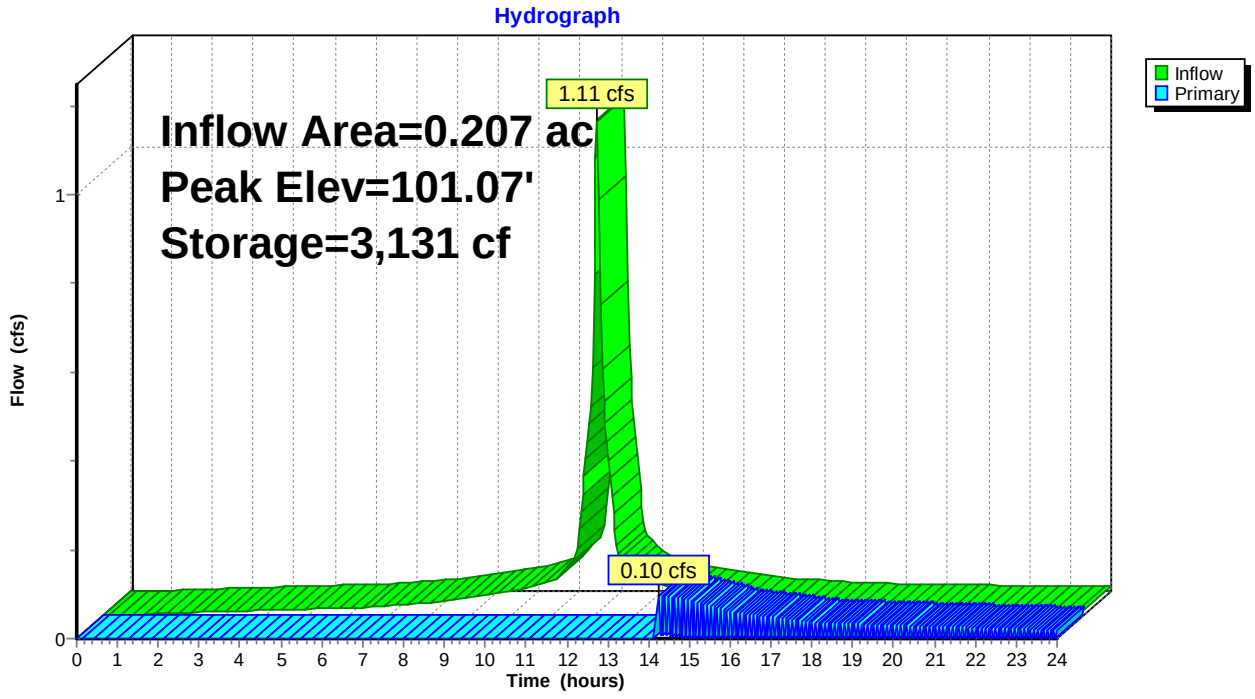
Plug-Flow detention time= 590.2 min calculated for 0.017 af (19% of inflow)
Center-of-Mass det. time= 318.3 min (1,063.9 - 745.5)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	313 cf	**18.00'W x 50.00'L x 4.00'H Stone** 3,600 cf Overall - 2,819 cf Embedded = 781 cf x 40.0% Voids
#2	97.00'	2,819 cf	**16.00'W x 48.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		3,131 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.09 cfs @ 14.24 hrs HW=101.07' (Free Discharge)
1=Orifice/Grate (Weir Controls 0.09 cfs @ 0.86 fps)

Pond 1P: 48" Concrete Galleries

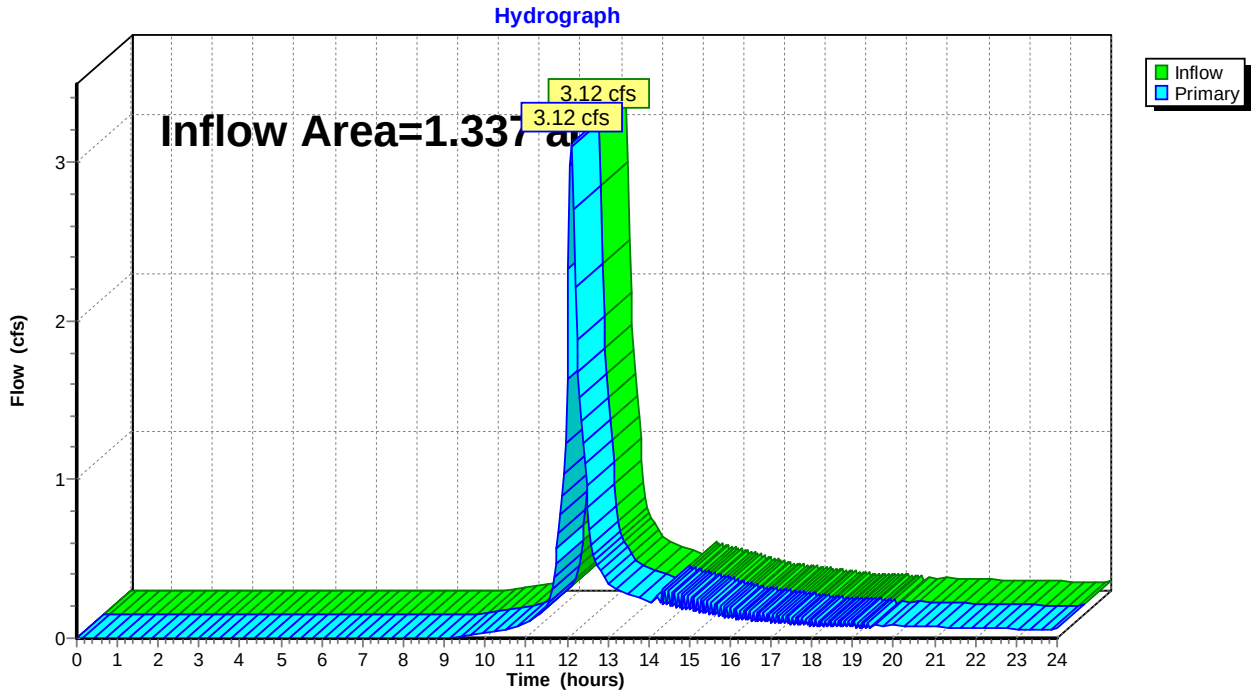


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.337 ac, 23.62% Impervious, Inflow Depth > 2.26" for 10 Year event
Inflow = 3.12 cfs @ 12.11 hrs, Volume= 0.252 af
Primary = 3.12 cfs @ 12.11 hrs, Volume= 0.252 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



Summary for Subcatchment 3S: Areas Routed to Retention

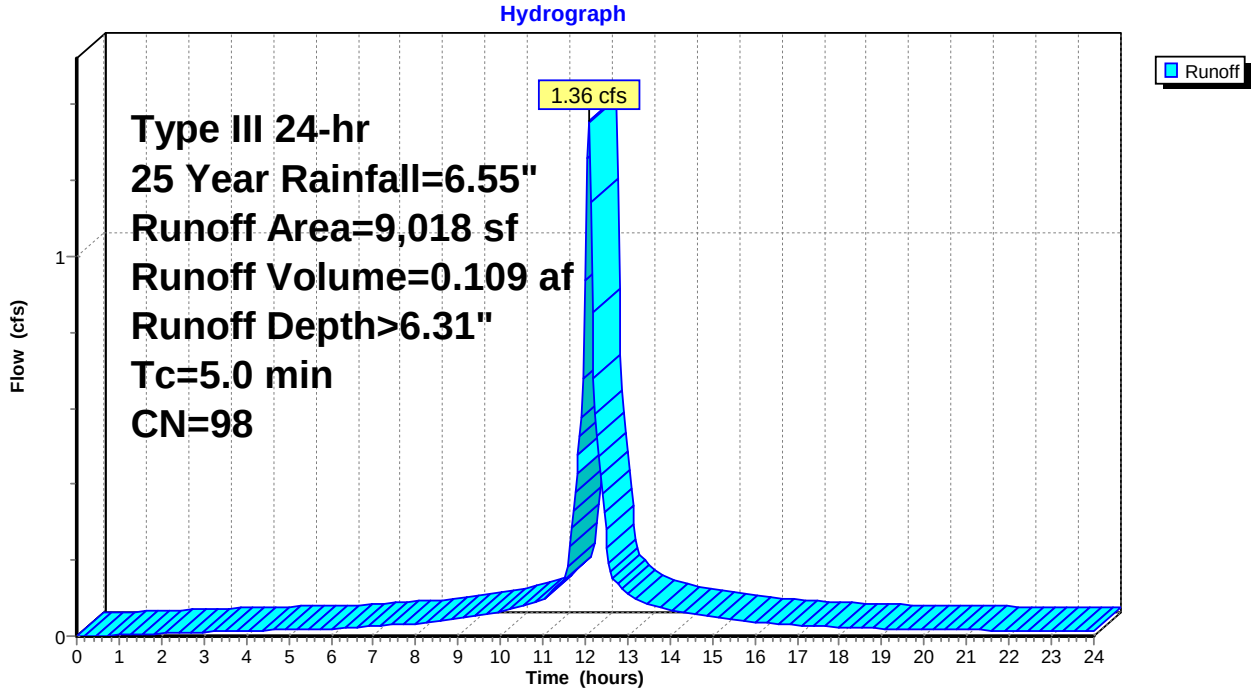
Runoff = 1.36 cfs @ 12.07 hrs, Volume= 0.109 af, Depth> 6.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25 Year Rainfall=6.55"

	Area (sf)	CN	Description
*	9,018	98	Driveway/Parking
	9,018		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

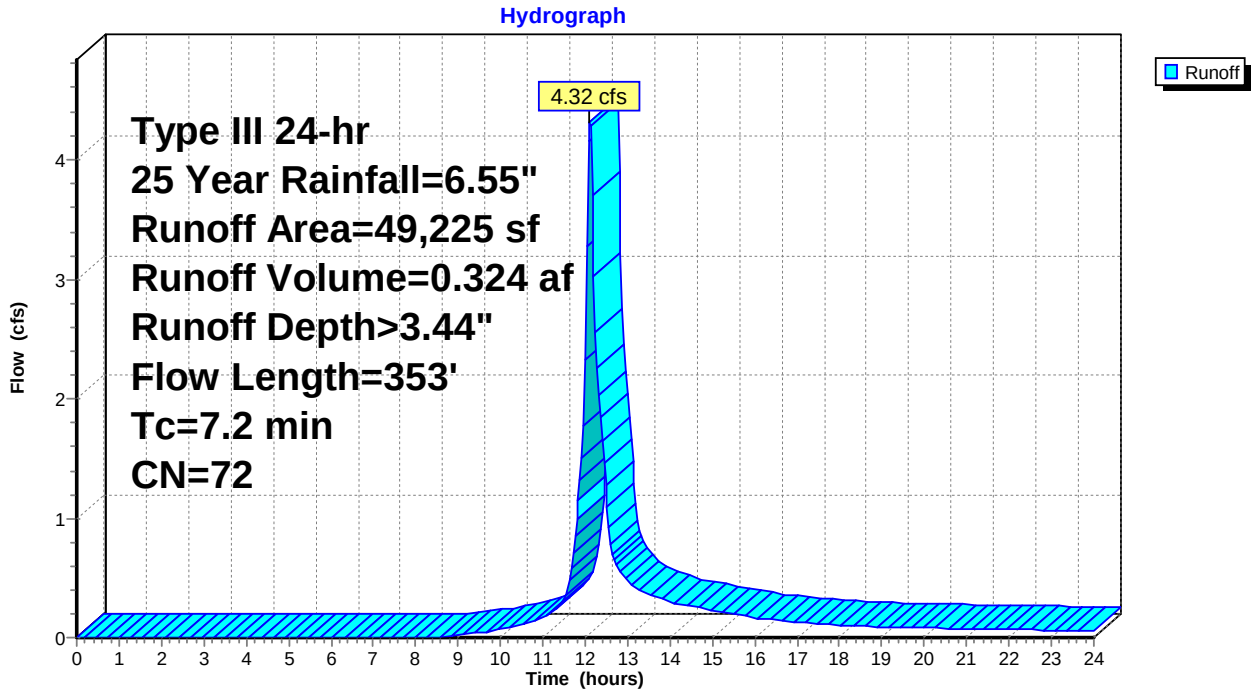
Runoff = 4.32 cfs @ 12.11 hrs, Volume= 0.324 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25 Year Rainfall=6.55"

	Area (sf)	CN	Description
*	4,741	98	Building
	44,484	69	50-75% Grass cover, Fair, HSG B
	49,225	72	Weighted Average
	44,484		90.37% Pervious Area
	4,741		9.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.207 ac,100.00% Impervious, Inflow Depth > 6.31" for 25 Year event
Inflow = 1.36 cfs @ 12.07 hrs, Volume= 0.109 af
Outflow = 0.34 cfs @ 12.46 hrs, Volume= 0.037 af, Atten= 75%, Lag= 23.2 min
Primary = 0.34 cfs @ 12.46 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 101.18' @ 12.46 hrs Surf.Area= 900 sf Storage= 3,131 cf

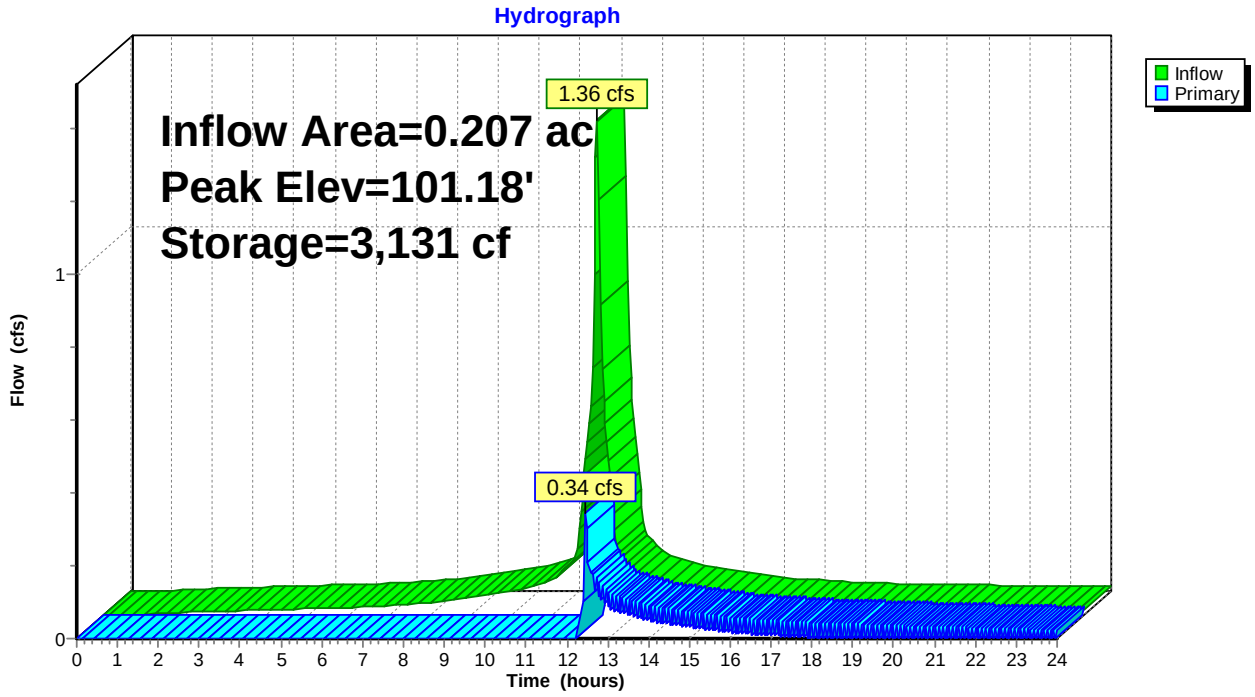
Plug-Flow detention time= 381.6 min calculated for 0.037 af (34% of inflow)
Center-of-Mass det. time= 199.0 min (941.5 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	313 cf	**18.00'W x 50.00'L x 4.00'H Stone** 3,600 cf Overall - 2,819 cf Embedded = 781 cf x 40.0% Voids
#2	97.00'	2,819 cf	**16.00'W x 48.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		3,131 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.30 cfs @ 12.46 hrs HW=101.15' (Free Discharge)
1=Orifice/Grate (Weir Controls 0.30 cfs @ 1.27 fps)

