Memorandum

To: Christopher Hulk, PE
FieldTurf

Date: December 19, 2023

Project #: 43380.00

From: Steven J. Kochis, PE
VHB

Re: FieldTurf Tennis Court Drainage
Ayers Road & Nevers Road
South Windsor, Connecticut

Site & Project Description

South Windsor High School is located at 161 Nevers Road in South Windsor, Connecticut. The property contains the existing school buildings, associated parking and athletic fields. The project proposes seven (7) new tennis courts with a small parking area located southeast of the existing school. VHB prepared an analysis of existing and proposed conditions drainage conditions.

NRCS Web Soil Survey lists the area as Udorthents-Urban Land Complex (Hydrologic Soil Group B), Enfield Silt Loam. 3-8% slopes (Hydrologic Soil Group B) and a small portion along Collins Crossing as Enfield Silt Loam, 3-8% Slopes (Hydrologic Soil Group B).

Per available FEMA Map No. 09003C0381F dated 09/26/2008, the site is located within Zone X – 0.2% annual chance flood hazard areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile. A portion of the development lies within zone AE – Area with a base flood elevation of approximately 162.4.

Existing Drainage Conditions

Under existing conditions, the project area was analyzed as two (2) drainage areas that outlet to one design point (Plum Gulley Brook at Collins Crossing "DP-1"). See Figure 1 – Existing Drainage Conditions.

Drainage Area C-1: This 1.13- acre catchment area consists of the frontage and western portion of the land between Collins Crossing and South Windsor High School Main Entrance off of Nevers Road. This area conveys stormwater runoff overland (west) through a grassed swale with stone check dams to DP-1.

Drainage Area C-2: This 1.05-acre catchment area consists of the eastern portion of the land between Collins Crossing and South Windsor High School Main Entrance off of Nevers Road. Stormwater in this area is conveyed westerly overland to Plum Gulley Brook towards DP-1.

Proposed Drainage Conditions

The project proposes seven (7) new tennis courts with a small parking area of eight (8) spaces located southeast of the existing school. Two stormwater basins are proposed with emergency overflows that ultimately outlet into Plum Gulley Brook. Both have been designed to allow volumetric storage of stormwater runoff to promote retention and infiltration for water quality. Peak rates of runoff are attenuated from proposed conditions down to pre-development levels. An infiltration rate of 7 inches per hour into the native soil has been assumed in the hydrologic model by recommendation of FieldTurf. This assumption should be tested in the field and VHB provided the opportunity to

adjust the stormwater design if/as needed upon completion. It is also recommended that a wetland study be performed within the development area for the possible presence of wetlands pertaining to the drainage ditch or Plum Gulley Brook as portions of the development may impact wetlands or upland review areas.

Table 1 below displays the anticipated existing and proposed peak flows for the project area before and after site improvements.

Figure 2 illustrates the proposed "post construction conditions for the project area. As shown the project area was analyzed as two (2) catchment areas that outlet to one design point (DP-1).

Drainage Area C-1: This 0.68-acre catchment area consists of the proposed parking area and western portion of the site including the existing grassed swale with stone check dams. The parking lot will drain overland into a proposed Stormwater Basin (1P) which then outlets into the existing grassed swale which then outlets into Plum Gulley Brook (DP-1).

Drainage Area C-2: This 1.49-acre catchment area consists of the proposed tennis courts. The courts will drain west and outlet into a proposed Stormwater Basin (2P) which then outlets towards Plum Gulley Brook (DP-1).

The table (Table 1) below presents a summary of the existing and proposed conditions peak discharge rates:

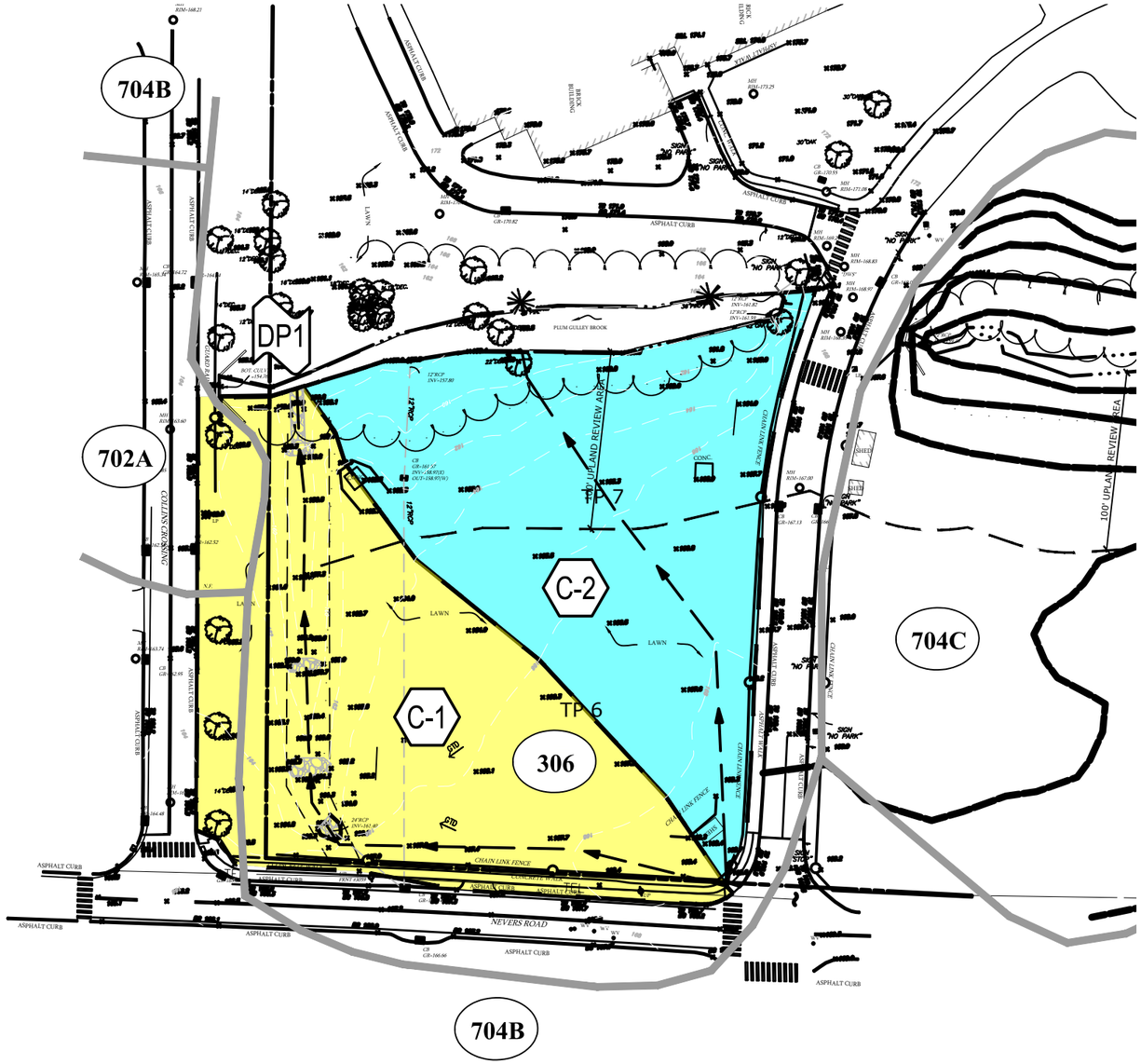
Design Point	2-year	10-year	25-year	100-year
Design Point: DP1				
Existing	0.7	2.9	4.6	7.6
Proposed	0.1	2.8	4.3	7.6

Water Quality

Retention and infiltration of the required water quality volume is provided within the two proposed stormwater basins. Computations for the required water quality volume are enclosed herewith.

Figures

Attachments



0 40 80 160 Feet

Legend

SYMBOLS

X — DRAINAGE AREA DESIGNATION

DPX — DESIGN POINT

LINETYPES

DRAINAGE AREA BOUNDARY

TIME OF CONCENTRATION FLOW LINE

SOIL TYPE BOUNDARY

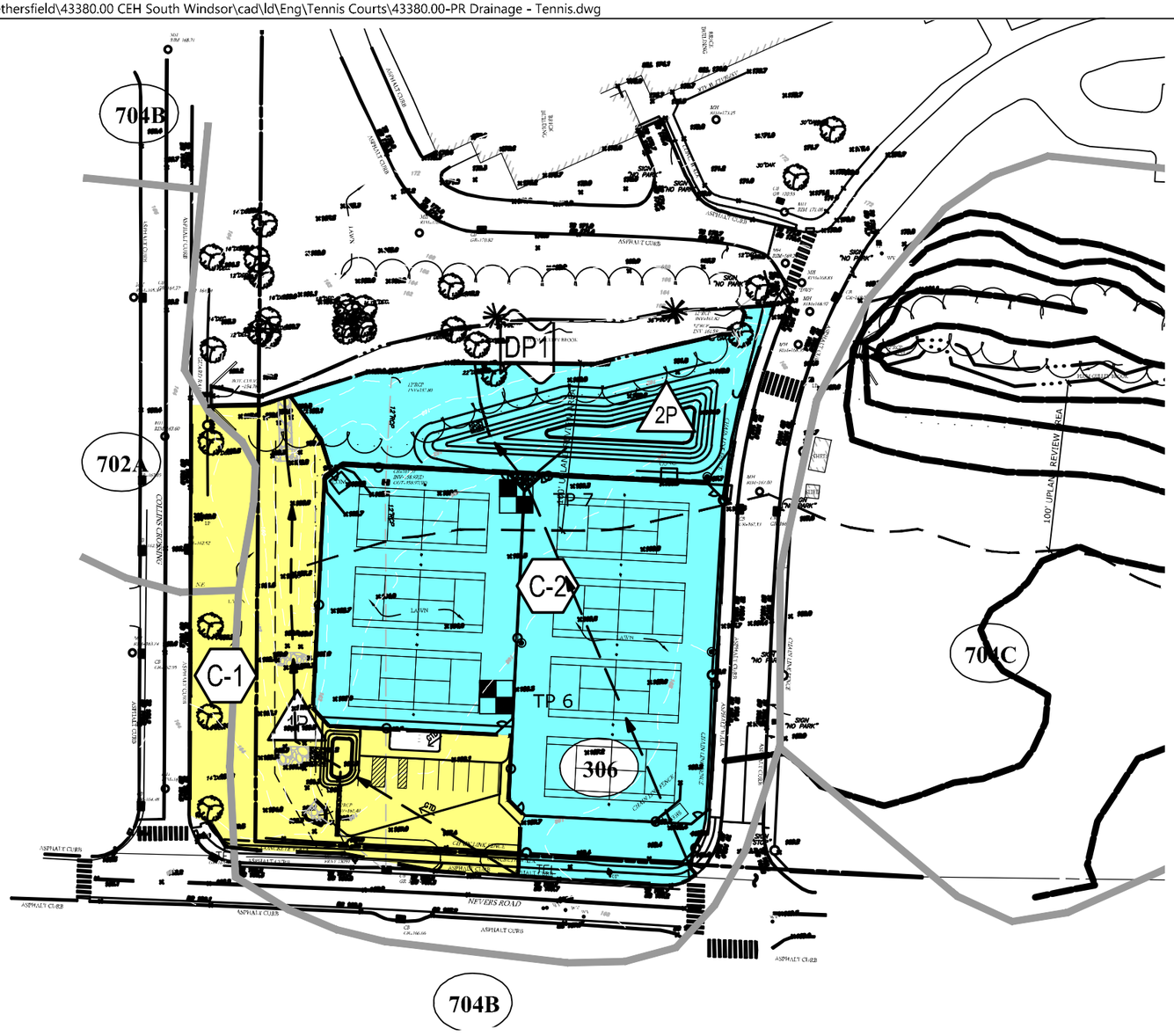
SCS SOIL CLASSIFICATIONS

306 — UDORTHENTS-URBAN LAND COMPLEX, HSG B

702A — TISBURY SILT LOAM, 0-3% SLOPES, HSG B/D

704B — ENFIELD SILT LOAM, 3-8% SLOPES, HSG B

704C — ENFIELD SILT LOAM, 8-15% SLOPES, HSG B



Legend

SYMBOLS

- X — DRAINAGE AREA DESIGNATION
- DPX — DESIGN POINT

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SOIL TYPE BOUNDARY

SCS SOIL CLASSIFICATIONS

- 306 — UDORTHENTS-URBAN LAND COMPLEX, HSG B
- 702A — TISBURY SILT LOAM, 0-3% SLOPES, HSG B/D
- 704B — ENFIELD SILT LOAM, 3-8% SLOPES, HSG B
- 704C — ENFIELD SILT LOAM, 8-15% SLOPES, HSG B

0 40 80 160 Feet

vhb

Proposed Drainage Conditions
FieldTurf - S. Windsor High Drainage
Proposed Tennis Courts
Ayers Road & Nevers Road, South Windsor, CT

Figure 2

12/19/2023

NOAA Atlas 14, Volume 10, Version 3
Location name: Hardwick, Massachusetts, USA*
Latitude: 42.3621°, Longitude: -72.1625°
Elevation: 636 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	**0.338** (0.265-0.430)	**0.393** (0.308-0.501)	**0.483** (0.377-0.617)	**0.558** (0.434-0.717)	**0.662** (0.496-0.883)	**0.742** (0.543-1.01)	**0.822** (0.581-1.15)	**0.906** (0.612-1.31)	**1.02** (0.661-1.52)	**1.10** (0.699-1.69)
10-min	**0.479** (0.376-0.609)	**0.557** (0.437-0.710)	**0.685** (0.535-0.876)	**0.791** (0.615-1.02)	**0.938** (0.703-1.25)	**1.05** (0.770-1.43)	**1.16** (0.824-1.63)	**1.28** (0.866-1.85)	**1.44** (0.937-2.16)	**1.56** (0.990-2.39)
15-min	**0.563** (0.442-0.716)	**0.655** (0.514-0.835)	**0.806** (0.630-1.03)	**0.931** (0.722-1.20)	**1.10** (0.827-1.47)	**1.24** (0.905-1.68)	**1.37** (0.969-1.92)	**1.51** (1.02-2.18)	**1.70** (1.10-2.54)	**1.84** (1.16-2.81)
30-min	**0.761** (0.597-0.968)	**0.886** (0.695-1.13)	**1.09** (0.851-1.39)	**1.26** (0.980-1.62)	**1.50** (1.12-2.00)	**1.68** (1.23-2.28)	**1.86** (1.31-2.60)	**2.04** (1.38-2.96)	**2.30** (1.49-3.44)	**2.50** (1.58-3.81)
60-min	**0.959** (0.752-1.22)	**1.12** (0.876-1.42)	**1.38** (1.08-1.76)	**1.59** (1.24-2.04)	**1.89** (1.42-2.52)	**2.12** (1.55-2.88)	**2.34** (1.66-3.29)	**2.58** (1.75-3.74)	**2.90** (1.88-4.34)	**3.15** (1.99-4.81)
2-hr	**1.21** (0.956-1.53)	**1.42** (1.12-1.79)	**1.75** (1.38-2.22)	**2.03** (1.58-2.59)	**2.41** (1.82-3.22)	**2.69** (2.00-3.68)	**3.00** (2.16-4.26)	**3.36** (2.28-4.84)	**3.91** (2.54-5.82)	**4.38** (2.78-6.64)
3-hr	**1.38** (1.09-1.74)	**1.62** (1.28-2.04)	**2.02** (1.59-2.55)	**2.34** (1.84-2.98)	**2.80** (2.13-3.73)	**3.13** (2.34-4.27)	**3.49** (2.54-4.98)	**3.95** (2.68-5.67)	**4.67** (3.04-6.92)	**5.29** (3.36-8.00)
6-hr	**1.70** (1.36-2.13)	**2.03** (1.62-2.55)	**2.57** (2.04-3.23)	**3.02** (2.38-3.82)	**3.64** (2.79-4.84)	**4.09** (3.08-5.57)	**4.59** (3.38-6.55)	**5.24** (3.57-7.48)	**6.29** (4.11-9.28)	**7.23** (4.61-10.9)
12-hr	**2.07** (1.66-2.58)	**2.52** (2.02-3.14)	**3.26** (2.61-4.07)	**3.88** (3.08-4.86)	**4.72** (3.64-6.24)	**5.34** (4.04-7.23)	**6.02** (4.45-8.53)	**6.90** (4.72-9.79)	**8.32** (5.45-12.2)	**9.57** (6.12-14.3)
24-hr	**2.45** (1.98-3.02)	**3.02** (2.44-3.73)	**3.96** (3.19-4.91)	**4.75** (3.79-5.91)	**5.82** (4.51-7.64)	**6.61** (5.03-8.89)	**7.48** (5.55-10.5)	**8.59** (5.89-12.1)	**10.4** (6.81-15.1)	**11.9** (7.65-17.7)
2-day	**2.81** (2.28-3.44)	**3.48** (2.83-4.28)	**4.60** (3.72-5.66)	**5.52** (4.44-6.82)	**6.78** (5.29-8.84)	**7.71** (5.90-10.3)	**8.74** (6.52-12.2)	**10.0** (6.92-14.1)	**12.1** (8.01-17.5)	**14.0** (9.00-20.6)
3-day	**3.06** (2.50-3.74)	**3.80** (3.10-4.64)	**5.01** (4.07-6.14)	**6.01** (4.85-7.40)	**7.38** (5.78-9.59)	**8.39** (6.44-11.2)	**9.51** (7.11-13.2)	**10.9** (7.55-15.2)	**13.2** (8.74-19.0)	**15.2** (9.82-22.3)
4-day	**3.30** (2.70-4.01)	**4.08** (3.34-4.97)	**5.36** (4.36-6.55)	**6.42** (5.19-7.89)	**7.88** (6.18-10.2)	**8.94** (6.88-11.9)	**10.1** (7.59-14.1)	**11.6** (8.04-16.2)	**14.1** (9.30-20.2)	**16.2** (10.4-23.6)
7-day	**3.97** (3.27-4.80)	**4.83** (3.98-5.86)	**6.25** (5.12-7.60)	**7.43** (6.04-9.08)	**9.05** (7.12-11.6)	**10.2** (7.90-13.5)	**11.5** (8.67-15.9)	**13.2** (9.16-18.2)	**15.8** (10.5-22.6)	**18.1** (11.7-26.3)
10-day	**4.63** (3.83-5.59)	**5.54** (4.57-6.69)	**7.04** (5.78-8.52)	**8.27** (6.76-10.1)	**9.98** (7.87-12.8)	**11.2** (8.67-14.7)	**12.6** (9.45-17.2)	**14.3** (9.95-19.7)	**16.9** (11.3-24.1)	**19.2** (12.5-27.8)
20-day	**6.67** (5.55-7.99)	**7.64** (6.34-9.16)	**9.22** (7.62-11.1)	**10.5** (8.65-12.7)	**12.3** (9.75-15.5)	**13.7** (10.6-17.6)	**15.1** (11.2-20.1)	**16.7** (11.7-22.8)	**19.1** (12.8-26.9)	**21.0** (13.6-30.2)
30-day	**8.38** (7.00-10.0)	**9.37** (7.82-11.2)	**11.0** (9.13-13.2)	**12.3** (10.2-14.9)	**14.2** (11.2-17.7)	**15.6** (12.0-19.9)	**17.0** (12.6-22.4)	**18.5** (13.0-25.1)	**20.6** (13.8-28.9)	**22.2** (14.5-31.8)
45-day	**10.5** (8.81-12.5)	**11.5** (9.66-13.7)	**13.2** (11.0-15.8)	**14.6** (12.1-17.5)	**16.5** (13.1-20.5)	**18.0** (13.9-22.7)	**19.5** (14.4-25.3)	**20.9** (14.7-28.1)	**22.6** (15.3-31.6)	**23.9** (15.6-34.1)
60-day	**12.3** (10.3-14.5)	**13.3** (11.2-15.8)	**15.1** (12.6-17.9)	**16.5** (13.7-19.8)	**18.5** (14.7-22.8)	**20.1** (15.5-25.2)	**21.6** (15.9-27.8)	**22.9** (16.2-30.8)	**24.5** (16.6-34.1)	**25.6** (16.7-36.4)

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

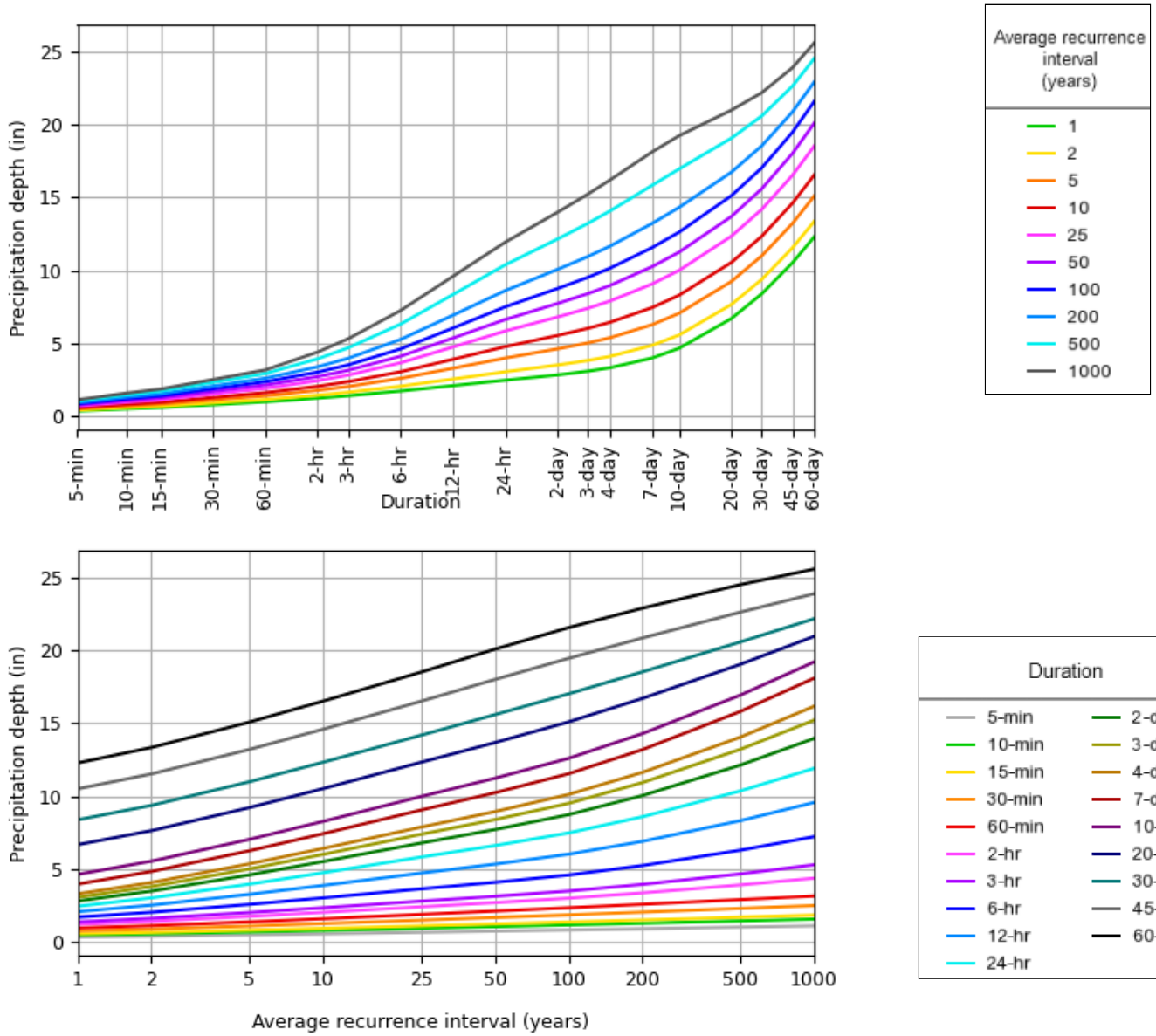
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper 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.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 42.3621°, Longitude: -72.1625°



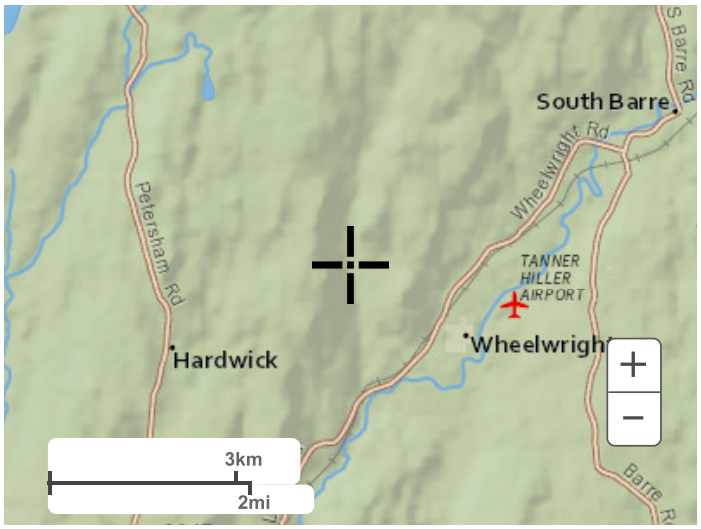
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Thu Nov 16 19:44:01 2023

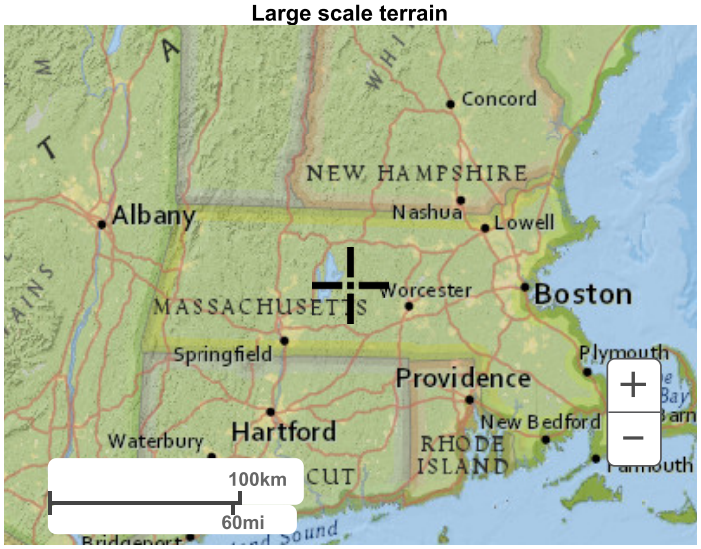
Back to Top

Maps & aerials

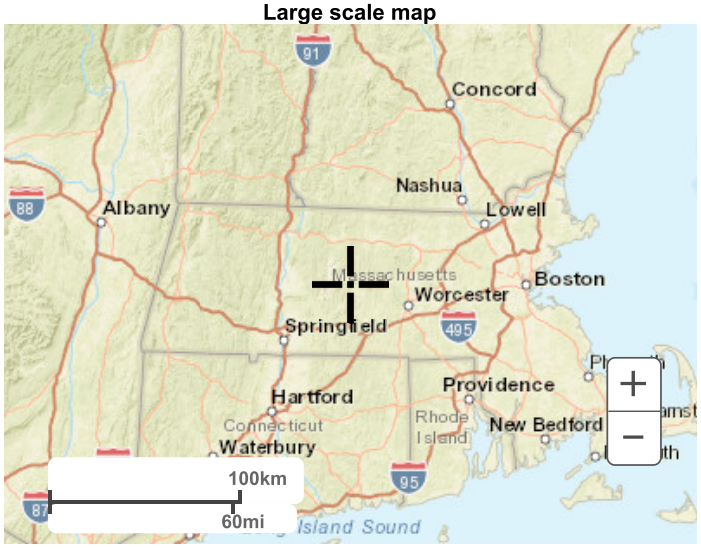
Small scale terrain



Large scale terrain



Large scale map

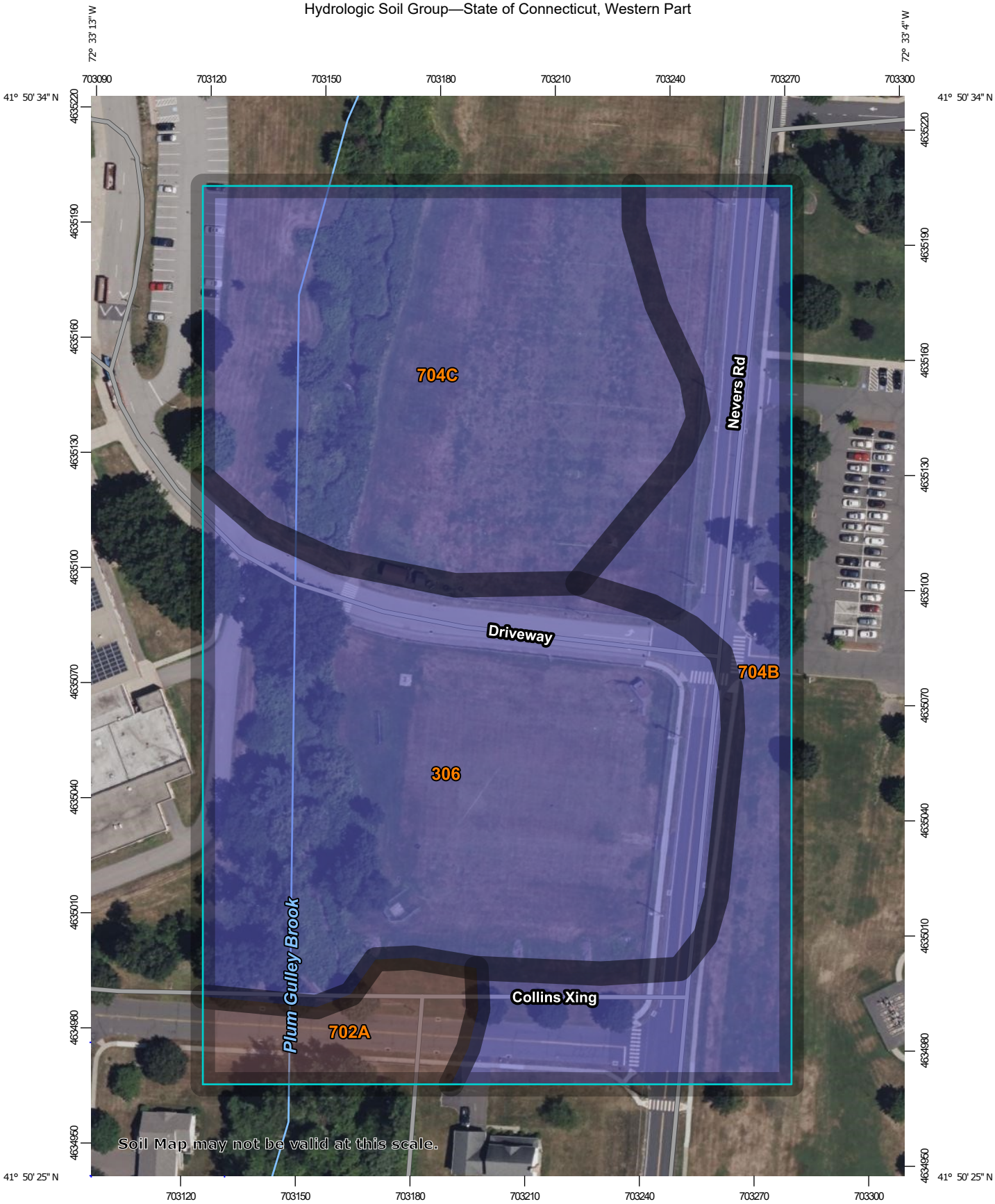


Large scale aerial

Back to Top

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



Map Scale: 1:1,370 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

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 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, Western Part
Survey Area Data: Version 1, Sep 15, 2023

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
306	Udorthents-Urban land complex	B	3.5	39.5%
702A	Tisbury silt loam, 0 to 3 percent slopes	B/D	0.5	5.0%
704B	Enfield silt loam, 3 to 8 percent slopes	B	2.1	23.2%
704C	Enfield silt loam, 8 to 15 percent slopes	B	2.9	32.3%
Totals for Area of Interest			**8.9**	**100.0%**

Description

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.