Pond 1P: 48" Concrete Galleries

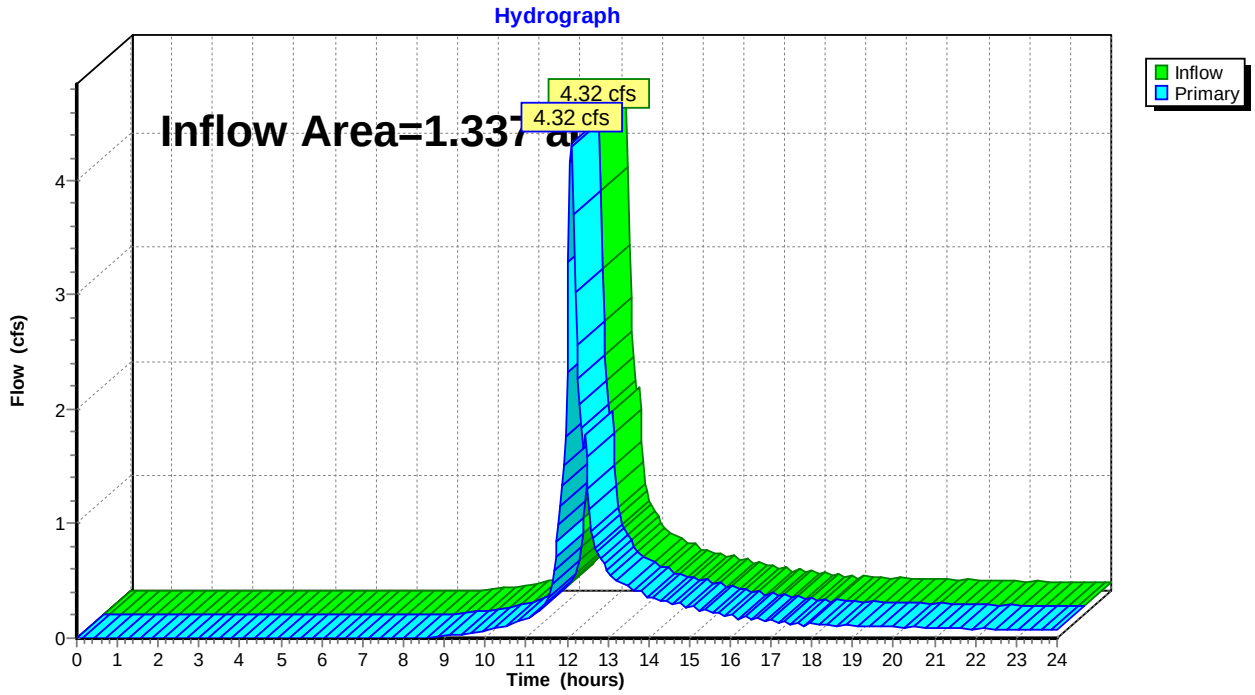


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.337 ac, 23.62% Impervious, Inflow Depth > 3.24" for 25 Year event
Inflow = 4.32 cfs @ 12.11 hrs, Volume= 0.361 af
Primary = 4.32 cfs @ 12.11 hrs, Volume= 0.361 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



Summary for Subcatchment 3S: Areas Routed to Retention

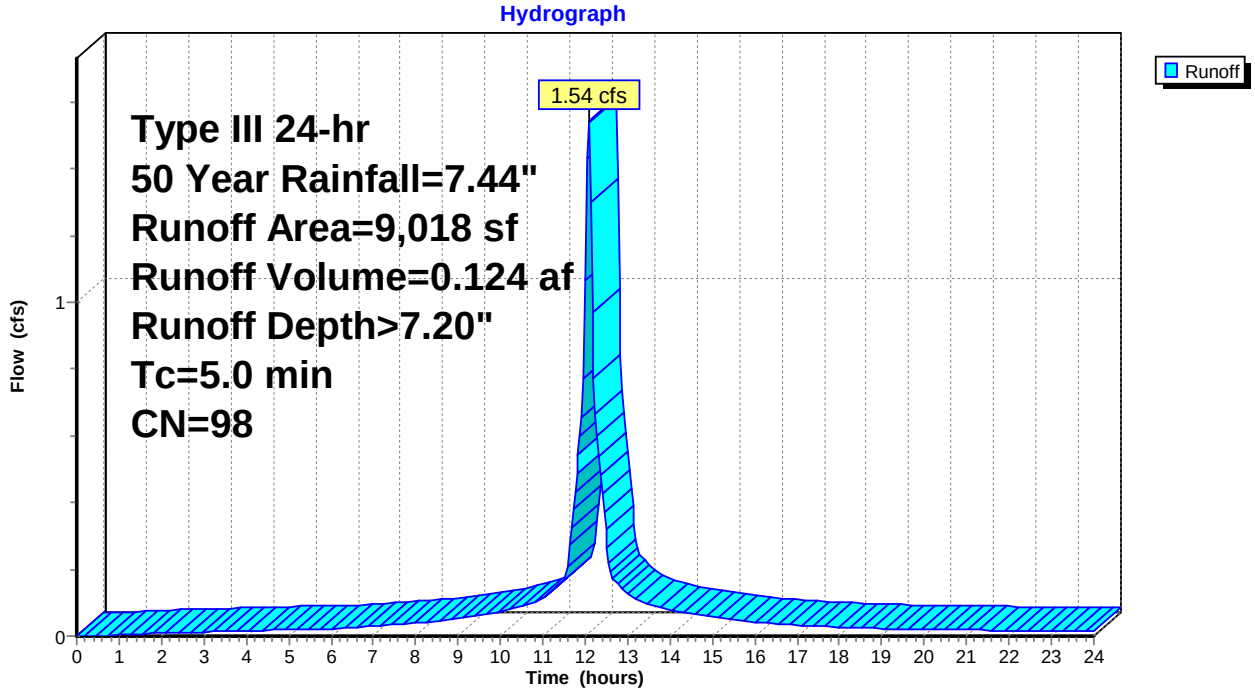
Runoff = 1.54 cfs @ 12.07 hrs, Volume= 0.124 af, Depth> 7.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 50 Year Rainfall=7.44"

	Area (sf)	CN	Description
*	9,018	98	Driveway/Parking
	9,018		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

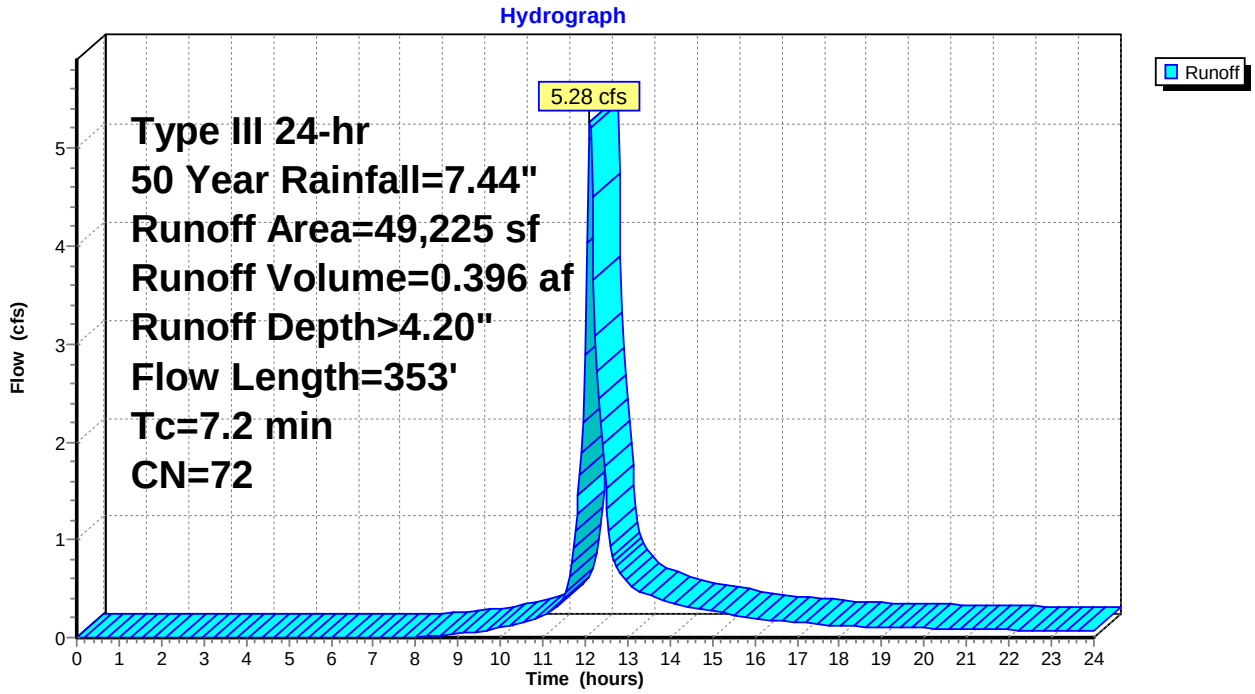
Runoff = 5.28 cfs @ 12.11 hrs, Volume= 0.396 af, Depth> 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 50 Year Rainfall=7.44"

	Area (sf)	CN	Description
*	4,741	98	Building
	44,484	69	50-75% Grass cover, Fair, HSG B
	49,225	72	Weighted Average
	44,484		90.37% Pervious Area
	4,741		9.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.207 ac,100.00% Impervious, Inflow Depth > 7.20" for 50 Year event
Inflow = 1.54 cfs @ 12.07 hrs, Volume= 0.124 af
Outflow = 1.40 cfs @ 12.24 hrs, Volume= 0.054 af, Atten= 9%, Lag= 10.0 min
Primary = 1.40 cfs @ 12.24 hrs, Volume= 0.054 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 103.21' @ 12.24 hrs Surf.Area= 900 sf Storage= 3,131 cf

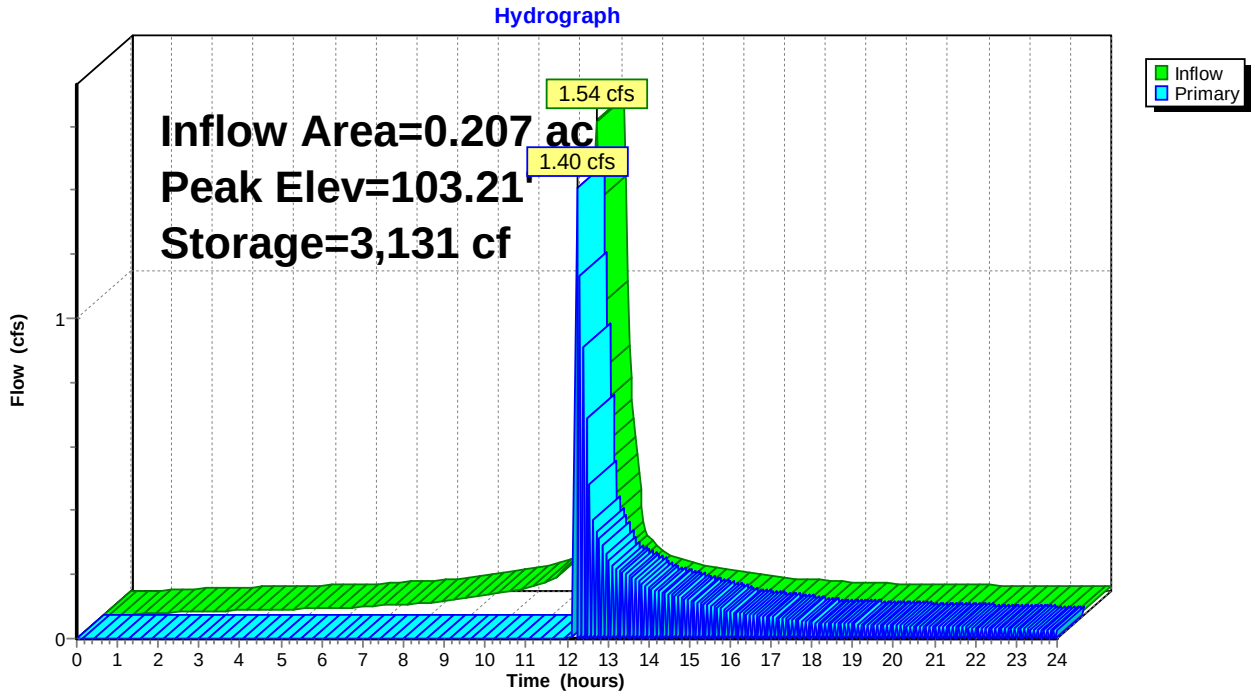
Plug-Flow detention time= 308.5 min calculated for 0.054 af (43% of inflow)
Center-of-Mass det. time= 157.6 min (898.4 - 740.9)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	313 cf	**18.00'W x 50.00'L x 4.00'H Stone** 3,600 cf Overall - 2,819 cf Embedded = 781 cf x 40.0% Voids
#2	97.00'	2,819 cf	**16.00'W x 48.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		3,131 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.40 cfs @ 12.24 hrs HW=103.20' (Free Discharge)
1=Orifice/Grate (Orifice Controls 1.40 cfs @ 7.13 fps)

Pond 1P: 48" Concrete Galleries

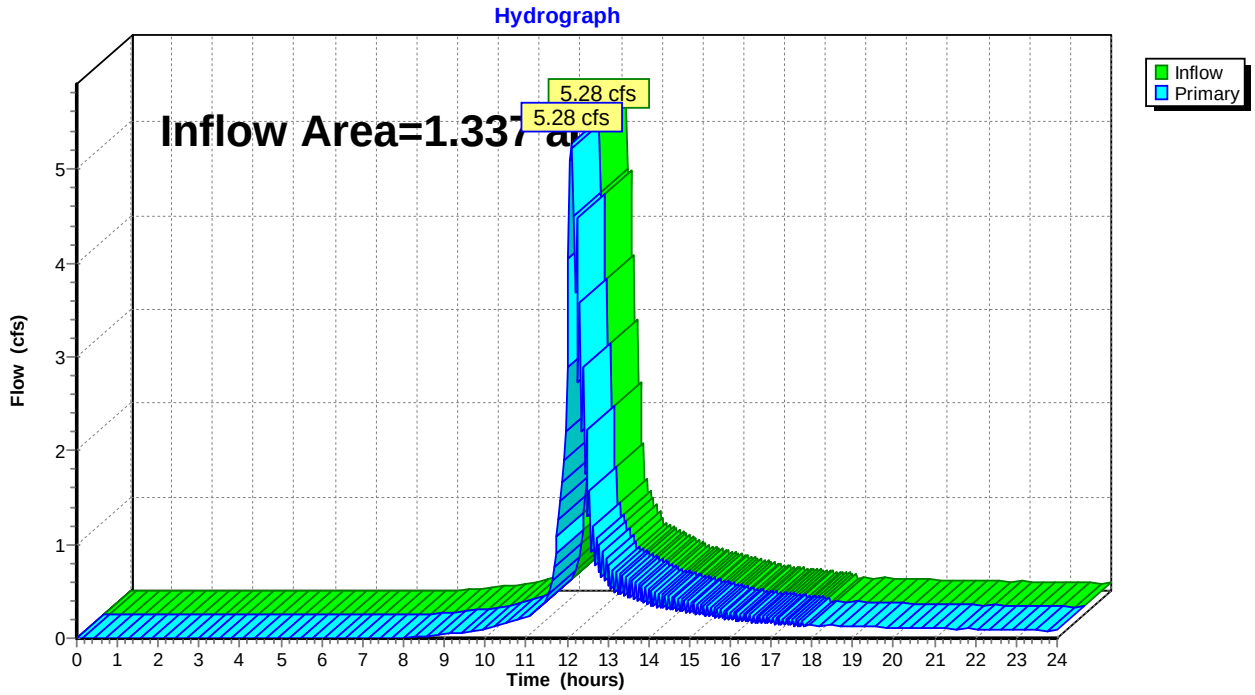


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.337 ac, 23.62% Impervious, Inflow Depth > 4.03" for 50 Year event
Inflow = 5.28 cfs @ 12.11 hrs, Volume= 0.449 af
Primary = 5.28 cfs @ 12.11 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.0 min

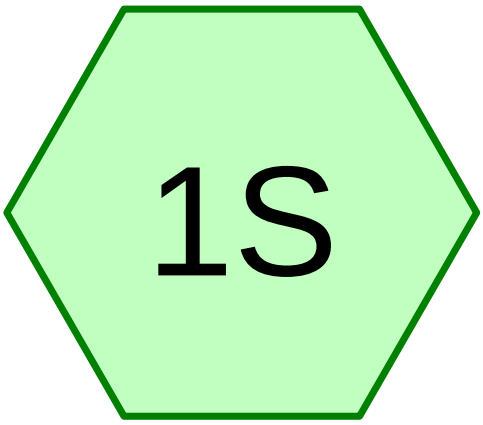
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



APPENDIX “D”

HYDROCAD ANALYSIS
PHASE 2



Existing Conditions

Subcat Reach Pond Link

Routing Diagram for 2578Existing
Prepared by Fairfield County Engineering LLC, Printed 2/6/2025
HydroCAD® 10.00-26 s/n 06020 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: Existing Conditions

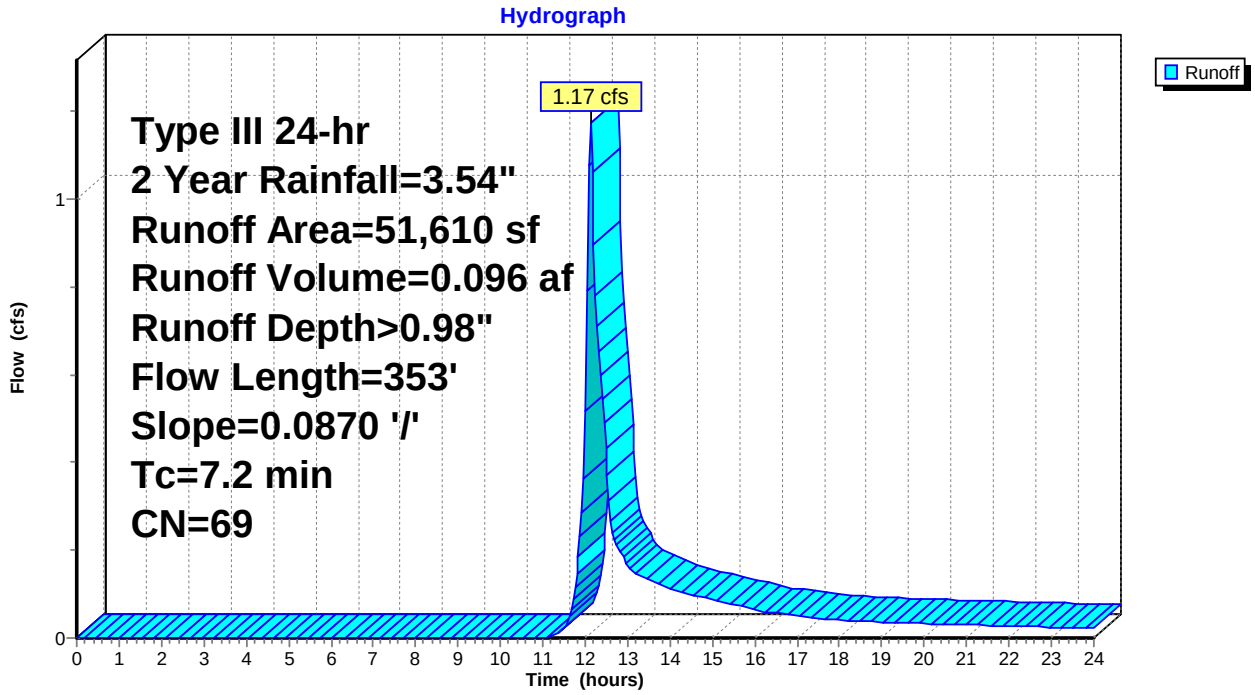
Runoff = 1.17 cfs @ 12.12 hrs, Volume= 0.096 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2 Year Rainfall=3.54"

Area (sf)	CN	Description
51,610	69	50-75% Grass cover, Fair, HSG B
51,610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions



Summary for Subcatchment 1S: Existing Conditions

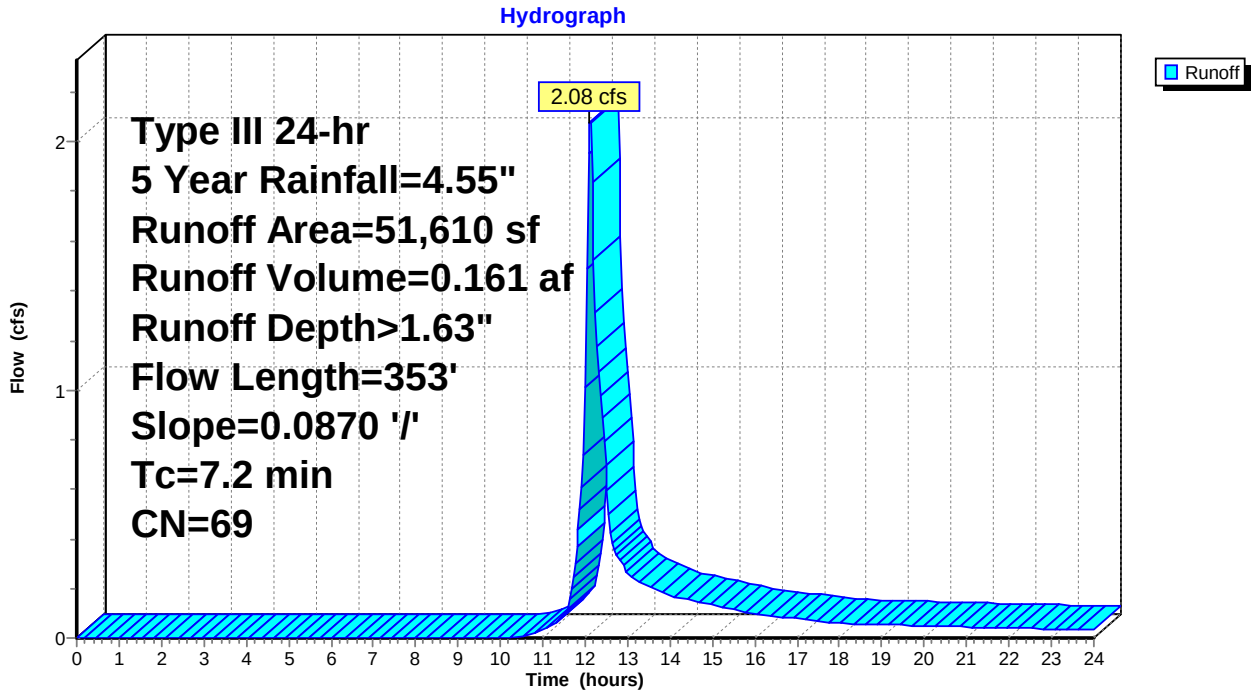
Runoff = 2.08 cfs @ 12.11 hrs, Volume= 0.161 af, Depth> 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 5 Year Rainfall=4.55"

Area (sf)	CN	Description
51,610	69	50-75% Grass cover, Fair, HSG B
51,610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions



Summary for Subcatchment 1S: Existing Conditions

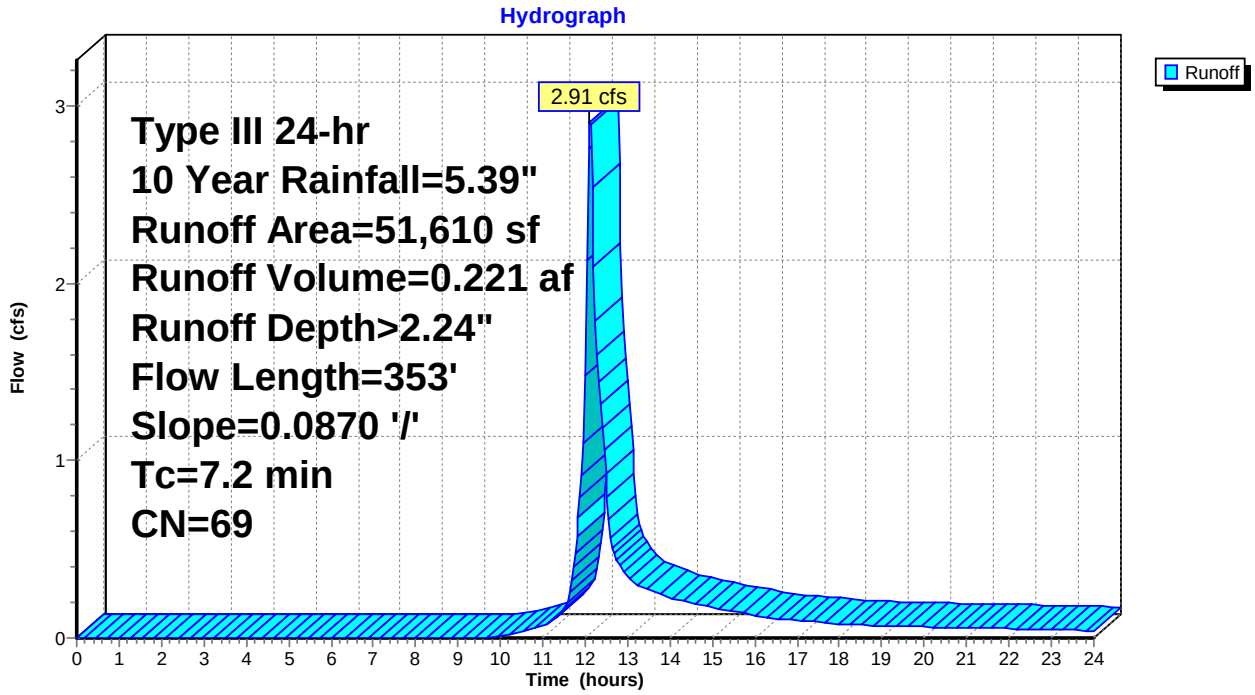
Runoff = 2.91 cfs @ 12.11 hrs, Volume= 0.221 af, Depth> 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10 Year Rainfall=5.39"

Area (sf)	CN	Description
51,610	69	50-75% Grass cover, Fair, HSG B
51,610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions



Summary for Subcatchment 1S: Existing Conditions

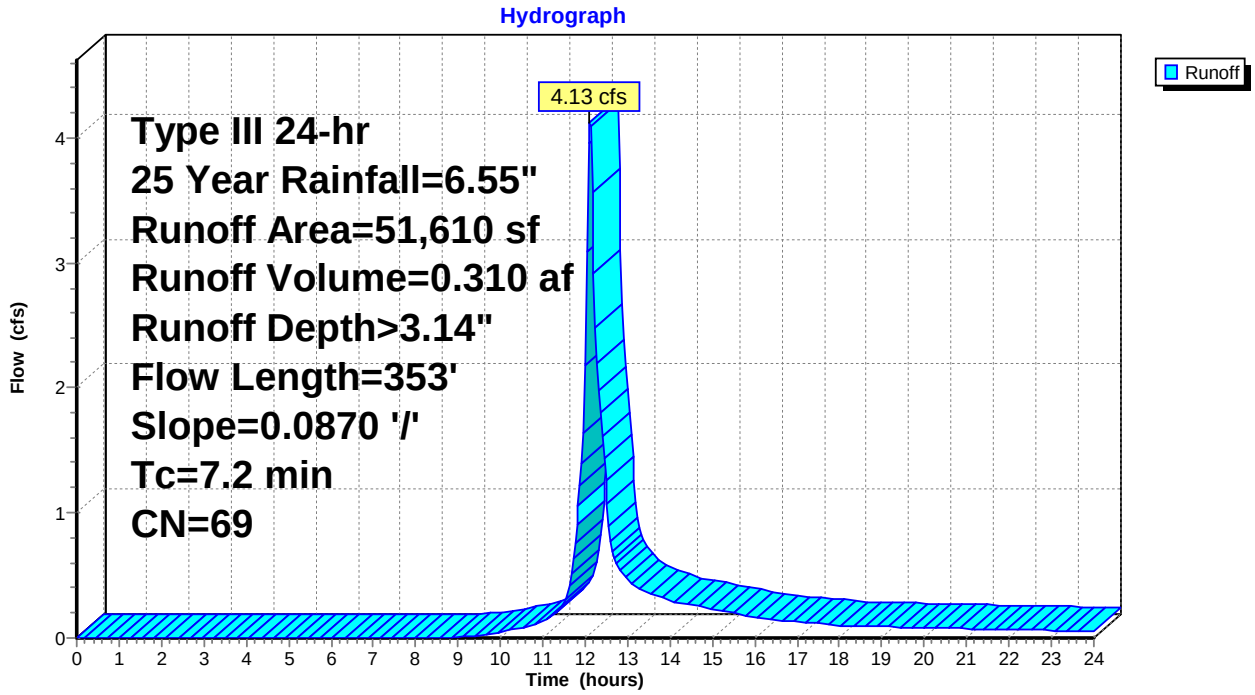
Runoff = 4.13 cfs @ 12.11 hrs, Volume= 0.310 af, Depth> 3.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25 Year Rainfall=6.55"

Area (sf)	CN	Description
51,610	69	50-75% Grass cover, Fair, HSG B
51,610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions



Summary for Subcatchment 1S: Existing Conditions

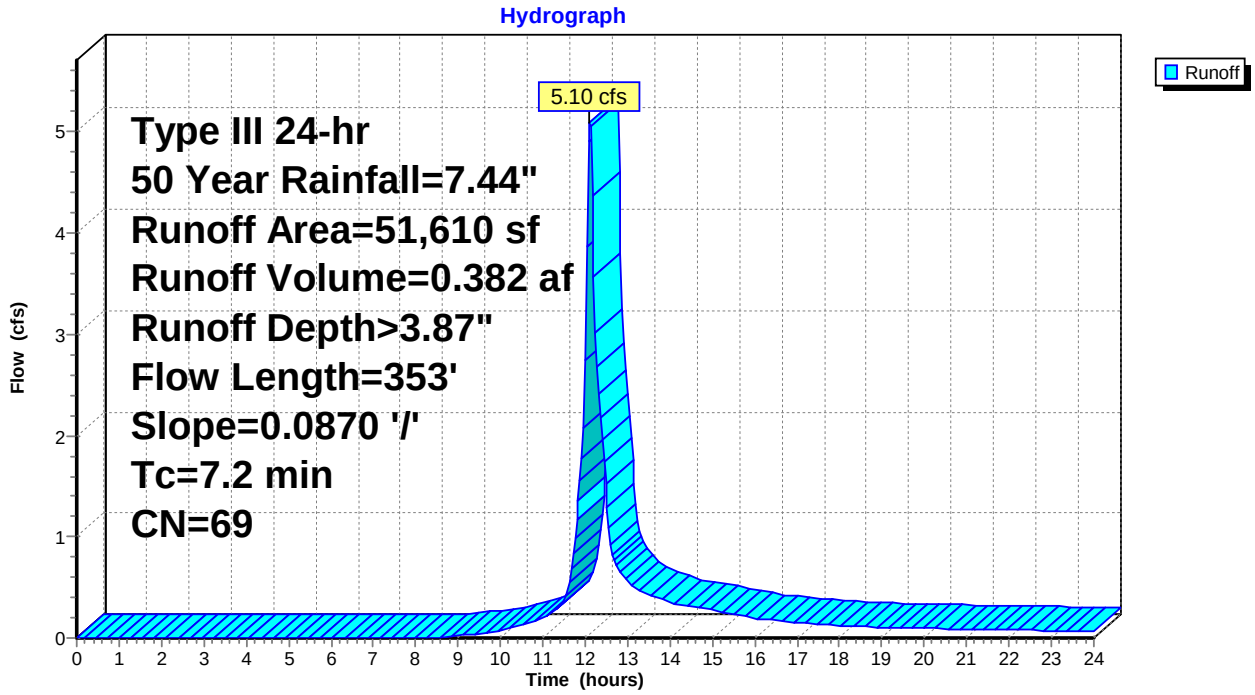
Runoff = 5.10 cfs @ 12.11 hrs, Volume= 0.382 af, Depth> 3.87"

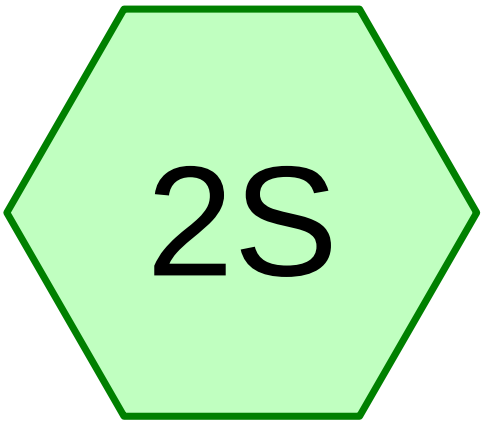
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 50 Year Rainfall=7.44"

Area (sf)	CN	Description
51,610	69	50-75% Grass cover, Fair, HSG B
51,610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 1S: Existing Conditions





Proposed Conditions

Subcat Reach Pond Link

Routing Diagram for 2578Proposed
Prepared by Fairfield County Engineering LLC, Printed 2/6/2025
HydroCAD® 10.00-26 s/n 06020 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 2S: Proposed Conditions

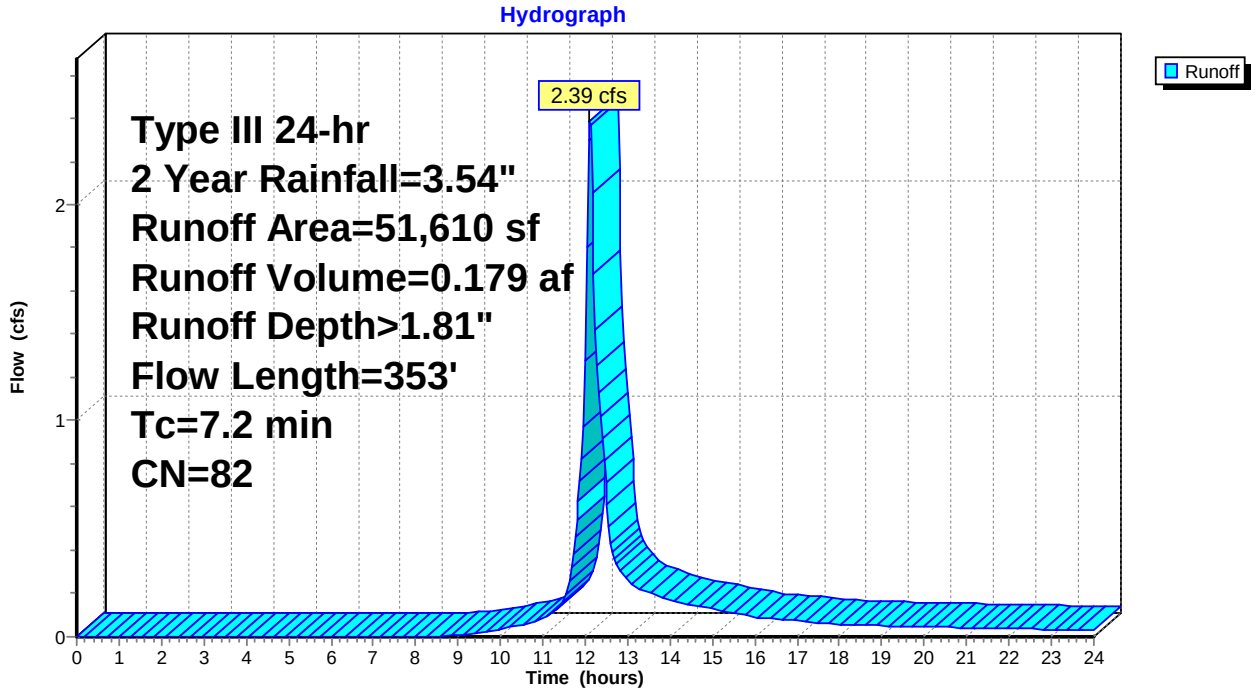
Runoff = 2.39 cfs @ 12.11 hrs, Volume= 0.179 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2 Year Rainfall=3.54"

	Area (sf)	CN	Description
*	12,169	98	Buildings
*	10,597	98	Driveway/Parking
	28,844	69	50-75% Grass cover, Fair, HSG B
	51,610	82	Weighted Average
	28,844		55.89% Pervious Area
	22,766		44.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions