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.

Rating Options

Aggregation Method: Dominant Condition

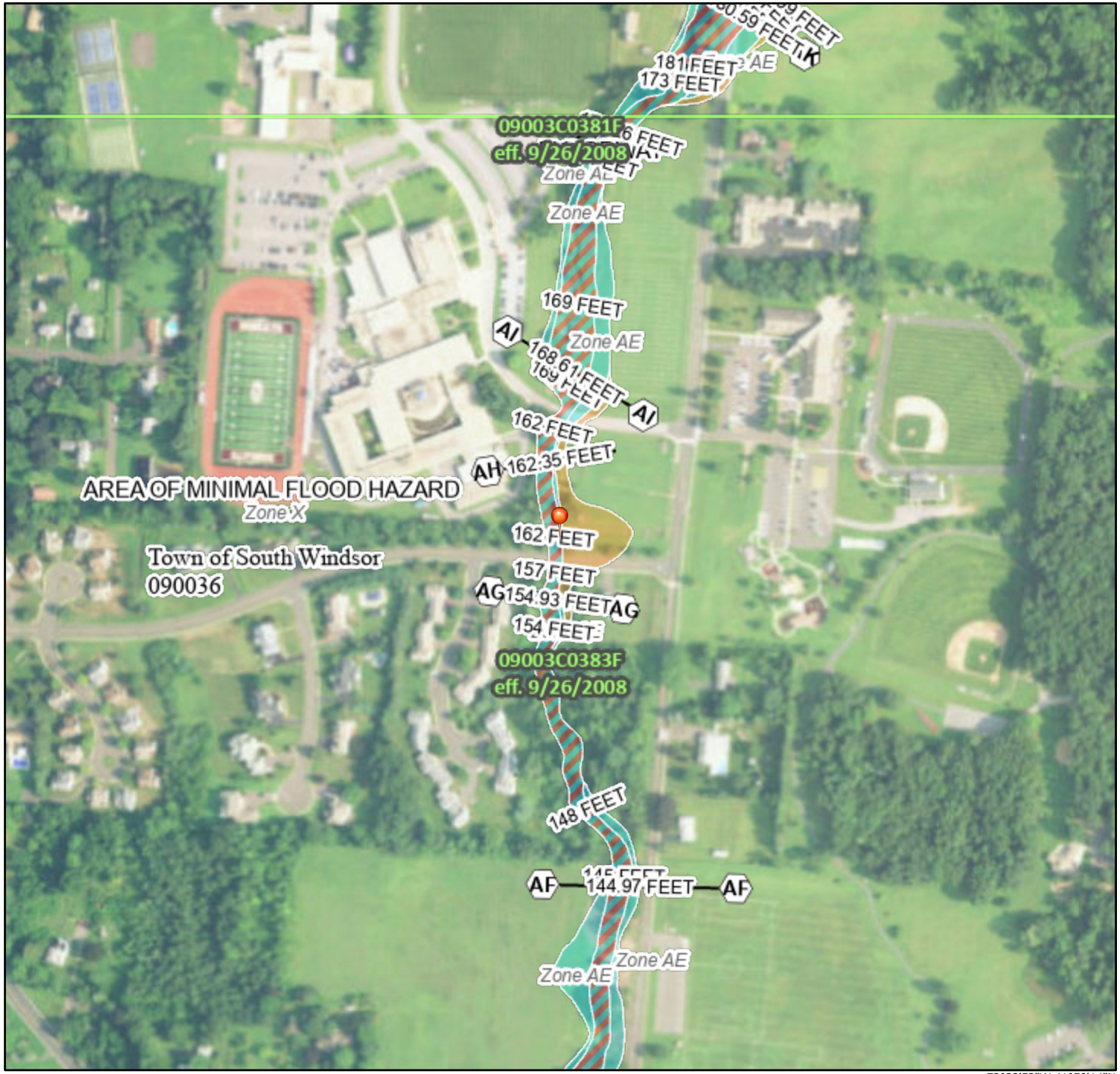
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

FEMA

72°33'30"W 41°50'40"N



72°32'52"W 41°50'14"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/15/2023 at 2:17 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Water Quality Volume Calculations

Project: South Windsor High School Tennis Court
Location: South Windsor, CT
By: AMK
Checked: SJK
Date: 12/19/23
Date:

Basin Name	C-1	C-2	
Rainfall, P	1.0 in.	1.0 in.	a
Area, A	0.68 ac	1.50 ac	b
Impervious Cover Area	0.17 ac	1.00 ac	c
% Impervious, I	25 %	67 %	
Volumetric Runoff Coeff., R	0.279	0.653	d
Water Quality Volume, WQV	0.016 ac-ft	0.081 ac-ft	e
	693 cf	3,549 cf	

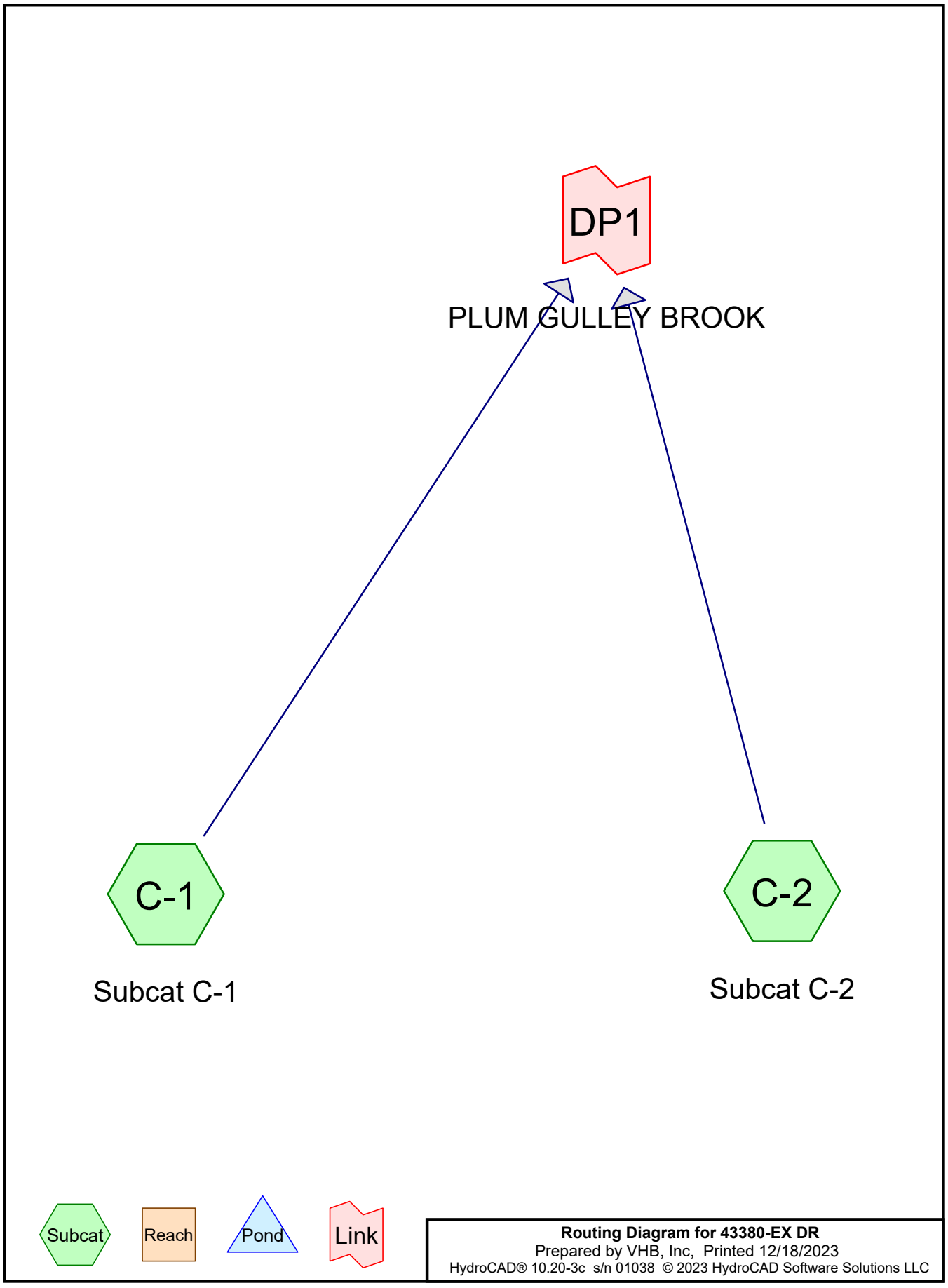
[a] First one inch of rainfall; 2004 Connecticut Stormwater Quality Manual

[b] Area tributary to the stormwater management basin

[c] Impervious cover area tributary to the stormwater management basin

[d] R=0.05+0.009*I; Section 7.4.1 from 2004 Connecticut Stormwater Quality Manual

[e] WQV=P*R*A/12; Section 7.4.1 from 2004 Connecticut Stormwater Quality Manual



Routing Diagram for 43380-EX DR
Prepared by VHB, Inc, Printed 12/18/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.067	61	>75% Grass cover, Good, HSG B (C-1, C-2)
0.080	74	>75% Grass cover, Good, HSG C (C-1)
0.035	98	Paved parking, HSG B (C-1, C-2)
0.000	98	Water Surface, 0% imp, HSG B (C-2)
2.182	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.102	HSG B	C-1, C-2
0.080	HSG C	C-1
0.000	HSG D	
0.000	Other	
2.182		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	2.067	0.080	0.000	0.000	2.148	>75% Grass cover, Good	C-1, C-2
0.000	0.035	0.000	0.000	0.000	0.035	Paved parking	C-1, C-2
0.000	0.000	0.000	0.000	0.000	0.000	Water Surface, 0% imp	C-2
0.000	**2.102**	**0.080**	**0.000**	**0.000**	**2.182**	**TOTAL AREA**	

Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment C-1: Subcat C-1 Runoff Area=1.132 ac 2.71% Impervious Runoff Depth=3.54"
Tc=10.0 min CN=63 Runoff=4.05 cfs 0.334 af

Subcatchment C-2: Subcat C-2 Runoff Area=1.050 ac 0.37% Impervious Runoff Depth=3.32"
Tc=10.0 min CN=61 Runoff=3.50 cfs 0.291 af

Link DP1: PLUM GULLEY BROOK Inflow=7.56 cfs 0.625 af
Primary=7.56 cfs 0.625 af

Total Runoff Area = 2.182 ac Runoff Volume = 0.625 af Average Runoff Depth = 3.44"
98.42% Pervious = 2.148 ac 1.58% Impervious = 0.035 ac

Summary for Subcatchment C-1: Subcat C-1

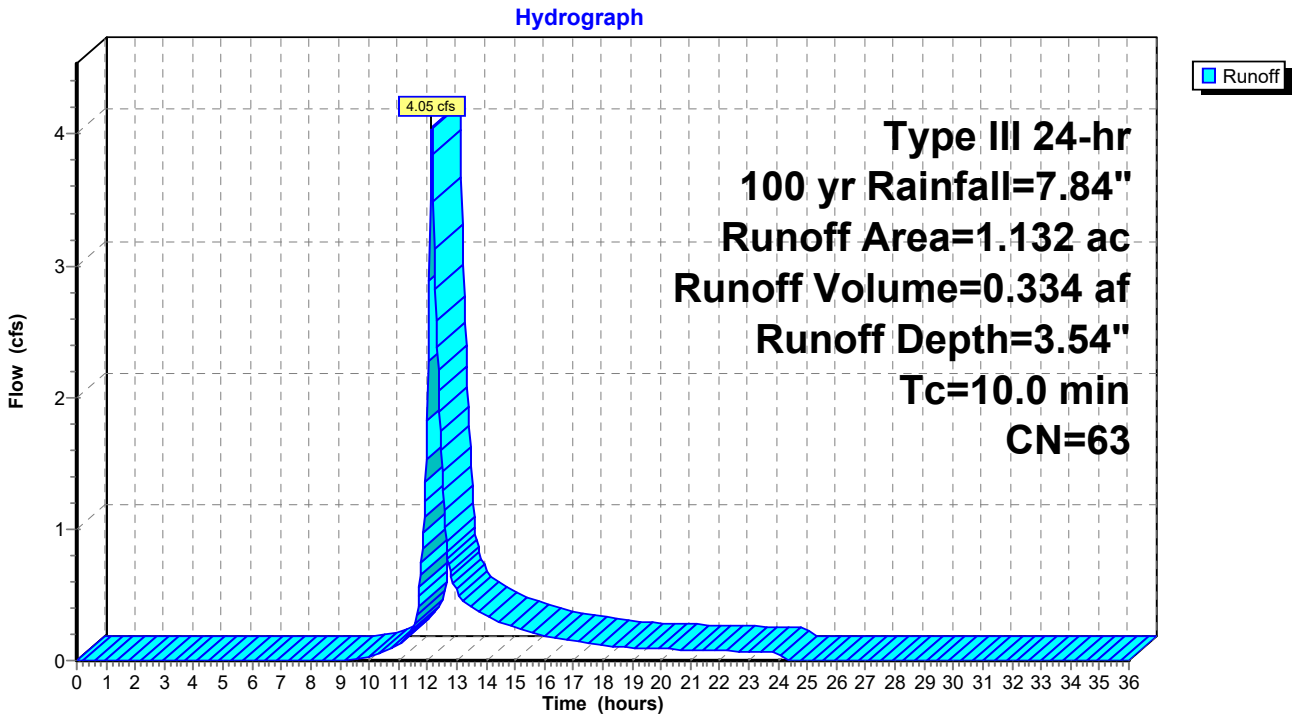
Runoff = 4.05 cfs @ 12.15 hrs, Volume= 0.334 af, Depth= 3.54"
Routed to Link DP1 : PLUM GULLEY BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=7.84"

Area (ac)	CN	Description
1.021	61	>75% Grass cover, Good, HSG B
0.080	74	>75% Grass cover, Good, HSG C
0.031	98	Paved parking, HSG B
1.132	63	Weighted Average
1.101		97.29% Pervious Area
0.031		2.71% Impervious Area

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

Subcatchment C-1: Subcat C-1



Summary for Subcatchment C-2: Subcat C-2

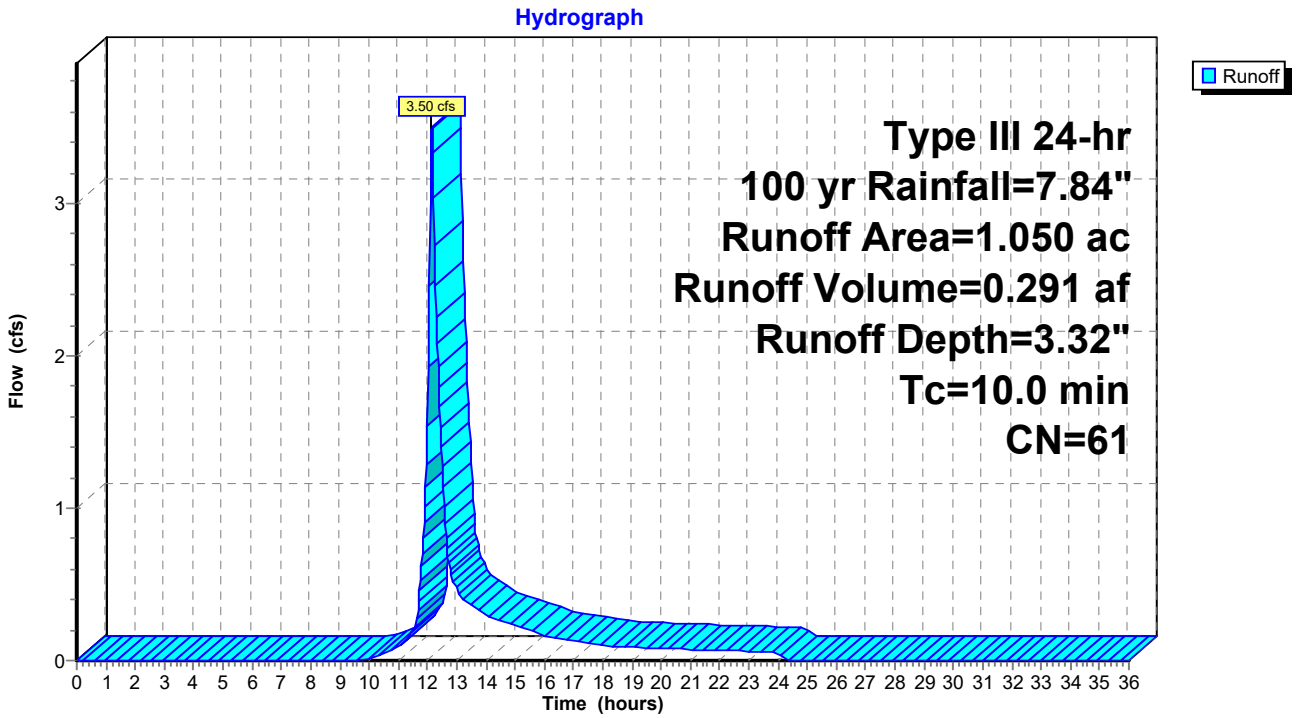
Runoff = 3.50 cfs @ 12.15 hrs, Volume= 0.291 af, Depth= 3.32"
Routed to Link DP1 : PLUM GULLEY BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=7.84"

Area (ac)	CN	Description
1.046	61	>75% Grass cover, Good, HSG B
0.004	98	Paved parking, HSG B
0.000	98	Water Surface, 0% imp, HSG B
1.050	61	Weighted Average
1.047		99.63% Pervious Area
0.004		0.37% Impervious Area

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

Subcatchment C-2: Subcat C-2

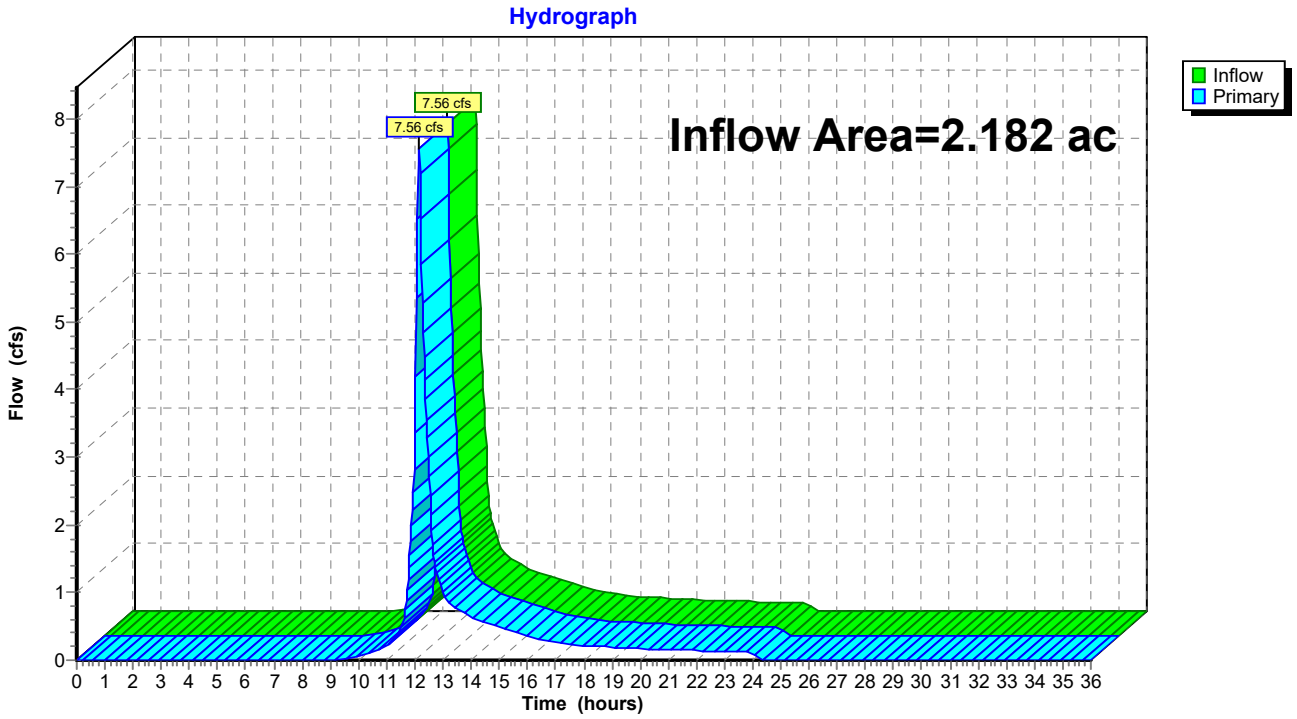


Summary for Link DP1: PLUM GULLEY BROOK

Inflow Area = 2.182 ac, 1.58% Impervious, Inflow Depth = 3.44" for 100 yr event
Inflow = 7.56 cfs @ 12.15 hrs, Volume= 0.625 af
Primary = 7.56 cfs @ 12.15 hrs, Volume= 0.625 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP1: PLUM GULLEY BROOK



Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 yr	Type III 24-hr		Default	24.00	1	3.13	2
2	10 yr	Type III 24-hr		Default	24.00	1	4.95	2
3	25 yr	Type III 24-hr		Default	24.00	1	6.09	2
4	100 yr	Type III 24-hr		Default	24.00	1	7.84	2

Summary for Pond 2P: Stormwater Basin 2

Inflow Area = 1.498 ac, 66.96% Impervious, Inflow Depth = 1.77" for 2 yr event
Inflow = 3.20 cfs @ 12.08 hrs, Volume= 0.221 af
Outflow = 0.41 cfs @ 12.69 hrs, Volume= 0.221 af, Atten= 87%, Lag= 36.7 min
Discarded = 0.38 cfs @ 12.69 hrs, Volume= 0.220 af
Primary = 0.03 cfs @ 12.69 hrs, Volume= 0.001 af
Routed to Link DP1 : PLUM GULLEY BROOK

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 162.04' @ 12.69 hrs Surf.Area= 2,686 sf Storage= 3,698 cf

Plug-Flow detention time= 97.8 min calculated for 0.221 af (100% of inflow)
Center-of-Mass det. time= 97.8 min (920.3 - 822.6)

Volume	Invert	Avail.Storage	Storage Description
#1	160.00'	10,535 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

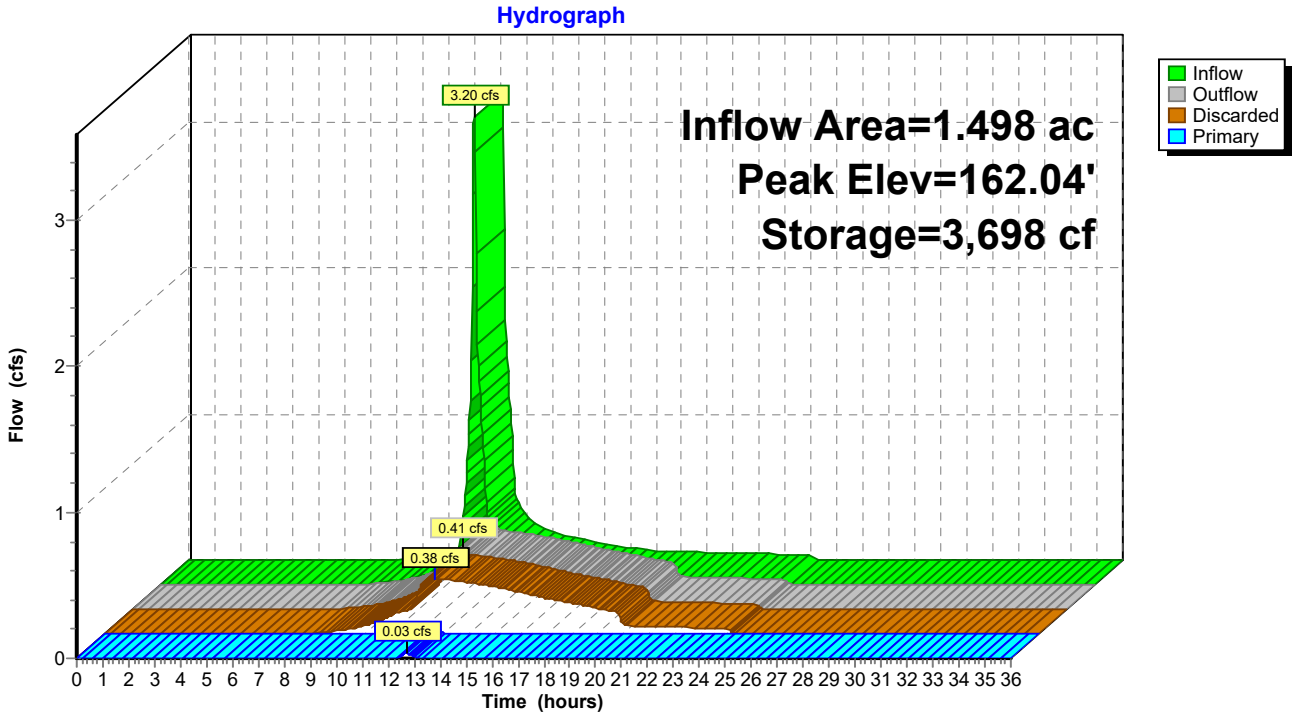
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
160.00	1,027	0	0
161.00	1,764	1,396	1,396
162.00	2,649	2,207	3,602
163.00	3,689	3,169	6,771
164.00	3,839	3,764	10,535

Device	Routing	Invert	Outlet Devices
#1	Primary	163.50'	**8.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	162.00'	**16.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	160.00'	**6.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=0.38 cfs @ 12.69 hrs HW=162.04' (Free Discharge)
└**3=Exfiltration** (Controls 0.38 cfs)

Primary OutFlow Max=0.03 cfs @ 12.69 hrs HW=162.04' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.61 fps)

Pond 2P: Stormwater Basin 2



Summary for Pond 2P: Stormwater Basin 2

Inflow Area = 1.498 ac, 66.96% Impervious, Inflow Depth = 3.42" for 10 yr event
Inflow = 6.10 cfs @ 12.07 hrs, Volume= 0.427 af
Outflow = 2.12 cfs @ 12.34 hrs, Volume= 0.427 af, Atten= 65%, Lag= 16.1 min
Discarded = 0.48 cfs @ 12.34 hrs, Volume= 0.313 af
Primary = 1.64 cfs @ 12.34 hrs, Volume= 0.114 af
Routed to Link DP1 : PLUM GULLEY BROOK

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 162.76' @ 12.34 hrs Surf.Area= 3,437 sf Storage= 5,908 cf

Plug-Flow detention time= 81.9 min calculated for 0.426 af (100% of inflow)
Center-of-Mass det. time= 81.8 min (885.7 - 803.9)

Volume	Invert	Avail.Storage	Storage Description
#1	160.00'	10,535 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

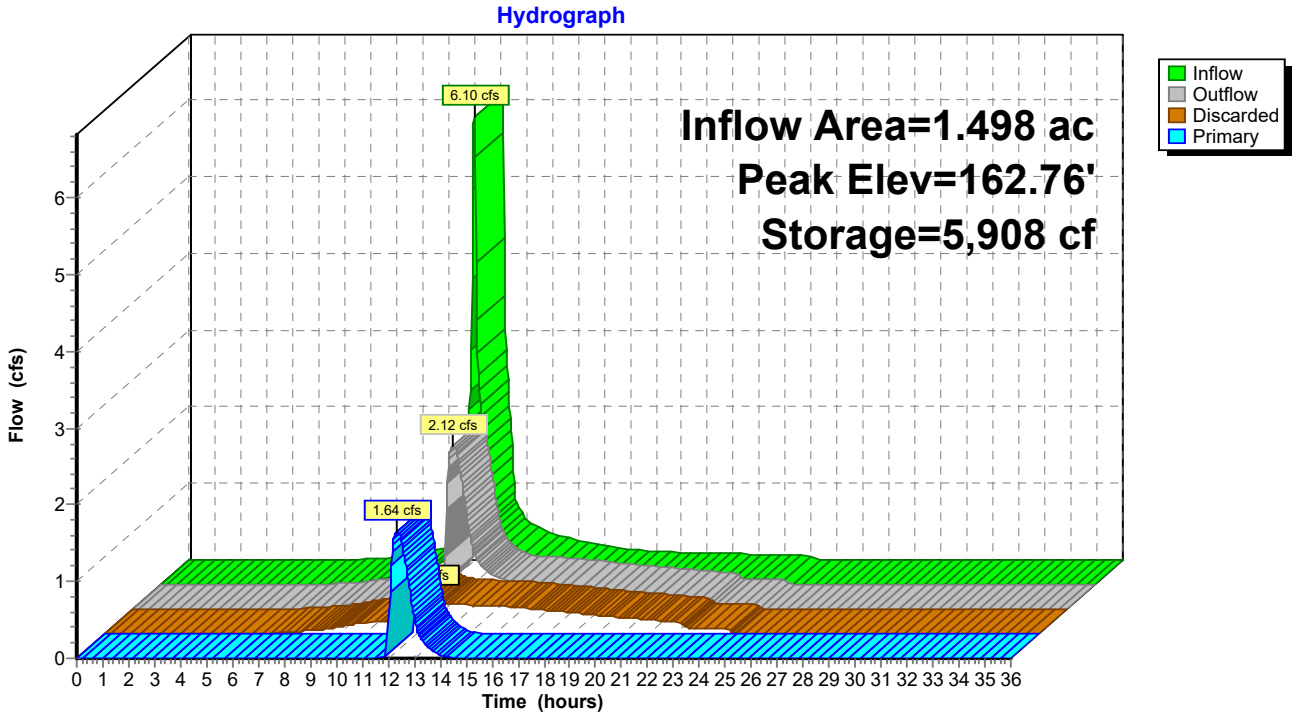
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
160.00	1,027	0	0
161.00	1,764	1,396	1,396
162.00	2,649	2,207	3,602
163.00	3,689	3,169	6,771
164.00	3,839	3,764	10,535

Device	Routing	Invert	Outlet Devices
#1	Primary	163.50'	**8.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	162.00'	**16.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	160.00'	**6.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=0.48 cfs @ 12.34 hrs HW=162.76' (Free Discharge)
└**3=Exfiltration** (Controls 0.48 cfs)

Primary OutFlow Max=1.64 cfs @ 12.34 hrs HW=162.76' (Free Discharge)
├**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**2=Orifice/Grate** (Orifice Controls 1.64 cfs @ 3.69 fps)

Pond 2P: Stormwater Basin 2



Summary for Pond 2P: Stormwater Basin 2

Inflow Area = 1.498 ac, 66.96% Impervious, Inflow Depth = 4.50" for 25 yr event
Inflow = 7.93 cfs @ 12.07 hrs, Volume= 0.561 af
Outflow = 2.76 cfs @ 12.34 hrs, Volume= 0.561 af, Atten= 65%, Lag= 15.8 min
Discarded = 0.52 cfs @ 12.34 hrs, Volume= 0.362 af
Primary = 2.23 cfs @ 12.34 hrs, Volume= 0.199 af
Routed to Link DP1 : PLUM GULLEY BROOK