Summary for Subcatchment 2S: Proposed Conditions

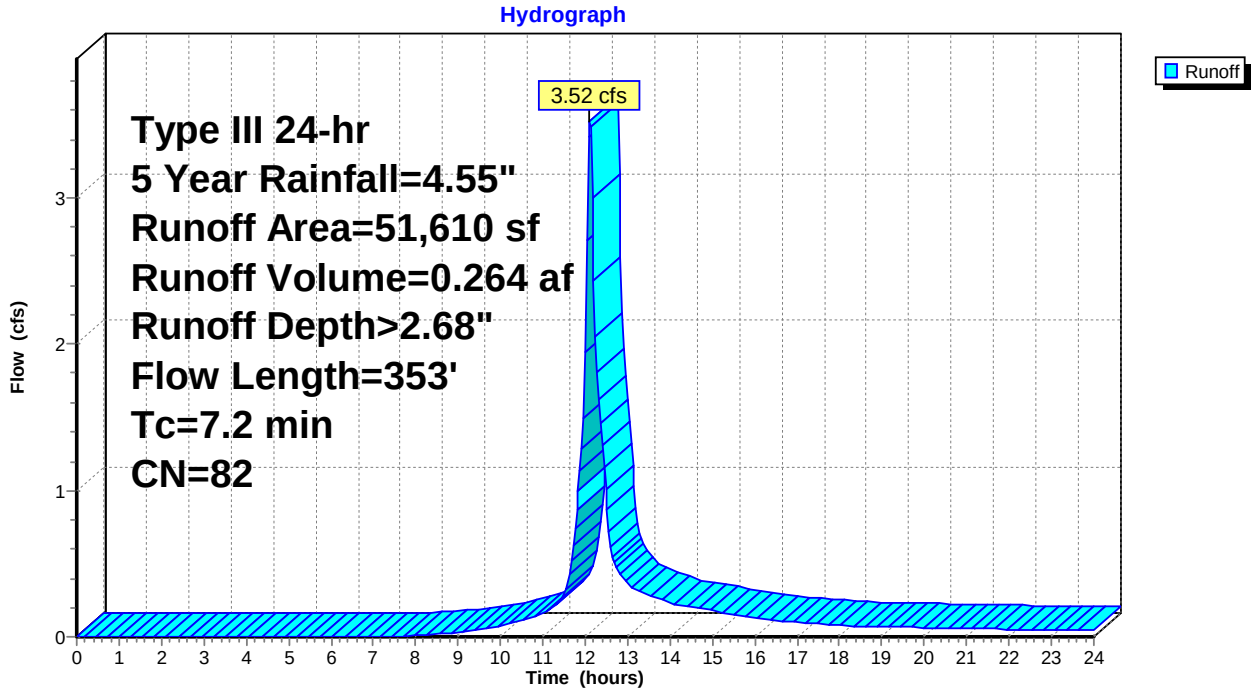
Runoff = 3.52 cfs @ 12.11 hrs, Volume= 0.264 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 5 Year Rainfall=4.55"

	Area (sf)	CN	Description
*	12,169	98	Buildings
*	10,597	98	Driveway/Parking
	28,844	69	50-75% Grass cover, Fair, HSG B
	51,610	82	Weighted Average
	28,844		55.89% Pervious Area
	22,766		44.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions



Summary for Subcatchment 2S: Proposed Conditions

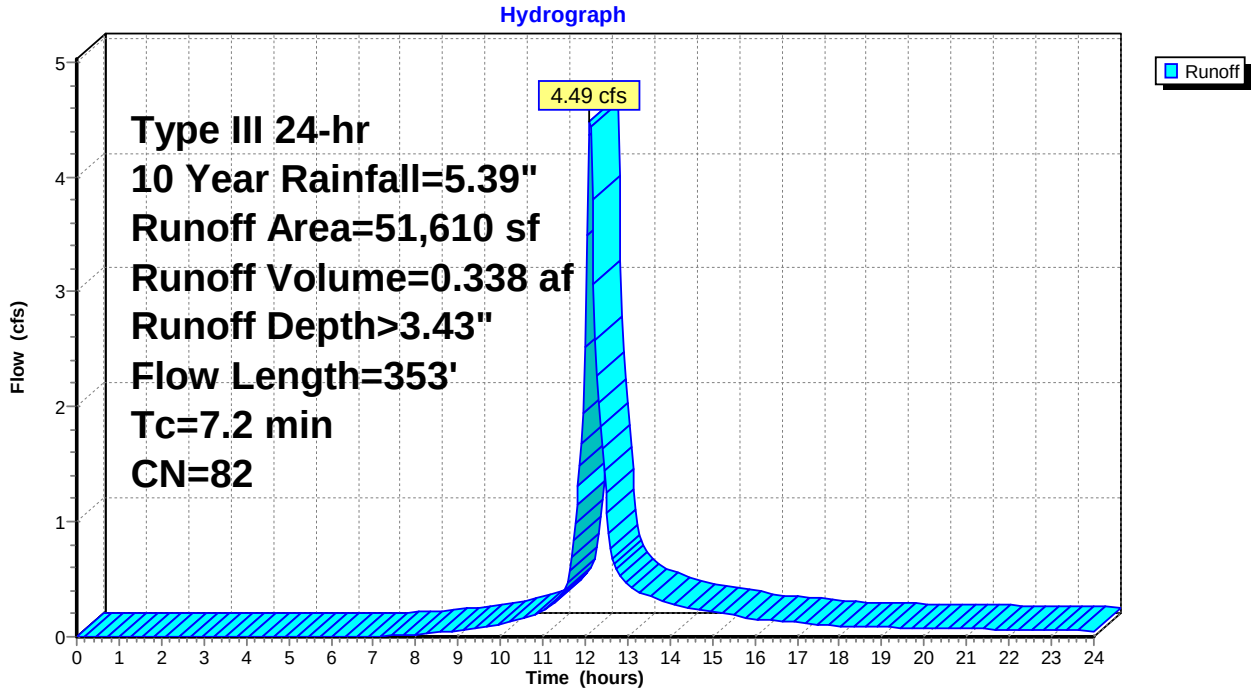
Runoff = 4.49 cfs @ 12.10 hrs, Volume= 0.338 af, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10 Year Rainfall=5.39"

	Area (sf)	CN	Description
*	12,169	98	Buildings
*	10,597	98	Driveway/Parking
	28,844	69	50-75% Grass cover, Fair, HSG B
	51,610	82	Weighted Average
	28,844		55.89% Pervious Area
	22,766		44.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions



Summary for Subcatchment 2S: Proposed Conditions

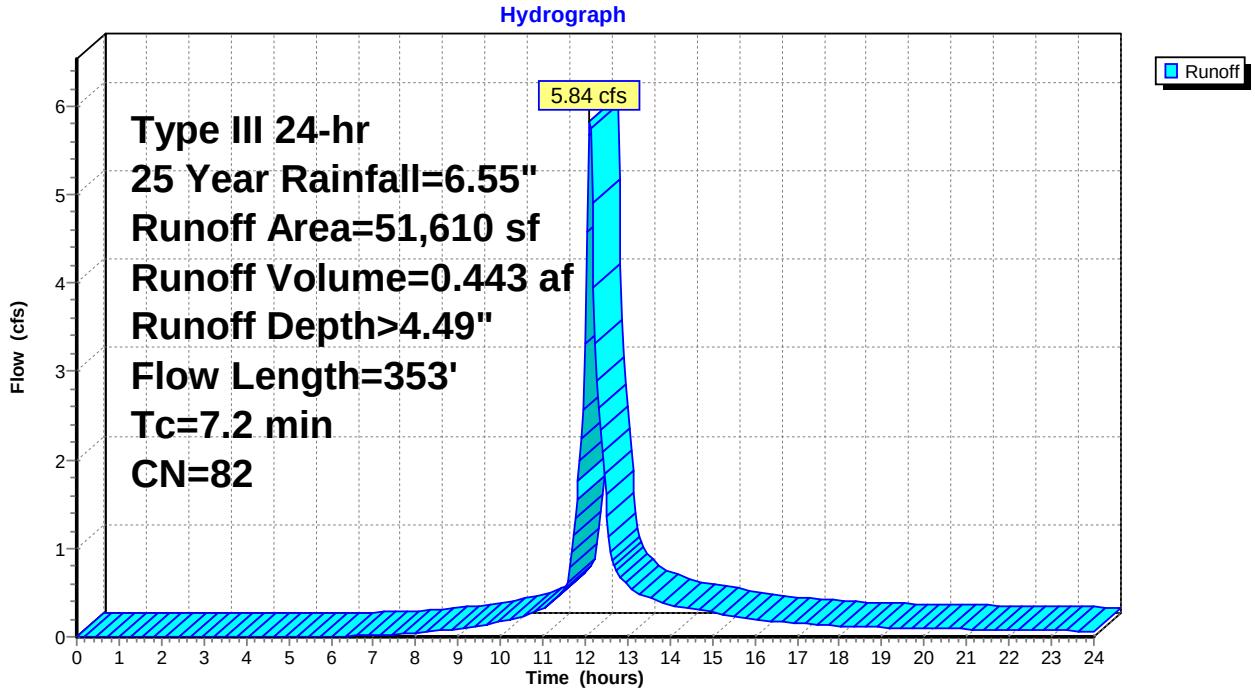
Runoff = 5.84 cfs @ 12.10 hrs, Volume= 0.443 af, Depth> 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25 Year Rainfall=6.55"

	Area (sf)	CN	Description
*	12,169	98	Buildings
*	10,597	98	Driveway/Parking
	28,844	69	50-75% Grass cover, Fair, HSG B
	51,610	82	Weighted Average
	28,844		55.89% Pervious Area
	22,766		44.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions



Summary for Subcatchment 2S: Proposed Conditions

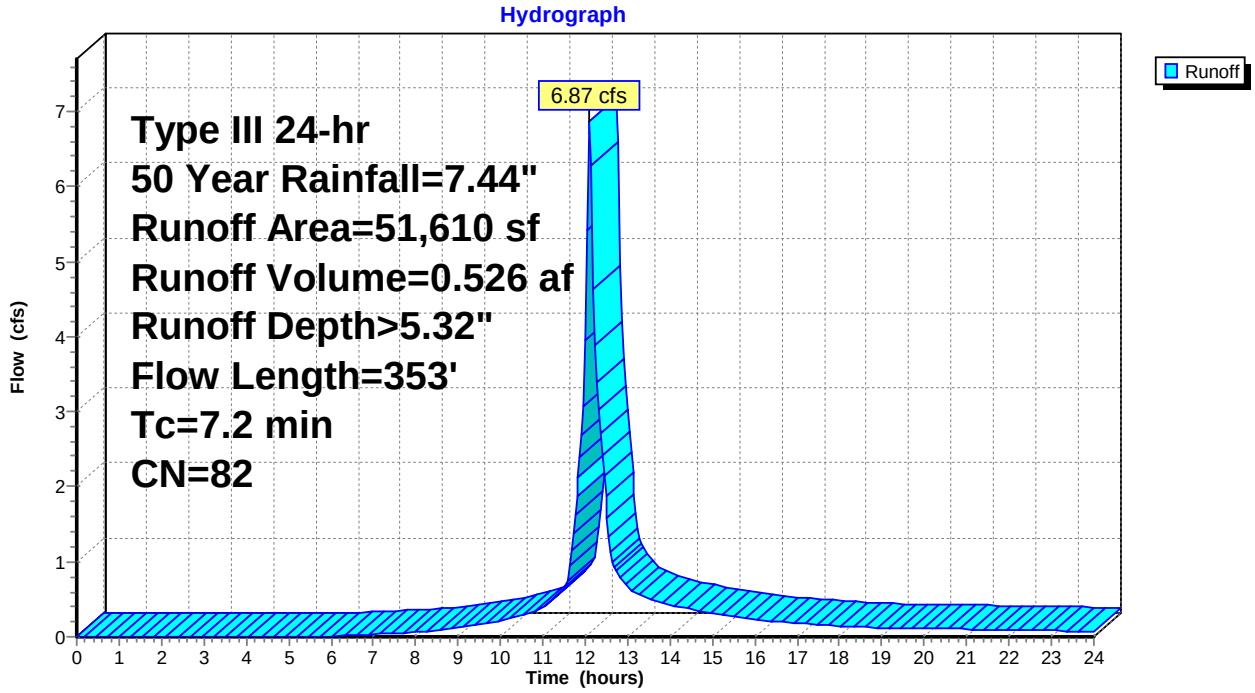
Runoff = 6.87 cfs @ 12.10 hrs, Volume= 0.526 af, Depth> 5.32"

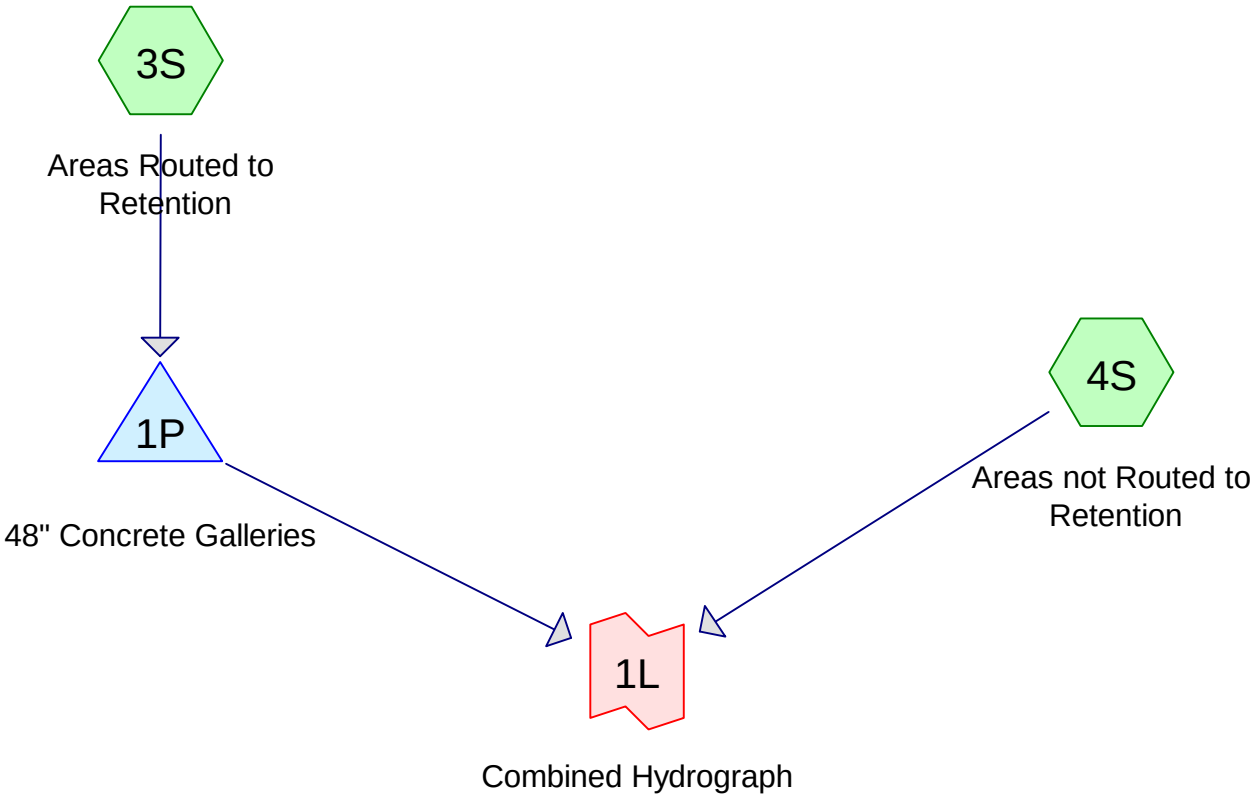
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 50 Year Rainfall=7.44"

	Area (sf)	CN	Description
*	12,169	98	Buildings
*	10,597	98	Driveway/Parking
	28,844	69	50-75% Grass cover, Fair, HSG B
	51,610	82	Weighted Average
	28,844		55.89% Pervious Area
	22,766		44.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 2S: Proposed Conditions





Subcat Reach Pond Link

Routing Diagram for 2578Combined
Prepared by Fairfield County Engineering LLC, Printed 2/6/2025
HydroCAD® 10.00-26 s/n 06020 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 3S: Areas Routed to Retention

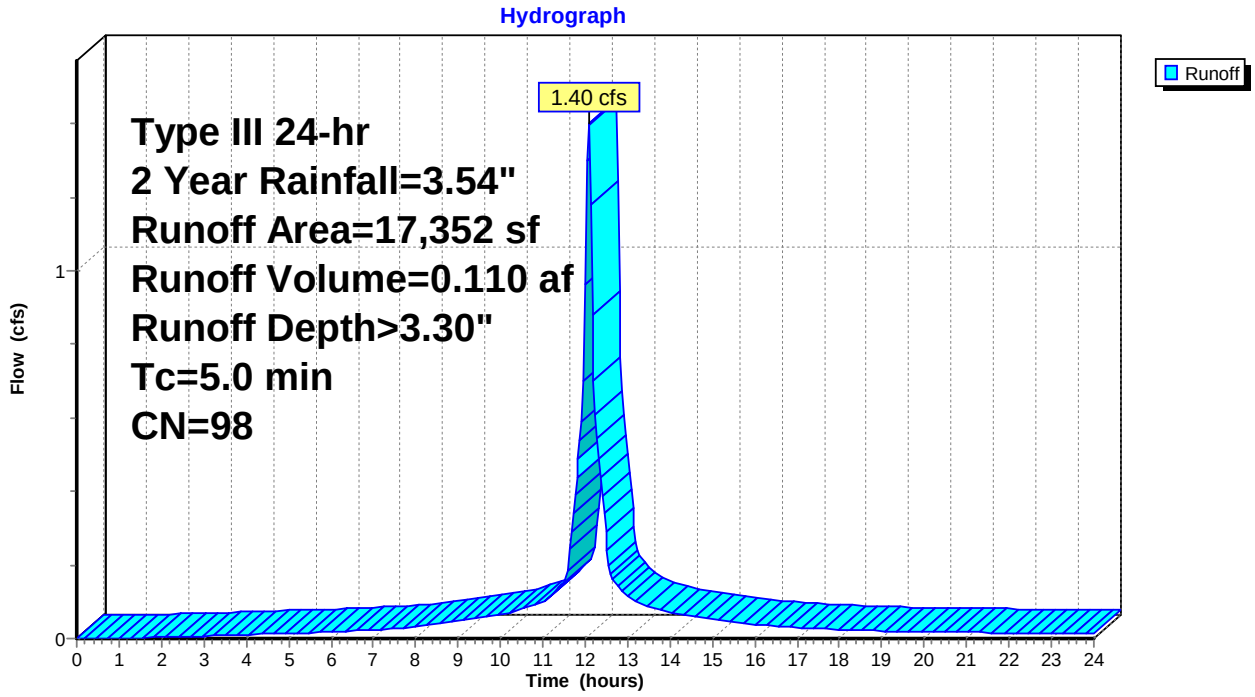
Runoff = 1.40 cfs @ 12.07 hrs, Volume= 0.110 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2 Year Rainfall=3.54"

	Area (sf)	CN	Description
*	10,597	98	Driveway/Parking
*	6,755	98	Portion of Building roof
	17,352	98	Weighted Average
	17,352		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

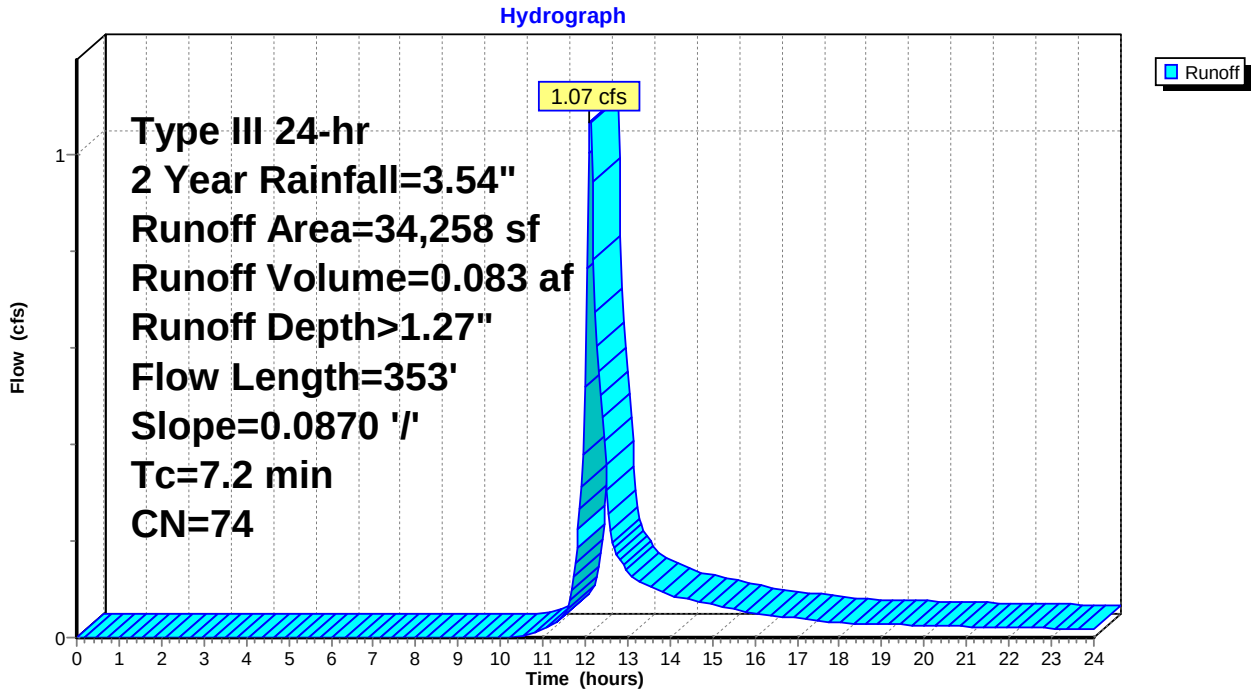
Runoff = 1.07 cfs @ 12.11 hrs, Volume= 0.083 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2 Year Rainfall=3.54"

	Area (sf)	CN	Description
*	5,414	98	Buildings
	28,844	69	50-75% Grass cover, Fair, HSG B
	34,258	74	Weighted Average
	28,844		84.20% Pervious Area
	5,414		15.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.398 ac,100.00% Impervious, Inflow Depth > 3.30" for 2 Year event
Inflow = 1.40 cfs @ 12.07 hrs, Volume= 0.110 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 101.97' @ 24.00 hrs Surf.Area= 1,716 sf Storage= 4,778 cf

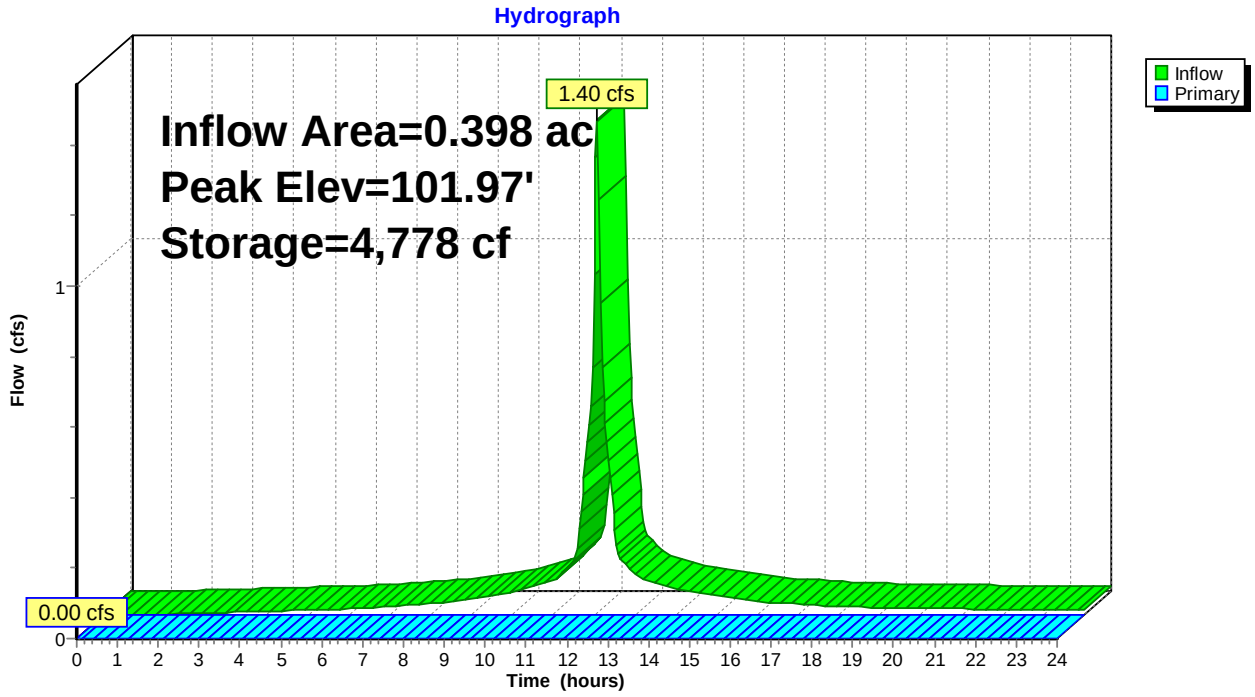
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	491 cf	**26.00'W x 66.00'L x 4.00'H Stone** 6,864 cf Overall - 5,637 cf Embedded = 1,227 cf x 40.0% Voids
#2	99.00'	5,637 cf	**24.00'W x 64.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		6,128 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=99.00' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: 48" Concrete Galleries

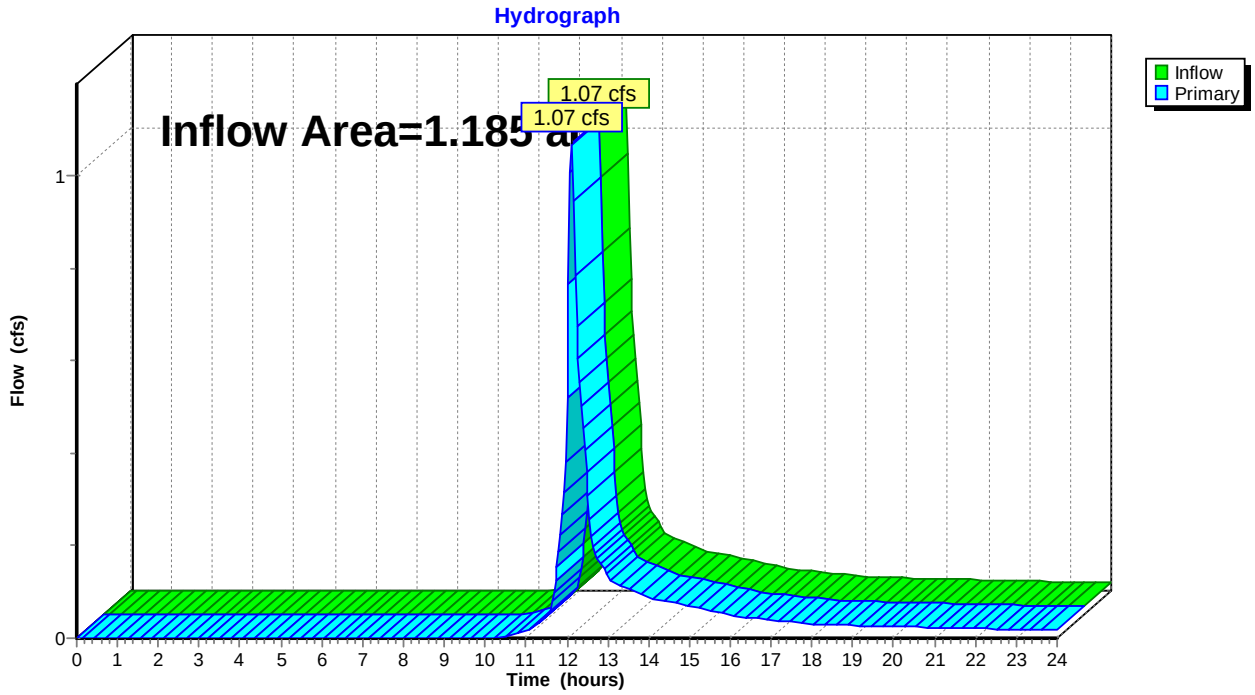


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.185 ac, 44.11% Impervious, Inflow Depth > 0.84" for 2 Year event
Inflow = 1.07 cfs @ 12.11 hrs, Volume= 0.083 af
Primary = 1.07 cfs @ 12.11 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



Summary for Subcatchment 3S: Areas Routed to Retention

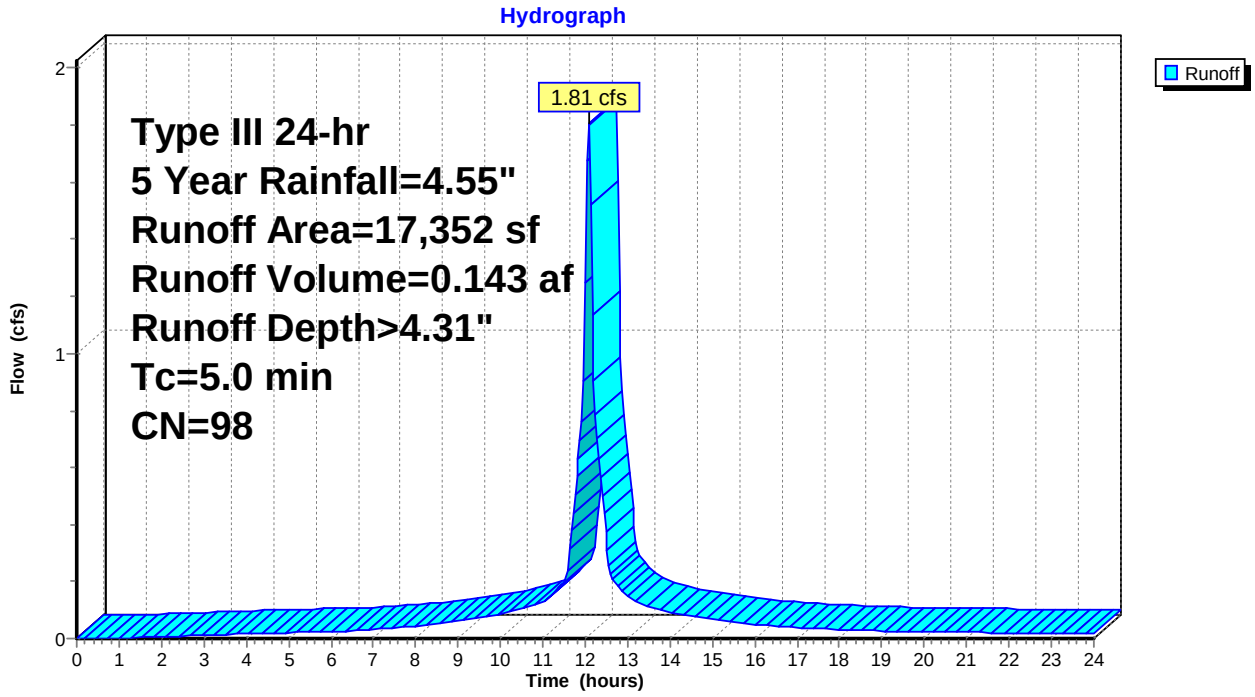
Runoff = 1.81 cfs @ 12.07 hrs, Volume= 0.143 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 5 Year Rainfall=4.55"

	Area (sf)	CN	Description
*	10,597	98	Driveway/Parking
*	6,755	98	Portion of Building roof
	17,352	98	Weighted Average
	17,352		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

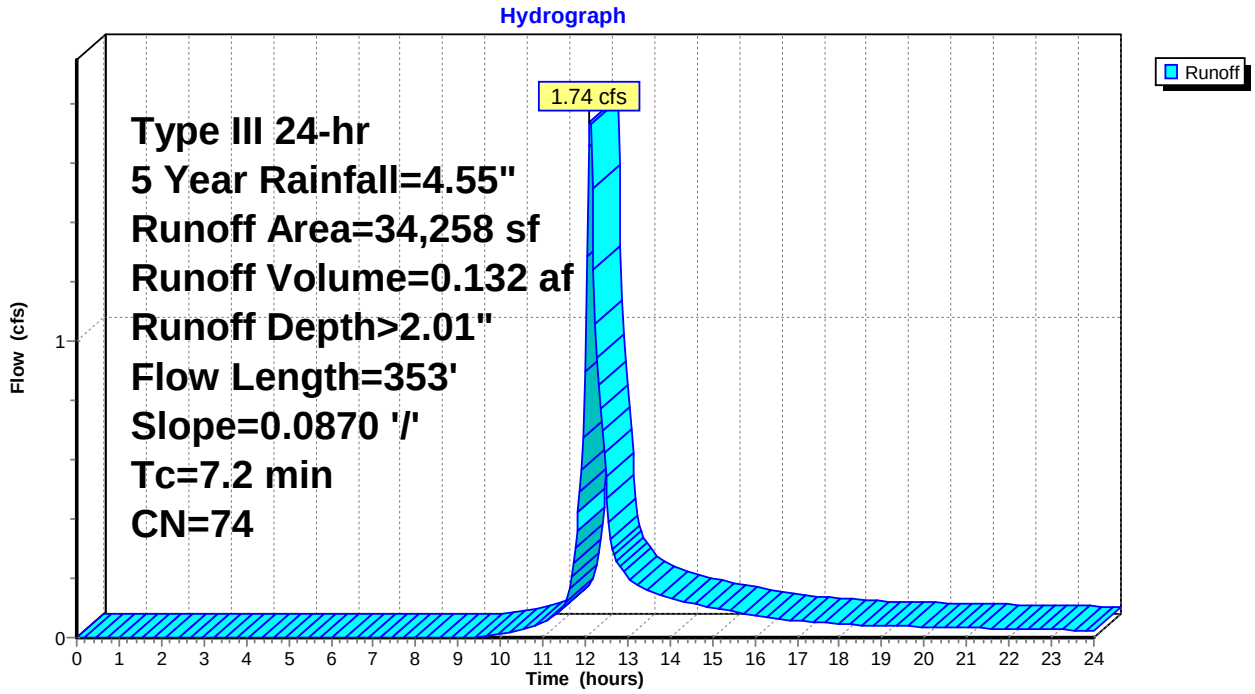
Runoff = 1.74 cfs @ 12.11 hrs, Volume= 0.132 af, Depth> 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 5 Year Rainfall=4.55"

	Area (sf)	CN	Description
*	5,414	98	Buildings
	28,844	69	50-75% Grass cover, Fair, HSG B
	34,258	74	Weighted Average
	28,844		84.20% Pervious Area
	5,414		15.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.398 ac,100.00% Impervious, Inflow Depth > 4.31" for 5 Year event
Inflow = 1.81 cfs @ 12.07 hrs, Volume= 0.143 af
Outflow = 0.03 cfs @ 22.36 hrs, Volume= 0.002 af, Atten= 98%, Lag= 617.3 min
Primary = 0.03 cfs @ 22.36 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 103.03' @ 22.36 hrs Surf.Area= 1,716 sf Storage= 6,128 cf