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 163.26' @ 12.34 hrs Surf.Area= 3,728 sf Storage= 7,728 cf

Plug-Flow detention time= 77.8 min calculated for 0.560 af (100% of inflow)
Center-of-Mass det. time= 77.7 min (874.0 - 796.2)

Volume	Invert	Avail.Storage	Storage Description
#1	160.00'	10,535 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

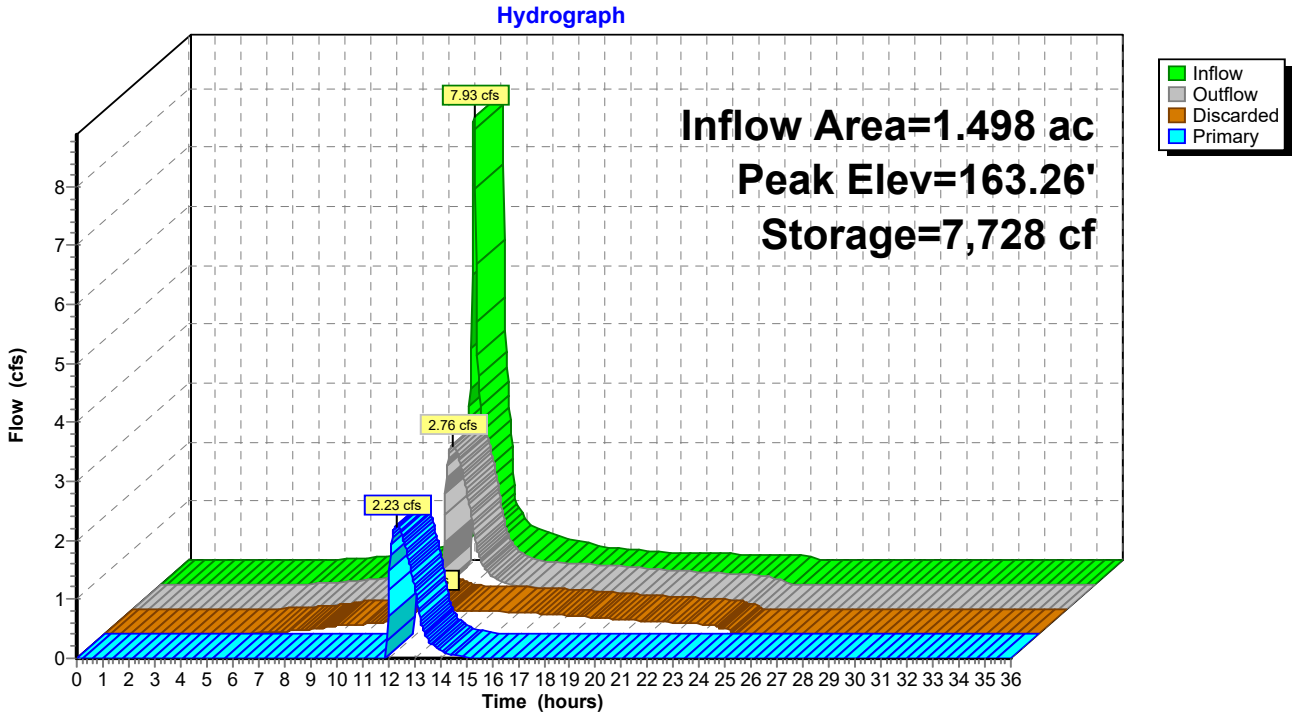
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
160.00	1,027	0	0
161.00	1,764	1,396	1,396
162.00	2,649	2,207	3,602
163.00	3,689	3,169	6,771
164.00	3,839	3,764	10,535

Device	Routing	Invert	Outlet Devices
#1	Primary	163.50'	**8.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	162.00'	**16.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	160.00'	**6.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=0.52 cfs @ 12.34 hrs HW=163.26' (Free Discharge)
└**3=Exfiltration** (Controls 0.52 cfs)

Primary OutFlow Max=2.23 cfs @ 12.34 hrs HW=163.26' (Free Discharge)
├**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**2=Orifice/Grate** (Orifice Controls 2.23 cfs @ 5.02 fps)

Pond 2P: Stormwater Basin 2



Summary for Pond 2P: Stormwater Basin 2

Inflow Area = 1.498 ac, 66.96% Impervious, Inflow Depth = 6.18" for 100 yr event
Inflow = 10.72 cfs @ 12.07 hrs, Volume= 0.771 af
Outflow = 5.83 cfs @ 12.19 hrs, Volume= 0.771 af, Atten= 46%, Lag= 7.1 min
Discarded = 0.54 cfs @ 12.19 hrs, Volume= 0.424 af
Primary = 5.29 cfs @ 12.19 hrs, Volume= 0.346 af
Routed to Link DP1 : PLUM GULLEY BROOK

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 163.75' @ 12.19 hrs Surf.Area= 3,802 sf Storage= 9,588 cf

Plug-Flow detention time= 72.4 min calculated for 0.770 af (100% of inflow)
Center-of-Mass det. time= 72.4 min (859.9 - 787.5)

Volume	Invert	Avail.Storage	Storage Description
#1	160.00'	10,535 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

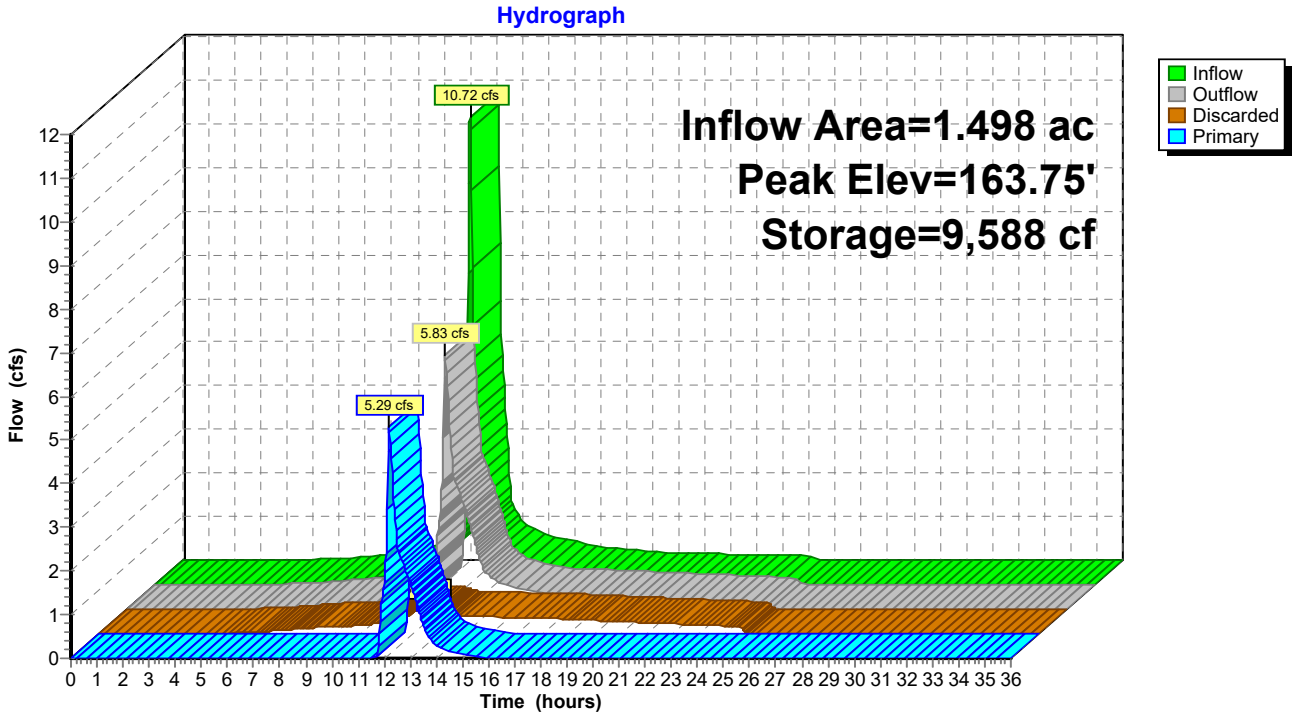
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
160.00	1,027	0	0
161.00	1,764	1,396	1,396
162.00	2,649	2,207	3,602
163.00	3,689	3,169	6,771
164.00	3,839	3,764	10,535

Device	Routing	Invert	Outlet Devices
#1	Primary	163.50'	**8.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	162.00'	**16.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	160.00'	**6.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=0.54 cfs @ 12.19 hrs HW=163.75' (Free Discharge)
└**3=Exfiltration** (Controls 0.54 cfs)

Primary OutFlow Max=5.22 cfs @ 12.19 hrs HW=163.75' (Free Discharge)
├**1=Broad-Crested Rectangular Weir** (Weir Controls 2.53 cfs @ 1.27 fps)
└**2=Orifice/Grate** (Orifice Controls 2.69 cfs @ 6.05 fps)

Pond 2P: Stormwater Basin 2



Memorandum

To: Christopher Hulk, PE
FieldTurf

Date: December 19, 2023

Project #: 43380.00

From: Steven J. Kochis, PE
VHB

Re: FieldTurf Athletic Field Drainage
Ayers Road & Nevers Road
South Windsor, Connecticut

Site & Project Description

South Windsor High School is located at 161 Nevers Road in South Windsor, Connecticut. The property contains the existing school buildings, associated parking and athletic fields. The project proposes a new synthetic turf field to replace an existing grass athletic field. The new field is proposed northwest of the existing field. VHB prepared an analysis of existing and proposed conditions drainage conditions.

NRCS Web Soil Survey lists the existing field as Udorthents-Urban Land Complex (Hydrologic Soil Group B) and a small portion as Enfield Silt Loam, 8-15% Slopes (Hydrologic Soil Group B) and Haven-Urban Land Complex, 0-8% Slopes (Hydrologic Soil Group B).

Per available FEMA Map No. 09003C0381F dated 09/26/2008, the site is located within Zone X – area of minimal flood hazard (no Special Flood Hazard Areas).

Existing Drainage Conditions

Under existing conditions, the project area was analyzed as two (2) drainage areas that outlet to two (2) design points. See Figure 1 – Existing Drainage Conditions.

Drainage Area E-1: This 6.4- acre catchment area consists of a portion of the South Windsor Parks and Recreation parking, an existing grassed field west of South Windsor Parks and Recreation Building, portions of the existing South Windsor High School Baseball Field and the existing South Windsor High School tennis courts. This area conveys stormwater runoff overland to the southern property line adjacent to the existing tennis courts (DP1).

Drainage Area E-2: This 2.3-acre catchment area consists of a portion of the South Windsor Parks and Recreation parking lot, the northern portion of the South Windsor High School Baseball Field and the grassed area adjacent to Ayers Road. Stormwater in this area is conveyed westerly overland to the western property line (DP2).

Proposed Drainage Conditions

A synthetic turf field is proposed, which will include no actual hardscape and a network of subsurface perforated drains within crushed stone. The proposed field area itself has been modelled as a stone reservoir for the subsurface stone. An outlet control structure incorporating an above-ground inlet will allow volumetric storage of stormwater runoff to promote retention and infiltration for water quality. A small basin is also proposed primarily to treat water quality from portions of the parking lot. Peak rates of runoff are attenuated from proposed conditions down to pre-development levels. An infiltration rate of 7 inches per hour into the native soil has been assumed in the hydrologic

model by recommendation of FieldTurf. This assumption should be tested in the field and VHB provided the opportunity to adjust the stormwater design if/as needed upon completion. It is also recommended that a wetland study be performed within the development area for the possible presence of wetlands.

Table 1 below displays the anticipated existing and proposed peak flows for the project area before and after site improvements including underdrainage.

Figure 2 illustrates the proposed "post construction conditions for the project area. As shown the project area was analyzed as four (4) catchment areas (two (2) drainage areas) that outlet to two (2) design points.

Drainage Area P-1A: This 2.2-acre catchment area consists of the grassed area at the western property line. The area drains overland to the southern proposed stormwater basin (Pond 1P).

Drainage Area P-1B: This 3.1-acre catchment area consists of a portion of the proposed parking expansion and the proposed field. Stormwater flows over the field being collected by the fields underdrainage and then is conveyed into the proposed stormwater basin (Pond 1P).

Drainage Area P-1C: This 1.1-acre catchment area consists of the majority of the proposed parking area as well as a portion of the proposed field and the grassed area located south of the field. Stormwater is collected via catch basins within the parking field and conveyed to a flared end section which deposits the stormwater into a grassed swale and then into the proposed stormwater basin (Pond 1P), where it is combined with Drainage Area P-1B.

Drainage Area P-2: This 2.3-acre catchment area consist of a portion of the existing and proposed parking area located along the road frontage as well as the grassed area proposed north of the field. Stormwater flows overland to the northwest corner of the property (DP2).

The table (Table 1) below presents a summary of the existing and proposed conditions peak discharge rates:

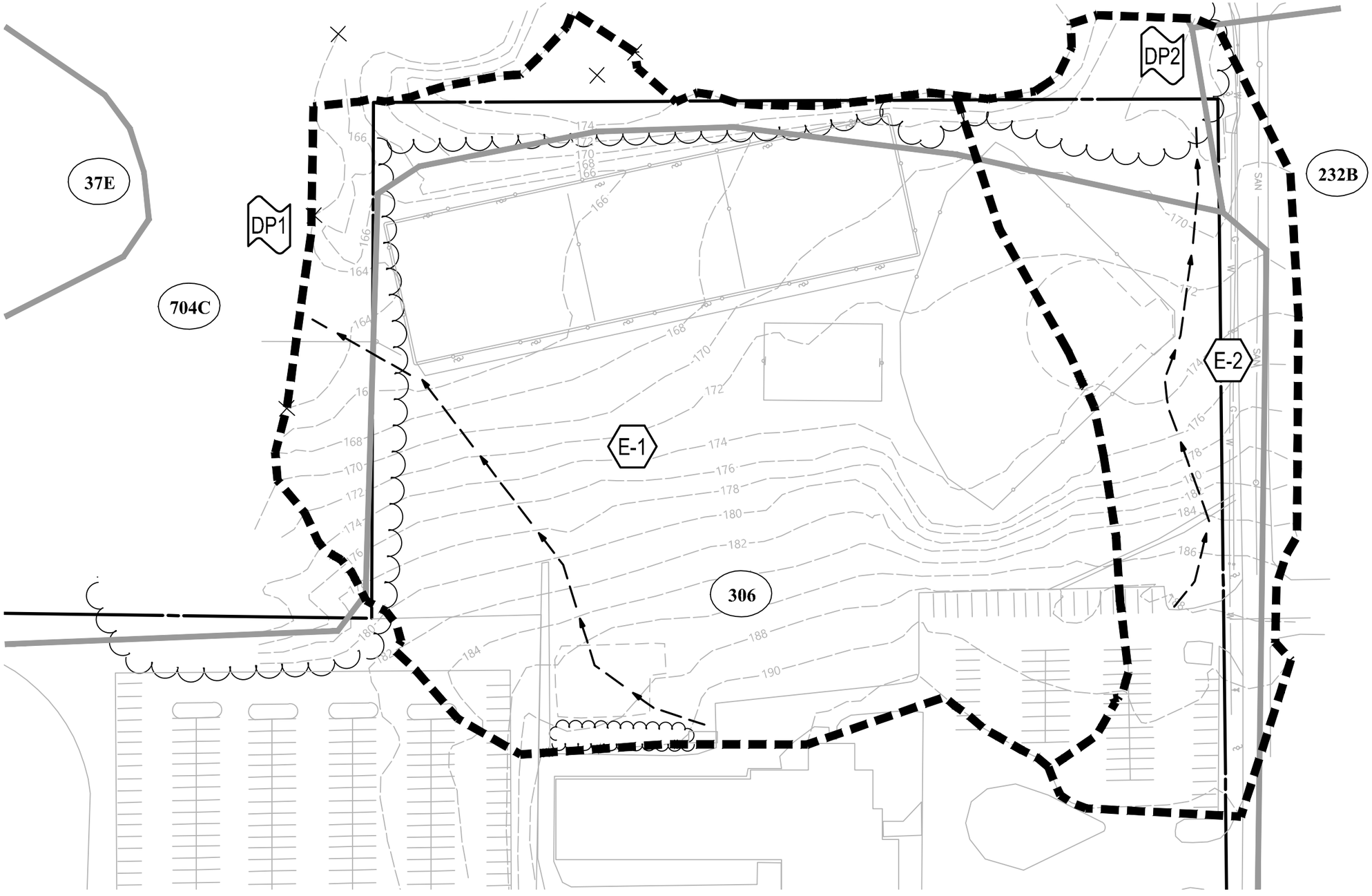
Design Point	2-year	10-year	100-year
Design Point: DP1			
Existing	3.6	12.2	29.1
Proposed	0.8	3.2	8.3
Design Point: DP2			
Existing	2.6	6.4	12.9
Proposed	2.5	6.1	12.7

Water Quality

Retention and infiltration of the required water quality volume is provided within the two proposed stormwater basins. Computations for the required water quality volume are enclosed herewith.

Figures

Attachments



Legend

SYMBOLS

- X — DRAINAGE AREA DESIGNATION
- DPX — DESIGN POINT

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SOIL TYPE BOUNDARY

SCS SOIL CLASSIFICATIONS

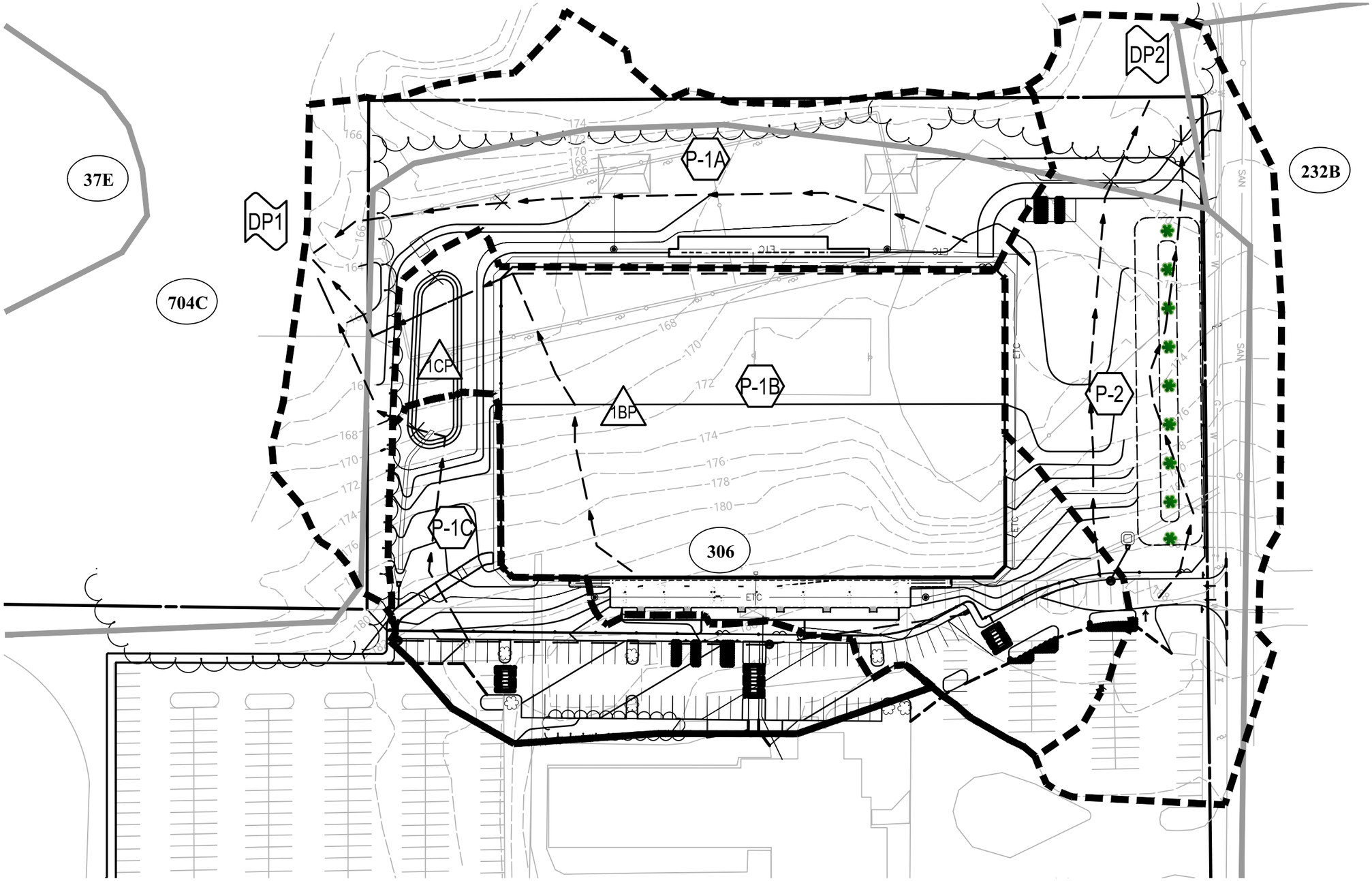
- 306 — UDORTHENTS-URBAN LAND COMPLEX, HSG B
- 704C — ENFIELD SILT LOAM, 8-15% SLOPES, HSG B
- 308 — UDORTHENTS, SMOOTHED, HSG B
- 232B — HAVEN-URBAN LAND COMPLEX, 0-8% SLOPES, HSG B
- 37E — MANCHESTER GRAVELLY SANDY LOAM, 15-45% SLOPES, HSG B

0 40 80 160 Feet

vhb

Existing Drainage Conditions **Figure 1**

FieldTurf - S. Windsor High Drainage 12-13-2023
Ayers Road & Nevers Road, South Windsor, CT



Legend

SYMBOLS

- X — **DRAINAGE AREA DESIGNATION**
- XP — **DRAINAGE POND**
- DPX — **DESIGN POINT**

LINETYPES

- **DRAINAGE AREA BOUNDARY**
- **TIME OF CONCENTRATION FLOW LINE**
- **SOIL TYPE BOUNDARY**

SCS SOIL CLASSIFICATIONS

306	**UDORTHENTS-URBAN LAND COMPLEX, HSG B**
704C	**ENFIELD SILT LOAM, 8-15% SLOPES, HSG B**
308	**UDORTHENTS, SMOOTHED, HSG B**
232B	**HAVEN-URBAN LAND COMPLEX, 0-8% SLOPES, HSG B**
37E	**MANCHESTER GRAVELLY SANDY LOAM, 15-45% SLOPES, HSG B**

0 40 80 160 Feet

Proposed Drainage Conditions **Figure 2**

FieldTurf - S. Windsor High Drainage 12-19-2023
Ayers Road & Nevers Road, South Windsor, CT

NOAA Atlas 14, Volume 10, Version 3
Location name: Hardwick, Massachusetts, USA*
Latitude: 42.3621°, Longitude: -72.1625°
Elevation: 636 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	**0.338** (0.265-0.430)	**0.393** (0.308-0.501)	**0.483** (0.377-0.617)	**0.558** (0.434-0.717)	**0.662** (0.496-0.883)	**0.742** (0.543-1.01)	**0.822** (0.581-1.15)	**0.906** (0.612-1.31)	**1.02** (0.661-1.52)	**1.10** (0.699-1.69)
10-min	**0.479** (0.376-0.609)	**0.557** (0.437-0.710)	**0.685** (0.535-0.876)	**0.791** (0.615-1.02)	**0.938** (0.703-1.25)	**1.05** (0.770-1.43)	**1.16** (0.824-1.63)	**1.28** (0.866-1.85)	**1.44** (0.937-2.16)	**1.56** (0.990-2.39)
15-min	**0.563** (0.442-0.716)	**0.655** (0.514-0.835)	**0.806** (0.630-1.03)	**0.931** (0.722-1.20)	**1.10** (0.827-1.47)	**1.24** (0.905-1.68)	**1.37** (0.969-1.92)	**1.51** (1.02-2.18)	**1.70** (1.10-2.54)	**1.84** (1.16-2.81)
30-min	**0.761** (0.597-0.968)	**0.886** (0.695-1.13)	**1.09** (0.851-1.39)	**1.26** (0.980-1.62)	**1.50** (1.12-2.00)	**1.68** (1.23-2.28)	**1.86** (1.31-2.60)	**2.04** (1.38-2.96)	**2.30** (1.49-3.44)	**2.50** (1.58-3.81)
60-min	**0.959** (0.752-1.22)	**1.12** (0.876-1.42)	**1.38** (1.08-1.76)	**1.59** (1.24-2.04)	**1.89** (1.42-2.52)	**2.12** (1.55-2.88)	**2.34** (1.66-3.29)	**2.58** (1.75-3.74)	**2.90** (1.88-4.34)	**3.15** (1.99-4.81)
2-hr	**1.21** (0.956-1.53)	**1.42** (1.12-1.79)	**1.75** (1.38-2.22)	**2.03** (1.58-2.59)	**2.41** (1.82-3.22)	**2.69** (2.00-3.68)	**3.00** (2.16-4.26)	**3.36** (2.28-4.84)	**3.91** (2.54-5.82)	**4.38** (2.78-6.64)
3-hr	**1.38** (1.09-1.74)	**1.62** (1.28-2.04)	**2.02** (1.59-2.55)	**2.34** (1.84-2.98)	**2.80** (2.13-3.73)	**3.13** (2.34-4.27)	**3.49** (2.54-4.98)	**3.95** (2.68-5.67)	**4.67** (3.04-6.92)	**5.29** (3.36-8.00)
6-hr	**1.70** (1.36-2.13)	**2.03** (1.62-2.55)	**2.57** (2.04-3.23)	**3.02** (2.38-3.82)	**3.64** (2.79-4.84)	**4.09** (3.08-5.57)	**4.59** (3.38-6.55)	**5.24** (3.57-7.48)	**6.29** (4.11-9.28)	**7.23** (4.61-10.9)
12-hr	**2.07** (1.66-2.58)	**2.52** (2.02-3.14)	**3.26** (2.61-4.07)	**3.88** (3.08-4.86)	**4.72** (3.64-6.24)	**5.34** (4.04-7.23)	**6.02** (4.45-8.53)	**6.90** (4.72-9.79)	**8.32** (5.45-12.2)	**9.57** (6.12-14.3)
24-hr	**2.45** (1.98-3.02)	**3.02** (2.44-3.73)	**3.96** (3.19-4.91)	**4.75** (3.79-5.91)	**5.82** (4.51-7.64)	**6.61** (5.03-8.89)	**7.48** (5.55-10.5)	**8.59** (5.89-12.1)	**10.4** (6.81-15.1)	**11.9** (7.65-17.7)
2-day	**2.81** (2.28-3.44)	**3.48** (2.83-4.28)	**4.60** (3.72-5.66)	**5.52** (4.44-6.82)	**6.78** (5.29-8.84)	**7.71** (5.90-10.3)	**8.74** (6.52-12.2)	**10.0** (6.92-14.1)	**12.1** (8.01-17.5)	**14.0** (9.00-20.6)
3-day	**3.06** (2.50-3.74)	**3.80** (3.10-4.64)	**5.01** (4.07-6.14)	**6.01** (4.85-7.40)	**7.38** (5.78-9.59)	**8.39** (6.44-11.2)	**9.51** (7.11-13.2)	**10.9** (7.55-15.2)	**13.2** (8.74-19.0)	**15.2** (9.82-22.3)
4-day	**3.30** (2.70-4.01)	**4.08** (3.34-4.97)	**5.36** (4.36-6.55)	**6.42** (5.19-7.89)	**7.88** (6.18-10.2)	**8.94** (6.88-11.9)	**10.1** (7.59-14.1)	**11.6** (8.04-16.2)	**14.1** (9.30-20.2)	**16.2** (10.4-23.6)
7-day	**3.97** (3.27-4.80)	**4.83** (3.98-5.86)	**6.25** (5.12-7.60)	**7.43** (6.04-9.08)	**9.05** (7.12-11.6)	**10.2** (7.90-13.5)	**11.5** (8.67-15.9)	**13.2** (9.16-18.2)	**15.8** (10.5-22.6)	**18.1** (11.7-26.3)
10-day	**4.63** (3.83-5.59)	**5.54** (4.57-6.69)	**7.04** (5.78-8.52)	**8.27** (6.76-10.1)	**9.98** (7.87-12.8)	**11.2** (8.67-14.7)	**12.6** (9.45-17.2)	**14.3** (9.95-19.7)	**16.9** (11.3-24.1)	**19.2** (12.5-27.8)
20-day	**6.67** (5.55-7.99)	**7.64** (6.34-9.16)	**9.22** (7.62-11.1)	**10.5** (8.65-12.7)	**12.3** (9.75-15.5)	**13.7** (10.6-17.6)	**15.1** (11.2-20.1)	**16.7** (11.7-22.8)	**19.1** (12.8-26.9)	**21.0** (13.6-30.2)
30-day	**8.38** (7.00-10.0)	**9.37** (7.82-11.2)	**11.0** (9.13-13.2)	**12.3** (10.2-14.9)	**14.2** (11.2-17.7)	**15.6** (12.0-19.9)	**17.0** (12.6-22.4)	**18.5** (13.0-25.1)	**20.6** (13.8-28.9)	**22.2** (14.5-31.8)
45-day	**10.5** (8.81-12.5)	**11.5** (9.66-13.7)	**13.2** (11.0-15.8)	**14.6** (12.1-17.5)	**16.5** (13.1-20.5)	**18.0** (13.9-22.7)	**19.5** (14.4-25.3)	**20.9** (14.7-28.1)	**22.6** (15.3-31.6)	**23.9** (15.6-34.1)
60-day	**12.3** (10.3-14.5)	**13.3** (11.2-15.8)	**15.1** (12.6-17.9)	**16.5** (13.7-19.8)	**18.5** (14.7-22.8)	**20.1** (15.5-25.2)	**21.6** (15.9-27.8)	**22.9** (16.2-30.8)	**24.5** (16.6-34.1)	**25.6** (16.7-36.4)