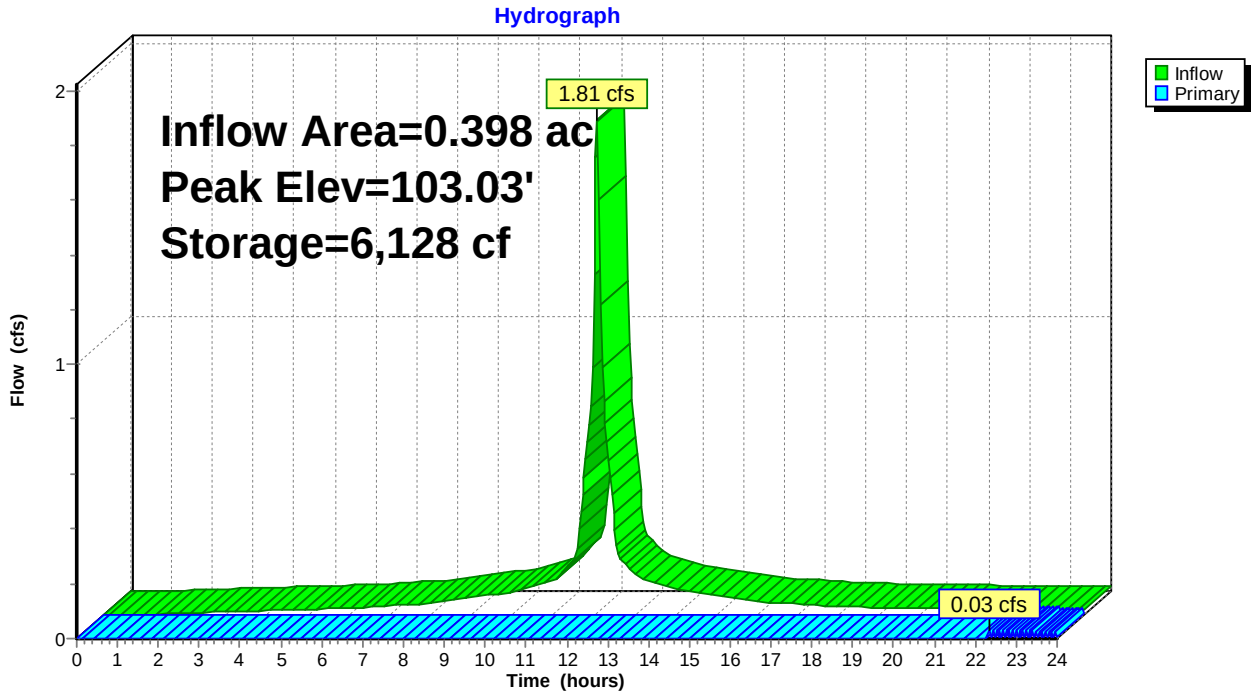
Plug-Flow detention time= 1,201.1 min calculated for 0.002 af (2% of inflow)
Center-of-Mass det. time= 639.5 min (1,387.8 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	491 cf	**26.00'W x 66.00'L x 4.00'H Stone** 6,864 cf Overall - 5,637 cf Embedded = 1,227 cf x 40.0% Voids
#2	99.00'	5,637 cf	**24.00'W x 64.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		6,128 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 22.36 hrs HW=103.03' (Free Discharge)
1=Orifice/Grate (Weir Controls 0.03 cfs @ 0.56 fps)

Pond 1P: 48" Concrete Galleries

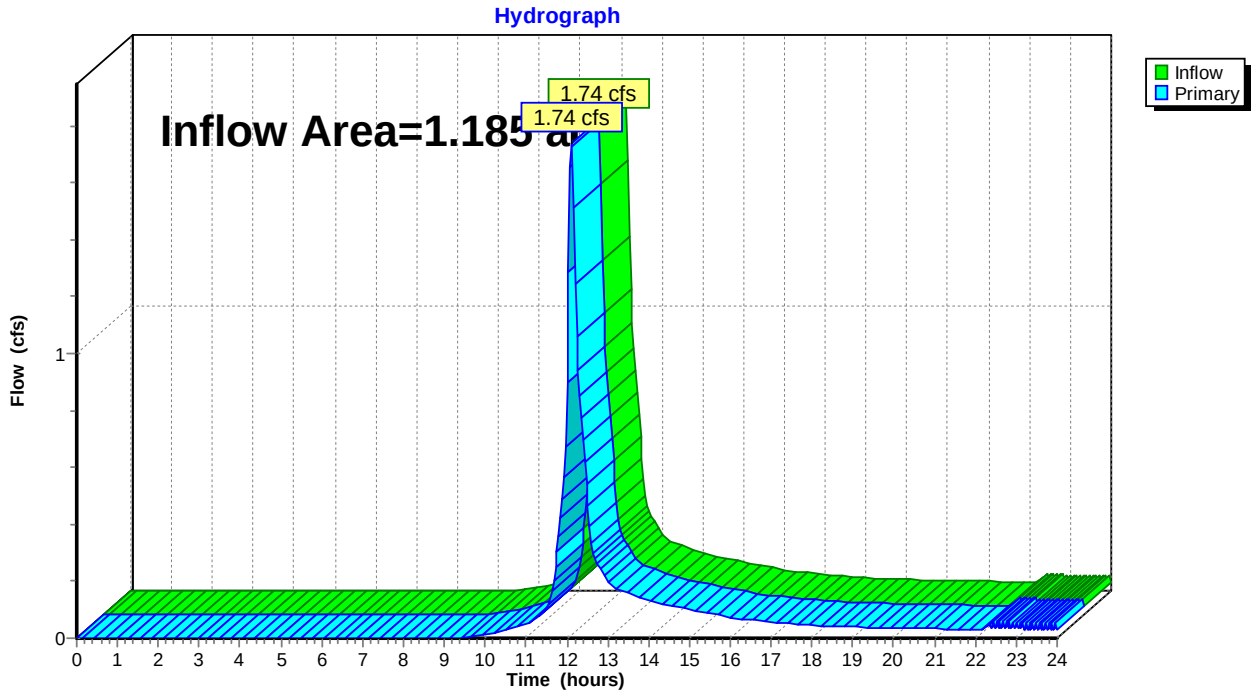


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.185 ac, 44.11% Impervious, Inflow Depth > 1.36" for 5 Year event
Inflow = 1.74 cfs @ 12.11 hrs, Volume= 0.134 af
Primary = 1.74 cfs @ 12.11 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



Summary for Subcatchment 3S: Areas Routed to Retention

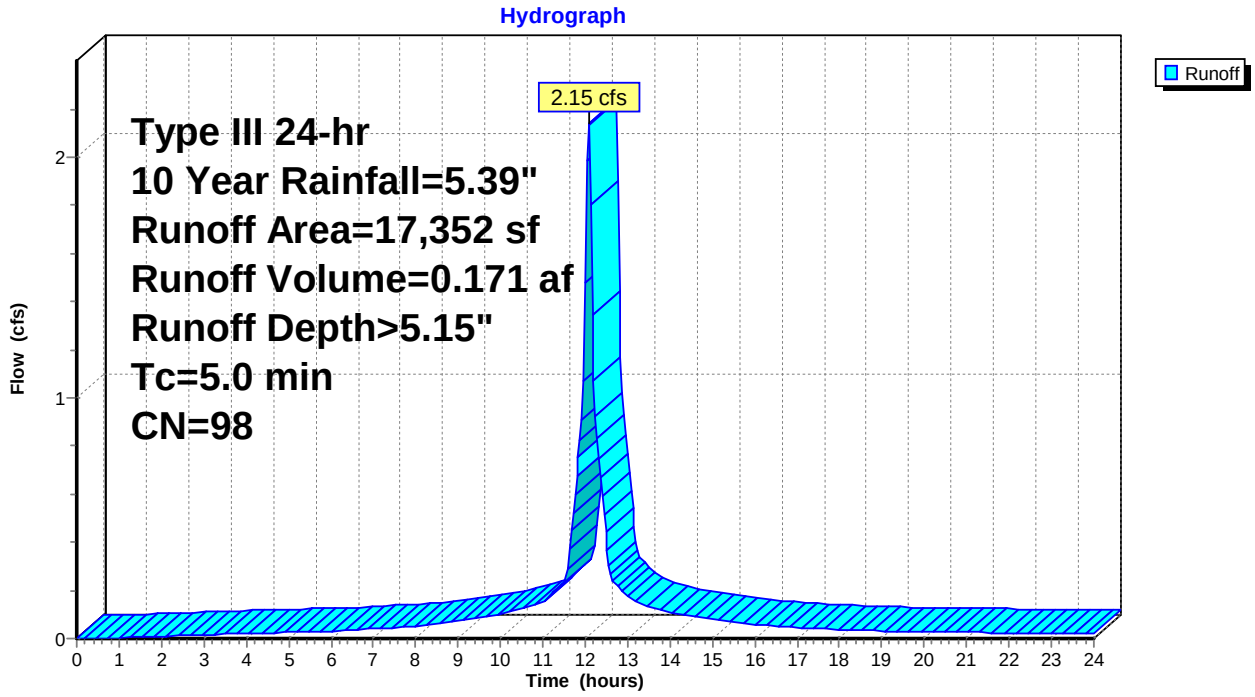
Runoff = 2.15 cfs @ 12.07 hrs, Volume= 0.171 af, Depth> 5.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10 Year Rainfall=5.39"

	Area (sf)	CN	Description
*	10,597	98	Driveway/Parking
*	6,755	98	Portion of Building roof
	17,352	98	Weighted Average
	17,352		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

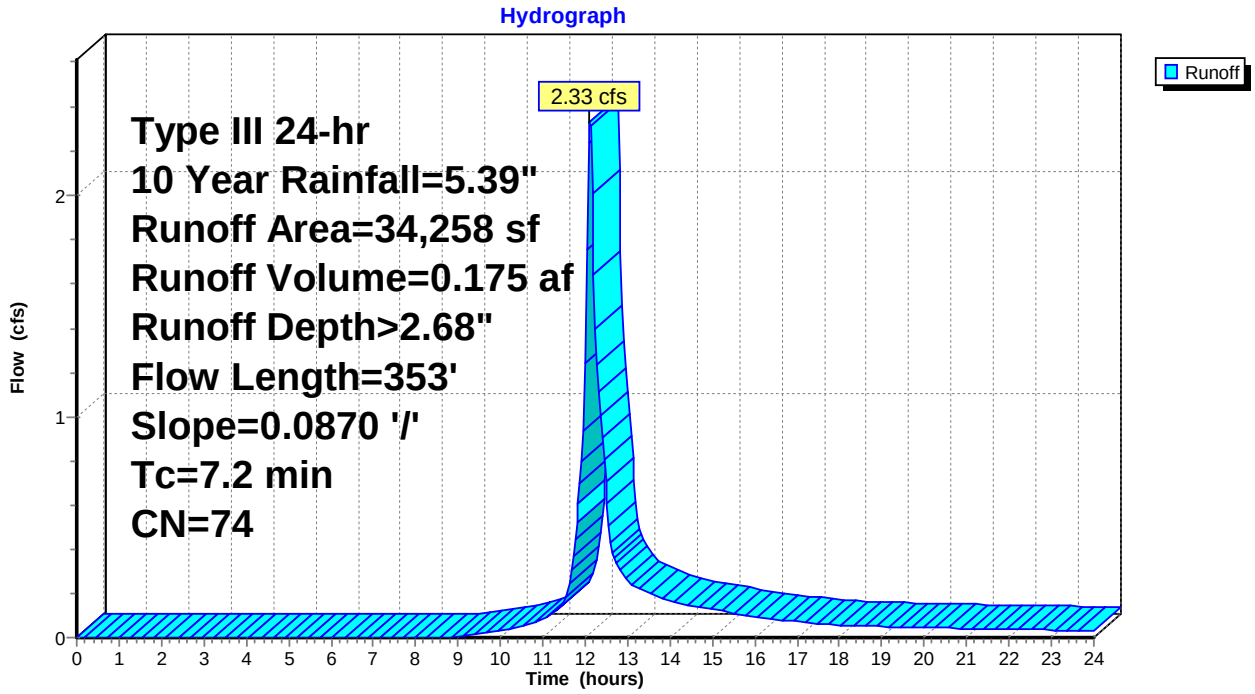
Runoff = 2.33 cfs @ 12.11 hrs, Volume= 0.175 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10 Year Rainfall=5.39"

	Area (sf)	CN	Description
*	5,414	98	Buildings
	28,844	69	50-75% Grass cover, Fair, HSG B
	34,258	74	Weighted Average
	28,844		84.20% Pervious Area
	5,414		15.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.398 ac,100.00% Impervious, Inflow Depth > 5.15" for 10 Year event
Inflow = 2.15 cfs @ 12.07 hrs, Volume= 0.171 af
Outflow = 0.17 cfs @ 14.52 hrs, Volume= 0.030 af, Atten= 92%, Lag= 146.9 min
Primary = 0.17 cfs @ 14.52 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 103.10' @ 14.52 hrs Surf.Area= 1,716 sf Storage= 6,128 cf

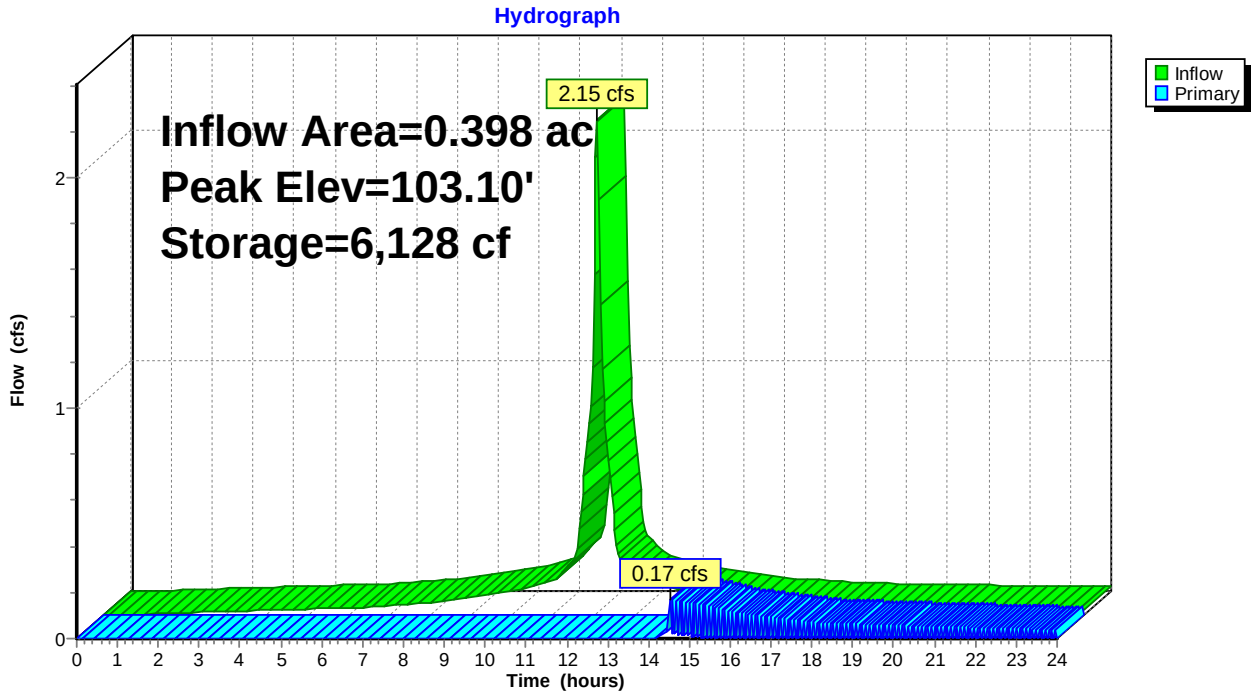
Plug-Flow detention time= 618.1 min calculated for 0.030 af (18% of inflow)
Center-of-Mass det. time= 333.6 min (1,079.1 - 745.5)

Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	491 cf	**26.00'W x 66.00'L x 4.00'H Stone** 6,864 cf Overall - 5,637 cf Embedded = 1,227 cf x 40.0% Voids
#2	99.00'	5,637 cf	**24.00'W x 64.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		6,128 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.17 cfs @ 14.52 hrs HW=103.10' (Free Discharge)
1=Orifice/Grate (Weir Controls 0.17 cfs @ 1.04 fps)

Pond 1P: 48" Concrete Galleries

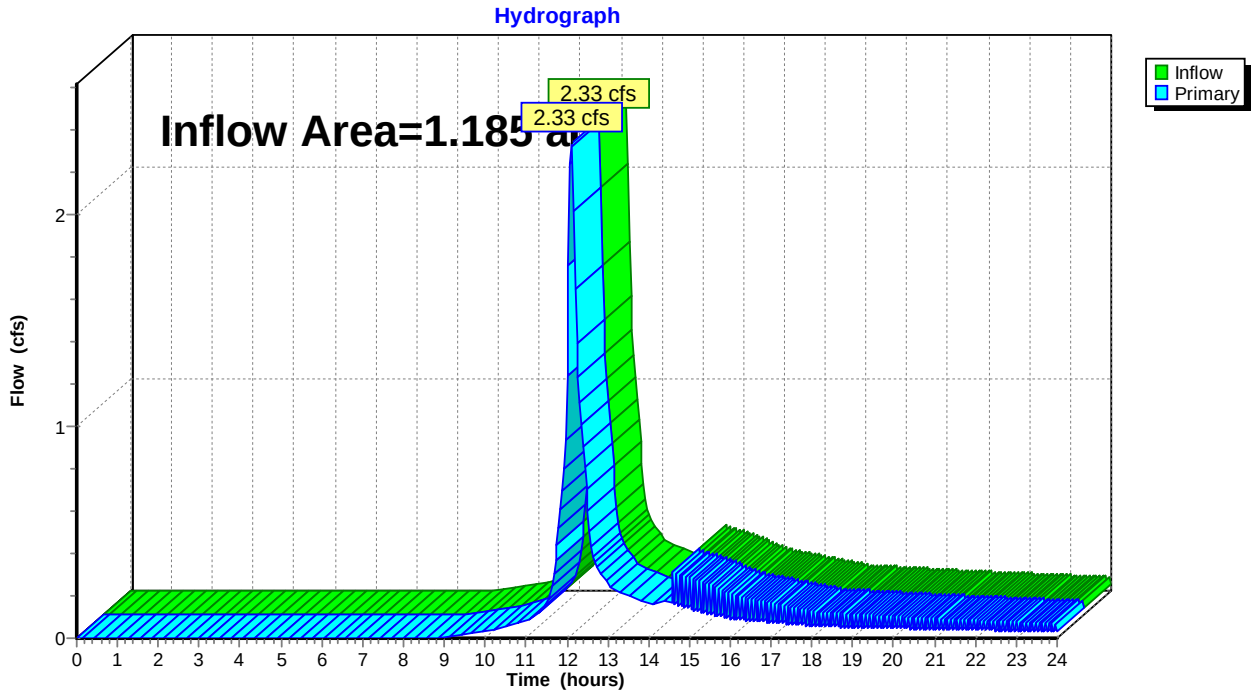


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.185 ac, 44.11% Impervious, Inflow Depth > 2.08" for 10 Year event
Inflow = 2.33 cfs @ 12.11 hrs, Volume= 0.206 af
Primary = 2.33 cfs @ 12.11 hrs, Volume= 0.206 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



Summary for Subcatchment 3S: Areas Routed to Retention

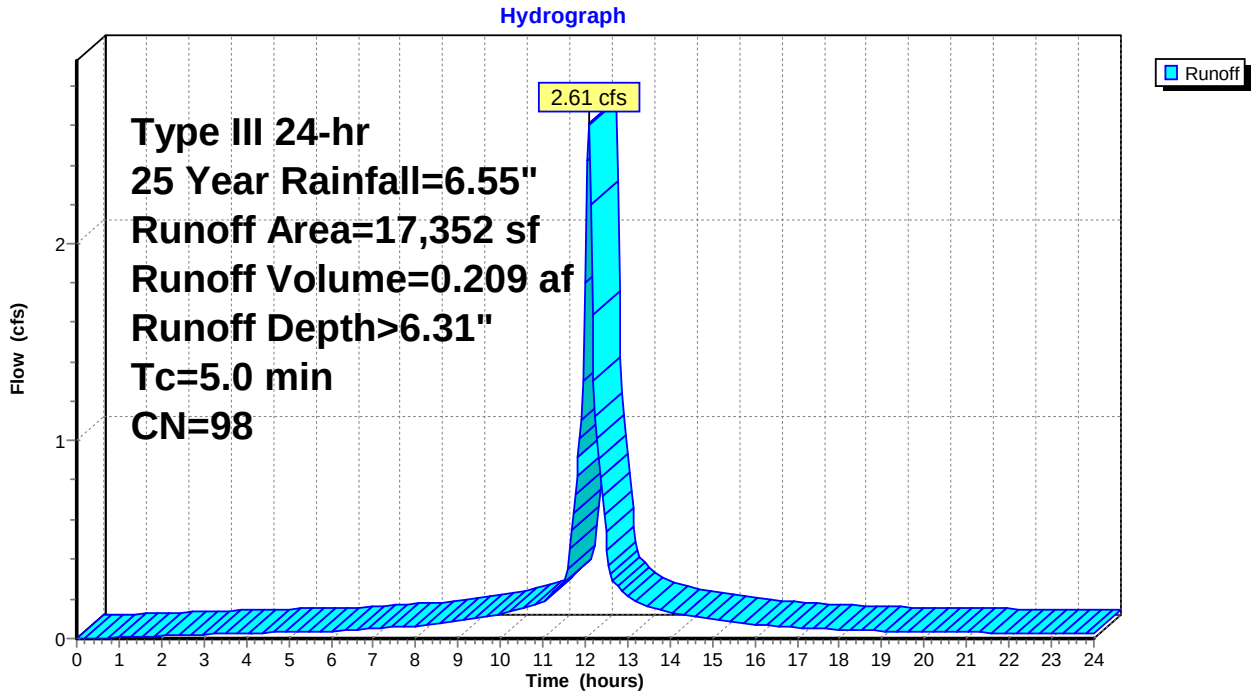
Runoff = 2.61 cfs @ 12.07 hrs, Volume= 0.209 af, Depth> 6.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25 Year Rainfall=6.55"

	Area (sf)	CN	Description
*	10,597	98	Driveway/Parking
*	6,755	98	Portion of Building roof
	17,352	98	Weighted Average
	17,352		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

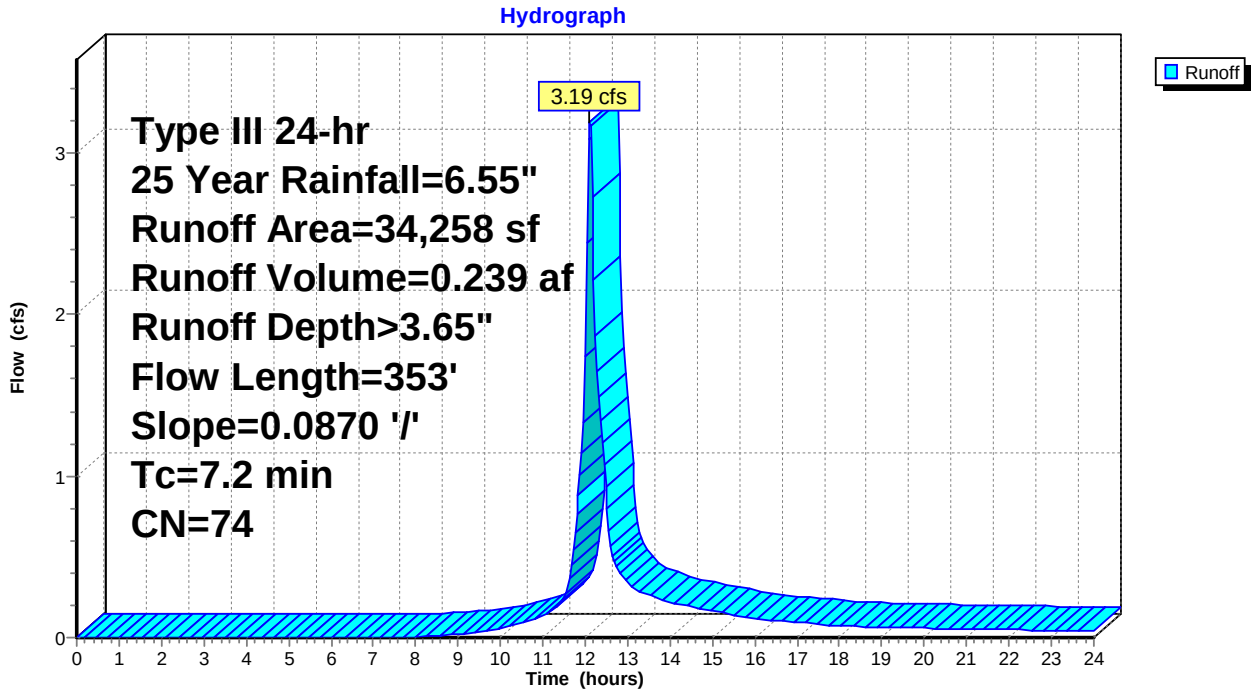
Runoff = 3.19 cfs @ 12.11 hrs, Volume= 0.239 af, Depth> 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25 Year Rainfall=6.55"

	Area (sf)	CN	Description
*	5,414	98	Buildings
	28,844	69	50-75% Grass cover, Fair, HSG B
	34,258	74	Weighted Average
	28,844		84.20% Pervious Area
	5,414		15.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.398 ac,100.00% Impervious, Inflow Depth > 6.31" for 25 Year event
Inflow = 2.61 cfs @ 12.07 hrs, Volume= 0.209 af
Outflow = 0.66 cfs @ 12.52 hrs, Volume= 0.069 af, Atten= 75%, Lag= 26.6 min
Primary = 0.66 cfs @ 12.52 hrs, Volume= 0.069 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 103.49' @ 12.52 hrs Surf.Area= 1,716 sf Storage= 6,128 cf

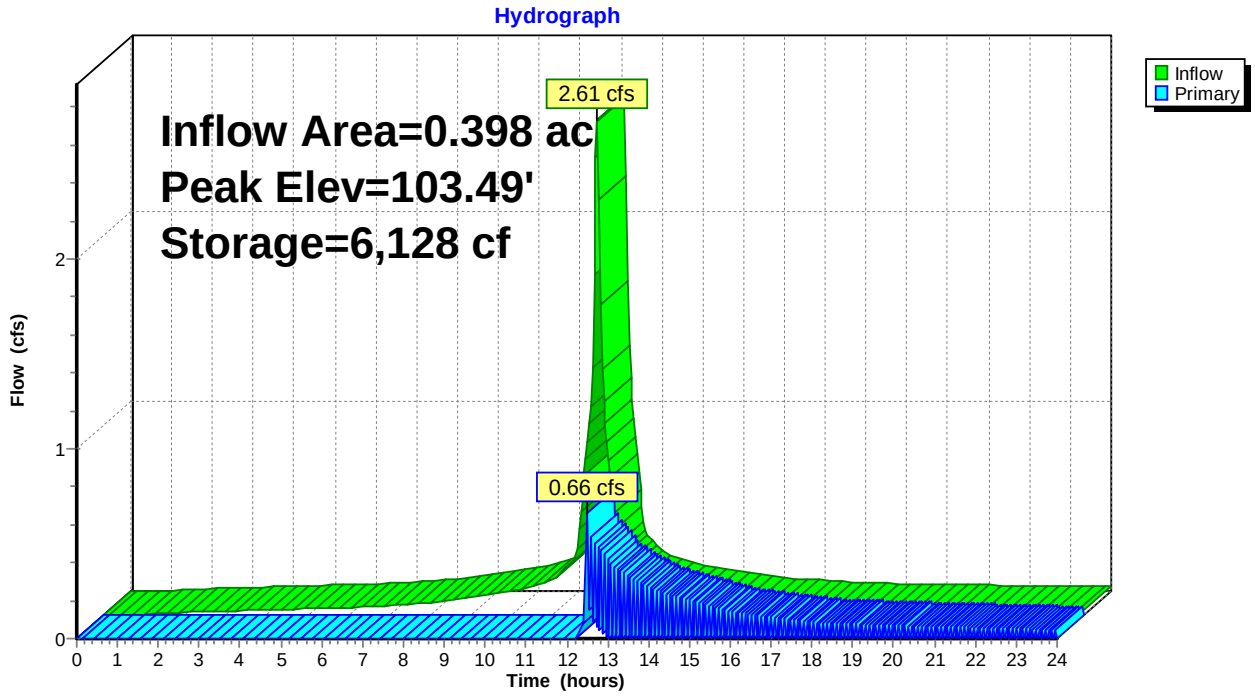
Plug-Flow detention time= 392.2 min calculated for 0.069 af (33% of inflow)
Center-of-Mass det. time= 204.8 min (947.4 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	491 cf	**26.00'W x 66.00'L x 4.00'H Stone** 6,864 cf Overall - 5,637 cf Embedded = 1,227 cf x 40.0% Voids
#2	99.00'	5,637 cf	**24.00'W x 64.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		6,128 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.64 cfs @ 12.52 hrs HW=103.45' (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.64 cfs @ 3.24 fps)

Pond 1P: 48" Concrete Galleries

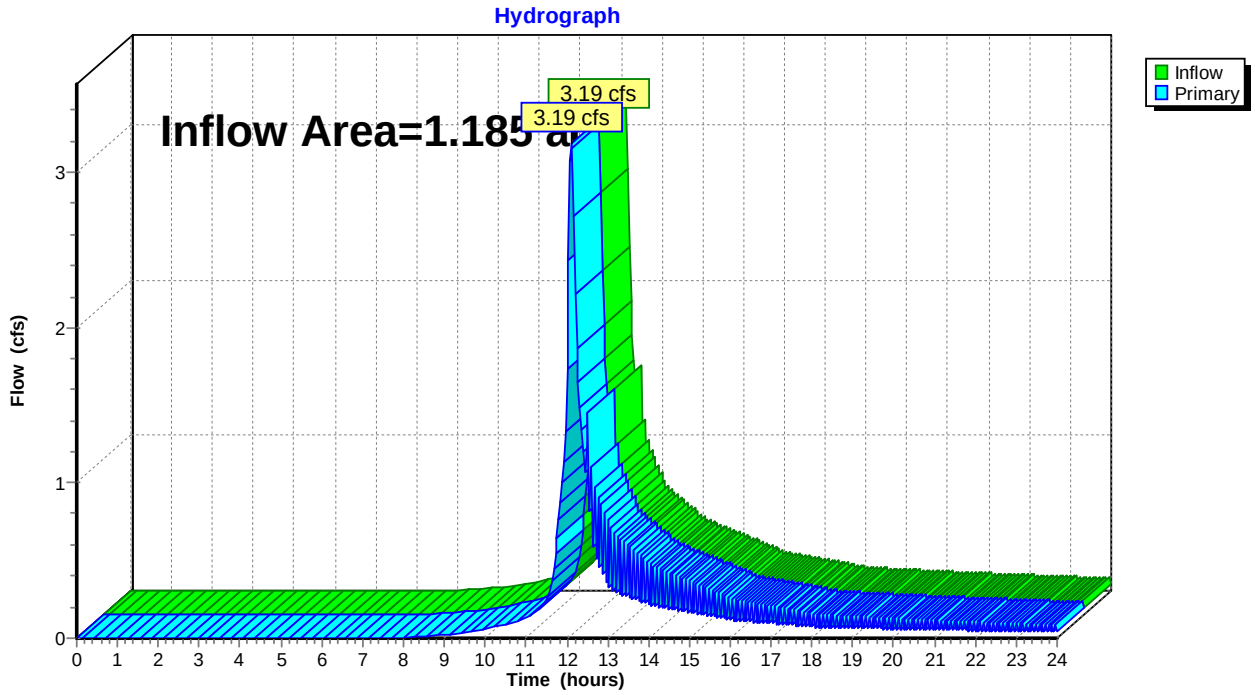


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.185 ac, 44.11% Impervious, Inflow Depth > 3.12" for 25 Year event
Inflow = 3.19 cfs @ 12.11 hrs, Volume= 0.308 af
Primary = 3.19 cfs @ 12.11 hrs, Volume= 0.308 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



Summary for Subcatchment 3S: Areas Routed to Retention

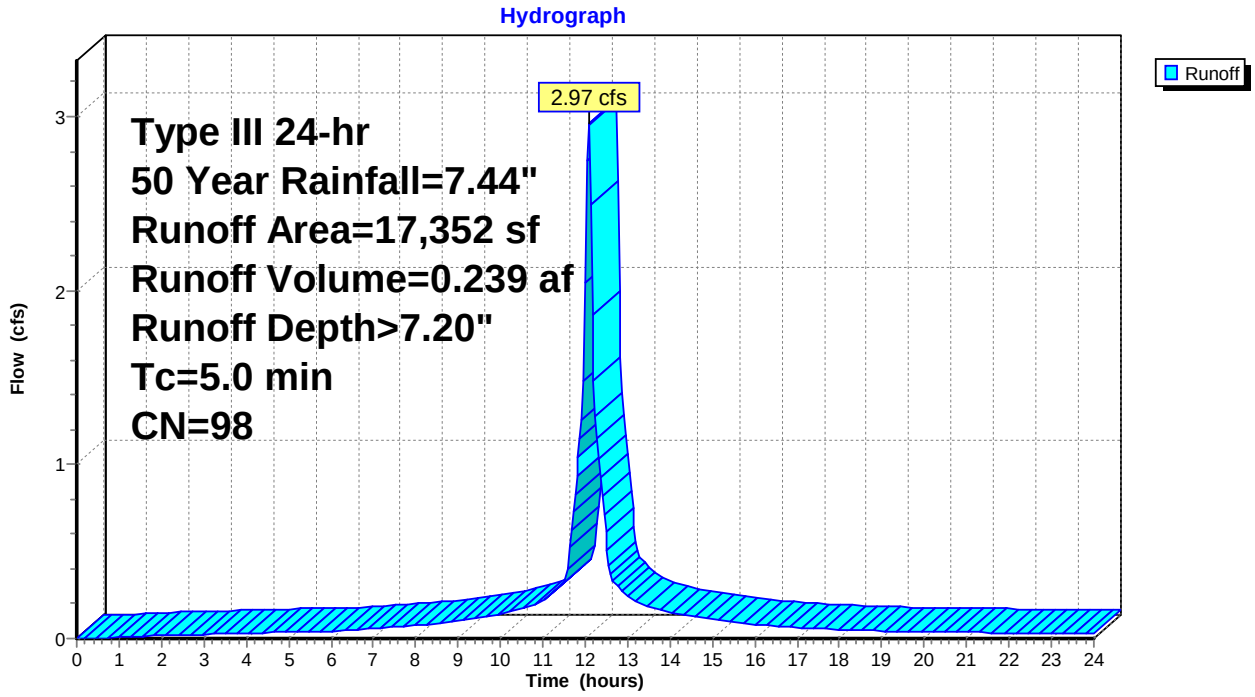
Runoff = 2.97 cfs @ 12.07 hrs, Volume= 0.239 af, Depth> 7.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 50 Year Rainfall=7.44"