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

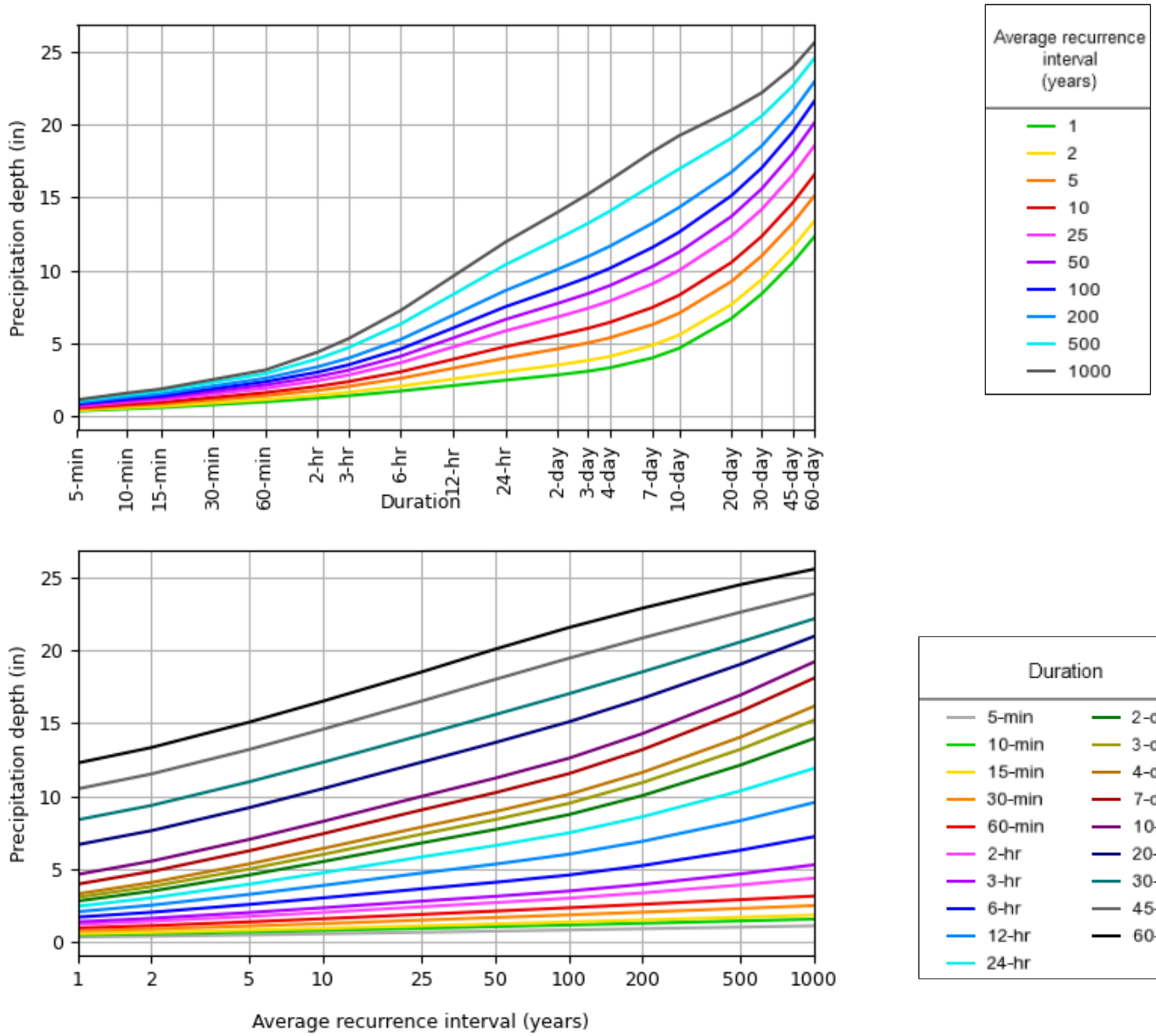
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper 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.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 42.3621°, Longitude: -72.1625°



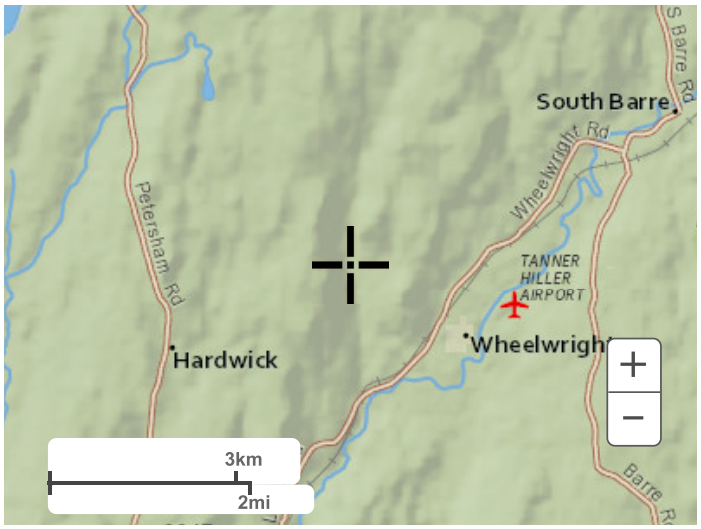
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Thu Nov 16 19:44:01 2023

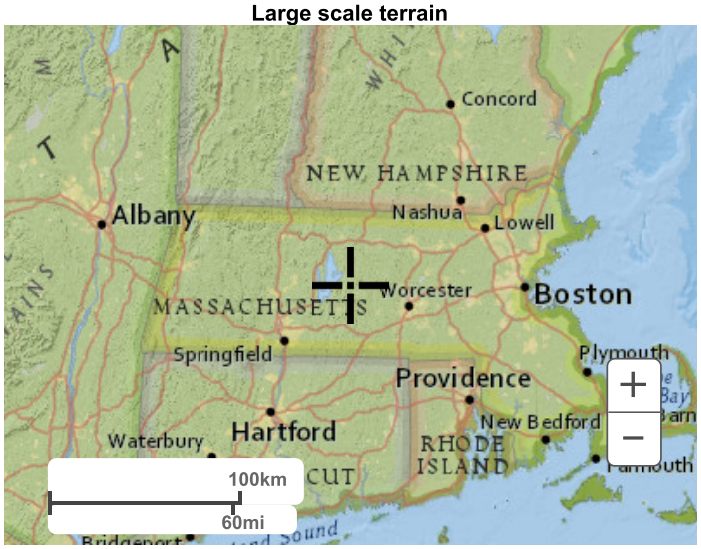
Back to Top

Maps & aerials

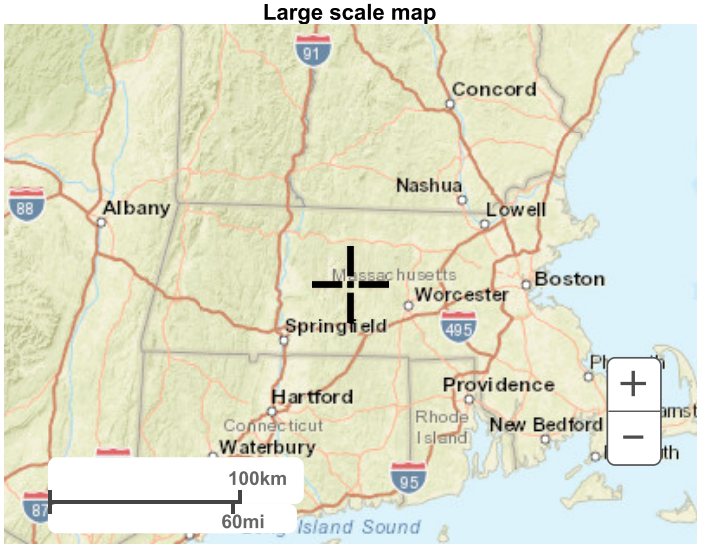
Small scale terrain



Large scale terrain



Large scale map

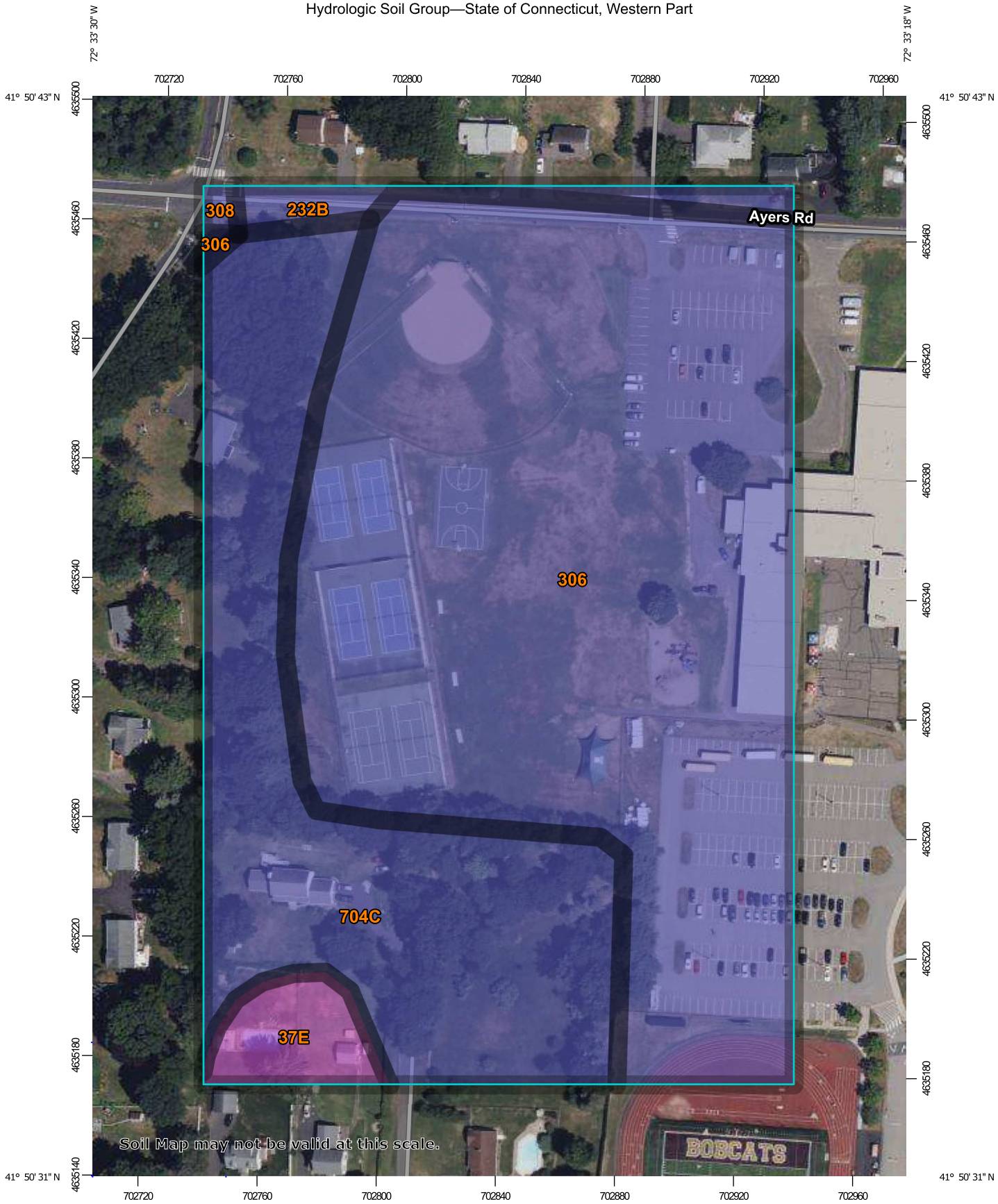


Large scale aerial

Back to Top

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



Map Scale: 1:1,760 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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 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, Western Part
Survey Area Data: Version 1, Sep 15, 2023

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
37E	Manchester gravelly sandy loam, 15 to 45 percent slopes	A	0.4	2.9%
232B	Haven-Urban land complex, 0 to 8 percent slopes	B	0.4	2.5%
306	Udorthents-Urban land complex	B	9.6	65.0%
308	Udorthents, smoothed	B	0.0	0.3%
704C	Enfield silt loam, 8 to 15 percent slopes	B	4.3	29.3%
Totals for Area of Interest			**14.8**	**100.0%**

Description

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.

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.

Rating Options

Aggregation Method: Dominant Condition

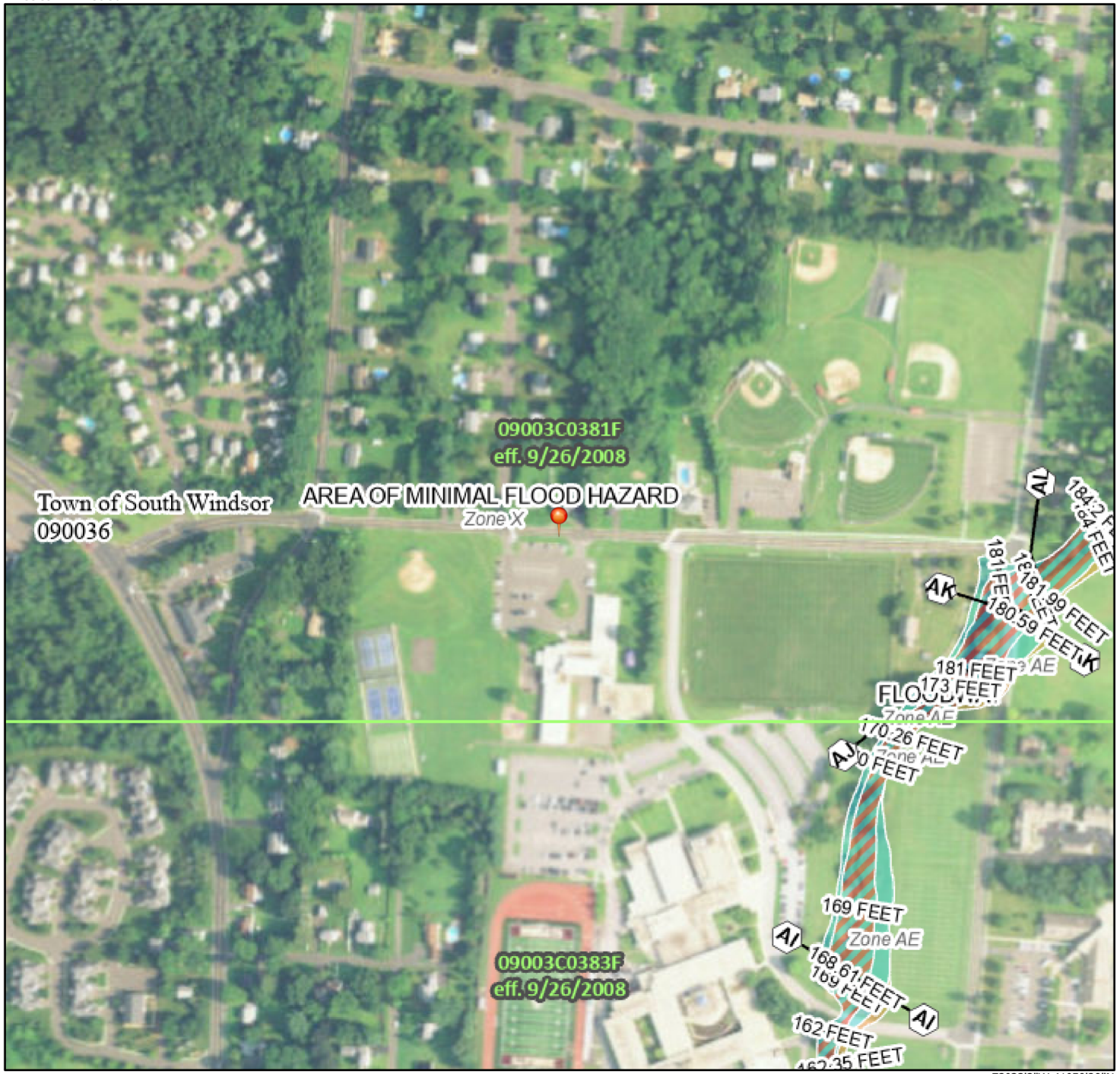
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

FEMA

72°33'39"W 41°50'56"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

72°33'2"W 41°50'29"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/16/2023 at 2:45 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Water Quality Volume Calculations

Project: South Windsor High School Field By: AMK Date: 12/19/23
Location: South Windsor, CT Checked: SJK Date:

Basin Name	PR-1B	PR-1C	
Rainfall, P	1.0 in.	1.0 in.	a
Area, A	3.13 ac	1.08 ac	b
Impervious Cover Area	0.6 ac	0.6 ac	c
% Impervious, I	19 %	54 %	
Volumetric Runoff Coeff., R	0.221	0.533	d
Water Quality Volume, WQV	0.058 ac-ft	0.048 ac-ft	e
	2,511 cf	2,087 cf	

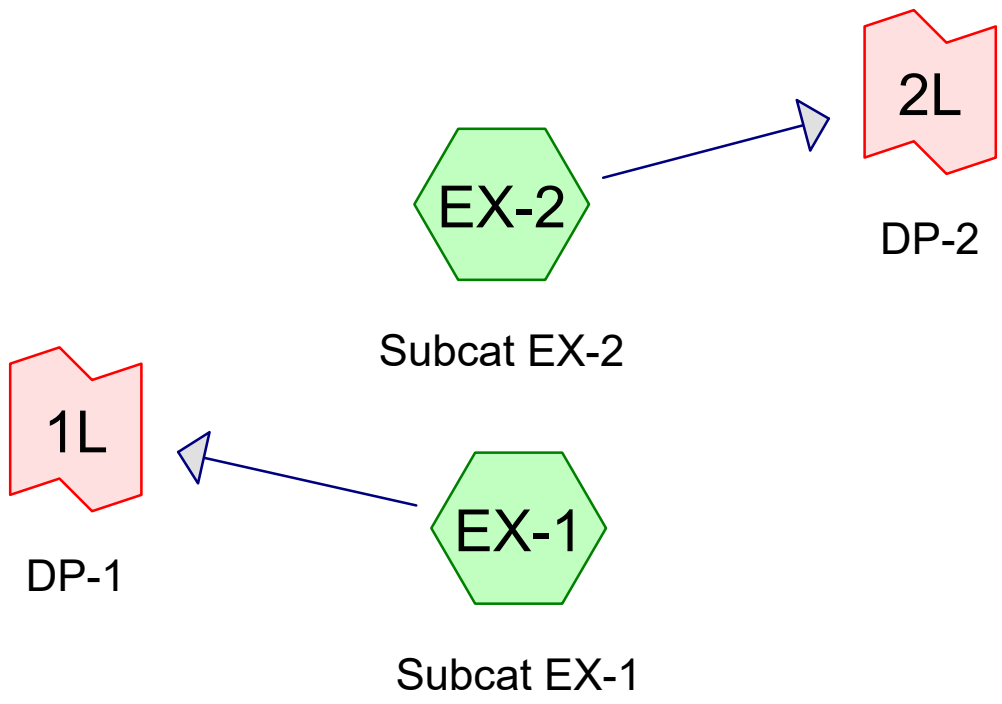
[a] First one inch of rainfall; 2004 Connecticut Stormwater Quality Manual

[b] Area tributary to the stormwater management basin

[c] Impervious cover area tributary to the stormwater management basin

[d] R=0.05+0.009*I; Section 7.4.1 from 2004 Connecticut Stormwater Quality Manual

[e] WQV=P*R*A/12; Section 7.4.1 from 2004 Connecticut Stormwater Quality Manual



Subcat Reach Pond Link

Routing Diagram for 43380-EX DR
Prepared by VHB, Inc, Printed 12/13/2023

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 yr	Type III 24-hr		Default	24.00	1	3.13	2
2	10 yr	Type III 24-hr		Default	24.00	1	4.95	2
3	100 yr	Type III 24-hr		Default	24.00	1	7.84	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.901	61	>75% Grass cover, Good, HSG B (EX-1, EX-2)
0.166	82	Dirt roads, HSG B (EX-1, EX-2)
2.649	98	Unconnected pavement, HSG B (EX-1, EX-2)
8.717	**73**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
8.717	HSG B	EX-1, EX-2
0.000	HSG C	
0.000	HSG D	
0.000	Other	
8.717		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	5.901	0.000	0.000	0.000	5.901	>75% Grass cover, Good	EX-1, EX-2
0.000	0.166	0.000	0.000	0.000	0.166	Dirt roads	EX-1, EX-2
0.000	2.649	0.000	0.000	0.000	2.649	Unconnected pavement	EX-1, EX-2
0.000	**8.717**	**0.000**	**0.000**	**0.000**	**8.717**	**TOTAL AREA**	

Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-1: Subcat EX-1 Runoff Area=6.449 ac 28.81% Impervious Runoff Depth=0.61"
Tc=6.0 min UI Adjusted CN=66 Runoff=3.63 cfs 0.327 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=2.268 ac 34.90% Impervious Runoff Depth=1.05"
Flow Length=381' Tc=6.0 min CN=75 Runoff=2.64 cfs 0.198 af

Link 1L: DP-1 Inflow=3.63 cfs 0.327 af
Primary=3.63 cfs 0.327 af

Link 2L: DP-2 Inflow=2.64 cfs 0.198 af
Primary=2.64 cfs 0.198 af

Total Runoff Area = 8.717 ac Runoff Volume = 0.525 af Average Runoff Depth = 0.72"
69.61% Pervious = 6.067 ac 30.39% Impervious = 2.649 ac

Summary for Subcatchment EX-1: Subcat EX-1

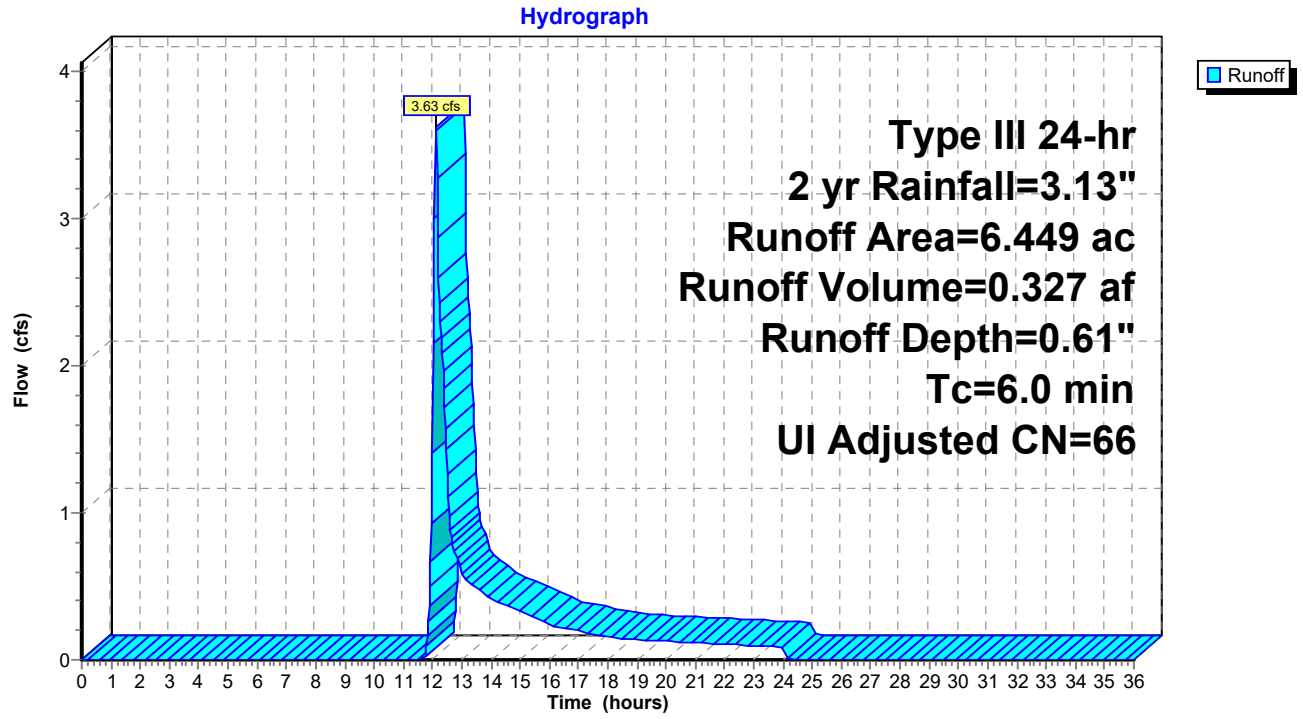
Runoff = 3.63 cfs @ 12.11 hrs, Volume= 0.327 af, Depth= 0.61"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.13"

Area (ac)	CN	Adj	Description
4.558	61		>75% Grass cover, Good, HSG B
0.033	82		Dirt roads, HSG B
1.858	98		Unconnected pavement, HSG B
6.449	72	66	Weighted Average, UI Adjusted
4.591			71.19% Pervious Area
1.858			28.81% Impervious Area
1.858			100.00% Unconnected

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

Subcatchment EX-1: Subcat EX-1



Summary for Subcatchment EX-2: Subcat EX-2

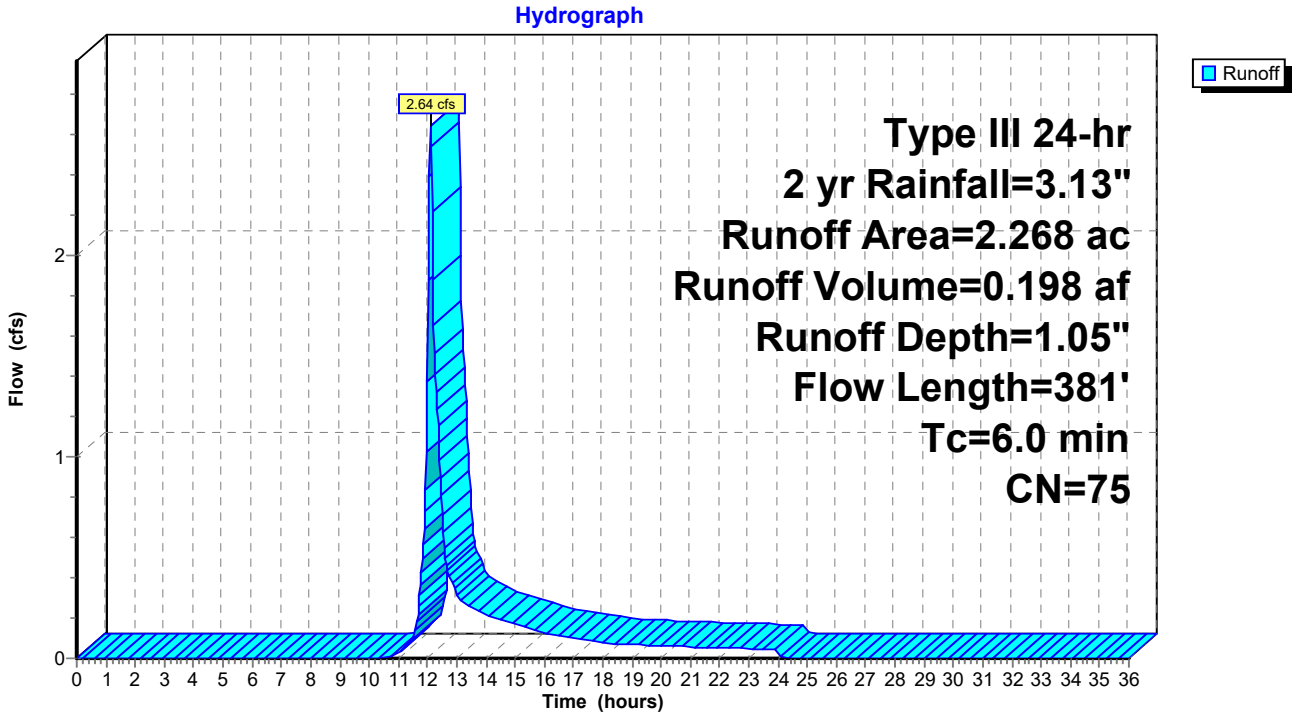
Runoff = 2.64 cfs @ 12.10 hrs, Volume= 0.198 af, Depth= 1.05"
Routed to Link 2L : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.13"

Area (ac)	CN	Description
1.343	61	>75% Grass cover, Good, HSG B
0.133	82	Dirt roads, HSG B
0.791	98	Unconnected pavement, HSG B
2.268	75	Weighted Average
1.476		65.10% Pervious Area
0.791		34.90% Impervious Area
0.791		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
0.1	36	0.0830	4.64		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	85	0.1060	5.24		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	210	0.0285	2.72		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.0	381	Total			

Subcatchment EX-2: Subcat EX-2

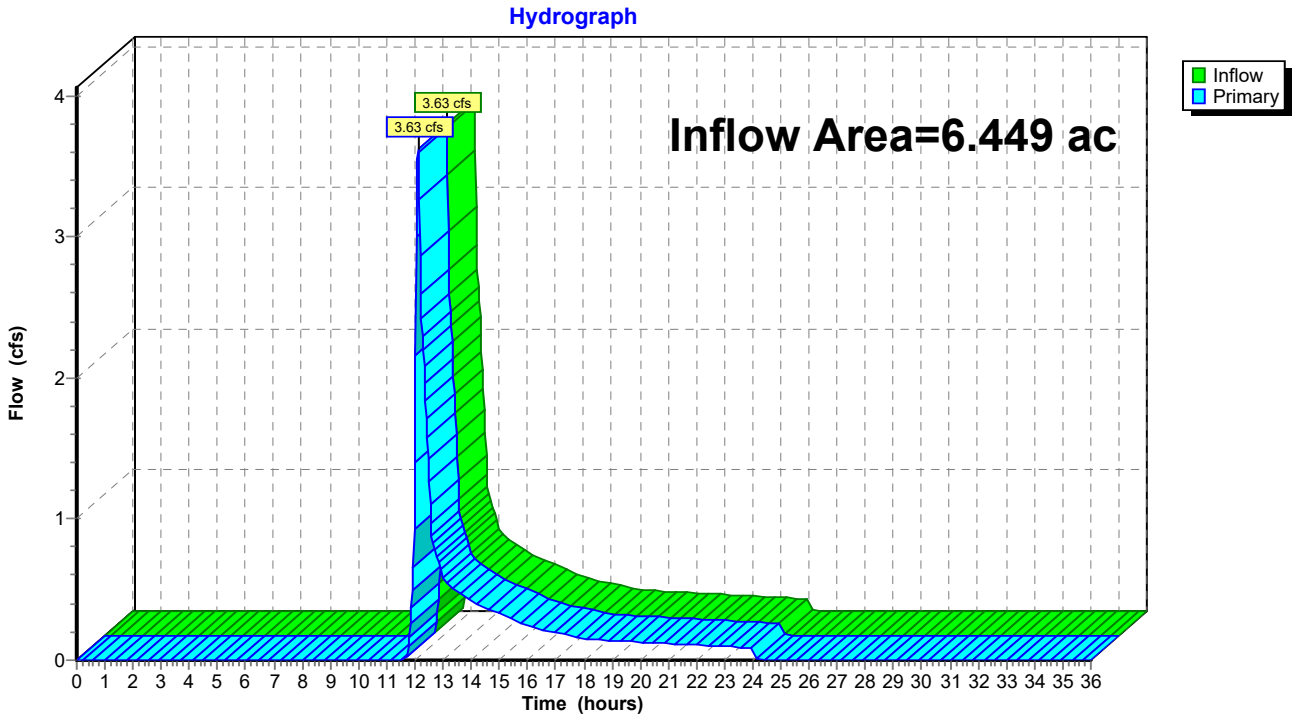


Summary for Link 1L: DP-1

Inflow Area = 6.449 ac, 28.81% Impervious, Inflow Depth = 0.61" for 2 yr event
Inflow = 3.63 cfs @ 12.11 hrs, Volume= 0.327 af
Primary = 3.63 cfs @ 12.11 hrs, Volume= 0.327 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link 1L: DP-1

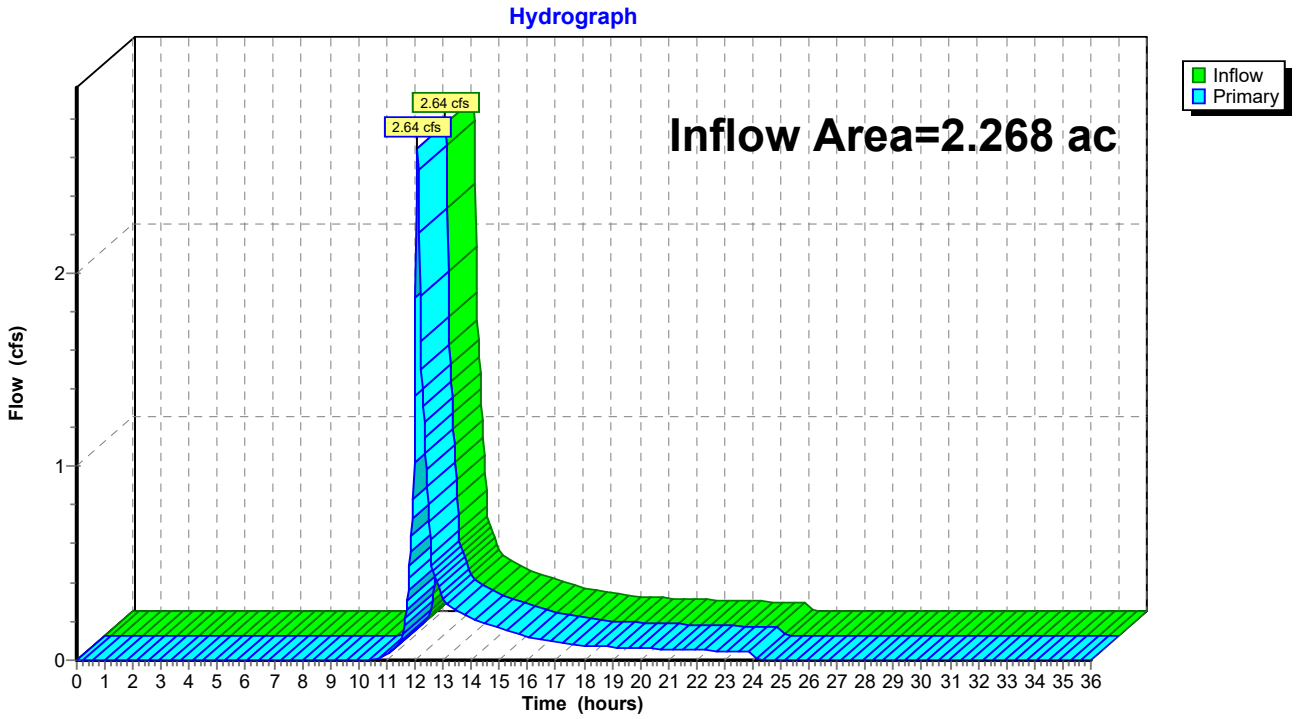


Summary for Link 2L: DP-2

Inflow Area = 2.268 ac, 34.90% Impervious, Inflow Depth = 1.05" for 2 yr event
Inflow = 2.64 cfs @ 12.10 hrs, Volume= 0.198 af
Primary = 2.64 cfs @ 12.10 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link 2L: DP-2



Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-1: Subcat EX-1 Runoff Area=6.449 ac 28.81% Impervious Runoff Depth=1.69"
Tc=6.0 min UI Adjusted CN=66 Runoff=12.21 cfs 0.910 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=2.268 ac 34.90% Impervious Runoff Depth=2.41"
Flow Length=381' Tc=6.0 min CN=75 Runoff=6.35 cfs 0.455 af

Link 1L: DP-1 Inflow=12.21 cfs 0.910 af
Primary=12.21 cfs 0.910 af

Link 2L: DP-2 Inflow=6.35 cfs 0.455 af
Primary=6.35 cfs 0.455 af

Total Runoff Area = 8.717 ac Runoff Volume = 1.365 af Average Runoff Depth = 1.88"
69.61% Pervious = 6.067 ac 30.39% Impervious = 2.649 ac

Summary for Subcatchment EX-1: Subcat EX-1

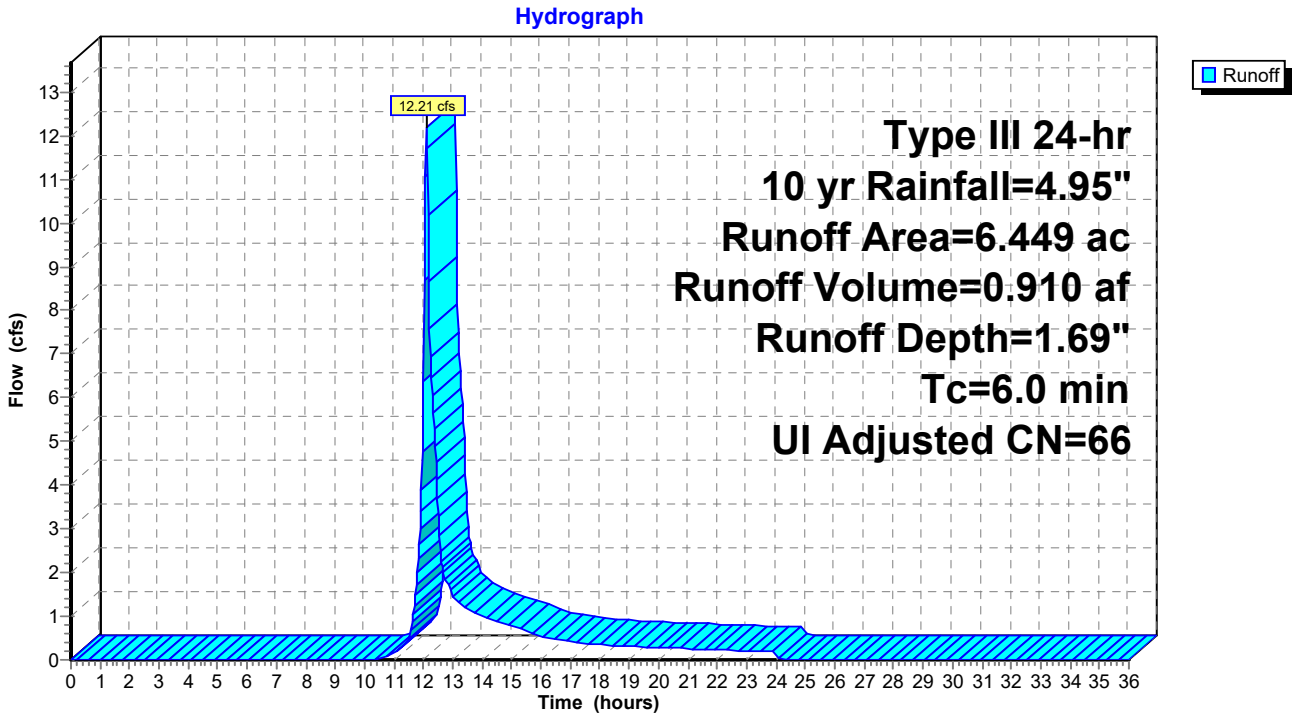
Runoff = 12.21 cfs @ 12.10 hrs, Volume= 0.910 af, Depth= 1.69"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.95"

Area (ac)	CN	Adj	Description
4.558	61		>75% Grass cover, Good, HSG B
0.033	82		Dirt roads, HSG B
1.858	98		Unconnected pavement, HSG B
6.449	72	66	Weighted Average, UI Adjusted
4.591			71.19% Pervious Area
1.858			28.81% Impervious Area
1.858			100.00% Unconnected

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

Subcatchment EX-1: Subcat EX-1



Summary for Subcatchment EX-2: Subcat EX-2

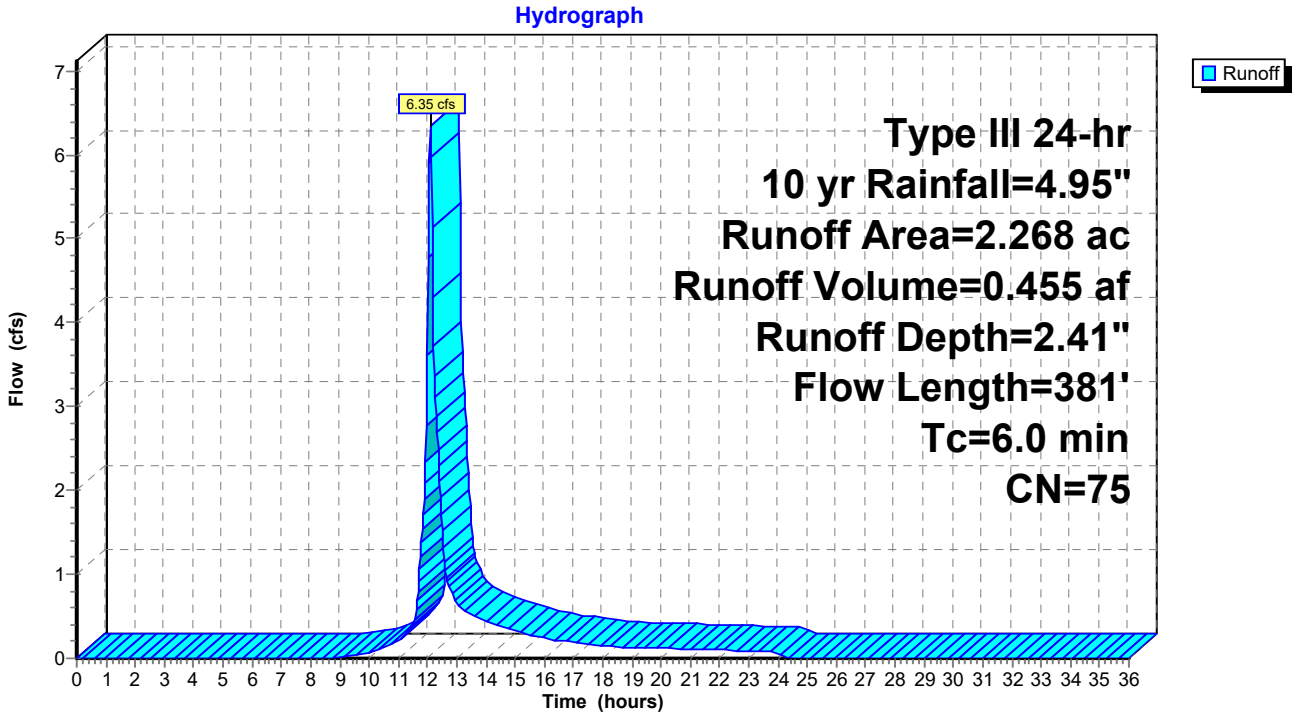
Runoff = 6.35 cfs @ 12.09 hrs, Volume= 0.455 af, Depth= 2.41"
Routed to Link 2L : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.95"

Area (ac)	CN	Description
1.343	61	>75% Grass cover, Good, HSG B
0.133	82	Dirt roads, HSG B
0.791	98	Unconnected pavement, HSG B
2.268	75	Weighted Average
1.476		65.10% Pervious Area
0.791		34.90% Impervious Area
0.791		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
0.1	36	0.0830	4.64		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	85	0.1060	5.24		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	210	0.0285	2.72		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.0	381	Total			

Subcatchment EX-2: Subcat EX-2

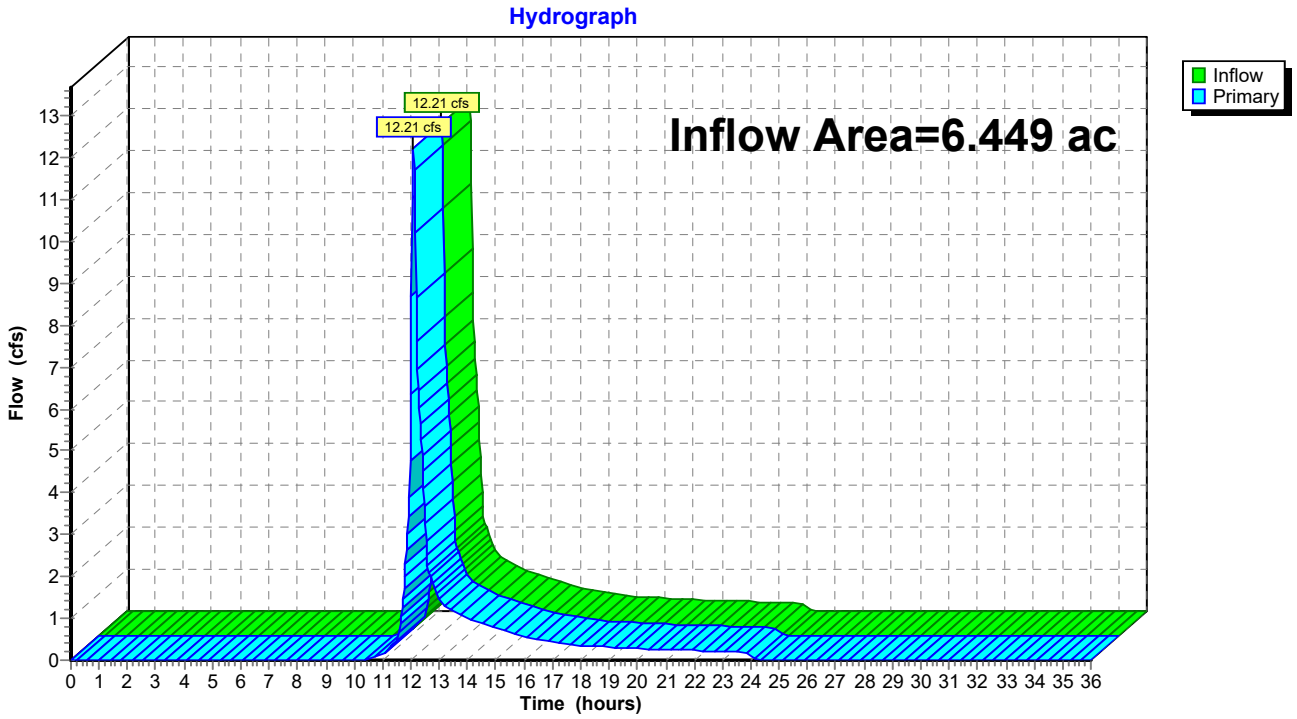


Summary for Link 1L: DP-1

Inflow Area = 6.449 ac, 28.81% Impervious, Inflow Depth = 1.69" for 10 yr event
Inflow = 12.21 cfs @ 12.10 hrs, Volume= 0.910 af
Primary = 12.21 cfs @ 12.10 hrs, Volume= 0.910 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link 1L: DP-1

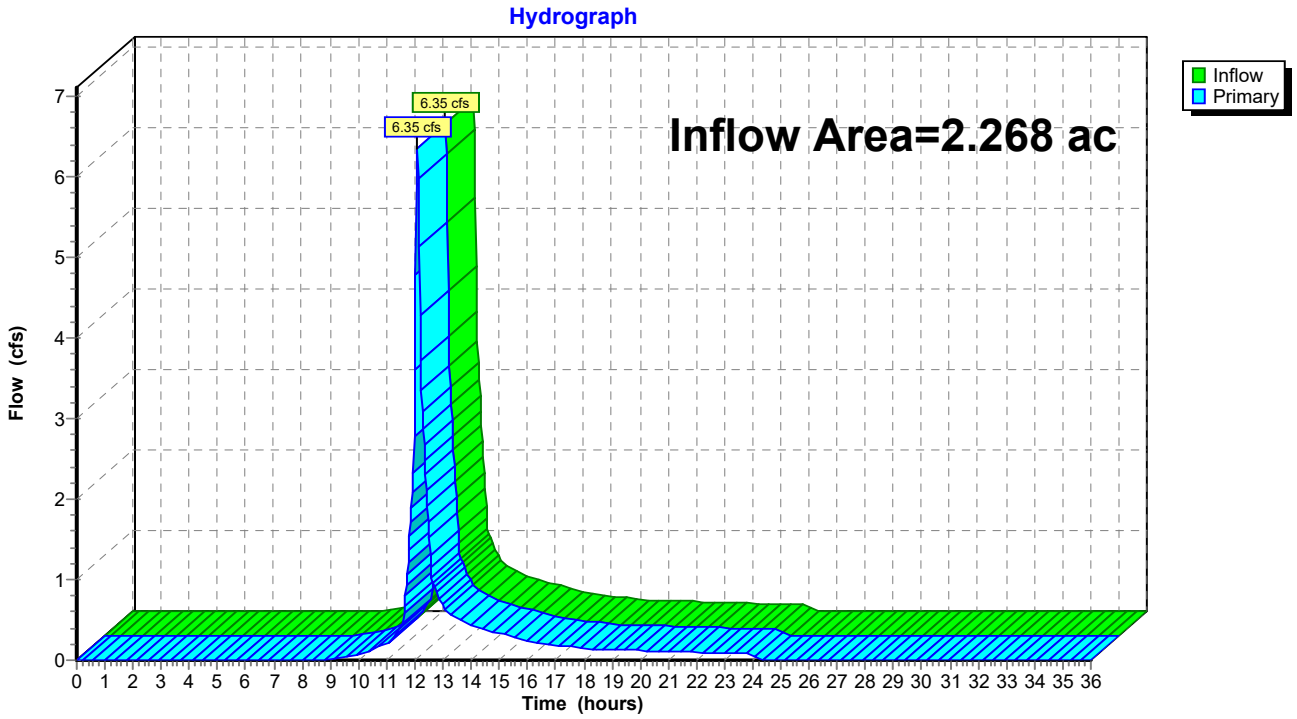


Summary for Link 2L: DP-2

Inflow Area = 2.268 ac, 34.90% Impervious, Inflow Depth = 2.41" for 10 yr event
Inflow = 6.35 cfs @ 12.09 hrs, Volume= 0.455 af
Primary = 6.35 cfs @ 12.09 hrs, Volume= 0.455 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link 2L: DP-2



Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-1: Subcat EX-1 Runoff Area=6.449 ac 28.81% Impervious Runoff Depth=3.88"
Tc=6.0 min UI Adjusted CN=66 Runoff=29.11 cfs 2.083 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=2.268 ac 34.90% Impervious Runoff Depth=4.90"
Flow Length=381' Tc=6.0 min CN=75 Runoff=12.91 cfs 0.925 af

Link 1L: DP-1 Inflow=29.11 cfs 2.083 af
Primary=29.11 cfs 2.083 af

Link 2L: DP-2 Inflow=12.91 cfs 0.925 af
Primary=12.91 cfs 0.925 af

Total Runoff Area = 8.717 ac Runoff Volume = 3.009 af Average Runoff Depth = 4.14"
69.61% Pervious = 6.067 ac 30.39% Impervious = 2.649 ac

Summary for Subcatchment EX-1: Subcat EX-1

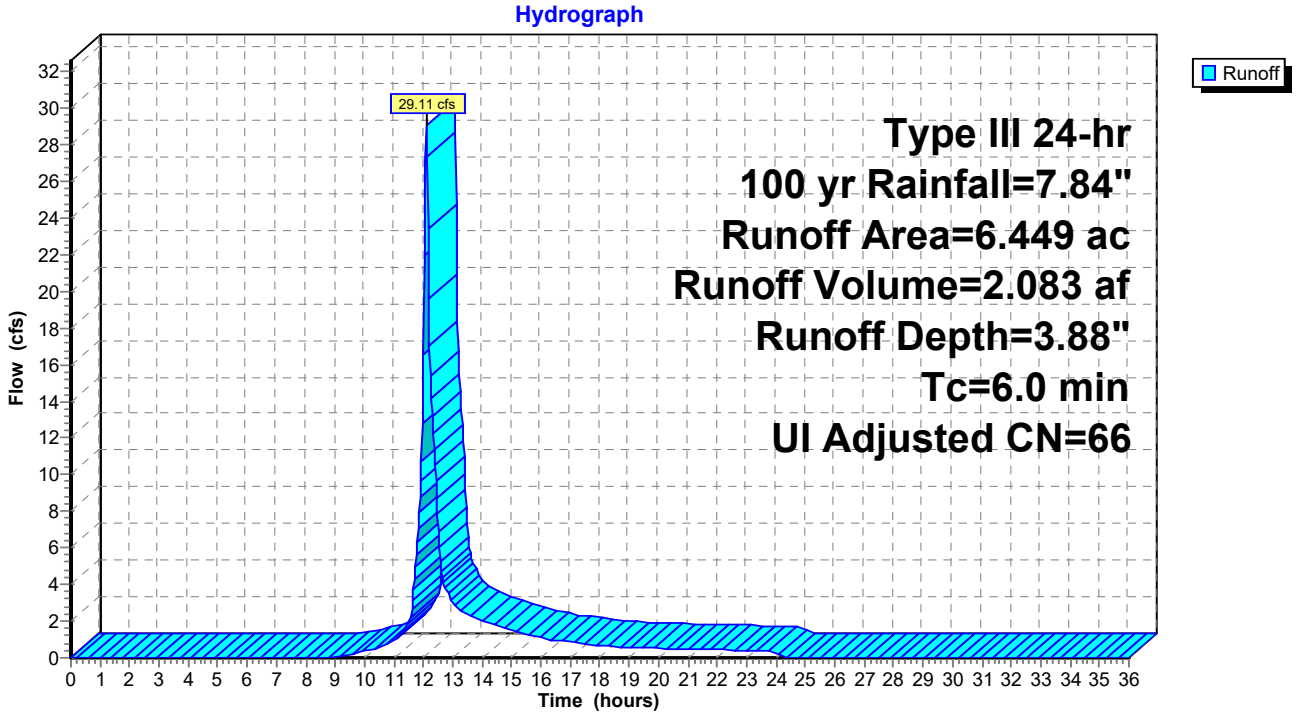
Runoff = 29.11 cfs @ 12.09 hrs, Volume= 2.083 af, Depth= 3.88"
Routed to Link 1L : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=7.84"

Area (ac)	CN	Adj	Description
4.558	61		>75% Grass cover, Good, HSG B
0.033	82		Dirt roads, HSG B
1.858	98		Unconnected pavement, HSG B
6.449	72	66	Weighted Average, UI Adjusted
4.591			71.19% Pervious Area
1.858			28.81% Impervious Area
1.858			100.00% Unconnected

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

Subcatchment EX-1: Subcat EX-1



Summary for Subcatchment EX-2: Subcat EX-2

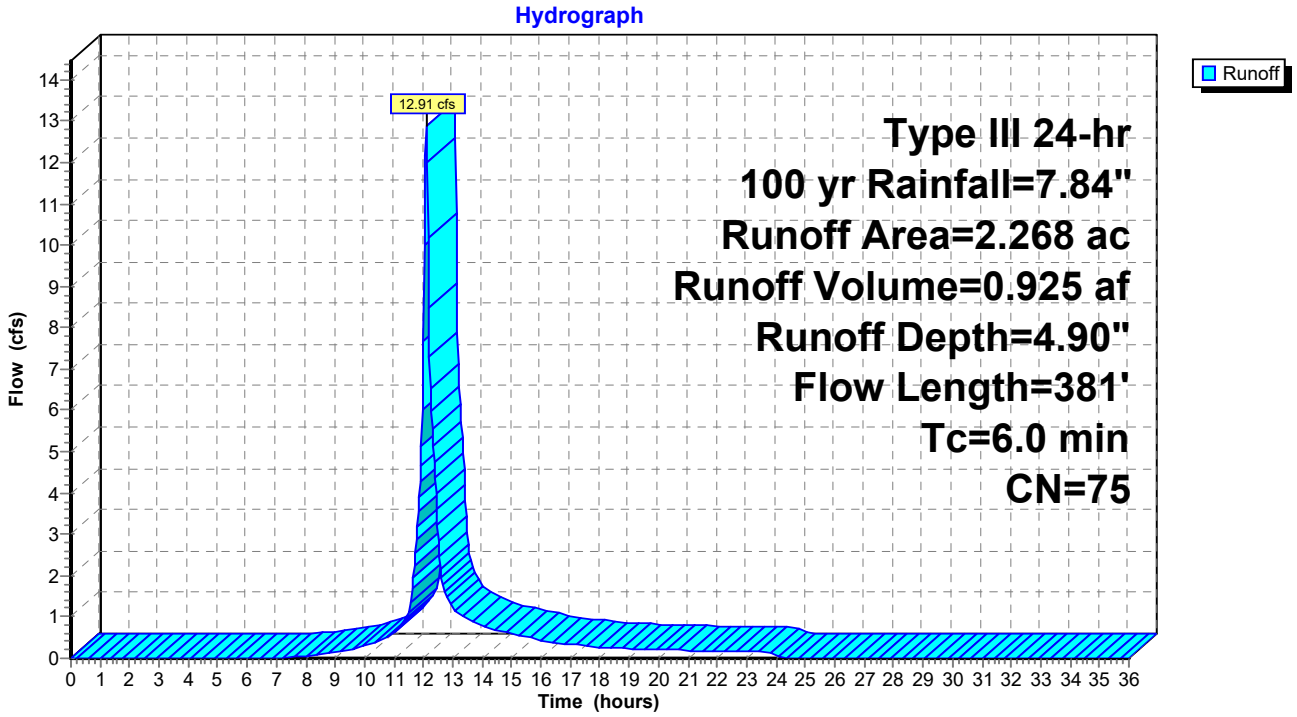
Runoff = 12.91 cfs @ 12.09 hrs, Volume= 0.925 af, Depth= 4.90"
Routed to Link 2L : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=7.84"

Area (ac)	CN	Description
1.343	61	>75% Grass cover, Good, HSG B
0.133	82	Dirt roads, HSG B
0.791	98	Unconnected pavement, HSG B
2.268	75	Weighted Average
1.476		65.10% Pervious Area
0.791		34.90% Impervious Area
0.791		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
0.1	36	0.0830	4.64		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	85	0.1060	5.24		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	210	0.0285	2.72		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.0	381	Total			

Subcatchment EX-2: Subcat EX-2

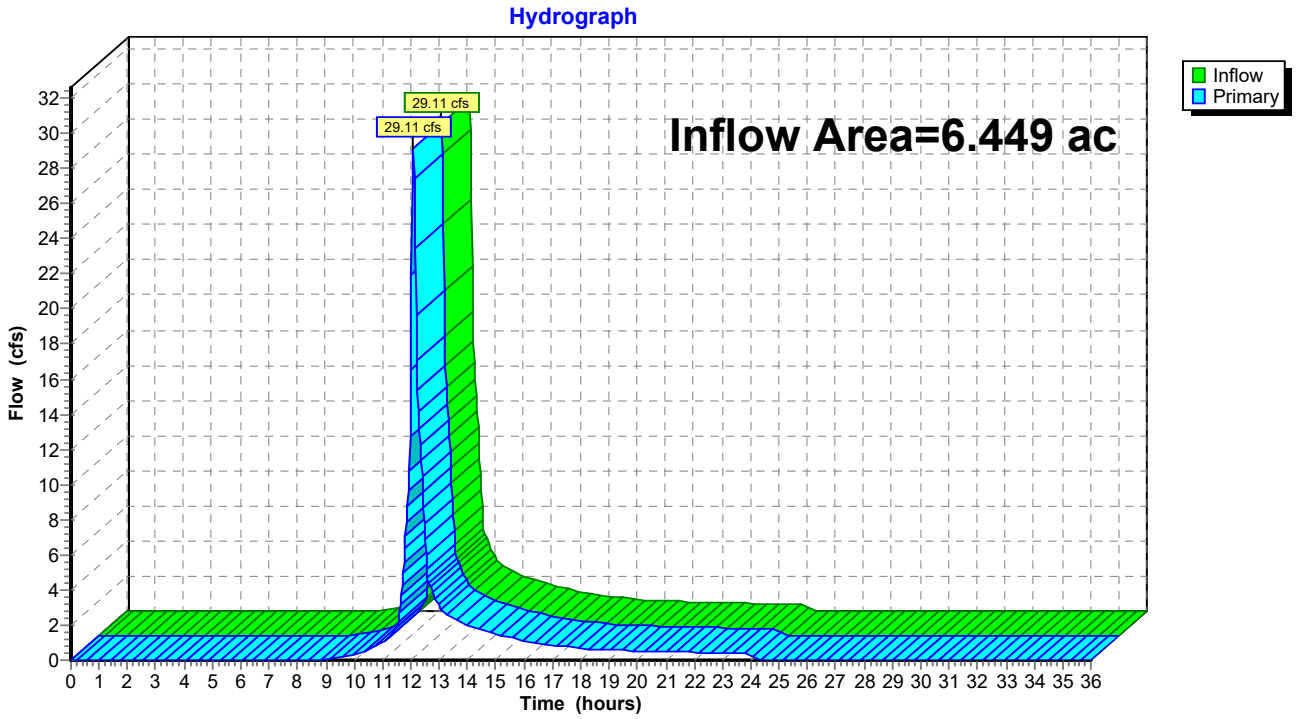


Summary for Link 1L: DP-1

Inflow Area = 6.449 ac, 28.81% Impervious, Inflow Depth = 3.88" for 100 yr event
Inflow = 29.11 cfs @ 12.09 hrs, Volume= 2.083 af
Primary = 29.11 cfs @ 12.09 hrs, Volume= 2.083 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link 1L: DP-1

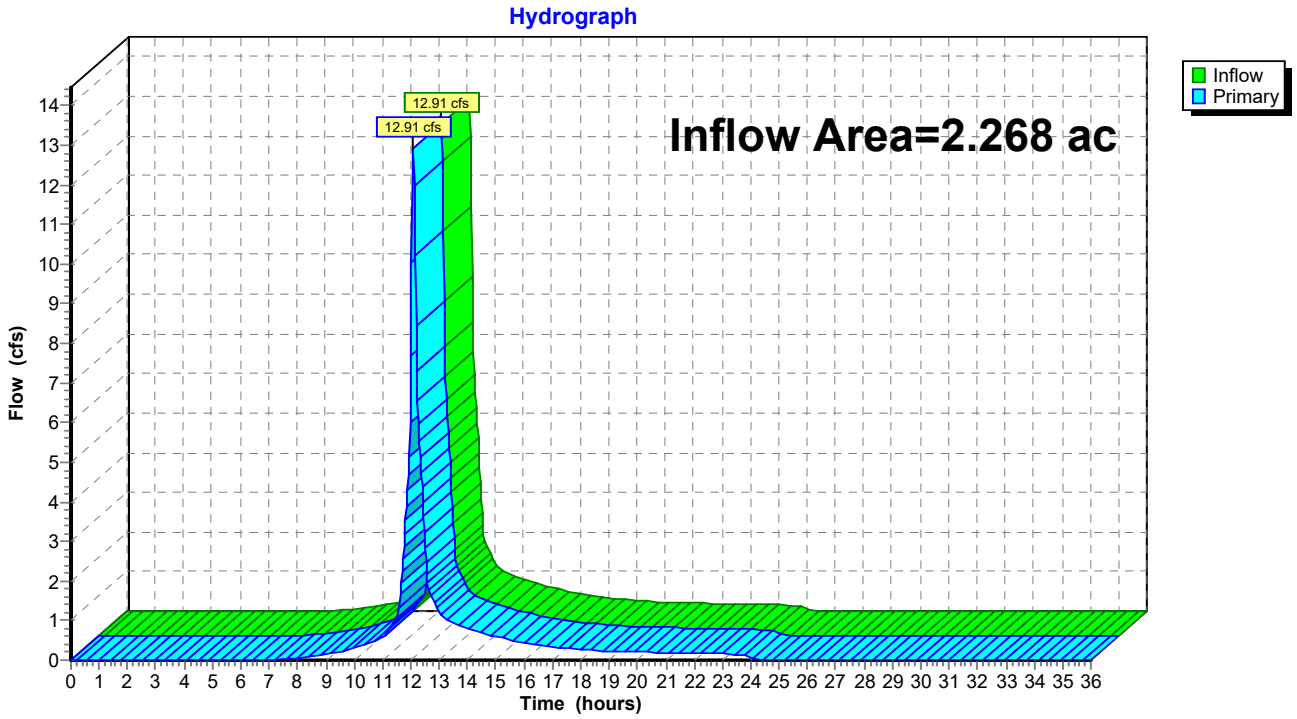


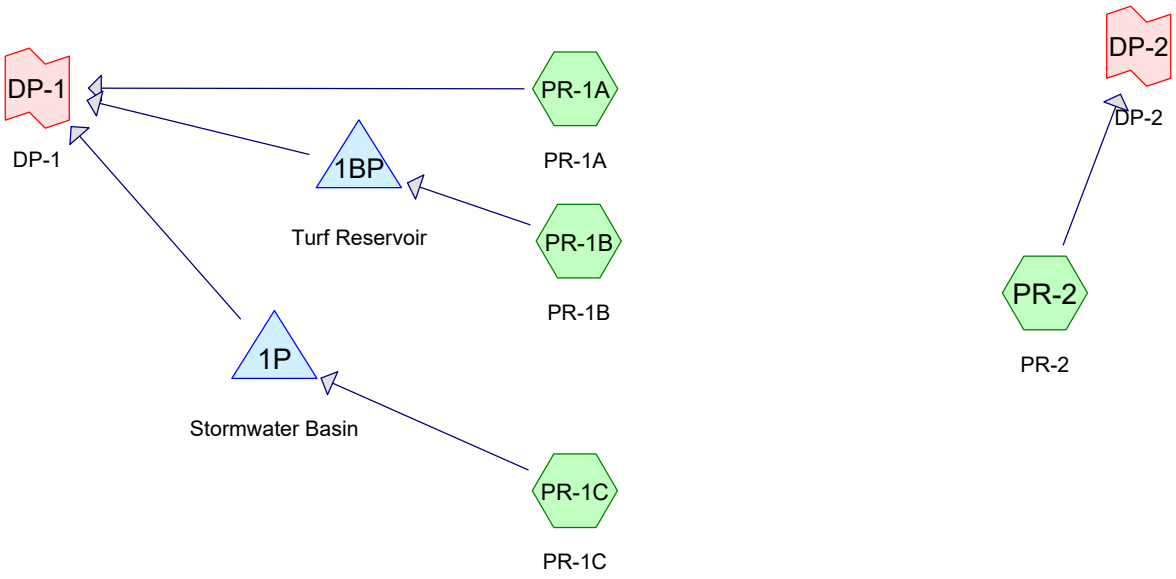
Summary for Link 2L: DP-2

Inflow Area = 2.268 ac, 34.90% Impervious, Inflow Depth = 4.90" for 100 yr event
Inflow = 12.91 cfs @ 12.09 hrs, Volume= 0.925 af
Primary = 12.91 cfs @ 12.09 hrs, Volume= 0.925 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link 2L: DP-2