	Area (sf)	CN	Description
*	10,597	98	Driveway/Parking
*	6,755	98	Portion of Building roof
	17,352	98	Weighted Average
	17,352		100.00% Impervious Area

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

Subcatchment 3S: Areas Routed to Retention



Summary for Subcatchment 4S: Areas not Routed to Retention

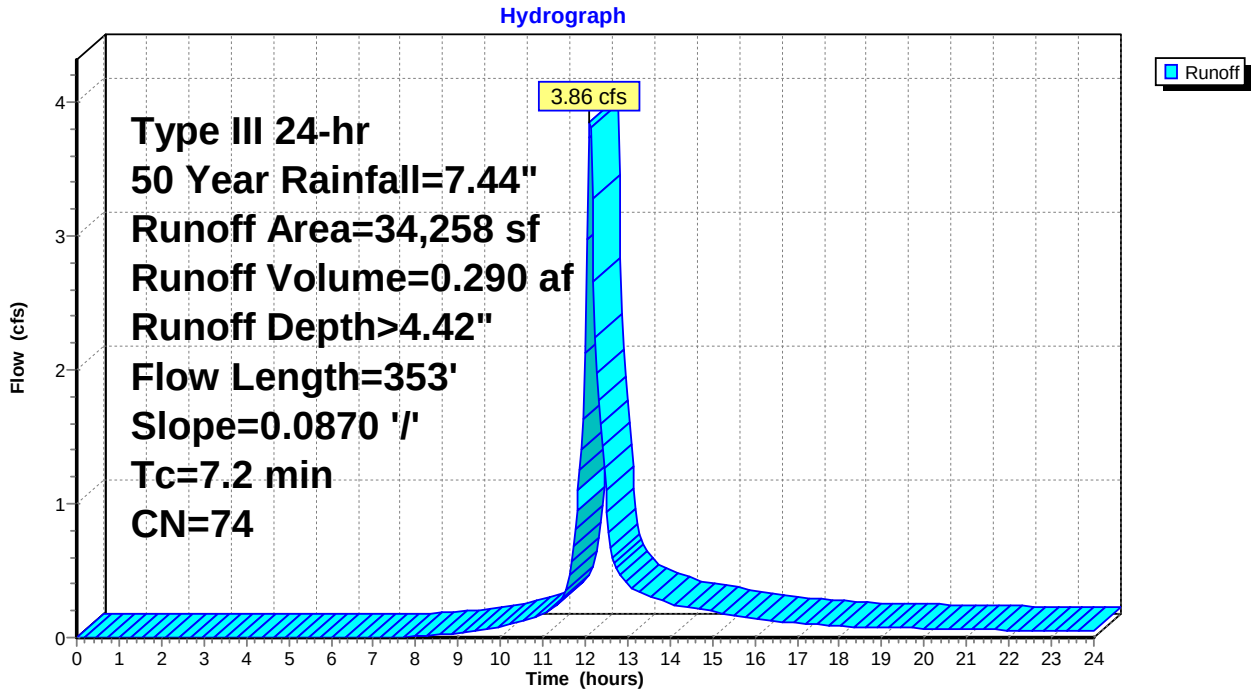
Runoff = 3.86 cfs @ 12.11 hrs, Volume= 0.290 af, Depth> 4.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 50 Year Rainfall=7.44"

	Area (sf)	CN	Description
*	5,414	98	Buildings
	28,844	69	50-75% Grass cover, Fair, HSG B
	34,258	74	Weighted Average
	28,844		84.20% Pervious Area
	5,414		15.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0870	0.32		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 3.54"
2.0	253	0.0870	2.06		**Shallow Concentrated Flow, Shallow Concentrated Flow** Short Grass Pasture Kv= 7.0 fps
7.2	353	Total			

Subcatchment 4S: Areas not Routed to Retention



Summary for Pond 1P: 48" Concrete Galleries

Inflow Area = 0.398 ac,100.00% Impervious, Inflow Depth > 7.20" for 50 Year event
Inflow = 2.97 cfs @ 12.07 hrs, Volume= 0.239 af
Outflow = 1.46 cfs @ 12.25 hrs, Volume= 0.098 af, Atten= 51%, Lag= 10.8 min
Primary = 1.46 cfs @ 12.25 hrs, Volume= 0.098 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Peak Elev= 105.21' @ 12.25 hrs Surf.Area= 1,716 sf Storage= 6,128 cf

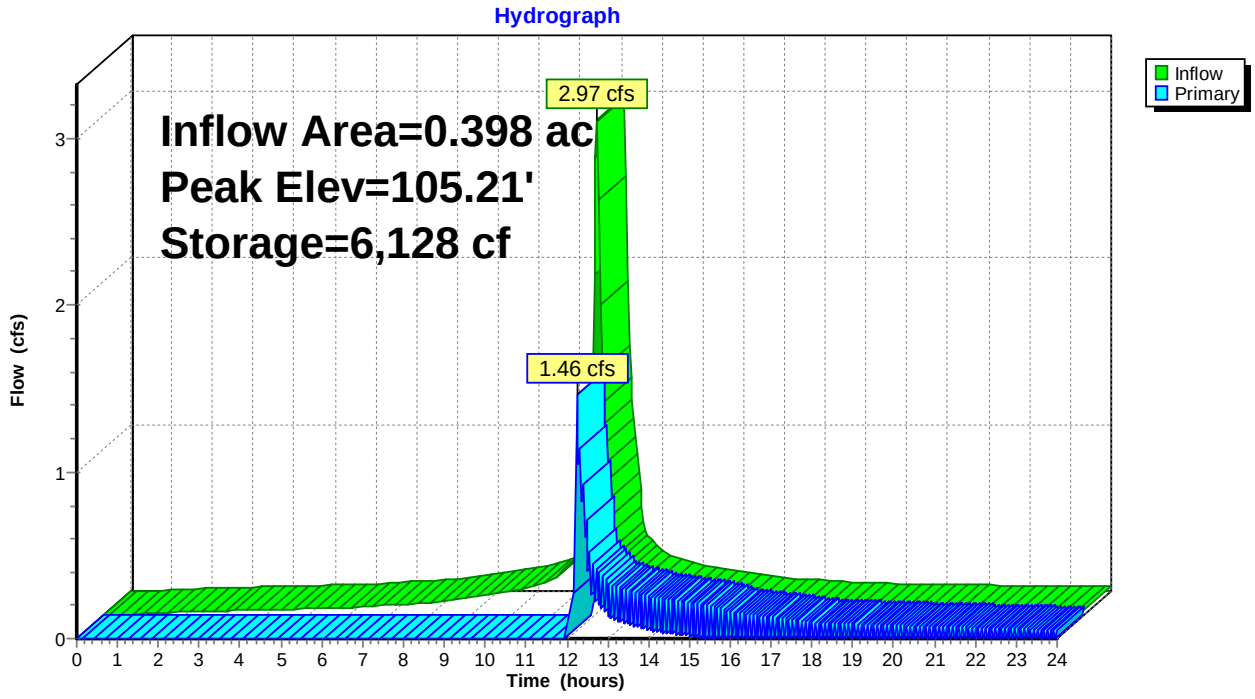
Plug-Flow detention time= 321.1 min calculated for 0.098 af (41% of inflow)
Center-of-Mass det. time= 164.7 min (905.6 - 740.9)

Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	491 cf	**26.00'W x 66.00'L x 4.00'H Stone** 6,864 cf Overall - 5,637 cf Embedded = 1,227 cf x 40.0% Voids
#2	99.00'	5,637 cf	**24.00'W x 64.00'L x 3.67'H 48" Concrete Galleries** Inside #1
		6,128 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.29 cfs @ 12.25 hrs HW=104.86' (Free Discharge)
1=Orifice/Grate (Orifice Controls 1.29 cfs @ 6.57 fps)

Pond 1P: 48" Concrete Galleries

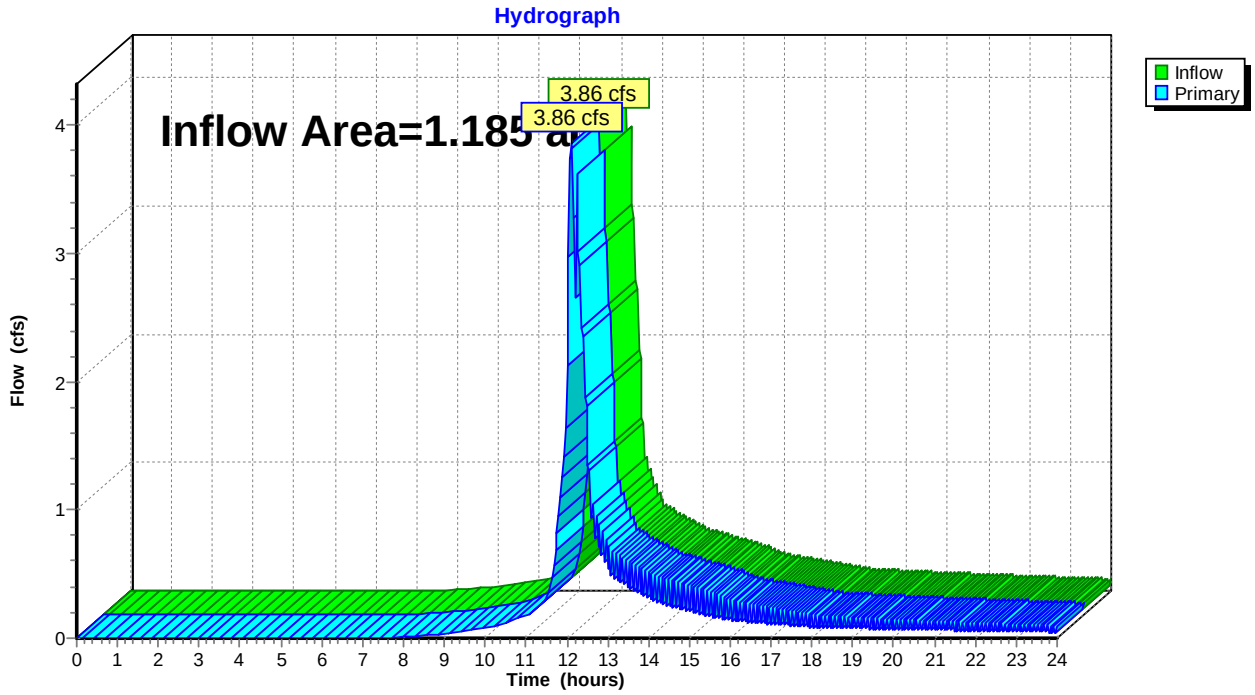


Summary for Link 1L: Combined Hydrograph

Inflow Area = 1.185 ac, 44.11% Impervious, Inflow Depth > 3.93" for 50 Year event
Inflow = 3.86 cfs @ 12.11 hrs, Volume= 0.388 af
Primary = 3.86 cfs @ 12.11 hrs, Volume= 0.388 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Link 1L: Combined Hydrograph



APPENDIX “E”

OPERATIONS AND MAINTENANCE PLAN

Appendix O
Operations and Maintenance Plan

145 Norwich New London Tpke. Route 32 &
18 Powerhouse Road
Montville, CT

February 11, 2025

Scope:

The purpose of the Operations and Maintenance Plan is to ensure that the existing and proposed stormwater components installed at *145 Route 32, Norwich New London Turnpike and 18 Powerhouse Road, Montville, CT* are maintained in operational condition throughout the life of the project. The service procedures associated with this plan shall be performed as required by the parties legally responsible for their maintenance.

Recommended Frequency of Service:

As further defined below, all stormwater components should be checked on a periodic basis and kept in full working order. Ultimately, the required frequency of inspection and service will depend on runoff quantities, pollutant loading, and clogging due to debris. At a minimum, we recommend that all stormwater components be inspected and serviced twice per year, once before winter begins and once during spring cleanup.

Qualified Inspector:

The inspections must be completed by an individual experienced in the construction and maintenance of stormwater drainage systems. Once every five years the inspections must be completed by a professional engineer.

Service Procedures:

1. Catch Basins & Drainage Inlets:
    a. Catch basins and drainage inlets shall be completely cleaned of accumulated debris and sediments at the completion of construction.
    b. For the first year, catch basins and drainage inlets shall be inspected on a quarterly basis.
    c. Any accumulated debris within the catch basins/inlets shall be removed and any repairs as required.
    d. From the second year onward, visual inspections shall occur twice per year, once in the spring and once in the fall, after fall cleanup of leaves has occurred.
    e. Accumulated debris within the catch basins/inlets shall be removed and repairs made as required.
    f. Accumulated sediments shall be removed at which time they are within 12 inches of the invert of the outlet pipe.
    g. Any additional maintenance required per the manufacturer's specifications shall also be completed.

2. Storm Drainage Piping and Manholes/Junction Boxes:
    a. All storm drainage piping shall be completely flushed of debris and accumulated sediment at the completion of construction.
    b. Manholes/Junction Boxes shall be inspected and repaired on an annual basis.

c. Unless system performance indicates degradation of piping, comprehensive video inspection of storm drainage piping shall occur once every ten years.

d. Any additional maintenance required per the manufacturer's specifications shall also be completed.

3. Stormwater Inlet/Control Structures:
   a. All control structures (orifice, weir, etc.) shall be completely cleaned of accumulated debris and sediments at the completion of construction. Any repairs shall be performed.
   b. For the first year, control structures (orifice, weir, etc.) shall be inspected on a quarterly basis.
   c. Any accumulated debris shall be removed and any repairs made to the control structures (orifice, weir, etc.) as required.
   d. From the second year onward, visual inspections shall occur twice per year, once in the spring and once in the fall, after fall cleanup of leaves has occurred.
   e. Accumulated debris shall be removed and repairs made as required.
   f. Any additional maintenance required per the manufacturer's specifications shall also be completed.
4. Drywells and Infiltration Systems:
   a. All drywells/infiltrators shall be completely cleaned of accumulated debris and sediments upon the completion of construction.
   b. For the first year, the drywells/infiltrators shall be inspected on a quarterly basis.
   c. Any accumulated debris within the drywells/infiltrators shall be removed and any repairs made to the units as required.
   d. From the second year onward, visual inspection shall occur twice per year, once in the spring and once in the fall, after fall cleanup of leaves has occurred.
   e. Accumulated debris within the units shall be removed and repairs made as required.
   f. Any additional maintenance required per the manufacturer's specifications shall also be completed.
5. Roof Gutters:
   a. Remove accumulated debris and inspect for damage. Any damage should be repaired as required.

Disposal of Debris and Sediment:

All debris and sediment removed from the stormwater structures and bioretention/biofiltration basins shall be disposed of legally. There shall be no dumping of silt or debris into or in proximity to any inland or tidal wetlands.

Maintenance Records:

The Owners(s) must maintain all records (logs, invoices, reports, data, etc.) and have them readily available for inspection at all times.

Operations and Maintenance Log (Page 1 of 3)

#245 Route 32 Norwich New London Tpke. Montville, CT
March 8, 2022 30,

Type of Inspection: ☐ Spring ☐ Fall ☐ Other

Inspector's Name:_____ Date of Inspection:_____

Affiliation:_____ Phone #:_____

Catch Basins & Drainage Inlets:

- Has accumulated debris been removed from grates? ☐ Yes ☐ No ☐ N/A
- Do any basins require additional repair? (identify below): ☐ Yes ☐ No ☐ N/A
- Have sumps been cleaned of sediment? ☐ Yes ☐ No ☐ N/A

Notes:

Storm Drainage Piping and Manholes/Junction Boxes:

- Has accumulated debris been removed? ☐ Yes ☐ No ☐ N/A
- Do any manholes require additional repair? (identify below): ☐ Yes ☐ No ☐ N/A
- Is there any evidence of stormwater piping failure? ☐ Yes ☐ No ☐ N/A
- Has a comprehensive video inspection been completed? ☐ Yes ☐ No ☐ N/A

Notes:

Stormwater Control Structures:

- Has accumulated debris been removed? ☐ Yes ☐ No ☐ N/A
- Are any repairs required? (identify below): ☐ Yes ☐ No ☐ N/A
- Have orifices and weirs been cleaned of debris? ☐ Yes ☐ No ☐ N/A

Notes:

Operations and Maintenance Log (Page 2 of 3)

#245 Route 32 Norwich New London Tpke., Montville, CT
March 8, 2022

Drainage Outfalls/Splash Pads/Scour Holes/Level Spreaders:

- Have all drainage outlets been cleared of debris? ☐ Yes ☐ No ☐ N/A
- Have all outlet protections been inspected/repaired? ☐ Yes ☐ No ☐ N/A
- Have all erosion issues been repaired? ☐ Yes ☐ No ☐ N/A

Notes:

Drywells and Infiltration Systems:

- Have units been cleared of debris/sediments? ☐ Yes ☐ No ☐ N/A
- Do units require additional repair? (identify below): ☐ Yes ☐ No ☐ N/A
- Has draining times of system been verified? ☐ Yes ☐ No ☐ N/A

Notes:

Roof Gutters:

- Has accumulated debris been removed from gutters? ☐ Yes ☐ No ☐ N/A
- Do any gutters require additional repair? (identify below): ☐ Yes ☐ No ☐ N/A

Notes:

Operations and Maintenance Log (Page 3 of 3)

#245 Route 32 Norwich New London Tpke. Montville CT
March 8, 2022

Please make additional notes/observations and particular concerns below. Also record any additional maintenance that has been performed:

_____ _____

Signature of Inspector: **Date:**