Subcat Reach Pond Link

Routing Diagram for 43380-PR DR
Prepared by VHB, Inc, Printed 12/19/2023

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 yr	Type III 24-hr		Default	24.00	1	3.13	2
2	10 yr	Type III 24-hr		Default	24.00	1	4.95	2
3	100 yr	Type III 24-hr		Default	24.00	1	7.84	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.383	61	>75% Grass cover, Good, HSG B (PR-1A, PR-1B, PR-1C, PR-2)
2.157	83	Fallow, crop residue, Good, HSG B (PR-1B)
0.180	96	Gravel surface, HSG B (PR-1A, PR-1B, PR-2)
1.894	98	Unconnected pavement, HSG B (PR-1A, PR-1B, PR-1C, PR-2)
0.102	98	Unconnected roofs, HSG B (PR-1A)
8.717	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
8.717	HSG B	PR-1A, PR-1B, PR-1C, PR-2
0.000	HSG C	
0.000	HSG D	
0.000	Other	
8.717		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	4.383	0.000	0.000	0.000	4.383	>75% Grass cover, Good	PR-1A, PR-1B, PR-1C, PR-2
0.000	2.157	0.000	0.000	0.000	2.157	Fallow, crop residue, Good	PR-1B
0.000	0.180	0.000	0.000	0.000	0.180	Gravel surface	PR-1A, PR-1B, PR-2
0.000	1.894	0.000	0.000	0.000	1.894	Unconnected pavement	PR-1A, PR-1B, PR-1C, PR-2
0.000	0.102	0.000	0.000	0.000	0.102	Unconnected roofs	PR-1A
0.000	**8.717**	**0.000**	**0.000**	**0.000**	**8.717**	**TOTAL AREA**	

Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-1A: PR-1A Runoff Area=96,811 sf 7.72% Impervious Runoff Depth=0.49"
Flow Length=522' Tc=9.0 min UI Adjusted CN=63 Runoff=0.78 cfs 0.090 af

Subcatchment PR-1B: PR-1B Runoff Area=136,533 sf 15.37% Impervious Runoff Depth=1.48"
Tc=6.0 min UI Adjusted CN=82 Runoff=5.40 cfs 0.387 af

Subcatchment PR-1C: PR-1C Runoff Area=46,988 sf 53.68% Impervious Runoff Depth=1.41"
Tc=6.0 min CN=81 Runoff=1.77 cfs 0.127 af

Subcatchment PR-2: PR-2 Runoff Area=99,364 sf 33.50% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=74 Runoff=2.49 cfs 0.189 af

Pond 1BP: Turf Reservoir Peak Elev=172.50' Storage=133 cf Inflow=5.40 cfs 0.387 af
Discarded=5.38 cfs 0.387 af Primary=0.00 cfs 0.000 af Outflow=5.38 cfs 0.387 af

Pond 1P: Stormwater Basin Peak Elev=167.29' Storage=978 cf Inflow=1.77 cfs 0.127 af
Discarded=0.57 cfs 0.127 af Primary=0.00 cfs 0.000 af Outflow=0.57 cfs 0.127 af

Link DP-1: DP-1 Inflow=0.78 cfs 0.090 af
Primary=0.78 cfs 0.090 af

Link DP-2: DP-2 Inflow=2.49 cfs 0.189 af
Primary=2.49 cfs 0.189 af

Total Runoff Area = 8.717 ac Runoff Volume = 0.793 af Average Runoff Depth = 1.09"
77.10% Pervious = 6.720 ac 22.90% Impervious = 1.996 ac

Summary for Subcatchment PR-1A: PR-1A

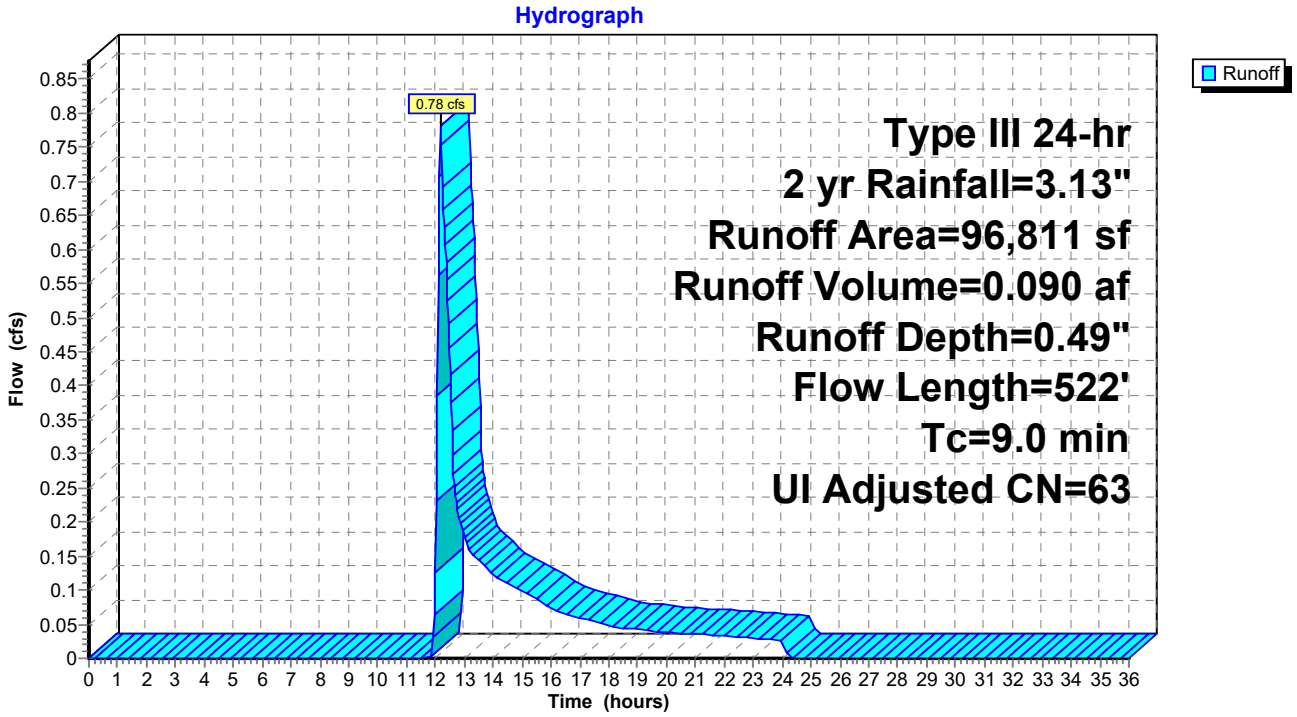
Runoff = 0.78 cfs @ 12.16 hrs, Volume= 0.090 af, Depth= 0.49"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.13"

Area (sf)	CN	Adj	Description
3,032	98		Unconnected pavement, HSG B
4,438	98		Unconnected roofs, HSG B
947	96		Gravel surface, HSG B
88,394	61		>75% Grass cover, Good, HSG B
96,811	64	63	Weighted Average, UI Adjusted
89,341			92.28% Pervious Area
7,470			7.72% Impervious Area
7,470			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0300	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	213	0.0150	1.97		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.0	193	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.0	522	Total			

Subcatchment PR-1A: PR-1A



Summary for Subcatchment PR-1B: PR-1B

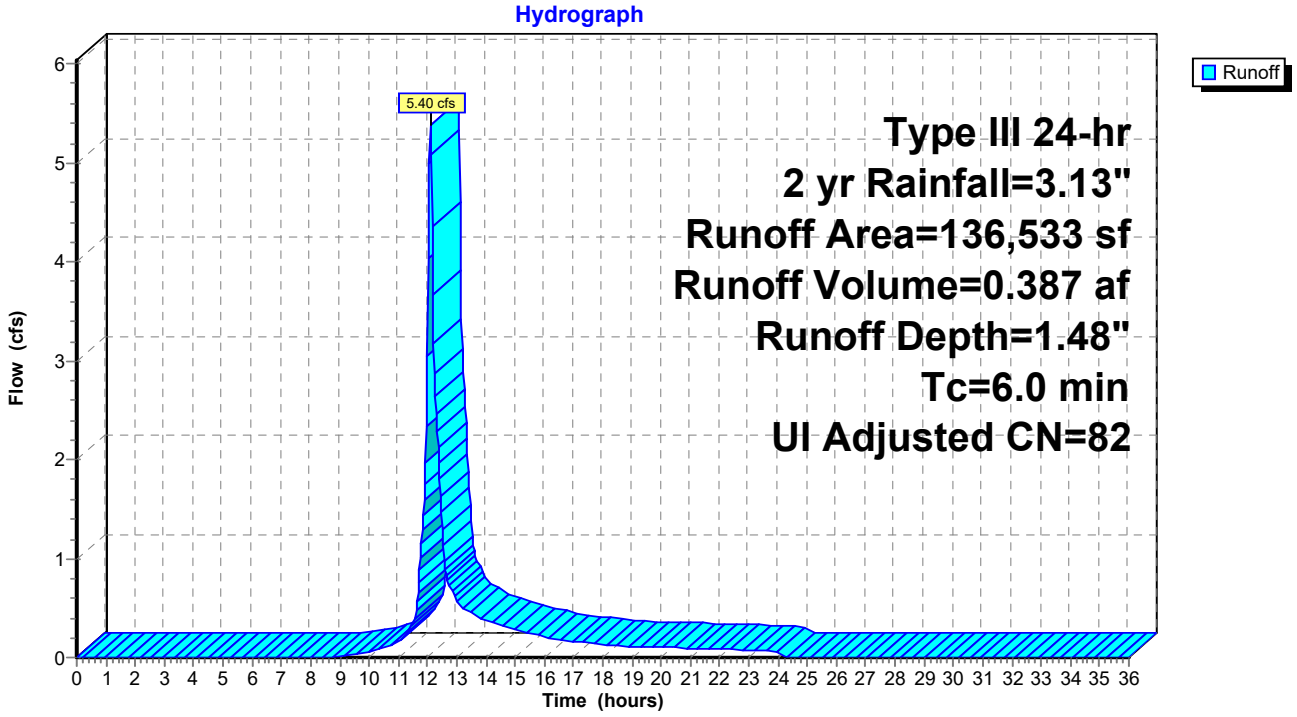
Runoff = 5.40 cfs @ 12.09 hrs, Volume= 0.387 af, Depth= 1.48"
Routed to Pond 1BP : Turf Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.13"

Area (sf)	CN	Adj	Description
20,984	98		Unconnected pavement, HSG B
4,917	96		Gravel surface, HSG B
93,955	83		Fallow, crop residue, Good, HSG B
16,677	61		>75% Grass cover, Good, HSG B
136,533	83	82	Weighted Average, UI Adjusted
115,549			84.63% Pervious Area
20,984			15.37% Impervious Area
20,984			100.00% Unconnected

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

Subcatchment PR-1B: PR-1B



Summary for Subcatchment PR-1C: PR-1C

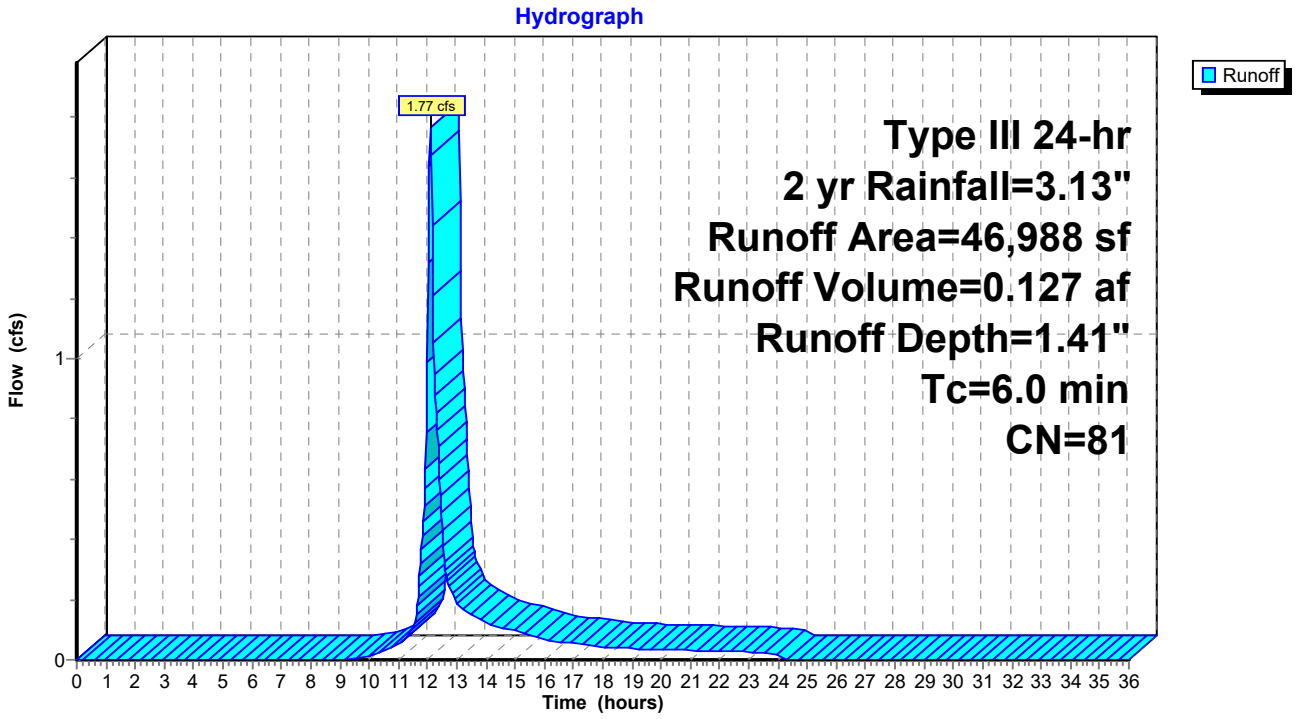
Runoff = 1.77 cfs @ 12.09 hrs, Volume= 0.127 af, Depth= 1.41"
Routed to Pond 1P : Stormwater Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.13"

Area (sf)	CN	Description
25,222	98	Unconnected pavement, HSG B
0	96	Gravel surface, HSG B
21,766	61	>75% Grass cover, Good, HSG B
46,988	81	Weighted Average
21,766		46.32% Pervious Area
25,222		53.68% Impervious Area
25,222		100.00% Unconnected

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

Subcatchment PR-1C: PR-1C



Summary for Subcatchment PR-2: PR-2

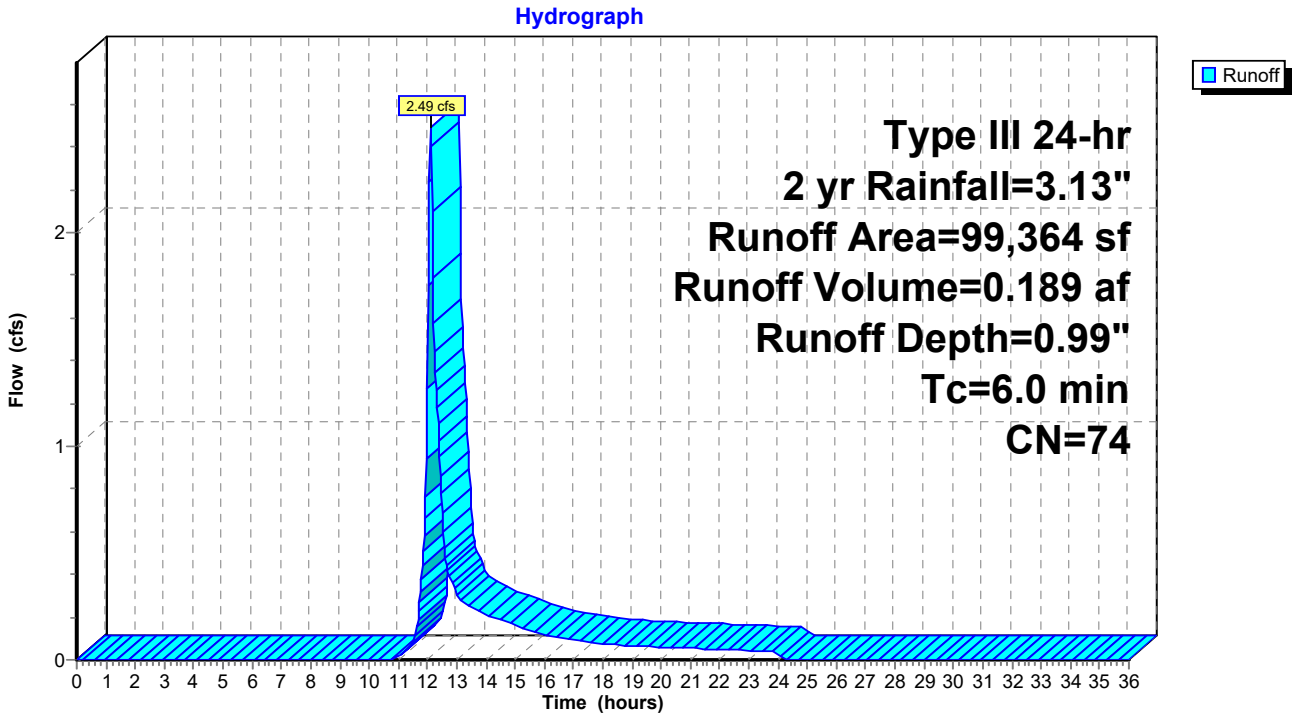
Runoff = 2.49 cfs @ 12.10 hrs, Volume= 0.189 af, Depth= 0.99"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.13"

Area (sf)	CN	Description
33,283	98	Unconnected pavement, HSG B
64,091	61	>75% Grass cover, Good, HSG B
1,990	96	Gravel surface, HSG B
99,364	74	Weighted Average
66,081		66.50% Pervious Area
33,283		33.50% Impervious Area
33,283		100.00% Unconnected

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

Subcatchment PR-2: PR-2



Summary for Pond 1BP: Turf Reservoir

Inflow Area = 3.134 ac, 15.37% Impervious, Inflow Depth = 1.48" for 2 yr event
Inflow = 5.40 cfs @ 12.09 hrs, Volume= 0.387 af
Outflow = 5.38 cfs @ 12.10 hrs, Volume= 0.387 af, Atten= 0%, Lag= 0.4 min
Discarded = 5.38 cfs @ 12.10 hrs, Volume= 0.387 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-1 : DP-1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 172.50' @ 12.10 hrs Surf.Area= 93,140 sf Storage= 133 cf

Plug-Flow detention time= 0.4 min calculated for 0.387 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (837.7 - 837.3)

Volume	Invert	Avail.Storage	Storage Description
#1	172.50'	37,256 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 93,140 cf Overall x 40.0% Voids

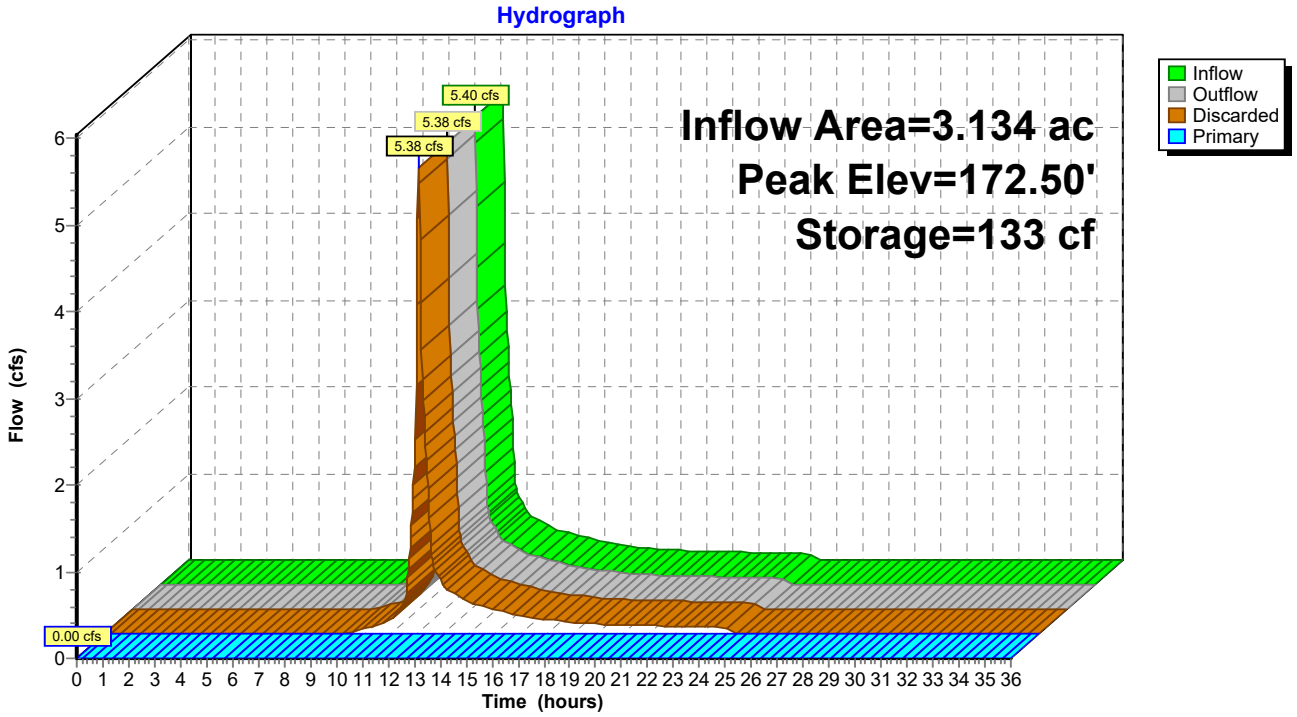
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
172.50	93,140	746.0	0	0	93,140
173.00	93,140	746.0	46,570	46,570	93,513
173.50	93,140	746.0	46,570	93,140	93,886

Device	Routing	Invert	Outlet Devices
#1	Primary	172.75'	**746.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	172.50'	**7.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=15.09 cfs @ 12.10 hrs HW=172.50' (Free Discharge)
↑—**2=Exfiltration** (Controls 15.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=172.50' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1BP: Turf Reservoir



Summary for Pond 1P: Stormwater Basin

Inflow Area = 1.079 ac, 53.68% Impervious, Inflow Depth = 1.41" for 2 yr event
Inflow = 1.77 cfs @ 12.09 hrs, Volume= 0.127 af
Outflow = 0.57 cfs @ 12.44 hrs, Volume= 0.127 af, Atten= 68%, Lag= 20.8 min
Discarded = 0.57 cfs @ 12.44 hrs, Volume= 0.127 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-1 : DP-1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 167.29' @ 12.44 hrs Surf.Area= 3,482 sf Storage= 978 cf

Plug-Flow detention time= 9.8 min calculated for 0.127 af (100% of inflow)
Center-of-Mass det. time= 9.8 min (850.5 - 840.6)

Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	8,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

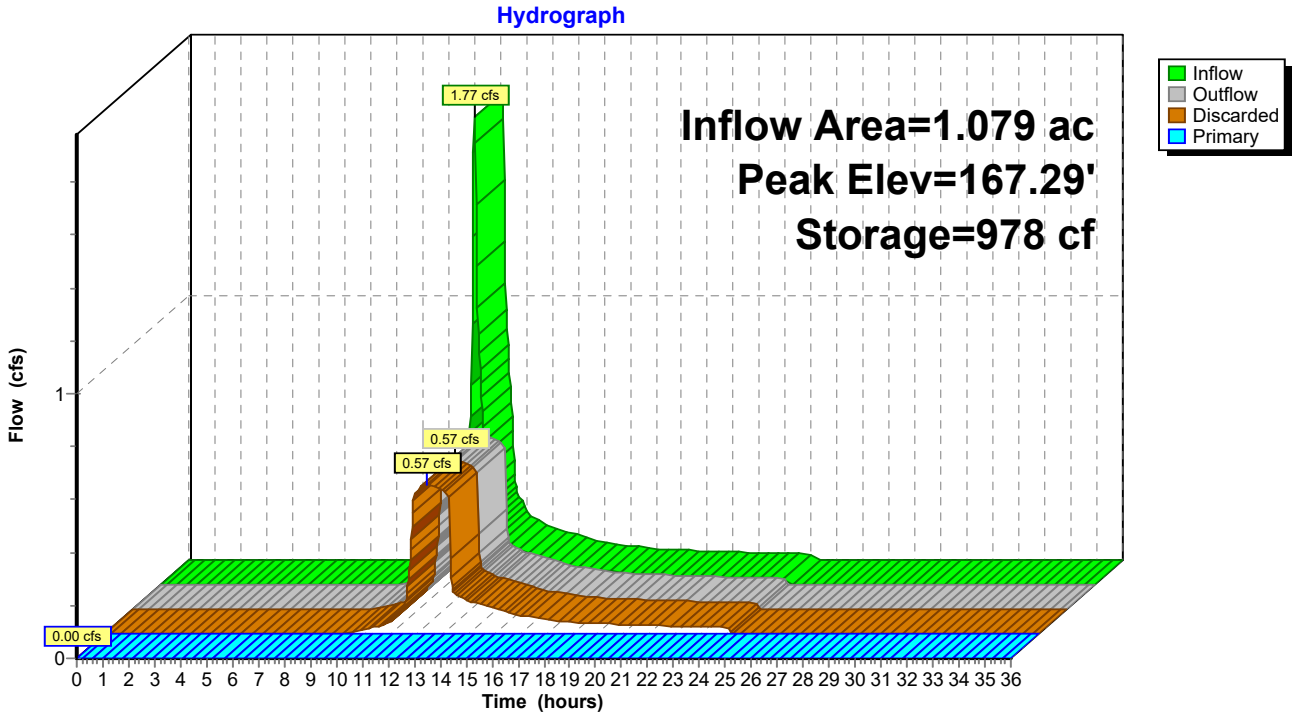
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.00	3,227	0	0
168.00	4,103	3,665	3,665
169.00	5,035	4,569	8,234

Device	Routing	Invert	Outlet Devices
#1	Primary	168.50'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	167.00'	**7.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=0.57 cfs @ 12.44 hrs HW=167.29' (Free Discharge)
↑**2=Exfiltration** (Controls 0.57 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=167.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Stormwater Basin

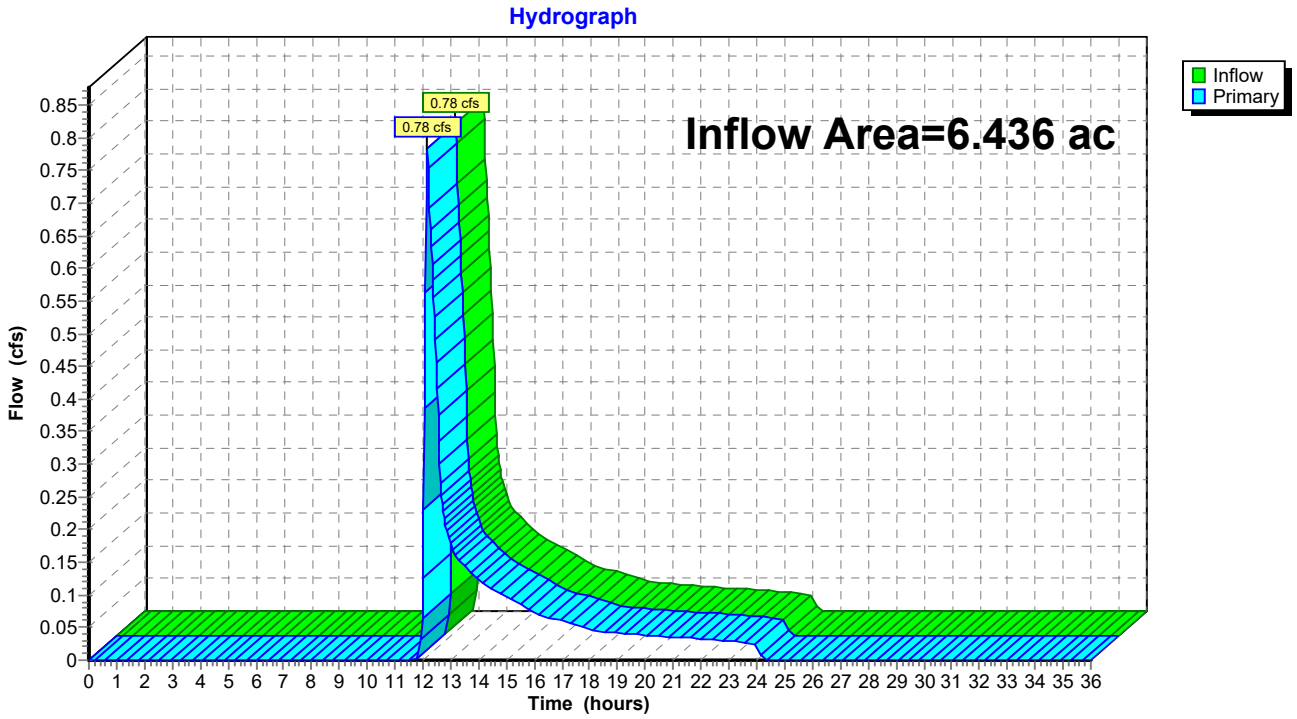


Summary for Link DP-1: DP-1

Inflow Area = 6.436 ac, 19.15% Impervious, Inflow Depth = 0.17" for 2 yr event
Inflow = 0.78 cfs @ 12.16 hrs, Volume= 0.090 af
Primary = 0.78 cfs @ 12.16 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-1: DP-1

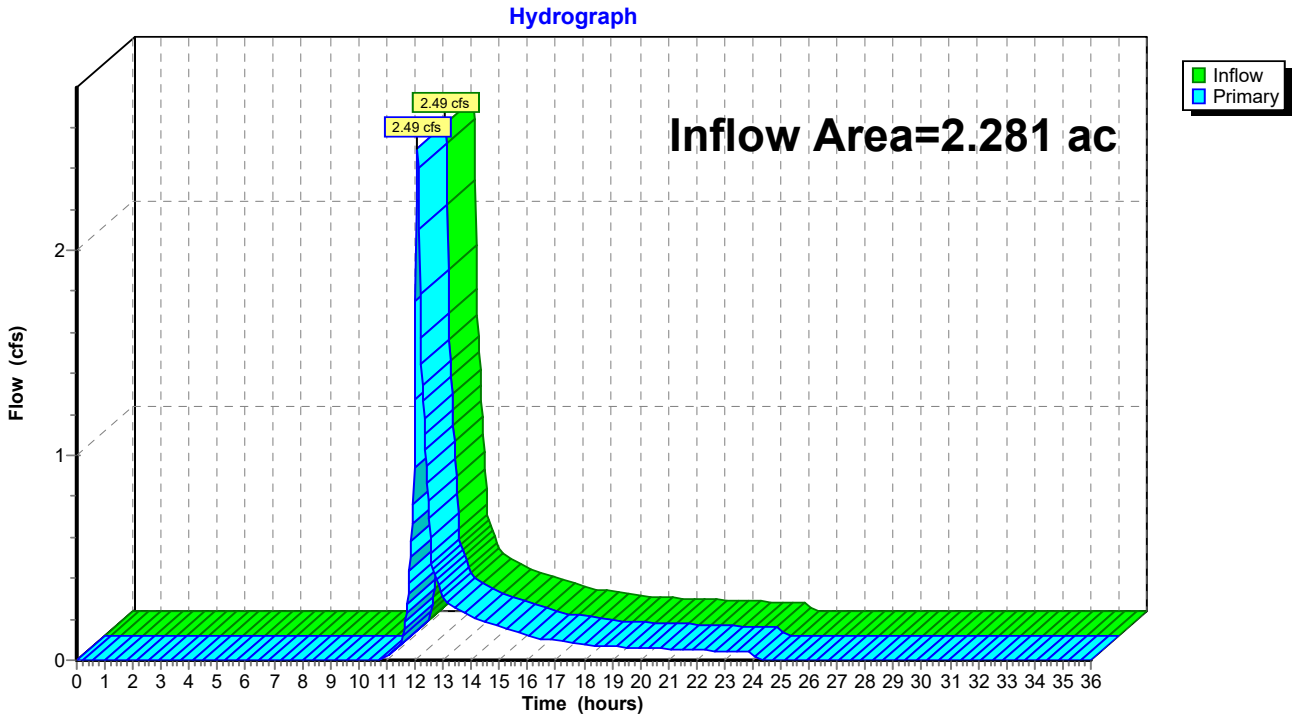


Summary for Link DP-2: DP-2

Inflow Area = 2.281 ac, 33.50% Impervious, Inflow Depth = 0.99" for 2 yr event
Inflow = 2.49 cfs @ 12.10 hrs, Volume= 0.189 af
Primary = 2.49 cfs @ 12.10 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-2: DP-2



Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-1A: PR-1A Runoff Area=96,811 sf 7.72% Impervious Runoff Depth=1.48"
Flow Length=522' Tc=9.0 min UI Adjusted CN=63 Runoff=3.20 cfs 0.274 af

Subcatchment PR-1B: PR-1B Runoff Area=136,533 sf 15.37% Impervious Runoff Depth=3.03"
Tc=6.0 min UI Adjusted CN=82 Runoff=11.07 cfs 0.793 af

Subcatchment PR-1C: PR-1C Runoff Area=46,988 sf 53.68% Impervious Runoff Depth=2.94"
Tc=6.0 min CN=81 Runoff=3.70 cfs 0.264 af

Subcatchment PR-2: PR-2 Runoff Area=99,364 sf 33.50% Impervious Runoff Depth=2.32"
Tc=6.0 min CN=74 Runoff=6.16 cfs 0.442 af

Pond 1BP: Turf Reservoir Peak Elev=172.51' Storage=272 cf Inflow=11.07 cfs 0.793 af
Discarded=11.04 cfs 0.793 af Primary=0.00 cfs 0.000 af Outflow=11.04 cfs 0.793 af

Pond 1P: Stormwater Basin Peak Elev=167.93' Storage=3,376 cf Inflow=3.70 cfs 0.264 af
Discarded=0.66 cfs 0.264 af Primary=0.00 cfs 0.000 af Outflow=0.66 cfs 0.264 af

Link DP-1: DP-1 Inflow=3.20 cfs 0.274 af
Primary=3.20 cfs 0.274 af

Link DP-2: DP-2 Inflow=6.16 cfs 0.442 af
Primary=6.16 cfs 0.442 af

Total Runoff Area = 8.717 ac Runoff Volume = 1.772 af Average Runoff Depth = 2.44"
77.10% Pervious = 6.720 ac 22.90% Impervious = 1.996 ac

Summary for Subcatchment PR-1A: PR-1A

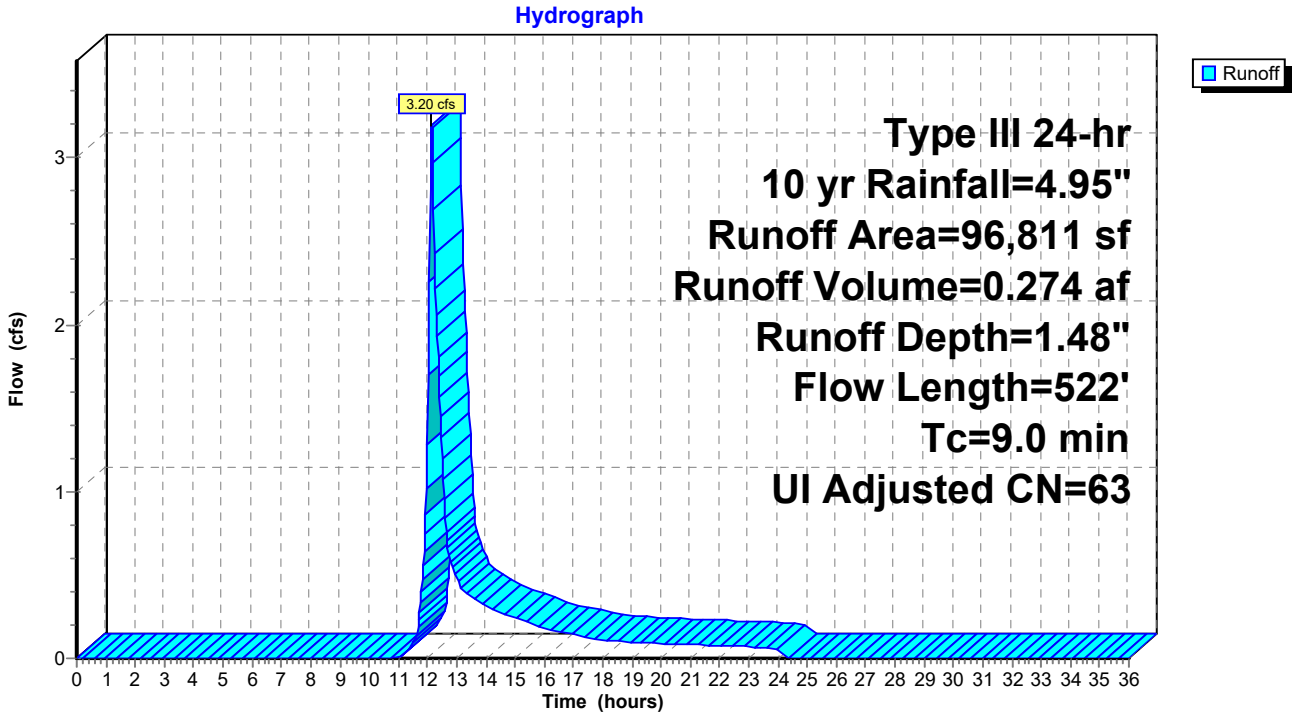
Runoff = 3.20 cfs @ 12.14 hrs, Volume= 0.274 af, Depth= 1.48"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.95"

Area (sf)	CN	Adj	Description
3,032	98		Unconnected pavement, HSG B
4,438	98		Unconnected roofs, HSG B
947	96		Gravel surface, HSG B
88,394	61		>75% Grass cover, Good, HSG B
96,811	64	63	Weighted Average, UI Adjusted
89,341			92.28% Pervious Area
7,470			7.72% Impervious Area
7,470			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0300	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	213	0.0150	1.97		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.0	193	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.0	522	Total			

Subcatchment PR-1A: PR-1A



Summary for Subcatchment PR-1B: PR-1B

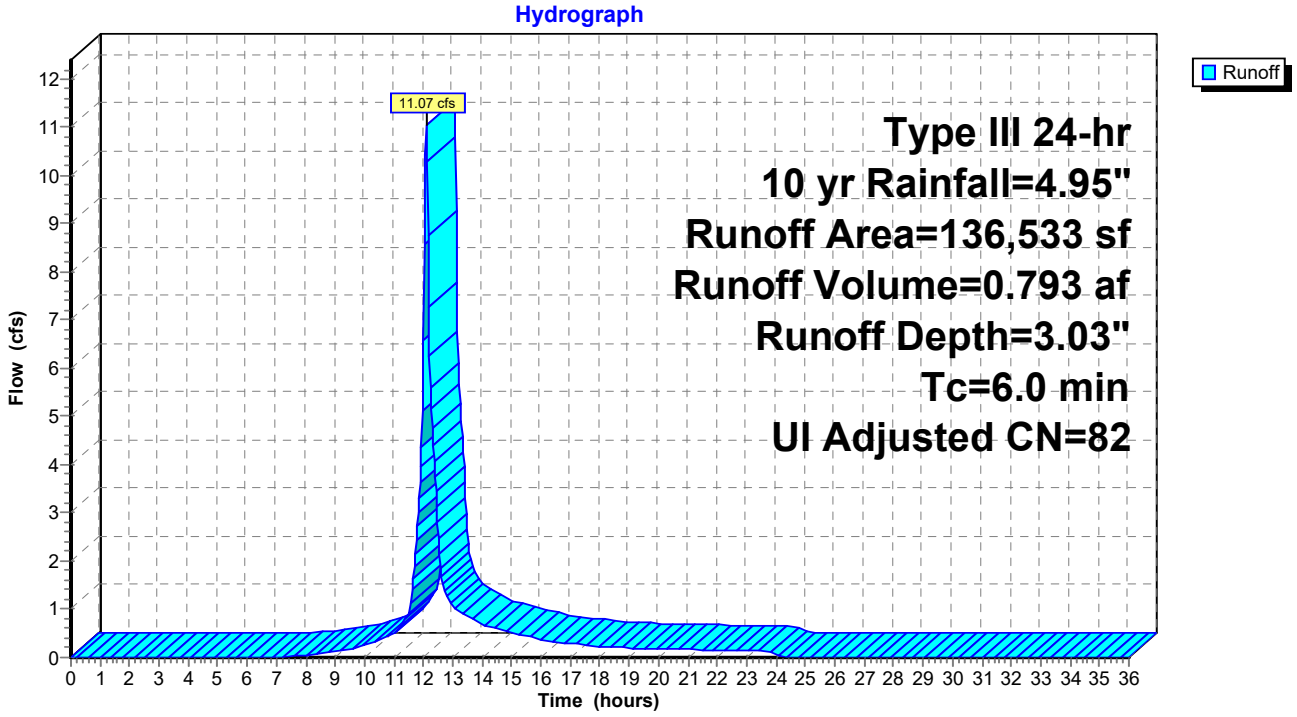
Runoff = 11.07 cfs @ 12.09 hrs, Volume= 0.793 af, Depth= 3.03"
Routed to Pond 1BP : Turf Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.95"

Area (sf)	CN	Adj	Description
20,984	98		Unconnected pavement, HSG B
4,917	96		Gravel surface, HSG B
93,955	83		Fallow, crop residue, Good, HSG B
16,677	61		>75% Grass cover, Good, HSG B
136,533	83	82	Weighted Average, UI Adjusted
115,549			84.63% Pervious Area
20,984			15.37% Impervious Area
20,984			100.00% Unconnected

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

Subcatchment PR-1B: PR-1B



Summary for Subcatchment PR-1C: PR-1C

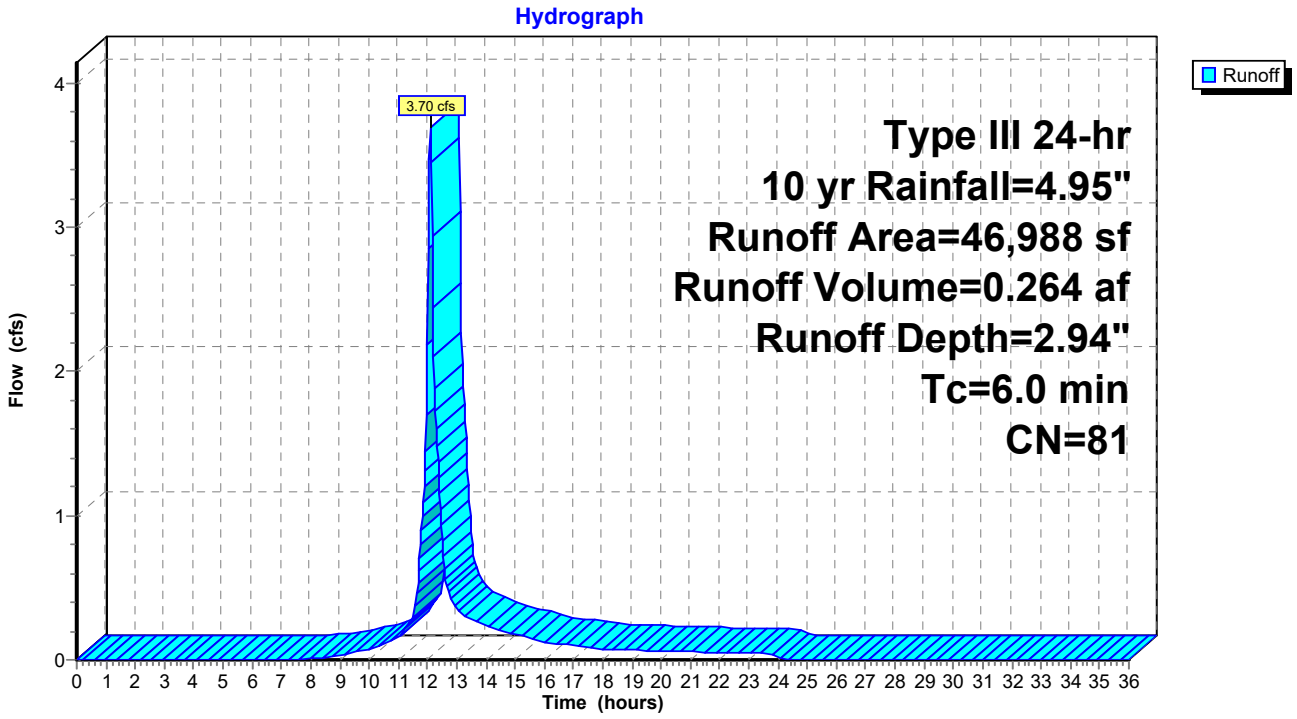
Runoff = 3.70 cfs @ 12.09 hrs, Volume= 0.264 af, Depth= 2.94"
Routed to Pond 1P : Stormwater Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.95"

Area (sf)	CN	Description
25,222	98	Unconnected pavement, HSG B
0	96	Gravel surface, HSG B
21,766	61	>75% Grass cover, Good, HSG B
46,988	81	Weighted Average
21,766		46.32% Pervious Area
25,222		53.68% Impervious Area
25,222		100.00% Unconnected

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

Subcatchment PR-1C: PR-1C



Summary for Subcatchment PR-2: PR-2

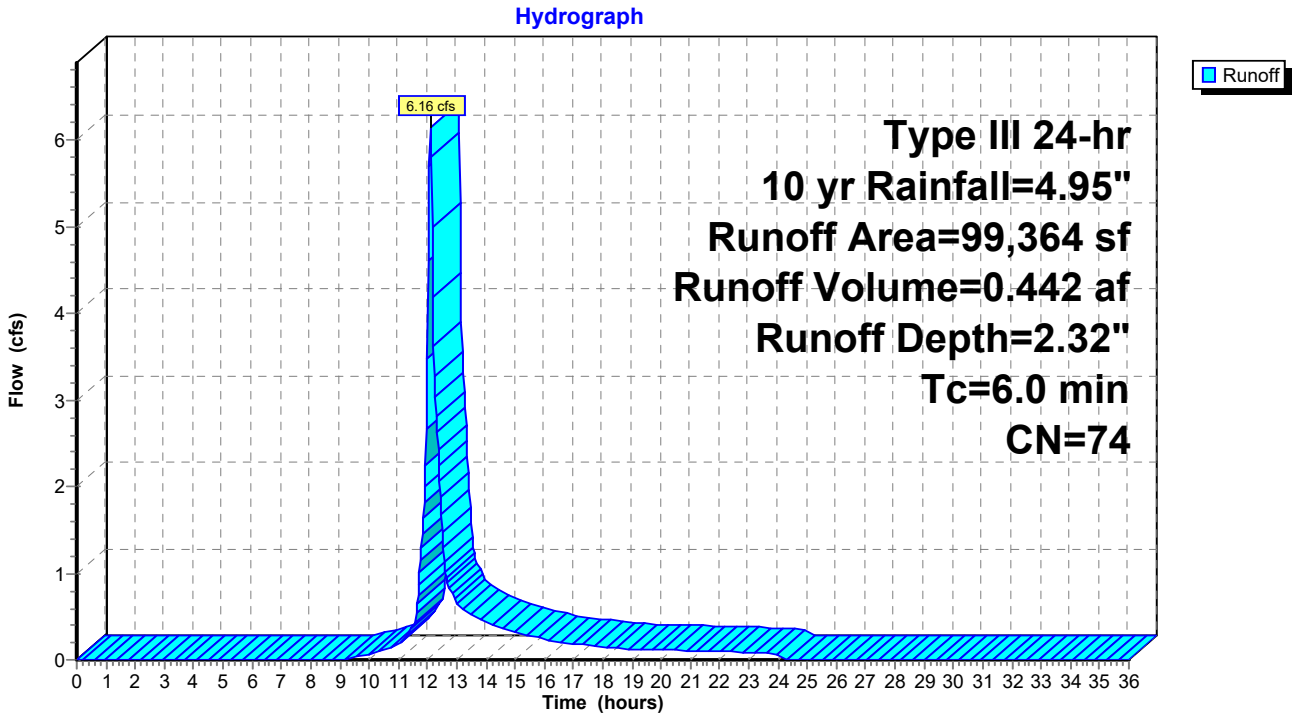
Runoff = 6.16 cfs @ 12.09 hrs, Volume= 0.442 af, Depth= 2.32"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.95"

Area (sf)	CN	Description
33,283	98	Unconnected pavement, HSG B
64,091	61	>75% Grass cover, Good, HSG B
1,990	96	Gravel surface, HSG B
99,364	74	Weighted Average
66,081		66.50% Pervious Area
33,283		33.50% Impervious Area
33,283		100.00% Unconnected

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

Subcatchment PR-2: PR-2



Summary for Pond 1BP: Turf Reservoir

Inflow Area = 3.134 ac, 15.37% Impervious, Inflow Depth = 3.03" for 10 yr event
Inflow = 11.07 cfs @ 12.09 hrs, Volume= 0.793 af
Outflow = 11.04 cfs @ 12.10 hrs, Volume= 0.793 af, Atten= 0%, Lag= 0.4 min
Discarded = 11.04 cfs @ 12.10 hrs, Volume= 0.793 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-1 : DP-1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 172.51' @ 12.10 hrs Surf.Area= 93,140 sf Storage= 272 cf

Plug-Flow detention time= 0.4 min calculated for 0.792 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (817.1 - 816.7)

Volume	Invert	Avail.Storage	Storage Description
#1	172.50'	37,256 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 93,140 cf Overall x 40.0% Voids

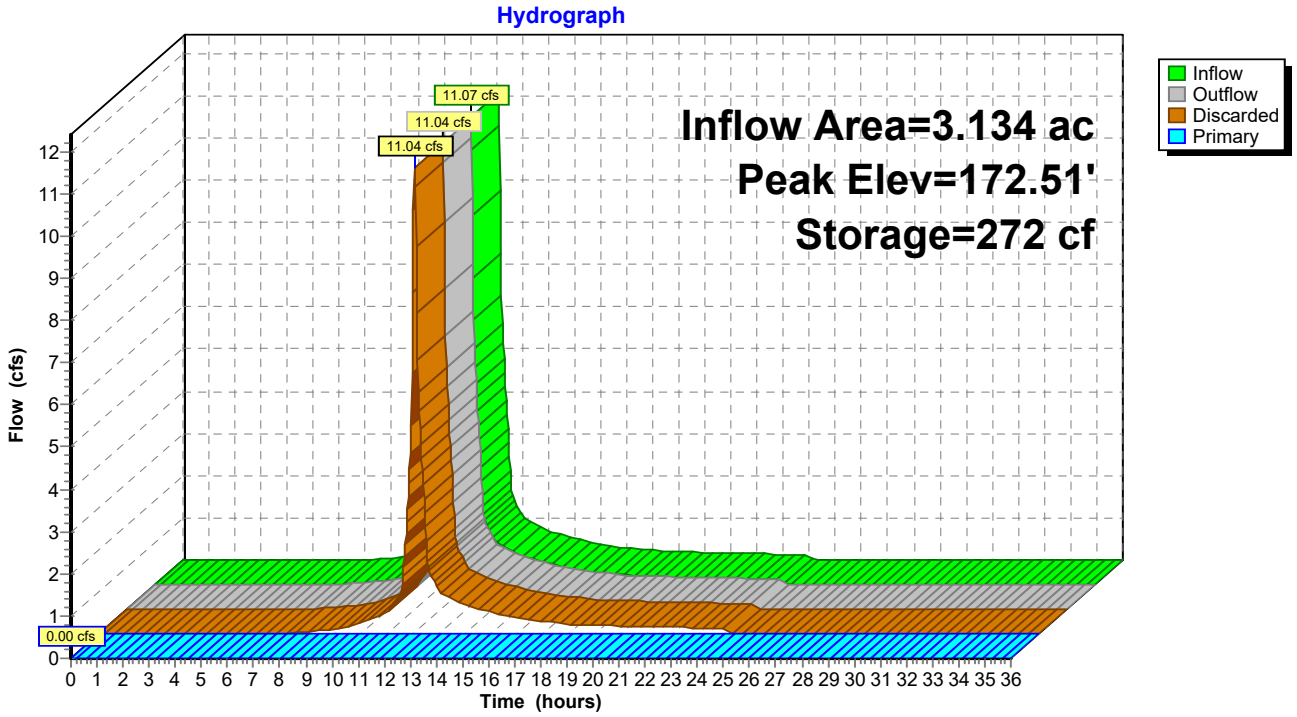
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
172.50	93,140	746.0	0	0	93,140
173.00	93,140	746.0	46,570	46,570	93,513
173.50	93,140	746.0	46,570	93,140	93,886

Device	Routing	Invert	Outlet Devices
#1	Primary	172.75'	**746.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	172.50'	**7.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=15.09 cfs @ 12.10 hrs HW=172.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 15.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=172.50' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1BP: Turf Reservoir



Summary for Pond 1P: Stormwater Basin

Inflow Area = 1.079 ac, 53.68% Impervious, Inflow Depth = 2.94" for 10 yr event
Inflow = 3.70 cfs @ 12.09 hrs, Volume= 0.264 af
Outflow = 0.66 cfs @ 12.56 hrs, Volume= 0.264 af, Atten= 82%, Lag= 28.3 min
Discarded = 0.66 cfs @ 12.56 hrs, Volume= 0.264 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-1 : DP-1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 167.93' @ 12.56 hrs Surf.Area= 4,041 sf Storage= 3,376 cf

Plug-Flow detention time= 35.6 min calculated for 0.264 af (100% of inflow)
Center-of-Mass det. time= 35.6 min (855.1 - 819.5)

Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	8,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

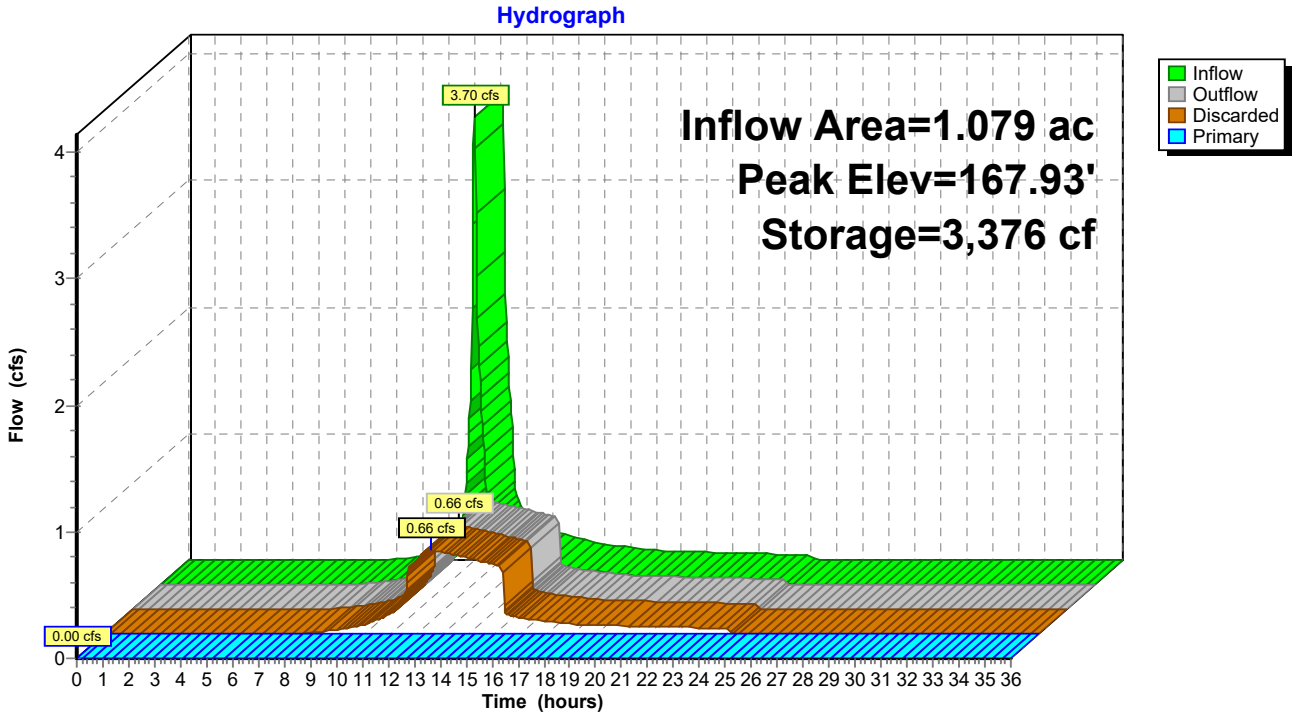
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.00	3,227	0	0
168.00	4,103	3,665	3,665
169.00	5,035	4,569	8,234

Device	Routing	Invert	Outlet Devices
#1	Primary	168.50'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	167.00'	**7.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=0.66 cfs @ 12.56 hrs HW=167.93' (Free Discharge)
↑**2=Exfiltration** (Controls 0.66 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=167.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Stormwater Basin

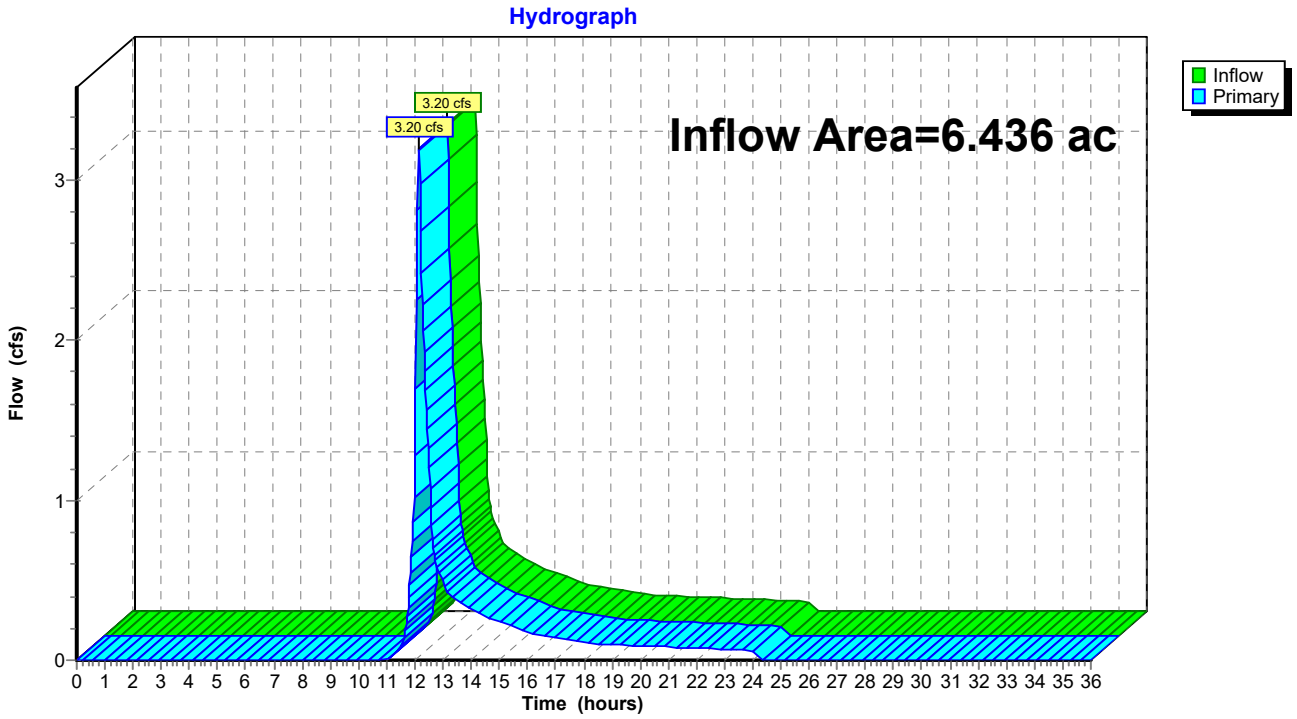


Summary for Link DP-1: DP-1

Inflow Area = 6.436 ac, 19.15% Impervious, Inflow Depth = 0.51" for 10 yr event
Inflow = 3.20 cfs @ 12.14 hrs, Volume= 0.274 af
Primary = 3.20 cfs @ 12.14 hrs, Volume= 0.274 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-1: DP-1

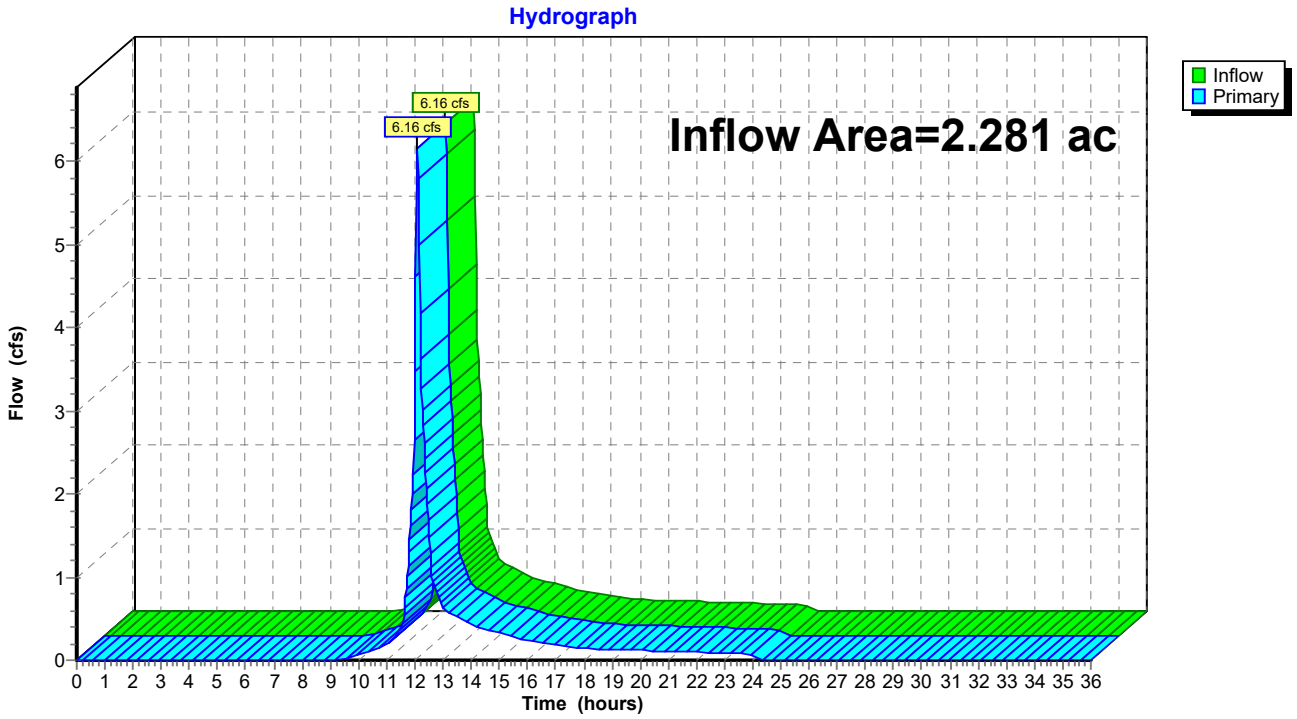


Summary for Link DP-2: DP-2

Inflow Area = 2.281 ac, 33.50% Impervious, Inflow Depth = 2.32" for 10 yr event
Inflow = 6.16 cfs @ 12.09 hrs, Volume= 0.442 af
Primary = 6.16 cfs @ 12.09 hrs, Volume= 0.442 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-2: DP-2



Time span=0.00-36.00 hrs, dt=0.03 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-1A: PR-1A Runoff Area=96,811 sf 7.72% Impervious Runoff Depth=3.54"
Flow Length=522' Tc=9.0 min UI Adjusted CN=63 Runoff=8.23 cfs 0.656 af

Subcatchment PR-1B: PR-1B Runoff Area=136,533 sf 15.37% Impervious Runoff Depth=5.71"
Tc=6.0 min UI Adjusted CN=82 Runoff=20.41 cfs 1.491 af

Subcatchment PR-1C: PR-1C Runoff Area=46,988 sf 53.68% Impervious Runoff Depth=5.59"
Tc=6.0 min CN=81 Runoff=6.90 cfs 0.503 af

Subcatchment PR-2: PR-2 Runoff Area=99,364 sf 33.50% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=74 Runoff=12.70 cfs 0.909 af

Pond 1BP: Turf Reservoir Peak Elev=172.55' Storage=1,934 cf Inflow=20.41 cfs 1.491 af
Discarded=15.10 cfs 1.491 af Primary=0.00 cfs 0.000 af Outflow=15.10 cfs 1.491 af

Pond 1P: Stormwater Basin Peak Elev=168.67' Storage=6,604 cf Inflow=6.90 cfs 0.503 af
Discarded=0.77 cfs 0.455 af Primary=1.58 cfs 0.048 af Outflow=2.35 cfs 0.503 af

Link DP-1: DP-1 Inflow=8.23 cfs 0.704 af
Primary=8.23 cfs 0.704 af

Link DP-2: DP-2 Inflow=12.70 cfs 0.909 af
Primary=12.70 cfs 0.909 af

Total Runoff Area = 8.717 ac Runoff Volume = 3.559 af Average Runoff Depth = 4.90"
77.10% Pervious = 6.720 ac 22.90% Impervious = 1.996 ac

Summary for Subcatchment PR-1A: PR-1A

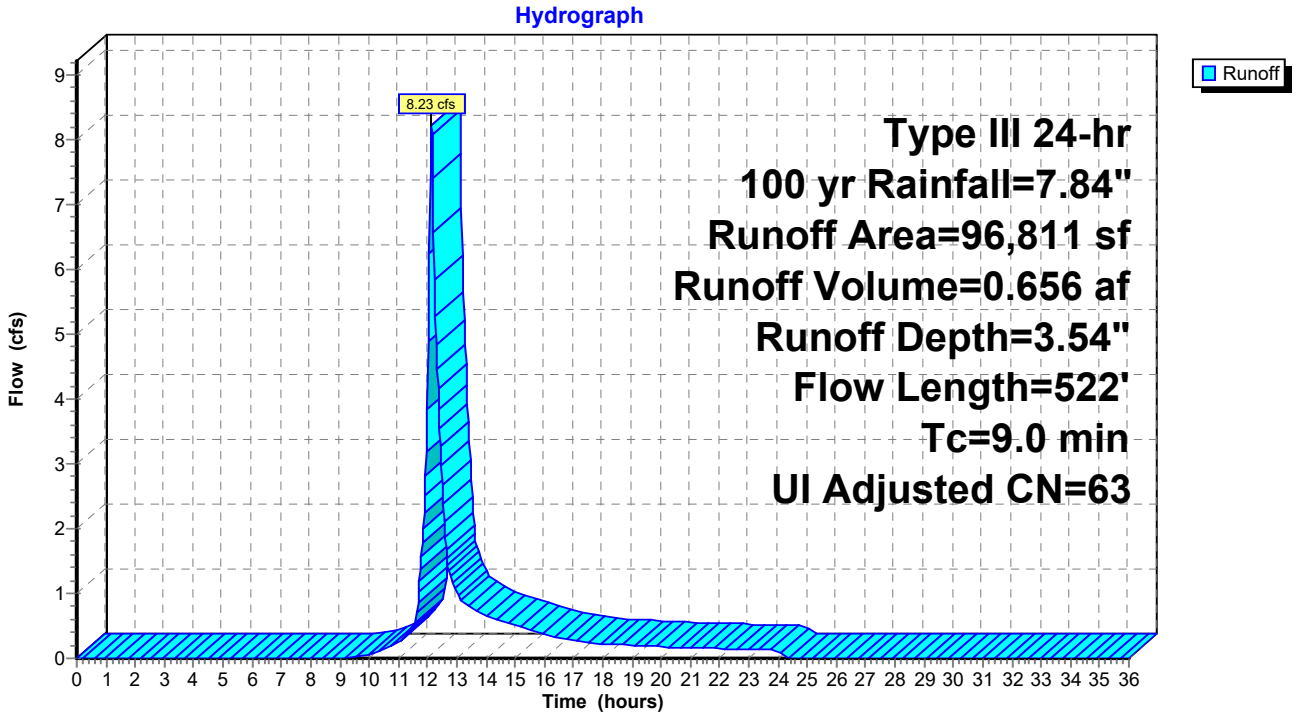
Runoff = 8.23 cfs @ 12.13 hrs, Volume= 0.656 af, Depth= 3.54"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=7.84"

Area (sf)	CN	Adj	Description
3,032	98		Unconnected pavement, HSG B
4,438	98		Unconnected roofs, HSG B
947	96		Gravel surface, HSG B
88,394	61		>75% Grass cover, Good, HSG B
96,811	64	63	Weighted Average, UI Adjusted
89,341			92.28% Pervious Area
7,470			7.72% Impervious Area
7,470			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0300	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.13"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.8	213	0.0150	1.97		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.0	193	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.0	522	Total			

Subcatchment PR-1A: PR-1A



Summary for Subcatchment PR-1B: PR-1B

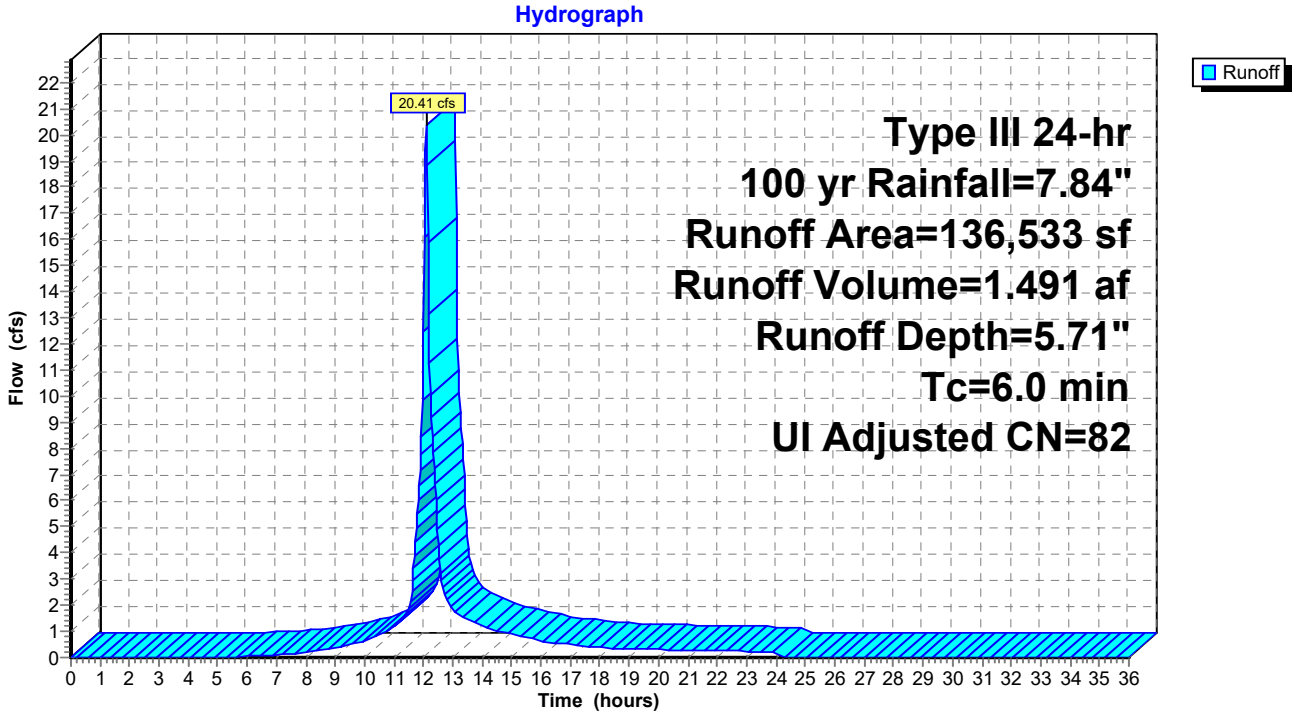
Runoff = 20.41 cfs @ 12.09 hrs, Volume= 1.491 af, Depth= 5.71"
Routed to Pond 1BP : Turf Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=7.84"

Area (sf)	CN	Adj	Description
20,984	98		Unconnected pavement, HSG B
4,917	96		Gravel surface, HSG B
93,955	83		Fallow, crop residue, Good, HSG B
16,677	61		>75% Grass cover, Good, HSG B
136,533	83	82	Weighted Average, UI Adjusted
115,549			84.63% Pervious Area
20,984			15.37% Impervious Area
20,984			100.00% Unconnected

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

Subcatchment PR-1B: PR-1B



Summary for Subcatchment PR-1C: PR-1C

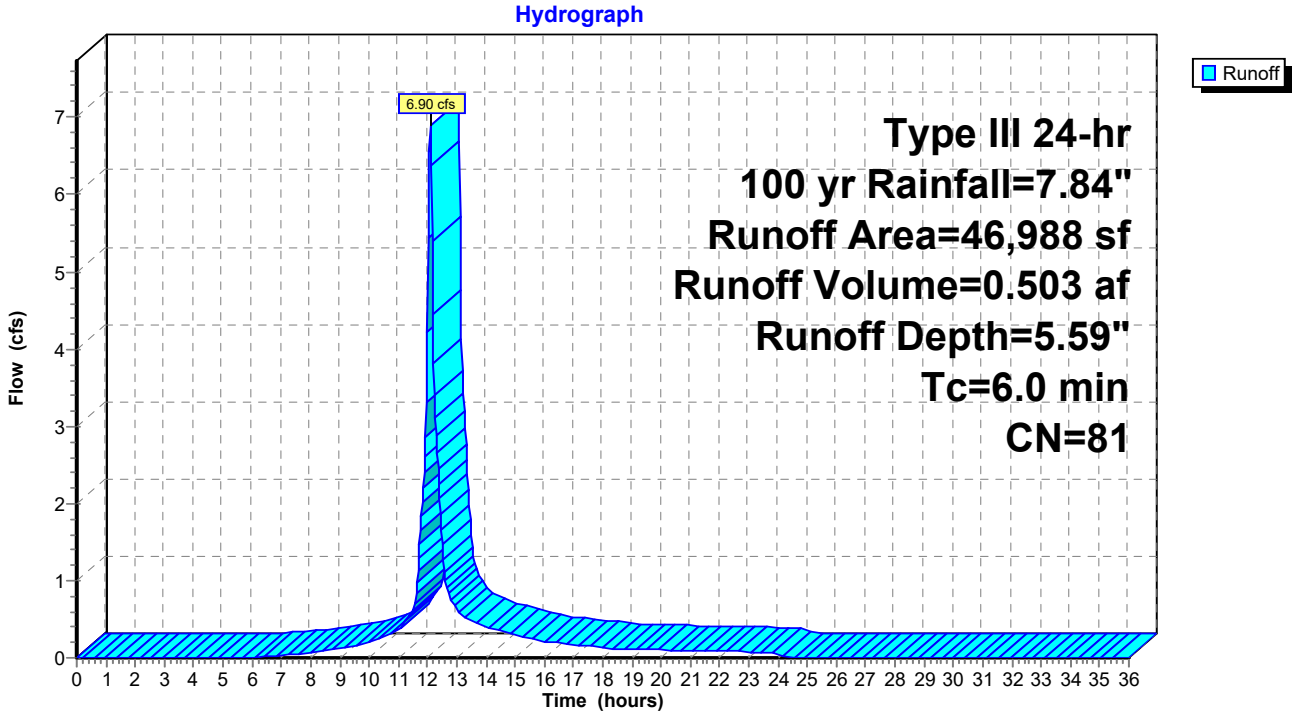
Runoff = 6.90 cfs @ 12.09 hrs, Volume= 0.503 af, Depth= 5.59"
Routed to Pond 1P : Stormwater Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=7.84"

Area (sf)	CN	Description
25,222	98	Unconnected pavement, HSG B
0	96	Gravel surface, HSG B
21,766	61	>75% Grass cover, Good, HSG B
46,988	81	Weighted Average
21,766		46.32% Pervious Area
25,222		53.68% Impervious Area
25,222		100.00% Unconnected

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

Subcatchment PR-1C: PR-1C



Summary for Subcatchment PR-2: PR-2

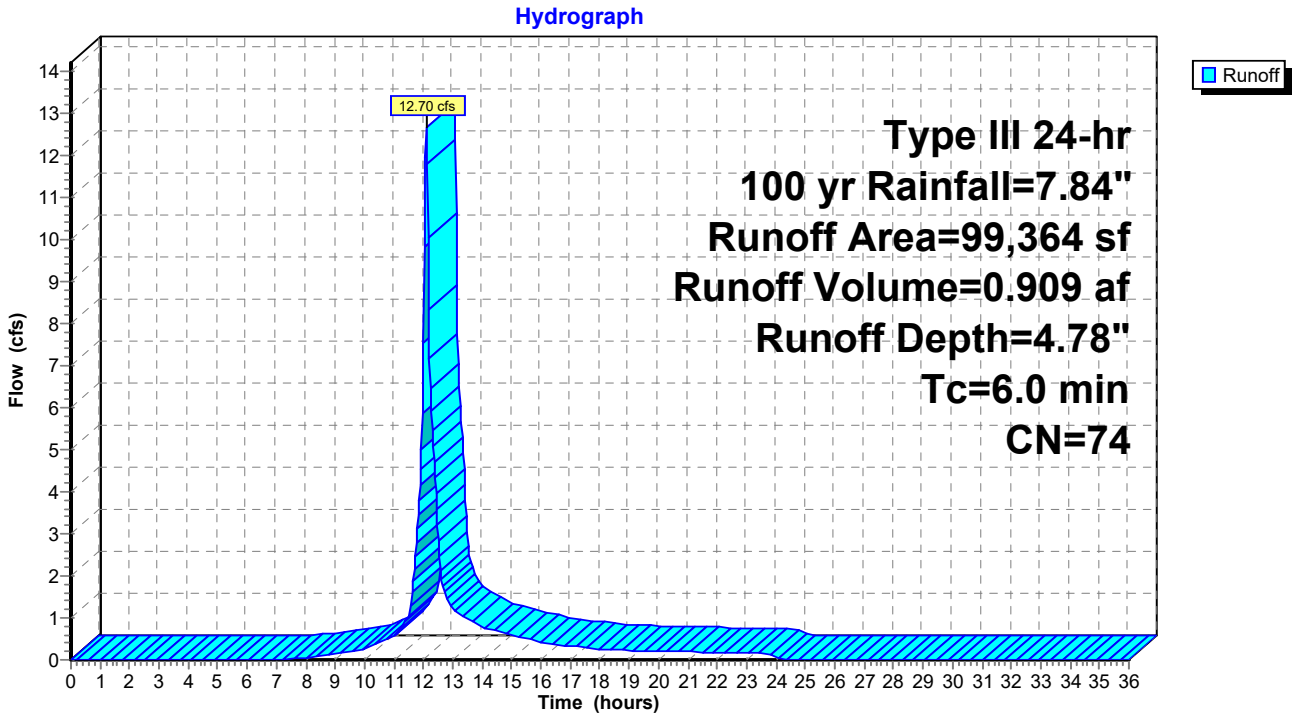
Runoff = 12.70 cfs @ 12.09 hrs, Volume= 0.909 af, Depth= 4.78"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=7.84"

Area (sf)	CN	Description
33,283	98	Unconnected pavement, HSG B
64,091	61	>75% Grass cover, Good, HSG B
1,990	96	Gravel surface, HSG B
99,364	74	Weighted Average
66,081		66.50% Pervious Area
33,283		33.50% Impervious Area
33,283		100.00% Unconnected

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

Subcatchment PR-2: PR-2



Summary for Pond 1BP: Turf Reservoir

Inflow Area = 3.134 ac, 15.37% Impervious, Inflow Depth = 5.71" for 100 yr event
Inflow = 20.41 cfs @ 12.09 hrs, Volume= 1.491 af
Outflow = 15.10 cfs @ 12.16 hrs, Volume= 1.491 af, Atten= 26%, Lag= 4.3 min
Discarded = 15.10 cfs @ 12.16 hrs, Volume= 1.491 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-1 : DP-1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 172.55' @ 12.16 hrs Surf.Area= 93,140 sf Storage= 1,934 cf

Plug-Flow detention time= 0.6 min calculated for 1.490 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (799.5 - 798.8)

Volume	Invert	Avail.Storage	Storage Description
#1	172.50'	37,256 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 93,140 cf Overall x 40.0% Voids

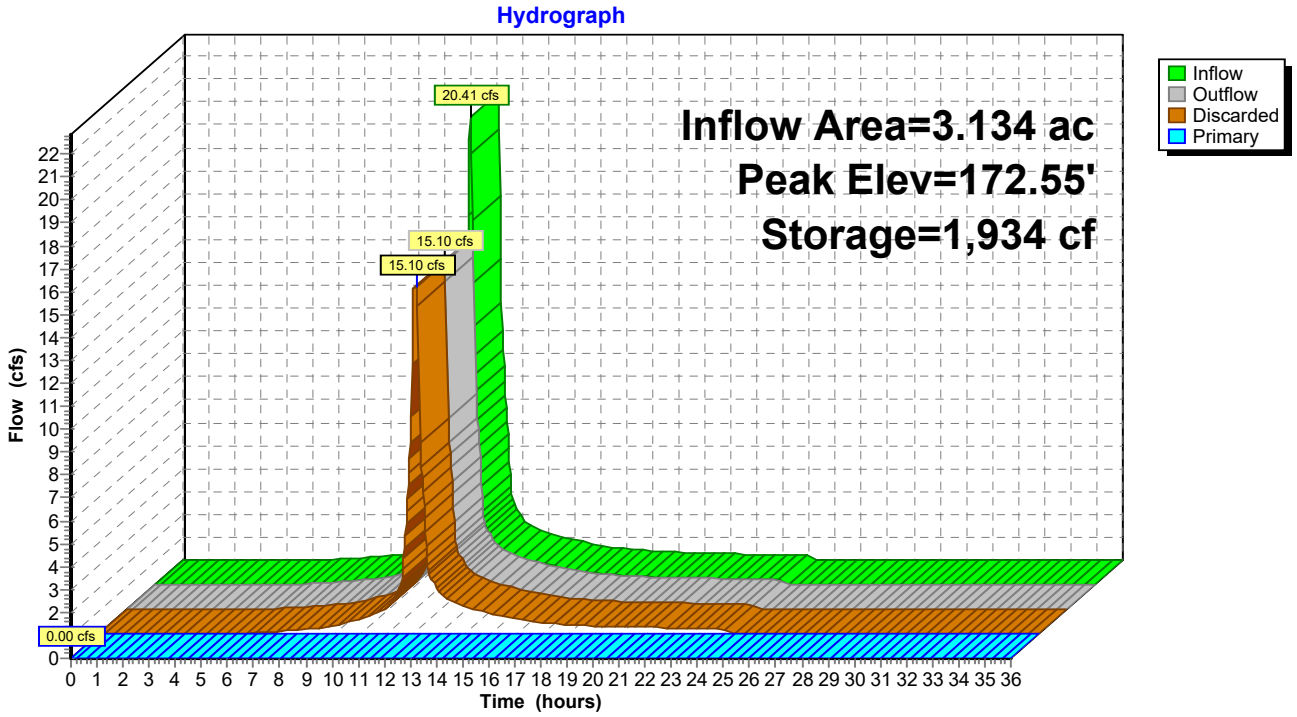
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
172.50	93,140	746.0	0	0	93,140
173.00	93,140	746.0	46,570	46,570	93,513
173.50	93,140	746.0	46,570	93,140	93,886

Device	Routing	Invert	Outlet Devices
#1	Primary	172.75'	**746.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	172.50'	**7.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=15.10 cfs @ 12.16 hrs HW=172.55' (Free Discharge)
↑—**2=Exfiltration** (Controls 15.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=172.50' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1BP: Turf Reservoir



Summary for Pond 1P: Stormwater Basin

Inflow Area = 1.079 ac, 53.68% Impervious, Inflow Depth = 5.59" for 100 yr event
Inflow = 6.90 cfs @ 12.09 hrs, Volume= 0.503 af
Outflow = 2.35 cfs @ 12.38 hrs, Volume= 0.503 af, Atten= 66%, Lag= 17.4 min
Discarded = 0.77 cfs @ 12.38 hrs, Volume= 0.455 af
Primary = 1.58 cfs @ 12.38 hrs, Volume= 0.048 af
Routed to Link DP-1 : DP-1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Peak Elev= 168.67' @ 12.38 hrs Surf.Area= 4,724 sf Storage= 6,604 cf

Plug-Flow detention time= 58.6 min calculated for 0.502 af (100% of inflow)
Center-of-Mass det. time= 58.5 min (859.8 - 801.3)

Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	8,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

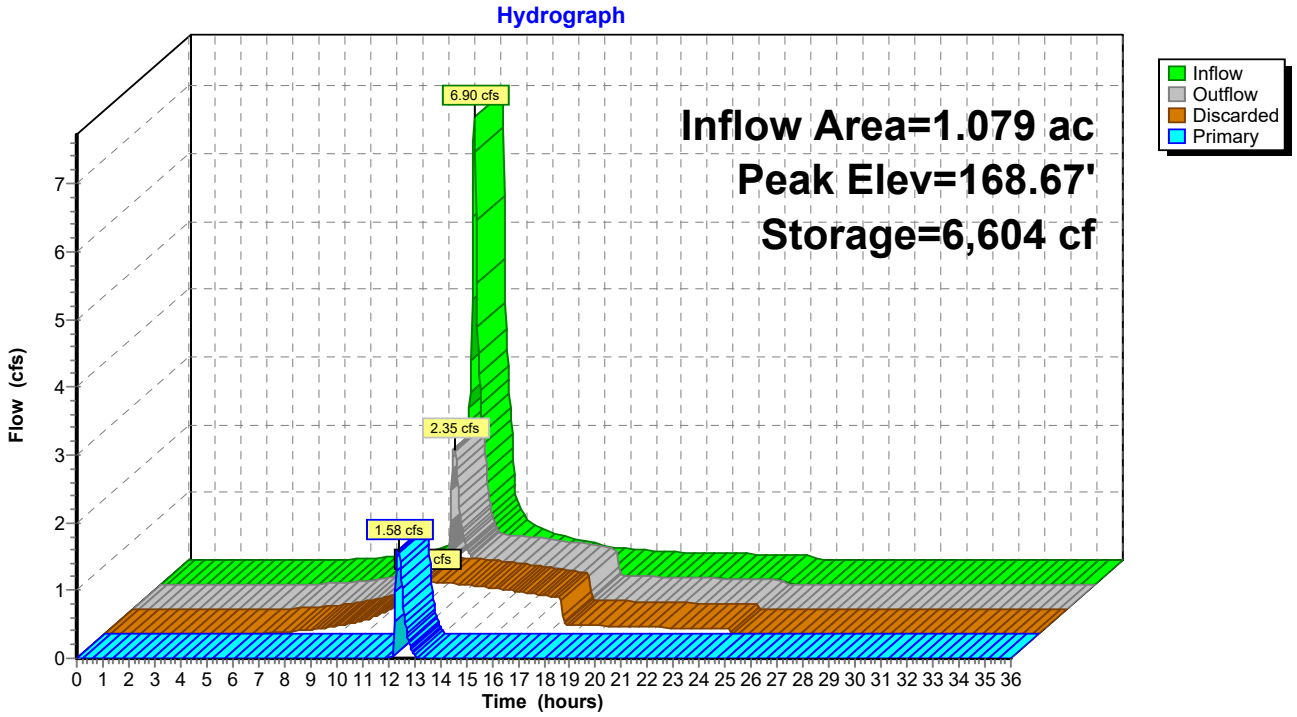
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.00	3,227	0	0
168.00	4,103	3,665	3,665
169.00	5,035	4,569	8,234

Device	Routing	Invert	Outlet Devices
#1	Primary	168.50'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	167.00'	**7.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 10.00'

Discarded OutFlow Max=0.77 cfs @ 12.38 hrs HW=168.67' (Free Discharge)
↑**2=Exfiltration** (Controls 0.77 cfs)

Primary OutFlow Max=1.57 cfs @ 12.38 hrs HW=168.67' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 1.57 cfs @ 0.95 fps)

Pond 1P: Stormwater Basin

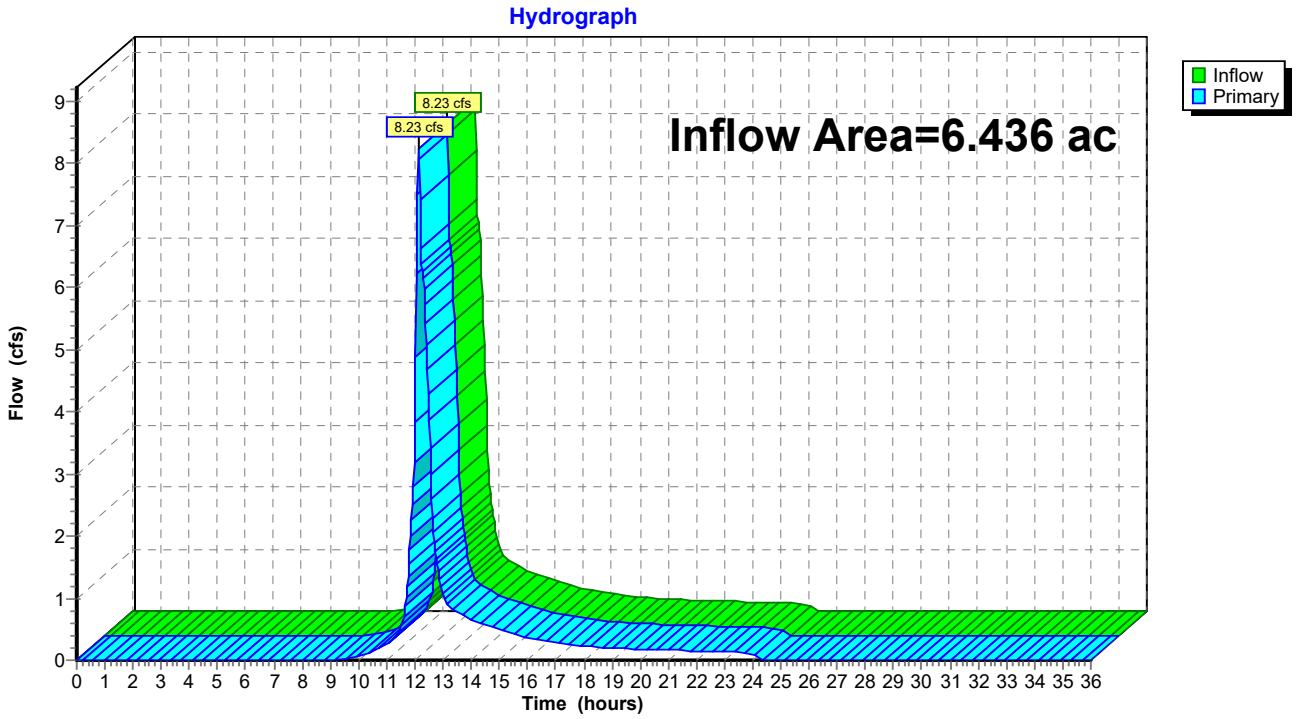


Summary for Link DP-1: DP-1

Inflow Area = 6.436 ac, 19.15% Impervious, Inflow Depth = 1.31" for 100 yr event
Inflow = 8.23 cfs @ 12.13 hrs, Volume= 0.704 af
Primary = 8.23 cfs @ 12.13 hrs, Volume= 0.704 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-1: DP-1



Summary for Link DP-2: DP-2

Inflow Area = 2.281 ac, 33.50% Impervious, Inflow Depth = 4.78" for 100 yr event
Inflow = 12.70 cfs @ 12.09 hrs, Volume= 0.909 af
Primary = 12.70 cfs @ 12.09 hrs, Volume= 0.909 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-2: DP-2